

# SAFETY LIFTING CLAMPS



## INSTRUCTION FOR OPERATION OF "SUPER" BRAND LIFTING CLAMPS

**SVC-E**



**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!

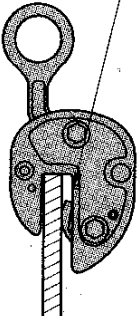
Plate thickness must be within grip range shown on clamp. In some cases with hardened plates, light plates (less than 1/5 of capacity marked on the clamp) and thin plates (less than 1/4 of the maximum clamping range) the clamping force of the clamp will be reduced. In these cases, confirm that the clamp has a positive grip before lifting!

- 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!
- Never use a steel lifting clamp (hereafter called clamp) on material other than steel!
- When operating clamps, always maintain a firm footing and only operate from a location that will be safe at all times!
- Before lifting the load, confirm that clamps are in good condition and functioning properly!
- Always protect the surface of cam and pad from weld spatters or other damaging contaminants! The surface of the load must always be clean and free of scale, grease, paint, dirt and coating or other foreign matters that can reduce friction!
- Note that the service life of clamps is reduced considerably when stainless steel sheets or high-tensile steel are clamped! Do not use clamps for lifting high-tensile steel (over 300HB) or soft steel (under 80HB) !
- Never vertically lift material that tapers down to the edge!
- Never vertically lift with horizontal or lateral clamps!
- Never lift more than one steel plate at a time!
- Always use slings correctly! Pay special attention to the correlation between the lifting angle and the rated load!

- Never operate clamps unless the load is properly centered!
- After the load has been lifted a few centimeters, confirm that the load is well balanced!
- Never allow the operator's attention to be diverted when operating clamps and never leave the suspended load unattended!
- Never modify clamps!
- Only use genuine parts when repairing clamps!
- Please refer, also, to the warnings in the catalog.

### CORRECT MANNER OF USING VERTICAL LIFTING CLAMPS

**Reference line protuberance (red mark)**

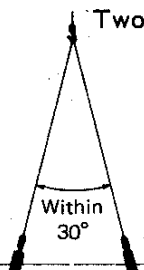


As indicated by arrow, a protuberance is provided in the main body of vertical lifting clamp.

(Insert the steel plate up to the bottom.)

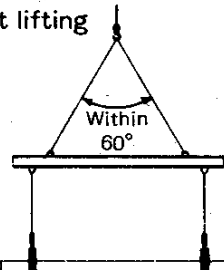
When clamping, insert the object sufficiently deeper than the red mark.

**Two-point lifting**



Within 30°

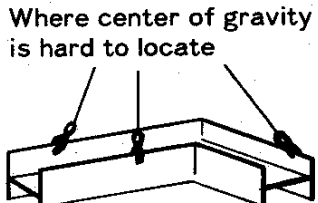
When balance is not used, keep the angle within 30° for safety precaution.



Within 60°

When balance is used, the maximum angle is 60°

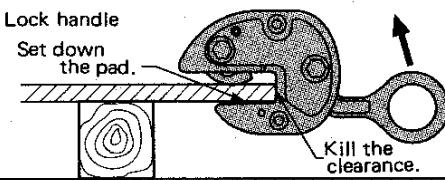
**Where center of gravity is hard to locate**



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.



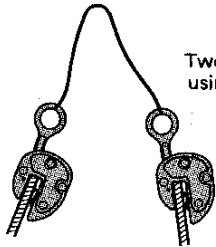
Kill the clearance.

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).

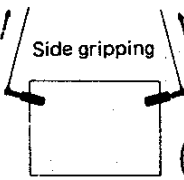
(If set reversely, the state of lock handle cannot be visually observed, and it is very dangerous.)

