Porsche 928 L- Jetronic Fuel System No-Start Diagnosis

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This document addresses the L-Jetronic fuel injection system used in US, North America and Japan model Porsche 928s from model year 1980 – 1984. [Note, the Euro/ROW 928s from 1980 – 1983 used the Bosch K-Jetronic mechanical fuel injection and from 1984 used the LH Jetronic (first generation digital fuel injection)]. The L-Jetronic fuel injection was the first-generation electronic fuel injection and provided Lambda air/fuel regulation for an O2-sensor catalytic converter emissions system. It is based on an analog design, there are no memory chips that can be tuned. As with any older electronic system parts fail with age. The ability to repair these older modules is limited. Electronik Repair may be able to repair them or have a good used/rebuilt modules in stock.

The Porsche 928 Factory Workshop Manuals are an excellent reference. The section addressing the L-Jetronic is Manual 1A Pages 24-01 to 24-122. I recommend reviewing those pages. Any problem with the spark system must be corrected before suspecting the L-Jetronic or associated modules as a problem.

The L-Jetronic system requires a certain set of signals to function.

The L-Jetronic module must have an RPM signal input, power, ground, airflow sensor and temperature sensor connections with valid voltages/resistance. A failed airflow meter and/or temperature sensor can result in a no start.

Diagram 1 illustrates all the necessary connections and where the probe points are on the Central Electric Panel (Fuse Panel). Test probe between the L-Jetronic Connector and various points to confirm continuity, voltages and ground. The AFM (Fuel Injection) Relay XVI is a custom part and the connections 87 (powers fuel injectors) and 87A (powers the L-Jetronic) circuits are necessary. Remove the AFM relay, create a Y shaped jumper wire between socket positions 30, 87 and 87A to power the two circuits and them measure the voltage at the L-Jetronic connector pins 10 & 29 and also double check that there is voltage at the fuel injectors L-Jetronic connectors pins 11, 15, 32 & 33.

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PORSCHE CARS NORTH AMERICA
SERVICE INFORMATION
P90

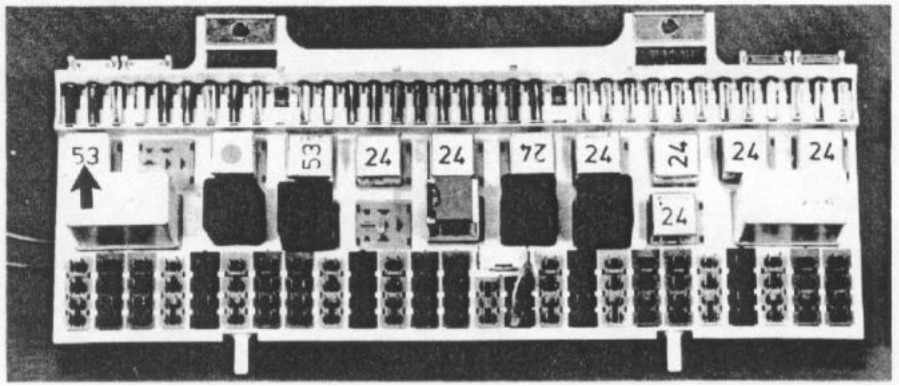
I recommend this manual to become familiar with 1978 – 1984 Electrics. The information provides is sourced from this manual.

A sage mechanic taught me that for diagnosis a good amount of current flowing is needed to verify a connection/ground. Just an Ohm meter measurement isn't good enough because very little current flows with that test so a bad connection can look good. This mechanic wired a brake light (or other bulb that will draw current) in series with a battery for continuity and ground connection testing! The lamp will be dim if the connection is bad. L-Jetronic Pins 23 and 35 must be verified as having good ground connections.

You'll need to probe every necessary connection at various points to verify continuity or if there is an open circuit, short circuit or no-connect (broken wire).

The Porsche Central Electric (Fuse) Panel. There are differences by model year, be sure to locate the exact lay-out and schematics.

The central electrical system is located under the foot well cover on the right hand side. It is called the central electrical system because all the vehicle's main cable harnesses lead to this board and all **fuses** (except radio and central locking fuses) and all **relays** (except time, rear wiper relay) are accommodated on the board. This is, therefore, the vehicle's central junction and switching point.



How do the individual CEBs differ?

CEB Mod. 78 – equipped with set of diodes in relay base XI.
Fuse 13 spare.

