PART NO. TONEE-EN-00

HITACHI

Reliable solutions

Technical Manual

Operational Principle

ZW

220-5B

Wheel Loader

Service Manual consists of the following separate Part No.

Technical Manual (Operational Principle)	: Vol. No.TONEE-EN
Technical Manual (Troubleshooting)	: Vol. No.TTNEE-EN
Workshop Manual	: Vol. No.WNEE-EN

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SECTION 1

GENERAL

CONTENTS

Group 1 Specifications
Specifications T1-1-1

Group 2 Component Layout
Main Component (Overview) T1-2-1
Main Component T1-2-2
Main Component T1-2-3
Electric Component Layout (Overview) T1-2-6
Electrical System (Cab) T1-2-7
Engine and Fan Pump T1-2-15
Pump Device T1-2-17
Control Valve T1-2-17
Fan Valve T1-2-18
Drive Unit T1-2-19
Front Axle T1-2-19
Manifold Valve T1-2-20
Parking Brake Solenoid Valve T1-2-20
Brake Charge Valve T1-2-20
3-Spool Solenoid Valve Unit T1-2-20
Steering Valve, Emergency SteeringValve (Optional) T1-2-21
Emergency Steering Pump (Optional) T1-2-21
Flow Regulator Valve T1-2-21

Group 3 Component Specifications
Engine T1-3-1
Engine Accessories T1-3-5
Hydraulic Component T1-3-7
Electrical Component T1-3-12

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TRANSMISSION	Model	SWG 210
	Type	Counter Shaft Type
	Gear Ratio	Forward 1st : 3.92
		Forward 2nd : 2.25
		Forward 3rd : 1.46
		Forward 4th : 0.94
		Forward 5th : 0.61
		Reverse 1st : 3.71
		Reverse 2nd : 2.13
		Reverse 3rd : 0.89
	Parking Brake Release Pressure	10 MPa (102 kgf/cm², 1450 psi)
AXLE (FRONT/REAR)	Type	Two Stage Reduction
	Brake Type	Wet Multiplate Disk Brake
	Brake Pressure	5.0 MPa (51 kgf/cm², 725 psi)
	Final Reduction Gear Ratio	25.767
PROPELLER SHAFT	Type	Cruciform Joint Type
	Dimension between Pins	Front : 1659 mm (65.31")
		Rear : 214 mm (8.42")

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Base Torque Control

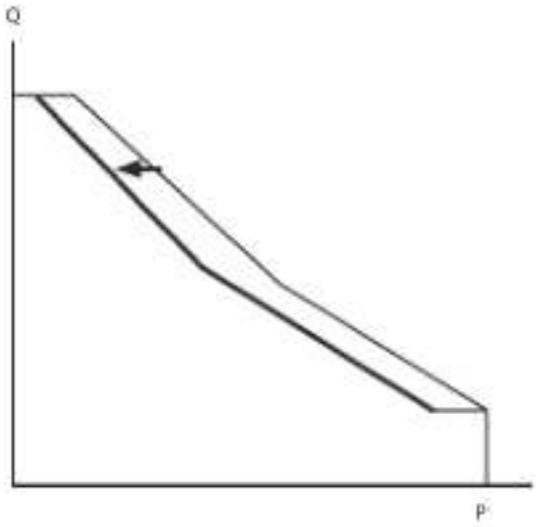
Purpose:
The base torque control controls the pump delivery flow rate in response to the engine speed changes due to variations in load so that the engine output power can be utilized more efficiently.

Operation:

1. ECM (10) sends the actual engine speed signals from engine (11) to MC (3) by using CAN communication (5).
2. MC (3) sends the signals to torque control solenoid valve (30) according to the actual engine speed signal detected by CAN communication (5) from ECM (10).
3. Torque control solenoid valve (30) delivers the pilot pressure oil according to the signals to the regulator and controls the pump delivery flow rate.

NOTE: The calculated values of MC (3) are different between at low temperature and at high temperature.

NOTE: Refer to Torque Decrease Control While Digging during digging operation.



