

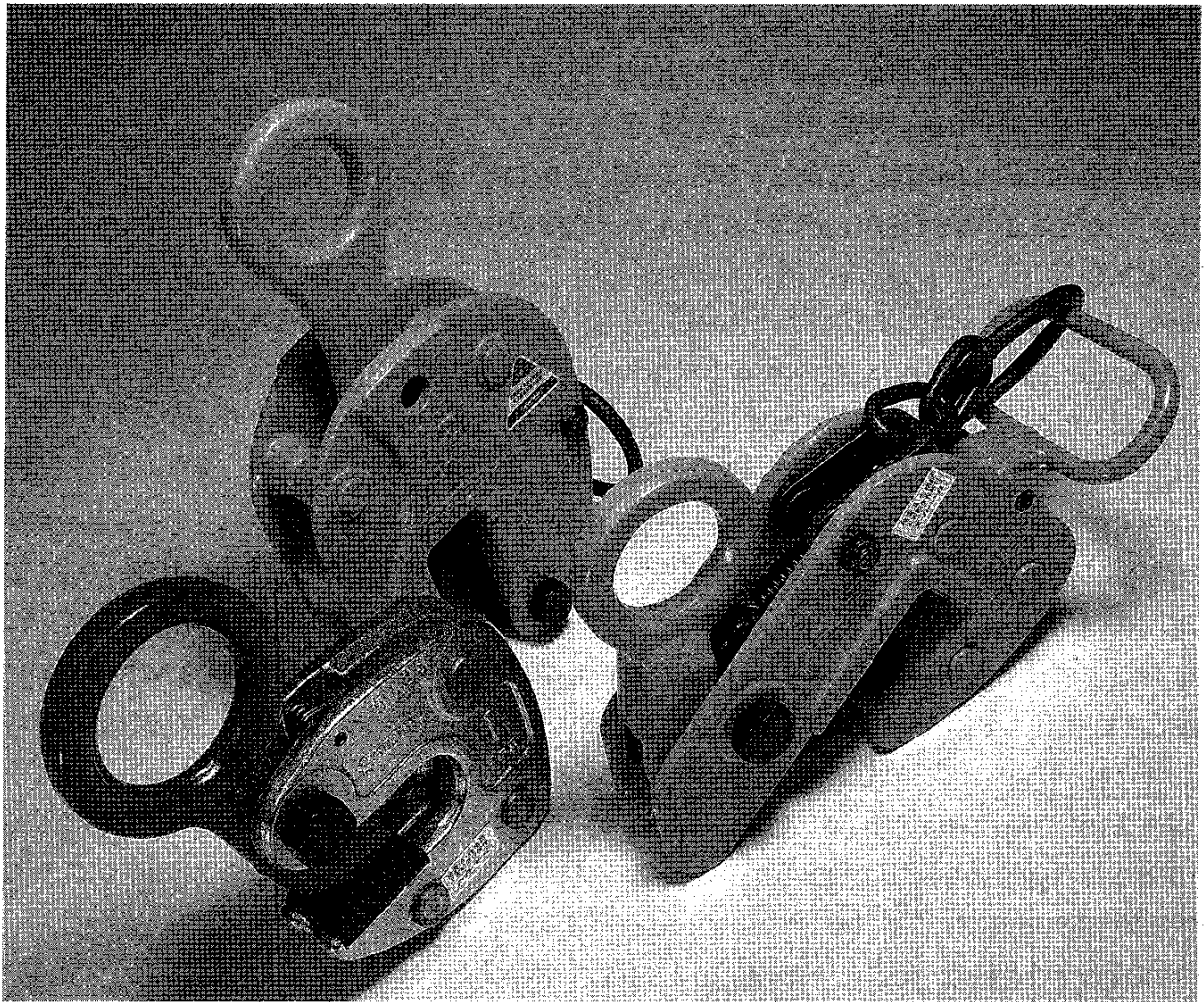
SAFETY LIFTING CLAMPS



INSTRUCTION FOR OPERATION

“SUPER” BRAND
LIFTING CLAMPS

SDC-N



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.

