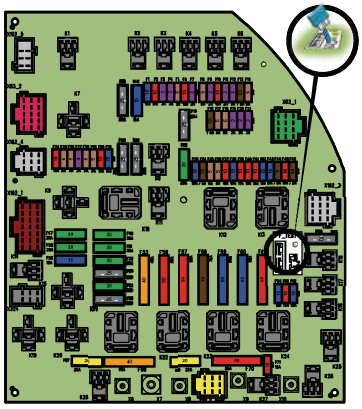
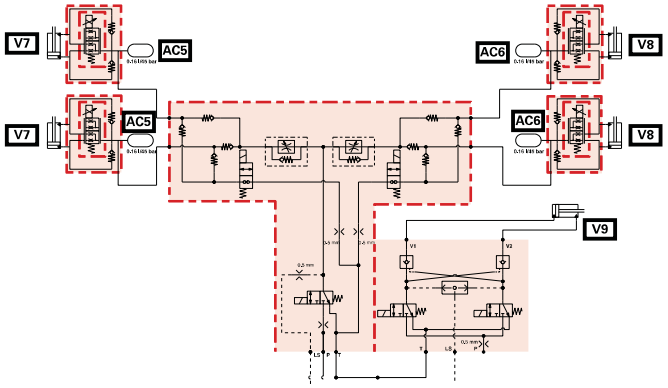
Workshop Service Manual

Technician Service Book - MF 8600 T4i

HA260
ML260

Electrical and hydraulics diagrams





AGCO S.A. - Beauvais - France - RC B562 104 539
MASSEY FERGUSON is a worldwide brand of AGCO

December 2014
No. 4346908M3
8600T4i - EAME
English

Rear axle transmission	
Pneumatic trailer braking pressure	6,5 bar to 8 bar
Hydraulic trailer braking pressure	0 to 150 bar
Maximum operating tilt	25° pitch (front/rear)
	25° roll (right/left)
	17° combined
Transmission preheater	110 volts/150 watt
Total loaded weight supported by rear axle	11500 kg

Front axle	
Front axle brand	DANA
Axle type	Suspended or fixed
Supplier reference	Fixed: – 770/504 (standard) – 770/510 (option)
	Suspended: – 770/618 (standard) – 770/624 (option)
Rotational direction	Clockwise
Front axle weight	Fixed: – 770/504: 770 kg – 770/510: 830 kg
	Suspended: – 770/618: 1077 kg – 770/624: 1230 kg
Total loaded weight supported by front axle	9000 kg
Recommended oil type (beam and final drive)	SAE 85 W 90 (API GL4)
Total ratio for front axle	16.862
Number of teeth on final drive	14 x 35 x 85
Final drive ratio	7.071
Number of pinion/ring gear teeth	13/31
Number of differential discs	15 discs
Maximum steering angle	55°
Oscillation angle	± 9°
Type of oscillation stop	Mechanical
Steering ram diameter	90 mm x 45 mm (front axles 770/504 and 770/618)
	110 mm x 60 mm (front axles 770/510 and 770/624)
Steering ram stroke	2 x 143,5 mm (front axles 770/504 and 770/618)
	2 x 146 mm (front axles 770/510 and 770/624)
Suspension type	Hydraulics
Suspension ram diameter	90 mm x 100 mm
Suspension ram stroke	100 mm
Hydraulic control unit brand	Husco
Hydraulic control unit nominal pressure	200 bar
Number of accumulators	2
Accumulator pressure	Left 1 l : 10 bar
	Right 1,4 l : 50 bar

Engine	
Firing order	1-5-3-6-2-4
Maximum pressure in the high-pressure system	1800 bar
Injector brand	Bosch
Injector type	CRIN 3/8 holes
Charge pump type	Manual
Fuel prefilter filtration capacity	25 µ
Main fuel filter filtration capacity	5 µ
Low-pressure system pressure at minimum speed	0,5 bar to 8,5 bar
Low-pressure system pressure at maximum speed	0,5 bar to 8,5 bar
Recommended oil:	API CJ4 or ACEA E9
Maximum operating tilt (precautions)	25° pitch
	20° roll
Oil/fuel consumption	Maximum 0.1%
Lubrication system	Gear pump at the bottom of the timing
Oil cooling system	Cooler integrated into the engine (left side)
Oil pressure at minimum speed	1 bar
Oil pressure at maximum speed	2,5 bar at 5 bar depending on the temperature
Relief valve adjustment pressure	5 bar (spring pressure)
Air suction type	Turbocharged with air/air intercooler
Air preheating type	Grid heater with relay controlled by the ECU
Number of valves	24
Valve clearance value	0,35 mm (inlet and exhaust)
Engine cooling system	Water cooling
Fan type	Vistronic fan
Thermostat begins to open at	82 °C
Liquid temperature of coolant	-35 °C to 108 °C
Air compressor brand for the brake system	Knorr Bremse
Type of compressor	Piston
Pressure range:	6,5 bar to 8 bar
Block preheater	110 or 220 volts
Fuel preheater	Accessory kit available
Urea preheater	Tank and gauge: coolant
	Pump module and supply lines: electric
Exhaust fumes recirculation system	DOC + SCR system
DOC + SCR system (AdBlue™ or DEF injection)	DOC with metal substrate (exhaust fumes oxidation catalyser)
	SCR with ceramic substrate (exhaust fume treatment)
Safety system	NOx sensors at exhaust inlet and outlet
Device brand	Bosch Denox 2.2
Type of control	Engine controller EEM4
Urea solidification temperature	-11 °C

