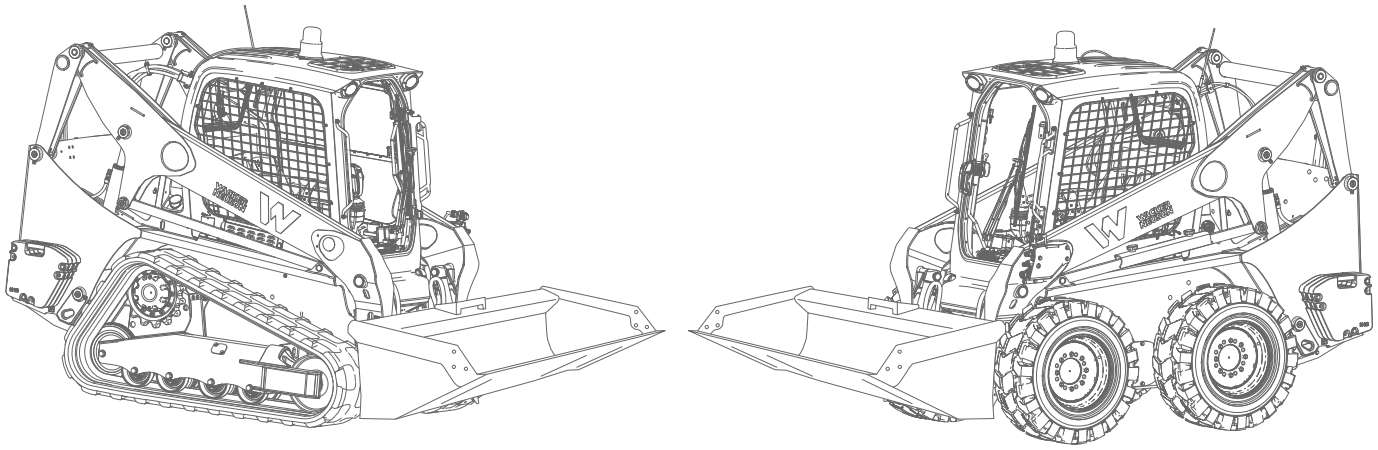
Medium Frame Skid Steer Loader / Compact Track Loader With Tier 4 Engine Service Manual



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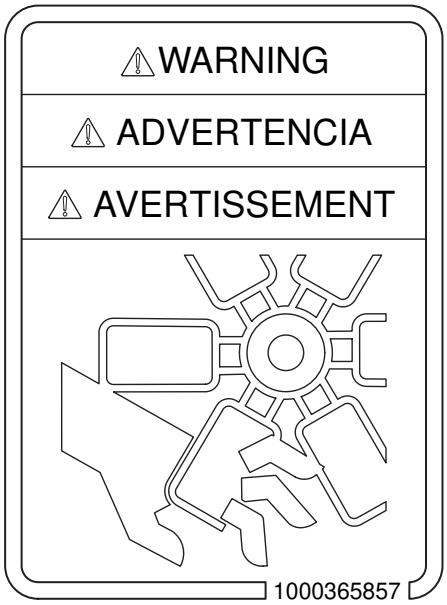
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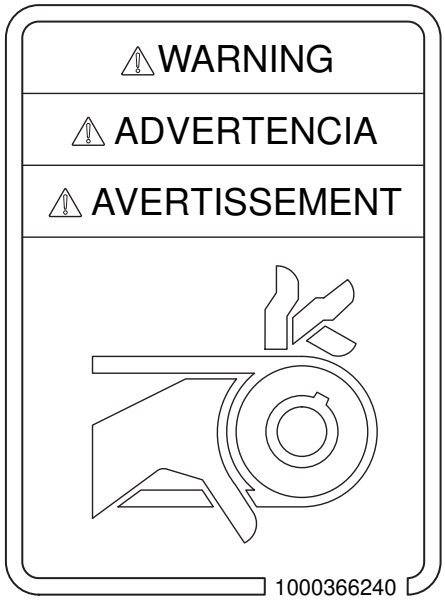
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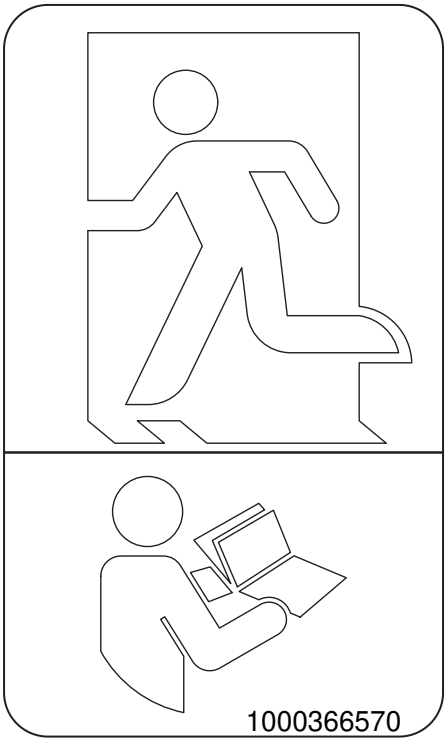
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Chapter 1

Specifications and General Information

1

Chapter 2

Electrical

Electrical Schematic Component Identification

Electrical Schematic Component Identification

Electrical components shown in the main schematic are identified with an alpha-numeric callout. All electrical components shown in the electrical schematic are listed below.

- A001—Radio (See **Figure 2-26**)
- B001—Fuel Level Sensor (See **Figure 2-26**)
- B002—Horn (See **Figure 2-16**)
- B003—Back Up Alarm (See **Figure 2-28**)
- B007—Hydraulic Oil Temperature Sensor (See **Figure 2-18**)
- B011A—RH Lower Speaker (See **Figure 2-26**)
- B011B—LH Lower Speaker (See **Figure 2-26**)
- B012A—RH Rear Speaker (See **Figure 2-26**)
- B012B—LH Rear Speaker (See **Figure 2-26**)
- B116—Boom Foot Pedal Sensor (See **Figure 2-20**)
- B117—Bucket Foot Pedal Sensor (See **Figure 2-20**)
- B118—Left Forward Neutral Reverse Swash Angle Position Sensor (See **Figure 2-15**)
- B119—Right Forward Neutral Reverse Swash Angle Position Sensor (See **Figure 2-15**)
- B121—Pressure Transducer (See **Figure 2-18**)
- C10—Engine (See **Figure 2-6**)
- E004—Left Tail Light (See **Figure 2-10**)
- E002—Right Tail Light (See **Figure 2-10**)
- E009—Right Front Work Light (See **Figure 2-10**)
- E010—Left Front Work Light (See **Figure 2-10**)
- E014—Dome Light (See **Figure 2-10**)
- E029—Left Rear Work Light (See **Figure 2-10**)
- E030—Right Rear Work Light (See **Figure 2-10**)
- E1C1—Engine Wire Harness Connector (See **Figures 2-11** and **2-26**)
- F000—Main Fuse (100-Amp)**Figures 2-8** and **2-13**)
- F001—15A HVAC Fuse (See **Figures 2-7** and **2-30**)
- F002—5A Instrument Display Fuse (See **Figures 2-7**, **2-15**, and **2-26**)
- F003—10A Cab Power Fuse (See **Figures 2-5**, **2-7**, **2-12**, **2-19**, **2-21**, **2-22**, and **2-29**)
- F004—15A Wiper Fuse (See **Figures 2-7** and **2-29**)
- F005—2A Beacon Fuse (See **Figures 2-7** and **2-10**)
- F006—30A (MCU) Fuse (See **Figure 2-7**)
- F007—20A Socket Fuse (See **Figure 2-7**)
- F008—20A Key Switch Fuse (See **Figures 2-6** and **2-7**)
- F009—25A AUX Electric (See **Figures 2-7** and **2-12**)
- F010—20A Lights: Work Lights Switch Fuse (See **Figures 2-7** and **2-10**)
- F011—20A Lights: Front Work Lights Fuse (See **Figures 2-7** and **2-10**)
- F012—15A Joysticks Fuse (See **Figures 2-7**, **2-14**, and **2-27**)
- F013—10A Seat: Heat and Compressor Fuse (See **Figures 2-7** and **2-27**)
- F014—5A Seat: Seat Switch and Belt Switch Fuse (See **Figures 2-7** and **2-27**)
- F015—10A Horn/Dome Light Fuse (See **Figures 2-7**, **2-10**, and **2-16**)
- F016—25A AUX Electric (J) Fuse (See **Figures 2-7** and **2-12**)
- F017—15A Starter Fuse (See **Figures 2-8** and **2-11**)
- F018—20A Engine Fuse (See **Figures 2-8** and **2-11**)
- F019—10A Lift Pump Fuse (See **Figures 2-8** and **2-11**)
- F020—10A DCU Fuse (See **Figures 2-8**, **2-15**, **2-28** and **2-31**)
- F021—20A HVAC Fuse (See **Figures 2-8** and **2-30**)
- F022—5A Engine Fuse (See **Figures 2-8**, **2-11**, and **2-31**)
- F023—5A Engine Fuse (See **Figures 2-8** and **2-11**)
- F024—5A Engine Fuse (See **Figures 2-8** and **2-11**)
- F025—25A AUX Electric (K) Fuse (See **Figures 2-8** and **2-13**)
- F026—15A AUX Pin C Fuse (See **Figure 2-13**)
- F027—15A AUX Pin D Fuse (See **Figure 2-13**)
- F028—15A AUX Pin E Fuse (See **Figure 2-13**)
- F029—15A AUX Pin F Fuse (See **Figure 2-13**)
- F030—15A AUX Pin G Fuse (See **Figure 2-13**)
- F031—15A AUX Pin H Fuse (See **Figure 2-13**)
- G1—Battery (See **Figures 2-8** and **2-13**)
- H028—Beacon Light (See **Figure 2-10**)
- K047—Work Lights Relay (See **Figures 2-7**, **2-9**, and **2-10**)
- K130—Horn Relay (See **Figures 2-7**, **2-9**, and **2-16**)

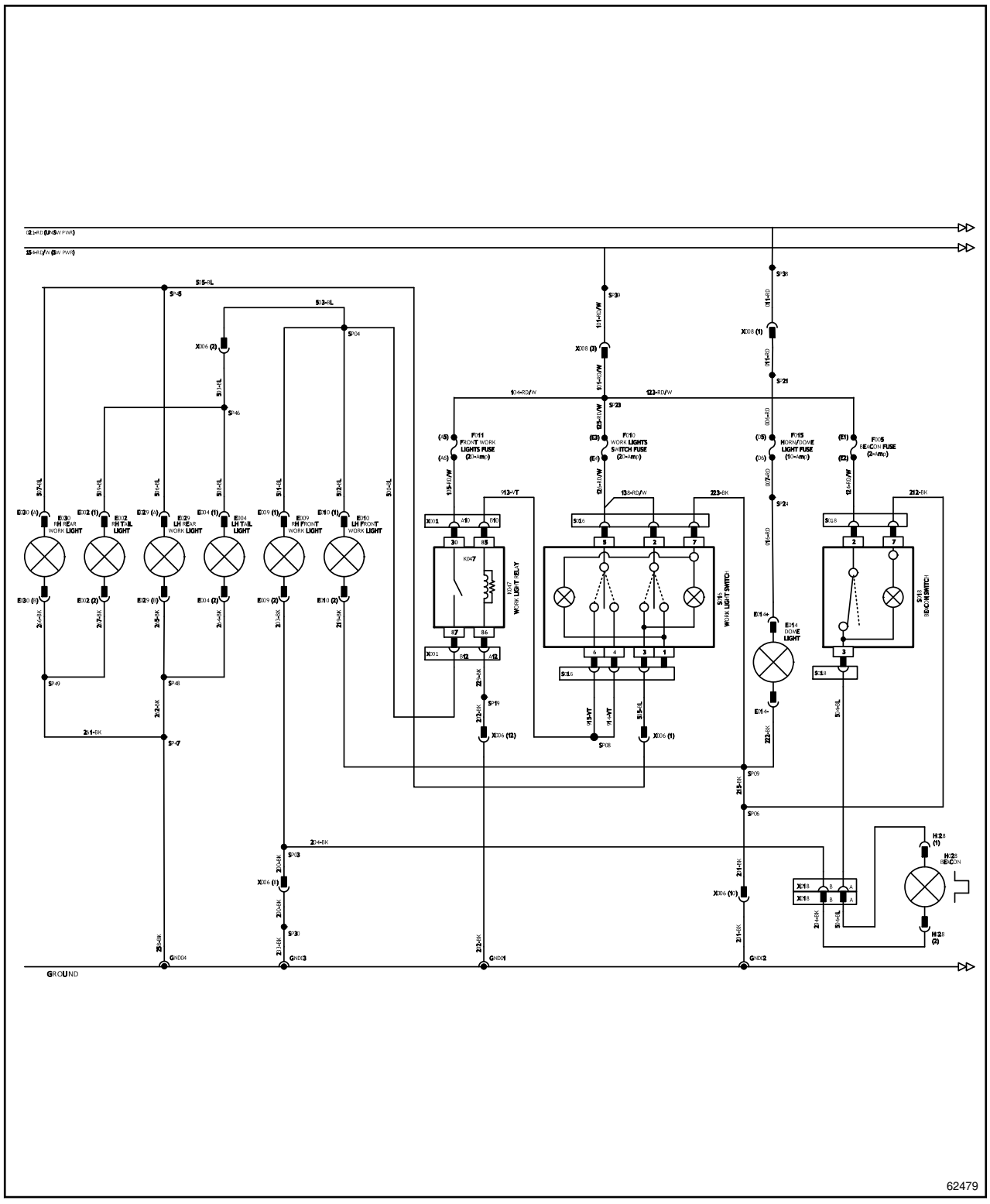


Figure 2-10: Lighting

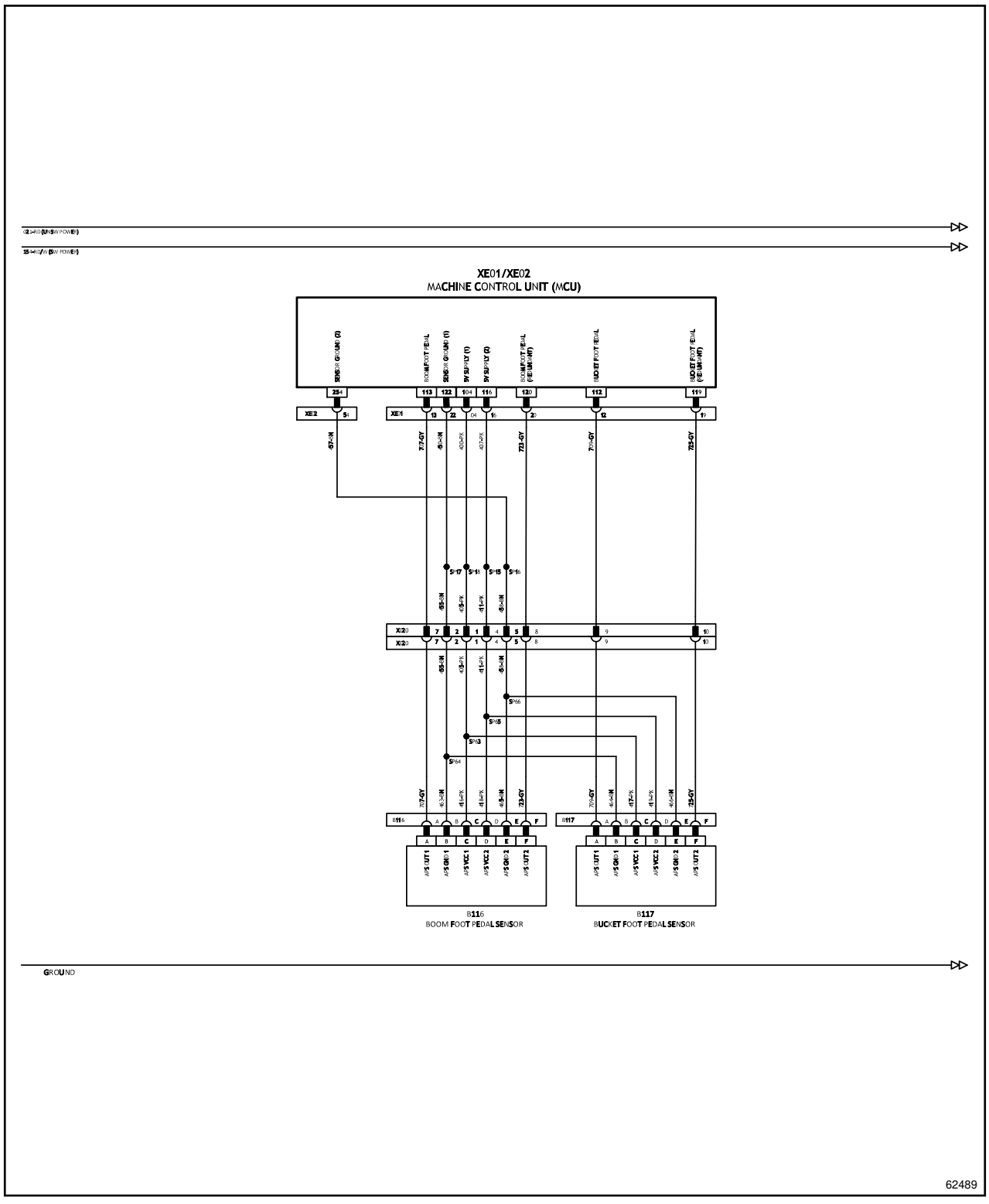


Figure 2-20: Hydraulics - Manual Foot Controls

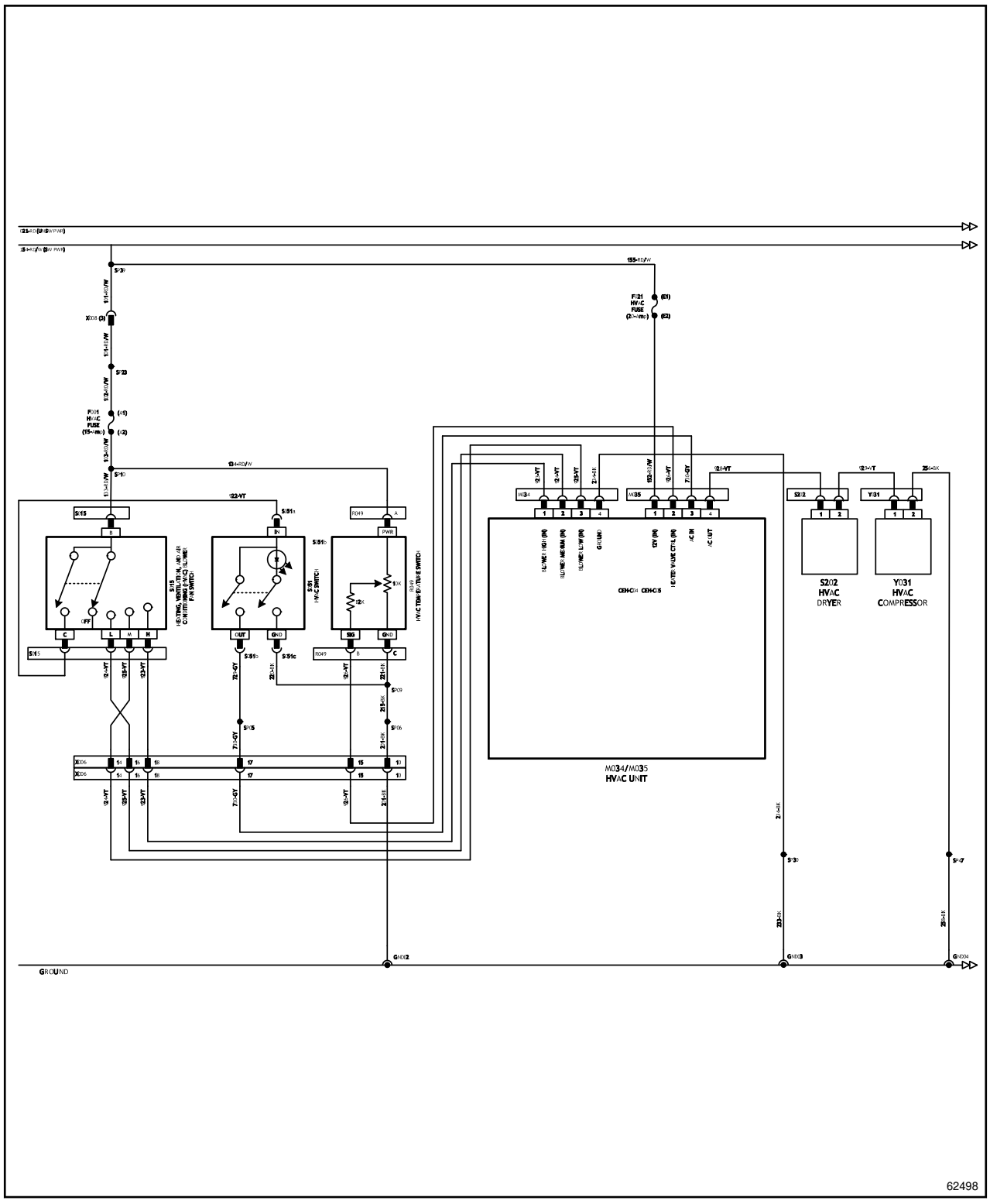


Figure 2-30: Heating, Ventilation, and Air Conditioning (HVAC)

