# MX305,MX275
# MX245,MX215
# Magnum™ 215
# Magnum™ 245
# Magnum™ 275
# Magnum™ 305

Tractors

# SERVICE MANUAL

87710915

CASE IH AGRICULTURE

MidWestTech | Case MX305, MX275, MX245, MX215, 215, 245, 275, 305 Tractor Service Manual | Publication 87710915

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**NOTE:** *Engine repair information is not contained within this tractor Repair Manual. For engine repair, refer to publication number 87515687 for the 8.3 & 9.0L 6 Cylinder, 24 Valve CNH Engine with High Pressure Common Rail Fuel System.*

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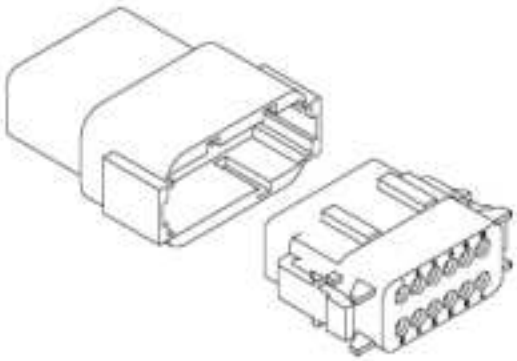
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51F
PIN HOUSING
FNRP HARNESS
223672A1



51M
SOCKET HOUSING
CAB HARNESS
223671A1

| CONNECTOR 51M - 223671A1 | | |
|---|---|---|
| FNRP SWITCH | | |
| CAV | WIRE NUMBER | CIRCUIT REFERENCE |
| 1 | 623A | START INPUT |
| 2 | 172B | START OUTPUT |
| 3 | 550J | RUN INPUT |
| 4 | 511A | FNRP - NOT PARK |
| 5 | 552B | FNRP-REVERSE |
| 6 | 551D | FNRP-FORWARD |
| 7 | 553F | FNRP-NOT NEUTRAL |
| 8 | 561B | FNRP 5V REF |
| 9 | 723A | HORN |
| 10 | 178AB | RT/LT TURN COMMON GND |
| 11 | 752A | FNRP RIGHT TURN INDICATOR |
| 12 | 751A | FNRP LEFT TURN INDICATOR |

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## Electrical Test

Both sensors have the same resistance vs temperature response even though they look dramatically different. Both sensors should measure 10-25K ohms at room temperature for normal operation.

Both sensors are thermistors - thermal resistors. With these thermistors the colder the environment, the greater the electrical resistance; and the warmer the environment, the less electrical resistance.

If a fault 111, 115 or 116 is displayed, the most likely problem is wiring to the sensor. The out of range values are so high or low - 180° F (82°C) and -2° F (-19°C) - that occurence is unlikely except as noted below in the fault code explanations.

More importantly, these sensors can fail without generating a fault code. Measure the resistance of the sensor and the ambient temperature at the sensor, and compare the readings to the Resistance versus Temperature table in this section. If the readings are not within the minus or plus 2.5% range, replace the sensor.

**NOTE:** *For the test to be valid, the thermometer used must be accurate, and the temperature recorded must be the temperature at the sensor.*

**NOTE:** *See Electrical Schematic section 60.*

## Power Circuit

Minimal voltage is fed to the sensors: about 0.5V at 70°F (21°C), and voltage drops as the temperature increases. Current is fed to the evaporator sensor from CJ8-23 and the cab sensor from CJ8-21.

### Service Note: Too Little Cooling/Too Much Heating Without Symptoms

The sensors should be suspect when the complaint is too little cooling when cooling and too much heating when heating ("the cab is too hot or too cold all the time"), and obvious symptoms are absent:

- System pressures are normal, and system is properly charged.
- Coolant system operating normally.
- No faults codes displayed on the Display.
- Compressor and heater valve are functioning normally.

The sensors fail in a consistent pattern: they sense a lower temperature then is actually present.

In cooling mode, actual cab temperature is 76°F (24°C), but the cab sensor senses 70°F (21°C) and the compressor is not engaged with sufficient frequency. In heating mode, actual cab temperature is 72°F (22°C), but the cab sensor senses 66°F (19°C) and heater valve is opened too widely.

