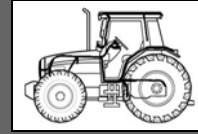


# Chapter 10



## Electricity

### TABLE OF CONTENTS

- 10A10 - Electricity/Electronics - General
- 10A11 - Section intentionally left blank
- 10A12 - Electricity/Electronics - Diagrams and plans
- 10A13 - Electricity/Electronics - Layout of components
- 10A14 - Section intentionally left blank
- 10A15 - Section intentionally left blank
- 10A16 - Section intentionally left blank
- 10A17 - Section intentionally left blank
- 10A18 - Section intentionally left blank
- 10B10 - Fuse box - General
- 10B11 - Section intentionally left blank
- 10B12 - Fuse box - Diagrams and plans
- 10B13 - Fuse box - Layout of components
- 10B14 - Section intentionally left blank
- 10B15 - Section intentionally left blank
- 10B16 - Section intentionally left blank
- 10B17 - Fuse box - Disassembly and reassembly
- 10B18 - Section intentionally left blank
- 10C10 - Alternator - General
- 10C11 - Section intentionally left blank
- 10C12 - Alternator - Diagrams and plans
- 10C13 - Alternator - Layout of components
- 10C14 - Alternator - Tests and diagnostics
- 10C15 - Section intentionally left blank
- 10C16 - Section intentionally left blank

- 10C17 - Alternator - Disassembly and reassembly
- 10C18 - Alternator - Service tools
- 10D10 - Batteries - General
- 10D11 - Section intentionally left blank
- 10D12 - Batteries - Diagrams and plans
- 10D13 - Batteries - Layout of components
- 10D14 - Batteries - Tests and diagnostics
- 10D15 - Section intentionally left blank
- 10D16 - Section intentionally left blank
- 10D17 - Batteries - Disassembly and reassembly
- 10D18 - Batteries - Service tools
- 10E10 - Starter - General
- 10E11 - Section intentionally left blank
- 10E12 - Starter - Diagrams and plans
- 10E13 - Starter - Layout of components
- 10E14 - Starter - Tests and diagnostics
- 10E15 - Section intentionally left blank
- 10E16 - Section intentionally left blank
- 10E17 - Starter - Disassembly and reassembly
- 10E18 - Section intentionally left blank

10A10

## **Electricity/Electronics - General**

### **TABLE OF CONTENTS**

A. General .....	3
B. Principles of operation .....	5
C. Schematic diagrams .....	6



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## A. General

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The electrical circuit supplies:

- the lighting (lights, signals, interior lighting etc.)
- the engine starter
- the electronic controllers (engine, transmission, hydraulic control, suspension, DCC etc.)
- the air conditioning (fan, automatic air conditioning controller etc.)
- the accessory power sockets

### *Electrical specifications*

Voltage	12 V
Earth	Negative
Alternators	2x80 A or 2x120 A
Batteries	2x505 A, maintenance-free

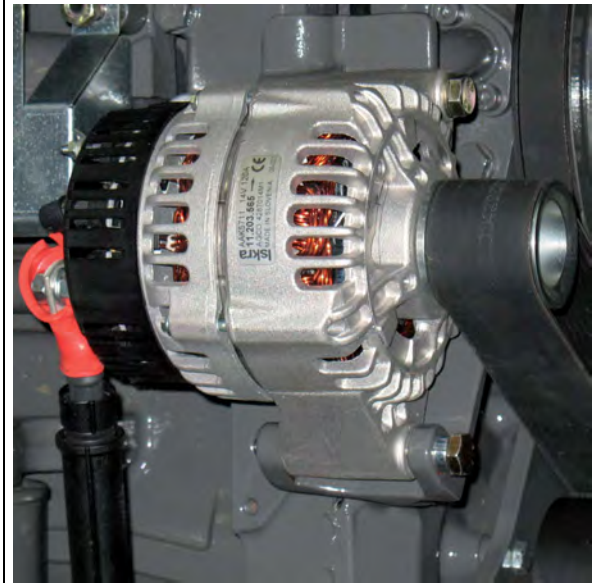
The electrical current is generated by 2 alternators and is stored in 2 12 V batteries installed in parallel. The batteries are located at the front-right of the cab in the battery tray (Fig. 1). The alternators are located on the left- and right-hand sides of the engine (Fig. 2).

The circuit is also protected by an electronic circuit breaker situated under the front-right of the cab.



1007824

Fig. 1



1009995

Fig. 2

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## **B. Principles of operation**

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Electricity is produced by 2 alternators (1) and a solar panel (5) (Fig. 3).

Current is stored in 2 batteries (2) fitted in parallel.

The batteries are recharged by the alternators when the engine is running.

The solar panel (5) maintains the charge of the batteries.

The current is available for the tractor's general circuit and the start-up circuit.

The starter (3) has a specific circuit due to the high current required to start the engine.

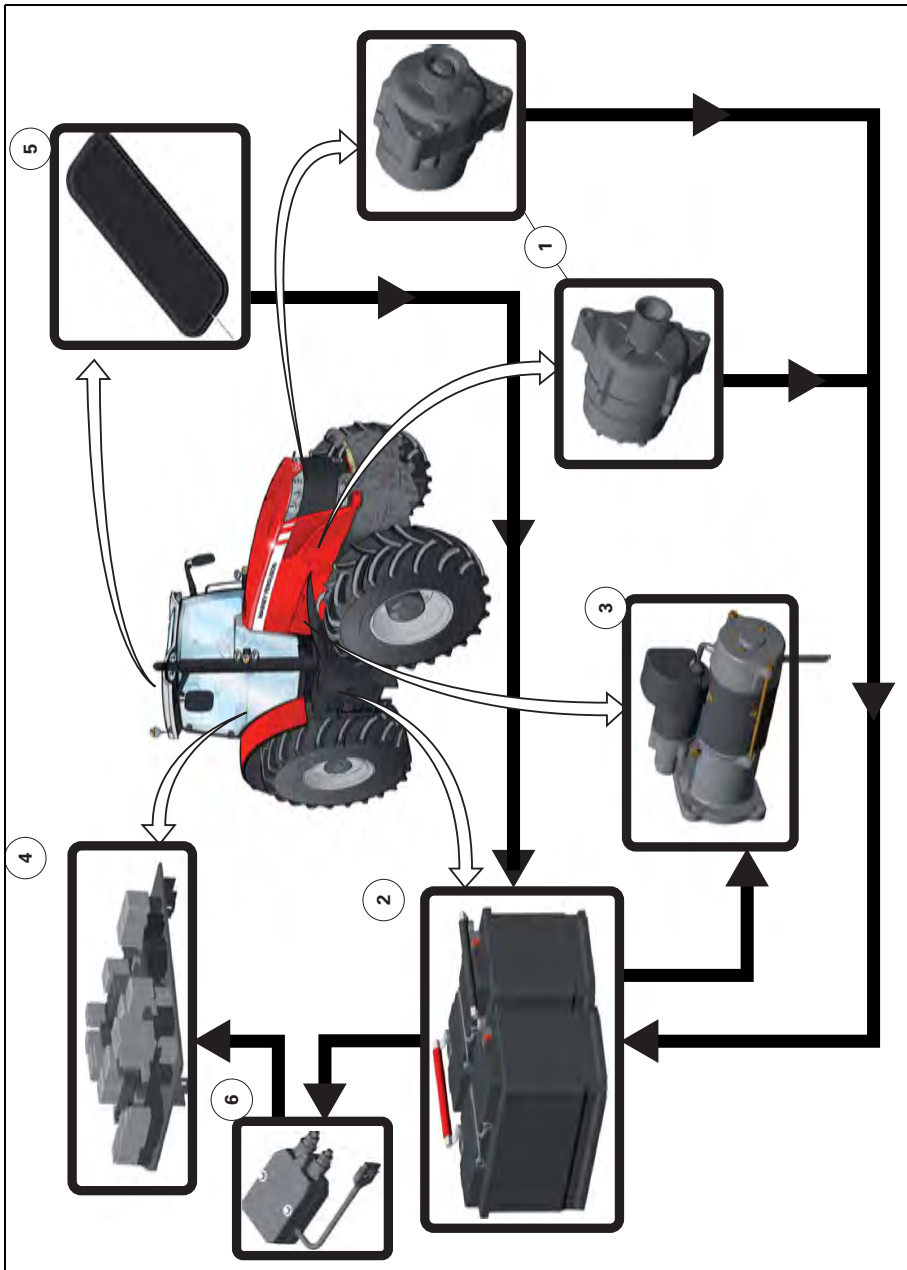
The low-current tractor circuit is supplied by the batteries via the circuit breaker (6).

The fuse box (4) protects and distributes the current to the various circuits of the tractor (controllers, lighting etc.).

### C. Schematic diagrams

- 1- Alternators
- 2 Batteries
- 3 Starter
- 4 Fuse box
- 5 Solar panel
- 6 Circuit breaker