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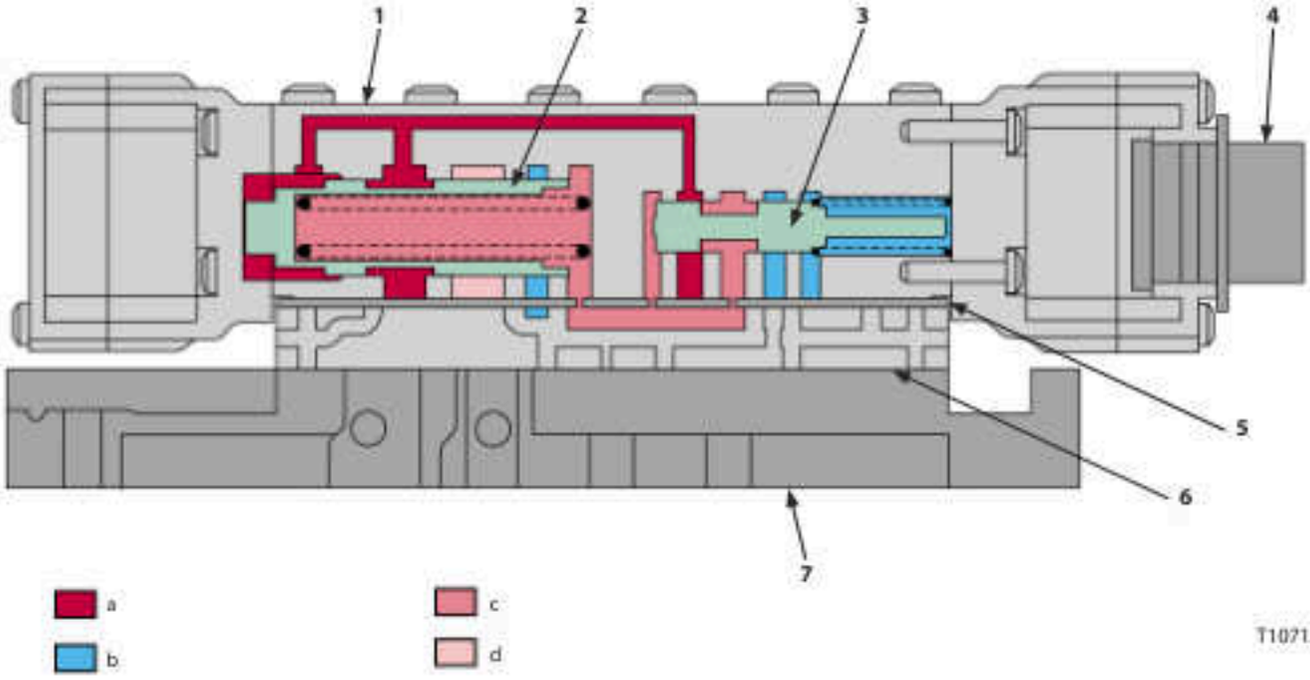
P - Pressure Q - Flow Rate

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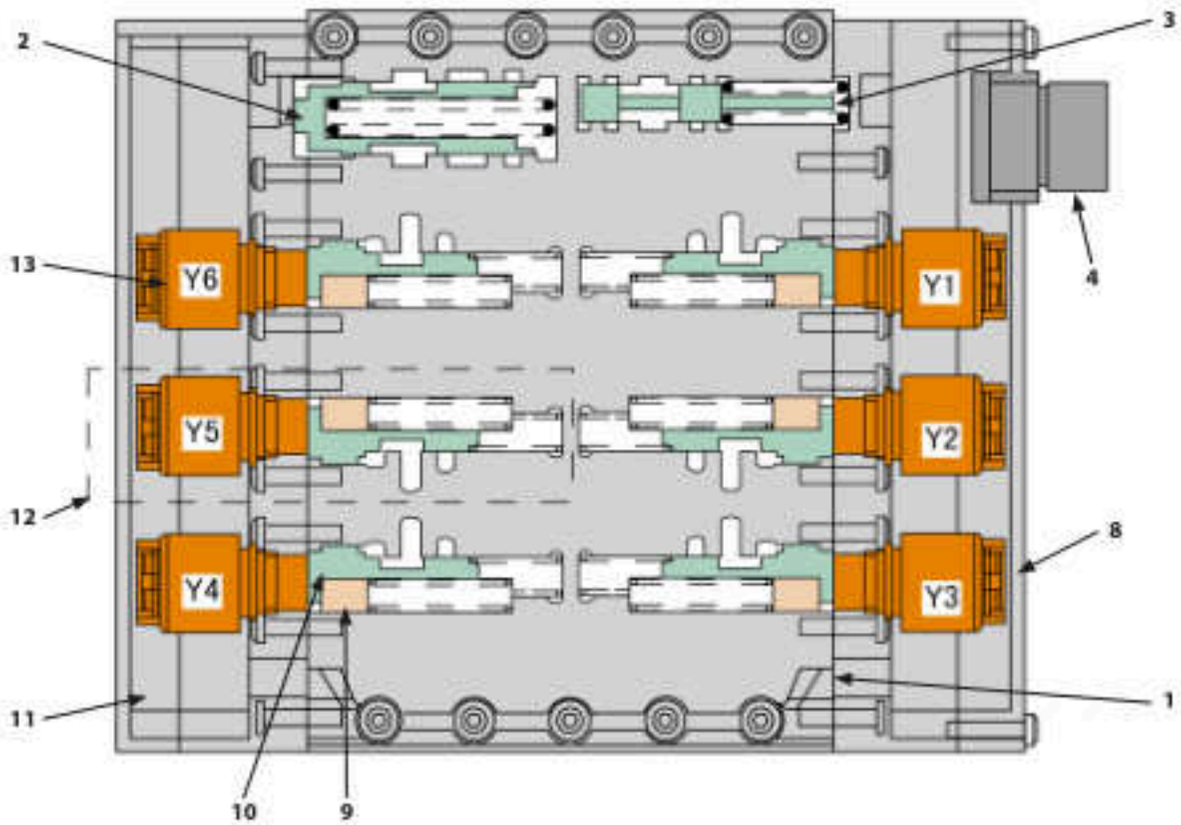
CAN Circuit

