World wide lifting equipment
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INSTRUCTION MANUAL

Screw Clamps for Steel
〈All-direction type〉

Models SBE, SBBE,
SBbE and SBCE

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.

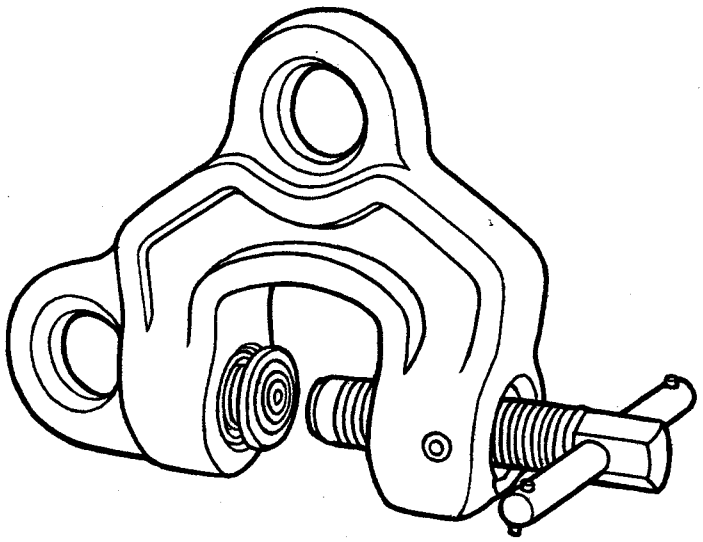
ISO-9001
A.C.NO.YKA 0200132
Design. Manufacture. Maintenance and Management.

EAGLE CLAMP CO.,LTD.

M-50

SCANTECH
A James Fisher Group Company

Instruction Manual



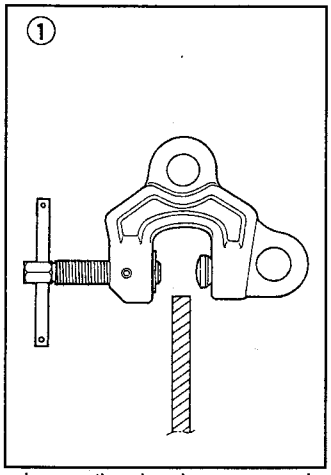
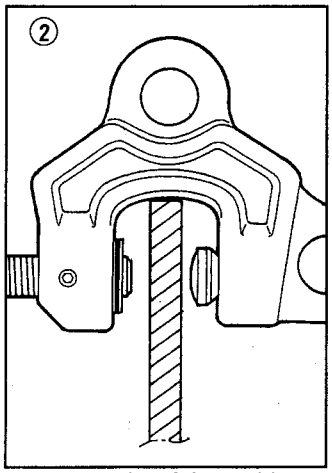
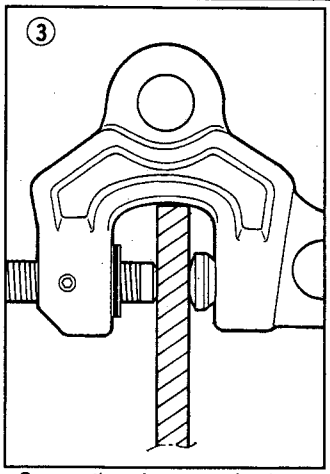
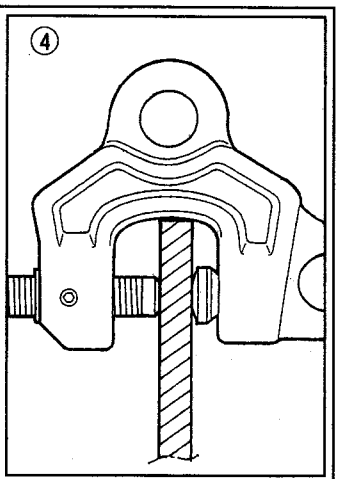
Special instructions when using screw clamps

Models :

SBN,SBB,SBb,SBC SBE, SBBE, SBbE and SBCE

DANGER

HOW TO ATTACH THE CLAMPS AND HOW TO USE THEM

①	②	③	④
			
Loosen the clamping screw, and open the clamp opening until it is slightly wider than the thickness of the steel item to be lifted.	Insert the edge of the steel item deep into the clamp opening.	Secure the clamp on the item using the clamping screw. When tightening the clamping screw, special care should be taken not to tilt the swivel jaw.	Tighten the clamping screw sufficiently so that the spring built into the pressure nut can work properly to provide a secure grip. Tightening torgue : ※working load (Less than 3 tons) →150kgf.cm, or more. ※working load (3 tons or more) →300kgf.cm, or more. Double check that the clamping safety check line (the red ring) is not visible. It should remain completely hidden inside the main body. Then start the lifting operation.

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Product by
EAGLE CLAMP CO.,LTD.
Japan.

When using these models, please carefully read the relevant instruction manual for the existing screw clamp that will be used for lifting (SBN, SBB, SBb, SBC SBE, SBBE, SBbE SBCE). Make sure you understand the instructions thoroughly. Only attach the clamps and perform lifting operations after you understand the details covered in the instruction manual for these models.

Difference between screw clamps for domestic use (Models: SBN, SBB, SBb and SBC) and screw clamps for overseas use (Models: SBE, SBBE, SBbE and SBCE)

1. The clamps for domestic use and the clamps for overseas use share the main body. However, although the main bodies and parts used are the same, the safety factors are different. Therefore, use the clamps according to the safety factor rules in the country of use.
   Do not try to use clamps with the wrong safety factors.

Models whose main body is shared

For domestic use (Safety factor: Five times or greater)	For overseas use (Safety factor: Four times or greater)	Product mass weight (kg)
SBN - 500 (0~25)		1.8
SBN - 800 (25~50)	SBE - 1 (25~50)	2.4
SBN - 1 (0~30)	SBE - 2 (0~30)	3.8
SBN - 2 (5~30)	SBE - 3 (5~30)	5.6
SBN - 3 (5~35)	SBE - 4 (5~35)	8.3
SBN - 5 (10~40)	SBE - 6 (10~40)	13.8
SBB - 500 (0~25)	SBBE- 0.8 (0~25)	1.8
SBB - 1 (0~40)	SBBE- 2 (0~40)	4.0
SBB - 2 (0~40)	SBBE- 3 (0~40)	7.6
SBB - 3 (5~35)	SBBE- 4 (5~35)	8.8
SBB - 5 (10 ~40)	SBBE- 6 (10~40)	14.3
SBB - 5 (10 ~40)	SBBE- 7.5 (10~40) For vertical and horizontal lifting	14.3
SBb - 5 (40~80)	SBbE- 6 (40~80)	24.4
SBb - 8 (65~100)	SBbE-10 (65~100)	31.6
SBC - 5 (20~80) Only for vertical lifting	SBCE- 7 (20~80) Only for vertical lifting	25.0

※The SBN is a new version of the Model SB.

2. Hardness limits for materials to be lifted (h)

HV85<h<320

3. Safety factors

For domestic use → Five or more times the basic working load (WLL)
For overseas use → Four or more times the basic working load (WLL)

4. Tightening force for the clamping bolts

Working load: Less than 3 tons → Be sure to secure the bolt with a tightening force of 150 kgf.cm, or more.
Working load: 3 tons or more → Be sure to secure the bolt with a tightening force of 300 kgf.cm, or more.
Since it is impossible to measure the tightening torque using the current check mark, use a wrench with a torque limiter.

5. Clamping bolts are classified as edge protrusion types or edge pad types. Never try to use them interchangeably.

5-1. Edge protrusion type

5-1-1. The clamping bolt and the edge section are integrated.

5-1-2. When the edge section of the clamping bolt becomes worn away to the specified value, be sure to replace the clamping bolt itself.

5-2. Edge pad type

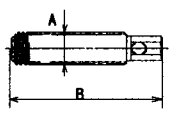
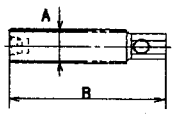
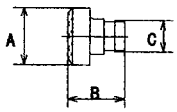
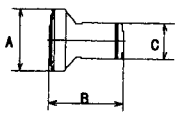
5-2-1. The clamping screw and the edge pad are separate parts, so that the edge pad on the clamping bolt can be replaced.

5-2-2. The edge pad must be always attached to the edge of the bolt.

5-2-3. When the edge section of the edge pad becomes worn away to the specified value, be sure to replace the edge pad.

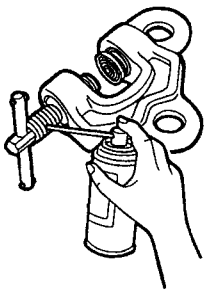
5-2-4. Clamping bolts can never be used without an edge pad.

Spare parts specifications

		EDGE PROTRUSION TYPE		EDGE PAD TYPE							
											
Parts name		Clamp screw		Clamping bolt		Pad			Swivel jaw		
Model \ Size (mm)		A	B	A	B	A	B	C	A	B	C
SBN - 500 (0 - 25)		ϕ20 P=2	96	ϕ20 P=2	90	17.7	18.6	M8	27.5	28.5	15
SBB - 500 (0 - 25)	SBBE - 0.8 (0 - 25)										
SBN - 800 (25 - 50)	SBE - 1 (25 - 50)	—	—								
SBN - 1 (0 - 30)	SBE - 2 (0 - 30)	ϕ24 P=2	124	ϕ24 P=2	116	21.7	23.3	M8	37	38	22
SBB - 1 (0 - 40)	SBBE - 2 (0 - 40)										
SBN - 2 (5 - 30)	SBE - 3 (5 - 30)	ϕ28 P=3	117	—	—	—	—	—	43	45	25
SBB - 2 (0 - 40)	SBBE - 3 (0 - 40)	ϕ32 P=3	134	ϕ32 P=3	125	27.5	26.3	M10			
SBN - 3 (5 - 35)	SBE - 4 (5 - 35)										
SBB - 3 (5 - 35)		ϕ36 P=4	137.5	ϕ36 P=4	127.5	31	28	M12	50	53.5	30
	SBBE - 4 (5 - 35)				122.5						
SBN - 5 (10 - 40)	SBE - 6 (10 - 40)	ϕ38 P=4	143.5	—	—	—	—	—	60	59.5	35
SBB - 5 (10 - 40)	SBBE - 6 (10 - 40)	ϕ40 P=4	150.5	ϕ40 P=4	146.5	35	31.5	M12			
	SBBE - 7.5 (10 - 40)										
SBb-5(40-80) (Old type)	SBbE-6(40-80) (Old type)	ϕ44 P=4	175	ϕ44 P=4	170	38	35.5	M14	60	63.5	35
SBb-5(40-80) (New type)	SBbE-6(40-80) (New type)	ϕ46 P=4	175	ϕ46 P=4	162.5	39.5	35.5	M14			
SBb - 8 (65-100)	SBbE -10 (65-100)	—	—	ϕ64 P=4	173.5	56	46	M14	70	74.5	40
SBC - 5 (20 - 80)	SBCE - 7 (20 - 80)	ϕ44 P=4	207.5	ϕ46 P=4	195	39.5	36	M14	60	63.5	35

6. Strict precautions when using screw clamps

6-1.Clamping bolt, swivel jaw, etc.



6-1-1. When an edge pad type clamping bolt is used, the edge pad must always be installed.

6-1-2. The swivel jaw must not be allowed to drop out.

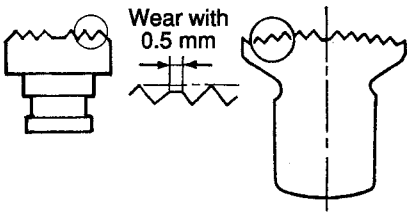
6-1-3. The clamping bolt should rotate smoothly.
Always lubricate the clamping bolt so that the tightening torque can be converted
to a tightening force.

6-1-4. The pressure nut should move smoothly.

6-1-5. If the nut moves poorly, be sure to lubricate it.
The other parts should always be present.

7. Wear limit on the swivel jaw, the edge protrusion type and edge pad type clamping bolts

The wear limit for the edge of the teeth that touch the surface of an object to be lifted is 0.5 mm or less.



When the wear on the teeth equals the specified wear limit, on the swivel jaw, the edge protrusion type or edge pad type clamping bolts, replace the worn part with a new one before using the clamp again.

8. Items to be strictly observed when installing the clamps on an object to be lifted

8-1. Minimum usable capacity and minimum usable thickness

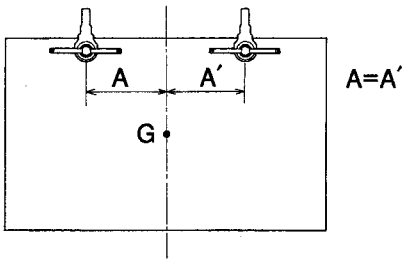
8-1-1. The minimum usable capacity is 1/5 the maximum usable capacity.

Example: When the maximum usable capacity is two tons, the minimum load should be 400 kg.

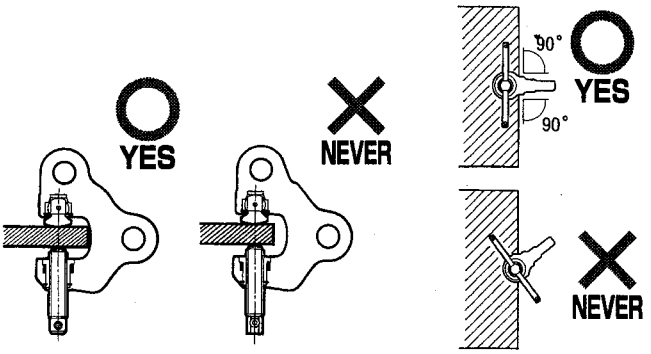
8-1-2. The minimum usable thickness is 1/4 the maximum usable thickness.

Example: When the maximum usable thickness is 20 mm, the minimum thickness of an object must be at least 5 mm.

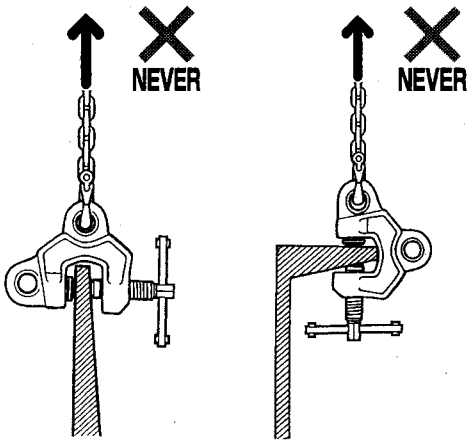
8-2. Clamps should be attached at optimum positions, depending on the shape of the objects to be lifted.
Optimum positions: Check the center of gravity just after the object to be lifted is raised from the ground.
Attach the clamps to positions that seem to be the safest.