General schematic diagram of the electrical circuit



1010030

Fig. 3



10A11

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**TABLE OF CONTENTS**



10A12

## **Electricity/Electronics - Diagrams and plans**

### **TABLE OF CONTENTS**

A. Electrical diagrams. . . . . 11



## A. Electrical diagrams

### A.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

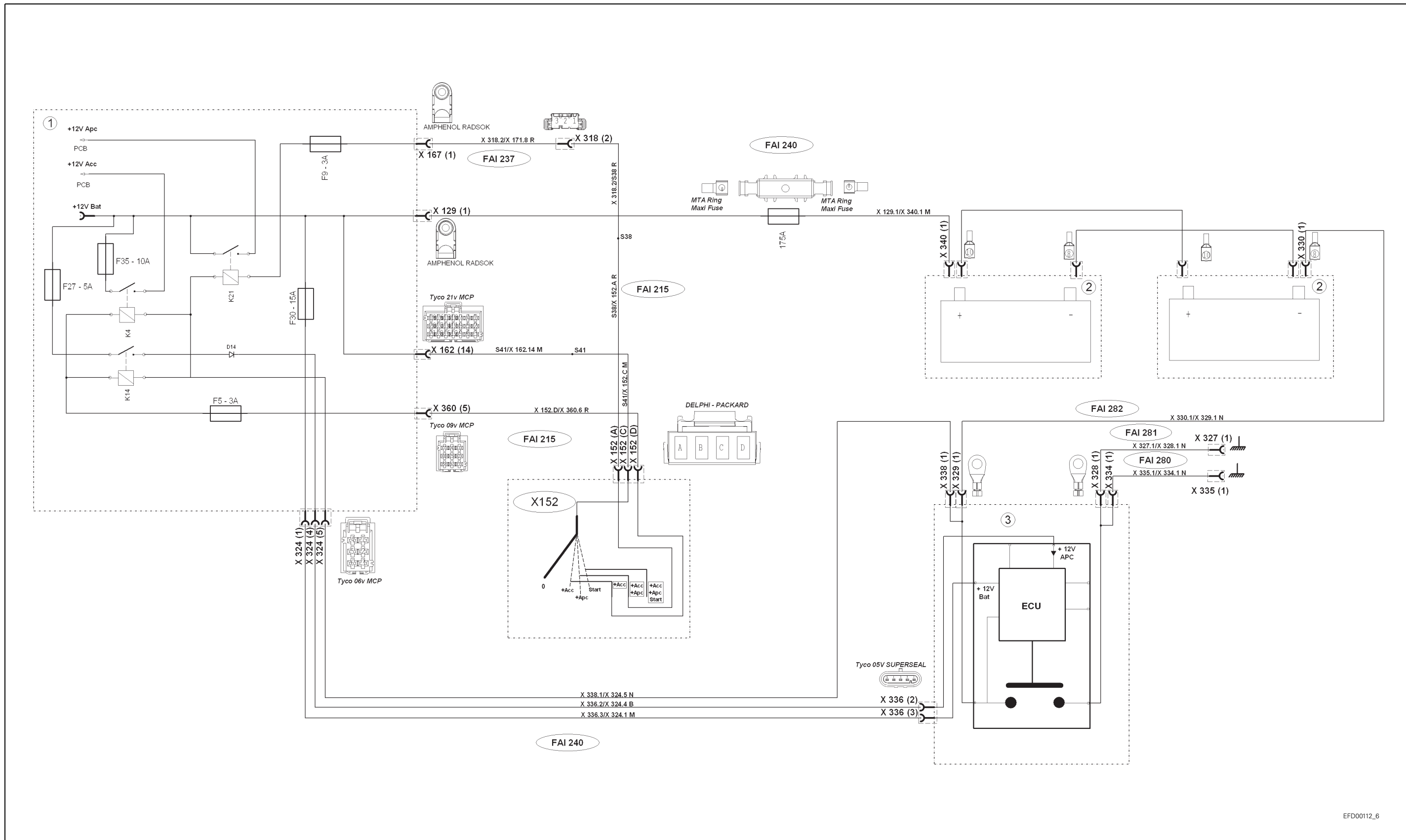
**FAI283** - TopDock harness

**FAIxxx** - Non-Isobus tool connector harness

**FAIxxx** - Non-Isobus implement connector controller harness

**FAIxxx** - Additional fan harness

A.2 Fuse box supply with circuit breaker

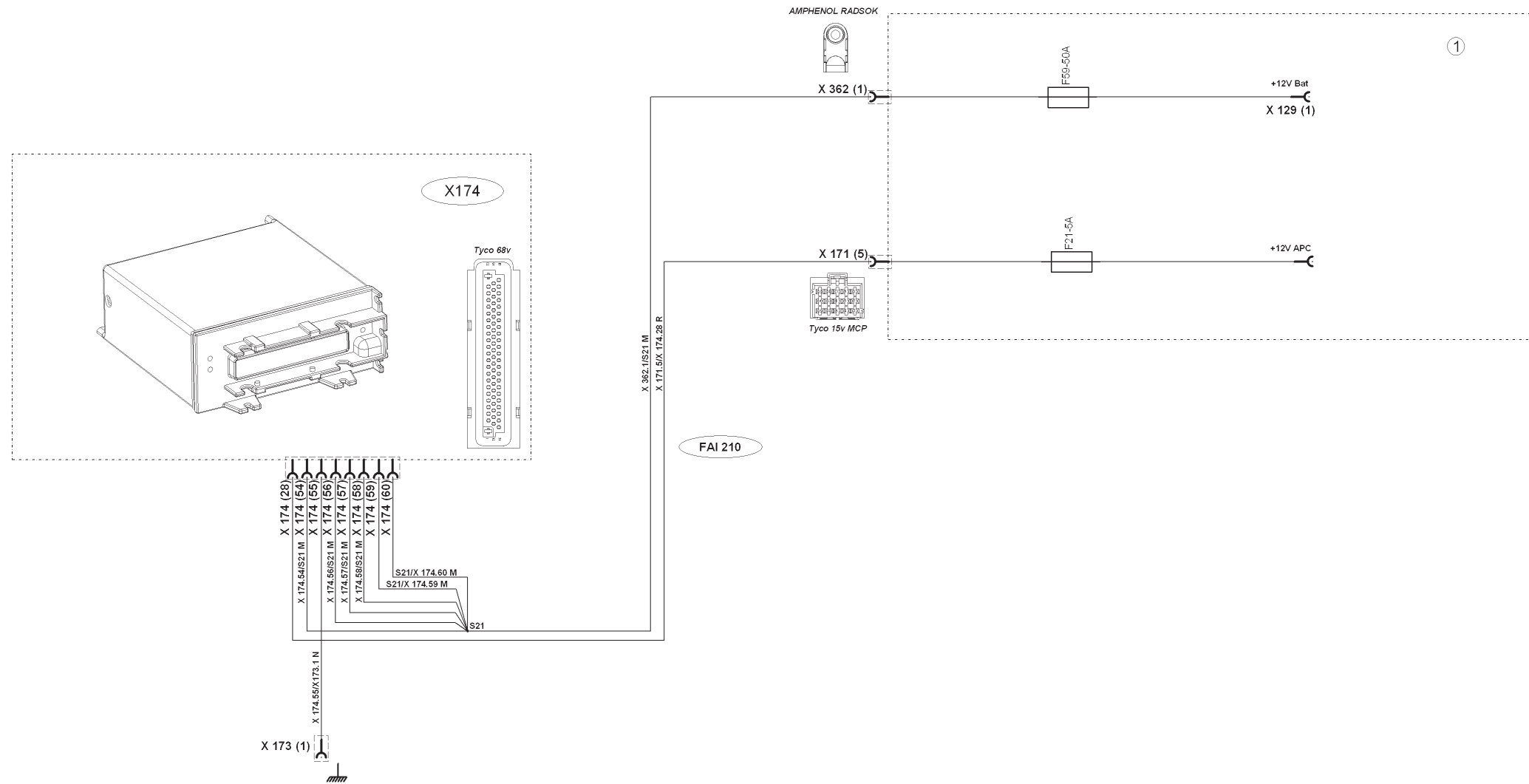


EFD00112\_6

Fig. 1



A.3 Autotronic 4 electrical power supply

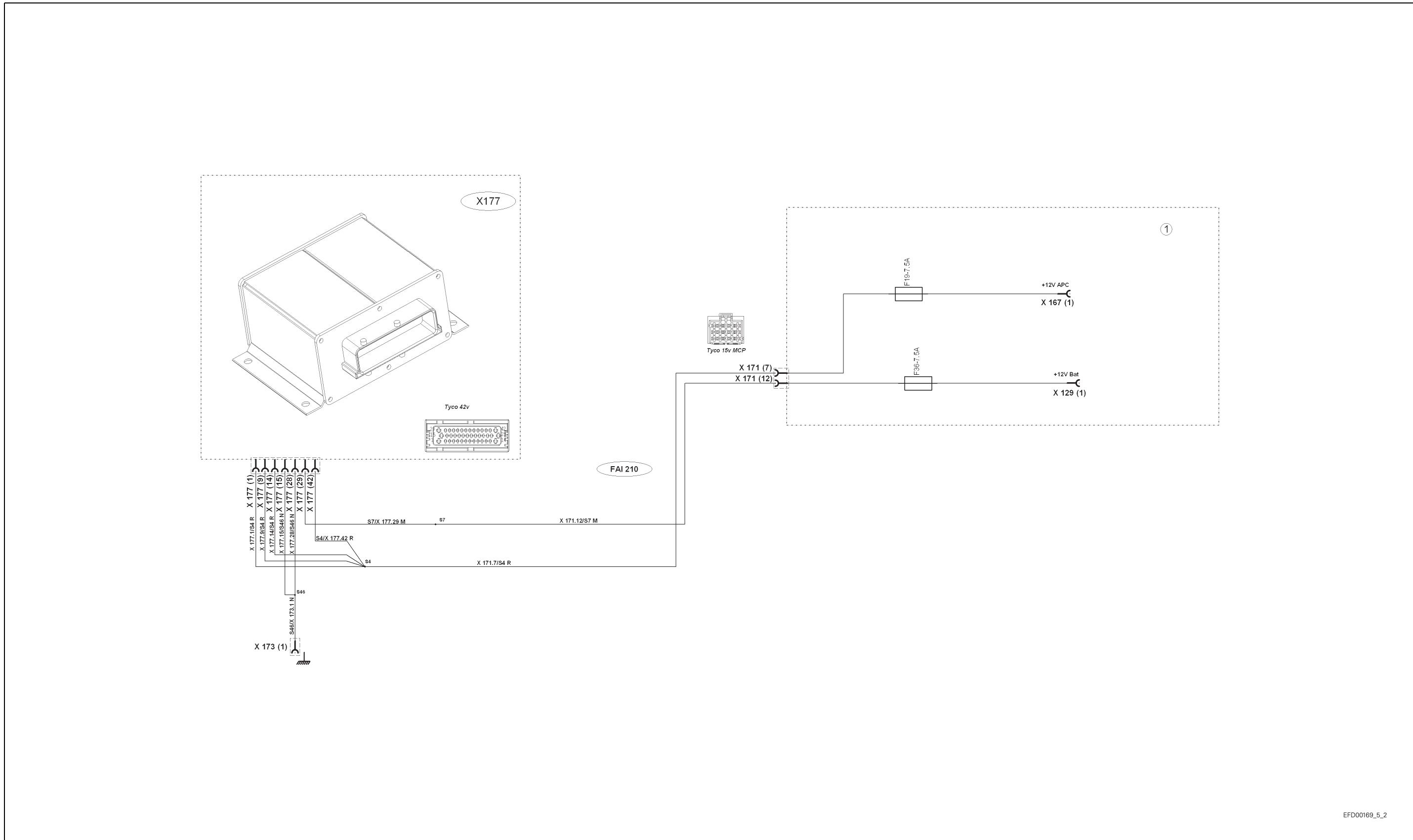


EFD00169\_5\_1

Fig. 2



A.4 Autotronic 5 linkage electrical power supply



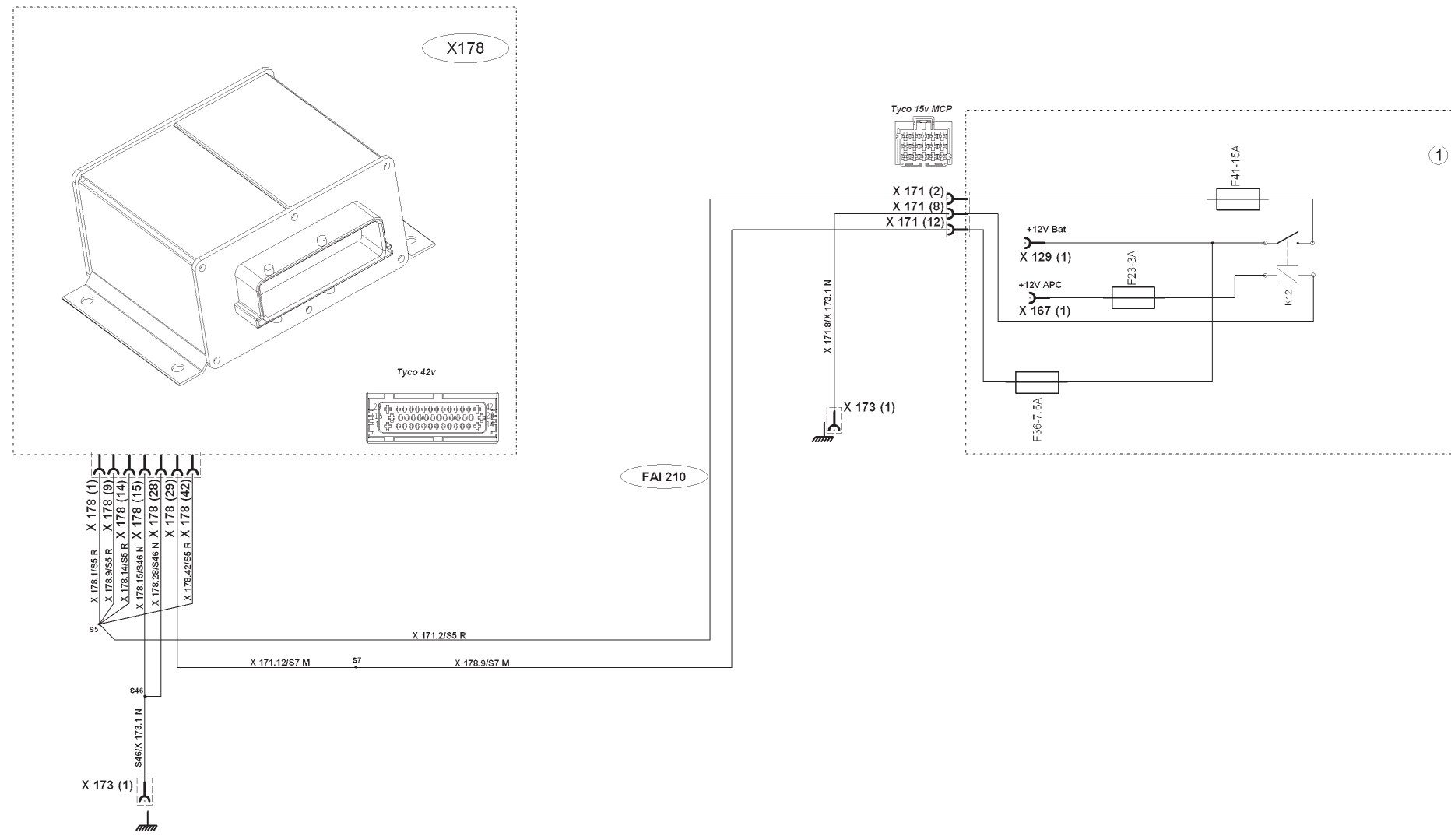
EFD00169\_5\_2

Fig. 3





**A.5 Autotronic 5 ParkLock/suspended front axle electrical power supply**

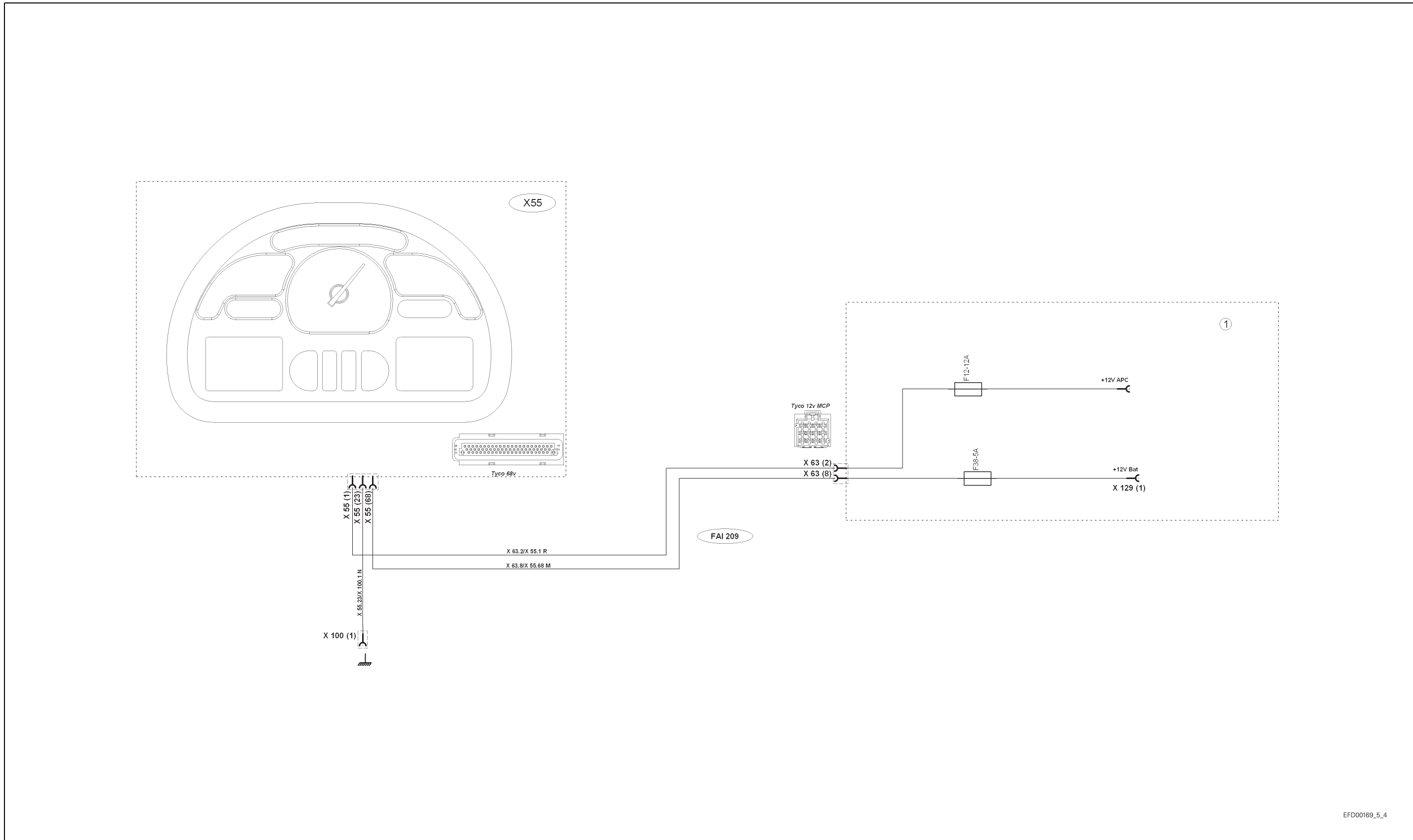


EFD00169\_5\_3

Fig. 4



A.6 DCC3 instrument panel electrical power supply

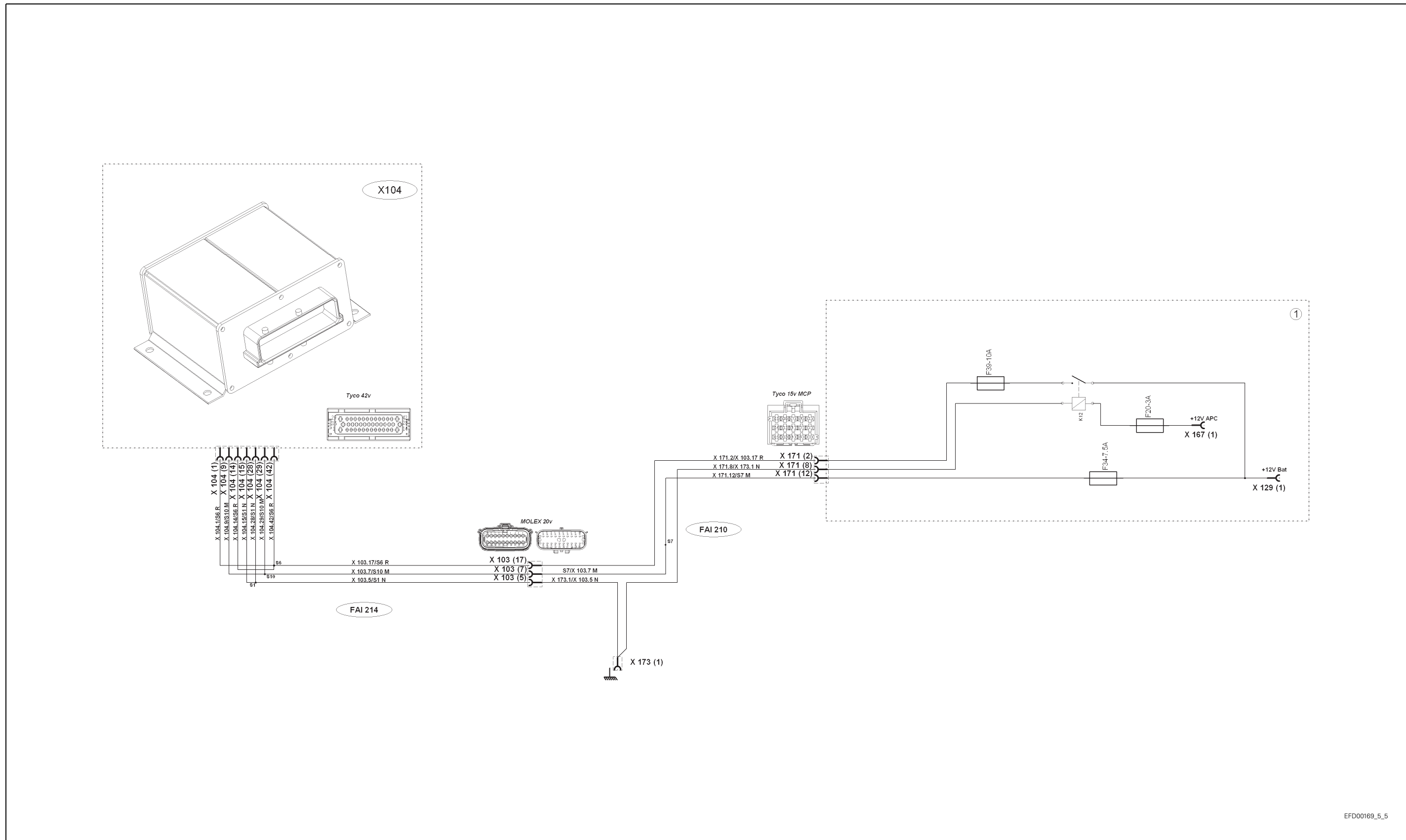


EFD00169\_5\_4

Fig. 5



A.7 Autotronic 5 armrest electrical power supply

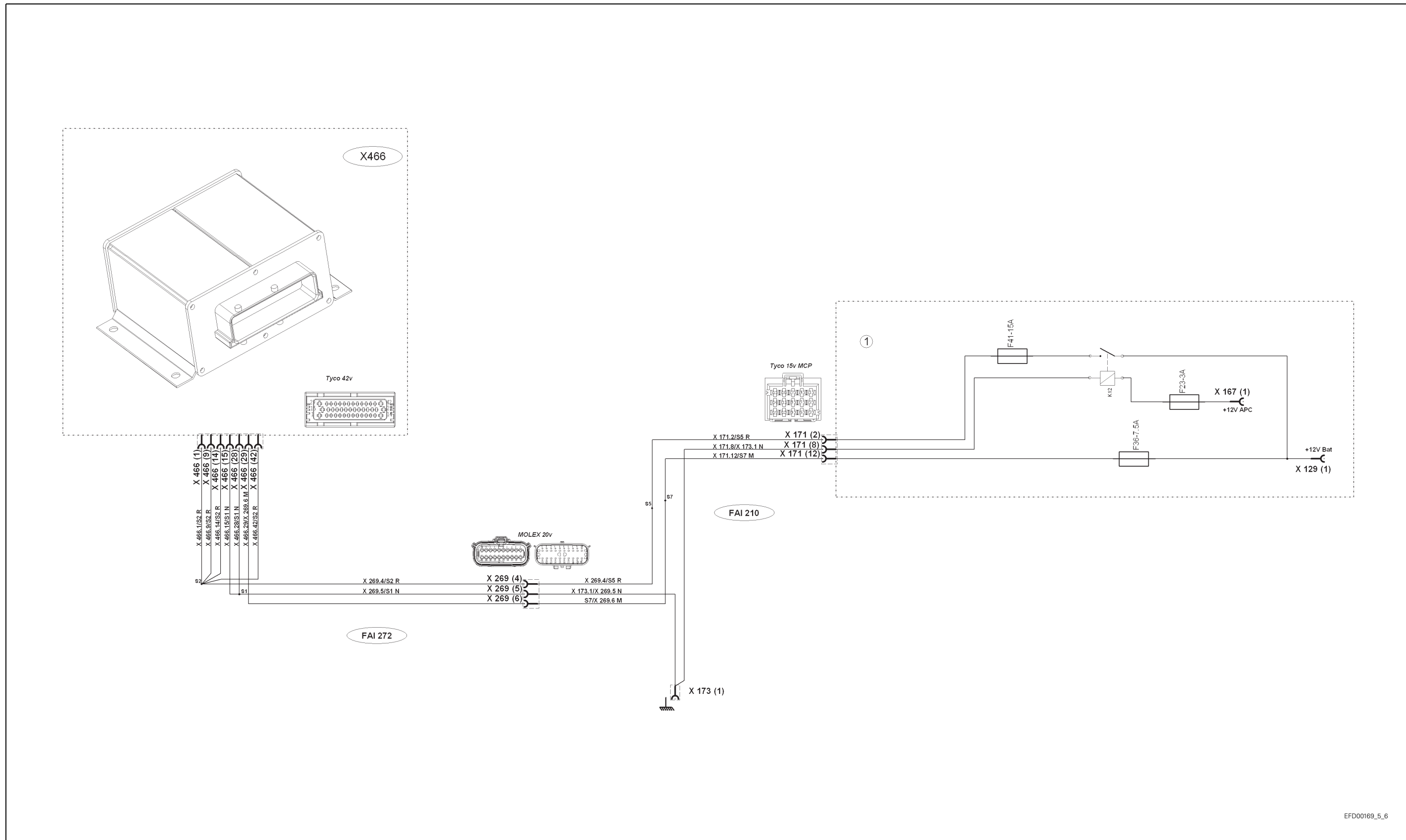


EFD00169\_5\_5

Fig. 6



A.8 Autotronic 5 active suspended cab electrical power supply



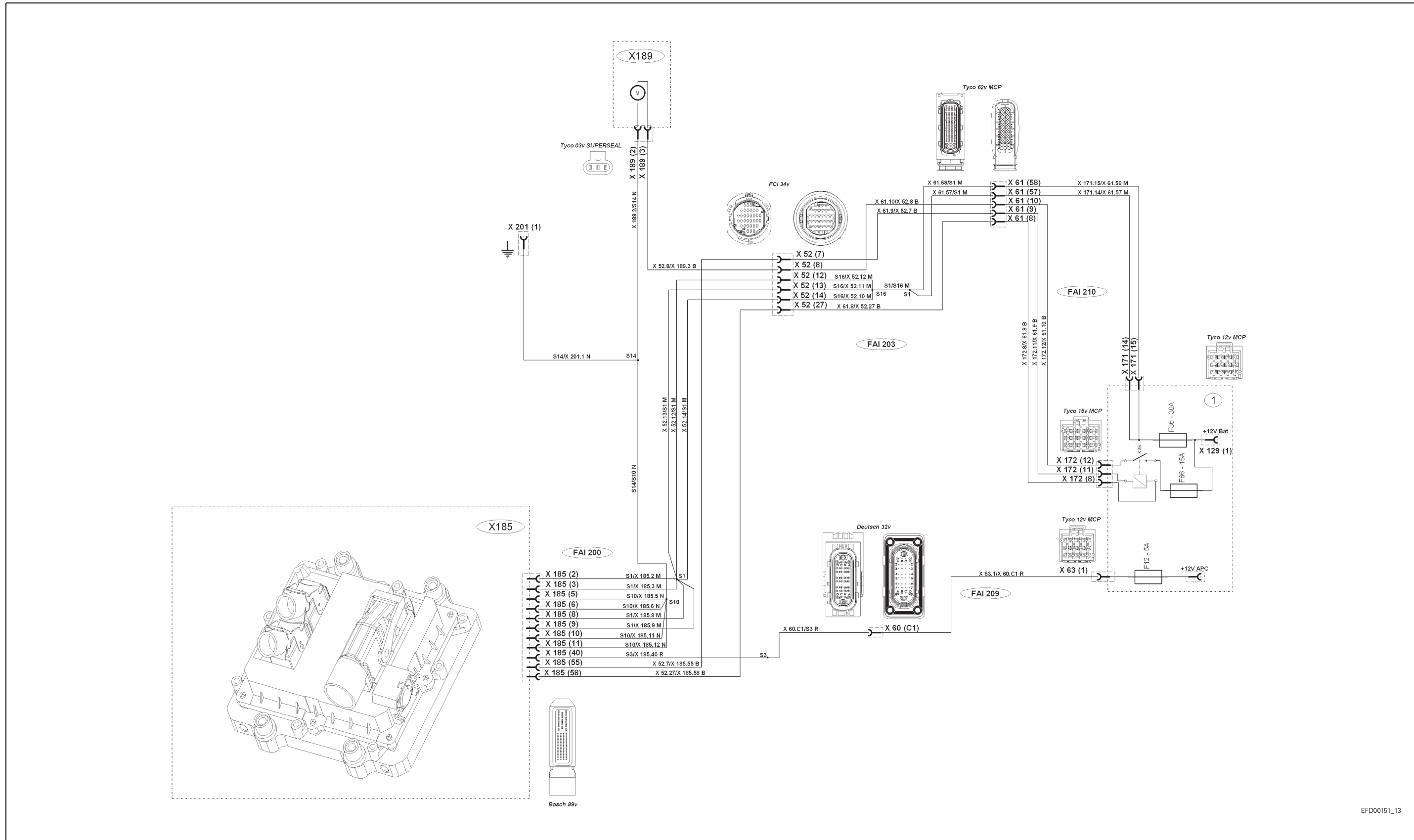
EFD00169\_5\_6

Fig. 7





**A.9 Sisu EEM electronic unit electrical power supply**

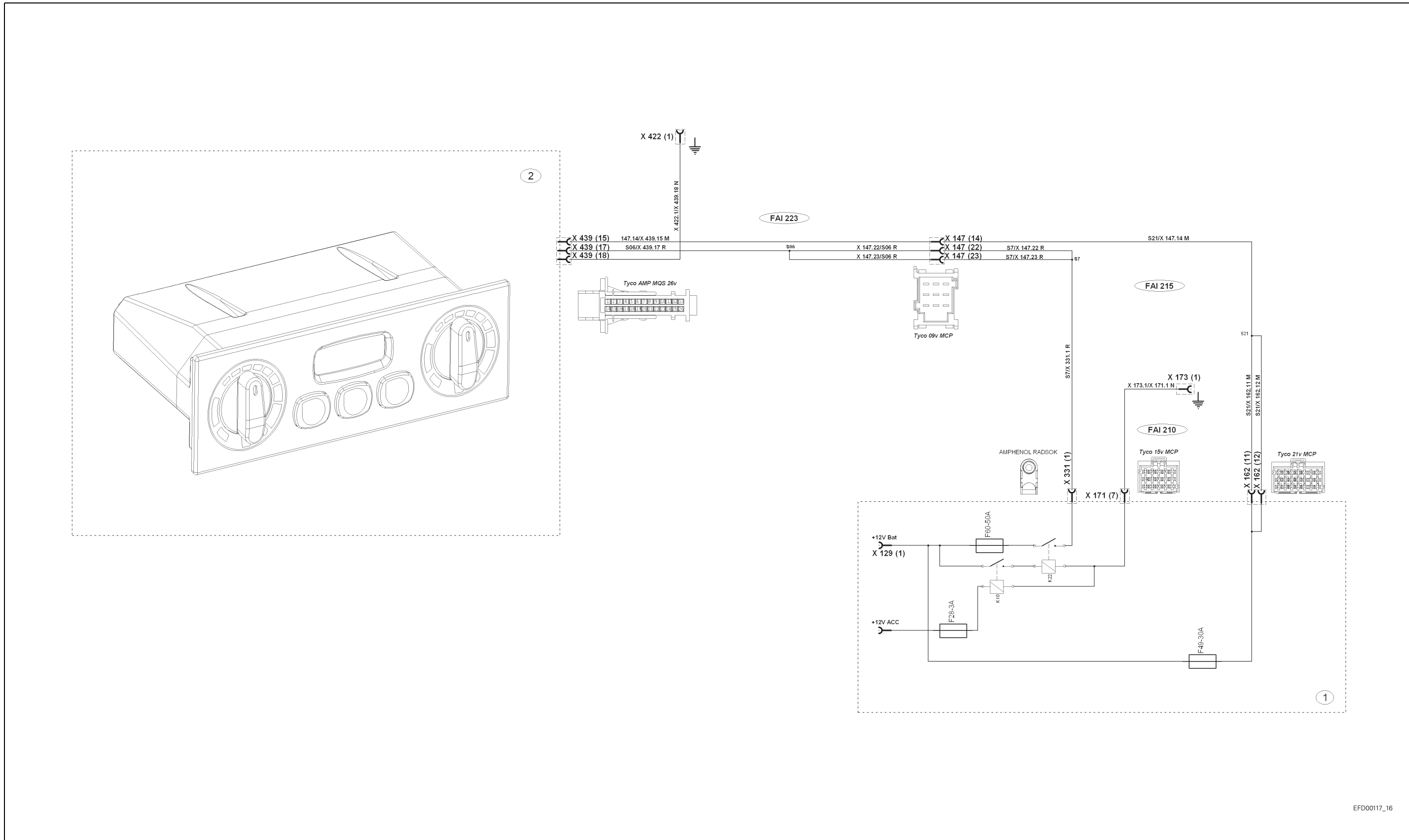


EFD00151\_13

Fig. 8



A.10 Automatic air-conditioning unit electrical power supply

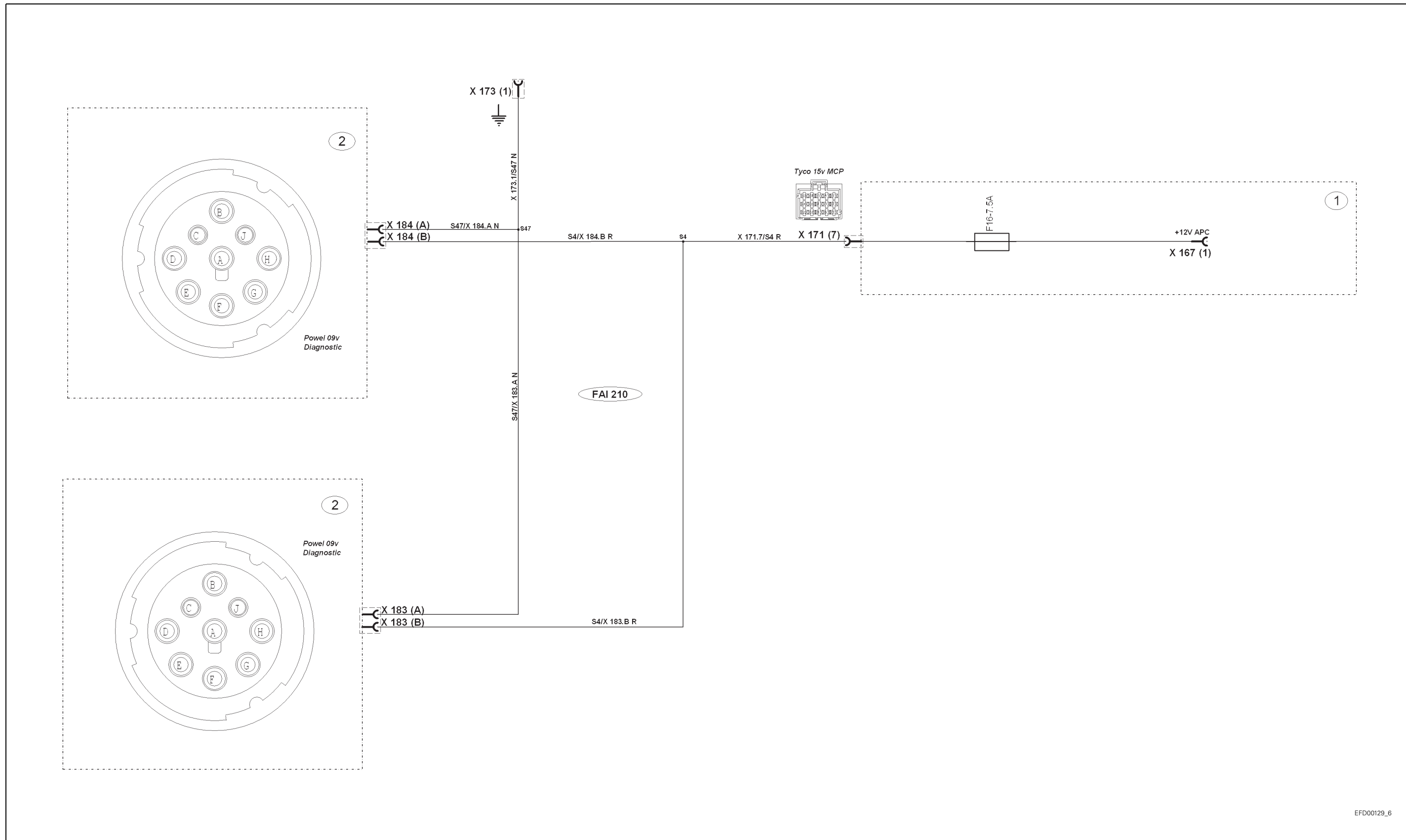


EFD00117\_16

Fig. 9



**A.11 Diagnostics connector electrical power supply**

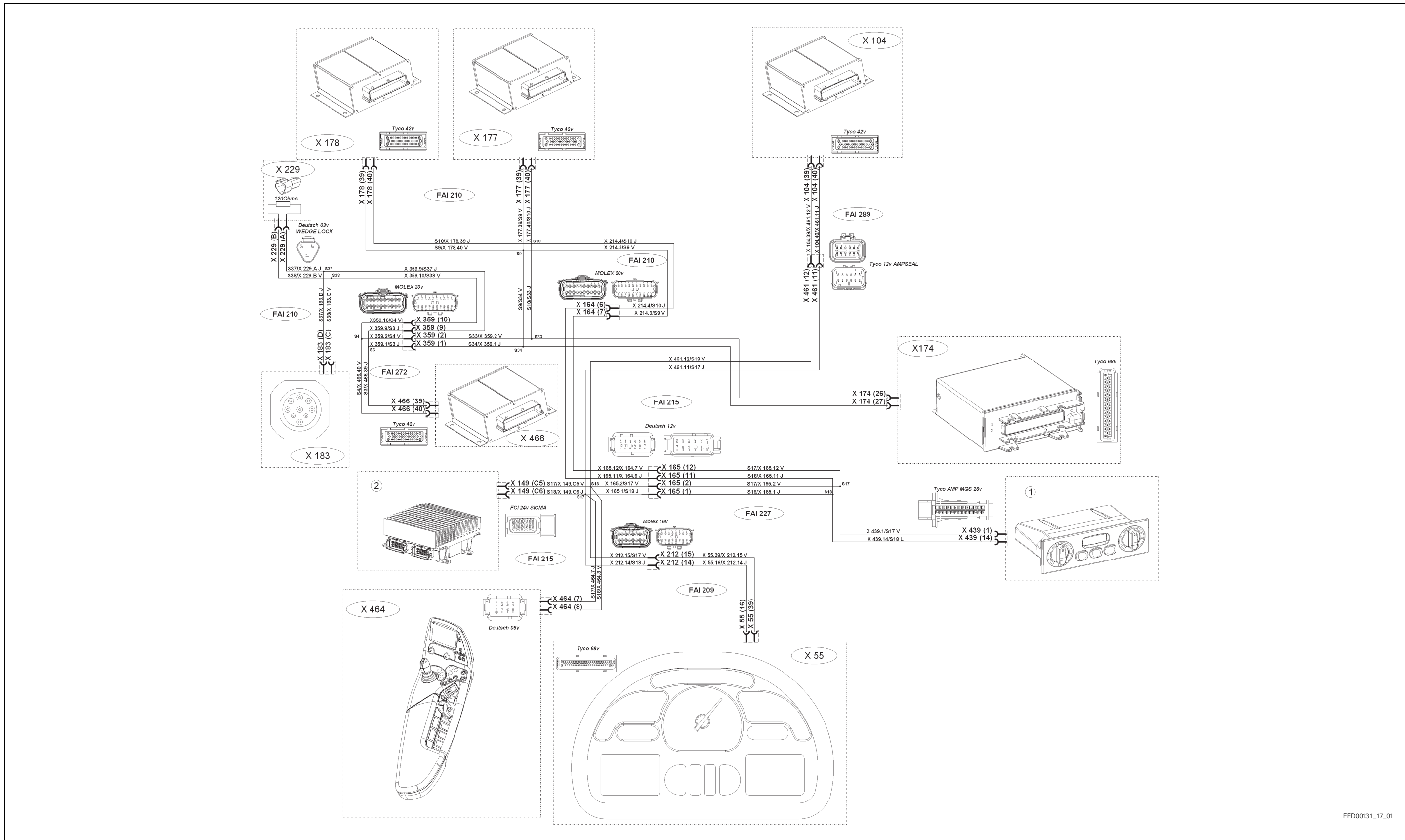


EFD00129\_6

Fig. 10



A.12 Tractor CAN network



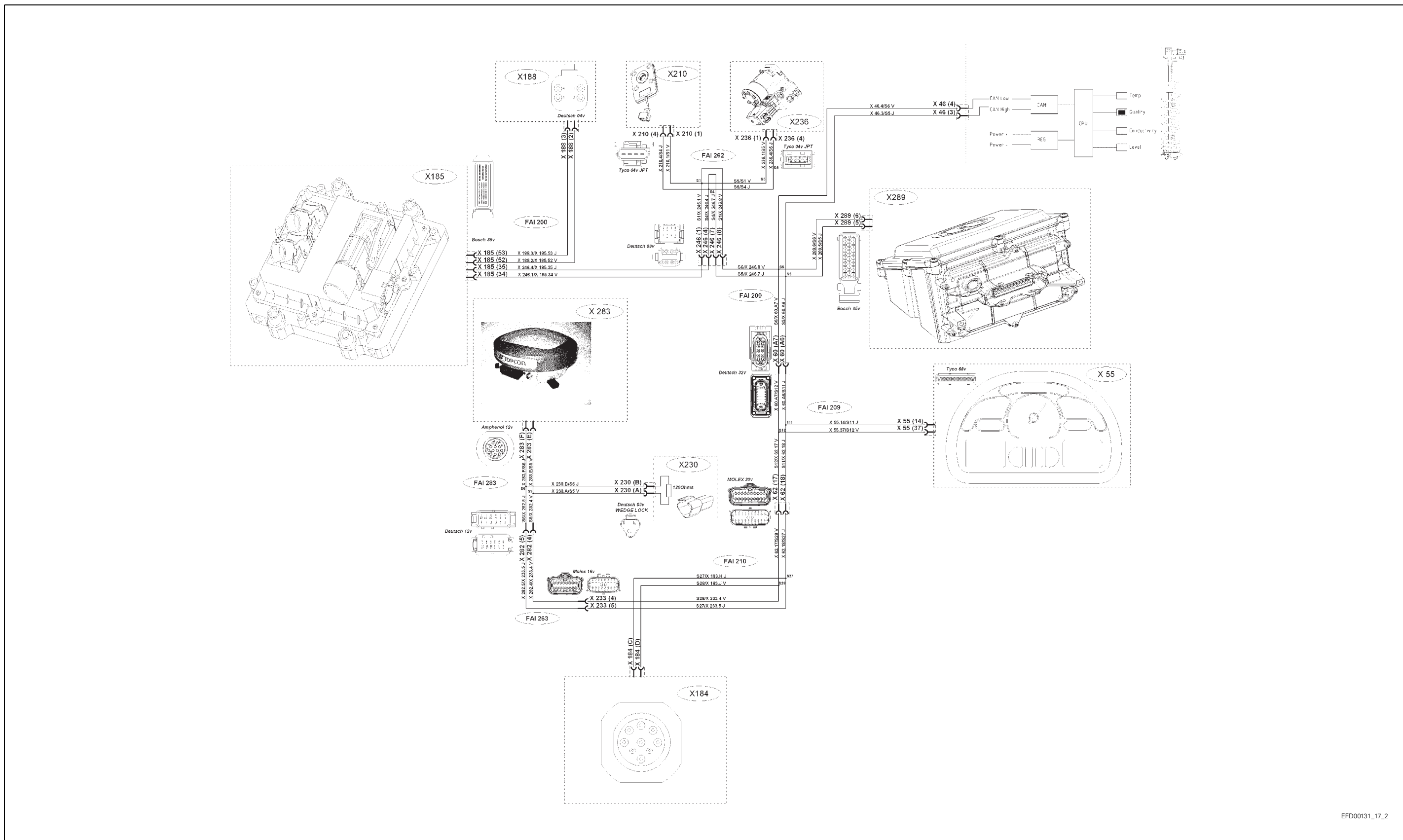
EFD00131\_17\_01

Fig. 11





A.13 Engine CAN network

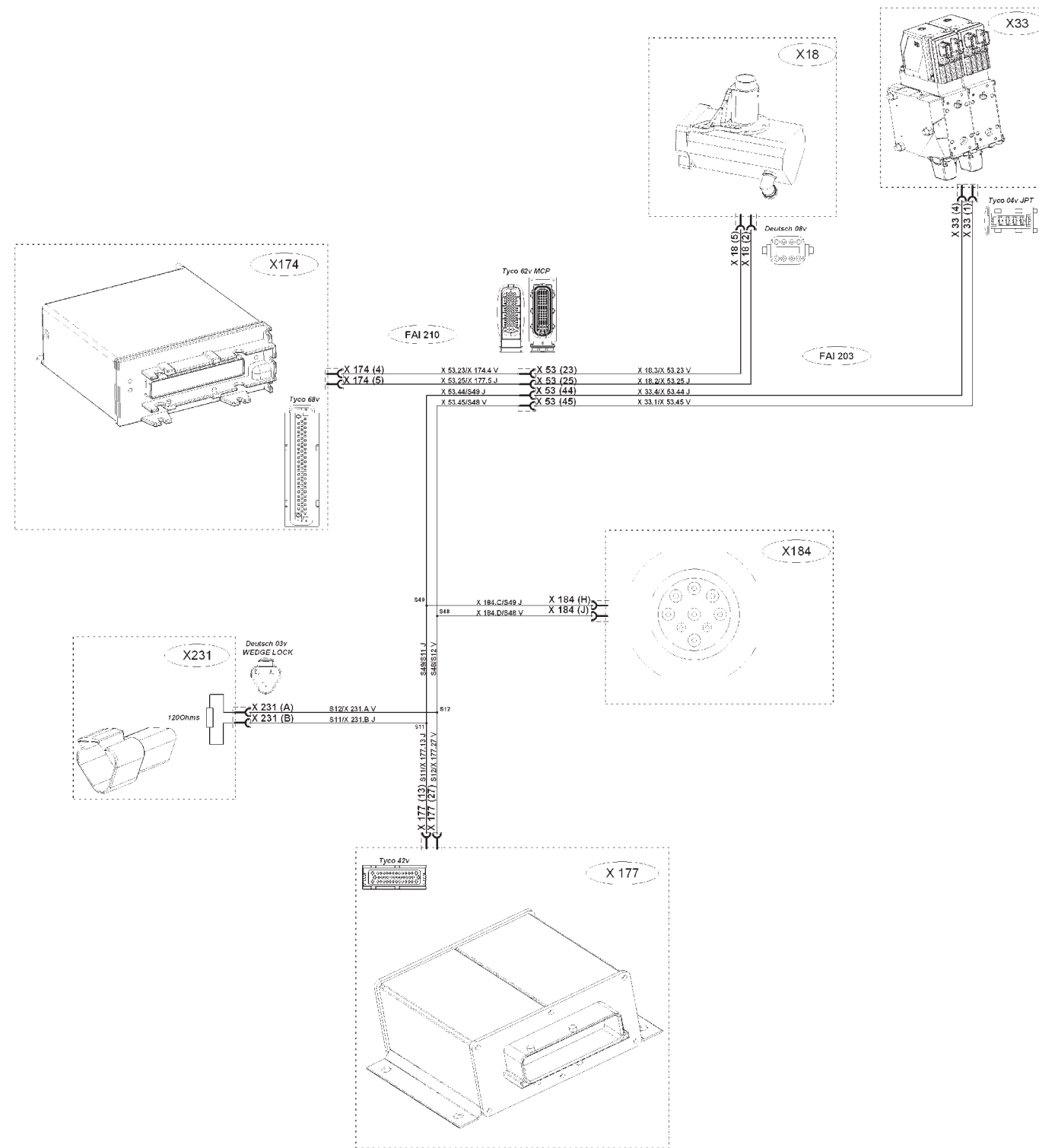


EFD00131\_17\_2

Fig. 12



A.14 Linkage CAN network

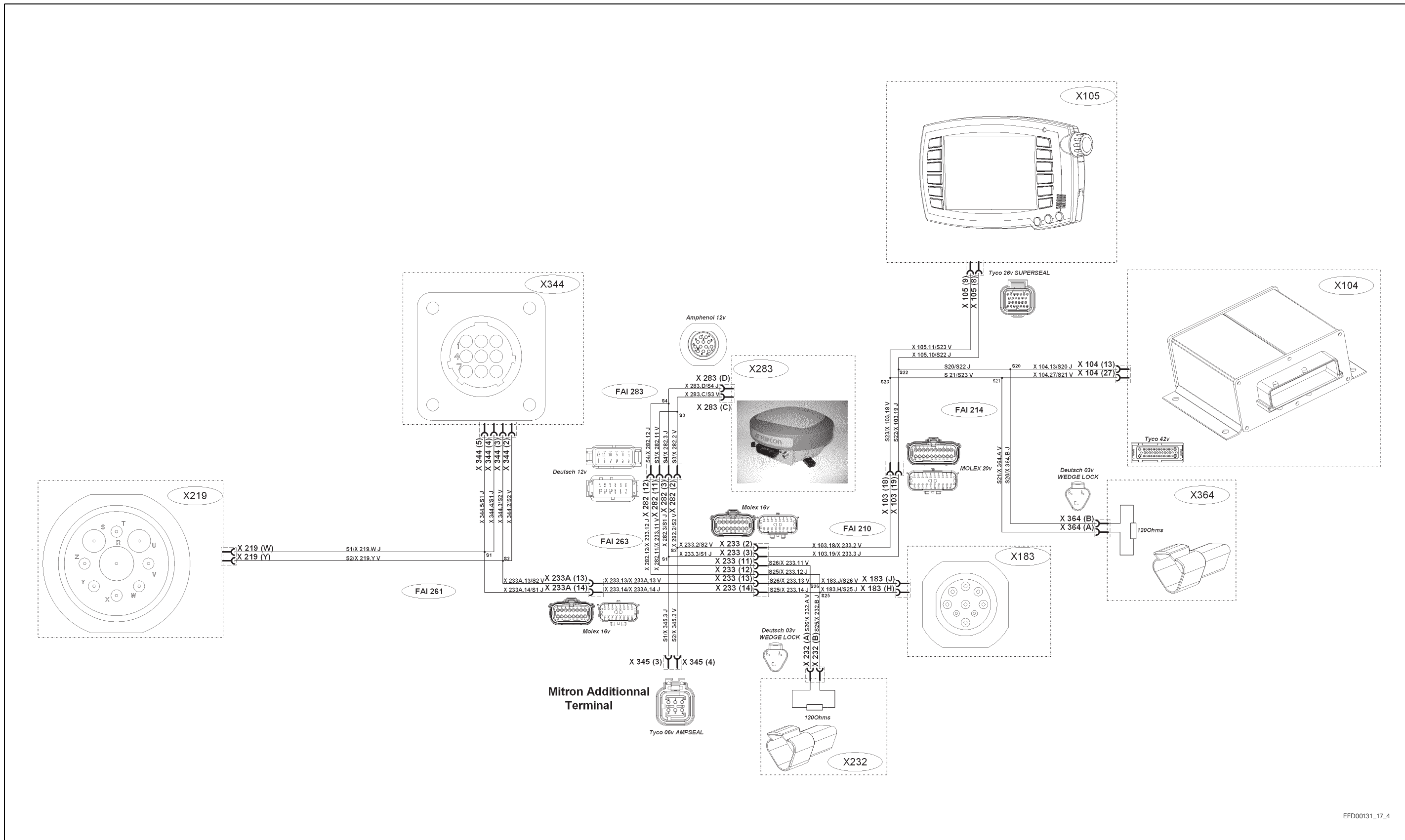


EFD00131\_17\_3

Fig. 13



A.15 Isobus CAN network

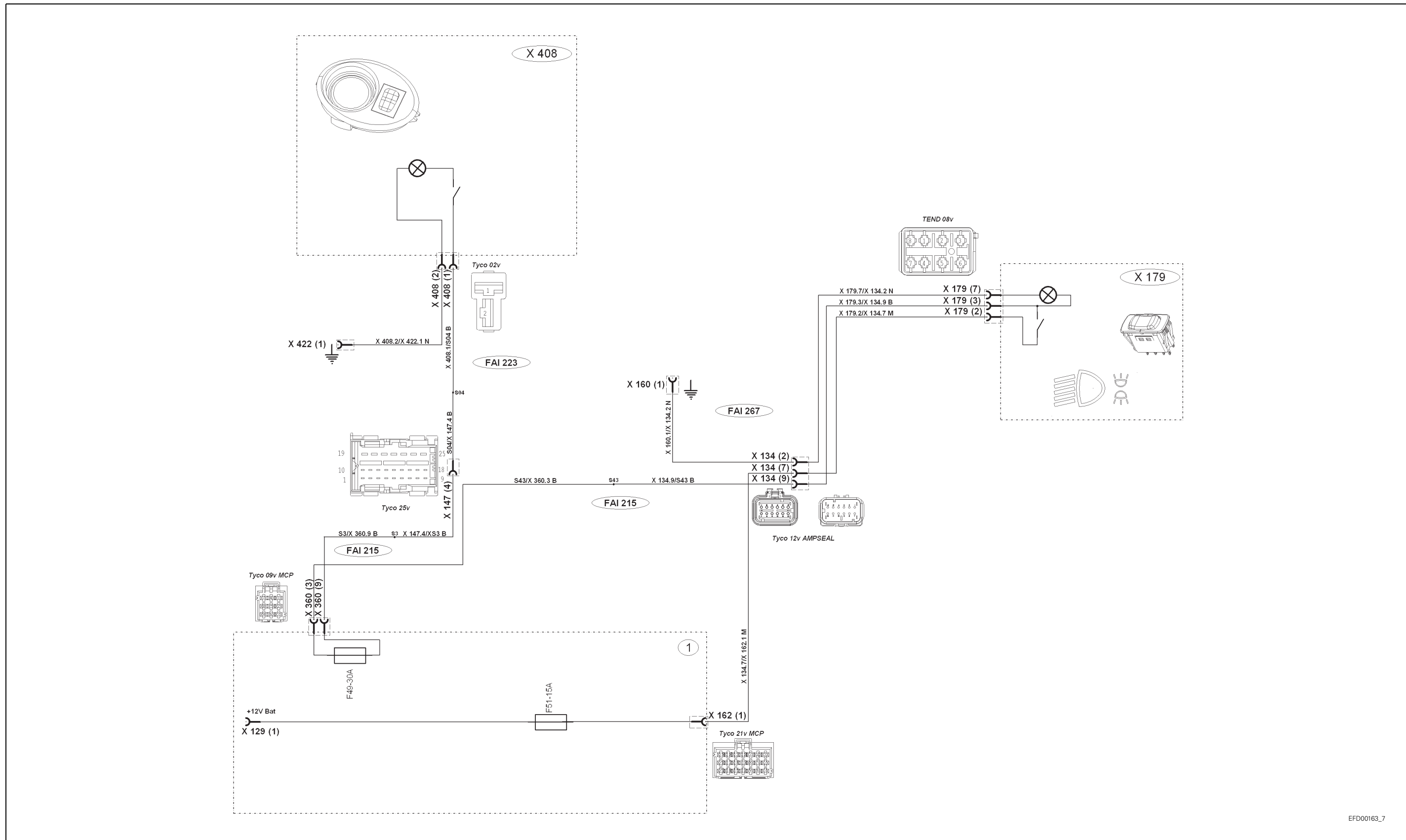


EFD00131\_17\_4

Fig. 14



A.16 Console lighting.



