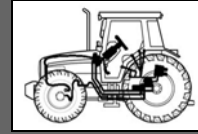


Chapter 9



Hydraulics

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9A10

LS hydraulic system - General

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A. General

The hydraulic system of the tractor comprises two separate systems. A closed centre system and an open centre system supplied by a variable displacement pump and a fixed displacement pump respectively.

The main components of the two systems are:

- 3 pumps: Variable displacement Load Sensing pump, steering pump and fixed displacement standby pump
- Priority valves
- Priority block
- Filters

This section deals mainly with the closed system supplied by the Load Sensing pump.

The principal of the Load Sensing (closed centre) flow and pressure regulation hydraulic system is to limit the power supplied by the engine.

If no hydraulic slave device is actuated, no flow or pressure is discharged by the variable displacement pump.

When one of the functions is actuated, the pump only supplies enough flow and pressure for that function.

IMPORTANT: *If the housing is drained, or if the main filter is replaced or any servicing operation results in air entering the system, it is essential to prime the hydraulic system. The method used to prime the system is to energise the starter several times without starting the engine. Once the system is properly primed, you can start the tractor.*

Specifications of the main components

Suction strainer

Type Cartridge
 Filtration threshold..... 300 μ



1011213

Fig. 1

Tank return filter

Type Cartridge
Filtration threshold 10 µ



I011214

Fig. 2

Variable displacement pump with pressure-flow rate regulator

Brand Sauer Danfoss
Type Axial pistons
Displacement Variable between 0 and
75 cm³ per revolution
Flow rate Between 0 and 185 l/
min at 2200 rpm
Minimum pressure 24 bar
Maximum pressure 200 bar
Ratio 1.1475

Priority block

The block comprises:

- A 3/2 proportional steering priority valve
- A 2/2 proportional steering boost valve
- LS system pressure relief valve set to 230 bar
- Thermostatic valve, opening at 71 °C.



I011215

Fig. 3

B. Principles of operation

Steering system (Fig. 4)

The steering system is supplied by the fixed displacement pump (P2), which sucks via the suction strainer from the hydraulic tank (F2).

The pump delivery is directed to a priority valve situated in the steering priority block (10).

This valve ensures the supply of the steering unit (2) and sends the excess flow rate to the thermostatic valve (12), which is situated in the steering priority block (10).

The oil is then divided into two sections.

One section returns to the return filter (F1) attached to the auxiliary hydraulic tank.

The other section is directed to the auxiliary hydraulic cooler (R1) if the temperature exceeds 70 °C.

When the oil leaves the cooler, it is filtered by the filter (6) before returning to the tank (R1).

A standby pump driven by the 4-wheel drive transmission shaft also sends oil to the priority valve. If the engine is switched off, this ensures the steering spool valve is supplied until the tractor is stationary.

Variable displacement pump system (Fig. 4)

The Load Sensing system is supplied by the variable displacement pump (P1).

It sucks partly via the filtered oil outlet of the filter (F1) and via the suction strainer (F2) from the hydraulic tank.

If the amount of filtered oil coming from the various returns is more than the request from the pump (P1), the oil is returned straight back to the tank via a valve. If, on the other hand, the return is not sufficient, the obtained oil supplying the pump will be a combination of return filtered oil (F1) and oil from the tank.

When the tractor is being operated without using the hydraulic controls (auxiliary spool valves, brake), the pressure in the variable displacement pump delivery system is 24 bar \pm 2 bar at an engine speed of 1500 rpm and an auxiliary oil temperature of 50 °C. The pump flow is zero. When a hydraulic control is activated, the Load Sensing line controls the flow rate regulation and the pump (P1) changes displacement to maintain a pressure of 24 bar between the delivery pressure and useful pressure.

The pump delivery is directed to the steering priority block (10).

Inside the block, a boost valve, which is controlled by the steering LS system, directs part of the pump (P1) delivery as a priority to the steering spool valve (2).

This increases the hydraulic flow if the flow from the steering pump (P2) is lower than the request from the steering spool valve (2).

When the steering LS system does not activate the boost valve, the entire delivery is directed to the trailer brake unit (7) and the main brake unit (6).

A pressure relief valve (13), situated in the steering priority block between the boost valve and the brake units, limits the system pressure to 230 bar.

The order of priority is:

- 1) Steering

- 2) Braking (trailer and tractor braking)
- 3) Auxiliary spool valves, suspended front axle hydraulic control unit, suspended cab hydraulic unit, front and rear linkage spool valve, auto-hitch hydraulic control unit.

Main brake unit (Fig. 4)

The main brake unit comprises a priority valve that directs the flow such as to give priority to the regulator cut-out, also situated in the main brake unit (6), to supply the brake section.

If there is no hydraulic request from the brakes, the entire hydraulic flow is sent:

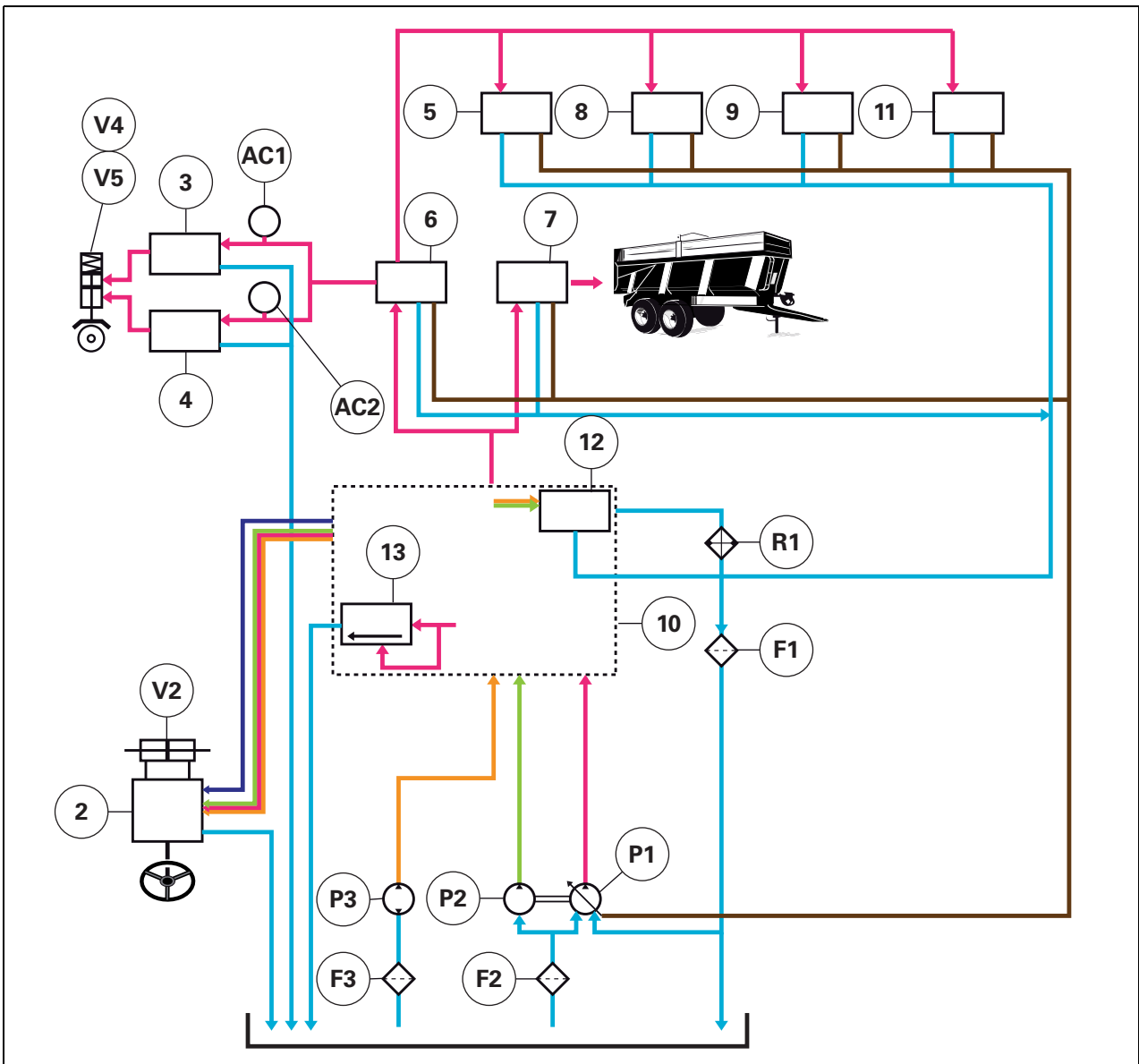
- To the auxiliary spool valve unit and linkage spool valve(s) (11)
- To the suspended front axle unit (5) if fitted
- To the auto-hitch unit (9) if fitted
- To the cab suspension unit (8) if fitted

Where the flow from the pump is at maximum and it is necessary to supply the brake master cylinder, the valve reduces the flow to the components mentioned above to direct the flow to the brake master cylinder via the regulator cut-out.

Trailer brake unit (Fig. 4)

The trailer brake unit is also supplied by the LS pump (P1) as a priority.

C. Schematic diagram



1011219

Fig. 4

- Return-suction
- Steering pump pressure
- Steering standby pump pressure
- Variable displacement pump pressure
- Steering LS
- Variable displacement LS pump
- (P1) Variable displacement pump
- (P2) Steering pump
- (P3) Steering standby pump
- (F1) Tank return filter
- (F2) Suction strainer
- (F3) Standby pump suction strainer
- (R1) Oil cooler
- (V2) Steering ram
- (V4) Right-hand brake fitting
- (V5) Left-hand brake fitting
- (Ac1) ParkLock accumulator

- (Ac2) Main brake accumulator
- (2) Steering spool valve
- (3) ParkLock control unit
- (4) Brake master cylinder
- (5) Suspended front axle unit
- (6) Main brake unit
- (7) Trailer brake unit
- (8) Cab suspension unit
- (9) Auto-hitch unit
- (10) Priority block
- (11) Auxiliary spool valve + linkage spool valves assembly
- (12) Thermo valve
- (13) Pressure relief valve

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LS hydraulic system - Diagrams and plans

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A. Hydraulics diagram

Different systems

- (1) Variable displacement pump
- (2) Orbitrol
- (3) ParkLock control unit
- (4) Brake master cylinder
- (5) Suspended front axle unit
- (6) Main brake unit

Pumps

- (P1) Variable displacement pump
- (P2) Steering pump
- (P3) Steering standby pump

Filters - Strainers

- (F1) Filter on the return to the tank
- (F2) Suction strainer
- (F3) Standby pump suction strainer
- (F4) Standby pump suction strainer

Rams

- (V1) Rear linkage rams
- (V2) Steering ram
- (V3) ParkLock rams
- (V4) Right-hand brake fitting
- (V5) Left-hand brake fitting
- (V6) Front axle suspension ram
- (V7) Front cab suspension ram
- (V8) Rear cab suspension ram
- (V9) Auto-hitch ram
- (V10) Trailer brake ram, if connected

Accumulators

- (AC1) ParkLock accumulator
- (AC2) Main brake accumulator
- (AC3) Front axle suspension left-hand side accumulator
- (AC4) Front axle suspension right-hand side accumulator
- (AC5) Front cab suspension ram accumulators
- (AC6) Rear cab suspension ram accumulators

Other components

- (R1) Oil cooler

Different systems

- (7) Trailer brake unit
- (8) Cab suspension unit
- (9) Auto-hitch unit
- (10) Priority block
- (11) Connection unit
- (12) Connection unit
- (13) Rear linkage

A.1 Main hydraulics diagram

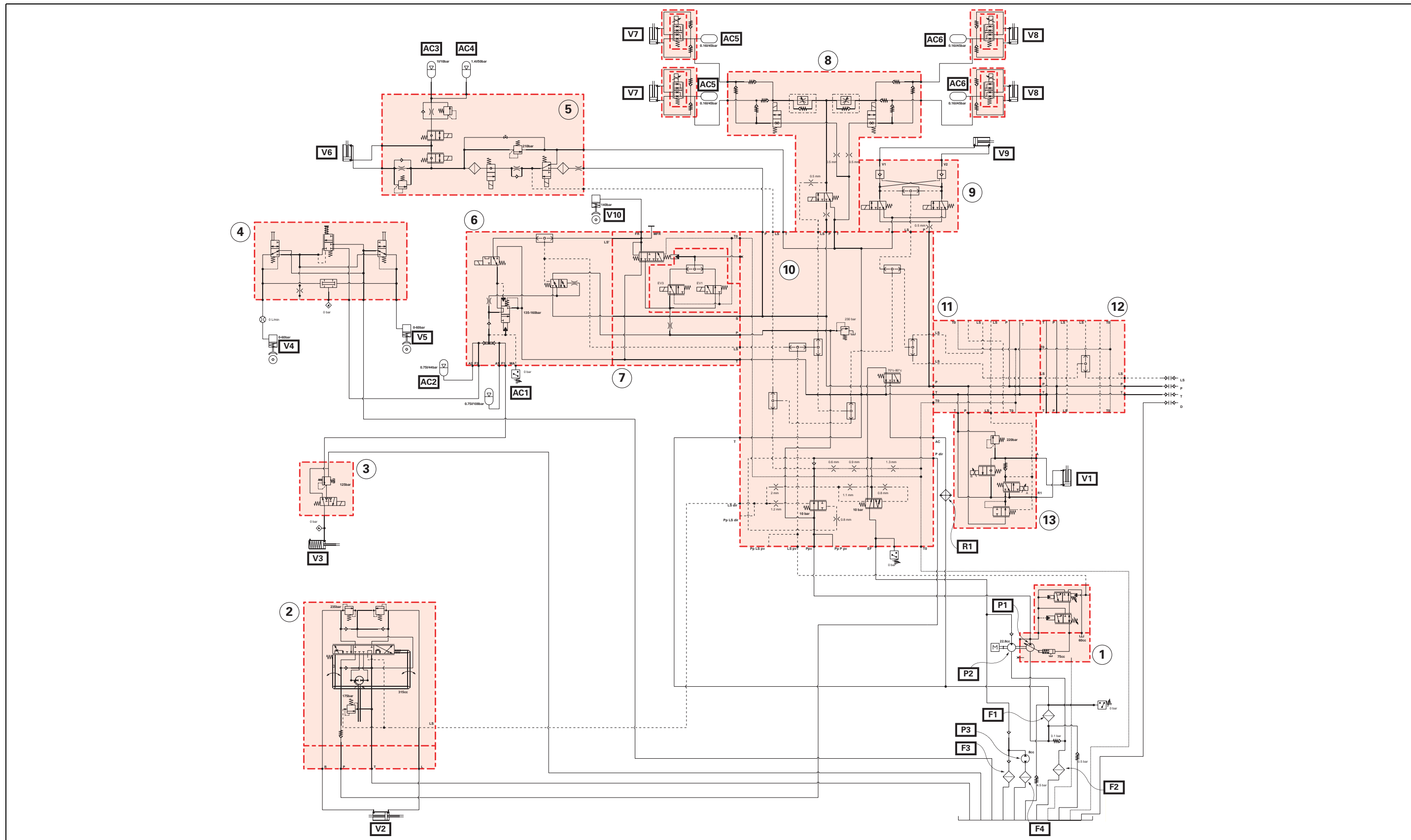


Fig. 1

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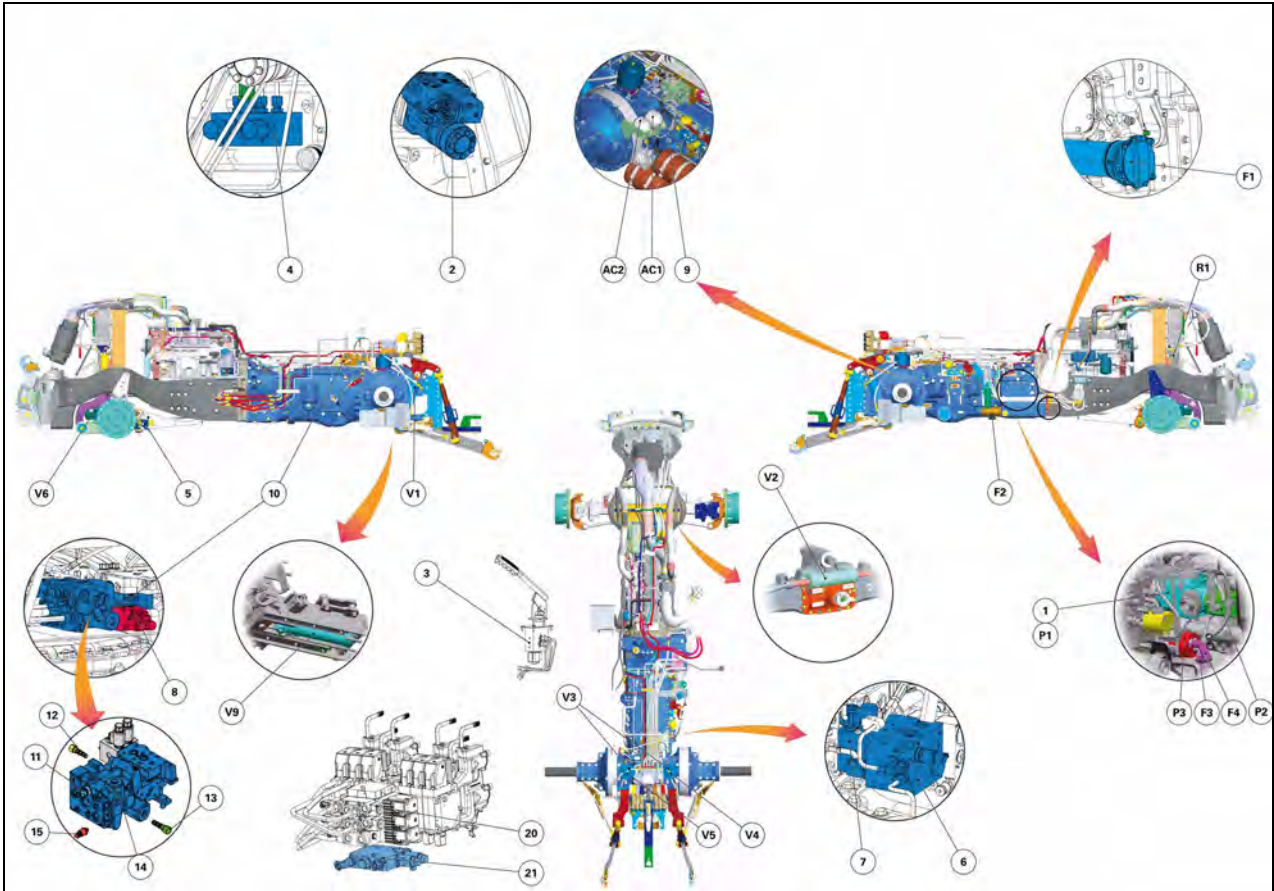
LS hydraulic system - Layout of components

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A. Layout of LS components - diagram

Layout of Load Sensing system components



1010366

Fig. 1

B. Layout of LS components - parts list

Layout of LS system components

Ref.	Description	Location
(P1)	Variable displacement pump	In the spacer
(P2)	Steering pump	In the spacer
(P3)	Steering standby pump	In the spacer
(F1)	Tank return filter	In front of the spacer, right-hand side
(F2)	Suction strainer	Behind the spacer, right-hand side
(F3)	Standby pump suction strainer	In the spacer
(F4)	Standby pump suction strainer	In the spacer
(V1)	Rear linkage rams	At the rear of the tractor
(V2)	Steering ram	Behind the front axle
(V3)	ParkLock rams	On the rear axle
(V4)	Right-hand brake fitting	On the rear axle on the right-hand side
(V5)	Left-hand brake fitting	On the rear axle on the left-hand side
(V6)	Front suspension ram	In front of the front axle
(V9)	Auto-hitch ram	Under the rear axle
(AC 1)	ParkLock accumulator	In front of the right-hand trumpet housing
(AC 2)	Main brake accumulator	In front of the right-hand trumpet housing
(R1)	Oil cooler	At the front of the tractor
(1)	Variable displacement pump	In the spacer
(2)	Orbitrol	In front of the cab
(3)	ParkLock control unit	Under the cab
(4)	Brake master cylinder	In front of the cab
(5)	Suspended front axle unit	Behind the front axle on the left-hand side
(6)	Main brake unit	On the gearbox on the right-hand side
(7)	Trailer brake unit	On the gearbox on the right-hand side
(8)	Cab suspension unit	On the gearbox on the left-hand side
(9)	Auto-hitch unit	On the rear axle on the right-hand side
(10)	Spool valve block	On the gearbox
(11)	Pressure relief valve	On the front of the spool valve block
(12)	Valve for boost	On the right-hand side of the spool valve block

Ref.	Description	Location
(13)	Valve for steering system	On the left-hand side of the spool valve block
(14)	Thermostatic valve	Above the spool valve block
(15)	Steering pressure sensor	On the front of the spool valve block

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LS hydraulic system - Tests and diagnostics

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A. Accumulator pressure and volume

Type	Volume	Pressure
Front axle left accumulator	1 l (of which 200 ml is oil)	10 bar
Front axle right accumulator	1,4 l	50 bar
ParkLock accumulator	0,75 l	108 bar
Main braking accumulator	0,75 l	44 bar
Passive suspended cab accumulator (the pressure cannot be modified)	0,075 l (of which 0,025 l is oil)	30 bar
Semi-active suspended cab accumulator (the pressure cannot be modified)	0,075 l	38 bar
Transmission accumulator (the pressure cannot be modified)	0,3 l	10 bar

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LS hydraulic system - Service tools

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A. LS auxiliary spool valves - Service tools

Ref.	AG01A
Description	Hydraulic testing and measuring instrument kit
Order	AGCO Stoneleigh

Contents

See Service Bulletin ADM 08/04



1009102

Fig. 1

9B10

LS hydraulic pumps - General

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A. LS pumps - General

Steering pump

The steering pump is fitted on the end of the variable displacement pump. It is a gear pump with a displacement of 22.8 cm³.

It has a maximum flow rate of 57 l/min and a maximum pressure of 230 bar.

The drive ratio is 70/61.

It is fitted to the variable displacement pump with 2 CHC M8 screws.

It is driven via a coupling sleeve with the variable displacement pump.

Variable displacement pump

The variable displacement pump is a piston type pump.

It has a maximum displacement of 60 cm³ or 75 cm³ depending on the option fitted.

The maximum pressure is 310 bar for the 60 cm³ pump and 260 bar for the 75 cm³ pump.

The drive ratio is 70/61.

The pump is fitted to the gearbox housing with 2 HM 12 screws.

It is driven by a gear train connected to the gearbox input shaft, which itself is directly driven by the engine.

Standby pump

The standby pump is a gear type pump.

It has a displacement of 8 cm³ per 10 km/h.

It is fitted on the 4-wheel drive shaft bearing and driven by a gear connected to this shaft.

Service pump

The service pump is only used for the gearbox section.

It is a gear type pump.

It has a displacement of 14 cm³.

It has a maximum pressure of (18 bar).

It is fitted on the gearbox housing.

It is driven by a gear train connected to the gearbox input shaft, which itself is directly driven by the engine.

Lubrication pump

The lubrication pump is only used for the gearbox section.

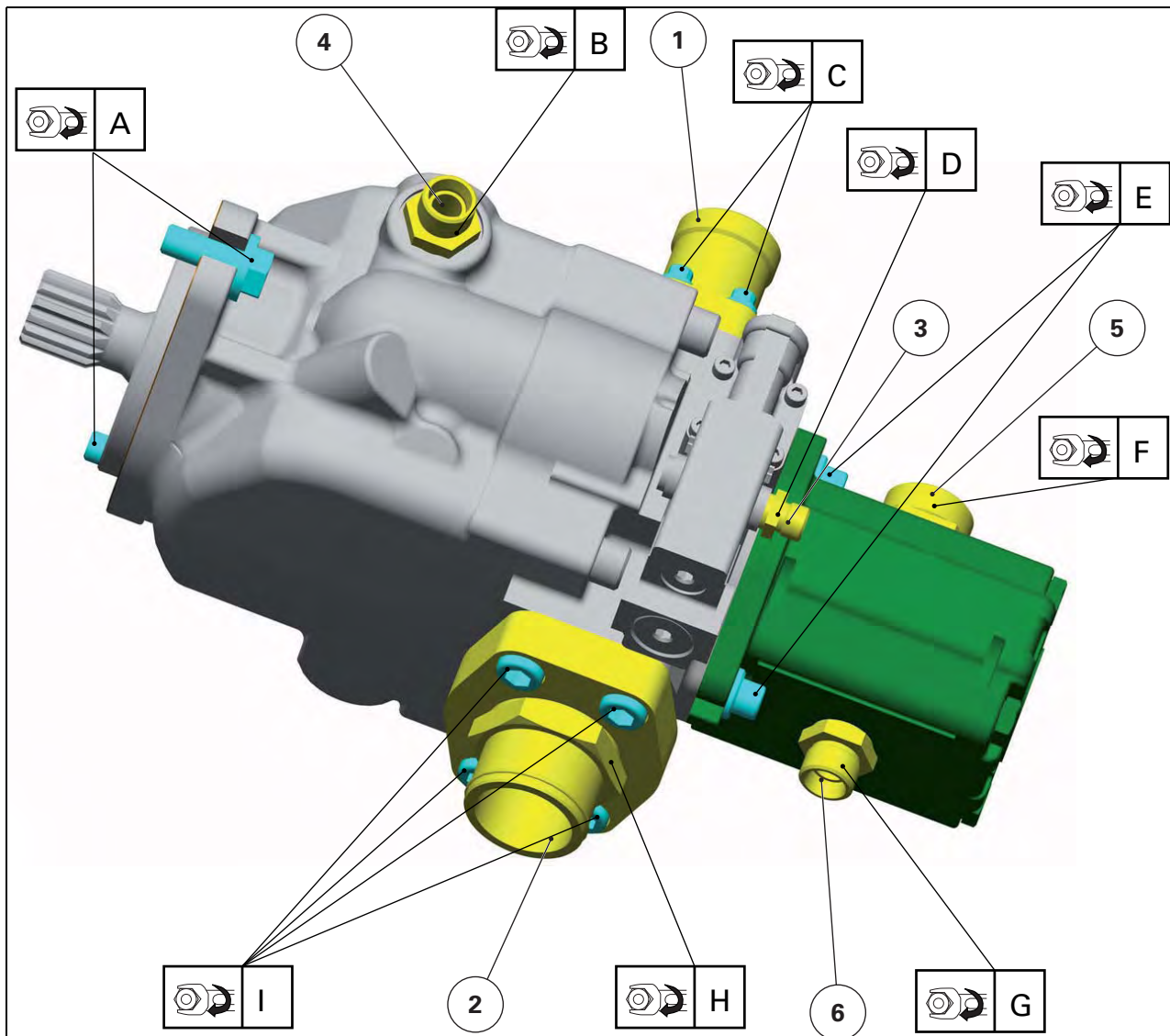
It is a gear type pump.

It has a displacement of 23.4 cm³.

It is fitted on the same drive gear as the service pump.

It is fitted inside the gearbox housing.

Variable displacement pump/steering pump assembly



1010484

Fig. 1

- A 112 Nm
- B 80 Nm
- C 49 Nm
- D 15 Nm
- E 85 Nm
- F 115 Nm
- G 47 Nm
- H 260 Nm
- I 85 Nm

- 1 Variable displacement pump suction channel
- 2 Variable displacement pump pressure channel
- 3 Variable displacement pump control channel
- 4 Variable displacement pump tank return channel
- 5 Steering pump suction channel
- 6 Steering pump pressure channel

9B11

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LS hydraulic pumps - Diagrams and plans

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A. Hydraulics diagram

Different systems

- (1) Variable displacement pump
- (2) Orbitrol
- (3) ParkLock control unit
- (4) Brake master cylinder
- (5) Suspended front axle unit
- (6) Main brake unit

Pumps

- (P1) Variable displacement pump
- (P2) Steering pump
- (P3) Steering standby pump

Filters - Strainers

- (F1) Filter on the return to the tank
- (F2) Suction strainer
- (F3) Standby pump suction strainer
- (F4) Standby pump suction strainer

Rams

- (V1) Rear linkage rams
- (V2) Steering ram
- (V3) ParkLock rams
- (V4) Right-hand brake fitting
- (V5) Left-hand brake fitting
- (V6) Front axle suspension ram
- (V7) Front cab suspension ram
- (V8) Rear cab suspension ram
- (V9) Auto-hitch ram
- (V10) Trailer brake ram, if connected

Accumulators

- (AC1) ParkLock accumulator
- (AC2) Main brake accumulator
- (AC3) Front axle suspension left-hand side accumulator
- (AC4) Front axle suspension right-hand side accumulator
- (AC5) Front cab suspension ram accumulators
- (AC6) Rear cab suspension ram accumulators

Other components

- (R1) Oil cooler

Different systems

- (7) Trailer brake unit
- (8) Cab suspension unit
- (9) Auto-hitch unit
- (10) Priority block
- (11) Connection unit
- (12) Connection unit
- (13) Rear linkage

A.1 Main hydraulics diagram

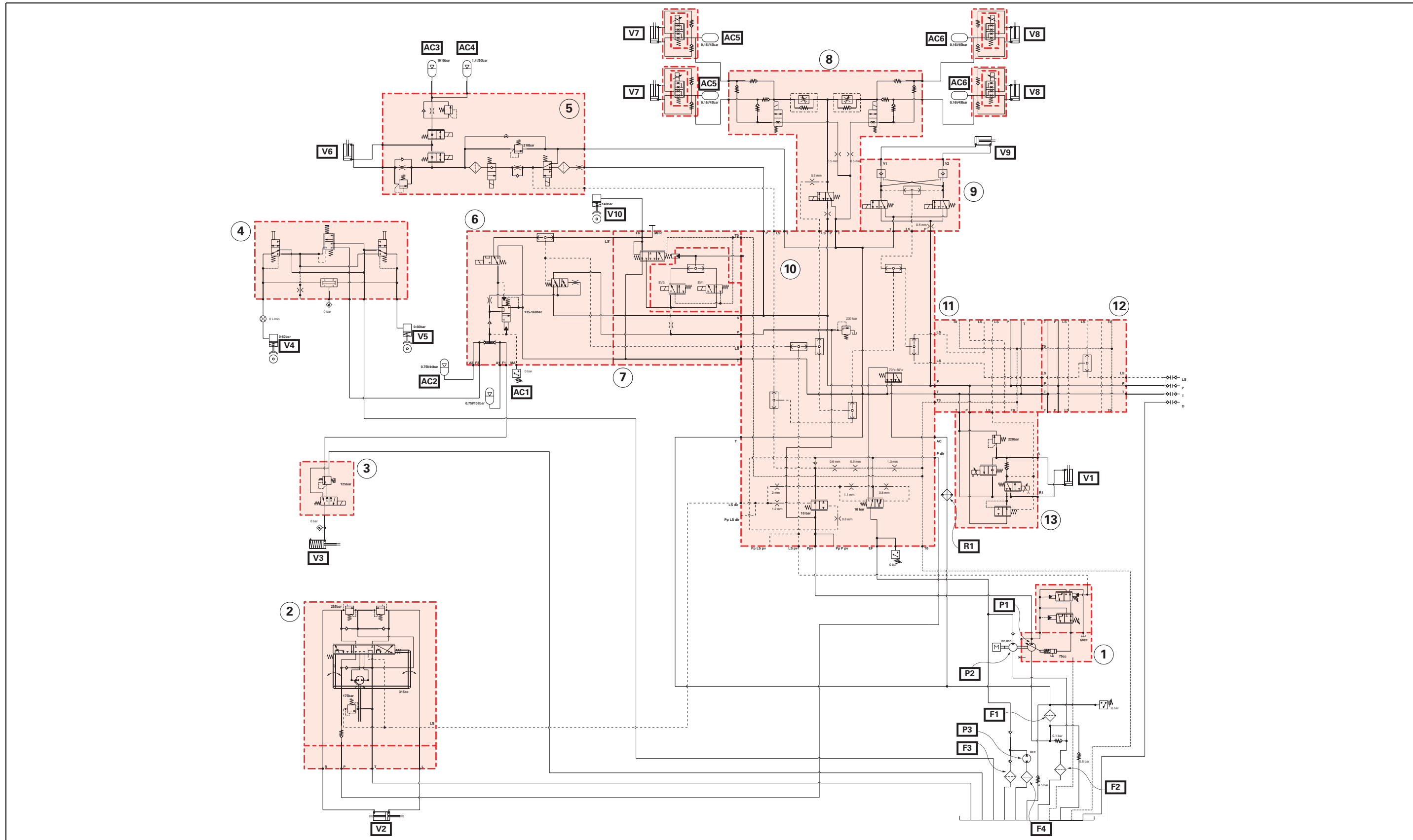
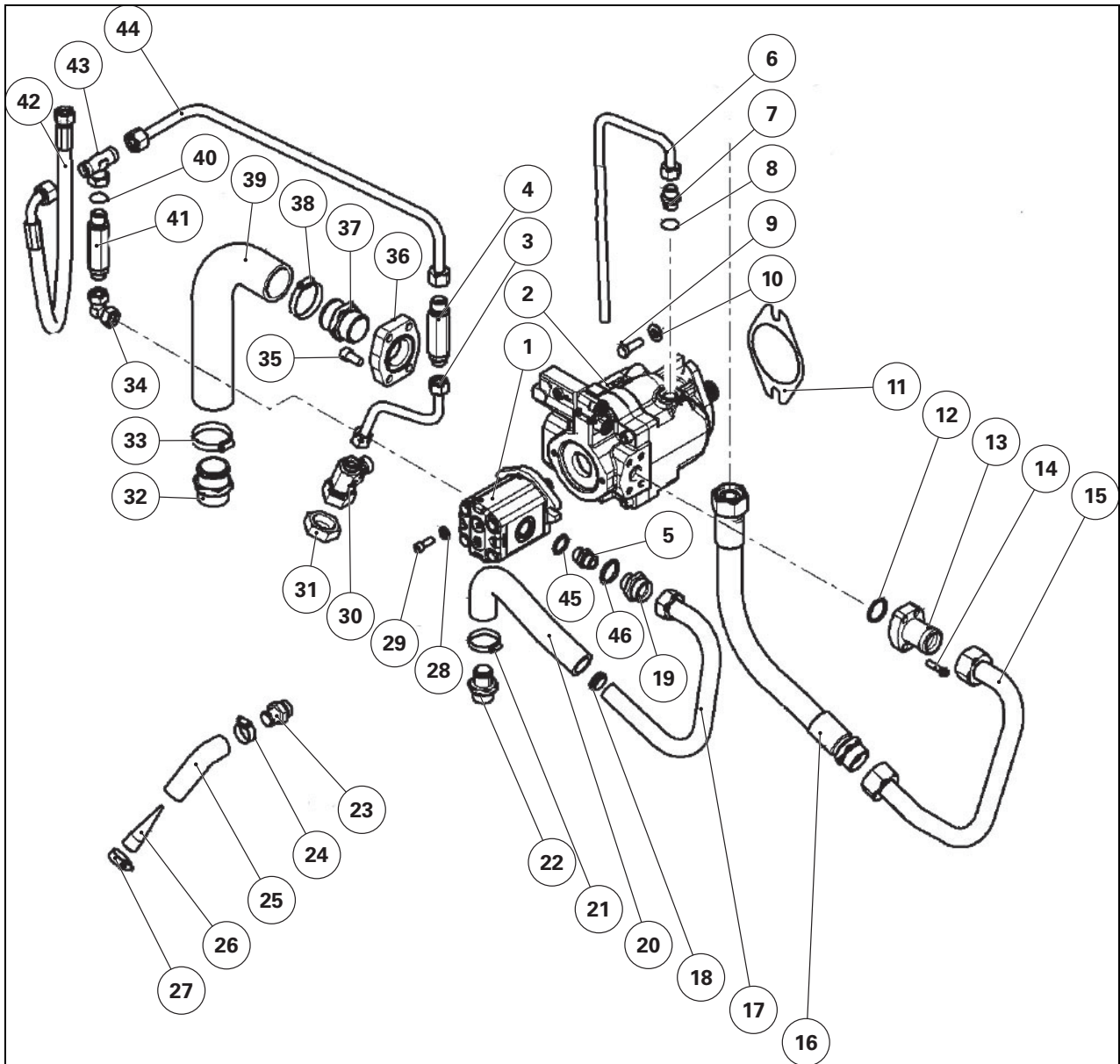


Fig. 1

A.2 Variable displacement pump and steering pump

Blown-up view of the pumps



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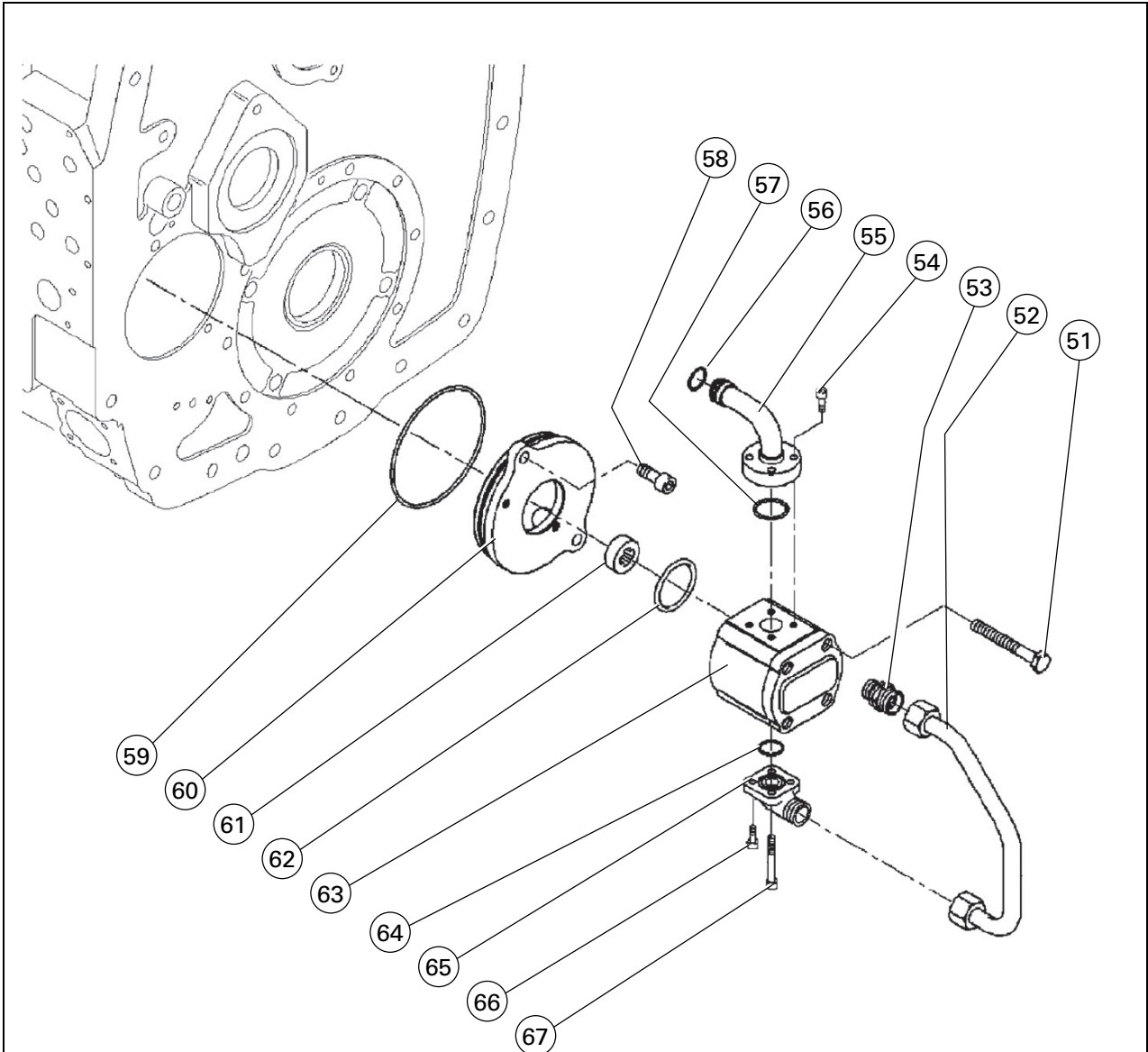
Fig. 2

- 1 Steering pump
- 2 Variable displacement pump
- 3 Suction pipe
- 4 Valve
- 5 Union
- 6 Delivery pipe
- 7 Union
- 8 "O" ring
- 9 M12x35 screw
- 10 Flat washer
- 11 Sealing ring
- 12 "O" ring
- 13 Flange
- 14 M16x1.25 screw
- 15 Suction pipe

16	Hydraulic hose
17	Suction pipe
18	Clip
19	Union
20	Hose
21	Clip
22	Union
23	Union
24	Clip
25	Elbow union
26	prefilter
27	Clip
28	Washer
29	M16x25 screw
30	Union with valve
31	Intake filter
32	Union
33	Clip
34	Union
35	M13x1 screw
36	Flange
37	Union
38	Clip
39	Hose
40	"O" ring
41	Valve
42	Hose
43	Union
44	Hydraulic pipe

A.3 Service pump

Blown-up view of the service pump



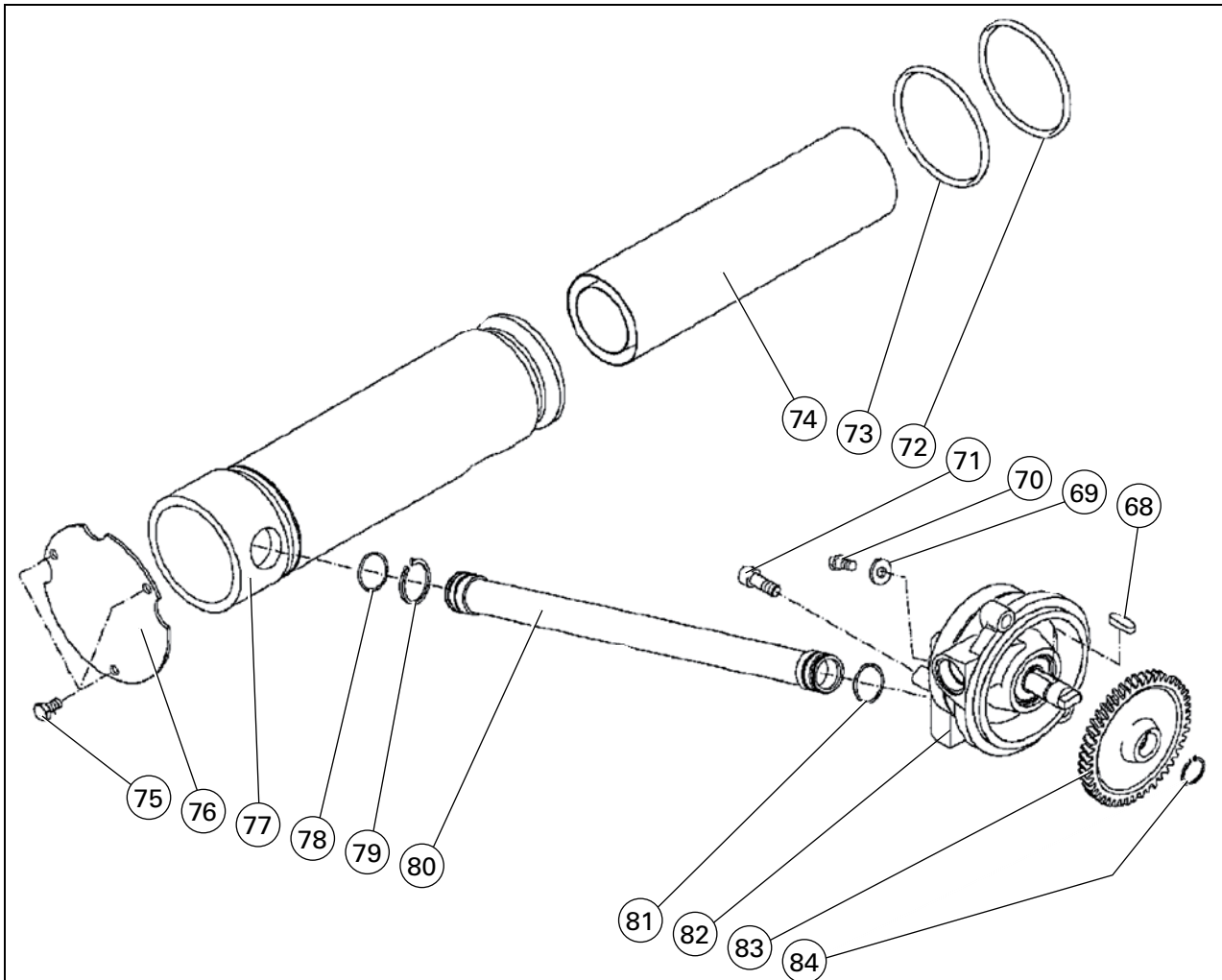
1010566

Fig. 3

- 51 Screw
- 52 Rigid pipe
- 53 Union
- 54 Screw
- 55 Union
- 56 "O" ring
- 57 "O" ring
- 58 Screw
- 59 "O" ring
- 60 Cover plate
- 61 Engaging piece
- 62 "O" ring
- 63 Hydraulic pump
- 64 "O" ring
- 65 Insert
- 66 Screw
- 67 Screw

A.4 Lubrication pump

Blown-up view of the lubrication pump



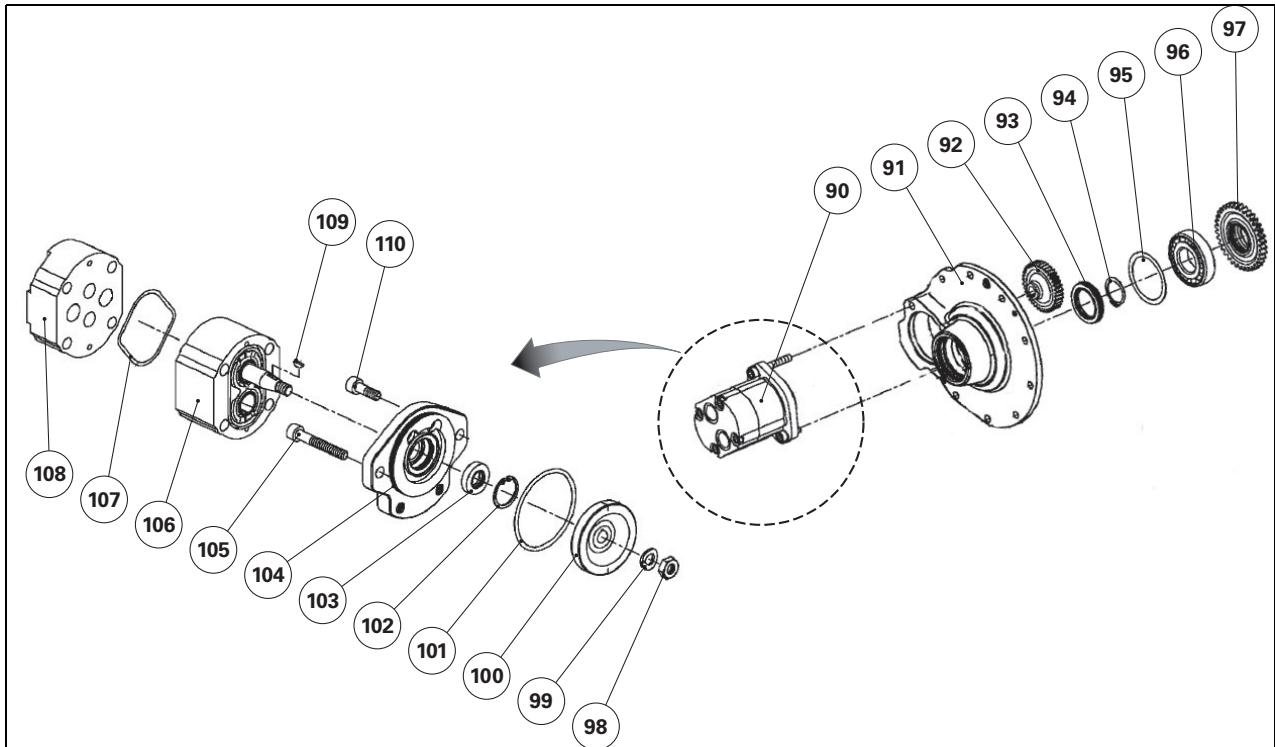
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Fig. 4

- 68 Key
- 69 Washer
- 70 Screw
- 71 Screw
- 72 "O" ring
- 73 "O" ring
- 74 Filter
- 75 Screw
- 76 Cover plate
- 77 Intake filter
- 78 "O" ring
- 79 Circlip
- 80 Pipe
- 81 "O" ring
- 82 Lubrication pump
- 83 Drive gear
- 84 Circlip

A.5 Standby pump

Blown-up view of the standby pump



1010569

Fig. 5

- 90 Standby pump
- 91 Bush
- 92 Gear
- 93 Seal ring
- 94 Circlip
- 95 Seal ring
- 96 Bearing
- 97 Gear
- 98 Nut
- 99 Lock washer
- 100 Gear
- 101 "O" ring
- 102 Circlip
- 103 Seal ring
- 104 Attachment plate
- 105 M10x70 screw
- 106 Pump body
- 107 "O" ring
- 108 Cover plate
- 109 Woodruff key
- 110 M10x30 screw

9B13

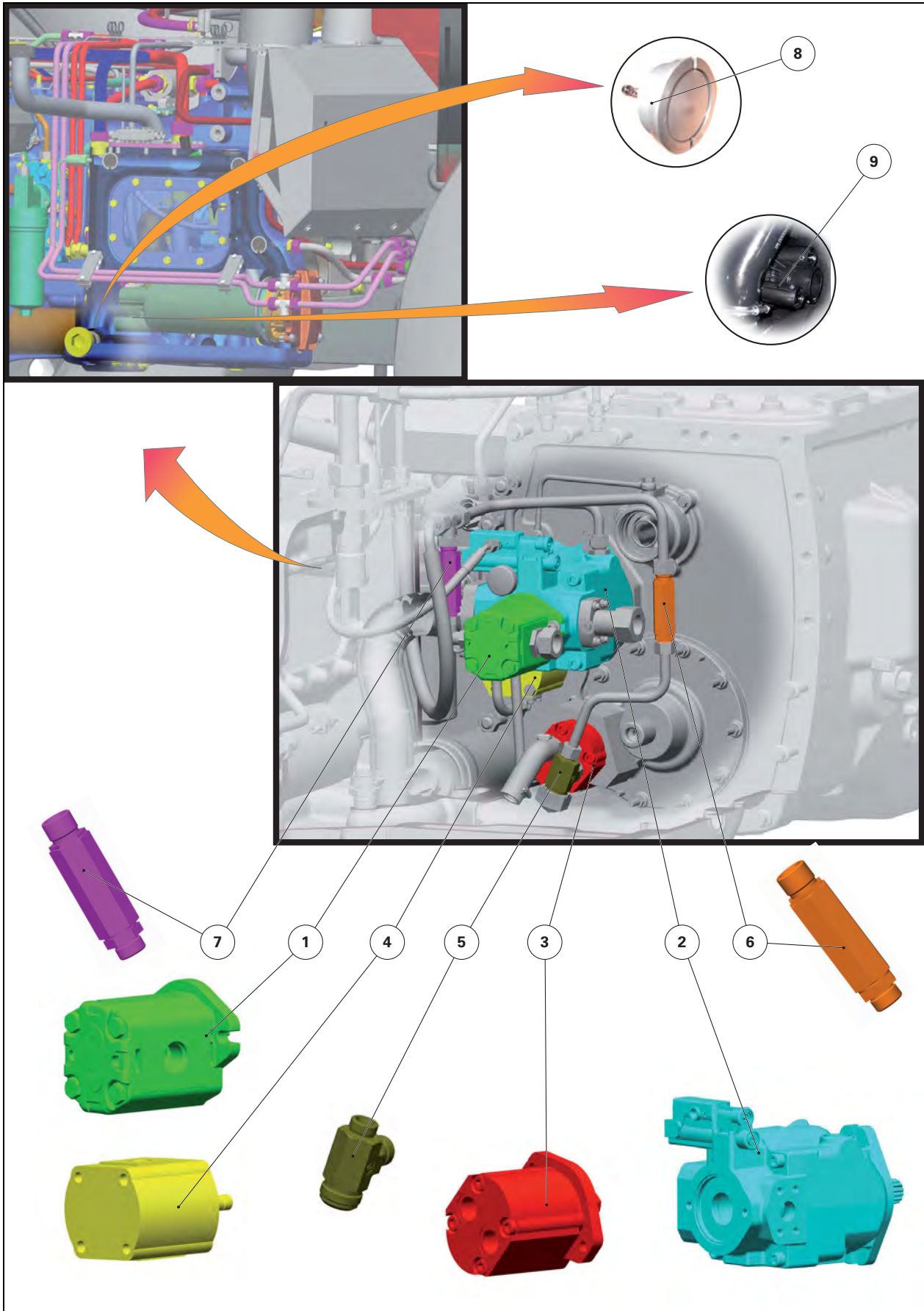
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A. Layout of components - diagram

Layout of pumps in the spacer



1010296

Fig. 1

B. Layout of components - parts list

Layout of pumps in the spacer

Reference	Description	Function and specifications
(1)	Steering system pump (22.8 cm ³ , 57 l/min)	Supplies the steering unit and the radiator, and fills the Load Sensing pump
(2)	Load Sensing system pump (75 cm ³ , approx. 180 l/min)	Supplies the priority braking system, part of the steering system and all other functions (auxiliary spool valves, front axle, suspended cab, auto-hitch etc.)
(3)	Standby pump (8 cm ³ , 6 l per 10 km/h)	Supplies the steering unit and the radiator. Its flow is added to that of the steering pump
(4)	Lubrication pump (8 cm ³)	Supplies the transmission lubrication system.
(5)	Valve	Ensures standby pump suction.
(6)	Valve	Ensures standby pump delivery.
(7)	Valve	Ensures steering pump delivery.
(8)	Valve	Secures the auxiliary suction system.
(9)	Valve	Secures the auxiliary delivery system.

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LS hydraulic pumps - Tests and diagnostics

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A. Checks and tests63

A. Checks and tests

Checking the maximum pump pressure

This test is used to check the maximum pressure of the LS pump.

Parameters required:

- hydraulic oil temperature at 60 °C
- engine idle speed at 800 rpm

Tools used:

- pressure gauge, minimum value of 250 bar
- flowmeter and unions on auxiliary spool valves

Method

1. Connect a pressure gauge with a capacity of approximately 270 bar to the PpPPV pressure connector (P3) located on the right-hand side of the distribution block.
2. Connect a flowmeter to an auxiliary spool valve.

NOTE: Ensure that the supply and return pipes are connected in the correct direction to avoid damaging the flowmeter.
3. Start the engine and allow it to run at idle speed
4. Activate the corresponding spool valve in fully open position
5. Close the flowmeter valve until the maximum pressure is obtained:
 - **P3 = 1200 bar at**

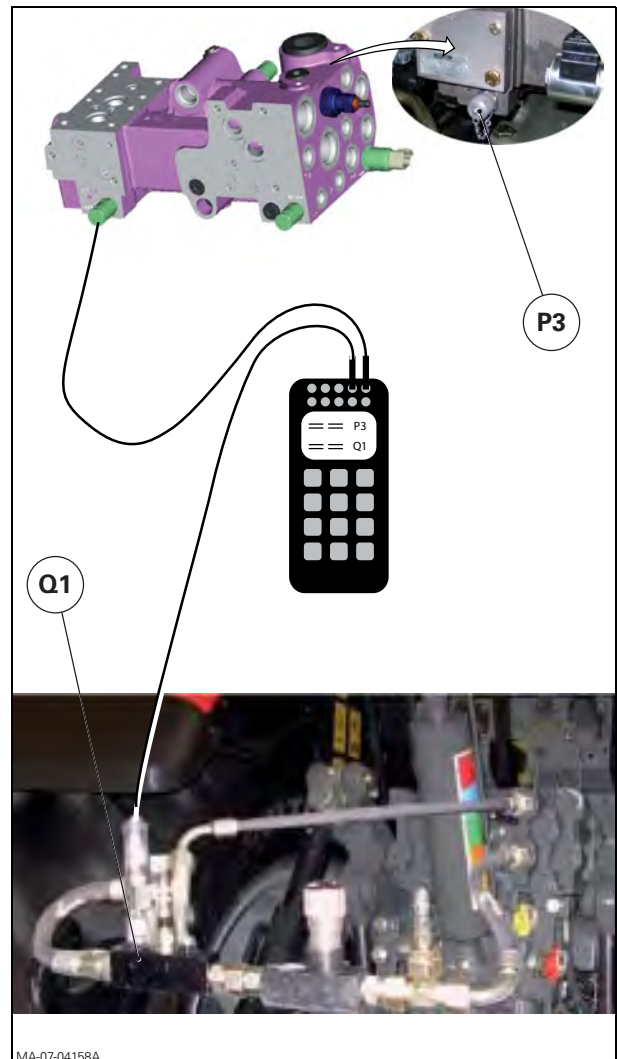
Checking the maximum pump flow rate

Parameters required:

- hydraulic oil temperature at 60°C
- engine idle speed at 800 rpm

Tools used:

- pressure gauge, minimum value of 250 bar
- hydraulic unions and flowmeter



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1009301

Fig. 1

Method

1. Connect a pressure gauge to the PpPPV pressure connector (P3) located on the right-hand side of the distribution block.
2. As the flow through the spool valve is limited to approximately 100 l/min, connect a flowmeter (Q1) to three auxiliary spool valves. (For the test at 1000 rpm, you can connect to just two spool valves).

NOTE: *Locally manufacture an assembly to connect three supplies and three returns from the spool valves to the same flowmeter. Ensure that suitable unions are used and that the supplies and returns are connected in the correct direction.*

3. Activate the corresponding auxiliary spool valves in fully open position.
4. Gradually close the flowmeter valve.
5. Check the P3 pressure and the corresponding Q1 flow rate at 1000 rpm:

Q1 flow rate in l/minute	P3 pressure in bars
83	50
82	75
80	100
79	125
77	150
76	175

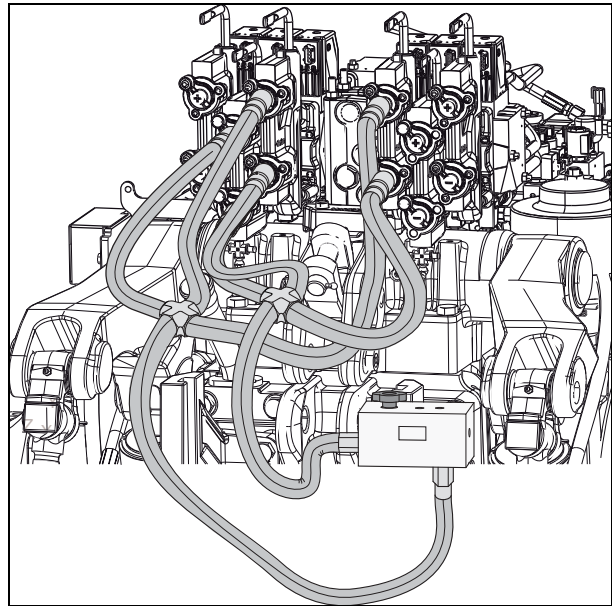
6. Check the P3 pressure and the corresponding Q1 flow rate at 2200 rpm:

Q1 flow rate in l/minute	P3 pressure in bars
185	50
182	75
180	100
178	125
175	150
173	175

Checking the delivery pressure and XLS pressure

Definition of pressures:

- The delivery pressure (P3) is measured at the variable displacement pump outlet.
- The XLS pressure (P4) is the pressure required to activate the requested function.
- The standby pressure or regulating pressure maintains a constant differential pressure between the delivery pressure and the XLS pressure.
- The standby pressure is measured on the pump delivery pressure connector, with the engine running and the high pressure functions at rest.



1009403

Fig. 2

NOTE: To avoid damaging the low capacity pressure gauges used during these tests, do not activate any high pressure components (auxiliary spool valve, linkage, trailer brake).

Parameters required:

- hydraulic oil temperature at 60 °C
- engine idle speed at 1000 rpm and 2200 rpm.

Tools used:

- 2 pressure gauges of capacity 100 bar
- hydraulic unions

Method

1. Connect a pressure gauge with a capacity of 100 bar to the PpLS pressure connector (P4) located on the right-hand side of the distribution block.
2. Connect a pressure gauge with a capacity of 100 bar to the PpPPV pressure connector (P3) located on the right-hand side of the distribution block.

NOTE: As the pressure connectors are difficult to access, it may be necessary to locally manufacture a suitable union.

3. With the tractor running at 1000 rpm, the values to read off are:

P3 = 22 bar
and
P4 = 4 bar

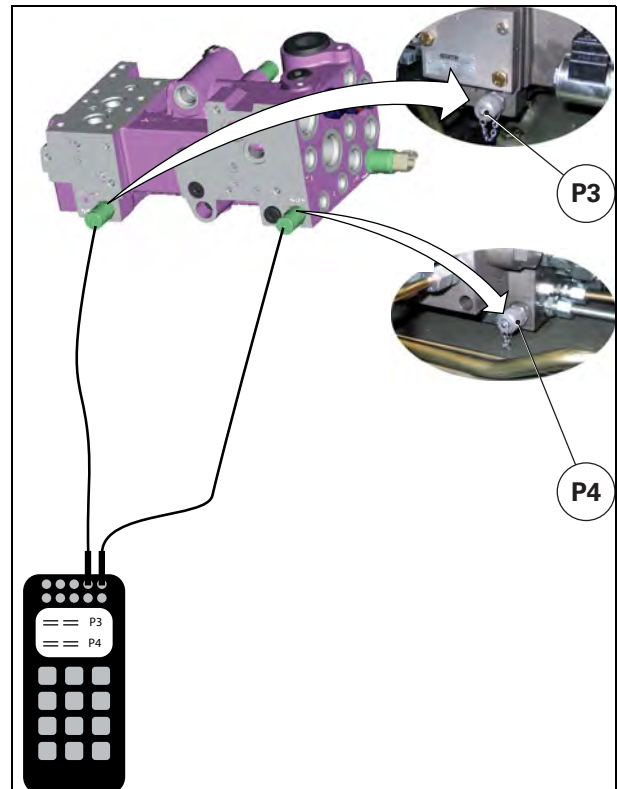
4. With the tractor running at 2200 rpm, the values to read off are:

P3 = 22 bar
and
P4 = 4 bar

The delivery pressure (P3) should be equal to the control pressure (P4) + 18 bar ± 2 bar

P3 = P4 + 18 bar ± 2 bar

NOTE: The XLS pressure can be checked at the same time as another high pressure function test. Checking the XLS pressure on the connection (P4) enables a check of the Load Sensing control line when activating a high pressure function. In this case, use pressure gauges with a capacity of approximately 270 bar



1009307

Fig. 3

9B15

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9B16

LS hydraulic pumps - Adjustments, bleeding and calibrations

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LS hydraulic pumps - Disassembly and reassembly

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A. Removing the LS pump	73
B. Refitting the LS pump	77

A. Removing the LS pump

Preliminary steps

1. Drain the auxiliary hydraulic oil (approx. 110 l).
2. Disassemble the cab (see chapter 2).



DANGER: Before disconnecting the pipes, it is necessary to release the pressure in the brake accumulator by pumping on the pedals.

3. Empty the air conditioning system, taking all necessary precautions to prevent any dirty particles from entering it, then disconnect the unions.

NOTE: It is recommended to raise the cab slightly before splitting it.

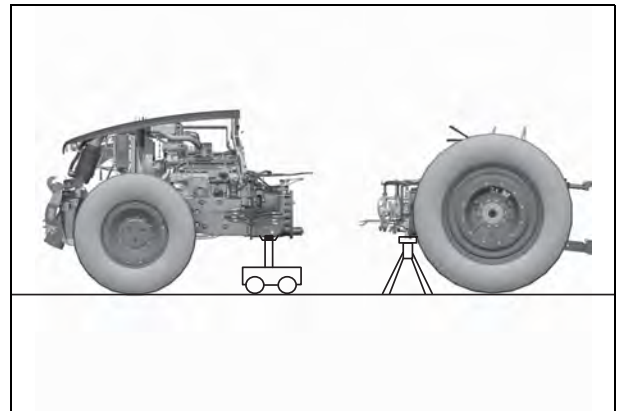
4. Pinch the heating pipes closed to avoid draining the system.
5. Attach the cab to a suitable lifting system and raise it.



CAUTION: Take care not to damage the roof cap.

