

CARCO

INSTALLATION AND PARTS MANUAL

MODEL H90VS

FOR

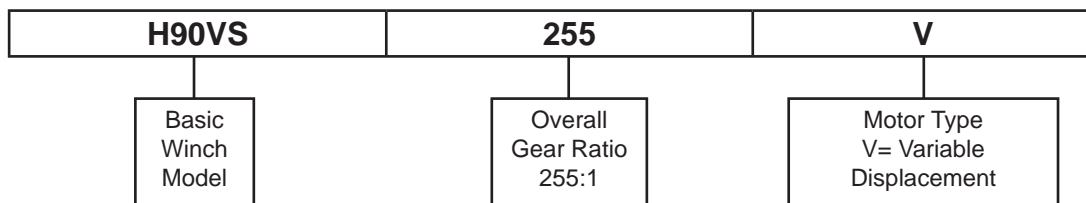
CATERPILLAR D6R III and D6T

NOTE: This manual covers winch installation and parts, specific to the tractor or tractors listed above. For all other common winch parts, refer to CARCO winch parts manual LIT2234.

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MODEL NUMBER DESCRIPTION



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General Safety Recommendations

Caterpillar D6R III & D6T

Some illustrations in this manual may show details or attachments which may be different from your winch. Also, some components may be removed for illustrative purposes.

Continuing product improvement may cause changes in your winch which may not be included in this manual. When a question arises regarding your winch or this manual, contact your nearest CARCO dealer or the factory Service Department at 918-251-8511, Monday - Friday, 8:00 a.m. to 4:30 p.m. CST, or by Fax at 918-259-1575. Provide the complete winch model number and serial number when making inquiries. The model and serial numbers are stamped into the winch housing on the upward facing surface near the forward most mounting flange.

CARCO provides parts and service through a network of authorized dealers. Parts and service are not available directly from the factory. For the name of your nearest dealer, consult your local phone directory or call us at the phone number shown above.

WARNING

Make sure the tractor is secured so that it cannot roll away and the engine switched off before starting ANY work on the hydraulic system.

CAUTION

The hydraulics may only be operated or serviced independently by persons who are over the age of 18, are physically and mentally fit, and have been instructed on how to operate and service hydraulic systems

WARNING

The hydraulic system may be under high pressure. It must therefore be depressurized as specified in the operating instructions before starting any work on the hydraulic system.

CAUTION

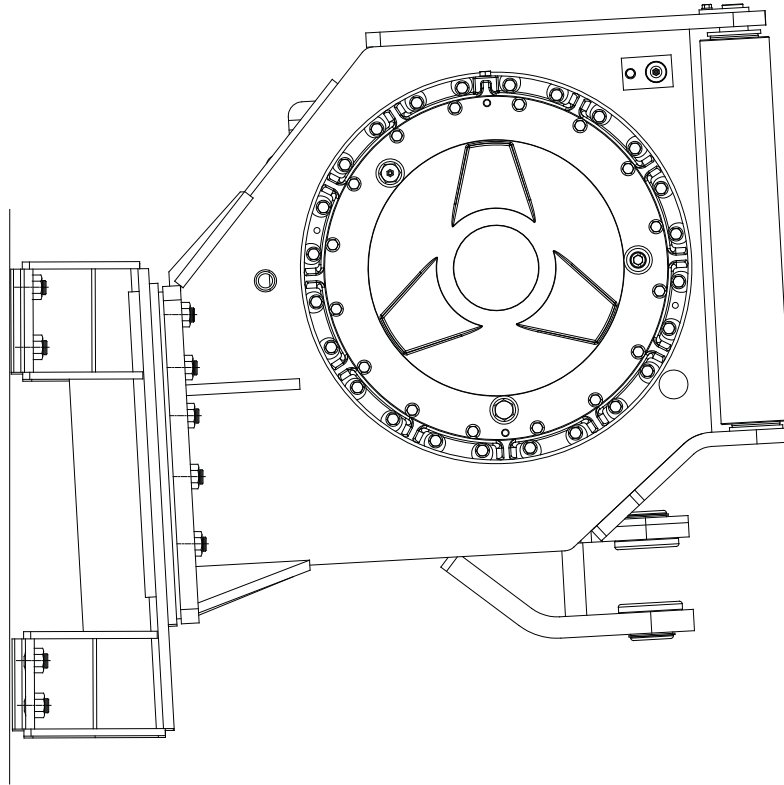
Beware of injuries when attempting to locate leaks. Always use a piece of paper or cardboard for this purpose, never your hands. Fluid emerging under pressure may not be visible but can penetrate the skin and cause serious injuries which must be treated by a medical professional without delay.

WARNING

Hydraulic hose lines must be examined regularly. The hoses must be replaced if damaged or deformed and upon expiry of their service life. The hose lines must comply with technical specifications of the supplier.

Mounting Group

Caterpillar D6R III & D6T

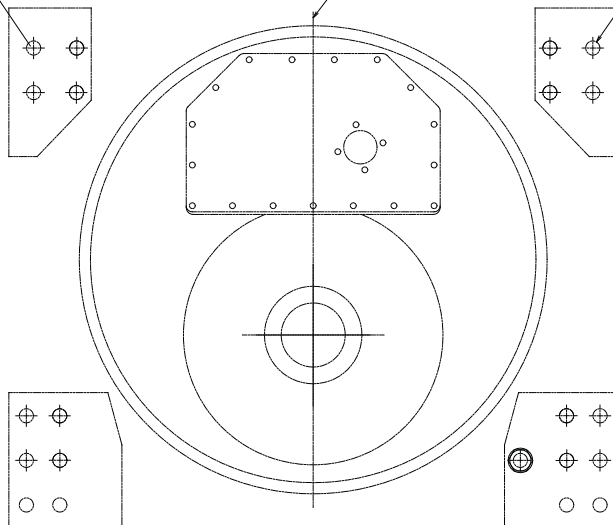


STUDS PRESENT IN TOP 4 HOLES ONLY

Q TRACTOR

WINCH MOUNTING HOLES
1"-8 UNC-2B, 16 PLCS

USE LOCTITE #272 OR SIMILAR
THREAD LOCKING PRODUCT



Mounting Group

Caterpillar D6R III & D6T

INSTALLATION INSTRUCTIONS



Cleanliness is of utmost importance when working on hydraulic equipment. Contamination may cause damage to close tolerances of the hydraulic components which may result in erratic operation and reduced service life.

NOTE: Mounting winch to tractor as the final step will ease access to control group and tractor conversion group. Install complete control group p/n 63652, except direct winch connections, prior to installing winch base unit on tractor.