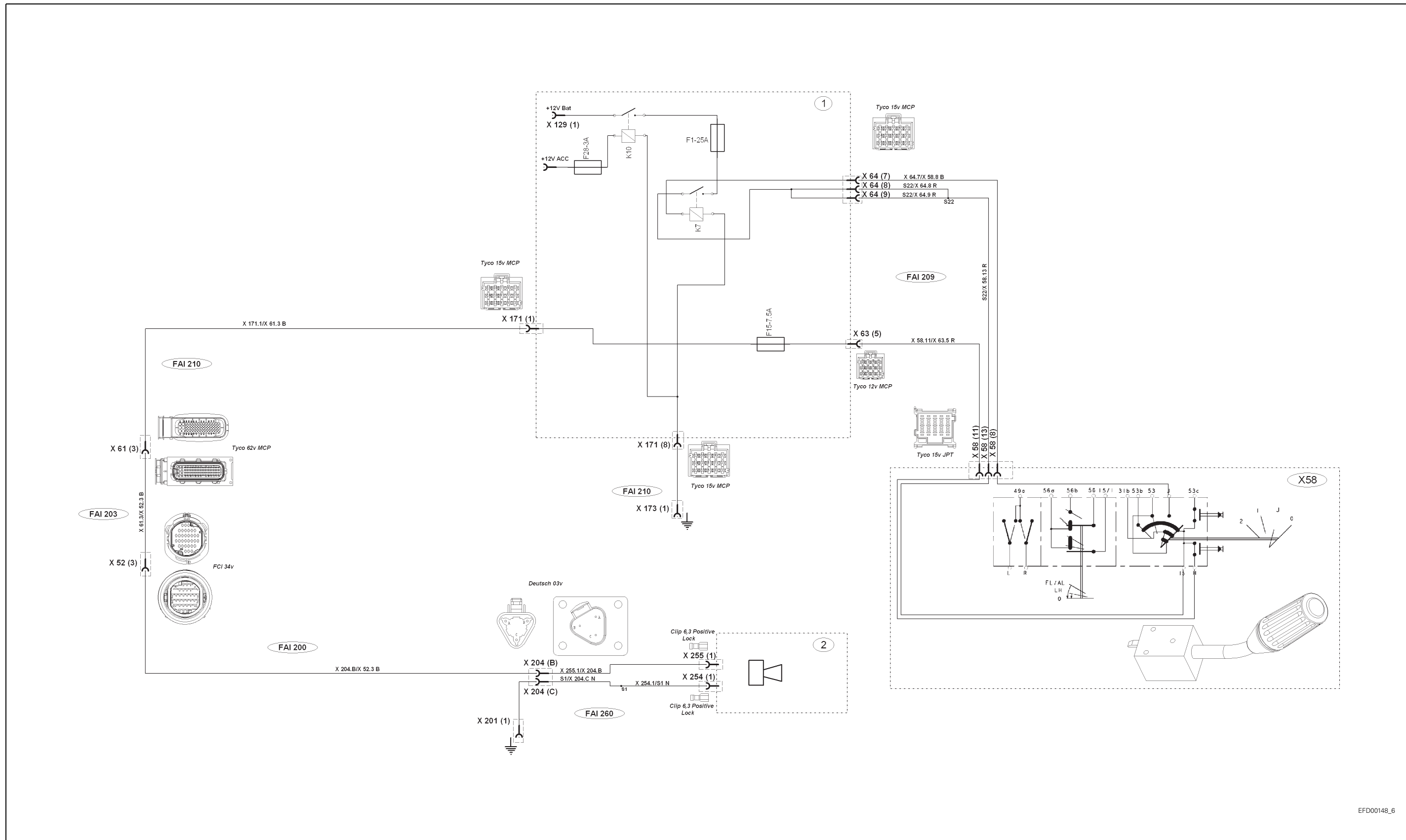
EFD00163\_7

Fig. 15





A.17Horn

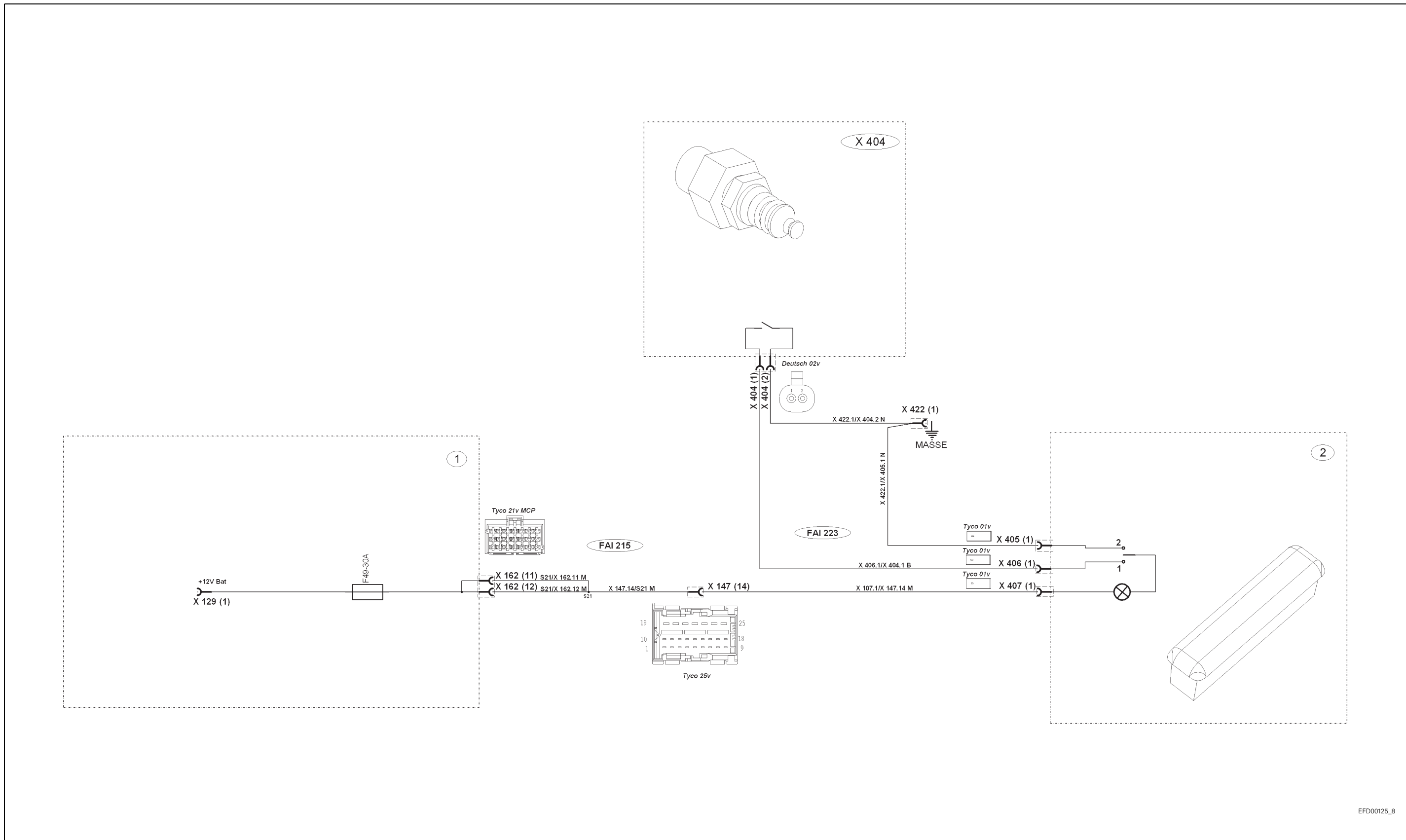


EFD00148\_6

Fig. 16



A.18 Door switch

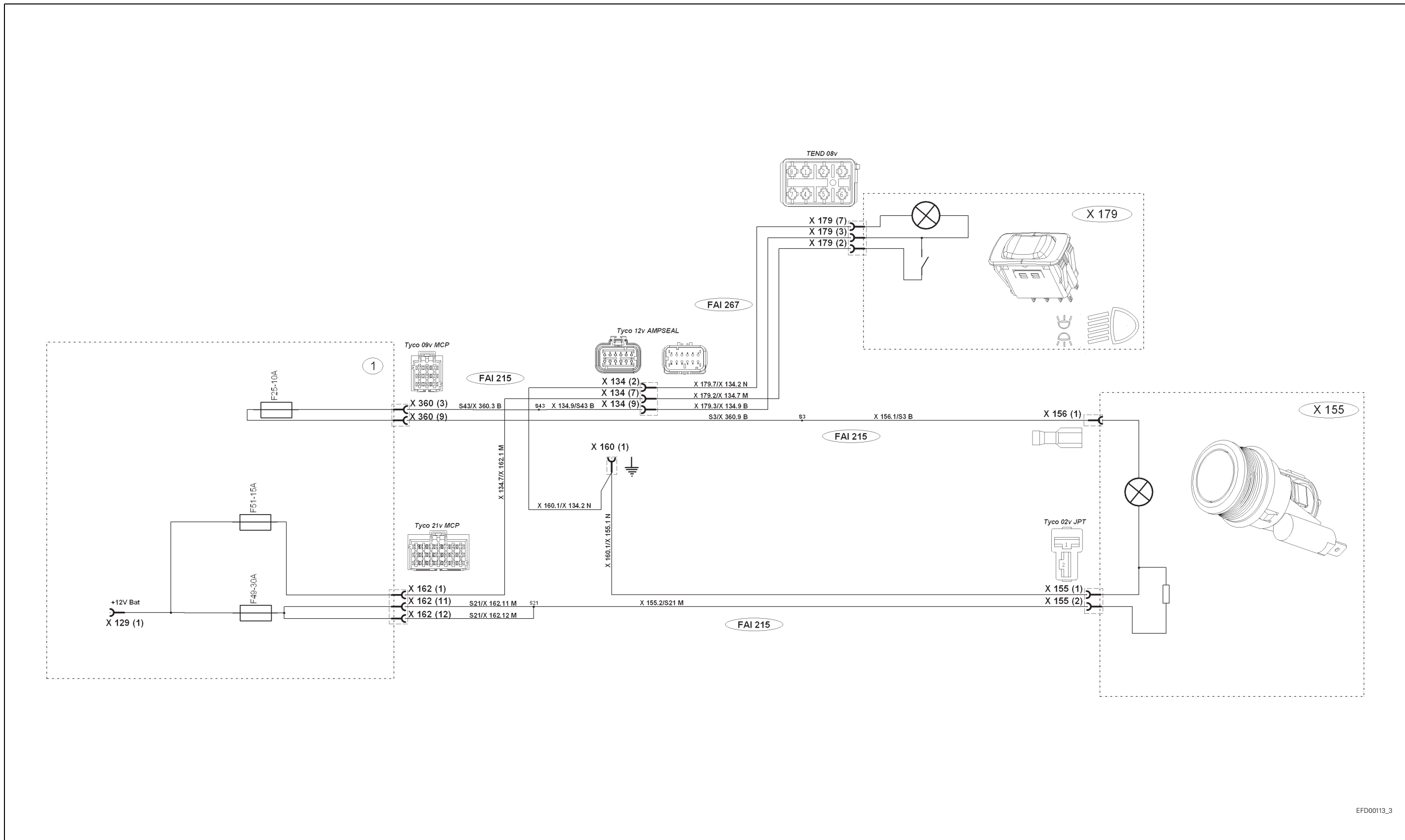


EFD00125\_8

Fig. 17



A.19 Cigarette lighter socket

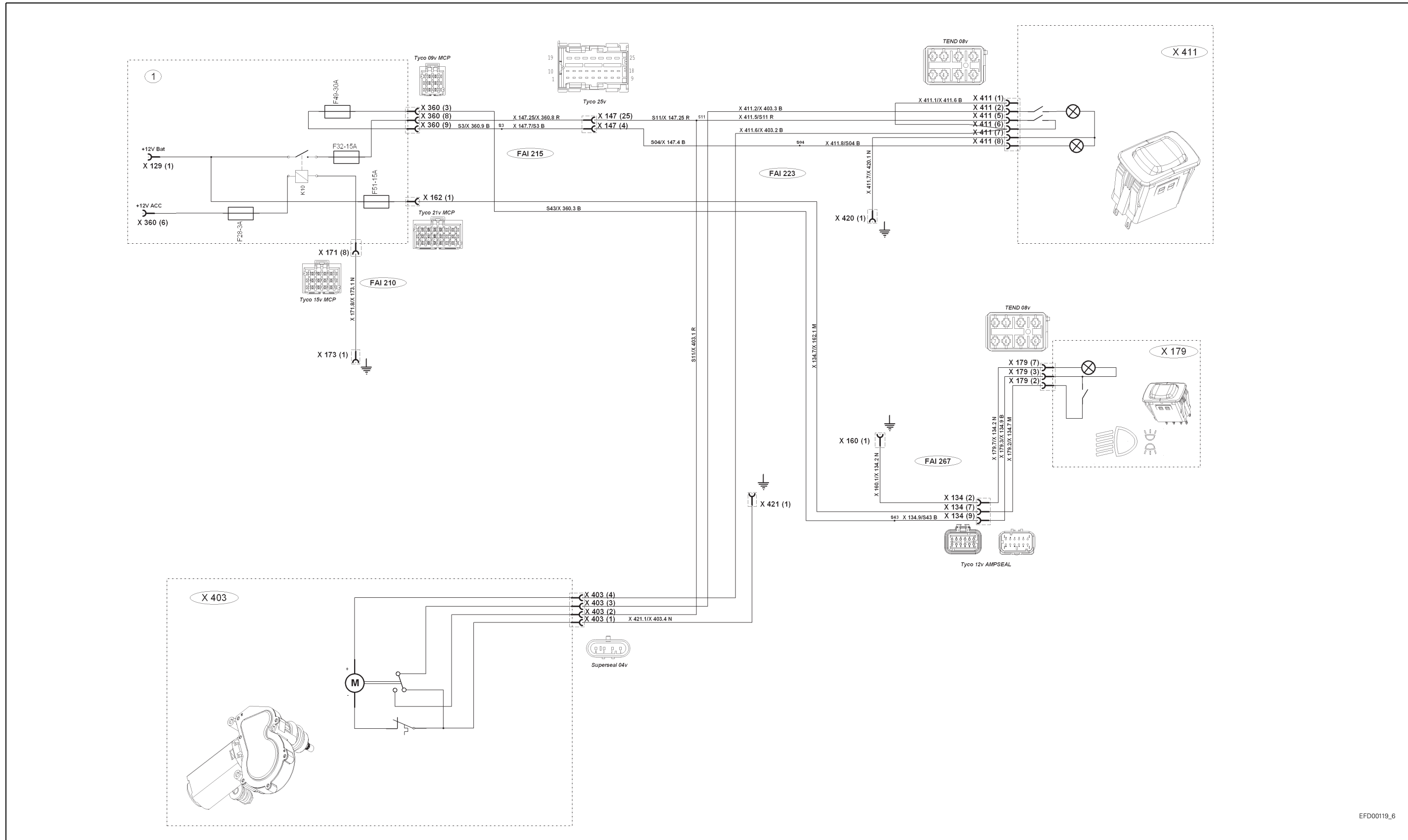


EFD00113\_3

Fig. 18



A.20Rear windscreen wiper



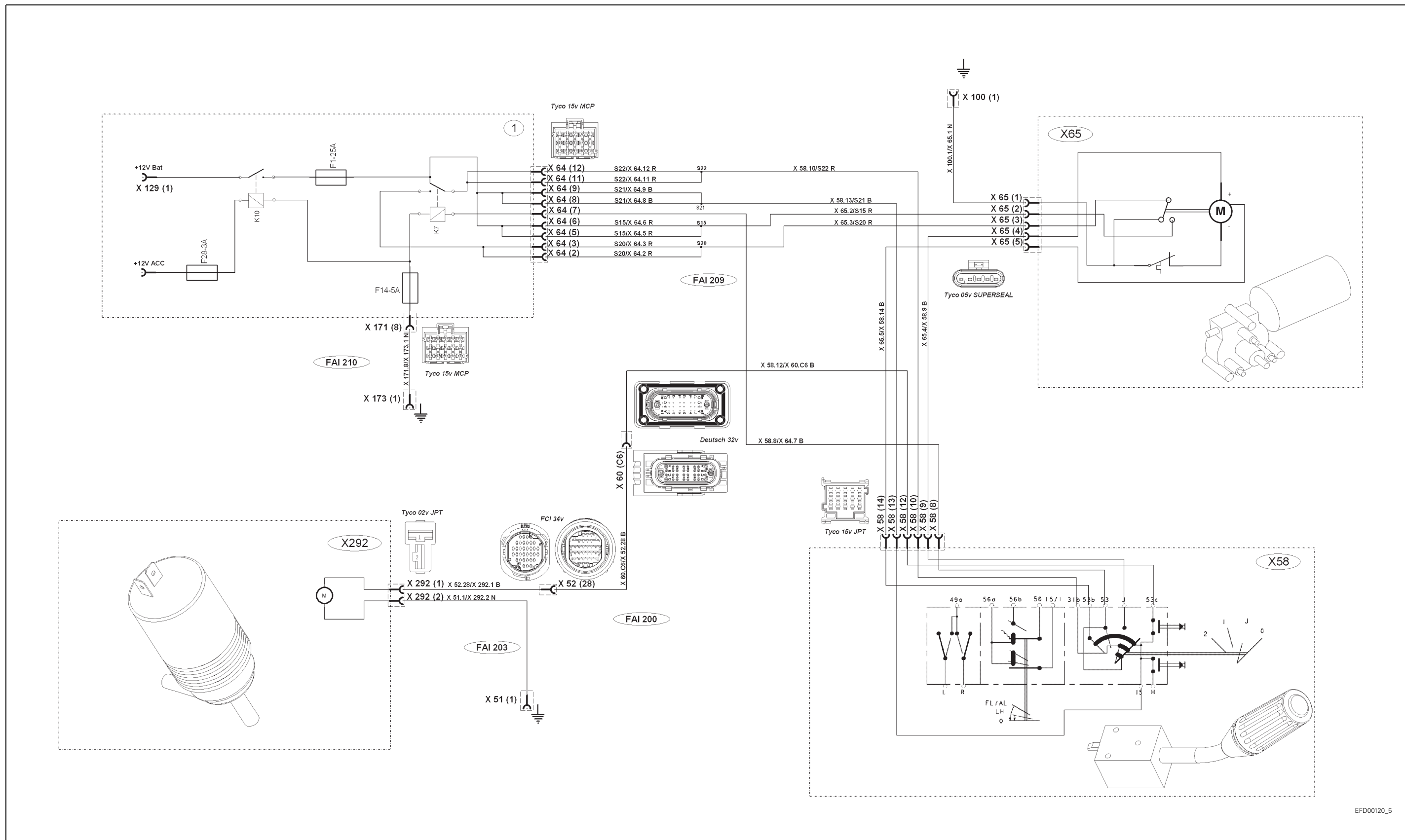
EFD00119\_6

Fig. 19





A.21 Front windscreen wiper

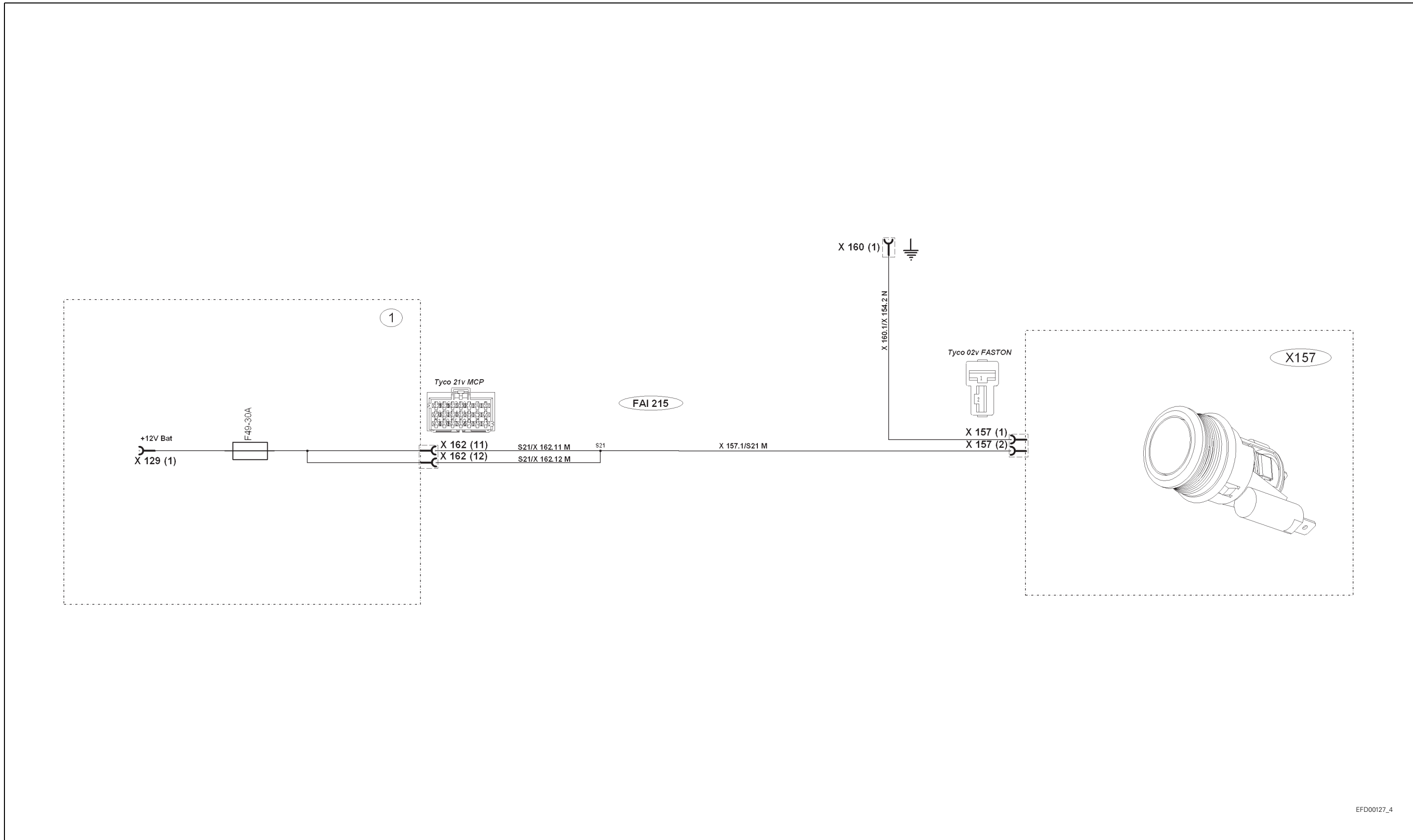


EFD00120\_5

Fig. 20



A.22 Left-hand +12 V socket

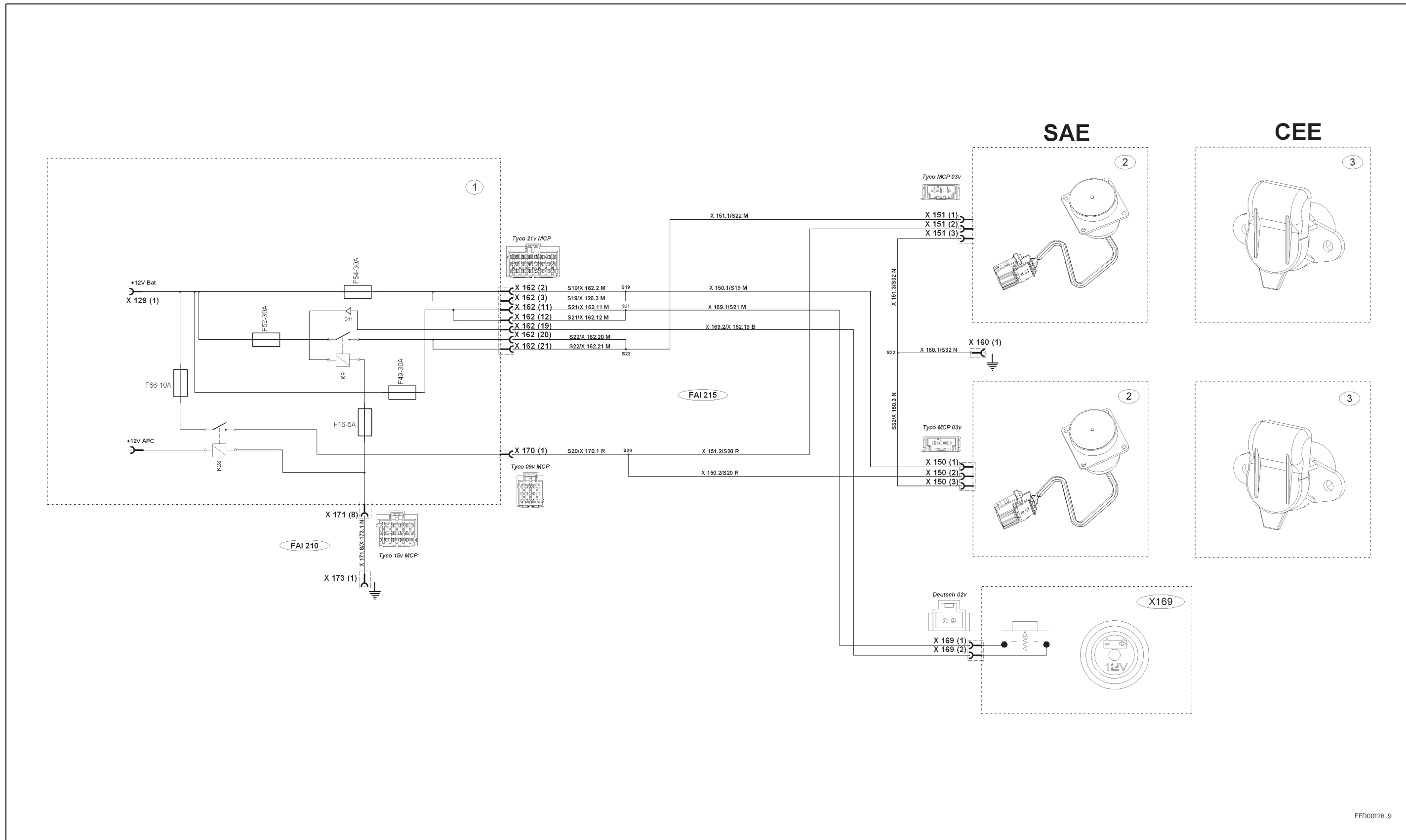


EFD00127\_4

Fig. 21



A.23 Cab power socket

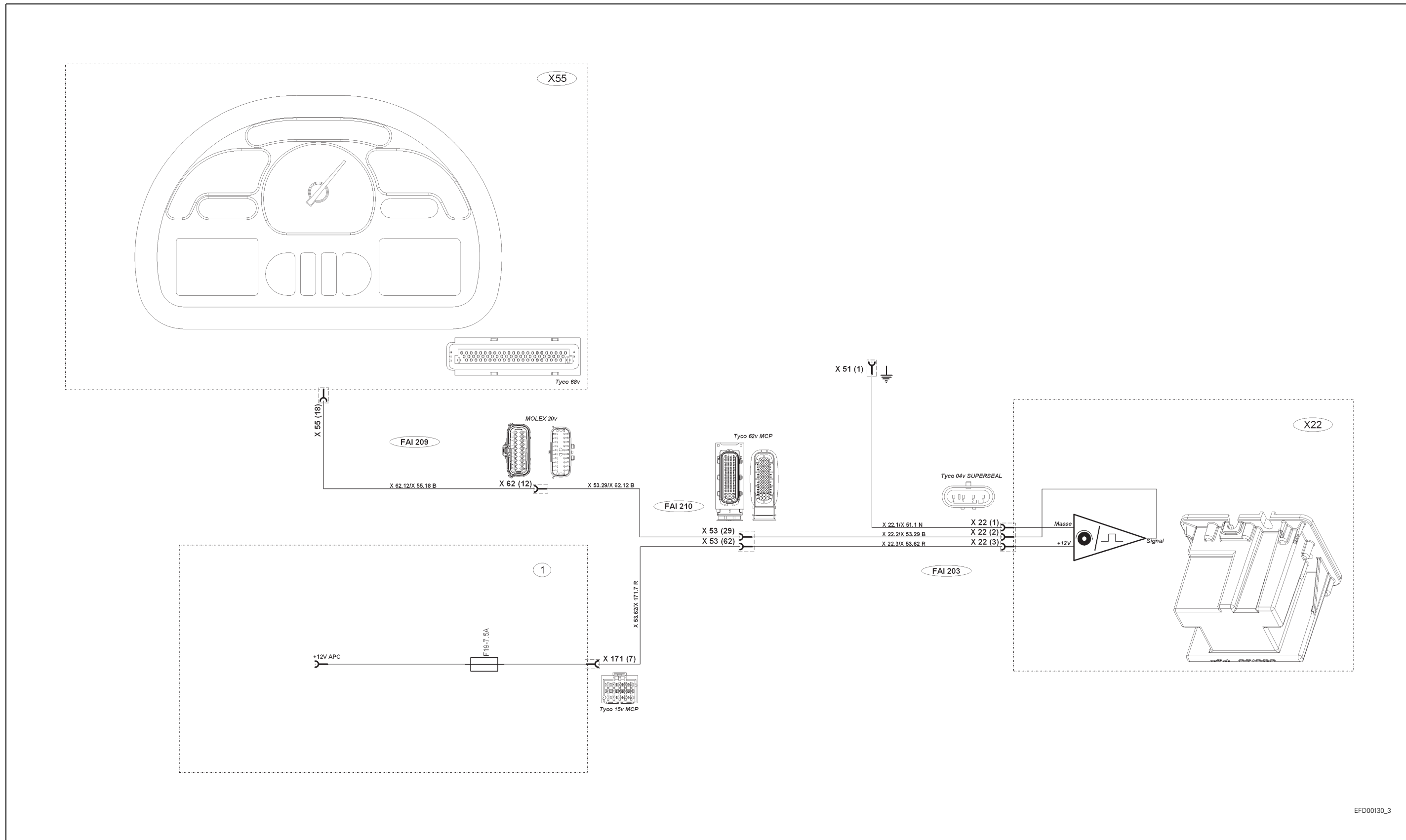


EFD00128\_9

Fig. 22



A.24 Radar



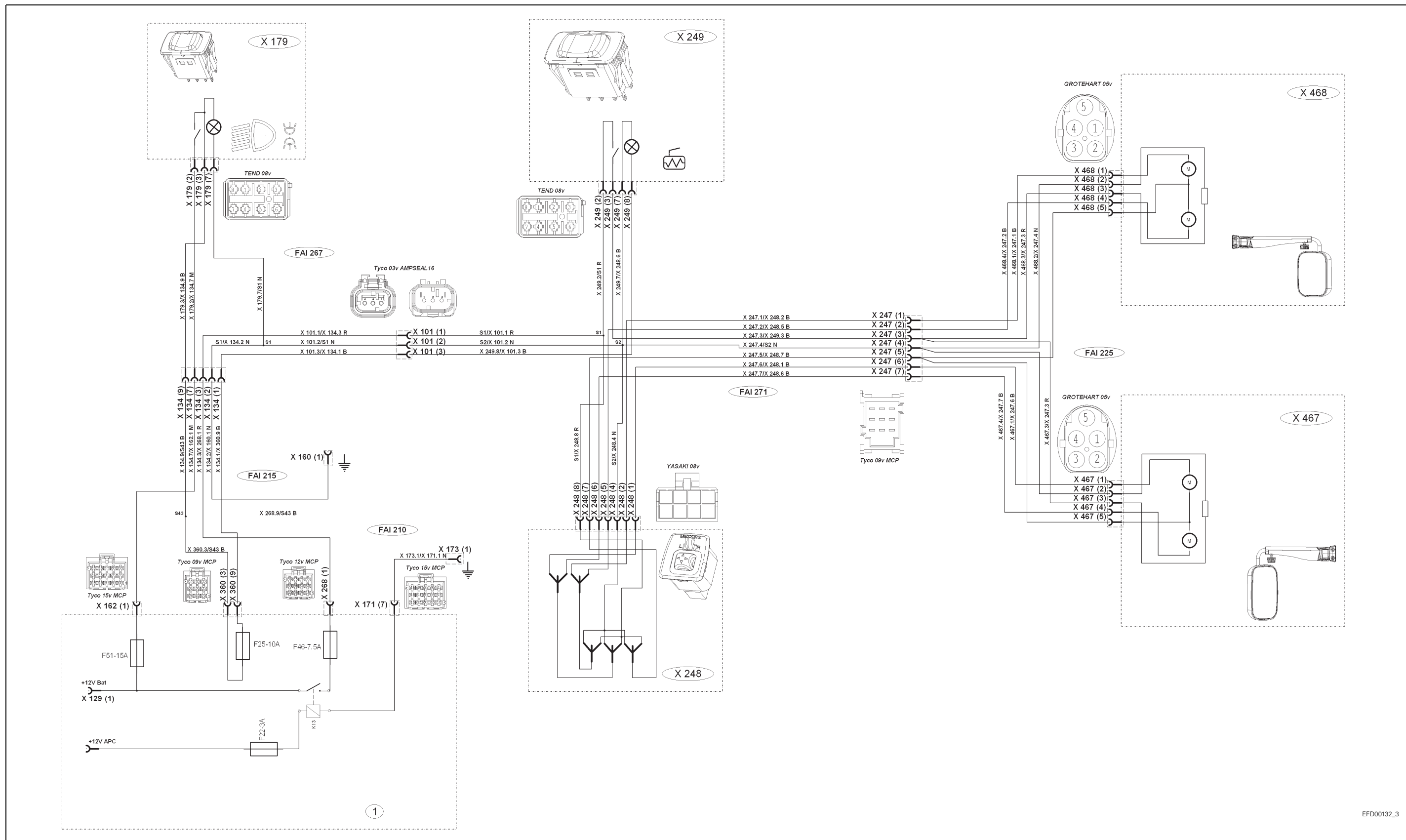
EFD00130\_3

Fig. 23





A.25 Electric rear-view mirrors

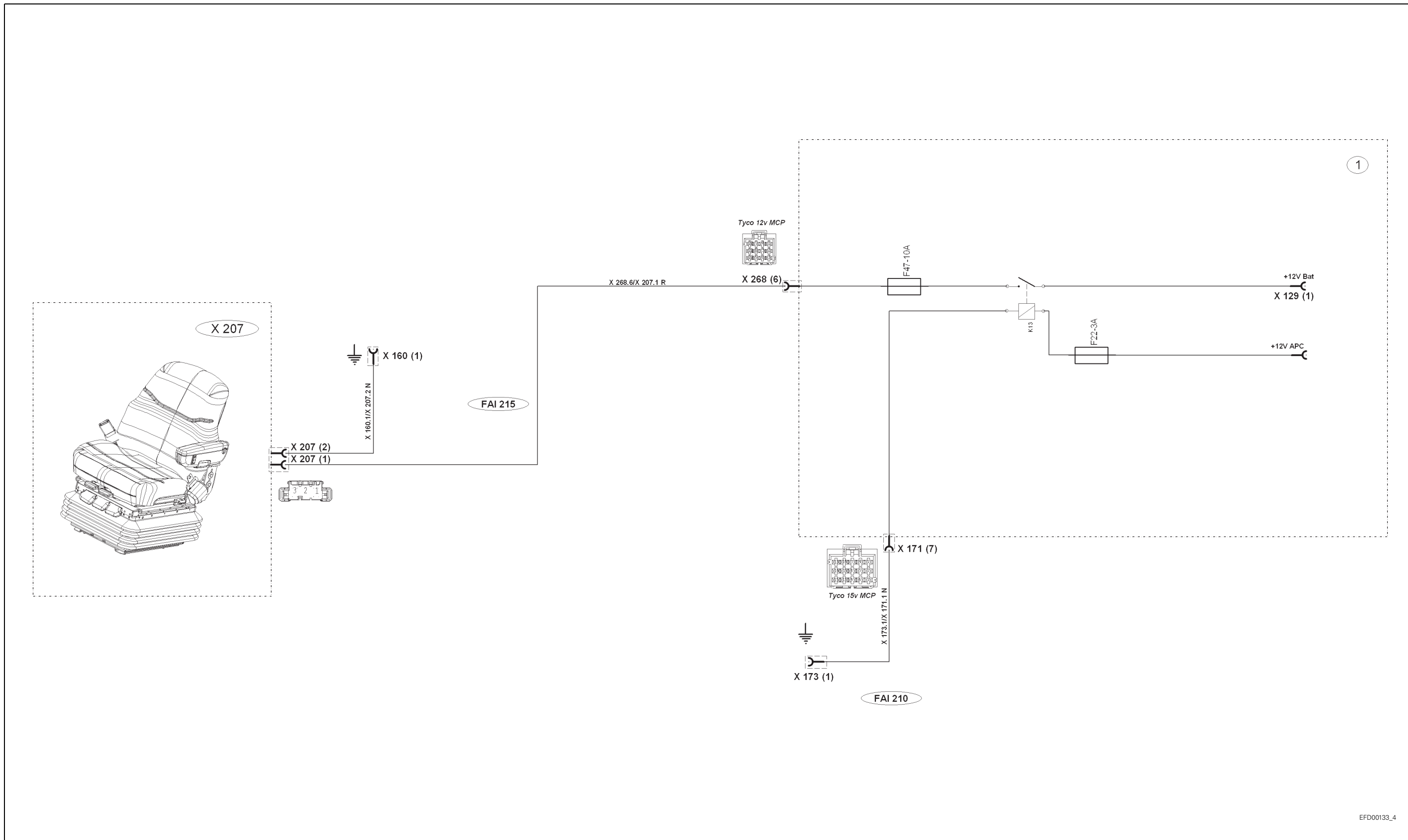


EFD00132\_3

Fig. 24



A.26 Pneumatic seat adjustment control

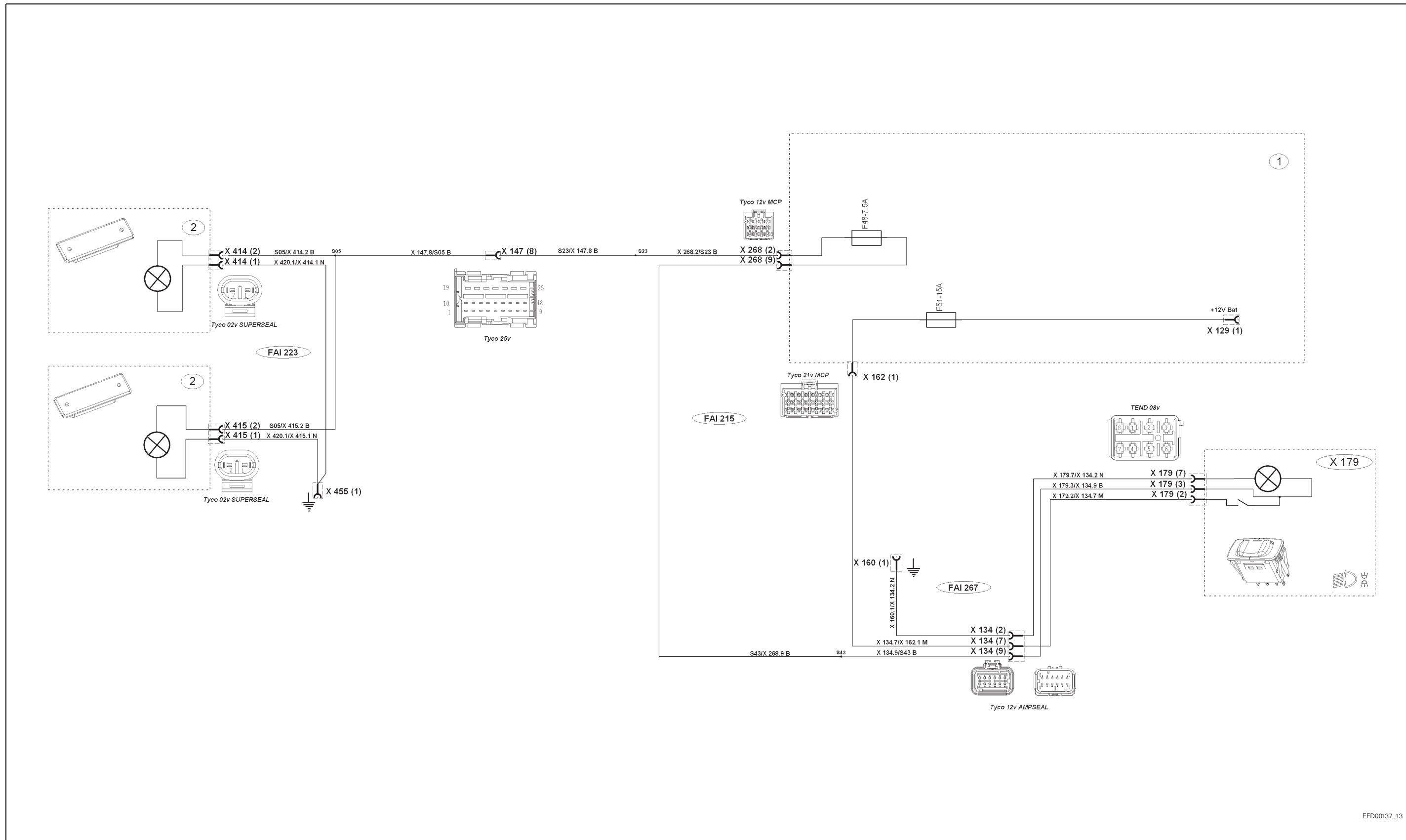


EFD00133\_4

Fig. 25



A.27 Number plate lighting

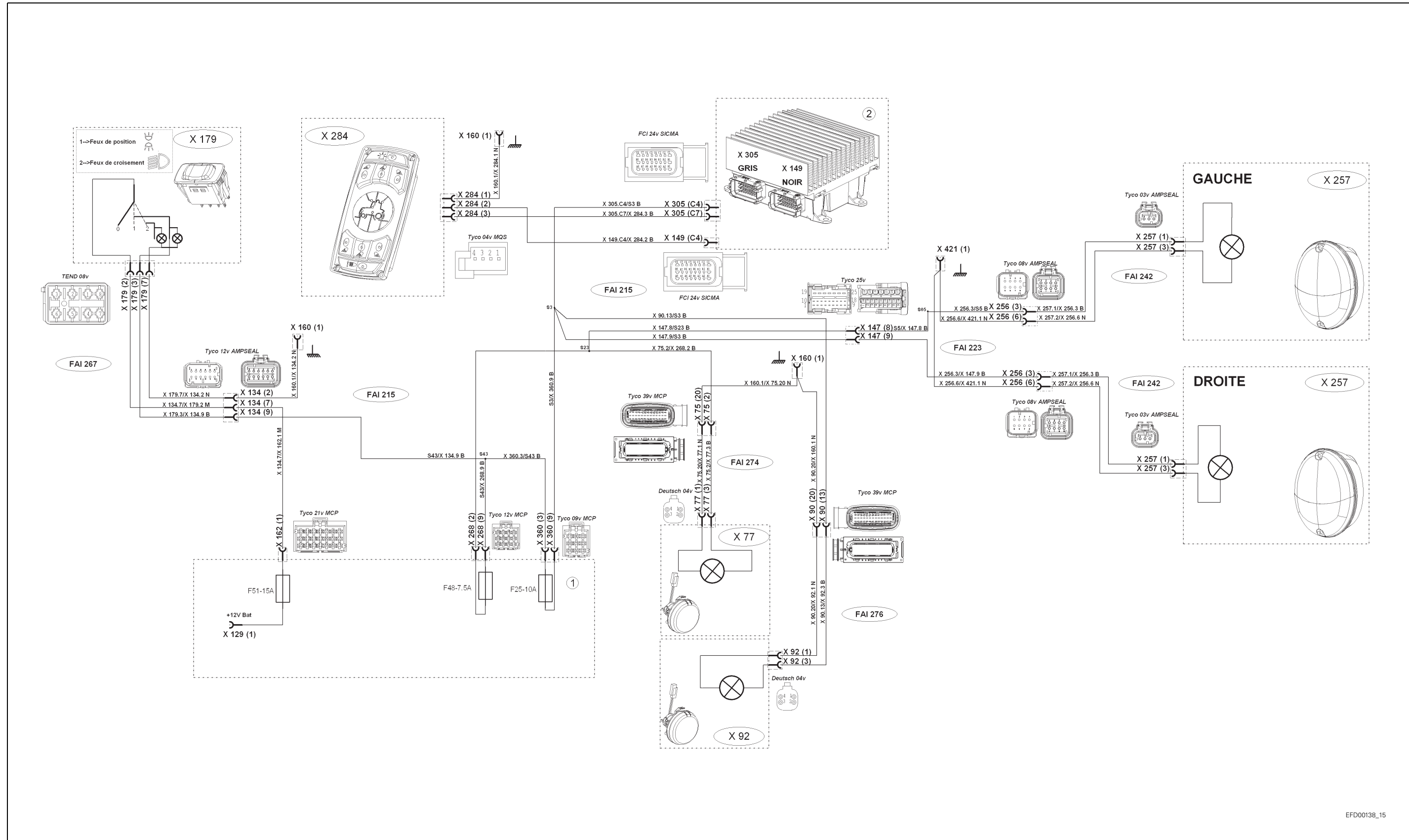


EFD000137\_13

Fig. 26



A.28 Side lights



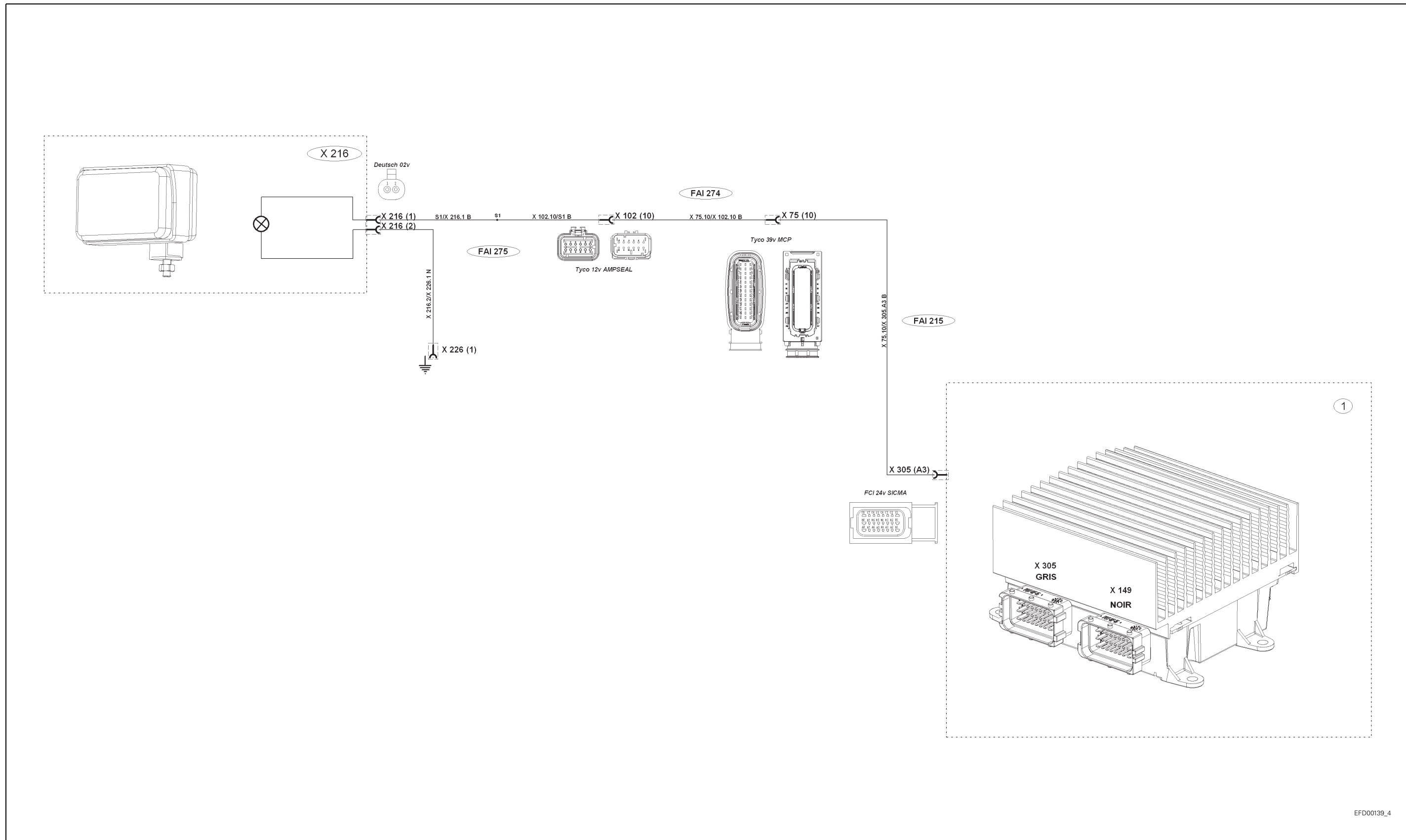
EFD00138\_15

Fig. 27





A.29 Reversing light

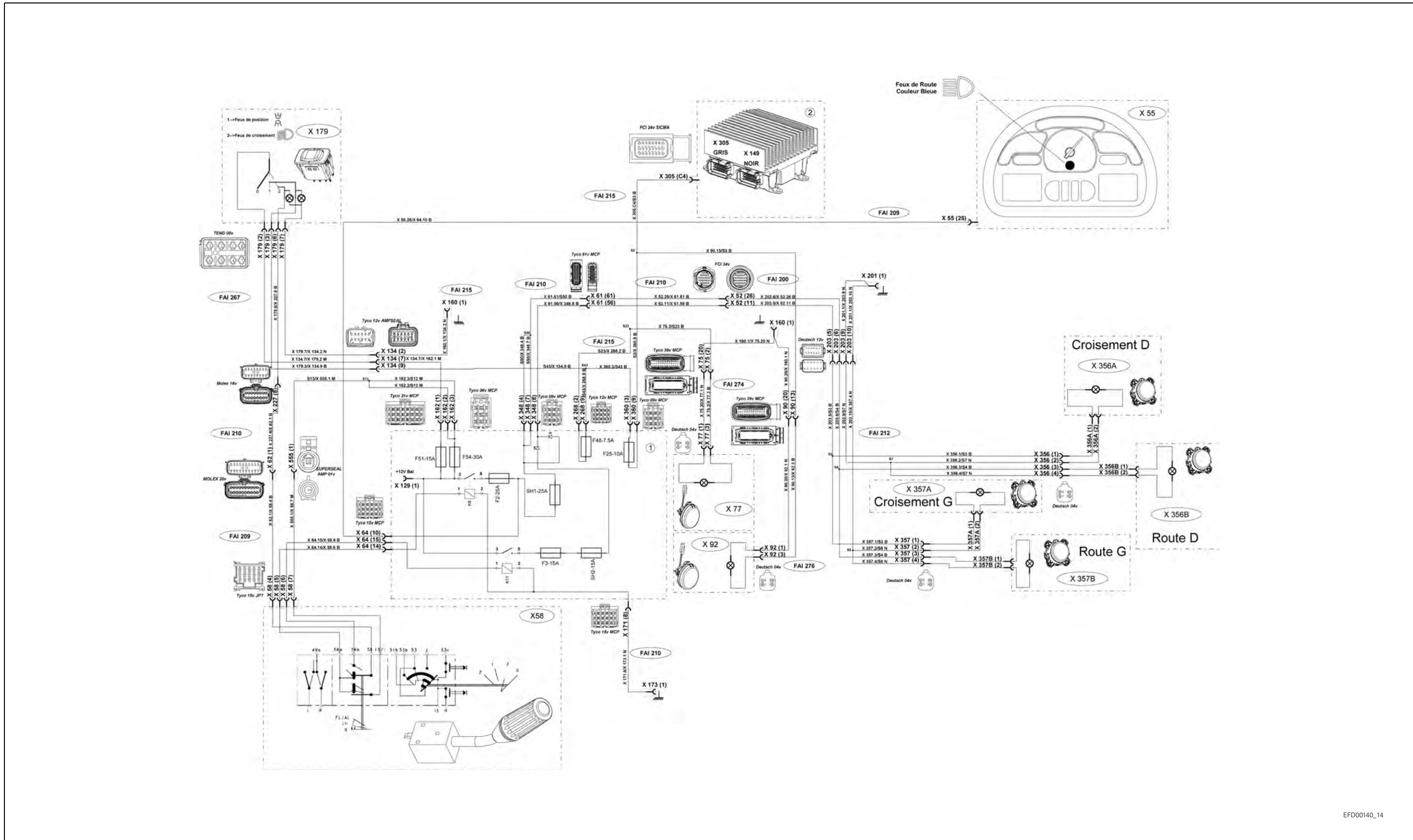


EFD00139\_4

Fig. 28



A.30 Main beams and dipped lights on grille

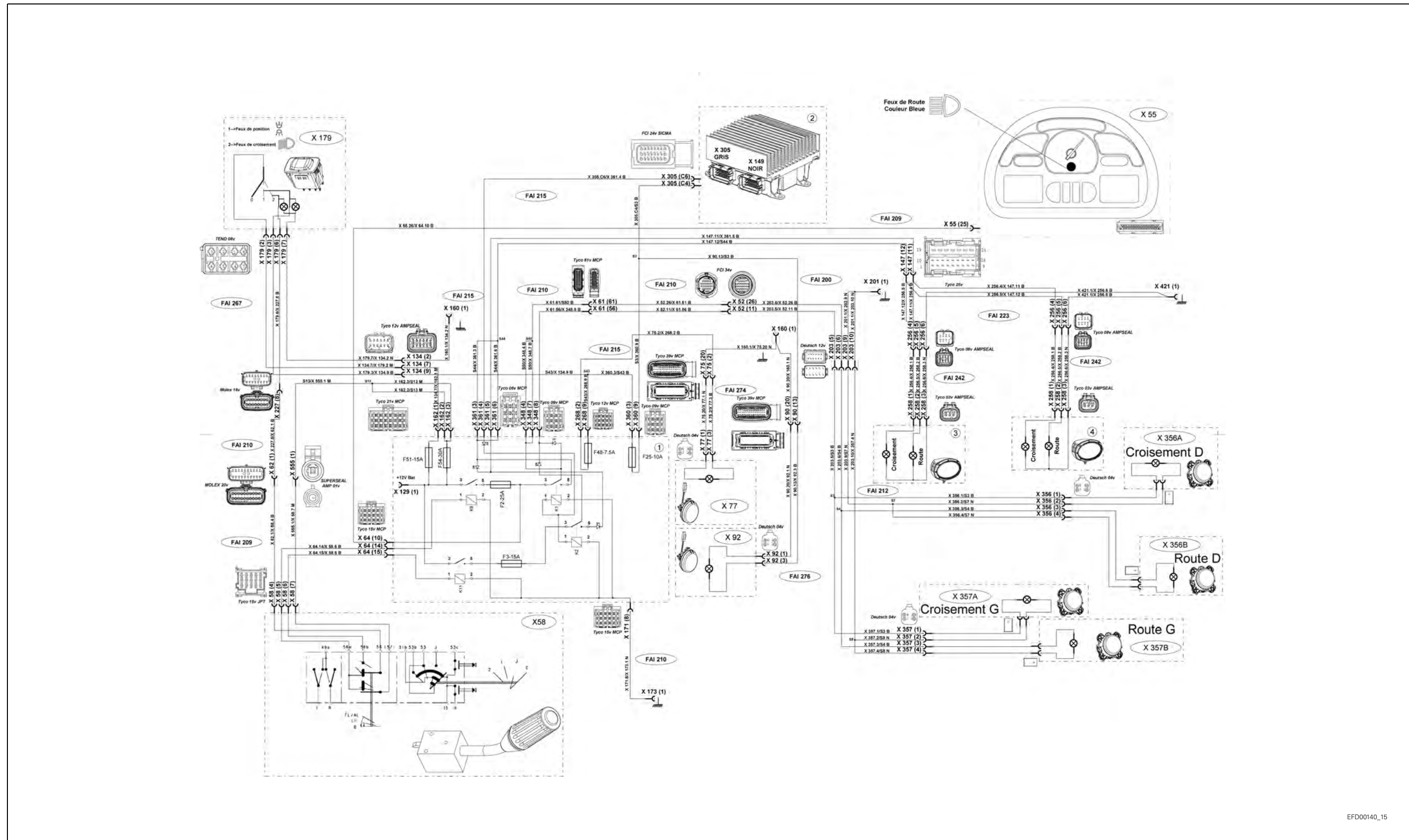


EFD00140\_14

Fig. 29



A.31 Main beams and dipped lights on grille and hand rail

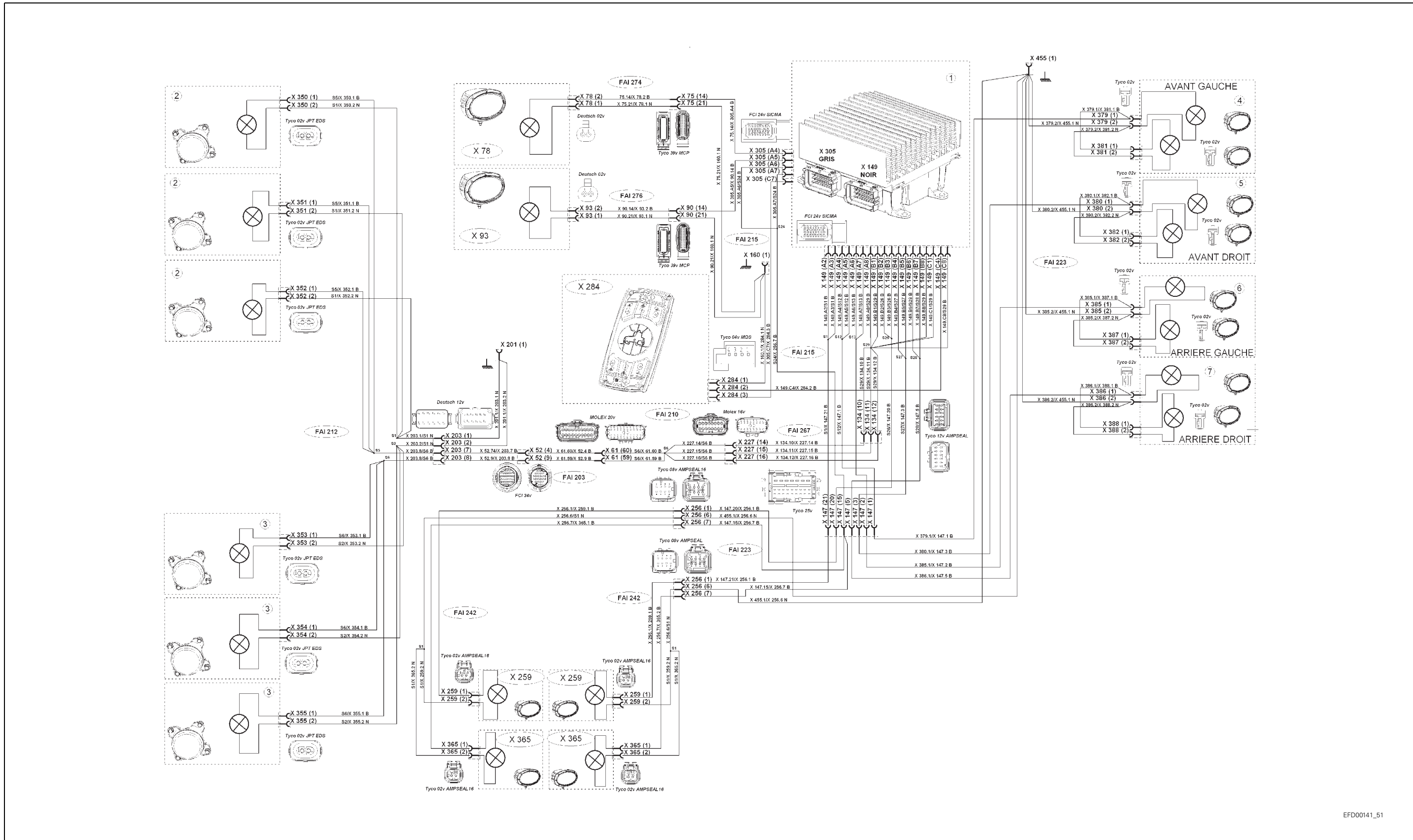


EFD00140\_15

Fig. 30



A.32 Work lights



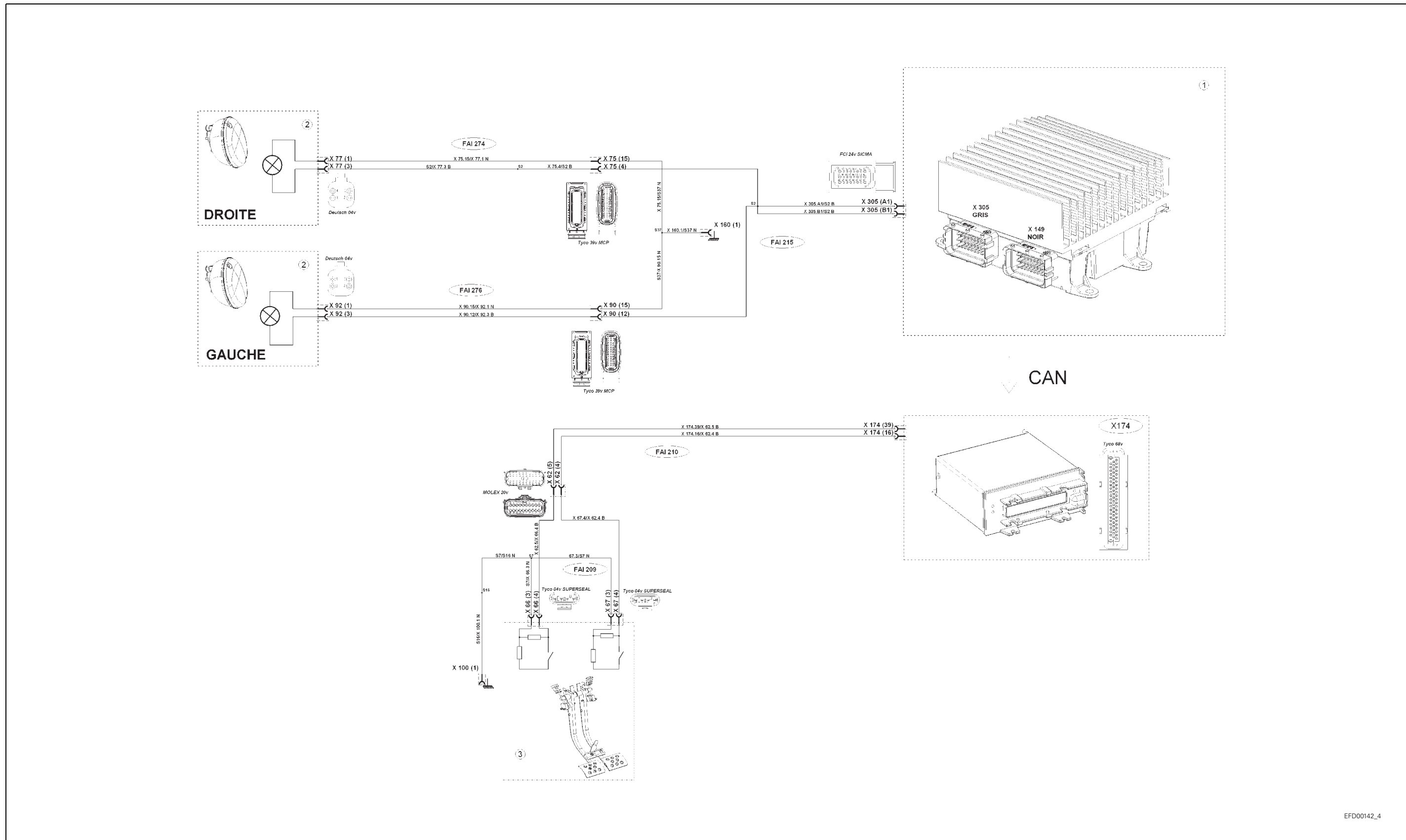
EFD00141\_51

Fig. 31





A.33 Stop lights

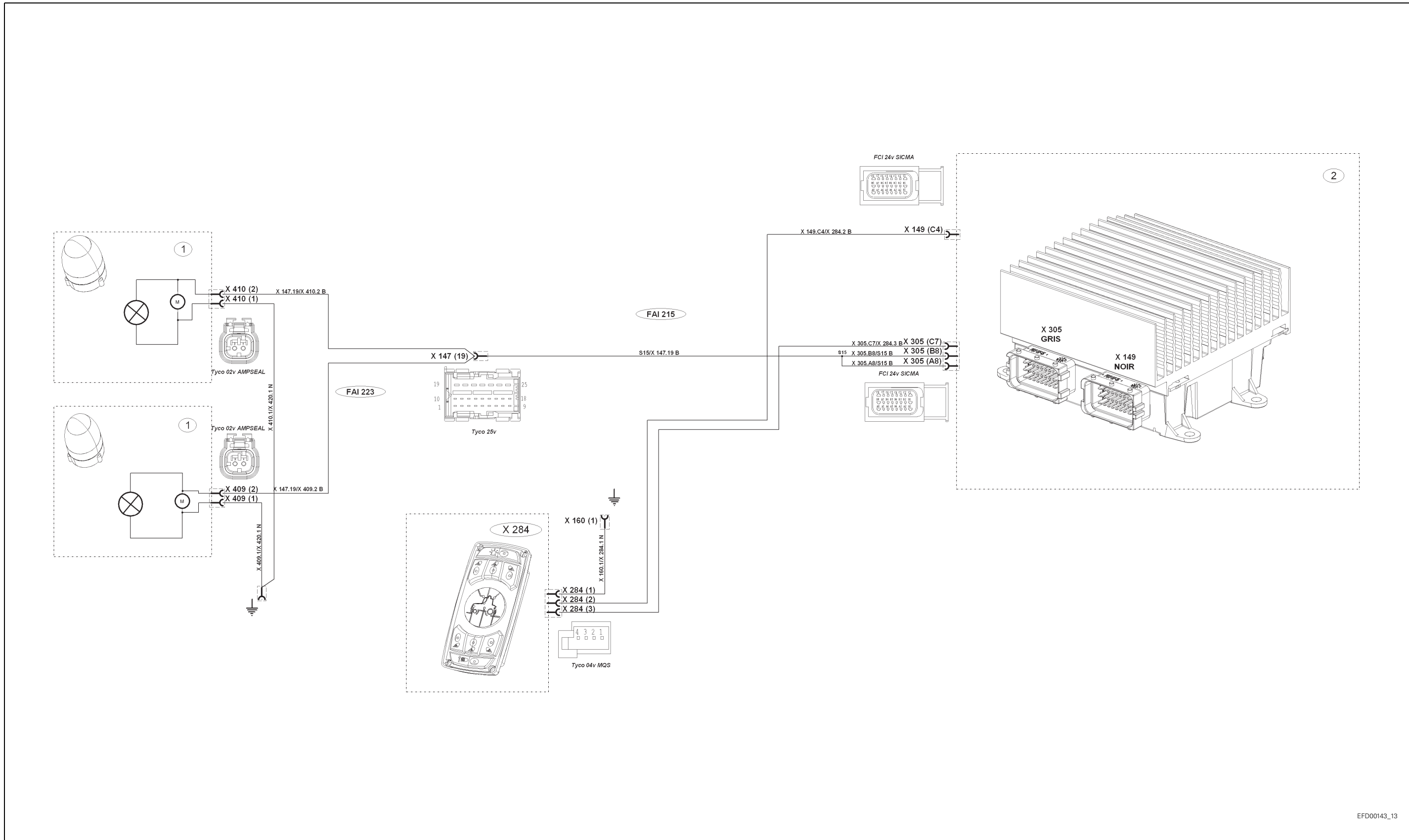


EFD00142\_4

Fig. 32



A.34 Rotary beacons

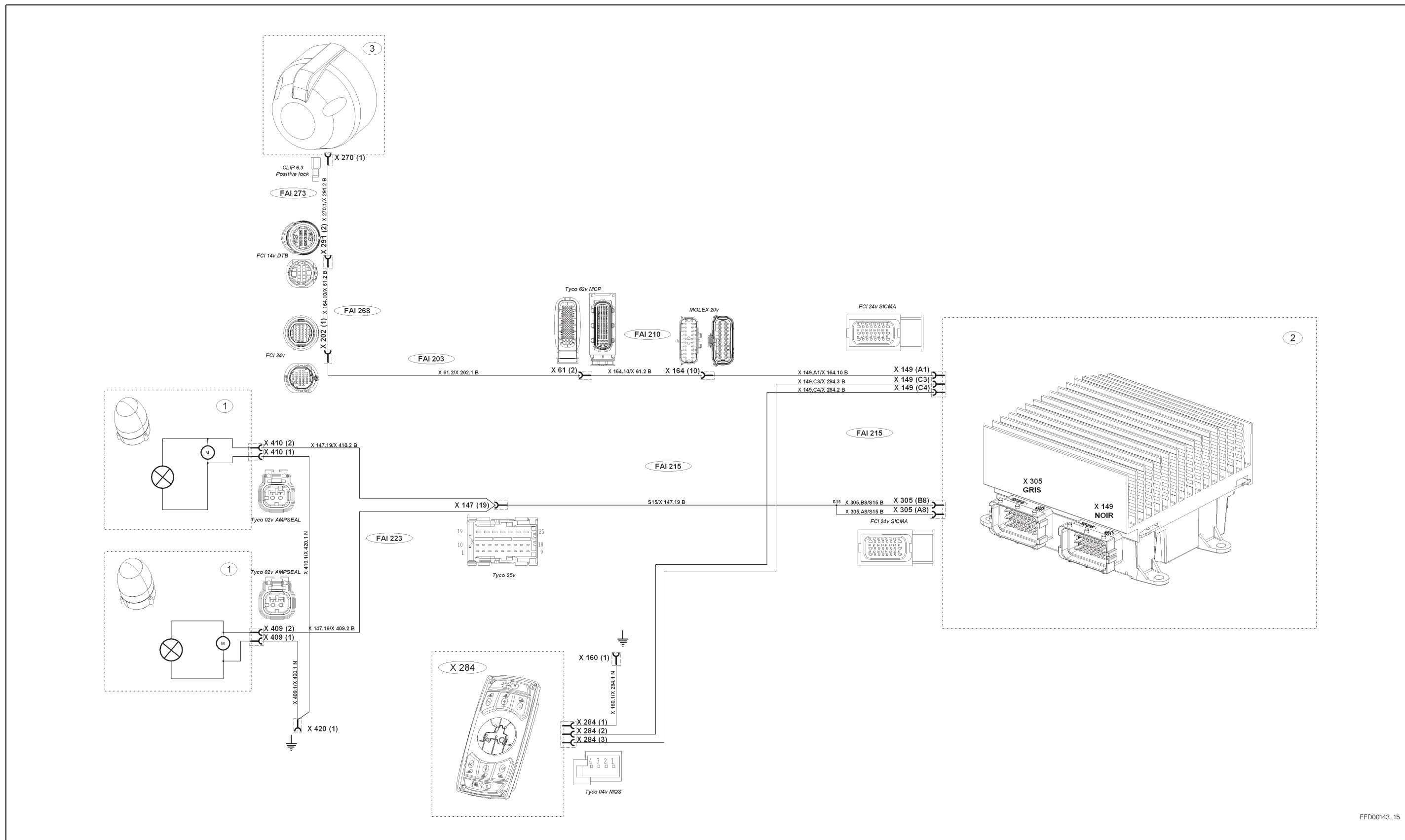


EFD00143\_13

Fig. 33



A.35 Rotary beacons and front accessory connection socket

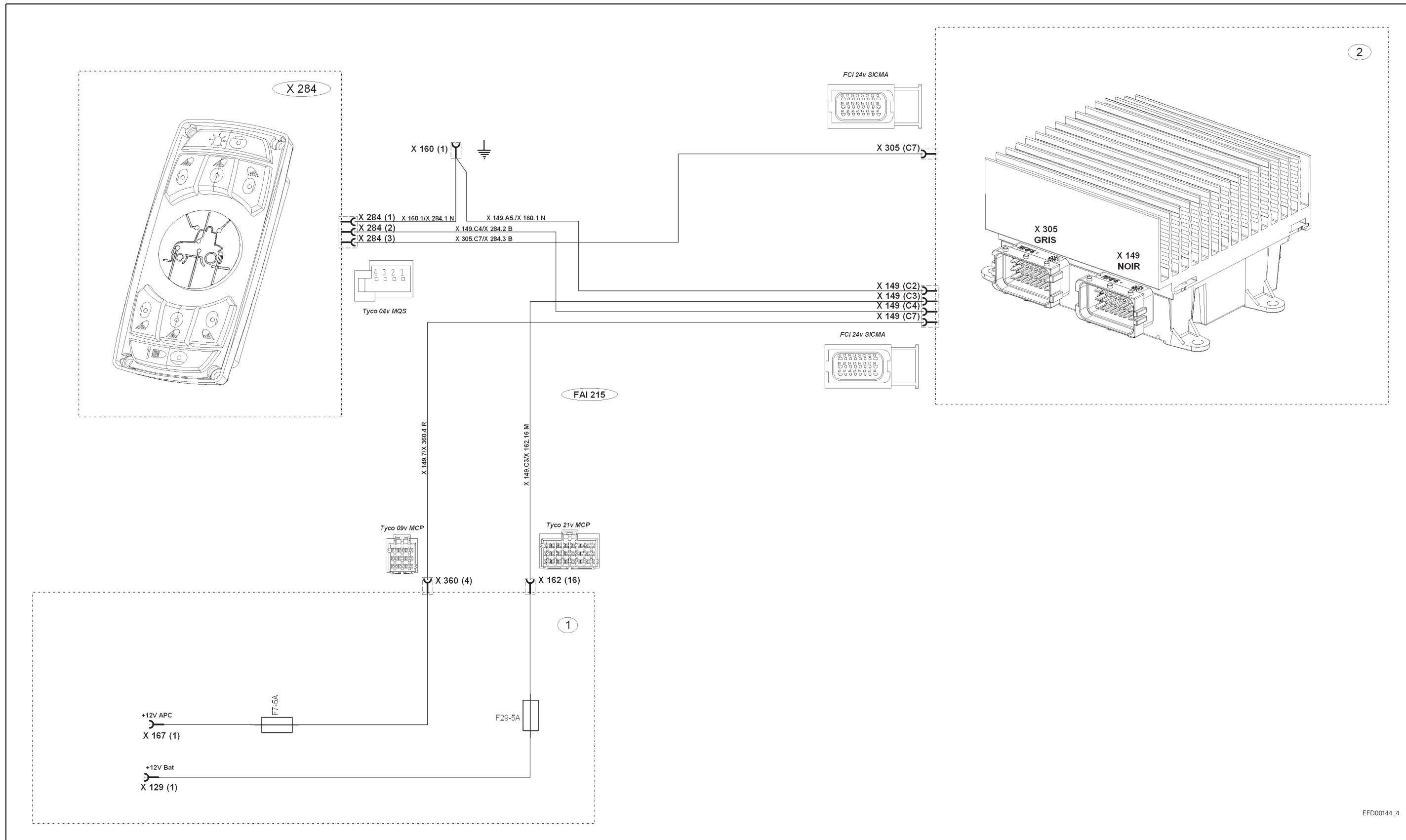


EFD00143\_15

Fig. 34



A.36 Headlights module electrical power supply



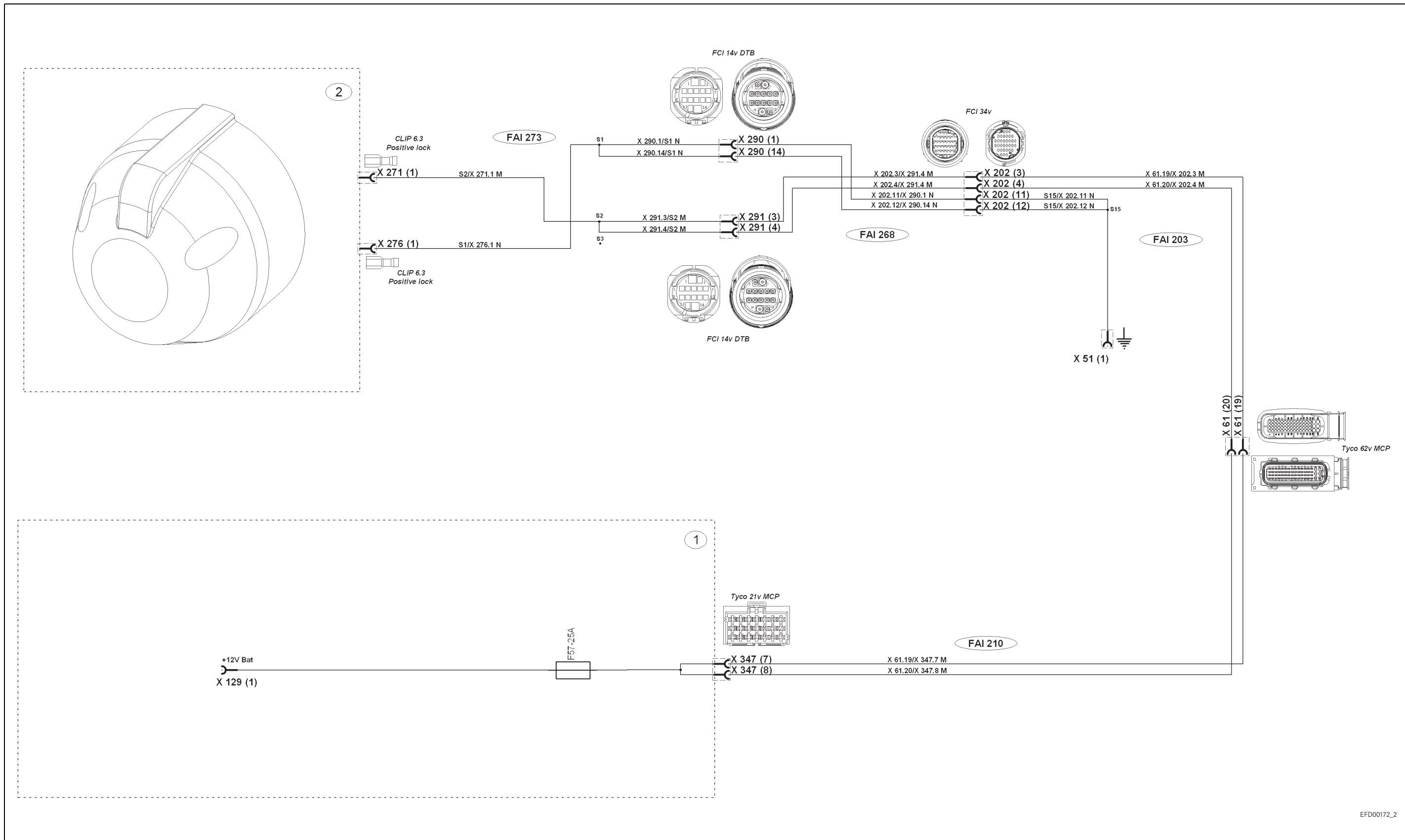
EFD00144\_4

Fig. 35





**A.37 Front accessory connection socket**



EFD00172\_2

Fig. 36



10A13

## **Electricity/Electronics - Layout of components**

### **TABLE OF CONTENTS**

A. Lighting - Layout of components .....91



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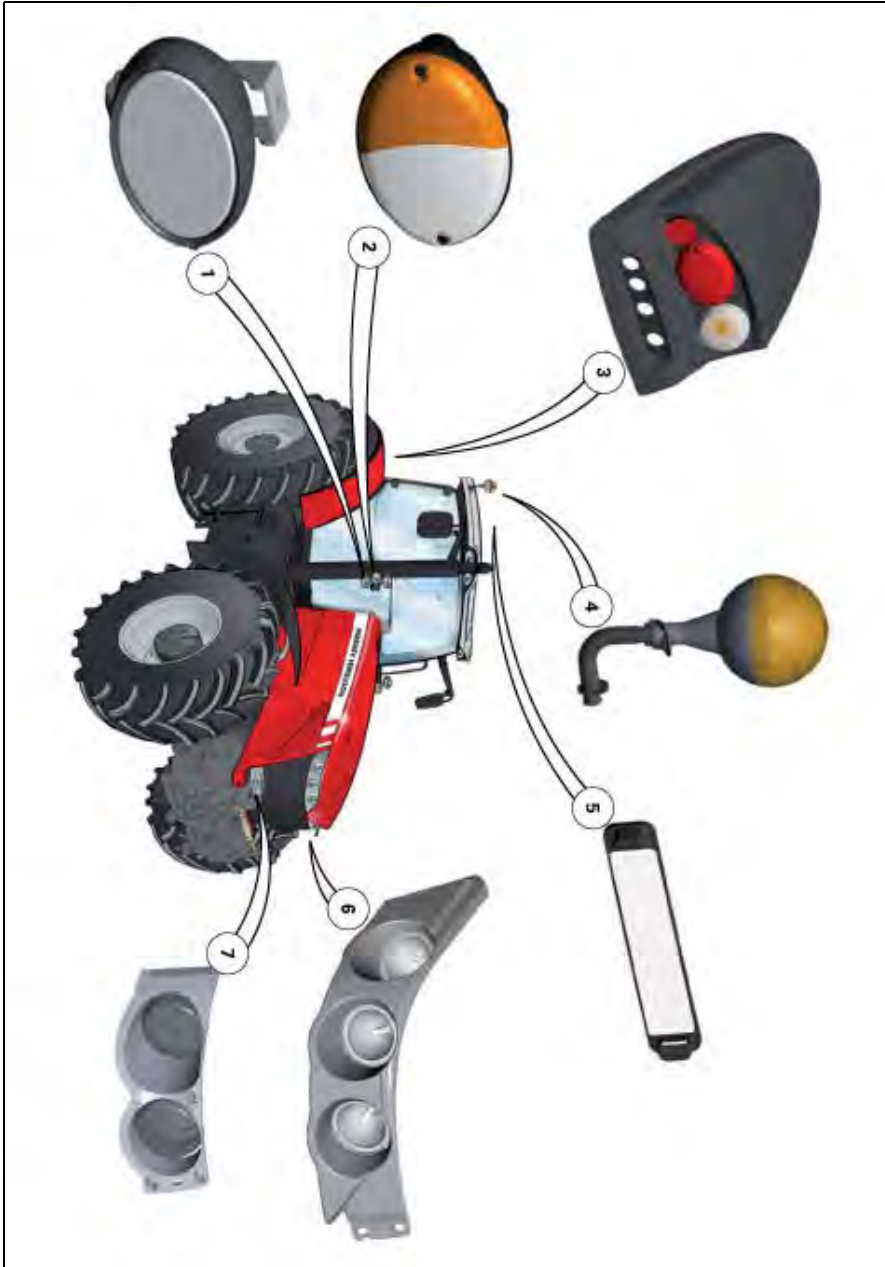
## **A. Lighting - Layout of components**

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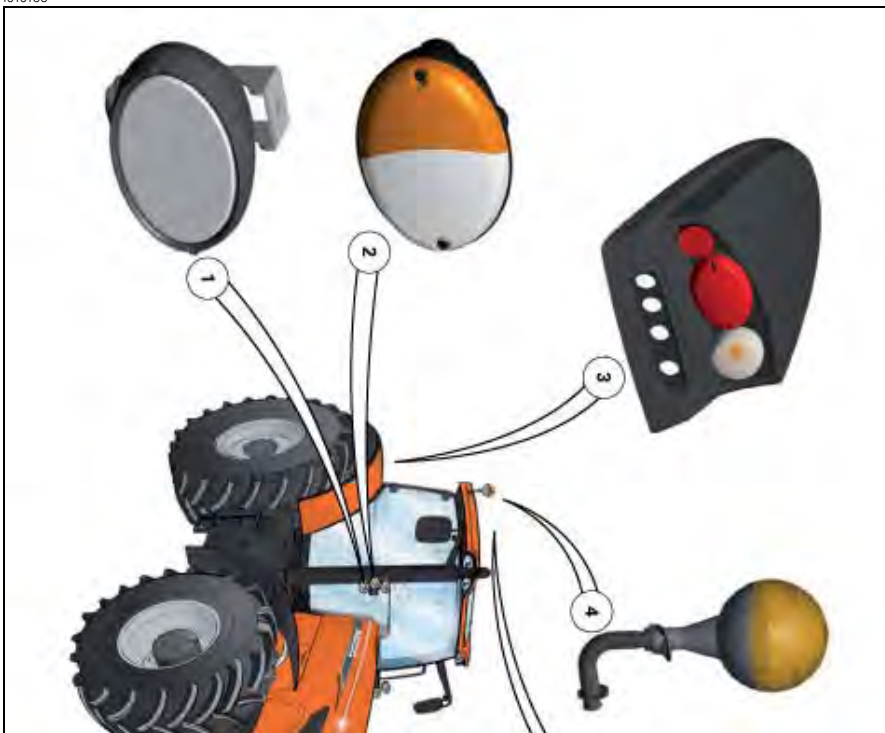
- 1- Work light: H3 55 W  
Xenon work light: HID DIS 35 W
- 2 Indicator: 21 W  
Side lights: 5 W
- 3 Indicator: 21 W  
Brake/side lights: 21 W / 5 W
- 4 Rotary beacon: H1 55 W
- 5 Number plate: 10 W
- 6 Work light: H9 65 W  
Work light: H3 55 W
- 7 Dipped lights: H7 55 W  
Side lights: 4 W  
Main beams: H7 55 W  
Main beams/dipped lights: H4 60 W / 55 W
- 8 Indicator extension: 21 W



Lighting system diagrams



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**TABLE OF CONTENTS**

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10B10

## **Fuse box - General**

### **TABLE OF CONTENTS**

A. General .....	107
B. Principles of operation .....	107



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## **A. General**

---

The fuse box is a printed circuit board that groups together the main fuses and relays protecting the electrical circuit on the tractor. The fuse box is linked to the positive and negative terminals of the battery. Each circuit is then supplied with power from the fuse box.

---

## **B. Principles of operation**

---

The fuse box protects the entire electrical circuit on the tractor against:

- short circuits
- overcurrents

In the event of a short circuit or overcurrent, the fuses open the circuit. Depending on the function to be supplied with power, the fuse can resist different currents.

The relays fitted in the fuse box provide control of functions that require strong currents, while limiting the current passing through the control circuit.



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**TABLE OF CONTENTS**

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10B12

## **Fuse box - Diagrams and plans**

### **TABLE OF CONTENTS**

A. Fuses ..... 113



## A. Fuses

Num.	Amp	Size	Protected function
F1	25 A	STD	Windscreen wiper control unit
F2	25 A	STD	Main beams
F3	15 A	Min.	Dipped lights on grille
F4	10 A	Min.	Implement connector on right-hand pillar without Isobus
F5	3 A	Min.	Start switch + ACC <sup>(1)</sup>
F6	3 A	Min.	K19 relay control circuit
F7	5 A	Min.	Lighting module + APC <sup>(2)</sup>
