

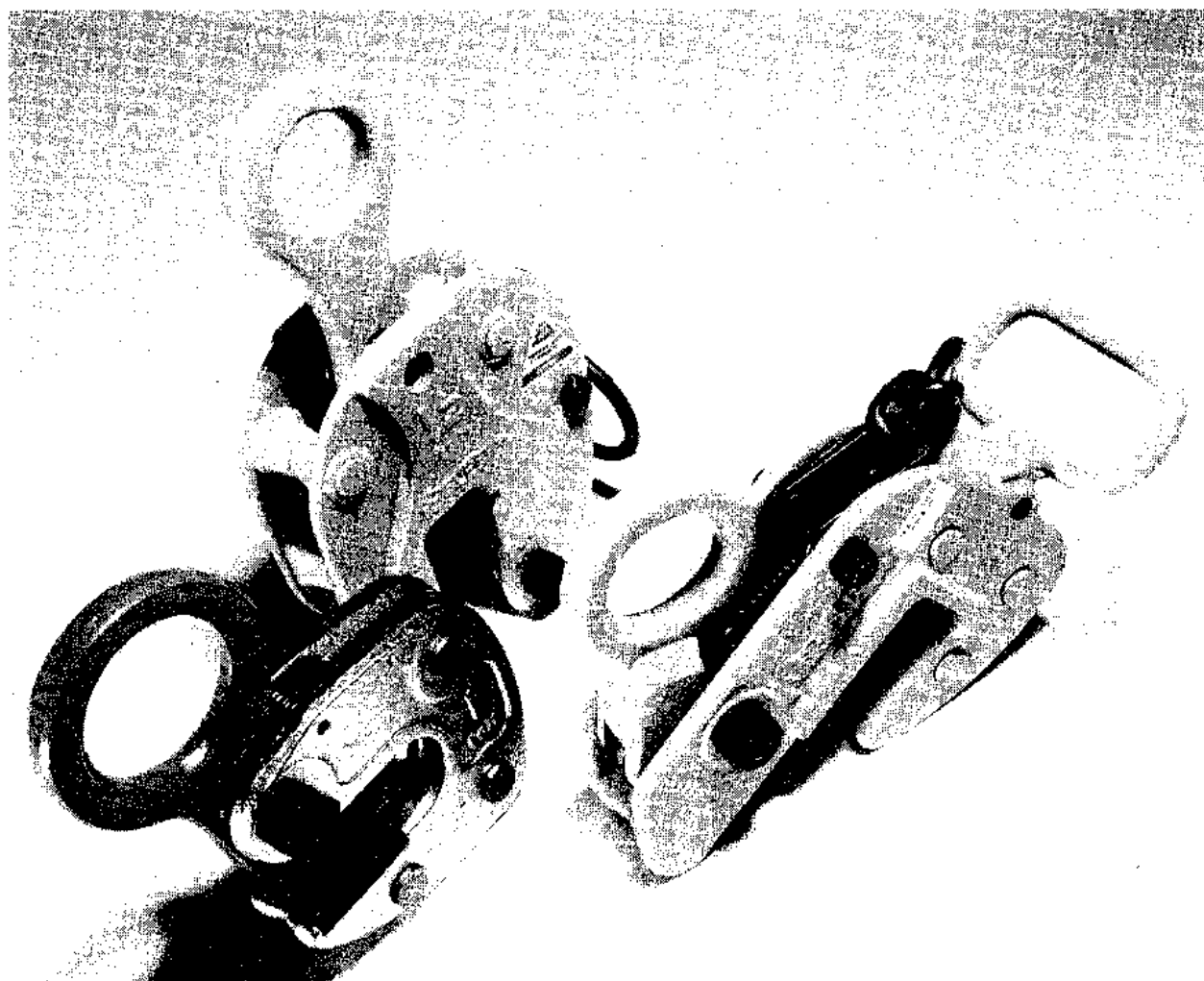
SAFETY LIFTING CLAMPS



INSTRUCTION FOR OPERATION

"SUPER" BRAND
LIFTING CLAMPS

SVC



△ SUPERTOOL

OSAKA, JAPAN

INSTRUCTIONS FOR USE

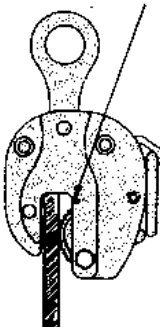
Keep these instructions within easy access of operators.

