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1. COMPONENTS

1.1 GENERAL

BULBS

Dipped beam light	70 W
Main beam light	70 W
Parking light	5 W
Rear light	10 W
Rear fog light	21 W
Reversing light	21 W
Stop light	21 W
Direction indicator lamp	21 W
Front fog light	70 W
Front spot lights	70 W
Interior lighting	10 - 21 W
Bunk lamp	21 W
Stepwell lighting	5 W
Marker light	5 W

Max. current and wire diameter (mm^2)				
Wire diameter	**Up to 2 m**	**2 - 4 m**	**4 - 8 m**	**From 8 m**
0.5	3	1.5	0.5	
1	9	5	4	
1.5	22.5	13.5	7.5	6
2.0	30	17	10	8
2.5	37.5	22.5	12.5	10
3.0	47	27	16	13
4	60	36	20	16
4.5	69	43	24	19
6	90	54	30	24
7.5	114	73	40	33
10	150	90	50	40
16	240	144	80	64
25	375	225	125	100
35	525	315	175	140
50	750	450	250	200
70	1050	630	350	280
95	1425	855	475	380
120	1800	1080	600	480

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Alternator

NCB1

Max. current	80 A
Rated voltage	28 V

NCB2

Max. current	100 A
Rated voltage	28 V

Battery

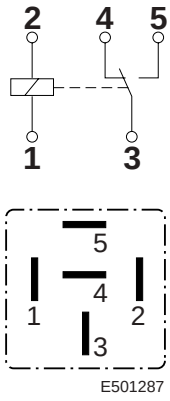
Voltage	12 V
Max. capacity	128 Ah

Optional:

Voltage	12 V
Max. capacity	170 Ah

Mini relay (20 A)

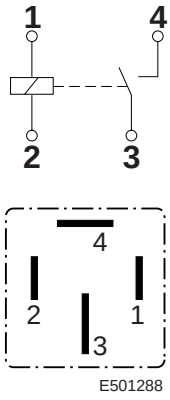
Resistance value of coil approx. 250 Ω
Measured between points 1 and 2



E501287

Relay (50 A)

Resistance value of coil approx. 175 Ω
Measured between points 1 and 2



E501288

CDS hand-held transmitters

Battery type (2x) CR1620, 3 V

1.2 TIGHTENING TORQUES

Alternator	
Drive pulley	80 Nm ± 5 Nm
B+ connection	15 Nm
Earth connection	
Chassis	35 ± 10 Nm

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1. BATTERIES

1.1 FAULT-FINDING TABLE

SYMPTOM: NEW BATTERY HEATS UP CONSIDERABLY DURING FILLING	
Possible cause	**Remedy**
Inadequate formation because of storage in unsuitable or damp conditions over a long period	Allow to cool Charge fully Check the relative density

SYMPTOM: BATTERY OVERFLOWS, BATTERY ACID SPILLS FROM PLUG HOLES	
Possible cause	**Remedy**
Battery overfilled	Siphon off some of the fluid
Overcharging	Check charging voltage Check/repair charging circuit

SYMPTOM: ACID LEVEL TOO LOW	
Possible cause	**Remedy**
Leaking battery	Replace the battery
Excessive gas development due to charging current being set too high	Check charging voltage Check/repair charging circuit

SYMPTOM: RELATIVE DENSITY TOO LOW (<1.240) STARTING TROUBLE	
Possible cause	**Remedy**
Power consumer left on by mistake	Charge the battery
Insufficient charging	Check alternator drive Check/repair charging circuit

SYMPTOM: RELATIVE DENSITY TOO HIGH (>1.290)	
Possible cause	**Remedy**
Topped up with battery acid instead of distilled water	Siphon off some of the fluid and top up with distilled water If necessary, repeat this after mixing (charging)

1

SYMPTOM: STARTING TROUBLE POOR STARTING TEST RESULT POWER FAILS UNDER LOAD	
Possible cause	**Remedy**
Discharged battery	Charge the battery
Worn battery (plates corroded and worn away)	Replace the battery
Defective battery (“dead cell”)	Replace the battery
Battery sulphated (plates have hardened)	Replace the battery

SYMPTOM: BURNT-IN BATTERY TERMINALS	
Possible cause	**Remedy**
Cable clamps not securely fitted or poor contact	Have the battery terminals repaired, fit the cable clamps properly and replace the cable clamps if necessary

SYMPTOM: 1 OR 2 CELLS BUBBLE EXCESSIVELY UNDER HIGH LOAD (STARTING OR STARTING TEST)	
Possible cause	**Remedy**
Defective cells	Replace the battery
Leaking cell partition	Replace the battery

SYMPTOM: BATTERY DISCHARGES VERY FAST (DOES NOT RETAIN POWER)	
Possible cause	**Remedy**
Insufficient charging	Check the charging. Is the charging time (driving time) sufficient?
Short circuit in charging circuit	Check the charging circuit
Major self discharging, for example due to contamination	Clean the battery
Battery sulphated (on examining the plates, they are found to be hard and, in some cases, whitened)	Replace the battery

SYMPTOM: SHORT BATTERY LIFE	
Possible cause	**Remedy**
Wrong type of battery chosen (for example if the vehicle has a tail lift)	Replace with battery of a higher capacity (170 Ah)
Often too deeply discharged	Intermediate charging with rectifier
Not recharged after deep discharge (white deposits)	Always charge the battery after deep discharge
Alternator capacity too low	Use alternator with higher capacity (100 A)

SYMPTOM: THE BATTERY HEATS UP DURING USE AND CONSUMES A LOT OF FLUID	
Possible cause	**Remedy**
Overloading, or charging voltage too high	Check the charging circuit (voltage regulator)

SYMPTOM: BATTERY HAS EXPLODED	
Possible cause	**Remedy**
Fire or sparks during or just after charging	Ensure good ventilation and exercise due caution as regards fire and sparks
Short circuit between the battery terminals	Exercise caution when storing conductive material (for example, tools)
Internal defect (loose connection)	Replace the battery

SYMPTOM: DEFECTIVE ALTERNATOR AND/OR DIODES (RADIO AND OTHER POLARITY SENSITIVE EQUIPMENT NOT WORKING)	
Possible cause	**Remedy**
Reversed battery polarity, or incorrect charging	Discharge the battery and charge in the correct direction Replace the battery and/or alternator if necessary

SYMPTOM: BATTERY HAS NO VOLTAGE	
Possible cause	**Remedy**
Internal open circuit	Replace the battery
Battery very deeply discharged	Charge the battery and test it; replace if necessary

1.2 SERVICE LIFE

The service life of a battery is significantly shortened if it used “cyclically”.
This means that the batteries are used a lot without their being charged.
For example when using a tail lift, cab heater, microwave oven or cooler box.
This is why batteries in commercial vehicles and vehicles used for international transport often fail prematurely (within 1.5 years).

The battery must be charged whenever the voltage measured across one battery falls below 12.5 V. If the battery is not charged, the “sulphating” process will begin.
This is a chemical reaction in the battery that produces lead sulphate. Lead sulphate adheres to the battery plates and can cause short-circuiting between the plates, reducing the capacity of the battery.
However, most lead sulphate breaks down when the battery is recharged.
If a battery is used (discharged) while it is not being charged by the alternator, short-circuiting between the battery plates will occur sooner.
This reduces the capacity and consequently the service life of the battery.

2. ALTERNATOR

2.1 FAULT-FINDING TABLE

SYMPTOM: ALTERNATOR NOT PRODUCING POWER WHEN IDLING	
Possible cause	**Remedy**
Open circuit in connection 15 on alternator	Repair connection 15
Connection 15 on alternator short-circuited to earth	Repair connection 15
Internal defect	Replace regulator

SYMPTOM: ALTERNATOR WARNING (YELLOW)	
Possible cause	**Remedy**
Open circuit in “S” connection	Measure the regulated alternator voltage with as many consumers as possible switched on and with the engine turning above idling speed
Open circuit in “L” connection	Check/repair wiring
Open circuit in connection 15	Increase the engine speed to approx. 1500 rpm. If voltage is now present, check connection 15 on the alternator
Voltage difference between “B+” and “S” connections is greater than 2.5 V	Check all contacts between alternator and B+ (contact resistors) Internal battery resistance too high
Voltage too low < 16 V	Check alternator drive. Check wiring on contact resistors

SYMPTOM: ALTERNATOR VOLTAGE HIGH (RED)	
Possible cause	**Remedy**
Voltage too high > 31 V	Measure voltage
Internal defect	Replace regulator/alternator

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3. FAULT FINDING

The following test equipment and tools can be used to trace faults.

1. The best instrument for this is a digital multimeter. This instrument can be used to measure voltages, currents and resistances without reading errors and it can be used to trace virtually any faults.
2. The “Multimeter” function of DAVIE XD can be used to carry out all the measurements that can be made with an ordinary, separate multimeter.
3. Many, but not all, faults are easily traced by means of warning lamps. Failures caused by poor earthing cannot normally be detected by a warning lamp or buzzer.

The most frequently occurring faults are:
a. short circuit
b. open circuits
c. earthing problems (poor earthing due to corrosion).

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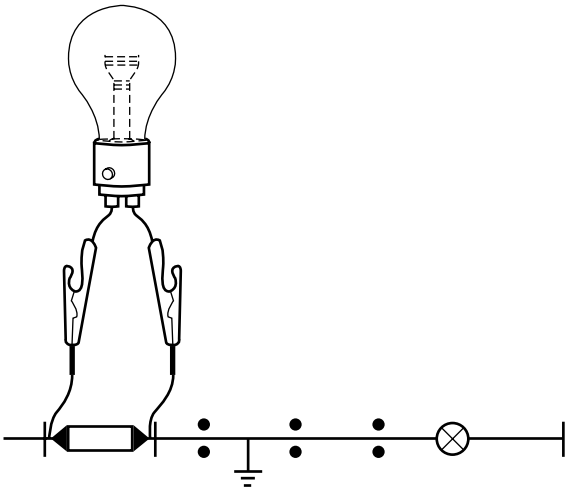
3.1 SHORT CIRCUITS

A short circuit is caused by a positive wire shorting somewhere to earth. This can generate a very high current. In most cases this will cause a fuse to blow.
To remedy this failure, use a test lamp of approximately 70 W. First check the diagram to see which consumers are connected to the fuse in question and then switch them all off.
Remove the fuse and connect the test lamp in its place. Now switch each of the consumers on and off one by one. If the lamp comes on very brightly when a consumer is switched on, the fault is almost certainly in the wiring of that consumer. Now check the diagram to see via which connectors the consumer is connected.
Now disconnect the first wiring connection (as seen from the fuse).
If the lamp is still bright, the fault is between the fuse and this wiring connection.

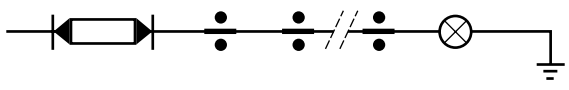


W 5 03 013

If, however, the lamp goes out, the fault is somewhere further on in the wiring.
Now reconnect the connectors and disconnect the next wiring connection. If the lamp is still bright, the failure is between these two wiring connections.
However, if the lamp goes out again, the fault-finding procedure must be continued.
The faulty wiring section can be found in this way.

3.2 OPEN CIRCUIT

Suppose a consumer is not functioning. The fault may be in the consumer itself, or there may be an open circuit in the wiring.
First switch on the consumer. Then check the consumer for voltage using a test lamp. If no voltage is found, first check whether the fuse is still intact.
If there is voltage at the fuse, check the wiring from the fuse to the consumer. This means every wiring connection must be checked.
Stop at the first wiring connection that has no voltage. The open circuit will be between this connection and the previous one.
However, if there was a voltage at the consumer, there may still be an open circuit in the negative (earth) wiring. Check this using a test lamp.
Ensure that the relevant circuit is switched on.
Connect one end of the test lamp to earth and the other end to the earth connection of the component to be checked.
If the test lamp comes on, the earth connection of the component is interrupted. If the test lamp does **not** light up, the earth connection will in many cases be in good condition.
If both the positive and negative connections are in good order, the consumer in question must be replaced.



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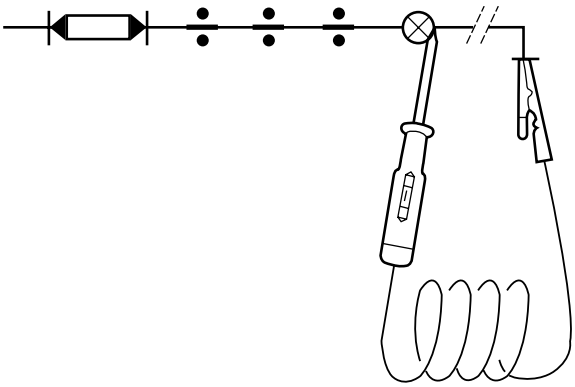

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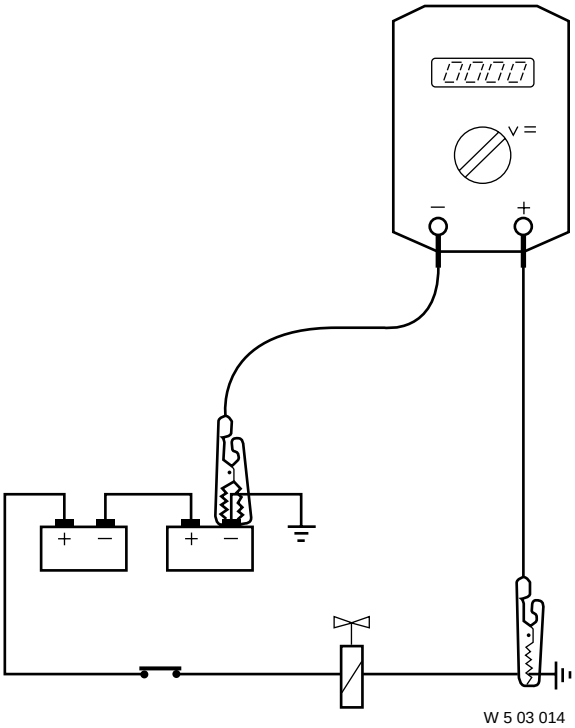
3.3 EARTHING PROBLEMS

Earthing problems are mainly caused by corrosion between the contact surfaces of electrical connections.
Earthing problems can only be detected using a multimeter (preferably digital). A digital tester is preferable because usually only a few volts will be measured and an analogue meter is generally not precise enough for this purpose.
To find out whether a specific earthing point has a good earth connection, use a voltmeter to measure the voltage between the negative battery pole and this earthing point.
Switch on as many consumers as possible.
If there is a correct earth connection, **no** voltage should be found.
In practice, however, a loss of approx. 0.5 volts will often be measured.
If the reading is higher, the earth connection must be checked carefully.
In this way, the earth connections of all consumers can be checked and measured.



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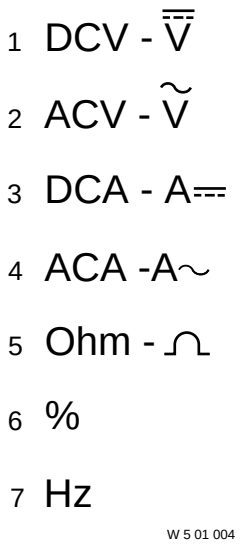
1. GENERAL

1.1 MULTIMETER

The Fluke 87 multimeter allows you to select various measuring options:

Units of measurement
The multimeter should be set to the range for the unit of measurement required.
For example, the voltage, current or resistance range.
The units of measurement are indicated by symbols on the meter. The following symbols are used.

1. DC voltage
2. AC voltage
3. DC current
4. AC current
5. resistance
6. duty cycle
7. frequency



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1.2 SCOPEMETER

Diagnostics in modern electronic systems is steadily becoming more complex.
Using a multimeter on its own is not always sufficient to diagnose a fault.

The scopemeter allows complex signals to be measured.

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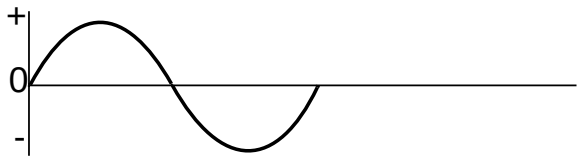
Practical examples of complex signals are:
- PWM signals
- deformation of signals
- CAN-bus signals

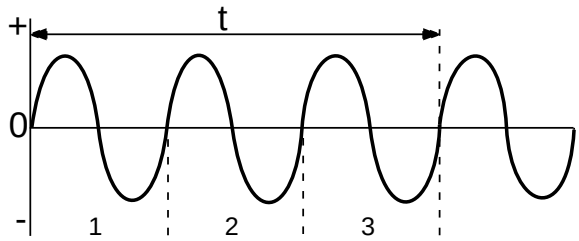
1.3 SIGNAL MEASUREMENTS

Sine-wave signal (AC voltage)
This signal regularly changes polarity with respect to the “0” line

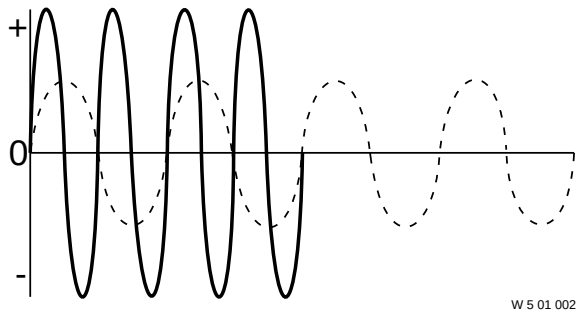


Frequency
The frequency is shown in Hertz (Hz).
The number of complete sines per second is the frequency of the signal (3 Hz in the diagram).

t = 1 second



Voltage
If the number of sines per second increases, not just the frequency increases but also the voltage. This depends on the type of sensor.

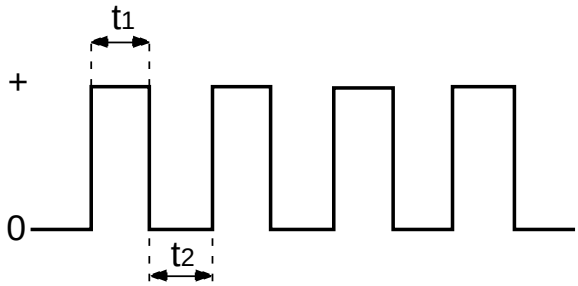


Measuring a sine-wave signal
The sine-wave signal can be measured in the following ways using a multimeter:
- with the multimeter in the frequency (Hz) position.
  In this way, the number of complete sines per second is measured.

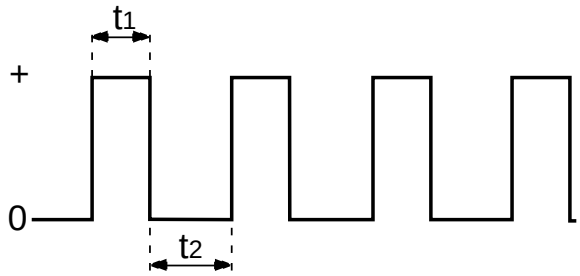
- multimeter in the AC voltage position.
  In this way, the average value of the supplied voltage is measured.

Sine-wave signals in the vehicle
- Wheel speed sensor output signal
- Engine speed sensor output signal.

Square-wave signal
Square-wave signals are signals with only two voltage levels, both of which have the same duration in principle (t1 is equal to t2).

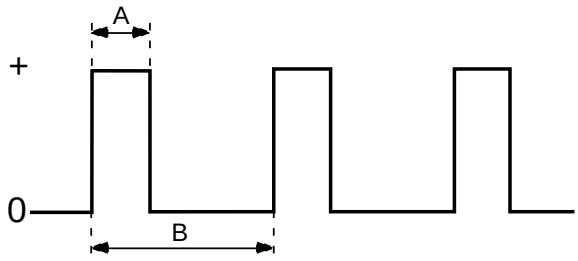


If the duration is different for the two levels (t1 is not equal to t2), the signal is also called “pulse train”.



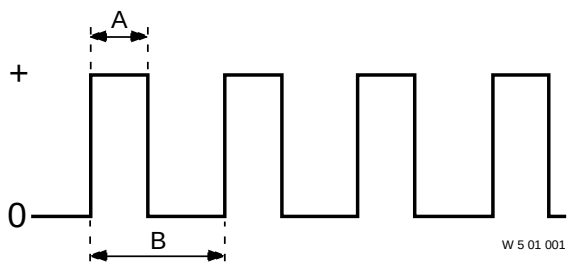
Duty cycle
The duty cycle is the ratio between the two voltage levels, expressed as a percentage.

$$\frac{A}{B} \times 100\%$$



The voltage level ratio of a pulse train may change (for example, when the vehicle speed increases).

Voltage
If the duty cycle increases, the average voltage will also increase.



Measuring a square-wave signal
The square-wave signal can be measured in the following ways using a multimeter:
- with the multimeter in the duty cycle (%) position.
  In this way, the voltage level ratio is measured.

- multimeter in the DC voltage position.
  In this way, the average value of the supplied voltage is measured.

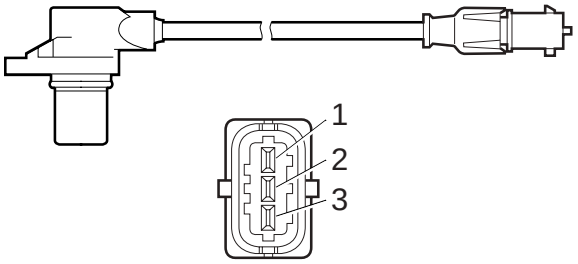
Square-wave signals in the vehicle
- Output signal of the vehicle speed sensor
- Vehicle speed signal from tachograph to electronic units

2. DESCRIPTION OF COMPONENTS

2.1 INDUCTIVE SENSOR

The vehicle has a number of inductive sensors, such as:
- wheel speed sensor
- engine speed sensor
- camshaft sensor

Registering engine speed
The engine speed is registered via the crankshaft position sensor.
The crankshaft position sensor output signal is a sine-wave signal with a frequency corresponding to the number of holes in the pulse disc and the crankshaft rotation frequency.
In the engine management electronic unit, the signal is converted into a message, which is sent via the CAN network. The VIC sends this message to the DIP, which then activates the rev counter.



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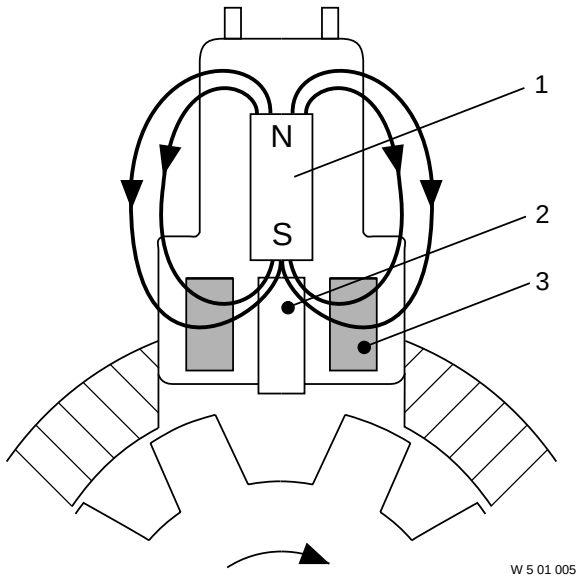
Engine speed sensor operating principle
The inductive sensor consists of a permanent magnet (1), a core (2) and a coil (3).
When the inductive sensor is situated between two teeth, the lines of force of the magnetic field will run directly from the north pole to the south pole via the housing.

The moment a tooth approaches the inductive sensor, the lines of force of the magnetic field will run from the north pole to the south pole via the housing, the teeth of the toothed wheel and the core.
As more lines of force are now running through the core, a more powerful magnetic field is obtained.
As a result of this change in the magnetic field, an AC voltage is generated in the coil.

The value of the AC voltage generated depends on the speed of rotation of the toothed wheel and the air gap between sensor (core) and tooth.



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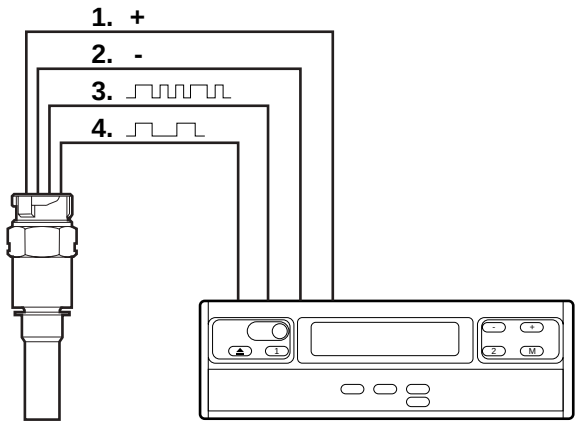
2.2 VEHICLE SPEED SENSOR

The vehicle speed sensor has two connections for output signals. The real-time speed signal, triggered by a Hall IC, is sent via the first connection,
Via the other connection, a data signal (bi-directional signal) is sent, which involves an exchange of data between the MTCO and the speed sensor. The MTCO requests data from the sensor.
The sensor sends the coded data to the MTCO in sequence, and the MTCO checks the accuracy of this data.
The coded signal consists of the following data:

- serial number of the sensor
- Master key (the same as that of the MTCO)
- coded speed signal

In the MTCO, the coded speed signal is compared with the real-time speed signal.
The MTCO sends commands and data to the sensor at 10-second intervals.



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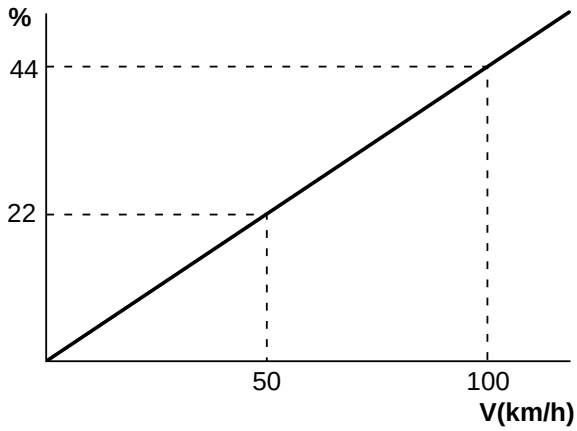
Duty cycle speed signal
The speed signal sent via the vehicle speed sensor to the MTCO is processed by the MTCO and sent as a message via the CAN network.
The speed signal is also converted into a duty cycle signal. This duty cycle signal is used by the electronic units that do not receive the speed signal message via the CAN network.

The diagram alongside shows the linear characteristic of the duty cycle (%) in relation to the vehicle speed (V).
This graph applies to all vehicle models.



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Inspection
The duty cycle signal (square-wave voltage) can be checked with a multimeter that is set to the DC voltage or duty cycle range or with a scopemeter.

2.3 TEMPERATURE SENSORS

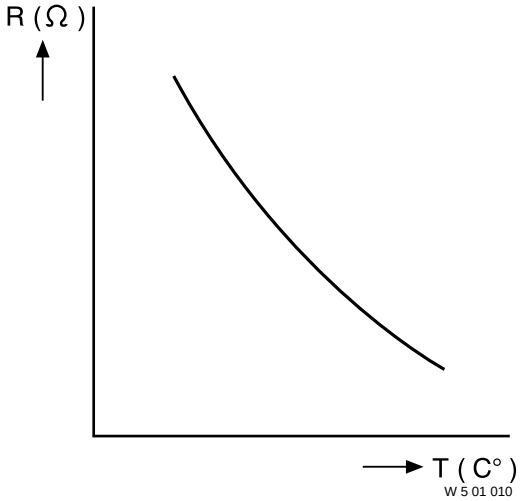
The vehicle has a number of temperature sensors, such as:
- coolant temperature sensor
- inlet air temperature sensor
- fuel temperature sensor
- ambient air temperature sensor

These sensors are temperature-sensitive resistors.
The resistance of these sensors changes considerably with rises or drops in temperature.

There are two types of temperature sensor:
- NTC resistor (Negative Temperature Coefficient)
- PTC resistor (Positive Temperature Coefficient).

NTC resistor
In an NTC resistor, the resistance value reduces as the temperature rises.

Application:
- measuring coolant temperature.

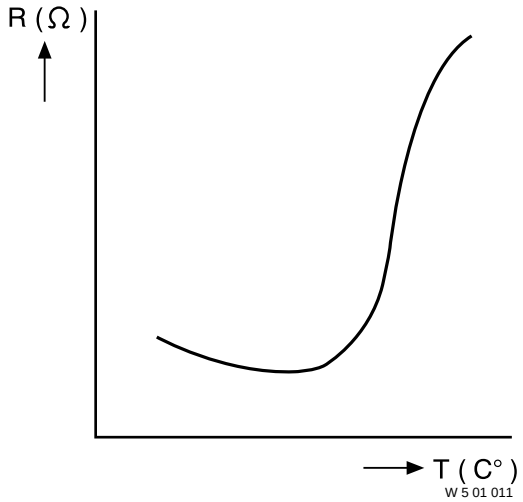


PTC resistor
In a PTC resistor, the resistance value increases as the temperature rises.

In the PTC resistor, in contrast to the NTC resistor, there will be a great change in resistance within a small temperature range.

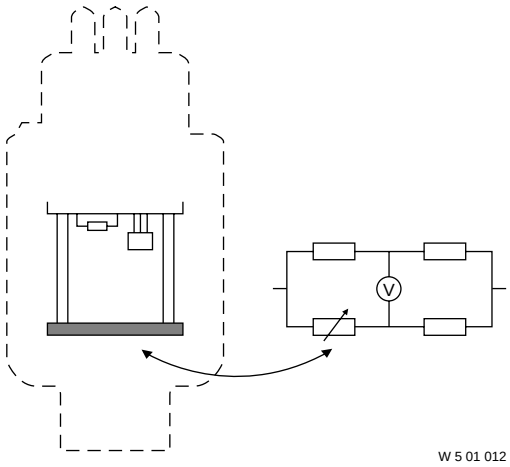
Application:
- measuring air temperature when cab heater is on.

Inspection
The temperature sensors can be checked using a multimeter that is set to the resistance range.



2.4 PRESSURE SENSORS

The vehicle has a number of pressure sensors, such as:
- pressure sensor to register the bellows pressure in ECAS.
- pressure sensor on the air supply unit for pressure gauges in the DIP-4.



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There is a diaphragm made of semiconducting material (silicon) in the pressure sensor.
When pressure is applied to the diaphragm, it will be deflected.
Deflection of the diaphragm leads to a change in the resistance of the semiconducting material.

The diaphragm is part of what is known as a bridge circuit.
Deflection of the diaphragm unbalances the bridge circuit, which changes the output signal.
The output voltage is in direct proportion to the pressure applied (deflection of the diaphragm).

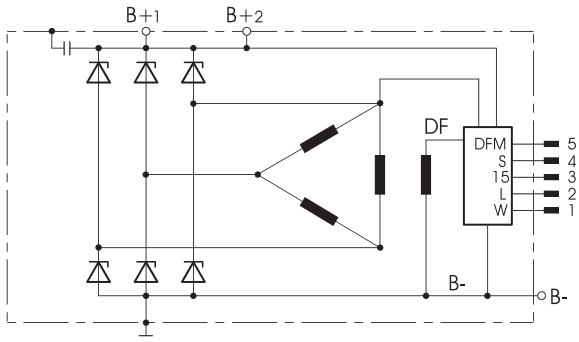
Inspection
The output voltage can be checked using a multimeter set to the DC voltage range.

2.5 ALTERNATOR

The compact alternator is a lightweight alternator with two internal cooling fans. The electronic controller also controls pre-excitation of the alternator. The function of the exciter diodes has also been taken over by the controller. The alternator generates high currents in the lower speed range.

S sens connection of the regulator
15 power supply after contact
L connection to VIC

The alternator has two B+ connections that are connected to each other internally. B+1 is connected to the batteries and the B+2 connection is connected to the “S” connection on the regulator. B– (earth) is connected to the alternator housing.



Connection 15
When the contact has been turned on, power is supplied to the alternator via connection 15, pin 3 (1010). The regulator uses this power to activate pre-excitation (self-energising). If there is an open circuit in this connection, the alternator will not produce any power until it reaches a speed of about 5000 rpm. This corresponds to an engine speed of approx. 1500 rpm. The alternator will energise itself when it reaches this speed.

Sens connection
The sens connection, pin 4, can be used to compensate for voltage losses in B+.
There are voltage differences between the alternator and the battery.
Voltage regulation can be improved if these voltage variations can be controlled.
This function is, however, not used. The sens connection is connected directly to B+2 and therefore no voltage differences are measured.

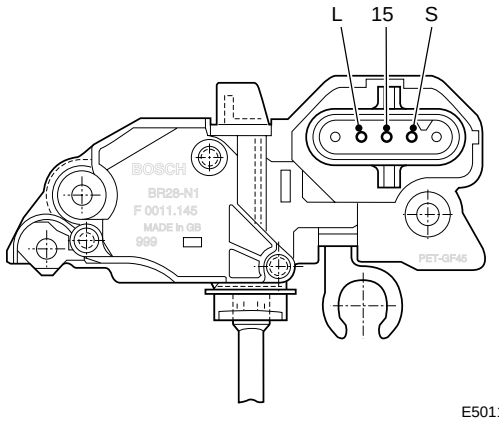
L connection
The L connection, pin 2, is connected to the VIC electronic unit.
This connection is used to activate a fault message in the main display via the VIC, if necessary.

L voltage high: no fault
L voltage low: fault

The following faults can be detected via the "L"-connection:
- voltage too low (< 16 V)
- open circuit in connection 15 (1010)
- open circuit in "S" connection - open circuit in "L" connection

These faults are indicated by the yellow "Alternator fault" warning.

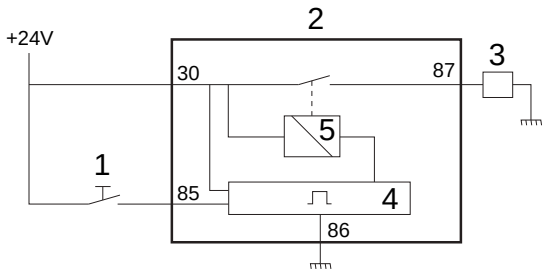
Too high a voltage (red warning) can be recognised by too high a voltage (>31 V) on the VIC electronic unit.



E501129

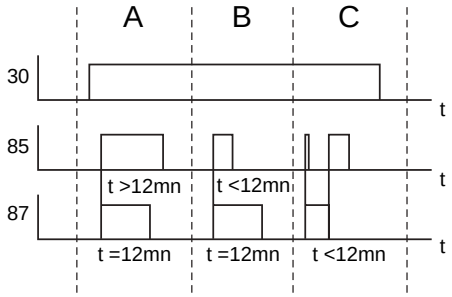
2.6 WINDSCREEN HEATING RELAY

The windscreen heating relay (2) is a time relay with a duration of 12 minutes. The relay is activated by the mirror heating switch (1). This activates the timer (4) in the relay. The timer in its turn activates the internal relay (5), thus supplying the windscreen heating system (3) with power.



E501512

A. After 12 minutes the timer automatically switches off the internal relay, although the switch continues to be operated.
B. If the switch is turned off before the 12 minutes have passed, the relay is still switched on for 12 minutes.
C. If the switch is turned on and off twice in succession within the twelve minutes, the timer will turn off the relay.



E501513

3. DIAGNOSTICS

3.1 DIAGNOSTICS IN ELECTRICAL SYSTEMS

For diagnosis, DAVIE XD is used.
This tool has a two-channel scope and a multimeter function.
DAVIE XD is also used to read data from electronic systems. When a fault arises, it offers the option of selecting a “guided” diagnosis that goes through a series of measurement steps to help locate the cause of the problem.

Refer to the user manual for an extensive description of the operation and possibilities of DAVIE XD.

2

CONTENTS

3

1. GENERAL

The increasing application of electronics in vehicles means a much broader range of connectors, contacts and wiring is being used. Be sure to pay special attention to this during repairs, so as to avoid unnecessary faults.

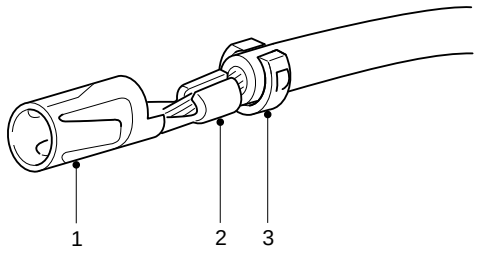
1.1 CONNECTOR

A connector is a removable connection between two or more electrical wires or components. The female contacts are on one side and the male contacts on the other side. This way they can be connected and disconnected.
The connector should protect the contacts against unwanted electrical connections and external influences. It also ensures the proper connection of the applicable contacts.

1.2 CONTACT

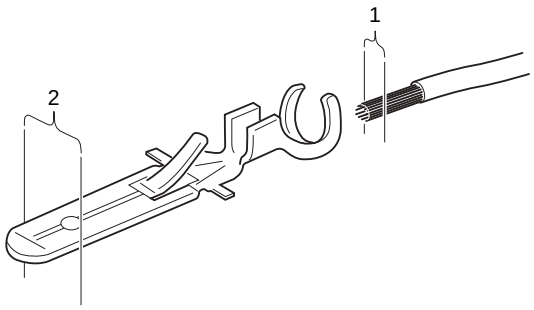
A connector has one or more contacts. These contacts are available in various sizes and models.
However, they all have the same design:

The mating part (1) enables the electrical connection between the contacts.
The contact press part (2) is the electrical connection between the stripped part of the wire and the contact.
The relief part (or pull relief) (3) relieves the contact press part from mechanical wear. The insulation relief is placed over the insulating sheath and/or the SCAT.



E501479

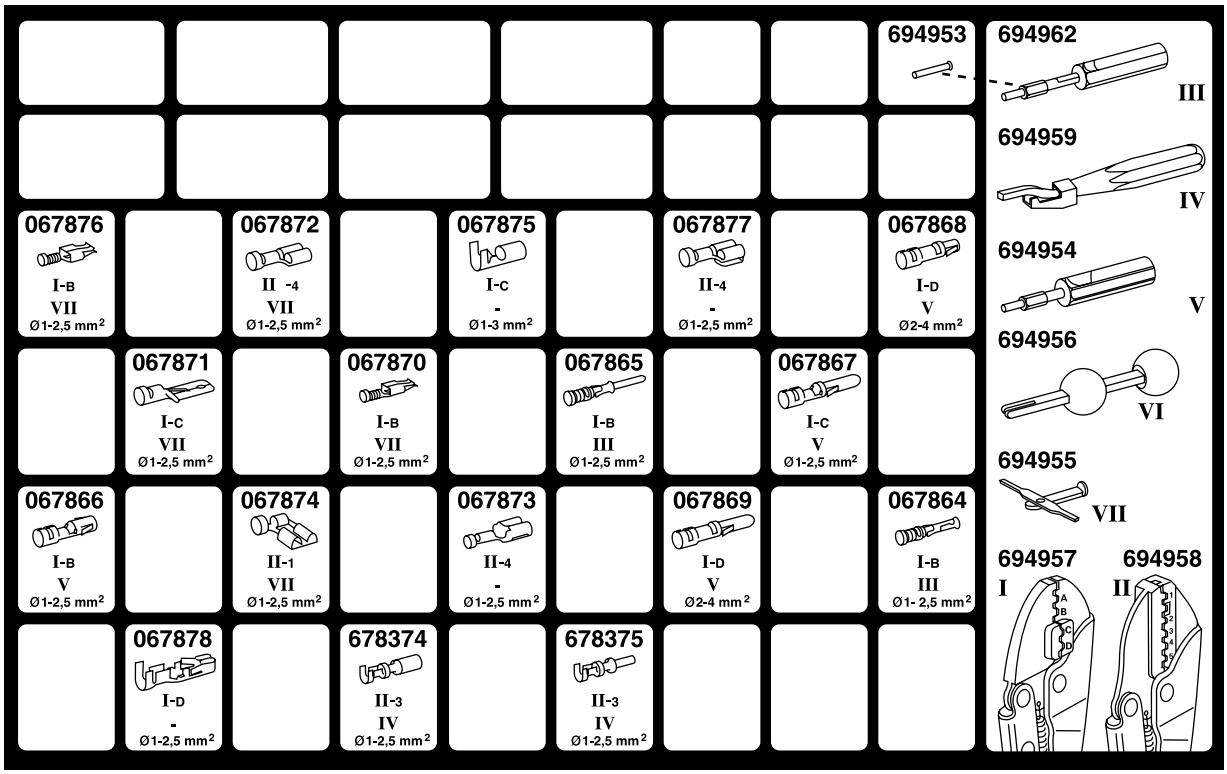
With contacts, three dimensions are important: the diameter (1) of the wire to be connected, the size of the contact press part (2), which is linked to the wire diameter, and the size of the mating part (3).



E501504

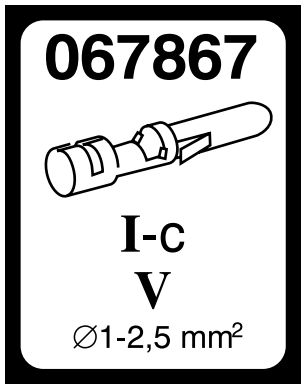
1.3 CONTACT KITS

Contact kit A
Contact kit A (DAF no. 0694960) is available for the contacts, except SCAT contacts and micro-timer contacts.
There is a sticker on the inside of the box to facilitate selection of the contact, contact crimping tool and ejector tool.



W 5 03 019

At the top the DAF no. of the contact is shown.
Roman numerals I and II, shown below the illustrations, refer to the contact crimping tool to be used.
The numeral or letter added to Roman numeral I or II indicates the hole in the contact crimping tool in which the contact is to be placed.
Roman numerals III to VII refer to the type of ejector tool to be used for removing the contact from the connector.
The information at the bottom refers to the core section suitable for the contact.



W 5 03 018

Contact kit B
Additional contact crimping and ejector tools are required for SCAT contacts and for micro-timer contacts. Contact kit B (DAF no. 1240065) is available for this purpose. There is a sticker on the inside of the box to facilitate selection of the contact, contact crimping tool and ejector tool (to be used in the same way as for contact kit A).

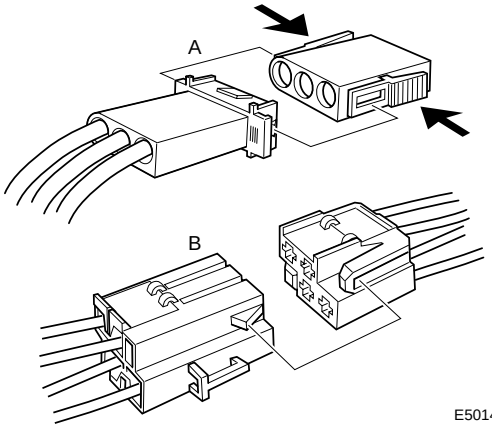
Note:
The proper ejector tool and the proper contact crimping tool for each contact can also be found through “Parts Rapido”.

3

2. REMOVAL AND INSTALLATION

2.1 REMOVAL AND INSTALLATION, CONNECTORS

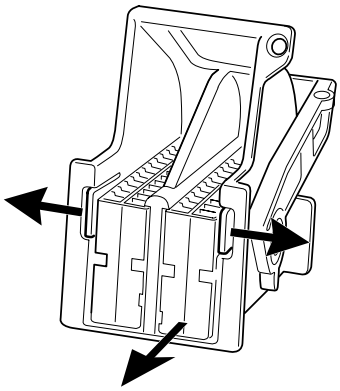
Unlocking the connectors
The connectors can often be locked with one another or with a component. They can be divided into:
A. active locking.
This means that the lock must be activated. With this type a lock must often be pressed.
B. passive locking.
Opens when the parts are pulled apart with a certain force.



E501480

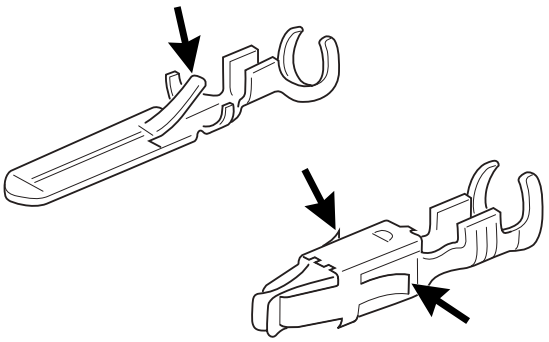
Two connectors in one housing
These connectors consist of two separate connectors. To remove the contacts first remove the connectors from the connector housing. Push the locking lip aside before removal. The connector can then be slid out of the connector housing.

For example:
- connector for VIC electronic unit


E501484

2.2 REMOVAL AND INSTALLATION, CONTACTS

Contact lock
There are various types of contact locks. A few examples are given below. When a lock is applied, individually for each contact, this is called a primary lock. An extra general lock for several contacts in a connector is a secondary lock.

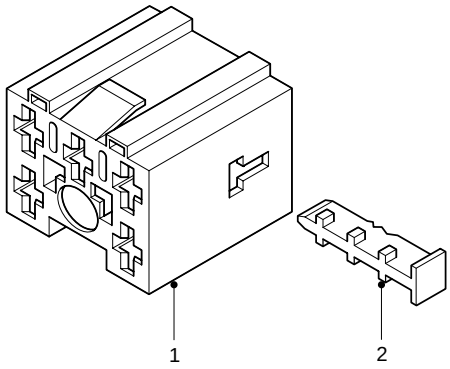


E501481

3

Primary contact lock
To keep an individual contact in the connector in place, a contact is often furnished with one or more locking bolts. This is a primary lock. These locking bolts should never be damaged, with a view to pressing and ejecting the contacts.

Secondary contact lock
This type of lock is normally used on 2 and 3-row connectors.
For connectors (1) with a locking lip (2) first remove the lip before removing the contacts. This is a secondary lock. The locking lip is on the side of the connector and can usually be recognised from a colour that is different from the colour of the connector.
The lip is removed entirely. Now the contacts can be removed using the proper ejector tool by unlocking the primary lock.

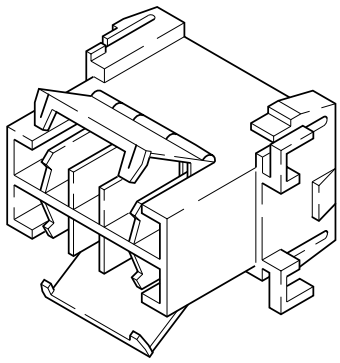


E501483

Examples:
- cab connectors
- electronic unit connectors

The contacts may also be locked secondarily by the lower part of the connector. After tilting this lower part, the contacts can be removed by unlocking the primary lock using the proper ejector tool.
This type of lock is used only on 2-row connectors.

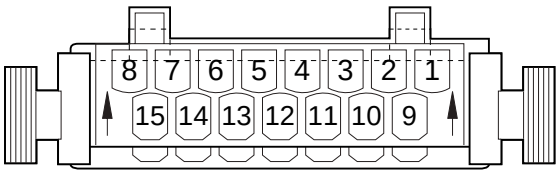
For example:
- MTCO connector



E501497

A different type of secondary lock consists of two sliding parts of the connector.
The upper half (on the wire insert side) and the lower half form the extra contact lock.

To unlock this secondary contact lock the upper half of the connector must be pushed away slightly in the direction of the arrows on the connector housing.
The contacts can then be removed from the connector using the proper ejector tool.



E500475

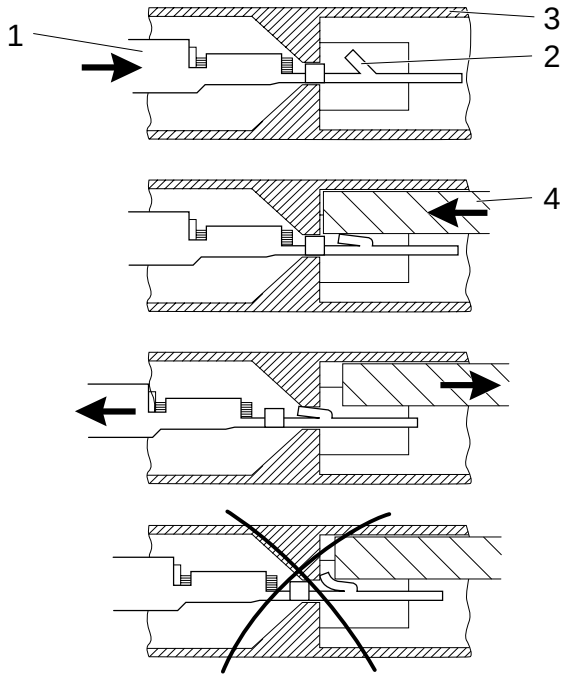
After any installation of wires with contacts, the connector must be pressed into the lock again. If this is not done it will not fit into the counterpart.

Application examples:
- connector for CDS electronic unit
- connector for ECAS-2/3 electronic unit
- connector for UPEC electronic unit

Ejecting contacts
For repair or extension of the wiring a contact may have to be replaced or added. Using special ejector tools a contact can be removed from the connector without being damaged.
For the proper ejector tools, see “Parts Rapido”.

1. Push the wire with contact forwards (1). The locking bolt (2) is now free from the connector (3).
2. Push the proper ejector tool (4) into the front of the connector. This will push the locking bolt (2) down.
3. The contact can now be removed by gently pulling the wire.

Note:
If the wire is pulled before the ejector tool pushes the locking bolt down, the contact will only be fixed in the connector even more.



E501482

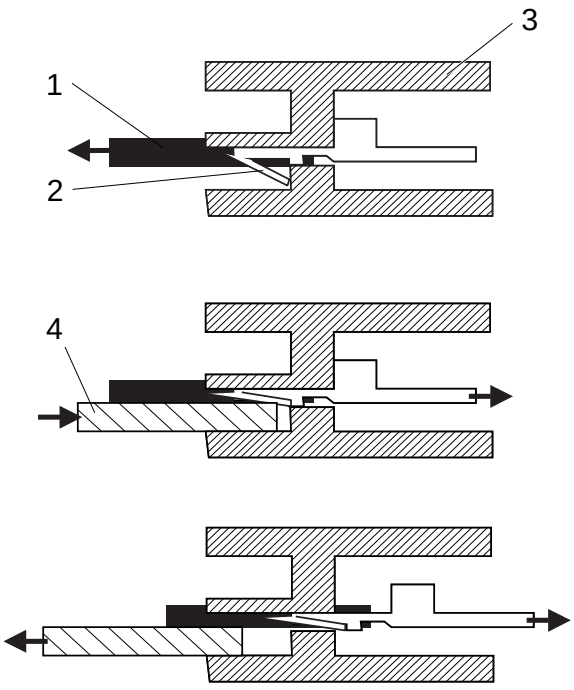
Contacts are also used in which the locking bolt (2) is on the rear of the connector (3).

1. Pull the wire and contact backwards (1). The locking bolt (2) is now free from the connector (3).
2. Push the proper ejector tool (4) into the back of the connector. This will push the locking bolt (2) up.
3. The contact can now be removed by gently pushing the wire forwards.

Note:
Here the locking bolt works exactly the opposite to the usual connectors.

Application examples:
- EMAS pressure sensor connector
- accelerator sensor connector for CF series / XF series

For each contact a specific ejector tool is required.
The proper ejector tool for each contact can be found through “Parts Rapido”.



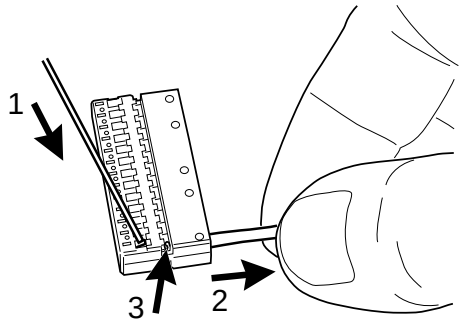
E501696

Locking an MQS (Micro Quadlock System) contact
Before the contact can be removed, the lock must be unlocked with a needle-shaped object.

1. First press the lock at the end of the connector (1). At the same time gently pull the wire (2) until resistance is felt.
2. Then press the second lock (3) and again gently pull the wire (2).
3. The contact can now be removed from the connector.

Note:
This type of contact is locked twice and must therefore be unlocked twice.

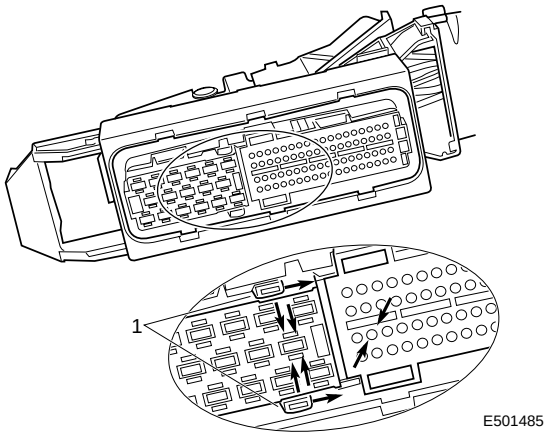
Application example:
- connector for VIC electronic unit



E501486

Removing contacts from the Bosch 89-pin connector
To remove a contact from this connector proceed as follows:

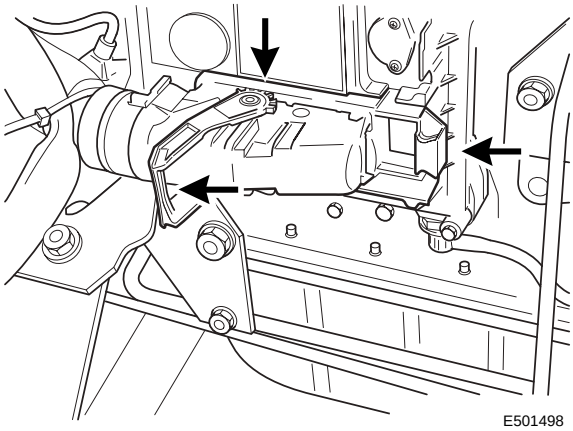
1. Fold the protective cover around the wiring harness down by pushing the lock outwards.
2. Now push the two outer halves of the protective cover outwards and then upwards. The protective cover can now be removed.
3. The pink secondary contact lock (1) must be slid to the centre of the connector to enable the contacts to be removed.
4. The contacts can now be removed using the proper ejection tool.



Note:
The larger contacts are locked with four locking bolts. The smaller contacts are locked with two locking bolts.
Always unlock the locks when adding contacts!

Fitting the Bosch 89-pin connector
When refitting the protective cover, ensure that the siphon and slide are both in the “unlocked” position.
If they are not, the connector, when fitted, will not be locked correctly on the electronic unit. As a result, the contact between the connector and the electronic unit may be bad.

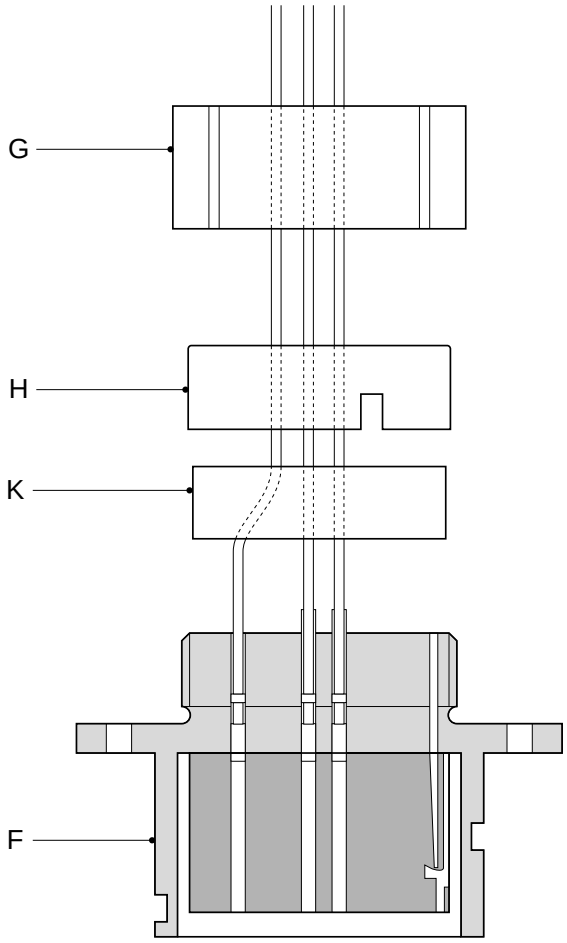
Application example:
- connector for ECS-DC3 electronic unit



Removing 39-pin connector contacts
1. Loosen union G.
2. Push pressure ring H and seal K back slightly over the wiring.
3. Then eject the contacts from connector housing F using a special ejector tool from contact kit A or B.

Fitting 39-pin connector contacts
1. Fit union G, pressure ring H over the wiring.
2. Fit new contacts to the wires using the correct tool.
3. Insert the wires and contacts through seal K.
4. Press the contacts to their definitive positions in connector housing F.
5. Press seal K against connector housing F.
6. Position pressure ring H so that the two ridges on the side of connector housing F fall into the pressure ring recesses.
7. Tighten union G by hand.

Note:
- Pressure ring H has contact numbers (their purpose is to enable the contacts to be positioned correctly). These contact numbers must be in the same position as the contact numbers on the connector housing.
- When an incorrectly positioned wire is removed the seal will leak. If a new wire is not inserted a sealing plug should be fitted.



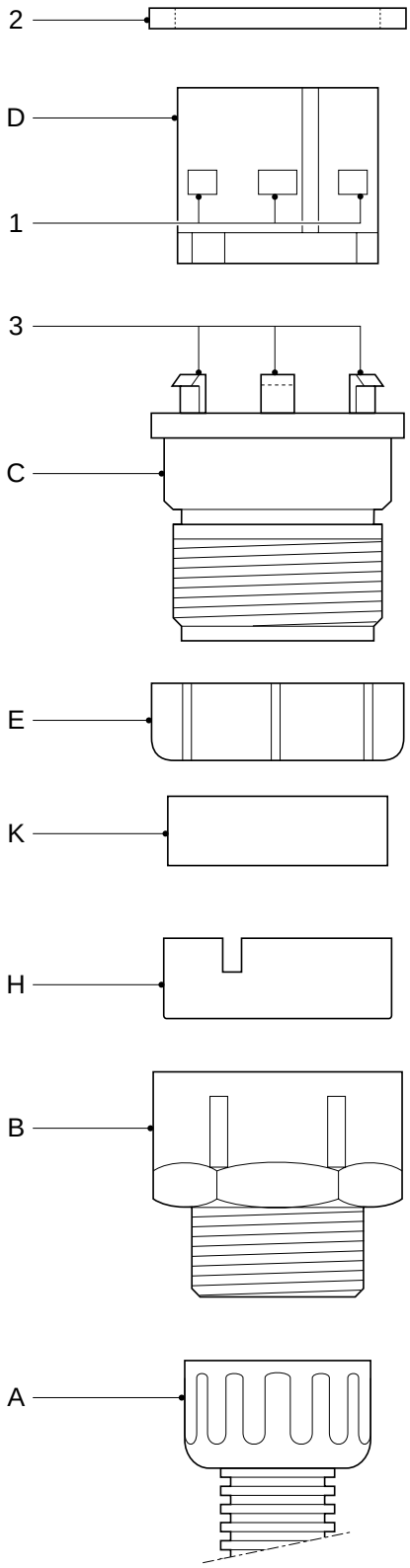
E500477

Removing contacts from 39-pin connector counterpart

1. Loosen end union nut A and tapered coupling nut B and push these as far as possible back over the insulation pipe.
2. Push pressure ring H and seal K as far as possible back over the wiring harness.
3. Push union E back over the wiring harness.
4. Carefully remove the sealing ring (2).
5. Carefully loosen the locking lugs (3) in connector housing F.
6. Remove centring sleeve D from connector housing C.
7. Then eject the contacts from connector housing C using a special ejector tool from contact kit A or B.

Fitting contacts in 39-pin connector counterpart

1. Push end union nut A and tapered coupling nut B as far as possible back over the insulation pipe.
2. Fit the centring sleeve (D) in connector housing C so that all openings are positioned opposite one another.
3. Check that all locking lugs (3) are positioned in the lock openings (1).
4. Insert the wires without contacts through pressure ring H and seal K.
5. Fit new contacts to the wires using the correct tool.
6. Feed the cable harness through tapered coupling nut B.
7. Press seal K against connector housing C.
8. Position pressure ring H so that the two ridges on the side of connector housing C fall into the pressure ring recesses.
9. Press the connector pins into their correct positions in connector housing C.
10. Fit sealing ring (2) around centring sleeve D and press it until the stop of connector housing C.



E500478

Note:
- When carrying out the last two steps it is important not to twist the cable harness as this can lead to serious damage (wire breakage).
- Tighten the respective union nuts by hand. Do not use tools (pliers) to do this.

11. Screw tapered coupling nut B onto connector housing C.

12. Screw end union nut A (with insulation pipe) onto tapered coupling nut B.

2.3 FITTING CONTACTS TO ELECTRICAL WIRES

The increasing application of electronics in vehicles means a much broader range of connectors, contacts and wiring is being used. The result of this is that more attention has to be paid to making and repairing connections. The following criteria should be taken into account:

1. Wires with a reduced insulation thickness, with retention of the mechanical properties, for use with core sections from 0.5 to 2.5 mm^2.

2. Wires with a normal insulation thickness, for use with core sections from 4 to 120 mm^2.

3. Wires for various temperature ranges:
   T1: from −40°C to +70°C (in cab and chassis) and
   T2: from −40°C to +100°C (in engine compartment and gearbox)

Note:
In view of the mechanical strength required, the minimum permissible core section is 1 mm^2, with the exception of cab wiring. At certain points this may be 0.5 mm^2.

To ensure the reliability of systems and connections, the following points should be observed when repairs or extensions are made to the wiring:

A. Always choose the following:
   - the correct type of contact
   - the correct wire diameter for the contact used
   - the correct type of contact material (tin-plated, silver-plated or gold-plated)

B. Use the right tool for the job. Wire ends are always clamped to a contact. Special crimping tools have been developed for this purpose.

Note:
Connections will only be reliable if these crimping tools are used and the contact is fitted in the correct hole.

3

C. Strip the correct length of wire. Always use stripping pliers.
   The rule of thumb is:
   strip length = crimp-sleeve length + 1 mm.

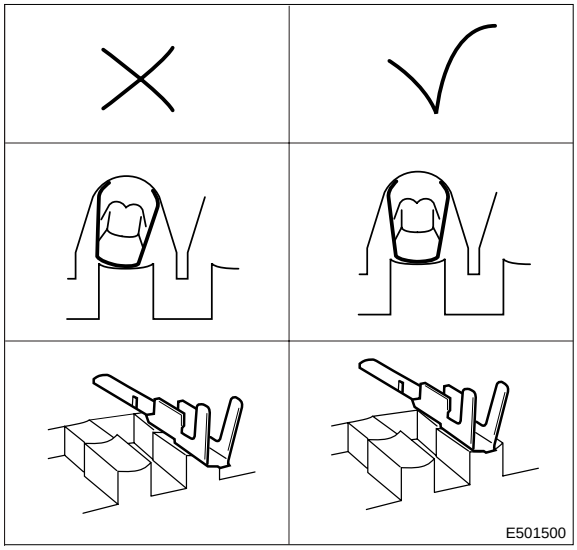
   Make sure that the core is not damaged during stripping or problems may occur after some time.

Note:
A good connection will only be obtained if points A, B and C are complied with. This implies that both the copper core and the insulation are firmly clamped in place.

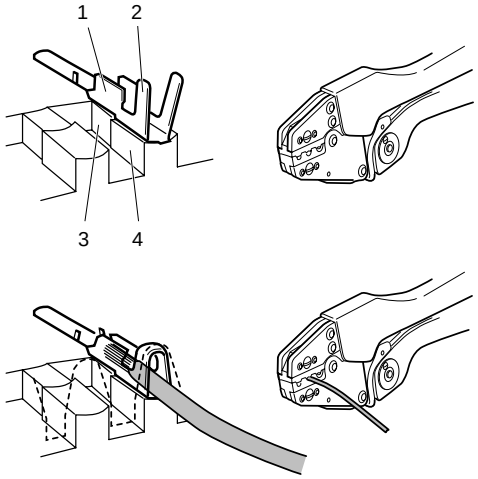
Crimping wire to a contact
Choose the right crimping tool and place the contact in the correct hole.

Note:
The proper crimping tool for each contact can be found through “Parts Rapido”.

The contact may never be in a twisted, slanting or slid position (X) in the press clamp opening.



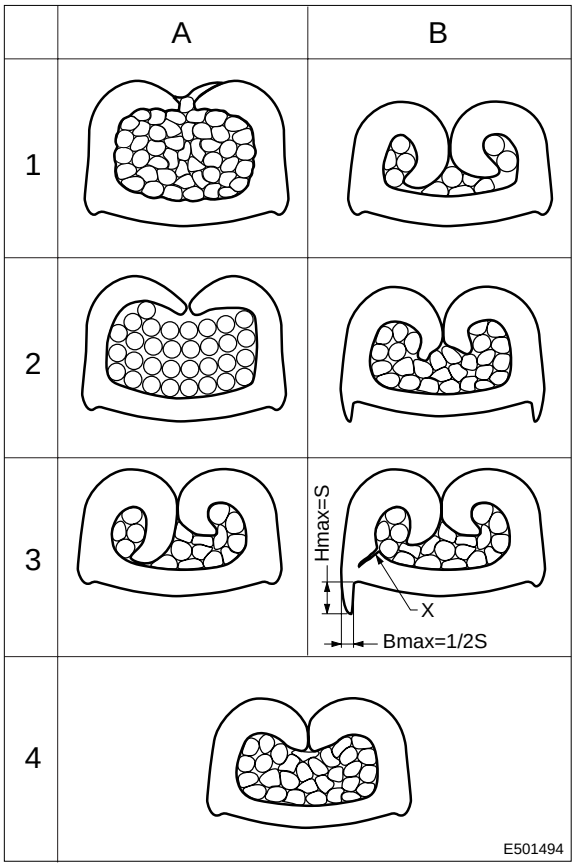
1. Place the wire in the contact.
2. The stripped wire part, the copper conductor, must be in the contact press part (1).
   The wire insulation must be in the relief part (2).
3. Check again whether the wire is in the correct position in the contacts (1 and 2) and press the contact press parts (3 and 4) together.
4. Do not interrupt the contact pressure before the tool is completely compressed in the end position. Only then is full contact pressure reached and the tool can be opened.



E501502

Copper connection
1A. Wire diameter too large
1B. Wire diameter too small
2A. Crimp height too great (hole in crimping tool too large)
2B. Crimp height too small (hole in crimping tool too small)
3A. Asymmetric crimping
3B. Asymmetric crimping
4. Proper contact crimping

S = material thickness
x = cracking



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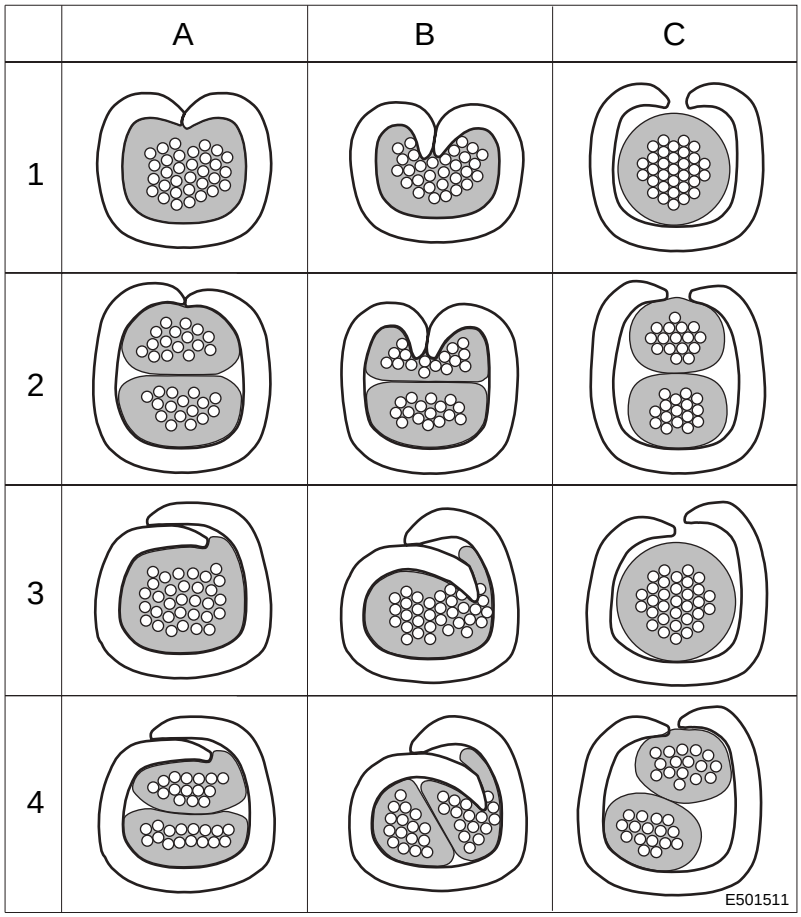
1A.	There is a risk that copper conductors could stick out, which would adversely affect the fixed position of the other copper conductors. This may result in a short circuit and loose contact.
1B.	The contact may crack and the copper conductors may not be sufficiently fixed in the contact.
2A.	Copper conductors are not sufficiently fixed in the contact. The wire will come loose of the contact.
2B.	The contact will be damaged. The contact may crack after some time and the wire will then come loose from the contact.
3A and B	The contact will be damaged and the copper conductors are not fully fixed in the contact. The wire may come loose. The height of any bulge on the contact may not exceed the material thickness of the contact. The width of this bulge may not exceed half the material thickness.

Insulation connection
Different types of crimping are allowed:
1. normal crimping: the two sides of the relief part fully engage the insulation.
2. double crimping: two wires are clamped in one contact.
3. overlap crimping: the two sides of the relief part engage one another slightly.
4. double overlap crimping: two wires are clamped in one contact, the two sides of the relief part engaging one another slightly.

A. If the insulation connection is correct, the wire is clamped in the relief part with the correct pressure and the insulation is not broken.

B. If the contact pressure is too high the insulation could break, possibly causing a short circuit.
This may for instance be caused by:
- using the wrong crimping tool
- using an improper hole in the crimping tool (too small)
- a defect in the crimping tool delaying the interruption of the contact pressure.

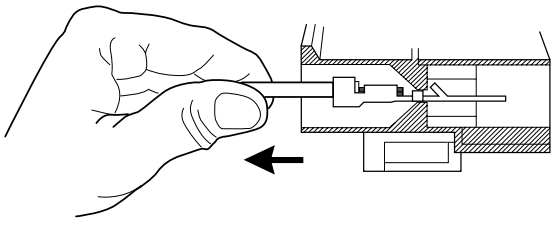
C. If the contact pressure is not sufficient the insulation may not be clamped and the wire may come loose. This will interrupt the electrical connection but may also result in a short circuit.
This may for instance be caused by:
- using the wrong crimping tool
- using an improper hole in the crimping tool (too big)
- interrupting the contact pressure prematurely.



1. Normal crimping
2. Double crimping
3. Overlap crimping
4. Double overlap crimping
   With double crimping the thinnest wire is always at the bottom.

A. Proper insulation connection
B. The insulation is broken
C. The insulation is not secured

A connection can be checked by gently pulling the wire after the contact is placed in the connector. The lock of the locking bolt in the connector should then be felt.



E501501

Examples of wire-contact connections

A. Wire not sufficiently slid forwards.
The wire is not sufficiently slid forwards to ensure a proper current transfer and pull relief.

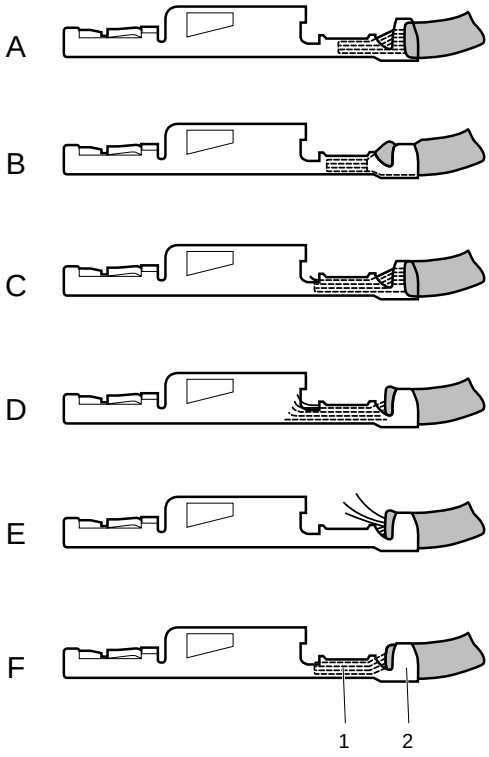
B. Stripped part of the wire too short.
The stripped part of the wire is too short to ensure a proper current transfer whereas a part of the insulation is clamped underneath the contact press part.

C. Wire too far backwards.
If the stripped part of the wire is too long and the wire is placed correctly relative to the contact press part, the pull relief will cover too little of the wire.

D. Wire too far forwards.
If the stripped part of the wire is too long and the wire is placed correctly relative to the pull relief, the copper conductors at the front will stick out too far past the contact press part.

E. Copper conductors not clamped.
Copper conductors not clamped may cause a short circuit to other wires nearby.

F. This is a correct connection.



E501499

2.4 FITTING A SCAT SEAL

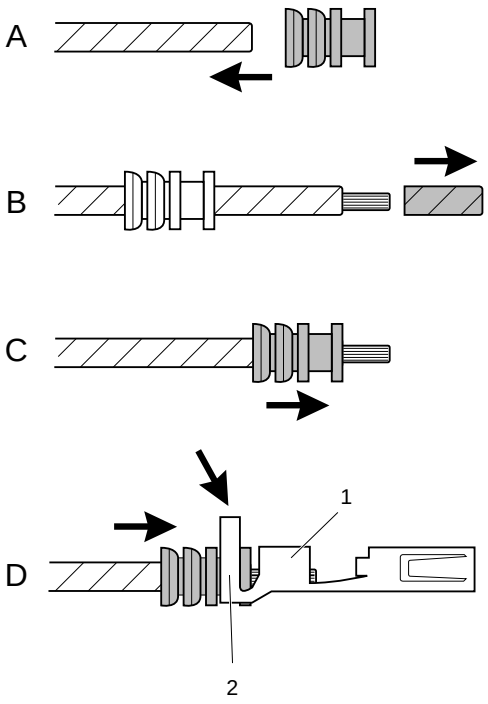
SCATs are used in places where wires are exposed to heavy conditions (environment or application of the vehicle), with the risk of water entering the connector.

The SCAT seal, which is made of silicone, prevents corrosion inside the connector and keeps the seal properties intact in the event of temperature changes.

The SCAT seal is pressed around the wire with the relief part of the contact.

The SCATs are available in various colours and sizes.

1. Select the right SCAT for the wire, contact and connector.
2. Slide the SCAT onto an unstripped wire (A).
3. Slide the SCAT far enough onto the wire and strip the wire to the proper length (B).
4. Slide the SCAT back to the tip of the stripped wire so that the copper just sticks out of the SCAT (C).
5. Place the contact in the proper manner (D) around the SCAT (2) and the stripped wire (1).
6. Now crimp the contact around the SCAT and the wire using the proper crimping tool.



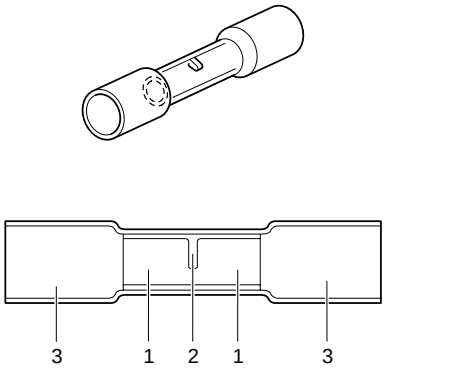
E501503

2.5 FITTING AN ELECTRICAL BUFFER CONNECTION

A buffer connection is made when at least two wire ends must be connected to one another. This may be required because of a wire repair or if a wire is to be added to a connection.

Note:
When adding a new wire to an existing wire, both wires must be of the same thickness.
If part of the existing wire is to be removed, try to make sure that the wire number can still easily be found on the wire.

The contact crimping part (1) is the electrical connection to the stripped wire part. The central stop (2) is a limiter, preventing the wire to be connected from being inserted too far. The insulation is a crimp insulating sleeve with glue layer (3), which, after heating by a blow drier, will offer protection against unwanted electrical contact and corrosion.



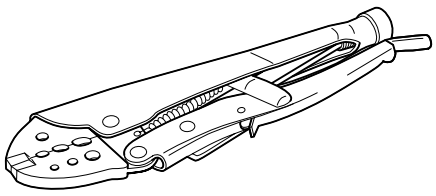
E501489

There are three different buffer connectors available: red, blue and yellow. Depending on the wire thicknesses to be connected (and possibly the number of wires to be connected) a specific colour must be used.

- red diameter 0.25 - 0.75 mm^2
- blue diameter 1.0 - 2.5 mm^2
- yellow diameter 4.0 - 6.0 mm^2

Connecting more than two wires to one another is not recommended. The glue layer of the crimping insulation is not sufficient to seal all resulting gaps. So this is certainly not permitted outside the cab.

It is very important to carry out contact crimping in the correct way to prevent electrical faults. For cold fusion a contact crimping tool is required. This tool creates a cold fusion between wire and buffer connector.


E501491

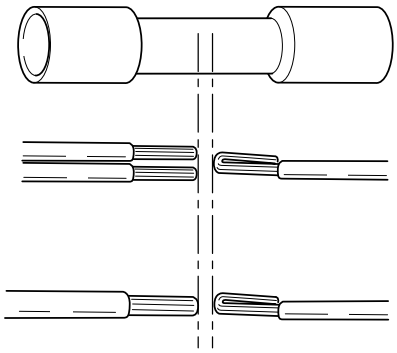
Fitting the contact crimp connector

1. Select the right buffer connector for the wires to be connected.

   Note:
   If three wires of the same diameter have to be connected after all, choose a buffer connector that is the same diameter as two of the wires. The single wire on the other side must be stripped to double length and folded double.
   The same applies when a wire is used on one side that is twice the diameter of the other.

2. Strip the wire to a length of 4 to 5 mm.

   Note:
   The stripped wire tip may **not** be twisted.



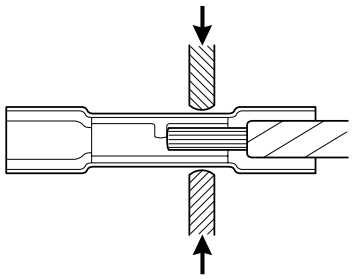
E501490

3. Choose the proper contact crimping tool on the basis of the buffer connector and wire diameter, and check the holes to be used.

4. Place the buffer connector in the hole of the tool and clamp it gently so the buffer connector will remain in the hole.

5. Slide the stripped wire ends into the side of the buffer connector that is engaged by the contact crimping tool.

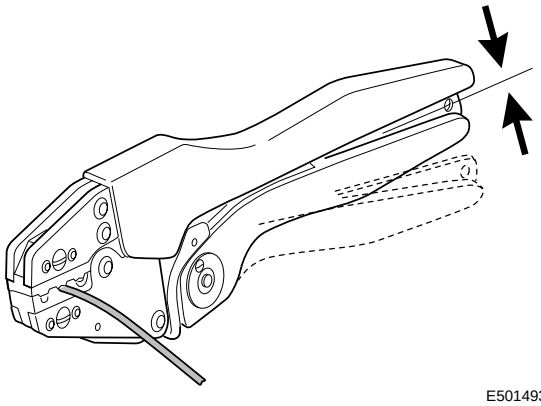
   Note:
   The insulation of the wire may not be slid into the contact part of the buffer connector.



E501492

6. Compress the contact crimping tool: Do not interrupt the contact crimping before the tool is completely compressed to the end position. Only then is full contact crimping achieved and the tool is opened.
7. Repeat this for the other ends of the buffer connector.
8. Check the contact crimping for damage and pull the wires to ensure they are properly fixed.

   Note:
   Improper contact crimping means a bad connection, which may cause failures.



E501493

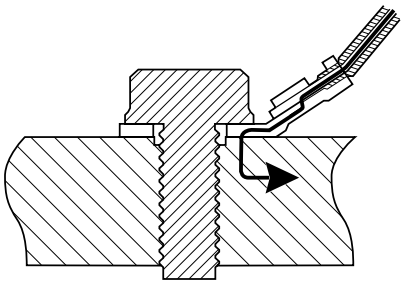
Avoid breathing in the vapours produced when heating the crimping insulation.

9. Heat the crimping insulation to fix it properly to the wire insulation. Ensure that the insulation does not get burnt. If the insulation gets burnt it will become brittle and easily break or crack.

2.6 REMOVAL AND INSTALLATION, EARTH WIRE

When a failure occurs in an electrical system, one of the first things to be checked is the earth connection, with particular attention being paid to earth connection on the chassis.

Points for special attention when checking earth connection on chassis
If an earth connection has been removed and is being re-installed, pay attention to the following:
- the bolt, nut, earth strip and washers must be cleaned (e.g. using a steel brush or sand paper). If a component is corroded, it must be replaced by a new one.
- clean all dirt and paint from the area around the engine/chassis earth connection on both sides of the chassis member so that the bare metal is visible.



E501495

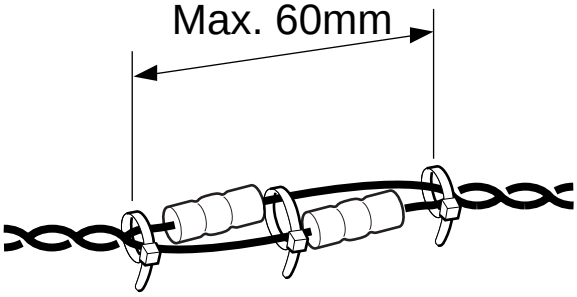
- clean all dirt and paint from the area around the battery/chassis earth connection on the inside of the chassis member so that the bare metal is visible.
- on the earth strip side, the cleaned area must be larger than the contact area of the earth strip.
- on the nut side, the cleaned area must be larger than the contact surface of the nut.
- after fitting the earth connection, a protective zinc primer should be applied to both sides of it and it should be painted.

3

2.7 REPAIRING CAN NETWORK WIRING

When repairing or replacing CAN wiring, the original twisted lengths and diameters of the wiring must be taken into consideration. A 10% tolerance in the twisted length of the wiring is permitted. Winding density 40-50 turns/m.

When repairing the wiring, the winding density must be maintained, with the provision that it is permissible for the wiring at the point of repair to have no windings over a maximum length of 60 mm. When the wiring is being repaired, it must be secured in a wire tie at the end and in the middle.



E500977

Replacing CAN wire

1. Measure the length of the original wire when untwisted.
2. Measure the diameter of the original wire. Always take a wire of the same diameter or, if this is not available, of the next size up.
3. Preferably choose a wire of the same colour as the original wire.
4. Follow the routing of the original wire and secure the wire in the original way.

CONTENTS

4

1. SAFETY INSTRUCTIONS

1.1 BATTERIES

- Always remove the earth lead before working on batteries.
- When connecting battery leads, always connect the earth lead last.
- Always handle batteries carefully and hold them upright.
- The sulphuric acid in the batteries is an aggressive and poisonous liquid. While working on batteries, wear protective clothing, gloves and safety goggles.
- In case of contact with cloths, the skin or the eyes, wash immediately with copious amounts of water. Consult a doctor in case of contact with eyes or skin.
- When topping up batteries, never allow the fluid level to rise more than 10 mm above the plates or to go higher than the level indicator.
- Never put down tools or other materials that could accidentally short-circuit the battery terminals on the batteries or in the vicinity of batteries. Short-circuited battery terminals may cause the battery to explode.
- Secure the batteries well after completing the work, but not too tightly.

1.2 BATTERY CHARGING

- During battery charging, an explosive gas mixture may be released.
- Only charge batteries in a well ventilated area.
- Never smoke or allow naked flames or sparks in the vicinity of the battery.
- Allow frozen batteries to thaw before charging.
- Switch the charger off before disconnecting the leads to the battery.

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2. CHARGING BATTERIES

2.1 GENERAL

- A battery may only be charged using DC current. Connect the positive terminal of the battery to the positive (+) connection of the charger and the negative terminal of the battery to the negative (–) connection of the charger.
  The cell sealing plugs may remain on the battery during charging (except during fast charging).
  During charging, the cell voltage will rise. This increase in voltage depends on the charging current applied and the temperature. During normal charging, the cell voltage will rise from about 2 volts/cell to about 2.65 volts/cell. If a charging voltage of about 2.35 to 2.4 volts/cell (about 14.2 volts in a 12 V battery) is exceeded, this will start off active gas development.
  As a consequence of the rise in voltage during charging, the charging current will, as a rule, fall gradually.
  Overcharging will reduce the service life of a battery.

- If the charging of the battery is continued after it has been fully charged (even with a low current), this will lead to corrosion (corrosive attack) of the grids of the positive battery plates. This type of wear leads to premature redundancy of the battery.
  Depending on the capacity of the charger, the normal charging time is between 8 and 15 hours.
  If during charging the temperature of the battery acid rises to more than 55°C, the charging should be stopped. High temperatures reduce the service life of the battery.

- A battery may be said to be charged if the charging voltage has not increased for more than 2 hours and the acid density (relative density) has reached the nominal value (for example, 1.28 kg/dm^3) and does not rise further.

- A charged battery must be used immediately. If this is not possible, maintain the battery as described in the section “Storage of batteries”.
- A discharged battery must be charged as soon as possible. If a discharged battery is not recharged, the battery plates may become sulphated (i.e. hard), which will lead to permanent loss of capacity.

2.2 METHODS OF CHARGING

Always disconnect the battery clamps before charging.

4

Normal charging
- Normal charging is done to restore partially or fully discharged batteries to full capacity. In most cases, a charging current of $^1/_{20}$ to $^1/_{10}$ of the capacity is selected.
- It is important to reduce the charging current during gas development and to switch the charger off when the battery is charged.

Fast charging
- With this charging method, multiples of the normal charge current (approx. 3 to 5 times) are used in order to achieve an acceptable charge condition in the shortest possible time.
- Before fast charging, remove the battery leads in order to prevent damage to the electronic components.
- Remove the cell sealing plugs so that the released gases can easily escape.
- To prevent overcharging, switch to a lower charging current on reaching the gas pressure (2.35 to 2.4 volts/cell).

  Note:
  Avoid fast charging. Only use this method in exceptional cases. Fast charging causes battery overloading, which reduces the service life of the battery.

Buffer charging

- With this method, the consumer and the charger are both connected to the battery. The charger delivers sufficient current to ensure that the battery remains virtually fully charged. The battery will deliver peak currents to the consumer.

- Buffer charging is best done at a constant (stabilised) voltage.

Trickle charging

- A fully charged battery that is not used for some time will start to discharge of its own accord. It may discharge at a rate of 0.1% to 1% per day. Trickle charging compensates for such discharges.

- The charging current for trickle charging should be around 0.1 A per 100 Ah.

3. STORAGE OF BATTERIES

3.1 GENERAL

Before storing batteries, carry out the following operations:

1. Remove the battery clamps.
2. Clean the battery terminals and the top of the batteries.
3. Grease the battery terminals with petroleum jelly.
4. Check the electrolyte level. The electrolyte level must be approx. 10 mm above the plates or up to the level indicator, if there is one.
   If necessary, top up the batteries with distilled water.
5. Check the charging condition of the batteries and charge them if necessary. See the section “Inspection and adjustment”.

3.2 STORAGE UP TO FOUR WEEKS.

If batteries (whether as separate units or fitted in a vehicle) are not going to be used for an extended period of time not exceeding four weeks, the following measures should be taken:

1. Do **not** connect the battery leads to the batteries.
2. Check the battery charge level regularly. See “Inspection and adjustment”.
   If the voltage falls below 12.4 volts, or if the relative density of the electrolyte in one or more of the cells is less than 1.23 kg/dm^3, the battery must be charged.

Note:
The higher the ambient temperature, the more rapidly the battery discharges.
The lower the relative density of the electrolyte, the higher the risk of the battery freezing.

3.3 STORAGE FOR MORE THAN FOUR WEEKS

If the batteries will not be used for more than four weeks, the following measures should be taken:

1. Remove the batteries from the vehicle and store them in a frost-free, dry, cool and well ventilated room.
2. Check the charging condition of the batteries regularly, at least once every four weeks. See “Inspection and adjustment”. If the voltage falls below 12.4 volts, or if the relative density of the electrolyte in one or more of the cells is less than 1.23 kg/dm^3, the battery must be charged.
3. Limit the storage period to a maximum of three months. The longer the period of storage, the greater the permanent loss of capacity.

4. INSPECTION OF BATTERIES

4.1 VISUAL INSPECTION

- A white dividing line at $^1/_3$ of the plate height (this can be seen through transparent battery boxes) indicates that the battery has been allowed to remain in a seriously discharged condition.
- If the electrolyte is brown and the battery consumes a lot of fluid, this indicates that the battery is overcharged.
- If the electrolyte is turbid and milky and the cells have a white deposit, the battery has become damaged due to insufficient charging (deep discharge).

4.2 INSPECTION OF THE CHARGING CONDITION

Relative density

- The charging and discharging of the battery leads to a chemical reaction in the battery, which involves sulphuric acid. The sulphuric acid concentration drops as the battery discharges.
  The concentration, measured as relative density (kg/dm^3), is a useful yardstick for determining the charging condition of the battery.

- An acidimeter can be used to check the charging condition.
  Relative density at 27°C in kg/dm^3

Charged battery	:	1.28
Half-charged battery	:	1.20
Discharged battery	:	1.10

- Measurement corrections are necessary if temperatures are significantly lower or higher. For every 10°C of lower temperature, subtract 0.007 points from the measured value. For each 10°C of higher temperature, 0.007 points must be added. In batteries in good condition, the relative density must be the same in all the cells. The maximum difference between the highest and lowest relative density may not exceed 0.03 kg/dm^3.

Note:
If the relative density in one of the cells is much lower than in the other cells, the cause may be cell closure. If the relative density of two adjacent cells is much lower than in the other cells, this indicates a leak in the cell partition. In both cases, the battery must be replaced.

Voltage

- The charging condition of the batteries can also be measured using a sensitive, preferably digital voltmeter. This method can only be used 1 to 2 hours after full completion of charging or discharging. Measure the absolute rest voltage (the positive and negative clamps must be removed from the battery).
  The charging condition of the battery can be calculated using the formula: voltage per cell = relative density (kg/dm^3) + 0.84.

  Example:
  For a fully charged battery, the relative density per cell is 1.28 kg/dm^3. The voltage per cell is therefore 1.28 + 0.84 = 2.12 V.
  A 12 V battery has 6 cells. The total voltage for a charged battery is 6 x 2.12 = 12.72 V.
  The voltage of a half-charged battery is approx. 12.24 V.
  The voltage of a discharged battery is approx. 11.75 V.

4.3 INSPECTION USING A BATTERY TESTER

- The general condition of the battery can be checked quickly using a battery tester. For this check, a load is applied to the battery and then the discharge voltage at the battery terminals is measured. The load applied to the battery must be at least 3 times the capacity of the battery.

- The rule of thumb is that the test can be carried out when the battery is sufficiently charged (relative density 1.25 - 1.28 kg/dm^3).
  At normal temperatures (10-20°C), the charging voltage for a properly charged battery must be 10 volts after 10 seconds.
  In the case of a partially discharged battery (relative density 1.25 kg/dm^3), the reading should be at least 9 volts.
  It is important that the voltage be measured directly at the battery terminals.

CONTENTS

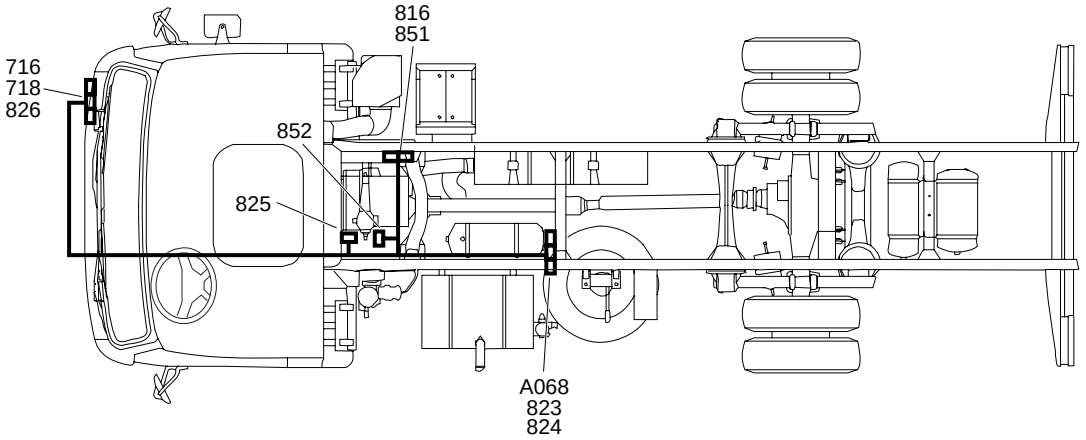
6

1. CONNECTION OF ACCESSORIES

1.1 GENERAL

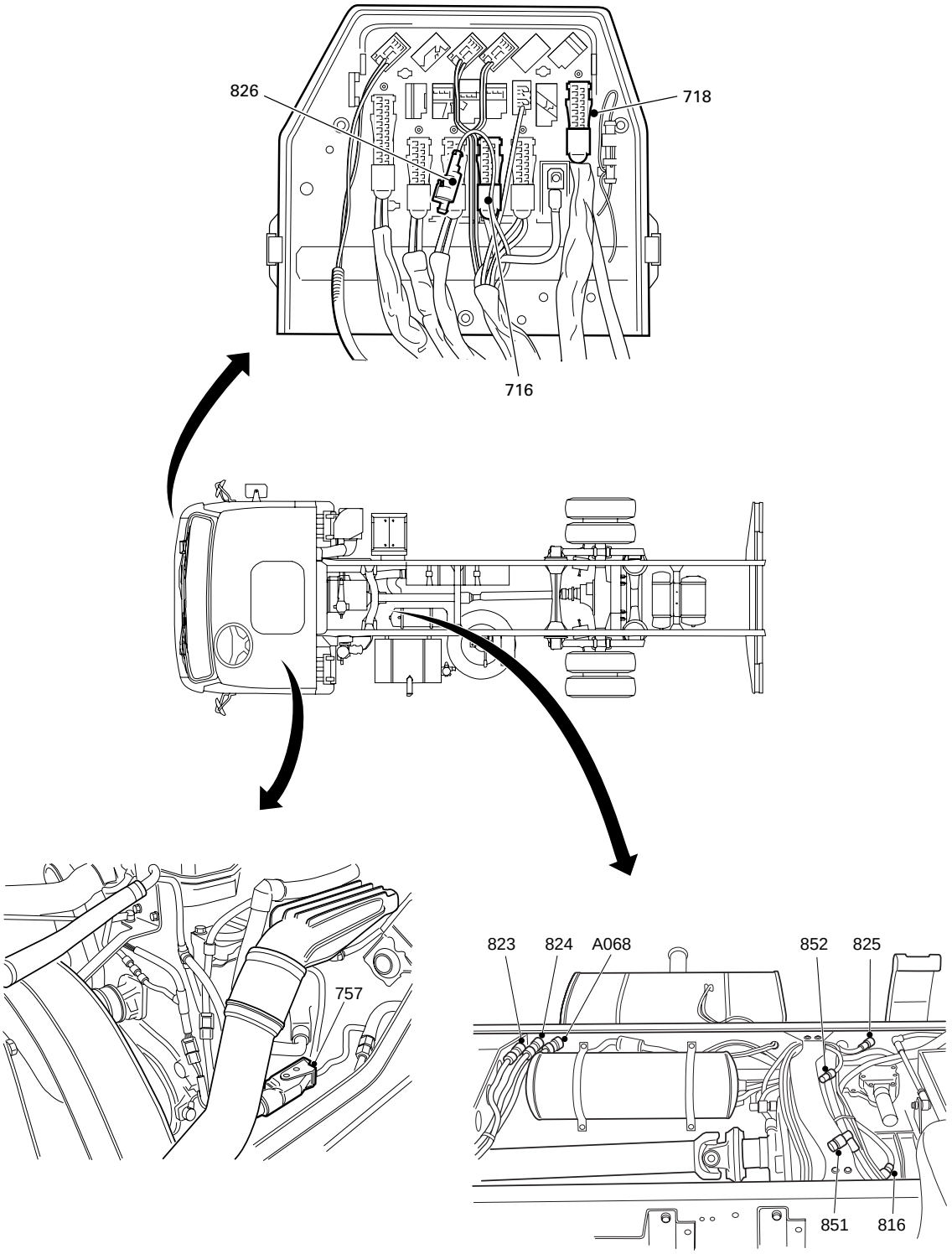
On LF vehicles the various possibilities for application connectors and reserve wiring consist of a number of different wiring harnesses.

One extensive application chassis wiring harness is connected to dashboard lead-through connectors 716, 78 and 826.
The following connectors connected to this wiring harness can be found on the chassis: A068, 816, 823, 824, 825, 852 and 851.



E501747

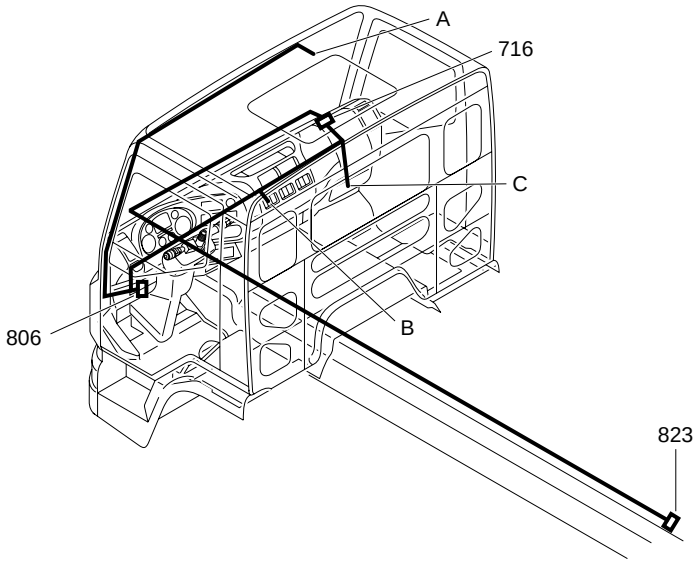
This wiring harness is referred to as the application wiring harness. Wiring harness versions that are less extensive are also possible.
The various applications are described individually below.
Connector 825 is again connected to connector 757, the B connector, of the ECS-DC3 electronic unit.



