Maintenance Schedule

IMPORTANT: *Maintenance intervals apply to average operating conditions and loads. More frequent maintenance may be required depending upon the level and type of use.*

Log all maintenance as it is performed in the “Maintenance Log” on page 133.

NOTE: *Refer to the hour meter and the required maintenance display screen to determine maintenance interval timing. See “Maintenance Interval” on page 102.*

Checks, Cleaning and Inspection

Table 34: Checks Cleaning and Inspection

Service Procedure	Maximum Interval		
	10 Hours (or daily)	250 Hours (or every 6 months)	500 Hours (or annually)
Clean machine	X		
Inspect machine for general wear/damage	X		
Check bucket cutting edge	X		
Check safety interlock system	X		
Inspect tracks for damage/wear	X		
Check automatic track tensioning	X		
Check engine oil level and condition	X		
Check coolant level and condition	X		
Check hydraulic fluid level and condition	X		
Check fuel level and fill if necessary	X		
Check windshield washer system and wiper blade, if applicable	X		
Check exhaust for excessive smoke emission	X		
Check hydraulic cylinder piston rods for damage/wear; clean if necessary	X		
Check ROPS structure (all fasteners must be installed and tightly secured)	X		
Check water separator and drain water, if present	X[1]		
Check coolant system for leaks, dirt and debris	X		
Check hydraulic hoses and tubes for cracks, leaks and/or debris	X		
Check hydraulic tank, valves and cylinders for leaks and/or damage	X		
Check coolant anti-freeze mixture		X	
Check V-belt tension and condition		X	
Check engine cover lock		X	
Check engine idle		X	
Clean radiator/oil cooler fins		X	
Check hinge pins, joint bushings, pivot bolts and bearings			X
Check engine mounts			X
Check exhaust system for damage			X
Clean battery terminals			X
Check timing belt			X
Check fuel injectors			X
Check electrical system for damage, wire routing			X

1. Model RT250: Multi-function screen displays the engine error code “97-12” if water is present in water separator. See “Engine Error Code Screen” on page 47 and “(Model RT250) Fuel prefilter sensor error” on page 147.

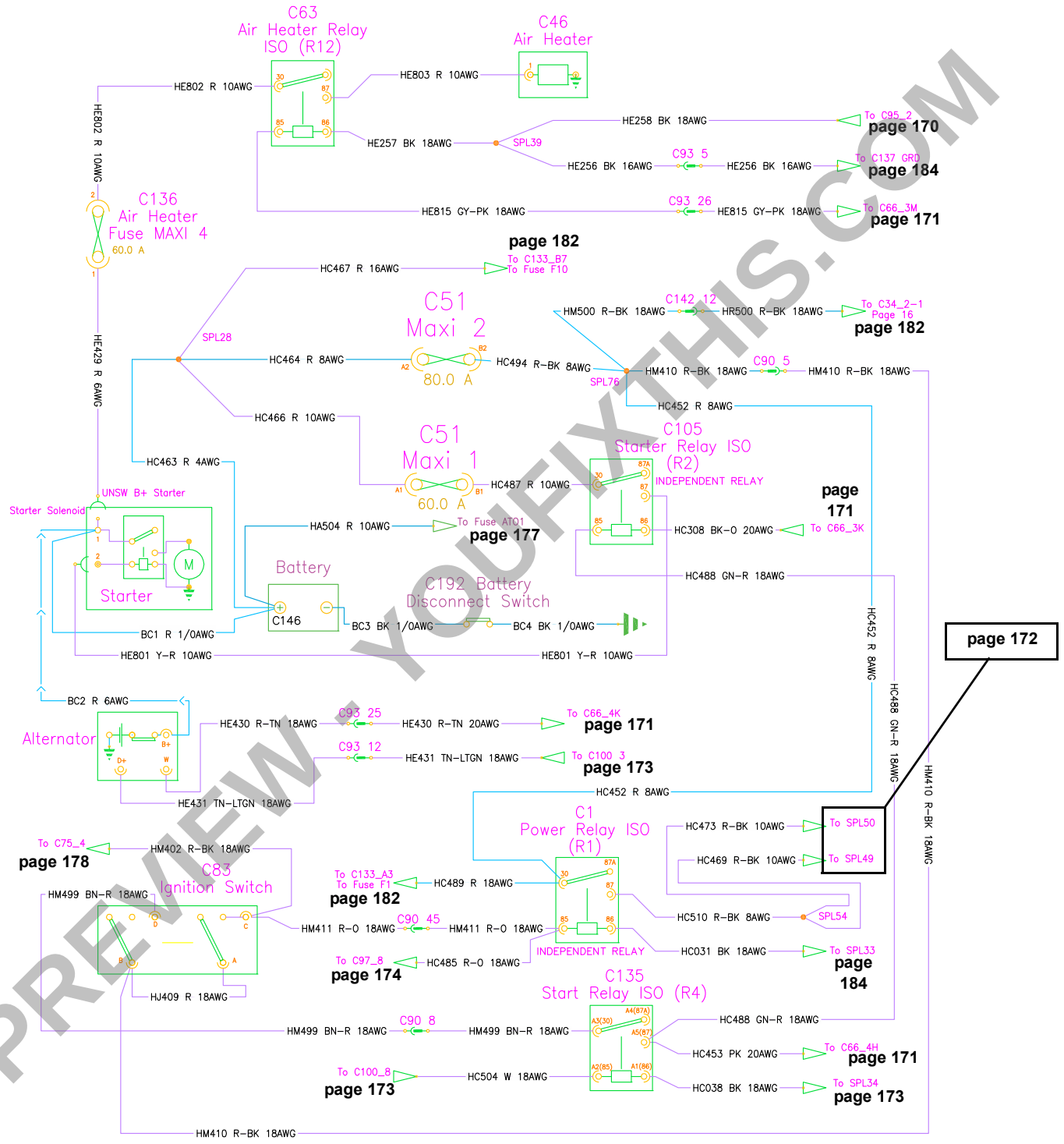
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Schematics