### ✗ WRONG MANNERS—IT'S DANGEROUS.

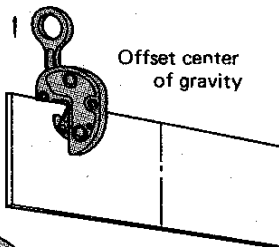
**Two-point lifting using one rope**



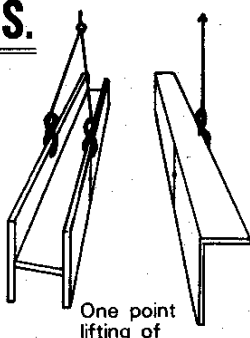
**Side gripping**



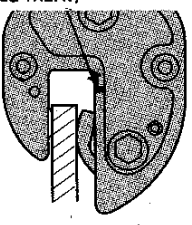
**Offset center of gravity**



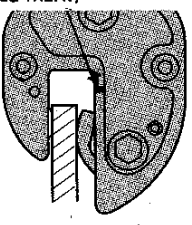
**One point lifting of long object**



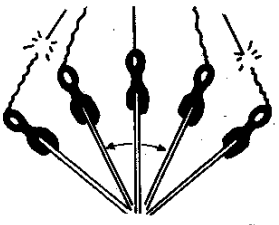
**Reference line protuberance (red mark)**



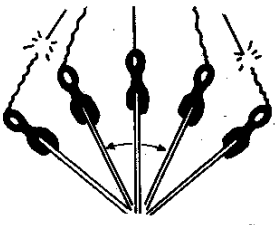
**Insufficient gripping not reaching the reference line**



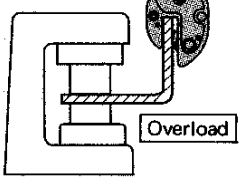
**Lifting more than one plate simultaneously**



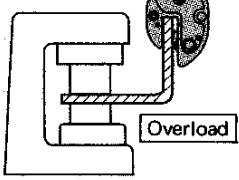
**Inverting angle exceeding 30° momentarily (Keep within 30°.)**



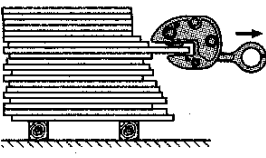
**Overload**



**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.

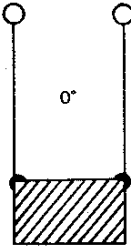
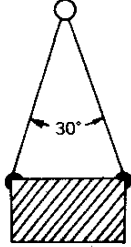
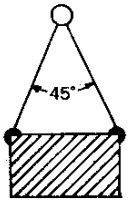
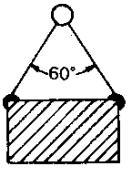
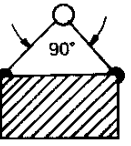
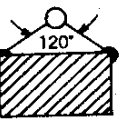
# LIFTING ANGLE AND SAFE LOAD OF WIRE ROPE

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) $W = \sigma / S$ (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

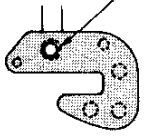
- ★ Check the main body for distortion or flaw.
- ★ Make sure the opening is normal (check if widened).
- ★ Check if the shackle is distorted.
- ★ Check the shackle pin hole for widening or looseness.
- ★ Check cam and pad teeth for defect or wear.
- ★ Check cam pin hole in main body for widening.
-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

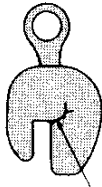
Most items may be checked visually or by touching. To measure the safety point distance and opening size, use slide calipers or the like to obtain precise measurements.

## DISCARD

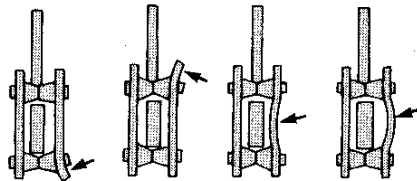
When clearance between bolt and hole exceeds 1 mm, and deflection of cam or shackle becomes excessive.



