

# Testing with Harness installed

# Without O2 Sensor

L-Jetronic, Checking

Most US 3.0 E engines

## IMPORTANT GENERAL INFORMATION

1. Never start engine without the battery being solidly connected.
2. Do not use a quick-charger unit to start the engine.
3. Never separate the battery from the on-board electrical system while the engine is running.
4. When quick-charging the battery, disconnect it from the vehicle's electrical system.
5. Before making any tests on the L-Jetronic, insure that the ignition system is in order i.e., timing and spark plugs must correspond to specifications.
6. At temperatures above 80°C (176°F) (paint drying kiln), remove the electronic control unit.
7. Insure that all cable harness plugs are connected solidly.
8. Never connect or disconnect cable harness plug at control unit when the ignition is switched on.
9. When making a compression check, the red power supply line between the battery and the combination relay near the battery is to be disconnected by separating the plug connection.

## 1. CHECKING THE L-JETRONIC WITH TEST LAMP AND OHMMETER

The following equipment is necessary for checking the L-Jetronic:

1. 12-volt, 2-watt test lamp with standard test probes.
2. Ohmmeter, measurement range 0 to 5000 ohms.
3. Tachometer.

The cable harness plug must be separated from the control unit in order to test the cable harness and the information transmitters.

The control unit need not be removed for this purpose.

Since the contact terminals on the plug strip are not marked, the contacts must be counted for the various tests, beginning with terminal 1.

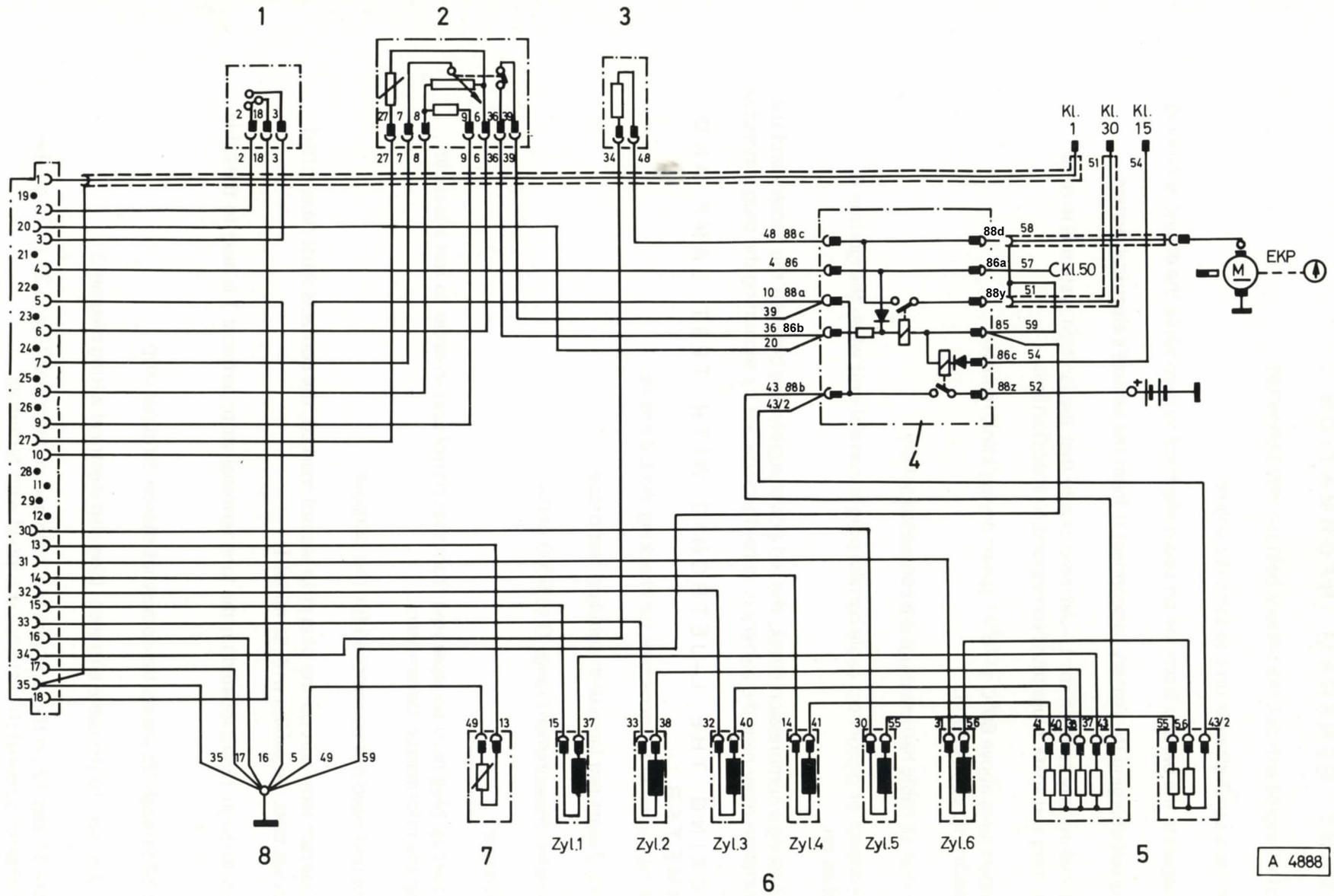
Terminals 1 through 18 are located on the long terminal strip; terminal 1 is next to the cable entrance.

Terminals 19 through 35 are on the somewhat shorter terminal strip.

Terminal 19 is next to the cable entrance. (See also electrical wiring diagram.)

Connections 11 and 12 on the long terminal strip and connections 19 and 21 to 29 on the somewhat shorter terminal strip are not equipped with terminals.

**J**



1 Throttle valve switch  
2 Air flow sensor

3 Auxiliary air valve  
4 Combination relay

5 Series (dropping) resistors  
6 Injection valves

7 Temperature sensor II  
8 Central ground connection

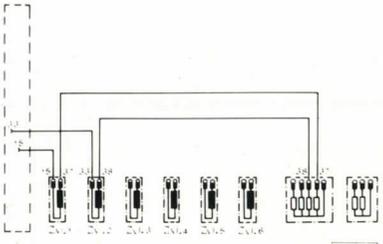
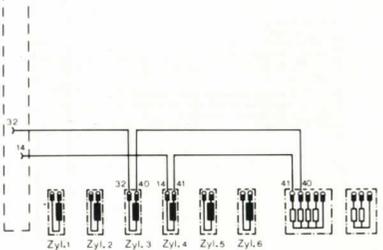
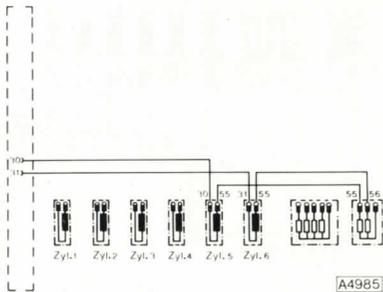
Function or component to be tested	Test with	Measurement between terminals:	Test status	Indication (correct)	If defective	Notes	Explanation, wiring for test step
Supply voltage	Test lamp	10(+) and ground at body	Ignition on	Test lamp lights	Double relay defective; double relay supply interrupted; break in lead 10; battery positive to double relay disconnected		<p>A3860</p>
Ground, injection system	Test lamp	10(+) & 5 (-)	Ignition on	Test lamp lights	Central ground conn. open; break in leads 5 or 16 and/or 17.		
		10(+) & 16(-)					
		10(+) & 17(-)					
Initiation of injection impulse	Test lamp	10(+) & 1 (-)	Operate starter briefly	Test lamp flickers like breaker points	Break in cable harness lead 1; ignition system; replace breaker points in distributor.		<p>A3861</p>