6. Disconnect the cables and hydraulic unions, taking care to mark them.
7. Split the tractor between the spacer and the gearbox (see chapter 2).

8. Remove the union from the left side of the steering pump and plug the port.



1010417

Fig. 1



1010418

Fig. 2

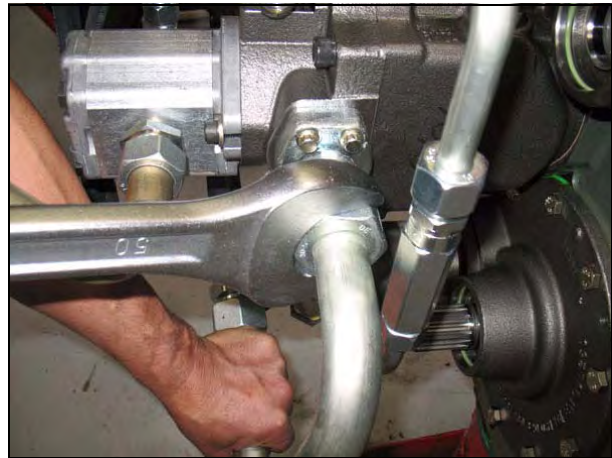
- 9.** Remove the union from the right side of the steering pump and plug the port.



1010419

Fig. 3

- 10.** Remove the union from the right side of the LS pump and plug the port.



1010434

Fig. 4

- 11.** Remove the union from the XLS signal and plug the port.



1010435

Fig. 5

- 12.** Remove the LS pump return channel and plug the port.



1010437

Fig. 6

- 13.** Remove the lower screw.



1010436

Fig. 7

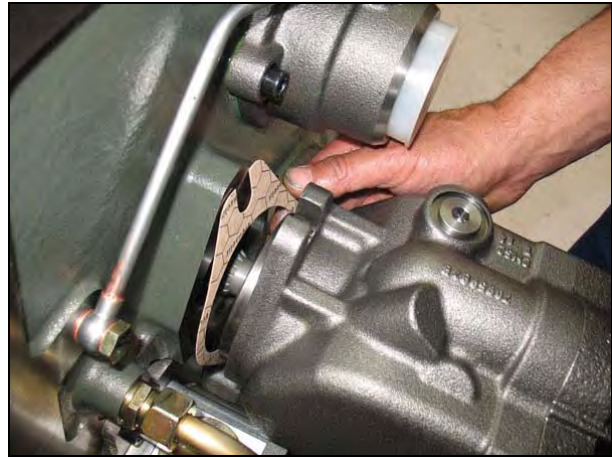
- 14.** Remove the upper screw.



1010438

Fig. 8

- 15.** Remove the LS pump.
- 16.** Discard any faulty parts.



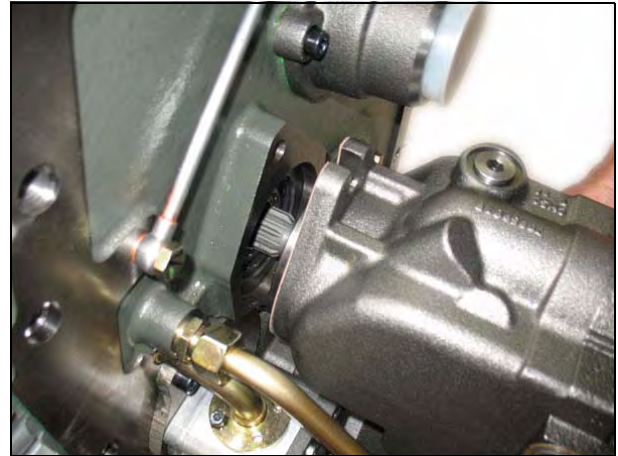
1010449

Fig. 9

B. Refitting the LS pump

Preliminary steps

1. Clean all the parts, especially the mating faces.
IMPORTANT: Any traces of mud, water or corrosion must be removed before fitting. Any faulty parts must be replaced.
2. Fit the LS pump in its location.
NOTE: Check that the seal is present and correctly positioned.



1010450

Fig. 10

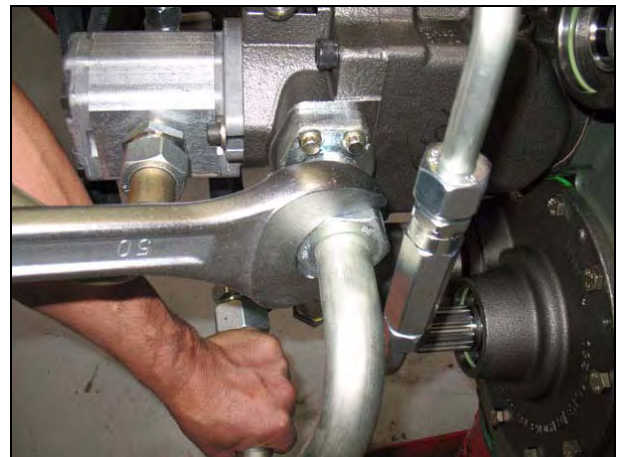
3. Fit the upper and lower screws and tighten to a torque of 112 Nm.



1010438

Fig. 11

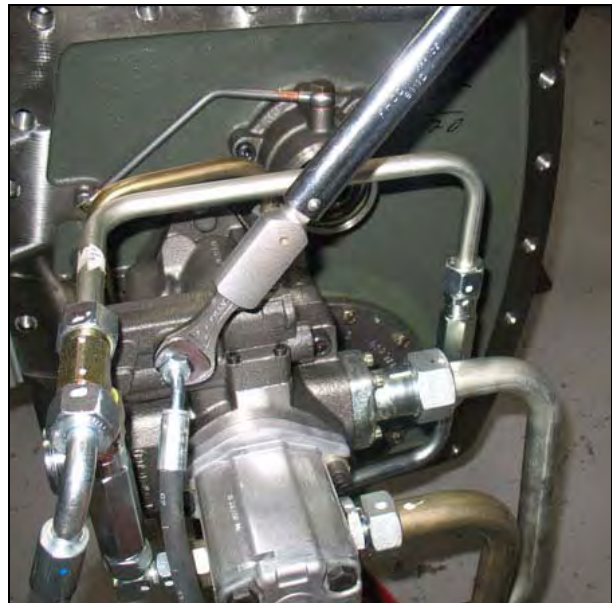
4. Remove the plugs and fit the suction pipe union on the right side of the LS pump.
5. Tighten the union to a torque of 263 Nm.



1010434

Fig. 12

6. Remove the plug and fit the XLS signal union.
7. Tighten the union to a torque of 15 Nm.



1010435

Fig. 13

8. Remove the plug from the LS pump return channel port.
9. Fill the LS pump with hydraulic oil (oil quality: see corresponding chapter in the Operator Instruction Book) to facilitate priming.



1010454

Fig. 14

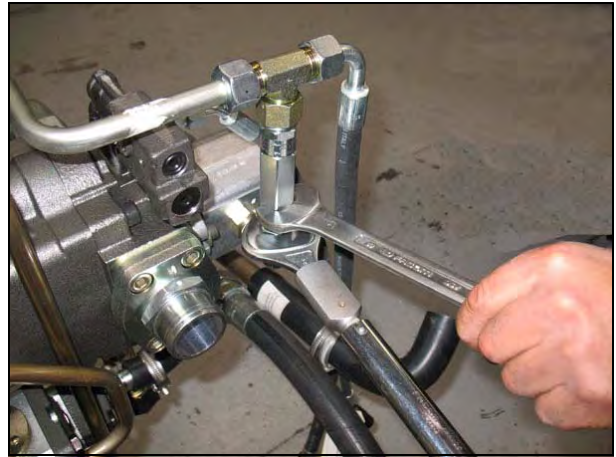
10. Fit the return channel and tighten to a torque of 80 Nm.



1010437

Fig. 15

- 11.** Fit the channel to the steering pump on the left-hand side and tighten to a torque of 70 Nm.
- 12.** Close the spacer on the gearbox (see chapter 2).
- 13.** Refit the cab (see chapter 2).
- 14.** Reconnect the electrical harnesses according to the marks made during removal.
- 15.** Refit the hydraulic unions according to the marks made during removal.
- 16.** Refit the heating pipes; remove the clamps fitted on the pipes during removal
- 17.** Refit the air conditioning pipes and charge the air conditioning system (see chapter 12)
- 18.** Fill the auxiliary hydraulic system. Capacity 110 l



1010418

Fig. 16

9B18

LS hydraulic pumps - Service tools

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A. LS auxiliary spool valves - Service tools83

A. LS auxiliary spool valves - Service tools

Ref.	AG01A
Description	Hydraulic testing and measuring instrument kit
Order	AGCO Stoneleigh

Contents

See Service Bulletin ADM 08/04



1009102

Fig. 1

9C10

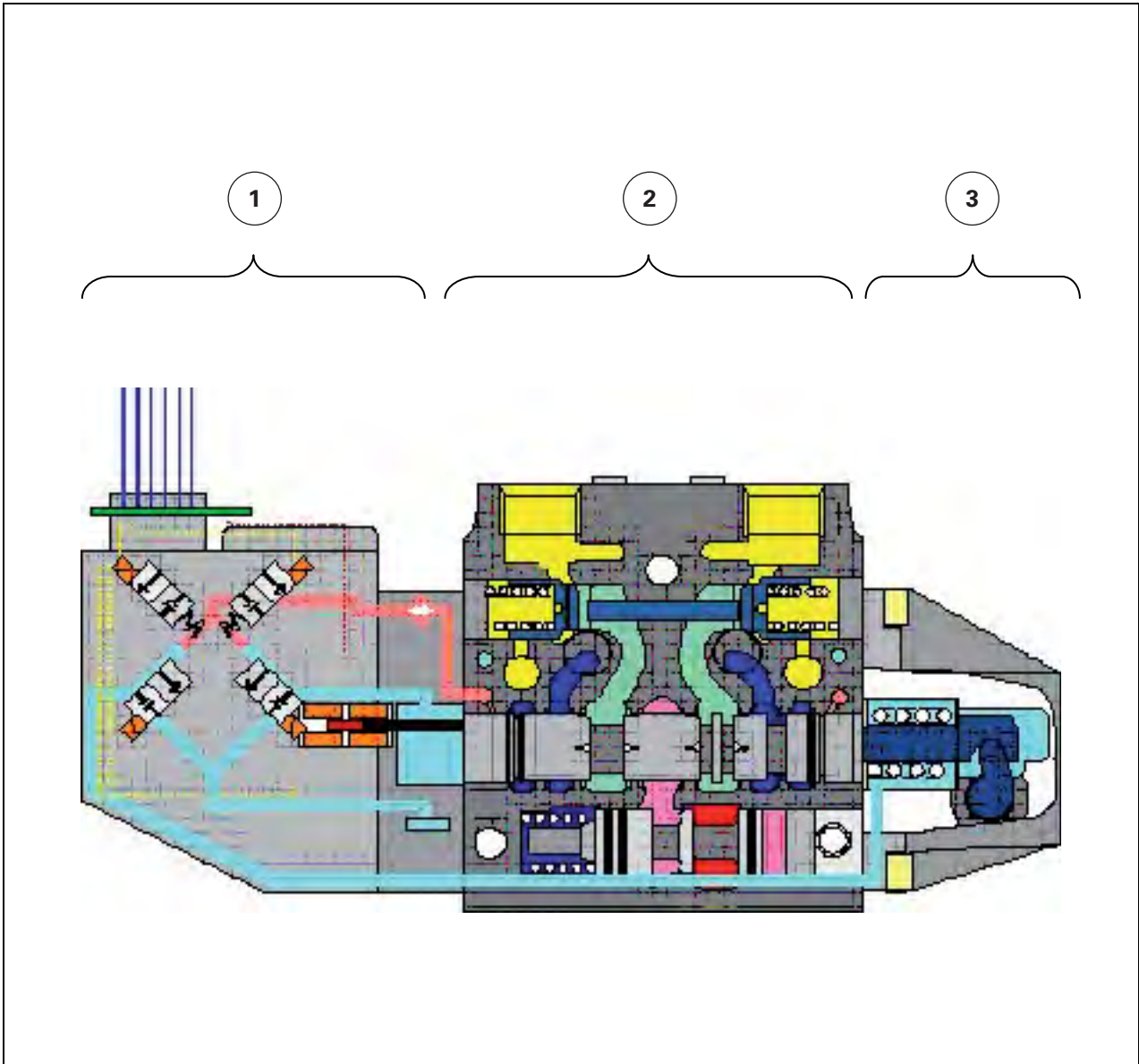
LS auxiliary spool valves - General

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A. Principles of operation

The spool valve comprises 3 separate parts:



1011862

Fig. 1

- (1) Control
- (2) Spool valve body
- (3) Closing plate

Control

This comprises:

- an electronic spool valve module (6) to control the spool valve
- 4 solenoid valves to control the spools (7)
- a position sensor (8), which is a non-contact sensor and will therefore not wear out as a result of friction

The control features both an electronic part and a hydraulic part.

Electronics

The control is CAN-based.

Operation:

The tractor controller sends regular messages to each of the tractor valves. The message contains information concerning the operation of the valves (specified flow rate/spool position etc.). The message is analysed by the valve, which interprets it hydraulically (spool movement etc.). The same valve may send error codes corresponding to a fault in the valve via the CAN network (see the chapter relating to error codes).

The specified value sent by the linkage controller is interpreted by the valve by a spool movement controlled by the position sensor (8). The electronic spool valve module (6) controls the hydraulic axle (7) comprising 4 electrohydraulic valves.

The valves (3) and (4) are normally closed, and the other two are normally open.

Hydraulics

The working pressure is set at 13 bar. The working pressure is the result of a reduction in the auxiliary supply pressure via a pressure relief valve located in the input plate.

When a valve is activated, the working pressure is sent through the hydraulic axle to one side of the spool. The solenoid valve control is switched off when the sensor detects the correct position.

Spool valve body

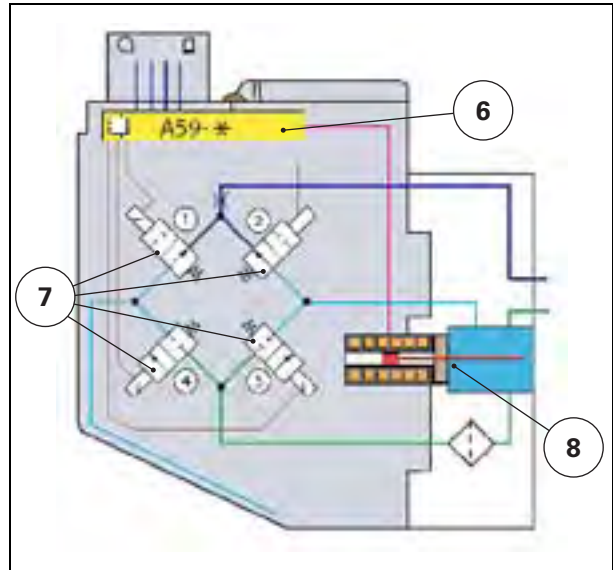
- (1) Outlet
- (2) Zero leak valve
- (3) Spool
- (4) Power supply
- (5) Balance
- (6) Return

Description of components:

- The balance creates a constant difference in pressure between the supply and the outlet to ensure a constant flow through the spool valve, thus protecting the implement from any variations in flow that may be caused by components located upstream of the spool valve.
- The zero leak valve ensures the tightness of the seal between the spool valve outlet and the supply. This component therefore allows an implement to be left in position without lowering under its own weight.

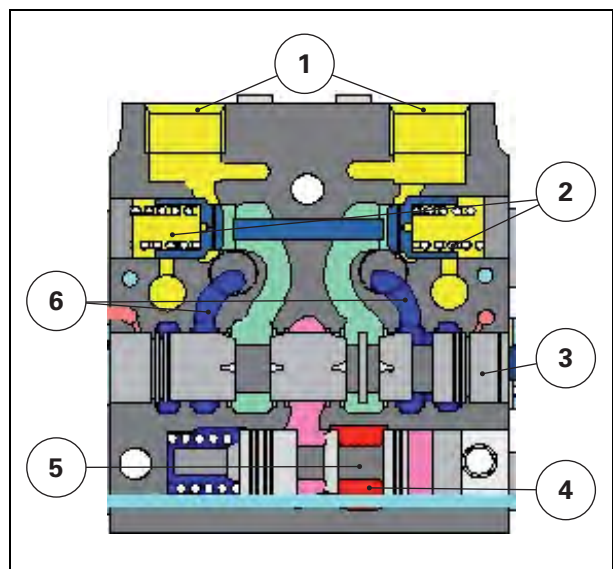
Operation:

(see § B)



1011864

Fig. 2



1011865

Fig. 3

Configuration of spool valves

Equipment	Armrest control	Reverse coupler	Front coupler	Front-end loader																																												
6 rear spool valves + 2 front spool valves	↑ 1- ← D 2 → ↓ 3 ← - + → R ← - 4 + → ← - 5 + → ← - 6 + →	<table border="1"> <tr> <td>D</td><td>D</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>1-</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>	D	D											1-	2	3	4	5	6							<table border="1"> <tr> <td>D</td><td>D</td><td></td><td></td> </tr> <tr> <td>1-</td><td>2</td><td></td><td></td> </tr> </table>	D	D			1-	2			<table border="1"> <tr> <td></td><td></td><td></td><td></td> </tr> <tr> <td>/</td><td>/</td><td></td><td></td> </tr> </table>					/	/						
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Fig. 4

Equipment	Armrest control	Reverse coupler	Front coupler	Front-end loader																																																																																																																														
4 rear spool valves + 2 front spool valves		<table border="1"> <tr> <td>D</td><td>D</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>1-</td><td>2</td><td>3</td><td>4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>	D	D																				1-	2	3	4																		<table border="1"> <tr> <td>D</td><td>D</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>1-</td><td>2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>	D	D																				1-	2																				<table border="1"> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>/</td><td>/</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>																						/	/																			
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Fig. 6

- R Front linkage
- D 1 control for 2 spool valves
- / Nothing










9C11

LS auxiliary spool valves - Error codes

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B. Armrest error codes	96

A. Reading error codes

ERROR CODES DISPLAYED ON THE INSTRUMENT PANEL				
	DISPLAY with Dash Control Center			DISPLAY without Dash Control Center
Instrument panel		+	Letter D (Dashboard)	Letter D (Dashboard)
Engine		+	Letter E (Engine)	Letter E (Engine)
SCR system	no icon		Letter U (Urea)	Letter U (Urea)
Transmission/4WD/PTO		+	Letter T (Transmission)	Letter T (Transmission)
Lights module		+	Letter L (Light)	Letter L (Light)
ParkLock		+	Letter P (ParkLock)	Letter P (ParkLock)
Front axle		+	Letters FA (Front Axle)	Letters FA (Front Axle)
Linkage		+	Letters R (Linkage)	Letter R (Linkage)
Electrohydraulic		+	Letters H (Hydraulics)	Letter H (Hydraulics)
Cab		+	Letters C (Cab)	Letter C (Cab)
Auto-Guide		+	Letters A (Auto-Guide)	Letter A (Auto-Guide)
Control Arm		+	Letters AR (ARmrest)	Letter AR (ARmrest)

OTHER DISPLAYS	
Automatic air conditioning	Displayed on the air conditioning module.

B. Armrest error codes

No.		Components concerned	Causes
AR	01	X104 - Armrest Autotronic 5	10 V output fault
AR	02	X104 - Armrest Autotronic 5	VIN Error - Vehicle electronic identification incorrect
AR	11	X307 - FingerTIP 1	Short circuit 0 V
AR	12		Short circuit to 12 V
AR	21	X308 - FingerTIP 2	Short circuit 0 V
AR	22		Short circuit to 12 V
AR	31	X108 - FingerTIP 3	Short circuit 0 V
AR	32		Short circuit to 12 V
AR	41	X109 - FingerTIP 4	Short circuit 0 V
AR	42		Short circuit to 12 V
AR	51	X110 - FingerTIP 5	Short circuit 0 V
AR	52		Short circuit to 12 V
AR	61	X130 - FingerTIP 6 front linkage function	Short circuit 0 V
AR	62		Short circuit to 12 V
AR	71	X122 - Hand throttle	Short circuit 0 V
AR	72		Short circuit to 12 V
AR	81	X121 - Rear linkage height/depth adjustment thumb wheel	Short circuit 0 V
AR	82		Short circuit to 12 V
AR	91	X106 - Transmission lever in armrest	Short circuit 0 V
AR	92		Short circuit to 12 V

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LS auxiliary spool valves - Diagrams and plans

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A. Hydraulics diagrams

Different systems

- (1) Variable displacement pump
- (2) Orbitrol
- (3) ParkLock control unit
- (4) Brake master cylinder
- (5) Suspended front axle unit
- (6) Main brake unit

Pumps

- (P1) Variable displacement pump
- (P2) Steering pump
- (P3) Steering standby pump

Filters - Strainers

- (F1) Filter on the return to the tank
- (F2) Suction strainer
- (F3) Standby pump suction strainer
- (F4) Standby pump suction strainer

Rams

- (V1) Rear linkage rams
- (V2) Steering ram
- (V3) ParkLock rams
- (V4) Right-hand brake fitting
- (V5) Left-hand brake fitting
- (V6) Front axle suspension ram
- (V7) Front cab suspension ram
- (V8) Rear cab suspension ram
- (V9) Auto-hitch ram
- (V10) Trailer brake ram, if connected

Accumulators

- (AC1) ParkLock accumulator
- (AC2) Main brake accumulator
- (AC3) Front axle suspension left-hand side accumulator
- (AC4) Front axle suspension right-hand side accumulator
- (AC5) Front cab suspension ram accumulators
- (AC6) Rear cab suspension ram accumulators

Other components

- (R1) Oil cooler

Different systems

- (7) Trailer brake unit
- (8) Cab suspension unit
- (9) Auto-hitch unit
- (10) Priority block
- (11) Connection unit
- (12) Connection unit
- (13) Rear linkage

A.1 Main hydraulics diagram

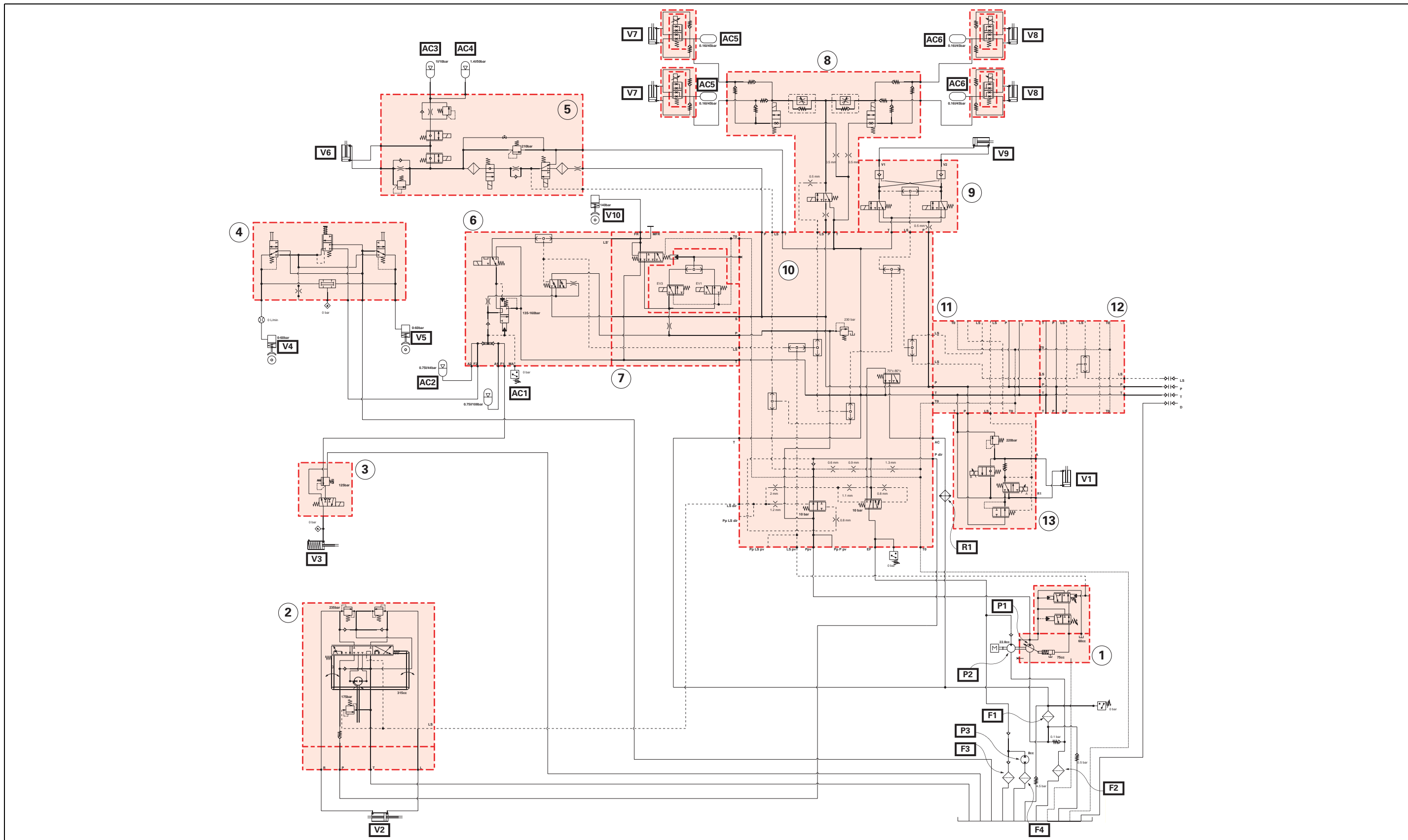


Fig. 1

Different systems

- (1) Rear linkage
- (2) Connection unit
- (3) Front linkage
- (4) Spool valve no. 1 for the no. 1 couplers at the front
- (5) Spool valve no. 2 for the no. 2 couplers at the front
- (6) Cover plate
- (7) Cover plate
- (8) Spool valve no. 1
- (9) Spool valve no. 2
- (10) Spool valve no. 3
- (11) Connection unit
- (12) Spool valve no. 4
- (13) Spool valve no. 5
- (14) Spool valve no. 6
- (15) Cover plate

A.2 Auxiliary spool valve hydraulics diagram (with front couplers)

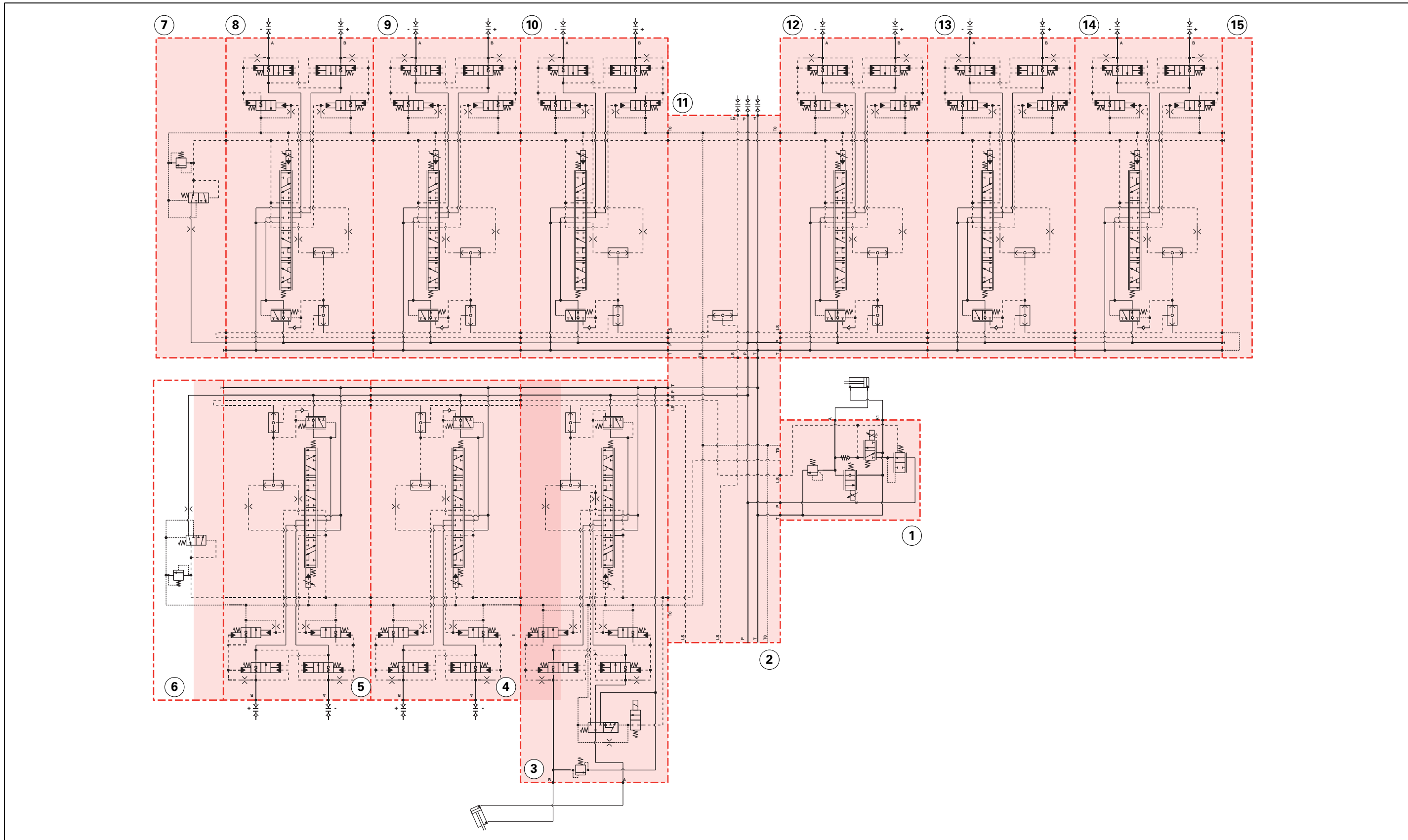


Fig. 2

Different systems

- (1) Rear linkage
- (2) Connection unit
- (3) Front linkage
- (4) Cover plate
- (5) Spool valve no. 1
- (6) Spool valve no. 2
- (7) Spool valve no. 6
- (8) Connection unit
- (9) Spool valve no. 3
- (10) Spool valve no. 4
- (11) Spool valve no. 5
- (12) Cover plate

A.3 Auxiliary spool valve hydraulics diagram (without front couplers)

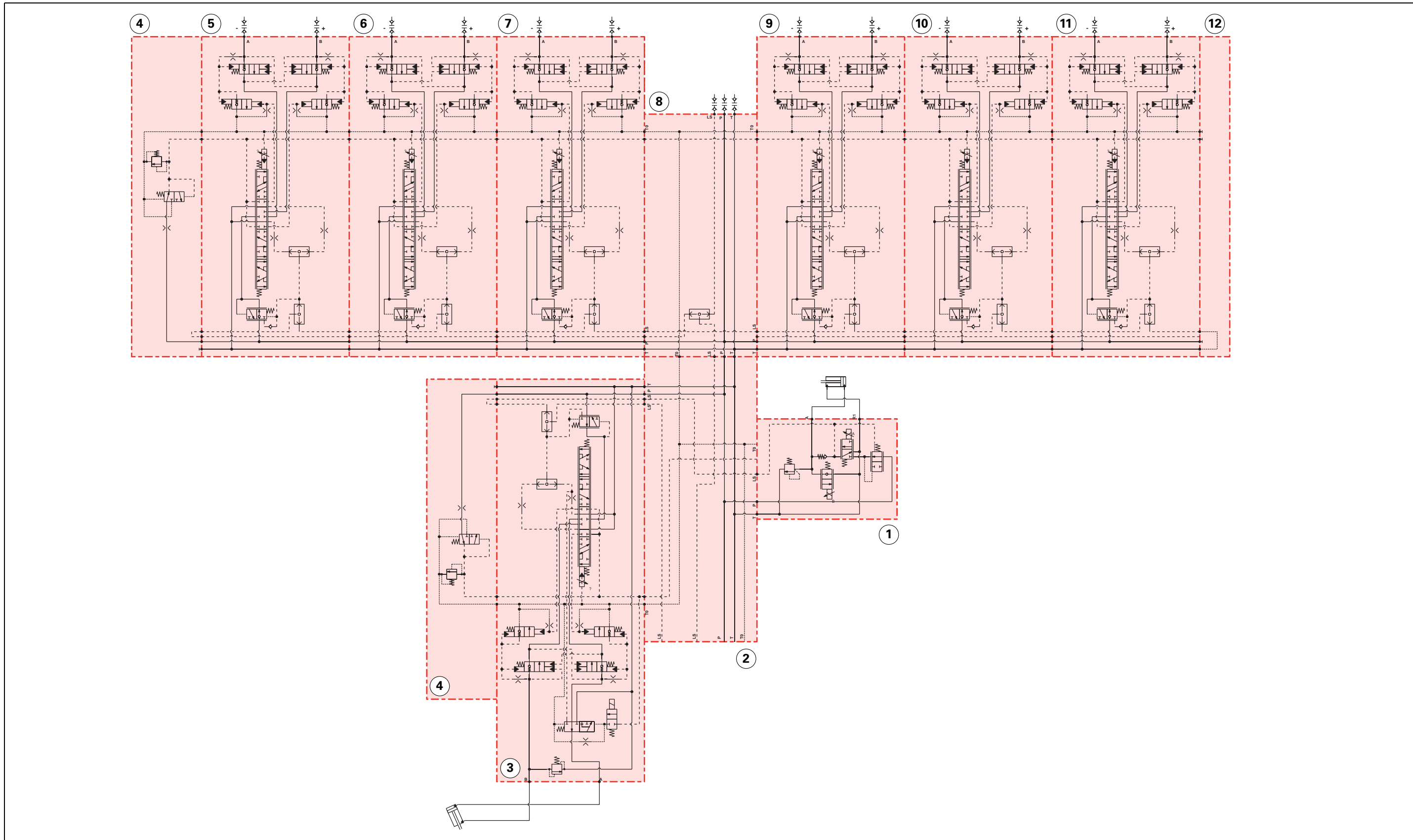


Fig. 3

B. Electrical diagrams

B.1 Identification of electrical connectors and harnesses

Identification of electrical connectors

- X1** - Auxiliary hydraulic oil temperature sensor
- X2** - Auxiliary hydraulic oil filter blockage switch
- X3** - 540 rpm PTO speed solenoid valve
- X4** - 1000 rpm PTO speed solenoid valve
- X5** - 4WD solenoid valve
- X6** - Differential lock solenoid valve
- X7** - Rear PTO solenoid valve
- X8** - Bevel gear theoretical speed sensor
- X9** - Transmission oil high pressure sensor 1
- X10** - Collecting shaft speed sensor
- X11** - Solenoid valve limiting speed to 30 kph
- X12** - Coupler function solenoid valve
- X13** - Hare range solenoid valve
- X14** - Tortoise range solenoid valve
- X15** - PTO clutch speed sensor
- X16** - PTO shaft speed sensor
- X17** - Hare/Tortoise range position sensor
- X18** - Transmission control module
- X19** - Transmission hydraulic oil temperature sensor
- X20** - Transmission filter blockage switch
- X21** - ParkLock brake pressure sensor
- X22** - Radar
- X23** - Steering pressure sensor
- X24** - Auxiliary hydraulic oil gauge
- X25** - Engine speed sensor
- X26** - Pneumatic brake solenoid valve
- X27** - Rear linkage lifting solenoid valve
- X28** - Rear linkage lowering solenoid valve
- X29** - Dual Control socket connector
- X30** - Rear linkage position sensor
- X31** - Rear linkage right-hand draft sensor
- X32** - Rear linkage left-hand draft sensor
- X33** - Transmission harness CAN junction
- X34** - Transmission oil high pressure sensor 2
- X35** - ParkLock hydraulic system pressure sensor
- X36** - LS signal breaker solenoid valve
- X37** - ParkLock pressure reversing solenoid valve
- X38** - Trailer braking proportional solenoid valve
- X39** - Trailer braking safety solenoid valve
- X40** - Front linkage single/double acting function solenoid valve
- X41** - Divider solenoid valve 1
- X42** - Divider solenoid valve 2
- X43** - Auto-hitch lifting solenoid valve
- X44** - Auto-hitch lowering solenoid valve
- X45** - Bleed for pneumatic suspended cab front and rear systems
- X46** - Rear left-hand ram position sensor for cab suspension
- X47** - Rear right-hand unit for suspended cab
- X48** - Rear left-hand unit for suspended cab
- X49** - Suspended cab rear lowering solenoid valve
- X50** - Suspended cab front lowering solenoid valve
- X51** - Transmission harness earth (chassis)
- X52** - Engine harness/transmission harness junction
- X53** - Cab transmission harness/transmission harness junction
- X54** - Suspended cab lifting solenoid valve
- X55** - Instrument panel
- X56** - Power Control lever
- X57** - DOT Matrix keyboard
- X58** - Windscreen wiper and indicator control unit
- X59** - DOT Matrix keyboard connection on instrument panel
- X60** - Engine harness/instrument panel harness junction
- X61** - Cab transmission harness/engine harness junction
- X62** - Instrument panel harness/cab transmission harness junction
- X63** - Instrument panel harness connection on fuse box
- X64** - Instrument panel harness connection on fuse box
- X65** - Front windscreen wiper motor
- X66** - Left-hand brake pedal sensor
- X67** - Right-hand brake pedal sensor
- X68** - Clutch pedal sensor
- X69** - Cab interior temperature sensor
- X70** - Solar radiation sensor
- X71** - Throttle pedal sensor
- X72** - ParkLock switch on Power Control lever
- X73** - Buzzer Control
- X74** - Buzzer Supply (+12 V APC)
- X75** - Pillar harness/right-hand fender harness junction
- X76** - Rear right-hand indicator
- X77** - Rear right-hand side light and stop light
- X78** - Work light on rear right-hand fender
- X79** - -
- X80** - -
- X81** - -
- X82** - -
- X83** - -
- X84** - -
- X85** - -
- X86** - -
- X87** - Linkage lifting/lowering switch on right-hand fender
- X88** - Rear right-hand NA indicator extension
- X89** - Earth (chassis)
- X90** - Pillar harness/left-hand fender harness junction
- X91** - Rear left-hand indicator
- X92** - Rear left-hand side light and stop light
- X93** - Work light on rear left-hand fender
- X94** - PTO ON/OFF switch on left-hand fender
- X95** - PTO Stop switch on left-hand fender
- X96** - Hydraulic spool valve switch on left-hand fender
- X97** - Linkage lifting/lowering switch on left-hand fender
- X98** - Rear left-hand NA indicator extension
- X99** - PTO and linkage console harness/cab transmission harness junction
- X100** - Instrument panel harness earth (chassis)
- X101** - Instrument panel harness/electric rear-view mirror harness junction
- X102** - Right-hand fender lighting harness/trailer connector harness junction
- X103** - Armrest harness/cab transmission harness junction
- X104** - Armrest Autotronic 5

- X105** - Datatronic CCD
X106 - Transmission lever in armrest
X107 - Headland mode switch (headland function)
X108 - FingerTIP 3
X109 - FingerTIP 4
X110 - FingerTIP 5
X111 - DTM dynamic transmission mode switch
X112 - Joystick
X113 - Armrest 6-button keyboard
X114 - Supply on fuse box for 3rd spool valve
X115 - Supply on fuse box for 4th spool valve
X116 - +12 V battery supply (for lighting module)
X117 - Isobus +12 V battery power socket
X118 - Automatic PTO switch
X119 - Rear linkage lifting/lowering switch
X120 - Datatronic CCD navigation keyboard
X121 - Rear linkage height/depth adjustment thumb wheel
X122 - Hand throttle
X123 - Hare/Tortoise range shift switch
X124 - Pedal/lever mode switch
X125 - SV1 speed setting potentiometer
X126 - SV2 speed setting potentiometer
X127 - Front PTO ON/OFF switch
X128 - Rear PTO ON/OFF switch
X129 - Fuse box +12 V battery connection
X130 - FingerTIP 6 front linkage function
X131 - Front linkage suspension solenoid valve
X132 - Instrument panel harness/armrest harness junction
X133 - Console harness/cab transmission harness junction
X134 - Console harness/pillar harness junction
X135 - Braking pressure sensor
X136 - Differential lock switch
X137 - 4WD switch
X138 - Hazard warning lights indicator light and switch
X139 - Suspended front axle switch
X140 - Suspended front axle setting potentiometer
X141 - Suspended cab switch
X142 - Suspended cab setting potentiometer
X143 - Variable steering switch (fast steering)
X144 - Variable steering setting potentiometer (fast steering)
X145 - PTO/linkage console
X146 - Rear linkage suspension switch
X147 - Roof harness/pillar harness junction
X148 - Roof harness/pillar harness junction
X149 - Headlights module (black connector)
X150 - Pillar harness/cab power socket harness junction
X151 - Pillar harness/cab power socket harness junction
X152 - Start switch
X153 - Non-Isobus implement connector
X154 - Suspended front axle lifting solenoid valve
X155 - Cigarette lighter socket (power)
X156 - Cigarette lighter socket (backlighting)
X157 - Left-hand side +12 V socket (power)
X158 - Left-hand side +12 V socket (backlighting)
X159 - Suspended front axle lowering solenoid valve
X160 - Console harness earth (chassis)
X161 - Solenoid valve 1 for suspended front axle suspension
X162 - Pillar harness connection on fuse box
X163 - Solenoid valve 2 for suspended front axle suspension
X164 - Pillar harness/cab transmission harness junction
X165 - Automatic air conditioning harness/pillar harness junction
X166 - Suspended front axle position sensor
X167 - +12 V APC fuse box connection
X168 - Pneumatic brake system pressure sensor
X169 - Power socket control switch (in cab)
X170 - Pillar harness connection on fuse box
X171 - Cab transmission harness connection on fuse box
X172 - Cab transmission harness connection on fuse box
X173 - Cab transmission harness earth
X174 - Autotronic 4 transmission controller
X175 - Emergency control switch
X176 - Earth (Autotronic 4 transmission controller)
X177 - Autotronic 5 Linkage
X178 - ParkLock/suspended front axle/passive suspended cab Autotronic 5
X179 - Main lighting, sidelight/dipped light activation switch
X180 - Front windscreen washer pump
X181 - Front linkage single acting / double acting function switch
X182 - Linkage external lifting switch
X183 - Diagnostics connector (tractor-Isobus CAN)
X184 - Diagnostics connector (engine-valve CAN)
X185 - Sisu EEM unit
X186 - Starter
X187 - Engine start relay
X188 - Engine identification module (ID module)
X189 - Fuel lift pump
X190 - Vistronic fan
X191 - Diesel fuel preheater
X192 - B + alternator 1
X193 - B + alternator 2
X194 - D + alternator 1
X195 - D + alternator 2
X196 - In line fuse (225 A)
X197 - Diesel fuel gauge
X198 - Pneumatic trailer brake sensor
X199 - Work light on left-hand step
X200 - Work light on right-hand step
X201 - Engine harness earth
X202 - Front accessory connection socket harness/front function harness junction
X203 - Engine harness/front headlights harness junction
X204 - Cooling unit harness/engine harness junction
X205 - Front axle harness/engine harness junction
X206 - Sensor detecting water in the diesel fuel
X207 - Pneumatic seat adjustment control
X208 - Front linkage suspension switch LED
X209 - Rear linkage external lowering switch
X210 - Orbitrol steering sensor (SASA sensor)
X211 - Rear Dual Control connector

- X212** - Instrument panel harness/armrest harness junction
- X213** - Power socket for additional heating
- X214** - Armrest harness/cab transmission harness junction
- X215** - Trailer connector (right-hand side light and number plate lights)
- X216** - Reversing light
- X217** - Isobus CAN connector
- X218** - External Isobus tool connector
- X219** - Cab Isobus harness/external Isobus harness junction
- X220** - Trailer connector (left-hand side light)
- X221** - Trailer connector (right-hand indicator)
- X222** - Trailer connector (left-hand indicator)
- X223** - Trailer connector (brake lights)
- X224** - Trailer connector (earth)
- X225** - Trailer connector (reversing light)
- X226** - Trailer connector harness earth
- X227** - Console harness/cab transmission harness junction
- X228** - Front linkage single/double-acting function LED
- X229** - 120 Ohm CAN 1 resistor (cab transmission harness)
- X230** - 120 Ohm CAN 2 resistor (cab transmission harness)
- X231** - 120 Ohm CAN 3 resistor (cab transmission harness)
- X232** - 120 Ohm CAN 4 resistor (cab transmission harness)
- X233** - Cab transmission harness/Isobus harness junction
- X234** - 120 Ohm CAN ATC resistor
- X235** - Front axle steering sensor (WAS sensor)
- X236** - Electrohydraulic Orbitrol (grey connector)
- X237** - Electrohydraulic Orbitrol (black connector)
- X238** - Connector 1 for valve harness
- X239** - Connector 2 for valve harness
- X240** - 120 Ohm resistor for electrohydraulic spool valves
- X241** - Sisu engine preheating supply (Grid Heater)
- X242** - Exhaust temperature sensor
- X243** - AdBlue/DEF reservoir (urea) level gauge and temperature sensor
- X244** - CAN SCR harness
- X245** - +12 V APC supply for SCR
- X246** - Auto-Guide external harness/engine harness junction
- X247** - Roof harness/electric rear-view mirror harness junction
- X248** - Right and left-hand electric rear-view mirror adjustment switch
- X249** - External rear-view mirror defroster switch
- X250** - Power socket in cab
- X251** - In line fuse (225 A)
- X252** - Automatic air conditioning condenser
- X253** - Air filter vacuum sensor
- X254** - Horn (earth)
- X255** - Horn
- X256** - Roof harness/hand rail harness junction
- X257** - Side light and indicator on hand rail (right and left)
- X258** - Main beam on hand rail (right and left)
- X259** - Hand rail upper work light
- X260** - Hand rail upper work light
- X261** - Front right-hand unit for suspended cab
- X262** - Front left-hand unit for suspended cab
- X263** - Floating stop relay control (US front-end loader)
- X264** - Front linkage suspension switch
- X265** - Rear linkage suspension switch indicator light
- X266** - Rear linkage diagnostic and lifting/lowering LEDs
- X267** - Switch for left-hand side heater
- X268** - Pillar harness connection on fuse box
- X269** - Cab suspension harness/cab transmission harness junction
- X270** - Front accessories connection socket (rotary beacon)
- X271** - Front accessories connection socket (+12 V battery)
- X272** - Front accessories connection socket (+12 V APC)
- X273** - Front accessories connection socket (main beam light)
- X274** - Front accessories connection socket (main beam light)
- X275** - Front accessories connection socket (work light)
- X276** - Earth for front accessory connection socket harness
- X277** - Front linkage lifting/lowering external control
- X278** - Front linkage lifting switch (external)
- X279** - Dual Control or TIC position sensor
- X280** - Front linkage rams pressure sensor
- X281** - Solenoid valve for front PTO
- X282** - Roof harness/cab Auto-Guide harness junction
- X283** - TopDock
- X284** - Headlights module keyboard
- X285** - Ad Blue (urea) metering valve
- X286** - Ad Blue (urea) injection valve
- X287** - Ad Blue (urea) reservoir preheating valve
- X288** - 12/24 V converter for SCR system
- X289** - SCR management module
- X290** - Front accessory connection socket harness/front function harness junction
- X291** - Front accessory connection socket harness/front function harness junction
- X292** - Front windscreen washer pump
- X293** - 540 rpm PTO switch
- X294** - 540 eco rpm PTO switch
- X295** - 1000 rpm PTO switch
- X296** - USB connector
- X297** - PTO/linkage console backlighting
- X298** - Headland mode switch (headland function)
- X299** - Linkage lowering speed potentiometer
- X300** - -
- X301** - PTO stop switch on left-hand fender
- X302** - Switch for pre-selected engine speed A
- X303** - Switch for pre-selected engine speed B
- X304** - Instrument panel harness/armrest harness junction
- X305** - Headlights module (grey connector)
- X306** - Switch for pre-selected engine speed A/B
- X307** - FingerTIP 1
- X308** - FingerTIP 2
- X309** - SV1/SV2 speed regulator switch

- X310** - Divider 1 indicator light and solenoid valve (earth)
X311 - Divider 2 indicator light and solenoid valve (+12 V)
X312 - SV1/SV2 speed setting potentiometer in armrest
X313 - Pedal/lever transmission control mode switch and DTM switch
X314 - Hydraulics switch 1, road/field mode
X315 - Hydraulics switch 2, road/field mode
X316 - Headland mode switch (headland function)
X317 - + battery supply for headlights module
X318 - Automatic air conditioning compressor
X319 - + battery supply for headlights module
X320 - + battery supply on headlights module
X321 - + battery supply on headlights module
X322 - + battery supply on headlights module
X323 - + battery supply on headlights module
X324 - +12 V APC fuse box connector (battery isolator switch)
X325 - Pillar harness / non-Isobus implement connector harness junction
X326 - Pillar harness / non-Isobus implement connector harness junction
X327 - Battery earth (chassis)
X328 - Battery isolator switch earth terminal
X329 - Battery isolator switch earth terminal
X330 - Battery negative terminal contact (battery isolator switch)
X331 - Pillar harness connection on fuse box
X332 - + battery (start switch)
X333 - Engine harness earth (chassis)
X334 - Battery isolator switch earth terminal
X335 - Battery isolator switch earth terminal
X336 - Battery isolator switch
X337 - Pneumatic brake ParkLock solenoid valve
X338 - Earth (battery isolator switch)
X339 - Pneumatic trailer braking solenoid valve
X340 - + terminal on battery for fuse box
X341 - Starter supply
X342 - Positive battery terminal
X343 - RS232 diagnostics connector for Auto-Guide
X344 - Isobus connector in cab
X345 - Supply for additional terminal (mitron unit)
X346 - Auto-Guide switch
X347 - Cab transmission harness connection on fuse box
X348 - Cab transmission harness connection on fuse box
X349 - -
X350 - Front right-hand grille work light
X351 - Front right-hand grille work light
X352 - Front right-hand grille work light
X353 - Front left-hand grille work light
X354 - Front left-hand grille work light
X355 - Front left-hand grille work light
X356 - Right-hand main beam and dipped light
X357 - Left-hand main beam and dipped light
X358 - Outside temperature sensor
X359 - Cab suspension harness/cab transmission harness junction
X360 - Pillar harness connection on fuse box
X361 - Pillar harness connection on fuse box
X362 - Fuse box (+12 V battery)
X363 - Auto-hitch (Dromone) switch
X364 - 120 Ohm resistor for Auto-Guide/Isobus CAN network
X365 - Hand rail lower work light
X366 - Pneumatic brake harness / transmission harness junction
X367 - Switch 1 on joystick
X368 - Switch 2 on joystick
X369 - Engine speed + switch
X370 - Engine speed - switch
X371 - Engine speed stop switch
X372 - Orbitrol safety solenoid valve
X373 - Left-hand 12 V socket (cab) (power)
X374 - Left-hand 12 V socket (cab) (backlighting)
X375 - Instrument panel harness/cab transmission harness junction
X376 - Fuse box (reserve for + APC)
X377 - Fuse box (supply for cab suspension compressor)
X378 - FNRP lever and button
X379 - Front left-hand work light on roof
X380 - Front right-hand work light on roof
X381 - Front left-hand work light on roof
X382 - Front right-hand work light on roof
X383 - Front left-hand roof indicator
X384 - Front right-hand roof indicator
X385 - Rear left-hand work light on roof
X386 - Rear right-hand work light on roof
X387 - Rear left-hand work light on roof
X388 - Rear right-hand work light on roof
X389 - Rear left-hand work lights
X390 - Rear right-hand work lights
X391 - Rear left-hand roof indicator
X392 - Rear right-hand roof indicator
X393 - Earth
X394 - Radio aerial connector
X395 - Radio supply
X396 - Radio speaker connector
X397 - Front left-hand speaker
X398 - Front right-hand speaker
X399 - Rear left-hand speaker (+ supply)
X400 - Rear right-hand speaker (+ supply)
X401 - Rear left-hand speaker (- supply)
X402 - Rear right-hand speaker (- supply)
X403 - Rear windscreen wiper motor
X404 - Door switch
X405 - Interior light (earth)
X406 - Interior light (control)
X407 - Interior light (+12 V battery supply)
X408 - Right-hand console light
X409 - Left-hand rotary beacon
X410 - Right-hand rotary beacon
X411 - Rear windscreen wiper switch
X412 - Radio aerial
X413 - Earth (aerial)
X414 - Left-hand number plate light
X415 - Right-hand number plate light
X416 - Radio supply
X417 - Radio speaker connector
X418 - Earth
X419 - Earth
X420 - Rotary beacon harness earth (chassis)

X421 - Earth
X422 - Roof harness earth (chassis)
X423 - Left-hand side fan ON/OFF switch
X424 - Fan speed control knob
X425 - Air conditioning switch
X426 - Air conditioning indicator light
X427 - Manual air conditioning module
X428 - Electronic thermostat for heating
X429 - Speed 1relay for fan
X430 - Speed 2relay for fan
X431 - Speed 3relay for fan
X432 - Speed 4relay for fan
X433 - Left-hand heating resistor
X434 - Right-hand fan
X435 - Left-hand fan
X436 - Left-hand side fan switch
X437 - Relay for left-hand side fan
X438 - Earth (automatic air conditioning)
X439 - Air conditioning control module (blue connector)
X440 - Air conditioning control module (yellow connector)
X441 - Heating temperature sensor
X442 - TT2 sensor
X443 - Evaporator temperature sensor
X444 - Right-hand fan adapter module (signal)
X445 - Left-hand fan adapter module
X446 - Right-hand fan adapter module (supply)
X447 - Left-hand fan adapter module (supply)
X448 - Separation harness for automatic air conditioning
X449 - Motor for left-hand heating shutter
X450 - Motor for right-hand heating shutter
X451 - Motor for heating mixer shutter
X452 - Relay for heater pump
X453 - Heater accelerator pump
X454 - Earth (roof)
X455 - Roof harness earth
X456 - Solar panel
X457 - Earth (Auto-Guide)
X458 - Cab transmission harness/pillar harness junction
X459 - Linkage lifting switch on fender
X460 - Linkage lowering switch on fender
X461 - Pillar harness/TECU harness junction
X462 - Supply indicator light for power socket on pillar
X463 - Earth (Isobus)
X464 - Pillar harness/armrest harness junction
X465 - Battery positive terminal contact
X466 - Active suspended cab Autotronic 5
X467 - Right-hand electric rear-view mirror
X468 - Left-hand electric rear-view mirror
X469 - Additional fan connection
X470 - Operator presence in seat switch
X471 - Suspended cab harness connection

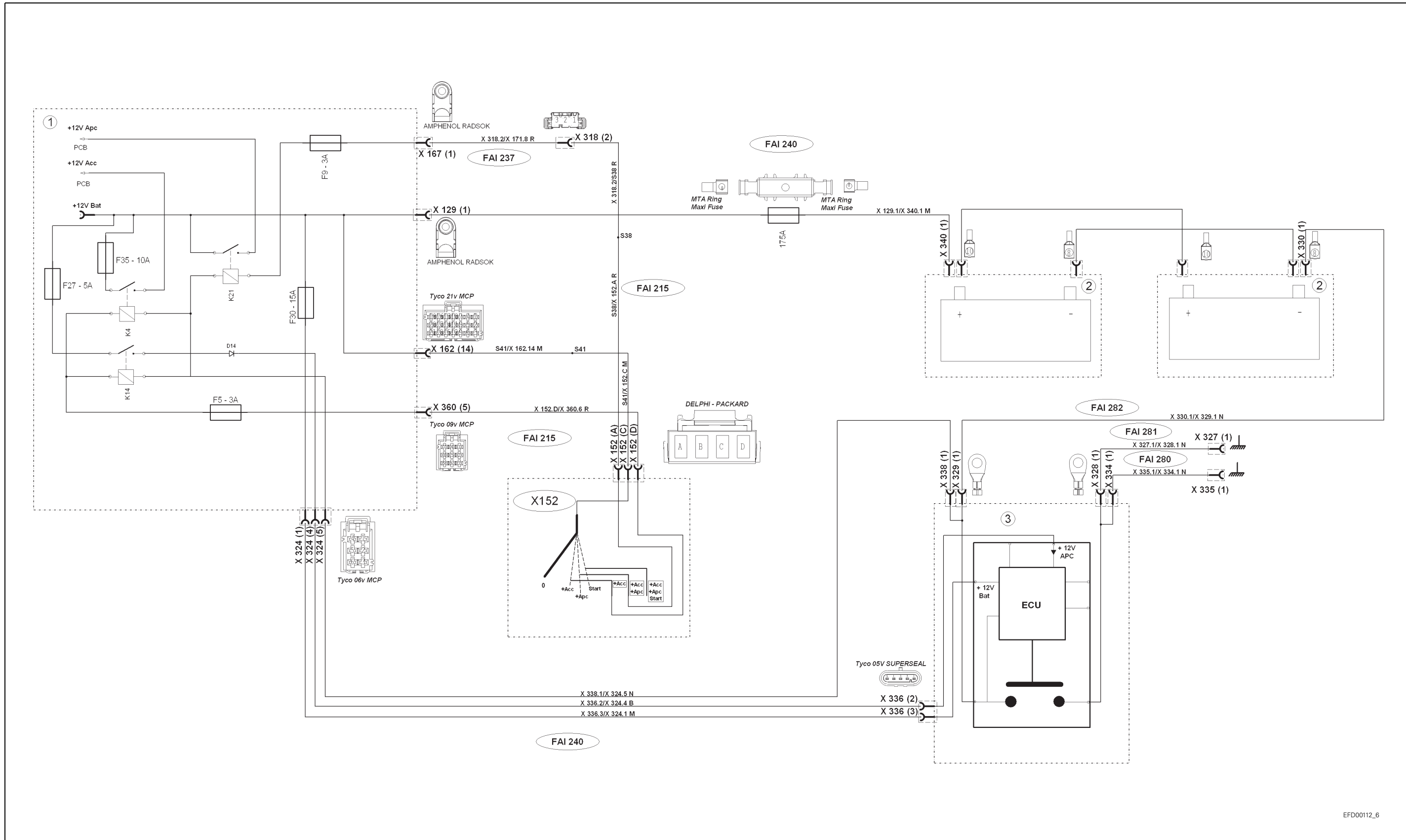
Identification of harnesses

FAI200 - Engine harness
FAI201 - Front headlights harness
FAI202 - Suspended front axle harness
FAI203 - Transmission harness
FAI204 - Cab/platform linkage external harness
FAI205 - Electrohydraulic valves harness
FAI206 - Transmission harness — PTO

FAI207 - Front Dual Control harness
FAI208 - Linkage with Dual Control and TIC harness
FAI209 - Instrument panel harness
FAI210 - Cab transmission harness
FAI211 - Cab linkage harness
FAI212 - Lighting harness
FAI213 - Cab interior lighting harness
FAI214 - Armrest harness
FAI215 - Pillar harness
FAI216 - Diagnostics connector harness
FAI217 - Datatronic 3 harness
FAI218 - Fieldstar harness
FAI219 - Cab interior power socket harness
FAI220 - BOC harness — safety switch
FAI221 - Automatic air conditioning harness — instrument panel
FAI222 - Autotronic 5 ParkLock/suspended front axle harness
FAI223 - Roof harness
FAI224 - Hand rail lighting harness
FAI225 - Electric rear-view mirror harness
FAI226 - Roof/external harness
FAI227 - Automatic air conditioning harness - roof
FAI228 - Number plate lighting harness
FAI229 - Xenon light adapter harness
FAI230 - GSPTO harness
FAI231 - Transmission harness — ParkLock
FAI232 - Radio harness
FAI235 - Front accessory connection socket harness
FAI236 - Start-up harness
FAI237 - +12 APC fuse box harness
FAI238 - +12 APC instrument panel harness
FAI239 - Permanent +12 V supply harness
FAI240 - +12 V permanent fuse box harness
FAI241 - Automatic air conditioning adapter harness
FAI242 - Main beams on hand rail adapter harness
FAI243 - Circuit breaker harness
FAI244 - Linkage external controls extension harness
FAI245 - Left-hand linkage external controls harness
FAI246 - Right-hand linkage external controls harness
FAI247 - PTO shunt harness
FAI248 - Linkage external controls harness
FAI249 - Suspended front axle harness
FAI250 - Engine harness
FAI251 - Parking brake harness
FAI252 - +12 V battery harness
FAI253 - Hand rail harness
FAI254 - Windscreen wiper harness
FAI255 - Windscreen wiper harness
FAI256 - High-visibility roof heating harness
FAI257 - High-visibility roof heating harness
FAI258 - Roof earth harness
FAI260 - Cooling unit harness
FAI261 - Isobus harness
FAI262 - Auto-Guide engine harness
FAI263 - Auto-Guide cab adapter harness
FAI265 - Pneumatic brake harness
FAI267 - Console harness
FAI268 - Front function harness
FAI271 - Cab electric rear-view mirror harness
FAI272 - Active suspended cab harness

- FAI273** - Front linkage harness
- FAI274** - Rear right-hand lighting harness
- FAI275** - Trailer connector harness
- FAI276** - Rear left-hand lighting harness
- FAI280** - Negative battery harness
- FAI281** - Negative battery harness
- FAI282** - Negative battery harness
- FAI283** - TopDock harness
- FAIxxx** - Non-Isobus tool connector harness
- FAIxxx** - Non-Isobus implement connector controller harness
- FAIxxx** - Additional fan harness

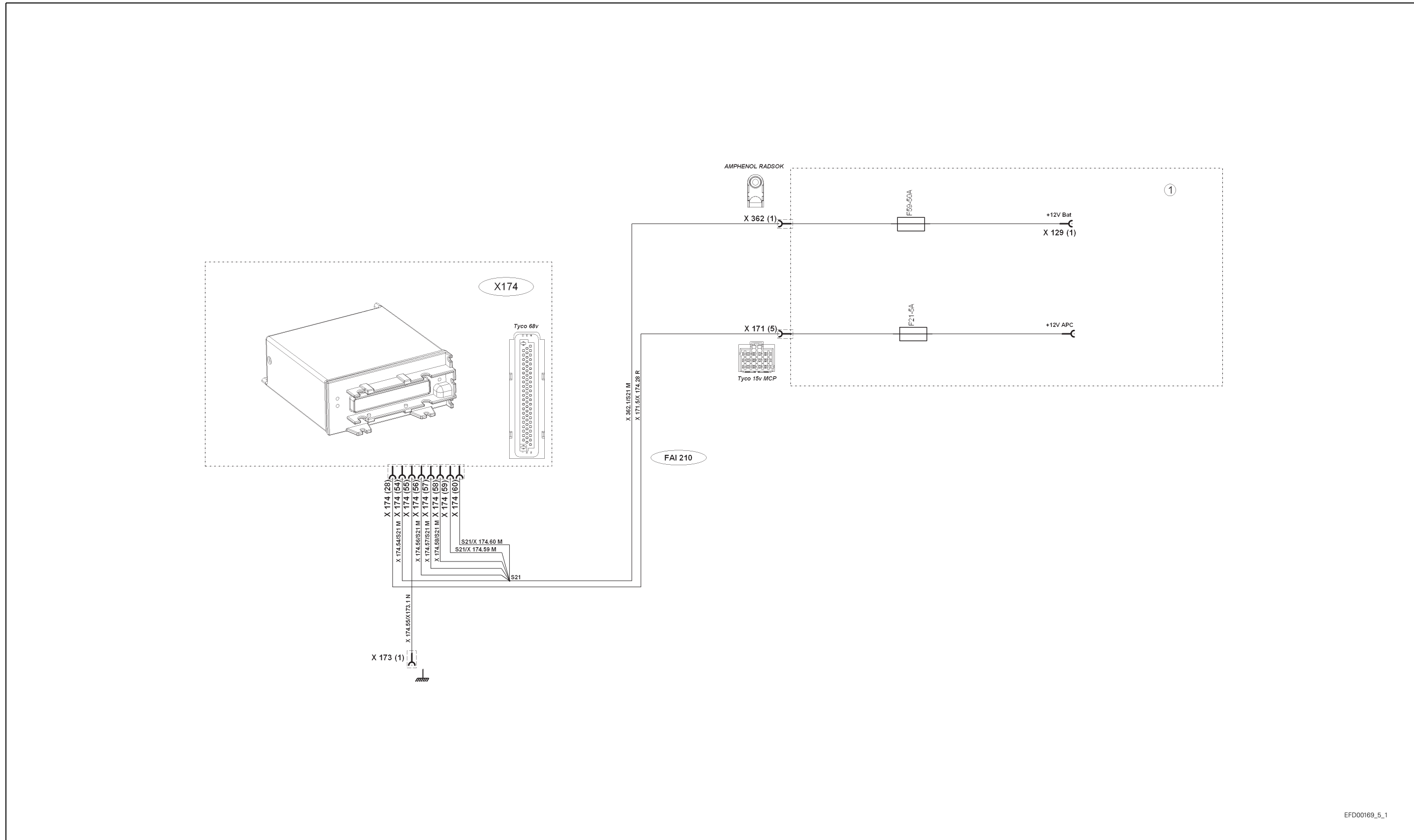
B.2 Fuse box supply with circuit breaker



