# CX135SR
# CRAWLER EXCAVATOR

## Service Manual

**9-4064NA**

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# PRIMARY HYDRAULIC POWER SYSTEM - Special tools (A.10.A - D.20.A.40)

CX135SR WE

***Digital tester assembly***



CRIL03G253E00 1

| DESCRIPTION | QUANTITY | CODE |
|---|---|---|
| Tester assembly for Multi-Handy 2051 | - | E54444449 |
| Multi-Handy 2051 tester | 1 | D5444448 |
| Pressure sensor (**0 bar** to **600 bar**) | 2 | V5344460 |
| Straight union for sensor | 2 | W5344461 |
| Elbow union for sensor | 1 | X5344462 |
| Engine speed sensor | 1 | Z5344463 |
| Cable (length **5 m**) | 3 | E3144472 |
| Electric plug **220 volts 50 Hz** | 1 | D5344467 |
| Cigarette lighter cable | 1 | E5344468 |
| Instruction Sheet | 1 | - |
| Carrying case | 1 | N5344476 |

The Multi-Handy tester is used to:
Check pressure (two pressure scales)
Check differential pressure (delta P)
Check temperature
Check engine rpm
Check the flow

***600 litre turbine***

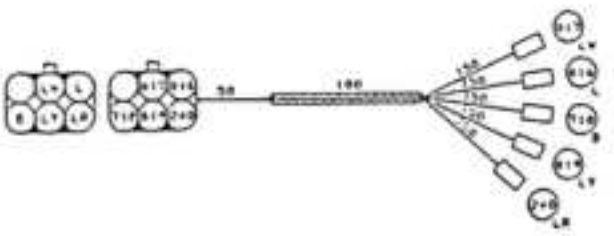
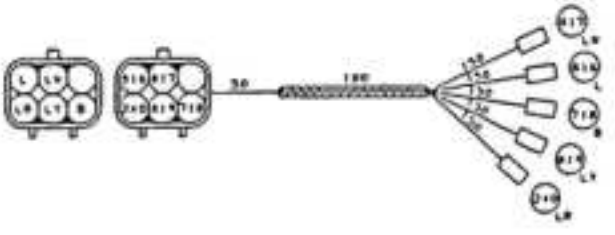
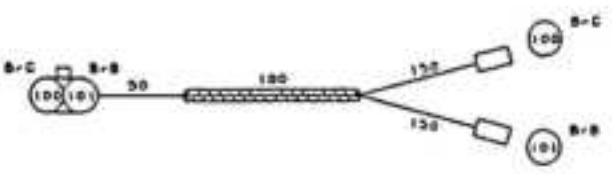
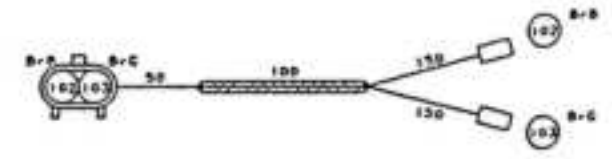


CRIL03G254E00 2

| DESCRIPTION | QUANTITY | CODE |
|---|---|---|
| Turbine | 1 | RE3 Z5344486 |
| Plates **M45x2** | 2 | D4323359 |
| Flange diameter **24 mm** | 2 | B8230183 |



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| | |
|---|---|
| Test electrical connector for emergency stop motor, motor side. |  CRPH038038A 4 |
| Test electrical connector for emergency stop motor, emergency stop motor harness side. |  CRPH038036A 5 |
| Test electrical connector for solenoid and fuel level sensor. |  CRPH038031A 6 |
| Test electrical connector for hydraulic pump proportional valve. |  CRPH038032A 7 |



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***List of fault codes***

| Fault code no. | Description | Indicator lamp lighted |
|---|---|---|
| **(32)** | Rack position detector | YES |
| **(31)** | Circuit inside the electronic regulator, linear servomotor | YES |
| **(41)** | TDC sensor | YES |
| **(42)** | Engine speed detector | YES |
| **(21)** | Acceleration sensor | NO |
| **(15)** | Coolant solution temperature sensor | NO |
| **(25)** | Resistance to fuel flow adjustment no | NO |