Perform the resistance versus temperature test on both sensors.

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# AUX/HITCH/PTO FAULT CODE 120

## Electro Hydraulic Remote Top Link Switch Is Stuck On

**Cause:**
The data bus signaled that the top link switches remain closed (ON).

**Possible failure mode:**
1. A Top link switch failed (in most cases).
2. Software execution error in the AUX/Hitch/PTO controller (small chance).

**Solution:**
The top link switch is hard wired to the AUX/Hitch/PTO controller.

1. Disconnect the harness connectors C399 and C401 at top link switches on fenders. Check the switch function. There should be no continuity between pins A, B or C. Depress switch to extend, there should be continuity between pins A and B only. Depress switch to retract, there should be continuity between pins B and C only.
   A. Switch contacts closed at all times, replace switch.
   B. Switch tests out okay. Erase fault code and retry.

**NOTE:** *Always inspect connector ends for damaged, bent or dislocated pins when troubleshooting.*

**NOTE:** *See schematic section 53 on the schematic poster.*

# AUX/HITCH/PTO FAULT CODE 123

## Current Sensed When The Aux #1 Driver Is Off, Retract /Lower Coil Shorted to 12 Volts

**Cause:**
When the lever for this remote section is in Neutral, the controller should provide no voltage to the solenoid. If the controller senses voltage on the circuit, this fault code is recorded.

**Possible failure modes:**
1. Damaged wiring resulting short to power.
2. Controller internal failure.

**Solution:**
Check the wiring from the remote hydraulic controller to the remote valve.
Check the function of the remote hydraulic controller.

1. Check the wiring harness from the AUX/Hitch/PTO controller connectors C053 pin 10 and C058 pin 1 to the remote valve connector C340 pins 1 and 2.
   There should be no shortage to12 volt power at any pin location.

**NOTE:** *Always inspect connector ends for damage, bent or dislocated pins when troubleshooting.*

2. In any of the following two conditions, replace the controller.
   a. No shortage to 12 V is found in the circuit and there is no 12 V at any of the pins or cavities,
   b. The 12 V is traced to the controller connectors C053 pin 10 or C058 pin 1 when the lever is in Neutral.

**NOTE:** *See schematic section 54 on the schematic poster.*

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INSTRUMENT CLUSTER — SECTION 24