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Fig. 4

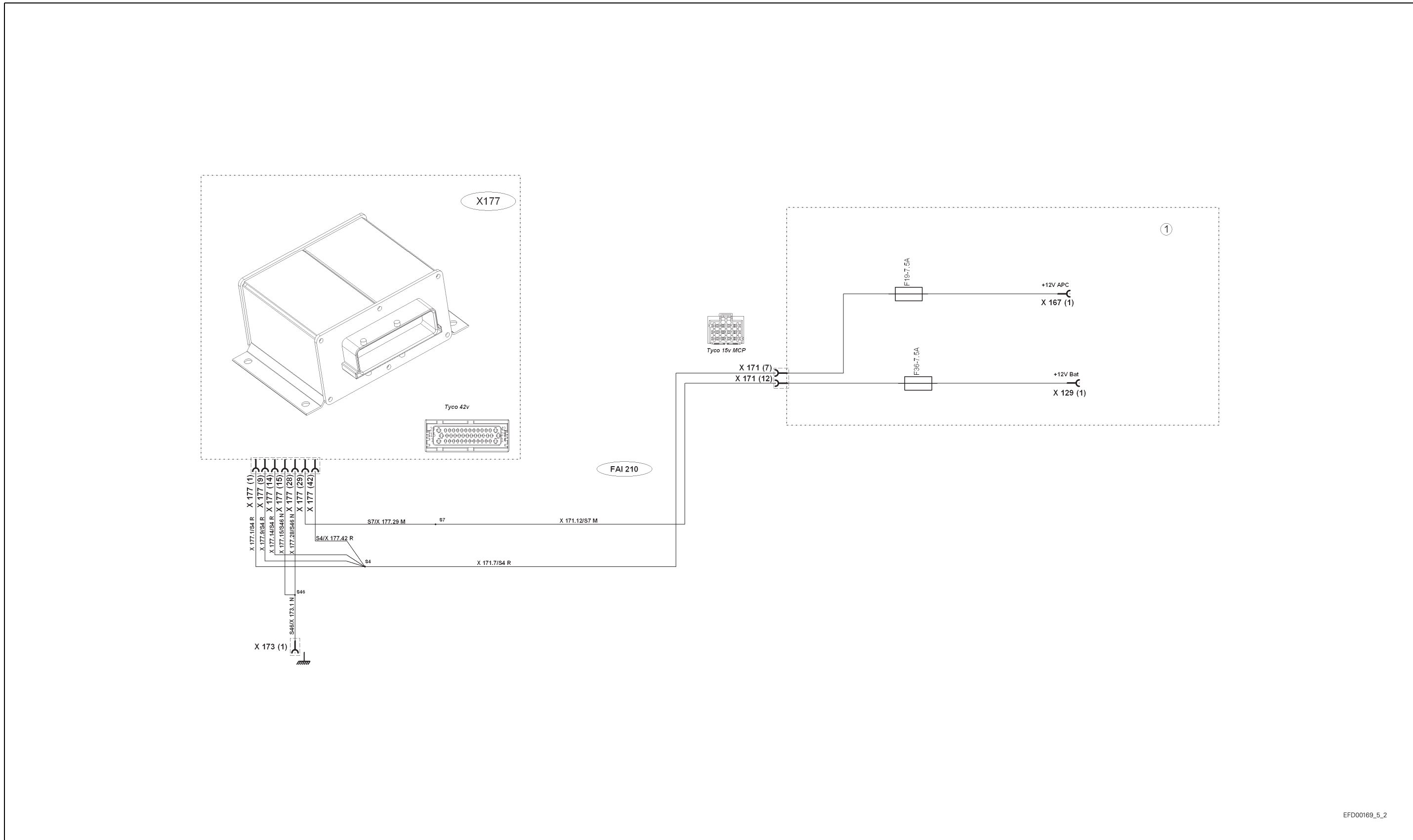
B.3 Autotronic 4 electrical power supply



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Fig. 5

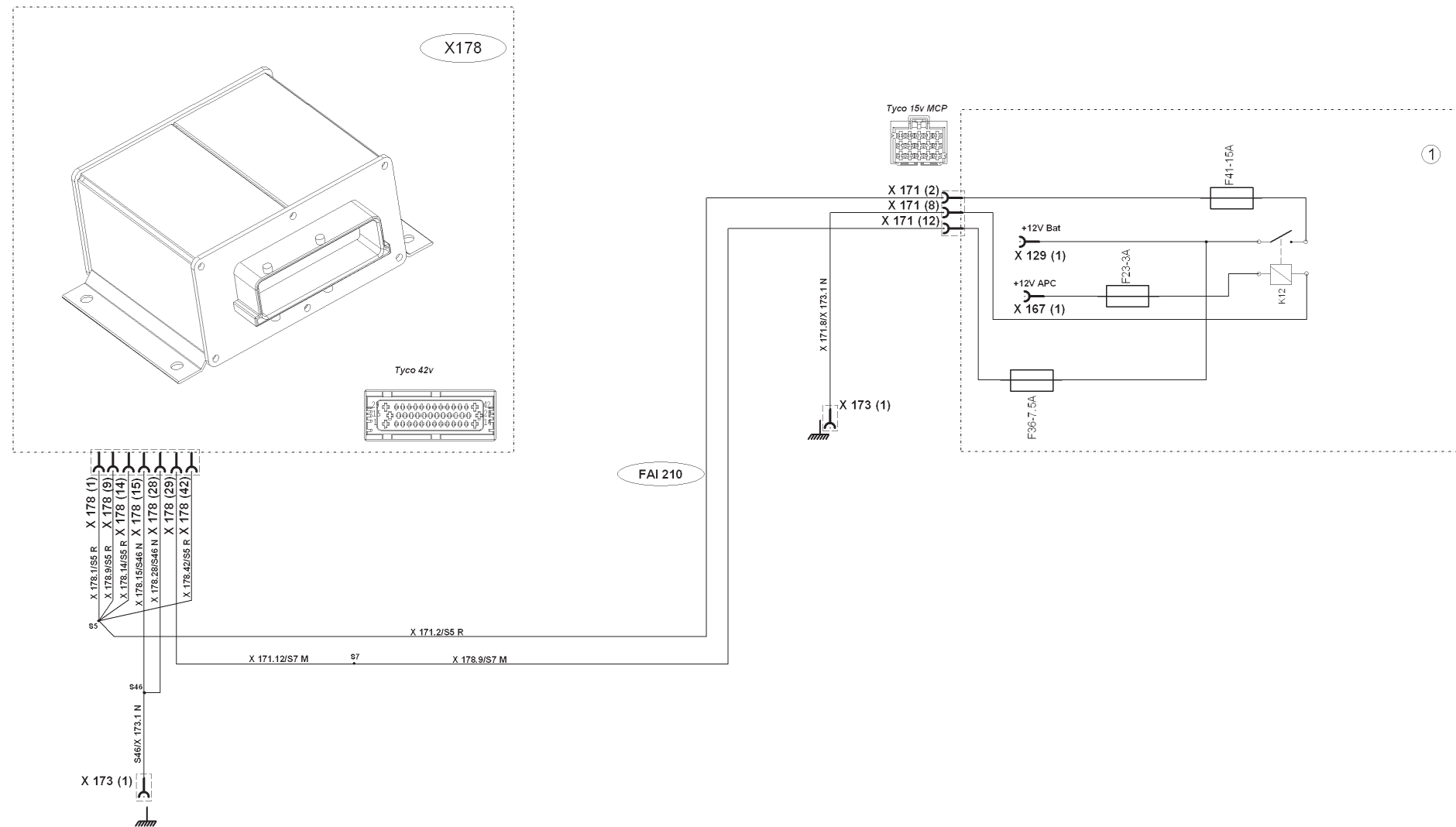
B.4 Autotronic 5 linkage electrical power supply



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Fig. 6

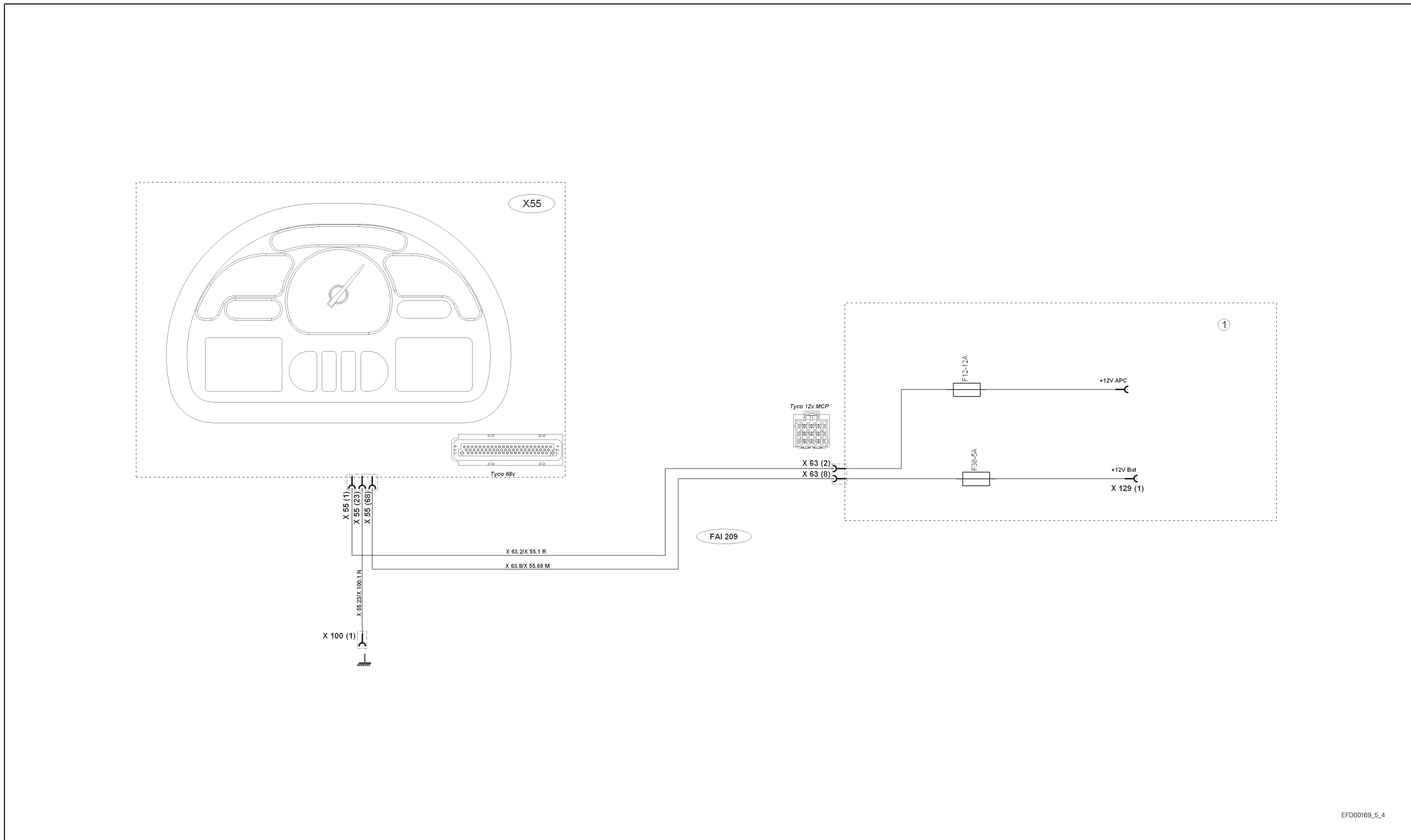
B.5 Autotronic 5 ParkLock/suspended front axle electrical power supply



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Fig. 7

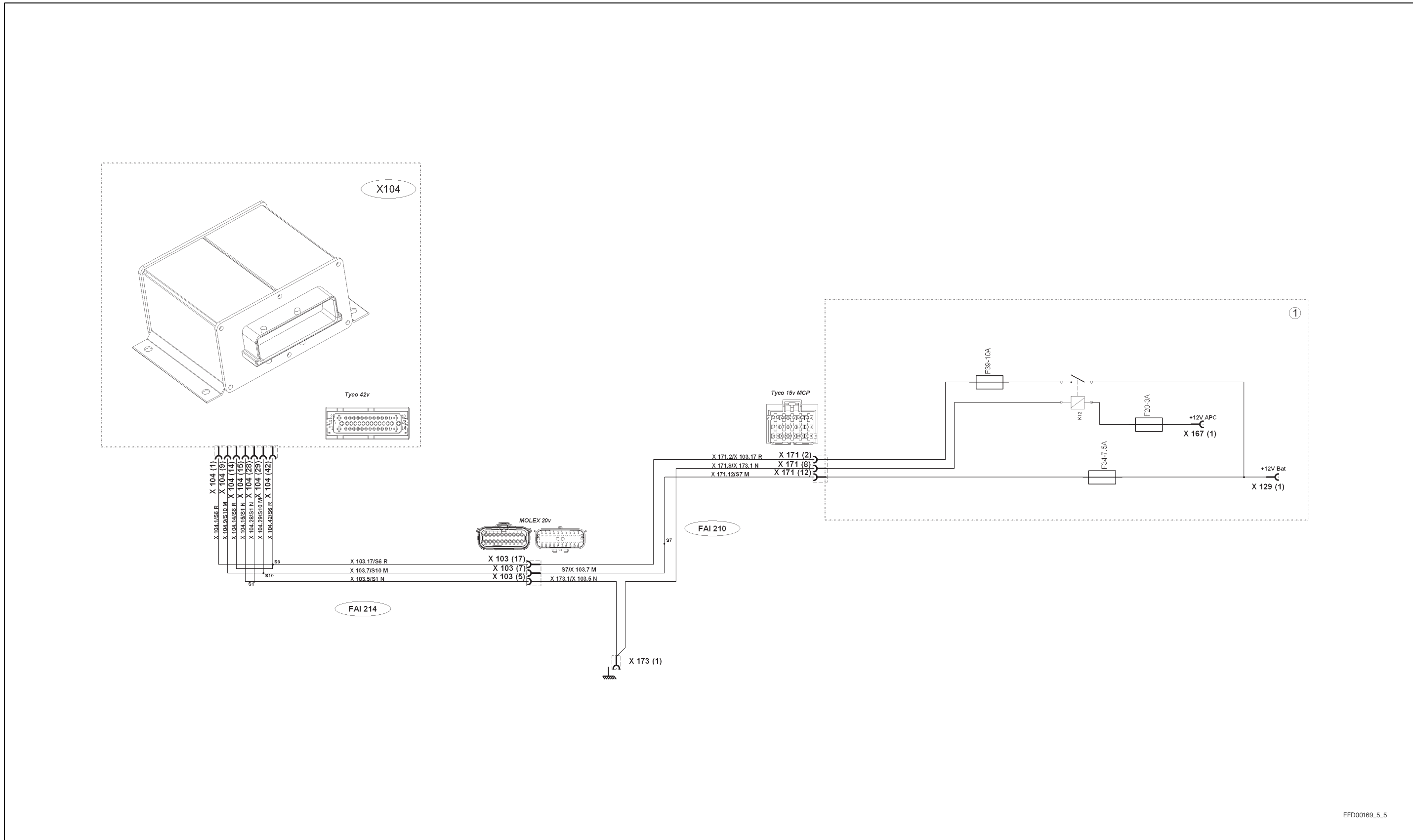
B.6 DCC3 instrument panel electrical power supply



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Fig. 8

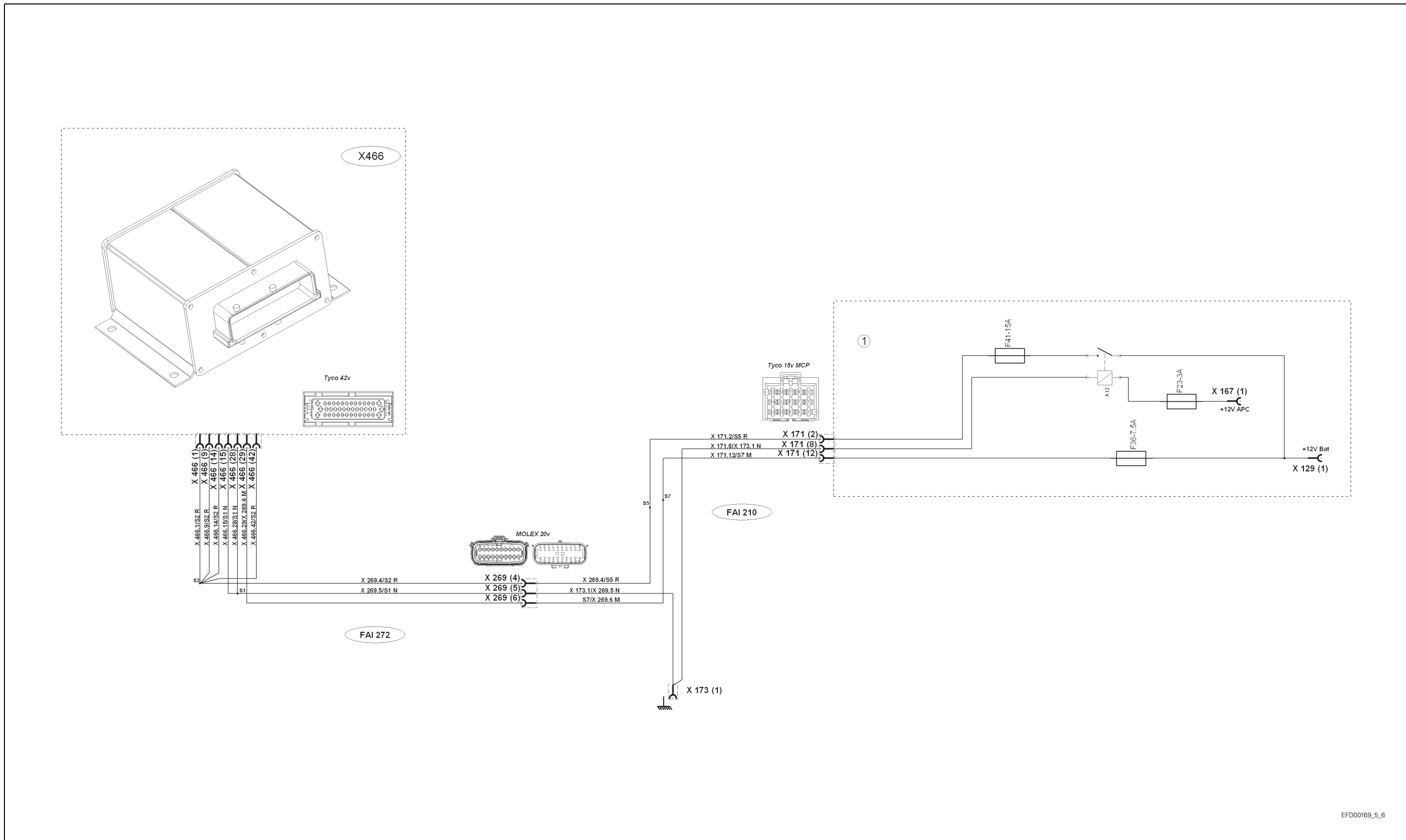
B.7 Autotronic 5 armrest electrical power supply



EFD00169_5_5

Fig. 9

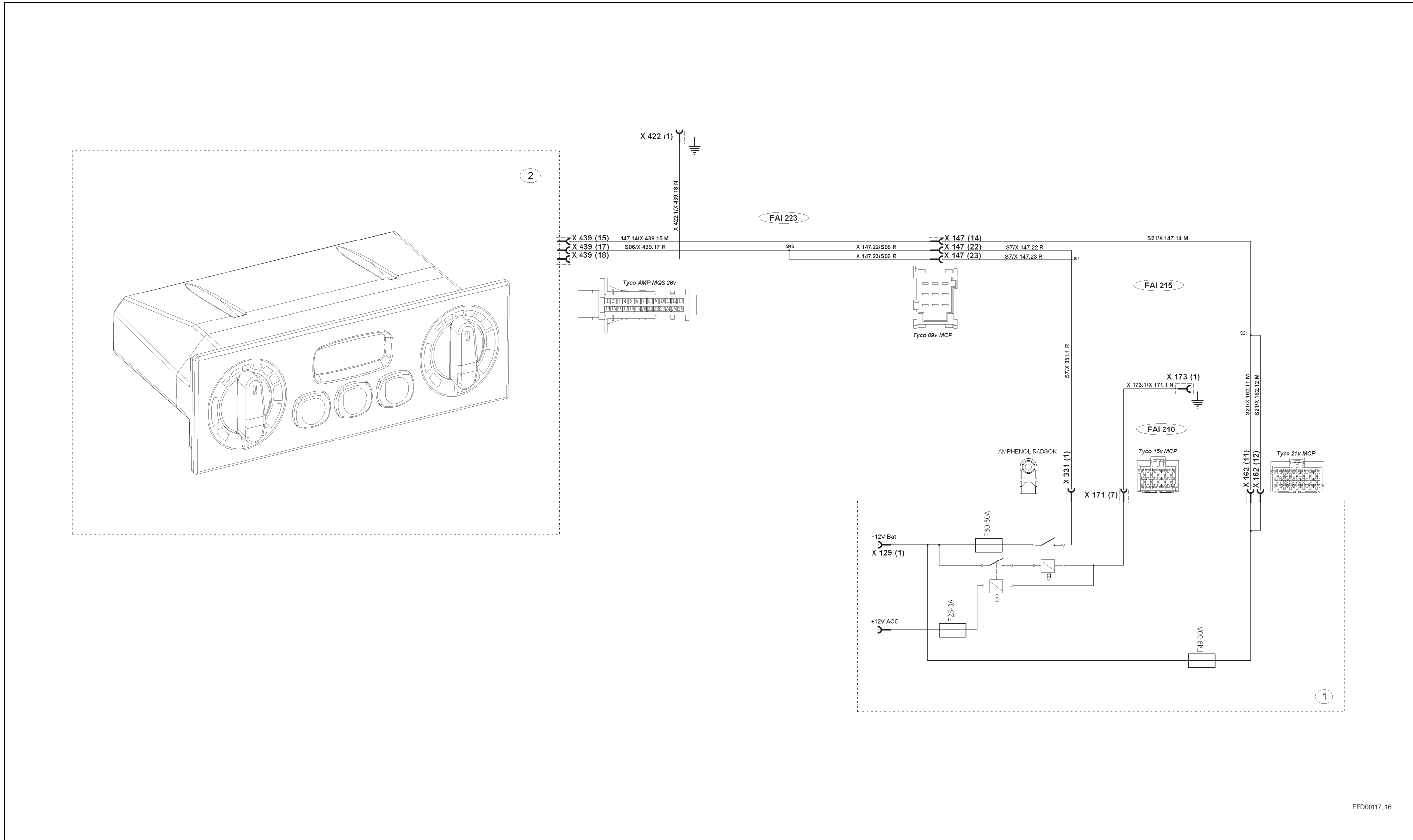
B.8 Autotronic 5 active suspended cab electrical power supply



EFD00169_5_6

Fig. 10

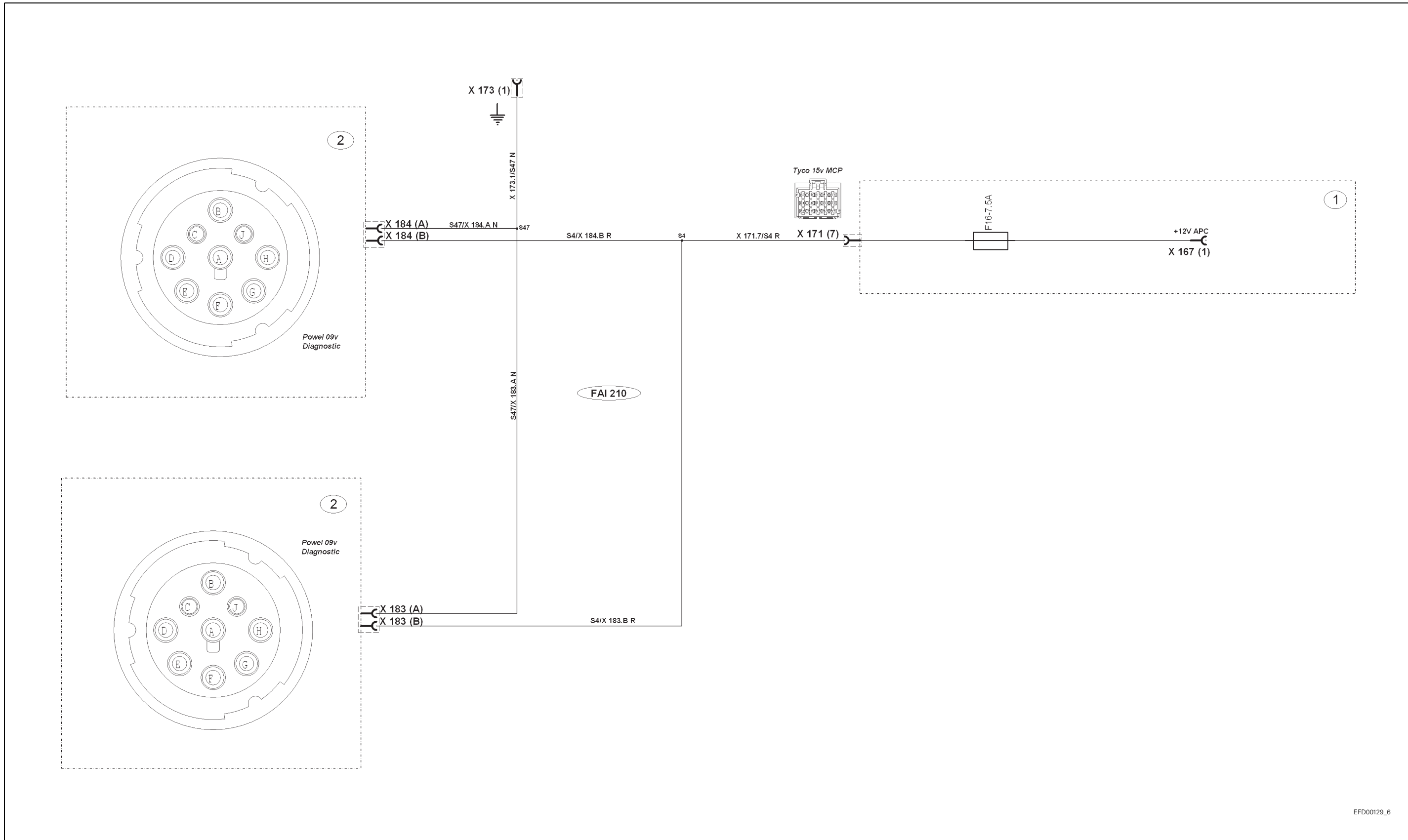
B.10 Automatic air-conditioning unit electrical power supply



EFD00117_16

Fig. 12

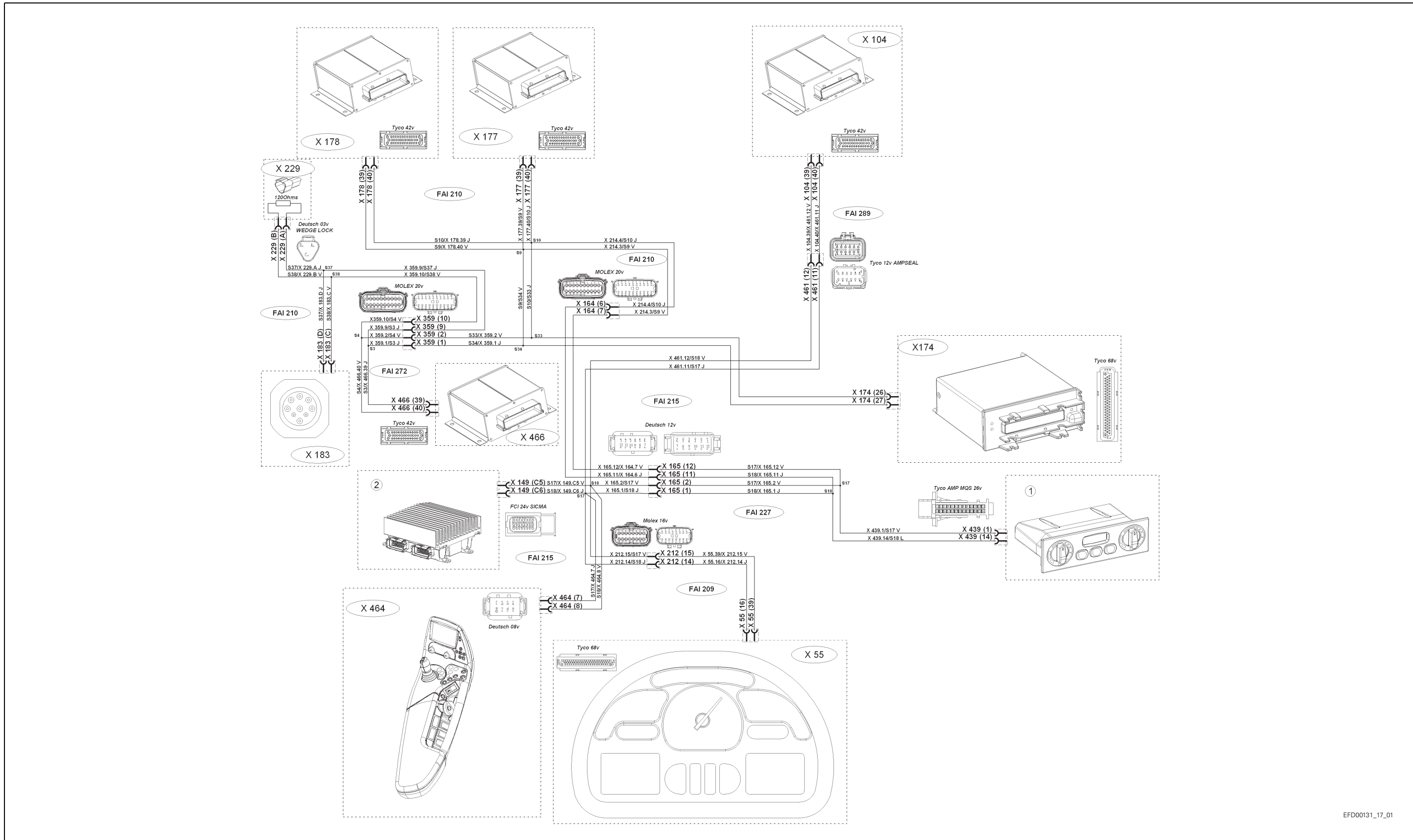
B.11 Diagnostics connector electrical power supply



EFD00129_6

Fig. 13

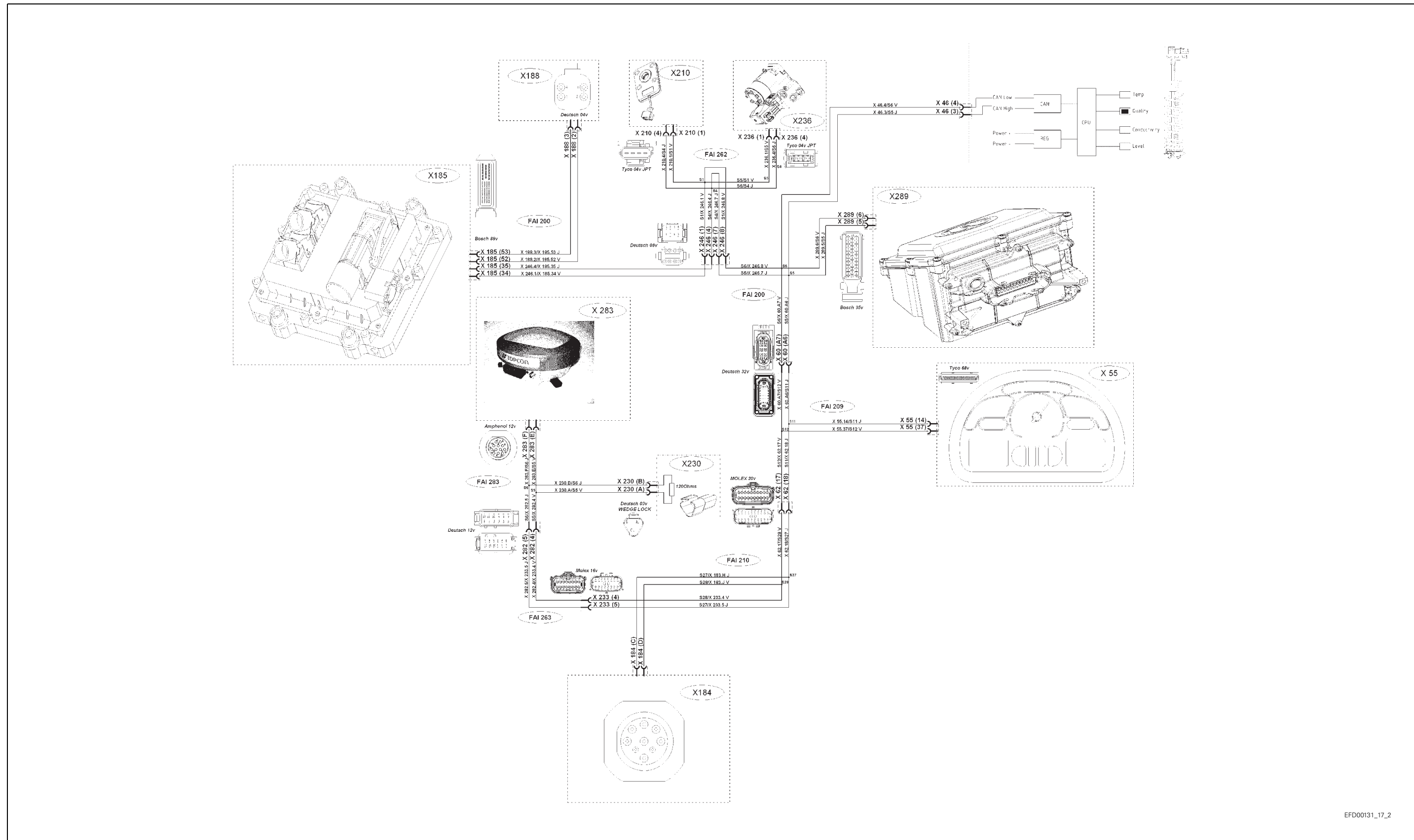
B.12 Tractor CAN network



EFD00131_17_01

Fig. 14

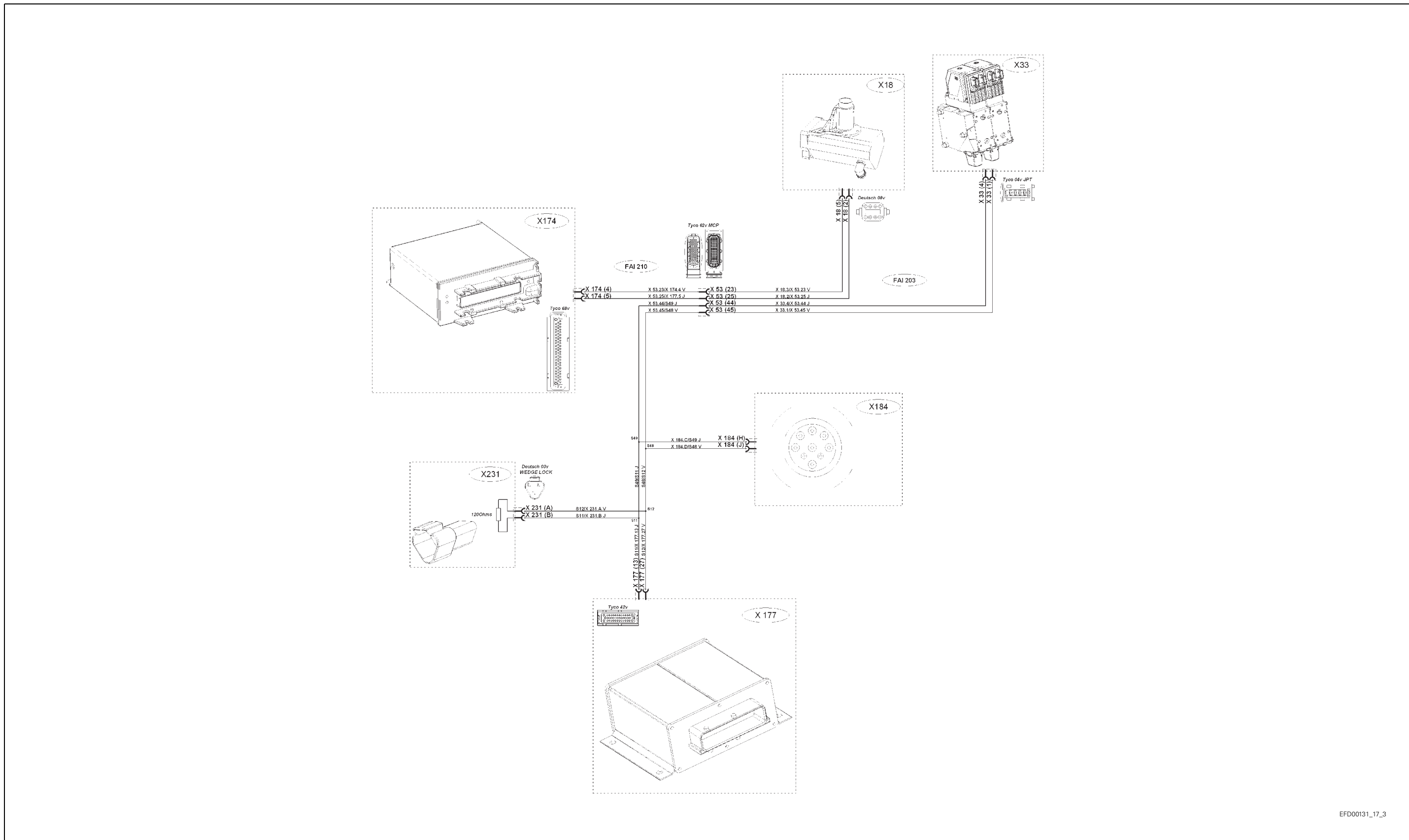
B.13 Engine CAN network



EFD00131_17_2

Fig. 15

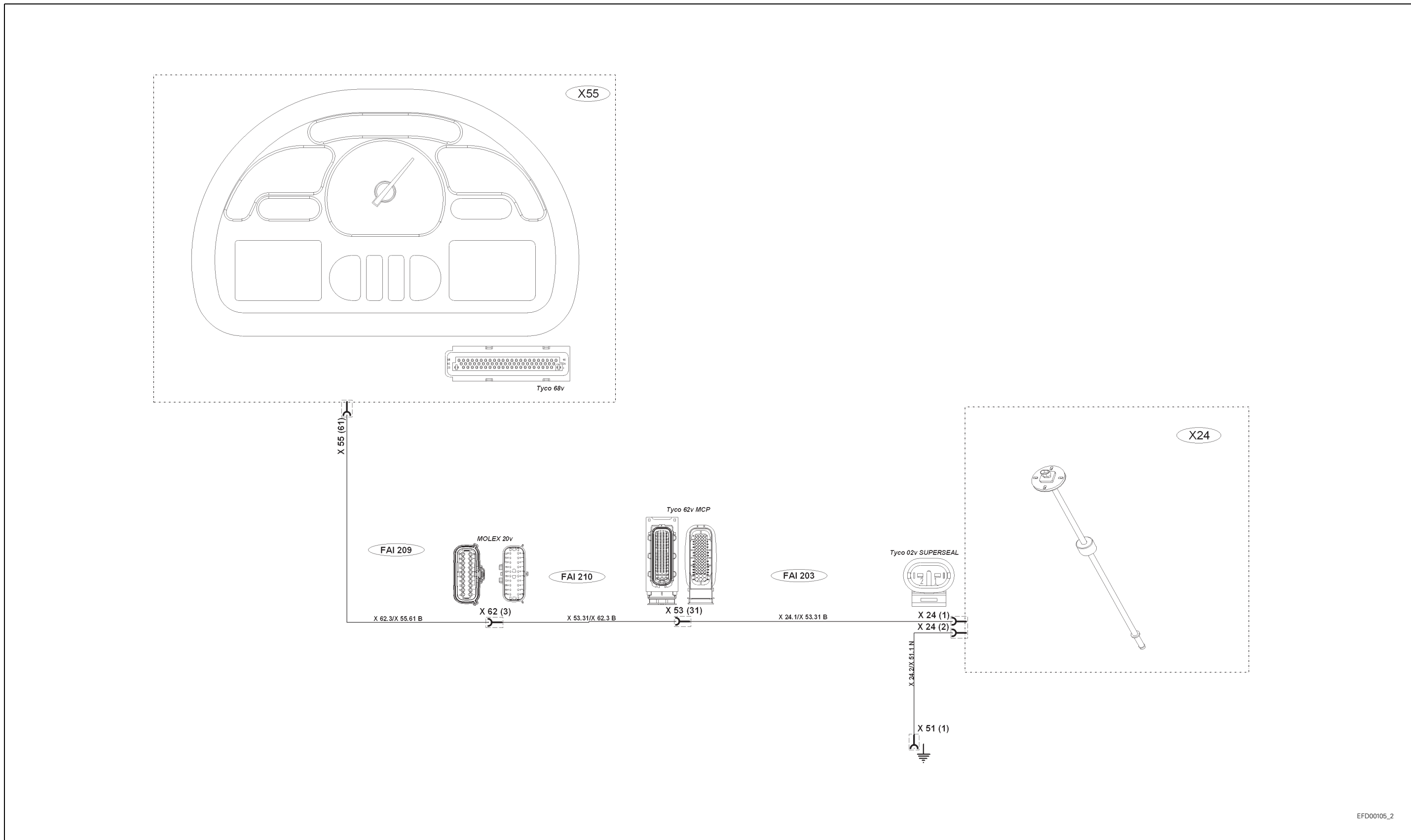
B.14 Linkage CAN network



EFD00131_17_3

Fig. 16

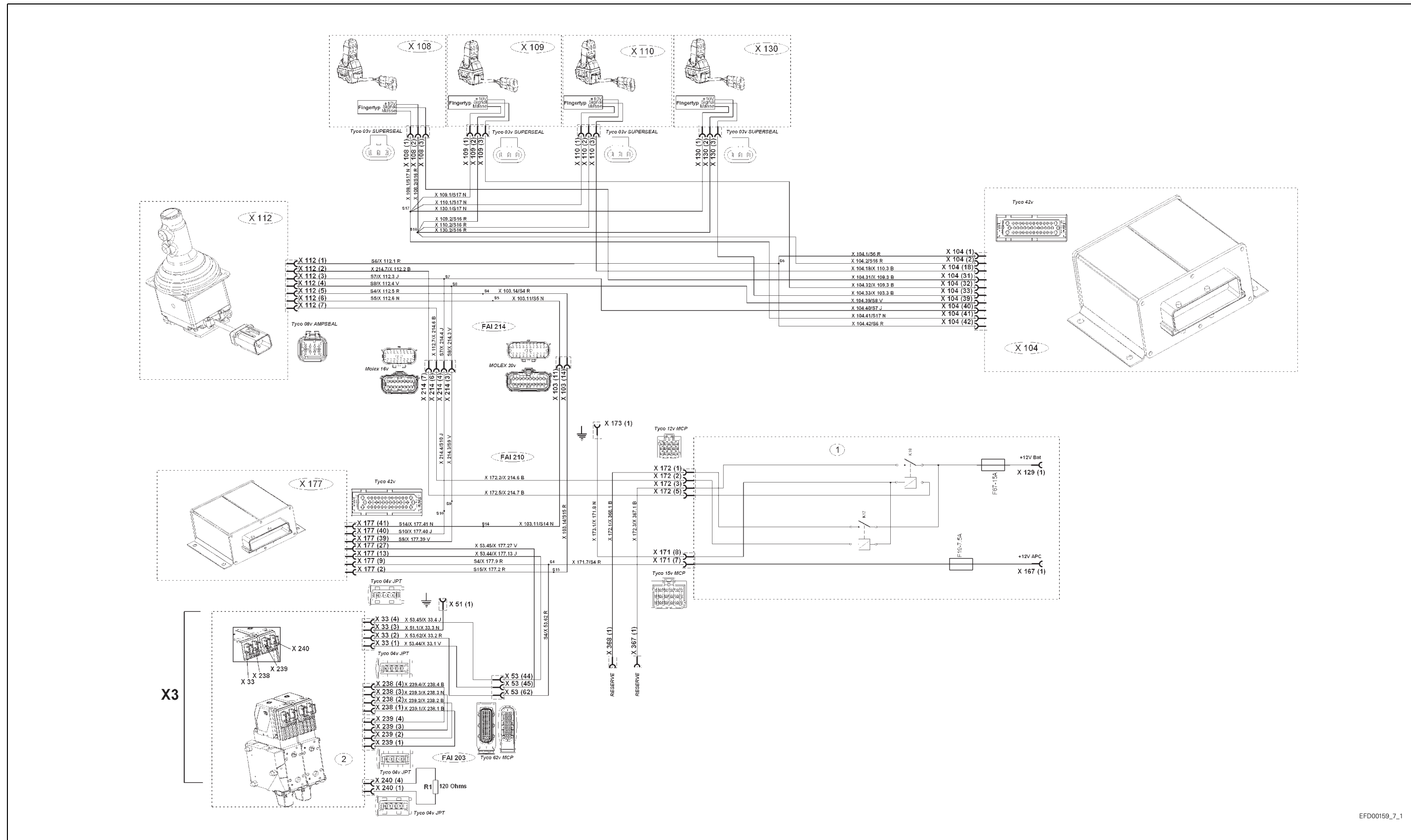
B.16 Auxiliary hydraulic oil gauge



EFD00105_2

Fig. 18

B.17 Electrohydraulic pool valves



EFD00159_7_1

Fig. 19

9C13

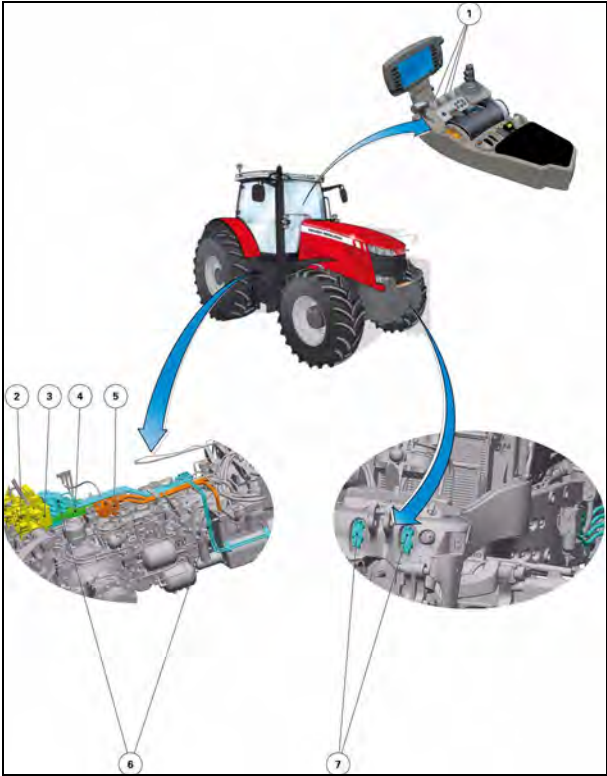
LS auxiliary spool valves - Layout of components

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A. Layout of auxiliary spool valve components

Layout of components



1011015

Fig. 1

B. Layout of auxiliary spool valve components

Layout of components - parts list

Reference	Description	Location
1-	Auxiliary spool valve electrical actuators	On the armrest in the cab
2	Rear hydraulic couplers	At the rear of the tractor
3	Rear auxiliary spool valves	At the rear of the tractor
4	Spool valve support plate	At the rear of the tractor
5	Auxiliary spool valve block	Under the cab, above the gearbox
6	Front auxiliary spool valves and channel	Under the cab, above the gearbox
7	Front hydraulic couplers	At the front of the tractor

9C14

LS auxiliary spool valves - Tests and diagnostics

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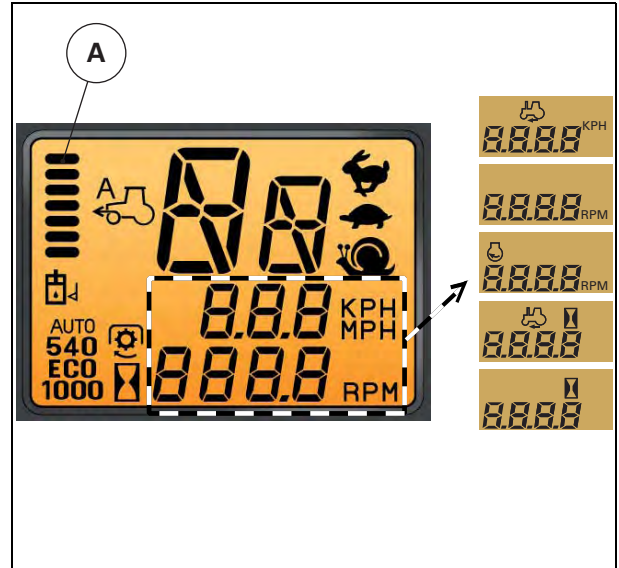
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A. Preliminary steps

The first points to check before carrying out the test are:

- check that the hydraulic oil level (A) (Fig. 1) is correct
- check that the last service inspections have been complied with

Before starting the tests, run the engine and operate a hydraulic function to reach a hydraulic operating temperature of 60°C. To assist the rise in temperature, connect a flowmeter to an auxiliary spool valve and limit the flowmeter flow rate.



1009075

Fig. 1

DIAGNOSTIC			
DATA		DC	BIN
DC	ANA	DC	ERR
DC	LED	DC	GAUGE
TC	BIN	TC	ANA
TC	EV	TC	ERR
EC	BIN	EC	ANA

1009073

Fig. 2

NOTE: To quickly read off the hydraulic oil temperature, it is necessary to return to diagnostic mode on the instrument panel by pressing the top arrow located on the steering column for 7 seconds. The screen (Fig. 2) is displayed. Using the navigation control on the steering wheel, enter DATA mode and then scroll through until "Hyd-Temp" appears (Fig. 3).

Reminder:

During the tests, select pressure gauges, hoses and unions of sufficient capacity and strength for the checks to be carried out.

Accelerator	0
Set Ratio	0
Act Ratio	0
Shu Dec Inc	1000
Speed Incr	192
Status Levr	1
SV I/2	0
Hyd Temp	189

1009074

Fig. 3

B. Checks and tests

Checking the maximum flow rate to the spool valve

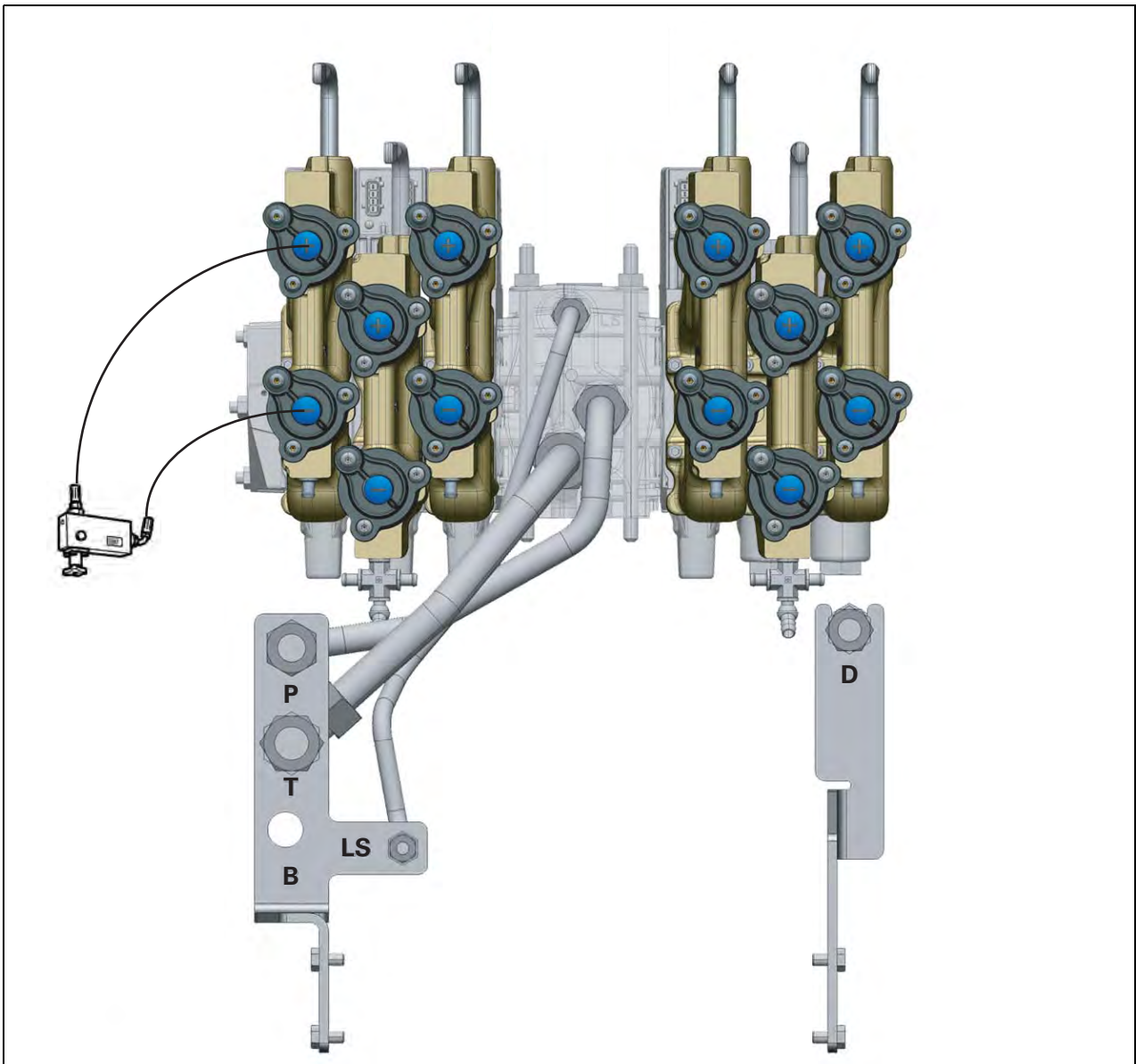
Parameters required:

- hydraulic oil temperature at 60 °C
- engine speed at 2200 rpm

Tools used:

- flowmeter
- Push/Pull type hydraulic unions

Method



1009338

Fig. 4

1. Connect the flowmeter to the spool valve to be checked.
2. With the tractor running, increase the engine speed to 2200 rpm.

3. Operate the hydraulic function, then operate the spool valve to be checked. The flow rate should be:
Q = 100 l/min +/- 10 l

NOTE: All of the tractor's spool valves can individually supply 100 l/min.

4. To check the maximum flow rate from the front spool valves, connect the flowmeter (Fig. 5).

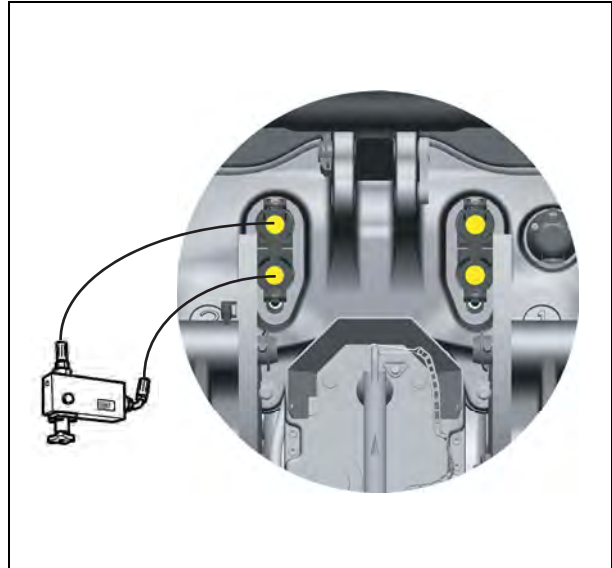
Check the maximum pressure to the spool valve

Parameters required:

- hydraulic oil temperature at 60 °C
- engine speed at 2200 rpm

Tools used:

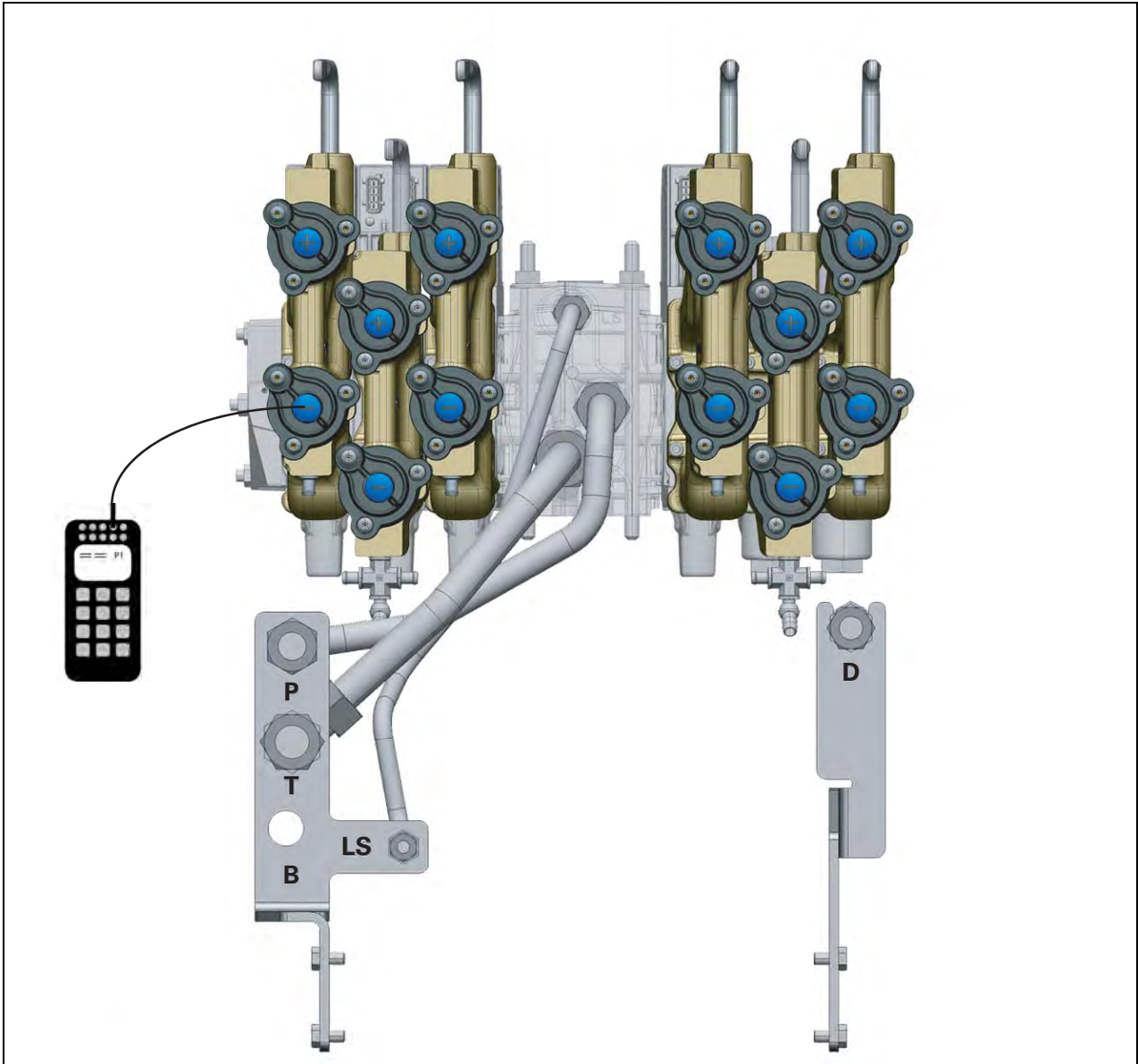
- pressure gauge, maximum value of 250 bar
- Push/Pull type hydraulic unions



1009339

Fig. 5

Method



1009340

Fig. 6

1. Connect the pressure gauge to one of the spool valves.
2. With the tractor running at 2200 rpm, operate the hydraulic function and then operate the spool valve to be checked. The pressure should be:
P = 190 bar +/- 10 bar

3. To check the maximum pressure of the front spool valves, connect the pressure gauge (Fig. 7).

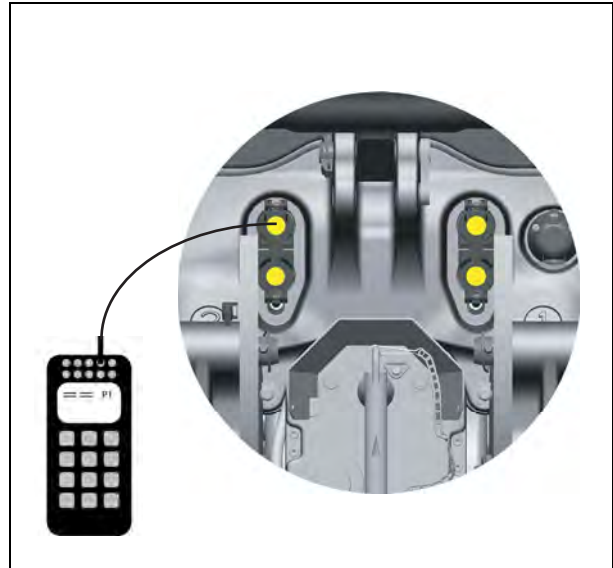
Zero leak test

Parameters required:

- hydraulic oil temperature at 60 °C
- engine idle speed at 800 rpm

Tools used:

- implements with ram under load (bucket, rotary harrow with hitch and seeder fitted etc.)
- pressure gauge, minimum value of 250 bar

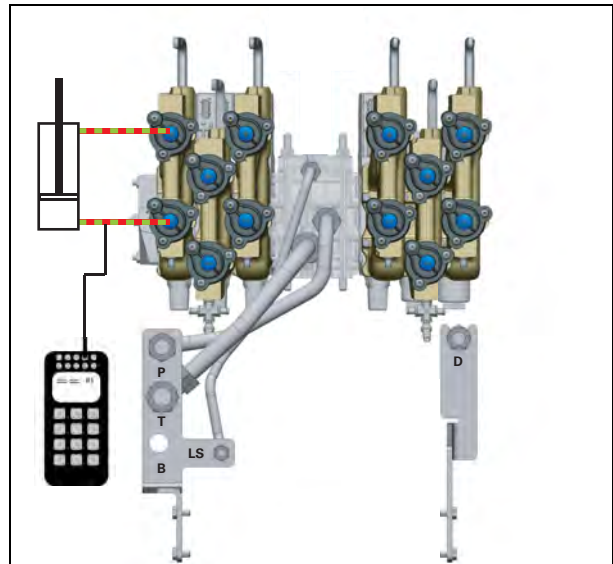


1009341

Fig. 7

Method

1. To one of the spool valves, connect an implement that will apply a pressure of approximately 100 bar on the spool valve.
2. Connect a T connector to the line under pressure in order to check the pressure.
3. With the tractor running, operate one of the spool valves to lift the implement.
4. Stop the engine with the ram loaded.
5. Read off the height of a point on the implement.
6. After 1 hour under load, the implement should not move and the height of the point should be the same.



1009342

Fig. 8

9C15

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9C16

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9C17

LS auxiliary spool valves - Disassembly and reassembly

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A. Removing the auxiliary spool valves

Preliminary steps

7. Mark the electrical connections.
8. Mark the spool valves. They can be numbered using a felt-tip pen to make refitting easier.

