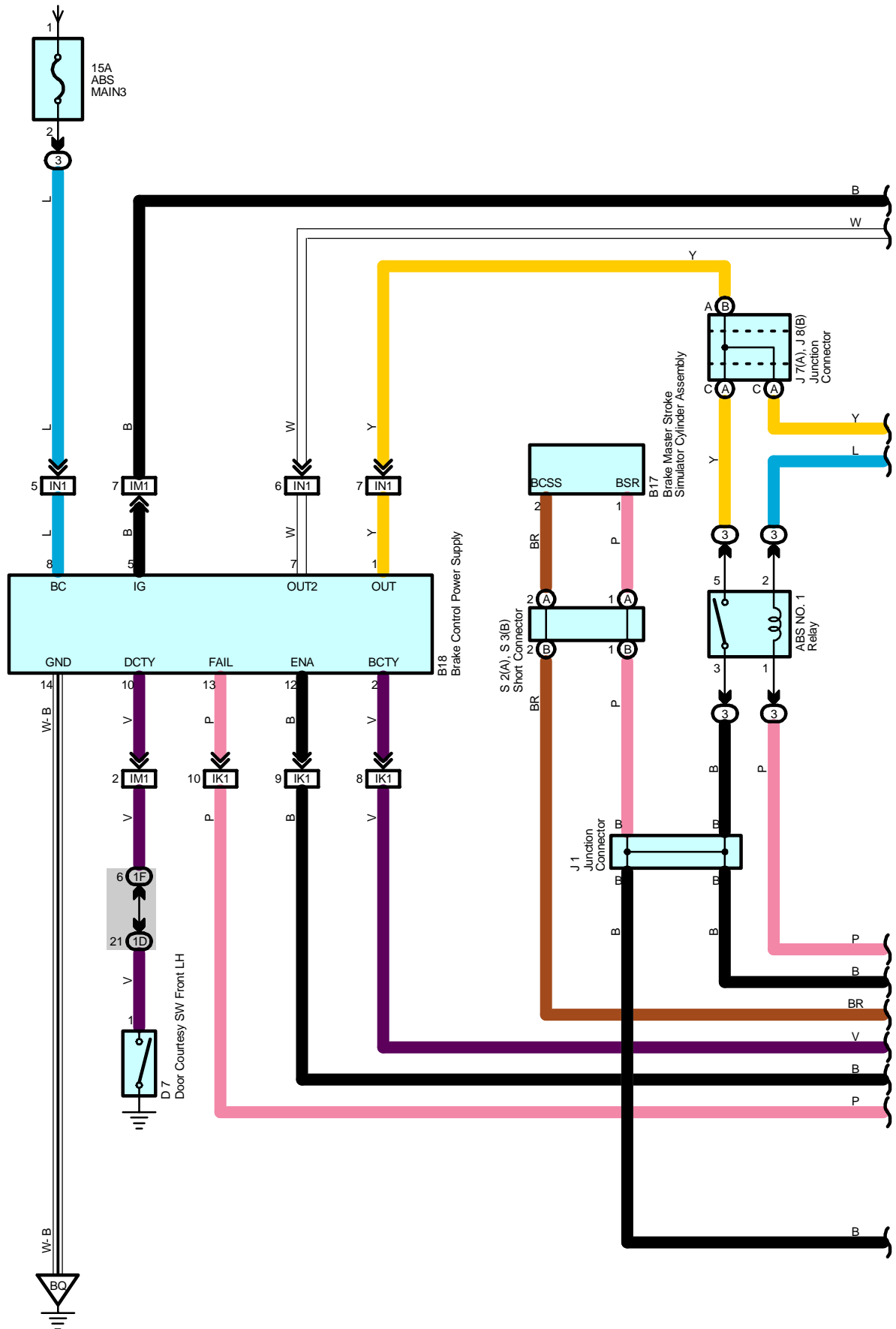
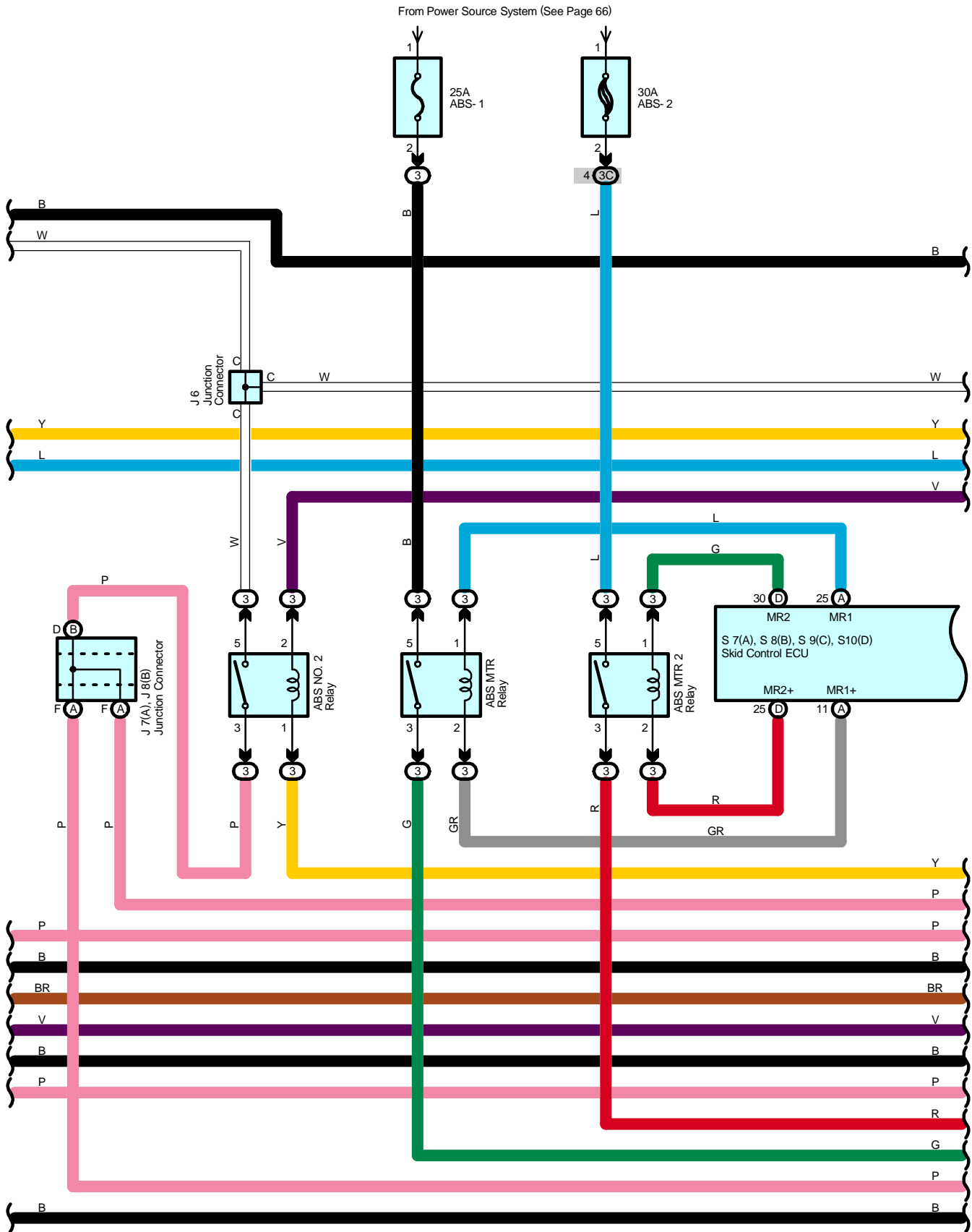