E501531

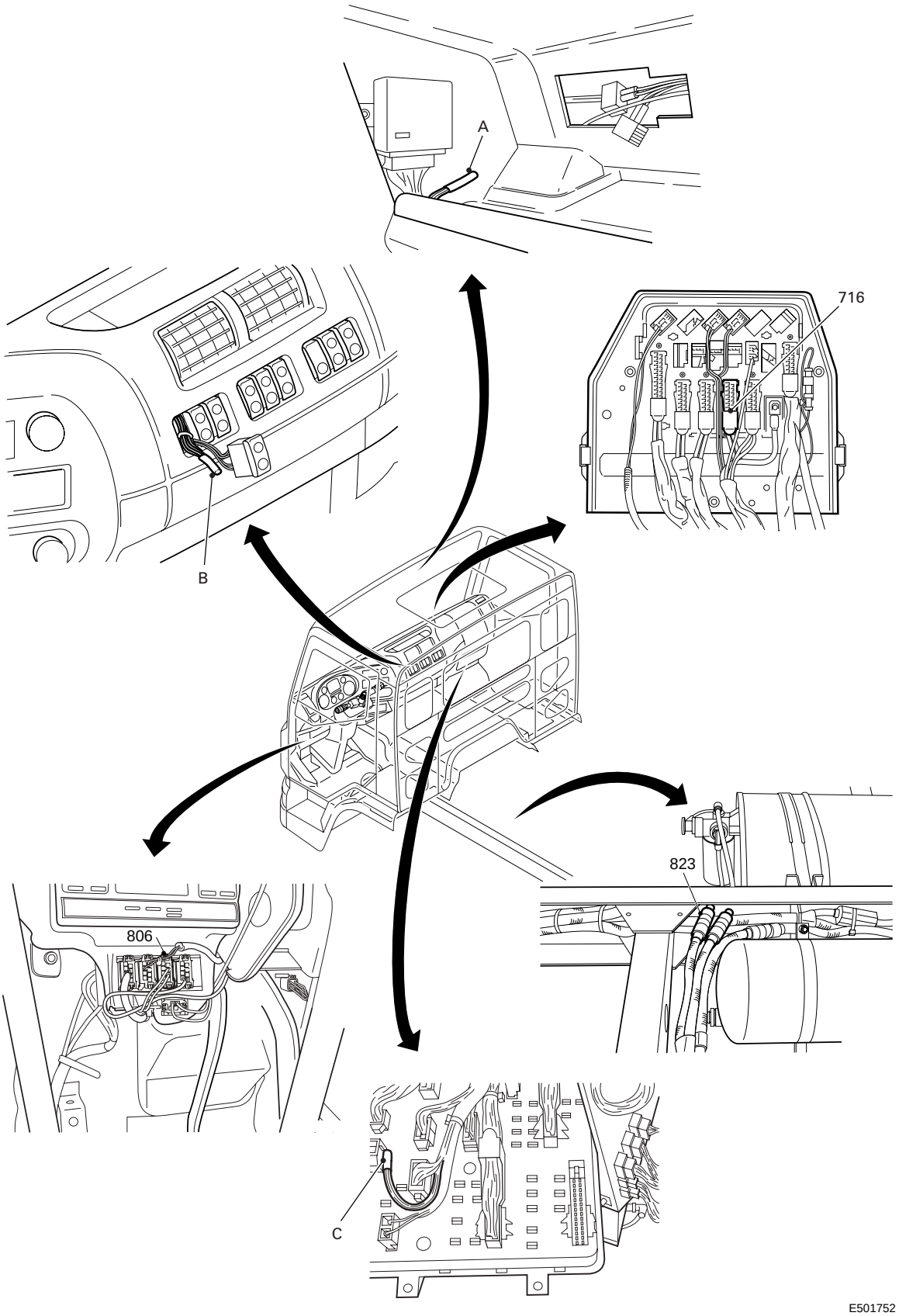
1.2 RESERVE WIRES

Additional wiring
A number of return wires (A) run from the roof console to the fuse box (C) through connector 806. These wires run via dashboard lead-through connector 716 and via the application wiring harness to superstructure functions application 823.
Reserve wires (B) run from the dashboard to superstructure functions application connector 823 via dashboard lead-through connector 716.



E501748

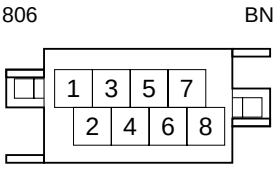
A. Roof console reserve wires X007 - X014
B. Dashboard reserve wires X003 - X006
C. Fuse box reserve wires X011 - X014
716. Green 16-pin dashboard lead-through connector
806. Brown 8-pin dashboard connector
823. Black 12-pin chassis connector



824 is a superstructure functions application connector that will be described below.

Under the tachograph is a brown 8-pin connector (806) containing the reserve wiring to the roof console.

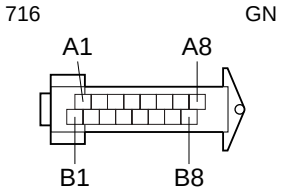
Pin pattern for wiring harness connector 806:



Pin no.	Wire no.	Description
1	X007	Reserve wire between connector 716 and roof console
2	X008	Reserve wire between connector 716 and roof console
3	X009	Reserve wire between connector 716 and roof console
4	X010	Reserve wire between connector 716 and roof console
5	X011	Reserve wire between fuse box and roof console
6	X012	Reserve wire between fuse box and roof console
7	X013	Reserve wire between fuse box and roof console
8	X014	Reserve wire between fuse box and roof console

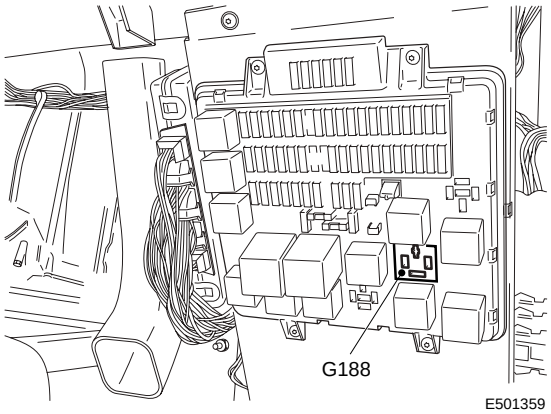
There is a green 16-pole connector (716) with 8 reserve wires in the dashboard lead-through.

Pin pattern for wiring harness connector 716:



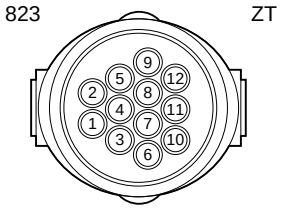
Pin no.	Wire no.	Description
A1	3458	Automatic gearbox fault message
A2	1240	Power supply after contact of fuse box
A3	3746	Gear selection during fault
A4	4614	“ABS active” signal for automatic gearbox
A5	-	-
A6	X002	Power supply before contact
A7	X003	Reserve wire to/from dashboard
A8	X004	Reserve wire to/from dashboard
B1	X005	Reserve wire to/from dashboard
B2	X006	Reserve wire to/from dashboard
B3	X007	Reserve wire to/from roof console
B4	X008	Reserve wire to/from roof console
B5	X009	Reserve wire to/from roof console
B6	X010	Reserve wire to/from roof console
B7	3725	RAS-EC “stop”
B8	3726	RAS-EC “warning”

ATTENTION: The power supply **before** contact (X002) is fuse-protected via fuse E048 (25 A). The power supply **after** contact (1240) is only present if relay G188 is fitted. The power supply **after** contact is fuse-protected via fuse E156 (25 A).



Connector 823 can be found on the chassis near the fuel tank.

Pin pattern for wiring harness connector 823:



Pin no.	Wire no.	Description
1	X003	Reserve wire to/from dashboard
2	X004	Reserve wire to/from dashboard
3	X005	Reserve wire to/from dashboard
4	X006	Reserve wire to/from dashboard
5	-	-
6	-	-
7	X007	Reserve wire to/from roof console
8	X008	Reserve wire to/from roof console
9	X009	Reserve wire to/from roof console
10	X010	Reserve wire to/from roof console
11	-	-
12	-	-

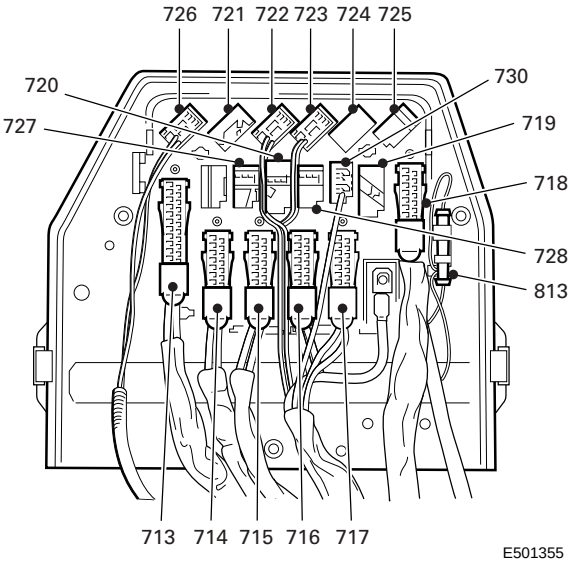
1.3 DASHBOARD LEAD-THROUGH CONNECTORS, GENERAL

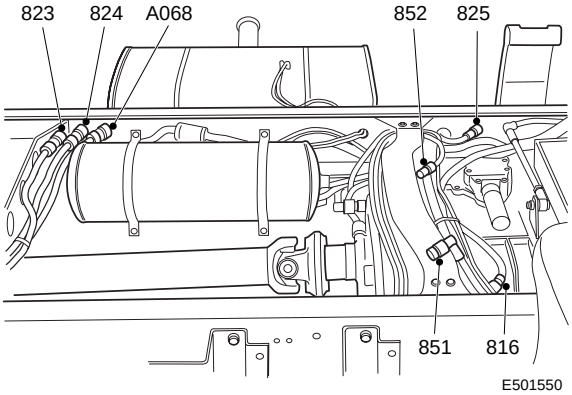
At the front of the cab there are a number of connectors placed one next to the other in the dashboard lead-through zone 1 for connectors. There are also lead-throughs for a number of earth wires and for the main power supply wire.

In the descriptions of the various connectors in the dashboard connector lead-through, the view is always from outside the cab.

When a vehicle is fitted with application connectors, this means that two specific wire harnesses are fitted.

- Chassis wiring harness.
  Dashboard lead-through connectors 716, 718 and 826 connected to superstructure functions application connectors 823 and 824, engine speed control application connector A068, PTO connectors 816 and 851.
- Engine wiring harness.
  Fitted with connector 825 for the engine speed control and connector 852 for “remote throttle”.

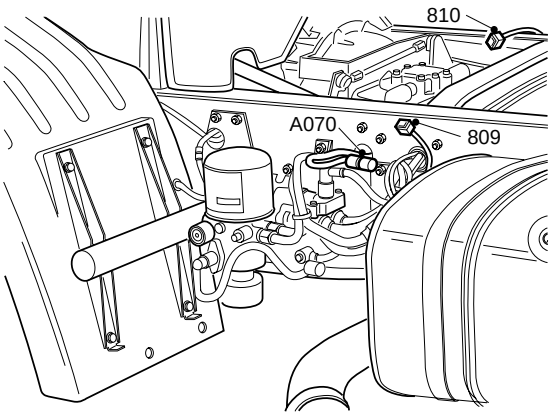




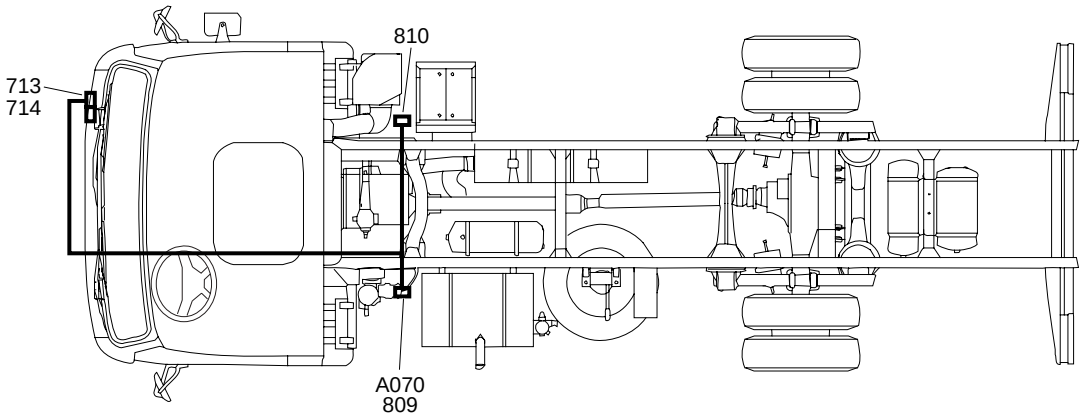
6

1.4 DASHBOARD LEAD-THROUGH CONNECTORS FOR SUPERSTRUCTURE FUNCTIONS APPLICATION CONNECTORS

Together with connectors 809 and 810, application connector A070 forms part of the standard chassis wiring harness. These connectors are connected to dashboard lead-through connectors 713 and 714. Connectors 809 and 810 are not fitted on vehicle type FT.

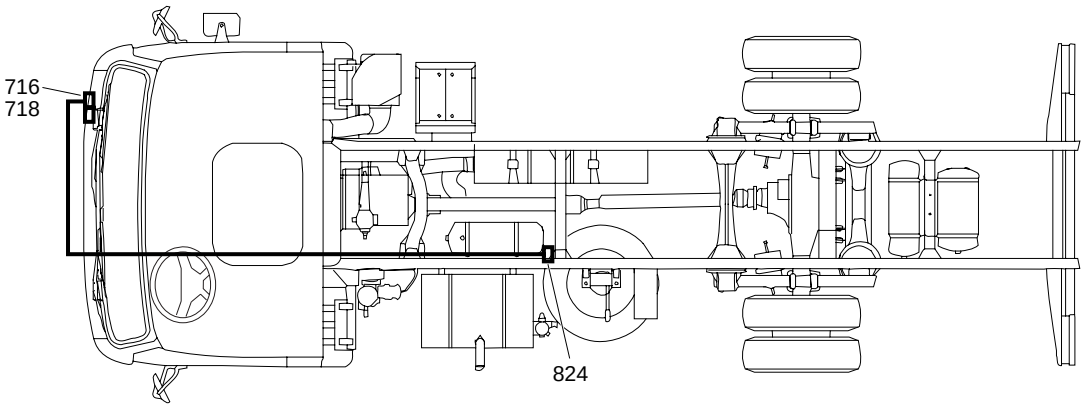


E501742



E501749

Superstructure functions application connector 824 is part of the extensive application wiring harness and is connected to dashboard lead-through connectors 716 and 718. Connector 824 is located on the inside of the chassis side member, near the fuel tank.



E501750

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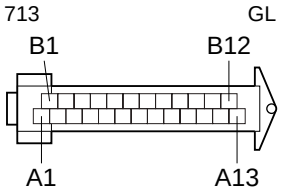
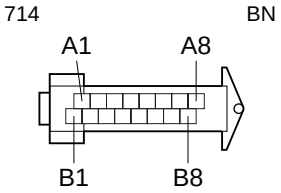
Pin pattern for wiring harness connector 713:



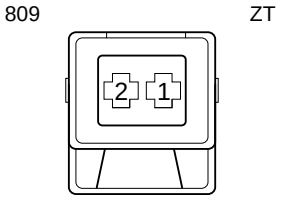
Pin no.	Wire no.	Description
A1	3503	Sensor, fuel level
A2	3402	Parking brake
A3	5104	Reversing buzzer
A4	4517	Differential lock valve
A5	-	
A6	3406	Brake lining wear signal
A7	1217	Reversing switch
A8	2036	Direction indicator, left
A9	2037	Direction indicator, right
A10	2170	Rear light, left
A11	2169	Rear light, right
A12	2152	Fog lights, rear
A13	4601	Stop lights
B1	1356	ABS, drawn vehicle
B2	4591	Reversing buzzer, dashboard switch
B3	1110	Power supply before contact, drawn vehicle
B4	1240	Power supply after contact
B5	5051	Fuel filter heating system
B6	3659	Alarm
B7	2009	Direction indicator, left, drawn vehicle
B8	2008	Direction indicator, right, drawn vehicle
B9	3408	Differential lock dashboard switch
B10	3428	ABS warning, drawn vehicle
B11	3412	Cab lock
B12	2155	Superstructure lighting

Pin pattern for wiring harness connector 714:



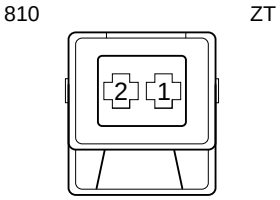
Pin no.	Wire no.	Description
A1	3639	Air pressure sensor, power supply, circuit 2
A2	3638	Air pressure sensor, earth, circuit 1
A3	3639	Air pressure sensor, power supply, circuit 1
A4	3640	Air pressure sensor signal, circuit 1
A5	3020	Vehicle speed sensor, earth
A6	3021	Vehicle speed sensor, power supply
A7	3018	Vehicle speed sensor signal, “real time”
A8	3019	Vehicle speed sensor signal, “coded”
B1	4030	Range-change protection, gearbox
B2	3660	Alarm
B3	4721	Neutral switch, gearbox
B4	4596	Activates PTO valve
B5	5049	‘Water in fuel’ sensor
B6	1264	Alarm battery
B7	3638	Air pressure sensor, earth, circuit 2
B8	3641	Air pressure sensor signal, circuit 2

Pin pattern for wiring harness connector 809:



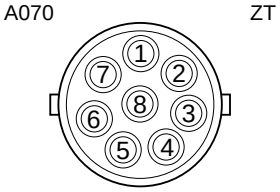
Pin no.	Wire no.	Description
1	2170	Rear light, left
2	M	Earth

Pin pattern for wiring harness connector 810:



Pin no.	Wire no.	Description
1	2169	Rear light, right
2	M	Earth

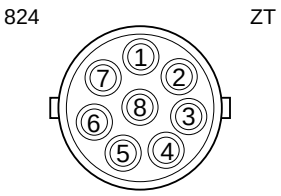
Pin pattern for wiring harness connector A070:



Pin no.	Wire no.	Description
1	1110	Power supply before contact
2	2155 2169	FA work lamp Rear light, right, FT
3	4601	“Stop light” signal
4	4591	“Reversing light” signal
5	1264	Alarm, power supply
6	3659	Alarm, superstructure/drawn vehicle
7	3660	Alarm, superstructure/drawn vehicle
8	M	Earth

Note:
On FT vehicles pin 2 for possible superstructure lighting is occupied by wire 2169.

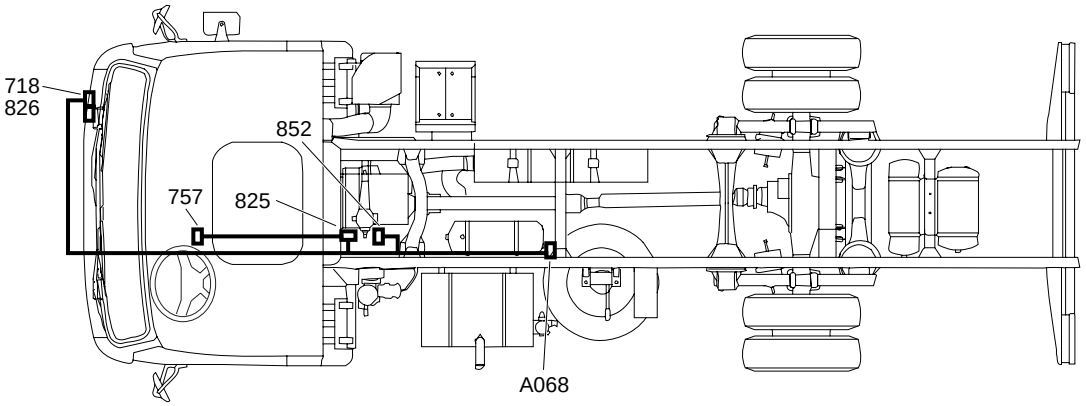
Pin pattern for wiring harness connector 824:



Pin no.	Wire no.	Description
1	X002	Power supply before contact
2	1240	Power supply after contact
3	3435	“Engine is running” signal (via the VIC unit)
4	3412	Cab lock (via the VIC unit)
5	3700E	V-CAN, high
6	3701E	V-CAN, low
7	M	Earth
8	M	Earth

1.5 DASHBOARD LEAD-THROUGH CONNECTOR FOR ENGINE SPEED CONTROL APPLICATION CONNECTOR

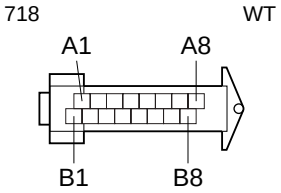
The optional application connector for the engine speed control system (connector A068) is a 12-pin Econoseal connector.
Most of the pins of connector A068 are connected to dashboard lead-through connector 718 and engine wiring harness connector 825.



E501751

Connector A068 is located on the co-driver's side near the air filter housing.
In the dashboard lead-through, the wiring harness from connector A068 is connected to the dashboard wiring harness via connector 718.

Pin pattern for wiring harness connector 718:

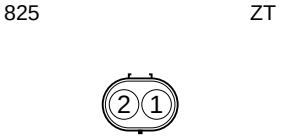


Pin no.	Wire no.	Description
A1	4177	Remote control for main switch
A2	3524	PTO status
A3	4176	Remote control for main switch
A4	3435	“Engine is running” signal
A5	1123	ADR MTCO (A1)
A6	4594	PTO remote control
A7	3700E	V-CAN, high
A8	3412	Cab lock
B1	M	Earth
B2	M	Earth
B3	3143	ESC enable
B4	3144	“N1” signal
B5	3145	“N2” signal
B6	3146	“N3” signal
B7	3514	MTCO vehicle speed signal (D3/B7)
B8	3701E	V-CAN, low

6

Connector A068 is also connected to engine wiring harness connector 825, which in turn is connected to B connector 757 on the ECS-DC3 electronic unit.

Pin pattern for wiring harness connector 825:

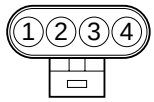


Pin no.	Wire no.	Description
1	3003	“Engine speed” signal
2	3039	Vmax application

The engine wiring harness also has a 4-pin connector for “remote throttle” (852).

Pin pattern for wiring harness connector 852:

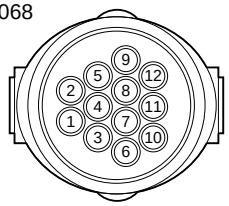
852 ZT



Pin no.	Wire no.	Description
1	4680	Accelerator pedal sensor earth
2	B68	5 V power supply
3	B85	“Remote throttle” signal
4	B21	Accelerator pedal sensor ON/OFF

Pin pattern for wiring harness connector A068:

A068 ZT



Pin no.	Wire no.	Description
1	M	Earth
2	-	-
3	3003	“Engine speed” signal
4	3039	Vmax application
5	-	-
6	-	-
7	3143	ESC enable
8	3144	“N1” signal
9	3145	“N2” signal
10	3146	“N3” signal
11	4594	PTO remote control
12	1240	Power supply after contact

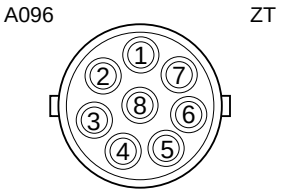
1.6 AUTOMATIC GEARBOXES APPLICATION CONNECTOR

The automatic gearbox application connector is entirely connected to the electronic unit of the automatic gearbox.
The connector's functions described below are those programmed as standard. Depending on the software programmed in the electronic unit, the functions may thus differ from the functions on the vehicle:

A096 Automatic gearbox socket, superstructure (AT2000)
A074 Automatic gearbox socket, superstructure

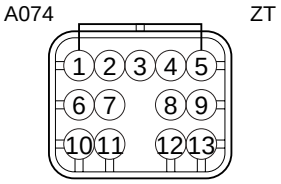
Note:
For a detailed explanation of the application connectors on an automatic gearbox, see the "Superstructure guidelines" book.

Pin pattern for wiring harness connector A068:



Pin no.	Wire no.	Description
1	4006	PTO activation only in neutral
2	5628	PTO request
3	110	Second shift program
4	111	"Range inhibit" prevents the PTO from remaining active when the gearbox is put into a gear by accident, for instance
5	112	Switching off overdrive
6	4596	PTO activation
7	3718	Switched gear indicator
8	-	

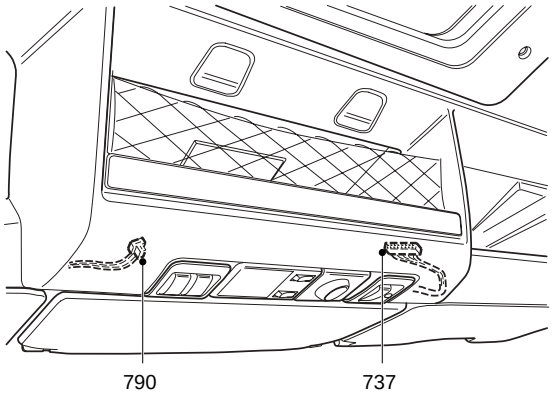
Pin pattern for wiring harness connector A070:



Pin no.	Wire no.	Description
1	5646	Feedback of neutral position
2	153	“Range inhibit” prevents the PTO from remaining active when the gearbox is put into a gear by accident, for instance.
3	5628	PTO request
4	-	
5	6035	Braking signal
6	5648	Automatic neutral position
7	-	
8	-	
9	167	Vehicle speed signal
10	5647	Earth
11	177	Kickdown
12	5644	Speed limiter for footboard protection
13	-	

1.7 CONNECTOR FOR 12V CONNECTION IN ROOF CONSOLE

In the roof console there is a white 2-pin connector, 790, whose purpose is to connect a CB set.
This connector has the following wires: 1153 and earth.

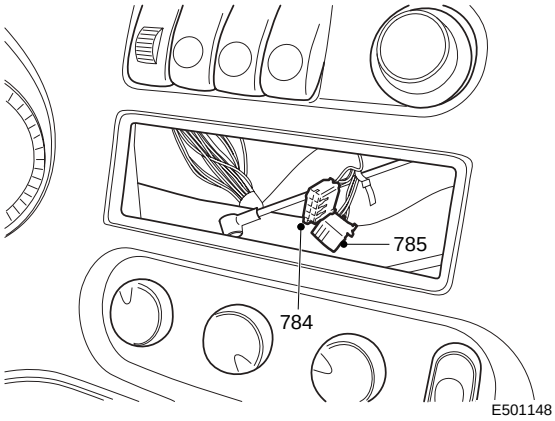


1.8 CONNECTORS FOR CONNECTING THE RADIO

Radio connection
Behind the radio panel there is a connector (connector no. 784) (to ISO standard) for the radio connection; this connector is provided with a power supply before contact of 12 V/10 A (15 A) (1153), power supply after contact (1143) and earth. The wiring for the loudspeakers, connector 785, to the speaker locations above the doors has also been fitted ready for use as standard.

Connectors for connecting the radio.

784 Power supply to radio
785 Loudspeakers for radio



CONTENTS

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1. LIST OF ABBREVIATIONS

Abbreviation	Explanation	Translation/description
ABS-D	Antilock Braking System - version D	Antilock braking system - version D
ABS/ASR-E	Antilock Braking System/Anti-Slip Regulation - version E	Antilock braking system/Anti-slip regulation - version E
ACH-W	Additional Cab Heater - Webasto	Cab heater - Webasto
AGC-A	Automatic Gearbox Control - Allison	Automatic Allison gearbox control
AIRCO	Air conditioning	Air conditioning
ALS-S	Alarm system - Scorpion	Alarm system - Scorpion
ASR	Anti-Slip Regulation	Anti-slip regulation
CAN	Controller Area Network	Multiplex digital communication network
CCU	CAN Connection Unit	CAN connection unit
CDB	Central Distribution Board	Central box
CDM	CAN Data Manager	CAN Data Manager
CDS-3	Central Door Locking System version 3	Central door locking system - version 3
CO	Change Over	Changeover contact
CXB	CAN extension box	CAN extension box
DAVIE XD	DAF Vehicle Investigation Equipment - version XD	DAF vehicle diagnostic tool - version XD
DIP-4	DAF Instrument Pack - version 4	DAF instrument panel - version 4
DVB	DoorVerBinding	Through-connection
ECAS-2	Electronically Controlled Air Suspension system - version 2	Electronically controlled air suspension system - version 2
ECAS-3	Electronically Controlled Air Suspension system - version 3	Electronically controlled air suspension system - version 3
ECS-DC3	Engine Control System DAF Cummins - version 3	DAF Cummins engine management system - version 3
FMS	Fleet Management System	Fleet Management System
MTCO	Modular Tachograph	Modular tachograph
NC	Normally Closed	Normally closed contact
NO	Normally Open	Normally open contact
PTO	Power Take-Off	Power take-off
RAS-EC	Rear Axle Steering - Electronically Controlled	Electronically controlled rear axle steering
VIC	Vehicle Intelligence Centre	Vehicle intelligence centre
VLG/ADR/GGVS/ PETREG/RTMDR	Vervoer te Land Gevaarlijke Stoffen	Transport of hazardous substances

7

2. MARKING OF WIRING

INTRODUCTION

This standard sets out specifications for the uniform use of markings on electrical wiring.

The marking system consists of a numerical system and a colour coding system, thus ensuring a clear wiring layout and precluding faulty connections and manufacturing errors.

The marking system does not apply to vehicles subject to special conditions, such as military vehicles.

Numerical and colour coding
Each numerical code consists of four digits, the first of which refers to the main group and to the colour.

Main groups
Power supplies (red)
1000 to 1999

Lighting (yellow)
2000 to 2999

Warning and control functions (blue)
3000 to 3999

Power consumers (grey)
4000 to 6999

Special applications (colour as desired)
6000 to 6999

Earth connections (white)
Not marked
9000 to 9499 test and signal earth

I-CAN wiring (twisted)
3565 CAN-L (yellow)
3566 CAN-H (grey)

V-CAN wiring (twisted)
3700 CAN-L (yellow)
3701 CAN-H (blue)

Notes:
- The “M” with serial number coding on earth wiring is used for production-related reasons.
- In the case of straight splicing of the wiring (cascading), the numerical codes are shown on each separate wire followed by a serial letter.

Earth connections
The application of electronic systems has made it necessary to divide the earth connections into groups. There is a distinction to be made between two different types of earth connection:
- switching earth
- test and signal earth

The switching earth is the conventional type of earth.
The test and signal earth is used exclusively for electronic systems.
The wiring colour for both types of earth is white, but the test and signal earth wiring is marked with numerical codes (from 9000 to 9500).

NEVER USE THE TEST AND SIGNAL EARTH WHEN FITTING AN ELECTRICAL COMPONENT

If you do this, electronic components may not work correctly.
If an electronic component needs to be connected, the earth for this system must be connected to the central earth connection in the cab.
This connecting point is located under the central box behind the dashboard.

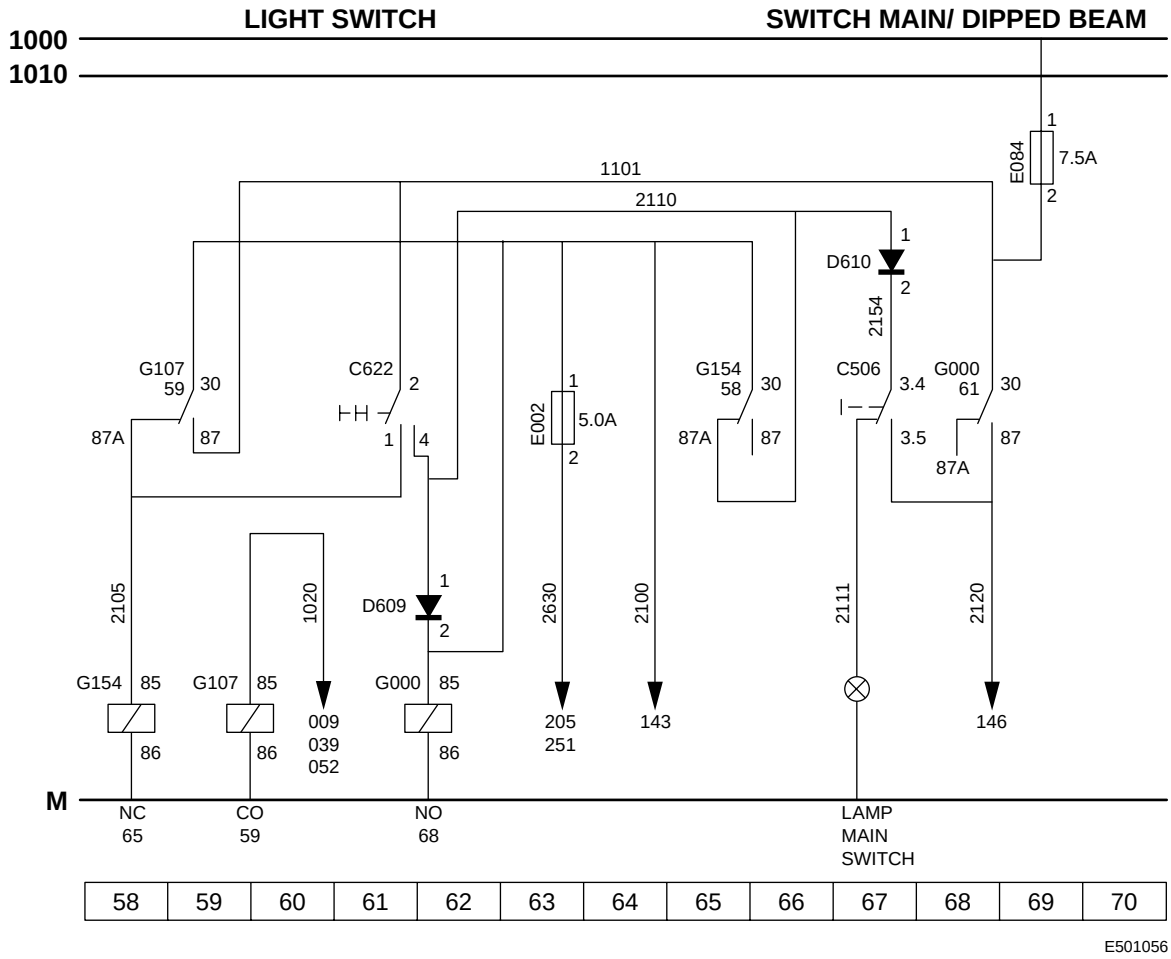
Abbreviations used in colour coding

7

Colour	Abbre-viation	Colour	Abbre-viation
red	rd	yellow	gl
brown	bn	white	wt
green	gn	grey	gs
blue	bw	black	zt
orange	oe	violet	vi
pink	re		

3. READING CIRCUIT DIAGRAMS

The circuit diagram is intended to show the various circuits in the simplest way possible. Symbols are used to do this.



1. In the diagram, the indications “1000” and “1010” are shown at the top, left side.
   Explanation to these indications:
   1000 = power supply before contact.
   1010 = power supply after contact.

2. The indication “M” is shown at the bottom of the diagram, left side.
   Explanation to this indication:
   M = earth connection.

3. To make it easier to find your way around the circuit diagram, a “search bar” is included at the bottom, which contains numbers.
   These numbers are called location numbers.

   In the legend to the circuit diagram the description of the basic code (ECN) is followed by the relevant location number. In this way, a specific component can immediately be located in the diagram.

4. There is an arrow above location numbers 60, 63, 64 and 68 in the example diagram. At the bottom of this arrow is a number. This number refers to the location number on the search bar where you can find the relevant wire number.

5. Under the “M” (earth connection) line, there are the codes “NC”, relating to relay G154, “CO”, relating to relay G107, and “NO”, relating to relay G000.
   What this code means:
   NC = normally closed contact
   CO = changeover contact
   NO = normally open contact

   These contacts can be found at the location numbers shown under the codes “NC”, “CO” and “NO”.

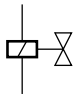
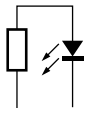
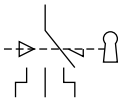
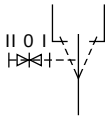
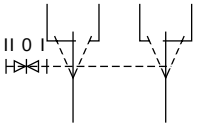
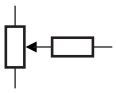
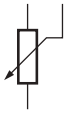
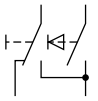
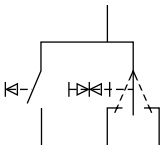
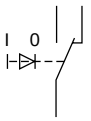
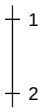
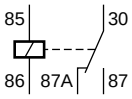
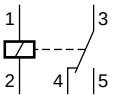
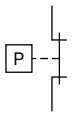
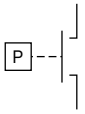
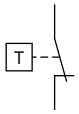
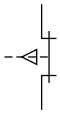
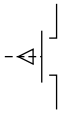
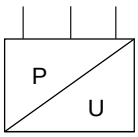
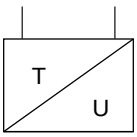
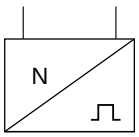
   At the relay contacts shown in the diagram you will also find the location numbers that indicate the relay coil locations.

6. In the circuit diagram you will find the basic codes (for example E002). What these codes stand for can be found in the legend to the relevant circuit diagram.

7. If the wire numbers remain unchanged they will not be repeated in the circuit diagram. For instance, in the example diagram wire 1101 is connected to connection point 87 of relay contact G107, but also to connection point 2 of component C622.

   Wire 2100 (at location number 64) is connected to connection point 30 of relay G154, but also to connection point 85 of relay G000, etc.

Symbols used

1 	2 	3 	4 
5 	6 	7 	8 
9 	10 	11 	12 
13 	14 	15 	16 
17 	18 	19 	20 
21 	22 	23 	24 
25 	26 	27 	28 

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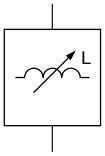
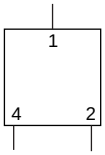
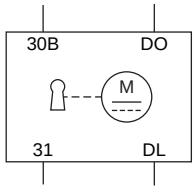
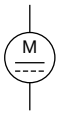
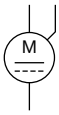
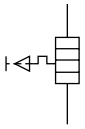
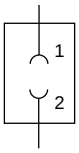
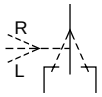
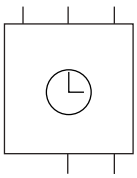
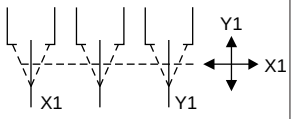
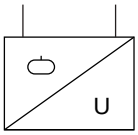
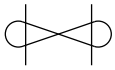
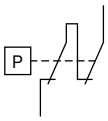
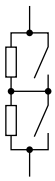
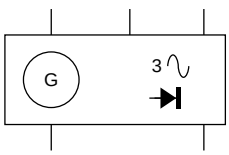
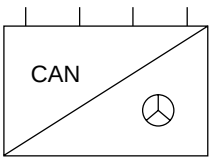
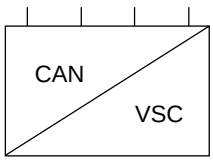
29 	30 	31 	32 
33 	34 	35 	36 
37 	38 	39 	40 
41 	42 	43 	44 
45 	46 	47 	48 
49 	50 	51 	52 
53 	54 	55 	56 

E502011

Symbol number	Description
1	Loudspeaker
2	Electropneumatic or hydraulic valve, 1 driving coil
3	Electropneumatic or hydraulic valve, 2 driving coils
4	Electropneumatic or hydraulic valve, 3 driving coils
5	Diode
6	Bipolar diode
7	LED
8	LED with series resistor
9	4-position switch, key-operated
10	3-position switch with fixed central position, manually operated, spring return
11	Dual 3-position switch with fixed central position, manually operated, spring return
12	Potentiometer with series resistor
13	Potentiometer without series resistor
14	Dual switch; one 2-position switch, manually operated, changeover contact, one 2-position switch, manually operated, contact normally open
15	Dual switch; one 2-position switch, spring return, contact normally open, one 3-position switch, fixed central contact, spring return, changeover contact
16	2-position switch with fixed 0-position, spring return, contact normally open
17	Through-connection
18	Relay with changeover contact
19	Relay with changeover contact
20	Switch, pressure-controlled, dual break, contact normally closed
21	Switch, pressure-controlled, dual break, contact normally open
22	Switch, temperature-controlled, single break, contact normally closed
23	Switch, mechanically operated, dual break, contact normally closed
24	Switch, mechanically operated, dual break, contact normally open
25	Pressure - voltage converter
26	Temperature - voltage converter
27	Revs - pulse converter
28	2-position switch, single break, contact normally open, foot-pedal-operated

Symbol number	Description
29	2-position switch, float-operated, dual break, contact normally closed
30	Sensor, Impedance
31	Sensor, Induction
32	DC motor, key-operated
33	DC motor
34	2-speed DC motor
35	Starter motor
36	Bulb
37	Resistor
38	Fuse
39	Heating element
40	Temperature-switched heating element
41	Socket with two contact sockets
42	2-position switch, fixed central position, manually operated
43	Timer
44	Threefold switch, fixed central position, contact normally open, manually operated, spring return
45	Fluid level, voltage converter
46	Twisted wire
47	Buzzer
48	2-position switch, manually operated, single break, contact normally open, in combination with tubular lamp
49	2-position switch, key-operated, single break, contact normally open
50	Protected wire with earth connection
51	Switch, temperature-operated, single break, contact normally closed
52	Switch, pressure-operated, single break, contact normally closed
53	Twofold, 2-position, magnetically operated reed switch, single break, contact normally open
54	Generator
55	Steering angle sensor
56	VSC module

4. READING SECTION DIAGRAMS

EXPLANATION OF THE POSITION NUMBERS IN THE SECTION DIAGRAMS

In the section diagram only information that is functional in the section diagram described is shown in detail.

1. The wiring is shown in the same colours as the wiring in the vehicle.
2. The wire numbers are as they are printed on the wiring in the vehicle.
   Suffixes to wire numbers, such as A, B, C, etc., have been omitted.
3. Basic code of a component. For component descriptions, see the legend to the diagram. For more information, see the relevant section diagram.
4. Number of the wire connection point or the PCB track on the component.
5. The basic code of the connector and the connection point on this connector.
6. The symbols indicate which system or component is being referred to (in most cases the symbol is also shown on the lens of the warning lamp or switch).
7. PCB tracks.
8. The central box and instrument panel PCBs are grey.
9. Removable components are shown in white.

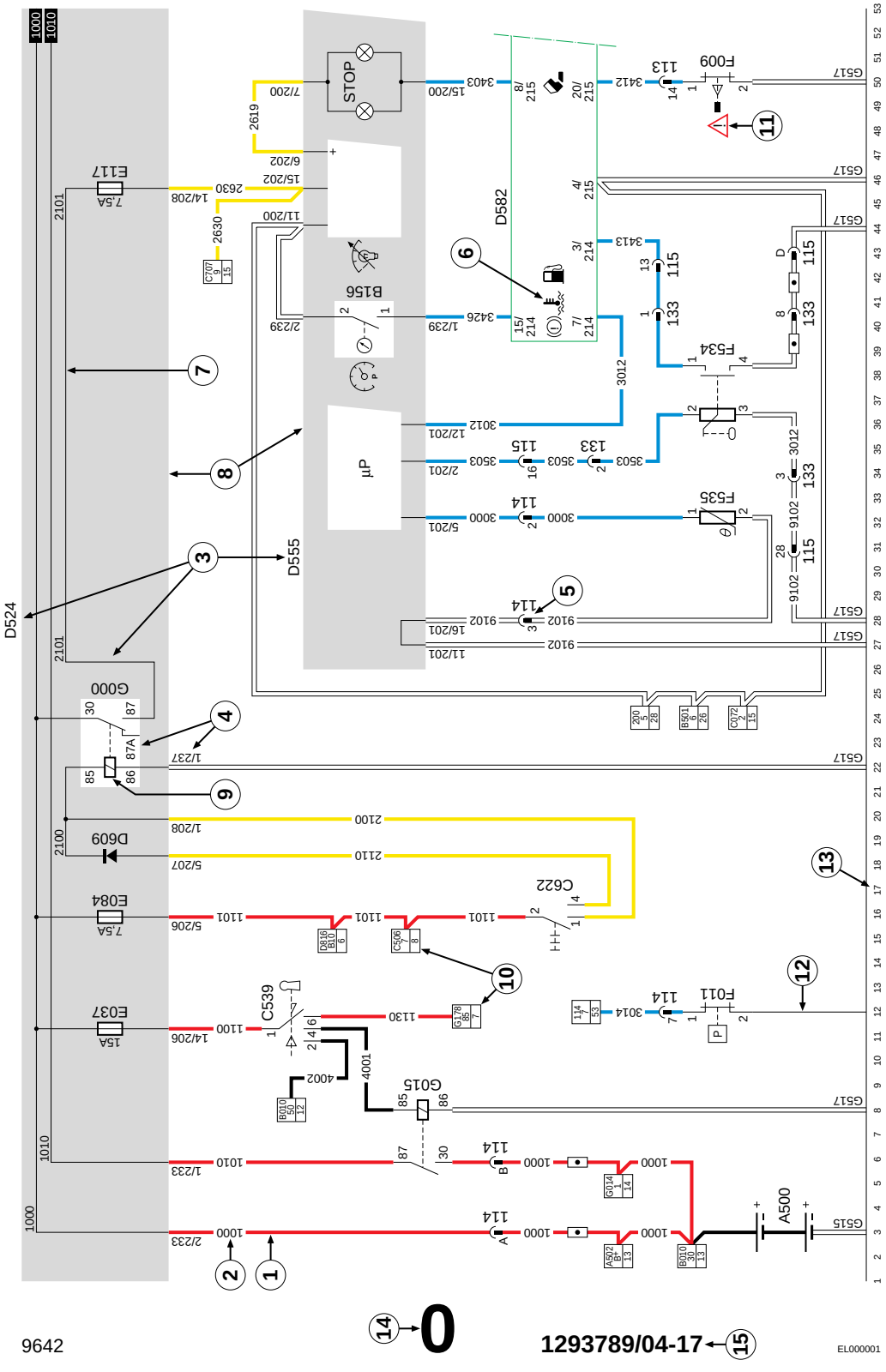
10. Reference to the component and connection point and to the section (section diagram) which gives further information about this component.

G178 85
7

G178	=	Basic code number of the component
85	=	Connection point on the component
7	=	Reference to section diagram 7

11. **ATTENTION!** The situation on the vehicle may be different, because of different specifications. Always consult the legend to the diagram.
12. The housing of this component is connected to earth. The line shown is therefore not a wire.
13. Search bar numbers.
14. Drawing number as well as section number.
15. Relation to the circuit diagram.

7



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CONTENTS

8

1. GENERAL LOCATION OF COMPONENTS

1.1 INTRODUCTION

This main group contains an overview of components that do **not** occur in a system manual.
The location of system components is shown in the appropriate system manual.

There is a sticker in the central box, which indicates what relays, through-connections and fuses can be found on the PCB.

1.2 LOCATION OF COMPONENTS IN RELATION TO CIRCUIT DIAGRAM 1427090/03-04

Column 1 = basic codes of component
Column 2 = description
Column 3 = location
Column 4 = page number

1	2	3	4
A000	FA drawn vehicle socket (7-pin)	Chassis rear end	1
A001	Socket, rear fog lamp/reversing light, FT drawn vehicle (7-pin)	Behind cab	1
A004	ABS socket, FA drawn vehicle (7-pin)	Chassis rear end	1
A011	Socket, 12 V accessories (2-pin)	Electrical panel, underside	4
A021	Diagnostic socket (16-pin)	Under floor mat, driver's side	3
A032	AGC diagnostic socket	On chassis side member above air supply unit	6
A074	Automatic gearbox socket, superstructure	On second side member behind gearbox	6
A087	CCU/CDM socket (2-pin)	Under central box	2
A510	Alarm system battery	In central box, above ABS unit	4
B003	Electric drop glass operation motor, driver's side	In driver's side door	3
B004	Electric drop glass operation motor, co-driver's side	In co-driver's side door	3
B042	Air dryer heating element	In air supply unit	7
B043	Air conditioning compressor	Engine, front left	7
B079	Low-range downshift protection valve	Left side of gearbox	1
B182	Water separator fuel heating element	Rear side of fuel tank, on fuel filter housing	2
B192	Exhaust brake valve	On the RH chassis side member	7
B199	Central door locking motor, driver's side	In door under door lock, driver's side	3

8

1	2	3	4
B200	Central door locking motor, co-driver's side	In door under door lock, co-driver's side	3
B201	Internal electrical components for AGC automatic gearbox	In bottom of gearbox housing	6
B241	Fuel filter/water separator heating element sensor	Rear side of fuel tank, under fuel filter	2
B245	PTO 1 control valve	On the RH chassis side member	7
B338	Alarm system horn	Front of side member, left	5
B341	Glow element	In inlet manifold	5
B360	Seat belt tensioner, driver's side	In roll-up mechanism, driver's seat	4
B361	Airbag module	In steering wheel	4
B399	Cooling fan 1, AGC automatic gearbox	Depending on vehicle application	6
B400	Cooling fan 2, AGC automatic gearbox	Depending on vehicle application	6
B401	Horn	Front of side member, left	5
C062	Stepwell lighting, left	At the bottom of door, driver's side	3
C063	Stepwell lighting, right	At the bottom of door, co driver's side	3
C119	Interior lighting with switch, driver's side	At the bottom, centre, in roof console	3
C525	Main switch	Dashboard, centre panel	4
C553	Mechanical main switch	Chassis side member	2
C622	Lighting switch	Next to steering column, left	4
C715	Rotating beam switch	Overhead panel	3
C725	Work lamp switch	Dashboard, centre panel	4
C727	Fog lamp switch, front/rear	Dashboard, electrical panel	4
C736	Roof hatch switch	Overhead panel	3
C748	Cross-axle differential lock switch	Dashboard, electrical panel	4
C750	PTO 1 switch	Dashboard, centre panel	4
C763	Instrument lighting dimming potentiometer	Dashboard, electrical panel	4

1	2	3	4
C765	Switch for warning lamps	Dashboard, centre panel	4
C773	Fog lamp switch, rear	Dashboard, electrical panel	4
C774	Central door locking switch	Dashboard, centre panel	4
C804	Switch, adjustable speed limiter	Dashboard, electrical panel	4
C835	Switch to turn off interior detection	Overhead panel	3
C836	Switch to turn off superstructure/drawn vehicle loadspace detection	Dashboard, centre panel	4
C854	Chassis main switch	On outside of chassis, next to the batteries	7
C864	Drop glass operation switch, co-driver's side (driver's side door)	In door panel, co-driver's side	3
C865	Drop glass operation switch, co-driver's side (co-driver's side door)	In door panel, driver's side	3
C866	Drop glass operation switch, driver's side (driver's side door)	In door panel, driver's side	3
C867	Mirror heating switch	Dashboard, electrical panel	4
C868	Mirror adjustment switch	In door panel, driver's side	3
C871	Potentiometer for headlamp height adjustment	Next to steering column, right	4
C880	Reversing buzzer switch	Dashboard, centre panel	4
C892	Heater fan switch	In heating/ventilation panel	4
C893	Air conditioning switch	In heating/ventilation panel	4
D609	Light switch diode	In diode block, against bottom of central box	2
D610	Diode, main beam/dipped beam	In diode block, against bottom of central box	2
D715	Alarm system LED	Overhead panel	3
D758	Diode to prevent feedback to the VIC	In diode block, against bottom of central box	2
D787	Diode, air conditioning compressor link	Internal in air conditioning-compressor link	7

1	2	3	4
D802	Electronic unit, ECAS-2 (6x2)	Top side of attachment plate, central box	5
D822	AGC vehicle interface module	On inside of chassis in AGC box	6
D851	Electronic unit, ECAS-3 (4x2)	Top side of attachment plate, central box	5
D866	Electronic unit, AGC-A4 automatic gearbox control	On inside of chassis in AGC box	6
D867	Automatic gearbox selector	In cab on floor	6
D900	Electronic unit, VIC	On inside of attachment plate, central box	5
D905	Electronic unit, CDS	In roof console, co-driver's side	3
D909	Electronic unit, alarm system, ultrasonic	In central box, above ABS unit	4
D910	Electronic unit, battery charger	In central box, above ABS unit	4
D911	Electronic unit, ALS-S alarm system	Against heater housing, left side	4
D912	Electronic unit, immobiliser	Against steering column near ignition/starter switch	4
D924	Electronic unit for main switch	In main switch box on chassis	7
D926	Electronic unit, airbag/seat belt tensioner	Under floor pan, driver's side	4
D941	Electronic unit, ABS/ASR, D version	On top side, central box, horizontal	5
D942	Fuse box	Central box	5
D958	Electronic unit, converter with power supply for radio memory	Next to central box, outside	2
D960	Airbag contact unit	Under steering wheel	4
D961	Electronic unit, ABS/ASR, E version	On top side, central box, horizontal	5
E153	Fuse, power supply for main switch	In main switch box on chassis	7
E286	Main fuse	Behind battery box on chassis	2
E299	Fuse, windscreen heating	Behind battery box on chassis	2

1	2	3	4
E330	Fuse, 'sens' wire main switches	In main switch box on chassis	7
E349	Main fuse, cab	Behind battery box on chassis	2
E354	Fuse, automatic gearbox, AGC fan	In AGC box on chassis	6
E501	Reversing light switch	On gearbox	1
E509	Air conditioning switch, high/low pressure	In evaporator pipe, on outside of cab, co-driver's side	1
E569	Neutral position switch, gearbox	Gearbox	1
E585	Selector switch, automatic gearbox (AT 1000/2000)	Bottom left on outside of gearbox housing	6
E587	Switch for stop lights/clutch	Above brake pedal and clutch pedal	3
E597	Switch, cooling fans, automatic gearbox (AGC)	In AGC oil cooling radiator	6
F000	Parking brake switch	On valve relay, chassis	1
F009	Control switch, cab tilting	In cab lock, driver's side	1
F087	Control switch, gearbox PTO	On PTO housing, type-dependent	7
F533	Vehicle speed sensor	Gearbox, rear end	1
F601	Output shaft speed sensor, automatic gearbox	At rear of gearbox	6
F602	Input shaft speed sensor, automatic gearbox	At front of gearbox	6
F651	Ambient temperature sensor	Between A-pillar and door, left side	1
F652	Air pressure sensor	On air supply unit	7
F670	Sensor, turbine speed, automatic gearbox	On gearbox	6
F671	Accelerator pedal sensor, ECS-DC3	Above accelerator	3
G014	Glow plug relay	Behind battery box on chassis	2
G185	Starting circuit interrupter relay	On Vehicle Interface Module in AGC box	6
G201	Fuel heating relay, FPH-E	Back of central box	2
G350	Reversing light relay, automatic gearbox	On Vehicle Interface Module in AGC box	6

1	2	3	4
G367	Main switch relay, power supply	In main switch box on chassis	7
G368	Main switch relay, earth	In main switch box on chassis	7
G397	Windscreen heating relay	In main switch box on chassis	7
G425	Main switch relay	In main switch box on chassis	7
G444	Cooling fan relay, automatic gearbox (AGC-A4)	In AGC box on chassis	6
G507	Earth, 1-pin, chassis - cab	Outside, under windscreen	2
G516	Central cab earth, co-driver's side	Inside, central box	2
G517	Central cab earth, driver's side	Outside, driver's side	2
G520	Central earth, chassis, front end	Chassis side member, behind the shock absorber, driver's side	2
G524	Earth point, glow element	Left side of engine, cylinder head	5
G525	Central earth, flywheel	Chassis side member, behind the shock absorber, co-driver's side	2

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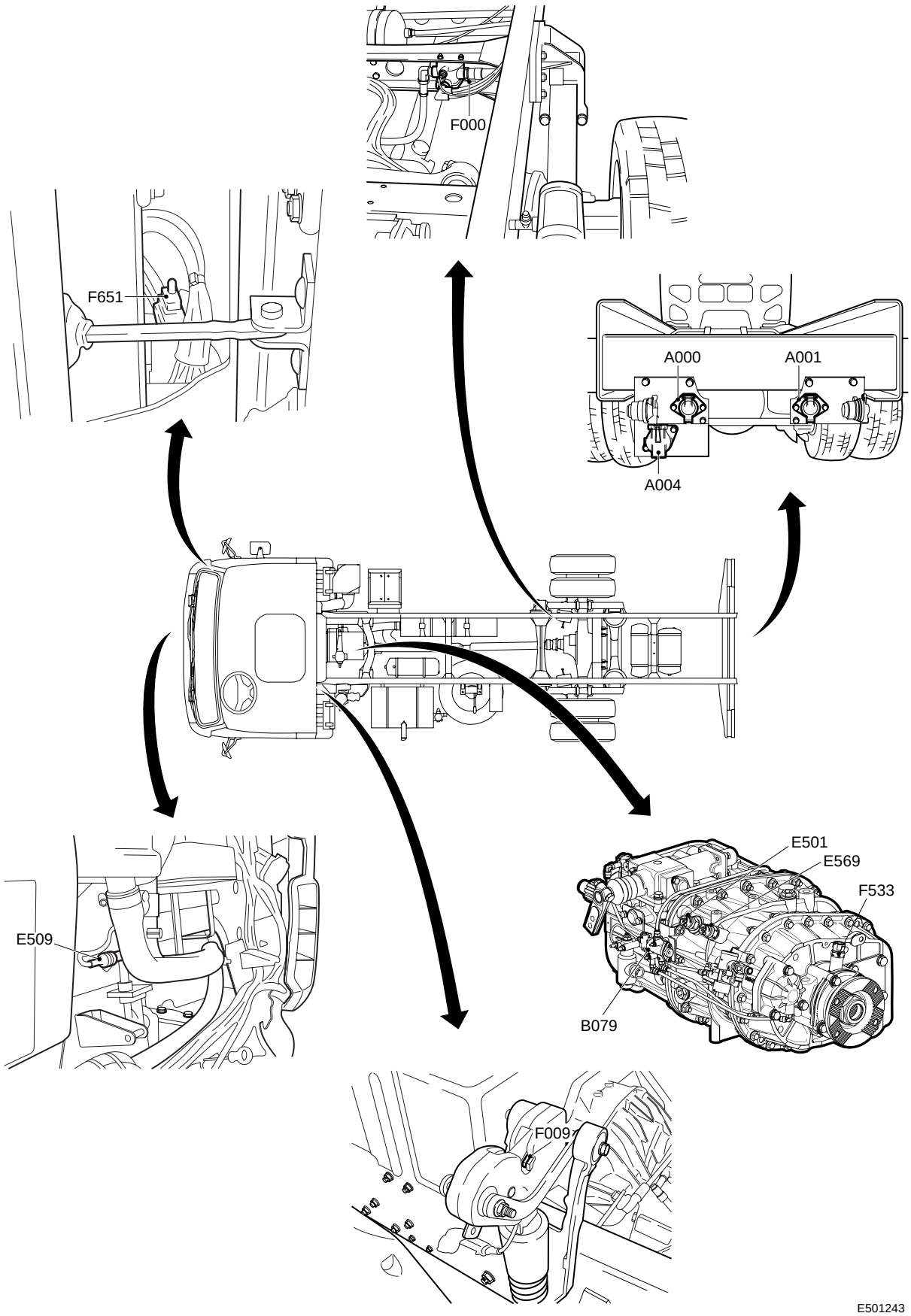

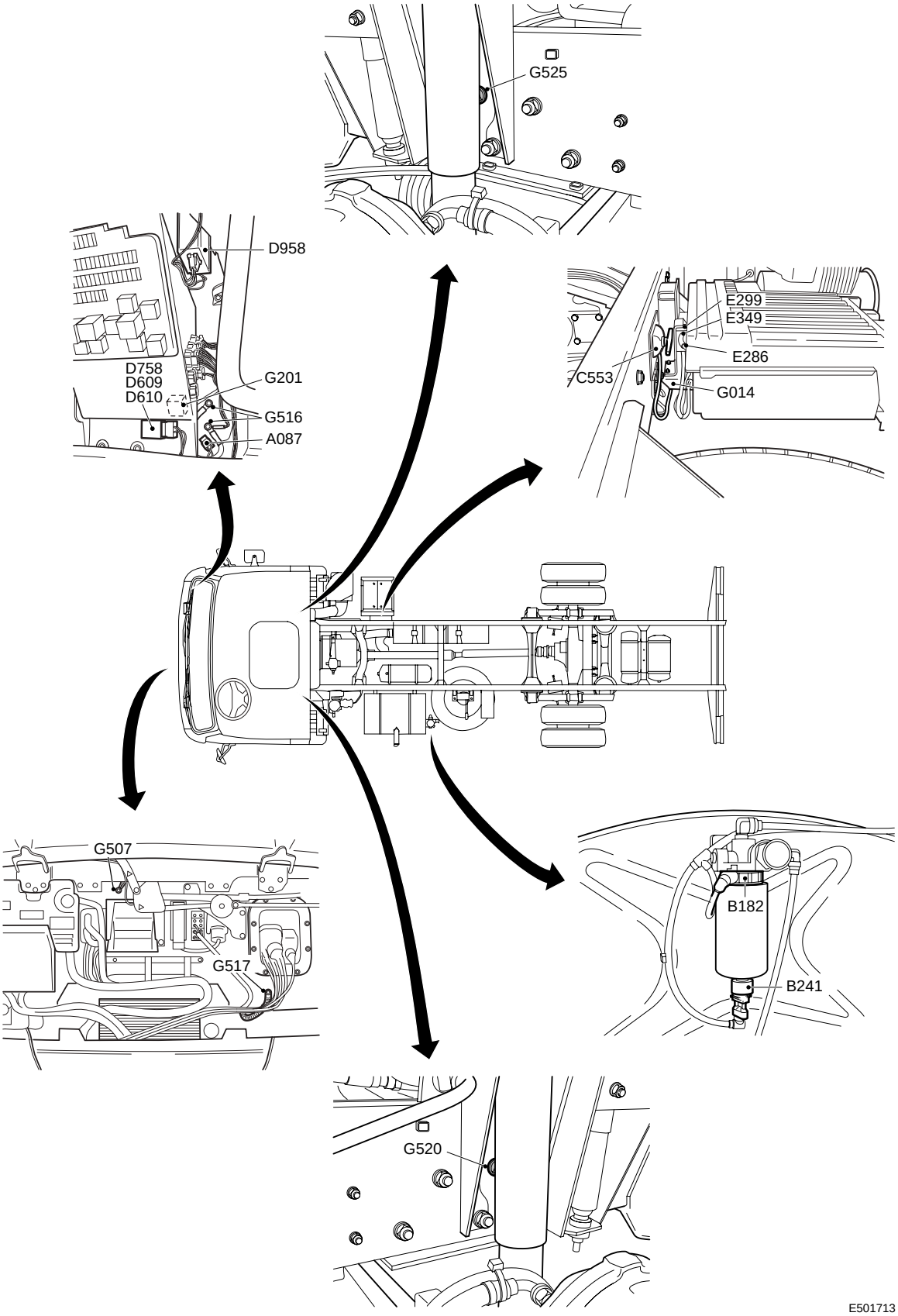

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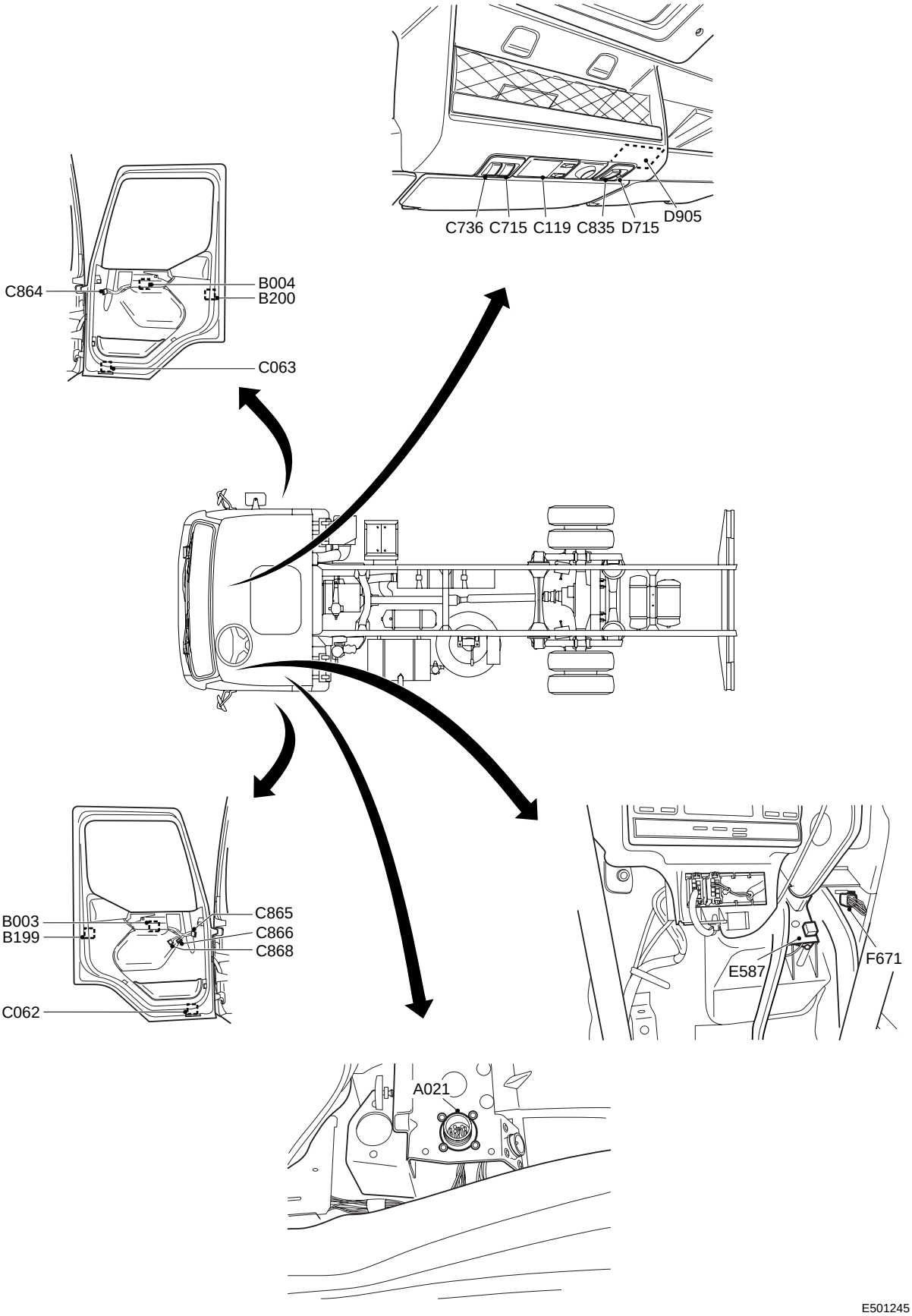

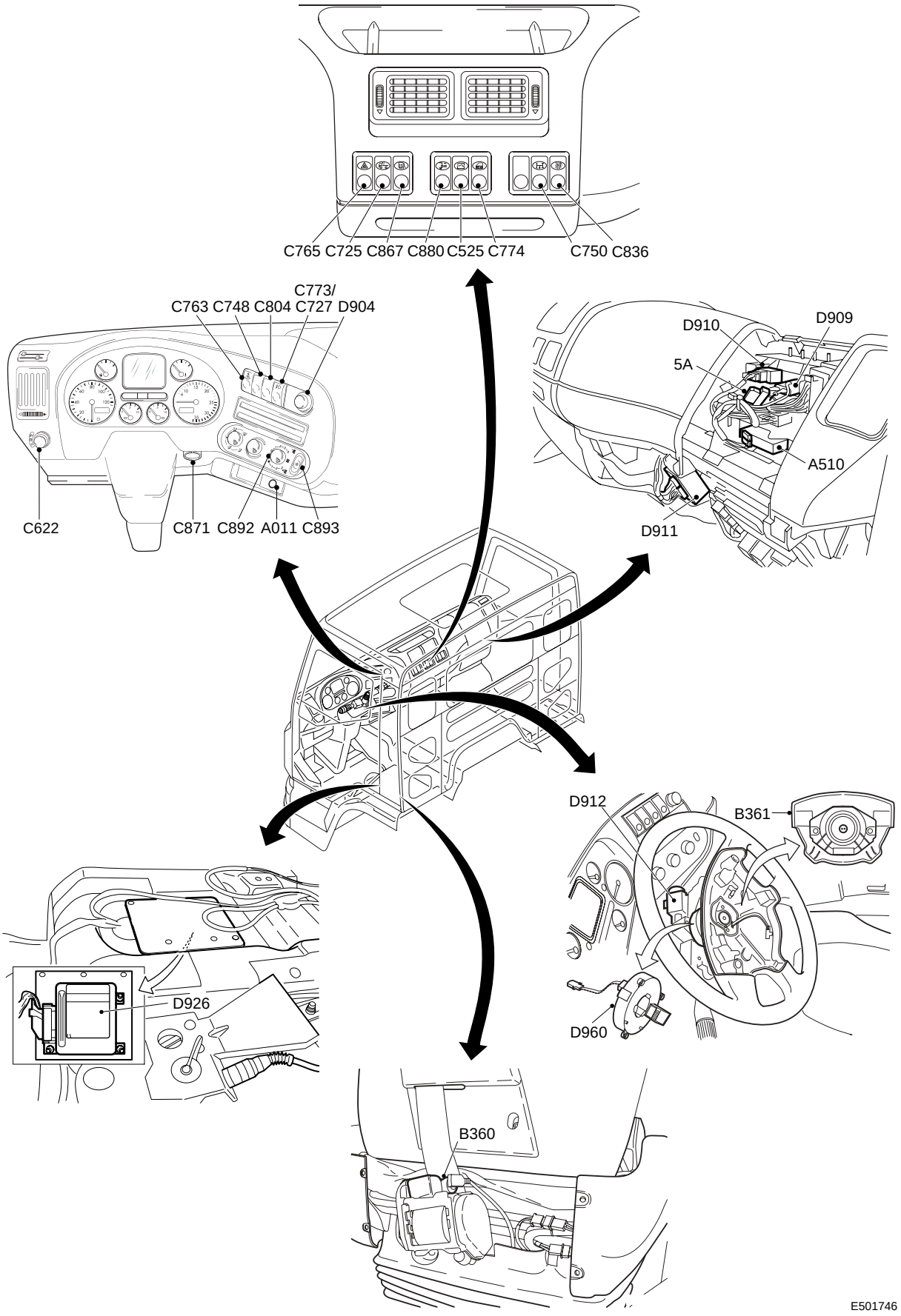

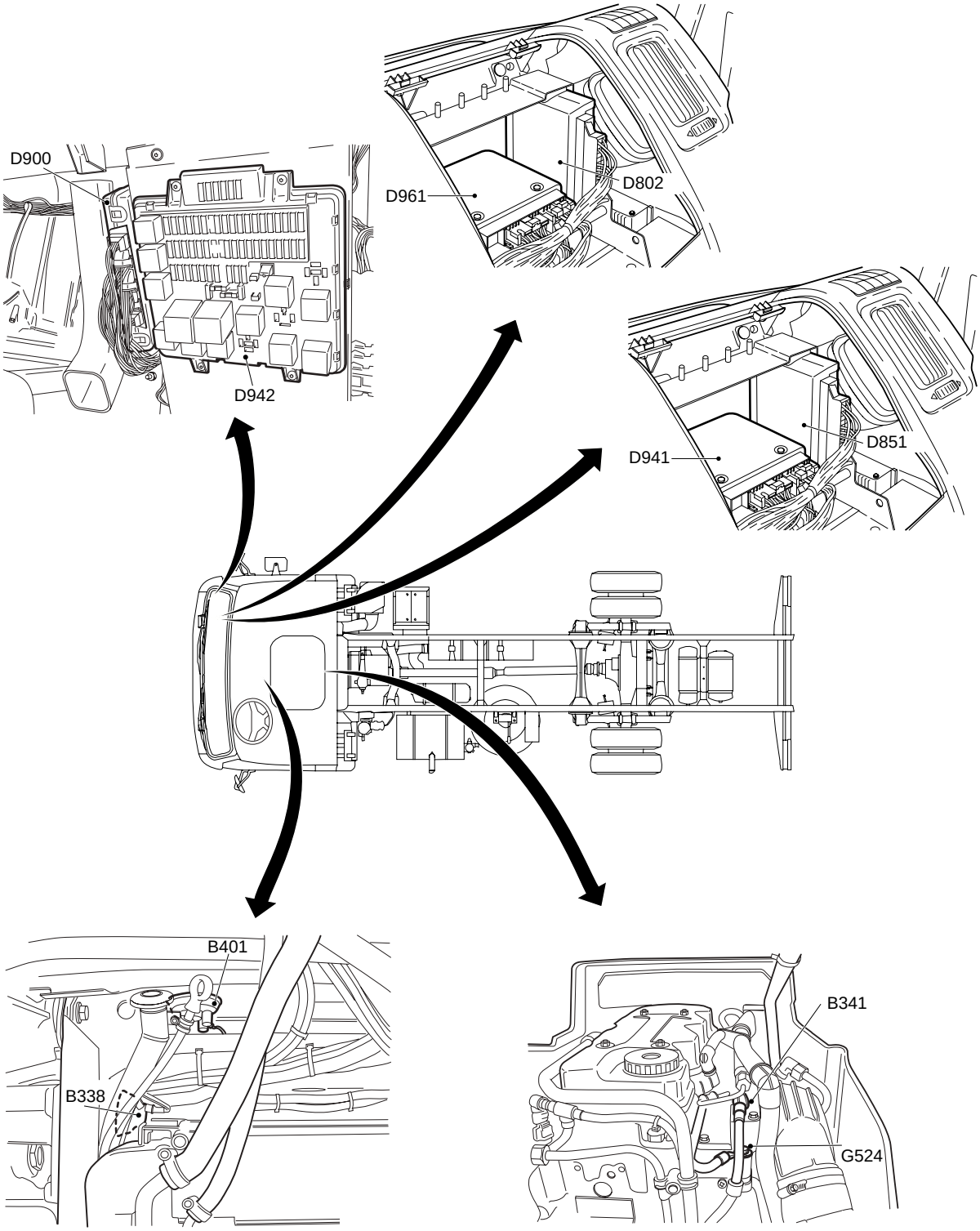

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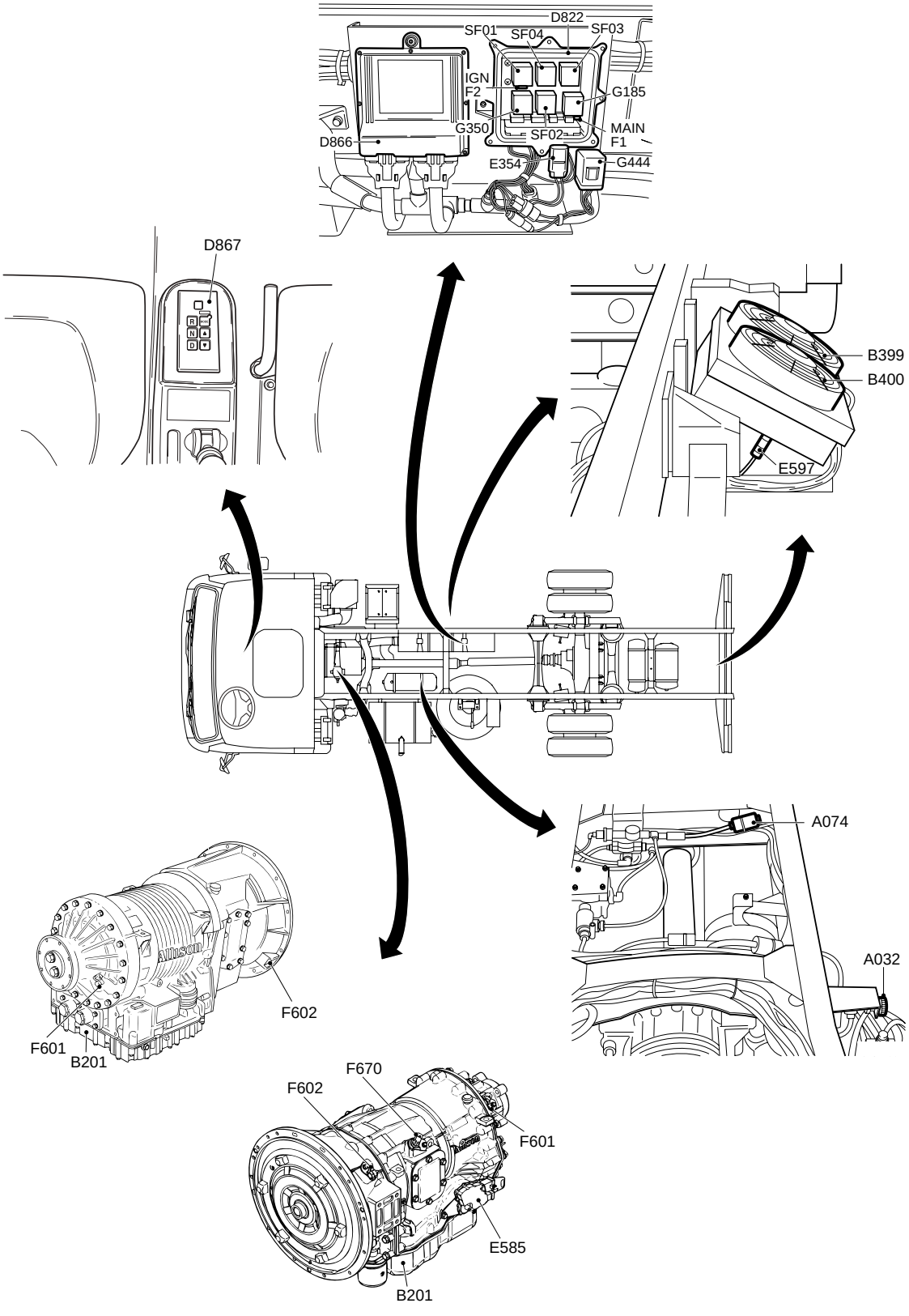

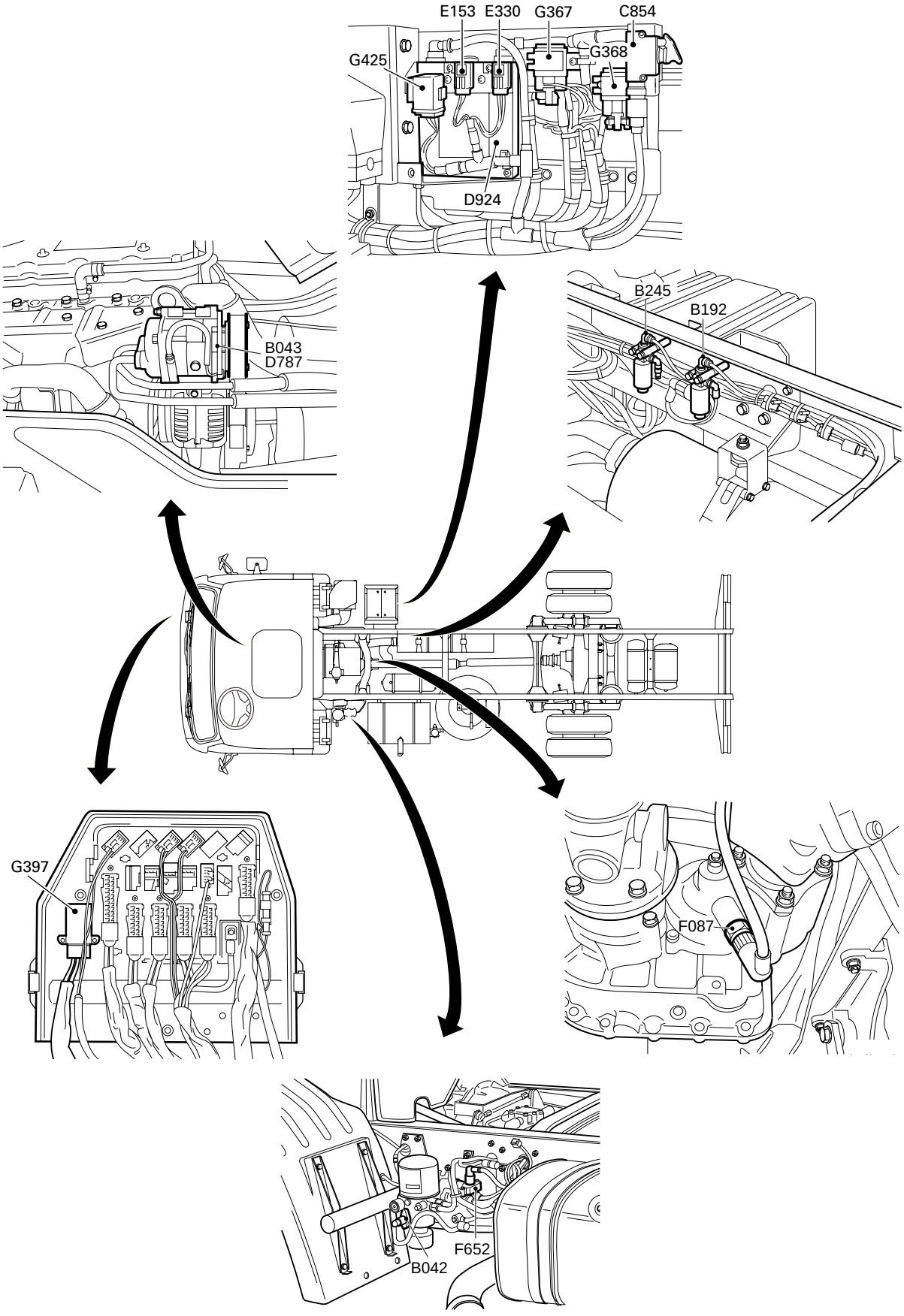

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CONTENTS

1. LOCATION OF CONNECTORS

1.1 LIST OF CONNECTORS

Column 1 = Connector coding
Column 2 = Number of connection points on connector
Column 3 = Colour of connector
Column 4 = Description of connector, if applicable
Column 5 = Location of connector in the vehicle
Column 6 = Reference to page number (see “Drawings showing location of connectors”)

1	2	3	4	5	6
340	35	Black	ECAS-2 electronic unit	Above central box	20
700	25	Brown	PCB connector	On PCB of central box	2
701	25	White	PCB connector	On PCB of central box	2
702	25	Yellow	PCB connector	On PCB of central box	2
703	25	Red	PCB connector	On PCB of central box	2
704	2	Brown	PCB connector	On PCB of central box	2
705	2	Grey	PCB connector, power supply before contact	On PCB of central box	2
706	2	Black	PCB connector	On PCB of central box	2
707	8	Yellow	PCB connector	On PCB of central box	2
708	8	Violet	PCB connector	On PCB of central box	2
709	8	Red	PCB connector	On PCB of central box	2
710	8	Brown	PCB connector	On PCB of central box	2
711	8	Grey	PCB connector	On PCB of central box	2
712	8	White	PCB connector	On PCB of central box	2
713	25	Yellow	Dashboard lead-through connector	Dashboard lead-through zone 1	4
714	16	Brown	Dashboard lead-through connector	Dashboard lead-through zone 1	4
715	16	Red	ABS-D, ABS/ASR-E	Dashboard lead-through zone 1	4
716	16	Green	Dashboard lead-through connector	Dashboard lead-through zone 1	4
717	16	Blue	Automatic gearbox	Dashboard lead-through zone 1	4
718	16	White	Engine speed control	Dashboard lead-through zone 1	4

1	2	3	4	5	6
719	8	White	Accelerator pedal sensor	Dashboard lead-through zone 1	4
720	8	Red	Dashboard lead-through connector	Dashboard lead-through zone 1	4
721	8	Yellow	Headlights/ indicator lamps, front	Dashboard lead-through zone 1	4
722	8	Grey	Headlamp height adjustment/ fog lamps, front	Dashboard lead-through zone 1	4
723	8	Violet	ECAS	Dashboard lead-through zone 1	4
724	8	Brown	Dashboard lead-through connector	Dashboard lead-through zone 1	4
725	4	Black	Cab heater	Dashboard lead-through zone 1	4
726	4	Grey	Headlight/windscreen washer	Dashboard lead-through zone 1	4
727	4	Yellow	ASR	Dashboard lead-through zone 1	4
728	4	Blue	Alarm siren	Dashboard lead-through zone 1	4
729	6	Black	Alarm battery charger	Central box	21
730	2	Grey	Dashboard lead-through connector	Dashboard lead-through zone 1	4
731	8	Yellow	Windscreen wiper motor	Dashboard lead-through zone 2	5
732	8	White	Door functions	Dashboard lead-through zone 2	5
733	8	Red	Door functions	Dashboard lead-through zone 2	5
734	8	Violet	Air conditioning switch	Dashboard lead-through zone 2	5
735	8	White	Central door locking	Side of central box	3
736	8	Blue	Loudspeakers, rotating beams, roof hatch, interior lighting	Side of central box	3
737	16	Black	Central door lock	Roof console, centre	9
738	16	Black	Door wiring, driver's side	Between A-pillar and door	8
739	16	Black	Door wiring, co-driver's side	Between A-pillar and door	8
740	4	Black	Alarm/immobiliser LED, roof console	Side of central box	3
741	8	White	Steering column switch, cruise control/engine speed	Next to steering column, inner side	10
742	8	Blue	Steering column switch, windscreen wipers/washer	Next to steering column, inner side	10
743	9	Black	A connector, VIC electronic unit	In central box	6
744	24	Black	B connector, VIC electronic unit	In central box	6

1	2	3	4	5	6
745	52	Black	C connector, VIC electronic unit	In central box	6
746	40	Black	D connector, VIC electronic unit	In central box	6
747	9	Black	E connector, VIC electronic unit	In central box	6
748	25	Black	Connector, ECAS electronic unit	Above central box	7
749	15	Black	Connector, ABS-D electronic unit	Above central box	7
750	18	Black	Connector, ABS-D electronic unit	Above central box	7
751	8	Blue	Connector, heater / air conditioning	On heater housing	21
752	8	White	MTCO A connector	On rear of MTCO	12
753	8	Yellow	MTCO B connector	On rear of MTCO	12
754	8	Black	Remote control system, ECAS	Outside, driver floor pan	7
755	14	Black	Connector, DIP	On rear of DIP	1
756	8	Grey	Connector for cab heater system, Webasto	Outside of central box	3
757	89	Black	B connector for ECS-DC3 engine management electronic unit	On left of engine	18
758	2	Black	Reversing buzzer	Left-hand chassis side member, near fuel tank	15
759	6	Black	Fuel pre-heating	Left-hand chassis side member, near fuel tank	14
760	6	Black	ECAS-3 chassis wiring harness, 45LF	Left-hand chassis side member, near fuel tank	15
761	13	Black	ABS	Left-hand chassis side member, near fuel tank	15
762	13	Black	Tail lights/differential lock	Left-hand chassis side member, near fuel tank	15
763	13	White	Drawn vehicle connection	Left-hand chassis side member, near fuel tank	15
764	7	Black	Tail lights, right	On tail light unit, right	15
765	7	Black	Tail lights, left	On tail light unit, left	15

1	2	3	4	5	6
766	3	Black	Differential lock	In chassis side member, near rear axle	16
				Dashboard lead-through zone 1	33
767	2	Black	Break lining wear	In chassis side member, near rear axle	17
768	6	Black	Engine connector	At front of engine block	18
769	7	Black	Air pressure sensor	On top of air supply unit	13
771	14	Black	Cruise control	Steering column, right	10
772	10	Black	Lighting / horn switch, steering column	Steering column, left	10
773	6	Black	Direction indicator switch, steering column	Steering column, left	10
774	4	White	12 V accessories connection	Outside of central box	3
775	4	Black	Immobiliser	Right of steering column	10
776	2	Black	Engine brake valve	Right-hand chassis side member, near air filter	16
777	2	Black	Direction indicator, left side	On mudguard support, left	13
778	2	Black	Direction indicator, right side	On mudguard support, right	14
779	3	Black	Glow plug relay	Chassis side member, near air supply unit	18
780	2	Black	Work lamp	Under cross member, rear cab suspension	17
781	2	Black	Seat heating	Under floor mat, driver's seat	7
782	6	Black	ECAS-3 chassis wiring harness, LF55	Left-hand chassis side member, near fuel tank	15
783	2	Black	ECAS-3 chassis wiring harness, height sensor, left, LF55	Left-hand chassis side member, near fuel tank	15
784	8	Black	Power supply to radio	Behind E-panel, dashboard	12
785	8	White	Loudspeakers for radio	Behind E-panel, dashboard	12
786	8	Blue	Clutch/stop light switch	Under MTCO	11
787	8	White	Engine brake switch	Under MTCO	11
788	6	Black	Mirror adjustment/heating, driver's side	Outside of door, behind mirror bracket shield	8
789	6	Black	Mirror adjustment/heating, co-driver's side	Outside of door, behind mirror bracket shield	8

1	2	3	4	5	6
790	2	White	CB set	Under panel of roof console	9
791	8	Black	Electronic unit, cab heater	Under storage compartment, behind co-driver's seat	19
792	4	Black	Electronic unit, cab heater	Under storage compartment, behind co-driver's seat	19
793	12	Black	Cab heater control and timer	Side wall, behind driver's seat	19
794	2	Black	Cab heater, fuel pump	Chassis side member, driver's side	20
795	8	Violet	Cab heater	Under storage compartment, behind co-driver's seat	19
796	12	Black	A connector, alarm electronic unit	Next to heater housing	21
797	21	Black	B connector, alarm electronic unit	Next to heater housing	21
798	10	White	Diode block	Below, on central box	3
799	6	Blue	Ultrasonic unit	Above, on central box	21
800	4	Yellow	Alarm, interior detection, superstructure	In side of central box	3
801	4	White	Airbag	Under MTCO	11
802	30	Black	Airbag electronic unit	In floor pan under driver's seat	7
803	8	Green	Airbag	Under MTCO	11
805	2	Black	ECAS-2, voltage and earth	Dashboard lead-through zone 1	31
806	8	Brown	Reserve wiring	Under MTCO	11
807	6	Black	LED electronic unit	Above central box	20
808	8	Yellow	Ignition/starter switch	Next to steering column, inner side	10
809	2	Black	Superstructure lighting, left	Between air supply unit and fuel tank	13
810	2	Black	Superstructure lighting, right	Between air inlet filter and battery pack	13
811	2	Grey	Seat belt tensioner	Rear of co-driver's seat	23
812	8	Black	Ignition unit, airbag	Steering column on airbag ignition unit	22
813	2	Black	MTCO earth, activated when main switch turned on	Dashboard lead-through zone 1	4

1	2	3	4	5	6
814	2	Black	Rotating beam, driver's side	Roof console, co-driver's side	9
815	2	Black	Rotating beam, co-driver's side	Roof console, co-driver's side	9
816	2	Black	PTO control switch	In chassis wiring harness	26
817	2	Yellow	Airbag	On steering wheel, between ignition unit and airbag unit	22
818	2	Green	Seat belt tensioner	Rear of co-driver's seat	23
819	2	Black	Seat heating	Rear of co-driver's seat	23
820	15	Black	Connector, ABS/ASR-E electronic unit	Above central box	24
821	18	Black	Connector, ABS/ASR-E electronic unit	Above central box	24
822	8	Black	Main switch	Right-hand chassis side member	30
823	12	Black	Spare wiring, superstructure functions application connector	Left-hand chassis side member, near fuel tank	25
824	8	Black	Superstructure functions application connector	Left-hand chassis side member, near fuel tank	25
825	2	Black	Motor connector, Vmax/engine speed	Left-hand chassis side member, near gearbox	25
826	1	Black	PTO control	Dashboard lead-through zone 1	4
827	36	Black	A connector for ECS-DC3 engine management electronic unit	On left of engine	18
828	16	Black	C connector for ECS-DC3 engine management electronic unit	On left of engine	18
829	13	Black	Chassis connector, automatic transmissions	Chassis cross member behind gearbox	28
830	4	Black	Motor connector, automatic transmissions	Left-hand chassis side member, near air supply unit	28
831	4	Black	Connector, external current limiter, ADR unit	On chassis in ADR box	31
832	4	Black	Connector, external current limiter, ADR unit	On chassis in ADR box	31
833	2	Black	Power supply, MTCO ADR earth connector	Dashboard lead-through zone 1	30
834	3	Black	VIC power supply and ADR alternator	Dashboard lead-through zone 1	30
835	13	Black	Cab functions chassis connector, RAS-EC	Left-hand chassis side member, near gearbox	26

1	2	3	4	5	6
836	4	Black	Oil level sensor, RAS-EC	Next to oil tank, on left under cab	27
837	68	Black	Connector, RAS-EC electronic unit	In between two cross members halfway between two rear axles	27
838	4	Black	Angle sensor, rear, RAS-EC	On left-hand brake booster, trailing axle	27
839	4	Black	Front axle angle sensor 1	On top of steering box	27
840	3	Black	Front axle angle sensor 2	On bottom of steering box	27
841	7	Black	Steering valve, RAS-EC	On rear axle cross member	27
842	2	Black	Wheel speed sensor, RAS-EC	On inside of left-hand chassis side member, near rear axles	27
843	13	Black	Automatic gearbox selector (MD3060)	Left-hand chassis side member, near fuel tank	28
844	2	Black	Activation of cooling fans, automatic gearbox	On chassis in AGC box	28
845	1	Black	Temperature switch, cooling fans, automatic gearbox	On chassis in AGC box	28
846	2	Black	Temperature switch, cooling fans, automatic gearbox	On oil cooler radiator unit	29
847	2	Black	Activation of cooling fan 1, automatic gearbox	On oil cooler radiator unit	29
848	2	Black	Activation of cooling fan 2, automatic gearbox	On oil cooler radiator unit	29
849	1	White	Light, automatic gearbox selector (MD3060)	Underside of central box	29
850	6	Black	Intermediate connector for diagnostic connector	Inside of left-hand chassis side member	28
851	4	Black	Activates PTO valve	Inside of right-hand chassis side member	26
852	4	Black	“Remote throttle” application	Chassis cross member behind gearbox	25
853	32	Grey	Connector, electronic unit, automatic gearbox (AT1000/2000)	On chassis in AGC box	31

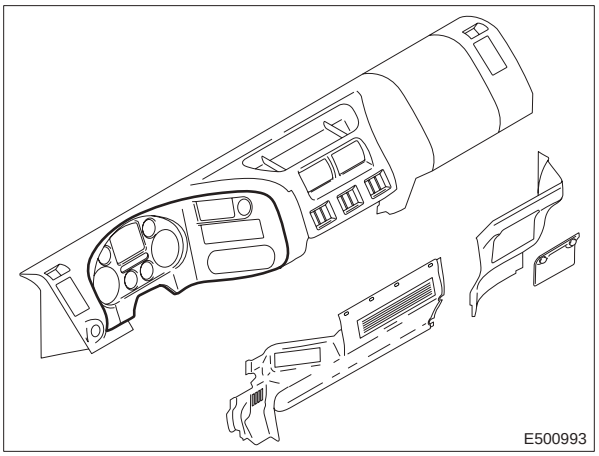
1	2	3	4	5	6
854	32	Red	Connector, electronic unit, automatic gearbox (AT1000/2000)	On chassis in AGC box	31
855	31	Black	Internal components, automatic gearbox (MD3060)	On rear of automatic transmission	28
856	16	Black	Engine speed sensors for automatic gearbox (MD3060)	On rear of automatic transmission	28
857	20	Grey	Automatic gearbox selector (MD3060)	Under floor mat, engine tunnel	29
858	4	Black	Chassis connector, low-range downshift protection valve	Left-hand chassis side member, near air supply unit	24
859	2	Black	Exhaust brake connector	At front of engine block	18
900	20	Black	Engine speed sensors, selector switch, automatic gearbox (AT1000/2000)	On rear of automatic transmission	31
901	8	Black	Chassis connector, RAS-EC components, front	Left-hand chassis side member, near fuel tank	26
902	2	Black	Alternator connector, voltage before contact in combination with main switch	At front of engine block	18
903	13	Black	Chassis connector, ECAS-2	Left-hand chassis side member, near fuel tank	26
904	2	Black	Intermediate connector, ECAS-2,-pressure sensor	-	31
905	32	Black	S connector, electronic unit, automatic gearbox (MD3060)	On chassis in AGC box	28
906	32	Blue	T connector, electronic unit, automatic gearbox (MD3060)	On chassis in AGC box	28
907	32	Grey	V connector, electronic unit, automatic gearbox (MD3060)	On chassis in AGC box	28
908	2	Black	Cooling fan connector, automatic gearbox (AT1000/2000)	On oil cooler radiator unit	31
952	5	Black	Transmission connector	Left-hand chassis side member, near air supply unit	32

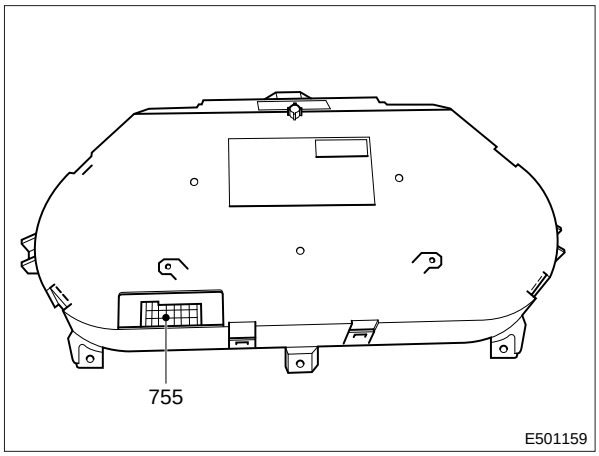
1	2	3	4	5	6
953	2	Black	Fuel level sensor	Left-hand chassis side member, near fuel tank	32
954	4	Black	Fuel tank connector	Left-hand chassis side member, near fuel tank	32
955	2	Black	FMS power connector	Central box	33

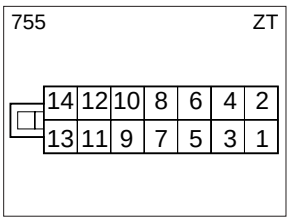
1.2 DRAWINGS SHOWING LOCATION OF CONNECTORS

Explanation of connector drawings

A: Connector coding
B: Colour of connector
BN = brown
BW = blue
GL = yellow
GS = grey
OE = orange
RD = red
VI = violet
WT = white
ZT = black
C: List of pin numbers on connector
The pin numbers on the connector are where possible viewed from the wire input side







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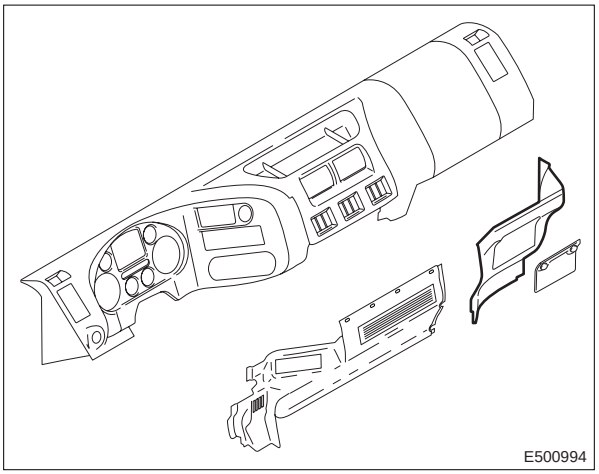

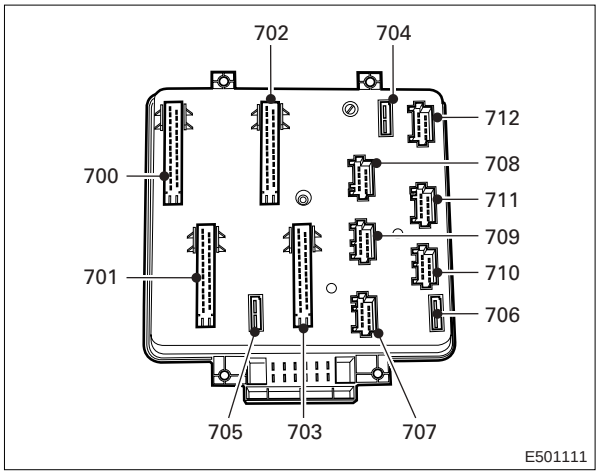

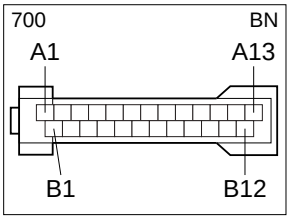

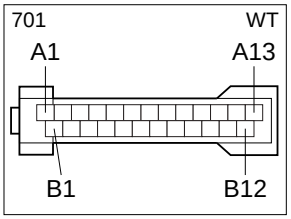

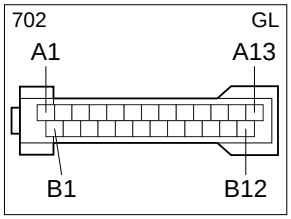

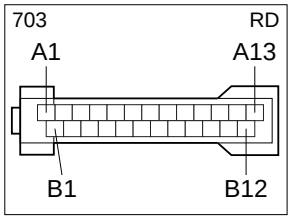

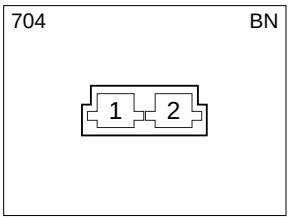

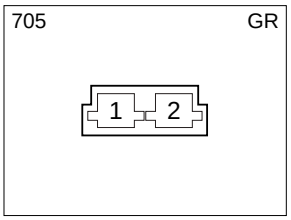

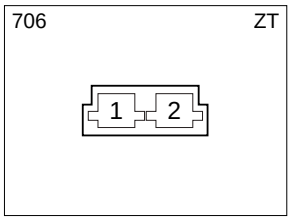

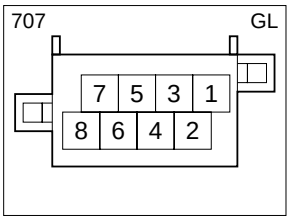

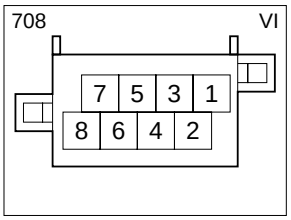

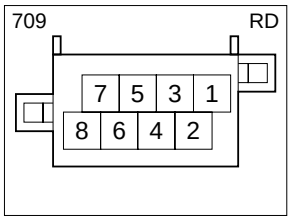

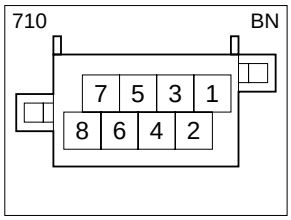

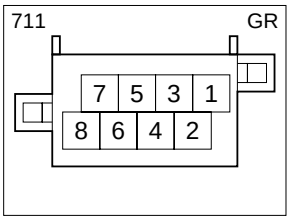

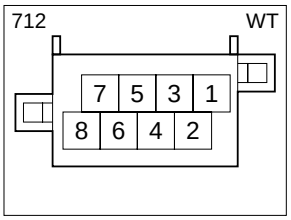

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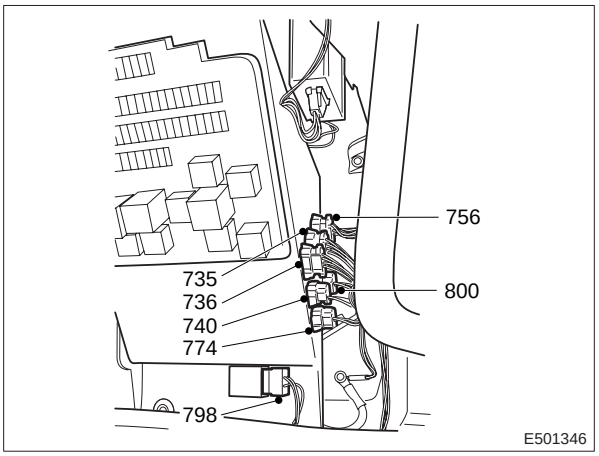