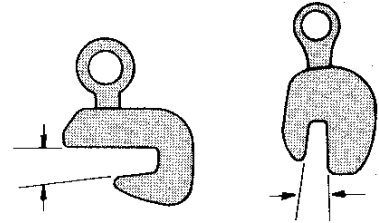
(Wear of pin or pin hole)



(Flaw of main body)



(Distortion of main body)

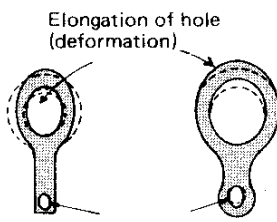


(Widening of opening)

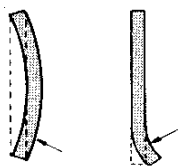
Discard the clamp if obvious flaw or distortion is found in the main body. Defects in the main body cannot be repaired in the light of safety. The main body may be cracked or deformed only after several uses if it is used incorrectly. Dent or swelling of main body, or widening of opening may be caused 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)



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
0.75 ton	0.7mm 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.

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.

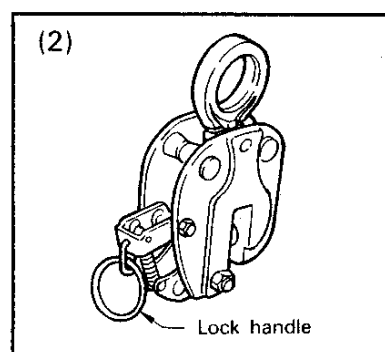
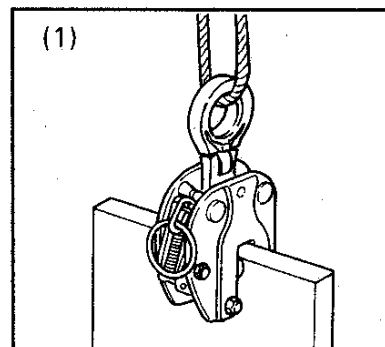
Lift, carry, touch down slowly. Be careful not to hit against surrounding objects while carrying. Keep off hands. Do not enter hazardous zone. Always pay attention to safety.

# Vertical Lifting Clamps, Free Direction Type

**Model : SVC-E**

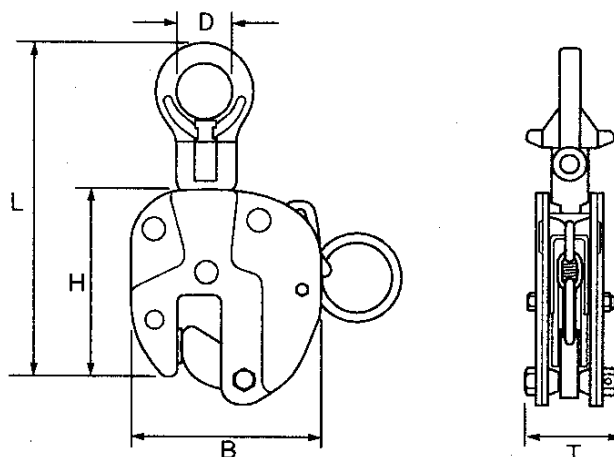
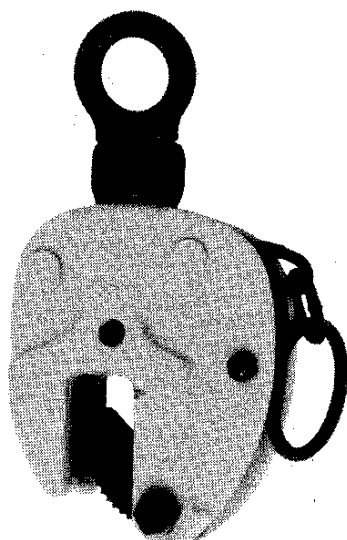
## Operation method

1. Lower clamp onto plate (object to be lifted) with spring tension off.  
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 tension arm into upper position (Lift) as shown in (1).
  3. When detaching plate, spring tension off as shown in (2) 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 untill plate is at rest.**
4. Do not lift steel plate in the state of 1 and 3.