Front power take-off	
Ratio	2.04
Clutch type	Hydraulics
Splined shaft type	6 and 21 in 1"3/8

Electric	
Battery brand	TAB
Battery specifications (2 batteries)	12 V - 105 A/H
Maximum current at start-up (IEC standard)	1010 A
Starter type	12 V noseless
Starter power	4.2 kW
Alternator type	2 x 14 V/80 A (160 A) or 2 x 14 V/120 A (240 A)
Current available on ISOBUS connector	50 A

Electronics	
Function of each controller	
instrument panel	Instrument panel
EXT Lite	Transmission, ParkLock function and front axle suspension
3 Autotronic 5 DC	Linkage/Armrest/Semi-active cab
PVG 32 valves	Electrohydraulic spool valves
Lights module	User interface for lights
Lighting controller	Lighting control
1 EEM4 (ECM Tier 4i AGCO Power)	Engine and SCR Denox 2.2 system
1 Orbitrol Danfoss valve	Orbitrol for the Auto-Guide™/SpeedSteer function
Datatronic CCD	Onboard computer
Automatic air conditioning module	Air conditioning
CAN switches key pad	Controls for several tractor functions, such as 4WD, differential lock, suspension, and Auto-Guide™.
AM50 unit	AGCOMMAND (telemetry)

Cab and fittings	
Type of cab suspension available	Semi-active
Type of rear-view mirror control available	Manual or automatic
Type of air conditioning control available	Manual or automatic
Type and brand of air conditioning compressor	SANDEN with axial pistons
Compressor displacement	154.9 cm3/rev.
Refrigerant	R134a
Cab noise level	71 DBA
Roof type	Standard or with window

Model MF 8690

Engine	
Brand	AGCO Power
Type	84 AWI-4V
Nominal power (ISO TR14396) at 2200 rpm	340 hp

1 Forward speed for all models with Dyna-VT transmission

Tractor version 50 km/h*

*depending on country legislation.

For the 40 km/h version, the speed is electronically controlled.
For the 40 km/h version, the tractor reaches maximum speed at 1600 rpm.
For the 50 km/h version, the tractor reaches maximum speed at 1900 rpm.

Continuous variation mode		
	Forward	**Reverse**
Slow speed range (Tortoise)	0,03 km/h to 28 km/h	0,03 km/h to 16 km/h
High speed range (Hare)	0,03 km/h to 40 km/h or 50 km/h depending on version.	0,03 km/h to 38 km/h

