

SAFETY LIFTING CLAMPS



INSTRUCTION FOR OPERATION

"SUPER" BRAND
LIFTING CLAMPS

SVC-L



SUPERTOOL

OSAKA, JAPAN

INSTRUCTIONS FOR USE

Keep these instructions within easy access of operators.

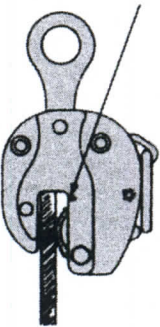
It is important that operators understand these warnings and instructions before using.

WARNINGS

- Select proper size clamp for the job. Determine the weight of the plate to be lifted. Do not exceed limited working load shown on clamp. Plate thickness must be within grip range shown on clamp. There is a case that the grip of clamp becomes insufficient in lifting hardened plate and light weight plate (less than 1/4 of maximum grip size of clamp in the thickness or less than 1/5 of limited working load of clamp in the weight). Use clamp after confirmed the gripped state.
- Inspect clamp. If cam or pad teeth are worn, or if clamp is damaged, do not use.
- All personnel must stand clear of load while it is being lifted or moved.
- Take up slack slowly. Do not bounce or jerk load.
- Use clamp with correct manners after read following illustration for lifting and clamping manners.

CORRECT MANNER OF USING VERTICAL LIFTING CLAMPS

Reference line protuberance (red mark)




As indicated by arrow, a protuberance is provided in the main body of vertical lifting clamp.

(Insert the steel plate up to the bottom.)


When clamping, insert the object sufficiently deeper than the red mark.

Two-point lifting



Within 30°


When balance is not used, keep the angle within 30° for safety precaution.



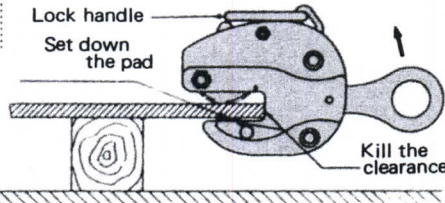
Within 60°

When balance is used, the maximum angle is 60°.

Where center of gravity is hard to locate



Lift at three points as shown above. In this case, do not use clamps of smaller capacity. (Since the lifting angle is widened, select wire ropes of proper diameter.)

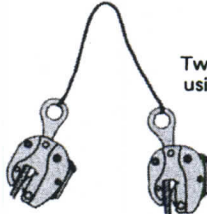


Lock handle
Set down the pad
Kill the clearance.

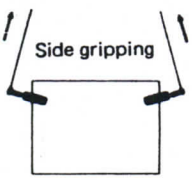
When gripping an object placed horizontally, set the clamp by directing upward the lock handle (or lock lever for SVC-L, stopper for SVC type).

(If set reversely, the state of lock handle cannot be visually observed, and it is very dangerous.)

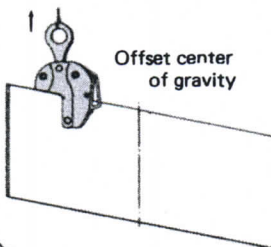
✘ WRONG MANNERS—IT'S DANGEROUS.



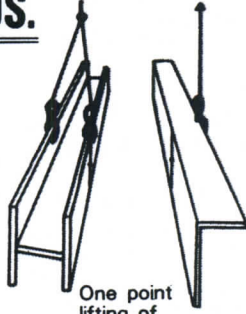
Two-point lifting using one rope



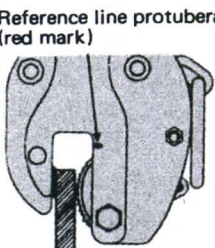
Side gripping



Offset center of gravity

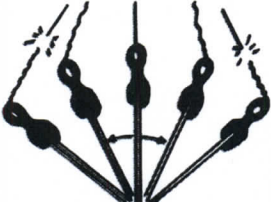


One point lifting of long object

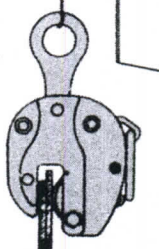


Reference line protuberance (red mark)

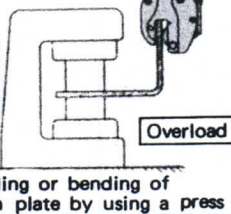
Insufficient gripping not reaching the reference line



Inverting angle exceeding 30° momentarily (Keep within 30°.)