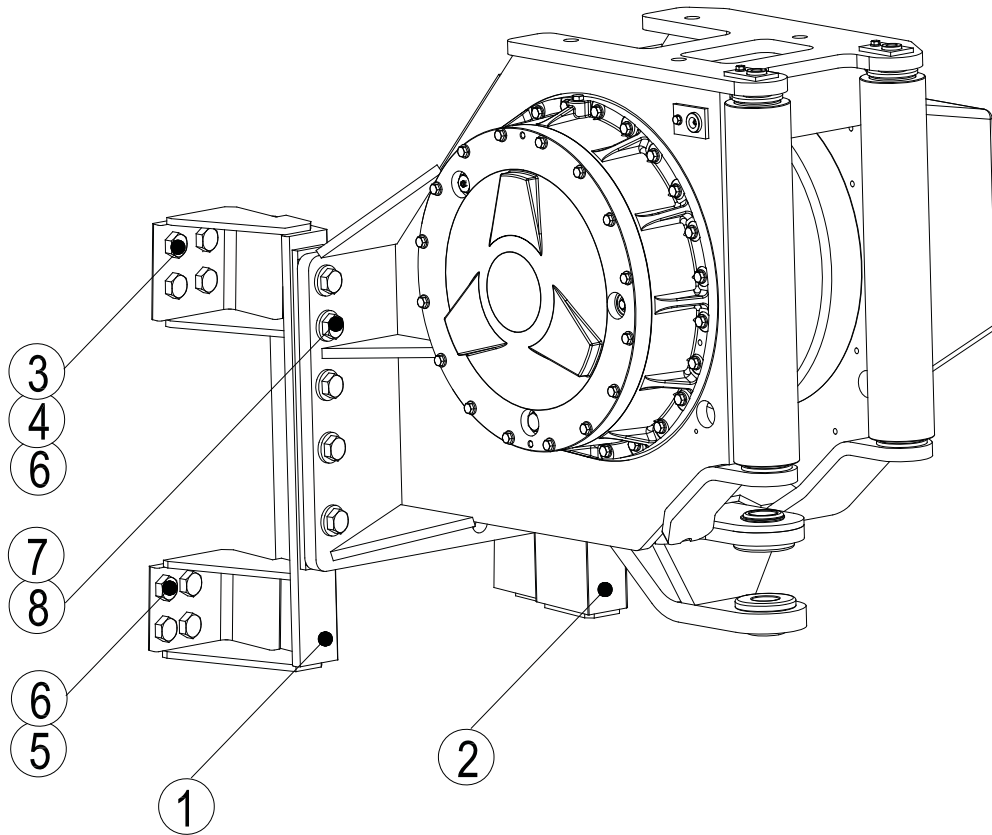


The winch weighs approximately 3,300 pounds (1,500 kg). Ensure your lifting equipment has the adequate capacity and use proper lifting techniques to eliminate the possibility of damage or injury.



Fill the winch to the proper level with the recommended oil BEFORE operating the winch. Component damage may occur if the winch is operated without oil.

1. Ensure that mating surfaces of winch, adapter brackets, and tractor frame are free of paint, clean and smooth.
2. Secure left hand adapter (item 1) and right hand adapter (item 2) to winch with 10 capscrews (item 7) and washers (item 8); torque to 1363 ft-lbs.
3. Install studs (item 3) to top mounting holes in tractor frame on each side (use Loctite 272.)
4. Raise winch/ bracket assembly to tractor and secure with nuts (item 4,) washers (item 6,) and capscrews (item 5). DO NOT torque fasteners until all hardware of the mounting assembly is installed
5. Torque nuts (item 4) and capscrews (item 5) to 682 ft-lbs.



PART	ITEM	DESCRIPTION	QTY
103652	1	LH MOUNTING BRACKET	1
103653	2	RH MOUNTING BRACKET	1
33446	3	STUD, 1 - 8 UNC X 3.25 LONG	4
PA6V8190	4	NUT, HEX 1 - 8 UNC GR 8	4
70690	5	CAPSCREW, 1- 7 UNC X 2.25 GR 8	12
101205	6	WASHER HARDENED 1.00	16
105261	7	CAPSCREW, 1 - 8 UNC X 4.00 GR 8	10
101206	8	WASHER HARDENED 1-1/4	10

Tractor Conversion Group

Caterpillar D6R III & D6T



Cleanliness is of utmost importance when working on hydraulic equipment. Contamination may cause damage to close tolerances of the hydraulic components which may result in erratic operation and reduced service life.

If Tractor is not equipped with ripper controls or pat blade:

1. Replace existing studs (item 107) with longer (15.75-inch long) studs provided with winch kit.
2. Add winch valve section (item 100) to top of valve stack.
3. Reinstall stack valve end-cap using existing nuts and washers
4. Install split-flange halves, bolts, and washers (items 101, 102, & 103) finger tight for safe-keeping until required for winch control group installation.

If Tractor is equipped with pat blade but not ripper controls:

1. Replace existing studs (item 107) with longer (18.1-inch long) studs provided with winch kit.
2. Add winch valve section (item 100) to top of valve stack.
3. Re-install stack valve end-cap using existing nuts and washers.
4. Install split-flange halves, bolts, and washers (items 101, 102, & 103) finger tight for safe-keeping until required for winch control group installation.

If Tractor is equipped with ripper controls and pat blade:

1. Remove ripper control valve, ripper pilot control hoses, ripper output hoses, and ripper adapter manifold (under fuel tank) from tractor.
2. Add winch stack valve section (item 100) to top of valve stack.
3. Re-install stack valve end-cap using existing nuts and washers.
4. Install split flange halves, bolts, and washers (items 101,

If Tractor is equipped with ripper controls but no pat blade:

NOTE: Ripper control valve may be removed or left in place at customer's option. Removing ripper control valve will slightly reduce initial winch installation time. Leaving ripper control valve in place will make subsequent conversion back to ripper much easier.

To install winch by removing ripper controls:

1. Remove ripper control valve, ripper output hoses, and ripper adapter manifold (under fuel tank) from tractor.
2. Add winch stack valve section (item 100) to top of valve stack in place of ripper valve.
3. Re-install stack valve end-cap using existing nuts and washers.
4. Install split-flange halves, bolts, and washers (items 101, 102, 103) finger tight for safe keeping until required for winch control group installation.