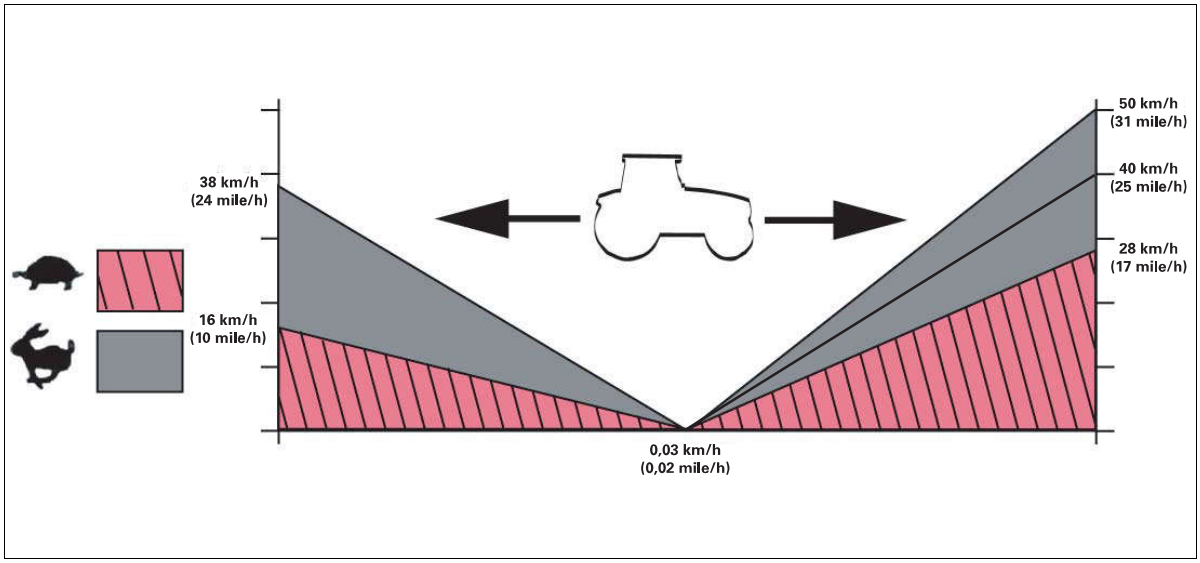


Fig. 1. I006017

2 Attachment points: All models with 5 t front linkage

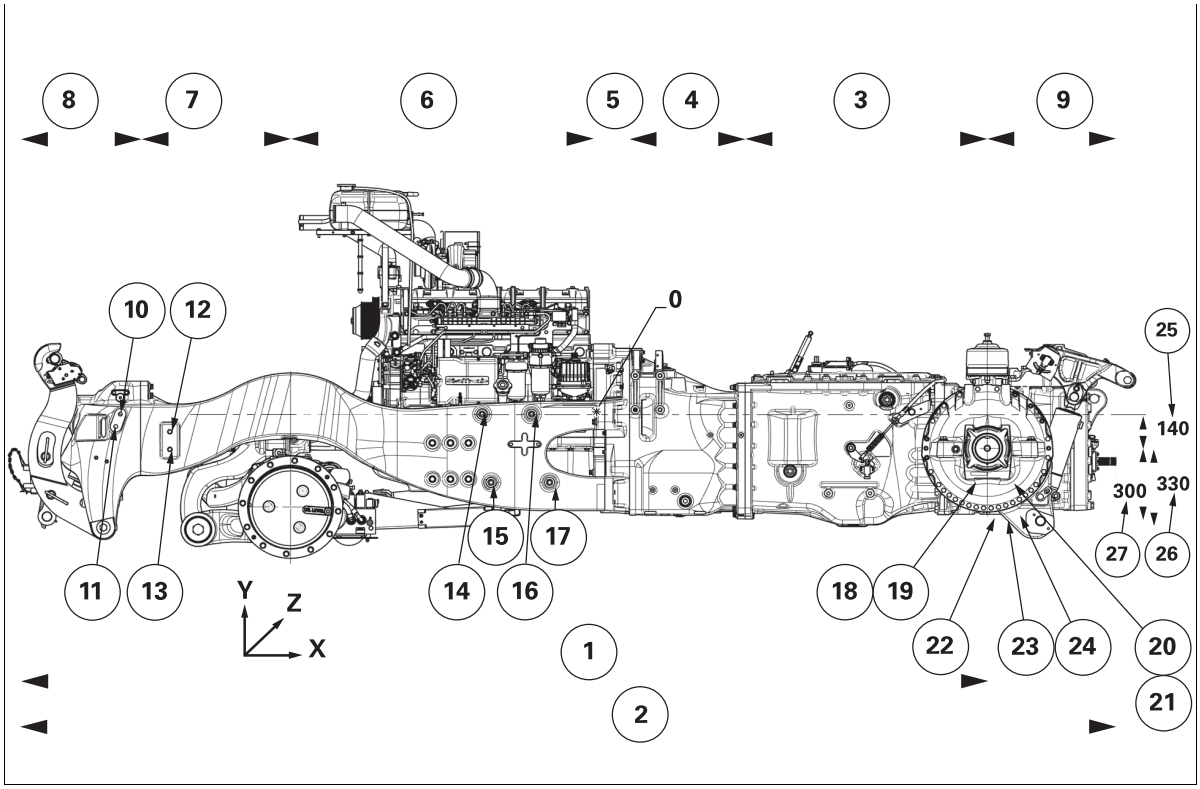


Fig. 3. I025652

NOTE: *Values x, y and z represent reference point 0 of the tractor.*

Reference		X	Y	Z
1	4276.3 mm			
2	4846.7 mm			
3	1075 mm			
4	512 mm			
5	161,3 mm			
6	1343,9 mm			
7	665,1 mm			
8	519 mm			
9	570,5 mm			
10	M20	-2099 mm	±410 mm	15 mm
11	M20	-2119 mm	±410 mm	-41,5 mm
12	M20	-1879 mm	±225 mm	-64,9 mm
13	M20	-1879 mm	±225 mm	-144,9 mm
14	M20 tapered alignment screw	-494 mm	±294 mm	15 mm
15	M20 tapered alignment screw	-454 mm	±284 mm	-294,9 mm
16	M20 tapered alignment screw	-274 mm	±294 mm	15 mm

1 Retaining compounds and sealing products

General

The Loctite compounds mentioned in this manual are referred to by their industrial name.