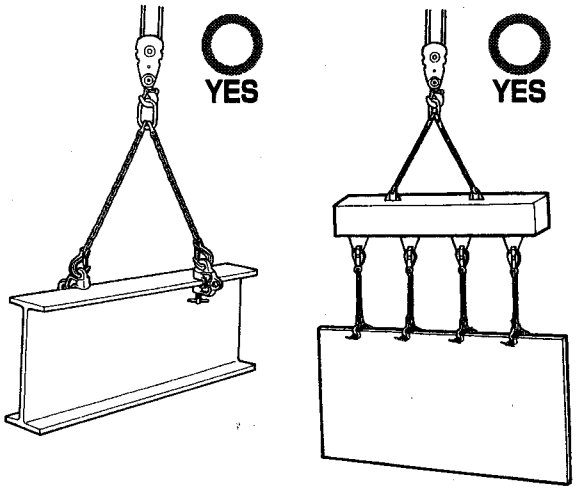
8-3. Be sure to insert each clamp vertically all the way into the throat of the opening section.
Then secure it with the clamping bolt.



8-4. Never use any clamp with materials whose opposite sides are not parallel (that slope together).

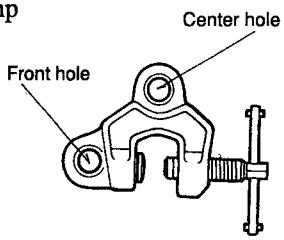


8-5. Be sure to always use two or more clamps as a set.

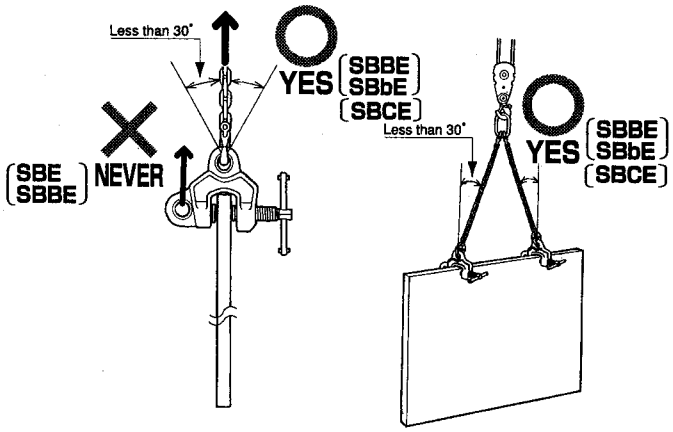


9. Selection of the two lifting shackle holes to use when lifting an object

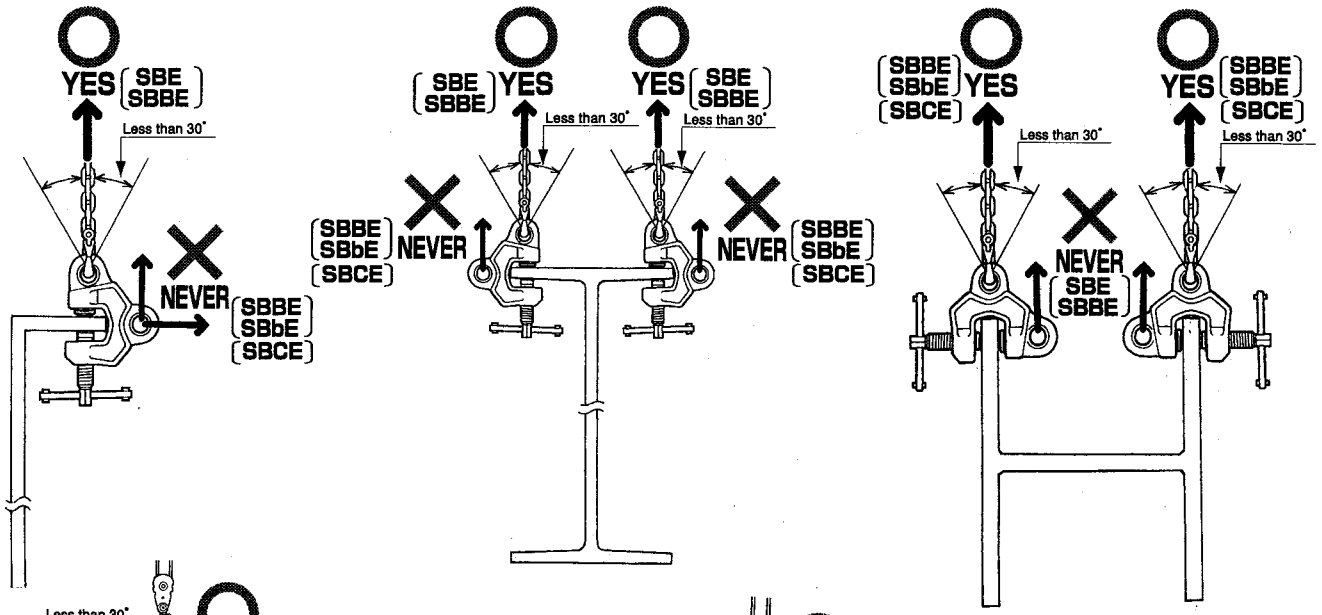
9-1. The SBB and SBBE models have two lifting shackle holes.
Front hole: Lifting shackle hole on the edge of the swivel jaw.
Center hole: Lifting shackle hole on the center of the back of the clamp

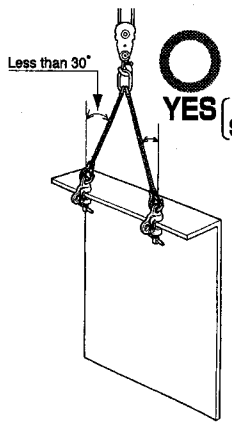


9-2. When lifting flat steel plates, be sure to use the center hole.

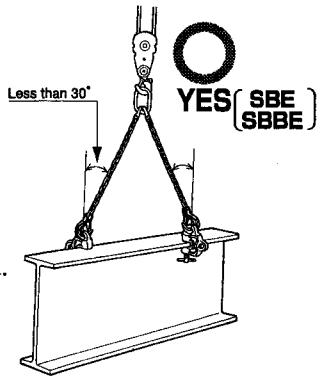


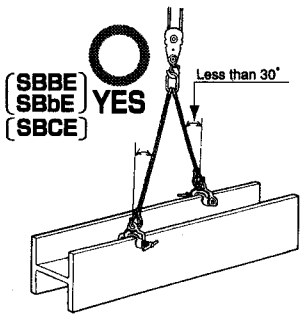
9-3. Pay special attention when lifting shaped steel plates. Never use the wrong lifting shackle hole.



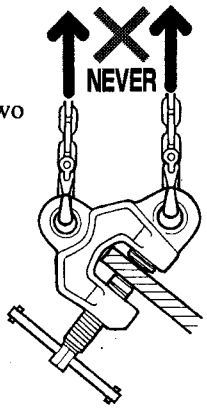


When an object is to be lifted from the ground, the lifting shackle hole position which will not apply an offset load is the hole that should be used.

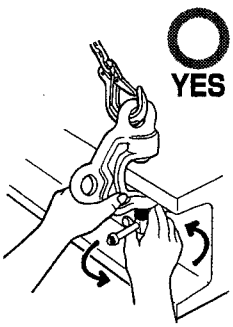




9-4. Lifting and handling operations must not be done by using the two lifting shackle holes on a single clamp at the same time.



9-5. Be sure to remove clamps after finishing a lifting and handling operation.
When continuing to lift and handle the same object, leaving the clamps installed where they are, be sure to recheck whether the clamps are attached properly, and be sure to retighten the clamping bolts.

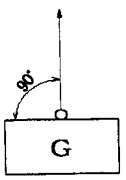
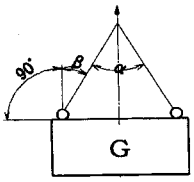
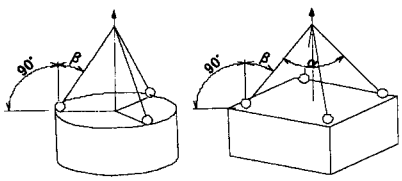


10. Maximum load performance for the clamp lifting angle

Clamps must have a reduced working load according to the lifting angles of the objects to be lifted.
To calculate the working load reduction ratio, use the following table strictly.

Lifting angle of clamps

G : Position of the center of gravity

Lifting method							
Number of slings	1	2			3・4		
Angle of inclination (α)	$\alpha = 0^\circ$	0 ~60°	60°~90°	90°~120°	0 ~60°	60°~90°	90°~120°
Angle to vertical (β)	$\beta = 0^\circ$	0 ~30°	30°~45°	45°~60°	0 ~30°	30°~45°	45°~60°
Factor for WLL	1	2	1.4	1	3	2.1	1.5
Model	WLL (ton)						
SBN - 500(0 - 25) SBB - 500(0 - 25)	0.5	1	0.7	0.5	1.5	1.05	0.75
SBN - 800(25 - 50) SBBE- 0.8 (0 - 25)	0.8	1.6	1.12	0.8	2.4	1.68	1.2
SBN - 1 (0 - 30) SBB - 1 (0 - 40)	1	2	1.4	1	3	2.1	1.5
SBN - 2 (5 - 30) SBB - 2 (0 - 40) SBE - 2 (0 - 30) SBBE- 2 (0 - 40)	2	4	2.8	2	6	4.2	3
SBN - 3 (5 - 35) SBB - 3 (5 - 35) SBE - 3 (5 - 30) SBBE- 3 (0 - 40)	3	6	4.2	3	9	6.3	4.5
SBE - 4 (5 - 35) SBBE- 4 (5 - 35)	4	8	5.6	4	12	8.4	6
SBN - 5 (10 - 40) SBB - 5 (10 - 40) SBb - 5 (40 - 80) SBC - 5 (20 - 80)	5	10	7	5	15	10.5	7.5
SBE - 6 (10 - 40) SBBE- 6 (10 - 40) SBbE- 6 (40 - 80)	6	12	8.4	6	18	12.6	9
SBCE- 7 (20 - 80)	7	14	9.8	7	21	14.7	10.5
SBBE- 7.5 (10 - 40)	7.5	15	10.5	7.5	22.5	15.75	11.25
SBb - 8 (65-100)	8	16	11.2	8	24	16.8	12
SBbE-10 (65-100)	10	20	14	10	30	21	15

11. How to use the screw clamps for vertical use only, SBC-5 (20-80) and SBCE-7 (20-80)

11-1. Make absolutely sure that lifting angle (α) is between 0 - 60°and angle (β) is between 0 - 30°, away from the vertical axis.

Other precautions:

Any details that are not described here are covered in the existing instruction manual.
When using these clamps, please make sure you understand the details in the manual, follow the advice given, and double check all safety measures.

We assume no responsibility for any incorrect applications that are not described in the existing instruction manual (SBN, SBB, SBb, SBC, SBE, SBBE, SBbE and SBCE) or in this additional instruction manual.

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.)

NOTES ON SAFETY

Please be sure to read this manual before using our sling clamps.

If you use sling clamps (hereafter just called "clamps") the wrong way, it creates a serious danger because the objects being lifted may fall. Before using these clamps, be sure to read this instruction manual carefully and always use the clamps according to the instructions given.
Please make sure that the "Crane Safety Regulations", "Manual for working with sling clamps", and your own working standards have been read by or explained to all workers and company managers. The clamps should only be used after confirming that everyone who will work with clamps has completely mastered all of the needed knowledge, relevant safety information and the precautions that must be taken.
Based on the report of the "Sling Safety Conference", the precautions used in this manual have been divided into "Danger" and "Caution".

We do not provide compensation nor offer any guarantee against accidents caused by failing to follow the directions or due to performing prohibited actions, as described in this instruction manual.

※ After reading this manual, please be sure to store it where workers can refer to it whenever they want.

M-50

DANGER	If you mishandle clamps, it is assumed that the danger of death or serious injury is likely.
CAUTION	If you mishandle clamps, it is assumed that a dangerous condition might exist and personal injury or property damage is likely.

Even though an item may be marked ⚠ CAUTION ,there is still a possibility that it could have very serious consequences, depending on the situation.
In any case, since important details are covered in these items, make sure to follow the instructions or advice given.

●Description of symbols

DANGER ・ CAUTION

The symbols ◈ DANGER and ⚠ CAUTION indicate details you must pay specific attention to. The specific type of hazard will be shown in the drawing.
(The drawing shown below means that you must be careful not to get your hand caught in the equipment.)

PROHIBITED ACTION

This symbol indicates an action that is prohibited.

DIRECTION

This symbol indicates specific actions that must be taken.
The details of the action are shown in or near the drawings.
(The drawing shown on the right indicates how to make a sling for two-point lifting.)

Two-point lifting

M-50

1. General Handling Precautions

DANGER

1. Anyone who is not completely familiar with the contents of the instruction manual and nameplate cautions 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.

DIRECTION

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.
   - · Fragile materials
   - · Very high hardness or low hardness materials, or materials that have low internal strength
   - · Tapered members that have an angle of 10° or more in the clamping area

PROHIBITED ACTION

4. Check the model, WLL, and effective thickness marked on the clamps. Also make sure the clamp has a label which shows that a recent inspection was carried out.

DIRECTION

DANGER

5. The load to be lifted must be less than the allowable WLL of 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.

DIRECTION

⚠ CAUTION

7. Do not remove any caution nameplate attached to a clamp. If the details on any caution nameplate are unclear, do not use the clamp.
8. Do not use clamps in the following conditions.
   - · If the temperature of the objects to be lifted is higher than 150℃ or lower than -20℃.
   - · In or around strong acid or alkali liquids

PROHIBITED ACTION

9. When working with clamps, only use slings that are suitable for the particular sling work.

DIRECTION

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 that are suspended from a power shovel.

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.

DIRECTION

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 exceeds the WLL of 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.)

DIRECTION

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.

DIRECTION

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

5. Maintenance, inspection and repairs should only be made by a qualified person, designated by the company that owns the clamps.
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.
7. Remove any paint, sludge, etc. from the movable sections, cams, and catches (swivel jaws) of the clamps.

DIRECTION

CAUTION

8. When performing maintenance, or making inspections or repairs, be sure to detach any object that the clamps are attached to.
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.
10. Be sure to lubricate the sliding sections of the clamps such as the rotating sections (around pins) and the guide grooves.
11. Be sure to store the clamps indoors.

DIRECTION

Note: For a detailed list of items to inspect and the standards to be used for disassembly and reassembly, please ask your distributor or our business office.

The following caution seal is attached to each clamp.

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

●Caution seal

DANGER
Be sure to read the "Instruction Manual" before using the lifting equipment.
If lifting equipment is used incorrectly, someone may be killed.

