# SHOP MANUAL

WEBM005700

# WH609-1 WH613-1 WH713-1 WH714-1 WH714H-1 WH716-1

## TELESCOPIC HANDLER

| MODEL | SERIAL NUMBER |
|---|---|
| WH609-1 | 395F60001 and up |
| WH613-1 | 395F60003 and up |
| WH713-1 | 395F70001 and up |
| WH714-1 | 395F70002 and up |
| WH714H-1 | 395F70003 and up |
| WH716-1 | 395F70004 and up |

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Utility

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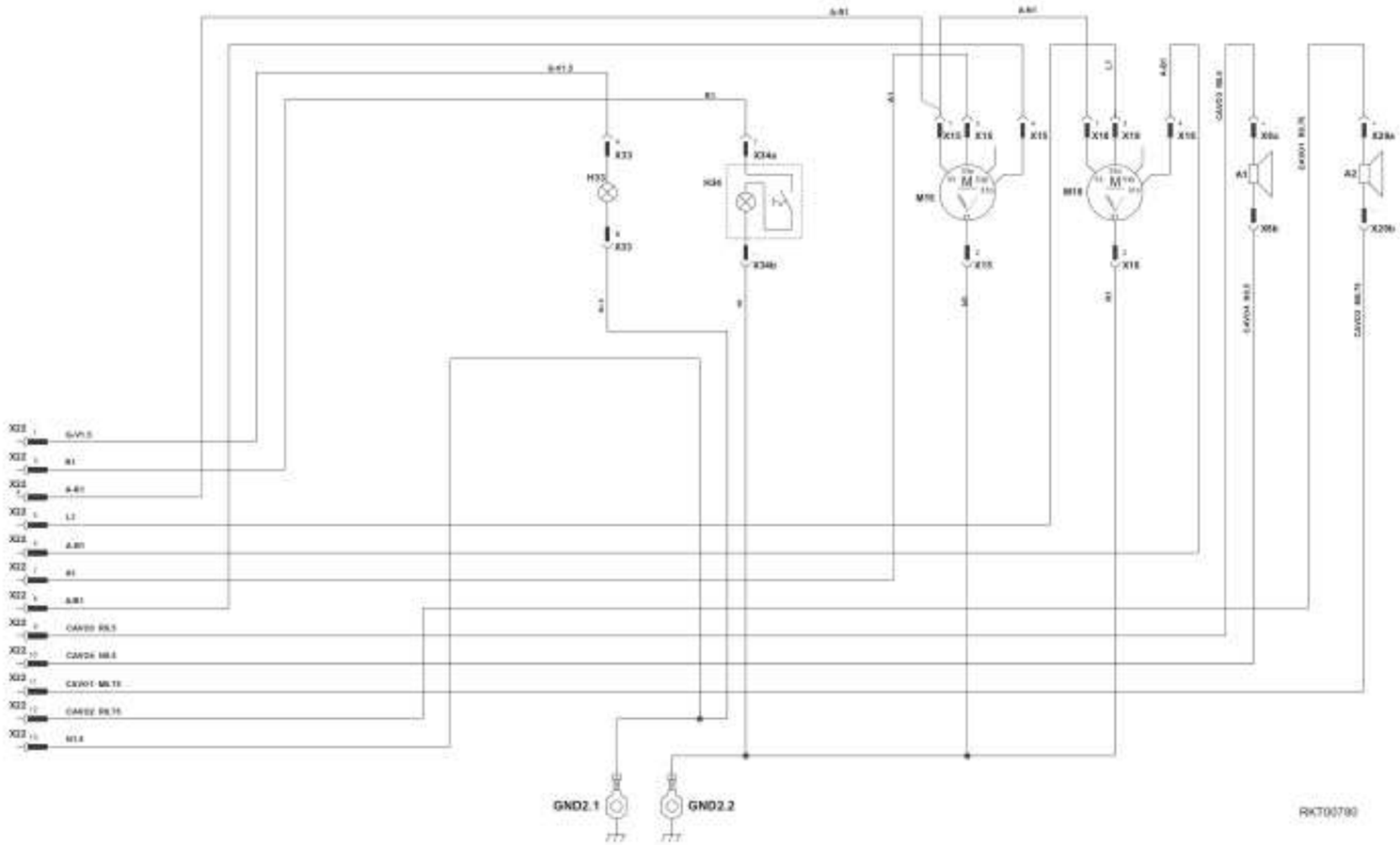




