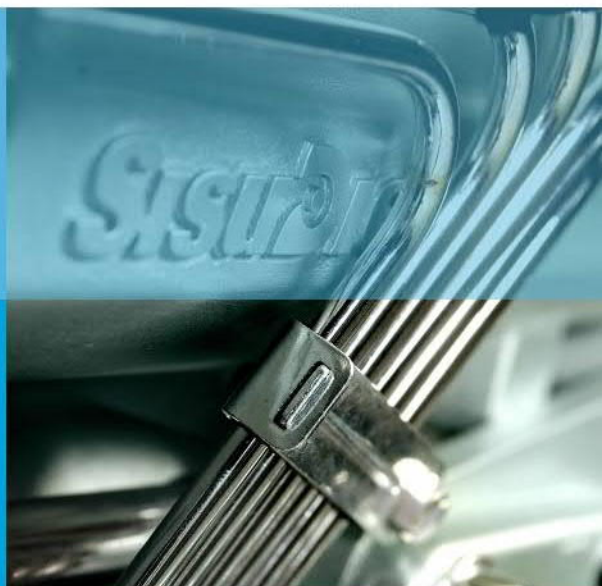


# Workshop Manual

## Fortius Series Engines

8366 62500



**SisuDiesel**

**SisuDiesel**  
**Fortius Series**  
**Engines**

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**Workshop Manual**

03 08

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## GENERAL

### TO THE USER

This Workshop Manual is intended to facilitate workshop operations and repair work.

Fortius series engines (types 33, 44, 66, 74 and 84) are mainly the same in construction, so the same repair instructions usually apply to different engine types. The differences between the various engine types which affect repair work have been mentioned in technical data and repair instructions. All measurements are in millimetres and valid when the temperature of the parts is +20°C, unless otherwise stated.

Before starting the repair work read the safety instructions in the beginning of this book. Make sure that you have all necessary tools, parts and accessories at your disposal. The special tools mentioned in the work instructions are not all essential, but they speed up and facilitate the work and contribute to successful execution of work. An engine which has undergone repairs must be run in just like a new one.

Should the engine require measures not described in this manual, please consult your local agent or the Service Department of Sisu Diesel Inc., Linnavuori, Finland. To facilitate consulting, find out the following facts about the engine before contacting us:

- engine type
- engine number
- application or equipment
- hours operated or kilometres driven.

In this Workshop Manual the regular service procedure is not handled as this is explained in the Fortius series Instruction Manual.

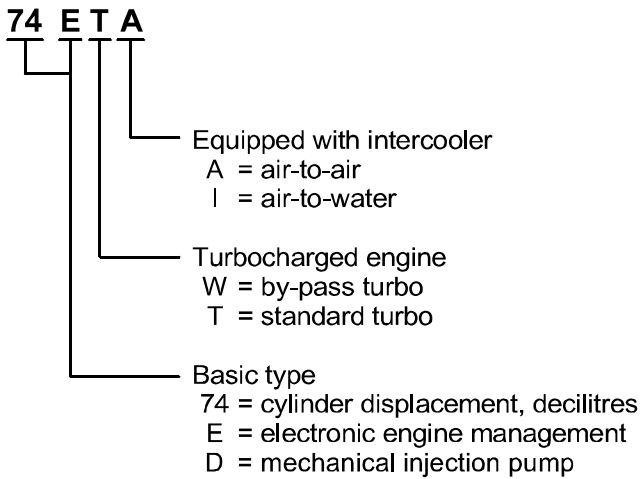
As Sisu Diesel Inc. is continuously developing the products, all rights are reserved without separate notice to change the adjustments, accessories and service- and repair procedure.