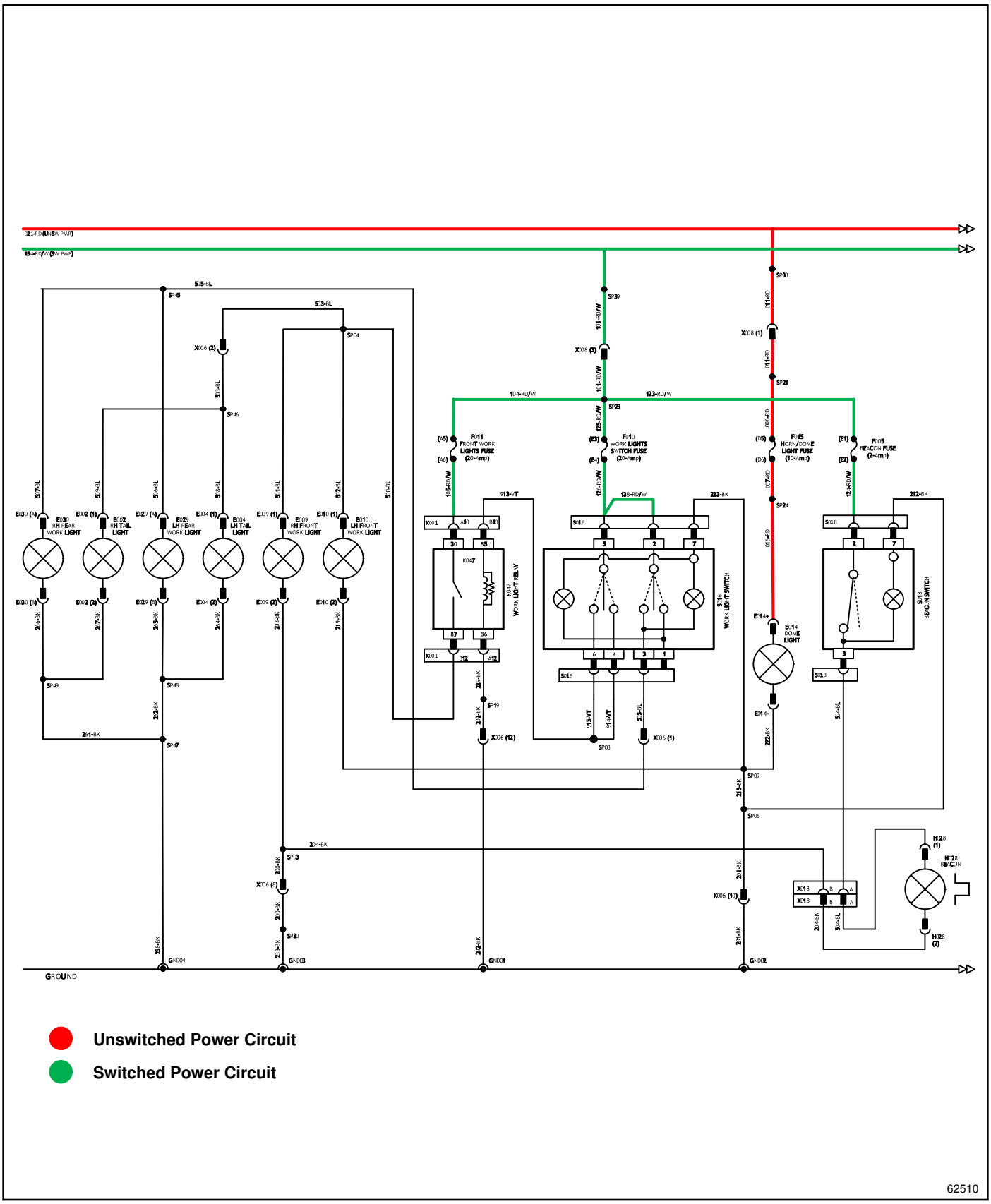


Figure 2-38: Lighting

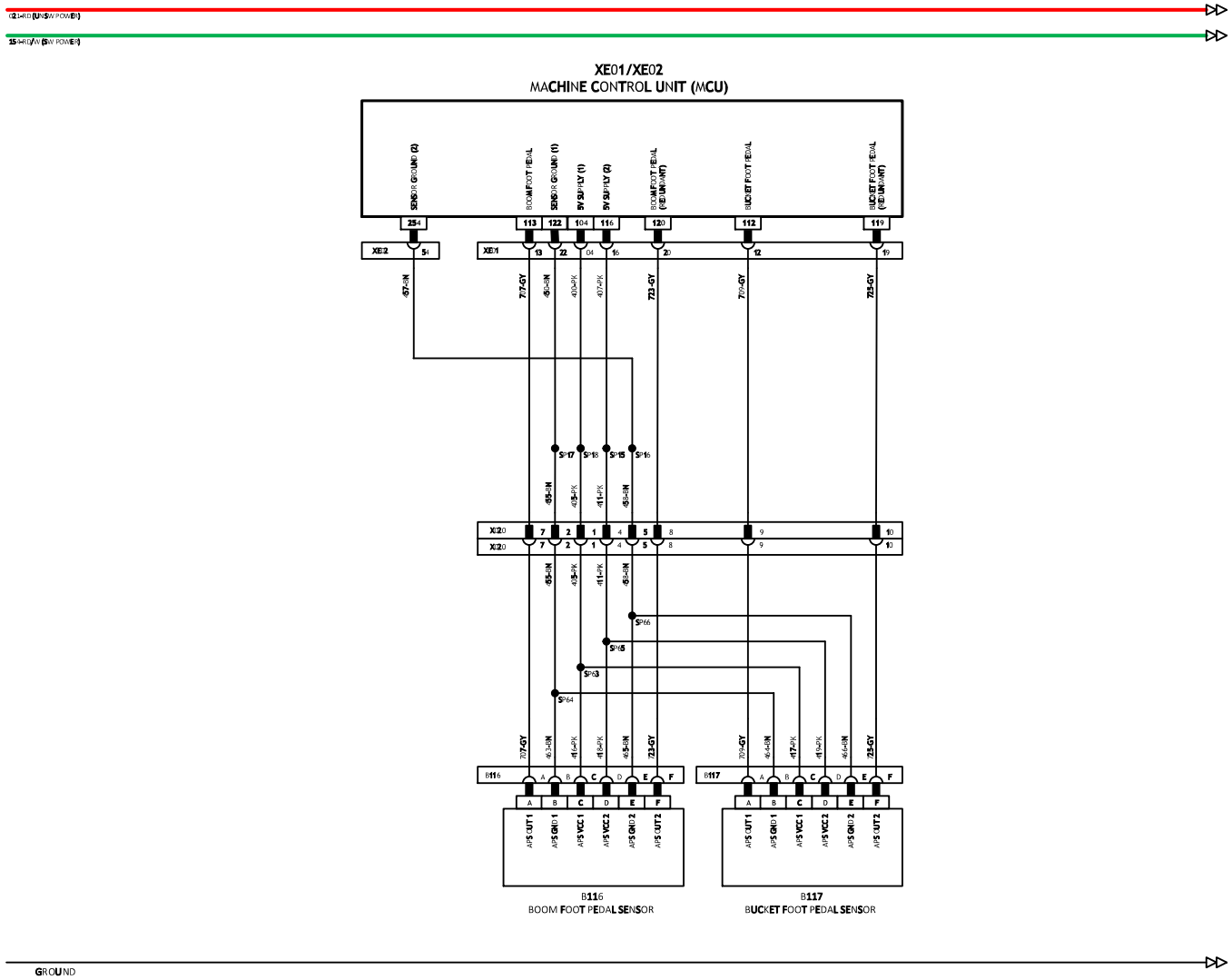


Figure 2-48: Hydraulics - Manual Foot Controls

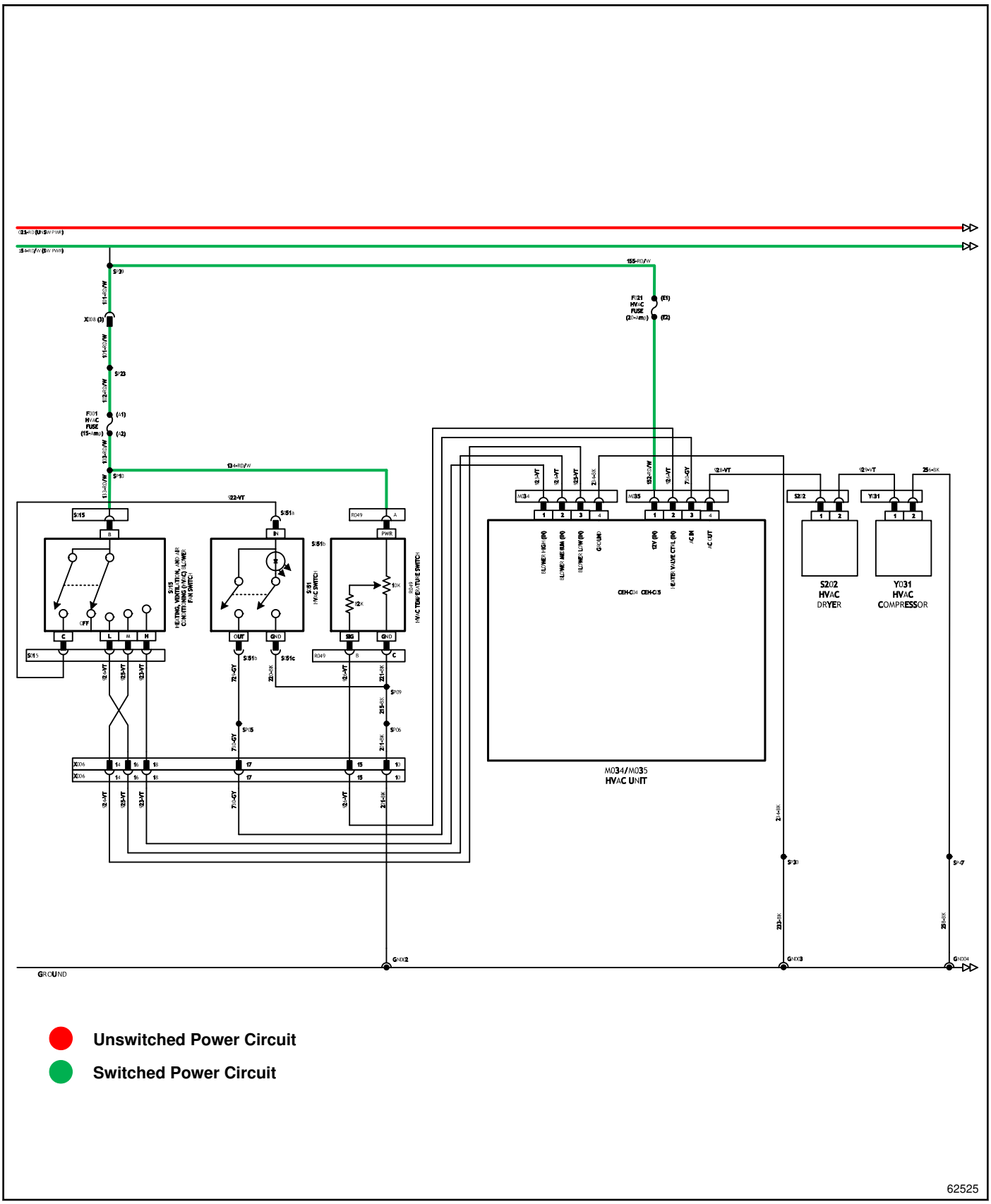


Figure 2-58: Heating, Ventilation, and Air Conditioning (HVAC)

Drive Circuit—Forward Theory of Operation (ISO-Mode)

Unswitched Power Circuit

Unswitched power is available from the battery positive terminal to the battery disconnect switch (S12). Unswitched power is then provided to the starter motor and to the 100-amp main fuse (F000).

Unswitched power is made available from the 100-amp main fuse cable connector (PWR01) to the following:

- 20-amp key switch fuse (F008)
- Main power relay (K902) terminal 03
- 5-amp seat: seat switch and seat belt switch fuse (F014)

Unswitched power is provided from the 20-amp key switch fuse (F008) to key switch (S001) terminals A and B.

Unswitched power is provided from the 5-amp seat: seat switch and seat belt switch fuse (F014) to Seat Control Unit (SCU) (X023) terminals 05 and 08.

Interlock Circuit

When the seat switch is in the closed position, the SCU (X023) sends output voltage from terminal 07 to the Machine Control Unit (MCU) (XE01) terminal 255.

When the seat belt switch is in the closed position, the SCU (X023) sends output voltage from terminal 10 to the MCU (XE01) terminal 145.

With the park brake switch (S065) in the disengaged position, the MCU (XE01) provides power from terminal 139 to the park brake release solenoid (Y043) terminal 1 and resistor (R005). The Danfoss Control Unit (DCU) (XE05) terminal 05 provides a ground for the park brake release solenoid (Y043) terminal 2, energizing the solenoid.

With the interlock circuit complete, all hydrostatic drive functions become active.

Switched Power

When the key switch (S001) is turned to the ON position, power is provided from key switch (S001) terminal C to diode connector (V004) terminal 2. Power is then provided from diode connector (V004) terminal 1 to main power relay (K902) terminal 02, energizing the relay. With the main power relay (K902) energized, switched power is provided from main power relay (K902) terminal 05 to the following:

- 5-amp instrument display fuse (F002)
- 10-amp cab power fuse (F003)
- 15-amp joysticks fuse (F012)
- 10-amp DCU fuse (F020)

Switched power is provided from the 5-amp instrument display fuse (F002) to the H/ISO pattern selection switch (S203) terminal 5.

Switched power is provided from the 10-amp cab power fuse (F003) to the park brake switch (S065) terminal 2.

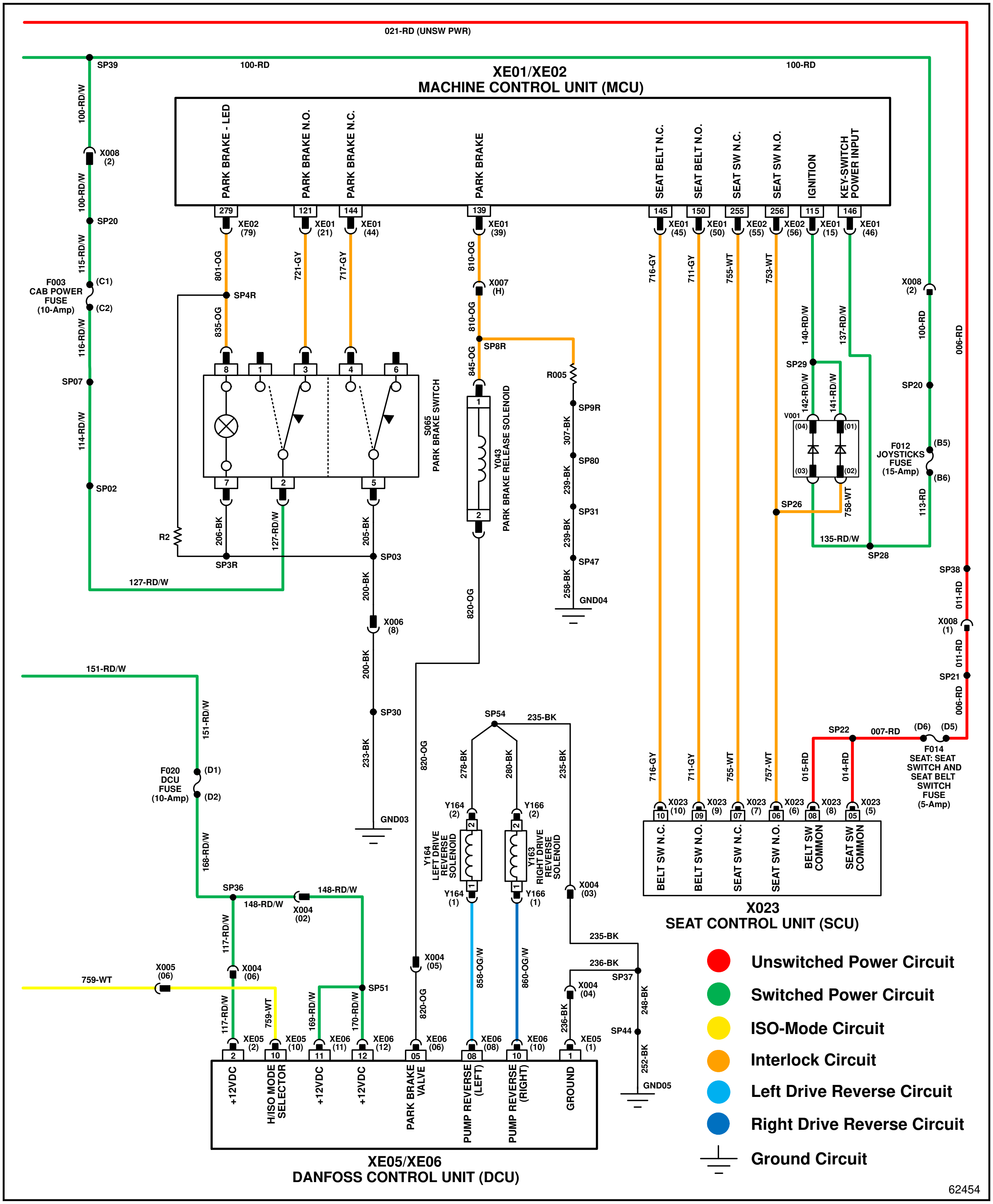
Switched power is provided from the 15-amp joysticks fuse (F012) to the LH joystick (X010), diode connector (V001) terminal 3, and MCU (XE01) terminal 146.

Switched power is provided from the 10-amp DCU fuse (F020) to the DCU (XE05/XE06) terminals 2, 11, and 12.

Forward Circuit

When ISO mode is selected on the H/ISO pattern selection switch (S203), switched power is provided from H/ISO pattern selection switch (S203) terminal 5 to H/ISO pattern selection switch (S203) terminal 6. Power is provided from H/ISO pattern selection switch (S203) terminal 6 to the DCU (XE05) terminal 10.

When the LH joystick (X010) is in the forward position (forward), power is provided from the DCU (XE06) terminal 07 to the left drive forward solenoid (Y166) terminal 1, and from the DCU (XE06) terminal 09 to the right drive forward solenoid (Y165) terminal 1, activating both solenoids.