CEB Mod. 79 – set of diodes deleted, tachometric relay (air conditioning) fitted in base XI.
Bridge terminals 30 – 87 if no air conditioning is fitted.
Fuse 13 spare.

CEB Mod. 80 – tachometric relay XI deleted, new wiring for different main light circuit (combination relay instead of individual relays).
Fuses 13 and 7 spare.

CEB Mod. 81 – fuse allocation changed (control of instrument lighting modified).
Fuses 13 and 10 spare.

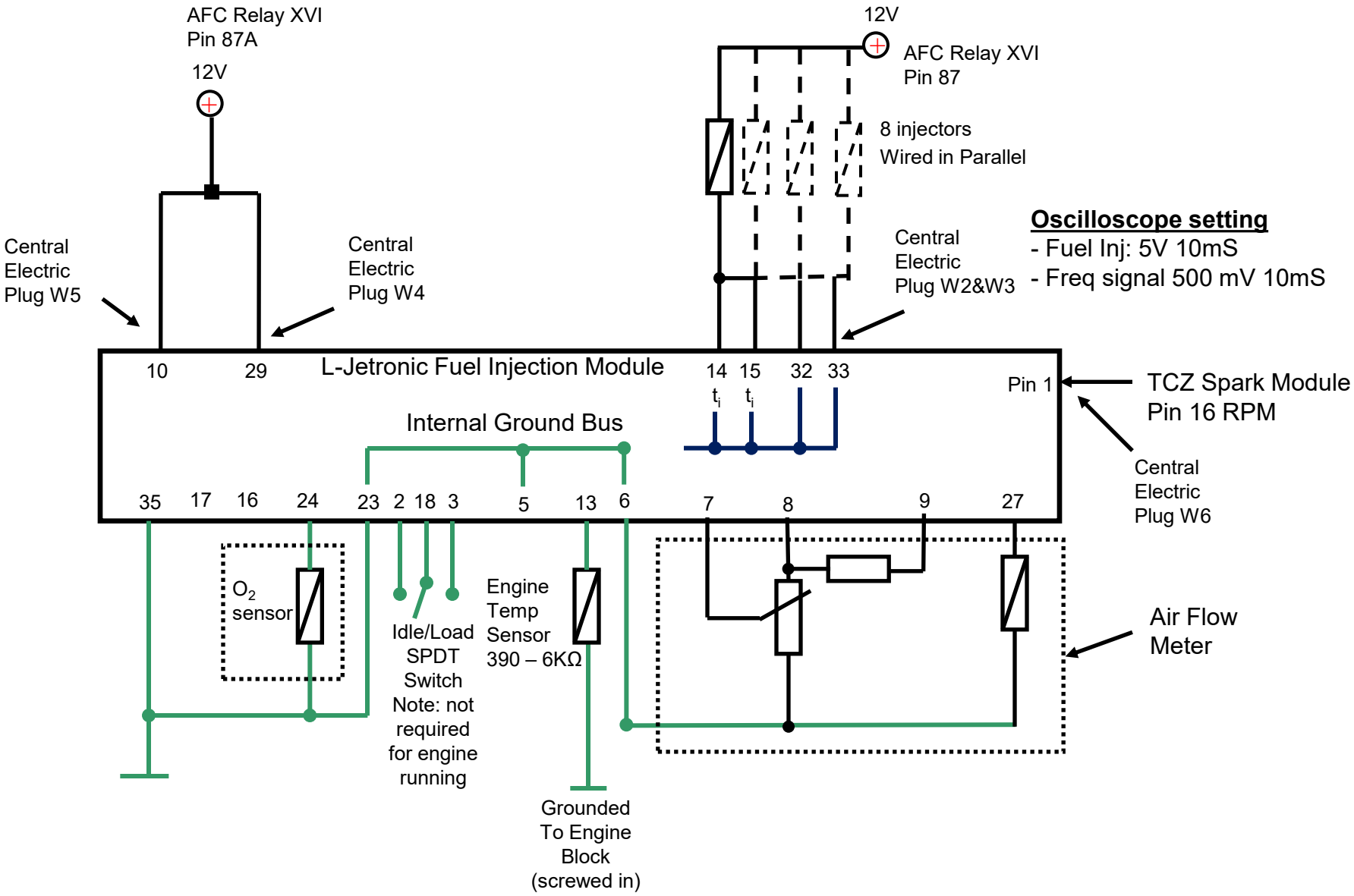
CEB Mod. 82 – modified wiring, starter relay XIV for all vehicles. (Bridge on connector in spare wheel well in case of manual gearbox.)
Fuses 13 and 10 spare.

