

LKV OVERLOAD GUARD



The PIAB LKV Crane Overload Guard is designed for easy installation without disturbing the crane, particularly on overhead travelling cranes, container handling equipment and haulages where operators may not know when they have an overload condition.

PIAB

RANGE OF APPLICATION

The PIAB LKV is intended for use as an overload guard or as a slack line switch in lifting equipment and is

made for forces up to 16000 kp in single line part and for max 44 mm line diameter.

FUNCTION

The PIAB LKV is attached to a stationary line part. The rope is deflected through a slight angle between the two wheels and the clamping jaw. When loaded, the rope tends to straighten. This applies a force to the clamping jaw and so directly to the pull rod. When the set switch value is reached, the pull rod operates a microswitch and a close/open circuit is made.

The spring element of the load cell is preloaded, reducing pull rod movement to the last 25% of full load.

For the best possible accuracy the LKV is equipped with case-hardened wheels with carefully designed rope grooves. To ensure correct fitting on the rope diameter, the wheels and the clamping jaws are provided with line tracks at intervals of 4 mm. The wheels should not be regarded as wheels but rather as moving support points, as the peripheral movement on the wheels at full line load is only about 0.6 mm (incl. the extension of the rope).



PROTECTION AGAINST CORROSION

The PIAB LKV is fully pressure tight. Each instrument is tested under pressure. The PIAB LKV fully conforms to the international protection specification class IP 67 acc. to IEC 529.

Externally it is zinc coated and yellow

chromated. The wheel bearings are sealed with O-rings and lubricated with MoS₂.

If the LKV is to be used in a very corrosive environment, we recommend polyuretan lacquering for protection.

SAFETY

The overload guard is not directly included in the rope system and does not affect the construction of the lifting equipment.

The locking device prevents unauthorized interference with the switch setting.

In spite of the changes that normally take place on the rope diameter, the PIAB LKV maintains its set switch value even after fitting to a new rope.

As the LKV is fully pressure tight, it

is well protected against dust, dirt, damp, frost and other atmospheric conditions.

The power-absorbing element consists of specially made Belleville washers dimensioned to resist fatigue. The spring washers cannot be overloaded. The PIAB LKV can be overloaded by 100% without affecting the repeatability.

INSTALLATION

Install the PIAB LKV directly to the static line part close to the anchor point or close to a compensating pulley. The line need not be unloaded.

Set the switch value with the spanner provided for this purpose. (The LKV can be delivered with the switch value set at our Works to trip at the value you require.) Check the switch

value with a buzzer or similar device. Connect the LKV electrically, e.g. to the control circuit of the hoisting movement or the top limit switch.

Test-load for control and possible re-adjustment. Seal the set value with the locking clamp and the padlock provided.

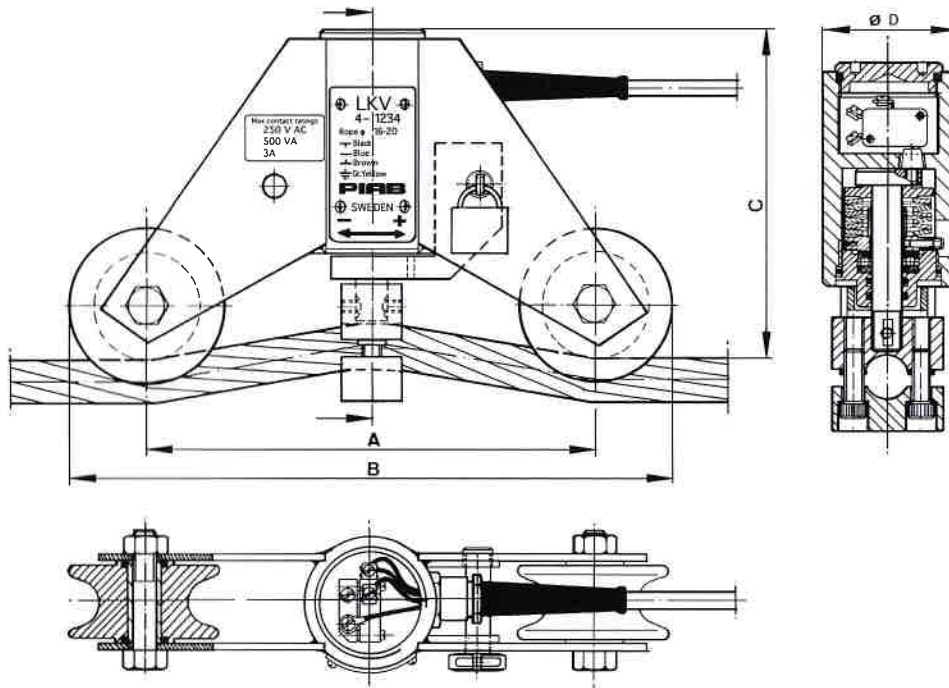
CONTACT FUNCTION

The microswitch has alternative contact functions. When the PIAB LKV is used as an overload guard, the normally closed function should always be used.