## SAFETY INSTRUCTIONS

**In the use and service of the engine there is always the possibility of injury. Before starting the service read and understand the following safety instructions and remarks!**

- ⚠ Do not start a repair work that you do not fully handle.
- ⚠ Make sure that the place of the repair and the surrounding gives the possibility for safe working.
- ⚠ Always be sure of the cleanness and the good order of the repairing place.
- ⚠ Do not use faulty or otherwise useless tools.
- ⚠ Remove all finger rings, chains and watch before starting work.
- ⚠ Use up-to-date protection equipment when you work. For example eye protection as working with compressed air for cleaning, grinding, hammering or other work.
- ⚠ Use lifting device for lifting and transporting heavy (over 20 kg) pieces. make sure of good condition of lifting hooks and chains. The lifting ears on the engine must not be applied by side forces when lifting.
- ⚠ Never work under an engine that is left handling under a lifting device or lifted up by a jack. Always use strong supports before starting the work.
- ⚠ Use only genuine **SisuDiesel** spare parts.
- ⚠ Start the engine only by using the starting switch in the cabin.
- ⚠ Do not start an engine if the protection covers are removed. **Note!** The fan is difficult to see as the engine is running! Make sure that wide clothes or long hair is not caught in the rotating parts of the engine.
- ⚠ If you start the engine indoors, be sure you have proper ventilation.
- ⚠ Never use aerosol type of starting aid! (Risk for explosion.)
- ⚠ When you are operating the engine or working near it, use hearing protectors to avoid noise injuries.
- ⚠ Stop the engine always before service- or repair work.
- ⚠ Avoid touching the exhaust manifold, turbo-charger and the other hot parts of the engine.
- ⚠ Open the radiator cap with care when the engine is hot as the cooling system is pressurised. The cooling liquid and lubrication oil of a hot engine causes injuries when touching the skin.
- ⚠ Open fire, smoking and sparks should not be allowed near the fuel system and batteries. (Specially when loading batteries, explosive.)
- ⚠ Always disconnect the minus (-) wire of the battery when doing service or repair of the electric system.
- ⚠ At temperatures on excess of 300°C, e.g. if the engine is burnt by a fire, the viton seals of the engine (e.g. the undermost o-ring of the cylinder liner) produce very highly corrosive hydrofluoric acid. Do not touch with bare hands, viton seals subjected to abnormally high temperatures. Always use neoprene rubber or heavy duty gloves and safety glasses when decontaminating. Wash the seals and the contaminated area with a 10% calcium hydroxide or other alkali solution. Put all removed material in sealed plastic bags and deliver them to the point stated by the Authorities concerned. **Note!** Never destroy viton-seals by burning!
- ⚠ When checking fuel injectors do not let the jet of high pressure fuel contact your skin. The fuel penetrates the skin causing severe injuries. Contact your doctor immediately!
- ⚠ The fuel, lubricating oil and coolant cause irritation in skin contact for long time.
- 👉 Avoid unnecessary idling of the engine.
- 👉 Do not let oil and other liquids drop into the soil when servicing the engine.
- 👉 All the gaskets of the engine are of non-asbestos material.
- 👉 Be careful when washing the engine with a high pressure washing machine. Do not use high pressure to wash e.g. the electric and fuel equipment or the radiator because they can easily be damaged.

## ENGINE TYPE DESIGNATIONS

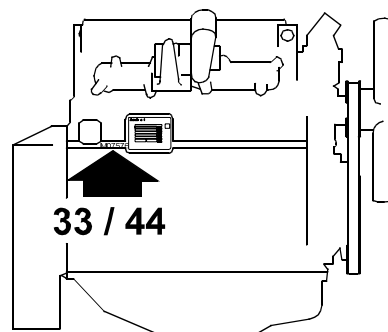
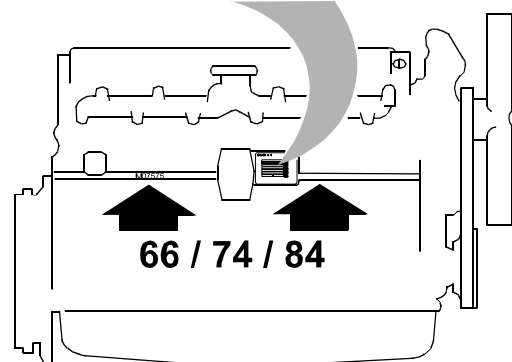


## LOCATION OF THE ENGINE SERIAL NO.

The engine serial number is always stamped on the cylinder block as the picture shows.