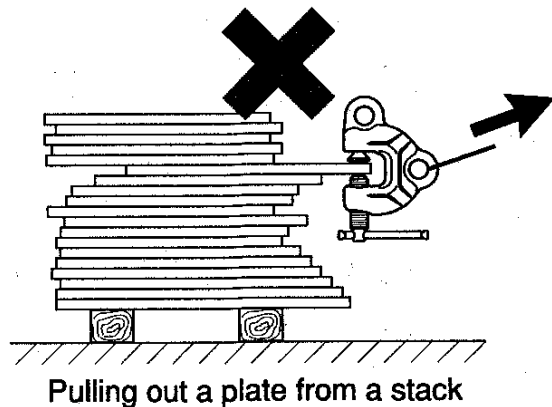
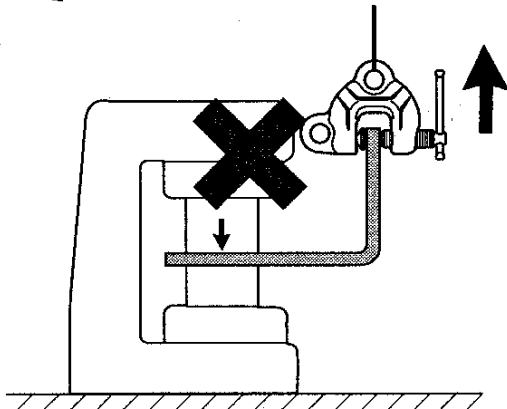
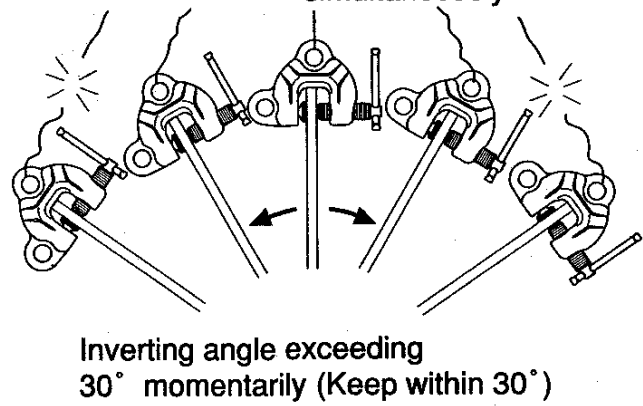
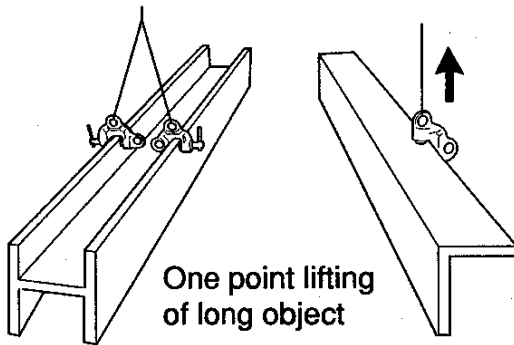
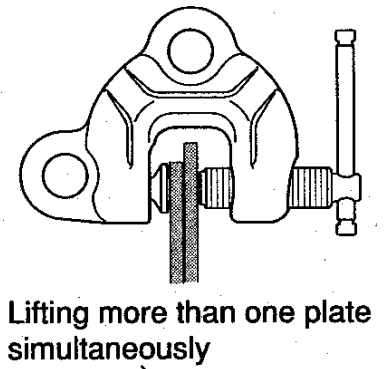
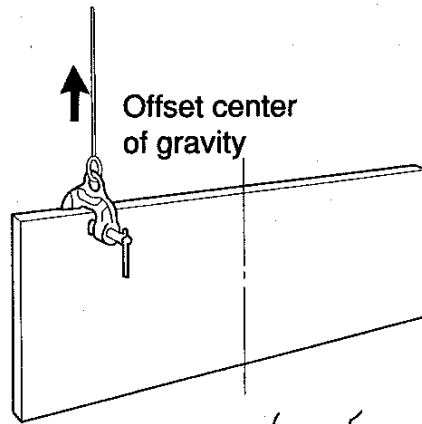
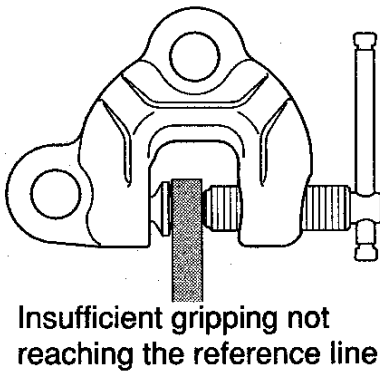
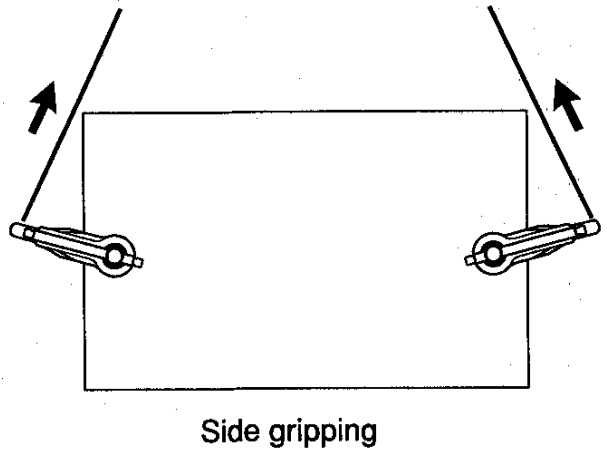
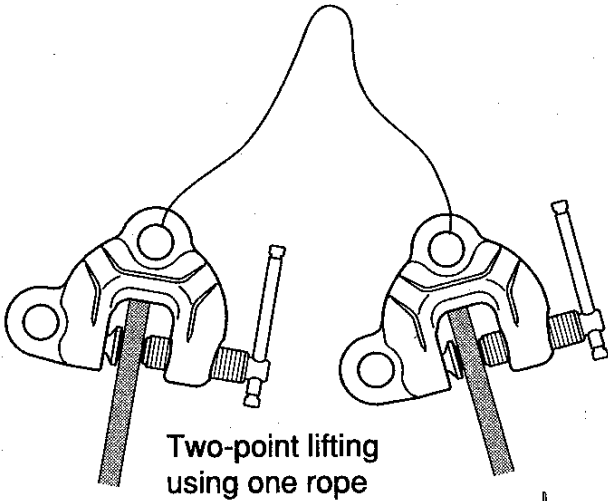
Plate thickness must be within grip range on clamp.