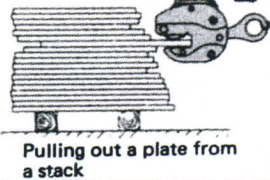


Lifting more than one plate simultaneously



Overload

Pulling or bending of iron plate by using a press



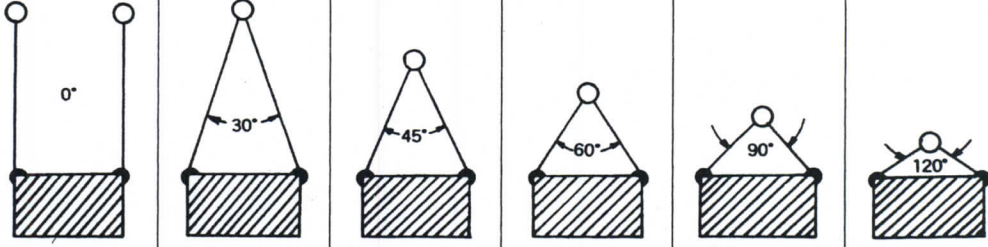
Pulling out a plate from a stack

Other cautions: Do not lift object exceeding the clamping range. Do not weld electrically the plate being lifted by clamp.

LIFTING ANGLE AND SAFE LOAD OF WIRE ROPE

The maximum allowable load ((safe load)) of wire rope also varies with the lifting angle. Therefore, select a wire rope of proper diameter in consideration of the lifting angle. ((The breakage load specified in the table below refers to No.4, 6 x 24A class of JIS G 3525.))

Correlation between Lifting Angle and Safe Load of Wire Rope (in two-point lifting)

D Wire rope dia (mm)	σ Breakage load (tons)	W Safe load (on one rope) W=σ/S (safety factor S=6) (tons)						
			(Changes in lifting efficiency due to lifting angle, %)					
			100%	96%	92%	86%	70%	50%
Max. allowable load (safe load) on two wire ropes (tons)								
8	3.21	0.54	1.08	1.04	0.99	0.93	0.76	0.54
9	4.06	0.68	1.36	1.31	1.25	1.17	0.95	0.68
10	5.02	0.84	1.68	1.61	1.55	1.44	1.18	0.84
11.2	6.29	1.05	2.1	2.02	1.93	1.81	1.47	1.05
12.5	7.84	1.31	2.62	2.52	2.41	2.25	1.83	1.31
14	9.83	1.64	3.28	3.15	3.02	2.82	2.3	1.64
16	12.8	2.13	4.26	4.09	3.92	3.66	2.98	2.13
18	16.2	2.7	5.4	5.18	4.97	4.64	3.78	2.7
20	20.1	3.35	6.7	6.43	6.16	5.76	4.69	3.35
22.4	25.2	4.2	8.4	8.06	7.73	7.22	5.88	4.2
25	31.3	5.22	10.44	10.02	9.6	8.98	7.31	5.22
28	39.3	6.55	13.1	12.58	12.05	11.27	9.17	6.55
30	45.1	7.52	15.04	14.44	13.84	12.93	10.53	7.52
31.5	49.8	8.3	16.6	15.94	15.27	14.28	11.62	8.3
33.5	56.3	9.38	18.76	18.01	17.26	16.13	13.13	9.38
35.5	63.2	10.53	21.06	20.22	19.38	18.11	14.74	10.53

Note: For four-point lifting, multiply the corresponding figure in the table by 2 to find the maximum allowable load (safe load).

