

HYDRAULIC POSI-CLAMPER

INSTRUCTION MANUAL

MODEL: PC – 140 Y – 01
PC – 200 Y – 01
PC – 300 Y – 01
PC – 450 Y – 01
PC – 650 Y – 01

**Read and understand this instruction manual before operating the hydraulic posi-clamper.
Improper operation or servicing might cause a serious accident.**

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1. INTRODUCTON

This manual is written to give the user necessary operating, routine servicing and preventive maintenance instructions for the hydraulic posi-clamper (hereinafter referred to as “the clamper”). Read this manual thoroughly and become completely familiar with the clamper unit before proceeding with operating and servicing.

2. WARNINGS

- 2-1. **Use caution to prevent the disc from rotating when carrying out periodic servicing.**
If the disc rotates when carrying out periodic servicing (when the disc is not clamped), a serious accident may occur. Apply a brake in other system or a mechanical lock before carrying out servicing. After making sure that the disc won't rotate, perform inspection and servicing.
- 2-2. **Keep the disc sliding surface clean.**
Remove oil, grease and rust from the disc sliding surface. Failure to do so will cause a poor clamping force, leading to an unexpected mechanical movement or action and in the worst case a serious accident. See “7-3. Checking disc sliding surface” on page 6.

3. CAUTIONS

- 3-1. Use general mineral oil (hydraulic oil) with an ISO viscosity index of 32 or equivalent for this clamper. **Never under any circumstances, use brake fluid.**
- 3-2. Keep water away from the clamper and the disc.
If there is a possibility of exposure to water, use a cover or equivalent to protect against it.
- 3-3. Adjust the supply pressure so that it becomes zero when the clamping force is released, to secure a clearance between the pads and the disc.

4. GENERAL DESCRIPTION

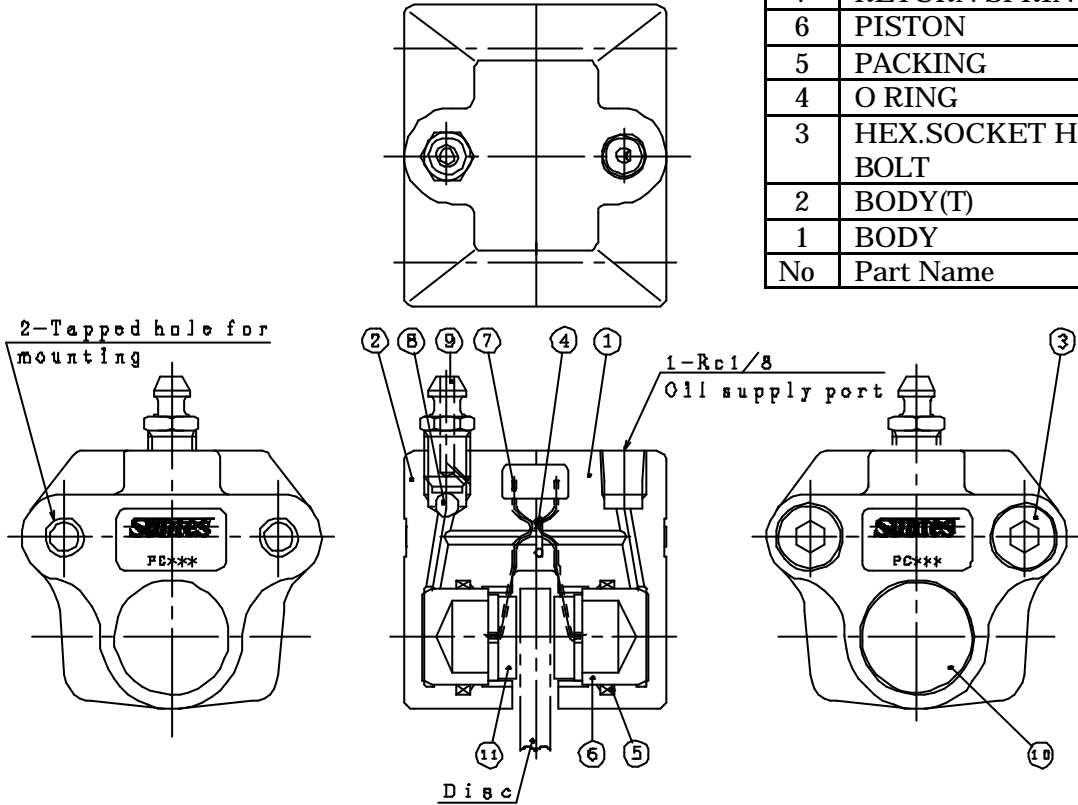
This hydraulic posi-clamper is designed to clamp the disc from both sides with pads (friction materials) by supplying oil pressure. Its compact design makes it easy to install and save space.