Models RT175/RT210

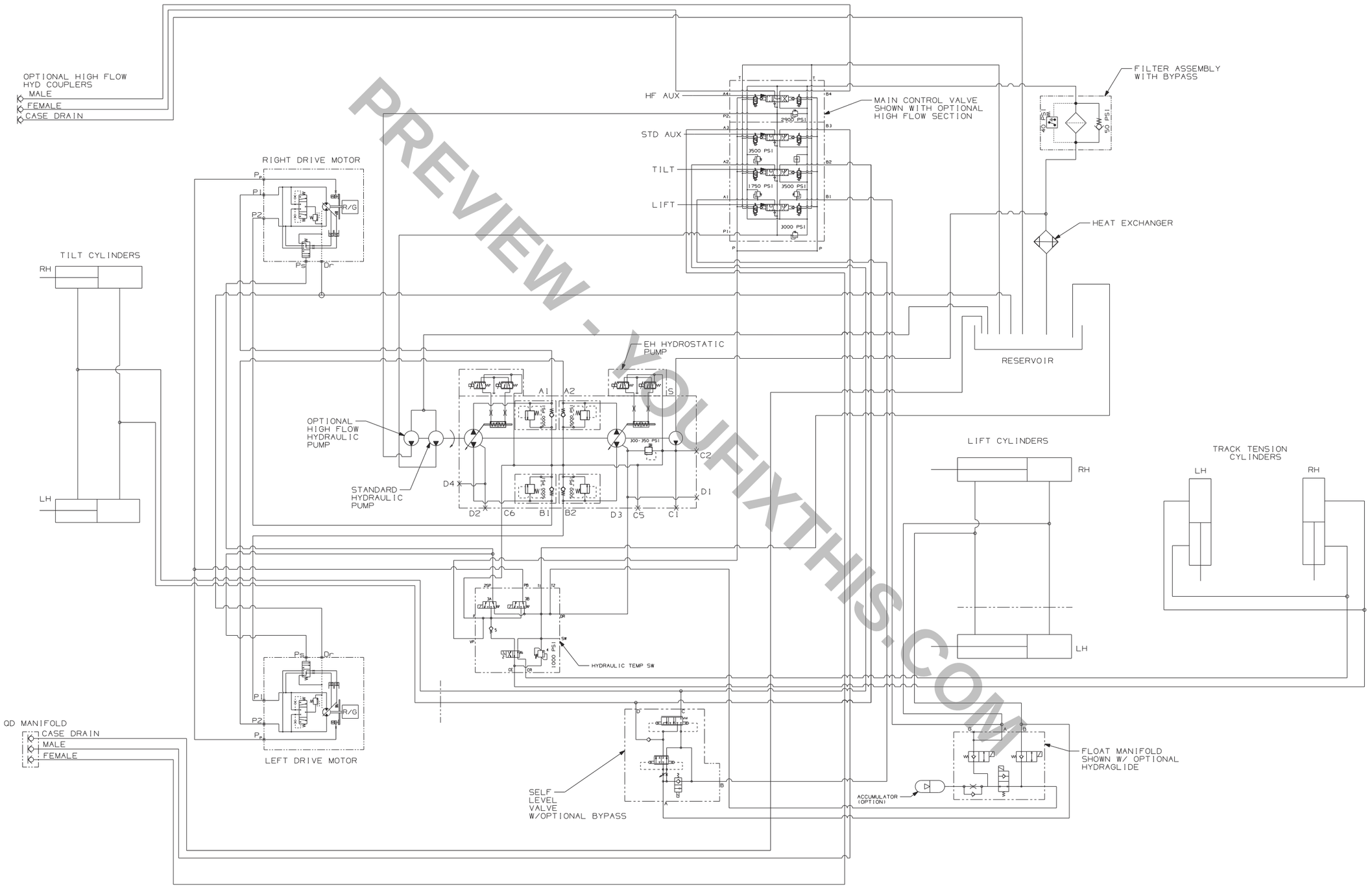
Engine/Starting and Charging – Models RT175/RT210