- Always use slings correctly ! Pay special attention to the correlation between the lifting angle and the rated load! Use within specified angles.
- Before lifting the load, confirm that the clamps are in good condition and functioning properly! Inspect clamp. If cam or pad teeth are worn or if clamp is damaged, do not use.

All personal must stand clear of plate while it is being lifted or moved.

- Never vertically lift material that tapers down to the edge!
- Never lift more than one steel plate at a time!
- 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!
- Take up slack slowly. Do not bounce or jerk load.
- Always protect the surfaces of the 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 coatings or other foreign matters that can reduce friction!
- Do not lift if cam teeth are not bitten sufficiently on workpiece when workpiece to be lifted is hard material or light weight (less than 1/5 against capacity or less than 1/4 against maximum opening jaw).
- Note that the service life of clamps is reduced considerably when stainless steel or high-tensile steel are clamped! Do not use clamps for lifting high-tensile steel (over 300 HB) or soft steel (under 80 HB)!
- Do not weld electrically workpiece being lifted by clamp.
- Do not modify clamp by gas cutting or welding.
- Only use genuine parts when repairing clamps!
- Use clamp in the correct manner in accordance with this instruction.

✘ WRONG MANNERS-IT'S DANDEROUS



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

Select the type and capacity best suited to the job. Check periodically, repair and replace parts, and use correctly in order to use the clamps over the full service, 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.

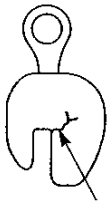
Check all the listed items. Inspect according to the Checking Standard.