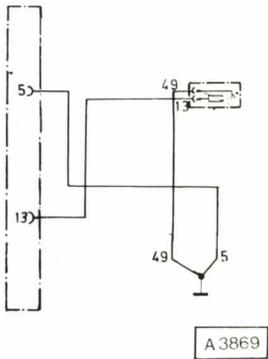
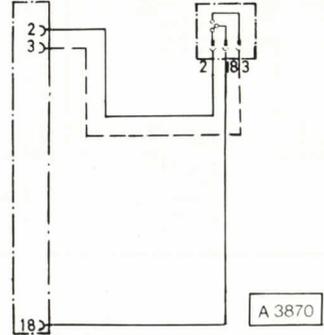


Function or component to be tested	Test with	Measurement between terminals:	Test status	Indication (correct)	If defective	Notes	Explanation, wiring for test step
Start signal from starter for control unit	Test lamp	4(+) & 5(-)	Operate starter briefly	Test lamp burns	Break between T. 50 at starter and double relay — break in lead 4; double relay defective	Lamp may light only as long as starter runs. If lamp lights with ignition on, check why T. 86a has power.	<p>A3862</p>
Combination relay (pump section)	Test lamp	20(+) & 5(-)	Operate starter briefly	Test lamp burns	Combination relay defective; not grounded; combination relay defective; pump fuse burned out.		<p>A3863</p>
Aux. air valve	Test lamp	34(+) & 5(-)	Operate starter briefly	Test lamp lights weakly	Break in cable harness; supp. air valve defective.		<p>A3864</p>

Function or component to be tested	Test with	Measurement between terminals:	Test status	Indication (correct)	If defective	Notes	Explanation, wiring for test step
Injection valves	Test lamp	14(+) & 5(-) 15(+) & 5(-) 30(+) & 5(-) 31(+) & 5(-) 32(+) & 5(-) 33(+) & 5(-)	Ignition on	Test lamp lights	Break in cable harness; series resistance defective; injection valve defective.		<p>A498B</p>
Air flow sensor	Ohm-meter	6 and 7 6 and 8 6 and 9 8 and 9 27 and 6	Ignition off	c. 50 Ohm c. 180 Ohm c. 280 Ohm c. 100 Ohm c. 2200 Ohm to 3800 Ohm	Break and/or short circuit in cable harness. Air flow sensor defective		<p>A392E</p>



Function or component to be tested	Test with	Measurement between terminals:	Test status	Indication (correct)	If defective	Notes	Explanation, wiring for test step
Injection valves and series resistors	Ohm-meter	15 and 33	Ignition off	15 to 19 Ohms	Look for break in cable harness. Check valves and series resistors individually with ohmmeter. Valve= 2 to 3 ohms. Pre-resistance= 5.5 to 6.5 ohms. Replace defective part.		 <p>A4987</p>
		15 and 32					 <p>A4986</p>
		14 and 32					 <p>A4985</p>
		14 and 33					
		30 and 31					
		14 and 33					

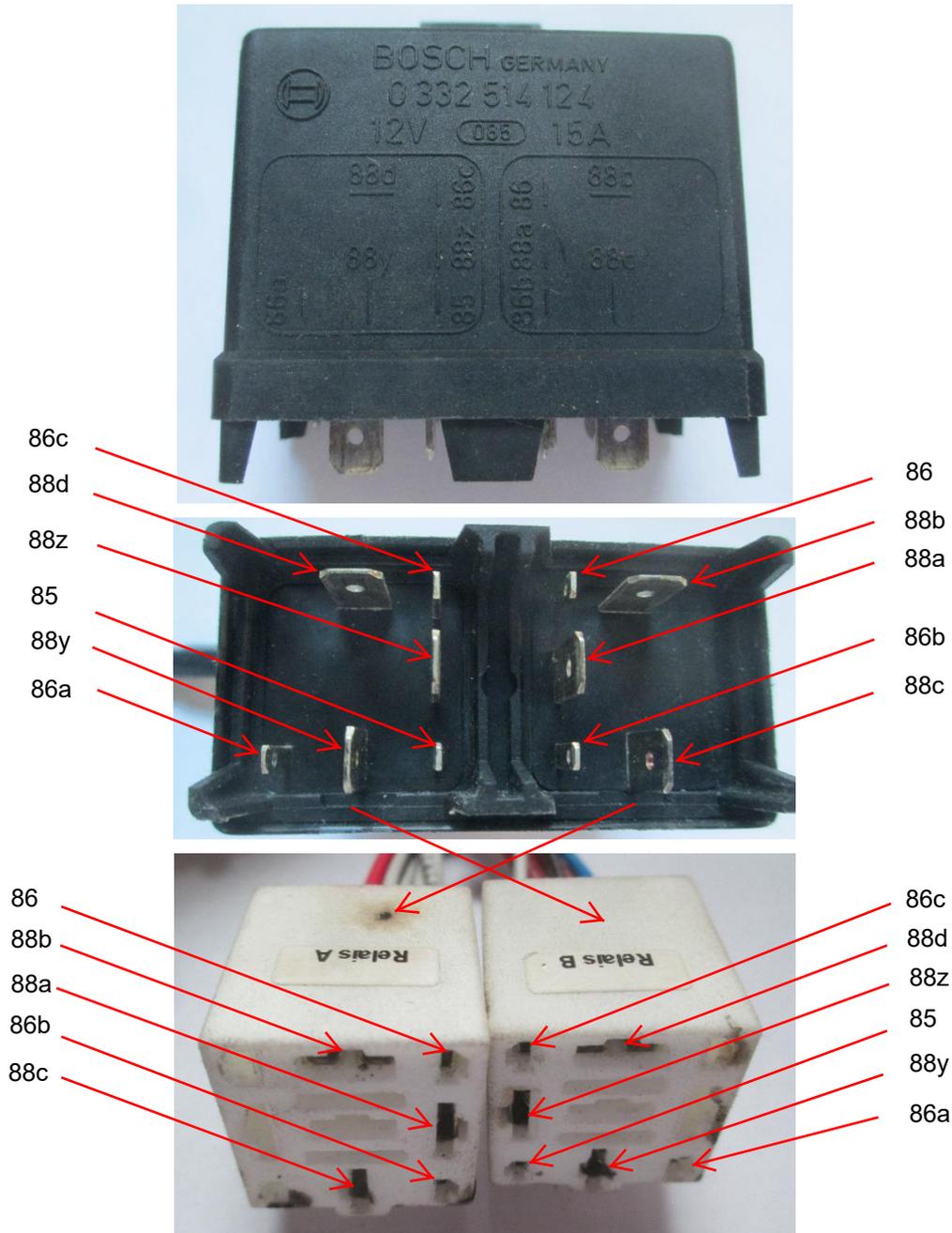
Function or component to be tested	Test with	Measurement between terminals:	Test status	Indication (correct)	If defective	Notes	Explanation, wiring for test step
Temperature sensor II	Ohm-meter	13 and 5	Ignition off	Temperature dependent: 0°C (32°F) = c. 5500 Ohms 20°C (68°F) = c. 2600 Ohms 80°C (176°F) = c. 300 Ohms 97°C (206°F) = c. 200 Ohms	Break in cable harness or replace temperature sensor		
Operation of idle contact in throttle valve switch	Ohm-meter	2 and 18	Ignition off Gas pedal in idle position	0 Ohms	Look for break in cable harness or replace throttle flap switch.		
			Depress gas pedal	$\infty$ Ohms			
Initiation of full load enrichment in throttle valve switch	Ohm-meter	3 and 18	Ignition off Gas pedal in idle position	$\infty$ Ohms			
		Floor gas	Floor gas pedal	0 Ohms			