Disassembly

9. Remove the 4 CHC screws from the rear plate of the spool valves.



1010701

Fig. 1

10. Disconnect the first connector of the front spool valves following the connector disassembly instructions.

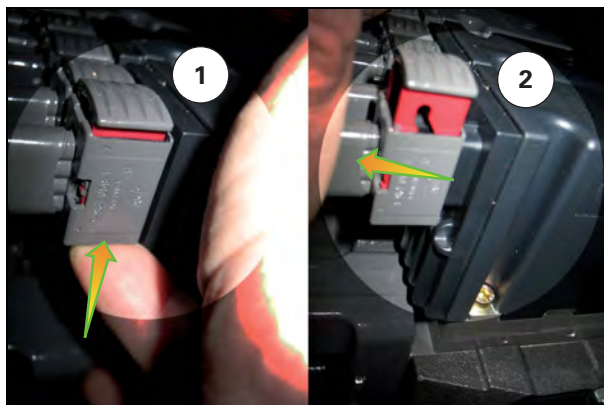


1010705

Fig. 2

Connector disassembly instructions

- 11.** Push the lock to the rear of the connector as shown (1).
- 12.** Pull the connector in the direction of the arrow as shown (2).



1010713

Fig. 3

- 13.** Disconnect the connector at the right-hand side as indicated by the arrow.
- 14.** Remove the rear plate.



1010717

Fig. 4

- 15.** Remove the 4 retaining nuts from the top link support.



1010718

Fig. 5

16. Remove the top link support.



1010719

Fig. 6

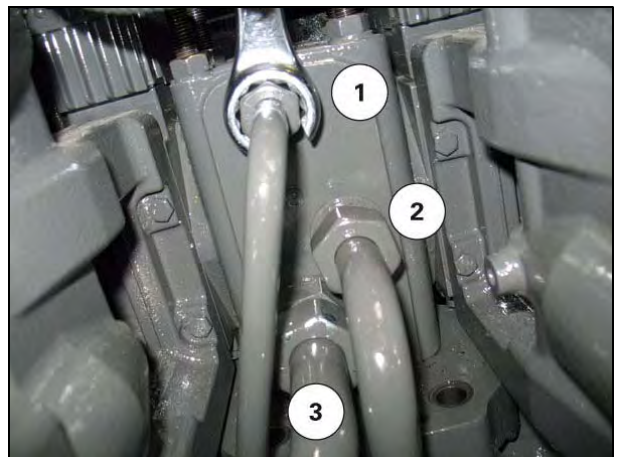
17. Remove the 2 screws from the hydraulic connector support (trailer brake and accessories sockets).



1010720

Fig. 7

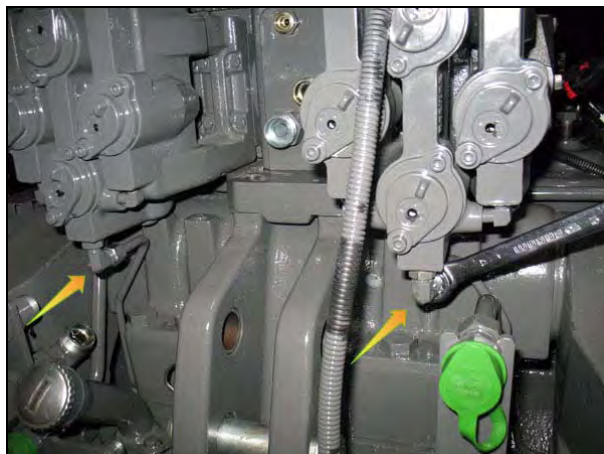
18. Remove the 3 hydraulic unions from the central unit in the order shown.



1010721

Fig. 8

- 19.** Remove the 2 dirty oil return channels from the couplers (see arrows).



1010726

Fig. 9

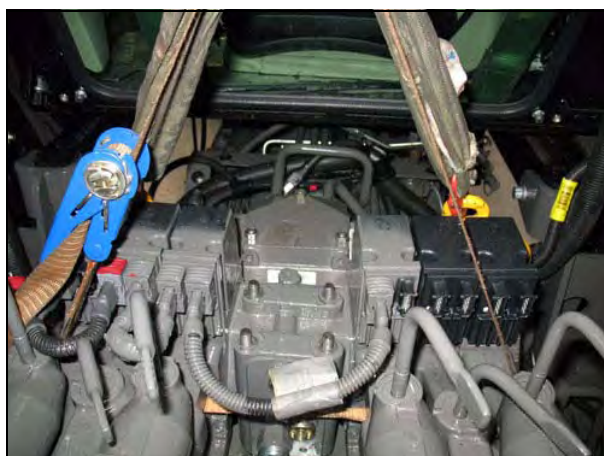
- 20.** Remove the 4 retaining nuts from the central unit.



1010787

Fig. 10

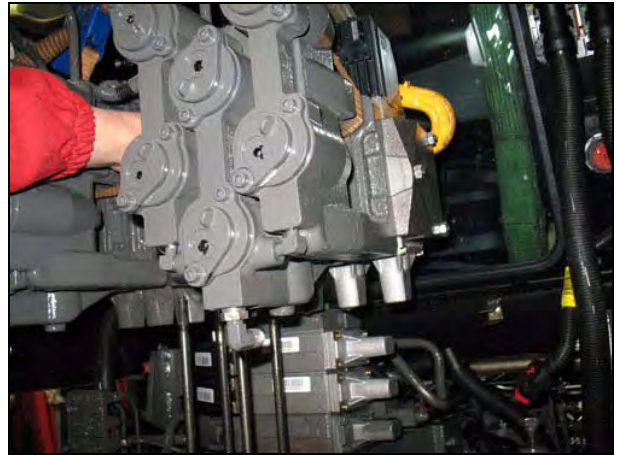
- 21.** Sling the spool valve assembly using shackles screwed to where the rear plate fixing holes are located, and a strap placed on the spool valve coupler side. Ensure the assembly is correctly balanced.



1010788

Fig. 11

- 22.** Raise the unit using a lifting tool. Ensure the assembly is removed without exerting any force on the 4 studs.



1010789

Fig. 12

- 23.** Place the spool valve assembly on a clean working area. It is advisable to position it vertically if an operation must be carried out on a spool valve section.

- 24.** Discard the old seals.



1010791

Fig. 13

B. Refitting the auxiliary spool valves

Preliminary steps

25. Ensure you have new seals.
26. Fully clean all components.



WARNING: Any traces of mud, water or oxidation must be removed, or, if necessary, the damaged component must be replaced.

Reassembly

27. Fit new "O" rings on the receiving plate.

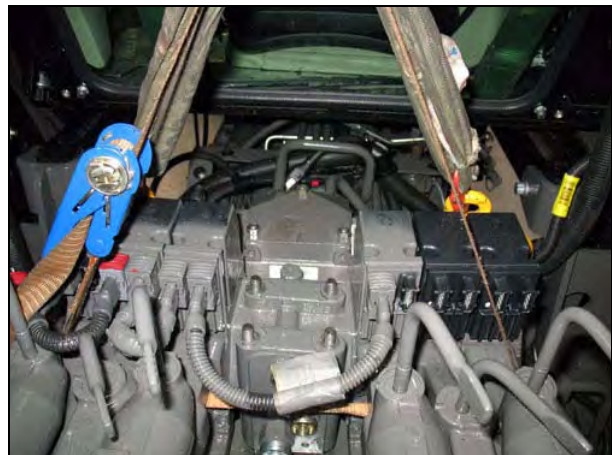


1010792

Fig. 14

28. Sling the spool valve assembly and fit it on the tractor's receiving plate at the rear of the cab.

NOTE: Check the "O" rings are positioned correctly before the unit is placed against the receiving plate.



1010788

Fig. 15

29. Fit the nuts and tighten them to a torque of 60 Nm



1010787

Fig. 16

30. Reconnect the spool valve electrical connectors.

NOTE: Do not forget the plug connector (see arrow)

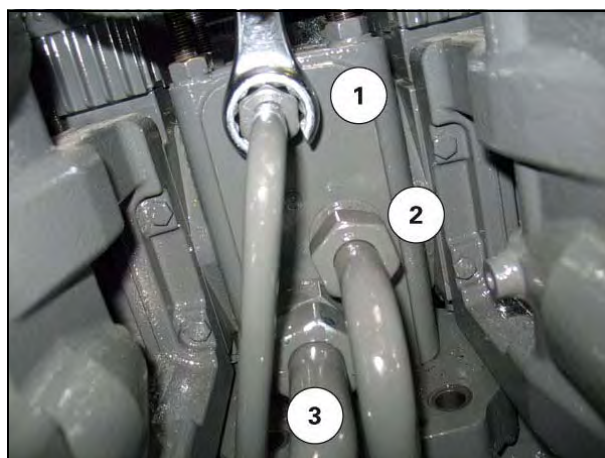


1010817

Fig. 17

31. Refit the 3 hydraulic unions according to the marks made during removal. Tighten the unions to the following torques:

- 1) 45 Nm
- 2) 60 Nm
- 3) 60 Nm



1010721

Fig. 18

- 32.** Refit the 2 screws from the hydraulic connector support (trailer brake and accessories sockets) and tighten them to a torque of 30 Nm.



1010720

Fig. 19

- 33.** Refit the 4 retaining nuts from the top link support and tighten them to a torque of 60 Nm.



1010816

Fig. 20

- 34.** Refit the rear plate.

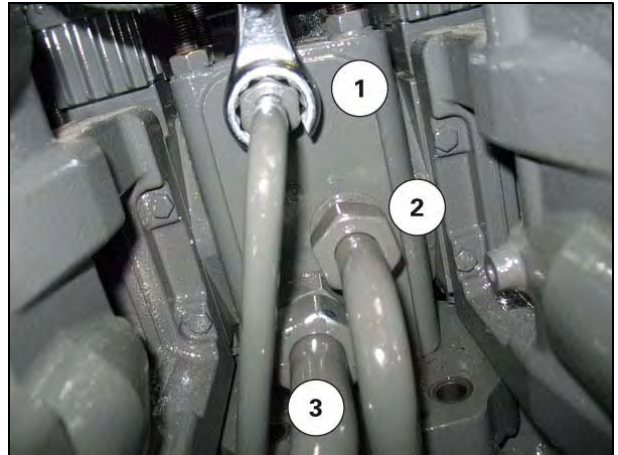
- 35.** Fit the screws and tighten them to a torque of 30 Nm.



1010701

Fig. 21

- 36.** Remove the 3 hydraulic unions from the central unit in the order shown.
- 37.** Reconnect the electrical connectors disconnected during removal.



1010721

Fig. 22

C. Removing the auxiliary spool valves

Preliminary steps

- 38.** Remove the auxiliary spool valve assembly from the tractor and place them on a clean working area.
- 39.** Mark the spool valves. They can be numbered using a felt-tip pen to make refitting easier.
- 40.** Ensure you have a complete pack of seals for the auxiliary spool valves.



1010818

Fig. 23

Disassembly

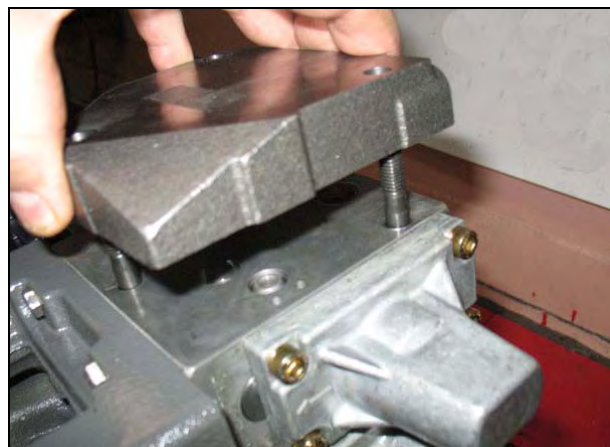
- 41.** Remove the 3 cover plate retaining nuts.



1010819

Fig. 24

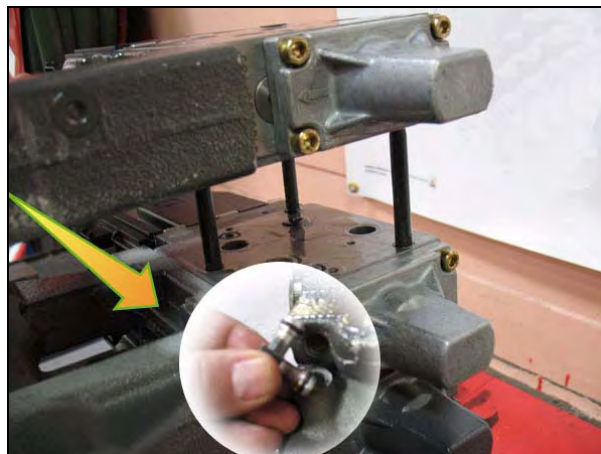
- 42.** Remove the cover plate and discard the "O" rings.



1010820

Fig. 25

- 43. Lift the first auxiliary spool valve.
- 44. Remove the oil recovery elbow union (see arrow).
- 45. Discard the "O" rings.



1010821

Fig. 26

- 46. Carry out the same procedure for the other spool valves until the faulty spool valve is reached.
- 47. Protect the removed spool valves correctly.
- 48. Discard the removed seals.



1010823

Fig. 27

- 49. Separate the coupler section from the spool valve section by removing the 4 screws.
- 50. Replace the spool valve section if it is faulty.



1010824

Fig. 28

D. Refitting the auxiliary spool valves

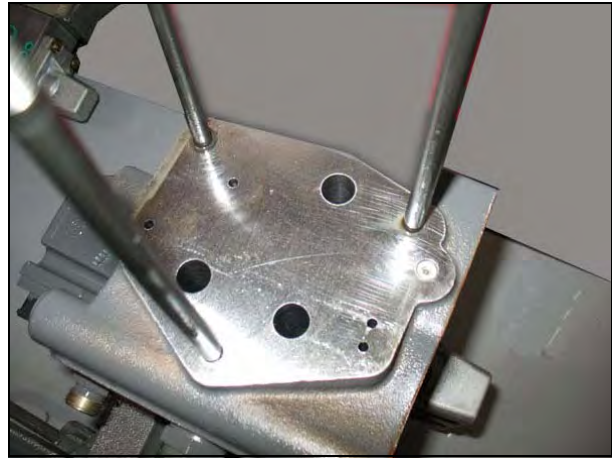
Preliminary steps

51. Check that the parts to be refitted are clean.



WARNING: Any traces of mud, water or corrosion must be removed.

52. Ensure you have a pack of seals for the spool valve and the new parts required.

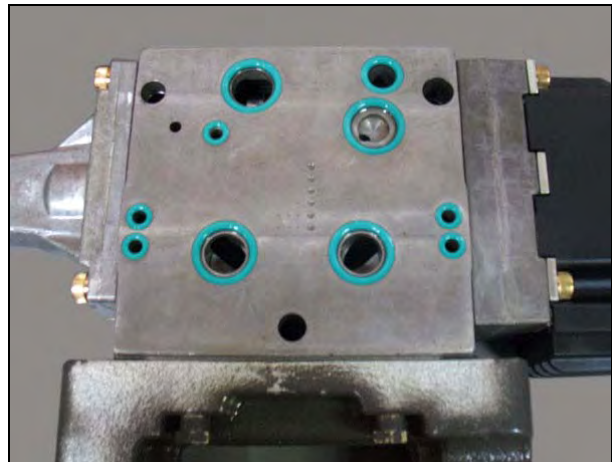


1010823

Fig. 29

Reassembly

53. Fit new "O" rings.

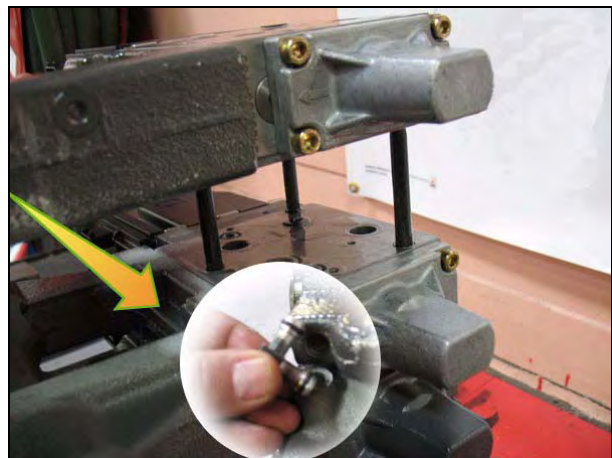


1010864

Fig. 30

54. Fit the spool valve equipped with new seals.

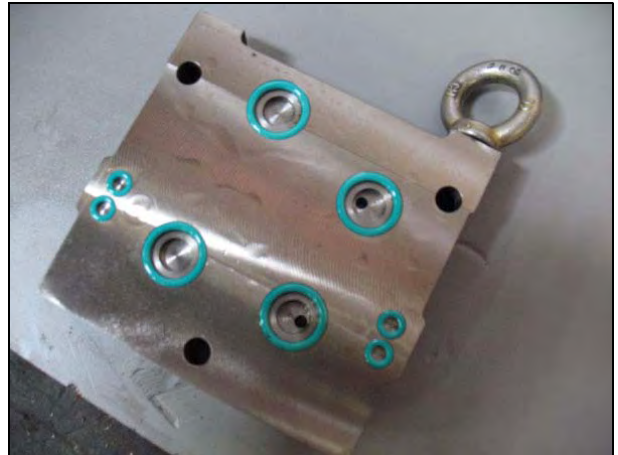
55. Repeat the operation depending on the number of spool valves.



1010821

Fig. 31

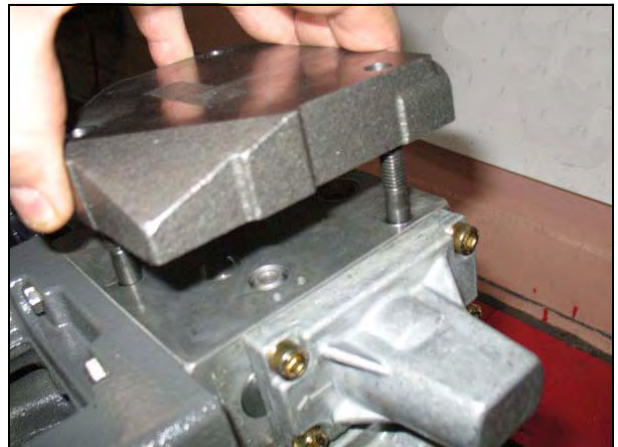
56. Fit new seals on the cover plate.



1010865

Fig. 32

57. Fit the cover plate.



1010820

Fig. 33

58. Fit the cover plate nuts and tighten them to a torque of 30 Nm.



1010819

Fig. 34

E. Removing the auxiliary spool valves - couplers

Removing the coupler

- 59.** Position the coupler so that the protection screws are facing upwards.
- 60.** Remove the screws.



1010827

Fig. 35

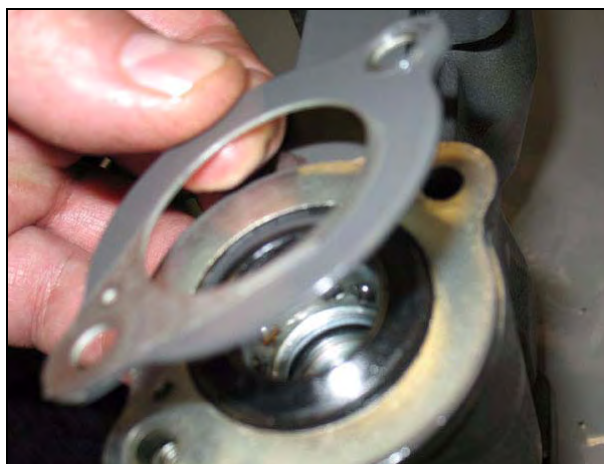
- 61.** Remove the coupler protection.



1010828

Fig. 36

- 62.** Remove the plate.



1010831

Fig. 37

63. Recover the protection safety pin.



1010829

Fig. 38

64. Remove the retaining plate.



1010832

Fig. 39

65. Remove the ring fitted with its "O" ring. Discard the "O" ring if there is even the slightest defect.

66. Repeat the same operation for the other port on the coupler.



1010833

Fig. 40

67. Secure the coupler in a vice.



1010836

Fig. 41

68. Remove the retaining circlip from the control lever.



1010834

Fig. 42

69. While moving the lever, gently release the coupler rings (see arrows).



1010825

Fig. 43

70. Remove the rings from the coupler.



1010839

Fig. 44

71. Remove the control pin by pulling it upwards.



1010843

Fig. 45

72. Remove the control cam using long nose pliers.

73. Clean and check all components.

74. Discard any faulty components.



1010846

Fig. 46

F. Refitting the auxiliary spool valves - couplers

Refitting the coupler

75. Position the control cam as shown in the photo (Fig. 47).

76. Fit it using long nose pliers.



1010866

Fig. 47

77. Fit the control pin, ensuring the upper control cam is correctly positioned.

78. Ensure the control pin is correctly inserted in the lower control cam.



1010869

Fig. 48

79. Refit the circlip.



1010834

Fig. 49

80. Fit a new seal on the ring.



1010870

Fig. 50

81. Refit the ring equipped with a new seal.



1010833

Fig. 51

82. Refit the retaining plate.



1010832

Fig. 52

83. Fit the cover plate stop pin.



1010829

Fig. 53

84. Fit the coupler protection.

85. Fit and tighten the screws.



1010827

Fig. 54

86. Refit the coupler section onto the spool valve section.



1010824

Fig. 55

- 87.** Refit the spool valve sections in the order they were removed.
- 88.** Refit the spool valve assembly to the tractor.



1010818

Fig. 56

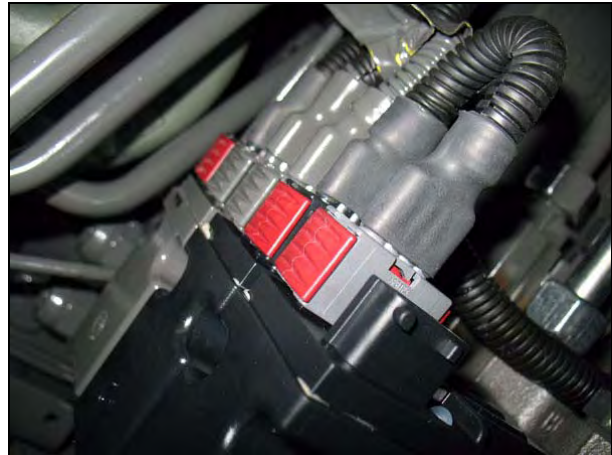
G. Removing the front auxiliary spool valves

Preliminary steps

- 89.** Mark the electrical connections.
- 90.** Mark the spool valves. They can be numbered using a felt-tip pen to make refitting easier.
- 91.** Ensure you have new seals.

Disassembly

- 92.** Disconnect the connectors from the front auxiliary spool valves.



1010884

Fig. 57

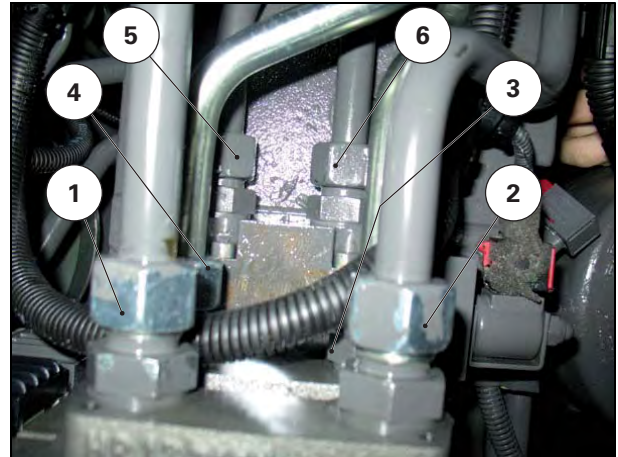
- 93.** Remove the hydraulic channel mounting flange.



1010908

Fig. 58

94. Disconnect the hydraulic unions in the order shown in the photo (Fig. 59).



1010900

Fig. 59

95. Remove the 3 retaining nuts.



1010901

Fig. 60

96. Remove the cover plate.

97. Discard the seals.

98. Remove the rear plate.



1010903

Fig. 61

- 99.** Remove the first spool valve.
- 100.** Repeat the operation until the faulty spool valve is reached.
- 101.** Systematically discard the seals.
- 102.** Repair the spool valve.



I010904

Fig. 62

H. Refitting the front auxiliary spool valves

Preliminary steps

103. Clean all components.



WARNING: Any traces of mud, water or corrosion must be removed.

104. Ensure you have new seals.

Reassembly

105. Refit the spool valves equipped with new seals in the order they were removed.



1010906

Fig. 63

106. Fit the cover plate equipped with new seals.

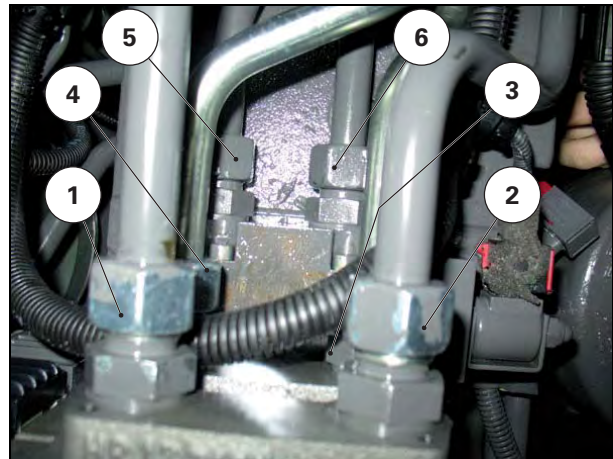
107. Fit the nuts and tighten them to a torque of 30 Nm.



1010907

Fig. 64

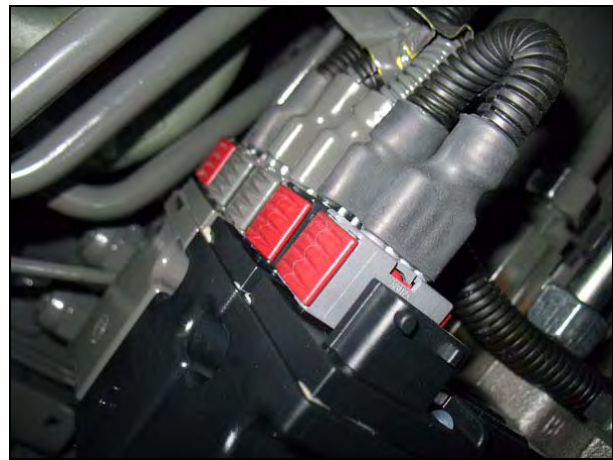
- 108.**Reconnect the hydraulic channels in reverse order to removal. Tighten the unions to a torque of 60 Nm.
- 109.**Refit the hydraulic channel mounting flange above the gearbox.



1010900

Fig. 65

- 110.**Reconnect the electrical connectors according to the marks made during removal.



1010884

Fig. 66

9C18

LS auxiliary spool valves - Service tools

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A. General

The tools described in this section can be ordered from the AGCO spare parts department or by contacting the tooling division of Beauvais by referring to AGCOnet bulletin Trac 60/07.

The prices will then be sent out to you.

B. LS auxiliary spool valves - Service tools

Ref.	AG01A
Description	Hydraulic testing and measuring instrument kit
Order	AGCO Stoneleigh

Contents

See Service Bulletin ADM 08/04



1009102

Fig. 1

9D10

LS rear linkage - General

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A. General

The rear linkage on 8600 series tractors is category 3 and single acting. It is controlled by a Bosch EHR 23 spool valve.

The function of the linkage spool valve (Fig. 1) is to regulate the oil flow to and from the lift rams according to the signals transmitted by the electronic linkage controller.

The linkage spool valve has an LS port for the Load Sensing system. This pilot port allows the spool valve to send pressure data to the variable displacement pump regulator via the priority block.

The linkage spool valve is made up of elements themselves comprising spools and valves.

NOTE: Some of these elements cannot be repaired as spare parts.

Reminder:

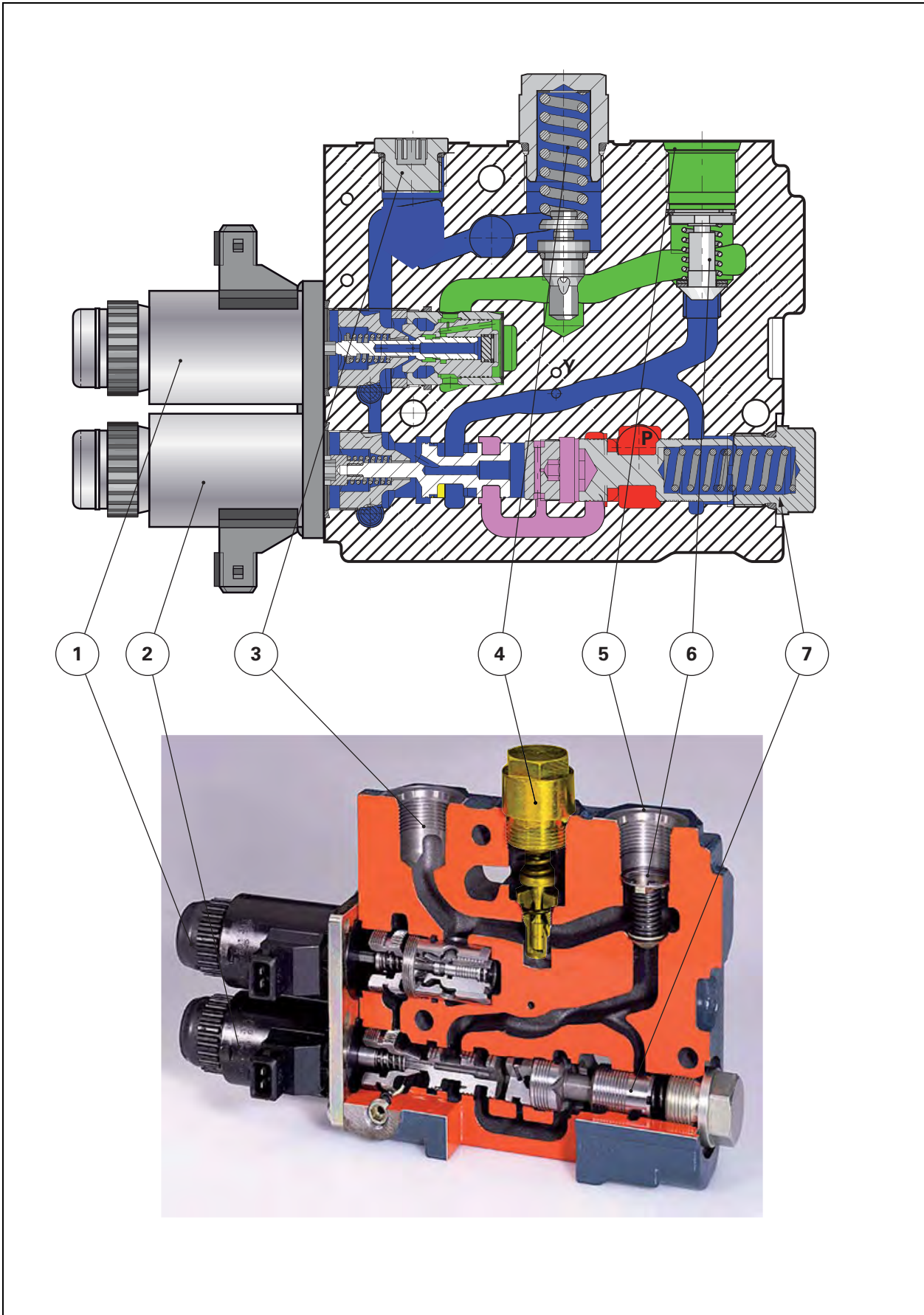
To determine whether a problem is hydraulic or electrical, operate the push buttons at the end of the solenoid valves (Fig. 1). This allows solenoid valve movement to be controlled manually.



1011867

Fig. 1

B. Principles of operation



1011930

Fig. 2

- (1) Lowering solenoid valve
- (2) Lifting solenoid valve
- (3) Supply port of ram small chamber
- (4) Security valve
- (5) Supply port of ram large chamber
- (6) Non-return valve
- (7) Pressure balancing valve

Neutral position

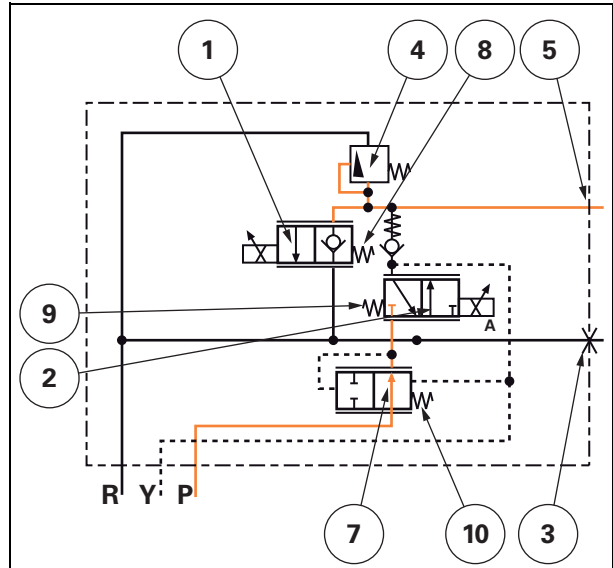
- (1) Lowering solenoid valve
- (2) Lifting solenoid valve
- (3) Supply port of ram small chamber
- (4) Security valve
- (5) Supply port of ram large chamber
- (6) Non-return valve
- (7) Pressure balancing valve
- (8) Spring
- (9) Spring
- (10) Spring
- R Tank return
- Y LS system
- P Pressure system

When the spool valve is in neutral position, the control spools (1) and (2) are held in closed position by springs (8) and (9) respectively.

The spool of the pressure balancing valve (7) is pushed to maximum open position by the spring (10).

When the engine is running and the spool valve is at neutral, the LS line (Y) is not connected to the pump (P) pressure, and no pressure information is sent to the variable displacement pump.

If no other functions are activated on the tractor, the variable displacement pump remains in standby position.



1011931

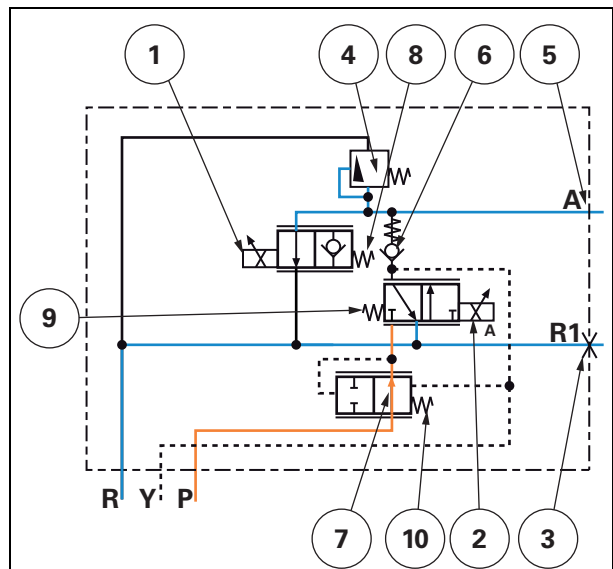
Fig. 3

Lowering position

- (1) Lowering solenoid valve
- (2) Lifting solenoid valve
- (3) Supply port of ram small chamber
- (4) Security valve
- (5) Supply port of ram large chamber
- (6) Non-return valve
- (7) Pressure balancing valve
- (8) Spring
- (9) Spring
- (10) Spring
- R Tank return
- Y LS system
- P Pressure system

When the lifting/lowering switch in the cab is activated in lowering position, the spool (1) moves and connects the large chamber of the lift rams with the tank return (R).

The linkage is therefore in the lowering position.



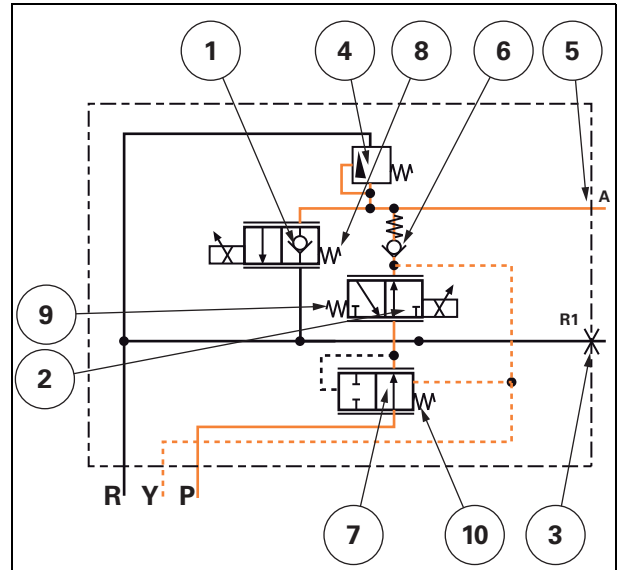
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Fig. 4

Lifting position

- (1) Lowering solenoid valve
- (2) Lifting solenoid valve
- (3) Supply port of ram small chamber
- (4) Security valve
- (5) Supply port of ram large chamber
- (6) Non-return valve
- (7) Pressure balancing valve
- (8) Spring
- (9) Spring
- (10) Spring
- R Tank return
- Y LS system
- P Pressure system

When the lifting/lowering switch in the cab is activated in lifting position, the spool (1) is pushed back by its spring (8), the spool (9) moves and allows the pressure system (P), LS system (Y) and ram large chamber (5) to be connected. The pressure in the LS system increases and changes the displacement of the pump, allowing the increase in pressure required to lift the linkage.



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Fig. 5










9D11

LS rear linkage - Error codes

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A. Reading error codes

ERROR CODES DISPLAYED ON THE INSTRUMENT PANEL				
	DISPLAY with Dash Control Center			DISPLAY without Dash Control Center
Instrument panel		+	Letter D (Dashboard)	Letter D (Dashboard)
Engine		+	Letter E (Engine)	Letter E (Engine)
SCR system	no icon		Letter U (Urea)	Letter U (Urea)
Transmission/4WD/PTO		+	Letter T (Transmission)	Letter T (Transmission)
Lights module		+	Letter L (Light)	Letter L (Light)
ParkLock		+	Letter P (ParkLock)	Letter P (ParkLock)
Front axle		+	Letters FA (Front Axle)	Letters FA (Front Axle)
Linkage		+	Letters R (Linkage)	Letter R (Linkage)
Electrohydraulic		+	Letters H (Hydraulics)	Letter H (Hydraulics)
Cab		+	Letters C (Cab)	Letter C (Cab)
Auto-Guide		+	Letters A (Auto-Guide)	Letter A (Auto-Guide)
Control Arm		+	Letters AR (ARmrest)	Letter AR (ARmrest)

OTHER DISPLAYS	
Automatic air conditioning	Displayed on the air conditioning module.

B. Linkage error codes

No.		Components concerned	Causes
R	11	X27 - Rear linkage lifting solenoid valve	Open circuit
		X28 - Rear linkage lowering solenoid valve	
R	12	X27 - Rear linkage lifting solenoid valve	Short circuit
R	13	X28 - Rear linkage lowering solenoid valve	Short circuit
R	14	X174 - Autotronic 4 transmission controller	No CAN unlocking signal
R	15	X87 - Linkage lifting/lowering switch on right-hand fender	Incorrect signal
		X97 - Linkage lifting/lowering switch on left-hand fender	
R	16	X177 - Autotronic 5 Linkage	Battery voltage <11 V or >16 V
R	17		Checksum error
R	18	X119 - Rear linkage lifting/lowering switch	Incorrect signal
R	19	X177 - Autotronic 5 Linkage	Parameter loss
R	22	X30 - Rear linkage position sensor	Incorrect signal
R	23	X121 - Rear linkage height/depth adjustment thumb wheel	Incorrect signal
R	24	X145 - PTO/linkage console	Incorrect signal
R	31	X32 - Rear linkage left-hand draft sensor	Incorrect signal
R	32	X31 - Rear linkage right-hand draft sensor	Incorrect signal
R	33	Front linkage suspension sensor	Signal incorrect or incorrect calibration
R	34	X145 - PTO/linkage console	Incorrect signal
R	35	X145 - PTO/linkage console	Incorrect signal
R	36	X145 - PTO/linkage console	Incorrect signal
R	41	X32 - Rear linkage left-hand draft sensor	Saturation
R	42	X31 - Rear linkage right-hand draft sensor	Saturation

C. Armrest error codes

No.		Components concerned	Causes
AR	01	X104 - Armrest Autotronic 5	10 V output fault
AR	02	X104 - Armrest Autotronic 5	VIN Error - Vehicle electronic identification incorrect
AR	11	X307 - FingerTIP 1	Short circuit 0 V
AR	12		Short circuit to 12 V
AR	21	X308 - FingerTIP 2	Short circuit 0 V
AR	22		Short circuit to 12 V
AR	31	X108 - FingerTIP 3	Short circuit 0 V
AR	32		Short circuit to 12 V
AR	41	X109 - FingerTIP 4	Short circuit 0 V
AR	42		Short circuit to 12 V
AR	51	X110 - FingerTIP 5	Short circuit 0 V
AR	52		Short circuit to 12 V
AR	61	X130 - FingerTIP 6 front linkage function	Short circuit 0 V
AR	62		Short circuit to 12 V
AR	71	X122 - Hand throttle	Short circuit 0 V
AR	72		Short circuit to 12 V
AR	81	X121 - Rear linkage height/depth adjustment thumb wheel	Short circuit 0 V
AR	82		Short circuit to 12 V
AR	91	X106 - Transmission lever in armrest	Short circuit 0 V
AR	92		Short circuit to 12 V

9D12

LS rear linkage - Diagrams and plans

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A. Hydraulics diagrams

Different systems

- (1) Variable displacement pump
- (2) Orbitrol
- (3) ParkLock control unit
- (4) Brake master cylinder
- (5) Suspended front axle unit
- (6) Main brake unit

Pumps

- (P1) Variable displacement pump
- (P2) Steering pump
- (P3) Steering standby pump

Filters - Strainers

- (F1) Filter on the return to the tank
- (F2) Suction strainer
- (F3) Standby pump suction strainer
- (F4) Standby pump suction strainer

Rams

- (V1) Rear linkage rams
- (V2) Steering ram
- (V3) ParkLock rams
- (V4) Right-hand brake fitting
- (V5) Left-hand brake fitting
- (V6) Front axle suspension ram
- (V7) Front cab suspension ram
- (V8) Rear cab suspension ram
- (V9) Auto-hitch ram
- (V10) Trailer brake ram, if connected

Accumulators

- (AC1) ParkLock accumulator
- (AC2) Main brake accumulator
- (AC3) Front axle suspension left-hand side accumulator
- (AC4) Front axle suspension right-hand side accumulator
- (AC5) Front cab suspension ram accumulators
- (AC6) Rear cab suspension ram accumulators

Other components

- (R1) Oil cooler

Different systems

- (7) Trailer brake unit
- (8) Cab suspension unit
- (9) Auto-hitch unit
- (10) Priority block
- (11) Connection unit
- (12) Connection unit
- (13) Rear linkage

A.1 Main hydraulics diagram

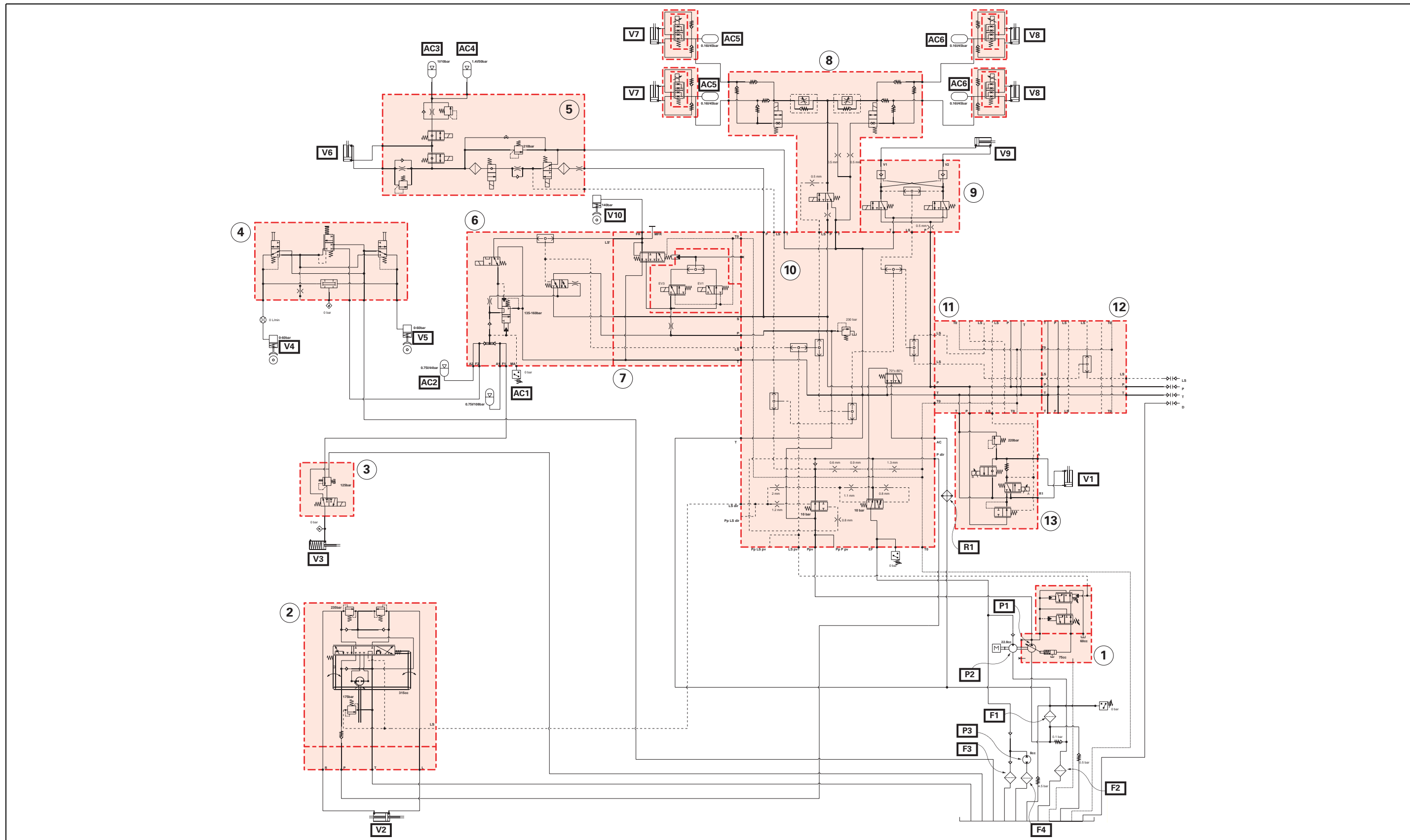


Fig. 1

Different systems

- (1) Rear linkage
- (2) Connection unit
- (3) Front linkage
- (4) Spool valve no. 1 for the no. 1 couplers at the front
- (5) Spool valve no. 2 for the no. 2 couplers at the front
- (6) Cover plate
- (7) Cover plate
- (8) Spool valve no. 1
- (9) Spool valve no. 2
- (10) Spool valve no. 3
- (11) Connection unit
- (12) Spool valve no. 4
- (13) Spool valve no. 5
- (14) Spool valve no. 6
- (15) Cover plate

A.2 Auxiliary spool valve hydraulics diagram (with front couplers)

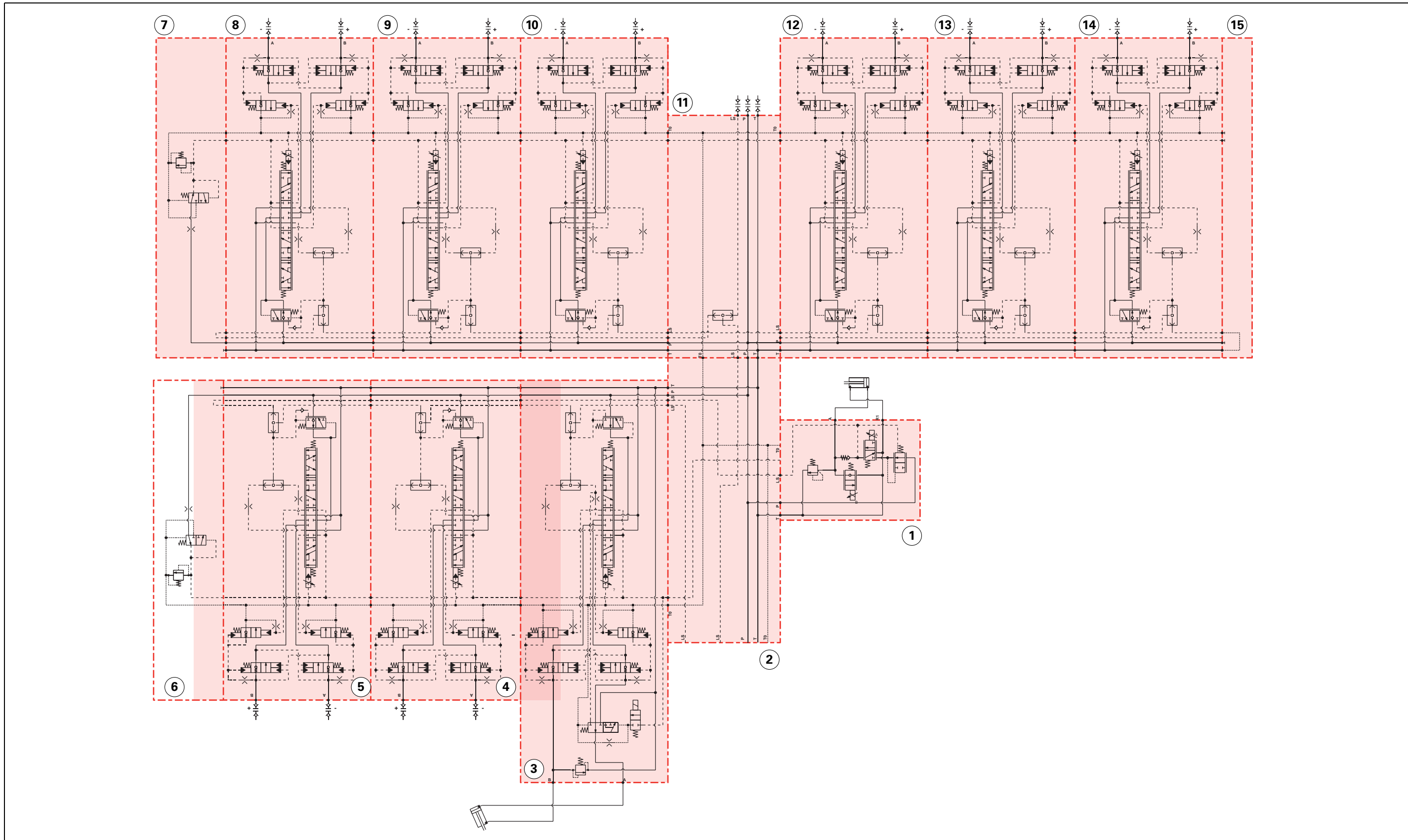


Fig. 2

Different systems

- (1) Rear linkage
- (2) Connection unit
- (3) Front linkage
- (4) Cover plate
- (5) Spool valve no. 1
- (6) Spool valve no. 2
- (7) Spool valve no. 6
- (8) Connection unit
- (9) Spool valve no. 3
- (10) Spool valve no. 4
- (11) Spool valve no. 5
- (12) Cover plate

A.3 Auxiliary spool valve hydraulics diagram (without front couplers)

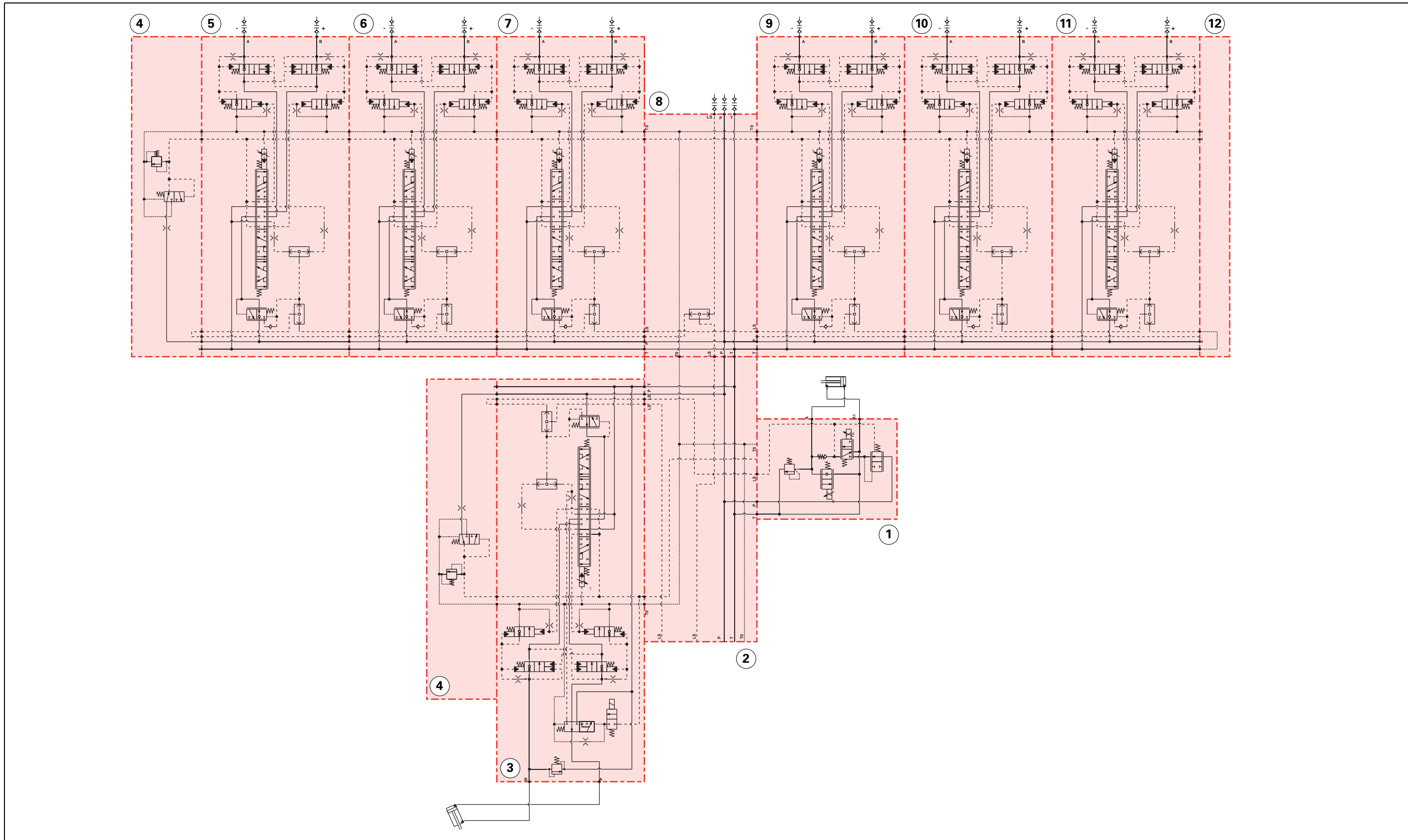


Fig. 3

B. Electrical diagrams

B.1 Identification of electrical connectors and harnesses

Identification of electrical connectors

- X1** - Auxiliary hydraulic oil temperature sensor
- X2** - Auxiliary hydraulic oil filter blockage switch
- X3** - 540 rpm PTO speed solenoid valve
- X4** - 1000 rpm PTO speed solenoid valve
- X5** - 4WD solenoid valve
- X6** - Differential lock solenoid valve
- X7** - Rear PTO solenoid valve
- X8** - Bevel gear theoretical speed sensor
- X9** - Transmission oil high pressure sensor 1
- X10** - Collecting shaft speed sensor
- X11** - Solenoid valve limiting speed to 30 kph
- X12** - Coupler function solenoid valve
- X13** - Hare range solenoid valve
- X14** - Tortoise range solenoid valve
- X15** - PTO clutch speed sensor
- X16** - PTO shaft speed sensor
- X17** - Hare/Tortoise range position sensor
- X18** - Transmission control module
- X19** - Transmission hydraulic oil temperature sensor
- X20** - Transmission filter blockage switch
- X21** - ParkLock brake pressure sensor
- X22** - Radar
- X23** - Steering pressure sensor
- X24** - Auxiliary hydraulic oil gauge
- X25** - Engine speed sensor
- X26** - Pneumatic brake solenoid valve
- X27** - Rear linkage lifting solenoid valve
- X28** - Rear linkage lowering solenoid valve
- X29** - Dual Control socket connector
- X30** - Rear linkage position sensor
- X31** - Rear linkage right-hand draft sensor
- X32** - Rear linkage left-hand draft sensor
- X33** - Transmission harness CAN junction
- X34** - Transmission oil high pressure sensor 2
- X35** - ParkLock hydraulic system pressure sensor
- X36** - LS signal breaker solenoid valve
- X37** - ParkLock pressure reversing solenoid valve
- X38** - Trailer braking proportional solenoid valve
- X39** - Trailer braking safety solenoid valve
- X40** - Front linkage single/double acting function solenoid valve
- X41** - Divider solenoid valve 1
- X42** - Divider solenoid valve 2
- X43** - Auto-hitch lifting solenoid valve
- X44** - Auto-hitch lowering solenoid valve
- X45** - Bleed for pneumatic suspended cab front and rear systems
- X46** - Rear left-hand ram position sensor for cab suspension
- X47** - Rear right-hand unit for suspended cab
- X48** - Rear left-hand unit for suspended cab
- X49** - Suspended cab rear lowering solenoid valve
- X50** - Suspended cab front lowering solenoid valve
- X51** - Transmission harness earth (chassis)
- X52** - Engine harness/transmission harness junction
- X53** - Cab transmission harness/transmission harness junction
- X54** - Suspended cab lifting solenoid valve
- X55** - Instrument panel
- X56** - Power Control lever
- X57** - DOT Matrix keyboard
- X58** - Windscreen wiper and indicator control unit
- X59** - DOT Matrix keyboard connection on instrument panel
- X60** - Engine harness/instrument panel harness junction
- X61** - Cab transmission harness/engine harness junction
- X62** - Instrument panel harness/cab transmission harness junction
- X63** - Instrument panel harness connection on fuse box
- X64** - Instrument panel harness connection on fuse box
- X65** - Front windscreen wiper motor
- X66** - Left-hand brake pedal sensor
- X67** - Right-hand brake pedal sensor
- X68** - Clutch pedal sensor
- X69** - Cab interior temperature sensor
- X70** - Solar radiation sensor
- X71** - Throttle pedal sensor
- X72** - ParkLock switch on Power Control lever
- X73** - Buzzer Control
- X74** - Buzzer Supply (+12 V APC)
- X75** - Pillar harness/right-hand fender harness junction
- X76** - Rear right-hand indicator
- X77** - Rear right-hand side light and stop light
- X78** - Work light on rear right-hand fender
- X79** - -
- X80** - -
- X81** - -
- X82** - -
- X83** - -
- X84** - -
- X85** - -
- X86** - -
- X87** - Linkage lifting/lowering switch on right-hand fender
- X88** - Rear right-hand NA indicator extension
- X89** - Earth (chassis)
- X90** - Pillar harness/left-hand fender harness junction
- X91** - Rear left-hand indicator
- X92** - Rear left-hand side light and stop light
- X93** - Work light on rear left-hand fender
- X94** - PTO ON/OFF switch on left-hand fender
- X95** - PTO Stop switch on left-hand fender
- X96** - Hydraulic spool valve switch on left-hand fender
- X97** - Linkage lifting/lowering switch on left-hand fender
- X98** - Rear left-hand NA indicator extension
- X99** - PTO and linkage console harness/cab transmission harness junction
- X100** - Instrument panel harness earth (chassis)
- X101** - Instrument panel harness/electric rear-view mirror harness junction
- X102** - Right-hand fender lighting harness/trailer connector harness junction
- X103** - Armrest harness/cab transmission harness junction
- X104** - Armrest Autotronic 5

- X105** - Datatronic CCD
X106 - Transmission lever in armrest
X107 - Headland mode switch (headland function)
X108 - FingerTIP 3
X109 - FingerTIP 4
X110 - FingerTIP 5
X111 - DTM dynamic transmission mode switch
X112 - Joystick
X113 - Armrest 6-button keyboard
X114 - Supply on fuse box for 3rd spool valve
X115 - Supply on fuse box for 4th spool valve
X116 - +12 V battery supply (for lighting module)
X117 - Isobus +12 V battery power socket
X118 - Automatic PTO switch
X119 - Rear linkage lifting/lowering switch
X120 - Datatronic CCD navigation keyboard
X121 - Rear linkage height/depth adjustment thumb wheel
X122 - Hand throttle
X123 - Hare/Tortoise range shift switch
X124 - Pedal/lever mode switch
X125 - SV1 speed setting potentiometer
X126 - SV2 speed setting potentiometer
X127 - Front PTO ON/OFF switch
X128 - Rear PTO ON/OFF switch
X129 - Fuse box +12 V battery connection
X130 - FingerTIP 6 front linkage function
X131 - Front linkage suspension solenoid valve
X132 - Instrument panel harness/armrest harness junction
X133 - Console harness/cab transmission harness junction
X134 - Console harness/pillar harness junction
X135 - Braking pressure sensor
X136 - Differential lock switch
X137 - 4WD switch
X138 - Hazard warning lights indicator light and switch
X139 - Suspended front axle switch
X140 - Suspended front axle setting potentiometer
X141 - Suspended cab switch
X142 - Suspended cab setting potentiometer
X143 - Variable steering switch (fast steering)
X144 - Variable steering setting potentiometer (fast steering)
X145 - PTO/linkage console
X146 - Rear linkage suspension switch
X147 - Roof harness/pillar harness junction
X148 - Roof harness/pillar harness junction
X149 - Headlights module (black connector)
X150 - Pillar harness/cab power socket harness junction
X151 - Pillar harness/cab power socket harness junction
X152 - Start switch
X153 - Non-Isobus implement connector
X154 - Suspended front axle lifting solenoid valve
X155 - Cigarette lighter socket (power)
X156 - Cigarette lighter socket (backlighting)
X157 - Left-hand side +12 V socket (power)
X158 - Left-hand side +12 V socket (backlighting)
X159 - Suspended front axle lowering solenoid valve
X160 - Console harness earth (chassis)
X161 - Solenoid valve 1 for suspended front axle suspension
X162 - Pillar harness connection on fuse box
X163 - Solenoid valve 2 for suspended front axle suspension
X164 - Pillar harness/cab transmission harness junction
X165 - Automatic air conditioning harness/pillar harness junction
X166 - Suspended front axle position sensor
X167 - +12 V APC fuse box connection
X168 - Pneumatic brake system pressure sensor
X169 - Power socket control switch (in cab)
X170 - Pillar harness connection on fuse box
X171 - Cab transmission harness connection on fuse box
X172 - Cab transmission harness connection on fuse box
X173 - Cab transmission harness earth
X174 - Autotronic 4 transmission controller
X175 - Emergency control switch
X176 - Earth (Autotronic 4 transmission controller)
X177 - Autotronic 5 Linkage
X178 - ParkLock/suspended front axle/passive suspended cab Autotronic 5
X179 - Main lighting, sidelight/dipped light activation switch
X180 - Front windscreen washer pump
X181 - Front linkage single acting / double acting function switch
X182 - Linkage external lifting switch
X183 - Diagnostics connector (tractor-Isobus CAN)
X184 - Diagnostics connector (engine-valve CAN)
X185 - Sisu EEM unit
X186 - Starter
X187 - Engine start relay
X188 - Engine identification module (ID module)
X189 - Fuel lift pump
X190 - Vistronic fan
X191 - Diesel fuel preheater
X192 - B + alternator 1
X193 - B + alternator 2
X194 - D + alternator 1
X195 - D + alternator 2
X196 - In line fuse (225 A)
X197 - Diesel fuel gauge
X198 - Pneumatic trailer brake sensor
X199 - Work light on left-hand step
X200 - Work light on right-hand step
X201 - Engine harness earth
X202 - Front accessory connection socket harness/front function harness junction
X203 - Engine harness/front headlights harness junction
X204 - Cooling unit harness/engine harness junction
X205 - Front axle harness/engine harness junction
X206 - Sensor detecting water in the diesel fuel
X207 - Pneumatic seat adjustment control
X208 - Front linkage suspension switch LED
X209 - Rear linkage external lowering switch
X210 - Orbitrol steering sensor (SASA sensor)
X211 - Rear Dual Control connector