The microswitch has self-cleaning, gold-plated silver contacts, suitable also for operation on low current/voltage (under 10 V and/or 60 mA).

The difference between contact at

rising and falling load is 5-8%. This hysteresis is somewhat reduced at lower loads and increases slightly at higher load values. To avoid "chatter" of the contacts and contactors if the load should start to sway, a time relay can be connected to prolong the re-connection of the hoisting movement.



The drawing is for an LKV 1-4. The other types are of a slightly different design.

TYPE	MAX SWITCH VALUE IN KG	FOR LINE DIMENSION Ø IN MM	DEAD WEIGHT IN KG	MEASUREMENTS IN MM			
				A	B	C	D
LKV 1	1000	5-8	5	200	268	142	60
LKV 2	2000	8-12					
LKV 4	4000	12-16					
LKV 8	8000	16-20	12	300	403	208	86
LKV 12	12000	20-24					
		24-28					
LKV 16	16000	28-32	22	480	600	215	135
		32-36					
		36-40					
		40-44					

LKV used as a slack line switch.

TYPE	MAX SWITCH VALUE IN KG	FOR LINE DIMENSION Ø IN MM	DEAD WEIGHT IN KG	MEASUREMENTS IN MM			
				A	B	C	D
LKV 01	40 - 100			as LKV 1-4 above			
LKV 08	200 - 1100			as LKV 8-12 above			

TECHNICAL DATA

MEASUREMENTS

See drawing and table.

REPEATABILITY

± 1.5 % of the max. capacity.

MAX CONTACT LOAD

250 V AC, 500 VA, 3 A.

THE MECHANICAL LIFE LENGTH OF THE MICROSWITCH

2 mill. cycles.

WORKING TEMPERATURES

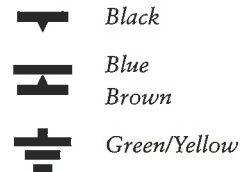
Continuous operation up to +60°C. Specially designed LKVs can be supplied for up to +200°C.

CABLE

4 m weather and oil resistant cable RDO 4 x 1.5 mm².

WIRING DIAGRAM

(Also inscribed on the badge plate.)



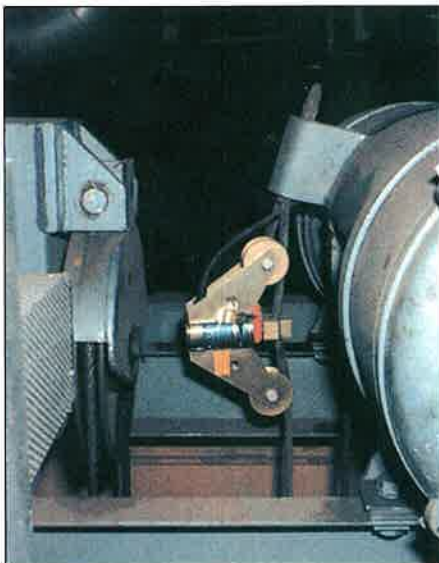
RANGE OF APPLICATION FOR THE PIAB LKV

To be able to determine the size of the PIAB LKV and adjust it to the right switch value, it is necessary to know:

- The max. capacity of the crane.
- Number of rope parts and the rope diameter.

Adjustment of the switch value can be made by PIAB or on location. Instructions and tools are included in the delivery.

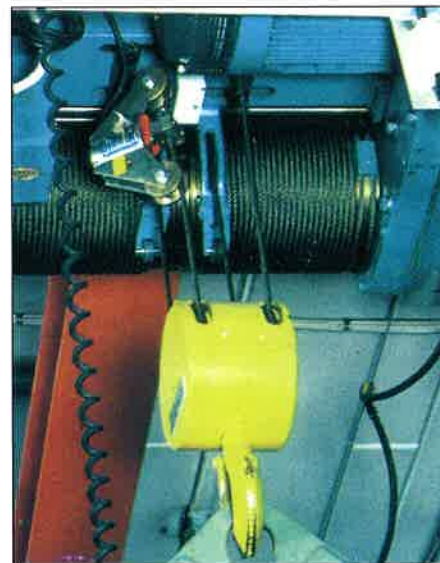
Some typical examples of the use of the PIAB LKV are illustrated here.



