AGCO SISU POWER

Workshop Manual

4th Generation Engines

8370 79492



MidWestTech | JCB AGCO Sisu Power 4th Gen 33, 44, 49, 66, 74, 84, 98 Engine Service M...

Order the manual at mid-west-tech.com >

CONTENT

GENERAL

TO THE USER 1
SAFETY INSTRUCTIONS 2
ENGINE TYPE DESIGNATIONS 4
LOCATION OF THE ENGINE SERIAL NO. 4
MARKING OF THE EEM 4 CONTROL UNIT 5
LIFTING THE ENGINE 5

CONSTRUCTION
- Technical Data 6
- General 7
- Cylinder Block 7
- Flywheel Housing 7
- Valve Mechanism 7
- Cylinder Head 8
- Crank Mechanism 8
- Timing Gears 9
- Lubricating System 10
- Cooling System 11
- Inlet and Exhaust System 12

TECHNICAL DATA
- Cylinder Block 13
- Cylinder Liners 13
- Cylinder Head 14
- Valves and Rockers 14
- Tappets and Push Rods 15
- Camshaft 15
- Crankshaft 15
- Flywheel 17
- Balancing Unit 18
- Timing Gears 18
- Connecting Rod 18
- Piston, Rings and Pin 19
- Lubricating System 20
- Oil Pump 20
- Coolant Pump 21
- Thermostat 22
- Turbocharger 22

TIGHTENING TORQUES 23

SPECIAL TOOLS
- Cylinder Block 24
- Timing Gear and Flywheel Housing 25
- Cylinder Head and Valve Mechanism 26
- Crank Mechanism 27
- Coolant Pump 28
- Fuel System 29

MidWestTech | JCB AGCO Sisu Power 4th Gen 33, 44, 49, 66, 74, 84, 98 Engine Servi... Order the manual at mid-west-tech.com >

WORK INSTRUCTIONS

1. CYLINDER BLOCK
- 1.1. Measuring cylinder liner wear 31
- 1.2. Removing cylinder liner 31
- 1.3. Checking cylinder block 31
- 1.4. Changing camshaft bushing 32
- 1.5. Fitting plug at camshaft rear end 33
- 1.6. Oversize bushings for camshaft 33
- 1.7. Fitting plug at camshaft rear end (oversize bushings) 34
- 1.8. Fitting cylinder liner 34

2. FLYWHEEL HOUSING
- 2.1. Fitting flywheel housing 37
- 2.2. Changing crankshaft rear oil seal 37

3. CYLINDER HEAD
- 3.1. Removing cylinder head 39
- 3.2. Removing valves 39
- 3.3. Checking cylinder head 40
- 3.4. Changing valve guides 40
- 3.5. Machining valve seat 41
- 3.6. Changing valve seat rings 41
- 3.7. Grinding valves 42
- 3.8. Fitting valves 42
- 3.9. Fitting cylinder head 42

4. VALVE MECHANISM
- 4.1. Reconditioning valve mechanism 45
- 4.2. Changing camshaft / camshaft gear 46
- 4.3. Adjusting valves 47

5. CRANKSHAFT
- 5.1. Removing crankshaft 49
- 5.2. Checking crankshaft 49
- 5.3. Changing crankshaft gears 50
- 5.4. Fitting crankshaft 50
- 5.5. Crankshaft hub piece 51
- 5.6. Checking element of the rubber damper 52
- 5.7. Viscose type Vibration Damper 52

6. CONNECTING RODS AND PISTONS
- 6.1. Removing Pistons Together with Connecting Rods 53
- 6.2. Changing Connecting Rod Bearings 53
- 6.3. Checking Connecting Rod 54
- 6.4. Changing Piston Rings 55
- 6.5. Checking Pistons. 55
- 6.6. Fitting Piston Pin 56
- 6.7. Fitting Piston Together with Connecting Rod. 56

7. COUNTERBALANCE (44- and 49-Engines)
- 7.1. Removing and Disassembling Counterbalance Unit 57
- 7.2. Reconditioning Counterbalance Unit 57
- 7.3. Fitting Counterbalance Unit 58
- 7.4. Changing Crankshaft Gear Rim 58

MidWestTech | JCB AGCO Sisu Power 4th Gen 33, 44, 49, 66, 74, 84, 98 Engine Servi... Order the manual at mid-west-tech.com >

8. FLYWHEEL
8.1. Changing Starter Ring Gear on Flywheel 59
8.2. Fitting Flywheel 59

9. TIMING GEAR ASSEMBLY
9.1. Removing Timing Gear Casing 61
9.2. Fitting Timing Gear Casing 62
9.3. Fitting the Crankshaft Hub, 98 63
9.4. Power Take-off 64
9.5. Fan Drive Device 64

10. LUBRICATION SYSTEM
10.1. Oil Pressure Regulating Valve 65
10.2. Removing and Dismantling Lubricating Oil Pump 65
10.3. Assembling and Fitting Lubricating Oil Pump 66
10.4. Piston Cooling Nozzles 66
10.5. Fitting Oil Sump Gasket 67
10.6. Lubricating Oil Cooler 67
10.7. Lubricating Oil Quality Requirements 68
10.8. Oil Capacities 69
10.8. Closed Crankcase Ventilation (CCV) 69

