

## Table of Contents

### MTX Series Tractors Service Manual SM 8-11504

#### 1 GENERAL

Safety Rules, General Information and Torque Specifications .....1001 SM

#### 2 ENGINE

**NOTE:** For Service and Overhaul procedures refer to your Engine Service Manual.

MTX110-175 1000 Series

MTX120-150 B Power Mech MTX165-185 B Power Elec B Power Error Codes How it Works

MTX 200 QSB 5.9

#### 3 FUEL

**NOTE:** For Service and Overhaul procedures refer to your Engine Service Manual.

#### 4 ELECTRICAL

Electrical Troubleshooting and Schematics

MTX110, MTX125 and MTX140 Tractors .....4001 SM

Electrical Schematics

MTX120, MTX135 and MTX150 Tractors .....4001 SM

Electrical Schematics

MTX165, MTX185 and MTX200 Tractors .....4001 SM

Instrument Cluster Programming.....4002 SM

Instrument Cluster Programming

Tractors Equipped With Dot Matrix Display Instrument Clusters .....4002 SM

Battery Servicing and Testing.....4004 SM

#### 5 STEERING

Steering Column and Steering Hand Pump Removal .....5001 SM

Rexroth Steering Hand Pump.....5002 SM

2WD Front Axle .....5003 SM

#### 6 TRANSMISSION

HOW IT WORKS.....

Powershift Transmission Servicing .....6006 SM

Range Transmission Servicing

MC Series and MTX110 to MTX150 Tractors .....6007 SM

Range Transmission Servicing

MTX155 to MTX200 Tractors .....6007 SM

Powershift Valve .....6009 SM

Shuttle Valve.....6010 SM

Differential and Differential Lock

MC Series and MTX110 to MTX150 Tractors .....6012 SM

Differential and Differential Lock

MTX155 to MTX200 Tractors .....6012 SM

Rear Axles and Planetaries

MTX110 to MTX150 Tractors .....6018 SM

PTO - Reversible and Shiftable

MC Series and MTX110 to MTX150 Tractors .....6019 SM

Shiftable PTO

MTX155 to MTX200 Tractors .....6019 SM

MFD Front Axle - 20.19 and 20.22 Axle .....	6021 SM
Independent Front Suspension Axle - 20.25 Axle .....	6022 SM
PTO Front Drive Shaft and Hydraulic Pump Drive Gear MC Series and MTX110 to MTX150 Tractors .....	6023 SM

## 7 BRAKES

Service Brakes.....	7002 SM
Hydraulic Trailer Brake Valve MC Series and MTX110 to MTX150 Tractors .....	7004 SM

## 8 HYDRAULICS

HOW IT WORKS.....	
Hydraulic Troubleshooting and Schematic .....	8001 SM
Hydraulic Troubleshooting and Schematic MTX110 to MTX150 Tractors from Transmission Serial No JJA300646 MTX155 to MTX200 Tractors from Transmission Serial No JJA400695.....	8001 SM
Charge Lubrication Pump MC Series and MTX110 to MTX150 Tractors .....	8003 SM
Charge Lubrication Pump MTX155 to MTX200 Tractors .....	8003 SM
Hydraulic Valves .....	8006 SM
Front Hitch .....	8007 SM
Remote Valves MC Series and MTX110 to MTX150 Tractors .....	8008 SM
Remote Valves (Bosch) MC and MTX Series Tractors .....	8008 SM