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Hydraulic Schematic



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Table 47: Hydraulic System Troubleshooting

Problem	Possible Cause	Corrective Action
Lift and/or tilt functions inconsistent/jerky	Air in hydraulic system	Cycle lift and tilt cylinders to maximum stroke and maintain for a few seconds to clear air from the hydraulic system
	Low hydraulic oil level	Top-off hydraulic oil. See “Checking Hydraulic Oil Level” on page 113
	Cylinder(s) malfunction	Contact dealer
	Joystick/electrical malfunction code displayed	See “Error Codes” on page 146
Lift arm does not maintain position with control joysticks in neutral	Hydraulic oil leaking past cylinder seals (external leak)	Contact dealer
	Hydraulic oil leaking past lift spool in control valve	Contact dealer
	Leaking hydraulic hoses, tubes of fittings between control valve and cylinders	Contact dealer
Auxiliary hydraulics not functioning	Spool in control valve not actuated or leaking	Contact dealer
	Hydraulic oil leaking past seals	Contact dealer
	Auxiliary hydraulics connected improperly	Correct hydraulic connections

Hydrostatic Travel Drive System Troubleshooting

Table 48: Hydrostatic Travel Drive System Troubleshooting

Problem	Possible Cause	Corrective Action
Hydrostatic drive and lift/tilt not responsive	Hydraulic oil viscosity too heavy	Allow longer warm-up
		Replace hydraulic oil with proper type/grade. See “Fluids/Lubricants Types and Capacities” on page 31
	Control system malfunction with error code displayed	See “Error Codes” on page 146
Drive does not operate in either direction	Parking brake applied	Disengage parking brake. See “Disengage Parking Brake” on page 66
	Low hydraulic oil level	Top-off hydraulic oil. See “Checking Hydraulic Oil Level” on page 113
	Low or no charge pressure	Contact dealer
	Hydrostatic pump(s) relief valves malfunction	Contact dealer
	Control system malfunction with error code displayed	See “Error Codes” on page 146

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Torque Specifications

Note: Use these torque values when tightening hardware (excluding: locknuts and self-tapping, thread forming and sheet metal screws) unless specified otherwise.

