



# JX60 - JX70 - JX80 - JX90 - JX95 MODEL TRACTORS SERVICE MANUAL

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S E R V I C E



# Repair Manual - JX Series Tractors

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## SAFETY RULES

### PAY ATTENTION TO THIS SYMBOL



*This warning symbol points out important messages involving personal safety. Carefully read the safety rules contained herein and follow advised precautions to avoid potential hazards and safeguard your safety and personal integrity.*

*In this manual you will find this symbol together with the following key-words:*

**WARNING** – *it gives warning about improper repair operations and deriving potential consequences affecting the service technician's personal safety.*

**DANGER** – *it gives specific warning about potential dangers for personal safety of the operator or other persons directly or indirectly involved.*



## TO PREVENT ACCIDENTS

Most accidents and personal injuries taking place in workshops are due from non-observance of some simple and essential prudential rule and safety precautions. For this reason, **IN MOST CASES THEY CAN BE AVOIDED.** It suffices to foresee possible causes and act consequently with necessary caution and care.

The possibility that an accident might occur with any type of machines should not be disregarded, no matter how well the machine in question was designed and built.

A wise and careful service technician is the best precautions against accidents.

Careful observance of this only basic precaution would be enough to avoid many severe accidents.

**DANGER:** Never carry out any cleaning, lubrication or maintenance operations when the engine is running.

## SAFETY RULES

### GENERALITIES

- ◇ Carefully follow specified repair and maintenance procedures.
- ◇ Do not wear rings, wristwatches, jewels, unbuttoned or flapping clothing such as ties, torn clothes, scarves, open jackets or shirts with open zips which could get hold into moving parts. We advise to use approved safety clothing such as anti-slipping footwear, gloves, safety goggles, helmets, etc.
- ◇ Never carry out any repair on the machine if someone is sitting on the operator's seat, except

if they are certified operators to assist in the operation to be carried out.

- ◇ Never operate the machine or use attachments from a place other than sitting at the operator's seat.
- ◇ Never carry out any operation on the machine when the engine is running, except when specifically indicated.
- ◇ Stop the engine and ensure that all pressure is relieved from hydraulic circuits before removing caps, covers, valves, etc.
- ◇ All repair and maintenance operations should be carried out with the greatest care and attention.
- ◇ Service stairs and platforms used in a workshop or in the field should be built in compliance with the safety rules in force.
- ◇ Disconnect the batteries and label all controls to warn that the tractor is being serviced. Block the machine and all equipment which should be raised.
- ◇ Never check or fill fuel tanks and accumulator batteries, nor use starting liquid if you are smoking or near open flames as such fluids are flammable.
- ◇ Brakes are inoperative when they are manually released for maintenance purposes. In such cases, the machine should be kept constantly under control using blocks or similar devices.
- ◇ The fuel filling gun should remain always in contact with the filler neck. Maintain this contact until the fuel stops flowing into the tank to avoid possible sparks due to static electricity buildup.