## 9 CHASSIS AND MOUNTED EQUIPMENT

Pedal, Lever and Switch Adjustments .....	9001 SM
---	---------

## 10 CONTROLLER SYSTEMS

Hitch/MFD/Differential Lock Controller - Calibration, Error Codes Troubleshooting and Schematics .....	10002 SM
Independent Front Suspension Axle Controller Calibration, Error Codes, Troubleshooting and Schematics.....	10003 SM
Speed Sequencer Controller, F/N/R and powershift - Calibration, Error Codes Troubleshooting and Schematics (For Tractors With Speed Sequencer).....	10004 SM
PTO Controller (For Tractors With Speed Sequencer), F/N/R Controller and Powershift (For Tractors Without Speed Sequencer) - Configuration, Error Codes, Troubleshooting and Schematics .....	10006 SM
Instrument Cluster Controller Software Programming, Error Codes, Troubleshooting and Schematics For Tractors Equipped With Dot Matrix Display Instrument Clusters .....	10009 SM
Hitch and PTO Controller Programming .....	10010 SM
Automatic Temperature Control error Codes, Troubleshooting and Schematics .....	10012 SM

## 11 Other

Auto-Speed Supplement.....	
Cab Suspension.....	
4 <sup>th</sup> Auxiliary valve .....	

# **Section 1001**

**1001**

## **SAFETY, GENERAL INFORMATION AND STANDARD TORQUE SPECIFICATIONS**

## TABLE OF CONTENTS

SAFETY .....	3
GENERAL INFORMATION	
Cleaning .....	5
Inspection .....	5
Bearings .....	5
Needle Bearings .....	5
Gears .....	5
Oil Seals, O-Rings And Gaskets .....	5
Shafts .....	5
Service Parts .....	5
Lubrication .....	5
STANDARD TORQUE DATA FOR NUTS AND BOLTS	
Chart 1 (Plain Nuts/Bolts) .....	6
Chart 2 (Phosphate Coated Nuts/Bolts) .....	6
Chart 3 (Zinc or Cadmium Plated Nuts/Bolts) .....	7

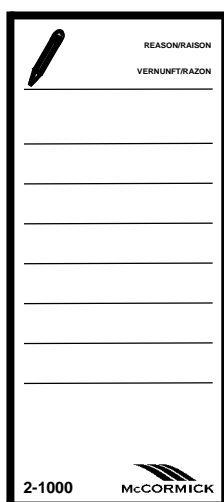
## SAFETY



**This symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED. The message that follows the symbol contains important information about safety. Carefully read the message. Make sure you fully understand the causes of possible injury or death.**

To prevent injury always follow the Warning, Caution and Danger notes in this section and throughout the manual.

Put a warning tag as shown below on the key for the key switch when carrying out servicing or repairs to the tractor. Warning tags (publication number 2-1000) are available from your McCormick dealer.



**WARNING: Read the operators manual to familiarize yourself with the correct control functions.**



**WARNING: Operate the machine and equipment controls from the seat position only. Any other method could result in serious injury.**



**WARNING: This is one a man machine, no riders allowed.**



**WARNING: Before starting engine, study Operator's Manual safety messages. Read all safety signs on machine. Clear the area of other persons. Learn and practice safe use of controls before operating.**

**It is your responsibility to understand and follow manufacturers instructions on machine operation, service, and to observe pertinent laws and regulations. Operator's and Service Manuals may be obtained from you McCormick dealer.**



**WARNING: If you wear clothing that is too loose or do not use the correct safety equipment for your job, you can be injured. Always wear clothing that will not catch on objects. Extra safety equipment that can be required includes hard hat, safety shoes, ear protection, eye or face protection, heavy gloves and reflector clothing.**



**WARNING: When working in the area of the fan belt with the engine running, avoid loose clothing if possible, and use extreme caution.**



**WARNING: When doing checks and tests on the equipment hydraulics, follow the procedures as they are written. DO NOT change the procedure.**



**WARNING: When putting the hydraulic cylinders on this machine through the necessary cycles to check operation or to remove air from a circuit, make sure all people are out of the way.**



**WARNING: Use insulated gloves or mittens when working with hot parts.**



**CAUTION:** Lower all attachments to the ground or use stands to safely support the attachments before you do any maintenance or service.