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## CAB ROOF WIRING DIAGRAM

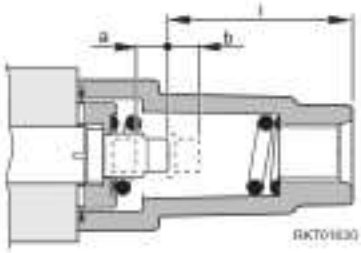
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
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## • MACHINE MODEL WH613-1

| Machine model | | | | WH613-1 | |
|---|---|---|---|---|---|
| Classification | Check item | Test conditions | Unit | Standard value | Permissible value |
| Circuit pressure | General (cut-off) valve | • Engine speed: min.<br>• Hydraulic oil temperature: 45–55 °C<br>• Check one circuit at a time | bar | 260 | 260±7 |
| | Servocontrols | • Engine speed: min.<br>• Equipment control in dump at end of travel | | 35 | 30$^{+3.5}$ |
| | LS differential pressure (unloading valve) | • Engine speed: max<br>• Hydraulic oil temperature: 45–55 °C | | 20 | 20±1 |
| | Steering | • Engine speed: 1500 rpm<br>• Hydraulic oil temperature: 45–55 °C | | 180 | 180±5 |
| Secondary valve pressure | Boom (up) | • Engine speed: min.<br>• Hydraulic oil temperature: 45–55 °C<br>• General valve calibration: 290 bar<br>• Check one circuit at a time | bar | 275 | 275$^{+5}_{-5}$ |
| | Boom (extension) | | | 275 | 275$^{+5}_{-5}$ |
| | Equipment control (curl) | • Engine speed: min.<br>• Hydraulic oil temperature: 45–55 °C<br>• General valve calibration: 260±7 bar | | 200 | 200$^{+5}_{-5}$ |
| Engine | Engine speed (with pump under load) | • Engine speed: max<br>• Hydraulic oil temperature: 45–55 °C<br>• Engine oil pressure: within the acceptable range<br>• Total steering + equipment curl | rpm | | |
| Control valve spool travel | Boom |  | mm | l: 45, a: 6.5±0.3, b: 6.5±0.3 | l: 45, a: 6.5±0.3, b: 6.5±0.3 |
| | Equipment | | | | |



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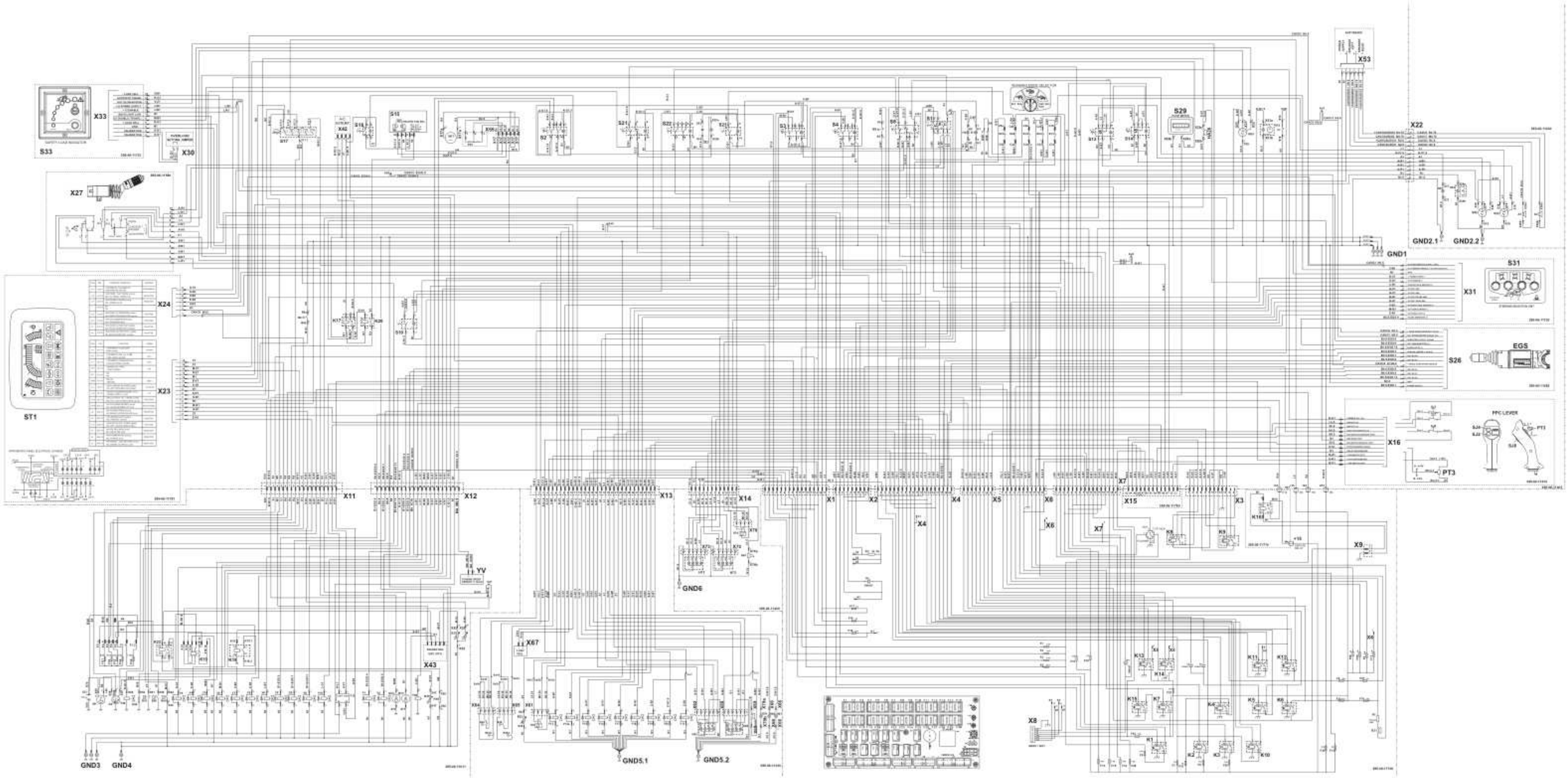
## TROUBLESHOOTING GUIDE