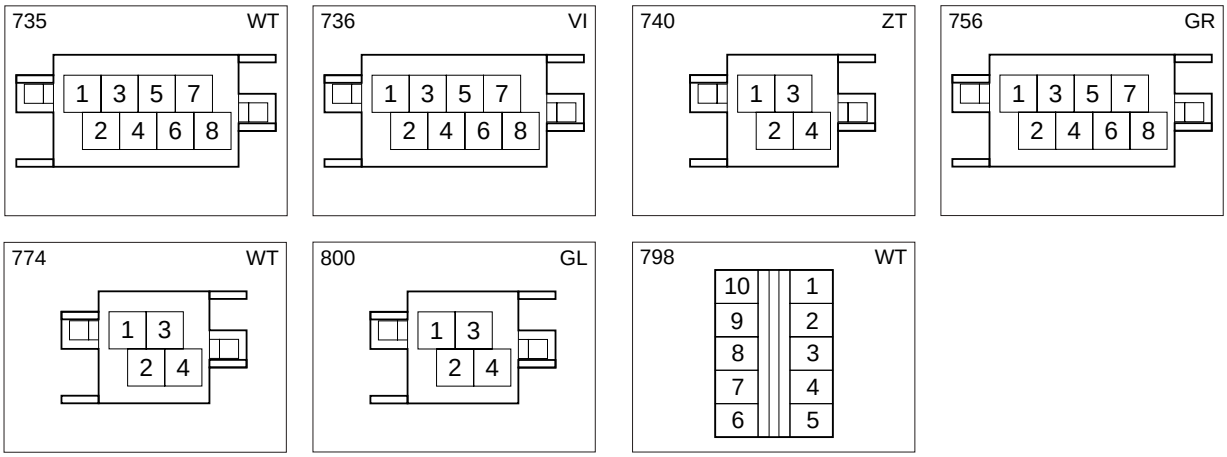

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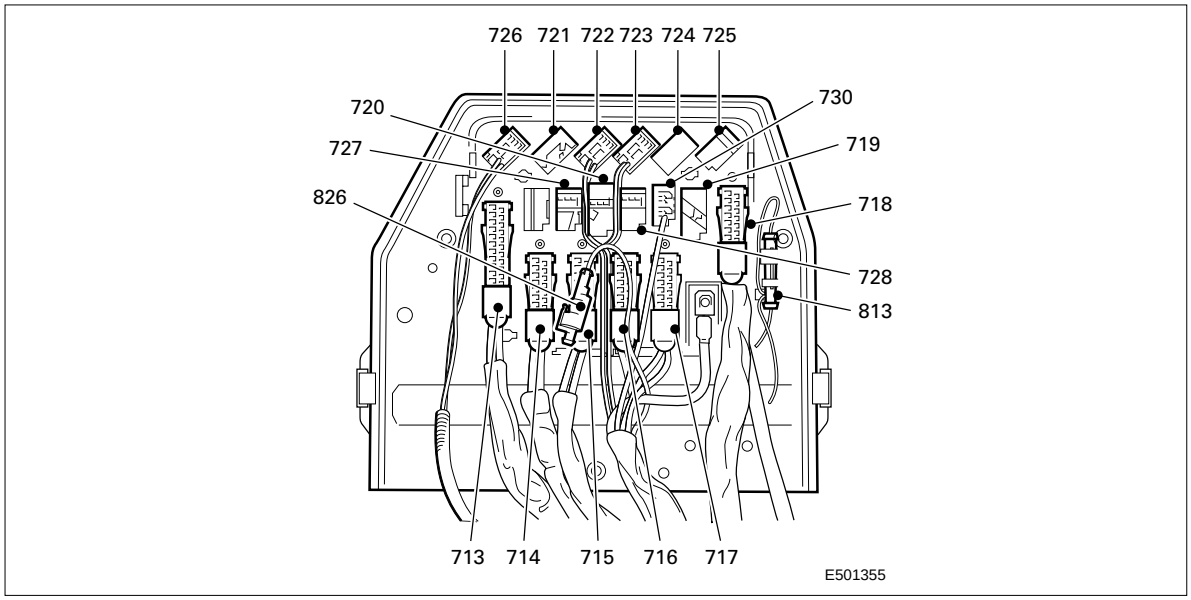

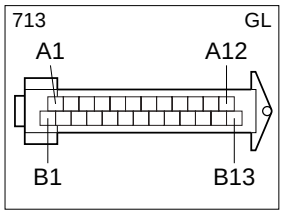

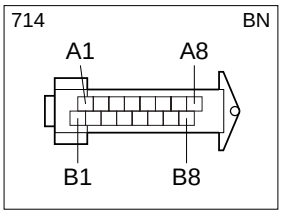

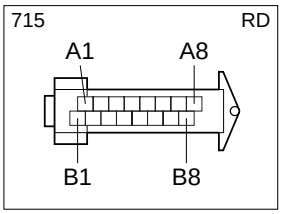

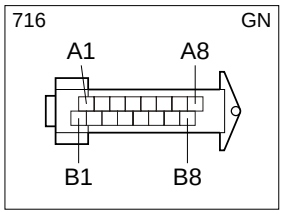

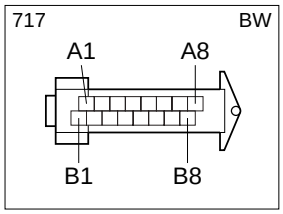

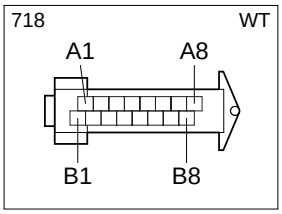

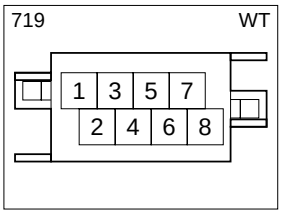

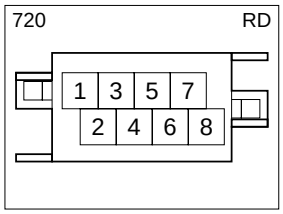

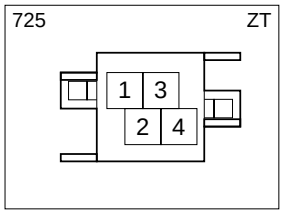

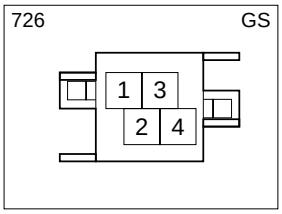

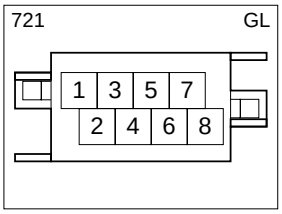

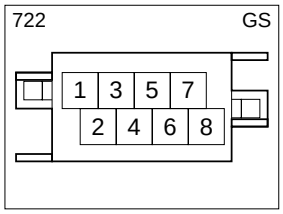

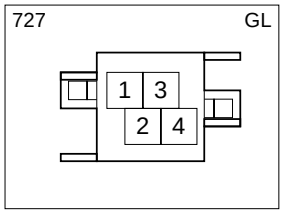

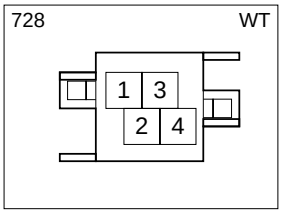

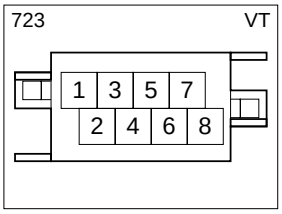

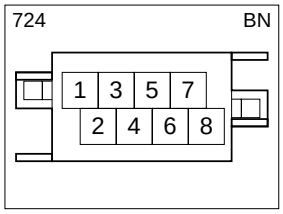

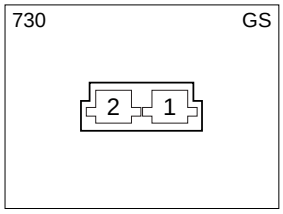

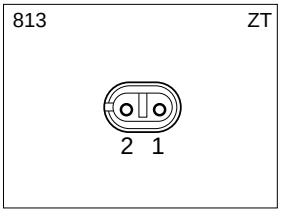

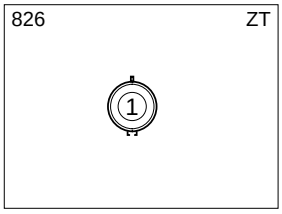

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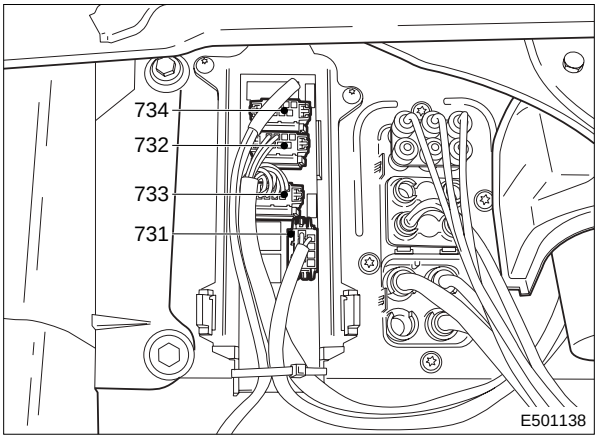

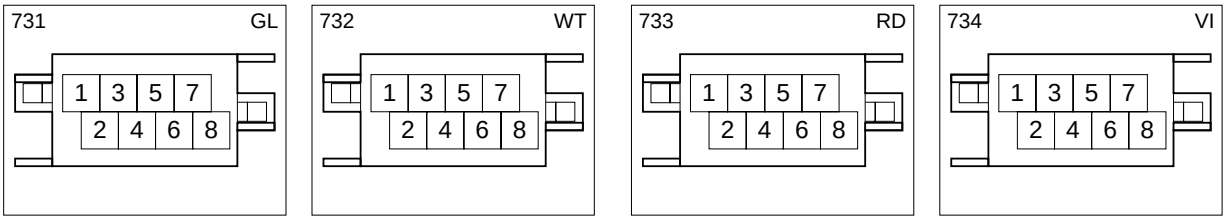

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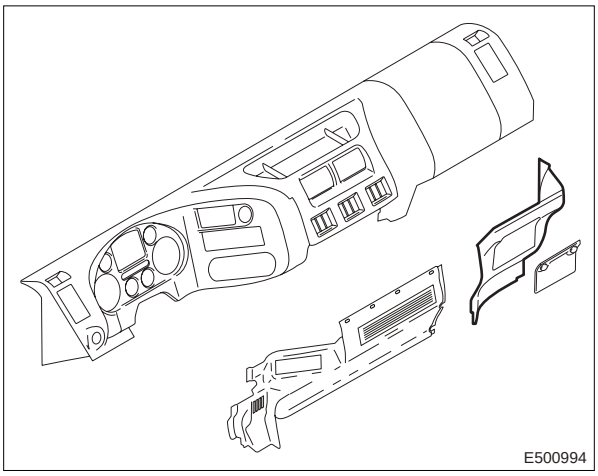

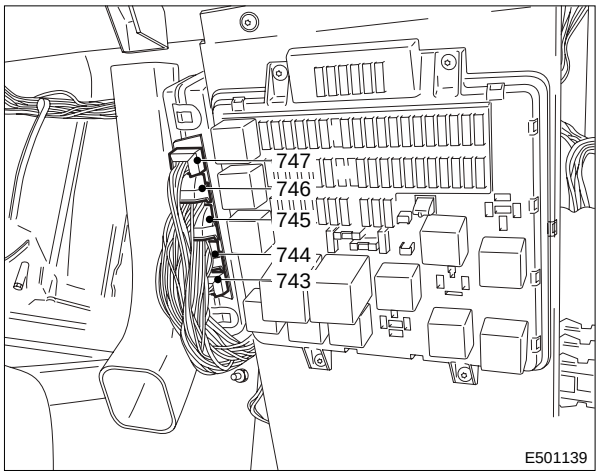

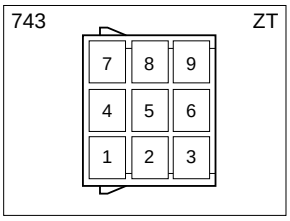

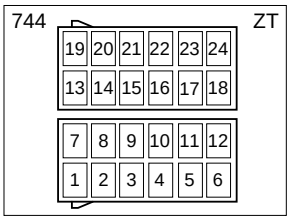

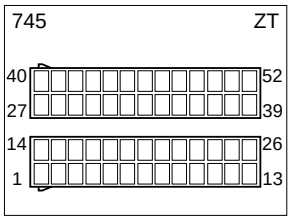

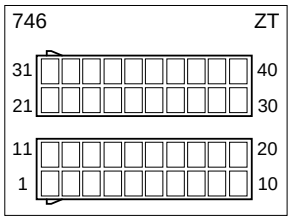

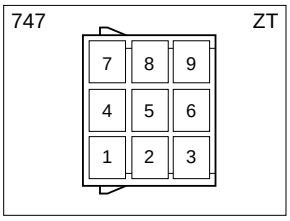

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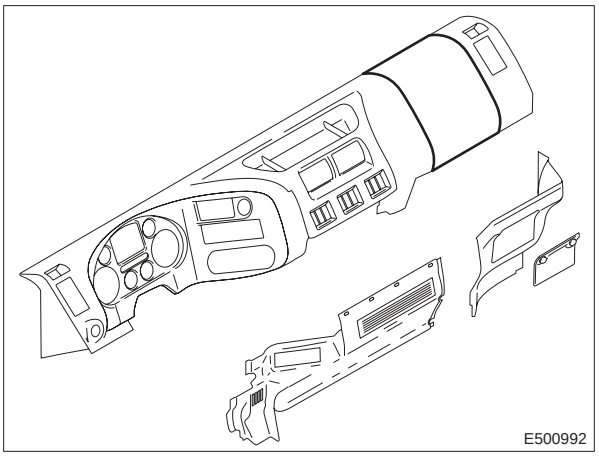

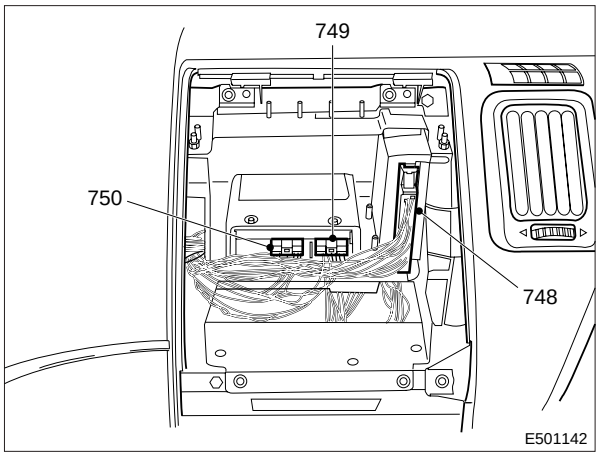

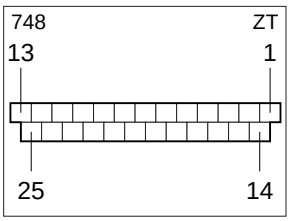

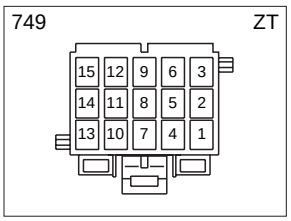

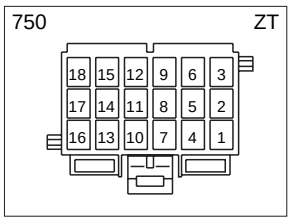

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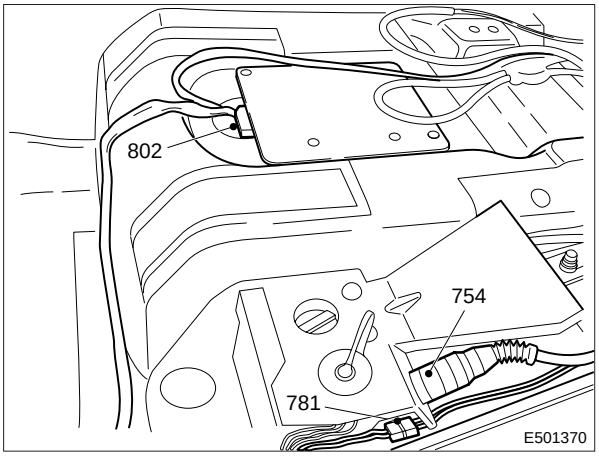

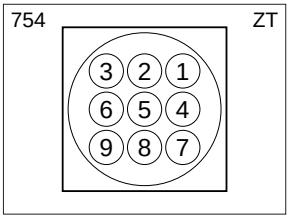

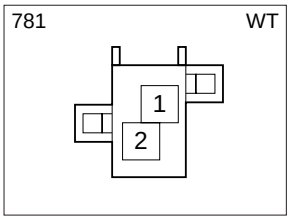

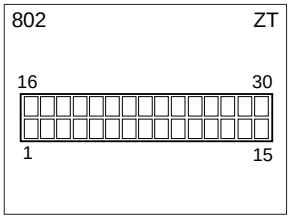

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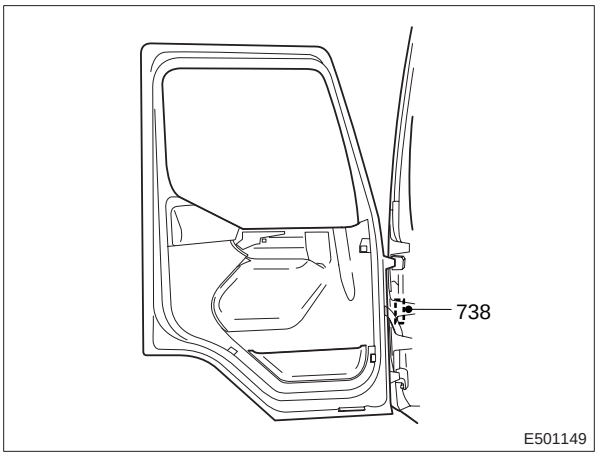

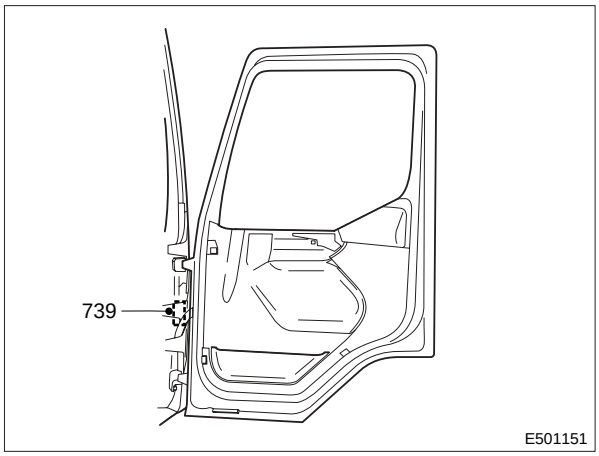

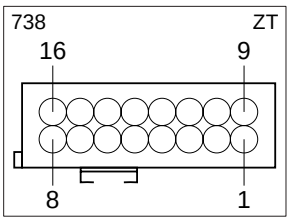

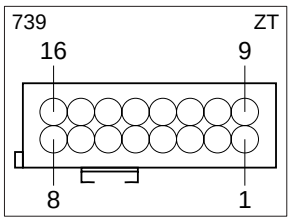

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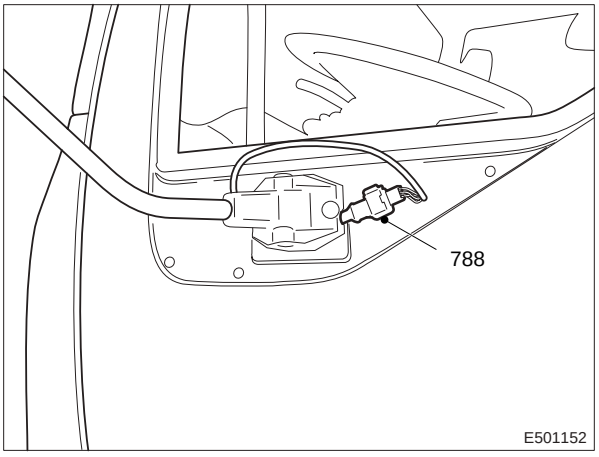

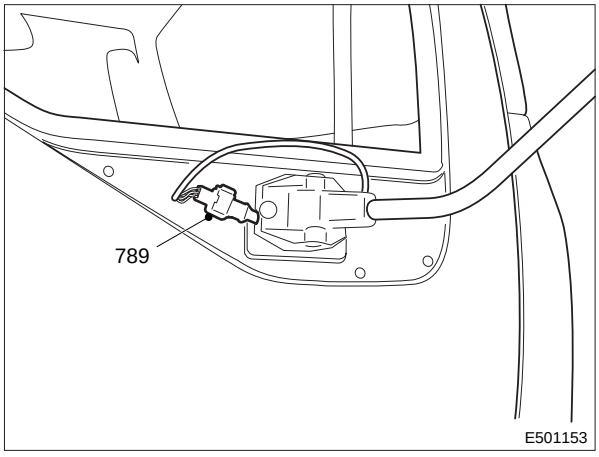

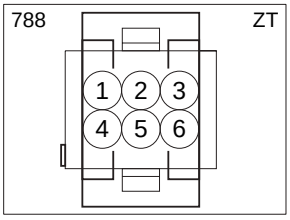

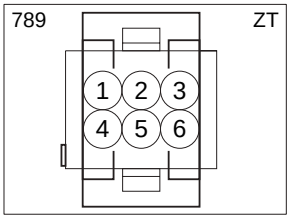

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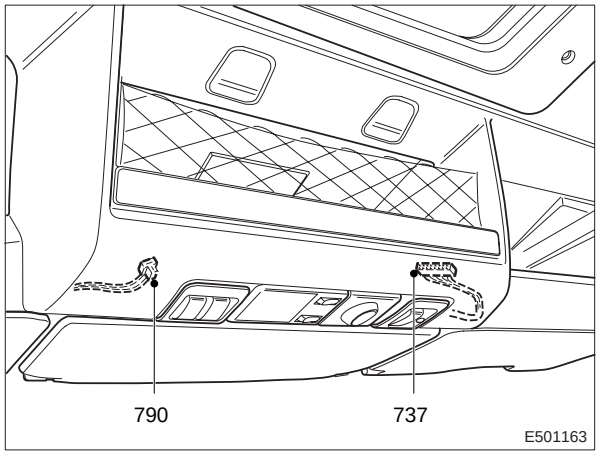

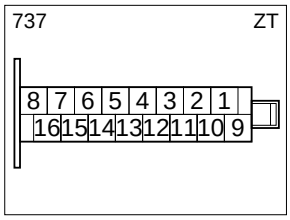

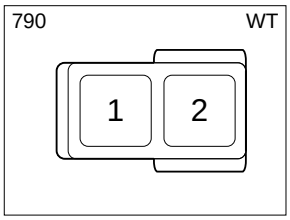

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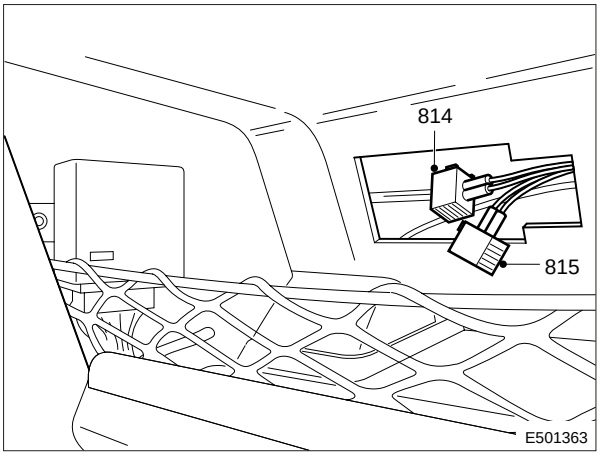

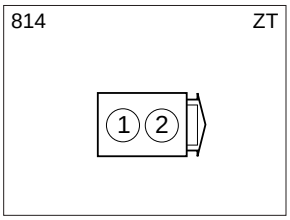

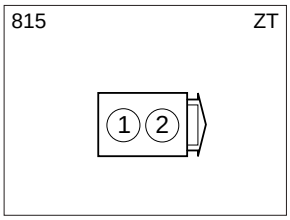

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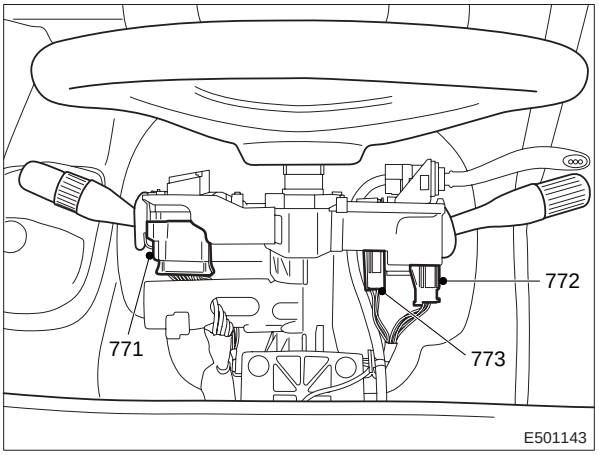

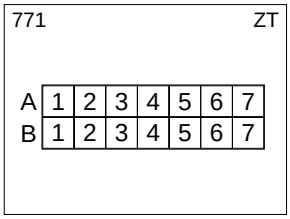

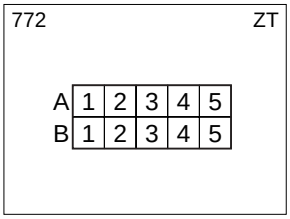

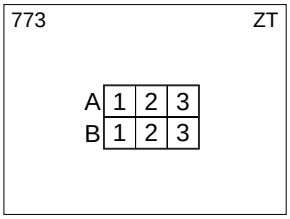

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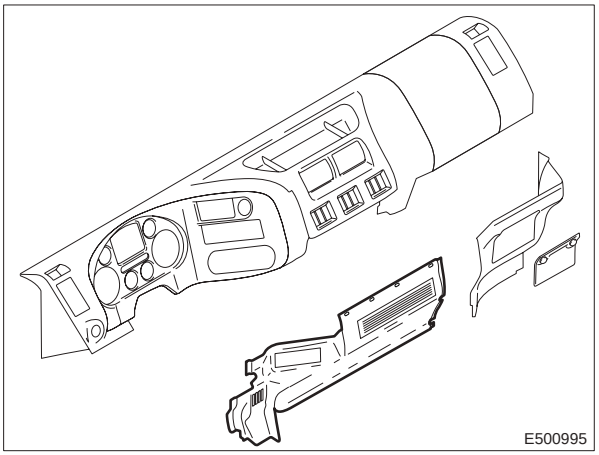

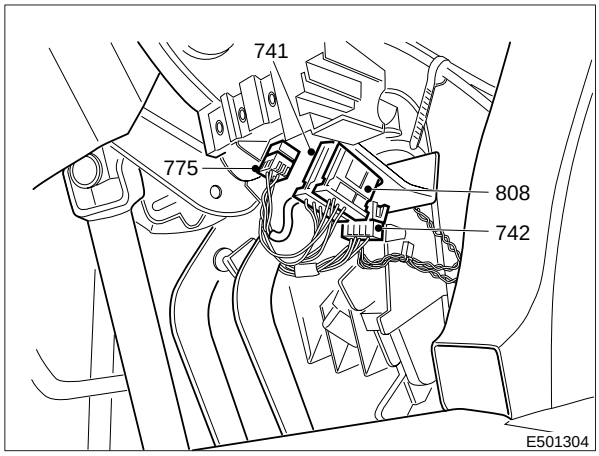

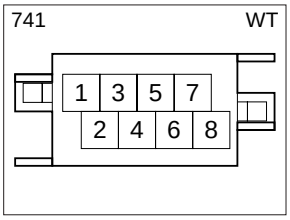

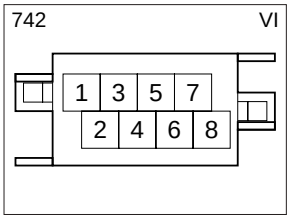

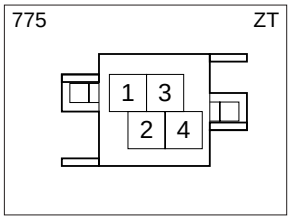

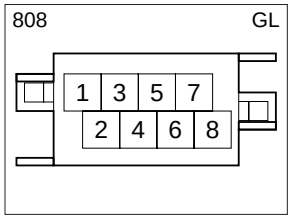

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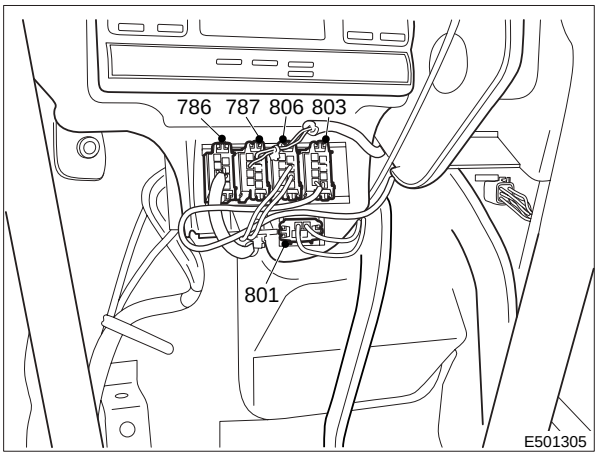

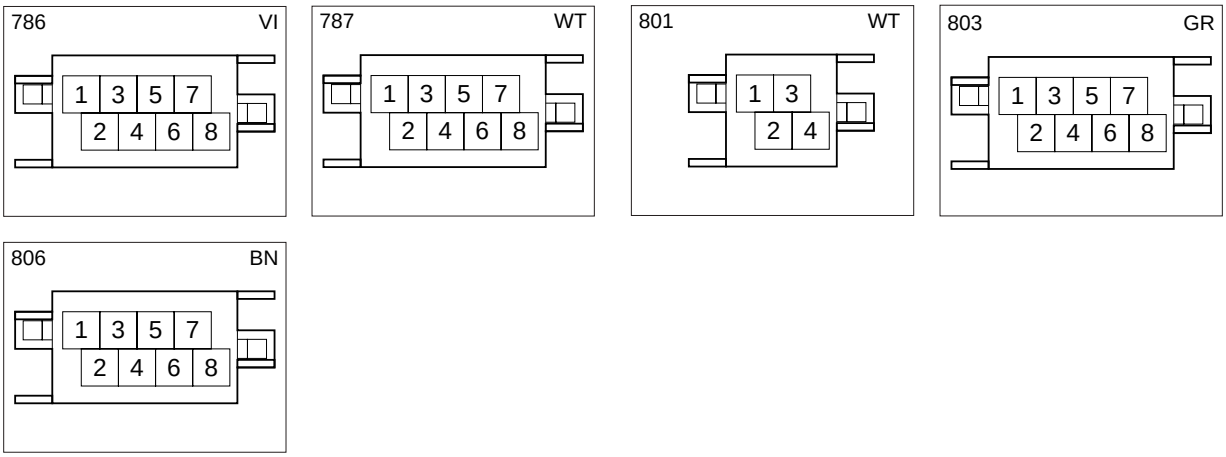

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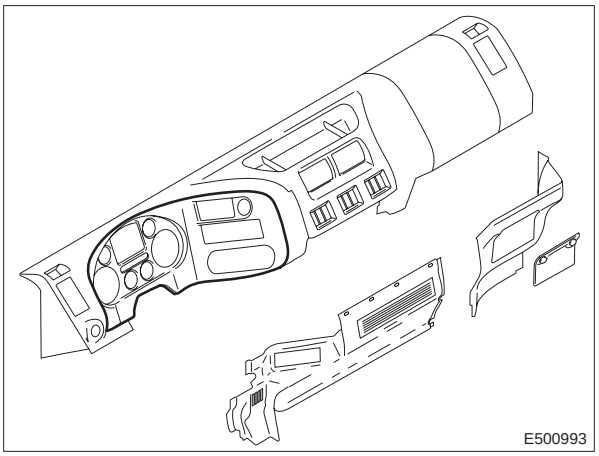

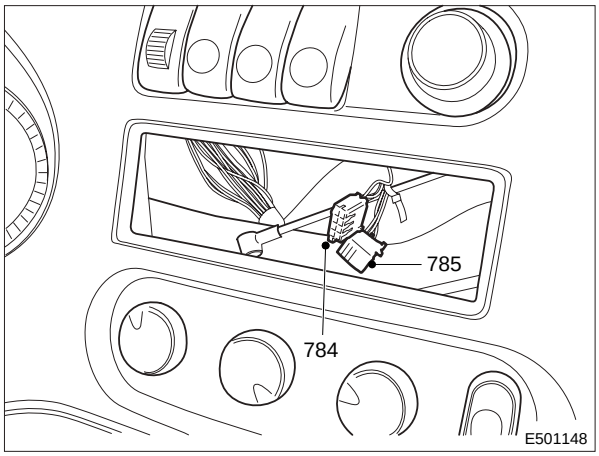

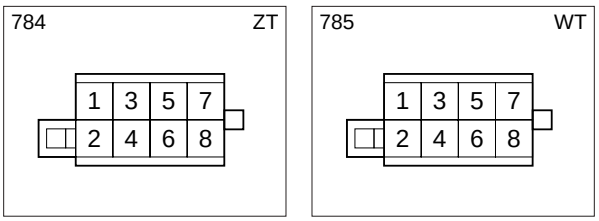

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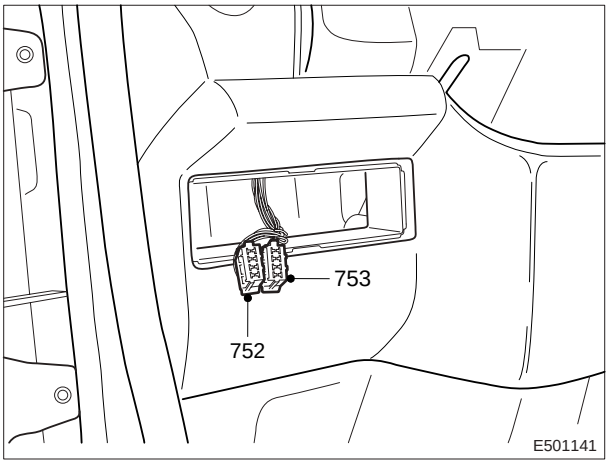

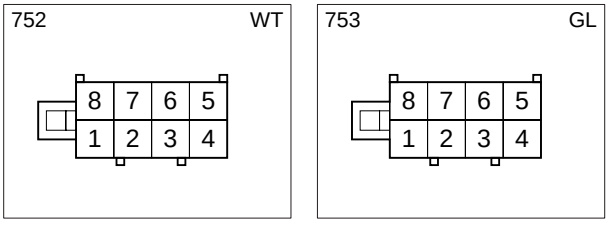

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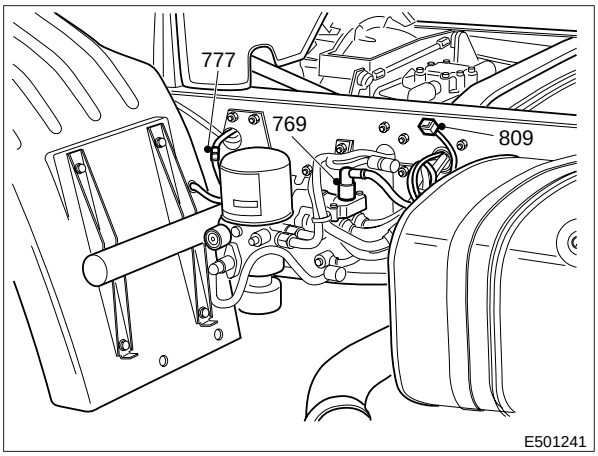

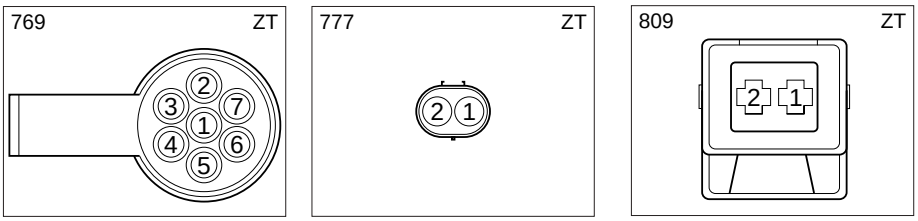

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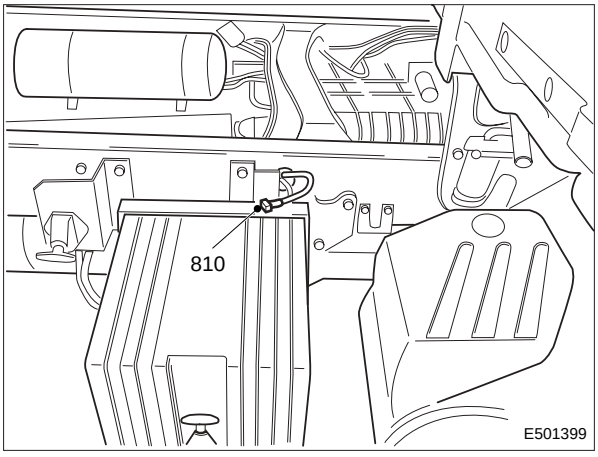

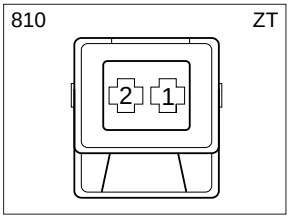

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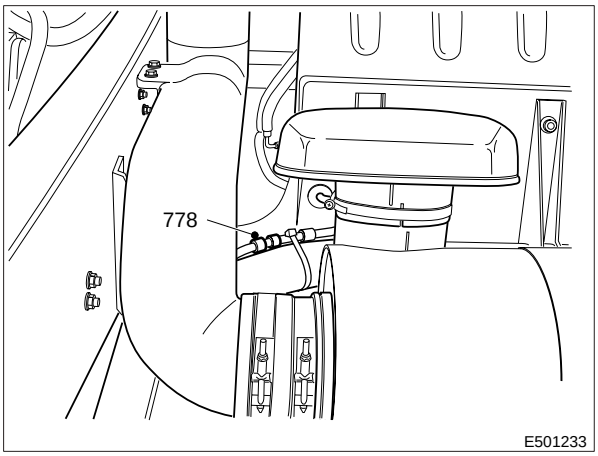

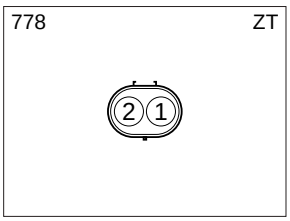

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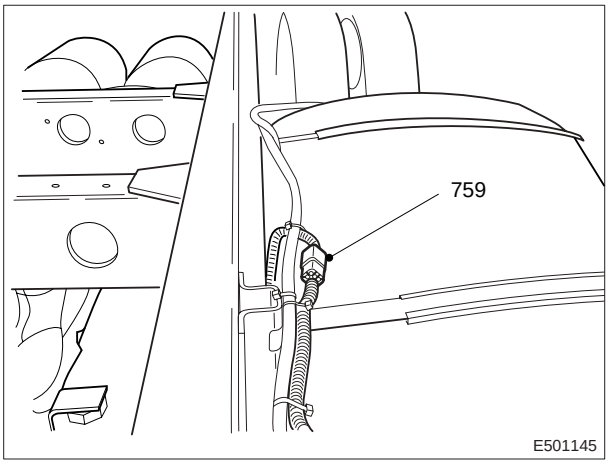

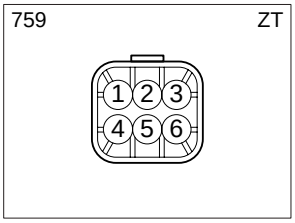

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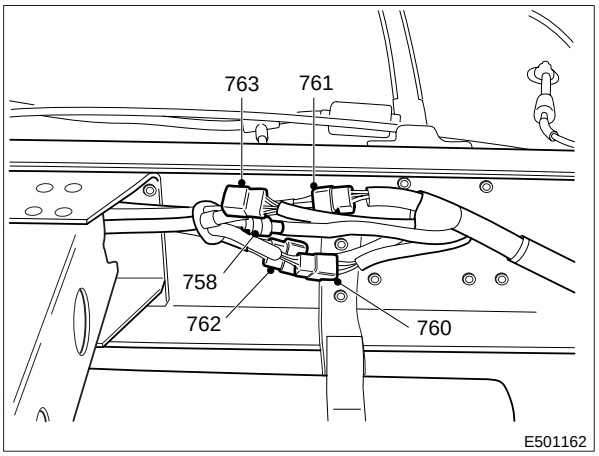

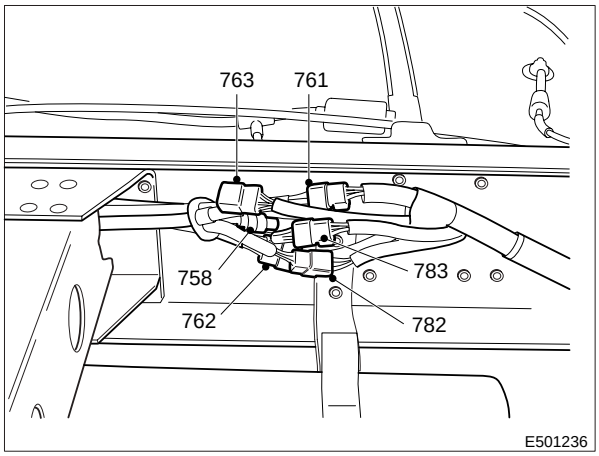

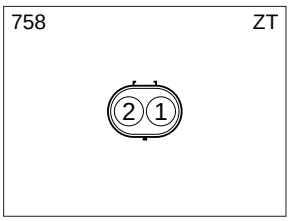

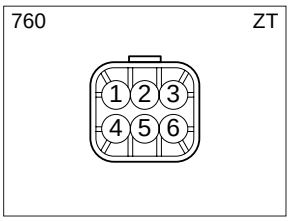

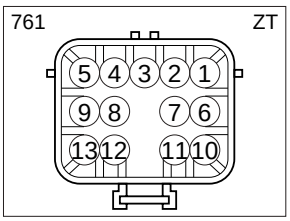

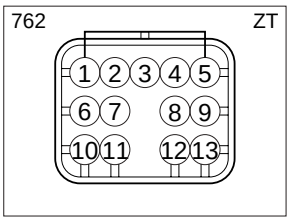

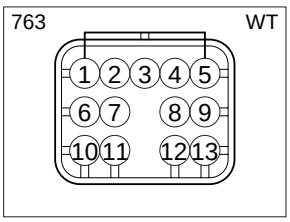

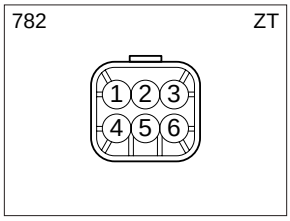

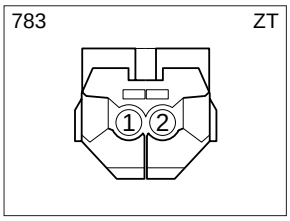

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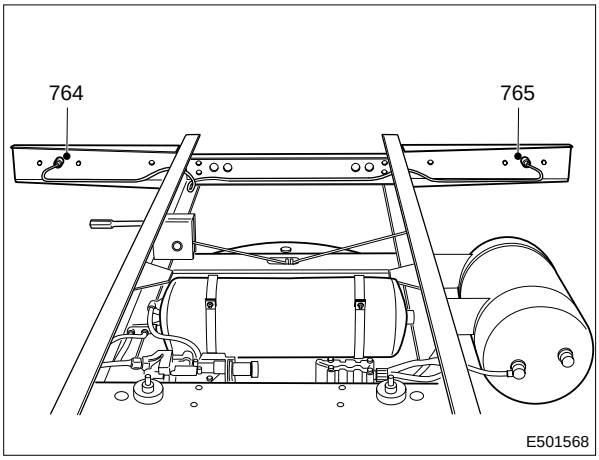

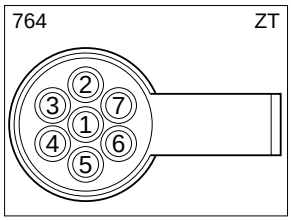

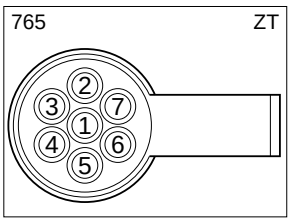

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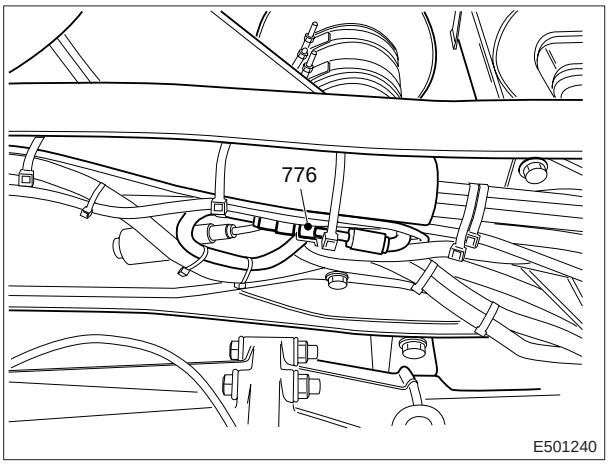

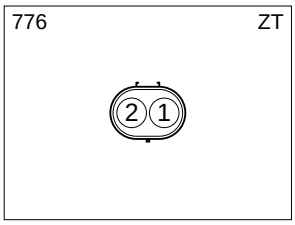

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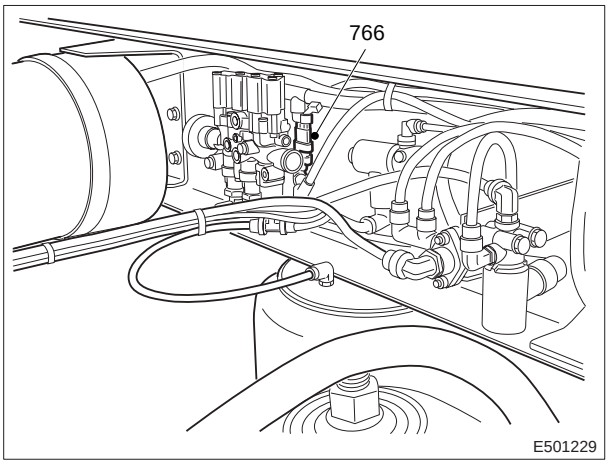

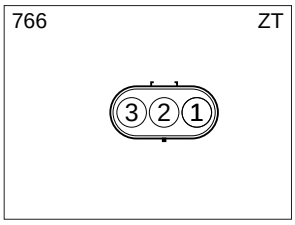

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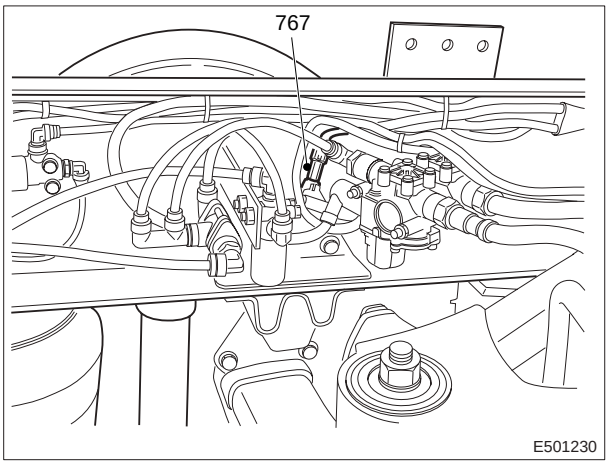

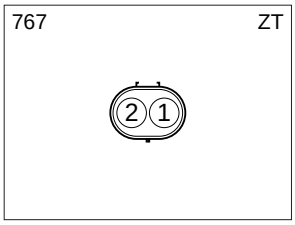

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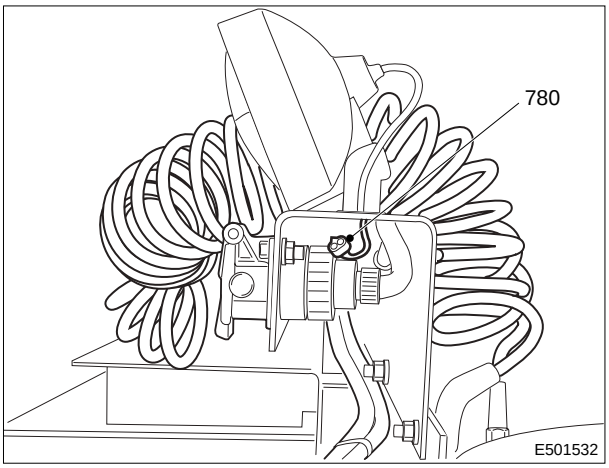

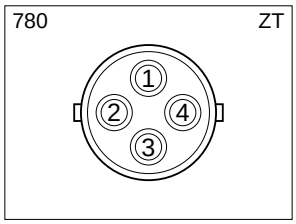

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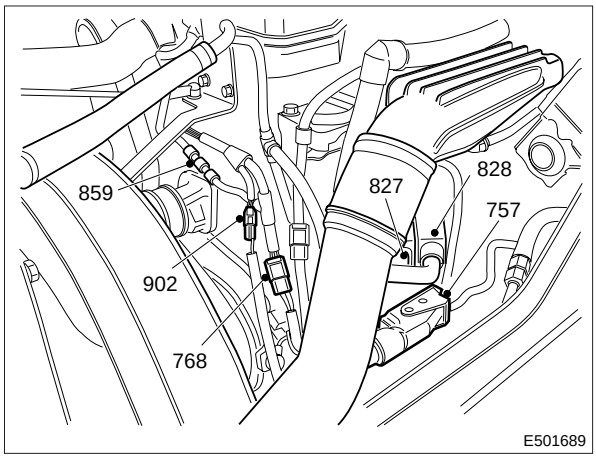

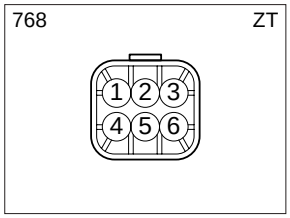

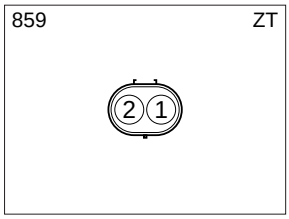

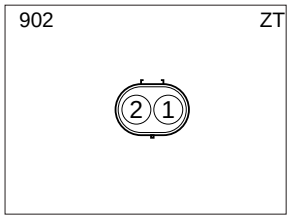

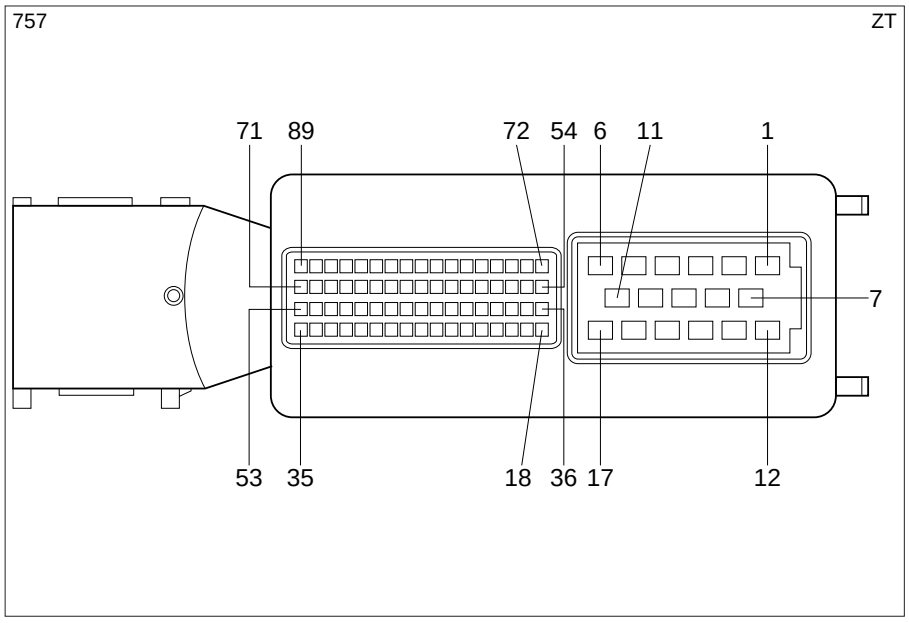

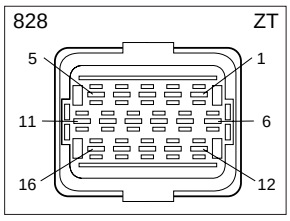

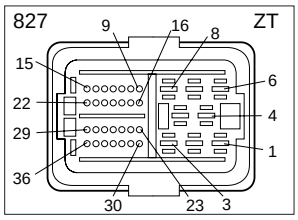

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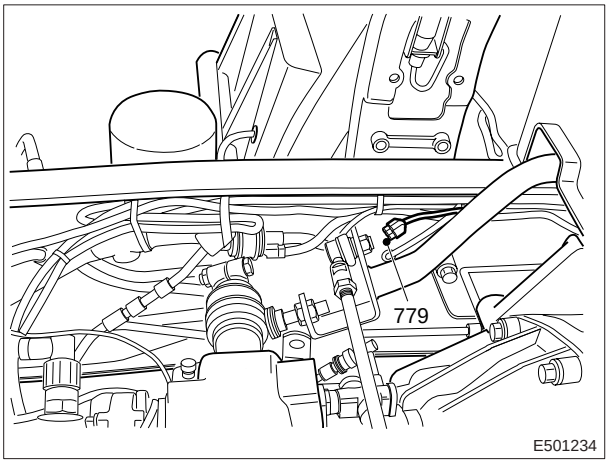

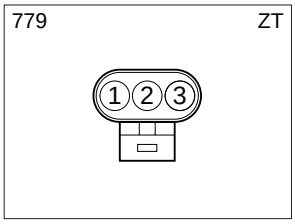

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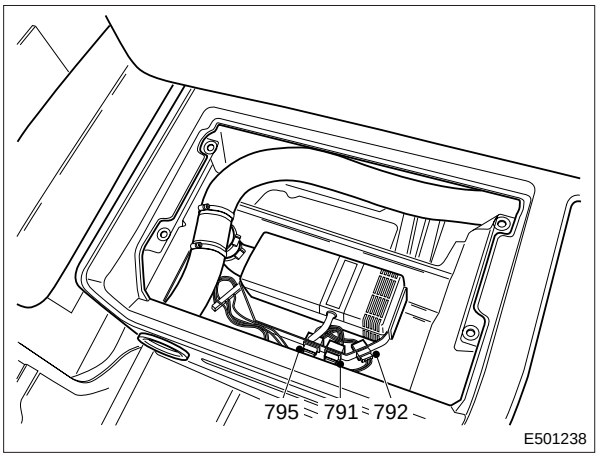

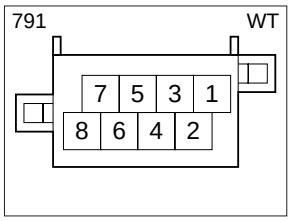

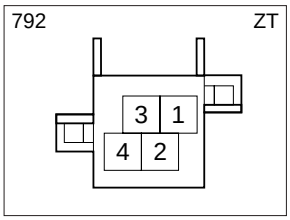

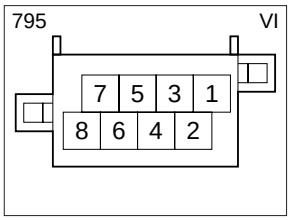

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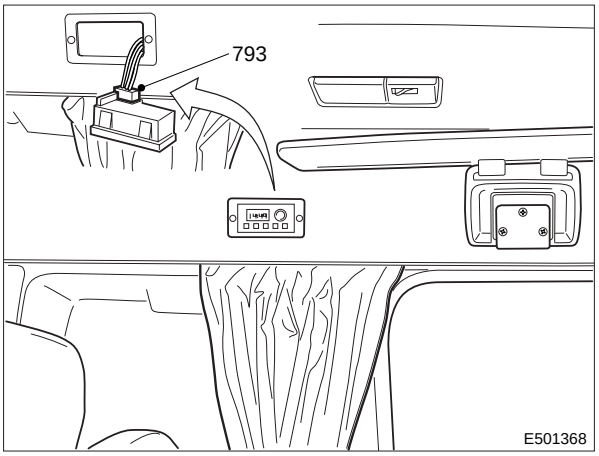

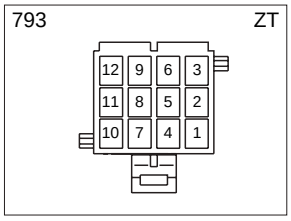

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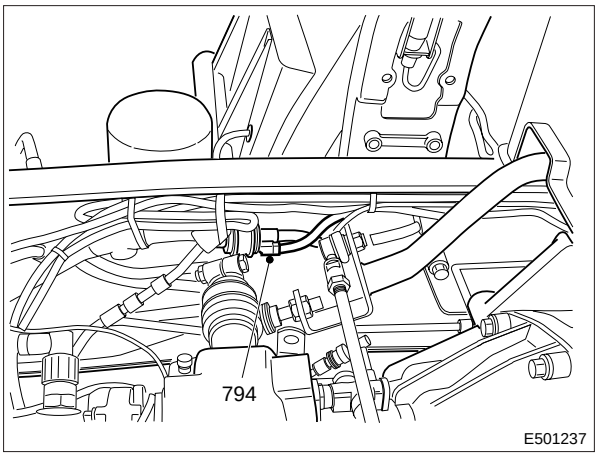

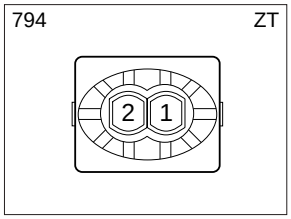

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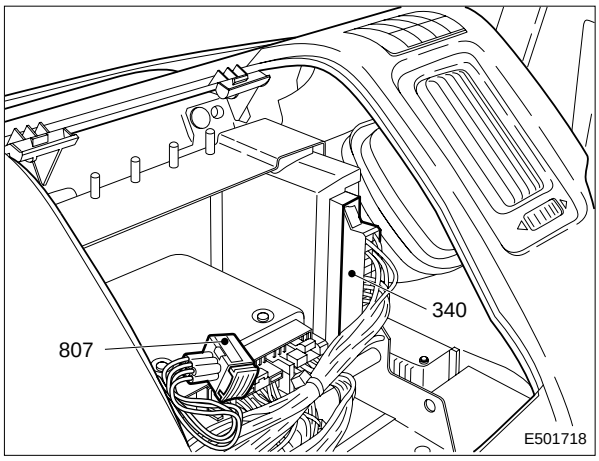

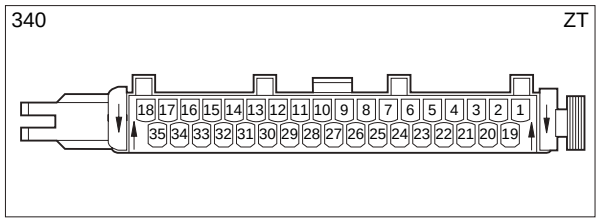

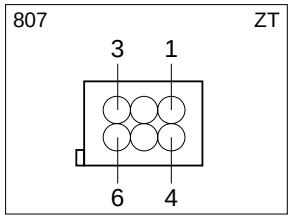

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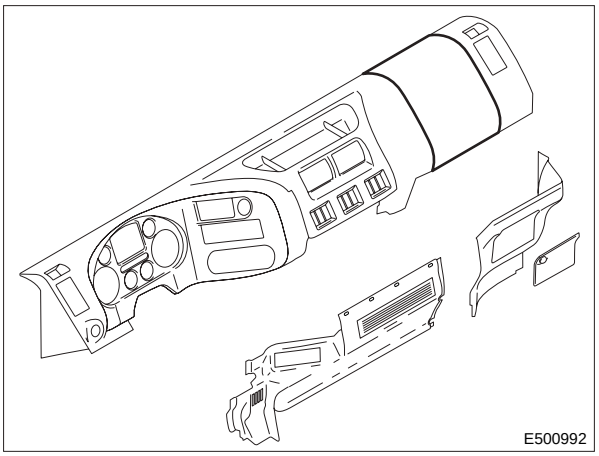

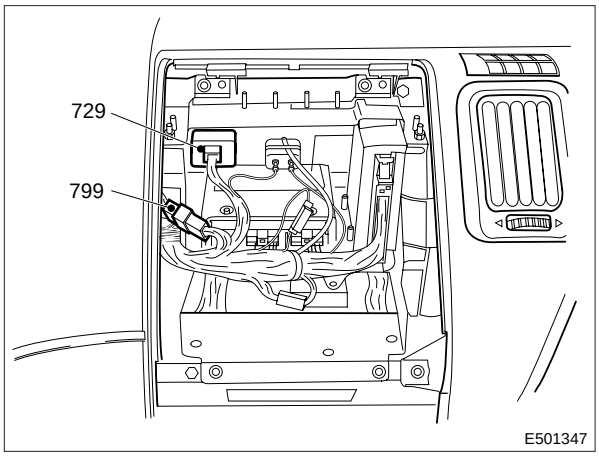

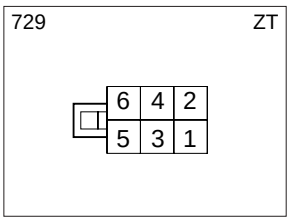

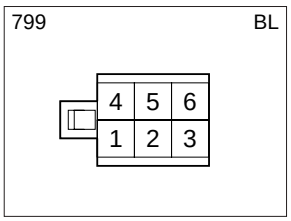

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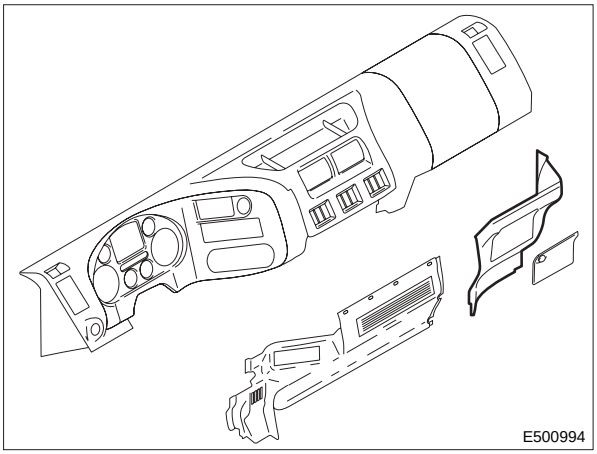

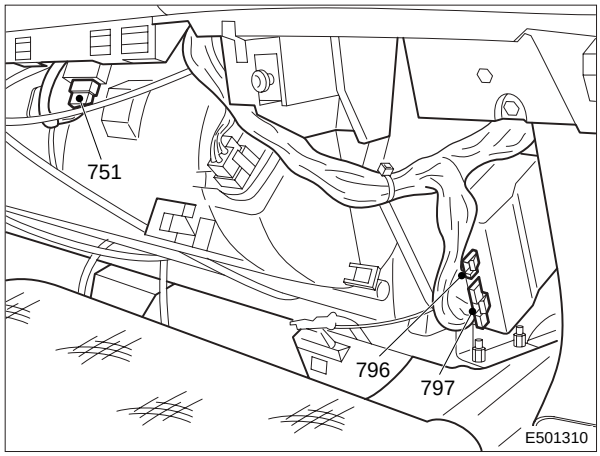

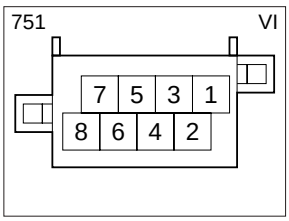

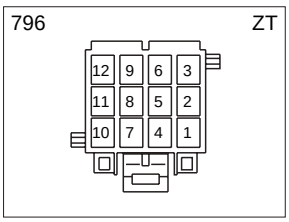

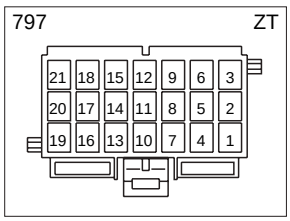

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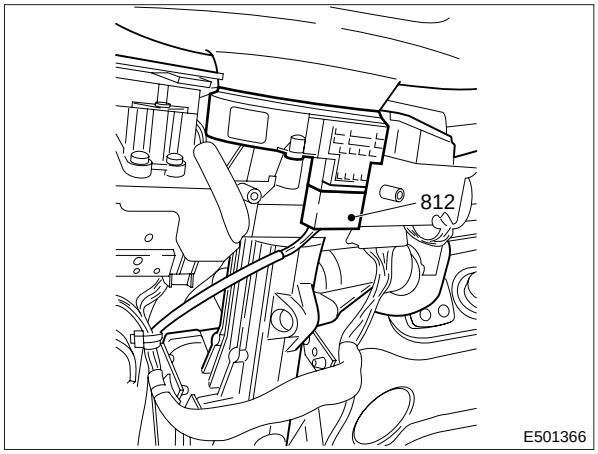

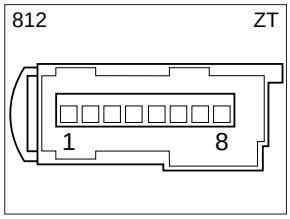

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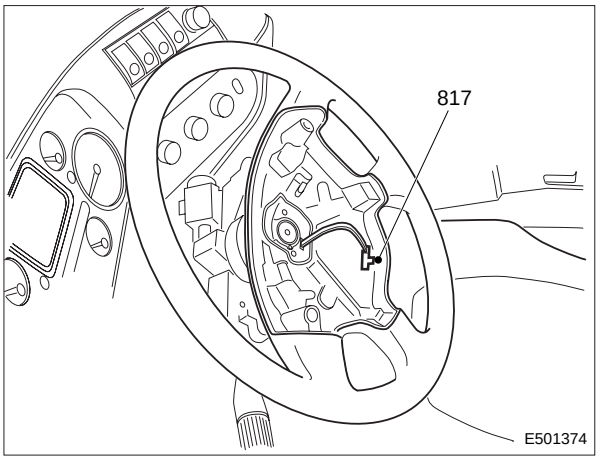

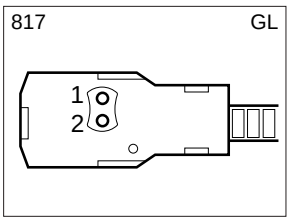

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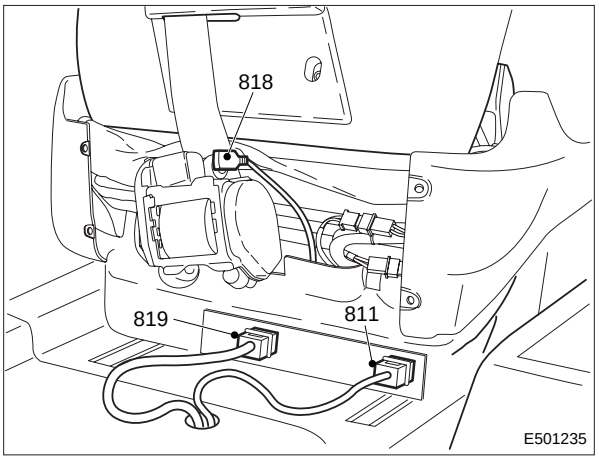

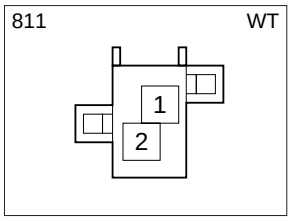

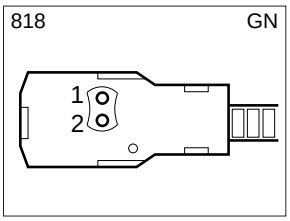

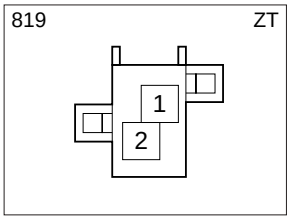

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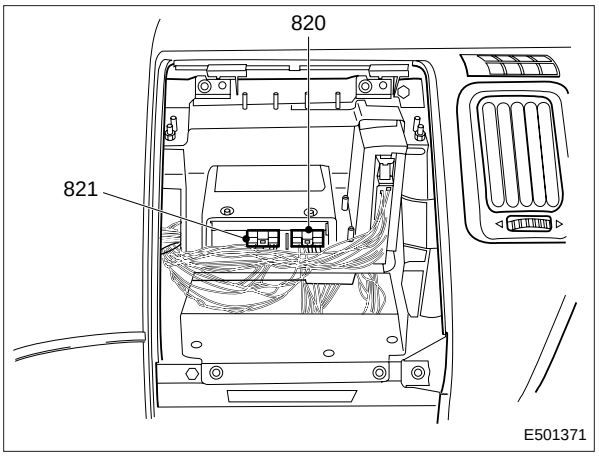

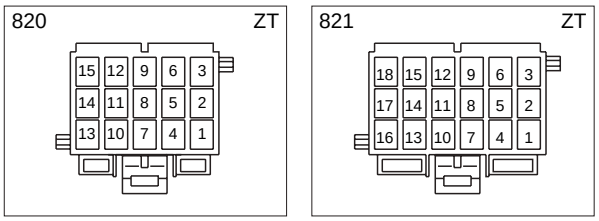

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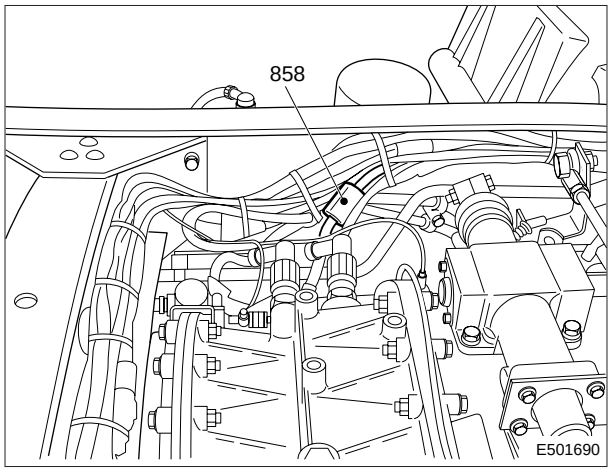

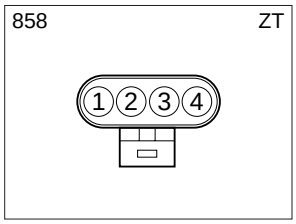

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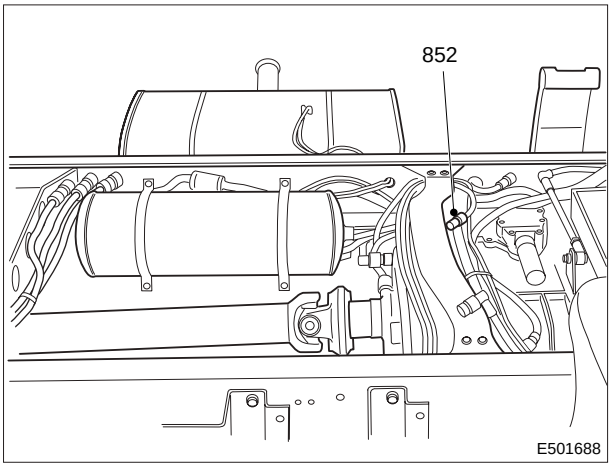

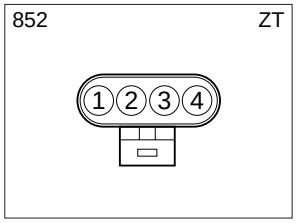

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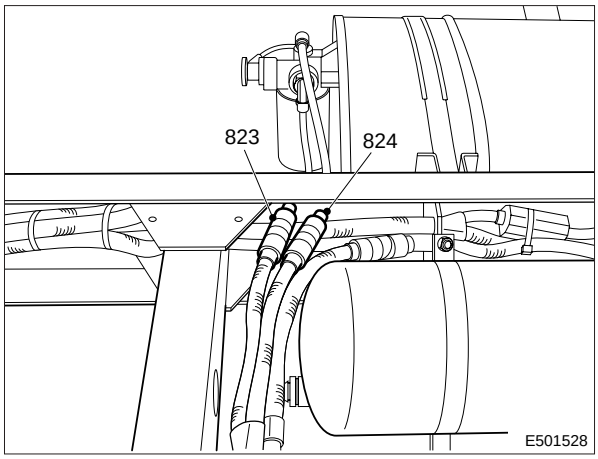

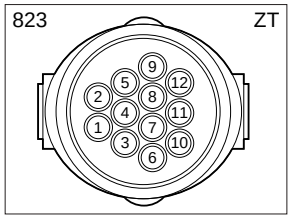

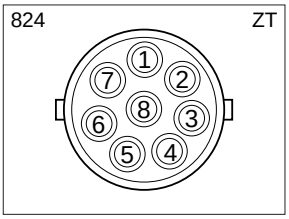

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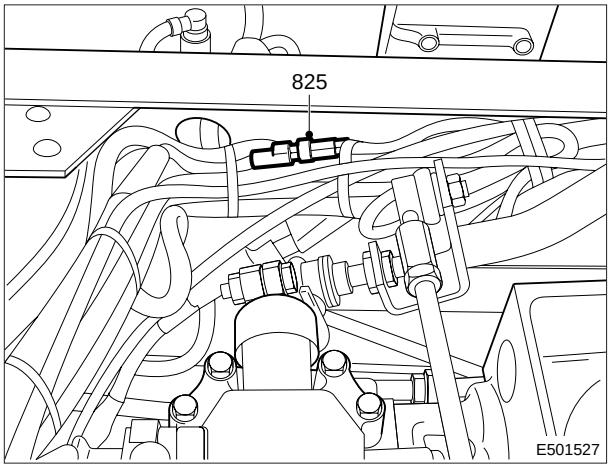

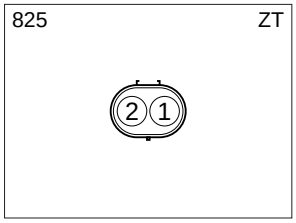

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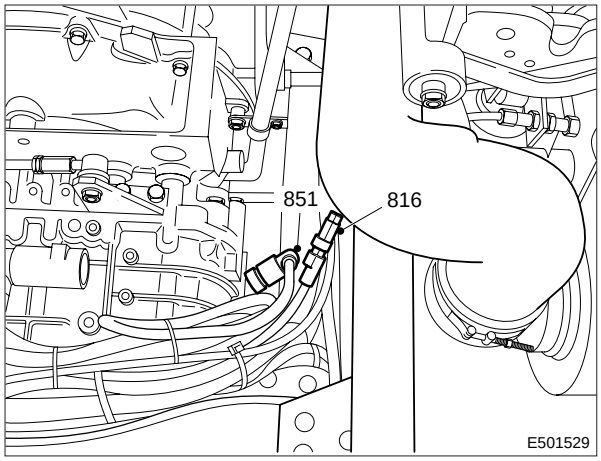

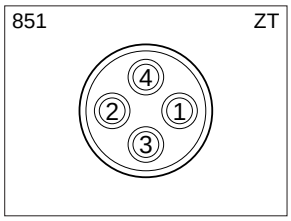

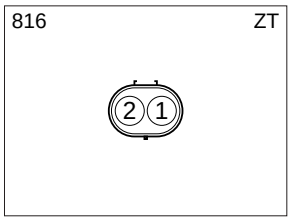

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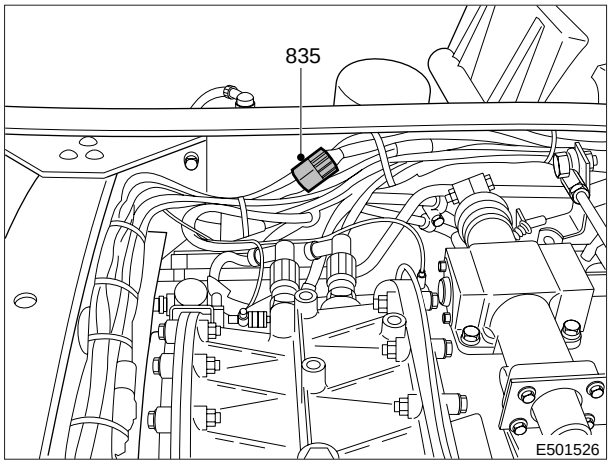

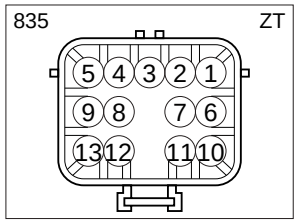

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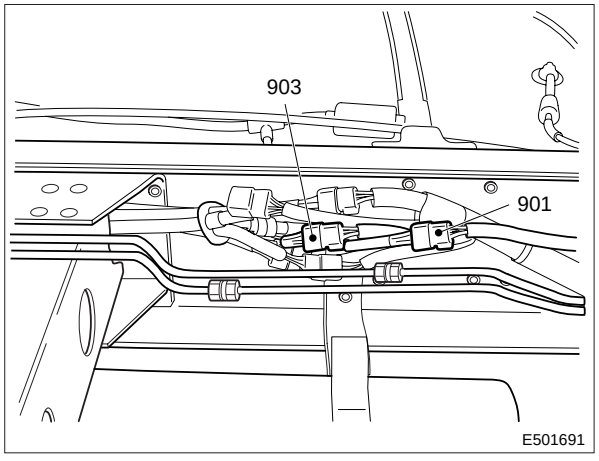

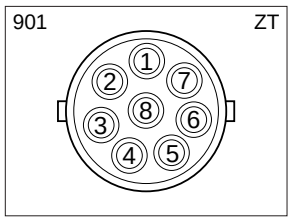

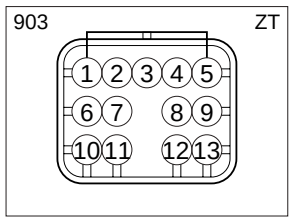

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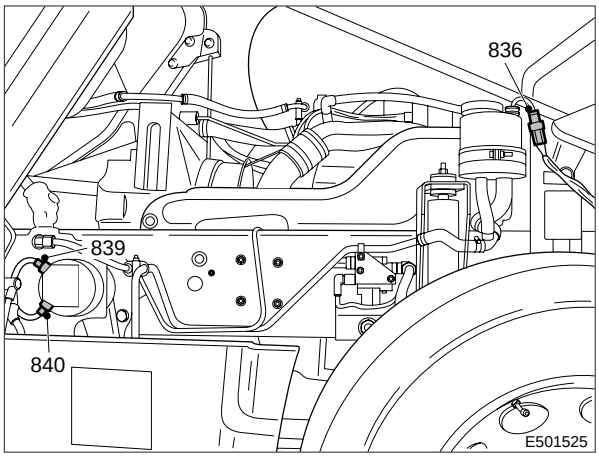

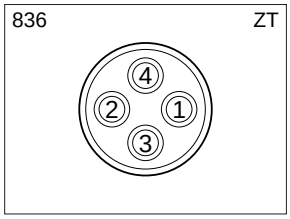

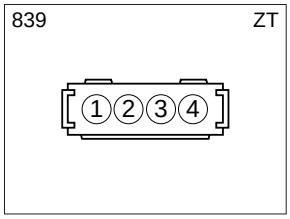

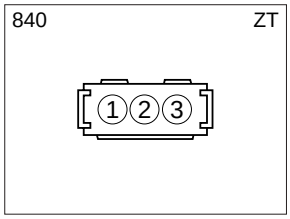

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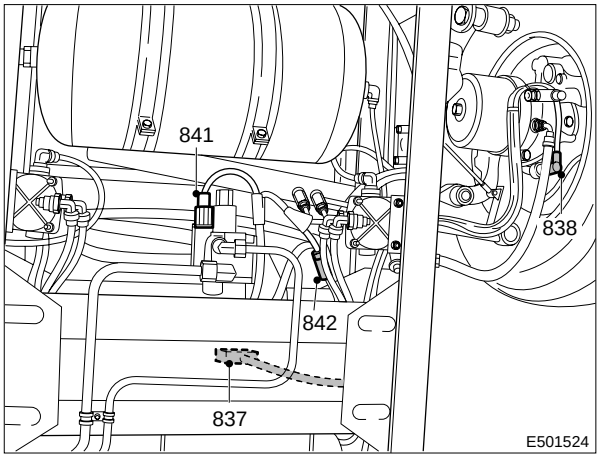

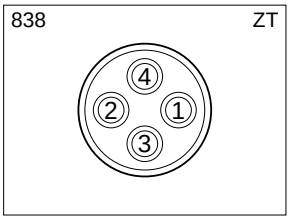

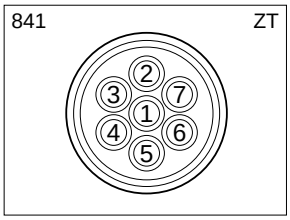

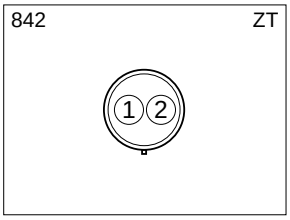

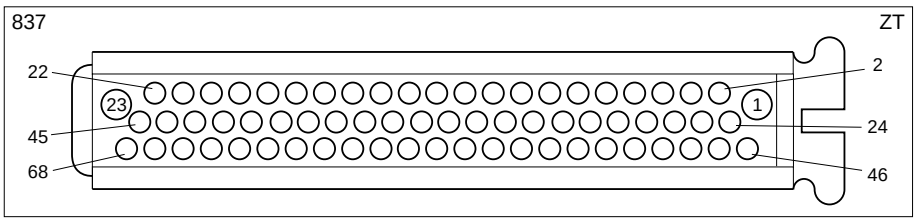

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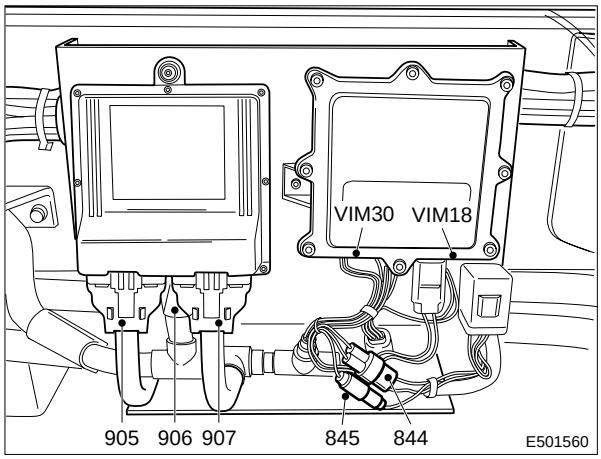

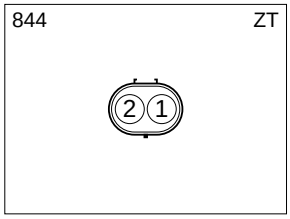

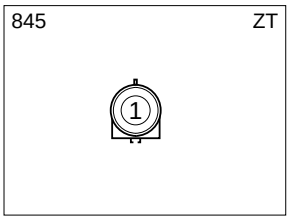

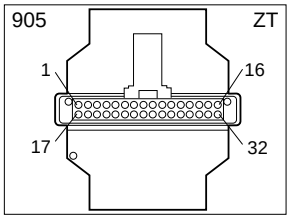

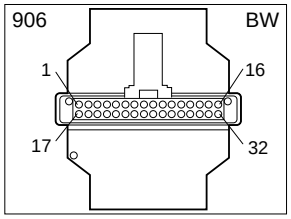

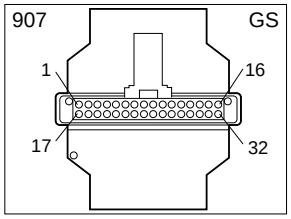

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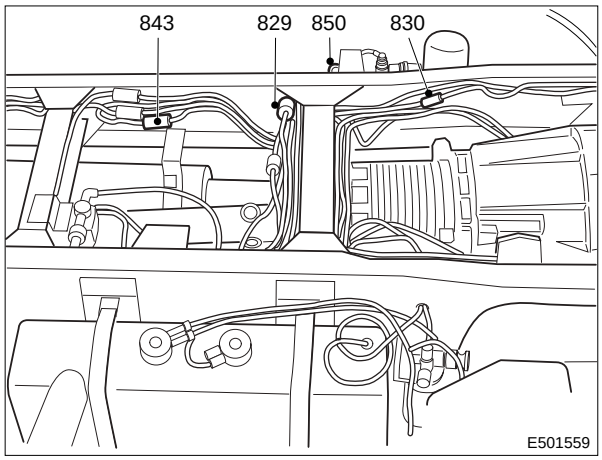

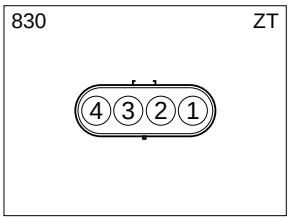

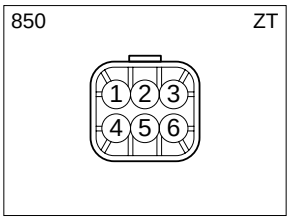

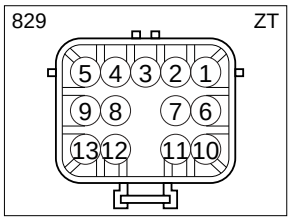

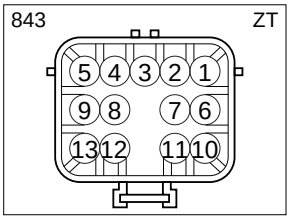

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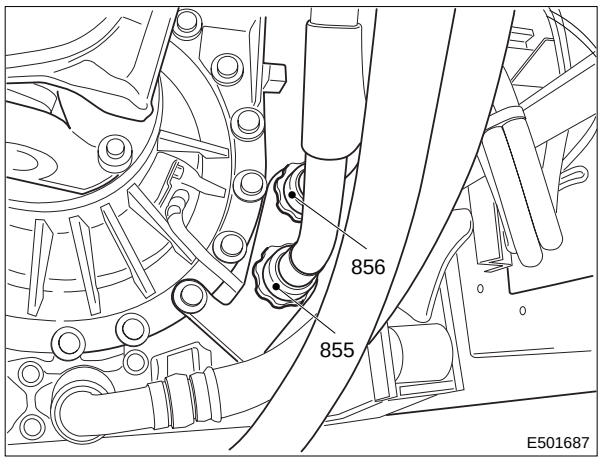

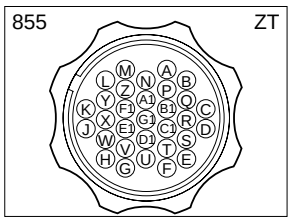

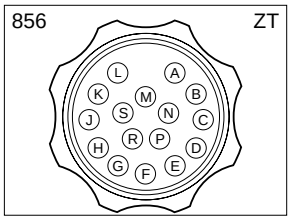

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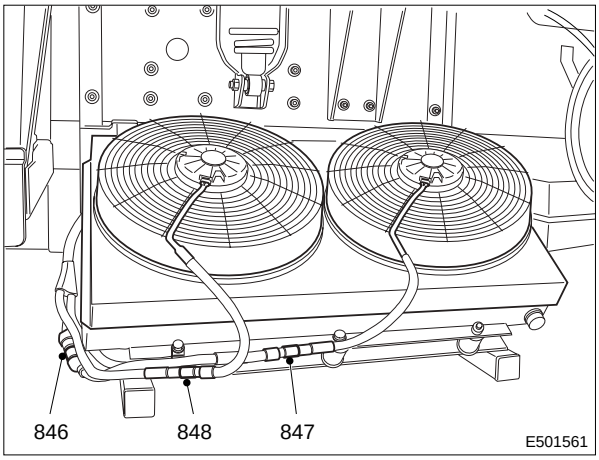

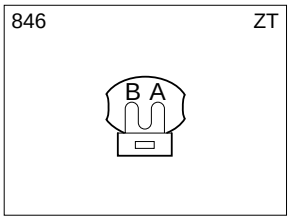

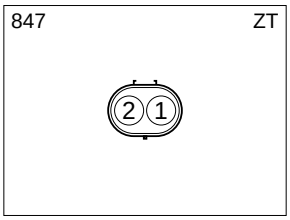

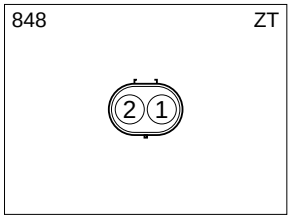

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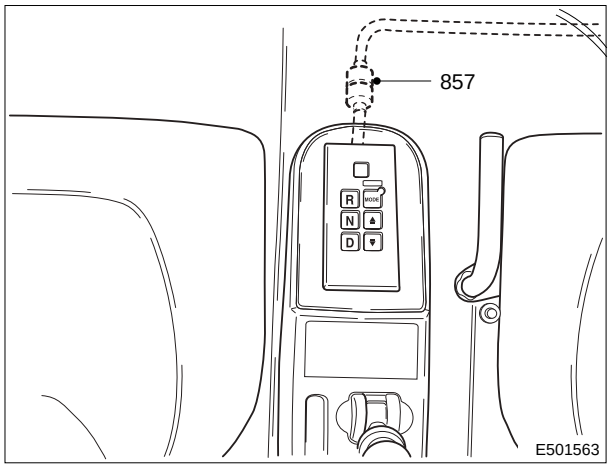

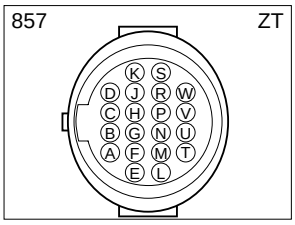

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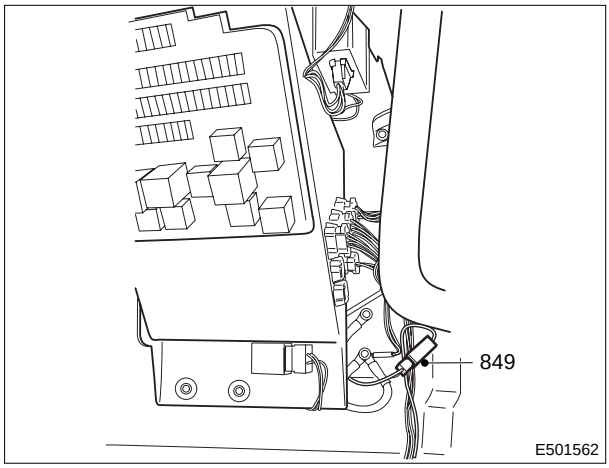

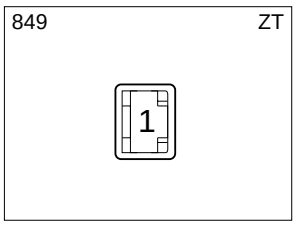

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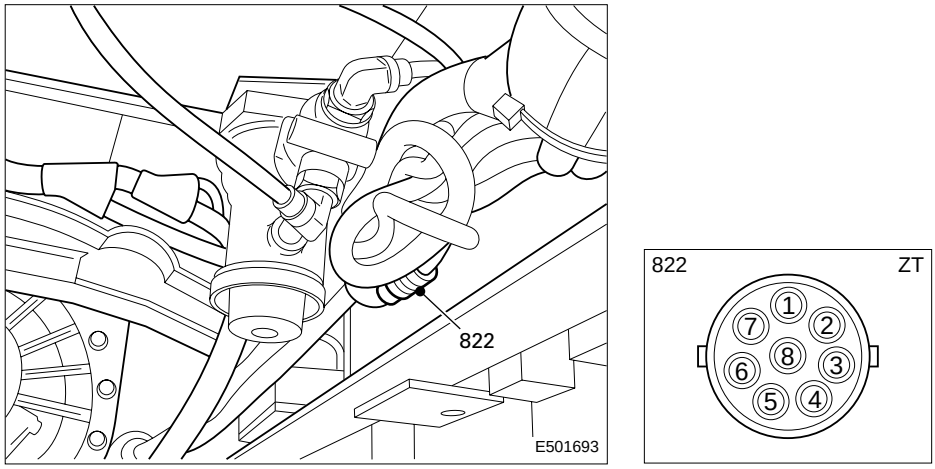

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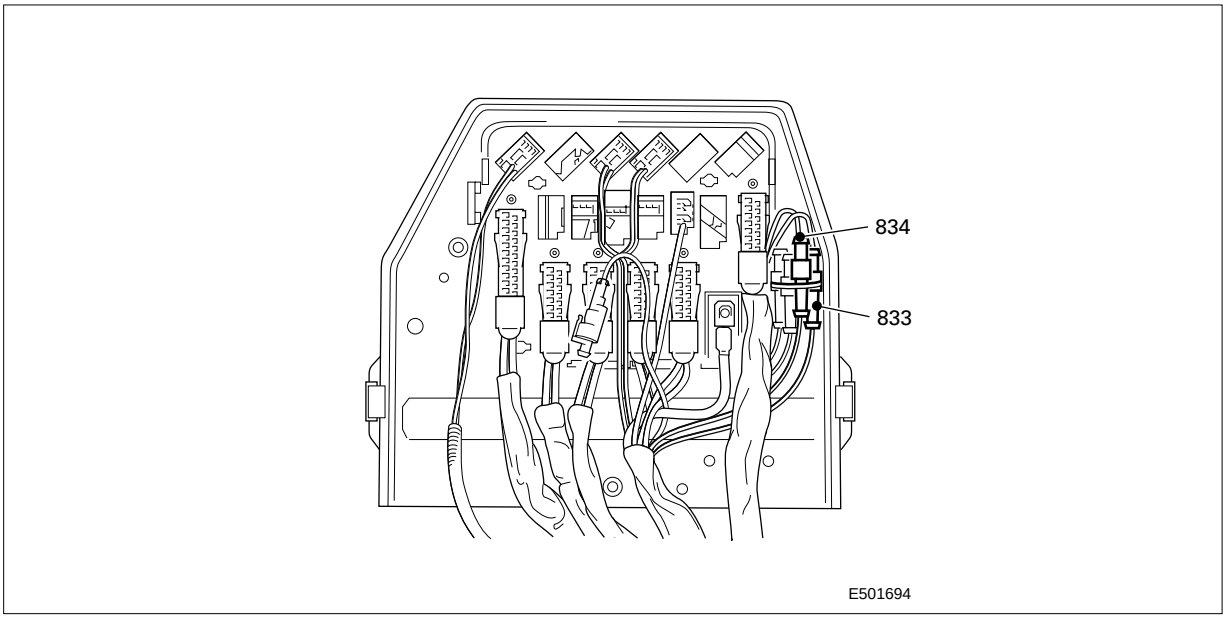

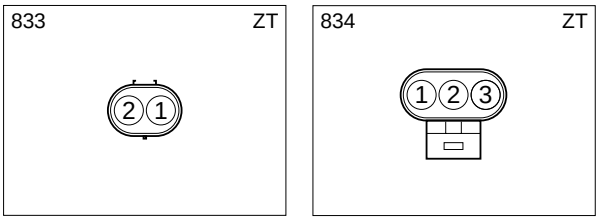

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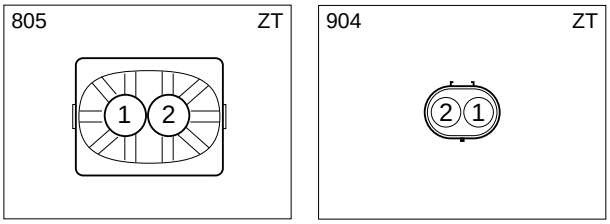
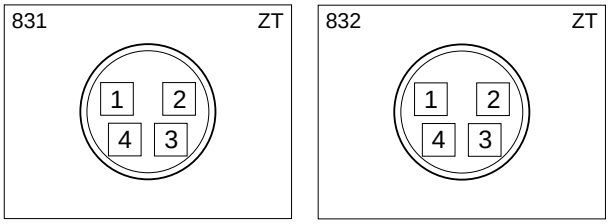
ECAS-2



E501754

Main switch



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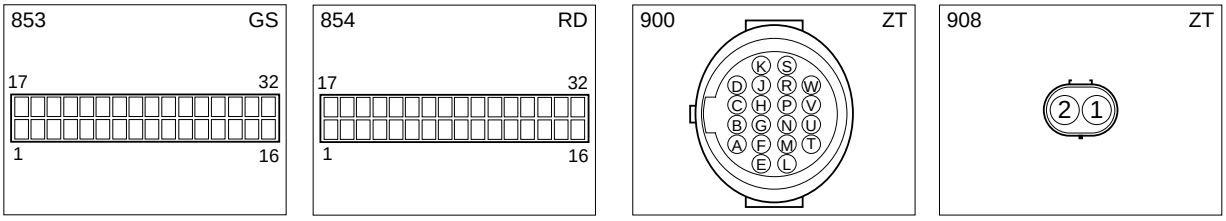
AT1000/2000



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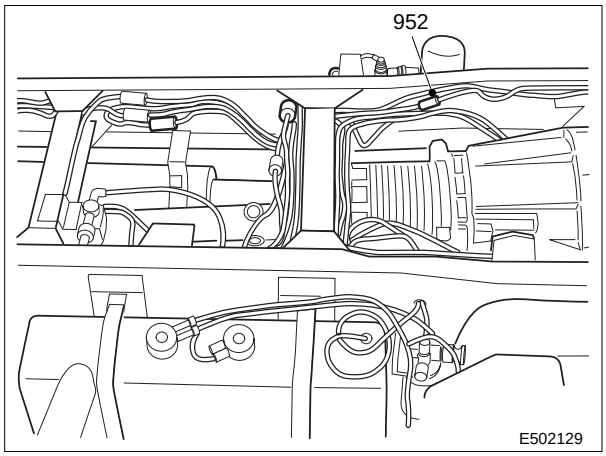

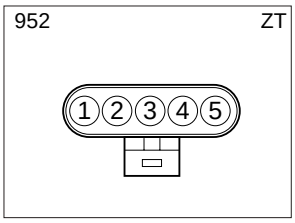

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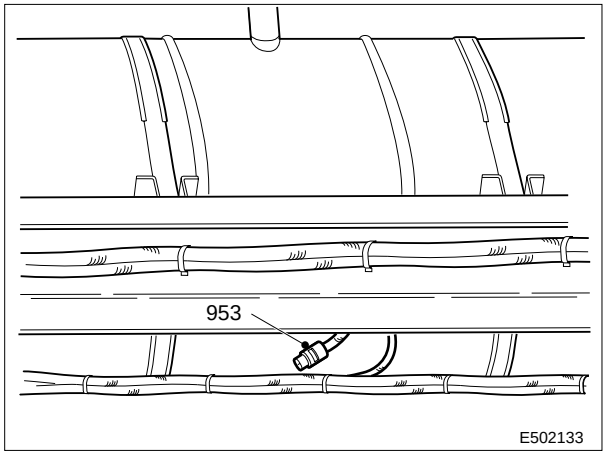

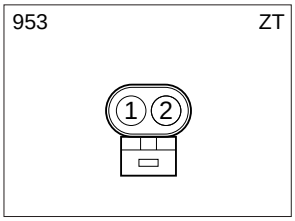

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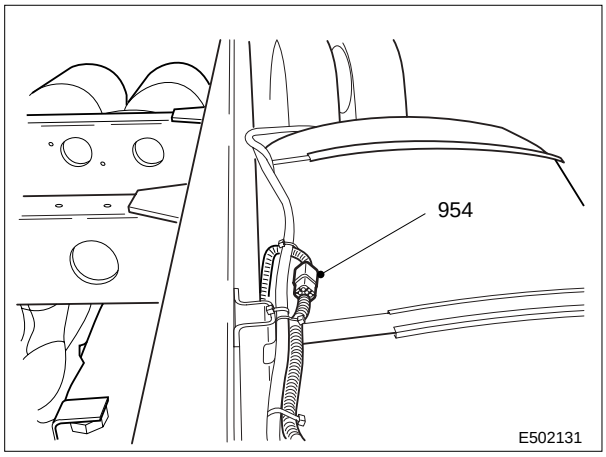

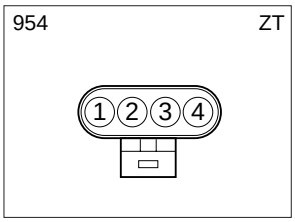

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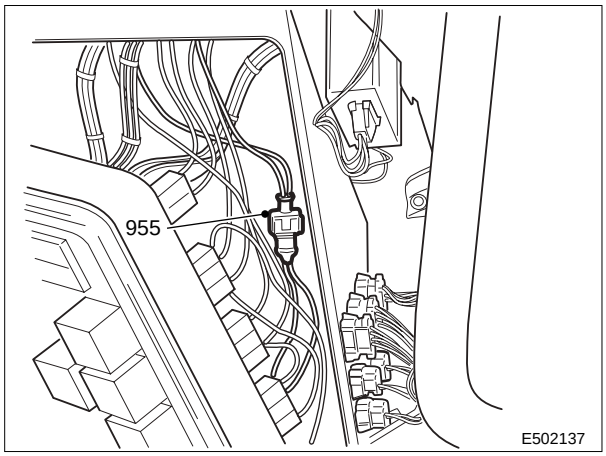

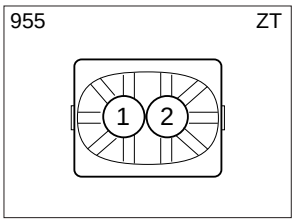

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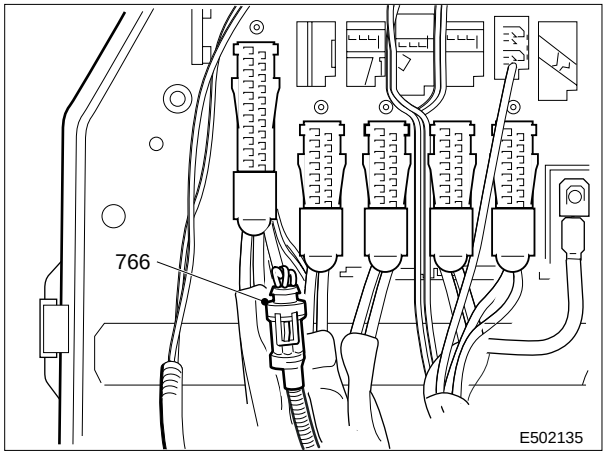

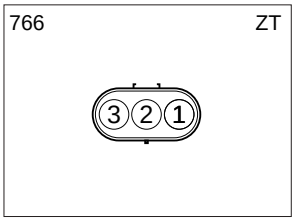

E502136

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CONTENTS

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1. INTRODUCTION

This main group includes the entire electrical system shown in the form of **section diagrams** and an **overview of connectors/pin allocations**.