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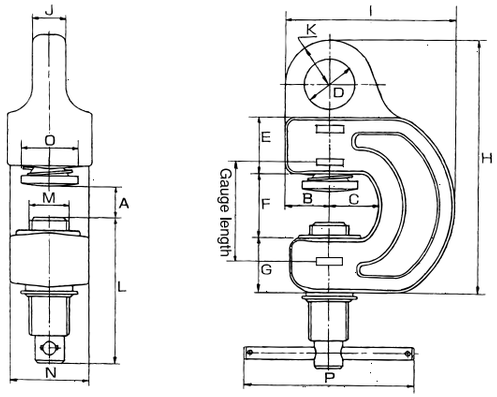
1. Specification and Dimensions/Construction and Part Names

Model SBE

●Dimension drawing



●Specification table

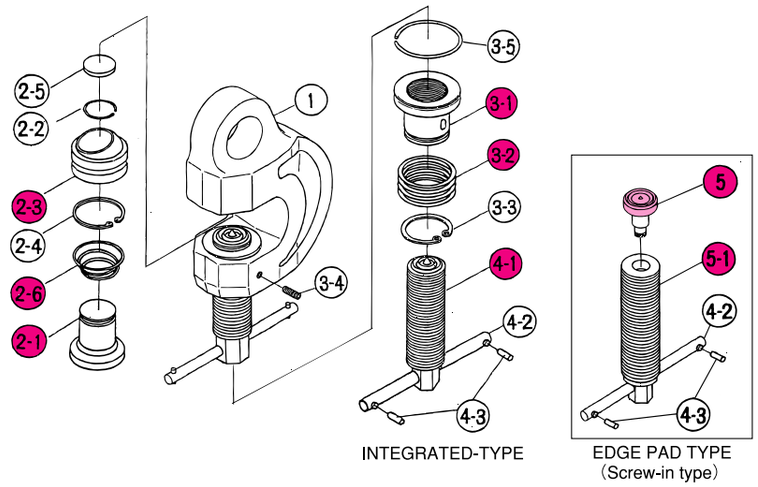
Model	WLL (t)	Opening size (mm)	Effective thickness A(mm)	Dimensions (mm)									
				B	C	D	E	F	G	H	I	J	K
SBE-1	1	25~50	25~50	26.5	34	Φ30	29	66	29.5	174.5	110.5	16	29
SBE-2	2	0~30	1~30	33	33	Φ35	35.5	49.5	36	181.5	113	18	35.5
SBE-3	3	5~30	5~30	35	35	Φ36	41	55	40	195	127	25	35
SBE-4	4	5~35	5~35	40	43	Φ45	47.5	61	45.5	223	150	30	40
SBE-6	6	10~40	10~40	47	45	Φ50	52	73	55	260	177	35	47

Model	Dimensions (mm)						Gauge length (mm)	Product weight (kg)	※Specified tightening torque
	L	M	N	O	P	※Q			
SBE-1	96	Φ20	48	Φ27.5	150	Φ15	80	2.4	1470N · cm
SBE-2	124	Φ24	60	Φ37	150	Φ22	60	3.8	1470N · cm
SBE-3	117	Φ28	65	Φ43	150	Φ25	70	5.6	1960N · cm
SBE-4	134	Φ32	70	Φ50	200	Φ30	80	8.3	2450N · cm
SBE-6	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 SBE



●Part names

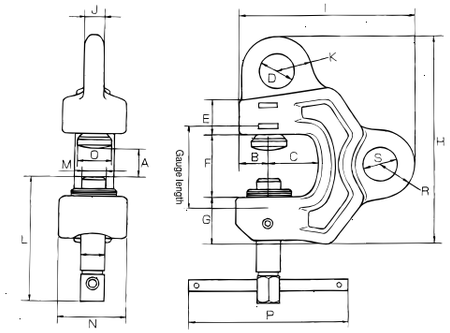
Model SBE

Part No.	Description	Sub No.	Part name	Q'ty
1	Main body			1
2	Swivel jaw (circlip lock type)	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	4-1	Clamp screw	1
		4-2	Clamp handle	1
		4-3	Spring pin	2
5	Edge pad	5	Edge pad	1
	Clamp screw for the edge pad	5-1	Clamp screw (edge pad type)	1

●……Lubrication points

Models SBBE, SBbE and SBCE

●Dimension drawing



●Specification table

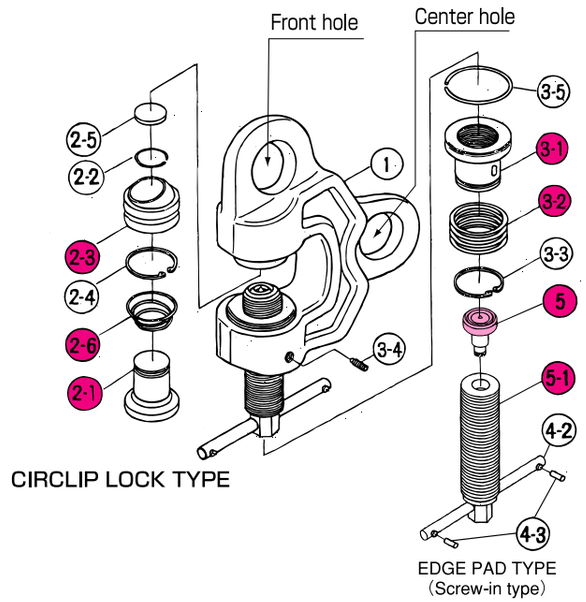
Model	WLL (t)	Opening size (mm)	Effective thickness A(mm)	Dimensions (mm)										
				B	C	D	E	F	G	H	I	J	K	L
SBBE- 0.8	0.8	0~25	1~25	23	25	φ27	22	41	29	140	112	15	24	96.3
SBBE- 2	2	0~40	1~40	27.5	46	φ32	31.5	61.5	45	202	165.5	18	34	124.3
SBBE- 3	3	0~40	1~40	35	43	φ36	44	66	45.5	218	183	25	38.5	134.3
SBBE- 4	4	5~35	5~35	37.5	47.5	φ48	38.5	61.5	59	241.5	183.5	28	43.5	137.5
SBBE- 6	6	10~40	10~40	48	55	φ50	52	75.5	66.5	276	213	35	47	157
SBbE- 6 (Old type)	6	40~80	40~80	45	92	—	83	115	87	285	282.5	40	—	181.5
SBbE- 6 (New type)	6	40~80	40~80	45	92	—	83	115	87	285	282.5	40	—	174.5
SBbE-10	10	65~100	65~100	49	92	—	97	146	101	344	280	40	—	190
※SBCE- 7	7	20~80	20~80	45	92	—	83	115	87	285	282.5	40	—	207

Model	Dimensions (mm)							Gauge length (mm)	Product weight (kg)	※Specified tightening torque
	M	N	O	P	※Q	R	S			
SBBE- 0.8	φ20	46	φ27.5	150	φ15	24	φ27	50	1.8	1470N · cm
SBBE- 2	φ24	60	φ37	150	φ22	34	φ32	90	4.0	1470N · cm
SBBE- 3	φ32	74	φ43	150	φ25	36	φ32	80	7.6	1960N · cm
SBBE- 4	φ36	80	φ50	200	φ30	32	φ27	80	8.8	2450N · cm
SBBE- 6	φ40	96	φ60	200	φ35	45	φ37	90	14.3	2450N · cm
SBbE- 6 (Old type)	φ44	107	φ60	200	φ35	57.5	φ60	130	24.4	2450N · cm
SBbE- 6 (New type)	φ46	107	φ60	200	φ35	57.5	φ60	130	24.4	2450N · cm
SBbE-10	φ64	128	φ70	200	φ40	52	φ41	170	31.6	2450N · cm
※SBCE- 7	φ46	107	φ60	200	φ35	57.5	φ60	130	25	2450N · cm

※The Model SBCE is a clamp designed for vertical lifting only.
※Be sure to tighten to at least the specified tightening torque.
※Q: Bearing dimensions

●Assembly and construction drawing

Model SBBE



CIRCLIP LOCK TYPE

EDGE PAD TYPE
(Screw-in type)

●Part names

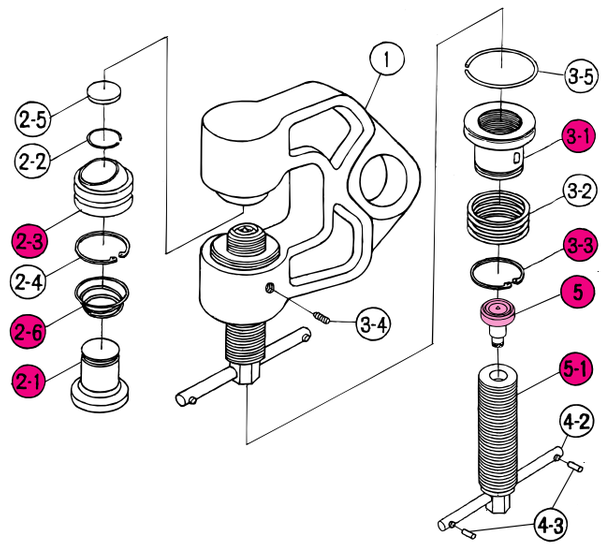
Model SBBE

Part No.	Description	Sub No.	Part name	Q'ty
1	Main body			1
2	Swivel jaw (circlip lock type)	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 handle	4-2	Clamp handle	1
		4-3	Spring pin	2
5	Clamp screw	5	Edge pad	1
		5-1	Clamp screw (edge pad type)	1

●……Lubrication points

●Assembly and construction drawing

Models SBbE and SBCE



EDGE PAD TYPE
(Screw-in type)

●Part names

Models SBbE and SBCE

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 handle	4-2	Clamp handle	1
		4-3	Spring pin	2
5	Clamp Screw	5	Edge pad	1
		5-1	Clamp screw (edge pad type)	1

●……Lubrication points

※The Model SBCE is a clamp designed for vertical lifting only.

2. Construction and Operating Mechanism

(1) Mechanism that produces the gripping force

This clamp can grip steel materials securely. The clamping force increases in proportion to the weight of the load.
Once the clamp is engaged, it can be pulled, lifted, and hung in any direction. These flexible features are based on the following principles.

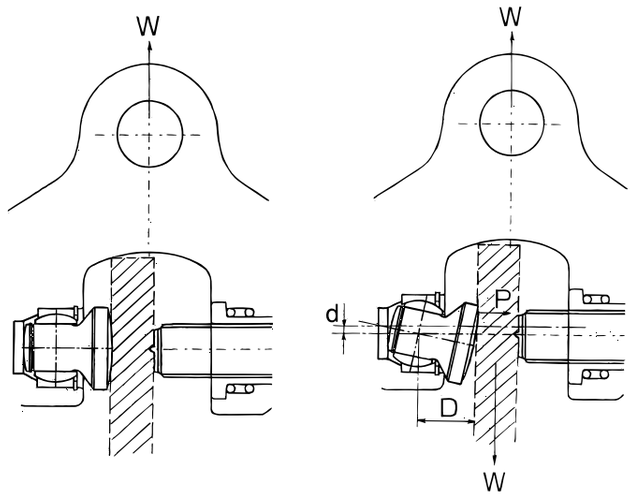


Fig. 1

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. (SBBE, SBbE, and SBCE)

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

k : Mechanical efficiency (0.1～0.5)

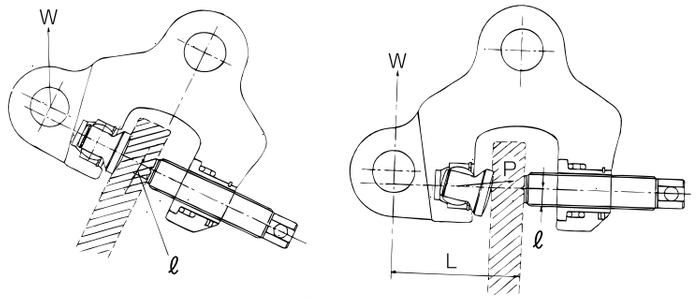


Fig. 2

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 applied by the lever action, 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)

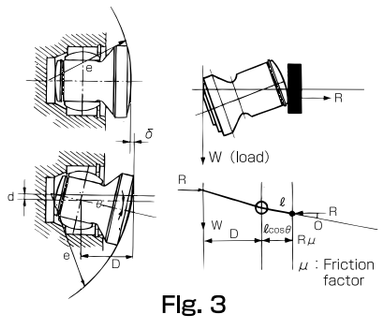
$$P \fallingdotseq \frac{L}{\ell} \times W \times k \qquad k : \text{Mechanical efficiency} \quad (0.1 \sim 0.5)$$

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 SBE, SBBE, SBbE and SBCE Operation

WLL (ton)	Allowable tilt angle θ (°)	Amount protruding δ (mm)
0.8	12	1.6
1	12	1.6
2	12	2.0
3	12	2.5
4	12	3.0
6, 7	12	3.5
10	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.



Flg. 3

According to Fig. 3,

$$R\ell\sin\theta + R^{\mu}\ell\cos\theta = WD$$

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

If D = 3, ℓ = 2, θ = 15°, and μ = 0.3, a pressure of R = 2.7W (approx. 2.7 times the load) is obtained.

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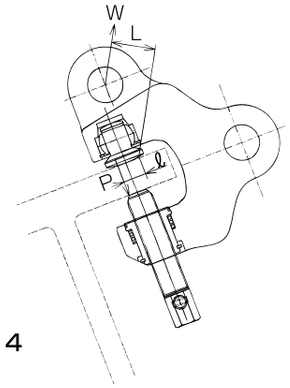
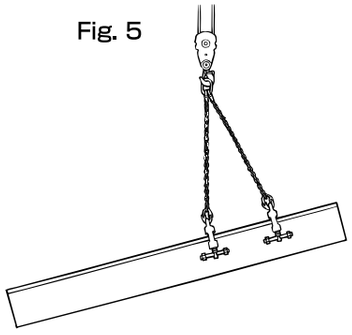
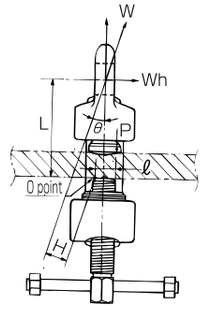


Fig. 4

4. When a steel plate is lifted or pulled, as shown in Fig. 4, a clamping force of P = L/ℓ x W x 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/ℓ ratio changes.
The clamping force is maintained in any direction.