11. COOLING SYSTEM
11.1. Quality Requirements of Coolant 71
11.2. Thermostat 71
11.3. Reconditioning Coolant Pump 72
11.4. Coolant Pumps with Heavy Duty Bearings 74
11.5. Installing the Cylinder Head Connection Part 76

12. INLET AND EXHAUST SYSTEM
12.1. Checking the Air Cleaner 77
12.2. Checking the Inlet and Exhaust Pipes 77
12.3. Checking the Turbocharger 78
12.4. Fitting the Turbocharger 79
12.5. EGR System 80

13. FUEL SYSTEM
13.1. Technical Data 84
13.2. Bleeding Fuel System 85
13.3. Measuring Fuel Feed Pressure 85
13.4. Inspecting Injectors 86
13.5. High-Pressure Pump 88
13.6. Rail 89
13.7. Fuel Quality Requirements 90
13.8. SCR System 91

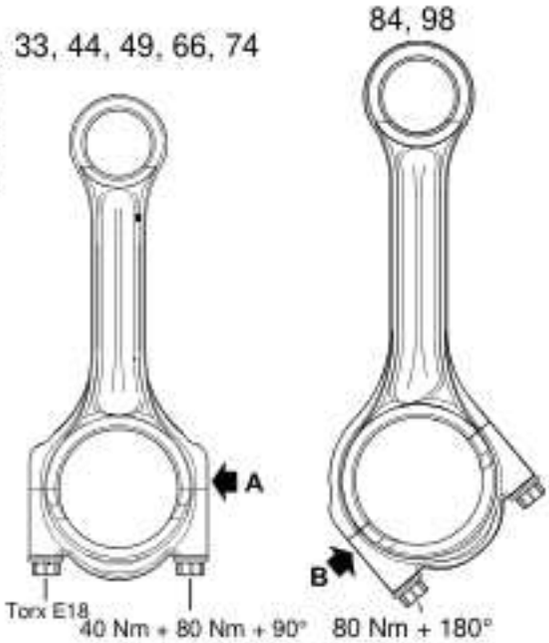
14. EEM4 ENGINE CONTROL SYSTEM
14.1. Construction of the EEM4 95
14.2. EEM4 Engine Control System, Description 96
14.3. Service Tool of the EEM4 System 96
14.4. Changing the Control Unit (ECU) 97
14.5. Wiring Sets 98
14.6. Sensors of the Engine Control System 100

MidWestTech | JCB AGCO Sisu Power 4th Gen 33, 44, 49, 66, 74, 84, 98 Engine Servi... Order the manual at mid-west-tech.com >

6.3. Checking Connecting Rod

The connecting rod is checked in a special fixture, intended for the purpose (e.g. Carl Larsson). See "**Technical data**", point "**Connecting rod**".

The connecting rods are divided into weight classes with intervals of **20 g**. The weight class (a letter) is stamped on the side face of the connecting rod. All the connecting rods in one engine should be of the same weight class, that is to say the greatest permissible weight difference is **20 g**.



Note! Always change screws when opened.

The letters show the weight classes as follows:

33-, 44-, 49-, 66- and 74-Engines

Letter (A)	Weight
F	1935 - 1954 g
V	1955 - 1974 g
X	1975 - 1994 g
Y	1995 - 2014 g
W	2015 - 2034 g
Z	2035 - 2054 g
G	2055 - 2074 g

84- and 98-Engines

Letter (B)	Weight
E	2330 - 2349 g
F	2350 - 2369 g
G	2370 - 2389 g
H	2390 - 2409 g
I	2410 - 2429 g
J	2430 - 2449 g
K	2450 - 2469 g
L	2470 - 2489 g
M	2490 - 2509 g

Spare part connecting rods are only available as kits. The order numbers of the connecting rod kits are:

Engine type	Number of cyl.	Order no.
33	3	8366 40968
44, 49	4	8367 40859
66, 74	6	8368 40928
84	6	8370 79475
98	7	8370 79496

MidWestTech | JCB AGCO Sisu Power 4th Gen 33, 44, 49, 66, 74, 84, 98 Engine Servi... Order the manual at mid-west-tech.com >

12.4. Fitting the Turbocharger

Locate the cause of the defects on the turbocharger. Remedy the fault before fitting the new turbocharger.

In order for the turbocharger to work satisfactorily, it is important that the engine oil is in good condition. Likewise, the oil should be to the correct quality specification. The air filter and oil filter should be serviced according to the Instruction Manual specification.

The adjusting of the EEM4 control system affects definitely to the function of the turbocharger. The adjusting have to be made according to the manufacturer's instructions.

1. Check the tightness of the intake and exhaust manifolds, and that they are securely fastened. Ensure that there are no loose carbon or rust particles, or other foreign objects in the manifolds.

