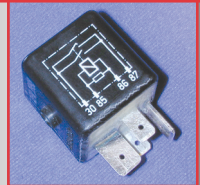
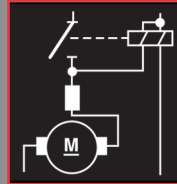


# AUDI ACADEMY

## How to Read Wiring Diagrams

Symbols, Layout and Navigation



Self-Study Program  
Course Number 973003

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Audi of America, Inc.  
Service Training  
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# Course Goals

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## Course Goals

This course will enable you to:

- Follow current from its power source to the Ground point quickly and accurately.
- Understand the symbols of common components and circuit designations used in Audi Wiring Diagrams.
- Practice Wiring Diagram navigation through practical exercises and hands on examples.



## Introduction

As today's vehicles become increasingly complex, so does the job of the technician. Wiring diagram navigation skills are critical to diagnosing and repairing today's vehicle in a timely and accurate manner.

This Self Study Program is not intended to instruct the technician how the electrical system operates in a vehicle. Given an understanding of electrical operation, this Self Study Program will introduce you to the skills necessary to read Audi wiring diagrams.

In this program you will be exposed to all aspects of wiring diagrams, including:

- Commonly used symbols and their meanings
- Current tracks, including how to follow circuits between pages or diagrams
- Component identification
- DIN standards for terminal designations
- Wiring color codes and gauge (size)
- Terminal identification on both connectors and components

This book will provide examples of various types of circuits. The Computer Based Training (CBT) CD included at the end of this self study will provide an opportunity to practice "hands-on" wiring diagram navigation.

Areas of text that give the technician an opportunity to practice the concepts in the CBT will be designated with an icon of a CD (below) at the beginning of that section.



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# Wiring Diagram Overview

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## Overview

Audi wiring diagrams are a graphic representation of the actual vehicle wiring. They are developed from the engineering drawings that are used to produce the wiring harness. A consistent set of symbols are used to represent the actual components and conductors.

Audi electrical systems and wiring diagrams follow the German DIN (Deutsche Industrie Norm/Deutsches Institut für Normung) standards. These standards are guidelines for manufacturing in Germany, similar to SAE (Society of Automotive Engineers) in the United States.

## Layout

The layout of wiring diagrams is common to all Audi vehicles. Called “Current Track” wiring diagrams, they show the power source at the top of the page and the Ground points at the bottom. Situated vertically between power and Ground are the current tracks, which contain electrical components and conductors.

This current track layout simplifies the wiring diagram. Conductor symbols crossing where they do not connect is kept to a minimum. Refer to the example on page 3 for the basic layout of the wiring diagram.

## Central/relay panel

The central/relay panel is indicated in gray at the top of the wiring diagram page. The central/relay panel includes common power circuits, such as battery power (30), ignition switched power (15), load reduction (75/X), and Ground (31).

## Ground Connections

Ground connections are represented as a line at the bottom of the wiring diagram page, directly above the current track numbers. All Ground connections, whether they occur as a splice in a harness, or the final Ground source, are numbered and identified in the wiring diagram.

## Conductors and components

Between the central/relay panel and the vehicle ground at the bottom of the diagram are located the component symbols and conductors. Components are marked with a component code listed in the legend. Conductors are generally marked with wire color and size.

## Current tracks

Individual current tracks are identified numerically along the base of the wiring diagram. These numbers are used to find the continuation of a conductor. Where the system or circuit layout is complex, this continuation may be on the same page, or on a different page.

For example, the number 191 inside of the small box on page 3 indicates that the wire is continued on current track 191. Following straight down on the diagram, we see that this wire is on current track 5. If we were to navigate to current track 191, we would see the same color and size wire with a small box containing the number 5.

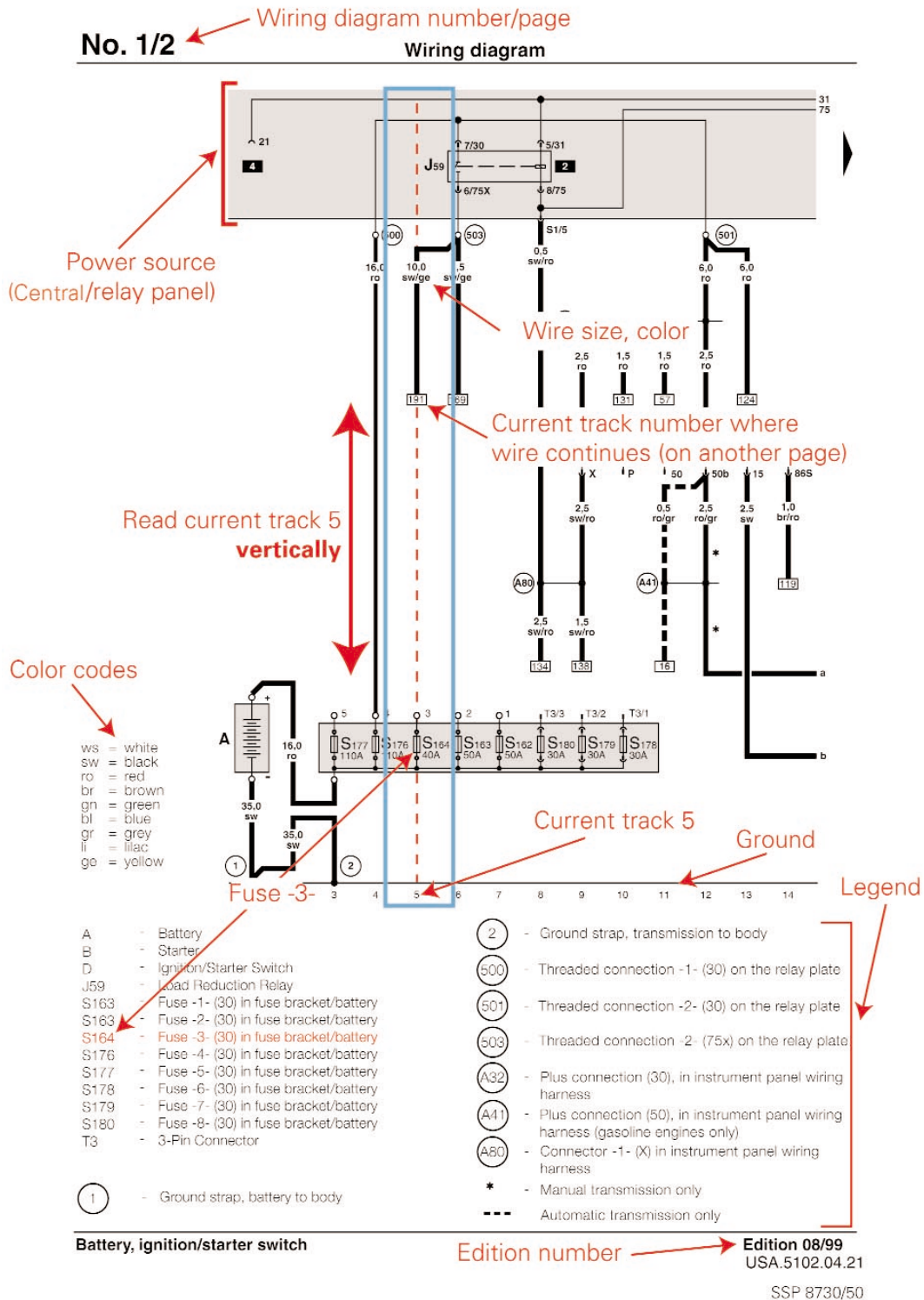
## Legend

Below the current track numbers you'll find a legend of the components (by component code) found in the specific diagram. This will often detail the location of a given component or connection.

# Wiring Diagram Overview

## Navigation

Navigation in the wiring diagram is based around the use of the current track numbers. You will generally start with the affected component and then follow the associated circuit from there, tracing Power, Ground, and signals that affect the component's operation.



## Elements of a Wiring Diagram

## Elements of a wiring diagram

In this section, we will look at how various symbols are used in a wiring diagram to represent the actual components on the vehicle.

Every circuit needs a minimum of the following to operate:

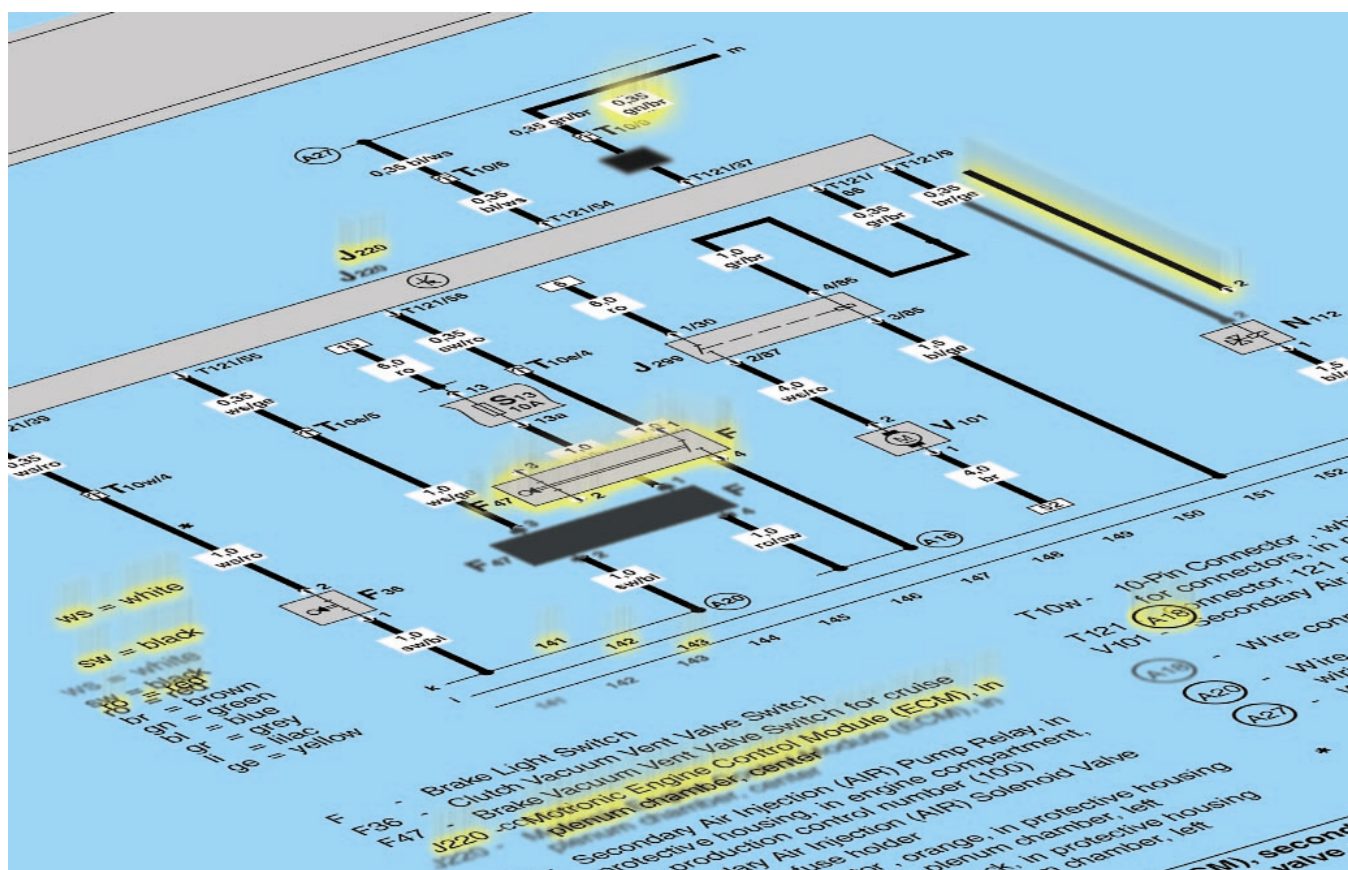
- Power supply
- Consumer (load)
- Ground
- Conductors (usually wire)

If any of these are missing, a complete circuit is broken and the consumer will not function. The ability to break down a circuit into its individual parts is the key to being able to diagnose failures in the circuit.

Wiring diagrams incorporate many symbols used to illustrate a complete circuit. These symbols can include:

- Current track numbers
- Components
- Terminal designations
- Conductors
- Connectors

Together these components make up a complete and accurate wiring diagram.



## Symbols

Graphical representations called "symbols" are used to represent components and conductors in wiring diagrams. The key to reading wiring diagrams is understanding the symbols.

These symbols are standardized, allowing quick recognition of various components.

## DIN Standard 72 552

This standard applies to the terminal designations for circuits. The purpose of the terminal designation system is to enable accurate connection identification from conductors (wires) to various components when diagnosis and repair is necessary. Examples of DIN standards for terminal designations are shown below:

1	Ignition coil primary
4	Ignition coil secondary
15	Ignition switched, on and start
30	Battery +
31	Ground
31b	Switched Ground
50	Starter control
75/X	Load Reduction/Ignition switched on only

The terminal designations do not identify the wires, but the type of circuit. For this reason, the designations are not placed on the wires in the diagram, but on the component. Refer to Appendix D on page 34 for a more complete list of terminal standards. Be aware that some abbreviations are used, and they may be abbreviations of German words. For example, "GRA" is the abbreviation for "cruise control," and VL is the abbreviation for "left front."



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# Elements of a Wiring Diagram

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## Introduction to Conductors

The wiring harness and related components may contain many different types of conductors, including wires, internal connections, threaded connections, welded connections, push-on connectors, multiple point connectors and Ground.

The complete list of wiring connections and symbols is shown in Appendix B.

## Wires

Wires are conductors that carry current to components, and are usually indicated by a solid line. A wire shown as a dashed line in a wiring diagram indicates that the wire does not apply to all vehicles, and is noted in the wiring diagram legend.

## Wire colors

Knowing the standards for wiring colors makes the job of reading and interpreting them easier. Some of the common standards include wiring color for specific circuits, as well as the terminal designation. For example:

Red . . . . .	Battery +
Green. . . . .	Ignition (1)
Brown . . . . .	Ground (31)
Yellow . . . . .	Headlights (58)

Once the technician has an understanding of the color guides, the job of isolating systems becomes easier.

Wire colors are shown as abbreviations of the German word for the color.

The following list shows the German abbreviations to the English text for the most common colors. Refer to appendix C for other color code definitions.

bl . . . . .	Blue
br . . . . .	Brown
ge . . . . .	Yellow
gn . . . . .	Green
ro . . . . .	Red
sw . . . . .	Black
li . . . . .	Violet
ws . . . . .	White

## Wire sizes

Wiring diagrams also indicate the wire gauge used (shown in mm<sup>2</sup>), designating the cross sectional area of the wire. Because standards exist for the maximum permissible voltage drop across a circuit, wire gauge is critical. If the voltage drop across the wire is too high, one or more of the following may occur:

- The circuit may overheat
- The consumer may not operate properly (due to low voltage condition)
- Components may be damaged

If a wiring repair needs to be made and metric sized wire is not available, the technician may need to use American Wire Gauge (AWG) sized wire.

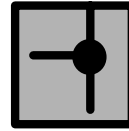
### Note:

- *If the exact size wire is not available for a repair, use the next larger size.*
- *For more information on wiring, refer to the **Wiring Harness Inspection and Repair** SSP (course number 971003).*

# Elements of a Wiring Diagram

## Other Conductor Descriptions

**Internal conductors** exist inside components, acting as bridges between the wiring harness and the final consumer. In some components these conductors are labeled in the component. An example would be the 30 circuit (Battery +) in the central/relay panel. In other components the conductor is not labeled. Internal conductors are shown as thin, black lines.



## Physical contact

Some components, such as the starter or generator, may receive Ground where they are bolted to the engine or transmission. This is also shown as a thin black line.

**Welded connections** are used in wiring harnesses to join multiple, smaller gauge wires to a single larger wire which terminates at the fuse relay panel or chassis Ground.



Sometimes a welded connection is shown with the thin line not terminating at another wire. This symbolizes that this welded connection is used in other diagrams for the car. The technician may need to reference other diagrams to locate components or Grounds related to this connection.

**Threaded connectors** are commonly used on the bottom of the fuse relay plate to distribute power and Ground to components. The common connectors include Battery power, Ground and load reduction (X).

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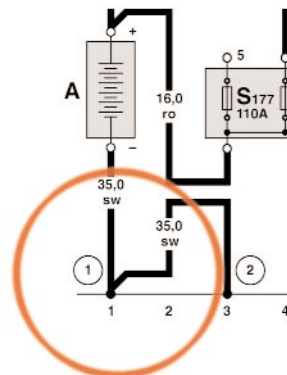




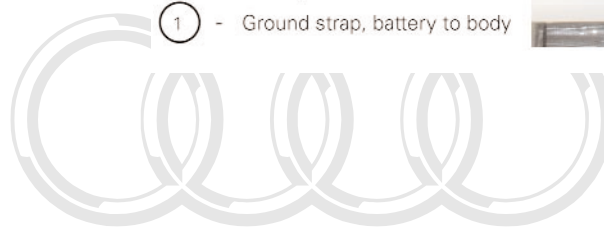
# Elements of a Wiring Diagram

## Ground

The vehicle chassis acts as a common Ground conductor throughout the vehicle, and is identified by the line at the bottom of the wiring diagram above the current track numbers. This Ground line will also show Grounds that are welded connections in the harness. The number in the circle will be repeated in the legend with a description of the Ground connection.



- A - Battery
- 1 - Ground strap, battery to body



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Audi wiring diagrams will show most Ground connections on the first page of the wiring diagram. In practice, you may need to search through the legend to find where a welded ground connection finally attaches to the vehicle chassis.



- T14i - Connector 14 pin, in engine compartment, left
- 12 - Ground connection, in engine compartment, left
- 50 - Ground connection, in luggage compartment, left
- 98 - Ground connection, in rear lid wiring harness
- 131 - Ground connection -2-, in engine compartment wiring harness
- 283 - Ground connection -2-, in wiring harness engine pre-wiring
- 286 - Ground connection -8- in wiring harness interior

SSP 8730/75



# Elements of a Wiring Diagram

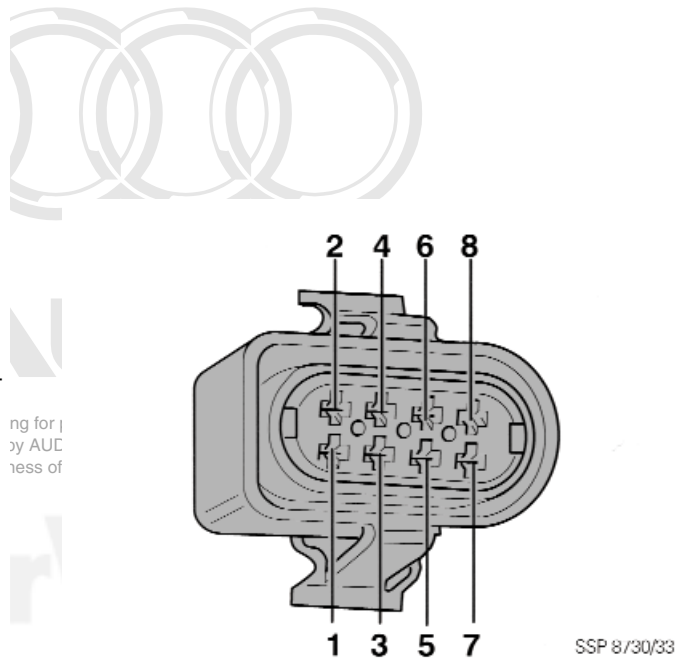
## Connector pin assignments

Wiring diagrams tell the user at which pin numbers the wires terminate, simplifying diagnosis.

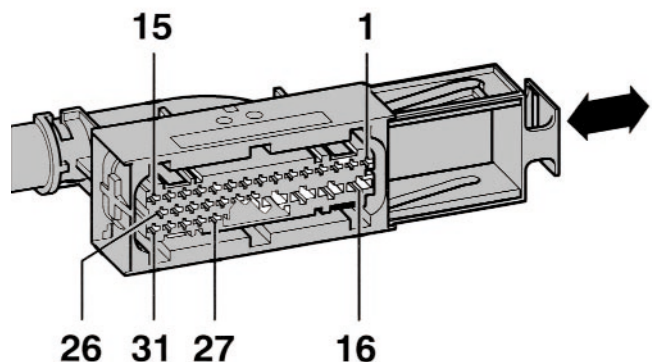
There are 4 main types of terminal designations:

- Push-on/multi-point connections
- Component/multi-point
- Central/relay panel
- Relay

**Push-on/multi-pin connectors** use the "T" designation, and are identified in the legend. For example, T8a/5 designates an 8-pin connector, with the specified wire located in terminal 5 of the connector housing. The legend will give additional information about this connector. For example: "8-Pin connector, brown, in engine compartment, in wiring duct, left" (see Wiring Diagram 2 beginning on page 61 for specific examples).



Generally, pin assignments are labeled on the plastic hard-shell connector housing and/or the corresponding component. On larger connectors, pin assignments are labeled at either end of a row. For example, the Engine Control Module (ECM) plug often has 2 or 3 rows of 12 or more terminals. Each row will be marked on each end to facilitate easier diagnosis.



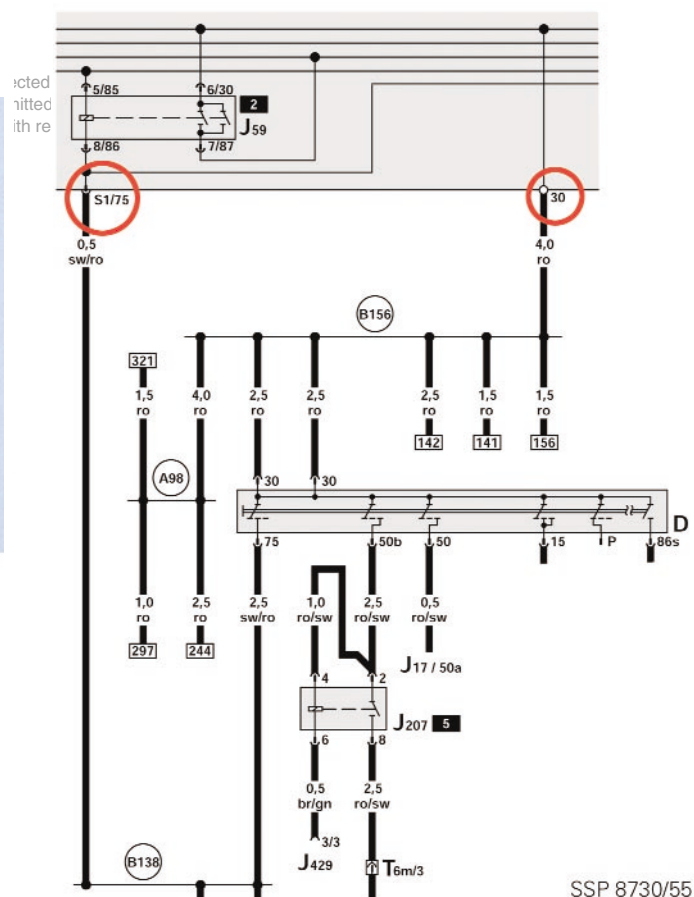
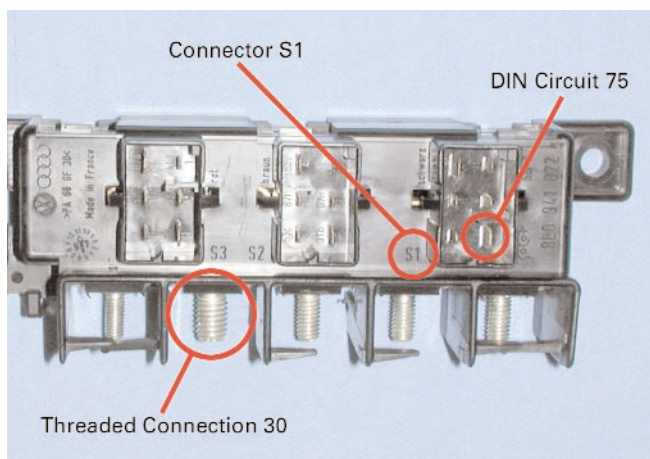
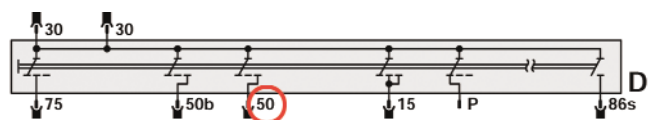
SSP 8730/48

# Elements of a Wiring Diagram

**Component/multi-point** pin assignments may or may not use the "T" designation. Some are numbered sequentially. Others may use DIN circuit designations, or a combination of these methods. See example at right, and find two examples in wiring diagram 1 (Appendix E).

**Central/relay panel** connections enter or exit as either threaded connections, or multi-point connectors. Threaded connectors are identified in the wiring diagram and on the component with the DIN circuit designation.

Multi-point connectors on the back of the panel are not identified in the legend. They will have a letter and possibly a number to identify location, followed by the DIN circuit designation.



SSP 8730/55

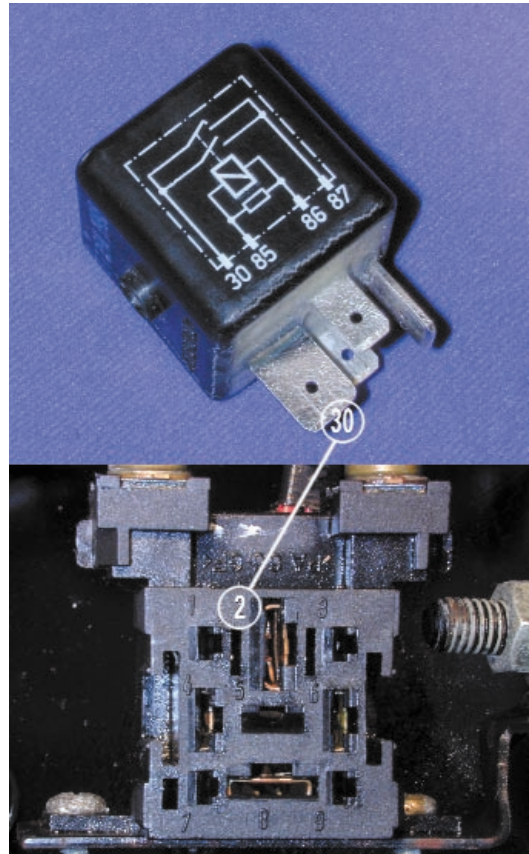
## Elements of a Wiring Diagram

**Relay connections** list the terminal cavity number on the relay socket, followed by the pin identification on the relay. Illustration SSP 8730/65 shows that cavity 2 of the harness connector is associated with the DIN terminal 30 of the relay. Both may be used during diagnosis of the circuit.

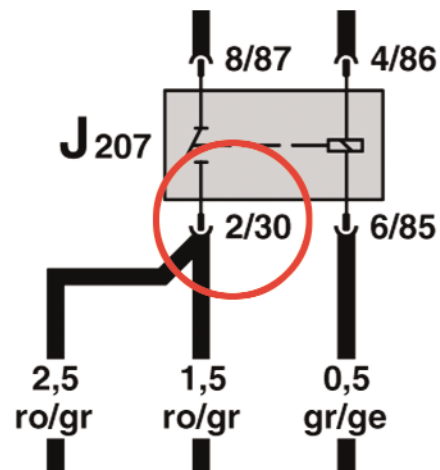
**Note:**

*When diagnosing electrical concerns using the VAG 1598 pin-out box, the pin numbers on the control module and multi pin connector usually match the pin numbers on the tool.*

*When using the VAG 1466 pin-out box, the numbers on the relay or control module and socket usually **do not** match those on the tool. These must be noted before beginning diagnosis.*



SSP 8730/65



J207 - Starting Interlock Relay

SSP 8730/76

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# Elements of a Wiring Diagram

## Components

Components in wiring diagrams are given an alphanumeric designation for identification. The first portion of the code separates the component into basic groups. An *F* for example, designates a switch, while a *Z* would be used for a heating element. A complete list of these designations are shown in Appendix C on page 33. The second part (numeric) designates which component is covered inside of these main groups.

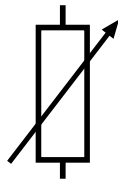
*Example: Evaporative Emissions (EVAP) Canister Purge Regulator Valve N80. N designates a solenoid valve, 80 clarifies which solenoid is being dealt with.*



Resistor

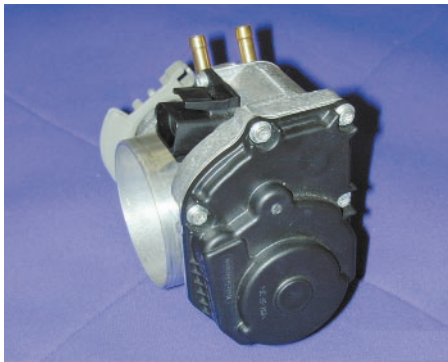
A commonly used symbol is the **resistor**, used to create a voltage drop in a circuit. Below are three types of resistors:

A **standard resistor** has a fixed resistance.

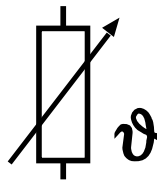


Variable Resistor (Rheostat)

A **rheostat**, or **potentiometer**, varies its resistance based on mechanical input. An example of this is the Throttle Position Sensor (TPS) on a Motronic equipped car (SSP 8730/57).



SSP 8730/57



Temperature Dependent Resistor

A **temperature dependent resistor** varies its resistance based on temperature. This type of resistor is used as the Engine Coolant Temperature (ECT) sensor on an engine management system, or the Interior Temperature sensor on models with climate control (SSP 8730/56).



SSP 8730/56

When a resistor is used as a sensor, it generally carries a component designator "G."



SSP 8730/21

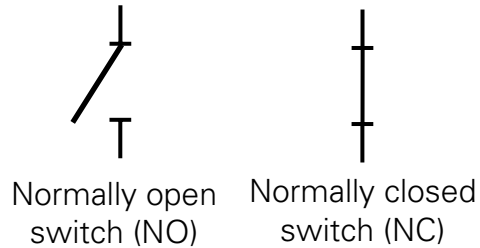
### Note:

*Any time the temperature symbol (left) is attached to another symbol, it signifies that the operation of that component will vary with temperature.*



## Elements of a Wiring Diagram

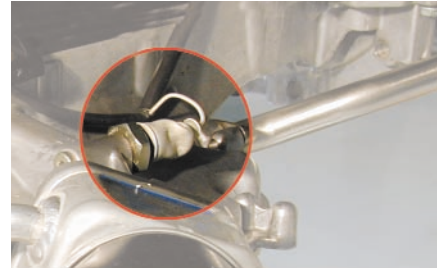
The **switch** is another component used to control current flow. The basic symbols for an open and closed switch are shown in illustration SSP 8730/22. An example of this simple two-position switch would be a glove compartment light switch. A simple switch uses the component designation "F".



SSP 8730/22

There are many types of designs, including mechanically actuated, pressure actuated, temperature actuated and momentary. Examples include:

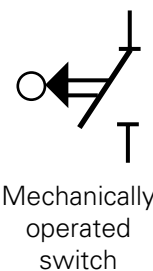
- Oil pressure switch (pressure actuated)
- Cooling fan thermo-switch (temperature actuated)
- Brake Switch -F- (mechanically operated)



SSP 8730/60



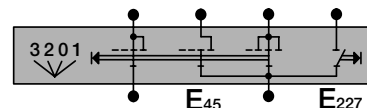
SSP 8730/59a



SSP 8730/58

More complex circuits may require a switch with multiple sets of contacts. An example of this would be the cruise control switch.

