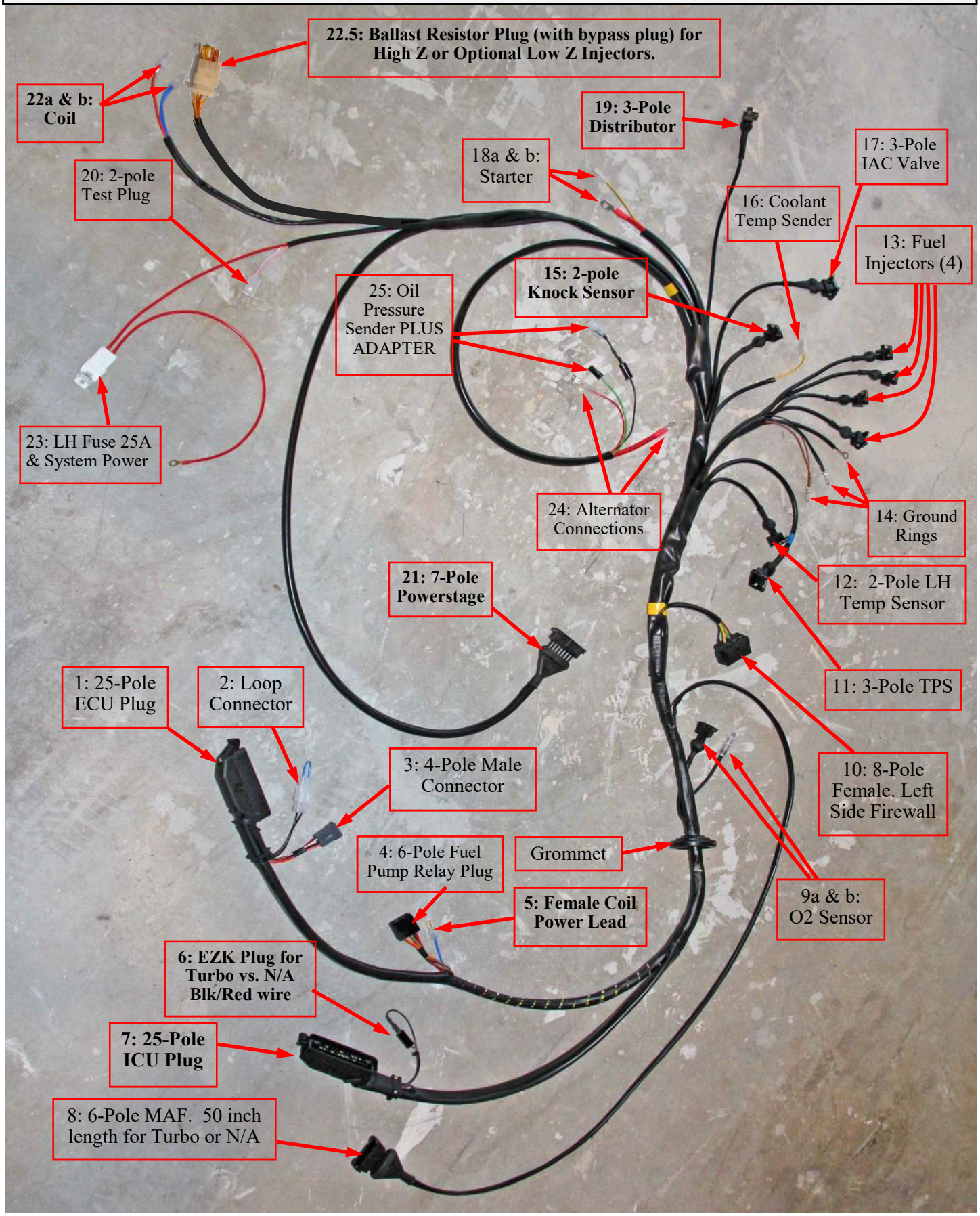
LH 2.2 +EZK 117 CONVERSION: Volvo 240 Turbo or Non-Turbo. For use with High or Low Z Injectors.



Volvo Conversion Harness 240 Turbo or Non-Turbo to LH 2.2, EZK 117.

For LH 2.2 using High or Low Impedance Fuel Injectors.

Circuits related to the EZK ignition system are in BLUE text.

Understanding Diagram Wire Locations in These Pages

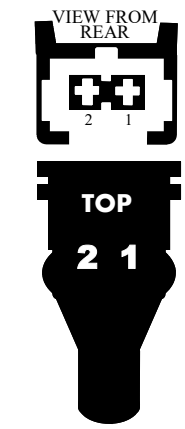
You will see information such as shown below for each connector in this harness. In the event that you need to know where a wire goes, this will explain how to read it.

The number at left is a CONNECTOR NUMBER.
You will see numbers like this for each connector listed.

The below example shows two wires.

The #1 **Black** wire shows **13,** which means the OTHER end on this wire goes to Connector 13, which is a Ground Ring.

The #2 **Blue** wire shows **1/2,** which means the OTHER end of this wire goes to Connector 1, Position 2, which is the LH ECU Pin 2.

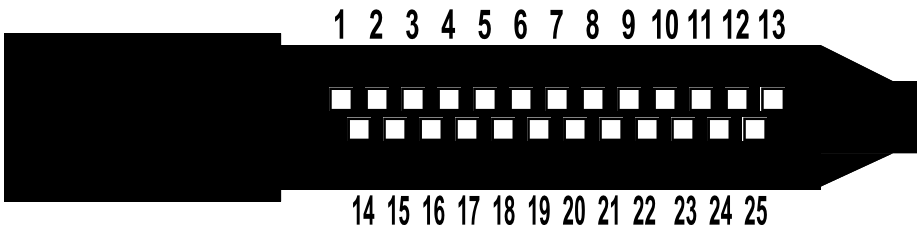


Wire Colors:		
1. Black	13	to ground ring.
2. Blue	1/2	to ECU pin 2.