CAN (Controller Area Network) is ISO Standards of the serial communication protocol.
Three networks (CAN bus (4)), CAN 1 (1), CAN 2 (5) and CAN 3 (18) are equipped for this machine.
CAN 1 (1) is used for the engine control. CAN 2 (5) is used for the accessories.
CAN 3 (18) is used for the turbocharger control.
CAN bus (4) consists of two harnesses, CAN-H (High) (2) and CAN-L (Low) (3).
Each controller judges the CAN bus (4) level due to potential difference between CAN-H (High) (2) and CAN-L (Low) (3).
Each controller arranges the CAN bus (4) level and sends the signal and data to other controllers.
In addition, termination resistors (120 Ω) (17) are installed to both ends of CAN bus (4).

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T107151

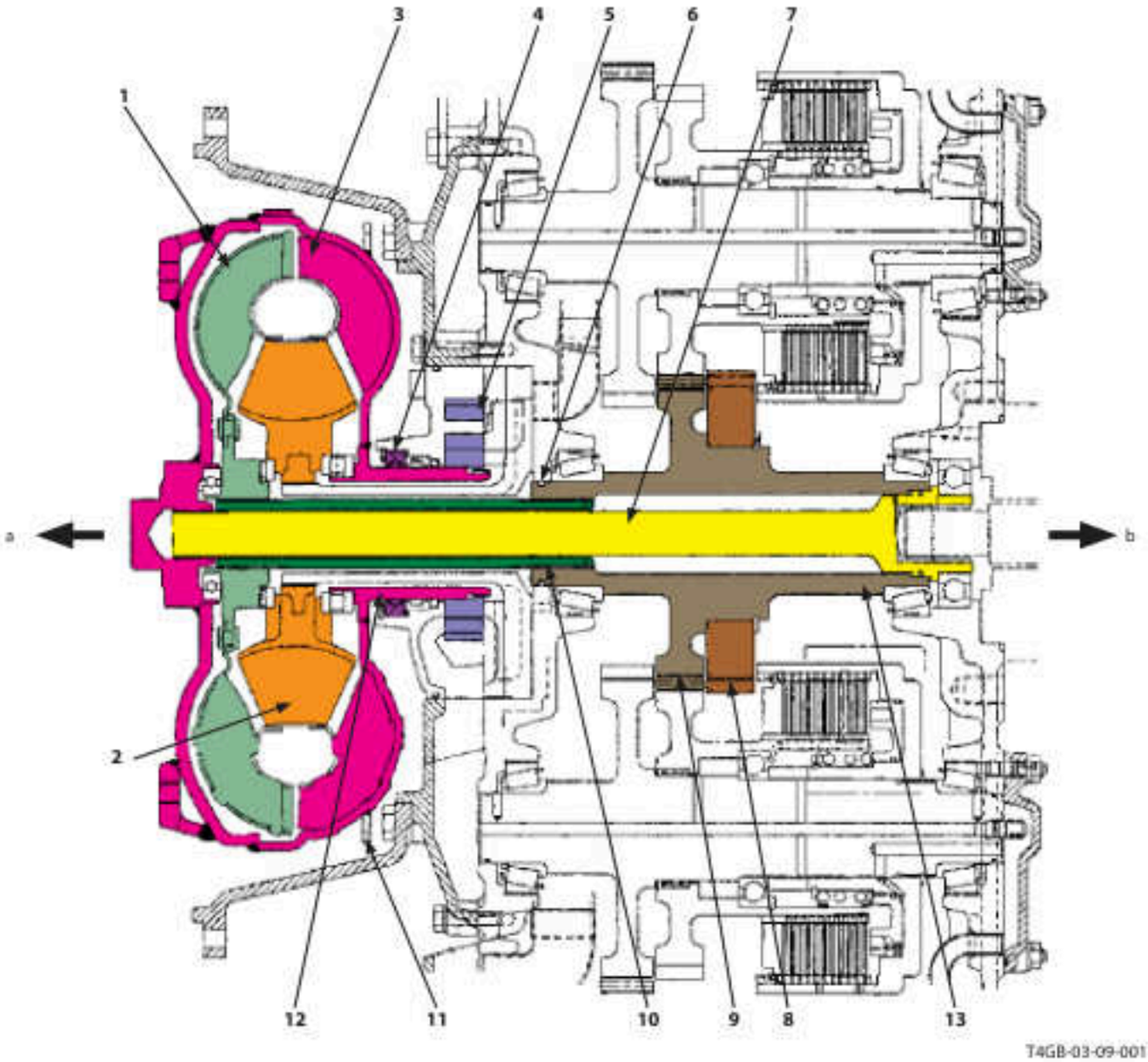


T107153

a- System Main Pressure Oil
b- Returning Oil
c- Reduced Pressure Oil
d- Converter Pressure Oil (Return Oil)