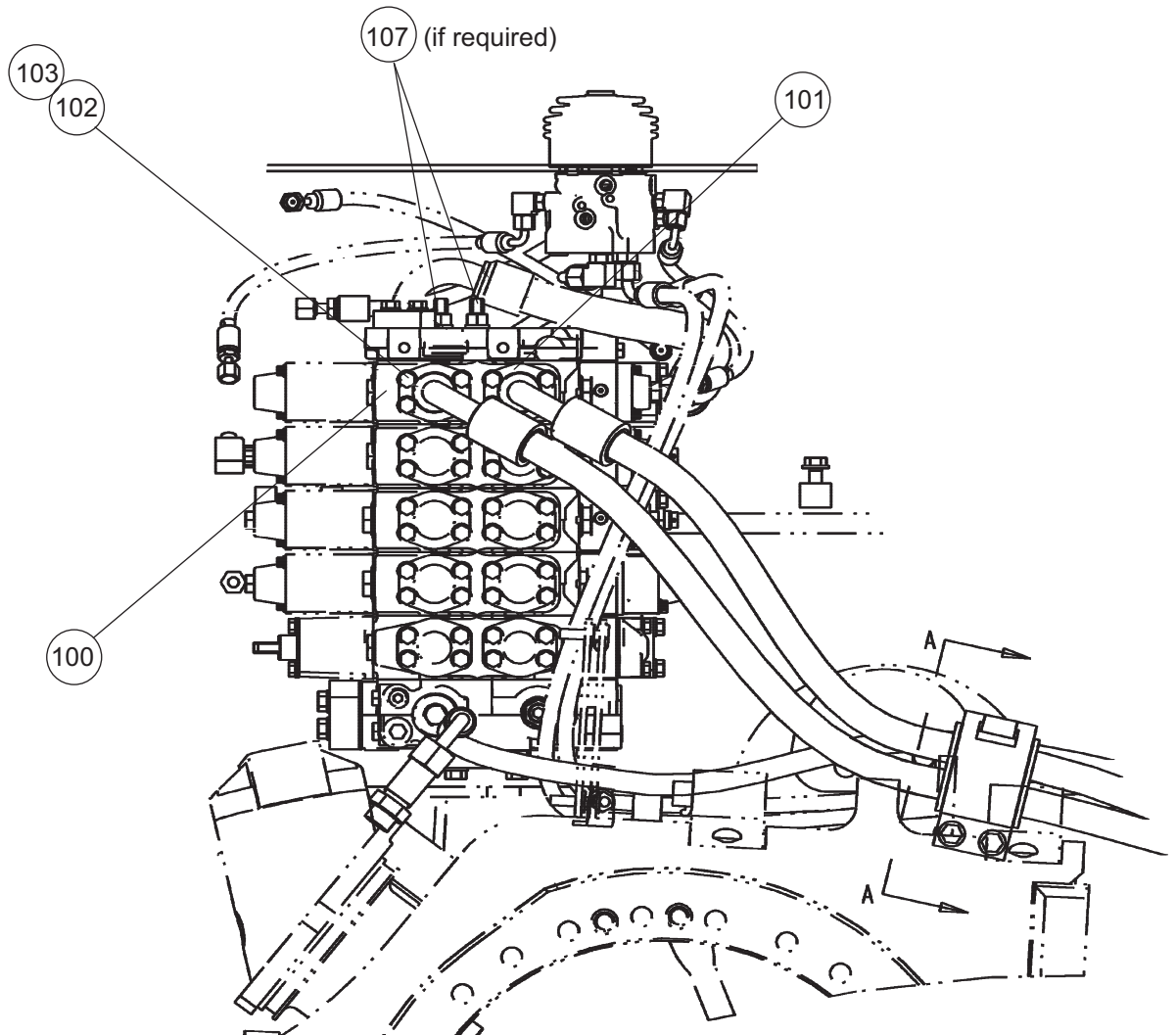
To install winch leaving ripper controls in place:

1. Remove ripper pilot control hoses, ripper control hoses, and ripper adapter manifold (under fuel tank.)
2. Plug pilot control input ports and power output ports in ripper control valve with suitable high pressure plugs.
3. Replace existing studs (item 107) with longer (18.1-inch long) studs provided with winch kit.
4. Add winch stack valve section (item 100) to top of stack valve.
5. Re-install stack valve end-cap using existing nuts and washers.
6. Install split flange halves, bolts, and washers (items 101, 102, & 103) finger tight for safe-keeping until required for winch control group installation.

NOTE: On initial startup, winch control and operation may be slow or unstable until air has been purged from the hydraulic control circuits. Clearing all air from the system may require several minutes of operation. In extreme conditions it may be desirable to manually "bleed" the various hydraulic control connections

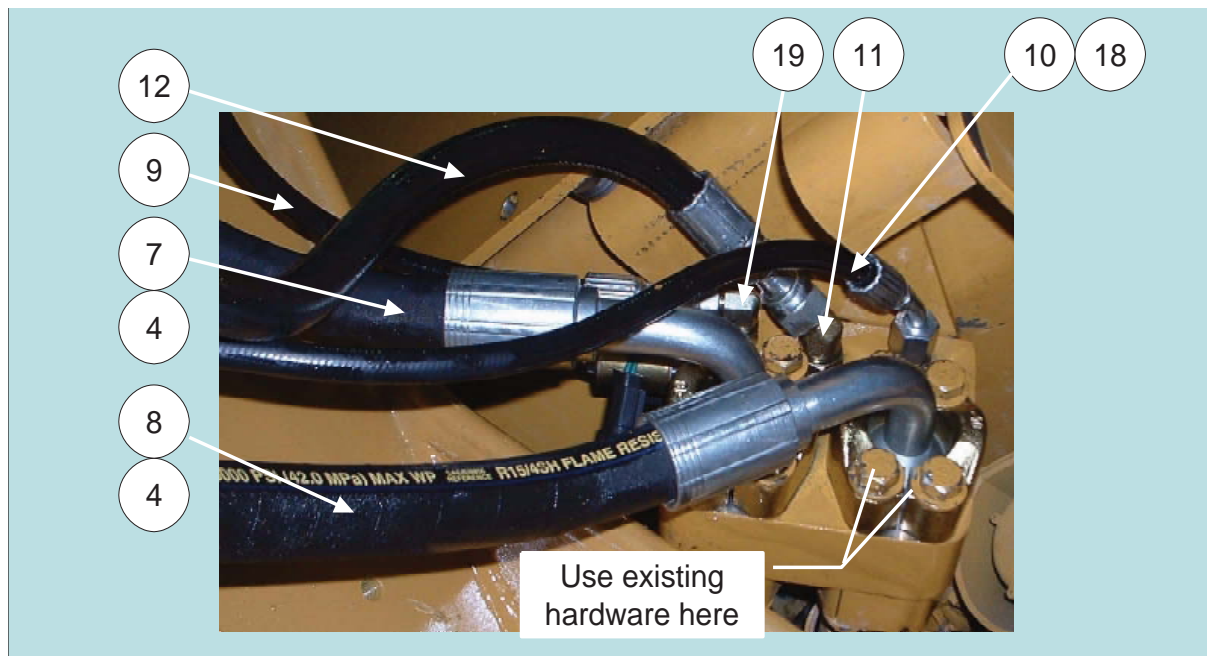
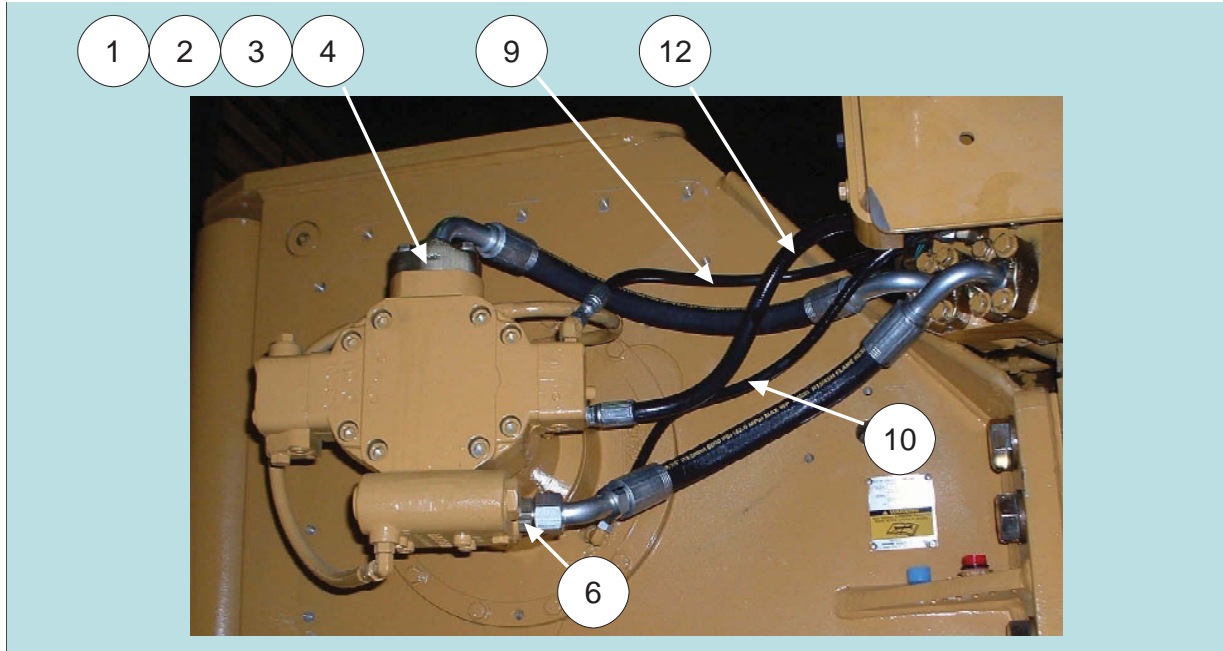
Tractor Conversion Group