**CAUTION:** Pin sized and smaller streams of hydraulic oil under pressure can penetrate the skin and result in serious infection. If hydraulic oil under pressure does penetrate the skin, seek medical treatment immediately. Maintain all hoses and tubes in good condition. Make sure all connections are tight. Make a replacement of any tube or hose that is damaged or thought to be damaged. **DO NOT** use your hand to check for leaks, use a piece of cardboard or wood.



**CAUTION:** When removing hardened pins such as a pivot pin, or a hardened shaft, use a soft head (brass or bronze) hammer or use a driver made from brass or bronze and a steel head hammer.



**CAUTION:** When using a hammer to remove and install pivot pins or separate parts using compressed air or using a grinder, wear eye protection that completely encloses the eyes (approved goggles or other approved eye protectors).



**CAUTION:** Use suitable floor (service) jacks or chain hoist to raise wheels or tracks off the floor. Always block machine in place with suitable safety stands.



**CAUTION:** When servicing or repairing the machine. Keep the shop floor and operator's compartment and steps free of oil, water, grease, tools, etc. Use oil absorbing material and or shop cloths as required. Use safe practices at all times.



**CAUTION:** Some components of this machine are very heavy. Use suitable lifting equipment or additional help as instructed in this Service Manual.



**DANGER:** Engine exhaust fumes can cause death. If it is necessary to start the engine in a closed place, remove the exhaust fumes from the area with an exhaust pipe extension. Open the doors and get outside air into the area.



**DANGER:** When the battery electrolyte is frozen, the battery can explode if (1), you try to charge the battery, or (2), you try to jump start and run the engine. To prevent that battery electrolyte from freezing, try to keep the battery at full charge. If you do not follow these instructions, you or others in the area can be injured.



**DANGER:** Batteries contain acid and explosive gas. Explosions can result from sparks, flames or wrong cable connections. To connect the jumper cables correctly to the battery of this machine see the Operator's Manual. Failure to follow these instructions can cause serious injury or death.

## GENERAL INFORMATION

### Cleaning

Clean all metal parts except bearings, in mineral spirits or by steam cleaning. Do not use caustic soda for steam cleaning. After cleaning dry and put oil on all parts. Clean oil passages with compressed air. Clean bearings in kerosene, dry the bearings completely and put oil on the bearings.

### Inspection

Check all parts when the parts are disassembled. Replace all parts that have wear or damage. Small scoring or grooves can be removed with a hone or crocus cloth. Complete visual inspection for indications of wear, pitting and the replacement of parts necessary will prevent early failures.

### Bearings

Check bearings for easy action. If bearings have a loose fit or rough action replace the bearing. Wash bearings with a good solvent or kerosene and permit to air dry. **DO NOT DRY BEARINGS WITH COMPRESSED AIR.**

### Needle Bearings

Before you press needle bearings in a bore always remove any metal protrusions in the bore or edge of the bore. Before you press bearings into position put petroleum jelly on the inside and outside diameter of the bearings.

### Gears

Check all gears for wear and damage. Replace gears that have wear or damage.

### Oil Seals, O-Rings And Gaskets

Always install new oil seals, o-rings and gaskets. Put petroleum jelly on seals and o-rings.

### Shafts

Check all shafts that have wear or damage. Check the bearing and oil seal surfaces of the shafts for damage.

### Service Parts

Always install genuine McCormick service parts, when ordering refer to the Parts Catalog for the correct part number of the genuine McCormick replacement items. Failures due to the use of other than genuine McCormick replacement parts are not covered by warranty.

### Lubrication

Only use the oils and lubricants specified in the Operators or Service Manual. Failures due to the use of non specified oils and lubricants are not covered by warranty.

## STANDARD TORQUE DATA FOR NUTS AND BOLTS

NOTE: A "click type" torque wrench is recommended for the bolt torques listed below.