2. Connect the turbocharger to the exhaust manifold and tighten down using a new gasket.

3. Connect the inlet pipe and the exhaust pipe to the turbo.

4. Pour about 0.1 litres of pure engine oil into the bearing housing before attaching the pressure oil pipe. This is very important in order to ensure that the turbocharger is lubricated when starting.

5. Connect the pressure and return oil pipes. Use a new seal. Check that there is no tension in the pipes when tightening.

6. Start the engine and check that there are no leaks.



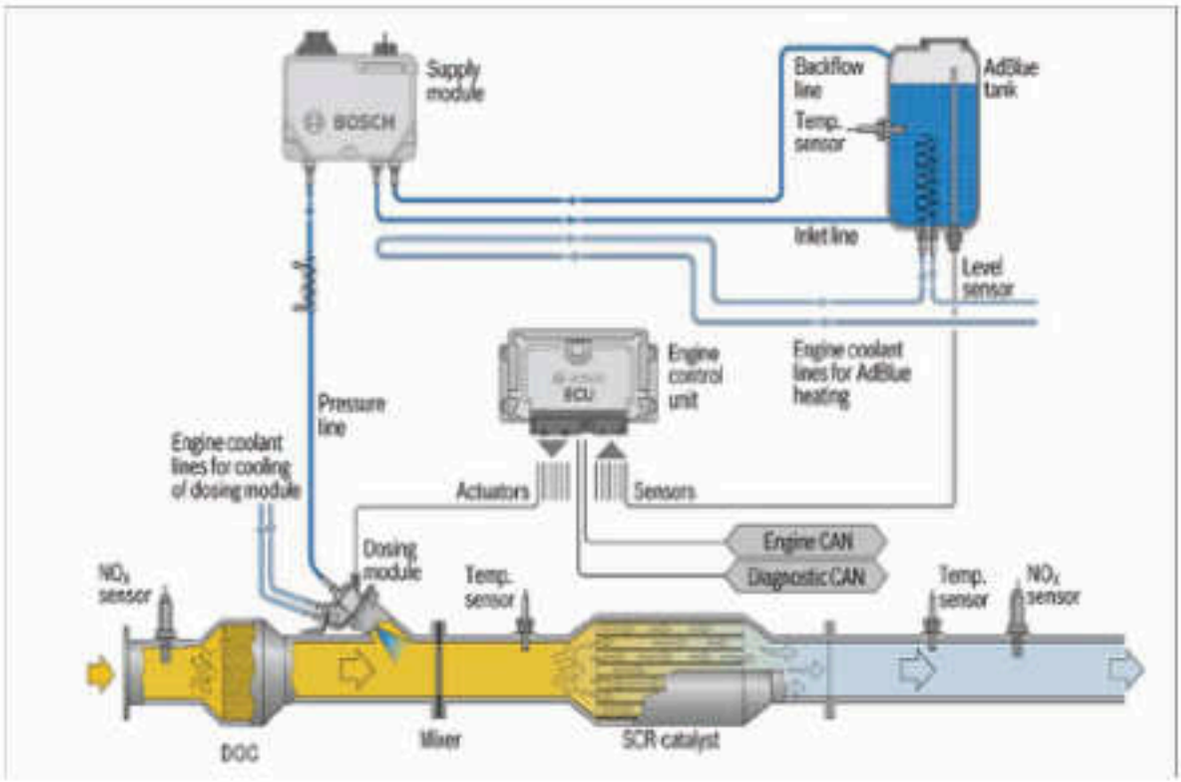
MidWestTech | JCB AGCO Sisu Power 4th Gen 33, 44, 49, 66, 74, 84, 98 Engine Servi... Order the manual at mid-west-tech.com >

13.8.1. SCR system components and their functions

The exhaust gas after-treatment system used is Bosch DENOXTRONIC2.2 (DNOX2.2). DNOX2.2 uses SCR (Selective Catalyst Reduction) technology in order to reduce the exhaust emissions from the engine.

AGCO SISU POWER SCR system consists of EEM4 engine control system and DNOX2.2 SCR system. These two systems are connected together via CAN bus.

See instructions of the appliance for location and instructions for removing and installing the SCR system components.



Supply Module

Supply Module (SM) transfers NOx reductant (DEF) from tank and pressurizes it. It contains also filters for reductant (prefilter and mainfilter).

Dosing Module

Dosing module (DM) is installed in the exhaust pipe between turbocharger and SCR catalyst. DM contains an electrically operated, EEM4-controlled solenoid valve, which will inject the required amount of DEF through the DM nozzle. DEF amount is calculated by EEM4 for optimal reduction of NOx.

Sensors

DNOX2.2 system includes several sensors:

- NOx sensors
- Exhaust temperature sensors
- DEF tank level sensor
- Temperature sensors: DEF tank, Supply Module internal

MidWestTech | JCB AGCO Sisu Power 4th Gen 33, 44, 49, 66, 74, 84, 98 Engine Servi... Order the manual at mid-west-tech.com >