When the clamper is released, the clearance between the pads and disc is secured by both the spring force and the restoring force of the packings which have been compressed and deformed during clamping, thus requiring no adjustment.

See next page for the unit's components and its operation.

4-1. Components

11	PAD	2
10	MODEL PLATE	1
9	BLEED SCREW	1
8	STEEL BALL	1
7	RETURN SPRING	2
6	PISTON	2
5	PACKING	2
4	O RING	1
3	HEX.SOCKET HEAD BOLT	2
2	BODY(T)	1
1	BODY	1
No	Part Name	Q'ty



4 – 2. Operation

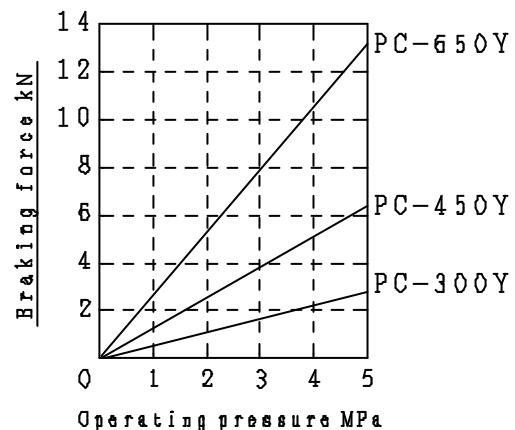
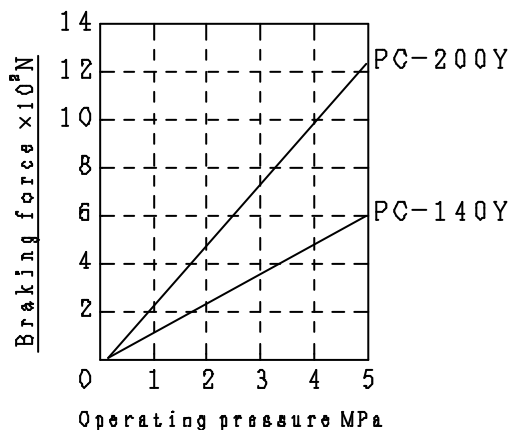
- (1) When oil pressure is supplied through the oil supply port of the hydraulic posi-clamper, the pistons advance to force the pads (friction materials) against the disc, producing clamping force.
- (2) When the oil pressure is removed, the pistons and pads retreat due to the forces of both the packings which have been compressed and deformed during clamping, and the return springs so that a clearance is created between the pads and disc, thus releasing the clamping force.

Note: The clamper is originally designed for use as a holding and emergency brake; however, it can be used as a usual service brake, depending on the quantity of absorbed energy and operating frequency. Consult us if you want to use the clamper as a service brake or about the details of emergency braking application.