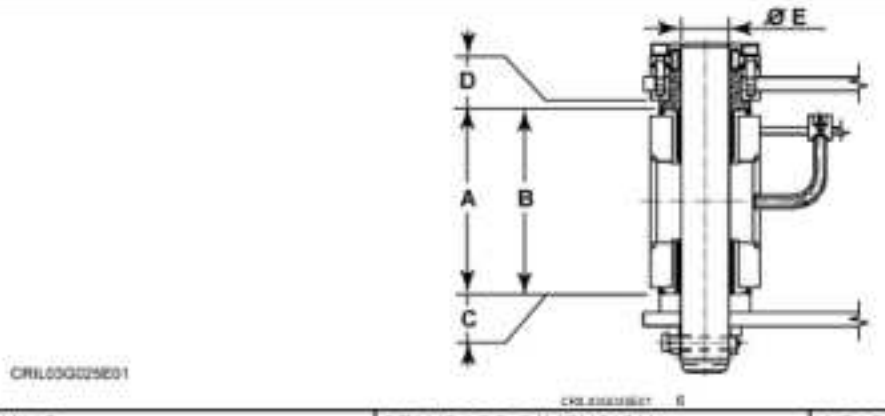
ERASING FAULT CODES

- To erase the fault code from the electronic control box memory, connect **(4)** the fault code erasing connector **(X13)** for at least one second, then turn the start switch to the "OFF" position for at least half a second.



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5. ***Bucket on bucket head***




| MARKING | STANDARD DIMENSION | WEAR LIMIT |
|---|---|---|
| (A) bucket | **255 mm** | **261 mm** |
| (B) bucket head | **254 mm** | **252 mm** |
| (C) (a-b) | **1 - 3.5 mm** | shims |
| (D) | **16 mm** | **8 mm** |
| (E) pin diameter | **65 mm** | **64 mm** |
| (E) dipper head bushing diameter | **65 mm** | **66.5 mm** |
| (E) bucket bushing diameter | **65 mm** | **66.5 mm** |