F8	10 A	Min.	Air conditioning compressor
F9	3 A	Min.	K21 relay control circuit
F10	5 A	Min.	instrument panel + APC <sup>(2)</sup>
F11	3 A	Min.	Brake switch
F12	10 A	Min.	instrument panel + APC <sup>(2)</sup>
F13	3 A	Min.	Not used
F14	3 A	Min.	Limp home mode switch
F15	7.5 A	Min.	Horn
F16	5 A	Min.	Fuse board earth
F17	10 A	Min.	Front connector + ACC <sup>(1)</sup>
F18	25 A	Min.	Not used
F19	7.5 A	Min.	Autotronic 5 linkage, Autotronic 4 and diagnostic connectors + APC <sup>(2)</sup>
F20	5 A	Min.	Auto-Guide + APC <sup>(2)</sup>
F21	5 A	Min.	Autotronic 4 + APC <sup>(2)</sup>
F22	3 A	Min.	K13 relay control circuit
F23	3 A	Min.	K12 relay control circuit
F24	3 A	Min.	Alternator + APC <sup>(2)</sup>
F25	10 A	Min.	Backlighting for console, cigarette lighter, lighting module, front right-hand and rear left-hand side lights
F26	5 A	Min.	Starter solenoid
F27	5 A	Min.	Electric battery isolator + APC <sup>(2)</sup>
F28	3 A	Min.	K10 relay control circuit
F29	5 A	Min.	Lighting module + BAT <sup>(3)</sup>
F30	15 A	Min.	Electric battery isolator + BAT <sup>(3)</sup>
F31	10 A	Min.	Radio + BAT <sup>(3)</sup>
F32	15 A	Min.	Rear windscreen wiper switch, rear windscreen wiper motor, extreme cold weather pump + BAT <sup>(3)</sup>
F33	50 A	Max.	Fuse board + APC <sup>(2)</sup>
F34	30 A	STD	Engine controller + BAT <sup>(3)</sup>
F35	10 A	Min.	Fuse board + ACC <sup>(1)</sup>
F36	7.5 A	Min.	Autotronic 5 linkage and Autotronic 5 suspended front axle/Park-Lock + BAT <sup>(3)</sup>
F37	5 A	Min.	Auto-Guide + BAT <sup>(3)</sup>
F38	5 A	Min.	instrument panel + BAT <sup>(3)</sup>
F39	10 A	Min.	Transmission actuator + BAT <sup>(3)</sup>
F40	15 A	Min.	Linkage + BAT <sup>(3)</sup>
F41	15 A	Min.	Cab suspension, Control Arm, ParkLock, Datatronic CCD + BAT <sup>(3)</sup>
F42	10 A	Min.	Throttle pedal shuttle, PTO stop on fenders, ignition key, clutch pedal + BAT <sup>(3)</sup>

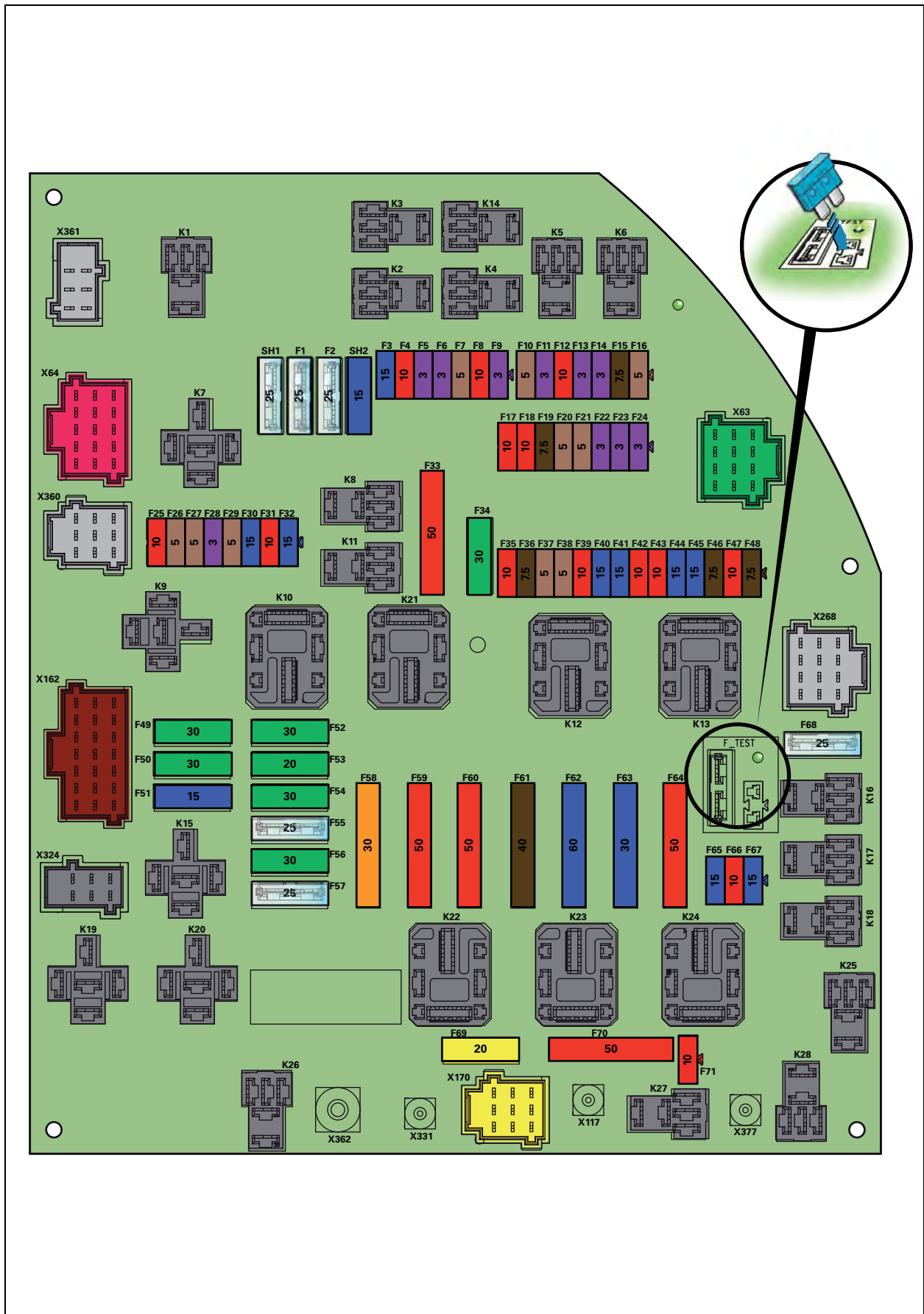
Num.	Amp	Size	Protected function
F43	10 A	Min.	Electrohydraulic spool valves + BAT <sup>(3)</sup>
F44	15 A	Min.	Fuel preheater + BAT <sup>(3)</sup>
F45	15 A	Min.	Heating to feet + BAT <sup>(3)</sup>
F46	7.5 A	Min.	Electric rear-view mirrors + BAT <sup>(3)</sup>
F47	10 A	Min.	Pneumatic seat + BAT <sup>(3)</sup>
F48	7.5 A	Min.	Backlighting for the instrument panel, left-hand front and right-hand rear side lights
F49	30 A	STD	Cigarette lighter, roof light, radio + BAT <sup>(3)</sup>
F50	30 A	STD	Trailer connector + BAT <sup>(3)</sup>
F51	15 A	STD	Dipped lights and side lights + BAT <sup>(3)</sup>
F52	30 A	STD	Right-hand pillar power socket + BAT <sup>(3)</sup>
F53	20 A	STD	+ BAT <sup>(3)</sup> to the lighting module for work lights in grille
F54	30 A	STD	Front right-hand fender power socket + BAT <sup>(3)</sup>
F55	25 A	STD	Not used
F56	30 A	STD	Engine controller + BAT <sup>(3)</sup>
F57	25 A	STD	Front linkage power socket + BAT <sup>(3)</sup>
F58	30 A	Max.	+ BAT <sup>(3)</sup> to the lighting module for the indicator lights and brake lights
F59	50 A	Max.	Autotronic 4 + BAT <sup>(3)</sup>
F60	50 A	Max.	Ventilation and additional ventilation + BAT <sup>(3)</sup>
F61	40 A	Max.	+ BAT <sup>(3)</sup> to the lighting module for the front/rear/step/hand rail work lights and reversing light
F62	60 A	Max.	Isobus connector + BAT <sup>(3)</sup>
F63	30 A	Max.	+ BAT <sup>(3)</sup> to the lighting module for the work lights in the roof
F64	50 A	Max.	Not used
F65	15 A	Min.	Fuel lift pump + BAT <sup>(3)</sup>
F66	10 A	Min.	Power socket + APC <sup>(2)</sup>
F67	15 A	Min.	Auxiliary spool valves, FingerTIP and joystick + BAT <sup>(3)</sup>
F68	25 A	STD	Not used
F69	20 A	STD	Additional ventilation + BAT <sup>(3)</sup>
F70	50 A	Max.	Isobus connector + BAT <sup>(3)</sup>
F71	10 A	Min.	Isobus connector + BAT <sup>(3)</sup>
SH1	25 A	STD	K1 relay control circuit
SH2	15 A	STD	K2 relay control circuit
K1			Main beam relay (hand rail and grille)
K2			Dipped lights relay (hand rail and grille)
K3			Air conditioning compressor relay
K4			Tractor accessories + ACC <sup>(1)</sup> relay
K5			Electrohydraulic spool valve relay
K6			Dyna-VT coupler solenoid valve and limp home mode switch relay
K7			Front windscreen wiper relay (motor and control unit)
K8			Main beams relay
K9			Right-hand pillar power socket relay
K10			Windscreen wiper control unit, radio, extreme cold weather pump and rear windscreen wiper (motor and switch) relay
K11			Dipped lights control unit relay
K12			Throttle pedal shuttle, PTO stop on fenders, ignition key, clutch pedal relay
K13			Heating to feet, fuel preheater, pneumatic seat, electric rear-view mirrors relay

