

[Click here to get the complete manual](#)

**SERVICE
MANUAL
RIPARAZIONI**

SERVICE MANUAL

WE190

WE210 - WE210 Industrial

WE230 - WE230 Industrial

WE190

WE210

WE210 Industrial

WE230

WE230 Industrial

~~Excavators
Backhoe Loaders~~

Wheeled Excavators

~~Disassembly Instructions~~

~~Disassembly Instructions~~



TO THE READER

This manual has been printed for a skilful engineer to supply necessary technical information to carry out service operations on this machine.

Read carefully this manual to collect correct information relevant to repair procedures.

For any question or remark, or in case of any error relevant the contents of this manual, please contact:

CNH ITALIA S.p.A.
Viale delle Nazioni, 55
41100 MODENA - Italy

REFERENCES

Beyond this Service Manual, also refer to documents hereunder listed:

- Operator's Manual
 - Parts Catalogue
-

COMPLETE SERVICE MANUAL

The complete Service Manual consists of two volumes:

- WE190
WE210 - WE210 Industrial
WE230 - WE230 Industrial
Service Manual "Wheeled Excavators"
- WE190
WE210 - WE210 Industrial
WE230 - WE230 Industrial
Service Manual "Engine"

The Service Manuals for "Wheeled Excavators" and "Engine" contain the necessary technical information to carry out service and repair on machine and on engine, necessary tools to carry out those operations and information on service standard, on procedures for connection, disconnection, disassembly and assembly of parts.

The Service Manual which covers the models WE190 - WE210 - WE210 Industrial - WE230 - WE230 Industrial consists of the following volumes, which can be identified through their print number as stated below:

VOLUME	MACHINE TYPE	PRINT NUMBER
Service Manual - "Wheeled Excavators"	WE190 WE210 - WE210 Industrial WE230 - WE230 Industrial	84291045A
Service Manual - "Engine"	WE190 WE210 - WE210 Industrial WE230 - WE230 Industrial	87704086A

TO PREVENT ACCIDENTS

The majority of accidents and injuries which occur in industry, at home or on the road, are caused by the failure of some individual to follow simple and fundamental safety rules or precautions. For this reason MOST ACCIDENTS CAN BE PREVENTED by recognizing the real cause and taking the necessary precautions, before the accident occurs.

Regardless of the care used in design and construction of any type of equipment, there may be conditions that cannot be completely safeguarded against, without interfering with reasonable accessibility and efficient operation.

A careful operator and / or technician is the best insurance against accidents. The complete observance of one simple rule would prevent many thousands of serious injuries each year.

This rule is: never attempt to clean, lubricate or adjust a machine while it is in motion.

⚠ WARNING

Before carrying out any maintenance operation, adjustment and or repair on machines equipped with attachments, controlled hydraulically or mechanically, make sure that the attachment is lowered and safely set on the ground. If it is necessary to have the equipment partially or fully raised to gain access to certain items, be sure the equipment is suitably supported by means other than the hydraulic lift cylinders, cable and /or mechanical device used for controlling the equipment.

CNH S.p.A.

Viale delle Nazioni, 55
41100 MODENA - Italy

All rights reserved.

Reproduction of text or illustrations, in whole or in part, is strictly prohibited.

SAFETY INSTRUCTION



This warning symbol points out important messages involving your safety.

Carefully read the safety rules contained herein and follow advised precautions to avoid potential hazards and to safeguard your safety and personal integrity.

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

▲ DANGER

With specific warnings about potential dangers for the operator's or other persons integrity directly or indirectly involved.

▲ WARNING

This symbol warns about the possibility of potential damages to the machine that can involve the operator's safety.

The non compliance with the warning preceded by the above mentioned key-words (**DANGER** and **WARNING**) can cause serious accidents or even the death of the persons involved.

Moreover, this Manual contains some instructions with texts in italics, preceded by the words **NOTE** and **CAUTION**:

NOTE: it emphasizes and underlines to the operator the correct technique or correct procedure to follow.

▲ CAUTION

It warns the operator of a possible hazard of machine damage in case he does not follow a determined procedure.

