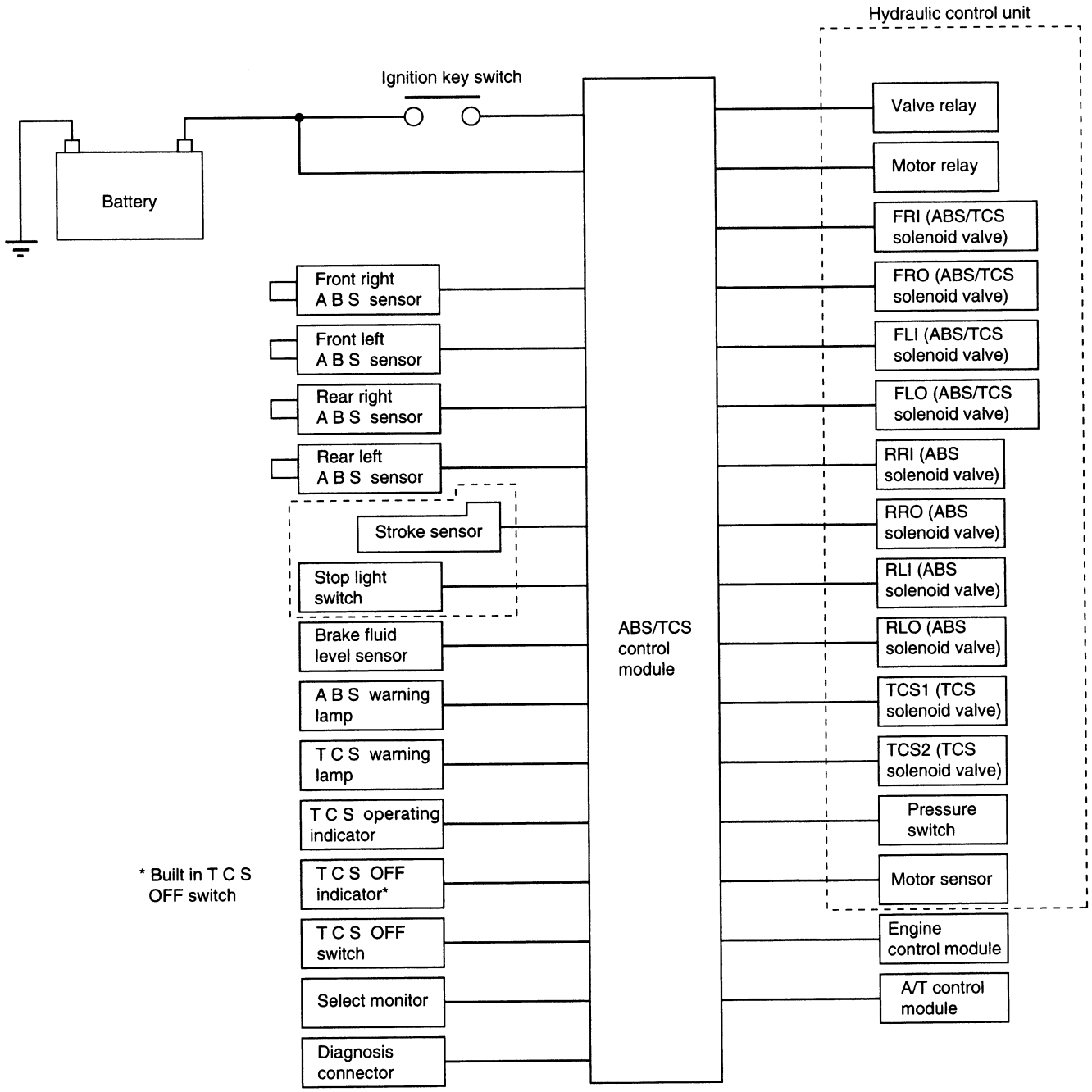
5. Control Module I/O Signal

1. I/O SIGNAL VOLTAGE

Contents			Connector No.	Terminal No.	Input/Output signals Measured value and measuring conditions
ABS sensor (Wheel speed sensor)	Front left wheel		P7	1—11	0.12 — 1 V (When it is 10 Hz.)
	Front right wheel		P6	8—16	0.12 — 1 V (When it is 10 Hz.)
	Rear left wheel		P6	7—15	0.12 — 1 V (When it is 10 Hz.)
	Rear right wheel		P7	2—12	0.12 — 1 V (When it is 10 Hz.)
Hydraulic unit	Solenoid valve	Front left outlet	P4	1—GND	10 — 14 V when the valve is OFF. Less than 1.5 V when the valve is ON.
		Front right outlet	P5	3—GND	
		Rear left outlet	P5	8—GND	
		Rear right outlet	P4	3—GND	
		Front left inlet	P4	2—GND	10 — 14 V when the valve is OFF. Less than 1.0 V when the valve is ON.
		Front right inlet	P5	2—GND	
		Rear left inlet	P5	7—GND	
		Rear right inlet	P4	4—GND	
		TCS 1	P4	5—GND	10 — 14 V when the valve is OFF. Less than 1.0 V when the valve is ON.
		TCS 2	P5	6—GND	
	Valve power supply		P6	6—GND	Ignition switch ON, 10 — 14 V
	Valve relay power supply		P6	1—GND	Less than 1.2 V when IGN is ON. 10 — 14 V when the system is down.
	Motor relay power supply		P6	9—GND	Less than 1.0 V when the motor is ON. 10 — 14 V when the motor is OFF.
	Motor sensor signals		P7	3—GND	Cyclic waveform of more than 180 Hz when the motor across terminals is ON. Less than 70 Hz when the motor is OFF.
			P7	13—GND	
	Pressure switch		P7	6—GND	H/L toggle signal with the brake pedal off (Cycle 14 mS, H: 10 —14 V, L: less than 0.7 V). 10 — 14 V with the brake pedal depressed.
Pedal stroke sensor	Output signals		P7	5—GND	0.7 — 0.9 V with the brake pedal off.
	Power supply		P7	4—14	5±0.4 V
Stop light switch	Switch		P7	7—GND	Less than 2 V when the stop light is off. 10 — 12 V when the stop light is on.