1

25-Pole Female EFI Connector. For LH 2.2 ECU.

Under Right Side Dash, near right kick panel



VIEW FROM FRONT

VIEW FROM FRONT FACE— USE POLE NUMBER MARKINGS ON PLUG

	WIRE COLOR	DESTINATION	DESTINATION DESCRIPTION	ECU FUNCTION
1.	**Gray/Yell:**	**to 7/17**	**ICU pin 17.**	Control signal from ICU.
2.	Blue:	to 11/2	LH Temp Sensor pin 2.	Signal from Coolant Temp Sensor.
3.	Orange: (2 wires)	to **7/7,** 12/1	**ICU pin 7**, TPS pin 1.	Idle signal from TPS when throttle is closed.
4.	empty			
5.	Black:	to 14b, 8/1, & Shield for 1/20 O2 Sensor.	Ground Ring b, MAF 1	Ground, shield for O2 Sensor.
6.	Green/Yell:	to 8/2	MAF pin 2.	Ground.
7.	Red/Wht:	to 8/3	MAF pin 3.	Signal from MAF.
8.	White:	to 8/4	MAF pin 4.	Control signal MAF burn off.
9.	Brown:	to 4/1	Fuel Relay 1.	Power from fuel relay.
10.	Brn/White:	to 17/1	Idle Air Valve.	Control signal to idle valve.
11.	Black: (2 wires)	to 1/5, 2/1, 14b, 8/1	ECU 5, 2-pole Loop Connector 1, Ground Ring b, MAF 1.	Ground.
12.	**Blk/Red**:	**to 7/15**	**ICU 15.**	Full load signal from TPS.
	Blue/Wht:	to 12/3 & 20/2	**ICU 15**, TPS 3, Lambda Test Plug 2.	
13.	Grn/Wht (fat):	to 13/2	Fuel Injectors pins 2.	Control signal to injectors.
14.	Yellow:	to 8/6	MAF 6.	Signal from CO potentiometer.
15.	empty			
16.	Red:	to 3/2	4-pole Plug pin 2.	Signal from AC.
17.	Blu/Green:	to 4/2	Fuel Relay pin 2.	Control signal to fuel relay.
18.	Blk/Red (thin):	to 4/6	Fuel Relay 6.	Switched power (Term. 15).
19.	Black:	to 2/2	2-pole Loop Connector 2.	Code.
20.	Green (shielded):	to 9a	O2 Sensor a.	Signal from Lambda sensor.
21.	Black/Yell	to 4/4	Fuel Relay pin 4.	Control signal for main relay.
22.	Pink	to 20/1	Lambda Test Plug pin 1.	Integrator voltage.
23.	Red/Green:	to 17/3	Idle Air Valve pin 3.	Control signal to idle valve.
24.	**Yellow:**	**to 7/8**	**ICU pin 8.**	Load signal output to ICU.
25.	Black:	to 9b2, 12/2, 14a	O2 Sensor b2, TPS pin 2, Gound Ring a.	Ground

2

2-Pole Female 6.3 mm plug with Male Loop Connector (Limp Mode Plug).

Near ECU Under Right Side Dash

Leave this connector in place.

View from Rear

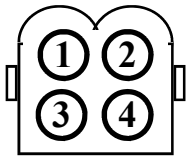
WIRE COLORS

1.	Black:	to 1/11	ECU pin 11
2.	Black:	to 1/19	ECU pin 19

3

4-Pole Male Bullet Connector.

This connector will be near the ECU connector (under dash) and will mate with the existing female 4-pole connector if you have a 1985-88 240. You may add a mating connector if you have a different 240.

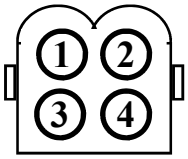


VIEW FROM REAR

WIRE COLORS:

1.	(2 wires) Black/Red, **Blue**:	to 1/18, 4/6, **7/6**	Blk/Red to ECU 18, Fuel Relay 6, **Blue to ICU 6.**
2.	Red:	to 1/16	ECU pin 16 (signal from AC).
3.	Red/Yellow (fat):	to 4/5, 9b1, 13/1, 17/2-Brn	Fuel Relay 5, O2 Plug b1, Fuel Injectors pin 1, Idle Air Valve pin 2.
4.	Red/White:	to 21/1	Ign Powerstage pin 1.

This information explains in detail the wires in this 4-pole bullet connector.



VIEW FROM REAR

The below information will help determine what circuits are needed to connect to these wires to your 240. If you are installing this harness into an **existing LH 2.2 240 (1985-1988),** you may simply **plug this into your existing 4-pole female plug.**

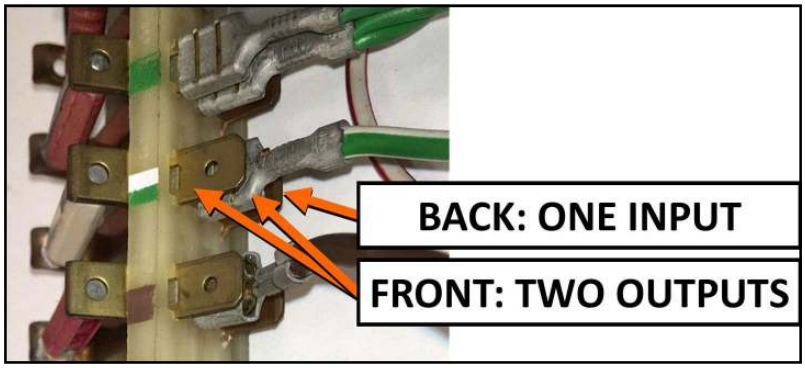
WIRE COLORS:

1. Black/Red, **Blue:** Connects power to ECU, ICU and Fuel Relay.
   If you have an existing 1985–88 LH 2.2 240, plug this connector into the existing mating plug in your car and these two wires are done.
   Connecting to other 240: This wire should go to switched power (originating from ignition switch terminal 15), which offers 12v when Ignition Switch in the "RUN" position. This source may be tapped from the back or INPUT (right) side of fuse 11, 12 or 13 (or fuse 3, 4 or 5 for a 1978 and older 240). Ensure the 12v connection also remains powered when the key is turned to the "START" position.