X212 - Instrument panel harness/armrest harness junction
X213 - Power socket for additional heating
X214 - Armrest harness/cab transmission harness junction
X215 - Trailer connector (right-hand side light and number plate lights)
X216 - Reversing light
X217 - Isobus CAN connector
X218 - External Isobus tool connector
X219 - Cab Isobus harness/external Isobus harness junction
X220 - Trailer connector (left-hand side light)
X221 - Trailer connector (right-hand indicator)
X222 - Trailer connector (left-hand indicator)
X223 - Trailer connector (brake lights)
X224 - Trailer connector (earth)
X225 - Trailer connector (reversing light)
X226 - Trailer connector harness earth
X227 - Console harness/cab transmission harness junction
X228 - Front linkage single/double-acting function LED
X229 - 120 Ohm CAN 1 resistor (cab transmission harness)
X230 - 120 Ohm CAN 2 resistor (cab transmission harness)
X231 - 120 Ohm CAN 3 resistor (cab transmission harness)
X232 - 120 Ohm CAN 4 resistor (cab transmission harness)
X233 - Cab transmission harness/Isobus harness junction
X234 - 120 Ohm CAN ATC resistor
X235 - Front axle steering sensor (WAS sensor)
X236 - Electrohydraulic Orbitrol (grey connector)
X237 - Electrohydraulic Orbitrol (black connector)
X238 - Connector 1 for valve harness
X239 - Connector 2 for valve harness
X240 - 120 Ohm resistor for electrohydraulic spool valves
X241 - Sisu engine preheating supply (Grid Heater)
X242 - Exhaust temperature sensor
X243 - AdBlue/DEF reservoir (urea) level gauge and temperature sensor
X244 - CAN SCR harness
X245 - +12 V APC supply for SCR
X246 - Auto-Guide external harness/engine harness junction
X247 - Roof harness/electric rear-view mirror harness junction
X248 - Right and left-hand electric rear-view mirror adjustment switch
X249 - External rear-view mirror defroster switch
X250 - Power socket in cab
X251 - In line fuse (225 A)
X252 - Automatic air conditioning condenser
X253 - Air filter vacuum sensor
X254 - Horn (earth)
X255 - Horn
X256 - Roof harness/hand rail harness junction
X257 - Side light and indicator on hand rail (right and left)

X258 - Main beam on hand rail (right and left)
X259 - Hand rail upper work light
X260 - Hand rail upper work light
X261 - Front right-hand unit for suspended cab
X262 - Front left-hand unit for suspended cab
X263 - Floating stop relay control (US front-end loader)
X264 - Front linkage suspension switch
X265 - Rear linkage suspension switch indicator light
X266 - Rear linkage diagnostic and lifting/lowering LEDs
X267 - Switch for left-hand side heater
X268 - Pillar harness connection on fuse box
X269 - Cab suspension harness/cab transmission harness junction
X270 - Front accessories connection socket (rotary beacon)
X271 - Front accessories connection socket (+12 V battery)
X272 - Front accessories connection socket (+12 V APC)
X273 - Front accessories connection socket (main beam light)
X274 - Front accessories connection socket (main beam light)
X275 - Front accessories connection socket (work light)
X276 - Earth for front accessory connection socket harness
X277 - Front linkage lifting/lowering external control
X278 - Front linkage lifting switch (external)
X279 - Dual Control or TIC position sensor
X280 - Front linkage rams pressure sensor
X281 - Solenoid valve for front PTO
X282 - Roof harness/cab Auto-Guide harness junction
X283 - TopDock
X284 - Headlights module keyboard
X285 - Ad Blue (urea) metering valve
X286 - Ad Blue (urea) injection valve
X287 - Ad Blue (urea) reservoir preheating valve
X288 - 12/24 V converter for SCR system
X289 - SCR management module
X290 - Front accessory connection socket harness/front function harness junction
X291 - Front accessory connection socket harness/front function harness junction
X292 - Front windscreen washer pump
X293 - 540 rpm PTO switch
X294 - 540 eco rpm PTO switch
X295 - 1000 rpm PTO switch
X296 - USB connector
X297 - PTO/linkage console backlighting
X298 - Headland mode switch (headland function)
X299 - Linkage lowering speed potentiometer
X300 - -
X301 - PTO stop switch on left-hand fender
X302 - Switch for pre-selected engine speed A
X303 - Switch for pre-selected engine speed B
X304 - Instrument panel harness/armrest harness junction
X305 - Headlights module (grey connector)
X306 - Switch for pre-selected engine speed A/B
X307 - FingerTIP 1
X308 - FingerTIP 2
X309 - SV1/SV2 speed regulator switch

- X310** - Divider 1 indicator light and solenoid valve (earth)
X311 - Divider 2 indicator light and solenoid valve (+12 V)
X312 - SV1/SV2 speed setting potentiometer in armrest
X313 - Pedal/lever transmission control mode switch and DTM switch
X314 - Hydraulics switch 1, road/field mode
X315 - Hydraulics switch 2, road/field mode
X316 - Headland mode switch (headland function)
X317 - + battery supply for headlights module
X318 - Automatic air conditioning compressor
X319 - + battery supply for headlights module
X320 - + battery supply on headlights module
X321 - + battery supply on headlights module
X322 - + battery supply on headlights module
X323 - + battery supply on headlights module
X324 - +12 V APC fuse box connector (battery isolator switch)
X325 - Pillar harness / non-Isobus implement connector harness junction
X326 - Pillar harness / non-Isobus implement connector harness junction
X327 - Battery earth (chassis)
X328 - Battery isolator switch earth terminal
X329 - Battery isolator switch earth terminal
X330 - Battery negative terminal contact (battery isolator switch)
X331 - Pillar harness connection on fuse box
X332 - + battery (start switch)
X333 - Engine harness earth (chassis)
X334 - Battery isolator switch earth terminal
X335 - Battery isolator switch earth terminal
X336 - Battery isolator switch
X337 - Pneumatic brake ParkLock solenoid valve
X338 - Earth (battery isolator switch)
X339 - Pneumatic trailer braking solenoid valve
X340 - + terminal on battery for fuse box
X341 - Starter supply
X342 - Positive battery terminal
X343 - RS232 diagnostics connector for Auto-Guide
X344 - Isobus connector in cab
X345 - Supply for additional terminal (mitron unit)
X346 - Auto-Guide switch
X347 - Cab transmission harness connection on fuse box
X348 - Cab transmission harness connection on fuse box
X349 - -
X350 - Front right-hand grille work light
X351 - Front right-hand grille work light
X352 - Front right-hand grille work light
X353 - Front left-hand grille work light
X354 - Front left-hand grille work light
X355 - Front left-hand grille work light
X356 - Right-hand main beam and dipped light
X357 - Left-hand main beam and dipped light
X358 - Outside temperature sensor
X359 - Cab suspension harness/cab transmission harness junction
X360 - Pillar harness connection on fuse box
X361 - Pillar harness connection on fuse box
X362 - Fuse box (+12 V battery)
X363 - Auto-hitch (Dromone) switch
X364 - 120 Ohm resistor for Auto-Guide/Isobus CAN network
X365 - Hand rail lower work light
X366 - Pneumatic brake harness / transmission harness junction
X367 - Switch 1 on joystick
X368 - Switch 2 on joystick
X369 - Engine speed + switch
X370 - Engine speed - switch
X371 - Engine speed stop switch
X372 - Orbitrol safety solenoid valve
X373 - Left-hand 12 V socket (cab) (power)
X374 - Left-hand 12 V socket (cab) (backlighting)
X375 - Instrument panel harness/cab transmission harness junction
X376 - Fuse box (reserve for + APC)
X377 - Fuse box (supply for cab suspension compressor)
X378 - FNRP lever and button
X379 - Front left-hand work light on roof
X380 - Front right-hand work light on roof
X381 - Front left-hand work light on roof
X382 - Front right-hand work light on roof
X383 - Front left-hand roof indicator
X384 - Front right-hand roof indicator
X385 - Rear left-hand work light on roof
X386 - Rear right-hand work light on roof
X387 - Rear left-hand work light on roof
X388 - Rear right-hand work light on roof
X389 - Rear left-hand work lights
X390 - Rear right-hand work lights
X391 - Rear left-hand roof indicator
X392 - Rear right-hand roof indicator
X393 - Earth
X394 - Radio aerial connector
X395 - Radio supply
X396 - Radio speaker connector
X397 - Front left-hand speaker
X398 - Front right-hand speaker
X399 - Rear left-hand speaker (+ supply)
X400 - Rear right-hand speaker (+ supply)
X401 - Rear left-hand speaker (- supply)
X402 - Rear right-hand speaker (- supply)
X403 - Rear windscreen wiper motor
X404 - Door switch
X405 - Interior light (earth)
X406 - Interior light (control)
X407 - Interior light (+12 V battery supply)
X408 - Right-hand console light
X409 - Left-hand rotary beacon
X410 - Right-hand rotary beacon
X411 - Rear windscreen wiper switch
X412 - Radio aerial
X413 - Earth (aerial)
X414 - Left-hand number plate light
X415 - Right-hand number plate light
X416 - Radio supply
X417 - Radio speaker connector
X418 - Earth
X419 - Earth
X420 - Rotary beacon harness earth (chassis)

X421 - Earth
X422 - Roof harness earth (chassis)
X423 - Left-hand side fan ON/OFF switch
X424 - Fan speed control knob
X425 - Air conditioning switch
X426 - Air conditioning indicator light
X427 - Manual air conditioning module
X428 - Electronic thermostat for heating
X429 - Speed 1relay for fan
X430 - Speed 2relay for fan
X431 - Speed 3relay for fan
X432 - Speed 4relay for fan
X433 - Left-hand heating resistor
X434 - Right-hand fan
X435 - Left-hand fan
X436 - Left-hand side fan switch
X437 - Relay for left-hand side fan
X438 - Earth (automatic air conditioning)
X439 - Air conditioning control module (blue connector)
X440 - Air conditioning control module (yellow connector)
X441 - Heating temperature sensor
X442 - TT2 sensor
X443 - Evaporator temperature sensor
X444 - Right-hand fan adapter module (signal)
X445 - Left-hand fan adapter module
X446 - Right-hand fan adapter module (supply)
X447 - Left-hand fan adapter module (supply)
X448 - Separation harness for automatic air conditioning
X449 - Motor for left-hand heating shutter
X450 - Motor for right-hand heating shutter
X451 - Motor for heating mixer shutter
X452 - Relay for heater pump
X453 - Heater accelerator pump
X454 - Earth (roof)
X455 - Roof harness earth
X456 - Solar panel
X457 - Earth (Auto-Guide)
X458 - Cab transmission harness/pillar harness junction
X459 - Linkage lifting switch on fender
X460 - Linkage lowering switch on fender
X461 - Pillar harness/TECU harness junction
X462 - Supply indicator light for power socket on pillar
X463 - Earth (Isobus)
X464 - Pillar harness/armrest harness junction
X465 - Battery positive terminal contact
X466 - Active suspended cab Autotronic 5
X467 - Right-hand electric rear-view mirror
X468 - Left-hand electric rear-view mirror
X469 - Additional fan connection
X470 - Operator presence in seat switch
X471 - Suspended cab harness connection

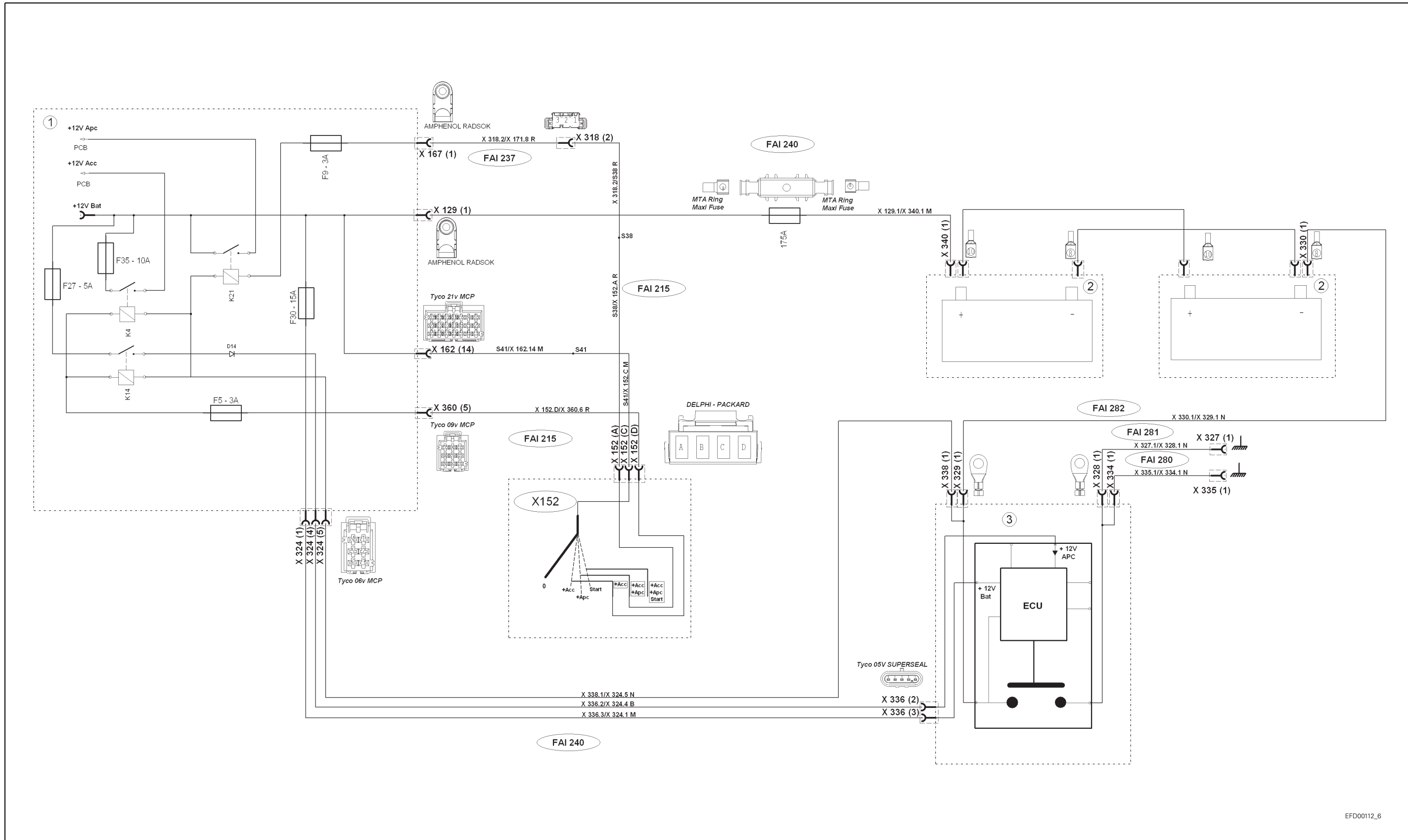
Identification of harnesses

FAI200 - Engine harness
FAI201 - Front headlights harness
FAI202 - Suspended front axle harness
FAI203 - Transmission harness
FAI204 - Cab/platform linkage external harness
FAI205 - Electrohydraulic valves harness
FAI206 - Transmission harness — PTO

FAI207 - Front Dual Control harness
FAI208 - Linkage with Dual Control and TIC harness
FAI209 - Instrument panel harness
FAI210 - Cab transmission harness
FAI211 - Cab linkage harness
FAI212 - Lighting harness
FAI213 - Cab interior lighting harness
FAI214 - Armrest harness
FAI215 - Pillar harness
FAI216 - Diagnostics connector harness
FAI217 - Datatronic 3 harness
FAI218 - Fieldstar harness
FAI219 - Cab interior power socket harness
FAI220 - BOC harness — safety switch
FAI221 - Automatic air conditioning harness — instrument panel
FAI222 - Autotronic 5 ParkLock/suspended front axle harness
FAI223 - Roof harness
FAI224 - Hand rail lighting harness
FAI225 - Electric rear-view mirror harness
FAI226 - Roof/external harness
FAI227 - Automatic air conditioning harness - roof
FAI228 - Number plate lighting harness
FAI229 - Xenon light adapter harness
FAI230 - GSPTO harness
FAI231 - Transmission harness — ParkLock
FAI232 - Radio harness
FAI235 - Front accessory connection socket harness
FAI236 - Start-up harness
FAI237 - +12 APC fuse box harness
FAI238 - +12 APC instrument panel harness
FAI239 - Permanent +12 V supply harness
FAI240 - +12 V permanent fuse box harness
FAI241 - Automatic air conditioning adapter harness
FAI242 - Main beams on hand rail adapter harness
FAI243 - Circuit breaker harness
FAI244 - Linkage external controls extension harness
FAI245 - Left-hand linkage external controls harness
FAI246 - Right-hand linkage external controls harness
FAI247 - PTO shunt harness
FAI248 - Linkage external controls harness
FAI249 - Suspended front axle harness
FAI250 - Engine harness
FAI251 - Parking brake harness
FAI252 - +12 V battery harness
FAI253 - Hand rail harness
FAI254 - Windscreen wiper harness
FAI255 - Windscreen wiper harness
FAI256 - High-visibility roof heating harness
FAI257 - High-visibility roof heating harness
FAI258 - Roof earth harness
FAI260 - Cooling unit harness
FAI261 - Isobus harness
FAI262 - Auto-Guide engine harness
FAI263 - Auto-Guide cab adapter harness
FAI265 - Pneumatic brake harness
FAI267 - Console harness
FAI268 - Front function harness
FAI271 - Cab electric rear-view mirror harness
FAI272 - Active suspended cab harness

- FAI273** - Front linkage harness
- FAI274** - Rear right-hand lighting harness
- FAI275** - Trailer connector harness
- FAI276** - Rear left-hand lighting harness
- FAI280** - Negative battery harness
- FAI281** - Negative battery harness
- FAI282** - Negative battery harness
- FAI283** - TopDock harness
- FAIxxx** - Non-Isobus tool connector harness
- FAIxxx** - Non-Isobus implement connector controller harness
- FAIxxx** - Additional fan harness

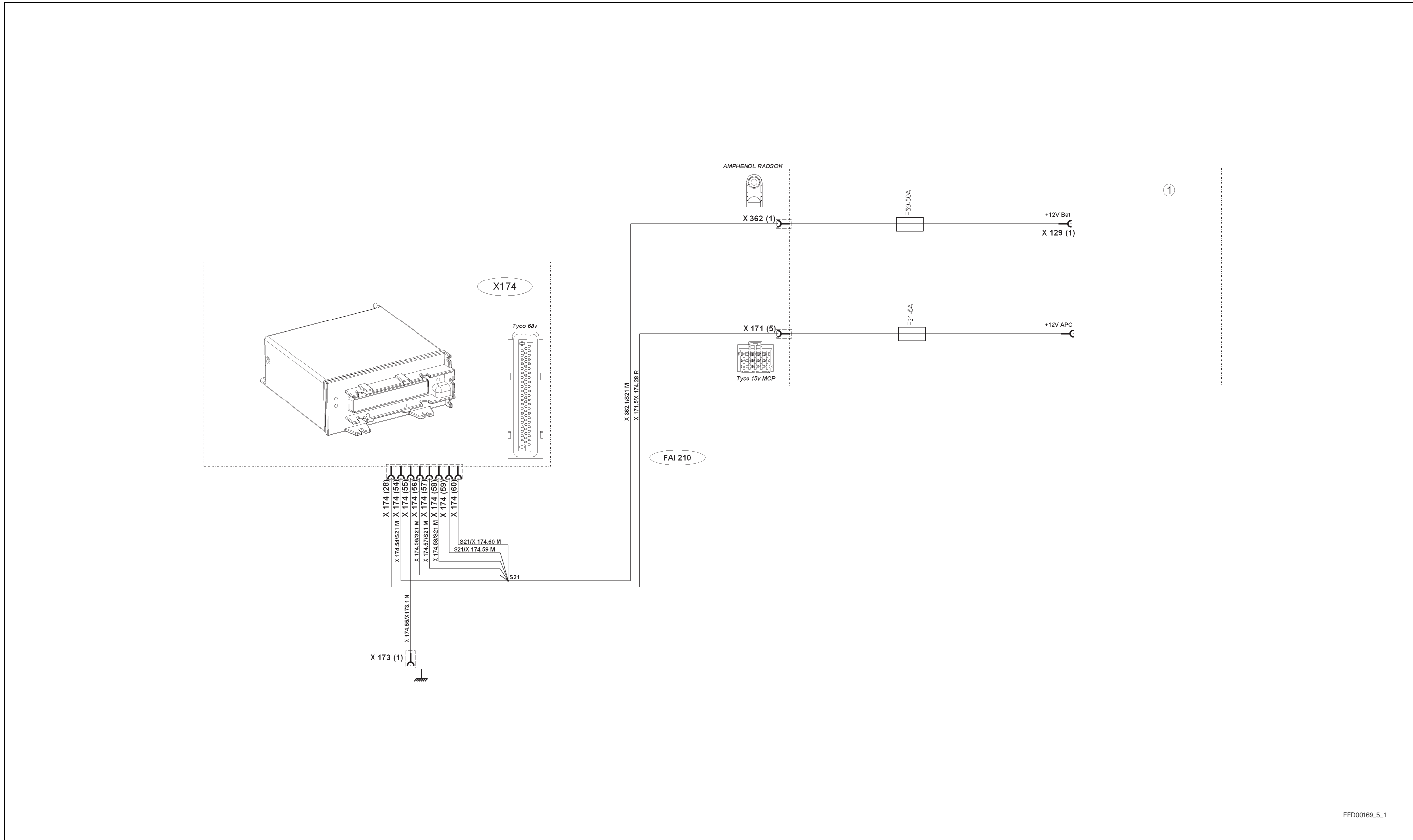
B.2 Fuse box supply with circuit breaker



EFD00112_6

Fig. 4

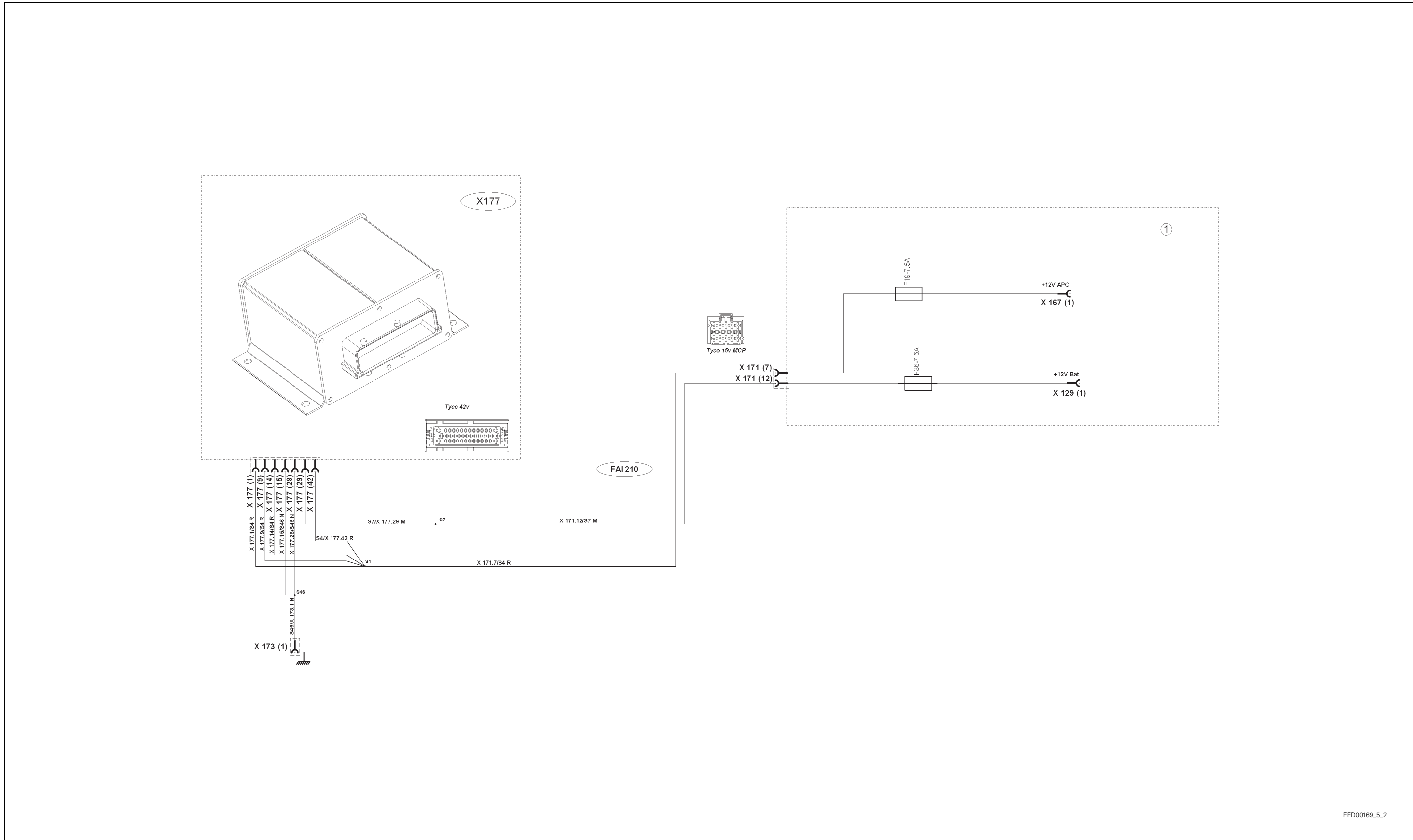
B.3 Autotronic 4 electrical power supply



EFD00169_5_1

Fig. 5

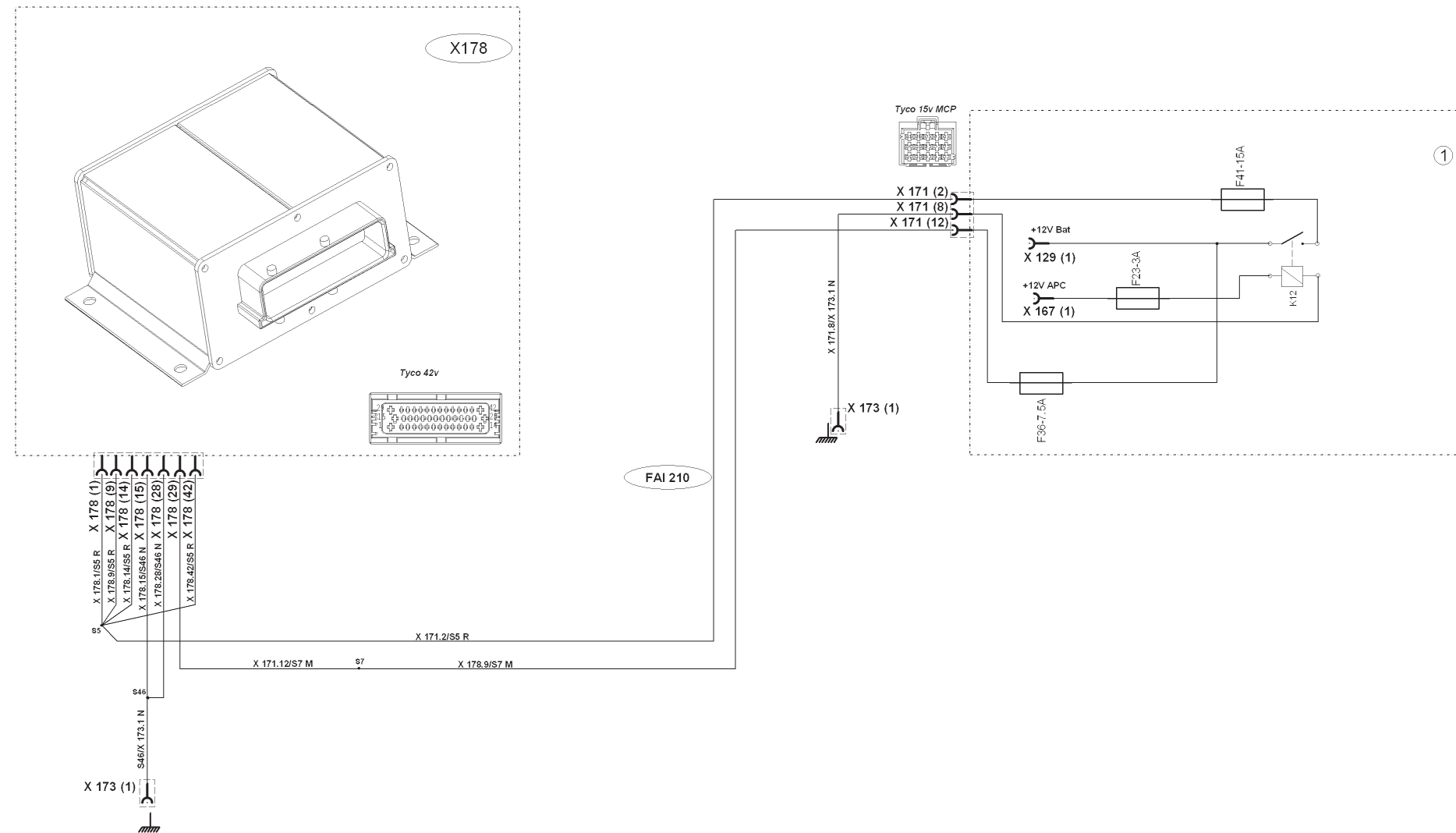
B.4 Autotronic 5 linkage electrical power supply



EFD00169_5_2

Fig. 6

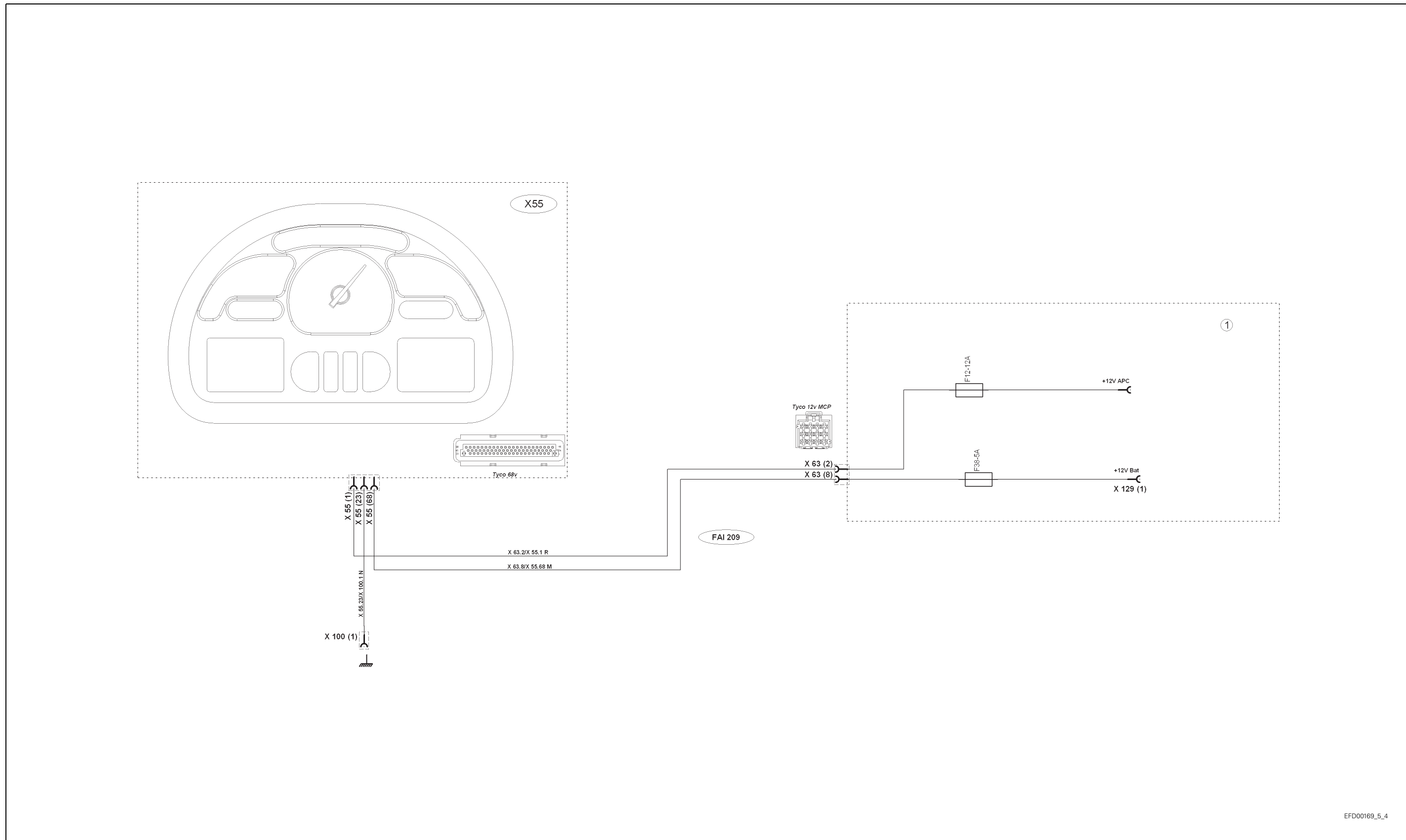
B.5 Autotronic 5 ParkLock/suspended front axle electrical power supply



EFD00169_5_3

Fig. 7

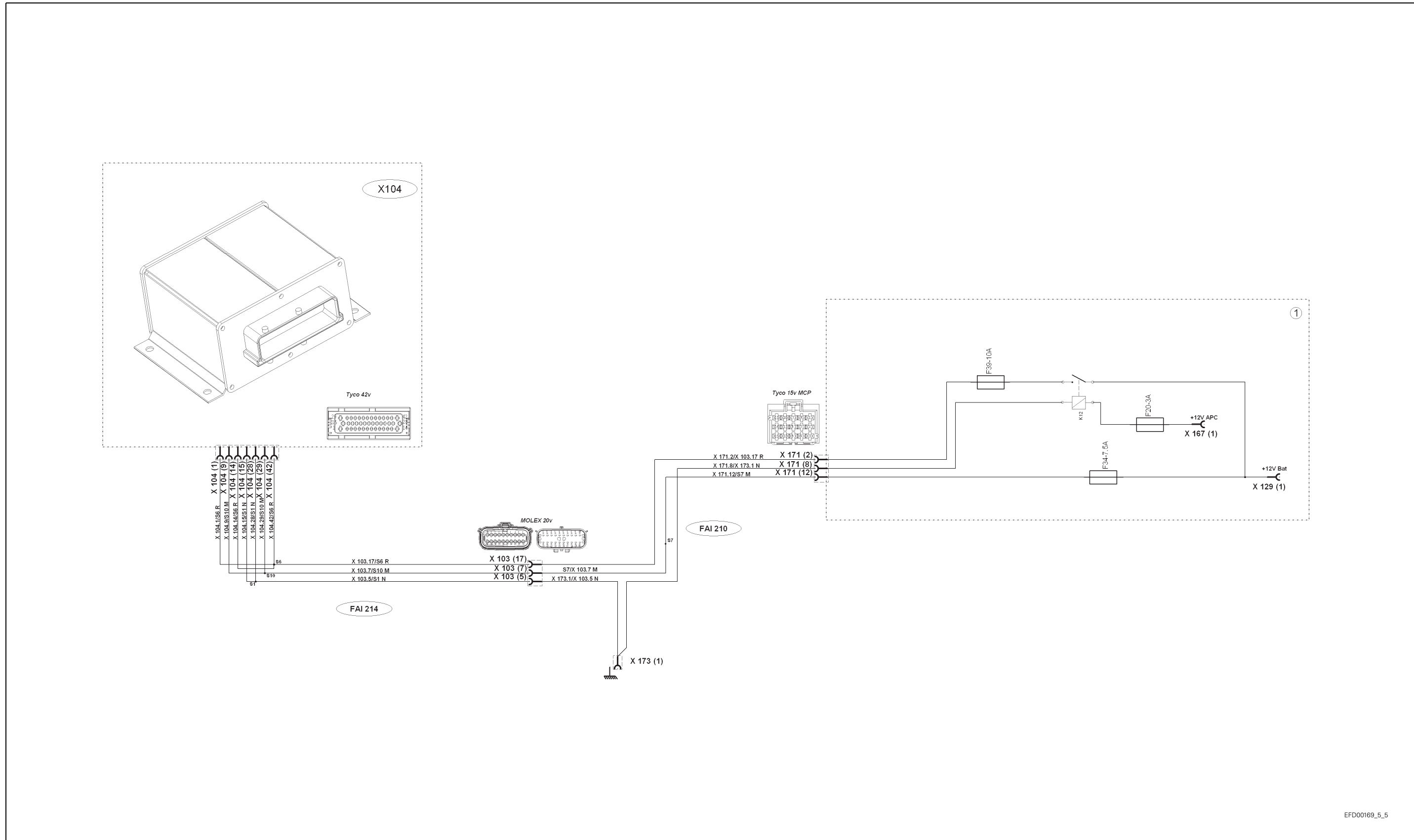
B.6 DCC3 instrument panel electrical power supply



EFD00169_5_4

Fig. 8

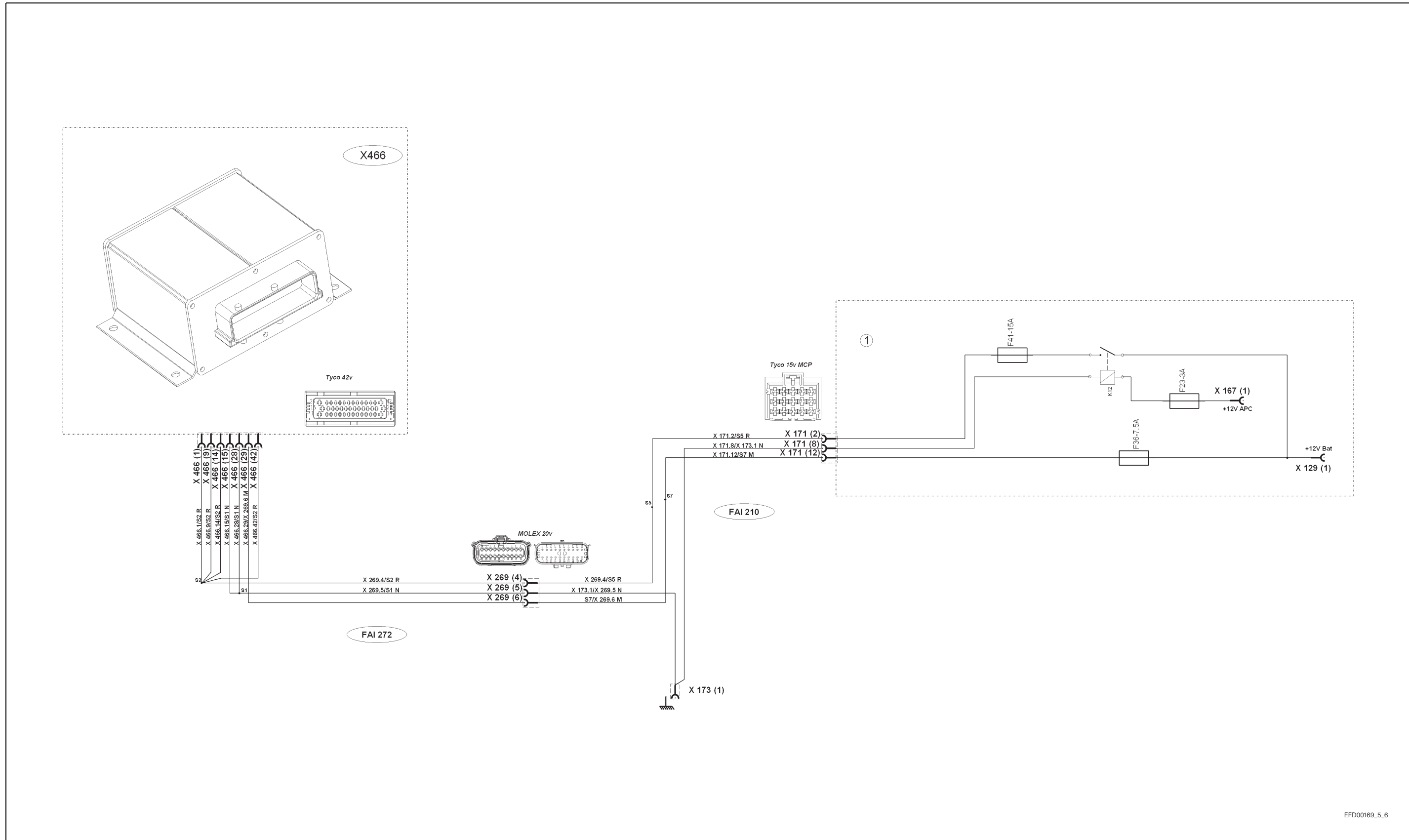
B.7 Autotronic 5 armrest electrical power supply



EFD00169_5_5

Fig. 9

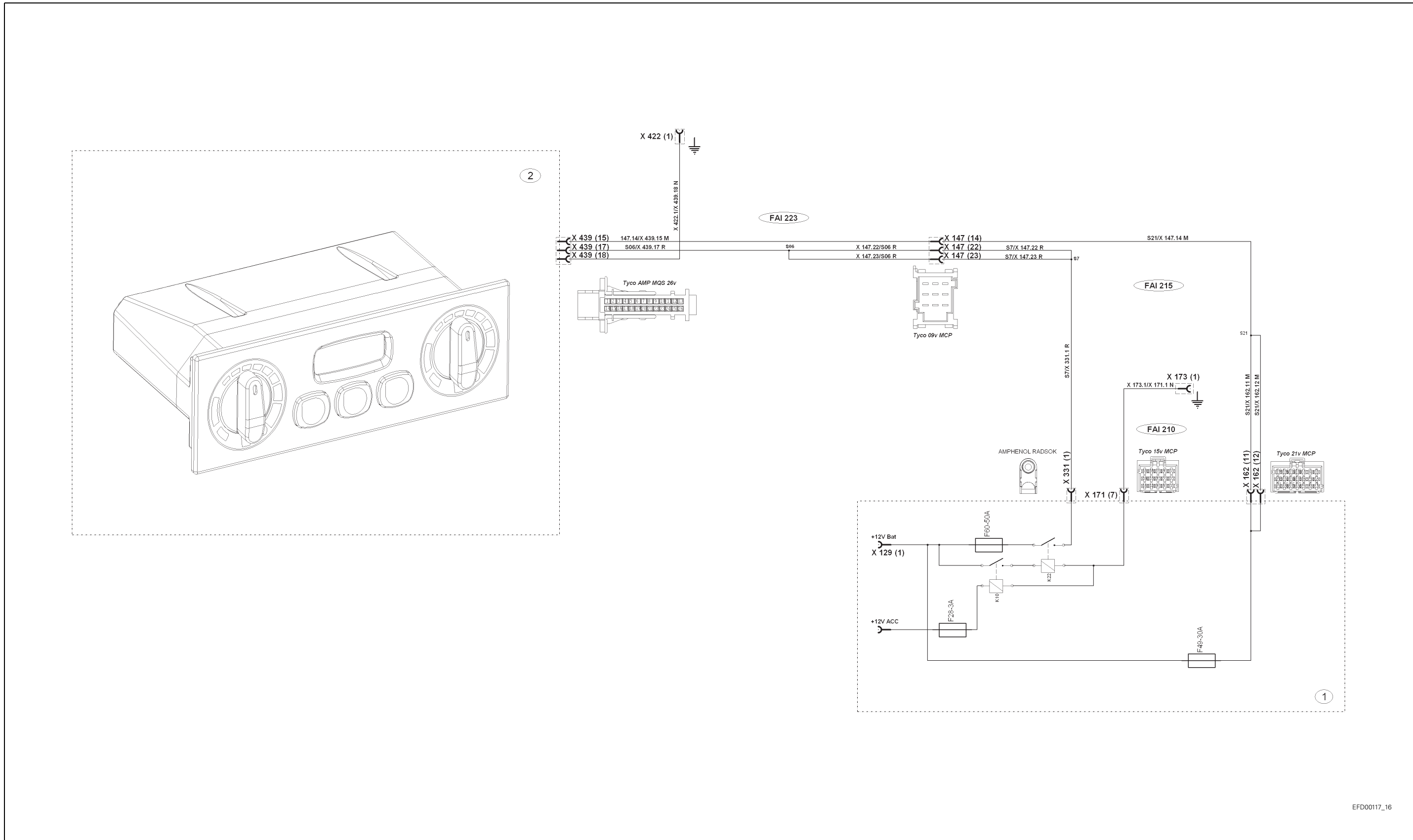
B.8 Autotronic 5 active suspended cab electrical power supply



EFD00169_5_6

Fig. 10

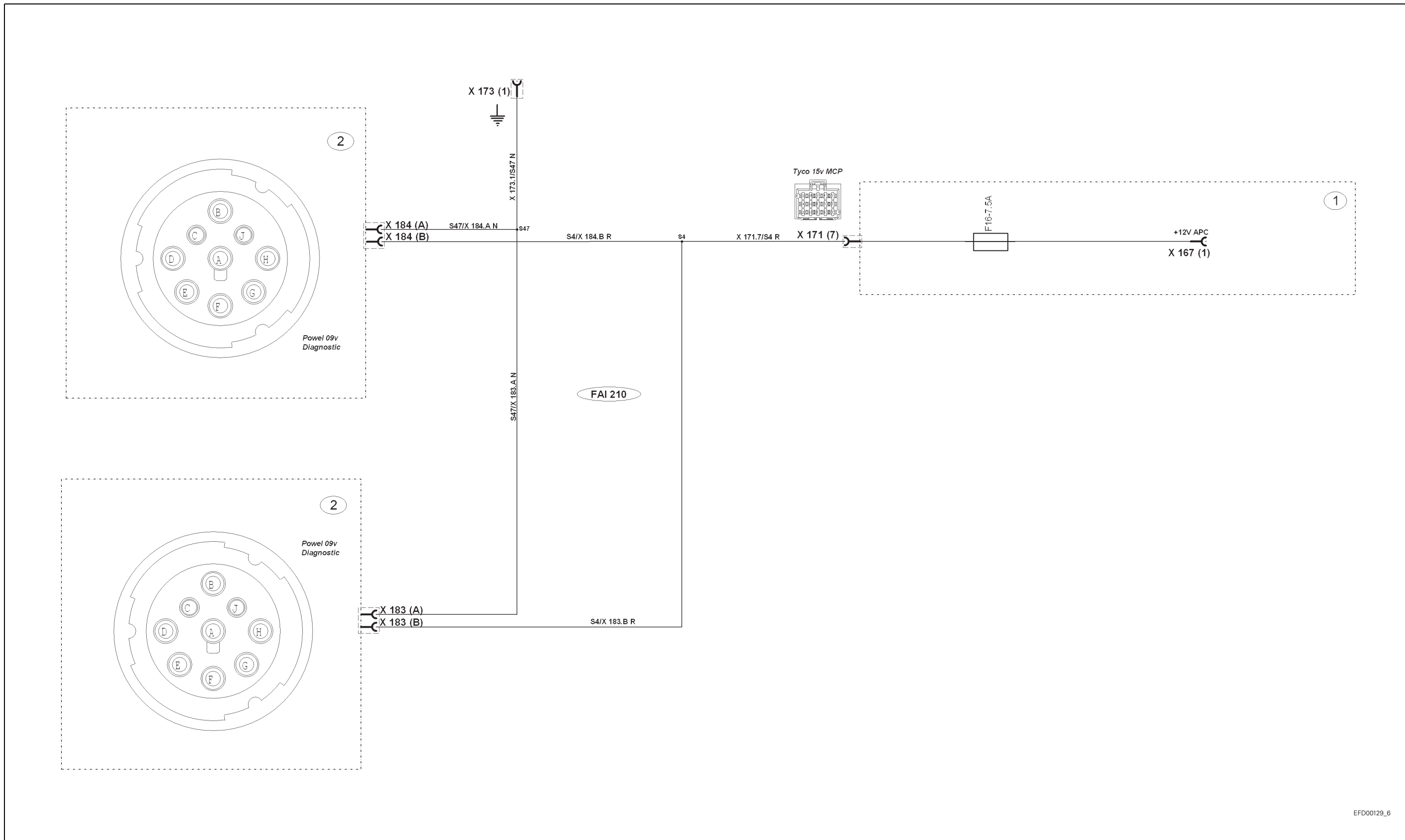
B.10 Automatic air-conditioning unit electrical power supply



EFD00117_16

Fig. 12

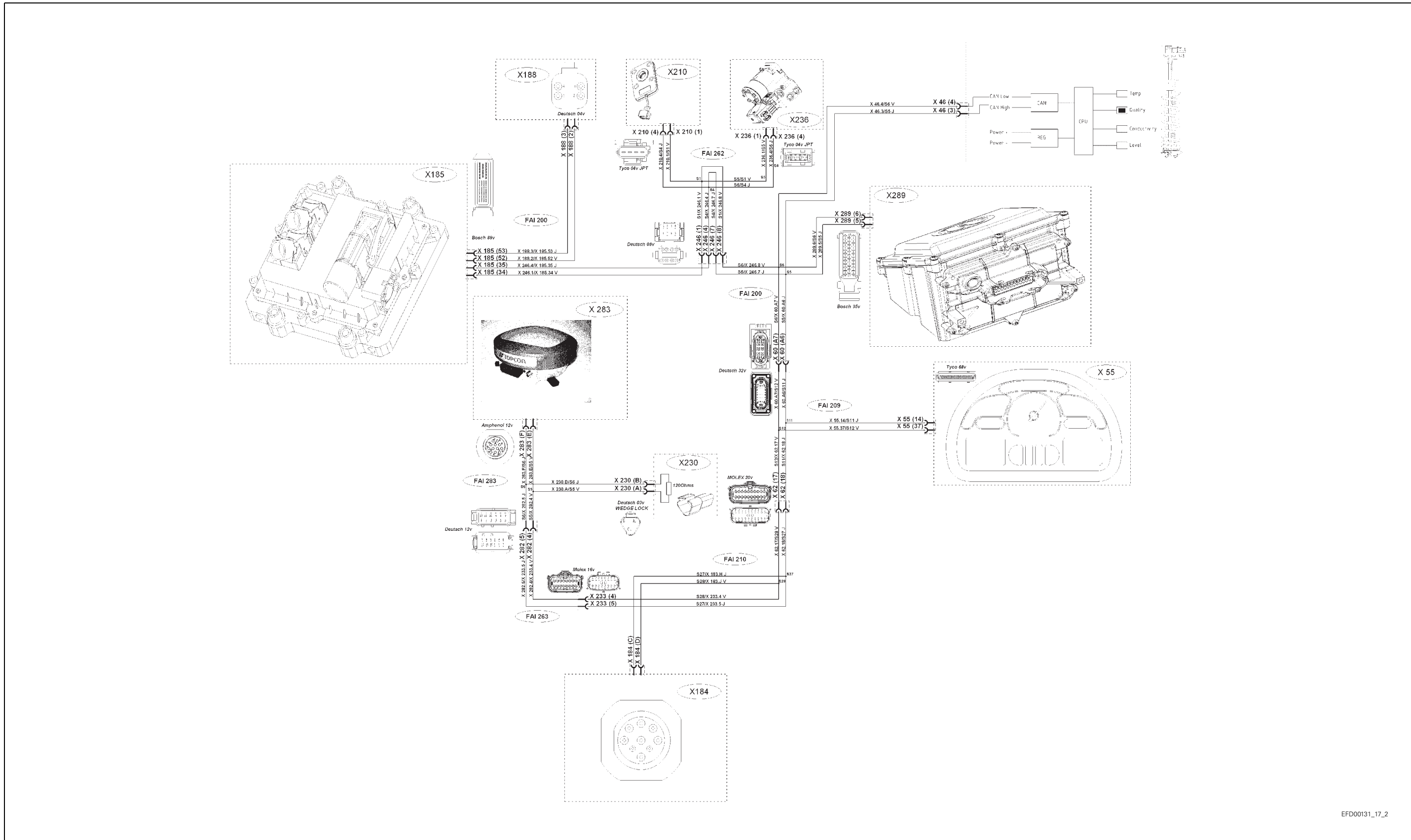
B.11 Diagnostics connector electrical power supply



EFD00129_6

Fig. 13

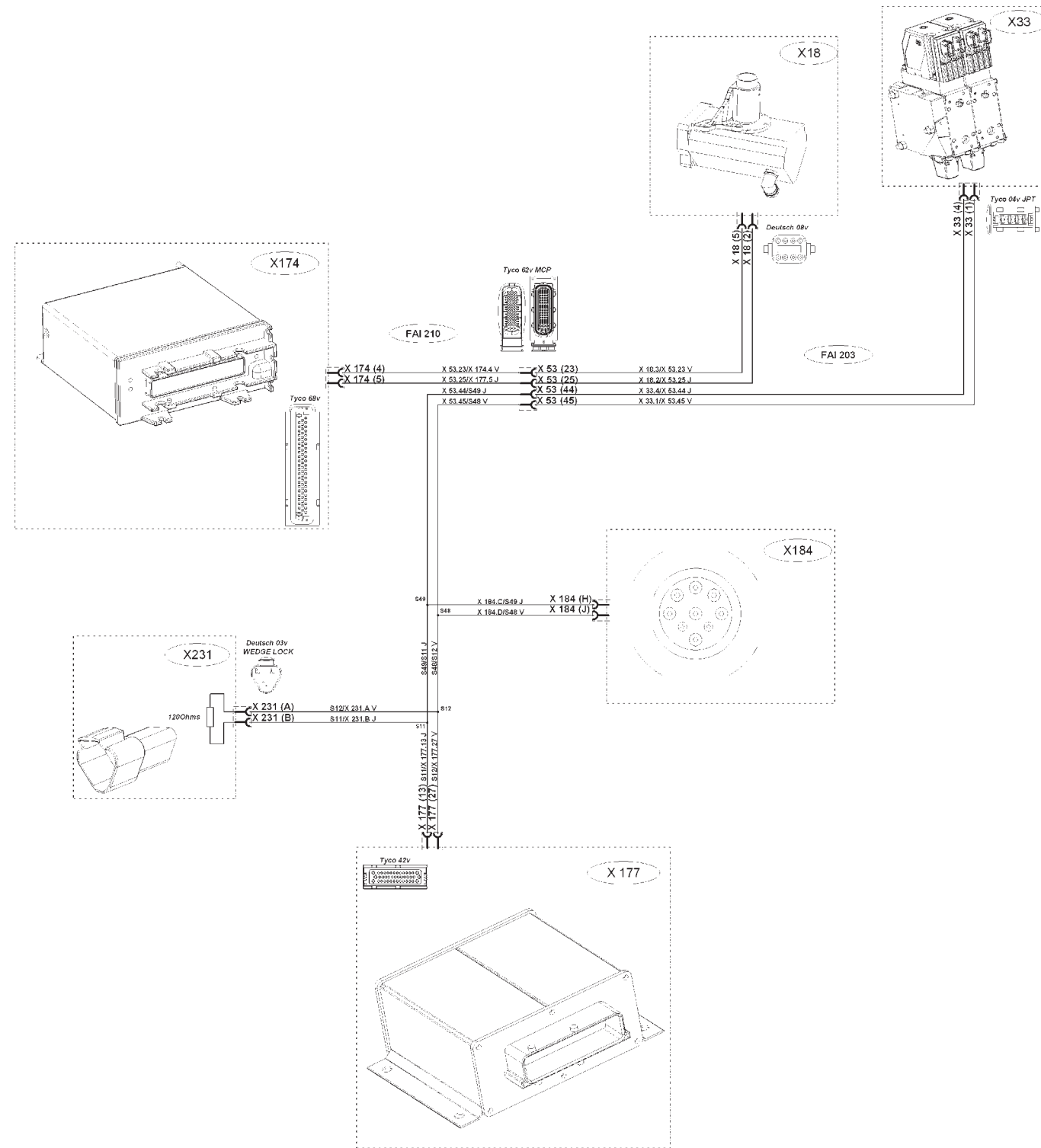
B.13 Engine CAN network



EFD00131_17_2

Fig. 15

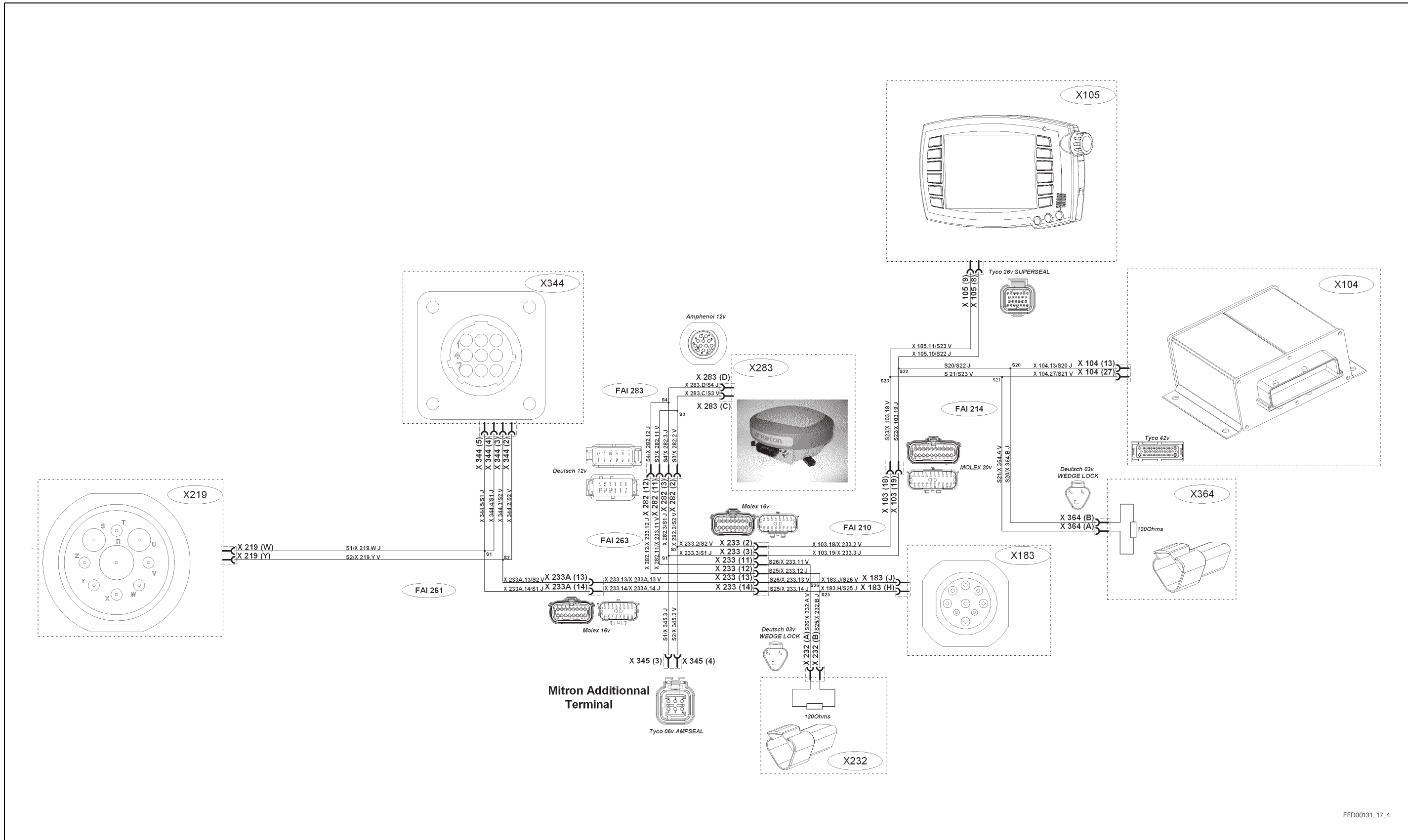
B.14 Linkage CAN network



EFD00131_17_3

Fig. 16

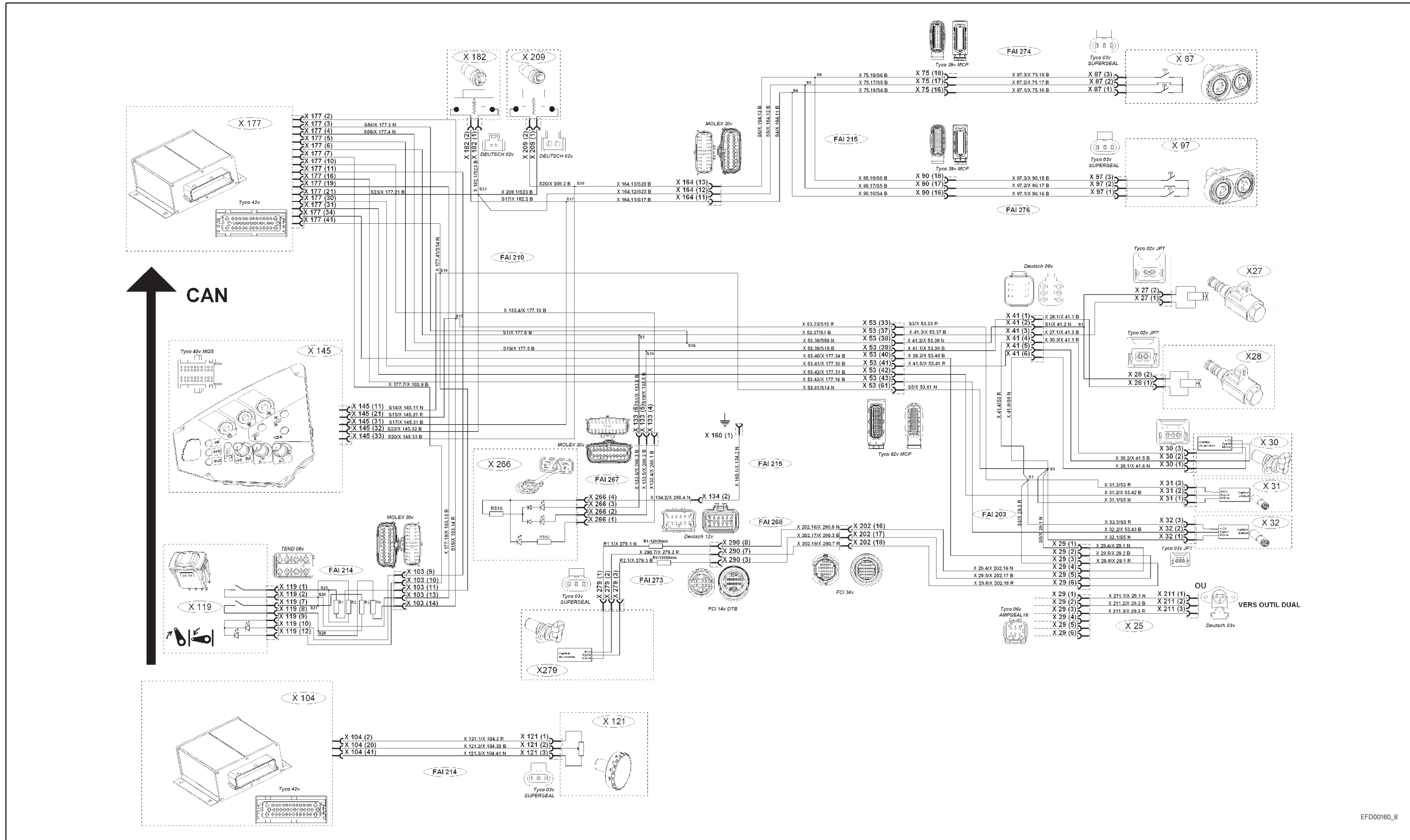
B.15 Isobus CAN network



EFD00131_17_4

Fig. 17

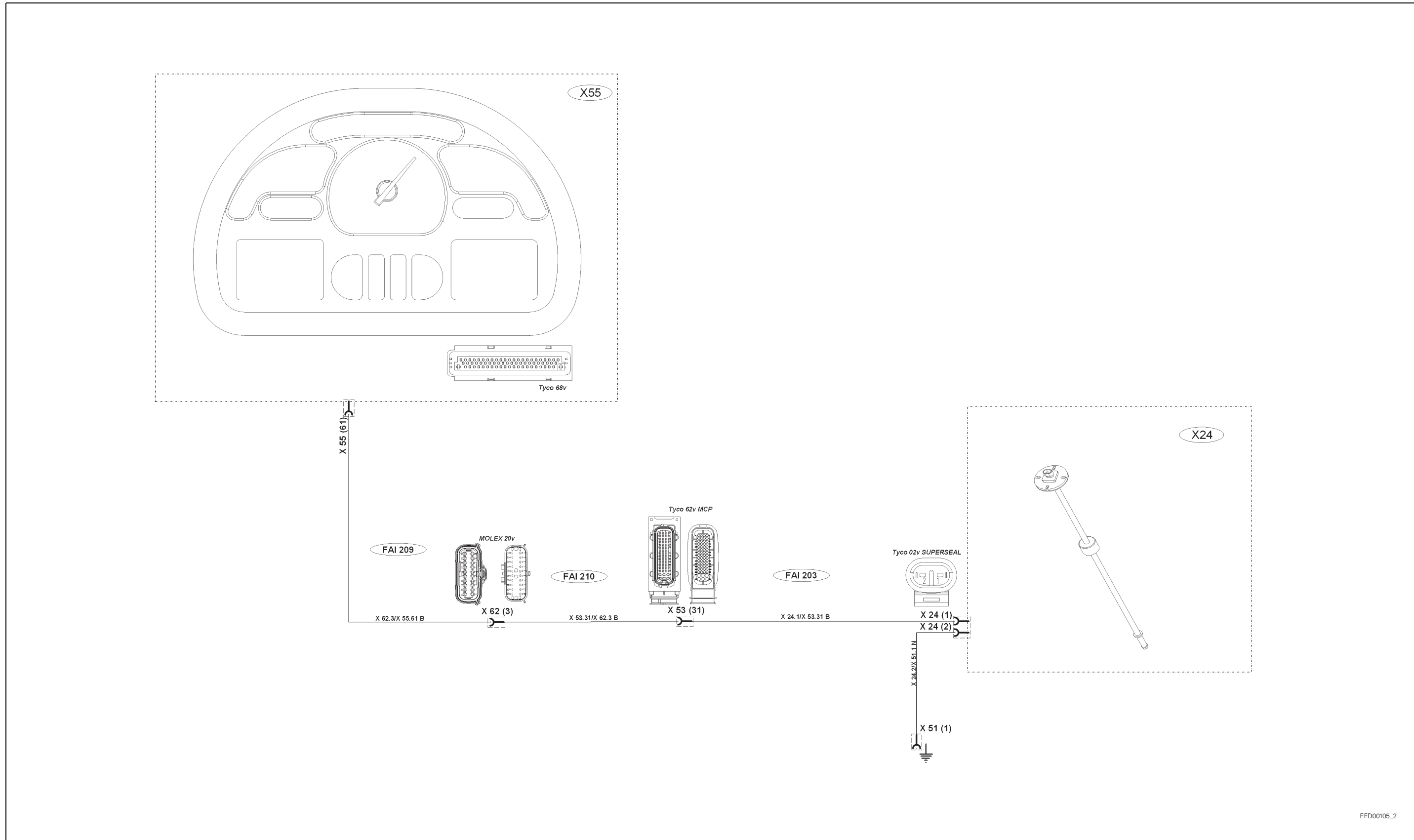
B.16 Rear linkage



EFD00160_B

Fig. 18

B.17 Auxiliary hydraulic oil gauge



EFD00105_2

Fig. 19

9D13

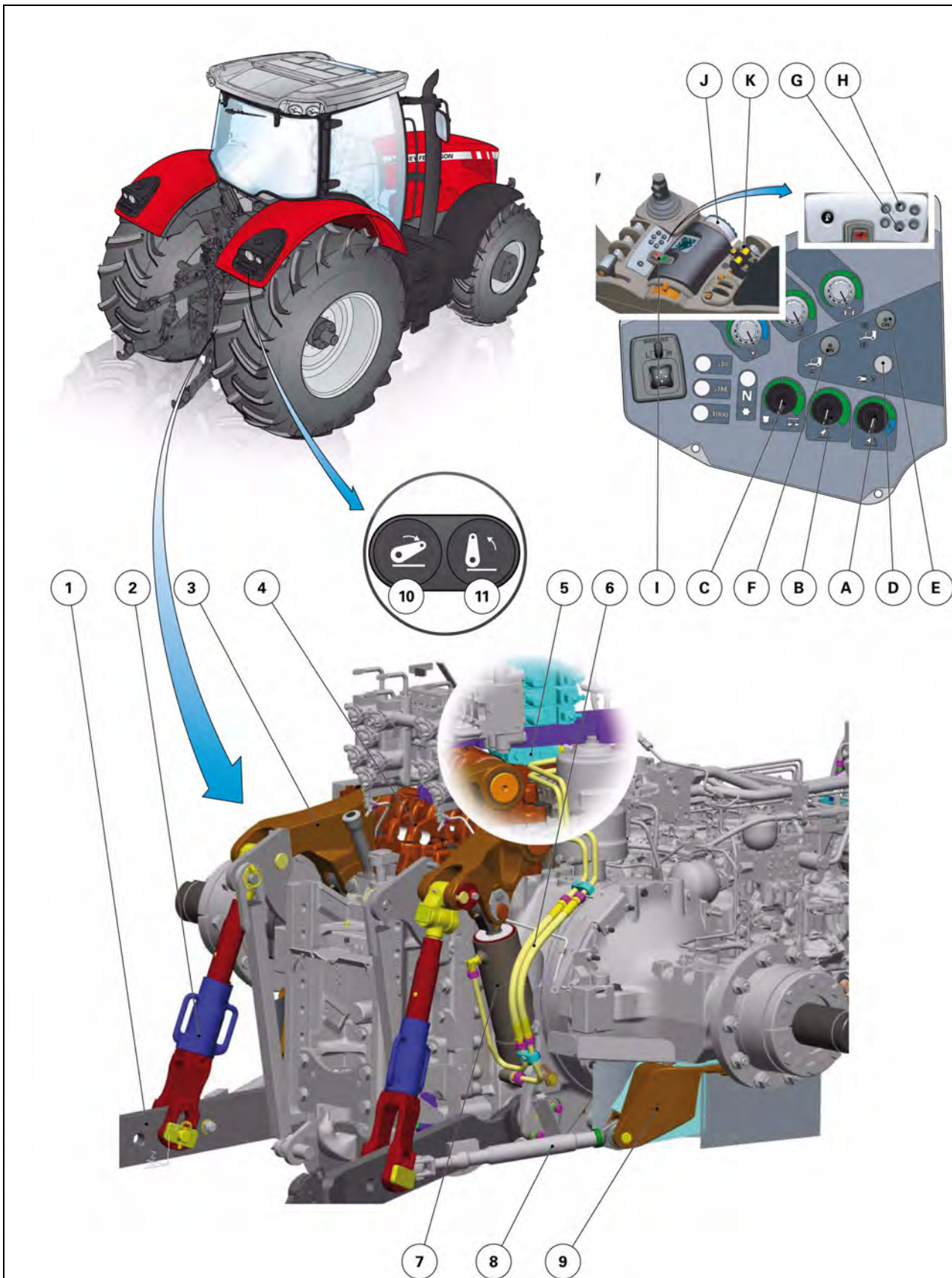
LS rear linkage - Layout of components

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**A. Layout of rear linkage
components - diagram**

Diagram



1011306

Fig. 1

B. Layout of rear linkage components - parts list

Item	Description	Location
(A)	Potentiometer for manual or automatic adjustment of the lowering speed.	In the cab on the right-hand side
(B)	Maximum linkage height adjustment potentiometer.	In the cab on the right-hand side
(C)	Intermix potentiometer (draft control and position control).	In the cab on the right-hand side
(D)	Suspension switch and rear linkage suspension indicator light.	In the cab on the right-hand side
(E)	Front linkage single/double acting switch.	In the cab on the right-hand side
(F)	Front linkage active transport control system switch	In the cab on the right-hand side
(G)	Front/rear hydraulic spool valve selector switch.	In the cab on the right-hand side
(H)	Hydraulics locking control, road/field mode.	In the cab on the right-hand side
(I)	Rear linkage Lift/Lower switch with neutral position.	In the cab on the right-hand side
(J)	Rear linkage height/depth adjustment thumb wheel	In the cab on the right-hand side
(K)	Front linkage control	In the cab on the right-hand side
(1)	Linkage link	At the rear of the tractor
(2)	Tie rod	At the rear of the tractor
(3)	Linkage arms	At the rear of the tractor
(4)	Support	On the rear axle
(5)	Spool valve	On the rear axle
(6)	Hydraulic hoses	On the sides of the rear axle
(7)	Lift ram	On the sides of the rear axle
(8)	Stabilisers	On the sides of the rear axle
(9)	Support	Under the rear axle
(10)	Linkage button	On the rear fenders
(11)	Linkage button	On the rear fenders

9D14

LS rear linkage - Tests and diagnostics

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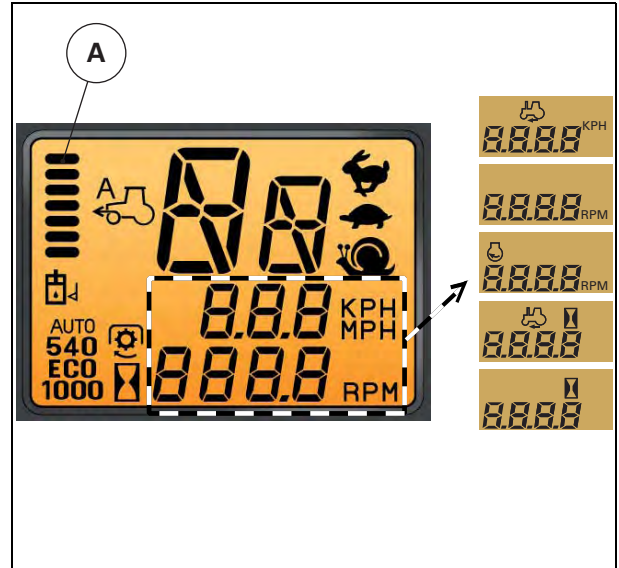
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A. Preliminary steps

The first points to check before carrying out the test are:

- check that the hydraulic oil level (A) (Fig. 1) is correct
- check that the last service inspections have been complied with

Before starting the tests, run the engine and operate a hydraulic function to reach a hydraulic operating temperature of 60°C. To assist the rise in temperature, connect a flowmeter to an auxiliary spool valve and limit the flowmeter flow rate.