As you can see in illustration SSP 8730/25, there are multiple sets of contacts within the assembly. Depending on the position of the switch, various sets of contacts are open or closed. Careful study of the symbols allows the technician to follow the circuit through the switch under any condition.



SSP 8730/25

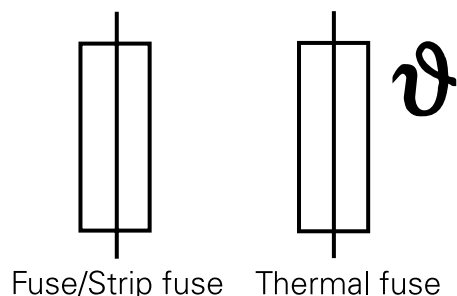
A complex switch uses the component designation "E".

### **Note:**

*All switches and relays are shown in a non-operated state.*

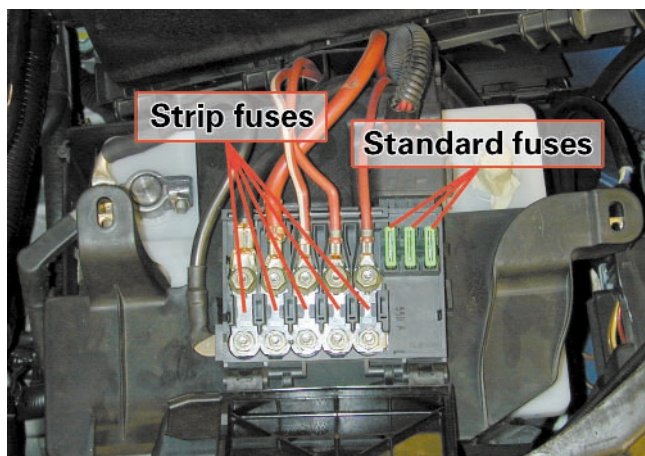
# Elements of a Wiring Diagram

**Fuses** are used to prevent excessive current from damaging other components in a circuit. There are various types, including standard fuses, thermal fuses (circuit breakers), and strip fuses. Fuses use the component designation "S"; their symbols are shown below:



SSP 8730/23

The example below shows strip fuses and standard fuses as seen in a current model vehicle.

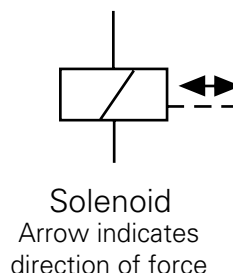


SSP 8730/45

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**Solenoids** are used to actuate many different components, including fuel injectors and relays.

A solenoid is a coil of wire wrapped around an iron core. When current is passed through the wire, a magnetic field is induced. This pulls a set of contacts in the relay closed, either opening or closing the circuit.



SSP 8730/24

## Complex Symbols

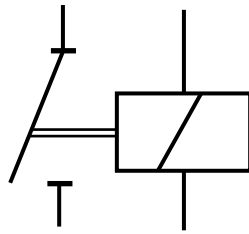
Often the internal schematic of the component is shown to allow the technician to follow current flow through the component.

These internal symbols are a combination of several basic symbols. This allows the technician to take a more complex symbol and break it down into its smaller components. Even the most complex components are nothing more than a combination of smaller basic symbols.

More complex components may contain complex control circuitry. This will be indicated with the symbol of a transistor in the component symbol (see control module).

## Elements of a Wiring Diagram

A **relay** is an example of a combination of symbols in a single component.

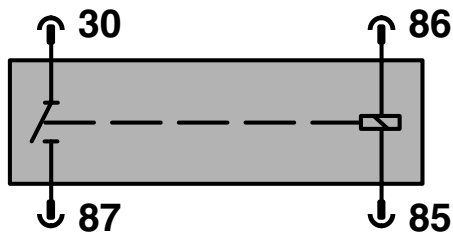


Relay

SSP 8730/26

Relays require a signal from an outside source to activate. Audi vehicles use common Bosch®-type 4-pin relays on many circuits, to remove electrical load from the switch. Relays share the component designator “J” with control units.

The basic 4-pin relay (below) contains two separate components: a switch and a solenoid.



SSP 8730/49

The coil in the solenoid is energized with low current, creating a magnetic pull that closes or opens the switch.

**Note:**

All switches and relays are shown in a non-operated state.

The 4 pins of a standard relay are generally (but not always) numbered as follows:

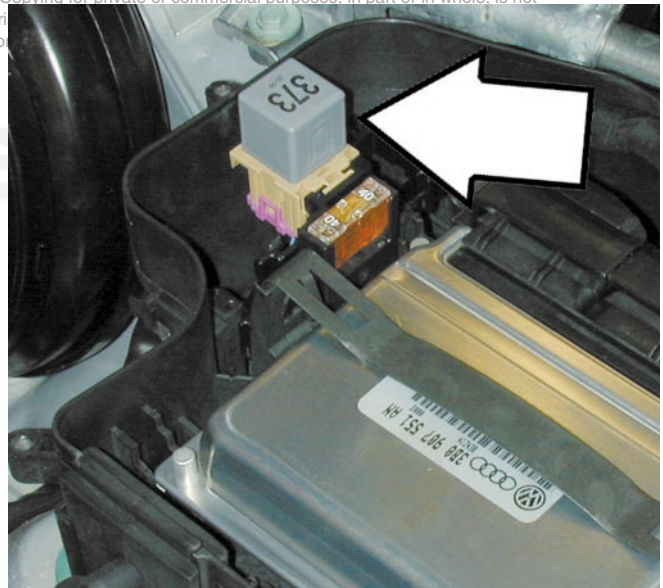
- 30** Receives Battery power (switched to consumer)
- 87** High load to the electrical consumer
- 86** Ignition switch, Battery+, load reduction (X)
- 85** Receives a switched ground to activate the solenoid winding in the relay

**Note:**

A production number may appear on top of the relay (see illustration SSP 8730/61). This number may be referred to in the wiring diagram for diagnostic purposes. See page 45 for examples.

However, do not rely solely on this information when diagnosing a circuit, as this number may change in production. Always refer to the parts information system for the current replacement part numbers.

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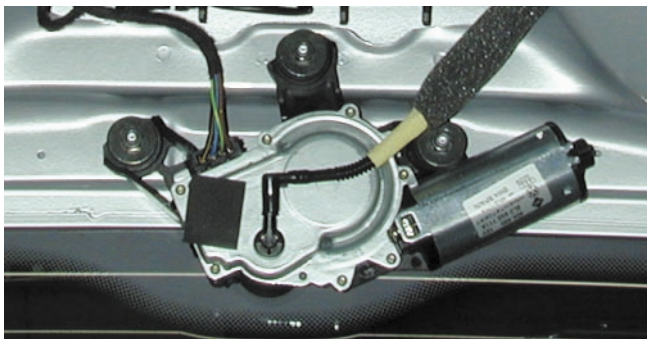
SSP 8730/61

## Elements of a Wiring Diagram

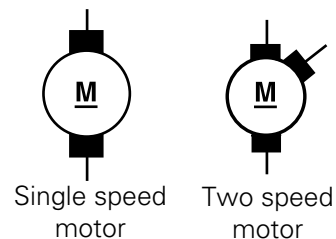
The last of the more common symbols we will look at are the **Electric motor** and the **Electronic Control Module**.

**Electric motors** are used throughout the vehicle for numerous applications, including the Windshield Wiper Motor and the Fuel Pump.

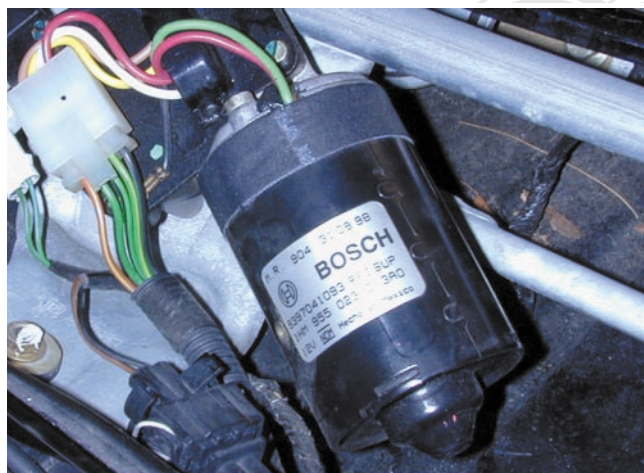
At the top and bottom of the motor symbol there are dark squares, representing the brushes in the electric motor.



SSP 8730/62



SSP 8730/28



SSP 8730/66

If there are only two brushes, it is a single speed motor. The rear window wiper motor shown in illustration SSP 8730/62 is an example of a single speed motor.

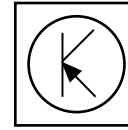
If there are three brushes, the motor has two speeds. In the case of the two speed motor, the upper set of brushes are the low and high speed brushes.

The windshield wiper motor shown in illustration SSP 8730/66 is an example of a two speed motor.



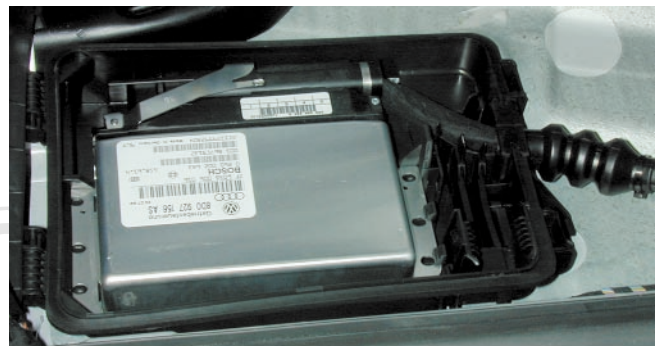
# Elements of a Wiring Diagram

**Control Modules** can make the task of reading and interpreting wiring diagrams more difficult because multiple signals enter and/or exit, but the internal schematic is not always shown.



Control Module  
SSP 8730/44

The Transmission Control Module (TCM) J217 seen in illustration SSP 8730/63 is an example of a common control module.

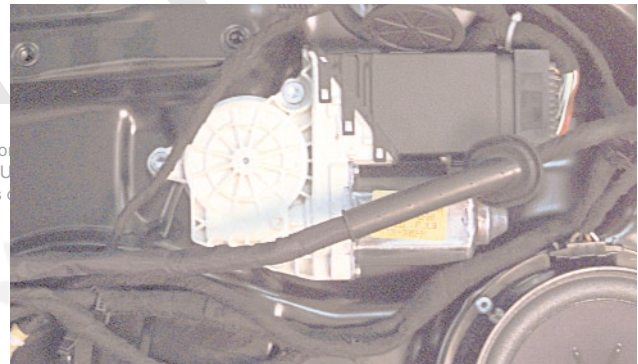
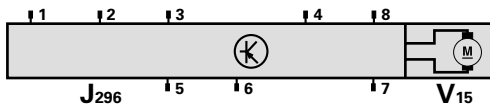


SSP 8730/63

Some control modules may be integrated with other components.

Take, for example, the window motor with control module. Both the motor and the control module are combined to make a single component (SSP 8730/74).

The symbol below represents the combined components.



SSP 8730/74

# Elements of a Wiring Diagram

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## Layout

- 1. Relay location number**  
Indicates location on relay panel. See page 1 of individual wiring diagram for details.
- 2. Arrow**  
Indicates wiring circuit is continued on the previous and/or next page.
- 3. Connector designation - relay/control module on relay panel**  
Shows relay panel terminals with corresponding relay terminal.  
For example: 17/30 equals terminal 30 of relay connects to terminal 17 of central relay panel.
- 4. Threaded pin on relay panel**  
White circle shows a threaded removable connection.
- 5. Fuse designation**  
For example: S228 equals Fuse 28, 15 amps, in fuse holder.
- 6. Reference of wire continuation (current track number)**  
Number in frame indicates current track where wire is continued (see page 3 for example).
- 7. Wire connection designation in wiring harness**  
Location of wire connections are indicated in the legend.
- 8a. Terminal designation on a multipoint connector**
- 8b. Terminal designation on a component**  
Designation which appears on the actual component and/or terminal number of a multi-point connector.
- 9. Ground connection designation in wire harness**  
Locations of ground connections are indicated in legend.
- 10. Component designation**  
Use legend at bottom of page to identify the component code.
- 11. Component symbols**  
A graphical representation of a component type. See Appendix A, page 29.
- 12. Wire cross section size (in mm<sup>2</sup>) and wire colors**  
Abbreviations are explained in the color chart beside the wiring diagram.
- 13. Component symbol with open drawing side**  
Indicated component is continued on another wiring diagram. The number of the corresponding wiring diagram can be found in the table of contents.
- 14. Internal connections (thin lines)**  
These connections are not wires. Internal connections are current carrying and are listed to allow tracing of current flow inside components and wiring harness.  
**a. Internal Harness Splice (Welded Connection)**  
**b. Physical Contact (Mounted to engine)**
- 15. Reference of continuation of wire to component (inset)**  
For example: Control module for anti-theft immobilizer J362 on 6-pin connector terminal 2.
- 16. Central Relay panel connectors**  
Shows wiring of multi-point or single connectors on central relay panel.  
For example: S3/31 equals Multi-point connector S3, terminal 31.
- 17. Reference of internal connection continuation**  
Letters indicate where connection continues on previous and/or next page.
- 18. Central Relay Panel**
- 19. Ground Path**  
ex.: from welded harness connection 135 to welded harness connection 81 to welded harness connection 42.

Wiring Diagram Number and Page

**No. 19/9**



Oil pressure switch, fuel pump (FP), fuel pump (FP) relay, engine coolant level sensor, speedometer vehicle speed sensor (VSS)

# Working With Wiring Diagrams

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## Working with wiring diagrams

When working to diagnose electrical concerns on vehicles, it is important that you have the correct wiring diagram. Not only are there different models and year, wiring harnesses will often change in the middle of a model year. There may be differences between models of the same type and year, but built in different factories.

Within models, there are also different levels of equipment. For example, the wiring for the fresh air blower of a vehicle with Automatic Climate Control will be different from one without Automatic Climate Control. Different engines, transmissions, even trim levels will mean differences. Always check that the wiring diagram is right for the vehicle in question.

It may be necessary to check more than one wiring diagram for the model you are servicing. A vehicle's wiring harness is often split into several different wiring diagrams. Engine, transmission and power accessory wiring diagrams will only show wiring for those specific systems.

When choosing a wiring diagram for diagnosis of an electrical concern, you should first confirm the vehicle model, model year, and production date, where applicable. Next, identify if the affected system is part of vehicle "standard equipment" or "additional equipment". Locate the appropriate wiring diagram by using the index.

A standard equipment diagram will show the vehicle with its base level wiring. Base level wiring is defined as the most basic possible rolling chassis, and this may be different than what is normally considered "standard equipment".

For example, all 2001 model year Audis sold in the US and Canada come with Automatic Climate Control as "standard equipment". However, Automatic Climate Control is shown in a separate wiring diagram.

Wiring diagrams are automatically shipped to your dealer. Periodic updates can include both new wiring diagrams and updated pages for existing diagrams.

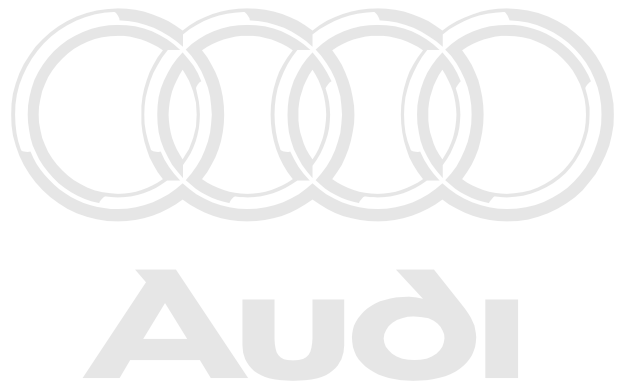
Wiring diagrams also exist as part of the Audi Electronic Service Information System (AESIS). The advantages of electronic wiring diagrams include easy updating, pages that don't get dirty or lost, and search capabilities that can make searching for a component much easier.

## Practical Examples

The preceding sections of this book gave examples of the symbols and layout of our current track wiring diagrams. In the following section we will examine current flow using navigation exercises. In these examples, we will look at:

- how battery power is provided to a component
- how consumers are actuated using relays
- how to split up a circuit to simplify diagnosis

Appendix E, starting on page 37, contains the complete wiring diagrams number 1 and 2. Within the navigation exercises, magnified views of specific sections of these Wiring Diagrams may be shown. Note that, for clarification purposes, certain components found in the Wiring Diagrams may not be shown in these magnifications.



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# Navigation 1

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## Navigation 1

In this example we will look at the circuit for the load reduction relay. The following page contains a composite diagram for this example.

### **Note:**

*Refer to wiring diagram 1 in Appendix E for the complete circuit for this example.*

The Load Reduction circuit (75 or X) supplies power to consumers such as the windshield wiper motor or fresh air blower motor when the ignition switch is in the "On" position. With the ignition switch in the "Start" position, the circuit is de-energized. This lowers the load on the electrical system when starting the vehicle.

Locate the Load Reduction Relay J59 in the wiring diagram on page 23. The relay consists of two separate circuits: the solenoid circuit, and the switch circuit. In order to supply power to the consumers in the load reduction circuit, the solenoid in the relay must be energized. To do this, terminal 8/86 must be supplied with power. The Ground side of the solenoid receives an internal ground from the central relay panel at pin 5/85.

Starting at current track 29, power enters the fuse box from the Positive (+) terminal of the Battery (A). Power then passes through S134, a 110A fuse, and exits the fuse box at terminal 4. From terminal 4, follow the 16.0 ro wire to threaded connection 30 on the relay plate. This un-switched battery power (30) supplies power to internal connection 30 in the central relay panel.

Note that internal connection 30 in the central relay panel is also supplied power through fuse S132, a 50A fuse. This power flows from terminal 2 of the fuse box through a 6.0 ro wire to terminal 30a on the relay plate.

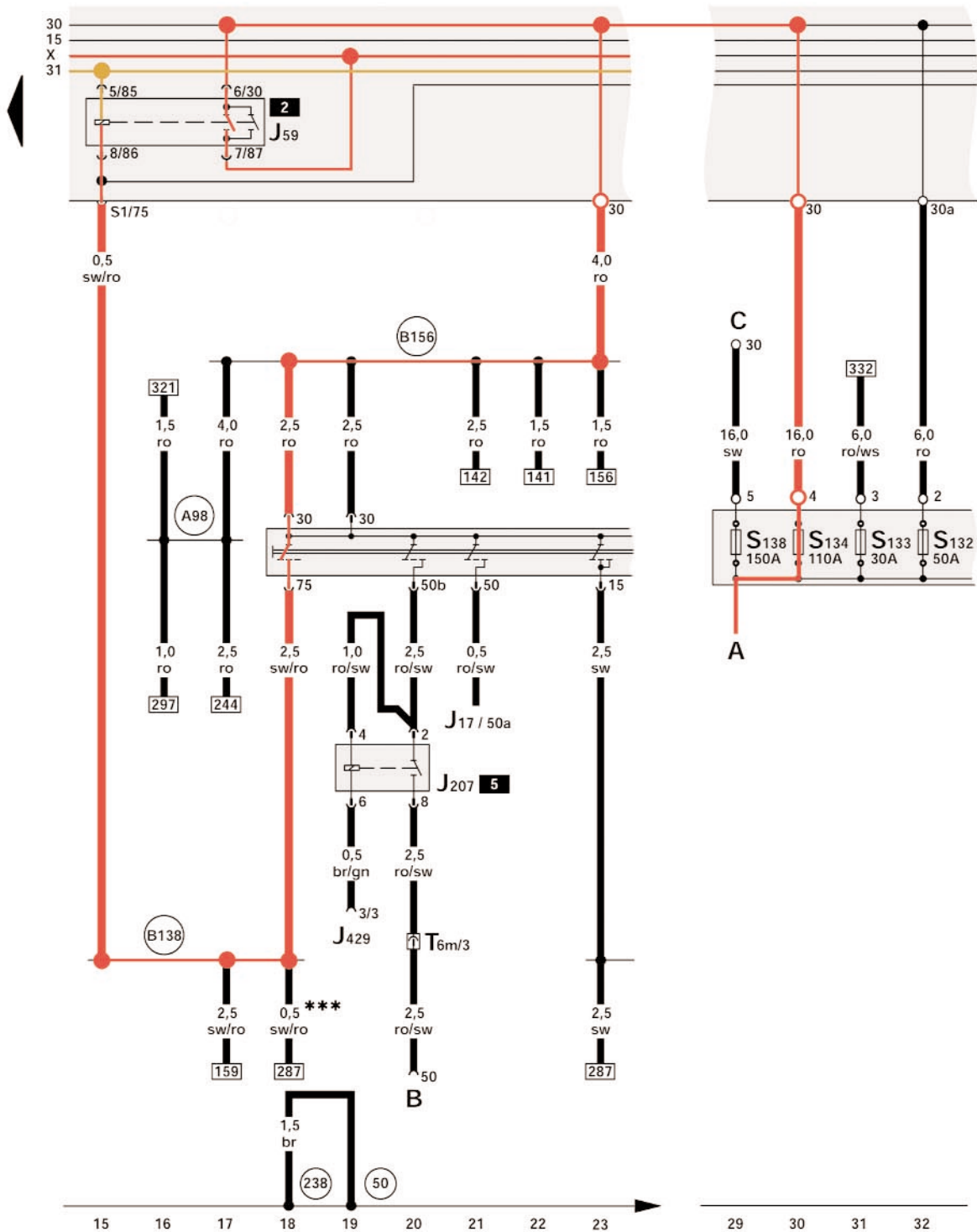
On current track 23 follow the 4.0 ro wire from terminal 30 on the central relay panel to welded connection B156. Note that the wire that supplies the power to the welded connection is larger than most of the other wires that leave the connection. This fact can be useful in diagnosis. When tracing out a weld with many wire connections, the largest wire will usually be the one that goes directly to power or ground.

From the welded connection two 2.5 ro wires go to terminal 30 of the Ignition/Starter switch D. When the Ignition switch is moved to the "ON" position, power continues through the switch to terminal 75. Power exits the Ignition switch through the 2.5 sw/ro wire on current track 18.

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Follow the wire to welded connection B138. A 0.5 sw/ro wire leaves this welded connection on current track 15, which connects to the central/relay panel at terminal S1/75. Power flows from this terminal through the internal connection to terminal 8/86 of the relay.

Because relay terminal 5/85 is already grounded at the relay panel the solenoid is energized, closing the switches in the relay. This supplies power from internal connection 30 in the central relay panel, to terminal 7/87 of the relay. From terminal 7/87, power flows to internal connection X in the central relay panel. From there, power can flow to the consumers on the circuit as needed.



## Navigation 2

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### Navigation 2

This example will follow the flow of power from its source, through a switch, and to a consumer. This example will build on our understanding of the Load Reduction circuit as seen in Navigation example 1.

The example we will use is a typical horn circuit. The horn circuit on all Audi vehicles is similar in design. The main components of the system are as follows.

- Mechanically operated switch (horn button)
- Relay
- Horns (high and low tone)
- Connecting wires

In order to follow these types of circuits, it is best to split the circuit into two sections. We will first look at the solenoid side of the relay circuit, then the switch side.

**Note:**

*Refer to wiring diagram 1 in appendix E for this example.*

From the Table of Contents for wiring diagram 1 on page 37, we see that the horn circuit is shown on page 1/5.

Locate the horn relay (J4) on page 1/5.

Starting at the solenoid side of the symbol, follow the internal connection from terminal 2/86 across the central relay panel until it terminates at an internal connection that runs between terminal S1/75 on the back of the central relay panel, and terminal 8/86 of relay J59. Looking at the legend, we see that J59 is the Load reduction relay.

Looking at the wiring for J59 we see that the internal connection we are concerned with here is the power that activates the load reduction relay. Follow the 0.5 sw/ro wire down current track 15 to plus connection B136, across to current track 18 and up to terminal X of component D.

As seen in Navigation example 1, the power will flow from the battery, through fuse S134, and through the ignition switch to the horn relay when the ignition switch is in the on position. Now, let's take a look at the ground side of the Horn relay solenoid.

From J4, follow the ground side of the circuit from terminal 3/85 of the relay to S1/71. A 0.35 br/bl wire runs from the central relay panel to T5a/3. The legend identifies T5a as a 5 pin connector in the steering wheel.



From the connector, the circuit continues through manually operated push button switch H (the horn contact), and then to terminal T5a/2. From this terminal a 0.35 br wire runs to welded ground connection 277, in the interior wiring harness.

To find where the ground for welded connection 277 originates, look through the legend to find 277. We find it in a ground connection at current track 35. This shows that a 4.0 br wire leaves internal connection 277, and goes to ground at location 42 on the steering column. We now have the complete circuit for the solenoid side of the relay.

Let's look at the horns and the switch circuit of the relay. Follow the internal connection from terminal 1/30 at the relay to where it exits the central relay panel at terminal S1/30ah as a 1.5 ro/br wire. Follow the current track continuation from 40 to 300, where it enters the fuse box at terminal 240a. From fuse S240 follow internal connection "a" to current track 315. A 6.0 ro wire goes from fuse box terminal 15 to threaded connection 30 on the central relay panel.

As seen in Navigation example 1, the power comes from the battery, through fuse S134, to threaded connection 30. When the relay is activated by pushing the horn contact, power will flow to the horns through S2/87h, through welded connection A72, to terminal 2 on each horn.

Tracing the ground side of the horns, we see that they go to ground connection 131 in the engine compartment wiring harness. Searching through the legend for 131, we find it in a ground connection at current track 3. This shows that a 2.5 br wire leaves internal connection 131, and goes to ground at location 12 in the Engine compartment. We now have the complete circuit for the horns.



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## Navigation 3



### Navigation 3

In this exercise, we will again examine the activation of an electrical consumer through a simple 4-pin relay. Let's look at the navigation from the point of view of diagnosing an inoperative motor. In this circuit we will look at the Secondary Air Injection (AIR) pump motor V101.

To diagnose this circuit, we need to understand that the secondary air system is activated by the Motronic ECM at certain times when the engine is running, and that we can trigger this function using the VAS 5051 scan tool. Assume that we have already attempted this, and the pump does not run. Also assume that the only DTC in the system's memory is the Secondary Air DTC.

#### **Note:**

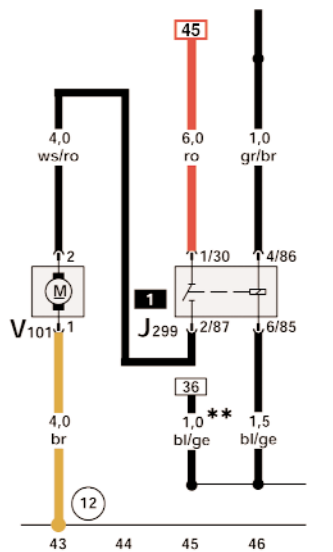
Refer to wiring diagram 2 in appendix E for this example.

From the Table of Contents for wiring diagram 2 on page 38, we see that the Secondary Air Injection (AIR) pump circuit is shown on page 2/6.

Locate the Secondary Air Injection (AIR) pump relay J299 on wiring diagram page 2/6. We will once again split the circuit into two parts to simplify diagnosis. Let's start with the switch side of the relay.

From motor V101, follow the 4.0 br wire down current track 43 to ground 12 in the engine compartment. Now let's trace the power side.

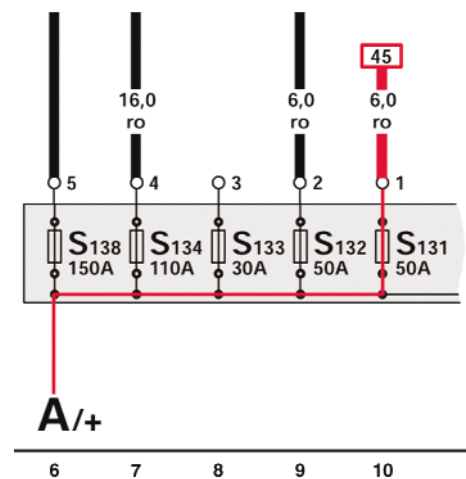
From motor V101, we see that the 4.0 ws/ro wire runs to the terminal 2/87 of relay J299. Following the 6.0 ro wire from where it leaves terminal 1/30 on the relay, through it's current track continuation, we see that the motor receives direct battery power (30) from fuse S131. Checking the fuse on the vehicle shows it to be good.



SSP 8730/11



vate or c  
AG. AUD  
information



SSP 8730/12

Locate relay J299, and pull it from its socket. Using a wire from the VAS 1978 wiring repair kit of the proper size, and with the proper size terminals, we can jump the relay socket from terminal 1/30 to 2/87. The Secondary Air Injection (AIR) pump motor V101 runs, verifying that this section of the circuit is functioning correctly.

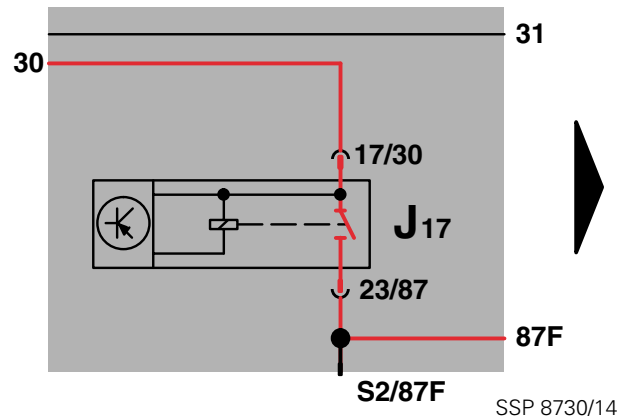
Let's trace out the power side of the solenoid in the relay. Terminal 85 on a standard 4-pin relay is usually the power side. Following the 1.5 bl/ge wire down from terminal 6/85, we see that it leads to weld connection D80.

Looking at D80, we see no less than 8 wires in the weld! This weld supplies power to many of the actuators in the engine management system. In practice, you may need to trace out every wire in the weld to find a problem. Let's use the trick we discussed in Navigation example 1 to narrow down the field. Looking at current track 49, we see a 2.5 bl/ge wire marked with current track continuation 113.

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any liability  
JDI AG.

Going to current track 113, we find the wire goes to another welded connection A101. Following the current track continuation from 118 to 134, we see that the 2.5 bl/ge wire gets its power from fuse S243. Since there are no other faults in this system, we can assume that fuse 43 is good. To test this circuit correctly, let's trace that power back to its source.

Follow the circuit up to welded connection A99 and over the current track continuation, we see that this power comes from the switch side of J17, the fuel pump relay. This is important for testing. We know that we will only have power at terminal 6/85 of the Secondary Air Injection (AIR) pump relay J299 when the fuel pump relay is energized.

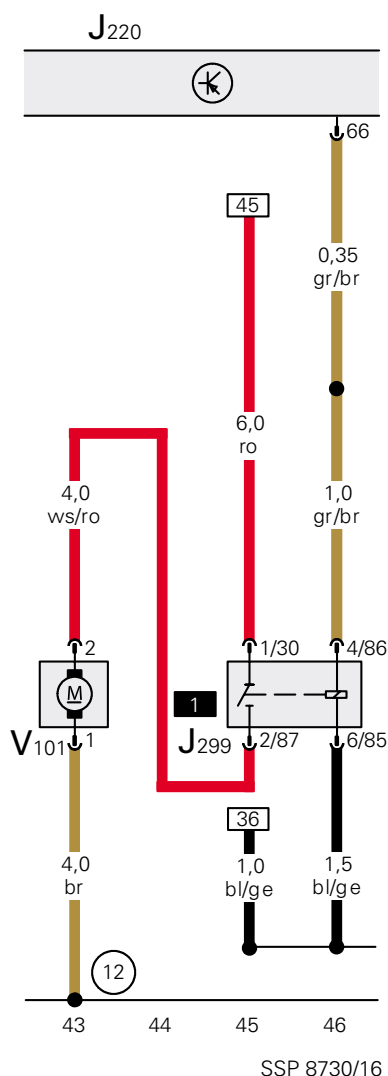


## Navigation 3

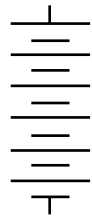
Go to the Secondary Air pump relay J299 on page 2/6. Follow the 1.0 gr/br wire from terminal 4/86 to terminal 66 on the Motronic ECM J220. Note that somewhere in the harness it appears that the wire enters an unidentified connection, and changes size. This wire carries the ground signal that energizes the relay.

