New Joules Engineering North America Inc.

An Argent Industrial Ltd. Company

JOULE RETARDER INSTALLATION
&
SERVICE GUIDE

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Correct installation is essential for proper operation of the retarder. Both the position on the track where the retarder is fitted, as well as the location of the retarder on the rail is important.

Regarding handling and maintenance, it must be emphasized to all concerned that all hydraulic components are precision made to extremely fine tolerances. As such they are readily damaged or distorted if not carefully handled. At no time must any of the components be dropped as this can cause irreparable damage.

1. ***Drilling Mounting Holes***

The position of the holes to be drilled is determined during the design process and is furnished in the form of a drilling list. The drilling list indicates exact distances measured from a fixed reference to the center line of the retarder mounting studs.

The following schematic shows the location of the retarder mounting holes as drilled into the rail web. (Fig. 1)

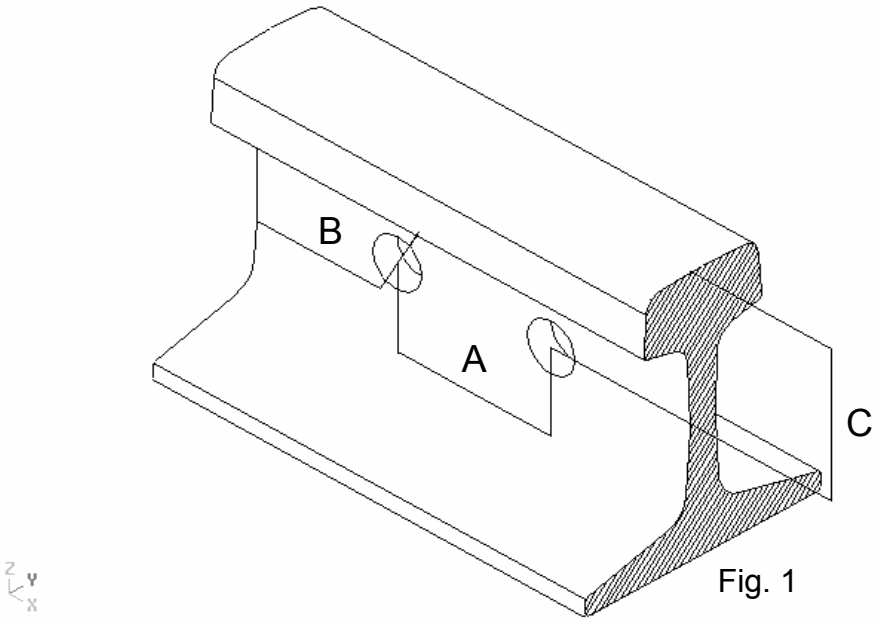

Fig. 1

A - Hole pitch: 3.500” (88.9mm)

B - Hole Diameter: 1.094” – 1.125” (28.00mm)

C - Height from crown to center of hole: 3.156” (80.00mm)

Prior to drilling remove all lettering and high spots that may be on the web in the area where the holes are to be drilled. Also clean of all scale, dirt and corrosion prior to installation thereby facilitating flush fitment of the pot housing to the rail web.

2. ***Retarder Bay***

The next step in the installation is to prepare the retarder bay. Clear away any ballast or debris that might obstruct the pot housing when fitted to the rail. (Fig. 2)

Fig. 2

Ballast must be kept clear from the base of the pot housing at all times otherwise stud shearing may occur. (Fig. 3)

Fig. 3

3. ***Retarder Assembly Installation***

Fig. 4

The retarder assembly is supplied with nuts and heavy duty lock washers. Remove the nuts and lock washers from the assembly and insert the retarder studs into the drilled holes. (Fig. 4)

Fig. 5

Re-fit the lock washers. (Fig 5)

Fig. 6

Re-fit and tighten the nuts by hand until the pot mounting pads are fitting flush against the rail web. (Fig.6)

The nuts must now be **torque tightened** to **600 lbf-ft** (820 N.m). The torque should be checked on a regular basis as vibration can cause the nuts to turn loose. Take care not to over torque the nuts as this will cause premature failure of the studs.(Fig. 7) (It is advisable to inspect the torque at least two weeks after first time installation.)