Chart 1 (Plain Nuts/Bolts)

BOLT SIZE (mm)	TYPE 8.8				TYPE 10.9			
	MIN		MAX		MIN		MAX	
	lb ft	Nm	lb ft	Nm	lb ft	Nm	lb ft	Nm
<b>M4</b>	3.0	4.0	3.4	4.5	4.3	5.8	4.8	6.5
<b>M5</b>	4.8	6.5	5.5	7.5	7.0	9.5	7.8	10.5
<b>M6</b>	8.2	11.0	9.2	12.5	11.8	16.0	13.3	18.0
<b>M8</b>	20.0	27.0	22.5	31.0	28.7	39.0	32.3	44.0
<b>M10</b>	40.0	54.0	45.0	61.0	56.0	77.0	64.0	87.0
<b>M12</b>	69.0	94.0	78.0	106.0	100.0	134.0	110.0	151.0
<b>M14</b>	110.0	150.0	125.0	170.0	160.0	215.0	180.0	240.0
<b>M16</b>	175.0	235.0	190.0	260.0	245.0	335.0	275.0	375.0
<b>M20</b>	345.0	470.0	390.0	530.0	480.0	650.0	540.0	730.0
<b>M22</b>	475.0	640.0	530.0	720.0	655.0	890.0	735.0	1000.0
<b>M24</b>	600.0	810.0	675.0	915.0	830.0	1125.0	930.0	1265.0
<b>M30</b>	1190.0	1615.0	1340.0	1815.0	1645.0	2235.0	1855.0	2515.0
<b>M36</b>	2080.0	2825.0	2340.0	3175.0	2875.0	3900.0	3235.0	4390.0

Chart 2 (Phosphate Coated Nuts/Bolts)

BOLT SIZE (mm)	TYPE 8.8				TYPE 10.9			
	MIN		MAX		MIN		MAX	
	lb ft	Nm	lb ft	Nm	lb ft	Nm	lb ft	Nm
<b>M4</b>	2.3	3.0	2.6	3.4	3.2	4.4	3.6	4.9
<b>M5</b>	3.6	4.9	4.1	5.6	5.2	7.1	5.9	8.0
<b>M6</b>	6.2	8.3	6.9	9.4	8.9	12.0	10.0	13.5
<b>M8</b>	15.0	20.3	16.9	23.3	21.5	29.2	24.2	32.8
<b>M10</b>	30.0	41.0	34.0	46.0	42.0	58.0	48.0	65.0
<b>M12</b>	52.0	71.0	59.0	80.0	75.0	101.0	83.0	113.0
<b>M14</b>	83.0	113.0	94.0	126.0	120.0	161.0	135.0	180.0
<b>M16</b>	131.0	176.0	143.0	195.0	185.0	251.0	205.0	280.0
<b>M20</b>	259.0	353.0	293.0	400.0	360.0	490.0	405.0	550.0
<b>M22</b>	355.0	480.0	400.0	540.0	490.0	665.0	550.0	750.0
<b>M24</b>	450.0	608.0	506.0	686.0	625.0	845.0	700.0	950.0
<b>M30</b>	893.0	1211.0	1005.0	1361.0	1235.0	1675.0	1390.0	1885.0
<b>M36</b>	1560.0	2119.0	1755.0	2381.0	2156.0	2925.0	2425.0	3295.0



Chart 3 (Zinc or Cadmium Plated Nuts/Bolts)