# Command valve Hand control valve - Torque (H.30.C.12.10 - D.20.A.10)

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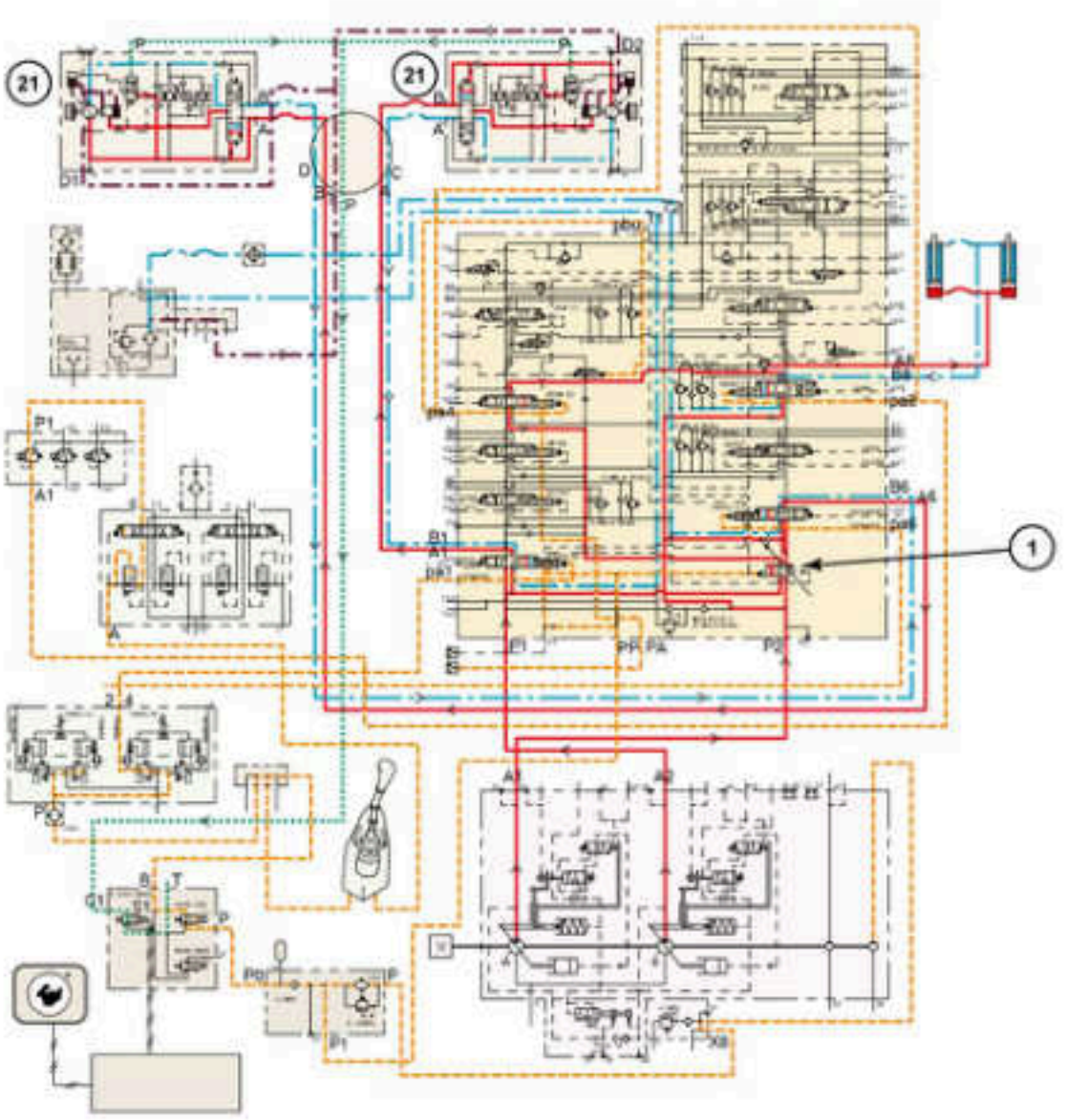
***NOTE:*** *Refer to* ***Command valve Hand command valve - Torque (F.40.C.12.10 - D.20.A.10)***



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# TRAVELLING Travel - Hydraulic schema (F.10.F - C.20.A.20)

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CRU03JYH4G01 1

**Straight-line travel circuit - Dynamic Description**

| | | | |
|---|---|---|---|
| **(1)** | Straight-line travel valve | **(21)** | Travel motor |
| **(Pa1/A1)** | RH forward travel | **(Pb1/B1)** | RH reverse travel |
| **(Pa6/A6)** | LH forward travel | **(Pb6/B6)** | LH reverse travel |
| **(Pa4)** | Boom spool 2 | **(Pa8/A8)** | Boom raising |
| **(Pb8/B8)** | Boom lowering | | |

STRAIGHT-LINE TRAVEL

This chapter describes the situation in which the boom is raised as the machine is travelling.