Now let's test the solenoid side of the circuit. Connect the appropriate test equipment, such as an LED test light, multimeter, or the Digital Storage Oscilloscope of the VAS 5051, between terminals 4/86 and 6/85 of the relay socket. We then activate the circuit (using the VAS 5051) and see that the proper signal is going to the relay socket.

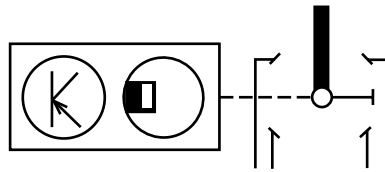
Since the circuit appears to be complete, the next step would be to replace the relay and retest. Doing this, we find that the circuit operates correctly. We can now clear the DTC, quality check the vehicle, and return it to the customer.



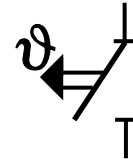
# Appendix A: Component Symbols



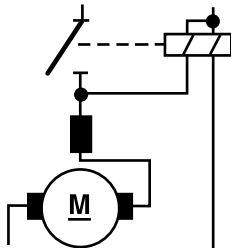
Battery



Distributor  
(electrical)



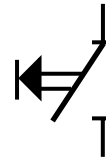
Thermally  
operated  
switch



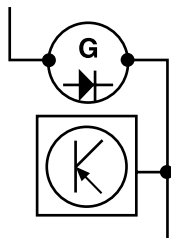
Starter



Spark plug  
connector  
and plug



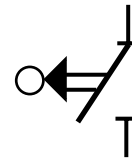
Push-button switch  
(manually operated)



Generator



Glow plug  
heater element



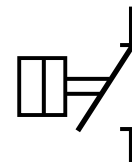
Mechanically  
operated  
switch



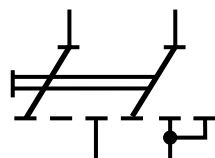
Ignition coil



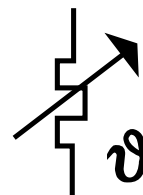
Manually  
operated  
switch



Pressure  
operated  
switch



Multiple switch  
(manually operated)



Heater element  
(temperature dependent)

SSP 8730/02

not  
bility

## Appendix A: Component Symbols

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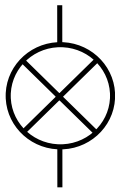
Diode



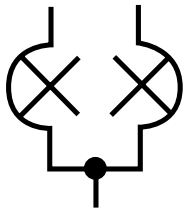
Zener diode



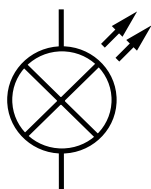
Diode  
(light sensitive)



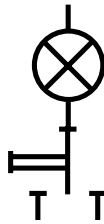
Light bulb



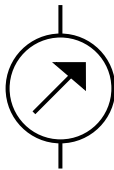
Light bulb  
(dual filament)



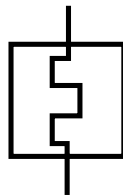
LED



Interior light



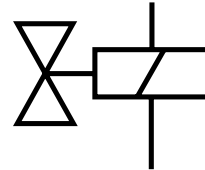
Instrument  
(gauge)



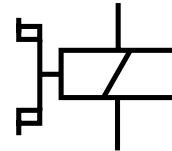
Rear window defogger  
heat element



Cigarette  
lighter



Solenoid valve



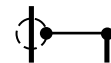
Magnetic clutch



Wire connection  
in wiring harness



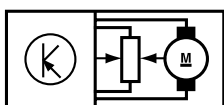
Resistance wire



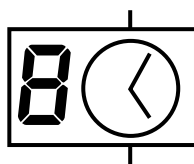
Shield wire

SSP 8730/03

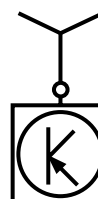
# Appendix A: Component Symbols



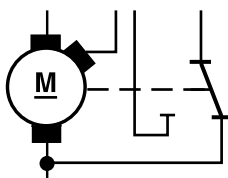
Control motor,  
headlight range  
adjustment



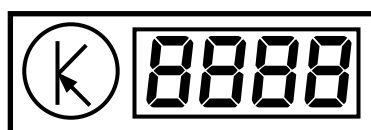
Digital clock



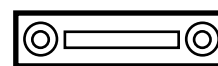
Antenna with  
electronic antenna  
amplifier



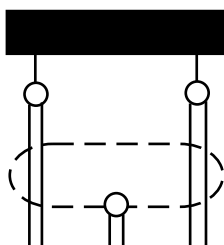
Wiper motor  
(2-speed)



Multifunction  
indicator



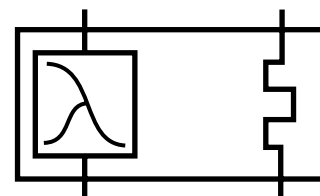
Radio



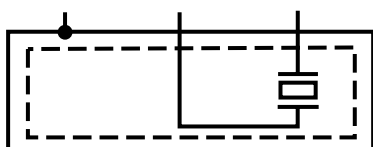
Crankshaft  
position sensor



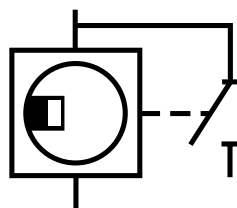
Airbag spiral  
spring



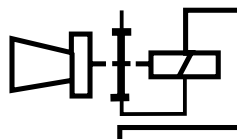
Heated oxygen  
sensor



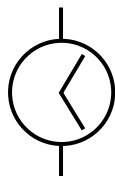
Camshaft  
position sensor



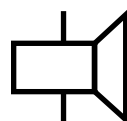
Speed sensor



Horn



Analog clock



Speaker

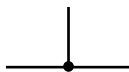
SSP 8730/04

## Appendix B: Wiring Connections

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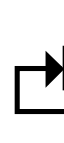
Wiring  
junction



Internal connection  
in a component



Disconnected  
wire terminal



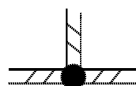
Slip contact



Multipoint connector  
or component



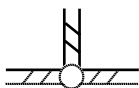
Push-on  
connector



Wires  
connected



Connected  
wire terminal



Wires connected  
(detachable junction)



Wires not  
connected

SSP 8730/30



## Appendix C: Component Codes and Wiring

### Component Code Prefixes

- A** Battery
- B** Starter
- C** Alternator/Generator
- D** Ignition/Starter switch
- E** Switches - these are usually more complex switches: A/C control head, sunroof regulator
- F** Switches - door, hood, brake, clutch, trunk, multifunction, etc.
- G** Gauges and sensors
- H** Horn
- J** Control modules, Relays, Electronic Relays
- K** Indicator/Warning lights
- L** Lights
- M** Lights
- N** Solenoids/Inductors/Ignition - Fuel injectors, Purge, Ignition coil, Ignition module, etc.
- P** Spark plug connector
- Q** Spark Plugs
- R** Radio, CD, Telephone, Navigation
- S** Fuse, circuit breaker, protection device
- T** Wire connector
- V** Motor - Window motors, vacuum pumps, etc.
- W** Lights - Interior, Trunk
- Z** Heating elements - O<sub>2</sub> sensor heater, heated seats, heated mirrors, etc.

### Color Codes

#### German Abbreviation to English

bl . . . . .	Blue
br . . . . .	Brown
ge . . . . .	Yellow
gn . . . . .	Green
ro . . . . .	Red
sw . . . . .	Black
li . . . . .	Violet
ws . . . . .	White

Occasionally in a complex circuit, other colors may be used. These are listed below.

el . . . . .	Cream
nf . . . . .	Neutral
og . . . . .	Orange
rs . . . . .	Pink
hbl . . . . .	Light Blue
hgn . . . . .	Light Green
rbr . . . . .	Maroon
x . . . . .	Braided cable
y . . . . .	High tension
z . . . . .	Non-cable

#### American Wire Gauge (AWG) Conversion to Metric

The conversion from AWG to Metric (mm<sup>2</sup>) is shown below.

AWG . . . . .	mm <sup>2</sup>
22 . . . . .	0.35
20 . . . . .	0.50
18 . . . . .	0.75
16 . . . . .	1.00
14 . . . . .	1.50
12 . . . . .	2.50
10 . . . . .	4.00
8 . . . . .	6.00
4 . . . . .	16.0
2 . . . . .	25.0
2 . . . . .	35.0

Protected  
permitted  
with re

## Appendix D: DIN Standards

---

### DIN standards for terminal designations

The following are examples of the common Audi DIN list for terminal designations:

- 1 Ignition coil, ignition distributor - Low voltage
- 1a To contact breaker I (Ignition distributor with two separate circuits)
- 1b To contact breaker II (Ignition distributor with two separate circuits)
- 4 Ignition coil, ignition distributor - high voltage
- 4a From ignition coil I (Ignition distributor with two separate circuits)
- 4b From ignition coil II (Ignition distributor with two separate circuits)
- 15 Switched (+) downstream of battery (output of ignition/driving switch)
- 15a Output at ballast resistor to ignition coil and starter
- 17 Glow plug and starter switch - Start
- 19 Glow plug and starter switch - Preheat
- 30 Input from battery (+) term., direct 12/24 V series-parallel battery switch
- 30a Input from (+) terminal of battery II
- 31 Battery negative terminal, or ground, direct
- 31b Return line to battery negative terminal, or ground via switch or relay (switched negative)
- 31a Return line to battery II, negative (12/24 V series-parallel battery switch)
- 31c Return line to battery I, negative (12/24 V series-parallel battery switch)

### Electric motors

- 32 Return line
- 33 Main terminal connection
- 33a Self-parking switch-off
- 33b Shunt field
- 33f For second lower-speed range
- 33g For third lower-speed range
- 33h For fourth lower-speed range
- 33L Counterclockwise rotation
- 33R Clockwise rotation

### Starters

- 45 Separate starter relay, output; starter, input (main current)  
Two-starter parallel operation - Starting relay for engagement current
- 45a Output, starter I, Input, starters I and II
- 45b Output, starter II
- 48 Terminal on starter & on start-repeating relay for monitoring starting

### Turn-signal flashers (pulse generators)

- 49 Input
- 49a Output
- 49b Output, second circuit
- 49c Output, third circuit

## Appendix D: DIN Standards

### Starter control

- 50 Starter control (direct)
- 50a Series-parallel battery switch - Output for starter control
- 50b with parallel operation of two starters with sequential control  
Starting relay for sequential control of the engagement current during parallel operation of two starters
- 50c Input at starting relay for starter I
- 50d Input at starting relay for starter II
- 50e Start-locking relay Input
- 50f Start-locking relay Output
- 50g Start-repeating relay Input
- 50h Start-repeating relay Output

### Wiper motors

- 53 Wiper motor, input (+)
- 53a Wiper (+), self-parking switch-off
- 53b Wiper (shunt winding)
- 53c Electric windshield-washer pump
- 53e Wiper (brake winding)
- 53l Wiper motor with permanent magnet and third brush (for higher speed)

### Lighting

- 55 Fog lamp
- 56 Headlamp
- 56a High beam, high-beam indicator lamp
- 56b Low beam
- 56d Headlamp-flasher contact
- 57a Parking lamp
- 57L Parking lamp, left
- 57R Parking lamp, right
- 58 Side-marker, tail, license plate, and instrument panel lamps
- 58b Dimmer
- 58d Dimmer
- 58L License-plate lamp, left
- 58R License-plate lamp, right

### Alternators and voltage regulators

- 61 Alternator charge-indicator lamp
- B+ Battery positive
- B- Battery negative
- D+ Dynamo positive
- D- Dynamo negative
- DF Dynamo field
- DF1 Dynamo field 1
- DF2 Dynamo field 2
- U,V,W Alternator terminals
- 75 Radio, cigarette lighter
- 76 Speakers

### Switches

#### Break contact (NC) and changeover switches

- 81 Input
- 81a Output 1, NC side
- 81b Output 2, NC side

#### Make contact (NO) switches

- 82 Input
- 82a Output 1
- 82b Output 2
- 82z Input 1
- 82y Input 2

#### Multiple-position switches

- 83 Input
- 83a Output, position 1
- 83b Output, position 2
- 83L Output, left-hand position
- 83R Output, right-hand position

#### Relays/Current relays

- 84 Input, actuator and relay contact
- 84a Output, actuator
- 84a Output, relay contact

## Appendix D: DIN Standards

---

### Switching relays

- 85 Output, actuator (end of winding to ground or negative)
- 86 Input, actuator (start of winding)
- 86a Start of winding or 1st winding
- 86b Winding tap or 2nd winding

### Relay contact for break (NC) and changeover contacts

- 87 Input
- 87a Output 1 (NC side)
- 87b Output 2
- 87c Output 3
- 87z Input 1
- 87y Input 2
- 87x Input 3

### Relay contact for make (NO) contact and changeover contacts

- 88 Input
- 88a Output 1
- 88b Output 2
- 88c Output 3
- 88z Input 1
- 88y Input 2
- 88x Input 3

### Directional signals (turn signal flashers)

- C Indicator lamp 1
- C2 Indicator lamp 2
- C0 Main terminal connection for separate indicator circuits actuated by the turn signal switch
- C3 Indicator lamp 3 (e.g., when towing two trailers)
- L Turn-signal lamps, left
- R Turn-signal lamps, right

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st guarantee or accept any liability  
iment. Copyright by AUDI AG.

## Appendix E: Wiring Diagrams 1 and 2

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### Audi TT, Standard Equipment

2000 m.y.	No./Page
Relay locations . . . . .	1/1
Relay locations . . . . .	1/2
Ground Connections . . . . .	1/3
Load Reduction Relay, Ignition/ Starter Switch, Starting Interlock Relay . . .	1/4
Main Fuse Box/Battery, Signal Horn . . . . .	1/5
Instrument Cluster, Warning Lights . . . . .	1/6
Instrument Cluster, Oil Pressure Switch, Engine Coolant Level Warning Switch, Fuel Pump . . . . .	1/7
Instrument Cluster, Speedometer Vehicle Speed Sensor . . . . .	1/8
Instrument Cluster, Parking Brake Warning Light Switch, Brake Fluid Level Warning Switch, Outside Air Temperature Sensor . . . . .	1/9
Instrument Cluster, Connector (K-diagnosis wire) for Data Link Connector (DLC) . . . . .	1/10
Instrument Cluster, Engine Coolant Temperature Gauge . . . . .	1/11
Instrument Cluster, Turn Signal Indicator Lights, Connector Radio, Seat Belt Warning Light . . . . .	1/12
Turn Signal Switch, Headlight Dimmer/Flasher Switch, Park Light Switch, Front Turn Signal Light . . . . .	1/13
Light Switch, Fog Light Switch . . . . .	1/14
Emergency Flasher Switch . . . . .	1/15
Fog Light Relay, Left Headlight, Fuses . . . . .	1/16
Right Headlight, Fuses . . . . .	1/17
Headlight Adjuster, Headlight Beam Adjusting Motors . . . . .	1/18
Wiper/Washer Intermittent Relay, Windshield Wiper/Washer Switch, Windshield Washer Pump . . . . .	1/19
Wiper/Washer Intermittent Relay, Windshield Wiper Motor, Glove Compartment Light, License Plate Light, Fuses . . . . .	1/20
Tail Light, Brake Light, Rear Fog Light . . . . .	1/21
Washer Nozzle Heater, Fuses . . . . .	1/22
Heated Rear Window, Fuses . . . . .	1/23
Cigarette Lighter, Fuses . . . . .	1/24
Data Link Connector, Fuses . . . . .	1/25
Coolant (Fan Control) Control Module, Fuses . . . . .	1/26
Coolant (Fan Control) Control Module, Coolant Fan Control Thermal Switch, Coolant Fan . . . . .	1/27
Interior Light, Make-Up Mirror Light, After-Run Coolant Pump . . . . .	1/28

## Appendix E: Wiring Diagrams 1 and 2

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### **Audi TT, 1.8 L - Engine Motronic Multiport Fuel Injection (MFI)/**

**132 kW, code ATC**

**165 kW, code AMU/AWP**

**2000 m.y.**

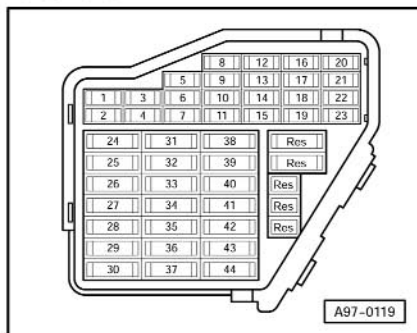
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Relay locations . . . . .	.2/1
Relay locations . . . . .	.2/2
Battery, Starter, Generator, Main Fuse Box / Battery, Starting Interlock Relay . . . . .	.2/3
Motronic Engine Control Module, Fuel Pump Relay, Fuel Injectors, Brake Light Switch . . . . .	.2/4
Motronic Engine Control Module, Power Steering Pressure Switch, Cruise Control Switch, Throttle Position Sensor . . . . .	.2/5
Motronic Engine Control Module, Secondary Air Injection Pump, Wastegate Bypass Regulator Valve, Heated Oxygen Sensors . . . . .	.2/6
Motronic Engine Control Module, Control Module for All Wheel Drive . . .	.2/7
Motronic Engine Control Module, Engine Speed Sensor, Manifold Absolute Pressure Sensor, Camshaft Position Sensor 2 . . . . .	.2/8
Motronic Engine Control Module, Knock Sensor 2, Intake Air Temperature Sensor, Throttle Valve Control Module . . . . .	.2/9
Motronic Engine Control Module, Ignition Coils . . . . .	.2/10
Motronic Engine Control Module, Leak Detection Pump, EVAP Canister Purge Solenoid Valve, Motronic Engine Control Module Power Supply Relay . . . . .	.2/11
Fuses, Speedometer Vehicle Speed Sensor, Fuel Level Sensor, Fuel Pump . . . . .	.2/12
Instrument Cluster, Parking Brake Warning Light Switch, Oil Pressure Switch . . . . .	.2/13

## Standard Equipment

2000 m. y.

### Fuse Panel

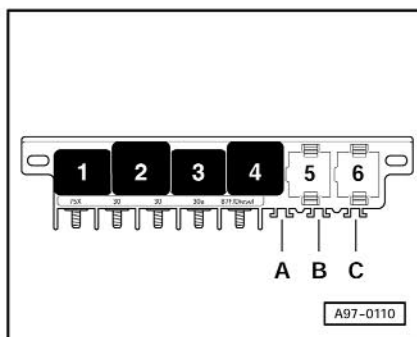


#### Fuse Colors:

30	A	- Green
25	A	- White
20	A	- Yellow
15	A	- Blue
10	A	- Red
7,5	A	- Brown
5	A	- Beige

Starting with fuse position 23, fuses in the fuse holder are identified with 223 in the wiring diagram.

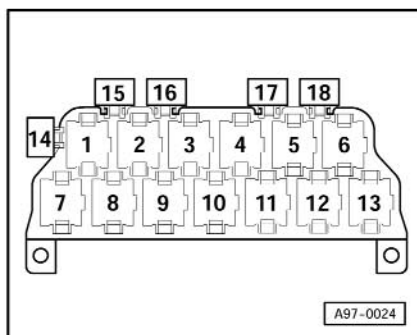
### Micro Central Electric Panel



#### Relay Location:

- 1** -Dual Horn Relay, J4
- 2** -Load Reduction Relay, J59
- 4** -Fuel Pump (FP) Relay, J17
- 5** -Wiper/Washer Intermittent Relay, J31
- 6** -Wiper/Washer Intermittent Relay, J31

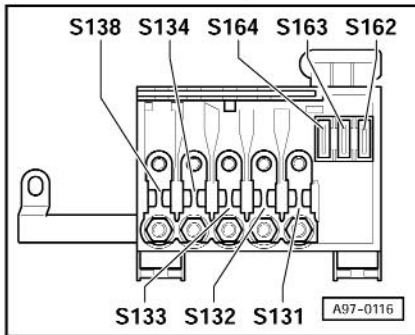
### 13 - Fold Relay Panel



#### Relay Location:

- 4** -Fog Light Relay, J5
- 5** -Starting Interlock Relay, J207
- 7** -Brake light disable relay (ESP), J508
- 10** -Rear Window Defogger Relay, J9

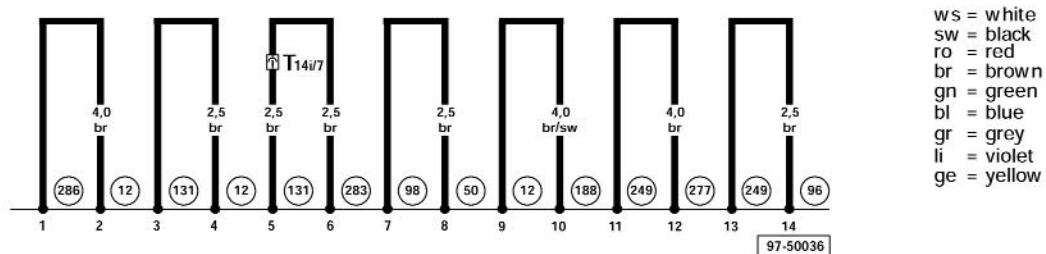
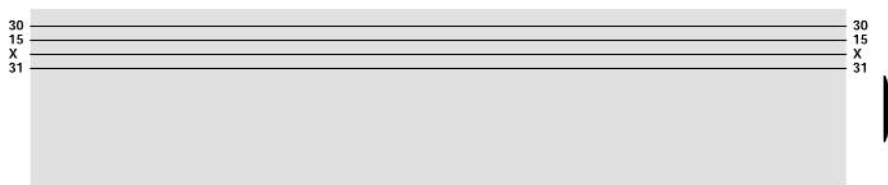
## Main Fuse Box/Battery



## Fuses Location:

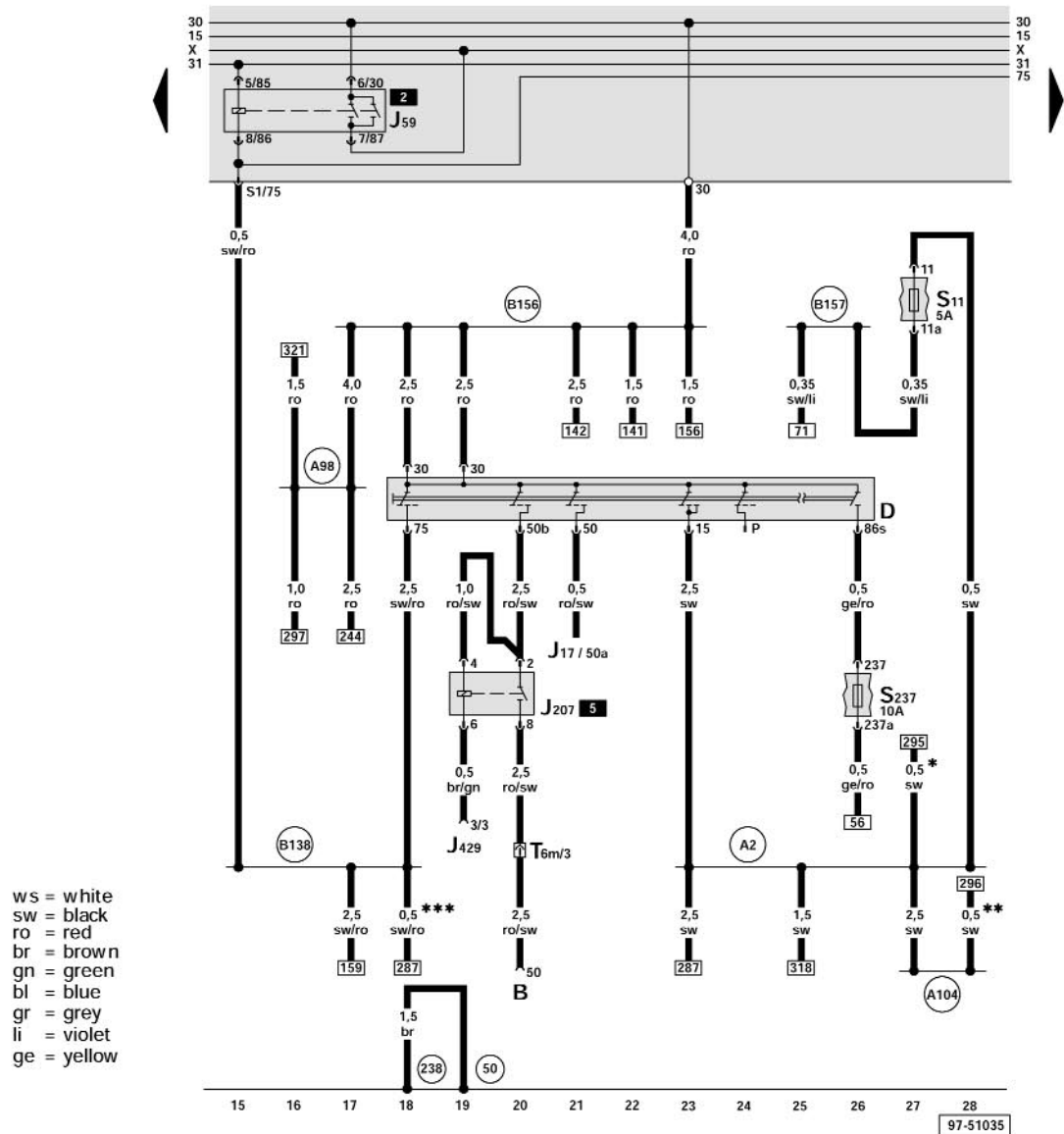
- S131 - Safety fuse 1
- S132 - Safety fuse 2
- S133 - Safety fuse 3
- S134 - Safety fuse 4
- S138 - Safety fuse 5
- S162 - Fuse 1 in fuse bracket/battery
- S163 - Fuse 2 in fuse bracket/battery
- S164 - Fuse 3 in fuse bracket/battery

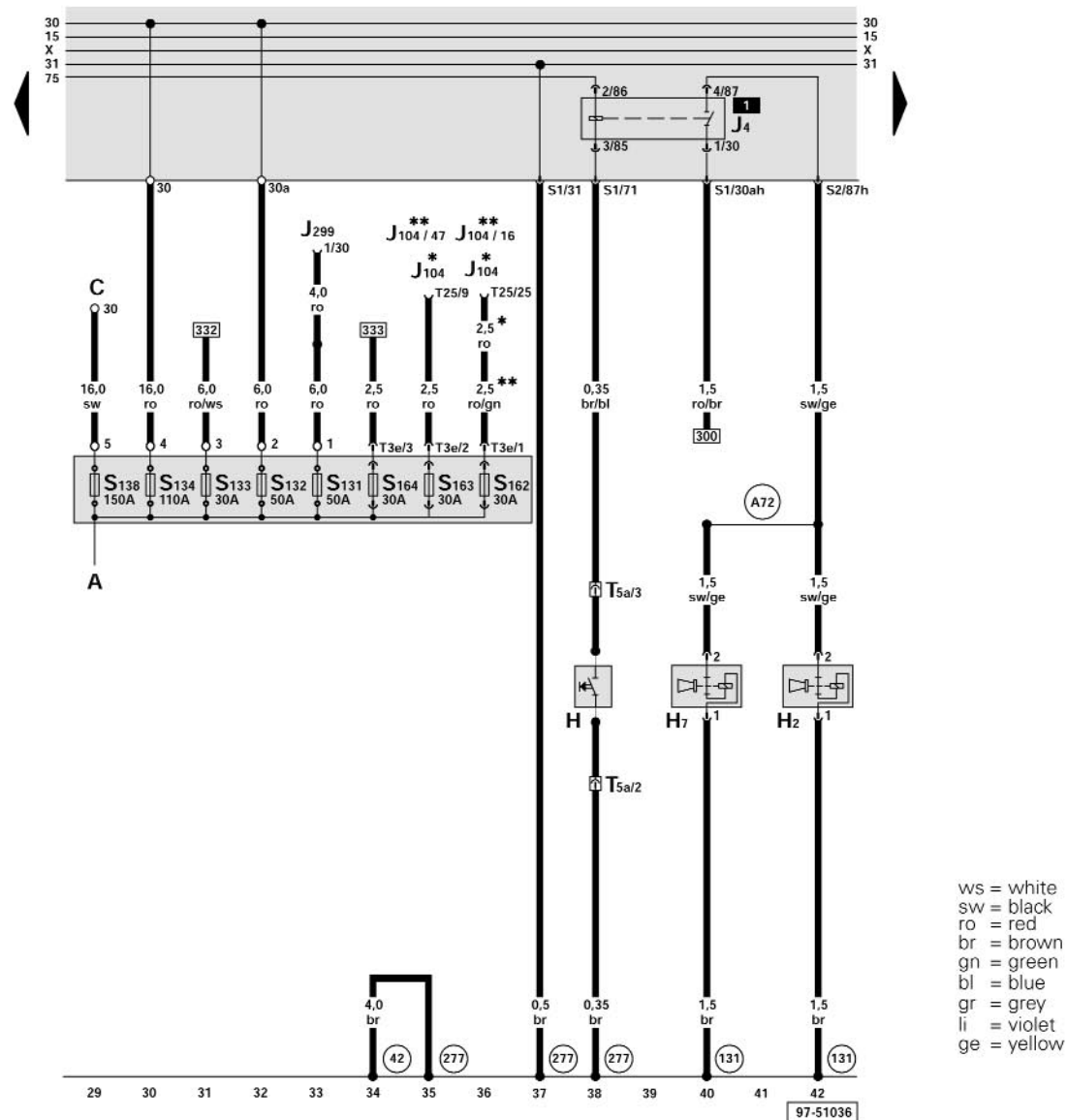




- T14i - Connector 14 pin, in engine compartment, left
- (12) - Ground connection, in engine compartment, left
- (50) - Ground connection, in luggage compartment, left
- (96) - Ground connection -1-, in heated seats wiring harness
- (98) - Ground connection, in rear lid wiring harness

- (131) - Ground connection -2-, in engine compartment wiring harness
- (188) - Ground connection -3-, in A/C wiring harness
- (249) - Ground connection -2-, in wiring harness interior
- (277) - Ground connector -3-, in wiring harness interior
- (283) - Ground connection 2, in wiring harness engine pre-wiring
- (286) - Ground connection -8- in wiring harness interior

