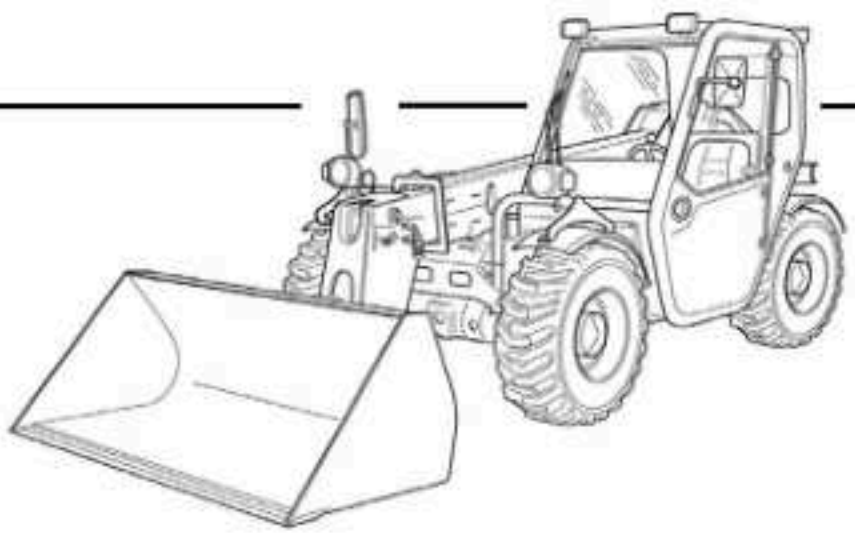
V417

Bobcat®

VersaHANDLER

Service Manual

V417 - S/N A7MK11001 & Above (With Cab)
V417 - S/N A7ML11001 & Above (With Canopy)



6904956 (6-09)

Printed in U.S.A.

© Bobcat Company 2009

MidWestTech | Bobcat V417 VersaHANDLER Service Manual | Publication 6904956_6_09 Order the manual at mid-west-tech.com >

ALPHABETICAL INDEX

AIR CLEANER 70-40-01
AIR CLEANER SERVICE 10-60-01
AIR CONDITIONING SERVICE 80-90-1
AIR CONDITIONING SYSTEM FLOW 80-10-1
ALTERNATOR 60-30-1
APPROVED BOOM STOP 10-150-1
AXLE AND DIFFERENTIAL (FRONT) 40-20-1
AXLE AND DIFFERENTIAL (REAR) 40-21-1
AXLE PIVOT FRAME 40-01
AXLE TOE-IN 40-40-1
AXLES (FRONT AND REAR) 10-110-1

BASIC TROUBLESHOOTING 80-50-1
BATTERY 60-20-1
BOOM ASSEMBLY 50-30-1
BRAKE VALVE 20-110-1
BUCKET POSITIONING CYLINDER 20-30-1

CAMSHAFT AND TIMING GEARS 70-100-1

CANOPY 50-11-1
COMPONENTS 80-20-1
COMPRESSOR 80-110-1
CONDENSER 80-120-1
CONVERSIONS SPEC-70-1
CRANKSHAFT AND PISTONS 70-90-1
CYLINDER HEAD 70-80-1

DASH COVER/STEERING COLUMN COVER 50-130-1
DIAGNOSTIC SERVICE CODES 60-140-1
DRIVE BOX 20-70-1

ENGINE AND ENGINE MOUNTS 70-11-1
ENGINE AND HYDROSTAT ASSEMBLY 70-12-1
ELECTRICAL SYSTEM INFORMATION 60-10-1
ENGINE COOLING SYSTEM 10-70-1
ENGINE COOLING SYSTEM 70-50-1
ENGINE COVER 10-160-1
ENGINE COVER 50-70-1
ENGINE LUBRICATION SYSTEM 10-01
ENGINE SPECIFICATIONS SPEC-01
ENGINE SPEED CONTROL 70-20-1
EVAPORATOR/BLOWER UNIT 80-150-1
EXPANSION VALVE 80-160-1
EXTENSION CYLINDER 20-40-1