Simplified calculation method of wire rope diameter and safe load (one-point lifting)

1) $D = \sqrt{W \times C}$

2) $W = \frac{D^2}{C}$

Where D : wire rope diameter(mm)
 W : safe load (tons)
 C : constant=120
 (safety factor S=6)

★To find the diameter of wire rope for 3 tons:

① $D = \sqrt{W \times C}$

$D = \sqrt{3 \times 120} = \sqrt{360} = 19 \rightarrow 20 \text{ mm}$

★To find the service load (safe load) on 25mm diameter wire rope:

② $W = \frac{D^2}{C}$

$W = \frac{25^2}{120} = \frac{625}{120} = 5.2 \rightarrow 5.2 \text{ ton}$

"SUPER" CLAMPS Maintenance and Repair

Check periodically, repair and replace parts, and use correctly in order to use the clamps over the full service life, safely.

Common Check Points

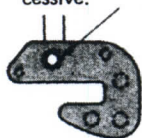
- ★ Check the main body for distortion or flaw.
- ★ Make sure the opening is normal (check if widened).
- ★ Check if the shackle is distorted.
- ★ Check the shackle pin hole for widening or looseness.
- ★ Check cam and pad teeth for defect or wear.
- ★ Check cam pin hole in main body for widening.
- ★ Check if cam pin is worn and thinned.
- ★ Check the performance of tightening lock (handle, lever), shackle, and other mechanism.

Check all the listed items. Inspect according to the Checking Standard.

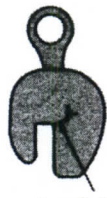
Most items may be checked visually or by touching. To measure the safety point distance and opening size, use slide calipers or the like to obtain precise measurements.

DISCARD

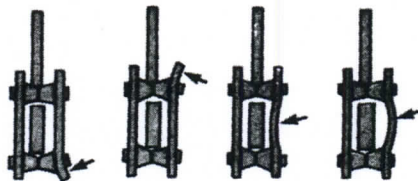
When clearance between bolt and hole exceeds 1 mm, and deflection of cam or shackle becomes excessive.



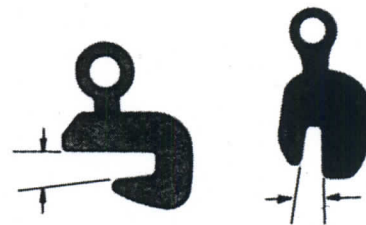
(Wear of pin or pin hole)



(Flaw of main body)



(Distortion of main body)

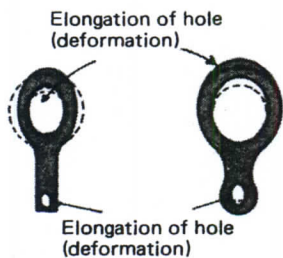


(Widening of opening)

Discard the clamp if obvious flaw or distortion is found in the main body. Defects in the main body cannot be repaired in the light of safety. The main body may be cracked or deformed only after several uses if it is used incorrectly. Dent or swelling of main body, or widening of opening may be caused by overload or wrong manner of use. If the defect is repaired by welding, hardening, or pressing, the original strength is not recovered. When used and controlled correctly, the clamp may be safely used for a long time only by replacing parts.

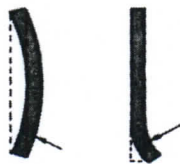
REPLACE

(Shackle)



Elongation of hole (deformation)

Elongation of hole (deformation)



Distortion (deformation)

(Cam and pad)

Clamping capacity	Wear limit width of cam, pad
0.5 ton	0.6mm or more
1 ton	0.7mm or more
2 tons	0.8mm or more
3 tons	0.9mm or more
5 tons	1.0mm or more

When worn as shown above, replace immediately. Or, if not worn, when even one tooth is missing, replace also immediately. The wear rate is accelerated when stainless steel or other hard material is clamped. Or when plates of specified thickness are continuously clamped, only particular threads will be worn in a short time. In such a case, too, replace immediately.

Regard the shackle as part of body. If deformed as shown above, replace it immediately. If deformed shackle is straightening up, the initial strength is not restored.

Besides, replace the support pins, bolts, springs, and other parts according to the Checking Standard.

Check Twice to Confirm Safety.

Check the type capacity of clamp. Is the wire rope proper? How about its size and length? Overloaded or not? Where's the center of gravity? Is the material inserted fully? Is it locked securely? Lift at two points for an object longer than a meter. Lift at three or four points where the center of gravity is hard to locate. Is the lifting angle proper? Check all these items, and confirm them once again. Lift, carry, touch down slowly. Be careful not to hit against surrounding objects while carrying. Keep off hands. Do not enter hazardous zone. Always pay attention to safety.