Fig. 7

4. ***Inspection***

After mounting the retarder onto the rail it must be inspected for proper operation.

Fig. 8

After installation the capsule must be depressed all the way into the pot housing and should move freely in and out with no obstruction. It had been found that due to burring of the rail head the capsule can become stuck on the return stroke or in excessive cases on the in (inward or down) stroke. This burr must be ground away.(Fig. 8, 12)

Fig. 9

Ensure that the pot housing is not tight up against the foot of the rail after installation. There must be at least 0.063” (1.588mm) or more clearance between the machined pad and the rail foot. If this is not the case the housing must be removed.(Fig. 9, 11) Also make sure that there is clearance between the capsule head and the rail head.(Fig. 8, 11)

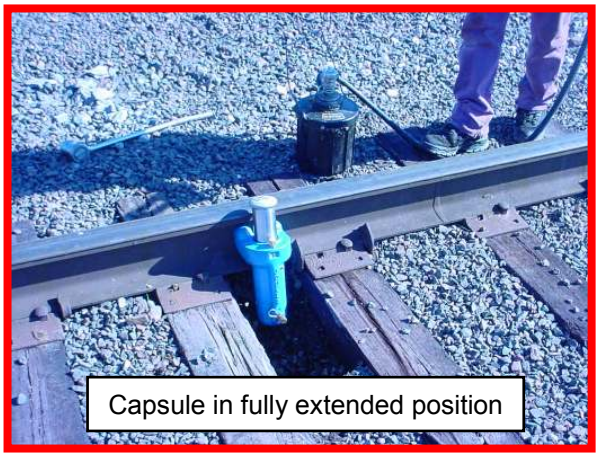

Fig. 10

After fully depressing the capsule it should return to the fully extended position (Up or rest position) freely.(Fig. 10)

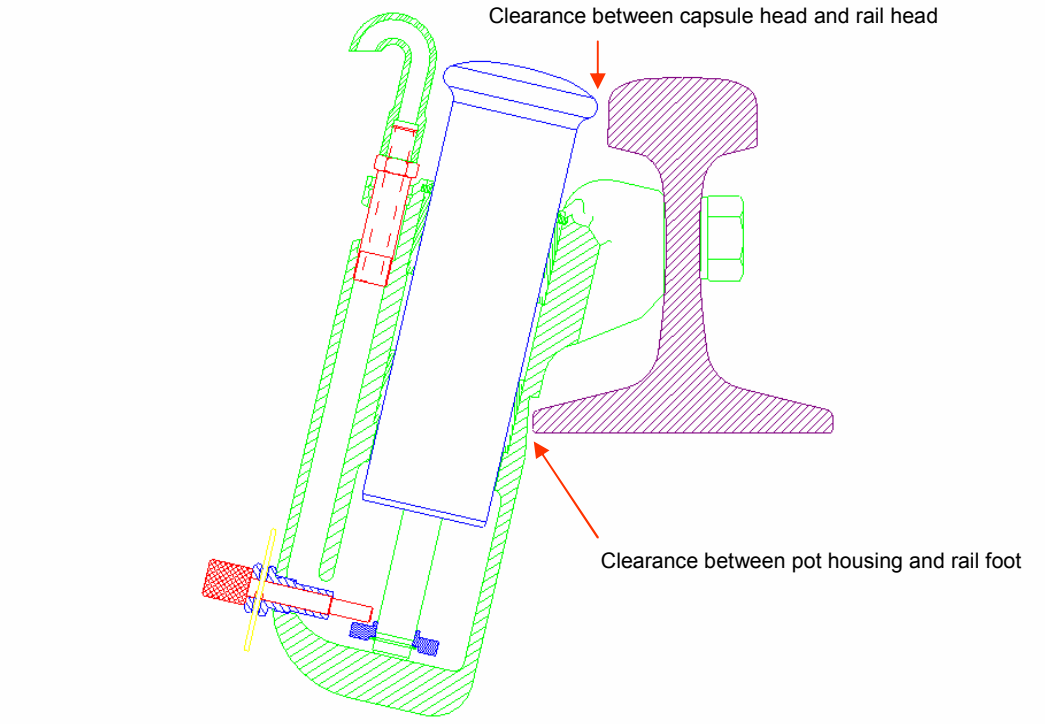
Clearance between capsule head and rail head
Clearance between pot housing and rail foot