FENDER 50-110-1
FUEL SYSTEM 70-70-1
FRONT AUXILIARY HYDRAULIC PRESSURE RELEASE VALVE 20-200-1
FRONT AXLE 40-30-1
FRONT WIPER MOTOR 60-90-1
FUEL SYSTEM 10-80-1
FUEL TANK 50-80-1

GEAR PUMP 20-120-1
GENERAL AIR CONDITIONING SERVICE GUIDELINES 80-60-1

HEATER ASSEMBLY 80-170-1
HYDRAULIC CONNECTION SPECIFICATIONS SPEC-50-1
HYDRAULIC CONTROL VALVE 20-150-1
HYDRAULIC/HYDROSTATIC FLUID SPECIFICATIONS SPEC-60-1
HYDRAULIC / HYDROSTATIC SYSTEM 10-100-1
HYDRAULIC RESERVOIR 20-130-1
HYDRAULIC SYSTEM INFORMATION 20-10-1
HYDROSTATIC DRIVE MOTOR 30-30-1
HYDROSTATIC PUMP 30-40-1
HYDROSTATIC SYSTEM INFORMATION 30-10-1

INCHING SWITCH 60-130-1
INNER BOOM 50-40-1
INSTRUMENT PANEL 60-80-1

JOYSTICK 20-160-1
JOYSTICK PANEL 50-120-1

LATERAL OPERATOR RESTRAINT SYSTEM (LORS™) 10-170-1
LATERAL OPERATOR RESTRAINT SYSTEM (LORS™) 60-50-1
LIFT CYLINDER 20-20-1
LIFTING AND BLOCKING THE VERSAHANDLER 10-10-1
LIGHTS 60-60-1
LUBRICATION 10-120-1
LUBRICATION SYSTEM 70-60-1

Order the manual at mid-west-tech.com >

ALPHABETICAL INDEX (CONT'D)

MACHINE TORQUE SPECIFICATIONS SPEC-30-1
MAIN RELIEF VALVE 20-80-1
MANIFOLD 20-210-1
MUFFLER 70-30-1

OIL COOLER 30-20-1
OPERATOR CAB/CANOPY 10-20-1
OPERATOR CAB 50-10-1
OPERATOR SEAT 50-20-1

PARKING BRAKE 20-170-1
PARKING BRAKE 40-50-1
PEDAL ASSEMBLY 60-120-1
PORT RELIEF VALVES 20-90-1
PRESSURE SWITCH 80-140-1

BOB-TACH 50-90-1

REAR AXLE 40-90-1
REAR WEIGHTS 50-100-1
REAR WIPER MOTOR 60-90-1
RECEIVER / DRIER 80-130-1
REGULAR MAINTENANCE 80-40-1

SAFETY 80-30-1
SERVICE BRAKE 40-80-1
SERVICE SCHEDULE 10-50-1
SPARK ARRESTOR MUFFLER 10-140-1
STARTER 60-40-1
STEERING ANGLE ADJUSTMENT 40-60-1
STEERING CYLINDER (FRONT) 20-60-1
STEERING CYLINDER (REAR) 20-61-1
STEERING MODE VALVE BLOCK 20-100-1
STEERING VALVE 20-150-1
SYSTEM CHARGING AND RECLAMATION 80-100-1
SYSTEM TROUBLESHOOTING CHART 80-70-1

TEMPERATURE AND PRESSURE 80-80-1
TIRE MAINTENANCE 10-130-1
TILT CYLINDER 20-50-1
TOP WIPER MOTOR 60-100-1
TORQUE SPECIFICATIONS FOR BOLTS SPEC-40-1
TOW VALVE 20-190-1
TOWING THE VersaHANDLER 10-40-1
TRANSPORTING THE VERSAHANDLER 10-30-1
TRAVEL LEVER 60-70-1
TROUBLESHOOTING 40-10-1, 70-01