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.

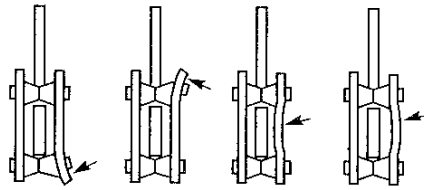
When clearance between bolt and hole exceeds 1 mm, and deflection of cam or shackle becomes excessive.



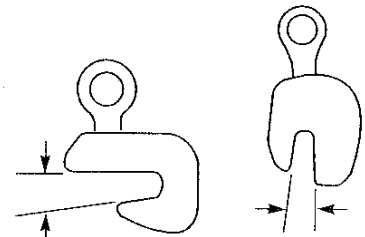
(Wear of pin or pin hole)



(Flaw of main body)



(Distortion of main body)



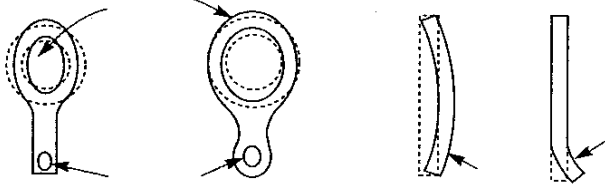
(Widening of opening)

DISCARD

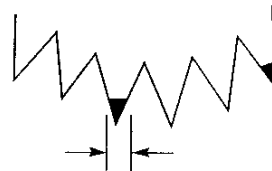
Discard the clamp if obvious flaw or distortion is found in the main body. Defects in the main body can not be repaired in the light of safety. The main body may be cracked or deformed only after several uses if it is used incorrectly. Dent or swelling of main body, or widening of

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



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.



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

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 table below refers to No.4. 6×24A class of JIS G3525.))

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(safeload).

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

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

SCREW CAM CLAMP

Double Eyes Type

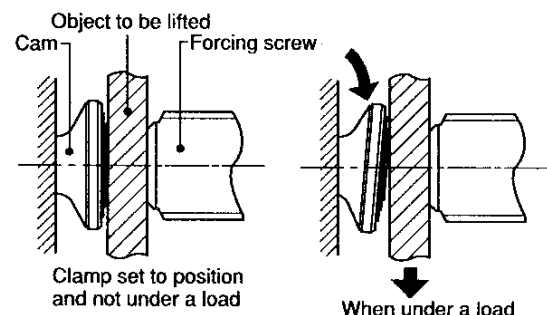
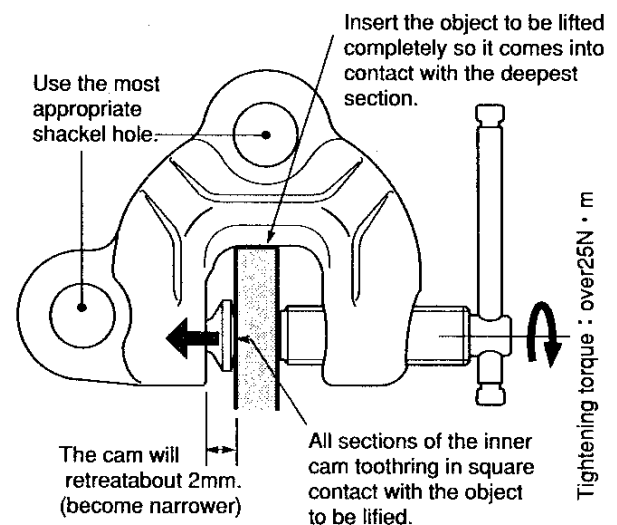
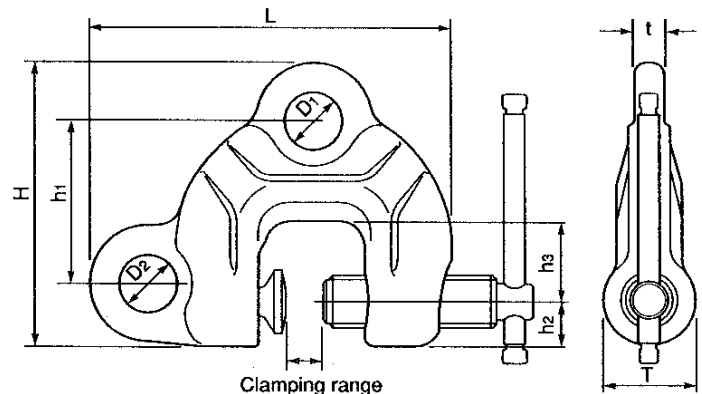
Item No.	Rated capacity	Clamping range	Weight
SDC 1N	1ton	0~40mm	3.4kg
SDC 3N	3ton	0~40mm	5.9kg