- ◇ Use exclusively specified towing points for towing the tractor. Connect parts carefully. Ensure that foreseen pins and/or locks are steadily fixed before applying traction. Do not stop near towing bars, cables or chains working under load.
- ◇ To transfer a failed tractor, use a trailer or a low loading platform trolley if available.
- ◇ To load and unload the machine from the transportation mean, select a flat area providing a firm support to the trailer or truck wheels. Firmly tie the machine to the truck or trailer platform and block wheels as required by the forwarder.
- ◇ For electrical heaters, battery–chargers and similar equipment use exclusive auxiliary power supplies with a efficient ground to avoid electrical shock hazard.
- ◇ Always use lifting equipment and similar of appropriate capacity to lift or move heavy components.
- ◇ Pay special attention to bystanders.
- ◇ Never pour gasoline or diesel oil into open, wide and low containers.
- ◇ Never use gasoline, diesel oil or other flammable liquids as cleaning agents. Use non–flammable non–toxic proprietary solvents.
- ◇ Wear protection goggles with side guards when cleaning parts using compressed air.
- ◇ Do not exceed a pressure of 2.1 bar, in accordance with local regulations.
- ◇ Do not run the engine in a closed building without proper ventilation.
- ◇ Do not smoke, use open flames, cause sparks in the nearby area when filling fuel or handling highly flammable liquids.
- ◇ Do not use flames as light sources when working on a machine or checking for leaks.
- ◇ Move with caution when working under a tractor, and also on or near a tractor. Wear proper safety accessories: helmets, goggles and special footwear.
- ◇ During checks which should be carried out with the engine running, ask an assistant to seat at the operator’s seat and keep the service technician under visual control at any moment.
- ◇ In case of operations outside the workshop, drive the tractor to a flat area and block it. If working on an incline cannot be avoided, first block the tractor carefully. Move it to a flat area as soon as possible with a certain extent of safety.
- ◇ Ruined or plied cables and chains are unreliable. Do not use them for lifting or trailing. Always handle them wearing gloves of proper thickness.
- ◇ Chains should always be safely fastened. Ensure that fastening device is strong enough to hold the load foreseen. No persons should stop near the fastening point, trailing chains or cables.
- ◇ The working area should be always kept CLEAN and DRY. Immediately clean any spillage of water or oil.
- ◇ Do not pile up grease or oil soaked rags, as they constitute a great fire hazard. Always place them into a metal container.  
Before starting the tractor or its attachments, check, adjust and block the operator’s seat. Also ensure that there are no persons within the tractor or attachment operating range.
- ◇ Do not keep into your pockets any object which might fall unobserved into the tractor’s inner compartments.
- ◇ Whenever there is the possibility of being reached by ejected metal parts or similar, use protection eye mask or goggles with side guards, helmets, special footwear and heavy gloves.
- ◇ Wear suitable protection such as tinted eye protection, helmets, special clothing, gloves and footwear whenever it is necessary to carry out welding procedures. All persons standing in the vicinity of the welding process should wear tinted eye protection. NEVER LOOK AT THE WELDING ARC IF YOUR EYES ARE NOT SUITABLY PROTECTED.
- ◇ Metal cables with the use get frayed. Always wear adequate protections (heavy gloves, eye protection, etc.)
- ◇ Handle all parts with the greatest caution. Keep your hands and fingers far from gaps, moving gears and similar. Always use approved protective equipment, such as eye protection, heavy gloves and protective footwear.

**START UP**

- ◇ Never run the engine in confined spaces which are not equipped with adequate ventilation for exhaust gas extraction.
- ◇ Never bring your head, body, arms, legs, feet, hands, fingers near fans or rotating belts.

**ENGINE**

- ◇ Always loosen the radiator cap very slowly before removing it to allow pressure in the system to dissipate. Coolant should be topped up only when the engine is stopped or idle if hot.
- ◇ Do not fill up fuel tank when the engine is running, mainly if it is hot, to avoid ignition of fires in case of fuel spilling.
- ◇ Never check or adjust the fan belt tension when the engine is running.  
Never adjust the fuel injection pump when the tractor is moving.
- ◇ Never lubricate the tractor when the engine is running.

**ELECTRICAL SYSTEMS**

- ◇ If it is necessary to use auxiliary batteries, cables must be connected at both sides as follows: (+) to (+) and (–) to (–). Avoid short-circuiting the terminals. **GAS RELEASED FROM BATTERIES IS HIGHLY FLAMMABLE.** During charging, leave the battery compartment uncovered to improve ventilation. Avoid checking the battery charge by means of “jumpers” made by placing metallic objects across the terminals. Avoid sparks or flames near the battery area. Do not smoke to prevent explosion hazards.
- ◇ Prior to any service, check for fuel or current leaks. Remove these leaks before going on with the work.
- ◇ Do not charge batteries in confined spaces. Ensure that ventilation is appropriate to prevent accidental explosion hazard due to build-up of gases released during charging.
- ◇ Always disconnect the batteries before performing any type of service on the electrical system.