021-RD (UNSW PWR)
SP39
100-RD
XE01/XE02
MACHINE CONTROL UNIT (MCU)
PARK BRAKE - LED
PARK BRAKE N.O.
PARK BRAKE N.C.
PARK BRAKE
SEAT BELT N.C.
SEAT BELT N.O.
SEAT SW N.C.
SEAT SW N.O.
IGNITION
KEY-SWITCH POWER INPUT
100-RD/W
X008 (2)
SP20
115-RD/W
F003 CAB POWER FUSE (10-Amp)
(C1)
(C2)
116-RD/W
SP07
114-RD/W
SP02
801-OG
SP4R
835-OG
721-GY
717-GY
810-OG
X007 (H)
SP8R
845-OG
R005
SP9R
307-BK
SP80
239-BK
SP31
SP47
258-BK
GND04
S065 PARK BRAKE SWITCH
Y043 PARK BRAKE RELEASE SOLENOID
R2
206-BK
127-RD/W
205-BK
SP3R
SP03
200-BK
X006 (8)
SP30
233-BK
GND03
820-OG
716-GY
711-GY
755-WT
753-WT
140-RD/W
137-RD/W
SP29
142-RD/W
141-RD/W
V001
758-WT
SP26
135-RD/W
SP28
F012 JOYSTICKS FUSE (15-Amp)
(B5)
(B6)
113-RD
006-RD
SP38
011-RD
X008 (1)
SP21
151-RD/W
F020 DCU FUSE (10-Amp)
(D1)
(D2)
168-RD/W
SP36
148-RD/W
X004 (02)
117-RD/W
X004 (06)
759-WT
X005 (06)
169-RD/W
170-RD/W
SP51
SP54
235-BK
278-BK
280-BK
Y164 LEFT DRIVE REVERSE SOLENOID
Y163 RIGHT DRIVE REVERSE SOLENOID
Y166
X004 (03)
X004 (05)
858-OG/W
860-OG/W
236-BK
SP37
X004 (04)
248-BK
SP44
252-BK
GND05
SP22
007-RD
(D6)
(D5)
F014 SEAT: SEAT SWITCH AND SEAT BELT SWITCH FUSE (5-Amp)
015-RD
014-RD
757-WT
X023
BELT SW N.C.
BELT SW N.O.
SEAT SW N.C.
SEAT SW N.O.
BELT SW COMMON
SEAT SW COMMON
X023 SEAT CONTROL UNIT (SCU)
+12VDC
H/ISO MODE SELECTOR
PARK BRAKE VALVE
PUMP REVERSE (LEFT)
PUMP REVERSE (RIGHT)
GROUND
XE05/XE06 DANFOSS CONTROL UNIT (DCU)
Unswitched Power Circuit
Switched Power Circuit
ISO-Mode Circuit
Interlock Circuit
Left Drive Reverse Circuit
Right Drive Reverse Circuit
Ground Circuit
62454

Figure 2-69

Drive Circuit—Right Turn Theory of Operation (H-Mode)

Unswitched Power Circuit

Unswitched power is available from the battery positive terminal to the battery disconnect switch (S12). Unswitched power is then provided to the starter motor and to the 100-amp main fuse (F000).

Unswitched power is made available from the 100-amp main fuse cable connector (PWR01) to the following:

- 20-amp key switch fuse (F008)
- Main power relay (K902) terminal 03
- 5-amp seat: seat switch and seat belt switch fuse (F014)

Unswitched power is provided from the 20-amp key switch fuse (F008) to key switch (S001) terminals A and B.

Unswitched power is provided from the 5-amp seat: seat switch and seat belt switch fuse (F014) to Seat Control Unit (SCU) (X023) terminals 05 and 08.

Interlock Circuit

When the seat switch is in the closed position, the SCU (X023) sends output voltage from terminal 07 to the Machine Control Unit (MCU) (XE01) terminal 255.

When the seat belt switch is in the closed position, the SCU (X023) sends output voltage from terminal 10 to the MCU (XE01) terminal 145.

With the park brake switch (S065) in the disengaged position, the MCU (XE01) provides power from terminal 139 to the park brake release solenoid (Y043) terminal 1 and resistor (R005). The Danfoss Control Unit (DCU) (XE06) terminal 05 provides a ground for the park brake release solenoid (Y043) terminal 2, energizing the solenoid.

With the interlock circuit complete, all hydrostatic drive functions become active.

Switched Power

When the key switch (S001) is turned to the ON position, power is provided from key switch (S001) terminal C to diode connector (V004) terminal 2. Power is then provided from diode connector (V004) terminal 1 to main power relay (K902) terminal 02, energizing the relay. With the main power relay (K902) energized, switched power is provided from main power relay (K902) terminal 05 to the following:

- 5-amp instrument display fuse (F002)
- 10-amp cab power fuse (F003)
- 15-amp joysticks fuse (F012)
- 10-amp DCU fuse (F020)

Switched power is provided from the 5-amp instrument display fuse (F002) to the H/ISO pattern selection switch (S203) terminal 5.

Switched power is provided from the 10-amp cab power fuse (F003) to the park brake switch (S065) terminal 2.

Switched power is provided from the 15-amp joysticks fuse (F012) to the LH joystick (X010) terminal 2, RH joystick (X012) terminal 1, diode connector (V001) terminal 3, and MCU (XE01) terminal 146.

Switched power is provided from the 10-amp DCU fuse (F020) to the DCU (XE05/XE06) terminals 2, 11, and 12.

Right Turn Circuit

When H mode is selected on the H/ISO pattern selection switch (S203), switched power is provided from H/ISO pattern selection switch (S203) terminal 5 to the H/ISO pattern selection switch (S203) terminal 4. Switched power is then provided from the H/ISO pattern selection switch (S203) terminal 4 to H/ISO pattern selection switch (S203) terminal 2. Switched power is provided from H/ISO pattern selection switch (S203) terminal 2 to the H/ISO pattern selection switch (S203) terminal 1. Power is provided from H/ISO pattern selection switch (S203) terminal 1 to the DCU (XE06) terminal 11.

When joysticks are in the right turn position (LH joystick [X010] forward RH joystick [X012] back), power is provided from the DCU (XE06) terminal 07 to the left drive forward solenoid (Y166) terminal 1, and from the DCU (XE06) terminal 10 to the right drive reverse solenoid (Y163) terminal 1, activating both solenoids.

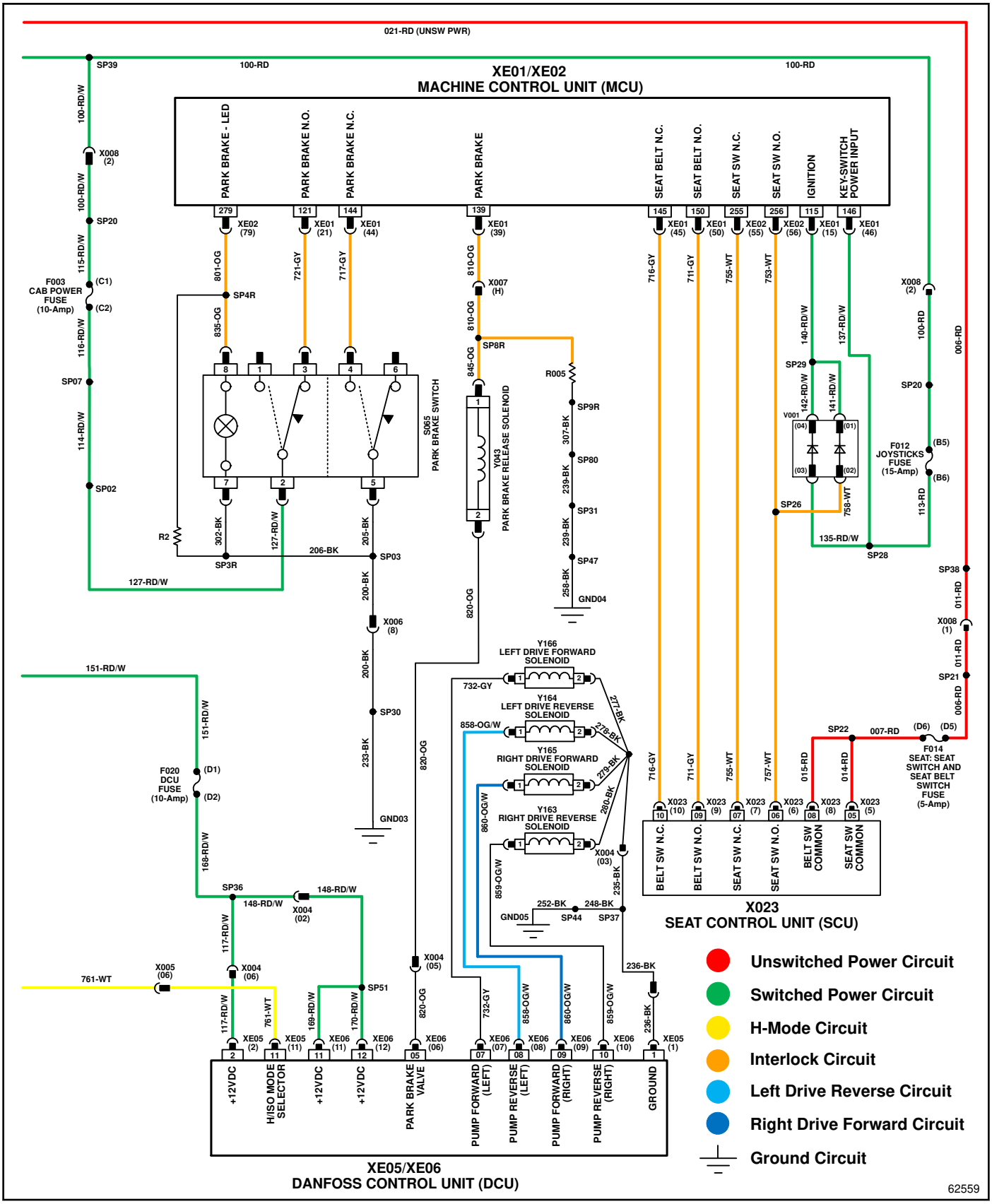

021-RD (UNSW PWR)
XE01/XE02
MACHINE CONTROL UNIT (MCU)
PARK BRAKE - LED
PARK BRAKE N.O.
PARK BRAKE N.C.
PARK BRAKE
SEAT BELT N.C.
SEAT BELT N.O.
SEAT SW N.C.
SEAT SW N.O.
IGNITION
KEY-SWITCH POWER INPUT
SP39
100-RD
100-RD/W
X008 (2)
SP20
115-RD/W
F003 CAB POWER FUSE (10-Amp)
(C1)
(C2)
116-RD/W
SP07
114-RD/W
SP02
127-RD/W
801-OG
835-OG
721-GY
717-GY
810-OG
845-OG
X007 (H)
SP8R
SP4R
SP3R
R2
S065 PARK BRAKE SWITCH
Y043 PARK BRAKE RELEASE SOLENOID
R005
SP9R
307-BK
SP80
239-BK
SP31
SP47
258-BK
GND04
302-BK
127-RD/W
205-BK
206-BK
SP03
200-BK
X006 (8)
SP30
233-BK
GND03
820-OG
716-GY
711-GY
755-WT
753-WT
140-RD/W
137-RD/W
142-RD/W
141-RD/W
SP29
V001
F012 JOYSTICKS FUSE (15-Amp)
(B5)
(B6)
113-RD
SP26
758-WT
135-RD/W
SP28
006-RD
SP38
011-RD
X008 (1)
SP21
Y166 LEFT DRIVE FORWARD SOLENOID
732-GY
Y164 LEFT DRIVE REVERSE SOLENOID
858-OG/W
277-BK
278-BK
Y165 RIGHT DRIVE FORWARD SOLENOID
279-BK
280-BK
Y163 RIGHT DRIVE REVERSE SOLENOID
860-OG/W
X004 (03)
235-BK
859-OG/W
252-BK
248-BK
GND05
SP44
SP37
SP22
007-RD
(D6)
(D5)
F014 SEAT: SEAT SWITCH AND SEAT BELT SWITCH FUSE (5-Amp)
015-RD
014-RD
X023 (10)
X023 (9)
X023 (7)
X023 (6)
X023 (8)
X023 (5)
BELT SW N.C.
BELT SW N.O.
SEAT SW N.C.
SEAT SW N.O.
BELT SW COMMON
SEAT SW COMMON
X023
SEAT CONTROL UNIT (SCU)
151-RD/W
F020 DCU FUSE (10-Amp)
(D1)
(D2)
168-RD/W
SP36
148-RD/W
X004 (02)
117-RD/W
761-WT
X005 (06)
X004 (06)
SP51
169-RD/W
170-RD/W
X004 (05)
236-BK
XE05 (2)
XE05 (11)
XE06 (11)
XE06 (12)
XE06 (06)
XE06 (07)
XE06 (08)
XE06 (09)
XE06 (10)
XE05 (1)
+12VDC
H/ISO MODE SELECTOR
+12VDC
+12VDC
PARK BRAKE VALVE
PUMP FORWARD (LEFT)
PUMP REVERSE (LEFT)
PUMP FORWARD (RIGHT)
PUMP REVERSE (RIGHT)
GROUND
XE05/XE06
DANFOSS CONTROL UNIT (DCU)
Unswitched Power Circuit
Switched Power Circuit
H-Mode Circuit
Interlock Circuit
Left Drive Reverse Circuit
Right Drive Forward Circuit
Ground Circuit
62559

Figure 2-79

Boom Controls Circuit—Theory of Operation (ISO-Mode)

Unswitched Power Circuit

Unswitched power is available from the battery positive terminal to the battery disconnect switch (S12). Unswitched power is then provided to the starter motor and to the 100-amp main fuse (F000).

Unswitched power is made available from the 100-amp main fuse cable connector (PWR01) to the following:

- 20-amp key switch fuse (F008)
- Main power relay (K902) terminal 03
- 5-amp seat: seat switch and seat belt switch fuse (F014)

Unswitched power is provided from the 20-amp key switch fuse (F008) to key switch (S001) terminals A and B.

Unswitched power is provided from the 5-amp seat: seat switch and seat belt switch fuse (F014) to Seat Control Unit (SCU) (X023) terminals 05 and 08.

Interlock Circuit

When the seat switch is in the closed position, the SCU (X023) sends output voltage from terminal 07 to the Machine Control Unit (MCU) (XE01) terminal 255.

When the seat belt switch is in the closed position, the SCU (X023) sends output voltage from terminal 10 to the MCU (XE01) terminal 145.

When the door switch (S087) is in the open position, the MCU (X023) no longer receives voltage from terminal 2 of the door switch (S087) to terminal 118.

With the park brake switch (S065) in the disengaged position, the MCU (XE01) provides power from terminal 139 to the park brake release solenoid (Y043) terminal 1 and resistor (R005). The Danfoss Control Unit (DCU) (XE06) terminal 05 provides a ground for the park brake release solenoid (Y043) terminal 2, energizing the solenoid.

With the interlock circuit complete, all hydrostatic and hydraulic functions become active.

Switched Power

When the key switch (S001) is turned to the ON position, power is provided from key switch (S001) terminal C to diode connector (V004) terminal 2. Power is then provided from diode connector (V004) terminal 1 to main power relay (K902) terminal 02, energizing the relay. With the main power relay (K902) energized, switched power is provided from main power relay (K902) terminal 05 to the following:

- 5-amp instrument display fuse (F002)
- 10-amp cab power fuse (F003)
- 15-amp joysticks fuse (F012)
- 10-amp DCU fuse (F020)

Switched power is provided from the 5-amp instrument display fuse (F002) to the H/ISO pattern selection switch (S203) terminal 5.

Switched power is provided from the 10-amp cab power fuse (F003) to the door switch (S087) terminal 1 and park brake switch (S065) terminal 2.

Switched power is provided from the 15-amp joysticks fuse (F012) to the RH joystick (X012), diode connector (V001) terminal 3, and MCU (XE01) terminal 146.

Switched power is provided from the 10-amp DCU fuse (F020) to the DCU (XE05) terminals 2, 11, and 12.

Boom Circuit

The MCU (XE01) provides power from terminal 276 to the main valve solenoid (Y157) terminal 1, and from MCU terminal 269 to the main valve solenoid (Y160) terminal 1.

When ISO mode is selected on the H/ISO pattern selection switch (S203), switched power is provided from H/ISO pattern selection switch (S203) terminal 5 to the H/ISO pattern selection switch (S203) terminal 6. Power is provided from H/ISO pattern selection switch (S203) terminal 6 to the DCU terminal 10.

With the RH joystick (X012) in the boom up position (back), power is provided from the MCU terminal 276 to the main control valve solenoid (Y157) terminal 1, energizing the solenoid.

With the RH joystick (X012) in the boom down position (forward), power is provided from the MCU terminal 269 to the main control valve solenoid (Y160) terminal 1, energizing the solenoid.

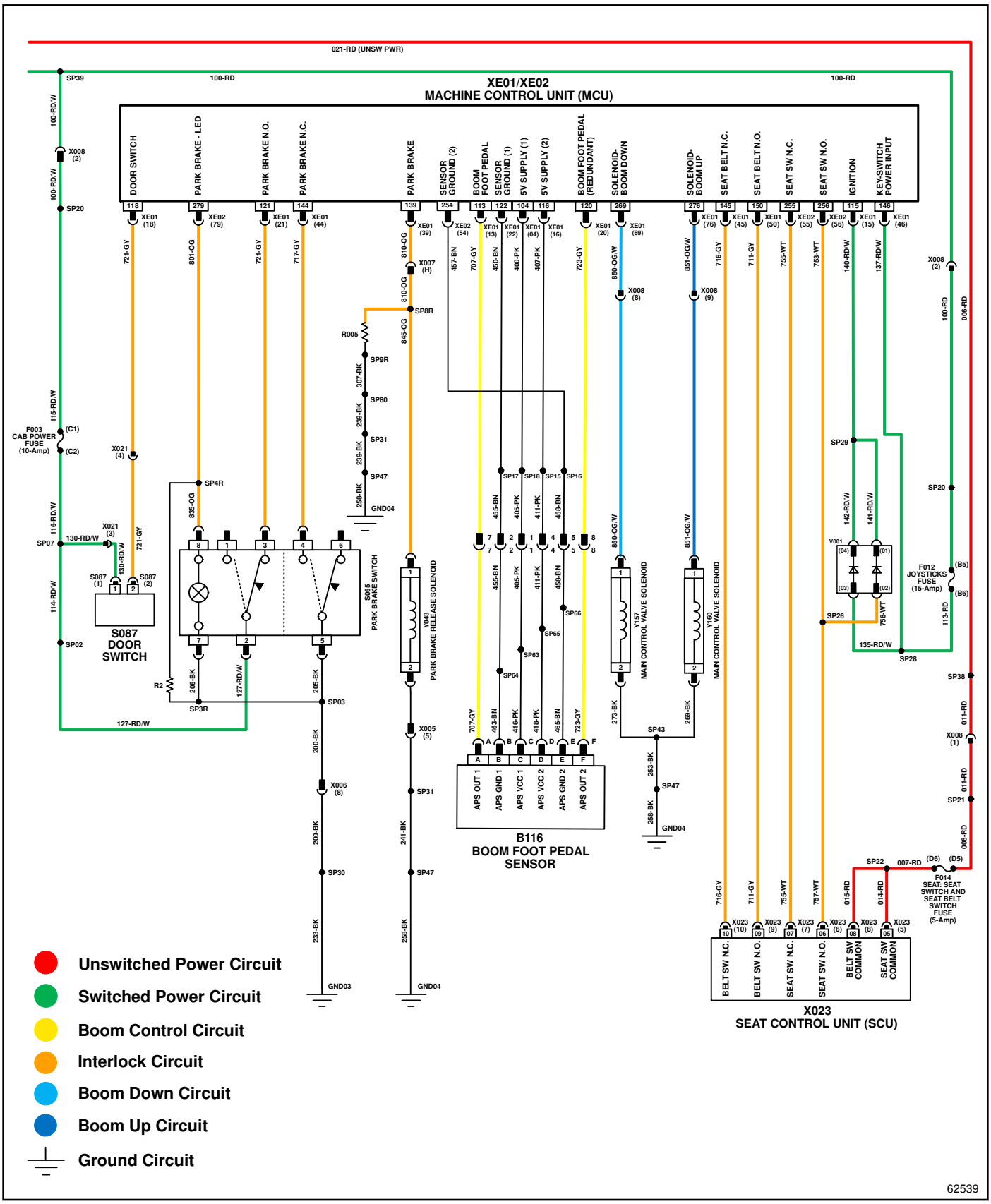

021-RD (UNSW PWR)
SP39
100-RD
XE01/XE02
MACHINE CONTROL UNIT (MCU)
100-RD
DOOR SWITCH
PARK BRAKE - LED
PARK BRAKE N.O.
PARK BRAKE N.C.
PARK BRAKE
SENSOR GROUND (2)
BOOM FOOT PEDAL SENSOR GROUND (1)
5V SUPPLY (1)
5V SUPPLY (2)
BOOM FOOT PEDAL (REDUNDANT)
SOLENOID-BOOM DOWN
SOLENOID-BOOM UP
SEAT BELT N.C.
SEAT BELT N.O.
SEAT SW N.C.
SEAT SW N.O.
IGNITION
KEY-SWITCH POWER INPUT
F003 CAB POWER FUSE (10-Amp)
S087 DOOR SWITCH
S085 PARK BRAKE SWITCH
Y043 PARK BRAKE RELEASE SOLENOID
B116 BOOM FOOT PEDAL SENSOR
APS OUT 1
APS GND 1
APS VCC 1
APS VCC 2
APS GND 2
APS OUT 2
Y157 MAIN CONTROL VALVE SOLENOID
Y160 MAIN CONTROL VALVE SOLENOID
F012 JOYSTICKS FUSE (15-Amp)
F014 SEAT: SEAT SWITCH AND SEAT BELT SWITCH FUSE (5-Amp)
X023 SEAT CONTROL UNIT (SCU)
BELT SW N.C.
BELT SW N.O.
SEAT SW N.C.
SEAT SW N.O.
BELT SW COMMON
SEAT SW COMMON
Unswitched Power Circuit
Switched Power Circuit
Boom Control Circuit
Interlock Circuit
Boom Down Circuit
Boom Up Circuit
Ground Circuit
62539

Figure 2-89

Bucket Controls Circuit—Theory of Operation (Manual Controls)

Unswitched Power Circuit

Unswitched power is available from the battery positive terminal to the battery disconnect switch (S12). Unswitched power is then provided to the starter motor and to the 100-amp main fuse (F000).