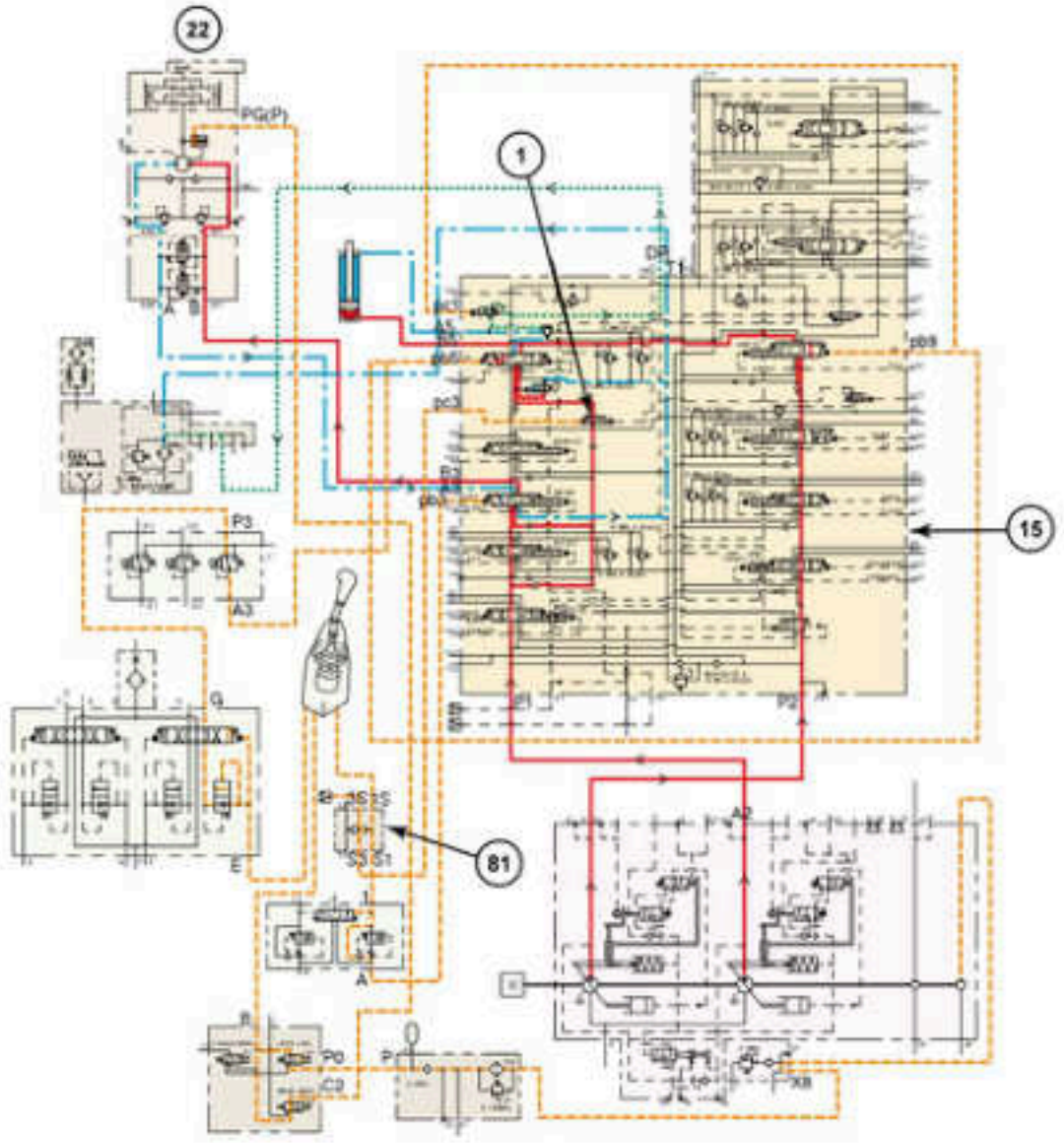
- When the boom requires raising, the boom spool is operated and the low pressure circuit coming from **(PP)** and passing through all attachment and swing spools is closed. This circuit increases in pressure up to **39 bar**, which pilots the straight-line travel valve **(1)**. The output from pump **(A2)** therefore supplies the two travel systems at **(P1)** and the output from pump **(A1)** supplies the attachment at **(P2)**. As both travel motors **(21)** are supplied in parallel, their pressure is equal and the machine travels in a straight line. In addition, if the flow is not completely expended on the attachment, the surplus from this flow is used for travel and the loss of speed is minimal.
- If functions other than the boom are used at the same time as travel, their operation is exactly the same.



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# SWINGING Circular swing - Hydraulic schema (F.40.C - C.20.A.20)

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CX0233(1406)01 1

**Swing variable priority circuit - Dynamic description**

| | | | |
|---|---|---|---|
| **(1)** | Swing priority valve | **(15)** | Main control valve |
| **(22)** | Swing motor | **(81)** | Swing shuttle block |
| **(Pa3/A3)** | Swing left | **(Pb3/B3)** | Swing right |
| **(Pa5/A5)** | Dipper out | **(Pb5/B5)** | Dipper return |
| **(Pa9/Pb9)** | Dipper valve spool 2 | **(Pc3)** | Priority to swing |
| **(Pb4)** | Boom valve spool 2 | **(Pc3)** | Swing priority valve piloting |