Fig. 11

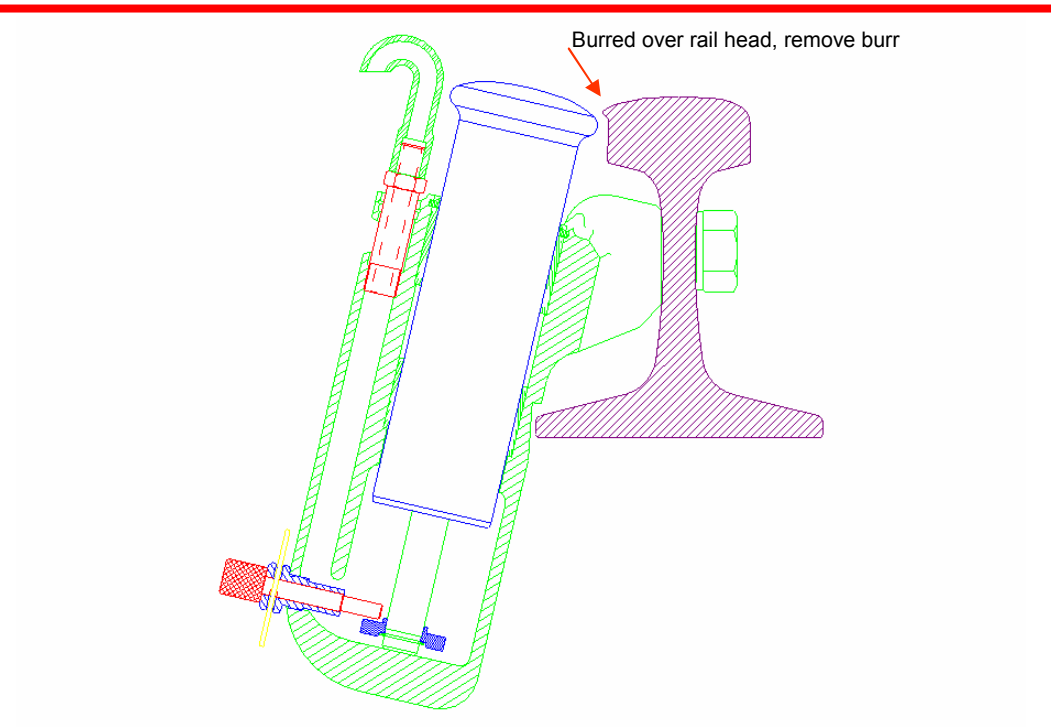
Burred over rail head, remove burr

Fig. 12

5. ***Maintenance Overview***

Maintenance should be carried out on a regular basis to preserve optimum functioning of the retarder. Track side maintenance is limited as the capsule assembly needs to be returned to New Joules Engineering for rebuilding in the event of a failure. Therefore the maintenance by the client is limited to installing and removing failed or damaged hardware, as well as general maintenance, as will be described next.