Unswitched power is made available from the 100-amp main fuse cable connector (PWR01) to the following:

- 20-amp key switch fuse (F008)
- Main power relay (K902) terminal 03
- 5-amp seat: seat switch and seat belt switch fuse (F014)

Unswitched power is provided from the 20-amp key switch (S001) fuse (F008) to key switch (S001) terminals A and B.

Unswitched power is provided from the 5-amp seat: seat switch and seat belt switch fuse (F014) to Seat Control Unit (SCU) (X023) terminals 05 and 08.

Interlock Circuit

When the seat switch is in the closed position, the SCU (X023) sends output voltage from terminal 07 to the Machine Control Unit (MCU) (XE01) terminal 255.

When the seat belt switch is in the closed position, the SCU (X023) sends output voltage from terminal 10 to the MCU (XE01) terminal 145.

When the door switch (S087) is in the open position, the MCU (XE01) no longer receives voltage from terminal 2 of the door switch (S087) to terminal 118.

With the park brake switch (S065) in the disengaged position, the MCU (XE01) provides power from terminal 139 to the park brake release solenoid (Y043) terminal 1 and resistor (R005), energizing the solenoid.

With the interlock circuit complete, all hydrostatic and hydraulic functions become active.

Switched Power

When the key switch (S001) is turned to the ON position, power is provided from key switch (S001) terminal C to diode connector (V004) terminal 2. Power is then provided from diode connector (V004) terminal 1 to main power relay (K902) terminal 02, energizing the relay. With the main power relay (K902) energized, switched power is provided from main power relay (K902) terminal 05 to the following:

- 10-amp cab power fuse (F003)
- 15-amp joysticks fuse (F012)

Switched power is provided from the 10-amp cab power fuse (F003) to the door switch (S087) terminal 1 and park brake switch (S065) terminal 2.

Switched power is provided from the 15-amp joysticks fuse (F012) to the diode connector (V001) terminal 3 and MCU terminal 146.

Bucket Circuit

The MCU (XE01) provides power from terminal 104 and 116 to the bucket foot pedal sensor (B117) terminals D and E.

With the bucket foot pedal sensor (B117) in the bucket curl position (back), power is provided from the bucket foot pedal sensor (B117) to the MCU (XE01) terminals 112 and 119. Power is then provided from MCU (XE01) terminal 276 to the main control valve solenoid (Y158) terminal 1, energizing the solenoid.

With the bucket foot pedal sensor (B117) in the bucket dump position (down), is provided from bucket foot pedal sensor (B117) to the MCU (XE01) terminals 112 and 119. Power is then provided from MCU (XE01) terminal 269 to the main control valve solenoid (Y162) terminal 1, energizing the solenoid.

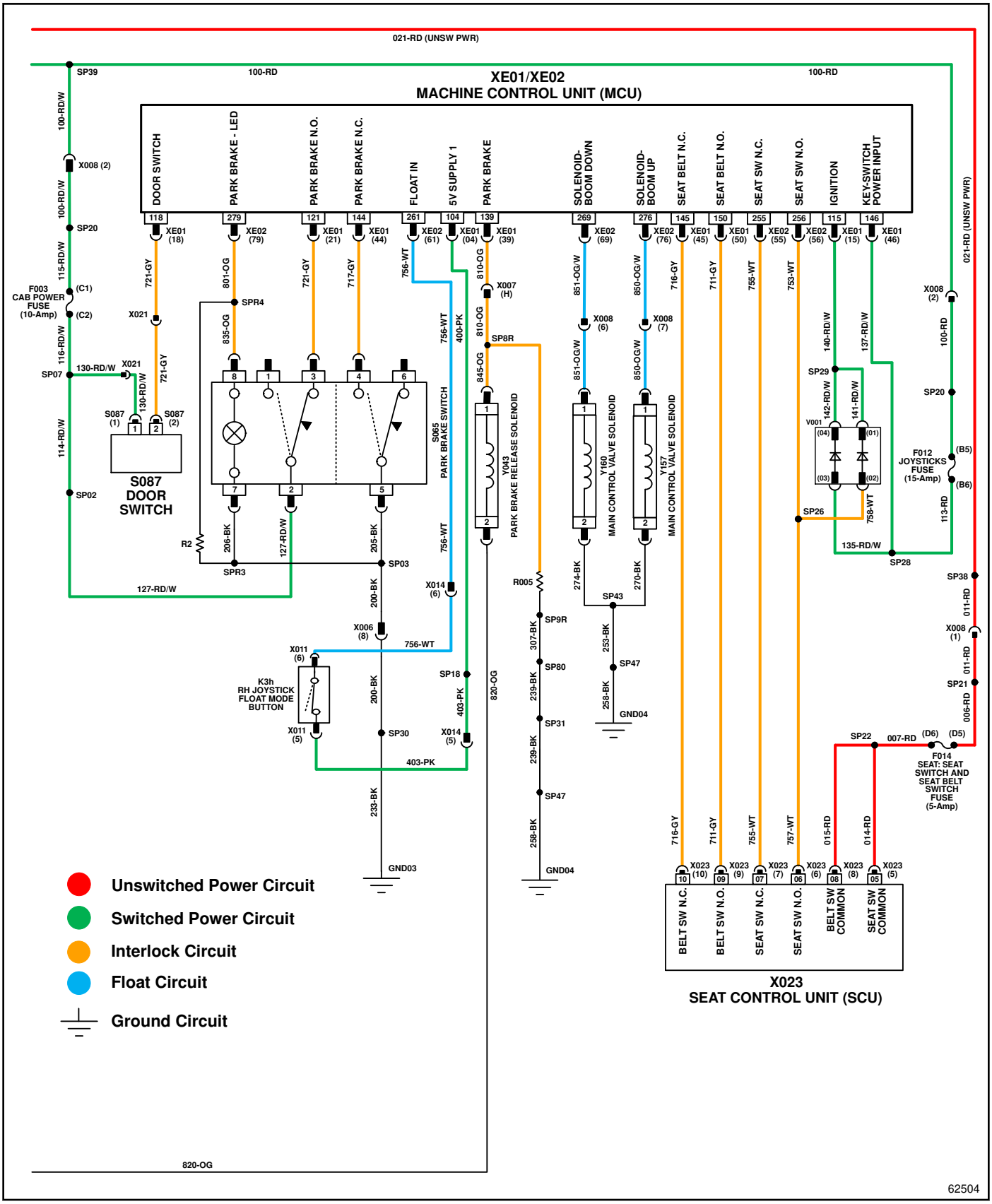

021-RD (UNSW PWR)
XE01/XE02
MACHINE CONTROL UNIT (MCU)
DOOR SWITCH
PARK BRAKE - LED
PARK BRAKE N.O.
PARK BRAKE N.C.
FLOAT IN
5V SUPPLY 1
PARK BRAKE
SOLENOID-BOOM DOWN
SOLENOID-BOOM UP
SEAT BELT N.C.
SEAT BELT N.O.
SEAT SW N.C.
SEAT SW N.O.
IGNITION
KEY-SWITCH POWER INPUT
S087 DOOR SWITCH
S065 PARK BRAKE SWITCH
Y043 PARK BRAKE RELEASE SOLENOID
Y160 MAIN CONTROL VALVE SOLENOID
Y157 MAIN CONTROL VALVE SOLENOID
F003 CAB POWER FUSE (10-Amp)
F012 JOYSTICKS FUSE (15-Amp)
F014 SEAT: SEAT SWITCH AND SEAT BELT SWITCH FUSE (5-Amp)
K3h RH JOYSTICK FLOAT MODE BUTTON
R2
R005
V001
X023 SEAT CONTROL UNIT (SCU)
BELT SW N.C.
BELT SW N.O.
SEAT SW N.C.
SEAT SW N.O.
BELT SW COMMON
SEAT SW COMMON
Unswitched Power Circuit
Switched Power Circuit
Interlock Circuit
Float Circuit
Ground Circuit
62504

Figure 2-100

Auxiliary Hydraulics Male Coupler Circuit—Theory of Operation

Unswitched Power Circuit

Unswitched power is available from the battery positive terminal to the battery disconnect switch (S12). Unswitched power is then provided to the starter motor and to the 100-amp main fuse (F000).

Unswitched power is made available from the 100-amp main fuse cable connector (PWR01) to the following:

- 20-amp key switch fuse (F008)
- Main power relay (K902) terminal 03
- 5-amp seat: seat switch and seat belt switch fuse (F014)

Unswitched power is provided from the 20-amp key switch fuse (F008) to key switch (S001) terminals A and B.

Unswitched power is provided from the 5-amp seat: seat switch and seat belt switch fuse (F014) to Seat Control Unit (SCU) (X023) terminals 05 and 08.

Interlock Circuit

When the seat switch is in the closed position, the SCU (X023) sends output voltage from terminal 07 to the Machine Control Unit (MCU) (XE01) terminal 255.

When the seat belt switch is in the closed position, the SCU (X023) sends output voltage from terminal 10 to the MCU (XE01) terminal 145.

When the door switch (S087) is in the open position, the MCU (XE01) terminal 118 no longer receives voltage from terminal 2 of the door switch (S087).

With the park brake switch (S065) in the disengaged position, the MCU (XE01) provides power from terminal 139 to the park brake release solenoid (Y043) terminal 1 and resistor (R005). The Danfoss Control Unit (DCU) (XE06) terminal 05 provides a ground for the park brake release solenoid (Y043) terminal 2, energizing the solenoid.

With the interlock circuit complete, all hydrostatic and hydraulic functions become active.

Switched Power

When the key switch (S001) is turned to the ON position, power is provided from key switch (S001) terminal C to diode connector (V004) terminal 2. Power is then provided from diode connector (V004) terminal 1 to main power relay (K902) terminal 02, energizing the relay. With the main power relay (K902) energized, switched power is provided from main power relay (K902) terminal 05 to the following:

- 10-amp cab power fuse (F003)
- 15-amp joysticks fuse (F012)
- 10-amp DCU fuse (F020)

Switched power is provided from the 10-amp cab power fuse (F003) to the door switch (S087) terminal 1 and park brake switch (S065) terminal 2.

Switched power is provided from the 15-amp joysticks fuse (F012) to the diode connector (V001) terminal 3 and MCU (XE01) terminal 146.

Switched power is provided from the 10-amp DCU fuse (F020) to the DCU (XE05) terminals 2, 11, and 12.

Auxiliary Hydraulics Male Coupler Circuit

When standard is selected on the standard/high flow selection switch (S207), the MCU (XE01) provides power from terminal 148 to the standard/high flow selection switch (S207) terminal 3. Power is then provided from MCU (XE01) terminal 104 to RH joystick auxiliary hydraulics control button (S10) terminal 1.

When the RH joystick auxiliary hydraulics control button (S10) is in the back position, the MCU (XE01) terminal 104 provides power to RH joystick auxiliary hydraulics control button (S10) terminal 1. The RH joystick auxiliary hydraulics control button (S10) terminal 1 provides power to the RH joystick auxiliary hydraulics control button (S10) terminal 3. Power then returns to MCU (XE01) terminal 114 from RH joystick auxiliary hydraulics control button (S10) terminal 3. The MCU (XE01) then provides power from terminal 138 to the main control valve solenoid B3 (Y159) terminal 1, energizing the solenoid.

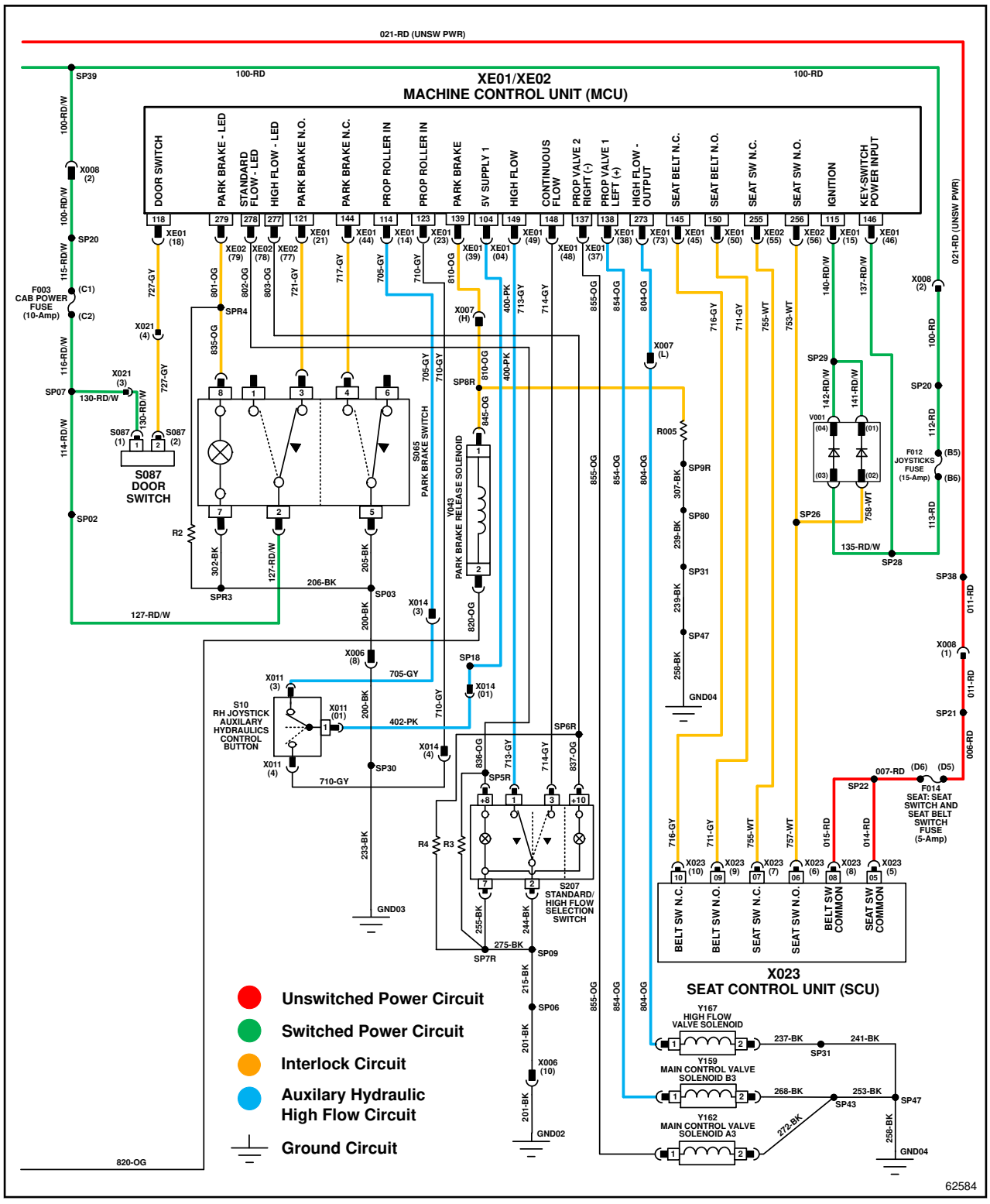

021-RD (UNSW PWR)
XE01/XE02
MACHINE CONTROL UNIT (MCU)
DOOR SWITCH
PARK BRAKE - LED
STANDARD FLOW - LED
HIGH FLOW - LED
PARK BRAKE N.O.
PARK BRAKE N.C.
PROP ROLLER IN
PROP ROLLER IN
PARK BRAKE
5V SUPPLY 1
HIGH FLOW
CONTINUOUS FLOW
PROP VALVE 2 RIGHT (-)
PROP VALVE 1 LEFT (+)
HIGH FLOW - OUTPUT
SEAT BELT N.C.
SEAT BELT N.O.
SEAT SW N.C.
SEAT SW N.O.
IGNITION
KEY-SWITCH POWER INPUT
S087 DOOR SWITCH
S065 PARK BRAKE SWITCH
Y043 PARK BRAKE RELEASE SOLENOID
S10 RH JOYSTICK AUXILARY HYDRAULICS CONTROL BUTTON
S207 STANDARD/ HIGH FLOW SELECTION SWITCH
F003 CAB POWER FUSE (10-Amp)
F012 JOYSTICKS FUSE (15-Amp)
F014 SEAT: SEAT SWITCH AND SEAT BELT SWITCH FUSE (5-Amp)
X023 SEAT CONTROL UNIT (SCU)
BELT SW N.C.
BELT SW N.O.
SEAT SW N.C.
SEAT SW N.O.
BELT SW COMMON
SEAT SW COMMON
Y167 HIGH FLOW VALVE SOLENOID
Y159 MAIN CONTROL VALVE SOLENOID B3
Y162 MAIN CONTROL VALVE SOLENOID A3
Unswitched Power Circuit
Switched Power Circuit
Interlock Circuit
Auxilary Hydraulic High Flow Circuit
Ground Circuit
62584

Figure 2-110

Backup Audible Alarm Circuit—Theory of Operation (Electronic Controls)

Unswitched Power Circuit

Unswitched power is available from the battery positive terminal to the battery connect/disconnect switch (S12). Unswitched power is then provided to the starter motor and to the 100-amp main fuse (F000).

Unswitched power is made available from the 100-amp main fuse cable connector (PWR01) to the following:

- 20-amp key switch fuse (F008)
- Main power relay (K902) terminal 03
- 5-amp seat: seat switch and seat belt switch fuse (F014)

Unswitched power is provided from the 20-amp key switch fuse (F008) to key switch (S001) terminals A and B.