1009075

Fig. 1

DIAGNOSTIC			
DATA		DC	BIN
DC	ANA	DC	ERR
DC	LED	DC	GAUGE
TC	BIN	TC	ANA
TC	EV	TC	ERR
EC	BIN	EC	ANA

1009073

Fig. 2

NOTE: To quickly read off the hydraulic oil temperature, it is necessary to return to diagnostic mode on the instrument panel by pressing the top arrow located on the steering column for 7 seconds. The screen (Fig. 2) is displayed. Using the navigation control on the steering wheel, enter DATA mode and then scroll through until "Hyd-Temp" appears (Fig. 3).

Reminder:

During the tests, select pressure gauges, hoses and unions of sufficient capacity and strength for the checks to be carried out.

Accelerator	0
Set Ratio	0
Act Ratio	0
Shu Dec Inc	1000
Speed Incr	192
Status Levr	1
SV I/2	0
Hyd Temp	189

1009074

Fig. 3

B. Checks and tests

Checking the lifting and lowering times

Parameters required:

- hydraulic oil temperature at 60 °C
- engine speed at 2200 rpm

Tools used:

- chronometer
- weight 900 kg.

Method

Lifting time

1. With the tractor running at 2200 rpm and no load on the linkage, unlock the linkage.
2. Actuate the linkage several times to heat the oil in the rams.
3. Lower the linkage to the lowest point.
4. Using the Dash Control Center or Datatronic CCD, adjust the maximum flow priority for the linkage.
5. Operate linkage lifting. The time should be between:
2.5 s < T < 3.5 s

Lowering time

1. With the tractor running at 2200 rpm, hitch the weight (1,5 t).
2. Unlock the linkage and lift it to the highest point.
3. Place the lowering speed potentiometer in the fast lowering position.
4. Operate linkage lowering. The time should be:
T = 2.6 s +/- 2 s

Checking the maximum linkage pressure

Parameters required:

- hydraulic oil temperature at 60 °C
- engine idle speed at 800 rpm

Tools used:

- pressure gauge, minimum value of 250 bar
- T connector to connect the pressure gauge

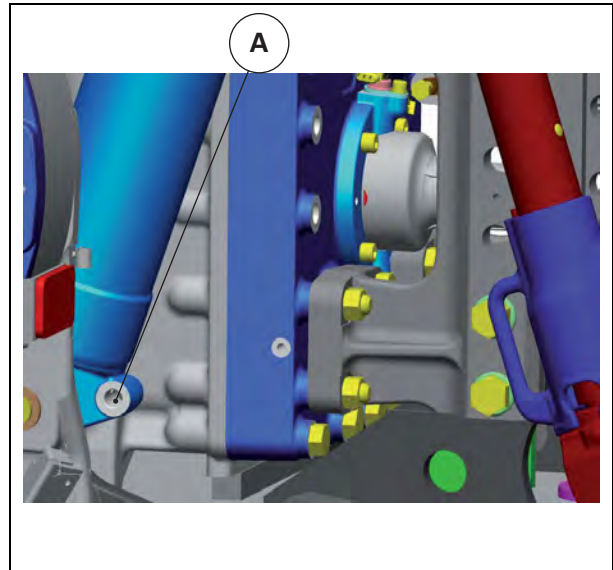
Method

1. Disconnect the supply hose from one of the 2 rams and fit a T connector between the hose and the ram (A) in order to read off the maximum pressure.

2. Place the linkage in the top position using the switches on the rear fenders.

Pmax = 200 bar +/- 10 bar

To simplify the procedure, the pressure can be checked upstream of the linkage valve.



1009334

Fig. 4

1. Connect a pressure gauge to the PpP PV pressure connector.

Pmax = 200 bar +/- 10 bar

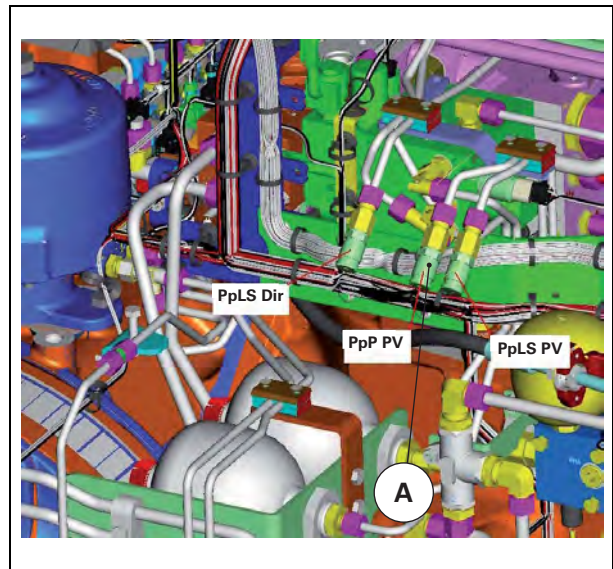
Checking the pressure of the linkage security valves

Parameters required:

- Tractor engine off.

Tools used:

- hand calibrating pump
- pressure gauge, minimum value of 250 bar

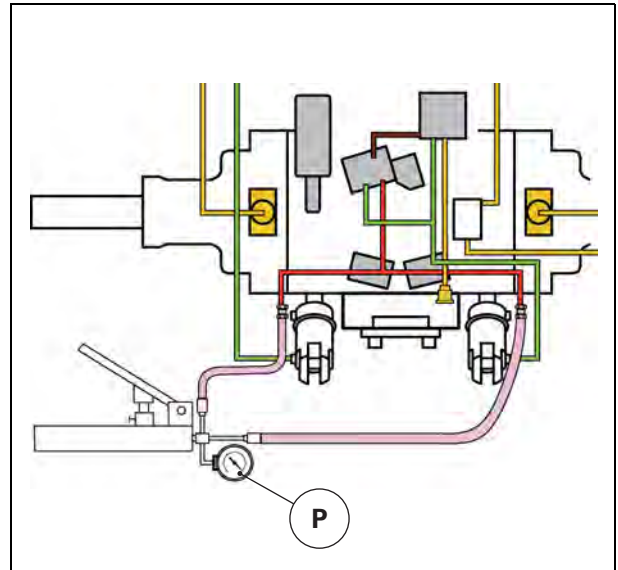


1009335

Fig. 5

Method

1. Connect a hand calibrating pump and a pressure gauge to the unions of the pipes supplying the linkage rams.
2. Check that the opening pressure of the relief valves is:
P = 220 bar +/- 5 bar



1009336

Fig. 6

9D15

Section intentionally left blank

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LS rear linkage - Adjustments, bleeding and calibrations

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A. Rear linkage273

A. Rear linkage

Adjusting the position sensor

For correct linkage calibration, ensure that the position sensor is fitted properly.

Calibration is the only way to obtain precise linkage positioning.

1. Position the mark on the rotating shaft on the same side as the connector (arrow (Fig. 19)).
2. Tighten the sensor approximately in the centre of the ports (Fig. 19).

After adjusting, the linkage must be calibrated.

Calibrating the linkage

The linkage must be calibrated after changing:

- a linkage solenoid valve
- the position sensor
- the linkage height/depth setting potentiometer
- the Autotronic 5 or software type

The purpose of this calibration is:

- to define the high and low stops of the linkage for optimum use of the linkage travel
- to measure sensor signals to obtain maximum linkage position precision according to the setting potentiometer
- to measure the solenoid valve starter currents that start to move the linkage

Preliminary steps

3. Hitch a weight of approximately 500 kg to the linkage.
4. Check that, with the hitch, the linkage is able to move through its entire operating range, between the upper and lower stops.
5. Position the tractor in a location where the linkage can operate freely, and ensure that no one can enter the area of linkage travel throughout the calibration process.

Procedure

6. Set the tractor engine to idle speed.

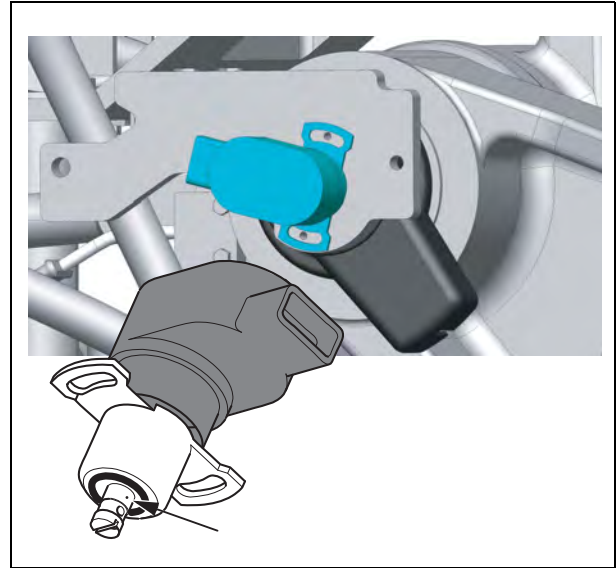


Fig. 1

7. Position the height/depth setting potentiometer between positions 3 and 4 (Fig. 20).
8. Set the selector switch (A) (Fig. 20) to the linkage lowered position (work position).



1007513

Fig. 2

9. Set the 3 linkage console potentiometers in position (Fig. 21), depending on the console type):
 - maximum raised stop (A)
 - pure position sensor (B)
 - maximum automatic lowering speed (C)
10. Press the shock absorber switch (D) 4 times in quick succession.
The indicator light (LED) (E) starts to flash (Fig. 21).
Calibration takes approximately 1 minute.
11. When calibration is complete, the indicator light stops flashing and the linkage locks.

NOTE: To exit the calibration process at any time, press the shock absorber switch or the lifting/lowering/neutral selector switch. In this case, the system uses the parameter settings stored previously or, in the event of a new Autotronic 5 unit, the default parameter settings are used.

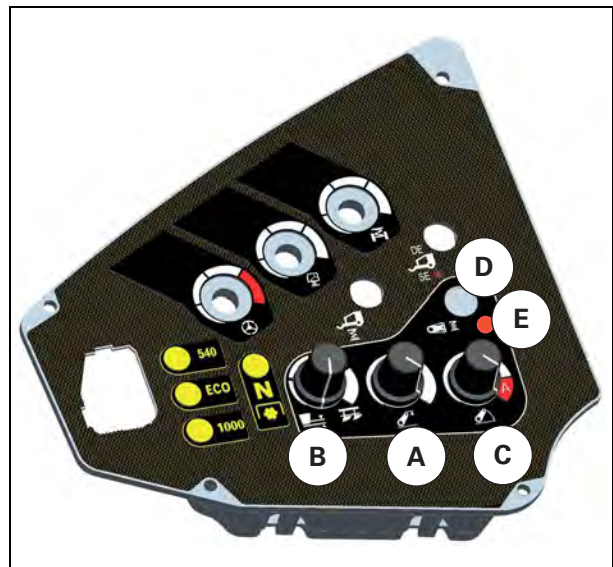


DANGER: Ensure that no one can enter the linkage operating area throughout the calibration process.

Validation

12. Check maximum linkage travel using the cab controls:
 - high position
 - low position; the lowering indicator light should always remain illuminated.
13. Check the sensitivity of the linkage height/depth setting potentiometer.
14. Set the linkage to transport position, engage the shock absorber and ensure that the linkage is lowered slightly (the lowering indicator light should come on).
15. Check the external controls and ensure that the lifting switch raises the linkage to its mechanical stop (hydraulic pump throttling sound).

NOTE: If the calibration appears to be incorrect (impossible to change position), reset the linkage by pressing the shock absorber switch 5 times in quick succession. In this



1007514

Fig. 3

case, the controller uses the default values. A new calibration procedure must then be started.

9D17

LS rear linkage - Disassembly and reassembly

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D. Reassembling the LS rear linkage spool valve	288

A. Disassembling the LS rear linkage

Preliminary steps

16. Remove the rear wheels and chock the tractor.

17. Remove the cab.

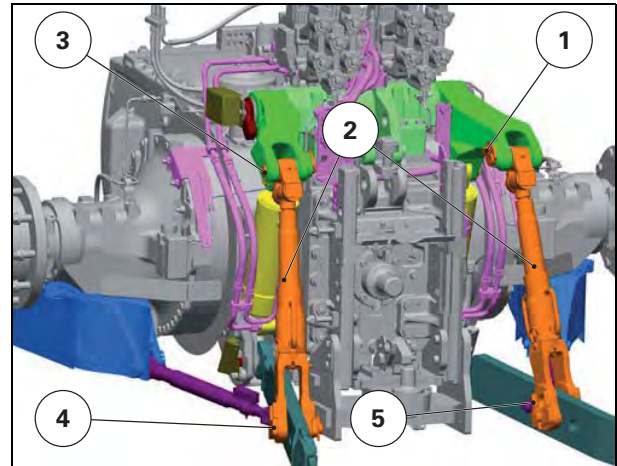
Disassembly

18. Remove the screws (1).

19. Remove the shims and then the pins (3).

20. Carry out the same process between the tie rod (4) and the link (5).

21. Remove the right and left tie rod.

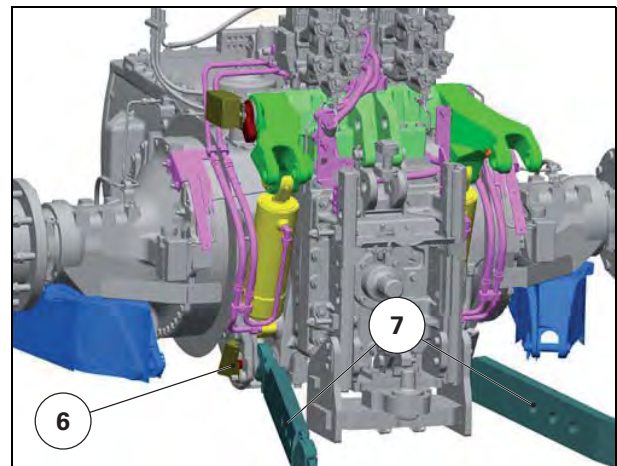


1011717

Fig. 1

22. Remove the draft sensors.

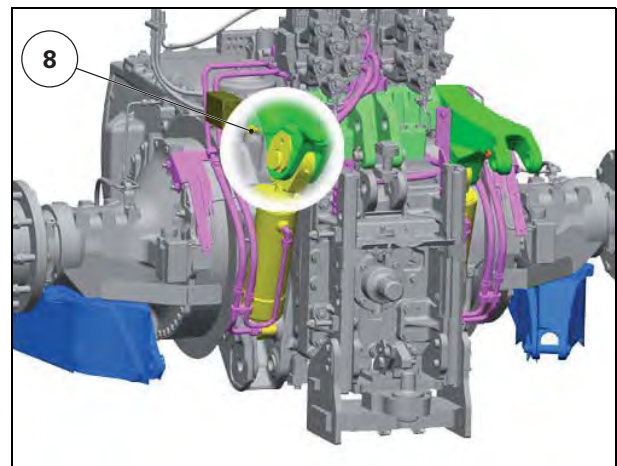
23. Remove the linkage links.



1011723

Fig. 2

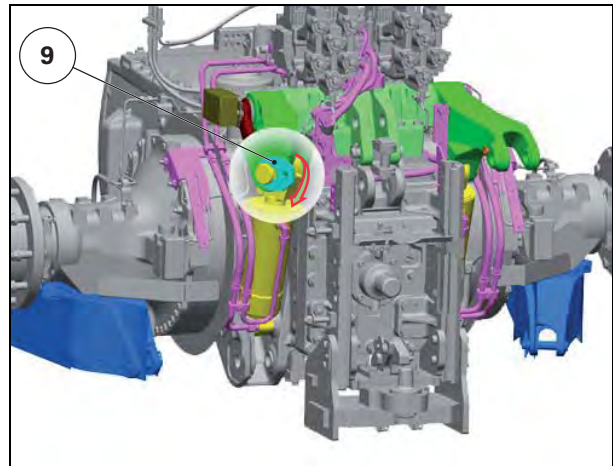
24. Remove the screw (8) and its washer.



1011724

Fig. 3

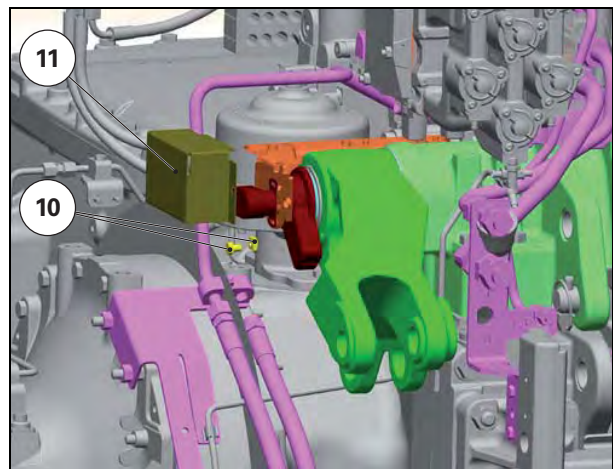
- 25.** Turn the locking plate by one quarter of a turn.
- 26.** Using a slide hammer puller fitted into the hole on the locking plate, extract the pin from the ram, then remove the ram.
- 27.** Repeat this process for the right-hand ram.



1011726

Fig. 4

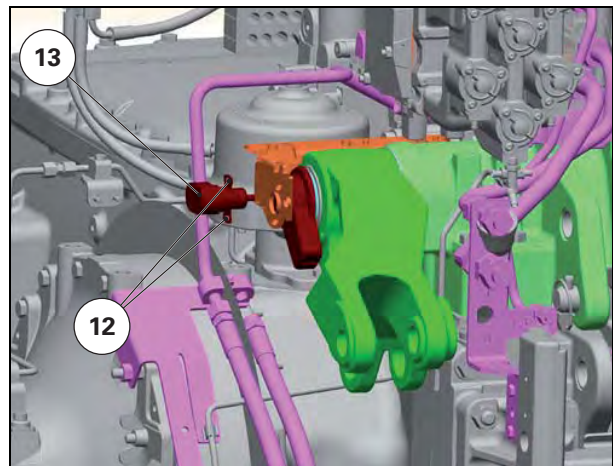
- 28.** Remove the screw (10) and its washer.
- 29.** Remove the protective guard (11) from the draft sensor.



1011727

Fig. 5

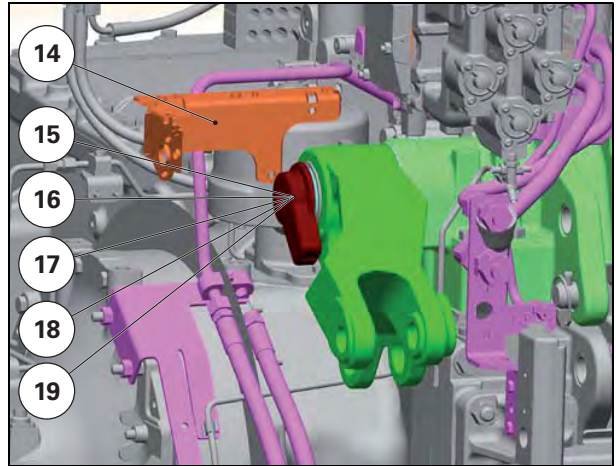
- 30.** Mark the position of the draft sensor.
- 31.** Remove the 2 screws (12).
- 32.** Remove the draft sensor (13).



1011728

Fig. 6

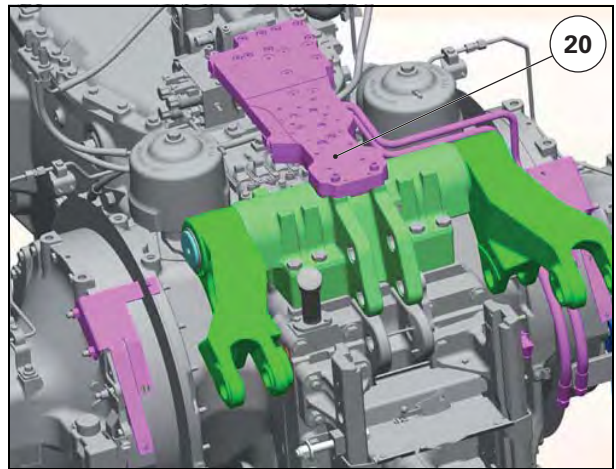
- 33.** Remove the support (14).
- 34.** Remove the guard (15).
- 35.** Remove the screws (16) and their washers.
- 36.** Remove the pin (17), the spring (18) and the bracket (19).



1011729

Fig. 7

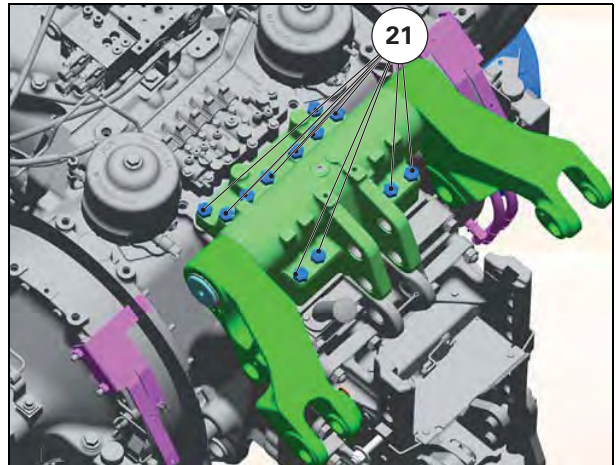
- 37.** Remove any obstructive hydraulic channels.
- 38.** Remove the screws.
- 39.** Remove the hydraulic unit (20).



1011730

Fig. 8

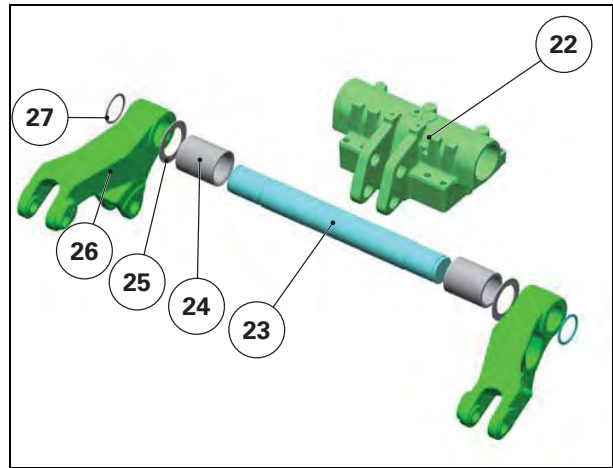
- 40.** Remove all the screws (21).
- 41.** Remove the linkage cover plate and the 2 arms.



1011731

Fig. 9

- 42.** Remove the circlips (27).
- 43.** Remove the arms (26).
- 44.** Remove the discs and the seals (25).
- 45.** Remove the shaft (23).
- 46.** Drive out the rings (24).
- 47.** Inspect all the parts and discard any that are faulty.



1011732

Fig. 10

B. Reassembling the LS rear linkage

Preliminary steps

48. Ensure all parts are clean and in good condition.



WARNING: All traces of rust, mud and water must be removed.

Reassembly

49. Refit the rings (24) in the cover plate (22).

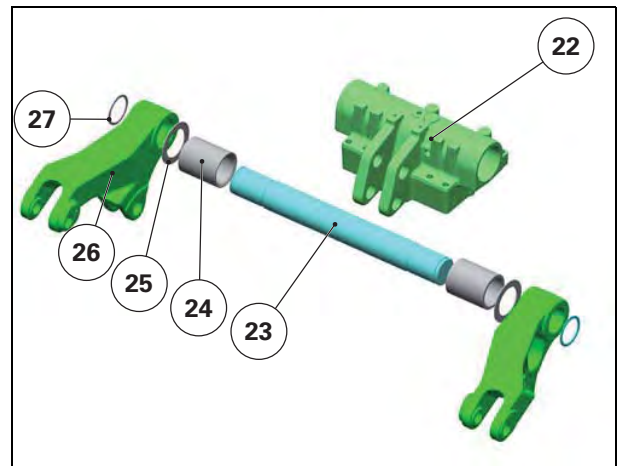
50. Oil the shaft (23) then fit it in the cover plate (22).

NOTE: Take care not to scratch the rings when inserting the shaft.

51. Fit the seal rings and discs (25).

52. Fit the arms (26) symmetrically in relation to one another.

53. Fit the circlips (27).

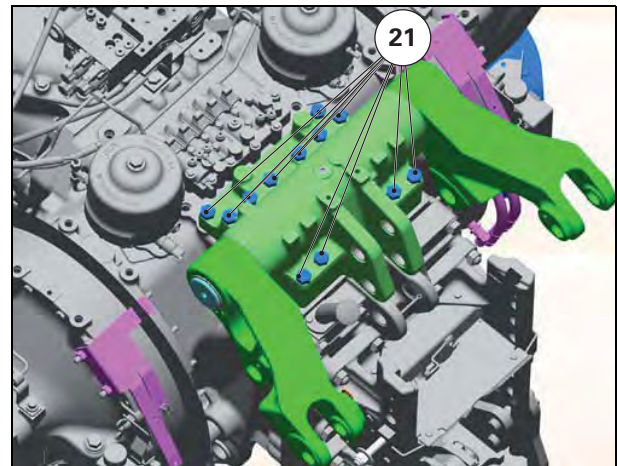


1011732

Fig. 11

54. Install the complete linkage cover plate on the rear axle.

55. Fit and tighten the screws (21) to a torque of 405 Nm.

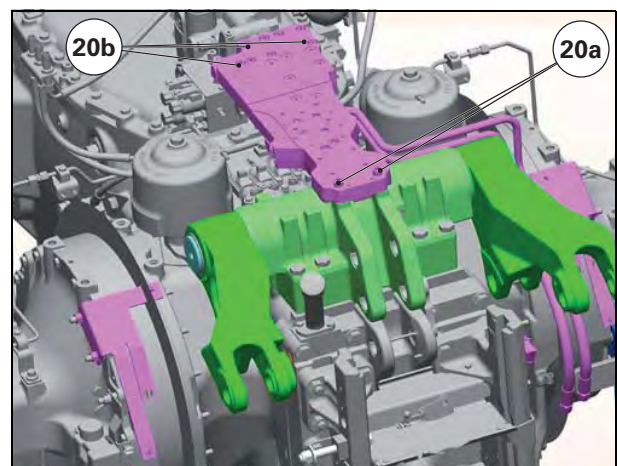


1011731

Fig. 12

56. Install the hydraulic unit, fitted with new "O" rings.

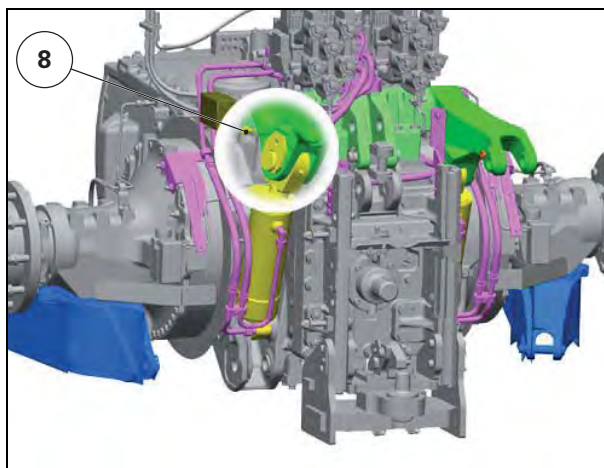
57. Fit the screws (20a) and tighten them to a torque of: 140 Nm, then tighten screws (20b) to a torque of: 60 Nm



1011764

Fig. 13

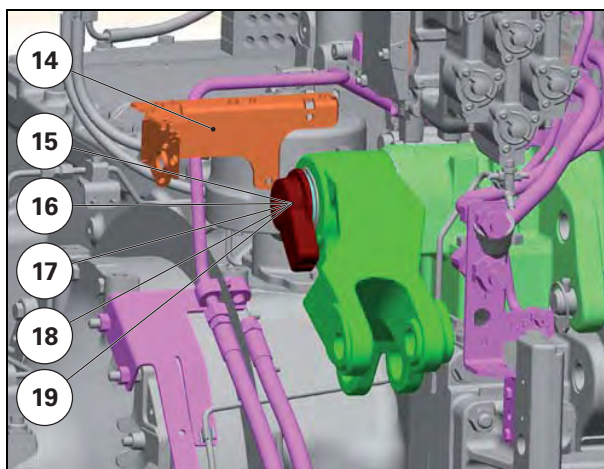
- 58. Fit the pins in the upper and lower rams.
- 59. Fit the retainer plate.
- 60. Fit the screw (8) fitted with the washer and tighten to a torque of 69 Nm.



1011724

Fig. 14

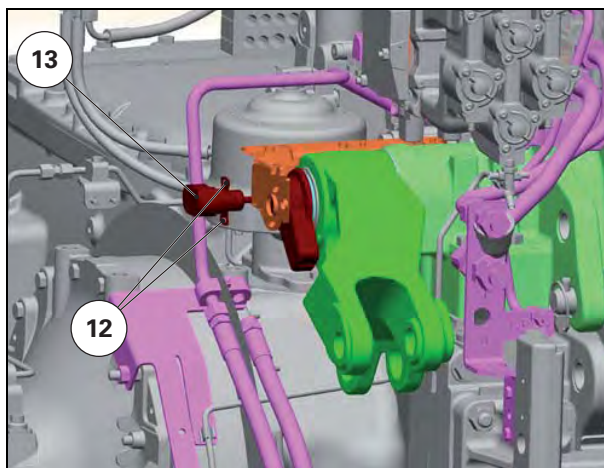
- 61. Fit the pin (17), the spring (18) and the bracket (19).
- 62. Fit the screws (16) and their washers.
- 63. Fit the shield (15).
- 64. Fit the support (14).



1011729

Fig. 15

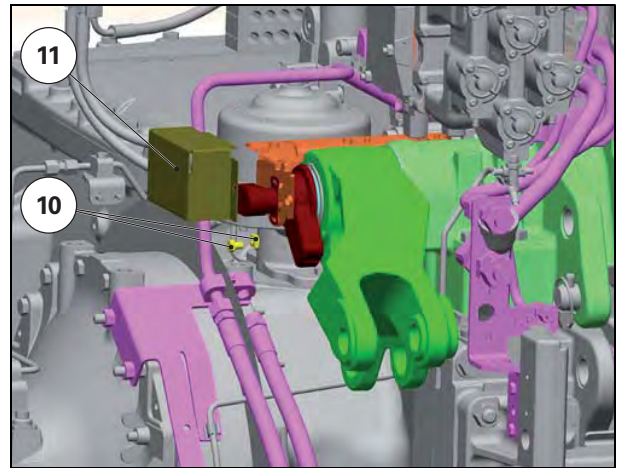
- 65. Fit the draft sensor according to the marks made during removal.
- 66. Fit the 2 screws (12).



1011728

Fig. 16

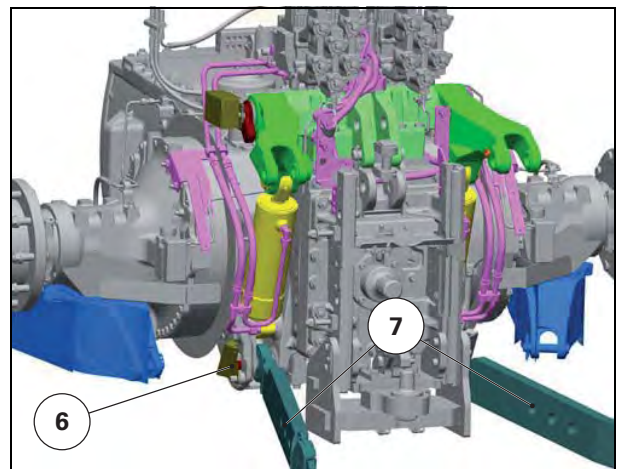
- 67. Fit the screw (10) and its washer.
- 68. Fit the protective guard (11) of the sensor.



1011727

Fig. 17

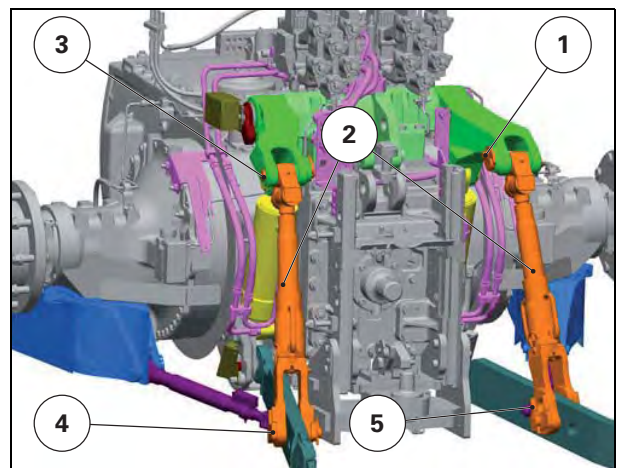
- 69. Fit the linkage links and draft sensors.



1011723

Fig. 18

- 70. Refit the lift rods (2) on the links (4) and (5), and the screws (1).
- 71. Refit the cab.
- 72. Refit the rear wheels.



1011717

Fig. 19

C. Disassembling the LS rear linkage spool valve

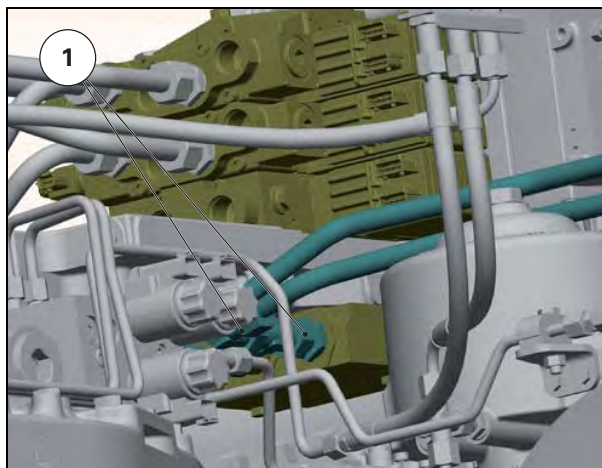
Preliminary steps

73. Remove the rear wheels and chock the tractor.

74. Remove the right-hand brake control.

Disassembly

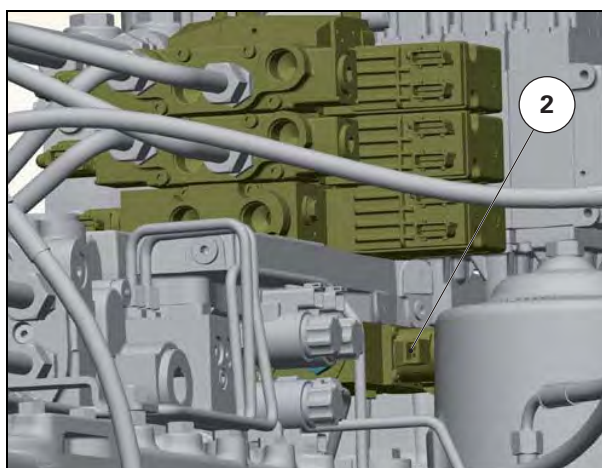
75. Remove the hydraulic channels (1).



1012011

Fig. 20

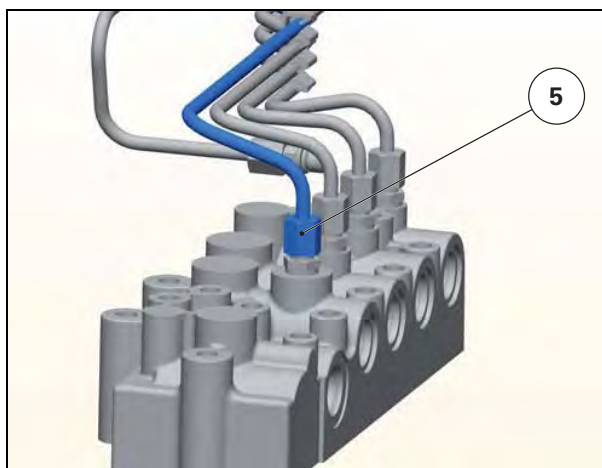
76. Disconnect the electrical connection (2).



1012012

Fig. 21

77. Remove the 4WD clutch bleed pipe.

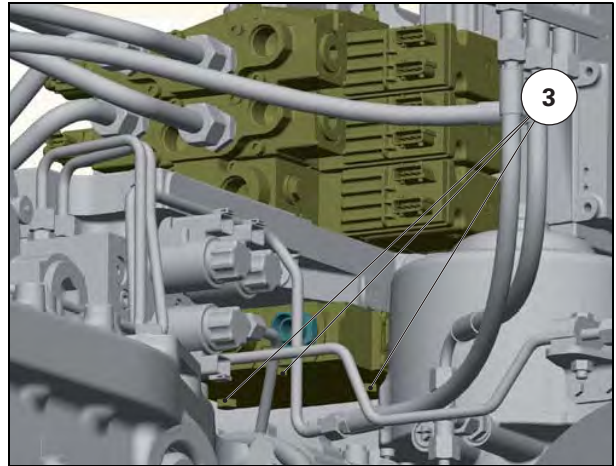


1012048

Fig. 22

78. Remove the 3 screws (3) attaching the spool valve.

79. Remove the spool valve.

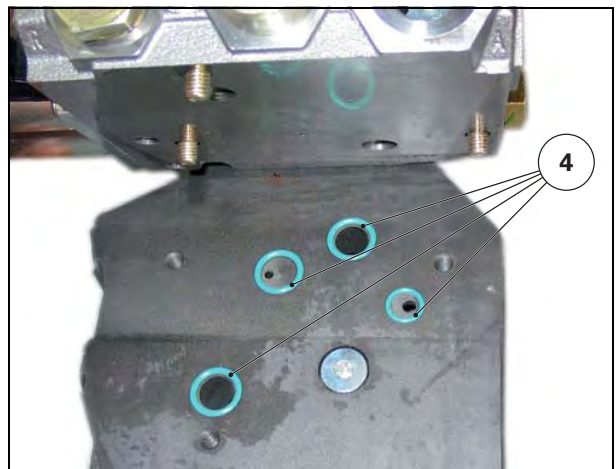


1012013

Fig. 23

80. Discard the "O" rings (4).

81. Clean all the parts for reassembly.



1012014

Fig. 24

D. Reassembling the LS rear linkage spool valve

Preliminary steps

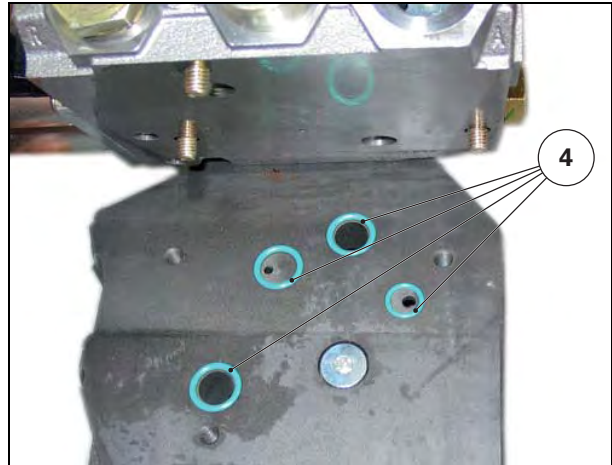
82. Ensure all parts are clean and in good condition.



WARNING: All traces of rust, mud and water must be removed.

Reassembly

83. Fit new "O" rings smeared with miscible grease on the hydraulic plate.

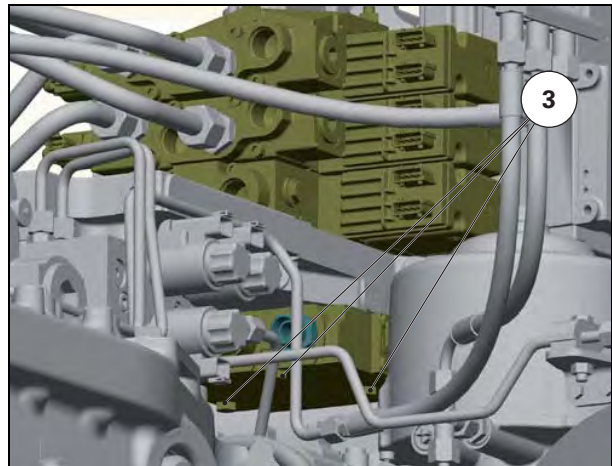


1012014

Fig. 25

84. Fit the linkage spool valve.

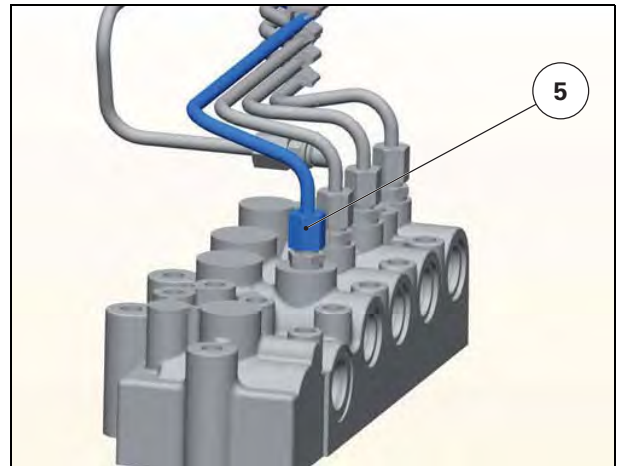
85. Fit the 3 screws (3) and tighten them to a torque of 30 Nm.



1012013

Fig. 26

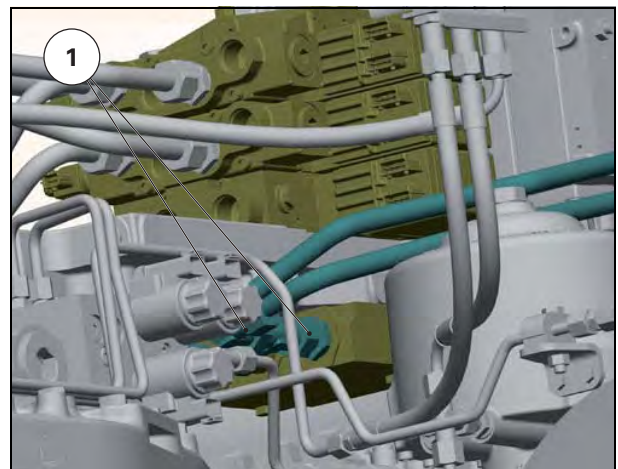
86. Refit the 4WD clutch bleed pipe.



1012048

Fig. 27

87. Refit the hydraulic channels (1) and tighten them to a torque of 47 Nm.



1012011

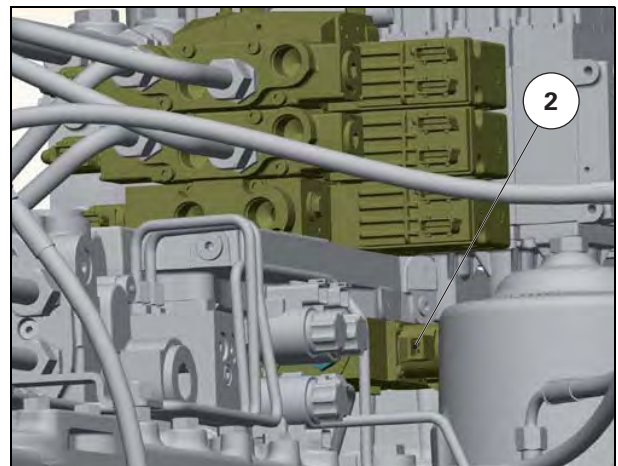
Fig. 28

88. Reconnect the electrical connector (2).

89. Refit the right-hand brake control.

90. Refit the rear wheels.

91. Bleed the 4WD clutch.



1012012

Fig. 29

9D18

LS rear linkage - Service tools

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A. General

The tools described in this section can be ordered from the AGCO spare parts department or by contacting the tooling division of Beauvais by referring to AGCOnet bulletin Trac 60/07.

The prices will then be sent out to you.

B. LS rear linkage - Service tools

Ref.	AG01A
Description	Hydraulic testing and measuring instrument kit
Order	AGCO Stoneleigh

Contents

See Service Bulletin ADM 08/04



1009102

Fig. 1

9D20

LS front linkage - General

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B. Principles of operation	299

A. General

8600 series tractors may be fitted with a front linkage integrated into the front cradle, as an option.

The linkage capacity is 5 t.

The linkage arms are controlled by two double-acting rams, which are supplied by the LS pump.

A Sauer Danfoss spool valve sends the oil flow from the LS pump to the lift rams and, via the various positions of its spool, allows the linkage to be set to single or double-acting lift/lower position, floating position or neutral position.

A transport position allows the overall dimensions to be reduced when the front linkage is not in use. A third ram makes it easier to shift between the transport and working positions.

NOTE: The system is fitted with accumulators if the tractor is not fitted with front axle suspension.

The front linkage may operate in position control with the rear linkage (Dual Control) (see the Operator Instruction Book for the tractor).

IMPORTANT: The load on the front linkage arms significantly increases the load on the front axle beam due to implement overhang. Overhang on the linkage arms further increases the load on the front axle beam.

Technical specifications

Rams

Type: Double-acting
 Pin diameter: 40 mm
 Ram internal diameter: 100 mm
 Rod diameter: 50 mm
 Min. centre-to-centre distance: 530 mm

Linkage arms

Implement attachment: Automatic hooks and balls, category 3
 Width between balls: 870 mm

Operating mode

The front linkage is controlled by the lifting/lowering switch (K) located on the armrest.



Fig. 1



Fig. 2

Single or double acting control

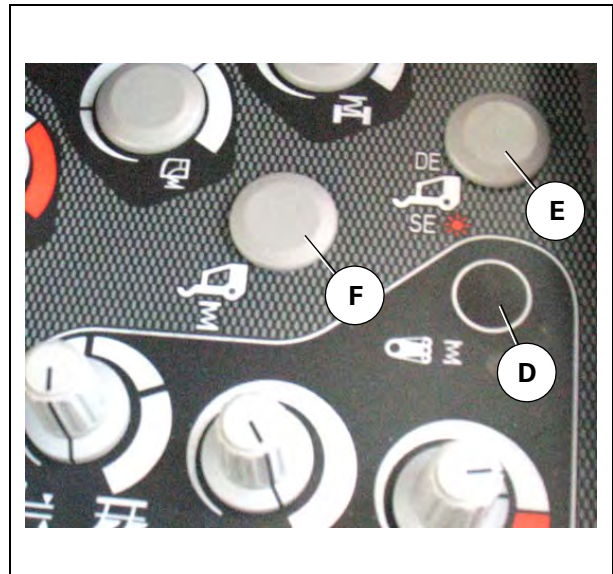
The switch (E) allows the front linkage to be used in single or double-acting mode.

Red LED lit: linkage in double acting mode.

Red LED not lit: linkage in single acting mode.

Active suspension: see the Operator Instruction Book.

Setting flow rates: see the Operator Instruction Book.



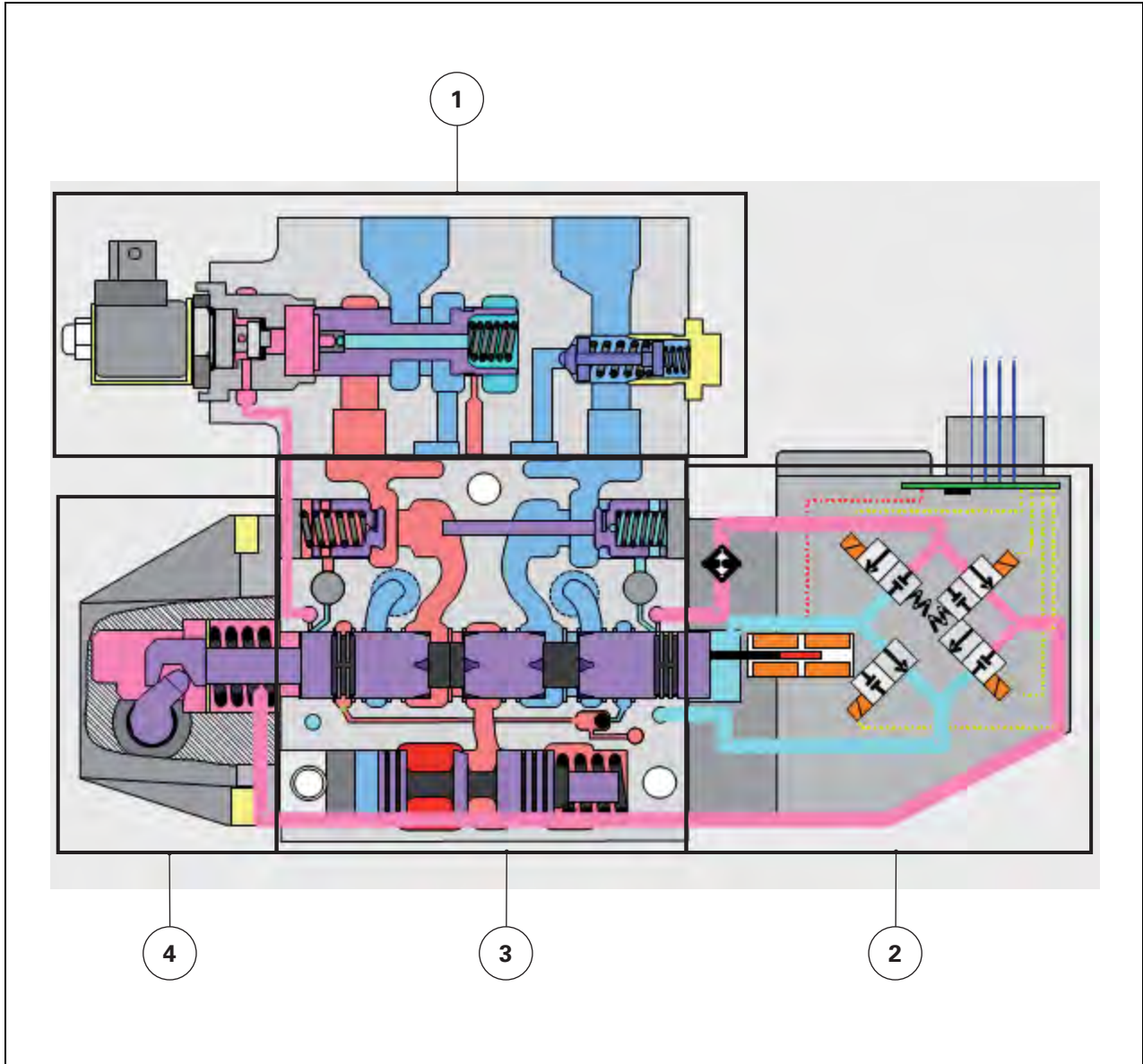
1006614

Fig. 3

B. Principles of operation

A controller called linkage Auto 5 receives instructions from the driver and controls the Sauer Danfoss spool valve via CAN messages.

The spool valve comprises 4 separate parts.



1011960

Fig. 4

- (1) Single or double-acting control
- (2) Spool valve pilot flow housing
- (3) Spool valve body (hydraulic part)
- (4) Closing plate

Control

This comprises:

- an electronic spool valve module (6) to control the spool valve
- 4 solenoid valves to control the spools (7)
- a position sensor (8), which is a non-contact sensor and will therefore not wear out as a result of friction

The control features both an electronic part and a hydraulic part.

Electronics

The control is CAN-based.

Operation:

The tractor controller sends regular messages to each of the tractor valves. The message contains information concerning the operation of the valves (specified flow rate/spool position etc.). The message is analysed by the valve, which interprets it hydraulically (spool movement etc.). The same valve may send error codes corresponding to a fault in the valve via the CAN network (see the chapter relating to error codes).

The specified value sent by the linkage controller is interpreted by the valve by a spool movement controlled by the position sensor (8). The electronic spool valve module (6) controls the hydraulic axle (7) comprising 4 electrohydraulic valves.

The valves (3) and (4) are normally closed, and the other two are normally open.

Hydraulics

The working pressure is set at 13 bar. The working pressure is the result of a reduction in the auxiliary supply pressure via a pressure relief valve located in the input plate.

When a valve is activated, the working pressure is sent through the hydraulic axle to one side of the spool. The solenoid valve control is switched off when the sensor detects the correct position.

Spool valve body

- (1) Outlet
- (2) Zero leak valve
- (3) Spool
- (4) Power supply
- (5) Balance
- (6) Return

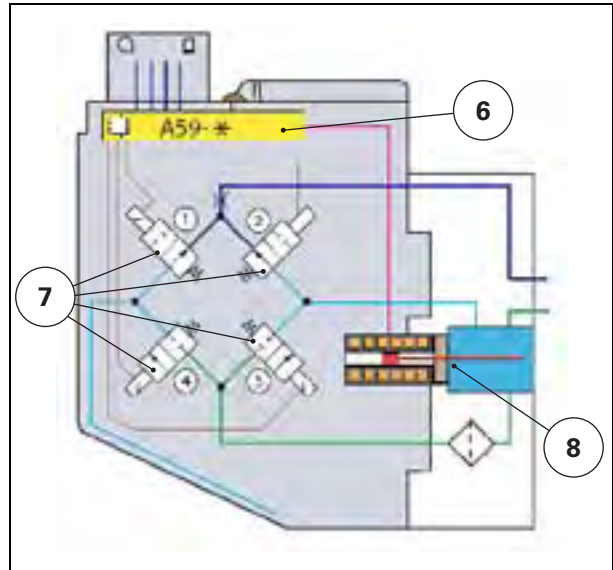
Description of components:

- The balance creates a constant difference in pressure between the supply and the outlet to ensure a constant flow through the spool valve, thus protecting the implement from any variations in flow that may be caused by components located upstream of the spool valve.
- The zero leak valve ensures the tightness of the seal between the spool valve outlet and the supply. This component therefore allows an implement to be left in position without lowering under its own weight.

Operation:

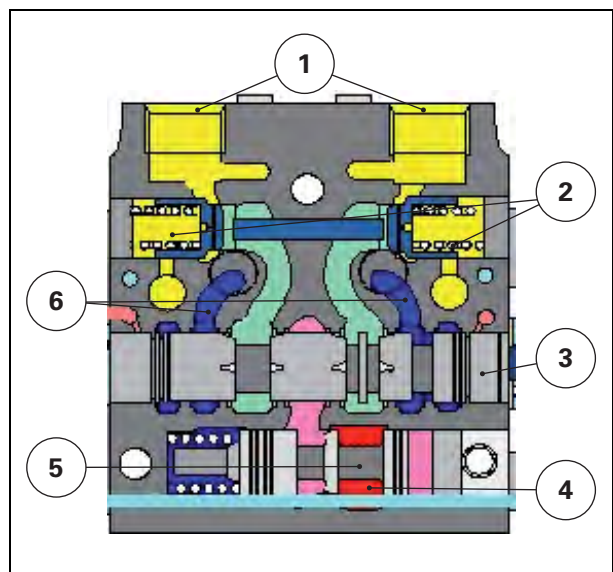
The supply pressure is sent to the balance; when it reaches a sufficient level, the balance is moved, allowing the flow into the spool.