VersaHANDLER TELESCOPIC TOOL CARRIER (TTC) SPECIFICATIONS SPEC-10-1

WEAR PADS (FRONT) 50-50-1
WEAR PADS (REAR) 50-60-1
WORKGROUP LOCKOUT VALVE 20-180-1

Order the manual at mid-west-tech.com >

CONTENTS

DELIVERY REPORT X

FOREWORD III

SAFETY INSTRUCTIONS V

SERIAL NUMBER LOCATION IX

BOBCAT VERSAHANDLER IDENTIFICATION XI

SAFETY AND MAINTENANCE 10-01

HYDRAULIC SYSTEM 20-01

HYDROSTATIC SYSTEM 30-01

DRIVE SYSTEM 40-01

MAIN FRAME 50-01

ELECTRICAL SYSTEM AND ANALYSIS 60-01

ENGINE SERVICE 70-01

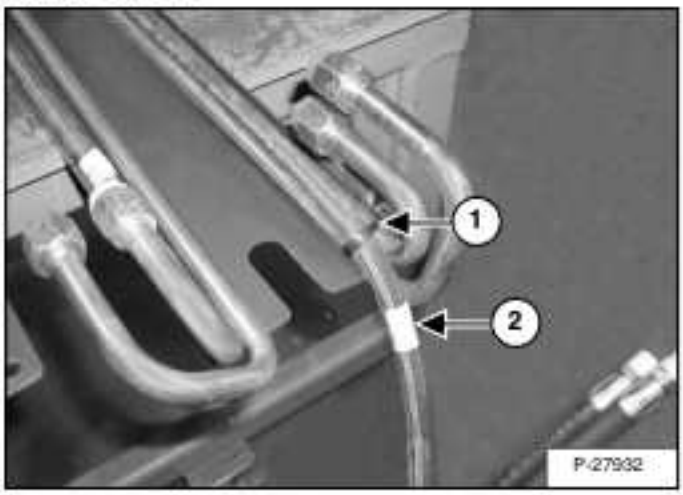
HEATING, VENTILATION, AIR CONDITIONING 80-01

SPECIFICATIONS SPEC-01

MidWestTech | Bobcat V417 VersaHANDLER Service Manual | Publication 6904956_6_09 Order the manual at mid-west-tech.com >

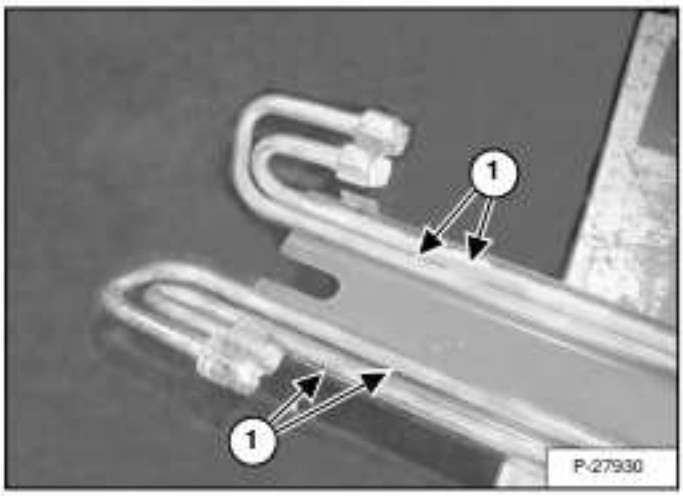
Tubeline Tray Disassembly (Cont'd)

Figure 20-40-26



Remove the tie strap (Item 1) from both ends of the electrical harness (Item 2) **[Figure 20-40-26]**. Remove the electrical harness.

Figure 20-40-27



Remove the tubelines (Item 1) **[Figure 20-40-27]**.