Note:
For the location of the connectors in the vehicle, see main group “Location of connectors”.

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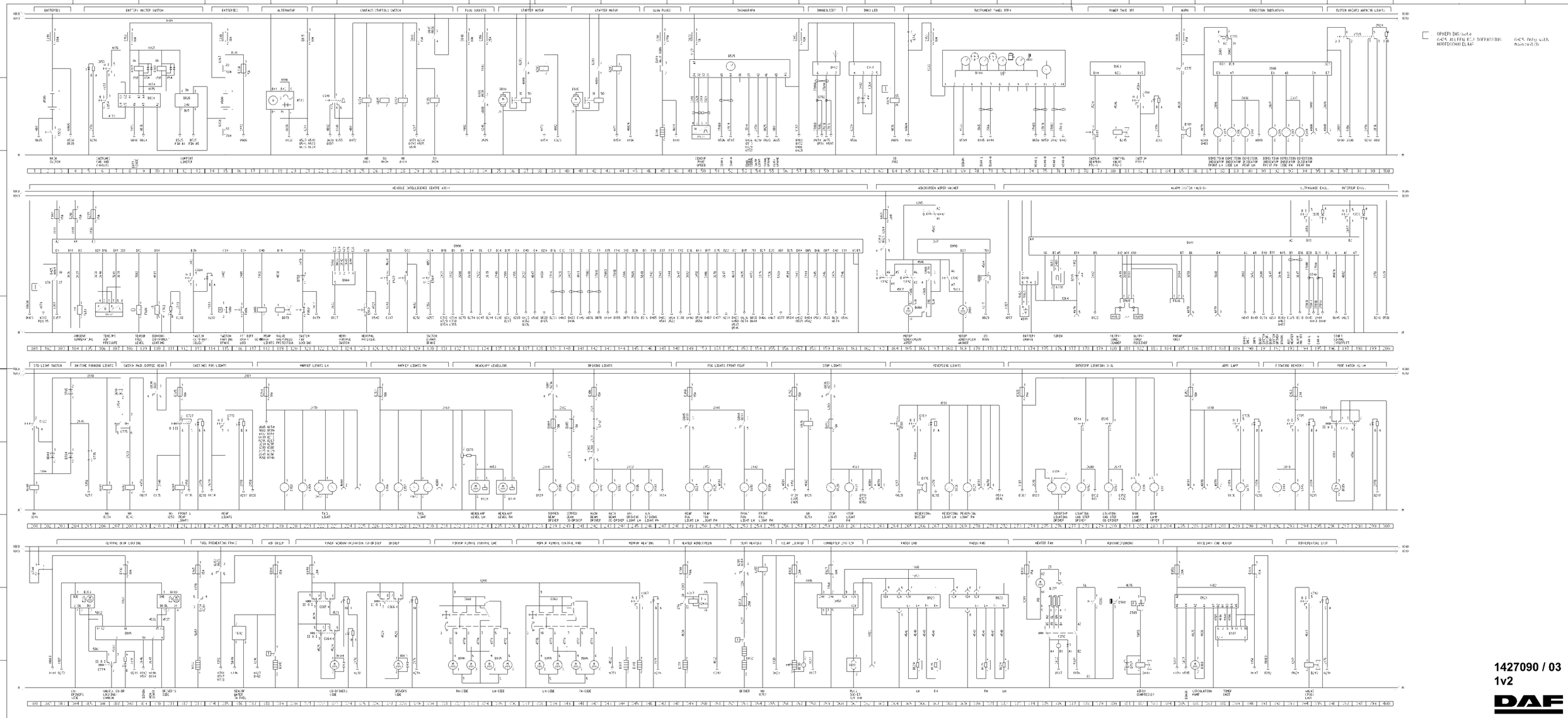
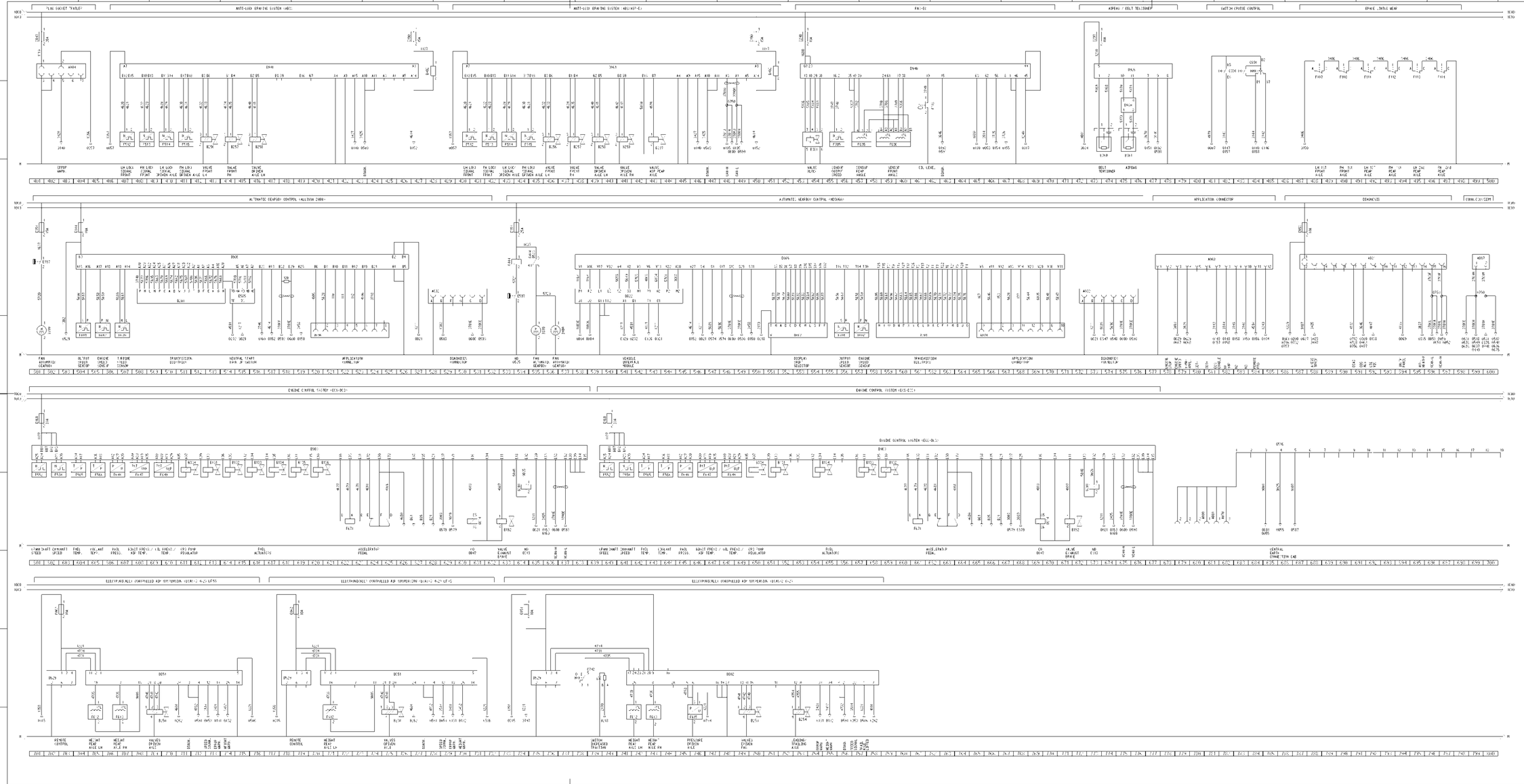
2. ELECTRICAL SYSTEM

2.1 CIRCUIT DIAGRAM 1427090/03

This page can be used to make your own notes on the circuit diagram.





1427090 / 03
2v2

DAF

2.2 OVERVIEW OF BASIC CODES FOR CIRCUIT DIAGRAM 1427090/03

1 Basic code number
2 Description
3 Number on search bar

1	2	3
A000	Drawn vehicle socket (7-pin)	0095 0096 0224 0231 0262 0681
A001	Rear fog light/reversing light socket (7-pin)	0251 0256 0270 0286 0682
A004	Socket, ABS/EBS, drawn vehicle (7-pin)	0403
A011	Socket, 12 V accessories (2-pin)	0361
A021	Diagnostics socket (16-pin)	0592
A032	AGC diagnostics socket	0528 0574
A068	Application connector, engine speed control	581
A070	Application connector, superstructure (8-pin)	0177 0186 0188 0263 0271 0287 0288 0682
A074	Automatic gearbox socket, superstructure (MD3060)	0568
A087	CCU/CDM socket (2-pin)	0599
A096	Automatic gearbox socket, superstructure (AT2000)	0522
A500	Batteries (2x)	0002 0015
A510	Alarm system battery	0174
A513	Alternator	0019
B000	Windscreen wiper motor	0165
B001	Windscreen wiper pump	0169
B003	Electric drop glass operation motor, driver's side	0328
B004	Electric drop glass operation motor, co-driver's side	0323
B005	Mirror adjustment motor, left	0335 0339
B006	Mirror adjustment motor, right	0332 0342
B009	Roof hatch motor	0297
B010	Starter motor	0035 0041
B017	Mirror heating, driver's side	0344
B018	Mirror heating, co-driver's side	0345
B023	Radio	0366 0371
B024	Loudspeaker, left	0365 0372

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1	2	3
B025	Loudspeaker, right	0367 0371
B030	Cigar lighter, driver's side	0357
B032	Seat heating, driver's side	0353
B042	Air dryer heating element	0319
B043	Air conditioning compressor	0382
B068	Fuel metering pump, cab heater	0386
B079	Low-range downshift protection valve	0119
B129	Left-hand headlamp height adjuster motor	0234
B130	Right-hand headlamp height adjuster motor	0236
B131	Solenoid valve, pump unit/injector, cylinder 1	0613 0651
B132	Solenoid valve, pump unit/injector, cylinder 2	0615 0659
B133	Solenoid valve, pump unit/injector, cylinder 3	0616 0658
B134	Solenoid valve, pump unit/injector, cylinder 4	0618 0654
B135	Solenoid valve, pump unit/injector, cylinder 5	0619
B136	Solenoid valve, pump unit/injector, cylinder 6	0621
B176	Reversing buzzer	0266
B182	Water separator fuel heating element	0313
B192	Exhaust brake valve	0633 0671
B199	Central door locking motor, driver's side	0311
B200	Central door locking motor, co-driver's side	0304
B201	Internal electrical components for automatic gearbox	0510 0561
B237	ABS/ASR-D differential lock valve, rear axle	0443
B238	ECAS valve, driven axle, air supply	725
B243	Cross-axle differential lock control valve	0394
B245	PTO 1 control valve	0080
B250	ECAS valve, driven axle, air supply	0709
B253	ECAS valve, driven axle, air supply	0749
B254	ECAS valve, steered leading axle/trailing axle, lifting bellows	0753
B256	ABS valve, front axle, left	0413 0436
B257	ABS valve, front axle, right	0414 0438
B258	ABS valve, driven axle, left	0416 0439
B259	ABS valve, driven axle, right	0441

1	2	3
B334	Fuel pump control solenoid valve	0612 0650
B338	Alarm system horn	0176
B341	Glow element	0047
B360	Seat belt tensioner, driver's side	0474
B361	Airbag module	0476
B371	Windscreen heating	0349
B377	Heater motor	0375
B381	RAS-EC valve block	0454
B399	Cooling fan 1, automatic gearbox (AGC)	0501 0535
B400	Cooling fan 2, AGC automatic gearbox	0537
B401	Horn	0085
B402	ABS resistor	0428
B525	Modular tachograph (MTCO)	0052
C000	Dipped beam, left	0239
C001	Dipped beam, right	0241
C002	Main beam, left	0242
C003	Main beam, right	0244
C006	Left spotlight	0245
C007	Right spotlight	0246
C008	Fog lamp, front left	0253
C009	Fog lamp, front right	0255
C014	Direction indicator lamp, front left	0088
C015	Direction indicator lamp, front right	0092
C016	Direction indicator lamp, side left	0089
C017	Direction indicator lamp, side right	0093
C018	Direction indicator lamp, rear left	0090
C019	Direction indicator lamp, rear right	0094
C020	Stop light, left	0259
C021	Stop light, right	0261
C022	Rear light, left	0222
C023	Rear light, right	0229
C024	Fog lamp, rear left	0249

1	2	3
C025	Fog lamp, rear right	0251
C026	Reversing light, left	0268
C027	Reversing light, right	0270
C062	Stepwell lighting, left	0278
C063	Stepwell lighting, right	0280
C071	Work lamp	0289
C110	Bunk light, bottom	0282
C111	Bunk light, top	0283
C119	Interior lighting with switch, driver's side	0276
C144	Rotating beam, left	0292
C145	Rotating beam, right	0293
C156	Marker light, left, 1st	0226
C157	Marker light, right, 1st	0228
C158	Marker light, left, 2nd	0219
C159	Marker light, right, 2nd	0221
C553	Mechanical main switch	0002
C622	Lighting switch	0201
C715	Rotating beam switch	0293
C725	Work lamp switch	0289
C727	Fog lamp switch, front/rear	0212
C736	Roof hatch switch	0297
C742	Traction assistance switch	0739
C748	Cross-axle differential lock switch	0394
C750	PTO 1 Switch	0082
D758	Diode to prevent feedback to the VIC	120
C763	Instrument lighting dimming potentiometer	0110
C765	Switch for warning lamps	0098
C773	Fog lamp switch, rear	0215
C774	Central door locking switch	0306
C775	Switch, steering column, direction indicators/horn/dipped beam/main beam	0085 0088 0208
C804	Switch, adjustable speed limiter	0113

1	2	3
C835	Switch to turn off interior detection	0194
C836	Switch to turn off superstructure/drawn vehicle loadspace detection	0197
C841	Accessories/ignition/starter switch	0023
C842	Windscreen wipers/washer steering column switch	0163 0165 0167 0168
C853	Cab main switch	0006
C854	Chassis main switch	0006
C864	Drop glass switch, co-driver's side (driver's side door)	0323
C865	Drop glass switch, co-driver's side (driver's side door)	0322
C866	Drop glass switch, driver's side (driver's side door)	0327
C867	Mirror heating switch	0345
C868	Mirror adjustment switch	0333 0339
C871	Potentiometer, headlamp height adjustment	0233
C880	Switch, reversing buzzer	0266
C891	Steering column switch, windscreen wiper/washer, cruise control, engine speed control	0483
C892	Heater fan switch	0376
C893	Air conditioning switch	0379
D521	Electronic unit, cab heater	0387
D529	Remote control system, ECAS	0702 0718 0735
D609	Light switch diode	0202
D610	Diode, main beam/dipped beam	0208
D715	Alarm system LED	0177
D784	Diode, Swedish lighting	0204
D785	Diode, Swedish lighting	0204
D787	Diode, air conditioning compressor link	0381
D802	ECAS-2 (6x2) electronic unit	0748
D822	Vehicle interface module AGC	0541
D836	Electronic unit for VLG current limiter	0012
D851	Electronic unit, ECAS-3 (4x2)	0710 0726
D866	Electronic unit, AGC-A4 automatic gearbox control	0552

1	2	3
D867	Automatic gearbox selector	0553
D899	DIP-4 instrument panel	0070
D900	VIC electronic unit	0080 0091 0132
D903	ECS-DC3 electronic unit	0620 0659
D904	Menu Control Switch, MCS	0124
D905	Electronic unit, CDS	0308
D909	Electronic unit, alarm system, ultrasonic	0181
D910	Electronic unit, battery charger	0174
D911	Electronic unit, ALS-S alarm system	0186
D912	Electronic unit, immobiliser	0060
D924	Electronic unit for main switch	0010
D926	Electronic unit, airbag/seat belt tensioner	0476
D931	LED unit, immobiliser	0063
D936	Electronic unit for automatic gearbox (AGC-T1000/2000)	0514
D940	Electronic unit, RAS-EC	0461
D941	Electronic unit for ABS/ASR, D model	0417
D942	Fuse box	-
D958	Electronic unit, converter with power supply for radio memory	0360
D960	Airbag contact unit	0475
D961	Electronic unit, ABS/ASR, E version	0440
E004	Fuse, dipped beam, driver's side	0239
E005	Fuse, dipped beam, co-driver's side	0240
E006	Fuse, main beam, driver's side	0242
E009	Fuse, front fog lamps	0249
E013	Fuse, stop lights	0259
E018	Windscreen wiper motor fuse	0029
E019	Fuse, horn	0085
E023	Fuse, switch, tachograph timer	0049
E025	Fuse, windscreen wiper motor/windscreen washer motor	0163
E026	Fuse, cigar lighter/door switches/electronic unit, 24/12 V converter with power supply for radio memory	0357

1	2	3
E027	Fuse, electronic unit, 24/12 V converter, with power supply for radio memory	0359
E028	Fuse, interior lighting/bunk lamps/central door lock	0273
E031	Fuse, heater fan	0373
E035	Fuse, voltage regulation generator/ECS-DC3	0021
E039	Fuse, seat heating	0353
E043	Fuse, ABS, drawn vehicle	0401
E044	Fuse, mirror heating/electric mirror adjustment/electric drop glass operation	0321
E048	Fuse, drawn vehicle power supply	0033
E051	ECAS fuse	0734
E052	Fuse for work lamp	0286
E053	Fuse, diagnostic connector/alarm system/ECAS	0587
E058	Fuse for cab heater	0385
E062	ECAS fuse	0703 0719
E091	Fuse, air dryer heating element/water separator/RAS-EC/engine speed control application connector	0319
E108	Fuse, VIC	0103
E114	Fuse, cab heater/warning lamps	0390
E143	Fuse, tachograph/alarm system/immobiliser/ABS-D/ABS/ASR-E	0057
E144	Fuse, automatic gearbox (AGC)	0504
E153	Fuse, power supply for main switch	0008
E156	Fuse for accessories lighting	0034
E158	Fuse, DIP-4 instrument panel	0067
E160	ECS-DC3 fuse	0601 0640
E163	Fuse, rotating beams/roof hatch	0293
E165	Fuse, FPH-E fuel heater after contact	0313
E190	Fuse, ABS-D / ABS / ASR-E	0427 0450
E198	Fuse, central door lock	0308
E277	Fuse, VIC	0106
E279	Fuse, voltage regulation generator	0021

1	2	3
E280	Fuse, VIC	0104
E282	Fuse, engine brake switch/stop light switch	0257
E283	Fuse, headlamp height adjustment/width marker light, 1st , left and right/tail light, right	0226
E284	Fuse, width marker light, 2nd, left and right/left rear light/search lighting	0218
E285	Fuse, VIC/fog light switch	0212
E286	Main fuse	0047
E290	Fuse, RAS-EC	0453
E297	Fuse, airbag and seat belt tensioner system	0473
E299	Fuse, windscreen heating	0349
E330	Fuse, 'sens' wire main switches	0016
E349	Main fuse, cab	0002 0015
E354	Fuse, automatic gearbox, AGC fan	0501 0534
E501	Reversing light switch	0264
E508	Temperature switch for air conditioning compressor	0380
E509	Air conditioning switch, high/low pressure	0382
E514	Cab stepwell lighting/interior lighting door switch, driver's side	0278
E515	Cab stepwell lighting/interior lighting door switch, co-driver's side	0280
E564	Engine brake switch	0130
E569	Neutral position switch, gearbox	0125
E581	Cab heater timer unit	0388
E585	Selector switch for AT 1000/2000 automatic gearbox	0515
E587	Switch for stop lights/clutch	0127
E597	Switch, cooling fans, automatic gearbox (AGC)	0501
F000	Parking brake switch	0115
F006	Control switch for differential lock, 1st differential	0116
F009	Control switch, cab tilting	0121
F087	Control switch, gearbox PTO	0079
F107	Control switch for brake lining wear, front left	0488
F108	Control switch for brake lining wear, front right	0490
F111	Control switch for brake lining wear, rear left	0492
F112	Control switch for brake lining wear, rear right	0493

1	2	3
F113	Control switch, brake lining wear, rear left, 2nd rear axle (6x2)	0495
F114	Control switch, brake lining wear, rear right, 2nd rear axle (6x2)	0497
F116	Oil level switch, RAS-EC	0462
F512	Wheel speed sensor, front axle, left	0407 0430
F513	Wheel speed sensor, front axle, right	0408 0432
F514	Wheel speed sensor, driven axle, left	0410 0433
F515	Wheel speed sensor, driven axle, right	0411 0435
F533	Vehicle speed sensor	0050
F552	Crankshaft sensor	0601 0640
F558	Camshaft sensor	0603 0641
F565	Fuel temperature sensor	0604 0642
F566	Coolant temperature sensor	0605 0644
F601	Output shaft speed sensor, automatic gearbox	0504 0556
F602	Input shaft speed sensor, automatic gearbox	0505 0557
F603	Ultrasonic transmitter	0180
F604	Ultrasonic receiver	0182
F608	Fuel level sensor	0109
F612	Height sensor, ECAS, rear axle, left	0705 0721 0742
F613	Height sensor, ECAS, rear axle, right	0707 0743
F615	ECAS pressure sensor, driven axle, left/right	0746
F647	Engine oil pressure and temperature sensor	0608 0648
F648	Fuel rail pressure sensor	0607 0645
F649	Charge boost pressure and temperature sensor	0610 0647
F651	Ambient temperature sensor	0104
F652	Air pressure sensor	0106
F670	Automatic gearbox turbine speed sensor	0507
F671	ECS-DC3 accelerator pedal sensor	0623 0662
F686	Alarm system radar sensor	0185
F692	Water separator sensor	0316
F695	Trailing axle angle sensor	0457
F696	Front axle angle sensor	0459

1	2	3
F705	Diode for switching off cab heater with running engine	0455
G000	Rear light/marker light and search light relay	0201 0210
G001	Dipped beam relay	0206 0239
G002	Main beam relay	0208 0242
G004	Fog lamp relay, front	0212 0253
G005	Fog lamp relay, rear	0118 0249
G008	Windscreen wiper relay	0166 0171
G014	Glow plug relay	0047 0631 0669
G015	Contact relay	0027 0030
G036	Stop light relay	0258 0259
G185	Starting circuit interrupter relay	0541 (in VIM D822)
G188	Lighting relay, accessories	0030 0034
G201	Fuel heating relay, FPH-E	0313 0634 0673
G203	Takeover relay, starter motor	0037 0038 0042 0044
G294	Relay, automatic gearbox	0541 (in VIM D822)
G350	Reversing light relay, automatic gearbox	0541 (in VIM D822)
G353	Contact relay	0028 0314
G354	Windscreen wiper relay	0025 0163
G355	Seat heating relay	0353 0354
G367	Main switch relay, power supply	0008
G368	Main switch relay, earth	0010 0015
G397	Relay, windscreen heating	0349
G425	Main switch relay	0064 0102
G444	Relay, cooling fans, automatic gearbox (AGC-A4)	0534 0535
G507	Earth, 1-pin, chassis - cab	-
G516	Central cab earth, co-driver's side	-
G517	Central cab earth, driver's side	-
G520	Central earth, chassis, front end	-
G522	Central earth, starter motor	-
G523	Central earth, engine	-
G524	Earth point, glow element	-
G525	Central earth, flywheel	-

1	2	3
G528	Central earth connection, cab, left	-
G529	Central earth connection, cab, right	-
G735	Through-connection for Swedish lighting	0205
G742	Through–connection, VIC/DIP-4	0065
G743	Through-connection, main beam	0242
G744	Through-connection, cab heater/warning lamps/central door locking	0301
G748	Node, V-CAN	0195
G750	Node, V-CAN	0448 0599
G752	Node, V-CAN	0059
G753	Node, V-CAN	0596

2.3 SECTION DIAGRAMS FROM CIRCUIT DIAGRAM 1427090/03

Overview of section diagrams of circuit diagram 1427090/03

Section diagram no.	Title of section diagram
A	Voltage before and after contact
B	Overview of earthing points
C	CAN overview
1	Main switch
2	Ignition/starter switch/charging circuit
3	MTCO tachograph
4	Immobiliser
5	Pre-glowing
6	DIP-4
7	Direction indicators/warning lamps
8	VIC
9	Marker lights/parking lights/tail lights
10	Reversing lights/buzzer
11	Lighting/dipped beam/main beam/Swedish lighting/fog lamps
12	Stop lights/cab tilting gear
13	Differential lock
14	Interior lighting
15	Mirror heating/windscreen heating/mirror adjustment
16	Search lighting
17	Air conditioning/heater fan
18	Seat heating/accessories connection
19	Horn/cigar lighter/work lamp/air dryer
20	ABS-D
21	ABS/ASR-E
22	ECS-DC3/exhaust brake
23	Cruise control
24	AGC automatic transmission (AT1000/2000)
25	AGC automatic transmission (MD3060)
26	PTO

Section diagram no.	Title of section diagram
27A	ECAS-3 LF45
27B	ECAS-3 LF55
27C	ECAS-2 LF55
29	Headlamp height adjustment/rotating beams
30	24/12 V 10/15 A converter for radio
31	CDS-3/drop glass operation/roof hatch
33	Windscreen wipe/wash system
34	ACH-W with timer
35	Application connectors, engine speed control, superstructure functions and spare wiring
36	Break lining wear
37	ALS-S/battery charger, alarm BV2/BV3
38	Sockets, FA/FT
39	Water separator/fuel pre-heating
40	Airbag/seat belt tensioner
41	RAS-EC

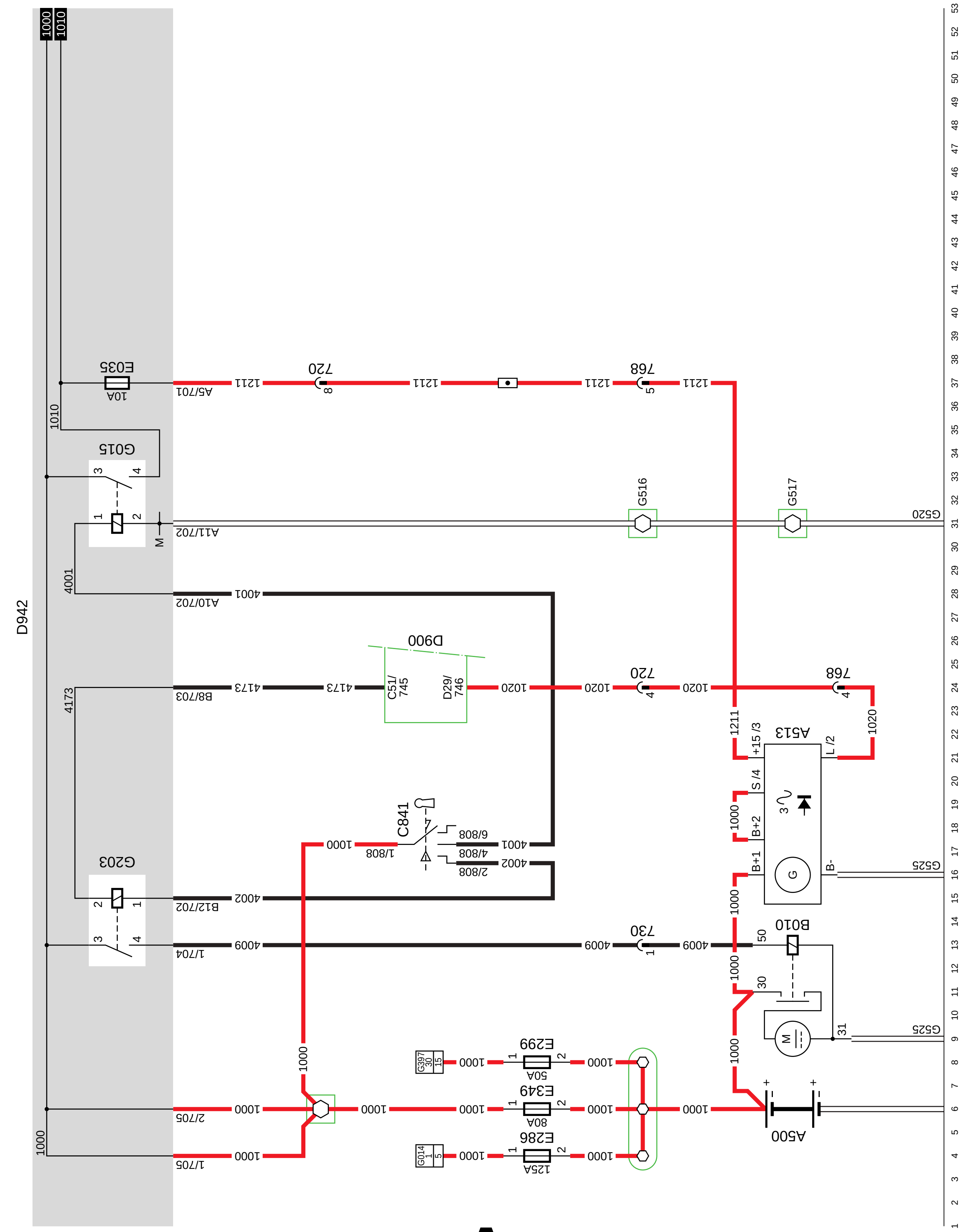
10

A VOLTAGE BEFORE AND AFTER CONTACT

VOLTAGE BEFORE CONTACT
Wire 1000 runs from the batteries (A500) to the starter motor (B010), connecting point 30, and via the main fuse (E349, 80 A) to dashboard lead-through zone 1. Wire 1000 runs from the glow plug relay fuse (E286, 125 A) to the glow plug relay (G014). Wire 1000 and the + distribution bolt in dashboard lead-through zone 1 provide a constant voltage at pins 1 and 2 of connector 705 on the PCB.
This provides "voltage before contact" for the entire PCB. Power is also provided (by wire 1000) from point 30 on the starter motor to the B+1 connection of the alternator (A513). Wire 1000 goes from the + distribution bolt to the ignition/starter switch (C841).

VOLTAGE AFTER CONTACT
When the ignition/starter switch (C841) is set to the "contact" position (connection between points 1 and 4), relay G015 is energised via wire 4001.
This then connects wire 1000 (voltage before contact) to wire 1010 (voltage after contact).

When the ignition/starter switch (C841) is turned against the spring pressure (connection between points 1 and 2), relay G015 remains activated.
When the ignition/starter key is released, the contact/starter switch automatically springs back and remains in the "contact" position.



A **1427090/03**

EL001553

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10

B OVERVIEW OF EARTHING POINTS

This section diagram gives an overview of all the earth connections, with wire markings and connector points.

VARIANTS

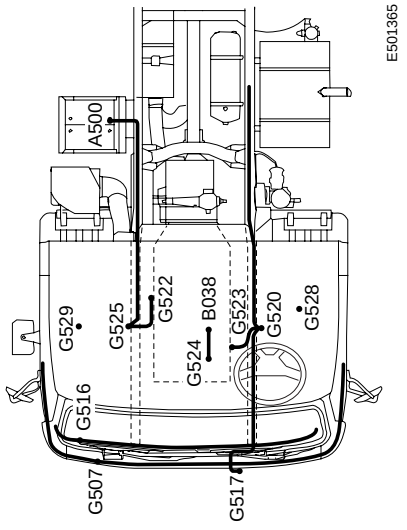
Location

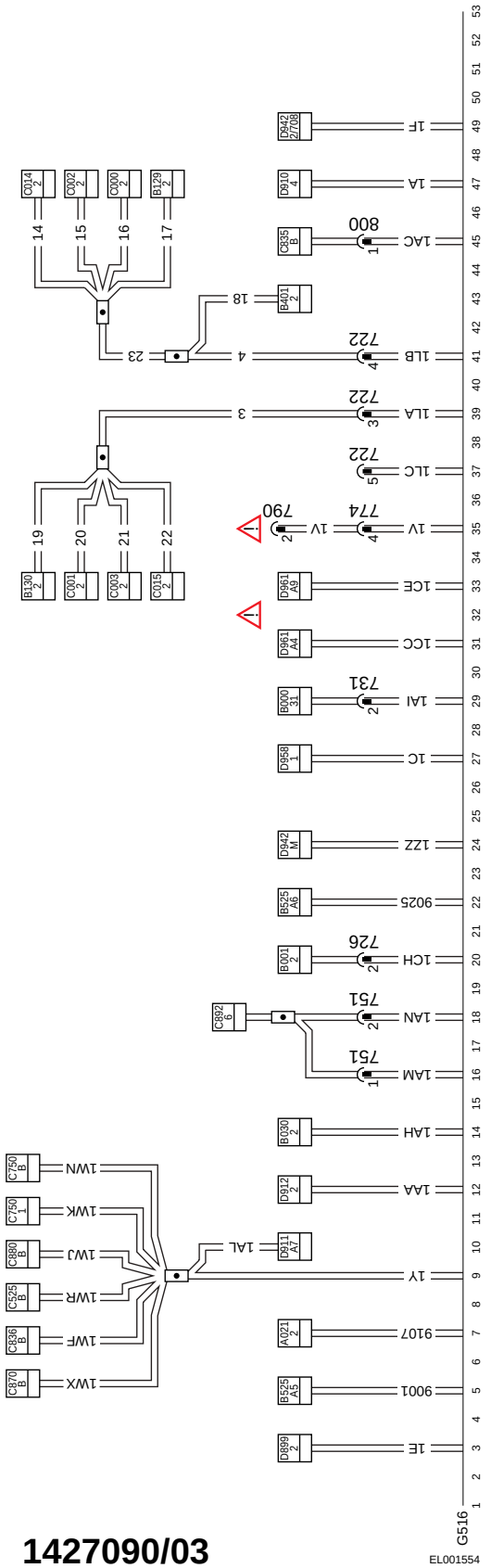
G516 central earth, cab

32 These earth points are also used with an ABS-D (D941) system

35 Connector 790 is designed for a CB set

68,70 The earth connection ends at connector 718.
The application wiring harness connected to 718 makes an earth connection directly on the chassis





B **1427090/03**

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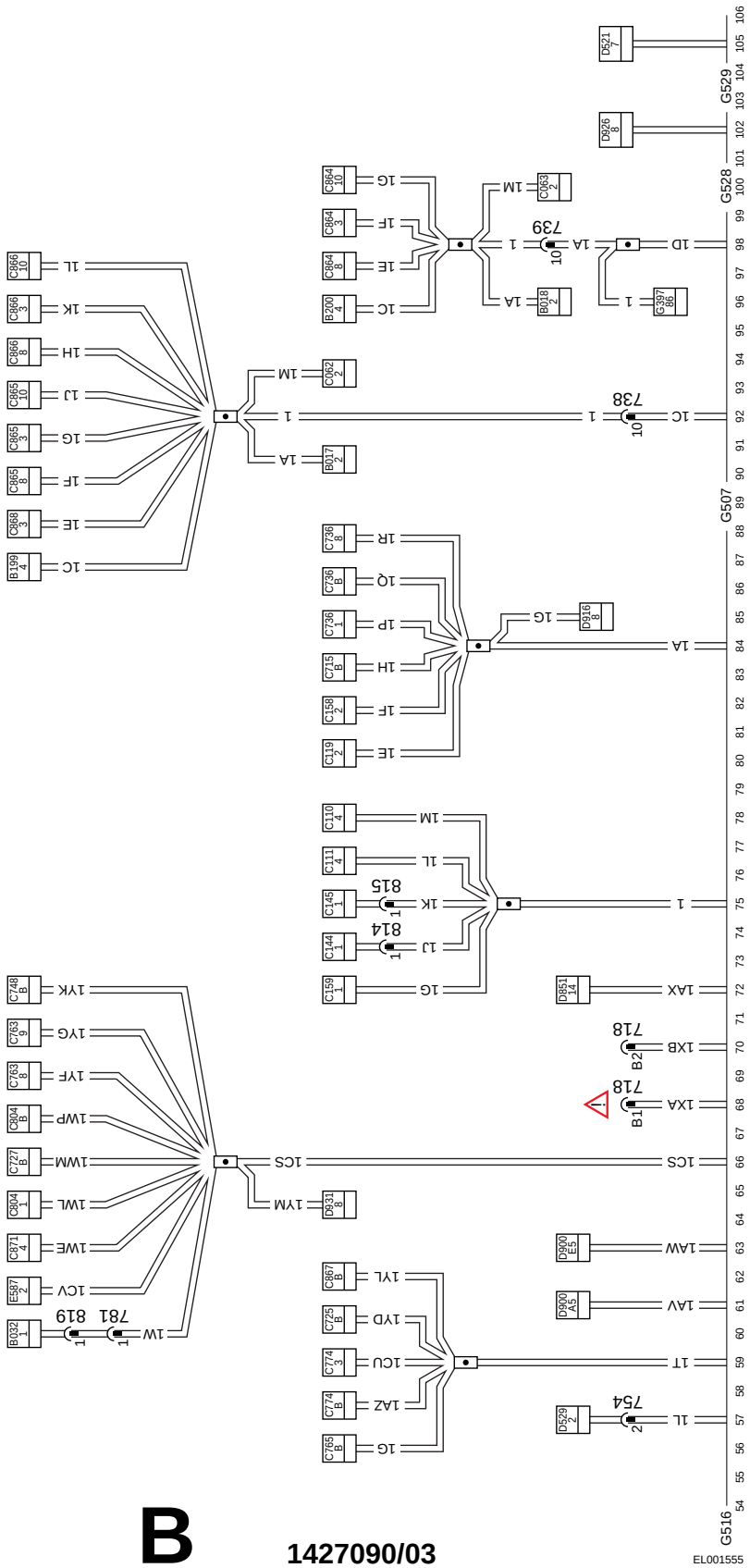

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C CAN OVERVIEW

This section diagram gives an overview of all the CAN connections, with wire markings and connector points.

SEE THE SYSTEM MANUAL FOR MORE INFORMATION

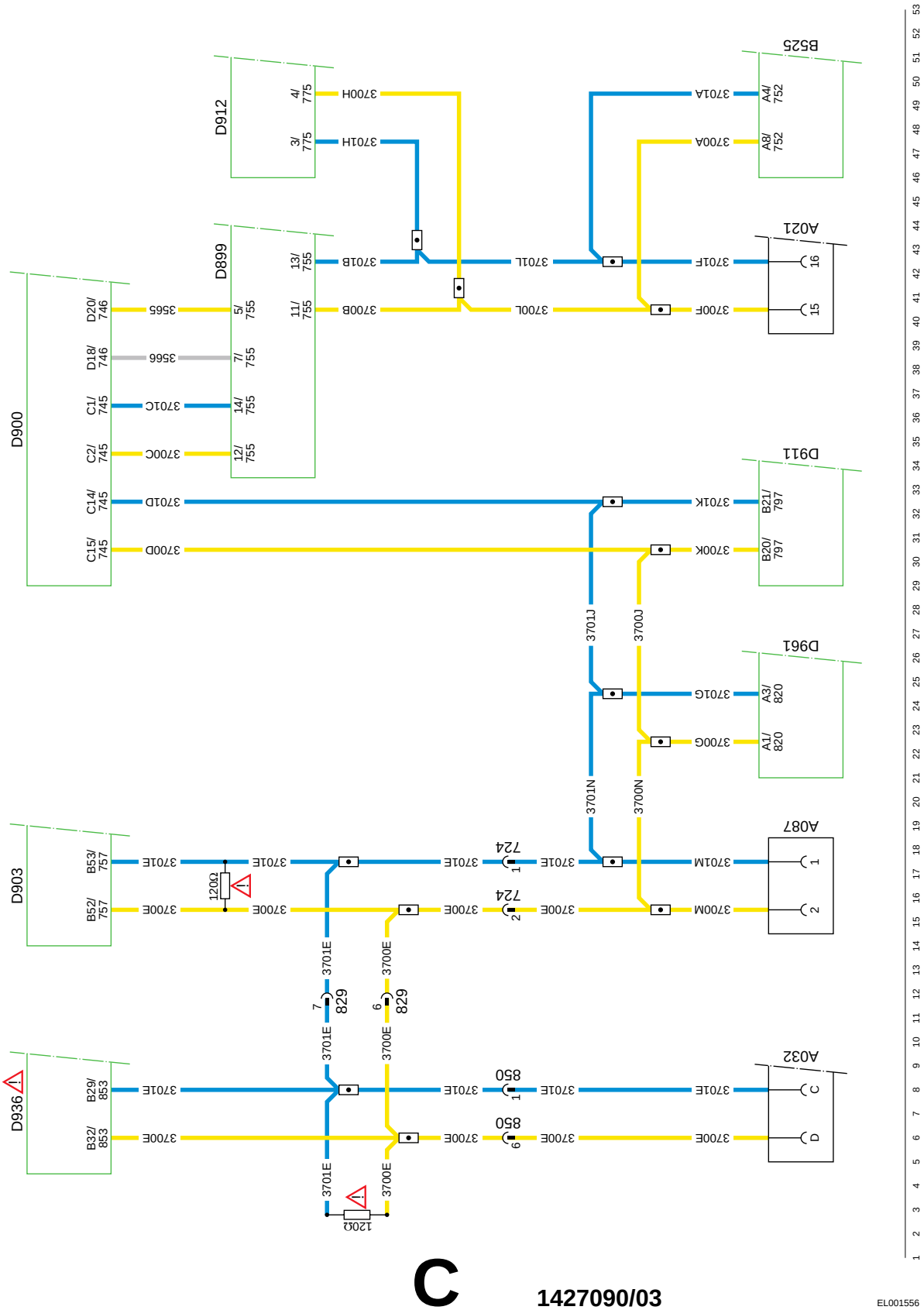
VARIANTS

Location

2 The terminating resistor is in the automatic transmission wiring harness

8 Electronic unit, automatic gearbox, AGC-T1000/2000 (D936): If MD3060 gearbox is fitted, the electronic unit is for AGC-A4 automatic gearbox operation (D866)

16 The terminating resistor is in the wiring harness of the ECS-DC3 engine management system


D912
D899
D900
D903
D936
B525
A021
D911
D961
A087
A032
3700H
3701H
3701A
3700A
3701B
3700B
3701L
3700L
3701F
3700F
3565
3566
3701C
3700C
3701D
3700D
3701K
3700K
3701G
3700G
3701J
3700J
3701N
3700N
3701M
3700M
3701E
3700E
724
850
829
1200Ω
C
1427090/03
EL001556

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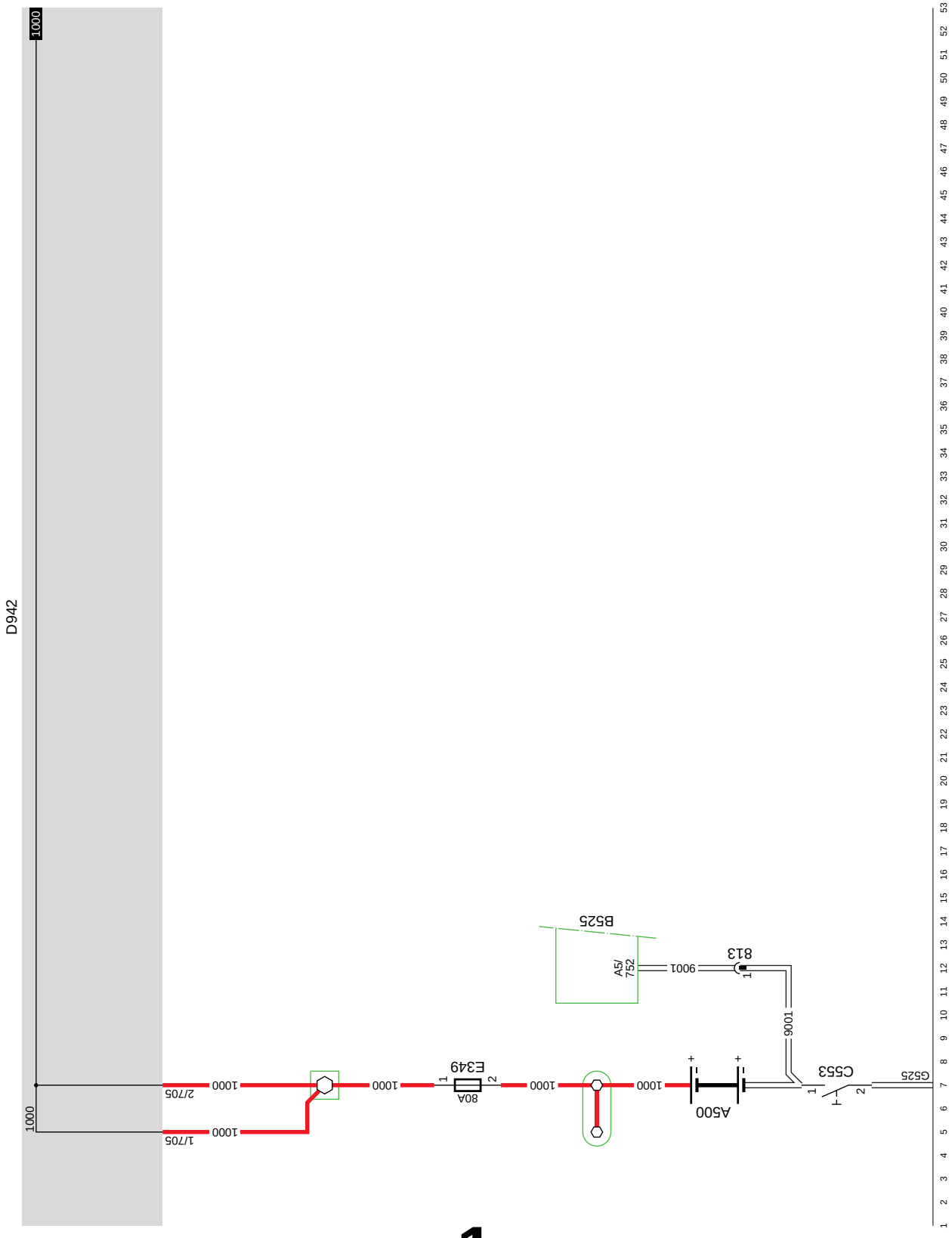
1. MAIN SWITCH

MANUALLY OPERATED EARTH BREAKER
Turning main switch C553 anti-clockwise will break the earth connection between the batteries (A500) and the chassis earth point G525. Because the tachograph (B525) must have a power supply and earth connection at all times, earth wire 9001 is connected directly to the earth connection of the batteries through 2-pin dashboard lead-through connector 813 in zone 1.



1 **1427090/03** EL001558

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ELECTRICALLY OPERATED MAIN SWITCH

The main switch (D924) can be closed:
- electrically in the cab
- electrically on the chassis

Closing the main switch electrically in the cab

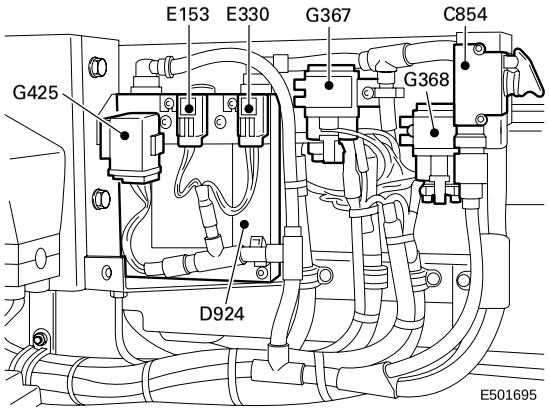
ATTENTION: switch C854 must be in the “main switch on” position (connection between contacts 1 and 2).

Switch C853 (switch for main switch in cab) connects the C1 and C2 connections to the C4 and C5 connections via wire 4176, contacts 5 - 7 of switch C853, wire 4177, contacts 1 - 2 of switch C854 and wire 4178. Relays G367 and G368 are immediately energised through wire 4174 and connection point A3 (A3 is connected to earth for 0.5 seconds). This closes the connection between points 88a and 88 of both relay G367 and relay G368. The positive and the negative terminals of the batteries are now connected to the vehicle’s power supply.
Immediately after switch C853 closes, connection point C2 is internally connected to point A7.

Connection point A5 is connected to the positive terminal via wire 3173 after connection point 88 of relay G367.
This connection transmits a signal to the ECU to indicate that relay G367 has switched.

Closing the main switch electrically on the chassis

ATTENTION: switch C853 must be in the “main switch on” position (connection between contacts 5 and 7).



Switch C854 (switch for main switch on the chassis) connects the C1 connection to the C4 and C5 connections via wire 4176, contacts 5 - 7 of switch C853, wire 4177, contacts 1 - 2 of switch C854 and wire 4178. Relays G367 and G368 are immediately energised through wire 4174 and connection point A3 (A3 is connected to earth for 0.5 seconds). This closes the connection between points 88a and 88 of both relay G367 and relay G368. The positive and the negative terminals of the batteries are now connected to the vehicle’s power supply.

Immediately after switch C854 closes, connection point C2 is internally connected to point A7.

Connection point A5 is connected to the positive terminal via wire 3173 after connection point 88 of relay G367. This connection transmits a signal to the ECU to indicate that relay G367 has switched.

The main switch (D924) can be opened:
- electrically in the cab
- electrically on the chassis

Opening the main switch electrically in the cab

ATTENTION: switch C854 must be in the “main switch on” position (connection between contacts 1 and 2).

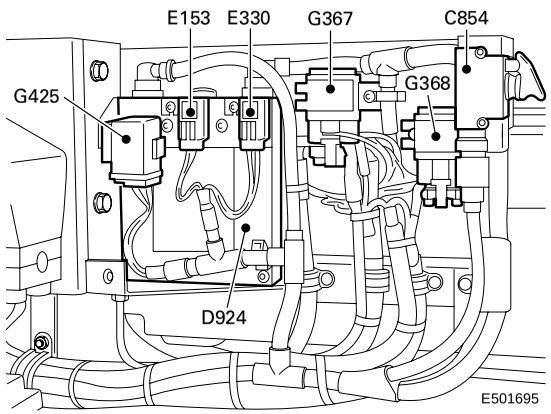
Switch C853 (switch for main switch in cab) disconnects wire 4176, contacts 5 - 7 of switch C853, wire 4177, contacts 1 - 2 of switch C854 and the C1 and C2 connections from the C4 and C5 connections via wire 4178.

Two actions are carried out immediately after switch C853 is opened:
1. Connection point A7 is connected to earth (A2).
2. After a delay of approx. 6 seconds, relays G367 and G368 are connected to earth for approx. 0.5 sec. via wire 4175 and connection point A4. This breaks the connection between points 88a and 88 of relays G367 and G368. The positive and the negative terminals of the batteries are now disconnected from the vehicle's power supply.

If the engine is running, it is switched off.

Connection point A5 is connected to the positive terminal via wire 3173 after connection point 88 of relay G367. This connection transmits a signal to the ECU to indicate that relay G367 has switched.

Opening the main switch electrically on the chassis



ATTENTION: switch C853 must be in the "main switch on" position (connection between contacts 5 and 7).

Switch C854 (switch for main switch in cab) breaks the C1 and C2 connections to the C4 and C5 connections via wire 4176, contacts 5 - 7 of switch C853, wire 4177, contacts 1 - 2 of switch C854 and wire 4178.
Two actions are carried out immediately after switch C854 is opened:
1. Connection point A7 is connected to earth (A2) in the unit.
2. After a delay of approx. 6 seconds, relays G367 and G368 are connected to earth for approx. 0.5 seconds via wire 4175 and connection point A4. This breaks the connection between points 88a and 88 of relays G367 and G368. The positive and the negative terminals of the batteries are now disconnected from the vehicle's power supply.

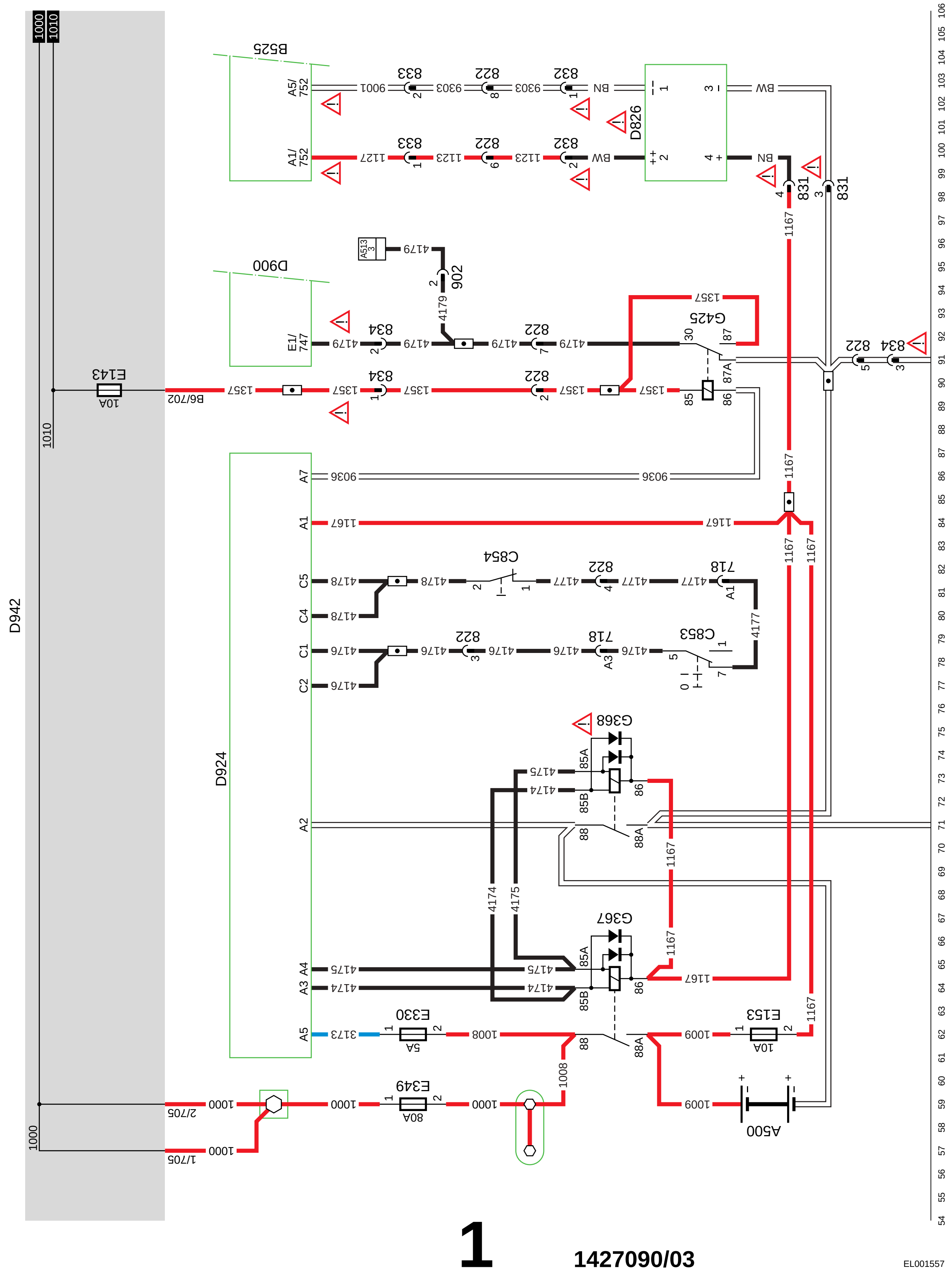
If the engine is running, it is switched off.

Connection point A5 is connected to the positive terminal via wire 3173 after connection point 88 of relay G367. This connection transmits a signal to the ECU to indicate that relay G367 has switched.

Note:
When one of the switches (C853 or C854) that activate the electronic unit (close main switch) is operated, relays G367 and G368 are activated after approximately 3 seconds. If one of the switches is operated again within the 3 seconds, the electronic unit (D924) will select the priority 'main switch ON'.

VARIANTS

Location	
76	G368, main switch relay, earth fitted depending on the requirements for transporting hazardous substances
88,90	These wires are only present if ADR is fitted
94	Earth connection to connector 834 is only present if ADR is fitted
97	Connector 831: Only present if the system is fitted with an external current limiter (D826)
98,101	Connector 832: Only present if the system is fitted with an external current limiter (D826)
99	Electronic unit for VLG current limiter (D826): Fitted depending on the requirements for transporting hazardous substances. Version with production date < 2002-49: current limiter (D826) used as shown
98,101	Version with production date > 2002-49: current limiter integrated into the MTCO (B525)


D942
D924
D900
B525
D826
G425
G368
G367
C854
C853
E143
E330
E349
E153
A500
1
1427090/03
EL001557

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2. IGNITION/STARTER SWITCH/CHARGING CIRCUIT

CONTACT CIRCUIT
When ignition/starter switch C841 is turned to the “accessories” position (contact 1 connected to contact 6), the “accessories” relay (G355) is energised via wire 1130.
If ignition switch C841 is turned further (contact 1 is connected to 4), ignition relay G015 will be activated via wire 4001. Wire 1010 is supplied with power.

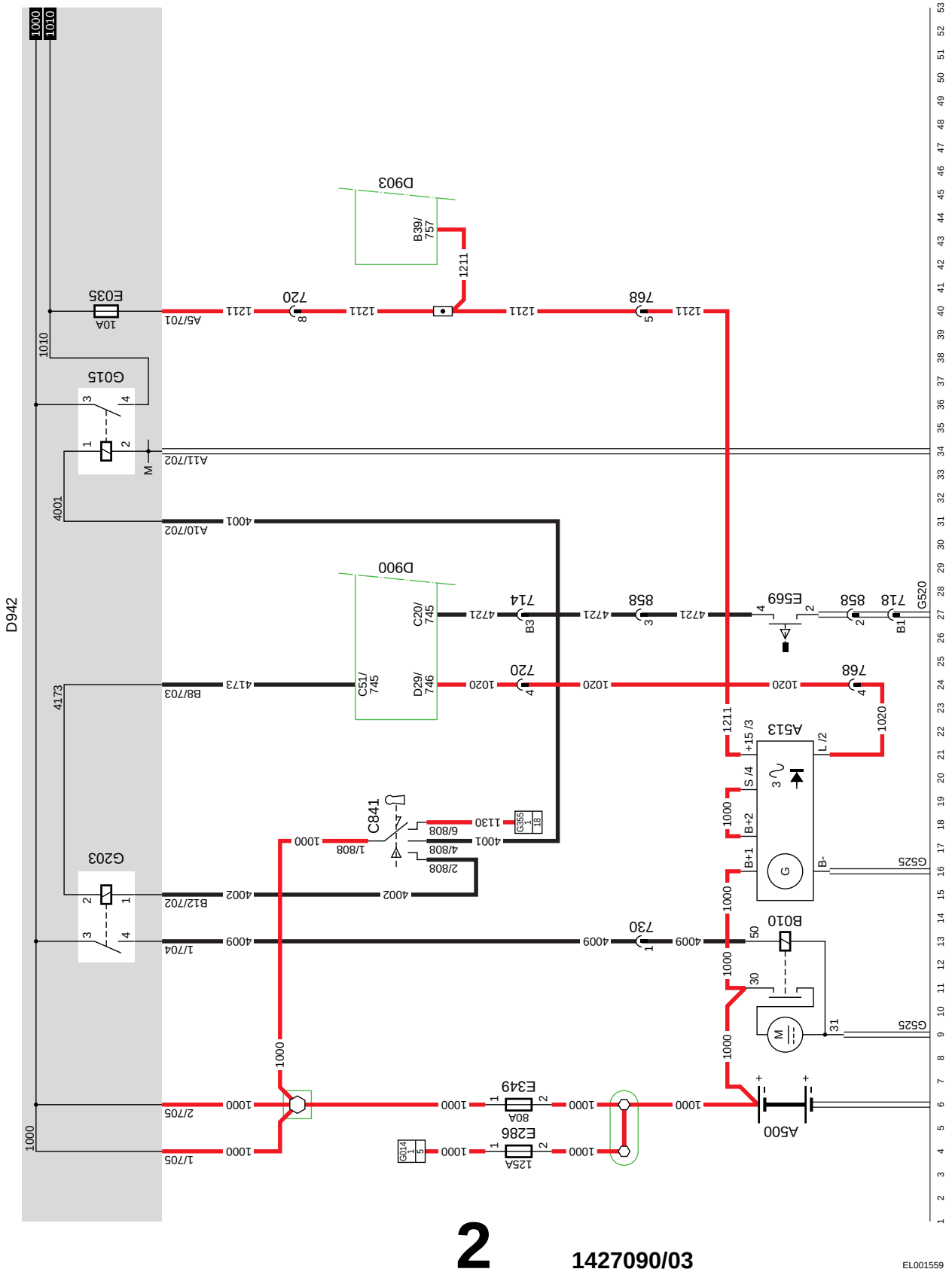
STARTING CIRCUIT
When the contact switch is turned to the “start” position, contacts1 and 2 in this switch are connected. Power is supplied to relay G203 via wire 4002. The VIC (D900) connects G203 to earth when the neutral position switch (E569) in the gearbox is closed. Relay G203 now supplies power via wire 4009 to connection point 50 of the starter motor (B010). As a result, the starter motor is energised.
This means that if the gearbox is not in neutral the VIC does not connect relay G203 to earth and the relay is therefore not energised.

CHARGING CIRCUIT
When the ignition is switched on, power is supplied to both the B+ connection and connection 15 (pin 3) of the alternator.
An internal resistor in the alternator is energised by an IC in the carbon brush holder. This resistor ensures that a low level of current passes through the energising resistor. This excites a magnetic field in the alternator.

After starting, the voltage on terminals B+ and 15 (pin 3) will rise to about 28.5 V. Once this voltage is reached, the control IC in the regulator interrupts the pre-exciter coil to enable the voltage to be regulated. The magnetic field will now disappear, so that the generator will not be energised for a short period of time. As a result, the voltage on outputs B+ and 15 will drop.
The regulator reactivates when the voltage drops below 27.6 V. This means that the voltage supplied by the generator remains relatively constant. The batteries are supplied through generator output B+1.

The alternator charging current warning lamp is activated via wire 1020, which is connected to the VIC (D900). The VIC controls the DIP via the CAN network. The voltage on wire 1020 is switched by the control IC. Errors are also shown on the DIP display through this connection.

The alternator is also equipped with a ‘sens’ connection (pin 4). However, this connection is not used and is now connected directly to B+2. The function of this connection is to correct the voltage difference between B+ and the batteries.



2 **1427090/03**

EL001559

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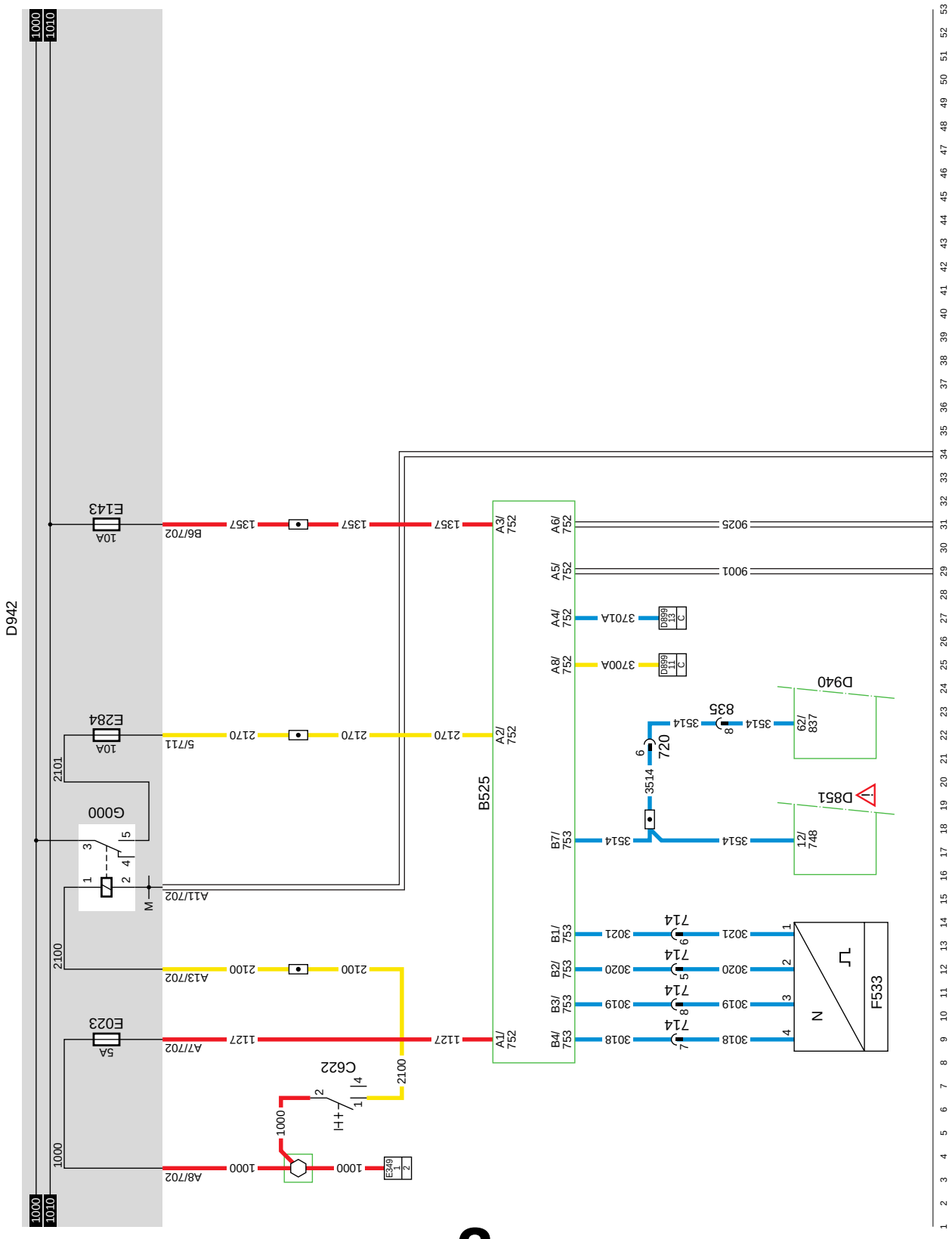
3. TACHOGRAPH

SEE THE SYSTEM MANUAL FOR MORE INFORMATION

Location

19 Electronic unit, ECAS-3 (D851): If ECAS-2 fitted, then electronic unit D802



3 **1427090/03** EL001560

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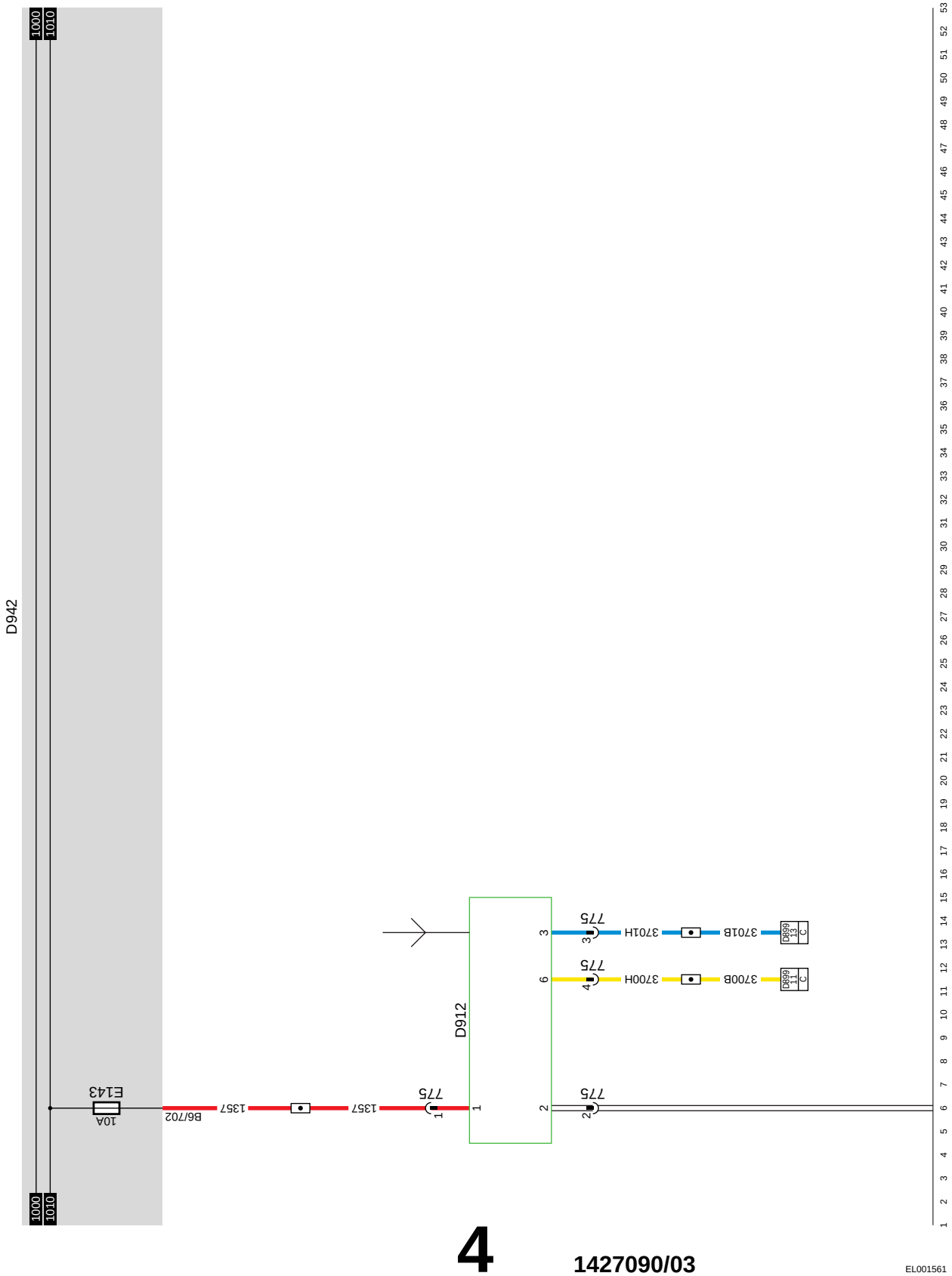
4. IMMOBILISER
SEE THE SYSTEM MANUAL FOR MORE INFORMATION



4 **1427090/03**

EL001561

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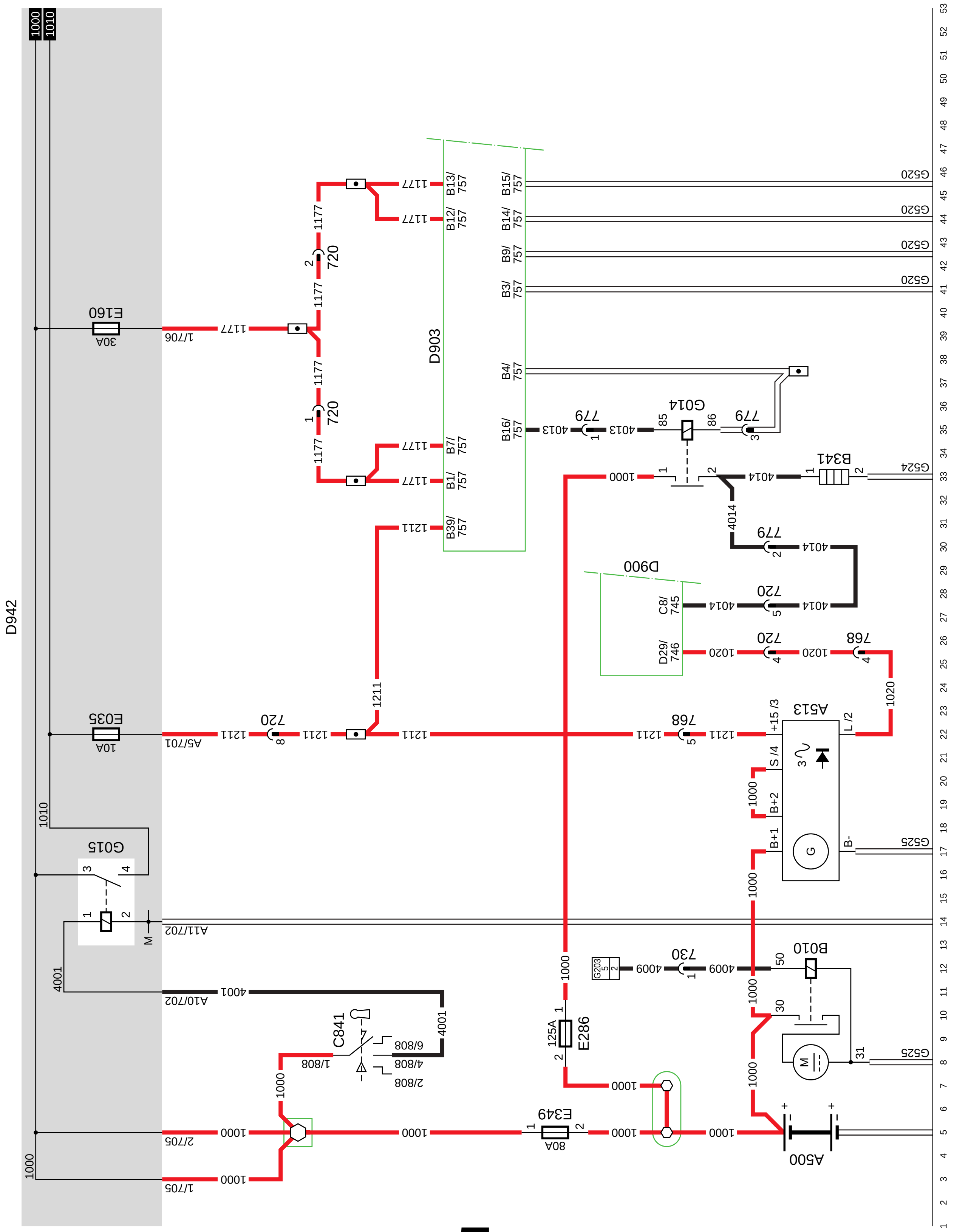
5. PRE-GLOWING
SEE THE SYSTEM MANUAL FOR MORE INFORMATION



5 **1427090/03**

EL001562

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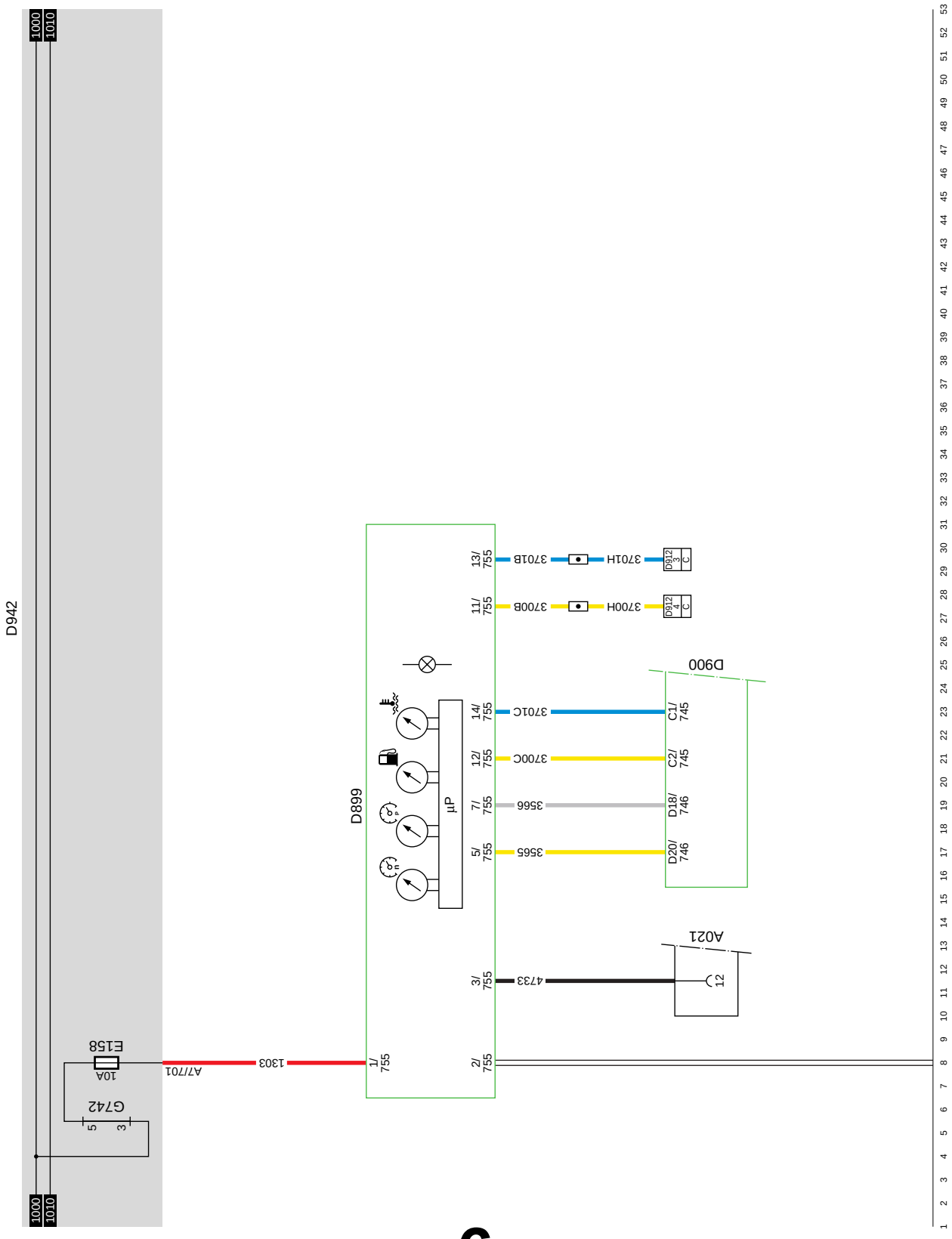
6. DIP-4
SEE THE SYSTEM MANUAL FOR MORE INFORMATION



6 **1427090/03**

EL001563

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7. DIRECTION INDICATORS AND WARNING LIGHTS

SEE THE SYSTEM MANUAL FOR MORE INFORMATION

VARIANTS

Location	
15,18	Connector 763:
	Not fitted on vehicle type FT
26,28,31	Connector 762:
	Not fitted on vehicle type FT

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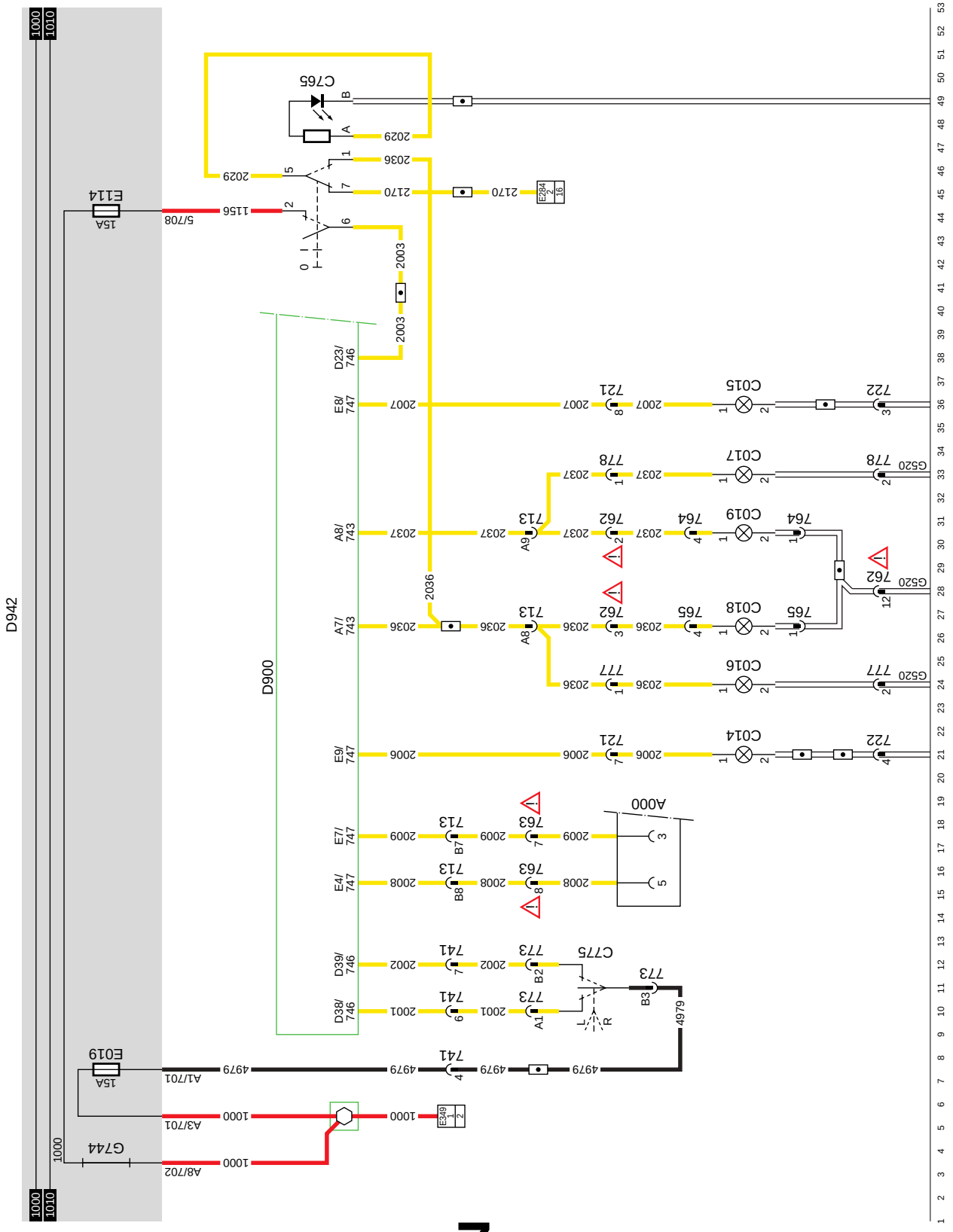
D942
D900
C765
E114
15A
E019
G744
A000
C015
C017
C019
C018
C016
C014
C775
E284
E349
1000
1010
2029
2036
2170
1156
2003
2007
2037
2009
2008
2002
2001
4979
1000
A1/701
A3/701
A8/702
5/708
D23/746
E8/747
A8/743
A7/743
E9/747
E7/747
E4/747
D39/746
D38/746
721
722
778
762
764
765
777
763
713
741
773
EL001564

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1427090/03

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8. VIC

SEE THE SYSTEM MANUAL FOR MORE INFORMATION

VARIANTS

Location

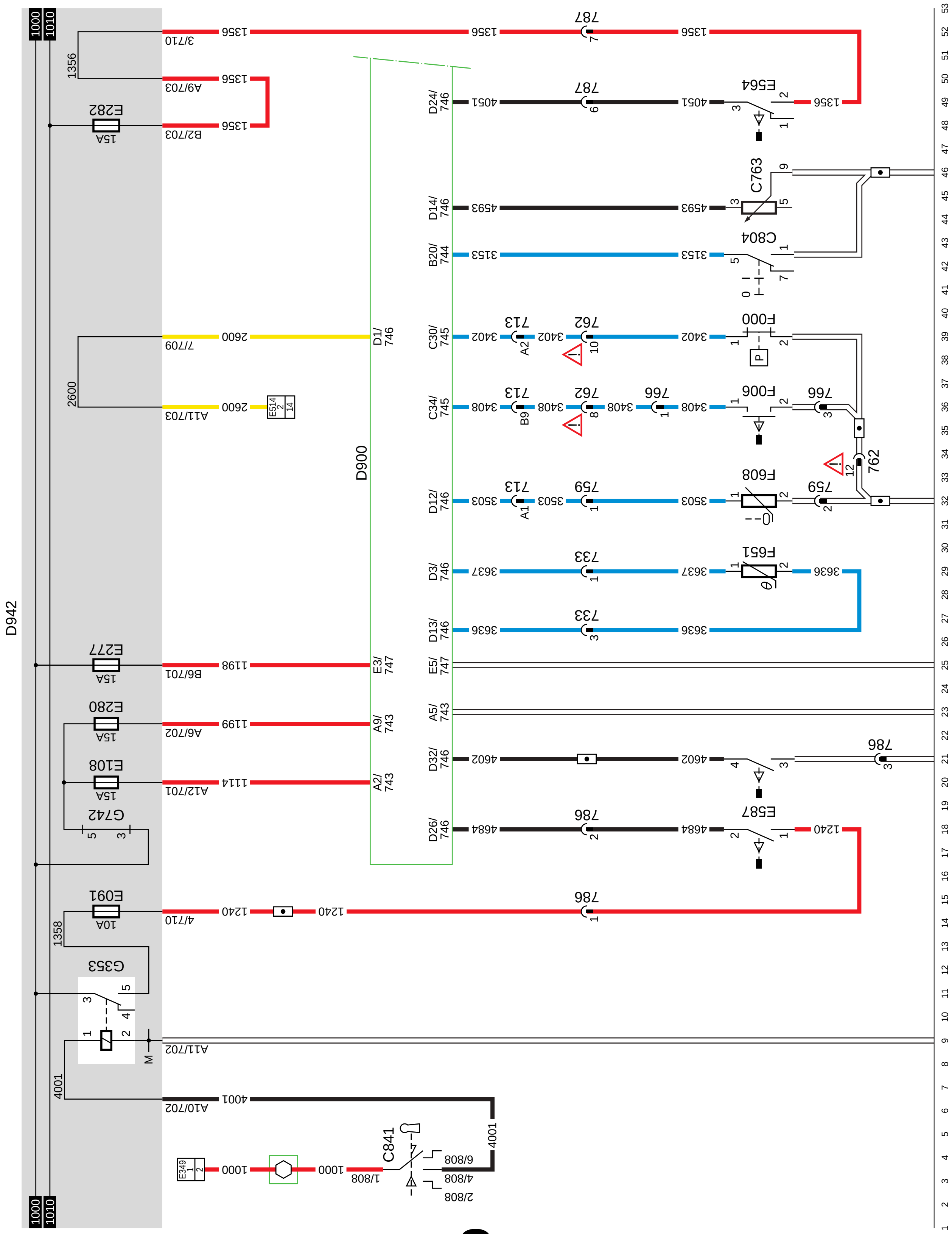
33,39 Connector 762:
Not fitted on vehicle type FT

88 Electronic unit, ABS/ASR-E (D961): If ABS-D fitted, then electronic unit D941

116 Electronic unit, automatic gearbox, AGC-T1000/2000 (D936): If MD3060 gearbox is fitted, the electronic unit is for AGC-A4 automatic gearbox operation (D866)

156 Connector 780:
Not fitted on vehicle type FA. Wire 2155 only fitted in application connector A070

182 Connector 763: Not fitted on vehicle type FT



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1427090/03

EL001565

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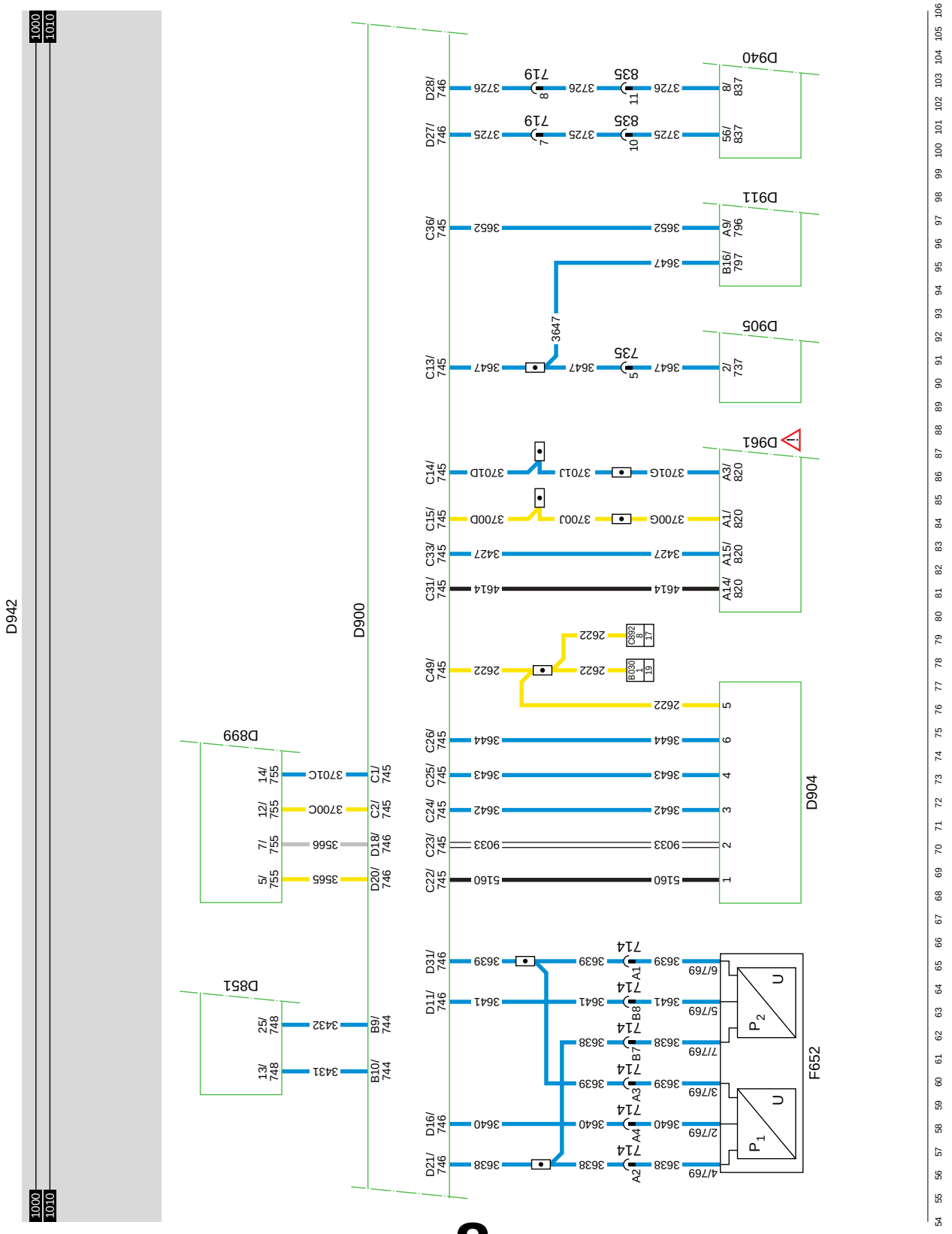
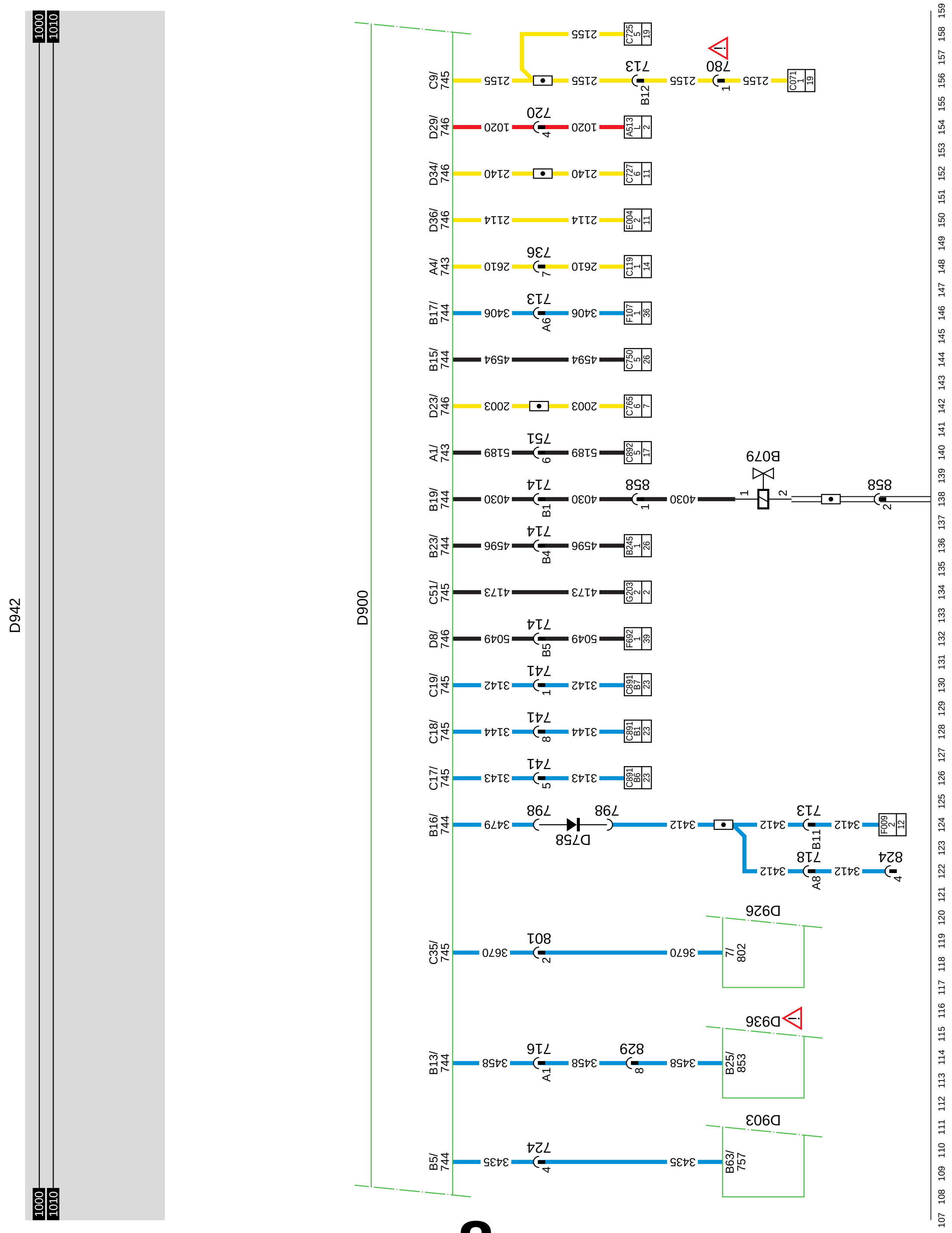
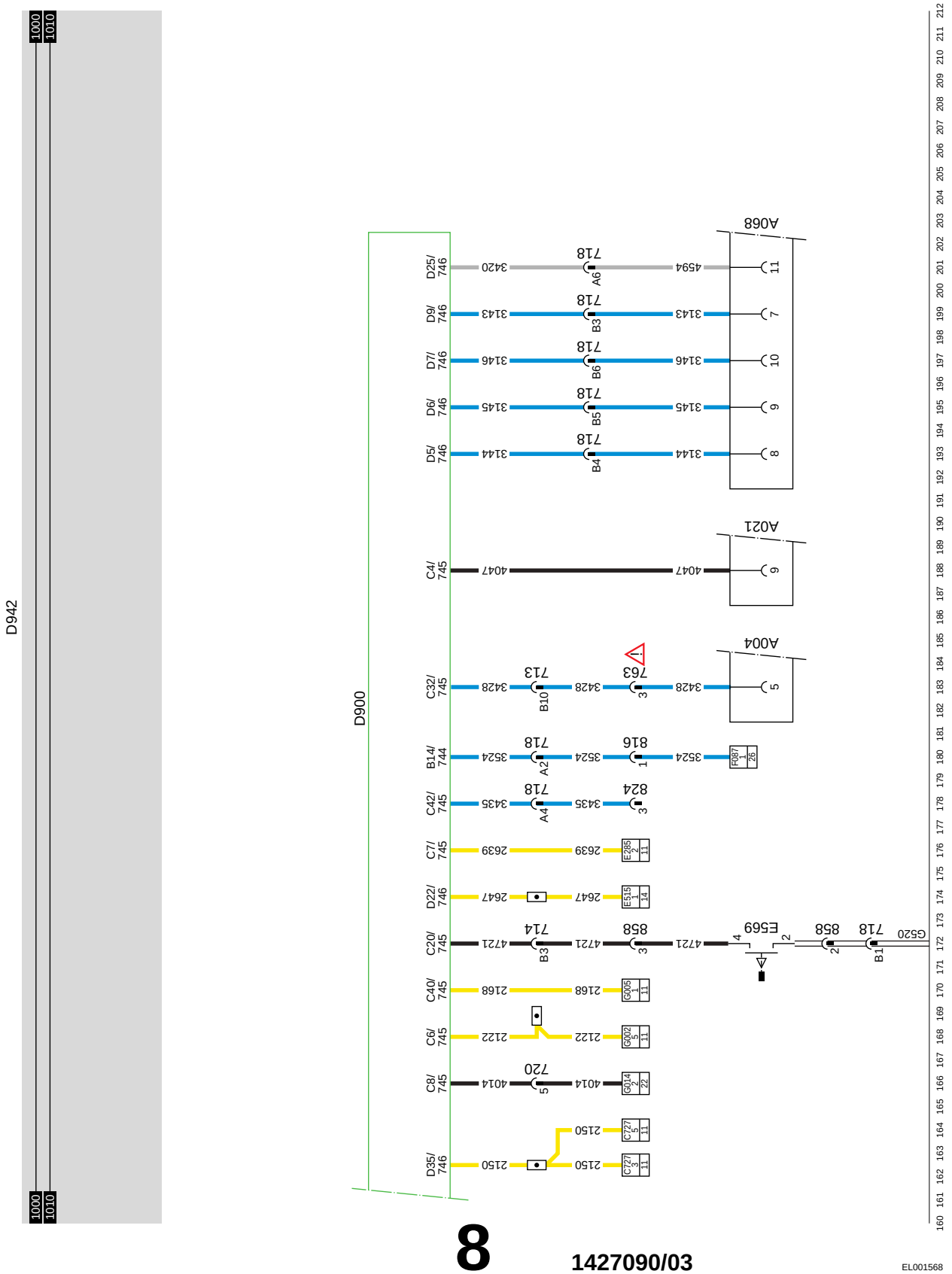




8 **1427090/03**



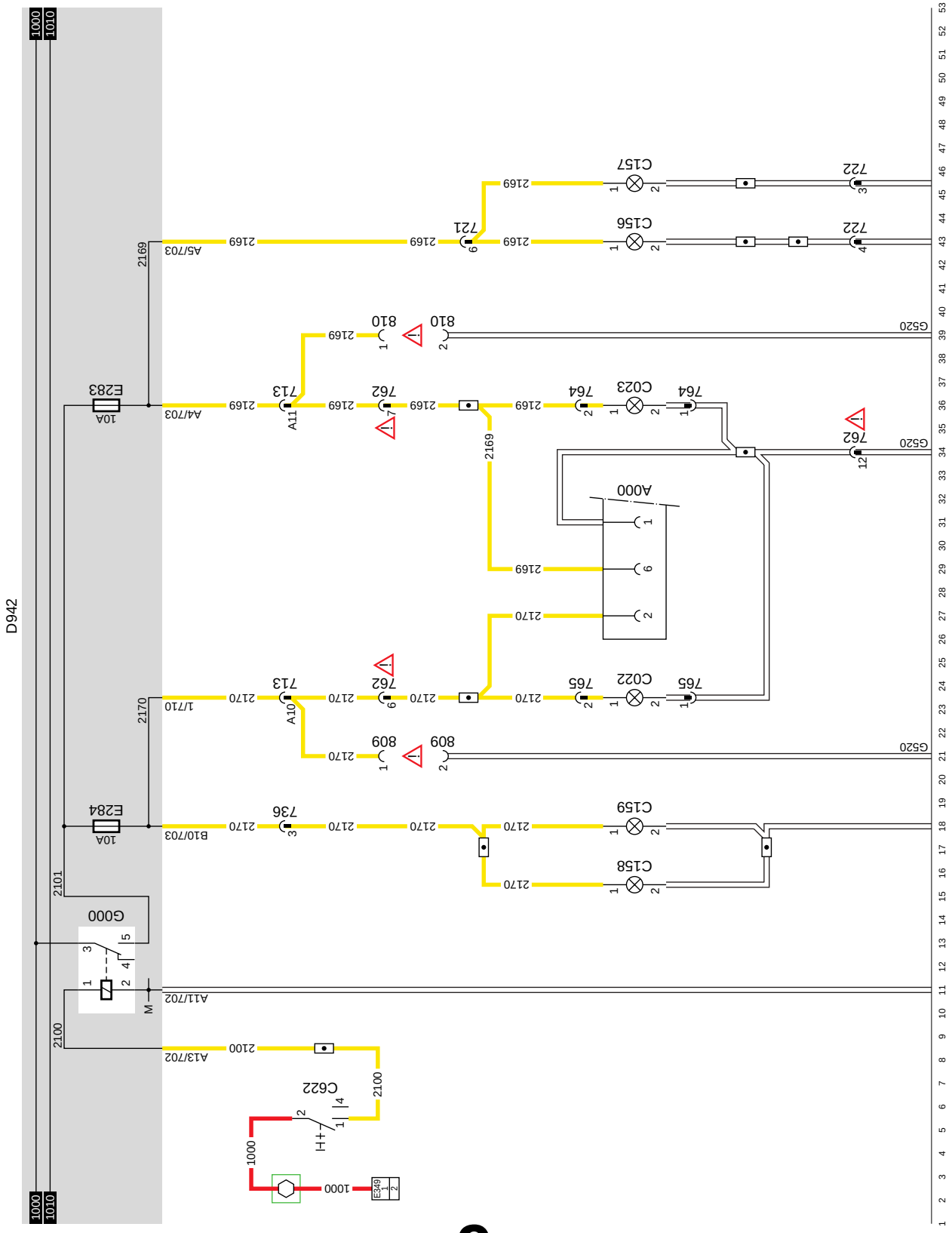
9. MARKER LIGHTS/PARKING LIGHTS/TAIL LIGHTS, FA/FT

By switching the lighting switch (C622) to the 1st position (connection between contacts 2 and 1), relay G000 is activated through wire 2100. Relay G000 provides the left/right marker lighting on top of the cab and the left tail light with voltage through fuse E284, wire 2170. A connection is also fitted in drawn vehicle socket A000 (pin 2).
The right-hand tail light and the parking light receives power via fuse E283, wire 2169.
A connection is also provided in drawn vehicle socket A000 (pin 6).