The serial number is also marked on the type plate.

|                                |                       |   |   |
|--------------------------------|-----------------------|---|---|
| <b>SisuDiesel</b> Manufacturer |                       | SISU Diesel Inc.<br>FIN-37240 Linnavuori<br>FINLAND | e 17*97/68EA*97/68EA*0016*00<br>This engine conforms to 199 U.S. EPA regulations large nonroad compression ignition engines |
| Type                           | SISUDIESEL 74.234 ETA |   |   |
| Power                          | 135 kW 2200 rpm       |   |   |
| Serial nr                      | M07575                |   |   |
| Valve clearance                | 0,35 mm               |   |   |
| Timing TDC                     | 23 degrees            |   |   |
| Low idle                       | 650 rpm               |   |   |
| Cust. Part nr                  | N 5853420             |   |   |
| EU Family                      | D20AEE                |   |   |
| EPA Family                     | YSIDL07.4C2A          |   |   |
| Displacement: 7.4 l            |                       | Fuel: 2-D fuel oil                                  |   |
| Assembled by:                  |                       |   |   |





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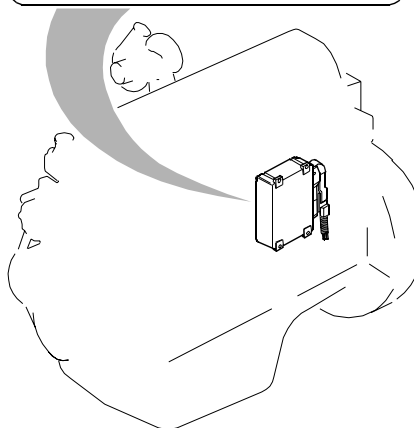
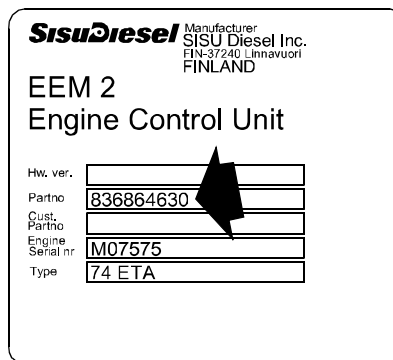
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## MARKING OF THE EEM 2 CONTROL UNIT

The specification of the application is indicated on the type plate of the EEM 2 control unit. This specification must always be stated when ordering a control unit or asking for adjusting settings.

**Note!** The engine meets EU97/68/EC Stage 2 and EPA 40 CFR 89 Tier 2 emission requirements.

Do not fit any components on the engine other than those originally suited for it. The use of other than original SisuDiesel spare parts invalidates the responsibility of Sisu Diesel Inc. on the fulfilment of the emission requirements.



## LIFTING THE ENGINE

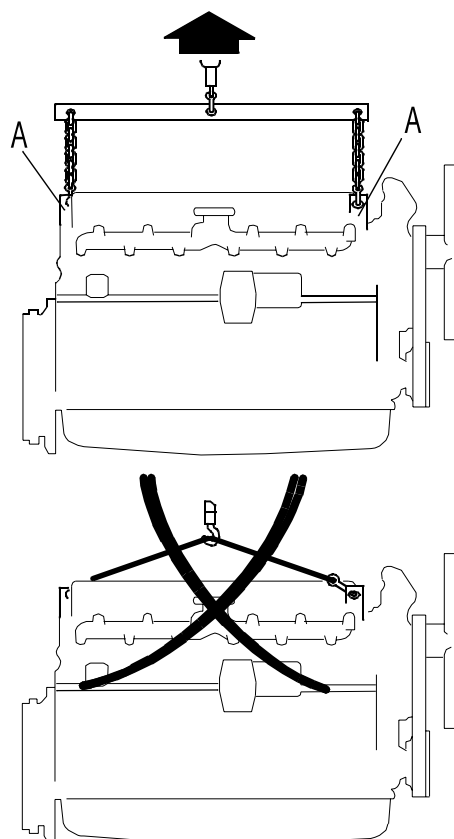
Safe lifting of the engine is done with a lifting device where the lifting force effects the lifting ears vertically.