BOLT SIZE (mm)	TYPE 8.8				TYPE 10.9			
	MIN		MAX		MIN		MAX	
	lb ft	Nm	lb ft	Nm	lb ft	Nm	lb ft	Nm
<b>M4</b>	2.6	3.5	2.9	3.9	3.7	5.0	4.1	5.6
<b>M5</b>	4.1	5.6	4.6	6.3	5.9	8.0	6.6	9.0
<b>M6</b>	7.0	9.5	7.8	10.6	10.0	13.6	11.3	15.3
<b>M8</b>	17.0	23.1	19.1	25.9	24.4	33.1	27.4	37.2
<b>M10</b>	34.0	46.0	38.3	52.0	48.0	65.0	54.0	74.0
<b>M12</b>	59.0	80.0	66.0	90.0	85.0	114.0	94.0	128.0
<b>M14</b>	94.0	128.0	106.0	145.0	136.0	183.0	153.0	205.0
<b>M16</b>	149.0	200.0	161.0	220.0	208.0	285.0	235.0	320.0
<b>M20</b>	293.0	400.0	330.0	450.0	408.0	555.0	460.0	620.0
<b>M22</b>	400.0	545.0	450.0	615.0	555.0	755.0	625.0	850.0
<b>M24</b>	510.0	690.0	575.0	780.0	705.0	955.0	790.0	1075.0
<b>M30</b>	1010.0	1375.0	1140.0	1545.0	1400.0	1900.0	1580.0	2140.0
<b>M36</b>	1770.0	2400.0	1990.0	2700.0	2445.0	3315.0	2750.0	3730.0

# **Section 4001**

**4001**

## **ELECTRICAL TROUBLESHOOTING AND SCHEMATICS**

**MTX110, MTX125, MTX140,  
MTX155 and MTX175 Tractors**

## TABLE OF CONTENTS

SPECIAL TOOLS .....	4
CIRCUIT TESTING	
General Information .....	5
FUSE LOCATION AND IDENTIFICATION	
(European Specification Tractors) .....	8
FUSE LOCATION AND IDENTIFICATION	
(American Specification Tractors) .....	10
SWITCHES AND CONTROLS	
Instrument Panel .....	12
Deluxe Cab Roof Controls (Operator Environment) .....	12
Right Hand Console .....	13
HARNESS LAYOUT AND CHASSIS GROUND LOCATIONS	
Instrument Panel Harness and Components .....	15
Right Hand Console Harness Components	
(Tractors Without Speed Sequencer) .....	16
Right Hand Console Harness Components (Tractors with Speed Sequencer) .....	17
Engine Harness Components .....	18
MTX110, MTX125 and MTX140 Transmission Harness Components .....	19
MTX155, and MTX175 Transmission Harness Components .....	20
Deluxe Cab Harness and Rear Fender Harness Components .....	21
Platform Harness and Rear Fender Harness Components .....	22
STARTER MOTOR, NEUTRAL START, FUEL SHUT-OFF	
COLD START AND CAB POWER RELAY .....	23
INSTRUMENT CLUSTER WARNING LIGHTS AND GAUGES .....	36
FRONT PTO, ROTARY BEACON AND ELECTRIC MIRRORS .....	56
4TH AUXILIARY SOLENOIDS, IMPLEMENT INTERFACE CONNECTOR	
AND 3 PIN AUXILIARY POWER CONNECTORS .....	74
HORN, CIGAR LIGHTER, SWITCHED FENDER AUXILIARY	
POWER CONNECTOR, 7 POLE SOCKET AUXILIARY POWER	
AND ELECTRIC AIR SEAT .....	84
RADIO AND INTERIOR LIGHT .....	90
BLOWER MOTORS AND AIR CONDITIONING .....	96
FRONT AND REAR WINDSCREEN WIPER/WASHER .....	108
BRAKE LIGHTS AND EUROPEAN SPECIFICATION AIR TRAILER BRAKE .....	118

---

EUROPEAN SPECIFICATION POSITION LIGHTS AND TURN SIGNAL .....	128
EUROPEAN SPECIFICATION HEADLIGHTS AND REAR FOG LIGHTS .....	150
AMERICAN SPECIFICATION WARNING AND TURN SIGNAL LIGHTS .....	166
AMERICAN SPECIFICATION HEADLIGHTS, POSITION LIGHTS AND RIGHT HAND CONSOLE LIGHT .....	184
WORK LIGHTS .....	198
MAIN CONNECTORS .....	217
HITCH, MFD AND DIFFERENTIAL LOCK .....	Refer to Section 10002
INDEPENDENT FRONT SUSPENSION AXLE .....	Refer to Section 10003
SPEED SEQUENCER .....	Refer to Section 10004
PTO, FORWARD/NEUTRAL/REVERSE (FNR) AND POWERSHIFT .....	Refer to Section 10006