Function or component to be tested	Test with	Measurement between terminals:	Test status	Indication (correct)	If defective	Notes	Explanation, wiring for test step
Pump contact in air flow sensor.	Test lamp	20 and 5	Disconnect air hose at air, flow sensor ignition on. Move air sensor flap by hand	Test lamp lights; pump runs (can be heard)	Look for break in cable harness volume gauge	Test lamp may not light with ignition on and engine not running. Otherwise replace air flow sensor.	

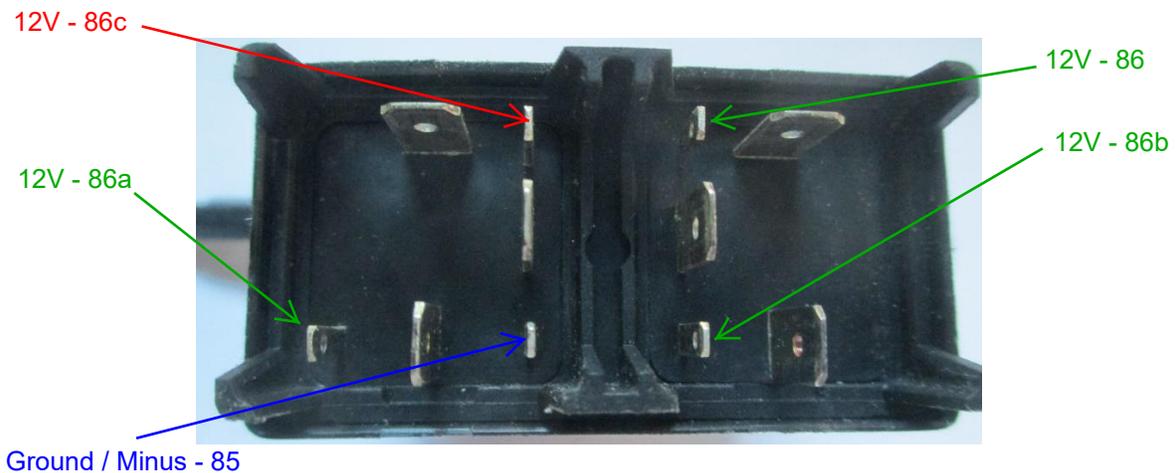
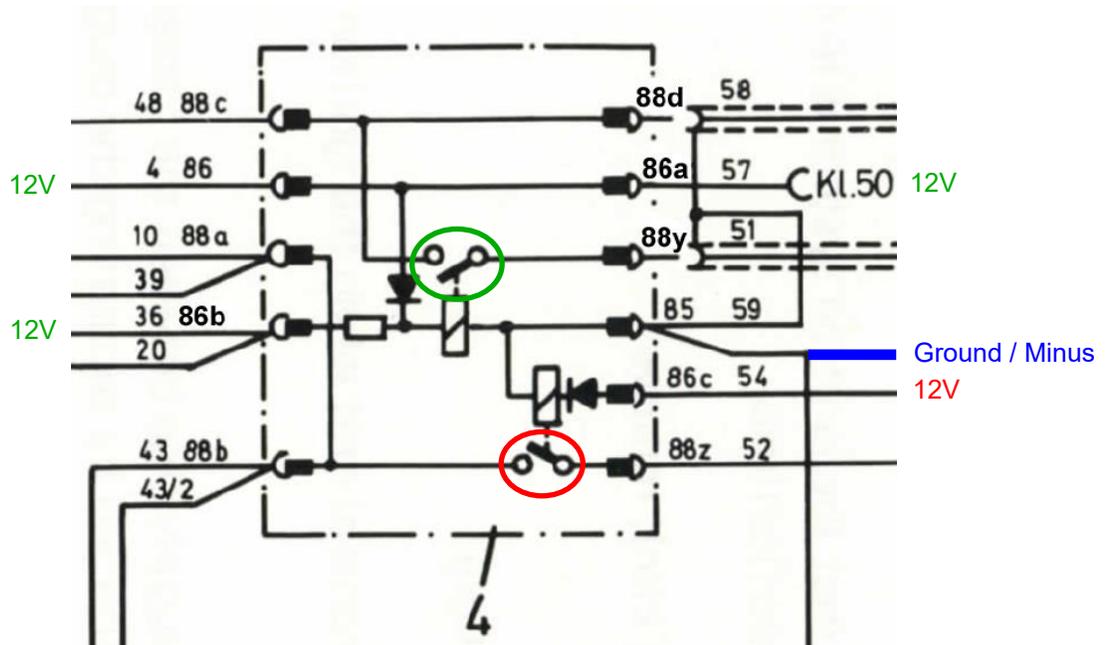
# Testing Fuel Injection Relay 3.0 E

## Pin designations on Fuel Injection Relay



Please keep in mind that, when you look at the plugs, the positions of the connectors are a mirror image of the pins on the relay.