CEB Mod. 83 – modified wiring - NEW! Relay IX (kickdown relay) for 4-speed automatic transmission only, relay XII (fog light for USA vehicles).
CEB 05 can be installed in Mod. 83 vehicles providing they are not equipped with 4-speed automatic transmission or USA versions.
CEB 06 can be installed in place of **CEB** 05.

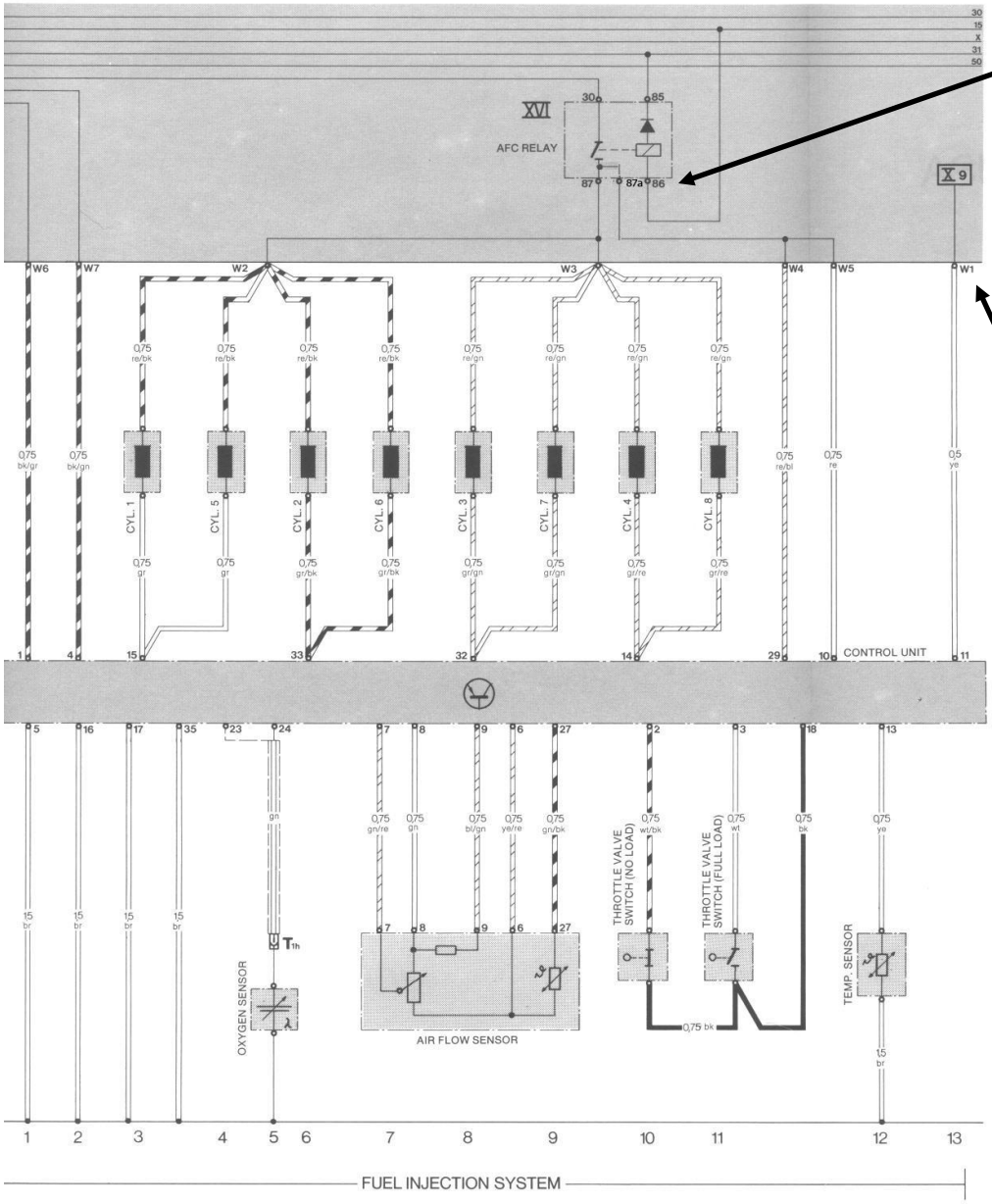
CEB Mod. 84 – USA – new wiring for ABS (anti-skid system).
Fuses 10 and 22 spare.