INDEX

SECTION 01 - SAFETY PRECAUTIONS

1. INTRODUCTION	2
1.1 DESIGNATED USE	2
2. GENERAL SAFETY INSTRUCTIONS	3
3. USE INSTRUCTION	12
3.1 LEVEL OF VIBRATIONS TRANSMITTED TO THE OPERATOR	13
3.2 NOISE LEVELS	14
3.3 TRAVELLING ON PUBLIC ROADS	15

SECTION 02 - CONTROLS AND INSTRUMENTS

1. SWITCHES AND PUSH-BUTTONS	1
2. CONTROLS AND PEDALS	11
3. MULTI-FUNCTION DISPLAY	18

SECTION 03 - TECHNICAL SPECIFICATIONS

1. MAIN COMPONENTS	1
1.1 2-PIECE BOOM ATTACHMENT (WE190)	1
1.2 2-PIECE BOOM ATTACHMENT (WE210 - WE230)	2
1.3 MONOBOOM ATTACHMENT (WE190 - WE210 - WE230)	3
1.4 HANDLING ATTACHMENT (WE210 Industrial - WE230 Industrial)	4
2. DIMENSIONS - OPERATING WEIGHTS	5
2.1 WE190 MODELS	5
2.2 WE210 MODELS	9
2.3 WE230 MODELS	13
2.4 WE210 Industrial MODELS	17
2.5 WE230 Industrial MODELS	18
3. DIGGING PERFORMANCE	19
3.1 WE190 MODELS	19
3.2 WE210 MODELS	23
3.3 WE230 MODELS	27
3.4 WE210 Industrial MODELS	31
3.5 WE230 Industrial MODELS	32
4. LIFTING CAPACITIES	33
4.1 WE190 MODELS	33
4.2 WE210 MODELS	35
4.3 WE230 MODELS	37
4.4 WE210 Industrial MODELS	39
4.5 WE230 Industrial MODELS	40
5. HYDRAULIC SYSTEM	41
5.1 PUMPS	41
6. SLEWING	42
6.1 SLEWING GEARBOX	42
7. TRAVEL	43
7.1 TYRES	44

INDEX

8. BRAKES	44
9. STEERING.....	44
10. ELECTRICAL SYSTEM.....	45
11. BUCKETS	45
11.1 BUCKETS - WE190	45
11.2 BUCKETS - WE210	45
11.3 BUCKETS - WE230	45
12. TIGHTENING TORQUES	46
13. FUEL SYSTEM	46
14. ENGINE	46
15. SUPPLY SUMMARIZING CHART	47

SECTION 04 - UPPER STRUCTURE

1. MAIN COMPONENTS	1
2. SLEWING BEARING	3
3. SLEWING GEARBOX.....	10
3.1 TECHNICAL SPECIFICATIONS.....	10
3.2 REMOVAL AND INSTALLATION	14
3.3 DISASSEMBLY AND ASSEMBLY.....	17
3.4 SPECIAL TOOLS.....	45
3.5 TROUBLESHOOTING.....	49
4. MULTI-COOLER	51
4.1 TECHNICAL SPECIFICATIONS.....	52
4.2 REMOVAL AND INSTALLATION EXPANSION TANK.....	54
4.3 COOLANT LEVEL, TOP-UP AND CHANGE	55
4.4 REMOVAL AND INSTALLATION OF FAN AND HYDRAULIC MOTOR	57
5. HYDRAULIC PUMPS	60
6. MUFFLER	61
7. HYDRAULIC OIL TANK.....	62
7.1 OIL RETURN FILTER.....	63
7.2 LEVEL CHECK AND TOP-UP	64
7.3 OIL CHANGE AND CLEANING.....	65
7.4 BLEEDING VALVE	68
8. AIR FILTER.....	69
9. COUNTERWEIGHT	69
9.1 COUNTERWEIGHT DISASSEMBLY	70
10. FUEL SYSTEM	72
10.1 FUEL TANK	74
10.2 FUEL FILTERS	76
11. CAB AND OPERATOR'S SEAT	78
11.1 CAB ASSEMBLY	91
11.2 CAB AT VARIABLE HEIGHT (WE210 Industrial - WE230 Industrial)	97
12. CENTRALIZED LUBRICATION	98
12.1 SAFETY INSTRUCTIONS	98
12.2 OPERATION.....	98
12.3 MAINTENANCE	99