For repair purposes, use their commercial names or the corresponding Massey Ferguson references listed in the table below.

Loctite product type	Operation
221	Standard threadlock
241	
242	Medium threadlock
270	Strong threadlock
496	Glue (for metals)
510	Standard sealant
518	Sealant for flat surfaces and paper seals
542	Thread sealant
549	Oil-resistant surface sealant
573	Surface sealant (engine, gearbox)
574	
577	Threaded union sealant (prevents loosening and leakages caused by vibrations)
603	Retainer for cylindrical assemblies (bearings, rings etc.)
638	Strong retainer for cylindrical assemblies (bearings, rings etc.)
648	Strong retainer for cylindrical assemblies (resistant to high temperatures)
706	Degreasing cleaner
5206	Metallic surface sealant (gearbox housing, engine sump)
5910	± Flexible surface sealant
5922	Sealant paste for ± flexible unions (sensor attachments etc.)
7100	Leakage detector for pneumatic systems

NOTE: *Use the product "Form A gasket 2" when sealing between plastic material and cast iron or steel.*

Application method for Loctite products

1. Remove all traces of previous sealants and corrosion
   - mechanically: wire brush or emery cloth
   - chemically: "DECAPLOC 88" (Leave the product to take effect then scrape off and wipe clean).
2. Degrease the components with dry solvent: preferably use "Super Solvant Sec LOCTITE 706".
3. Allow the solvents to evaporate
4. Apply the recommended type of LOCTITE product to the parts:
   - for blind tapped holes, apply a quantity of the product to the last threads at the bottom of the hole.
   - for cylindrical fittings, apply the product on the two mating faces using a clean brush.
   - for mating faces, apply a bead to one of the two faces, circling the holes, and then tighten as quickly as possible.

   NOTE:
   - *Do not use too much of the compound, in order to avoid locking adjacent parts.*
   - *Do not attempt to retighten after 5 minutes of curing, in order to avoid breaking the film of compound.*
   - *If the ambient temperature is less than +10 °C, and to ensure quicker setting of Loctite products, (except SILICOMET), use LOCTITE T 747 activator after phase 2 on at least one of the two parts. Excess product outside the joint will not harden (anaerobic products — curing takes place only when there is no oxygen).*

Parking brake indicator light 
Activating condition(s) – Indicator light permanently on = parking brake engaged

Grid Heater indicator light 
Activating condition(s) – Indicator light permanently on = Grid Heater activated: Preheating when the ignition key is in the pre-heating position, then post-heating for 40 seconds after the engine has started.

Engine air filter blockage indicator light 	
Activating condition(s) – Indicator light permanently on = engine air filter blocked	
Cause(s)	**Solution(s)**
Air filter blocked	Clean the air filter.
Air filter blockage switch faulty	Contact the dealer.

Indicator light displayed when an error code occurs	No.		FMI	Components concerned	Causes
	E	157	20	Rail pressure sensor	Pressure above the maximum value
	E	157	(21)	Rail pressure sensor	Pressure below the minimum value
	E	157	(31)	Rail pressure sensor	Leakage detected
	E	168	0	Battery voltage	Battery voltage VERY HIGH (>17 V)
	E	168	1	Battery voltage	Battery voltage VERY LOW (<7.8 V)
	E	168	3	Battery voltage	Battery voltage ABOVE NORMAL
	E	168	4	Battery voltage	Battery voltage BELOW NORMAL
	E	171	3	Ambient temperature sensor	Temperature above normal
	E	171	4	Ambient temperature sensor	Temperature below normal
	E	171	(10)	Ambient temperature sensor	Signal inconsistent
	E	171	(19)	Ambient temperature sensor	CAN signal missing
X	E	174	0	Fuel temperature sensor	Fuel inlet temperature high, ALARM (> 85 °C)
X	E	174	3	Fuel temperature sensor	HIGH fuel temperature sensor fault
X	E	174	4	Fuel temperature sensor	LOW fuel temperature sensor fault
	E	190	(16)	Engine protection	Engine speed above normal
	E	626	3	Grid Heater	Inlet air heater control, voltage above normal
	E	626	5	Grid Heater	Inlet air heater control, voltage below normal
	E	626	9	Grid Heater	Inlet air heater control, voltage above normal or in short circuit to earth
	E	639	(19)	CAN bus	Vehicle CAN bus fault (250K)
	E	651	5	Injector no. 1	Current below normal: open circuit
	E	651	6	Injector no. 1	Current above normal: short circuit between the cables

