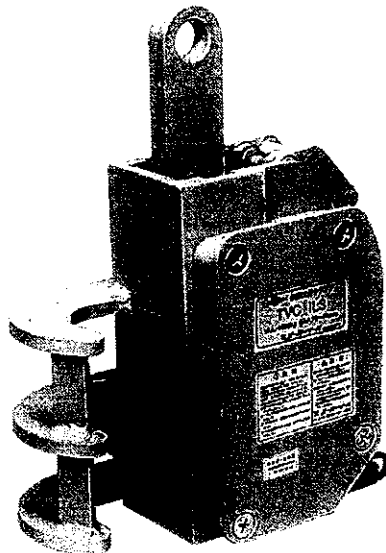


VERTICAL LIFTING CLAMP for Reinforcing Rod (Double Lock Type)

TVC1L3 TVC1L5 Operation Manual



This operation manual explains the basic operation and handling of the clamps. Please read this manual carefully before use, and observe the precautions for safe operation.



SUPER TOOL CO., LTD.

On the Proper Handling of Lifting Clamps with Super Tool's Mark

We are thankful to you for your selection and purchase of our Lifting Clamps with Super Tool's mark on them. Our Lifting Clamps with Super Tool's mark on them (hereinafter to be called "Lifting Clamp" or "Clamp") is energy-saving lifting tools designed and developed for transportation of U-shaped reinforced and semi-thick-walled reinforced concrete gutters, U-shaped flumes, and concrete shelf boards.

Proper use of Lifting Clamps demanded

You are kindly asked to operate the Lifting Clamps after careful reading and understanding of this instruction manual for the purpose of enhancing safety and efficiency at work.

Prime efficiency and economy

The sophisticated functions, reasonableness and wide applications of the finely and carefully designed Lifting Clamps ensure prime efficiency and economy.

Special care of safety

We have executed tensile tests with loads three times (or twice) the rated capacity according to the testing standards set forth by the National Institute of Industrial Safety of Ministry of Labor and attached inspection numbers to individual products, thus directing special attention to the aspect of safety.

Attachment of products and completed operation liability insurance

If there occur damages due to the defective qualities of the Lifting Clamps under the normal conditions of use, insurance money under the products and completed operation liability insurance will be paid for them. If the damages are, however, incurred due to intentional misbehavior or mistaken use (non-safety actions), abrasion of the clamp pads, they are not covered. Be careful. Never fail to post before use the application for registration for products and completed operation liability insurance attached with the clamp (return post card) after filling in all the required items of information.

Cautions for safety operation

Please do not fail to carefully read this instruction manual before use of the Lifting Clamps. Mistaken use of the Lifting Clamps (hereinafter to be called "Clamps") may cause troubles such as the dropping of lifted work.

Please never fail to carefully read this manual for proper operation before use.

Education of "crane safety regulations," "operation manual for lifting clamps," "in-house operation standards," etc. is to be given before actual operation not only to business owners who have purchased the Clamps but also to their operators to ensure that actual operators will have acquired enough knowledge of clamps, safety information, and cautions.

As according to the "Lifting clamp safety council," we have divided cautions in general into "Dangers" and "Cautions," which are used in this instruction manual.

◇DANGER: Indicates mistaken handling may cause a potentially hazardous situation which, if not avoided, could result in death or serious injury.

△CAUTION: Indicates mistaken handling may cause a potentially hazardous situation which, if not avoided, could result in medium damage or slight injury, or could result in property damage.

Even though only mentioned in the Cautions, those incidents may lead to a serious disaster.

So, do not fail to pay attention both to dangers and cautions which are of great importance in operating the Clamps properly.

Meanings of Signs

The signs of ◊ and △ indicate that attention is to be given to the marks indicative of dangers and cautions respectively. The signs figuratively show the contents of danger or caution. (The left-side sign indicates a caution to the pinching.)

The sign indicates prohibited actions.

The sign of ○ indicates that an action is enforced or instructed to be executed. Inside the sign or beside it is shown a concrete instruction is described. (The left-side sign requires a lifting at two points.)

* After reading of this manual, please keep it at a convenient place to which any user can gain easy access for reference.