Vertical Lifting Clamps, LEVER Type

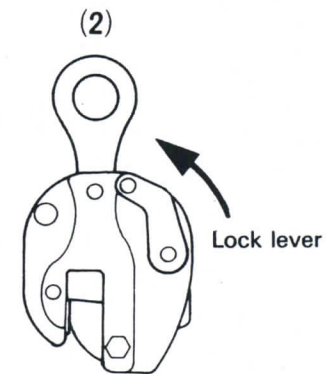
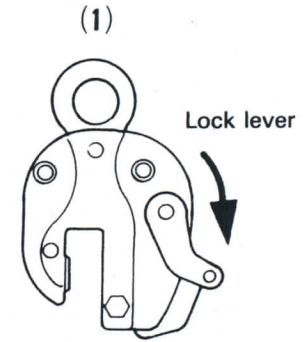
Model : SVC-L

Operation method

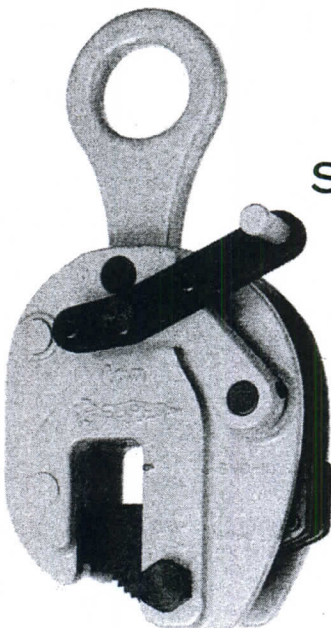
1. Lower clamp onto plate (object to be lifted) with spring tension as shown (1).
Be sure that end of plate is sufficiently deeper than red mark on the mouth part of body.
When lifting from horizontal, place short leg under plate.
2. Raise lock lever into upper position (Lift) as shown in (2).
3. When detaching plate, lower lock lever as shown in (1) after loosed the wire rope.
When detaching plate horizontally, place short leg down not to damage lock device part.

Warning : Do not reverse spring tension until plate is at rest.

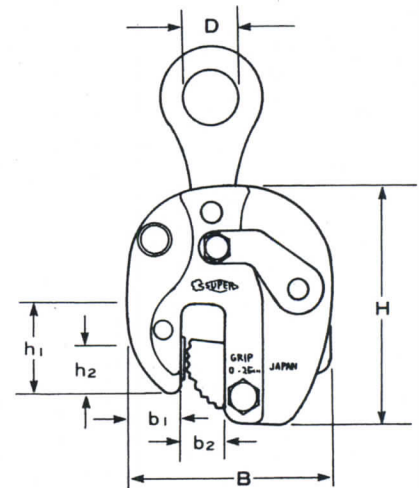
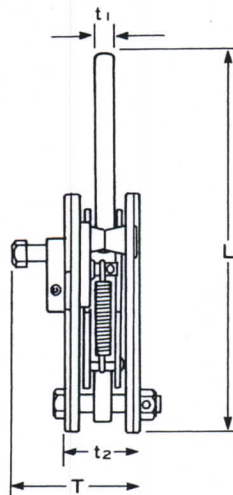
4. Do not lift steel plate in the state of 1 and 3.
5. The lever operation should be securely done to up and down. Do not use or operate the clamp when the lever position is in middle.