1- Valve Body
2- Pressure Control Valve
3- Pressure Reducing Valve
4- Connector
5- Middle Plate
6- Channel Plate
7- Plate
8- Cover
9- Damper Valve
10- Spool
11- Housing
12- Modulation Circuit
13- Proportional Solenoid Valve

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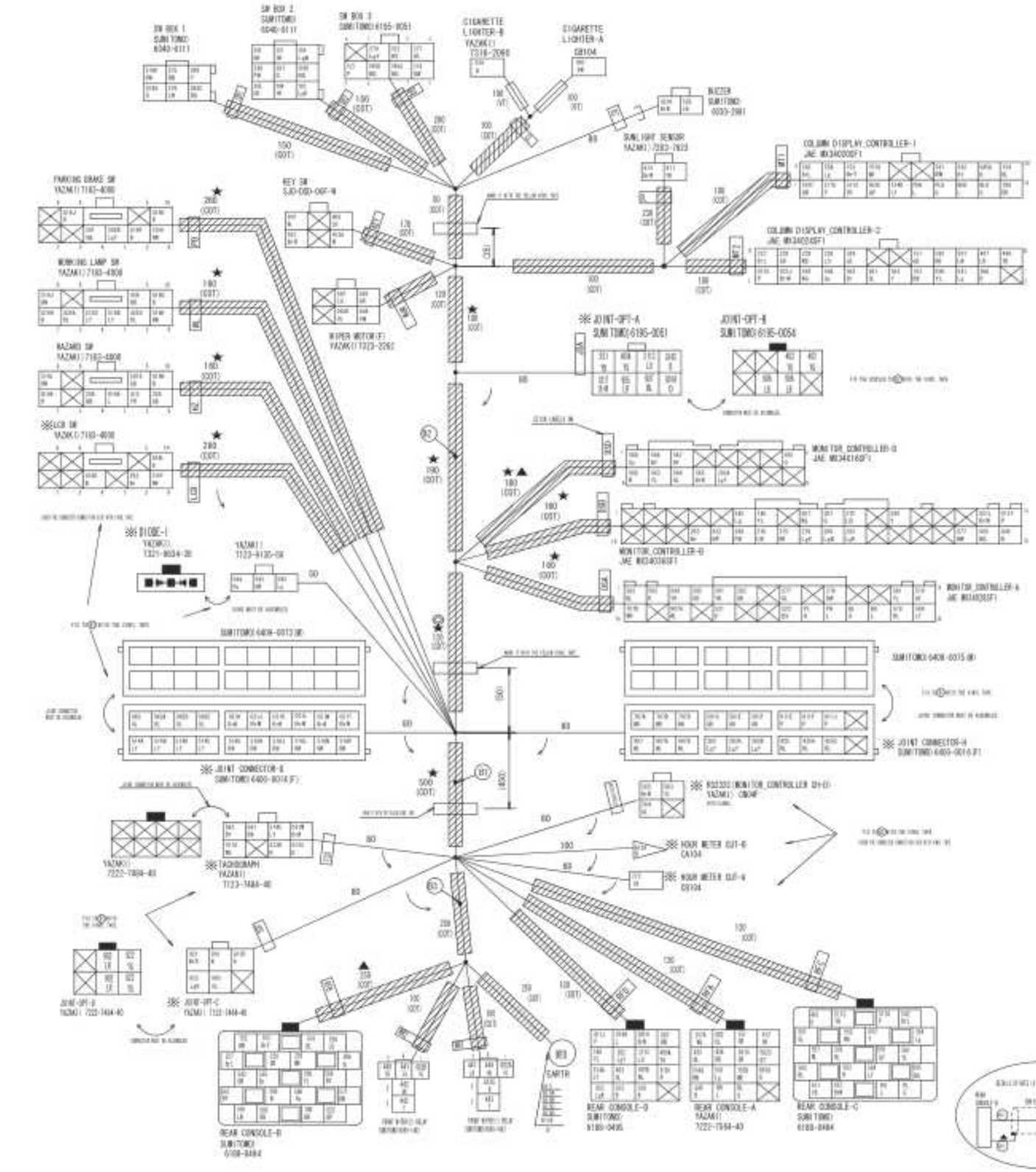
a- Engine Side
b- Main Pump Side

