

INSTRUCTION MANUAL

Screw Clamps for Steel <All-direction type>

Models SBN, SBB, SBb
and SBC



World wide lifting equipment
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Agents / Distributors :

Please be sure to read this instruction manual
before using the clamps.
Please give a copy of this manual to each person
who will use the clamps. If you want extra
manuals, please request them from your
distributor or our business office.

Quality Management System
ISO9001 Certified



ISO 9001
A.C.NO.YKA 0200132

Design, Manufacture, Maintenance and Management



GREETINGS

Thank you very much for purchasing "Eagle's screw clamp". Before using this clamp, please be sure to read this instruction manual thoroughly so that you can use it safely, as intended.

As an expert in lifting equipment, we also offer special safety measures for extra assurance, such as regular inspections made by our traveling services specialists and replacement of defective parts, to help you manage the maintenance of the clamps you purchase. Since our clamps are used around the world, we conduct our inspection trips according to a schedule, except in emergencies.

Regular, owner-performed inspections for clamps and lifting equipment currently being used, and records of the inspection details, are required by occupational safety and health regulations, regardless of the equipment manufacturer. Therefore, we would like to urge you to perform regular inspections that conform with the occupational safety and health regulations, and take extra time to consider how to prevent accidents when using lifting equipment.

Also, refer to the table of inspection standards later in this document for details about maintaining and inspecting Eagle clamps. If any abnormality is found in a clamp, stop using it immediately. Replace the defective parts or repair the clamp before returning it to service.

Discard parts that cannot be repaired in order to prevent accidents.

Please feel free to consult any store dealing in Eagle clamps, or the Eagle Clamp business office nearest you, to request replacement parts, repair parts, inspection services, products, etc.

This instruction manual will be needed for maintenance and inspection. After reading this manual, carefully store it together with the warranty card and your inspection reports, where any worker can refer to them as needed.

Helpful tip for user registration and clamp registration

Since these registrations are important data in managing the maintenance of your clamps, please be sure to fill out the written confirmation of the warranty details, that is attached to the warranty card, and return it to us.

(When you purchased our product outside of Japan, please be sure to contact the local distributor where you purchased it.)

1. General Handling Precautions

DANGER	
1. Anyone who is not completely familiar with the contents of the instruction manual and the meaning of any warning label should not use the clamps. 2. Unlicensed personnel should never be allowed to operate a crane or perform sling work. 3. While objects are being lifted and transported or turned over, everyone must stay clear of the falling and swinging range of the objects being lifted. 4. Do not use the clamps in any operation other than when performing sling work.	 PROHIBITED ACTION
5. Be sure to inspect the clamps before starting operation each day and also carry out periodic inspections.	 INSTRUCTION

DANGER	
5. The load of an object to be lifted must be within the allowable range for the clamp you intend to use. 6. The thickness of the object to be lifted must be within the specified range of the clamp you intend to use.	 INSTRUCTION
CAUTION	
7. Do not remove any warning label attached to a clamp. If the details on any warning label are unclear, do not use the clamp. 8. Do not use clamps in the following conditions. <ul style="list-style-type: none">• If the temperature of the clamps is higher than 150°C or the air temperature is lower than -20°C• In or around strong acid or alkali liquids 9. When working with clamps, only use slings that are suitable for the particular sling work.	 PROHIBITED ACTION

2. Checking Clamps before Starting Operation

DANGER	
1. Do not use clamps which are not suitable for the operation being performed. 2. Do not use deformed, cracked, inoperative or worn clamps. 3. If any of the objects to be lifted fit any of the following descriptions, do not use clamps to lift them. <ul style="list-style-type: none">• Fragile materials• Very high hardness or low hardness materials, or materials that have low internal strength• A clamping area on a member with a sloping face, or tapered members 4. Check the model, maximum WLL, and effective thickness marked on the clamps. Also, make sure the label shows that an inspection has been carried out recently.	 PROHIBITED ACTION

3. Use and Sling Work

DANGER	
1. Do not use a clamp as a single lifting point. (Excluding special-purpose or custom-ordered goods) 2. Clamps should not be used with any of the following lifting methods. (Combined lifting, lifting with pads, double-level lifting, lifting multiple objects using separate clamps suspended from one hook, or lifting by clamping the side of an object) 3. Do not use clamps to pull out sheet metal pilings or to lift them vertically. 4. If a strong wind is expected, this is a dangerous condition and you should not do any lifting. 5. Do not use clamps on vehicle-type construction machines which are not equipped with crane functions.	 PROHIBITED ACTION

DANGER	
6. Install at least two clamps, in separate positions on the object to be lifted, so that the object can be kept in balance in a stable orientation.	 Two-point lifting
7. The clamp lifting angle and the sling width angle should be within the specified angle for each model. 8. Insert the object to be lifted completely into the throat of the clamp. 9. If you are using a clamp with a lock device, be sure to lock the locking handle.	 INSTRUCTION
CAUTION	
10. Do not use clamps if there is any material, such as oil, paint, scales, rust, etc., in the clamping area on the object to be lifted. 11. Do not throw clamps or drag them across the ground.	 PROHIBITED ACTION

4. Crane Operation

DANGER	
1. Never lift an object which is outside of the allowed WLL range for clamps. 2. Do not operate a crane in a manner such that the object being lifted or the clamps may be banged by anything else. 3. Never allow a worker to ride on an object being lifted with clamps. Never use clamps to lift people in any way. 4. Do not use clamps for ground lifting. 5. Do not open the lock of a clamp while an object is suspended. 6. Do not allow clamps which have been removed from an object to strike the object and do not allow them to hit any nearby objects.	 PROHIBITED ACTION

DANGER	
7. When raising a crane with clamps suspended from it, stop raising when the load is first applied to the lifting shackle and check the clamps for safe installation (depth of insertion and locked condition). 8. Stop the crane before landing an object and check the following. (Angle of the object being lifted, possibility of its turning over, and the landing site and the surrounding area for safety hazards.)	 INSTRUCTION
CAUTION	
9. Do not operate a crane in a fashion that allows objects being lifted to drag on the ground. 10. While an object is being lifted with clamps, do not leave the driver's seat of the crane (winch etc.).	 PROHIBITED ACTION
11. Raising or lowering the crane should be done slowly and carefully.	

5. Maintenance, Inspection, Storage and Modifications

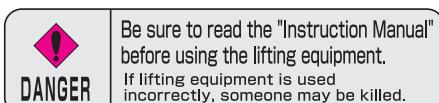
DANGER	
1. Never modify the clamps or their accessories. 2. Do not weld or heat the clamps or their accessories. 3. Never use any repair or replacement parts other than genuine parts purchased from us. 4. Store any clamps that must be repaired in a separate place, to prevent them from being used by mistake.	 PROHIBITED ACTION

DANGER	
<p>5. Maintenance, inspections and repairs should only be performed by a qualified person (with sufficient expertise), designated by the company that owns the clamps.</p> <p>6. If any abnormal conditions are seen in the clamps during maintenance and inspection, do not keep using them. Repair them immediately or discard them.</p> <p>7. Remove any paint, sludge, etc. from the movable sections, cams, and swivel jaw (catches) of the clamps.</p>	
INSTRUCTION	INSTRUCTION
<p>8. When performing maintenance, or making inspections or repairs, be sure to detach any object that the clamps are attached to.</p> <p>9. When performing maintenance, or making inspections or repairs, be sure to use a sign that says "Being Inspected" which indicates that an inspection is being carried out.</p> <p>10. Be sure to lubricate the sliding sections of the clamps such as the rotating sections (around pins) and the guide grooves.</p> <p>11. Be sure to store the clamps indoors.</p>	
INSTRUCTION	INSTRUCTION

The following warning label is attached to each clamp.

When using a clamp, make sure that it is present.

● Warning label

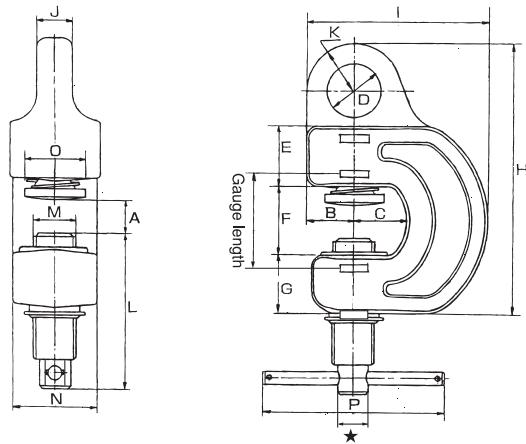


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1. Specification and Dimensions/Construction and Part Names

Model SBN

● Dimension drawing



● Specification table ★The width across flats on the hexagonal head of the clamp screw is 21 mm.

Model	WLL Min. - Max. (kg)	Effective thickness A(mm)	Dimensions (mm)								
			B	C	D	E	F	G	H	I	J
SBN-300	60~ 300	1~25	19	25	φ23	26	41	26	131.5	74	14
SBN-500	100~ 500	1~25	23	25	φ27	29	41	29	140	86	15
SBN-800	160~ 800	25~50	26.5	34	φ30	29	66	29.5	174.5	110.5	16
SBN-1	200~1000	1~30	33	33	φ35	35.5	49.5	36	181.5	113	18
SBN-2	400~2000	5~30	35	35	φ36	41	55	40	195	127	25
SBN-3	600~3000	5~35	40	43	φ45	47.5	61	45.5	223	150	30
SBN-5	1000~5000	10~40	47	45	φ50	52	73	55	260	177	35

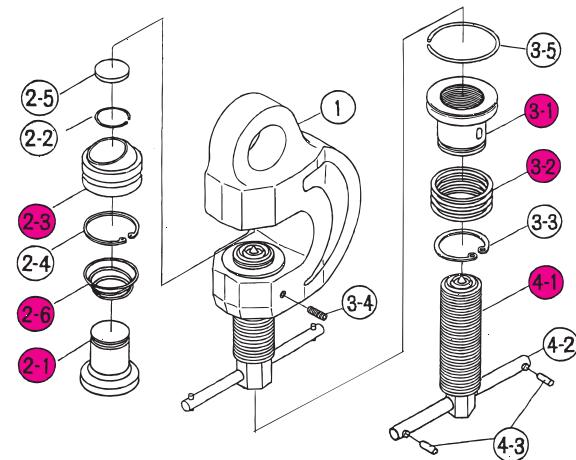
Model	Dimensions (mm)							Gauge length (mm)	Product weight (kg)	※Specified tightening torque
	K	L	M	N	O	P	Q			
SBN-300	21.5	92	φ18	43	φ27.5	150	φ15	50	1.2	1470N · cm
SBN-500	24	96	φ20	46	φ27.5	150	φ15	50	1.8	1470N · cm
SBN-800	29	96	φ20	48	φ27.5	150	φ15	80	2.4	1470N · cm
SBN-1	35.5	109	φ24	60	φ37	150	φ22	60	3.8	1470N · cm
SBN-2	35	117	φ28	65	φ43	150	φ25	70	5.6	1960N · cm
SBN-3	40	134	φ32	70	φ50	150	φ30	80	8.3	2450N · cm
SBN-5	47	143.5	φ38	84	φ60	200	φ35	90	13.8	2450N · cm

※Be sure to tighten to at least the specified tightening torque.

※Q: Bearing dimensions

● Assembly and construction drawing

Model SBN



● Part names

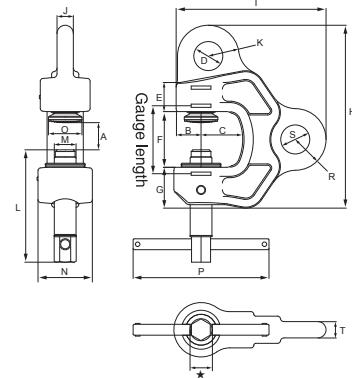
Model SBN

Part No.	Description	Sub No.	Part name	Q'ty
1	Main body			1
		2-1	Swivel jaw	1
		2-2	Circlip	1
		2-3	Bearing	1
		2-4	Snap ring for the swivel jaw	1
		2-5	Bottom plate	1
2	Swivel jaw			1
		2-6	Conical spring	1
		3-1	Pressure nut	1
		3-2	Compression spring	1
		3-3	Snap ring for the pressure nut	1
		3-4	Setscrew	1
3	Pressure nut			1
		3-5	Clamping confirmation line (circular ring)	1
		4-1	Clamp screw	1
		4-2	Clamp handle	1
		4-3	Spring pin	2

● Lubrication points

Models SBB, SBb and SBC

● Dimension drawing



★ The width across flats on the hexagonal head of the clamp screw is 21 mm. (except Model SBb-8)



● Specification table

Model	WLL Min. - Max. (kg)	Effective thickness A(mm)	Dimensions (mm)									
			B	C	D	E	F	G	H	I	J	K
SBB-500	100~500	1~25	23	25	27	22	41	29	140	112	15	24
SBB-1	200~1000	1~40	27.5	45	32	31	61	46	203	165.5	18	34
SBB-1	200~1000	40~70	27.5	65	32	36.5	92	43	234	186.5	18	34
SBB-2	400~2000	1~40	35	43	36	44	66	45.5	218	183	25	38.5
SBB-3	600~3000	5~35	40	47.5	45	42	64	61.5	245	170	30	42.5
SBB-3	600~3000	35~70	42	65	40	47.5	99	61.5	290.5	236	24	42
SBB-5	1000~5000	10~40	48	55	50	52	75.5	66.5	276	213	35	47
SBB-5	1000~5000	40~80	45	92	—	83	115	87	285	282.5	—	—
SBb-8	1600~8000	65~100	49	92	—	97	146	101	344	280	—	—
※ SBC-5	1000~5000	20~80	45	92	—	83	115	87	285	282.5	—	—

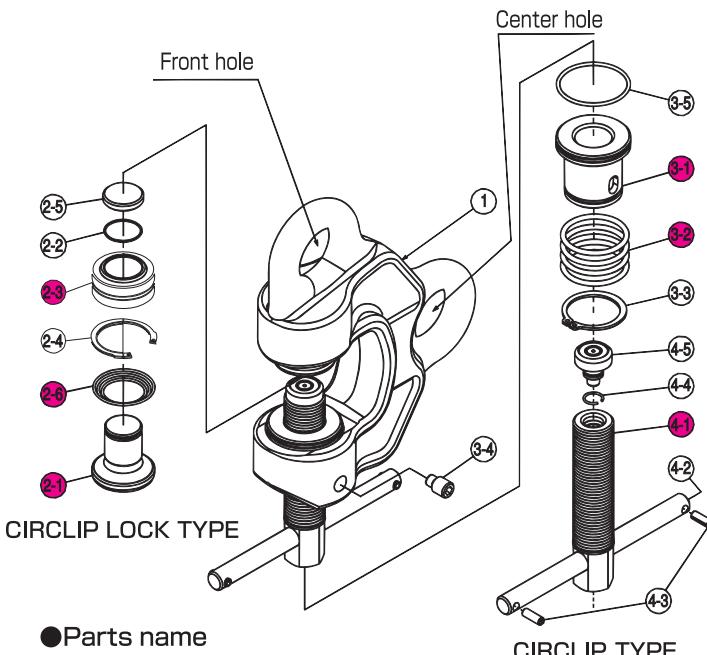
Model	Dimensions (mm)									Gauge length (mm)	Product weight (kg)	*Specified tightening torque
	L	M	N	O	P	Q	R	S	T			
SBB-500	96	20	46	27.5	150	15	24	27	15	50	1.8	1470N · cm
SBB-1	124	24	55	37	150	22	34	32	18	75	4.0	1470N · cm
SBB-1	125	28	65	37	150	22	34	32	18	110	5.5	1470N · cm
SBB-2	134	32	74	43	150	25	36	32	25	80	7.6	1960N · cm
SBB-3	137.5	36	80	50	200	30	30	31	38	80	8.8	2450N · cm
SBB-3	157	40	96	50	200	30	42	40	24	120	13.1	2450N · cm
SBB-5	157	40	96	60	200	35	45	37	44	90	15.8	2450N · cm
SBB-5	175	46	107	60	200	35	57.5	60	40	130	24.4	2450N · cm
SBb-8	190	64	128	70	200	40	52	41	40	170	31.6	2450N · cm
※ SBC-5	207.5	46	107	60	200	35	57.5	60	40	130	24.5	2450N · cm

※ The SBC model clamp is specially designed for vertical lifting.
Be sure to tighten to at least the specified tightening torque.