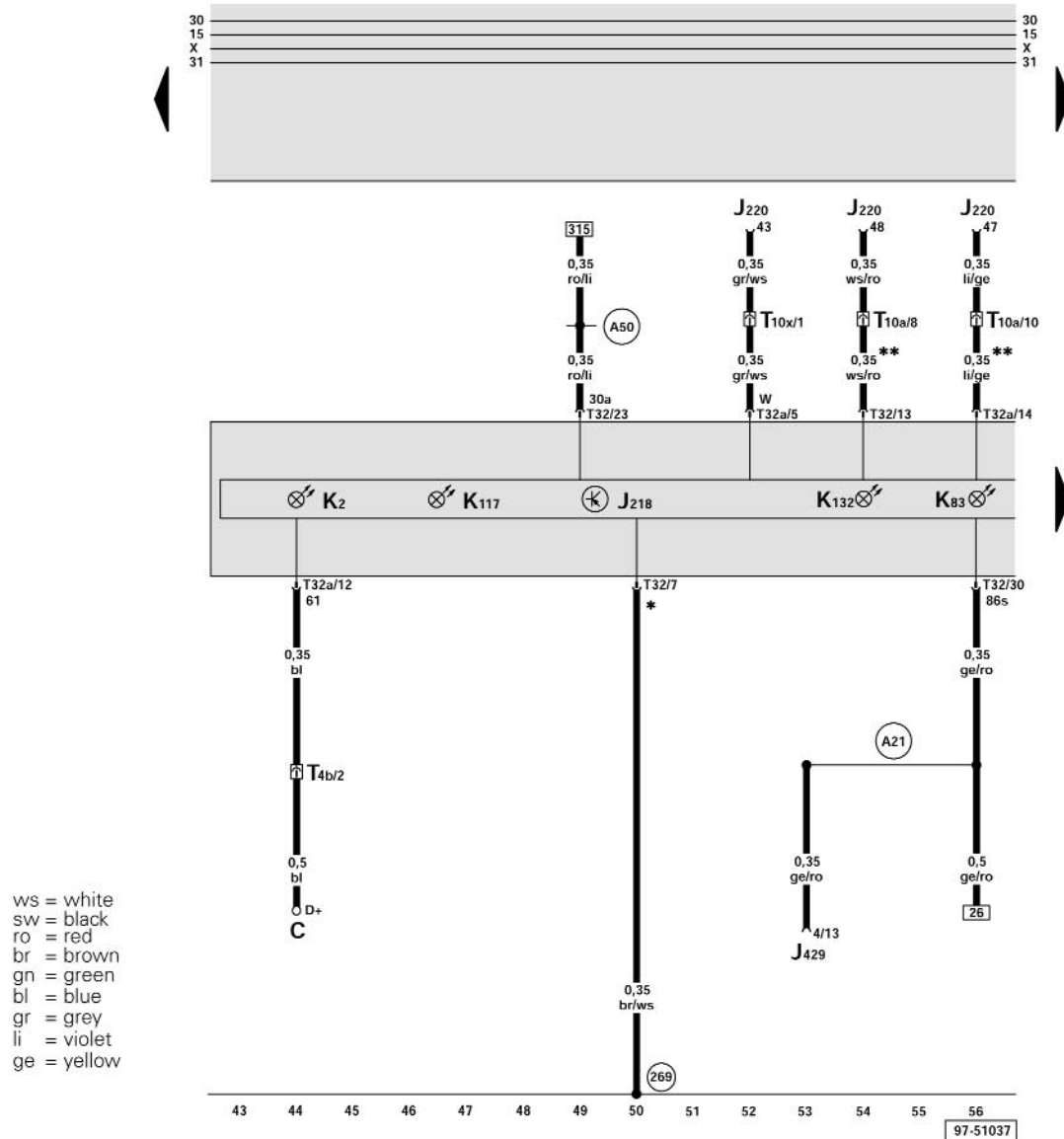




- A - Battery
- C - Generator (GEN)
- H - Horn Button
- H2 - High Tone Horn
- H7 - Low Tone Horn
- J4 - Dual Horn Relay
- J104 - ABS Control Module (w/EDL)
- J299 - Secondary Air Injection (AIR) Pump Relay
- S131 - Safety fuse 1
- S132 - Safety fuse 2
- S133 - Safety fuse 3
- S134 - Safety fuse 4
- S138 - Safety fuse 5
- S162 - Fuse -1- in fuse bracket/battery
- S163 - Fuse -2- in fuse bracket/battery
- S164 - Fuse -3- in fuse bracket/battery
- T3e - Connector 3 pin, black, on Main Fuse Box/Battery
- T5a - Connector 5 pin, yellow, in steering wheel
- T25 - Connector 25 pin, on ABS Control Module (w/EDL)

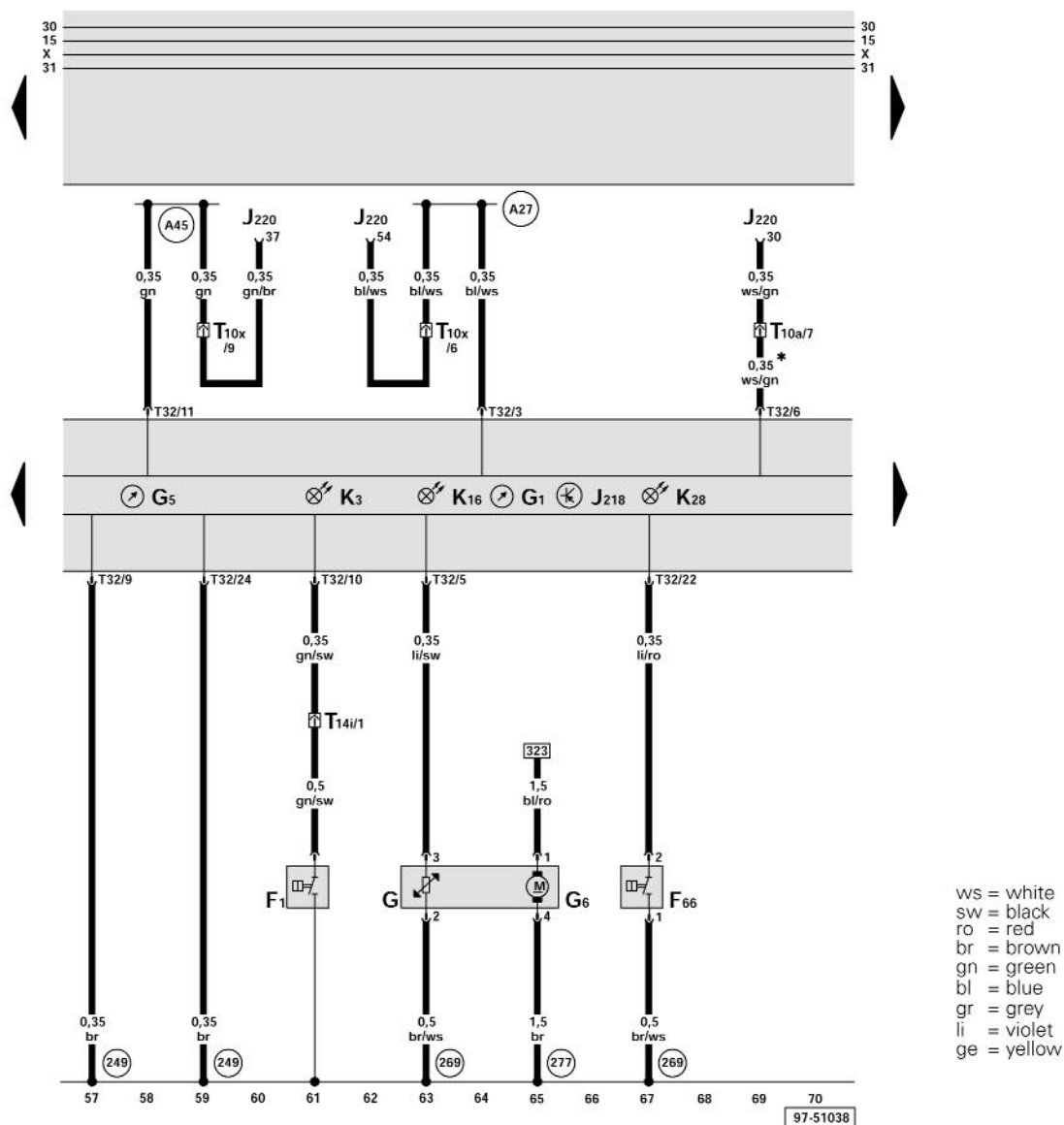
- (42) - Ground connection, on steering column
- (131) - Ground connection -2-, in engine compartment wiring harness
- (277) - Ground connector -3-, in wiring harness interior
- (A72) - Connector (71), in instrument panel wiring harness

- \* - Vehicles with ABS
- \*\* - Vehicles with ABS and ESP



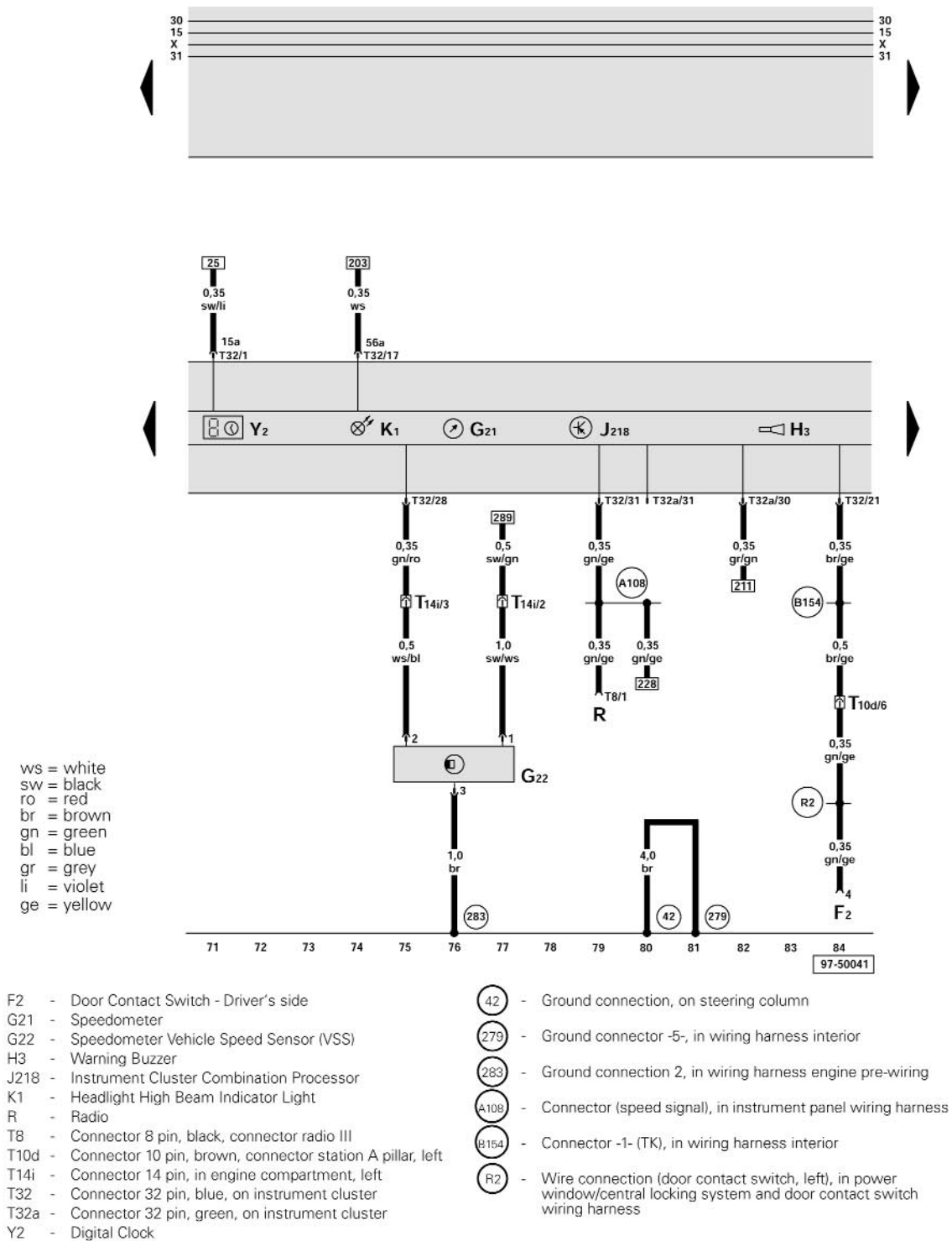
- C - Generator (GEN)
- J218 - Instrument Cluster Combination Processor
- J220 - Motronic Engine Control Module (ECM)
- J429 - Control module for central locking
- K2 - Generator (GEN) Warning Light
- K83 - Malfunction Indicator Lamp (MIL)
- K117 - Warning light for anti-theft immobilizer
- K132 - Electronic Power Control (EPC) Warning Lamp
- T4b - Connector 4 pin, in engine compartment, left
- T10a - Connector 10 pin, white, in E-box plenum chamber
- T10x - Connector 10 pin, orange, in E-box plenum chamber
- T32 - Connector 32 pin, blue, on instrument cluster
- T32a - Connector 32 pin, green, on instrument cluster

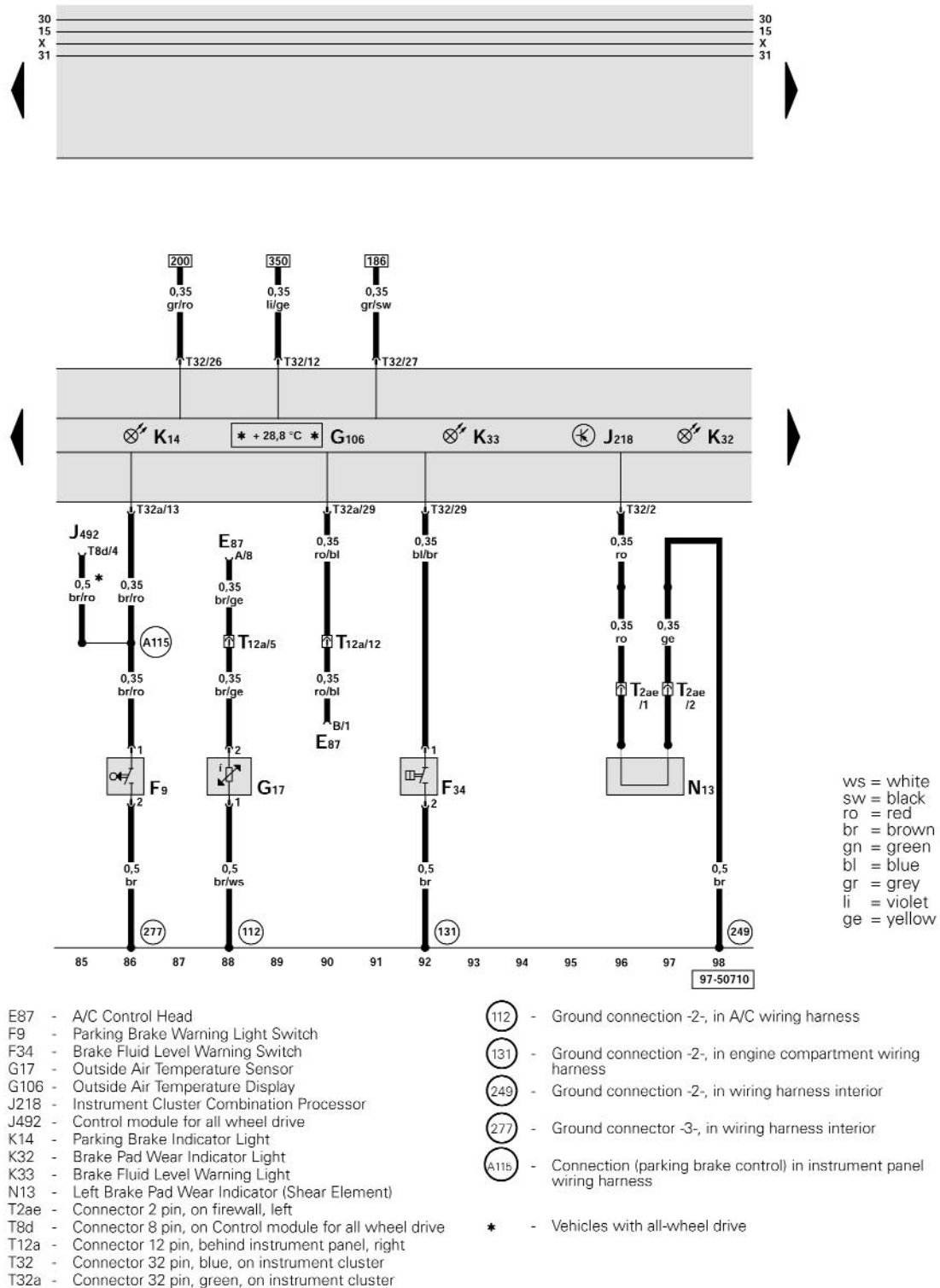
- 269 - Ground connector (sensor ground) -1-, in instrument panel wiring harness
- A21 - Wire connection (86s), in instrument panel wiring harness
- A50 - Plus connection (30a), in instrument panel wiring harness
- \* - Sensor ground output
- \*\* - only instrument cluster without CAN-Bus

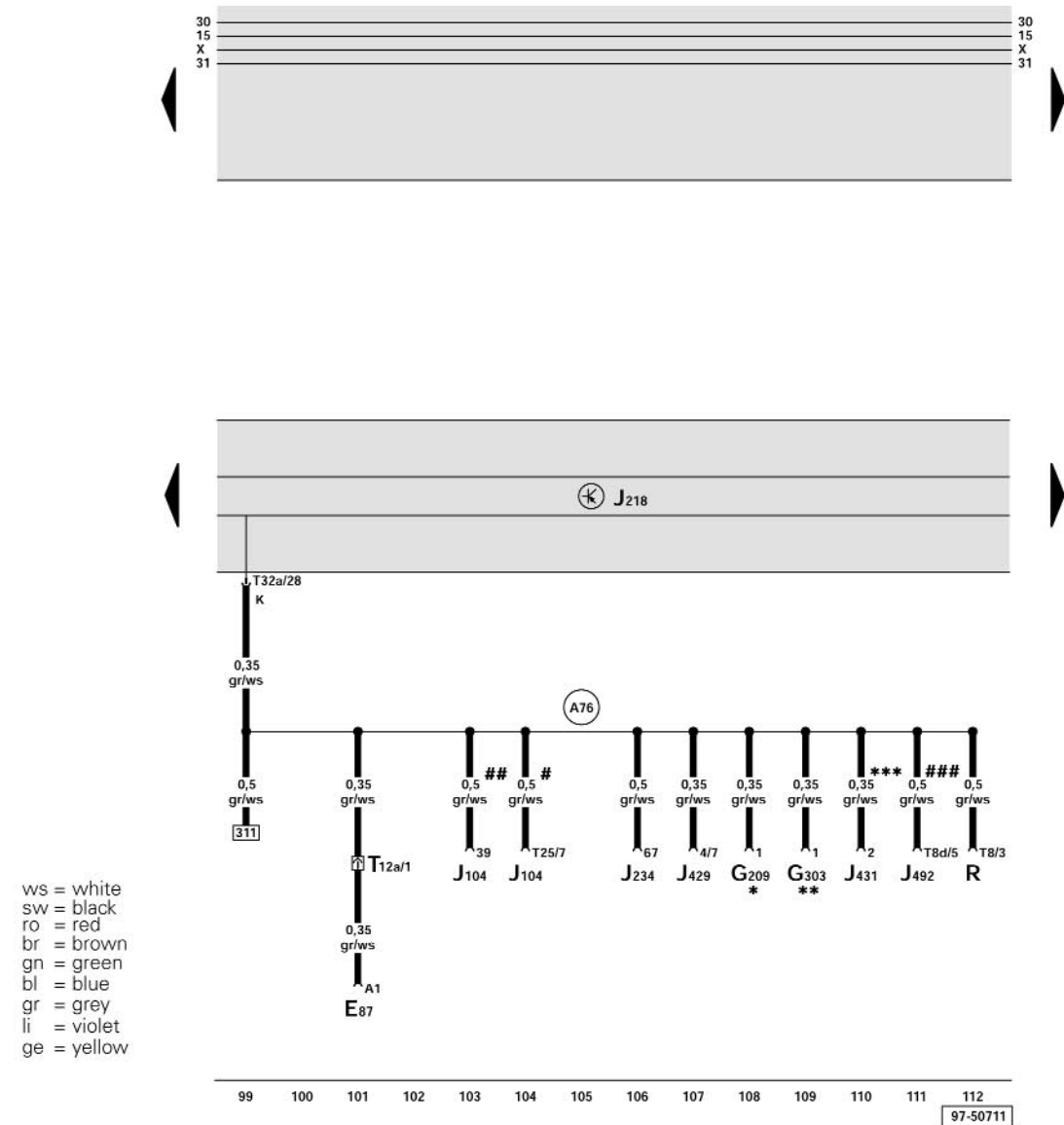


- F1 - Oil Pressure Switch
- F66 - Engine Coolant Level (ECL) Warning Switch
- G - Fuel Level Sensor
- G1 - Fuel Gauge
- G5 - Tachometer
- G6 - Fuel Pump (FP)
- J218 - Instrument Cluster Combination Processor
- J220 - Motronic Engine Control Module (ECM)
- K3 - Oil Pressure Warning Light
- K16 - Fuel Reserve Warning Light
- K28 - Engine Coolant Level/Temperature (ECL/ECT) Warning Light
- T10a - Connector 10 pin, white, in E-box plenum chamber
- T10x - Connector 10 pin, orange, in E-box plenum chamber
- T14i - Connector 14 pin, in engine compartment, left
- T32 - Connector 32 pin, blue, on instrument cluster

- (249) - Ground connection -2-, in wiring harness interior
- (269) - Ground connector (sensor ground) -1-, in instrument panel wiring harness
- (277) - Ground connector -3-, in wiring harness interior
- (A27) - Wire connection (vehicle speed signal), in instrument panel wiring harness
- (A45) - Wire connection (RPM-signal), in instrument panel wiring harness
- \* - only instrument cluster without CAN-Bus





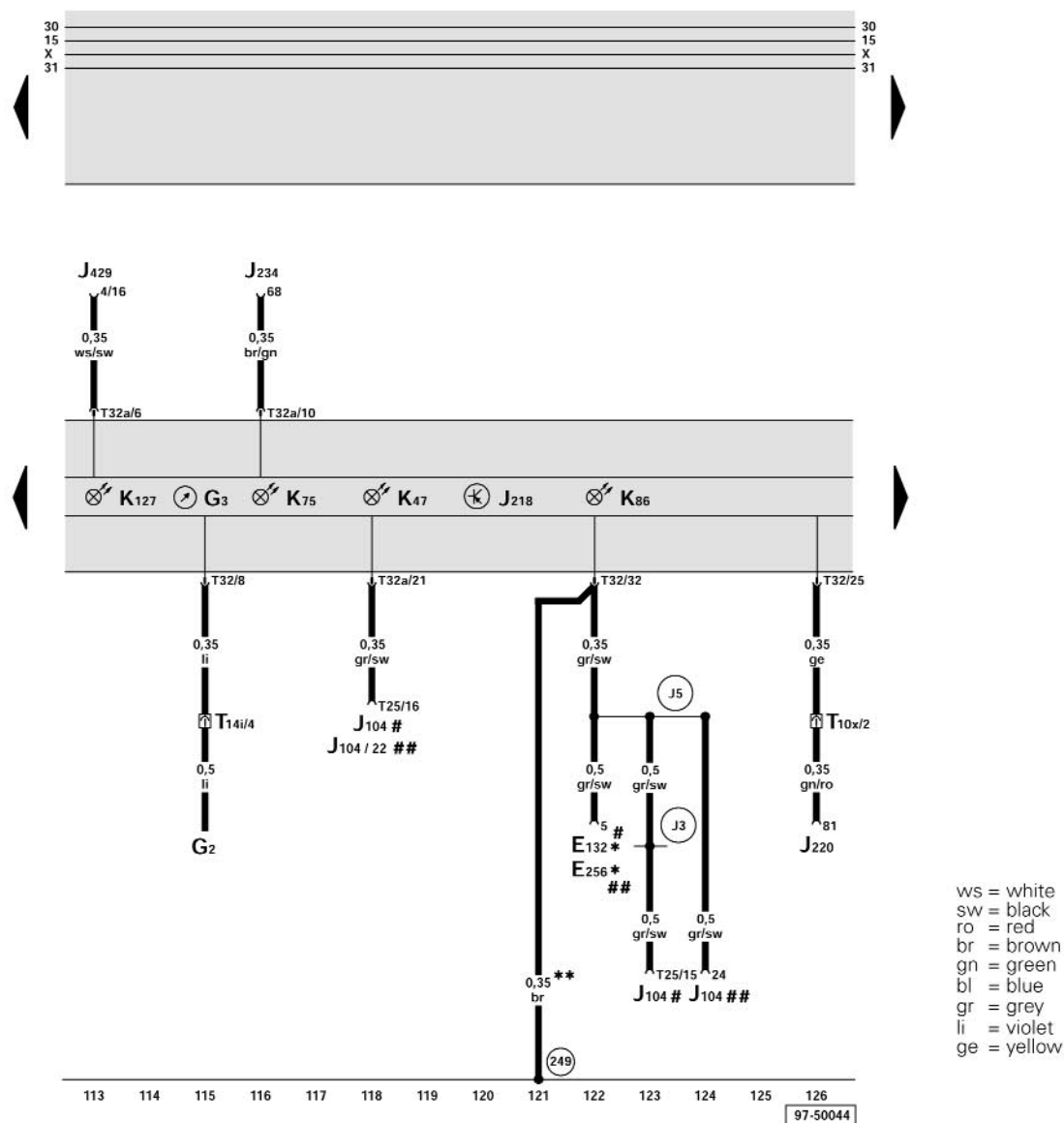


E87 - A/C Control Head  
G209 - Ultra-sound sensor for anti-theft warning  
G303 - Radar Interior Monitoring Control Module 1  
J104 - ABS Control Module (w/EDL)  
J218 - Instrument Cluster Combination Processor  
J234 - Airbag Control Module  
J429 - Control module for central locking  
J431 - Control module for Headlight Beam Adjusting  
J492 - Control module for all wheel drive  
R - Radio  
T8 - Connector 8 pin, black, connector radio III  
T8d - Connector 8 pin, on Control module for all wheel drive  
T12a - Connector 12 pin, behind instrument panel, right  
T25 - Connector 25 pin, on ABS Control Module (w/EDL)  
T32a - Connector 32 pin, green, on instrument cluster

(A76) - Connector (K-diagnosis wire), in instrument panel wiring harness

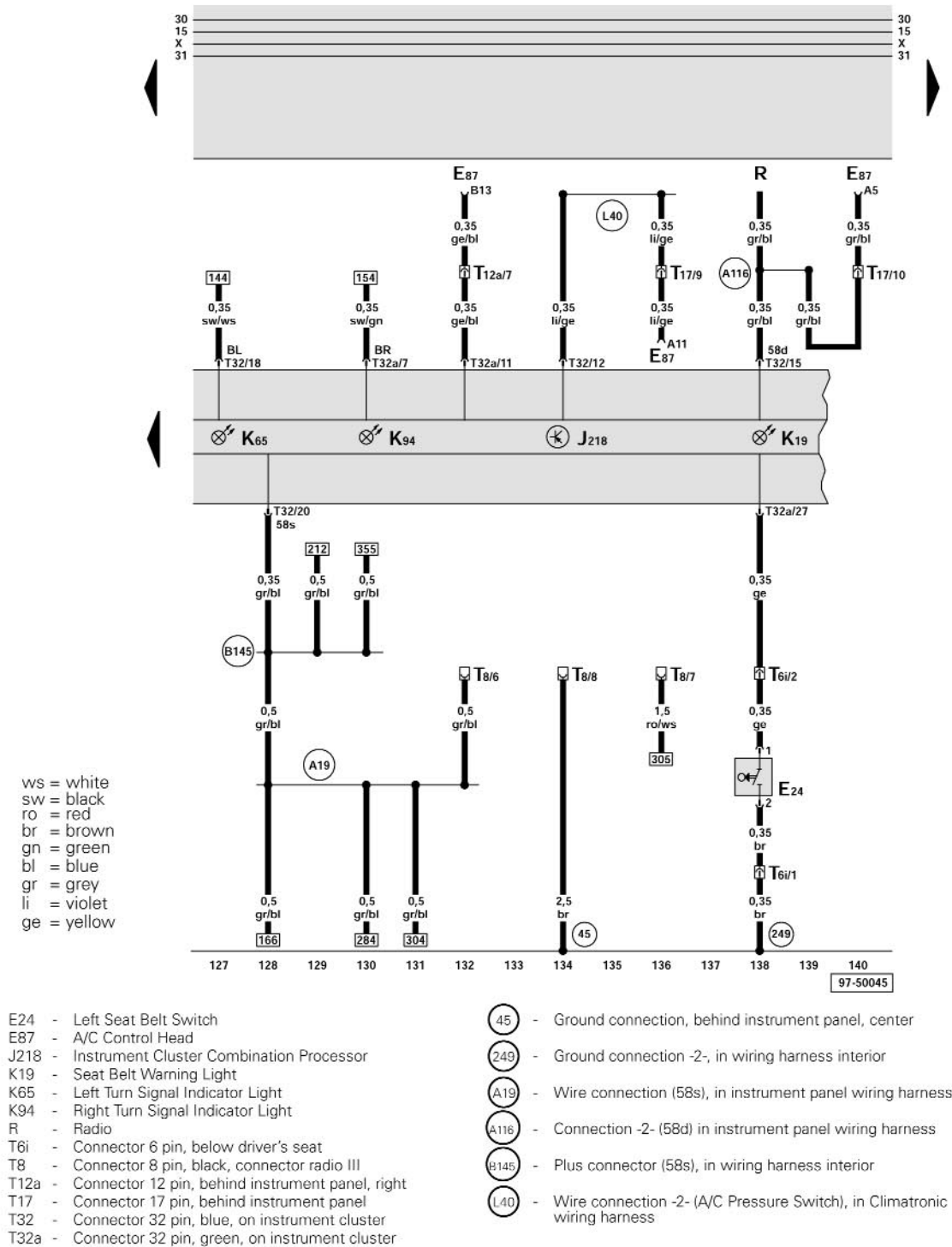
\* - Coupé  
\*\* - Roadster  
\*\*\* - Vehicles with Automatic Headlight Beam Adjusting  
# - Vehicles with ABS  
## - Vehicles with ABS and ESP  
### - Vehicles with all-wheel drive