1- Turbine
2- Stator
3- Impeller
4- Oil Seal
5- Transmission Pump
6- Seal Ring
7- Impeller Shaft
8- High-Speed Drive Gear
9- Low-Speed Drive Gear
10- Turbine Shaft
11- Notch Ring
12- Drive Tube
13- Torque Converter Input Shaft

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Attach to Vol. No. : TTNEE-EN-00, TTNEC-EN-00

ZW220-5B/250-5B FRONT CONSOLE HARNESS



No.	SIZE	COLOR	TYPE	FROM	TO	
0170	0.5	P	AVSS	JOINT CONNECTOR-H	COLUMN DISPLAY CONTROLLER-1 (17)	1
0171	0.5	P	AVSS	JOINT CONNECTOR-H	MONITOR CONTROLLER-H (17)	2
0172	0.75	P	AVSS	REAR CONSOLE-C	JOINT CONNECTOR-H	3
0184	0.5	L	AVSS	REAR CONSOLE-F	HAZARD SW	4
0174	0.5	W-G	AVSS	REAR CONSOLE-H	*GROUND-PA/PH	5
0219	0.5	Br-W	AVSS	REAR CONSOLE-G	JOINT CONNECTOR-B	6
0242	0.5	Br-W	AVSS	JOINT CONNECTOR-B	REAR CONSOLE-H	7
0239	0.5	Br-W	AVSS	JOINT CONNECTOR-B	BUZZER	8
0175	0.5	Br-W	AVSS	JOINT CONNECTOR-B	MONITOR CONTROLLER-B (17)	9
0176	0.5	Br-W	AVSS	JOINT CONNECTOR-B	*GROUND-PA/PH	10
0177	0.5	Br-W	AVSS	JOINT CONNECTOR-B	JOINT-OPT-A	11
0183	0.75	G-L	AVSS	REAR CONSOLE-A	JOINT CONNECTOR-B	12
0183M	0.5	G-L	AVSS	JOINT CONNECTOR-B	*HOT WATER T. SELF	13
0183N	0.5	G-L	AVSS	JOINT CONNECTOR-B	*HOT WATER T. SELF	14
0183C	0.75	G-L	AVSS	JOINT CONNECTOR-B	IN-VEH MONITOR T.	15
0187	1.25	W-R	AVSS	REAR CONSOLE-G	CIGARETTE LIGHTER-A	16
146	0.5	Y-L	AVSS	MONITOR CONTROLLER-H (1)	REAR CONSOLE-G	17
151	0.5	G-R	AVSS	COLUMN DISPLAY CONTROLLER-2 (2)	REAR CONSOLE-G	18
152	0.5	G-R	AVSS	COLUMN DISPLAY CONTROLLER-2 (3)	REAR CONSOLE-G	19
153	0.5	Br-Y	AVSS	COLUMN DISPLAY CONTROLLER-2 (7)	REAR CONSOLE-G	20
154	0.5	B-L	AVSS	REAR CONSOLE-G	COLUMN DISPLAY CONTROLLER-2 (8)	21
201	0.5	Y-B	AVSS	JOINT-OPT-A	PARKING BRAKE SW	22
202	0.5	Lg-Y	AVSS	REAR CONSOLE-G	JOINT CONNECTOR-H	23
203A	0.5	Lg-Y	AVSS	JOINT CONNECTOR-H	MONITOR CONTROLLER-H (13)	24
203B	0.5	Lg-Y	AVSS	JOINT CONNECTOR-H	PARKING BRAKE SW	25
205	0.5	B-G	AVSS	HAZARD SW	HAZARD SW	26
216	0.5	L-O	AVSS	REAR CONSOLE-G	JOINT-OPT-A	27
220	0.5	L-O	AVSS	COLUMN DISPLAY CONTROLLER-2 (10)	REAR CONSOLE-G	28
227	0.5	Br-L	AVSS	COLUMN DISPLAY CONTROLLER-2 (11)	REAR CONSOLE-G	29
228	0.5	G-R	AVSS	COLUMN DISPLAY CONTROLLER-2 (14)	REAR CONSOLE-G	30
229	0.5	W-O	AVSS	COLUMN DISPLAY CONTROLLER-2 (15)	REAR CONSOLE-G	31
304	0.5	B	AVSS	COLUMN DISPLAY CONTROLLER-2 (16)	REAR CONSOLE-G	32
172	0.5	L-B	AVSS	MONITOR CONTROLLER-H (11)	MAIN MONITOR (GT)-H	33