Tubeline Tray Assembly

Figure 20-40-28

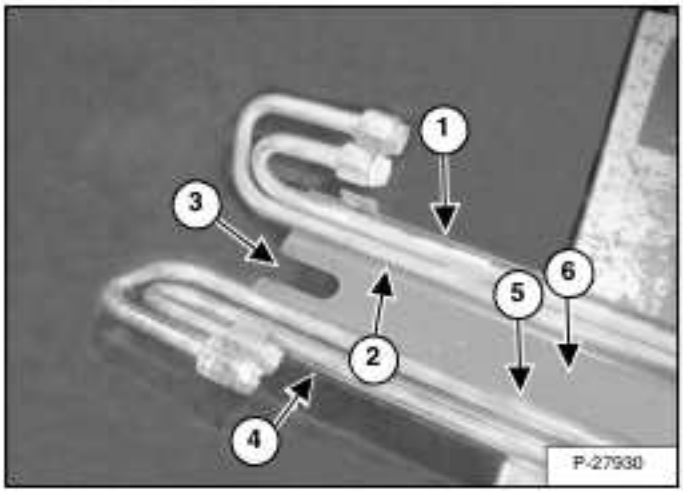
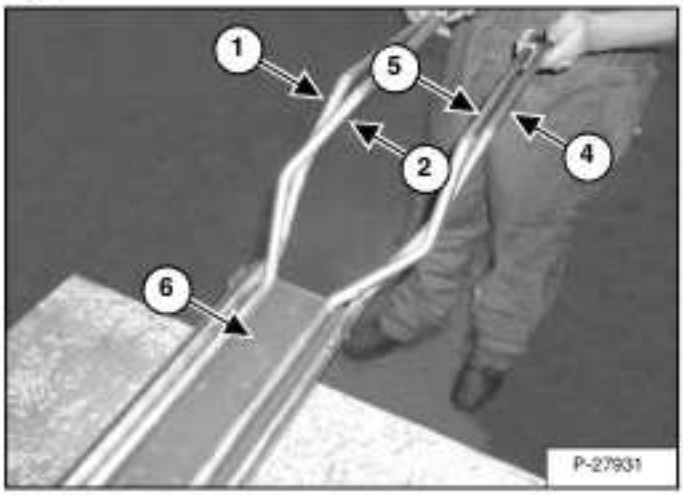


Figure 20-40-29



Place the tubelines (Item 1) and (Item 2) next to each other on the right side of the tray (Item 6) **[Figure 20-40-28]** & **[Figure 20-40-29]**.

NOTE: The notch (Item 3) [Figure 20-40-28] represents the front of the tray.

Place the tubelines (Item 4) and (Item 5) next to each other on the left side of the tray (Item 6) **[Figure 20-40-28]** & **[Figure 20-40-29]**.

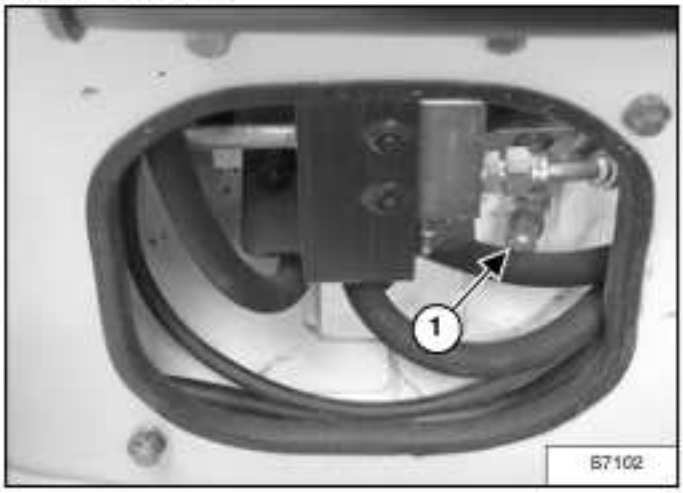
MidWestTech | Bobcat V417 VersaHANDLER Service Manual | Publication 6904956_6_09 Order the manual at mid-west-tech.com >

Auxiliary Valve Section Troubleshooting (Cont'd)

10. Reinstall the controller.

Checking Pilot Pressure

Figure 20-150-22



11. Locate the test fitting (Item 1) **[Figure 20-150-22]**, through the right side frame hole, below the control valve and remove the cap.

Figure 20-150-23



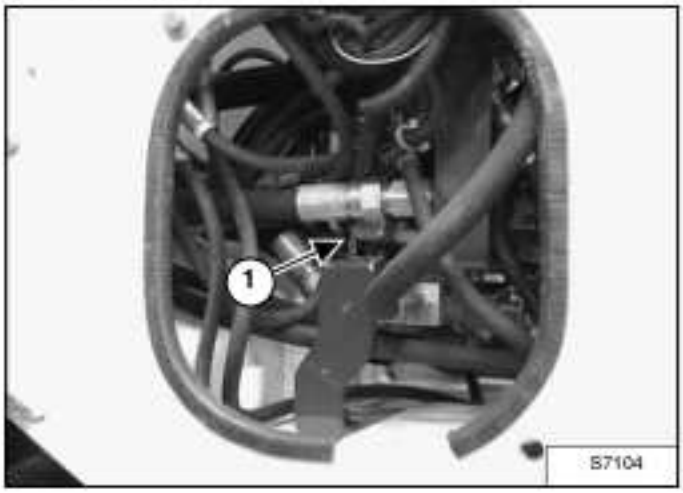
12. Install a 1000 PSI (70 bar) gauge on the test fitting **[Figure 20-150-23]**.