### Weight of engine

| Engine type | Weight kg *) |
|-------------|--------------|
| 33          | 280          |
| 44          | 340          |
| 66          | 510          |
| 74          | 520          |
| 84          | 660          |

\*) Dry weight without flywheel and electrics

A = Engine lifting ears



**CONSTRUCTION****Technical data**

| <b>Engine type</b>                          | <b>33</b>  | <b>44</b> | <b>66</b>   | <b>74</b> | <b>84</b> |
|---|--|-----------|-------------|-----------|-----------|
| <b>Principal dimensions and data</b>        |  |           |             |           |           |
| Number of cylinders                         | 3  | 4         | 6           | 6         | 6         |
| Displacement (ltr)                          | 3,3  | 4,4       | 6,6         | 7,4       | 8,4       |
| Cylinder bore (mm)                          | 108  | 108       | 108         | 108       | 111       |
| Stroke (mm)                                 | 120  | 120       | 120         | 134       | 145       |
| Combustion                                  | Direct injection                                       |           |             |           |           |
| Injection timing (installation mark)        | Marked on the crankshaft pulley/damper                 |           |             |           |           |
| Valve clearance, intake and exhaust (mm)    | 0,35 (cold or hot)                                     |           |             |           |           |
| Direction of rotation from the engine front | Clockwise  |           |             |           |           |
| <b>Fuel system</b>                          |  |           |             |           |           |
| Injection pump                              |  |           |             |           |           |
| Stanadyne DB4                               | ■  | ■         |             |           |           |
| Bosch VP 30                                 |  | ■         | ■           | ■         |           |
| Bosch VP 44                                 |  |           |             | ■         | ■         |
| Bosch P 7100                                |  |           |             |           | ■         |
| Fuel  | The fuel must be according to norm EN 590, see page 93 |           |             |           |           |
| Injection order                             | 1-2-3  | 1-2-4-3   | 1-5-3-6-2-4 |           |           |
| Feed pressure at idle speed                 | 1,0...1,2 bar  |           |             |           |           |
| Injector                                    | Five-hole nozzle                                       |           |             |           |           |
| Opening pressure of the nozzle              | 270 bar  |           |             |           |           |
| Adjusting pressure of the nozzle            | 278 bar  |           |             |           |           |
| Fuel filters                                |  |           |             |           |           |
| Pre-filter                                  | Stanadyne 30 µ   |           |             |           |           |
| Final filter                                | Stanadyne 5 µ  |           |             |           |           |
| <b>Lubrication system</b>                   |  |           |             |           |           |
| Oil pressure in hot engine at running speed | 2,5...5,0 bar  |           |             |           |           |
| Oil pressure at idle speed, min             | 1,0 bar  |           |             |           |           |
| Oil capacity                                | see page 73  |           |             |           |           |
| Oil quality requirements                    | see page 73  |           |             |           |           |
| <b>Cooling system</b>                       |  |           |             |           |           |
| Number of thermostats                       | 1  | 1         | 1/2         | 2         | 2         |
| Opening temperature                         | Ø 54 mm = 79°C    Ø 67 mm = 83°C                       |           |             |           |           |
| Coolant quality requirements                | see page 74  |           |             |           |           |

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