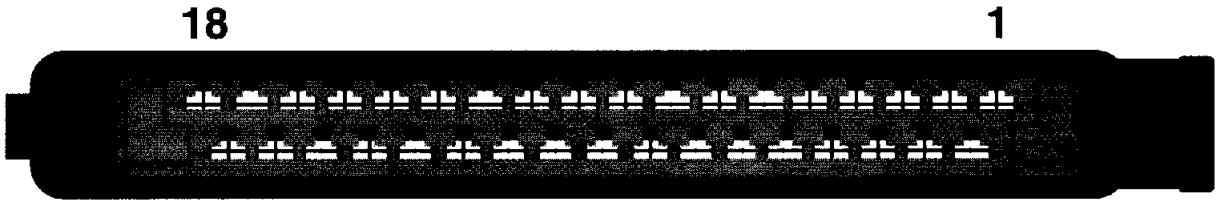
MODEL :	535iA, 635csiA, 735iA
YEAR (S) :	1986 - 88 535iA, 1986 - 89 635CSiA, 1986 -87 735iA
TYPE SYSTEM :	ZF Early E - 7 Version
ECU LOCATION (S):	UNDER DASH DRIVER'S SIDE "A" PILLAR

ECU PLUG REFERENCE



35 POSITION ECU PLUG

CONTROL UNIT PIN TERMINAL IDENTIFICATION

1 - Solenoid Valve Power
2 - Kickdown Switch
3 - NO CONNECTION
4 - Shift Lever Position "Neutral"
5 - Ground
6 - Throttle Potentiometer Ground
7 - Throttle Potentiometer Signal
8 - Road Speed Sensor
9 - Throttle Potentiometer Supply
10 - Coding
11 - Injection Open Time "Ti" Milliseconds
12 - NO CONNECTION
13 - NO CONNECTION
14 - Program Switch
15 - Program Switch
16 - Solenoid Valve "MV1"
17 - Solenoid Valve "MV2"
18 - Shift Lever Position "1st Gear"
19 - Ground
20 - Solenoid Valve "MV4" Reverse
21 - Engine Speed Signal "TD"
22 - Solenoid Valve "MV5" Pressure Regulator
23 - Road Speed Sensor Shield
24 - Timing Retard Torque Reduction
25 - Lock up Solenoid "MV3"
26 - Coding
27 - Road Speed Sensor
28 - Shift Lever Position "2nd Gear"
29 - Shift Lever Position "3rd Gear"
30 - Shift Lever Position "Drive"
31 - Wide Open Throttle "VL Signal
32 - NO CONNECTION
33 - Fault Lamp
34 - NO CONNECTION
35 - Ignition Switch

NOTES:

1. EML means the car has a electronic management logic unit which controls the drive by wire throttle position sensor.

2. The data makes use of the symbols < & >. Symbol < means less than and symbol > means greater than.

3. MV refers to the solenoid valves which control the shifting of the gears.

BMW 535-635-735 models - 1986 thru 1989 transmission pinout specifications - ZF 4HP 22 - E7 voltages, grounds and continuities E32 E34

TRANSMISSION CONTROL TEST MEASUREMENTS

MANUFACTURER	BMW
MODEL (S)	535iA, 635CSiA, 735iA
YEAR (S)	1986 - 88 (535iA), 1986 - 89 635CSiA, & 1986 - 87 (735iA)
TYPE SYSTEM	ZF Early E - 7

TECHNICAL DATA

GROUNDS

Key OFF (ECU disconnected)		Ohms
(Pin 5	to G1)	CONTINUITY
(Pin 19	to G1)	CONTINUITY
(Pin 6	to G 1)	ECU connected CONTINUITY
(Pin	to)	
(Pin	to)	
(Pin	to)	
(Pin	to)	
(Pin	to)	

GROUNDS

Ignition Key	OFF	ON	Volts
(Pin 5 to G1)	√		0.0
(Pin 19 to G1)	√		0.0
(Pin 6 to G1)	√		0.0
(Pin 5 to G1)		√	0.0 - 0.1
(Pin 19 to G1)		√	0.0 - 0.1
(Pin 6 to G1)		√	0.0 - 0.1
(Pin to)			
(Pin to)			

BATTERY SUPPLY

Ignition Key	OFF	ON	Volts
(Pin 35 to 5)	√		0.0
(Pin 35 to 19)	√		0.0
(Pin 35 to 6)	√		0.0
(Pin 35 to 5)		√	> 10
(Pin 35 to 19)		√	> 10
(Pin 35 to 6)		√	> 10
(Pin to)			

SHIFT LEVER RANGE SELECTOR

Position	N	P	D	1	2	3	R	Volts
(Pin 4 to 5)	√							> 10
(Pin 30 to 5)			√					> 10
(Pin 29 to 5)						√		> 10
(Pin 28 to 5)					√			> 10
(Pin 18 to 5)				√				> 10
All Positions when not selected								< 1