(Dimension in mm)

Item No.	L	H	h ₁	h ₂	h ₃	T	t	D ₁	D ₂
SDC 1N	199	157	90	25	45	50	16	φ 32	φ 32
SDC 3N	236.5	180.5	103	30	50	60	20	φ 35	φ 45

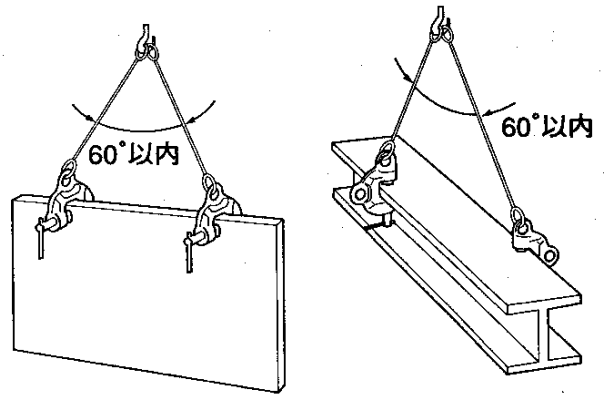
OPERATION METHOD

- 1) The forcing screw will tighten when turned clockwise, and will loosen when turned counterclockwise.
- 2) The cam will retreat about 2mm after coming into contact with the steel plate when tightening the forcing screw. Continue to tighten the forcing screw until the cam is firmly in contact with the steel plate. When under a load, the cam will tilt and generate a larger clamping force.
- 3) The tightening torque of the forcing screw must exceed 25N·m (about 250kgf·cm).
- 4) Determine which shackle hole (wire rope hole) to use from the method of use and from the shape of the object to be lifted.
- 5) When setting the clamp, insert the object to be lifted completely into the jaw opening until it comes into contact with the deepest section. Next turn the handle and tighten the forcing screw firmly till all sections of the inner cam toothring come into square contact with the object to be lifted.
- 6) When hoisting or during other operations, special attention must be given to prevent the handle from coming into contact with the wire rope or other objects. When the handle comes into contact with something, there is a possibility that the forcing screw will turn and loosen.

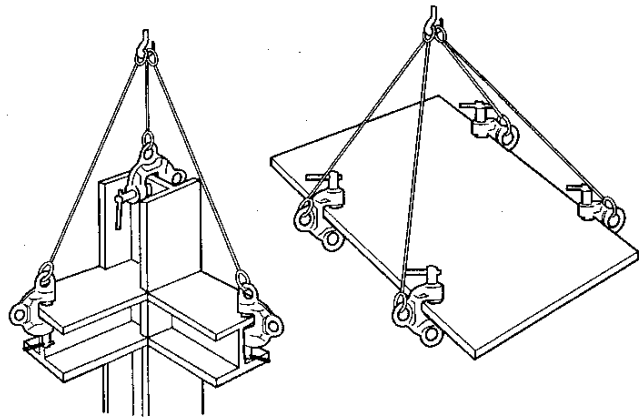


METHODS OF USE

1) When lifting at 2 points, keep the lifting angle within 60°.