**SPECIAL TOOLS**



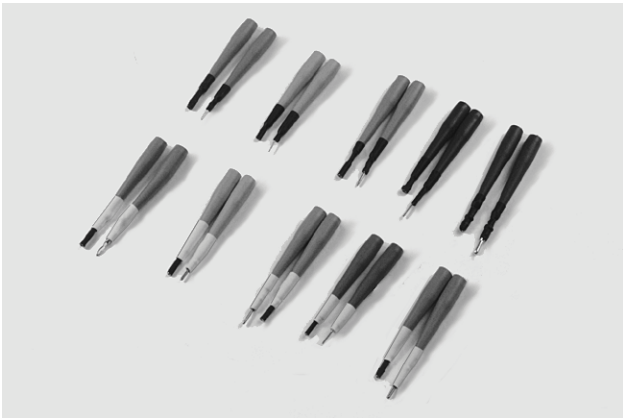
DD98H120

**MC2616 MULTIMETER KIT includes:  
MC2616-1 MULTIMETER ONLY  
MC2616-2 TEST LEADS  
MC2616-3 TEMPERATURE PROBE**



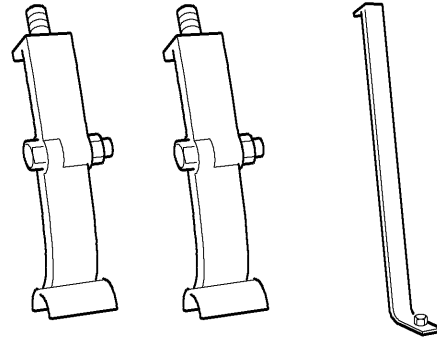
DD97E383

**MC31000 HARNESS REPAIR KIT**



DD99A051

**MC2656 TEST PROBE KIT**



DI97K101

**MC2530 and MC2531 CAB ROOF TILT TOOLS**



DP99A034

**MC2636 OPTICAL TACHOMETER  
OR EQUIVALENT**

## CIRCUIT TESTING

### General Information



**WARNING:** *Never operate the engine in a closed building. Proper ventilation is required under all circumstances.*



**WARNING:** *Before carrying out any servicing, repairs or troubleshooting procedures on tractors equipped with speed sequencer make sure the range transmission selector levers are in NEUTRAL and the range selector rods are disconnected. Failure to do this may result in serious injury.*

**IMPORTANT:** *MAKE SURE the transmission range levers are in NEUTRAL and the speed sequencer selector rods are disconnected, refer to Section 10004 for the correct procedure.*

**IMPORTANT:** *All electrical checks must be made with the tractor parked on hard level ground with the parking brake engaged and the engine OFF unless otherwise stated.*

**IMPORTANT:** *Put blocks in front of and behind the rear wheels.*

**IMPORTANT:** *The battery must be at full charge and all connections must be clean and tight before testing. Only use a HIGH IMPEDANCE multimeter for the tests. Do not use a test lamp or damage to the switches may occur.*

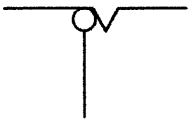
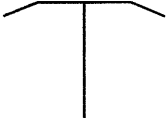

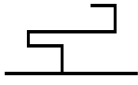




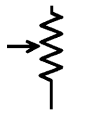






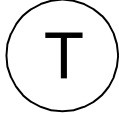



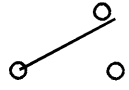
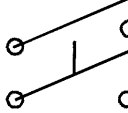
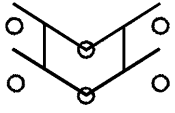