Num.	Amp	Size	Protected function
K14			Battery isolator + ACC <sup>(1)</sup> relay
K15			Not used
K16			Not used
K17			Relay for the 4th spool valve function of the joystick
K18			Relay for the 3rd spool valve function of the joystick
K19			Engine controller relay
K20			Engine controller relay
K21			Fuse board + APC <sup>(2)</sup> relay
K22			Ventilation and additional ventilation relay
K23			Isobus connector relay
K24			Not used
K25			Fuel lift pump relay
K26			Not used
K27			Not used
K28			Power socket + APC <sup>(2)</sup> relay

(1) + ACC = + 12 V accessories

(2) + APC = + 12 V ignition on

(3) + BAT = + 12 V batteries



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Fig. 1

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## **Fuse box - Layout of components**

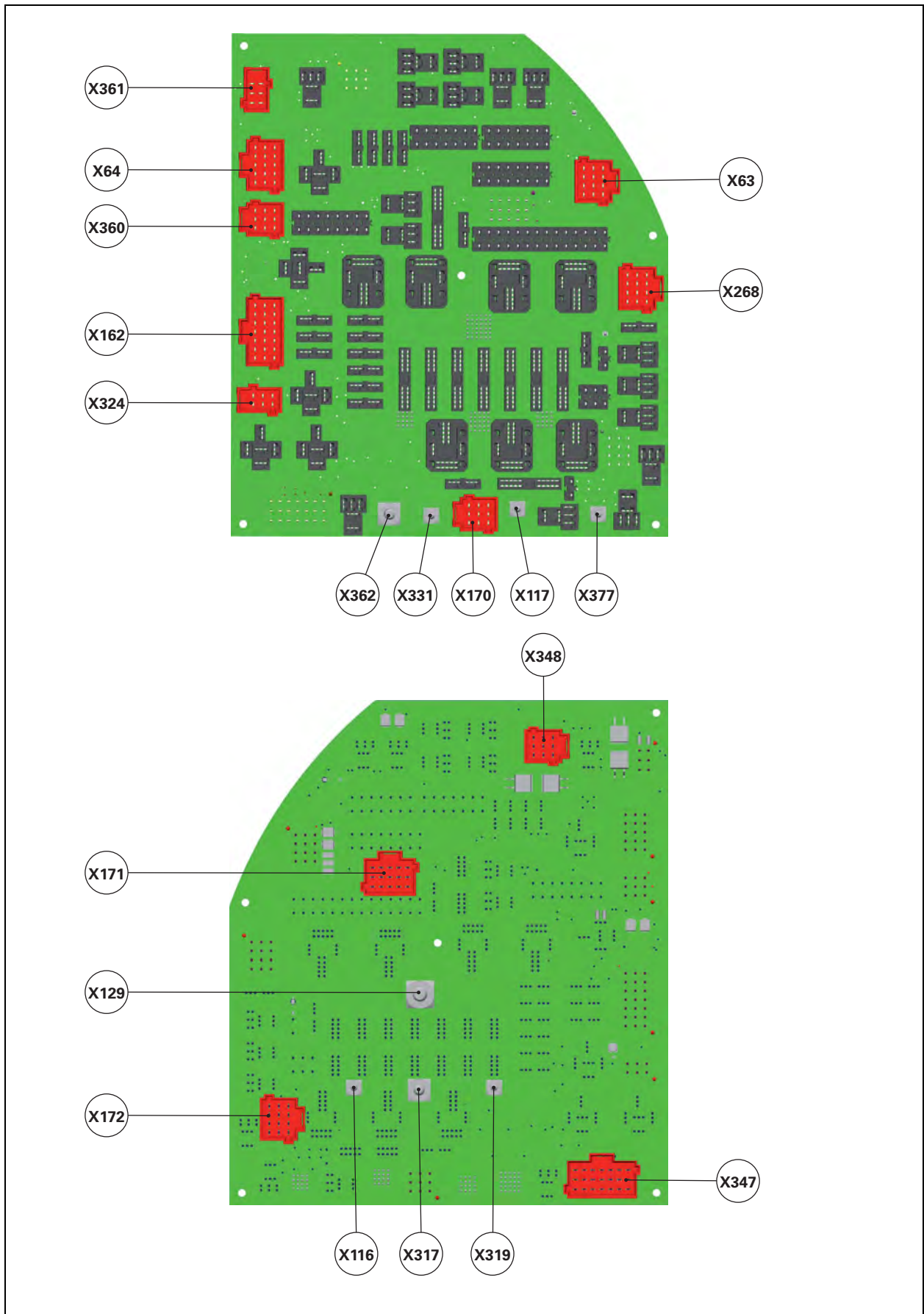
### **TABLE OF CONTENTS**

A. Fuse box: Layout of components.....	119
--	-----





**A. Fuse box: Layout of components**



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Fig. 1

63	Instrument panel harness connection on fuse box
64	Instrument panel harness connection on fuse box
116	+12 V supply for headlights module
117	+12 V supply for Isobus
129	+12 V connection for batteries/fuse box
162	Pillar harness connection on fuse box
170	Pillar harness connection on fuse box
171	Cab transmission harness connection on fuse box
172	Cab transmission harness connection on fuse box
268	Pillar harness connection on fuse box
317	+12 V supply for headlights module
319	+12 V supply for headlights module
324	+12 V APC connector for fuse box/battery isolator switch
331	Pillar harness connection on fuse box
347	Cab transmission harness connection on fuse box
348	Cab transmission harness connection on fuse box
360	Pillar harness connection on fuse box
361	Pillar harness connection on fuse box
362	+12 V supply for transmission
377	Fuse box (supply for cab suspension compressor)
	Not used



10B14

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10B15

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**TABLE OF CONTENTS**

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10B16

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10B17

## **Fuse box - Disassembly and reassembly**

### **TABLE OF CONTENTS**

A. Removing/refitting the fuse board.....	131
---	-----



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## A. Removing/refitting the fuse board

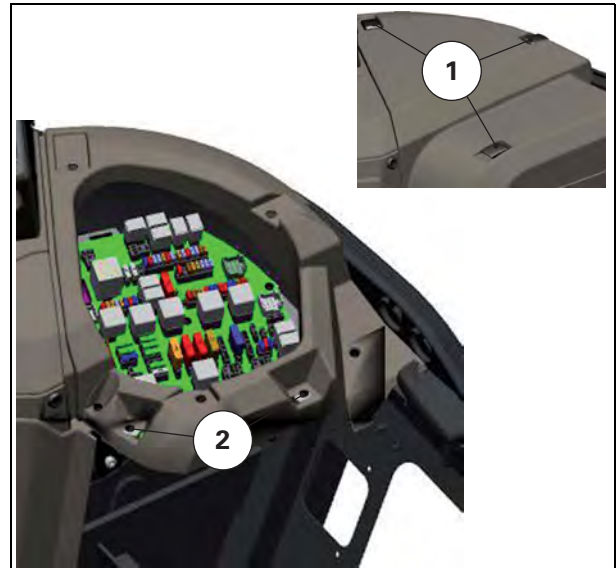
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### *Removing the fuse board*

1. Disconnect the batteries.
2. Remove the locks (1) and remove the fuse box cover.
3. Remove the screws (2) and the lining under the fuse box.
4. Remove the fuse board screws.
5. Mark the position of the connections on the fuse box and disconnect them.
6. Remove the fuse board.

### *Refitting the fuse board*

7. Refit the fuse board.
8. Connect the connections to the fuse box.
9. Refit the screws.
10. Refit the lining.
11. Reconnect the batteries.
12. Check the whole tractor for correct operation.