2. Red: Connects to ECU/16.
   If you have an existing 1985-88 LH 2.2 240, plug this connector in and no other changes are needed for this wire.
   Connecting to other 240: For AC idle increase. Connect to the AC relay 12v output or the 12v trigger circuit that activates the AC compressor clutch.

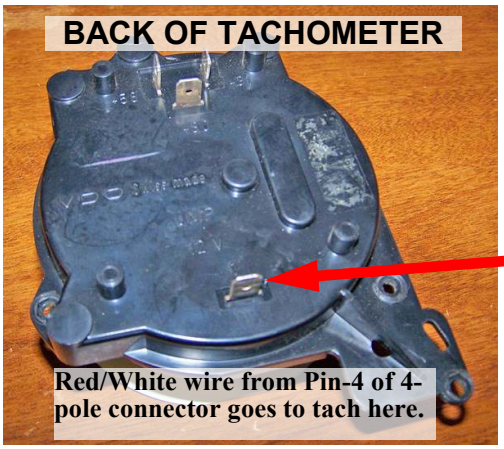
3. Red/Yellow: Connects to Fuel Pump Relay, O2 Sensor Plug, Fuel Injectors, Idle Air Control Valve.
   If you have an existing 1985-88 LH 2.2 240, plug this connector in and no other changes are needed for this wire.
   Connecting to other 240: This should go to the 12v input or the back/right side of the fuse panel for power to the fuel pumps. This fuse location is as follows for a 240: 1979-84: Fuse 5. 1985 and later: Fuse 4. Pre-1979 240 does not have a dedicated fuse for the fuel pump, so you may use any fuse not already being used, such as Fuse 10, or you may install a new in-line fuse.

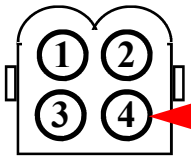
4. Red/White: Connects to Tachometer signal from Ignition Power Stage.
   The original wire going to pin 4 of this plug in a 1985-88 LH 2.2 240 was not used. So Pin 4 on this plug is now used as a tach signal wire that is available if you need a tach signal for your tach or any other device. You may use this wire and connect it to your tach as shown on the next page.



If you're not familiar with where the inputs and outputs are on a 240 fuse panel, here's a photo of the RIGHT side of the fuse panel. There is one INPUT for each fuse and TWO OUTPUTS. If you need to tap into a power input, that means you're tapping into power BEFORE it goes through the fuse.

More detailed information about 240 fuse panels can be found at:
www.240turbo.com/fusepanel240.html





VIEW FROM REAR

Pin 4: Red/White wire.

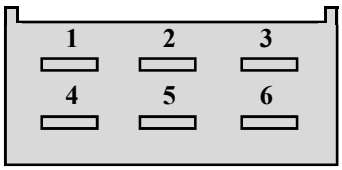
If your tach has <u>two spades</u> at the bottom, either one will do.

CAUTION: Do not goof and connect this wire anywhere else on the tach or instrument panel. Damage may occur to your ignition box if you do that.

4

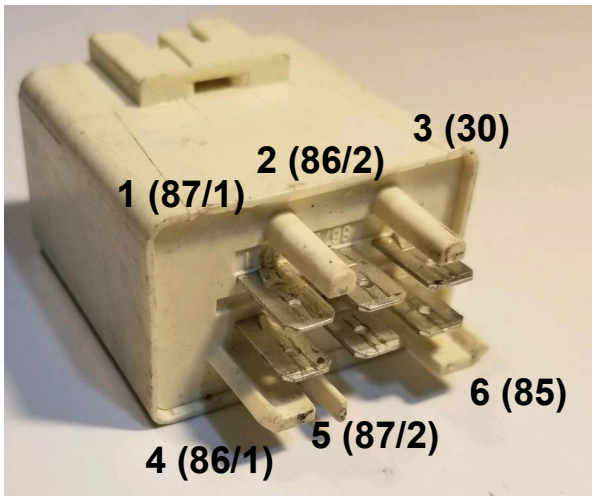
6-Pole Female 6.3 mm Fuel Relay Connector.

Under Passenger Dash



VIEW FROM REAR OF PLUG

<<< Connector for white FUEL PUMP RELAY PN 3523608.