INSTRUMENT CLUSTER — SECTION 25

SECTION 26

OPTIONAL FRONT HITCH LAMPS / EGRESS LIGHTING — SECTION 27

OPTIONAL WORKLAMPS CAB REAR ROOF / OPTIONAL WORKLAMPS CAB BELTLINE / OPTIONAL 360° WORKLAMPS — SECTION 28

STANDARD WORKLAMPS CAB FRONT ROOF — SECTION 29

ROOF WARNING LIGHTS (NAO) — SECTION 30

STANDARD HEADLAMPS / STANDARD HEADLAMPS — SECTION 31

WIDE MARKER LIGHT / SINGLE, OR OPT TWIN LAMP FENDER LIGHTS / LEFT FENDER STOP, TAIL TURN LIGHT — SECTION 32

RIGHT FENDER STOP, TAIL TURN LIGHT / SINGLE, OR OPT TWIN LAMP FENDER LIGHTS / WIDE MARKER LIGHT — SECTION 33

FORWARD NEUTRAL REVERSE PARK (FNRP) / HORN — SECTION 34

SECTION 35

SECTION 36

TRANSMISSION CONTROL SYSTEM — SECTION 37

TRANSMISSION CONTROL SYSTEM — SECTION 38

TRANSMISSION CONTROL SYSTEM — SECTION 39

TRANSMISSION CONTROL SYSTEM — SECTION 40

PNEUMATIC BRAKE OPTION — SECTION 41

MUS SUSPENSION AXLE CONTROLLER — SECTION 43

ARMREST CONTROLLER (ARU) — SECTION 44

ARMREST CONTROLLER (ARU) — SECTION 45

ARMREST CONTROLLER (ARU) — SECTION 46

ARMREST CONTROLLER (ARU) — SECTION 47

ARMREST CONTROLLER (ARU) — SECTION 48

# MAGNUM SERIES TRACTORS
# MAGNUM 215, 245, 275, AND 305
# P.I.N. Z7RZ01521 AND AFTER
# NAO ELECTRICAL SCHEMATIC

RAC. 87624272

LEGEND

INDICATES CONSTANT POWER

INDICATES POWER WHEN KEY SWITCH IS ON

TRANSMISSION CONTROL IN PARK
MFD IS OFF

NAMAG_02_07



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# MX SERIES MAGNUM TRACTORS
# MX215, MX245, MX275, AND MX305

## NAO ELECTRICAL SCHEMATIC
## 87389708

### ELECTRICAL SCHEMATIC DIAGRAM
### NAO MX MAGNUM SERIES TRACTOR

| CIRCUIT DESCRIPTION | SECTION | CIRCUIT DESCRIPTION | SECTION |
|---|---|---|---|
| AIR CONDITIONING | 58-61 | | |
| ARMREST CONTROLLER | 44-46 | - OPTIONAL FRONT HITCH | 27 |
| AUTOGUIDANCE | 73-78 | - OPTIONAL FRONT BELTLINE | 28 |
| AUXILIARY CONTROL SYSTEM | 54 | - OPTIONAL HIGH INTENSITY LAMP | 31 |
| AUTOMATIC TEMPERATURE CONTROL UNIT | 59 | | |
| AUXILIARY POWER CONN. (IMPLEMENT) | 68 | - OPTIONAL REAR FENDER WORK | 32-33 |
| AUXILIARY POWER (7-PIN TRAILER) | 33 | - OPTIONAL ROOF WORK CAB | 28 |
| BLOWER MOTOR (4SCU OR CCU) | 59 | | |
| BRAKE PEDAL SWITCHES | 59 | | |
| CHARGING SYSTEM | 19 | - STANDARD CAB FENDER | 32-33 |
| CAB CONTROLLER POWER | 20 | - STANDARD CAB FRONT ROOF | 28 |
| CAN DATA BUS - TRACTOR | 13-18 | - STANDARD FENDER WARNING LAMPS | 32-33 |
| CIGAR LIGHTER | 68 | - STANDARD BELTLINE WARNING LAMPS | N/A |
| CLIMATE CONTROL UNIT | 58 | | |
| CRUISE CONTROL | 57 | MECHANICAL FRONT DRIVE (MFD) | 44 |
| DIFFERENTIAL LOCK | 44 | POWER MIRRORS | 64 |
| EXPRESS LIGHTING | 27 | PTO CONTROLLER SYSTEM | 49-50 |
| ELECTRONIC ENGINE CONTROLLER | 55-56 | RADIO ANTENNA | 62 |
| ELECTRONIC PTO | 49-50 | RADIO SOUND SYSTEM | 62 |
| EMERGING MARKET | 79-80 | ROTARY LIGHT SWITCH | 28 |
| ETHER START | 60 | SCHEMATIC - LEGEND | 1-10 |
| FOOT THROTTLE | 57 | SCHEMATIC - SYMBOL DEFINITIONS | 2 |
| FORWARD/NEUTRAL/REVERSE/PARK | 34-36 | SEAT | 67 |
| HITCH CONTROL SYSTEM | 51-52 | STARTING SYSTEM | 19-20 |
| HEADLIGHT SWITCH | 29 | SUSPENDED AXLE | 43 |
| INSTRUMENT CLUSTER | 24-25 | SWCD MONITOR | 69 |
| ISO11783 | 70-72 | TRAILER CONNECTOR (7-PIN) | 33 |
| LIGHTS - STANDARD HEAD LIGHTS | 31 | TRANSMISSION CONTROL SYSTEM | 37-40 |
| - BEACON | 66 | WINDSHIELD WIPER/WASHER - FRONT | 65 |
| - BRAKE | 32-33 | WINDSHIELD WIPER/WASHER - REAR | 65 |
| - DOME/CONSOLE | 63 | | |
| - LICENSE PLATE | N/A | | |

### ACTUATORS

LEVER · HAND · FOOT · TEMP

LIQUID LEVEL FLOAT · PRESSURE · COIL · DIODE

VARIABLE RESISTOR · RESISTOR · CONTACTS: MOMENTARY, MAINTAINED

### HOUSINGS

V VACUUM SWITCH · P PRESSURE SWITCH · T TEMPERATURE SWITCH · M MOTOR · LAMP

### CONTACT CONFIGURATIONS

S.P.S.T. · S.P.D.T. · D.P.S.T. · D.P.D.T.