Indicator light displayed when an error code occurs	No.		FMI	Components concerned	Causes
	E	52 02 30	(31)	Engine protection	Specification fault
	E	52 02 31	(31)	All applications	Power take-off input error
	E	52 02 32	(31)	All applications	Incorrect digital input configuration
	E	52 02 33	(31)	OCWDA (WDA/ABE cut-off operation condition)	Diagnostic error
	E	52 02 34	(31)	OCWDA (WDA/ABE cut-off operation condition)	Diagnostic error
	E	52 02 35	(31)	OCWDA (WDA/ABE cut-off operation condition)	Diagnostic error
	E	52 02 36	(31)	OCWDA (WDA/ABE cut-off operation condition)	Diagnostic error
	E	52 02 37	(31)	User 1 error	Digital input
	E	52 02 38	(31)	User 2 error	Digital input
	E	52 02 39	3	AdBlue™ or DEF metering valve after cooler	Short circuit to +12 V
	E	52 02 39	5	AdBlue™ or DEF metering valve after cooler	Open circuit
	E	52 02 39	6	AdBlue™ or DEF metering valve after cooler	Short circuit to earth
	E	52 02 40	(31)	Injectors	Harness 0 in short circuit
	E	52 02 41	(31)	Injectors	Harness 1 in short circuit
	E	52 02 42	(31)	Injectors	Harness 2 in short circuit

Indicator light displayed when an error code occurs	No.		Components concerned	Causes
X	T	41 A2	**X18** - Transmission control module **X174** - EXT Lite transmission controller (96-pin) for Dyna-VT transmission **X598** - EXT Lite transmission controller (58-pin)	The CAN network control is interrupted
X	T	41 A3	**X18** - Transmission control module	Increment sensor signal (internal actual position sensor) interrupted or illogical
X	T	41 A4	**X18** - Transmission control module	Transmission controller signal interrupted or illogical
X	T	41 A5	**X18** - Transmission control module	Reference output (Position "0") not found at start-up
X	T	41 A6	**X18** - Transmission control module	Reference point signal interrupted during operation
	T	41 B0	CAN network	Initialisation error
X	T	41 B1	**X174** - EXT Lite transmission controller (96-pin) for Dyna-VT transmission **X598** - EXT Lite transmission controller (58-pin)	Illogical range shift
	T	41 B2	**X174** - EXT Lite transmission controller (96-pin) for Dyna-VT transmission **X598** - EXT Lite transmission controller (58-pin)	Faulty programming
	T	41 B3	**X174** - EXT Lite transmission controller (96-pin) for Dyna-VT transmission **X598** - EXT Lite transmission controller (58-pin)	Faulty programming
	T	41 B4	**X174** - EXT Lite transmission controller (96-pin) for Dyna-VT transmission **X598** - EXT Lite transmission controller (58-pin)	Faulty programming
X	T	41 B5	**X174** - EXT Lite transmission controller (96-pin) for Dyna-VT transmission **X598** - EXT Lite transmission controller (58-pin)	Faulty programming
	T	41 B7		Temperature sensor fault
	T	41 BB		The tractor is moving faster than the maximum authorised speed
	T	41 BC		Range selection condition not satisfied. Restart range selection.
	T	41 BE		The range has not been selected. Neutral position. Restart range selection.

10 Suspended front axle error codes - MF 8600 T4i

No.		Components concerned	Causes
FA	111	EXT Lite	Calibration fault
FA	121	**X166** - Suspended front axle position sensor	Sensor value too low
FA	122	**X166** - Suspended front axle position sensor	Sensor value too high
FA	124	**X166** - Suspended front axle position sensor	Calibration too low
FA	125	**X166** - Suspended front axle position sensor	Calibration too high
FA	131	**X154** - Suspended front axle lifting solenoid valve	Open circuit or short circuit to +12 V
FA	132	**X154** - Suspended front axle lifting solenoid valve	Short circuit to earth (-)
FA	133	**X154** - Suspended front axle lifting solenoid valve	Undetermined error
FA	134	**X159** - Suspended front axle lowering solenoid valve	Open circuit or short circuit to +12 V
FA	135	**X159** - Suspended front axle lowering solenoid valve	Short circuit to earth (-)
FA	136	**X159** - Suspended front axle lowering solenoid valve	Undetermined error
FA	137	**X161** - Solenoid valve 1 for suspended front axle suspension	Open circuit or short circuit to +12 V
FA	138	**X161** - Solenoid valve 1 for suspended front axle suspension	Short circuit to earth (-)
FA	139	**X161** - Solenoid valve 1 for suspended front axle suspension	Undetermined error
FA	141	**X163** - Solenoid valve 2 for suspended front axle suspension	Open circuit or short circuit to +12 V
FA	142	**X163** - Solenoid valve 2 for suspended front axle suspension	Short circuit to earth (-)
FA	143	**X163** - Solenoid valve 2 for suspended front axle suspension	Undetermined error