**HYDRAULIC SYSTEMS**

- ◇ Some fluid slowly coming out from a very small port can be almost invisible and be strong enough to penetrate the skin. For this reason, **NEVER USE YOUR HANDS TO CHECK FOR LEAKS**, but use a piece of cardboard or a piece of wood to this purpose. If any fluid is injected into the skin, seek medical aid immediately. Lack of immediate medical attention, serious infections or dermatosis may result.
- ◇ Always take system pressure readings using the appropriate gauges.

**WHEELS AND TYRES**

- ◇ Check that the tyres are correctly inflated at the pressure specified by the manufacturer. Periodically check possible damages to the rims and tyres.
- ◇ Keep off and stay at the tyre side when correcting the inflation pressure.
- ◇ Check the pressure only when the tractor is unloaded and tyres are cold to avoid wrong readings due to over-pressure. Do not reuse parts of recovered wheels as improper welding, brazing or heating may weaken the wheel and make it fail.
- ◇ Never cut, nor weld a rim with the inflated tyre assembled.
- ◇ To remove the wheels, block both front and rear tractor wheels. Raise the tractor and install safe and stable supports under the tractor in accordance with regulations in force.
- ◇ Deflate the tyre before removing any object caught into the tyre tread.
- ◇ Never inflate tyres using flammable gases as they may originate explosions and cause injuries to bystanders.

**REMOVAL AND INSTALLATION**

- ◇ Lift and handle all heavy components using lifting equipment of adequate capacity. Ensure that parts are supported by appropriate slings and hooks. Use lifting eyes provided to this purpose. Take care of the persons near the loads to be lifted.
- ◇ Handle all parts with great care. Do not place your hands or fingers between two parts. Wear approved protective clothing such as safety goggles, gloves and footwear.
- ◇ Do not twine chains or metal cables. Always wear protection gloves to handle cables or chains.