VARIABLE PRIORITY

- The swing pilot pressure arrives in the main control valve **(15)** via port **(Pc3)** after passing through swing shuttle block **(81)** and pilots swing priority valve **(1)**. This provides the maximum possible torque to swing motor **(22)** with high swing pressure, even the dipper is used at the same time.
- When digging, the pilot pressure for raising the boom actuates the swing priority valve **(1)** via orifice **(Pbu)**. The swing flow is therefore in parallel with the dipper via swing priority valve **(1)**. This has the effect of improving the speed of the dipper.
- The trench is dug more uniformly even if the free passage is closed by the valve spool on boom 2.



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| ITEM | DESCRIPTION | PRESSURE SETTING |
|---|---|---|
| A = | MAIN RELIEF (STANDARD) | 34.3 MPa / 343 bar / 4977 psi |
| B = | BOOM RAISING PORT SECONDARY RELIEF | 37.8 MPa / 378 bar / 5729 psi |
| B1/B2 = | RELIEF ON BOOM HBCV | 37.3 MPa / 373 bar / 5410 psi |
| C = | BOOM LOWERING PORT SECONDARY RELIEF | 37.8 MPa / 378 bar / 5482 psi |
| D = | DIPPER OUT PORT SECONDARY RELIEF | 37.8 MPa / 378 bar / 5482 psi |
| D1 = | RELIEF ON DIPPER HBCV | 36.3 MPa / 363 bar / 5265 psi |
| E = | DIPPER IN PORT SECONDARY RELIEF | 37.8 MPa / 378 bar / 5482 psi |
| F = | BUCKET OPEN PORT SECONDARY RELIEF | 37.8 MPa / 378 bar / 5482 psi |
| G = | BUCKET CLOSE PORT SECONDARY RELIEF | 37.8 MPa / 378 bar / 5482 psi |
| H = | PILOT PRESSURE RELIEF | 3.9 MPa / 39 bar / 566 psi |
| I = | RIGHT-HAND SWING PORT SECONDARY RELIEF | 28.5 MPa / 285 bar / 4133 psi |
| J = | LEFT-HAND SWING PORT SECONDARY RELIEF | 28.5 MPa / 285 bar / 4133 psi |
| K1/K2 = | TRAVEL REVERSE PORT SECONDARY RELIEF | 34.8 MPa / 348 bar / 5047 psi |
| L1/L2 = | TRAVEL FORWARD PORT SECONDARY RELIEF | 34.8 MPa / 348 bar / 5047 psi |
| M1/M2 = | NEGATIVE CONTROL RELIEF | 2.7 MPa / 27 bar / 392 psi |
| O = | OFFSET BACKHOE SECONDARY RELIEF VALVE, RIGHT-HAND | 23.5 MPa / 235 bar / 3406 psi |
| P = | OFFSET BACKHOE SECONDARY RELIEF VALVE, LEFT-HAND | 23.5 MPa / 235 bar / 3406 psi |
| S = | DOZER BLADE + OFFSET BACKHOE MAIN RELIEF | 29.6 MPa / 296 bar / 2989 psi |
| T = | DOZER BLADE LOWERING SECONDARY RELIEF | 23.5 MPa / 235 bar / 3406 psi |
| U = | DOZER BLADE RAISING SECONDARY RELIEF | 23.5 MPa / 235 bar / 3406 psi |
| W1/W2 = | CRUSHER OPTION SECONDARY RELIEF VALVE | 37.8 MPa / 378 bar / 5482 psi |
| X1 = | ACCUMULATOR PRECHARGE | 1.5 MPa / 15 bar / 214 psi |