## Testing if internal relays are operational



Use a voltage source that delivers 12V DC.

If you use a car battery please be aware that they can deliver extremely high currents. Do NOT use a car battery without an in-line fuse (2A) in the 12V wire you use for testing.

Connect Ground / Minus to pin 85

Touch pins 86, 86a and 86b, one after the other, with 12V to see if the relay clicks

Touch pin 86c with 12V to see if the other relay clicks

If you hear clicking noises the internal relays are operational

# Testing internal Wiring for correct Function

## Checking for continuity:

Please use an Ohm-meter, ideally with a "beep setting" for continuity which will make it easier.

## Without voltage applied:

You should see continuity between the following pins:

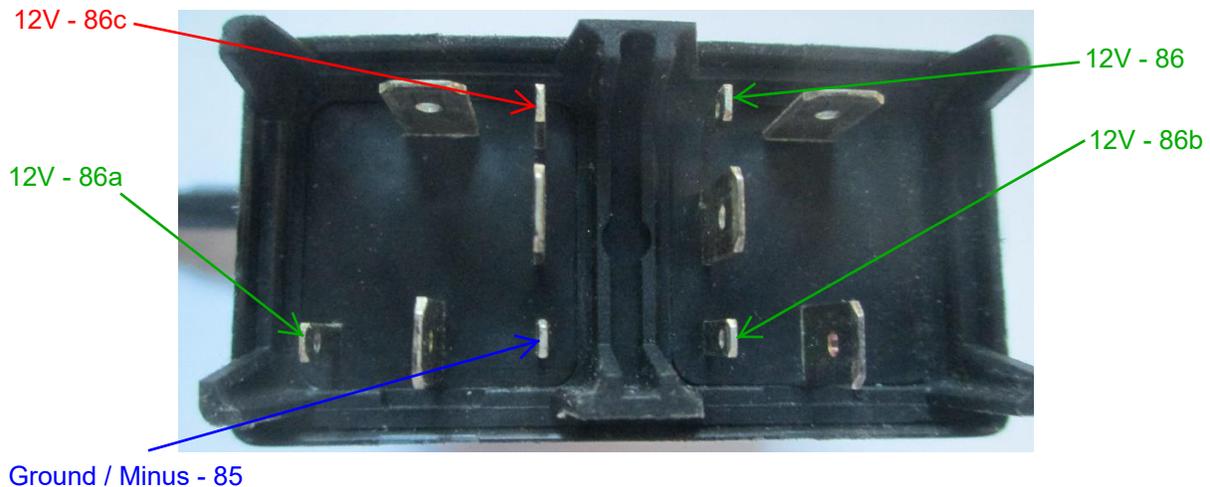
88c and 88d

86 and 86a

88a and 88b

## With voltage applied ("green" relay in diagram):

Connect Ground / Minus of your voltage source to pin 85 and 12V to either 86, 86a or 86b.



You should see continuity between the following pins:

88c and 88d

88c and 88y

## With voltage applied ("red" relay in diagram):

Connect Ground / Minus of your voltage source to pin 85 and 12V to 86c

You should see continuity between the following pins:

88b and 88z

## Checking internal diodes:

In this test you want the internal relays NOT to click:

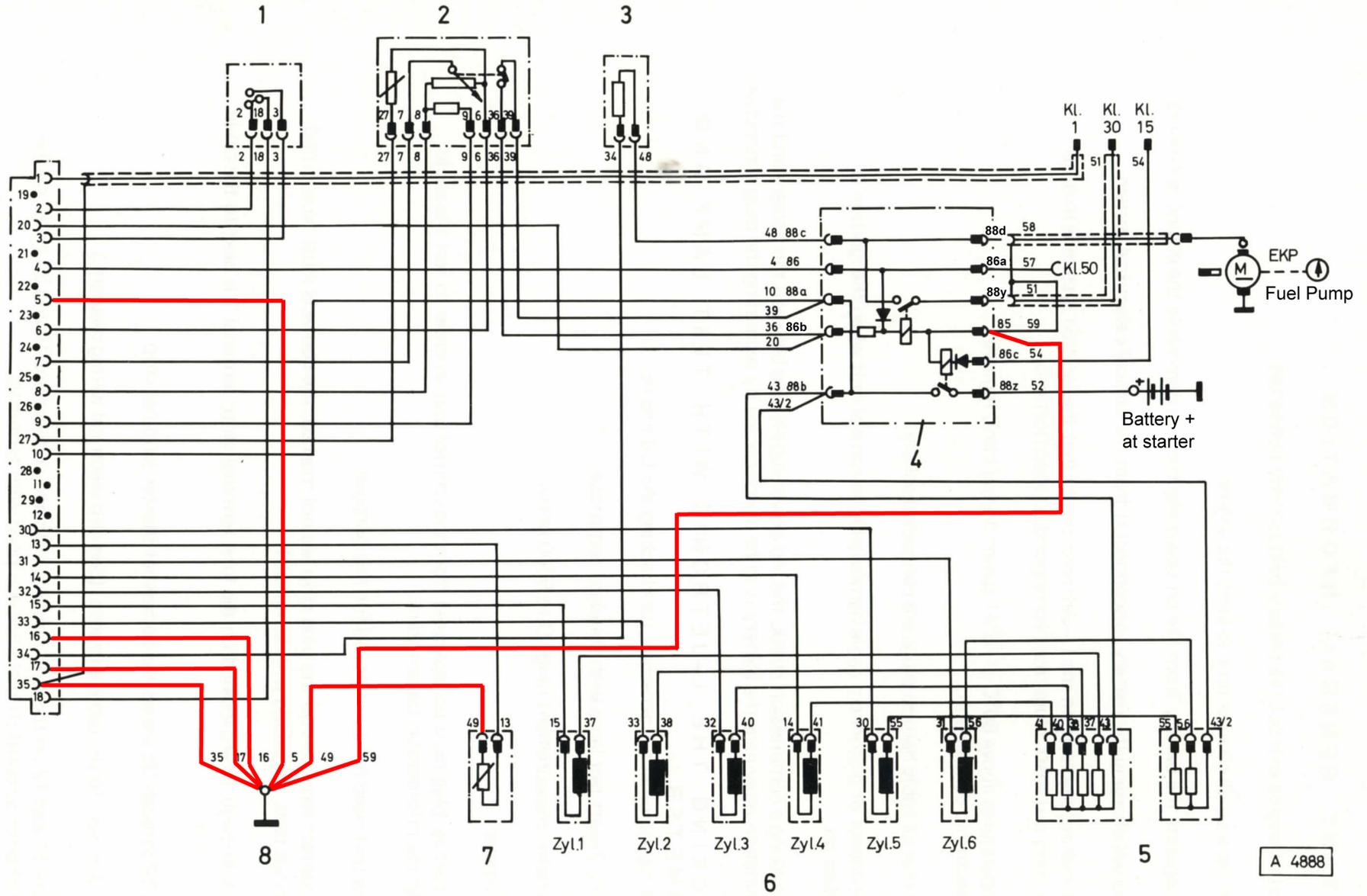
Connect 12V to pin 85

Touch pin 86 with Ground/Minus ("green" relay) - Result should be no clicking

Touch pin 86c with Ground/Minus ("red relay") - Result should be no clicking

**If your relay passes all the above tests it is fully operational.**

# Testing with Harness removed from Car



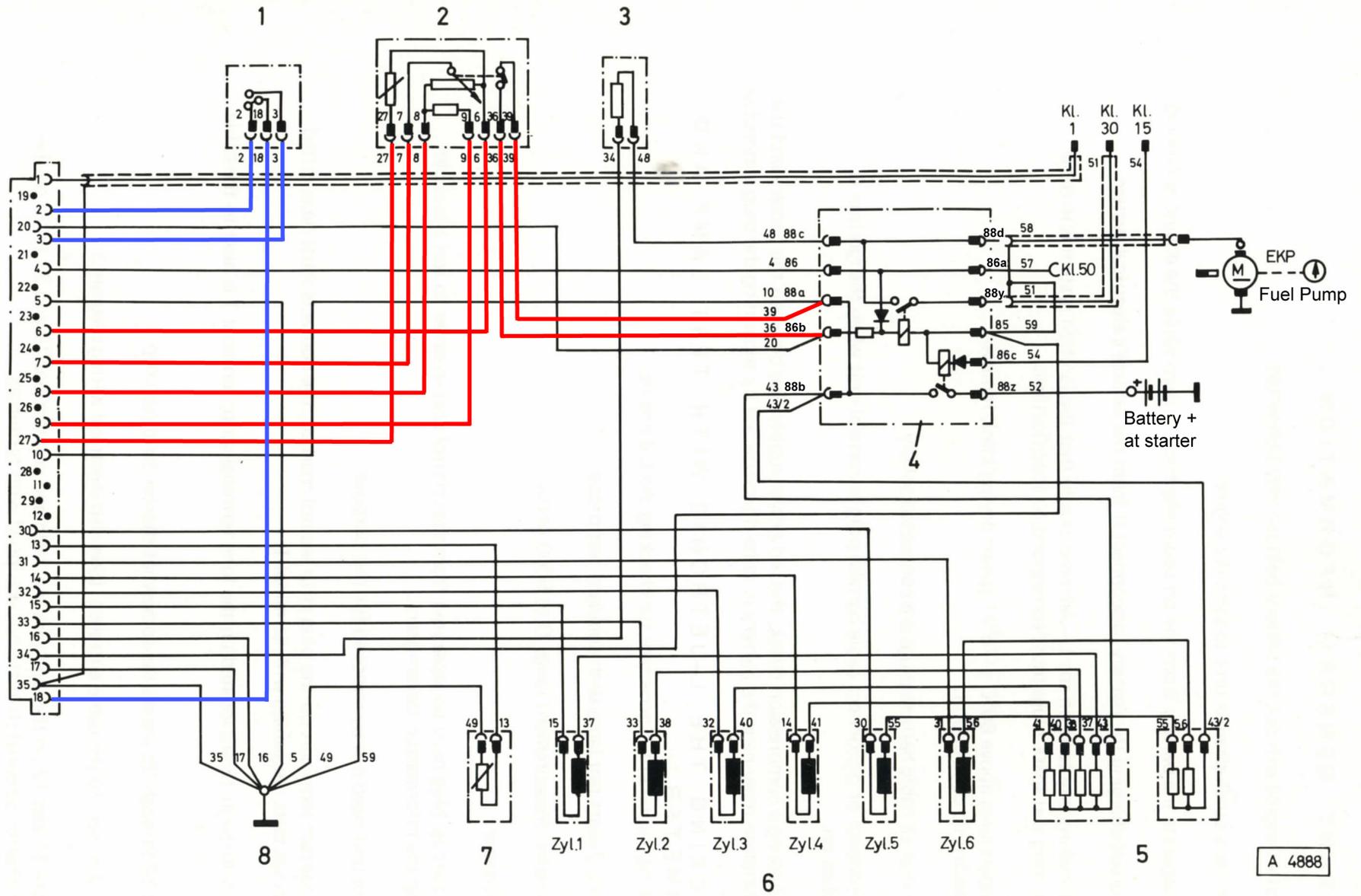
1 Throttle valve switch  
2 Air flow sensor