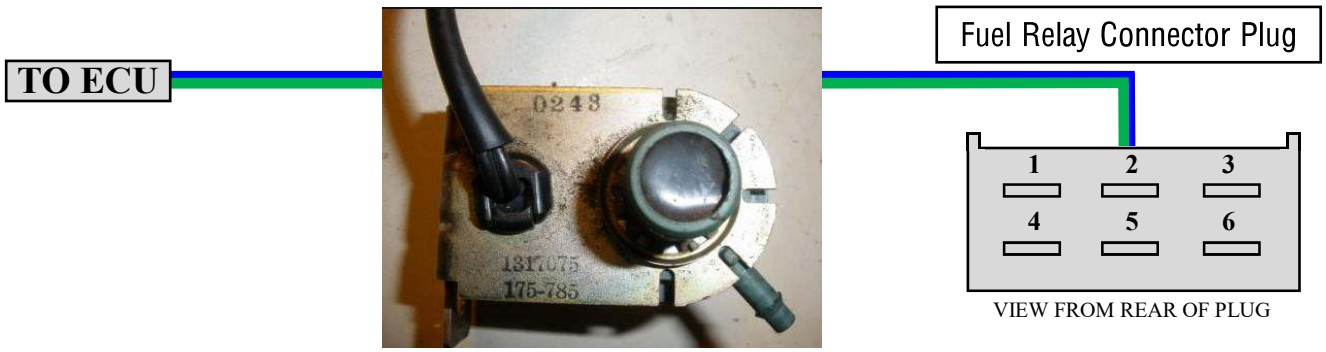
RELAY PIN	WIRE COLOR	DESTINATION	DESTINATION / DESCRIPTION
1. 87/1	Brown	to 1/9	ECU pin 9.
87/1	Orange	to 8/5	MAF pin 5.
2. 86/2	Blue/Grn	to 1/17	ECU pin 17.
3. 30	Red (fat)	to 23	LH Fuse.
4. 86/1	Black/Yell	to 1/21	ECU pin 21
5. 87/2	Red/Yell (fat)	to 3/3, 9b1, 13/1, 17/2	4-pole bullet plug pin 3, O2 Plug b1, Fuel Injectors pin 1, Idle Air Valve pin 2.
6. 85	Blk/Red(2 wires)	to 1/18, 3/1	ECU 18, 4-pole bullet plug pin 1.

NOTE:
Pin 3 (RED) is main voltage input from the battery via the LH fuse on the inner fender.
Pin 5 (RED/YELL) is power output to the fuel pumps via the 4-pole plug.

OPTIONAL INSTALLATION OF TURBO OVERBOOST SWITCH

LH 2.2 uses a similar method of overboost protection as earlier K-Jetronic turbo cars. An overboost switch should be seen as a simple ON/OFF switch that is closed (ON) under normal operation, but then it opens (OFF) when a set boost pressure is reached. A typical factory Volvo overboost switch is pictured below and if you have a 240 Turbo overboost switch, it's the same as shown. There will be two wires. Polarity of the wires is not critical. Other non-Volvo overboost switches will be suitable. One that has adjustable boost level will be best.

This switch is wired into the above **Blue/Green wire from Pole 2** of the fuel relay connector. This Blue/Green wire receives the control signal from the ECU to turn on the fuel pumps. Installing the overboost switch to interrupt this circuit will put it in the same circuit as normally used for any LH 2.2 Turbo system and it will interrupt the fuel pump circuit when overboost is reached.



5

POWER LEAD CONNECTION for Ignition Coil and Power Stage.
6.3 mm Female Terminal with Insulator.

Blue (fat):	**to 22b**	**Coil +**

This is a power lead for the Ignition System. It needs to be extended and connected to a power input, which can be at the fuse panel (or any 12v source from Ignition Switch Terminal 15). It may be connected at fuse 11, 12 or 13 (or you can use fuse 3, 4 or 5 for a 1978 and older 240). This provides power to the coil and ignition power stage.

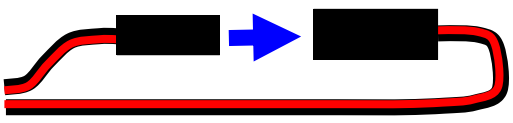
Ensure that power is present when the ignition switch is in the "RUN" and "CRANK" positions.

6

This Black/Red wire bridges ICU pin 15 to ECU pin 12. It should only be connected when a <u>TURBO fuel ECU is being used</u>. If a non-turbo fuel ECU is used, damage could occur to the EZK ICU if this wire is connected.

This circuit provides a fuel enrichment signal to the ECU when knock is detected by the ICU.

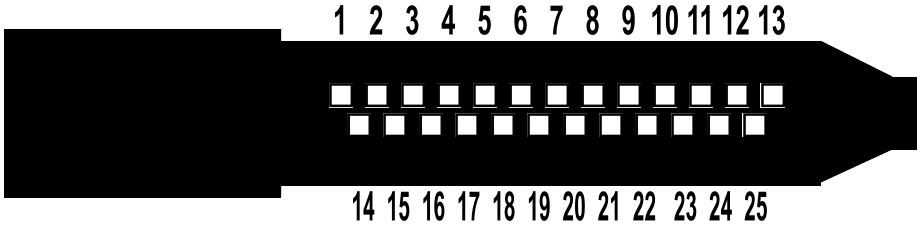
If using a non-turbo fuel ECU, this connector should be unplugged.



6.3 mm Male and Female Terminals with Insulators
Exits harness near the EZK ICU

Black/Red: Connection between 7/15 (ICU 15) and 1/12 (ECU 12)