Fig. 5





- H: Distance between the vertical line of W and the O point
- Wh: Component force in the lateral direction (for the central axis of the clamp) of W
- P: Presser force (clamping force)
- Wh = $W\sin\theta$ or $= W\cos\alpha$
  θ: Tilt of the clamp
  α: Tilt of the load being lifted

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 $WH + W\ell L = P\ell$

$$P = \frac{WH + W\sin\theta L}{\ell}$$

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

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

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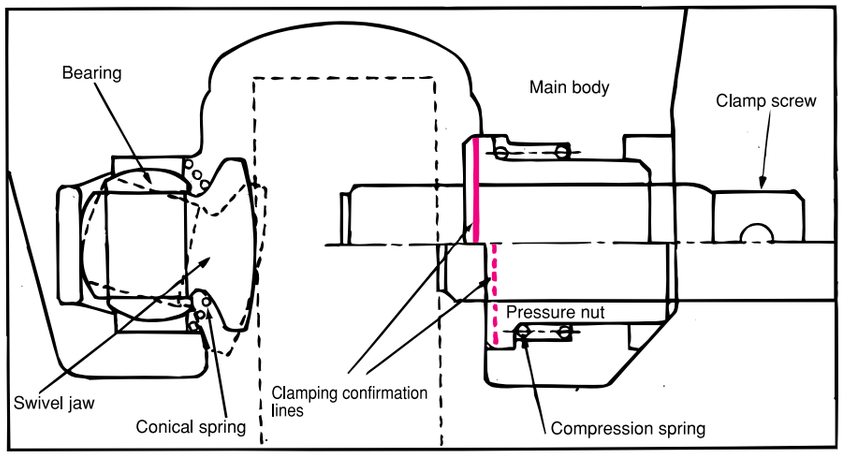
(2) Utility of the conical spring (patented mechanism)

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) Clamping force confirmation mechanism (patented 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.

3. Performance and Materials Used in the Product

(1) Safety factor

- Test load (proof-load): 2.5 times the WLL
- Breaking load : 4 times the WLL, or greater
- Safety factor : 4 times or greater

(2) Materials used and mechanical characteristics

- Main body

Material	Yield point (N/mm²)	Tensile strength (N/mm²)	Elongation (%)	Hardness (H.B.)
SCM435	785 or higher	930 or greater	15 or more	269~331

- Swivel jaw and clamp screw

Material	Tooth-edge hardness (HV)
EKN-7	544~674
SNCM447	438~560

4. Operation Manual for Screw Clamps (Models SBE, SBBE, SBbE and SBCE)

(1) Purpose

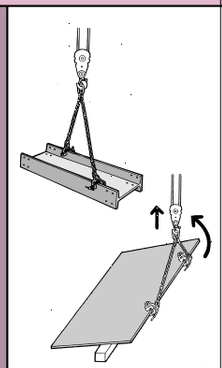
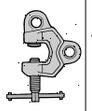
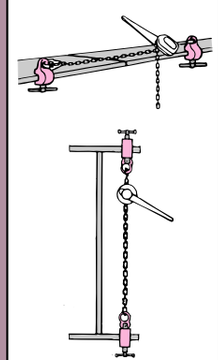
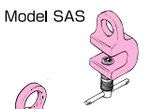
The purpose of this manual is to give you the information needed to perform sling work safely and to prevent accidents.
If the wrong method is employed when using clamps for sling work, there is a possibility that the object being lifted may fall, people may be injured or die and the clamps may be seriously 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 SBE, SBBE, SBbE and SBCE) that are used as a part of the sling equipment.

(3) Types of clamps

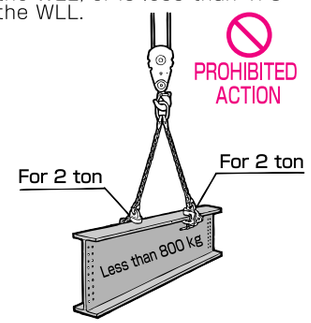
When sling work is performed, the clamps used must be suitable for the working requirements.

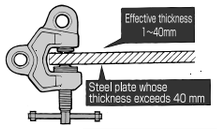
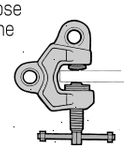
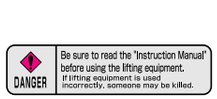
Job details		Screw clamp selection	Criteria used to evaluate the job requirements
Pulling out / turning over / lifting and transporting of steel plates, shaped steel, etc.		Model SBBE  Model SBE Models SBbE and SBCE	・**Lifting clamp** The clamp is designed so that the opening section of the clamp is 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 pulled out using a crane. ※Model SBCE is a clamp designed to be used only for vertical lifting.
Pulling in, positioning and clamping		Model SAS  Model SAR Models SRN and FXJ	・**Pulling and positioning jig** These clamps are used for clamping or positioning members using pulling jigs or hydraulic jacks.

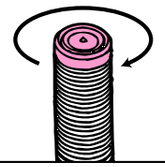
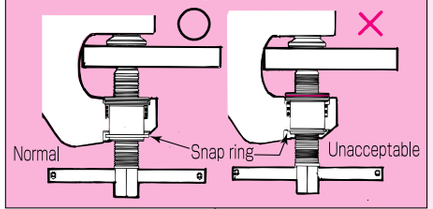
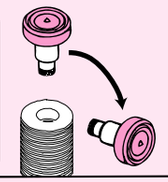
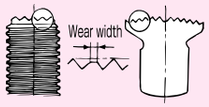
(4) Items to be checked before beginning work

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	⚠DANGER ●Check the following items on the side of the clamps' main body. •Model •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.)	If there is no marking on a clamp or if it can't be read, do not use the clamp. 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. However, in-house regulations provided by your company take priority.	If there is no marking on a clamp, or if it can't be read, do not leave the clamp on the job site.
(2) Checking the weight of the object to be lifted	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. Do not use clamps with any object whose weight exceeds the WLL, or is less than 1/5 the WLL.  ⚠DANGER ●The weight of the object to be lifted must be within the allowable WLL range for the clamp you intend to use.	Replace clamps with ones with a suitable WLL for the load to be lifted.	If the load exceeds the allowable range, the clamps may break or the object may fall out of the clamps. 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.) 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. In four-point lifting, the load distribution on each clamp should be considered to be the same as that in three-point lifting. That calculated clamp load should be used to select the clamps to be used.

Item	Item to be checked	Action	Precautions
(3) Checking the maximum thickness of 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.)  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.	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.
(4) Checking the minimum 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.)  **⚠CAUTION** ●The thickness of the object to be lifted must be within the allowable thickness range of the clamps you intend to use.	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.
(5) Checking the caution seal	 **⚠CAUTION** ●Do not remove the caution seal that is attached to each clamp. If it can't be read, do not use the clamp.	Do not use any clamps without a caution seal. If a caution seal is not present, be sure to ask us for a replacement and attach it to the clamp.	
(6) Checking the sling	The safety factors for slings and the fittings used for clamp operations 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. (1) **⚠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 60 to 71 of the "7. Inspection Manual for Screw Clamps". (2) Operation check Check the operation of the clamp screws, pressure nuts, bearings and conical springs. (3) Follow the advice in "Inspection of sling equipment" (refer to "Precautions" in the right column) for mounting slings (chains, wires, fittings, shackles, etc.). **⚠DANGER** ●When using edge pad type clamp screws, make sure that the edge pads are installed and that they turn smoothly before starting to use the screw clamp. 	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. Do not use clamps that have cracks or significant deformation or wear. **⚠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.  **⚠DANGER** ● Never use screw clamps with edge pad clamp screws if the edge pads have fallen off. 	For details about the "Inspection of sling equipment", refer to the Safety Regulations in each country. Wear width limit : Wear of 0.5 mm on any model 
(8) Worker qualifications	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

Depending on the model, when working limits are assigned to the lifting holes in a clamp ("Working limits of lifting holes" on page 52), carefully consider the clamp mounting method before starting to use the clamp.

(6) Compatibility table for connecting fittings

Use connection fittings that are suitable for clamps.

Model	Green Pin shackle	Coupling
SBE— 1 (25~50)	GPSB-13 (2.0ton)	CP — 8 (2.0ton) CP —10 (3.15ton)
SBE— 2 (0~30)	GPSB-16 (3.25ton)	CP — 8 (2.0ton) CP —10 (3.15ton) CP —13 (5.3ton)
SBE— 3 (5~30)	GPSB-19 (4.75ton)	CPZ—10 (3.15ton) CP —13 (5.3ton)
SBE— 4 (5~35)	GPSB-22 (6.5ton)	CP —16 (8.0ton)
SBE— 6 (10~40)	GPSB-25 (8.5ton)	CP —20 (12.5ton)
SBBE—0.8 (0~25)	GPSB-10 (1.0ton)	CP — 6 (1.12ton) CP — 8 (2.0ton)
SBBE—2 (0~40)	GPSB-16 (3.25ton)	CP — 8 (2.0ton) CP —10 (3.15ton) CP —13 (5.3ton)
SBBE—3 (0~40)	GPSB-19 (4.75ton)	CP —13 (5.3ton) CPZ—10 (3.15ton)
SBBE—4 (5~35)	GPSB-25 (8.5ton)	CP —16 (8.0ton) (Front hole)
SBBE—6 (10~40)	GPSB-28 (9.5ton)	CP —16 (8.0ton) (Front hole) CP —20 (12.5ton) (Front hole)
SBbE— 6 (40~80) SBCE—7 (20~80)	GPSB-28 (9.5ton) GPSB-32 (12.0ton)	CP —22 (15ton)
SBbE—10 (65~100)	Light weight shackle JIS RB-10ton	——

⚠CAUTION

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

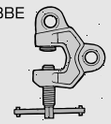
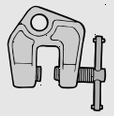
(7) Clamp operation procedures

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 details on the caution nameplate should not be allowed to 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
(1) Model selection: Screw clamp for lifting	Determining the lifting method, number of lifting points, and installation points Checking the weight of the object to be lifted and the thickness of the object to be clamped	Model SBBE 
	⚠DANGER ●Do not use clamps that are not suitable for the operating method.	Model SBE
Check the swivel jaw and clamp screw for tooth wear and for clogging.	← If the wear or breakage of the teeth exceeds the allowable value, replace the part. Clogging is removed using a sharp object. If it cannot be removed, replace the part.	Models SBbE and SBCE 
Operation check	← Check the operation of the clamp screw, pressure nut, bearing and conical spring.	
(2) Inspections before beginning work	<Method for checking before use> • Swivel jaw Loosen the clamp screw to enlarge the opening section. The swivel jaw should rotate and tilt smoothly. • Pressure nut When the clamp screw is tightened, make sure that the confirmation line on the pressure nut section disappears. When the clamp screw is loosened, make sure that the confirmation line reappears. Then, make sure that the pressure nut operates normally.	
	⚠DANGER ●Do not use clamps that have a problem.	
	Refer to Section 「7. Inspection Manual for Screw Clamps」 on pages 60 to 71.	

Job procedure	Item to be checked	Illustrated description

(3) Clamp attachment

① Enlarging the opening ← Rotate the clamp handle to loosen the clamp screw.

② Checking the installation position ← Attachment point conditions.

⚠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.

⚠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.

③ Checking the sling angle

⚠DANGER

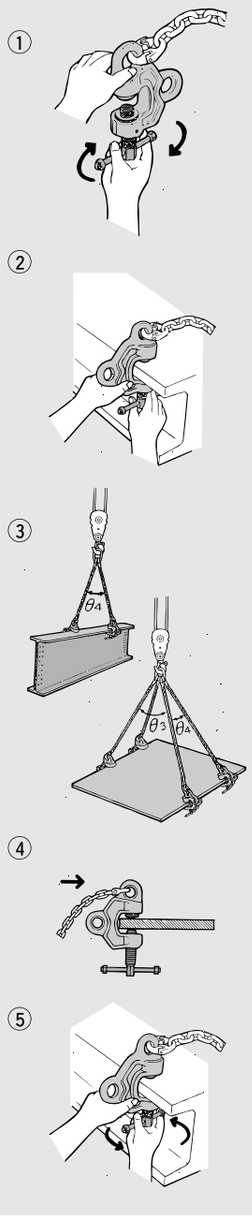
- In two-point lifting, the sling width angle (θ_4) should be less than 60°.
- In four-point lifting, the diagonal angle (θ_3) should be less than 60°, and the sling width angle between any two clamps on the object should be less than 60°.
- Insert the clamp until the back of the clamp throat opening touches the object to be lifted.

④ Set deeply.

⑤ Close the opening section. ← Pay attention not to tilt the main body and the swivel jaw, and rotate the clamp handle to tighten the clamp screw.

More than the specified tightening torque

Refer to the "Specification table" on pages 10 to 12.



Job procedure	Item to be checked	Illustrated description

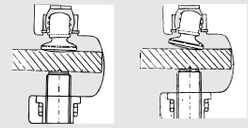
(4) Checking the condition and tightening of the swivel jaw

⑥ Check the tightness of the main body and swivel jaw. ← 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.

⑦ Check the tightness.

⑥

DIRECTION PROHIBITED ACTION

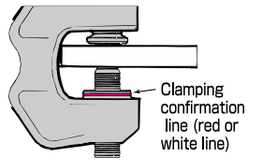


How to check the tightness

<Clamps with a clamping confirmation line>
Models SBE, SBBE, SBbE and SBCE

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.

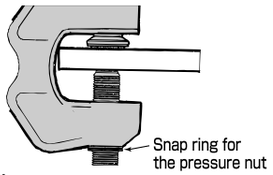
Before tightening



<Clamps without a clamping confirmation line>

After tightening

After tightening, make sure that the snap ring on the underside of the pressure nut is lifted away from the main body.



<Rechecking after tightening>
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.

⚠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.

Job procedure	Item to be checked	Illustrated description

(5) Pulling out and hoisting

⑧ Hoisting with a crane

⚠ CAUTION
- Raising or lowering the crane should be done slowly and carefully.

⑨ Pausing

⚠ 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.

⑩ Checking for safety

⑪ Resume lifting with the crane. ← Slowly and carefully

⚠ 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.

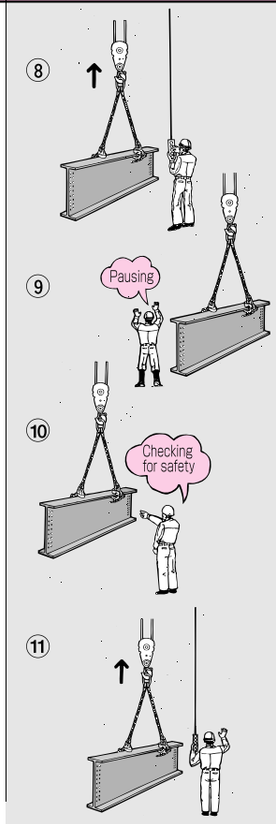
(6) Lifting and transportation

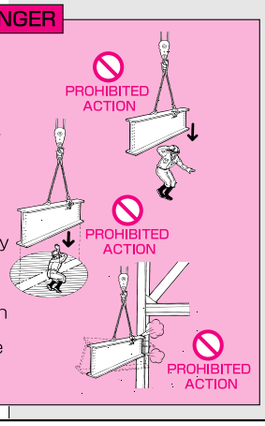
⑫ Checking the attitude of the object being lifted ← The object is unbalanced. → Stop the operation

⑬ The attitude of the object being lifted is good.