1. About handling in general

Dangers	
<ul style="list-style-type: none"> ●Any person who is not well-informed about instruction manual, tags, and signs of cautions is not eligible for use of the Lifting Clamps. ●Any person who is not legally qualified is never to operate a crane and a lifting clamp. (Clauses 221 and 222, Crane Safety Regulations) ●While lifting or turning the work, do not enter the area where the lifted work threatens to drop off or fall over. (Clauses 28 and 29, Crane Safety Regulations) ●Do not use this lifting clamp for other purposes than lifting work. 	
<ul style="list-style-type: none"> ●Never fail to execute an inspection before use and periodical inspections. (Clauses 217 and 220, Crane Safety Regulations) 	

2. About checkings before operation

Dangers	
<ul style="list-style-type: none"> ●Do not use a clamp other than applicable to the operation method. ●Do not use an abnormal clamp with deformation, cracks, operational trouble, abrasion, etc. ●If the work to lift is under the following conditions, do not apply the clamp. (fragile material, high-hardness material, low-hardness or extremely low-hardness material, and members with the gripping part of no pitchedness and of more than 10 degrees in temperature of itself) 	
<ul style="list-style-type: none"> ●Please check on the clamp main unit the type, basically applicable load, opening diameter, and indication of periodical inspections executed. ●The load of the work to lift shall be within the allowable range of the basically applicable load of the clamp. ●The thickness of the work to lift shall be within the allowable clamping range. 	
Cautions	
<ul style="list-style-type: none"> ●Do not use the clamp with tags and signs of cautions attached to it taken away, and with them kept invisible. ●Do not use the clamp for the work under the following conditions. (The work to lift is more than 150 degrees, is less than minus 20 degrees in temperature, and acidic or alkaline chemicals.) 	
<ul style="list-style-type: none"> ●The sling to be used for the clamp shall be an appropriate one for 	

the lifting operation.	
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3. About the method of use and lifting operation

◇Dangers	
<ul style="list-style-type: none"> ●Do not use the Clamp, lifting at one point. ●Do not use the Clamp in the following way of lifting: (overlapped works, padded work, engrafted lifting, concurrent lifting, and side gripping) ●Do not use the Clamp for pulling out from among steel sheet pilings and not lift pulled-out steel sheets vertically. ●Do not use the Clamp when strong wind threatens to cause any danger. ●Do not use the Clamp for a hydraulic excavator. 	
●Install two or more Clamps in a balanced way to keep the work' balance.	
<ul style="list-style-type: none"> ●The lifting angle of the Clamp and the dividing angle are to be kept within the allowable angles according to types. ●The work is to be inserted to the innermost end of the Clamp opening. ●When you use the Clamp with a locking system, never fail to use the Clamp with the locking system on. 	
△Cautions	
<ul style="list-style-type: none"> ●If oil, paint, scales, rust, etc. are on the gripping pad, do not use the Clamp. ●Do not drop to the ground or drag along the ground the Clamp. 	

About the operation of a crane

◇Dangers	
<ul style="list-style-type: none"> ●Never lift the work weighing more than the basic working load. ●Do not operate the crane in such a way as to give an impacting load to the work or the Clamp. ●Do not allow a man to stand on the lifted work. Never use the Clamp for the purpose of carrying a man. ●Do not lift the earth itself. ●In the course of lifting the work, do not release the lock of the Clamp. ●Do not let the Clamp removed from the work collide with the work or an adjacent member. ●When you wind up the wire by the crane and notice the load at the lifting ring, stop the operation temporarily for safety checking (depth of the work into the Clamp opening; status of locking). ●Stop the operation of the crane just before the work reaches the ground, check the following items of things: (Slant and falling over of the work; security at the landing site and its surrounding) 	
<ul style="list-style-type: none"> ●When you wind up the wire by the crane and notice the load at the lifting ring, stop the operation temporarily for safety checking (depth of the work into the Clamp opening; status of locking). ●Stop the operation of the crane just before the work reaches the ground, check the following items of things: (Slant and falling over of the work; security at the landing site and its surrounding) 	
△Cautions	
<ul style="list-style-type: none"> ●Do not operate the crane in such a way as to drag the work along the ground. ●Do not step away from the crane (winder, etc.) operating position while keeping the work being lifted with the Clamp. 	
●Hoisting and lowering operation by the crane are to be made slowly and	

carefully.	
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About maintenance, storage and remodeling