LEVER
TYPE



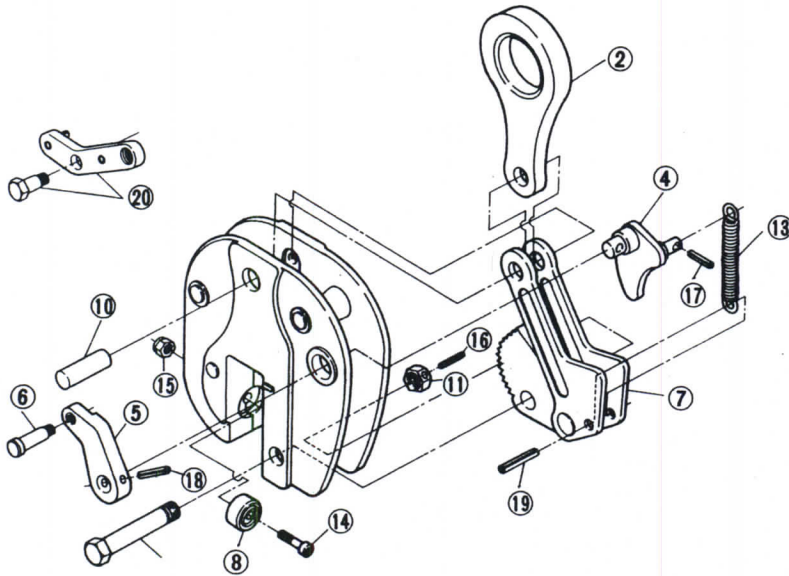
SVC-L



Unit : mm

ITEM NO.	Capacity (tons)	Clamping range	L	t ₁	t ₂	T	h ₁	h ₂	H	b ₁	b ₂	B	D	Weight (kg)
SVC 0.5L	0.5	0~19	250	12	45	80	60	24	158	36	26	131	36	3.0
SVC 1L	1	0~25	310	16	59	105	69	24	185	42	32	152	48	6.0
SVC 2L	2	0~30	375	18	71	118	77	30	210	48	39	172	60	10.5
SVC 3L	3	0~35	405	20	75	129	81	34	225	51	42	182	66	12.5
SVC 5L	5	0~40	455	22	92	157	94	52	260	65	50	220	84	21.5

Replacement parts and fittings (Model : SVC-L)



Part No.	Part Name	Item No.
SHACKLE ASSEMBLY		SVH
2	Shackle	SVCH
10	Support pin for shackle	SVCY
CAM ASSEMBLY		SVT
7	Cam · Link	SVCT
19	Spring pin	SVCU
CAM SUPPORT PIN ASSEMBLY		SVK
11	Support bolt for cam	SVCK
11	Support nut for cam	
16	Spring pin	SVCO
PAD ASSEMBLY		SVP
8	Pad	SVCP
14	Hex. socket head cap screw	SVCV
15	Nylon nut	
LOCK LEVER ASSEMBLY		SVG
4	Lock	SVCL
5	Lock lever	SVCF
6	Lock lever grip	SVCG
17	Spring pin (For lock)	SVCW
18	Spring pin (For lever)	SVCQ
13	Spring	SVCS
20	Lever for remoto control	SVCR

Replacement procedure for cam and pad

Disassembling

A) PAD

1. Take out by loosening Cap screw ⑭ and Nut ⑮ after raised lock lever ⑤ into upper position.

B) CAM

1. Pull out the Spring pin ⑯ for Bolt and Nut ⑪.
2. Take out Bolt, Nut ⑪.
3. Pull up the Shackle ② and bring the shackle support pin ⑩ into line with hole of Main body, and pull out the Pin ⑩.
4. Lay down the main body. Pull out the Spring pin ⑱ in the cam (link) side on its half way and take out the Spring ⑬.
5. Put Cam and Link ⑦ on the body and pull out the Spring pin ⑱.

Reassembling

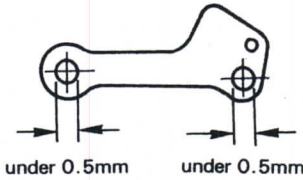
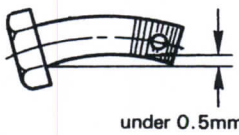
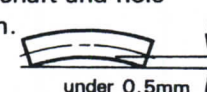
A) CAM

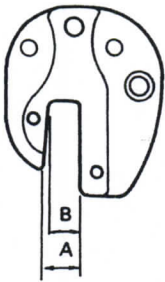

1. Install the Spring ⑬ to Cam and Link ⑦ with Spring pin ⑱ and insert them into the body. Check the Shackle support pin ⑩ fits into the Link ⑦.
2. Lay down the body setting the big hole side to up.
3. Line up the holes of Shackle ② and Link ⑦, then insert the Shackle support pin ⑩ to the hole through the hole of body.
4. Take down the Shackle ②. Line up holes of Cam ⑦ and body, and insert Bolt ⑪. Then set upright the body and tighten the Nut ⑮.
5. Strike the Spring pin ⑯ into the hole on Bolt ⑪ and Nut ⑮.