**CONSUMABLES**

COMPONENT TO BE FILLED OR TOPPED UP	QUANTITY			CASE IH RECOMMENDED PRODUCTS	INTERNATIONAL SPECIFICATION
	litres/dm <sup>3</sup>	US gal	IMP gal		
Cooling system: JX60, JX70 models JX80, JX90, JX95 models with cab : JX60, JX70 models JX80, JX90, JX95 models	12 14 14 16	3.2 3.7 3.7 4.2	2.64 3.08 3.1 3.5	Water & liquid <b>AKCELA PREMIUM ANTI-FREEZE</b> <b>50% + 50%</b>	–
Windscreen washer bottle .....	2	0.53	0.44	Water & cleaning liquid	–
Fuel tank	90	23.8	19.8	Decanted and filtered diesel fuel	–
Additional fuel tank (Optional) .....	27	7.1	5.94		–
Engine sump: without filter : JX60, JX70 models JX80, JX90, JX95 models with filter : JX60, JX70 models JX80, JX90, JX95 models	7.6 10.5 8.3 11.2	1.98 2.77 2.19 2.96	1.67 2.31 1.83 2.46	<b>AKCELA No.1 ENGINE OIL</b>  <b>API CH-4 * ACEA E5 * MB 228.3 * CUMMINS CES 200072/20076/20077</b>	API CF-4/SG CCMC D4 MIL-L-2104E
Brake control circuit .....	0.4	0.1	0.09	<b>AKCELA LHM FLUID Oil</b>	ISO 7308
Hydrostatic steering circuit .....	2.0	0.5	0.44	Oil <b>AKCELA NEXPLORE</b>	API GL4 ISO 32/46 SAE 10W-30
Front axle: – axle housing : JX60, JX70 models JX80, JX90, JX95 models – final drives (each) : JX60, JX70 HP models JX80, JX90, JX95 models	4.5 7.0 0.8 1.25	1.2 1.8 0.2 0.3	0.99 1.54 0.18 0.28		
Rear transmission (bevel drive and brakes), gearbox, hydraulic lift and PTO JX60, JX70, JX80, JX90, JX95 models .....	46	12.15	10.12		
– with synchro-reverser: JX60, JX70, JX80, JX90, JX95 models .....	46	12.15	10.12		
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GENERAL SPECIFICATIONS	3 cylinders	4 cylinders
<b>Engine type:</b>		
- mod. JX60 normally aspirated - type 8035.05D.939 (BOSCH pump) .....	see data pages 6-7	-
- mod. JX70 turbocharged - type 8035.25C.939 (BOSCH pump) .....	see data pages 8-9	-
- mod. JX80 normally aspirated - type 8045.05R.939 (BOSCH pump) .....	-	see data pages 10-11
- mod. JX90 turbocharged - type 8045.25.939 (BOSCH pump) .....	-	see data pages 12-13
- mod. JX95 turbocharged - type 8045.25L.939 (BOSCH pump) .....	-	see data pages 14-15
Cycle .....	Diesel, 4-stroke	
Fuel injection .....	Direct	
Number of cylinders in line .....	3	4
Cylinder liners .....		dry force-fitted in cylinder block
Piston diameter		
- mod. JX60 .....	104 mm (4.0945 in.)	-
- mod. JX70 .....	104 mm (4.0945 in.)	-
- mod. JX80 .....	-	104 mm (4.0945 in.)
- mod. JX90 .....	-	104 mm (4.0945 in.)
- mod. JX95 .....	-	104 mm (4.0945 in.)
Piston stroke .....	115 mm (4.5276 in.)	
Total displacement:		
- mod. JX60-JX70 .....	2931 cm <sup>3</sup> (178.8496 in. <sup>3</sup> )	-
- mod. JX80-JX90-JX95 .....	-	3908 cm <sup>3</sup> (238.4662 in. <sup>3</sup> )
Compression ratio .....	17 to 1 normally aspirated 16.5 to 1 turbocharged	
Maximum power 2000/25 EC at 2500 rpm:		
- mod. JX60 .....	43.4 kW (59 hp)	-
- mod. JX70 .....	50.7 kW (69 hp)	-
- mod. JX80 .....	-	58.8 kW (80 hp)
- mod. JX90 .....	-	65.5 kW (89 hp)
- mod. JX95 .....	-	69.1 kW (94 hp)
Maximum power ECE R 24 at 2500 rpm:		
- mod. JX60 .....	41.2 kW (56 hp)	-
- mod. JX70 .....	47.8 kW (65 hp)	-
- mod. JX80 .....	-	55.9 kW (76 hp)
- mod. JX90 .....	-	63.3 kW (86 hp)
- mod. JX95 .....	-	66.9 kW (91 hp)
Fast idling speed .....	2500 rpm.	
Maximum torque (daNm) at 1500 rpm: JX60 model .....	20.7 (152.6753 ft lb)	-
Maximum torque (daNm) at 1500 rpm: JX70 model .....	25.0 (184.3905 ft lb)	-
Maximum torque (daNm) at 1500 rpm: JX80 model .....	-	27.9 (205.9778 ft lb)
Maximum torque (daNm) at 1500 rpm: JX90 model .....	-	32.0 (236.0194 ft lb)
Maximum torque (daNm) at 1500 rpm: JX95 model .....	-	33.7 (248.5584 ft lb)
Number of main bearings .....	4	5
Sump .....	Structural, cast iron	

(continued)