	Switch test signal		P7	18—GND	H/L toggle signal with the brake pedal off (Cycle 14 mS, H: 10 —12 V, L: less than 0.7 V). Less than 2 V with the brake pedal depressed.
TCS OFF switch			P7	16—GND	Less than 2.0 V with the switch pressed and 10 — 12 V with it released.
Indicator light	TCS OFF		P6	10—GND	Less than 2 V when the light is on and 10 — 12 V when it is off.
	TCS operation		P6	11—GND	
	TCS warning		P6	3—GND	
	ABS warning		P6	2—GND	

Contents		Connector No.	Terminal No.	Input/Output signals
				Measured value and measuring conditions
TCS control unit ECM communication	TCS → ECM communication (torque command)	P6	14—GND	Less than 0.7 V when the vehicle stands still.
	TCS → ECM communication (torque command)	P6	5—GND	Less than 5 V when the vehicle stands still.
	TCS → ECM communication (TCS operates)	P6	12—GND	4 — 5.4 V when TCS controls no operations. Less than 0.7 V when it controls operations.
	ECM → TCS communication (engine control)	P6	4—GND	H/L toggle signal with the accelerator pedal off (Cycle 20 mS, H: 10 — 14 V, L: less than 0.7 V). Less than 2.0 V with the accelerator pedal depressed. Also when TCS OFF indicator light comes on by TCS OFF switch.
ABS operation signal		P6	13—GND	10 — 14 V when the ABS control does not operate still and less than 0.7 V when ABS operates.
Fluid level sensor		P7	20—GND	Less than 2 V when IGN is ON and 10 — 14 V when idling.
Select monitor	Data is received.	P7	9—GND	4 — 4.5 V when no data is received.
	Data is sent.	P7	19—GND	4 — 4.5 V when no data is sent.
Diagnosis connector		P7	8—GND	10 — 14 V when IGN is ON.
Power supply	Ignition	P5	1—GND	10 — 14 V when IGN is ON.
	Battery	P5	4—GND	10 — 14 V
Grounding line	Power	P5	5—body	1 Ω or less
	Digital	P7	15—body	1 Ω or less
	Power	P4	6—body	1 Ω or less