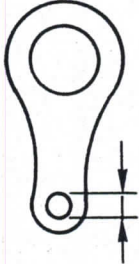
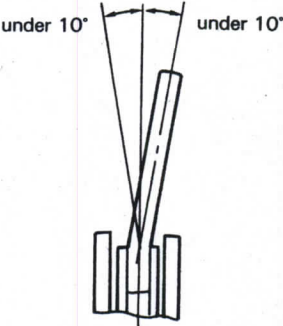
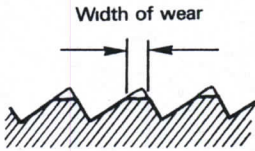
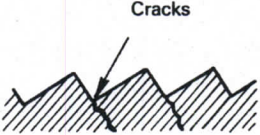
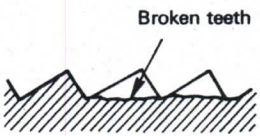
B) PAD

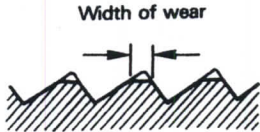
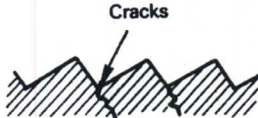

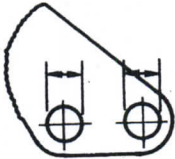
1. Insert a new pad into main body and tighten with the Cap screw ⑭ and Nut ⑮.

Standards for checking clamps (Model ; SVC-L)

SECTION	INSPECTING METHOD	PERMISSIBLE LIMIT	CAUSES OF THE TROUBLE
Link	<p>Visually check and measure for bends and deformation.</p> <p>Measure the pin holes and check for wear.</p>	<p>Replace when unusual sounds generate or when the movement is not smooth.</p> <p>Replace when the wear exceeds 0.5mm.</p> 	<ul style="list-style-type: none"> * Overloading * Too large hoisting angle * Natural wear from use * Insufficient lubrication * Overloading
Cam Support Bolt	<p>Measure the shaft and check for wear.</p> <p>Visually check and measure for bends and other forms of deformation.</p> <p>Visually confirm that the spring pin is in place and the nut is securely tightened.</p>	<p>Replace when the clearance between the shaft and hole exceeds 0.5mm, or when the play of the cam becomes large.</p> <p>Replace when the deformation exceeds 0.5mm.</p> 	<ul style="list-style-type: none"> * Natural wear from use * Insufficient lubrication * Overloading * Dynamic loads * Not tightened and inserted properly when repairs were made.
Link Crimping Pin	<p>Measure the shaft and check for wear.</p>	<p>Replace when the clearance between the shaft and hole exceeds 1mm, or when the play of the cam becomes large.</p>	<ul style="list-style-type: none"> * Natural wear from use * Insufficient labrication * Too large hoisting angle
Shackle Support Pin	<p>Measure the shaft and check for wear.</p> <p>Visually check and measure for bends and other forms of deformation.</p>	<p>Replace when the clearance between the shaft and hole exceeds 1mm.</p> <p>Replace when the deformation exceeds 0.5mm.</p> 	<ul style="list-style-type: none"> * Natural wear from use * Insufficient lubrication * Overloading * Dynamic loads