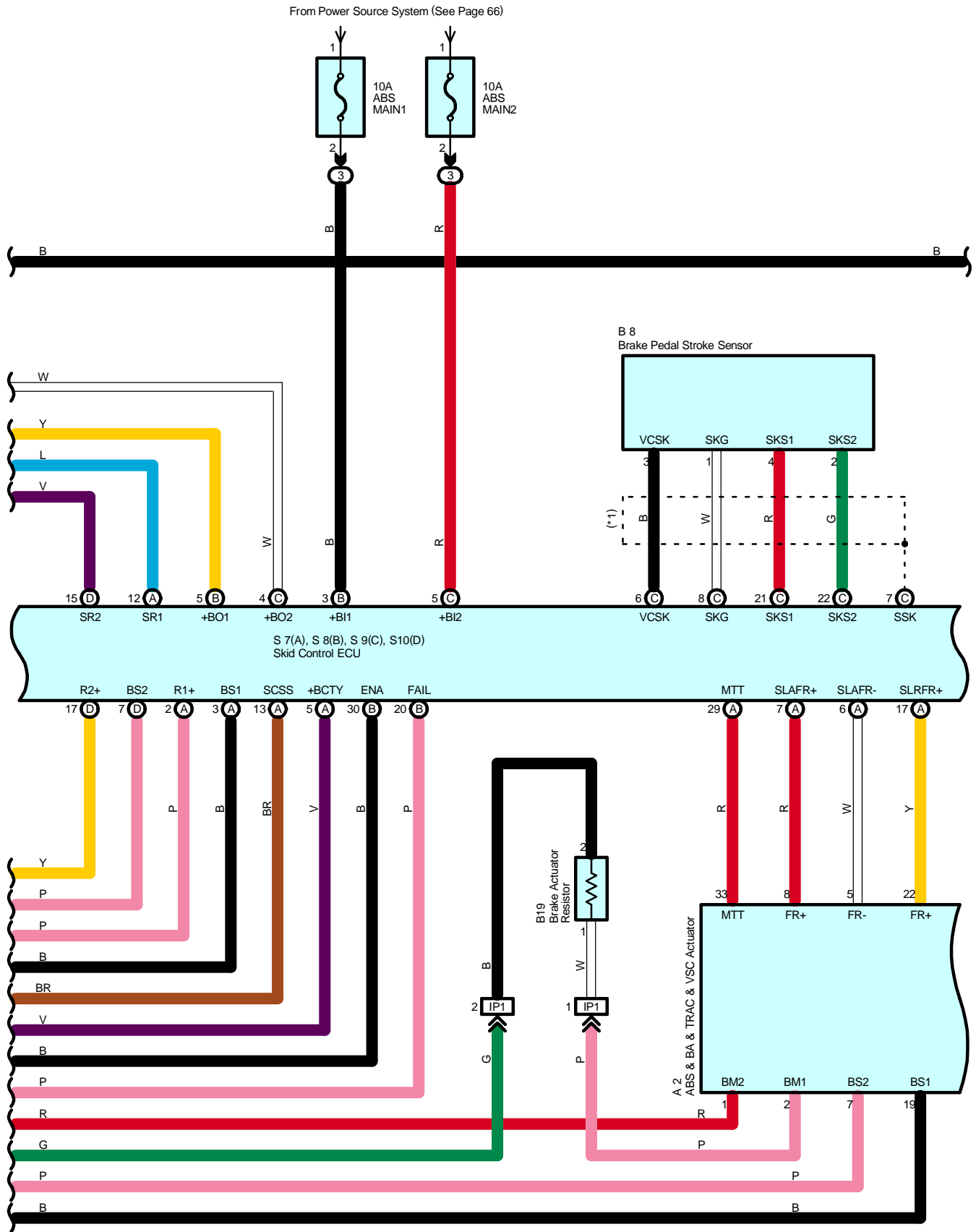


