ELECTRO-MOTIVE DIVISION • GENERAL MOTORS CORPORATION
SERVICE DEPARTMENT

MAINTENANCE INSTRUCTION

FRICTION TYPE JOURNAL BOX

GENERAL DESCRIPTION

The friction type journal box, Fig. 1, used on EMD switching locomotives consists of a cast steel housing with a dust proof spring closed lid, journal bearing and wedge, thrust block assembly, dust guard, and lubricating pad.

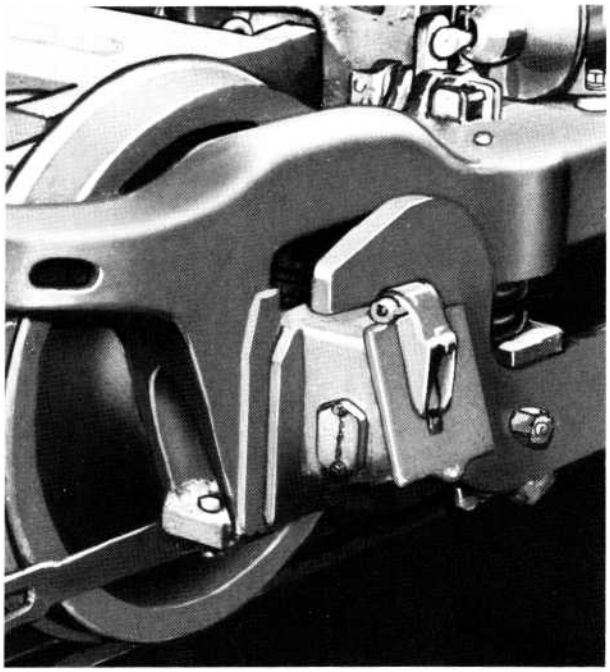

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Fig. 1 — Friction Type Journal Box

Channels, Fig. 2, on each side of the journal box fit over the truck pedestal and hold the journal box in place in the truck frame. A tie bar is bolted across the two lower ends of the pedestal and serves as a reinforcement for the pedestal and prevents the journal box from dropping out in case of derailment. The 6" x 12" wedge provides a solid contact between the box and the journal bearing. It has a smooth surface which makes it easy to install and remove. The journal bearing is a bronze backed babbit type bearing which rides on top of the axle journal with the 3/4" radius toward the wheel.

The thrust block assembly is a bronze faced steel casting located in the front of the journal box and contacts the end of the axle journal if a lateral thrust is exerted. The block also houses nine lateral springs and two snubber springs to absorb lateral forces. A 14" long felt wick is attached to the top of the thrust block and is glued into a slot which runs down the face of the thrust block. The lower end of the wick is allowed to extend into the lube oil sump in the bottom of the box.

The dust guard fits into a slot in the back end of the journal box. It consists of a plywood frame coated with an adhesive material and covered with black polyurethane. The dust guard fits on the shoulder of the axle next to the wheel and prevents the entrance of dirt into the journal box and retards the leakage of lubricant out of the journal box.

The lubricating pad is positioned between the bottom of the journal box and the axle journal. The pad is made of twin pads of sponge rubber (acrylonitrile) with a center section and covering of chenilled cotton fabric securely sewn between the twin resilient sections. This type of lubricating element provides

*This bulletin covers current friction type journal boxes; refer to M.I. 1204 for older boxes.