Return to Step ① on page 26, and try again. ← Lower the crane.

⚠ DANGER
- Never pass any objects being lifted over people's heads.
- 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.
  ※Complies with the "Safety and Health Law for sling Work" in Japan
- Do not operate a crane in a manner such that the object being lifted, or the clamps, may be banged by anything else.





Job procedure	Item to be checked	Illustrated description

(7) Lowering and removing

⑭ Lowering the crane ← Slowly and carefully

⑮ Stop the crane before the object is set down.

⚠ 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.

⑯ Checking for safe conditions before landing the object → The object is unbalanced.

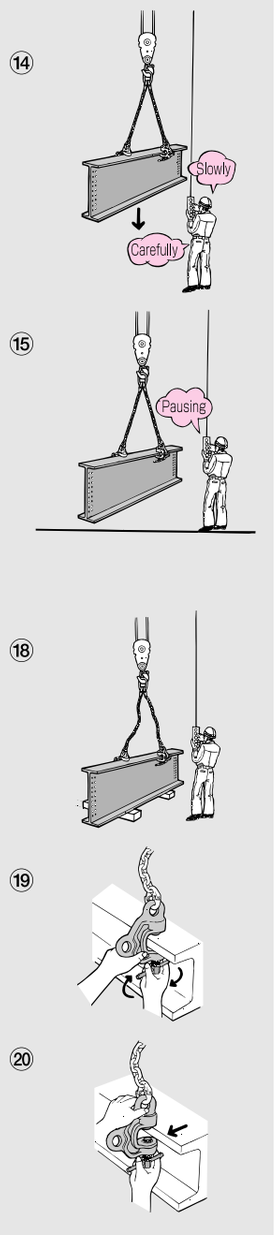
⑰ Checking for safe conditions ← Carrying out safety procedures

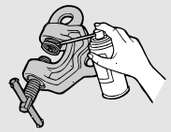
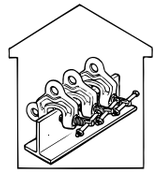
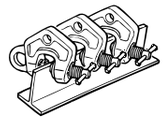
⑱ Resume lowering the crane. ← Lower the crane until no load is applied to the clamps.

⑲ Enlarging the opening ← Rotate the clamp handle to loosen the clamp screw.

⑳ Removing the clamps ← Hold the clamp main body and remove it from the object.

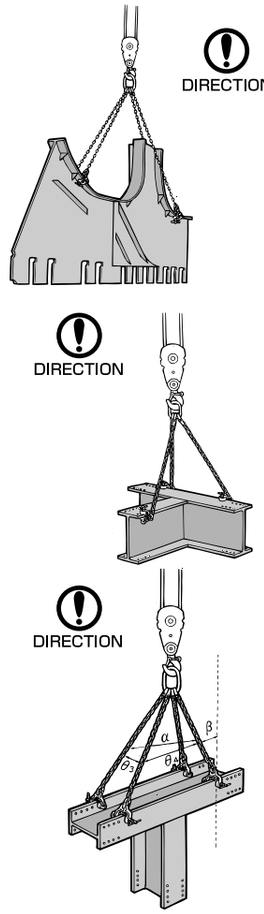
㉑ Return to page 26 ① for the next operation.

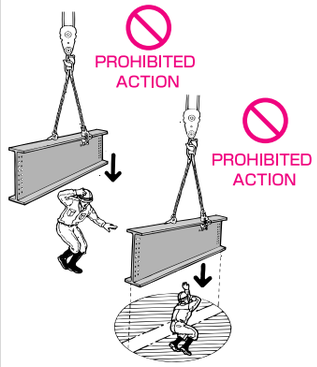
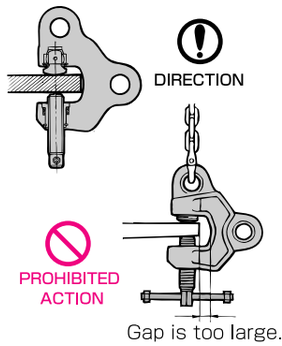


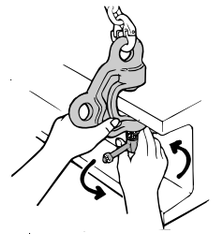
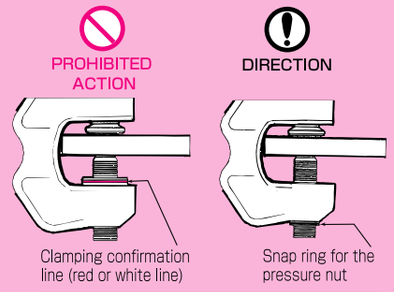
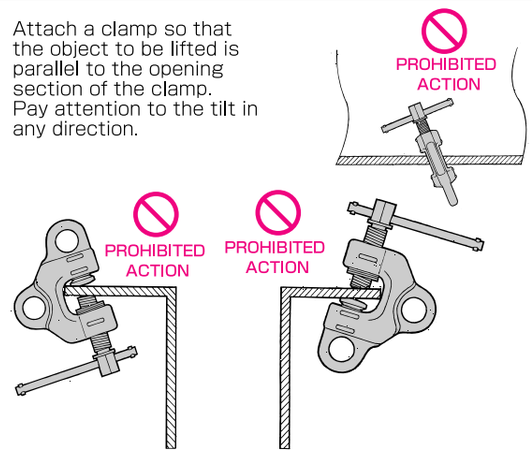
Job procedure	Item to be checked	Illustrated description
(8) Maintenance and storage ㉒ Greasing	**DANGER** ●Remove any paint or sludge from the moving parts, swivel jaws, and clamp screws (threads and thread edges) of the clamps.	㉒  The places to lubricate are shown in the "Assembly and construction 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.
㉓ Storing the clamps in place  	**CAUTION** ●Be sure to grease the sliding sections, such as the rotating sections (threads of the clamp screws and bottom of the swivel screws) and the guide grooves in the clamps. ●Be sure to store the clamps indoors.	

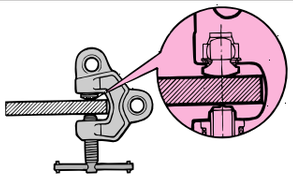
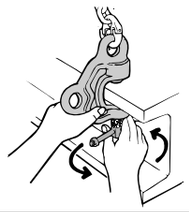
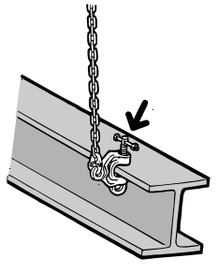
5-1. Precautions for Use

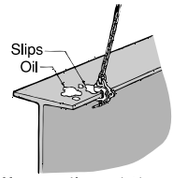
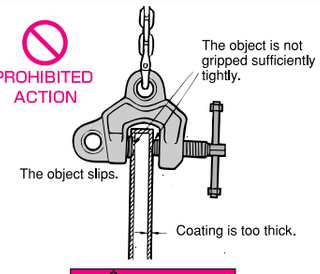
Most of the accidents involving clamps are due to using incorrect techniques for sling work. Operators should be completely familiar with the correct methods for performing sling work and then do their work in a safe fashion.

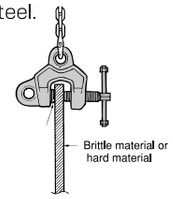
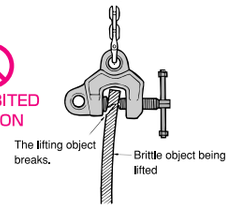
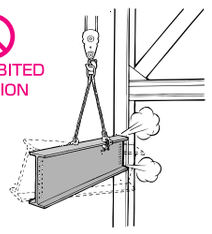
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(1) Never lift objects using a single point.	 Note: When using four-point lifting, as specified in JIS and ISO, the maximum angle in the diagonal direction should be regarded as the lifting angle (α) and the external angle in the diagonal direction should be regarded as (β).	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. **DANGER** ●When using two or more clamps, make sure they are the same model of clamp (WLL and effective thickness). **DANGER** ●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° 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.	

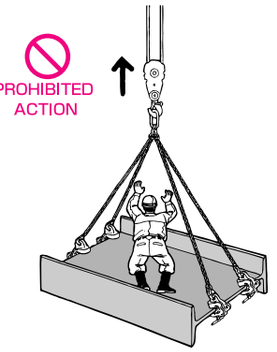
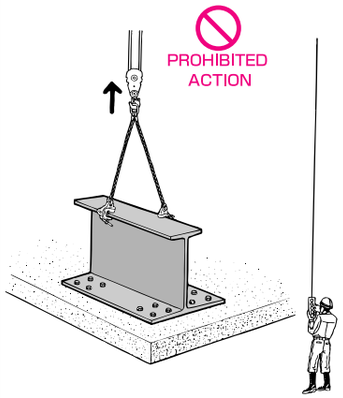
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(2) Be sure that everyone stays clear of the swinging range of the object being lifted.	 **DANGER** ●Never allow anyone to enter the falling or swinging range of the object being lifted while an object is being lifted 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	 **DANGER** ●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.	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. 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.

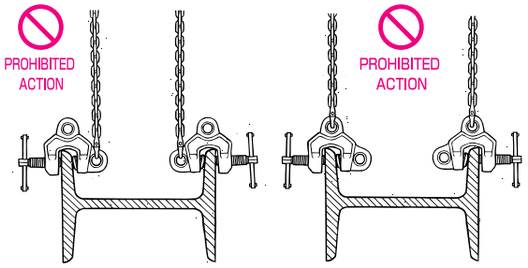
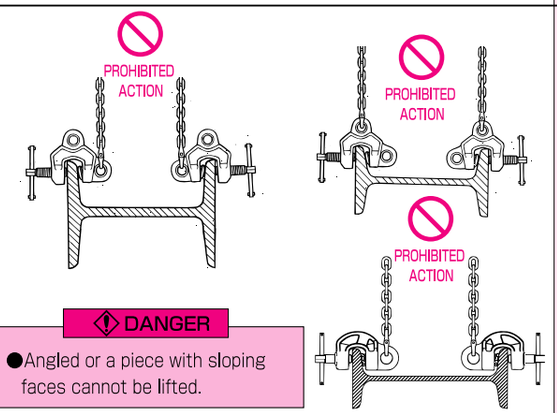
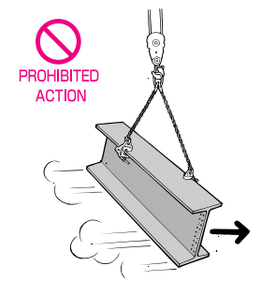
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(4) Tightening the clamp screw	Tighten the clamp screw firmly and make sure that the clamping confirmation line (red or white line) has disappeared and the snap ring has lifted away.  **More than the specified tightening torque** Refer to the "Specification table" on pages 10 to 12.	**DANGER** ●Checking the clamping confirmation line 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. Before tightening / After tightening  Without a clamping confirmation line ●Checking the snap ring● 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」.)	Force similar to when you wring a wet towel strongly.
(5) Precautions about the tilt of the clamp body	Attach a clamp so that the object to be lifted is parallel to the opening section of the clamp. Pay attention to the tilt in any direction. 		If the clamp body is tilted, loosen the clamp screw. Then, adjust the tilt of the main body and attach the clamp again.

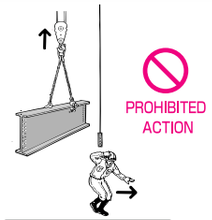
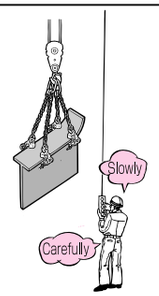
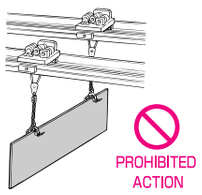
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(6) Checking the tilt of the swivel jaw	 **DANGER** ●When attaching a screw clamp, be careful not to tilt the swivel jaw.		If the swivel jaw is tilted, loosen the clamp screw. Then, adjust the tilt of the swivel jaw and tighten the clamp screw again.
(7) Retightening the clamp screw	Before lifting an object, be sure to retighten the clamp screw. **More than the specified tightening torque** Refer to the "Specification table" on pages 10 to 12. 	Once a clamp has lifted an object, the clamping force is reduced.	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.**
(8) Precautions against catching the handle	 **DANGER** ●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.	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.	

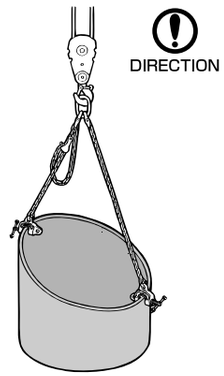
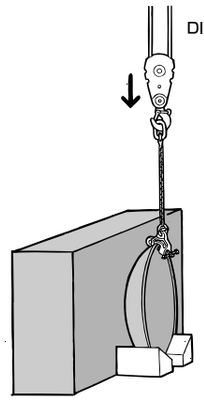
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(9) Using appropriate connection fittings	If the direction of the load changes while pulling out, turning over or pulling down objects, use couplings (Model CP). 		Refer to "Compatibility table for connecting fittings" on page 24.
(10) Lifting materials coated with oil	 Wipe off any oil, and then attach the clamps. **CAUTION** ●Before using clamps, remove any oil, paint, rust, scale, etc., from the object to be lifted.	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.	
(11) Precaution when lifting coated objects	PROHIBITED ACTION  **DANGER** ●Before lifting coated steel products, be sure to replace the swivel jaws and clamp screws with new ones. ●Do not use clamps on steel products with a coating on any single side that is 0.2 mm or more thick.	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.	If the coating thickness on any side is 0.2 mm or more thick, use lifting pieces or consult our business office. 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.

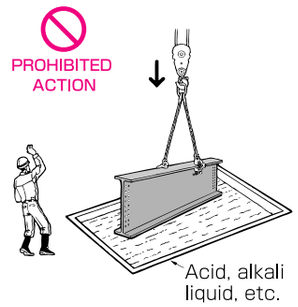
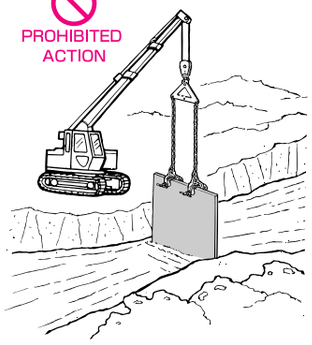
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(12) Hardness of objects to be lifted	(1) Objects to be lifted that are made of hard material or stainless steel. PROHIBITED ACTION  DANGER ●Do not use these clamps to lift brittle materials, hard materials or stainless steel which are extremely hard.	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 PROHIBITED ACTION  DANGER ●Do not use clamps to lift materials with an extremely low tensile strength or which are soft.	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.	PROHIBITED ACTION  DANGER ●Do not operate a crane in a manner that allows the object being lifted, or the clamps, to be banged by 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. DANGER ●Never use clamps if they have been subjected to an impact load.