On tower cranes of different types the LKV is installed on the backstay and functions here as a moment switch. Due to the high protection class, the LKV functions summer or winter with constant reliability.



This is a typical installation of the PIAB LKV. The LKV is installed at the anchor point of the hoist rope in a travelling crane and functions either as an overload guard or as a slack line switch.



GIGASENSE

Force Measurement

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Instruktion för montering av PIAB LKV

1. Kontrollera att Er LKV har rätt brytvärde. Brytvärdet ärpräglat på plåtbricken vid hänglåset. Kontrollera även att lindiametern är riktig och stämmer med den på dataskylten angivna.
2. Demontera den yttre spännbacken.
3. Placera LKV:n på avsedd plats mot linan (A).
4. Montera den yttre spännbacken och drag åt de två insexskruvarna med den medlevererade nyckeln för hand (B).
5. Anslut nu LKV:n till lyftdonets manöverkrets så att lyftrorelsen kommer att brytas vid överlast, men att lasten går att sänka (D).

OBS! Kopplas in mellan brun och grå kabel så att kretsen bryts vid överlast.

6. Kontrollera att LKV:s kabel hänger fritt och inte sträcks för hårt då kroken gungar.
7. Justera lyftdonets topplägesbrytare vid behov.

Assembly Instructions for PIAB LKV Overload Guard

1. Check that your LKV has the correct switch value engraved on the plate near the padlock. Also check that the rope dia is correct and corresponds to the data plate.
2. Dismantle the outer clamping jaw.
3. Apply the LKV to the intended position on the rope (A).
4. Install the outer clamping jaw and tighten the two hexagon-headed bolts by hand using the spanner provided (B).
5. Connect the LKV to the operating circuit of the lifting equipment so that the lifting motion will be interrupted on overload leaving it possible to lower the load (D).

NOTE: Connect between the brown and grey wires so that the circuit is broken by overload.

6. Check that the LKV cable is hanging clear and is not stretched too much when the hook is swinging.
7. Adjust the limit switch of the lifting equipment when necessary.

Montageanleitung für PIAB LKV

1. Kontrolliere, ob der LKV den richtigen Schaltpunkt hat. Diese Angabe befindet sich auf dem Datenschild beim Vorhängeschloss. Gleichfalls überprüfe ob der Seildurchmesser mit den Daten des Leistungsschildes übereinstimmt.
2. Entferne die äussere Seilklammerbacke.
3. Setze den LKV an die vorgesehene Stelle des Seiles (A).
4. Montiere die äussere Seilklammerbacke und ziehe die beiden Inbusschrauben mittels mitgeliefertem Schlüssel an (B).
5. Schliesse den LKV so an den Schaltkreis des Hebezeuges an, dass die Hubbewegung bei Überlast ausschaltet, aber der Senkvorgang noch in Funktion bleibt (D).

ACHTUNG! Beim Anschluss von den Adern "braun-grau" des Kabels erfolgt eine Unterbrechung des Schaltkreises bei Überlast.

6. Überprüfe das LKV-Kabel auf Freigängigkeit auch bei Schwankungen des Gerätes.
7. Falls erforderlich, justiere den Endschalter des Hebezeuges.