| • Low clutch pressure | |
|---|---|
| **Cause** | **Solution** |
| 1. Oil level is low. | 1. Top up the oil level. |
| 2. Pressure-control valve shows a blow-by condition. | 2. Clean the valve spool and seat. |
| 3. Feed pump is faulty | 3. Replace the pump. |
| 4. Piston seal rings or shaft segments are faulty. | 4. Replace the rings and segments. |
| 5. Clutch piston exhaust valve shows blow-by condition. | 5. Clean the valve. |
| **• Low feed pressure** | |
| **Cause** | **Solution** |
| 1. Oil level is low. | 1. Top up the oil level. |
| 2. Suction filter is clogged. | 2. Clean the filter. |
| 3. Feed pump is faulty. | 3. Replace the pump. |
| **• Overtemperature** | |
| **Cause** | **Solution** |
| 1. Seal rings are worn. | 1. Remove and recondition the converter. |
| 2. Pump is worn. | 2. Replace the pump. |
| 3. Oil level is low. | 3. Top up the oil level. |
| 4. Exchanger is dirty. | 4. Clean the exchanger. |
| 5. Exchanger feed and return hoses are obstructed or damaged. | 5. Replace the hoses. |
| **• Noisy converter** | |
| **Cause** | **Solution** |
| 1. Pump is worn. | 1. Replace the pump. |
| 2. Bearings are damaged. | 2. Fully remove the assembly to inspect the damaged bearings. |
| **• Poor power** | |
| **Cause** | **Solution** |
| 1. Engine speed is low when converter is stalled. | 1. Check pump injection. |
| 2. See OVERTEMPERATURE and carry out the checks described there. | 2. Solutions are illustrated in the OVERTEMPERATURE section. |



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# ELECTRICAL DIAGRAM




**COMPONENTS**

| | |
|---|---|
| A1 | Speaker right |
| A2 | Speaker left |
| B6 | Low brake oil level |
| B22 | Fuel level sender |
| B44 | Air filter blocked switch |
| B47 | Temperature switch fuel filter |
| B51 | Engine oil pressure switch |
| B56 | Max oil temperature transmission switch |
| B64 | Boom 30° switch |
| B65 | Boom retracted switch |
| BZ1 | Buzzer |
| G1 | Battery |
| G2 | Generator |
| H1 | No Autostop warning light |
| H2 | No Autostop warning light |
| H32 | Cigarette lighter light |
| H33 | Rear work light |
| H34 | Cabin lamp |
| H62 | Rear left light |
| H66 | Boom work light |
| H67 | Boom work light |
| H68 | Rear right light |
| H72 | Front right light |
| H73 | Front left light |
| H79 | Number plate light |
| HA1 | Horn |
| HA28 | Buzzer |
| HA69 | Back up alarm |
| M1 | Starter motor |
| M15 | Roof windshield wiper motor |
| M17 | Heater fan motor |
| M18 | Rear windshield wiper motor |
| M25 | Front windscreen wiper motor |
| M76 | Front washer pump |
| M77 | Rear, roof washer pump |
| R48 | Fuel filter resistor |
| R53 | Engine water temperature sender |
| R54 | Engine air preheating resistor |
| R55 | Heater fan resistor |
| S1 | Hazard switch |
| S2 | Right stabilizer switch |
| S3 | Left stabilizer switch |
| S4 | Frame leveling switch |
| S5 | Brake pedal switch |
| S8 | Boom work light switch |
| S10 | Beacon light switch |
| S13 | Rear windshield wiper motor switch |
| S14 | Roof windshield wiper motor switch |
| S15 | Heater fan speed selector switch |
| S16 | Air conditioner swtch |
| S17 | Key switch |
| S18 | N.C. switch parking brake |
| S21 | General light switch |
| S22 | Auxiliary boom solenoid valve switch |
| S23 | Switch disable autostop (opt) |
| S27 | Steering column lights-windshield |
| S29 | Hour meter |
| S31 | Steering mode selection unit |
| S61 | Rear axle alignement sensor |
| S70 | Front axle alignement sensor |
| ST1 | Instrument panel |
| SC1 | N.C. steering, EV boom ext/retr. disable (travel side) |
| SC2 | N.C. frame leveling, stabilizer disable (work side) |
| SC3 | N.C. EGS neutral lock (work side) |
| SC4 | N.O. overload warning display disable (travel side) |
| SC5 | N.C. frame leveling, stabilizer disable (work side) |