Caterpillar D6R III & D6T



List # 63653 Tractor Conversion Group H90 / D6R III			
PART #	ITEM #	DESCRIPTION	QTY
104330	100	CONTROL VALVE SECTION	1
106578	107	STUD 1/2 - 13 UNC X 18.1 LONG	3
106579	107	STUD 1/2 - 13 UNC X 15.75 LONG	3
103741	101	SPLIT-FLANGE HALF	4
104311	102	CAPSCREW, HEX HD 3/8 - 16 UNC X 1.75 GR 8	8
101440	103	WASHER, HARDENED 3/8	8

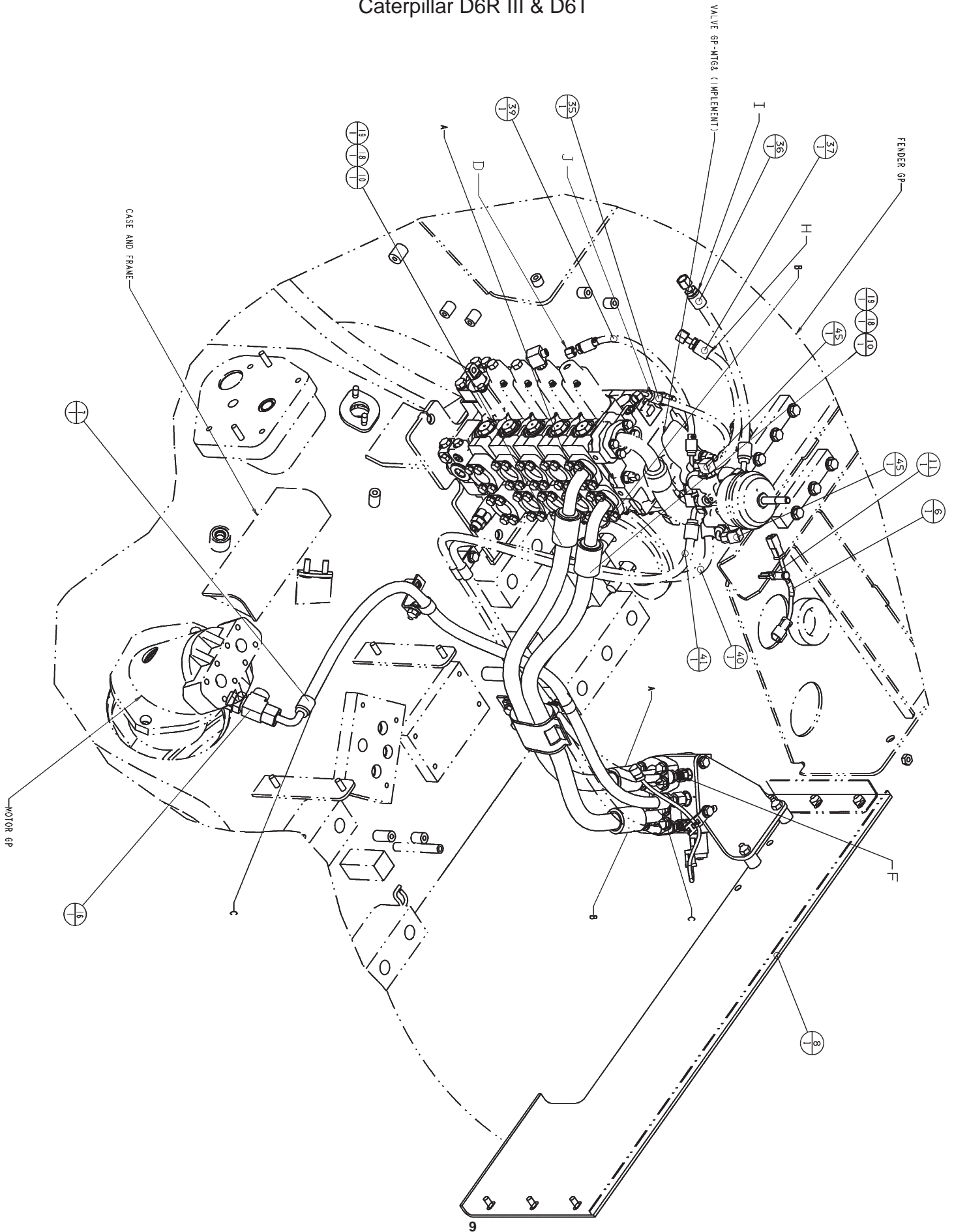
Motor Lines Group



ITEM	PART	DESCRIPTION	QTY.
1	101277	SPLIT FLG, HALF	2
2	104319	CAPSCREW, HEX HEAD 7/16 - 14 X 2-3/4 GD8 Z	4
3	101432	WASHER, HARD 7/16 Z	4
4	101278	D-RING, SPLIT FLG	3
6	101467	ADAPTER, -12/-12 ORB-ORFS	1
7	106636	HOSE, -16/-12 X 27.0 REEL-OUT	1
8	106637	HOSE, -16/-12 X 20.5 REEL-IN	1
9	101831	HOSE -4 X 26.0 MOTOR X PORT	1
10	101260	HOSE ASSY -6 X 27.0, DRUM CLUTCH	1
11	101438	ELBOW 45, -8/-8 ORB/ORFS	1
12	104200	HOSE ASSY -8 ORFS X 20.5, MOTOR CASE DRAIN	1
16	32235	RETAINING STRAP	2
18	101286	ELBOW 45, -6/-6 ORB/ORFS	1
19	27430	ADAPTER, 90 ELBOW ORS/ORB	1