Hydraulic fittings with various seals (light application). All torque values are in Nm (lb.-ft.) unless marked otherwise.					
Thread	**Straight pipe fitting with thread and screwed plug (GE)**			**Non-return valve with elastic seal**	**Identification aid outside Ø**
	Sealing washer	**Elastic seal**	**O-ring**		
M10X1.0	9 (7)	18 (13)	15 (11)	18 (13)	10 mm (0.4 in.)
M12X1.5	20 (15)	25 (18)	25 (18)	25 (18)	12 mm (0.5 in.)
M14X1.5	35 (26)	45 (33)	26 (35)	35 (26)	14 mm (0.6 in.)
M16X1.5	45 (33)	55 (41)	40 (30)	50 (37)	16 mm (0.6 in.)
M18X1.5	55 (41)	70 (52)	45 (33)	70 (52)	18 mm (0.7 in.)
M22X1.5	65 (48)	125 (92)	60 (44)	125 (92)	22 mm (0.9 in.)
M27X2.0	90 (66)	180 (133)	100 (74)	145 (107)	27 mm (1.0 in.)
M33X2.0	150 (111)	310 (229)	160 (118)	210 (155)	33 mm (1.3 in.)
M42X2.0	240 (177)	450 (332)	210 (155)	360 (266)	42 mm (1.7 in.)
M48X2.0	290 (214)	540 (398)	260 (192)	540 (398)	48 mm (1.9 in.)
G1/8A	9 (7)	13 (18)	15 (11)	18 (13)	9.73 mm (0.4 in.)
G1/4A	35 (26)	35 (26)	30 (22)	35 (26)	13.16 mm (0.5 in.)
G3/8A	45 (33)	70 (52)	45 (33)	50 (37)	16.66 mm (0.7 in.)
G1/2A	65 (48)	90 (66)	55 (41)	65 (48)	20.96 mm (0.8 in.)
G3/4A	90 (66)	180 (133)	100 (74)	140 (103)	26.44 mm (1.0 in.)
G1A	150 (111)	310 (229)	160 (118)	190 (140)	33.25 mm (1.3 in.)
G1 1/4A	240 (177)	450 (332)	210 (155)	360 (266)	41.91 mm (1.7 in.)
G1 1/2A	290 (214)	540 (398)	260 (192)	540 (398)	47.80 mm (1.9 in.)

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Leakage Check

Table 35: Leakage Check

Service Procedure	Maximum Interval		
	10 Hours (or daily)	250 Hours (or every 6 months)	500 Hours (or annually)
Check engine for oil/coolant leaks	X		
Check cooling system for leaks	X		
Check hydraulic system for leaks	X		

Lubrication and Filter Changes

Table 36: Lubrication and Filter Changes

Service Procedure	Maximum Interval			
	10 Hours (or daily)	150 Hours (or every 4 months)	250 Hours (or every 6 months)	500 Hours (or annually)
Lubricate grease fittings according to lubrication diagram (See Fig. 115 on page 120)	X			
Travel motor gear oil		X[1]		
Change engine oil/filter			X[2]	
Change cab air filter, if applicable			X[3]	
Lubricate all levers, cables and hinges with oil			X	
Change outer air cleaner filter element; check and change inner air cleaner element if necessary			X[3]	
Change hydraulic oil and return filter			X	
Change fuel filter; clean pre-filter			X	
Change coolant				X

1. After first 150 hours; every 1000 hours thereafter
2. After first 50 hours; every 250 hours thereafter.
3. Replace if needed.

