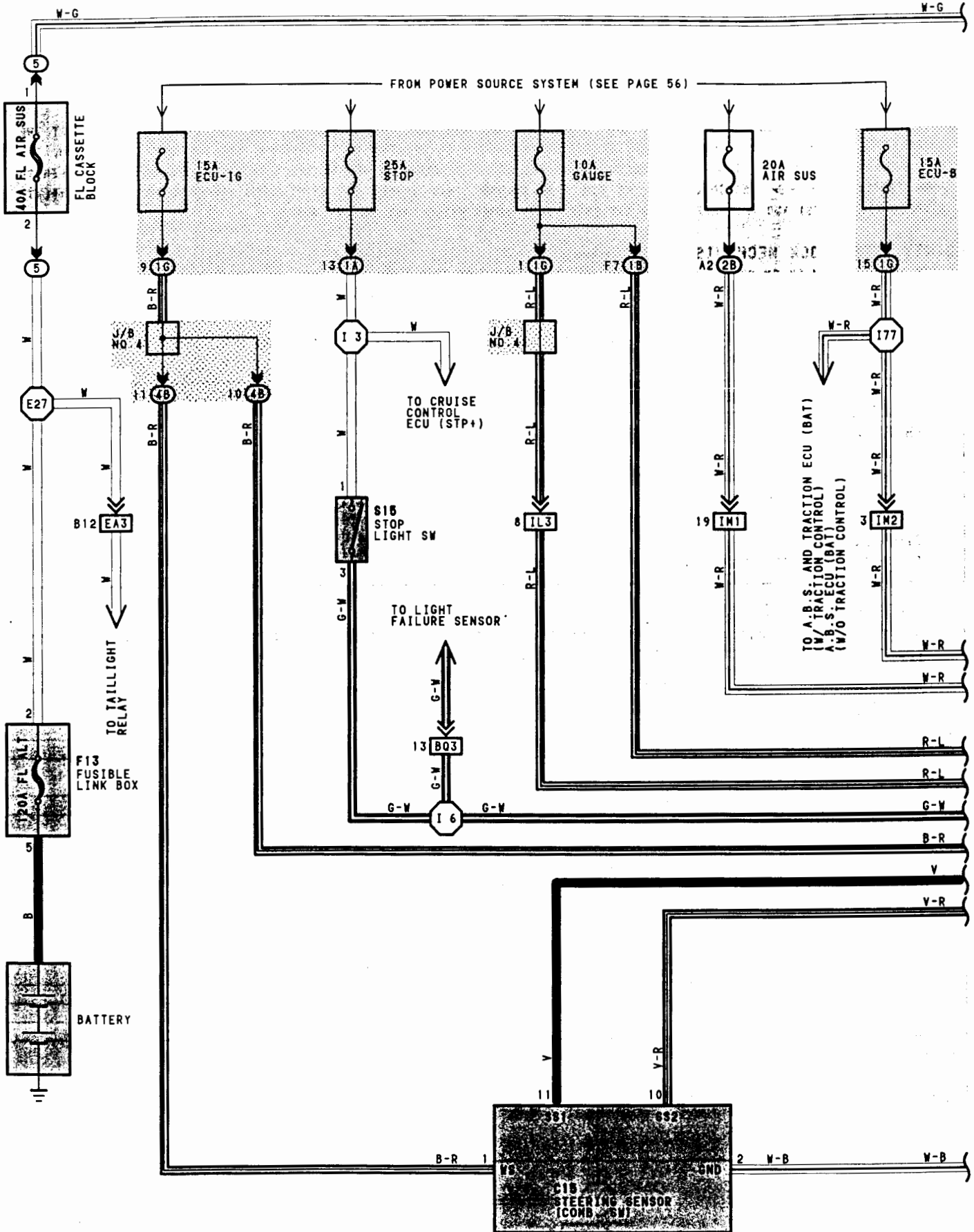
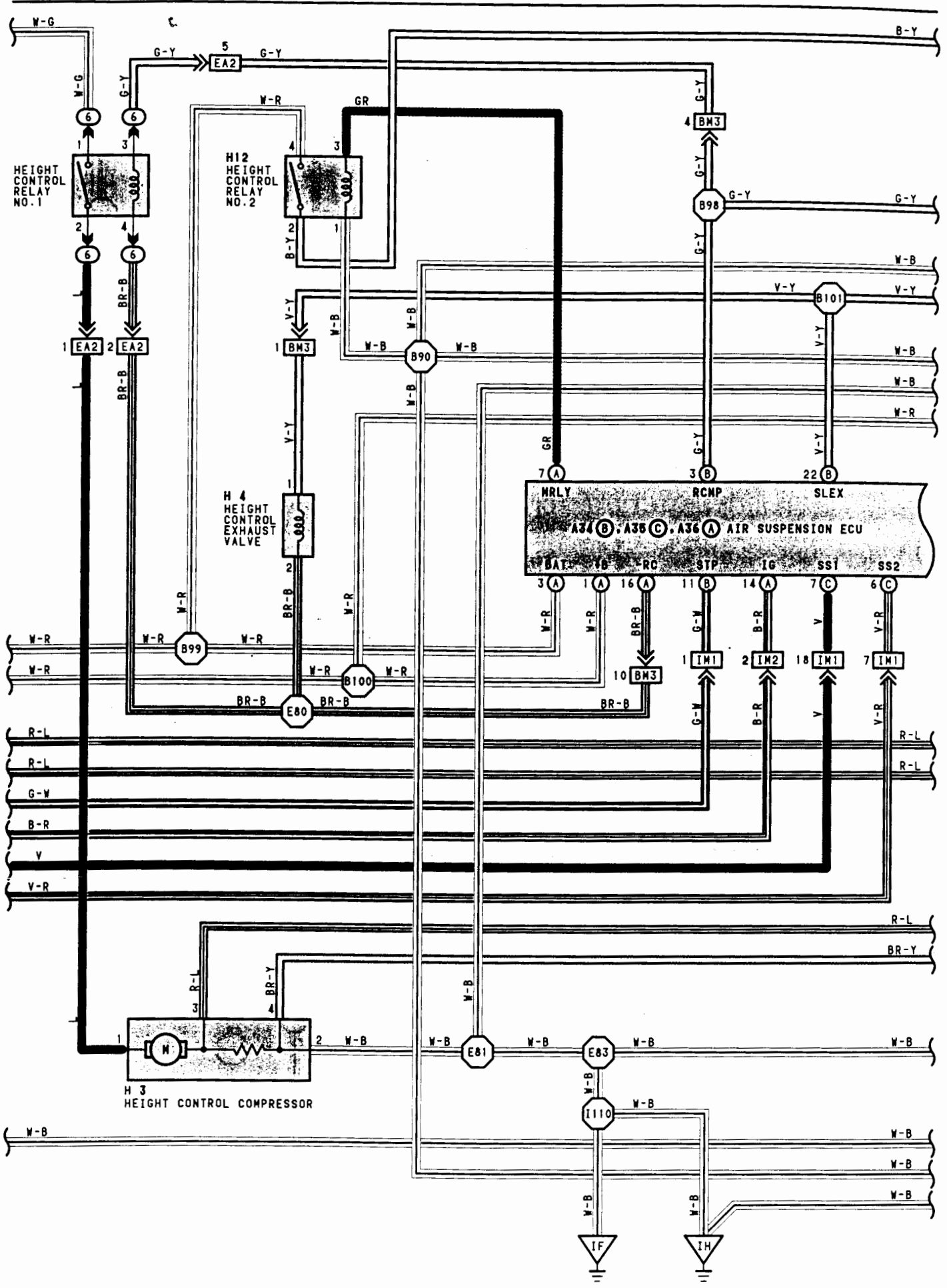
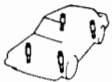