Control Group

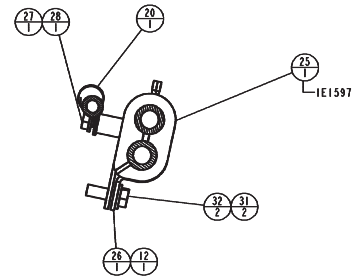
Caterpillar D6R III & D6T



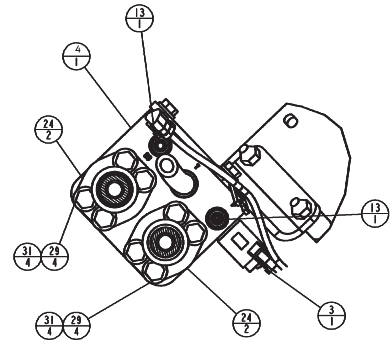
Control Group

Caterpillar D6R III & D6T

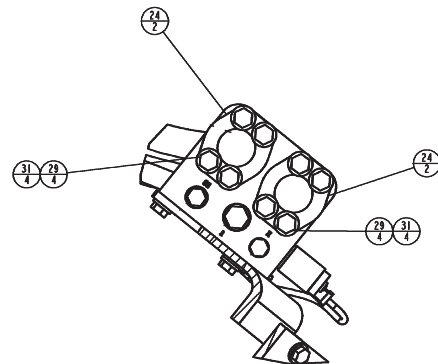
PART	ITEM	DESCRIPTION	QTY
PA9B0523	1	SPACER 3/4 OD X 1.00 LONG	2
32489	2	TIE-STRAP, BLACK	1
PA1704891	3	WIRING HARNESS ASSY 2-PLUG	1
83481	4	MANIFOLD & CARTRIDGE SUB-ASSY	1
106574	5	L-BRACKET ASSEMBLY	1
PA1650107	6	WIRING HARNESS ASSY 4-PLUG	1
106598	7	HOSE ASSY, -12 ORFS 90° X 53 LONG X -8 ORFS	1
106571	8	GUARD, REAR HYD ACCESS	1
106572	9	BRACKET ASSY, HYD MANIFOLD	1
106600	10	HOSE ASSY, -12 FLANGE 68° X 46.5 LONG X -16 FLANGE	2
29846	11	INDICATOR LIGHT	1
106613	12	CLIP-HALF USED WITH P/N 106602	1
101222	13	ADAPTER, STRAIGHT -6 ORB X -6 ORFS	4
101284	14	ADAPTER, STRAIGHT -8 ORB X -8 ORFS	1
100643	15	CAPSCREW, BUTTON HD M6 1.0 X 25L STAINLESS	4
106580	16	TEE, -10 ORB X -12 ORFS X -12 ORFS	1
PA1P3702	18	SEAL, CAT D-RING, -12	2
101278	19	D-RING, SPLIT FLANGE	2
25869	20	HOSE CLAMP, -8 HOSE	2
PA4P7581	21	CLIP, USE WITH TIE-STRAP	1
101718	23	WASHER, HARDENED 3/8	6
106618	24	FLANGE HALF, HYDRAULIC PORT	8
106611	25	GROMMET, 2-HOSE	1
106602	26	CLIP-HALF USED WITH P/N 106613	1
102126	27	WASHER, M10 HARDENED	1
104719	28	CAPSCREW, HEX HD M10 X 1.50 X 25L GR 10.9	3
106130	29	CAPSCREW, HEX HD M12 X 1.75 X 45L GR 10.9	16
104464	30	CAPSCREW, HEX HD M10 X 1.50 X 30L GR 10.9	2
100859	31	WASHER, HARDENED M12	18
103935	32	CAPSCREW, HEX HD M12 X 1.75 X 30L GR 10.9	2
106633	33	CAPSCREW, HEX HD M10 X 1.50 X 60L GR 10.9	2
106591	34	HOSE ASSY, -16 FLANGE 110° X 22.9 LONG X -20 FLANGE 22°	1
106581	35	HOSE ASSY, -4 ORFS X 23 LONG X -4 ORFS 45°	1
106584	36	HOSE ASSY, -6 ORFS X 16.5 LONG X -6 ORFS 45°	1
105828	37	HOSE ASSY, -6 ORFS 90° X 17 LONG X -6 ORFS	1
106587	38	HOSE ASSY, -4 ORFS X 11.5 LONG X -4 ORFS 90°	1
106590	39	HOSE ASSY, -4 ORFS X 17.5 LONG X -4 ORFS 90°	1
106585	40	HOSE ASSY, -6 ORFS X 57.25 LONG X -6 ORFS 45°	1
101466	41	HOSE ASSY, -6 ORFS 90° X 61 LONG X -6 ORFS	1
100946	42	ADAPTER, STRAIGHT -4 ORB X -4 ORFS	1
100945	43	ELBOW, 90° -6 ORB X -6 ORFS SWIVEL NUT	1
26680	44	ELBOW 90° -6 ORB X -4 ORFS	2
27430	45	ELBOW, 90° -4 ORB X -4 ORFS	2
40107	46	ELBOW, 90° -6 ORB X -6 ORFS	1
106595	47	CLIP, DOUBLE HOSE 9/16	1
102199	48	O-RING, -219 N 90	1
13838	49	O-RING, -222 N70	1
106596	50	CLIP, SINGLE HOSE 9/16	2
PA1600766	51	CONTROL, JOYSTICK	1
PA1649928	52	DECAL, LOCK IN LOW	1
PA1649930	53	DECAL, CONTROL	1



