

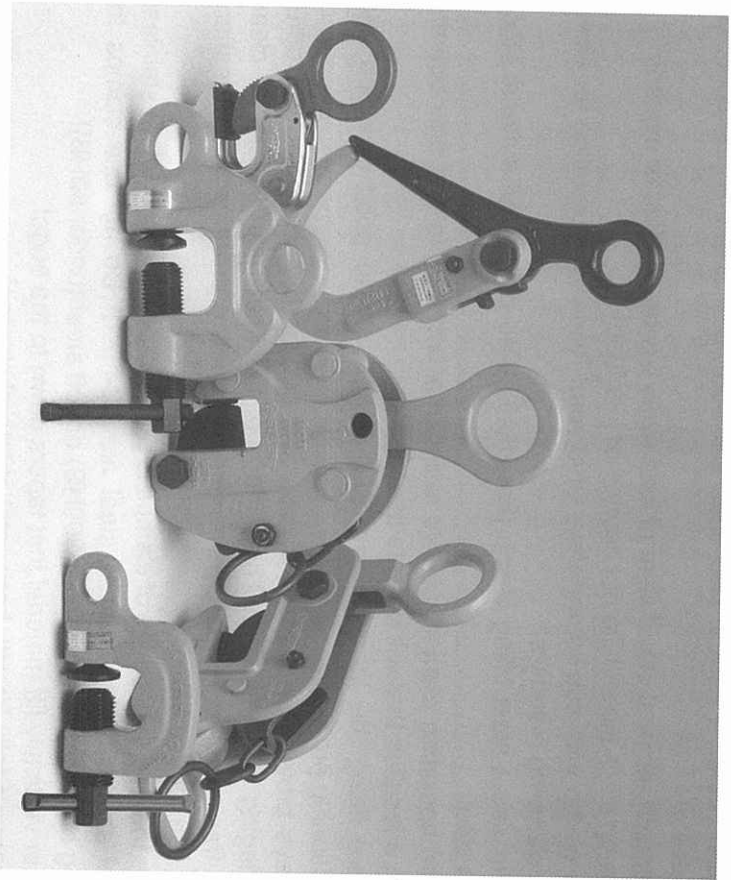
SAFETY LIFTING CLAMPS



INSTRUCTION FOR OPERATION

“SUPER” BRAND
LIFTING CLAMPS

HPG-N



SUPERTOOL

OSAKA, JAPAN

INSTRUCTION FOR USE

Keep these instructions within easy access of operators. It is important that operators understand these warnings and instructions before using.

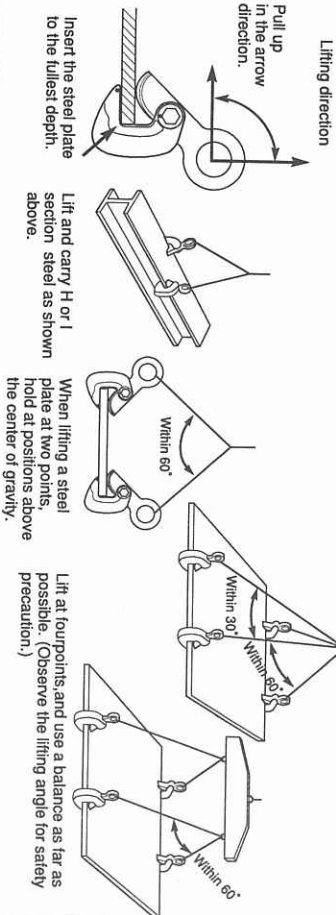
WARNINGS

- Select proper size clamp for the job. Determine the weight of the plate H-beam or steel structure 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 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!