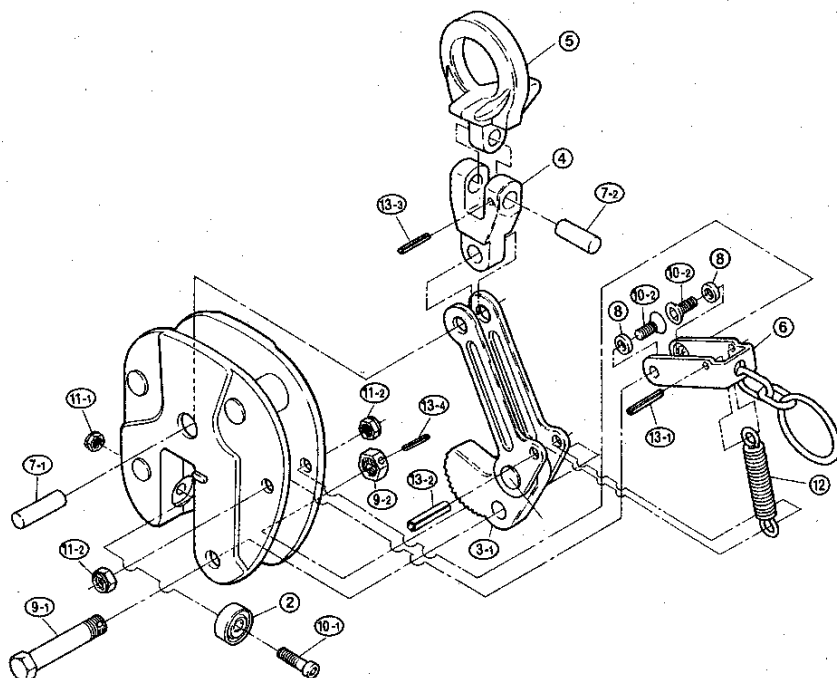
## FREE DIRECTION TYPE

**SVC-E**



ITEM NO.	Capacity (ton)	Clamping range	D	L	H	B	T	Weight (kg)
SVC 0.3E	0.3	0~16	26	157-176	110	100	49	1.5
SVC 0.5E	0.5	0~19	30	180-204	125	110	54.5	2.1
SVC 1E	1	0~25	35	223-257	160	130	65	3.7
SVC 1.5E	1.5	0~28	45	254-290	174	150	74	5.5
SVC 2E	2	0~32	55	292-335	194	162	76	7.0

# Replacement parts and fitting (Model : SVC-E)



Part No.	Part Name	Item No.
SHACKLE ASSEMBLY		SVH
4	Connector	SVCJ
5	Shackle	SVCH
7-1	Connecting pin (Long)	SVCY
7-2	Connecting pin (Short)	SVCX
13-3	Spring pin	SVCR
CAM ASSEMBLY		SVT
3-1	Cam - Link	SVCT
13-2	Spring pin	SVCU
CAM SUPPORT PIN ASSEMBLY		SVK
9-1	Support bolt for cam	SVCK
9-2	Support nut for cam	
13-4	Spring pin	SVCO
PAD ASSEMBLY		SVP
2	Pad	SVCP
10-1	Hex. socket head cap screw	SVCV
11-1	Nylon nut	
HANDLE ASSEMBLY		SVG
6	U-handle	SVCG
10-2	Hex. socket flat head bolt	SVCF
11-2	U-nut	
8	Collar	SVCZ
13-1	Spring pin	SVCQ
12	Spring	SVCS