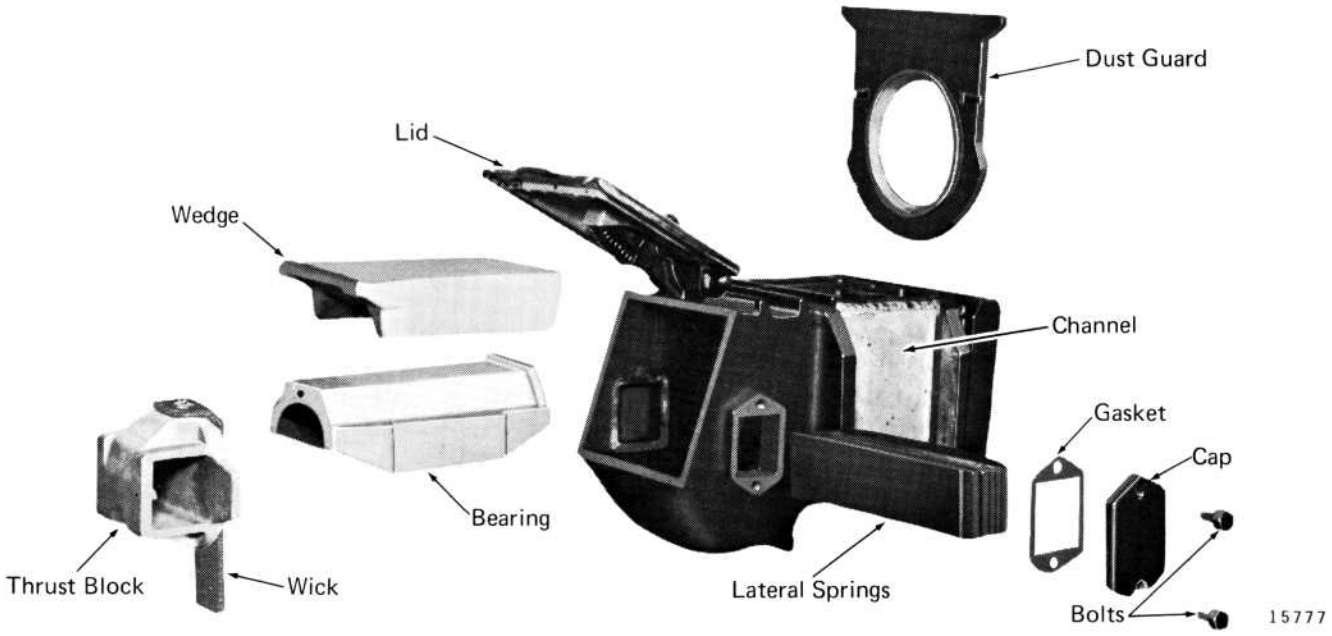

Fig. 2 – Exploded View of Friction Journal Box

maximum wicking under the most adverse conditions. The shape of the cover is such that the full length of the axle journal receives complete lubrication. A one piece pull loop is sewn along the center of the pad to facilitate its removal when necessary.

MAINTENANCE

Check pads and lubricate at intervals as specified in the applicable Scheduled Maintenance Program.

INSPECTION

Periodic inspections should be made even though replacements are rarely needed. Generally, bearing maintenance is done when wheels and axles are removed due to necessary wheel work.

REMOVING JOURNAL BOXES

Wear between the journal box liners and pedestal wear plates should be checked BEFORE the journal boxes are removed from the truck to determine in advance if box liners or pedestal wear plates need replacement. Wear is checked by use of a feeler gauge placed between the inner stop on the journal box and the truck frame pedestal jaw. Then, without moving the journal box, the clearance between the outer stop and the same pedestal jaw should be measured. The sum of these two measurements is the total lateral free play on the box. Similar measurements should then be taken on the other box on the same axle. The maximum free play for each box is 3/8". Replacement is recommended when the free play reaches 5/16" per box or a total of 5/8" for both boxes. The replacement of either pedestal liners or journal box liners will depend on their individual condition.

The clearance between the driving face on the journal box and the pedestal is 1/16" to 1/8". The condemning limit is 1/4", but replacement of driving face liners is recommended when clearance reaches 3/16".

The pedestal tie bar should be removed and the journal box jacked up just high enough to remove the wedge and the brass bearing.

CAUTION: If the box is jacked up TOO HIGH, the felt seal in the dust guard may be DAMAGED BEYOND USE.

If the axle has a collar on its end, be sure the brass is not damaged during removal.

Take the spring covers off each side of the box and remove the springs. One spring leaf may be punched out, and the rest of the spring pack will be loose and can be removed easily. Hold the thrust block while removing the springs so it will not fall and be damaged. Remove and inspect the lubricating pad to determine if it can be reused.

After the wheels and axle have been removed from the truck, the journal boxes can be lifted off the axle ends. Each journal box should be cleaned thoroughly, inside and out. Remove and inspect the dust guard from the rear of the box. Renew if worn or damaged. Check bearing face of thrust block and renew if worn 3/32" or if there are ridges on the face. The maximum wear on the thrust block face is 1/8".

With the proper equipment, the face of the thrust block can be built up with bearing metal and machined off to its original dimension. The wedge should be checked for cracks and distortion.