SECTION A-A
SCALE 1:2
SH 2 A-5

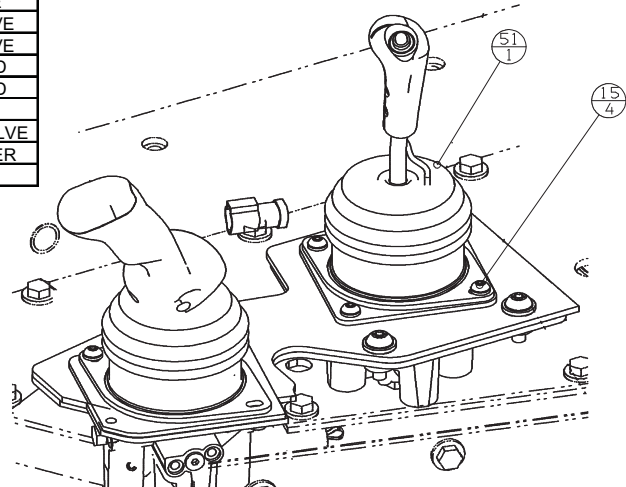


SECTION B-B
SCALE 1:2
SH 2 E-4



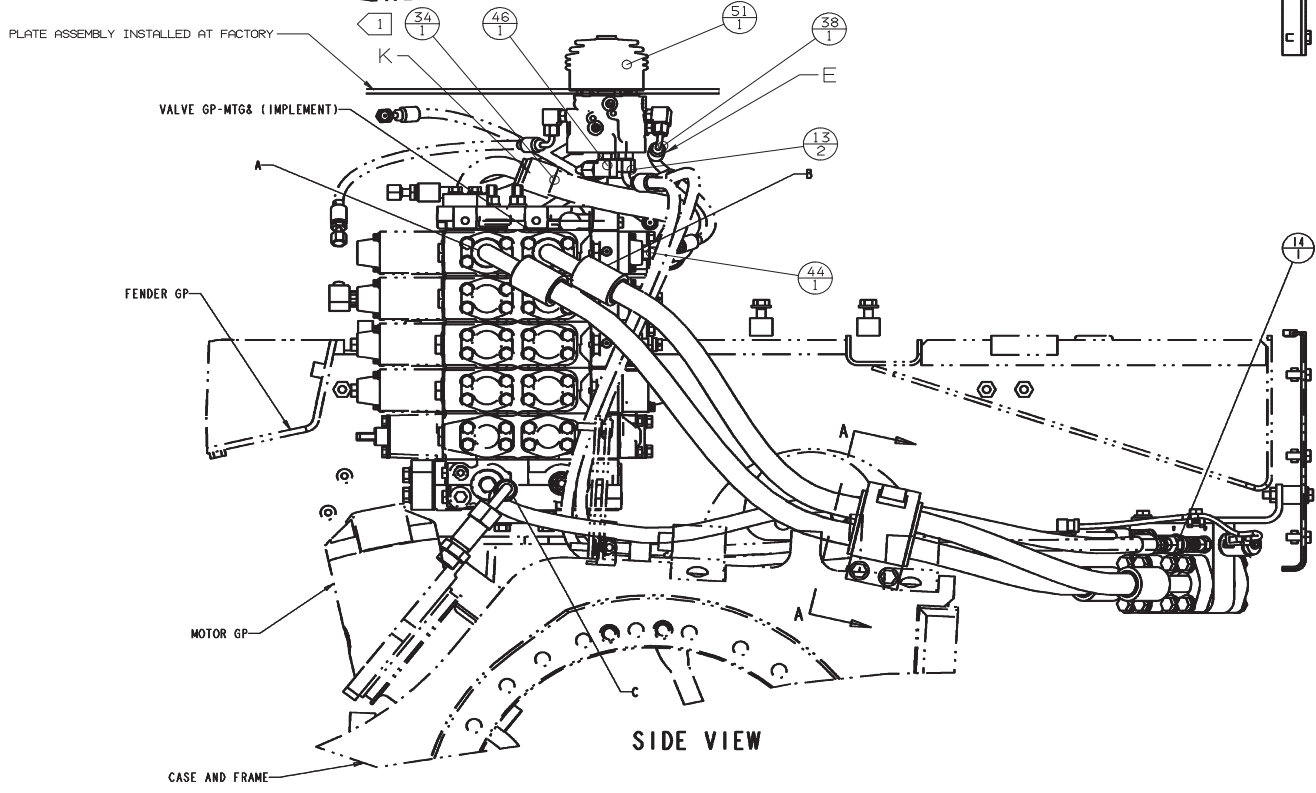
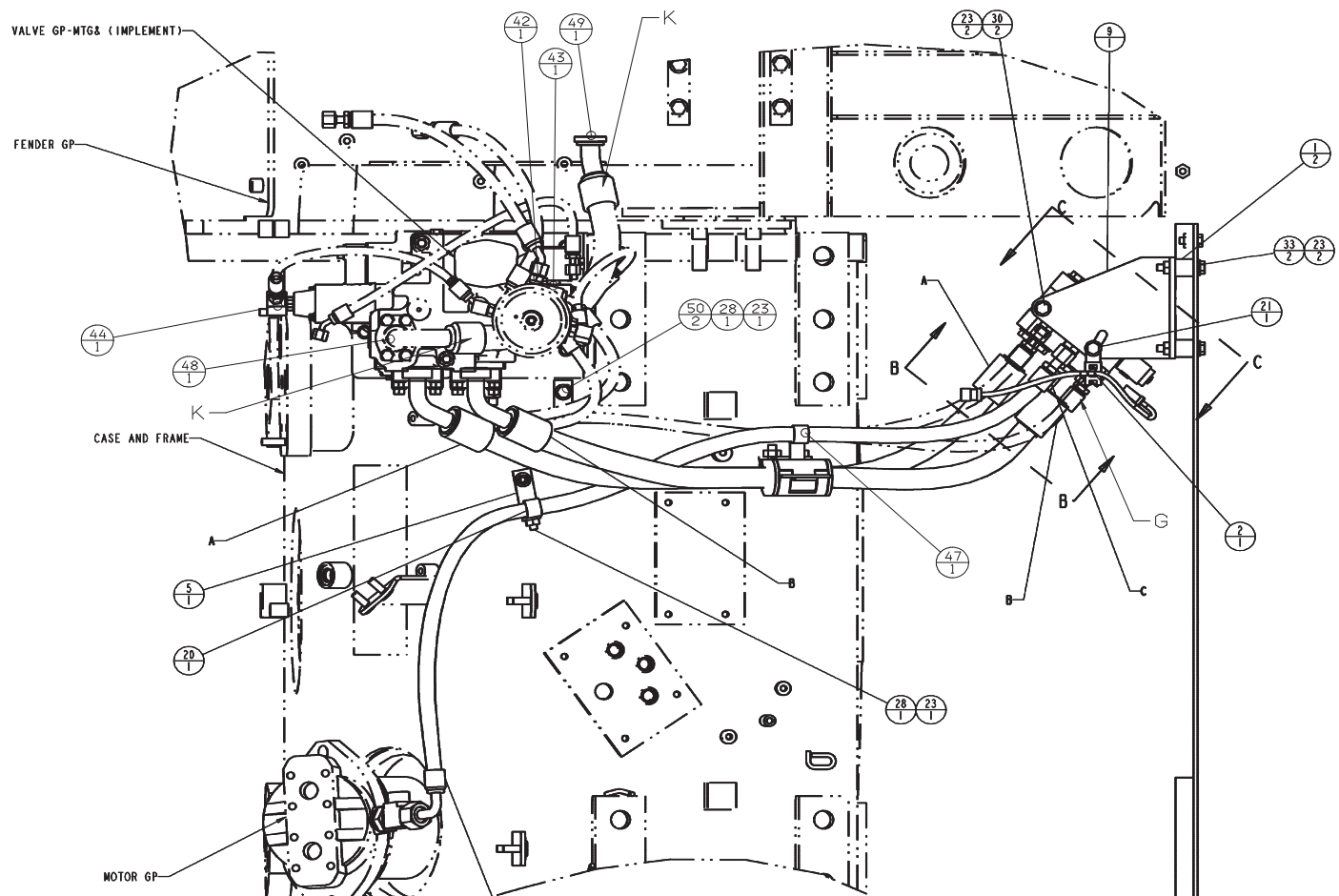
SECTION C-C
SCALE 1:2
SH 2 F-4

HOSE ROUTING INDEX			
	DESCRIPTION	FROM	TO
A	WINCH SPOOL-IN	IMPLEMENT VALVE	MANIFOLD
B	WINCH SPOOL-OUT	IMPLEMENT VALVE	MANIFOLD
C	WINCH MANIFOLD DRAIN	WINCH MANIFOLD	CASE DRAIN LINE
D	PILOT CONTROL WINCH SPOOL-IN	WINCH PILOT VALVE	IMPLEMENT VALVE
E	PILOT CONTROL WINCH SPOOL-OUT	WINCH PILOT VALVE	IMPLEMENT VALVE
F	PILOT CONTROL WINCH SPOOL-FREE	WINCH PILOT VALVE	WINCH MANIFOLD
G	PILOT SUPPLY MANIFOLD	WINCH PILOT VALVE	WINCH MANIFOLD
H	WINCH PILOT DRAIN	WINCH PILOT VALVE	TANK
I	WINCH PILOT SUPPLY	BULKHEAD	WINCH PILOT VALVE
J	FLOAT BOOST	DOZER PILOT VALVE	VALVE END COVER
K	IMPLEMENT RETURN	VALVE END COVER	COOLER BYPASS