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Fig. 1



10B18

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10C10

## **Alternator - General**

### **TABLE OF CONTENTS**



10C11

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**TABLE OF CONTENTS**



10C12

## **Alternator - Diagrams and plans**

### **TABLE OF CONTENTS**

A. Electrical diagrams. . . . . 141



## A. Electrical diagrams

### A.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

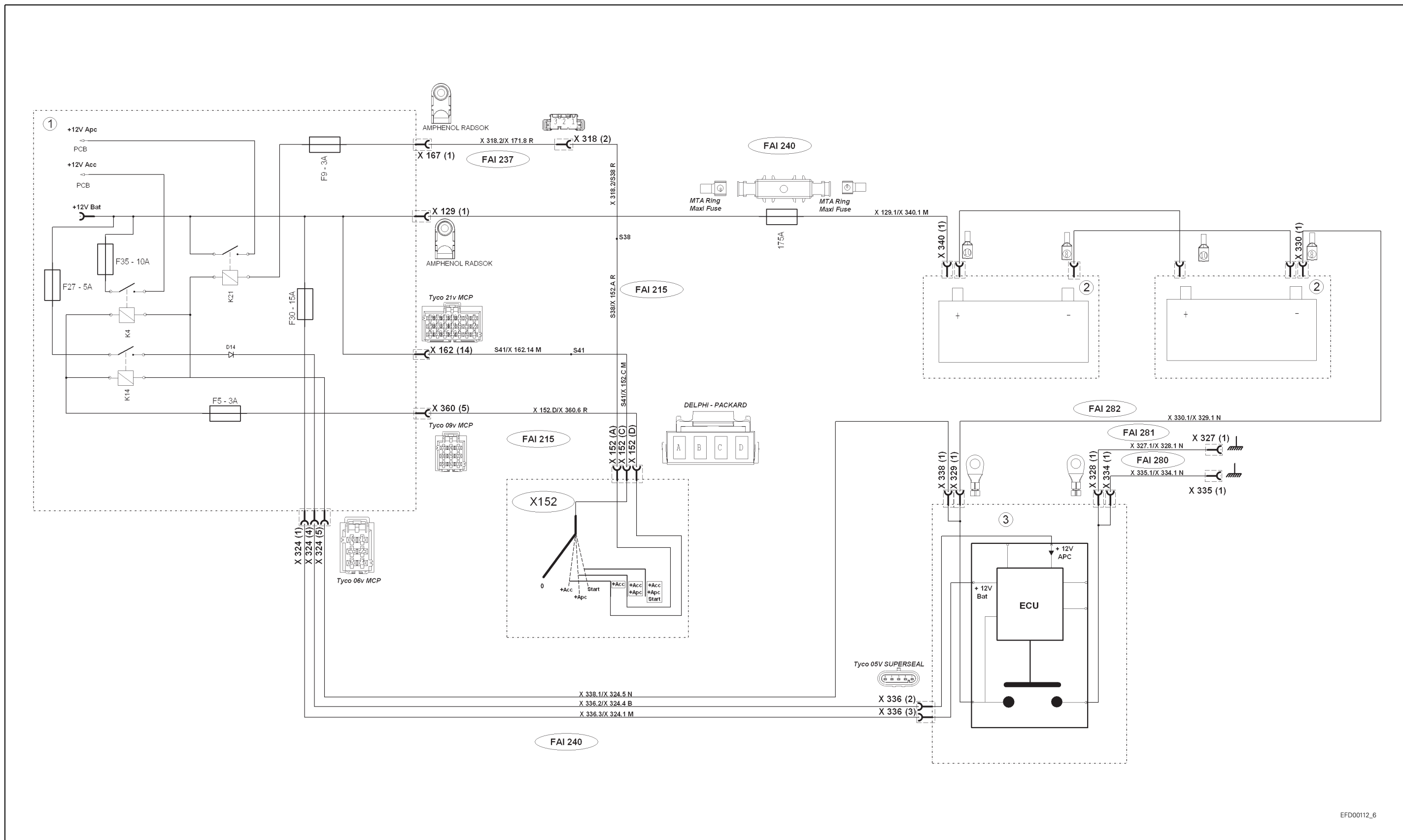
**FAI283** - TopDock harness

**FAIxxx** - Non-Isobus tool connector harness

**FAIxxx** - Non-Isobus implement connector controller harness

**FAIxxx** - Additional fan harness

A.2 Fuse box supply with circuit breaker

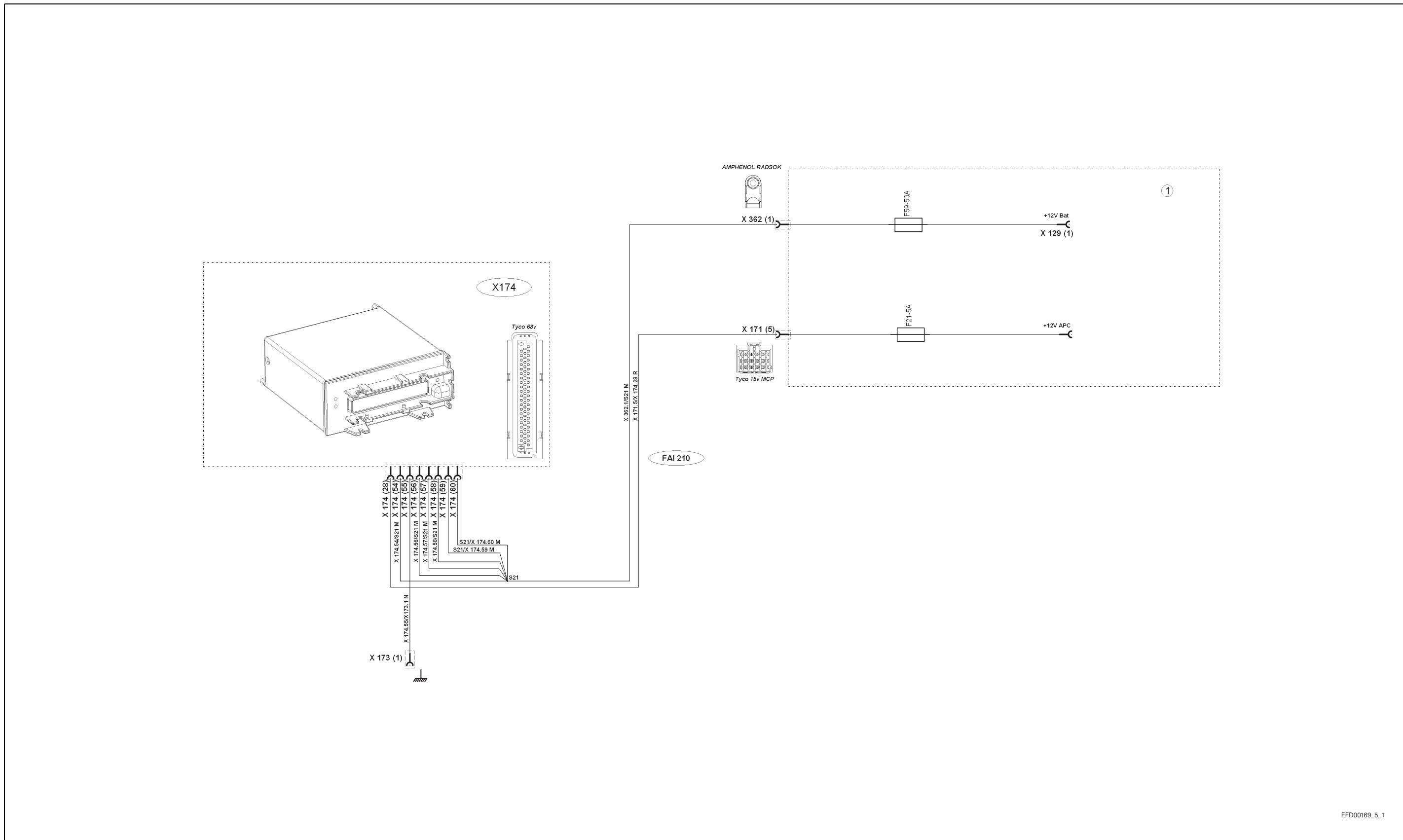


EFD00112\_6

Fig. 1



A.3 Autotronic 4 electrical power supply



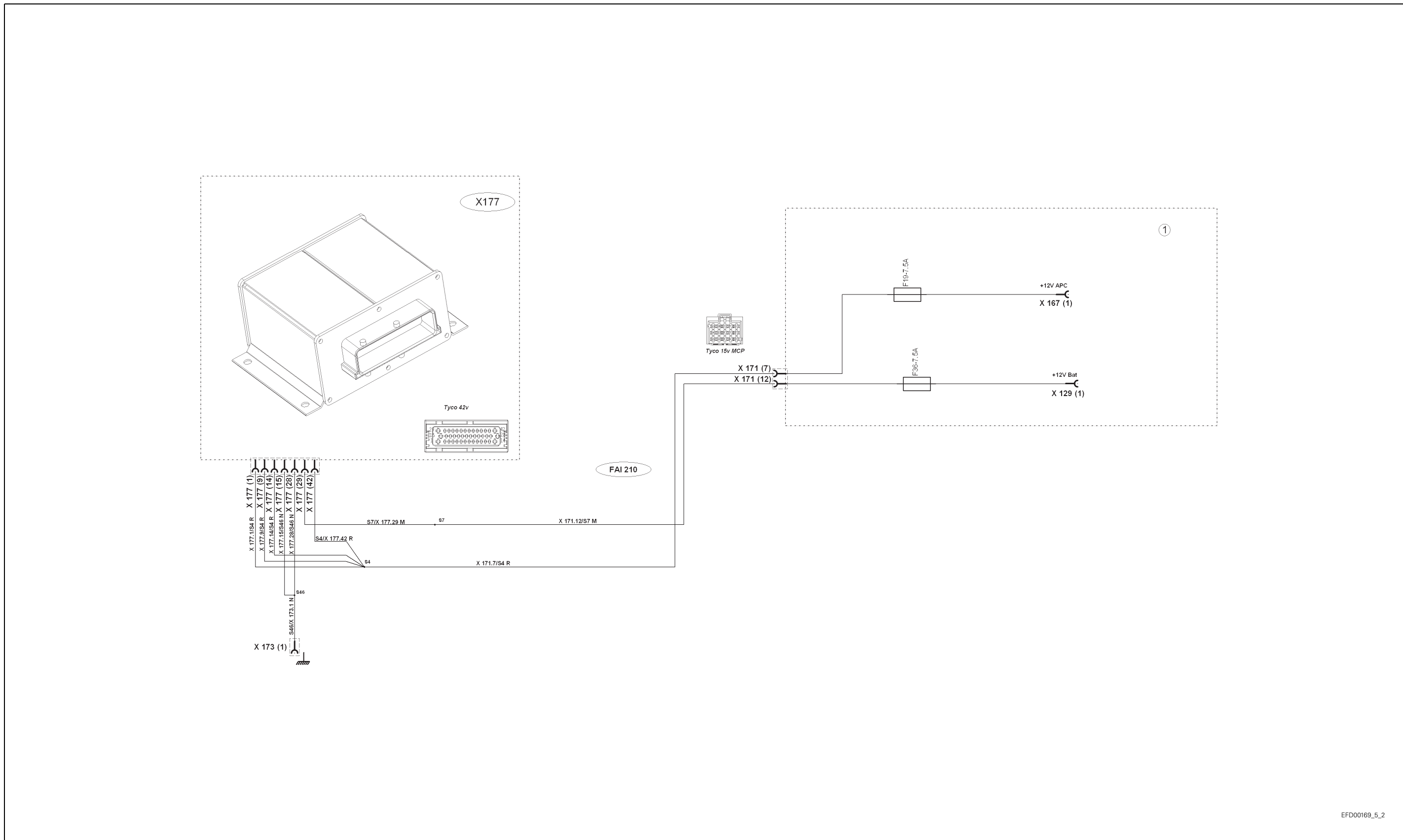
EFD00169\_5\_1

Fig. 2





A.4 Autotronic 5 linkage electrical power supply

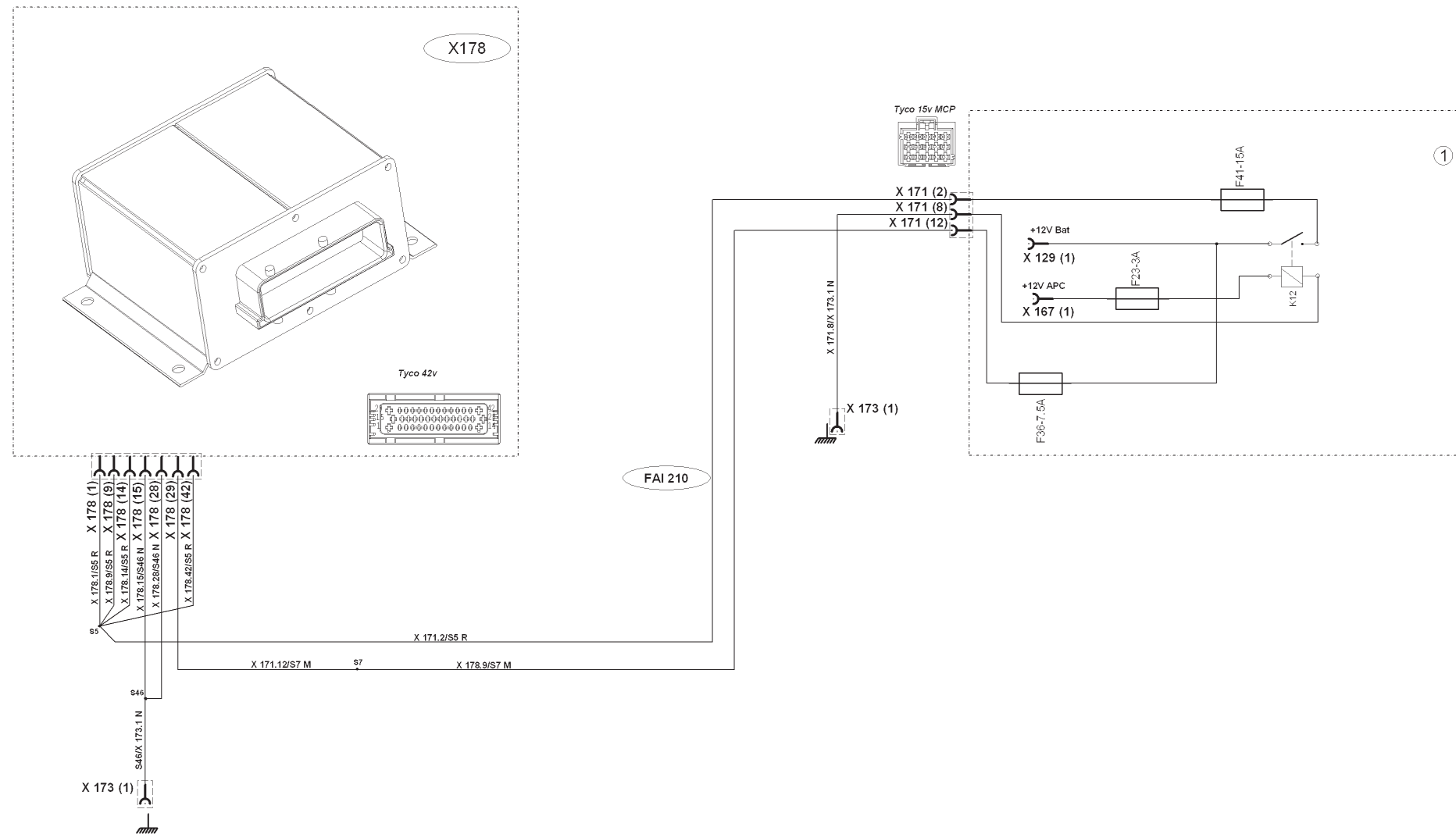


EFD00169\_5\_2

Fig. 3



**A.5 Autotronic 5 ParkLock/suspended front axle electrical power supply**

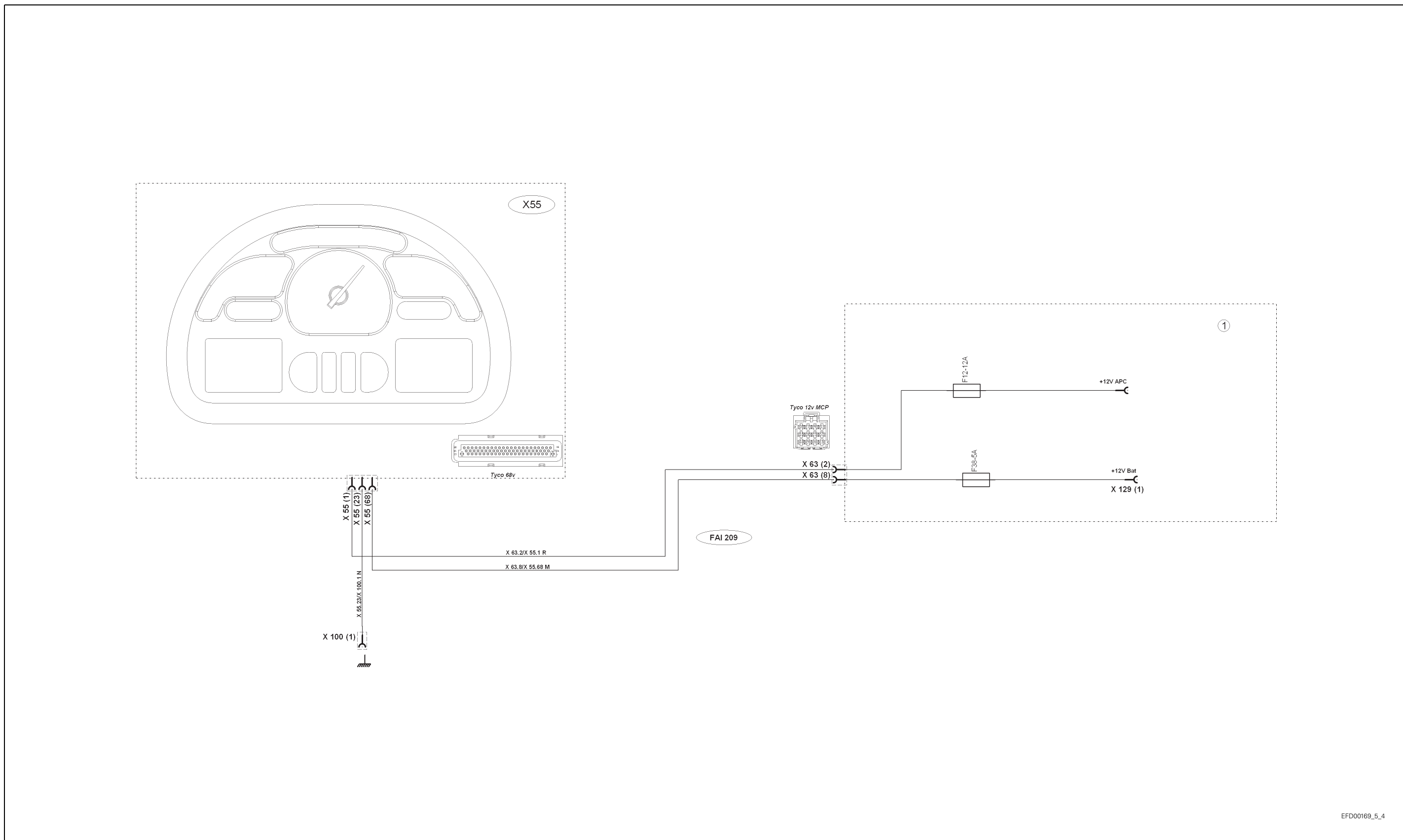


EFD00169\_5\_3

Fig. 4



A.6 DCC3 instrument panel electrical power supply

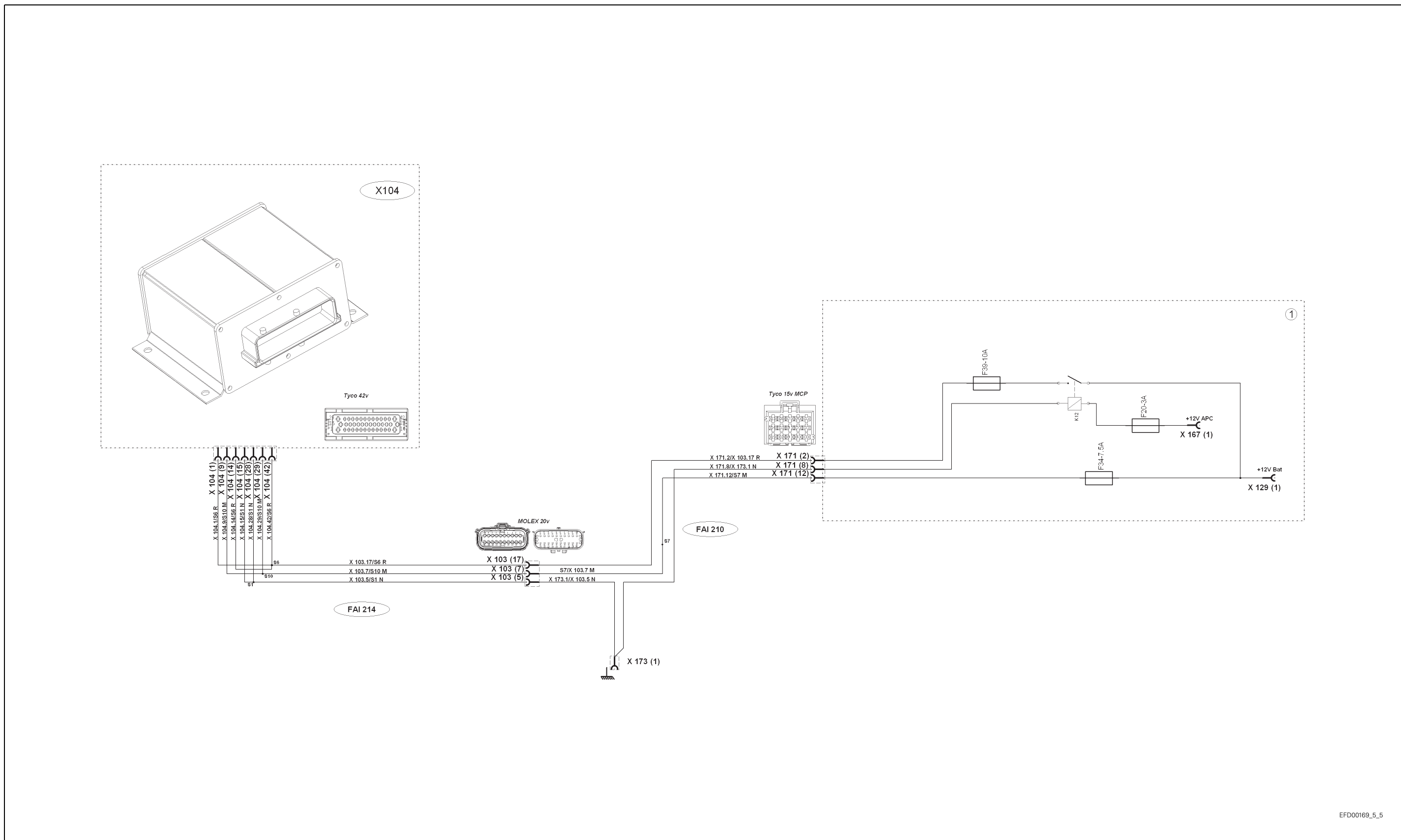


EFD00169\_5\_4

Fig. 5



A.7 Autotronic 5 armrest electrical power supply



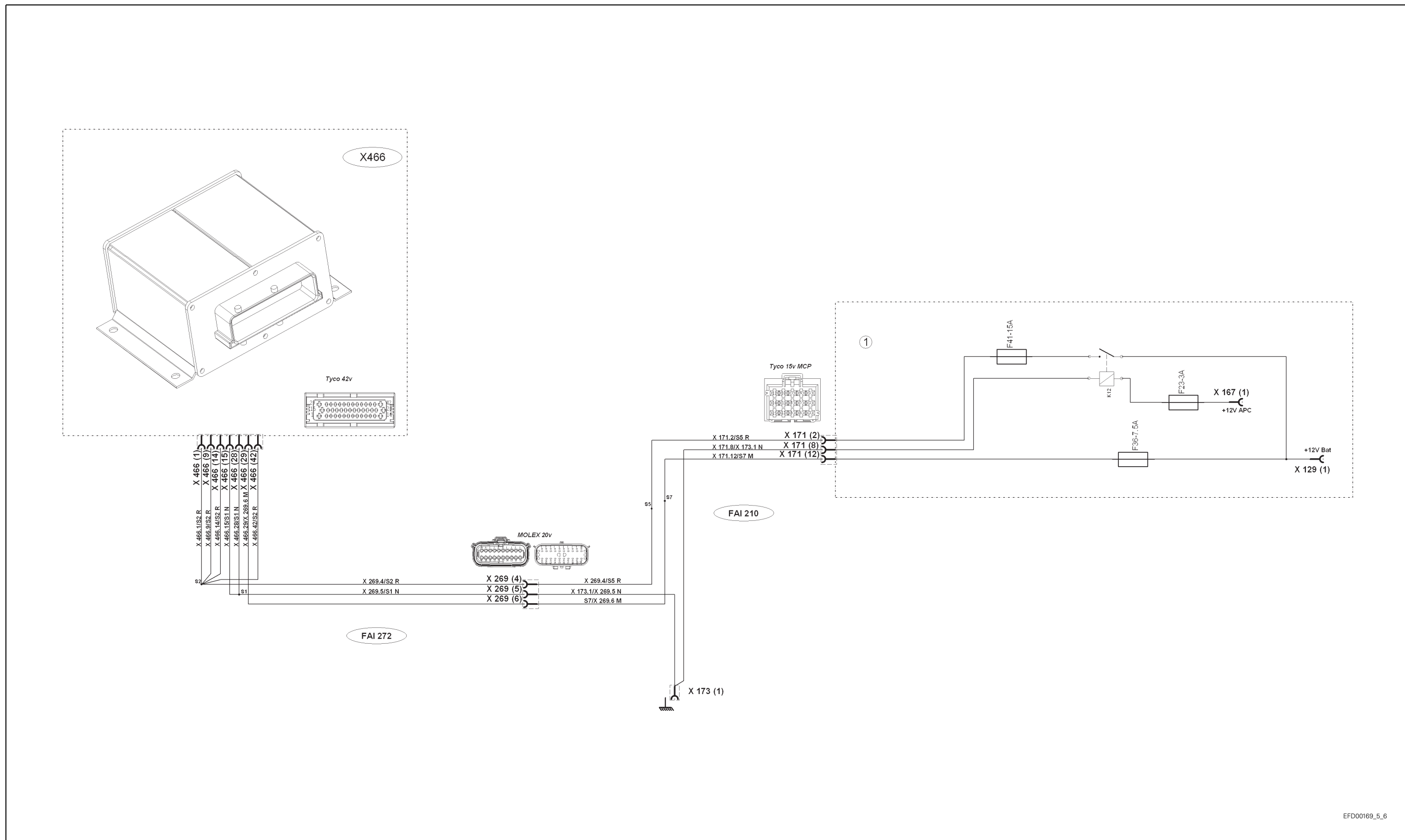
EFD00169\_5\_5

Fig. 6





A.8 Autotronic 5 active suspended cab electrical power supply

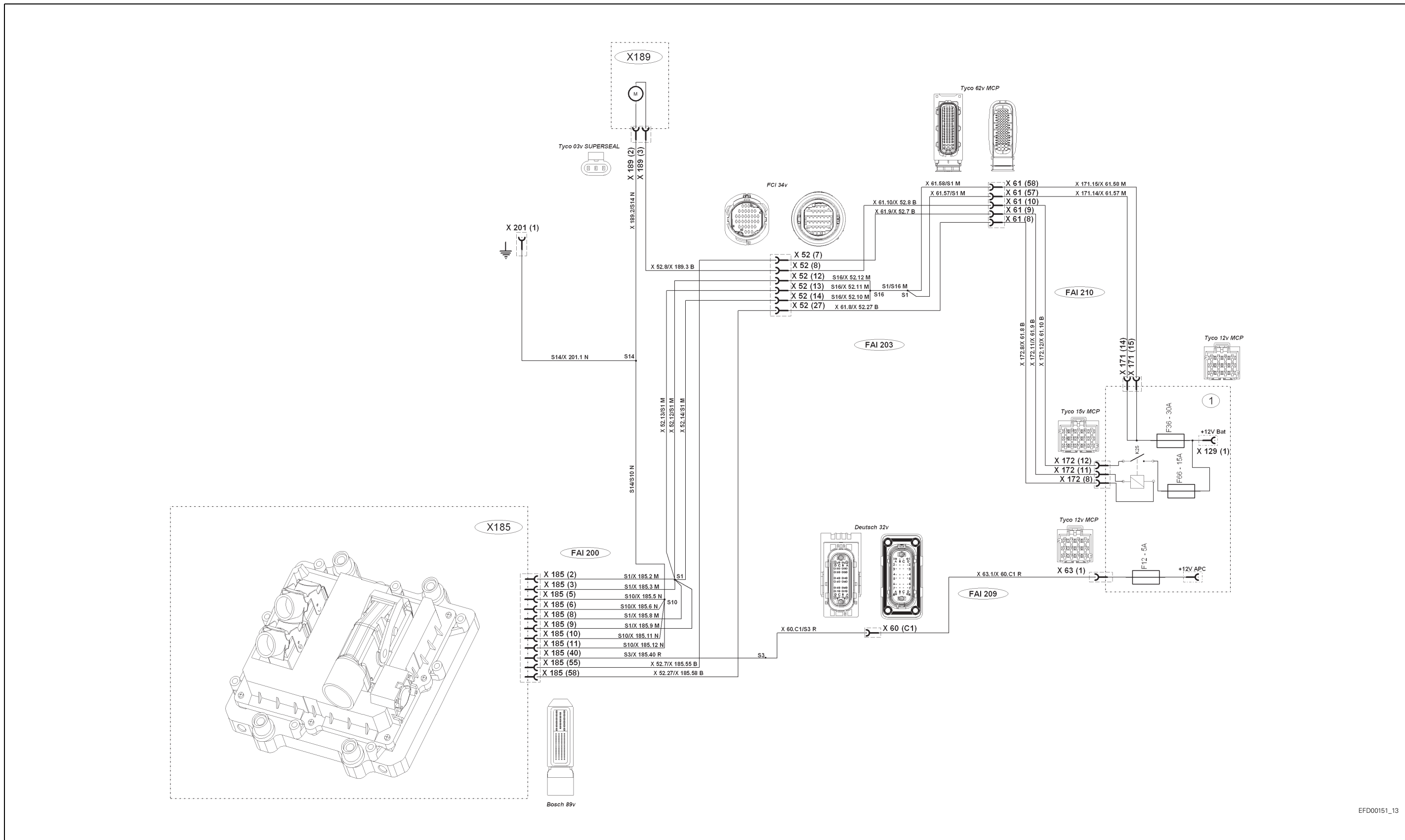


EFD00169\_5\_6

Fig. 7



A.9 Sisu EEM electronic unit electrical power supply

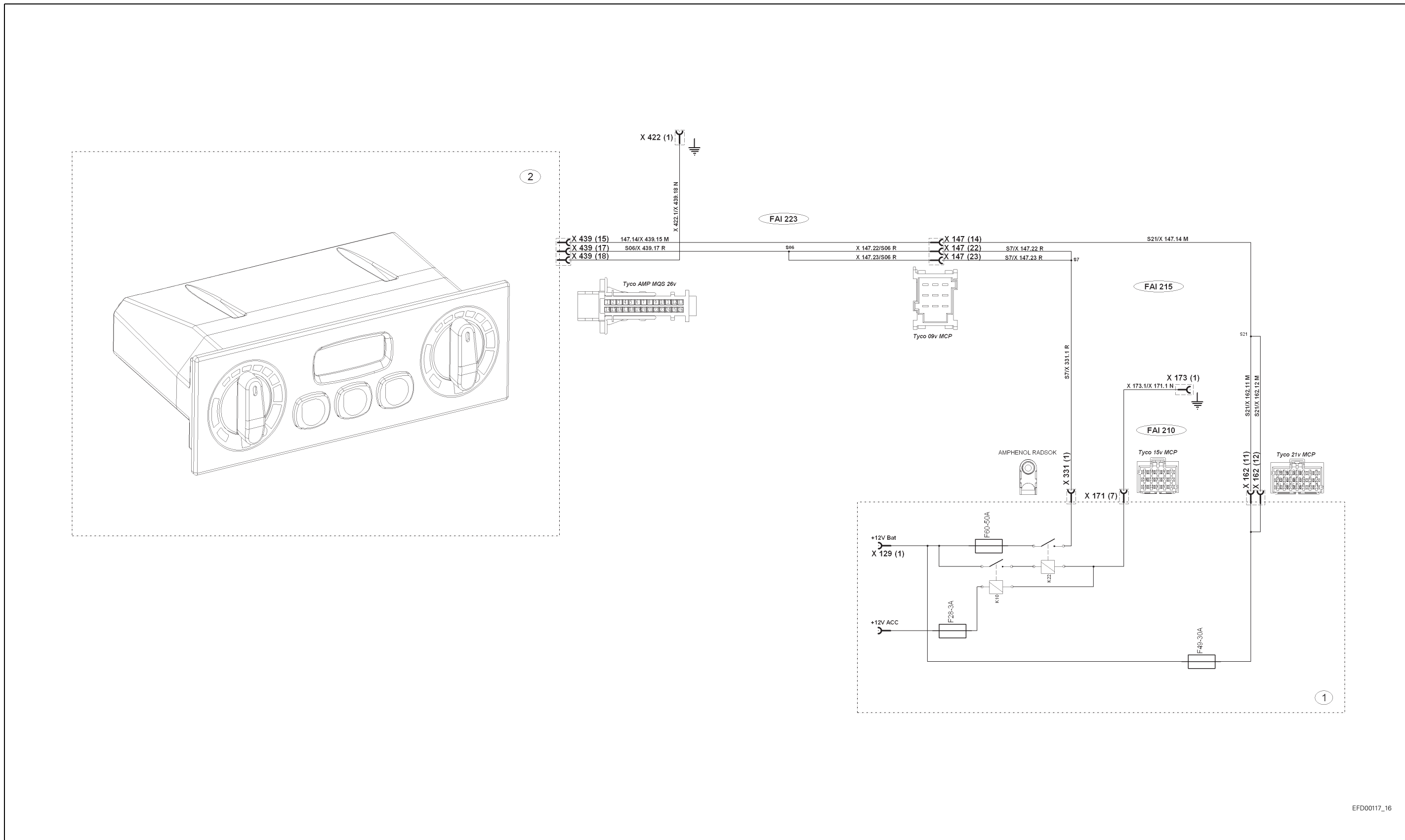


EFD00151\_13

Fig. 8



A.10 Automatic air-conditioning unit electrical power supply

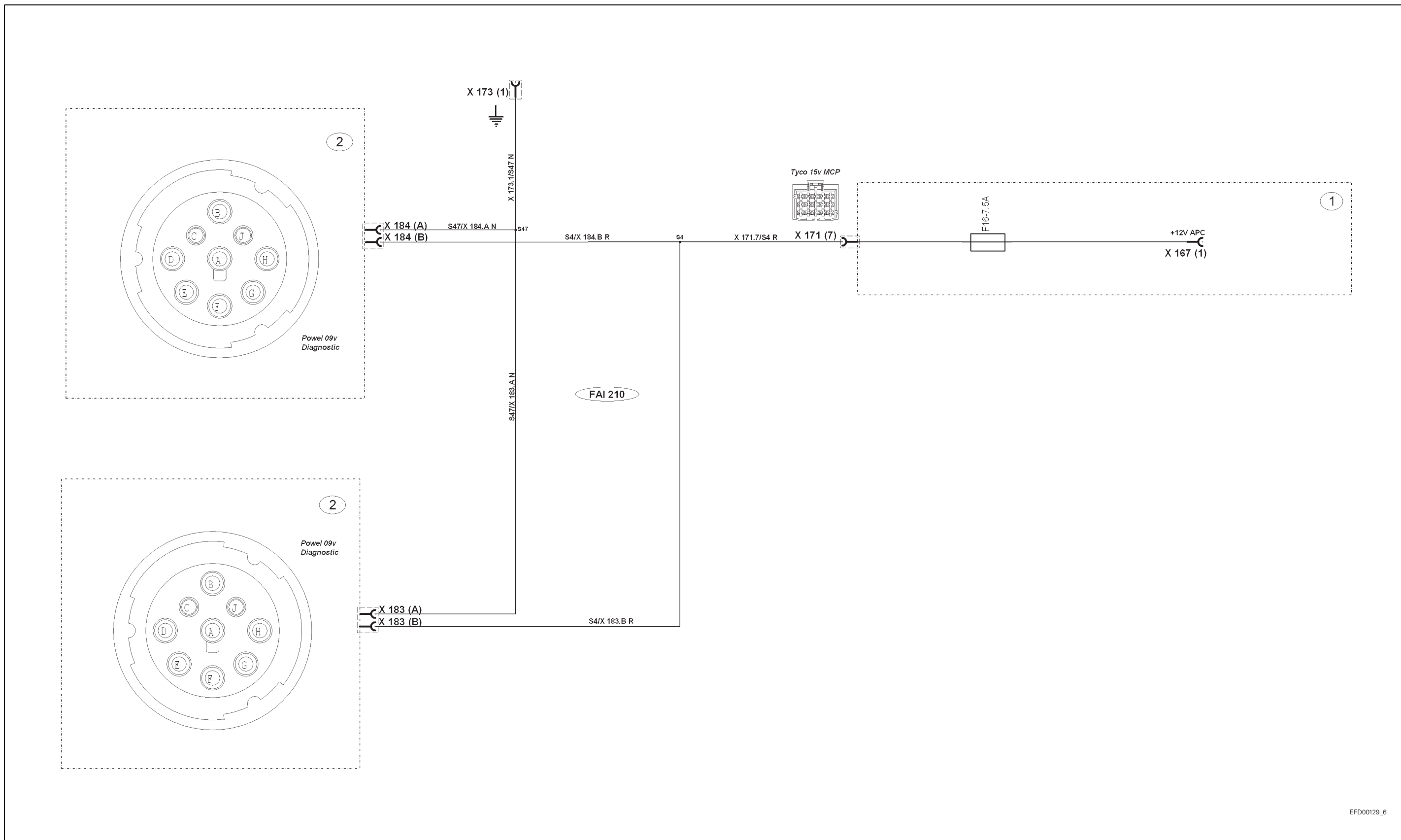


EFD00117\_16

Fig. 9



A.11 Diagnostics connector electrical power supply



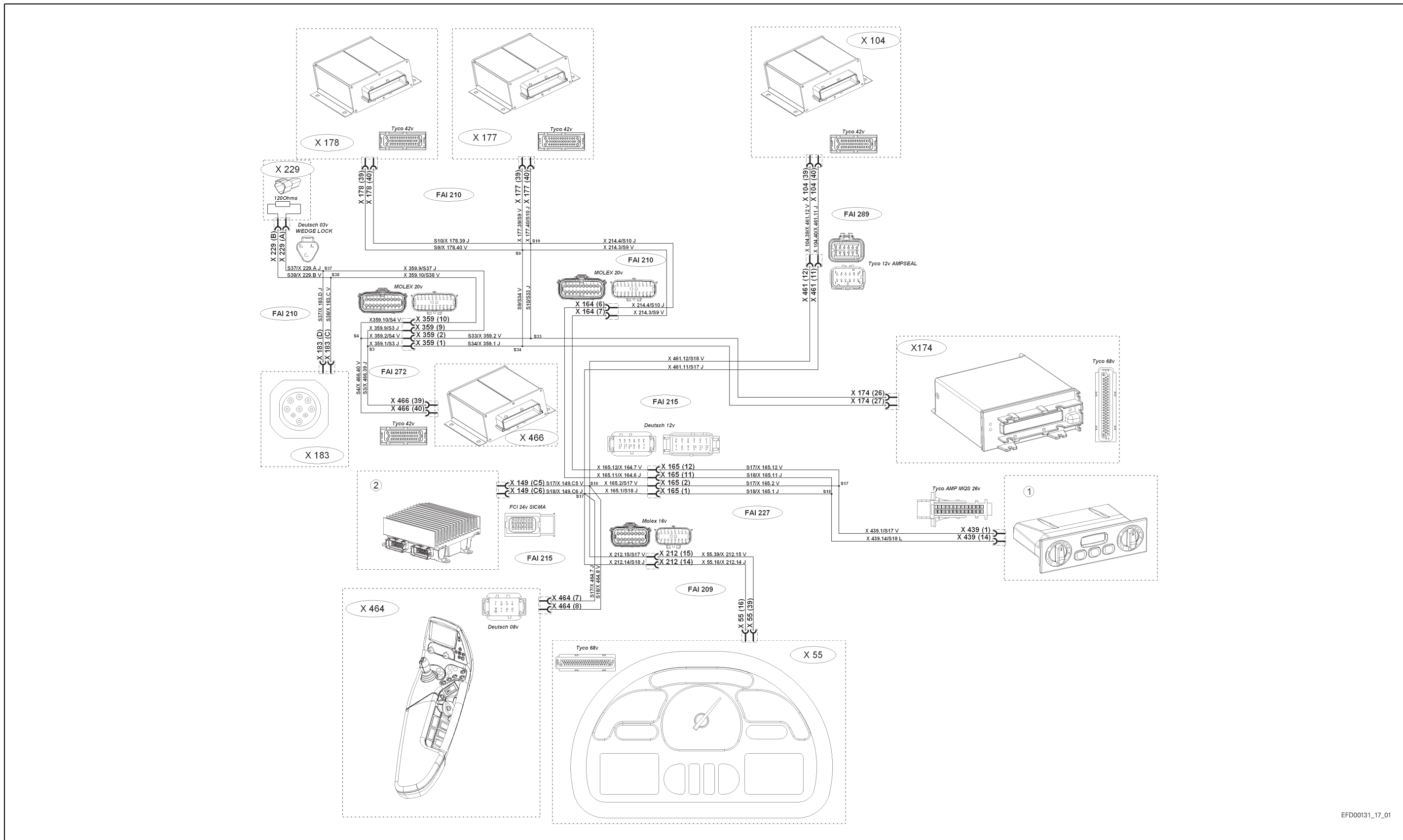
EFD00129\_6

Fig. 10





A.12 Tractor CAN network

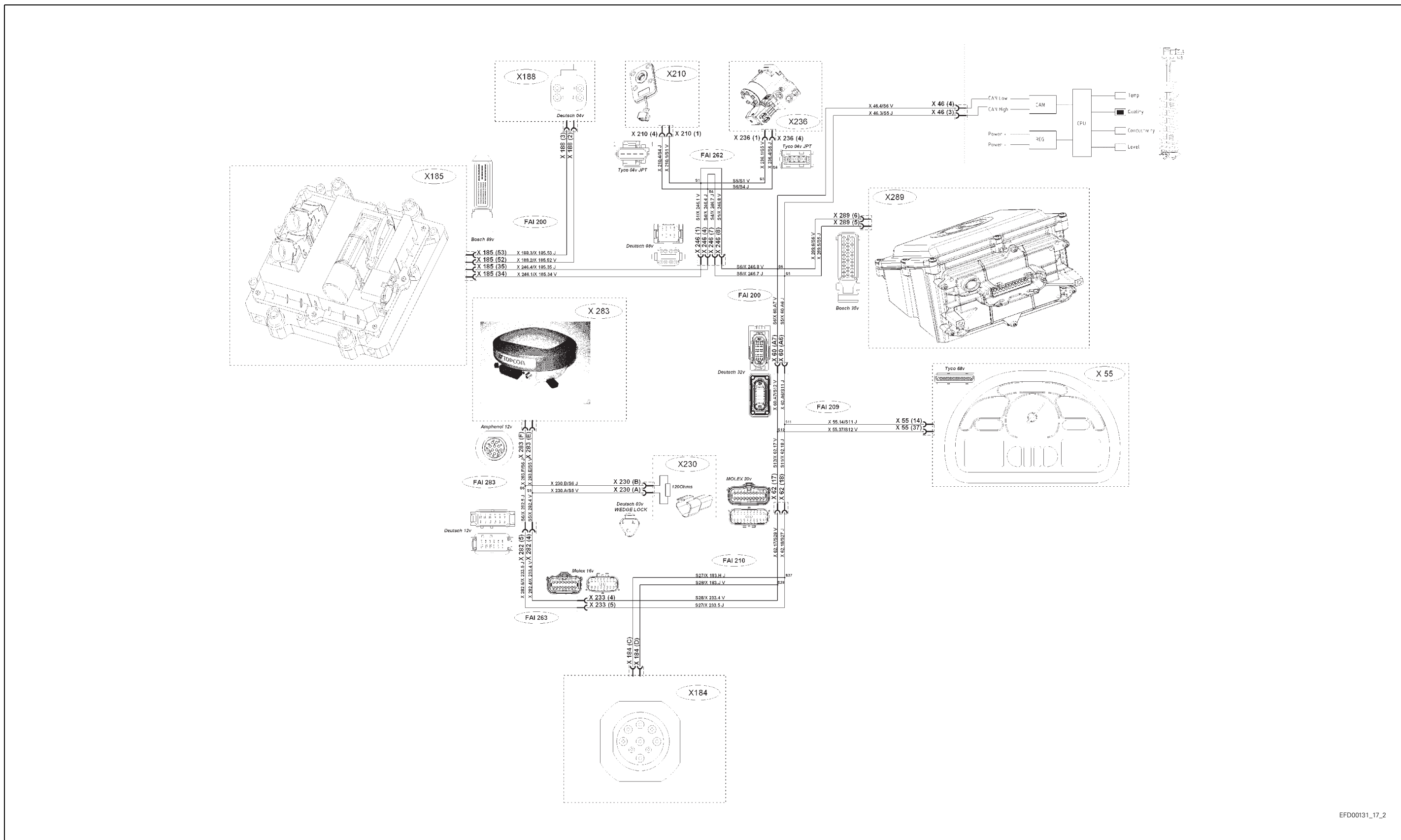


EFD00131\_17\_01

Fig. 11



A.13 Engine CAN network

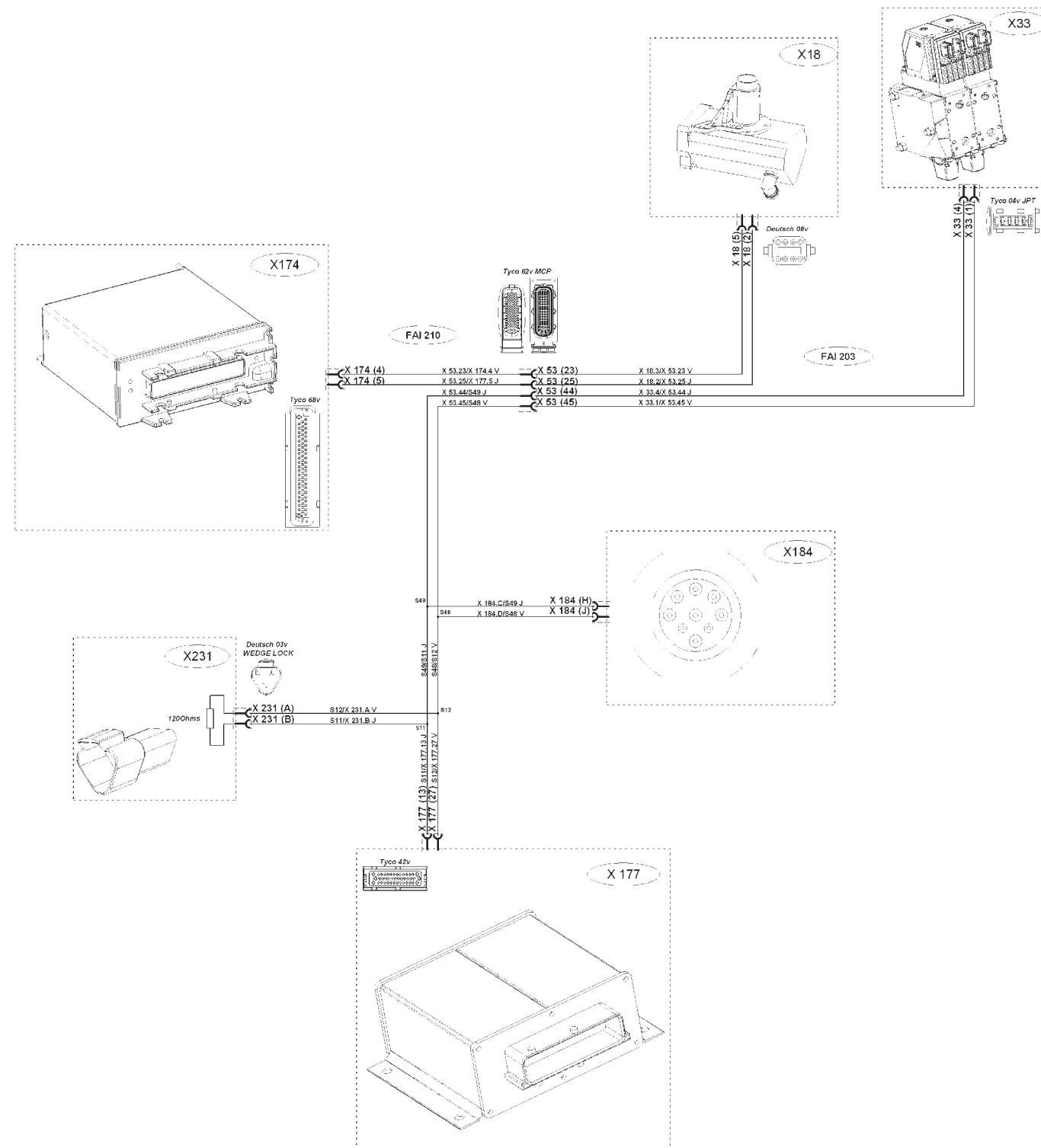


EFD00131\_17\_2

Fig. 12



A.14 Linkage CAN network

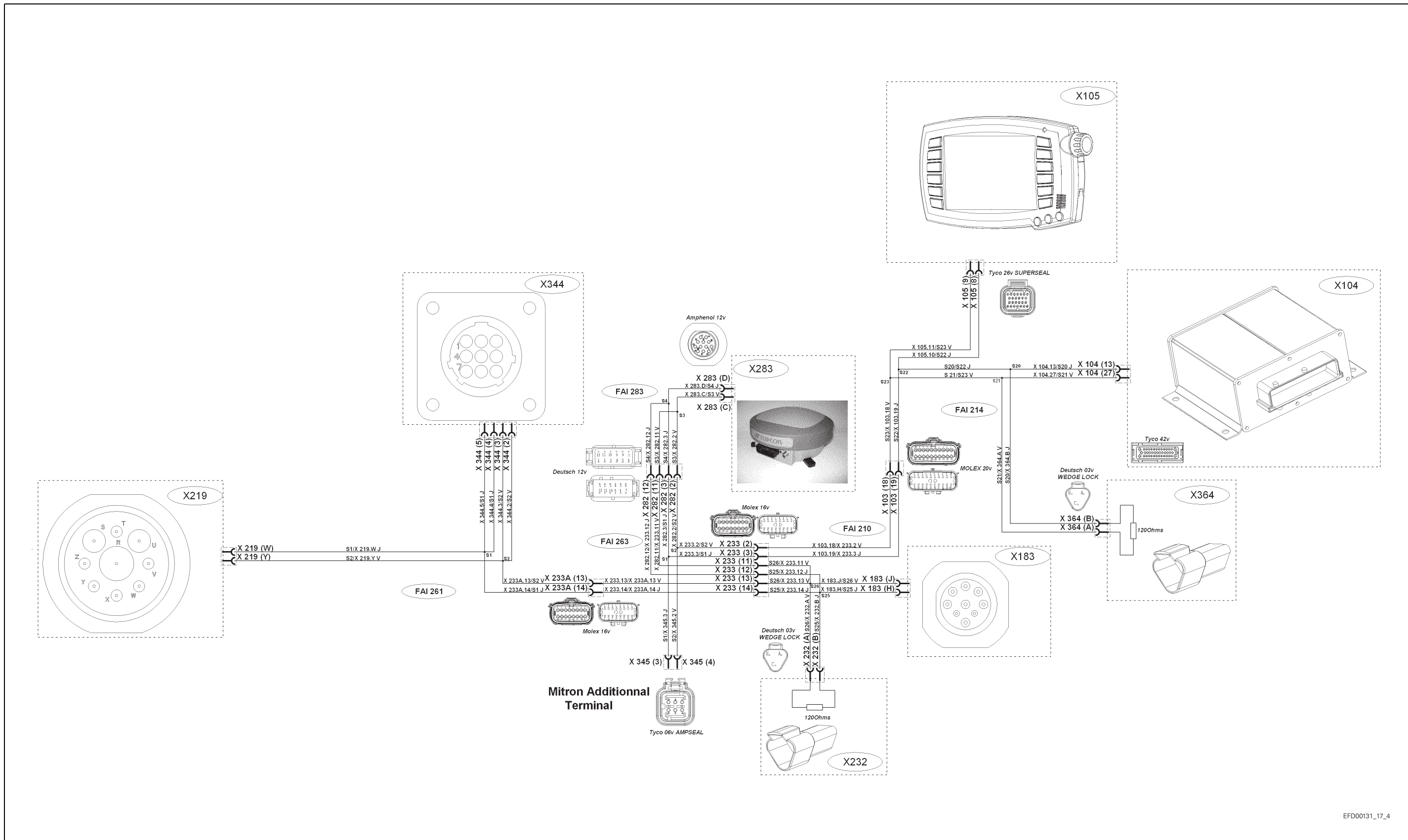


EFD00131\_17\_3

Fig. 13



A.15 Isobus CAN network



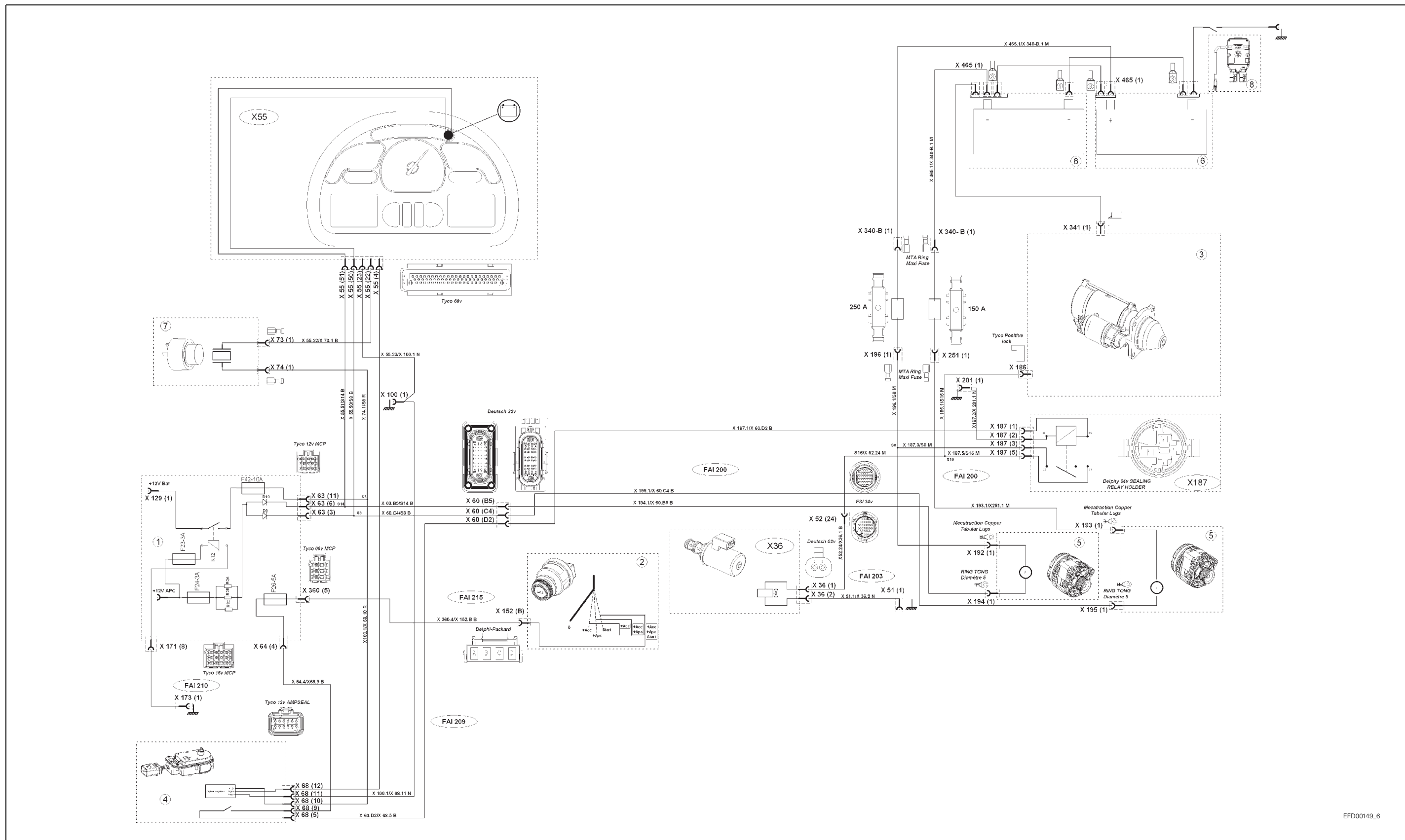
EFD00131\_17\_4

Fig. 14





A.16 Batteries - load/start-up circuit



EFD00149\_6

Fig. 15



10C13

## **Alternator - Layout of components**

### **TABLE OF CONTENTS**

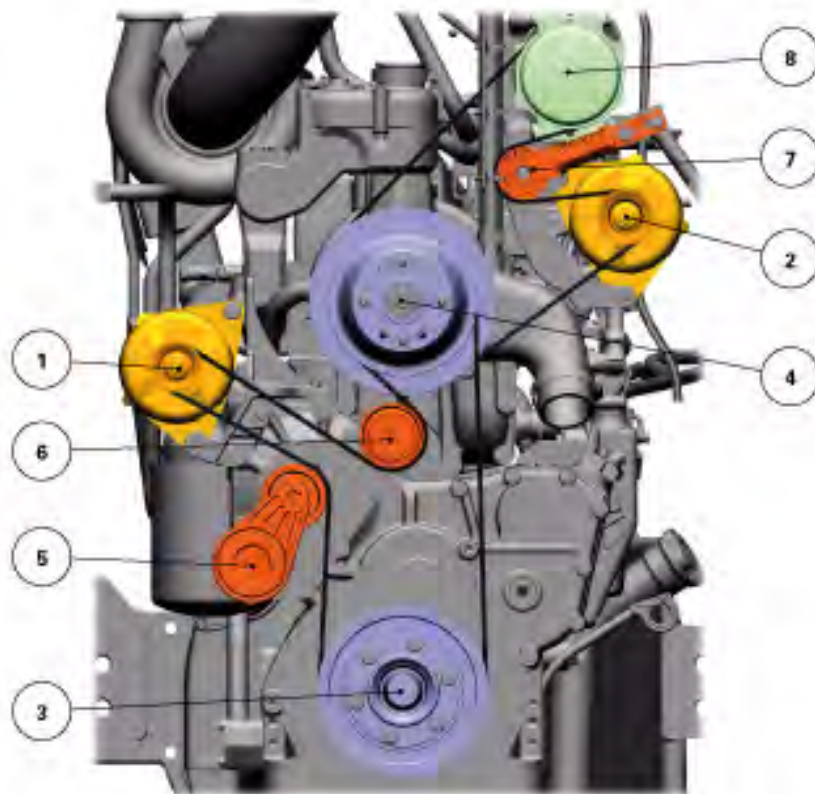
A. Alternator - Layout of components .....	179
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**A. Alternator - Layout of components**

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1010278



- 1- Right-hand alternator
- 2 Left-hand alternator
- 3 Crankshaft pulley
- 4 Water pump pulley
- 5 Automatic tensioner
- 6 Guide roller
- 7 Automatic tensioner
- 8 Air conditioning compressor
- 9 Air compressor





10C14

## **Alternator - Tests and diagnostics**

### **TABLE OF CONTENTS**

A. Alternator - test procedure. . . . .	185
B. Alternator - Checking components . . . . .	188



## A. Alternator - test procedure

B+	Alternator output
D+	Alternator energising
W	Current signal before rectification

### Preliminary checks

First of all, carefully check the load circuit and the electrical circuit. Check the condition of the cables, and that the electrical connections and the alternator body acting as earth are correctly tightened.

- 1) Check the battery  
Under normal circumstances, the minimum open-circuit voltage of a battery in good condition should be approx. 12.5 V if it has not been subjected to charging or discharging within the last 24 hrs. If the voltage is weak at the battery terminals, recharge the battery. If it is not possible to wait until the battery has recharged, use another charged battery to perform the diagnostics procedure.
- 2) Check the drive  
Check the drive belt for the alternator and the pulley, ensuring it is clean, free from oil, grease and paint and in good condition. Check the tension of the drive belt for the alternator is correct. For engines with two belts fitted with tensioners, the deflection must be less than 0.5 cm.
- 3) Check the voltage at terminal D+.  
Switch on the ignition and check that the voltage between alternator terminal D+ and the alternator earth is between 1 and 1.5 V.
- 4) Check the alternator earth  
Check that there is no paint between the alternator body and the chassis. Also check that the alternator is properly tightened on its support.

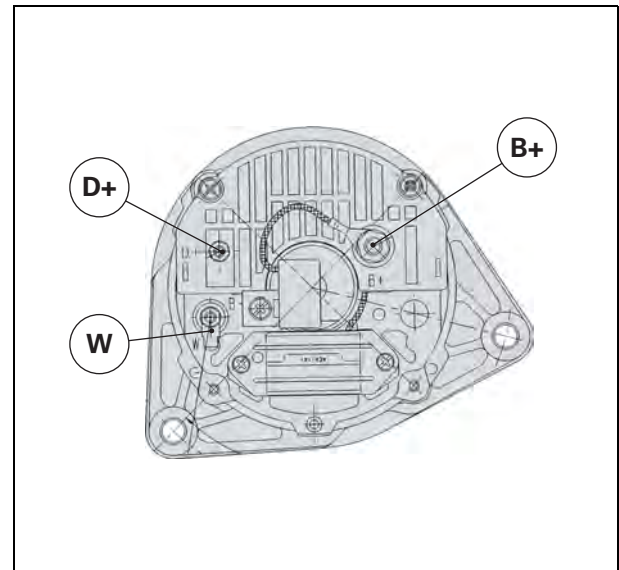
### Check the alternator wiring

- 1) Disconnect the battery.
- 2) Disconnect alternator terminals B+ and D+.
- 3) Reconnect the battery. Switch on the ignition. Do not start the engine.
- 4) Check the voltage between terminal B+ of the harness and the earth.  
Check the voltage between terminal D+ of the harness and the earth.  
In both cases, the voltage must be equal to that of the battery. If this is not the case, check the electrical harness.
- 5) Disconnect the battery to reconnect the alternator cables then reconnect the battery.

### Check the load current and regulated voltage

- 1) Ensure that all of the tractor electrical components are off and that the ignition is switched off.
- 2) Connect a voltmeter between terminal B+ and the alternator body (earth).
- 3) Connect a hook-on ammeter to the cable that is connected to terminal B+.

Alternator connections



1010286

Fig. 1

- 4) Start the engine and adjust the speed to between 1200 and 1500 rpm. Check the results on the ammeter and the voltmeter.
  - If the voltage exceeds 14.7 V, the alternator is faulty and the alternator regulator must be replaced.
  - If the voltage is below 13.6 V, one of the alternator components is faulty.
  - If the amperage is close to 0 A, one of the alternator components is faulty.
  - If the voltage is between 13.6 and 14.7 V, the alternator is functioning normally.

### **Check the maximum output of the alternator**

- 1) Establish a connection identical to that in step [Check the load current and regulated voltage](#).
- 2) Gradually activate all the components that draw electricity (lights, fan etc.) and observe the load current. The current at the alternator output on terminal B + should increase.
- 3) If the maximum alternator output is obtained before all the tractor electrical components are activated, your alternator is not powerful enough. You therefore need to:
  - Check that the connections at terminal B+ of the alternator and at the battery terminals are not overheating. In the event of overheating, check that the bolt connections are fixed in place and that the harness crimping is correct. Adjust these if necessary.
  - Install a more powerful alternator.

### **Look for a drop in voltage**

#### *Voltage drop in the insulated circuit*

- 1) Ensure that the ignition is switched off.
- 2) Connect a voltmeter between the positive battery terminal and terminal B+.
- 3) Start the engine and adjust the speed to between 1200 and 1500 rpm.
- 4) Gradually activate all the components that draw electricity (lights, fan etc.).
- 5) Ensure that the voltage does not exceed 400 mV. If the reading exceeds 400 mV, there is high resistance and therefore too great a drop in the alternator external circuit.
- 6) Test the voltage drop between the battery + and the cab + situated behind the cab; the value should not exceed 150 mV.

#### *Voltage drop in the earth circuit*

- 1) Ensure that the ignition is switched off and carry out the same operation by connecting the voltmeter between the negative battery terminal and the alternator earth.
- 2) Start the engine and adjust the speed to between 1200 and 1500 rpm.
- 3) Ensure that the voltage does not exceed 200 mV. If the result exceeds 200 mV, there is excessive resistance and therefore too great a drop in the earth circuit. If the nominal alternator output cannot be obtained and the result on the voltmeter is below 200mV, one

of the alternator components is faulty. If the total voltage drop value is exceeded (600mV): Check that the connections between the alternator and its support and between the support and the engine are clean and sufficiently tightened. Also check that there is no break in continuity (including fuses) or break in the harness between terminal "B+" of the alternator and the positive battery terminal. Voltage drops may cause the indicator light on the instrument panel to light up without the alternator presenting a fault.

## B. Alternator - Checking components

The alternator components only need to be checked if the previous steps have indicated that there is a faulty component. These checks allow the following to be inspected:

- Regulator, brushes, springs and slip rings.
- Continuity of the rotor electrical coil.

**NOTE:** These components can be checked with the alternator in place.

**IMPORTANT:** Before removing the alternator cables, ensure that the ignition is switched off and that the negative cable of the battery is disconnected.

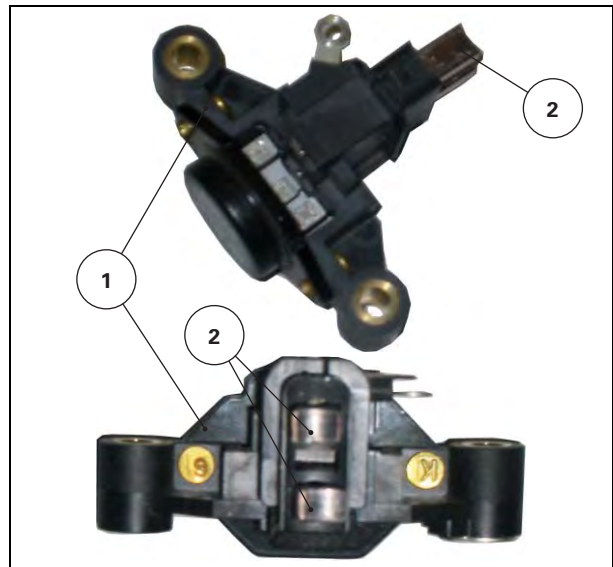
Equipment required for the checks:

- 12 V battery
- Multimeter
- 12 volt, 2.2 watt indicator light

### Checking the brushes, springs and slip rings

- 1) Remove the regulator/brush holder assembly (1).
- 2) Ensure that the slip rings (3) and brushes (2) are clean, and check that the brushes slide freely in the brush holder.
- 3) Check the length of the brushes (2) in released position. They must be longer than 5 mm. If this is not the case, replace the regulator/brush holder assembly (1).

**NOTE:** The brushes are an integral part of the regulator/brush holder assembly. They may not be replaced individually.



1010297



1010344

Fig. 2

**Checking the continuity of the rotor electrical coil**

- 1) Connect an ohmmeter between the two slip rings.
- 2) Check the resistance of the coil at 20 °C:  
80 A alternator:  $2.7 \pm 0.1$  Ohms  
120 A alternator:  $2.8 \pm 0.1$  Ohms  
150 A alternator:  $2.85 \pm 0.1$  Ohms



1010351

Fig. 3





10C15

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**TABLE OF CONTENTS**



10C16

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10C17

## **Alternator - Disassembly and reassembly**

### **TABLE OF CONTENTS**

A. Replacing the fan/alternator/air conditioning belts.....	197
B. Removing and refitting the alternators .....	199



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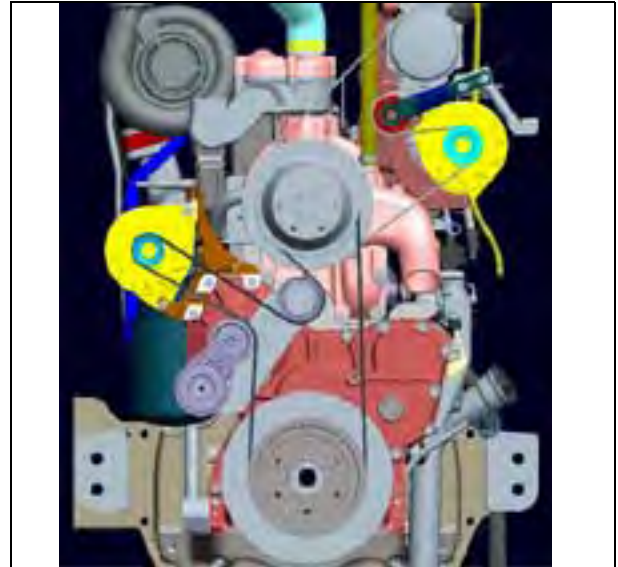
## A. Replacing the fan/alternator/air conditioning belts

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### Frequency

Replace the belts as soon as it shows signs of wear or every 1200 hours.

### Replacing a Poly-V belt



1005127

Fig. 1

### Roller tensioner

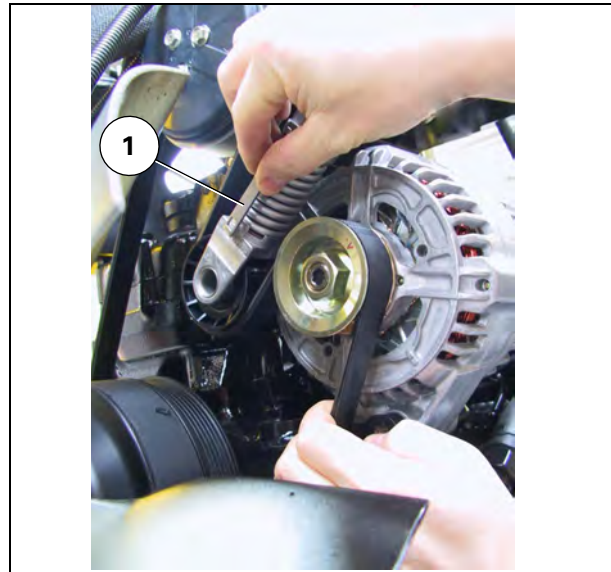
- 1) Lift the tensioner to remove and refit the belt
- 2) After replacement, check the belt tension and adjust if necessary.
- 3) After the tensioner has been slackened to remove/refit the belt, check the torque of the tensioner screw 43 Nm.



1005132

Fig. 2

Spring tensioner (Fig. 3)(Fig. 4)



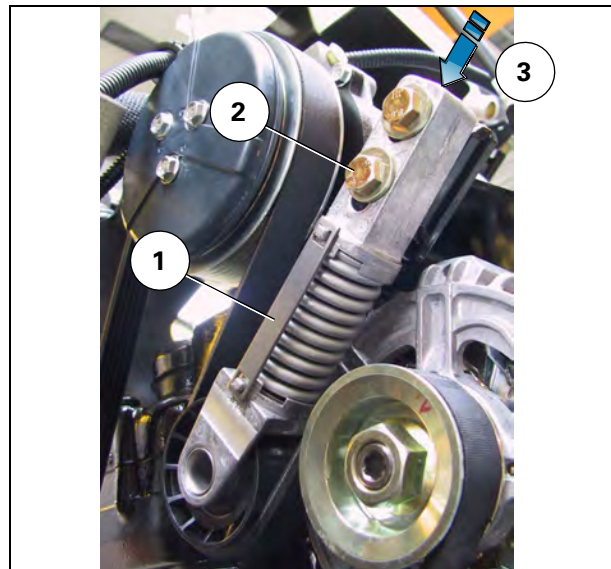
1004766

Fig. 3

- 1) Pull the belt manually so as to engage the tension spring retaining tool (1).
- 2) Loosen the tension spring support screws (2) to release the belt and replace it.
- 3) During re-fitting, push the end of the tension support (3) as far as it will go and retighten the screws (2) to a torque of 27 Nm to 37 Nm.
- 4) Remove the tool (1) to ensure belt tension. Nominal tension value: 73 Nm.