Check the journal brass as follows:

1. The back or lug must not be cracked or broken.

2. The bearing metal must not be loose, or sections of the metal broken out.

3. The bearing metal must not be worn through to the brass at either the crown or sides. The minimum thickness of the brass bearing at the crown is 1-1/4". Be sure the radius at the back of the brass has not been damaged and has the same contour as the 3/4" radius at the axle fillet.

4. If the bearing metal has started to pull at any part of the bearing surface, the bearing should be replaced. Scraping bearings is not recommended as the resulting high and low spots in the bearing surface may cause trouble. Scraping may also change the bearing radius which if carried too far could also cause trouble.

   If the bearing metal extends below the side edges of the brass, with no signs of metal pulling at any other part of the bearing surface, this bearing metal may be trimmed away, if the radius of the brass is not too large. Be sure there are no sharp corners at the side edges.

5. The radius of a new bearing is from .005" to .015" greater than the radius of the O.D. of a new axle journal. If the bearing radius is 1/16" or more greater than the radius of the axle journal, the bearing should be replaced.

   Clean and inspect the thrust block springs for cracked or broken springs.

REMOVING AND REAPPLYING JOURNAL BOX LINERS

The journal box should be completely disassembled. To remove liner plate, grind at least two sides of the liner welds free, then the liner can be wedged off with the aid of a chisel or wedge. Any remaining weld deposit on the box must be ground off to allow proper fitting of the new liner.

When the new liners are applied, they must fit flat and tight to the backing surfaces. The use of a clamping fixture to hold the plate tight against the box while welding is recommended.

Low hydrogen welding electrode, A.W.S. Class E-7016, 5/32" diameter, is recommended for application. The weld should be made with a low current consistent with proper welding practice. A full fillet weld with a convex weld contour is desirable and weld craters must be filled in by backing into the weld puddle. Welding should be done in the flat welding position with the journal box submerged in water, except for the part being welded.

INTERCHANGEABILITY

All parts of the journal box are interchangeable when new. Experience has shown that after the bearing parts have been operating together for a considerable length of time, they will wear in a complimentary and

individual manner. For this reason it is recommended that each journal bearing be kept with the same axle journal, regarding them as a unit.

REASSEMBLY

With the inside of the box thoroughly cleaned and dry, the dust guard is applied to the rear of the box, before the box is put onto the axle. After the box has been applied to the axle, the axle journal and the bearing surface of the brass should be coated with a clean good quality, car oil.

With the weight of the box supported, the brass bearing and the wedge are applied. Be sure the brass and the wedge are properly positioned in the box. The transverse center of the brass and the wedge should line up with the transverse center of the box.

To accomplish this, slide the brass onto the axle journal. Slide the wedge over the top of the brass. With the wedge in its proper position, there should be 1/8" clearance between the outer end of the wedge and the inner edge of the lip inside the box, Fig. 3. The outer end of the brass should extend 9/16" from the edge of the wedge on top of the brass.