### MISCELLANEOUS SYMBOLS

FUSE · CIRCUIT BREAKER · RELAYS · FUSE BLOCK · LED · PHOTO TRANSISTOR

### COLOR ABBREVIATIONS

| ABBREVIATION | COLOR |
|---|---|
| R | RED |
| T | TAN |
| W | WHITE |
| Y | YELLOW |
| BK | BLACK |
| N | BROWN |
| S | GREY |
| O | ORANGE |
| K | PINK |
| P | VIOLET (PURPLE) |
| DU | DARK BLUE |
| LU | LIGHT BLUE |
| DG | DARK GREEN |
| LG | LIGHT GREEN |

### CIRCUIT DIAGRAM LEGENDS

702A B-1.0 — CIRCUIT NUMBER, COLOR, CIRCUIT TAG IF REQUIRED, CONDUCTOR AREA

C20 — INDICATES CIRCUIT SPLICE

INDICATES CIRCUIT CONNECTION

INDICATES CIRCUIT CROSSING NOT CONNECTED

INDICATES INTERNALLY GROUNDED UNITS

GROUND

WIRE BUNDLE: CIRCUIT 1, CIRCUIT 2, CIRCUIT 3, CIRCUIT 4

### LEGEND

INDICATES CONSTANT POWER

INDICATES POWER WHEN KEY SWITCH IS ON

TRANSMISSION CONTROL IN PARK
MFD IS OFF

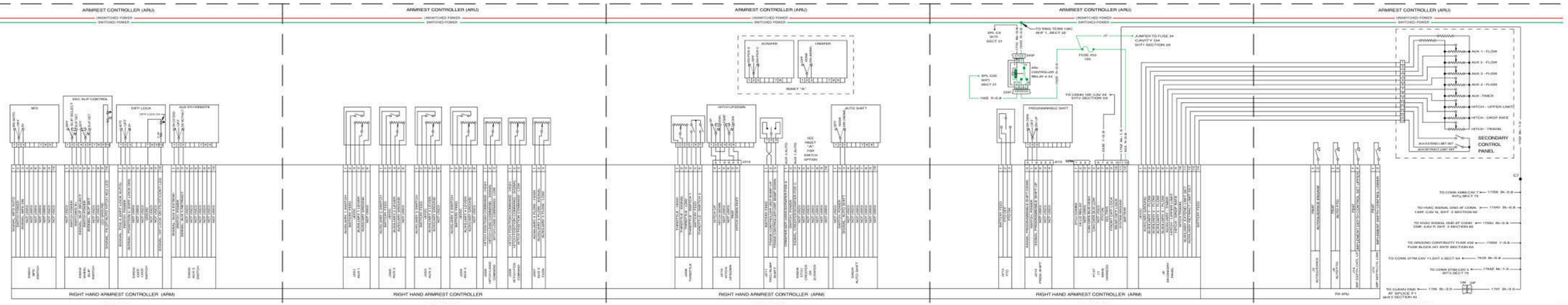
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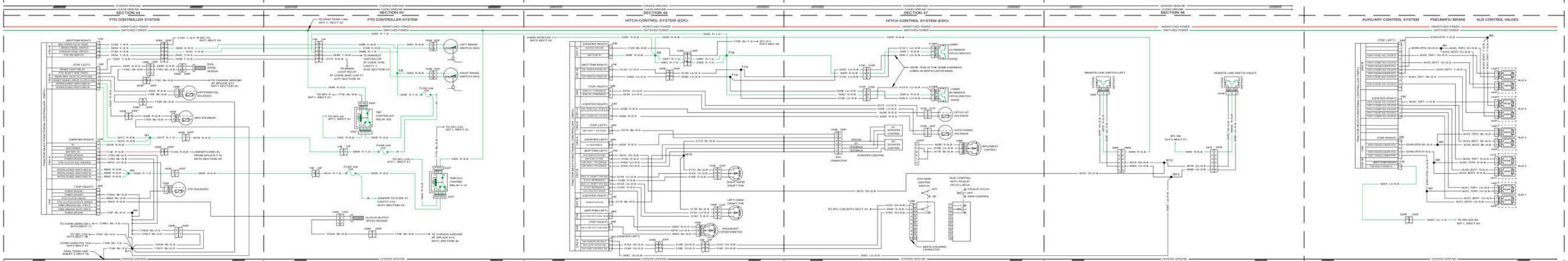
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INSTRUMENT CLUSTER · OPTIONAL FRONT HITCH LAMPS · OPTIONAL WORKLAMPS CAB REAR ROOF · OPTIONAL WORKLAMPS CAB BELTLINE · OPTIONAL 360° WORKLAMPS · STANDARD WORKLAMPS CAB FRONT ROOF · ROOF WARNING LIGHTS (NAO)