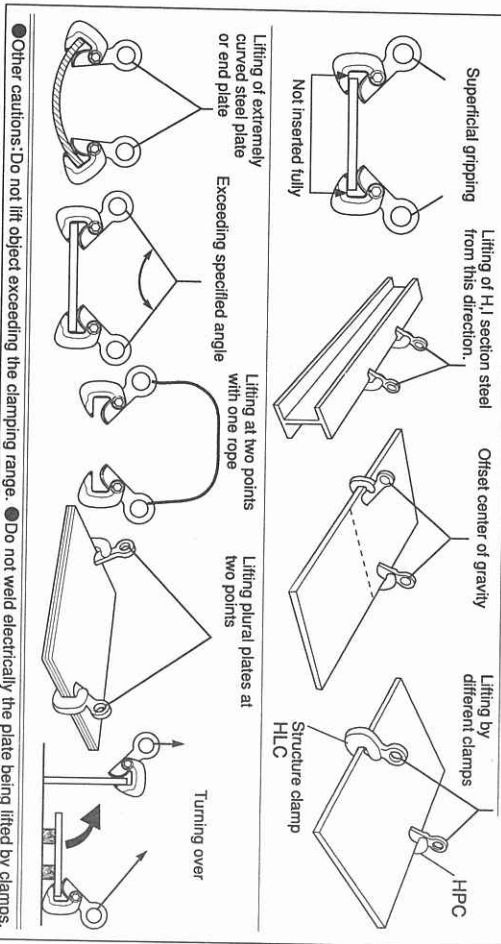
- Never operate clamps unless the load is properly centered!
- After the load has been lifted a few centimeters, confirm that the load is well balanced!
- Never allow the operator's attention to be diverted when operating clamps and never leave the suspended load unattended!
- Never modify clamps!
-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

CORRECT MANNER OF USE

Lift at least at two points.



WRONG MANNERS... DANGEROUS!



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, 6X24A class of JIS G3525.)

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

D Wire rope dia (mm)	σ Break-age load (tons)	W Safe load (on one rope) $W = \sigma / S$ (safety factor S=6)	Changes in lifting efficiency due to lifting angle. %					
			100%	96%	92%	86%	70%	50%
			Max. allowable load (safe load) on two wire ropes (tons)					
			1.08	1.04	0.99	0.93	0.76	0.54
8	3.21	0.54	1.36	1.31	1.25	1.17	0.95	0.68
9	4.06	0.68	1.68	1.61	1.55	1.44	1.18	0.84
10	5.02	0.84	2.1	2.02	1.93	1.81	1.47	1.05
11.2	6.29	1.05	2.62	2.52	2.41	2.25	1.83	1.31
12.5	7.84	1.31	3.28	3.15	3.02	2.82	2.3	1.64
14	9.83	1.64	4.26	4.09	3.92	3.66	2.98	2.13
16	12.8	2.13	5.4	5.18	4.97	4.64	3.78	2.7
18	16.2	2.7	6.7	6.43	6.16	5.76	4.69	3.35
20	20.1	3.35	8.4	8.06	7.73	7.22	5.88	4.2
22.4	25.2	4.2	10.44	10.02	9.6	8.98	7.31	5.22
25	31.3	5.22	13.1	12.58	12.05	11.27	9.17	6.55
28	39.3	6.55	15.04	14.44	13.84	12.93	10.53	7.52
30	45.1	7.52	16.6	15.94	15.27	14.28	11.62	8.3
31.5	49.8	8.3	18.01	17.26	16.13	15.13	12.13	8.93
33.5	56.3	9.38	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.

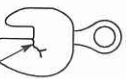
Most items may be checked visually or by touching. To measure the safety point distance and opening size, use slide calipers or the like to obtain precise measurements.

DISCARD

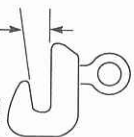
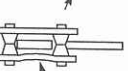
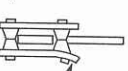
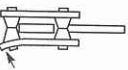
When clearance between bolt and hole exceeds 1mm, and deflection of cam or shackle becomes excessive.