13. Start the engine, lower the restraint bar (if equipped) and run the engine at 2200 RPM. Record the pressure. The pressure at the gauge should be 508 PSI (35 bar) maximum.

14. Remove the gauge.

Checking Drain Pressure

Figure 20-150-24



15. Locate the test fitting (Item 1) **[Figure 20-150-24]** behind the control valve and remove the cap.

Figure 20-150-25



16. Install a 500 PSI (35 bar) gauge on the test fitting **[Figure 20-150-25]**.

17. Start the engine, lower the restraint bar (if equipped) and run the engine at 2200 RPM. Record the pressure. The pressure at the gauge should be 22 PSI (1,5 bar) maximum.

18. Remove the gauge.

MidWestTech | Bobcat V417 VersaHANDLER Service Manual | Publication 6904956_6_09 Order the manual at mid-west-tech.com >

Crankshaft And Bearings - Servicing (Cont'd)

Crankshaft Side Clearance

Figure 70-90-37

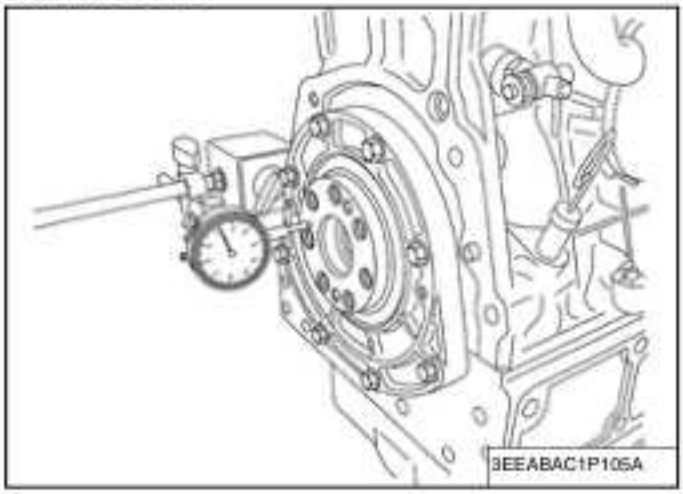
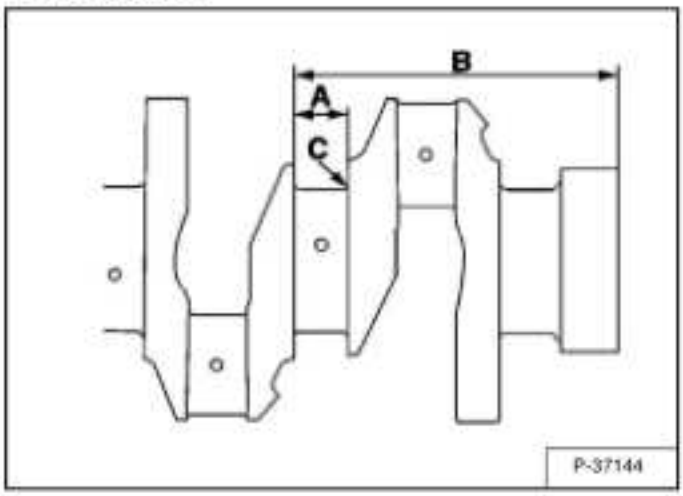


Figure 70-90-38



Set a dial indicator with its tip on the end of the crankshaft **[Figure 70-90-37]**.

Measure the side clearance by moving the crankshaft to the front and rear.

If the measurement exceeds the allowable limit, replace the thrust bearings.

If the same size bearing is useless because of the crankshaft journal wear, replace it with an oversize one referring to the table and **[Figure 70-90-38]**.