Unswitched power is provided from the 5-amp seat: seat switch and seat belt switch fuse (F014) to Seat Control Unit (SCU) (X023) terminals 05 and 08.

Interlock Circuit

When the seat switch is in the closed position, the SCU (X023) sends output voltage from terminal 07 to the Machine Control Unit (MCU) (XE01) terminal 255.

When the seat belt switch is in the closed position, the SCU (X023) sends output voltage from terminal 10 to the MCU (M3) terminal 145.

With the park brake switch (S065) in the disengaged position, the MCU (XE01) provides power from terminal 139 to the park brake release solenoid (Y043) terminal 1 and resistor (R005). The Danfoss Control Unit (DCU) (XE06) terminal 05 provides a ground for the park brake release solenoid (Y043) terminal 6, energizing the solenoid.

With the interlock circuit complete, all hydrostatic and hydraulic functions become active.

Switched Power

When the key switch (S001) is turned to the ON position, power is provided from key switch (S001) terminal C to diode connector (V004) terminal 2. Power is then provided from diode connector (V004) terminal 1 to main power relay (K902) terminal 02, energizing the relay. With the main power relay (K902) energized, switched power is provided from main power relay (K902) terminal 05 to the following:

- 10-amp cab power fuse (F003)
- 15-amp joysticks fuse (F012)
- 10-amp Danfoss Control Unit (DCU) fuse (F020)

Switched power is provided from the 10-amp cab power fuse (F003) to the park brake switch (S065) terminal 2.

Switched power is provided from the 15-amp joysticks fuse (F012) to the diode connector (V001) terminal 3, and MCU terminal 146.

Switched power is provided from the 10-amp DCU fuse (F020) to the DCU (XE05) terminals 2, 11, and 12.

Backup Audible Alarm Circuit

When joystick(s) are in the reverse position (back), the DCU provides power from terminal 3 to the backup audible alarm (B003) terminal 2, sounding the backup audible alarm.

Symptom: Creep Mode Will Not Engage.

Probable Cause	Remedy
Faulty or missing cab PDM fuse(s): cab power (F003), key switch (F008), joysticks (F012), and/or seat: seat switch and seat belt switch (F014)	Check fuses and replace with same specified current rating.
Faulty or missing chassis PDM fuse: DCU (F020)	Check fuse and replace with same specified current rating.
Loose or corroded chassis grounds: GND03, GND04, and/or GND05	Check chassis grounds for loose fit or corrosion.
Faulty park brake switch (S065)	Test park brake switch. (See "**Park Brake Switch Test**" on **page 2-203**.)
Faulty LH joystick (X010)	Repair or replace LH joystick. (See "**Joystick**" on **page 2-226**.)
Possible hydrostatic system failure	See **Two Speed Valve Will Not Engage**.

Symptom: Two Speed Control Will Not Engage.

Probable Cause	Remedy
Faulty or missing cab PDM fuse(s): cab power (F003), key switch (F008), joysticks (F012), and/or seat: seat switch and seat belt switch (F014)	Check fuses and replace with same specified current rating.
Faulty or missing chassis PDM fuse: DCU (F020)	Check fuse and replace with same specified current rating.
Loose or corroded chassis grounds: GND03, GND04, and/or GND05	Check chassis grounds for loose fit or corrosion.
Faulty park brake switch (S065)	Test park brake switch. (See "**Park Brake Switch Test**" on **page 2-203**.)
Faulty LH joystick (X010)	Repair or replace LH joystick. (See "**Joystick**" on **page 2-226**.)
Possible hydrostatic system failure	See "**Table 3-6**" on **page 3-72**.

Key Switch Test

See **Figures 2-120** and **2-121**.

NOTE

Key and keyless ignition switches are tested the same way. Key switch is shown.

Required Tools or Equipment
Digital Multimeter

1. Park the machine safely. (See "**Park Machine Safely**" on **page 15**.)
2. Remove key switch. (See "**Key Switch/Keyless Ignition Switch**" on **page 2-222**.)

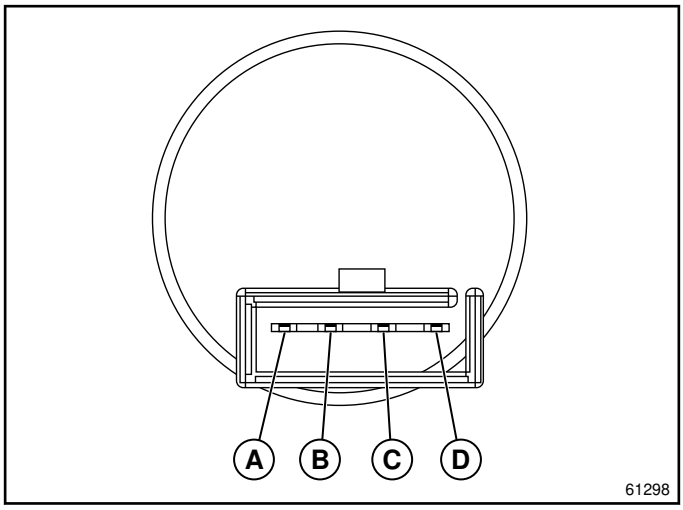


Figure 2-120: Key Switch Pin View

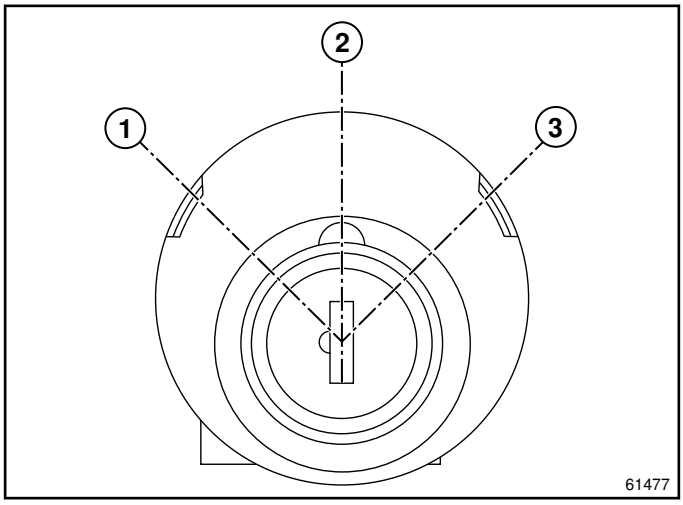


Figure 2-121: Key Switch Top View

3. Set digital multimeter to test continuity.
4. Connect test leads to terminals B and C.
5. Turn key switch to OFF (1).
6. Using digital multimeter, test for continuity.

   Is continuity indicated?

   YES *Key switch is faulty. Replace key switch.*

   NO *Proceed to Step 7.*
7. Connect test leads to terminals A and D.
8. Turn key switch to OFF (1).
9. Using digital multimeter, test for continuity.

   Is continuity indicated?

   YES *Key switch is faulty. Replace key switch.*

   NO *Proceed to Step 10.*
10. Connect test leads to terminals B and C.
11. Turn key switch to ON (2).
12. Using digital multimeter, test for continuity.

    Is continuity indicated?

    YES *Proceed to Step 13.*

    NO *Key switch is faulty. Replace key switch.*
13. Connect test leads to terminals A and D.
14. Turn key switch to START (3) and hold.
15. Using digital multimeter, test for continuity.

    Is continuity indicated?

    YES *Proceed to Step 16.*

    NO *Key switch is faulty. Replace key switch.*
16. Connect test leads to terminals B and C.
17. Turn key switch to START (3) and hold.
18. Using digital multimeter, test for continuity.

    Is continuity indicated?

    YES *Key switch is good.*

    NO *Key switch is faulty. Replace key switch.*

H/ISO Pattern Selection Switch Test

See **Figure 2-133**.

Required Tools or Equipment
Digital Multimeter

1. Park the machine safely. (See "**Park Machine Safely**" on **page 15**.)
2. Remove H/ISO pattern selection switch. (See "**Rocker Switch**" on **page 2-224**.)

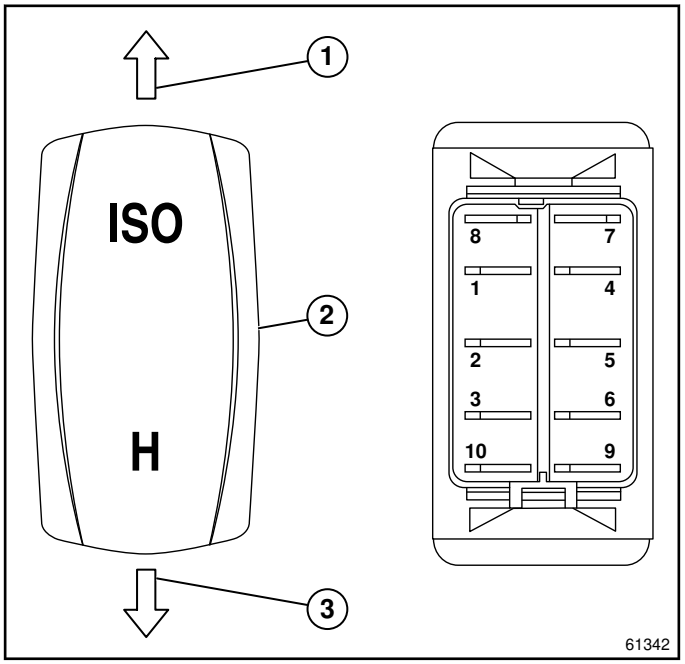


Figure 2-133: H/ISO Pattern Selection Switch

3. Set digital multimeter to test continuity.
4. Connect red test lead to terminal 2.
5. Connect black test lead to terminal 3.
6. Set H/ISO pattern selection to center (2).
7. Using digital multimeter, test for continuity.

   Is continuity indicated?

   YES *Proceed to Step 8.*

   NO *H/ISO pattern selection switch is faulty. Replace H/ISO pattern selection switch.*
8. Connect red test lead to terminal 5.
9. Connect black test lead to terminal 4.
10. Set H/ISO pattern selection to center (2).
11. Using digital multimeter, test for continuity.

    Is continuity indicated?

    YES *Proceed to Step 12.*

    NO *H/ISO pattern selection switch is faulty. Replace H/ISO pattern selection switch.*
12. Connect red test lead to terminal 2.
13. Connect black test lead to terminal 3.
14. Depress H/ISO pattern selection to ISO (1) and hold.
15. Using digital multimeter, test for continuity.

    Is continuity indicated?

    YES *Proceed to Step 16.*

    NO *H/ISO pattern selection switch is faulty. Replace H/ISO pattern selection switch.*
16. Connect red test lead to terminal 5.
17. Connect black test lead to terminal 6.
18. Depress H/ISO pattern selection switch to ISO (1) and hold.
19. Using digital multimeter, test for continuity.

    Is continuity indicated?

    YES *Proceed to Step 20.*

    NO *H/ISO pattern selection switch is faulty. Replace H/ISO pattern selection switch.*
20. Connect red test lead to terminal 2.
21. Connect black test lead to terminal 1.
22. Depress H/ISO pattern selection to H (3) and hold.
23. Using digital multimeter, test for continuity.

    Is continuity indicated?

    YES *Proceed to Step 24.*

    NO *H/ISO pattern selection switch is faulty. Replace H/ISO pattern selection switch.*
24. Connect red test lead to terminal 5.
25. Connect black test lead to terminal 4.
26. Depress H/ISO pattern selection switch to H (3) and hold.
27. Using digital multimeter, test for continuity.

    Is continuity indicated?

    YES *Proceed to Step 28.*

    NO *H/ISO pattern selection switch is faulty. Replace H/ISO pattern selection switch.*
28. Connect red test lead to terminal 8.
29. Connect black test lead to terminal 7.

Deluxe Instrument Display

Removal and Installation

See **Figure 2-149** and **Figure 2-150**.

1. Park machine safely. (See "**Park Machine Safely**" on **page 15**.)
2. Open engine cover.
3. Disconnect negative battery cable at battery. (See "**Battery**" on **page 2-217**.)

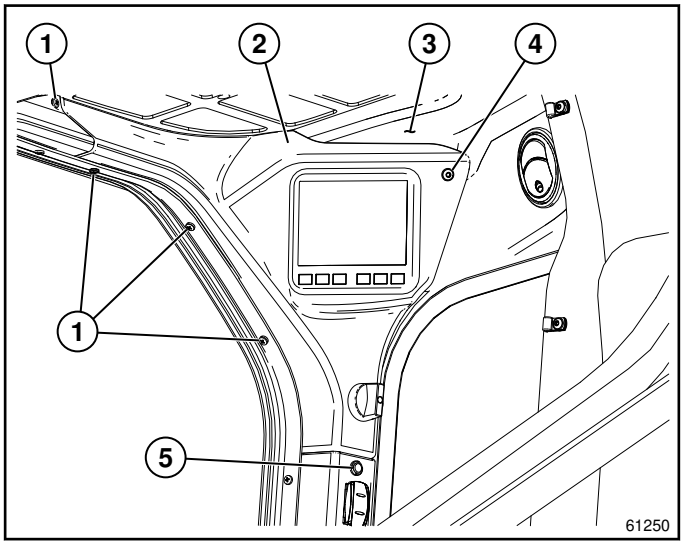


Figure 2-149: Panel Removal and Installation

4. Remove bolt (4) from panel (2).
5. Remove plastic rivet (5) from panel (2).
6. Remove four screws (1) and panel (2) from cab (3).

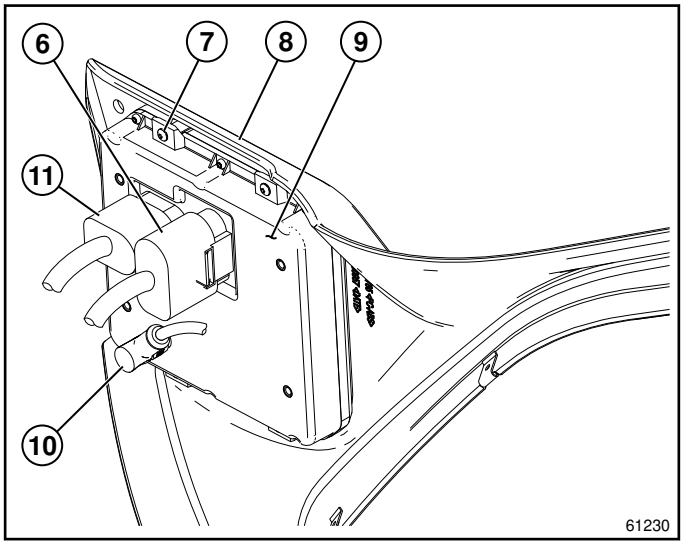


Figure 2-150: Deluxe Instrument Display Removal and Installation

7. Disconnect connector (11) from delux instrument display (9).
8. Disconnect connector (6) from delux instrument display (9).
9. Disconnect connector (10) from delux instrument display (9).
10. Remove four screws (7) and delux instrument display (9) from panel (8).

Installation Note

Install the delux instrument display by reversing the order or removal.

Fuel Level Sensor

Removal and Installation

See **Figure 2-168**.

WARNING

- **Never remove the fuel cap from the fuel tank or add fuel when the engine is running or while the engine is hot.**
- **Do not smoke when handling fuel. Never fill or drain the fuel tank indoors.**
- **Do not spill fuel. Clean spilled fuel immediately.**
- **Never handle or store fuel containers near an open flame or any device that may create sparks and ignite the fuel or fuel vapors.**
- **Be sure to reinstall and tighten fuel cap securely.**
- **Use an approved container; the spout must fit inside the fuel filler neck. Avoid using cans and funnels to transfer fuel.**

CAUTION

Diesel fuel is highly flammable. Handle with care. Use an approved container with a spout that will fit inside the fuel filler neck. Avoid using unapproved containers to transport fuel. Keep all fuel containers clean and closed when not in use.

CAUTION

Dispose of fuel properly. Contact the local environmental department for instructions on disposing of unwanted fuel products.

1. Park machine safely. (See "**Park Machine Safely**" on **page 15**.)
2. Open engine cover.

WARNING

Always ensure boom is secured with safety strut when raising boom. Failure to secure boom with safety strut may result in death or serious injury.

3. Raise boom and secure with safety strut.
4. Disconnect negative battery cable at battery. (See "**Battery**" on **page 2-217**.)

WARNING

Always ensure cab is secured with safety strut when raising cab. Failure to secure cab with safety strut may result in death or serious injury.

5. Raise cab and secure with safety strut to gain access to fuel level sensor.

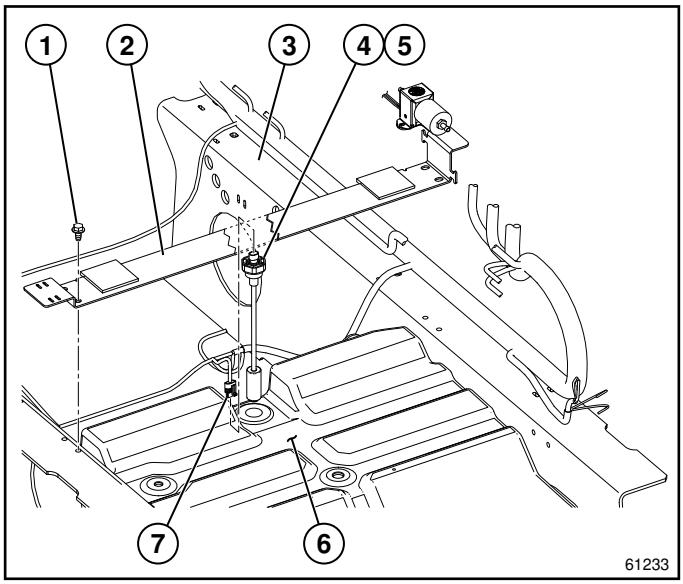


Figure 2-168: Fuel Level Sensor Removal and Installation

6. Remove four screws (1) from mount (2) and inner case (3).
7. Reposition mount (2) to allow fuel level sensor (4) removal from fuel tank (6).
8. Disconnect connector (7) from fuel level sensor (4).
9. Remove fuel level sensor (4) and gasket (5) from fuel tank (6).

Installation Note

Install the fuel level sensor by reversing the order of removal.