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



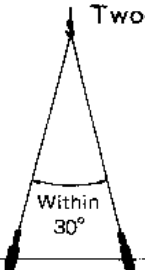
Reference line protuberance (red mark)

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

(Insert the steel plate up to the bottom.)

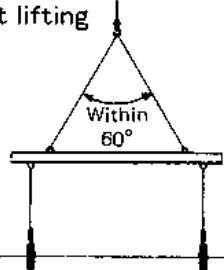
When clamping, insert the object sufficiently deeper than the red mark.

Two-point lifting



Within 30°

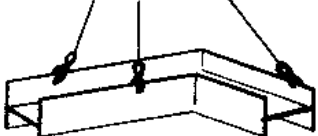
When balance is not used, keep the angle within 30° for safety precaution.



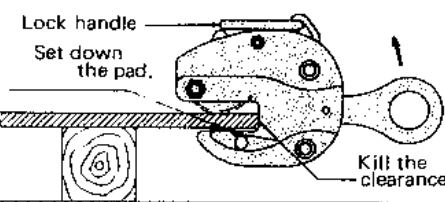
Within 60°

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.)

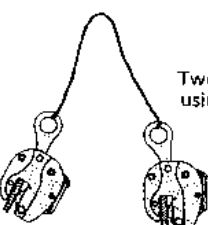


Lock handle
Set down the pad.
Kill the clearance.

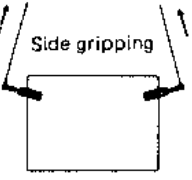
When gripping an object placed horizontally, set the clamp by directing upward the lock handle (or lock lever for SVC-L, stopper for SVC type).

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

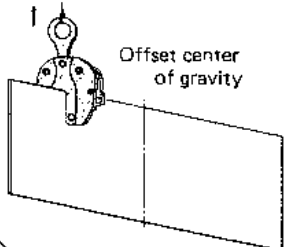
✘ WRONG MANNERS—IT'S DANGEROUS.



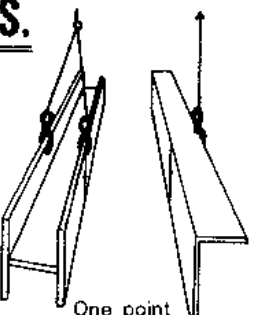
Two-point lifting using one rope



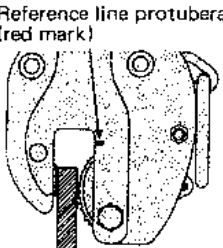
Side gripping



Offset center of gravity

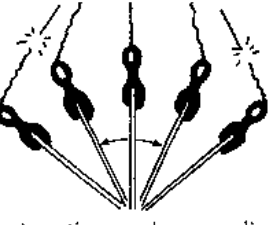


One point lifting of long object

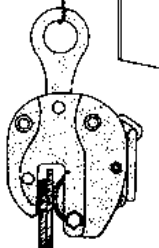


Reference line protuberance (red mark)

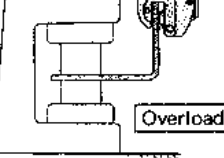
Insufficient gripping not reaching the reference line