7 EZK 117 25-Pole Female Ignition Control Unit (ICU) Connector.



VIEW FROM FRONT

VIEW FROM FRONT FACE— USE POLE NUMBER MARKINGS ON PLUG

	WIRE COLOR	DESTINATION	DESTINATION DESCRIPTION	ICU FUNCTION
1.	Empty			
2.	Empty			
3.	Empty			
4.	**Red (shielded):**	**to 19/1**	**Ign Distributor pin 1.**	**Power to Distributor Hall Generator.**
5.	Empty			
6.	**Blue:**	**to 3/1**	**4-pole plug 1.**	**Switched 12v from Ign. Switch 15.**
7.	**Orange:**	**to 1/3, 12/1**	**ECU pin 3, TPS pin 1.**	**Idle Signal from TPS when throttle is closed.**
8.	**Yellow:**	**to 1/24**	**ECU pin 24 (ECU load signal output)**	**ICU load signal input.**
9.	Empty			
10.	**Black:**	**to 19/3**	**Ign Distributor pin 3.**	**Shield for ICU 4 & ICU 24 (distributor).**
11.	Empty			
12.	**Brown:**	**to 15/2**	**Knock Sensor pin 2.**	**Shield for ICU 13 knock sensor.**
13.	**Green (shielded)**	**to 15/1**	**Knock Sensor pin 1.**	**Signal input from knock sensor.**
14.	Empty			
15.	**Black/Red:**	**to 1/12**	**ECU pin 12.**	**Knock fuel enrichment signal to ECU (for B230FT ECU only).**
16.	**Gray:**	**to 21/5**	**Ign Powerstage 5.**	**Ignition pulse output to power stage.**
17.	**Gray/Yell:**	**to 1/1**	**ECU pin 1.**	**Engine speed output signal to ECU.**
18.	Empty			
19.	Empty			
20.	**Brown:**	**to 21/2, 14c**	**Ign Powerstage 2, Ground Ring C at intake manifold.**	**Ground for ICU and power stage.**
21.	Empty			
22.	Empty			
23.	Empty			
24.	**Blue (shielded):**	**to 19/2**	**Ign Distributor pin 2.**	**Engine speed input signal from distributor Hall generator.**
25.	Empty			

8 6-Pole Female Mass Air Flow (MAF) Sensor Connector.

50”/1270 mm from Junction for Turbo or non-turbo.

LH 2.2 Compatible MAF needed.

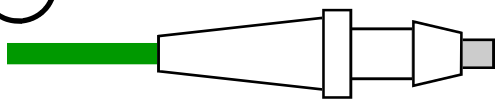
WIRE COLORS:

1.	Black:	to 1/5, 1/11, 12/1, 14b	ECU 5 & 11, LH Temp Sensor 1, Ground Ring B.
2.	Green/Yell:	to 1/6	ECU pin 6.
3.	Red/White:	to 1/7	ECU pin 7.
4.	White:	to 1/8	ECU pin 8.
5.	Orange:	to 4/1	Fuel Relay pin 1 (87/1).
6.	Yellow:	to 1/14	ECU pin 14.

**Number markings embossed on plug.
Peel back rubber boot to see.

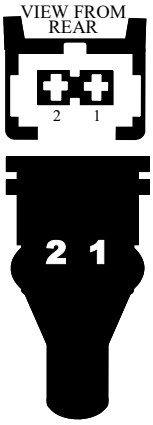
9a

1-Pole Male Oxygen Sensor Connector.



Green (shielded): to 1/20 ECU pin 20.

9b



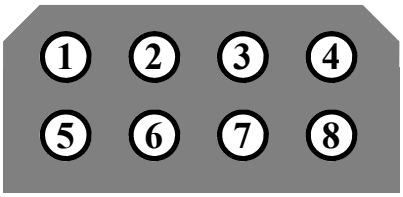
2-Pole Female EFI Connector.
For Oxygen Sensor, Heated Type

Wire Colors:

1.	Red/Yellow (fat):	to 3/3, 4/5, 17/2	4-pole plug 3, Fuel Relay 5, Idle Air Valve pin 2.
2.	Black:	to 1/25, 12/2, 14a	ECU pin 25, TPS pin 2, Ground Ring A.

10

8-Pole Female Connector.
LEFT (driver side) Firewall



VIEW FROM REAR

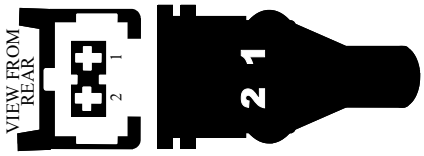
WIRE COLORS:

1.	Black:	to 25a	Oil Pressure Sender.
2.	Yellow:	to 16	Coolant Temp Sender.
3.	Red:	to 24b	Alternator D+.
4.	empty		
5.	Blue/Yellow:	to 18b	Starter Solenoid.
6.	Green:	to 25b	Oil Press Sender - see NOTE.
7.	empty		
8.	empty		

NOTE: The GREEN wire in pin 6 is not normally found in an LH 2.2 240 engine harness. It was added to this harness for the convenience for a 240 Turbo other 240 model that will use this green wire for a 2-pole oil pressure sender (the type used for a separate oil pressure gauge). Your 240 may have a different color wire in pin 6 coming through the firewall. If you are using this wire for an oil pressure gauge, it will be important to make sure this wire goes to the oil pressure gauge pin "G" (a 240 Turbo will already be wired as such).

CAUTION: If you have a 240 non-turbo WITHOUT an in-dash oil pressure gauge (most don't) and you find an already existing GREEN wire coming from the firewall to this 8-pole firewall plug, that GREEN wire may be the wire Volvo used for the optional engine bay light. In this case, it goes to the fuse panel and is connected to power. DO NOT use this circuit for the oil pressure sender. You may remove that terminal from the connector housing and re-connect it separately outside the connector housing to restore your engine bay light.