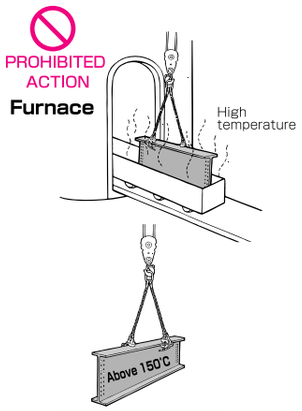
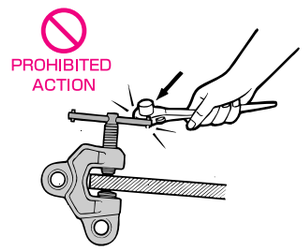
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(14) Never allow a worker to ride on the object being lifted.	PROHIBITED ACTION  DANGER ●Never allow a worker to ride on any object being lifted with clamps. Never use clamps to lift people in any way.	"The company 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) Never use clamps for lifting or supporting objects that are attached to the ground.	PROHIBITED ACTION  DANGER ●Do not use a screw clamp to try to prevent an adjacent steel sheet pile from being driven down when a neighboring sheet pile is being driven in. ●Do not use clamps for ground lifting.	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.

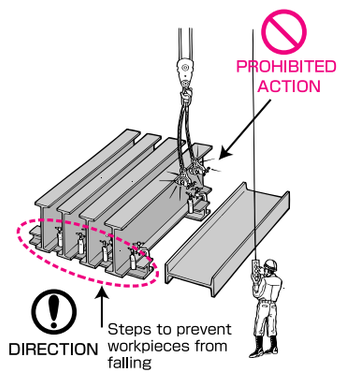
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(16) Never lift tapered objects	 ⚠ DANGER ●Angled or tapered objects cannot be lifted.		If the faces on the object inserted into a clamp are at an angle to each other (not parallel) ,it is dangerous to try and lift the object because the swivel jaw and clamp screw cannot clamp the object sufficiently, tightly. Then the object may slip.
(17) Never lift a piece with sloping faces	 ⚠ DANGER ●Angled or a piece with sloping faces cannot be lifted.		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.
(18) Never drag objects on the ground.	 ⚠ DANGER ●Do not operate a crane in a fashion that allows the object being lifted to drag on the ground.	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. 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.	

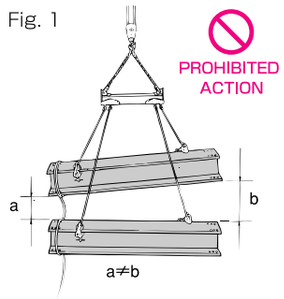
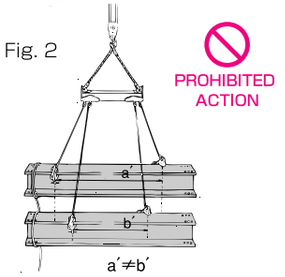
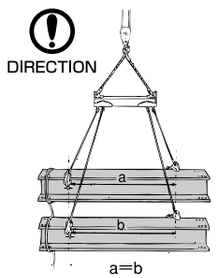
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(19) Precautions for crane operation	(1)  ⚠ CAUTION ●While an object is being lifted with clamps, the operator must not leave the driver's seat in the crane (winch, etc.).	If an object is suspended for a long time, it will have a negative effect on all of the lifting tools including the crane and clamps.	Observe the Safety Regulations in each country strictly.
	(2)  ⚠ CAUTION ●Raise and lower the crane slowly and carefully.	If reckless crane operations are performed, the object being lifted may slip or fall out of the clamps due to vibration or shock loading.	When pulling up, turning over, and pulling down beams, check each and every item for safety and operate the crane carefully.
	(3)  ⚠ 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).	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.	

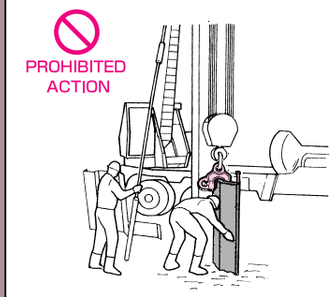
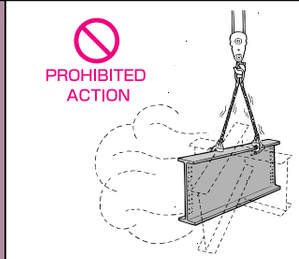
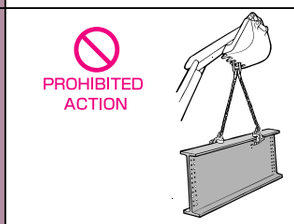
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(20) Handling different steel profiles	(1)  **DANGER** ●When lifting and transporting different steel profiles, be sure to use at least two clamps, and pay special attention to the offset load.	There is a danger that the object may slip due to swinging or the clamps may come off the object.	
	(2)  **DANGER** ●When different steel profiles are set down, be sure to use blocks to prevent them from toppling over.	Since objects are not stable, there is a danger that they will turn over when landed.	

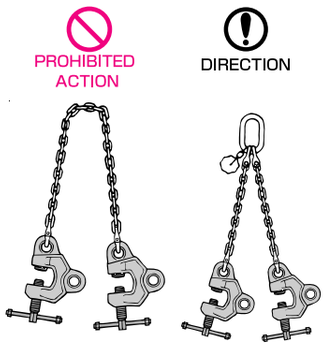
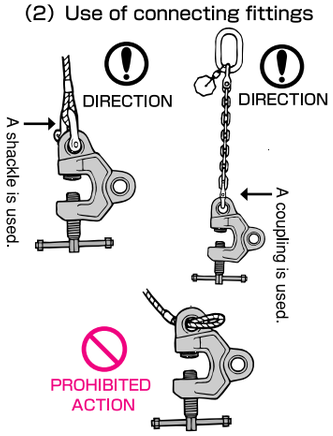
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(21) Handling clamps around chemical agents	 **CAUTION** ●Do not use clamps in or around strong acid or alkali liquids.	The clamp main body and important parts will corrode, and their strength and function will be reduced, which will cause the clamp to corrode or crack.	Use custom-designed clamps for these operations.
(22) Using clamps in the water	 **CAUTION** ●Pay special attention to sling work with objects that will be lowered into or lifted out of the water.	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. • 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.	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.

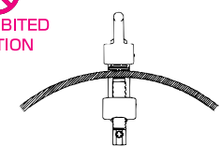
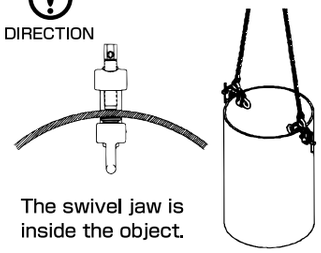
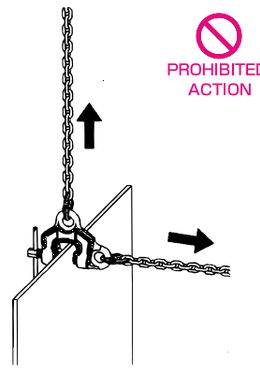
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(23) Working temperature High temperature	 ⚠CAUTION ●Do not use clamps for sling work involving hot materials which could cause the clamp temperature to rise above 150°C.	Due to softening in the main clamp body, the 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.	If the clamp temperature unavoidably exceeds 150°C, please consult our business office.
Low temperature	⚠CAUTION ●Do not use clamps for sling work in cold climates where the temperature will drop below -20°C.	Since the shock resistance of the steel materials is greatly reduced at low temperatures, any reduction in the strength of the clamps can cause the clamps to break.	If the clamp temperature unavoidably drops below -20°C, please consult our business office.
(24) Never hit the handle.	 DANGER ●When tightening the clamp handle, do not hit it using a ratchet handle or a hammer.		

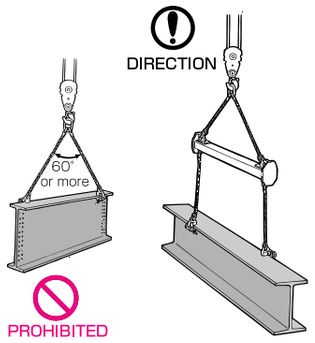
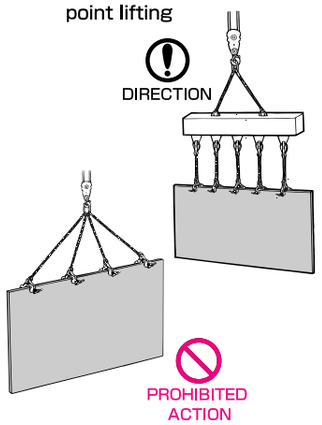
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(25) Precautions after detaching clamps	 DANGER ●Do not allow clamps which have been removed from an object to strike the object and do not allow them to hit any nearby objects.	When a crane is being hoisted after 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. When the detached clamps strike the ground or other objects, they may be damaged or deformed, or parts may fall off due to shock.	Before removing the clamps, take appropriate steps to prevent the objects being lifted from falling over.
(26) Never perform combined lifting.	 DANGER ●Never lift more than one steel plate at a time and never perform lifting with pads.	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.	Sling work using clamps should only ever handle one object at a time.

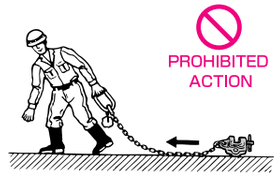
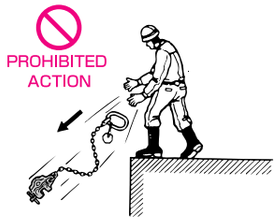
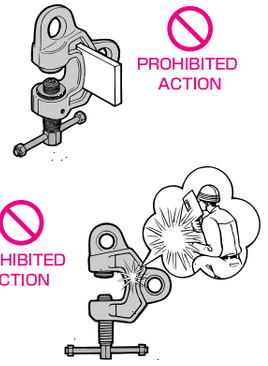
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(27) Precautions when performing double-level lifting	Fig. 1  Fig. 2   **DANGER** ●When performing double-level lifting, observe the following items and work with due care. (According to the "Working guidelines for the assembly of steel frames used for buildings" issued by the Construction Labor Disaster Prevention Association) • Check the center of gravity of each object to be lifted. • Line up the objects in the same direction, and secure them with a separate rope. • Space the objects about 1.5 ~ 2m apart along a vertical line. Do not let the interval become too small. Do not lift objects when the left and right ends of the objects are at different heights. (Fig. 1) • When the clamps are attached or detached from the lower objects being lifted or they are lifting or transporting objects, pay strict attention to the condition of the upper object being lifted. Make sure that the lower objects will not strike or catch on other adjacent workpieces. • Always use 2 or more clamping points to lift each object. Use uniform spacing between the objects. (Fig. 2)	Double-level lifting is dangerous because people may walk under the object being lifted. Since it must be assumed that the objects being lifted might touch each other or they may touch the slings, pay special attention to the sling method.	When performing double-level lifting, use a balance that is designed for that type of work.

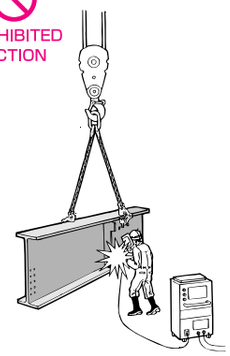
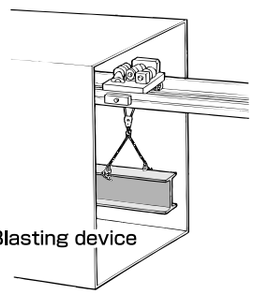
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(28) Never pullingout steel sheet pilings.	 **DANGER** ●When pulling out steel sheet pilings, use special clamps or clamps suitable for the specific task.	When pulling out steel sheet pilings that have been driven in, the clamps may be overloaded and there is a danger that the clamps may deform or break.	Use clamps suitable for the specific task. Model PE When transporting steel sheet pilings after pulling them out, the best suited models are the SBE, SBBE, and SBbE.
(29) Do not use these clamps in high places or in a strong wind.	 **DANGER** ●Do not use clamps to perform sling work in high places, or especially when a strong wind is blowing.	Since the wind in high places is stronger than on the ground, 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.	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.
(30) Lifting using a power shovel	 **DANGER** ●When sling work is performed using a power shovel, do not place the sling wires directly on the teeth at the end of the power shovel bucket.	Sling work with the sling wires placed directly over the teeth on the power shovel bucket is not allowed.	Observe the Safety Regulations in each country strictly.

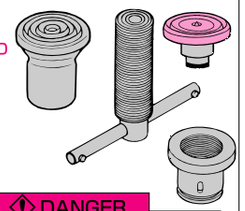
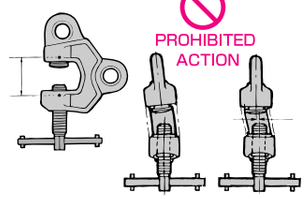
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(31) How to attach a mounting sling	(1) When using two clamps, be sure to use two chain slings or two wire ropes.  ⚠CAUTION ●When working with clamps, only use slings that are suitable for the particular sling work.	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.	Strictly observe the Safety Regulations in each country.
	(2) Use of connecting fittings  ⚠CAUTION ●Do not attach chain slings or wire ropes directly to clamps.	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.	Use couplings (CP model) for chain slings when connecting between clamps and chain slings. Refer to the "Compatibility table for connecting fittings" on page 24.

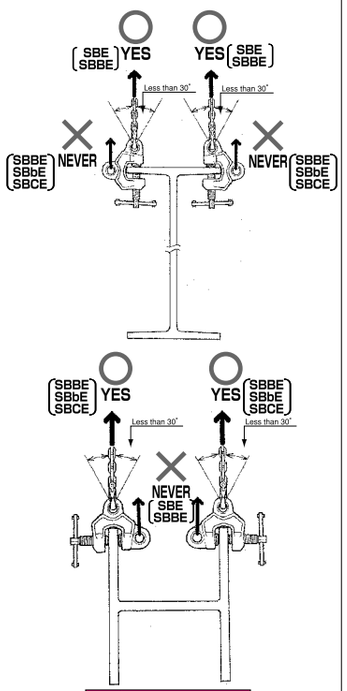
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(32) Lifting steel tubes	PROHIBITED ACTION  The swivel jaw is outside the object. DIRECTION  The swivel jaw is inside the object. ⚠DANGER ●When round objects such as steel tubes are lifted, clamps should be attached with the swivel jaw on the inside of the object.	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.	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 SBE, Model SBBE, Model SBbE or Model SBCE clamps.
(33) Never use two holes in a clamp at the same time.	 ⚠DANGER ●Do not 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, it may cause an object to fall out of the clamp.	Pay strict attention to the idea that "the load direction should only ever be one direction for one operation".