3 Auxiliary air valve  
4 Combination relay

5 Series (dropping) resistors  
6 Injection valves

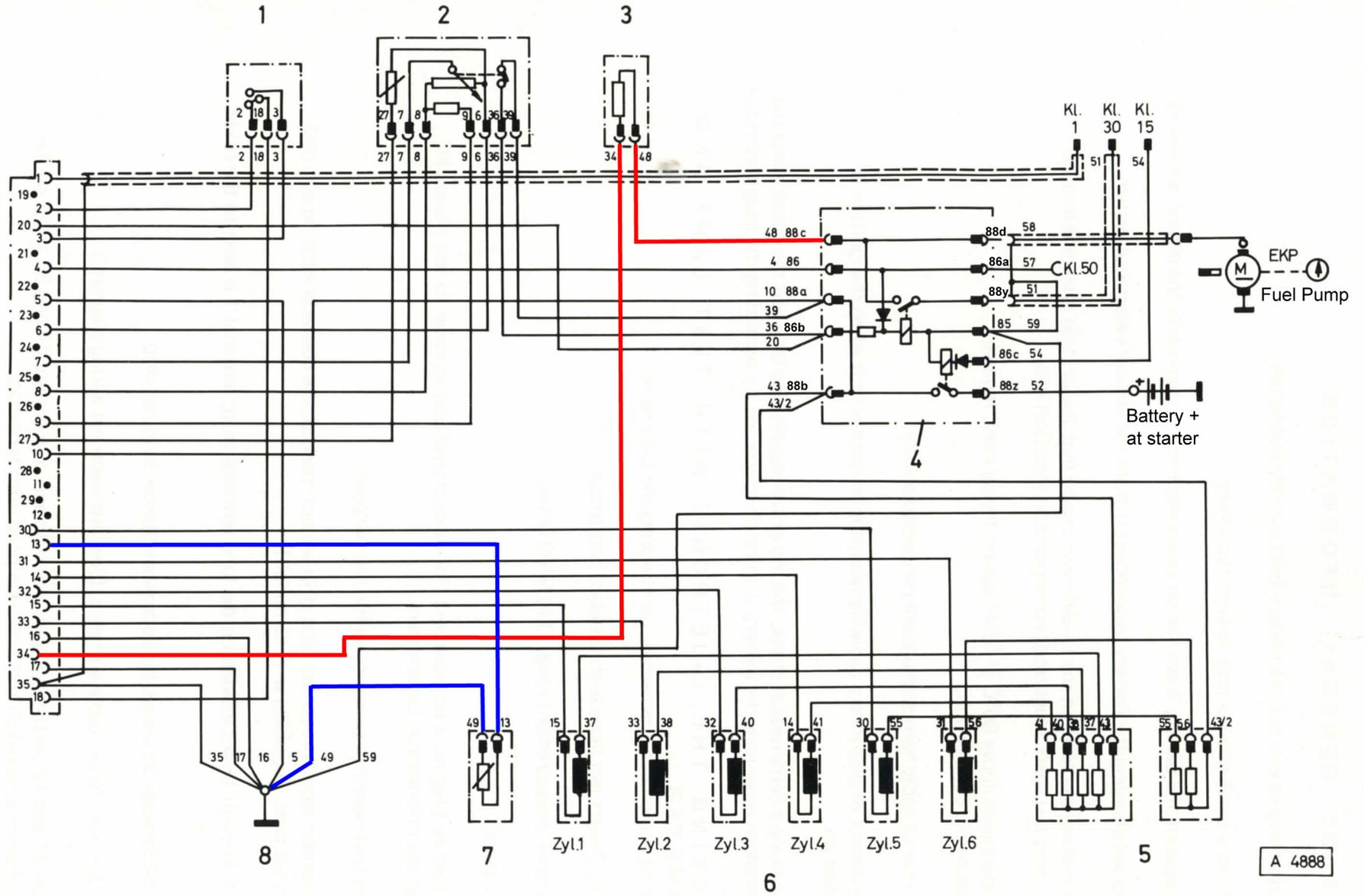
7 Temperature sensor II  
8 Central ground connection

# Testing Injection Ground



- |                         |                       |                               |                             |
|-------------------------|-----------------------|-------------------------------|-----------------------------|
| 1 Throttle valve switch | 3 Auxiliary air valve | 5 Series (dropping) resistors | 7 Temperature sensor II     |
| 2 Air flow sensor       | 4 Combination relay   | 6 Injection valves            | 8 Central ground connection |

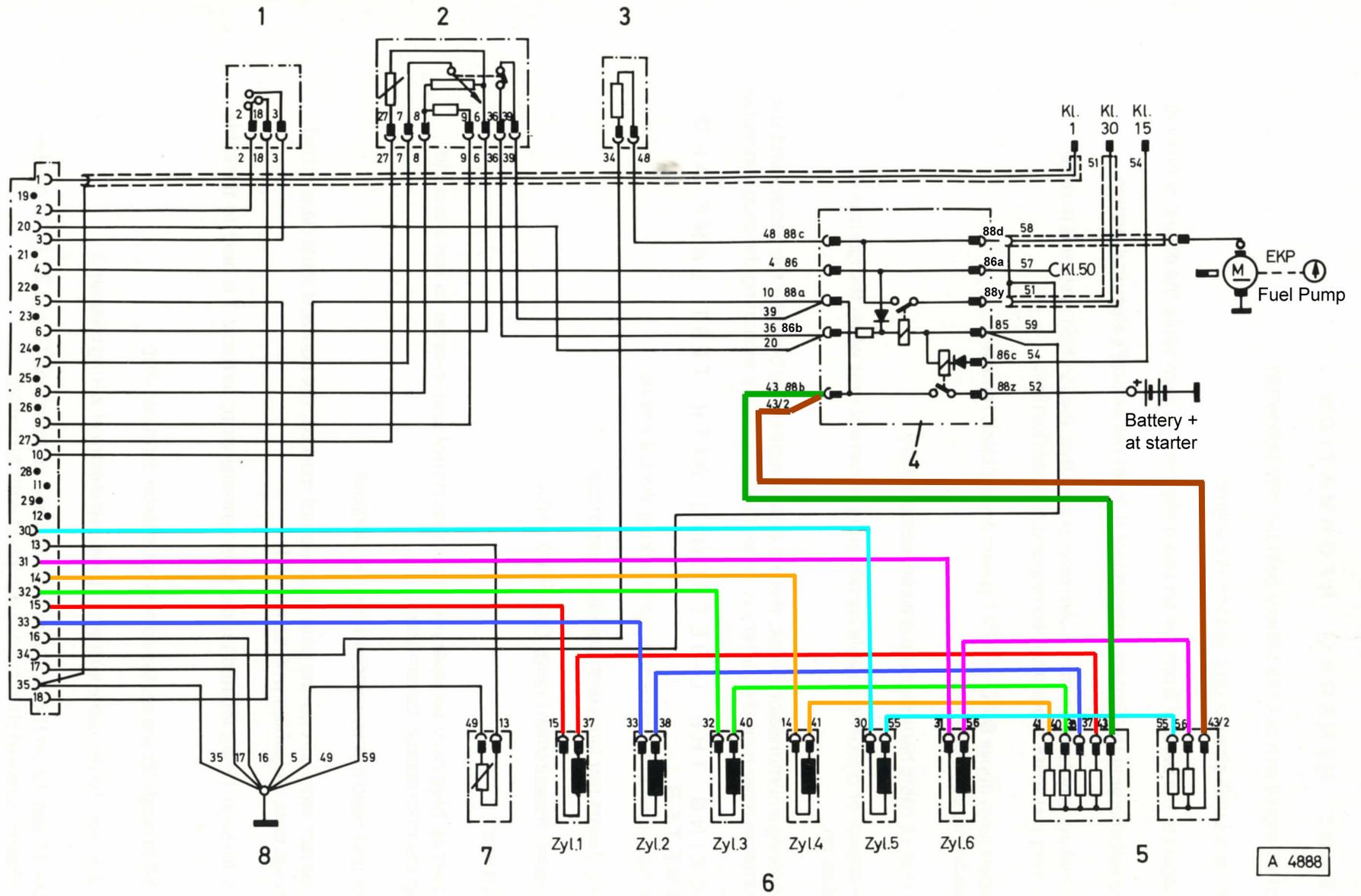
## Testing Air Flow Meter and Throttle Position Sensor



A 4888

- |                         |                       |                               |                             |
|-------------------------|-----------------------|-------------------------------|-----------------------------|
| 1 Throttle valve switch | 3 Auxiliary air valve | 5 Series (dropping) resistors | 7 Temperature sensor II     |
| 2 Air flow sensor       | 4 Combination relay   | 6 Injection valves            | 8 Central ground connection |