CEB Mod. 84 – completely new wiring for ABS, LH Jetronic and EZF ignition.
Second ground (earth) lead from **CEB's** ABS relay.
4 connections on connector base Y assigned to ABS.
Fuses 10 and 22 spare.

Diagram 1: Porsche 928 L-Jetronic Required Connections



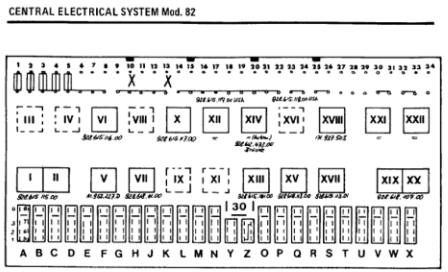
rrent Flow Diagram Type 928 USA Model 82 Part II



in Germany - Va, 1981

Note the AFC Relay XVI circuit schematic has been updated to accurately illustrate relay terminals 87 and 87A which are not noted in the original Factory Workshop Manual Schematics

Note the Central Electric (Fuse Panel) Plug Numbers on Diagram.



Note the Central Electric Plug Identified by Letter, look for W socket then locate Pin numbers for probing.

Color coding of cables

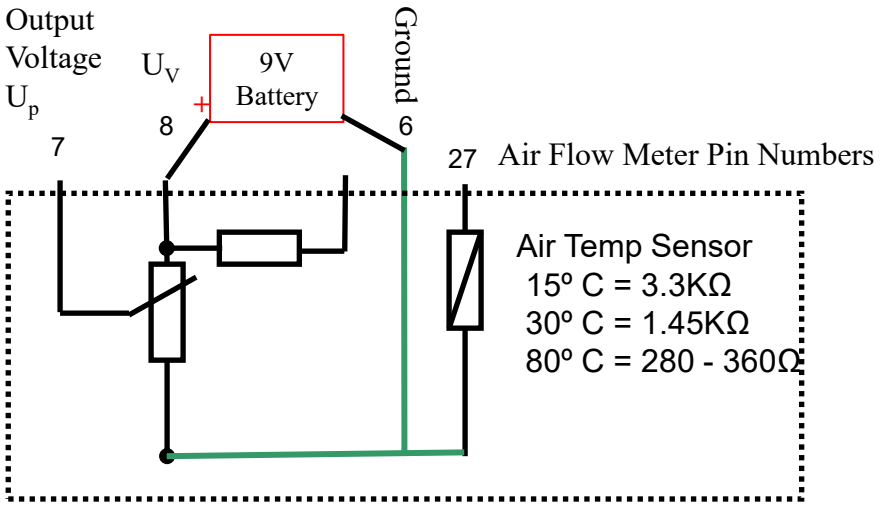
Examples:

green	– ignition coil to distributor
black	- battery to starter
	-- ignition switch to coil
red	– starter to generator
brown	– ground (earth)
light blue	– charge light to generator
white	– dipswitch to fuse (main beam)
yellow	– dipswitch to fuse (dipped beam)
grey	– fuse to tail/license plate lamps

Airflow Meter

The L-Jet requires the proper voltages from the airflow meter. Once continuity is confirmed from each connector pin to the L-Jet connector in the car, verify that the Air Flow Meter is producing the proper signals.

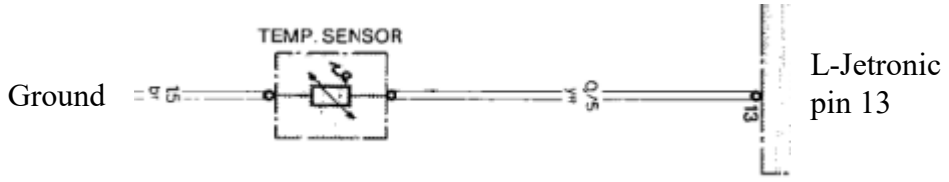
A bench air flow meter test setup consisting of a volt meter, 9V battery, battery connector, and two 0.1 inch female blade connectors. The input voltage U_v is 9V, the output voltage U_P must rise smoothly as the door is opened.