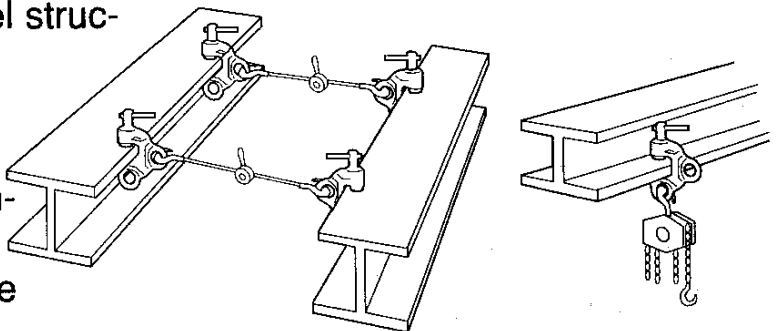
2) Always lift at 3 points with complicated shaped objects. (When lifting steel plates horizontally, always lift at 4 points.)



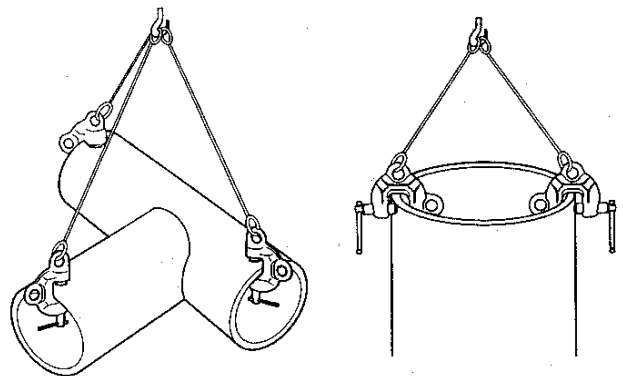
3) Clamps used for positioning steel structure for welding, for pulling and for hanging.

N.B.

When the clamps are used continuously over a long period of time, check the clamping force regularly at short intervals.

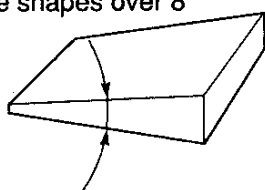


4) The clamps can also be used for lifting pipe shaped objects and for turning over objects.



5) The clamps can not be used on the following shaped structures:

Wedge shapes over 8°

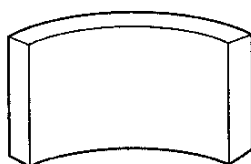


Lift with care when clamped the tapered side even if the wedge shapes under 8°

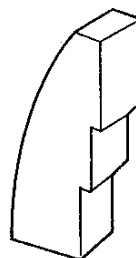
Round bars



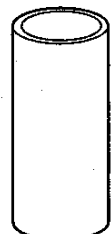
Curve shapes with radius under 100 mm



Objects with uneven surfaces (no flat surfaces for clamping)



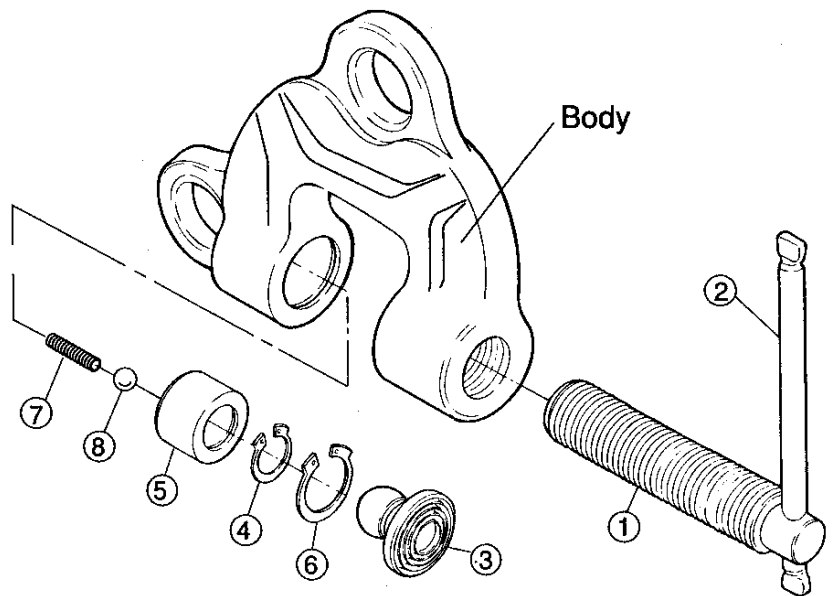
Cylinders with inner dia. under 600mm



REPLACEMENT PARTS AND FITTINGS

(Model:SDC-N)