5. SPECIFICATIONS

Model	PC-140Y	PC-200Y	PC-300Y	PC-450Y	PC-650Y
Disc outer diameter (mm)	50 to	100 to	100 to	150 to	260 to
Disc thickness (mm)	3	6	6	10	10
Pad measurements (mm) [L x W x T]	18 x 13 x 4	25 x 17x 4	32 x 20 x 5	48 x 30 x 5	70 x 50 x 5
Pad surface area (cm ²)	2.16	4.06	6.10	14.07	35.12
Pad wear allowance (mm)	2	2	2	2	2
Cylinder diameter (mm)	14	20	30	45	65
Cylinder area (mm ²)	154	314	707	1590	3317
Fluid to be used	General mineral oil (Hydraulic oil) ISO viscosity grade 32	General mineral oil (Hydraulic oil) ISO viscosity grade 32	General mineral oil (Hydraulic oil) ISO viscosity grade 32	General mineral oil (Hydraulic oil) ISO viscosity grade 32	General mineral oil (Hydraulic oil) ISO viscosity grade 32
Operating pressure (MPa)	0.15 - 5	0.1- 05	0.1- 5	0.05- 5	0.05- 5
Tapped hole for mounting (mm)	M6 x depth 16	M8 x depth 15.5	M10 x depth 19	M14 x depth 21.5	M16 x depth 26
Weight (kg)	0.20	0.35	0.69	1.3	3.3
Pad model	DB-0480-01	DB-0481-01	DB-0482-01	DB-0483-01	DB-0484-01
Mechanical life of body	3 million of operations	3 million of operations	3 million of operations	3 million of operations	3 million of operations
Life of packing	3 million of operations or 5 years	3 million of operations or 5 years	3 million of operations or 5 years	3 million of operations or 5 years	3 million of operations or 5 years

Braking force



Note: Braking force = $2 \times 0.4 \times (\text{operating pressure} \times \text{cylinder area} - 20\text{N})$

0.4 represents the frictional coefficient of the pads obtained after fitting.

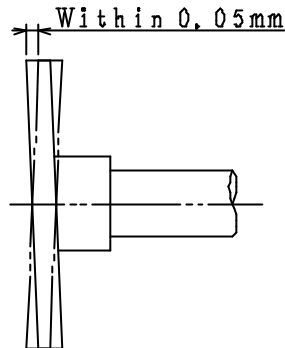
20N represents return spring force.

In the case of non-backlash, the braking force will be lower than the values shown above.

6. INSTALLATION

6-1. Installing the disc

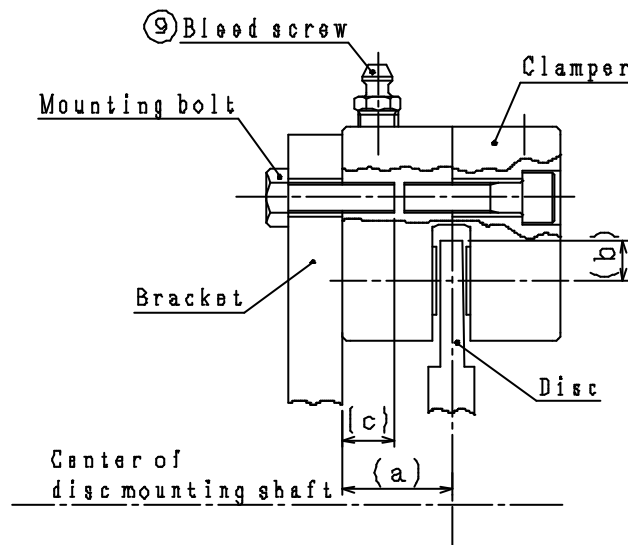
- 1) Install the disc with the axial runout not exceeding 0.05 mm at the periphery of the disc.



- 2) Install the disc securely on the rotating shaft to prevent its axial displacement.
- 3) Wipe away oil, grease, dirt, etc. from the disk surface with alcohol or thinner.

6-2. Installing the clamber unit

- 1) The clamber unit can be installed in all directions (vertical, horizontal, up/down). However, it is advisable to install the clamber with the bleed screw positioned upward so that air bleeding is easily and securely carried out.