◇Dangers	
<ul style="list-style-type: none"> ●Never execute any remodeling of the Clamp and its accessories. ●Do not apply welding work or heating to the Clamp and its accessories. ●Do not use any other parts than our company's brand-name parts. ●Store at a different place Clamps requiring repairing not to be used mistakenly. 	
<ul style="list-style-type: none"> ●A person with specialized knowledge specified by the business owner is to conduct maintenance and repairing work. ●When you detect abnormality with the Clamp, do not use it and immediately repair or dispose of it. ●Remove, if any, paint or mud sticking to the moving parts of the Clamp, cams, and pads. 	
△Cautions	
<ul style="list-style-type: none"> ●Conduct maintenance and repairing with no work lifted. ●Conduct maintenance and repairing after posting a sign indicating that you're working on the maintenance work. ●Never fail to put lubricating oil on the rotating part of the Clamp (around the pin), guide groove, sliding parts, etc. ●Store Clamps inside a room. 	

Note: Please contact our company's sales agents or sales offices to make advantage of our services in respect with items of inspections and maintenance standards accompanying disassembly and assembly.

TVC1L3 and TVC1L5

■ Applications

They are optimal for assembling, pressure welding, and extracting of reinforced concrete products.

■ Features

1. You can safely lift horizontally and move reinforced concrete products, irregular-shaped steel bars, and steel bars.
2. The releasing lock of central lever type can be remotely controlled by the wire rope.
3. The cams are made of heat-treated special steel, excellent in rigidity and durability.
4. When the remote control lever is pressed up, the lever preventing the sideways sliding of the work is protruded at the same time, so the sideway sliding caused by collision by the work can be prevented.

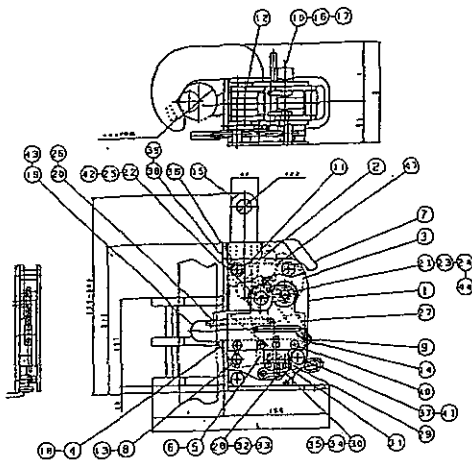
■ Specifications

Product No.	Capacity (ton)	External diameter of application (mm)	Diameter of reinforced concrete of application (mm)	Product weight (kg)
TVC1L3	1	16 φ to 41 φ	D16 to D38	11.0
TVC1L5	1	35 φ to 55 φ	D35 to D51	12.0

● Names of parts and major dimensions

No.	Names of parts	Quantity	No.	Names of parts	Quantity
1	Main unit	1	25	Lock gear (B) collar	1
2	Link	1	26	Bolt with hexagon socket	2
3	Lock	1	27	Guide plate	1
4	Cam	1	28	Stopper pin	1
5	Link pin	1	29	Stopper pin drop-prevention plate	1
6	Collar for cam	2	30	Lever for controlling stopper pin	1
7	Remote-control lever	1	31	Bolt with hexagon socket	2
8	Cam supporting pin	1	32	Pressured coil spring	1
9	Spring	1	33	Bolt with hexagon socket	1
10	Lock supporting bolt	1	34	Bolt with hexagon socket	1
11	Hook pin	1	35	Collar for lever	1
12	Collar for lifting plate	2	36	Cover plate	1
13	Spring pin	2	37	Cover plate collar (A)	3
14	Spring pin	1	38	Cover plate collar (B)	1
15	Lifting plate	1	39	Flat-head bolt with cross-recessed head	1
16	Spring washer	1	40	Flat-head bolt with cross-recessed head	3
17	C-shaped stopper	2	41	Flat-head bolt with cross-recessed head	3
18	Caulking pin	1	42	Flat-head bolt with cross-recessed head	1
19	Slide stopper	1	43	Spring pin	1
20	Rack gear	1	44	Spring pin	1
21	Lock gear (A)	1	45	Rope for remote control (yellow color)	1
22	Lock gear (B)	1	46	Rope for stopper control (white color)	1
23	Lock supporting pin	1	47	Cover	1