3 - Fuse box, electrical diagrams, harnesses, hydraulics diagrams and pneumatic diagrams

Rear view of fuse box

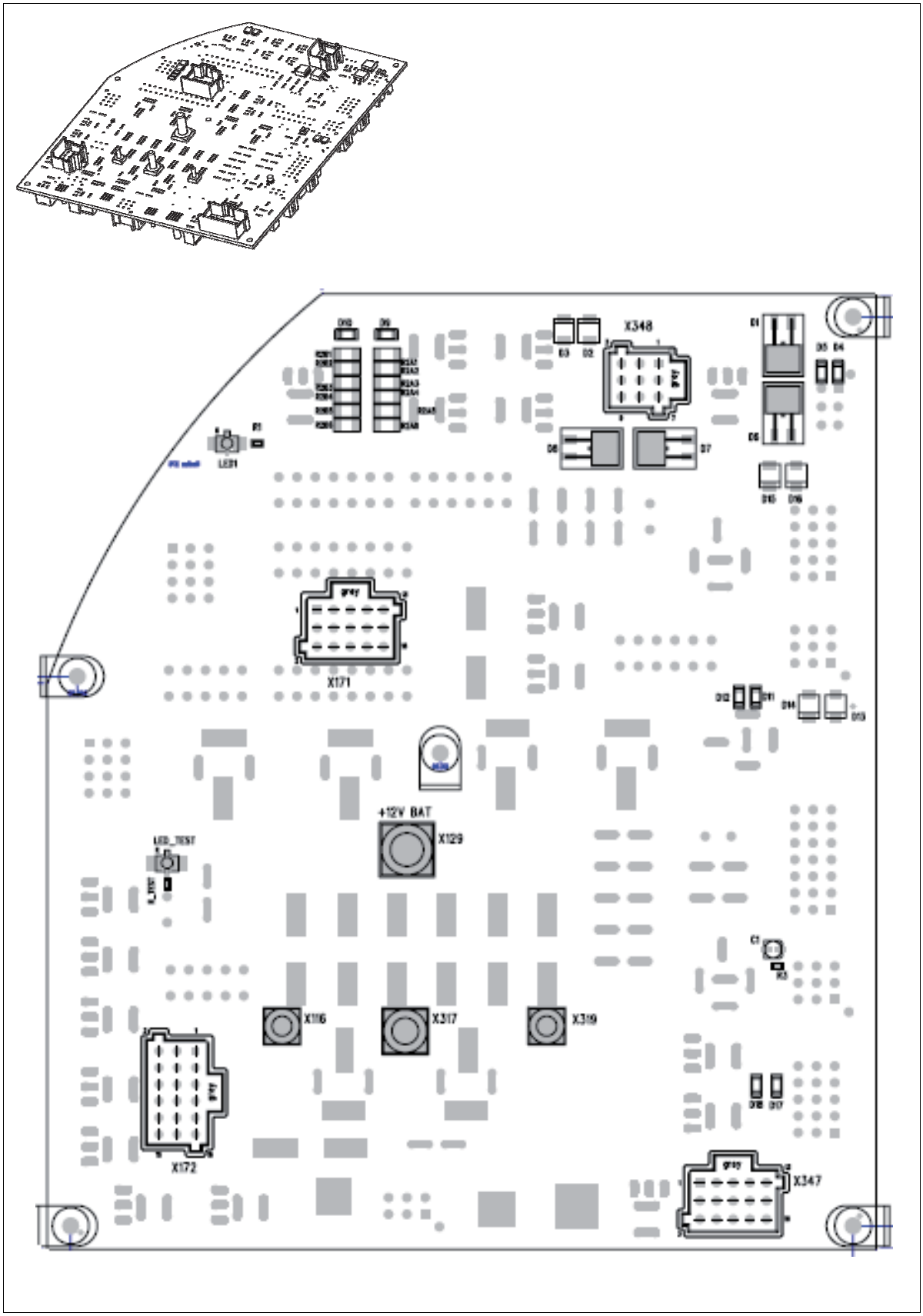


Fig. 2.