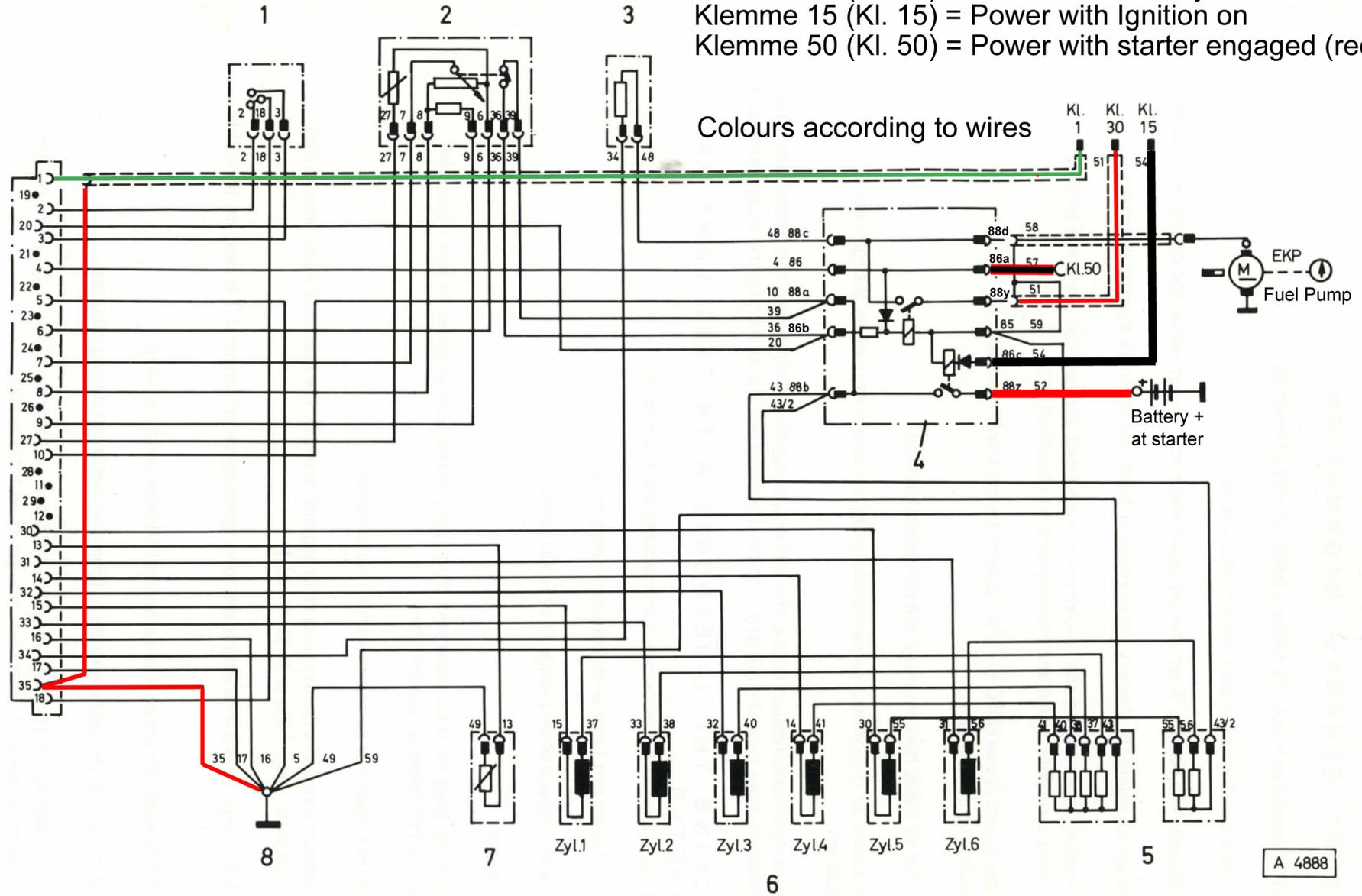
## Testing Auxiliary Air Valve (3) and Temperature Sensor (7)



- 1 Throttle valve switch
- 3 Auxiliary air valve
- 5 Series (dropping) resistors
- 7 Temperature sensor II
- 2 Air flow sensor
- 4 Combination relay
- 6 Injection valves
- 8 Central ground connection

## Testing Injection Valves (6) and Resistor Packs (5)

Klemme 1 (Kl. 1) = Low Voltage Distributor Connection  
 Klemme 30 (Kl. 30) = Permanent Battery Power  
 Klemme 15 (Kl. 15) = Power with Ignition on  
 Klemme 50 (Kl. 50) = Power with starter engaged (red/black)