OPTIONAL HIGH INTENSITY LAMP · STANDARD HEADLAMPS · WIDE MARKER LIGHT · SINGLE OR OPT TWIN LAMP FENDER LIGHTS · LEFT FENDER STOP, TAIL, TURN LIGHT · RIGHT FENDER STOP, TAIL, TURN LIGHT · FORWARD NEUTRAL REVERSE PARK (FNRP) · HORN

TRANSMISSION CONTROL SYSTEM · TRANSMISSION CONTROL SYSTEM · TRANSMISSION CONTROL SYSTEM · PNEUMATIC BRAKE OPTION · MUX SUSPENSION AXLE CONTROLLER




| CIRCUIT DESCRIPTION | SECTION |
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| AIR CONDITIONING | 58-61 |
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| AUTOMATIC TEMPERATURE CONTROL UNIT | 59 |
| AUXILIARY POWER CONN. (IMPLEMENT) | 68 |
| AUXILIARY POWER (7-PIN TRAILER) | 33 |
| BLOWER MOTOR (ATCU OR CCU) | 59 |
| BRAKE PEDAL SWITCHES | 50 |
| CHARGING SYSTEM | 19 |
| CAB/CONTROLLER POWER | 20 |
| CAN DATA BUS - TRACTOR | 13-18 |
| CIGAR LIGHTER | 68 |
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| CRUISE CONTROL | 57 |
| DIFFERENTIAL LOCK | 44 |
| EGRESS LIGHTING | 27 |
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| ELECTRONIC PTO | 49-50 |
| EMERGING MARKET | 79-80 |
| ETHER START | 80 |
| FOOT THROTTLE | 57 |
| FORWARD/NEUTRAL/REVERSE/PARK | 35-36 |
| HITCH CONTROL SYSTEM | 51-52 |
| HEADLIGHT SWITCH | 28 |
| INSTRUMENT CLUSTER | 24-25 |
| ISO11783 | 70-72 |
| LIGHTS - STANDARD HEAD LIGHTS | 31 |
| - BEACCON | 68 |
| - BRAKE | 32-33 |
| - DOME/CONSOLE | 63 |
| - LICENSE PLATE | N/A |