I025681

X175 - Emergency control switch
X176 - Earth (transmission controller)
X177 - Linkage controller
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) - AGCO Power 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)

X593 - Connection between the cab interior harness and the Datatronic CCD harness
X594 - AgCommand™ unit
X595 - AgCommand™ reserve
X596 - General power supply relay
X597 - AdBlue™ or DEF suction line heater relay
X598 - EXT Lite transmission controller (58-pin)
X599 - 540 rpm PTO solenoid valve
X600 - Adflow sensor
X601 - Provision
X602 - GSPTO switch
X603 - Creeper unit switch
X604 - Economy PTO switch
X605 - Engine harness/exhaust harness connection
X606 - Secondary fuse box connector 1
X607 - Secondary fuse box connector 2
X608 - Connection between the cab exterior harness and the right-hand work light harness
X609 - Connection between the cab exterior harness and the left-hand work light harness
X610 - Connection between the pillar harness and the roof harness
X611 - Connection between the pillar harness and the roof harness
X612 - Creeper unit switch power supply
X613 - Connection between the cab transmission harness and the cab linkage control harness
X614 - Connection between the cab transmission harness and the cab lighting harness
X615 - Connection between the cab transmission harness and the cab lighting harness
X616 - GSPTO switch power supply
X617 - Economy PTO switch power supply
X618 - Hand brake switch
X619 - Road/field mode switch
X620 - + speed selector switch
X621 - - speed selector switch
X622 - Validation switch
X623 - Connection between the cab exterior transmission harness and the engine harness
X624 - Connection between the cab exterior transmission harness and the cab exterior lighting harness
X625 - Rear linkage lowering switch on the right-hand fender
X626 - Rear linkage lowering switch on the left-hand fender
X627 - Connection between the cab exterior lighting harness and the exterior cab suspension harness
X628 - Connection between the cab exterior lighting harness and the PTO speed harness
X629 - Left-hand brake wear sensor
X630 - Right-hand brake wear sensor
X631 - Auto-Guide™ passive connector
X632 - Dual relay Isobus
X633 - Cab harness/Auto-Guide™ harness connection
X634 - CAN extension
X635 - Auto-hitch extension switch
X636 - Auto-hitch retraction switch
X637 - MEAS sensor
X638 - Connection between the fuse holder board and the hazard warning light unit