ABS and VSC

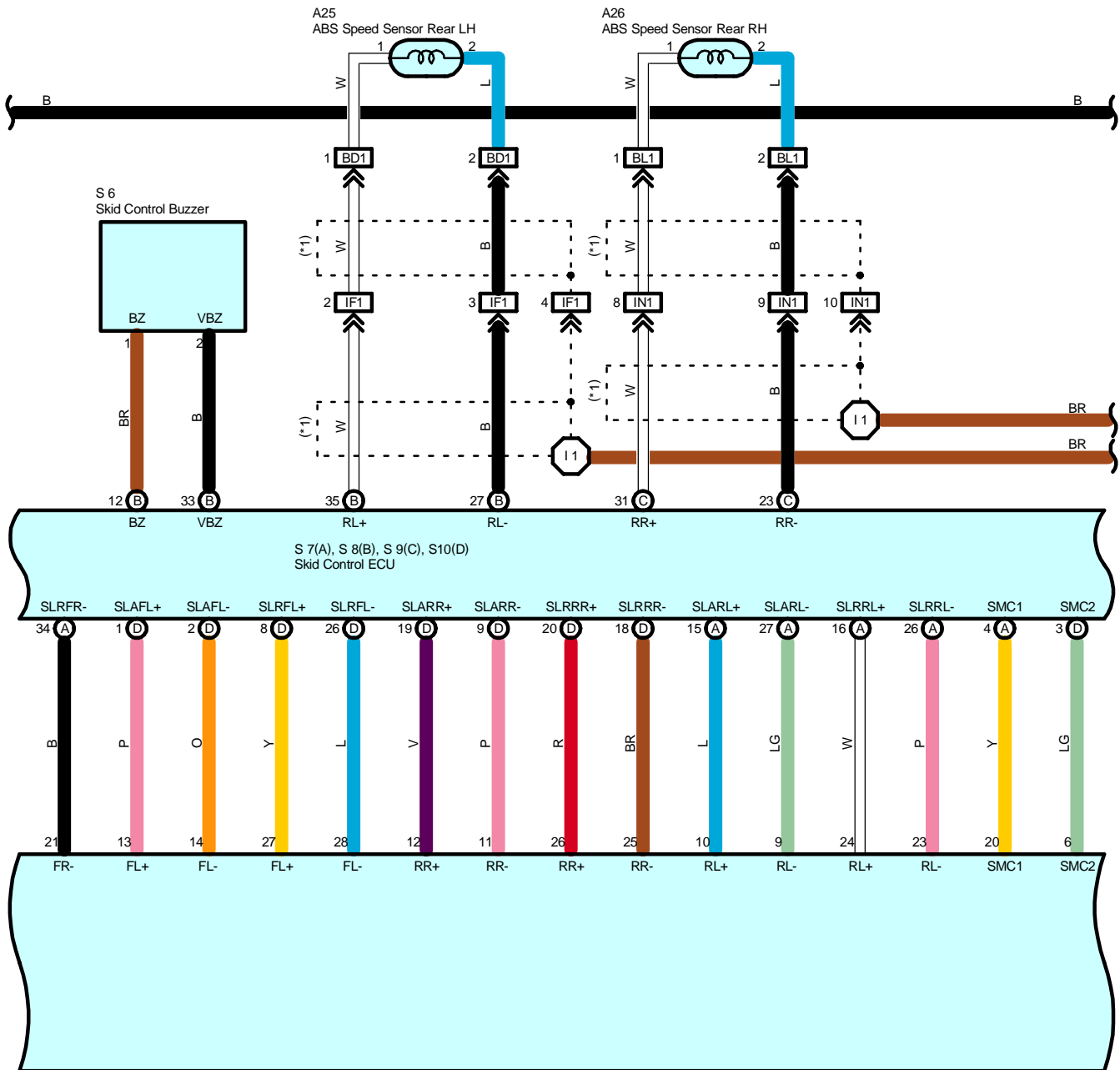
From Power Source System (See Page 66)