INDEX

SECTION 05 - UNDERCARRIAGE

1.	UNDERCARRIAGE COMPONENTS.....	1
2.	REAR RIGID AXLE.....	2
2.1	TECHNICAL SPECIFICATIONS	3
2.2	DISASSEMBLY	7
2.3	DISASSEMBLY AND ASSEMBLY	9
2.4	TROUBLESHOOTING.....	88
2.5	SPECIAL TOOLS	90
3.	TRAVEL MOTOR	91
3.1	TECHNICAL SPECIFICATIONS	91
3.2	DISASSEMBLY AND ASSEMBLY	92
3.3	DISASSEMBLY AND ASSEMBLY	93
4.	CARDAN SHAFT	104
4.1	DISASSEMBLY AND ASSEMBLY	105
5.	FRONT STEERING AXLE.....	108
5.1	TECHNICAL SPECIFICATIONS	109
5.2	DISASSEMBLY AND ASSEMBLY	112
5.3	DISASSEMBLY AND ASSEMBLY	115
5.4	TROUBLESHOOTING.....	187
5.5	SPECIAL TOOLS	189
6.	WHEELS AND TYRES	190
6.1	TYRES.....	191
7.	BLADE	194
7.1	BLADE CYLINDER.....	196
8.	AXLE FLOATING LOCKING CYLINDERS	204
8.1	TECHNICAL SPECIFICATIONS	205
8.2	DISASSEMBLY AND ASSEMBLY	206
8.3	AIR BLEEDING.....	207
8.4	DISASSEMBLY AND ASSEMBLY	208
8.5	TROUBLESHOOTING.....	210
9.	STABILIZERS.....	211
9.1	STABILIZER CYLINDERS.....	214
9.2	TROUBLESHOOTING.....	224
10.	LEFT LADDER	226
11.	RIGHT LADDER AND TOOL STORAGE BOX.....	227
12.	ROTARY CONTROL VALVE AND ELECTRIC ROTOR	228
12.1	TECHNICAL SPECIFICATIONS	228
12.2	DISASSEMBLY AND ASSEMBLY	229
12.3	ROTARY CONTROL VALVE OVERALL	231
12.4	ELECTRIC ROTOR.....	233

SECTION 06 - FRONT ATTACHMENT

1.	TYPES OF FRONT ATTACHMENT	2
2.	HYDRAULIC CYLINDERS.....	4
2.1	BOOM CYLINDER.....	7
2.2	DIPPER CYLINDER (WE190 - WE210 - WE230).....	17
2.3	DIPPER CYLINDER (WE210 Industrial - WE230 Industrial).....	27
2.4	BUCKET CYLINDER.....	37

INDEX

2.5 BOOM ADJUSTING CYLINDER	47
2.6 SPECIAL TOOLS.....	56
3. BUCKETS	57
3.1 BUCKETS - WE190.....	57
3.2 BUCKETS - WE210.....	57
3.3 BUCKETS - WE230.....	57
3.4 BUCKET TEETH - CHANGE	59

SECTION 07 - STEERING SYSTEM

1. OPERATION.....	1
2. POWER STEERING	3
2.1 TECHNICAL SPECIFICATIONS.....	3
2.2 OPERATION.....	4
2.3 DISASSEMBLY AND ASSEMBLY.....	5
3. PRIORITY VALVE	23
4. TROUBLESHOOTING.....	24

SECTION 08 - BRAKE SYSTEM

1. OPERATION.....	1
2. SERVICE BRAKE	4
3. PARKING BRAKE.....	7
4. PEDAL BRAKE VALVE	8
5. ACCUMULATORS.....	9
5.1 MAINTENANCE.....	10
6. TROUBLESHOOTING.....	11

SECTION 09 - HYDRAULIC SYSTEM

1. HYDRAULIC SYSTEM	1
2. HYDRAULIC SYSTEM DIAGRAMS	5
2.1 HYDRAULIC SYSTEM DIAGRAMS - UPPER STRUCTURE	5
2.2 HYDRAULIC SYSTEM DIAGRAMS - UNDERCARRIAGE	27
2.3 HYDRAULIC SYSTEM DIAGRAMS BLADE AND/OR STABILIZERS	28
3. HYDRAULIC PUMPS	31
3.1 VARIABLE-FLOW RATE TWIN PUMP	32
3.2 ROTATION PUMP	45
3.3 GEAR PUMP	63
4. UPPER STRUCTURE CONTROL VALVE	64
5. UNDERCARRIAGE CONTROL VALVE	76
6. PILOT CONTROL ASSY	78
6.1 PILOT CONTROL ASSY SOLENOID VALVES.....	83
7. ROTATION SYSTEM.....	87
7.1 SLEWING GEARBOX.....	89
8. TRAVEL	91
8.1 TRAVEL MOTOR.....	94
9. STABILIZATION HYDRAULIC SYSTEM	100
10. BOOM HYDRAULIC SYSTEM.....	105

INDEX

11. HYDRAULIC SYSTEM OF BUCKET	111
12. HYDRAULIC SYSTEM OF DIPPER	116
13. HYDRAULIC SYSTEM OF 2-PIECE BOOM	120
14. HYDRAULIC SYSTEM WITH COMBINATION OF DIFFERENT FUNCTIONS (BOOM, 2-PIECE BOOM, DIPPER AND BUCKET)	126
15. HYDRAULIC SYSTEM OF HAMMER (WITH 2-PIECE BOOM)	128
16. HYDRAULIC SYSTEM OF HAMMER AND SHEARS (WITH 2-PIECE BOOM)	131
17. HYDRAULIC SYSTEM OF SHEARS (WITH 2-PIECE BOOM)	136
18. HYDRAULIC SYSTEM OF HAMMER (WITH MONOBOOM)	139
19. HYDRAULIC SYSTEM OF HAMMER AND SHEARS (WITH MONOBOOM)	142
20. HYDRAULIC SYSTEM OF SHEARS (WITH MONOBOOM)	147
21. TROUBLESHOOTING	150