## Replacement procedure for cam and pad

### Disassembling

#### A) PAD (2)

1. Take out by loosening Cap screw (10-1) and Nut (11-1).

#### B) CAM (3-1)

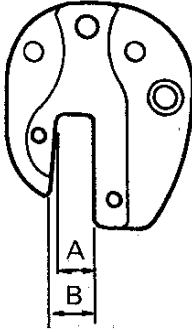
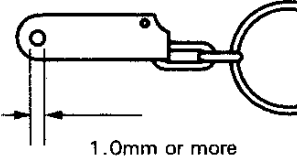
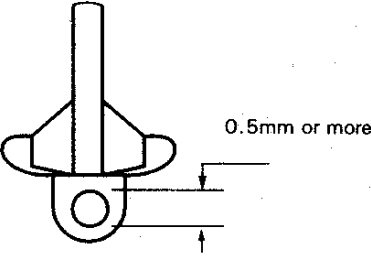
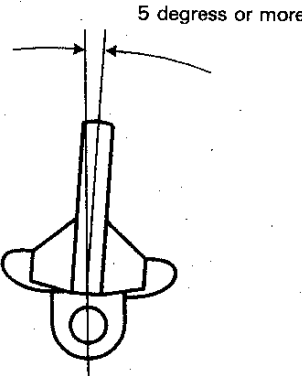
1. Pull out Spring pin (13-4) for Bolt (9-1) and Nut (9-2).
2. Take out Bolt (9-1) and Nut (9-2). Be sure Spring (12) is not tensed before taking out.
3. Detach Shackle (5) by pulling out Connecting pin (7-2) after taking out Spring pin (13-3) for Connector (4).
4. Push down Connector (4) and push out Connector pin (7-1) with pin-punch or likes through small hole in the back-side of body after bringing Connecting pin (7-1) into line with hole of Main body.
5. Take out Connector (4) and Cam (7-1). Pull out Spring pin (13-2) in Cam (3-1) side in order to take out Spring (12).

### Assembling

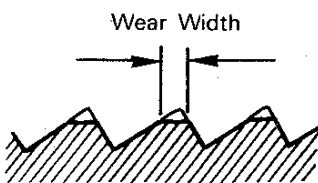
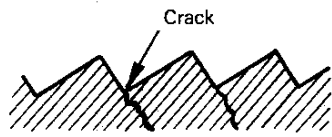
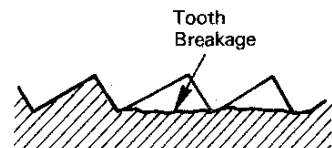
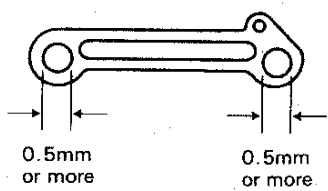
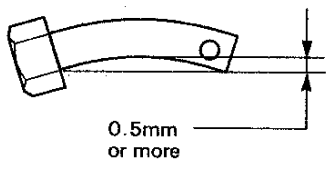
#### A) PAD and (B) CAM

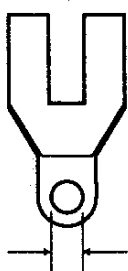
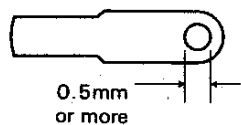
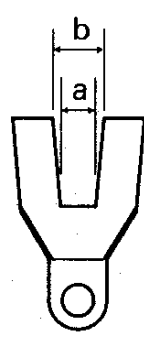
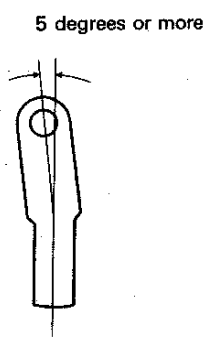
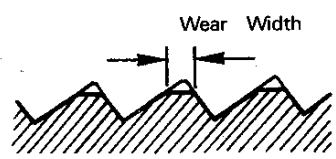
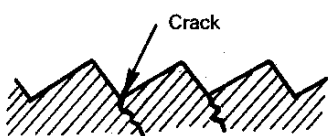
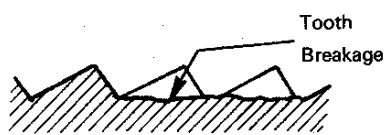
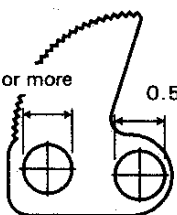
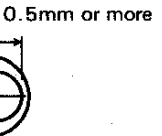
- Assemble Pad (2) and Cam (3-1) with counter order of disassembly.