2. I/O SIGNAL DIAGRAM



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3. LIST OF ABS/TCS ON-BOARD DIAGNOSTICS FUNCTIONS

Trouble code	Diagnostic items <detailed diagnostic items>	Detection timing					Indicator light ON			Parts concerned
		At initial checking	Under no control	Under ABS control	Under TCS control	In diagnostic mode	ABS warning light	TCS warning light	TCS OFF indicator light	
21 FR 23 FL 25 RR 27 RL	Detection of fault in ABS sensor hardware <open/short circuits of sensor>	○	○	○	○		○	○	—	ABS sensor (ABS/TCS C/M)
22 FR 24 FL 26 RR 28 RL	Detection of fault in ABS sensor software <variations in wheel speed>		○	○	○		○	○	—	ABS sensor (ABS/TCS C/M)
			○	○	○		○	○	—	ABS sensor harness circuit (ABS/TCS C/M)
	Detection of fault in ABS sensor software <decompression mode>			○			○	○	—	ABS sensor and solenoid valve (ABS/TCS C/M)
				○			○	○	—	ABS sensor (ABS/TCS C/M)
	Detection of fault in sensor software <speed higher than prescribed>	○	○	○	○		○	○	—	ABS sensor (ABS/TCS C/M)
31 FRI 32 FRO 33 FLI 34 FLO 35 RRI 36 RRO 37 RLI 38 RLO 61 TCS1 62 TCS2	Abnormal valve <Abnormal valve>	○	○	○	○	○*	○	○	—	Solenoid valve (ABS/TCS C/M)
41	Abnormal ABS/TCS C/M <Abnormal ABS/TCS C/M>	○	○	○	○		○	○	—	ABS/TCS C/M
42	Abnormal line voltage <Abnormal line voltage>	○	○	○	○	○	○	○	—	Power source operating environment (ABS/TCS C/M)
—	Power source voltage drop <Power source voltage drop>	○	○	○	○		○	○	—	
		○	○	○	○	○	○		—	

*: Except when trouble code is being displayed.

Trouble code	Diagnostic items <detailed diagnostic items>	Detection timing					Indicator light ON			Parts concerned
		At initial checking	Under no control	Under ABS control	Under TCS control	In diagnostic mode	ABS warning light	TCS warning light	TCS OFF indicator light	
43	Abnormal EGI communication line <Abnormal EGI communication line>	○	○	○			—	○	—	AET communication line (ABS/TCS C/M)
		○	○	○			—	○	—	
					○		—	○	—	
		○	○	○	○		—	○	—	AEB communication line (ABS/TCS C/M)
		○	○	○	○		—	○	—	
				○	○		—	○	—	
		○	○	○	○		—	○	—	AEC communication line (ABS/TCS C/M)
		○	○	○	○		—	○	—	
			○	○	○		—	○	—	
—	Abnormal EGI communication line <Abnormal EGI communication line>	○	○	○			—	—	○	EAM communication line (ABS/TCS C/M)
51	Abnormal valve relay <failure of valve relay ON> <failure of valve relay OFF>	○					○	○	—	Valve relay (ABS/TCS C/M)
	Abnormal valve relay <failure of valve relay OFF>	○	○	○	○		○	○	—	Valve relay (ABS/TCS C/M)
		○	○	○	○		○	○	—	
52	Abnormal motor system <failure of motor relay OFF>		○	○	○		○	○	—	Motor (ABS/TCS C/M)
	Abnormal motor system <failure of motor relay ON>		○	○			○	○	—	Motor (ABS/TCS C/M)
	Abnormal motor system <failure of motor relay OFF>		○				○	○	—	

Trouble code	Diagnostic items <detailed diagnostic items>	Detection timing					Indicator light ON			Parts concerned
		At initial checking	Under no control	Under ABS control	Under TCS control	In diagnostic mode	ABS warning light	TCS warning light	TCS OFF indicator light	
54	Abnormal pedal stroke sensor and stop light switch <open/short circuits of stroke sensor>	○	○	○			○	○	—	Pedal stroke sensor (ABS/TCS C/M)
	Abnormal pedal stroke sensor and stop light switch <comparison of acceleration and stroke sensor>		○				○	○	—	Pedal stroke sensor (ABS/TCS C/M)
	Abnormal pedal stroke sensor and stop light switch <comparison of stroke sensor and brake lamp switch>		○				○	○	—	Stop light switch, pedal stroke sensor (ABS/TCS C/M)
	Abnormal pedal stroke sensor and stop light switch <comparison of stroke sensor and pump exitation>			○			○	○	—	Pump, pedal stroke sensor (ABS/TCS C/M)
	Abnormal stroke sensor and stop light switch <open circuit of stop light switch>		○	○	○		—	○	—	Stop light switch circuit (ABS/TCS C/M)
57	Abnormal fluid level sensor <Abnormal fluid level sensor>	○					○	○	—	Fluid level sensor circuit
—	Abnormal fluid level sensor <Abnormal fluid level sensor> <Insufficient brake fluid>	○	○	○	○		○	○	—	Fluid level sensor circuit, reservoir
58	Abnormal pressure switch <Abnormal pressure switch>	○	○	○	○		—	○	—	Pressure switch (ABS/TCS C/M)
		○	○	○			—	○	—	Pressure switch, stop light switch (ABS/TCS C/M)
			○	○	○		—	○	—	Pressure switch (ABS/TCS C/M)