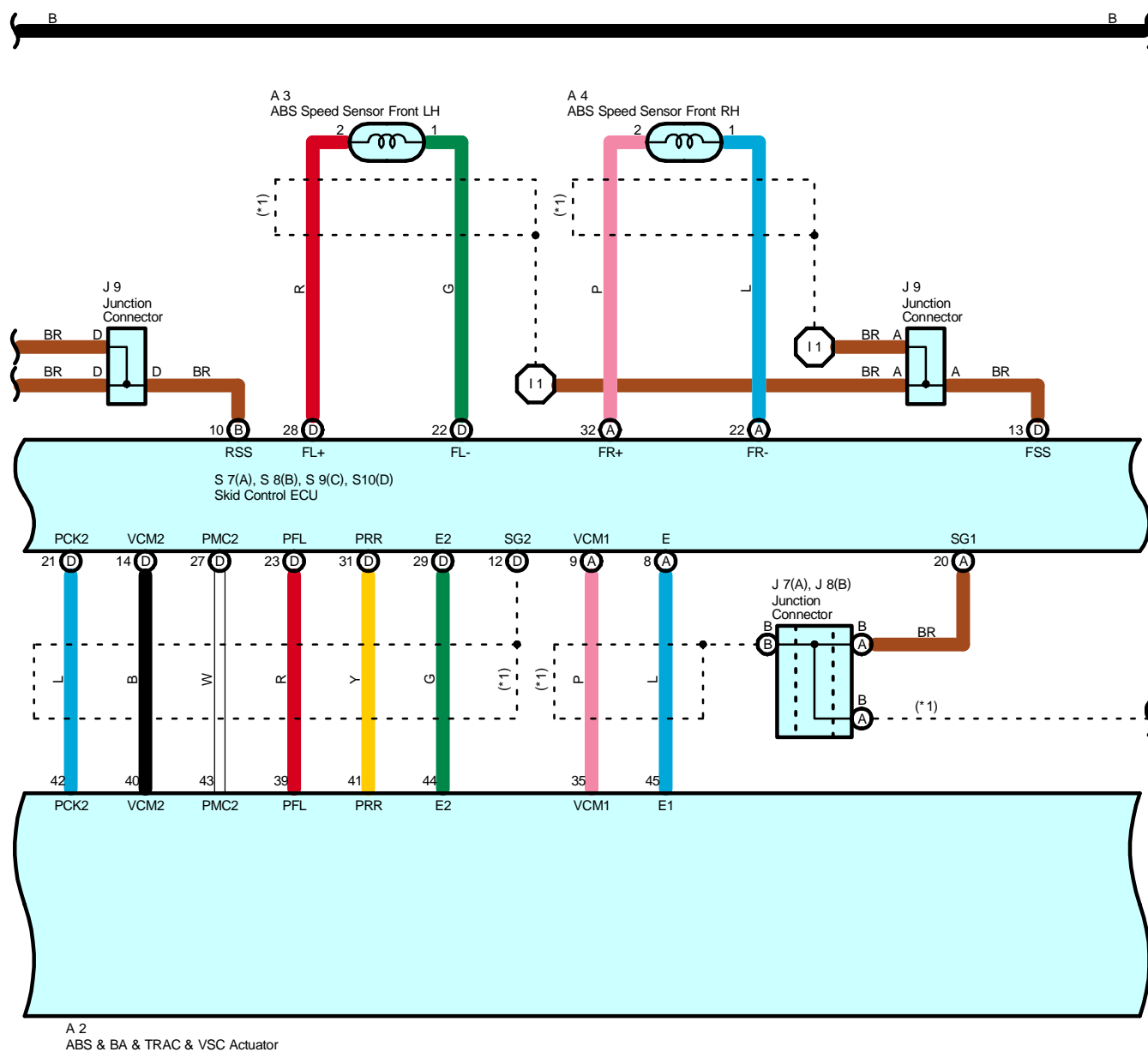




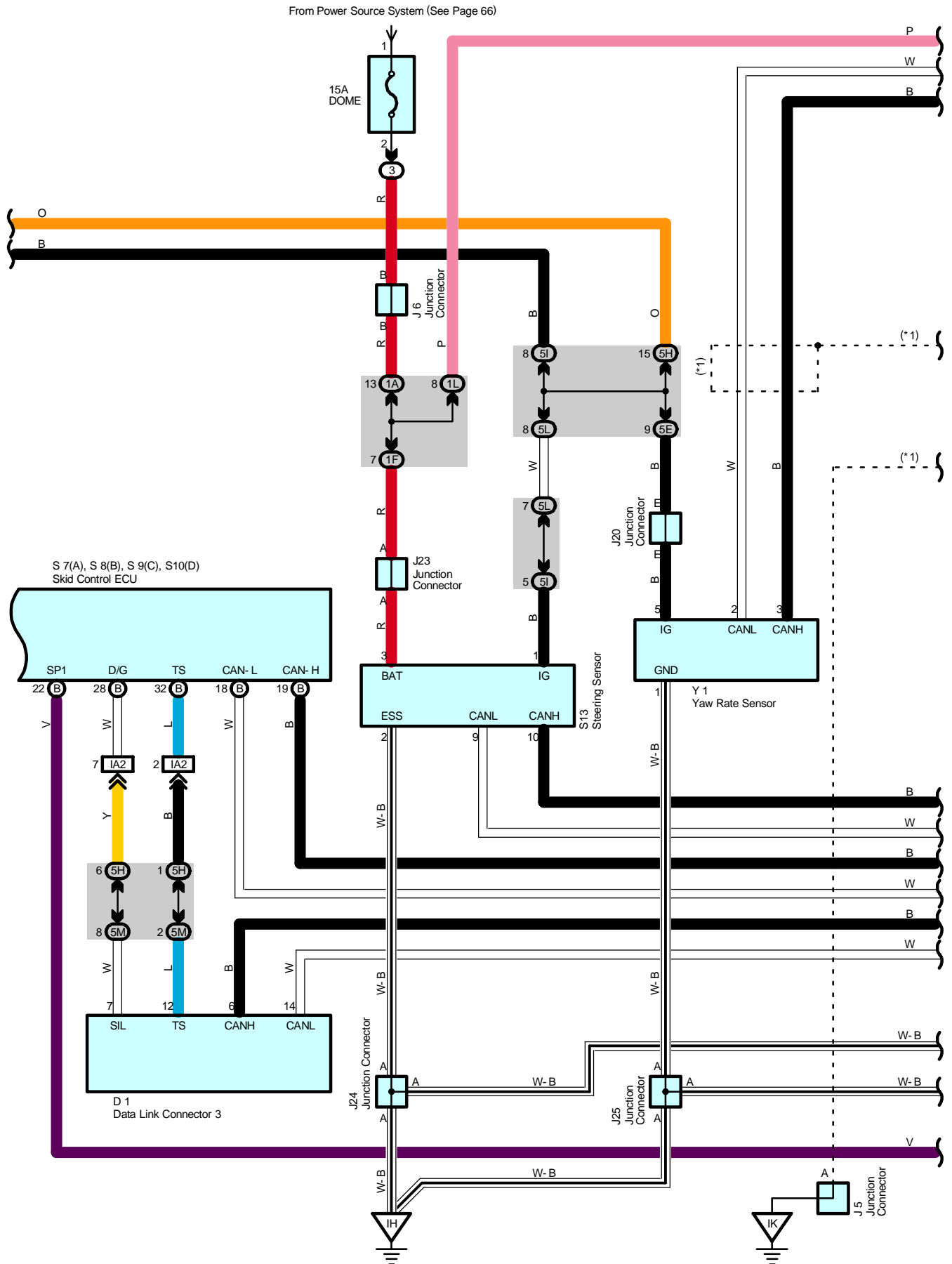
* 1 : Shielded

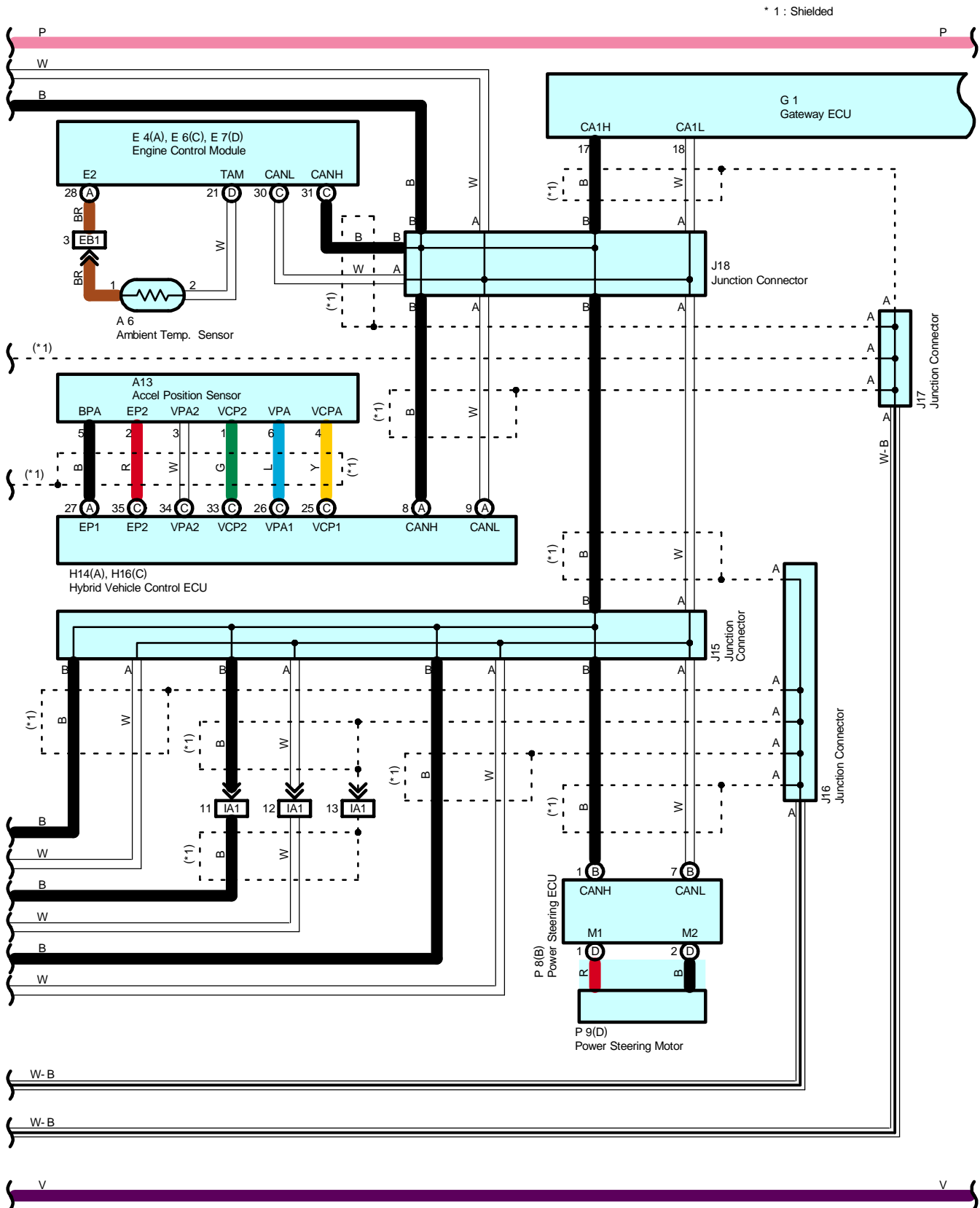


A 2
ABS & BA & TRAC & VSC Actuator

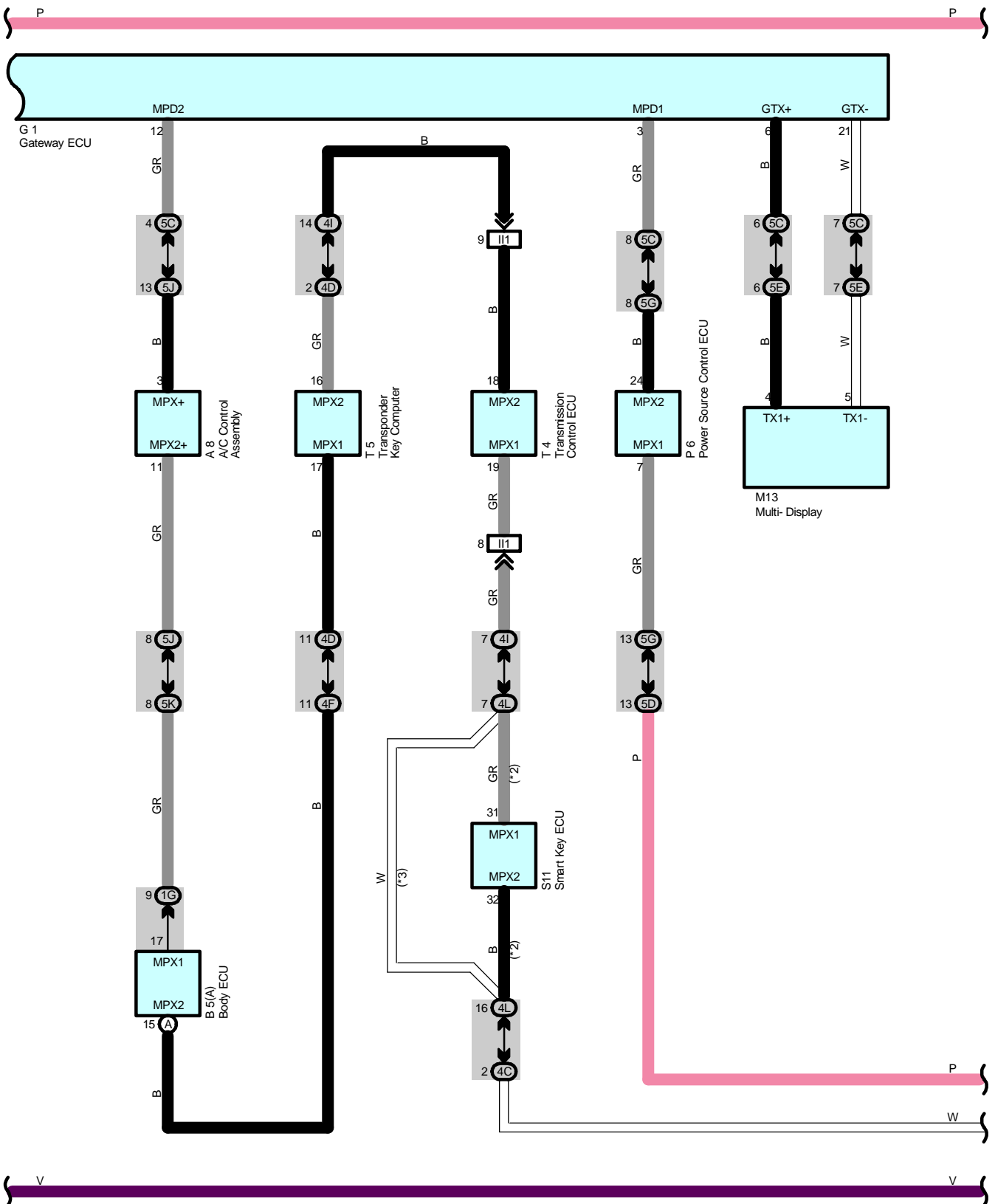








ABS and VSC



System Outline

1. ABS Operation

If the brake pedal is depressed suddenly, the ABS controls the hydraulic pressure of all the four wheel cylinders to automatically avoid wheel locking and to ensure the directional and steering stability of the vehicle. Under the situation, the skid control ECU controls the solenoids in the actuators, using the signals from the sensors to move the brake fluid to the reservoir in order