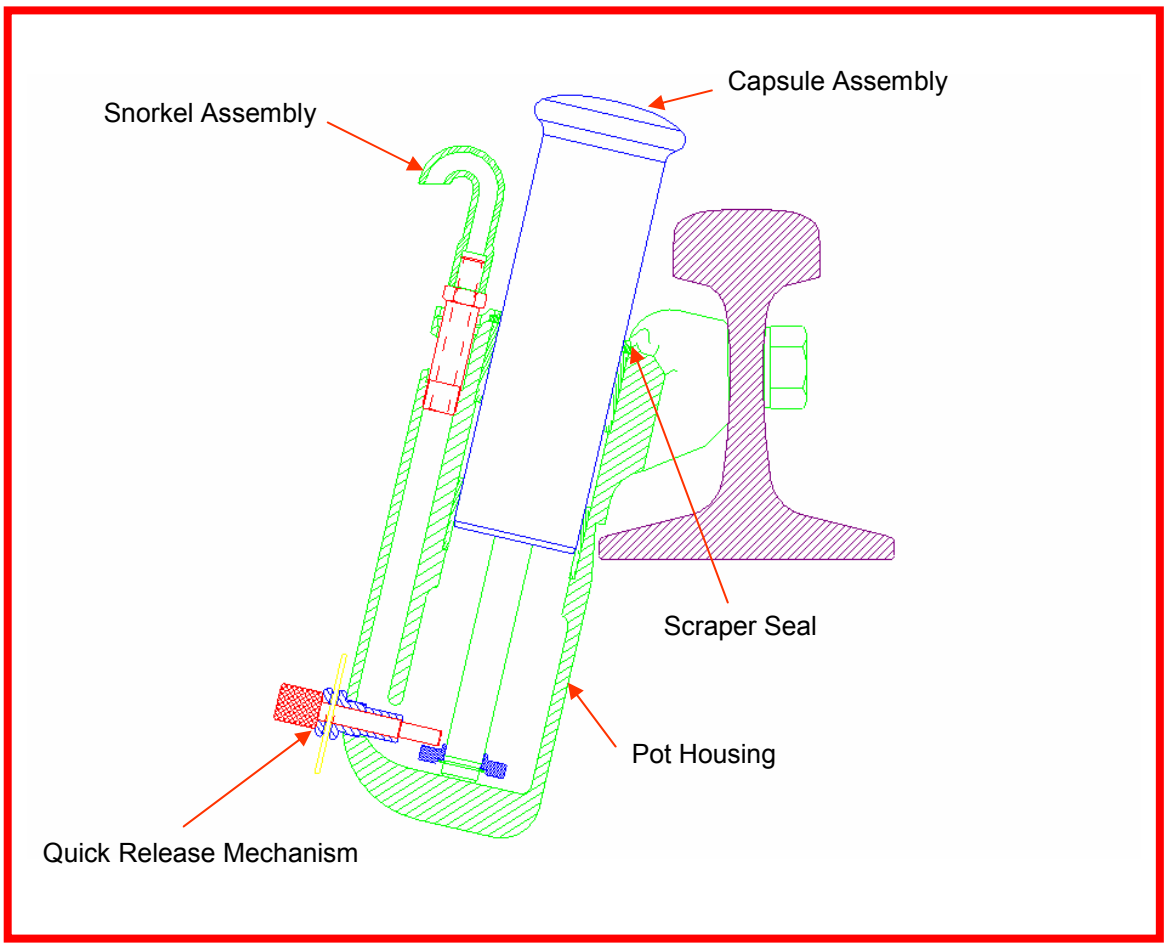

Fig. 13

Retarder Assembly = Pot Housing + Capsule Assembly

Safety: Care must be exercised when handling capsules which have recently operated as they become very HOT and can cause severe burns.

6. ***Retarder Maintenance***

Retarder maintenance starts by a visual inspection of the overall condition of the housing, protruding capsule and immediate surroundings. Look for damage on both the pot housing and protruding capsule journal.

Fig. 14

If the capsule is in the fully extended position depress it fully inward and release. The capsule should return to it's fully extended position quickly and freely. If the capsule does not return to the fully extended position, or stops on it's way back it must be replaced.