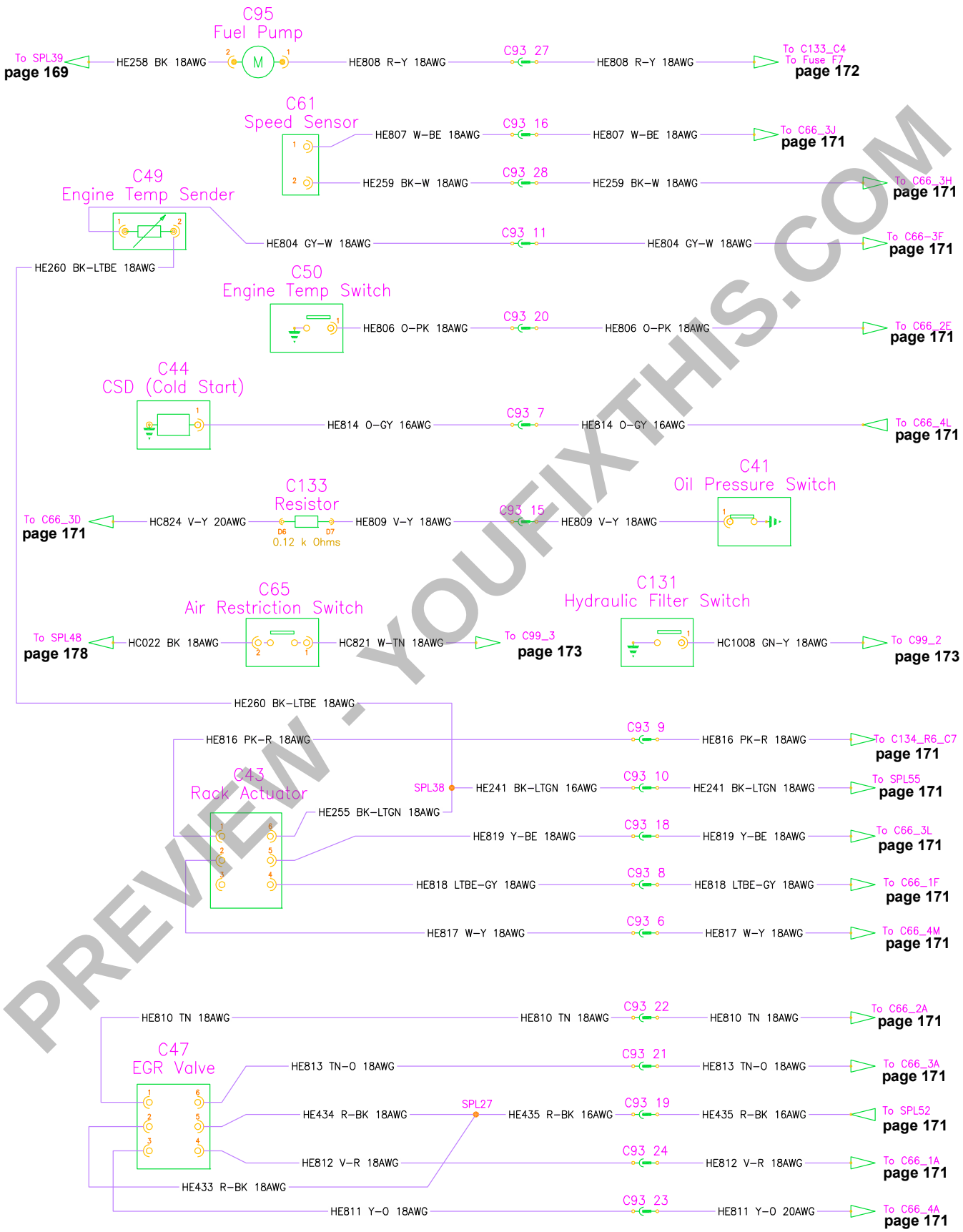
Functional Check

Table 37: Functional Check

Service Procedure	Maximum Interval		
	10 Hours (or daily)	250 Hours (or every 6 months)	500 Hours (or annually)
Check seat belt	X		
Check service and parking brake function	X		
Check joystick operation	X		
Check windshield wipers, if applicable	X		
Check control switches/buttons, indicators and audible warning devices	X		
Check installed lighting systems	X		

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Engine Sensors – Models RT175/RT210



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Table 52: Engine Error Codes