215	0.5	W-G	AVSS	MONITOR CONTROLLER-H (24)	DM BOX 1	34
174	0.5	L-W	AVSS	MONITOR CONTROLLER-H (22)	DM BOX 1	35
217	0.5	B-L	AVSS	MONITOR CONTROLLER-H (6)	DM BOX 1	36
218	0.5	B-W	AVSS	MONITOR CONTROLLER-H (21)	DM BOX 1	37
219	0.5	Lg-Y	AVSS	MONITOR CONTROLLER-H (23)	DM BOX 1	38
301	0.5	Y-B	AVSS	MONITOR CONTROLLER-H (5)	DM BOX 1	39
302	0.5	B-B	AVSS	MONITOR CONTROLLER-H (4)	DM BOX 1	40
303	0.5	Lg-W	AVSS	MONITOR CONTROLLER-H (20)	DM BOX 1	41
304	0.5	Y-R	AVSS	MONITOR CONTROLLER-H (3)	DM BOX 1	42
305	0.5	G-R	AVSS	MONITOR CONTROLLER-H (8)	DM BOX 1	43
306	0.5	Lg-B	AVSS	MONITOR CONTROLLER-H (19)	DM BOX 1	44
307	0.5	B	AVSS	MONITOR CONTROLLER-H (9)	DM BOX 1	45
308	0.5	Y-B	AVSS	MONITOR CONTROLLER-H (18)	DM BOX 1	46
309	0.5	P	AVSS	MONITOR CONTROLLER-H (12)	DM BOX 1	47
310	0.5	Br	AVSS	MONITOR CONTROLLER-H (25)	LCD DM	48
402	0.5	Y-G	AVSS	JOINT-OPT-B	JOINT-OPT-H	49
402M	0.5	Y-G	AVSS	REAR CONSOLE-G	JOINT-OPT-A	50
412	0.5	P-R	AVSS	HAZARD SW	REAR CONSOLE-H	51
426	0.5	W-L	AVSS	JOINT CONNECTOR-H	REAR CONSOLE-A	52
426A	0.5	W-L	AVSS	WORKING LAMP SW	JOINT CONNECTOR-H	53
426B	0.5	W-L	AVSS	WORKING LAMP SW	JOINT CONNECTOR-H	54
426	0.5	W-B	AVSS	WORKING LAMP SW	REAR CONSOLE-A	55
441	0.75	L-Q	AVSS	WIPER MOTOR (F)	*HOT WATER T. SELF	56
442	0.75	B-R	AVSS	WIPER MOTOR (F)	*HOT WATER T. SELF	57
422	0.75	P	AVSS	*HOT WATER T. SELF	*HOT WATER T. SELF	58
444	0.75	Y-Ng	AVSS	*HOT WATER T. SELF	IN-VEH MONITOR T.	59
447	0.5	L-R	AVSS	*HOT WATER T. SELF	COLUMN DISPLAY CONTROLLER-2 (1)	60
448	0.5	P-B	AVSS	*HOT WATER T. SELF	COLUMN DISPLAY CONTROLLER-2 (5)	61
461	0.5	B	AVSS	REAR CONSOLE-C	MONITOR CONTROLLER-H (4)	62
501C	0.5	B-R	AVSS	REAR CONSOLE-A	JOINT CONNECTOR-H	63
501E	0.5	B-R	AVSS	JOINT CONNECTOR-H	HAZARD SW	64
501F	0.5	B-R	AVSS	JOINT CONNECTOR-H	COLUMN DISPLAY CONTROLLER-2 (6)	65
502C	0.5	G-Y	AVSS	REAR CONSOLE-A	JOINT CONNECTOR-H	66
510C	0.5	Y-B	AVSS	REAR CONSOLE-A	JOINT CONNECTOR-H	67
514C	0.5	L-Y	AVSS	JOINT CONNECTOR-G	WORKING LAMP SW	68
514D	0.5	L-Y	AVSS	REAR CONSOLE-A	WORKING LAMP SW	69
514E	0.5	L-Y	AVSS	JOINT CONNECTOR-G	COLUMN DISPLAY CONTROLLER-1 (5)	70
514F	0.5	L-Y	AVSS	JOINT CONNECTOR-G	*BACKGROUND	71
514G	0.5	W-Ng	AVSS	REAR CONSOLE-A	JOINT CONNECTOR-G	72
519B	0.5	Br-Ng	AVSS	JOINT CONNECTOR-G	PARKING BRAKE SW	73
519C	0.5	Br-Ng	AVSS	REAR CONSOLE-A	WORKING LAMP SW	74
519D	0.5	Br-Ng	AVSS	JOINT CONNECTOR-G	WORKING LAMP SW	75
519E	0.5	Br-Ng	AVSS	12 V+	WORKING LAMP SW	76