Depending on the requested direction (pilot flow housing), the spool rocks to one side, allowing the flow through to



1011864

Fig. 5

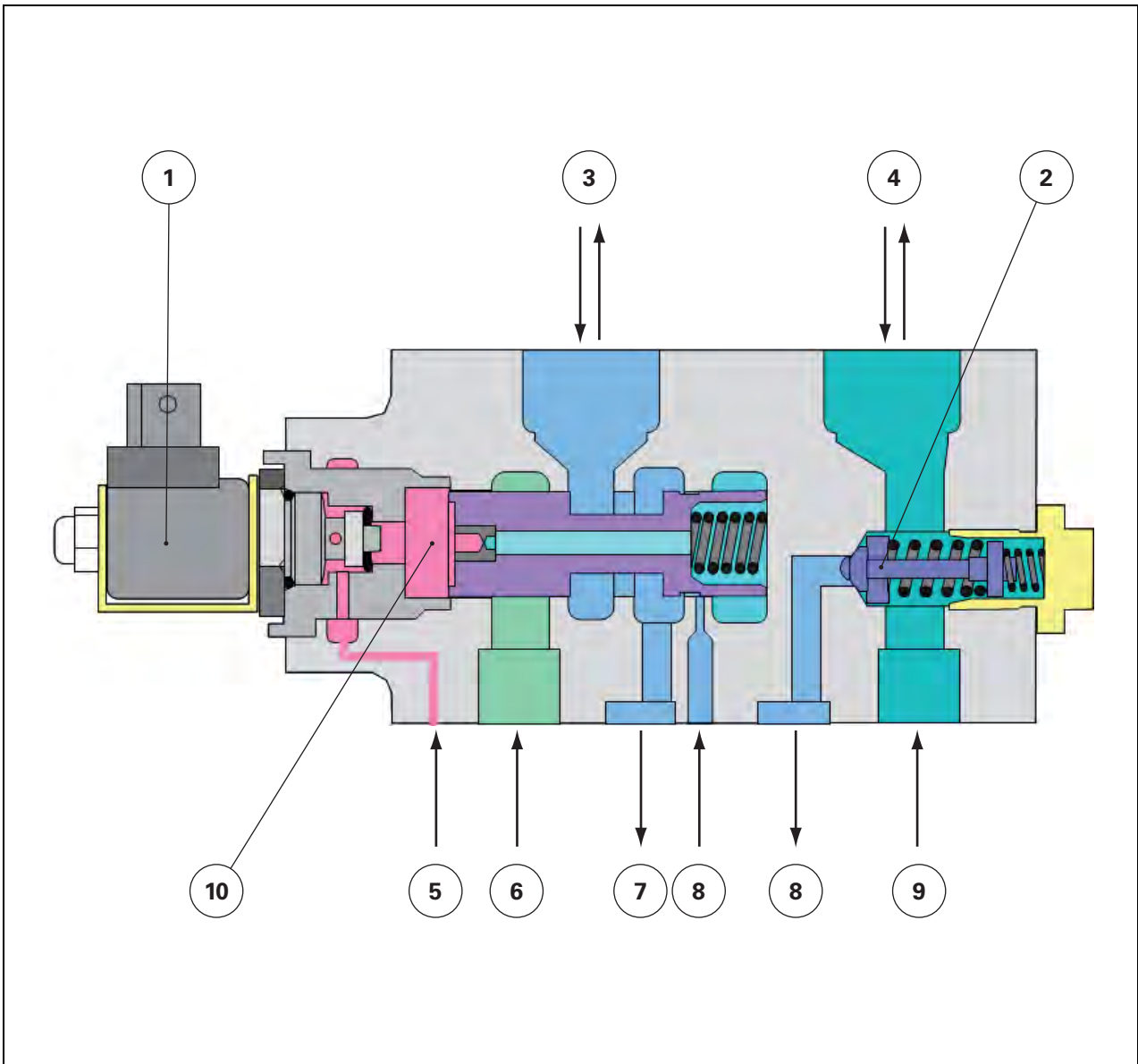


1011865

Fig. 6

one of the 2 zero leak valves, which opens to allow the flow into the implement.

Single or double-acting control



1011961

Fig. 7

- (1) Single/double-acting solenoid valve
- (2) Security valve
- (3) Lowering port
- (4) Lifting port
- (5) Linkage pressure supply (13 bar)
- (6) Port connecting with spool valve body outlet (lowering)
- (7) Port to tank
- (8) Port connecting with LS system
- (9) Port connecting with spool valve body outlet (lifting)
- (10) Spool

NOTE: The figure shows the single-acting position.

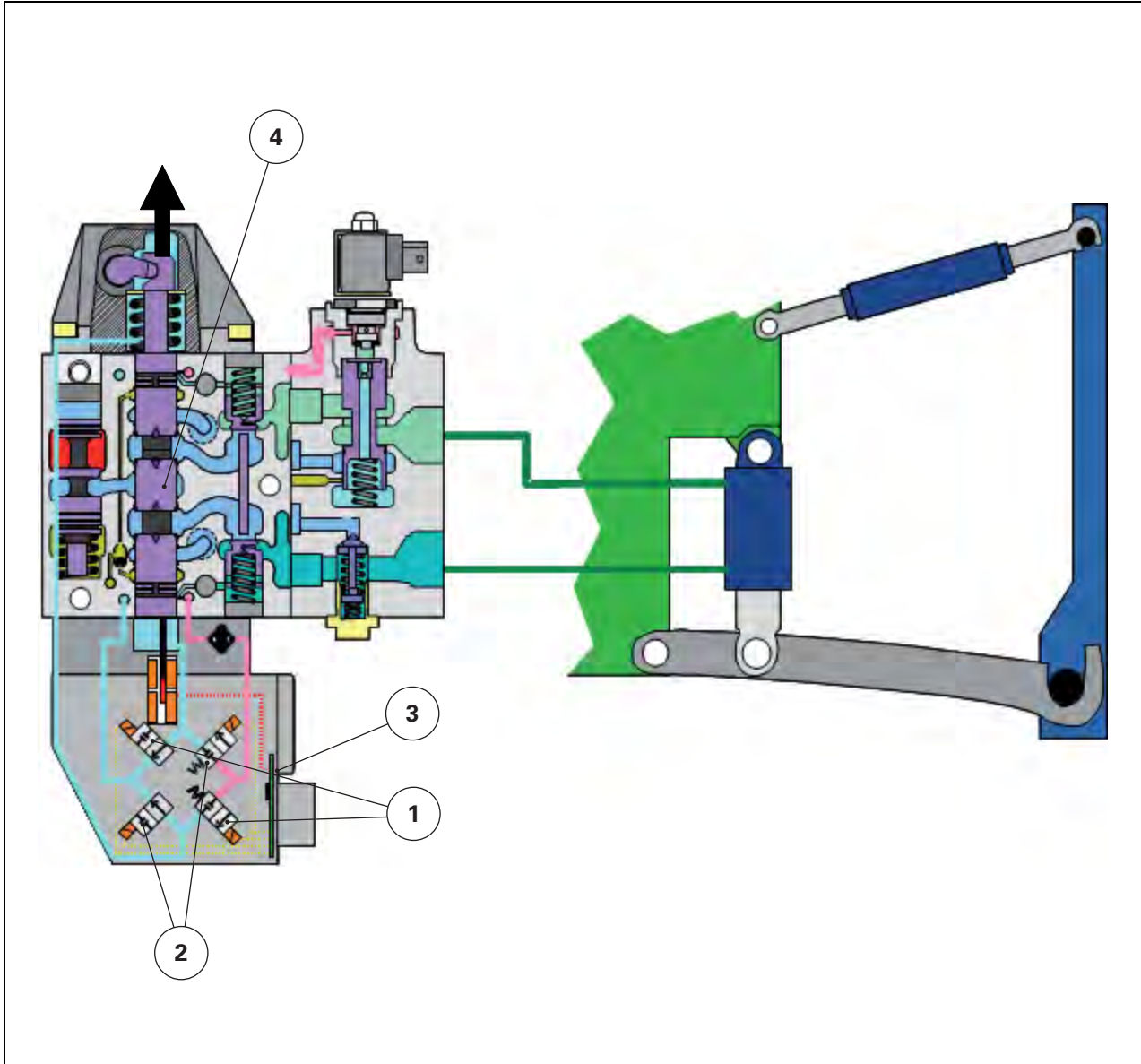
Operation:

In single-acting position, the solenoid valve (1) is energised and lets the control pressure (5) pass through and push the

spool (10). The spool connects the lowering port (3) and the LS system (8) to the tank return (7).

In double-acting position, the solenoid valve (1) is not energised, and the spool is held in position by its return spring. The port (3) is connected to the port (6).

Lifting position



1011963

Fig. 8

When the operator activates the lift position control, the pilot flow housing receives the information from the linkage Auto 5 controller located in the cab. The electronic spool valve module (3) activates the solenoid valves (2) and allows the control pressure (13 bar) to flow through and move the main spool (4) in the direction of the arrow.

The movement of the spool allows several changes to take place at the same time:

- pressure inlet (P) is connected with port (B) via the valve
- the LS system is connected with the supply pressure of the port (B)

- the control pressure (13 bar) is sent to the spool, allowing it to move and release the pressure from the zero leak valve
- the pressure sent to the port (B) also pushes the rod, which in turn pushes the spool (zero leak valve), allowing the oil coming from the port (A) to return to the tank

Linkage folding function in transport mode

A third ram, smaller than the linkage rams, allows hydraulic folding for transport mode (see the Operator Instruction Book for operation).

This ram is fitted in parallel to the two main rams.

Shifting from working mode to transport mode

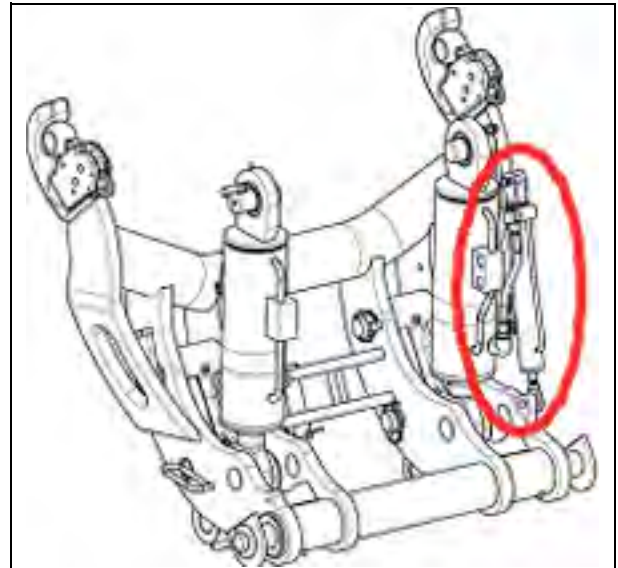
Use the external linkage controls to activate the lifting mode.

When the linkage reaches its upper stop (main ram rods fully retracted), remove the two pins (see the Operator Instruction Book). When the two pins have been taken out, raise the linkage. As the oil can no longer push the rod for the main rams, it flows to the small ram, whose rod has not yet reached its fully retracted position.

In this way the linkage continues to rise, allowing the part to be tipped. When the rod of the small ram reaches its stop, the holes are aligned and the pin can be inserted.

Shifting from transport mode to working mode

Carry out the same operations in reverse order.



1011965

Fig. 9

9D21

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9D22

LS front linkage - Diagrams and plans

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A. Hydraulics diagrams

Different systems

- (1) Variable displacement pump
- (2) Orbitrol
- (3) ParkLock control unit
- (4) Brake master cylinder
- (5) Suspended front axle unit
- (6) Main brake unit

Pumps

- (P1) Variable displacement pump
- (P2) Steering pump
- (P3) Steering standby pump

Filters - Strainers

- (F1) Filter on the return to the tank
- (F2) Suction strainer
- (F3) Standby pump suction strainer
- (F4) Standby pump suction strainer

Rams

- (V1) Rear linkage rams
- (V2) Steering ram
- (V3) ParkLock rams
- (V4) Right-hand brake fitting
- (V5) Left-hand brake fitting
- (V6) Front axle suspension ram
- (V7) Front cab suspension ram
- (V8) Rear cab suspension ram
- (V9) Auto-hitch ram
- (V10) Trailer brake ram, if connected

Accumulators

- (AC1) ParkLock accumulator
- (AC2) Main brake accumulator
- (AC3) Front axle suspension left-hand side accumulator
- (AC4) Front axle suspension right-hand side accumulator
- (AC5) Front cab suspension ram accumulators
- (AC6) Rear cab suspension ram accumulators

Other components

- (R1) Oil cooler

Different systems

- (7) Trailer brake unit
- (8) Cab suspension unit
- (9) Auto-hitch unit
- (10) Priority block
- (11) Connection unit
- (12) Connection unit
- (13) Rear linkage

A.1 Main hydraulics diagram

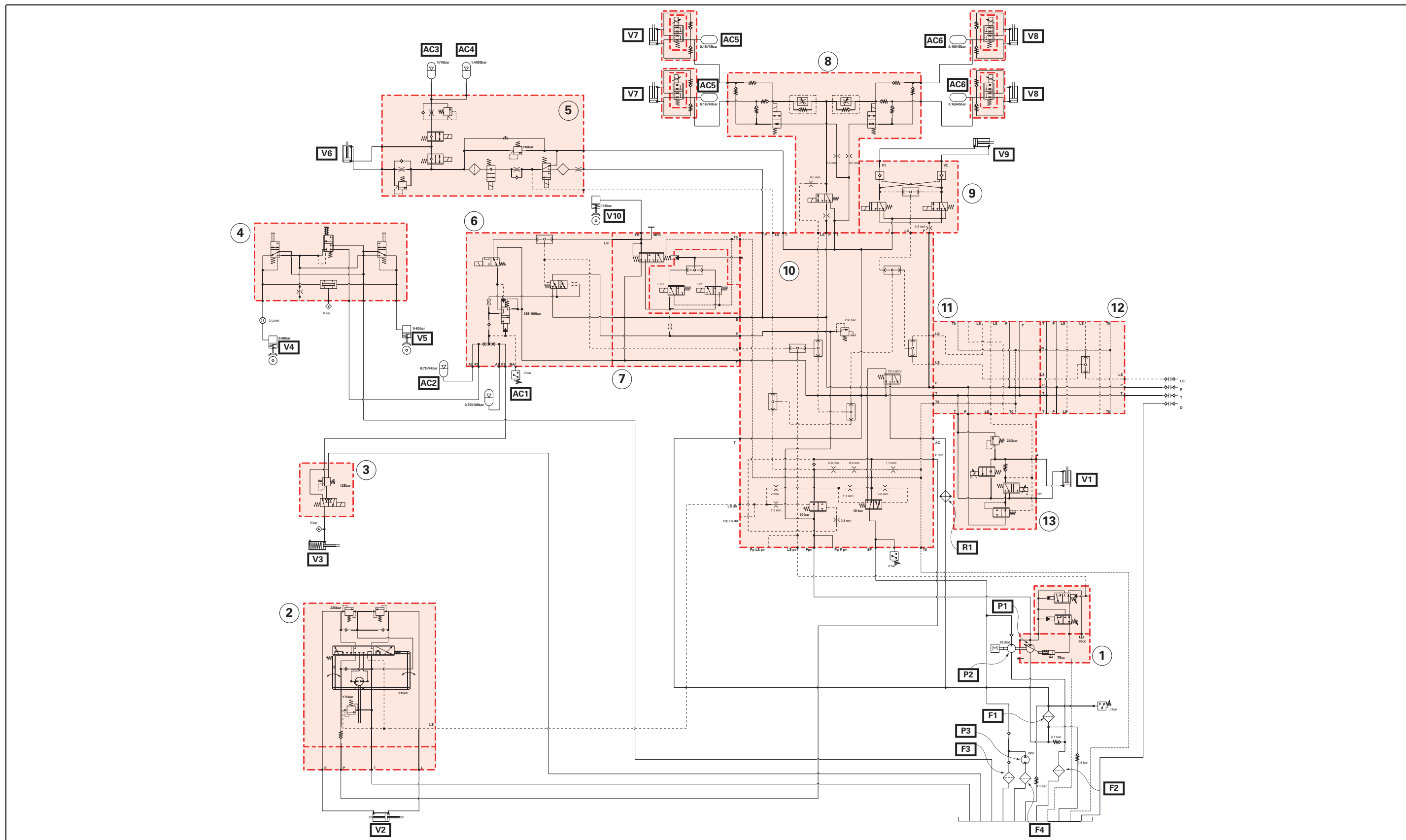


Fig. 1

Different systems

- (1) Rear linkage
- (2) Connection unit
- (3) Front linkage
- (4) Spool valve no. 1 for the no. 1 couplers at the front
- (5) Spool valve no. 2 for the no. 2 couplers at the front
- (6) Cover plate
- (7) Cover plate
- (8) Spool valve no. 1
- (9) Spool valve no. 2
- (10) Spool valve no. 3
- (11) Connection unit
- (12) Spool valve no. 4
- (13) Spool valve no. 5
- (14) Spool valve no. 6
- (15) Cover plate

A.2 Auxiliary spool valve hydraulics diagram (with front couplers)

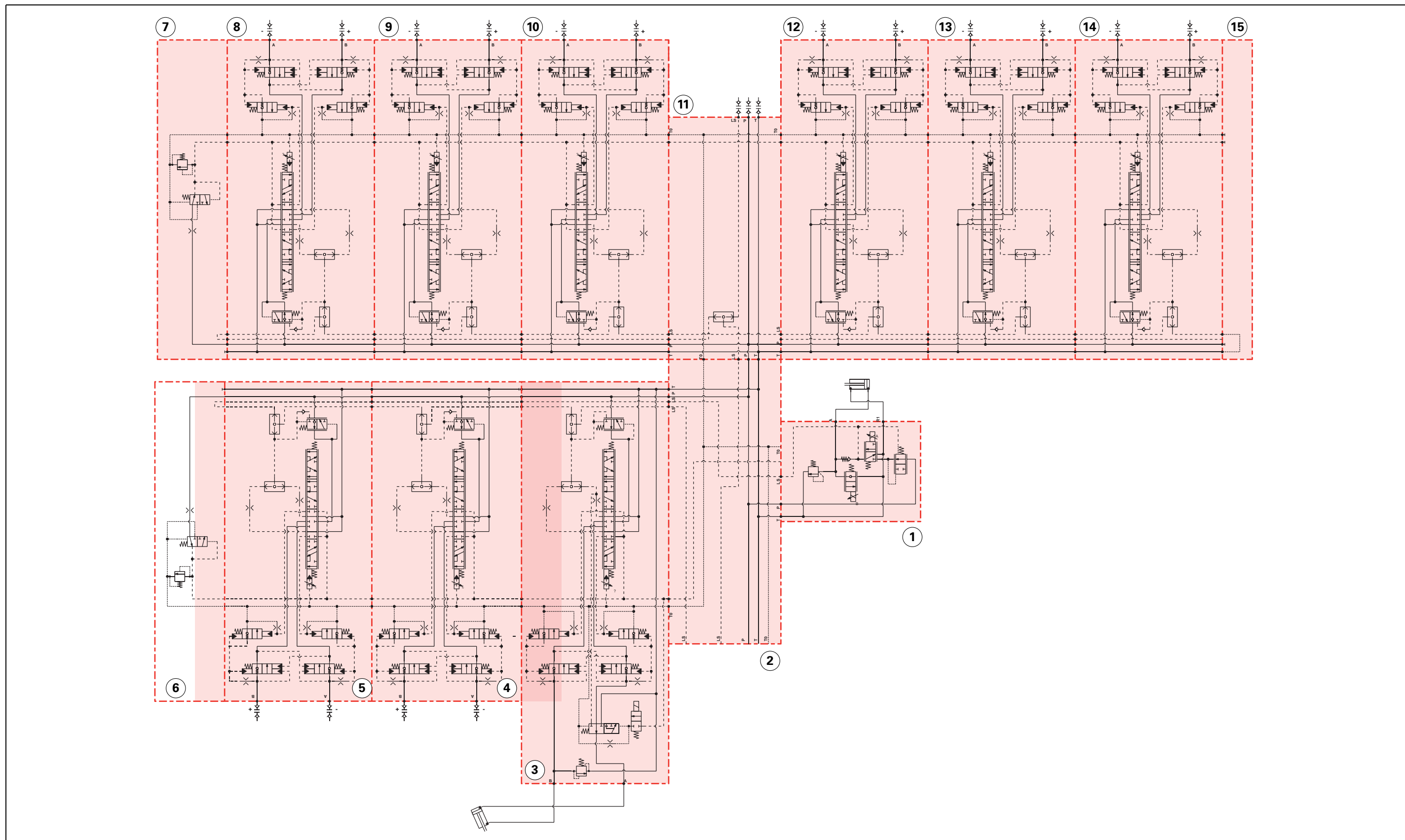


Fig. 2

Different systems

- (1) Rear linkage
- (2) Connection unit
- (3) Front linkage
- (4) Cover plate
- (5) Spool valve no. 1
- (6) Spool valve no. 2
- (7) Spool valve no. 6
- (8) Connection unit
- (9) Spool valve no. 3
- (10) Spool valve no. 4
- (11) Spool valve no. 5
- (12) Cover plate

A.3 Auxiliary spool valve hydraulics diagram (without front couplers)

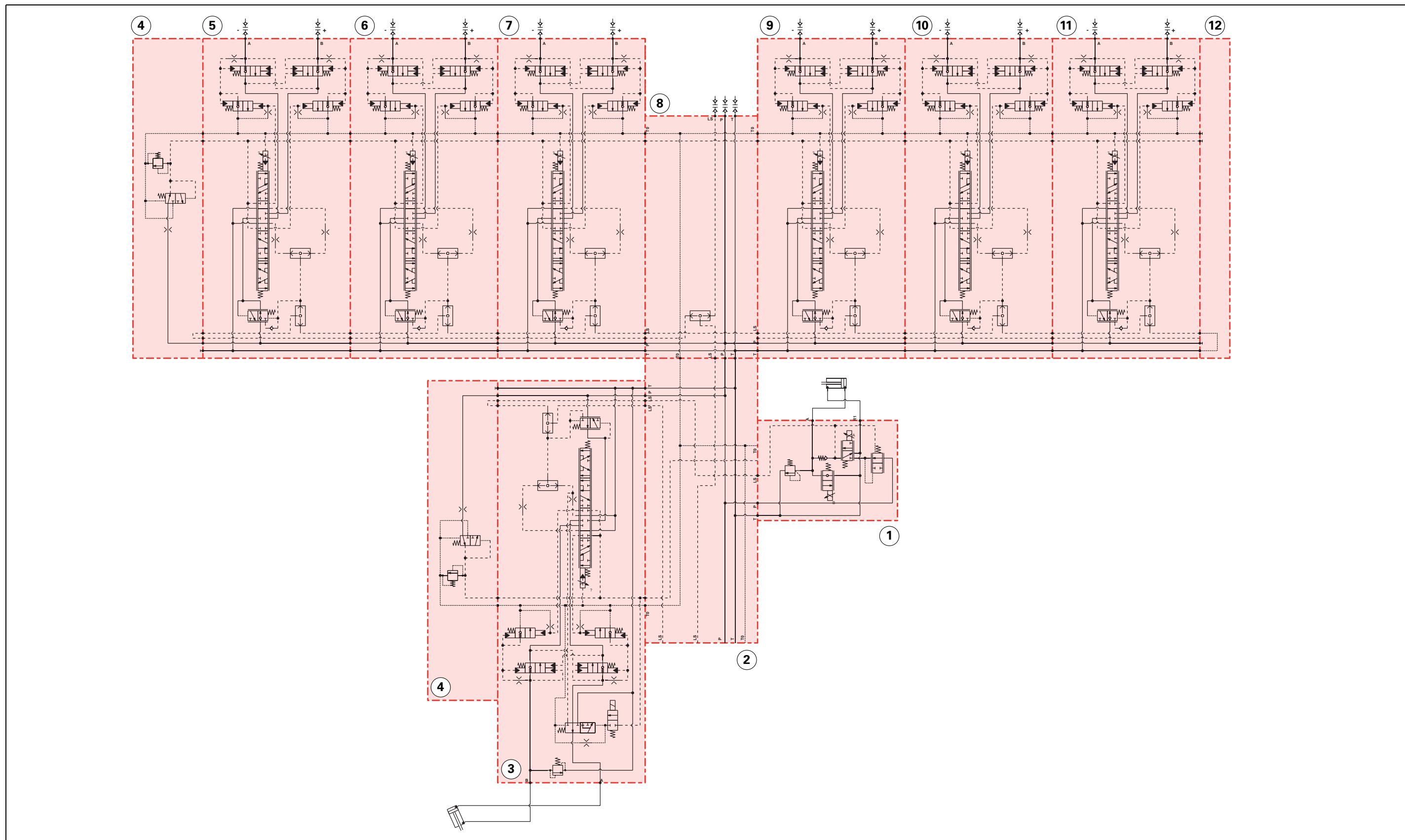


Fig. 3

B. Electrical diagrams

B.1 Identification of electrical connectors and harnesses

Identification of electrical connectors

- X1** - Auxiliary hydraulic oil temperature sensor
- X2** - Auxiliary hydraulic oil filter blockage switch
- X3** - 540 rpm PTO speed solenoid valve
- X4** - 1000 rpm PTO speed solenoid valve
- X5** - 4WD solenoid valve
- X6** - Differential lock solenoid valve
- X7** - Rear PTO solenoid valve
- X8** - Bevel gear theoretical speed sensor
- X9** - Transmission oil high pressure sensor 1
- X10** - Collecting shaft speed sensor
- X11** - Solenoid valve limiting speed to 30 kph
- X12** - Coupler function solenoid valve
- X13** - Hare range solenoid valve
- X14** - Tortoise range solenoid valve
- X15** - PTO clutch speed sensor
- X16** - PTO shaft speed sensor
- X17** - Hare/Tortoise range position sensor
- X18** - Transmission control module
- X19** - Transmission hydraulic oil temperature sensor
- X20** - Transmission filter blockage switch
- X21** - ParkLock brake pressure sensor
- X22** - Radar
- X23** - Steering pressure sensor
- X24** - Auxiliary hydraulic oil gauge
- X25** - Engine speed sensor
- X26** - Pneumatic brake solenoid valve
- X27** - Rear linkage lifting solenoid valve
- X28** - Rear linkage lowering solenoid valve
- X29** - Dual Control socket connector
- X30** - Rear linkage position sensor
- X31** - Rear linkage right-hand draft sensor
- X32** - Rear linkage left-hand draft sensor
- X33** - Transmission harness CAN junction
- X34** - Transmission oil high pressure sensor 2
- X35** - ParkLock hydraulic system pressure sensor
- X36** - LS signal breaker solenoid valve
- X37** - ParkLock pressure reversing solenoid valve
- X38** - Trailer braking proportional solenoid valve
- X39** - Trailer braking safety solenoid valve
- X40** - Front linkage single/double acting function solenoid valve
- X41** - Divider solenoid valve 1
- X42** - Divider solenoid valve 2
- X43** - Auto-hitch lifting solenoid valve
- X44** - Auto-hitch lowering solenoid valve
- X45** - Bleed for pneumatic suspended cab front and rear systems
- X46** - Rear left-hand ram position sensor for cab suspension
- X47** - Rear right-hand unit for suspended cab
- X48** - Rear left-hand unit for suspended cab
- X49** - Suspended cab rear lowering solenoid valve
- X50** - Suspended cab front lowering solenoid valve
- X51** - Transmission harness earth (chassis)
- X52** - Engine harness/transmission harness junction
- X53** - Cab transmission harness/transmission harness junction
- X54** - Suspended cab lifting solenoid valve
- X55** - Instrument panel
- X56** - Power Control lever
- X57** - DOT Matrix keyboard
- X58** - Windscreen wiper and indicator control unit
- X59** - DOT Matrix keyboard connection on instrument panel
- X60** - Engine harness/instrument panel harness junction
- X61** - Cab transmission harness/engine harness junction
- X62** - Instrument panel harness/cab transmission harness junction
- X63** - Instrument panel harness connection on fuse box
- X64** - Instrument panel harness connection on fuse box
- X65** - Front windscreen wiper motor
- X66** - Left-hand brake pedal sensor
- X67** - Right-hand brake pedal sensor
- X68** - Clutch pedal sensor
- X69** - Cab interior temperature sensor
- X70** - Solar radiation sensor
- X71** - Throttle pedal sensor
- X72** - ParkLock switch on Power Control lever
- X73** - Buzzer Control
- X74** - Buzzer Supply (+12 V APC)
- X75** - Pillar harness/right-hand fender harness junction
- X76** - Rear right-hand indicator
- X77** - Rear right-hand side light and stop light
- X78** - Work light on rear right-hand fender
- X79** --
- X80** --
- X81** --
- X82** --
- X83** --
- X84** --
- X85** --
- X86** --
- X87** - Linkage lifting/lowering switch on right-hand fender
- X88** - Rear right-hand NA indicator extension
- X89** - Earth (chassis)
- X90** - Pillar harness/left-hand fender harness junction
- X91** - Rear left-hand indicator
- X92** - Rear left-hand side light and stop light
- X93** - Work light on rear left-hand fender
- X94** - PTO ON/OFF switch on left-hand fender
- X95** - PTO Stop switch on left-hand fender
- X96** - Hydraulic spool valve switch on left-hand fender
- X97** - Linkage lifting/lowering switch on left-hand fender
- X98** - Rear left-hand NA indicator extension
- X99** - PTO and linkage console harness/cab transmission harness junction
- X100** - Instrument panel harness earth (chassis)
- X101** - Instrument panel harness/electric rear-view mirror harness junction
- X102** - Right-hand fender lighting harness/trailer connector harness junction
- X103** - Armrest harness/cab transmission harness junction
- X104** - Armrest Autotronic 5

- X105** - Datatronic CCD
- X106** - Transmission lever in armrest
- X107** - Headland mode switch (headland function)
- X108** - FingerTIP 3
- X109** - FingerTIP 4
- X110** - FingerTIP 5
- X111** - DTM dynamic transmission mode switch
- X112** - Joystick
- X113** - Armrest 6-button keyboard
- X114** - Supply on fuse box for 3rd spool valve
- X115** - Supply on fuse box for 4th spool valve
- X116** - +12 V battery supply (for lighting module)
- X117** - Isobus +12 V battery power socket
- X118** - Automatic PTO switch
- X119** - Rear linkage lifting/lowering switch
- X120** - Datatronic CCD navigation keyboard
- X121** - Rear linkage height/depth adjustment thumb wheel
- X122** - Hand throttle
- X123** - Hare/Tortoise range shift switch
- X124** - Pedal/lever mode switch
- X125** - SV1 speed setting potentiometer
- X126** - SV2 speed setting potentiometer
- X127** - Front PTO ON/OFF switch
- X128** - Rear PTO ON/OFF switch
- X129** - Fuse box +12 V battery connection
- X130** - FingerTIP 6 front linkage function
- X131** - Front linkage suspension solenoid valve
- X132** - Instrument panel harness/armrest harness junction
- X133** - Console harness/cab transmission harness junction
- X134** - Console harness/pillar harness junction
- X135** - Braking pressure sensor
- X136** - Differential lock switch
- X137** - 4WD switch
- X138** - Hazard warning lights indicator light and switch
- X139** - Suspended front axle switch
- X140** - Suspended front axle setting potentiometer
- X141** - Suspended cab switch
- X142** - Suspended cab setting potentiometer
- X143** - Variable steering switch (fast steering)
- X144** - Variable steering setting potentiometer (fast steering)
- X145** - PTO/linkage console
- X146** - Rear linkage suspension switch
- X147** - Roof harness/pillar harness junction
- X148** - Roof harness/pillar harness junction
- X149** - Headlights module (black connector)
- X150** - Pillar harness/cab power socket harness junction
- X151** - Pillar harness/cab power socket harness junction
- X152** - Start switch
- X153** - Non-Isobus implement connector
- X154** - Suspended front axle lifting solenoid valve
- X155** - Cigarette lighter socket (power)
- X156** - Cigarette lighter socket (backlighting)
- X157** - Left-hand side +12 V socket (power)
- X158** - Left-hand side +12 V socket (backlighting)
- X159** - Suspended front axle lowering solenoid valve
- X160** - Console harness earth (chassis)
- X161** - Solenoid valve 1 for suspended front axle suspension
- X162** - Pillar harness connection on fuse box
- X163** - Solenoid valve 2 for suspended front axle suspension
- X164** - Pillar harness/cab transmission harness junction
- X165** - Automatic air conditioning harness/pillar harness junction
- X166** - Suspended front axle position sensor
- X167** - +12 V APC fuse box connection
- X168** - Pneumatic brake system pressure sensor
- X169** - Power socket control switch (in cab)
- X170** - Pillar harness connection on fuse box
- X171** - Cab transmission harness connection on fuse box
- X172** - Cab transmission harness connection on fuse box
- X173** - Cab transmission harness earth
- X174** - Autotronic 4 transmission controller
- X175** - Emergency control switch
- X176** - Earth (Autotronic 4 transmission controller)
- X177** - Autotronic 5 Linkage
- X178** - ParkLock/suspended front axle/passive suspended cab Autotronic 5
- X179** - Main lighting, sidelight/dipped light activation switch
- X180** - Front windscreen washer pump
- X181** - Front linkage single acting / double acting function switch
- X182** - Linkage external lifting switch
- X183** - Diagnostics connector (tractor-Isobus CAN)
- X184** - Diagnostics connector (engine-valve CAN)
- X185** - Sisu EEM unit
- X186** - Starter
- X187** - Engine start relay
- X188** - Engine identification module (ID module)
- X189** - Fuel lift pump
- X190** - Vistronic fan
- X191** - Diesel fuel preheater
- X192** - B + alternator 1
- X193** - B + alternator 2
- X194** - D + alternator 1
- X195** - D + alternator 2
- X196** - In line fuse (225 A)
- X197** - Diesel fuel gauge
- X198** - Pneumatic trailer brake sensor
- X199** - Work light on left-hand step
- X200** - Work light on right-hand step
- X201** - Engine harness earth
- X202** - Front accessory connection socket harness/front function harness junction
- X203** - Engine harness/front headlights harness junction
- X204** - Cooling unit harness/engine harness junction
- X205** - Front axle harness/engine harness junction
- X206** - Sensor detecting water in the diesel fuel
- X207** - Pneumatic seat adjustment control
- X208** - Front linkage suspension switch LED
- X209** - Rear linkage external lowering switch
- X210** - Orbitrol steering sensor (SASA sensor)
- X211** - Rear Dual Control connector

- X212** - Instrument panel harness/armrest harness junction
- X213** - Power socket for additional heating
- X214** - Armrest harness/cab transmission harness junction
- X215** - Trailer connector (right-hand side light and number plate lights)
- X216** - Reversing light
- X217** - Isobus CAN connector
- X218** - External Isobus tool connector
- X219** - Cab Isobus harness/external Isobus harness junction
- X220** - Trailer connector (left-hand side light)
- X221** - Trailer connector (right-hand indicator)
- X222** - Trailer connector (left-hand indicator)
- X223** - Trailer connector (brake lights)
- X224** - Trailer connector (earth)
- X225** - Trailer connector (reversing light)
- X226** - Trailer connector harness earth
- X227** - Console harness/cab transmission harness junction
- X228** - Front linkage single/double-acting function LED
- X229** - 120 Ohm CAN 1 resistor (cab transmission harness)
- X230** - 120 Ohm CAN 2 resistor (cab transmission harness)
- X231** - 120 Ohm CAN 3 resistor (cab transmission harness)
- X232** - 120 Ohm CAN 4 resistor (cab transmission harness)
- X233** - Cab transmission harness/Isobus harness junction
- X234** - 120 Ohm CAN ATC resistor
- X235** - Front axle steering sensor (WAS sensor)
- X236** - Electrohydraulic Orbitrol (grey connector)
- X237** - Electrohydraulic Orbitrol (black connector)
- X238** - Connector 1 for valve harness
- X239** - Connector 2 for valve harness
- X240** - 120 Ohm resistor for electrohydraulic spool valves
- X241** - Sisu engine preheating supply (Grid Heater)
- X242** - Exhaust temperature sensor
- X243** - AdBlue/DEF reservoir (urea) level gauge and temperature sensor
- X244** - CAN SCR harness
- X245** - +12 V APC supply for SCR
- X246** - Auto-Guide external harness/engine harness junction
- X247** - Roof harness/electric rear-view mirror harness junction
- X248** - Right and left-hand electric rear-view mirror adjustment switch
- X249** - External rear-view mirror defroster switch
- X250** - Power socket in cab
- X251** - In line fuse (225 A)
- X252** - Automatic air conditioning condenser
- X253** - Air filter vacuum sensor
- X254** - Horn (earth)
- X255** - Horn
- X256** - Roof harness/hand rail harness junction
- X257** - Side light and indicator on hand rail (right and left)
- X258** - Main beam on hand rail (right and left)
- X259** - Hand rail upper work light
- X260** - Hand rail upper work light
- X261** - Front right-hand unit for suspended cab
- X262** - Front left-hand unit for suspended cab
- X263** - Floating stop relay control (US front-end loader)
- X264** - Front linkage suspension switch
- X265** - Rear linkage suspension switch indicator light
- X266** - Rear linkage diagnostic and lifting/lowering LEDs
- X267** - Switch for left-hand side heater
- X268** - Pillar harness connection on fuse box
- X269** - Cab suspension harness/cab transmission harness junction
- X270** - Front accessories connection socket (rotary beacon)
- X271** - Front accessories connection socket (+12 V battery)
- X272** - Front accessories connection socket (+12 V APC)
- X273** - Front accessories connection socket (main beam light)
- X274** - Front accessories connection socket (main beam light)
- X275** - Front accessories connection socket (work light)
- X276** - Earth for front accessory connection socket harness
- X277** - Front linkage lifting/lowering external control
- X278** - Front linkage lifting switch (external)
- X279** - Dual Control or TIC position sensor
- X280** - Front linkage rams pressure sensor
- X281** - Solenoid valve for front PTO
- X282** - Roof harness/cab Auto-Guide harness junction
- X283** - TopDock
- X284** - Headlights module keyboard
- X285** - Ad Blue (urea) metering valve
- X286** - Ad Blue (urea) injection valve
- X287** - Ad Blue (urea) reservoir preheating valve
- X288** - 12/24 V converter for SCR system
- X289** - SCR management module
- X290** - Front accessory connection socket harness/front function harness junction
- X291** - Front accessory connection socket harness/front function harness junction
- X292** - Front windscreen washer pump
- X293** - 540 rpm PTO switch
- X294** - 540 eco rpm PTO switch
- X295** - 1000 rpm PTO switch
- X296** - USB connector
- X297** - PTO/linkage console backlighting
- X298** - Headland mode switch (headland function)
- X299** - Linkage lowering speed potentiometer
- X300** - -
- X301** - PTO stop switch on left-hand fender
- X302** - Switch for pre-selected engine speed A
- X303** - Switch for pre-selected engine speed B
- X304** - Instrument panel harness/armrest harness junction
- X305** - Headlights module (grey connector)
- X306** - Switch for pre-selected engine speed A/B
- X307** - FingerTIP 1
- X308** - FingerTIP 2
- X309** - SV1/SV2 speed regulator switch

- X310** - Divider 1 indicator light and solenoid valve (earth)
X311 - Divider 2 indicator light and solenoid valve (+12 V)
X312 - SV1/SV2 speed setting potentiometer in armrest
X313 - Pedal/lever transmission control mode switch and DTM switch
X314 - Hydraulics switch 1, road/field mode
X315 - Hydraulics switch 2, road/field mode
X316 - Headland mode switch (headland function)
X317 - + battery supply for headlights module
X318 - Automatic air conditioning compressor
X319 - + battery supply for headlights module
X320 - + battery supply on headlights module
X321 - + battery supply on headlights module
X322 - + battery supply on headlights module
X323 - + battery supply on headlights module
X324 - +12 V APC fuse box connector (battery isolator switch)
X325 - Pillar harness / non-Isobus implement connector harness junction
X326 - Pillar harness / non-Isobus implement connector harness junction
X327 - Battery earth (chassis)
X328 - Battery isolator switch earth terminal
X329 - Battery isolator switch earth terminal
X330 - Battery negative terminal contact (battery isolator switch)
X331 - Pillar harness connection on fuse box
X332 - + battery (start switch)
X333 - Engine harness earth (chassis)
X334 - Battery isolator switch earth terminal
X335 - Battery isolator switch earth terminal
X336 - Battery isolator switch
X337 - Pneumatic brake ParkLock solenoid valve
X338 - Earth (battery isolator switch)
X339 - Pneumatic trailer braking solenoid valve
X340 - + terminal on battery for fuse box
X341 - Starter supply
X342 - Positive battery terminal
X343 - RS232 diagnostics connector for Auto-Guide
X344 - Isobus connector in cab
X345 - Supply for additional terminal (mitron unit)
X346 - Auto-Guide switch
X347 - Cab transmission harness connection on fuse box
X348 - Cab transmission harness connection on fuse box
X349 - -
X350 - Front right-hand grille work light
X351 - Front right-hand grille work light
X352 - Front right-hand grille work light
X353 - Front left-hand grille work light
X354 - Front left-hand grille work light
X355 - Front left-hand grille work light
X356 - Right-hand main beam and dipped light
X357 - Left-hand main beam and dipped light
X358 - Outside temperature sensor
X359 - Cab suspension harness/cab transmission harness junction
X360 - Pillar harness connection on fuse box
X361 - Pillar harness connection on fuse box
X362 - Fuse box (+12 V battery)
X363 - Auto-hitch (Dromone) switch
X364 - 120 Ohm resistor for Auto-Guide/Isobus CAN network
X365 - Hand rail lower work light
X366 - Pneumatic brake harness / transmission harness junction
X367 - Switch 1 on joystick
X368 - Switch 2 on joystick
X369 - Engine speed + switch
X370 - Engine speed - switch
X371 - Engine speed stop switch
X372 - Orbitrol safety solenoid valve
X373 - Left-hand 12 V socket (cab) (power)
X374 - Left-hand 12 V socket (cab) (backlighting)
X375 - Instrument panel harness/cab transmission harness junction
X376 - Fuse box (reserve for + APC)
X377 - Fuse box (supply for cab suspension compressor)
X378 - FNRP lever and button
X379 - Front left-hand work light on roof
X380 - Front right-hand work light on roof
X381 - Front left-hand work light on roof
X382 - Front right-hand work light on roof
X383 - Front left-hand roof indicator
X384 - Front right-hand roof indicator
X385 - Rear left-hand work light on roof
X386 - Rear right-hand work light on roof
X387 - Rear left-hand work light on roof
X388 - Rear right-hand work light on roof
X389 - Rear left-hand work lights
X390 - Rear right-hand work lights
X391 - Rear left-hand roof indicator
X392 - Rear right-hand roof indicator
X393 - Earth
X394 - Radio aerial connector
X395 - Radio supply
X396 - Radio speaker connector
X397 - Front left-hand speaker
X398 - Front right-hand speaker
X399 - Rear left-hand speaker (+ supply)
X400 - Rear right-hand speaker (+ supply)
X401 - Rear left-hand speaker (- supply)
X402 - Rear right-hand speaker (- supply)
X403 - Rear windscreen wiper motor
X404 - Door switch
X405 - Interior light (earth)
X406 - Interior light (control)
X407 - Interior light (+12 V battery supply)
X408 - Right-hand console light
X409 - Left-hand rotary beacon
X410 - Right-hand rotary beacon
X411 - Rear windscreen wiper switch
X412 - Radio aerial
X413 - Earth (aerial)
X414 - Left-hand number plate light
X415 - Right-hand number plate light
X416 - Radio supply
X417 - Radio speaker connector
X418 - Earth
X419 - Earth
X420 - Rotary beacon harness earth (chassis)

X421 - Earth
X422 - Roof harness earth (chassis)
X423 - Left-hand side fan ON/OFF switch
X424 - Fan speed control knob
X425 - Air conditioning switch
X426 - Air conditioning indicator light
X427 - Manual air conditioning module
X428 - Electronic thermostat for heating
X429 - Speed 1relay for fan
X430 - Speed 2relay for fan
X431 - Speed 3relay for fan
X432 - Speed 4relay for fan
X433 - Left-hand heating resistor
X434 - Right-hand fan
X435 - Left-hand fan
X436 - Left-hand side fan switch
X437 - Relay for left-hand side fan
X438 - Earth (automatic air conditioning)
X439 - Air conditioning control module (blue connector)
X440 - Air conditioning control module (yellow connector)
X441 - Heating temperature sensor
X442 - TT2 sensor
X443 - Evaporator temperature sensor
X444 - Right-hand fan adapter module (signal)
X445 - Left-hand fan adapter module
X446 - Right-hand fan adapter module (supply)
X447 - Left-hand fan adapter module (supply)
X448 - Separation harness for automatic air conditioning
X449 - Motor for left-hand heating shutter
X450 - Motor for right-hand heating shutter
X451 - Motor for heating mixer shutter
X452 - Relay for heater pump
X453 - Heater accelerator pump
X454 - Earth (roof)
X455 - Roof harness earth
X456 - Solar panel
X457 - Earth (Auto-Guide)
X458 - Cab transmission harness/pillar harness junction
X459 - Linkage lifting switch on fender
X460 - Linkage lowering switch on fender
X461 - Pillar harness/TECU harness junction
X462 - Supply indicator light for power socket on pillar
X463 - Earth (Isobus)
X464 - Pillar harness/armrest harness junction
X465 - Battery positive terminal contact
X466 - Active suspended cab Autotronic 5
X467 - Right-hand electric rear-view mirror
X468 - Left-hand electric rear-view mirror
X469 - Additional fan connection
X470 - Operator presence in seat switch
X471 - Suspended cab harness connection

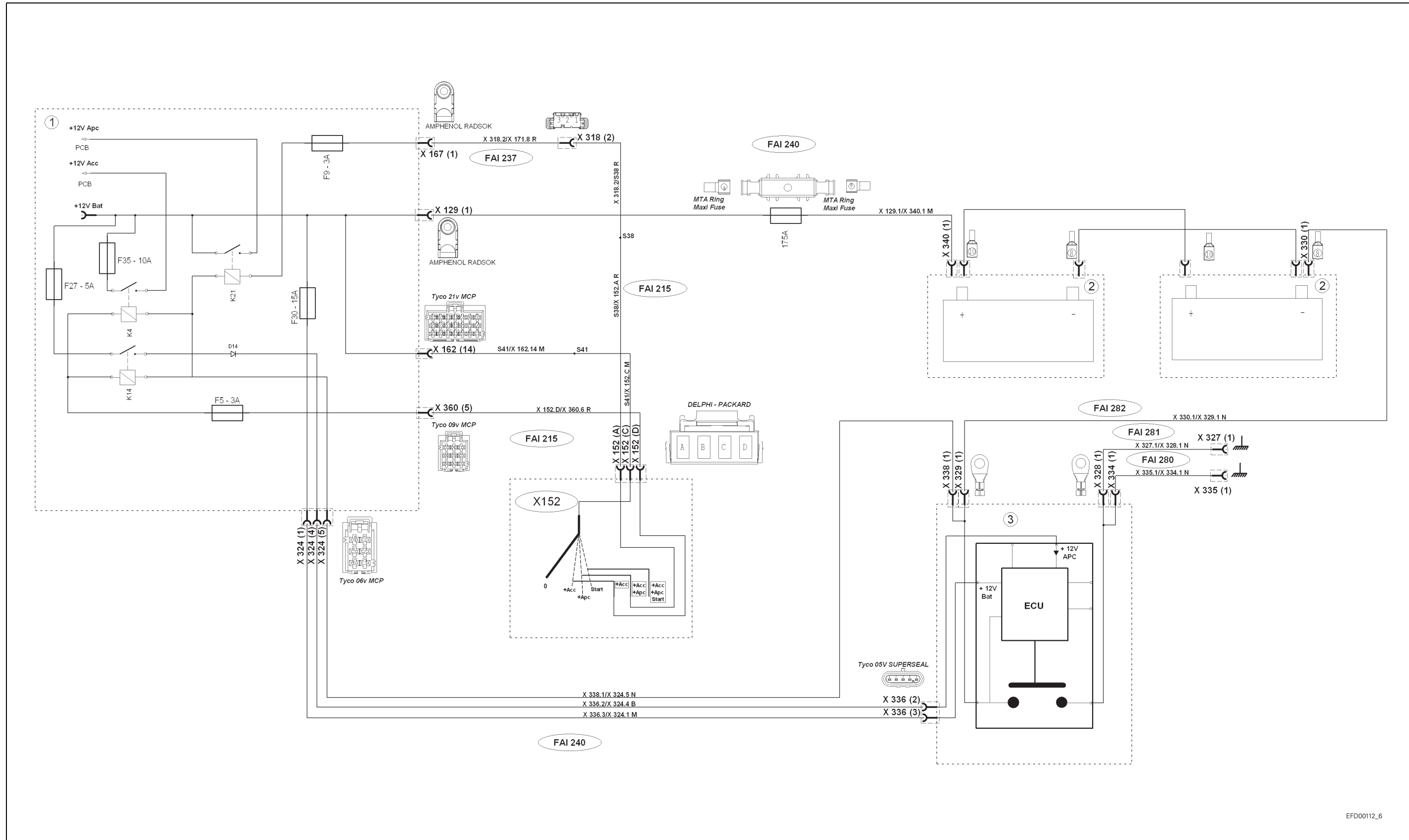
Identification of harnesses

FAI200 - Engine harness
FAI201 - Front headlights harness
FAI202 - Suspended front axle harness
FAI203 - Transmission harness
FAI204 - Cab/platform linkage external harness
FAI205 - Electrohydraulic valves harness
FAI206 - Transmission harness — PTO

FAI207 - Front Dual Control harness
FAI208 - Linkage with Dual Control and TIC harness
FAI209 - Instrument panel harness
FAI210 - Cab transmission harness
FAI211 - Cab linkage harness
FAI212 - Lighting harness
FAI213 - Cab interior lighting harness
FAI214 - Armrest harness
FAI215 - Pillar harness
FAI216 - Diagnostics connector harness
FAI217 - Datatronic 3 harness
FAI218 - Fieldstar harness
FAI219 - Cab interior power socket harness
FAI220 - BOC harness — safety switch
FAI221 - Automatic air conditioning harness — instrument panel
FAI222 - Autotronic 5 ParkLock/suspended front axle harness
FAI223 - Roof harness
FAI224 - Hand rail lighting harness
FAI225 - Electric rear-view mirror harness
FAI226 - Roof/external harness
FAI227 - Automatic air conditioning harness - roof
FAI228 - Number plate lighting harness
FAI229 - Xenon light adapter harness
FAI230 - GSPTO harness
FAI231 - Transmission harness — ParkLock
FAI232 - Radio harness
FAI235 - Front accessory connection socket harness
FAI236 - Start-up harness
FAI237 - +12 APC fuse box harness
FAI238 - +12 APC instrument panel harness
FAI239 - Permanent +12 V supply harness
FAI240 - +12 V permanent fuse box harness
FAI241 - Automatic air conditioning adapter harness
FAI242 - Main beams on hand rail adapter harness
FAI243 - Circuit breaker harness
FAI244 - Linkage external controls extension harness
FAI245 - Left-hand linkage external controls harness
FAI246 - Right-hand linkage external controls harness
FAI247 - PTO shunt harness
FAI248 - Linkage external controls harness
FAI249 - Suspended front axle harness
FAI250 - Engine harness
FAI251 - Parking brake harness
FAI252 - +12 V battery harness
FAI253 - Hand rail harness
FAI254 - Windscreen wiper harness
FAI255 - Windscreen wiper harness
FAI256 - High-visibility roof heating harness
FAI257 - High-visibility roof heating harness
FAI258 - Roof earth harness
FAI260 - Cooling unit harness
FAI261 - Isobus harness
FAI262 - Auto-Guide engine harness
FAI263 - Auto-Guide cab adapter harness
FAI265 - Pneumatic brake harness
FAI267 - Console harness
FAI268 - Front function harness
FAI271 - Cab electric rear-view mirror harness
FAI272 - Active suspended cab harness

- FAI273** - Front linkage harness
- FAI274** - Rear right-hand lighting harness
- FAI275** - Trailer connector harness
- FAI276** - Rear left-hand lighting harness
- FAI280** - Negative battery harness
- FAI281** - Negative battery harness
- FAI282** - Negative battery harness
- FAI283** - TopDock harness
- FAIxxx** - Non-Isobus tool connector harness
- FAIxxx** - Non-Isobus implement connector controller harness
- FAIxxx** - Additional fan harness

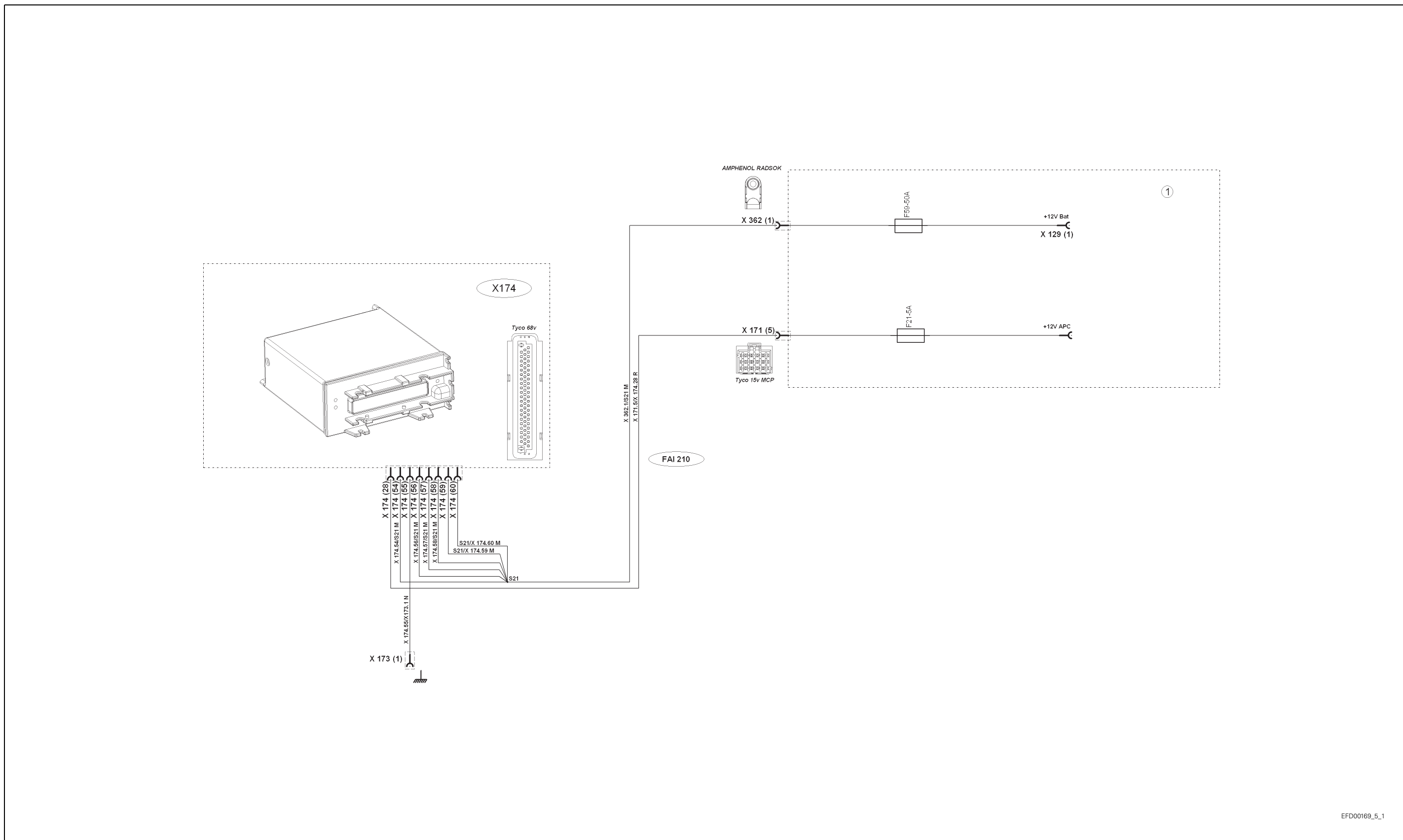
B.2 Fuse box supply with circuit breaker



EFD00112_6

Fig. 4

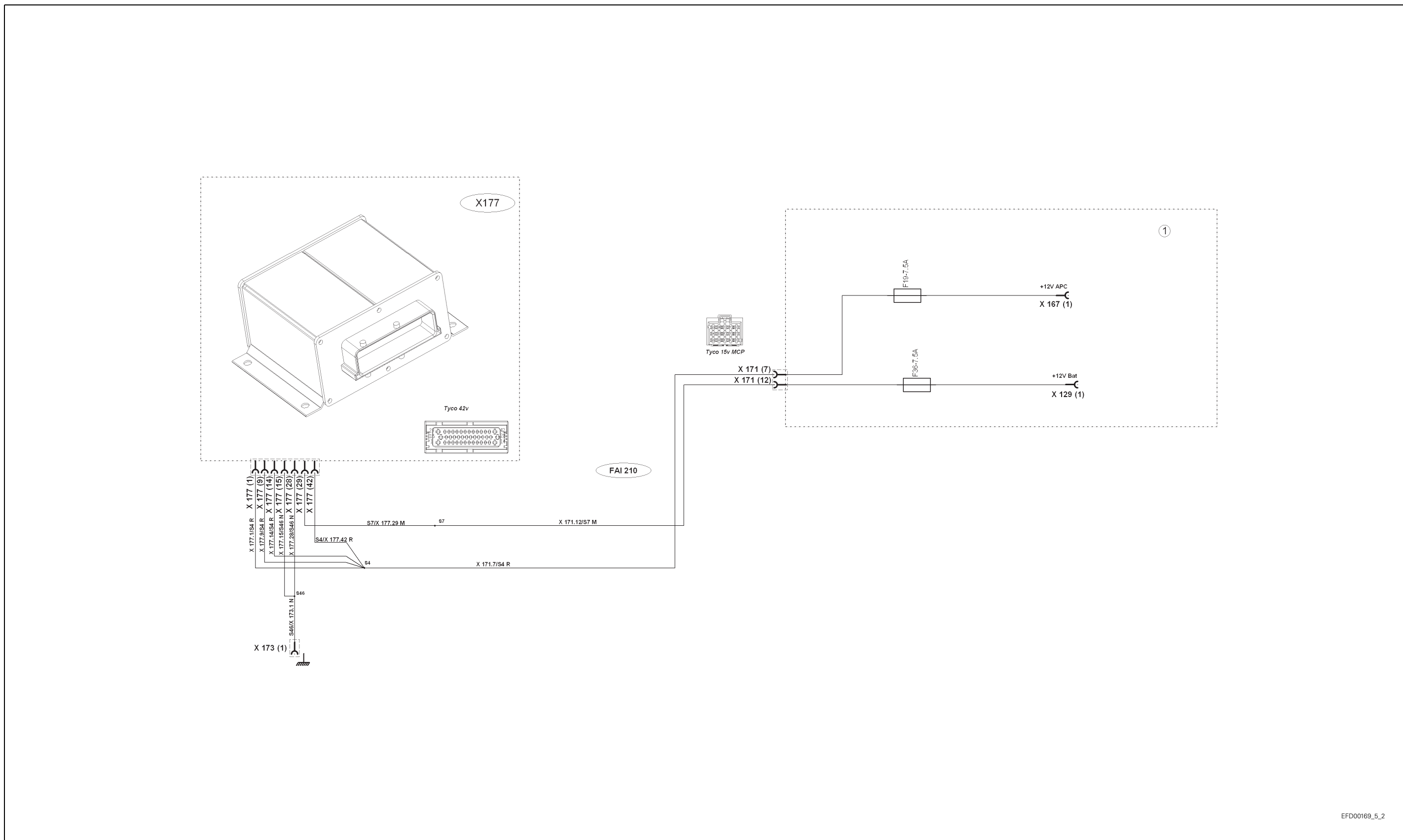
B.3 Autotronic 4 electrical power supply



EFD00169_5_1

Fig. 5

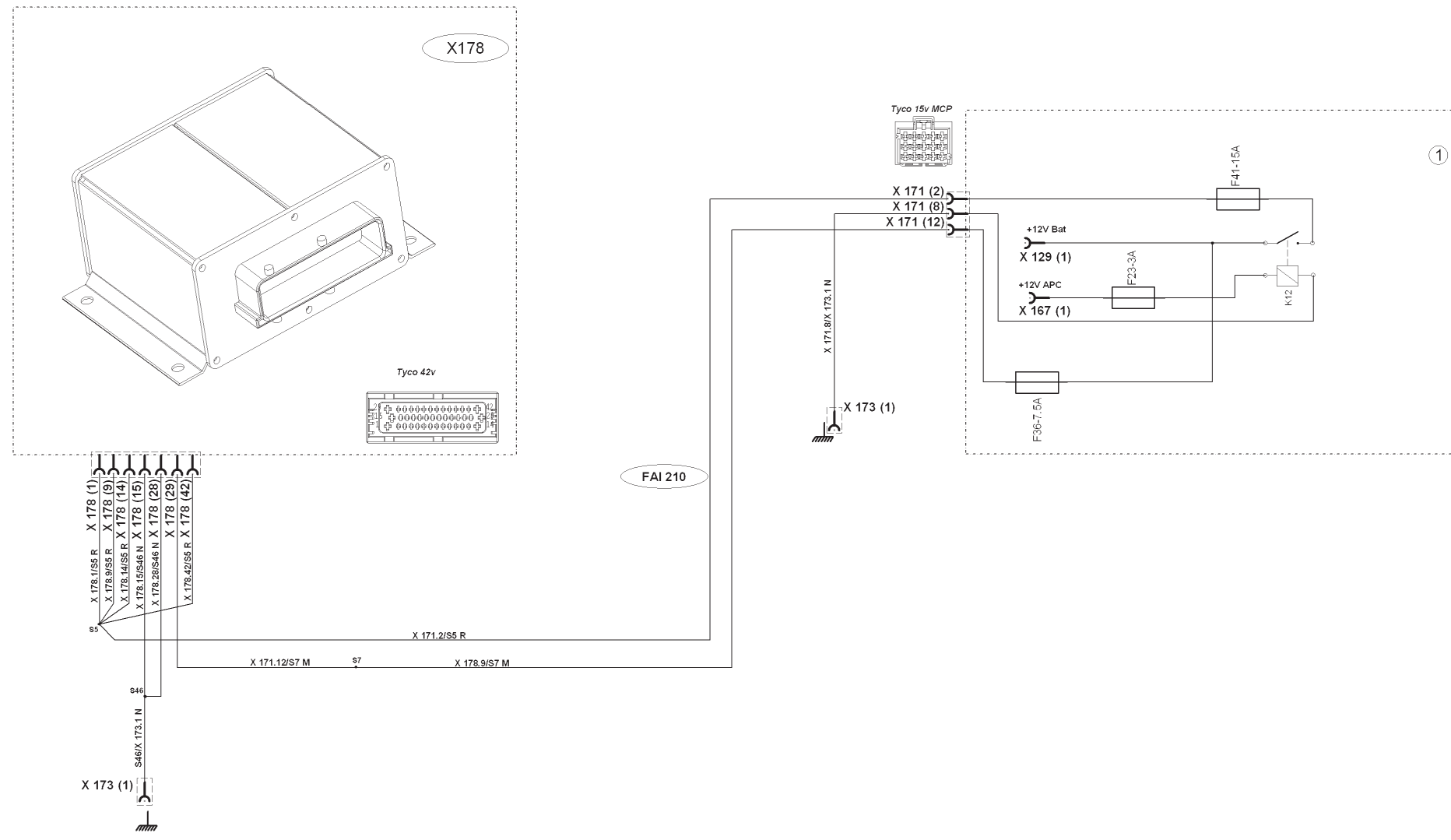
B.4 Autotronic 5 linkage electrical power supply