Q: Bearing dimensions

● Assembly and construction drawing

Model SBB



● Parts name

Model SBB

Part No.	Description	Sub No.	Part name	Q'ty
1	Main body			1
2-1			Swivel jaw	1
2-2			Circlip	1
2-3			Bearing	1
2-4			Snap ring for the swivel jaw	1
2-5			Bottom plate	1
2-6	Pressure nut		Conical spring	1
3-1			Pressure nut	1
3-2			Compression spring	1
3-3			Snap ring for the pressure nut	1
3-4			Setscrew	1
3-5	Clamp screw		Clamping confirmation line (circular ring)	1
4-1			Clamp screw ☆	1
4-2			Clamp handle	1
4-3			Spring pin	2
4-4			Circlip ☆	1
4-5			Edge pad ☆	1

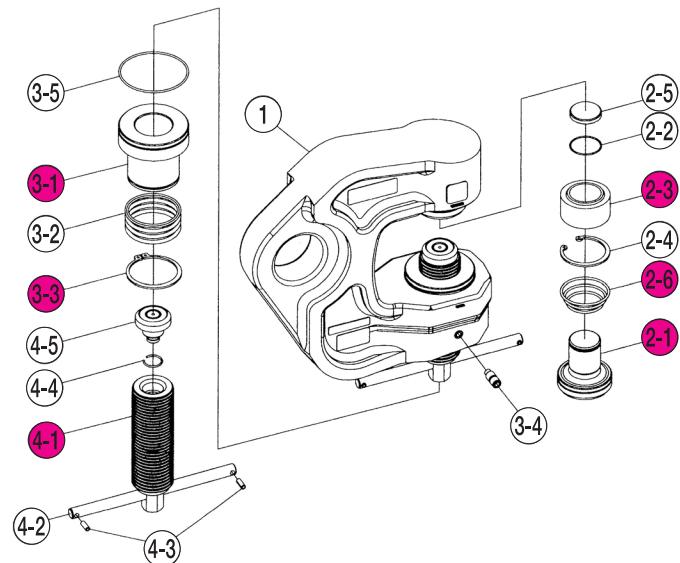
● Lubrication points

● Sub No. 4-1, 4-4 and 4-5 are set item.

2. Construction and Operating Mechanism

● Assembly and construction drawing

Models SBb and SBC



● Parts name

Models SBb and SBC

Part No.	Description	Sub No.	Part name	Q'ty
1	Main body			1
2	Swivel jaw	2-1	Swivel jaw	1
		2-2	Circlip	1
		2-3	Bearing	1
		2-4	Snap ring for the swivel jaw	1
		2-5	Bottom plate	1
		2-6	Conical spring	1
3	Pressure nut	3-1	Pressure nut	1
		3-2	Compression spring	1
		3-3	Snap ring for the pressure nut	1
		3-4	Setscrew	1
		3-5	Clamping confirmation line (circular ring)	1
4	Clamp screw (with handle)	4-1	Clamp screw ☆	1
		4-2	Clamp handle	1
		4-3	Spring pin	2
		4-4	Circlip ☆	1
		4-5	Edge pad ☆	1

● Lubrication points

☆ Sub No. 4-1, 4-4 and 4-5 are set item.

※ The SBC model clamp is specially designed for vertical lifting.

(1) Mechanism that produces the gripping force

This clamp can grip steel materials securely. The clamping force increases in proportion to the load.

The clamp can be engaged from any direction (360 degrees). These flexible features are based on the following principles.

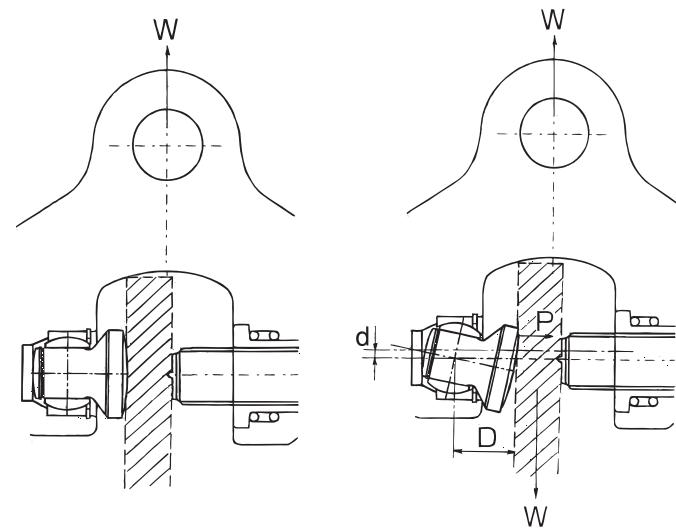
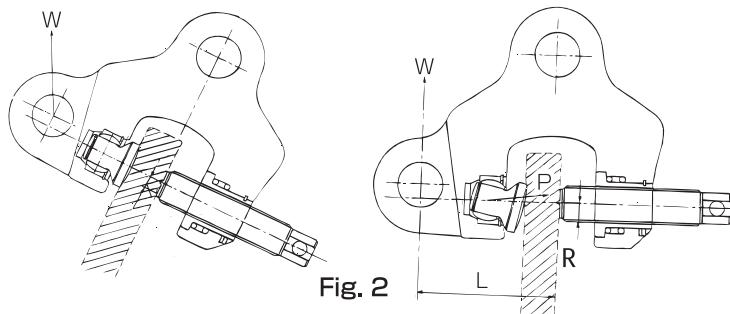


Fig. 1

1. When a steel plate is lifted or pulled in the direction of the line of force, as shown in Fig. 1, the swivel jaw is rotated by the friction due to the initial load, and by the load (W) itself, to produce a clamping force (P). Normally, this force will be about 2 - 3 times the weight of the load being lifted. (SBb, SBb, and SBC)

$$P = \frac{D}{d} \times W \times k$$

k : Mechanical efficiency (0.1~0.5)

Fig. 2**Fig. 2**

2. When a steel plate is lifted or pulled in the direction of the line of force, as shown in Fig. 2, another clamping force is created by using the front hole of the clamp to pull the object, in addition to the clamping force described in Section 1. This force is also roughly 2 - 3 times the weight of the load being lifted or the pulling force applied. (All models)

$$P = \frac{L}{R} \times W \times k \quad k : \text{Mechanical efficiency (0.1~0.5)}$$

The effective rotation angle and the amount that the swivel jaw protrudes vary with the model. The values are as shown in Table 1.

Table 1
Models SBN and SBB Operation details of the swivel jaw

Maximum WLL (ton)	Allowable tilt angle θ (°)	Amount protruding δ (mm)
500kg	12	1.6
800kg	12	1.6
1	12	2.0
2	12	2.5
3	12	3.0
5	12	3.5
8	12	5.0

3. Pressure on the bottom of the swivel jaw ($R = P$)

This clamp produces a clamping force both by the rotation of the bearing (by the rotation of the swivel jaw) and by the protrusion of the swivel jaw at the bottom. This force (R) is shown as follows.

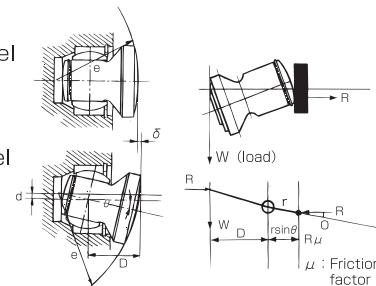
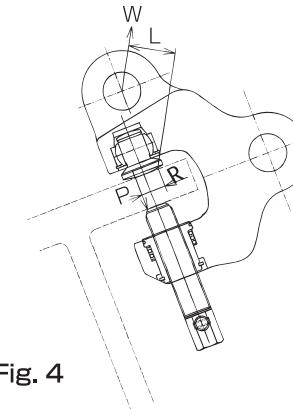
According to Fig. 3,

$$R \times \sin \theta + R \times \mu \times \cos \theta = WD$$

$$WD$$

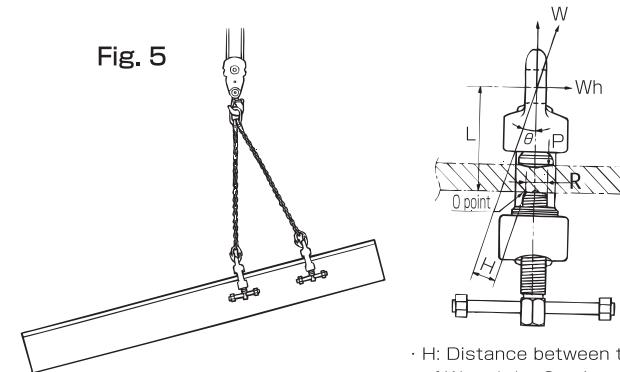
$$R = \frac{WD}{r(\sin \theta + \mu \cos \theta)}$$

If $D = 3$, $r = 2$, $\theta = 15^\circ$, and $\mu = 0.3$, a pressure of $R = 2.7W$ (approx. 2.7 times the load) is obtained.

**Fig. 3****Fig. 4**

4. When a steel plate is lifted or pulled, as shown in Fig. 4, a clamping force of $P = L/R \times W \times k$ [k : Mechanical efficiency (0.1~0.5)] plus the clamping force due to the rotation of the swivel jaw are both applied. Therefore, the steel plate is securely clamped. When a steel plate is lifted or pulled, as shown in Figs. 1, 2 and 4, and the direction of the load is changed to the lateral, only the L/R ratio changes.

The clamping force is maintained in any direction.

Fig. 5

- H : Distance between the vertical line of W and the O point
- W_h : Component force in the lateral direction (for the central axis of the clamp) of W
- P : Presser force (clamping force)
- $W_h = W \sin \theta$
- θ : Tilt of the clamp

5. When a steel plate is lifted at an angle, as shown in Fig. 5, the following clamping force is produced between the swivel jaw and clamp screw in the clamp.

If the torque around the O point is $\Sigma = \theta$, according to $W_h + WRL = PR$

$$P = \frac{W_h + W \sin \theta L}{R}$$

$$= W(H + L \sin \theta) / R$$

However, among these clamping forces (P) that are produced, the largest force is applied to the load being lifted.

3. Product performance

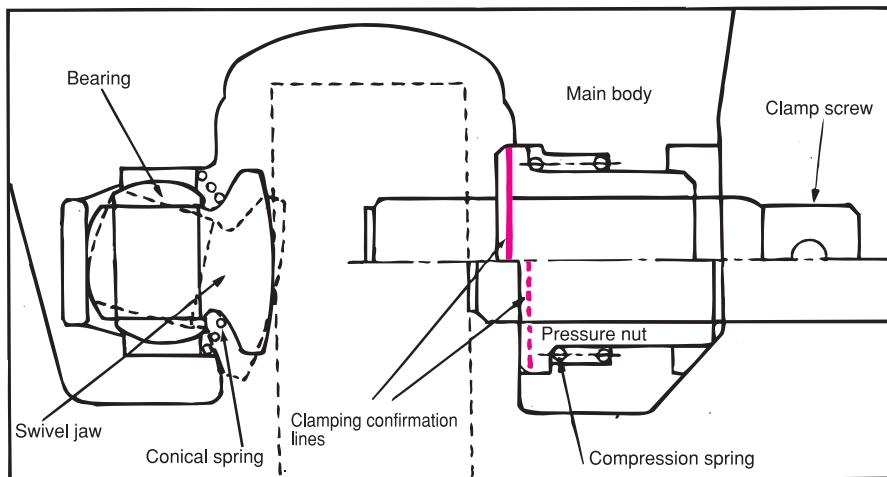
(2) Utility of the conical spring

The swivel jaw is always held in the proper position due to the springs that control the attitude of the swivel jaw. The clamp has springs inside of it so that the swivel jaw will never move to the position shown by the dotted line.

(3) Clamp-engaged confirmation mechanism

When the clamp screw is tightened, the pressure nut moves into the main body, as shown by the solid line (lower half). Therefore, you can securely confirm whether or not the clamp screw has been tightened sufficiently.

Additionally, you can check visually whether the clamp screw is tightened sufficiently due to the fact that the clamping confirmation line is normally hidden in the main body. The design of the clamp helps to keep you from forgetting to tighten the clamp screw.



(4) Edge pad type clamp screw (patented mechanism)

Since the edge pad rotates relatively easily against the clamp screw main body, even when it presses on the joint surface of an object to be lifted and then the object is tightened by rotating the clamp screw, the edge pad will not rotate on the object being lifted, thus ensuring stable clamp operation.

This also greatly reduces wear on the toothed edges of the edge pad.

(1) Safety factor

- Test load (proof-load): 2.5 times the maximum WLL
- Safety factor : 5 times or greater
(According to Articles 213 and 214 in Chapter 8 of the Japanese Crane Safety Regulations)

4. Operation Manual for Screw Clamps (Models SBN, SBB, SBb and SBC)

(1) Purpose

The purpose of this manual is to give you the information needed to perform sling work safely and to prevent accidents.

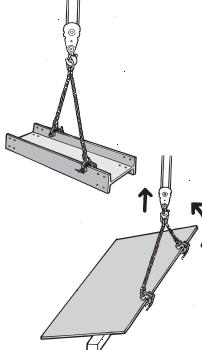
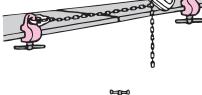
If the wrong method is employed when using clamps for sling work, there is a possibility that the object being lifted may fall, people may be injured or die and the clamps may be seriously damaged. Therefore, all workers should be required to master the correct methods for using these clamps before actually using them for work.

(2) Scope

This manual specifies the working standards for screw clamps (models SBN, SBB, SBb and SBC) that are used as a part of the sling equipment.

(3) Types of clamps

When sling work is performed, the clamps used must be suitable for the working requirements.

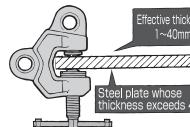
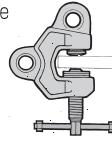
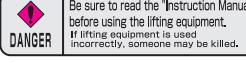
Job details	Screw clamp selection	Criteria used to evaluate the job requirements
Pulling out / turning over / lifting and transporting of steel plates, shaped steel, etc.	 Model SBB  Model SBN  Models SBb and SBC 	<ul style="list-style-type: none"> Lifting clamp The clamp is designed so that the opening section of the clamp is in the same direction as the direction of the load imposed by the objects being lifted. Lifting operation This refers to operations in which objects are transported, turned over or pulling-out using lifting machines such as cranes. ※ The SBC model clamp is specially designed for vertical lifting.
Pulling in, positioning and clamping	 Model SAS  Model SAR  Models SRN and FXJ	<ul style="list-style-type: none"> Pulling and positioning jig These clamps are used for clamping or positioning members using pulling jigs or hydraulic jacks. "Clamps not used for sling work"

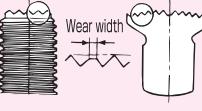
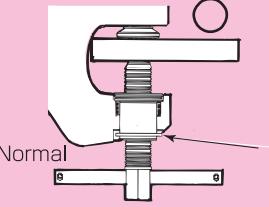
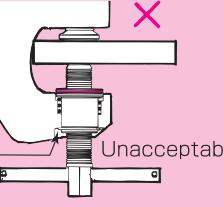
(4) Items to be checked before beginning work

Before starting operation each day, be sure to inspect the clamps that will be used and the requirements of the job, as well as the following items.