Error Code	Engine Error Code Type	Error Description
84-2	(Model RT250) Vehicle speed sensor error	Sensor vehicle speed; plausibility error
91-0	Throttle position sensor “A”	Above normal operational range
91-1		Below normal operational range
91-2		Intermittent fault
91-3		Sensor error accelerator pedal; signal range check high; shorted to high source
91-4		Shorted to low source; Sensor error accelerator pedal; signal range check low
91-8		Throttle duty cycle or pedal cycle duration PWM signal; signal range check high or low
91-11		Plausibility error between APP1 and APP2 or APP1 and idle switch
91-15		Not available
94-1	(Model RT250) Sensor error	Low fuel pressure; warning or shut-off threshold exceeded
94-3		Sensor error low fuel pressure; signal range check high
94-4		Sensor error low fuel pressure; signal range check low
97-3		Sensor error water in fuel; signal range check high
97-4		Sensor error water in fuel; signal range check low
97-12	(Model RT250) Fuel prefilter sensor error	Water in fuel level prefilter; maximum value exceeded
100-0	Oil pressure	High oil pressure; warning threshold exceeded
100-1		Low oil pressure; warning threshold exceeded
100-3		Sensor error oil pressure; signal range check high
100-4		Sensor error oil pressure sensor; signal range check low
102-2	(Model RT250) Charged air pressure error	Charged air pressure above warning threshold
		Charged air pressure above shut-off threshold
102-3		Sensor error charged air pressure; signal range check high
102-4		Sensor error charged air pressure; signal range check low
105-0	(Model RT250) Sensor error	High charged air cooler temperature; warning or shut-off threshold exceeded
105-3		Sensor error charged air temperature; signal range check high
105-4		Sensor error charged air temperature; signal range check low
107-0	(Model RT250) Air filter sensor error	Sensor error or high air filter differential pressure; short circuit to ground; warning threshold exceeded
107-3		Sensor error air filter differential pressure; short circuit to battery
108-2	Barometric pressure sensor	Intermittent fault
108-3		Shorted to high source
108-4		Shorted to low source