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



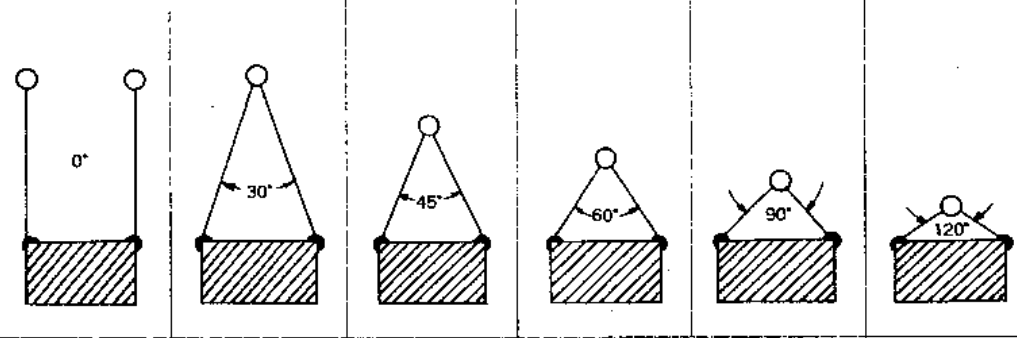
Pulling out a plate from a stack

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

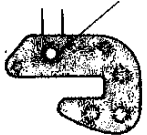
- ★ Check the main body for distortion or flaw.
- ★ Make sure the opening is normal (check if widened).
- ★ Check if the shackle is distorted.
- ★ Check the shackle pin hole for widening or looseness.
- ★ Check cam and pad teeth for defect or wear.
- ★ Check cam pin hole in main body for widening.
- ★ 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.

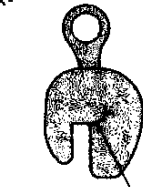
Most items may be checked visually or by touching. To measure the safety point distance and opening size, use slide calipers or the like to obtain precise measurements.

DISCARD

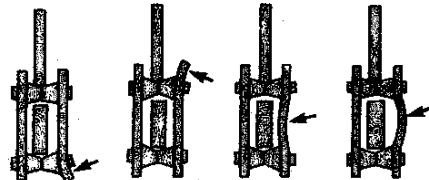
When clearance between bolt and hole exceeds 1 mm, and deflection of cam or shackle becomes excessive.



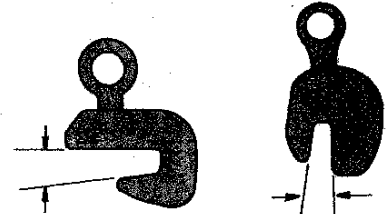
(Wear of pin or pin hole)



(Flaw of main body)



(Distortion of main body)

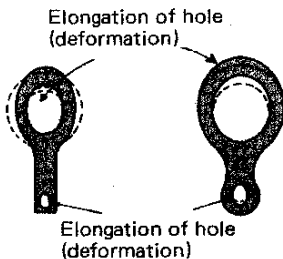


(Widening of opening)

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.

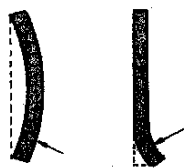
REPLACE

(Shackle)



Elongation of hole (deformation)

Elongation of hole (deformation)



Distortion (deformation)

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.

(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	1.0 mm 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.

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, Stopper Type

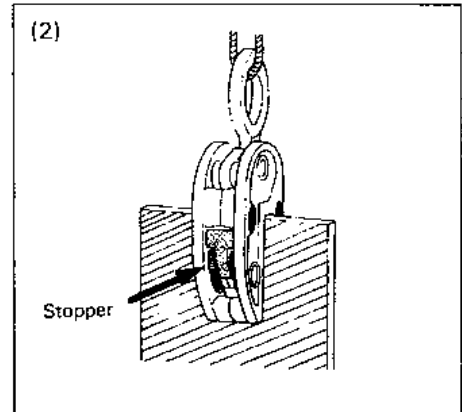
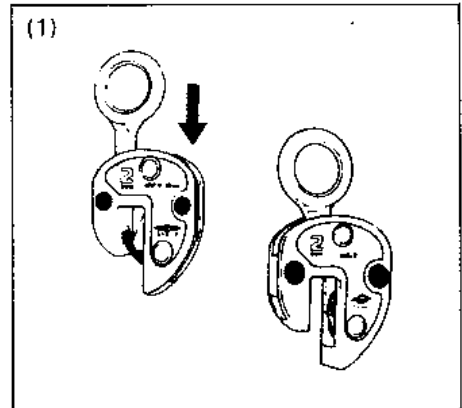
Model : SVC