(Wear of pin or pin hole) (Flaw of main body)



(Distortion of main body)



(Widening of opening)

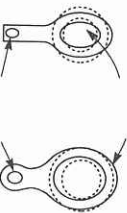


Discard the clamp if obvious flaw or distortion is found in the main body. Defects in the main body can not be repaired in the light of safety. The main body may be cracked or deformed only after several uses if it is used incorrectly. Dent or swelling of main body, or widening of

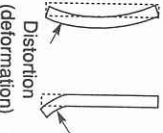
opening may be caused by overload or wrong manner of use. If the defect is repaired by welding, hardening or pressing, the original strength is not recovered. When used and controlled correctly, the clamp may be safely used for a long time only by replacing parts.

(Shackle)

Elongation of hole (deformation)



Elongation of hole (deformation)



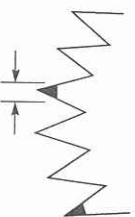
Distortion (deformation)

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.

REPLACE

(Cam and pad)

Wear limit width of cam, pad 0.5mm 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.

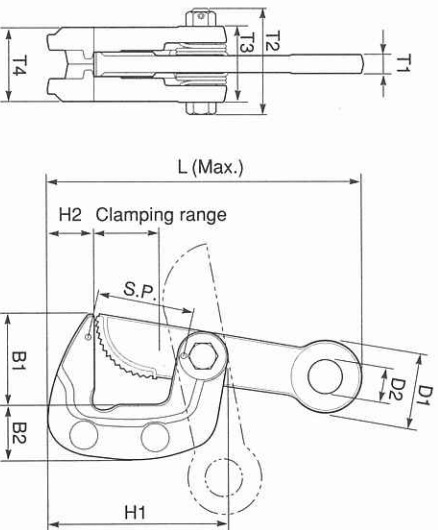
Lift, carry, touch down slowly. Be careful not to hit against surrounding objects while carrying. Keep off hands. Do not enter hazardous zone. Always pay attention to safety.

Horizontal Lifting Clamp

Model : HPC-N

Operation method

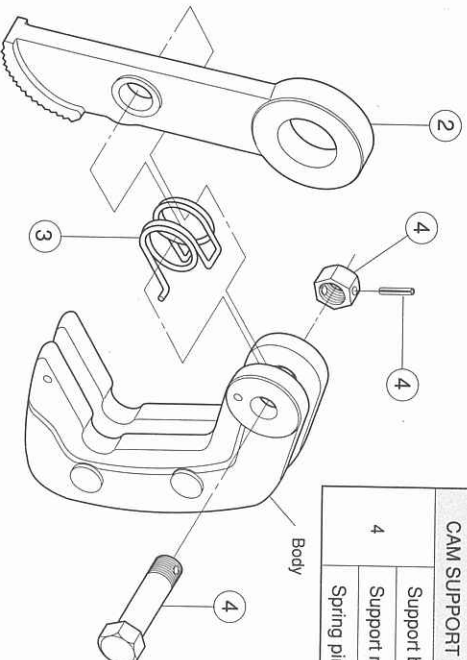
1. Remove iron powder, sand, oil, stone or other harmful deposits on the steel plate, cam and pad of the body.
2. Insert steel plate (Object to be lifted) to the full depth of the opening part of body pushing down the shackle a little bit.
3. When detaching steel plate, remove the clamp by pushing down the shackle of clamps after loosed wire rope.



Item No.	Rated capacity (ton)	Clamping range (mm)	L	H1	H2	B1	B2	D1	D2	T1	T2	T3	T4	S.P.	Weight (kg)
HPC 0.5N	0.5	0~35	170	96.5	25	51.5	31	40	18	10	57	41.2	40.2	52	0.9
HPC 1N	1	0~40	204	117.0	32	59.0	39	50	23	13	72	52.0	51.0	61	1.8
HPC 2N	2	0~50	268	152.5	33	73.0	52	67	30	17	92	68.0	67.0	76	4.0
HPC 3N	3	0~60	329	181.0	51	88.0	62	82	36	22	108	82.0	80.0	90	6.8
HPC 5N	5	0~80	415	236.0	66	117.0	78	101	46	28	138	104.0	102.0	121	15.0