VARIANTS

Location	
21	Connector 809: Only fitted on vehicle type FA
24	Connector 810: Only fitted on vehicle type FA
34,36,39	Connector 762: Not fitted on vehicle type FT

10



9 **1427090/03**

EL001569

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10. REVERSING LIGHTS/BUZZER

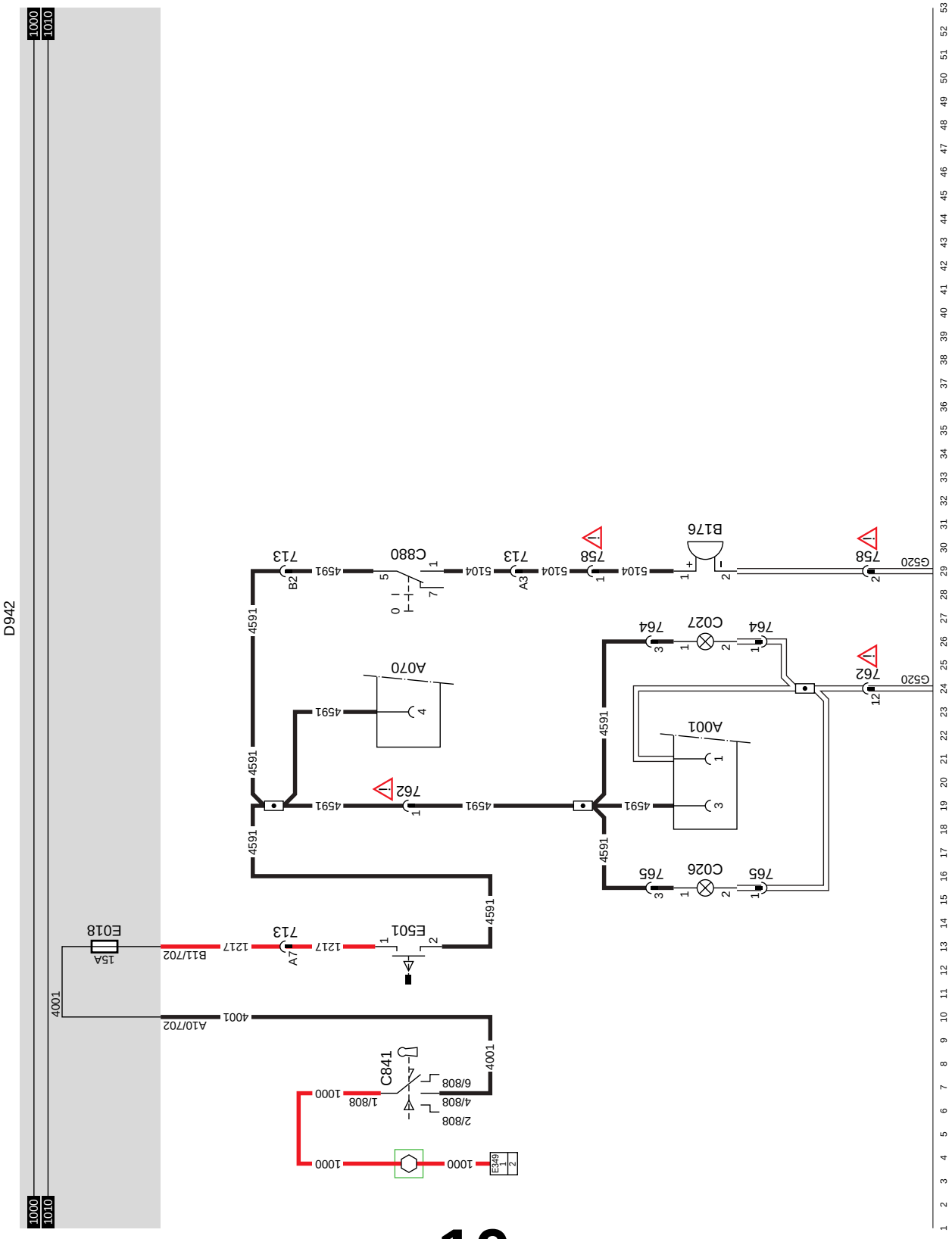
When the contact is switched on, power is supplied to the reversing light switch (E501) via E018 and wire 1217.
This switch is mounted in the gearbox. The contacts are closed when the gearbox is switched to the "reverse" position.
Power is then supplied via wire 4591 to the reversing lights (C026/C027) and drawn vehicle connector A001.
The reversing buzzer (B176) can only be activated via wire 5104 if the dashboard switch (C880) is in position I. Switching C880 to the 0 position turns off the reversing buzzer.
The application connector (A070) also has a connection that is switched by the reversing light switch (E501).

VARIANTS

Location

22, 27 Connector 762:
Not fitted on vehicle type FT

32 Connector 758:
Not fitted on vehicle type FT



10 **1427090/03**

EL001570

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11. LIGHTING/DIPPED BEAM/MAIN BEAM/SWEDISH LIGHTING/FOG LAMPS

MARKER, PARKING AND TAIL LIGHTS
FOR SECTION DIAGRAM AND EXPLANATION: SEE SECTION DIAGRAM 9

LIGHT SWITCH

Position 1 (“town lights”)
By switching the lighting switch (C622) to the 1st position (connection between contacts 2 and 1), relay G000 is activated through wire 2100. Relay G000 provides power to the marker lights and tail lights and to the fog lamps switch (C727), pins 1 and 2. This is done via fuse E285, wire 2639. There is also a connection via the same fuse and wire to the VIC (pin C7/745) for the “light on” buzzer (in DIP).

Position 2 (“dipped beam”)
By switching the lighting switch (C622) to the 2nd position (connection between contacts 2 and 4), relay G001 is energised through wire 2110. Power for the dipped beam headlights (C000) and the VIC is supplied via fuse E004 and wire 2114 through pin D36/746.
Dipped beam C001 is supplied with power via fuse E005 and wire 2113.
Diode D609 ensures that relay G000 remains activated when the light switch is turned to position 2.

MAIN BEAM

“Signalling light”
Steering column switch C775 is supplied with power before contact at pin B3. This power supply is used for signalling. During signalling, points B3 and B4 are connected to each other. This is a spring-loaded connection.
Relay G002 is activated via wire 2120. Relay G002 supplies power to the main beam headlights (C002/C003) via fuse E006, through-connection G743 and wire 2122. Wire 2122 is also connected to pin C6/745 of the VIC and the spotlights (C006/C007). The VIC switches on the “main beam” indicator in the DIP via the I-CAN.
Diode D610 prevents voltage from getting to relays G000 and G001 through connection A4 when the main beam switch is pulled back further during signalling. Otherwise this would activate all the other lights during signalling.

“Main beam”
When the main beam headlights are switched on, points A4 and B4 of the steering column switch (C775) are connected to each other.
Pin A4 is supplied with power via diode D610 when light switch C622 is turned to position 2.
Relay G002 is then again energised via wire 2120, as a result of which the main beam headlights (C002/C003) will come on.

SWEDISH LIGHTING
Swedish lighting is provided using through-connection G735. When the vehicle ignition is switched on, relays G000 and G001 are directly activated via fuse E282. As a result, the dipped beam headlights are activated and the fog lamp switch (C727) is supplied with power.
Diodes D784 and D785 are fixed on the PCB of the fuse box. In vehicles that do not have Swedish lighting, diode D784 prevents relay G001 from being activated when the light switch (C622) is in position I. Diode D785 prevents relay G000 from being activated when the light switch is moved to position II.

The interior lighting will NOT switch off when the engine is started.

FRONT FOG LIGHTS
Moving the fog lamp switch (C727) to position I (fog lamps, front) activates relay G004 via wire 2140, provided that light switch C622 is in position 1. Relay G004 supplies the front fog lamps (C008/C009) with power through fuse E009 and wire 2142. The VIC (D900) also receives power through wire 2140 at pin D34/746. The VIC switches on the "front fog lamps" indicator on the instrument panel through I-CAN.

REAR FOG LIGHTS
When the fog lamp switch (C727) is set to position II, which is spring-loaded, the VIC receives a voltage signal at pin D35/746, provided that light switch C622 is in position 1. The VIC then activates relay G005 through pin C40/745. Relay G005 supplies power to the rear fog lamps (C024/C025) via fuse E009, wire 2152.
If the lighting or the ignition has been turned off and the lighting is then turned on again, the fog lamp switch (C727) will have to be re-set to position II in order to switch on the rear fog lamps.
Power is also supplied to drawn vehicle connector A001 (pin 7) via wire 2152.

SPOTLIGHT
Operating the main beam switch (C775) energises main beam relay G002 via wire 2120. Relay G002 supplies power to the spotlights (C006/C007) via fuse E006 and wire 2122.

VARIANTS

Location	
9	Removable through-connection G735 for Swedish lighting (see label on fuse box)
11	The diode is located on PCB D492
15	Diode located in diode block on the bottom of the central console
18	Diode located in diode block on the bottom of the central console
24	If only a rear fog light is fitted, switch C727 is replaced by switch C773.
26	The diode is located on PCB D492
76,81	Connector 762: Not fitted on vehicle type FT

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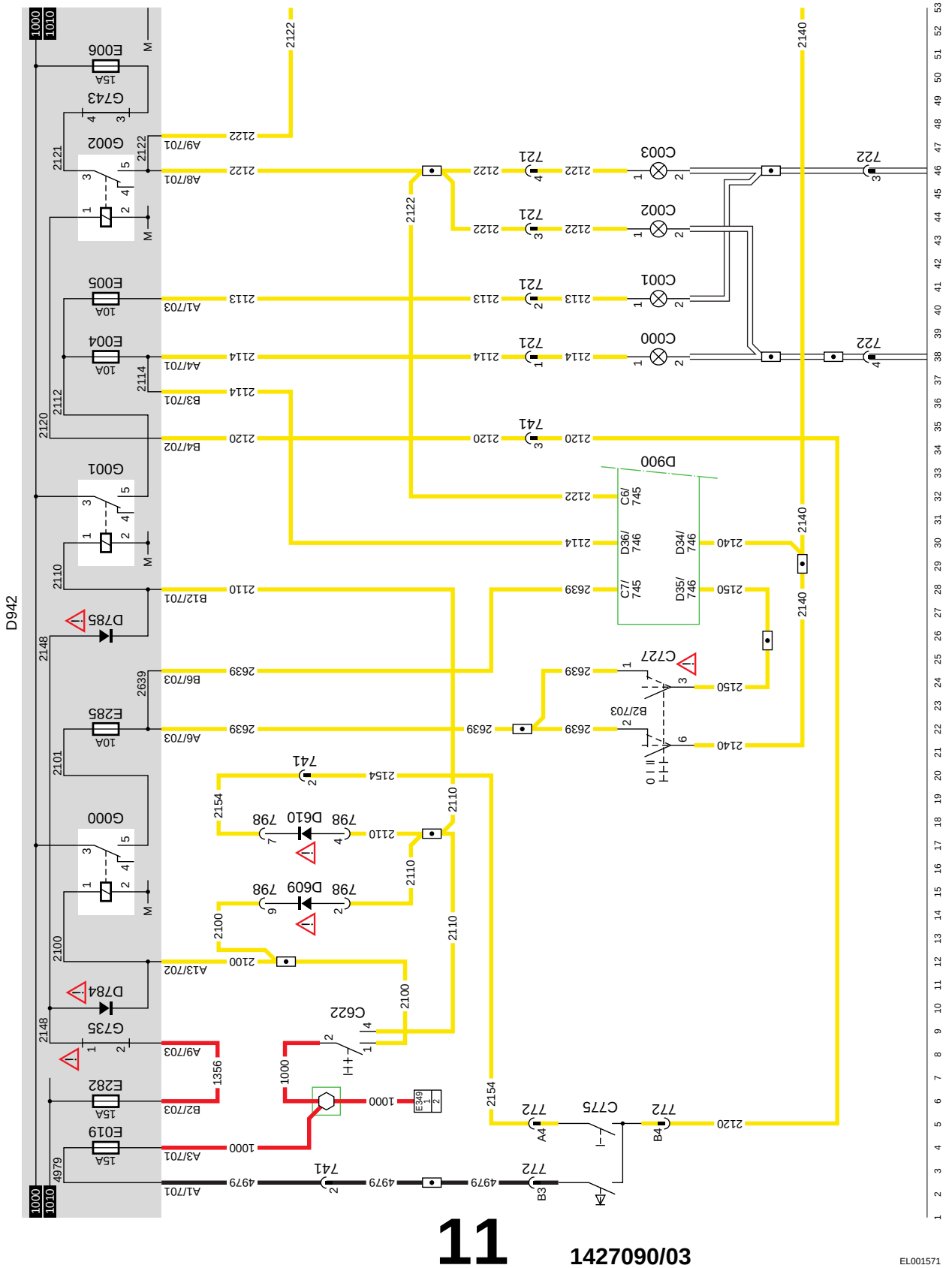

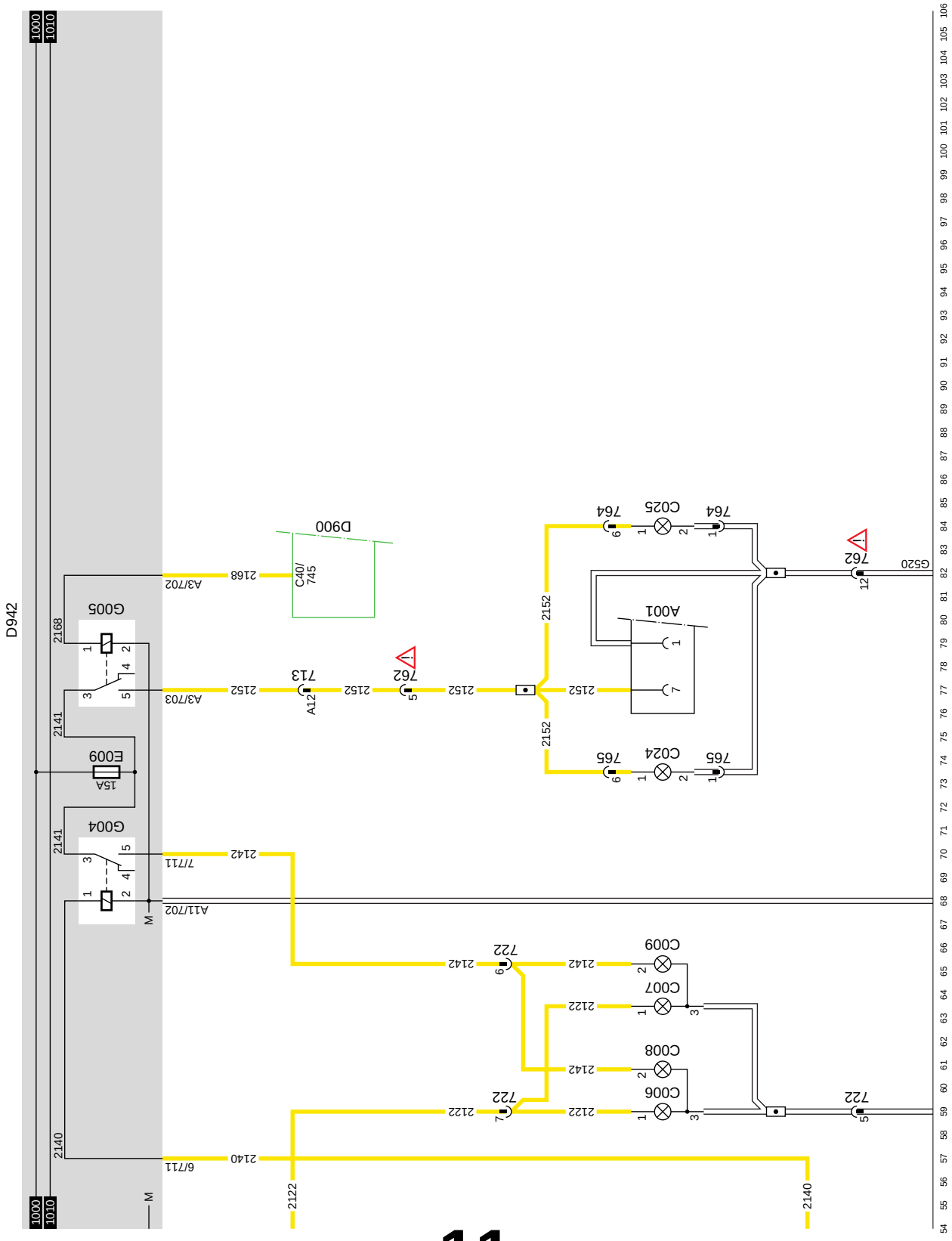

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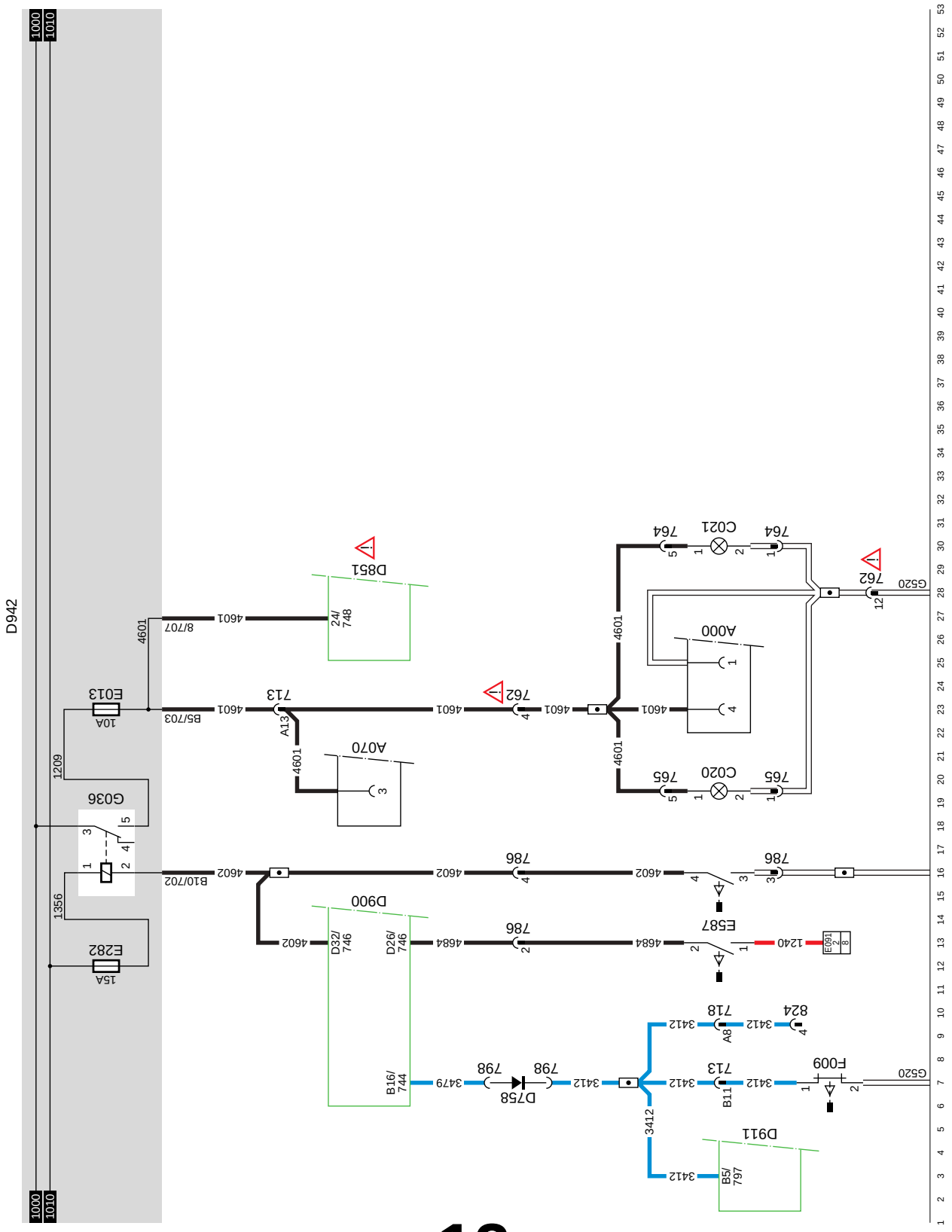
12. STOP LIGHTS/CAB TILTING GEAR

STOP LIGHTS
When stop light/clutch operating switch E587 is operated (connection between contacts 4 and 3) by depressing the brake pedal, relay G036 is energised via wire 4602. Power will also be supplied to the VIC (pin D32/746). Through fuse E013, wire 1209, contacts 3 and 5 of relay G036 and wire 4601 a voltage is now applied to the right stop light (C021) and the left stop light (C020), so that they come on. The lights that are connected via drawn vehicle socket A000 will also come on. The ECAS-3 unit (D851) or ECAS-2 unit (D802) then also receives a signal.
Application connector A070 is also connected to wire 4601.

CAB TILTING GEAR
The switch for the cab lock (F009) is a "normally closed" switch. The switch is opened when the cab is in the driving position. When the cab is tilted, the switch closes and pin B16/744 of the VIC is connected to earth via wire 4312.
When the alarm is active it knows that the cab is in the driving position because a small current goes to earth through the control switch for cab tilting (F009). Diode D758 prevents this current from also flowing to earth through the VIC (the VIC in sleep mode), in which case the alarm would not know whether the cab is being tilted intentionally or by accident.

VARIANTS

Location	
23,28	Connector 762: Not fitted on vehicle type FT
29	Electronic unit, ECAS-3 (D851): On a 6x2 vehicle, ECAS-2 electronic unit D802 (7/340)


D942
1000
1010
D851
24/ 748
8/707
4601
E013
10A
B5/703
713
A13
762
A070
A000
C021
764
C020
765
G520
12
1209
G036
1356
E282
15A
B10/702
4602
786
D900
D32/ 746
D26/ 746
4684
E587
1240
E091
824
718
A8
3412
B16/ 744
3479
798
D758
B11
713
F009
D911
B5/ 797
3412
12
1427090/03
EL001573

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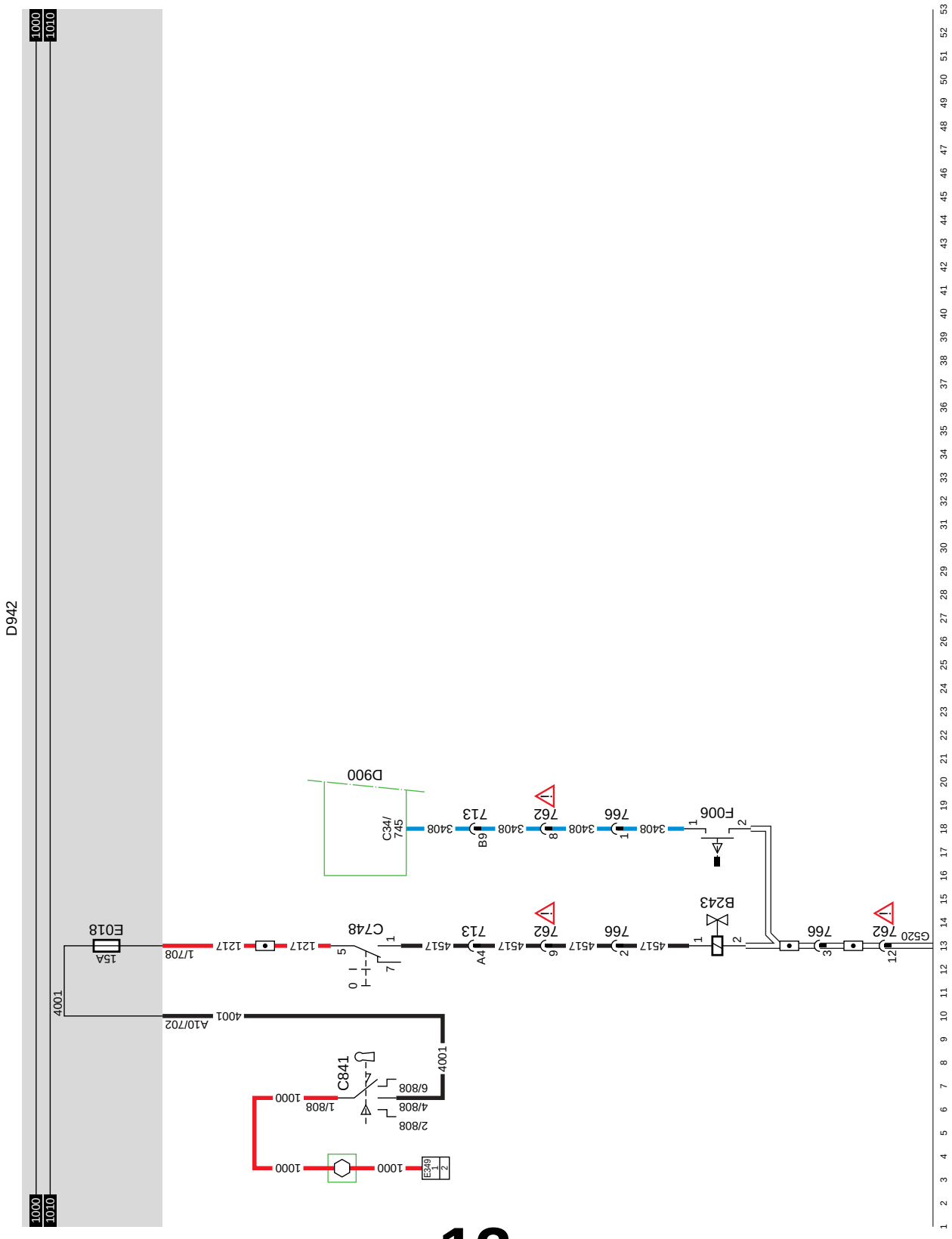
13. DIFFERENTIAL LOCK

If the contact switch (C841) is activated, a voltage is applied through fuse E018 and wire 1217 to the switch for the cross-axle differential lock (C748). If switch C748 is operated, a voltage is applied to the operating valve for the cross-axle differential lock (B243) through wire 4517. If the differential is locked, the differential lock control switch (F006) connects pin C34/745 of the VIC to earth via wire 3408. The VIC will activate the DIP through I-CAN to switch on the "differential lock switched on" indicator.

VARIANTS

Location
17,21 Connector 762:
Not fitted on vehicle type FT



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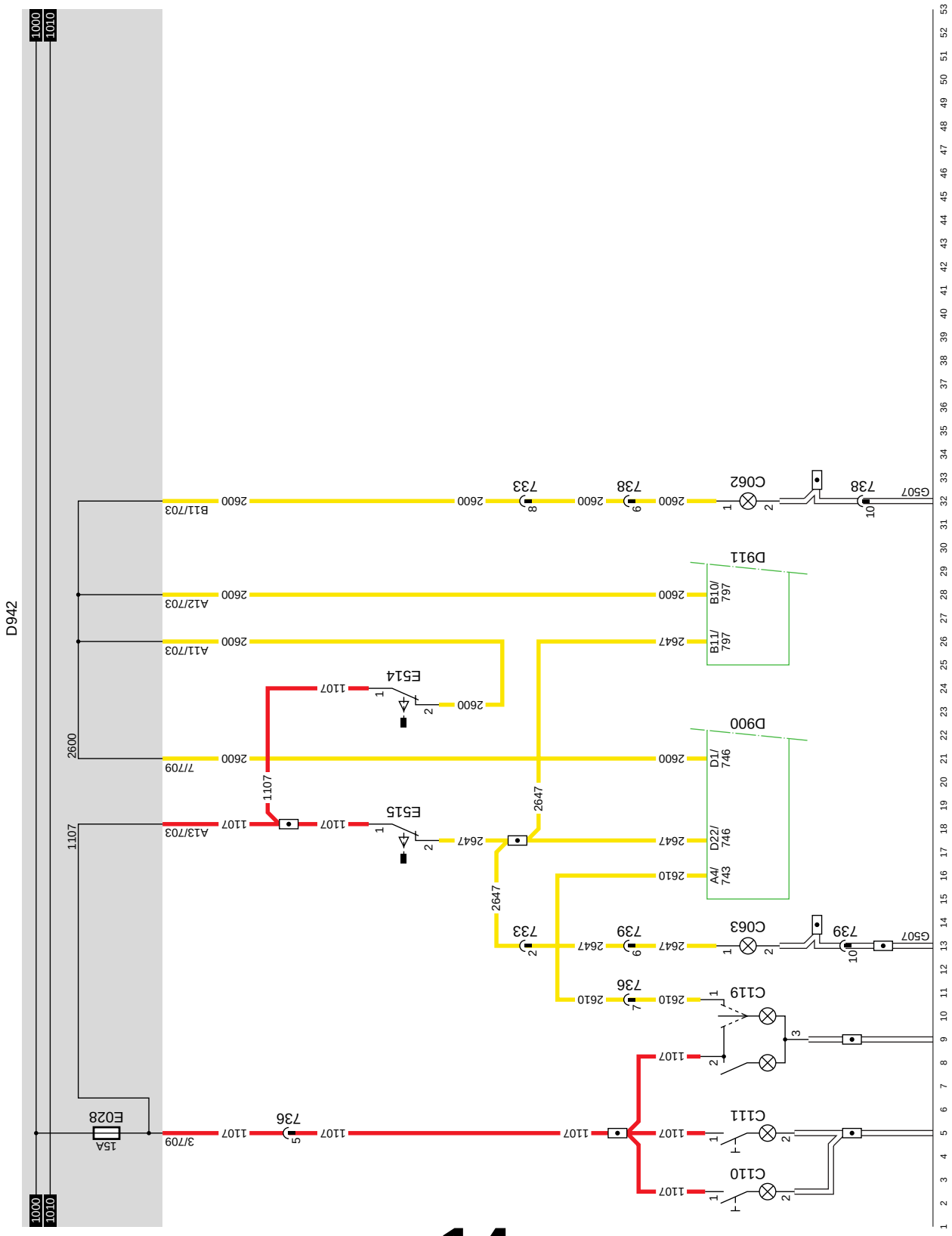
14. INTERIOR LIGHTING

Power is supplied to the door switches (E514 and E515) through fuse E028 and wire 1107. If the door on the driver's side is opened, door switch E514 is activated (connection between 1 and 2). As a result, power will be supplied via wire 2600 to the left-hand stepwell lighting (C062) and to pin D1/746 of the VIC (D900). The VIC also turns on the interior lighting (C119) via pin A4/743, provided that the switches are in the correct position. At the same time, a voltage signal is applied to the alarm system electronic unit (D911) If the alarm system was activated, it can be triggered in this way to activate the alarm horn and hazard warning lights.
Switch E515 provides exactly the same function on the co-driver's side.

When the door on the driver's side is closed (contact between 1 and 2 interrupted), power is no longer supplied to pin D1/746 of the VIC. From this moment, pin A4/743 will continue to be supplied with power for about another 9 seconds.

When the vehicle ignition is switched on, the power supply to pin A4/743 of the VIC will cease immediately. The lighting will be switched off immediately.

In an SL cab, the bunk lights (C110 and C111) receive power through fuse E028. Operating the switches in the bunk lights turns the lights on. The interior lighting (C119) also contains a bunk light function that is activated in exactly the same way.



14 **1427090/03** EL001575

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15. MIRROR HEATING/WINDSCREEN HEATING/MIRROR ADJUSTMENT

MIRROR HEATING

When the ignition/starter switch (C841) is set to the “contact” position (connection between points 1 and 4), relay G353 is energised via wire 4001. This relay supplies power to the mirror heating switch (C867) and the mirror adjustment switch (C868) via fuse E044 and wire 1208.
When the mirror heating switch (C867) is operated, power is supplied to mirror heating B017 (driver’s side) and B018 (co-driver’s side) via wire 4532.
The time-dependent windscreen heating relay (G397) will also be energised. This relay will automatically be de-activated after 12 minutes.

WINDSCREEN HEATING SYSTEM

If the vehicle has a windscreen heating system, the windscreen heating relay (G397) will be energised when the mirror heating system is activated.
The windscreen heating system (B371) will be supplied with power via fuse E299. The windscreen heating relay (G397) will automatically be de-activated after 12 minutes.

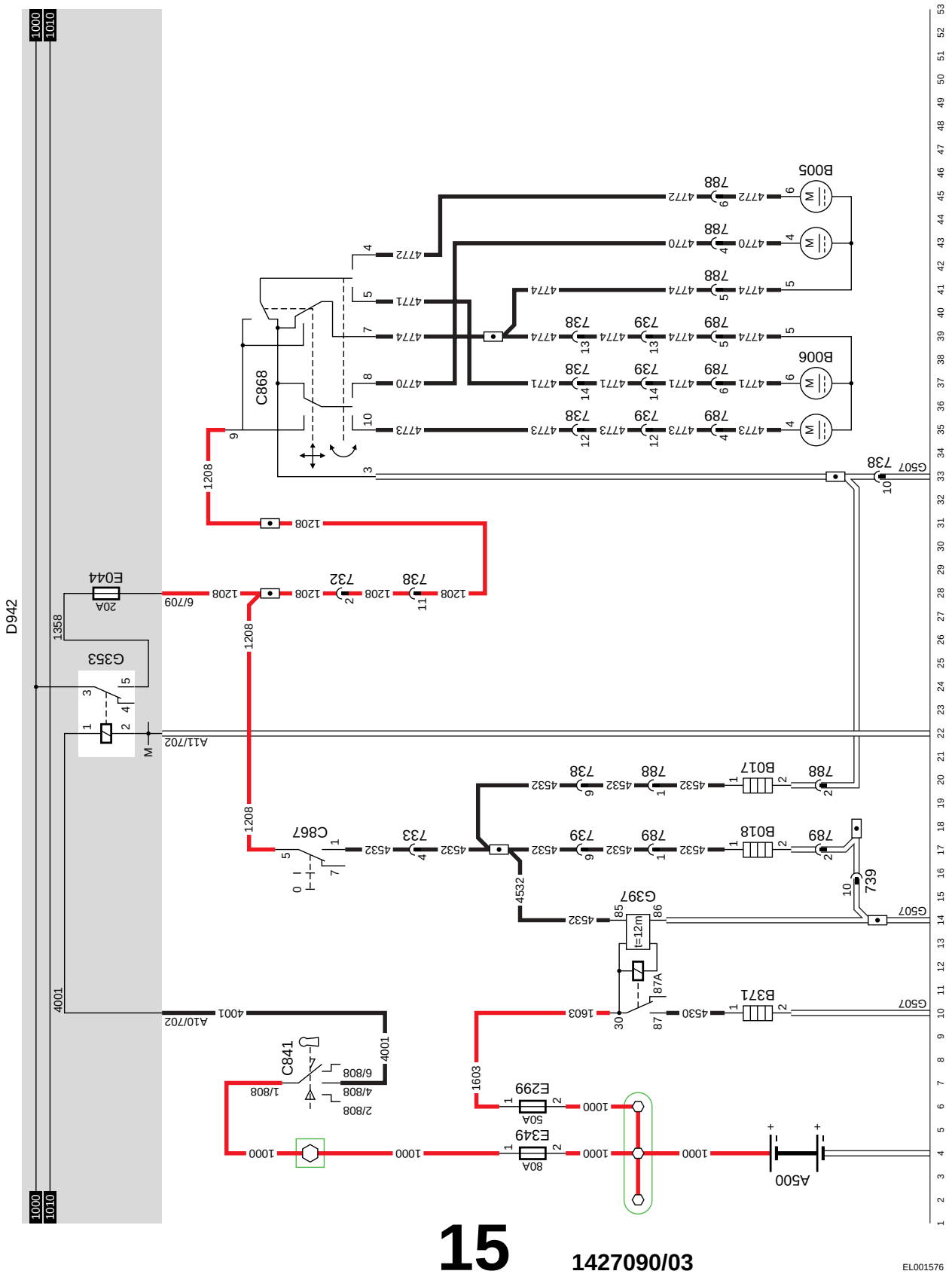
MIRROR ADJUSTMENT

The outside mirrors are adjusted using “joystick” switches C868 (driver’s side and co-driver’s side). If the handle of the switch is moved from the rest position (centre) in a particular direction, power will be supplied to mirror adjustment motor B005 (left-hand side) or B006 (right-hand side) and the mirror in question will follow the movement of the handle.

When pins 10 and 5 are connected, mirror adjustment switch C868 is in the “right mirror” position. When pins 8 and 4 are connected, the mirror adjustment switch is in the “left mirror” position.

For this, wires 4770 and 4774 (left-hand side) or 4771 and 4774 (right-hand side) supply power to the motor for the left/right movement. Wires 4772 and 4774 (left-hand side) or 4771 and 4774 (right-hand side) supply power to the adjusting motor for the up and down movement.

The mirror adjustment system can only be used if the contact relay (G353) is energised.



15 **1427090/03**

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16. SEARCH LIGHTING

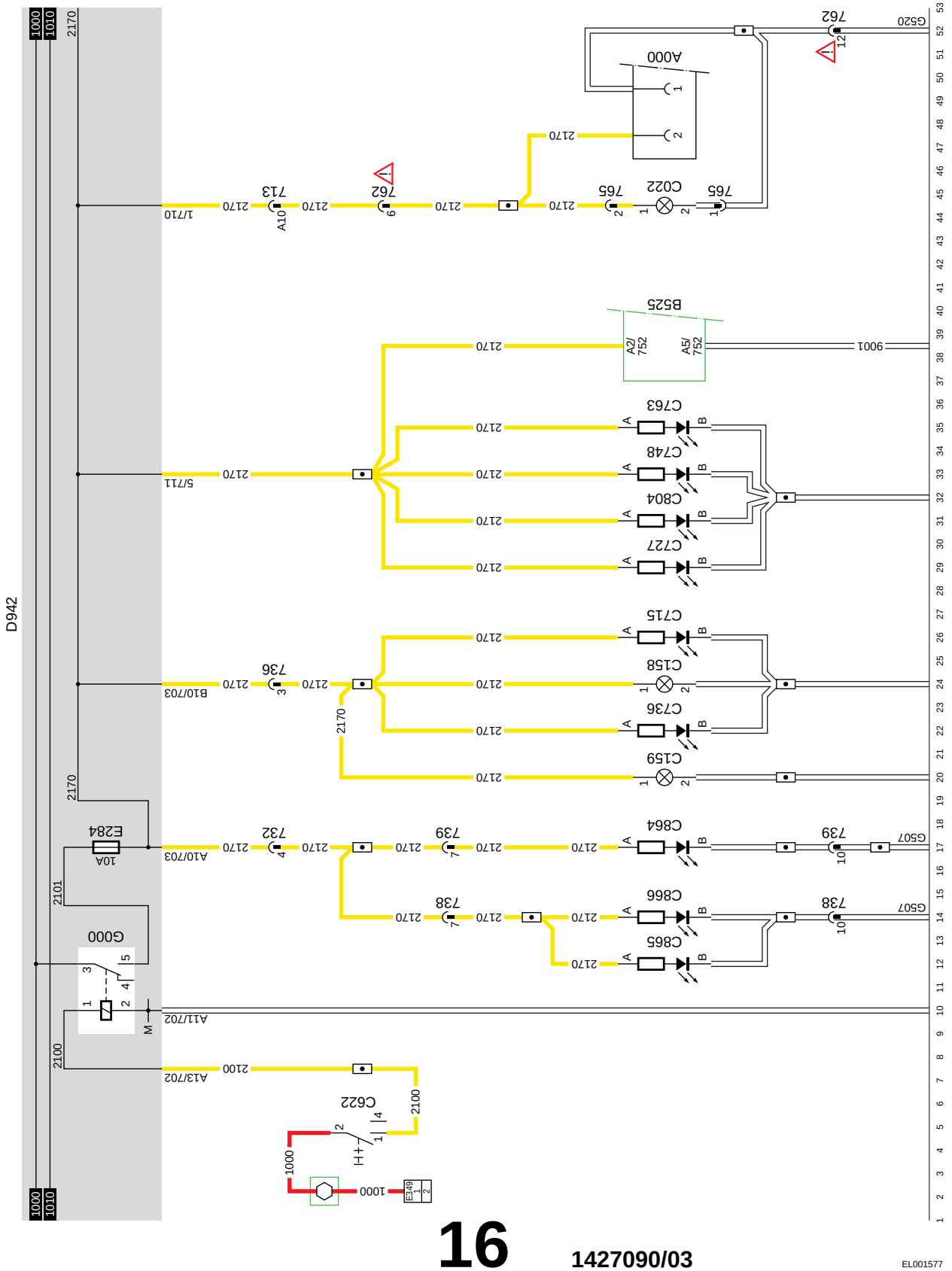
SEARCH LIGHTING

Search lighting refers to lights or LEDs in the various function switches.
When the lighting switch (C622) is operated, relay G000 is energised. This relay supplies power to turn on the various search lighting lamps or LEDs through fuse E284 and wire 2170. This also activates the tachograph lighting (B525).

VARIANTS

Location

44, 52 Connector 762:
Not fitted on vehicle type FT



16 1427090/03 EL001577

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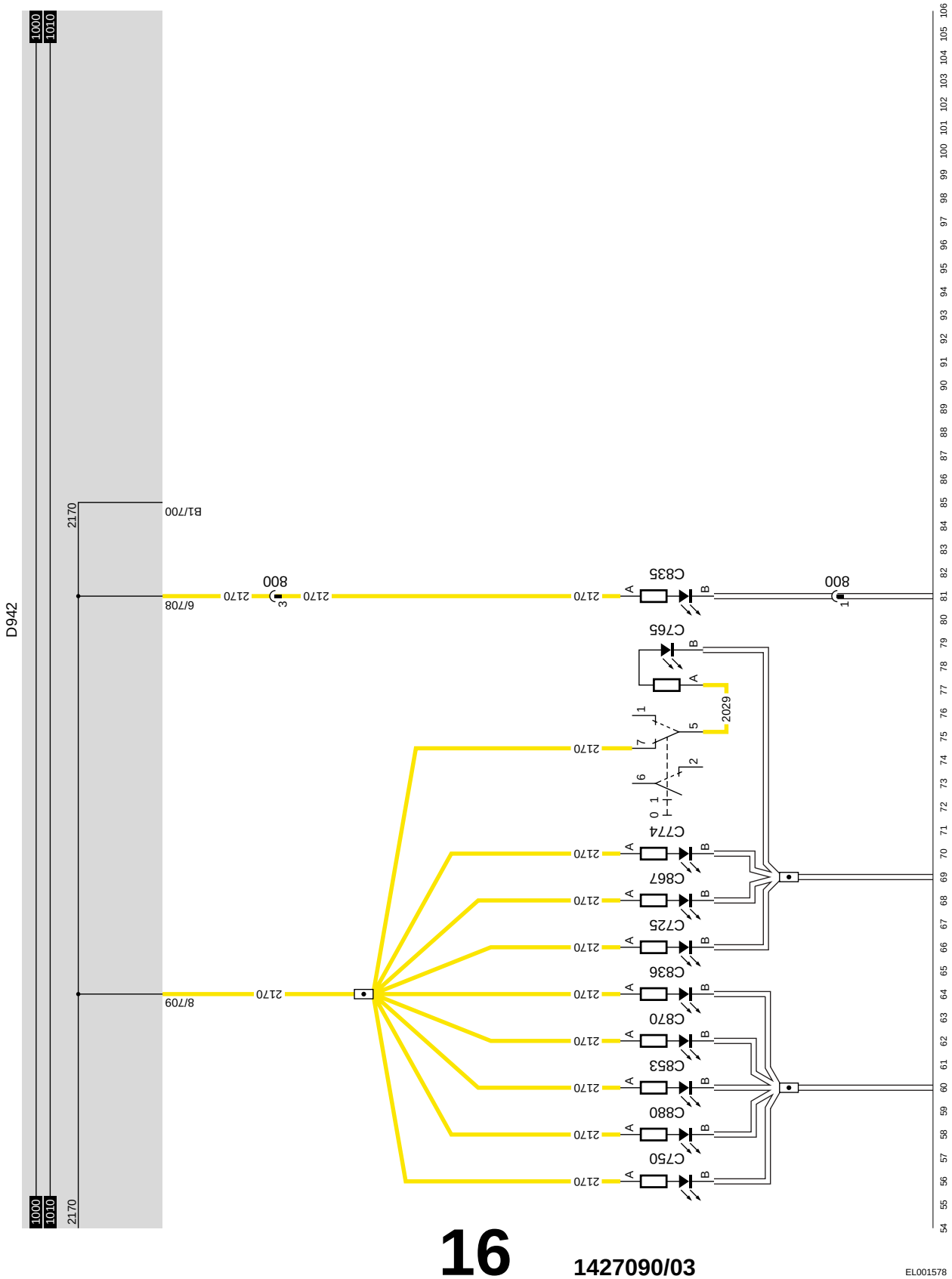

16 **1427090/03** EL001578

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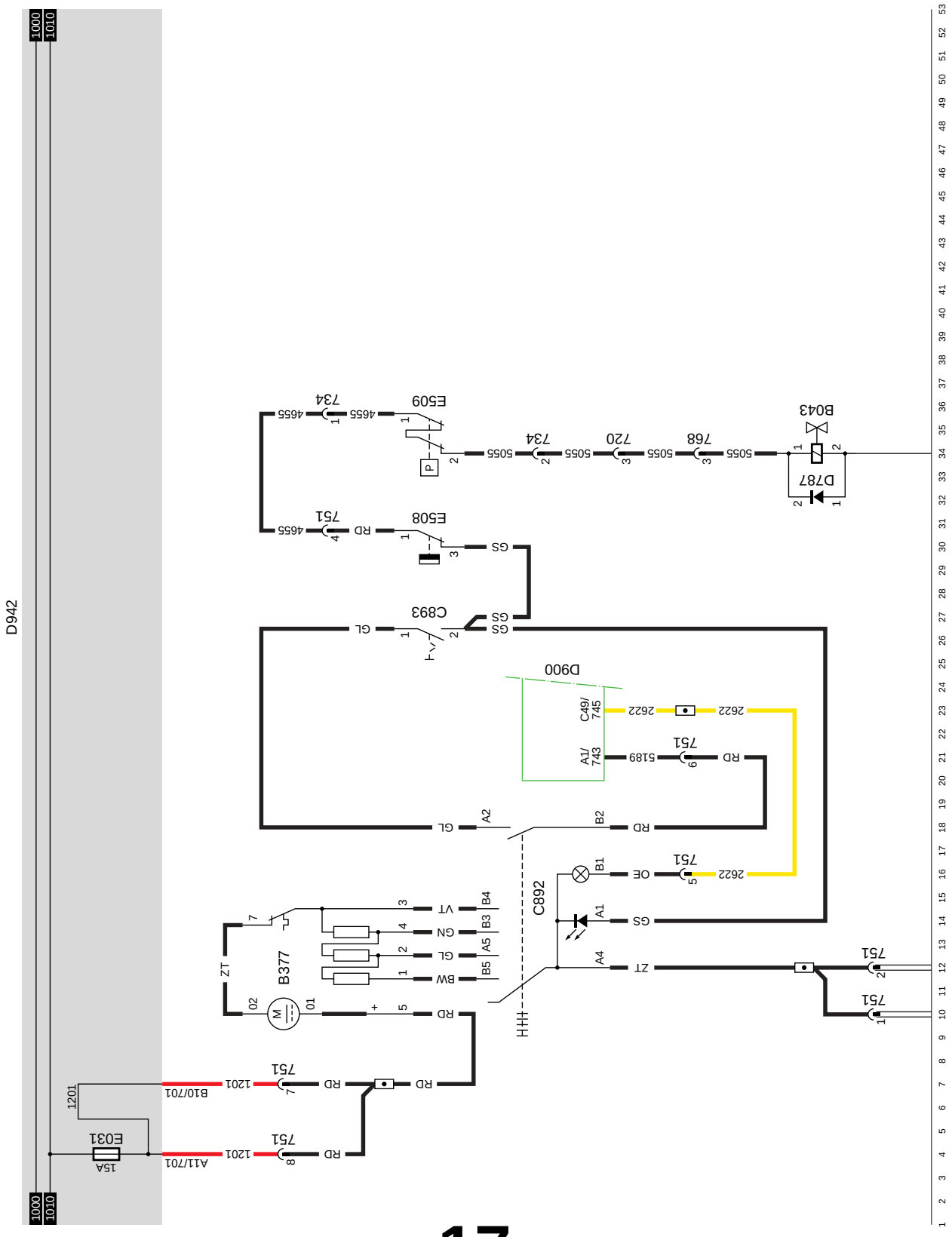
17. AIR CONDITIONING/HEATER FAN

HEATER FAN
The heater motor (B377) is supplied with voltage after contact through fuse E031. The motor is activated when the heater fan switch (C892) is turned, so that earth is connected. The heater fan motor is fitted with an overheating protection device between contact 7 and the connection points of the operating switch.

AIR CONDITIONING
Depending on the engine temperature, voltage is applied to wire 5189 from pin A1/743 of the VIC unit. When the engine temperature goes above a certain value, the VIC unit switches this voltage off so as to prevent the engine from overheating. When the temperature falls back below a particular temperature, the voltage is switched on again. To supply the air conditioning switch (C893) with voltage, the parallel switch in the heater fan switch (C892) must be closed. This switch is closed in positions 1 to 4. The air-conditioning compressor temperature switch (E508) prevents the heater fan from freezing and is closed at normal operating temperature. The air conditioning operating switch, high/low pressure, is operated depending on the pressure in the air conditioning system.
When all conditions have been met, the air conditioning compressor (B043) is activated. Diode D787 is fitted in the air conditioning compressor so as to damp high voltage peaks that can arise during switch-off.



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EL001579

18. SEAT HEATING/ACCESSORIES CONNECTION

SEAT HEATING

When the vehicle is put into accessories position, relay G355 is energised. This relay supplies power to the driver's side seat heating system (B032) via fuse E039 and wire 1227.
If the seat heating switch is activated, the heating element will start warming up.
When the maximum temperature is reached, a thermal switch in the seat heating system switches off the heating element.

ACCESSORIES CONNECTION

12 V accessories socket A011 is connected to 24 V/12 V converter D958 through a white 2-pin connector. 12 V is applied to A011 before contact.
The converter is supplied with power at pin 3 after contact via contact switch C841 and fuse E026.
The "before contact" connection, 1000, is connected via fuse E027 at pin 2.
12 V before contact is applied to CB connector 790 in the roof console through connector 774 on the outside of the central box.

VARIANTS

Location	
31	12 V connector, at top of roof console, to be used with CB, for example.

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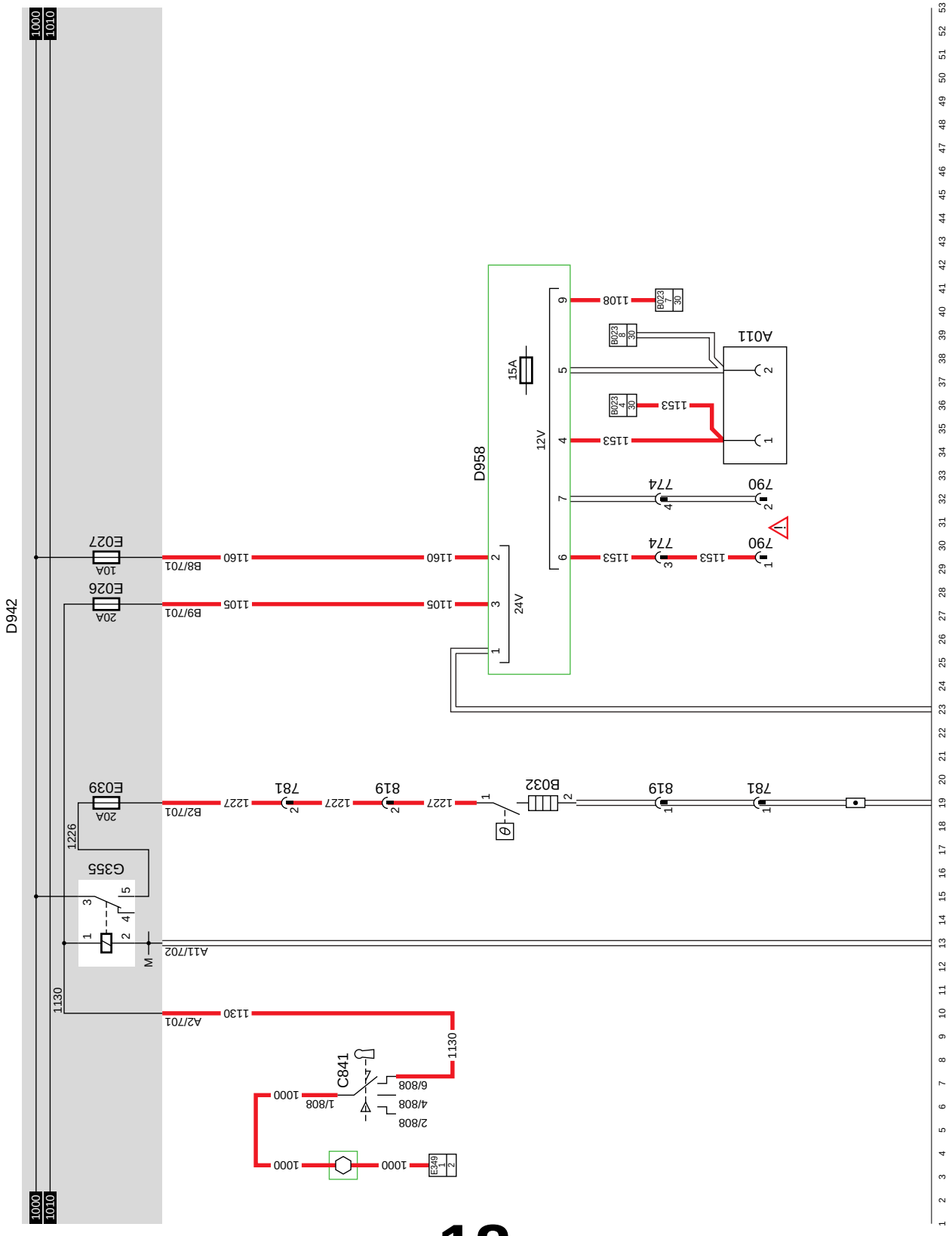

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19. HORN/CIGAR LIGHTER/WORK LAMP/AIR DRYER

HORN

The horn (B401) is activated before contact via steering column switch C775 (1000). The horn is supplied with power via wire 4979 and fuse E019.

CIGAR LIGHTER

If the ignition switch (C841) is in the accessories position (connection between contacts 1 and 6), cigar lighter B030 is supplied with power via fuse E026 and wire 1105. By depressing the cigar lighter, the heating element is warmed up.

WORK LAMP

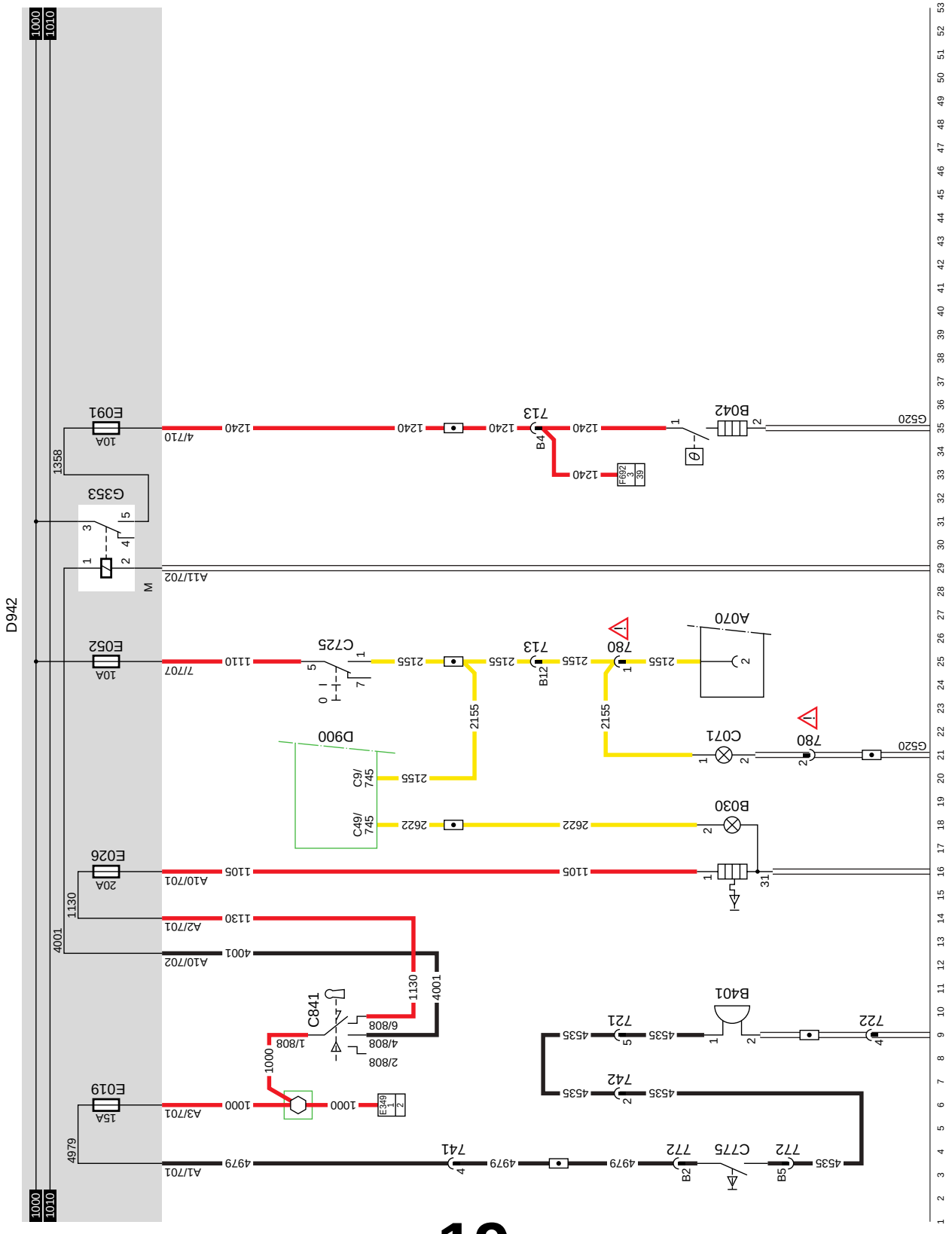
Work lamp switch C725 is supplied with voltage from power supply before contact and via fuse E052. When the switch is operated voltage is applied to the work lamp (C071) and to pin C9/745 of the VIC unit in order to activate the "work lamp" indicator on the DIP via I-CAN.

AIR DRYER

When the ignition switch (C841) is on (connection between contacts 1 and 4), relay G353 is activated. This relay supplies power to the air dryer heating element (B042) via fuse E091 and wire 1240.
When the maximum temperature is reached, a thermal switch in the air dryer switches off. The water separator sensor (F692) is supplied with power via the same wire.

VARIANTS

Location	
20,24	Connector 780: Not fitted on vehicle type FA. Wire 2155 only fitted in application connector A070



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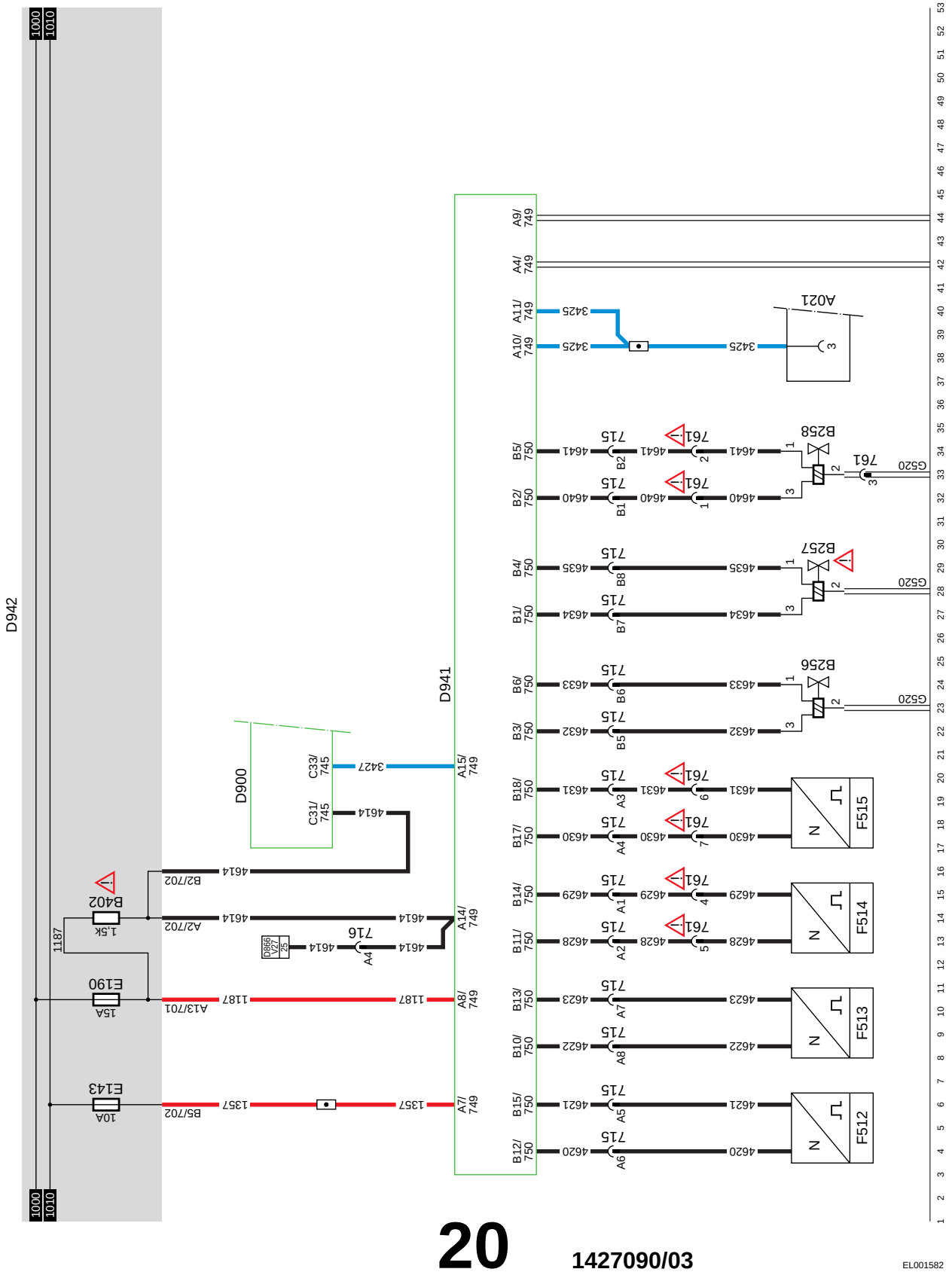
20. ABS-D

SEE THE SYSTEM MANUAL FOR MORE INFORMATION

VARIANTS

Location	
14	Resistor B402: Fixed on PCB D942
13,15,17,19, 32,34	Connector 761: Not fitted on vehicle type FT
29	Valve, ABS-D, ABS/ASR-E, right front axle, B257: Not fitted on 4S/2M system


D942
D941
D900
A021
B258
B257
B256
F515
F514
F513
F512
G520
B402
E190
E143
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EL001582

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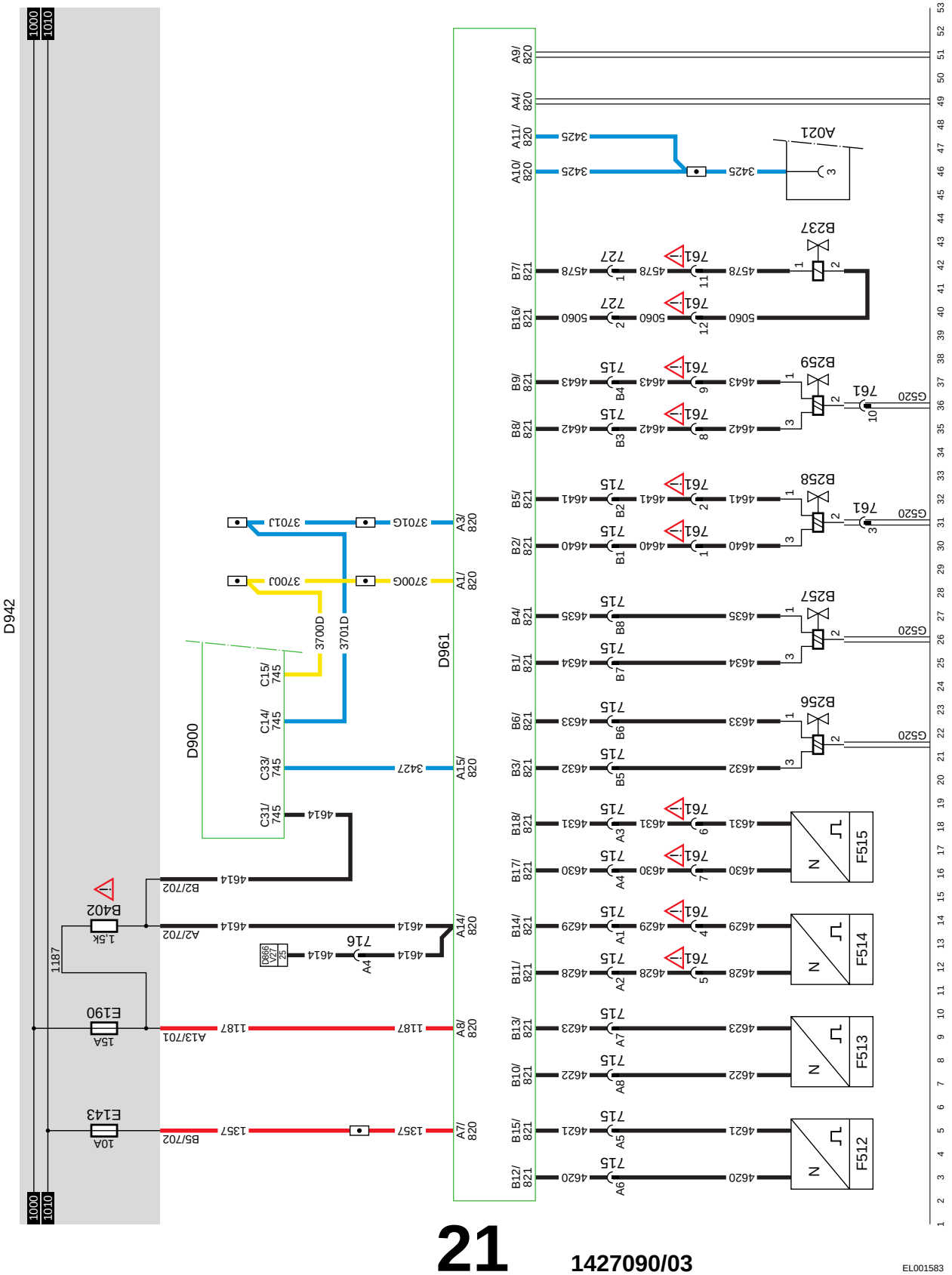
21. ABS/ASR-E

SEE THE SYSTEM MANUAL FOR MORE INFORMATION

VARIANTS

Location	
14	Resistor B402: Fixed on PCB D942
12,14,16,18,31, 33,36,38,40,42	Connector 761: Not fitted on vehicle type FT
29	Valve, ABS-D, ABS/ASR-E, right front axle, B257: Not fitted on 4S/2M system



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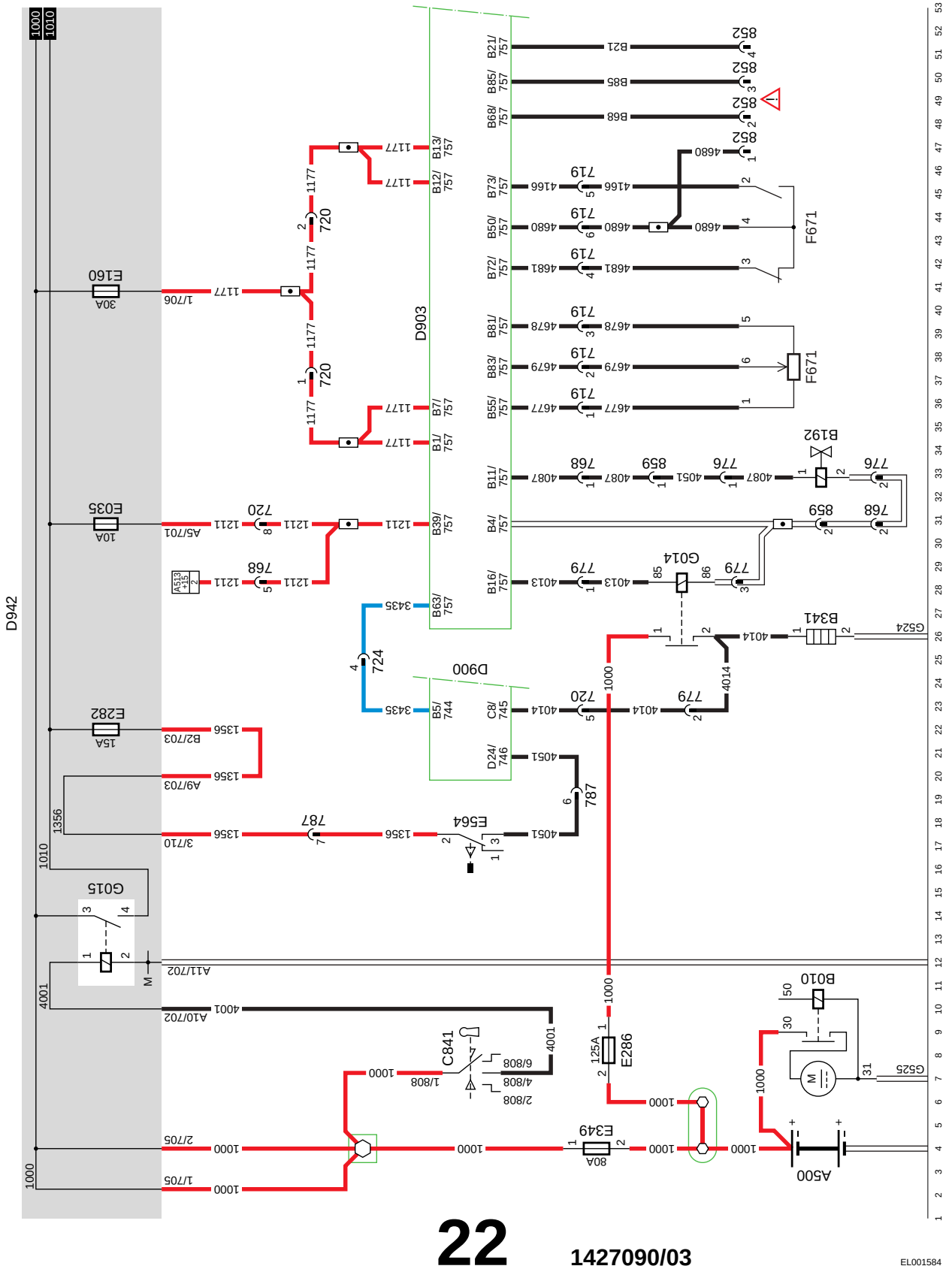
22. ECS-DC3/EXHAUST BRAKE

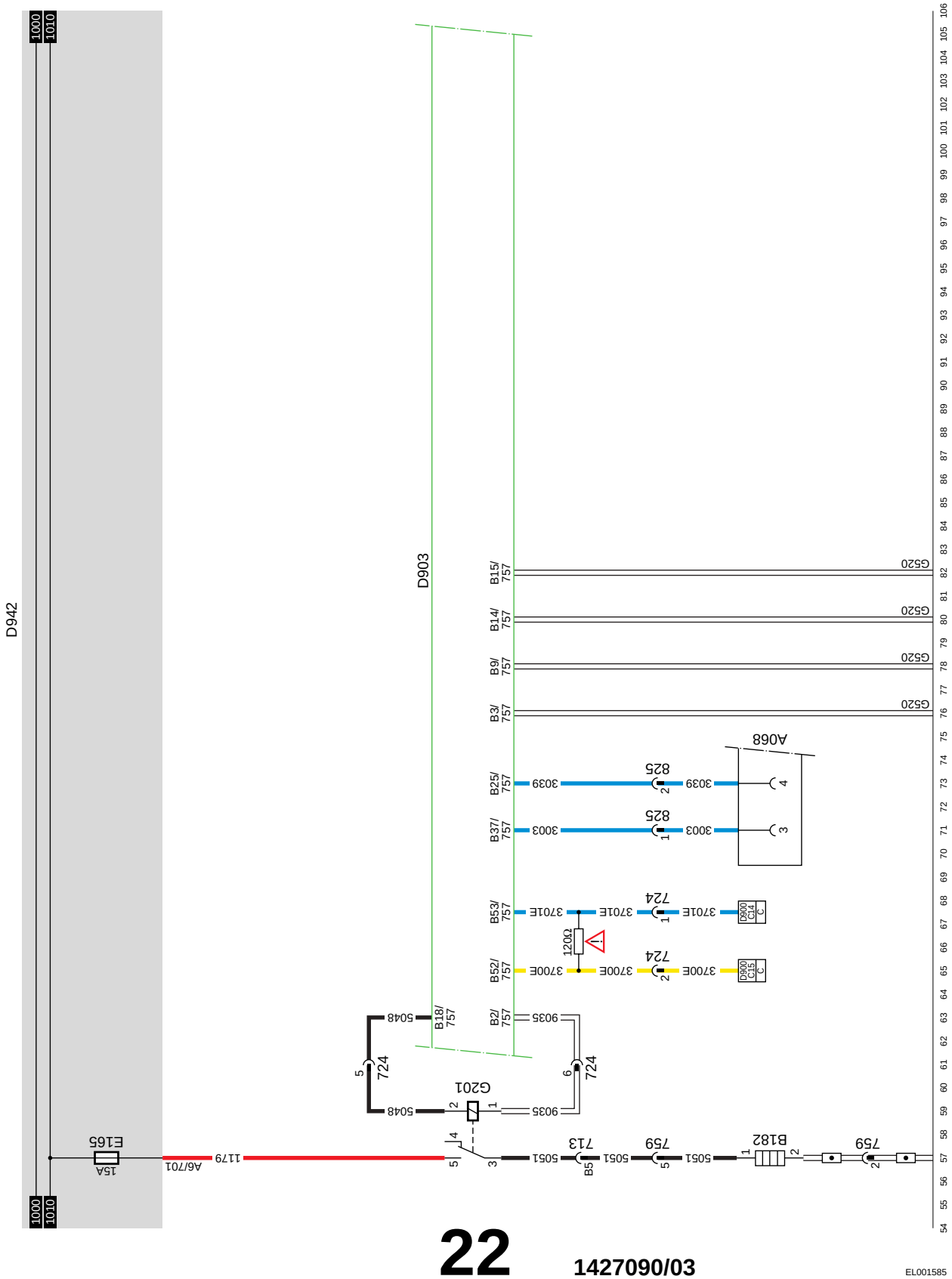
FOR MORE INFORMATION SEE SYSTEM MANUAL

VARIANTS

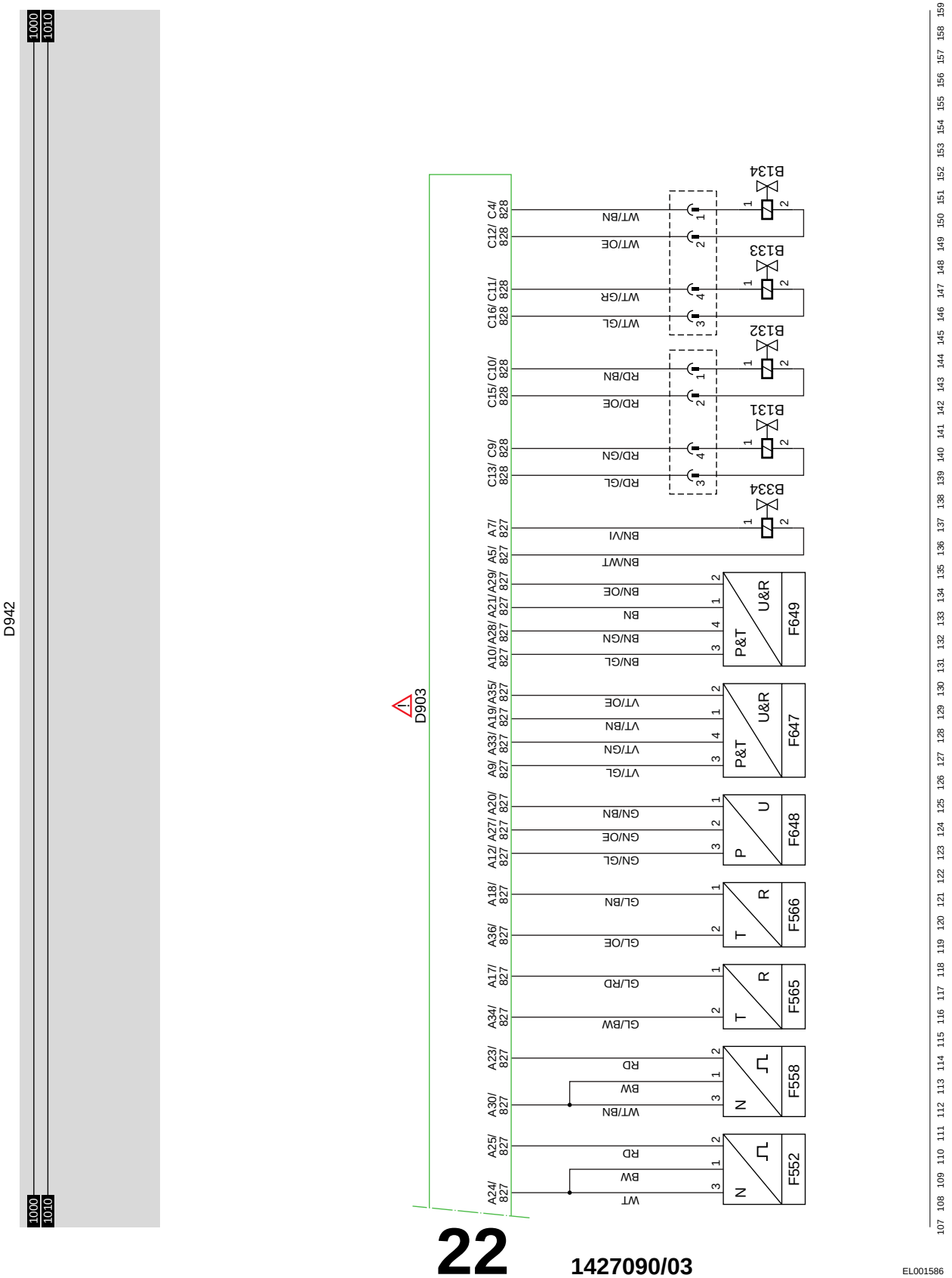
Location	
49	Connector 852: Optional connector for "remote throttle" function
66	The CAN terminating resistor is fitted in the wiring harness, near the B connector
129	This part of the ECS-DC3 electronic unit relates to the BE engine (4-cylinder)
186	This part of the ECS-DC3 electronic unit relates to the CE engine (6-cylinder)



22 **1427090/03**



22 **1427090/03**


D942
1000
1010
D903
B134
B133
B132
B131
B334
C4/ 828
C12/ 828
C11/ 828
C16/ 828
C10/ 828
C15/ 828
C9/ 828
C13/ 828
A7/ 827
A5/ 827
A29/ 827
A21/ 827
A28/ 827
A10/ 827
A35/ 827
A19/ 827
A33/ 827
A9/ 827
A20/ 827
A27/ 827
A12/ 827
A18/ 827
A36/ 827
A17/ 827
A34/ 827
A23/ 827
A30/ 827
A25/ 827
A24/ 827
WT/BN
WT/OE
WT/GR
WT/GL
RD/BN
RD/OE
RD/GN
RD/GL
BN/VI
BN/WT
BN/OE
BN
BN/GN
BN/GL
VT/OE
VT/BN
VT/GN
VT/GL
GN/BN
GN/OE
GN/GL
GL/BN
GL/OE
GL/RD
GL/BW
RD
BW
WT/BN
RD
BW
WT
P&T
U&R
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F648
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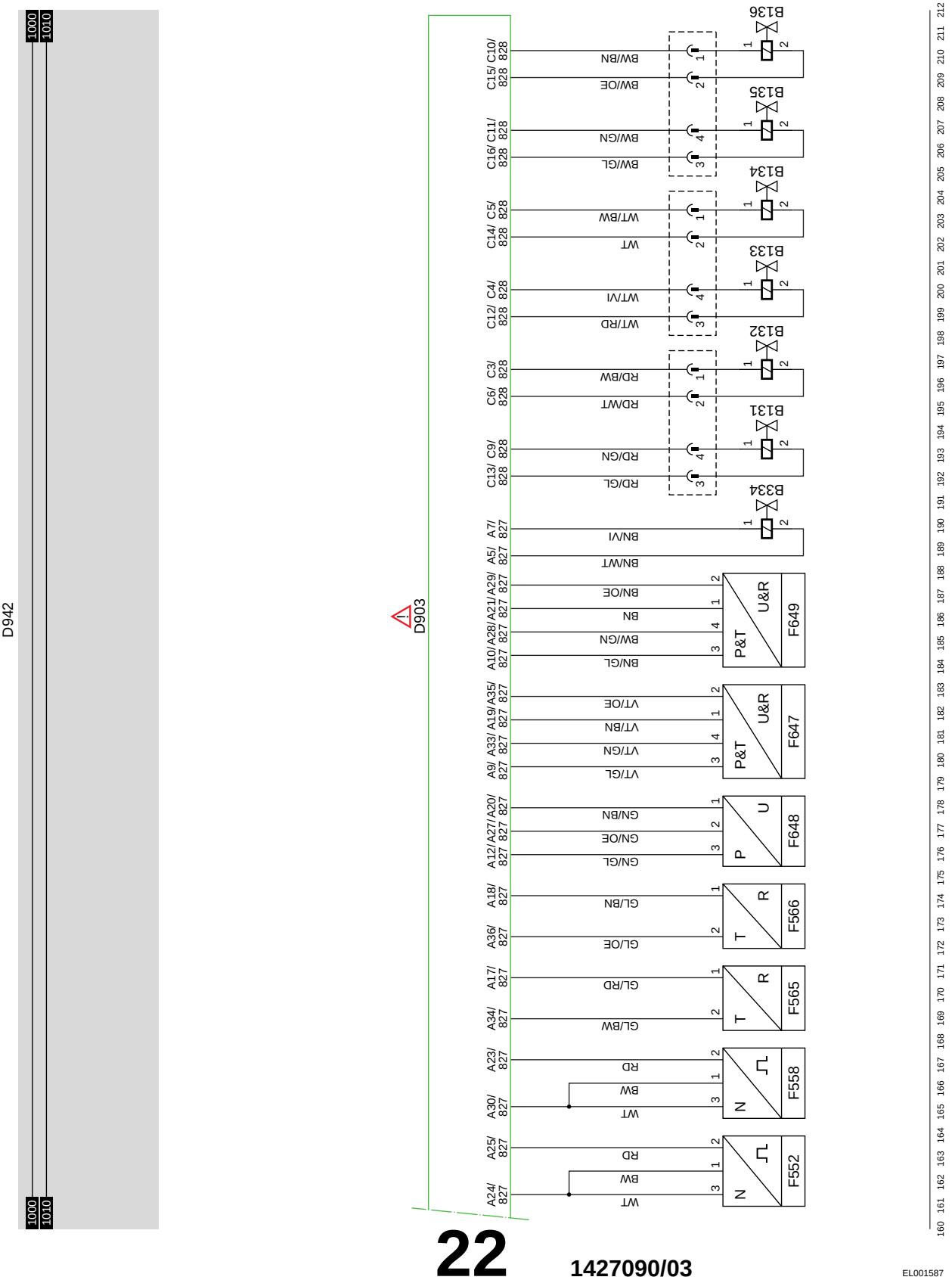
F565
N
F558
F552
22
1427090/03
EL001586


D942
1000
1010
D903
B136
B135
B134
B133
B132
B131
B334
F649
F647
F648
F566
F565
F558
F552
P&T
U&R
P
U
T
R
N
22
1427090/03
EL001587

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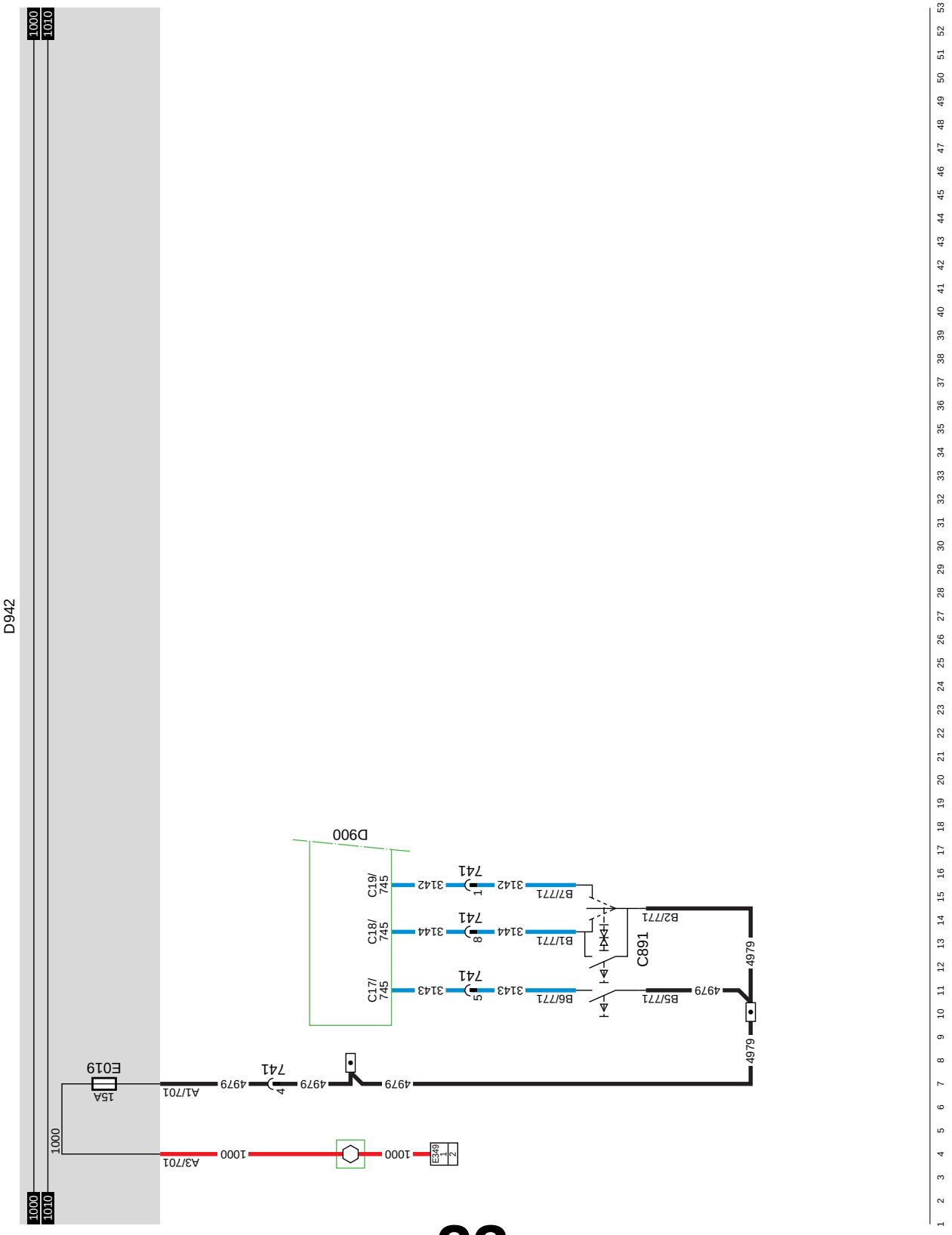
23. CRUISE CONTROL

The right-hand steering column switch C891 is a multi-function switch for windscreen wiper/washer functions and cruise control/ engine speed control. The VIC sends the desired commands in respect of vehicle/ engine speed to the ECS-DC3 electronic unit via the CAN network (see system manual).
When the innermost ring of switch C891 is rotated (B5 with B6), power is supplied to pin 17/745. The "ON" function is now activated.
When the outermost ring of switch C891 is rotated downwards (B2 with B1), power is supplied to pin C18/745. This activates the "SET+" function.
When the outermost ring of switch C891 is rotated upwards (B2 with B7), power is supplied to pin C19/745. This activates the "RES –" function.
Operating the RES button at the end of the switch has the same effect as turning the "RES –" rotary switch.



23 **1427090/03**

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24. AGC AUTOMATIC GEARBOX (AT1000/2000)

Power supply before contact is obtained directly from the batteries (A500) via a 10 A fuse (E144) and wire 1302.
The voltage before contact can also be found in the diagnostic socket for the automatic gearbox (A032).

Voltage after contact is obtained via fuse E279 and wire 1211.
The AT 1000/2000 automatic gearbox selector switch (E585) receives power after contact through fuse E016 and wire 1217. The reversing lights are activated from the same switch via wire 4591.

The earth connections are connected directly to the earth side of the batteries (A500).

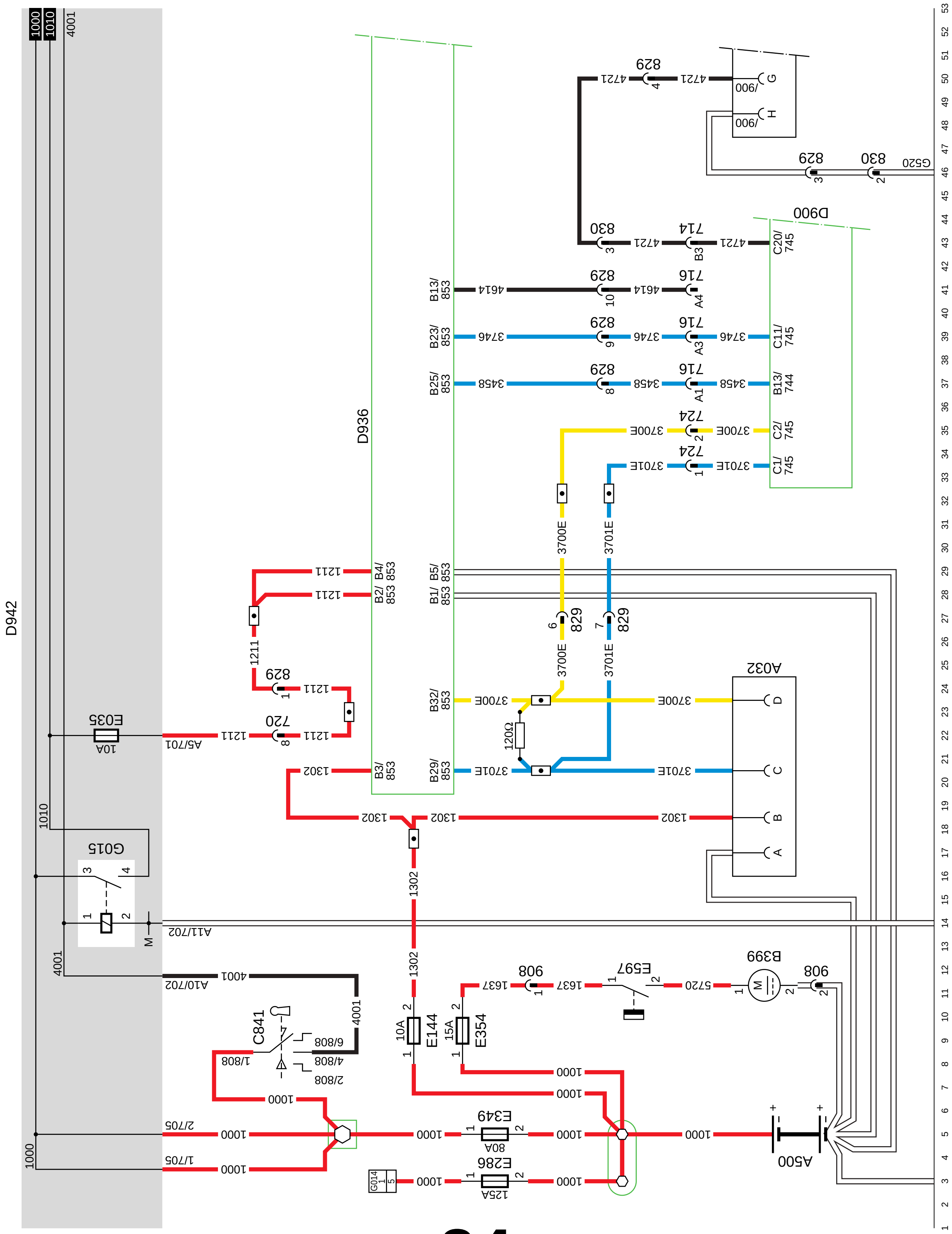
The electrical system of the automatic gearbox is almost completely located on the chassis.
Connections leading into the cab are provided for a number of VIC functions:

- fault messages from the automatic gearbox (B25/853) to the VIC unit (D900)
- "Range inhibit" (B23/853) to the VIC unit (D900)
- CAN connections (B29/853 and B32/853) to the VIC unit (D900)
- Neutral position protection (G/900) to the VIC unit (D900)

Diagnosis of the automatic gearbox takes place via the CAN network, which is connected to the diagnostic socket (A032) and the VIC unit (D900).