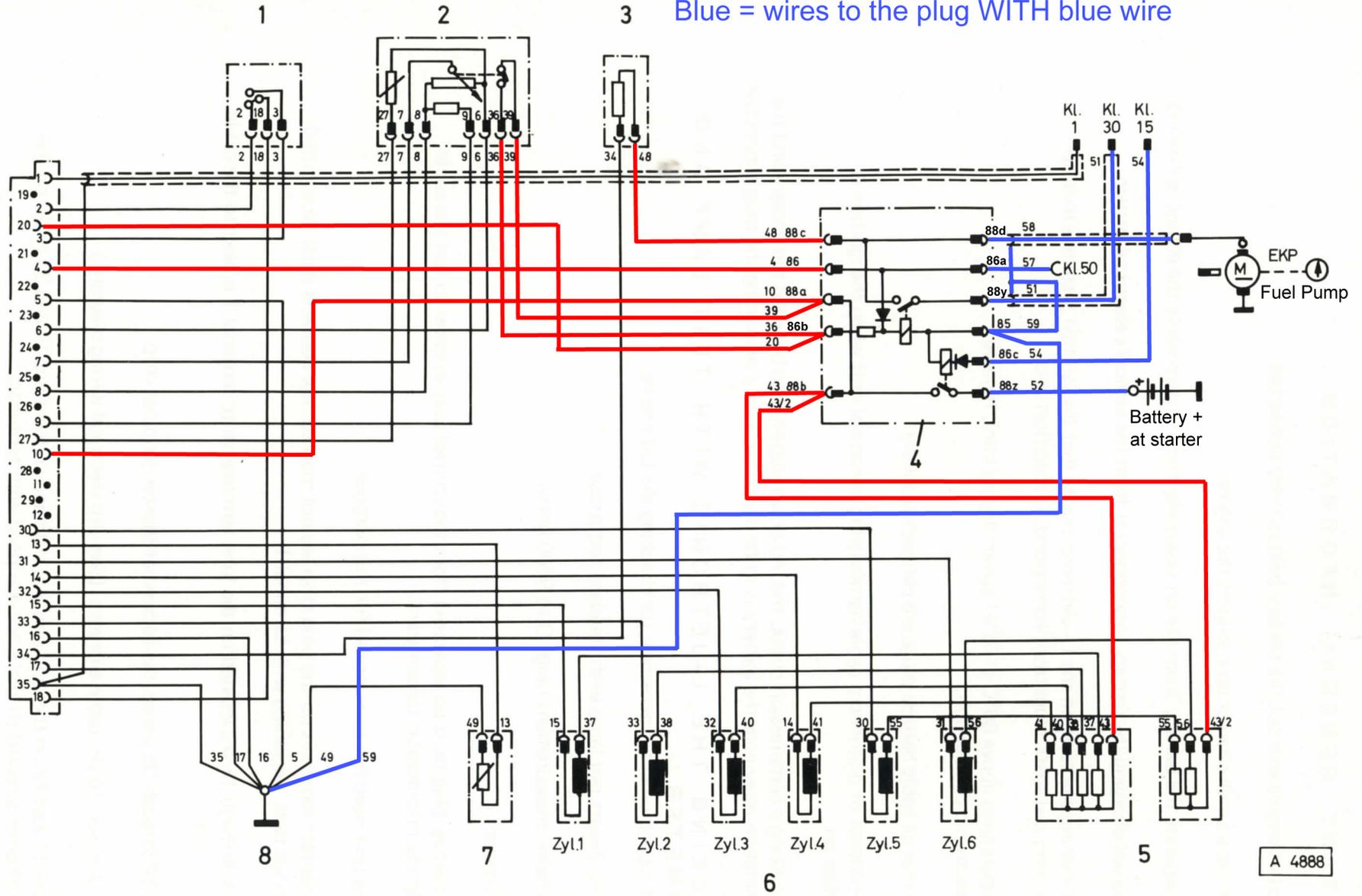


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|-------------------------|-----------------------|-------------------------------|-----------------------------|
| 1 Throttle valve switch | 3 Auxiliary air valve | 5 Series (dropping) resistors | 7 Temperature sensor II     |
| 2 Air flow sensor       | 4 Combination relay   | 6 Injection valves            | 8 Central ground connection |

## Testing Three Pin Connector at the Firewall and Connections at Starter

Red = wires to the plug WITHOUT blue wire

Blue = wires to the plug WITH blue wire



1 Throttle valve switch

2 Air flow sensor

3 Auxiliary air valve

4 Combination relay

5 Series (dropping) resistors

6 Injection valves

7 Temperature sensor II

8 Central ground connection

# Testing Connection to the Double Relay

# Connections, ECU plug - Cars without O2 sensor

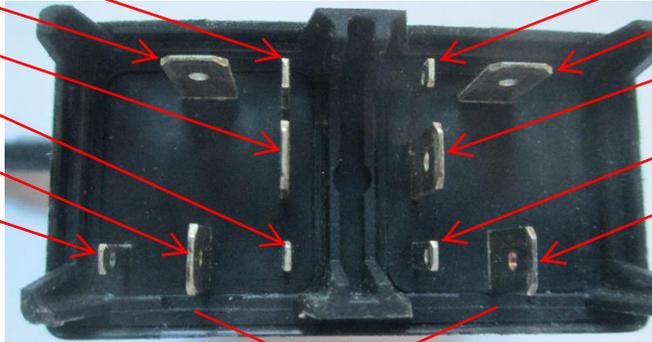
Nothing	<del>19</del>	1	Plug at back of engine - green wire
Relay connection 86b	20	2	Throttle switch - Left pin
Nothing	<del>21</del>	3	Throttle switch - Right pin
Nothing	<del>22</del>	4	Relay connection 86
Nothing	<del>23</del>	5	Main ground - back of intake manifold
Nothing	<del>24</del>	6	Air flow meter - Pin 5
Nothing	<del>25</del>	7	Air flow meter - Pin 2
Nothing	<del>26</del>	8	Air flow meter - Pin 3
Air flow meter - Pin 1 (left)	27	9	Air flow meter - Pin 4
Nothing	<del>28</del>	10	Relay connection 88a
Nothing	<del>29</del>	11	Testing port
Injection valve - Cylinder 5	30	<del>12</del>	Nothing
Injection valve - Cylinder 6	31	13	Temperature sensor 2
Injection valve - Cylinder 3	32	14	Injection valve - Cylinder 4
Injection valve - Cylinder 2	33	15	Injection valve - Cylinder 1
Auxiliary air valve	34	16	Main ground - back of intake manifold
Main ground - back of intake manifold	35	17	Main ground - back of intake manifold
		18	Throttle switch - Center pin

# Pin designations on Fuel Injection Relay



- 86c - Plug, back of engine, black
- 88d - Blue wire near ECU plug
- 88z - Starter positive terminal
- 85 - Main ground, intake
- 88y - Plug, back of engine, red
- 86a - Red/black wire, starter

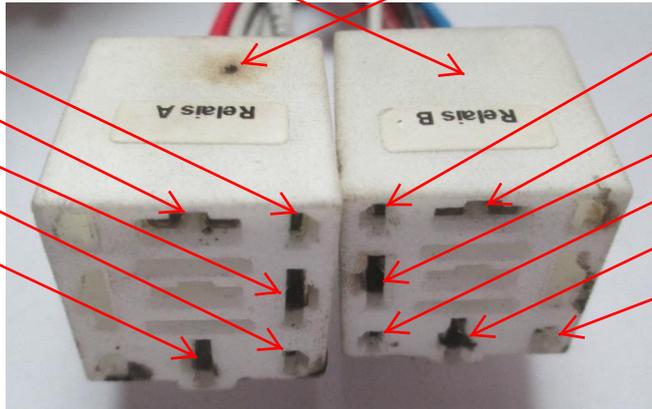
- 86 - ECU pin 4
- 88b - Resistor packs, 2 and 4 pins
- 88a - ECU pin 10 and AFM pin 7
- 86b - ECU pin 20 and AFM pin 6
- 88c - Auxiliary air valve



86 - ECU pin 4

- 88b - Resistor packs, 2 and 4 pins
- 88a - ECU pin 10 and AFM pin 7
- 86b - ECU pin 20 and AFM pin 6
- 88c - Auxiliary air valve

- 86c - Plug, back of engine, black
- 88d - Blue wire near ECU plug
- 88z - Starter, positive terminal
- 85 - Main ground, intake
- 88y - Plug, back of engine, red
- 86a - Red/black wire at starter



Please keep in mind that, when you look at the plugs, the positions of the connectors are a mirror image of the pins on the relay.

# Resistor Pack to Injector Connections

Cylinders 1 through 4

Cylinders 5 and 6