4-4-1

Item	Item to be checked	Action	Precautions
(1) Checking the details of the clamp markings	<p>DANGER</p> <ul style="list-style-type: none"> Check the following items on the side of the clamps' main body. <ul style="list-style-type: none"> Model Maximum WLL Effective thickness Label which shows that an inspection has been carried out recently (Only used to indicate that an inspection was made by the manufacturer in Japan.) 	<p>If there is no marking on a clamp or if it can't be read, do not use the clamp.</p> <p>If a clamp does not have a label which shows that an inspection was carried out recently, or if the inspection is out of date, do not use it.</p> <p>However, in-house regulations provided by your company take priority.</p>	<p>If there is no marking on a clamp, or if it can't be read, do not leave the clamp on the job site.</p>
(2) Checking the weight of the object to be lifted	<p>When calculating the weight of the load, take into consideration the effects of an unbalanced load and of the load impact, if it should hit something.</p> <p>Do not use clamps with any object whose mass/weight exceeds the maximum WLL, or is less than the minimum WLL (refer to the specification tables).</p> <p>Even when performing 3-point or 4-point lifting, you must use clamps whose maximum WLL is the same as when performing 2-point lifting.</p> <p>INSTRUCTION 600kg \leq WLL \leq 2000kg</p> <p>INSTRUCTION For 1 ton</p> <p>INSTRUCTION For 1 ton</p> <p>DANGER</p> <ul style="list-style-type: none"> The mass/weight of the object to be lifted must be within the allowable WLL range for the clamp you intend to use. <p>Check the WLL for each model in the specification tables, from page 10 to page 12.</p>	<p>Use clamps with a suitable WLL for the load to be lifted.</p> <p>INSTRUCTION 600kg \leq WLL \leq 2000kg</p> <p>INSTRUCTION For 1 ton</p> <p>INSTRUCTION For 1 ton</p> <p>DANGER</p> <ul style="list-style-type: none"> The mass/weight of the object to be lifted must be within the allowable WLL range for the clamp you intend to use. <p>Check the WLL for each model in the specification tables, from page 10 to page 12.</p>	<p>If the load exceeds the allowable range, the clamps may break or the object may fall out of the clamps.</p> <p>On the other hand, if the object is too light, the force created by the weight of the object, that helps the clamp grab the steel plate, will be reduced. This reduced grip may cause the object being lifted to slip or fall. (Pay attention to objects that may be too lightweight.)</p> <p>If the change in speed is too large when turning over an object, it produces an impact force on the load. Therefore, be sure to work in a smooth and gradual fashion.</p> <p>For multiple-point lifting, refer to "Using a balance" on page 48.</p>

Item	Item to be checked	Action	Precautions
(3) plates to be lifted	Do not force the clamp onto an object whose thickness exceeds the maximum specified thickness.(Lifting a steel plate that is thicker than the specified limit is prohibited.)	Use clamps that have an effective thickness suitable for the thickness of the object to be lifted.	If the object to be lifted is thicker than the specified thickness, it may be impossible to remove the clamps after finishing lifting.
	 PROHIBITED ACTION DANGER ● The thickness of an object to be lifted must be within the allowable thickness range of the clamps you intend to use.		
(4) thickness of plates to be lifted	Do not lift an object whose thickness is less than the minimum specified thickness. (Pay attention when lifting thin steel plates.)	Use clamps that have an effective thickness suitable for the thickness of the object to be lifted.	If the object to be lifted is too thin, there is a danger that the clamp screw may not be tightened sufficiently and the object being lifted may fall due to insufficient clamping force.
	 CAUTION ● The thickness of the object to be lifted must be within the allowable thickness range of the clamps you intend to use.		
(5) label	 DANGER Be sure to read the "Instruction Manual" before using the lifting equipment. If lifting equipment is used incorrectly, someone may be killed. CAUTION ● Do not remove the warning label that is attached to each clamp. If it can't be read, do not use the clamp.	Do not use any clamps without a warning label. If a warning label is not present, be sure to ask us for a replacement and attach it to the clamp	
(6) sling	The safety factors for slings and the fittings used for sling works should meet the following standards. • Wire rope: 6 times or greater • Chain sling: 5 times or greater • Fittings: 5 times or greater ※Complies with the "Safety and Health Law for Sling Work" in Japan CAUTION ● Slings used with clamps should be suitably designed for the sling work you will perform.	Do not use dangerous wire ropes, chain slings, or fittings.	Observe the Safety Regulations in each country strictly. Refer to the [Compatibility table for connecting fittings] on page 24.

Item	Item to be checked	Action	Precautions
(7) Inspection before starting work	Inspect the appearance, tooth wear, and function of the clamps.	When abnormal conditions are encountered, do not use the clamps. Disassemble and inspect the clamp, and replace any defective parts, or send the clamp back to the manufacturer or agent specified by the manufacturer.	For details about the "Inspection of sling equipment", refer to the Safety Regulations in each country.  
	DANGER ● Always be sure to perform all start-up inspection procedures. ※Complies with the "Safety and Health Law for Sling Work" in Japan.	Follow the advice on pages 59 to 70 of the "7. Inspection Manual for Screw Clamps".	
	CAUTION Operation check Check the operation of the clamp screws, pressure nuts, bearings and conical springs.	CAUTION Follow the advice in "Inspection of sling equipment" (refer to "Precautions" in the right column) for mounting slings (chains, wires, fittings, shackles, etc.).	 Wear width limit : Wear of 0.5 mm on any model
(8) Worker qualifications	DANGER Operation check method Loosen the clamp screw to enlarge the opening section, and check the rotation and tilt of the swivel jaw. Tighten the clamp screw to close the opening section. Tighten the screw further to make sure that the pressure nut goes down from the opening section of the main body.	 Normal  Snap ring Unacceptable	
	Workers who are engaged in sling work must be trained and certified for the type of job to be performed. (Check the worker's qualification certificate.) DANGER ● Unlicensed personnel should never be allowed to operate a crane or perform sling worker's. ※Complies with the "Safety and Health Law for Sling Work" in Japan.		

(5) Lifting holes used and operating method

Screw clamps are not regulated by the lifting direction of objects. However, since it may be difficult to attach or remove the clamps depending on how they are used, use the lifting holes where it will be easiest to attach and remove the clamps (tighten the clamp screws).

(6) Compatibility table for connecting fittings

Use connection fittings that are suitable for clamps.

Model	Green Pin shackle	Coupling
SBN-300 (1~25)		CP — 6 (0.5ton)
SBN-500 (1~25)	GPSB-10 (1.0ton)	CPZ — 6 (0.5ton) CP — 8 (1.0ton)
SBN-800 (25~50)	GPSB-13 (2.0ton)	CP — 8 (1.0ton) CP — 10 (2.0ton)
SBN- 1 (1~30)	GPSB-13 (2.0ton)	CP — 8 (1.0ton) CP — 10 (2.0ton) CP — 13 (3.0ton) CPZ — 8 (1.0ton)
SBN- 2 (5~30)	GPSB-16 (3.25ton)	CP — 13 (3.0ton) CPZ — 10 (2.0ton)
SBN- 3 (5~35)	GPSB-22 (6.5ton)	CP — 16 (5.0ton)
SBN- 5 (10~40)	GPSB-25 (8.5ton)	CP — 20 (9.0ton)
SBB-500 (1~25)	GPSB-10 (1.0ton)	CP — 6 (0.5ton) CP — 8 (1.0ton) CPZ — 6 (0.5ton)
SBB-1 (1~40) SBB-1 (40~70)	GPSB-13 (2.0ton)	CP — 8 (1.0ton) CP — 10 (2.0ton) CP — 13 (3.0ton) CPZ — 8 (1.0ton) CPZ — 10 (2.0ton)
SBB-2 (1~40)	GPSB-16 (3.25ton)	CP — 13 (3.0ton) CPZ — 10 (2.0ton)
SBB-3 (5~35)	GPSB-25 (8.5ton)	CP — 16 (5.0ton) (Front hole)
SBB-3 (35~70)	GPSB-25 (8.5ton)	CP — 13 (3.0ton)
SBB-5 (10~40)	GPSB-28 (9.5ton)	CP — 20 (9.0ton) (Front hole)
SBB-5 (40~80) SBC-5 (20~80)	GPSB-28 (9.5ton) GPSB-32 (12.0ton)	CP — 22 (12ton)
SBB-8 (65~100)	Light weight shackle JIS RB-10ton	—

※Screw shackle for Model SBB-8 (65~100) is optional.

※When the large crown section is put into the lifting shackle hole of a clamp, the CPZ coupling can be used with clamps.

※The SBC model clamp is specially designed for vertical lifting.

CAUTION

- The crown section of the shackle should not be put in the lifting holes of Models SBN, SBB, SBB and SBC. If the direction of the load varies while pulling out, turning over or pulling down objects, use couplings.

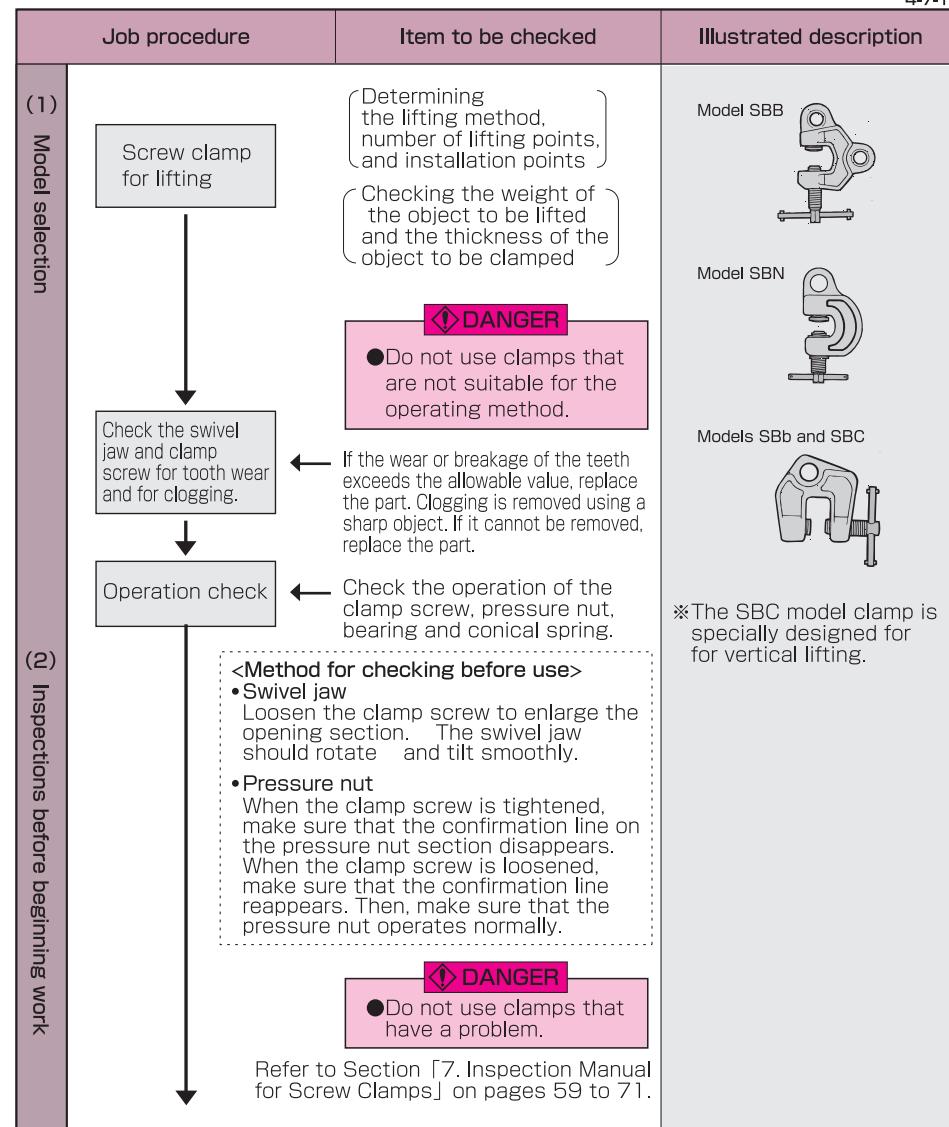
(7) Sling work procedures

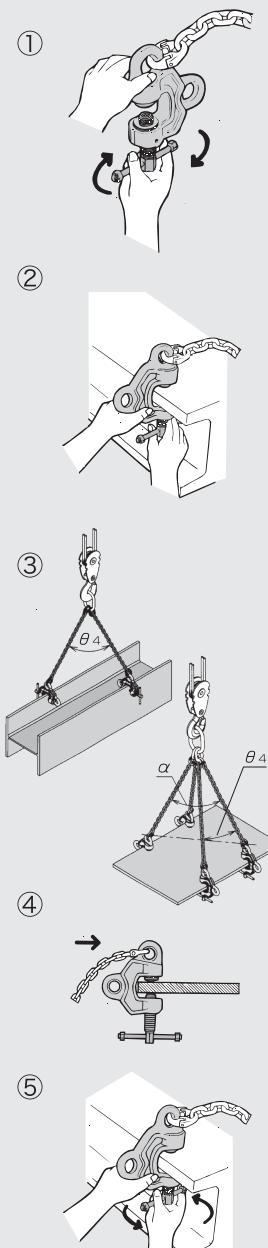
When clamps are used for sling work, the correct procedure must be used for the type of work.

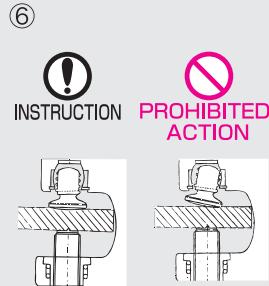
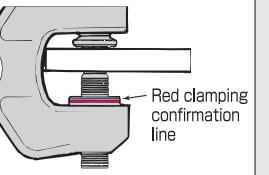
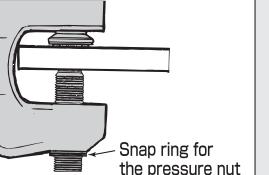
DANGER

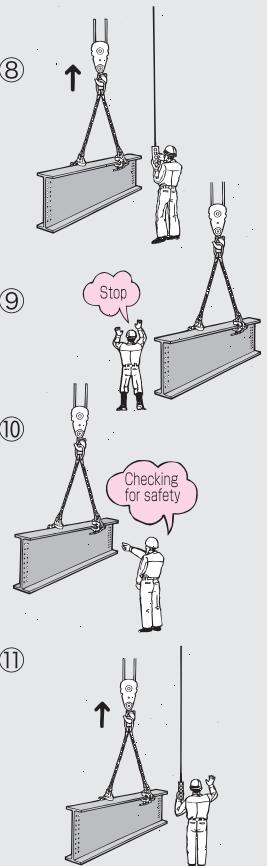
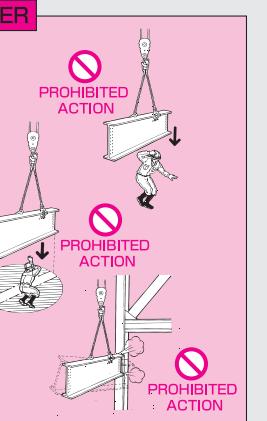
- Anyone who is not completely familiar with the contents of the instruction manual and the meaning of any warning label should not use the clamps.
- Do not use these clamps for any operation other than performing sling work.