**IMPORTANT:** *Use MC2656 test probe kit when making electrical checks at connectors to avoid the risk of shorting between the connector pins or terminals.*

**NOTE:** *When measuring resistance values, always measure the resistance of the multimeter leads before testing components. Subtract the resistance of the multimeter leads from the component resistance to obtain a true resistance value.*

**NOTE:** *When testing diodes and diode modules use the multimeter diode test function.*

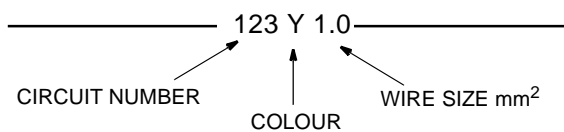
**NOTE:** *All components, wires and connectors disconnected during any electrical checks must be connected when the checks are completed.*

## Schematic Symbols

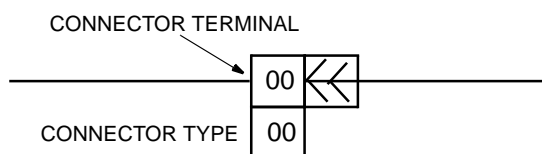
ACTUATORS				
				
LEVER	HAND	FOOT	TEMPERATURE	
				
LIQUID LEVEL FLOAT	PRESSURE	COIL	DIODE	
			CONTACTS	
VARIABLE RESISTOR	RESISTOR	MAGNETIC	 MOMENTARY  MAINTAINED	
HOUSINGS				
				
VACUUM SWITCH	PRESSURE SWITCH	TEMPERATURE SWITCH	MOTOR	LIGHT
SWITCH CONTACT CONFIGURATION				
				
S.P.S.T. (SINGLE POLE SINGLE THROW)	S.P.D.T. (SINGLE POLE DOUBLE THROW)	D.P.S.T. (DOUBLE POLE SINGLE THROW)	D.P.D.T. (DOUBLE POLE DOUBLE THROW)	
MISCELLANEOUS SYMBOLS				
				
FUSE	CIRCUIT BREAKER			

**NOTE:** Schematic symbols shown with tractor parked and power OFF.

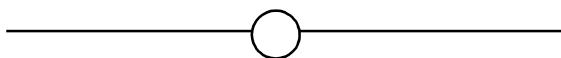
## Schematic Legend



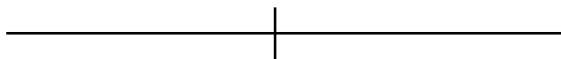
CIRCUIT TAG IF REQUIRED



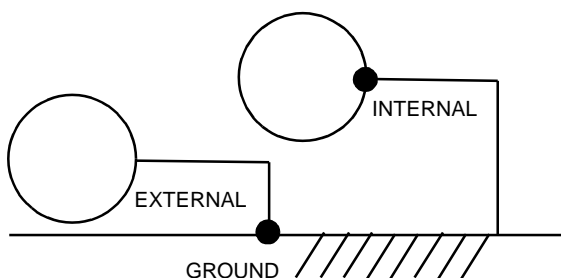
INDICATES INLINE CONNECTION WITH TERMINALS



INDICATES CIRCUIT CONNECTION



INDICATES CIRCUIT CROSSING NOT CONNECTED



INDICATES CHASSIS GROUND CONNECTIONS

## Wire Colour Code

R.....	RED
T.....	TAN
W.....	WHITE
Y.....	YELLOW
B.....	BLACK
G.....	GREY
O.....	ORANGE
P.....	PINK
V.....	VIOLET (PURPLE)
BR.....	BROWN
DB.....	DARK BLUE
DG.....	DARK GREEN
LB.....	LIGHT BLUE
LG.....	LIGHT GREEN



**BUY NOW**

**Then Instant Download  
the Complete Manual  
Thank you very much!**