11



2-Pole Female EFI Connector.
LH Temperature Sensor. Located under intake manifold

Wire Colors:

1.	Black:	to 1/5, 1/11, 14b, 8/1	ECU pin 5, pin 11, Ground Ring B, MAF pin 1
2.	Blue:	to 1/2	ECU pin 2

12

3-Pole Female EFI Connector.
Throttle Position Sensor (TPS)

WIRE COLORS

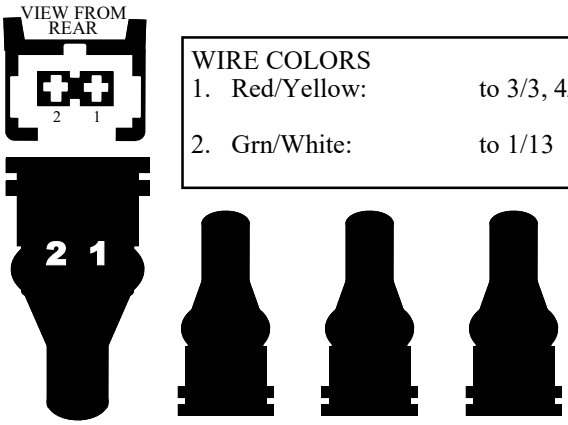
1. Orange:	to 1/3, **7/7**	ECU pin 3, **ICU pin 7** (Idle signal).
2. Black:	to 1/25, 9b2, 14a	ECU 25, O2 Sensor b2, Ground Ring A.
3. Blu/Wht (2 wires):	to 1/12, 20/2	ECU pin 12, Idle Test Plug (pin 2).

NOTE for pin 3: A car using a **TURBO Fuel ECU** does not use TPS pin 3 (full-throttle switch). If you are using a TURBO ECU, **the terminal for PIN 3** (Blue/White wire) **should be disabled for this connector.** There are two ways to do this. If you have a terminal extraction tool, the terminal for Pin 3 can be pulled from the back of the connector. An alternate method is to **cut both Blue/White wires from this connector and then splice them together.** It's important to splice them together because this wire also connects the Idle Test Plug to the ECU. The Idle Test Plug will be needed when you set your base idle.

NOTE: BLUE TAPE

13

2-Pole Female EFI Connectors.
Fuel Injectors (x4)



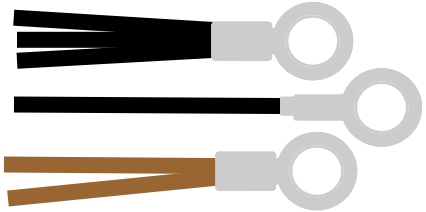
WIRE COLORS

1. Red/Yellow:	to 3/3, 4/5, 9b1, 22.5/2	4-pole plug 3, Fuel Relay 5, O2 Plug b1, and Ballast Resistor pins 1, 3, 4 and 6 (if used).
2. Grn/White:	to 1/13	ECU pin 13.

All four injector connectors are wired the same. The wire leads are different lengths so they may be routed for best fit.

14

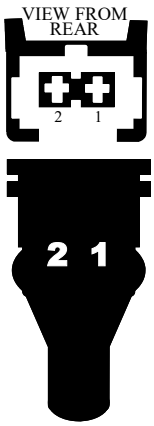
Three Ground Rings.
Bolted to Intake Manifold



WIRE COLORS

a. Black (3 wires):	to 1/25, 9b2, 12/2	ECU 25, O2 Plug b2, TPS pin 2.
b. Black:	to 1/5, 1/11, 11/1, 8/1	ECU 5 & 11, LH Temp Sensor 1, MAF pin 1.
c. Brown (2 wires):	**to 7/20, 21/2**	**ICU pin 20, Ign Powerstage pin 2.**

15



2-Pole Female EFI Connector. Ignition Knock Sensor.
Knock sensor needs to be Bosch compatible. Not the early Chrysler type.

1. Green:	**to 7/13**	**(shielded wire)**	**ICU pin 13.**
2. Brown:	**to 7/12**	**(shield for above)**	**ICU pin 12.**

16

6.3 mm Female Terminal with Insulator.
Coolant Temperature Sender on Left Side of Head

Yellow:	to 10/2	8-pole Firewall connector pin 2.

17

3-Pole Female EFI Connector.
Idle Air Control Valve. LH 2.2 compatible.

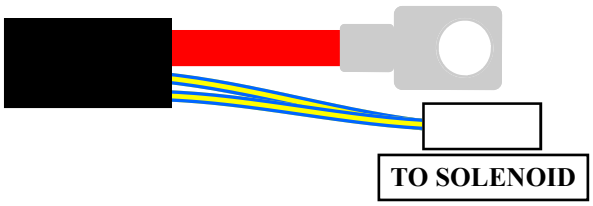
WIRE COLORS

1. White/Brown:	to 1/10	ECU pin 10.
2. Brown:	to 3/3, 4/5, 9b1, 22.5/2	4-pole Plug 3, Fuel Relay 5, O2 Plug b1, Ballast Resistor pin 2 wire (Red/Yell wire).
3. Red/Green:	to 1/23	ECU pin 23.

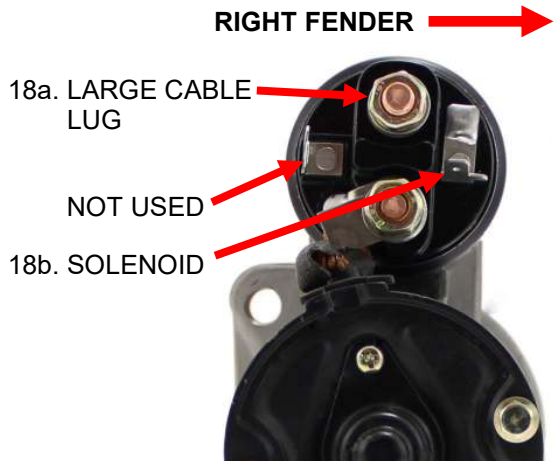
**Number markings on plug are under rubber boot.

18

STARTER MOTOR CONNECTIONS
18a. Heavy Red cable with Large Eyelet (B+).
18b. Yellow/Blue wire with Female Connector.

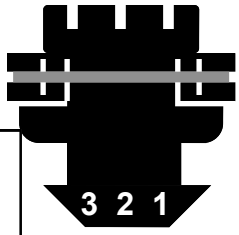


Wire Colors:		
18a. Red cable:	to 24a	Alternator B+.
18b. Blue/Yell:	to 10/5	8-pole Firewall Connector pin 5.