Crankshaft side clearance	Factory spec.	0,15 - 0,31 mm 0.0059 - 0.0122 in.
	Allowable limit	0,50 mm 0.0197 in.

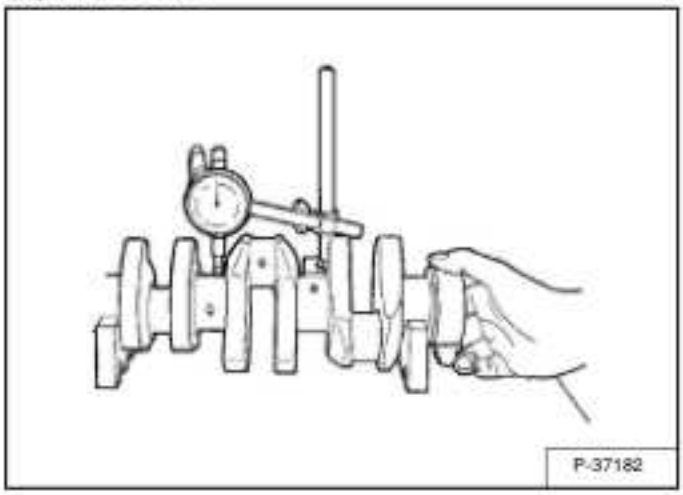
Oversize thrust bearing

Oversize	Bearing	Code Number	Marking
0.2 mm 0.008 in.	Thrust bearing 1 02	1C010-23951	020 OS
	Thrust bearing 2 02	1C010-23971	020 OS
0.4 mm 0.016 in.	Thrust bearing 1 04	1C010-23961	040 OS
	Thrust bearing1 04	1C010-23981	040 OS

Oversize dimensions of crankshaft journal.

Oversize	0,2 mm 0.008 in.	0,4 mm 0.016 in.
Dimension A	29,20 - 29,25 mm 1.1496 - 1.1515 in.	29,40 - 29,45 mm 1.1574 - 1.1594 in.
Dimension B	169,1 - 169,15 mm 6.6575 - 6.6594 in.	169,2 - 169,25 mm 6.6614 - 6.6634 in.
Dimension C	2,8 - 3,2 mm radius 0.1102 - 0.1260 in. radius	2,8 - 3,2 mm radius 0.1102 - 0.1260 in. radius
(0.8-S) The crankshaft journal must be fine-finished to higher than ———		

Figure 70-90-39



Support the crankshaft with V block on the surface plate and set a dial indicator with its tip on the intermediate journal at right angle **[Figure 70-90-39]**.

Rotate the crankshaft on the V block and get the misalignment (half of the measurement).

If the misalignment exceeds the allowable limit, replace the crankshaft.

Crankshaft alignment	Allowable limit	0,02 mm 0.00079 in.

MidWestTech | Bobcat V417 VersaHANDLER Service Manual | Publication 6904956_6_09 Order the manual at mid-west-tech.com >

