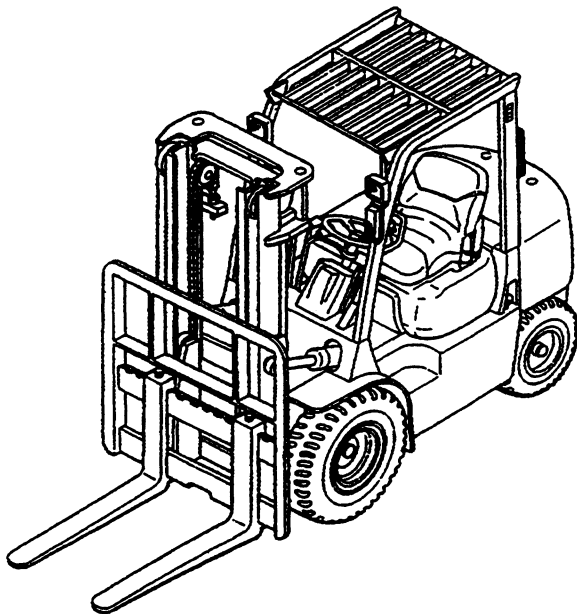


MITSUBISHI
FORKLIFT TRUCKS

SERVICE MANUAL
DIESEL ENGINE

S4Q2
2976—UP

for **FD10**
FD14
FD15
FD18



99719-73100

Quality Makes the Difference

FOREWORD

This service manual is a guide to servicing of Mitsubishi Lift Trucks. The instructions are grouped by systems to serve the convenience of your ready reference.



Long productive life of your lift trucks depends to a great extent on correct servicing — the servicing consistent with what you will learn from this service manual. We hope you read the respective sections of this manual carefully and know all the components you will work on before attempting to start a test, repair or rebuild job.

The descriptions, illustrations and specifications contained in this manual were of the trucks of serial numbers in effect at the time it was approved for printing. Mitsubishi reserves the right to change specifications or design without notice and without incurring obligation.

Whenever a question arises regarding your engine, or this manual, consult your Mitsubishi distributor for the latest available information.

NOTES, CAUTIONS and WARNINGS

NOTES, CAUTIONS and WARNINGS are used in this manual to emphasize important and critical instructions. They are used for the following conditions:

- | | |
|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| NOTE |An operating procedure, condition, etc., essential to highlight. |
|  CAUTION |Operating procedures, practices, etc., which if not strictly observed, will result in damage to or destruction of engine. |
|  WARNING |Operating procedures, practices, etc., which if not correctly followed, will result in personal injury or loss of life. |



WARNING

SAFETY



WARNING

The proper and safe lubrication and maintenance for this machine, recommended by Mitsubishi, are outlined in the OPERATION & MAINTENANCE MANUAL for these machines.

Improper performance of lubrication or maintenance procedures is dangerous and could result in injury or death. Read and understand the OPERATION & MAINTENANCE MANUAL before performing any lubrication or maintenance.

The serviceman or mechanic may be unfamiliar with many of the systems on this machine. This makes it important to use caution when performing service work. A knowledge of the system and/or components is important before the removal or disassembly of any component.

Because of the size of some of the machine components, the serviceman or mechanic should check the weights noted in this Manual. Use proper lifting procedures when removing any components.

Following is a list of basic precautions that should always be observed.

1. Read and understand all warning plates and decals on the machine before operating, lubricating or repairing the product.
2. Always wear protective glasses and protective shoes when working around machines. In particular, wear protective glasses when pounding on any part of the machine or its attachments with a hammer or sledge. Use welders gloves, hood/goggles, apron and other protective clothing appropriate to the welding job being performed. Do not wear loose-fitting or torn clothing. Remove all rings from fingers when working on machinery.
3. Do not work on any machine that is supported only by lift jacks or a hoist. Always use blocks or jack stands to support the machine before performing any disassembly.
4. Lower the forks or other implements to the ground before performing any work on the machine. If this cannot be done, make sure the forks or other implements are blocked correctly to prevent them from dropping unexpectedly.



WARNING

Do not operate this machine unless you have read and understand the instructions in the OPERATOR'S MANUAL. Improper machine operation is dangerous and could result in injury or death.