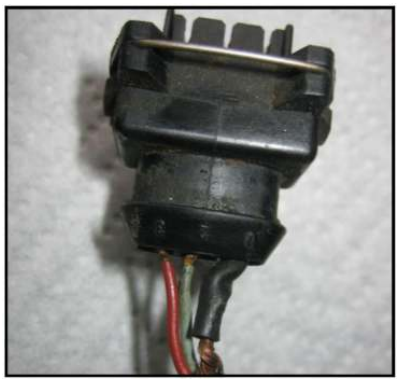
19

3-Pole Female Connector (Special for Ignition Distributor).
Distributor needs to be LH 2.2 compatible.



View from Top

**Number markings embossed on plug are under rubber boot.

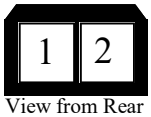


1.	**Black (shield):**	**to 7/10**	**ICU pin 10 (ground).**
2.	**Blue (shielded):**	**to 7/24**	**ICU pin 24 (signal).**
3.	**Red (shielded):**	**to 7/4**	**ICU pin 4 (12v)**

Note: Blue and Red wires are shielded. Black wire (ground) is connected to signal shield.

20

2-Pole Female 6.3 mm Plug.
Lambda/Idle Test Plug.



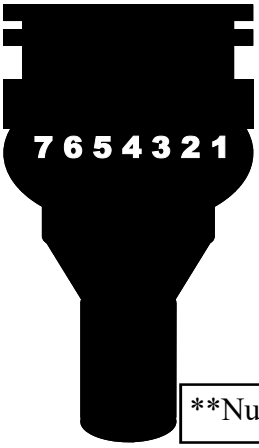
View from Rear

Wire Colors:

1.	Pink (Lambda):	to 1/22	ECU pin 22.
2.	Blue/White (Idle):	to 1/12, 12/3	ECU pin 12, TPS pin 3.

21

7-Pole Female EFI Connector. Ignition Power Stage.
Left front fender.

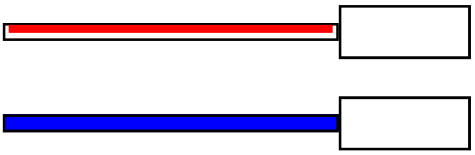


1.	**Red/White (2 wires):**	**to 3/4, 22a**	**4-pole plug 4, Ign Coil #1 Negative.**
2.	**Brown:**	**to 7/20, 14c**	**ICU pin 20, Ground Ring C**
3.	**Black**		**Shield for pin 5 Gray pulse wire.**
4.	**Blue (fat):**	**to 7/6**	**Ign Coil #2 Positive.**
5.	**Gray (shielded):**	**to 7/16**	**ICU pin 16 (Ignition Pulse Signal).**
6.	Empty		
7.	Empty		

**Number markings embossed on plug are under rubber boot.

22

6.3 mm Female Terminals with Insulators. EZK Connections to Coil.
Red/White connects to Coil terminal 1 (Neg). Blue connects to Coil terminal 15 (Pos).



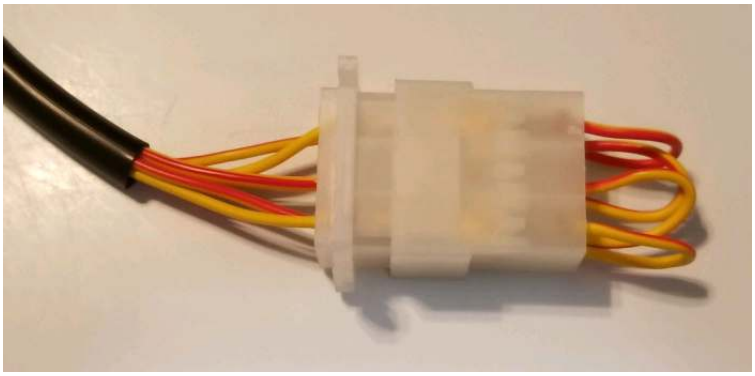
a.	**Red/White:**	**to 21/1**	**Ign Power Stage pin 1.**
b.	**Blue (fat):**	**to 5, 21/4**	**Coil and Power Stage 12v power lead, Power Stage pin 4.**

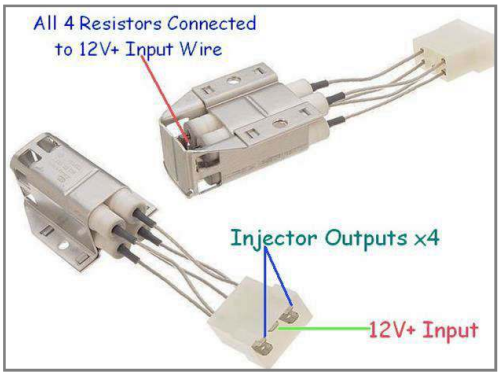
22.5

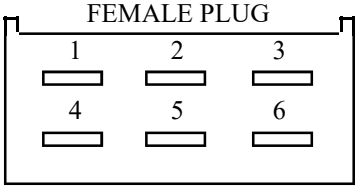
6-Pole Female Connector Plug

Below bypass plug may be removed and <u>OPTIONAL Fuel Injector Ballast Resistor Pack</u> may be plugged in ONLY when LOW Impedance fuel injectors are to be installed. Leave the bypass plug in place when HIGH Impedance fuel injectors are used.