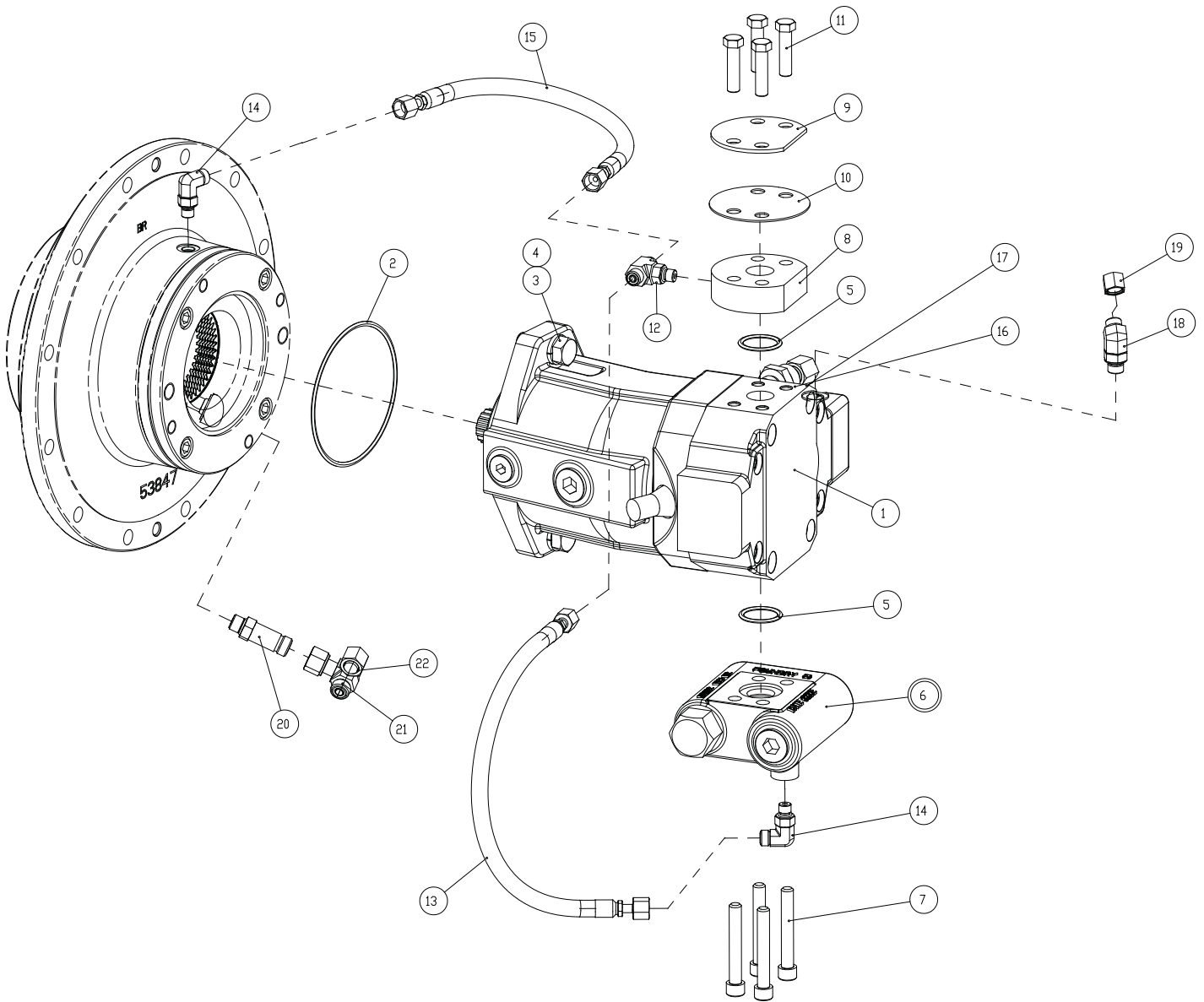
Control Group

Caterpillar D6R III & D6T



Motor Group

Caterpillar D6R III & D6T



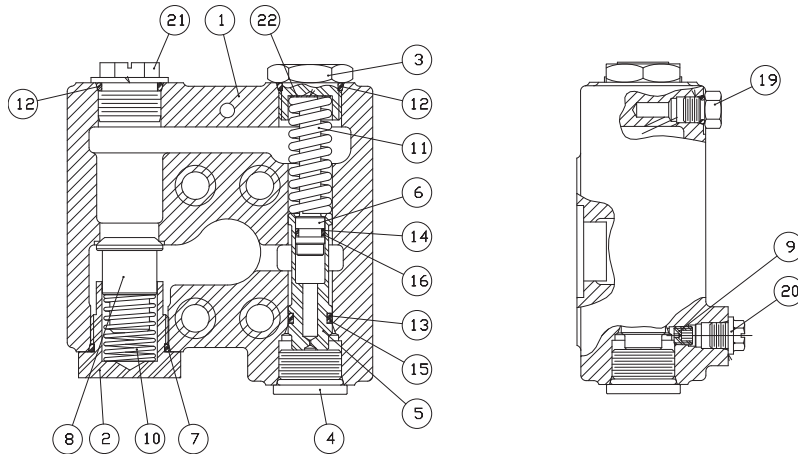
ITEM	PART NO	DESCRIPTION	QTY
1	103030	HYD MOTOR for D6R III	1
	107073	HYD MOTOR for D6T	1
2	10330	O-RING	1
3	103249	CAPSCREW (5/8 - 11 X 1-3/4 G8 Z)	2
4	102423	LOCKWASHER (5/8)	2
5	25366	O-RING	2
7	21134	CAPSCREW (7/16 - 14 X 3 G8 S Hd)	4
8	29395	ADAPTER BLOCK	1
9	29679	SHIPPING COVER	1
10	102985	GASKET, -16 (1.0")	1
11	104318	CAPSCREW (7/16 - 14 X 1-3/4 G8 Z)	4

ITEM	PART NO	DESCRIPTION	QTY
12	101268	TEE	1
13	101271	HOSE ASSY	1
14	27430	ADAPTER, 90° ELBOW ORS/ORB	2
15	101919	HOSE -4 ORFS X 14	1
16	105263	ADAPTER, ORB/ORFS	1
17	101274	CAP	1
18	101433	ELBOW 45°	1
19	101273	CAP	1
20	101222	ADAPTER, ORFS/ORB	1
21	100945	ELBOW, 90° ORS SWIVEL NUT	1
22	101581	CAP	1

Brake Valve

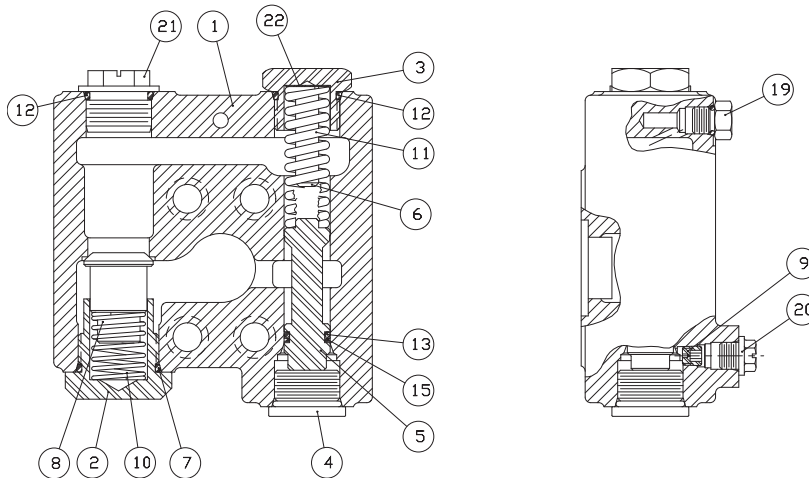
Caterpillar D6R III & D6T

D6T



ITEM NO.	PART NO	DESCRIPTION	QTY	
			D6R III	D6T
--	82133	BRAKE VALVE ASSY	1	--
--	83577	BRAKE VALVE ASSY	--	1
1	29011	BRAKE VALVE HOUSING	1	1
2	24424	VALVE SPRING RETAINER	1	1
3	104733	PLUG, SPRING RETAINER	1	1
4	22450	PLUG	1	1
5	29995	SPOOL, LOW PRESSURE	1	1
6	29993	STOP, SPOOL	1	1
7	24186	O-RING	1	1
8	24423	CHECK VALVE POPPET	1	1
9	24200	PILOT ORIFICE	1	1
10	24190	CHECK VALVE SPRING	1	1
11	104732	DIE SPRING	1	1
12	23601	O-RING	2	2
13	24193	O-RING	1	1
14	24194	O-RING	--	1
15	24195	BACK-UP RING	1	1
16	24196	BACK-UP RING	--	1
19	25663	HEX HEAD PLUG (-4SAE)	1	1
20	25403	SHIPPING PLUG HYD	1	1
21	75288	SHIPPING PLUG	1	1
22	25661	SHIM, VALVE SPRING	1	1

D6R III



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RECOMMENDED FASTENER TORQUE

Higher or lower torque values for special applications will be specified; such as the use of spanner nuts, nuts on shaft ends, jam nuts and where distortion of parts or gaskets is critical.