- 2) Install the clamber so that the distance (a) between the clamber mounting bracket and the center of the disc, and the penetration (b) into the disc are obtained as specified in Table 1.
Make sure the bracket is parallel to the disc.
- 3) Select proper mounting bolts according to the size, strength grade, and the length of threaded engagement into the tapped hole (See Table 1). Attach the clamber to the bracket to the specified tightening torque. (Torque the 2 mounting bolts evenly.)

Table-1

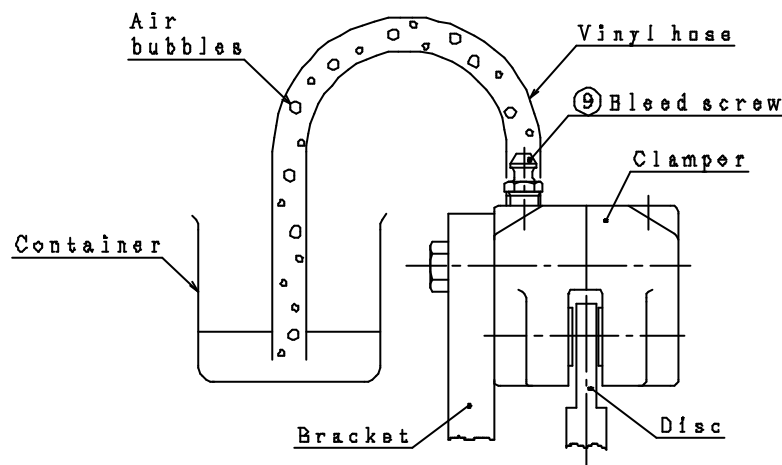
Model	PC-140Y	PC-200Y	PC-300Y	PC-450Y	PC-650Y
Dimension (a) (mm)	25 ± 0.2	27.5 ± 0.2	34 ± 0.2	39.5 ± 0.2	50 ± 0.2
Dimension (b) (mm)	8	10	12	18	29
Mounting bolt size	M6	M8	M10	M14	M16
Strength grade	4.6 or more	4.6 or more	4.6 or more	4.6 or more	8.8 or more
Dimension (c) (mm)	9 – 15	10 – 15	13 – 18	16 – 21	20 – 25
Tightening torque (N-m)	4.6	11.2	22.0	62.0	144

- 4) Connect the oil tubing to the oil supply port (size: Rc 1/8) of the clamper.
Support or protect the tubing if needed.
Use general mineral oil (hydraulic oil) with an ISO viscosity index of 32 or equivalent for this clamper.
Never under any circumstances, use brake fluid.

6-3. Air bleeding

Bleed air from the interior of the clamper and the piping in the following manner:
Note that air bleeding should be performed after the clamper is installed on the disc.

- 1) Connect one end of a transparent vinyl hose (6 mm inner dia.) to the bleed screw and put the other end in a container.



- 2) With oil pressure supplied to the clamper, loosen the bleed screw using a 10-mm wrench at the hex. part of the bleed screw to let oil flow out through the bleed screw. Tighten the bleed screw just before the oil pressure becomes zero.
- 3) Repeat step 2) until oil coming from the bleed screw contains no air bubble.
- 4) After making sure there is no air bubble in the oil coming from the bleeder, tighten the bleed screw securely. (Reference torque: 6 N-m)
- 5) Air bleeding is now over. Operate the clamper several times to check if there is no oil leakage or malfunction of the device.

7. MAINTENANCE

Periodic inspection is necessary to maintain the performance of the clamper. Be sure to perform periodic checks.

7-1. Checking clamper unit bolts and bolts for securing to the bracket for looseness

Check the clamper unit bolts listed as No.3 in "4-1. Components" on page 3 and the bolts attaching the clamper to the bracket for looseness.

Tighten any loose bolt to the torque as shown in the table below (applicable for both the clamper unit bolts and the bolts for securing to the bracket).