4-7-1



Job procedure	Item to be checked	Illustrated description
(3) Clamp attachment	<p>① Enlarging the opening</p> <p>② Checking the installation position</p> <p>③ Checking the sling angle</p> <p>④ Set deeply.</p> <p>⑤ Close the opening section.</p>	<p>Rotate the clamp handle to loosen the clamp screw.</p> <p>Attachment point conditions.</p> <p>CAUTION ● If there is any coating, such as oil, paint, scale, etc., in the clamping area on the object to be lifted, it must be removed completely.</p> <p>DANGER ● Install at least two clamps, at positions on the object to be lifted, so that it can be kept in balance and will remain stable. ● When lifting by raising or lowering a crane, attach the clamps in positions where the clamp handle will not touch the slings, the lifting shackle, the object being lifted, etc. ● When attaching a clamp with the clamp screw pointing upward and lifting an object, be careful not to catch the sling in the clamp handle.</p> <p>DANGER ● In two-point lifting, the sling width angle (θ_4) should be less than 60°. ● In four-point lifting, the diagonal angle (α) should be less than 60°, and the sling width angle (θ_4) between any two clamps on the object should be less than 60°. ● Insert the clamp until the back of the clamp throat opening touches the object to be lifted.</p> <p>Apply the specified tightening torque Refer to the "Specification table" on pages 10 to 12.</p> 

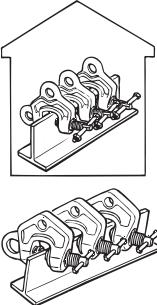
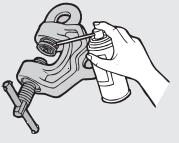
Job procedure	Item to be checked	Illustrated description
(4) Checking the condition and tightness of the swivel jaw	<p>⑥ Check the tilt of the main body and swivel jaw.</p> <p>⑦ Check the tightness.</p>	<p>If the main body and swivel jaw tilt when viewed from the side of the clamp, loosen the clamp screw to adjust the tilt of the main body and swivel jaw, and then retighten the screw.</p> <p>INSTRUCTION PROHIBITED ACTION</p>  <p>How to check the tightness</p> <p><Clamps with a clamping confirmation line> Models SBN, SBB, SBb, and SBC</p> <p>Make sure that the clamping confirmation line (red or white line) marked on the opening side of the pressure nut has disappeared. Then, tighten the clamp screw further.</p> <p>Before tightening</p>  <p>After tightening</p>  <p><Clamps without a clamping confirmation line></p> <p>After tightening, make sure that the snap ring on the underside of the pressure nut is lifted away from the main body.</p> <p><Rechecking after tightening></p> <p>After tightening, try to move the clamp body. Make sure that it no longer moves. If the main body is not secured firmly, retighten the clamp screw.</p> <p>DANGER ● When the clamping confirmation line is seen or the snap ring for the pressure nut does not lift off from the main body, the safety device which prevents the clamp screw from loosening will not work.</p>

Job procedure	Item to be checked	Illustrated description
(5) Pulling out and hoisting	<p>⑧ Hoisting with a crane</p> <p>⑨ Pausing</p> <p>⑩ Checking for safety</p> <p>⑪ Resume lifting with the crane.</p> <p>⑫ Checking the attitude of the object being lifted</p> <p>⑬ The attitude of the object being lifted is good.</p> <p>⑭ Never pass any objects being lifted over people's heads.</p> <p>⑮ While objects are being lifted and transported, or while they are being turned over, be sure that everyone stays clear of the falling and swinging range.</p> <p>⑯ Complies with the "Safety and Health Law for Sling Work" in Japan</p> <p>⑰ Do not operate a crane in a manner such that the object being lifted, or the clamps, may be banged by anything else.</p>	<p>CAUTION ● Raising or lowering the crane should be done slowly and carefully.</p> <p>DANGER ● When hoisting with a crane, stop lifting when the load is first applied to the lifting shackle and check the following items for safety. • Diagonal angle: Less than 60° • Sling width angle between two clamps: Less than 60° (Refer to the Table of sling angles by type on page 73.) • Depth to insert an object into a clamp. • Tightness of the clamp screw • When a clamp is attached with the clamp screw pointing upward, the sling should not be caught by the clamp handle.</p> <p>DANGER ● During a pulling-out operation that accompanies lifting or turning-over, it remains dangerous until the load has been completely applied to the clamps.</p> <p>DANGER ● Never pass any objects being lifted over people's heads.</p> <p>DANGER ● While objects are being lifted and transported, or while they are being turned over, be sure that everyone stays clear of the falling and swinging range.</p> <p>PROHIBITED ACTION ● Complies with the "Safety and Health Law for Sling Work" in Japan</p> <p>PROHIBITED ACTION ● Do not operate a crane in a manner such that the object being lifted, or the clamps, may be banged by anything else.</p>
(6) Lifting and transportation		 

4-7-4

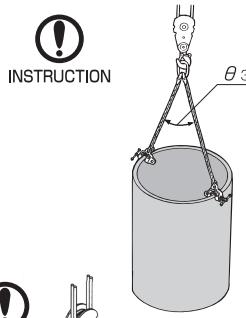
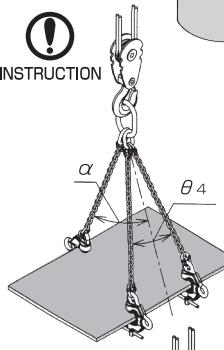
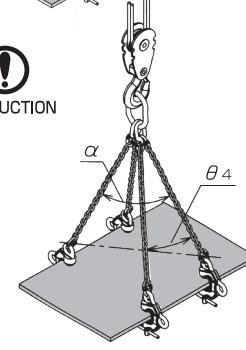
Job procedure	Item to be checked	Illustrated description
(7) Lowering and removing	<p>⑭ Lowering the crane</p> <p>⑮ Stop the crane before the object is set down.</p> <p>⑯ Checking for safe conditions before landing the object</p> <p>⑰ Checking for safe conditions</p> <p>⑱ Resume lowering the crane.</p> <p>⑲ Enlarging the opening</p> <p>⑳ Removing the clamps</p> <p>㉑ Return to page 26 ① for the next operation.</p>	<p>Slowly and carefully</p> <p>DANGER ● Stop the crane before landing the object, and check the following: • The angle of the object being lifted. The possibility that the object may turn over when landed. • The landing site and surrounding area for safety hazards.</p> <p>The object is unbalanced.</p> <p>Carrying out safety procedures</p> <p>Lower the crane until no load is applied to the clamps.</p> <p>Rotate the clamp handle to loosen the clamp screw.</p> <p>Hold the clamp main body and remove it from the object.</p>

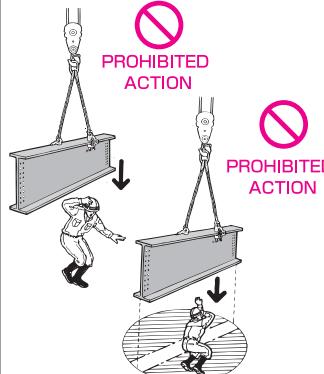
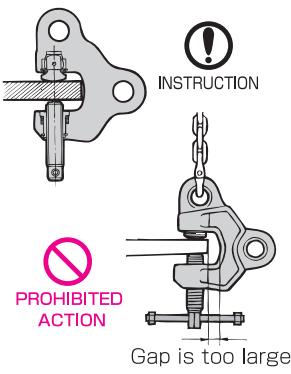
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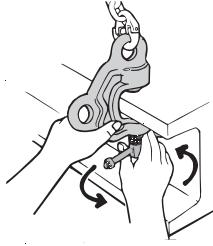
Job procedure	Item to be checked	Illustrated description
(8) Maintenance and storage	<p>22 Greasing</p> <p>23 Storing the clamps in place</p> 	<p>DANGER</p> <ul style="list-style-type: none"> Remove any paint or sludge from the moving parts, swivel jaws, and clamp screws (threads and thread edges) of the clamps. <p>CAUTION</p> <ul style="list-style-type: none"> Be sure to grease the sliding sections, such as the rotating sections (threads of the clamp screws and bottom of the swivel screws) and guide grooves in the clamps. Be sure to store the clamps indoors. <p>22</p>  <p>The places to lubricate are shown in the "Assembly and construction drawing" on pages 11, 13, and 14. Before greasing, wipe off any oil attached to teeth, on the thread edges of swivel jaws and on the clamp screws.</p>

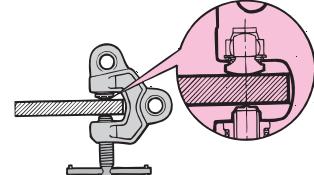
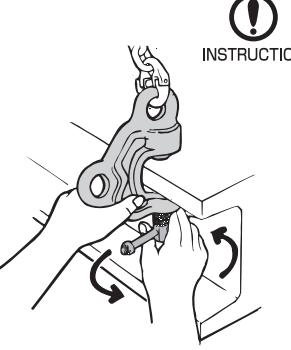
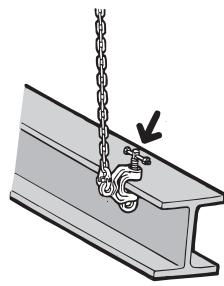
5-1. Precautions for Use

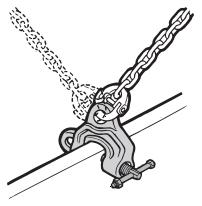
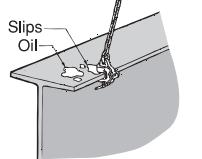
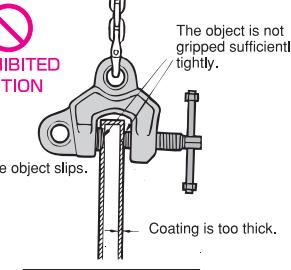
Most of the accidents involving clamps are due to using incorrect techniques for sling work. Operators should be completely familiar with the correct methods for performing sling work and then do their work in a safe fashion.

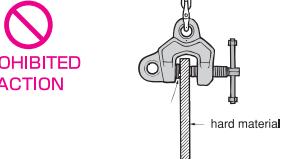
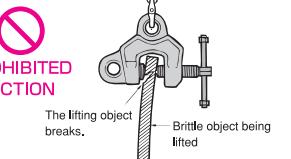
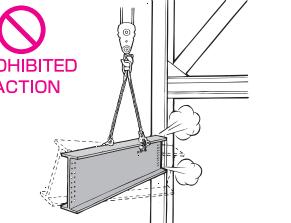
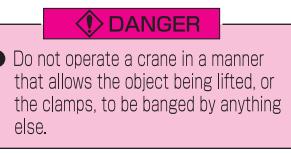
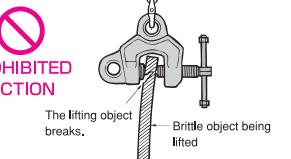
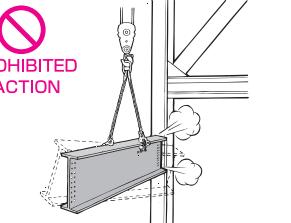
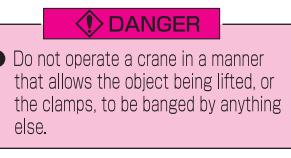
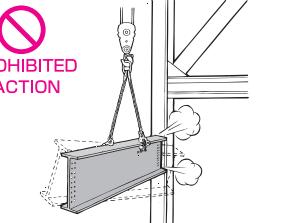
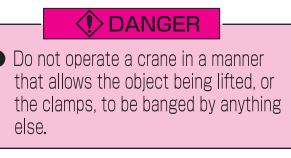
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(1) Never lift objects using a single point.	 <p>INSTRUCTION</p>  <p>INSTRUCTION</p>  <p>INSTRUCTION</p>	Even if an object were lifted at its center of gravity using single-point lifting, the balance point might shift and the clamp can come off. Single point lifting is always very dangerous.	<p>DANGER</p> <ul style="list-style-type: none"> When using two or more clamps, make sure they are the same model of clamp (maximum WLL and effective thickness)
			<p>DANGER</p> <ul style="list-style-type: none"> Do not use clamps in single-point lifting. The center of gravity needs to be determined precisely in order to keep any object being lifted in a stable position. At least two clamps should be attached at positions which will keep the object balanced while it is being lifted. When multiple clamps are used, the diagonal angle (θ_3) should be less than 60°, the angle in the diagonal direction (α) should be less than 60°, and the sling width angle (θ_4) should be less than 60°. For the specific angle limits by model, refer to the "Table of sling angles by type", on page 73.
		<p>Note: 1. In four-point lifting, the angle in the diagonal direction should be regarded as the lifting angle (α), the same as the standard specified by the JCAS (Japan Crane Association Standard), and in three-point lifting, the diagonal angle should be regarded as (α). 2. Even when performing 3-point or 4-point lifting, you must use clamps whose maximum WLL is the same as when performing 2-point lifting.</p>	

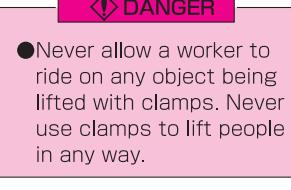
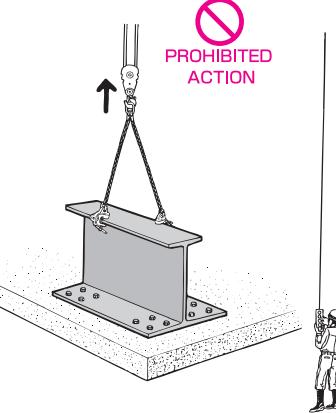
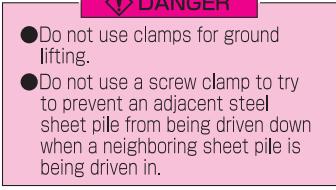
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(2) Be sure that everyone stays clear of the swinging range of the object being lifted.	 <p>DANGER</p> <ul style="list-style-type: none"> Never allow anyone to enter the falling or swinging range of the object being lifted while an object is being lifted or transported, or while it is being turned over. Never pass any objects being lifted over people's heads. 	Since the design of the clamps is such that the clamping force is reduced while an object is being turned over or set down, it is dangerous if anyone enters the falling or swinging range of the object being lifted.	Observe the Safety Regulations in each country strictly.
(3) Attaching clamps securely	 <p>INSTRUCTION</p> <p>Gap is too large.</p> <p>DANGER</p> <ul style="list-style-type: none"> When attaching a clamp to an object, insert the object completely into the throat of the clamp. 	If the object is not inserted completely into the clamp, there is a danger that the clamp will come off.	<p>Depending on the model, the position where the object to be lifted must be inserted is indicated by a red mark or a protruding mark on each clamp. In this case, make sure the object passes this mark and is inserted deeply. Then, hoist with the crane.</p> <p>When clamps are used with material that is less than 1/4 of the maximum effective thickness and the object to be lifted is pulled sideways, the clamp may slip.</p>

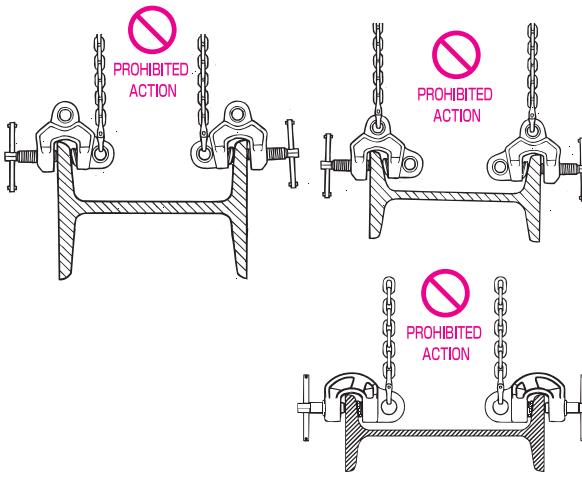
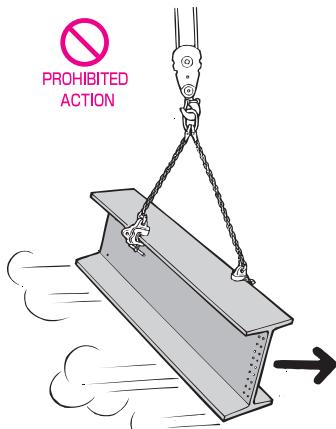
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(4) Tightening the clamp screw	<p>Tighten the clamp screw firmly and make sure that the red clamping confirmation line has disappeared and the snap ring has lifted away.</p>  <p>Before tightening After tightening</p> <p>DANGER</p> <p>INSTRUCTION</p> <p>Red clamping confirmation line</p> <p>Snap ring for the pressure nut</p>		Force similar to when you wring a wet towel strongly.
(5) Precautions about the tilt of the clamp body	<p>Apply the specified tightening torque</p> <p>Refer to the "Specification table" on pages 10 to 12.</p> <p>Without a clamping confirmation line</p> <p>Checking the snap ring</p> <p>After tightening, make sure that the snap ring on the underside of the pressure nut lifts away from the main body. (Refer to the drawing above shown in [After tightening].)</p>  <p>If the clamp body is tilted, loosen the clamp screw. Then, adjust the tilt of the main body and attach the clamp again.</p> <p>PROHIBITED ACTION</p> <p>PROHIBITED ACTION</p>		