24	Lock gear (A) collar	1				
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●Table of Dimensions

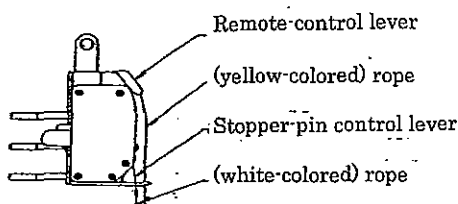
Unit: mm

Product No.	Capacity	Clamping range		l	L	b	B	Product weight
		External Diameter	Diameter of reinforced concrete					
TVC1L3	1 ton	16 φ to 41 φ	D16 to D38	78	234	63	124	11 kg
TVC1L5		35 φ to 55 φ	D35 to D51	109	265	87	148	12 kg

■Application method

●Apply and control this clamp in the following procedure.

1. The lifting plate attached with the shackle is to be connected to the crane hook by wire rope, spring chain, etc.
2. The rope for remote control is to be connected as in the figure below.
 Stopper-pin control lever: While-colored rope is connected.
 Remote control lever: Yellow-colored rope is connected.



3. Put the clamp in a state of release as in the following figure. (Here, if the clamp is in a state described in Figure 1, place the clamp on the steady table, and draw down the yellow rope while the white rope is being pulled.)

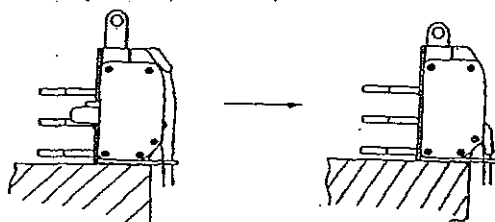
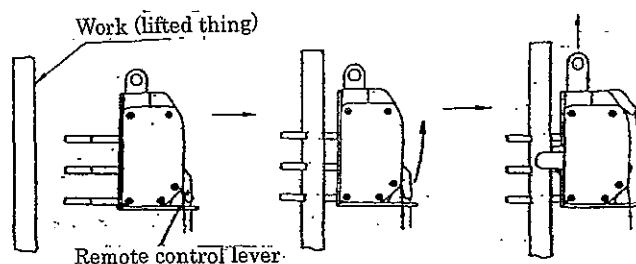
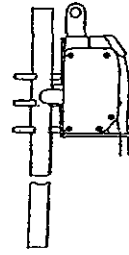


figure 1.

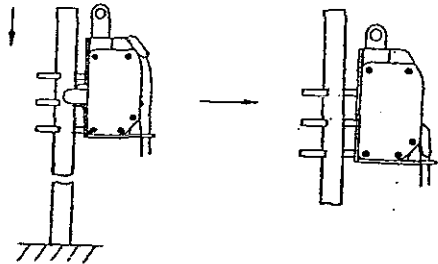
4. Next, lift the clamp, move it near to the work and set the clamp on the work, and pull the lever in the arrowhead direction and lock it. (Here, ensure that the work is securely clamped.)



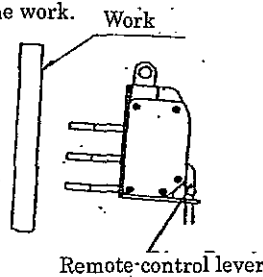
- Then, wind up the crane hook, lift the work and move it to the destination.
(Here, be careful not to have the clamp and the work collide with other obstacles. And after confirming there are no people or obstacles in the direction of movement, then move it in the direction.)



- When the work has been moved to the destination, wind down the crane hook slowly and land the work on the ground.
- After confirming that the work has been landed steady on the ground, execute the clamp opening work.
(Here, after confirming the wire rope is perfectly loosened, draw down the yellow rope while the white rope is being pulled.)