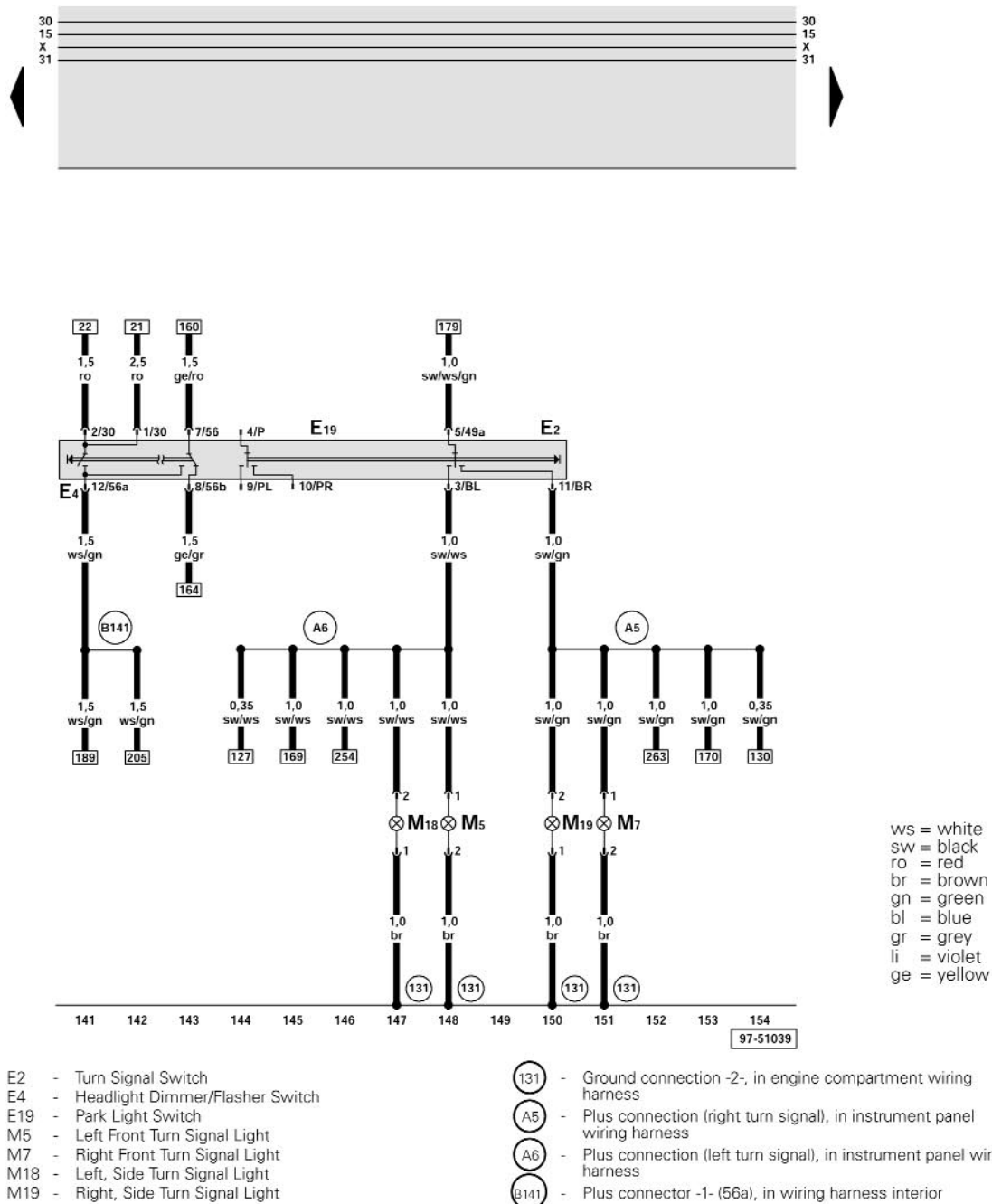


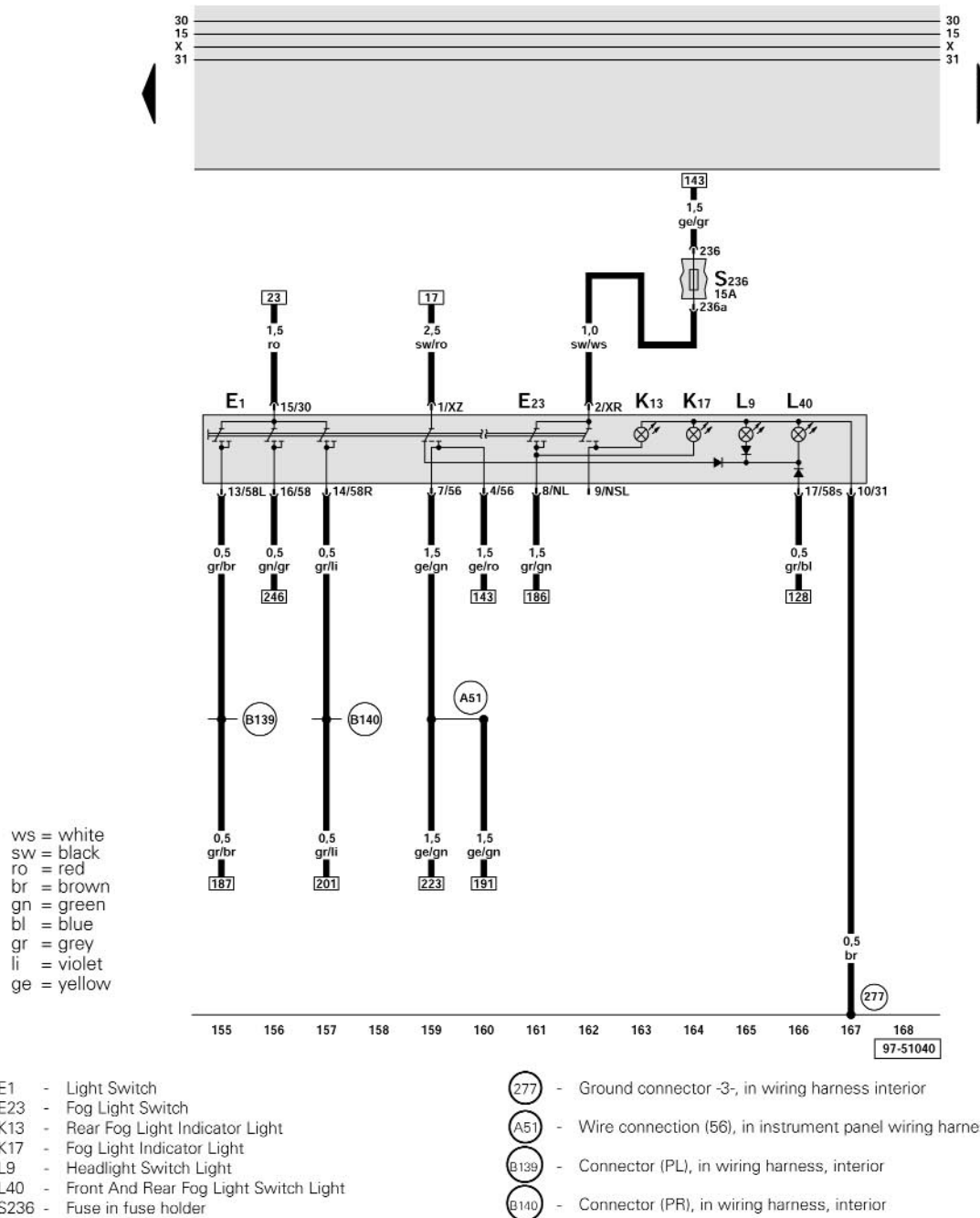


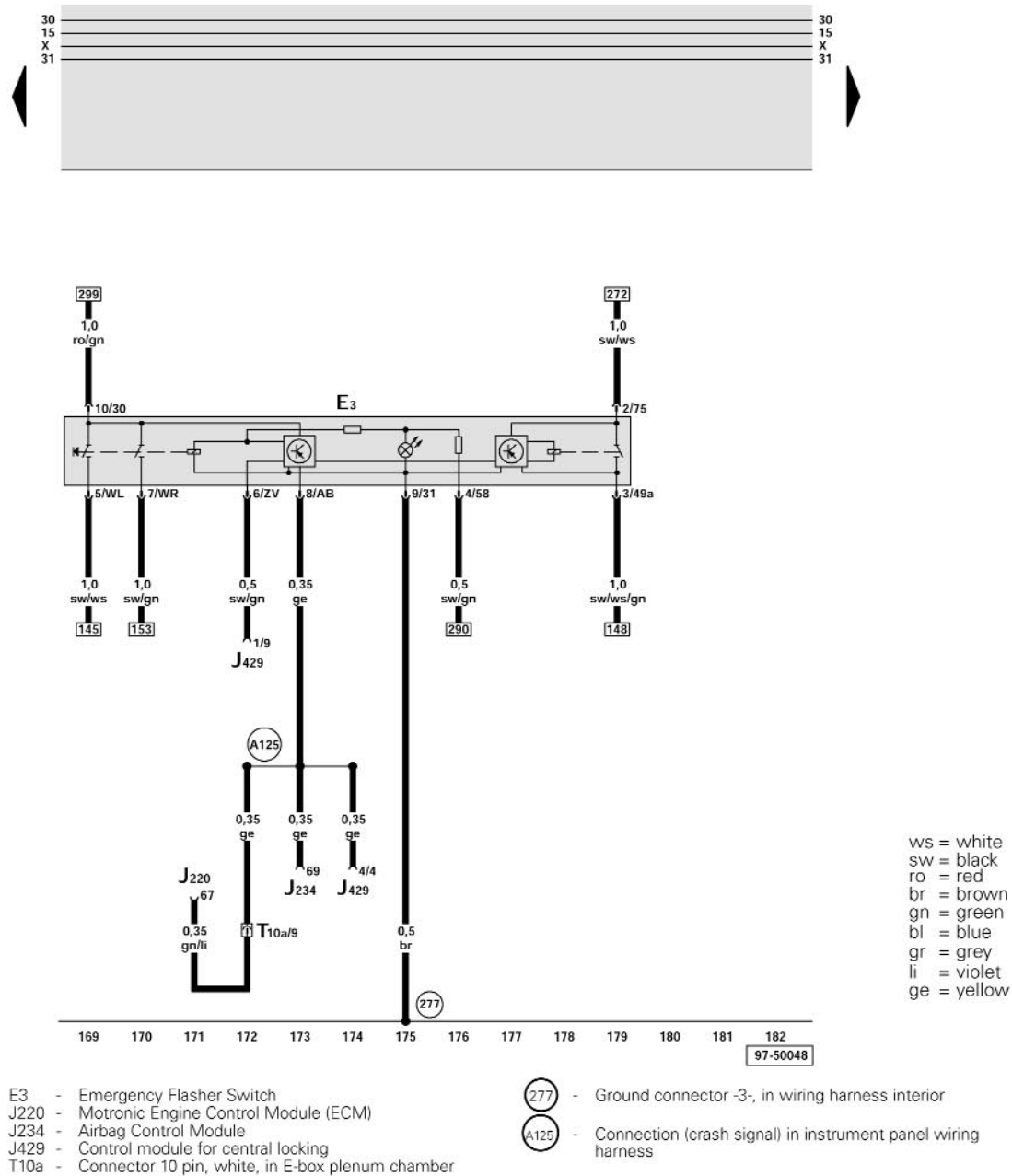
- E132 - Anti-Slip Control Switch
- E256 - ASR/ESP Button
- G2 - Engine Coolant Temperature (ECT) Sensor
- G3 - Engine Coolant Temperature (ECT) Gauge
- J104 - ABS Control Module (w/EDL)
- J218 - Instrument Cluster Combination Processor
- J220 - Motronic Engine Control Module (ECM)
- J234 - Airbag Control Module
- J429 - Control module for central locking
- K47 - ABS Warning Light
- K75 - Airbag Malfunction Indicator Lamp (MIL)
- K86 - Traction Control Indicator Light
- K127 - Indicator light for open trunk
- T10x - Connector 10 pin, orange, in E-box plenum chamber
- T14i - Connector 14 pin, in engine compartment, left
- T25 - Connector 25 pin, on ABS Control Module (w/EDL)
- T32 - Connector 32 pin, blue, on instrument cluster
- T32a - Connector 32 pin, green, on instrument cluster

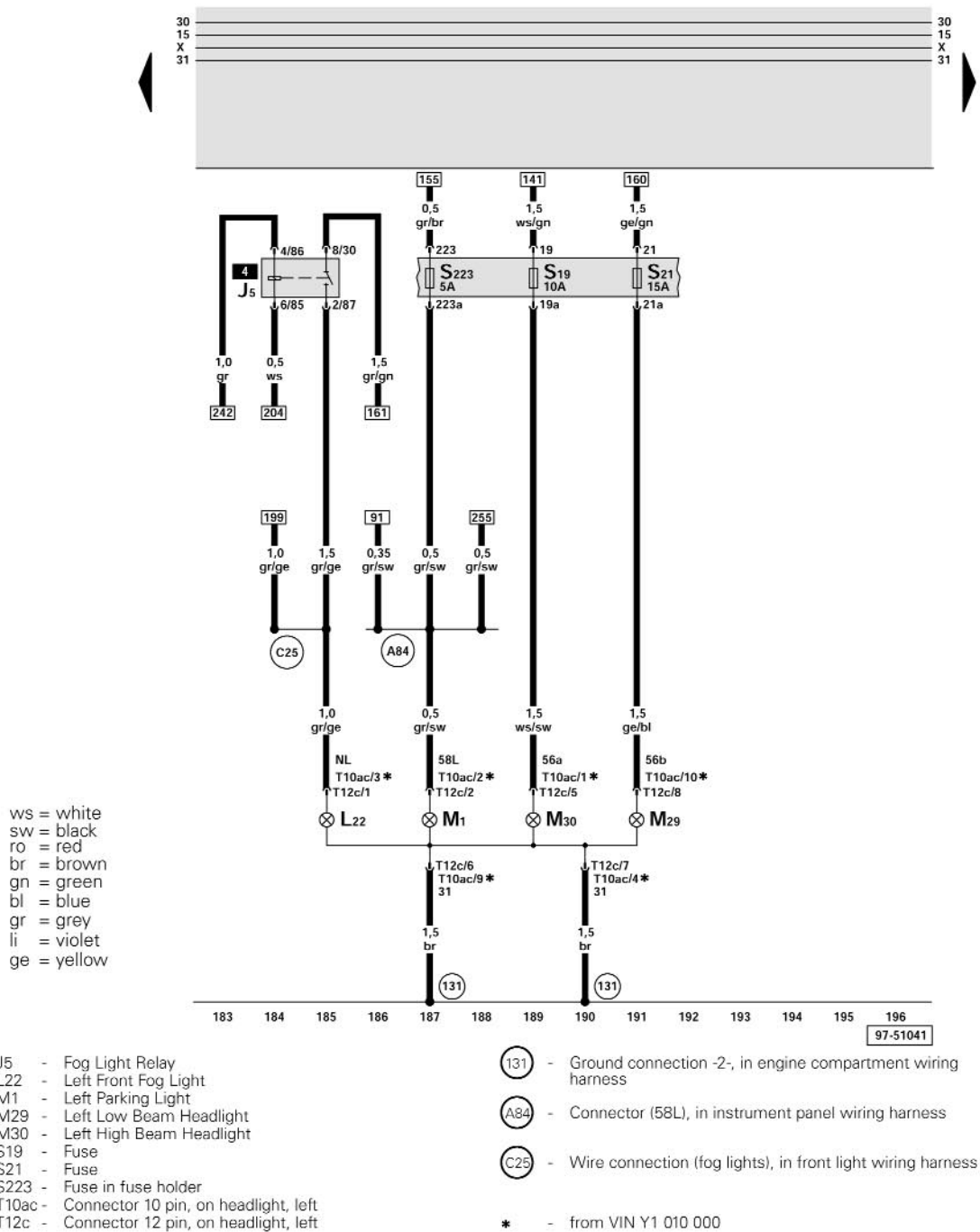
- 249 - Ground connection -2-, in wiring harness interior
  - J3 - Wire connection -1-, in ABS wiring harness
  - J5 - Wire connection -2-, in ABS wiring harness, near anti-slip control switch
- 
- \* - Vehicles with Traction Control
  - \*\* - Vehicles with all-wheel drive
  - # - Vehicles with ABS
  - ## - Vehicles with ABS and ESP

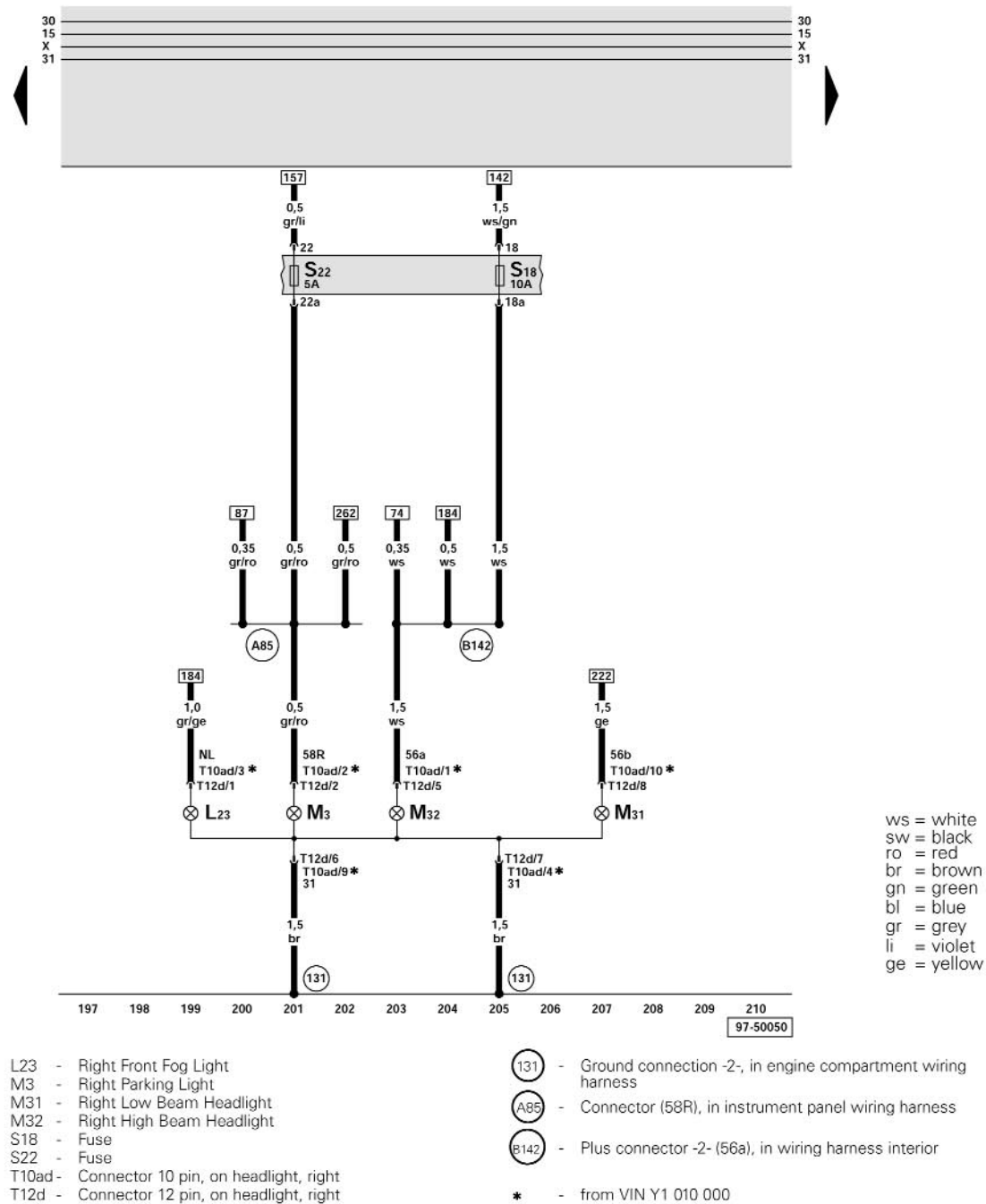


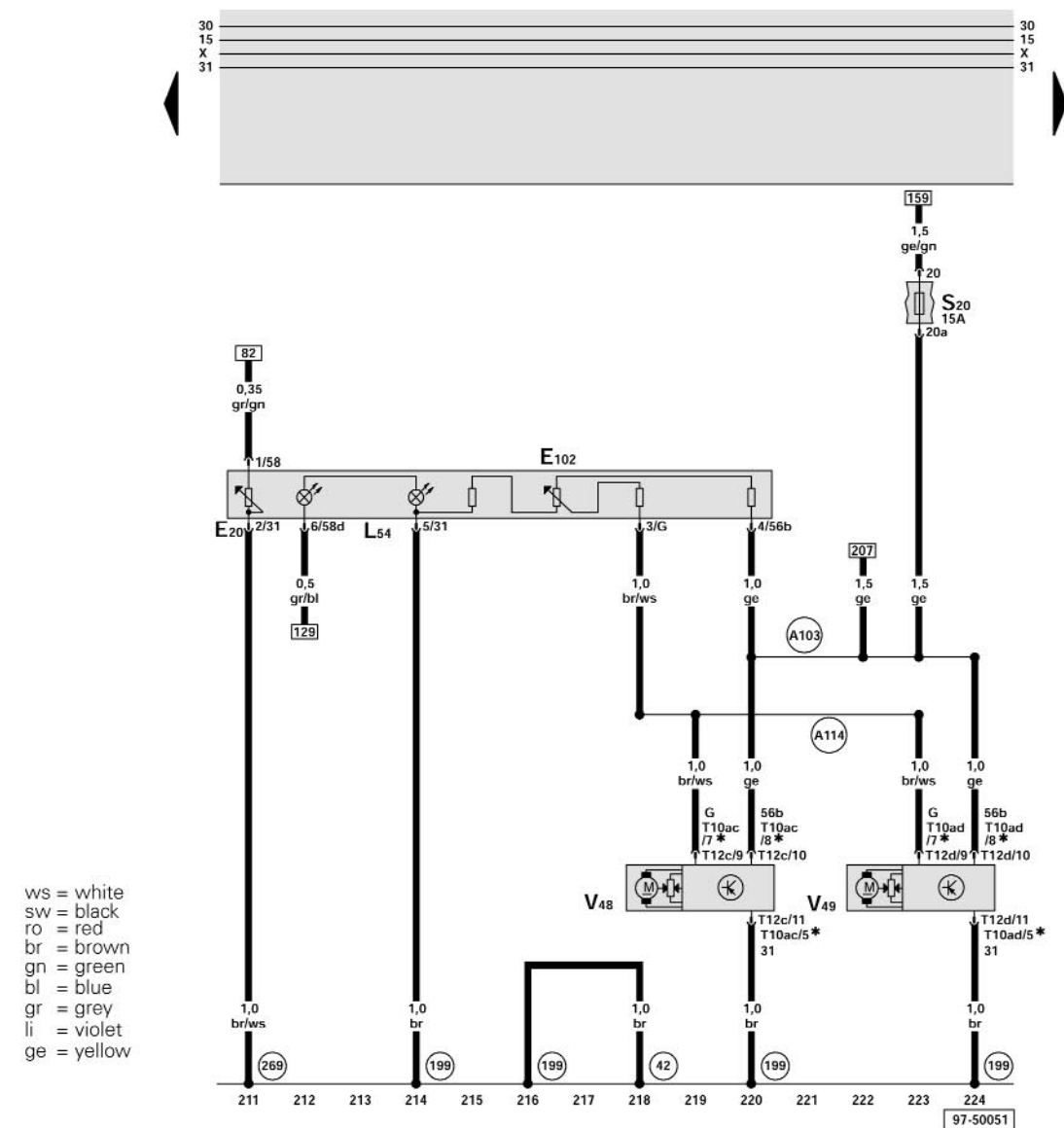










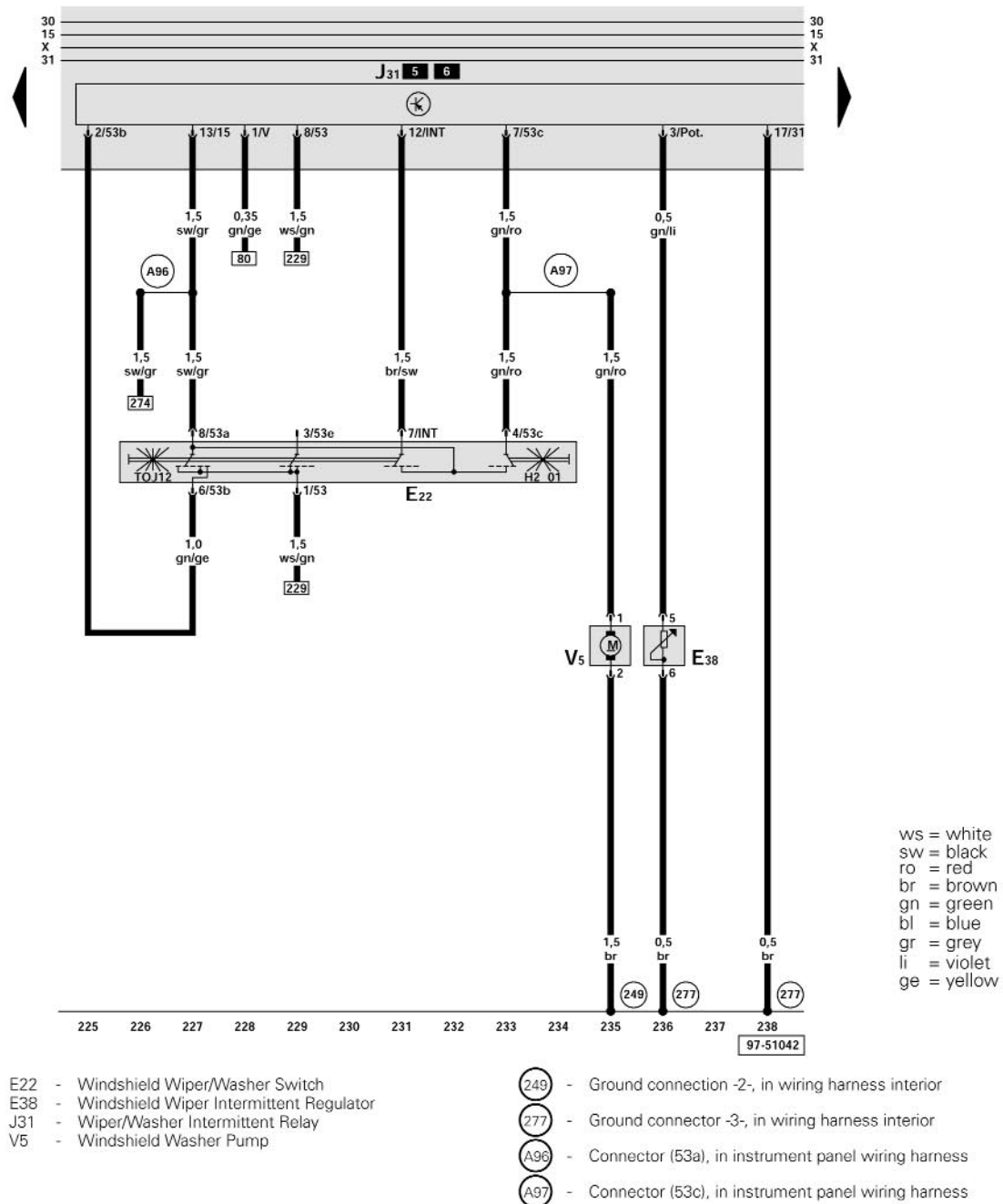


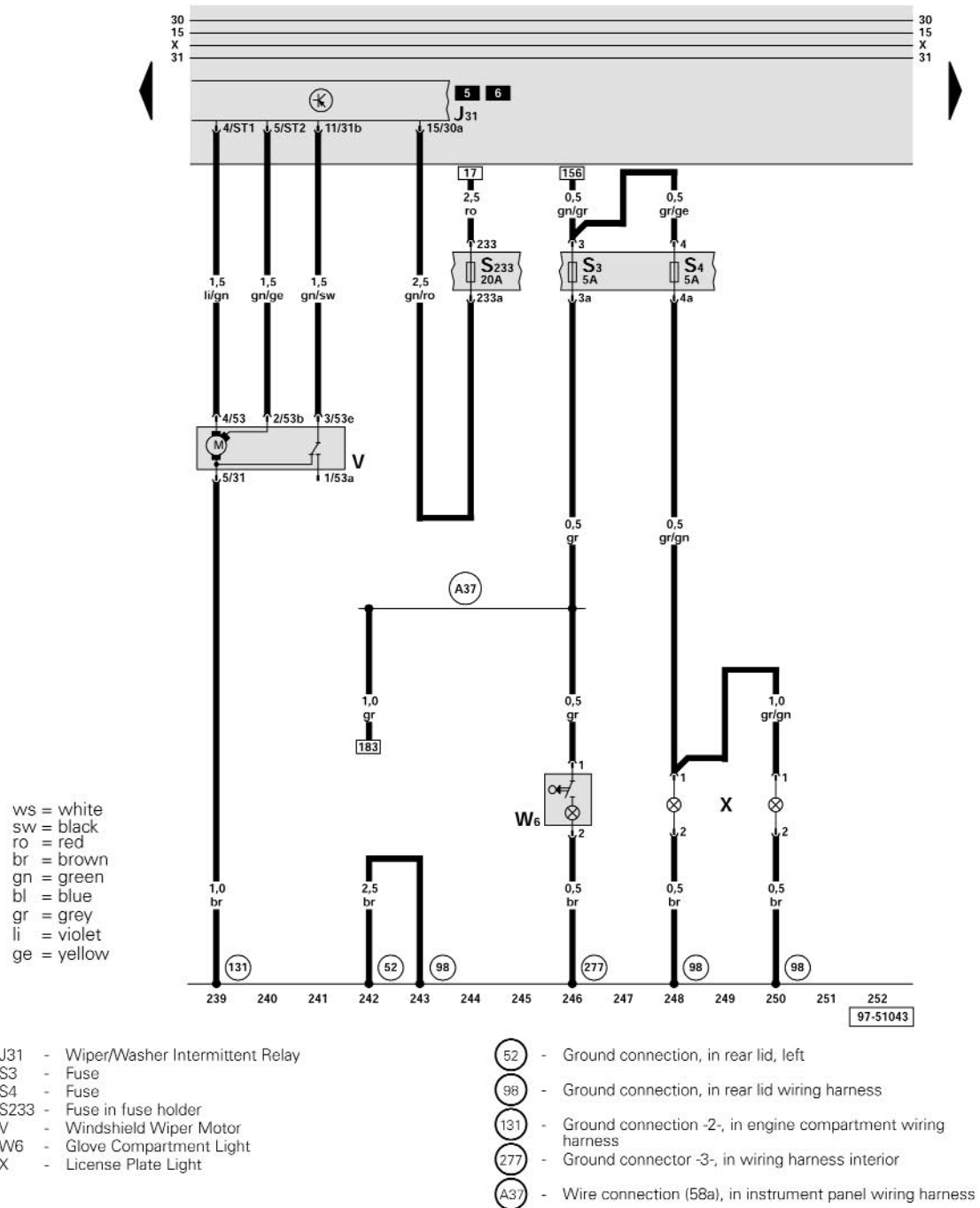
E20 - Instrument Panel Light Dimmer Switch  
E102 - Headlight Adjuster  
L54 - Headlight Adjuster Control Light  
S20 - Fuse  
T10ac - Connector 10 pin, on headlight, left  
T10ad - Connector 10 pin, on headlight, right  
T12c - Connector 12 pin, on headlight, left  
T12d - Connector 12 pin, on headlight, right  
V48 - Left Headlight Beam Adjusting Motor  
V49 - Right Headlight Beam Adjusting Motor