Fuel Injector Bypass Plug / Ballast Resistor Detail

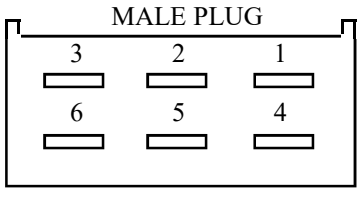






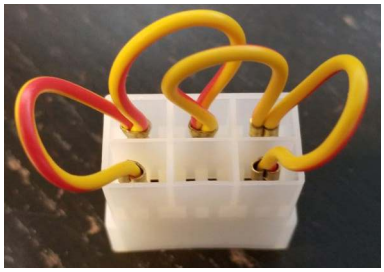
VIEW FROM REAR

WIRE COLORS:		
1. Red/Yellow	13/1	to fuel injector pin 1.
2. Red/Yellow	17/2	to idle valve pin 2.
3. Red/Yellow	13/1	to fuel injector pin 1.
4. Red/Yellow	13/1	to fuel injector pin 1.
5. empty		
6. Red/Yellow	13/1	to fuel injector pin 1.



VIEW FROM REAR

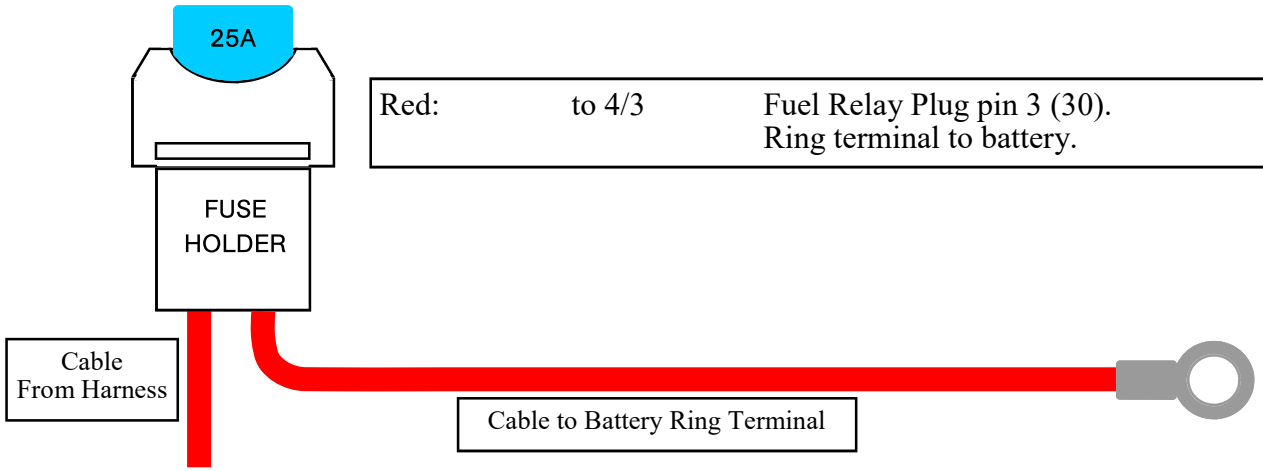
6-Pole MALE Connector BYPASS Plug.
This bypass plug should be in place when HIGH Impedance Injectors are to be installed.



BYPASS PLUG WIRE CONNECTION:	
1. Red/Yellow	to pin 2, 4
2. Red/Yellow	to pin 1, 3, 4, 6
3. Red/Yellow	to pin 2, 6
4. Red/Yellow	to pin 1, 2
5. empty	
6. Red/Yellow	to pin 2, 3

23

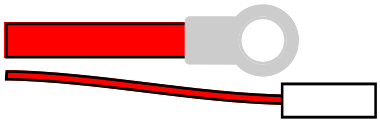
Red Cable to White Fuse Holder.
Left Fender. Provides power to the LH fuel system relay.



Red:	to 4/3	Fuel Relay Plug pin 3 (30). Ring terminal to battery.

24

Alternator Connections.
Heavy Red cable (B+). Red wire (D+). 6.3 mm terminal with insulator.



a.	(B+) Red Cable:	to 18a	Starter
b.	(D+) Red:	to 10/3	8-pole firewall connector pin 3

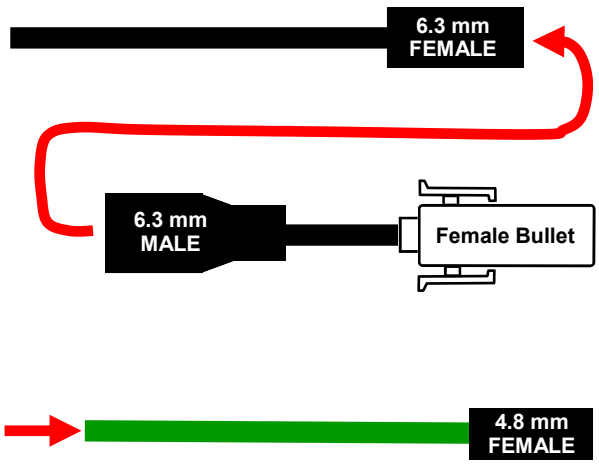
25

Oil Pressure Sender (OPS)
Also see NOTE about OPS wires in diagram 10.

25a: **(Black wire)** 6.3 mm FEMALE terminal. Used by itself only with early style 1-pole oil pressure sender that has a flat spade. Also used for a 2-pole oil pressure sender (accessory OP gauge) in conjunction with the below green wire.

Short adapter: **(Black wire)** This is a 6.3 mm MALE terminal with a FEMALE bullet plug on other end. This adapter is plugged into the above black wire and used for a later style 1-pole oil pressure sender using a bullet connector.

25b: **(Green wire)** 4.8 mm FEMALE terminal. Used only with a 2-pole oil pressure sender for an accessory oil pressure gauge.



WIRE COLORS:

25a. Black:	to 10/1	8-pole firewall plug pin 1.
25b. Green:	to 10/6	8-pole firewall plug pin 6.