TECHNICAL DATA SHEET
DS 013

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TITLE.	Instructions for Installation of Type TSC Size T3 Combined Steel Spring and Rubber Spring Unit Isolators - Marine Propulsion

Details of isolators as Leaflet PL001

General Notes:

Installation of resilient mounting system for marine propulsion engine driving a solidly mounted gearbox through a flexible coupling utilising independent jacking arrangement.

We recommend that the vessel is afloat during alignment and installation of the isolators.

For details of isolators see Drawing No. S 001, S 002 (and the Mounting Adjustment drawing if issued for this application).

Procedure:

1. Engine feet (or bearers) and jacking brackets are to be fitted to the engine housing typically as shown on Drawing No. S 002 Figure Nos. 1 and 4.

2. The isolators, complete with soleplates, are to be fitted to the underside of the engine feet. Between the top of each isolator and the underside of the engine foot a proof packing plate is to be fitted. These are to be suitably drilled and slotted to allow the proof plates to be withdrawn when the jacking screws in the engine foot have been used to deflect the isolator top.

3. A set screw, complete with locking nut, is to be fitted in the tapped hole in each engine jacking bracket. The set screw shall have a coned end for location in the dimple on the topside of the loose plates typically as shown on Drawing No. S 002 Fig. No. 1.

4. The following brackets are to be supplied by the shipbuilder and fitted:-

i.) One drive end restraint bracket to be bolted to the seating on each side of the engine. The bracket is to be fitted with studs and lock nuts that act directly on rib of engine jacking bracket to enable the coupling gap to be adjusted during alignment.

ii.) Transverse thrust brackets to be bolted to the ship's seating complete with stud or lock nuts that act directly on outside face of engine jacking bracket to enable transverse alignment to be accurately attained.

All as typically shown on Drawing No. S 002.

5. Grease the lower surface of the loose plates to allow easier movement of the engine when jacking along the ship's seating and then position these on the ship's engine seating as required.

6. The engine complete with its isolators and jacking set screws is then to be lowered ensuring that the coned ends of the jacking set screws locate in the dimples on the top surface of the greased loose plates and that the gap between the underside of the isolator soleplate and the ship's seating is not less than 19 mm.

7. At the commencement of the alignment procedure the coupling gap should be approximately 3 mm less than the nominal dimension. The side and end thrust bracket adjusting screws are then to be adjusted so that they are in contact with the engine jacking brackets.

8. Alignment of the engine to the gearbox should now be effected using the jacking studs and thrust screws. On completion of the alignment procedure, the thrust screws and jacking studs must be secured in position by the lock nuts provided.

NOTE - When aligning, allowance must be made for longitudinal deflection of the isolators due to the angle of installation. The axial gap for the engine/gearbox coupling should therefore be set at the nominal dimension plus the allowance as advised by Christie & Grey, usually on the Mounting Adjustment drawing. The initial vertical setting is high to allow for settlement and for the weight of oil and water, and an athwart ship offset may be included to allow for proper coupling alignment when under load.

9. The four levelling screws in each isolator base should now be screwed down until they are just in contact with the ship's engine seating. Ensure that the bases are parallel to the isolator tops, if necessary, by minor adjustment of the levelling screws.

10 i) Transfer the weight of the engine from the jacking brackets to the isolators by screwing down the isolator levelling screws. Start by turning each screw once by 360^{o} in sequence around the engine. This will load the isolators without moving the engine. Continue by turning the screws on each isolator through 180^{o} in sequence around the engine until one of the jacking screws just becomes unloaded.

ii) The remaining weight must be transferred to the isolators without moving the engine. To do this turn the screws down on the isolators in sequence by no more than 60^{o} at a time, in proportion to the distance of the isolator from the jack. When the jacks at one end or on one side are both free the adjacent isolator screws should require no more adjustment.

NOTE - For engines at a large rake angle, there will be a displacement down the slope. This should be allowed to occur by slackening the fore/aft restraint screws to give about 2 mm clearance after transferring the vertical load.

iii) Check that the isolator bases have remained parallel to the tops and correct as required whilst maintaining the average height of each.

11. Continue this procedure until all four jacking screws are just free of the dimpled loose plates. Check that the isolator bases have remained parallel with the isolator tops correcting any errors as necessary.

12. The jacking screws are to be slackened off and dimpled loose plates should now be removed and the engine left to stand in this condition for a minimum period of 48 hours.

13. Shaft alignment should now be checked. Any correction necessary is to be made by adjustment of the isolator levelling screws - a uniform rate of adjustment again being necessary.

The engine should be reset high, by the allowance advised on the Mounting Adjustment drawing to allow for oil and water and shakedown which will occur when the engine is first run.

14. Since 1998, the underside of the mounting top casting is machined to provide a datum for height measurements. The initial dimension from the underside to the top surface of the soleplate at each corner is to be measured and the average measurement for each mounting recorded; preferably stamped on the engine foot. A sample blank record sheet is given on our DS045 which may be copied and completed if desired.

    On some older mountings, alignment indicator arms may be provided as shown on drawing S002. Again the height from the indicator to the soleplate should be recorded.

15. The main seating chocks for fitting beneath the isolator bases should now be prepared and placed in position together with the isolator H.D. bolts.

NOTE - When resin chocks are to be used, provision must be made by the Shipbuilder to prevent the liquid resin from rising above the level of the underside of the isolator bases and the isolator levelling screws and H.D. bolts are to be suitably greased.

16. Remove the levelling screws from the isolator bases and secure the isolator H.D. bolts. Remove the drive end and side thrust brackets and screws and also the engine jacking brackets.

17. Adjust the centre bolt in the isolator top so that the clearance above the combined overload and rebound washer is as advised by Christie and Grey (usually 4mm). Tighten the lock nut on the centre bolt to a torque of 200 to 220 Nm.

18. The flexible coupling and flexible pipes are to be fitted whereupon the engine may be filled with oil and water and then may be run.

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19. After the engine has been run on full load, shaft alignment must be checked. Changes of approximately 0.5 mm may be expected due to hysteresis and initial creep. Any adjustment considered necessary shall be made by fitting shims between the engine feet and the isolator tops using jacking screws in the engine feet as shown on Drawing No. S002 Figure No. 3a.

Please contact our Technical Department at the address below if you have any problems relating to installation or selection.

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