**NOTE:** Use the specific tool (1) for removing and fitting the new belt.

The belts are tensioned by an automatic tensioner.



1004767

Fig. 4



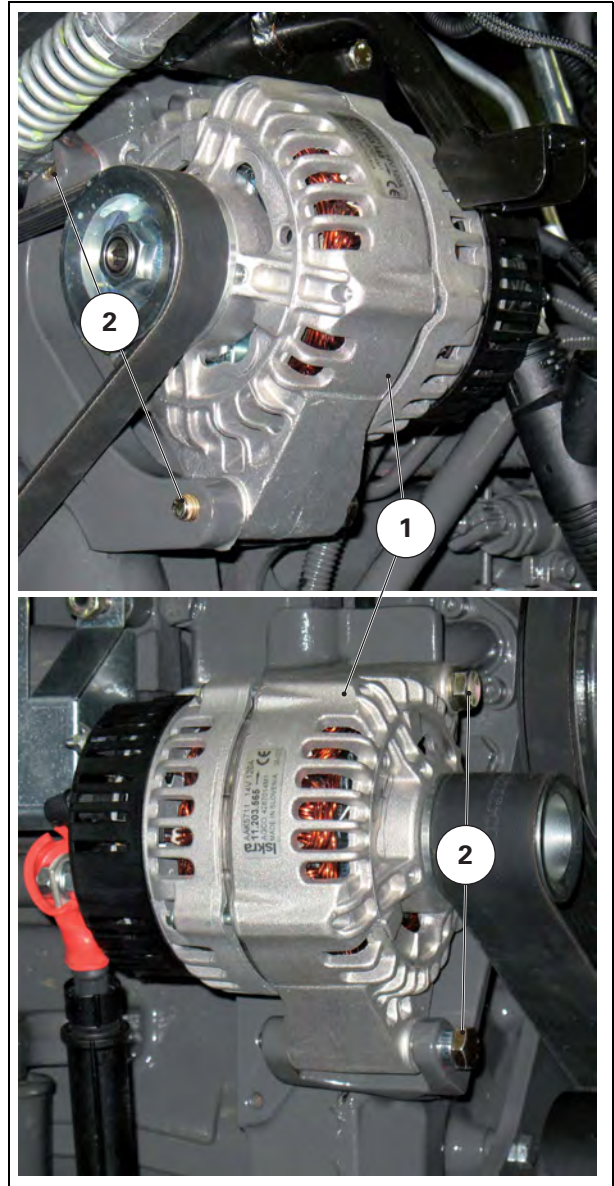
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## B. Removing and refitting the alternators

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### *Removing the alternators*

- 13.** Disconnect the batteries.
- 14.** Release the belt from the alternator pulley by moving the tensioner.
- 15.** Mark and disconnect the alternator's electrical connections.
- 16.** Remove the 2 alternator screws.

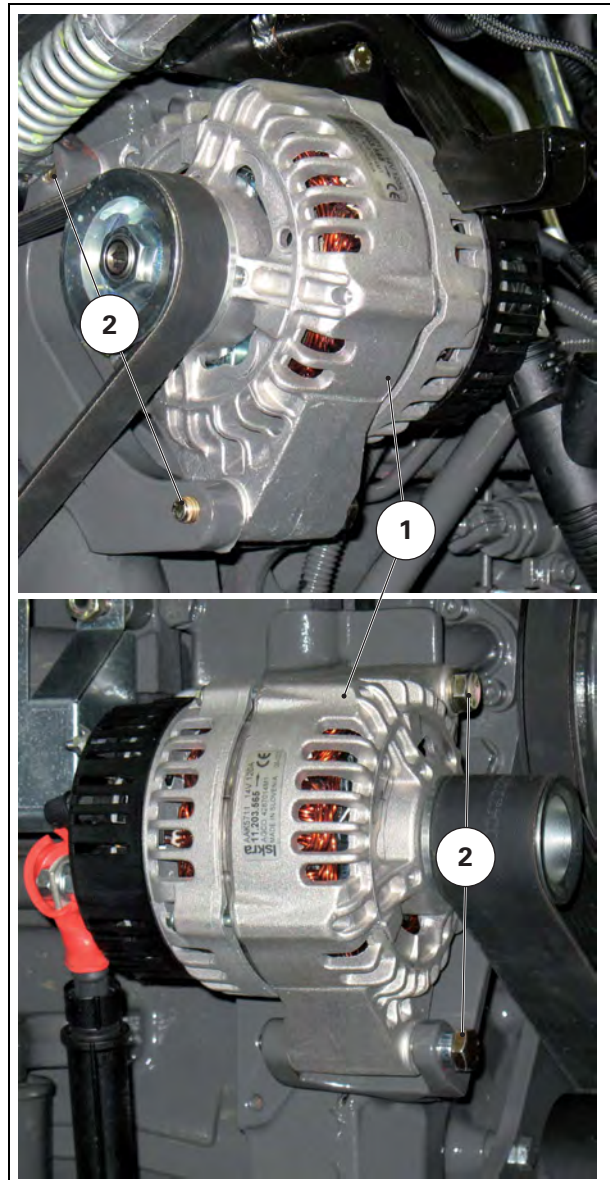


1010361

Fig. 5

**Refitting the alternators**

- 17.** Refit the alternator and the alternator screws.
- 18.** Replace the belt on the alternator pulley by moving the tensioner.
- 19.** Connect the alternator's electrical connections.
- 20.** Reconnect the batteries.



1010361

Fig. 6

10C18

**Alternator - Service tools**

**TABLE OF CONTENTS**

A. Alternator - Service tools .....203

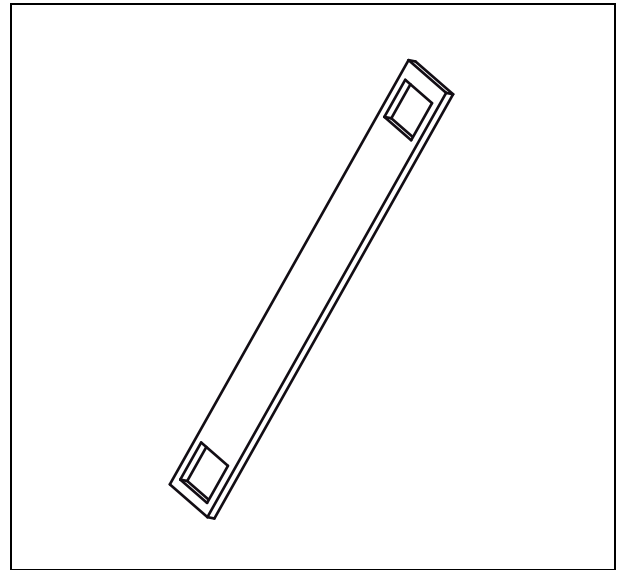


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## A. Alternator - Service tools

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Ref.	4315579M1
Description	Belt tensioner retaining tool