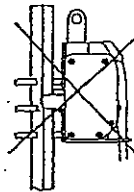
- Next, separate the clamp from the work.



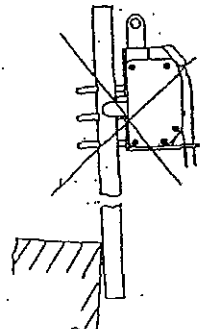
- Hereafter, repeat the operation from No. 4 to No. 8.

■ Cautions in handling

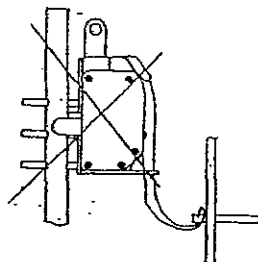
- Do not enter the dangerous area to evade an accident caused by falling objects during the lifting operation.
- Confirm the weight of the work to lift, and if the weight is beyond the capacity of the clamp, do not apply it to the work.
- Do not apply the clamp beyond the clamping range.
- Do not lift more than two works at the same time. This may cause an incident by falling objects.
Just apply this clamp to a single work.



- During the lifting operation, do not let the clamp and the work collide with or get hooked on other objects.
(Be careful of this especially in the course of lowering the work.)
Impact or the loosening of the rope may cause an incident by falling objects.

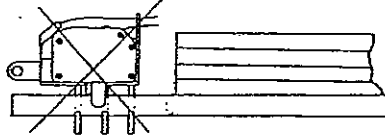


- During the operations of lifting and lowering the work, be careful enough not to have the remote control rope get hooked on obstacles such as a scaffold.

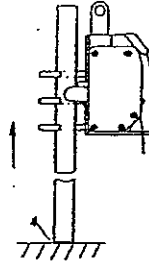


7. Do not remodel this unit by gas cutting and welding.
Heating and processing may degrade the quality (strength) of the unit.
8. To put the remote control lever in a locked status, never fail to lift the work before hand. Be careful enough not to catch your hand and fingers in between the main unit and the cam.
9. When you raise up the work, set the clamp with the remote control lever directing upward.

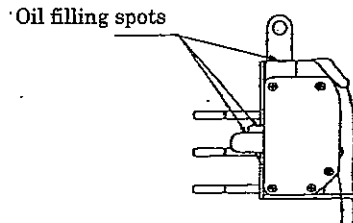
And do not extract one of the piled up works in the course of the operation.



10. Do not wind up and down the crane hook abruptly.
When the hook is loaded in the course of winding up the hook, temporarily stop the winding up and confirm the safety for further operation. (If this process is omitted, there is a possibility of the work being knocked up from below, which may cause an incident by falling objects.)



11. Periodically fill lubrication oil in the oil filling spots. Fill oil in each supporting pin as well.



Cautions

■ Maintenance and inspection of clamps

1. Method of maintaining clamps

Daily maintenance is most important for efficient safety operation of clamps under the extreme conditions of use. Keep to the following items of maintenance work.

- (1) Maintain clamps according to the inspection standards for clamps.
- (2) Store clamps inside buildings not outside.
- (3) Make inspections of the following items and be careful in keeping clamps in the best conditions.
 - i) Status of operation
 - ii) Abrasion and chipping-off of the dens of clamps
 - iii) Deformation and distortion of the main unit
- (4) If you find out clamps which threaten to cause an accident, during operation or inspection, separate them from the good-conditioned ones for urgent repairing by indicating them as ones requiring repairing.
- (5) Never fail to receive makers' inspections.
- (6) Oil moving parts such as bolts and pins once every week. However, be careful not to put oil on the surface of the pad of polyurethane rubber.

2. Periodical inspection

Execute periodical inspections according to the periodical inspection standards. The functions and longevity of clamps vary according to conditions of use. Therefore, you as the user are recommended to prepare your own effective handling standards or maintenance standards and to follow them. You are asked to make efforts to acquire security by all-out maintenance activities using our Super Tool's maintenance standards on lifting clamps for your reference. If an abnormality is confirmed, you are recommended to receive a maker's inspection by indicating the spot where the abnormality lies.