SECTION 10 - ELECTRICAL SYSTEM

1. ELECTRICAL DIAGRAMS	1
1.1 ELECTRICAL DIAGRAMS (WE190 - WE210 - WE230)	1
1.2 ELECTRICAL DIAGRAMS (WE210 Industrial - WE230 Industrial)	39
2. FUSES	77
2.1 FUSES - REPLACEMENT	79
2.2 BATTERIES - REPLACEMENT	80
2.3 CLAMPS CHECK	81
2.4 CHARGE	81
3. BULBS	82
3.1 CAB LIGHT	82
3.2 FRONT WORK LIGHTS	82
3.3 BOOM WORK LIGHT	83
3.4 TRAVEL LIGHT	83
3.5 TURN SIGNAL LIGHTS	84
3.6 REAR FLOODLAMPS	84
4. TROUBLESHOOTING	85

SECTION 11 - ELECTRONICS

1. MAIN COMPONENTS	1
2. COMPONENTS OF LINE 1	3
2.1 MULTI-FUNCTION DISPLAY	3
2.2 CENTRAL UNIT	3
2.3 KEY-PAD MODULES	6
2.4 POWER CONTROL SYSTEM	7
2.5 DIAGNOSTICS SOCKET	9
2.6 ELECTRO-HYDRAULIC CONTROLLER	9
3. COMPONENTS OF LINE CAN 2	13
3.1 OPERATION	13
3.2 CENTRAL UNIT	14
3.3 HYDRAULIC CONTROL LEVERS	14
3.4 TRAVEL PEDAL	19
3.5 ATTACHMENT PEDAL (FOR HAMMER AND ADJUSTING CYLINDER) (WE190 - WE210 - WE230, no Industrial models)	20
3.6 POWER CONTROL SYSTEM	21

INDEX

4.	ENGINE SPEED ACTUATOR	28
4.1	ENGINE SPEED SENSING.....	28
5.	COOLANT TEMPERATURE DETECTION.....	29
6.	CHARGE AIR TEMPERATURE DETECTION.....	30
7.	HYDRAULIC OIL TEMPERATURE DETECTION.....	31
8.	PROPORTIONAL VALVE - FAN MOTOR.....	32
9.	PROPORTIONAL VALVES - CONTROL BLOCK.....	33
10.	PILOT CONTROL BLOCK.....	34

SECTION 12 - CALIBRATION

1.	NECESSARY OPERATIONS BEFORE CALIBRATION.....	1
1.1	CALIBRATION OF THE MAIN PUMP	1
1.2	CALIBRATION OF THE ROTATION PUMP.....	2
2.	DISPLAY: CALIBRATION MENU	3
3.	CALIBRATIONS WITH THE ENGINE RUNNING.....	4
3.1	VDO CALIBRATION	6
3.2	POWER CALIBRATION	7
3.3	MAIN VALVE CALIBRATION (CONTROL VALVE).....	8
3.4	TRAVEL CALIBRATION.....	11
3.5	PUMP DELIVERY CALIBRATION.....	13
3.6	SLEWING PUMP CALIBRATION	16
3.7	AUXILIARY PRESSURE CALIBRATION	18
4.	CALIBRATIONS WITH THE ENGINE STOPPED	20
4.1	CALIBRATIONS, ALL SOLENOID VALVES, MAIN PUMP, ROTATION PUMP, AUXILIARY PRESSURE	22
4.2	MAIN VALVE CALIBRATION (CONTROL VALVE).....	24

SECTION 13 - FAULT CODES

1.	ERROR INDICATION ON THE DISPLAY.....	1
2.	CENTRAL UNIT AND ENGINE.....	3
2.1	FAULT CODES.....	3
3.	PCS UNIT (POWER CONTROL SYSTEM).....	5
3.1	FAULT CODES.....	5
4.	HYDRAULICS	6
4.1	SAFETY-RELATED SYSTEM DIAGNOSTIC FAULTS	6
4.2	COMMON FAULTS	7
4.3	CAN INTERFACE	10
4.4	DISPLAY INDICATORS.....	11
4.5	KEY PADS	11
4.6	COMMON DIGITAL INPUTS	12
4.7	HYDRAULIC CONTROL LEVER / PEDALS.....	13
4.8	PILOT PRESSURE SUPPLY	18
4.9	MAIN PUMPS	20
4.10	ATTACHMENT SENSORS.....	21
4.11	SLEWING SYSTEM.....	22
4.12	PILOT VALVES ON MAIN VALVE	24
4.13	ADDITIONAL VALVES AND SENSORS	28
4.14	AUTOMATIC CALIBRATION FAULTS	29