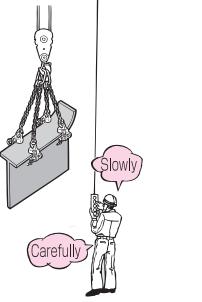
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(6) Checking the tilt of the swivel jaw	 <div style="border: 1px solid black; padding: 5px; background-color: #f0f0ff;"> <p>DANGER</p> <ul style="list-style-type: none"> When attaching a screw clamp, be careful not to tilt the swivel jaw. </div>		<p>If the swivel jaw is tilted, loosen the clamp screw. Then, adjust the tilt of the swivel jaw and tighten the clamp screw again.</p>
(7) Retightening the clamp screw	<p>Before lifting an object, be sure to retighten the clamp screw.</p> 	<p>Once a clamp has lifted an object, the clamping force is reduced.</p>	<p>When an object is being lifted, the teeth of the clamp screw bite into the object. Therefore, since the clamping force is reduced as the teeth bite in, retighten the clamp screw.</p> <p>When retightening, refer to "Checking the clamping confirmation line" of (4) Tightening the clamp screw on P33.</p> <p>Apply the specified tightening torque</p> <p>Refer to the "Specification table" on pages 10 to 12.</p>
(8) Precautions against catching the handle	 <div style="border: 1px solid black; padding: 5px; background-color: #f0f0ff;"> <p>DANGER</p> <ul style="list-style-type: none"> When attaching a clamp with the clamp handle pointing upward and lifting an object, be careful not to catch the sling chain in the clamp handle. </div>	<p>If a sling chain is caught in the clamp handle when an object is being lifted, transported or turned over, there is a danger that the clamp screw will be loosened and the clamp will slip or come off due to shock.</p>	

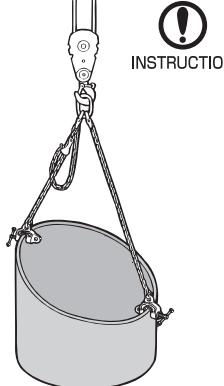
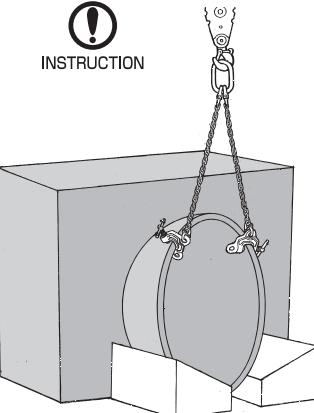
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(9) Using appropriate connection fittings	<p>If the direction of the load changes while pulling out, turning over or pulling down objects, use couplings (Model CP).</p> 		<p>Refer to "Compatibility table for connecting fittings" on page 24.</p>
(10) Lifting materials coated with oil	 <p>Wipe off any oil, and then attach the clamps.</p> <div style="border: 1px solid black; padding: 5px; background-color: #f0f0ff;"> <p>CAUTION</p> <ul style="list-style-type: none"> Before using clamps, remove any oil, paint, rust, scale, etc., from the object to be lifted. </div>		<p>If contaminants such as paint or oil are left on the swivel jaw or the edge of the clamp screw, these parts will be slippery and the object being lifted may fall out of the clamp.</p>
(11) Precaution when lifting object with coated surfaces	<div style="border: 1px solid black; padding: 5px; background-color: #f0f0ff;"> <p>PROHIBITED ACTION</p>  <p>The object is not gripped sufficiently tightly.</p> <p>The object slips.</p> <p>Coating is too thick.</p> <p>DANGER</p> <ul style="list-style-type: none"> When lifting steel products with coated surfaces, always ensure that any clogged coating material is removed from the Swivel jaws and the clamp screws before using the clamps. Do not use clamps on steel products with a coating on any single side that is 0.2 mm or more thick. </div>		<p>When a coating is too thick, if swivel jaws and clamp screws are worn even a little, the grip on the object to be lifted is reduced in proportion to the thickness of the coating. Then there is a danger that the object may fall.</p> <p>If the coating thickness on any side is 0.2 mm or more thick, use lifting pieces or consult our business office.</p> <p>When lifting and transporting coated steel products continuously, be sure to eliminate any debris from the teeth of the swivel jaw and clamp screw each time, before the clamp is attached.</p> <p>When lifting steel products with coated surfaces that are not dry because they have just been coated, always use clamps with unworn teeth.</p>

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(12) Hardness of objects to be lifted	(1) Objects to be lifted that are made of hard material or stainless steel.    	If an object is extremely hard, the teeth on the swivel jaw or clamp screw will not grip the object securely. Therefore, the clamp will not function properly. This can cause shifting or slipping. This type of lifting is very dangerous.	Approved materials for objects to be lifted: Steel products and nonferrous metal with a hardness in the range of HV85 — HV320 When you must work with materials that are outside of the hardness working range, please consult our business office.
	(2) Brittle objects to be lifted that have low strength   	If the strength or hardness of an object is extremely low, the clamping force may break the object or the object may break from its own weight. This is dangerous.	
(13) Never hit the clamp on or with anything else.		If a clamp is subjected to an impact load, pay special attention because the rotation function of the swivel jaw that is the main part of the clamp may be damaged and the clamp might cease to function.	Allow sufficient space around the work area. Pay special attention when turning over items such as shaped steel or steel frames.  

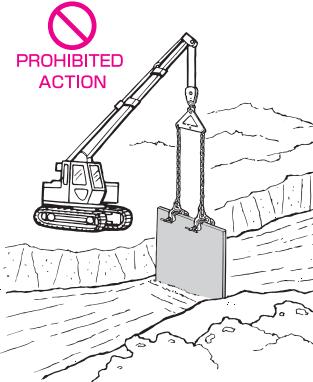
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(14)	 	"The company managers must not allow workers to be carried or lifted using a crane." ※Complies with the "Safety and Health Law for Sling Work" in Japan	
(15)	 	An overload may cause the clamps to break or it may cause the object being lifted to come out of the clamp. Do not lift a base that has shaped steel attached to it. Make sure the bolts securing the base to the shape steel are removed.	

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(16) Never lift tapered objects	 <p>PROHIBITED ACTION</p> <p>PROHIBITED ACTION</p> <p>PROHIBITED ACTION</p> <p>DANGER ● Tapered objects cannot be lifted.</p>	<p>If the faces on the object inserted into a clamp are at an angle to each other (not parallel), it is dangerous to try and lift the object because the swivel jaw and clamp screw cannot clamp the object sufficiently, tightly. Then the object may slip.</p>	
(17) Never drag objects on the ground.	 <p>PROHIBITED ACTION</p> <p>DANGER ● Do not operate a crane in a fashion that allows the object being lifted to drag on the ground.</p>	<p>If the object is allowed to drag on the ground, the clamps will experience an instantaneous no-load state, due to vibration. The clamping force will disappear, and the object may slip out of the clamp.</p> <p>Due to impacts when an object is turned over, an impact load is applied to the clamps and it may cause the clamps to break. It can also cause an accident if the object falls.</p>	

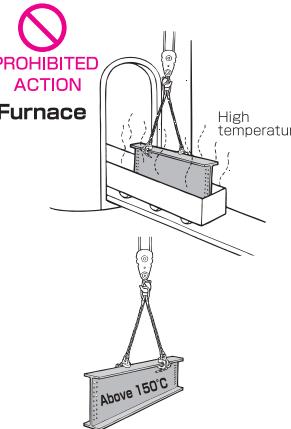
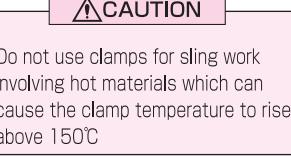
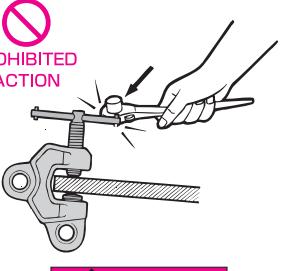
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(18) Precautions for crane operation	<p>(1)</p>  <p>PROHIBITED ACTION</p> <p>CAUTION ● While an object is being lifted with clamps, the operator must not leave the driver's seat in the crane (winch, etc.).</p>	<p>If an object is suspended for a long time, it will have a negative effect on all of the lifting tools including the crane and clamps.</p>	Observe the Safety Regulations in each country strictly.
	<p>(2)</p>  <p>Slowly</p> <p>Carefully</p> <p>CAUTION ● Raise and lower the crane slowly and carefully.</p>	<p>If reckless crane operations are performed, the object being lifted may slip or fall out of the clamps due to vibration or shock loading.</p>	When pulling up, turning over, and pulling down beams, check each and every item for safety and operate the crane carefully.
	<p>(3)</p>  <p>PROHIBITED ACTION</p> <p>DANGER ● It is very dangerous to lift and transport a single object using two cranes (if there is no control device to coordinate the operation of the two cranes).</p>	<p>When two cranes are used at the same time, their operation will not be synchronized. The object will tilt, the clamps will come off and the object will swing dangerously or fall.</p>	

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(19) Handling different steel profiles	 <div style="border: 1px solid black; padding: 5px; background-color: #f0f0ff; margin-top: 10px;">  DANGER <ul style="list-style-type: none"> When lifting and transporting different steel profiles, be sure to use at least two clamps, and pay special attention to the offset load. </div>	<p>There is a danger that the object may slip due to swinging or the clamps may come off the object.</p>	
	 <div style="border: 1px solid black; padding: 5px; background-color: #f0f0ff; margin-top: 10px;">  DANGER <ul style="list-style-type: none"> When different steel profiles are set down, be sure to use blocks to prevent them from toppling over. </div>	<p>Since objects are not stable, there is a danger that they will turn over when landed.</p>	

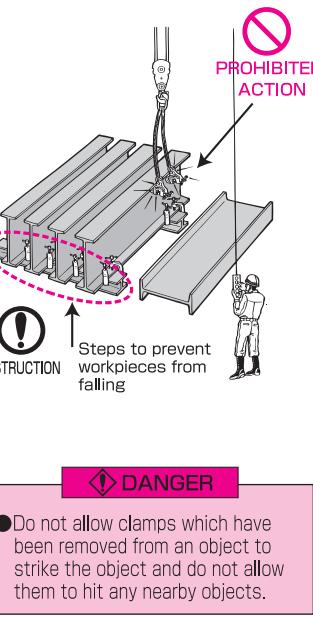
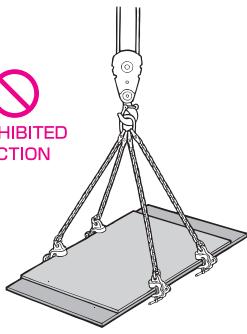
5-1-10

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(20) Handling clamps around chemical agents	 <div style="border: 1px solid black; padding: 5px; background-color: #f0f0ff; margin-top: 10px;">  CAUTION <ul style="list-style-type: none"> Do not use clamps in or around strong acid or alkali liquids. </div>	<p>The clamp main body and important parts will corrode, and their strength and function will be reduced, which will cause the clamp to corrode or crack.</p>	<p>Use custom-designed clamps for these operations.</p>
	 <div style="border: 1px solid black; padding: 5px; background-color: #f0f0ff; margin-top: 10px;">  CAUTION <ul style="list-style-type: none"> Pay special attention to sling work with objects that will be lowered into or lifted out of the water. </div>	<p>When handling objects that will be lowered into or lifted out of the water or that are currently in the water (salt water or fresh), special attention is needed because the following items cannot be checked.</p> <ul style="list-style-type: none"> Change in the lifting load due to buoyancy. Safety of the objects being lifted due to the flow of water. Condition of the objects being lifted out of the water. 	<p>When objects being lifted with clamps are put into the water, for example in order to dam up a river, they may experience resistance or buoyancy due to the flow of water, and an instantaneous no-load condition may occur. Such work should never be performed with these clamps.</p>

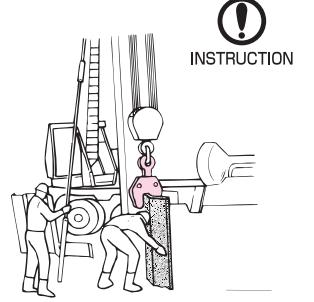
5-1-11

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(22) Working temperature	 <p>CAUTION</p> <ul style="list-style-type: none"> Do not use clamps for sling work involving hot materials which can cause the clamp temperature to rise above 150°C. 	<p>Due to softening in the main clamp body, the swivel jaw, and the clamp screw, any reduction in the strength or gripping function of the main clamp body can cause the main body to break. Then the load may fall.</p>	<p>If the clamp temperature unavoidably exceeds 150°C, please consult our business office.</p>
	 <p>CAUTION</p> <ul style="list-style-type: none"> Do not use clamps for sling work in cold climates where the air temperature will drop below -20°C. 	<p>When the surface of an object being lifted drops below the freezing point of water, it may cause slippage resulting in the object falling out of the clamp.</p>	<p>If the clamp temperature unavoidably drops below -20°C, please consult our business office.</p>
(23) Never hit the handle.	 <p>DANGER</p> <ul style="list-style-type: none"> When tightening the clamp handle, do not hit it using a ratchet handle or a hammer. 		

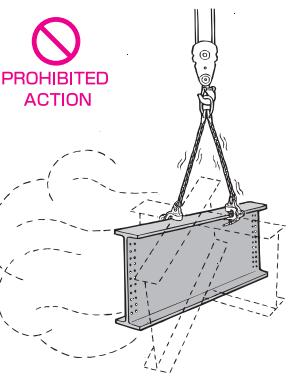
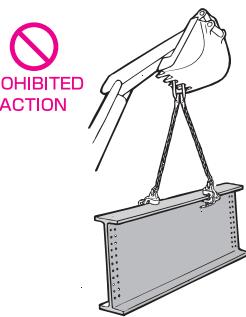
5-1-12

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(24) Precautions after detaching clamps	 <p>DANGER</p> <ul style="list-style-type: none"> Do not allow clamps which have been removed from an object to strike the object and do not allow them to hit any nearby objects. 	<p>When a crane is being hoisted after the clamps have been detached, there is a danger that clamps may strike the object just landed or an adjacent piece of steel. This can cause a turn-over accident.</p> <p>When the detached clamps strike the ground or other objects, they may be damaged or deformed, or parts may fall off due to shock.</p>	
(25) Never perform combined lifting.	 <p>DANGER</p> <ul style="list-style-type: none"> Never lift more than one steel plate at a time and never perform lifting with pads. 	<p>The clamping function is obtained by directly gripping both sides of the object between the teeth of the swivel jaw and the thread edges of the clamp screw. Therefore, when a number of objects are lifted or lifting is performed with pads, one side or both sides of the objects may only be held by the friction force without them being gripped by the teeth. There is a danger that the objects may slip and fall if there is even the slightest vibration or shock.</p>	<p>Sling work using clamps should only ever handle one object at a time.</p>

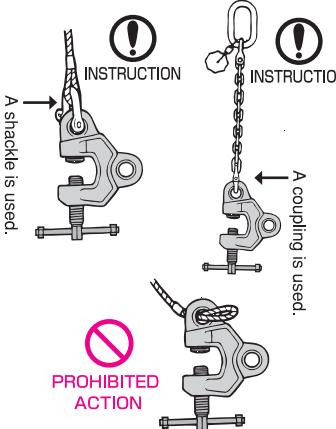
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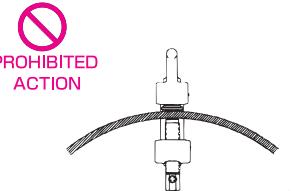
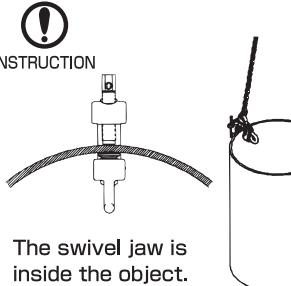
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(26) Never pulling out steel sheet pilings.	 <p>DANGER</p> <ul style="list-style-type: none"> When pulling out steel sheet pilings, use special clamps or clamps suitable for the specific task. 	<p>When pulling out steel sheet pilings that have been driven in, the clamps may be overloaded and there is a danger that the clamps may deform or break.</p>	<p>Use clamps suitable for the specific task.</p>  <p>Model PE</p> <p>When transporting steel sheet pilings after pulling them out, the best suited models are the SBN, SBB, and SBb.</p>