5. Use steps and grab handles (if applicable) when mounting or dismounting a machine. Clean any mud or debris from steps, walkways or work platforms before using. Always face machine when using steps, ladders and walkways. When it is not possible to use the designed access system, provide ladders, scaffolds, or work platforms to perform safe repair operations.
6. To avoid back injury, use a hoist when lifting components which weigh 23 kg (50 lb.) or more. Make sure all chains, hooks, slings, etc., are in good condition and are of the correct capacity. Be sure hooks are positioned correctly. Lifting eyes are not to be side loaded during a lifting operation.
7. To avoid burns, be alert for hot parts on machines which have just been stopped and hot fluids in lines, tubes and compartments.
8. Be careful when removing cover plates. Gradually back off the last two bolts or nuts located at opposite ends of the cover or device and pry cover loose to relieve any spring or other pressure, before removing the last two bolts or nuts completely.
9. Be careful when removing filler caps, breathers and plugs on the machine. Hold a rag over the cap or plug to prevent being sprayed or splashed by liquids under pressure. The danger is even greater if the machine has just been stopped because fluids can be hot.
10. Always use tools that are in good condition and be sure you understand how to use them before performing any service work.
11. Reinstall all fasteners with same part number. Do not use a lesser quality fastener if replacements are necessary. Do not mix metric fasteners with standard nuts and bolts.

12. If possible, make all repairs with the machine parked on a level, hard surface. Block machine so it does not roll while working on or under machine.
 13. Disconnect battery and discharge any capacitors (electric trucks) before starting to work on machine. Hang "Do Not Operate" tag in the Operator's Compartment.
 14. Repairs, which require welding, should be performed only with the benefit of the appropriate reference information and by personnel adequately trained and knowledgeable in welding procedures. Determine type of metal being welded and select correct welding procedure and electrodes, rods or wire to provide a weld metal strength equivalent at least to that of parent metal.
 15. Do not damage wiring during removal operations. Reinstall the wiring so it is not damaged nor will it be damaged in operation by contacting sharp corners, or by rubbing against some object or hot surface. Do not connect wiring to a line containing fluid.
 16. Be sure all protective devices including guards and shields are properly installed and functioning correctly before starting a repair. If a guard or shield must be removed to perform the repair work, use extra caution.
 17. Always support the mast and carriage to keep carriage or attachments raised when maintenance or repair work is performed, which requires the mast in the raised position.
 18. Loose or damaged fuel, lubricant and hydraulic lines, tubes and hoses can cause fires. Do not bend or strike high pressure lines or install ones which have been bent or damaged. Inspect lines, tubes and hoses carefully. Do not check for leaks with your hands. Pin hole (very small) leaks can result in a high velocity oil stream that will be invisible close to the hose. This oil can penetrate the skin and cause personal injury. Use cardboard or paper to locate pin hole leaks.
 19. Tighten connections to the correct torque. Make sure that all heat shields, clamps and guards are installed correctly to avoid excessive heat, vibration or rubbing against other parts during operation. Shields that protect against oil spray onto hot exhaust components in event of a line, tube or seal failure must be installed correctly.
 20. Relieve all pressure in air, oil or water systems before any lines, fittings or related items are disconnected or removed. Always make sure all raised components are blocked correctly and be alert for possible pressure when disconnecting any device from a system that utilizes pressure.
 21. Do not operate a machine if any rotating part is damaged or contacts any other part during operation. Any high speed rotating component that has been damaged or altered should be checked for balance before reusing.
 22. Caution should be used to avoid breathing dust that may be generated when handling components containing asbestos fibers. If this dust is inhaled, it can be hazardous to your health.
- If dust which may contain asbestos is present, there are several common sense guidelines that should be followed.
- a. Never use compressed air for cleaning.
 - b. Avoid brushing or grinding of asbestos containing materials.
 - c. For clean up, use wet methods or a vacuum equipped with a high efficiency particulate air (HEPA) filter.
 - d. Use exhaust ventilation on permanent machining jobs.
 - e. Wear an approved respirator if there is no other way to control the dust.
 - f. Comply with applicable rules and regulations for the work place.
 - g. Follow environmental rules and regulations for disposal of asbestos.
 - h. Avoid areas where asbestos particles may be in the air.

HOW TO USE THIS MANUAL

Following is a brief summary of the system used in compiling this service manual.

1. The fuel injection pump and governor are covered in the supplement of this manual.
2. The sections of the manual and their contents are listed in the index furnished at the beginning of the manual. The contents of each section are listed in the index furnished at the beginning of the section.
3. The parts read in the texts or shown in the disassembled views are numbered in the disassembly sequence.
4. What to be inspected for during disassembly are indicated in in the disassembled view.
5. The maintenance standards or specifications to be referred to for inspection and repair are indicated in easy-to-refer passages of the texts and also in Section 11 in a tabulated form.
6. The following terms are used in the dimensional and other specifications:

Nominal size Is the named size which has no specified limits of accuracy.

Assembly standard Is the dimension of a part to be attained at the time of assembly, or the standard performance. Its value is rounded to the nearest whole number needed for inspection and is different from the design value.

Standard clearance Is the clearance to be obtained between mating parts at the time of assembly.

Repair limit Is the maximum or minimum dimension specified for a part. A part which has reached this limit must be repaired.

Service limit Is the maximum or minimum dimension specified for a part. A part which has reached this limit must be replaced.

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