No.	SIZE	COLOR	TYPE	FROM	TO	
519L	0.5	Br-W	AVSS	JOINT CONNECTOR-G	HAZARD SW	77
519M	0.5	Br-W	AVSS	JOINT CONNECTOR-G	DM BOX 1	78
519P	0.5	Br-W	AVSS	JOINT CONNECTOR-G	LCD DM	79
513B	0.5	P	AVSS	REAR CONSOLE-C	COLUMN DISPLAY CONTROLLER-1 (2)	80
521	0.5	P	AVSS	MONITOR CONTROLLER-H (10)	DM BOX 1	81
522	0.5	W-Y	AVSS	DM BOX 1	MONITOR CONTROLLER-H (22)	82
559	0.5	L-W	AVSS	DM BOX 1	COLUMN DISPLAY CONTROLLER-1 (7)	83
541	0.5	Lg	AVSS	COLUMN DISPLAY CONTROLLER-1 (1)	REAR CONSOLE-H	84
542	0.5	Br-L	AVSS	COLUMN DISPLAY CONTROLLER-1 (3)	REAR CONSOLE-G	85
543	0.5	G-W	AVSS	DM BOX 1	REAR CONSOLE-G	86
544	0.5	Gr	AVSS	COLUMN DISPLAY CONTROLLER-1 (5)	DM BOX 1	87
545	0.5	Lg	AVSS	MONITOR CONTROLLER-H (6)	DM BOX 1	88
551	0.5	G-L	AVSS	COLUMN DISPLAY CONTROLLER-1 (2)	REAR CONSOLE-C	89
552	0.5	W-G	AVSS	COLUMN DISPLAY CONTROLLER-1 (4)	REAR CONSOLE-C	90
553	0.5	Y	AVSS	COLUMN DISPLAY CONTROLLER-1 (6)	REAR CONSOLE-C	91
554	0.5	Lg	AVSS	COLUMN DISPLAY CONTROLLER-1 (8)	REAR CONSOLE-C	92
555	0.5	Br	AVSS	COLUMN DISPLAY CONTROLLER-1 (9)	REAR CONSOLE-G	93
556	0.5	Y-L	AVSS	COLUMN DISPLAY CONTROLLER-1 (10)	REAR CONSOLE-G	94
557	0.5	W-L	AVSS	REAR CONSOLE-C	MONITOR CONTROLLER-H (5)	95
561	0.5	B-W	AVSS	COLUMN DISPLAY CONTROLLER-1 (11)	*BACKGROUND	96
562	0.5	B-Y	AVSS	COLUMN DISPLAY CONTROLLER-1 (12)	*BACKGROUND	97
563	0.5	Y-L	AVSS	MONITOR CONTROLLER-H (7)	CIGARETTE LIGHTER-B (2)	98
564	0.5	B-L	AVSS	MONITOR CONTROLLER-H (21)	CIGARETTE LIGHTER-B (3)	99
565	0.5	Br-W	AVSS	MONITOR CONTROLLER-H (23)	CIGARETTE LIGHTER-B (4)	100
566	0.5	B-Y	AVSS	REAR CONSOLE-B	MONITOR CONTROLLER-H (2)	101
567	0.5	B-Y	AVSS	MONITOR CONTROLLER-H (1)	REAR CONSOLE-B	102
568	0.5	W	AVSS(G)	REAR CONSOLE-B	MONITOR CONTROLLER-H (3)	103
569	0.5	Gr	AVSS(G)	REAR CONSOLE-B	MONITOR CONTROLLER-H (11)	104
577	0.5	W-R	AVSS	MONITOR CONTROLLER-H (16)	REAR CONSOLE-B	105
578	0.5	W-L	AVSS	MONITOR CONTROLLER-H (17)	REAR CONSOLE-C	106
579	0.5	G-Y	AVSS	MONITOR CONTROLLER-H (14)	REAR CONSOLE-C	107
581	0.5	Y-L	AVSS	MONITOR CONTROLLER-H (13)	REAR CONSOLE-C	108
582	0.5	B-L	AVSS	MONITOR CONTROLLER-H (15)	REAR CONSOLE-C	109
583	0.5	R	AVSS	MONITOR CONTROLLER-H (12)	REAR CONSOLE-C	110
584	0.5	L-Y	AVSS	MONITOR CONTROLLER-H (18)	REAR CONSOLE-C	111
585	0.5	B-G	AVSS	REAR CONSOLE-C	MONITOR CONTROLLER-H (19)	112
586A	0.5	B-G	AVSS	DM BOX 1	SVC	113
586B	0.5	B-G	AVSS	DM BOX 1	SVC	114
586C	0.5	B-G	AVSS	DM BOX 1	SVC	115
586D	0.5	B-G	AVSS	DM BOX 1	SVC	116
591	0.5	L-W	AVSS	REAR CONSOLE-B	COLUMN DISPLAY CONTROLLER-2 (2)	117
592	0.5	W-R	AVSS	REAR CONSOLE-B	COLUMN DISPLAY CONTROLLER-2 (1)	118