Model	PC-140Y	PC-200Y	PC-300Y	PC-450Y	PC-650Y
Tightening torque (N-m)	4.6	11.2	22.0	62.0	144

7-2. Checking the clamper and tubing for oil leak

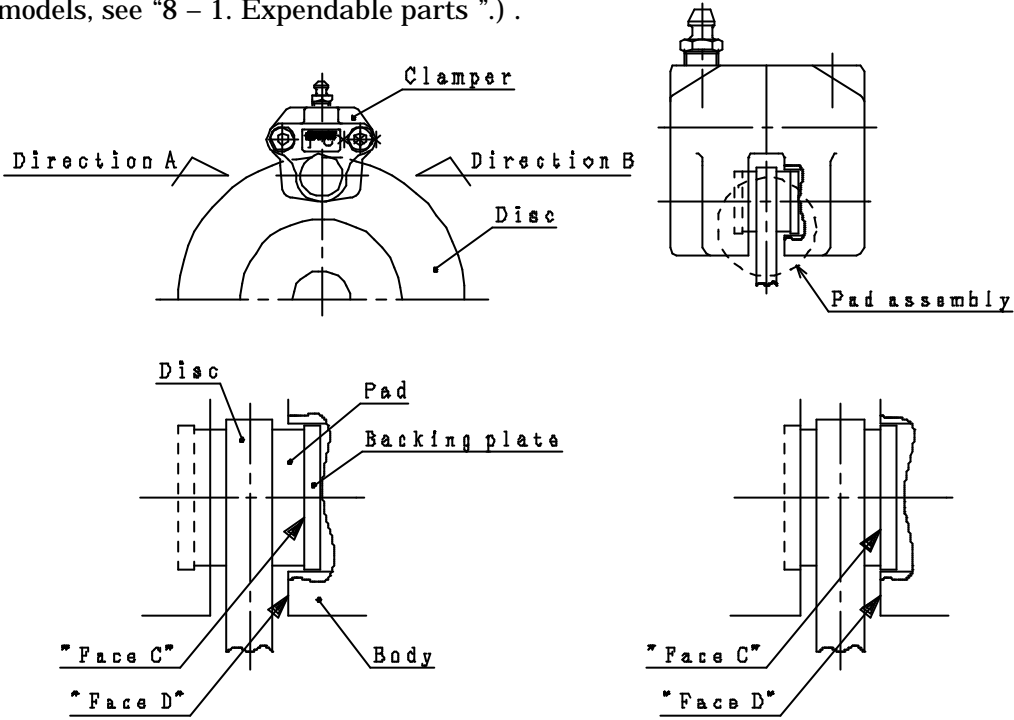
- (1) Check the clamper for oil leak. If any oil leak should be found, consult us.
- (2) Check tubing (including connectors) for oil leak. If any oil leak is found, retighten the connectors or replace the tubing with new one.

7-3. Checking disc sliding surface

- (1) Care should be taken not to allow oil or grease on the disc sliding surface. If the disc sliding surface appears dirty with oil or grease, clean it with alcohol or thinner.
- (2) Check the disc surface for rust or roughness. If any rust or roughness is found, correct the surface with sand paper.

7-4. Checking pads for wear

* Check both the right and left pads (2 pcs.).
 With the disc clamped (or with oil pressure applied), look at the pad either from direction A or B as shown in the figure below. If the "Face C" is level or near level with the "Face D" of either of the backing plates (metal square plates bonding the pad), it suggests that the pad is worn to its limit. Replace both the right and left pads (2 pcs.) with new ones, referring to "8 - 2. Procedure for replacing pad assembly" on page 9 (For information on pad models, see "8 - 1. Expendable parts ").



New pad

"Face C" is situated at a position inner than "Face D"; therefore, the backing plate is invisible from outside.

Pad wear limit

"Face C" is at the same level as "Face D".

Details of pad assembly

Note: If a brake pad which exceeds the wear limit continues to be used, the return spring will contact the disc to damage it.