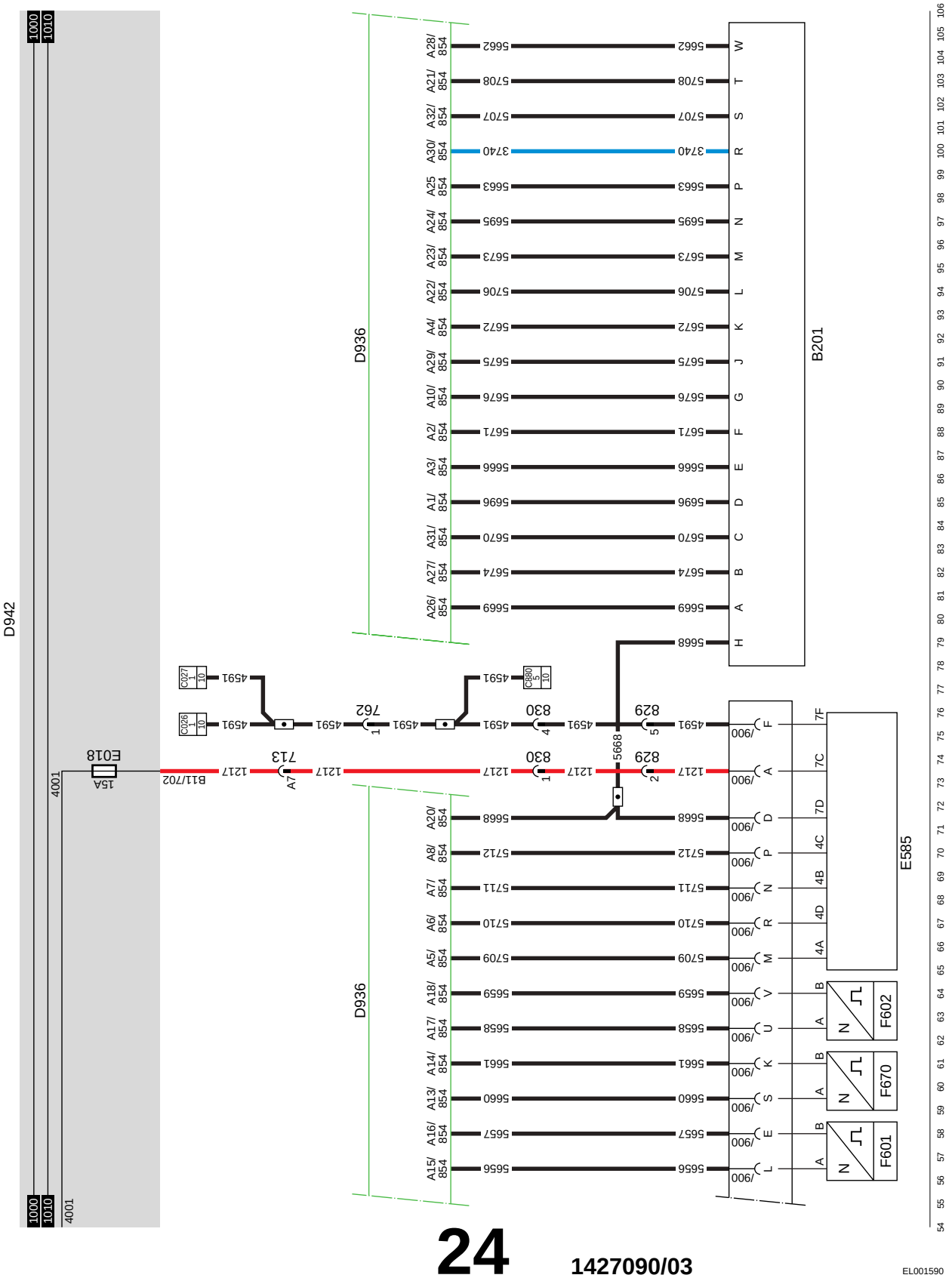
VARIANTS

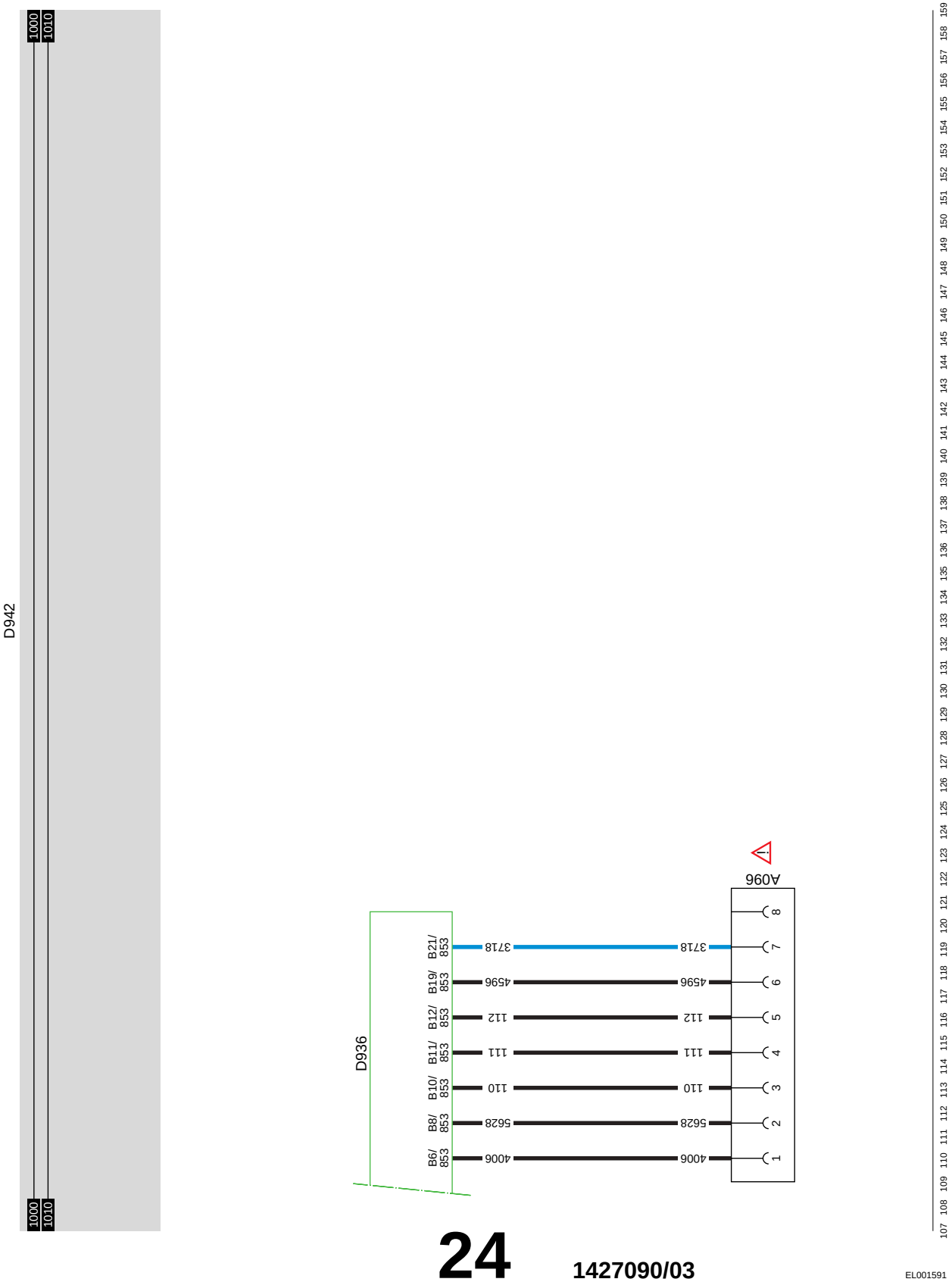
Location	
122	Application connector (A096)



24 **1427090/03**

EL001589




1000
1010
D942
A096
D936
B21/ 853
B19/ 853
B12/ 853
B11/ 853
B10/ 853
B8/ 853
B6/ 853
3718
4596
112
111
110
5628
4006
8
7
6
5
4
3
2
1
24
1427090/03
EL001591

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25. AGC AUTOMATIC GEARBOX (MD3060)

Power supply before contact is obtained directly from the batteries (A500) via wire 336 and a 10 A fuse (MAIN) in the VIM (D822, pins J1 and J2). The electronic unit (D866) receives voltage before contact at pin V1/907 and V16/907 from the VIM (D822, pins R1 and R2) via wires 1164.

Voltage after contact is obtained via fuse E279 and wire 1211. Wire 1211 is connected directly to electronic unit D866 (pin S4/905). The wire also runs to the VIM (pin C1) and various relays in de VIM are supplied with voltage after contact via a 10 A fuse (IGN). The voltage after contact can also be found in the diagnostic socket for the automatic gearbox (A032).

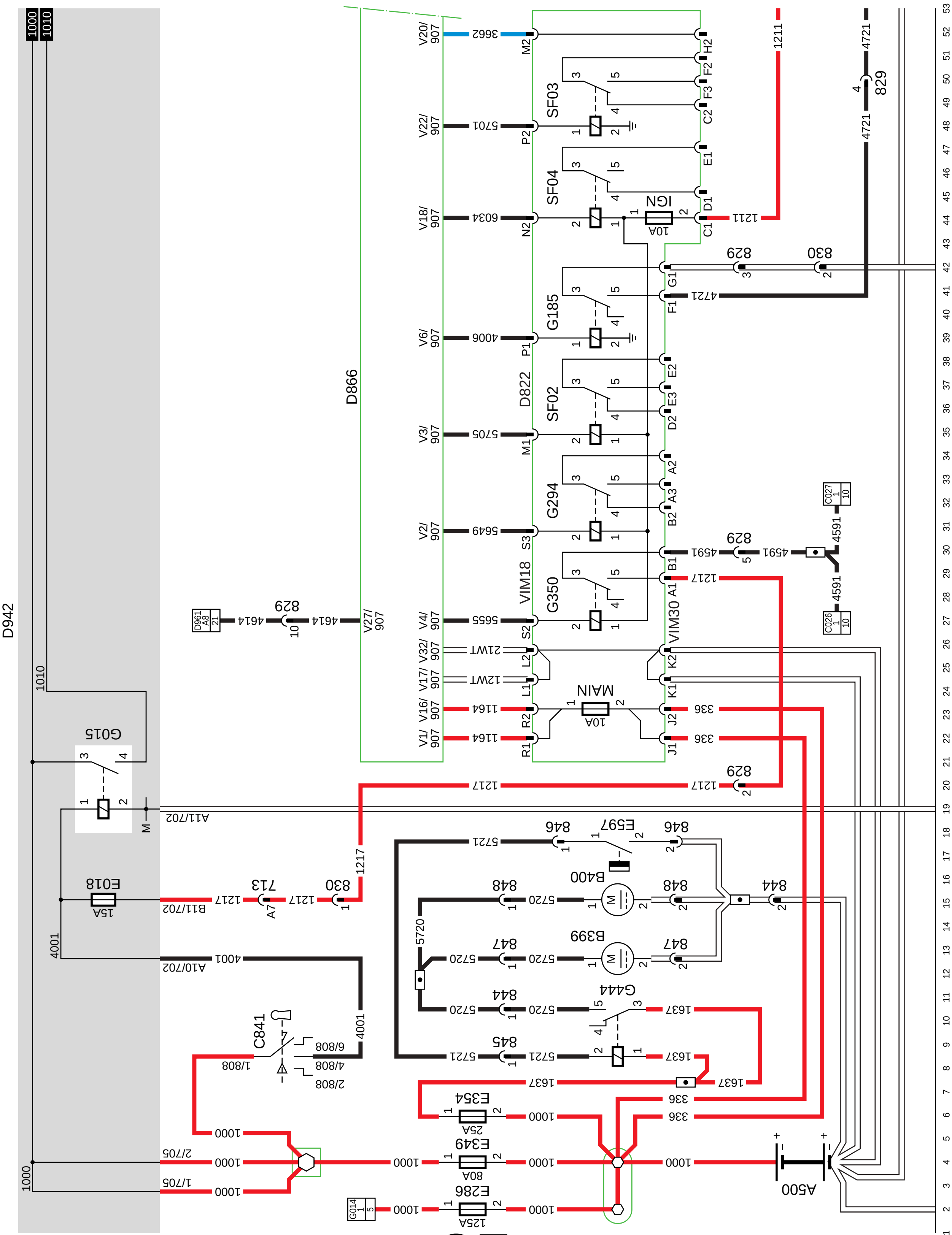
The earth connections are connected directly to the earth side of the batteries (A500) and also run to the electronic unit (D866) via the VIM (pins K1 and K2).

The electrical system of the automatic gearbox is almost completely located on the chassis.
Connections leading into the cab are provided for a number of VIC functions:

- fault messages from the automatic gearbox (S31/905) to the VIC unit (D900)
- CAN connections (S13/905 and S29/905) to the VIC unit (D900)
- Vehicle interface module (D822, pin F1) to the VIC unit (D900)

Diagnosis of the automatic gearbox takes place via the CAN network, which is connected to the diagnostic socket (A032) and the VIC unit (D900).

Note:
Where an automatic gearbox is fitted, there are two dashboard lead-through connectors, 716. One connector is occupied by spare wiring (see application connectors) and the other has 3 occupied positions (A1, wire 3458; A3, wire 123; and A4, wire 4614), only one of which is connected.
The 716 with the spare wiring is not then connected and hangs loose near the dashboard lead-through.



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1427090/03

EL001592

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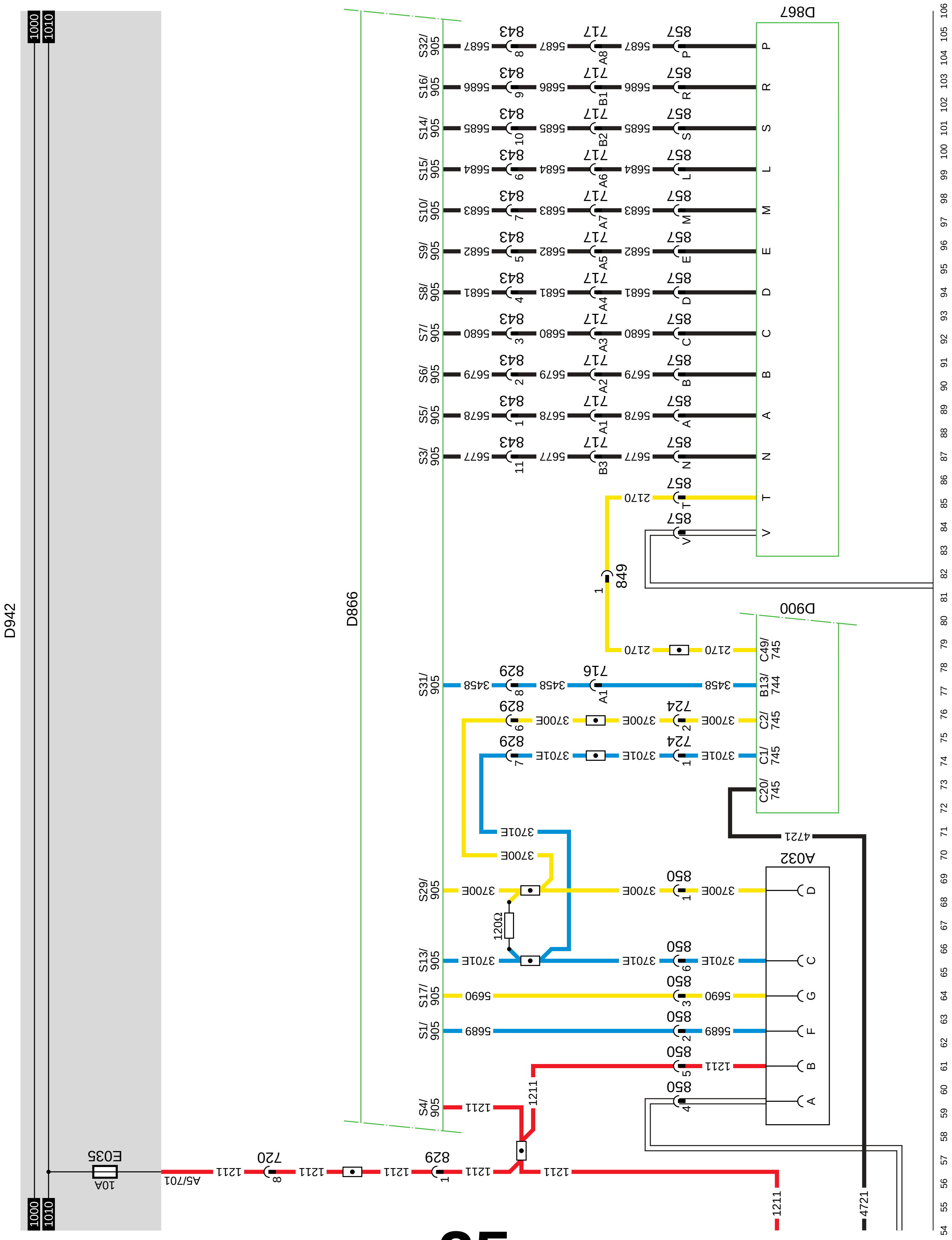

25 1427090/03


D942
1000
1010
D866
A074
B201
F602
F601
25
1427090/03
EL001594

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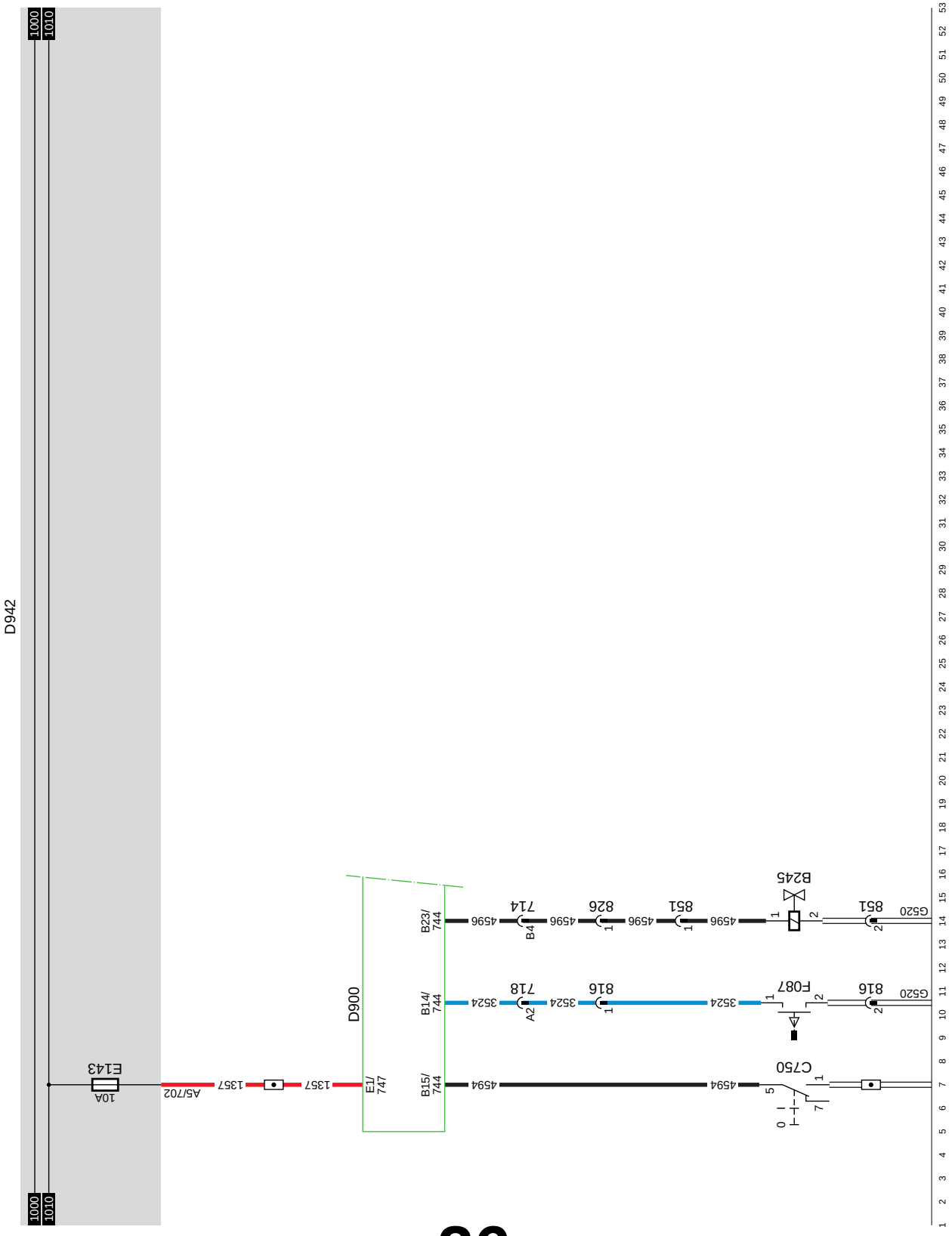
26. PTO

When the PTO operating switch (C750) is operated, pin B15/744 of the VIC is connected to earth. Depending on the conditions programmed in the VIC (for example parking brake activated or vehicle speed below a certain value), the PTO operating valve (B245) is supplied with power via pin B23/744 of the VIC. If the PTO is in fact switched on, the gearbox-PTO control switch F087 is operated to provide feedback to connection point B14/744 of the VIC. This will activate the indicator on the DIP.



26 **1427090/03** EL001595

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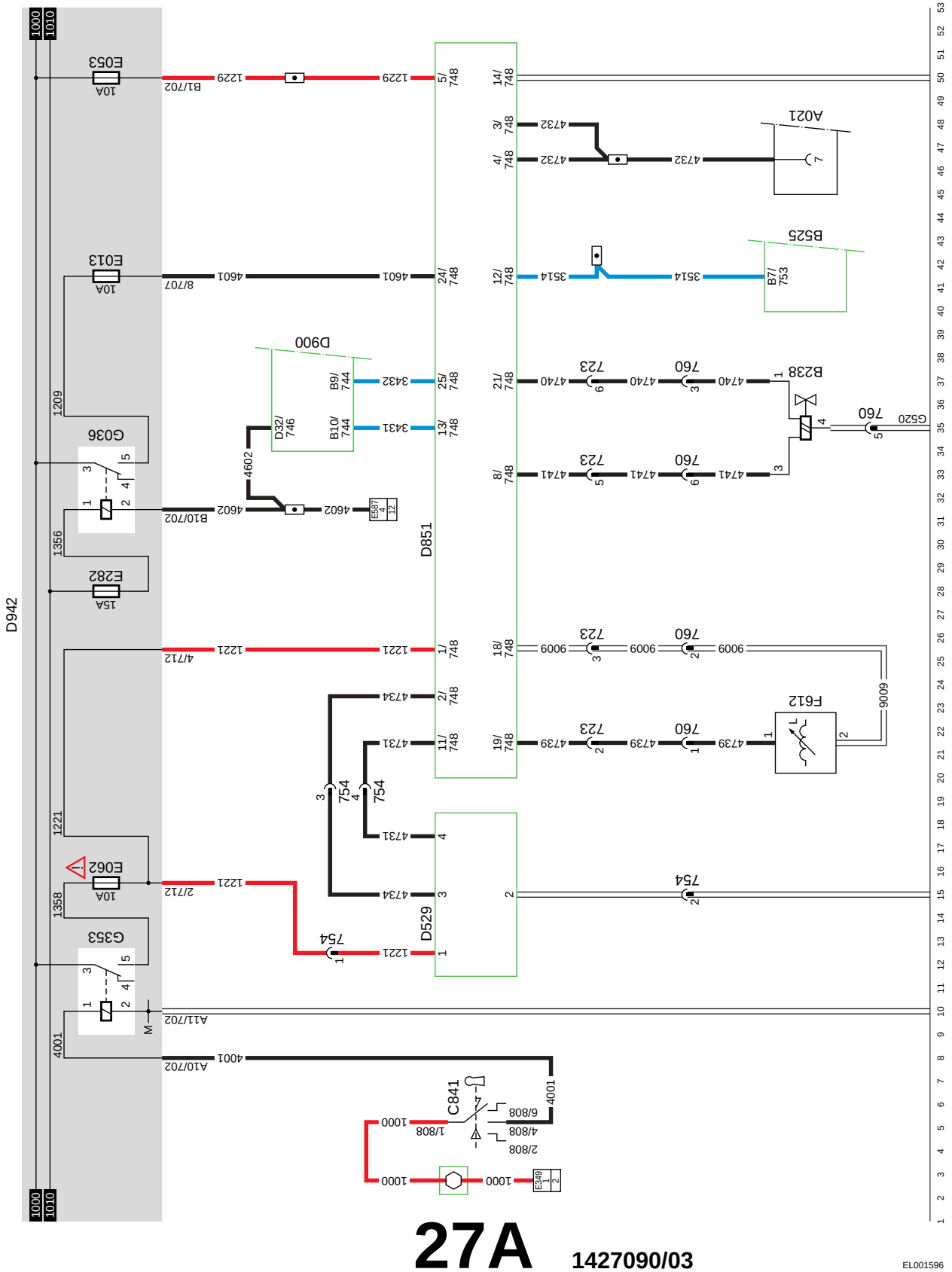
27A. ECAS-3 4x2 LF45

FOR MORE INFORMATION SEE SYSTEM MANUAL

VARIANTS

Location

16 Fuse E051 may also be fitted instead of fuse E062.



27A **1427090/03**

EL001596

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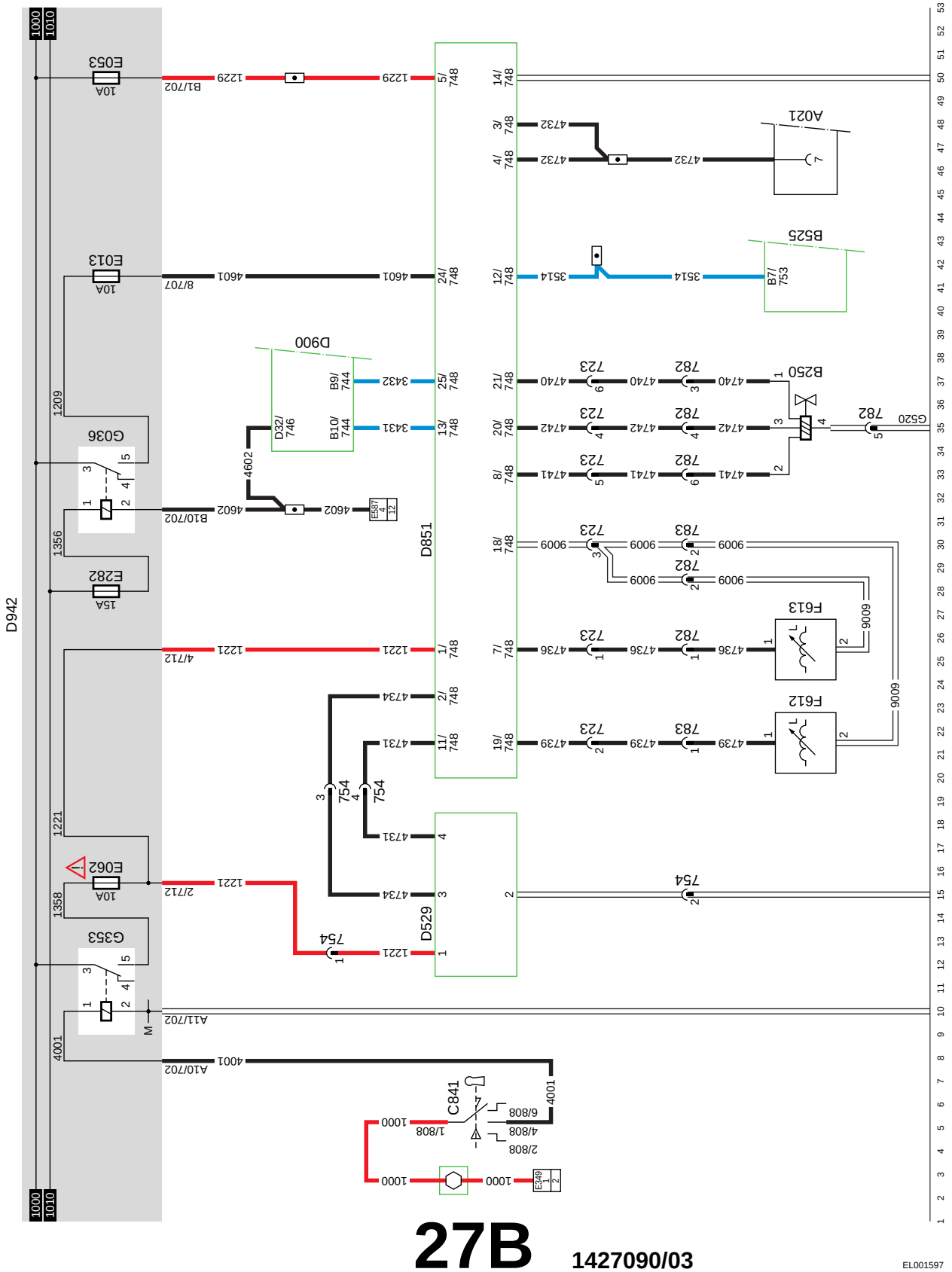
27B. ECAS-3 4x2 LF55

FOR MORE INFORMATION SEE SYSTEM MANUAL

VARIANTS

Location

16 Fuse E051 may also be fitted instead of fuse E062.



27B **1427090/03**

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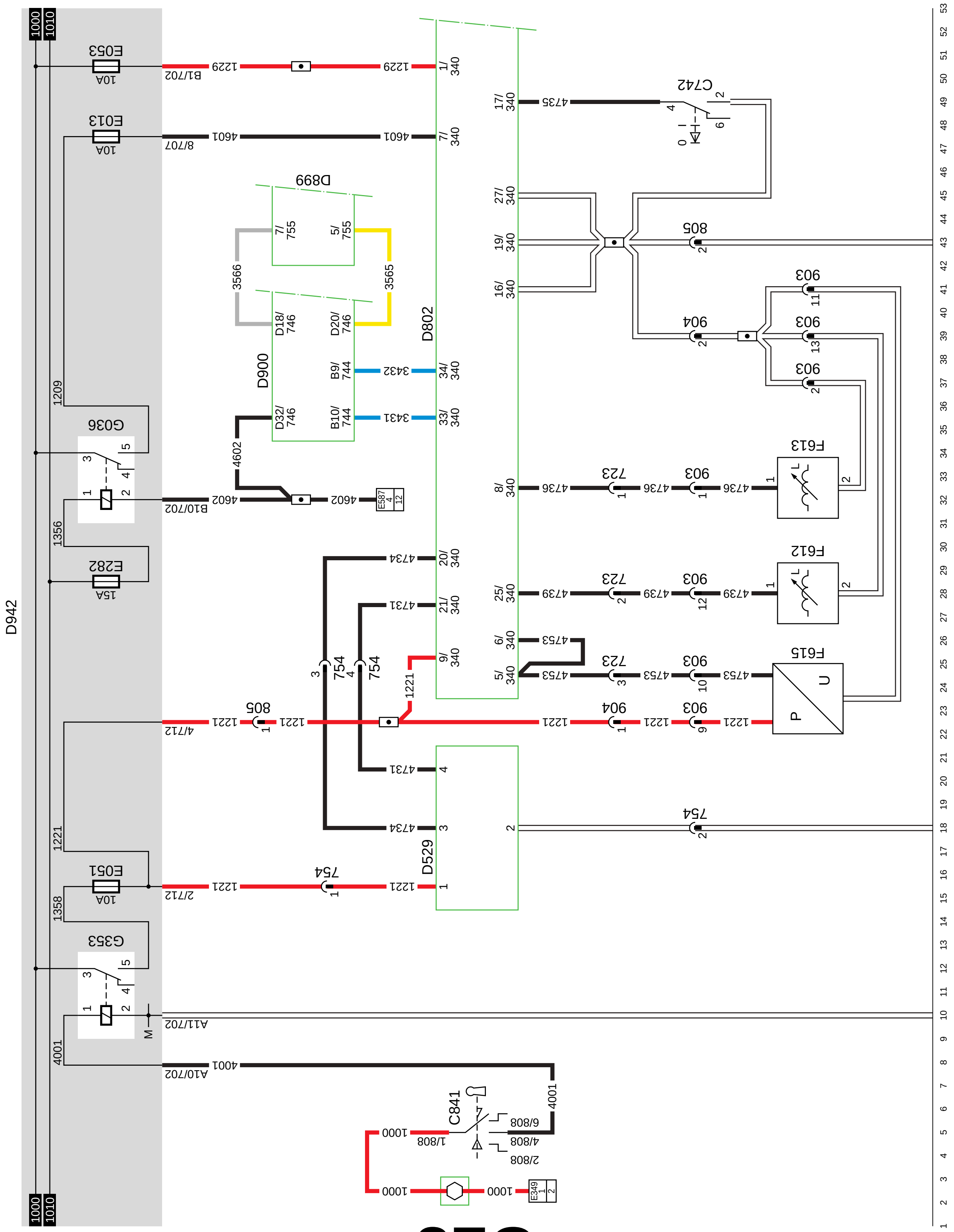
27C. ECAS-2 (6x2) LF55
FOR MORE INFORMATION SEE SYSTEM MANUAL



27C **1427090/03**

EL001598

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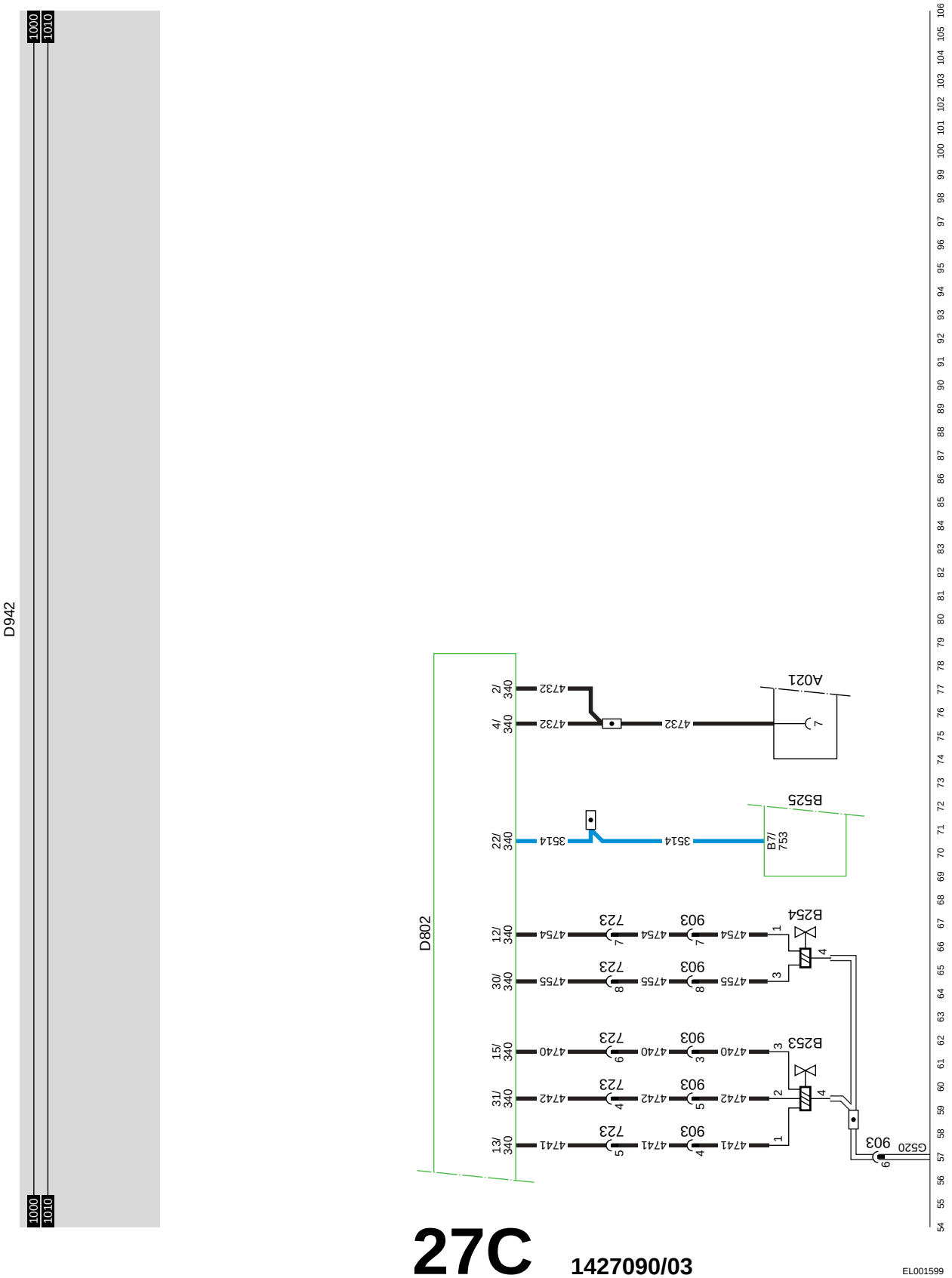

27C **1427090/03**

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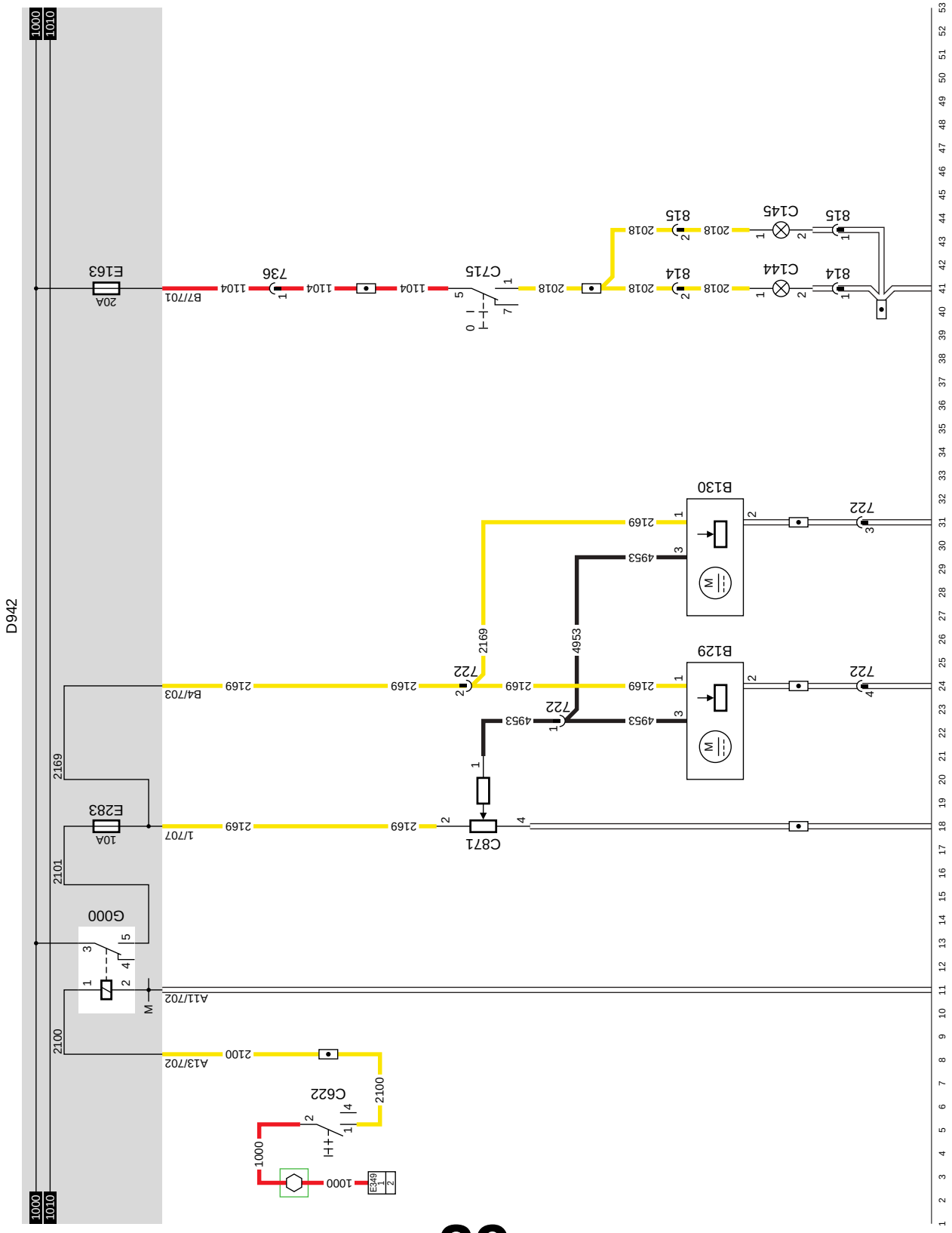
29. HEADLAMP HEIGHT ADJUSTMENT / ROTATING BEAMS

HEADLAMP HEIGHT ADJUSTMENT
Power before contact is supplied at pin 2 of the lighting switch (C622). If a connection is made to switch C622 (contacts 2 and 1), a voltage is applied to contact 1 of relay G000 (tail light/width marker light relay) via wire 2100. Once the relay is energised, a connection is made between points 3 and 5. As a result, a voltage is applied through relay G000 (contacts 3 - 5), wire 2101, fuse E283 and wire 2169 to pin 2 of switch C871 (potentiometer for headlamp height adjustment). Via the same wire, power is also supplied to pin 1 of the headlamp height-adjustment motor on the left (B129) and right (B130).
When the headlamp height switch is operated, the voltage at pin 1 of the switch will change, so that the headlamp height adjustment motors on the left (B129) and right (B130) will be activated via wire 4953 at pin 3.
Depending upon the position of C871 (headlamp height adjustment potentiometer), the motor in the headlamp will be activated. This will continue until electrical equilibrium is achieved. This equilibrium refers to the voltage difference that exists between wires 2169 and 4953 of C871, B129 and B130. The voltage difference should be the same for all three components.

ROTATING BEAMS
The rotating beam switch (C715) is supplied with power before contact via fuse E163 and wire 1104.
When the switch is operated, rotating beam left (C144) and rotating beam right (C145) will be supplied with power via wire 2018.



29 **1427090/03**

EL001600

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30. 24 V/12 V CONVERTER FOR RADIO

Note:
The following description of the operation and connection is intended as a general guideline only.
Also refer to the manufacturer's installation instructions supplied with the radio.

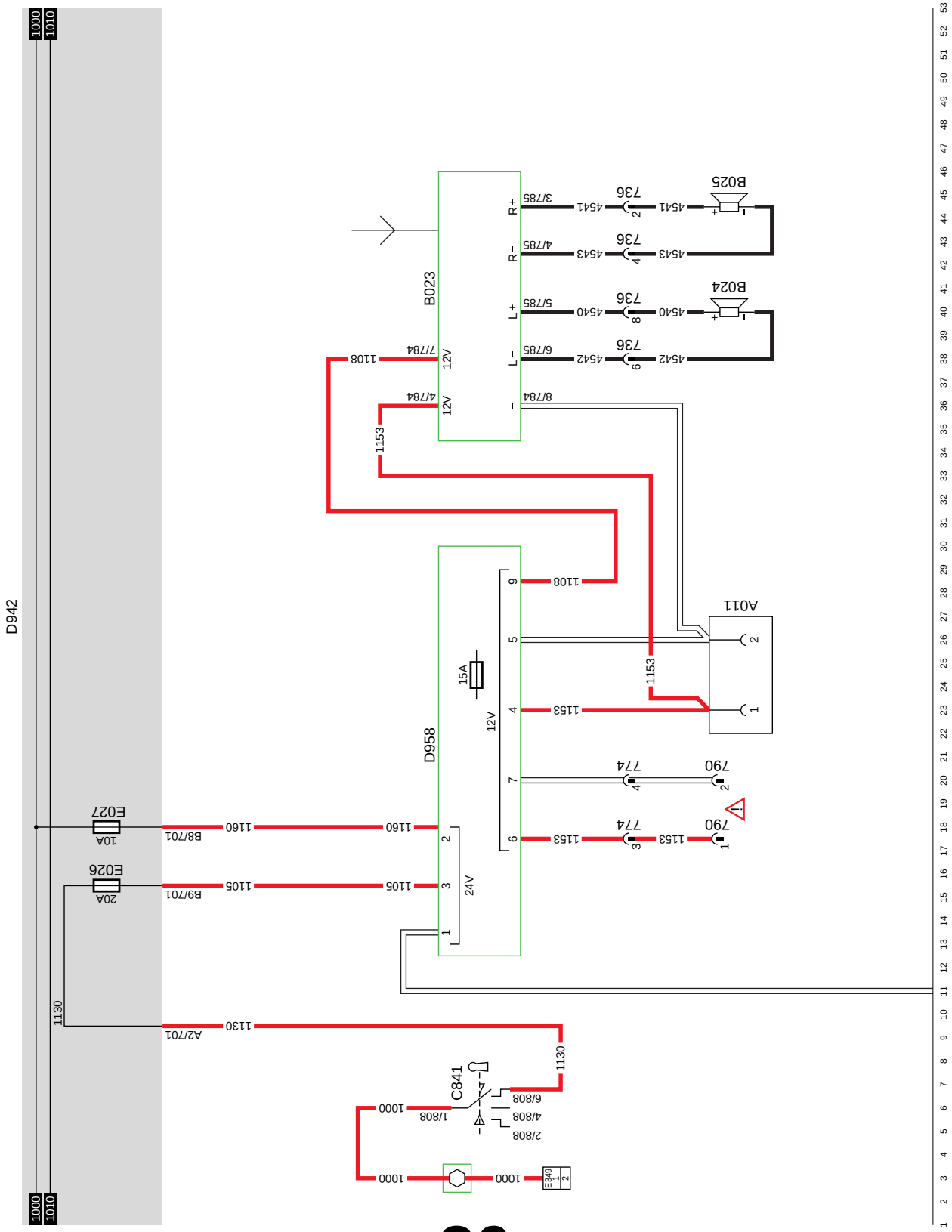
The converter has three 12 V outputs.
- Pin 4: 12 V output before contact
- Pin 6: 12 V output before contact
- Pin 9: 12 V output switched via accessories/ignition switch (C841)

If the contact switch (C841) is in the "accessories" position (connection between contacts 1 and 6), the converter (D958) is supplied with power through wire 1130 and fuse E026. The converter receives power before contact at pin 2 via fuse E027. The converter has an internal fuse to protect the 12 V outputs.

The radio has an aerial connection and 2 loudspeaker outputs which can be used to connect loudspeakers B024 and B025.
For more information, see "Connection of accessories".

VARIANTS

Location	
19	Connector 790: Optional connector for, say, the CB or CD player.



30 **1427090/03**

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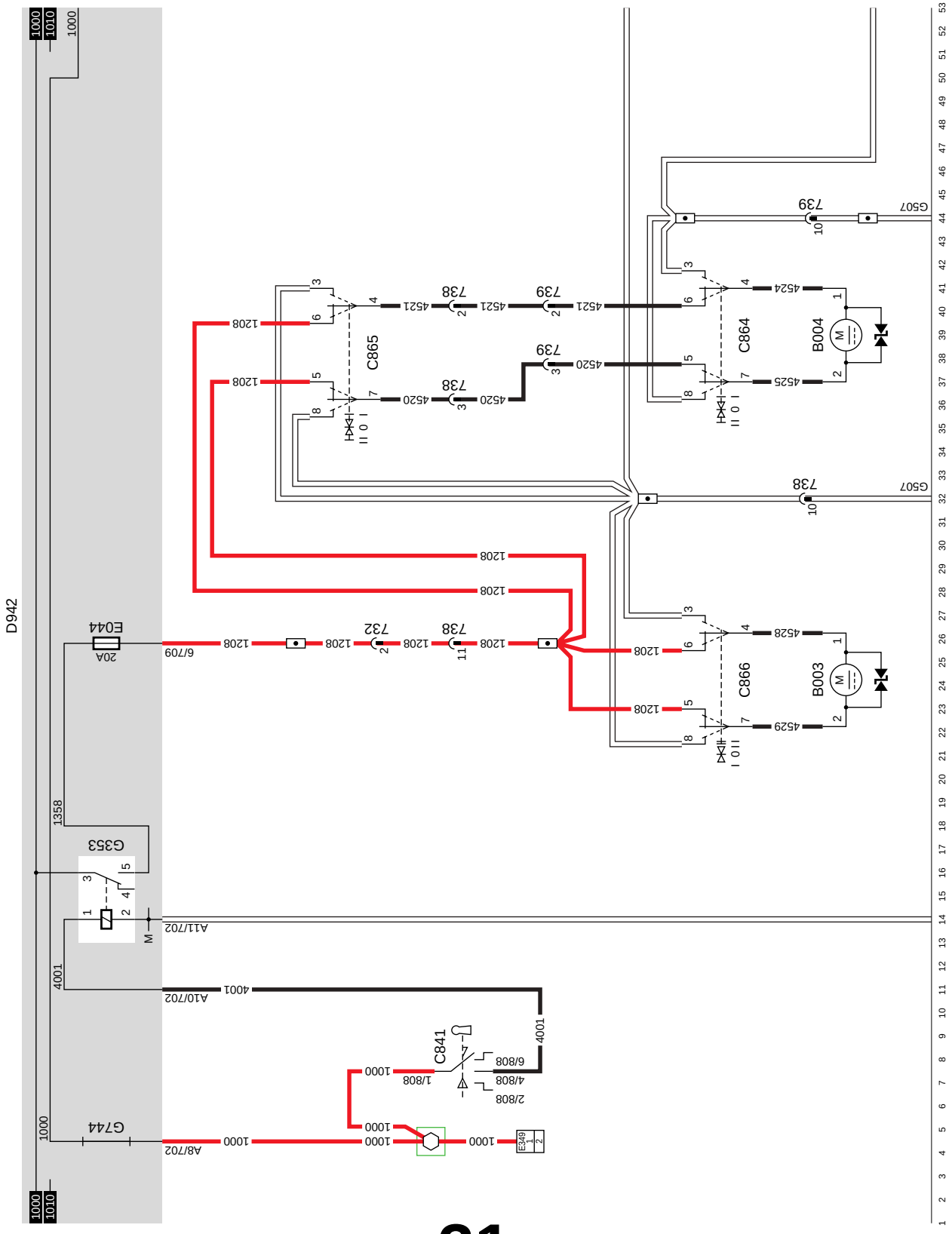
31. CDS-3/DROP GLASS OPERATION/ROOF HATCH

DROP GLASS OPERATION

When the vehicle ignition is switched on (connection between pins 1 and 4, C841), relay G353 is energised. Via fuse E044 and wire 1208, relay G353 supplies power to the electric drop glass door switches (C864 in the co-driver's door, C865 in the driver's door for the co-driver's door, and C866 in the driver's door).
There are two independent drop glass switches. In the rest position, pins 7 and 4 of the switch are connected to power supply via wire 1208. Depending on the side on which the switch is operated, pin 7 or 4 will be connected to earth and the drop glass motor (B003 - driver's side, B004 - co-driver's side) will be activated.



31 **1427090/03**

EL001602

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CENTRAL DOOR LOCKING

Purpose:
- Automatic locking of both doors when one of the doors is locked with the key/button.
- Automatic locking of both doors using remote control.
- If one of the two doors is unlocked using the key/button, only this door will be unlocked; the other door will remain locked.
- Automatic unlocking of the driver's side door using remote control.

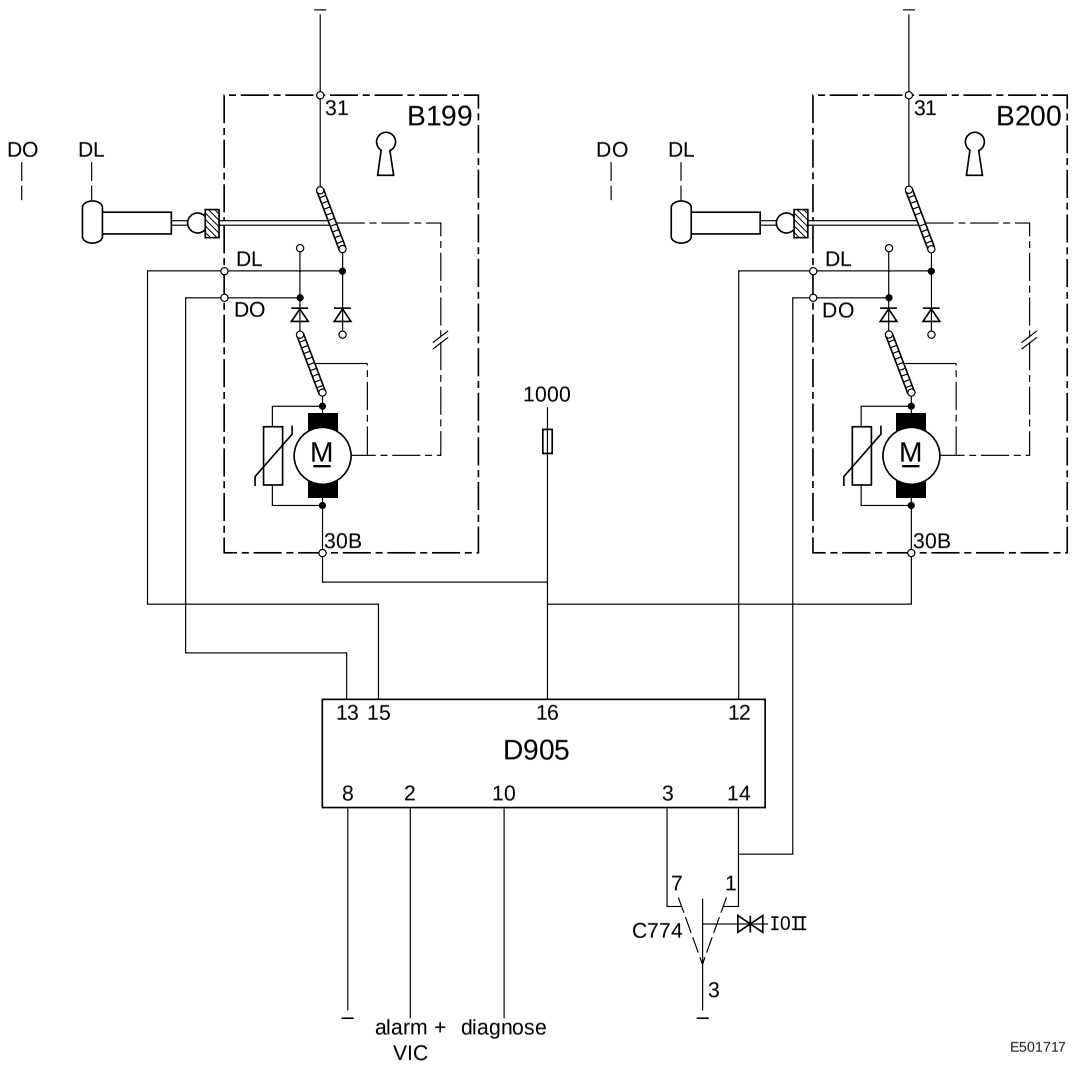
Conditions: both doors locked.

- **Unlocking co-driver's side door using key.**

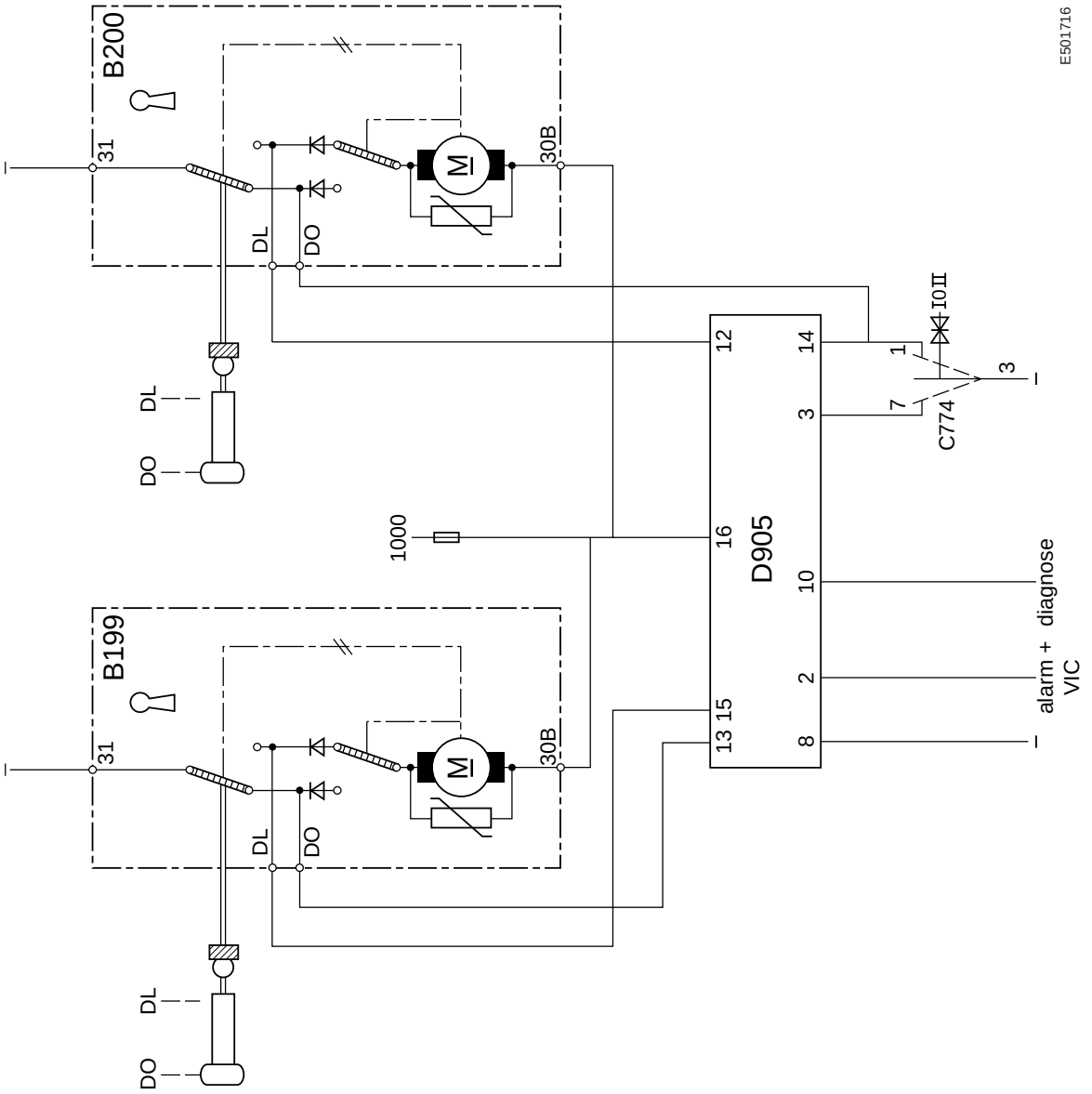
This is equivalent to opening a door without central locking. The other door remains locked.

- **Unlocking the co-driver's side door using switch C774.**

When switch C774 is operated (pin 3 connected to pin 1), connection DO of component B200 is connected to earth. The co-driver's door will unlock.



- **Unlocking using remote control.**
If the door unlocking button on the remote control unit is pressed, the remote control unit will send a fixed-code signal to the CDS electronic unit (D905). When the CDS electronic unit (D905) recognises the remote control unit on the basis of the fixed code, the remote control unit will send coded messages to the unit (D905). These messages are coded with a rolling code. This rolling code will change every time the remote control is operated. After the CDS electronic unit (D905) has accepted the messages, it will send a signal to the VIC (D900). As a result, the VIC will switch on the interior lighting for a specific period of time.
The CDS unit (D905) now switches pin 13 to earth. This will only activate the motor (B199). The CDS unit (D905) checks the status of the output to the motor (B199). This is done to ensure that the DL connection is not connected to earth when the motor is in the "open" position. The CDS unit can deduce from this whether the driver's side door has been successfully unlocked. The CDS unit (D905) will then send a message to the VIC (D900) via pin 2 stating that the driver's side door has been successfully unlocked. If the driver's side door is not unlocked properly after three attempts, a message will be sent to the VIC (D900) to inform it that the door has not unlocked successfully.



Conditions: both doors unlocked.

- **Locking driver's side door with key/button.**
  The D905 unit will measure an earth signal at pin 15 through connection DL. D905 will now connect pin 12 to earth, which will also activate B200. The co-driver's side door will now lock as well.
- **Locking the driver's side door with key/button.**
  The operation is as described above, except that unit D905 will now measure an earth signal at pin 12 and it will connect pin 15 of component B199 to earth. The door on the driver's side will now also be locked.
- **Locking co-driver's side door using switch C774.**
  When switch C774 is operated (pin 3 connected to pin 7), an earth signal is created at pin 3 of unit D905. D905 will now connect pin 12 to earth, which will activate B200. This will lock the door on the co-driver's side.
- **The doors on the driver's and co-driver's sides are locked using the remote control unit.**
  When the lock doors button on the remote control unit is pressed, a procedure starts that is comparable to the procedure for opening the doors.

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However, during the locking operation the CDS unit (D905) will connect pins 12 and 15 to earth. This will activate the motors (B199 and B200). The CDS unit (D905) then checks the status of the outputs to the motors (B199 and B200). It uses this information to determine whether the doors have been successfully locked. The CDS unit (D905) will then send a message to the VIC (D900) via pin 2 stating that the doors have been successfully locked. As a result, the VIC (D900) will switch off the interior lighting. If the doors are not locked properly after three attempts, a message will be sent to the VIC (D900), stating that the locking operation was not successful.

Initialisation
When the CDS unit is supplied with power for the first time (on installing or replacing the electronic unit) or when new hand-held transmitters are used (up to 8), the unit must recognise these hand-held transmitters. To enable the hand-held transmitters to communicate with the CDS unit, the unit and the hand-held transmitters must be taught using DAVIE.

ROOF HATCH

Opening roof hatch
When the roof hatch switch (C736) is operated and a connection is made between contacts 2 and 6 and therefore between contacts 1 and 3, a voltage is applied to pin 1 of the roof hatch motor (B009) through fuse E163, switch C736 and wire 4761. The roof hatch will open.

Closing roof hatch
When the roof hatch switch (C736) is operated and a connection is made between contacts 8 and 6 and therefore between contacts 7 and 3, a voltage is applied to pin 2 of the roof hatch motor (B009) through fuse E163, switch C736 and wire 4760. The roof hatch will now close.

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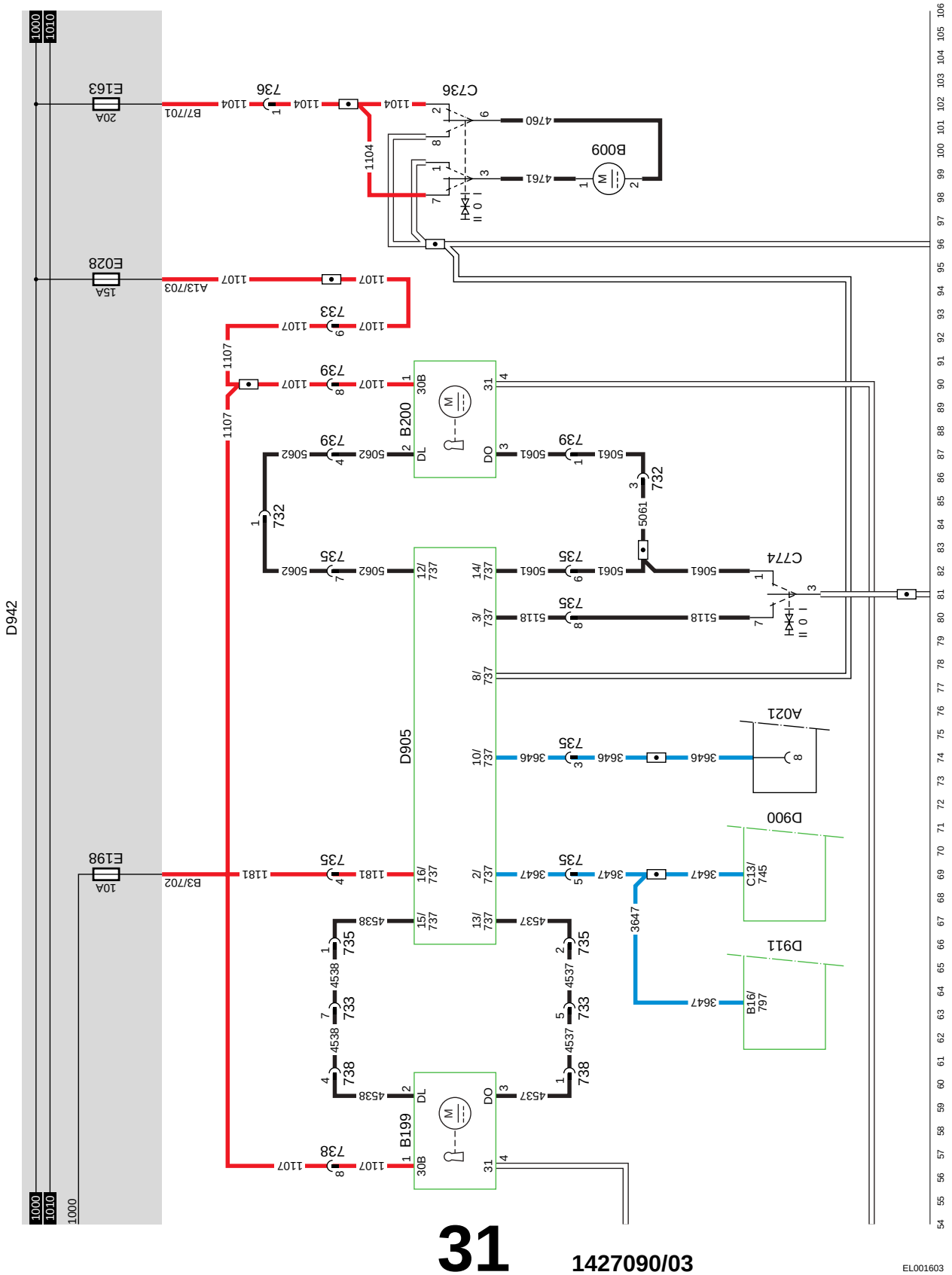

31 **1427090/03**

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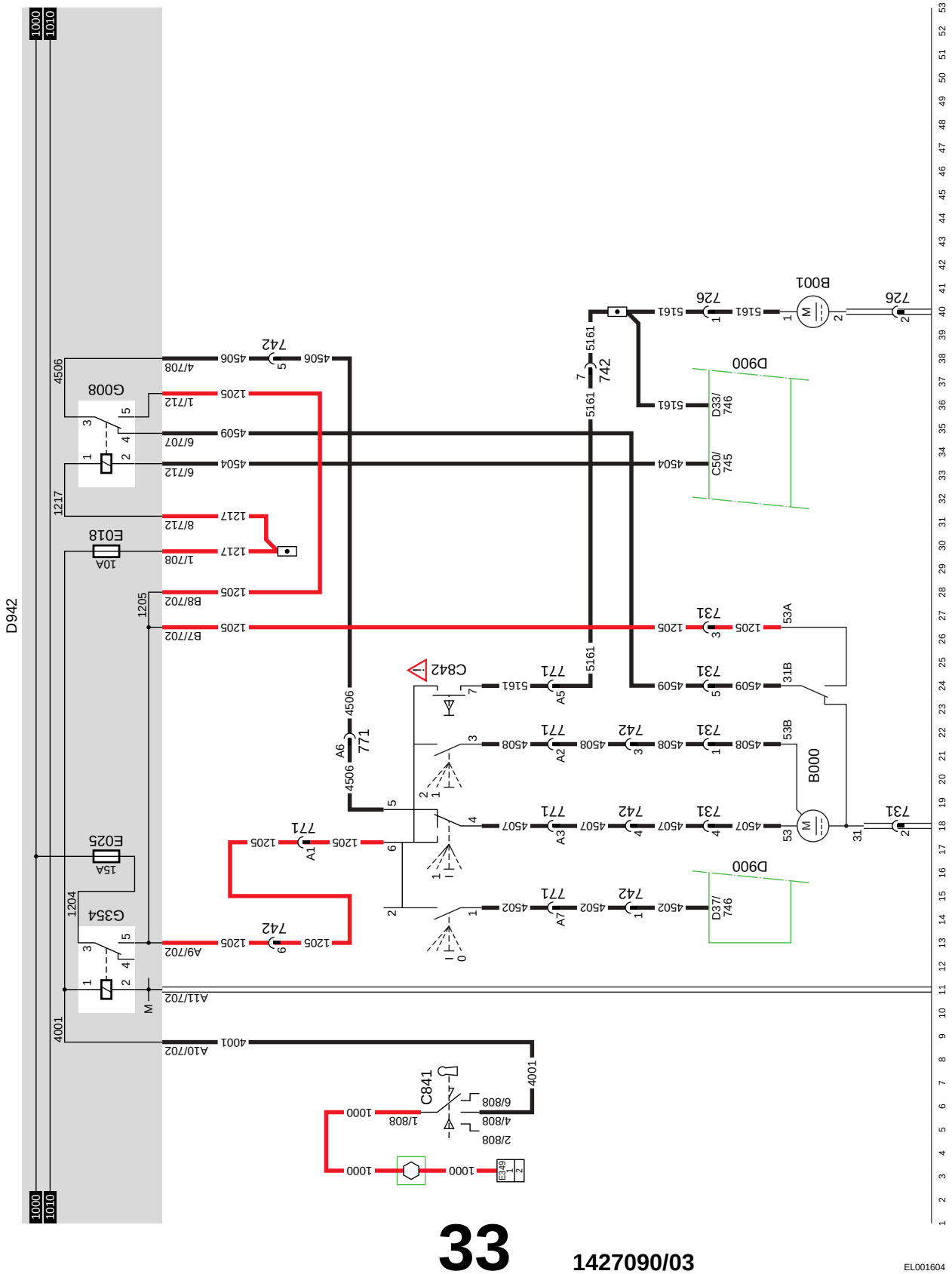
33. WINDSCREEN WIPE/WASH SYSTEM

FOR MORE INFORMATION SEE SYSTEM MANUAL

VARIANTS

Location	
25	Steering column switch (C842): If the vehicle is fitted with cruise control/engine speed control, the Basic Code Number of the stalk switch is C891.



33 **1427090/03**

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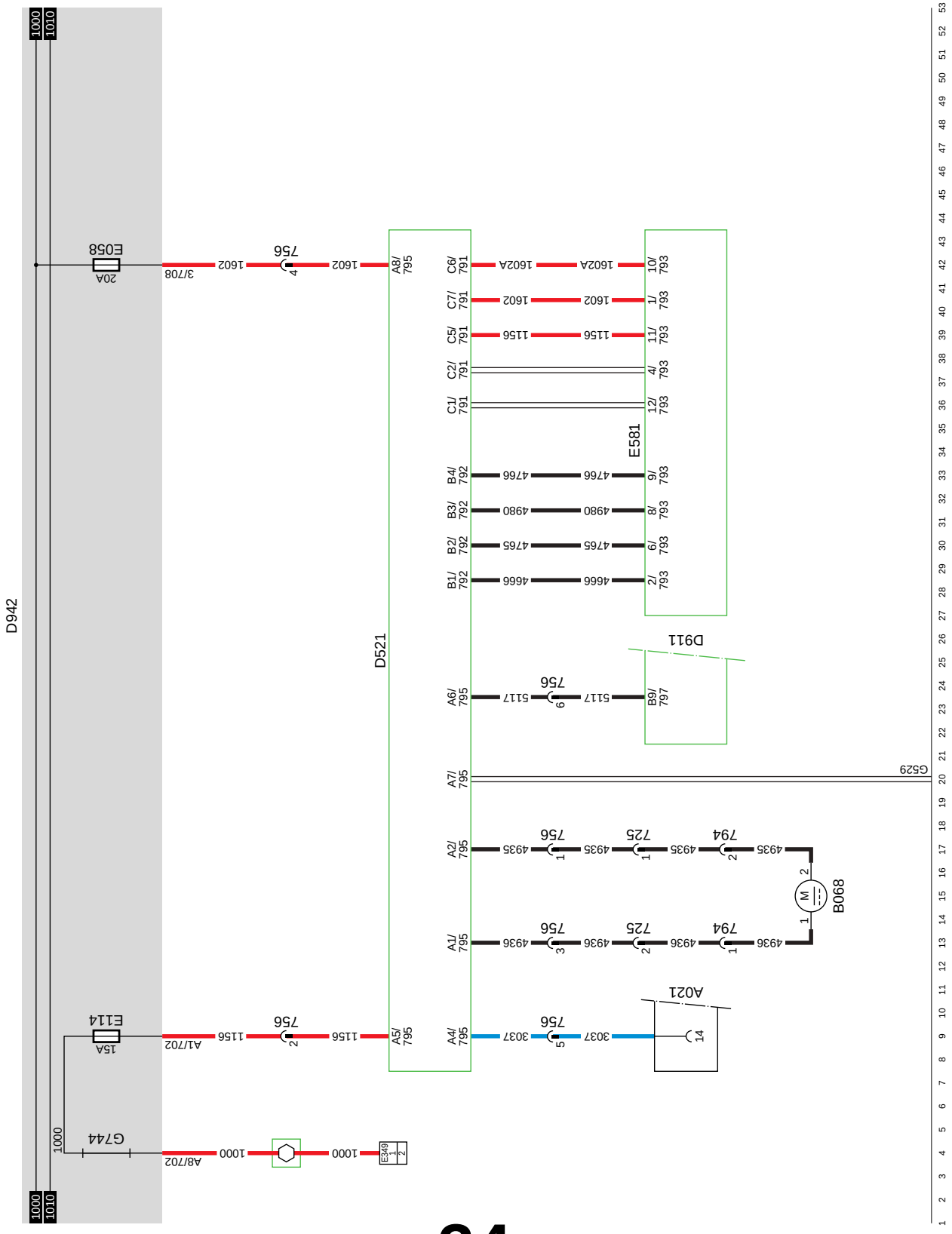
34. ACH-W WITH TIMER
FOR MORE INFORMATION SEE SYSTEM MANUAL



34 **1427090/03** EL001605

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35. APPLICATION CONNECTOR, ENGINE SPEED CONTROL, SUPERSTRUCTURE FUNCTIONS AND SPARE WIRING

FOR MORE INFORMATION SEE "CONNECTION OF ACCESSORIES"

VARIANTS

Location	
28,30,32,34	The spare wires are bundled together behind the dashboard central panel
36,38,40,42, 44,46,48,50	The spare wires are bundled together in the co-driver's side roof console
44,46,48,50	The spare wires are bundled together behind the fuse box.

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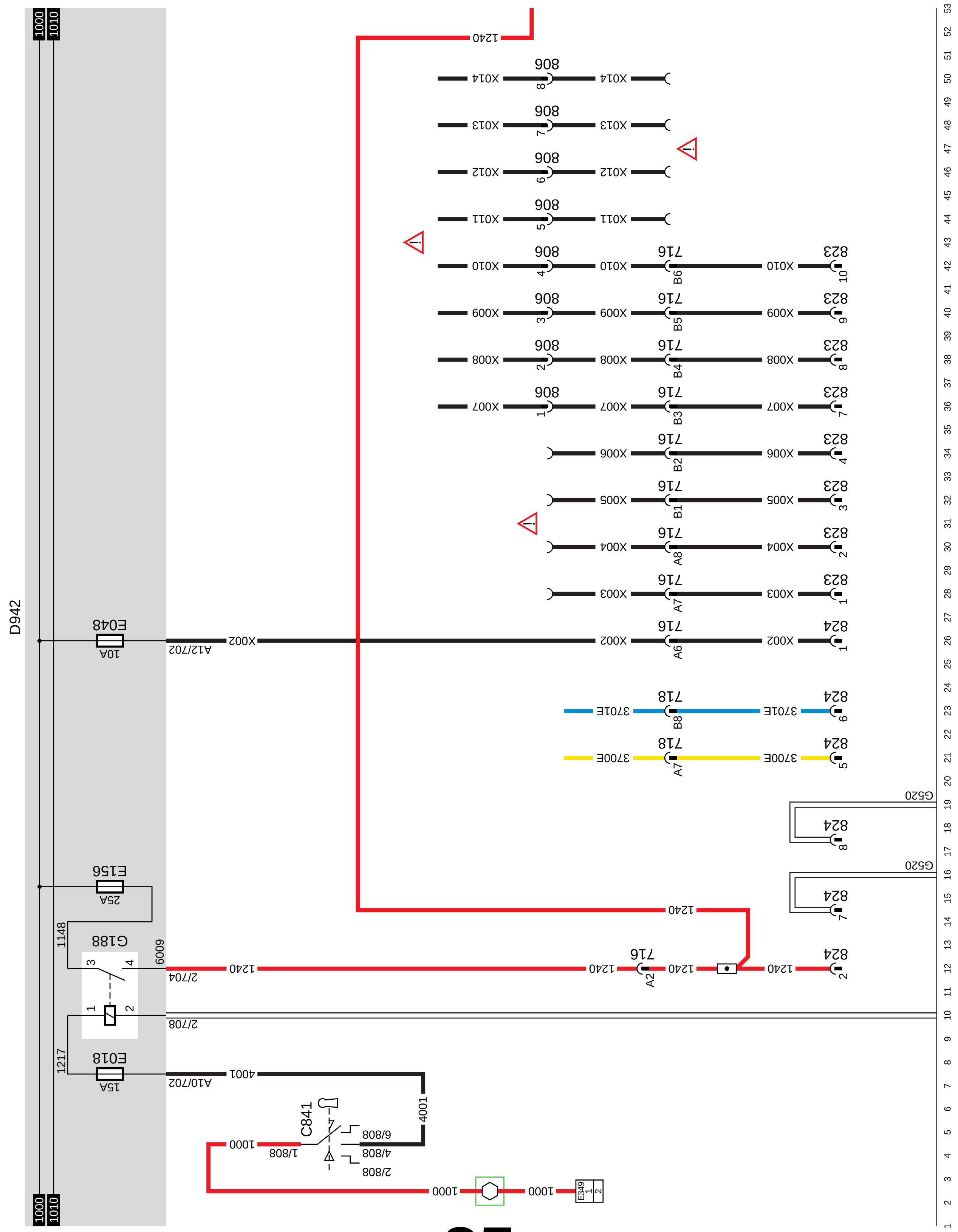

35 **1427090/03**

EL001606

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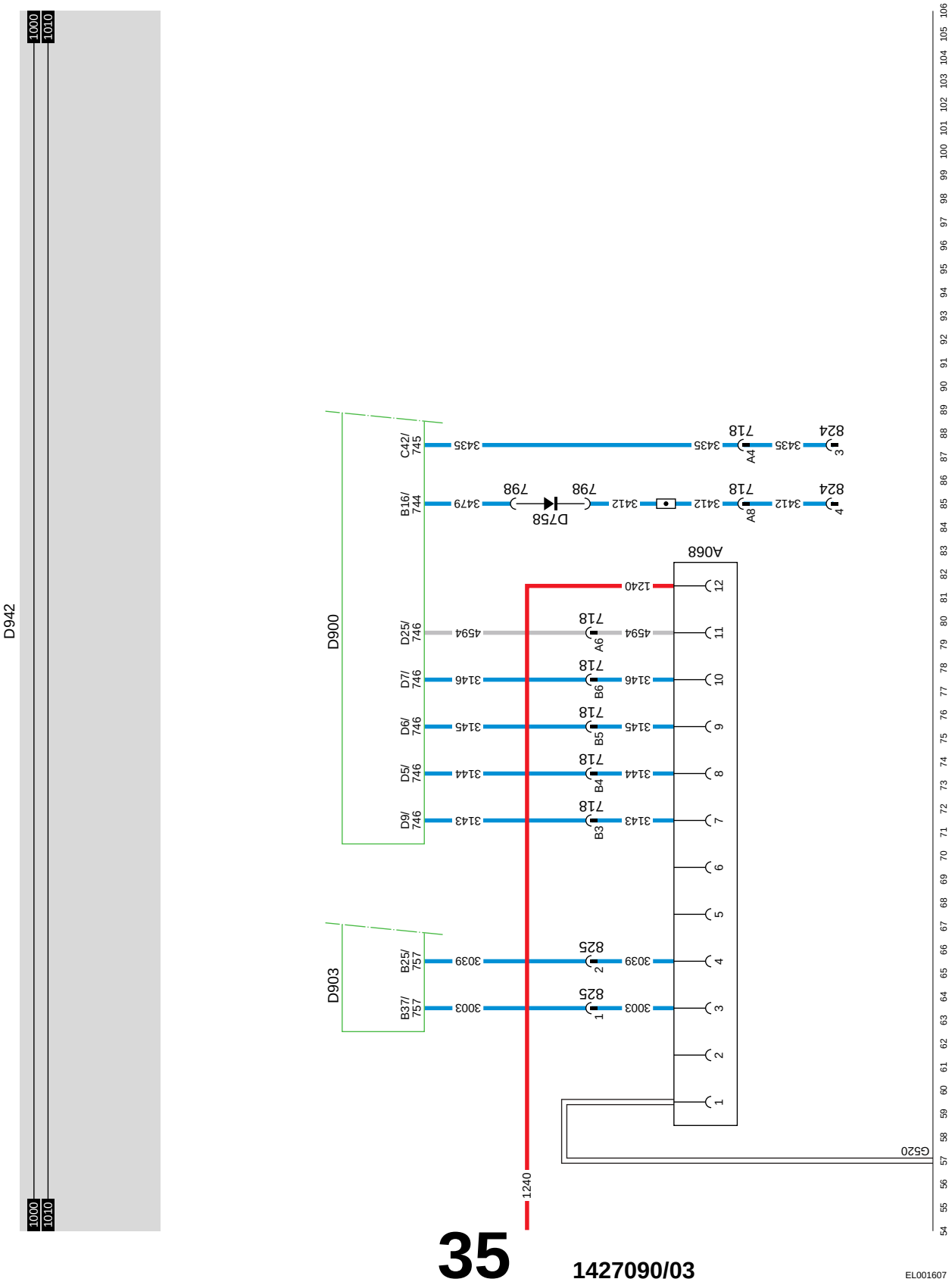

35 **1427090/03** EL001607

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36. BREAK LINING WEAR

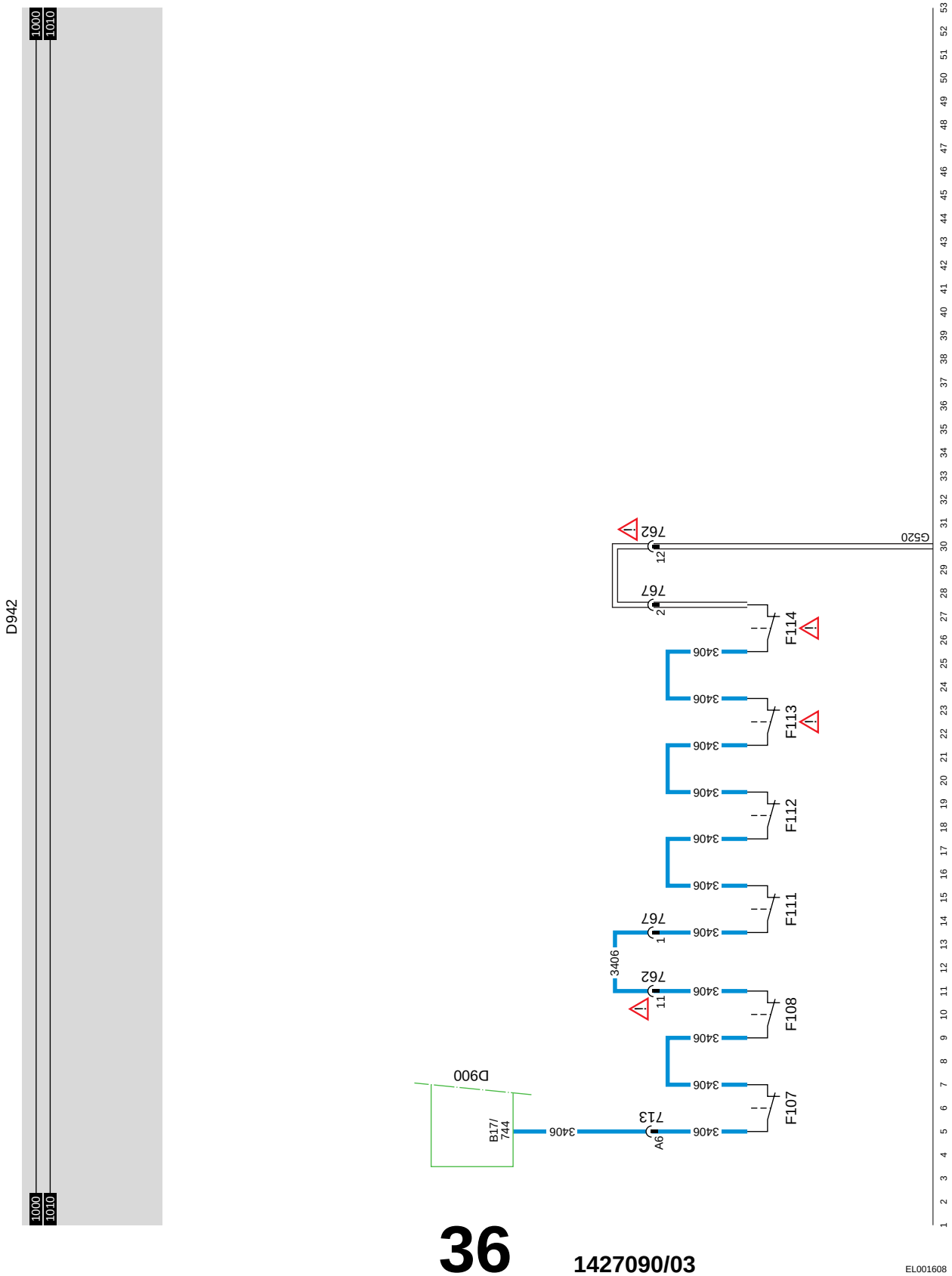
If one of the brake linings is too thin, pin 17, connector 744 of the VIC will, via wire 3406, be interrupted by the appropriate brake lining wear control switch (F107, F108, F111, F112, F113 or F114). The VIC will send a message to the instrument panel, which will then activate the "brake lining wear" indicator.

VARIANTS

Location

11,30 Connector 762:
Not fitted on vehicle type FT

22,26 Brake lining wear switches F113 and F114:
Only applicable to 6x2 vehicles



36 **1427090/03** EL001608

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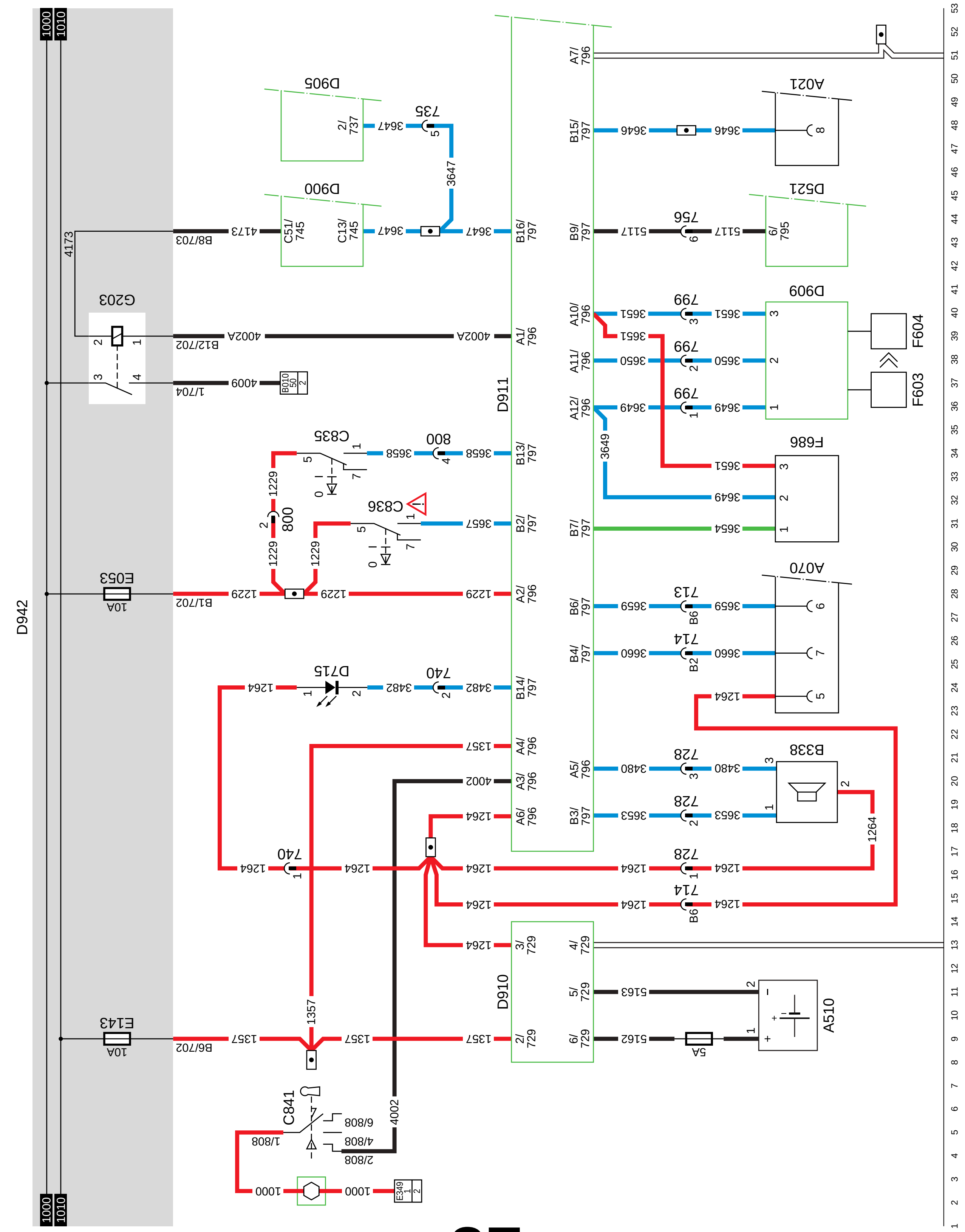
37. ALS-S/BATTERY CHARGER FOR ALARM BV2/BV3

FOR MORE INFORMATION SEE SYSTEM MANUAL

VARIANTS

Location	
1	If trailer protection fitted.
93	Where an immobiliser system is fitted, the optional LED alarm system (D715) can be made to flash by the LED unit D931 when the ignition is turned off.



37 1427090/03

EL001609

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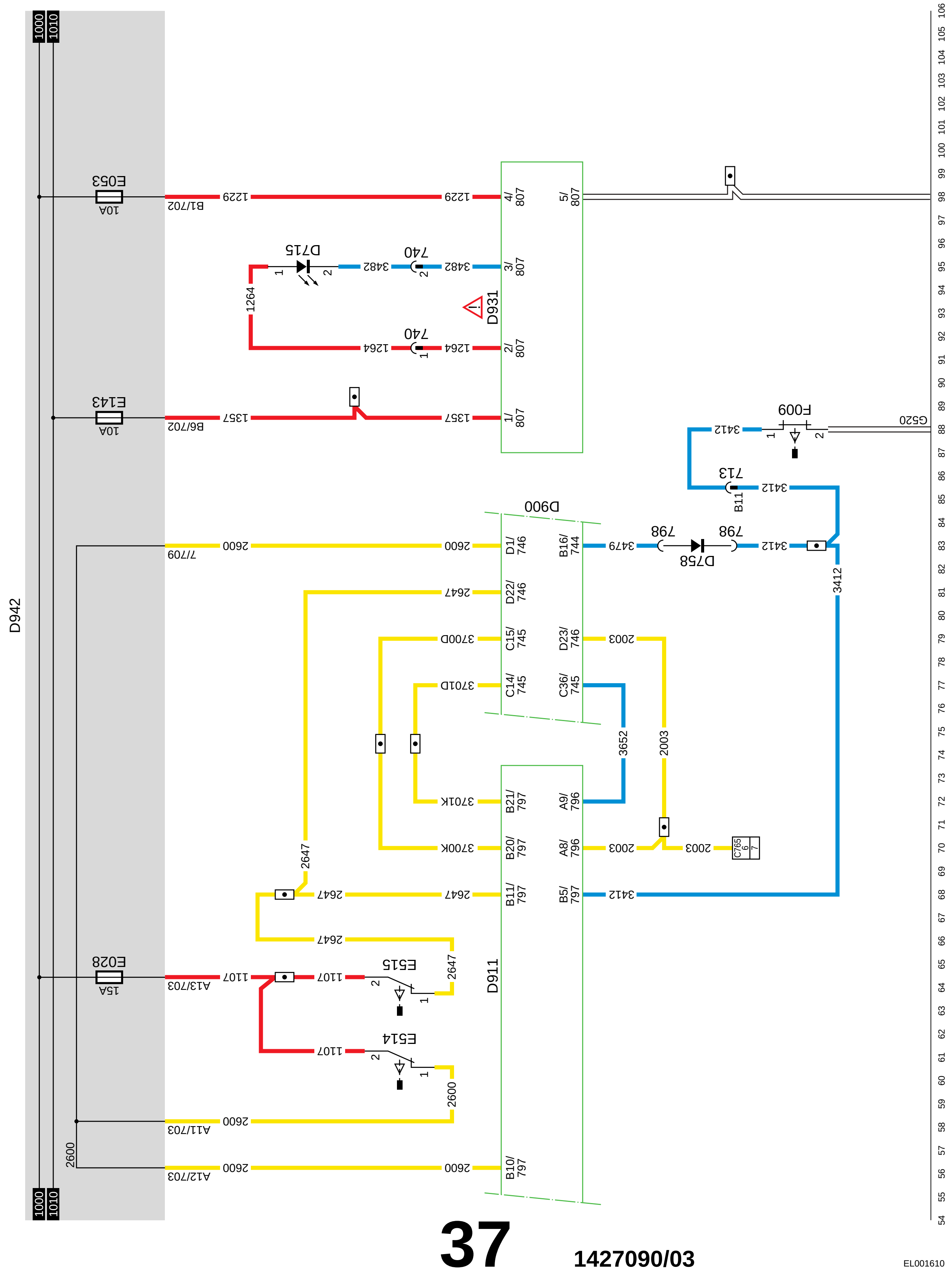
D942
D931
D900
D911
E053
E143
E028
E515
E514
F009
D715
D758
G520
37
1427090/03
EL001610

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38. SOCKETS, FA/FT

12 V PLUG (A011)
Pin 1 is connected to the 24/12 V converter (12 V before contact) through wire 1153.
Pin 2 is connected to the earth connection of the converter.

DIAGNOSTIC SOCKET (A021)
The diagnostic socket is located to the left of the driver's seat on the floor plate. This is the socket for the DAVIE connection.
Power before contact is supplied to pin 1 through fuse E053. Pin 2 is connected to earth. The remaining pins are for communication with the various systems and are connected to those systems.

Pin no.	Wire no.	Colour	Description
1	1229	red	Power supply before contact
2	9107	white	Earth
3	3425	blue	ABS-D/ABS/ASR-E
4	-		
5	-		
6	-		
7	4732	black	ECAS-3/ECAS-2
8	3646	blue	CDS, ALS-S, airbag/seat belt tensioner, RAS-EC
9	4047	black	VIC
10	-		
11	-		
12	4733	black	DIP-4
13	-		
14	3037	blue	Cab heater
15	3700	yellow	CAN-network (ECS-DC3, MTCO)
16	3701	blue	CAN-network (ECS-DC3, MTCO)

DRAWN VEHICLE ABS/EBS SOCKET (A004)

Pin 1 of the drawn vehicle ABS/EBS socket (A004) is connected directly to power before contact via fuse E043 and wire 1119.
Pin 2 connected directly to power after contact via fuse E282 and wire 1356.
Pin 3 connected to earth.
Pin 4 connected to earth.
Pin 5 connected to pin C32/745 of the VIC (D900) via wire 3428.
Pin 6 -
Pin 7 -

VARIANTS

Location

26	Electronic unit, ABS/ASR, E version (D961): Or electronic unit for ABS/ASR, D version (D941)
49	Electronic unit, ECAS-3 (D851): Or electronic unit ECAS-2 (D802)
79,81,91, 117,126,135	Connector 762: Not fitted on vehicle type FT
86,88,122, 129,144, 148,150	Connector 763: Not fitted on vehicle type FT

DRAWN VEHICLE SOCKET (A000) (7-pin)

Pin 1 connected to earth.

When a connection is made between contacts 2 and 1 (marker light/parking light position) by switching on the lighting switch (C622), relay G000 is energised. Relay G000 supplies power to wire 2101 via wire 1000. Via fuses E284 and E283, power is supplied to connector A000 at pin 2 (via wire 2170) and pin 6 (via wire 2169) respectively.