SECTION	INSPECTING METHOD	PERMISSIBLE LIMIT	CAUSES OF THE TROUBLE
Springs	Confirm that the spring generates a constant initial load when the cam is closed.	Replace when deformation or other causes lower the spring force below a level that can smoothly move the cam.	* Fatigue caused by repeated use.
	Confirm that there is sufficient spring force when the cam is pressed in (to maximum jaw opening).	Replace when deformation or other causes lower the spring force below a level that can smoothly move the cam and safety lever.	* Fatigue caused by repeated use.
Body	Visually check or use color dyes to locate cracks.	Dispose of the clamp when a crack is found.	* Overloading * Dynamic loads
	Measure the jaw opening.	Dispose of the clamp when the difference of "A" and "B" exceeds 5%.	* Overloading * Too large hoisting angle
	Visually check and measure each section and confirm that there is no damage.		* Overloading * Too large hoisting angle
Visually check and confirm that there is no wear on the point of the lock.	Wear on the point of the lock 	* Natural wear from use	

SECTION	INSPECTING METHOD	PERMISSIBLE LIMIT	CAUSES OF THE TROUBLE										
Shackle	<p>Visually check or use color dyes to locate cracks</p> <p>Visually check and measure the pin hole for wear.</p>	<p>Replace when cracks are found.</p>  <p>Replace when the wear exceeds 0.5mm</p>	<ul style="list-style-type: none"> * Overloading * Dynamic loads * Natural wear from use * Insufficient lubrication * Overloading 										
	<p>Visually check and measure for bends or other forms of deformations.</p>	<p>Replace when deformation or play exceeds 10 degrees from the center of the clamp.</p> 	<ul style="list-style-type: none"> * Overloading * Dynamic loads * Too large hoisting angle 										
Pad	<p>Visually check and measure the amount of wear.</p> <p>Visually check or use color dyes to locate cracks at the base of the pad teeth.</p> <p>Visually check for broken pad teeth.</p>	 <table border="1" data-bbox="737 1393 1029 1556"> <thead> <tr> <th>Capacity</th> <th>Permissible limit of width of wear</th> </tr> </thead> <tbody> <tr> <td>0.5T</td> <td>under 0.6mm</td> </tr> <tr> <td>1T</td> <td>0.7</td> </tr> <tr> <td>2T</td> <td>0.8</td> </tr> <tr> <td>3T & 5T</td> <td>1.0</td> </tr> </tbody> </table>  	Capacity	Permissible limit of width of wear	0.5T	under 0.6mm	1T	0.7	2T	0.8	3T & 5T	1.0	<ul style="list-style-type: none"> * Natural wear from use * Wear from clamping hardened material * Overloading * Dynamic loads * Damage from clamping hardened material * Overloading * Dynamic loads * Damage from clamping hardened material
Capacity	Permissible limit of width of wear												
0.5T	under 0.6mm												
1T	0.7												
2T	0.8												
3T & 5T	1.0												

SECTION	INSPECTING METHOD	PERMISSIBLE LIMIT	CAUSES OF THE TROUBLE										
Cam	Visually check and measure the amount of wear.	 <p style="text-align: center;">Width of wear</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Capacity</th> <th>Permissible limit of width of wear</th> </tr> </thead> <tbody> <tr> <td>0.5T</td> <td>under 0.6mm</td> </tr> <tr> <td>1T</td> <td>0.7</td> </tr> <tr> <td>2T</td> <td>0.8</td> </tr> <tr> <td>3T & 5T</td> <td>1.0</td> </tr> </tbody> </table>	Capacity	Permissible limit of width of wear	0.5T	under 0.6mm	1T	0.7	2T	0.8	3T & 5T	1.0	<ul style="list-style-type: none"> * Natural wear from use * Wear from clamping hardened material
	Capacity	Permissible limit of width of wear											
	0.5T	under 0.6mm											
	1T	0.7											
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Visually check or use color dyes to locate cracks at the base of the cam teeth.	 <p style="text-align: center;">Cracks</p>	<ul style="list-style-type: none"> * Overloading * Dynamic loads * Damage from clamping hardened material 											
Visually check for broken cam teeth.	 <p style="text-align: center;">Broken teeth</p>	<ul style="list-style-type: none"> * Overloading * Dynamic loads * Damage from clamping hardened material 											
Measure the pin hole and check for wear.	 <p style="text-align: center;">under 0.5mm under 0.5mm</p>	<ul style="list-style-type: none"> * Natural wear from use * Insufficient lubrication * Overloading 											