8. EXPENDABLE PARTS AND REPLACEMENT PROCEDURE

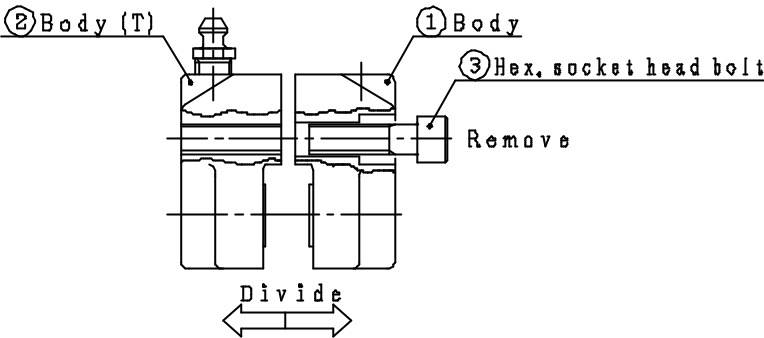
8-1. Expendable parts

[See also the component parts list (on page 3)]

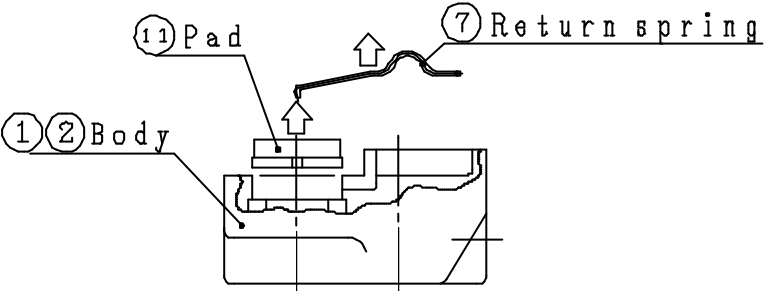
Part Name & Particulars	Model				
	PC-140Y	PC-200Y	PC-300Y	PC-450Y	PC-650Y
Pad kit Pad (Assy) x 2 + Return spring x 2	DB-0480-K01	DB-0481-K01	DB-0482-K01	DB-0483-K01	DB-0484-K01

8-2. Procedure for replacing pad assembly

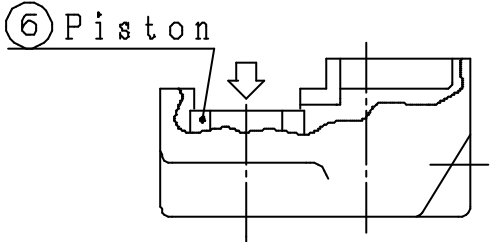
- 1) Remove the clamber from the bracket. Remove the hex. socket head bolt and divide the body into the right and left halves.



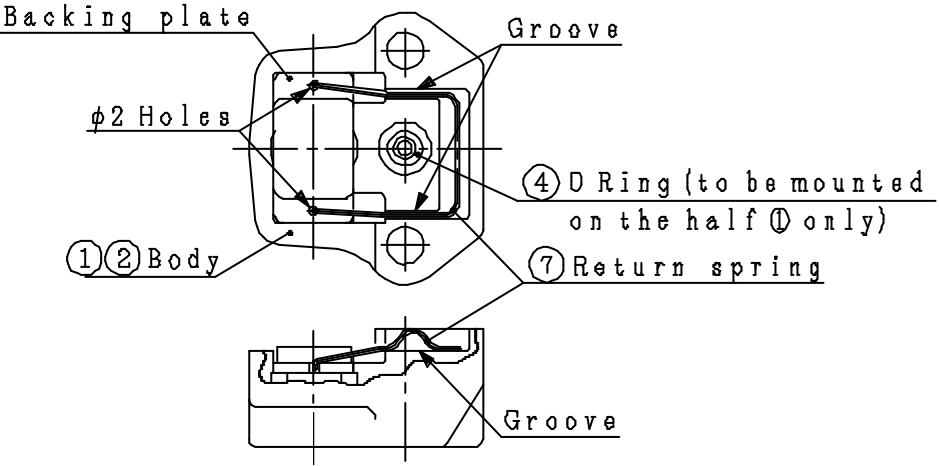
- 2) Remove the return spring and the pad from each half.