	DESCRIPTION	SHEET	LOCATION
CAB	JOYSTICK	3	G2
	KEY SWITCH	3	G5
	FNR LEVER	3	G3
	STARTER RELAY	3	G7
	IGNITION RELAY	3	D6
	GLOW PLUG RELAY	3	C6
	FUEL PULL RELAY	3	C4
	LOW SPEED RELAY	3	D4
	INCHING SENSOR	3	D2
	CAB BUZZER	3	B5
	STEER MODE	4	E6
	STEER MODE SWITCH	4	G6
	6/2 VALVE SWITCH	4	G7
	HEATER 3 SPEED SWITCH	4	D5
	CAB HEATER BOWER	4	B5
	AC FAN RELAY	4	F4
	BLOWER SPEED SWITCH	4	E4
	AC EVAPORATOR/BLOWER	4	D4
	AC COMPRESSOR RELAY	4	E3
	ACD LH SKI SWITCH	4	G3
	ACD ATTACH SKI SWITCH	4	G2
	ACD RH SKI SWITCH	4	G1
	DOME LIGHT	5	F8
	HORN RELAY	5	F8
	HORN SWITCH	5	G7
	WIPER SWITCH	5	E7
	FRONT WASHER MOTOR	5	D7
	FRONT WIPER MOTOR	5	D7
	TURN SIGNAL SWITCH	5	E6
	HAZARD WARNING SWITCH	5	F5
	FLASHER RELAY	5	E5
	HAZARD	5	D5
	FOG LIGHT SWITCH	5	G5
	HEADLIGHT SWITCH	5	G4
	ROADLIGHT	5	C4
	LOW BEAM RELAY	5	E3
	POWER BOBTACH SWITCH	5	G2
	BOOMFLOAT RELAY	5	E2
	POWER BOBTACH	5	F3
	PARK BRAKE SWITCH	5	G1
	BACKUP ALARM RELAY	5	E1
	BLUE WORK LIGHT RELAY	6	D8
	FRONT WORK LIGHT RELAY	6	D7
	REAR AND BOOM WORK LIGHT RELAY	6	D7
	BEACON SWITCH	6	G6
	BEACON	6	E6
	CIGAR LIGHT	6	F6
	STOP LIGHT RELAY	6	D5
	HYDRAULIC CATCH SWITCH	6	F4
	HYDRAULIC HOOK SWITCH	6	F3
	REAR WASHER SWITCH	6	G2
	REAR WASHER MOTOR	6	E2
	REAR WIPER	6	C1
	TOP WIPER	6	C1
	LORS BAR SENSOR	7	G5
	RADIO	7	E2
	RIGHT SPEAKER	7	C1
	LEFT SPEAKER	7	C1

	DESCRIPTION	SHEET	LOCATION
ENGINE	STARTER	3	B7
	ALTERNATOR	3	B6
	FUEL SOLENOID PUMP	3	B4
	ENGINE PREHEATER	3	A6
	AC COMPRESSOR	4	D3
	TRINARY SWITCH	4	B4
	ENGINE COOLANT TEMP	4	D3
	ENGINE OIL PRESSURE SWITCH	4	C2
	HYDRAULIC FILTER RESTRICTION	4	C1
	ENGINE SPEED SENSOR	7	F3
FRAME	BATTERY	3	C8
	DISCONNECT SWITCH	3	D8
	LOW SPEED VALVE	3	C4
	DRIVE PUMP FORWARD VALVE	3	D3
	DRIVE PUMP REVERSE VALVE	3	D2
	BOOMFLOAT PRESSURE SENSOR	3	D1
	PASSIVE BRAKE VALVE	3	C3
	BUZZER SHUNT AMA	4	C8
	CRAB STEER VALVE	4	D6
	4 WHEEL STEER VALVE	4	D5
	HAND BRAKE STATUS PRESSURE SWITCH	4	C1
	HYDRAULIC OIL TEMPERATURE	4	C2
	HORN	5	E8
	BOOM FLOAT VALVE	5	D2
	REVERSE HORN	5	C1
	FRONT LEFT LIGHT	5	B8
	REAR LEFT LIGHT	5	B7
	RIGHT REAR LIGHT	5	B5
	RIGHT FRONT LIGHT	5	B4
	FRONT RIGHT WORK LIGHT	6	B7
	FRONT LEFT WORK LIGHT	6	B7
	REAR LEFT WORK LIGHT	6	B7
	BOOM WORK LIGHT	6	B6
	REAR AUXILIARY DIVERTER VALVE	6	D4
	AUXILIARY VALVE	7	E8
	AUXILIARY VALVE	7	E7
	BOOM RETRACT VALVE	7	E7
	BOOM EXTEND VALVE	7	E6
	POWER BOBTACH 4/2 VALVE	7	D6
	FUEL LEVEL	7	F4
	WORK GROUP VALVE	7	D3
BOOM	BOOM ANGLE SWITCH	4	G8
	ACD ATTACHMENT	7	C5
	POWER BOBTACH 6/2 VALVE	7	C3

PRINTED IN U.S.A.

WIRING SCHEMATIC
V417 (S/N A7MK11001 AND ABOVE)
(S/N A7ML11001 AND ABOVE)

(PRINTED JUNE 2009)
V-1103

MidWestTech | Bobcat V417 VersaHANDLER Service Manual | Publication 6904956_6_09

Order the manual at mid-west-tech.com >