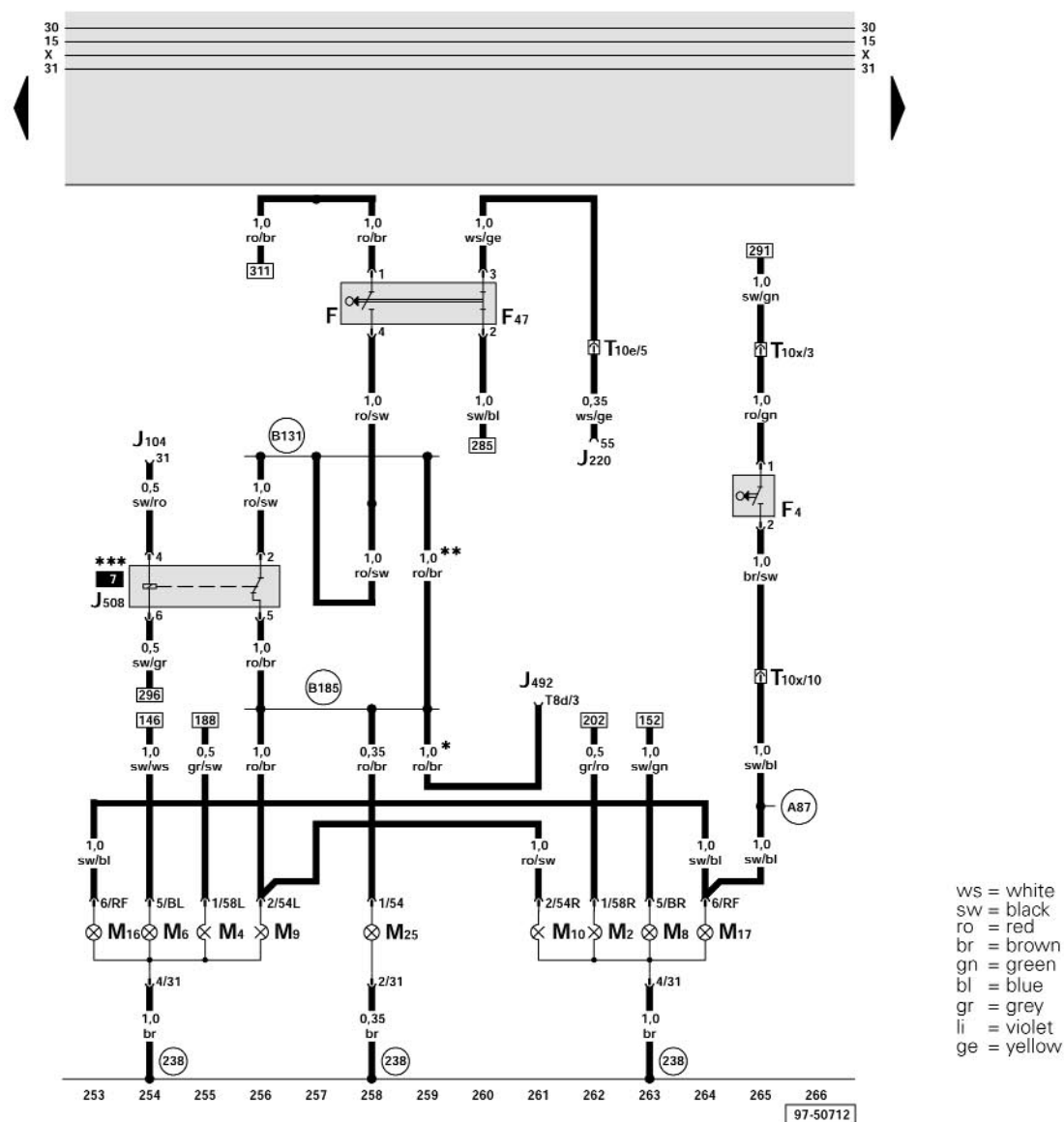
(42) - Ground connection, on steering column  
(199) - Ground connection -3-, in instrument panel wiring harness  
(269) - Ground connector (sensor ground) -1-, in instrument panel wiring harness  
(A103) - Connector -2- (56), in instrument panel wiring harness  
(A114) - Connection (Headlight adjusting), in instrument panel wiring harness

\* - from VIN Y1 010 000





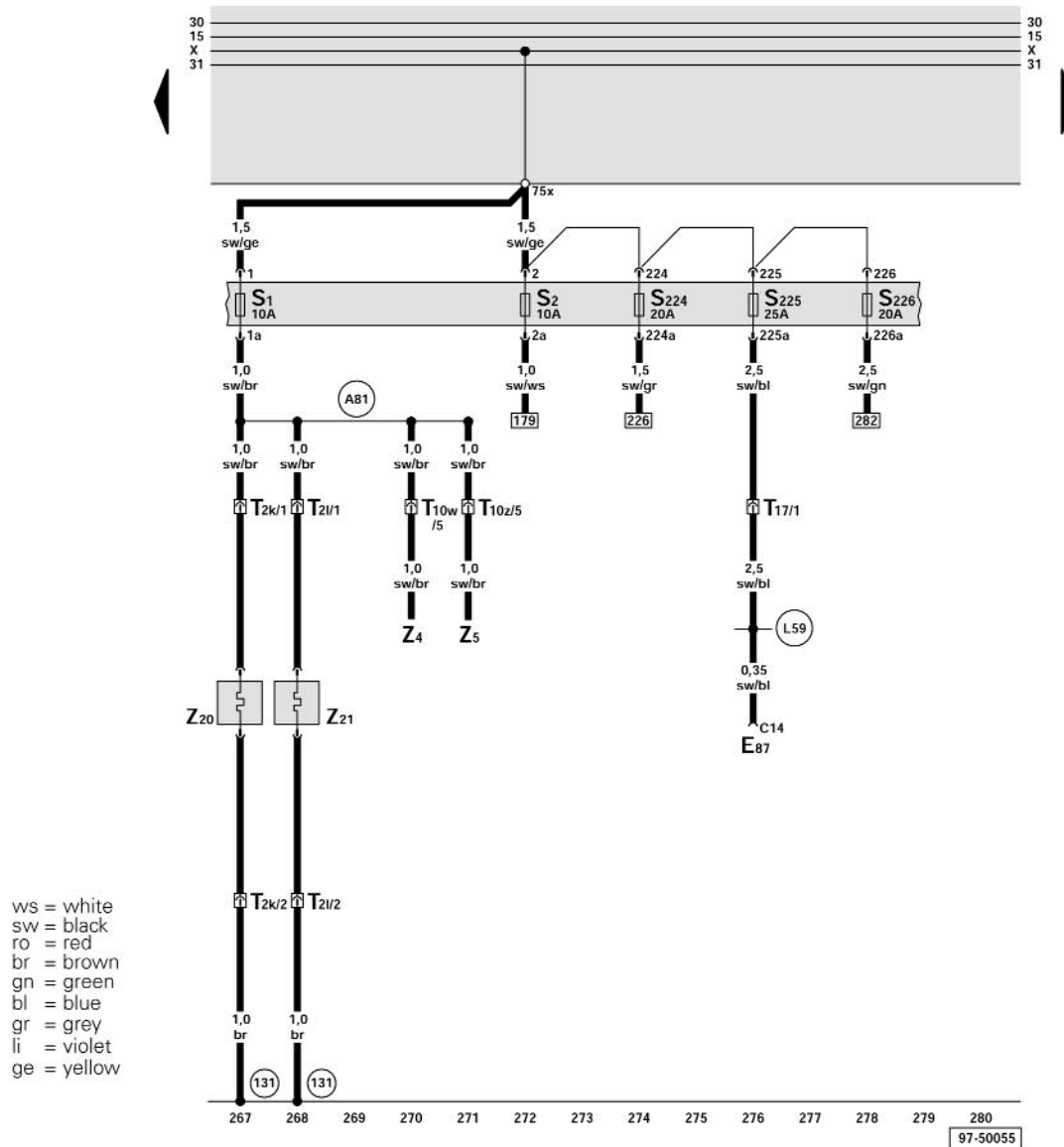




- F - Brake Light Switch
- F4 - Back-Up Light Switch
- F47 - Vacuum Vent Valve, Brake
- J104 - ABS Control Module (w/EDL)
- J220 - Motronic Engine Control Module (ECM)
- J492 - Control module for all wheel drive
- J508 - Brake light disable relay (ESP)
- M2 - Right Tail Light
- M4 - Left Tail Light
- M6 - Left Rear Turn Signal Light
- M8 - Right Rear Turn Signal Light
- M9 - Left Brake Light
- M10 - Right Brake Light
- M16 - Left Back-Up Light
- M17 - Right Back-Up Light
- M25 - High-mount Brake Light
- T8d - Connector 8 pin, on Control module for all wheel drive
- T10e - Connector 10 pin, black, in E-box plenum chamber
- T10x - Connector 10 pin, orange, in E-box plenum chamber

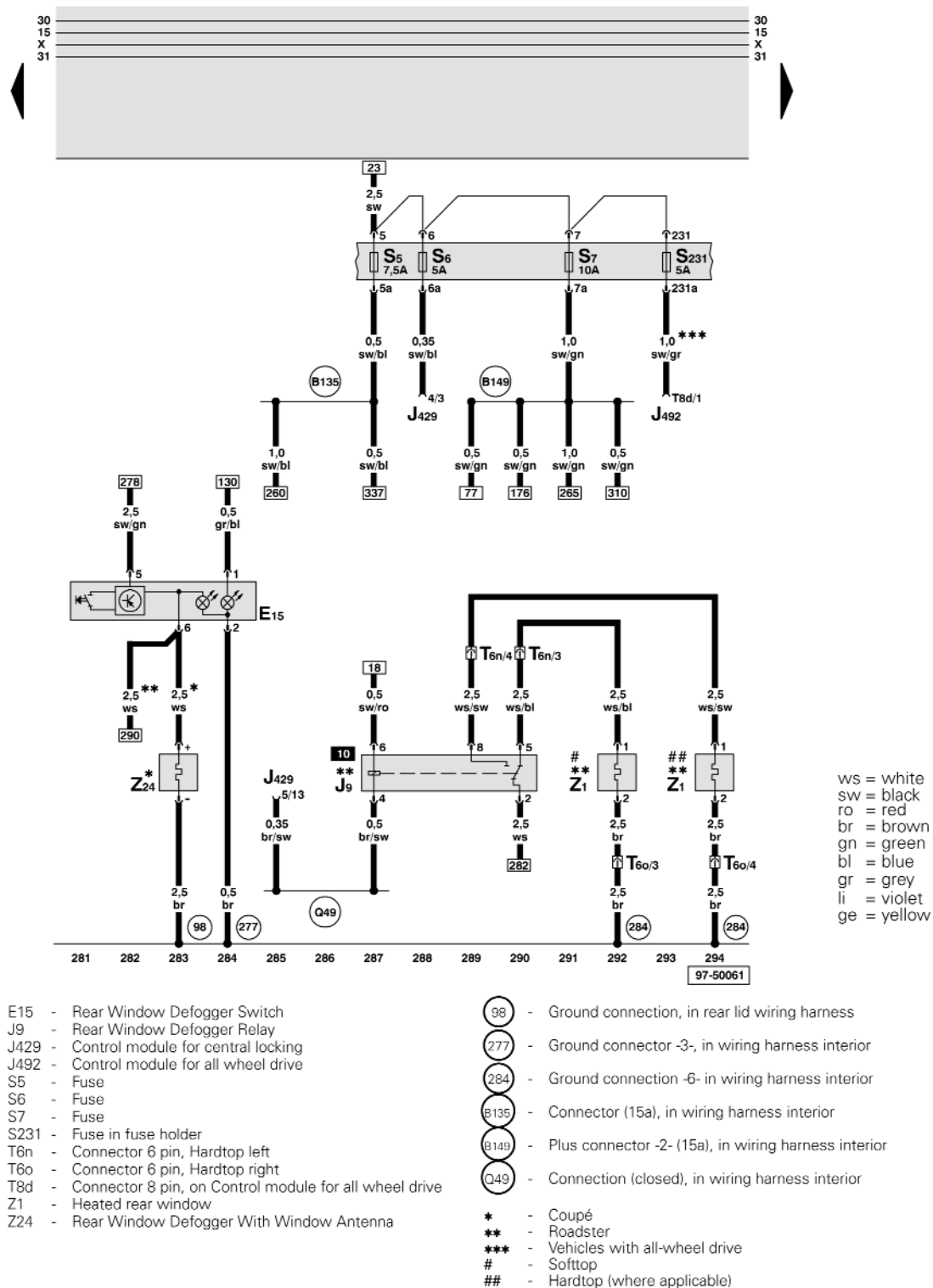
- (238) - Ground connection -1-, in wiring harness interior
- (A87) - Connector (RF), in instrument panel wiring harness
- (B131) - Connector (54), in wiring harness interior
- (B185) - Connection 2 (54) in passenger compartment wiring harness

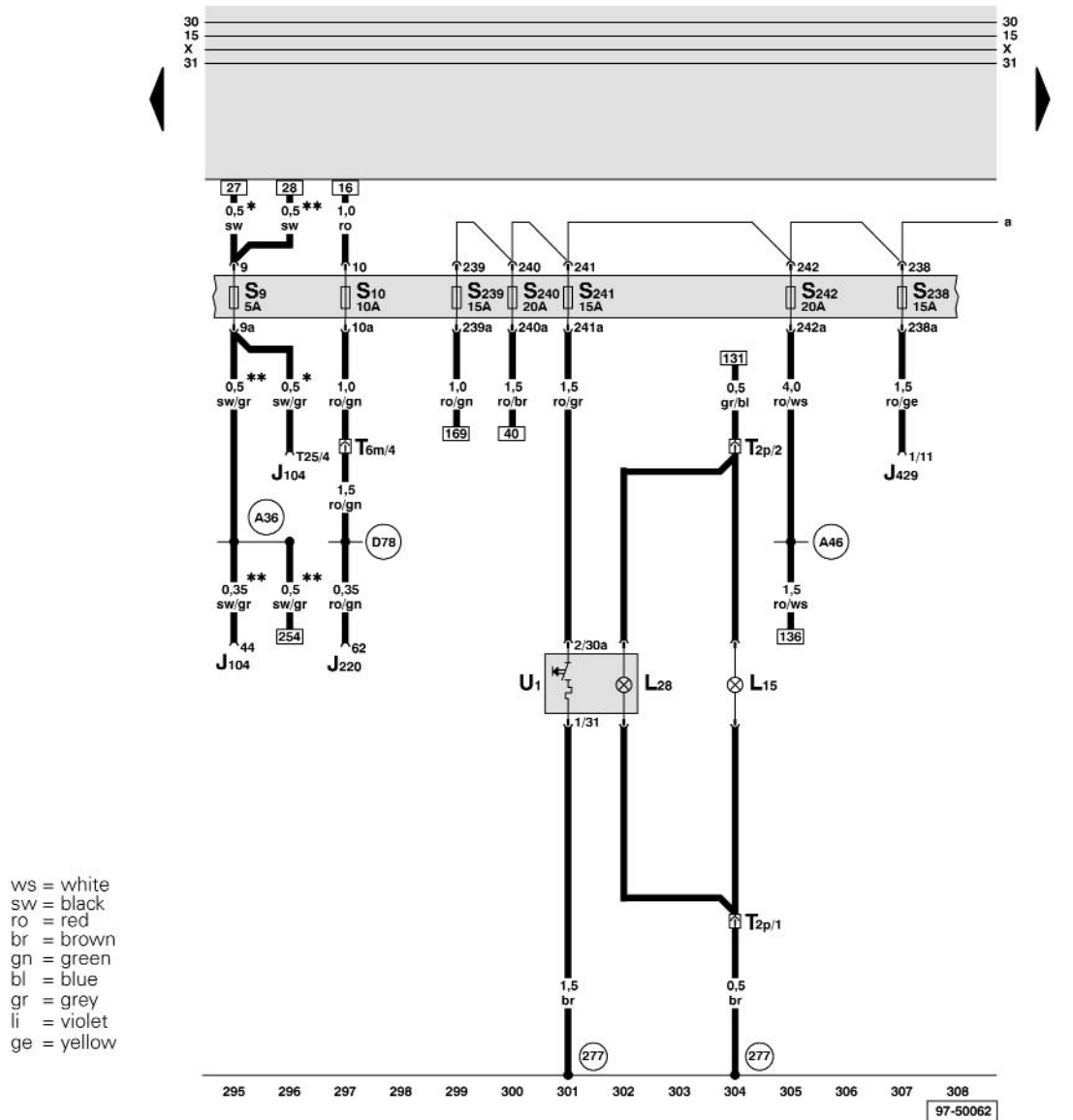
- \* - Vehicles with all-wheel drive
- \*\* - Vehicles with ABS
- \*\*\* - Vehicles with ABS and ESP



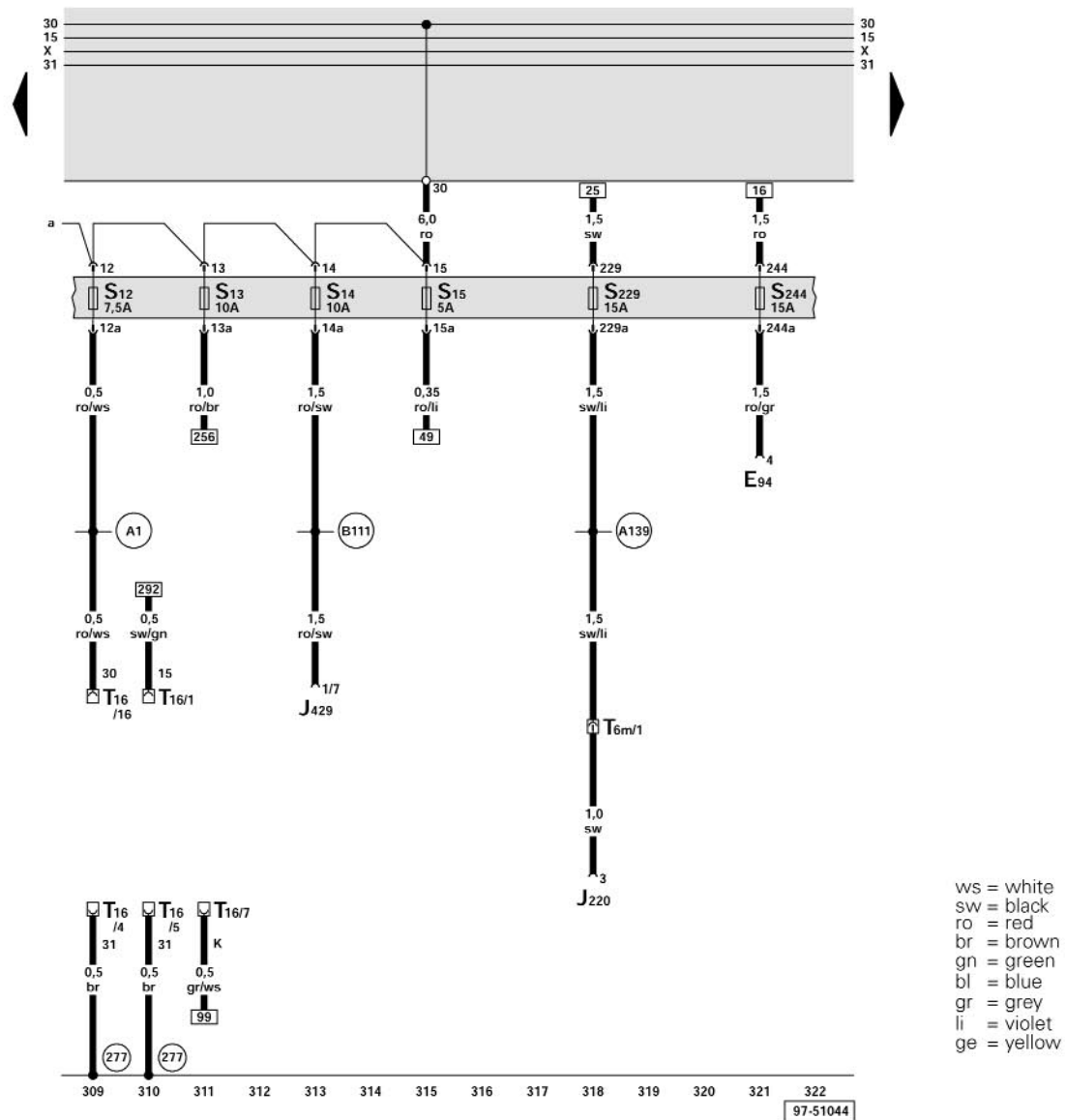
- E87 - A/C Control Head  
 S1 - Fuse  
 S2 - Fuse  
 S224 - Fuse in fuse holder  
 S225 - Fuse in fuse holder  
 S226 - Fuse in fuse holder  
 T2k - Connector 2 pin, black, on engine hood  
 T2l - Connector 2 pin, black, on engine hood  
 T10w - Connector 10 pin, blue, connector station A pillar, left  
 T10z - Connector 10 pin, blue, connector station A pillar, right  
 T17 - Connector 17 pin, behind instrument panel  
 Z4 - Heated outside mirror, driver side  
 Z5 - Heated outside mirror, passenger side  
 Z20 - Left Washer Nozzle Heater  
 Z21 - Right Washer Nozzle Heater

- 131 - Ground connection -2-, in engine compartment wiring harness  
 A81 - Connector -2- (X), in instrument panel wiring harness  
 L59 - Plus connection (30), in wiring harness heater



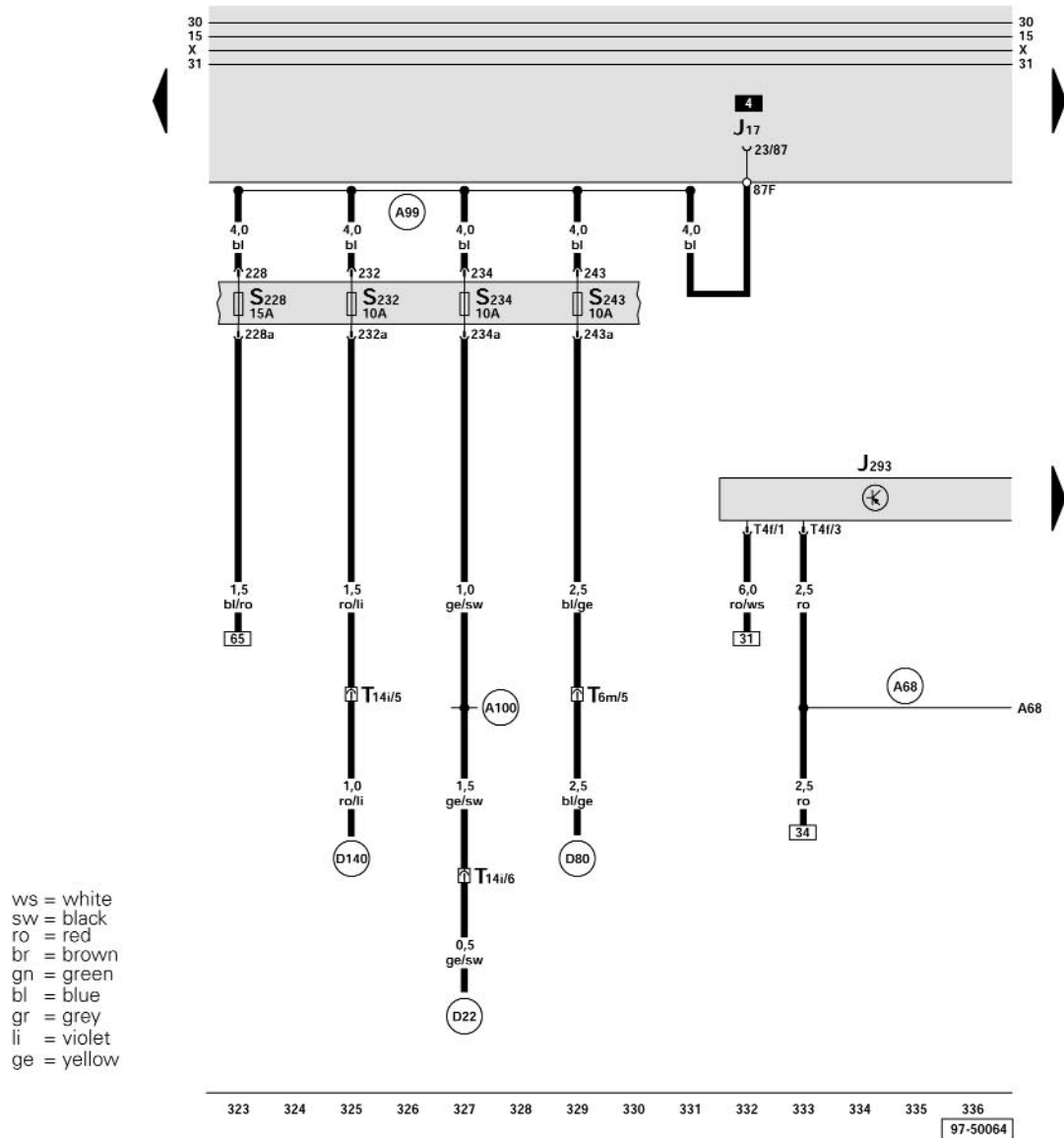


- J104 - ABS Control Module (w/EDL)  
J220 - Motronic Engine Control Module (ECM)  
J429 - Control module for central locking  
L15 - Ashtray Light  
L28 - Cigarette Lighter Light  
S9 - Fuse  
S10 - Fuse  
S238 - Fuse in fuse holder  
S239 - Fuse in fuse holder  
S240 - Fuse in fuse holder  
S241 - Fuse in fuse holder  
S242 - Fuse in fuse holder  
T2p - Connector 2 pin, behind console  
T6m - Connector 6 pin, brown, in E-box plenum chamber  
T25 - Connector 25 pin, on ABS Control Module (w/EDL)  
U1 - Cigarette Lighter



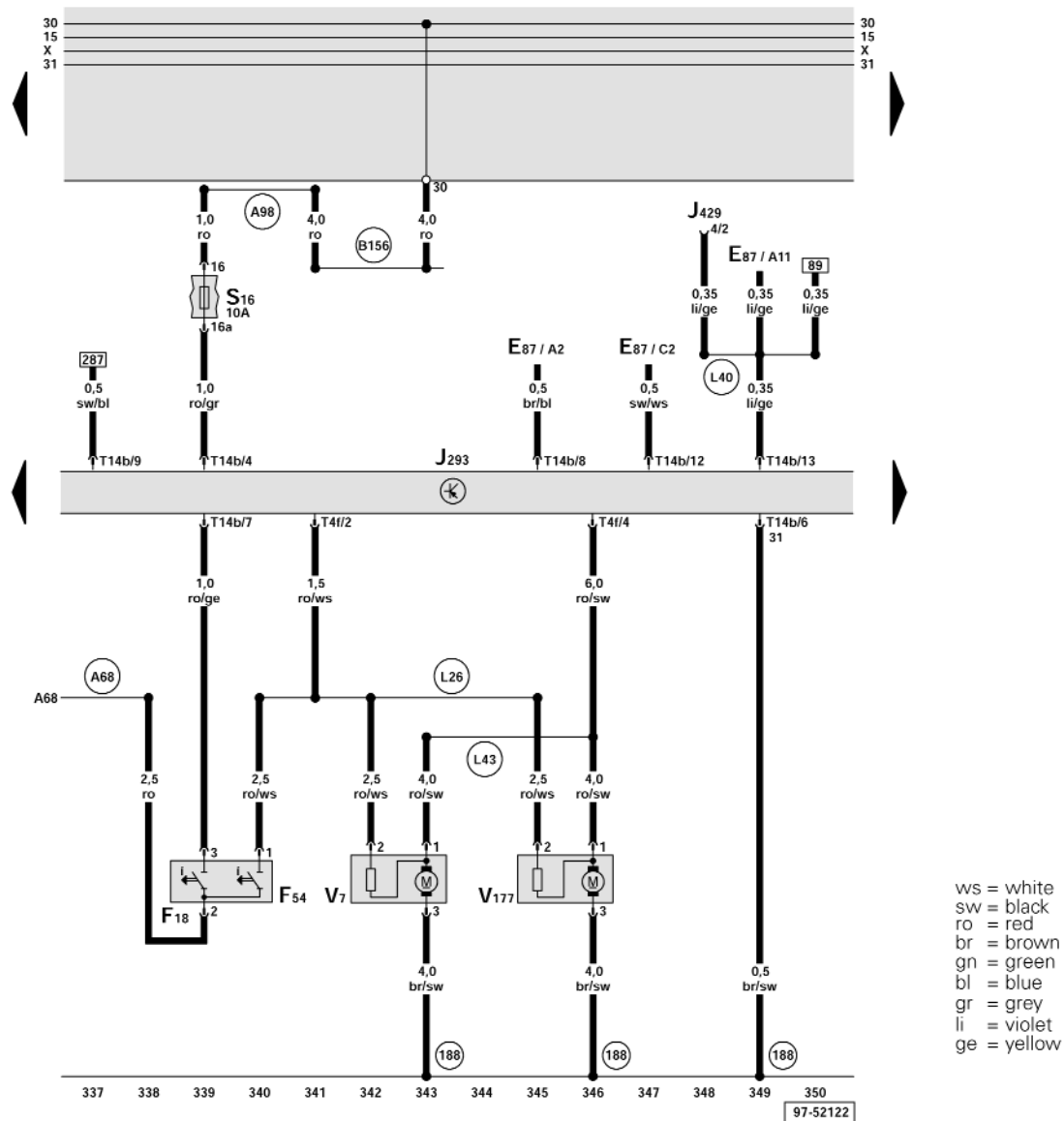
- E94 - Adjuster for heated driver's seat  
J220 - Motronic Engine Control Module (ECM)  
J429 - Control module for central locking  
S12 - Fuse  
S13 - Fuse  
S14 - Fuse  
S15 - Fuse  
S229 - Fuse in fuse holder  
S244 - Fuse in fuse holder  
T6m - Connector 6 pin, brown, in E-box plenum chamber  
T16 - Connector 16 pin, black, Data Link Connector (DLC), below storage compartment, driver's side

- 277 - Ground connector -3-, in wiring harness interior  
A1 - Plus connection (30a), in instrument panel wiring harness  
A139 - Connection 3 (15), in instrument panel wiring harness  
B111 - Connector (30a), in wiring harness interior



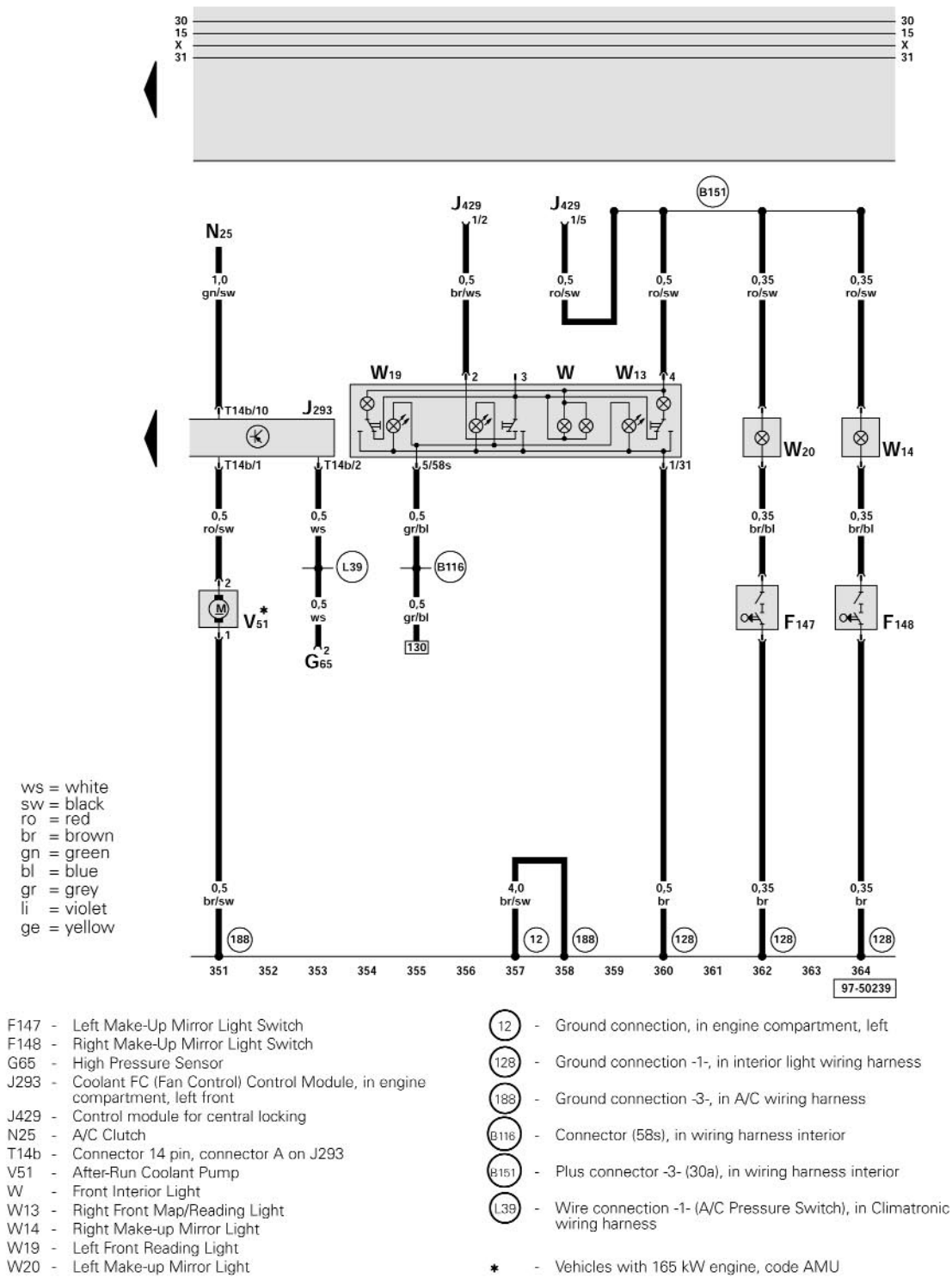
- |      |  |      |   |
|------|--|------|---|
| J17  | - Fuel Pump (FP) Relay   | A68  | - Connector (30, A/C), in instrument panel wiring harness                               |
| J293 | - Coolant FC (Fan Control) Control Module, in engine compartment, left front | A99  | - Connector -1- (87), in instrument panel wiring harness                                |
| S228 | - Fuse in fuse holder  | A100 | - Connector -2- (87), in instrument panel wiring harness                                |
| S232 | - Fuse in fuse holder  | D22  | - Connector (over fuse 234), in wiring harness front, right                             |
| S234 | - Fuse in fuse holder  | D80  | - Plus connection (87a- for EVAP system solenoid), in engine compartment wiring harness |
| S243 | - Fuse in fuse holder  | D140 | - Connector (injectors), in wiring harness, engine pre-wiring                           |
| T4f  | - Connector 4 pin, connector B on J293                                       |      |   |
| T6m  | - Connector 6 pin, brown, in E-box plenum chamber                            |      |   |
| T14i | - Connector 14 pin, in engine compartment, left                              |      |   |





- E87 - A/C Control Head  
F18 - Coolant Fan Control (FC) Thermal Switch  
F54 - Coolant Fan Control (FC) Thermal Switch  
J293 - Coolant FC (Fan Control) Control Module, in engine compartment, left front  
J429 - Control module for central locking  
S16 - Fuse  
T4f - Connector 4 pin, connector B on J293  
T14b - Connector 14 pin, connector A on J293  
V7 - Coolant Fan  
V177 - Coolant Fan -2-

- (188) - Ground connection -3-, in A/C wiring harness  
(A68) - Connector (30, A/C), in instrument panel wiring harness  
(A98) - Plus connector -4- (30), in instrument panel wiring harness  
(B156) - Plus connector -4- (30), in wiring harness interior  
(L26) - Wire connection (coolant fan), in A/C-climatronic/engine compartment wiring harness  
(L40) - Wire connection -2- (A/C Pressure Switch), in Climatronic wiring harness  
(L43) - Wire connection (coolant fan), in A/C system-coolant fan wiring harness



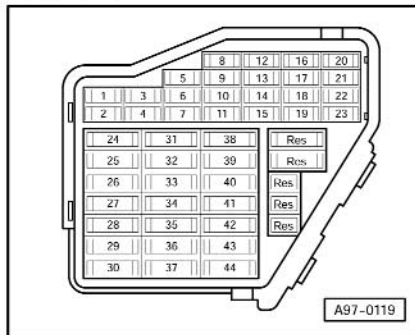
## 1.8 L - Engine Motronic Multiport Fuel Injection (MFI)/

132 kW, code ATC

165 kW, code AMU/AWP

2000 m. y.