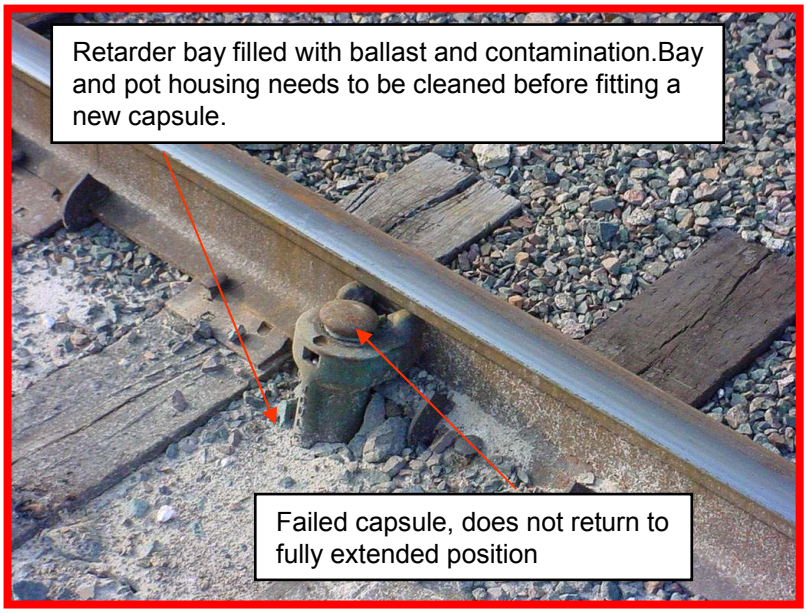

Fig. 15

The surrounding retarder bay should be clean and the pot housing should have clearance all round inside the bay. Remove ballast that may have worked itself into the retarder bay. (Fig. 2, 3, 15)

7. ***Pot Housing Maintenance***

Pot housing maintenance starts with inspecting the bay and making sure that there is no **foreign objects** inside the housing itself, that might cause damage or malfunctioning. The pot housing must be lightly greased once in 3 months, or according to service demands. (Grease type: Shell Alvania EP2 or equivalent)

Only grease with the capsule installed as this will prevent spillage of grease into the bottom of the housing. It is advisable to rotate the capsule while greasing as it helps to evenly distribute the grease in the annulus between the bearings.

CAUTION: **Do not over grease** as excess grease can gather in the bottom of the housing which can lead to failure and damage of capsule. 2 – 3 hand pumps of grease should be sufficient.

Fig. 16

-Inspect the **scraper seal** condition. The capsule journal is also a tell tale of scraper condition. Replace if necessary.

- Check the **torque** of the nuts. (**600 lbf-ft** (820 N.m)) Re-torque if not acceptable. (Fig. 7)

- Both the bronze bearings have **wear grooves** machined into the inside diameter. If these grooves are visible the bearings is still in good condition. (Fig. 17)

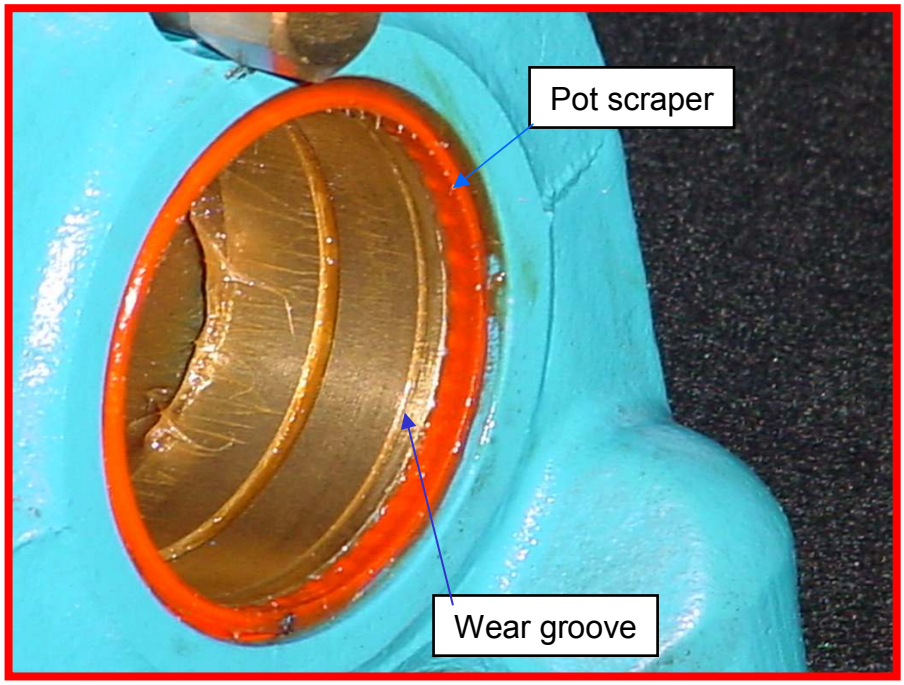

Fig. 17

8. *Quick Release Mechanism*

The Quick Release mechanism is used to retain the capsule assembly and is part of the pot housing assembly. There are two types commonly in use, namely a “Standard” and a “Sealed” type. The only difference is that the sealed type has an o-ring seal to seal of the assembly while the standard has no seal. Fig. 23)