EFD00169_5_2

Fig. 6

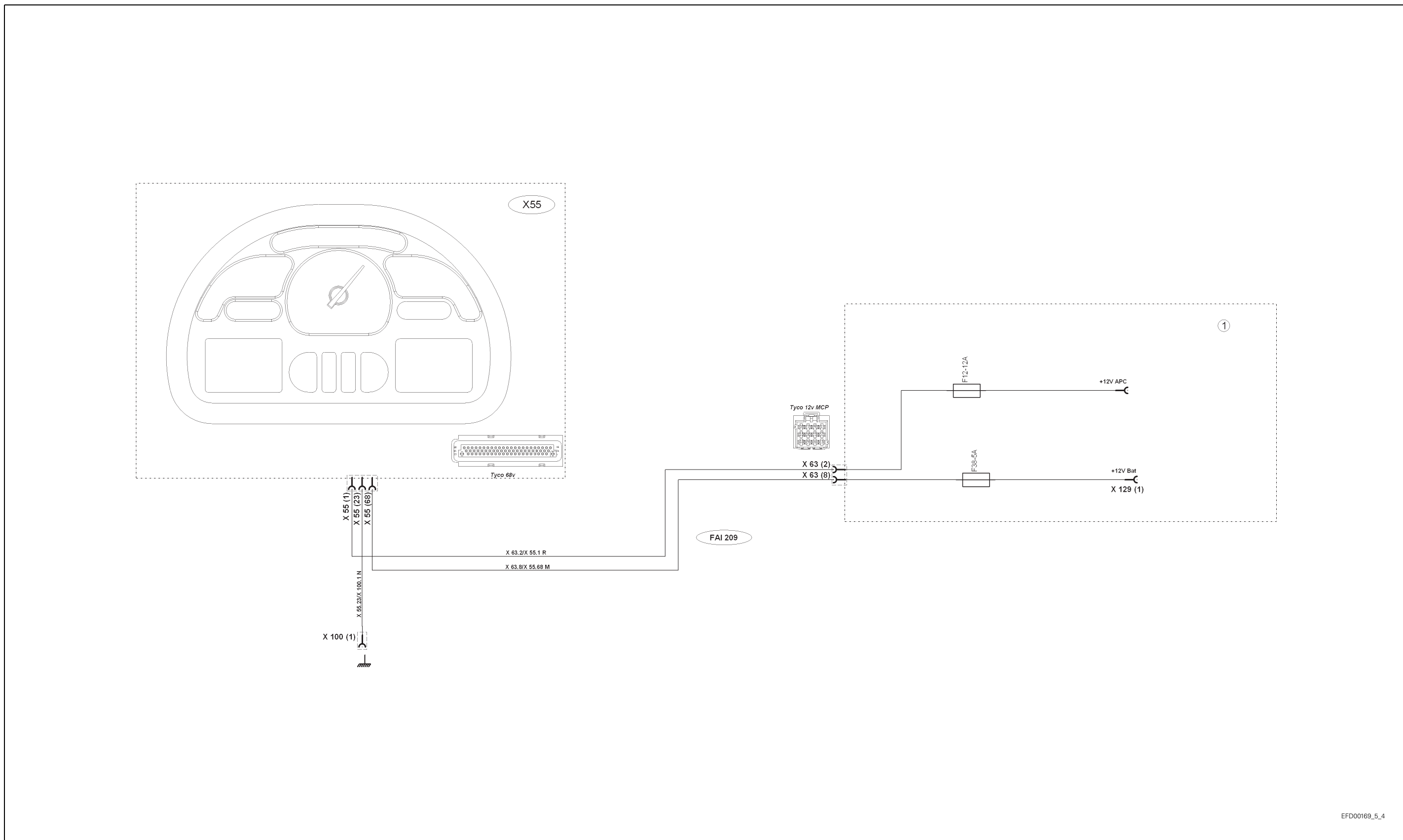
B.5 Autotronic 5 ParkLock/suspended front axle electrical power supply



EFD00169_5_3

Fig. 7

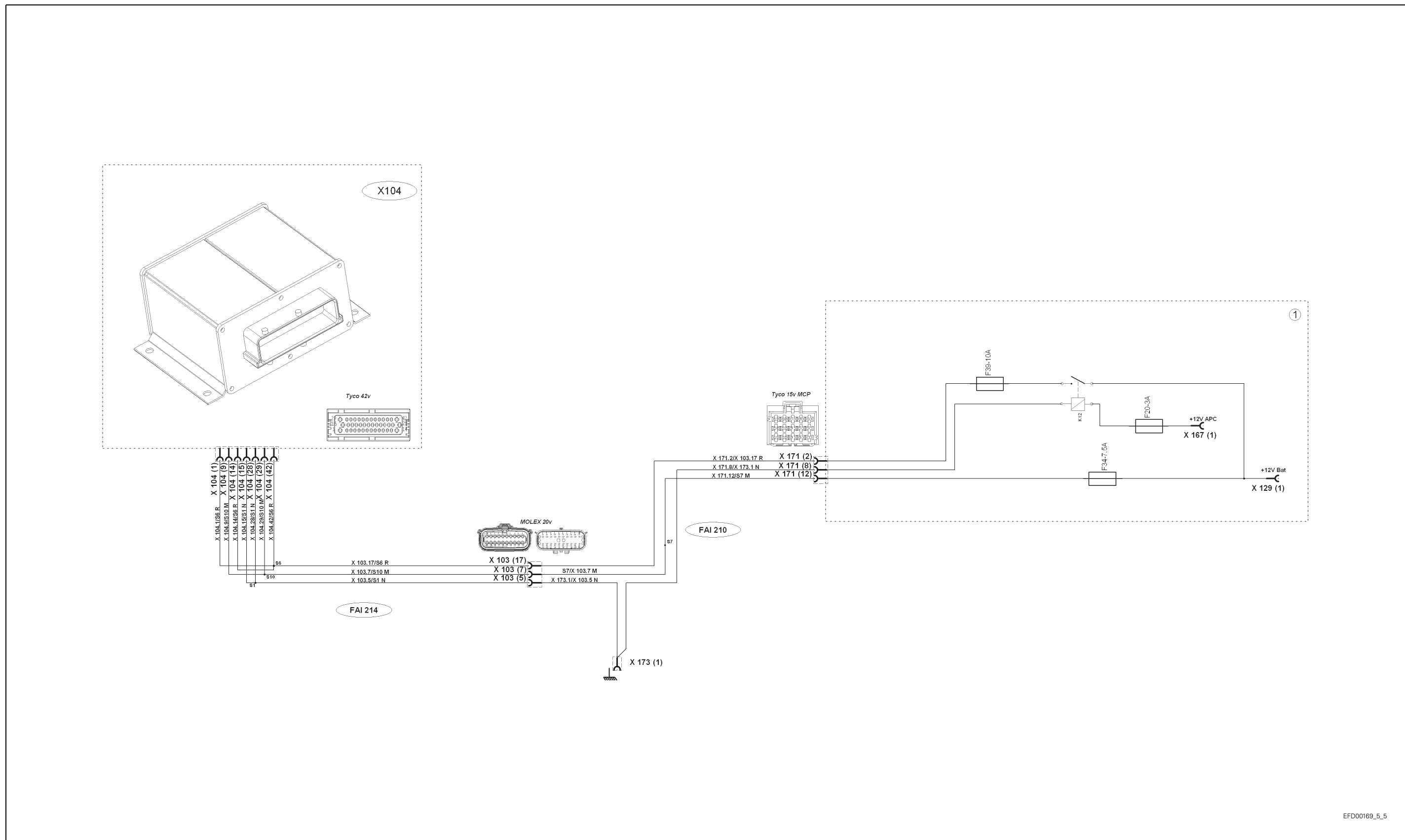
B.6 DCC3 instrument panel electrical power supply



EFD00169_5_4

Fig. 8

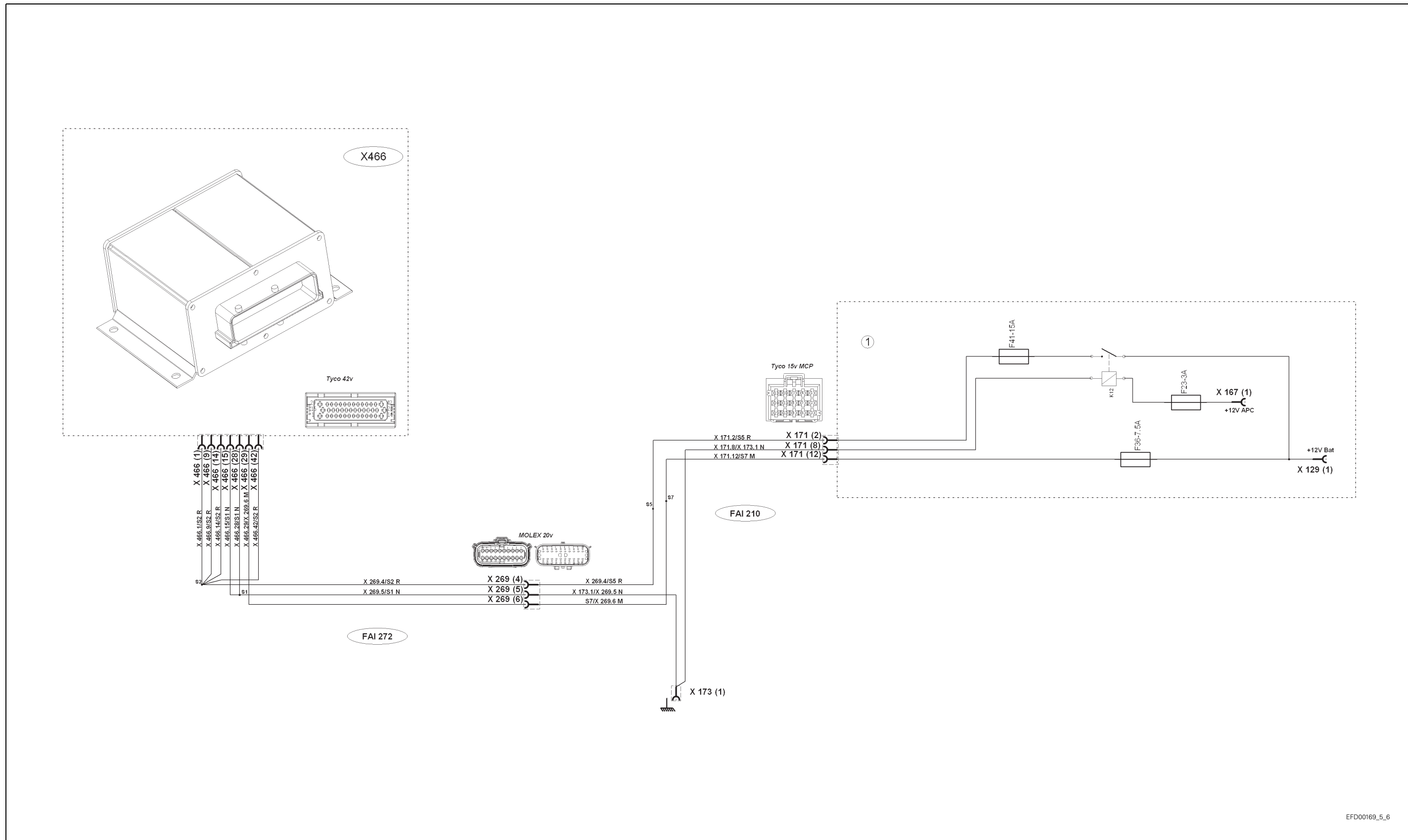
B.7 Autotronic 5 armrest electrical power supply



EFD00169_5_5

Fig. 9

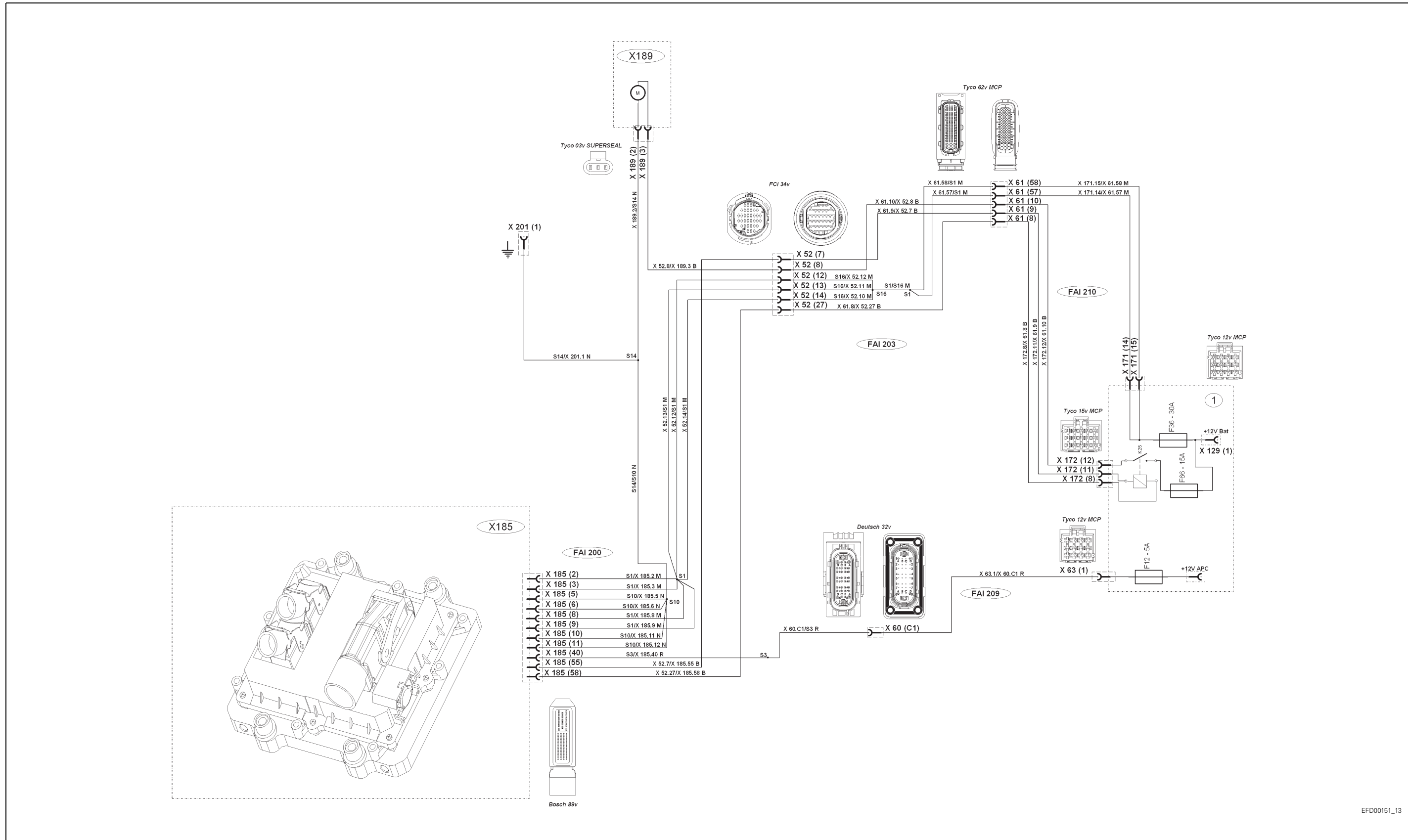
B.8 Autotronic 5 active suspended cab electrical power supply



EFD00169_5_6

Fig. 10

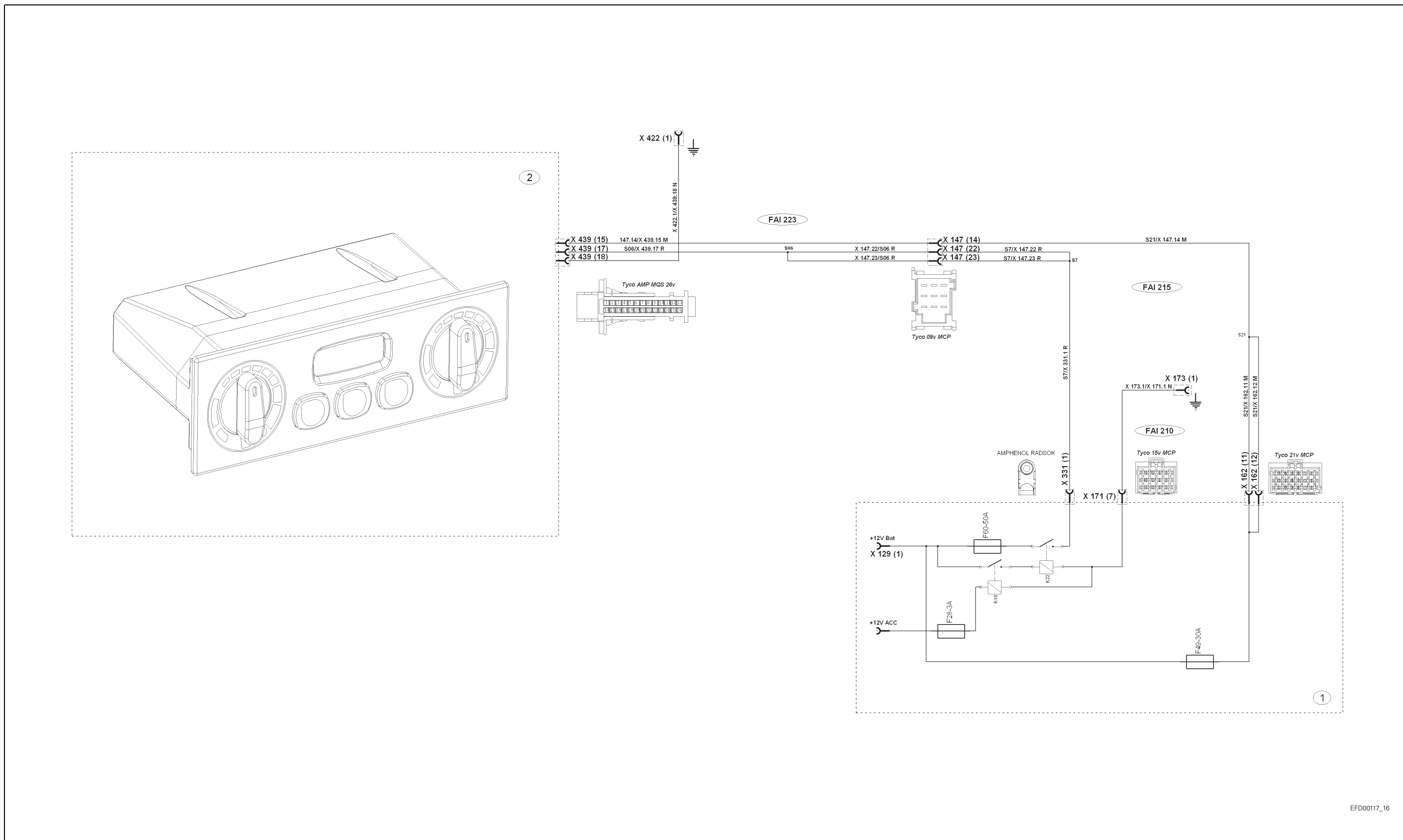
B.9 Sisu EEM electronic unit electrical power supply



EFD00151_13

Fig. 11

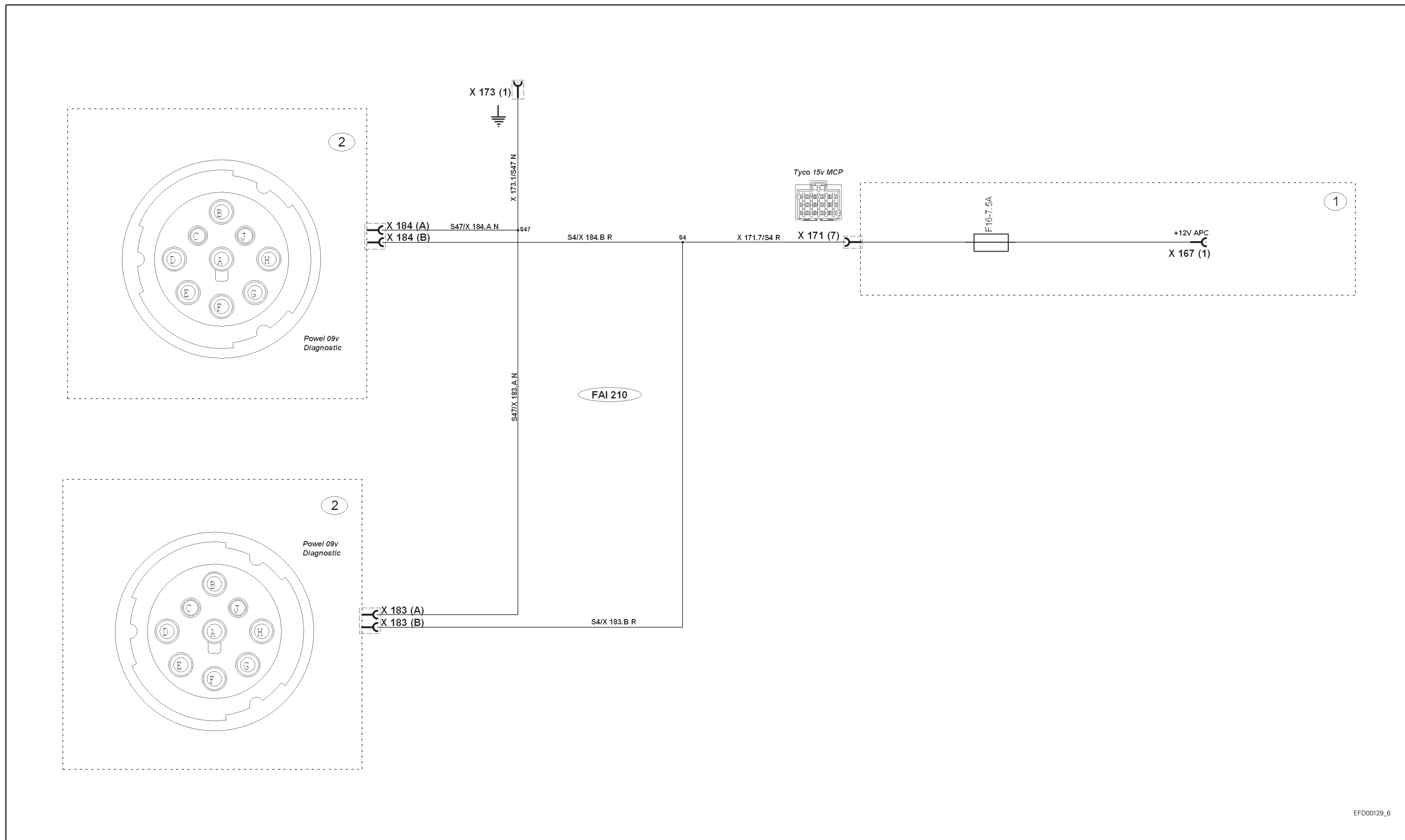
B.10 Automatic air-conditioning unit electrical power supply



EFD00117_16

Fig. 12

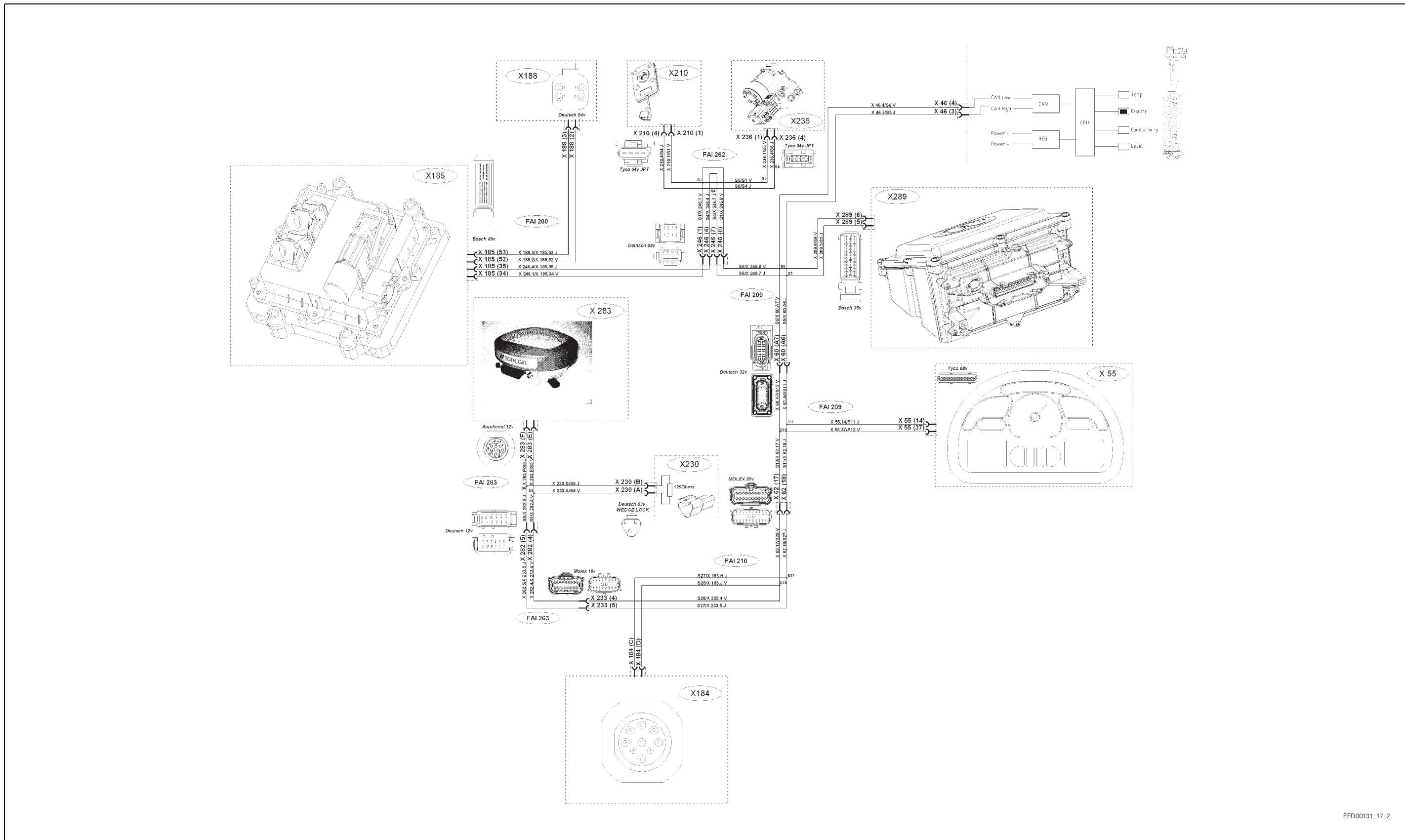
B.11 Diagnostics connector electrical power supply



EFD00129_6

Fig. 13

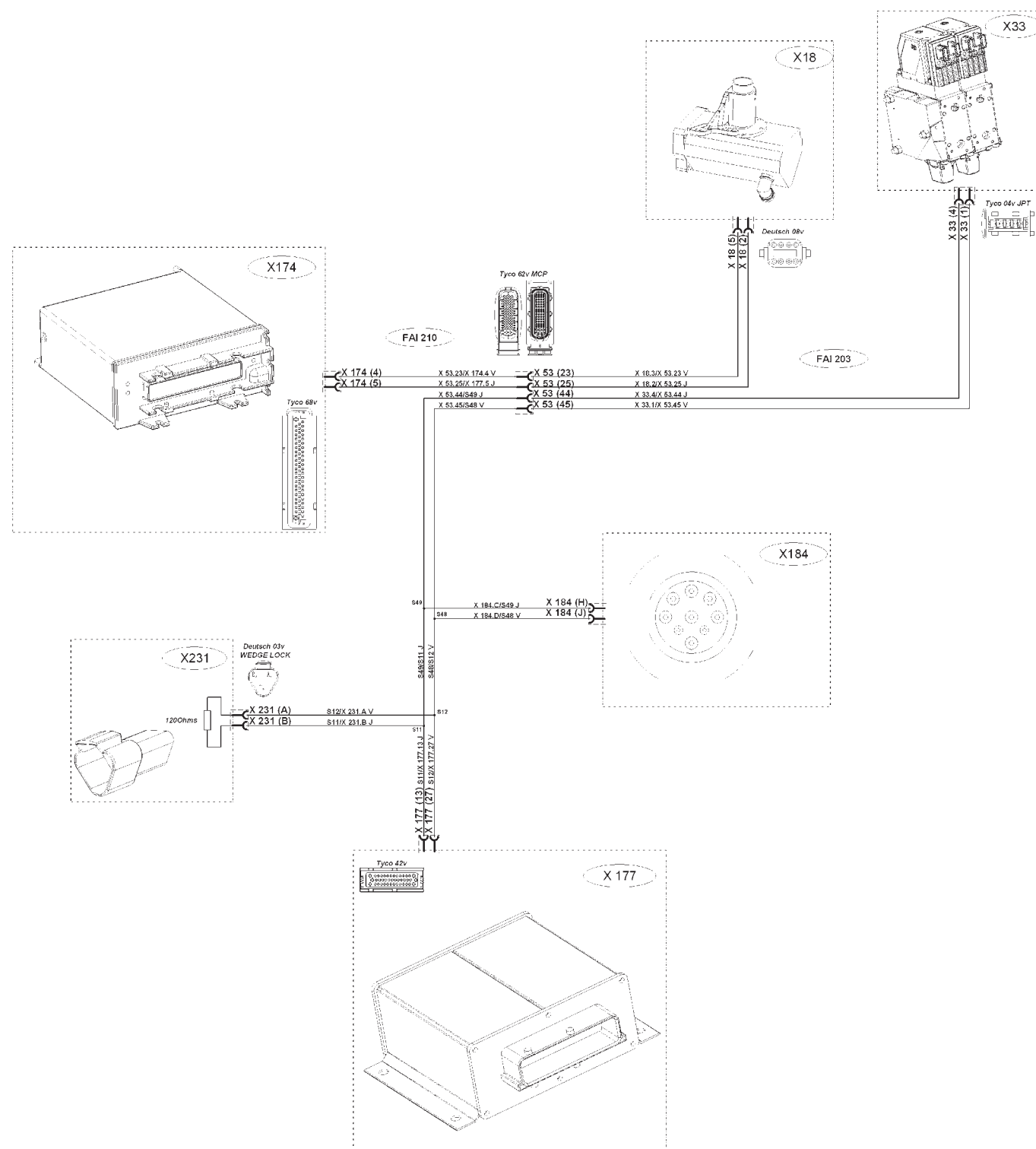
B.13 Engine CAN network



EFD00131_17_2

Fig. 15

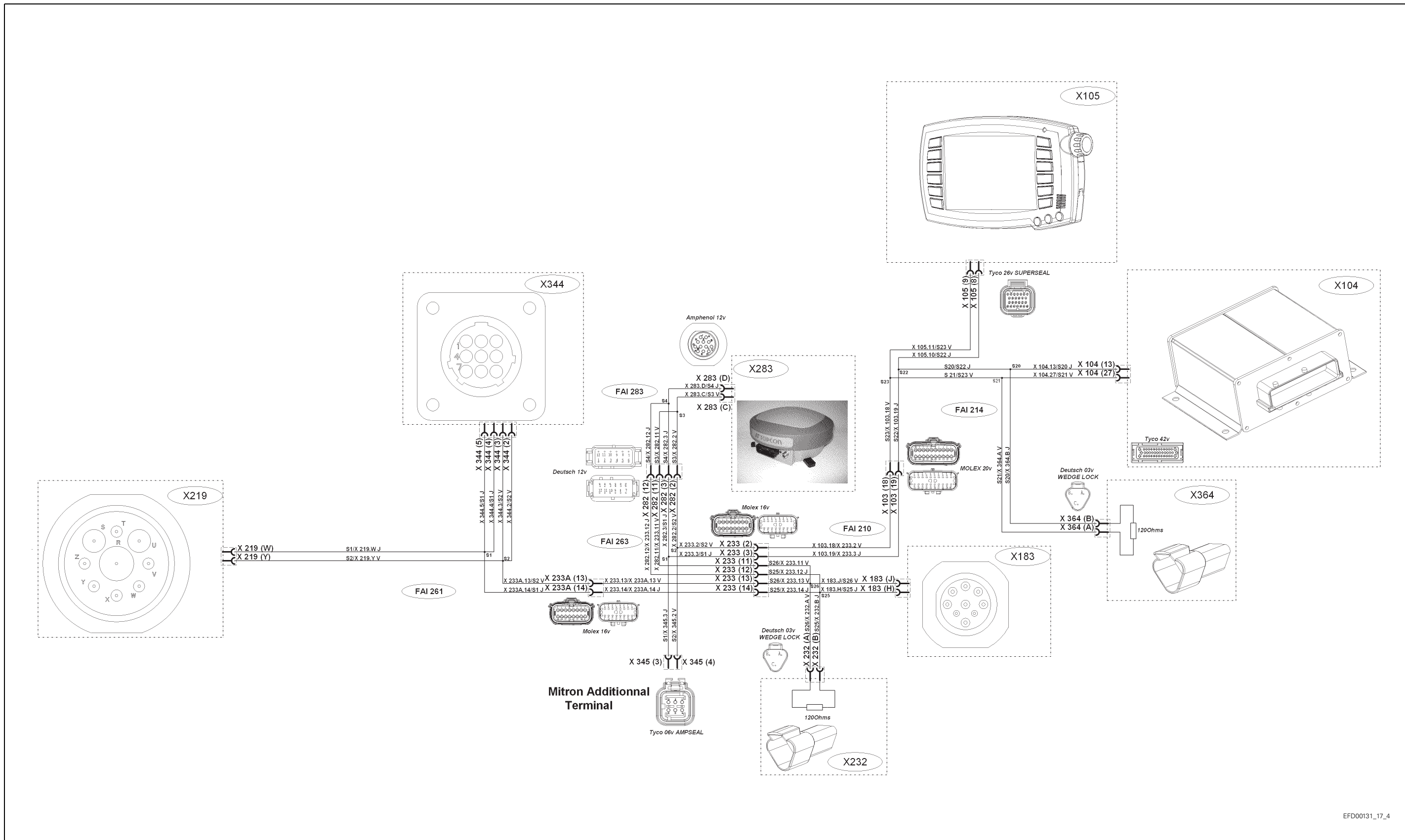
B.14 Linkage CAN network



EFD00131_17_3

Fig. 16

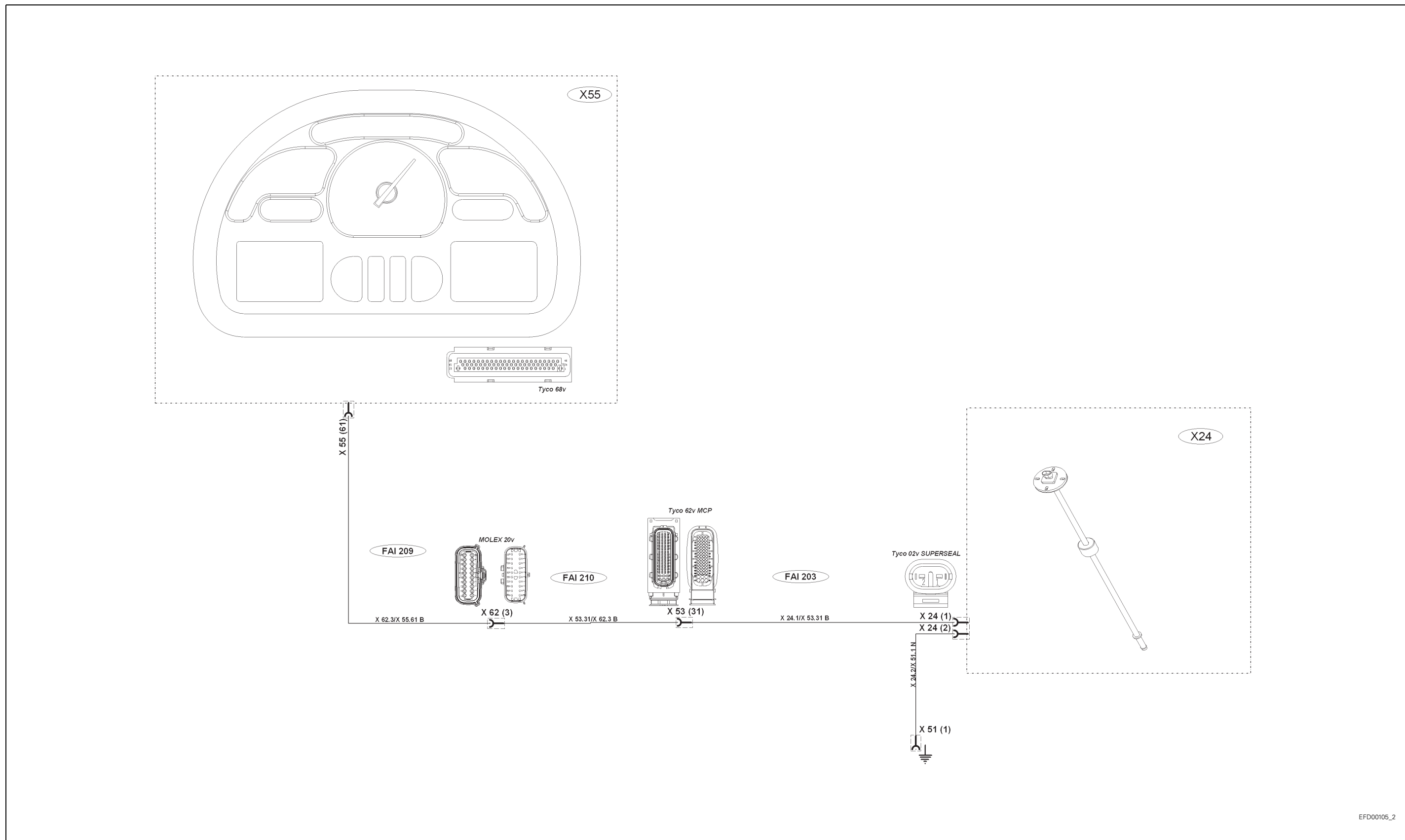
B.15 Isobus CAN network



EFD00131_17_4

Fig. 17

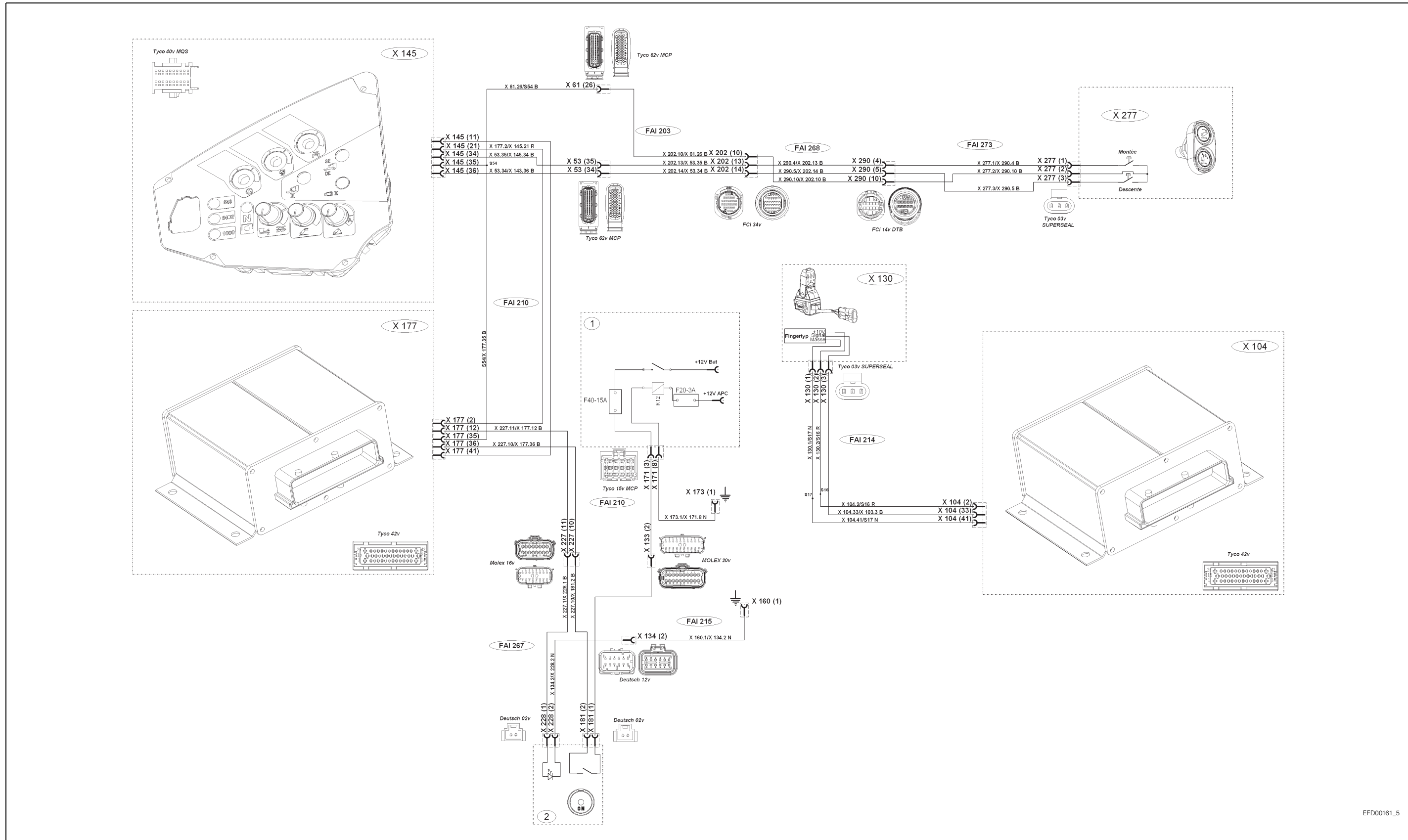
B.16 Auxiliary hydraulic oil gauge



EFD00105_2

Fig. 18

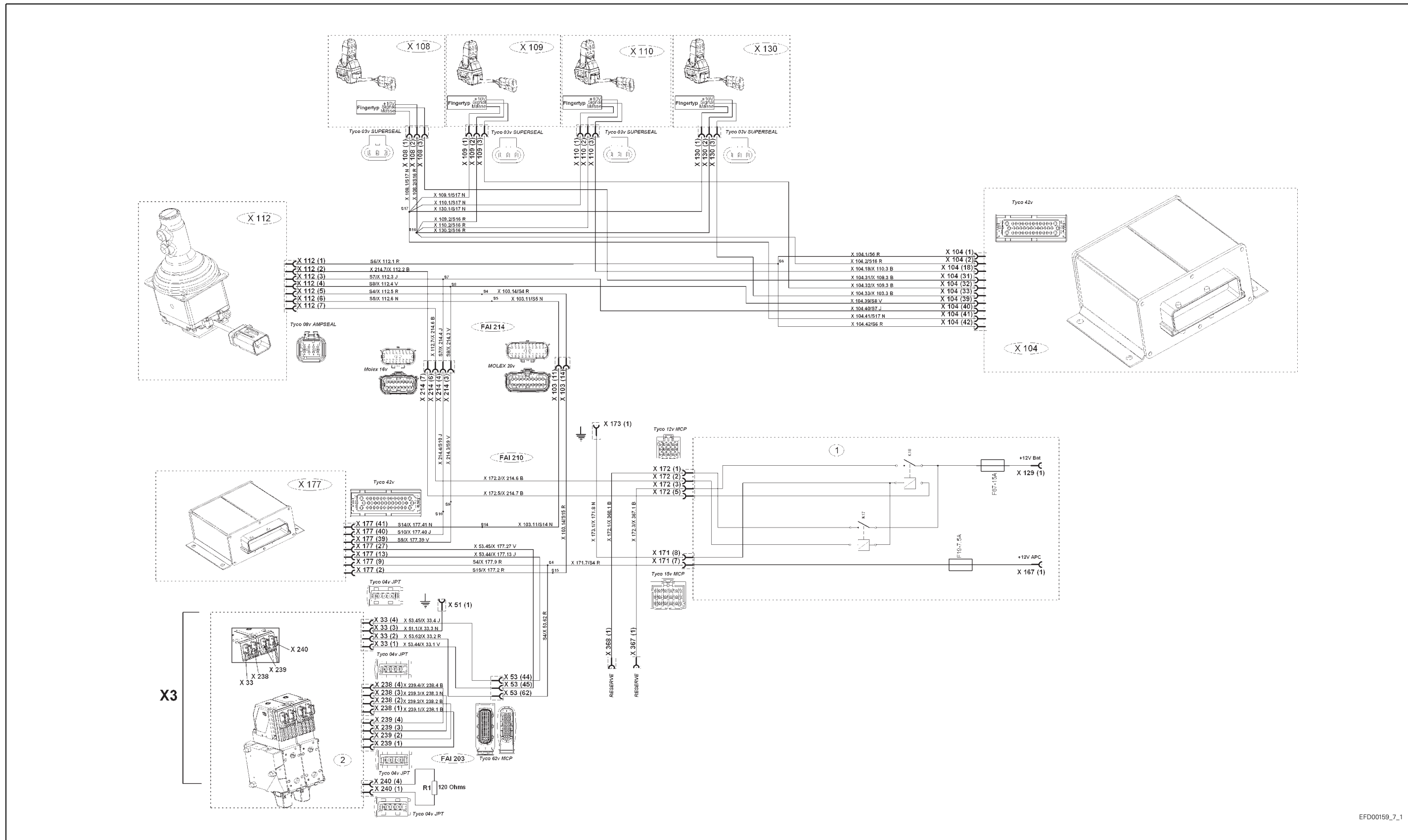
B.17 Front linkage



EFD00161_5

Fig. 19

B.18 Electrohydraulic spool valves



EFD00159_7_1

Fig. 20

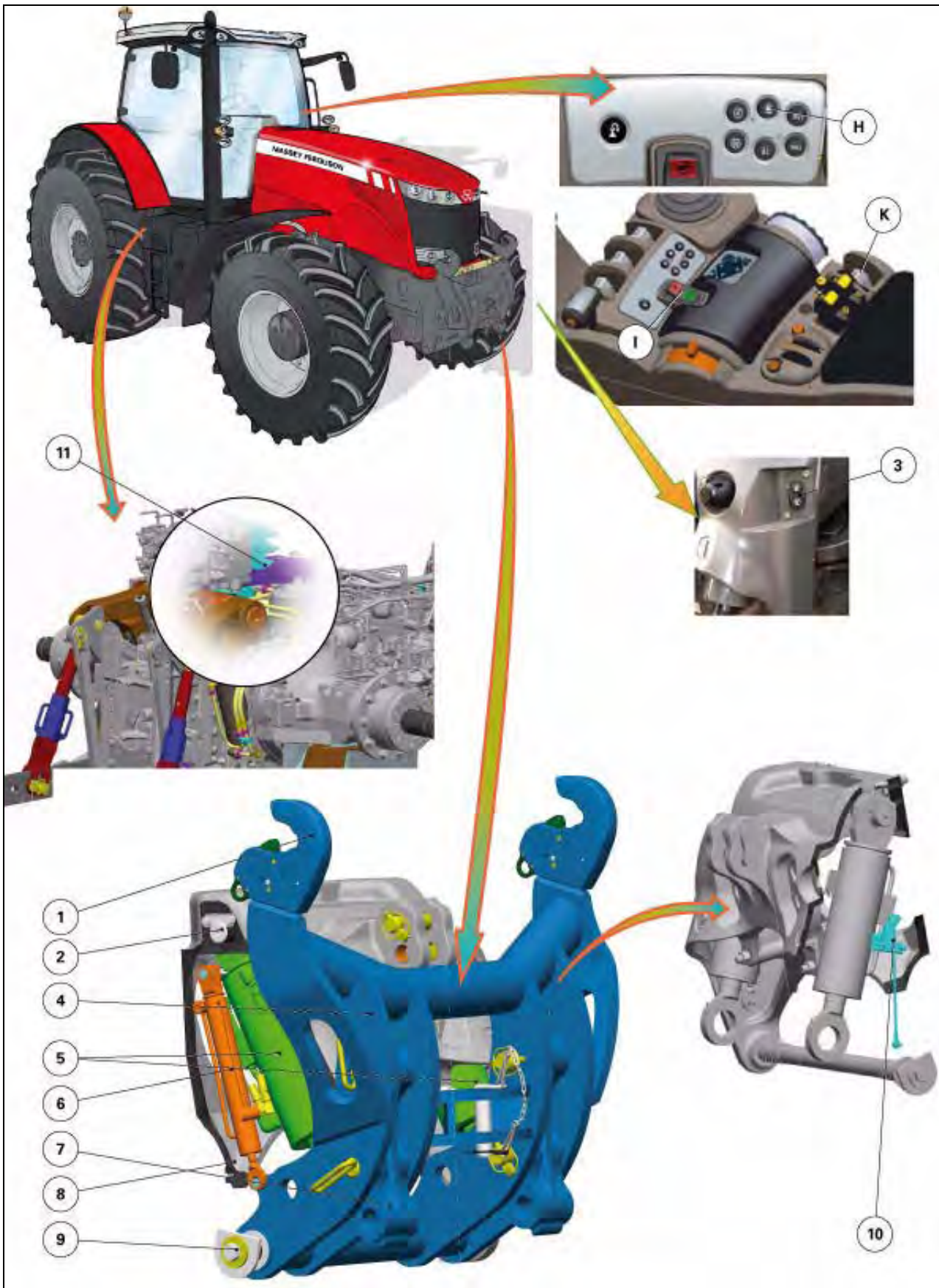
9D23

LS front linkage - Layout of components

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**A. Layout of front linkage
components**



1011360

Fig. 1

B. Layout of front linkage components

R e f.	Description	Location
(H)	Auxiliary hydraulic switch	In the cab, on the armrest
(I)	Rear linkage lifting/lowering switch	In the cab, on the armrest
(K)	Lifting/lowering switch	In the cab, on the armrest
(1)	Dromone	At the front of the tractor
(2)	Pin	At the front of the tractor
(3)	Exterior lifting/lowering switch	At the front of the tractor on the left-hand side
(4)	Linkage arms	At the front of the tractor
(5)	Ram	At the front of the tractor on both sides
(6)	Ram	At the front of the tractor on the right-hand side
(7)	Linkage arms	At the front of the tractor
(8)	Frame	At the front of the tractor
(9)	Pin	At the front of the tractor on both sides
(10)	Sensor	At the front of the tractor on the left-hand side
(11)	Front linkage spool valve	On the rear axle
(E)	Linkage suspension control	Inside the cab

9D24

LS front linkage - Tests and diagnostics

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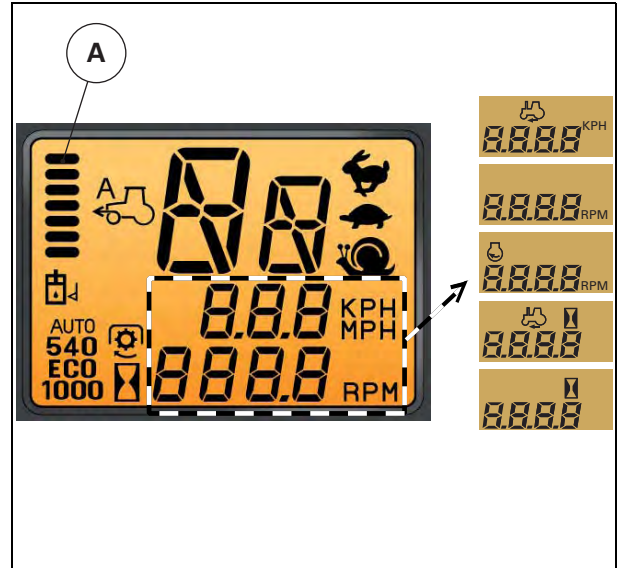
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A. Preliminary steps

The first points to check before carrying out the test are:

- check that the hydraulic oil level (A) (Fig. 1) is correct
- check that the last service inspections have been complied with

Before starting the tests, run the engine and operate a hydraulic function to reach a hydraulic operating temperature of 60°C. To assist the rise in temperature, connect a flowmeter to an auxiliary spool valve and limit the flowmeter flow rate.



1009075

Fig. 1

DIAGNOSTIC			
DATA		DC	BIN
DC	ANA	DC	ERR
DC	LED	DC	GAUGE
TC	BIN	TC	ANA
TC	EV	TC	ERR
EC	BIN	EC	ANA

1009073

Fig. 2

NOTE: To quickly read off the hydraulic oil temperature, it is necessary to return to diagnostic mode on the instrument panel by pressing the top arrow located on the steering column for 7 seconds. The screen (Fig. 2) is displayed. Using the navigation control on the steering wheel, enter DATA mode and then scroll through until "Hyd-Temp" appears (Fig. 3).

Reminder:

During the tests, select pressure gauges, hoses and unions of sufficient capacity and strength for the checks to be carried out.

Accelerator	0
Set Ratio	0
Act Ratio	0
Shu Dec Inc	1000
Speed Incr	192
Status Levr	1
SV I/2	0
Hyd Temp	189

1009074

Fig. 3

B. Checks and tests

Checking the lifting and lowering times

Parameters required:

- hydraulic oil temperature at 60 °C
- engine speed at 2200 rpm

Tool used:

- chronometer

Method

Lifting time

1. The front linkage must be in double-acting mode and with no time delay activated.
2. With the tractor running at 2200 rpm and no load on the linkage, unlock the linkage.
3. Actuate the linkage several times to heat the oil in the rams.
4. Lower the linkage to the lowest point.
5. Operate linkage lifting. The time should be between:
1.5 seconds < T < 2.5 seconds

Lowering time

1. With the tractor running at 2200 rpm and no load on the linkage.
2. Unlock the linkage and lift it to the highest point.
3. Operate linkage lowering. The time should be between:
2 seconds < T < 3 seconds

Checking the maximum linkage pressure

Parameters required:

- hydraulic oil temperature at 60 °C
- engine idle speed at 800 rpm

Tools used:

- pressure gauge, minimum value of 250 bar
- T connector to connect the pressure gauge

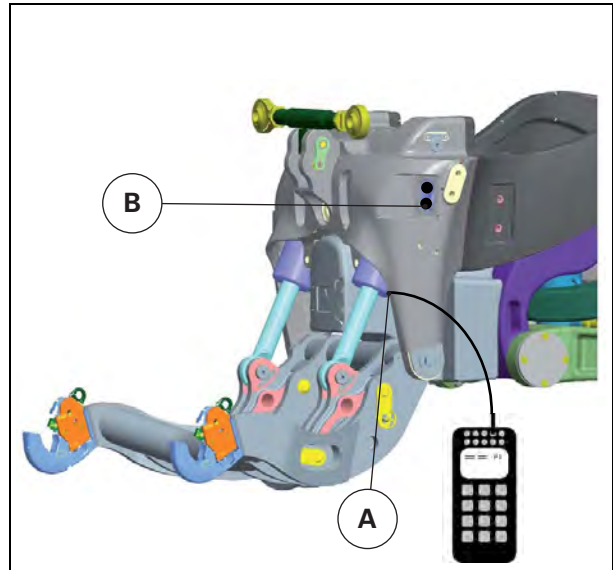
Method

1. Disconnect the supply hose from one of the 2 rams and fit a T connector between the hose and the ram (A) in order to read off the maximum pressure.

2. Place the linkage in the raised position using the switches on the front of the chassis (B).

Pmax = 200 bar +/- 10 bar

To simplify the procedure, the pressure can be checked upstream of the linkage valve.

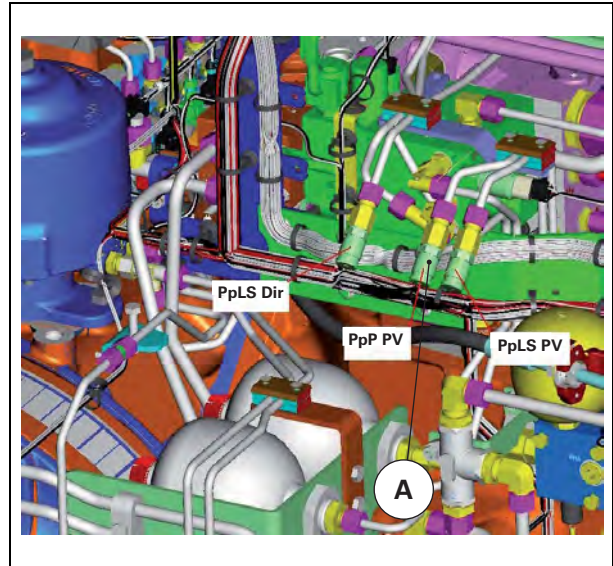


1009337

Fig. 4

1. Connect a pressure gauge to the pressure connector.

Pmax = 200 bar +/- 10 bar



1009335

Fig. 5

9D25

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9D26

LS front linkage - Adjustments, bleeding and calibrations

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A. Adjusting the front linkage position sensor

Calibration


To ensure correct operation of the Front Dual Control, the front linkage position sensor must be calibrated.

IMPORTANT: This operation must be performed on first use, or as soon as work is carried out on the front linkage position sensor.



Calibration is carried out via the Datatronic CCD calibration screen.

Preparation for calibration


- A Minimum and maximum specified Dual Control activation specified values
 - B Maximum (high) and minimum (low) position front linkage
 - C Correction on lifting and lowering. This correction is mainly dependent upon ram capacity.
2. Call up the Front Dual Control settings window. The window (Fig. 18) is displayed.

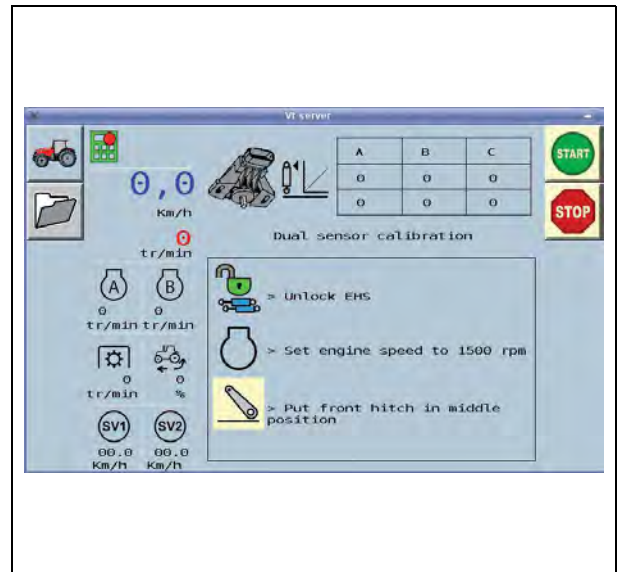
3. Press the switch corresponding to the  icon when the window is open.

Conditions required for calibration:

1.  - Unlock the electrohydraulic spool valves.
2.  - Set engine speed to 1500 rpm.

IMPORTANT: To ensure correct calibration, the front linkage must be able to move from its highest position to its lowest position. Calibration must therefore be carried out with no front implement attached.

3.  - Place the front linkage in approximately its middle position.
4. Place the rear linkage control in the lowered position.
5. Place the rear linkage height/depth setting control between 3 and 4.
6. To start the calibration, press the switch corresponding to the "START" icon.
7. During calibration, the front linkage is lifted and lowered several times.
8. When the calibration is complete, the window is displayed again, complete with the calibration values.



1009377

Fig. 1

Calibration values for optimum Dual Control operation:

- A 1 to 10
- B a difference of more than 100 points (the value of the top line is always higher than the value of the bottom line)
- C 5 to 100

NOTE: *If the calibration values fall significantly out of this range, either the sensor working area needs to be modified or the sensor specifications are incorrect. However, the Dual Control will operate using default values.*

9D27

LS front linkage - Disassembly and reassembly

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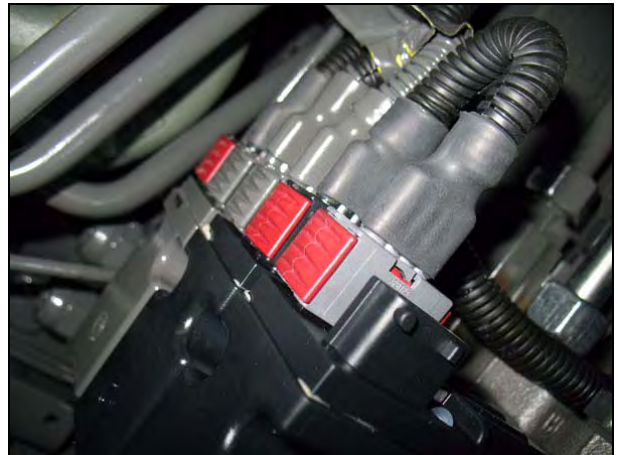
A. Disassembling the LS front linkage spool valve

Preliminary steps

9. Remove the rear wheels and chock the tractor.
10. Remove the front spool valves.
11. Mark the electrical connections.
12. Mark the spool valves. They can be numbered using a felt-tip pen to make refitting easier.
13. Ensure you have new seals.

Disassembly

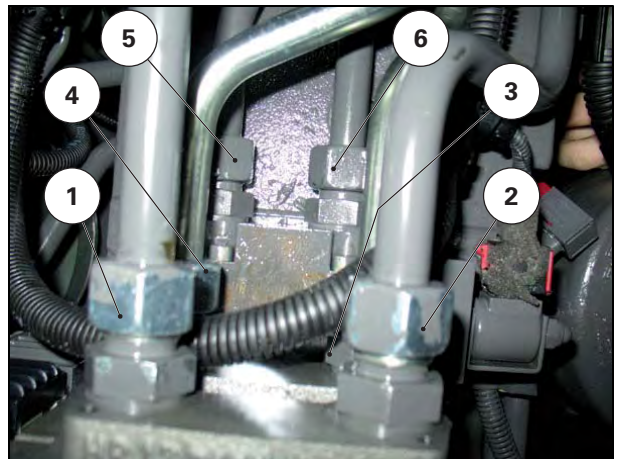
14. Disconnect the connectors from the front auxiliary spool valves.



1010884

Fig. 1

15. Disconnect the hydraulic unions in the order shown in the photo (Fig. 59).



1010900

Fig. 2

- 16.** Remove the 3 retaining nuts.
- 17.** Use a nut and counter-nut to remove the 3 mounting studs.
- 18.** Move the spool valves backwards until they stop against the rear plate, in order to release them from the hydraulic channels.
- 19.** Remove the cover plate.
- 20.** Remove the LS hydraulic spool valves.
- 21.** Remove the front linkage spool valve.
- 22.** Discard the seals.
- 23.** Clean the parts required for reassembly.



1010901

Fig. 3

B. Reassembling the LS front linkage spool valve

Preliminary steps

24. Ensure all parts are clean and in good condition.



WARNING: All traces of rust, mud and water must be removed.

Reassembly

25. Refit the spool valves equipped with new seals in the order they were removed.



1010906

Fig. 4

26. Fit the cover plate equipped with new seals.

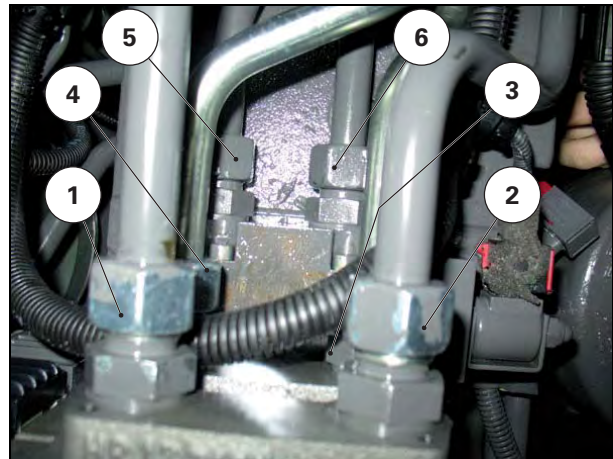
27. Fit the nuts and tighten them to a torque of 30 Nm.



1010907

Fig. 5

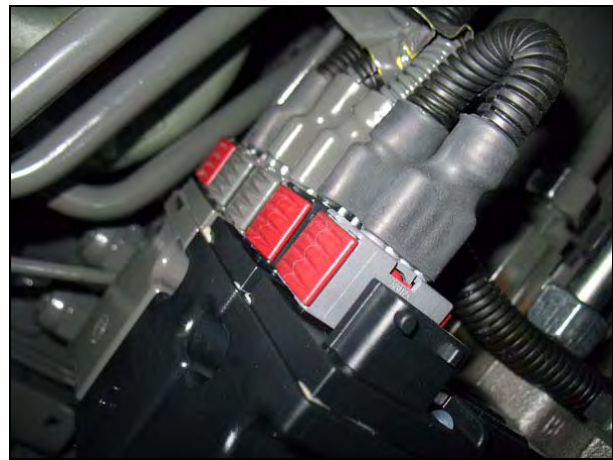
- 28.** Reconnect the hydraulic channels in reverse order to removal. Tighten the unions to a torque of 60 Nm.
- 29.** Refit the hydraulic channel mounting flange above the gearbox.



1010900

Fig. 6

- 30.** Reconnect the electrical connectors according to the marks made during removal.
- 31.** Refit the right-hand brake control.
- 32.** Refit the rear wheels.



1010884

Fig. 7

9D28

LS front linkage - Service tools

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A. General

The tools described in this section can be ordered from the AGCO spare parts department or by contacting the tooling division of Beauvais by referring to AGCOnet bulletin Trac 60/07.

The prices will then be sent out to you.

B. LS front linkage - Service tools

Ref.	AG01A
Description	Hydraulic testing and measuring instrument kit
Order	AGCO Stoneleigh

Contents

See Service Bulletin ADM 08/04



1009102

Fig. 1

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Spool valve block - General

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