- 3) Install the piston on each half by pushing in.

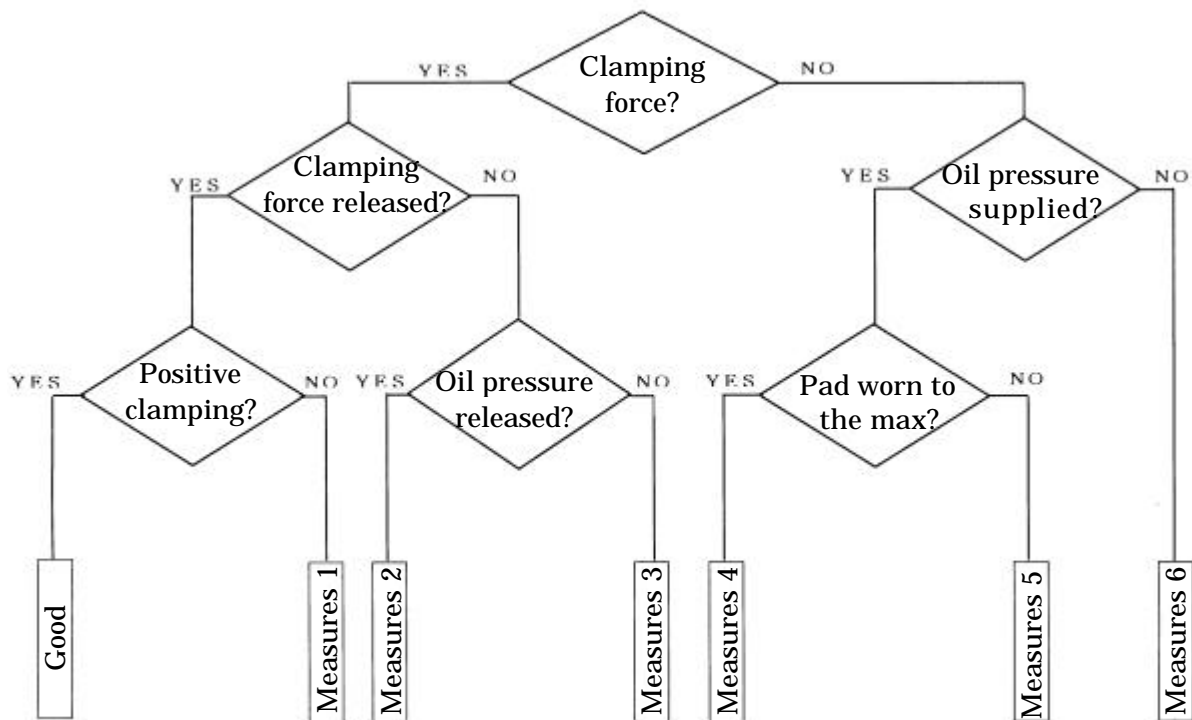


- 4) Install a new pad and a new return spring on each half. When installing a new return spring, first insert the tip of the return spring into the 2 holes (2 locations) in the backing plate (square metal plate to which the pad is attached) and then install the return spring into the groove in the two halves and



- 5) After checking the O ring is fitted in the O ring groove in the body , assemble the divided halves & together, using caution so as not to let the return springs and the pads installed inside the halves & come off, with hex. socket head bolts in the opposite sequence of Step 1).
Tighten both hex. socket head bolts to the torque specified in the Table on page 6.
- 6) Reinstall the clamper unit on the bracket/disc, referring to “6 – 2. Installing the clamper” on page 5.

9. TROUBLESHOOTING GUIDE



Measures 1 Increase oil supply pressure.
Remove oil or grease from the pad sliding surface of the disc.

Measures 2 Check disc for runout or axial displacement, and the Clamper body.

Measures 3 Check valves and electric circuit.

Measures 4 Replace pads with new ones.

Measures 5 Check oil leak.

Measures 6 Check oil supply, valves and electric circuit.