Operation method

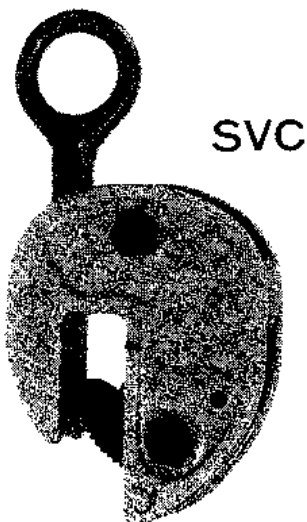
1. Push down the shackle as shown in (1).
(The cam retreats into the body of clamp and the stopper is applied to keep the released.)
2. Lower clamp onto plate (object to be lifted) and be sure that end of plate is sufficiently deeper than red mark on the mouth part of body.
When lifting from horizontal, lock open-position as illustrated in 1. and place short leg under plate.
3. Push the stopper indicated by arrow in (2), then the stopper clicks to clamp tightly.
4. When detaching steel plate, push down the shackle as shown in (1) after loosed wire rope.

Warning : Do not push down shackle until plate is at rest.

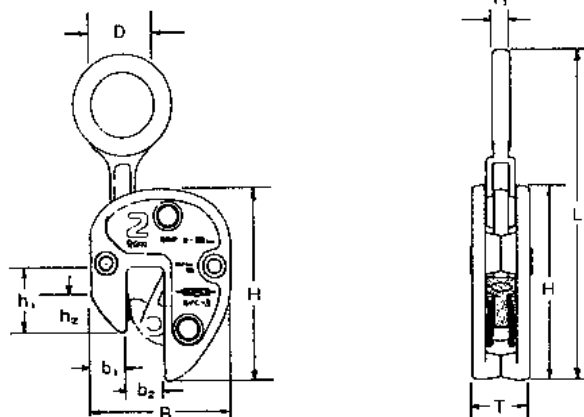
5. Do not lift steel plate in the state of 1. and 2.