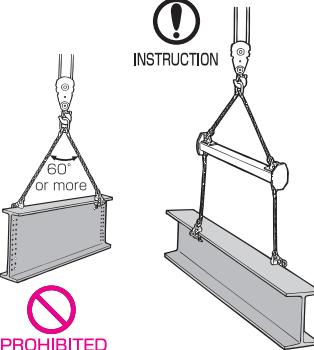
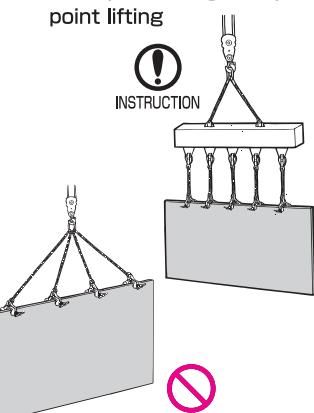
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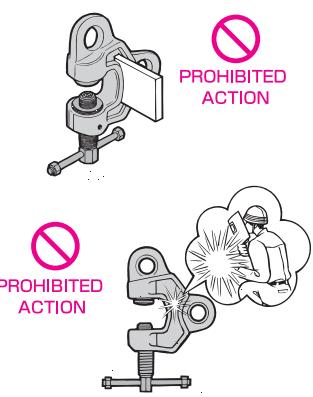
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(27) Do not use these clamps if a strong wind is blowing	 <p>DANGER</p> <ul style="list-style-type: none"> Do not use these clamps when the wind is very strong. 	<p>The object being lifted may oscillate in the wind, swing, hit something or become unbalanced, which can cause the object to come loose from the clamp and fall.</p>	<p>Even if the wind on the ground is not very strong, pay special attention when working because an unexpectedly strong wind can be blowing in high places. Observe the Safety Regulations in each country strictly.</p>
(28) Lifting using vehicle-type construction machines which are equipped with crane functions	 <p>DANGER</p> <ul style="list-style-type: none"> When sling work is performed using vehicle-type construction machines which are equipped with crane functions, do not place the sling wires directly on the teeth of the vehicle-type construction machines. 	<p>Sling work with the sling wires placed directly over the teeth on the power shovel bucket is not allowed.</p>	<p>Observe the Safety Regulations in each country strictly.</p>

5-1-15

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(29) How to attach a mounting sling	<p>(1) When using two clamps, be sure to use two chain slings or two wire ropes.</p>  <p>CAUTION</p> <ul style="list-style-type: none"> When working with clamps, only use slings that are suitable for the particular sling work. 	<p>Do not attach two clamps to a single sling chain or wire rope. If the chain sling slips, a greater than expected load will be applied to one of the clamps due to the tilt and shock loading of the objects being lifted. Then there is a danger that the chain sling, wire rope or clamps may be damaged and the objects may fall.</p>	<p>Strictly observe the Safety Regulations in each country.</p>
	<p>(2) Use of connecting fittings</p>  <p>CAUTION</p> <ul style="list-style-type: none"> Do not attach chain slings or wire ropes directly to clamps. 	<p>When a chain sling or a wire rope is put directly into a lifting hole, the chain sling or the wire rope will be damaged considerably by the corner of the lifting shackle.</p>	<p>Use couplings (CP model) for chain slings when connecting between clamps and chain slings.</p> <p>Refer to the "Compatibility table for connecting fittings" on page 24.</p>

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(30) Lifting steel tubes	 <p>PROHIBITED ACTION</p> <p>The swivel jaw is outside the object.</p>  <p>INSTRUCTION</p> <p>The swivel jaw is inside the object.</p>	<p>If clamps are attached with the swivel jaw on the outside of the object, sufficient gripping force for safety may not be obtained from the teeth if there is an impact or vibration, or if the load tilts.</p>	<p>Refer to "Minimum Diameter of Steel Tubes that can be used" on page 73, for the sizes allowed when lifting round objects such as steel tubes with Model SBN, Model SBB, Model SBb or Model SBC clamps.</p>
(31) Never use two holes in a clamp at the same time.	 <p>PROHIBITED ACTION</p> <p>DANGER</p> <ul style="list-style-type: none"> When round objects such as steel tubes are lifted, clamps should be attached with the swivel jaw on the inside of the object.  <p>DANGER</p> <ul style="list-style-type: none"> Do not use two holes in a clamp at the same time. 	<p>If the clamping force is reduced due to a variation in the load, or if a change occurs in the load direction due to various forces, it may cause an object to fall out of the clamp.</p>	<p>Pay strict attention to the idea that "the load direction should only ever be one direction for one operation"</p>

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(32) Using a balance	<p>(1) When the objects to be lifted are extremely wide</p>  <p>DANGER</p> <ul style="list-style-type: none"> When long materials are lifted, use a balance and bring the clamp mounting angle as close to vertical as possible. 	<p>When long materials are lifted without using a balance, it is dangerous because the lifting angle and the clamp mounting angle will be too large.</p> <p>If a balance is used, the clamp mounting angle can be brought close to vertical, and the lifting can be performed safely because the clamp can clamp the object deep in its throat.</p>	<p>Pay special attention to the design and maximum WLL of the balance.</p>
	<p>(2) When performing multiple-point lifting</p>  <p>DANGER</p> <ul style="list-style-type: none"> When using a balance and performing multiple-point lifting, pay attention to the length and offset load of the sling. 	<p>When performing multiple-point lifting, since the offset load is different and the length of the mounting sling is different for each situation, there is a danger that the clamp may break or fall if it is overloaded due to the load being concentrated at a specific lifting point.</p>	<p>When an object is not very rigid and too few lifting points are used along its length, there is a danger that clamps may come off due to the object bending or twisting.</p> <p>In multiple-point lifting that exceeds four points, the load balance must be considered (when using an equalizer or block loader) according to $WLL = L/(N-2)$.</p> <p>WLL: Capacity required for each clamp L: Mass/Weight of the object to be lifted N: Number of lifting points</p>

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(33) Handling clamps	 <p>CAUTION</p> <ul style="list-style-type: none"> Never throw or drag clamps. 	<p>Mechanical shock can cause clamps and parts to break and malfunction.</p>	
(34) Never modify clamps.	 <p>DANGER</p> <ul style="list-style-type: none"> Never modify clamps or their accessories. Do not weld or heat clamps or their accessories. 	<p>When a clamp is heated, the material qualities will change and it will become hard and fragile. This can cause the clamp to break.</p>	

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(35) that is suspended from clamps.		If the ground for the arc welding is not adequate, it may damage parts such as the swivel jaws and clamp screws, or chain slings and wire ropes.	<p>If you must do welding while an object is suspended, use an insulated hook and establish a very secure ground to prevent electric current flowing through the clamps.</p>
(36) Blasting is not allowed.		The clamps, chain slings or wire ropes may be damaged and this will make them dangerous to use.	

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(37)		When the lifting load is reduced while pulling out or landing an object, the gripping force will be greatly reduced and there is a danger that the object being lifted may slip out of the clamp.	<p>Be sure to inspect all the clamps before starting operation. If any abnormal conditions are seen in the clamps, do not use them. Disassemble and inspect them, replacing parts as necessary. Defective parts should be sent to the manufacturer (or the manufacturer's authorized representative) for repair.</p>
		Stretching in the opening of the main body and distortion of the main body	<p>If the main body has a problem, faulty operations may occur. Then there is a danger that the object being lifted may slip out of the clamp.</p> <p>For the details about the inspection standards to use, refer to Section "7. Inspection Manual for Screw Clamps", on pages 59 to 71.</p>

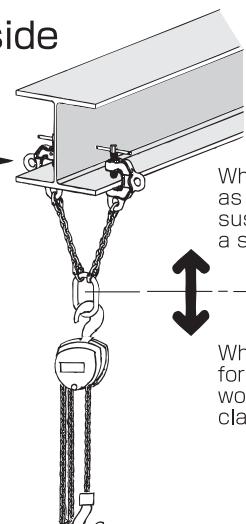
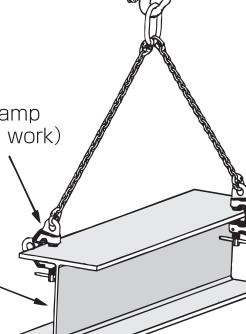
5-2. Precautions for use (suspending jigs)

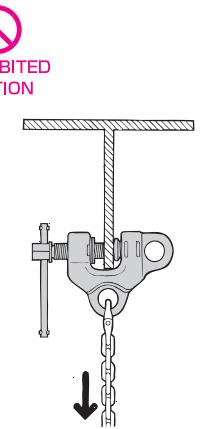
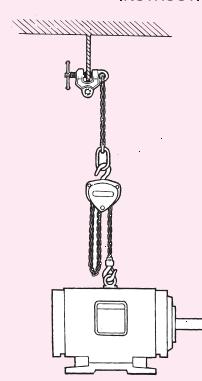
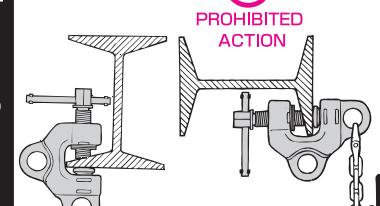
When screw clamps are used as suspending jigs, they are not all-direction type clamps. Therefore, strictly observe the following precautions.
Case (1), in which the clamps are used as fixed supports in suspending work (i.e. suspending jigs), is different from case (2) in which they are used solely for lifting or transporting (i.e. sling clamps).

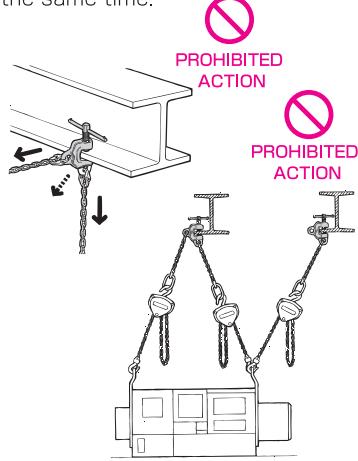
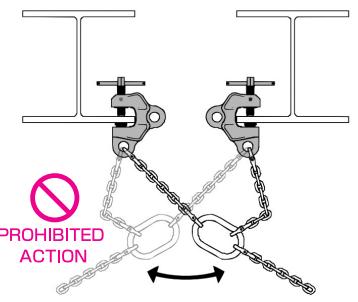
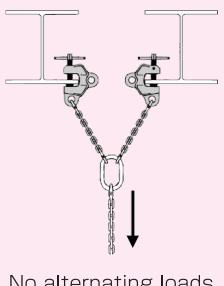
In case (1), since an object being clamped is fixed, if the object shakes the lifting side, the clamps become fulcrum points, and they may come off due to the application of alternating directions of loading.

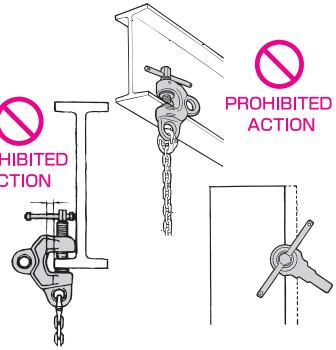
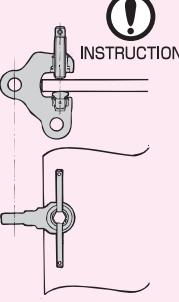
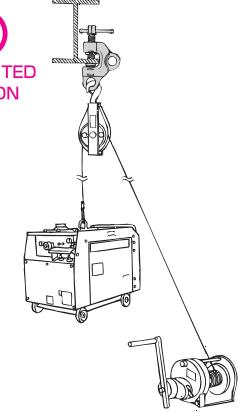
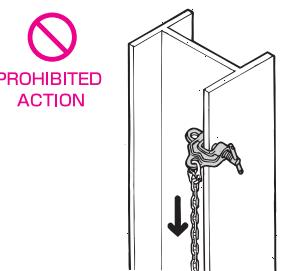
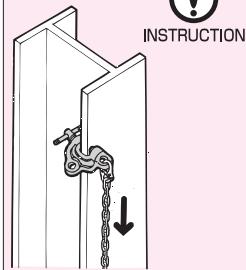
Therefore, since the direction of a load or an applied load may vary repeatedly during use, and alternating loads (*) may occur, there is a danger that clamps may come off.

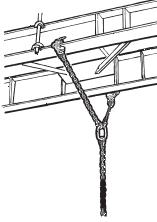
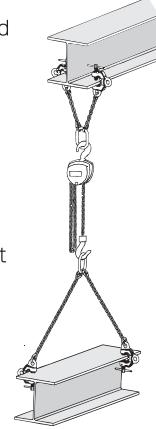
*Refer to "Prohibition of alternating loads (2)" on page 54.

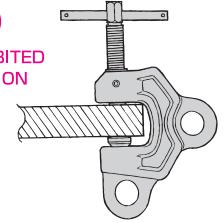
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(1) Division between suspending and lifting	<p>Suspending side</p> <p>(1) Clamp used as a suspending jig (Clamped support for suspending)</p>  <p>When a screw clamp is used as a clamped support for suspending, it is treated as a suspending jig.</p> <p>(2) Clamp used as a sling clamp (Lifting or transportation work)</p>  <p>Object being lifted</p>		

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(1) Never use clamps when there is a load in the direction that would detach the clamps	<p>Never use clamps in the direction that would detach the clamps.</p> <p>PROHIBITED ACTION</p> 	<p>If the center hole of the clamp is used to pull in a direction that would detach it, there is a danger because the clamping force generated by rotation of the main body is small.</p>	<p>When a clamp will be pulled in the direction that you would move it to detach the clamp, only use the front hole of the clamp for the load.</p> <p>INSTRUCTION</p> 
(2) Never use on tapered members or members with sloping faces	<p>Never use on tapered members or members with sloping faces.</p> <p>PROHIBITED ACTION</p>  <p>PROHIBITED ACTION</p>  <p>PROHIBITED ACTION</p> 	<p>The swivel jaw and clamp screw cannot grip the object, and the clamp slips.</p>	

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(3) Never use two holes in a clamp at the same time (1)	Never use two holes in a clamp at the same time. 	If the clamping force is reduced due to a variation in the load, or if a change occurs in the load direction due to various forces, there is a danger that a load may be applied in the direction that would detach the clamps.	Pay strict attention to the idea that "the load direction should only ever be one direction for one operation".
Prohibition of alternating loads (2)	Never use clamps in a way that different loading forces may be applied repeatedly. 	If the object being lifted swings, the load direction applied to the clamps may change and alternating loading of the clamps may occur. This creates a danger that the clamps will come off.	INSTRUCTION 

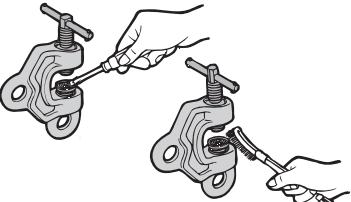
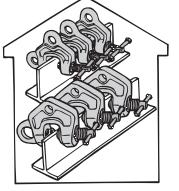
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(4) Strictly check whether each object is inserted fully into the clamp.	Never use clamps in places where they cannot be attached securely. 	If the object is not inserted completely into the clamp, there is a danger that the clamp will come off. The clamp cannot be used by inserting the object at an angle.	Insert the object completely into the throat of the clamp and tighten the clamp screw. 
(5) Other precautions (1)	Never use clamps for work where a winch and pulley are used. 	There is a danger that the direction of load applied to a clamp under load and under no load may change and then the clamping force may be reduced. This is dangerous because an impact load is applied repeatedly whenever a winch and pulley are used.	
	Never use clamps for work where the center hole is used and load is applied sideways. 	This is dangerous because a load applied in the direction that would detach the clamp may force the clamp to come off. If the center hole of the clamp is used to pull in a direction that would detach it, there is a danger because the clamping force generated by rotation of the main body is small.	INSTRUCTION 

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(5) Other precautions (2)	<p>Never use clamps in places where the tightness cannot be checked.</p>  <p>PROHIBITED ACTION</p>	The clamps cannot be used in places where retightening is impossible after the load is applied.	
	 <p>PROHIBITED ACTION</p> <p>Oil Slips</p> <p>CAUTION</p> <ul style="list-style-type: none"> Before using clamps, remove any oil, paint, rust, scale, etc., from the areas where the clamps are attached. 	If contaminants such as paint or oil are left on the swivel jaw or the edge of the clamp screw, it is dangerous because these parts will be slippery.	<p>Wipe off any oil or paint, and then attach the clamps.</p>
	<p>Limit for the suspended load</p> <p>When calculating the weight of the load, take into consideration the effects of an unbalanced load and of a load impact if it should hit something.</p>  <p>DANGER</p> <ul style="list-style-type: none"> The weight of the object to be lifted must be within the allowable maximum WLL range for the clamp from which you intend to suspend the load. 	<p>If the load being lifted exceeds the specified load range, it may cause the clamps to break or the object being lifted may fall out of the clamp.</p> <p>If the object is too light, there is a danger because the clamp screw and swivel jaw may not grab the member firmly.</p>	<p>Only use clamps whose maximum WLL is suitable for the load being lifted.</p>

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(5) Other precautions (3)	<p>Limit for steel thickness</p>  <p>PROHIBITED ACTION</p> <p>CAUTION</p> <ul style="list-style-type: none"> The thickness of an object to be suspended must be within the allowable thickness range of the clamps you intend to use. 	If the object to be suspended is thinner than the effective thickness specified for the clamp, there is a danger that the clamp screw may not tighten sufficiently and the object may fall due to an insufficient clamping force.	<p>Use clamps that have an effective thickness suitable for the thickness of the object to be suspended.</p> <p>However, if the grab section deforms due to the weight of the load, the decision about which clamps to use should be made by the user.</p>

6. About Maintenance and Storage

After finishing work for the day, perform the required maintenance for the next round of work, according to the following procedures. Then store the clamps in an approved location.