When preparing your own maintenance standards, be careful about the following things:

(1) Handling standards

- (i) Preparation of standards of use (according to shapes of works and methods of applications)

- (ii) Complete sharing of cautions in handling and use
- (iii) Making the checking at the site compulsory

(2) Periodical maintenance standards

- (i) Setting of the schedule of periodical maintenance days
- (ii) Establishment of methods of maintenance
 - a) Timing of inspections
 - b) Personnel in charge of inspections
 - c) Sites where inspections are executed
 - d) Measuring devices for inspections and examinations
 - e) Establishment of the limits of use
 - f) Clear indication of countermeasures and methods of repairing

3. Maker's inspection method

We as the maker will make the following items of inspections to check whether the units are normally operated or not.

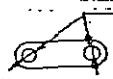
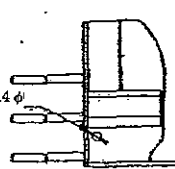
- (1) Check for deformation, abrasion, stains, and damages of the cams.
- (2) Check for distortion of the lifting plates.
- (3) Check for deformation and distortion of the main units.
- (4) Check for defects of bolts, pins, links, and springs.


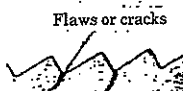
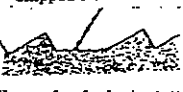
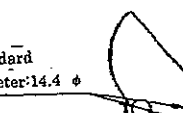
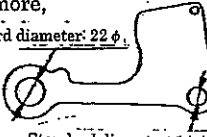
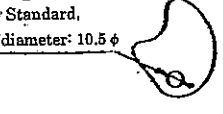
■ Daily inspection




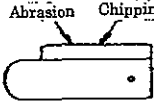
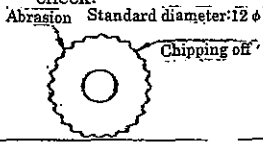
Daily inspection and maintenance is required for safety and prevention of the degradation of efficiency in operation.

- 1. Checking for damages such as flaws and cracks on the respective parts of main unit, cams, and lifting plate.
- 2. Checking of whether bolts, nuts, pins, etc. are properly installed.
- 3. Checking of whether each part is properly actuated and lubrication is enough.
- 4. Refer to the maintenance standards for other details.

■ Maintenance standards

Items	Inspection method	Limit of use	Major causes of defects	Counter-measures
Lifting plate	<ul style="list-style-type: none"> ● Check for deformation of the holes. (by visual check or measuring device) ● Check for deflection or deformation (by visual check or measuring device) 	<ul style="list-style-type: none"> ● When the holes are deformed by 0.5mm or more, Standard diameter: 22 φ ● When the plate is bent or deformed by more than 5 degrees. 	<ul style="list-style-type: none"> ● Overloading ● Sudden impact load ● Unreasonable lifting angle ● Lack of lubrication 	Replacement
Main unit	<ul style="list-style-type: none"> ● Check for deformation of the holes. (by visual check or measuring device) ● Check for cracks on or deformation ● Check for cracks on the welded parts. (by visual check or color check) 	<ul style="list-style-type: none"> ● When the holes are deformed by 0.5mm or more, Standard diameter: 14.4 φ ● When confirmed by visual check, etc. 	<ul style="list-style-type: none"> ● Overloading ● Sudden impact load ● Unreasonable lifting angle ● Lack of lubrication 	Disposal