Black = schwarz
Grey = grau
Brown = braun
Green / Yellow = grün / gelb

Max. contact rating =
Max Kontaktbelastung

Instructions de montage des LKV PIAB

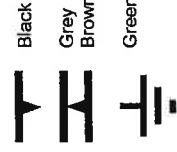
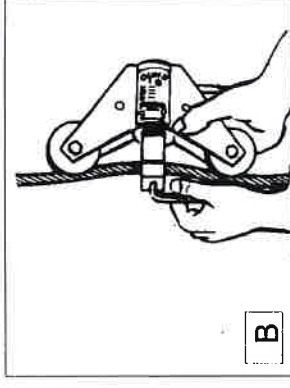
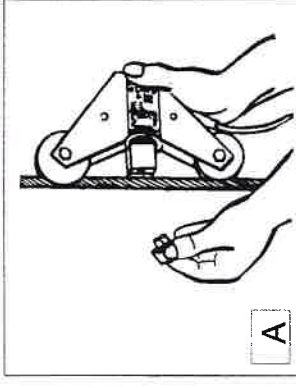
1. Vérifier que votre LKV est bien réglé à la valeur demandée. Le point de contact est gravé sur la plaque près du cadenas. Vérifier également le diamètre du câble gravé sur la plaque signalétique.
2. Démontez la mâchoire à câble.
3. Poser le LKV contre le câble (A).
4. Remonter la mâchoire à câble et serrer à l'aide de la clé six pans livrée (B).
5. Raccorder le LKV à l'armoire électrique du système de levage de telle façon que les fonctions de montée et de déplacement soit bloquées mais que la descente soit autorisée (D).

NB. La fonction de coupure se fait entre gris et brun.

6. Contrôler que le LKV est monté libre et que lors des déplacements il ne passe pas dans le mouflage (montage près d'une poulie d'équilibrage).
7. Régler les fins de course si nécessaire.

Black = noir
Grey = gris
Brown = brun
Green / Yellow = vert / jaune

Max. contact rating =
Charge de contact maxi



Max. contact rating
250 VAC 500 VA 3 A

D

PIAB LKV

GIGASENSE
 Force Measurement

Instruktion för montering av PIAB LKV

Denna LKV är levererad från PIAB utan förinställt brytvärde. För att erhålla rätt inställningsvärde skall nedanstående instruktion följas.

PIAB framtager sig allt ansvar för att brytvärden som inställs av användaren eller av honom anlitad person är korrekta samt för eventuella skador på person eller egendom som orsakats av felaktigt inställda brytvärden.

1. Demontera hänglås, sprint, bygel samt den yttre spämnbacken.
2. Placera LKV:n på avsedd plats mot linan (A).

3. Montera den yttre spämnbacken och drag åt de två insexskruvarna med den medlevererade nyckeln för hand (B).

4. Inställning av brytvärde
 Belasta lyftdonet med en last motsvarande brytgränsen, antingen genom:
 - vikt i lyftdonets krok, eller
 - dragning mot fast punkt i golvet.

OBS! Lyftdonets maskineri får ej användas!
 Kontrollera brytvärdet med hjälp av vägutrustning mellan krok och last.

Anslut en summer eller annat signal-don enligt kopplingsschema (D). (Finns även på LKVns datasätyt.) Om LKV:n används som överlastskydd bör alltid brytande kontaktfunktion användas. Vrid inställningsskruven (C) enligt markering på dataskyften med den medlevererade fasta nyckeln. Önskas ett högre brytvärde, vrid åt höger (+). Vrid åt vänster (-) då ett lägre brytvärde önskas.

För att eliminera LKVns hysterese skall brytgränsen närmast underifrån, dvs under ökande last. Detta innebär att om man har en viss last i kroken motsvarande överlastgränsen och

LKV:n inte löst ut, justeras gränsen nedåt (-) tills brytning sker. Om LKV:n är inställd på för lågt värde, dvs löser ut för tidigt, justeras gränsen först uppåt (+), väl förbi brytgränsen och sedan ner igen (-) precis så mycket att brytning sker. 1/6 varv på inställningsskruven motsvarar en förändring av brytvärdet med ca:

- 75 kg för typ LKV 1
- 150 kg för typ LKV 2
- 300 kg för typ LKV 4
- 950 kg för typ LKV 8
- 1400 kg för typ LKV 12

Avlasta nu lyftdonet och belasta det igen för kontroll av brytvärdet.

5. Efterdrag spämnbackens insexskruvar.
6. Anslut nu LKV:n till lyftdonets manöverkrets så att lyftörelsen kommer att brytas vid överlast, men att lasten går att sänka (D).
7. Kontrollera att LKVns kabel hänger fritt och inte sträcks för hårt då kroken gungar. Kontrollera LKVns funktion ännu en gång genom provbelastning.
8. Sätt tillbaka bygel, sprint och hänglås. Inställt brytvärde är nu plomberat så att obehörig ej kommer åt inställningsskruven.
9. Justera lyftdonets toppläges brytare vid behov.

Assembly Instructions for PIAB LKV Overload Guard

This LKV is supplied by PIAB without a pre-set switch value. To set the correct switch value the instructions below must be followed.