Hydrostatic Power Train Schematics

Hydrostatic Schematic (Wheeled Machine with Electronic Controls)

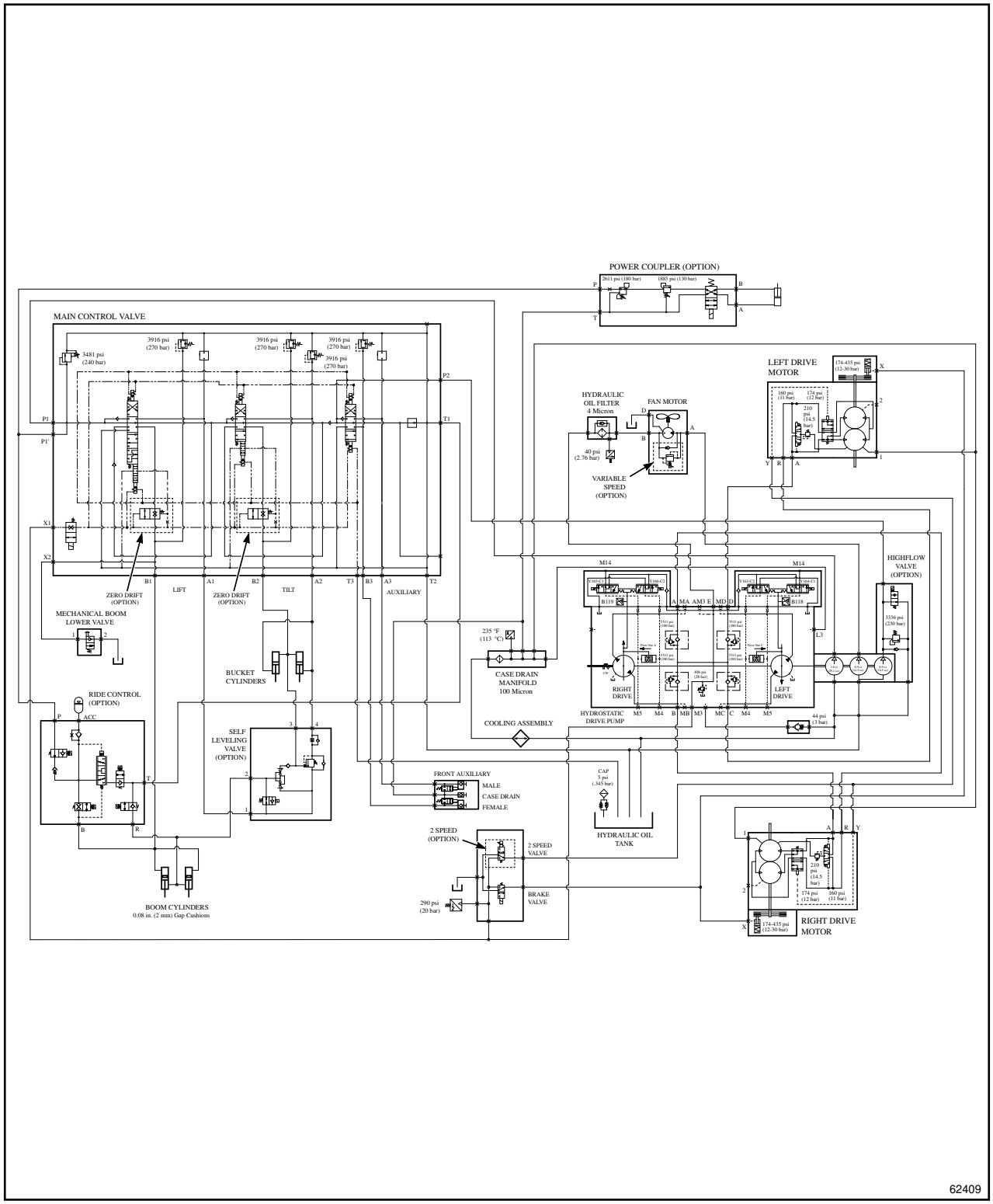


Figure 3-3

Drive Circuit Neutral Schematic (Wheeled Machine with Manual Controls)

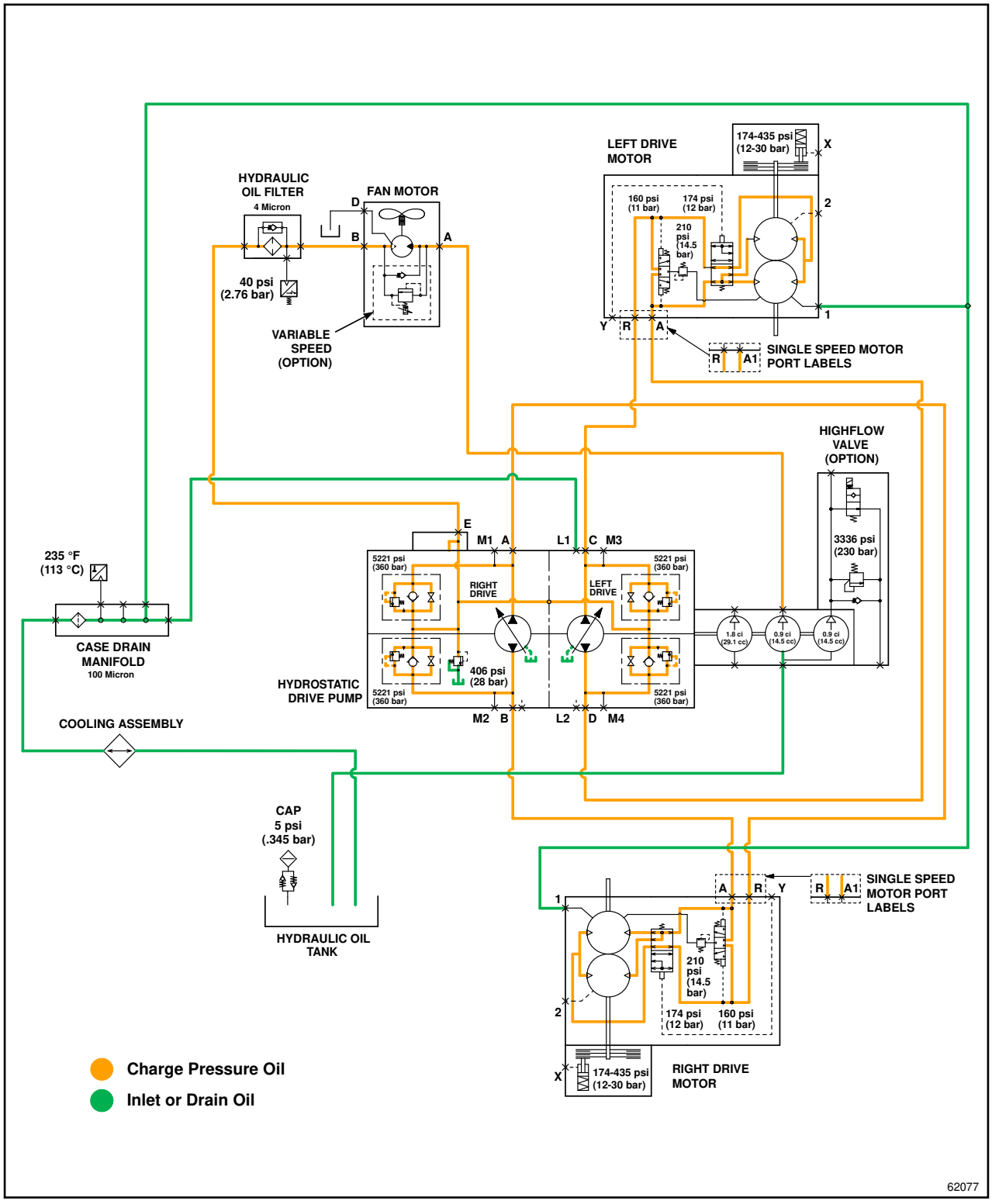


Figure 3-9

Drive Circuit Forward Schematic (Track Machine with Manual Controls)

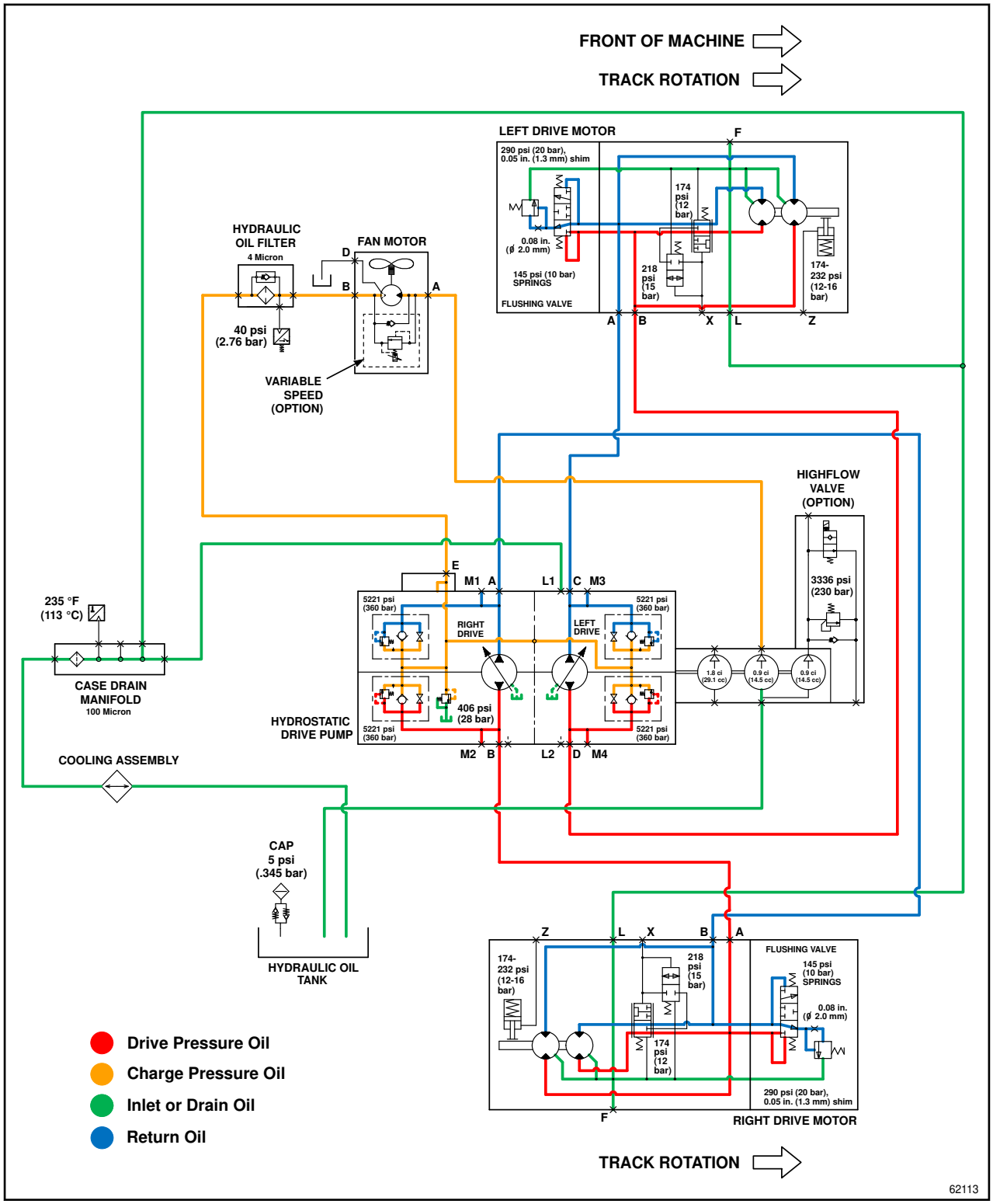


Figure 3-14

Drive Circuit Right Turn Schematic (Wheeled Machine with Electronic Controls)

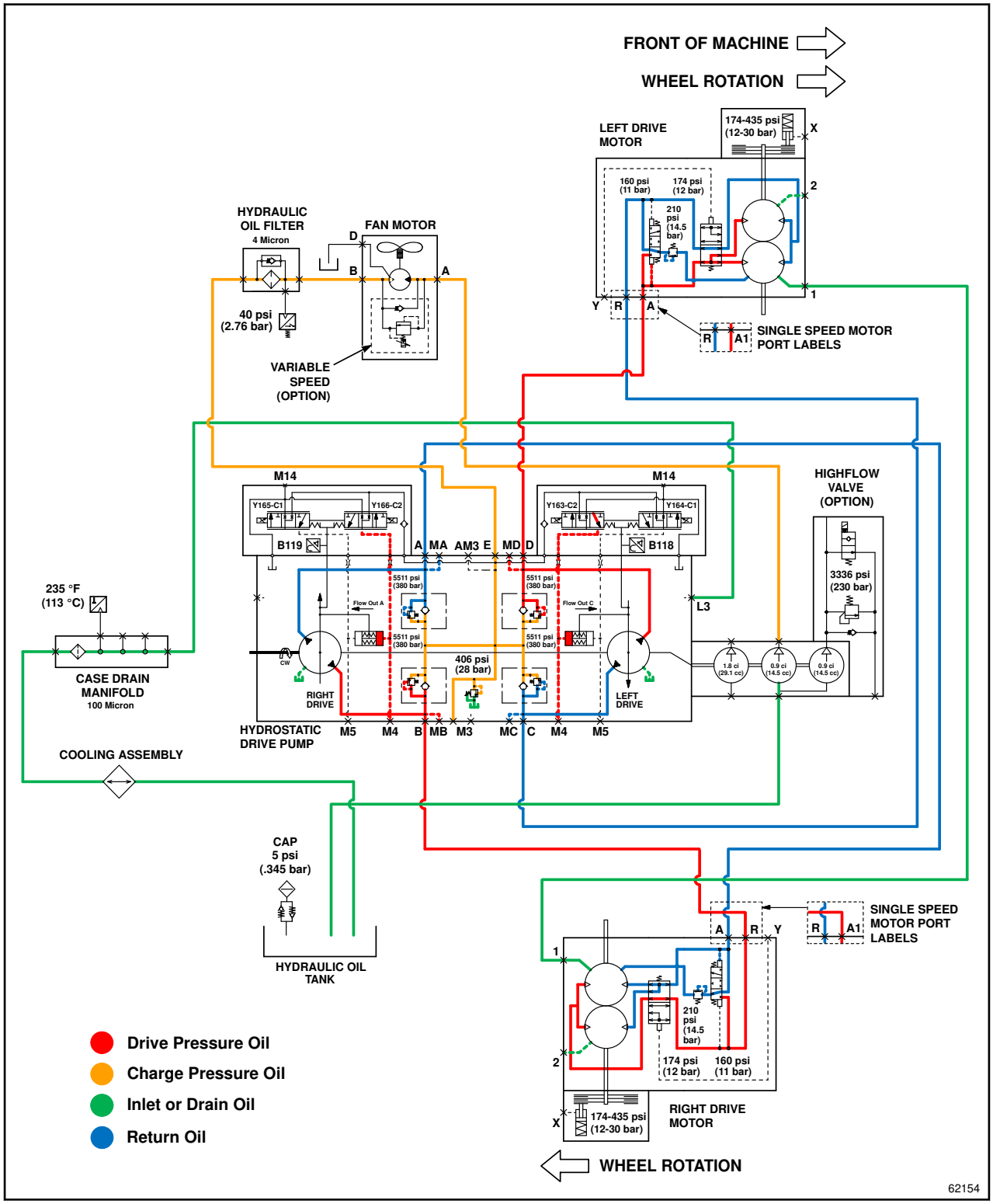


Figure 3-19

Drive Circuit Left Turn Schematic (Track Machine with Electronic Controls)

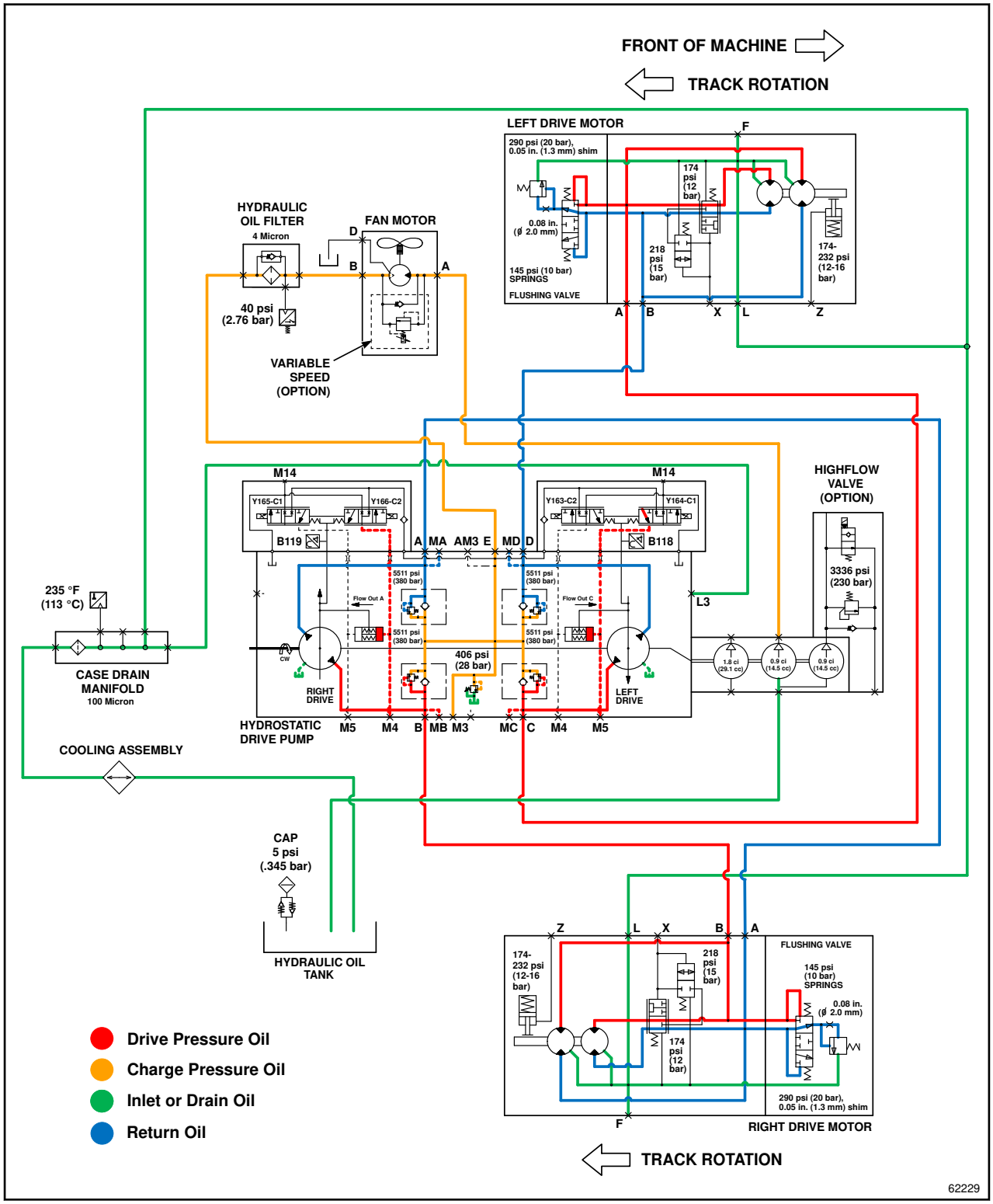


Figure 3-24

Drive Circuit Brake Valve Schematic (Wheeled Machine with Manual Controls)

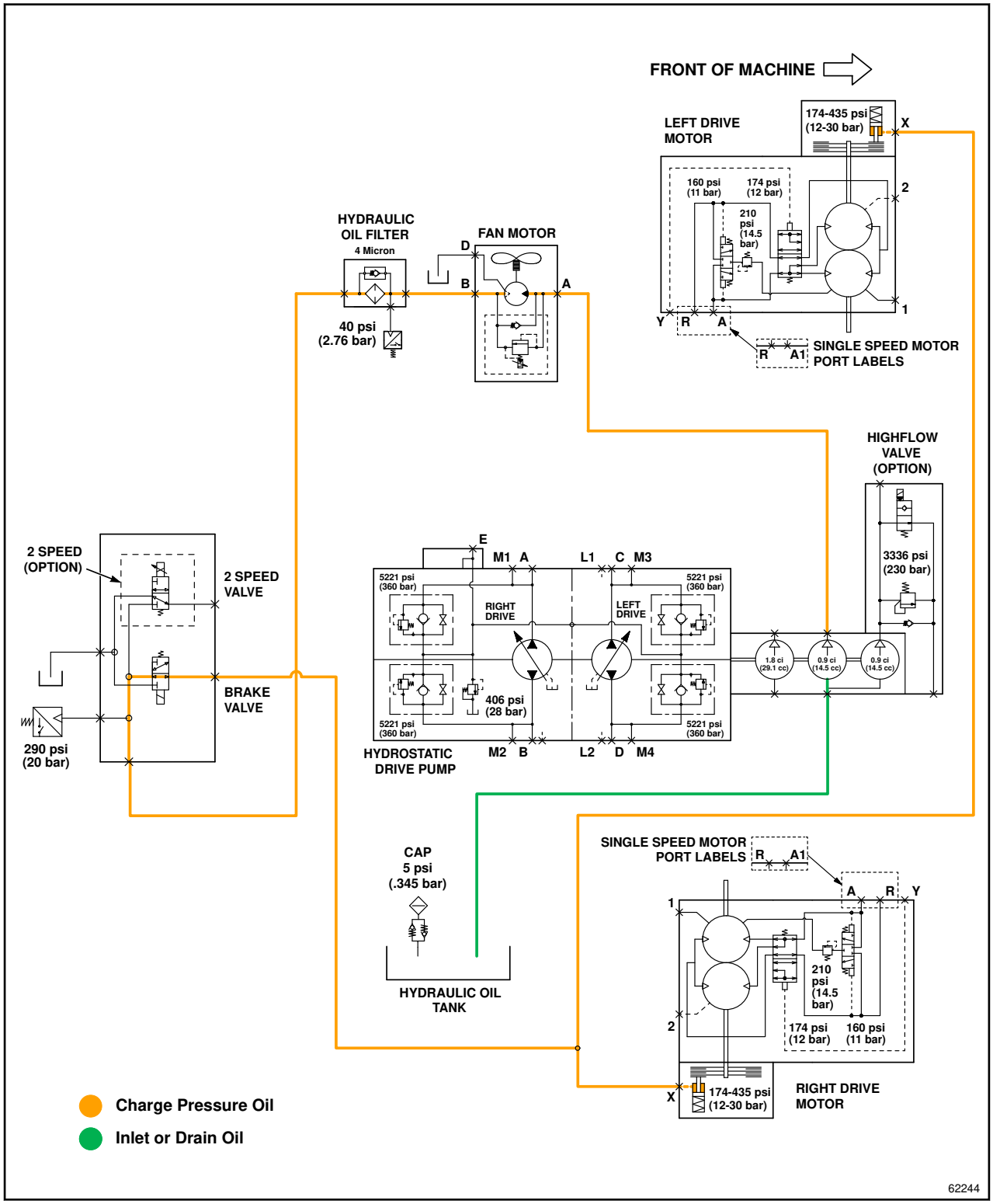


Figure 3-29

Drive Circuit Two Speed Valve Schematic (Track Machine with Manual Controls)