Parts No.	Parts Name	Item No.
Screw assembly		
1	Forcing screw	SDCR
2	Handle	
assembly Cam		
3	Circular cam	SDCT
4	Retaining ring(Small)	
Cam holder assembly		
5	Cam holder	SDCC
6	Retaining ring(Large)	
7	Spring	SDCS
8	Steel ball	SDCQ



REPLACEMENT PROCEDURE FOR CAM AND SCREW

DISASSEMBLING

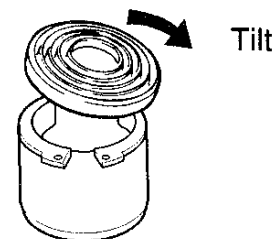
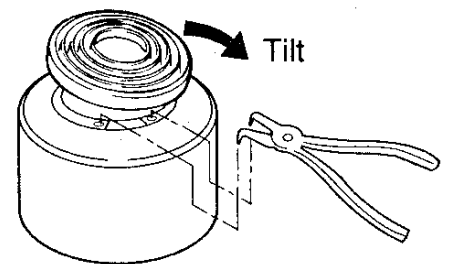
A)Screw

Turn the handle counterclockwise and remove the forcing screw from the body.

(The forcing screw and handle can not be detached)

B)Cam

- ① As shown in the drawing on the right, tilt the circular cam and remove the stop-ring (Large) with snap ring pliers. Next, remove cam holder, steel ball and spring from the body.
- ② Remove the retaining ring (Small) from the cam holder and detach the circular cam.

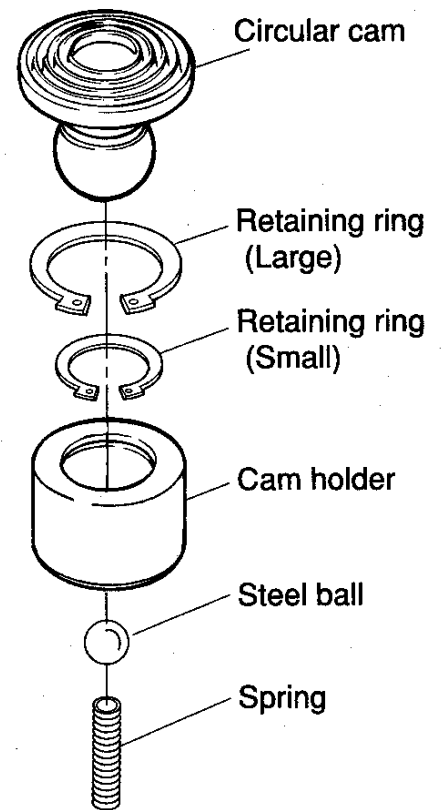


Dia.size of Retaining ring

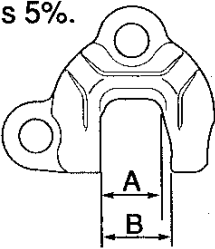
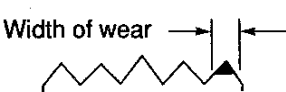
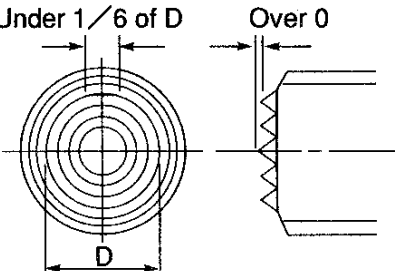
Item No.	Retaining Ring(Large)	Retaining Ring(Small)
SDC 1N	21	32
SDC 2N	24	36

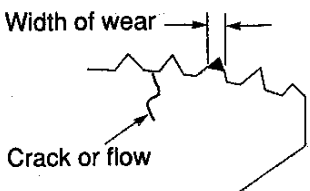
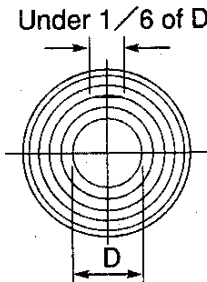
ASSEMBLING