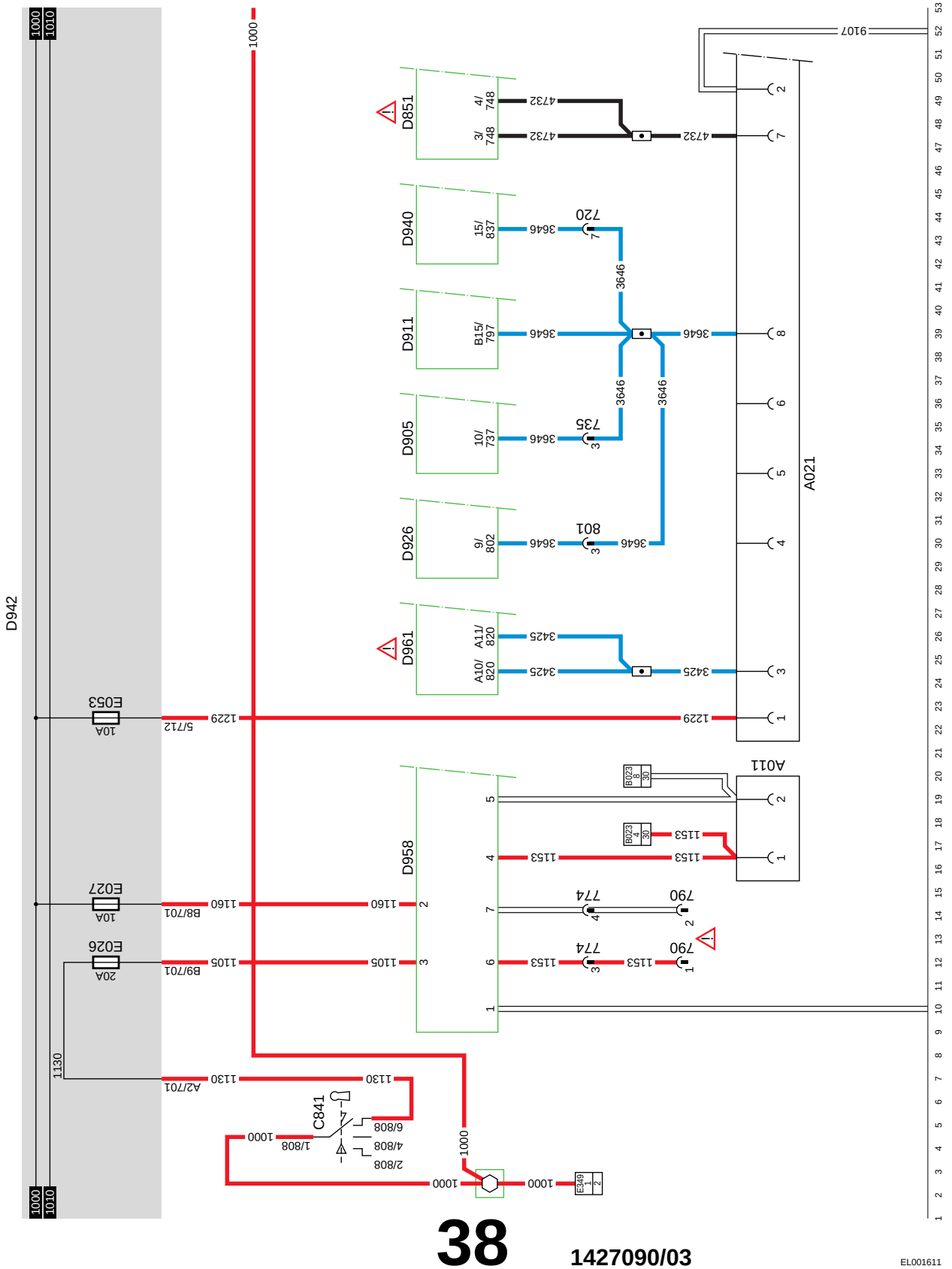
Pin 2 switches the left-hand rear light.
Pin 3 is connected via wire 2008 to connection point E7/747 of the VIC (D900) (direction, left).
Pin 4 is connected via wire 4601 and fuse E013 to relay G036 (brake light relay).
Pin 5 is connected via wire 2008 to pin E4/747 of the VIC (D900) (direction, right).
Pin 6 switches the right-hand rear light.
Pin 7 -

SUPERSTRUCTURE APPLICATION CONNECTOR (A070)

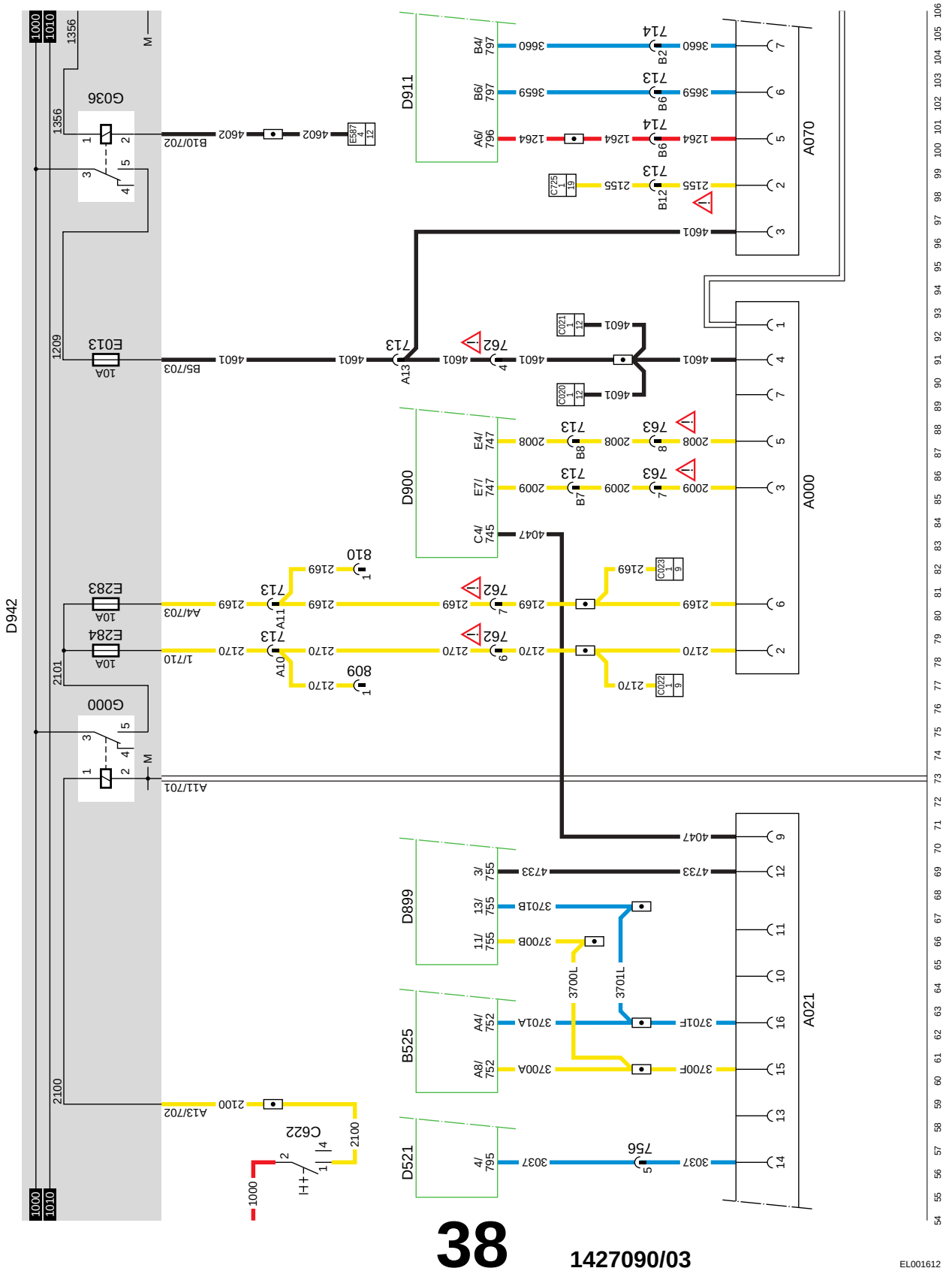
Pin 1 connected to power before contact via wire 1110 and fuse E052.
Pin 2 on vehicle type FA, connected to the VIC and the work lamp switch (C725) through wire 2155, fuse E283 and wire 2101. On vehicle type FT, pin 2 is connected to the right-hand rear light through wire 2169 .
Pin 3 connected to connection point 5 of G036 (stop light relay) via wire 4601 and fuse E013.
Pin 4 connected via wire 4591 to connection point 2 of E501 (reversing lamp switch).
Pin 5 connected to connection point A6/796 of D911 (electronic unit, alarm system ALS-S) via wire 1264.
Pin 6 connected to connection point B6/797 of D911 (electronic unit, alarm system ALS-S) via wire 3659.
Pin 7 connected to connection point B4/797 of D911 (electronic unit, alarm system ALS-S) via wire 3660.
Pin 8 connected directly to earth point G520.

REAR FOG LAMP/REVERSING LIGHT SOCKET (A001)

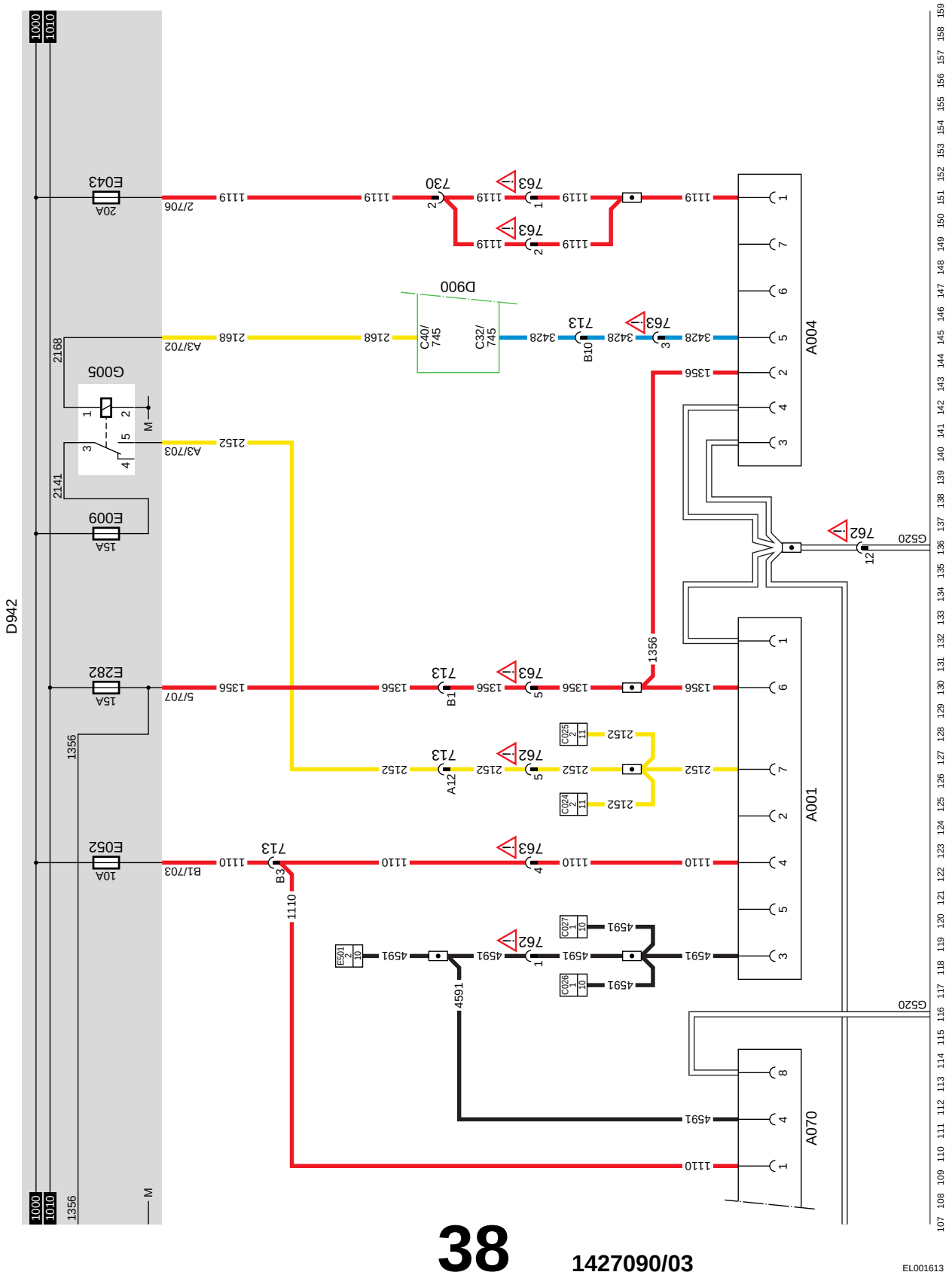
Pin 1 connected to earth.
Pin 2 -
Pin 3 connected via wire 4591 to pin 2 of E501 (reversing lamp switch).
Pin 4 connected via wire 1110 to power before contact (1000) via fuse E052.
Pin 5 -
Pin 6 connected via wire 1356 to power after contact (1010) via fuse E282.
Pin 7 connected via wire 2152 to relay G005 (rear fog lamp relay).



38 **1427090/03** EL001611



38 **1427090/03** EL001612



38 **1427090/03**

39. WATER SEPARATOR/FUEL PRE-HEATING

WATER SEPARATOR

The water separator sensor (F692) is supplied with power via relay G353 and fuse E091. If the water level in the fuel filter becomes too high, the VIC receives a signal at pin D8/746. A warning is then indicated on the DIP through the VIC.

FUEL PRE-HEATING

Depending on the temperature, the ECS-DC3 electronic unit (D903) activates the fuel heater relay (G201).
The relay supplies power to the water separator fuel heating element (B182) through fuse E165.

VARIANTS

Location	
34	Fuel heating relay G201: May be placed behind the central box.

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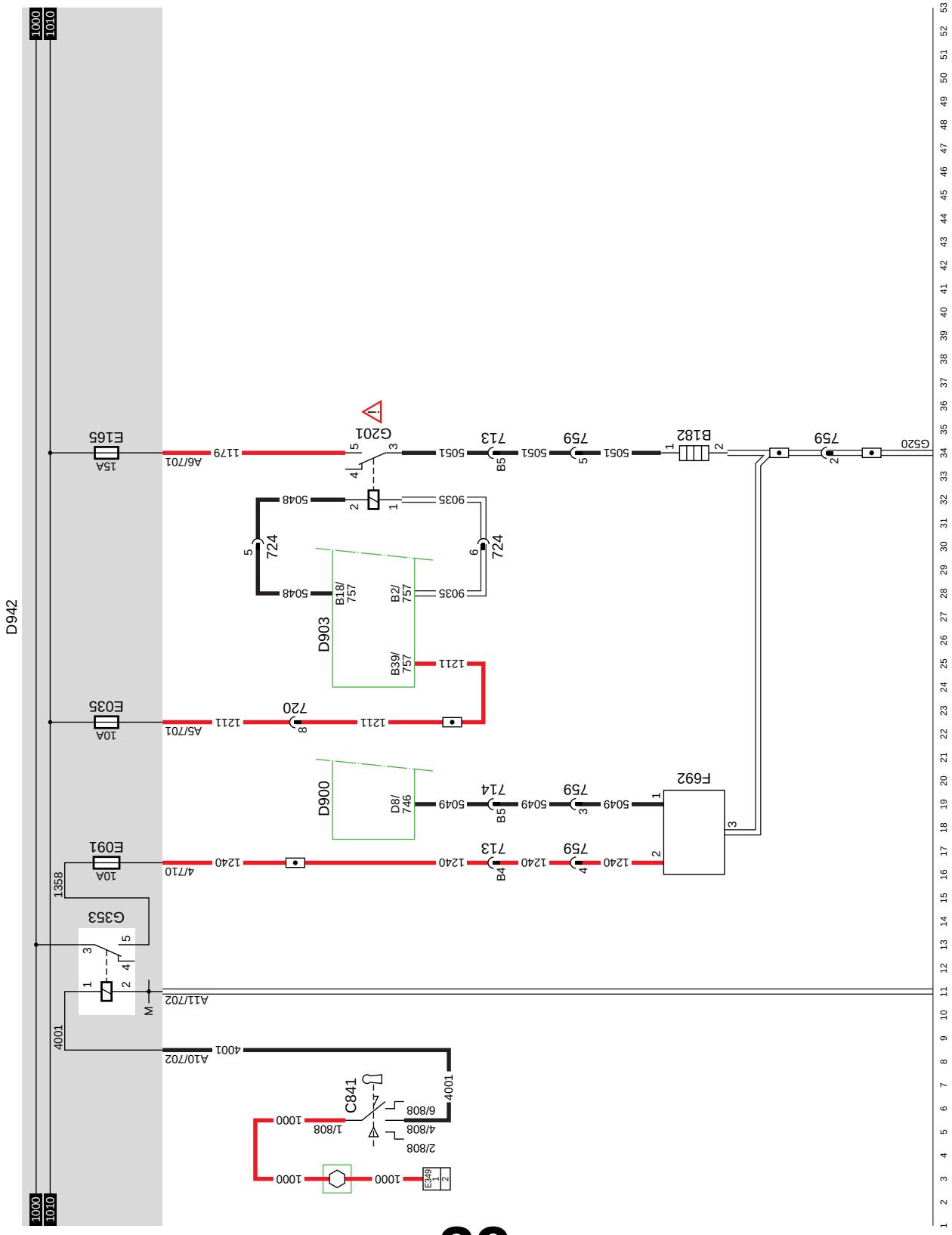

39 **1427090/03**

EL001614

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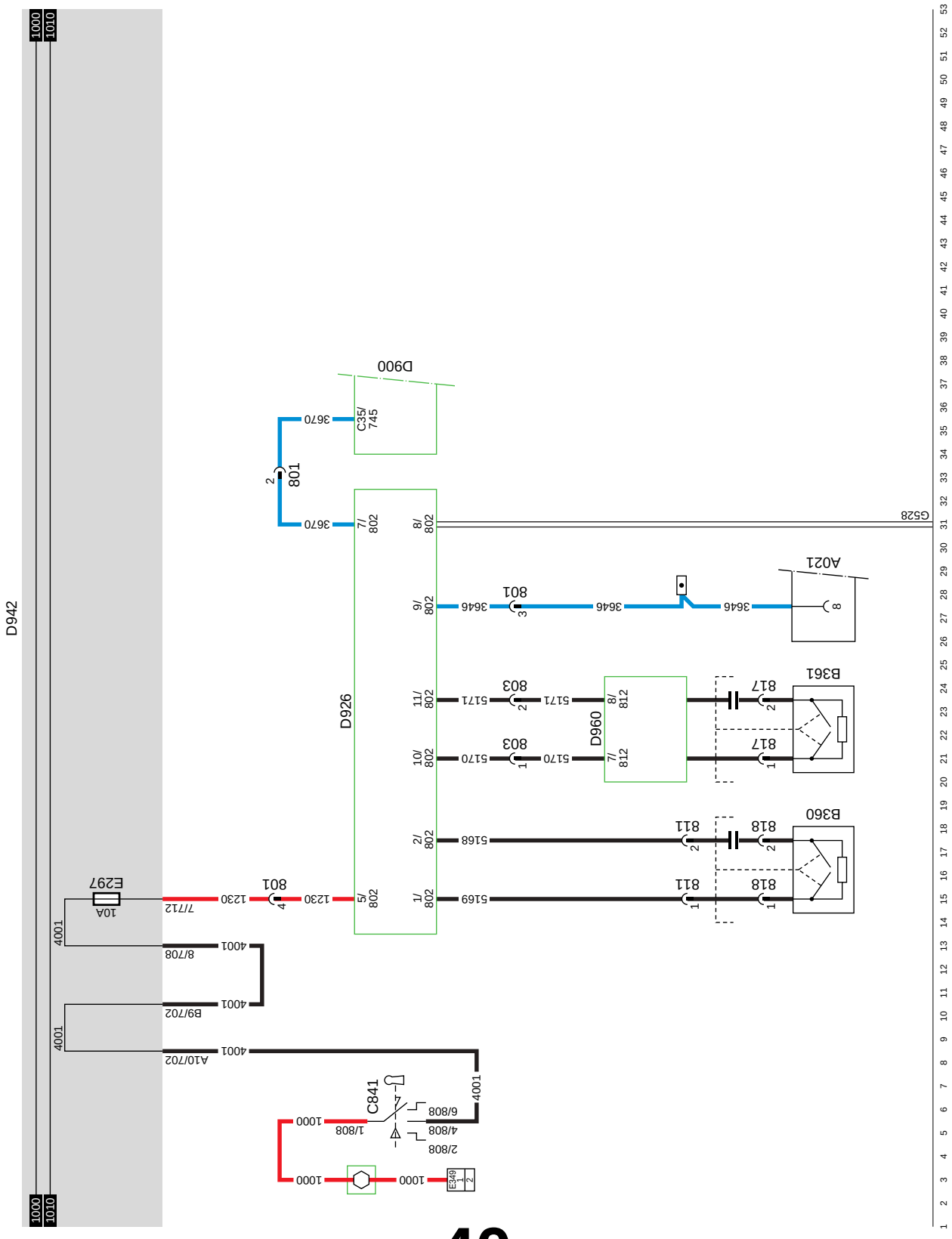
40. AIRBAG/SEAT BELT TENSIONER

FOR MORE INFORMATION SEE SYSTEM MANUAL

SAFETY INSTRUCTIONS

- Never disconnect an electrical connection in the airbag or seat belt tensioner circuits with the ignition switched on.
- Repairing or modifying the wiring of pyrotechnic systems (systems with airbag(s) and/or seat belt tensioner(s)) is not permitted. The wiring must be replaced if damaged.
- The pyrotechnic units (airbags and/or seat belt tensioners) must be checked using the DAVIE-XD Direct Test. Test lamps, multimeters and oscilloscopes (including those that are part of DAVIE-XD) present a danger and are therefore not permitted.
- Only the wiring harnesses may be checked using test lamps, multimeters or oscilloscopes. Ensure beforehand that no pyrotechnic or electronic units whatsoever are still connected to the wiring harness to be tested.
- Before any work is carried out on a pyrotechnic part (airbag and/or seat belt tensioner):
  a. switch off the ignition.
  b. the battery terminal clamp must be carefully separated from the negative terminal.
  c. wait at least 5 minutes.



40 **1427090/03**

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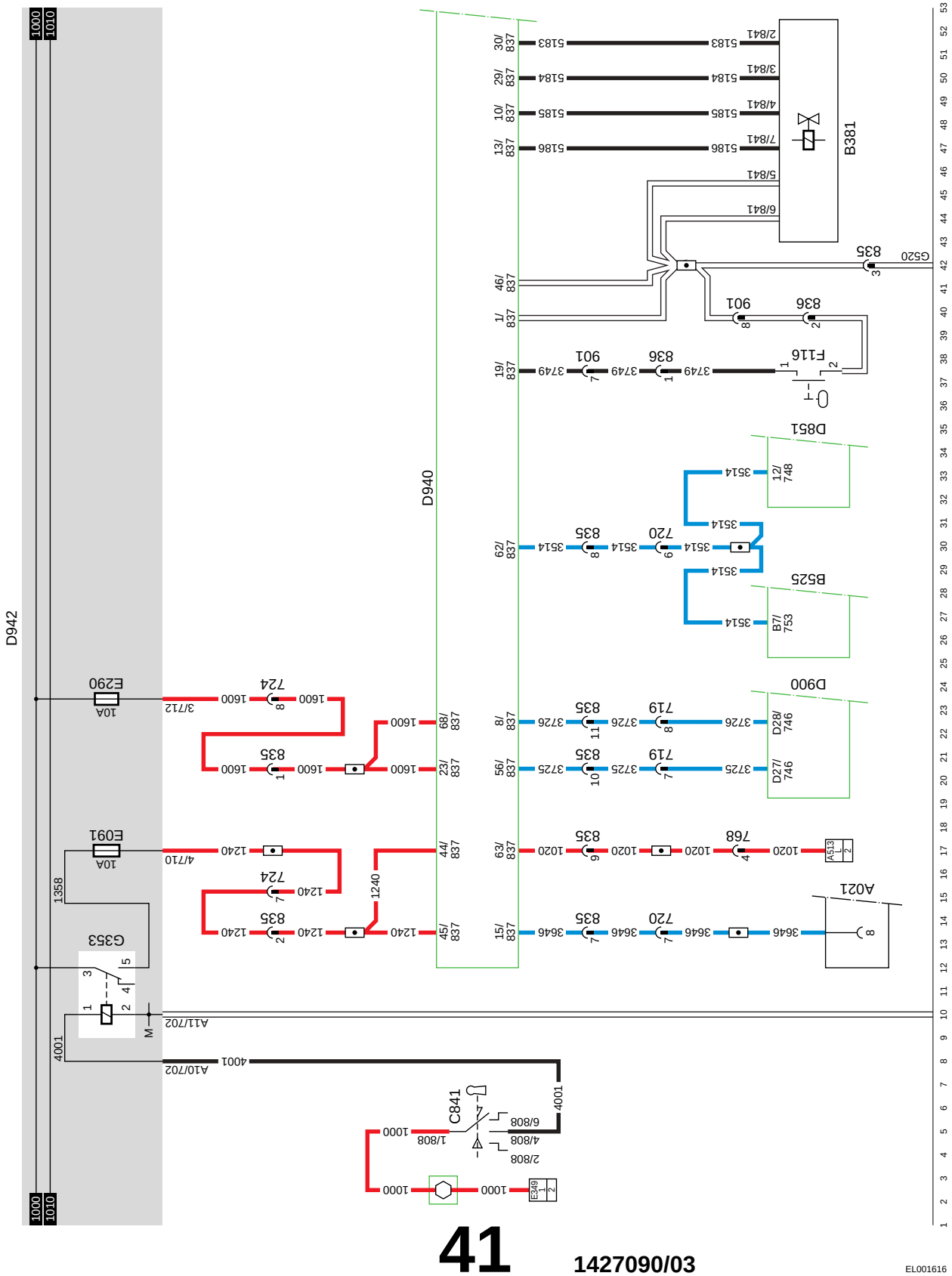
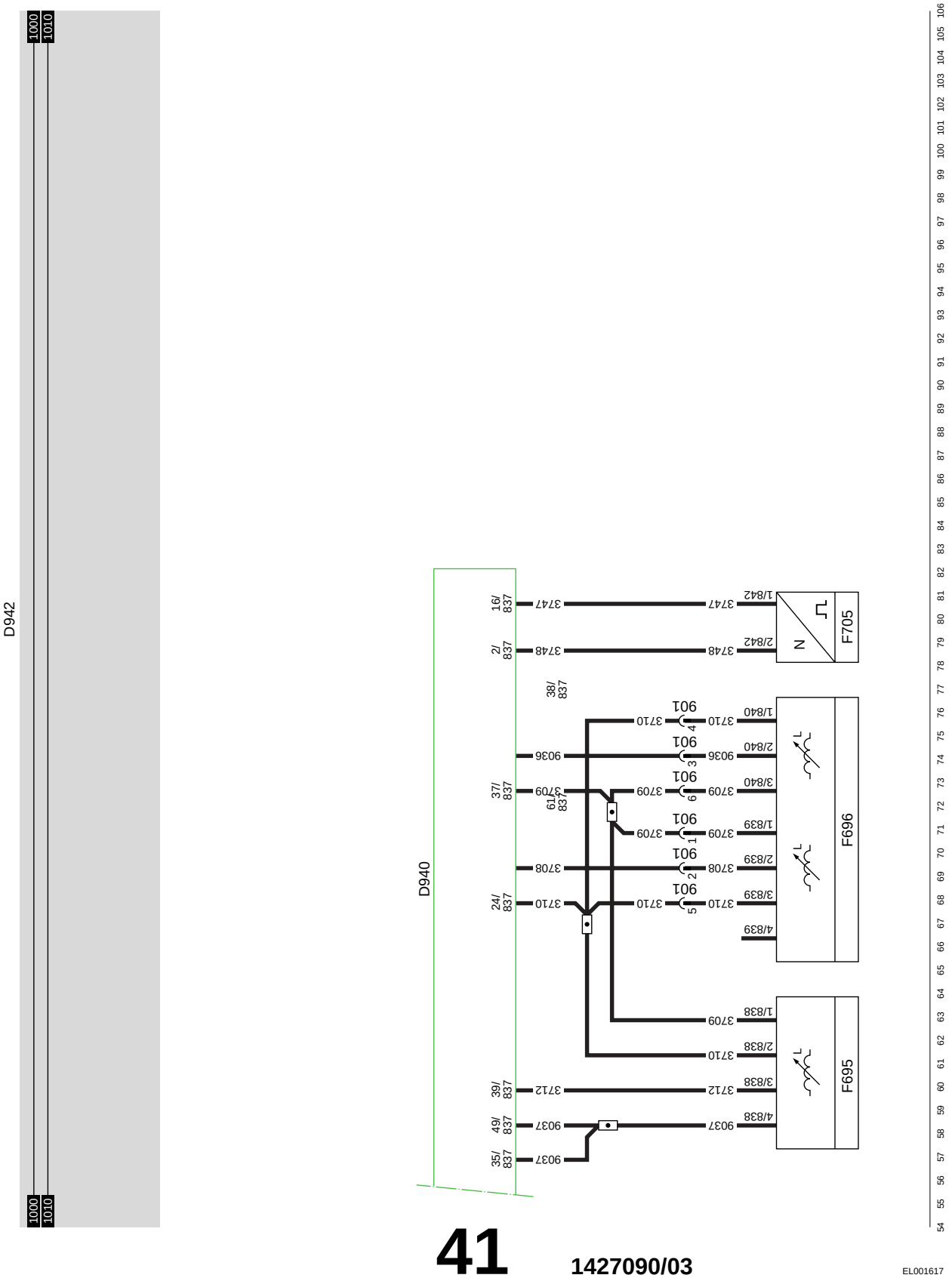
41. RAS-EC
FOR MORE INFORMATION SEE SYSTEM MANUAL


D942
D940
B381
G520
F116
D851
B525
D900
A021
E290
E091
G353
C841
41
1427090/03
EL001616


D942
1000
1010
D940
F705
F696
F695
1/842
2/842
1/840
2/840
3/840
1/839
2/839
3/839
4/839
1/838
2/838
3/838
4/838
3747
3748
3710
9036
3709
3708
9037
3712
16/837
2/837
38/837
37/837
61/837
24/837
39/837
49/837
35/837
9011
9012
9013
9014
9015
9016
41
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EL001617

CONTENTS

11

11

1. INTRODUCTION

This main group includes the entire electrical system shown in the form of **circuit diagrams** and an **overview of connectors/pin allocations**.

Circuit diagrams
All information that relates to the complete electrical system of the vehicle is found in the circuit diagrams with the exception of the connectors.

Note:
For the location of the connectors in the vehicle, see “Location of connectors”.

2. CHANGES IN THE ELECTRICAL SYSTEM FROM CHASSIS NUMBER 0L247507

2.1 OVERVIEW OF THE CHANGES IN THE ELECTRICAL SYSTEM

Section diagram	Electrical system	Changes	From chassis number
A	Voltage before and after contact	Battery earth and starter motor modified for LF55	0L247507
C	CAN overview	CDM-unit (D969) added	0L252611
1	Main switch	Battery earth and starter motor modified for LF55	0L247507
2	Ignition/starter switch/ charging circuit	Battery earth and starter motor modified for LF55	0L247507
5	Pre-glowing	Battery earth and starter motor modified for LF55	0L247507
8	VIC	Connector 858 changed to 952 for LF45	0L248731
10	Reversing lights/buzzer	LF45 wiring harness modified	0L248731
12	Stop lights/cab tilting gear	CDM variant added	0L252611
13	Differential lock	LF45 wiring harness modified	0L248731
15	Mirror heating/windscreen heating/mirror adjustment	Battery earth and starter motor modified for LF55	0L247507
19	Horn/cigar lighter/work lamp/air dryer	CDM variant added	0L252611
22	ECS-DC3/exhaust brake	- Oil pressure sensor (F647) replaced by engine oil pressure control switch (F011) - Fuel temperature sensor (F566) no longer fitted	0L253643
24	AGC automatic gearbox (AT1000/2000)	Battery earth and starter motor modified for LF55	0L247507
25	AGC automatic gearbox (MD3060)	Battery earth and starter motor modified for LF55	0L247507
31	CDS-3/drop glass operation/ roof hatch	CDM variant added	0L252611
32	CDM	New	0L252611
39	Water separator/fuel pre-heating	CDM variant added	0L252611

The other section diagrams from circuit diagram 1427090/04 contain no functional changes compared with circuit diagram 1427090/03.

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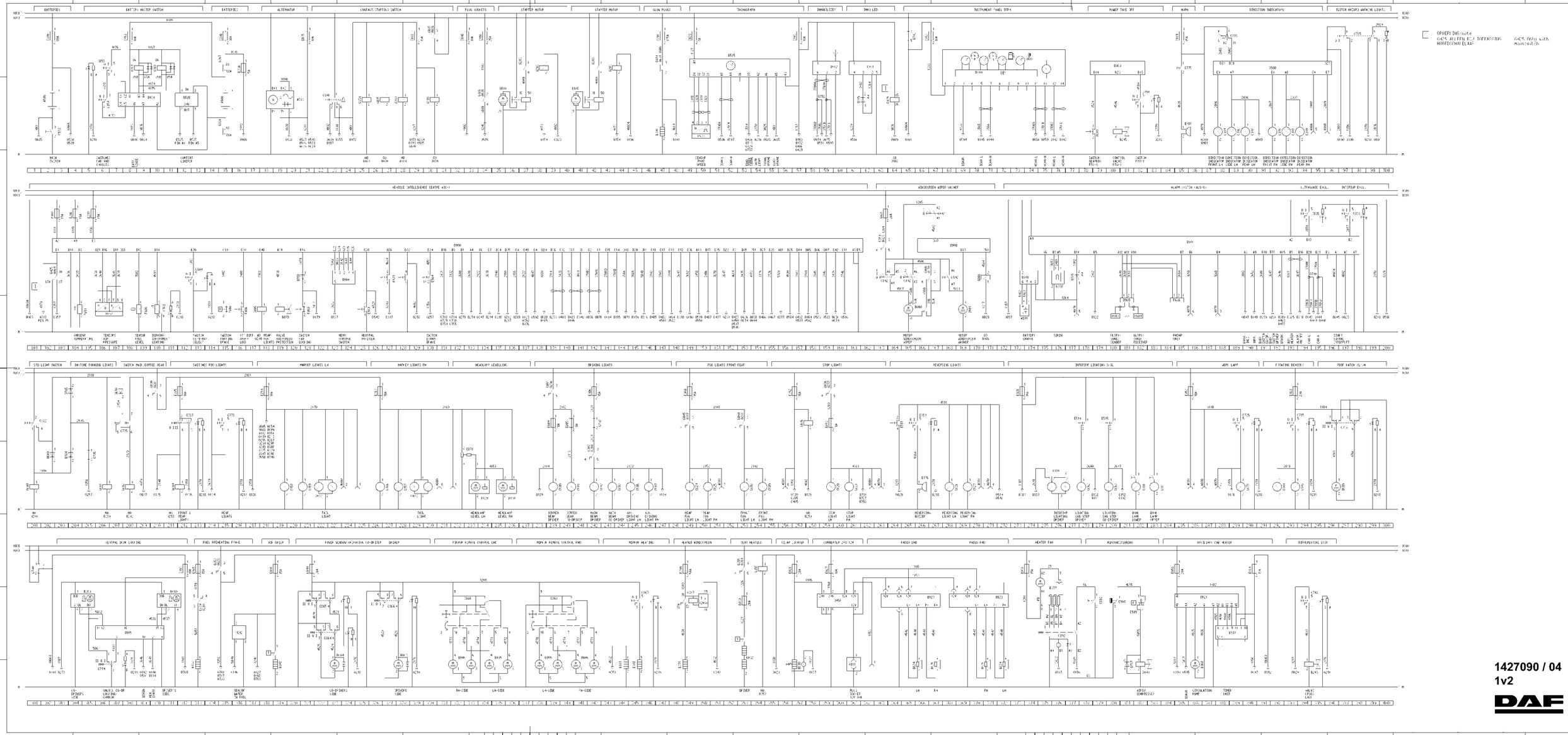
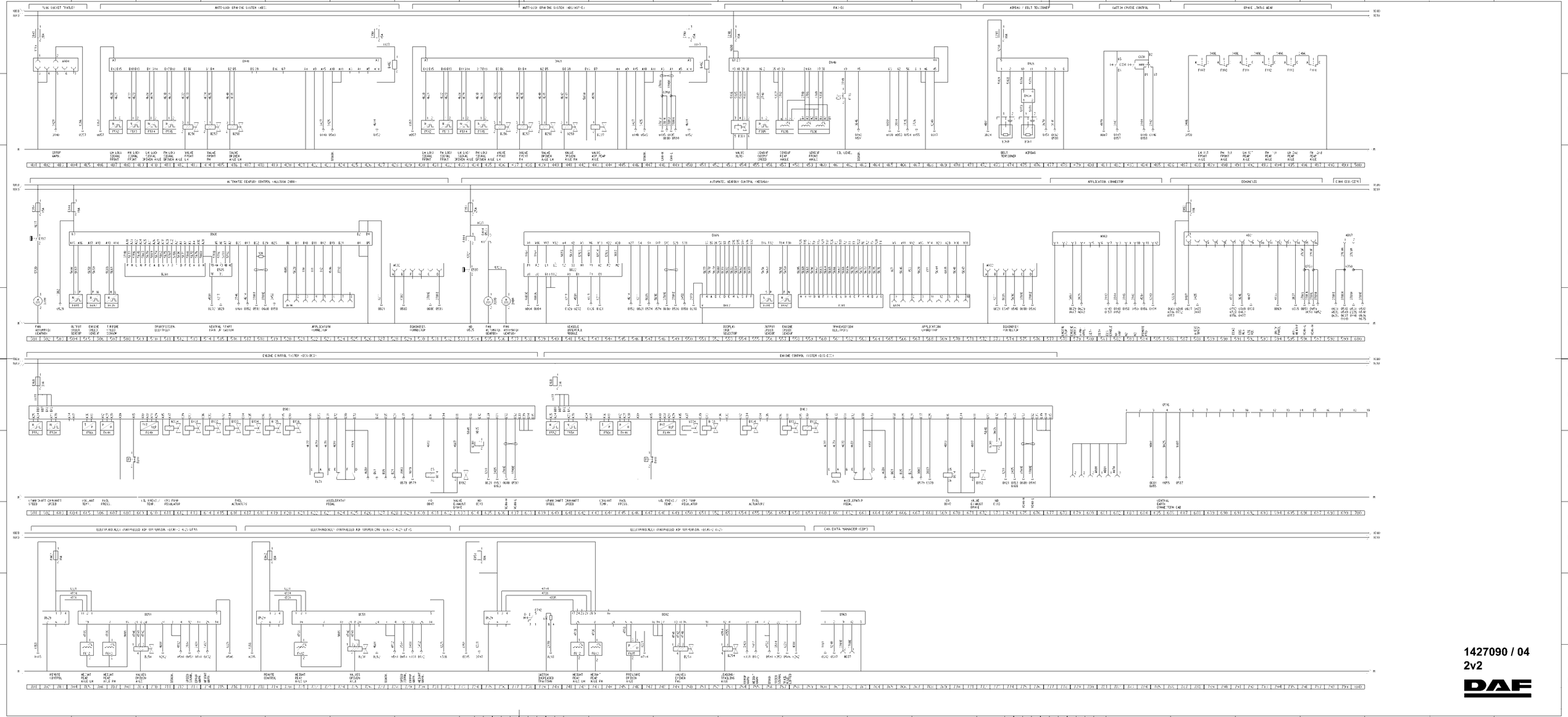
2.2 CIRCUIT DIAGRAM 1427090/04

This page can be used to make your own notes on the circuit diagram.





1427090 / 04
2v2

DAF

2.3 OVERVIEW OF BASIC CODES FOR CIRCUIT DIAGRAM 1427090/04

1 Basic code number
2 Description
3 Number on search bar

1	2	3
A000	Drawn vehicle socket (7-pin)	0095 0096 0224 0231 0262 0681
A001	Rear fog light/reversing light socket (7-pin)	0251 0256 0270 0286 0682
A004	Socket, ABS/EBS, drawn vehicle (7-pin)	0403
A011	Socket, 12 V accessories (2-pin)	0361
A021	Diagnostic socket (16-pin)	0592
A032	AGC diagnostic socket	0528 0574
A068	Application connector, engine speed control	581
A070	Application connector, superstructure (8-pin)	0177 0186 0188 0263 0271 0287 0288 0682
A074	Automatic gearbox socket, superstructure	0568
A087	CCU/CDM socket (2-pin)	0599
A096	Automatic gearbox socket, superstructure (AT2000)	0522
A500	Batteries (2x)	0002 0015
A510	Alarm system battery	0174
A513	Alternator	0019
B000	Windscreen wiper motor	0165
B001	Windscreen wiper pump	0169
B003	Electric drop glass operation motor, driver's side	0328
B004	Electric drop glass operation motor, co-driver's side	0323
B005	Mirror adjustment motor, left	0335 0339
B006	Mirror adjustment motor, right	0332 0342
B009	Roof hatch motor	0297
B010	Starter motor	0035 0041
B017	Mirror heating, driver's side	0344
B018	Mirror heating, co-driver's side	0345
B023	Radio	0366 0371
B024	Loudspeaker, left	0365 0372

1	2	3
B025	Loudspeaker, right	0367 0371
B030	Cigar lighter, driver's side	0357
B032	Seat heating, driver's side	0353
B042	Air dryer heating element	0319
B043	Air conditioning compressor	0382
B068	Fuel metering pump, cab heater	0386
B079	Low-range downshift protection valve	0119
B129	Left-hand headlamp height adjuster motor	0234
B130	Right-hand headlamp height adjuster motor	0236
B131	Solenoid valve, pump unit/injector, cylinder 1	0613 0651
B132	Solenoid valve, pump unit/injector, cylinder 2	0615 0659
B133	Solenoid valve, pump unit/injector, cylinder 3	0616 0658
B134	Solenoid valve, pump unit/injector, cylinder 4	0618 0654
B135	Solenoid valve, pump unit/injector, cylinder 5	0619
B136	Solenoid valve, pump unit/injector, cylinder 6	0621
B176	Reversing buzzer	0266
B182	Water separator fuel heating element	0313
B192	Exhaust brake valve	0633 0671
B199	Central door locking motor, driver's side	0311
B200	Central door locking motor, co-driver's side	0304
B201	Internal electrical components for automatic gearbox	0510 0561
B237	ABS/ASR-D differential lock valve, rear axle	0443
B238	ECAS valve, driven axle, air supply	725
B243	Cross-axle differential lock control valve	0394
B245	PTO 1 control valve	0080
B250	ECAS valve, driven axle, air supply	0709
B253	ECAS valve, driven axle, air supply	0749
B254	ECAS valve, steered leading axle/trailing axle, lifting bellows	0753
B256	ABS valve, front axle, left	0413 0436
B257	ABS valve, front axle, right	0414 0438
B258	ABS valve, driven axle, left	0416 0439
B259	ABS valve, driven axle, right	0441

1	2	3
B334	Fuel pump control solenoid valve	0612 0650
B338	Alarm system horn	0176
B341	Glow element	0047
B360	Seat belt tensioner, driver's side	0474
B361	Airbag module	0476
B371	Windscreen heating	0349
B377	Heater motor	0375
B381	RAS-EC valve block	0454
B399	Cooling fan 1, AGC automatic gearbox	0501 0535
B400	Cooling fan 2, AGC automatic gearbox	0537
B401	Horn	0085
B402	ABS resistor	0428
B525	Modular tachograph (MTCO)	0052
C000	Dipped beam, left	0239
C001	Dipped beam, right	0241
C002	Main beam, left	0242
C003	Main beam, right	0244
C006	Left spotlight	0245
C007	Right spotlight	0246
C008	Fog lamp, front left	0253
C009	Fog lamp, front right	0255
C014	Direction indicator lamp, front left	0088
C015	Direction indicator lamp, front right	0092
C016	Direction indicator lamp, side left	0089
C017	Direction indicator lamp, side right	0093
C018	Direction indicator lamp, rear left	0090
C019	Direction indicator lamp, rear right	0094
C020	Stop light, left	0259
C021	Stop light, right	0261
C022	Rear light, left	0222
C023	Rear light, right	0229
C024	Fog lamp, rear left	0249

1	2	3
C025	Fog lamp, rear right	0251
C026	Reversing light, left	0268
C027	Reversing light, right	0270
C062	Stepwell lighting, left	0278
C063	Stepwell lighting, right	0280
C071	Work lamp	0289
C110	Bunk light, bottom	0282
C111	Bunk light, top	0283
C119	Interior lighting with switch, driver's side	0276
C144	Rotating beam, left	0292
C145	Rotating beam, right	0293
C156	Marker light, left, 1st	0226
C157	Marker light, right, 1st	0228
C158	Marker light, left, 2nd	0219
C159	Marker light, right, 2nd	0221
C553	Mechanical main switch	0002
C622	Lighting switch	0201
C715	Rotating beam switch	0293
C725	Work lamp switch	0289
C727	Fog lamp switch, front/rear	0212
C736	Roof hatch switch	0297
C742	Traction assistance switch	0739
C748	Cross-axle differential lock switch	0394
C750	PTO 1 switch	0082
D758	Diode to prevent feedback to the VIC	120
C763	Instrument lighting dimming potentiometer	0110
C765	Switch for warning lamps	0098
C773	Fog lamp switch, rear	0215
C774	Central door locking switch	0306
C775	Steering column switch, direction indicators/horn/dipped beam/ main beam	0085 0088 0208
C804	Switch, adjustable speed limiter	0113
C835	Switch to turn off interior detection	0194

1	2	3
C836	Switch to turn off superstructure/drawn vehicle loadspace detection	0197
C841	Accessories / ignition / starter switch	0023
C842	Windscreen wipers/washer steering column switch	0163 0165 0167 0168
C853	Cab main switch	0006
C854	Chassis main switch	0006
C864	Drop glass operation switch, co-driver's side (driver's side door)	0323
C865	Drop glass operation switch, co-driver's side (co-driver's side door)	0322
C866	Drop glass operation switch, driver's side (driver's side door)	0327
C867	Mirror heating switch	0345
C868	Mirror adjustment switch	0333 0339
C871	Potentiometer, headlamp height adjustment	0233
C880	Reversing buzzer switch	0266
C891	Steering column switch, windscreen wiper/washer, cruise control, engine speed control	0483
C892	Heater fan switch	0376
C893	Air conditioning switch	0379
D521	Electronic unit, cab heater	0387
D529	Remote control system, ECAS	0702 0718 0735
D609	Light switch diode	0202
D610	Diode, main beam/dipped beam	0208
D715	Alarm system LED	0177
D784	Diode, Swedish lighting	0204
D785	Diode, Swedish lighting	0204
D787	Diode, air conditioning compressor link	0381
D802	Electronic unit, ECAS-2 (6x2)	0748
D822	AGC vehicle interface module	0541
D826	Electronic unit for VLG current limiter	0012
D851	Electronic unit, ECAS-3 (4x2)	0710 0726
D866	Electronic unit, AGC-A4 automatic gearbox control	0552
D867	Automatic gearbox selector	0553
D899	DIP-4 instrument panel	0070

1	2	3
D900	Electronic unit, VIC	0080 0091 0132
D903	Electronic unit, ECS-DC3	0620 0659
D904	Menu Control Switch, MCS	0124
D905	Electronic unit, CDS	0308
D909	Electronic unit, alarm system, ultrasonic	0181
D910	Electronic unit, battery charger	0174
D911	Electronic unit, ALS-S alarm system	0186
D912	Electronic unit, immobiliser	0060
D924	Electronic unit for main switch	0010
D926	Electronic unit, airbag/seat belt tensioner	0476
D931	LED unit, immobiliser	0063
D936	Electronic unit for automatic gearbox (AGC-T1000/2000)	0514
D940	Electronic unit, RAS-EC	0461
D941	Electronic unit, ABS/ASR, D version	0417
D942	Fuse box	-
D958	Electronic unit, converter with power supply for radio memory	0360
D960	Airbag contact unit	0475
D961	Electronic unit, ABS/ASR, E version	0440
D969	Electronic unit, CDM	0761
E004	Fuse, dipped beam, driver's side	0239
E005	Fuse, dipped beam, co-driver's side	0240
E006	Fuse, main beam, driver's side	0242
E009	Fuse, front fog lamps	0249
E013	Fuse, stop lights	0259
E018	Fuse, windscreen wiper motor	0029
E019	Fuse, horn	0085
E023	Fuse, switch, tachograph timer	0049
E025	Fuse, windscreen wiper motor/windscreen washer motor	0163
E026	Fuse, cigar lighter/door switches/electronic unit, 24/12 V converter with power supply for radio memory	0357
E027	Fuse, electronic unit, 24/12 V converter, with power supply for radio memory	0359
E028	Fuse, interior lighting/bunk lights/central door lock	0273

1	2	3
E031	Fuse, heater fan	0373
E035	Fuse, instruments and warning lamps/parking brake switch/power supply after contact	0021
E039	Fuse, seat heating	0353
E043	Fuse, ABS, drawn vehicle	0401
E044	Fuse, mirror heating/electric mirror adjustment/electric drop glass operation	0321
E048	Fuse, drawn vehicle power supply	0033
E051	Fuse, ECAS	0734
E052	Fuse, work lamp	0286
E053	Fuse, diagnostic connector/LED unit/alarm system	0587
E058	Fuse, cab heater	0385
E062	Fuse, ECAS	0703 0719
E091	Fuse, air dryer heating element/water separator/RAS-EC/engine speed control application connector	0319
E108	Fuse, VIC	0103
E114	Fuse, cab heater/warning lamps	0390
E143	Fuse, tachograph/alarm system/immobiliser/ABS-D/ABS/ASR-E	0057
E144	Fuse, AGC-A4 automatic gearbox	0504
E153	Fuse, power supply for main switch	0008
E156	Fuse, accessories lighting	0034
E158	Fuse, DIP-4 instrument panel	0067
E160	Fuse, ECS-DC3	0601 0640
E163	Fuse, rotating beams/roof hatch	0293
E165	Fuse, FPH-E fuel heater after contact	0313
E190	Fuse, ABS-D / ABS / ASR-E	0427 0450
E198	Fuse, central door lock	0308
E277	Fuse, VIC	0106
E279	Fuse, generator voltage control	0021
E280	Fuse, VIC	0104
E282	Fuse, engine brake switch/stop light switch	0257
E283	Fuse, headlamp height adjustment/width marker light, 1st, left and right/tail light, right	0226

1	2	3
E284	Fuse, width marker light, 2nd, left and right/tail light, left /search lighting	0218
E285	Fuse, VIC/fog light switch	0212
E286	Main fuse	0047
E290	Fuse, RAS-EC	0453
E297	Fuse, airbag and seat belt tensioner system	0473
E299	Fuse, windscreen heating	0349
E330	Fuse, 'sens' wire main switches	0016
E349	Main fuse, cab	0002 0015
E354	Fuse, automatic gearbox, AGC fan	0501 0534
E501	Reversing light switch	0264
E508	Temperature switch for air conditioning compressor	0380
E509	Air conditioning switch, high/low pressure	0382
E514	Cab stepwell lighting/interior lighting door switch, driver's side	0278
E515	Cab stepwell lighting/interior lighting door switch, co-driver's side	0280
E564	Engine brake switch	0130
E569	Neutral position switch, gearbox	0125
E581	Cab heater timer unit	0388
E585	Selector switch, automatic gearbox (AT 1000/2000)	0515
E587	Switch for stop lights/clutch	0127
E597	Switch, cooling fans, automatic gearbox (AGC)	0501
F000	Parking brake switch	0115
F006	Differential lock control switch, 1st differential	0116
F009	Control switch, cab tilting	0121
F011	Control switch, engine oil pressure	0608 0647
F087	Control switch, gearbox PTO	0079
F107	Control switch, brake lining wear, front left	0488
F108	Control switch, brake lining wear, front right	0490
F111	Control switch, brake lining wear, rear left	0492
F112	Control switch, brake lining wear, rear right	0493
F113	Control switch, brake lining wear, rear left, 2nd rear axle (6x2)	0495
F114	Control switch, brake lining wear, rear right, 2nd rear axle (6x2)	0497

1	2	3
F116	Oil level switch, RAS-EC	0462
F512	Wheel speed sensor, front axle, left	0407 0430
F513	Wheel speed sensor, front axle, right	0408 0432
F514	Wheel speed sensor, driven axle, left	0410 0433
F515	Wheel speed sensor, driven axle, right	0411 0435
F533	Vehicle speed sensor	0050
F552	Crankshaft sensor	0601 0640
F558	Camshaft sensor	0603 0641
F566	Coolant temperature sensor	0605 0644
F601	Output shaft speed sensor, automatic gearbox	0504 0556
F602	Input shaft speed sensor, automatic gearbox	0505 0557
F603	Ultrasonic transmitter	0180
F604	Ultrasonic receiver	0182
F608	Fuel level sensor	0109
F612	Height sensor, ECAS, rear axle, left	0705 0721 0742
F613	Height sensor, ECAS, rear axle, right	0707 0743
F615	Pressure sensor, ECAS, driven axle, left/right	0746
F648	Fuel rail pressure sensor	0607 0645
F649	Charge boost pressure and temperature sensor	0610 0647
F651	Ambient temperature sensor	0104
F652	Air pressure sensor	0106
F670	Sensor, turbine speed, automatic gearbox	0507
F671	Accelerator pedal sensor, ECS-DC3	0623 0662
F686	Radar sensor, alarm system	0185
F692	Water separator sensor	0316
F695	Angle sensor, trailing axle	0457
F696	Angle sensor, front axle	0459
F705	Speed sensor, AS Tronic	0455
G000	Rear light/marker light and search light relay	0201 0210
G001	Dipped beam relay	0206 0239
G002	Main beam relay	0208 0242
G004	Relay, front fog lamp	0212 0253

1	2	3
G005	Relay, rear fog lamp	0118 0249
G008	Windscreen wiper relay	0166 0171
G014	Glow plug relay	0047 0631 0669
G015	Contact relay	0027 0030
G036	Stop light relay	0258 0259
G185	Starting circuit interrupter relay	0541 (in VIM D822)
G188	Lighting relay, accessories	0030 0034
G201	Fuel heating relay, FPH-E	0313 0634 0673
G203	Transfer relay, starter motor	0037 0038 0042 0044
G294	Relay, automatic gearbox	0541 (in VIM D822)
G350	Reversing light relay, automatic gearbox	0541 (in VIM D822)
G353	Contact relay	0028 0314
G354	Windscreen wiper relay	0025 0163
G355	Seat heating relay	0353 0354
G367	Main switch relay, power supply	0008
G368	Main switch relay, earth	0010 0015
G397	Windscreen heating relay	0349
G425	Main switch relay	0064 0102
G444	Cooling fan relay, automatic gearbox (AGC-A4)	0534 0535
G507	Earth, 1-pin, chassis - cab	-
G516	Central cab earth, co-driver's side	-
G517	Central cab earth, driver's side	-
G520	Central earth, chassis, front end	-
G522	Central earth, starter motor	-
G523	Central earth, engine	-
G524	Earth point, glow element	-
G525	Central earth, flywheel	-
G528	Earth point, cab, airbag LHD/cab heater RHD	-
G529	Earth point, cab, cab heater LHD/airbag RHD	-
G735	Through-connection, Swedish lighting	0205
G742	Through-connection, VIC/DIP-4	0065
G743	Through-connection, main beam	0242

1	2	3
G744	Through-connection, cab heater/warning lamps/central door locking	0301
G748	Node, V-CAN	0195
G750	Node, V-CAN	0448 0599
G752	Node, V-CAN	0059
G753	Node, V-CAN	0596

2.4 SECTION DIAGRAMS FROM CIRCUIT DIAGRAM 1427090/04

Section diagram no.	Title of section diagram
A	Voltage before and after contact
C	CAN overview
1	Main switch
2	Ignition/starter switch/charging circuit
5	Pre-glowing
8	VIC
10	Reversing lights/buzzer
12	Stop lights/cab tilting gear
13	Differential lock
15	Mirror heating/windscreen heating/mirror adjustment
19	Horn/cigar lighter/work lamp/air dryer
22	ECS-DC3/exhaust brake
24	AGC automatic gearbox (AT1000/2000)
25	AGC automatic gearbox (MD3060)
31	CDS-3/drop glass operation/roof hatch
32	CDM
39	Water separator/fuel pre-heating

A VOLTAGE BEFORE AND AFTER CONTACT

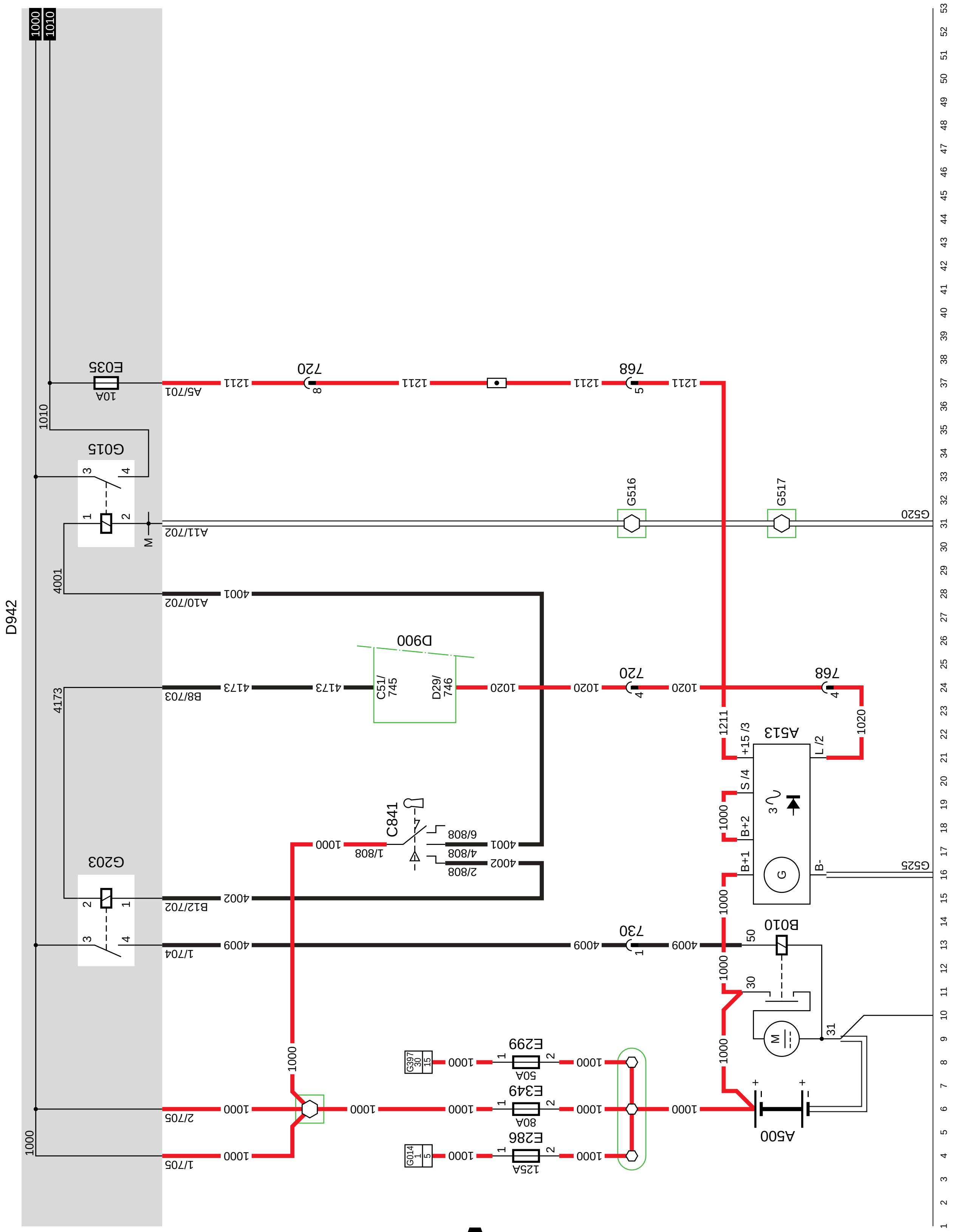
VOLTAGE BEFORE CONTACT
Wire 1000 runs from the batteries (A500) to the starter motor (B010), connecting point 30, and via the main fuse (E349, 80 A) to dashboard lead-through zone 1. Wire 1000 runs from the main fuse (E286, 125 A) to the glow plug relay (G014). Wire 1000 and the + distribution bolt in dashboard lead-through zone 1 provide a constant voltage at pins 1 and 2 of connector 705 on the PCB.
This provides "voltage before contact" for the entire PCB. Power is also provided (by wire 1000) from point 30 on the starter motor to the B+1 connection of the alternator (A513). Wire 1000 goes from the + distribution bolt to the ignition/starter switch (C841).

VOLTAGE AFTER CONTACT
When the ignition/starter switch (C841) is set to the "contact" position (connection between points 1 and 4), relay G015 is energised via wire 4001.
This then connects wire 1000 (voltage before contact) to wire 1010 (voltage after contact).

When the ignition/starter switch (C841) is turned against the spring pressure (connection between points 1 and 2), relay G015 remains activated.

When the ignition/starter key is released, the contact/starter switch automatically springs back and remains in the "contact" position.

11



A **1427090/04**

EL001618

11

C CAN OVERVIEW

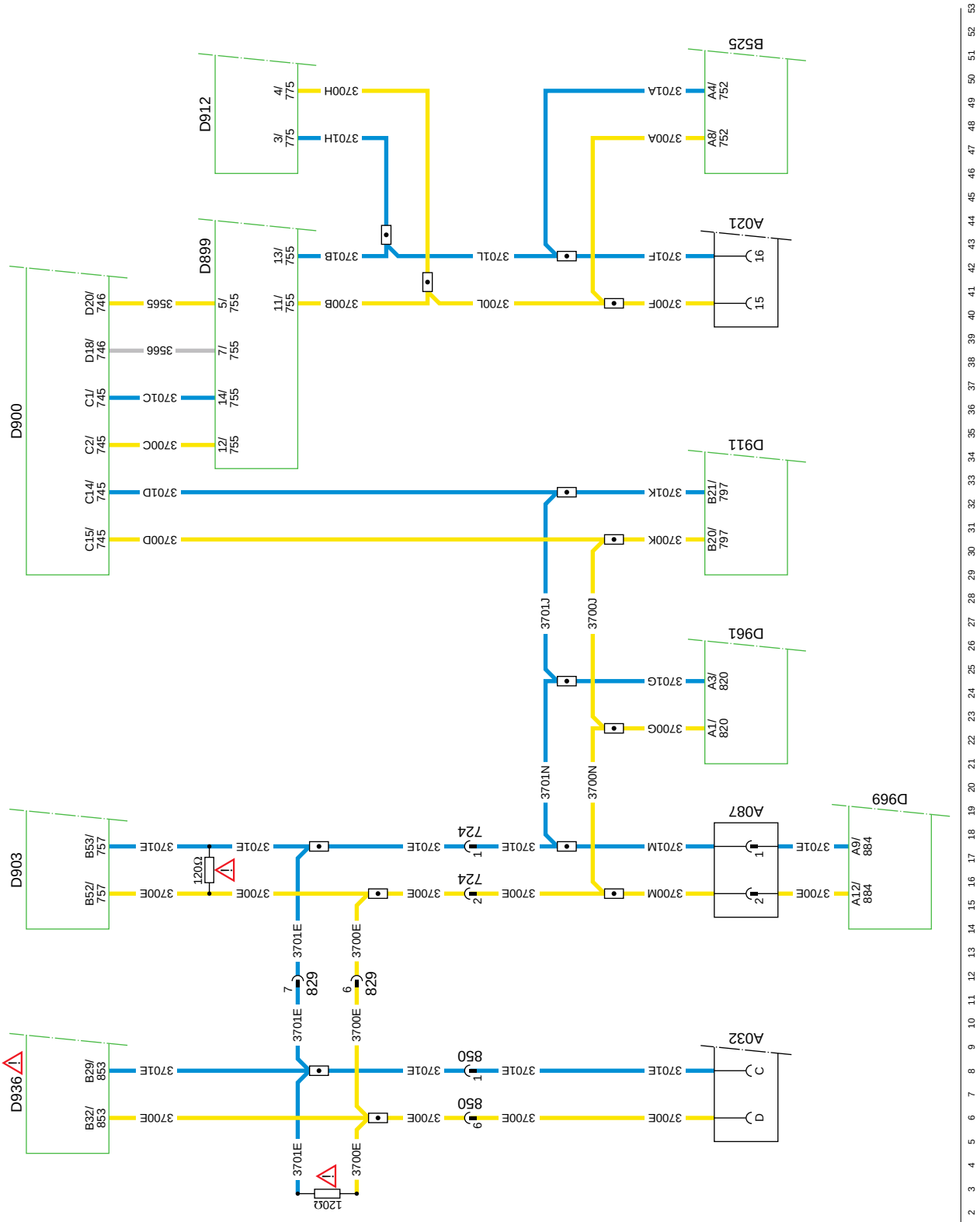
This section diagram gives an overview of all the CAN connections, with wire markings and connector points.

SEE THE SYSTEM MANUAL FOR MORE INFORMATION

VARIANTS

Location	
2	The terminating resistor is in the automatic transmission wiring harness
8	Electronic unit, automatic gearbox, AGC-T1000/2000 (D936): If MD3060 gearbox is fitted, the electronic unit is for AGC-A4 automatic gearbox operation (D866)
16	The terminating resistor is in the wiring harness of the ECS-DC3 engine management system

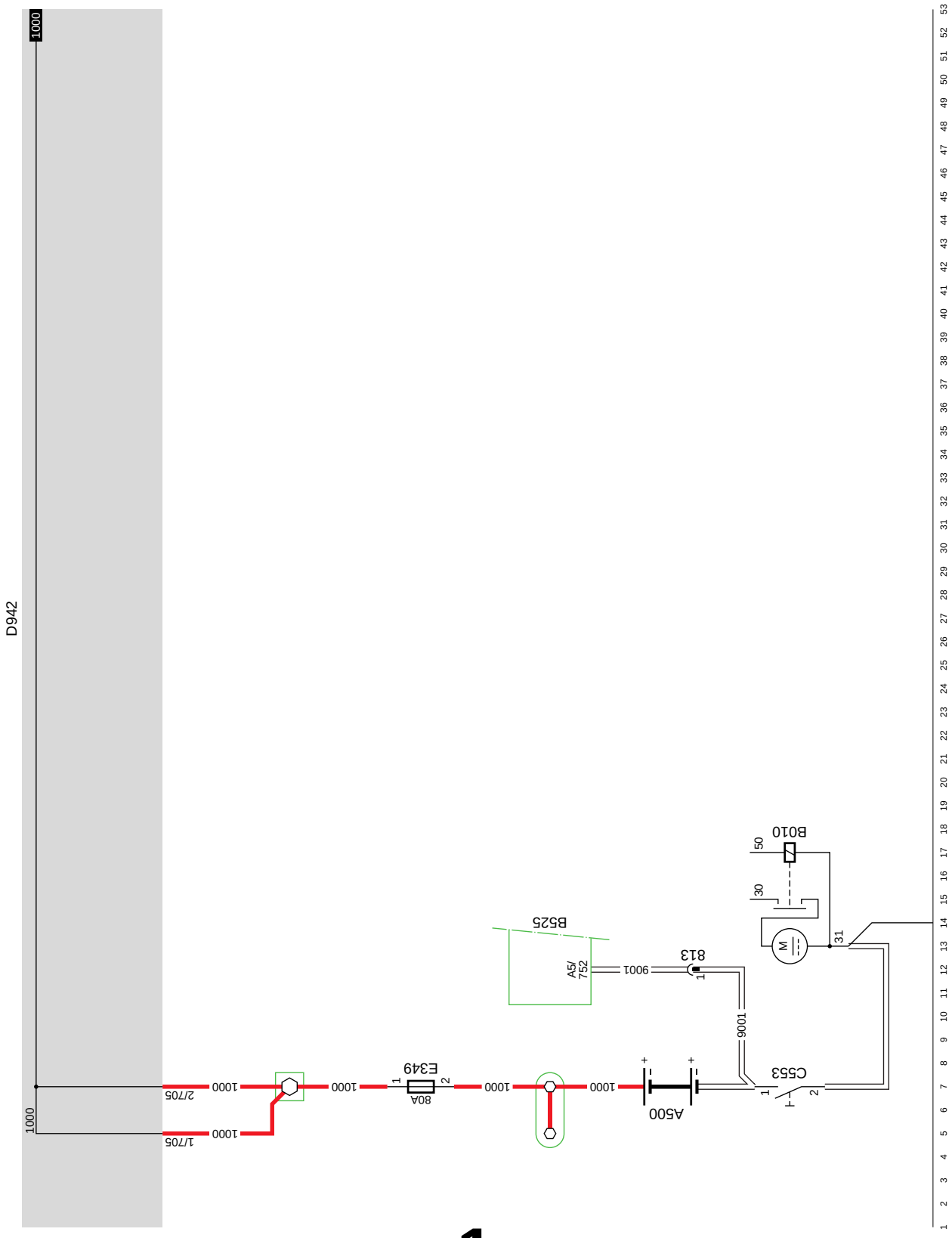
11


D912
D899
D900
D903
D936
B525
A021
D911
D961
A087
D969
A032
3700H
3701H
3701A
3700A
3701B
3700B
3701L
3700L
3701F
3700F
3565
3566
3701C
3700C
3701D
3700D
3701K
3700K
3701G
3700G
3701J
3700J
3701N
3700N
3701E
3700E
3701M
3700M
724
850
829
120Ω
C
1427090/04
EL001619

11

1. MAIN SWITCH

MANUALLY OPERATED EARTH BREAKER
Turning main switch C553 anticlockwise will break the earth connection between the batteries (A500) and the chassis earth point. Because the tachograph (B525) must have a power supply and earth connection at all times, earth wire 9001 is connected directly to the earth connection of the batteries through 2-pin dashboard lead-through connector 813 in zone 1.



1 **1427090/04**

EL001620

11

ELECTRICALLY OPERATED MAIN SWITCH

The main switch (D924) can be closed:
- electrically in the cab
- electrically on the chassis

Closing the main switch electrically in the cab

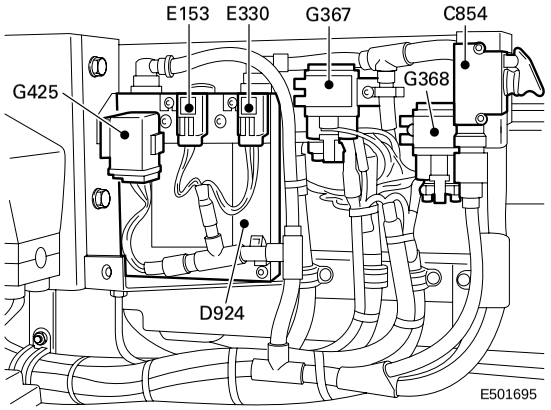
ATTENTION: switch C854 must be in the "main switch on" position (connection between contacts 1 and 2).

Switch C853 (switch for main switch in cab) connects the C1 and C2 connections to the C4 and C5 connections via wire 4176, contacts 5 - 7 of switch C853, wire 4177, contacts 1 - 2 of switch C854 and wire 4178. Relays G367 and G368 are immediately energised through wire 4174 and connection point A3 (A3 is connected to earth for 0.5 seconds). This closes the connection between points 88a and 88 of both relay G367 and relay G368. The positive and the negative terminals of the batteries are now connected to the vehicle's power supply.
Immediately after switch C853 closes, connection point C2 is internally connected to point A7.

Connection point A5 is connected to the positive terminal via wire 3173 after connection point 88 of relay G367.
This connection transmits a signal to the ECU to indicate that relay G367 has switched.

Closing the main switch electrically on the chassis

ATTENTION: switch C853 must be in the "main switch on" position (connection between contacts 5 and 7).



Switch C854 (switch for main switch on the chassis) connects the C1 connection to the C4 and C5 connections via wire 4176, contacts 5 - 7 of switch C853, wire 4177, contacts 1 - 2 of switch C854 and wire 4178. Relays G367 and G368 are immediately energised through wire 4174 and connection point A3 (A3 is connected to earth for 0.5 seconds). This closes the connection between points 88a and 88 of both relay G367 and relay G368. The positive and the negative terminals of the batteries are now connected to the vehicle's power supply.
Immediately after switch C854 closes, connection point C2 is internally connected to point A7.
Connection point A5 is connected to the positive terminal via wire 3173 after connection point 88 of relay G367. This connection transmits a signal to the ECU to indicate that relay G367 has switched.

The main switch (D924) can be opened:
- electrically in the cab
- electrically on the chassis

Opening the main switch electrically in the cab

ATTENTION: switch C854 must be in the "main switch on" position (connection between contacts 1 and 2).

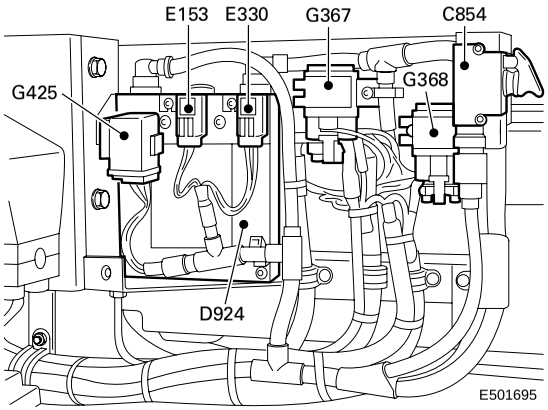
Switch C853 (switch for main switch in cab) disconnects wire 4176, contacts 5 - 7 of switch C853, wire 4177, contacts 1 - 2 of switch C854 and the C1 and C2 connections from the C4 and C5 connections via wire 4178.

Two actions are carried out immediately after switch C853 is opened:
1. Connection point A7 is connected to earth (A2).
2. After a delay of approx. 6 seconds, relays G367 and G368 are connected to earth for approx. 0.5 sec. via wire 4175 and connection point A4. This breaks the connection between points 88a and 88 of relays G367 and G368. The positive and the negative terminals of the batteries are now disconnected from the vehicle's power supply.

If the engine is running, it is switched off.

Connection point A5 is connected to the positive terminal via wire 3173 after connection point 88 of relay G367. This connection transmits a signal to the ECU to indicate that relay G367 has switched.

Opening the main switch electrically on the chassis



ATTENTION: switch C853 must be in the "main switch on" position (connection between contacts 5 and 7).

Switch C854 (switch for main switch in cab) breaks the C1 and C2 connections to the C4 and C5 connections via wire 4176, contacts 5 - 7 of switch C853, wire 4177, contacts 1 - 2 of switch C854 and wire 4178.
Two actions are carried out immediately after switch C854 is opened:
1. Connection point A7 is connected to earth (A2) in the unit.
2. After a delay of approx. 6 seconds, relays G367 and G368 are connected to earth for approx. 0.5 seconds via wire 4175 and connection point A4. This breaks the connection between points 88a and 88 of relays G367 and G368. The positive and the negative terminals of the batteries are now disconnected from the vehicle's power supply.

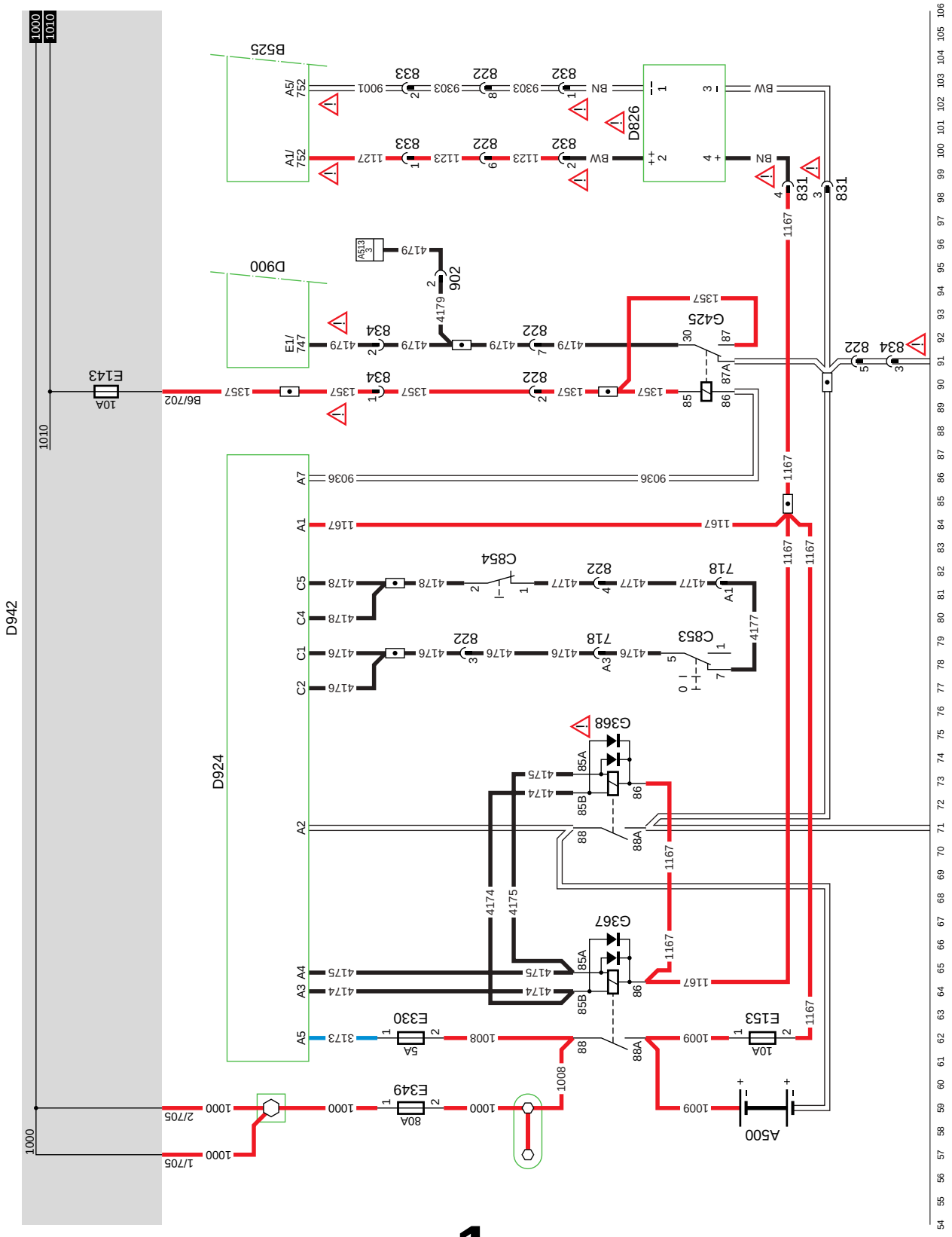
If the engine is running, it is switched off.

Connection point A5 is connected to the positive terminal via wire 3173 after connection point 88 of relay G367. This connection transmits a signal to the ECU to indicate that relay G367 has switched.

Note:
When one of the switches (C853 or C854) that activate the electronic unit (close main switch) is operated, relays G367 and G368 are activated after approximately 3 seconds. If one of the switches is operated again within the 3 seconds, the electronic unit (D924) will select the priority 'main switch ON'.

VARIANTS

Location	
76	G368, main switch relay, earth: Fitted depending on the requirements for transporting hazardous substances
88, 90	These wires are only present if ADR is fitted.
	These wires are only present if ADR is fitted
94	Earth connection to connector 834 is only present if ADR is fitted
	Earth connection to connector 834 is only present if ADR is fitted
97	Connector 831: Only present if the system is fitted with an external current limiter (D826)
98, 101	Connector 832: Only present if the system is fitted with an external current limiter (D826)
99	Electronic unit, VLG current limiter (D826): Fitted depending on the requirements for transporting hazardous substances. Version with production date < 2002-49: current limiter (D826) used as shown
98, 101	Version with production date > 2002-49 with current limiter integrated into the MTCO (B525).



1 **1427090/04**

11

2. IGNITION/STARTER SWITCH/CHARGING CIRCUIT

CONTACT CIRCUIT
When ignition/starter switch C841 is turned to the "accessories" position (contact 1 connected to contact 6), the "accessories" relay (G355) is energised via wire 1130.
If ignition switch C841 is turned further (contact 1 is connected to 4), ignition relay G015 will be activated via wire 4001. Wire 1010 is supplied with power.

STARTING CIRCUIT
When the contact switch is turned to the "start" position, contacts 1 and 2 in this switch are connected. Power is supplied to relay G203 via wire 4002. The VIC (D900) connects G203 to earth when the neutral position switch (E569) in the gearbox is closed. Relay G203 now supplies power via wire 4009 to connection point 50 of the starter motor (B010). As a result, the starter motor is energised.
This means that if the gearbox is not in neutral the VIC does not connect relay G203 to earth and the relay is therefore not energised.

CHARGING CIRCUIT
When the ignition is switched on, power is supplied to both the B+ connection and connection 15 (pin 3) of the alternator.
An internal resistor in the alternator is energised by an IC in the carbon brush holder. This resistor ensures that a low level of current passes through the energising resistor. This excites a magnetic field in the alternator.

After starting, the voltage on terminals B+ and 15 (pin 3) will rise to about 28.5 V. Once this voltage is reached, the control IC in the regulator interrupts the pre-exciter coil to enable the voltage to be regulated. The magnetic field will now disappear, so that the generator will not be energised for a short period of time. As a result, the voltage on outputs B+ and 15 will drop.
The regulator reactivates when the voltage drops below 27.6 V. This means that the voltage supplied by the generator remains relatively constant. The batteries are supplied through generator output B+1.

The alternator charging current warning lamp is activated via wire 1020, which is connected to the VIC (D900). The VIC controls the DIP via the CAN network. The voltage on wire 1020 is switched by the control IC. Errors are also shown on the DIP display through this connection.

The alternator is also equipped with a 'sens' connection (pin 4). However, this connection is not used and is now connected directly to B+2. The function of this connection is to correct the voltage difference between B+ and the batteries.

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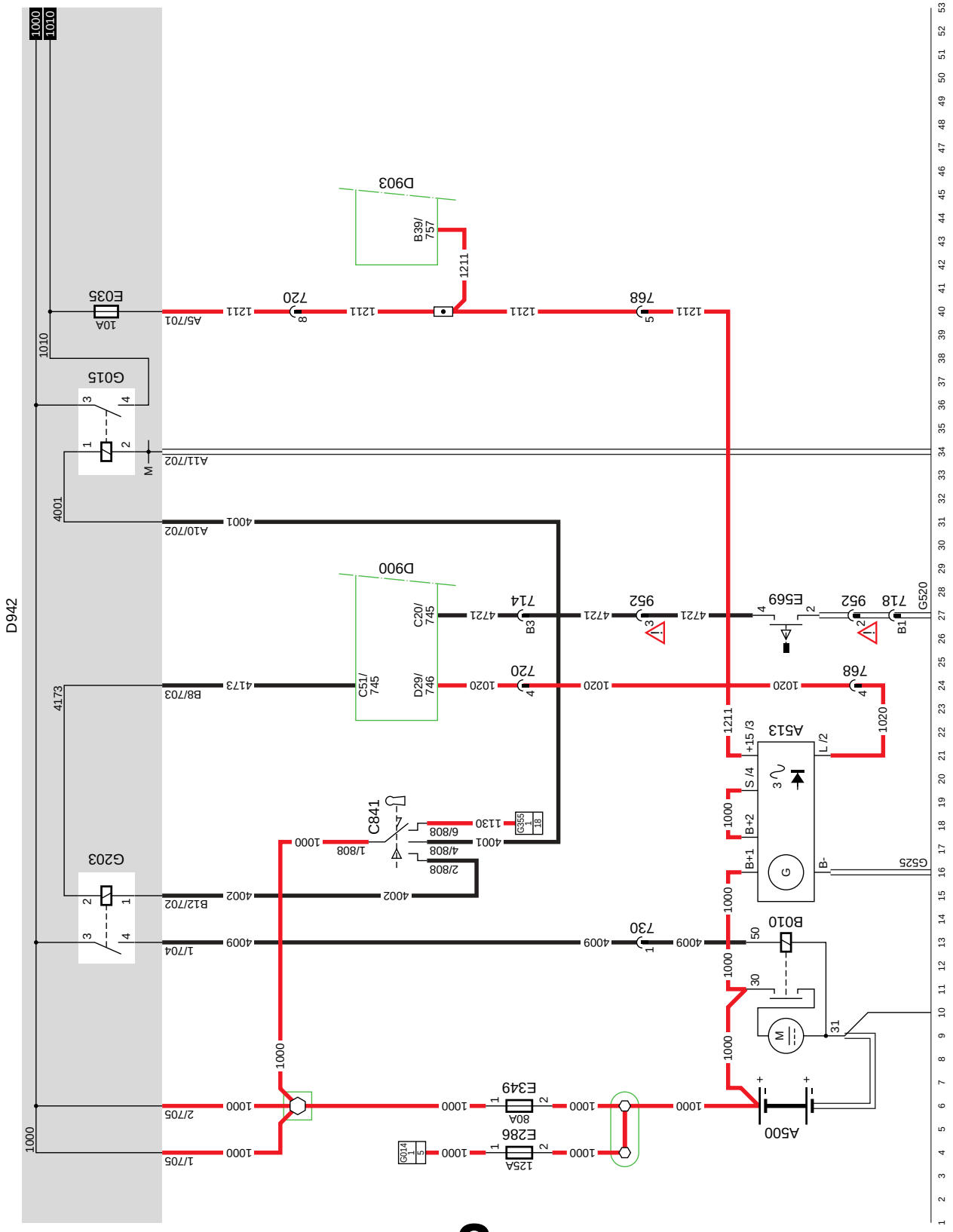

2 **1427090/04**

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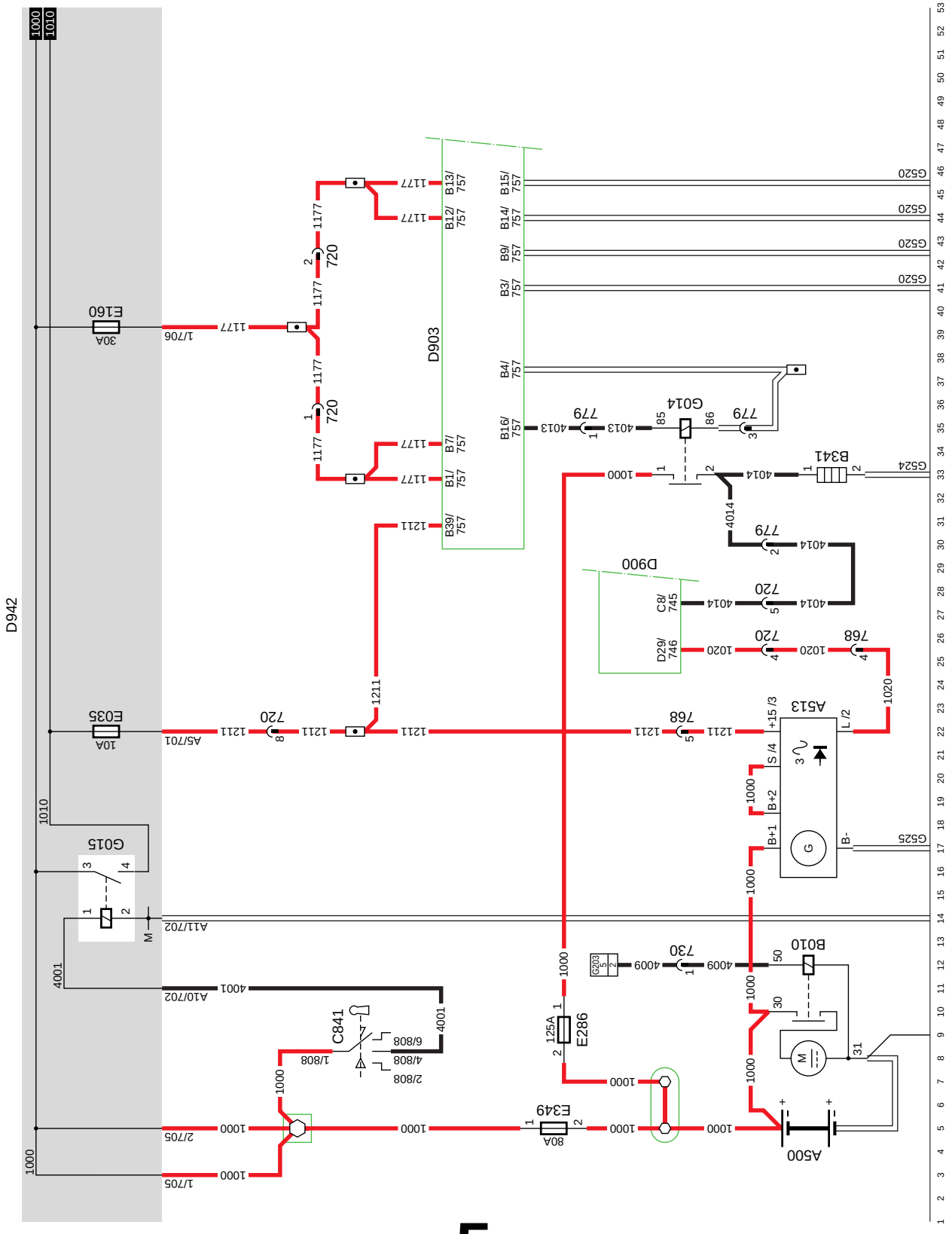
5. PRE-GLOWING
SEE THE SYSTEM MANUAL FOR MORE INFORMATION


D942
D903
D900
E160
30A
E035
10A
G015
E349
80A
E286
125A
C841
G014
B341
A513
B010
A500
EL001623

5 **1427090/04**

8. VIC

SEE THE SYSTEM MANUAL FOR MORE INFORMATION

VARIANTS

Location	
14	If the vehicle is fitted with CDM, see section diagram 32
39	Connector 762: not fitted on vehicle type FT
88	Electronic unit, ABS/ASR-E (D961): If ABS-D fitted, the electronic unit is D941
116	Electronic unit, automatic gearbox, AGC-T1000/2000 (D936): If MD3060 gearbox is fitted, the electronic unit is for AGC-A4 automatic gearbox operation (D866)
138	On vehicle type LF55
156	Connector 780: Not fitted on vehicle type FA. Wire 2155 only fitted in application connector A070
182	Connector 763: Not fitted on vehicle type FT

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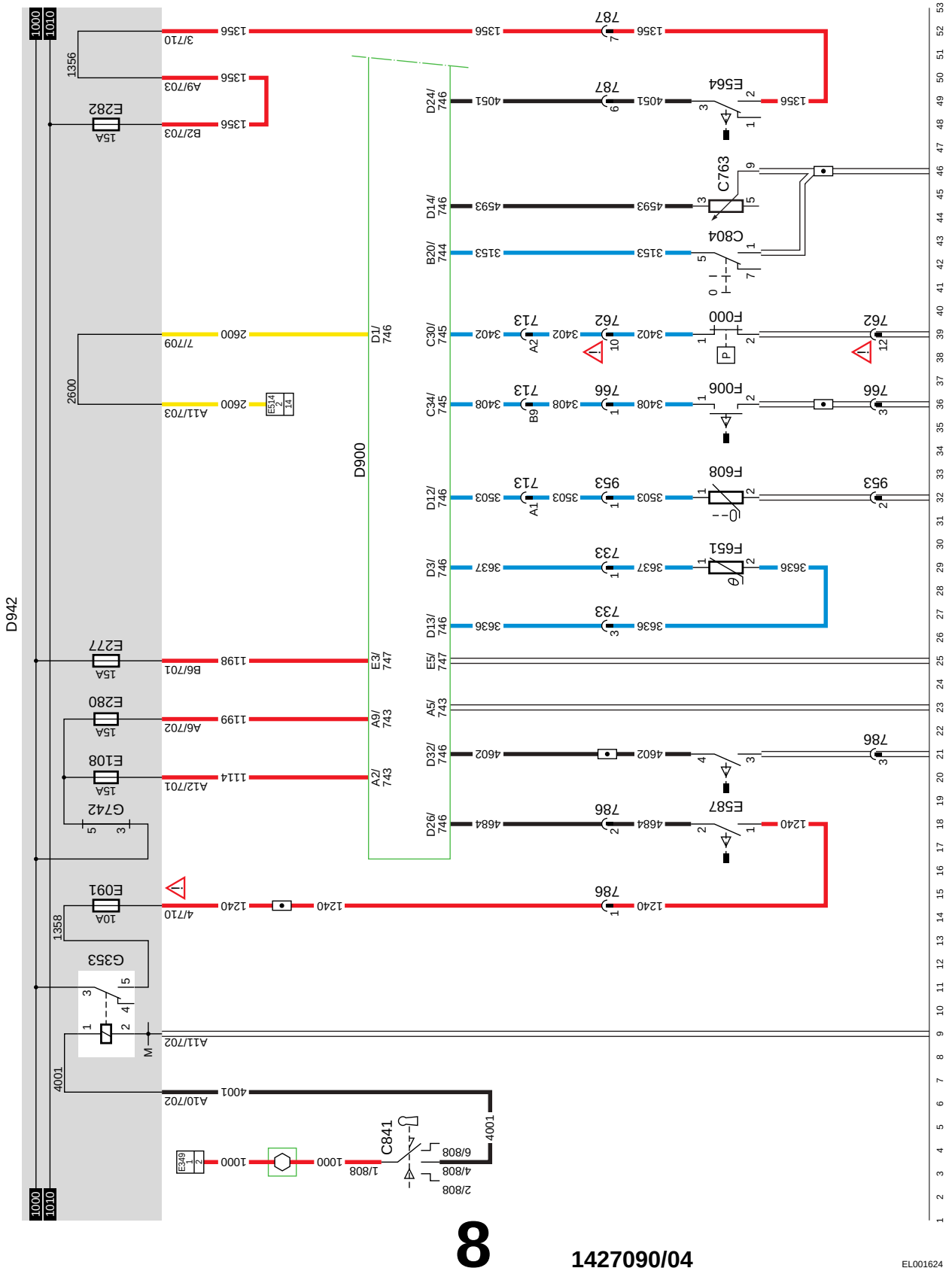

8 1427090/04 EL001624

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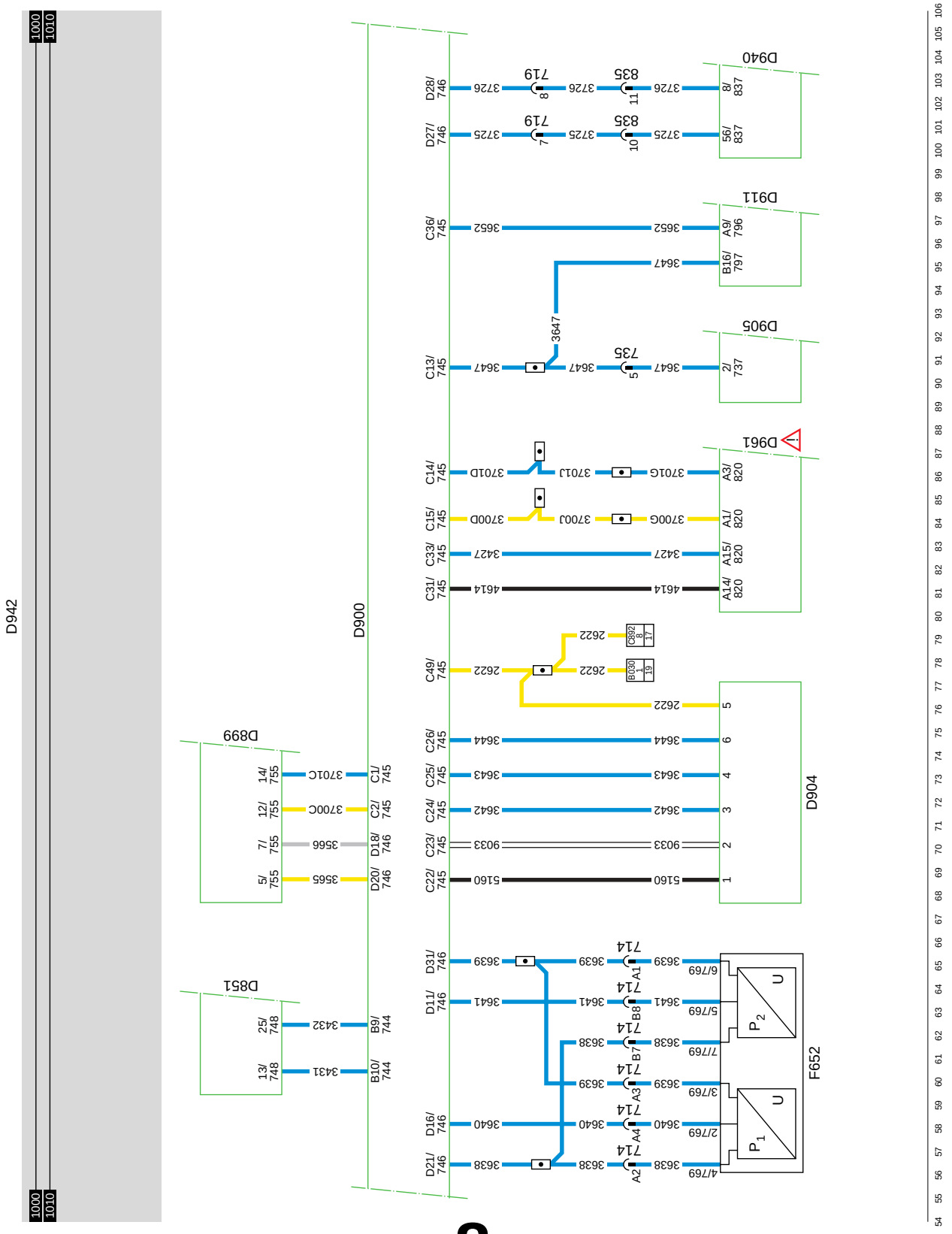

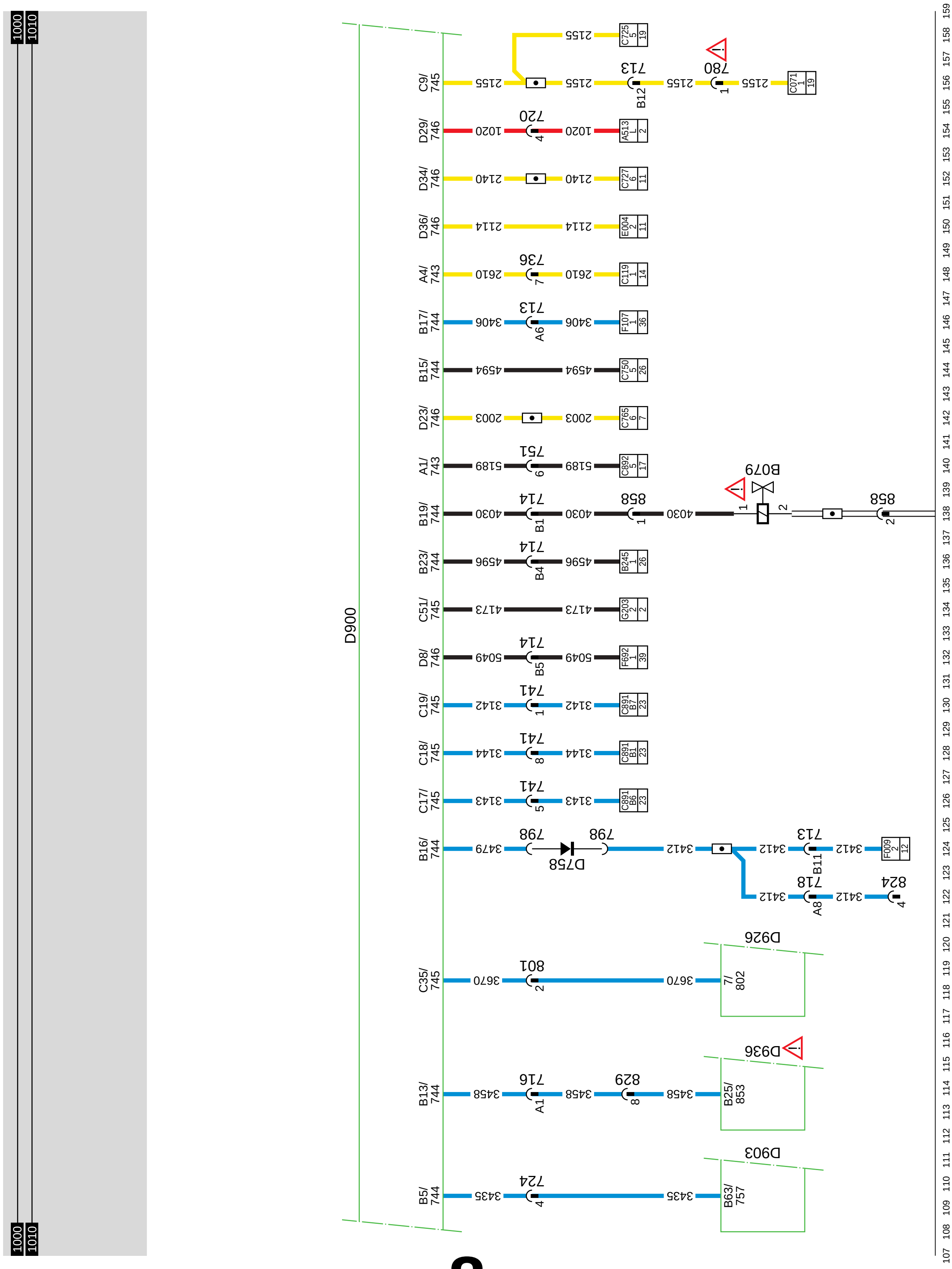

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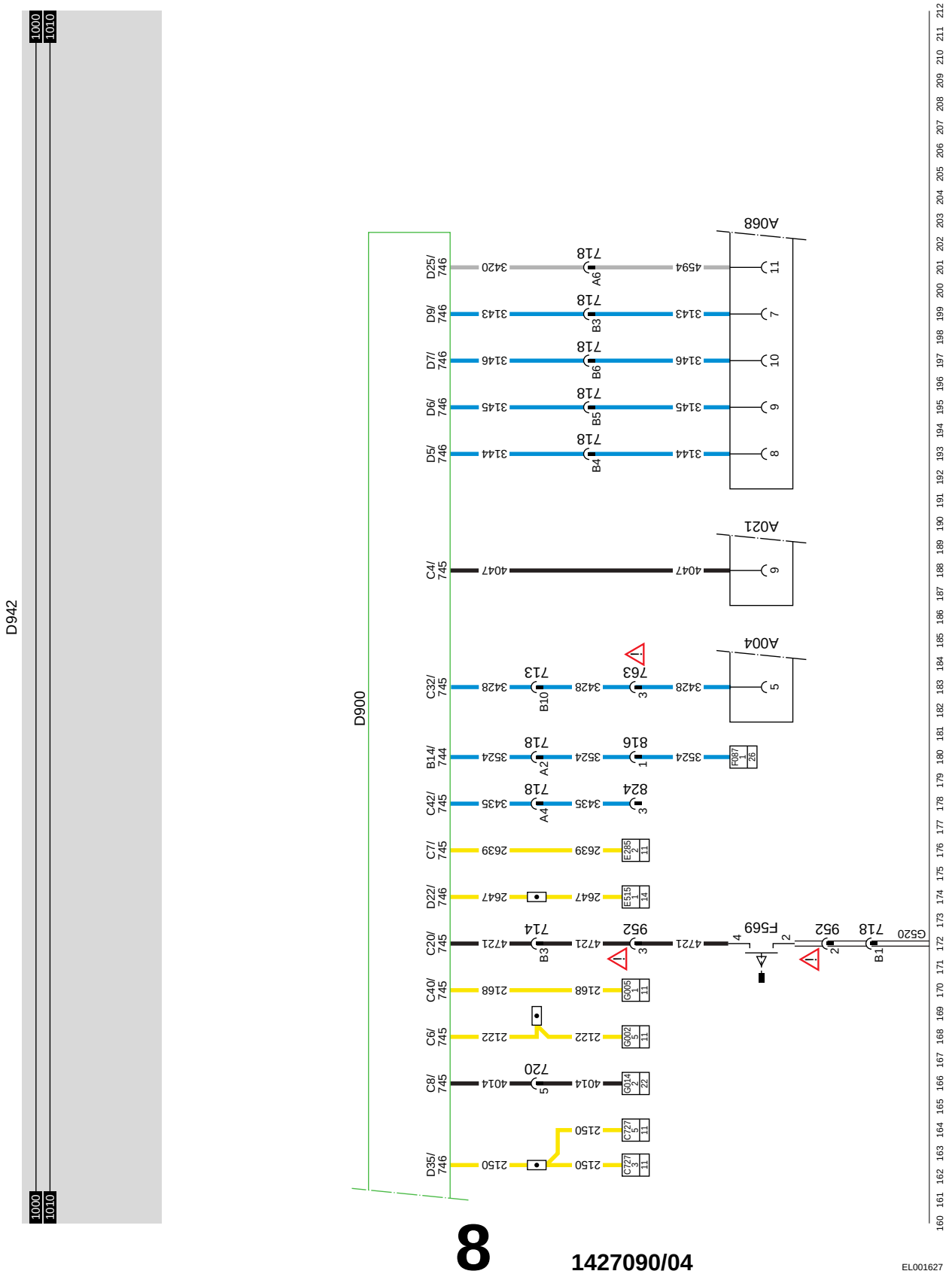
1427090/04

EL001626



8 **1427090/04**

10. REVERSING LIGHTS/BUZZER

When the contact is switched on, power is supplied to the reversing light switch (E501) via E018 and wire 1217.
This switch is mounted in the gearbox. The contacts are closed when the gearbox is switched to the "reverse" position.
Power is then supplied via wire 4591 to the reversing lights (C026/C027) and drawn vehicle connector A001.
The reversing buzzer (B176) can only be activated via wire 5104 if the dashboard switch (C880) is in position I. Switching C880 to the 0 position turns off the reversing buzzer.
The application connector (A070) also has a connection that is switched by the reversing light switch (E501).