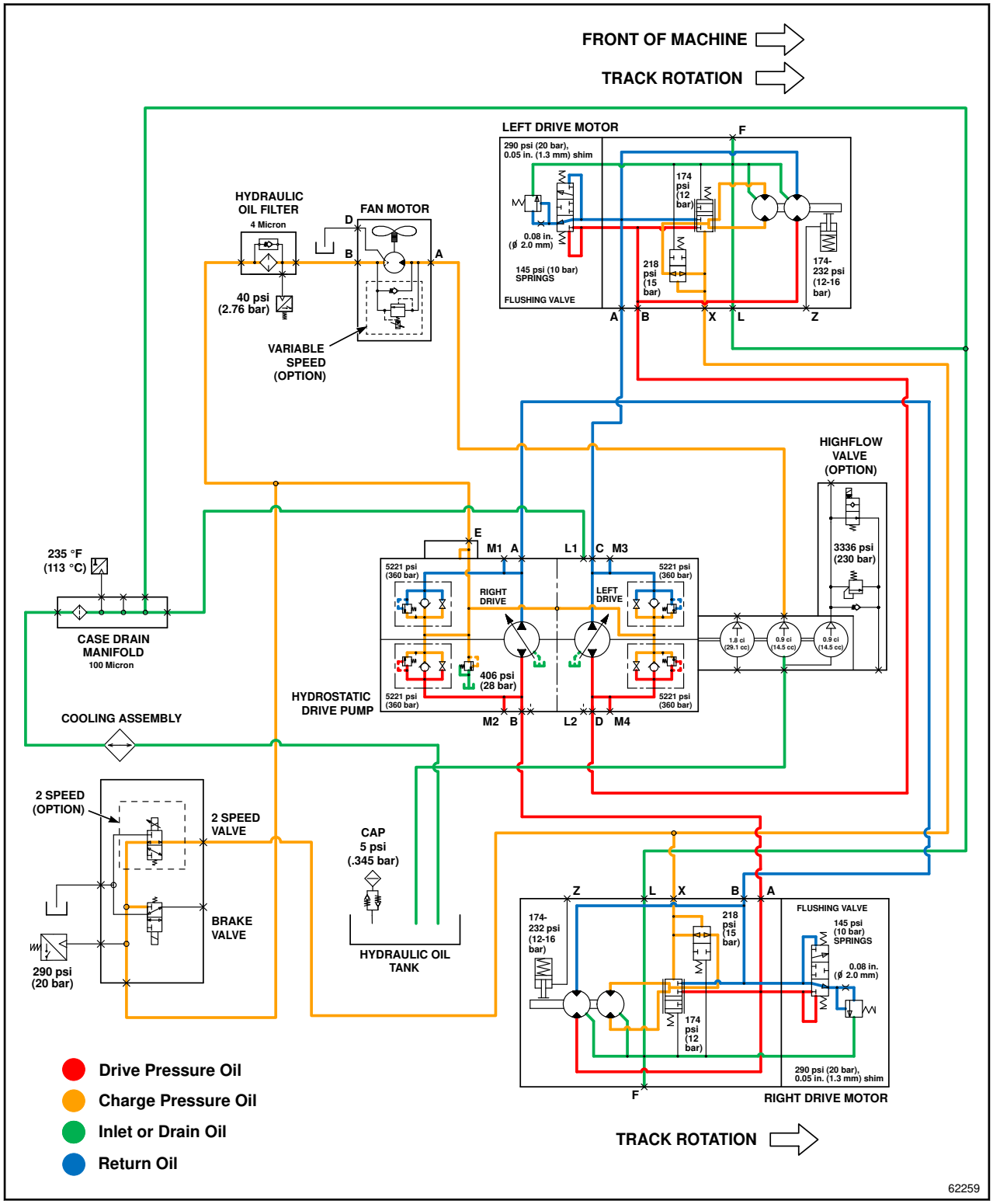


Figure 3-34

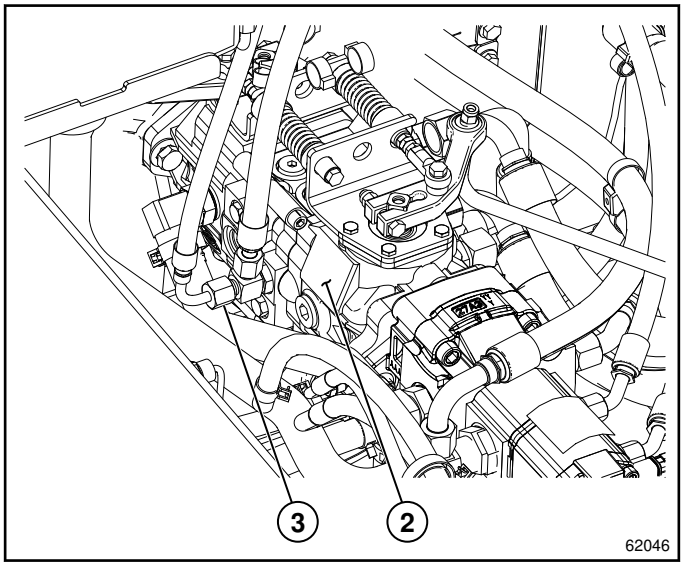


Figure 3-39: Charge Pressure Test (Manual Controls)

4. Remove hose (3) from hydrostatic drive pump (2).
5. Install tee fitting between the hose (3) and drive pump (2). Tighten the tee fitting and hose.
6. Connect pressure gauge (1) to tee fitting.
7. Start machine.
8. Verify pressure gauge (1) reads 406 psi (28 bar).

   Does pressure gauge read 406 psi (28 bar)?

   YES *Charge pressure is good. Proceed to step 8.*

   NO *Test charge pressure system. (See "**Charge Pressure System Test**" on **page 3-78**.)*
9. Turn off machine.
10. Disconnect and remove test equipment. Install all hoses and fittings as noted prior to removal.
11. Install and connect all components as noted prior to test.
12. Check hydraulic oil level. Add oil as needed. (See "**Hydraulic Oil Tank Drain/Fill Procedure**" on **page 4-64**.)

Hydrostatic Drive Pump (Machines with Electronic Controls)

Removal and Installation

See **Figures 3-48** and **3-49**.

WARNING

Hydraulic system operates at high pressures and temperatures. Always allow hydraulic oil to cool and relieve pressure in hydraulic reservoir before working on hydraulic system. Wear eye protection and gloves to prevent injury. Open lines and hoses slowly and wait for any residual pressure to relieve before continuing to open lines and hoses. Failure to comply may result in injury or death to personnel.

WARNING

Prolonged contact with lubricating oil may cause skin rash. Remove saturated clothing immediately and thoroughly wash skin that comes in contact with lubricating oil. Failure to comply may result in injury or death to personnel.

WARNING

Spilled hydraulic oil is slippery and creates a hazardous condition. Clean up and properly dispose of hydraulic oil. Failure to comply may result in injury or death to personnel.

CAUTION

Wipe clean area around all fluid connections prior to removal. Cap and plug all hoses, lines, fittings, and ports during removal to prevent contamination of system components. System must be kept clean from contaminants. Failure to comply may result in damage to equipment.

NOTES

- *Position drain pan under hoses being removed.*
- *Tag and mark hoses and fittings prior to removal to ensure proper installation.*
- *Inspect O-rings upon removal for wear or damage and replace as necessary.*
- *Cap and plug hoses and fittings during removal.*

1. Park machine safely. (See "**Park Machine Safely**" on **page 15**.)

WARNING

- **Support the machine using properly rated jackstands. Never work under a machine supported only by a jack.**
- **Do not use wood or concrete blocks to support the machine. Failure to properly support the machine may result in death or serious injury.**

2. Support machine securely. (See "**Support Machine Securely**" on **page 16**.)
3. Remove lower access panel from bottom of machine.

WARNING

Always ensure boom is secured with safety strut when raising boom. Failure to secure boom with safety strut may result in death or serious injury.

4. Raise boom and secure with safety strut.
5. Disconnect negative battery cable at battery. (See "**Removal and Installation**" on **page 2-217**.)

WARNING

Always ensure cab is secured with safety strut when raising cab. Failure to secure cab with safety strut may result in death or serious injury.

6. Raise cab and secure with safety strut to gain access to hydrostatic drive pump.
7. Drain hydraulic oil tank. (See "**Drain/Fill**" on **page 4-64**.)
8. Remove gear pump. (See "**Removal and Installation**" on **page 4-68** or "**Removal and Installation**" on **page 4-69**.)

Right Drive Motor (Two Speed Wheeled Machine)

Removal and Installation

See **Figures 3-58** through **3-60**.

WARNING

Hydraulic system operates at high pressures and temperatures. Always allow hydraulic oil to cool and relieve pressure in hydraulic reservoir before working on hydraulic system. Wear eye protection and gloves to prevent injury. Open lines and hoses slowly and wait for any residual pressure to relieve before continuing to open lines and hoses. Failure to comply may result in injury or death to personnel.

WARNING

Prolonged contact with lubricating oil may cause skin rash. Remove saturated clothing immediately and thoroughly wash skin that comes in contact with lubricating oil. Failure to comply may result in injury or death to personnel.

WARNING

Spilled hydraulic oil is slippery and creates a hazardous condition. Clean up and properly dispose of hydraulic oil. Failure to comply may result in injury or death to personnel.

CAUTION

Wipe clean area around all fluid connections prior to removal. Cap and plug all hoses, lines, fittings, and ports during removal to prevent contamination of system components. System must be kept clean from contaminants. Failure to comply may result in damage to equipment.

NOTES

- *Position drain pan under hoses being removed.*
- *Tag and mark hoses and fittings prior to removal to ensure proper installation.*
- *Inspect O-rings upon removal for wear or damage and replace as necessary.*
- *Cap and plug hoses and fittings during removal.*

1. Park machine safely. (See "**Park Machine Safely**" on **page 15**.)

WARNING

- **Support the machine using properly rated jackstands. Never work under a machine supported only by a jack.**
- **Do not use wood or concrete blocks to support the machine. Failure to properly support the machine may result in death or serious injury.**

2. Support machine securely. (See "**Support Machine Securely**" on **page 16**.)
3. Remove lower access panel from bottom of machine.

WARNING

Always ensure boom is secured with safety strut when raising boom. Failure to secure boom with safety strut may result in death or serious injury.

4. Raise boom and secure with safety strut.
5. Drain hydraulic oil tank. (See "**Drain/Fill**" on **page 4-64**.)

WARNING

Always ensure cab is secured with safety strut when raising cab. Failure to secure cab with safety strut may result in death or serious injury.

6. Raise cab and secure with safety strut to gain access to hydrostatic pump.

Chapter 4

Hydraulics

Hydraulic Schematic (Wheeled Machine with Manual Controls)