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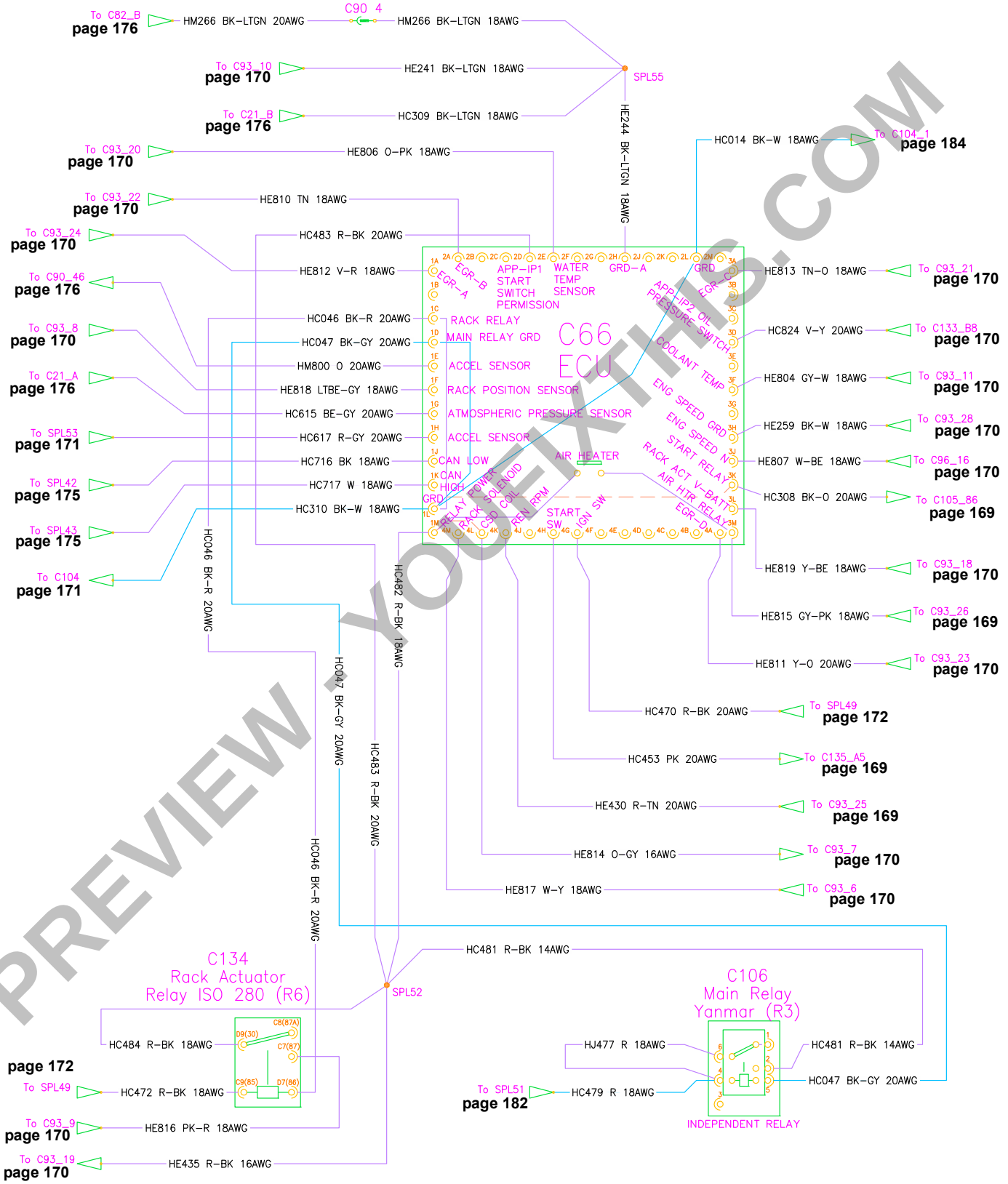
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Hydraulic fittings with various seals (heavy application). All torque values are in Nm (lb.-ft.) unless marked otherwise.					
Thread	Straight pipe fitting with thread and screwed plug (GE)			Non-return valve with elastic seal	Identification aid outside Ø
	Sealing washer	Elastic seal	O-ring		
M12X1.5	20 (15)	35 (26)	35 (26)	35 (26)	12 mm (0.5 in.)
M14X1.5	35 (26)	55 (41)	45 (33)	45 (33)	14 mm (0.6 in.)
M16X1.5	45 (33)	70 (52)	55 (41)	55 (41)	16 mm (0.6 in.)
M18X1.5	55 (41)	90 (66)	70 (52)	70 (52)	18 mm (0.7 in.)
M20X1.5	55 (41)	125 (92)	80 (59)	100 (74)	20 mm (0.8 in.)
M22X1.5	65 (48)	135 (100)	100 (74)	125 (92)	22 mm (0.9 in.)
M27X2.0	90 (66)	180 (133)	170 (125)	135 (100)	27 mm (1.0 in.)
M33X2.0	150 (111)	310 (229)	310 (229)	210 (155)	33 mm (1.3 in.)
M42X2.0	240 (177)	450 (332)	330 (243)	360 (266)	42 mm (1.7 in.)
M48X2.0	290 (214)	540 (398)	420 (310)	540 (398)	48 mm (1.9 in.)
G1/8A	35 (26)	55 (41)	45 (33)	45 (33)	13.16 mm (0.5 in.)
G1/4A	45 (33)	80 (59)	60 (44)	60 (44)	16.66 mm (0.7 in.)
G3/8A	65 (48)	115 (85)	75 (55)	100 (74)	20.96 mm (0.8 in.)
G1/2A	90 (66)	180 (133)	170 (125)	145 (107)	26.44 mm (1.0 in.)
G3/4A	150 (111)	310 (229)	310 (229)	260 (192)	33.25 mm (1.3 in.)
G1A	240 (177)	450 (332)	330 (243)	360 (266)	41.91 mm (1.7 in.)
G1 1/4A	290 (214)	540 (398)	420 (310)	540 (398)	47.80 mm (1.9 in.)

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Engine ECU – Models RT175/RT210



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Table 52: Engine Error Codes