Item	Place to be maintained	Maintenance method	Precautions
(1) Removing foreign material		<p>Remove any paint and sludge using a cloth and a wire brush.</p> <p>Remove dried paint using a chisel.</p>	<p>If it cannot be removed, replace the swivel jaws and clamp screws.</p>
(2) Greasing		<p>Apply machine oil and wipe off any grease found on the thread edges of the swivel jaws or clamp screws.</p> <p>Lubricate the bottom of the swivel jaws. To find the location of the points that need to be lubricated, refer to the "Assembly and Construction Drawings" on pages 11, 13, and 14.</p>	<p>If any grease is left on the thread edges of the swivel jaws or clamp screws, there is a danger that the object being lifted may slip.</p>
(3) Storage location	 	<p>CAUTION</p> <p>● Always store clamps indoors.</p> <p>DANGER</p> <p>● Clamps which must be repaired should be stored in a separate location to prevent them from being used by mistake.</p>	<p>If clamps are left outdoors or in a place where the temperature varies greatly, they may get rusty due to rain or condensation. Then they can no longer be counted on to function correctly.</p> <p>Clamps that must be discarded should be marked with the reason on the main body, and they should be moved to a separate location and discarded at once.</p>

7. Inspection Manual for Screw Clamps (Models SBN, SBB, SBb and SBC)

(1) Purpose

This manual specifies the inspection routine to be used for clamps before beginning work, and also at specified intervals. These inspections must be carried out to prevent accidents, and in order to have safe and reliable use of these clamps.

(2) Scope

Specifies the inspection of clamps which are used in sling equipment.

(3) Types, procedures and measures used for inspection

● Inspections before beginning work (Daily checks)

The people who use the clamps or own them should inspect them before beginning work each day.
(Reference: Article 220 of the Crane Safety Regulations, "Inspections before beginning work")

● Routine checks

A visual inspection of the appearance and an operational inspection of the clamps should be performed by a qualified person (with sufficient expertise). If no abnormal conditions are found in the clamps, a label that says "Inspected" should be attached to them.

The clamps should be disassembled and inspected as needed. If any abnormal conditions are seen in the clamps, they should never be used. The parts should be serviced, replaced or sent to the manufacturer (or a location designated by the manufacturer) for repair.

The inspector should record and store all inspection dates and the details of each inspection and repair.
(Reference: Article 217 of the Crane Safety Regulations and JCAS 6601-2019 of the Japanese Crane Safety Regulations, "Lifting clamps")

The parts replacement standards must conform to the "Evaluation criteria" described in the separate table.

(4) Precautions during maintenance and inspection

Checking and precautions	
①	<p>DANGER</p> <p>Maintenance and inspections should only be performed by a qualified person (with sufficient expertise), designated by the company that owns the clamps.</p> <p>Eagle Clamp Co., Ltd. issues a completion certificate of qualification to people who have completed an inspection course.</p>
②	<p>DANGER</p> <p>If any abnormal conditions are seen in the clamps during maintenance or inspection, you must stop using them immediately. They must be repaired or discarded.</p> <p>If you have determined during an inspection that a product is unusable, attach a label that says "DO NOT USE" to such products.</p>
③	<p>DANGER</p> <p>Do not use any parts that are not genuine Eagle Clamp parts.</p> <p>We do not offer any compensation nor accept any responsibility for accidents or problems that are due to the use of parts made by anyone else.</p>
④	<p>CAUTION</p> <p>When performing maintenance, or making inspections or repairs, a sign that says "Inspection taking place" should be posted.</p> 
⑤	<p>CAUTION</p> <p>When performing maintenance, or making inspections or repairs, be sure to remove the clamps from any object they are attached to.</p> <p>It is dangerous to perform maintenance or make inspections or repairs during operation. These practices should always be carried out in a safe place.</p>
<p>For labels that show that an inspection was carried out recently</p> <p>If you purchased our product outside of Japan, we request that you make a voluntary inspection. If you need the label for this, please contact us.</p> 	

(5) Places to be inspected

Models SBN, SBB, SBb and SBC

No.	Places to be inspected	Inspections before beginning work (Daily checks)	Routine checks
0-1	Appearance (overall)	Check the maximum working load that is marked on the clamp. Should not be any gouges or impact flaws.	Same as described on the left
0-2	Completely functional	The swivel jaws, pressure nuts, and clamp screws should move smoothly and normally.	Same as described on the left. Each section should operate smoothly.
1	Main body	Should not be any deformation or flaws. The lifting holes should not show any deformation.	Same as described on the left. Should not be any wear or deformation in the bearings or pressure nut holes.
2	Swivel jaw	Should not be any wear, deformation or chipping in the swivel edges, and the operation must be trouble free.	Same as described on the left. Should not be any rust.
3	Circlip		Should not be any deformation or breakage, and should not have any missing circlips.
4	Bearing	Should not be any cracking.	Should not be any cracking, deformation or wear.
5	Bottom plate		Should not be any wear, indentation, cracking or breakage.
6	Conical spring	Should not be any deformation or breakage.	Same as described on the left
7	Pressure nut	Should not be any wear or deformation on the outside diameter, and should have trouble free operation.	Same as described on the left. Should not be any wear in the threads, and should not be any wear or deformation in the guide grooves.
8	Compression spring		Should not be any deformation or breakage, and should not have any loss of compression force.
9	Setscrew	Should not be any deformation or breakage, and there should not be any missing setscrews.	Same as described on the left.
10	Clamp screw	Should not be any wear or flaws in screw threads. Should not be any wear, deformation, chipping or clogging on the edge of the projection or the thread edges. Should not be any deformation or cracks in the screws, and should have trouble free operation.	Same as described on the left. Should not be any rust.
11	Clamp handle	Should not be any deformation in the handle bars, and should be free from missing handle bars.	Same as described on the left
12	Snap ring	Should not be any deformation or breakage, and should be free from missing snap rings.	Same as described on the left

- Daily checks (Inspections before beginning work) In principle, a visual inspection and an operational inspection should both be made.
- Routine checks In principle, inspected without disassembly. Disassemble and inspect as needed.(Attach a label that says "Inspected".)

(6) Inspection standards

Models SBN, SBB, SBb and SBC

7-7-1

Places to be inspected	Item	Evaluation criteria	Inspection procedure	Action (part No.)
0-1. Appearance (overall)	1.Checking the details of the clamp markings • Model • Maximum WLL • Effective thickness • Label which shows when the most recent inspection was performed • Checking the warning label	If there is no marking on the clamp or if it cannot be read, do not use the clamp.	Visual check	
	2.Clogged teeth 3.Gouges or impact flaws	Teeth should not be clogged.	Visual inspection	Clean clogged teeth.
		There should not be any gouges or impact flaws.	Visual inspection	If the gouge or impact flaw in the clamp exceeds the allowed value, discard it.
0-2. Completely functional	Operation condition 1) Clamp screw 2) Pressure nut Clamping confirmation line 3) Swivel jaw	1) Tightening and releasing can be performed smoothly. 2) When the clamp screw is tightened, the pressure nut should be operated until the clamping confirmation line on the pressure nut is seated in the main body. At this time, the pressure nut should operate smoothly against the spring tension. 3) The swivel jaw must tilt smoothly in any direction.	1) Rotate the clamp screw and perform an operation inspection. 2) Turn the clamp screw and perform an operation inspection of the pressure nut. 3) Perform an operation inspection. <Inspection method> Push the swivel jaw into the main body with your finger. Tilt the swivel jaw while pressed in and move it in all directions.	

Places to be inspected	Item	Evaluation criteria	Inspection procedure	Action (part No.)
	1. Main body (a1-1)	1.Stretching in the opening • Measuring the spacing between the gauge marks	If the distance between the gauge marks exceeds the allowed value, the main body cannot be used.	Vlusal check (vernier caliper or gauge block) . If any abnormality is seen in the visual inspection, measure it with a vernier caliper to check it.
		Model	Allowable size (mm)	If any place in the opening is stretched beyond the allowed value, discard the main body.
		SBN-300	51.2	
		SBN-500	51.2	
		SBN-800	82	
		SBN-1	61.8	
		SBN-2	71.7	
		SBN-3	82	
		SBN-5	92.2	
		SBB-500	51.2	
		SBB-1(1~40)	77.3	
		SBB-1(40~70)	113.3	
		SBB-2	82.1	
		SBB-3(5~35)	82.3	
		SBB-3(35~70)	123.6	
		SBB-5	92.7	
		SBb-5	134.5	
		SBC-5	134.5	
		SBb-8	175.1	1
	2.Distortion in the opening	$B-b \geq 3$	Not allowed if the difference between the opening sizes on either side is greater than 3 mm.	Vlusal check (vernier caliper or gauge block) . If any abnormality is seen in the visual inspection, measure it with a vernier caliper to check it.
	3.Distortion of the main body		3. Not allowed if the distortion between the thread edge of the clamp screw and the center line of the swivel jaw is greater than 1 mm.	Vlusal check (vernier caliper or gauge block) . If any abnormality is seen in the visual inspection, measure it with a vernier caliper to check it.
				If any distortion in the main body exceeds the allowed value, discard it.
				1

Places to be inspected	Item	Evaluation criteria	Inspection procedure	Action (part No.)
1. Main body (main)	4. Flaws in the opening 1) Gouges 2) Impact flaws or wear	1) Gouges greater than 0.5 mm (deep) x 30mm (total length) are not allowed. 2) Impact flaws or wear greater than 0.5 mm (deep) x 24 mm ² (area in total) are not allowed.	Visual check (vernier caliper or gauge block). If any abnormality is seen in the visual inspection, measure it with a vernier caliper to check it.	If any gouge, impact flaw or wear in the opening exceeds the allowed values, discard the main body.
				1
	5. Flaws on the main body 1) Gouges 2) Impact flaws or wear	1) Gouges greater than 0.5 mm (deep) x 30 mm (total length) are not allowed. 2) Impact flaws or wear greater than 0.5 mm (deep) x 24 mm ² (total area) are not allowed.	Visual check (vernier caliper or gauge block). If any abnormality is seen in the visual inspection, measure it with a vernier caliper to check it.	If any gouge, impact flaw or wear in the main body exceeds the allowed values, discard it.
				1
	6. • Bearing mounting hole • Pressure nut mounting hole 1) Wear 2) Deformation	1) Not allowed if the diameter is increased by more than 0.5 mm due to wear. 2) Any deformation greater than 2.5% is not allowed.	Visual check (vernier caliper or gauge block). If any abnormality is seen in the visual inspection, measure it with a vernier caliper to check it.	If any wear or deformation in the bearing and pressure nut mounting holes exceeds the allowable values, discard them.
				1
	7. Lifting hole 1) Wear 2) Deformation or stretching	1) Not allowed if the diameter is increased by more than 1 mm due to wear. 2) Any deformation or stretching greater than 5% is not allowed. a: Basic size f: Measured size $\frac{f-a}{a} \geq \frac{5}{100}$	Visual check (vernier caliper or gauge block). If any abnormality is seen in the visual inspection, measure it with a vernier caliper to check it.	If any wear or deformation in the lifting hole exceeds the allowable values, discard the main body.
				1

Places to be inspected	Item	Evaluation criteria	Inspection procedure	Action (part No.)
2. Swivel jaw	1. Swivel edge 1) Wear 2) Deformation or chipping	1) The wear width should be less than 0.5 mm. 2) There should not be any deformation or chipping.	1) Visual check (vernier caliper or gauge block). If any abnormality is seen in the visual inspection, measure it with a vernier caliper to check it. 2) Visual inspection	1) If any wear in the swivel jaw exceeds the allowable value, replace it. 2) Even if only one example of deformation or chipping is seen, replace the swivel jaw.
				2-1
	2. Deformation or cracking in the main body	There should not be any deformation or cracking.	Visual inspection	Even if only one example of deformation or cracking is seen, replace the main body.
				2-1
3. Circlip	Deformation, breakage or missing	There should not be any deformed, broken or missing circlips.	Functional check and visual inspection	If any deformation or breakage is seen in a circlip, replace it. If any circlips are missing, install new ones.
				2-2
4. Bearing	Faulty operation due to cracking, deformation or wear	There should not be any problems with operation and there must be no significant cracking, deformation or wear.	Functional check and visual inspection	If any faulty operation, significant cracking, deformation or wear is seen in the bearing, replace it.
				2-3
5. Bottom plate	1) Wear 2) Cracking	1) Wear greater than 1mm is not allowed. 2) There should not be any cracking.	1) Visual check (vernier caliper or gauge block). If any abnormality is seen in the visual inspection, measure it with a vernier caliper to check it. 2) Visual inspection	1) If any wear in the bottom plate exceeds the allowable value, replace it. 2) Even if only one example of cracking is seen, replace the bottom plate.
				2-5

Places to be inspected	Item	Evaluation criteria	Inspection procedure	Action (part No.)
6. Conical spring	1. Deformation or breakage 	There should not be any deformation or breakage.	Visual inspection	Even if only one example of deformation or breakage is seen, replace the conical spring. 2-6
	2. Reduction in resistive pressure 	The resistive pressure must be at least 500 g.		Functional check If the resistive pressure is less than the allowable value, replace the conical spring. 2-6
7. Pressure nut <Models SBB, SBb, SBC and SBN> (αr-)	1. Wear in the outer diameter 	Wear exceeding 5% of the normal size is not allowed.	Visual check (vernier caliper or gauge block). If any abnormality is seen in the visual inspection, measure it with a vernier caliper to check it.	If any wear in the pressure nut exceeds the allowable value, replace it. 3-1
	2. Flaws or deformation 	Faulty operation due to flaws or deformation is not allowed.		Functional check and visual inspection If any faulty operation, significant flaws or deformation are seen in the pressure nut, replace it. 3-1
	3. Wear or flaws in the threads 	Faulty operation due to wear, impact flaws or deformation is not allowed.	Functional check and visual inspection	If any faulty operation, significant flaws or deformation are seen in the threads, replace the pressure nut. 3-1