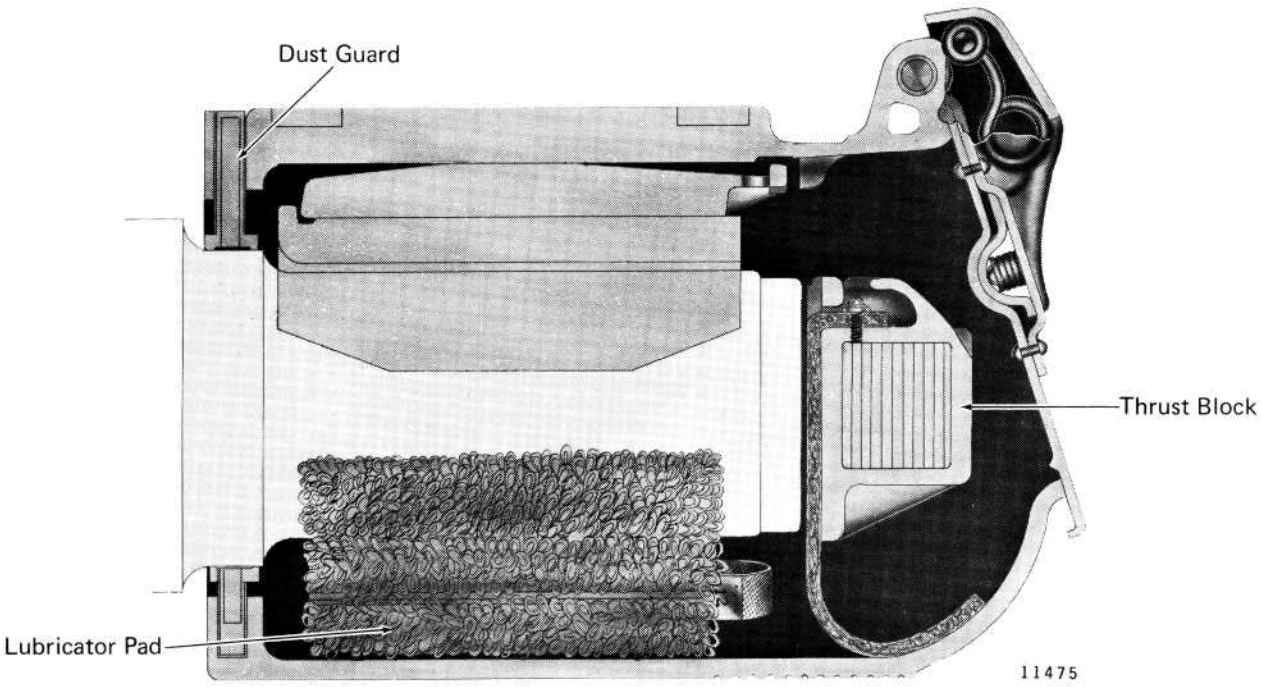

Fig. 3 – Side View Cross Section Of Journal Box

It is possible that the 9/16" dimension cannot be obtained if the wheel and axle assembly (or the truck frame) is crowded over to one side. Barring the wheels or truck frame in the opposite direction will give sufficient clearance to get this dimension. Remove the support so the brass bearing will have the weight of the box.

The lubricating pad, after being properly prepared as described under Preparation of the Pad, should be placed in the journal box.

The thrust block and lateral springs are next applied. The two cambered springs are put in first, one to the inside and one to the outside of the thrust block pocket, with CONCAVE SIDE TOWARDS THE AXLE

END, Fig. 4. Take all but one of the flat springs and put them BETWEEN the cambered springs. The last flat leaf may be driven in. Be sure the springs are tight in the box. Shims may be used if necessary to tighten these springs.

Check the bearing face of the thrust block and make sure it is square with the face on the end of the axle.