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(34) Using a balance	(1) When the objects to be lifted are extremely wide  **DANGER** ●When long materials are lifted, use a balance and bring the clamp mounting angle as close to vertical as possible.	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. 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.	Pay special attention to the design and maximum working load of the balance. .
	(2) When performing multiple-point lifting  **DANGER** ●When using a balance and performing multiple-point lifting, pay attention to the length and offset load of the sling.	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.	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.

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(35) Handling clamps	  **CAUTION** ●Never throw or drag clamps.	Mechanical shock can cause clamps and parts to break and malfunction.	
(36) Never modify clamps.	 **DANGER** ●Never modify clamps or their accessories. ●Do not weld or heat clamps or their accessories.	When a clamp is heated, the material qualities will change and it will become hard and fragile. This can cause the clamp to break.	

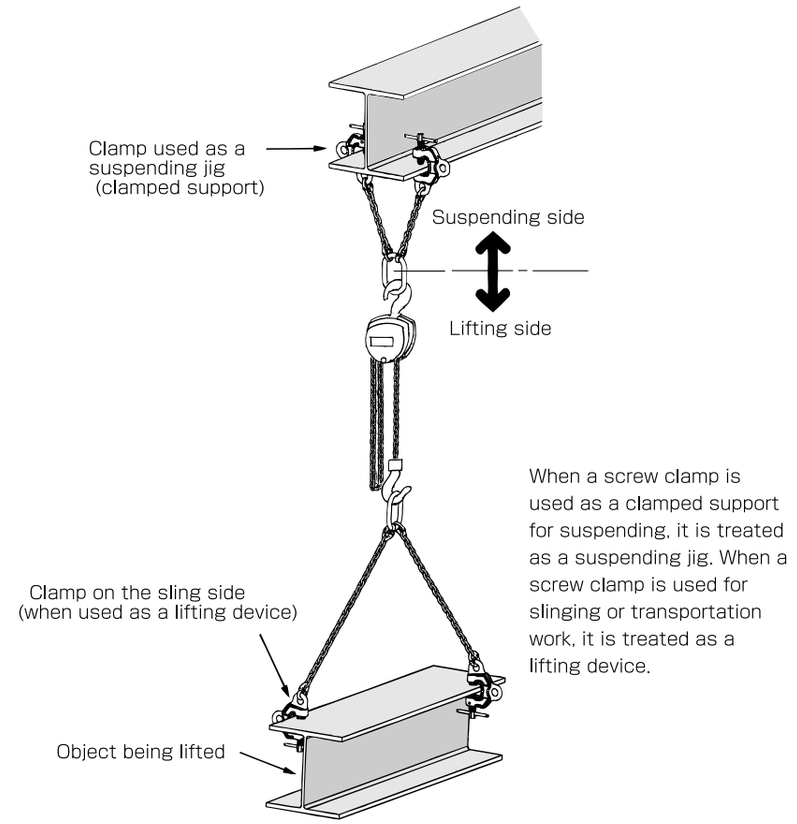
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(37) Never perform welding on an object that is suspended from clamps.	PROHIBITED ACTION  DANGER ● Do not perform welding on objects while they are suspended from a crane.	If the ground for the arc welding is not adequate, it may damage parts such as the swivel jaws and clamp screws, or chain slings and wire ropes.	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. Insulated hook: IHM model
(38) Blasting is not allowed.	PROHIBITED ACTION  Blasting device DANGER ● Do not perform blasting with clamps attached to an object.	The clamps, chain slings or wire ropes may be damaged and this will make them dangerous to use.	

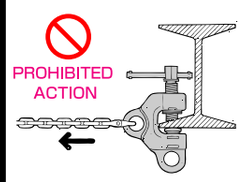
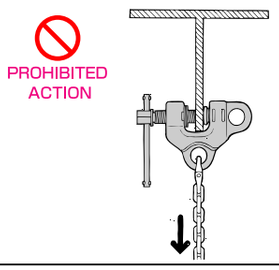
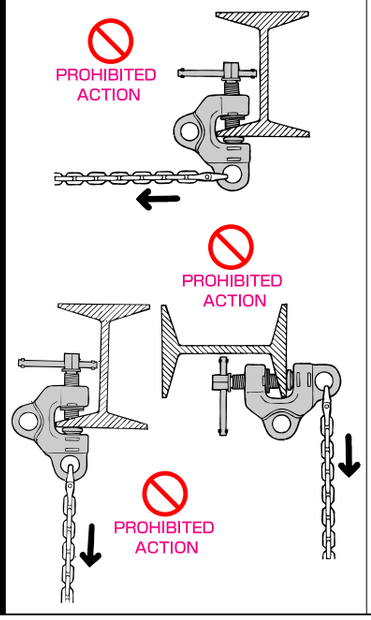
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(39) Never use poorly maintained clamps.	PROHIBITED ACTION  DANGER ● Do not use clamps in which the swivel jaws and clamp screws are worn, the teeth are clogged or cracked or the pressure nuts do not work smoothly.	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.	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. For the details about the inspection standards to use, refer to Section "7. Inspection Manual for Screw Clamps", on pages 60 to 71.
	Stretching in the opening of the main body and distortion of the main body PROHIBITED ACTION  DANGER ● Do not use clamps which are abnormal, such as showing signs of stretching in the opening of the main body or a deformed main body.	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.	
(40) Helpful tip about user registration	 DIRECTION DANGER ● Since the user registration provides important data for maintenance management, please be sure to register your clamps.	If you do not register the clamps, we cannot perform inspections or give you information about their inspection. Poor clamp maintenance is often the reason that accidents occur. (When you purchase our products outside of Japan, please be sure to contact the local distributor to register them.)	

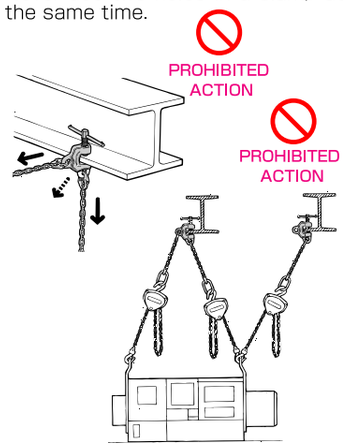
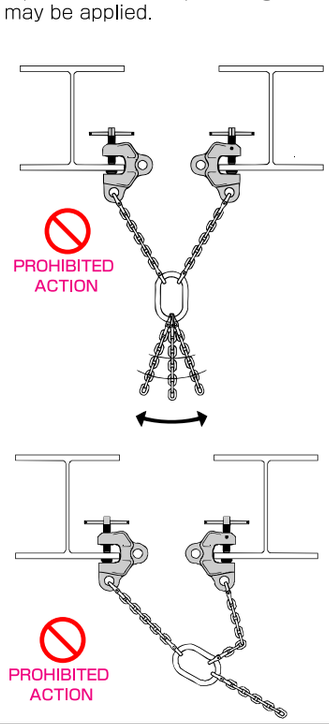
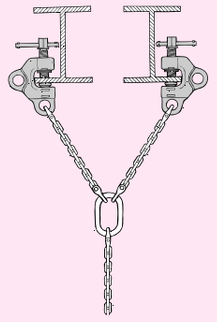
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(41) Other precautions	Working limits of lifting holes  DANGER ●When working limits are assigned to the lifting holes in a clamp, be sure to observe the working limit strictly.	If clamp with working limits on the lifting holes are used so that the lifting holes are gouged, it may damage the clamps or cause the object being lifted to fall.	Use the correct lifting holes for the object to be lifted and verify the clamp mounting positions.

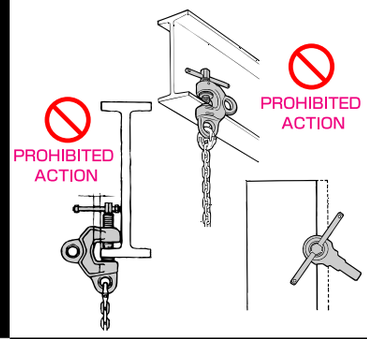
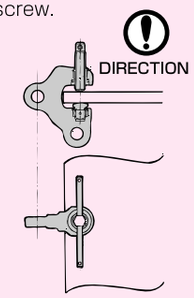
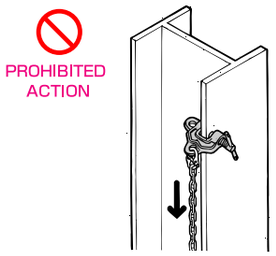
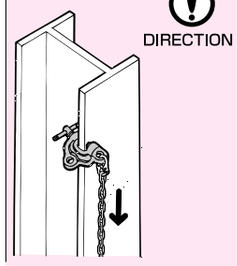
5-2. Precautions for use (suspending jigs)

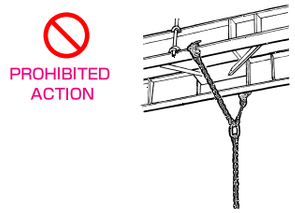
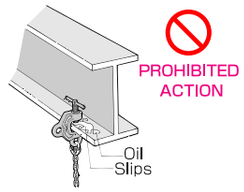
When screw clamps are used as suspending jigs, strictly observe the following precautions.
When any clamps are used as suspending jigs, unlike in the case of clamps that are used for lifting or transporting, there are cases where **the direction of load or the applied load may vary repeatedly during use.**
Therefore, since there is a danger that objects being lifted may fall due to reduction in the clamping force or a change in the gripping position, pay special attention when using clamps.

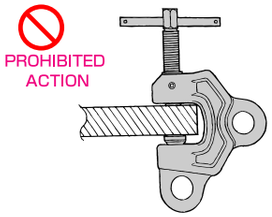
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(1) Division between suspending and lifting			

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(2) Never use clamps when there is a load in the direction that would detach the clamps	Never use clamps in the direction that would detach the clamps. 	When the size of load is changed, there is a danger that the clamping force may be reduced.	
	Never use clamp continuously for a long period of time. 		Be sure to retighten the clamp bolt after each operation and make sure it is retightened securely. (Refer to item (7) on page 34.)
	Never use on tapered members or members with sloping faces. 	The swivel jaw and clamp screw cannot grip the object, and the clamp slips.	

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	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".
	Never use clamps in a way that a repeated load or a pulsating load may be applied. 	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.	DIRECTION 

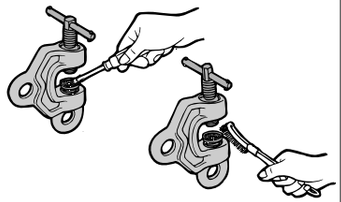
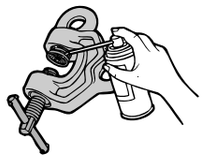
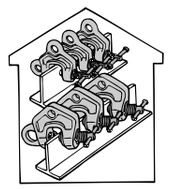
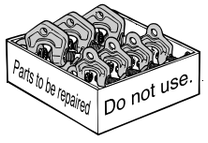
Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(4) Strictly check whether each object is inserted fully into the clamp.	Never use clamps in places where they cannot be attached securely. 	If the object is not inserted completely into the clamp, there is a danger 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. 	There is a danger because a load is applied in the direction that would detach the clamps and then the clamp will come off.	Use the front hole. It cannot be used with tapered members. 

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(5) Other precautions (2)	Never use clamps in places where the tightness cannot be checked. 	The clamps cannot be used in places where retightening is impossible after the load is applied.	
	 **⚠CAUTION** ●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.	Wipe off any oil or paint, and then attach the clamps.
	Limit for the suspended load 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. **⚠DANGER** ●The weight of the object to be lifted must be within the allowable W.L.L. range for the clamp from which you intend to suspend the load.	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. If the object is too light, there is a danger because the clamp screw and swivel jaw may not grab the member firmly.	Only use clamps whose W.L.L. is suitable for the load being lifted.

Item	Method for attaching and checking the clamps	Reason	Precautions and action to take
(5) Other precautions (3)	Limit for steel thickness  ⚠CAUTION ●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.	Use clamps that have an effective thickness suitable for the thickness of the object to be suspended. 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.

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	 ⚠DANGER ●Remove all paint and sludge from moving parts, swivel jaws and clamp screws.	Remove any paint and sludge using a cloth and a wire brush. Remove dried paint using a chisel.	If it cannot be removed, replace the swivel jaws and clamp screws.
(2) Greasing	 ⚠CAUTION ●Lubricate the sliding and rotating sections (screws and bearings) and pressure nut grooves.	Apply machine oil and wipe off any grease found on the thread edges of the swivel jaws and clamp screws. 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.	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.
(3) Storage location	 	⚠CAUTION ●Always store clamps indoors. ⚠DANGER ●Clamps which must be repaired should be stored in a separate location to prevent them from being used by mistake.	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. 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.

7. Inspection Manual for Screw Clamps (Models SBE, SBBE, SBbE and SBCE)

(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 of inspections

●Daily checks (inspections performed before beginning work)

The people who will be performing the sling work should inspect all of the sling equipment themselves before beginning work.
(Complies with the “Safety snd Health Law for Sling Work ” in Japan)

●Routine checks

- Monthly checks: A visual inspection of the appearance and function of the clamps should be performed. If any abnormal conditions are found, they should be removed from service immediately.
- Annual checks: People who inspect the clamps routinely should periodically disassemble and check them on a specified date once a year. The inspection date and details should be recorded and the records stored in a safe place.
(Complies with the “Safety snd Health Law for Sling Work ” in Japan)

(4) Inspection procedures and measures

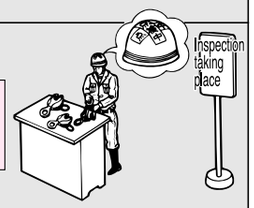
●Daily and monthly checks

Inspect the appearance (particularly tooth wear) and the function of the clamps. Monthly checks: If no abnormal conditions are found in the clamps, a label that says "Inspected" should be attached to them. If any abnormal conditions are seen in the clamps, they should never be used until they have been disassembled and inspected further. The parts should be maintained, replaced or sent to the manufacturer (or the manufacturer's authorized representative) for repair. The parts replacement standards must conform to the "Evaluation criteria" described in the separate table.

●Annual checks

In addition to the appearance and functional checks, the clamps should be disassembled and inspected. If no abnormal conditions are found in the clamps, a label that says "Inspected" should be attached to them.
If any abnormal conditions are seen in the clamps, they should be removed from service. The inspection measures must be in conformance with the daily and monthly checks.