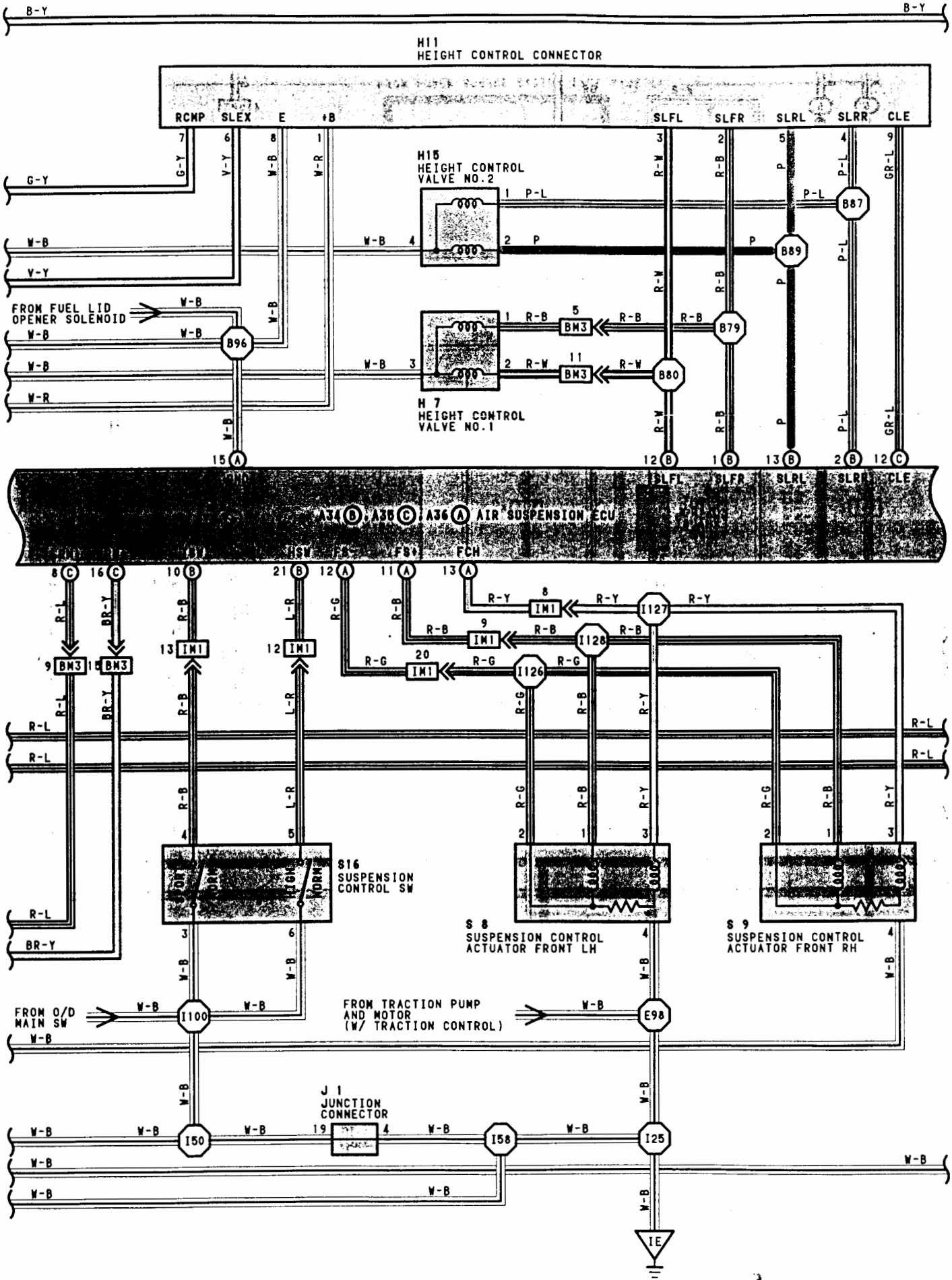
# ELECTRONIC MODULATED AIR SUSPENSION

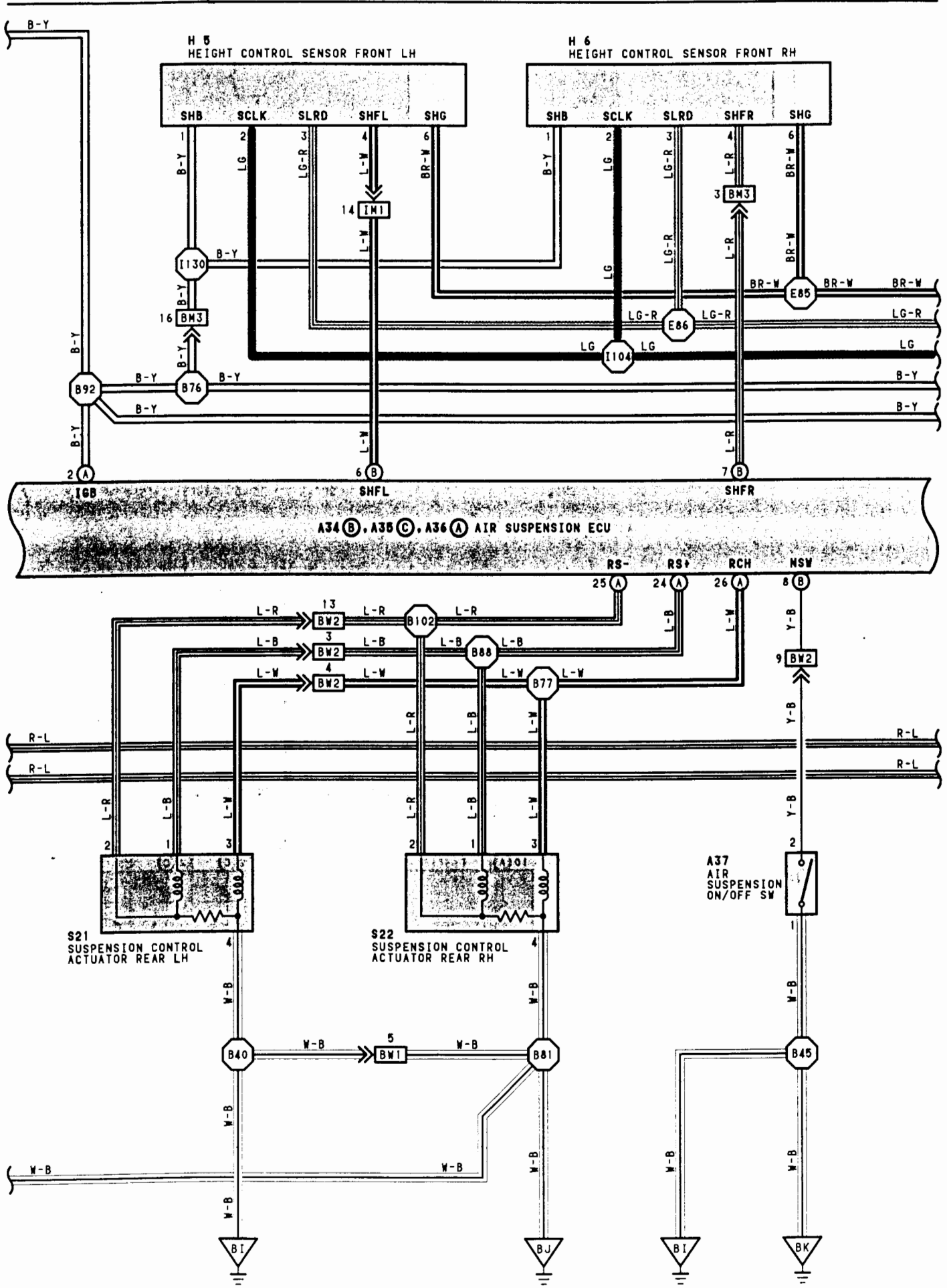






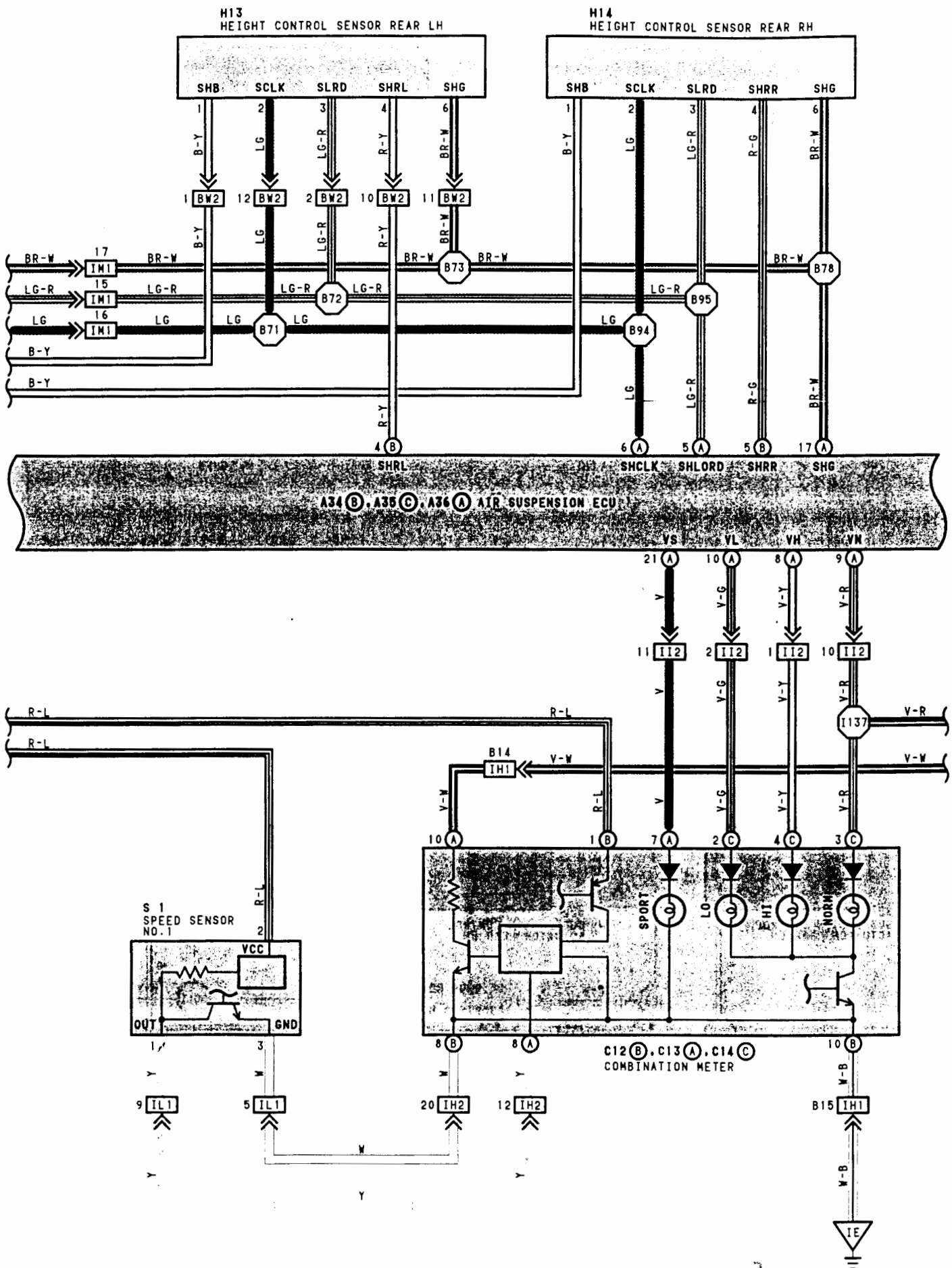
# ELECTRONIC MODULATED AIR SUSPENSION

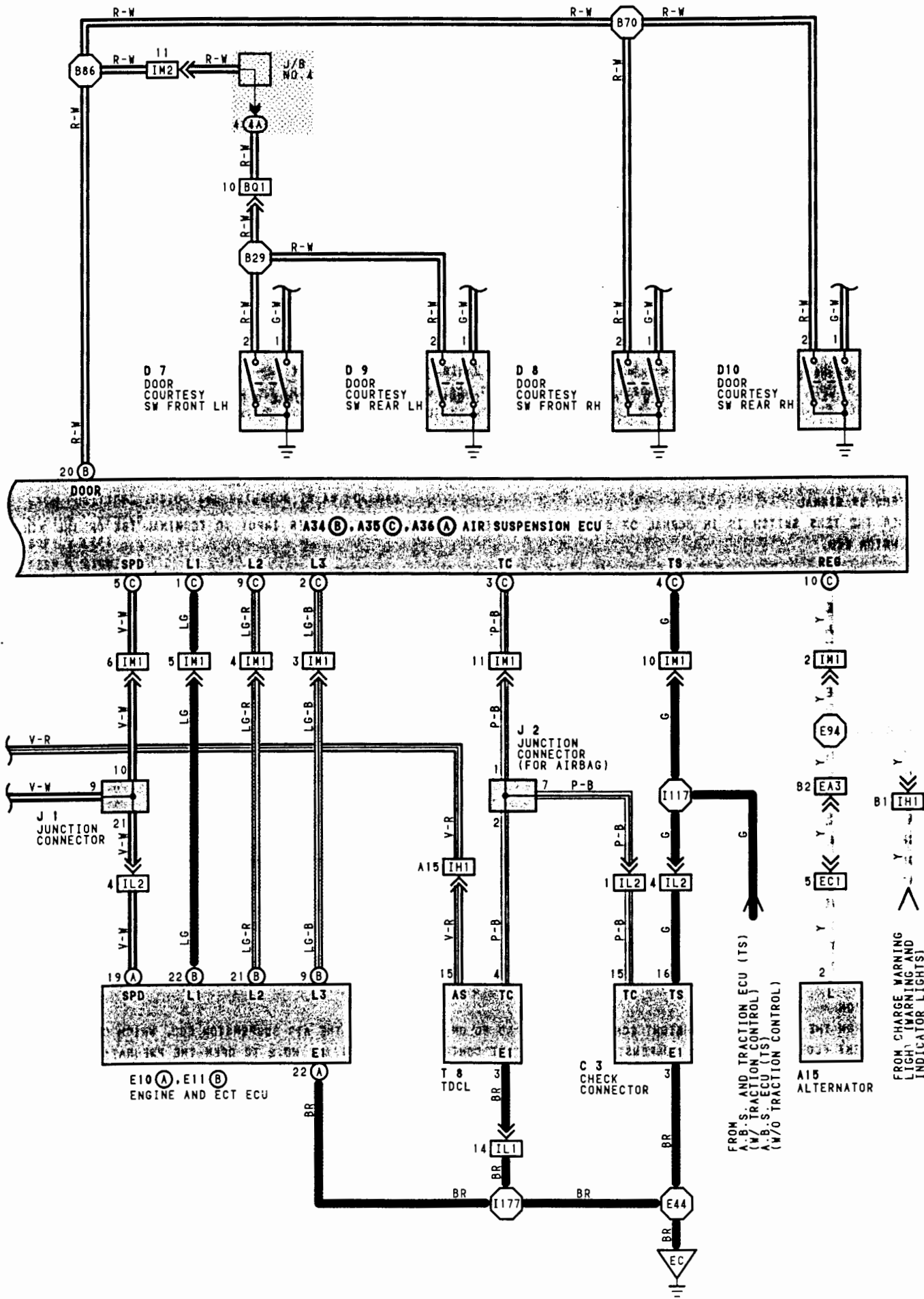






# ELECTRONIC MODULATED AIR SUSPENSION







# ELECTRONIC MODULATED AIR SUSPENSION

## SYSTEM OUTLINE

THIS SYSTEM CONSISTS OF A PNEUMATIC CYLINDER WHICH HAS PRESSURED AIR IN AN AIR CHAMBER AND AN ECU WHICH AUTOMATICALLY SWITCHES THE SPRING RATE AND VEHICLE HEIGHT