Lubricated torque values based on use of SAE 30wt engine oil applied to threads and face of bolt or nut.

Avoid using thread lubricants as the applied torque may vary by 10 - 40%, depending upon the product used.

Bolt Dia. Inches	Thds Per Inch	Torque (LB-FT)			
		Grade 5		Grade 8	
		Dry	Lubed	Dry	Lubed
1/4	20	8	6	12	9
	28				
5/16	18	17	13	24	18
	24				
3/8	16	31	23	45	35
	24				
7/16	14	50	35	70	50
	20				
1/2	13	75	55	110	80
	20				
9/16	12	110	80	150	110
	18				
5/8	11	150	115	210	160
	18				

Bolt Dia. Inches	Thds Per Inch	Torque (LB-FT)			
		Grade 5		Grade 8	
		Dry	Lubed	Dry	Lubed
3/4	10	265	200	380	280
	16				
7/8	9	420	325	600	450
	14				
1	8	640	485	910	680
	14				
1 1/8	7	790	590	1290	970
	12				
1 1/4	7	1120	835	1820	1360
	12				
1 3/8	6	1460	1095	2385	1790
	12				
1 1/2	6	1940	1460	3160	2370
	12				

To convert lb•ft to kg•m, multiply lb•ft value by 0.1383.

METRIC CONVERSION TABLE

English to Metric

Metric to English

English to Metric			Metric to English		
LINEAR					
inches (in.)	X 25.4	= millimeters (mm)	millimeters (mm)	X 0.3937	= inches (in.)
feet (ft.)	X 0.3048	= meters (m)	meters (m)	X 3.281	= feet (ft.)
miles (mi.)	X 1.6093	= kilometers (km)	kilometers (km)	X 0.6214	= miles (mi.)
AREA					
inches ² (sq.in.)	X 645.15	= millimeters ² (mm ²)	millimeters ² (mm ²)	X 0.000155	= inches ² (sq.in.)
feet ² (sq.ft.)	X 0.0929	= meters ² (m ²)	meters ² (m ²)	X 10.764	= feet ² (sq.ft.)
VOLUME					
inches ³ (cu.in.)	X 0.01639	= liters (l)	liters (l)	X 61.024	= inches ³ (cu.in.)
quarts (qts.)	X 0.94635	= liters (l)	liters (l)	X 1.0567	= quarts (qts.)
gallons (gal.)	X 3.7854	= liters (l)	liters (l)	X 0.2642	= gallon (gal.)
inches ³ (cu.in.)	X 16.39	= centimeters ³ (cc)	centimeters ³ (cc)	X 0.06102	= inches ³ (cu.in.)
feet ³ (cu.ft.)	X 28.317	= liters (l)	liters (l)	X 0.03531	= feet ³ (cu.ft.)
feet ³ (cu.ft.)	X 0.02832	= meters ³ (m ³)	meters ³ (m ³)	X 35.315	= feet ³ (cu.ft.)
fluid ounce (fl.oz.)	X 29.57	= milliliters (ml)	milliliters (ml)	X 0.03381	= fluid ounce (fl.oz.)
MASS					
ounces (oz.)	X 28.35	= grams (g)	grams (g)	X 0.03527	= ounces (oz.)
pounds (lbs.)	X 0.4536	= kilograms (kg)	kilograms (kg)	X 2.2046	= pounds (lbs.)
tons (2000 lbs.)	X 907.18	= kilograms (kg)	kilograms (kg)	X 0.001102	= tons (2000 lbs.)
tons (2000 lbs.)	X 0.90718	= metric tons (t)	metric tons (t)	X 1.1023	= tons (2000 lbs.)
tons (long) (2240 lbs.)	X 1013.05	= kilograms (kg)	kilograms (kg)	X 0.000984	= tons (long) (2240 lbs.)
PRESSURE					
inches Hg (60 °F)	X 3600	= kilopascals (kPa)	kilopascals (kPa)	X 0.2961	= inches Hg (60 °F)
pounds/sq.in. (PSI)	X 6.895	= kilopascals (kPa)	kilopascals (kPa)	X 0.145	= pounds/sq.in. (PSI)
pounds/sq.in. (PSI)	X 0.0703	= kilograms/sq.cm. (kg/cm ²)	kilograms/sq.cm. (kg/cm ²)	X 14.22	= pounds/sq.in. (PSI)
pounds/sq.in. (PSI)	X 0.069	= bars	bars	X 14.5	= pounds/sq.in. (PSI)
inches H ₂ O (60 °F)	X 0.2488	= kilopascals (kPa)	kilopascals (kPa)	X 4.0193	= inches H ₂ O (60 °F)
bars	X 100	= kilopascals (kPa)	kilopascals (kPa)	X 0.01	= bars
POWER					
horsepower (hp)	X 0.746	= kilowatts (kW)	kilowatts (kW)	X 1.34	= horsepower (hp)
ft.-lbs./min.	X 0.0226	= watts (W)	watts (W)	X 44.25	= ft.-lbs./min.
TORQUE					
pound-inches (in.-lbs.)	X 0.11298	= newton-meters (N-m)	newton-meters (N-m)	X 8.851	= pound-inches (in.-lbs.)
pound-feet (ft.-lbs.)	X 1.3558	= newton-meters (N-m)	newton-meters (N-m)	X 0.7376	= pound-feet (ft.-lbs.)
pound-feet (ft.-lbs.)	X .1383	= kilograms/meter (kg-m)	kilogram/meter (kg-m)	X 7.233	= pound-feet (ft.-lbs.)
VELOCITY					
miles/hour (m/h)	X 0.11298	= kilometers/hour (km/hr)	kilometers/hour (km/hr)	X 0.6214	= miles/hour (m/h)
feet/second (ft./sec.)	X 0.3048	= meter/second (m/s)	meters/second (m/s)	X 3.281	= feet/second (ft./sec.)
feet/minute (ft./min.)	X 0.3048	= meter/minute (m/min)	meters/minute (m/min)	X 3.281	= feet/minute (ft./min.)
TEMPERATURE					
°Celsius = 0.556 (°F - 32)			°Fahrenheit = (1.8 X °C) + 32		
COMMON METRIC PREFIXES					
mega	(M)	= 1,000,000 or 10 ⁶	deci	(d)	= 0.1 or 10 ⁻¹
kilo	(k)	= 1,000 or 10 ³	centi	(c)	= 0.01 or 10 ⁻²
hecto	(h)	= 100 or 10 ²	milli	(m)	= 0.001 or 10 ⁻³
deka	(da)	= 10 or 10 ¹	micro	(µ)	= 0.000.001 or 10 ⁻⁶