Coolant Temperature Sensor

P/N 928 606 201 03 Resistance Test … make sure it is a smooth curve (it is not a linear curve)

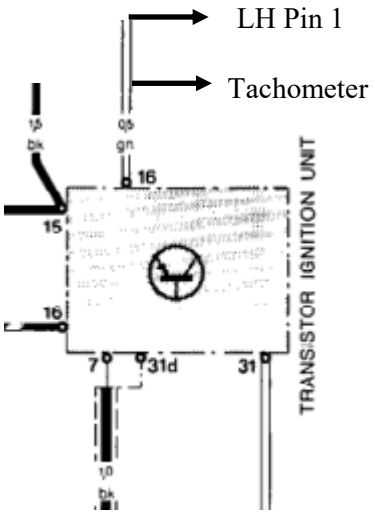
0 C / 32 F:	4.4 - 6.0k Ω (Ohm)
15 – 30 C / 59 - 86 F:	1.4 to 3.6k Ω
40 C / 104 F:	0.9 – 1.3k Ω
60 C / 140 F:	480 – 720 Ω
80 C / 176 F:	250 – 390 Ω



My mechanic has had sensors work at one temperature then fail as the engine warmed up. It must be tested across the full range.

RPM Signal Ignition Unit Pin 16 to L-Jetronic Pin 1 Circuit

The output from the transistor spark unit pin 16 goes to the L-Jetronic pin 1, to the tachometer, and possibly an anti-theft device (look to the factory workshop schematics to find that). Many difficult to diagnose no-start conditions have been traced to a corroded connection, failed tachometer, or short to ground in this circuit. First verify that there is an RPM signal. If the fuel pump turns on when the engine is cranking, this verifies that there is an RPM signal as the custom relay has an internal RPM senor and won't turn the relay on unless an RPM of 50 or greater is sensed. If an oscilloscope is used, probe L-Jet connector Pin 1 socket and look for a square wave (lower duty cycle) when the engine is cranking. If there is no signal, locate where the problem is. It is possible that the RPM output from the Transistor Ignition Unit has failed. Disconnecting the two ribbon cables at the base of the instrument cluster to the car would eliminate the tachometer as a potential failure. One mechanic informed me that he had to cut the wire to the tach to get the engine to start.



O2 Sensor

The sensor has a shielded cable (grounded). Ensure that the signal wire L-Jet connector pin 24 isn't shorted to the shielding L-Jet connector pin 23.

There Are Many Differences in Central Electric Panels Over The Model Years

Model	CEB end digits 928.610.105. . .	can be installed in model
1978	.00	only '78
1979	.01	'78 / 79
1980	.03	only '80
1981	.04	'80 / 81
1982	.05	only '82
1983	.06	only '83 for USA 4-speed automatic '82 / 83 for rest of world
1984	.07 / 08	07 – only 84 for USA / Japan, 08 – only 84 for rest of world
1985		

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1. Front of CEB

The central electrical system consists of a plastic board with fuse holders and relay bases as well as connectors for the cable harness sockets. The relay and connector bases are fitted individually in the CEB board and held by retaining lugs.

All **fuses** are situated in the upper part of the board. They are numbered from left to right with the numbers **1 – 34**. These identification numbers are visible above the fuses.

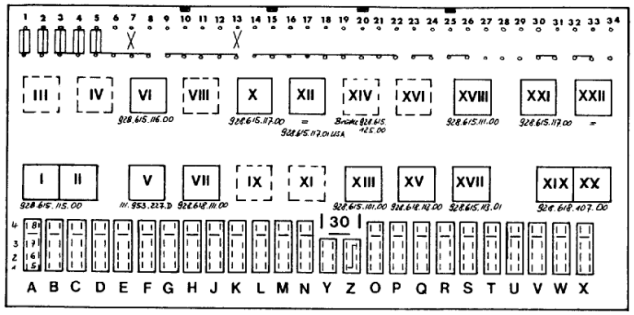
The **relays** are arranged in the center of the **CEB** board and are identified by the **"Roman numerals I — XXII"** which are also applied to the board. **(Remember this point — it is important!)**

The **connector groups** for the cable harness sockets are arranged in the lower part of the board and marked by the letters **A – Z** on the bottom multi-point connector. The base of each connector group is also numbered **1 – 8** for each connector. This means that each individual plug and socket connection can be found very easily.