STOPPER TYPE

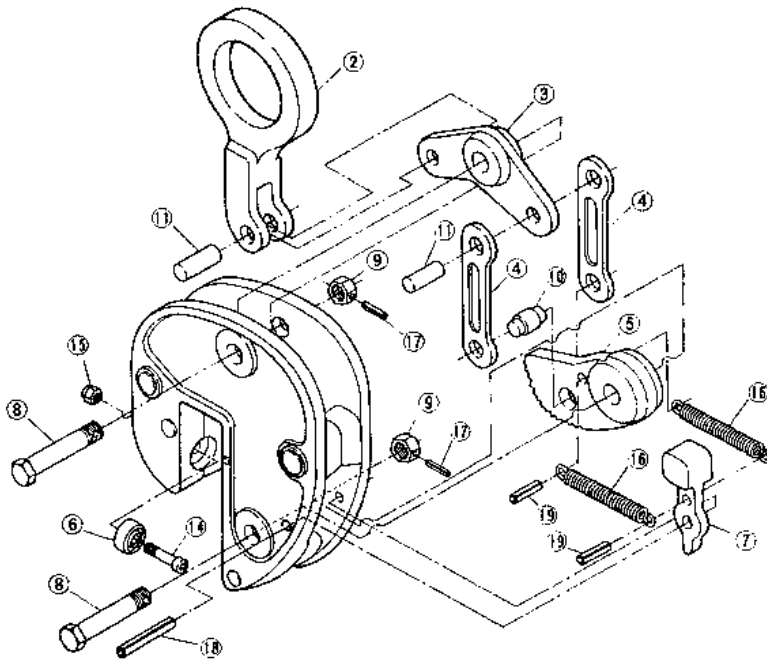


SVC



ITEM NO.	Capacity (tons)	Clamping range	L	t ₁	T	h ₁	h ₂	H	b ₁	b ₂	B	D	Weight (kg)
SVC 0.5	0.5	0~19	210	20	32	54	21	138	29	22	108	35	1.5
SVC 1	1	0~25	265	21	42	62	24	165	35	28	126	46	3
SVC 2	2	0~32	330	28	56	73	28	200	43	35	152	61	6
SVC 3	3	0~38	385	35	66	81	33	225	47	41	168	74	9
SVC 5	5	0~50	485	42	81	99	38	276	59	53	210	92	18

Replacement parts and fittings (Model : SVC)



Part No.	Part Name	Item No.
SHACKLE ASSEMBLY		
2	Shackle	SVCH
11	Support pin for shackle	SVCY
LINK ASSEMBLY		
3	L-shape link	SVCL
4	I-shape link	SVCI
11	Connection pin for link	SVCY
8	Support bolt	SVCX
9	Support nut	
17	Spring pin	SVCD
CAM ASSEMBLY		
5	Cam	SVCT
19	Spring pin for spring	SVCQ
8	Support bolt	SVCX
9	Support nut	
17	Spring pin	SVCD
10	Connection pin for cam	SVCK
PAD ASSEMBLY		
6	Pad	SVCP
14	Hex. socket head cap screw	SVCV
15	Nylon nut	
STOPPER ASSEMBLY		
7	Stopper	SVCR
19	Spring pin for spring	SVCQ
18	Spring pin	SVCU
16	Spring for cam	SVCS

Replacement procedure for cam and pad

● Disassembling

A) PAD

1. Take out by loosening Cap screw 14 and Nut 15.

B) CAM

1. Take out Spring pin 16 for the stopper 7.
2. Take out Bolts 8 and Nuts 9 for the Cam 5 and the L-shape link 3.
3. Take off Cam 5 after pulled out each part from the body.

● Reassembling

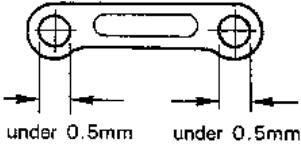
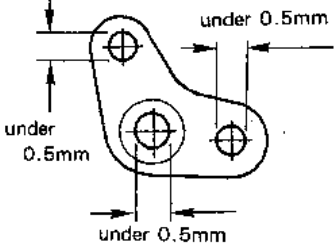
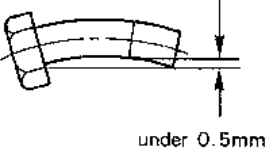
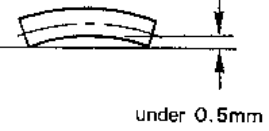
A) PAD

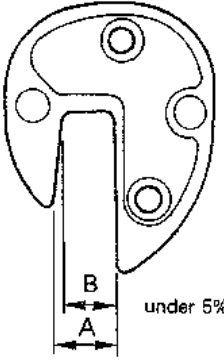
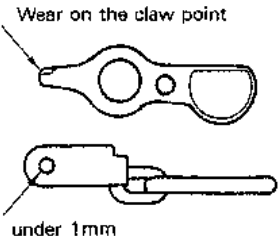
1. Fasten with Cap screw 14 and Nut 15.