TECHNICAL DATA

PROGRAM SWITCH

Switch Position	Volts
Economy (Pin 14 to 5) "E"	< 1
Economy (Pin to)	
Economy (Pin to)	
Sport (Pin 14 to 5) "S"	> 5
Sport (Pin 15 to 5) "S"	>10
Sport (Pin to)	
"321" (Pin 15 to 5)	< 1
Manual(Pin to)	
Manual(Pin to)	
Manual(Pin to)	

KICKDOWN SWITCH

Position	Volts
95% Travel (Pin 2 to 5)	4.5 - 5.5
100% Travel (Pin 2 to 5)	0.0 - 1.0

THROTTLE POTENTIOMETER

Position (non EML Vehicles)	Volts
Supply (Pin 9 to 6)	4.5 - 5.5
Idle (Pin 7 to 6)	0.0 -1.0
Full load (Pin 7 to 6)	4.5 - 5.5

SHIFT SOLENOID ACTIVATION

Gear	1st	2nd	3rd	4th	Volts
(Pin 16 to 5)	< 1	>10	>10	<1	√
(Pin 17 to 5)	< 1	< 1	>10	>10	√

LOCK UP SOLENOID ACTIVATION

Speed (mph)		Volts
Less than 55 1st,2nd,3rd	(Pin 25 to 5)	>10
More than 55 4th	(Pin 25 to 5)	< 1

TRANSMISSION CONTROL TEST MEASUREMENTS

TECHNICAL DATA

FAULT LAMP FUNCTION

Ignition ON		Volts
(Pin 35 to 5)		>10
(Pin 33 to 5)		>10
Engine		**Volts**
Idle (Pin 33to 5)	**Fault Lamp Off**	<1
Idle (Pin 1 to 5)		>10

PRESSURE REGULATOR

Engine Idling (Lift rear wheels)

Program Switch "Economy" & "Select Drive"

	Volts	Frequency
(Pin 22 to 5)	8.5 - 10.5	6000 - 8000 Hz

Shift Firmness Jump (Pin 22 to 19)

Accelerate slowly through all upshifts

Shift action **"SOFT"**

Jump (Pin 22 to 35)

Accelerate slowly through all upshifts

Shift action **"HARD"**

TD/TR SIGNAL

Engine Idling @ 800rpm	Hertz
(Pin 21to 5)	35 - 45
Engine @ 2000rpm	**Hertz**
(Pin 21to 5)	100 - 110

Ti SIGNAL

Engine Idling @ 800rpm	AC Volts
(Pin 11 to 5)	0.8 - 1.2
Engine @ 3000rpm	**AC Volts**
(Pin 11 to 5)	2.8 - 3.2

TIMING RETARD/TORQUE REDUCTION

Engine running (Lift rear wheels)	Volts
Select "Drive" (Depress Accel. to 50%)	
(Pin 24 to 5)*	> 4

Slowly accelerate engine , during each gear shift a slight voltage drop occurs, then returns to more than 4 volts DC.

WOT/VL SIGNAL

Ignition ON - Engine OFF	Volts
Accelerator Pedal	
Released (Pin31 to 5)	4.5 - 5.5
Fully Depressed (Pin 31 to 5)	<1

TECHNICAL DATA

CODING

Model	Volts
535iA (Pin 10 to 5)	> 3
535iA (Pin 26 to 5)	> 3
635 CSiA (Pin 10 to 5)	< 1
635 CSiA (Pin 26 to 5)	> 3
735iA (Pin 10 to 5)	> 3
735iA (Pin 26to 5)	< 1

ROAD SPEED SIGNAL SHIELD

Ignition OFF TCU Disconnected	Ohms
(Pin 27 to 8)	900 - 1300
(Pin 23 to 27)	>10K
(Pin 23 to 5)	0

ROAD SPEED SIGNAL

Speed (rpm) Rear wheels lifted	A/C Volts
Idle (In Drive) (Pin 8 to 27)	2.5 - 3.5
More than 3000 (In Drive) (Pin 8 to 27)	>10

REVERSE GEAR LOCKOUT SOLENOID ACTIVATION

Speed (mph)		Volts
Stopped	(Pin 20to 5)	>10
Stopped	(Pin to)	
More than 3	(Pin 20to 5)	< 1
More than 3	(Pin to)	

SOLENOID VALVES

Winding TCU disconnected		Ohms
(Pin 1 to 16)	MV1	30 - 35
(Pin 1 to 17)	MV2	30 - 35
(Pin 1 to 20)	MV3	30 - 35
(Pin 1 to 25)	MV4	30 - 35
(Pin 1 to 22)	MV5	5 - 7

*Digital Meter with Trend bar graph will make it easier to see the voltage change.

INPUT/OUTPUT CIRCUIT DIAGRAM