Error Code	Engine Error Code Type	Error Description
110-0	Engine coolant temperature	Too high; shut off threshold exceeded
110-2		Intermittent fault
110-3		Shorted to high source
110-4		Shorted to low source
111-1	(Model RT250) Engine coolant temperature	Coolant level too low
132-11	(Model RT250) Air flow sensor fault	Air flow sensor load correction factor exceeding the maximum drift limit; plausibility error
		Air flow sensor load correction factor exceeding drift limit; plausibility error
		Air flow sensor low idle correction factor exceeding the maximum drift limit
		Air flow sensor load correction factor exceeding the maximum drift limit
157-3	(Model RT250) Rail pressure error	Sensor error rail pressure; signal range check high
157-4		Sensor error rail pressure; signal range check low
158-0	System voltage	Too high
158-1		Too low
164-2	(Model RT250) Rail pressure error	Rail pressure safety function is not executed correctly
167-1	Charge warning	
167-4	Battery charge switch	Shorted to low source
168-0	(Model RT250) Sensor error battery voltage	Physical range check high for battery voltage
168-1		Physical range check low for battery voltage
168-3		Signal range check high
168-4		Signal range check low
168-2	(Model RT250) Voltage threashold exceeded	High battery voltage
		Low battery voltage
171-3	(Model RT250) Sensor error	Sensor error environment temperature; signal range check high
171-4		Sensor error environment temperature; signal range check low
172-2		Sensor ambient air temperature; plausibility error
172-3		Sensor error intake air; signal range check high
172-4		Sensor error intake air sensor; signal range check low
174-0	(Model RT250) Fuel temperature error	High or low fuel temperature; warning or shut-off threshold exceeded
175-0	(Model RT250) Oil temperature error	High oil temperature; Physical range check high for oil temperature; warning or shut-off threshold exceeded
175-1		Physical range check low for oil temperature
175-2		Sensor oil temperature; plausibility error; oil temperature too high
175-3		Sensor error oil temperature; signal range check high
175-4		Sensor error oil temperature; signal range check low

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With coarse-pitch thread. All torque values are in Nm (lb.-ft.) unless marked otherwise.					
Thread	Threads according to DIN 912, DIN 931, DIN 933, etc.			Threads according to DIN 7984	
	8.8	10.9	12.9	8.8	10.9
M5	5.5 (4.1)	8 (6)	10 (7)	5 (4)	7 (5)
M6	10 (7)	14 (10)	17 (13)	8.5 (6.3)	12 (9)
M8	25 (18)	35 (26)	42 (31)	20 (15)	30 (22)
M10	45 (33)	65 (48)	80 (59)	40 (30)	59 (44)
M12	87 (64)	110 (81)	147 (108)	69 (51)	100 (74)
M14	135 (100)	180 (133)	230 (170)	110 (81)	160 (118)
M16	210 (155)	275 (203)	350 (258)	170 (125)	250 (184)
M18	280 (207)	410 (302)	480 (354)	245 (181)	345 (254)
M20	410 (302)	570 (420)	690 (509)	340 (251)	490 (361)
M22	550 (406)	780 (575)	930 (686)	460 (339)	660 (487)
M24	710 (524)	1000 (738)	1190 (878)	590 (435)	840 (620)
M27	1040 (767)	1480 (1092)	1770 (1305)	870 (642)	1250 (922)
M30	1420 (1047)	2010 (1482)	2400 (1770)	1200 (885)	1700 (1254)

With fine-pitch thread. All torque values are in Nm (lb.-ft.) unless marked otherwise.					
Thread	Threads according to DIN 912, DIN 931, DIN 933, etc.			Threads according to DIN 7984	
	8.8	10.9	12.9	8.8	10.9
M8X1.0	25 (18)	37 (27)	32 (43)	22 (16)	32 (24)
M10X1.0	50 (37)	75 (55)	88 (65)	43 (32)	65 (48)
M10X1.25	49 (36)	71 (52)	83 (61)	42 (31)	62 (46)
M12X1.25	87 (64)	130 (96)	150 (111)	75 (55)	110 (81)
M12X1.5	83 (61)	125 (92)	145 (107)	72 (53)	105 (77)
M14X1.5	135 (100)	200 (148)	173 (235)	120 (89)	175 (129)
M16X1.5	210 (155)	310 (229)	360 (266)	180 (133)	265 (195)
M18X1.5	315 (232)	450 (332)	530 (391)	270 (199)	385 (284)
M20X1.5	440 (325)	630 (465)	730 (538)	375 (277)	530 (391)
M22X1.5	590 (435)	840 (620)	980 (723)	500 (369)	710 (524)
M24X2.0	740 (546)	1070 (789)	1250 (922)	630 (465)	900 (664)
M27X2.0	1100 (811)	1550 (1143)	1800 (1328)	920 (679)	1300 (959)
M30X2.0	1500 (1106)	2150 (1586)	2500 (1844)	1300 (959)	1850 (1364)

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