to release the braking pressure applied to the wheel cylinder. If the skid control ECU detects that the fluid pressure in the wheel cylinder is insufficient, the ECU controls the solenoids in the actuators to increase the braking pressure.

2. Electronic Brake-Force Distribution

Skid control ECU distributes appropriate brake-force to front and rear wheels (Control of brake-force distribution to front and rear wheels) corresponding to the vehicle driving conditions. It also makes effective use of rear wheel brake-force to match loading condition and decelerating of the vehicle, resulting to reduce depressing of brake pedal and to ensure effective braking. In braking during making a turn, the ECU controls appropriate brake-force distribution to right and left wheels (Control of brake-force distribution to right and left wheels) to ensure stability and braking of the vehicle.

3. Brake Assist System

Skid control ECU recognizes emergency braking from detecting applying speed of brake pedal and brake travel, and controls braking effectiveness to supply strong brake-force for the emergency braking.

4. VSC Operation (w/ VSC)

Unexpected road conditions, emergency situation, and any other external factors may cause large under- or over-steering of the vehicle. If they occur, the VSC system automatically controls the driving power and wheel brakes to reduce the under- or over-steering.

To reduce large over-steering :

If the VSC system determines that the over-steering is large, it activates the brakes for the outer turning wheels depending on the degree of the over-steering to produce the moment toward the outside of the vehicle and reduce the over-steering.

To reduce large under-steering :

If the VSC system determines that the under-steering is large, it controls the driving power and activates the front wheel brakes and rear inner side wheel brake to reduce the under-steering.

If there is malfunction in the VSC system, the VSC indicator lights up to warn the driver.