PIAB does not accept any responsibility or liability for switch values set by the user who should ensure for himself that the equipment is operating correctly and safely.

1. Dismantle the padlock, the cotter, the shackle and the outer clamping jaw.
2. Apply the LKV to the intended position on the rope (A).
3. Install the outer clamping jaw and tighten up the two hexagon-headed bolts manually with the spanner provided for this purpose (B).
4. Setting of switch value
 Apply a load to the lifting equipment equal to the intended switch value either by means of a load on the hook or by pulling a rope through a point on the floor.

Use a cranescale on the hook to verify the load.

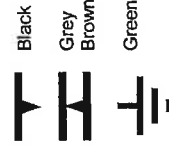
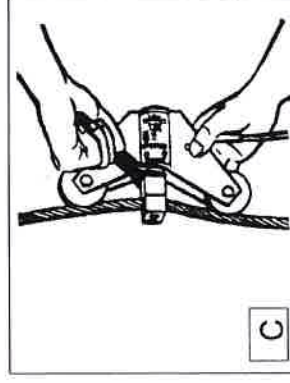
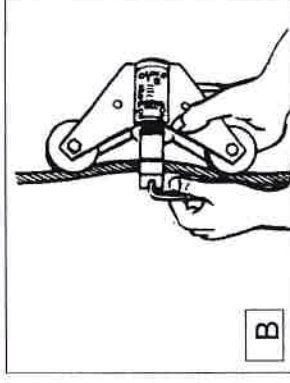
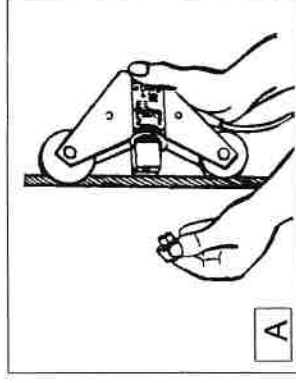
NOTE: The machinery of the lifting equipment must not be used. Connect a buzzer or meter according to the wiring diagram (D). (Also inscribed on the badge plate.) If the LKV is to be used as an overload guard, the normally closed function should always be used. Turn the adjustment screw (C) according to the inscription on the badge plate with the spanner provided for this purpose. If a higher switch value is desired, turn the adjustment screw to the right (+). For a lower switch value, turn the adjustment screw to the left (-). To eliminate the hysteresis of the LKV, the switch setting should be approached by rising load but if a weight on the hook is used, equivalent to the overload setting and the LKV switch does not operate, adjust the screw to the left (-) until it does. If the ad-

justed value is too low, turn the screw to the right (+) well past the switch value and then down again just enough for it to switch off. 1/6 turn of the adjustment screw corresponds to a change of the switch value with about:

- 75 kg for type LKV 1
- 150 kg for type LKV 2
- 300 kg for type LKV 4
- 950 kg for type LKV 8
- 1400 kg for type LKV 12

Unload the lifting equipment and test load it once more to check the switch setting values.

5. Tighten the hexagon-headed screws of the clamping jaw.
6. Connect the LKV to the operating circuit of the lifting equipment so that the lifting movement will switch off by overload, but it is still possible to lower the load (D).
7. Check that the LKV cable is hanging free and is not stretched when the hook swings. Test load the LKV once more to check the functions.
8. Put the shackle, the cotter and the padlock back. The set switch value is now locked in position and interference with the adjustment screw is prevented.
9. Adjust the limit switch of the lifting equipment if necessary.



Black
 Grey
 Brown
 Green / Yellow

Max. contact rating
 250 VAC 500 VA 3 A

PIAB LKV

Overload Guard

Prevent accidents and avoid costly equipment breakdowns for a negligible daily cost.

Can temporarily be overloaded by 100% without affecting the accuracy.

Does not need to be adjusted when wire rope is changed.

High repeatability, $\pm 1,5\%$ of max. rated capacity of LKV.

Is installed directly on to wire rope in minutes (with 2 bolts+1 cable) close to the anchor point or an equalizing pulley.

Pre-set from factory or easily set during installation.

Tamper proof

Pressure tight, conforming to IP 67 according to IEC529.

Cover loads in the sizes from 40 to 16000kg (90-35300lb.) in 8 different capacities and up to 44 mm (1 $\frac{3}{4}$ inch) wire rope diameter.

More than 17 000 LKVs are in operation.

MAINTENANCE-FREE, AND A FIVE-YEAR WARRANTY IS GIVEN!