GENERAL SPECIFICATIONS	3 cylinders	4 cylinders
<b>Lubrication</b> ..... Pump drive ..... Engine speed/oil pump speed ratio ..... Oil cleaning ..... Normal oil pressure, with engine hot and at fast idling speed . Pressure relief valve ..... Valve opening pressure ..... For further lubrication data .....	forced, with gear pump camshaft 2:1 mesh filter on oil intake and cartridge filter on delivery line 2.9 to 3.9 bar (42.06 to 56.56 psi) built into pump housing 3.5 bar (50.76 psi) See page 23	
<b>Cooling system</b> ..... Radiator on JX60, JX70, JX80 and JX90 models ..... Radiator on JX95 models ..... Fan, attached to coolant pump pulley ..... Coolant pump ..... Engine speed/coolant pump speed ratio ..... Temperature control ..... Coolant temperature gauge ..... Temperature ranges corresponding to each section: - initial white section ..... - middle green section ..... - final red section ..... For further cooling system data .....	coolant circulation three-row vertical pipes with copper fins four-row vertical pipes with copper fins four-blade steel exhauster fan 6-blade steel exhauster fan (JX95) centrifugal vane-type 1:1,403 Thermostat coloured scale divided into three sections from 30° to 65° C (86° to 149° F) from 65° to 105° C (149° to 221° F) from 105° to 115° C (221° to 300.2° F) See page 23	
<b>Rev counter</b> ..... Rev counter drive ..... Hour counter calibrated for engine speed of .....	incorporated in control panel from gear on camshaft 1800 rpm.	

(Continued)



(continued)

GENERAL SPECIFICATIONS	3 cylinders	4 cylinders
<b>Timing</b> .....  Intake: - start: before T.D.C ..... - end: after B.D.C ..... Exhaust: - start: before B.D.C ..... - end: after T.D.C ..... Valve clearance for timing check ..... Valve clearance for normal running (engine cold): - intake ..... - exhaust ..... For further timing data .....	overhead valves operated by a camshaft located in the engine block through tappets, pushrods and rockers. Camshaft is driven by the crankshaft through helical gears.  12° 31°  50° 16°  0.45 mm (0.0177 in.)  0.30 ± 0.05 mm (0.0118 ± 0.0020 in.) 0.30 ± 0.05 mm (0.0118 ± 0.0020 in.)  See page 20	
<b>Fuel System</b> Air cleaning .....  Fuel pump .....  Fuel filter .....  Minimum fuel flow rate with pump shaft rotating at 1600 rev/min.  Operated by eccentric cam .....  BOSCH Injection pump .....  All-speed governor, incorporated in pump: BOSCH  Automatic advance regulator, incorporated in pump: BOSCH  For further fuel system data:  For fixed advance (pump setting for start of delivery before TDC) – Pressure setting – Injection order, and other information regarding the BOSCH pump	dual cartridge dry air filter, with clogged filter indicator with centrifugal pre-filter and automatic dust ejector.  with double diaphragm  mesh filter in fuel supply pump, and replaceable cartridge on delivery line to injection pump.  100 litres/hour  on camshaft  rotary distributor type  centrifugal counterweights  hydraulic  see pages 5 to 15  refer to the data for the relevant engine type in the tables from page 6 to page 14.	

## DATA

Turbocharger (Model JX95): - ..... GARRETT type .....		T25			
Fuel injection pump ..... BOSCH pump: - ..... JX60 model .. - ..... JX70 model ..... - ..... JX80 model ..... - ..... JX90 model ..... - ..... JX95 model ..... Direction of rotation ..... Injection order .....		distributor type with incorporated speed governor and automatic advance regulator  VE 3/12 F 1250 L 976 - 504054473 VE 3/12 F 1250 L 977 - 504054474 VE 4/12 F 1250 L 985 - 504041416 VE 4/12 F 1250 L 982 - 504042214 VE 4/12 F 1250 L 952 - 504042718  anticlockwise  1-2-3 (JX60 and JX70) 1-3-4-2 (JX80, JX90 and JX95)			
Fuel injectors: BOSCH ..... - Nozzle holder type ..... - Nozzle type ..... Number of nozzle holes ..... Diameter of nozzle orifices ..... Pressure setting .....	5  248-272 bar (3596.9176-3945.0064 psi)	6  248-272 bar (3596.9176-3945.0064 psi)			
	JX70	JX95	JX60	JX80	JX90
Fuel delivery lines - BOSCH pump - Type ..... - Dimensions ..... mm	-	-	-	-	-



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