Replacement parts and fittings (Model : HPC-N)

Part No.	Part Name	Item No.
2	Cam	HPCT
3	Spring	HPCS
CAM SUPPORT BOLT ASSEMBLY		
4	Support bolt for cam	
	Support nut for cam	
	Spring pin	



Replacement procedure for cam

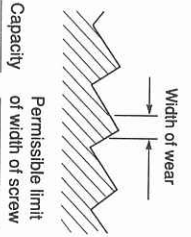
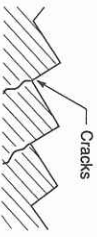
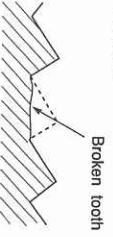
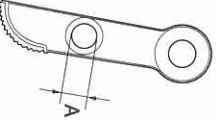
Disassembling of cam

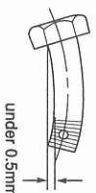
Pull out spring pin in nut side, and remove bolt and nut.

Then, pull out ends of spring from spring hole of body with edge of Screw Driver of linkes.

Reassembling of cam

After installed spring onto cam, insert ends of spring into spring holes of body. Join bolt holes of cam and body in line. Then, insert bolt and tighten bolt and nut. After tightend and nut, insert spring pin into pin holes of nut and bolt.

SECTION	INSPECTING METHOD	PERMISSIBLE LIMIT	CAUSES OF THE TROUBLE								
Cam	Visually check and measure the amount of wear.	 <table border="1" data-bbox="1061 498 1220 733"> <tr> <td>Capacity</td> <td>Permissible limit of width of screw</td> </tr> <tr> <td>0.5T</td> <td rowspan="5">under 0.5mm</td> </tr> <tr> <td>1T</td> </tr> <tr> <td>2T</td> </tr> <tr> <td>3T</td> </tr> <tr> <td>5T</td> </tr> </table>	Capacity	Permissible limit of width of screw	0.5T	under 0.5mm	1T	2T	3T	5T	<ul style="list-style-type: none"> * Natural wear from use * Wear from clamping hardened material
	Capacity	Permissible limit of width of screw									
	0.5T	under 0.5mm									
1T											
2T											
3T											
5T											
Visually check of use color dyes to locate cracks at the base of the cam teeth.		<ul style="list-style-type: none"> * Overloading * Dynamic loads * Damage from clamping hardened material 									
Visually check for broken teeth.		<ul style="list-style-type: none"> * Overloading * Natural wear from use * Damage from clamping hardened material 									
Visually check and measure the pin hole for wear or deformation		<p>Replace when the A dimension of the pin hole exceeds 0.5mm beyond standard dimension.</p> <ul style="list-style-type: none"> * Overloading * Natural wear from use * Insufficient lubrication 									

SECTION	INSPECTING METHOD	PERMISSIBLE LIMIT	CAUSES OF THE TROUBLE
Cam pin	Measure the shaft section and inspect for wear.	Replace when the clearance between the pin and hole exceeds 1mm, or when the cam swings largely from excessive play.	<ul style="list-style-type: none"> * Overloading * Natural wear from use * Insufficient lubrication
	Visually check and measure for bends and other forms of deformation.	Replace when the deformation exceeds 0.5mm, or when the cam does not move smoothly. <div style="text-align: center;">  <p>under 0.5mm</p> </div>	<ul style="list-style-type: none"> * Overloading * Dynamic loads * Too large hoisting angle
Cam spring	Confirm that the nut is securely tightened and the spring is in place.	Replace when the nut or spring pin are damaged or loss.	<ul style="list-style-type: none"> * Overloading * Too large hoisting angle
	Visually confirm that there is a constant initial spring force when the cam is closed.	Replace when deformation reduces the spring force and prevents the cam from moving smoothly.	<ul style="list-style-type: none"> * Fatigue from repeated use * Too large hoisting angle
Cam spring	Confirm that there is a constant spring force when the cam is in the maximum open position.	= Same as above=	= Same as above=