- ① Insert the retaining ring (Small) into the groove of the cam holder.
- ② Connect the retaining ring (Large) temporarily on to the stem of the circular cam.
- ③ Insert the circular cam into the cam holder from the sphere-shaped section.
- ④ From the bottom of the cam holder, insert the steel ball and next the spring.
- ⑤ Insert the cam holder assembly of ④ into the hole of the body and replace retaining ring (Large) into the groove of the body.
- ⑥ Replace and tighten the forcing screw.



INSPECTION STANDARD FOR MODEL : SDC

Category	Inspecting method	Permissible limit	Causes of the trouble					
Body	Visually check or use color dyes to find cracks	Dispose of the clamp when a crack is found.	*Overloading *Dynamic load					
	Measure the jaw opening	Dispose of the clamp when the difference of "A" and "B" exceeds 5%.  Dispose of the clamp when the displacement of the center of the forcing screw and cam exceed 2 mm.	*Overloading *Too large hoisting angle *Overloading *Too large lifting angle					
Forcing Screw	Visually check or use color dyes to locate cracks	Replace when cracks are found.	*Overloading *Dynamic load					
	Visually check the forcing screw for bends	Replace when the movement is not smooth or when the displacement of the screw center is large.						
	Visually check the forcing screw for wear or damage on the screw	Replace when the deformation or displacement becomes large.	*Natural wear from use *Insufficient lubrication					
	Visually check and measure the amount of wear	Replace when the width of wear exceeds the following limits:  <table border="1" data-bbox="758 1568 1141 1668"> <thead> <tr> <th>Rated capacity</th> <th>Width of wear</th> </tr> </thead> <tbody> <tr> <td>1ton</td> <td>over 0.3mm</td> </tr> <tr> <td>3ton</td> <td>over 0.5mm</td> </tr> </tbody> </table>	Rated capacity	Width of wear	1ton	over 0.3mm	3ton	over 0.5mm
Rated capacity	Width of wear							
1ton	over 0.3mm							
3ton	over 0.5mm							
	Visually check for broken teeth in the edge part	Replace when the broken teeth exceeds following limit. 	*Wear from clamping hardened material *Overloading					

Category	Inspecting method	Permissible limit	Causes of the trouble						
SPRING	Confirm that the spring generates a sufficient amount of pressure when the cam is pressed.	Replace when the spring is deformed or when it does not generate a sufficient amount of pressure to correctly move the cam.	* Fatigue from repeated use.						
	Visually check the coil for deformation.	Replace when the spring becomes 5% shorter than its original length or when the clearance between the coils become small.							
Circular cam	Visually check and measure the amount of wear.	Replace when the width of wear exceeds the following limit.  <table border="1" data-bbox="718 1019 1109 1131"> <thead> <tr> <th>Rated capacity</th> <th>Width of wear</th> </tr> </thead> <tbody> <tr> <td>1ton</td> <td>over 0.3mm</td> </tr> <tr> <td>3ton</td> <td>over 0.5mm</td> </tr> </tbody> </table>	Rated capacity	Width of wear	1ton	over 0.3mm	3ton	over 0.5mm	*Natural wear from use *Wear from clamping hardened material
	Rated capacity	Width of wear							
1ton	over 0.3mm								
3ton	over 0.5mm								
	Visually check or use color dyes to locate cracks at the base of the cam teeth.	Replace when the crack is found.	*Overloads *Dynamic load *Damage from clamping hardened material						
	Visually check for broken cam teeth	Replace when the broken tooth is found. 	*Overloads *Dynamic load *Damage from clamping hardened material						
Cam holder	Inspect each section for wear	Replace when the clearance between the body, cam rest and cam becomes large, and exceeds 0.5 mm.	*Natural wear from use *Dynamic load *Overloading						
Retaining ring	Visually check for deformation.	Replace when the deformation exceeds than 0.5 mm from the standard dimensions.	*Natural wear from use *Insufficient lubrication * Overloading						