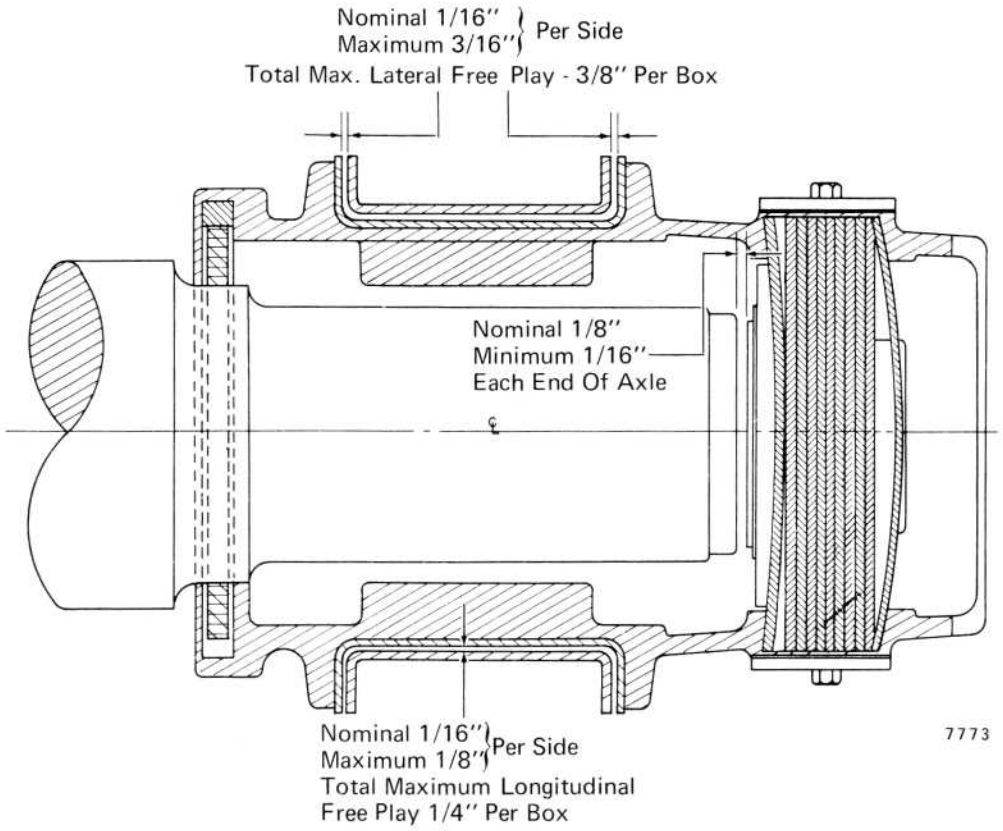

Fig. 4 — Top View Cross Section Of Journal Box

PREPARATION OF THE PAD

The lubricating pad should be thoroughly saturated with oil before it is installed in the journal box. Any oil that meets the AAR specifications (M-906) for journal box oil may be used.

The pad should be submerged in car oil at a temperature of not less that 70° F. for a period of 24 hours. Saturation can be accelerated by depressing and releasing the pad while immersed. This action forces air out of the foam inserts and allows oil to fill the pores more quickly.

Saturated pads should be allowed to drain for 3 hours to remove surplus oil. The pad can be installed without tools and without removing the bearing and wedge. However, if facilities are available, time will be saved by removing the bearing and wedge, and lowering the journal box on the axle journal.

An oil level of 1/2" should be maintained in the bottom sump of the journal box. The felt wick of the thrust block should be positioned so that it is submerged in this oil, Fig. 3. The wick should also be saturated before installation on the thrust block.

NOTE: The axle journal should be protected with leather or some suitable material if the journal box is allowed to rest on it. This method provides more clearance to push the pad under the axle collar. After the pad is in place and the bearing and wedge have been replaced, the pad position should be checked to ensure that it is centered. Only EMD lubricating pads should be used in EMD switching locomotive journal boxes. Other model switchers may have journal boxes with flat bottoms which will not provide sufficient contact between the pad and axle journal for proper lubrication.

TOTAL LATERAL BETWEEN AXLE ENDS AND THRUST BLOCKS

The total lateral between the axle ends and the thrust blocks should be taken after the wheel and axle assembly and the journal boxes have been installed in the truck.

With long feelers, measure the clearance between the journal box guide and the inner side of the pedestal, on each end of the axle. Then measure the clearance between the axle ends and the thrust blocks. The sum of the four measurements will be the total lateral free play between the axle ends and the thrust blocks. The nominal total lateral free play is approximately 1/4". The condemning limit is 3/4".

With pedestal liners, journal box liners and both thrust blocks worn to their condemning limit, the combined total lateral free play at the axle ends can be as much as 1-1/4". However, the total allowable combined lateral free play is 3/4" maximum.

To prevent the combined lateral free play from exceeding the 3/4" maximum, it is more economical to renew the pedestal and journal box liners during overhaul, since the total lateral can still be controlled by the thrust blocks.

Pedestal and journal box liners can be renewed only at time of journal box removal from the pedestal ways.

Thrust blocks can be renewed without removing journal box from pedestals.

If with new, or slightly worn journal box liners and pedestal wear plates, and new thrust blocks the total lateral free play is still 3/8" or more, this may be caused by an axle whose ends may have been cut or scored at some time and have been machined off, making it shorter than a standard axle.

As there are no provisions made for adjustment on the thrust blocks, it will be necessary to build up the face of the thrust block with bearing metal and machine it off to about 1/8" maximum over thickness, if the proper equipment to do this work correctly is available.

CAUTION: Do not under any circumstances attempt to stamp identification marks or axle data on the end faces of the axle, as this will ruin the thrust blocks.

MAINTENANCE DATA

	PART NUMBER
Lubricating Pad	8274612

	Weight (Lbs)	Oil (Pts)
Dry	2.0 AVG.	0.0
Saturated	7-9.0	8.1 AVG.
Oil added to stabilize oil level @ 1/2"	3.0 MAX.	1.5 AVG.

NOTE: A pint of car oil weighs .936 Lbs.

Thrust Block

Plain (without speed recorder drive)	8316273
Combination (with speed recorder drive)	8316283

NOTE: Both available with appropriate felt wicks.

Dust Guard	8265366

Journal Bearings

	Bearing Bore	Journal Size	
Regular	6.515"	6.500"	8100598
Undersize	6.390"	6.375"	8277385
	6.265"	6.250"	8277386

Litho in U.S.A.