Fuse Panel

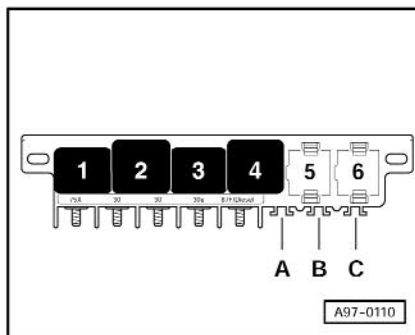


## Fuse Colors:

30	A - Green
25	A - White
20	A - Yellow
15	A - Blue
10	A - Red
7,5	A - Brown
5	A - Beige

Starting with fuse position 23, fuses in the fuse holder are identified with 223 in the wiring diagram.

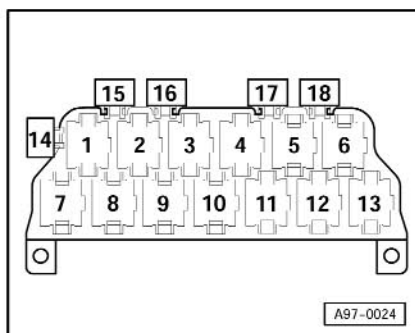
Micro Central Electric Panel



## Relay Location:

- 4** -Fuel Pump (FP) Relay, J17

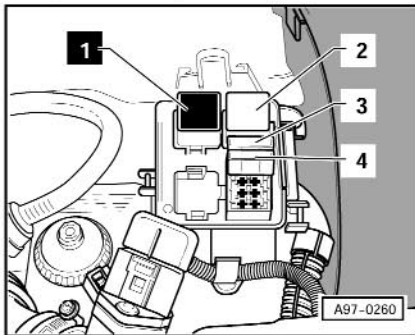
13 - Fold Relay Panel



## Relay Location:

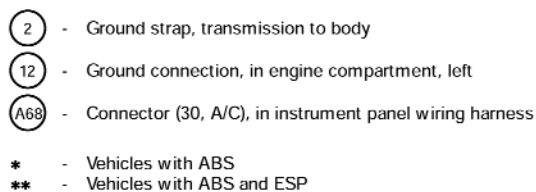
- 7** -Brake light disable relay (ESP), J508

Relay Box in engine compartment

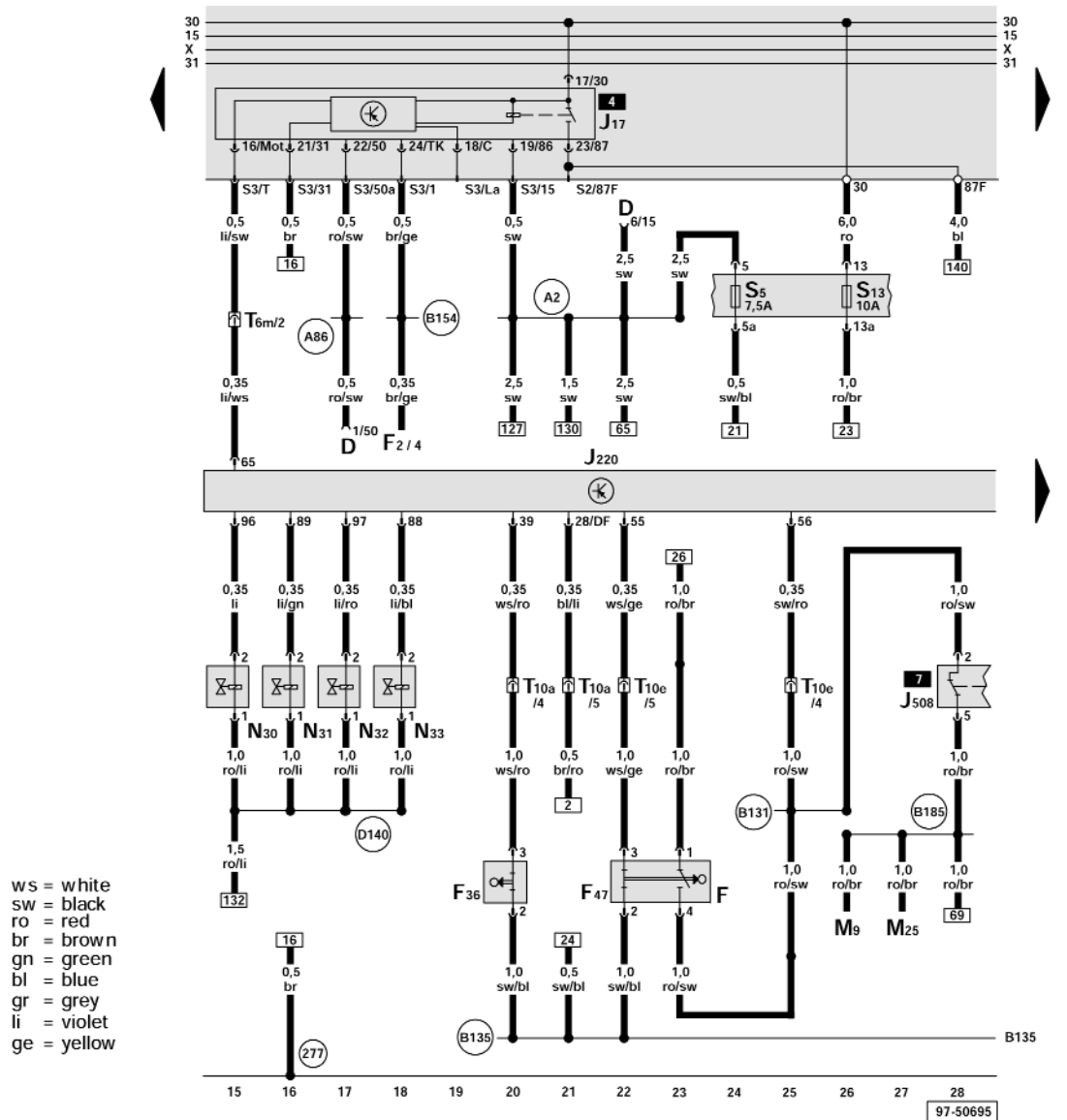


Relay Location:

- 1** -Secondary Air Injection (AIR) Pump Relay, J299
- 2** -Motronic Engine Control Module (ECM) Power Supply Relay, J271
- 4** -Fuse for secondary air pump, S130



Battery, Starter, Generator, Main Fuse Box/ Battery,  
Starting Interlock Relay

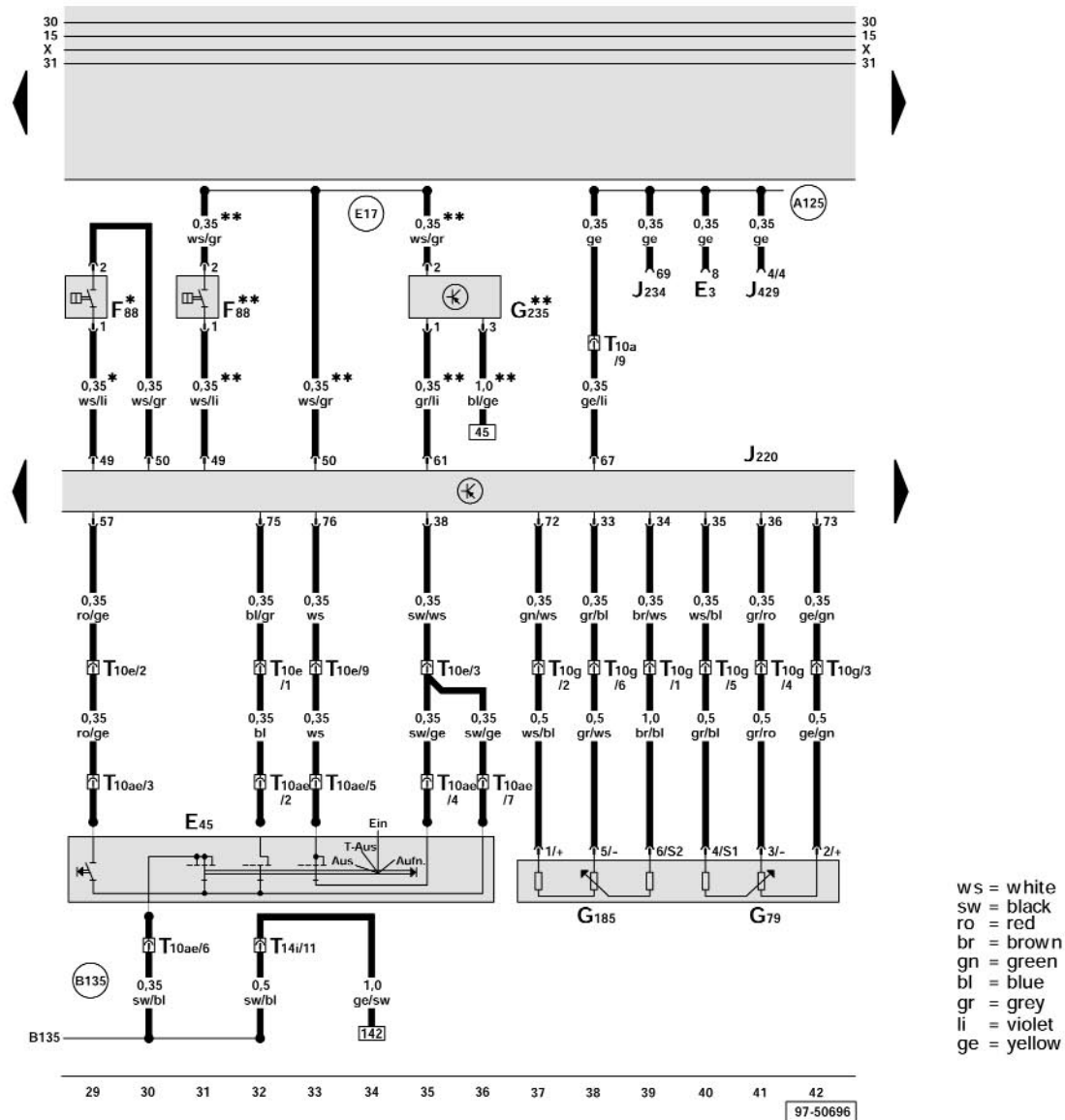


- D - Ignition/Starter Switch
- F - Brake Light Switch
- F2 - Door Contact Switch - Driver's side
- F36 - Clutch Vacuum Vent Valve Switch
- F47 - Vacuum Vent Valve, Brake
- J17 - Fuel Pump (FP) Relay
- J220 - Motronic Engine Control Module (ECM)
- J508 - Brake light disable relay (ESP)
- M9 - Left Brake Light
- M25 - High-mount Brake Light
- N30 - Cylinder 1 Fuel Injector
- N31 - Cylinder 2 Fuel Injector
- N32 - Cylinder 3 Fuel Injector
- N33 - Cylinder 4 Fuel Injector
- S5 - Fuse
- S13 - Fuse
- T6m - Connector 6 pin, brown, in E-box plenum chamber
- T10a - Connector 10 pin, white, in E-box plenum chamber
- T10e - Connector 10 pin, black, in E-box plenum chamber

- 277 - Ground connector -3-, in wiring harness interior
- A2 - Plus connection (15), in instrument panel wiring harness
- A86 - Connection (50a), in instrument panel wiring harness
- B131 - Connector (54), in wiring harness interior
- B135 - Connector (15a), in wiring harness interior
- B154 - Connector -1- (TK), in wiring harness interior
- B185 - Connection 2 (54), in passenger compartment wiring harness
- D140 - Connector (injectors), in wiring harness, engine pre-wiring

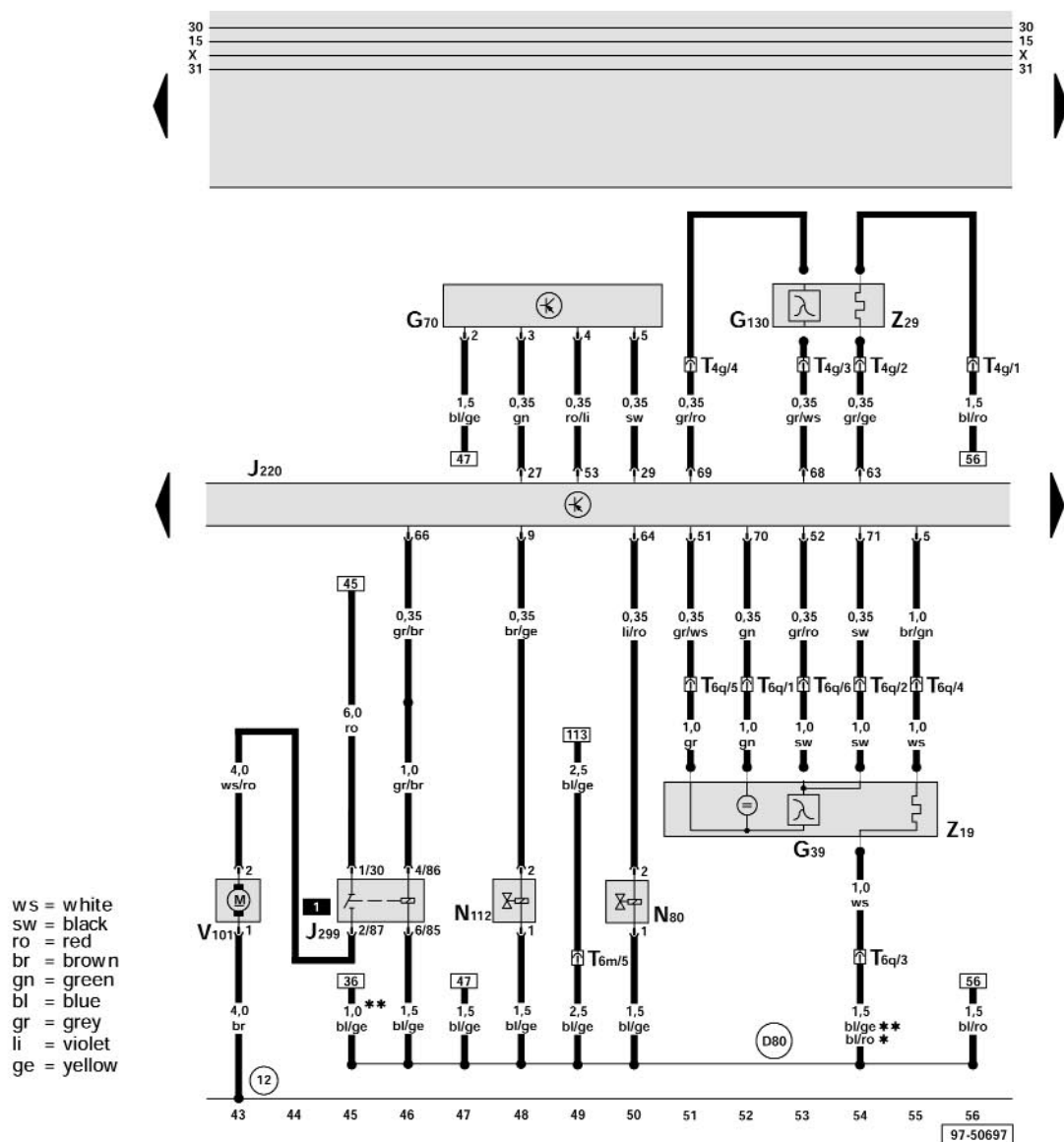
Motronic Engine Control Module, Fuel Pump Relay,  
Fuel Injectors, Brake Light Switch

Edition 05/01  
W42.USA.5702.07.21



- E3 - Emergency Flasher Switch
- E45 - Cruise Control Switch
- F88 - Power Steering Pressure (PSP) Switch
- G79 - Throttle Position (TP) Sensor
- G185 - Sender -2- for accelerator pedal position
- G235 - Sensor -1- for exhaust temperature
- J220 - Motronic Engine Control Module (ECM)
- J234 - Airbag Control Module
- J429 - Control module for central locking
- T10a - Connector 10 pin, white, in E-box plenum chamber
- T10e - Connector 10 pin, black, in E-box plenum chamber
- T10g - Connector 10 pin, blue, in E-box plenum chamber
- T10ae - Connector 10 pin, on Cruise Control Switch
- T14i - Connector 14 pin, in engine compartment, left

- A125 - Connection (crash signal) in instrument panel wiring harness
- B135 - Connector (15a), in wiring harness interior
- E17 - Wire connection -2-, in Motronic Multipoint Fuel Injection (MFI) wiring harness
- \* - only engine code ATC
- \*\* - only engine code AMU, AWP

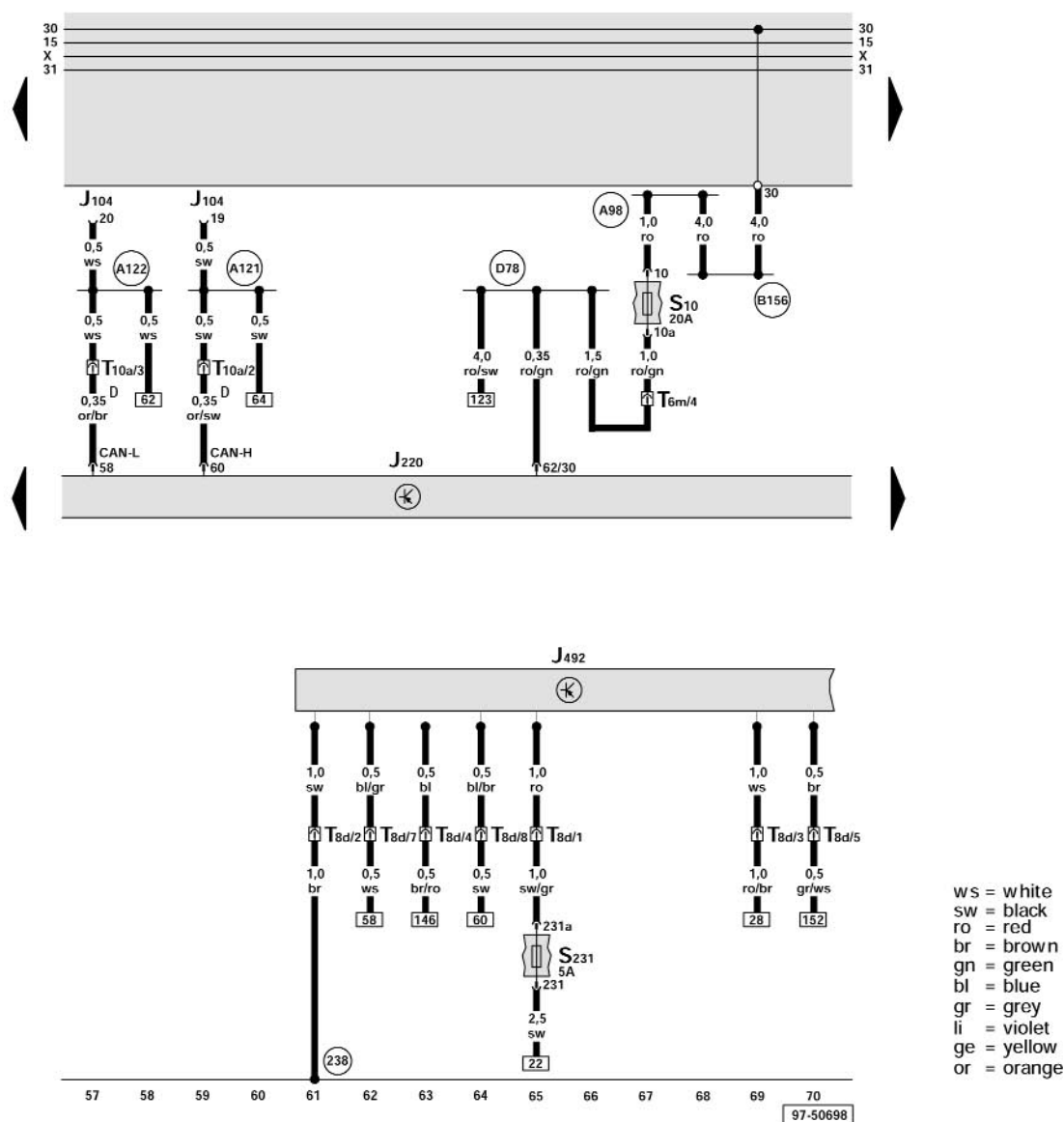


- G39 - Heated Oxygen Sensor (HO2S)
- G70 - Mass Air Flow (MAF) Sensor
- G130 - Oxygen Sensor (O2S) Behind Three Way Catalytic Converter (TWC)
- J220 - Motronic Engine Control Module (ECM)
- J299 - Secondary Air Injection (AIR) Pump Relay
- N80 - Evaporative Emission (EVAP) Canister Purge Regulator Valve
- N112 - Secondary Air Injection (AIR) Solenoid Valve
- S130 - Fuse for secondary air pump
- T4g - Connector 4 pin, in engine compartment, right, for Oxygen Sensor behind Three Way Catalytic Converter
- T6m - Connector 6 pin, brown, in E-box plenum chamber
- T6q - Connector 6 pin, in engine compartment right
- V101 - Secondary Air Injection (AIR) Pump Motor
- Z19 - Oxygen Sensor (O2S) Heater
- Z29 - Heater for Lambda-probe 1

- 12 - Ground connection, in engine compartment, left
- D50 - Plus connection (30), in engine compartment wiring harness
- D80 - Plus connection (87a- for EVAP system solenoid), in engine compartment wiring harness

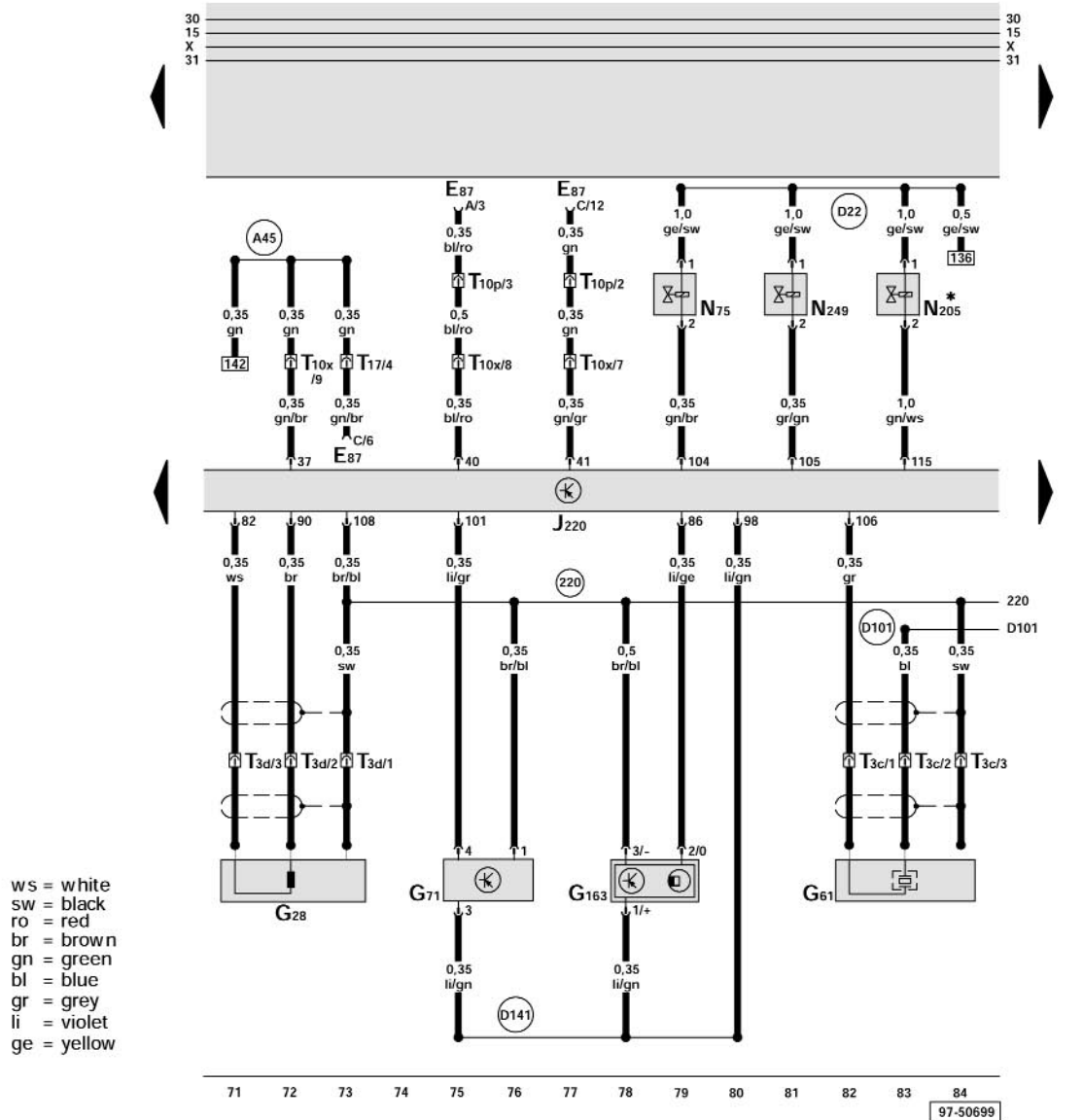
- \* - only engine code ATC
- \*\* - only engine code AMU, AWP





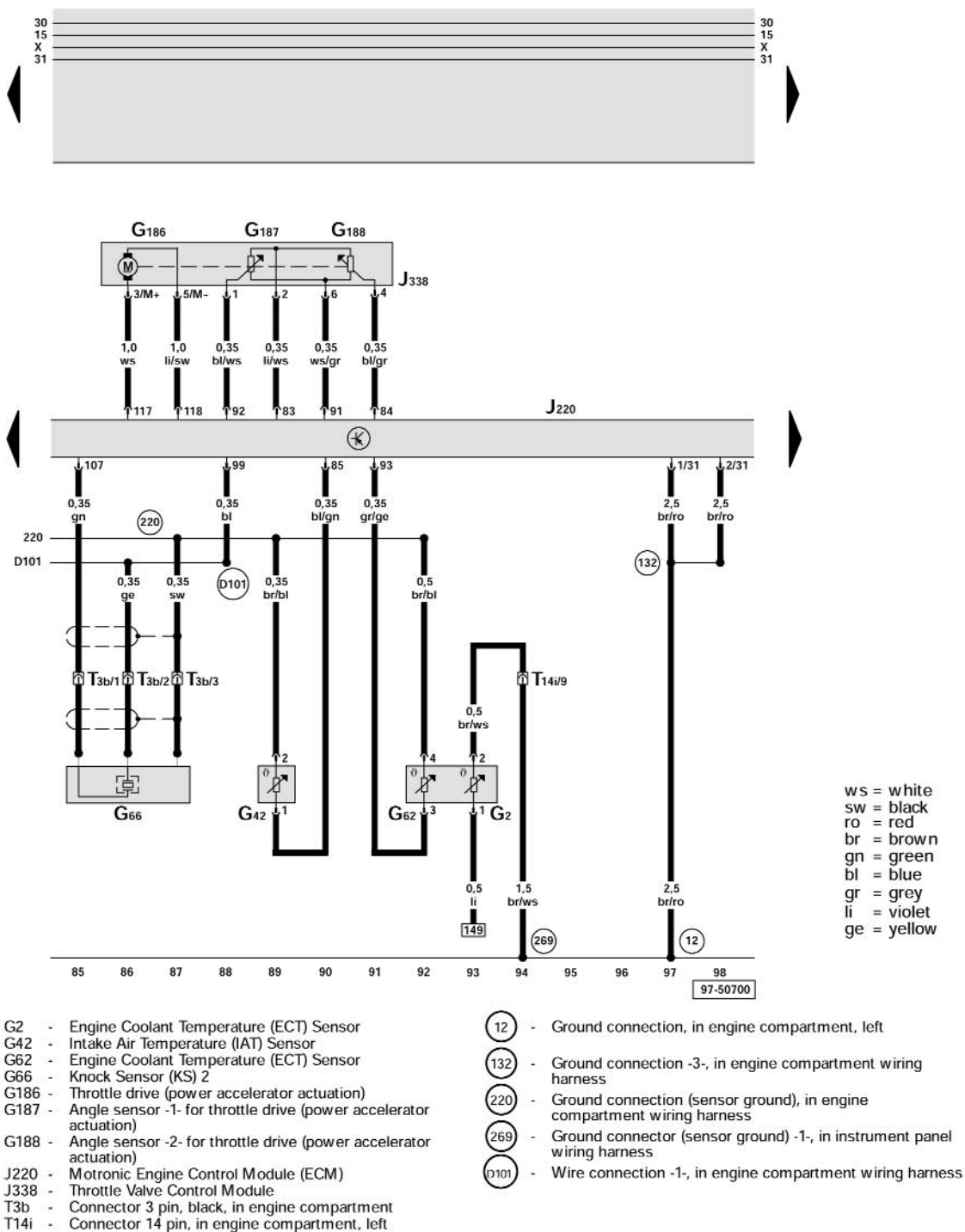
- J104 - ABS Control Module (w/EDL)  
J220 - Motronic Engine Control Module (ECM)  
J492 - Control module for all wheel drive  
S10 - Fuse  
S231 - Fuse 31 in fuse holder  
T6m - Connector 6 pin, brown, in E-box plenum chamber  
T8d - Connector 8 pin, on Control module for all wheel drive  
T10a - Connector 10 pin, white, in E-box plenum chamber