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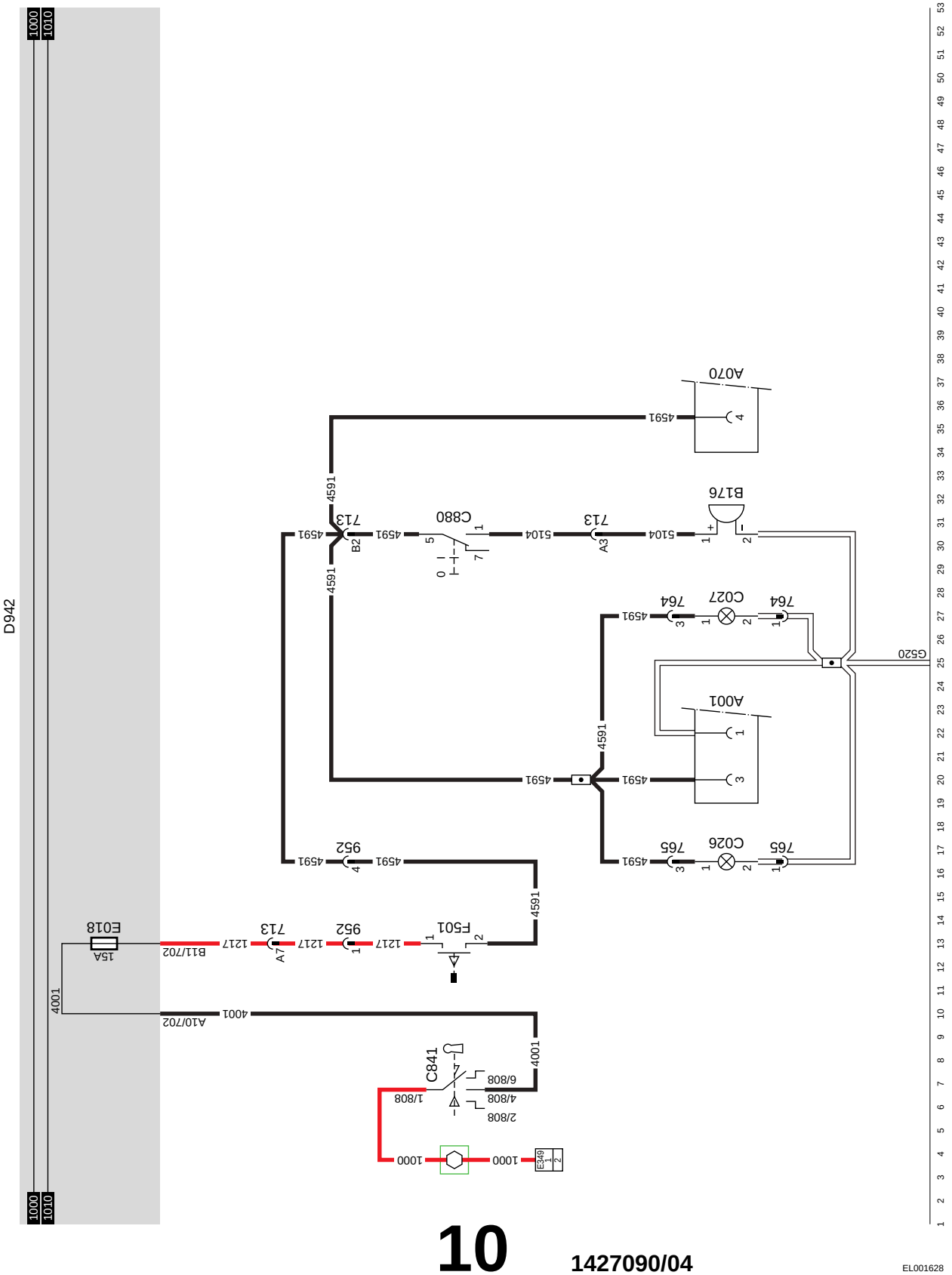

10 **1427090/04**

11

12. STOP LIGHTS/CAB TILTING GEAR

STOP LIGHTS

When stop lights/clutch switch E587 is operated (connection between contacts 4 and 3) by depressing the brake pedal, relay G036 is energised via wire 4602. Power will also be supplied to the VIC (pin D32/746). Through fuse E013, wire 1209, contacts 3 and 5 of relay G036 and wire 4601 a voltage is now applied to the right stop light (C021) and the left stop light (C020), so that they come on. The lights that are connected via drawn vehicle socket A000 will also come on. The ECAS-3 unit (D851) or ECAS-2 unit (D802) then also receives a signal.
Application connector A070 is also connected to wire 4601.

CAB TILTING GEAR

The switch for the cab lock (F009) is a "normally closed" switch. The switch is opened when the cab is in the driving position. When the cab is tilted, the switch closes and pin B16/744 of the VIC is connected to earth via wire 4312.
When the alarm is active it knows that the cab is in the driving position because a small current goes to earth through the control switch for cab tilting (F009). Diode D758 prevents this current from also flowing to earth through the VIC (the VIC in sleep mode), in which case the alarm would not know whether the cab is being tilted intentionally or by accident.

VARIANTS

Location	
13	If the vehicle is fitted with CDM, see section diagram 32
23,28	Connector 762: Not fitted on vehicle type FT
29	Electronic unit, ECAS-3 (D851): On a 6x2 vehicle, ECAS-2 electronic unit D802 (7/340)

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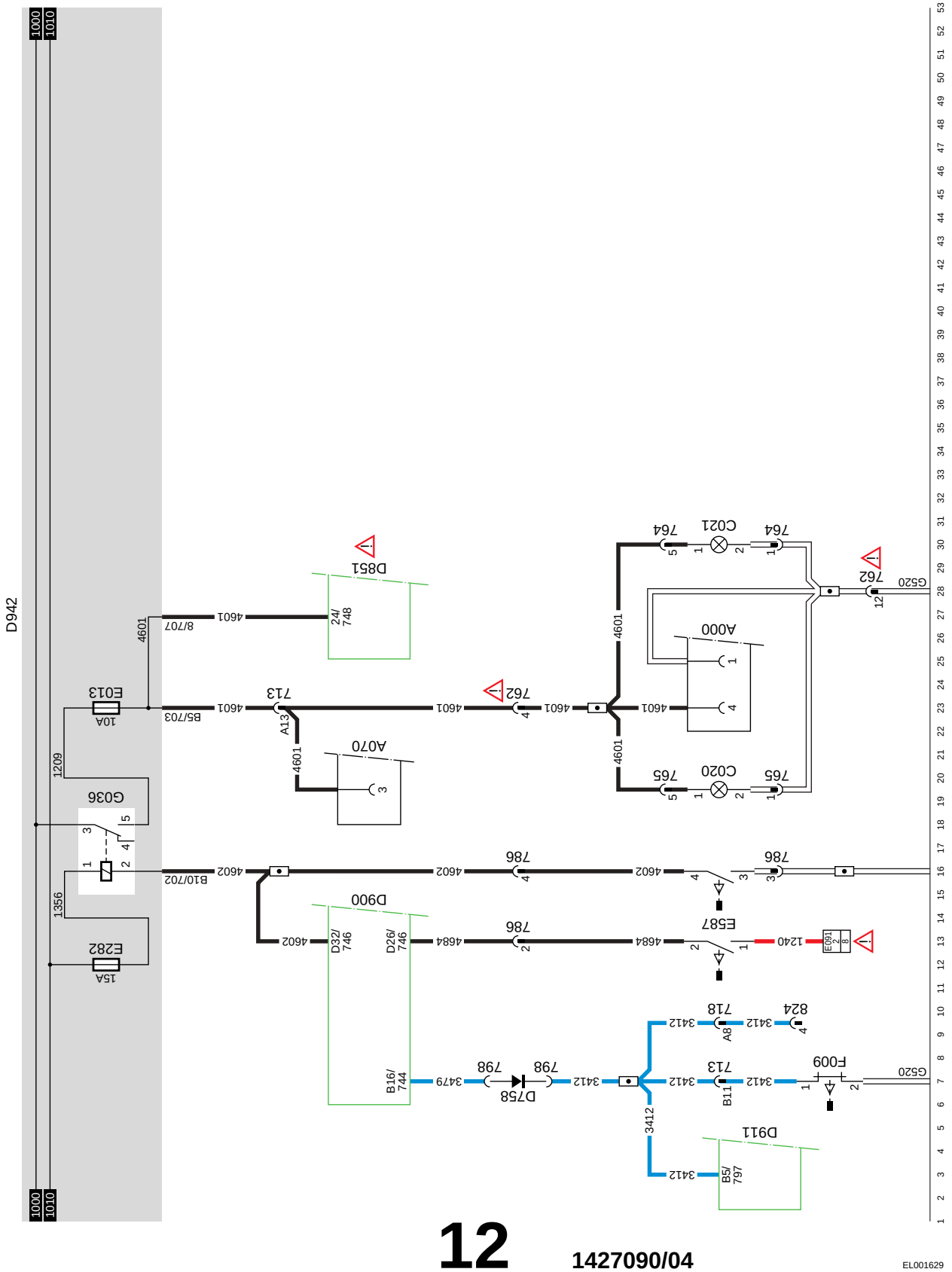

12 **1427090/04** EL001629

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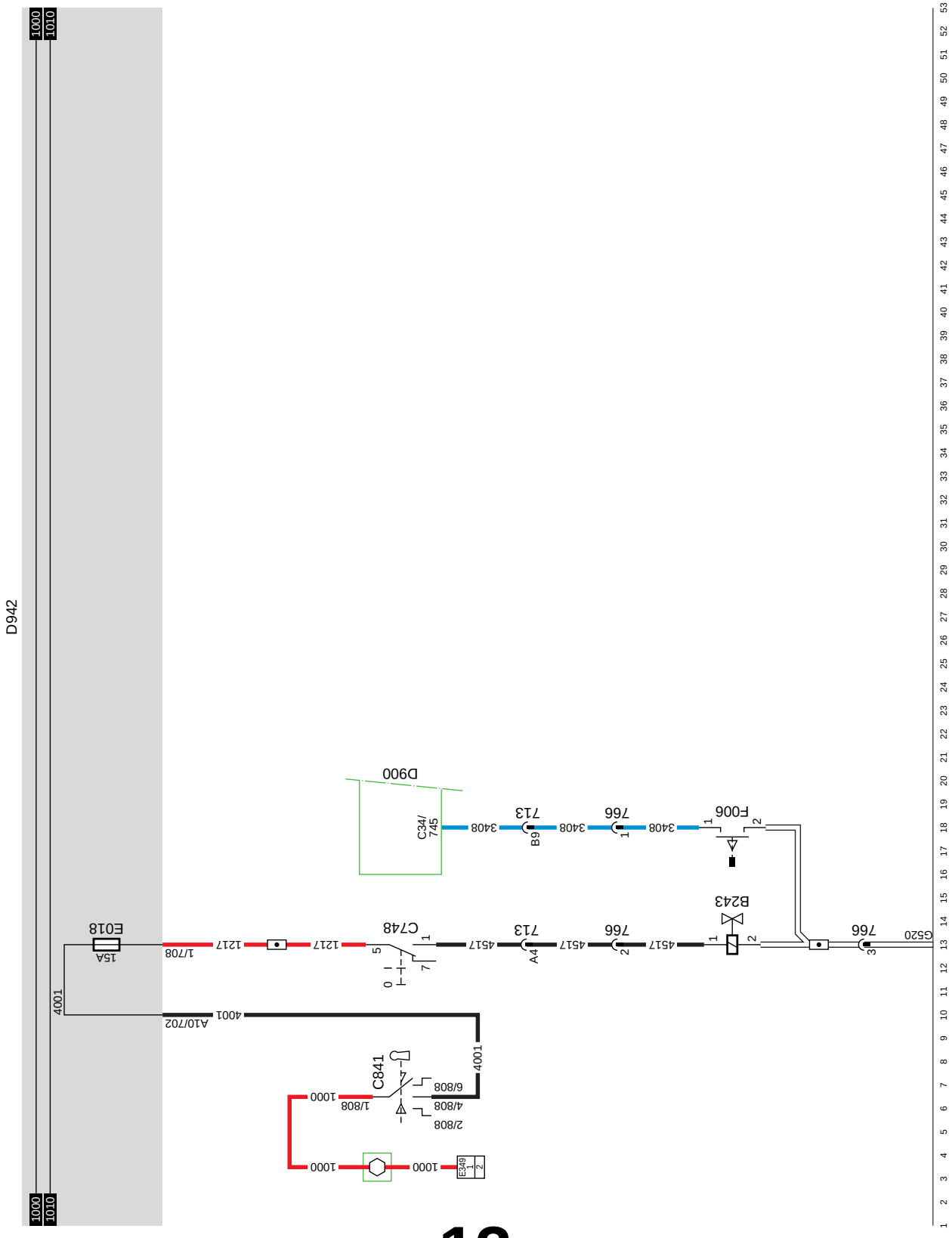
11

13. DIFFERENTIAL LOCK

If the contact switch (C841) is activated, a voltage is applied through fuse E018 and wire 1217 to the cross-axle differential lock switch (C748). If switch C748 is operated, a voltage is applied to the operating valve for the cross-axle differential lock (B243) through wire 4517. If the differential is locked, the differential lock control switch (F006) connects pin C34/745 of the VIC to earth via wire 3408. The VIC will activate the DIP through I-CAN to switch on the "differential lock switched on" indicator.



13 **1427090/04** EL001630

11

15. MIRROR HEATING/WINDSCREEN HEATING/MIRROR ADJUSTMENT

MIRROR HEATING

When the ignition/starter switch (C841) is set to the "contact" position (connection between points 1 and 4), relay G353 is energised via wire 4001. This relay supplies power to the mirror heating switch (C867) and the mirror adjustment switch (C868) via fuse E044 and wire 1208.
When the mirror heating switch (C867) is operated, power is supplied to mirror heating B017 (driver's side) and B018 (co-driver's side) via wire 4532.
The time-dependent windscreen heating relay (G397) will also be energised. This relay will automatically be de-activated after 12 minutes.

WINDSCREEN HEATING SYSTEM

If the vehicle has a windscreen heating system, the windscreen heating relay (G397) will be energised when the mirror heating system is activated.
The windscreen heating system (B371) will be supplied with power via fuse E299. The windscreen heating relay (G397) will automatically be de-activated after 12 minutes.

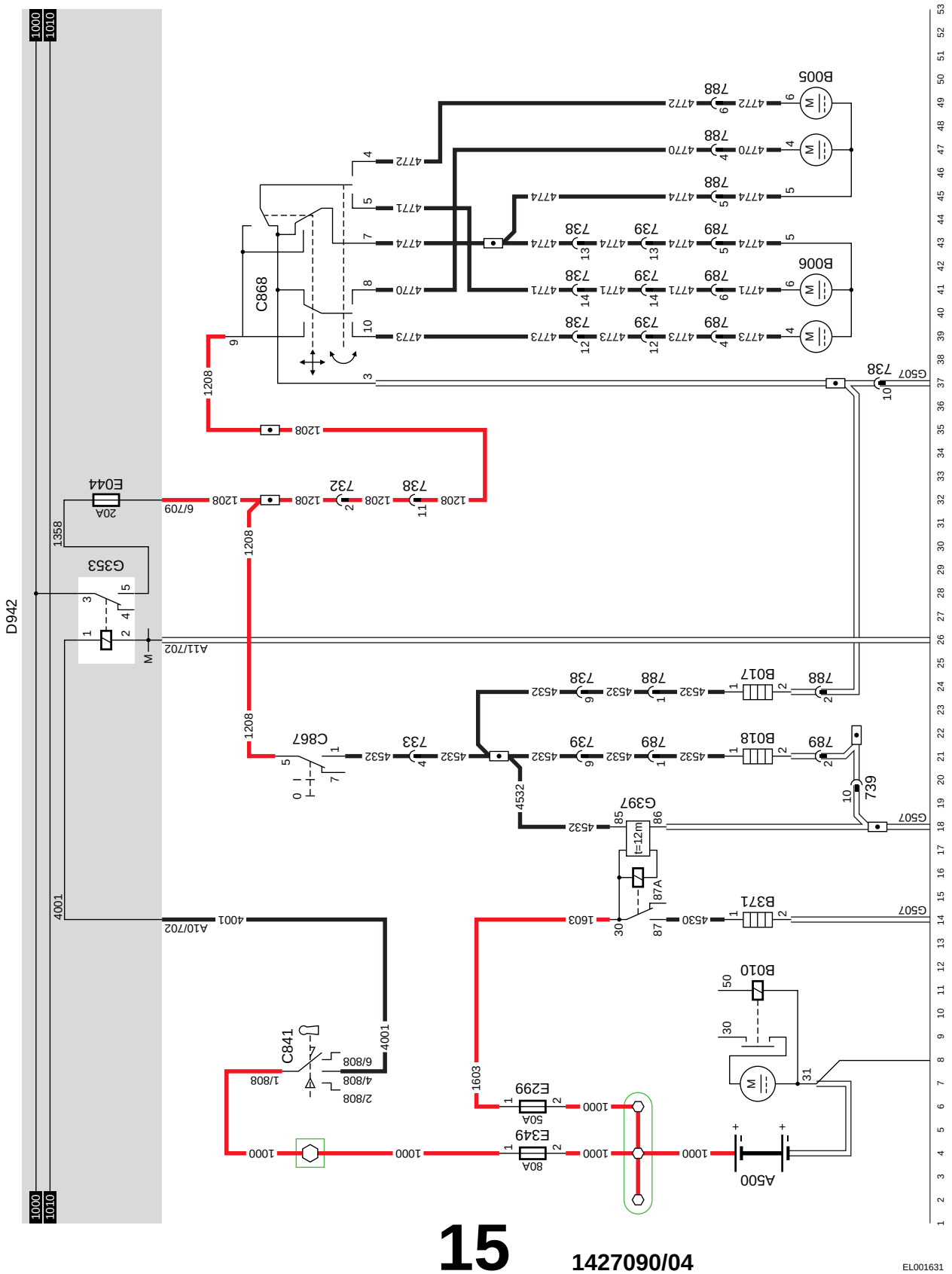
MIRROR ADJUSTMENT

The outside mirrors are adjusted using "joystick" switches C868 (driver's side and co-driver's side). If the handle of the switch is moved from the rest position (centre) in a particular direction, power will be supplied to mirror adjustment motor B005 (left-hand side) or B006 (right-hand side) and the mirror in question will follow the movement of the handle.

When pins 10 and 5 are connected, mirror adjustment switch C868 is in the "right-hand mirror" position. When pins 8 and 4 are connected, the mirror adjustment switch is in the "left-hand mirror" position.

For this, wires 4770 and 4774 (left-hand side) or 4771 and 4774 (right-hand side) supply power to the motor for the left/right movement. Wires 4772 and 4774 (left-hand side) or 4771 and 4774 (right-hand side) supply power to the adjusting motor for the up and down movement.

The mirror adjustment system can only be used if the contact relay (G353) is energised.



15 **1427090/04**

EL001631

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19. HORN/CIGAR LIGHTER/WORK LAMP/AIR DRYER

HORN
The horn (B401) is activated before contact via steering column switch C775 (1000). The horn is supplied with power via wire 4979 and fuse E019.

CIGAR LIGHTER
If the vehicle ignition switch (C841) is in the "accessories" position (connection between contacts 1 and 6), cigar lighter B030 is supplied with power via fuse E026 and wire 1105. By depressing the cigar lighter, the heating element is warmed up.

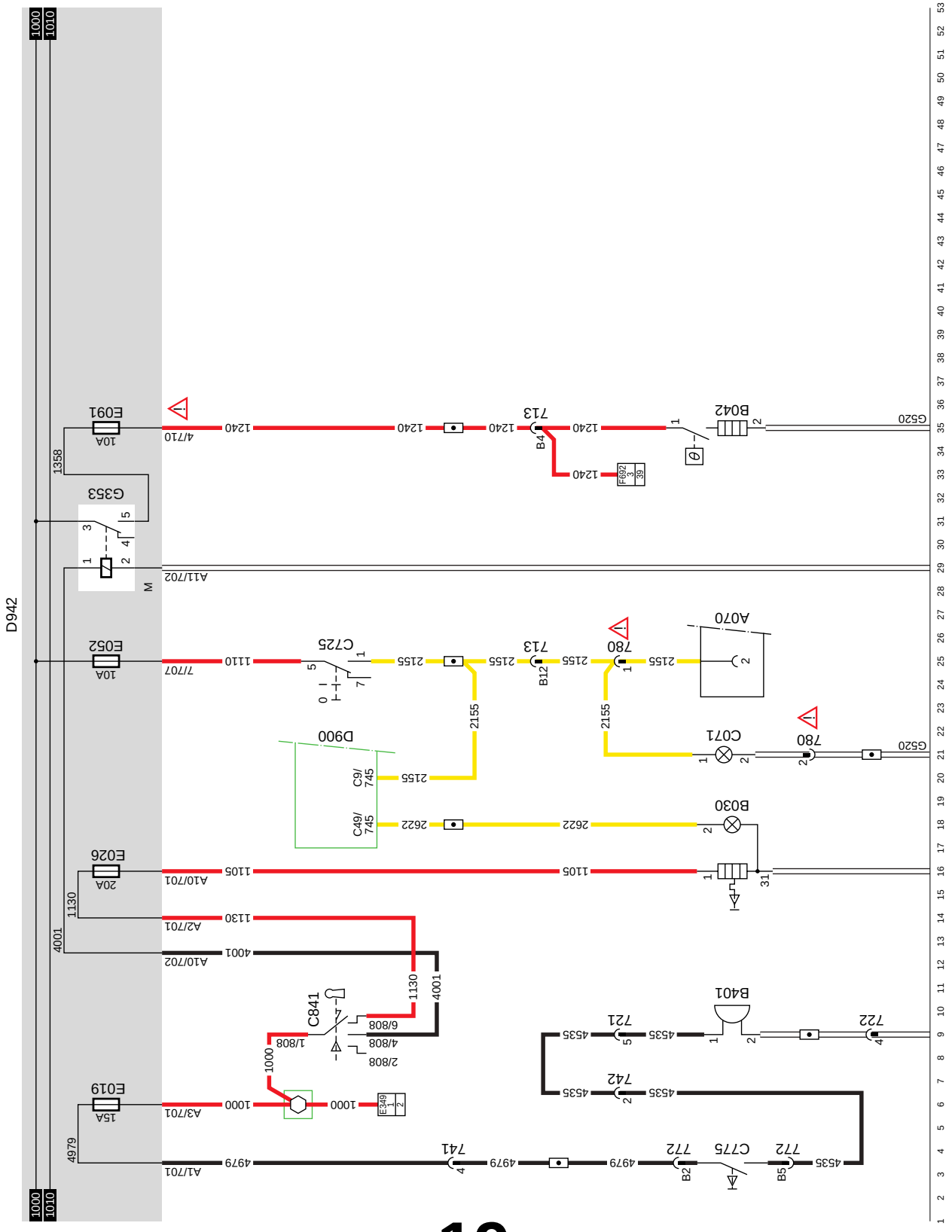
WORK LAMP
Work lamp switch C725 is supplied with voltage from power supply before contact and via fuse E052. When the switch is operated voltage is applied to the work lamp (C071) and to pin C9/745 of the VIC unit in order to activate the "work lamp" indicator on the DIP via I-CAN.

AIR DRYER
When the vehicle ignition (C841) is on (connection between contacts 1 and 4), relay G353 is activated. This relay supplies power to the air dryer heating element (B042) via fuse E091 and wire 1240.
When the maximum temperature is reached, a thermal switch in the air dryer switches off. The water separator sensor (F692) is supplied with power via the same wire.

VARIANTS

Location	
20,24	Connector 780: Not fitted on vehicle type FA. Wire 2155 only fitted in application connector A070
35	If the vehicle is fitted with CDM, see section diagram 32

11



19 **1427090/04**

EL001632

11

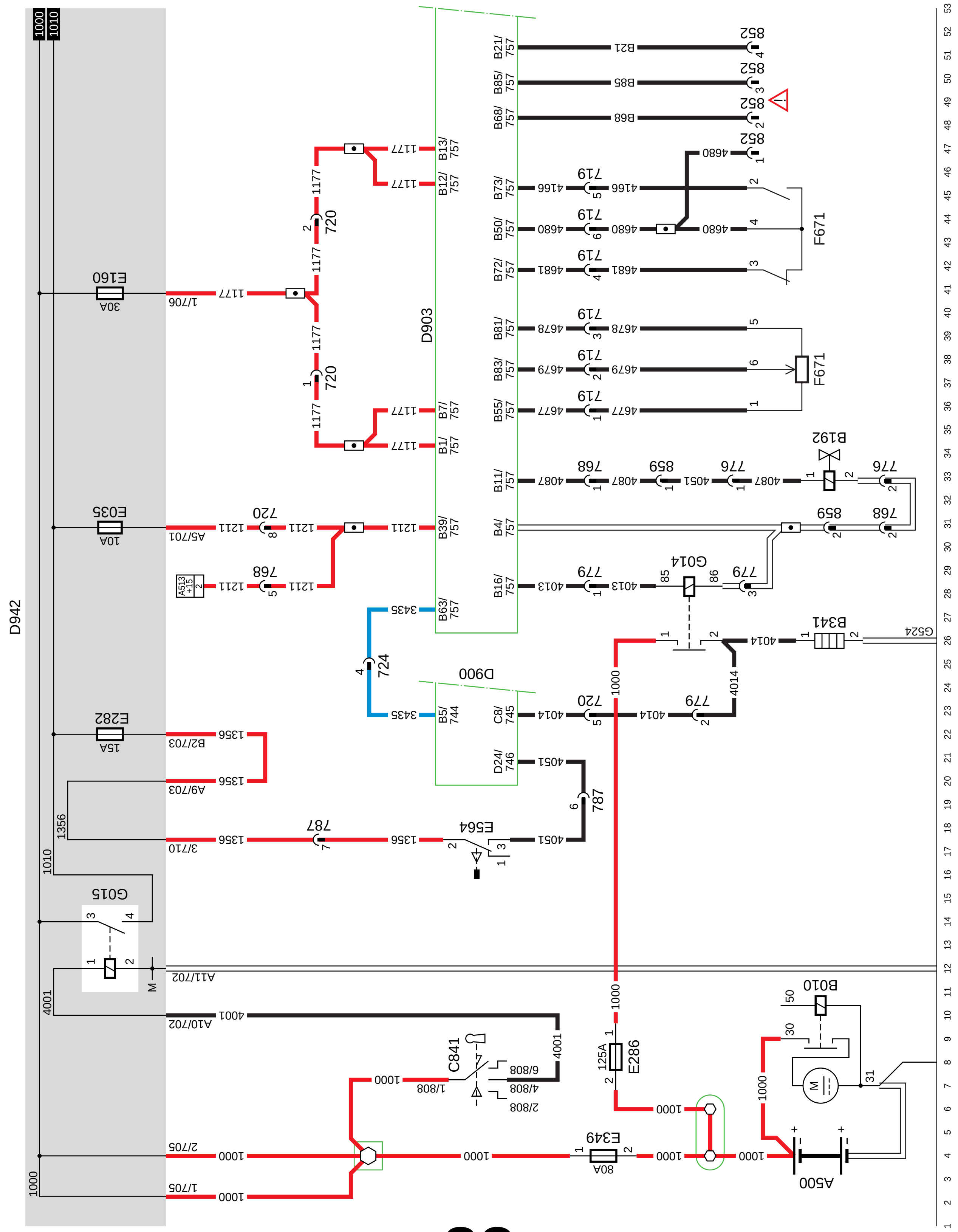
22. ECS-DC3/EXHAUST BRAKE

FOR MORE INFORMATION SEE SYSTEM MANUAL

VARIANTS

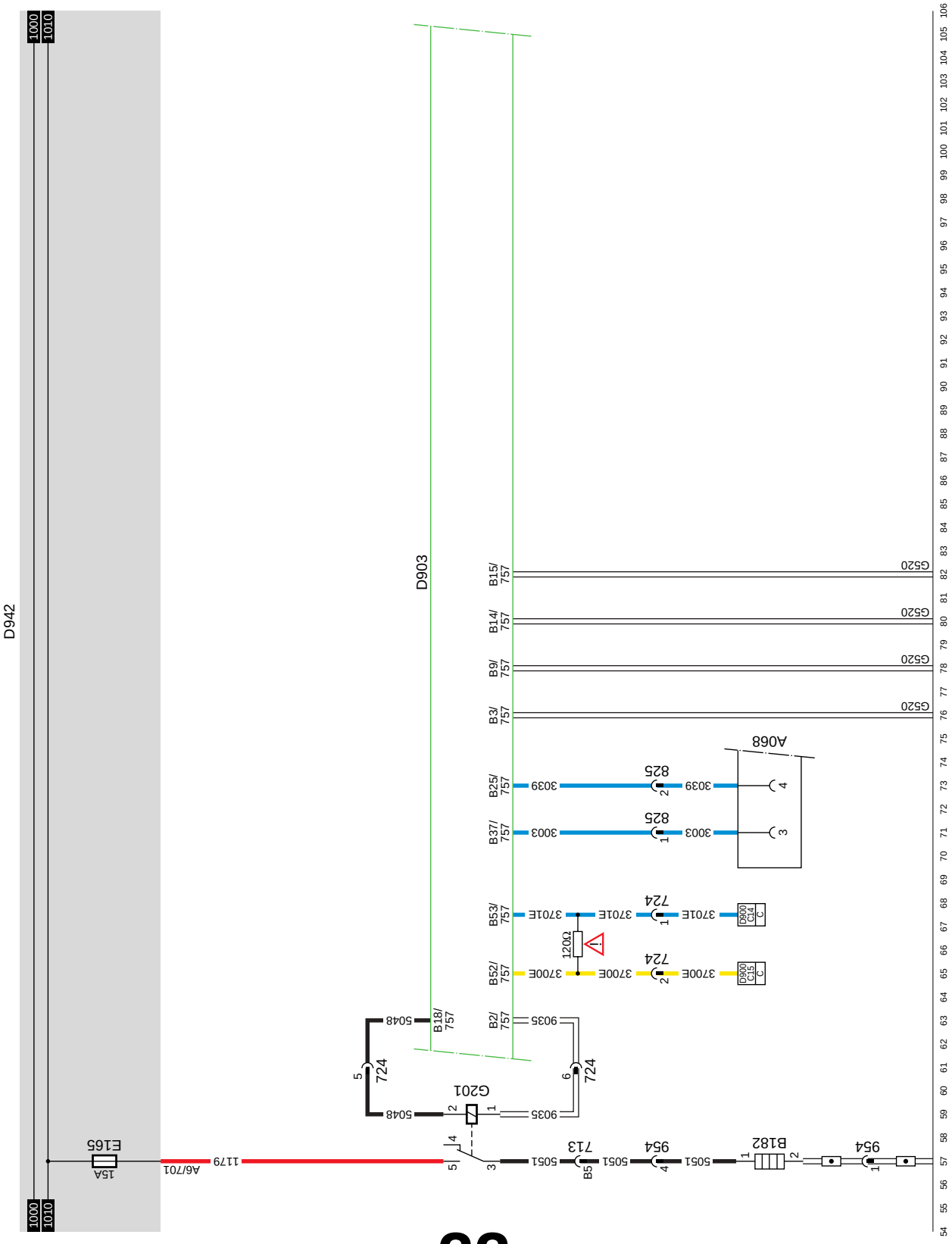
Location	
49	Connector 852: Optional connector for "remote throttle" function
66	The CAN terminating resistor is fitted in the wiring harness, near the B connector
129	This part of the ECS-DC3 electronic unit relates to the BE engine (4-cylinder)
186	This part of the ECS-DC3 electronic unit relates to the CE engine (6-cylinder)

11

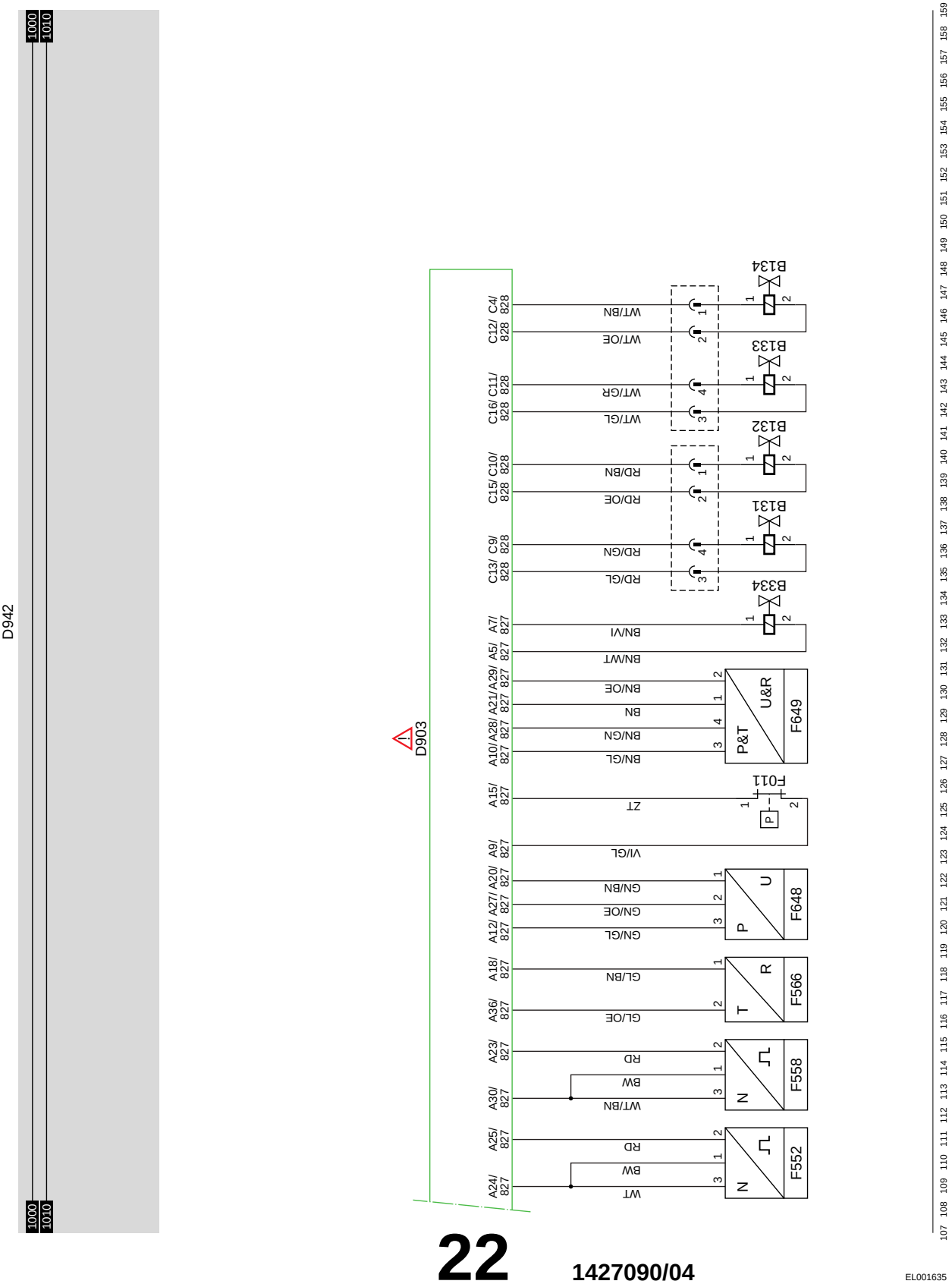


22 **1427090/04**

EL001633



22 **1427090/04** EL001634


1000
1010
D942
D903
B134
B133
B132
B131
B334
F011
P&T
U&R
F649
F648
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F558
F552
C4/ 828
C12/ 828
C11/ 828
C16/ 828
C10/ 828
C15/ 828
C9/ 828
C13/ 828
A7/ 827
A5/ 827
A29/ 827
A21/ 827
A28/ 827
A10/ 827
A15/ 827
A9/ 827
A20/ 827
A27/ 827
A12/ 827
A18/ 827
A36/ 827
A23/ 827
A30/ 827
A25/ 827
A24/ 827
WT/BN
WT/OE
WT/GR
WT/GL
RD/BN
RD/OE
RD/GN
RD/GL
BN/VI
BN/WT
BN/OE
BN
BN/GN
BN/GL
ZT
VI/GL
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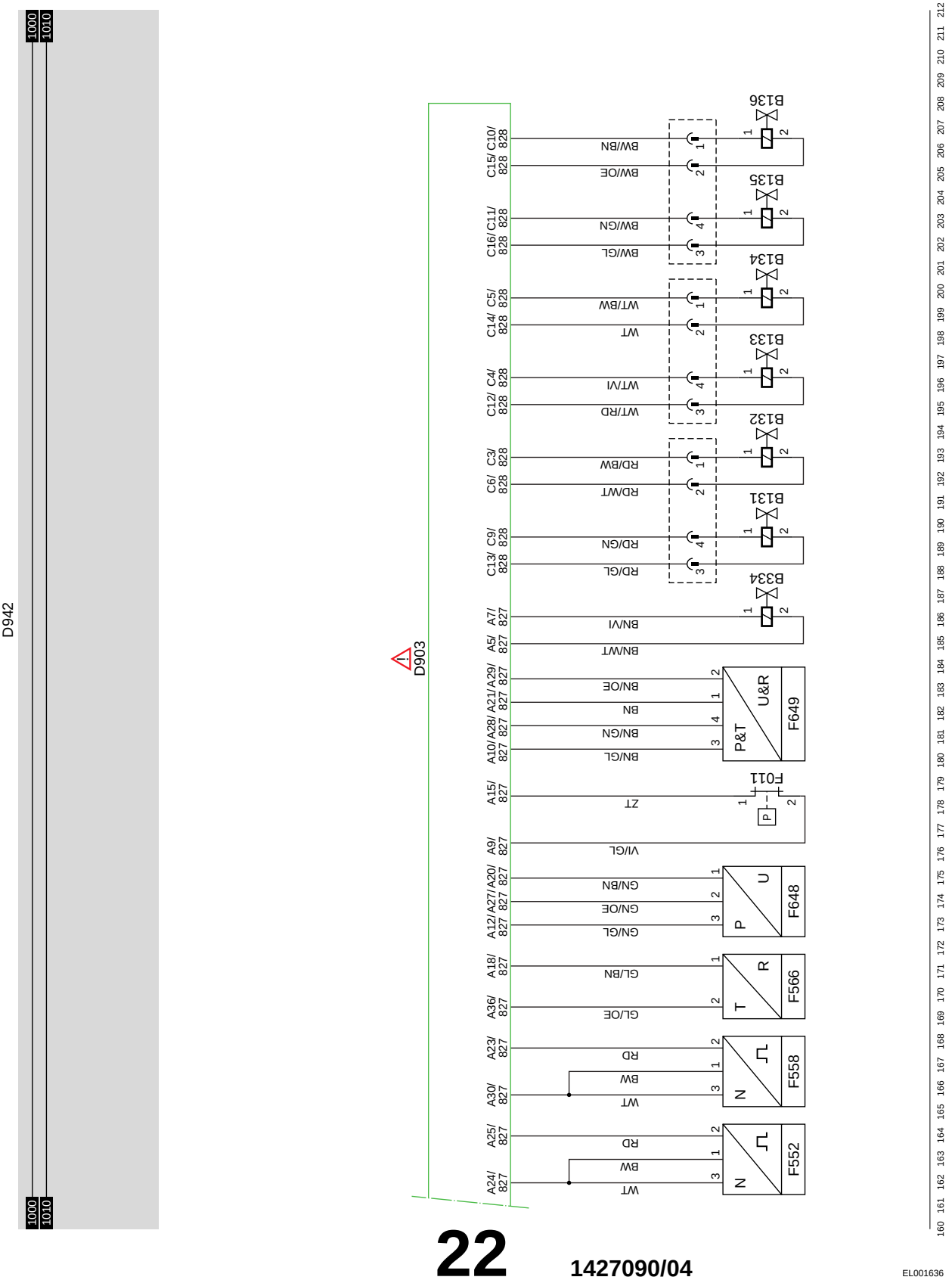
WT
22
1427090/04
EL001635



22 **1427090/04** EL001636

24. AGC AUTOMATIC GEARBOX (AT1000/2000)

Power supply before contact is obtained directly from the batteries (A500) via a 10 A fuse (E144) and wire 1302.
The voltage before contact can also be found in the diagnostic socket for the automatic gearbox (A032).

Voltage after contact is obtained via fuse E279 and wire 1211.
The AT 1000/2000 automatic gearbox selector switch (E585) receives power after contact through fuse E016 and wire 1217. The reversing lights are activated from the same switch via wire 4591.

The earth connections are connected directly to the earth side of the batteries (A500).

The electrical system of the automatic gearbox is almost completely located on the chassis.
Connections leading into the cab are provided for a number of VIC functions:

- fault messages from the automatic gearbox (B25/853) to the VIC unit (D900)
- "Range inhibit" (B23/853) to the VIC unit (D900)
- CAN connections (B29/853 and B32/853) to the VIC unit (D900)
- Neutral position protection (G/900) to the VIC unit (D900)

Diagnosis of the automatic gearbox takes place via the CAN network, which is connected to the diagnostic socket (A032) and the VIC unit (D900).

VARIANTS

Location	
122	Automatic gearbox socket, superstructure (AT2000), A096

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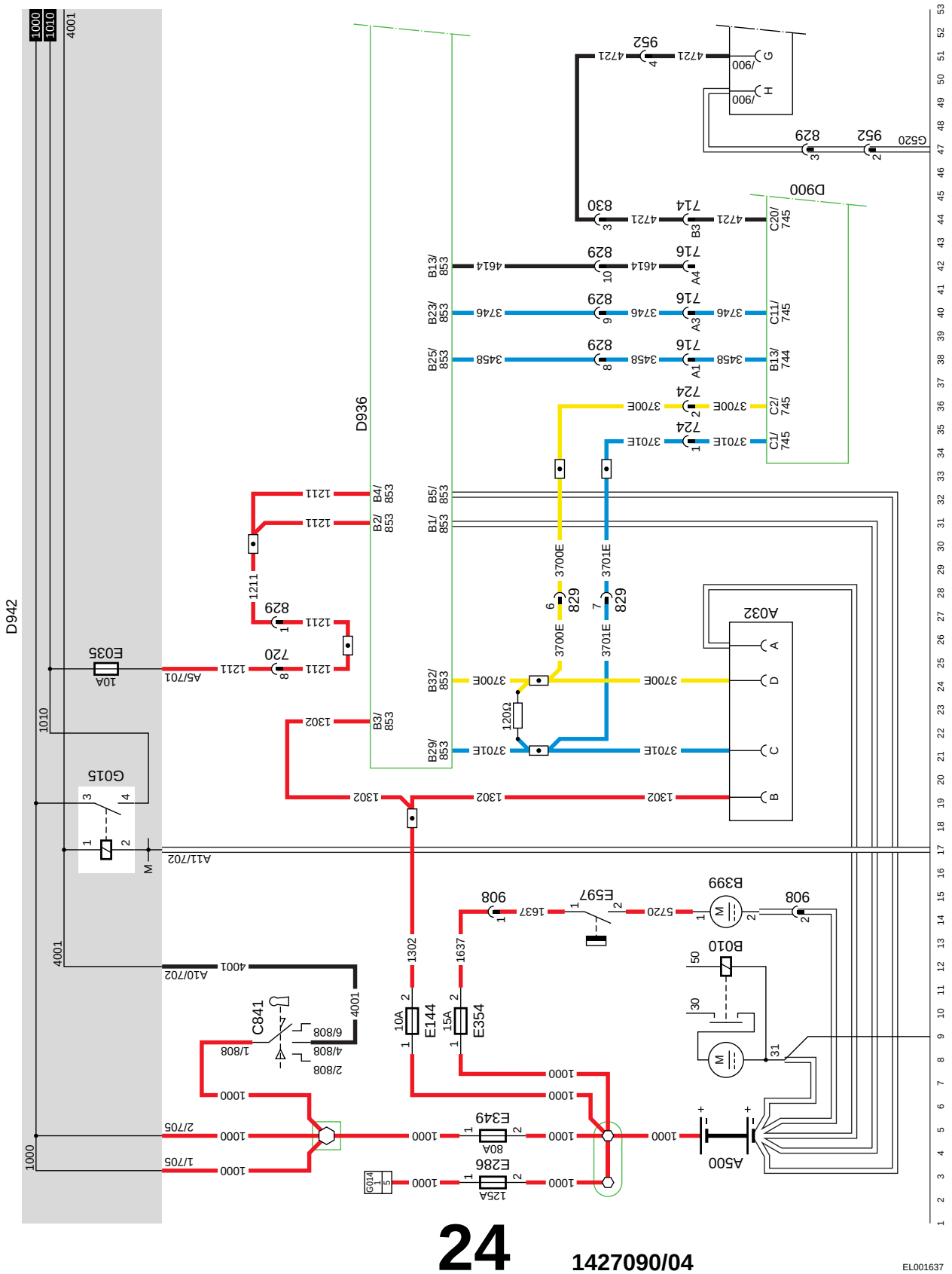

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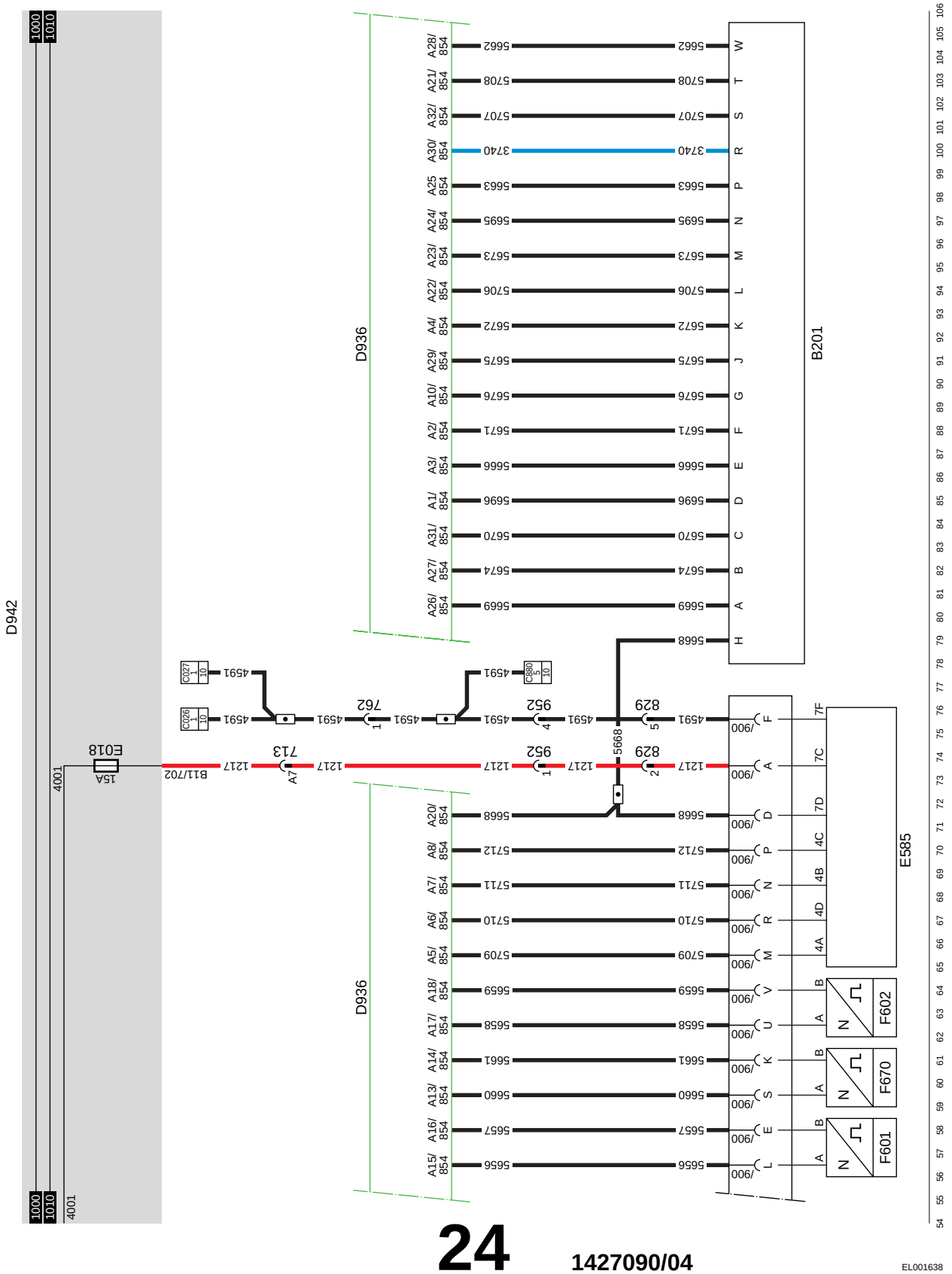

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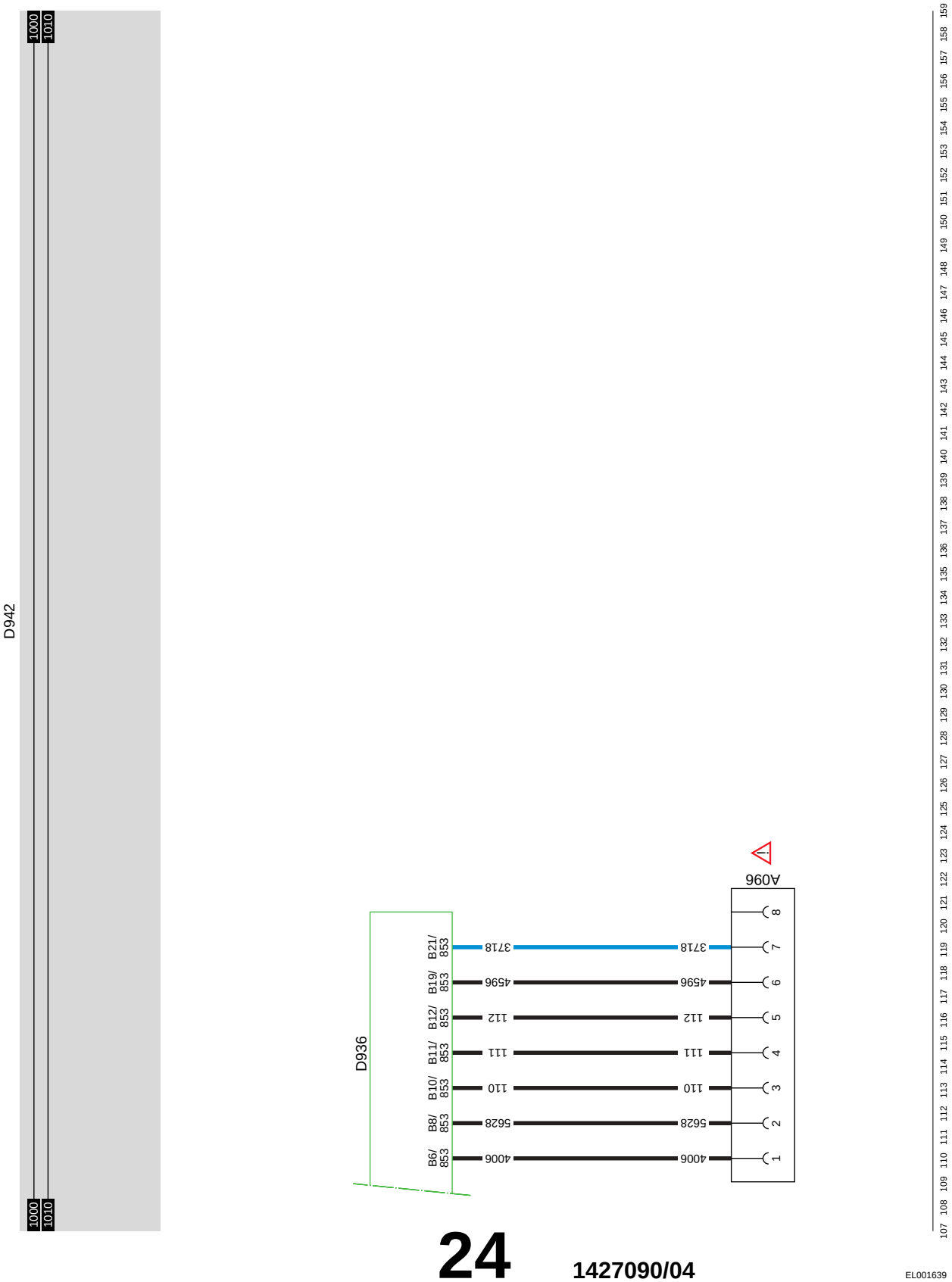

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25. AGC AUTOMATIC GEARBOX (MD3060)

Power supply before contact is obtained directly from the batteries (A500) via wire 336 and a 10 A fuse (MAIN) in the VIM (D822, pins J1 and J2). The electronic unit (D866) receives voltage before contact at pin V1/907 and V16/907 from the VIM (D822, pins R1 and R2) via wires 1164.

Voltage after contact is obtained via fuse E279 and wire 1211. Wire 1211 is connected directly to electronic unit D866 (pin S4/905). The wire also runs to the VIM (pin C1) and various relays in de VIM are supplied with voltage after contact via a 10 A fuse (IGN). The voltage after contact can also be found in the diagnostic socket for the automatic gearbox (A032).

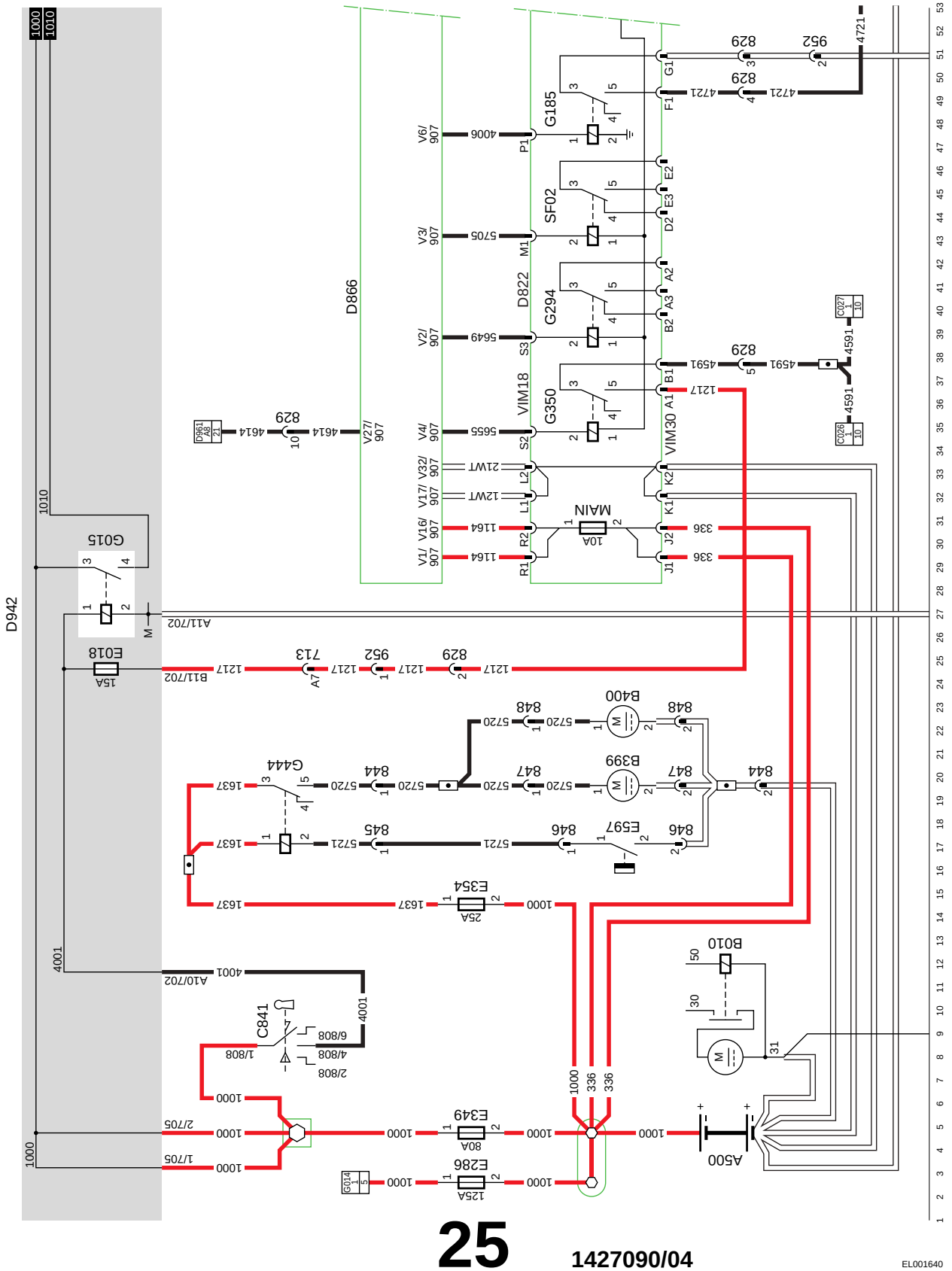
The earth connections are connected directly to the earth side of the batteries (A500) and also run to the electronic unit (D866) via the VIM (pins K1 and K2).

The electrical system of the automatic gearbox is almost completely located on the chassis.
Connections leading into the cab are provided for a number of VIC functions:

- fault messages from the automatic gearbox (S31/905) to the VIC unit (D900)
- CAN connections (S13/905 and S29/905) to the VIC unit (D900)
- Vehicle interface module (D822, pin F1) to the VIC unit (D900)

Diagnosis of the automatic gearbox takes place via the CAN network, which is connected to the diagnostic socket (A032) and the VIC unit (D900).

Note:
Where an automatic gearbox is fitted, there are two dashboard lead-through connectors, 716. One connector is occupied by spare wiring (see application connectors) and the other has 3 occupied positions (A1, wire 3458; A3, wire 123; and A4, wire 4614), only one of which is connected.
The 716 with the spare wiring is not then connected and hangs loose near the dashboard lead-through.



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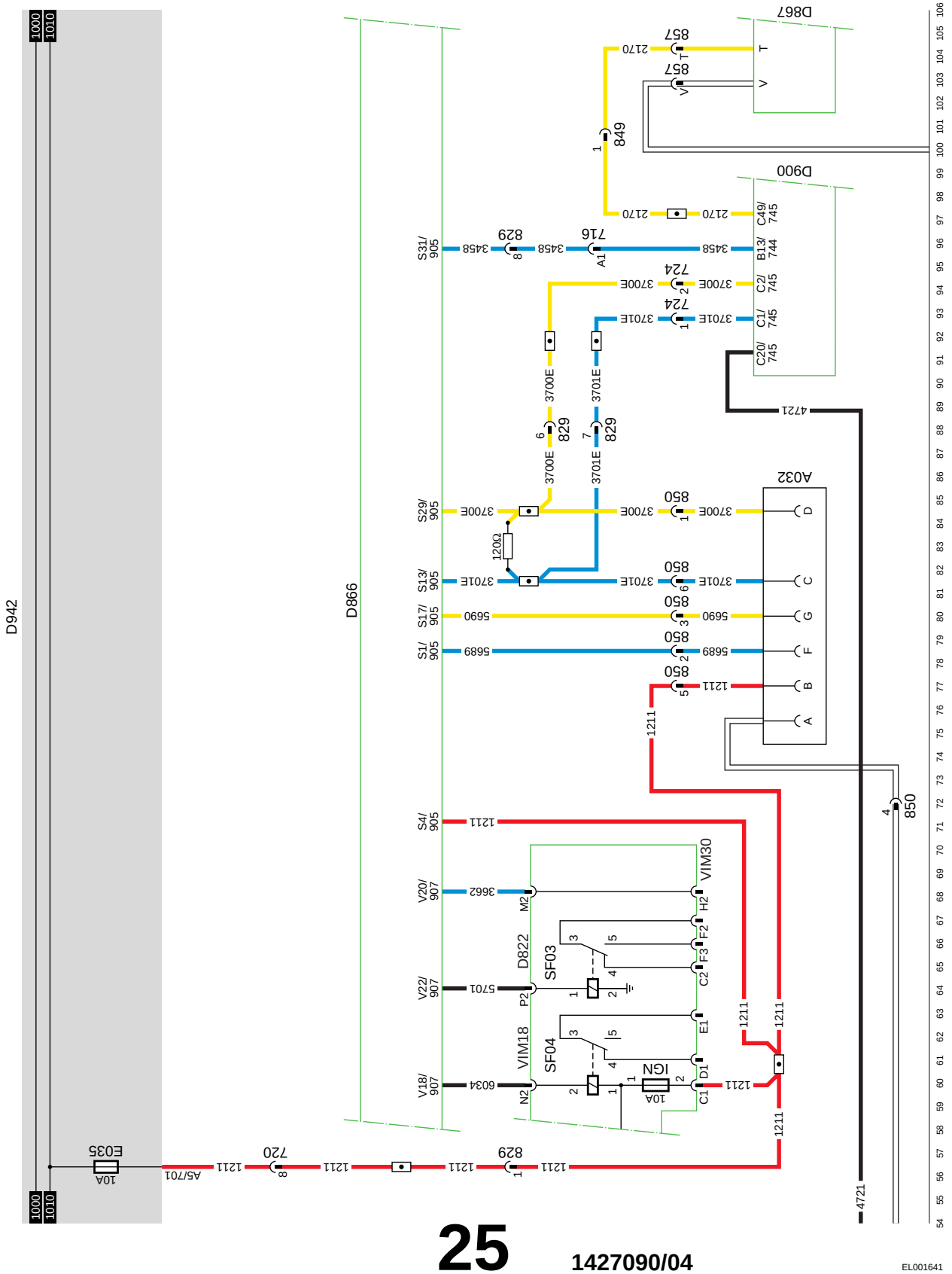

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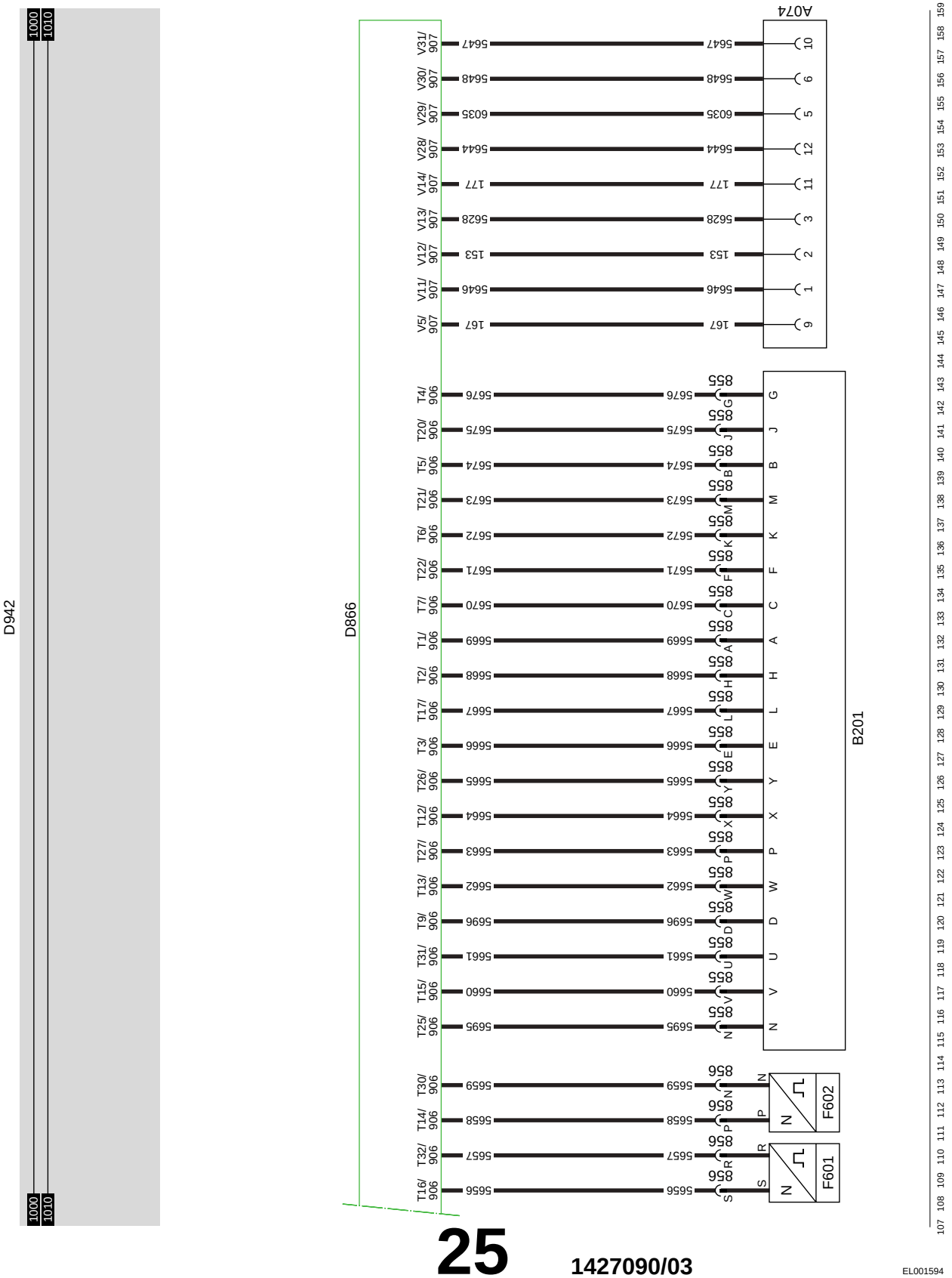

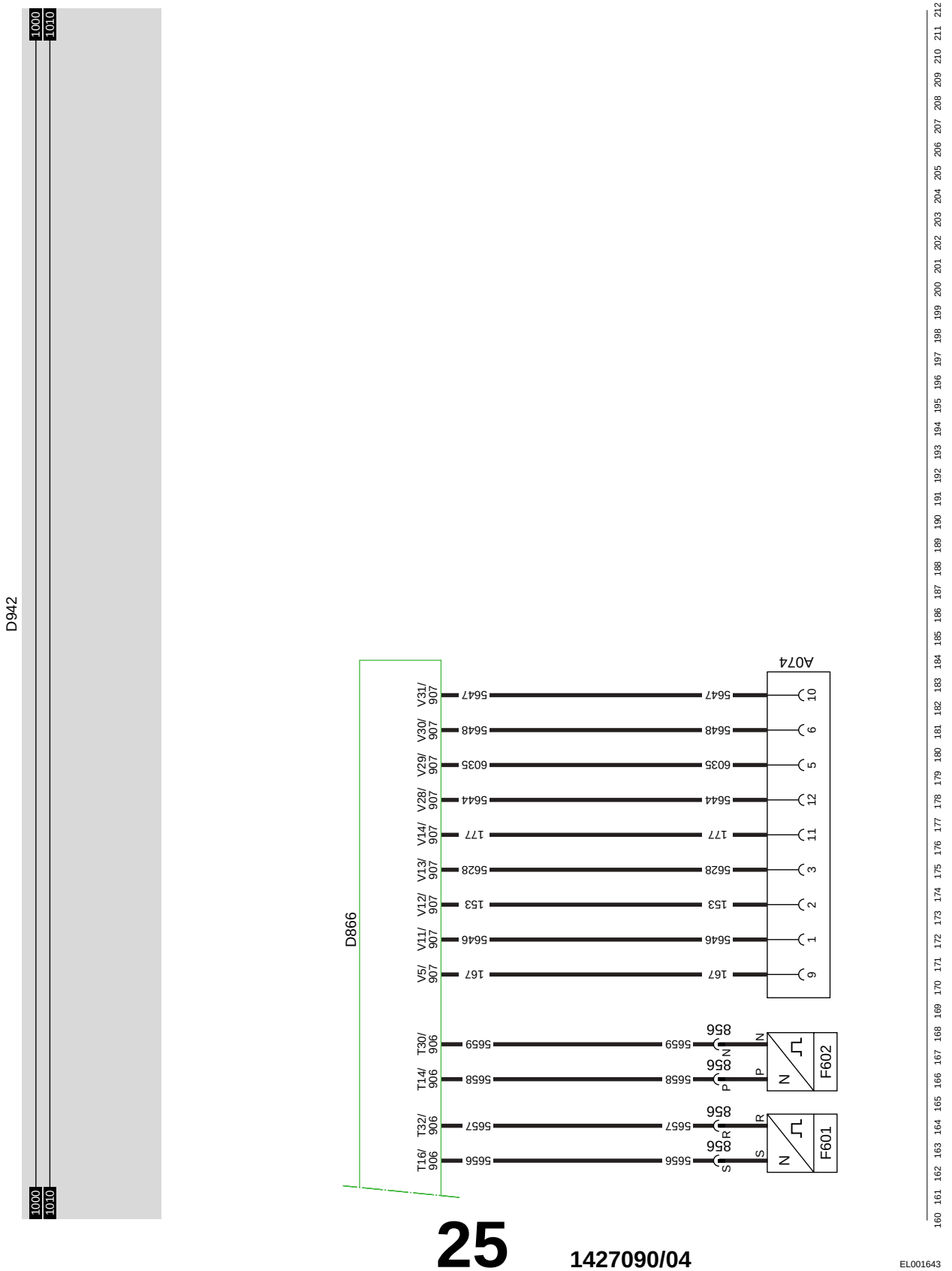
1000
1010
D942
D866
A074
V31/ 907
V30/ 907
V29/ 907
V28/ 907
V14/ 907
V13/ 907
V12/ 907
V11/ 907
V5/ 907
T30/ 906
T14/ 906
T32/ 906
T16/ 906
F602
F601
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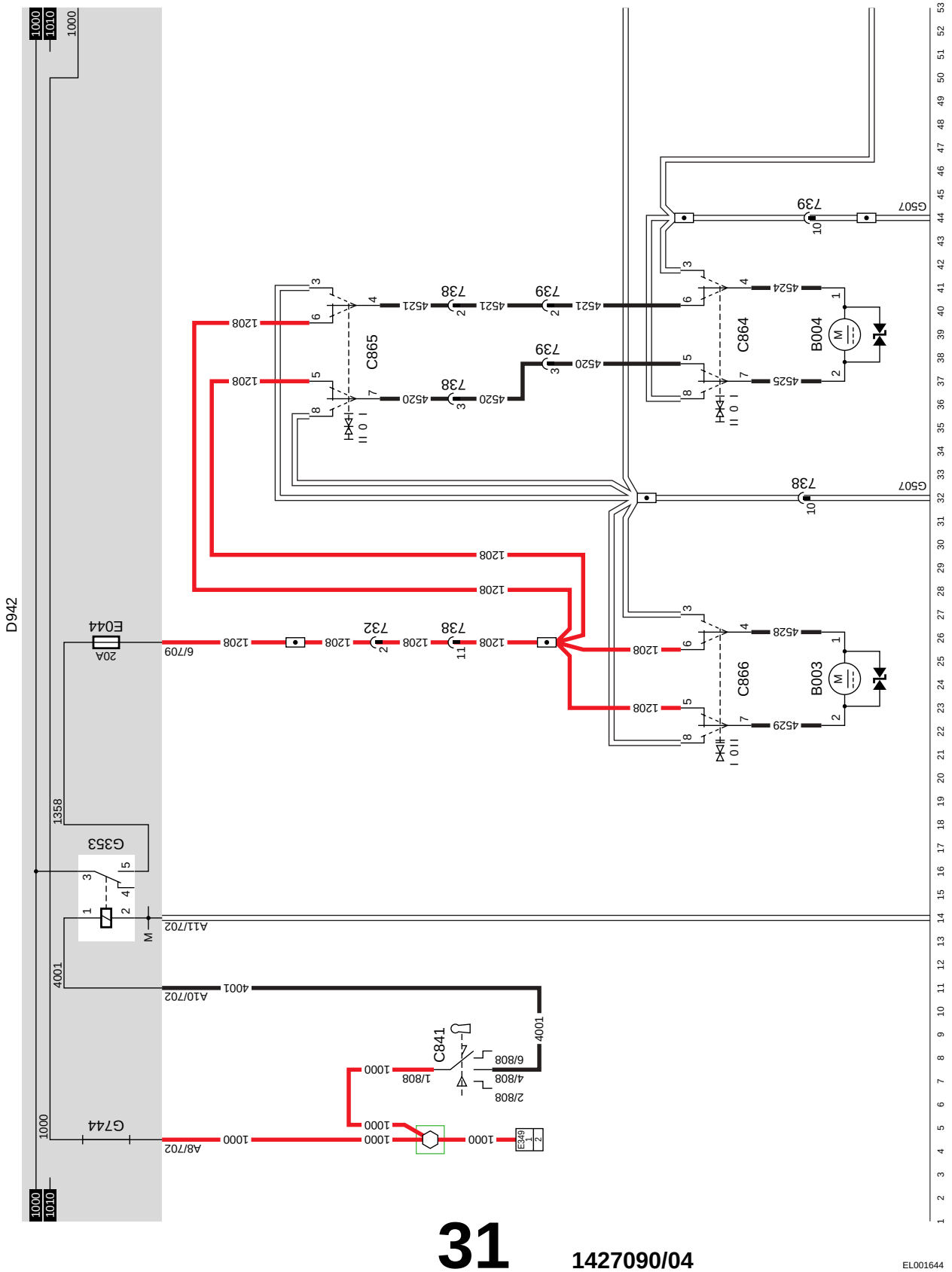
31. CDS-3/DROP GLASS OPERATION/ROOF HATCH

DROP GLASS OPERATION

When the vehicle ignition is switched on (connection between pins 1 and 4, C841), relay G353 is energised. Via fuse E044 and wire 1208, relay G353 supplies power to the electric drop glass door switches (C864 in the driver's door, C865 in the co-driver's door for the co-driver's door, and C866 in the driver's door).
There are two independent drop glass switches. In the rest position, pins 7 and 4 of the switch are connected to power supply via wire 1208. Depending on the side on which the switch is operated, pin 7 or 4 will be connected to earth and the drop glass motor (B003 - driver's side, B004 - co-driver's side) will be activated.



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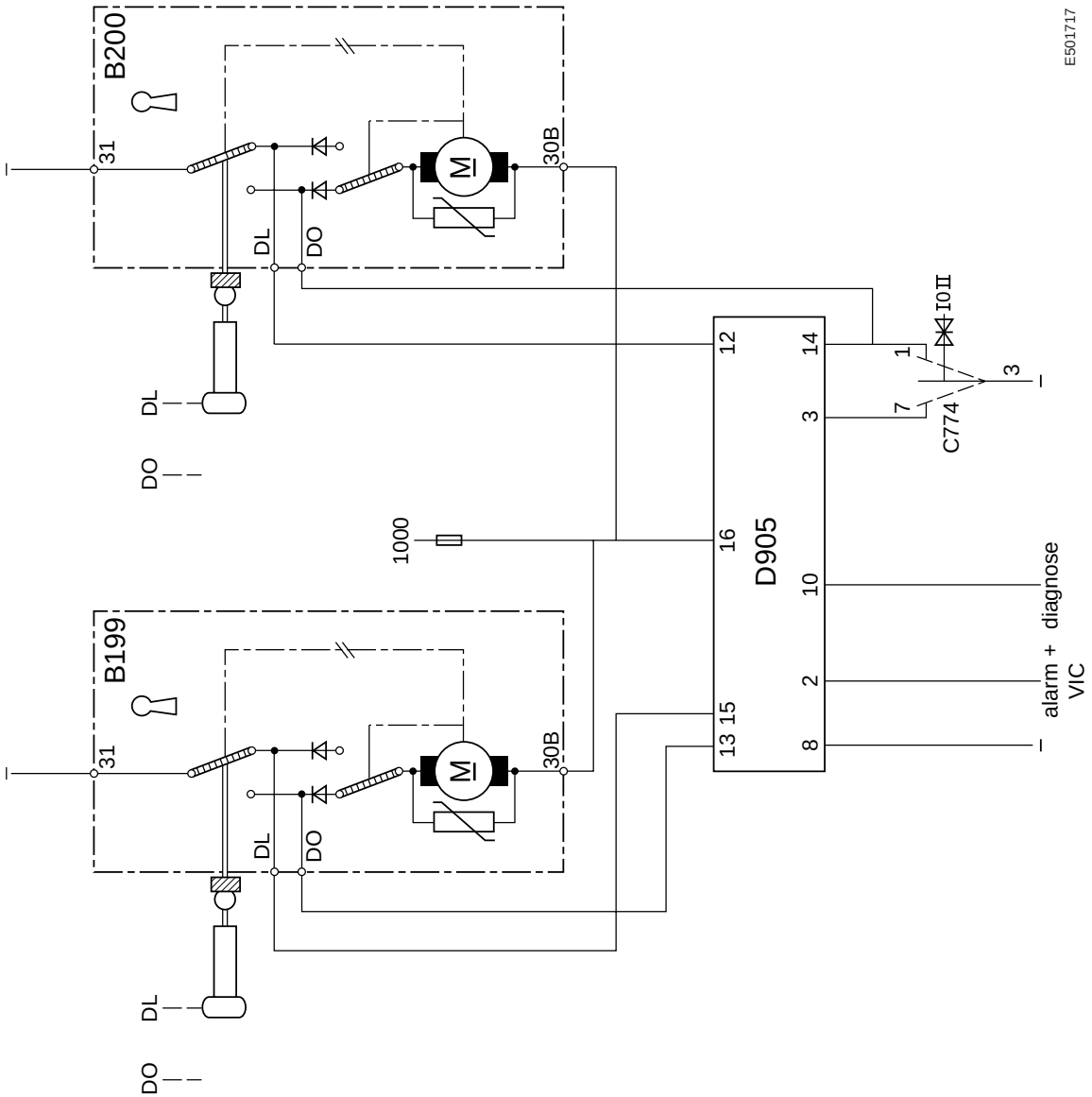

CENTRAL DOOR LOCKING

Purpose:

- Automatic locking of both doors when one of the doors is locked with the key/button.
- Automatic locking of both doors using remote control.
- If one of the two doors is unlocked using the key/button, only this door will be unlocked; the other door will remain locked.
- Automatic unlocking of the driver's side door using remote control.

Conditions: both doors locked.

- **Unlocking co-driver's side door using key.**

This is equivalent to opening a door without central locking. The other door remains locked.

- Unlocking co-driver's side door with switch C774.

When switch C774 is operated (pin 3 connected to pin 1), connection DO of component B200 is connected to earth. The co-driver's door will unlock.

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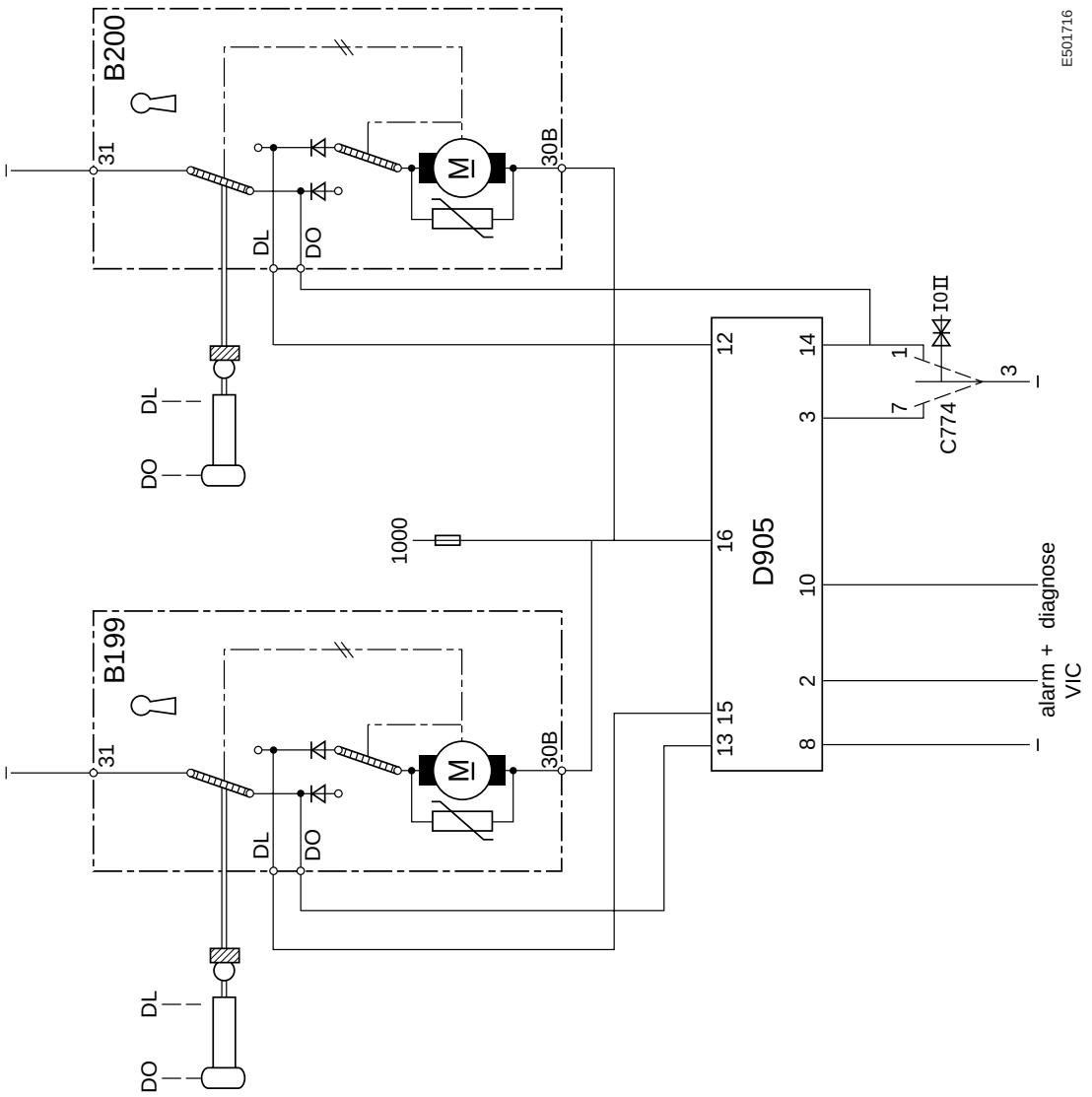
- Unlocking using remote control.
If the door unlocking button on the remote control unit is pressed, the remote control unit will send a fixed-code signal to the CDS electronic unit (D905). When the CDS electronic unit (D905) recognises the remote control unit on the basis of the fixed code, the remote control unit will send coded messages to the unit (D905). These messages are coded with a rolling code. This rolling code will change every time the remote control is operated. After the CDS electronic unit (D905) has accepted the messages, it will send a signal to the VIC (D900). As a result, the VIC will switch on the interior lighting for a specific period of time.
The CDS unit (D905) now switches pin 13 to earth. This will only activate the motor (B199). The CDS unit (D905) checks the status of the output to the motor (B199). This is done to ensure that the DL connection is not connected to earth when the motor is in the "open" position. The CDS unit can deduce from this whether the driver's side door has been successfully unlocked. The CDS electronic unit (D905) will then send a message to the VIC (D900) via pin 2 stating that the driver's side door has been successfully unlocked. If the driver's side door is not unlocked properly after three attempts, a message will be sent to the VIC (D900) to inform it that the door has not unlocked successfully.



Conditions: both doors unlocked.

- Locking driver's side door with key/button.

The D905 unit will measure an earth signal at pin 15 through connection DL. D905 will now connect pin 12 to earth, which will also activate B200. The co-driver's side door will now lock as well.

- Locking the driver's side door with key/button.

The operation is as described above, except that unit D905 will now measure an earth signal at pin 12 and it will connect pin 15 of component B199 to earth. The door on the driver's side will now also be locked.

- **Locking co-driver's side door using switch C774.**

When switch C774 is operated (pin 3 connected to pin 7), an earth signal is created at pin 3 of unit D905. D905 will now connect pin 12 to earth, which will activate B200. This will lock the door on the co-driver's side.

- The doors on the driver's and co-driver's sides are locked using the remote control unit.

When the lock doors button on the remote control unit is pressed, a procedure starts that is comparable to the procedure for opening the doors.

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However, during the locking operation the CDS electronic unit (D905) will connect pins 12 and 15 to earth. This will activate the motors (B199 and B200). The CDS electronic unit (D905) then checks the status of the outputs to the motors (B199 and B200). It uses this information to determine whether the doors have been successfully locked. The CDS unit (D905) will then send a message to the VIC (D900) via pin 2 stating that the doors have been successfully locked. As a result, the VIC (D900) will switch off the interior lighting. If the doors are not locked properly after three attempts, a message will be sent to the VIC (D900), stating that the locking operation was not successful.

Initialisation
When the CDS electronic unit is supplied with power for the first time (on installing or replacing the electronic unit) or when new hand-held transmitters are used (up to 8), the unit must recognise these hand-held transmitters. To enable the hand-held transmitters to communicate with the CDS unit, the unit and the hand-held transmitters must be taught using DAVIE.

ROOF HATCH

Opening roof hatch
When the roof hatch switch (C736) is operated and a connection is made between contacts 2 and 6 and therefore between contacts 1 and 3, a voltage is applied to pin 1 of the roof hatch motor (B009) through fuse E163, switch C736 and wire 4761. The roof hatch will open.

Closing roof hatch
When the roof hatch switch (C736) is operated and a connection is made between contacts 8 and 6 and therefore between contacts 7 and 3, a voltage is applied to pin 2 of the roof hatch motor (B009) through fuse E163, switch C736 and wire 4760. The roof hatch will now close.

VARIANTS

Location
68 If the vehicle is fitted with CDM, see section diagram 32

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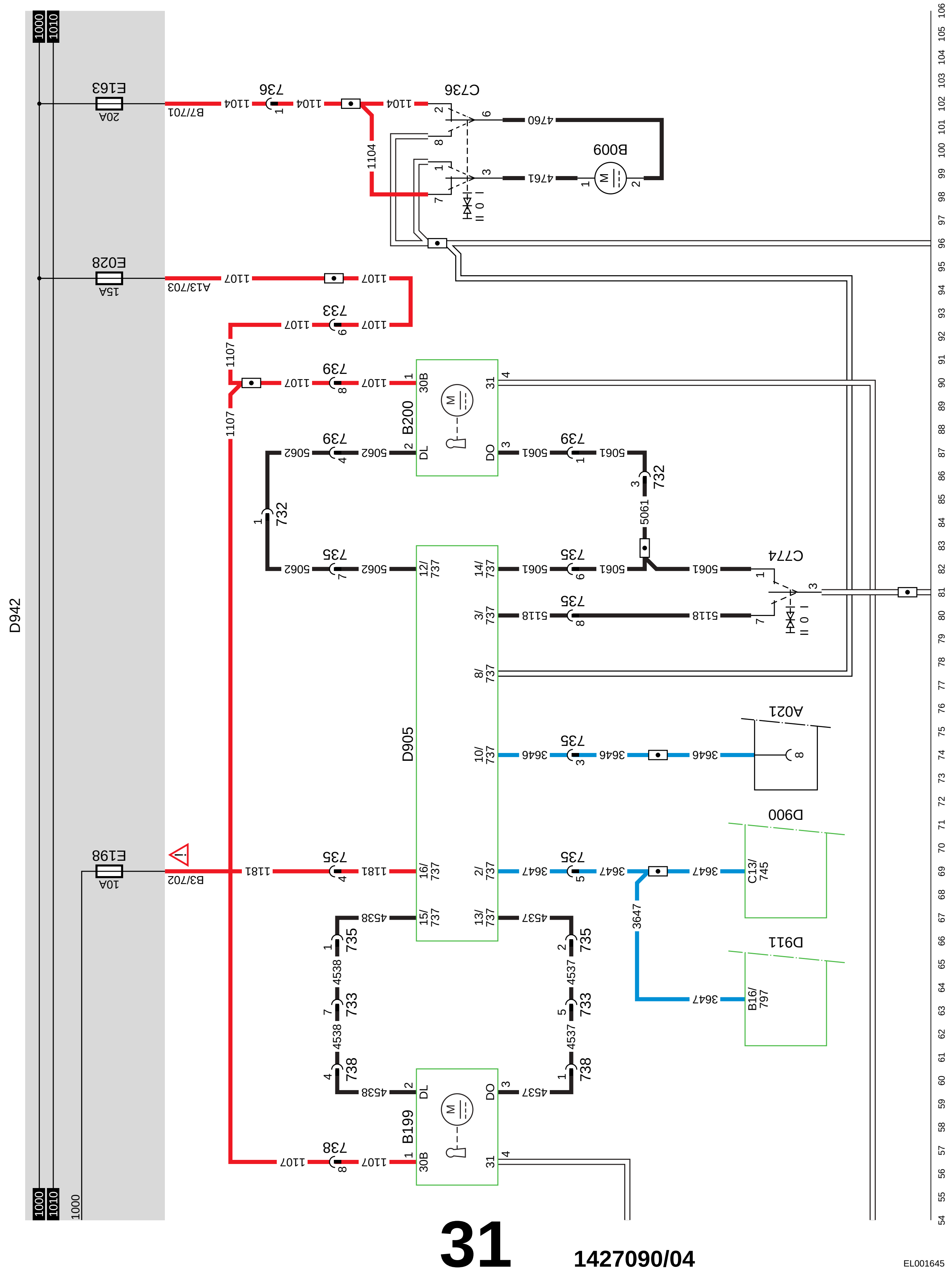
D942
E163
20A
E028
15A
E198
10A
C736
B009
B200
D905
C774
A021
D900
D911
B199
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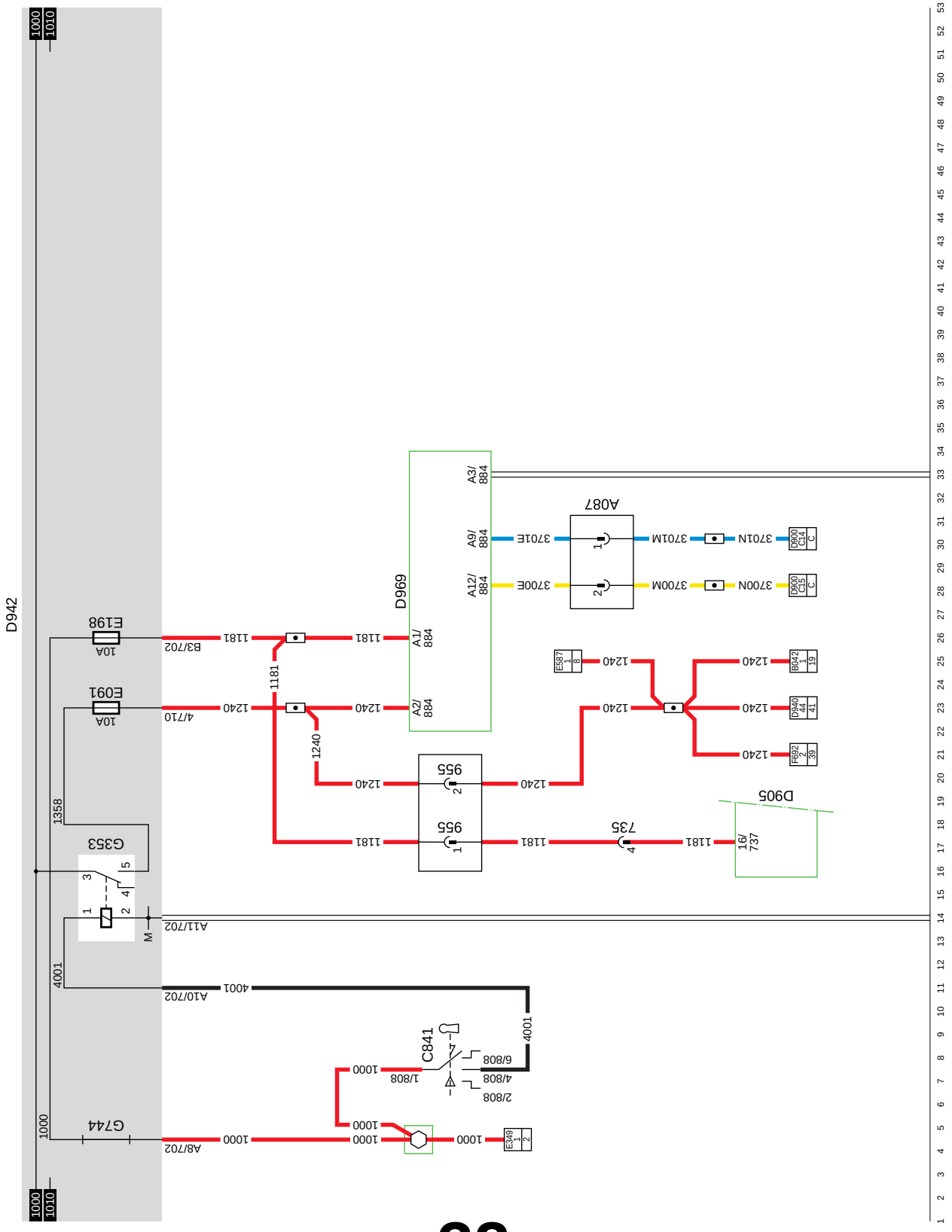
32. CDM
FOR MORE INFORMATION SEE SYSTEM MANUAL



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39. WATER SEPARATOR/FUEL PRE-HEATING

WATER SEPARATOR

The water separator sensor F692 is supplied with power via relay G353 and fuse E091. If the water level in the fuel filter becomes too high, the VIC receives a signal at pin D8/746. A warning is then indicated on the DIP through the VIC.

FUEL PRE-HEATING

Depending on the temperature, the ECS-DC3 electronic unit (D903) activates the fuel heating relay (G201).
The relay supplies power to the water separator fuel heating element (B182) through fuse E165.

VARIANTS

Location	
34	Fuel heating relay (G201): May be placed behind the central box.
39	If the vehicle is fitted with CDM, see section diagram 32

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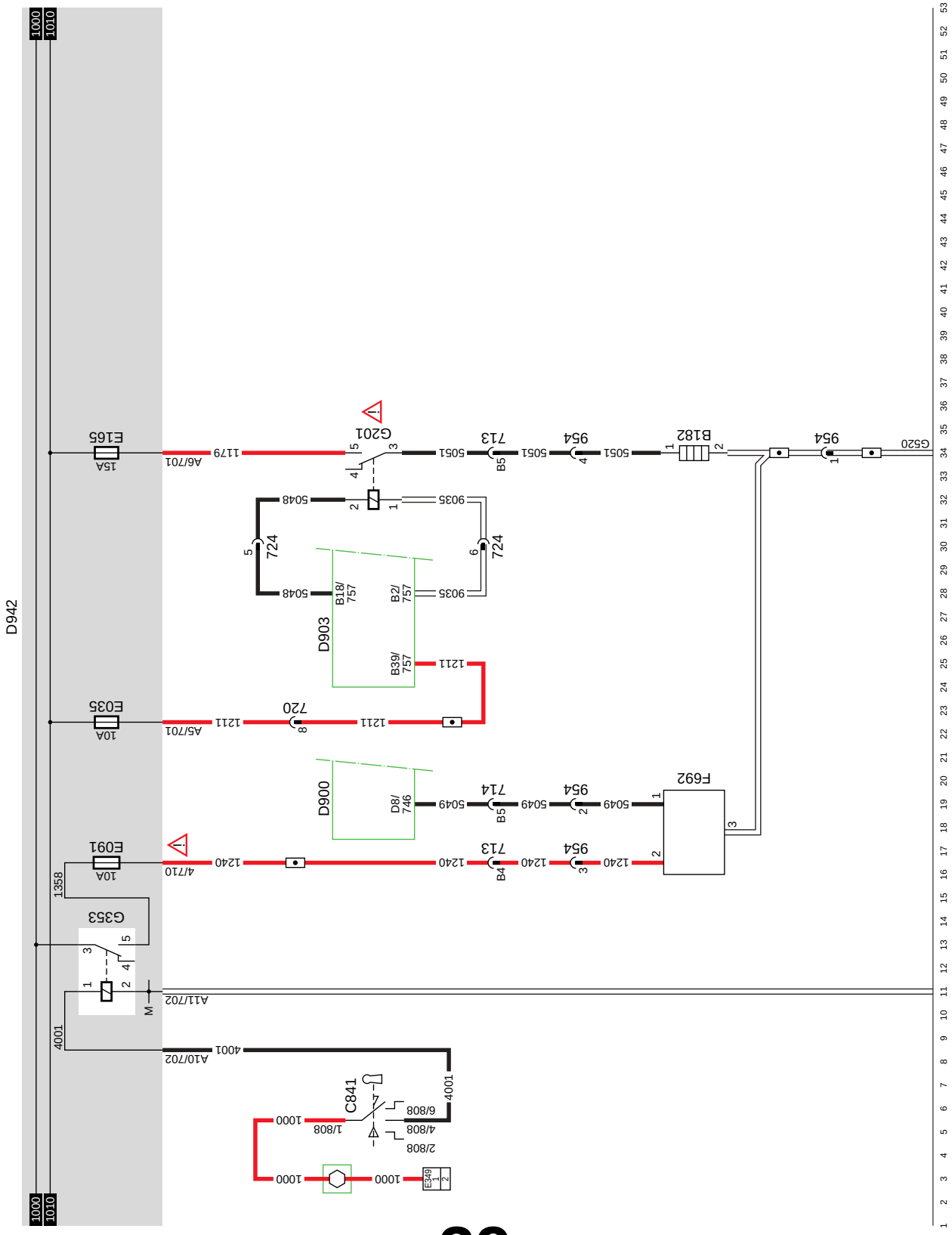

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