BETWEEN THREE RANGES (LOW, NORMAL AND HIGH) ACCORDING TO THE DRIVING CONDITIONS AND ALSO TWO (2) MODES (NORMAL AND HIGH) WHICH THE DRIVER CAN CHOOSE FROM ACCORDING TO PREFERENCE. ALSO, THE DAMPING FORCE OF THE SHOCK ABSORBER IS AUTOMATICALLY SWITCHED BY THE ECU BETWEEN THREE LEVELS (SOFT, MEDIUM AND FIRM) AND THE DRIVER CAN CHOOSE ONE OF TWO (2) MODES (NORMAL, SPORT) ACCORDING TO PREFERENCE. COMBINED CONTROL OF THE SPRING RATE, VEHICLE HEIGHT AND DAMPING FORCE SUPPRESSES CHANGES IN THE VEHICLE'S ATTITUDE SUCH AS ROLL, NOSE DIVE AND SQUAT TO PROVIDE OUTSTANDING RIDING COMFORT AND CONTROLLABILITY.

## 1. INPUT SIGNALS

### (1) STEERING SENSOR SIGNAL

THE ROTATION SPEED AND ROTATION ANGLE OF THE STEERING WHEEL ARE INPUT TO TERMINAL SS1 AND SS2 OF AIR SUSPENSION ECU.

### (2) THROTTLE POSITION SENSOR SIGNAL

THE THROTTLE VALVE OPENING ANGLE IS DETECTED AND THE SIGNAL IS INPUT TO TERMINALS L1, L2 AND L3 OF THE AIR SUSPENSION ECU VIA THE ENGINE AND ECT ECU.

### (3) SPEED SENSOR SIGNAL

THE VEHICLE SPEED IS DETECTED BY SPEED SENSOR NO.1 AND THE SIGNAL IS INPUT TO TERMINAL SPD OF THE AIR-SUSPENSION ECU.

### (4) STOP LIGHT SW SIGNAL

THE BRAKE OPERATION SIGNAL IS DETECTED AND A SIGNAL IS INPUT TO TERMINAL STP OF AIR SUSPENSION ECU.

### (5) TEMS SW SIGNAL

WHETHER THE TEMS SWITCH IS IN NORMAL OR SPORT MODE IS DETECTED AND THE SIGNAL IS INPUT TO TERMINAL TSW OF THE AIR SUSPENSION ECU.

### (6) HEIGHT SW SIGNAL

WHETHER THE HEIGHT SWITCH IS IN NORMAL OR HIGH MODE IS DETECTED AND THE SIGNAL IS INPUT TO TERMINAL HSW OF THE AIR SUSPENSION ECU.