1010147

Fig. 1



10D10

## **Batteries - General**

### **TABLE OF CONTENTS**





10D11

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10D12

## **Batteries - Diagrams and plans**

### **TABLE OF CONTENTS**

A. Electrical diagrams. . . . . 211



## A. Electrical diagrams

### A.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

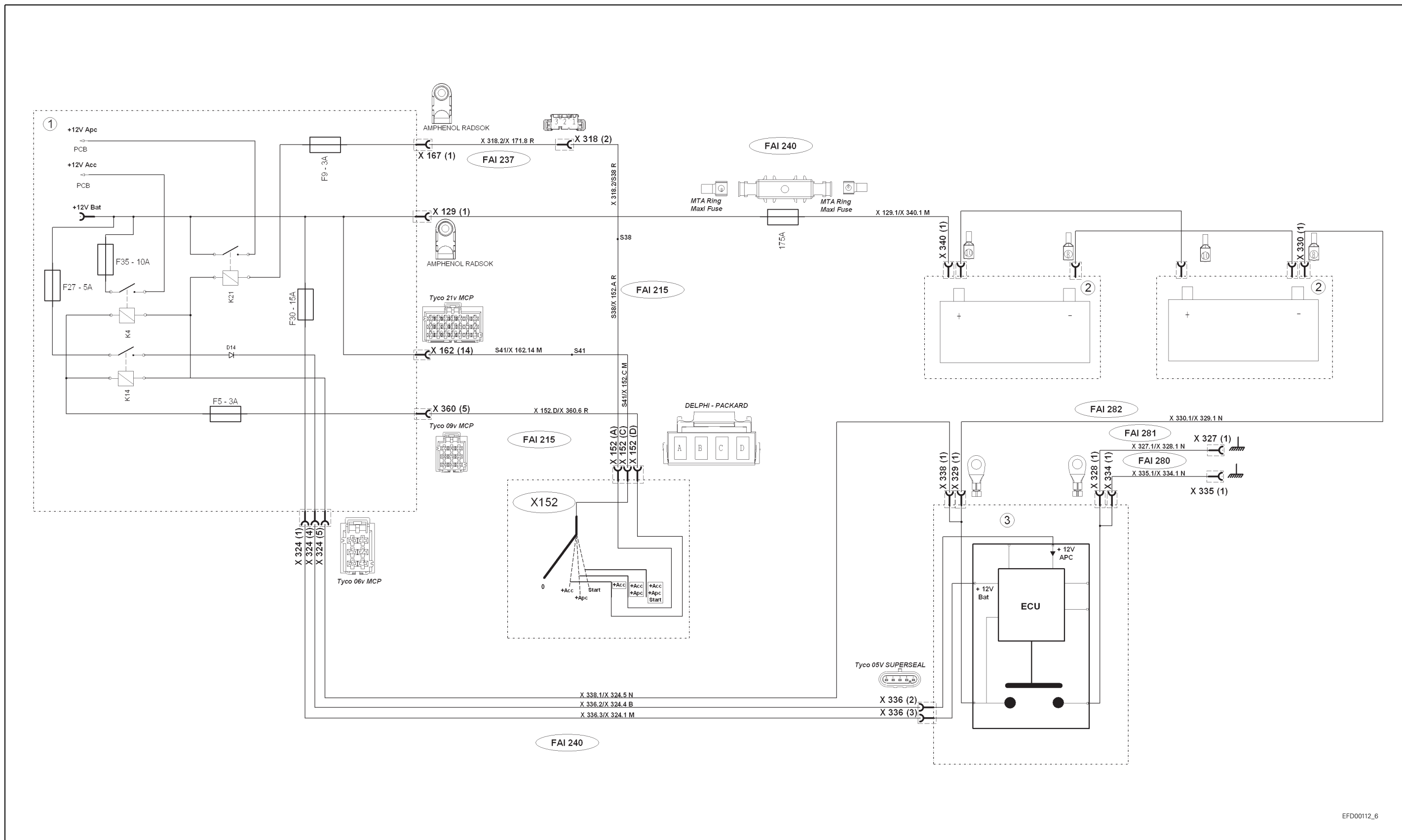
**FAI283** - TopDock harness

**FAIxxx** - Non-Isobus tool connector harness

**FAIxxx** - Non-Isobus implement connector controller harness

**FAIxxx** - Additional fan harness

A.2 Fuse box supply with circuit breaker

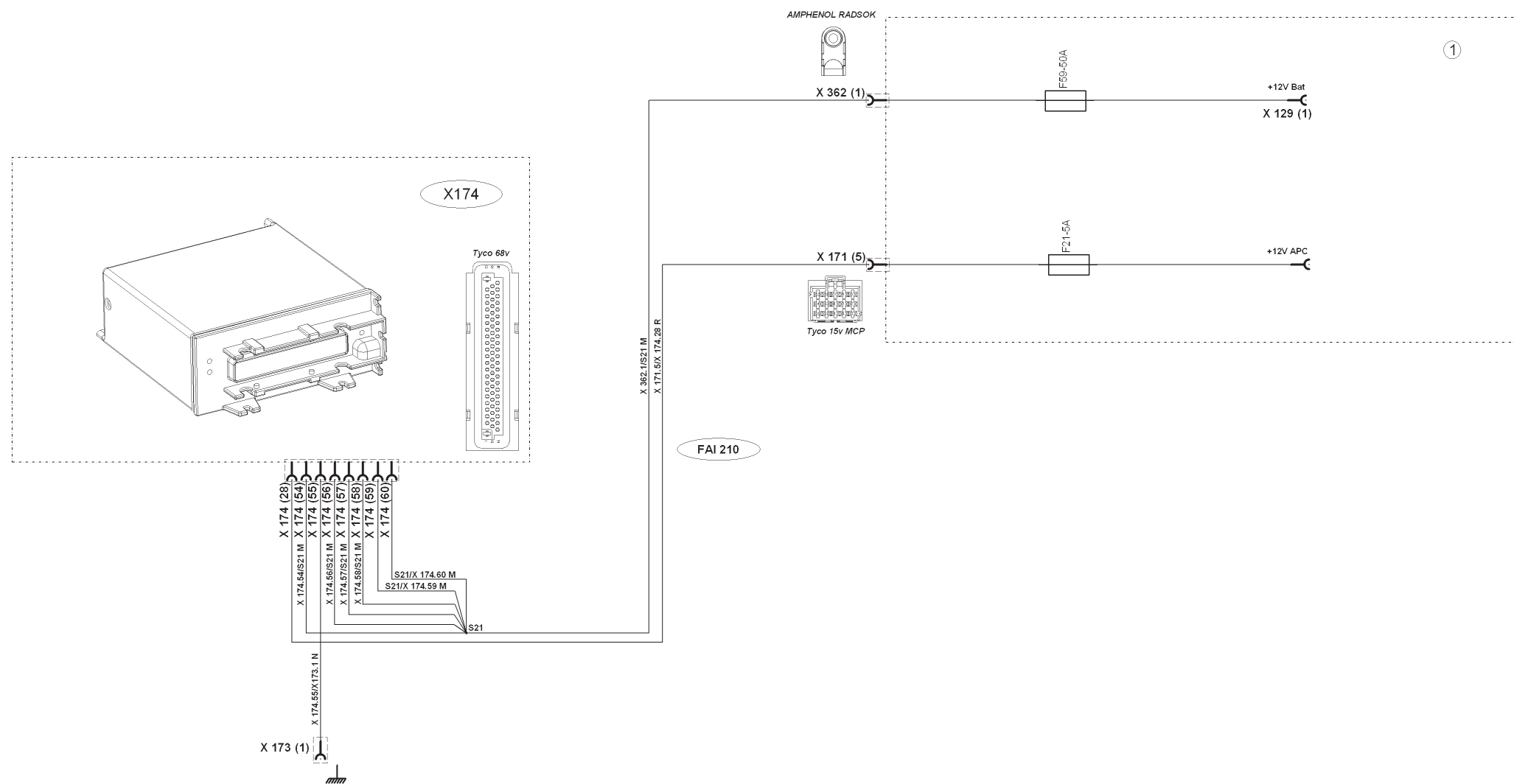


EFD00112\_6

Fig. 1



A.3 Autotronic 4 electrical power supply

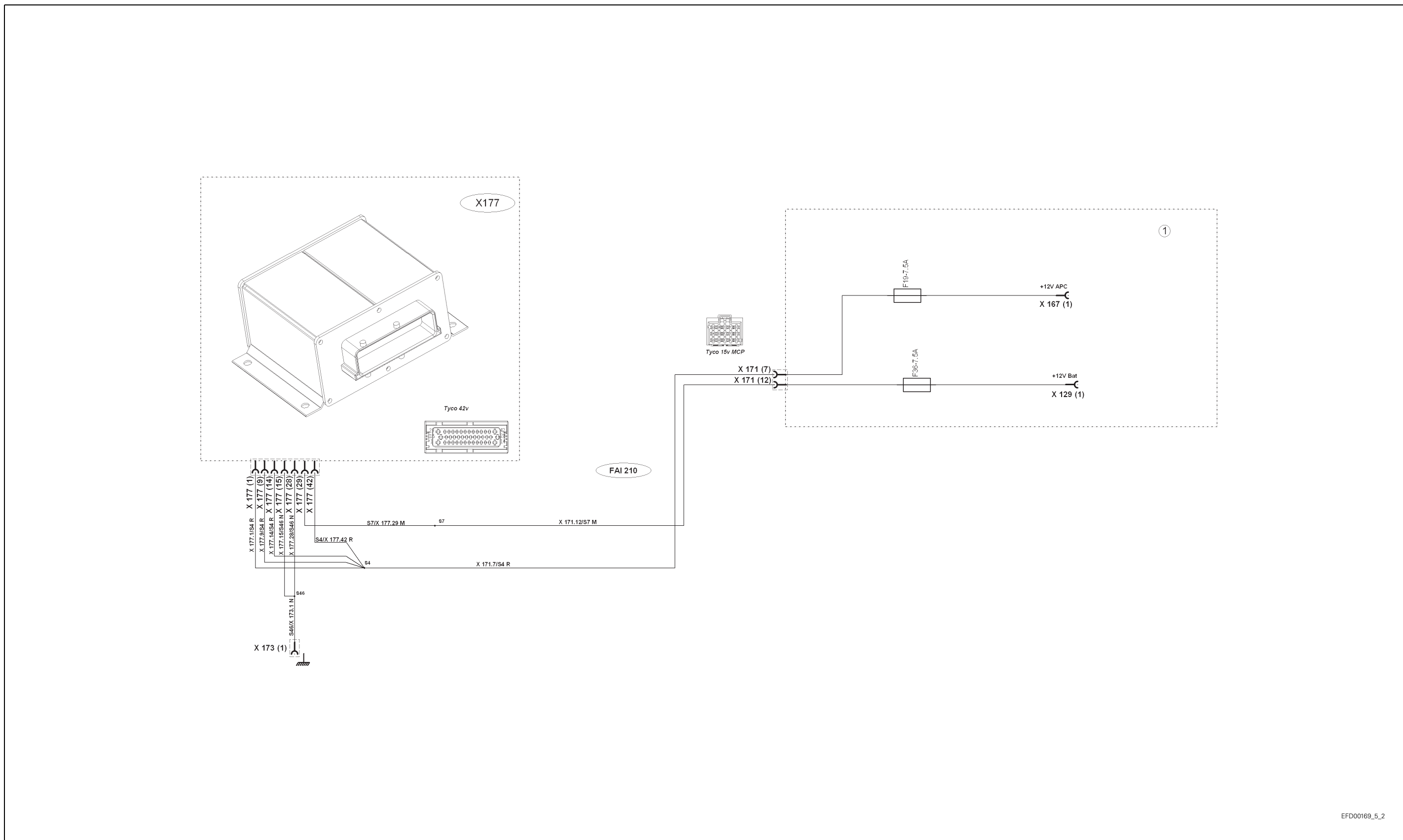


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Fig. 2



A.4 Autotronic 5 linkage electrical power supply



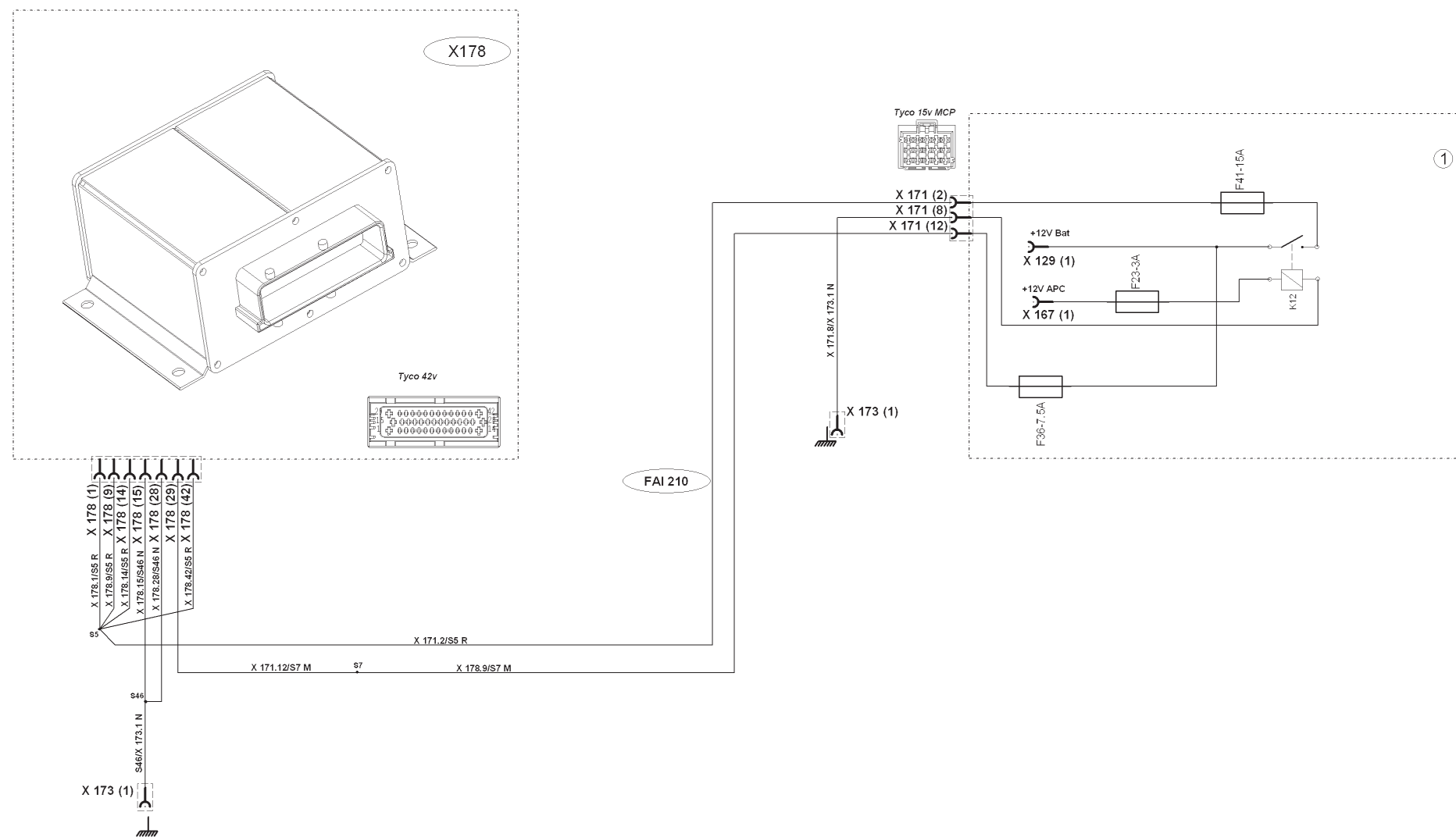
EFD00169\_5\_2

Fig. 3





**A.5 Autotronic 5 ParkLock/suspended front axle electrical power supply**

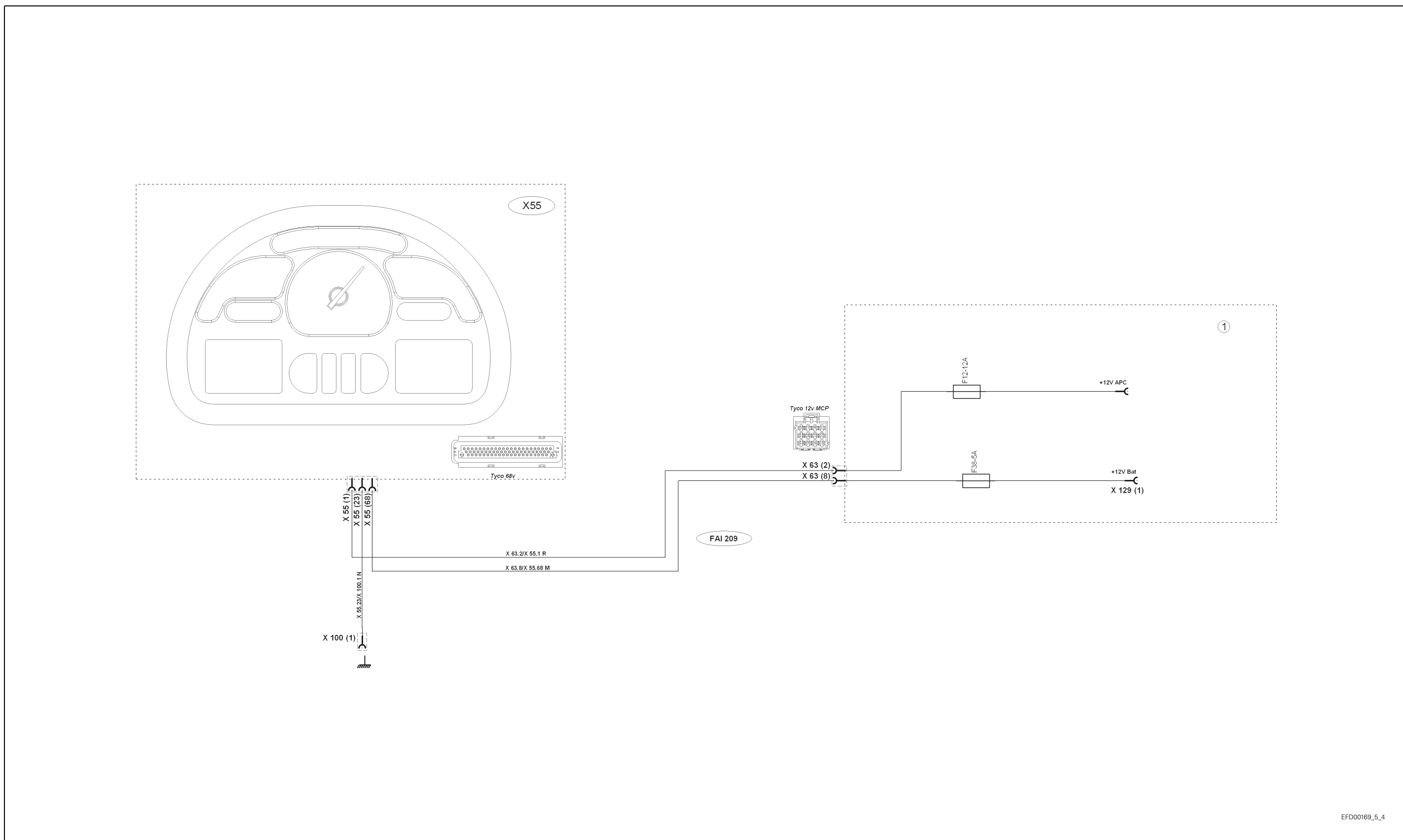


EFD00169\_5\_3

Fig. 4



A.6 DCC3 instrument panel electrical power supply

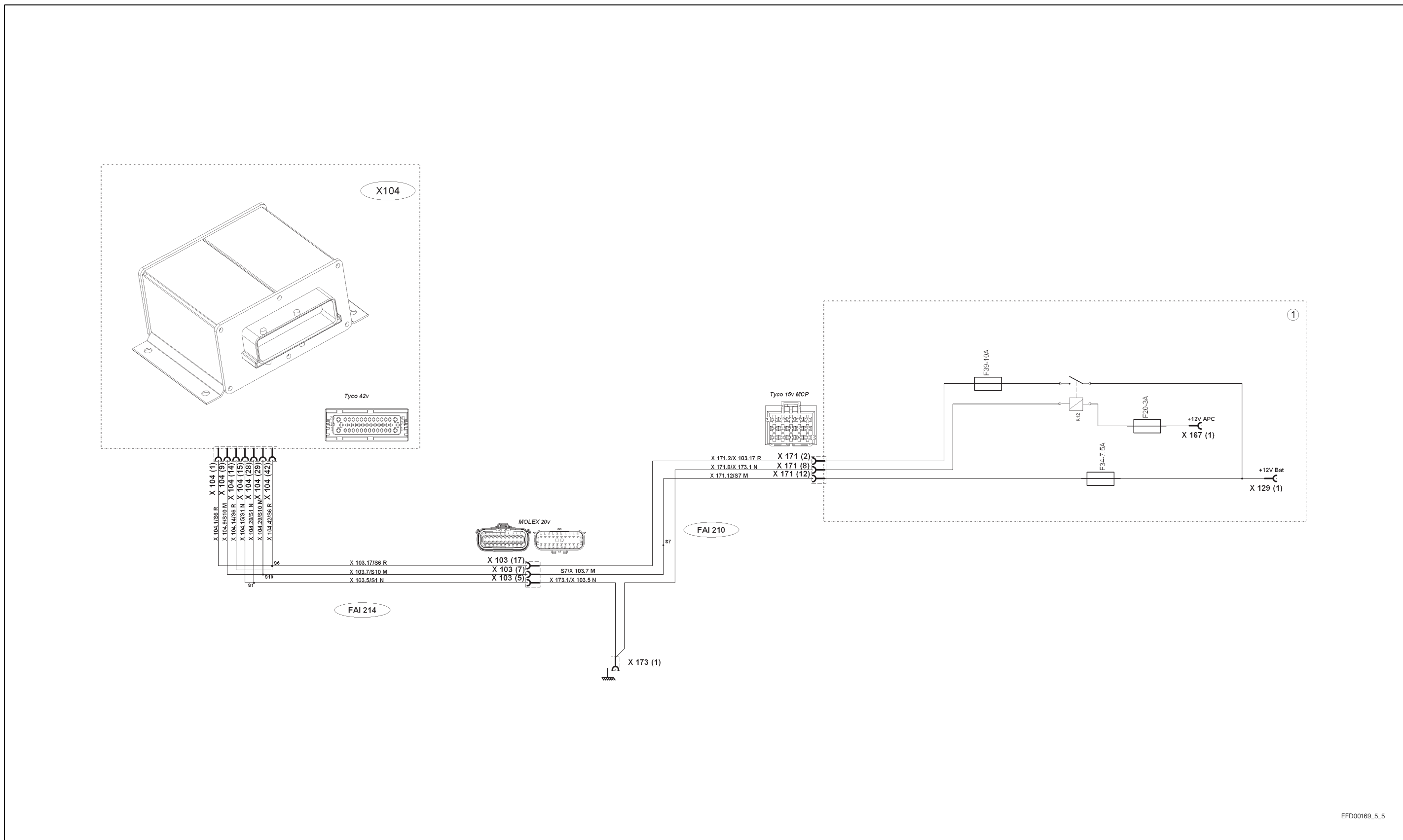


EFD00169\_5\_4

Fig. 5



A.7 Autotronic 5 armrest electrical power supply

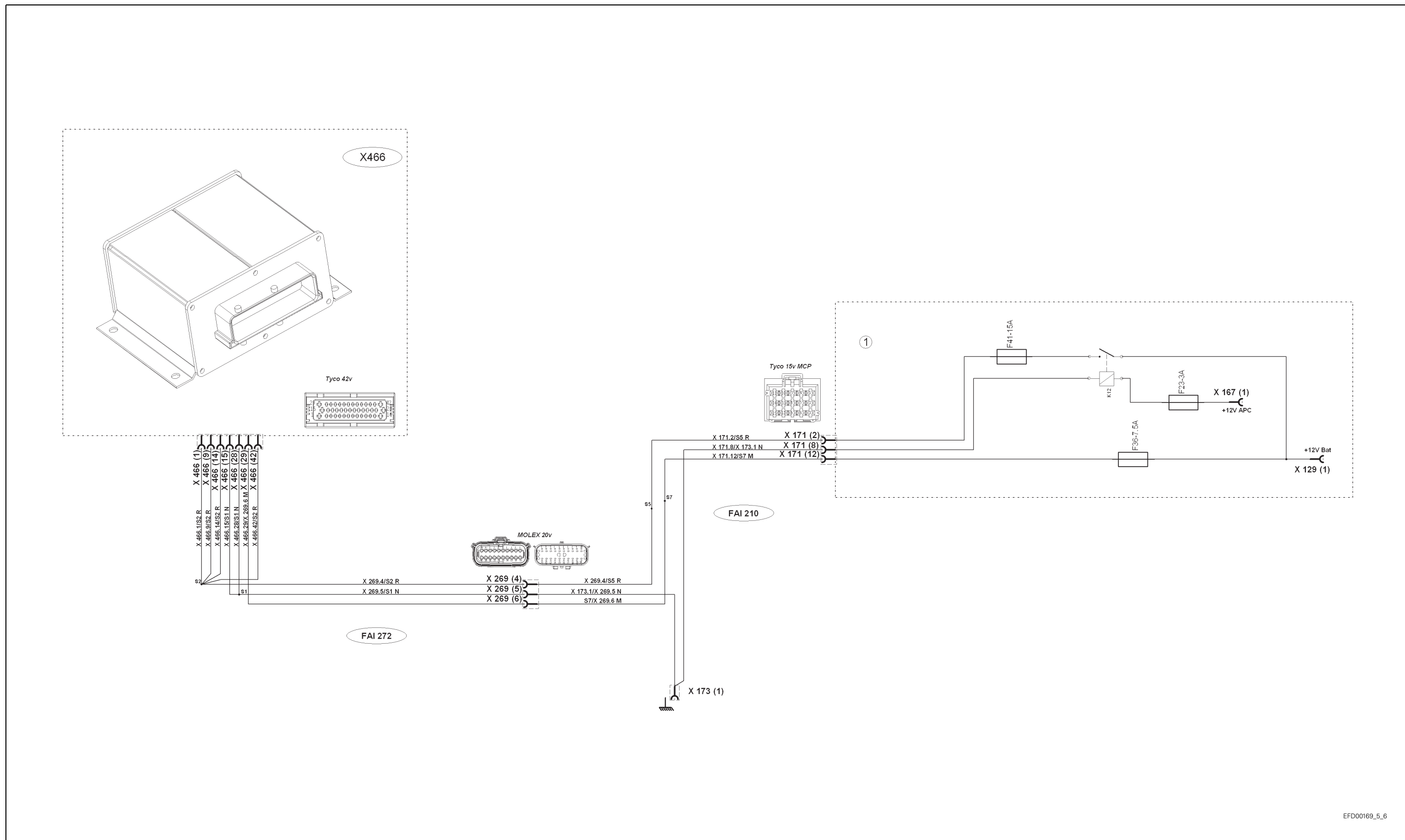


EFD00169\_5\_5

Fig. 6



A.8 Autotronic 5 active suspended cab electrical power supply



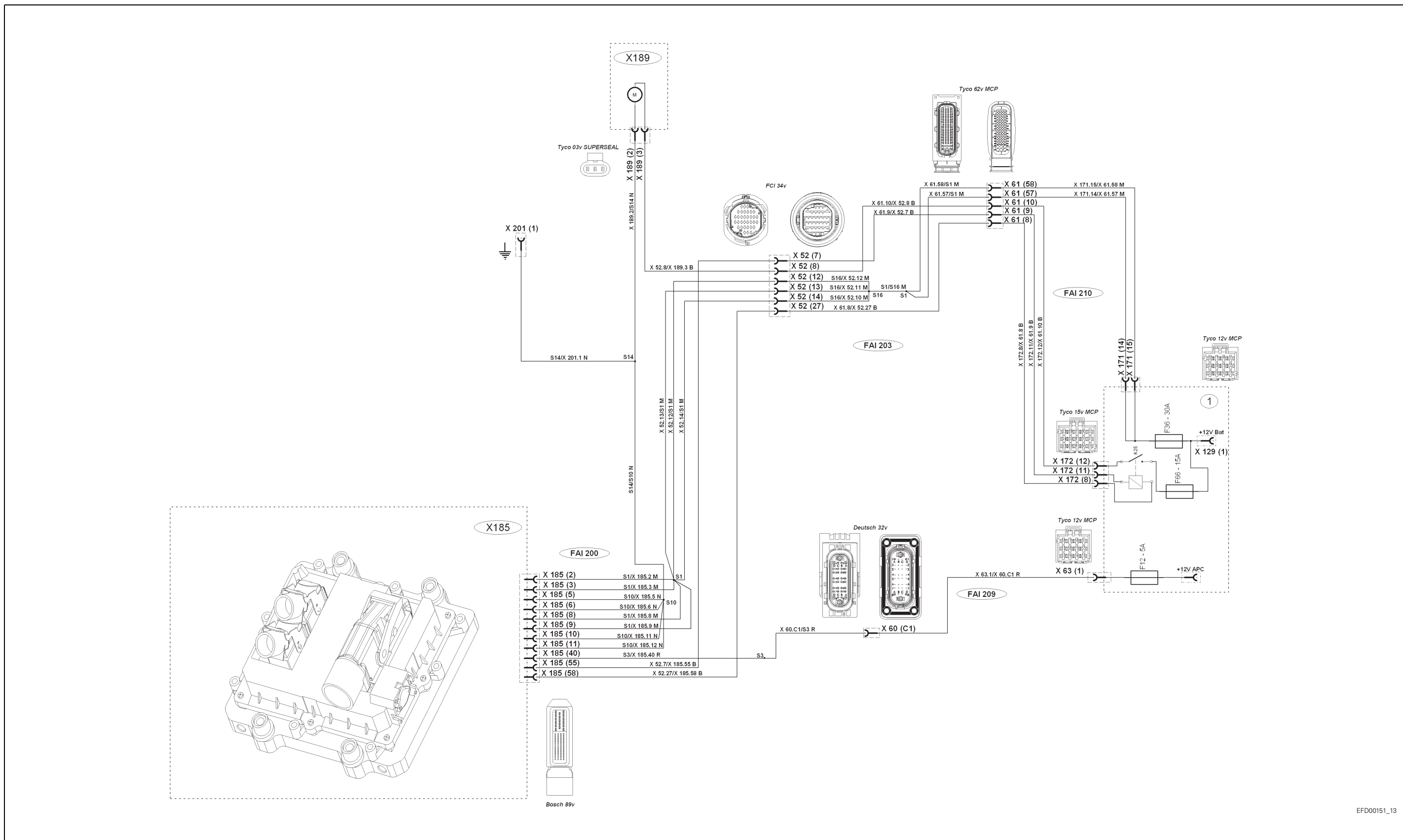
EFD00169\_5\_6

Fig. 7





A.9 Sisu EEM electronic unit electrical power supply

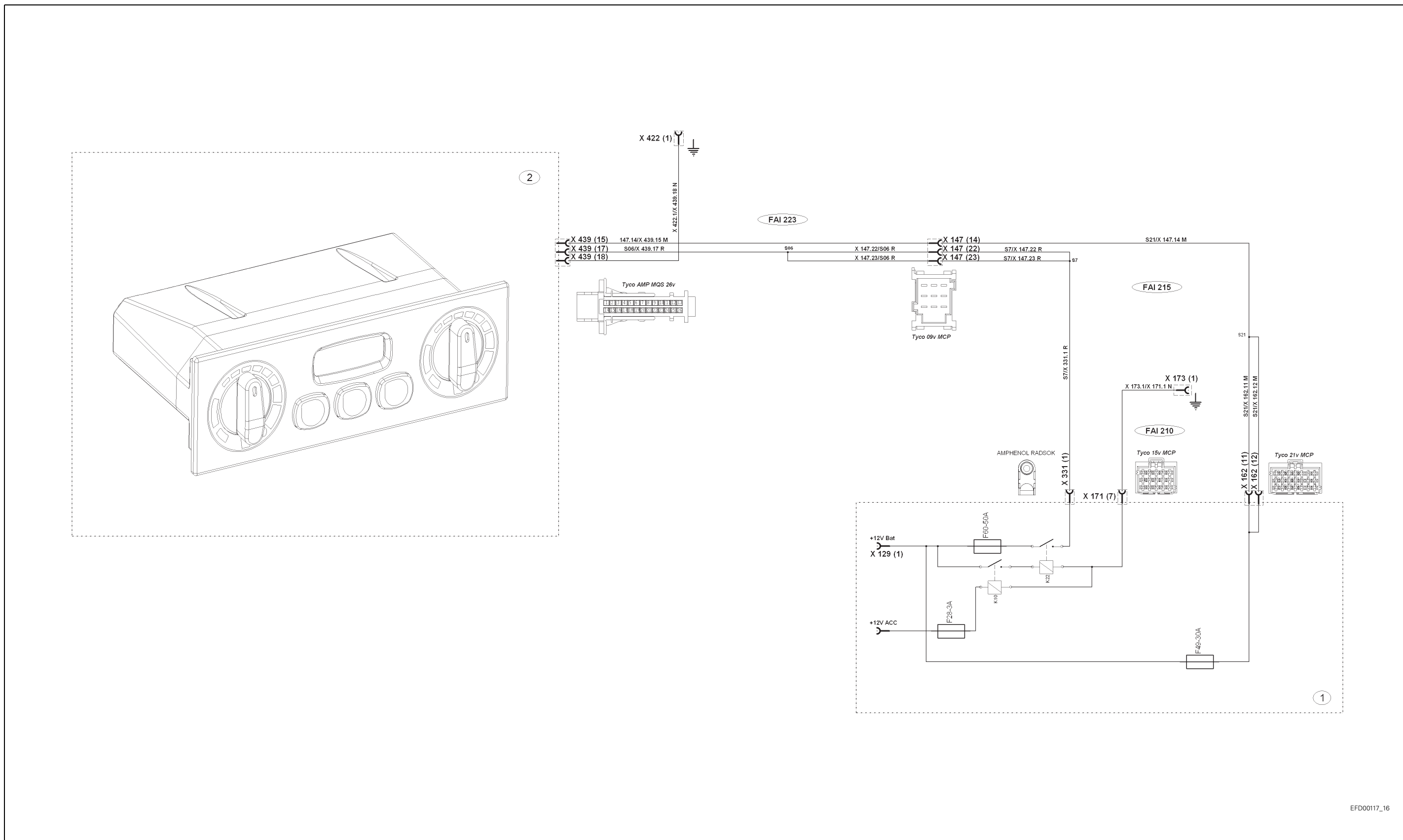


EFD00151\_13

Fig. 8



A.10 Automatic air-conditioning unit electrical power supply

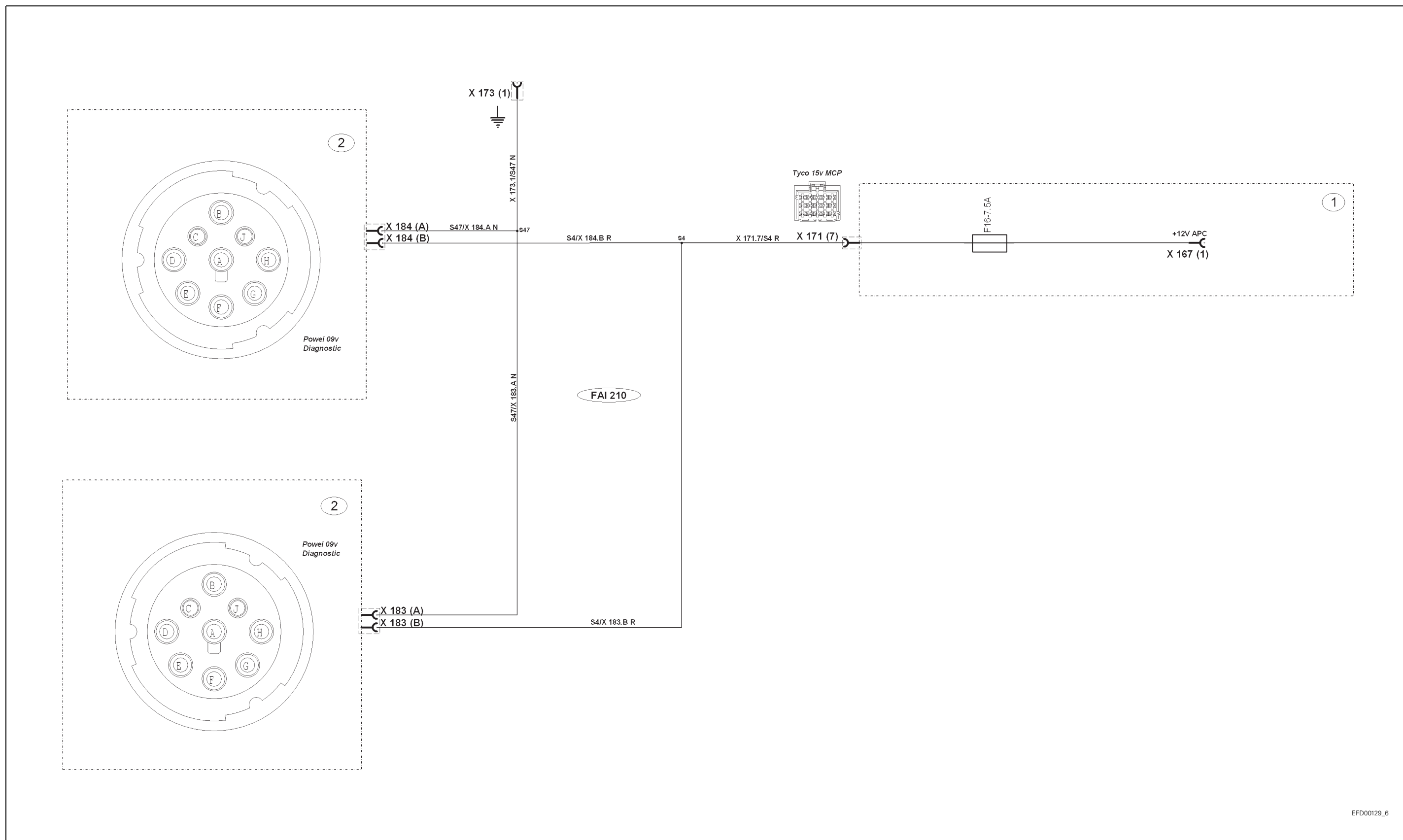


EFD00117\_16

Fig. 9



A.11 Diagnostics connector electrical power supply

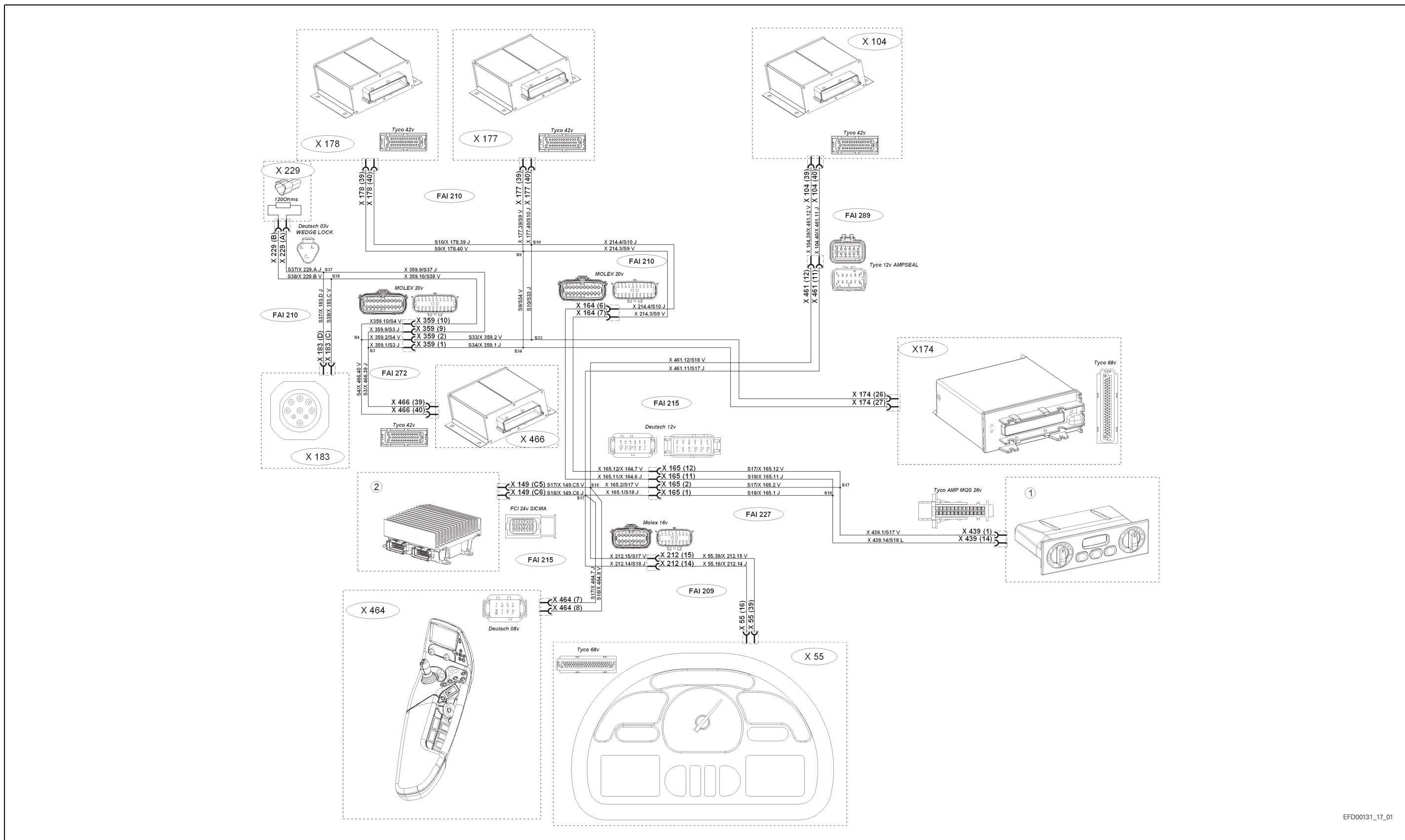


EFD00129\_6

Fig. 10



A.12 Tractor CAN network



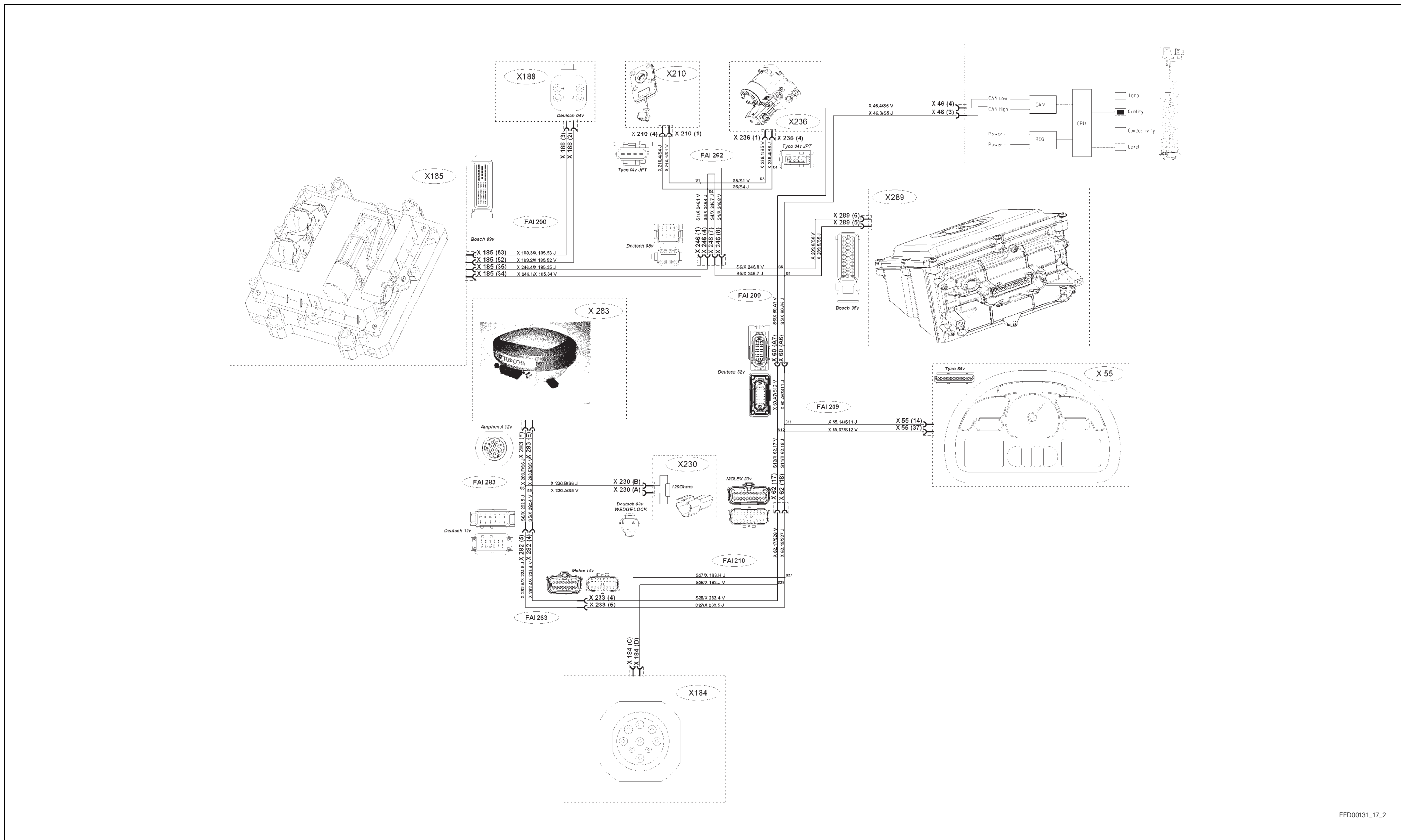
EFD00131\_17\_01

Fig. 11





A.13 Engine CAN network

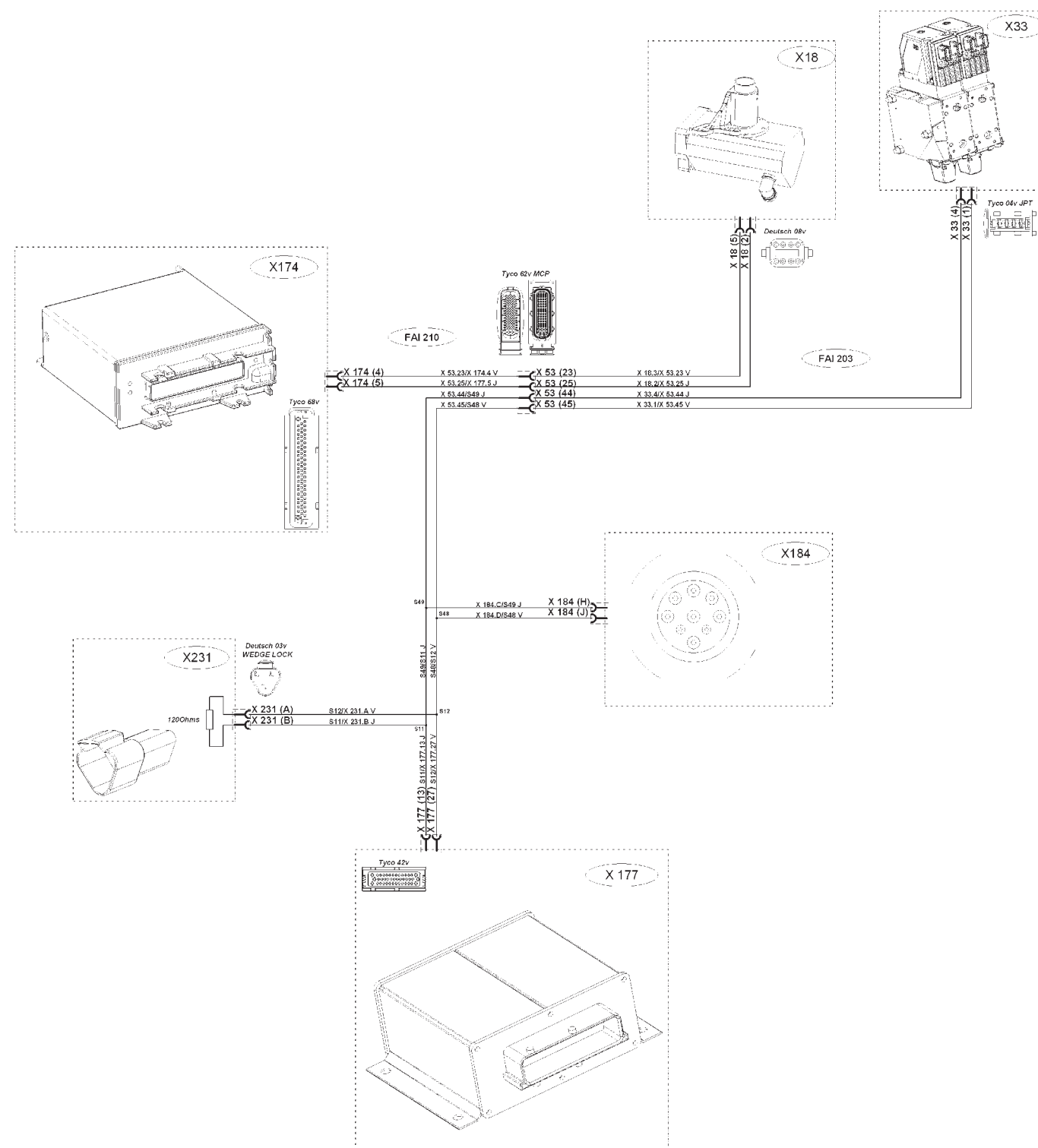


EFD00131\_17\_2

Fig. 12



A.14 Linkage CAN network

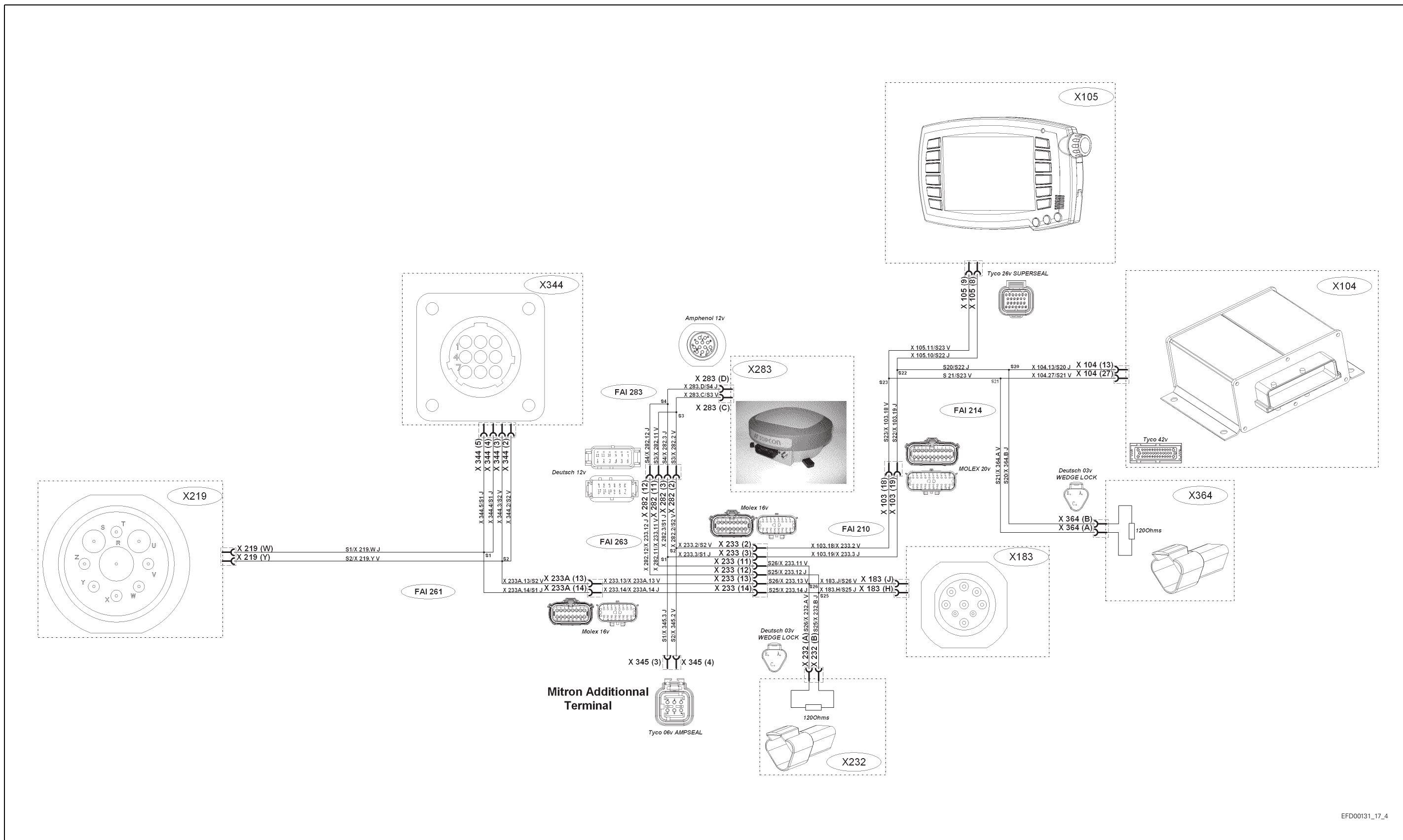


EFD00131\_17\_3

Fig. 13



A.15 Isobus CAN network

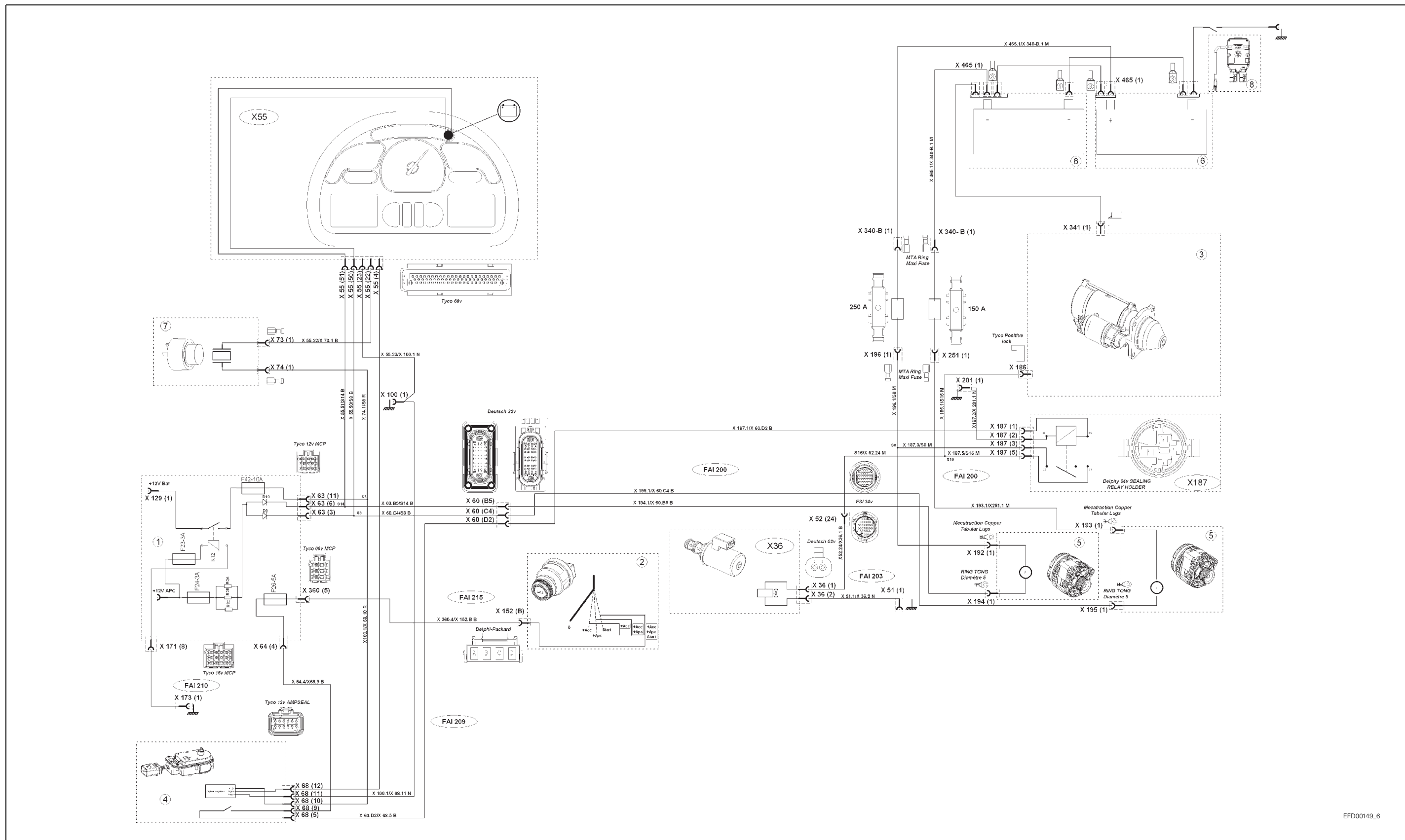


EFD00131\_17\_4

Fig. 14



A.16 Batteries - load/start-up circuit



EFD00149\_6

Fig. 15





10D13

## **Batteries - Layout of components**

### **TABLE OF CONTENTS**



10D14

## **Batteries - Tests and diagnostics**

### **TABLE OF CONTENTS**



10D15

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**TABLE OF CONTENTS**

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10D16

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10D17

## **Batteries - Disassembly and reassembly**

### **TABLE OF CONTENTS**



10D18

## **Batteries - Service tools**

### **TABLE OF CONTENTS**



10E10

## **Starter - General**

### **TABLE OF CONTENTS**

A. General .....	261
B. Principles of operation .....	261
C. Schematic diagrams .....	262



---

## A. General

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The starter is a 12 V electric motor that starts the engine. It is connected to the positive terminal of the battery by large diameter cables that can resist a high current. The earth passes through the chassis and the starter body. The starter is fitted on the right-hand side of the engine, at the same level as the engine flywheel. At start-up, it drives the ring gear on the engine flywheel.

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## B. Principles of operation

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The starter is connected to two electrical circuits:

- the power circuit, connected directly to the battery
- the control circuit, connected to the start switch

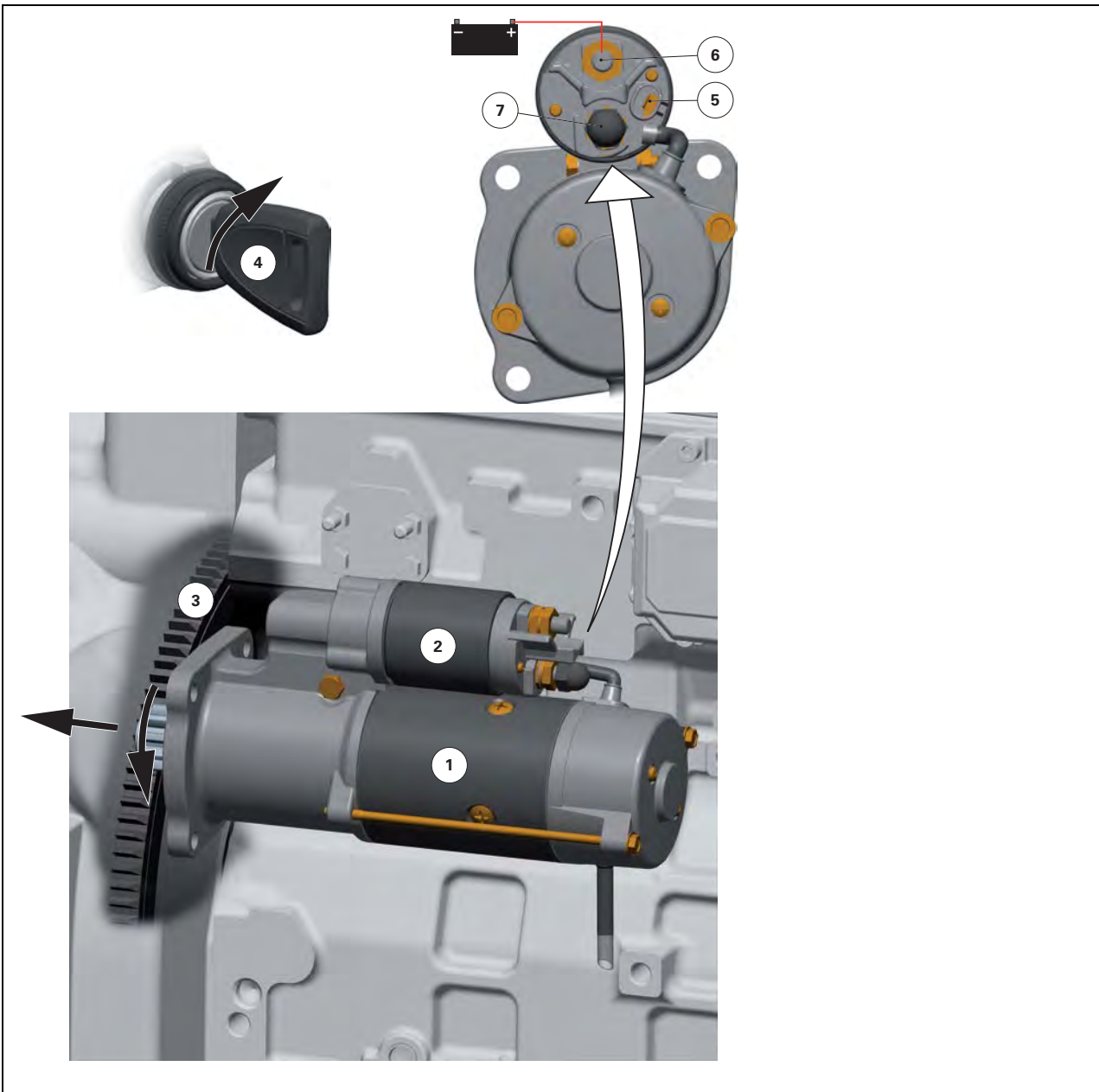
The start switch (4) in the cab operates a relay and then the solenoid (2) via the starter terminal (5).

When the solenoid moves, the starter pinion engages with the engine flywheel ring gear (3) and the starter terminals (6) and (7) are brought into contact in order to supply the starter power circuit ([Fig. 1](#)).

### C. Schematic diagrams

- 1- Starter
- 2 Solenoid
- 3 Ring gear
- 4 Start switch
- 5 Solenoid supply
- 6 Power supply
- 7 Starter supply

Starter schematic diagrams



1011018

Fig. 1



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10E12

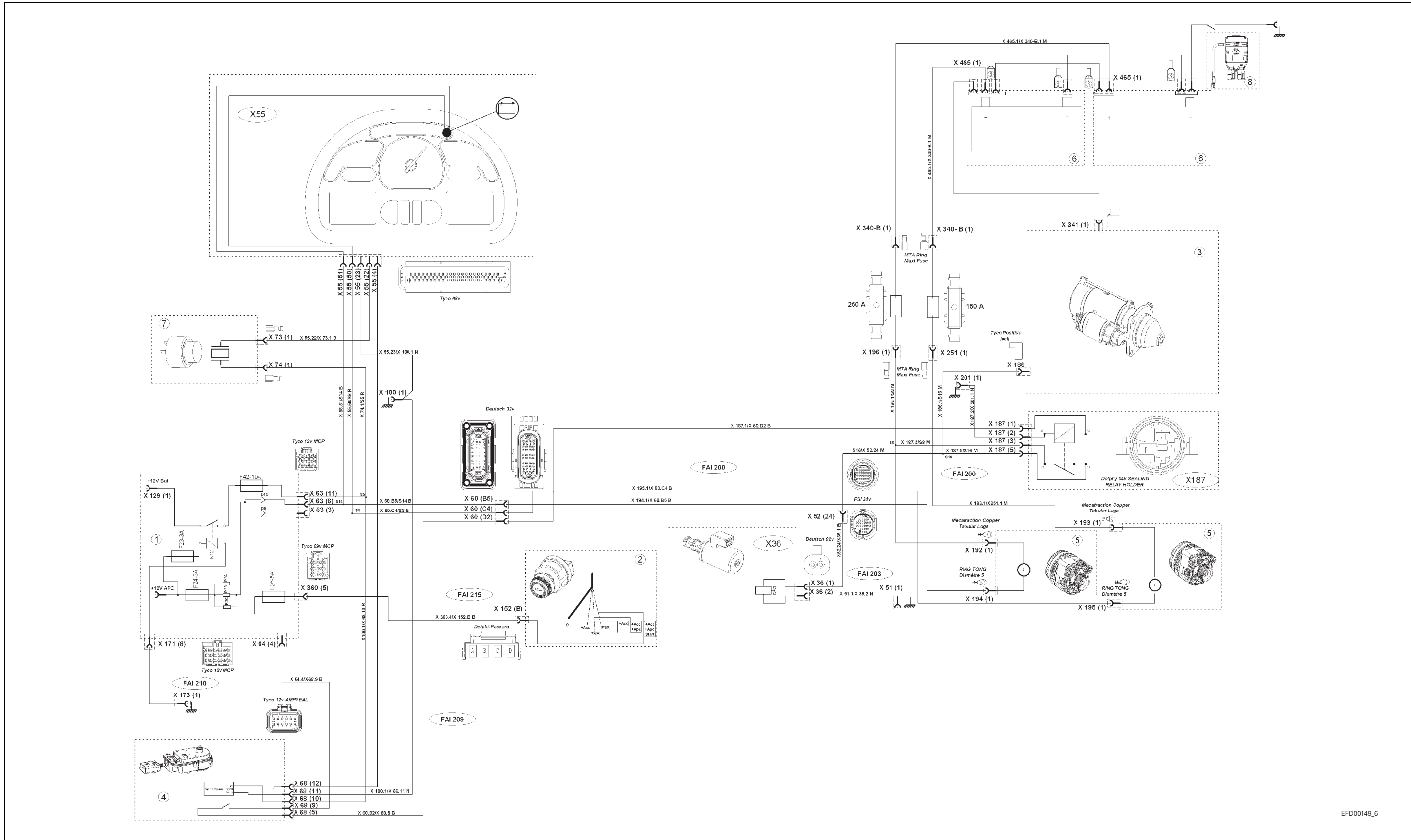
## **Starter - Diagrams and plans**

### **TABLE OF CONTENTS**

D. Batteries - load/start-up circuit .....	267
--	-----



**D. Batteries - load/start-up circuit**



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Fig. 1



10E13

## **Starter - Layout of components**

### **TABLE OF CONTENTS**

A. Layout of components .....271





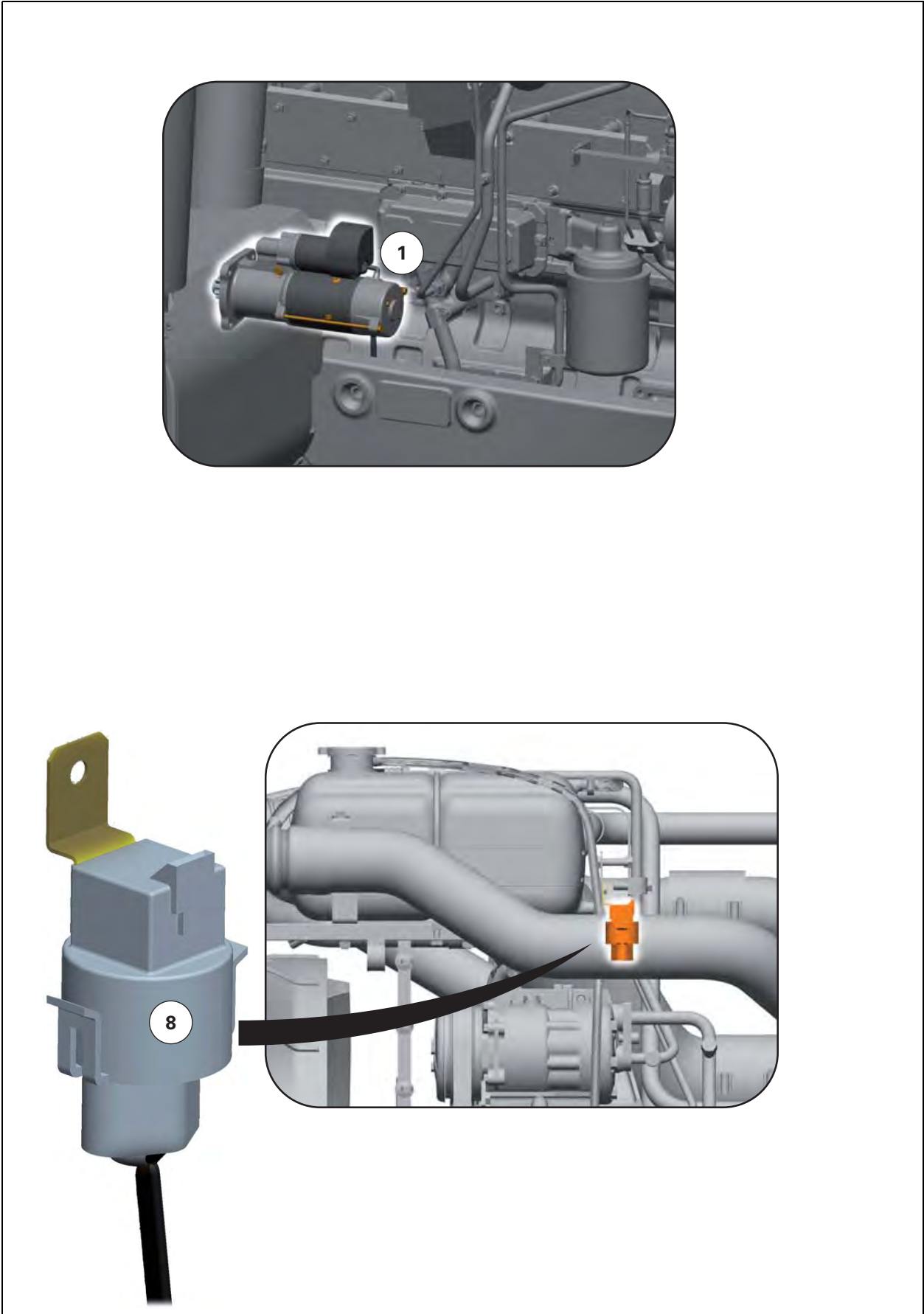
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## **A. Layout of components**

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- 1- Starter
- 8 Starter relay

Location of starter components



1011041

Fig. 1





10E14

**Starter - Tests and diagnostics**

**TABLE OF CONTENTS**

A. Diagnostics .....277



---

## A. Diagnostics

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<b>Fault</b>	<b>Possible cause</b>	<b>Check point</b>
The solenoid is working	Flat battery	Check whether the batteries are charged, then recharge them or replace them if necessary
	Disconnected cables or battery terminals	Check that the battery terminals and the earth and supply cables are connected properly
	Faulty starter	Remove the starter, check that it is working on a workbench and replace it if necessary
The solenoid is not working	The solenoid is not supplied with power	Check the solenoid connection and supply
	The start relay is faulty	Check the start relay connection and supply
	Flat battery	Check whether the batteries are charged, then recharge them or replace them if necessary
	Disconnected cables or battery terminals	Check that the battery terminals and the earth and supply cables are connected properly
	Faulty starter	Remove the starter, check that it is working on a workbench and replace it if necessary





10E15

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**TABLE OF CONTENTS**

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10E16

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10E17

## **Starter - Disassembly and reassembly**

### **TABLE OF CONTENTS**

A. Removing and refitting the starter.....285



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## A. Removing and refitting the starter

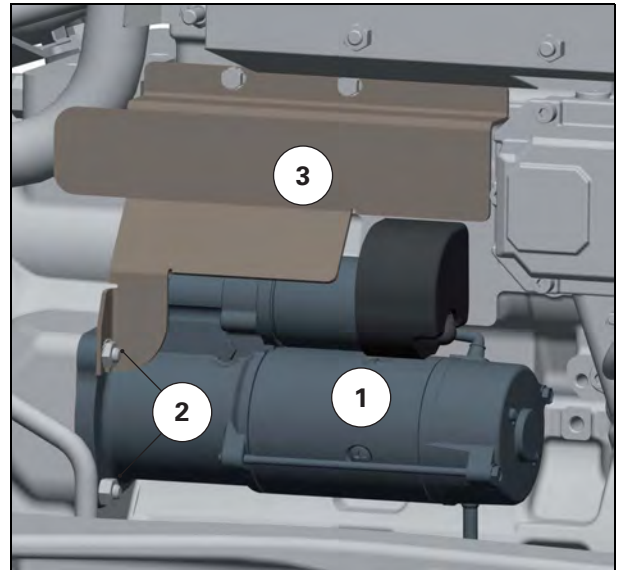
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### *Removing the starter*

- 21.** Disconnect the batteries.
- 22.** Remove the protection plate (3) for the supply cables of the starter (1).
- 23.** Disconnect the supply for the starter and the solenoid.
- 24.** Remove the nuts (2).
- 25.** Remove the starter (1).

### *Refitting the starter*

- 26.** Carry out the removal steps in reverse order.
- 27.** Tighten the starter nuts (2) to a torque of 60 Nm.



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Fig. 1





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**TABLE OF CONTENTS**

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