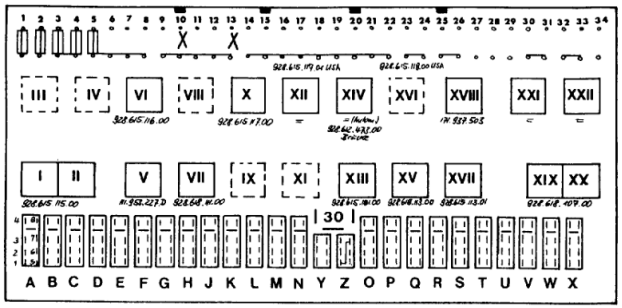
For example: **A1** = connector group **A**, connector No. **1**
U5 = connector group **U**, connector No. **5** etc.

The connector bases and the cable connectors are colored.

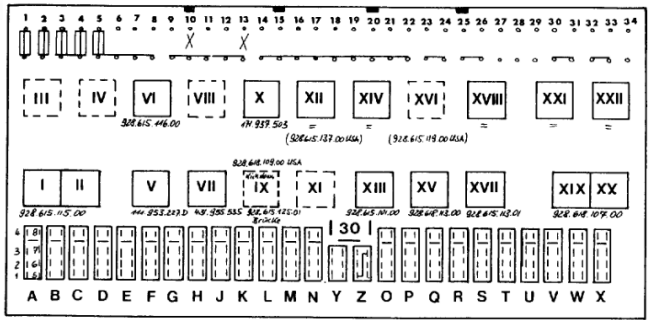
CENTRAL ELECTRICAL SYSTEM Mod. 80 – 928 S



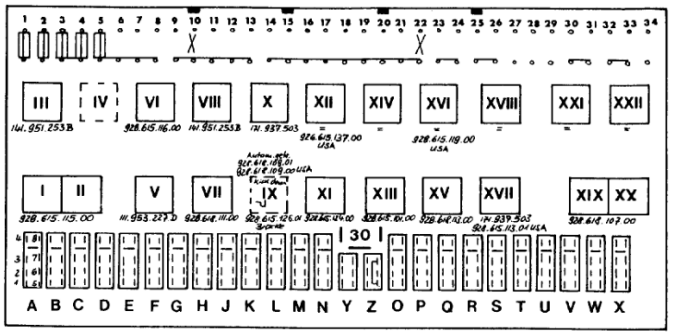
CENTRAL ELECTRICAL SYSTEM Mod. 82



CENTRAL ELECTRICAL SYSTEM Mod. 83



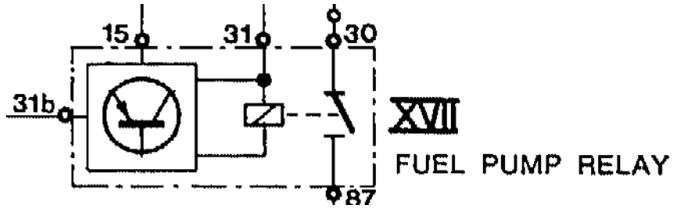
CENTRAL ELECTRICAL SYSTEM Mod. 84



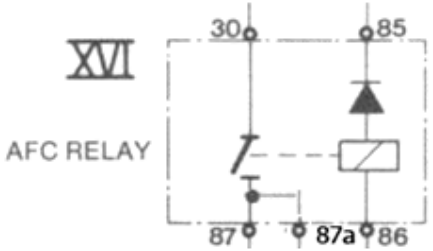
Porsche 928 L-Jetronic Fuel Pump and AFC/Fuel Injection Relays
These Are Dedicated Parts, Standard Relays Will Not Function

- Many Cars may have the original relays, now decades old and may have failed
- Check the part number, the wrong relay may have been installed

1978 to 1984 (US-Spec L-Jet)
Fuel Pump Relay is a Custom Relay
P/N 928-615-113-03 (supersedes -02 and -01).
Contains internal RPM sensor circuit to energize relay.



1980 to 1984 (US-Spec L-Jet)
AFC/Fuel Injection Relay is a Custom Relay
P/N 928-615-119-03 (supersedes -01 and -00).
Has “Y” shaped switched output to 87 and 87A circuits.



35 Pin L-Jet Connector Pin-out Detail