### (7) HEIGHT CONTROL SENSOR SIGNAL

THE VEHICLE HEIGHT AND THE DIFFERENT LEVELS OF THE ROAD SURFACE ARE DETECTED BY THE HEIGHT CONTROL SENSOR AND THE SIGNAL IS INPUT TO TERMINALS SHFL, SHFR, SHRL AND SHRR OF THE AIR SUSPENSION ECU.

### (8) DOOR COURTESY SW SIGNAL

WHETHER THE DOOR IS OPEN OR CLOSED IS DETECTED AND INPUT TO THE AIR SUSPENSION ECU.

## 2. AIR SUSPENSION OPERATION

### •HIGH POSITION

SIGNALS FROM THE SPEED SENSOR, HEIGHT CONTROL SENSOR AND SO ON ARE INPUT TO THE AIR SUSPENSION ECU, WHICH OPERATES SO THAT THE CURRENT FLOWS FROM THE AIR SUSPENSION ECU TO HEIGHT CONTROL VALVE NO.1 AND NO.2 TO OPEN THE PNEUMATIC CYLINDER VALVE.

AS A RESULT, THE PASSAGE IS OPENED AS FAR AS THE HEIGHT CONTROL DRYER. THEN, THE CURRENT FLOWING TO THE HEIGHT CONTROL RELAY FLOWS TO THE HEIGHT CONTROL COMPRESSOR. CONTROL OF THIS CURRENT BY THE AIR SUSPENSION ECU CAUSES THE COMPRESSOR TO OPERATE AND AIR FLOWS INTO THE PNEUMATIC CYLINDER TO RAISE THE VEHICLE HEIGHT.

### •LOW POSITION

SIGNALS FROM THE SPEED SENSOR, HEIGHT CONTROL SENSOR AND SO ON ARE INPUT TO THE AIR SUSPENSION ECU, WHICH OPERATES SO THAT CURRENT FLOWS FROM THE AIR SUSPENSION ECU TO HEIGHT CONTROL VALVE NO.1 AND NO.2 TO OPEN THE PNEUMATIC CYLINDER VALVE.

AS A RESULT, THE PASSAGE IS OPENED AS FAR AS THE HEIGHT CONTROL DRYER. THEN, THE CURRENT FLOWS TO THE HEIGHT CONTROL EXHAUST VALVE INSTALLED IN THE HEIGHT CONTROL DRYER. CONTROL OF THIS CURRENT BY THE AIR SUSPENSION ECU CAUSES THE VALVE TO OPEN SO THAT THE AIR INSIDE THE PNEUMATIC CYLINDER IS EXPELLER AND THE VEHICLE HEIGHT IS LOWERED.

### 3. BASIC OPERATION OF SUSPENSION CONTROL ACTUATOR (LRC (LEXUS RIDE CONTROL) OPERATION)

#### (1) FROM SOFT OR MEDIUM TO FIRM POSITION

THE CURRENT FLOWS FROM TERMINAL FS+ AND RS+ OF AIR SUSPENSION ECU → TERMINAL 1 OF EACH ACTUATOR → TERMINAL 2 → TERMINAL FS- AND RS- OF ECU → GROUND. CAUSING THE MOTOR INSIDE THE ACTUATOR TO ROTATE, AND SWITCH THE ROTARY VALVE CONTROL ROD OF THE SHOCK ABSORBER TO THE FIRM POSITION. AT THIS TIME, THE ROTARY VALVE CONTROL ROD AND AIR VALVE CONTROL ROD INSIDE THE SUSPENSION CONTROL ACTUATOR ARE LINKED BY A GEAR SO THAT THE AIR VALVE CONTROL ROD ALSO ROTATES AND THE AIR VALVE CLOSES. CAUSING THE SPRING RATE TO CHANGE TO FIRM POSITION

#### (2) FROM SOFT OR FIRM TO MEDIUM POSITION

CURRENT FLOWS FROM TERMINAL FCH AND RCH OF AIR SUSPENSION ECU → TERMINAL 3 OF EACH ACTUATOR → TERMINAL 4 → GROUND. SWITCHING THE ROTARY VALVE CONTROL ROD OF THE SHOCK ABSORBER TO THE MEDIUM POSITION. THE AIR VALVE CONTROL ROD ROTATES AT THIS TIME BUT THE SPRING RATE REMAINS IN THE FIRM POSITION BECAUSE OF THE AIR VALVE IS ALSO CLOSED WHEN THE ROTARY VALVE CONTROL ROD IS IN MEDIUM POSITION.

#### (3) FROM FIRM OR MEDIUM TO SOFT POSITION

THE CURRENT FLOWS IN REVERSE TO (1) ABOVE AND THE CURRENT FLOWS FROM TERMINAL FS- AND RS- OF AIR SUSPENSION ECU → TERMINAL 2 OF EACH ACTUATOR → TERMINAL 1 → TERMINAL FM+ AND RM+ OF ECU → GROUND. CAUSING THE MOTOR IN THE ACTUATOR TO ROTATE. AS A RESULT, THE ROTARY VALVE CONTROL ROD OF THE SHOCK ABSORBER IS SWITCHED TO SOFT POSITION. AT THIS TIME, THE AIR VALVE CONTROL ROD IS ROTATED TO OPEN THE AIR VALVE AND THE SPRING RATE IS SET TO THE SOFT POSITION BECAUSE THE AIR PASSAGE BETWEEN THE MAIN AIR CHAMBER AND SUB AIR CHAMBER IN THE PNEUMATIC CYLINDER IS OPENED.