The retaining sleeve is installed using Loctite 592 on the threads, acting as both a sealer and thread locker. Insert the retaining sleeve into the housing and tighten firmly. Do not over tighten as fine threads are used for sealing purposes and can strip out easily. Tighten down until it stops firmly against the pot housing. Fig. 18, 19, 20)

After inserting the capsule into the pot housing the retaining pin can be installed. When using the sealed type pin ensure that the o-ring is fitted properly. It is advisable to use a little petroleum jelly on the o-ring to ease the installation of the pin. After installing the capsule firmly pull the capsule in the outward direction to ensure that the retaining pin is securing the capsule. (Fig. 21)

The Hitch pin is now inserted to keep the retaining pin from falling out. (Fig. 22)

Note: the Standard configuration has a golden color while the seal type configuration has a silvery color.

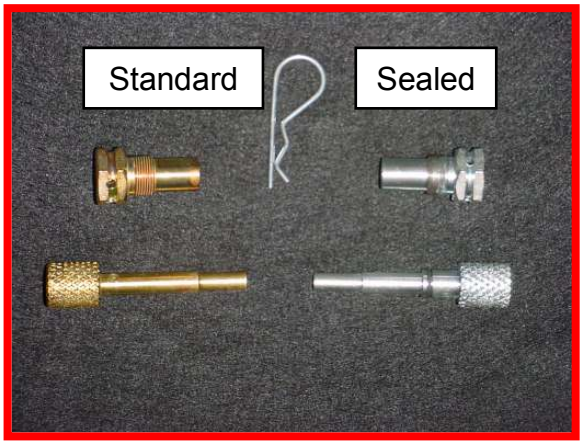

Fig. 18

Fig. 19

Fig. 20

Fig. 21

Fig. 22

Fig. 23

9. ***Capsule Removal and Installation***

In order to remove the capsule assembly the hitch pin needs to be removed first and then the retaining pin can be extracted from the retaining sleeve. The capsule can now be removed from the pot housing.(Fig. 24, 25)

When removing the capsule handle it with care and protect the protruding piston rod from damage. Dropping the capsule on the ballast can cause irreparable damage to the piston rod and sliding cylinder.

Fig. 24

Fig. 25

Fig. 26

If there is no replacement capsule the pot housing must be plugged with a plastic protection cap. This will prevent ingress of dirt and other foreign matter into the pot housing.(fig. 26)

Prior to installing the capsule ensure that the retaining collar is installed properly and that the snap ring is properly located in it's groove. (Fig. 27)

Also ensure that the pot housing is free from foreign matter and that the scraper is in good condition.

Installation is the reversal of removal. When using the seal type retaining pin it is advisable to replace the o-ring and use a little petroleum jelly for ease of installation.

After installation is completed pull the capsule in an upward direction to ensure that the retaining collar is located beneath the retaining pin. Also ensure that the capsule moves freely up and down in the housing and that it returns to it's rest position after being depressed all the way down. (Fig. 28, 8, 10)

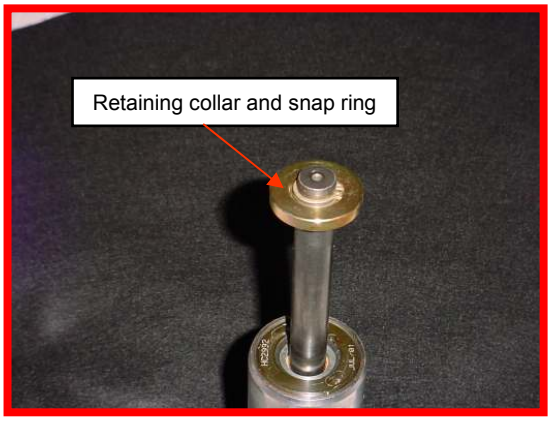

Fig. 27

Fig. 28

10. *Repairs*

In the event of a capsule failing, it must be returned to New Joules Engineering for repair work. Special equipment is needed to disassemble the capsule and ensure safe evacuation of gas and oil in the capsule.

CAUTION: Do not attempt to open the capsule.

Pot assemblies which is damaged or worn also needs to be returned to New Joules Engineering where a complete or partial, rebuild can be done.

Sales & Service location details on last page.