<p>Cam</p>	<ul style="list-style-type: none"> ● Check for abrasion of the tip of the dens. (by visual check or measuring device) ● Check for flaws or cracks on the bottom of the dens. (by visual check or color check) ● Check for the chipping off of the dens. (by visual check) ● Check for deformation of the holes. (by visual check or measuring device) 	<ul style="list-style-type: none"> ● When the width of abrasion is as below in the figure. Width of abrasion: 0.7mm or more  ● When flaws or cracks are confirmed by visual check, etc.  ● When more than one threads are chipped off.  ● When the hole is 0.5mm or more deformed.  <p>Standard diameter: 14.4 φ</p>	<ul style="list-style-type: none"> ● Natural abrasion or others. ● Clamping of hard material ● Sudden impact load ● Unreasonable lifting angle ● Clamping of hard material ● Sudden impact load ● Unreasonable lifting angle ● Clamping of hard material ● Overloading ● Sudden impact load ● Unreasonable lifting angle ● Lack of lubrication. 	<p>Replacement</p>
<p>Link</p>	<ul style="list-style-type: none"> ● Check for deformation of the holes. (by visual check or measuring device) ● Check for deflection or deformation. (by visual check or measuring device) 	<ul style="list-style-type: none"> ● When the holes are deformed by 0.5mm or more, Standard diameter: 22 φ.  ● When confirmed by visual check, etc. Standard diameter: 14.4 φ 	<ul style="list-style-type: none"> ● Overloading ● Sudden impact load ● Unreasonable lifting angle ● Lack of lubrication 	<p>Replacement</p>
<p>Lock</p>	<ul style="list-style-type: none"> ● Check for deformation of the holes. (by visual check or measuring device) ● Check for deflection or deformation. (by visual check or measuring device) 	<ul style="list-style-type: none"> ● When the holes are deformed by 0.5mm or more, Standard diameter: 10.5 φ.  ● When confirmed by visual check, etc. 	<ul style="list-style-type: none"> ● Sudden impact load ● Lack of lubrication 	<p>Replacement</p>
<p>Remote control lever</p>	<ul style="list-style-type: none"> ● Check for deformation of the holes. (by visual check or measuring device) ● Check for cracks on the welded parts. (by visual check or color check) 	<ul style="list-style-type: none"> ● When the holes are deformed by 0.5mm or more, ● When confirmed by visual check, etc. 	<ul style="list-style-type: none"> ● Sudden impact load ● Lack of lubrication 	<p>Replacement</p>

Hook pin	<ul style="list-style-type: none"> ● Check for abrasion or deformation of the hook pin shaft. (by visual check or measuring device) 	<ul style="list-style-type: none"> ● When the hook pin is worn away or deformed by 0.5mm or more. 	<ul style="list-style-type: none"> ● Overloading ● Sudden impact load ● Unreasonable lifting angle ● Lack of lubrication 	Replacement
Link pin	<ul style="list-style-type: none"> ● Check for abrasion or deformation of the link pin shaft. (by visual check or measuring device) 	<ul style="list-style-type: none"> ● When the link pin is worn away or deformed by 0.5mm or more, 	<ul style="list-style-type: none"> ● Overloading ● Sudden impact load ● Unreasonable lifting angle ● Lack of lubrication 	Replacement
Cam supporting pin	<ul style="list-style-type: none"> ● Check for abrasion or deformation of the cam supporting pin shaft. (by visual check or measuring device) 	<ul style="list-style-type: none"> ● When the cam supporting pin is worn away or deformed by 0.5mm or more. 	<ul style="list-style-type: none"> ● Overloading ● Sudden impact load ● Unreasonable lifting angle ● Lack of lubrication 	Replacement
Sideways sliding prevention lever	<ul style="list-style-type: none"> ● Check for abrasion or chipping off of the rack (by visual check) ● Check for normal operation 	<ul style="list-style-type: none"> ● When abrasion or chipping off is confirmed by visual check. 	<ul style="list-style-type: none"> ● Sudden impact load ● Unreasonable use ● Lack of lubrication 	Replacement
Lock gear	<ul style="list-style-type: none"> ● Check for abrasion or chipping off of the lock gear (by visual check) ● Check for normal operation 	<ul style="list-style-type: none"> ● When abrasion or chipping off is confirmed by visual check. 	<ul style="list-style-type: none"> ● Sudden impact load ● Unreasonable use ● Lack of lubrication 	Replacement
Spring	<ul style="list-style-type: none"> ● Check whether there is proper rebounding, when the lifting plate is pressed with the locking on. (by visual check) 	<ul style="list-style-type: none"> ● In case proper rebounding is not confirmed, when the lifting plate is pressed. ● When deformation or breaking of the spring is confirmed by visual check. 	<ul style="list-style-type: none"> ● Overloading ● Sudden impact load ● Unreasonable lifting angle ● Lack of lubrication ● Fatigue etc. 	Replacement