EACH POSITIONS INSIDE THE ACTUATOR IS AS FOLLOWS:

MIDIUM : CENTER

SOFT : LEFT

FIRM : RIGHT

TO SWITCH TO EACH POSITION, THE CURRENT FLOWS AS DESCRIBED ABOVE. BASED ON THE ABOVE MOVEMENT, THE AIR SUSPENSION ECU OPERATES AND CONTROLS THE ACTUATOR ACCORDING TO THE INPUT SIGNALS.





# ELECTRONIC MODULATED AIR SUSPENSION

## ○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
A15	24	D10	28	H15	28
A34	B 28	E10	B 26	J 1	27
A35	C 28	E11	A 26	J 2	27
A36	A 28	F13	24	S 1	25
A37	28	H 3	24	S 8	25
C 3	24	H 4	24	S 9	25
C12	B 26	H 5	24	S15	27
C13	A 26	H 6	24	S16	27
C14	C 26	H 7	24	S21	29
C15	26	H11	28	S22	29
D 7	28	H12	28	T 8	27
D 8	28	H13	28		
D 9	28	H14	28		

## ○ : RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
5	20	R/B NO.5 (NEAR THE J/B NO.2)
6	17	R/B NO.6 (UNDER THE HEADLIGHT LH)

## ○ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1A	18	COWL WIRE AND J/B NO.1 (LEFT SIDE OF STEERING COLUMN TUBE)
1B	18	INSTRUMENT PANEL WIRE AND J/B NO.1 (LEFT SIDE OF STEERING COLUMN TUBE)
1G	18	COWL WIRE AND J/B NO.1 (LEFT SIDE OF STEERING COLUMN TUBE)
2B	20	COWL WIRE AND J/B NO.2 (ENGINE COMPARTMENT LEFT)
4A	23	COWL WIRE AND J/B NO.4 (BEHIND THE COMBINATION METER)
4B		

## □ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

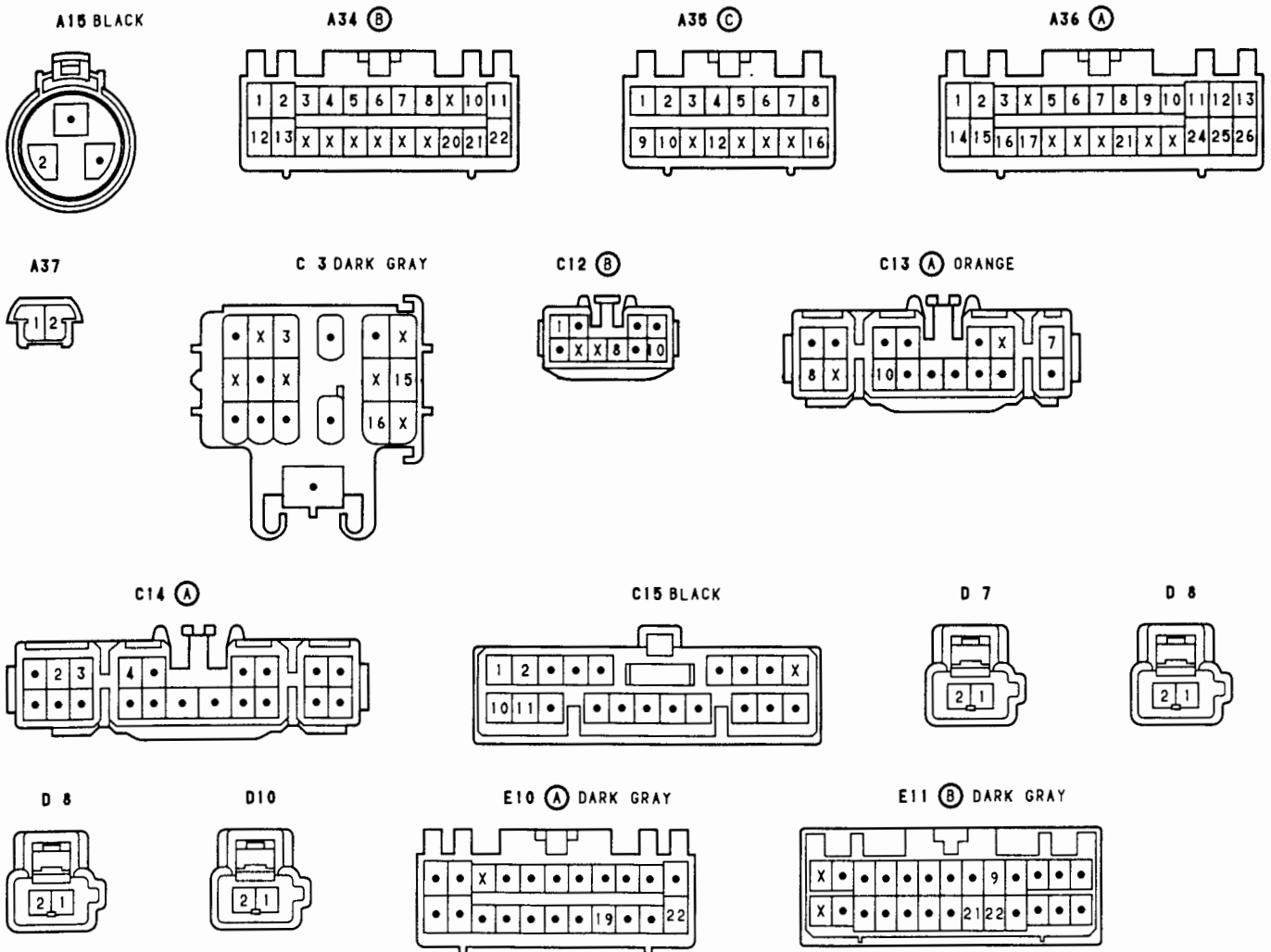
CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EA2	32	COWL WIRE AND ENGINE ROOM MAIN WIRE (FRONT SIDE OF RIGHT FENDER)
EA3	32	COWL WIRE AND ENGINE ROOM MAIN WIRE (INSIDE OF J/B NO.2)
EC1	32	ENGINE NO.4 WIRE, FOR ALTERNATOR AND ENGINE ROOM MAIN WIRE (RIGHT SIDE OF J/B NO.2)
IH1	34	INSTRUMENT PANEL WIRE AND COWL WIRE (J/B NO.1)
IH2	34	INSTRUMENT PANEL WIRE AND COWL WIRE (BEHIND GLOVE BOX)
II2	34	INSTRUMENT PANEL WIRE AND FLOOR NO.1 WIRE (UNDER THE INSTRUMENT PANEL BRACE RH)
IL1	36	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IL2		
IL3		
IM1	36	FLOOR NO.1 WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IM2		
BM3	38	COWL WIRE AND FLOOR NO.1 WIRE (RIGHT KICK PANEL)
BQ1	38	COWL WIRE AND FLOOR NO.2 WIRE (LEFT KICK PANEL)
BQ3		
BW1	38	FLOOR NO.1 WIRE AND FLOOR NO.2 WIRE (UNDER THE LEFT SIDE OF REAR SEAT CUSHION)
BW2		