| CIRCUIT DESCRIPTION | SECTION |
|---|---|
| | |
| - OPTIONAL FRONT HITCH | 27 |
| - OPTIONAL FRONT BELTLINE | 28 |
| - OPTIONAL HIGH INTENSITY LAMP | 31 |
| | |
| - OPTIONAL REAR FENDER WORK | 32-33 |
| - OPTIONAL ROOF WORK CAB | 28 |
| | |
| - STANDARD CAB FENDER | 32-33 |
| - STANDARD CAB FRONT ROOF | 29 |
| - STANDARD FENDER WARNING LAMPS | 32-33 |
| - STANDARD BELTLINE WARNING LAMPS | N/A |
| | |
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| POWER MIRRORS | 64 |
| PTO CONTROLLER SYSTEM | 49-50 |
| RADIO ANTENNA | 62 |
| RADIO SOUND SYSTEM | 62 |
| ROTARY LIGHT SWITCH | 28 |
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| STARTING SYSTEM | 19-20 |
| SUSPENDED AXLE | 43 |
| SWCD MONITOR | 69 |
| TRAILER CONNECTOR (7-PIN) | 33 |
| TRANSMISSION CONTROL SYSTEM | 37-40 |
| WINDSHIELD WIPER/WASHER - FRONT | 65 |
| WINDSHIELD WIPER/WASHER - REAR | 65 |

| ACTUATORS | | | |
|---|---|---|---|
| LEVER | HAND | FOOT | TEMP. |
| LIQUID LEVEL FLOAT | PRESSURE | COIL | DIODE |
| VARIABLE RESISTOR | RESISTOR | CONTACTS: MOMENTARY / MAINTAINED | |

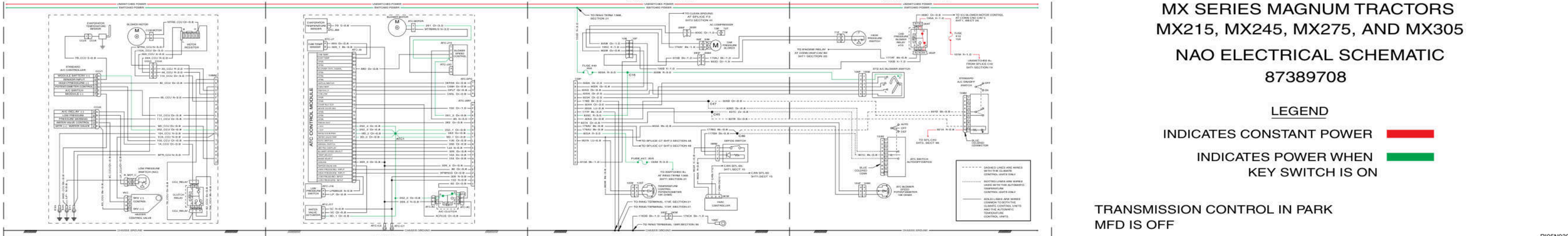
HOUSINGS: VACUUM SWITCH, PRESSURE SWITCH, TEMPERATURE SWITCH, MOTOR, LAMP

CONTACT CONFIGURATIONS: S.P.S.T., S.P.D.T., D.P.S.T., D.P.D.T.

MISCELLANEOUS SYMBOLS: FUSE, CIRCUIT BREAKER, RELAYS, FUSE BLOCK, LED, PHOTO TRANSISTOR

| ABBREVIATION—COLOR | ABBREVIATION—COLOR |
|---|---|
| R—RED | OR—ORANGE |
| T—TAN | K—PINK |
| W—WHITE | P—VIOLET (PURPLE) |
| Y—YELLOW | DU—DARK BLUE |
| BK—BLACK | LU—LIGHT BLUE |
| N—BROWN | DG—DARK GREEN |
| S—GREY | LG—LIGHT GREEN |

CIRCUIT DIAGRAM LEGENDS: 702A R-1.0 (CIRCUIT NUMBER, COLOR, CONDUCTOR AREA) — CIRCUIT TAG IF REQUIRED; C20 — INDICATES CIRCUIT SPLICE; INDICATES CIRCUIT CONNECTION; INDICATES CIRCUIT CROSSING NOT CONNECTED; INDICATES INTERNALLY GROUNDED UNITS; GROUND; WIRE BUNDLE — CIRCUIT 1, CIRCUIT 2, CIRCUIT 3, CIRCUIT 4




# MX SERIES MAGNUM TRACTORS
# MX215, MX245, MX275, AND MX305
# NAO ELECTRICAL SCHEMATIC
# 87389708

## LEGEND

INDICATES CONSTANT POWER

INDICATES POWER WHEN KEY SWITCH IS ON

TRANSMISSION CONTROL IN PARK
MFD IS OFF

RI05N039



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