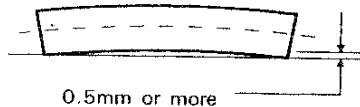
# CHECKING STANDARD

Part to be checked	Check List	Working life limitation	Disposal
Body	<p>Cracks</p> <p>Deformation in the jaw opening</p> <p>Damage in each part</p>	 <p>When difference between A and B is more than 5% against distance of depth of opening</p>	Disregard
"U" Handle	<p>Cracks</p> <p>Wear of hole</p>	 <p>1.0mm or more</p>	Replacing
Shackle	<p>Cracks</p> <p>Wear in pin hole</p> <p>Bends and deformation</p>	 <p>0.5mm or more</p> <p>When permanent deformation or play exceeds 5 degrees from center of clamp</p>  <p>5 degrees or more</p>	Replacing



Part to be checked	Check List	Working life limitation	Disposal												
Pad	Amount of Wear	<div></div> <table><thead><tr><th>Capa. (ton)</th><th>Width of Wear</th></tr></thead><tbody><tr><td>0.3</td><td>0.5mm or more</td></tr><tr><td>0.5</td><td>0.6mm or more</td></tr><tr><td>1.0</td><td>0.7mm or more</td></tr><tr><td>1.5</td><td>0.8mm or more</td></tr><tr><td>2.0</td><td>0.8mm or more</td></tr></tbody></table>	Capa. (ton)	Width of Wear	0.3	0.5mm or more	0.5	0.6mm or more	1.0	0.7mm or more	1.5	0.8mm or more	2.0	0.8mm or more	Replacing
	Capa. (ton)	Width of Wear													
	0.3	0.5mm or more													
0.5	0.6mm or more														
1.0	0.7mm or more														
1.5	0.8mm or more														
2.0	0.8mm or more														
Cracks at the base of pad teeth	<div></div>														
Teeth breakage	<div></div>														
Link	Bends and deformation	When unusual sounds generate or when the movement is not smooth.	Replacing												
	Wear of pin hole	<div></div>													
Cam Support Bolt	Wear	When exceeds 1.0mm or more in the clearance between shaft and hole and when the play of cam becomes large.	Replacing												
	Bends and Deformation	<div></div>													
	Looseness of nut caused by comming off spring pin														

Part to be checked	Check List	Working life limitation	Disposal												
Connector	Cracks	  0.5mm or more	Replacing												
	Wear of pin hole														
Connector	Bends and deformation	When 1.0mm exceeds in difference of distance between A and B  													
Cam	Amount of wear	 <table><thead><tr><th>Capa. (ton)</th><th>Width of Wear</th></tr></thead><tbody><tr><td>0.3</td><td>0.5mm or more</td></tr><tr><td>0.5</td><td>0.6mm or more</td></tr><tr><td>1.0</td><td>0.7mm or more</td></tr><tr><td>1.5</td><td>0.8mm or more</td></tr><tr><td>2.0</td><td>0.8mm or more</td></tr></tbody></table>	Capa. (ton)	Width of Wear	0.3	0.5mm or more	0.5	0.6mm or more	1.0	0.7mm or more	1.5	0.8mm or more	2.0	0.8mm or more	Replacing
	Capa. (ton)	Width of Wear													
0.3	0.5mm or more														
0.5	0.6mm or more														
1.0	0.7mm or more														
1.5	0.8mm or more														
2.0	0.8mm or more														
Cracks of the base of cam teeth															
Cam	Teeth brakage	 													
	Wear of pin hole														
		 													

Part to be checked	Check List	Working life limitation	Disposal
Rivet Pin for Link	Wear in shaft	When becomes bigger in the clearance between shaft and hole or when exceeds 0.5mm or more in the play of cam or link.	Replacing
Connecting Pin	Wear in shaft  Bends and deformation	When exceeds 1.0mm or more in the clearance between shaft and hole.  	Replacing
Spring	Elongation  Deformation  Reduction in tension	When the normal length elongate 5% or more becoming large in the clearance.  When deformation of others prevent a normal spring force and when the cam and others do not move smoothly.	Replacing

\* Remark ;

The working life limitation shows the limitation which has to dispose.