| ITEM | DESCRIPTION |
|---|---|
| 1. | HYDRAULIC RESERVOIR |
| 2. | BREATHER |
| 4. | BY-PASS VALVE |
| 5. | SCREEN FILTER |
| 6. | RETURN FILTER |
| 10. | MAIN HYDRAULIC PUMP |
| 15. | MAIN CONTROL VALVE |
| 16. | HYDRAULIC SWIVEL |
| 21. | TRAVEL MOTOR |
| 22. | SWING MOTOR |
| 23. | TRAVEL MOTOR BRAKE |
| 25. | RIGHT BOOM CYLINDER |
| 26. | LEFT BOOM CYLINDER |
| 27. | DIPPER CYLINDER |
| 28. | BUCKET CYLINDER |
| 29. | BOOM SAFETY VALVE |
| 30. | DIPPER SAFETY VALVE |
| 31. | DIPPER LOAD HOLDING VALVE |
| 32. | BOOM LOAD HOLDING VALVE |
| 41. | FILTER (ULTRA CLEAN) |
| 42. | OIL COOLER |
| 43. | RETURN MANIFOLD |
| 44. | OIL COOLER BY-PASS VALVE |
| 51. | ACCUMULATOR |
| 53. | BOOM & BUCKET CONTROL LEVER |
| 54. | SWING & DIPPER CONTROL LEVER |
| 55. | TRAVEL CONTROL PEDAL |
| 56. | DIPPER CONTROL SHOCK ABSORBER |
| 57. | BOOM & DIPPER CONTROL SHOCK ABSORBER |
| 60. | PILOT SYSTEM MANIFOLD |
| 72. | CONTROL PEDAL (OPTIONAL) |
| 75. | FLOW RE-INJECTION BLOCK (OPTIONAL) |
| 76. | 3 WAY SELECTOR (OPTIONAL) |
| 78. | RETURN FILTER (OPTIONAL) |
| 79. | CONTROL SHUTTLE BLOCK (OPTIONAL) |
| 81. | SWING SHUTTLE BLOCK |
| 82. | PILOT CIRCUIT FILTER |
| 83. | SHUT-OFF VALVE (OPTIONAL) |
| 85. | HANDY/FOOT CONTROL PILOT FILTER |
| 86. | PILOT FILTER BY-PASS VALVE |
| 93. | PILOT CIRCUIT SUPPLY MANIFOLD |
| 94. | PILOT CIRCUIT RETURN MANIFOLD |
| 95. | BOOM-DIPPER PILOT CIRCUIT MANIFOLD |
| 96. | SWING PILOT CIRCUIT CUSHION VALVE |
| 97. | HYDRAULIC BREAKER FOOT CONTROL |
| 98. | OFFSET BACKHOE FOOT CONTROL |
| 99. | DOZER BLADE HAND CONTROL |
| 100. | DOZER BLADE CYLINDER |
| 101. | OFFSET BACKHOE CYLINDER |
| 102. | 3 ELECTROVALVE BLOCK |
| B22. | SWING PILOT PRESSURE SWITCH |
| B26. | UPPER PILOT PRESSURE SWITCH (YELLOW BAND) |
| B27. | TRAVEL PILOT PRESSURE SWITCH |
| B45. | OVERLOAD INDICATOR PRESSURE SWITCH |
| M3. | PRESSURE TEST POINT (x3) |
| Y2. | PILOT PRESSURE SOLENOID VALVE (BLUE BAND) |
| Y3. | SWING BRAKE SOLENOID VALVE (PINK BAND) |
| Y4. | 2 STAGE TRAVEL SOLENOID VALVE (RED BAND) |
| Y9. | CRUSHER/BREAKER OPTION TWO FLOW SOLENOID VALVE |

LEGEND

- P1 PUMP
- P2 PUMP
- PILOT SYSTEM PUMP
- RETURN TO RESERVOIR
- LEAK-OFF RETURN
- SUPPLY CIRCUIT
- PILOT SYSTEM CIRCUIT
- HOSE
- COMPONENT BOUNDARY
- PIPING CONNECTION
- PIPING CROSS-OVER
- 41 COMPONENT ITEM NO.
- COMPONENT NUMBER
- CONNECTION ITEM NO.
- * OPTIONAL ITEM NO.

# CX135SR EXCAVATOR HYDRAULIC / ELECTRIC SCHEMATIC

## CX135SR EXCAVATOR HYDRAULIC SCHEMATIC

Number 9-43660



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