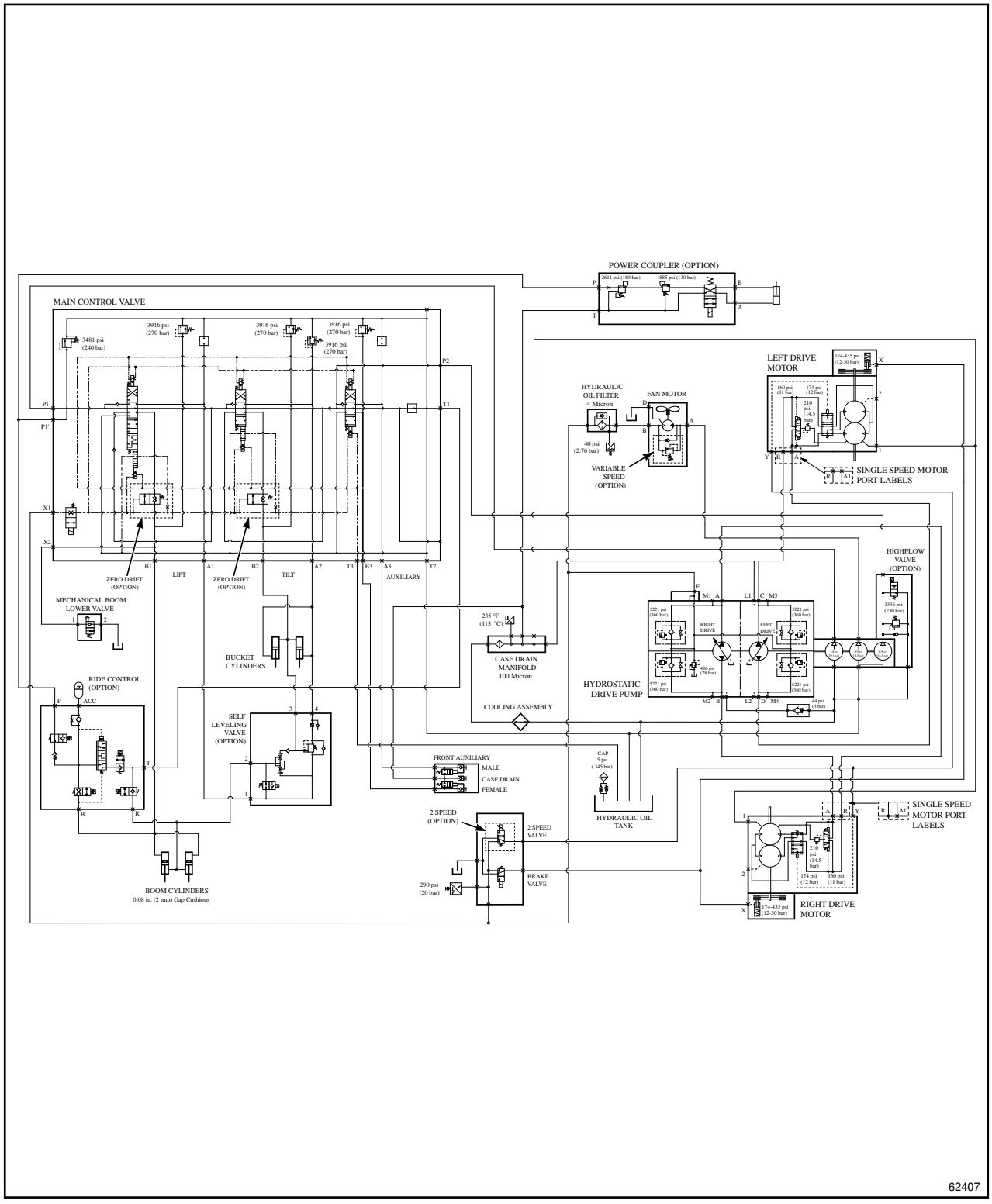


Figure 4-9

Bucket Curl Circuit Schematic

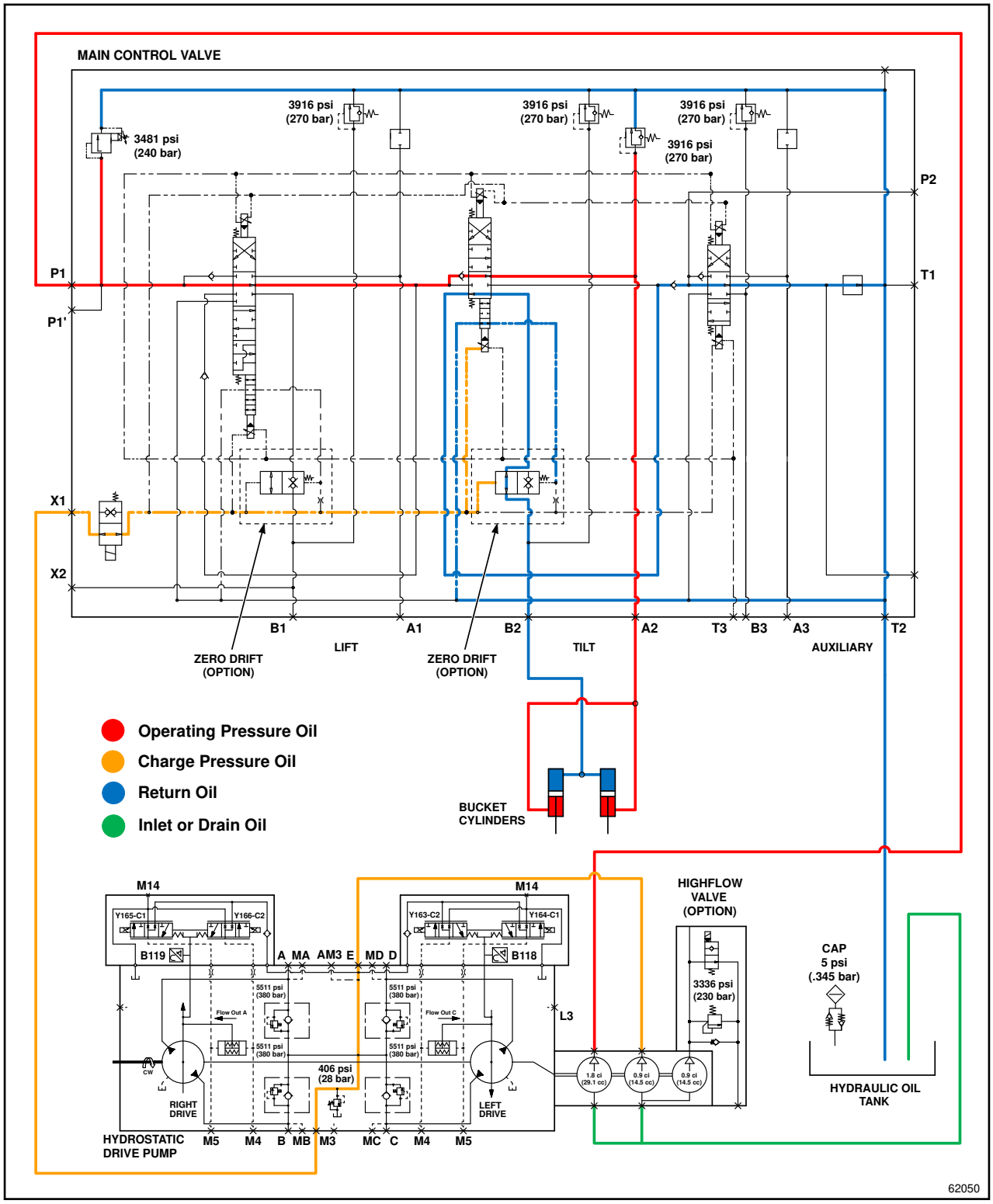


Figure 4-14

Ride Control Circuit Schematic

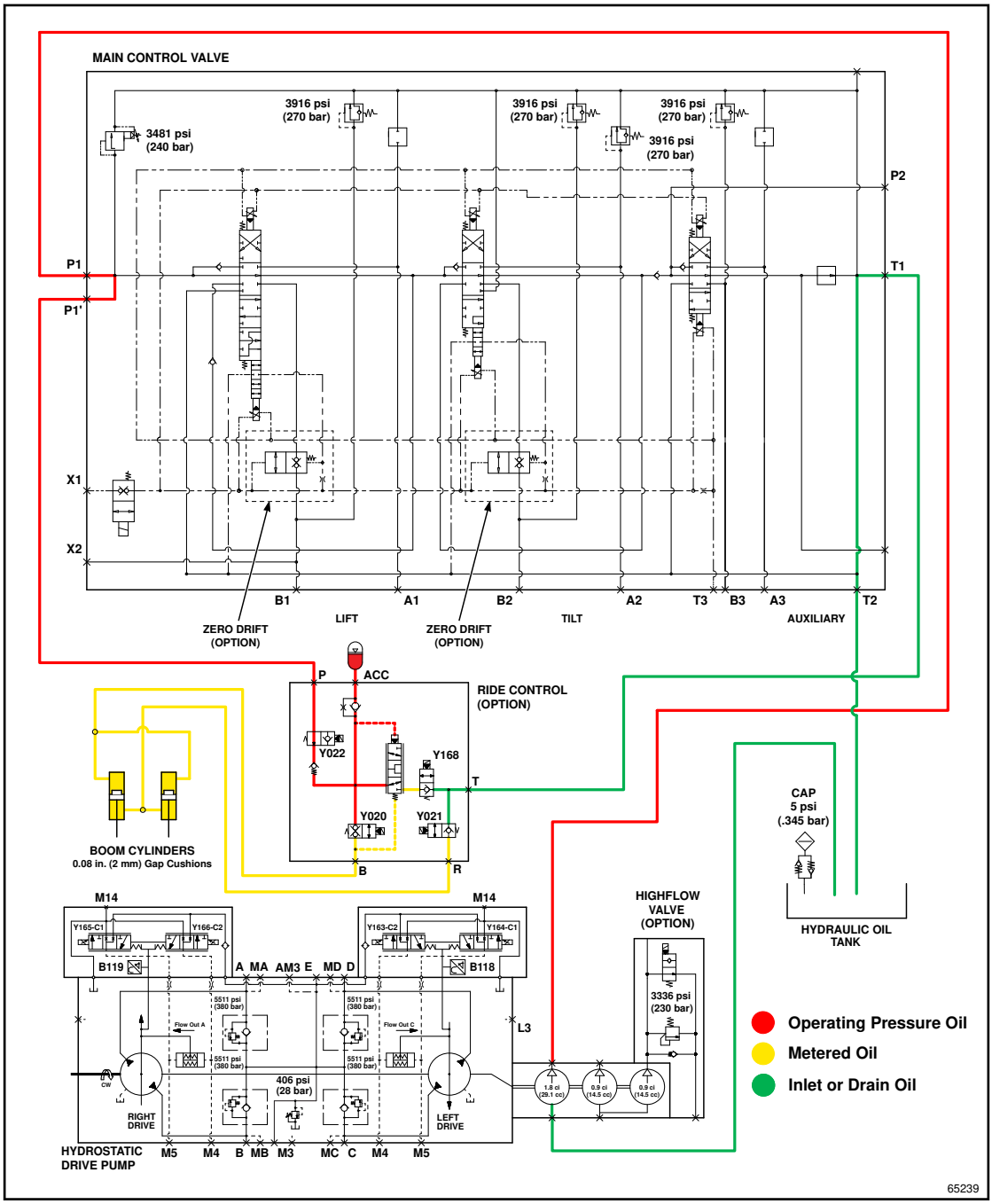


Figure 4-19: Ride Control Charging Circuit

Auxiliary Hydraulics Female Coupler Circuit Schematic

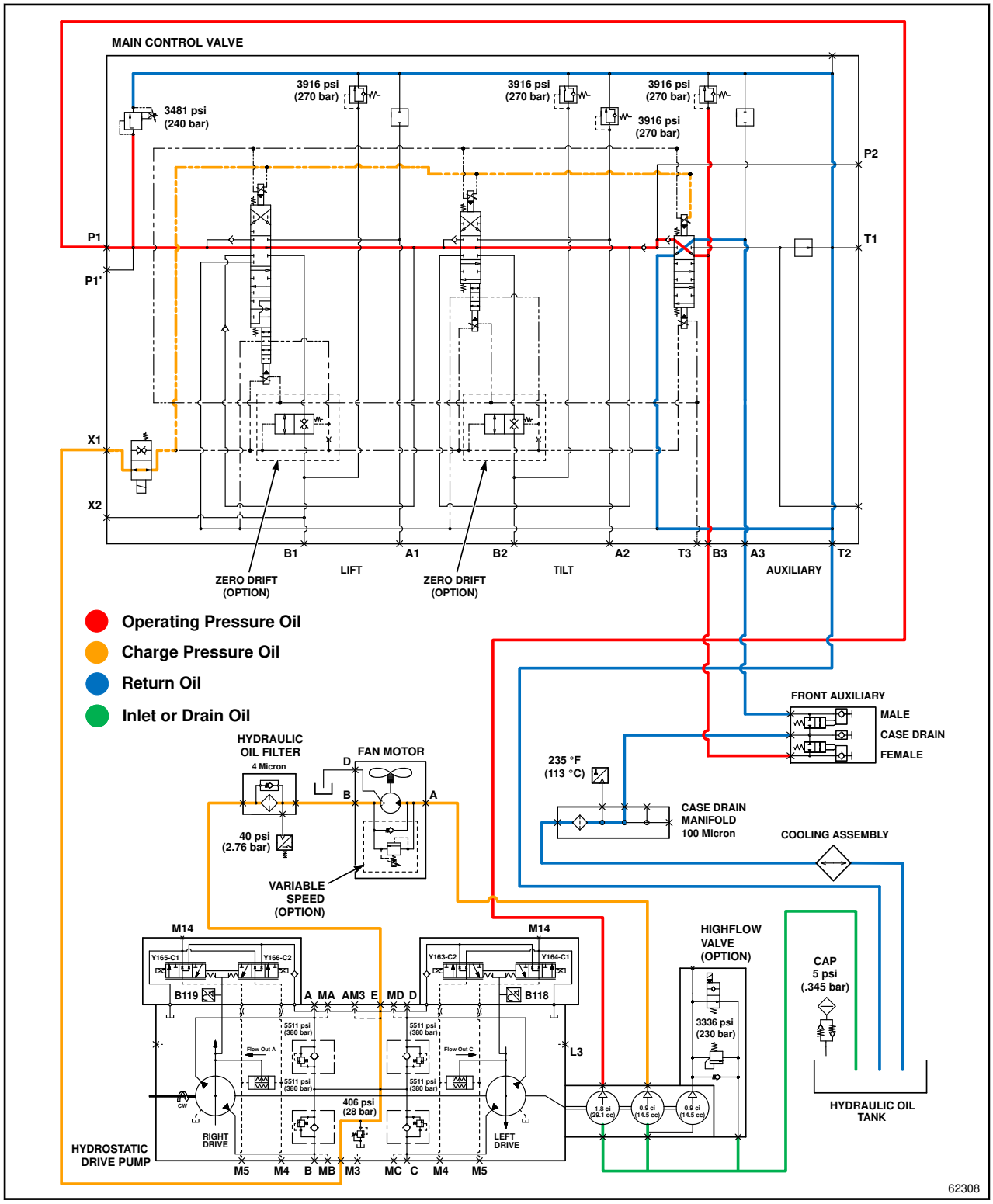


Figure 4-25

Boom Cylinder Leakage Test

See **Figure 4-29**.

WARNING

Hydraulic system operates at high pressures and temperatures. Always allow hydraulic oil to cool and relieve pressure in hydraulic reservoir before working on hydraulic system. Wear eye protection and gloves to prevent injury. Open lines and hoses slowly and wait for any residual pressure to relieve before continuing to open lines and hoses. Failure to comply may result in injury or death to personnel.

WARNING

Prolonged contact with lubricating oil may cause skin rash. Remove saturated clothing immediately and thoroughly wash skin that comes in contact with lubricating oil. Failure to comply may result in injury or death to personnel.

WARNING

Spilled hydraulic oil is slippery and creates a hazardous condition. Clean up and properly dispose of hydraulic oil. Failure to comply may result in injury or death to personnel.

CAUTION

Wipe clean area around all fluid connections prior to removal. Cap and plug all hoses, lines, fittings, and ports during removal to prevent contamination of system components. System must be kept clean from contaminants. Failure to comply may result in damage to equipment.

1. Park machine safely. (See "**Park Machine Safely**" on **page 15**.)
2. Mark boom cylinder rod (1) 0.24 in. (6 mm) from base of boom cylinder (2) as shown in **Figure 4-29**.

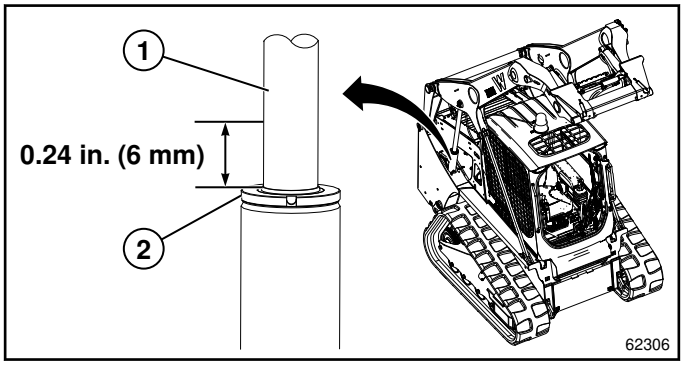


Figure 4-29: Boom Cylinder Leakage Test

CAUTION

Do not scratch, scribe, or gouge boom cylinder rod. Scratching, scribing, or gouging boom cylinder rod may result in boom cylinder leakage. Failure to comply may result in damage to equipment.

3. Repeat Step 2 for remaining boom cylinder.
4. Allow boom cylinders to support weight of boom and attachment for 1 hour.

   Did boom cylinder(s) leak down 0.24 in. (6 mm) or more?

   YES *Boom cylinder(s) is faulty. Replace boom cylinder(s). (See "**Boom Cylinders**" on **page 4-88**.)*

   NO *Boom cylinder(s) are good.*

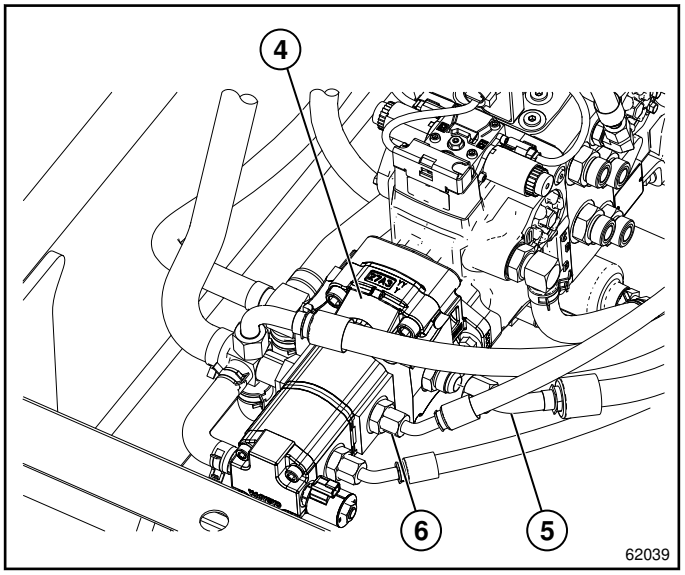


Figure 4-38: Drive Motor Hose Removal

4. Disconnect outlet hose from section 1 of gear pump (4).
5. Connect inlet side of flow meter (1) to section 1 of gear pump (4).
6. Connect outlet side of flow meter (1) to outlet hose (5).
7. Ensure flow meter valve (2) is fully open.
8. Start machine.
9. Raise engine speed to 2725 RPM using hand throttle control.
10. Allow hydraulic oil to warm to 140° F (60° C) by slowly closing flow meter valve (2) until gauge (3) reads 1000 psi (69 bar). Do not exceed relief pressure of 3481 psi (240 bar).
11. Open flow meter valve (2) until valve is completely open.
12. Verify flow meter (1) reads 20 GPM (76 LPM).

    Does flow meter (1) 20 GPM (76 LPM)?

    YES *Gear pump is good. Proceed to step 13.*

    NO *Gear pump is faulty. Replace gear pump. (See "**Gear Pump (Two Section)**" on **page 4-68** or "**Removal and Installation**" on **page 4-69**.)*

13. Turn off machine.
14. Disconnect outlet side of flow meter (1) from outlet hose (5).
15. Disconnect inlet side of flow meter (1) from section 1 of gear pump (4).
16. Disconnect outlet hose (6) from gear pump (4).
17. Connect inlet side of flow meter (1) to section 2 of gear pump (4).
18. Connect outlet side of flow meter (1) to outlet hose (6).
19. Ensure flow meter valve (2) is fully open.
20. Start machine.
21. Raise engine speed to 2725 RPM using hand throttle control.
22. Allow hydraulic oil to warm to 140° F (60° C) by slowly closing flow meter valve (2) until gauge (3) reads 1000 psi (69 bar). Do not exceed relief pressure of 3481 psi (240 bar).
23. Open flow meter valve (2) until valve is completely open.
24. Verify flow meter (1) reads 10.5 GPM (40 LPM).

    Does flow meter (1) 10.5 GPM (40 LPM)?

    YES *Gear pump is good. Proceed to step 25.*

    NO *Gear pump is faulty. Replace gear pump. (See "**Gear Pump (Two Section)**" on **page 4-68** or "**Gear Pump (Three Section)**" on **page 4-69**.)*

25. Turn off machine.
26. Disconnect and remove test equipment. Install all hoses and fittings as noted prior to removal.
27. Install and connect all components as noted prior to test.
28. Check hydraulic oil level. Add oil as needed. (Refer to "**Hydraulic Oil Tank Drain/Fill Procedure**" on **page 4-64**.)

1. Park machine safely. (See "**Park Machine Safely**" on **page 15**.)
2. Open engine cover.
3. Open radiator cover to gain access to fan motor.

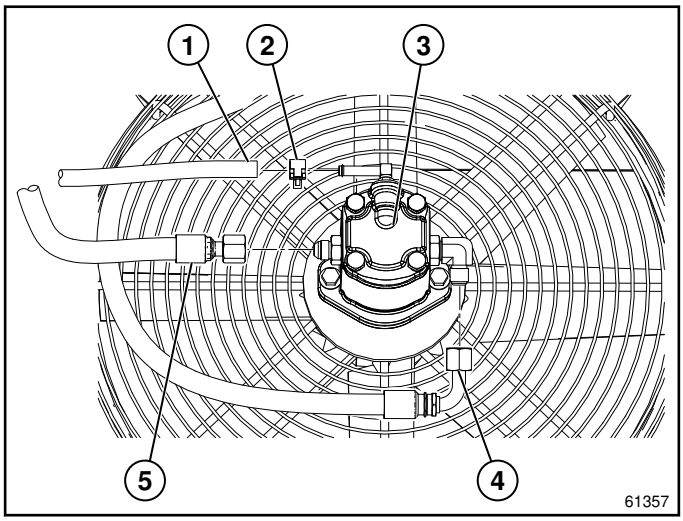


Figure 4-46: Hose Removal and Installation

4. Remove clamp (2) and hose (1) from fan motor (3).
5. Remove hose (5) from fan motor (3).
6. Remove hose (4) from fan motor (3).

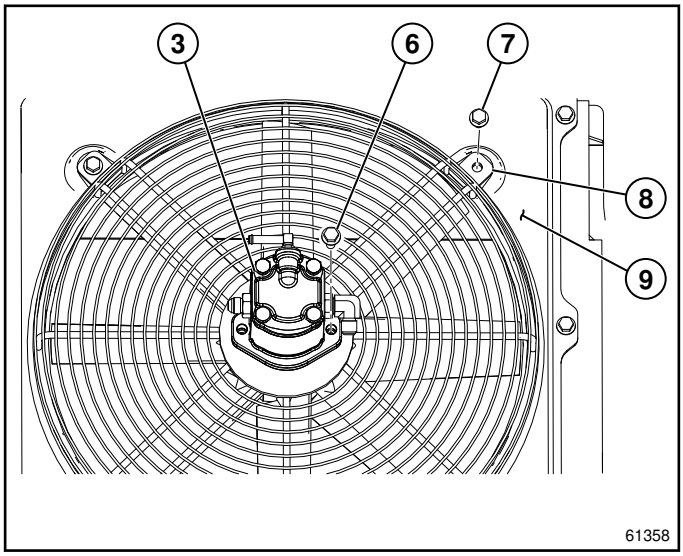


Figure 4-47: Fitting Removal and Installation

7. Remove four bolts (7), fan motor (3), and guard (8) from machine (9).
8. Remove two bolts (6) from fan motor (3) and guard (8).

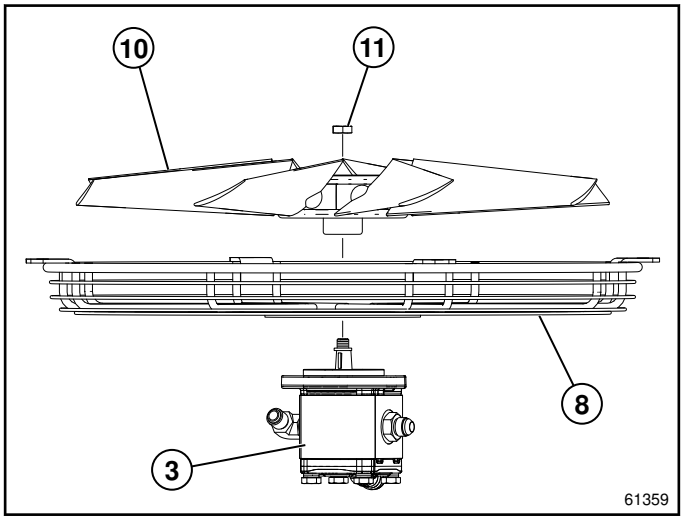


Figure 4-48: Fan Motor Removal and Installation

9. Remove nut (11), fan (10), and guard (8) from fan motor (3).

Installation Notes

- *Install the fan motor by reversing the order of removal.*
- *Lightly lubricate O-rings with clean hydraulic oil prior to installation.*
- *Remove caps and plugs as hoses and fittings are installed.*
- *Install hoses and fittings as noted prior to removal.*

5. Remove hose (8) from mechanical boom lower valve (4).
6. Remove hose (5) from mechanical boom lower valve (4).
7. Remove two nuts (3), bolts (1), and mechanical boom lower valve (4) from cab (2).

Installation Notes

- *Install the mechanical boom lower valve by reversing the order of removal.*
- *Lightly lubricate O-rings with clean hydraulic oil prior to installation.*
- *Remove caps and plugs as hoses and fittings are installed.*
- *Install hoses and fittings as noted prior to removal.*

Chapter 5

WANDA Diagnostics and Configuration

5

Figure 5-8: Main Menu

5

12. Click on the Calibration button (2) in the main menu.

Figure 5-17: Calibration Screen

7. Click on the S.P.A.S. Override button (3) in the calibration screen.

Machine Configuration

See **Figures 5-27** through **5-30**.

1. Park machine safely. (See "**Park Machine Safely**" on **page 15**.)
2. Using interface cable, connect Personal Computer (PC) with WANDA software to the machine diagnostic port.
3. Turn key switch to ON.
4. Start WANDA software.

Figure 5-27: Machine Identification Screen

5. Ensure machine identification parameters are correct and click the Next button (1) on the Machine Identification screen.