Places to be inspected	Item	Evaluation criteria	Inspection procedure	Action (part No.)																										
7. Pressure nut <Models SBB, SBb, SBC and SBN>	4. Wear or deformation in guide grooves 	Faulty operation due to wear, impact flaws or deformation is not allowed.	Functional check and visual inspection	If any faulty operation, significant flaws or deformation are seen in the guide grooves, replace the pressure nut. 3-1																										
	5. Missing line or paint on the clamping confirmation line (circular ring) 	A clamping confirmation line that is missing or cannot be readily seen is not allowed. A clamping confirmation line with missing paint is also not allowed.		Visual inspection If the clamping confirmation line is missing, attach a new one. A clamping confirmation line with missing paint should be replaced. SBB·SBb·SBC·SBN 3-5																										
8. Compression spring <Models SBB, SBb, SBC and SBN>	1. Reduction in the compression force 	A reduction of free length of 3 mm or more is not allowed.	Visual check (vernier caliper or gauge block). If any abnormality is seen in the visual inspection, measure it with a vernier caliper to check it.	If the reduced compression force in the compression spring exceeds the allowable value, replace it. 3-2																										
	Model	Allowable size (mm)		<table border="1"> <tr><td>SBB-300</td><td>12</td></tr> <tr><td>SBN-500</td><td>25</td></tr> <tr><td>SBB-500</td><td>37</td></tr> <tr><td>SBB-1</td><td>37</td></tr> <tr><td>SBB-1(1~40)</td><td>37</td></tr> <tr><td>SBB-1(40~70)</td><td>29</td></tr> <tr><td>SBB-2</td><td>46</td></tr> <tr><td>SBB-3</td><td>46</td></tr> <tr><td>SBB-3(5~35)</td><td>47</td></tr> <tr><td>SBB-3(35~70)</td><td>73</td></tr> <tr><td>SBN-5</td><td>45</td></tr> <tr><td>SBB-5</td><td>73</td></tr> <tr><td>SBb-5</td><td>73</td></tr> <tr><td>SBC-5</td><td>82</td></tr> </table>	SBB-300	12	SBN-500	25	SBB-500	37	SBB-1	37	SBB-1(1~40)	37	SBB-1(40~70)	29	SBB-2	46	SBB-3	46	SBB-3(5~35)	47	SBB-3(35~70)	73	SBN-5	45	SBB-5	73	SBb-5	73
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SBb-5	73																													
SBC-5	82																													
9. Setscrew	2. Deformation or breakage 	There should be not any deformation or breakage.	Visual inspection	If any deformation or breakage is seen in the compression spring, replace it. 3-2																										
	Deformation, breakage or missing 	There should be not any deformation, breakage or missing setscrews.		Visual inspection If any setscrews are deformed, broken or missing, replace them. SBB·SBb·.....3-4 SBC·SBN																										
☆If a setscrew breaks in the guide groove and it cannot be replaced, replace the pressure nut.																														

Places to be inspected	Item	Evaluation criteria	Inspection procedure	Action (part No.)
10 Clamp screw	1. Threads 1) Wear 2) Flaws or clogging	1) Wear in the outer diameter of the screw of 5% or more from its normal size is not allowed. 2) Faulty operation due to impact flaws, deformation or clogging is not allowed.	1) Visual check (vernier caliper or gauge block). If any abnormality is seen in the visual inspection, measure it with a vernier caliper to check it. 2) Functional check and visual inspection	1) If any wear in the threads exceeds the allowable value, replace the clamp screw. 2) If any faulty operation, significant flaws or deformation in the clamp screw are seen, replace it. 4-1
	2. Edge projection 1) Wear 2) Flaws or clogging	1) Wear of 1mm or more in diameter is not allowed. 2) There should not be any deformation or chipping.	1) Visual check (vernier caliper or gauge block). If any abnormality is seen in the visual inspection, measure it with a vernier caliper to check it. 2) Visual inspection	1) If any wear in the threads exceeds the allowable value, replace the clamp screw. 2) Even if only one example of deformation or chipping is seen, replace the clamp screw. 4-1 4-5
	3. Thread edges 1) Wear 2) Deformation, chipping or clogging	1) The wear width should be less than 0.5 mm. 2) There should not be any deformation, chipping or clogging.	1) Visual check (vernier caliper or gauge block). If any abnormality is seen in the visual inspection, measure it with a vernier caliper to check it. 2) Visual inspection	1) If any wear in the threads exceeds the allowable value, replace the clamp screw. 2) Even if only one example of deformation or chipping is seen, replace the clamp screw. 4-1 4-5
	4. Bent, deformed or cracked screw	There should not be any bending, deformation or cracking.	Visual inspection, magnetic inspection and functional check	If any bending, deformation or cracking is seen in the clamp screw, replace it. 4-1 5-1

Places to be inspected	Item	Evaluation criteria	Inspection procedure	Action (part No.)
11. Clamp handle	Deformed or missing clamp handle.	There should not be any faulty operation due to deformation. The clamp handle must be present.	Visual inspection and functional inspection	If there is any faulty operation due to deformation or if the clamp handle is missing, replace it.
				4-2
12. Snap ring	Deformation, breakage or missing	There should not be any deformed, broken or missing snap rings. Reduction in function	Visual inspection	If any deformation or breakage is seen in a snap ring, replace it. If any snap ring is missing, install a new one.
				2-4 3-3

8. About Sling Angles

(1) Correct angles for using the clamps

Depending on the working conditions of the clamps, the following angles and their limits should be observed.

Clamping angle θ_1		When the object is lifted and the clamp main body is viewed from the side, the clamping angle is the angle at which the center line of the opening section intersects the horizontal line. The load that can be lifted is limited by this angle.
Mounting angle θ_2		When a clamp is attached to an object or the object is lifted, the mounting angle is the angle at which a line at right angles to the edge of the object intersects the center line of the thickness of the clamp main body.
Diagonal angle θ_3		Angle at which wire ropes or chains intersect when an object is lifted.
Sling width angle θ_4		In four-point lifting, when the clamp positions are next to each other, the angle is a "sling width angle". When the clamp positions face each other, the maximum angle is a "diagonal angle".
Diagonal angle in three-point lifting Angle in the diagonal direction in four-point lifting (α)	Two-point lifting Three-point lifting Four-point lifting	
Tilt angle of an object to be lifted θ_5		When clamps are used in a row in the right conditions, the angle of the edge or upper side of the object is the tilt angle.

(2) Table of sling angles by type

The following table shows the sling angle limits (Maximum) by type and by model. Angles to observe when lifting objects (Refer to the previous page.) For safety while working, please work within the allowable range.

Type	Model	Clamping angle	Mounting angle	Diagonal angle	Sling width angle	Max. tilt angle of the object to be lifted	Diagonal angle in three-point lifting Angle in the diagonal direction in four-point lifting
		θ_1	θ_2	θ_3	θ_4	θ_5	α
Vertical lifting clamps	E, EK, SL, RS, WOL, ET, LV	45 ~ 135	0±5	60	60	30	60
	SLT, RST	45 ~ 135	0±5	60	60	30	60
	NNE, NE, NNE II, NNE II L	45 ~ 135	0±5	60	20	10	60
	NEC	45 ~ 135	0±5	60	20	10	60
Lateral lifting clamps	G, GT, GC, GD, GL, AMS, VAR, AMN, LH	0 ~ 45	0±5	60	30	15	60
	VA, VAS, VAN, VANL	0 ~ 45	0±5	30	30	15	30
	BMB, GNE	0 ~ 30	0±5	60	20	10	60
Screw clamps	SBB, SBb, SBN	-90~90	0±5	60	60	90	60
	SBC	45~135	0±5	60	60	30	60



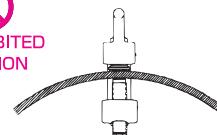
If a clamping angle of -90° is used, there is a danger that the clamp may come off due to its own weight in a no-load condition.

9. Minimum Diameter of Steel Tubes that can be used

Type	SBB-500 SBN-300 SBN-800	SBB-1 SBN-1	SBB-2 SBN-2	SBB-3 SBN-3	SBB-5 SBN-5	SBb-5 SBC-5	SBb-8
Minimum allowable inner diameter (mm)	φ450	φ550	φ550	φ550	φ600	φ800	φ1000



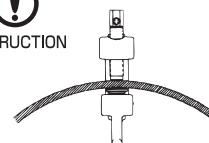
PROHIBITED ACTION



The swivel jaw is outside the object.



INSTRUCTION



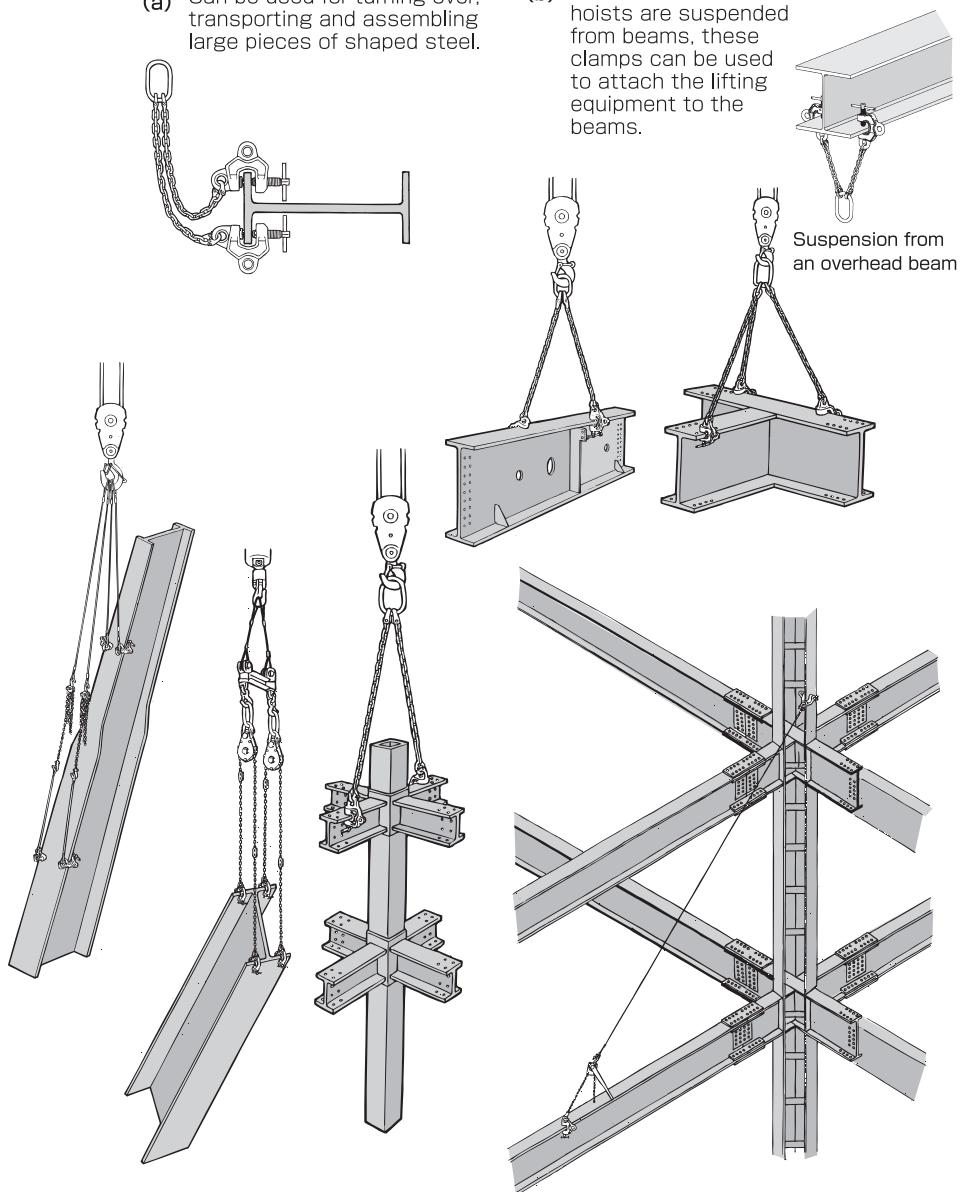
The swivel jaw is inside the object.

10. Examples of use

1) On bridge beams, steel frames, and construction sites

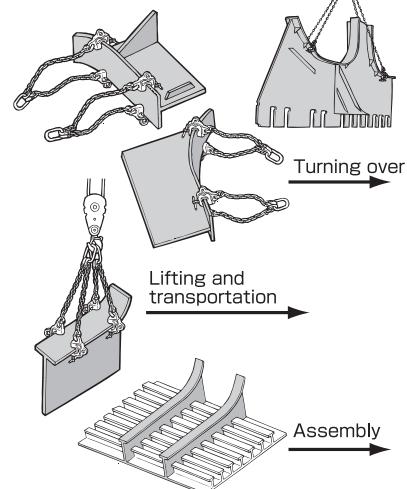
(a) Can be used for turning over, transporting and assembling large pieces of shaped steel.

(b) When chain blocks or hoists are suspended from beams, these clamps can be used to attach the lifting equipment to the beams.



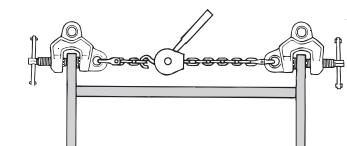
2) Shipyard

(a) These clamps can be used in manufacturing, transporting and assembling transverse sections and in removing deformed members. When using clamps at heights, attach jigs to them so that they can be removed easily. Then they can be used as conveniently as other types of lifting devices. Attaching or detaching this clamp will not cause any problems.

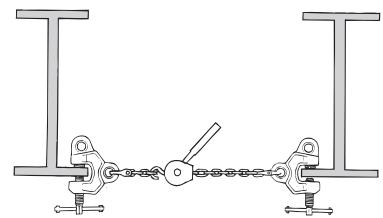


(b) Can be used for pushing or pulling members into position when welding.

(Erecting a plate beam)

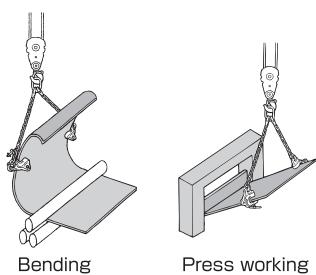


(Correcting the distance between beams)

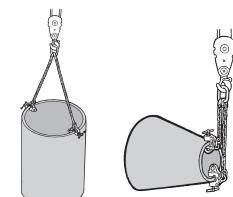


3) Can manufacturing

(a) Can be used to support, transport and pull out workpieces when press working, rolling or bending.



(b) Can be conveniently used to support, transport or turn over irregularly shaped workpieces such as cylinders, pipes and elbows.



Note: Attach the swivel jaw to the inside of a steel pipe. Pay attention to the minimum inner diameters. Also pay attention not to catch the clamp handles on the lifting chain.

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Afterword

We have prepared this instruction manual hoping that you will be able to use these clamps correctly and routinely for a long time. We want to improve the safety and efficiency of your operations.

The safe use of lifting equipment is ensured by using correct working procedures, selecting clamp types appropriate to the sling work, and maintaining the lifting equipment correctly.

The details in this manual are intended for users performing standard sling work. However, since these details may be different from the optimum conditions at your work site (depending on the working details), please contact us if you have any doubts about the details in the manual or if you find any errors in our descriptions.

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* The contents of this manual are subject to change without prior notice.

* We have made every attempt to ensure that the contents of this manual are correct. If you have any concerns about any advice or numbers given herein, please contact the shop where you purchased the product, or write to us the address above.

* Please note that, since there are too many variables over which we have no control, we may not be held responsible for the results of using these clamps, even when the instructions in this manual are followed, and regardless of the invitation above to tell us of corrections needed.

* Please also note that we do not offer any compensation for damage due to accidents or other problems, even if the cause is the result of following the advice in this manual.

* Product designs and specifications are subject to change without prior notice.

* This manual is intended to cover Eagle Clamp products that are in production as of the date of printing described on the back cover. For details about newer models or other models purchased after this date, please contact us.