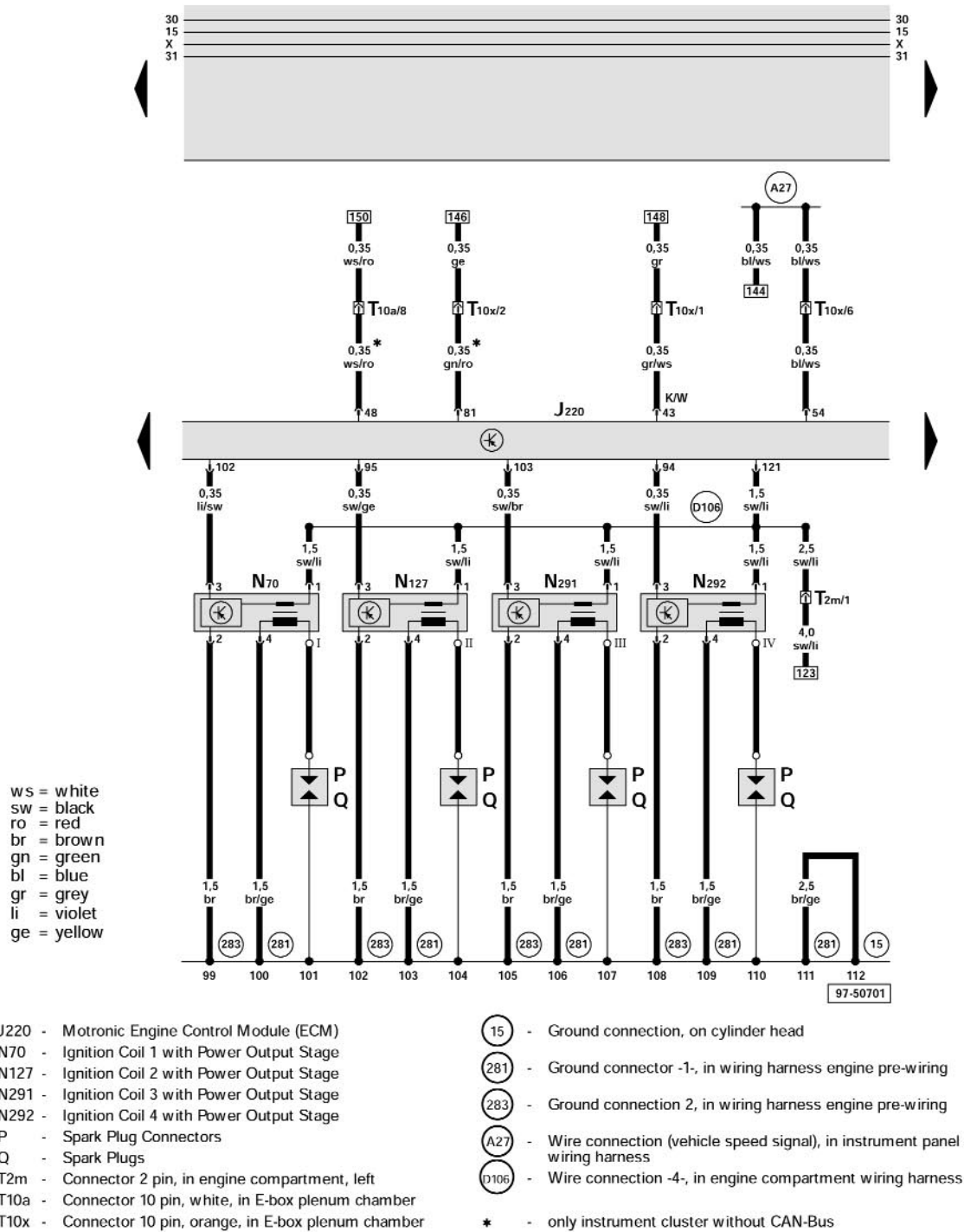
- (238) - Ground connection -1-, in wiring harness interior  
(A98) - Plus connector -4- (30), in instrument panel wiring harness  
(A121) - Connection (high bus) in instrument panel wiring harness  
(A122) - Connection (low bus) in instrument panel wiring harness  
(B156) - Plus connector -4- (30), in wiring harness interior  
(D78) - Plus connection -1- (30a), in engine compartment wiring harness  
D - CAN-Bus (Data-Bus)

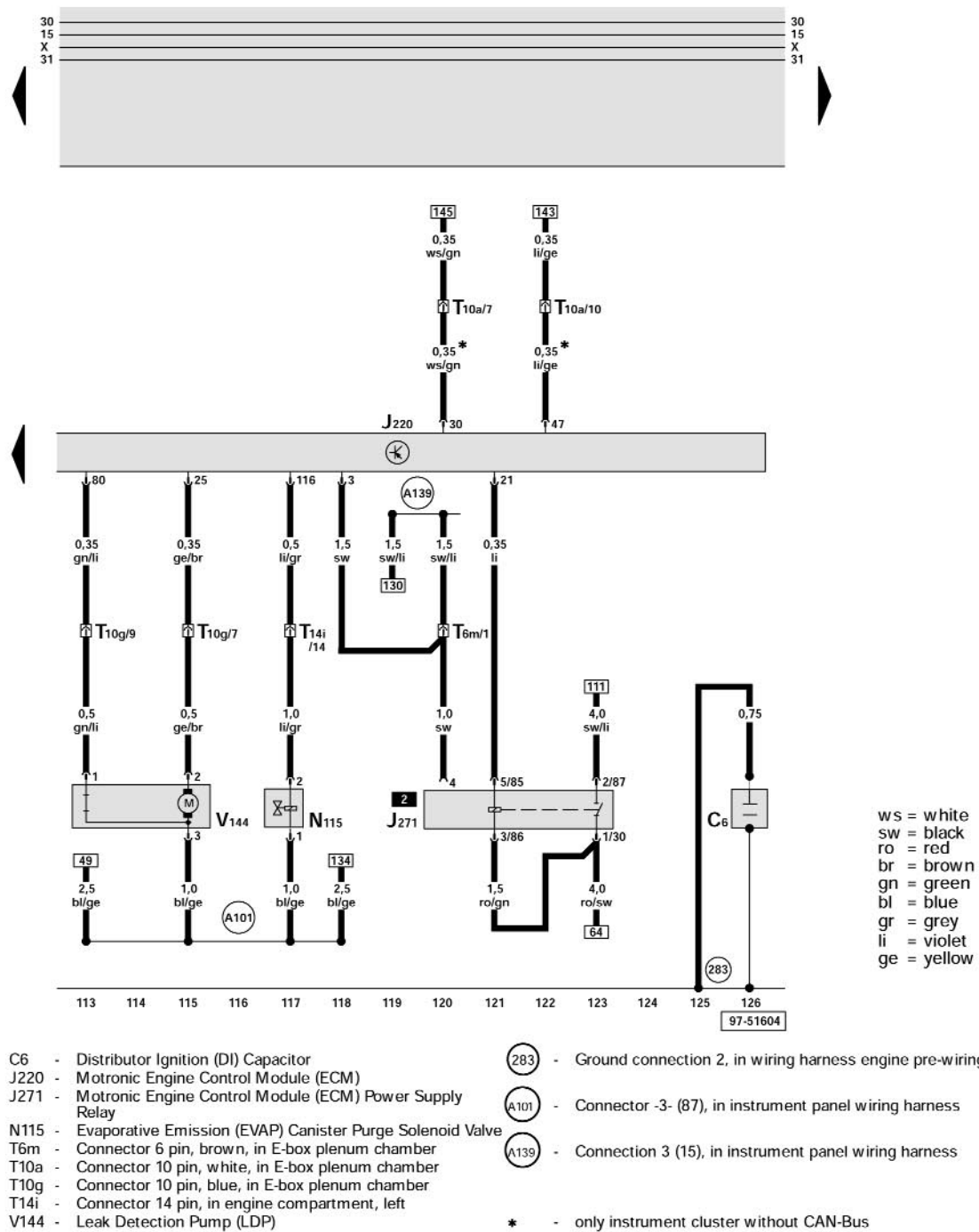


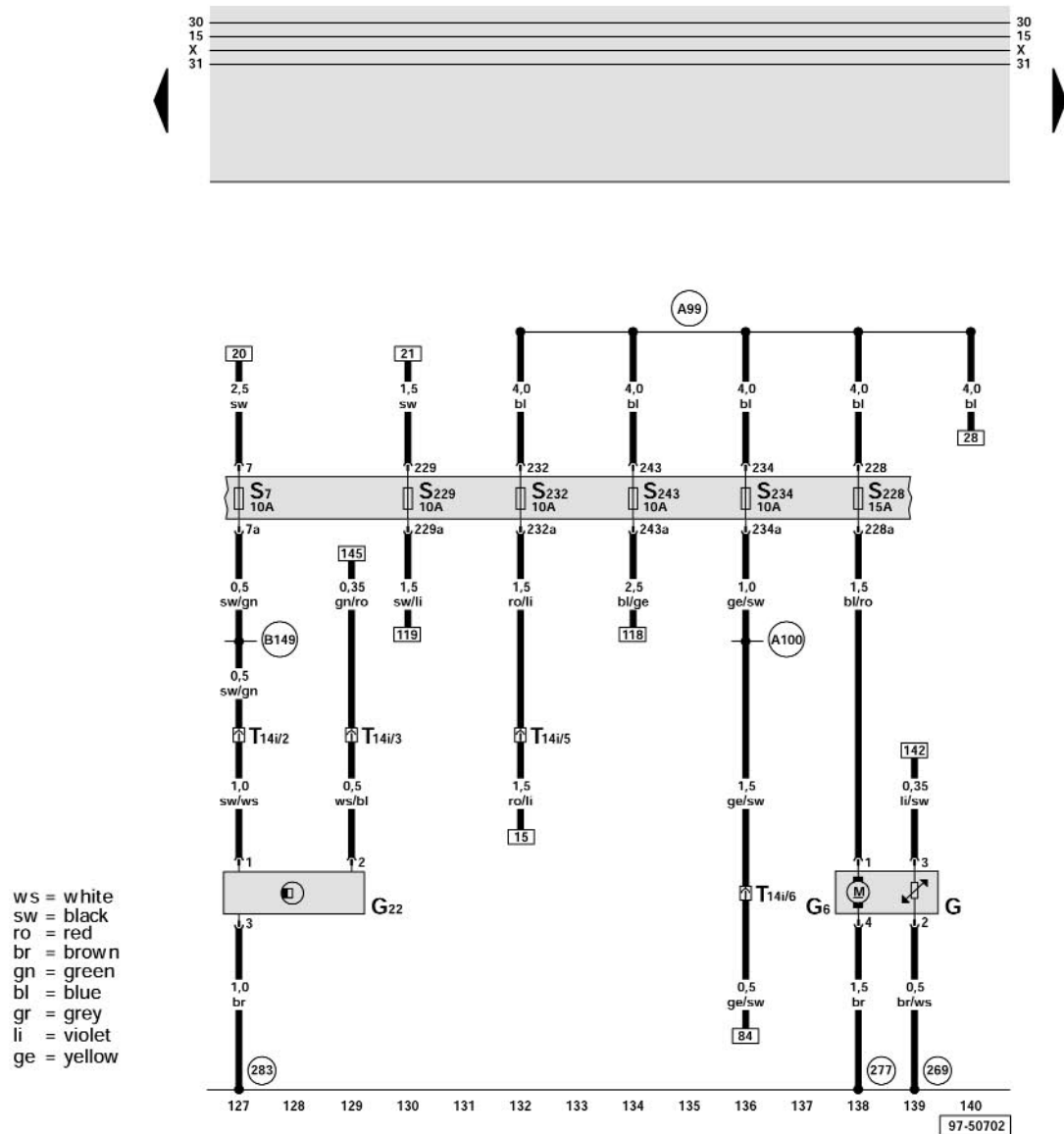
- E87 - A/C Control Head
- G28 - Engine Speed (RPM) Sensor
- G61 - Knock Sensor (KS) 1
- G71 - Manifold Absolute Pressure (MAP) Sensor
- G163 - Camshaft Position (CMP) Sensor 2
- J220 - Motronic Engine Control Module (ECM)
- N75 - Wastegate Bypass Regulator Valve
- N205 - Valve -1- for camshaft adjustment
- N249 - Recirculating valve for turbocharger
- T3c - Connector 3 pin, brown, in engine compartment
- T3d - Connector 3 pin, gray, in engine compartment
- T10p - Connector 10 pin, behind instrument panel
- T10x - Connector 10 pin, orange, in E-box plenum chamber
- T17 - Connector 17 pin, behind instrument panel

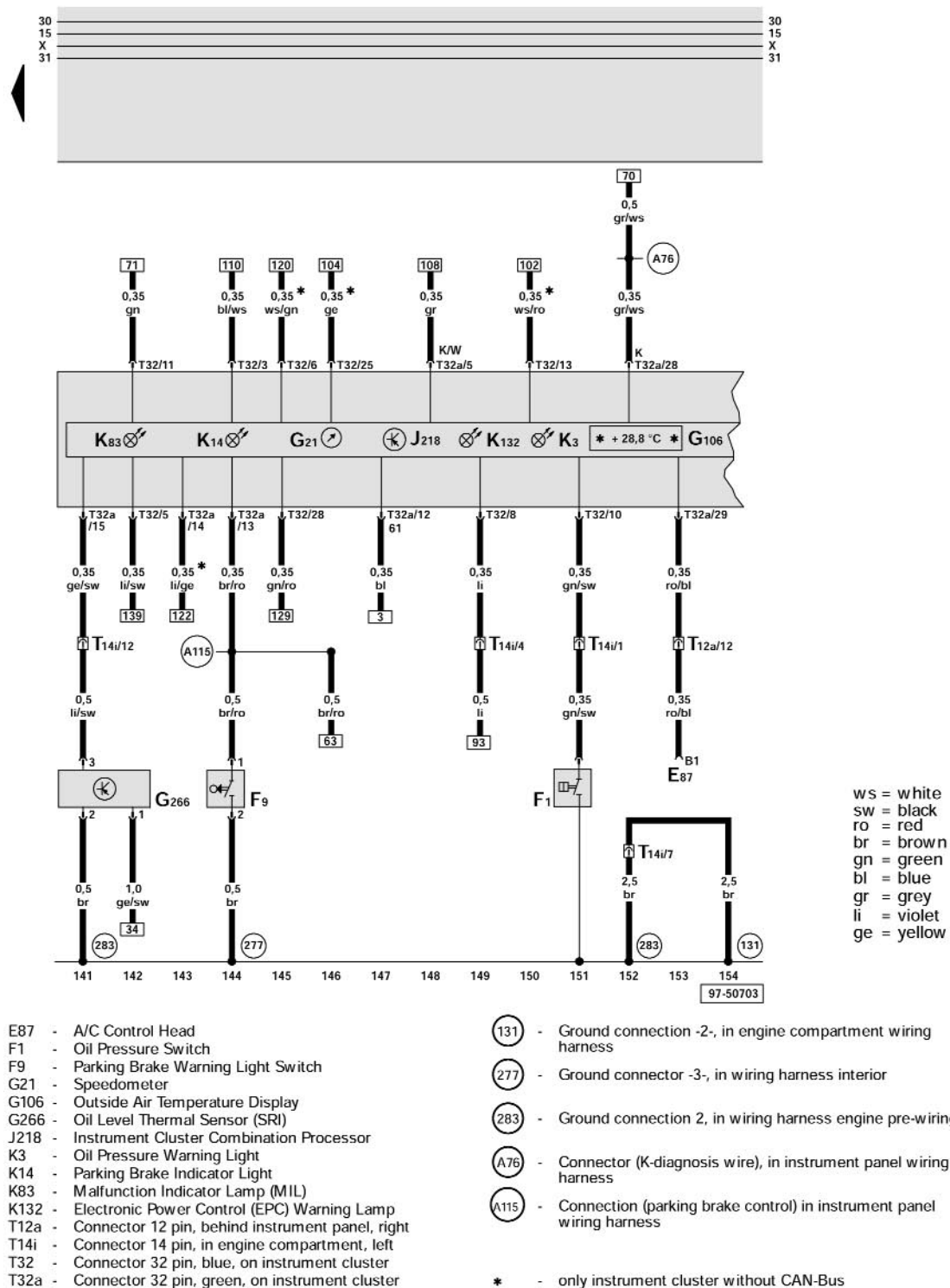
- 220 - Ground connection (sensor ground), in engine compartment wiring harness
- A45 - Wire connection (RPM-signal), in instrument panel wiring harness
- D22 - Connector (over fuse 234), in wiring harness front, right
- D101 - Wire connection -1-, in engine compartment wiring harness
- D141 - Connector (5V), in wiring harness, engine pre-wiring
- \* - only engine code ATC











# Glossary

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## Glossary

**American Wire Gauge (AWG):** The American standard for wire size, expressed in units from 2 gauge to 22 gauge.

**Central relay panel:** A centralized location for relays and circuits in an automobile. Includes common circuits used to provide battery power, ignition "ON", and Ground to vehicle systems.

**Control Module:** A transistorized, rather than analog, switching circuit that relies on one or inputs to control the switching of a logic circuit.

**Current track number:** A method of following circuits within Audi wiring diagrams. The wiring diagram is numbered along the bottom of the page to aid in navigating between disconnected pages.

**DIN (Deutsche Institut fur Normung) standards:** German institute for standards that establishes guidelines for manufacturing and nomenclature.

**Electric motor:** A motor driven by electromotive force.

**Fuse:** A component installed in series with a circuit, designed to disrupt the circuit when carrying more than its specified amperage. Fuses are placed in circuits to protect other components in the circuit from damage.

**Ground:** A wire connected to the vehicle's chassis (and therefore the Ground). This allows power to be supplied by one insulated wire, while the chassis acts as the return path.

**Internal conductors:** Connections inside of a component, often not designated in the wiring diagrams.

**Load reduction circuit:** A circuit designed to switch off high current electrical consumers during starting to insure optimal available voltage supply to the starter. The term comes from removing the load of the consumers from the Ignition switch.

**Metric wire sizes:** The metric system for wire size, expressed in mm<sup>2</sup>. This designates the cross-sectional area of the wire. The wiring used in Audi vehicles ranges from .35 to 35 mm<sup>2</sup>.

**Multi-point connectors:** A connector installed in a wiring harness that allows the wiring harness to be detached from the component.

**Potentiometer:** see Rheostat

**Relay:** Component that uses a low current to switch a high current circuit.



**Resistor:** A component that creates a voltage drop in a circuit. Resistors can be used for measurement of current flow, as well as to drop the applied voltage for certain consumers.

**Rheostat:** A resistor that varies its resistance based on a mechanical input.

**Push-on connectors:** See Multi-point connector.

**Solenoid:** Used to actuate other components, a solenoid consists of a coil of wire wrapped around an iron core. When a current is passed through a wire, a magnetic field is induced. This magnetic "pull" is used to operate other components.

**Switch:** A component used to disrupt or redirect current flow.

**Symbols:** Graphical representations of electrical components in Audi wiring diagrams

**Temperature dependent resistor:** A resistor that varies its resistance with temperature.

**Threaded Connectors:** A connector consisting of a threaded stud to which other wires attach. Often used in high Amperage circuits.

**Vehicle Chassis:** See Ground.

**Welded Connectors:** A connection inside of a component created by compressing several wires together under high heat, partially melting the separate wires together.

**X circuit:** See Load reduction circuit.



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**1. The "E" designates components E128 and E129 to be:**

1. Controllers
2. Relays
3. Switches
4. LEDs

**2. Pin 85 of a standard 4-pin relay is usually:**

1. Battery power
2. Switched Ground
3. Ignition switched
4. X (relief)

**3. Pin 30 of a standard 4-pin relay is usually:**

1. Battery power
2. Battery Ground
3. Ignition switched
4. X (relief)

**4. Which of the following DIN circuit numbers is used for the headlights?**

1. 1
2. 15
3. X
4. 56

**5. Metric wire gauge is expressed in:**

1. AWG
2. mm
3. mm<sup>2</sup>
4. cm

**6. A symbol showing a resistor with an arrow through it designates a:**

1. Potentiometer
2. Circuit Breaker
3. Variable Capacitor
4. ATC Fuse

**7. The load reduction relay is associated with which circuit?**

1. 31
2. 50
3. 15
4. 75

**8. The current track layout of the wiring diagram:**

1. Keeps the crossing of conductor symbols, where they do not connect, to a minimum
2. Shows the geographical location of all components
3. Shows Ground at the top and Power at the bottom of the page
4. All of the above

**9. The first character of a component designates:**

1. The components location
2. The type of component
3. Nothing
4. The part number

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# Teletest

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**10. A thermal fuse is also referred to as:**

1. an ATC fuse
2. a thermister
3. a circuit breaker
4. a potentiometer

**11. A welded connection shown with the thin line not terminating at another wire symbolizes:**

1. That this welded connection is used in other diagrams for the vehicle
2. the welded connection is continued on the next page
3. The technician may need to reference other diagrams to locate components or Grounds related to this connection
4. 1 and 3 only

**12. A wiring diagram:**

1. Is a graphical representation of the actual vehicle wiring
2. is developed from the engineering drawings that are used to produce the wiring harness
3. uses a consistent set of symbols to represent the actual components and conductors
4. All of the above

**13. When tracing out a weld with many wire connections, which wire most likely goes directly to power or ground?**

1. The largest gauge wire
2. The smallest gauge wire
3. Any of the wires in the connection
4. None of the above

**14. Wiring diagram component and connector descriptions are found:**

1. in the wiring diagram graphic
2. in the wiring diagram legend
3. in the current tracks
4. in the glossary

**15. The numbers found in the small box at the end of a conductor indicate:**

1. current track continuation
2. power supply
3. switched condition
4. wire color

**16. You are starting to troubleshoot a vehicle concern using a wiring diagram, and the vehicle, system, and component details are known. How should you begin locate the proper page of the wiring diagram?**

1. Go page by page through the wiring diagram
2. look in the parts catalog
3. Check the index or table of contents
4. none of the above

**17. In order to locate the continuation of a ground path from a welded connection, you may need to look:**

1. through the legend at the bottom of the wiring diagram for the ground connection number
2. look in the parts catalog
3. Check the index or table of contents
4. all of the above

**18. The 30 circuit (Battery +) in the central/relay panel is an example of an internal conductor, and is shown in the wiring diagrams as a:**

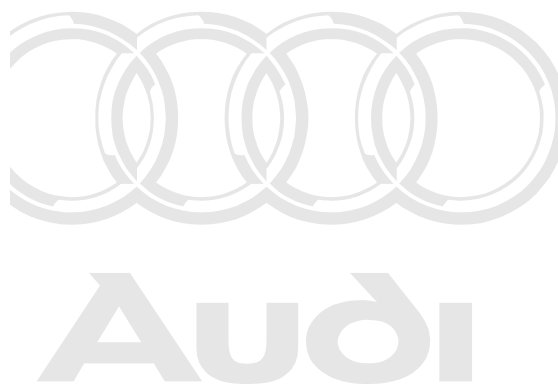
1. heavy, dark line
2. thin black line
3. Dashed line
4. Dotted line

**19. The Load Reduction circuit supplies power to consumers such as the windshield wiper motor and fresh air blower motor when the ignition switch is:**

1. only in the "ON" position
2. only in the "START" position
3. in the "OFF" and "START" positions
4. in the "ON" and "START" positions

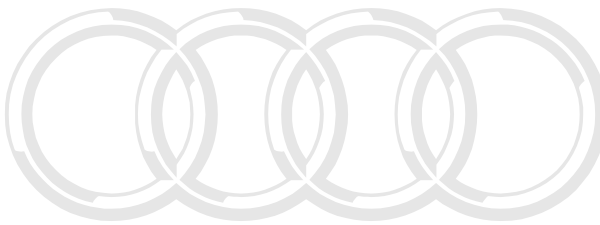
**20. Switches and relays are shown in their non-operated state**

1. true
2. false



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6 <input type="text"/>	7 <input type="text"/>	8 <input type="text"/>	9 <input type="text"/>	10 <input type="text"/>
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# Cautions & Warnings

**Please read these WARNINGS and CAUTIONS before proceeding with maintenance and repair work. You must answer that you have read and you understand these WARNINGS and CAUTIONS before you will be allowed to view this information.**

- If you lack the skills, tools and equipment, or a suitable workshop for any procedure described in this manual, we suggest you leave such repairs to an authorized Audi retailer or other qualified shop. We especially urge you to consult an authorized Audi retailer before beginning repairs on any vehicle that may still be covered wholly or in part by any of the extensive warranties issued by Audi.
- Disconnect the battery negative terminal (ground strap) whenever you work on the fuel system or the electrical system. Do not smoke or work near heaters or other fire hazards. Keep an approved fire extinguisher handy.
- Audi is constantly improving its vehicles and sometimes these changes, both in parts and specifications, are made applicable to earlier models. Therefore, part numbers listed in this manual are for reference only. Always check with your authorized Audi retailer parts department for the latest information.
- Any time the battery has been disconnected on an automatic transmission vehicle, it will be necessary to reestablish Transmission Control Module (TCM) basic settings using the VAG 1551 Scan Tool (ST).
- Never work under a lifted vehicle unless it is solidly supported on stands designed for the purpose. Do not support a vehicle on cinder blocks, hollow tiles or other props that may crumble under continuous load. Never work under a vehicle that is supported solely by a jack. Never work under the vehicle while the engine is running.
- For vehicles equipped with an anti-theft radio, be sure of the correct radio activation code before disconnecting the battery or removing the radio. If the wrong code is entered when the power is restored, the radio may lock up and become inoperable, even if the correct code is used in a later attempt.
- If you are going to work under a vehicle on the ground, make sure that the ground is level. Block the wheels to keep the vehicle from rolling. Disconnect the battery negative terminal (ground strap) to prevent others from starting the vehicle while you are under it.
- Do not attempt to work on your vehicle if you do not feel well. You increase the danger of injury to yourself and others if you are tired, upset or have taken medicine or any other substances that may impair you or keep you from being fully alert.
- Never run the engine unless the work area is well ventilated. Carbon monoxide (CO) kills.
- Always observe good workshop practices. Wear goggles when you operate machine tools or work with acid. Wear goggles, gloves and other protective clothing whenever the job requires working with harmful substances.
- Tie long hair behind your head. Do not wear a necktie, a scarf, loose clothing, or a necklace when you work near machine tools or running engines. If your hair, clothing, or jewelry were to get caught in the machinery, severe injury could result.

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- Do not re-use any fasteners that are worn or deformed in normal use. Some fasteners are designed to be used only once and are unreliable and may fail if used a second time. This includes, but is not limited to, nuts, bolts, washers, circlips and cotter pins. Always follow the recommendations in this manual - replace these fasteners with new parts where indicated, and any other time it is deemed necessary by inspection.
- Illuminate the work area adequately but safely. Use a portable safety light for working inside or under the vehicle. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.
- Friction materials such as brake pads and clutch discs may contain asbestos fibers. Do not create dust by grinding, sanding, or by cleaning with compressed air. Avoid breathing asbestos fibers and asbestos dust. Breathing asbestos can cause serious diseases such as asbestosis or cancer, and may result in death.
- Finger rings should be removed so that they cannot cause electrical shorts, get caught in running machinery, or be crushed by heavy parts.
- Before starting a job, make certain that you have all the necessary tools and parts on hand. Read all the instructions thoroughly, do not attempt shortcuts. Use tools that are appropriate to the work and use only replacement parts meeting Audi specifications. Makeshift tools, parts and procedures will not make good repairs.
- Catch draining fuel, oil or brake fluid in suitable containers. Do not use empty food or beverage containers that might mislead someone into drinking from them. Store flammable fluids away from fire hazards. Wipe up spills at once, but do not store the oily rags, which can ignite and burn spontaneously.
- Use pneumatic and electric tools only to loosen threaded parts and fasteners. Never use these tools to tighten fasteners, especially on light alloy parts. Always use a torque wrench to tighten fasteners to the tightening torque listed.
- Keep sparks, lighted matches, and open flame away from the top of the battery. If escaping hydrogen gas is ignited, it will ignite gas trapped in the cells and cause the battery to explode.
- Be mindful of the environment and ecology. Before you drain the crankcase, find out the proper way to dispose of the oil. Do not pour oil onto the ground, down a drain, or into a stream, pond, or lake. Consult local ordinances that govern the disposal of wastes.
- The air-conditioning (A/C) system is filled with a chemical refrigerant that is hazardous. The A/C system should be serviced only by trained automotive service technicians using approved refrigerant recovery/recycling equipment, trained in related safety precautions, and familiar with regulations governing the discharging and disposal of automotive chemical refrigerants.
- Before doing any electrical welding on vehicles equipped with anti-lock brakes (ABS), disconnect the battery negative terminal (ground strap) and the ABS control module connector.
- Do not expose any part of the A/C system to high temperatures such as open flame. Excessive heat will increase system pressure and may cause the system to burst.

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- When boost-charging the battery, first remove the fuses for the Engine Control Module (ECM), the Transmission Control Module (TCM), the ABS control module, and the trip computer. In cases where one or more of these components is not separately fused, disconnect the control module connector(s).
- Some of the vehicles covered by this manual are equipped with a supplemental restraint system (SRS), that automatically deploys an airbag in the event of a frontal impact. The airbag is operated by an explosive device. Handled improperly or without adequate safeguards, it can be accidentally activated and cause serious personal injury. To guard against personal injury or airbag system failure, only trained Audi Service technicians should test, disassemble or service the airbag system.
- Do not quick-charge the battery (for boost starting) for longer than one minute, and do not exceed 16.5 volts at the battery with the boosting cables attached. Wait at least one minute before boosting the battery a second time.
- Never use a test light to conduct electrical tests of the airbag system. The system must only be tested by trained Audi Service technicians using the VAG 1551 Scan Tool (ST) or an approved equivalent. The airbag unit must never be electrically tested while it is not installed in the vehicle.
- Some aerosol tire inflators are highly flammable. Be extremely cautious when repairing a tire that may have been inflated using an aerosol tire inflator. Keep sparks, open flame or other sources of ignition away from the tire repair area. Inflate and deflate the tire at least four times before breaking the bead from the rim. Completely remove the tire from the rim before attempting any repair.
- When driving or riding in an airbag-equipped vehicle, never hold test equipment in your hands or lap while the vehicle is in motion. Objects between you and the airbag can increase the risk of injury in an accident.

**I have read and I understand these Cautions and Warnings.**

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