**FUSES**

| | |
|---|---|
| F1 | Hazard fuse 10A |
| F2 | Cigarette lighter socket fuse 10A |
| F3 | Beacon light fuse 10A |
| F4 | Cabin lamp + radio fuse 7.5A |
| F5 | Horn relay fuse 7.5A |
| F6 | High beam relay fuse 15A |
| F7 | Stop light fuse 5A |
| F8 | EV. rear axle lock, boom 30° switch fuse 10A |
| F9 | Steering unit fuse 10A |
| F10 | EGS fuse, small buzzer 7.5A |
| F11 | Opt. fusE 5A |
| F12 | Boom work light fusE 15A |
| F13 | Front windshield wiper motor, horn relay fuse 10A |
| F14 | Column light switches and flasher fuse 10A |
| F15 | Roof and rear windshield wiper motor fusE 10A |
| F16 | Elettrostop fuse 7.5A |
| F17 | Back light left, front light right and number plate lamp fuse 3A |
| F18 | Back light right, front light left and instrument light fuse 3A |
| F19 | Optional fusE 7.5A |
| F20 | Low beam relay fusE 15A |
| F21 | Back up alarm, backward light fuse 10A |
| F22 | Relay off services, working mode selector fuse 10A |
| F23 | Boom auxiliary line fuse 10A |
| F24 | Autostop unit (optional) fuse 10A |
| F25 | Cold area preheating unit (opt) fuse 5A |
| F26 | Front instrument fuse 3A |
| F27 | Overloading warnig panel fuse 3A |
| F28 | Side light fusE 7.5A |
| F29 | Rear work light fusE 5A |
| F30 | A/C condenser fan fuse 20A |
| FG1 | General, services relay fuse 50A |
| FG2 | Cabin fan heater fuse 30A |
| FG3 | Key switch fuse 50A |
| FG4 | Fuse unit and fuel preheating relay fuse 50A |
| FG5 | Engine air preheating megafuse 175A |

**RELAYS**

| | |
|---|---|
| K1 | Horn relay |
| K2 | Low beam relay |
| K3 | High beam relay |
| K4 | Back up alarm relay |
| K5 | Gear engaged relay |
| K6 | Services relay |
| K7 | Boom auxiliary valve relay |
| K8 | Optional valve relay |
| K9 | Boom work light relay |
| K10 | Stop light relay |
| K11 | Frame leveling and stabilizer relay |
| K12 | Rear axle lock relay |
| K13 | Boom auxiliary line relay 1 |
| K14 | Boom auxiliary line relay 2 |
| K15 | Boom ext/ retr proportional valve power supply relay |
| K16 | Service relay |
| K17 | A/C Fan condenser relay |
| K18 | Engine air preheating relay |
| K20 | Cabin fan heater relay |
| K22 | Fuel preheating relay |

**SOLENOID VALVES**

| | |
|---|---|
| Y1 | Transmission solenoid valve "1" |
| Y2 | Transmission solenoid valve "2" |
| Y3 | Up right stablizer solenoid valve |
| Y4 | Down right stablizer solenoid valve |
| Y5 | Up left stablizer solenoid valve |
| Y6 | Down left stablizer solenoid valve |
| Y7 | Left frame leveling solenoid valve |
| Y8 | Right frame leveling solenoid valve |
| Y9 | Boom auxiliary solenoid valve 1 |
| Y10 | Boom auxiliary solenoid valve 2 |
| Y11 | Rear axle lock solenoid valve 1 |
| Y12 | Proportional ext/retraction solenoid valve |
| Y13 | Ext/retract boom charge solenoid valve |
| Y13a | PPC boom charge solenoid valve |
| Y15 | 2WS steeering solenoid valve |
| Y16 | 4WS steering solenoid valve |
| Y17 | Round steering solenoid valve |
| Y18 | Crab steering solenoid valve |
| Y19 | Rear axle lock solenoid valve 2 |
| Y20 | Optional solenoid valve |
| Y46 | Fuel shut off solenoid valve |
| YS2 | A/C clutch |
| YF | Forward speed solenoid valve |
| YR | Reverse speed solenoid valve |
| YS | Transmission "splitter" solenoid valve |



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