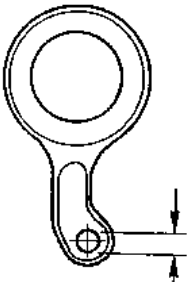
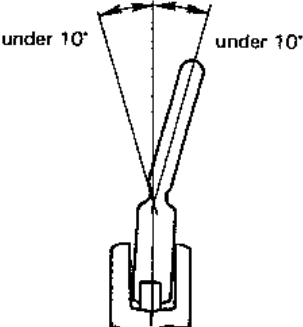
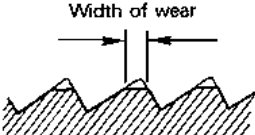
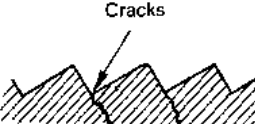
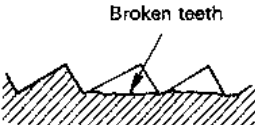
B) CAM

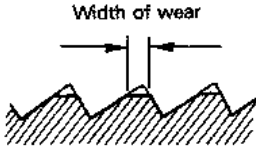
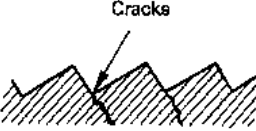
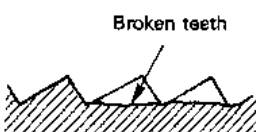
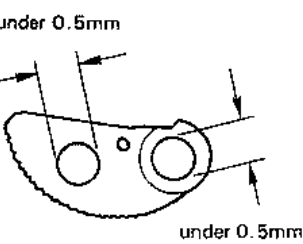

1. Link Shackle 2, L-shape link 3, I-shape link 4 and Cam 5 with each Link pin 11, 10 with the correct linking order and shape.
2. Insert the linked shackle and cam into the body orderly from the cam side.
3. Set Springs 16 by coming the cam towards the pad side.
4. Insert each Bolt 8 into holes of L-shape link and cam.
5. Hook Springs 16 onto spring pin of the stopper by drawing the springs towards outside.
6. Stand the body and tighten nuts 9.
7. Insert Spring pin 16 into a hole of the stopper. Be sure that the springs are not touched to the the sprit of the pin.
8. Insert Spring pins 17 into a hole of the nuts and support bolts for the cam and link.

Standards for checking clamps (Model ; SVC)

SECTION	INSPECTING METHOD	PERMISSIBLE LIMIT	CAUSES OF THE TROUBLE
<p>Links for L shape and I shape</p>	<p>Visually check and measure for bends and other forms of 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
<p>Cam Support Bolt</p>	<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 1mm, 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.
<p>Connection Pin for Cam</p>	<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 lubrication * Too large hoisting angle
<p>Shackle Support Pin and Connection Pin for link</p>	<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 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
	Visually check to find the deformation of the hook section.	Replace when the spring comes off easily from the cam or the stopper.	* Fatigue caused by repeated use
Body	Visually check or use color dyes to find 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
Stopper	Visually check to find the wear on the point of the claw.	Replace when the lock is not smoothly operated because of the wear on the claw point.	* Natural wear caused by use.
			
Spring Pin for Stopper	Measure the shaft and check for wear and deformation.	Replace when the operation of stopper is not smooth.	* Natural wear from use * Insufficient lubrication

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 * Too large hoisting angle * 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>Width of wear</p>  <table border="1" data-bbox="742 1366 1029 1534"> <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
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<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>	<p>Cracks</p>  <p>Broken teeth</p> 	<ul style="list-style-type: none"> * Overloading * Dynamic loads * Damage from clamping hardened material * Overloading * Dynamic loads * Damage from clamping hardened material 											

SECTION	INSPECTING METHOD	PERMISSIBLE LIMIT	CAUSES OF THE TROUBLE										
Cam	Visually check and measure the amount of wear.	 <table border="1" data-bbox="783 506 1066 674"> <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
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Measure the pin hole and check for wear.		<ul style="list-style-type: none"> * Natural wear from use * Insufficient lubrication * Overloading 											
Confirm that the cam are not appeared from the body when the the stopper is applied.	<p>Replace when found the wear on the section where the claw point of stopper is touched.</p> 	<ul style="list-style-type: none"> * Overloading 											