## ▽ : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EC	32	REAR SIDE OF CYLINDER HEAD RH
IE	34	LEFT KICK PANEL
IF	34	INSTRUMENT PANEL BRACE LH
IH	34	RIGHT KICK PANEL
BI	38	UNDER THE LEFT REAR PILLAR
BJ	38	UNDER THE RIGHT REAR PILLAR
BK	38	BACK PANEL RIGHT

○ : SPLICE POINTS

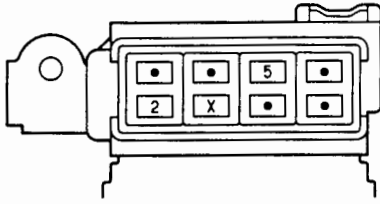
CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 27	32	ENGINE ROOM MAIN WIRE	B 40	38	FLOOR NO.2 WIRE
E 44	32	ENGINE WIRE	B 45		
E 80	32	COWL WIRE	B 70	38	FLOOR NO.1 WIRE
E 81			B 71		
E 83			B 72		
E 85			B 73		
E 86			B 76		
E 94			B 77		
E 98			B 78		
I 3			B 79		
I 6			B 80		
I 25			B 81		
I 50			B 86		
I 58			B 87		
I 77			B 88		
I100			B 89		
I104	B 90				
I110	B 92				
I117	B 94				
I126	B 95				
I127	B 96				
I128	B 98				
I130	B 99				
I137	36	INSTRUMENT PANEL WIRE	B100	38	FLOOR NO.2 WIRE
I177	36	ENGINE WIRE	B101		
B 29	38	FLOOR NO.2 WIRE	B102		



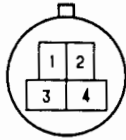


# ELECTRONIC MODULATED AIR SUSPENSION

F13



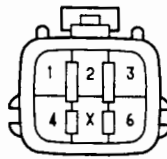
H 3 GRAY



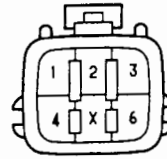
H 4 GRAY



H 5 GRAY



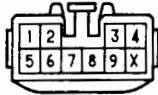
H 6 GRAY



H 7 GRAY



H11



H12



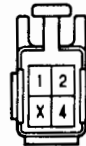
H13 GRAY



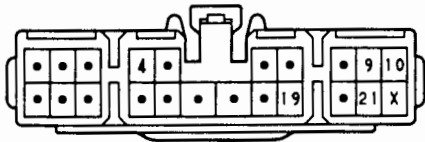
H14 GRAY



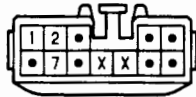
H15 GRAY



J 1



J 2



S 1 GRAY



S 8



S 9



S15



S16



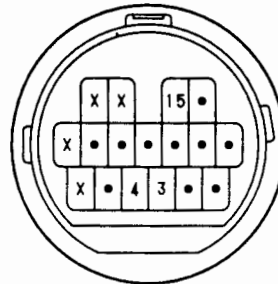
S21



S22



T 8 DARK GRAY



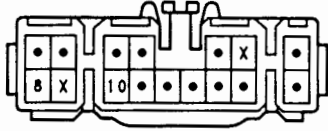
# PPS (PROGRESSIVE POWER STEERING)



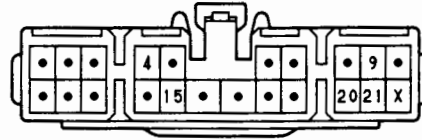
C12 (A)



C13 (B) ORANGE



J 1



P 1 GRAY



P 2



S 1 GRAY