(5) Precautions during maintenance and inspection

Checking and precautions	
❶ ⚠DANGER Maintenance and inspections should only be conducted by a qualified person, specified by the company which owns the clamps. Eagle Clamp Co., Ltd. issues a certificate of qualification to people who have completed an inspection course.	
❷ ⚠DANGER 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. Products which have been determined to be unusable must have a label that says "DO NOT USE" attached to them.	"DO NOT USE" label (Should be attached by each user.)
❸ ⚠DANGER Do not use any parts that are not genuine Eagle Clamp parts. 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.	
❹ ⚠CAUTION When performing maintenance, or making inspections or repairs, a sign that says "Inspection taking place" should be posted.	
❺ ⚠CAUTION When performing maintenance, or making inspections or repairs, be sure to remove the clamps from any object they are attached to. It is dangerous to perform maintenance or make inspections or repairs during operation. These practices should always be carried out in a safe place.	

For labels that show that an inspection was carried out recently

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.

(6) Places to be inspected

Models SBE, SBBE, SBbE and SBCE

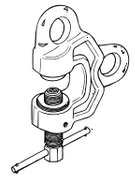
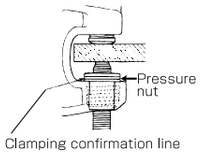
No.	Places to be inspected	Daily checks	Routine checks	
			Monthly checks	Annual checks
0-1	Appearance (overall)	Check the maximum working load that is marked on the clamp. Should not be any gouges or impact flaws.		Same as described on the left
0-2	Completely functional	The swivel jaws, pressure nuts, 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

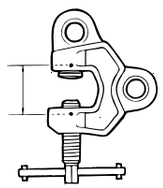
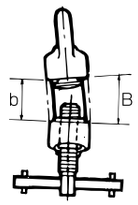
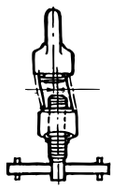
●Daily checks (inspection before beginning work) ·····In principle, inspected without disassembly
●Routine checks (monthly) ·····In principle, inspected without disassembly (Attach an inspection label.)
(annual) ·····Disassemble and inspect. (Attach an inspection label.)

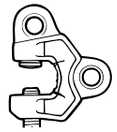
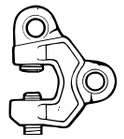
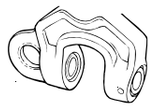
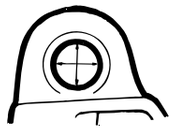
(7) Inspection standards

Models SBE, SBBE, SBbE and SBCE

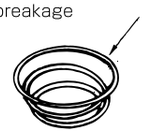
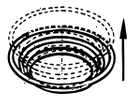
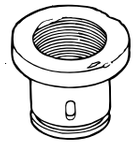
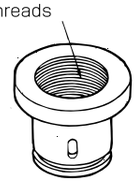
7-7-1

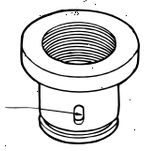
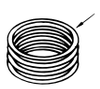
Places to be inspected	Item	Evaluation criteria	Inspection procedure	Action (part No.)
0-1. Appearance (overall)	1.Checking the details of the clamp markings • Model • WLL • Effective thickness • Label which shows when the most recent inspection was performed • Check for a caution seal	If there is no marking on the clamp or if it cannot be read, do not use the clamp.	Visual check	
		Teeth should not be clogged.	Visual inspection	Clean clogged teeth.
	2.Clogged teeth 3.Gouges or impact flaws 	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  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 still 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.	1) ~3) If the clamp screw, pressure nut, or swivel jaw does not move smoothly, disassemble the clamp and inspect it.

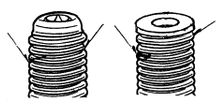
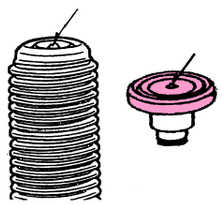
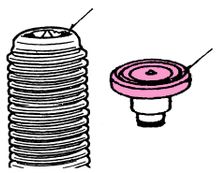
Places to be inspected	Item	Evaluation criteria	Inspection procedure	Action (part No.)
1. Main body (ฉนวน)	1.Stretching in the opening • Measuring the spacing between the gauge marks 	If the distance between the gauge marks exceeds the allowed value, the main body cannot be used. Model / Allowable size (mm) SBE-1 82.0 SBE-2 61.7 SBE-3 71.7 SBE-4 82.1 SBE-6 92.2 SBBE-0.8 51.2 SBBE-2 77.3 SBBE-3 82.1 SBBE-4 82.3 SBBE-6 92.7 SBbE-6 134.5 SBbE-10 175.1 SBCE-7 134.5	Visual check (vernier caliper or gauge block). If any abnomality is seen in the visual inspection, measure it with a vernier caliper to check it.	If any place in the opening is stretched beyond the allowed value, discard the main body. 1
	2.Distortion in the opening 	Not allowed if the difference between the opening sizes on either side is greater than 3 mm. B−b≧3	Visual check (vernier caliper or gauge block). If any abnomality is seen in the visual inspection, measure it with a vernier caliper to check it.	If any distortion in the opening exceeds the allowed value, discard the main body. 1
	3.Distortion of the main body 	3. Not allowed if the distortion between the thread edge of the clamp screw and the center line ofthe swivel jaw is greater than 1 mm.	Visual check (vernier caliper or gauge block). If any abnomality 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 bod (ฉนวน)	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 abnomality 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 abnomality 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 abnomality 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. $\frac{f-a}{a} \geqq \frac{5}{100}$	Visual check (vernier caliper or gauge block). If any abnomality is seen in the visual inspection, measure it with a vernier caliper to check it.	IIf 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 abnomality is seen in the visual inspection, measure it with a vernier caliper to check it. 2) Visualinspection	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 abnomality 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 SBE SBBE, SBbE and SBCE> (U-T)	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 abnomality 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 SBE, SBBE, SBbE and SBCE>	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. SBE·SBBE·SBbE·SBCE 3—5
8. Compression spring <Models SBE, SBBE, SBbE and SBCE>	1. Reduction in the compression force	A reduction of free length of 3 mm or more is not allowed. Model / Allowable size (mm) SBBE- 0.8 / 25 SBE- 1 / 25 SBBE- 2 / 37 SBE- 2 / 37 SBBE- 3 / 46 SBE- 3 / 29 SBBE- 4 / 47 SBE- 4 / 46 SBBE- 6 / 73 SBE- 6 / 45 SBbE- 6 / 73 SBCE- 7 / 73 SBbE-10 / 82	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
	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
9. Setscrew	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. SBE·SBBE·SBbE·SBCE 3—4
☆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 5—1
	2. Edge projection 1) Wear 2) Flaws or clogging 	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 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 5
	3. Thread edges 1) Wear 2) Deformation, chipping or clogging 	1) A wear width of 0.5 mm or more is not allowed. 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 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) How to install the swivel pad type clamping screw

① Apply grease inside the screw.

⑤ Grease is squeezed out at the air vent port.

② Apply more grease.

⑥ Finally, push the pad in firmly.

③ Attach the edge pad.

⑦ Wipe off the excess grease with a cloth.

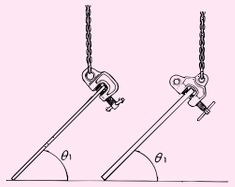
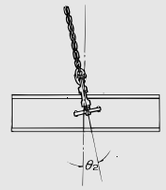
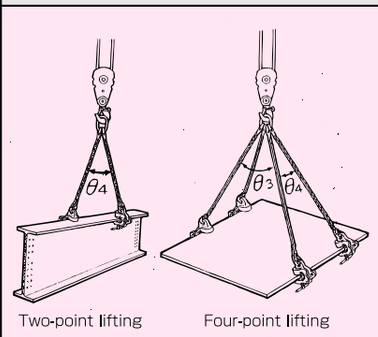
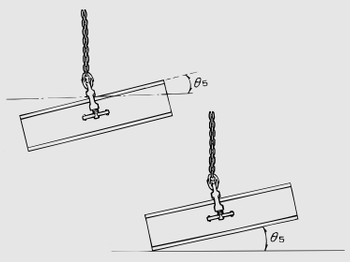
④ Screw in unitil the pad screw begins to freewheel.

⑧ Installation is complate.

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 Sling width angle θ_4		Angle at which wire ropes or chains intersect when an object is lifted. 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".
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 by type and by model.
For safety while working, please work within the allowable range.

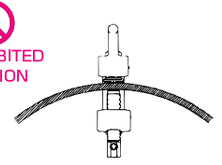
Type	Model	Clamping angle θ_1	Mounting angle θ_2	Diagonal angle θ_3	Sling width angle θ_4	Max. tilt angle of the object to be lifted θ_5
Vertical lifting clamps	E、SL/SLE、RS/RSE	0 ～180	0±5	60	60	30
	SLT/SLTE	0 ～180	0±5	60	60	45
	NNE、NE/NEE	0 ～180	0±5	60	20	10
	NEC	0 ～180	0±5	60	20	10
Lateral lifting clamps	G/GE、GT、GC、GD、GL、VA/VAE、VA(N)、VAS、KVA、VAN、VANL	0 ～ 45	0±5	60	30	15
	AMS、VAR/VARE、AMN	0 ～ 45	0±5	60	30	15
	AC/ACE	Refer to the instruction manual written specially for the AC and ACE model.				
	HR、BMB、BM/BME	0 ～ 45	0±5	60	30	15
Screw clamps	SBBE, SBbE, SBE	-90 ～ 90	0±5	60	60	90
	SBCE	-90 ～ 90	0±5	60	60	90

⚠CAUTION 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

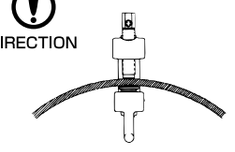
Type	SBBE-0.8 SBE- 1	SBBE-2 SBE-2	SBBE-3 SBE-3	SBBE-4 SBE-4	SBBE-6 SBE-6	SBbE-6 SBCE-7	SBbE-10
Minimum allowable inner diameter (mm)	φ450	φ550	φ550	φ550	φ600	φ800	φ1000

PROHIBITED ACTION



The swivel jaw is outside the object.

DIRECTION

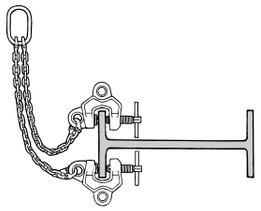


The swivel jaw is inside the object.

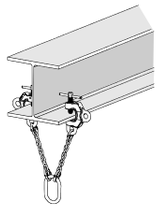
10. Examples of use

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

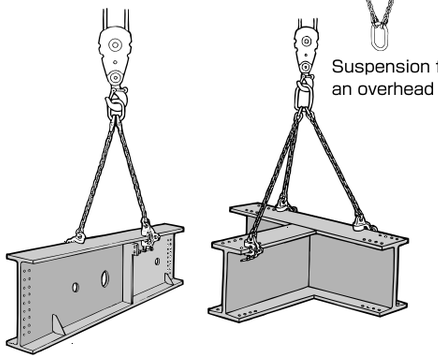
(a) Can be used for turning over, transporting and assembling large pieces of shaped steel.

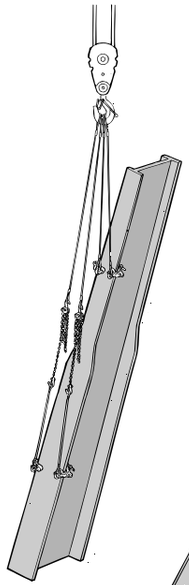


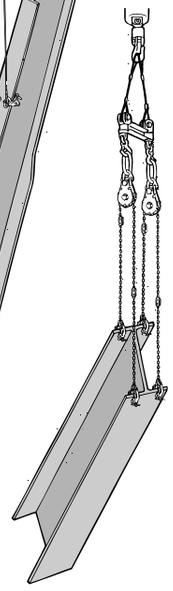
(b) When chain blocks or hoists are suspended from beams, these clamps can be used to attach the lifting equipment to the beams.

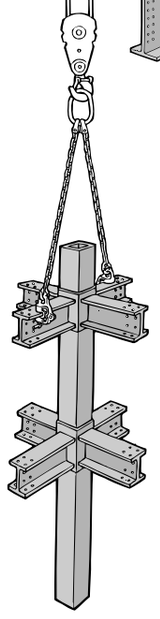


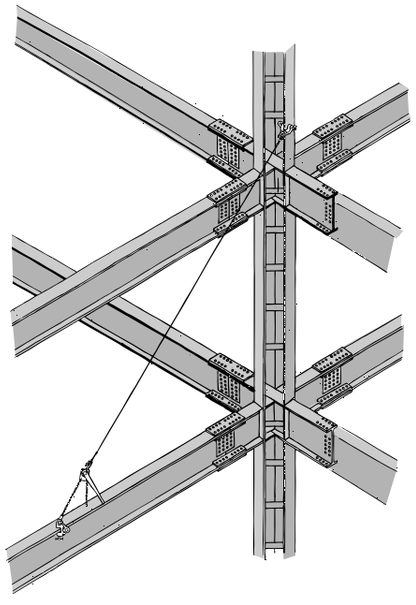
Suspension from an overhead beam





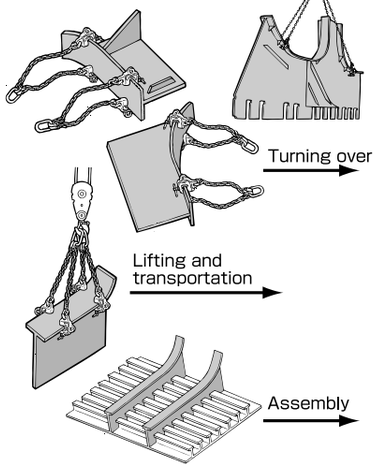






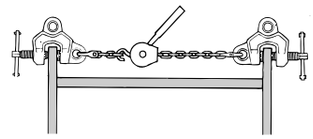
2) Shipyard

(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.

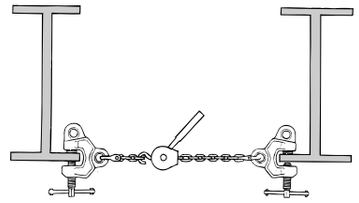


(b) Can be used for pushing or pulling members into position when welding.

(Erecting a plate beam)

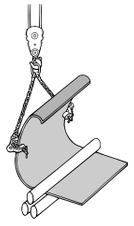


(Correcting the distance between beams)

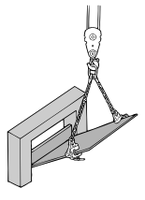


3) Sheet metal contractor

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

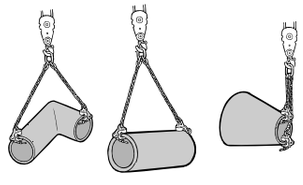


Bending



Press working

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



Elbows (curved pipes) can be lifted horizontally.

Memo

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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* 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.
* We cannot give you any assurance that accidents will not occur. Additionally, please note that we also cannot accept liability for loss or damage to other equipment, even if the cause is the result of following the advice in this manual or due to clamp problems or failures.
* 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 end of August, 2013. For details about newer clamp types or other types of sling equipment purchased after this date, please contact us.