611	0.5	Y-G	AVSS	REAR CONSOLE-C	CANCEL KEY SENSOR	119
612	0.5	Br-W	AVSS	REAR CONSOLE-C	COLUMN DISPLAY CONTROLLER-2 (7)	120
613A	0.5	W-W	AVSS	JOINT CONNECTOR-H	COLUMN DISPLAY CONTROLLER-1 (13)	121
613B	0.5	W-W	AVSS	JOINT CONNECTOR-H	REAR CONSOLE-H	122
613C	0.5	W-W	AVSS	JOINT CONNECTOR-H	MONITOR CONTROLLER-H (13)	123
614	0.5	W-W	AVSS	COLUMN DISPLAY CONTROLLER-1 (13)	REAR CONSOLE-B	124
615A	0.5	O	AVSS	REAR CONSOLE-A	JOINT-OPT-A	125
622	0.5	Br-P	AVSS	MONITOR CONTROLLER-H (15)	REAR CONSOLE-B	126
901	0.5	W	AVSS	KEY SW (ACC)	JOINT-OPT-C	127
902	0.5	L-W	AVSS	JOINT-OPT-B	JOINT-OPT-H	128
902C	0.5	Gr-L	AVSS	JOINT-OPT-C	REAR CONSOLE-B	129
903	0.75	L-R	AVSS	KEY SW (START)	JOINT-OPT-A	130
904	0.75	L-R	AVSS	JOINT-OPT-B	JOINT-OPT-H	131
907	0.5	W-L	AVSS	JOINT-OPT-H	JOINT CONNECTOR-H	132
908A	0.5	W-L	AVSS	JOINT CONNECTOR-H	MONITOR CONTROLLER-H (17)	133
908B	0.75	W-L	AVSS	JOINT CONNECTOR-H	REAR CONSOLE-B	134
910A	1.25	W	AVSS	REAR CONSOLE-C	BATT (B)	135
911	1.25	Br-R	AVSS	KEY SW (B)	JOINT-OPT-C	136
912	1.25	Y-Q	AVSS	JOINT-OPT-C	JOINT-OPT-G	137
913	1.25	Lg-R	AVSS	JOINT-OPT-C	REAR CONSOLE-B	138
915	1	B	AVSS	STARTER	STARTER	139
916A	0.5	B	AVSS	*HOT WATER T. SELF	STARTER	140
916B	0.5	B	AVSS	*BACKGROUND	STARTER	141
916C	0.5	B	AVSS	*BACKGROUND	JOINT-OPT-C	142
916D	0.5	B	AVSS	JOINT-OPT-C	*HOT WATER T. SELF	143
916E	0.75	B	AVSS	*HOT WATER T. SELF	STARTER	144
916F	1.25	B	AVSS	CIGARETTE LIGHTER-B	REAR CONSOLE-B	145
916G	0.5	B	AVSS	HAZARD SW	G-14	146
916H	0.5	B	AVSS	HAZARD SW	G-14	147
916K	0.5	B	AVSS	JOINT-OPT-A	G-14	148
916M	0.5	B	AVSS	DM BOX 1	G-14	149
916N	0.5	B	AVSS	PARKING BRAKE SW	G-14	150
916P	0.5	B	AVSS	PARKING BRAKE SW	G-14	151
916Q	0.5	B	AVSS	WORKING LAMP SW	G-14	152
916R	0.5	B	AVSS	WORKING LAMP SW	G-14	153
916U	0.5	B	AVSS	PARKING BRAKE SW	G-14	154
916W	0.5	B	AVSS	LCD DM	G-14	155
916X	0.5	B	AVSS	LCD DM	G-14	156
916Y	0.5	B	AVSS	MONITOR CONTROLLER-H (26)	REAR CONSOLE-H	157
916M	0.5	B	AVSS	COLUMN DISPLAY CONTROLLER-1 (14)	G-45	158
P01	0.5	L	AVSS(G)	MONITOR CONTROLLER-H (28)	REAR CONSOLE-C	159
P02	0.5	G	AVSS(G)	MONITOR CONTROLLER-H (27)	REAR CONSOLE-C	160
P03	0.5	L	AVSS(G)	P03	COLUMN DISPLAY CONTROLLER-1 (15)	161
P04	0.5	G	AVSS(G)	P04	COLUMN DISPLAY CONTROLLER-1 (17)	162
Q01	0.5	L	AVSS(G)	MONITOR CONTROLLER-H (29)	REAR CONSOLE-A	163
Q02	0.5	G	AVSS(G)	MONITOR CONTROLLER-H (30)	REAR CONSOLE-A	164
Q03	0.5	L	AVSS(G)	Q03	COLUMN DISPLAY CONTROLLER-1 (16)	165
Q04	0.5	G	AVSS(G)	Q04	COLUMN DISPLAY CONTROLLER-1 (18)	166

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