5. Mutual System Control

Due to cooperative control with hybrid vehicle control ECU, skid control ECU controls hydraulic brake to collect much electrical energy by making the most use of regenerative brake.

Skid control ECU also improves stability of the vehicle, performing cooperative control with power steering ECU to give steering torque assistance, corresponding to driving conditions. (w/ VSC)

6. Electric Source Backup Function

Electric charge is stored in brake control power supply. If voltage of vehicle electricity is declined, electric charge is released to cover electric supply to the system.

7. Fail Safe Function

Skid control ECU monitors the system component parts electrically. In case there is abnormality in ECU, sensor signal and actuator, normal parts except parts with abnormality continue braking operation.

Even in case braking is shut off due to malfunction of oil pressure source, braking is secured as master cylinder pressure made by manpower works on wheel cylinder.

In case only regenerative brake is not effective due to abnormality in communication with hybrid vehicle control ECU, control will be changed to have oil pressure brake generate all the braking force

Service Hints

S7 (A), S8 (B), S9 (C), S10 (D) Skid Control ECU

(B) 3, (C) 5-Ground : Always approx. 12 volts

(B) 7, (D) 5-Ground : Approx. 12 volts with the power SW at IG ON position

(B)14-Ground : Approx. 12 volts with the brake pedal depressed

(A) 1, (B) 1, (B) 2, (C) 1, (C) 2, (D) 4-Ground : Always continuity

 : Parts Location

Code		See Page		Code		See Page		Code		See Page	
A2		44		E7	D	47		M13		48	
A3		44		G1		47		P2		49	
A4		44		H14	A	47		P6		49	
A6		44		H16	C	47		P8	B	49	
A8		46		J1		45		P9	D	49	
A13		46		J4		45		S2	A	45	
A25		50		J5		48		S3	B	45	
A26		50		J6		48		S6		49	
B1		44		J7	A	48		S7	A	49	
B5	A	46		J8	B	48		S8	B	49	
B8		46		J9		48		S9	C	49	
B17		44		J15		48		S10	D	49	
B18		50		J16		48		S11		49	
B19		46		J17		48		S13		49	
C10		47		J18		48		S16		49	
D1		47		J20		48		T4		49	
D7		50		J23		48		T5		49	
E4	A	47		J24		48		Y1		49	
E6	C	47		J25		48					

 : Relay Blocks

Code	See Page	Relay Blocks (Relay Block Location)
3	22	Engine Room R/B (Engine Compartment Left)

 : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	28	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
1D	28	Floor Wire and Driver Side J/B (Lower Finish Panel)
1F	28	Instrument Panel Wire and Driver Side J/B (Lower Finish Panel)
1G		
1L	29	
1M		
3C	23	Engine Room Main Wire and Engine Room J/B (Engine Compartment Left)
4C	36	Instrument Panel Wire and Center Connector No.1 (Behind the Combination Meter)
4D		
4F		
4H		
4I		
4L		
5C	40	Instrument Panel Wire and Center Connector No.2 (Instrument Panel Brace RH)
5D		
5E		
5G		
5H		
5I		
5J		
5K		
5L		
5M		

ABS and VSC

: Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EB1	54	Engine Wire and Engine Room Main Wire (Inside of the Engine Room R/B)
IA1	56	Engine Room Main Wire and Instrument Panel Wire (Upper Parts of Front Body Pillar LH)
IA2		
IF1	56	Floor Wire and Engine Room Main Wire (Left Kick Panel)
IG1	58	Instrument Panel Wire and Instrument Panel No.2 Wire (Behind the Combination Meter)
IG2		
II1	58	Engine Wire and Instrument Panel Wire (Behind the Glove Box)
IK1	58	Engine Room Main Wire and Floor No.2 Wire (Cowl Side Panel RH)
IM1	58	Instrument Panel Wire and Floor No.2 Wire (Right Kick Panel)
IN1	58	Floor No.2 Wire and Engine Room Main Wire (Right Kick Panel)
IP1	58	Engine Room No.2 Wire and Engine Room Main Wire (Upper Parts of Front Body Pillar LH)
BD1	60	Skid Control Sensor No.1 Wire and Floor Wire (Front Side of Left Quarter Panel)
BL1	62	Skid Control Sensor No.2 Wire and Floor No.2 Wire (Front Side of Right Quarter Panel)

: Ground Points

Code	See Page	Ground Points Location
EA	54	Right Side of the Fender Apron
EE	54	Left Side of the Suspension Tower
EF		
IH	56	Cowl Side Panel LH
II	56	Instrument Panel Brace LH
IK	56	Cowl Side Panel RH
BQ	60	Rear Side of Right Quarter Panel

: Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E1	54	Engine Room Main Wire	I1	58	Instrument Panel Wire
E3					