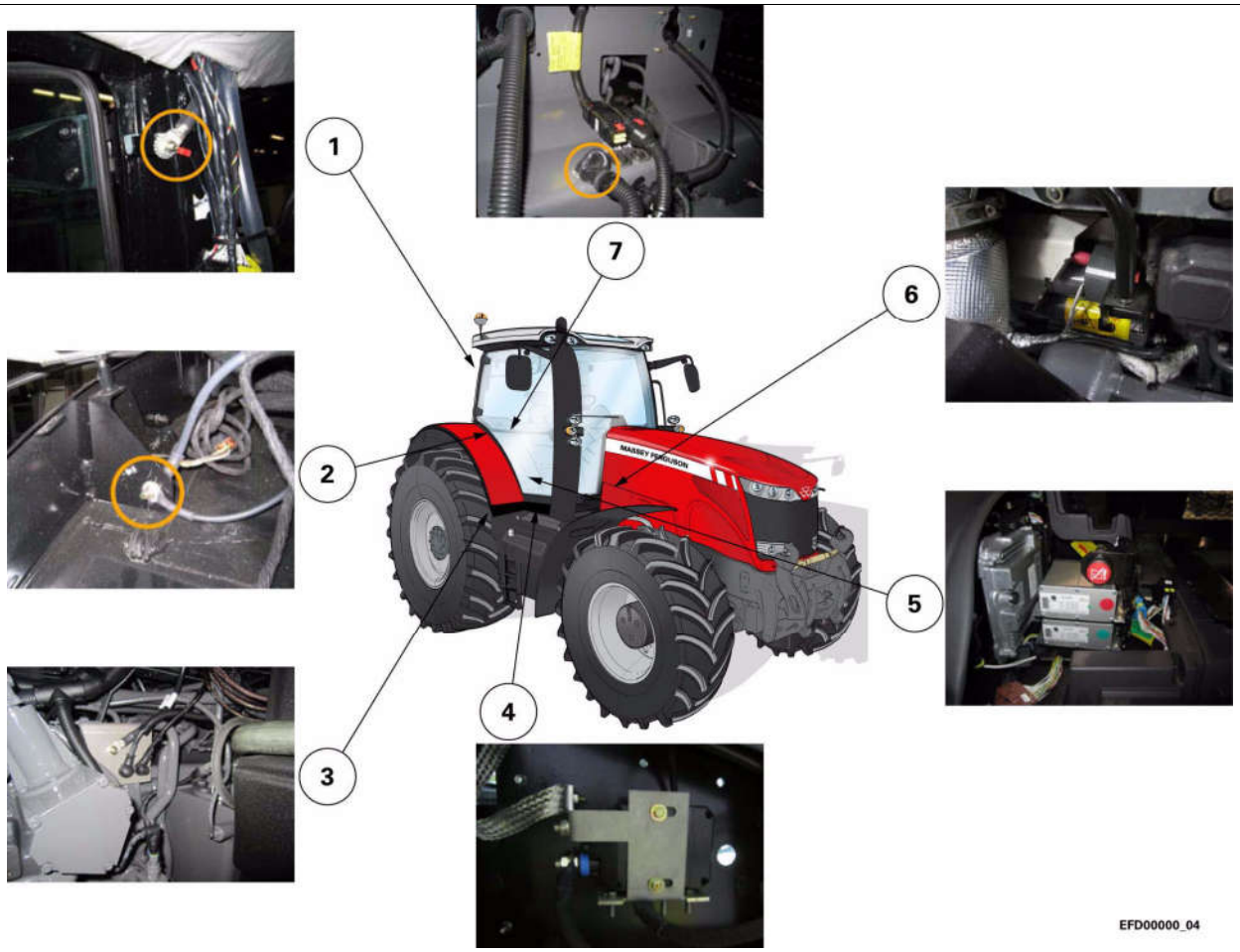


Fig. 7.

I028351

2.16 EFD00114_28 - NA radio

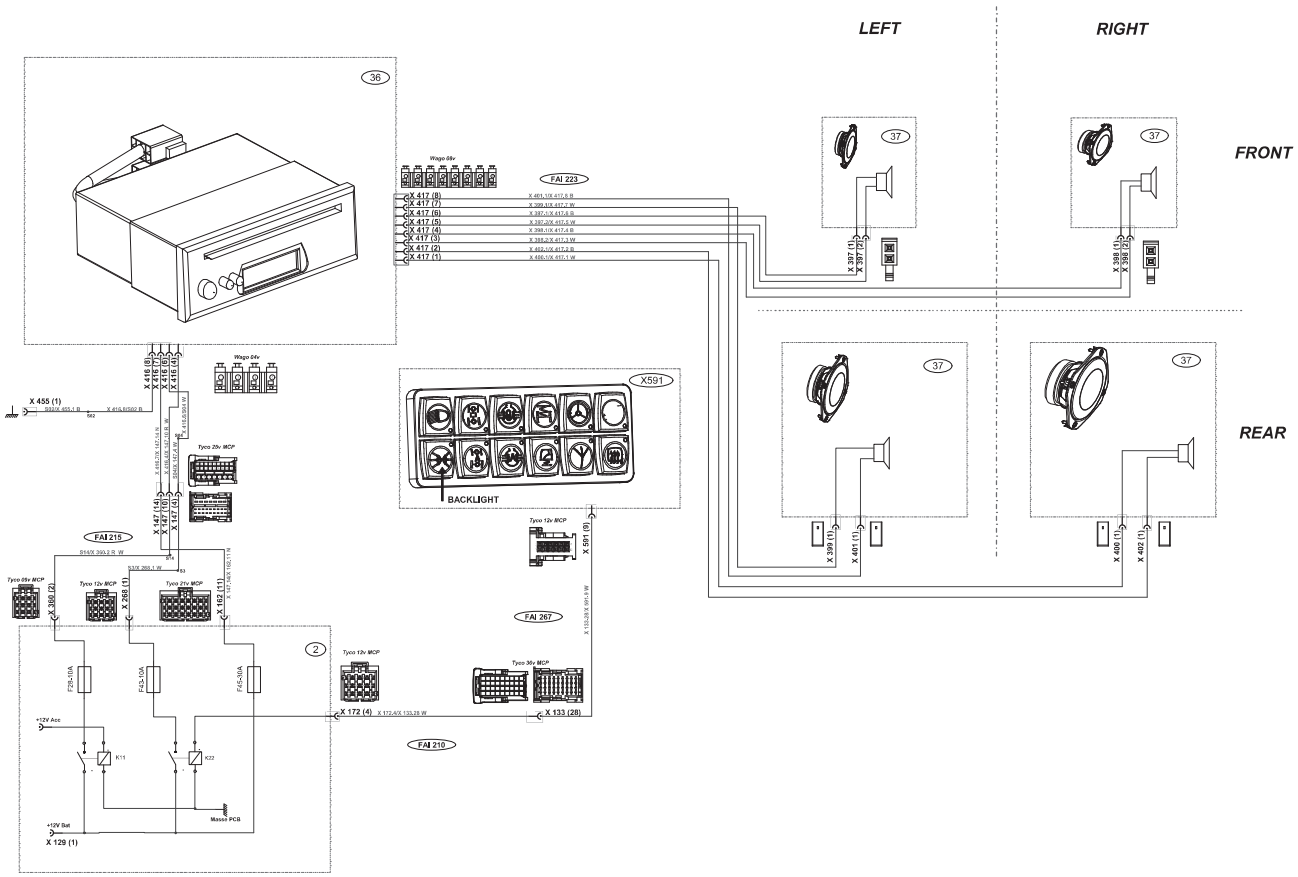


Fig. 17.

I027294

2.26 EFD00122_4 - Fuel sender unit

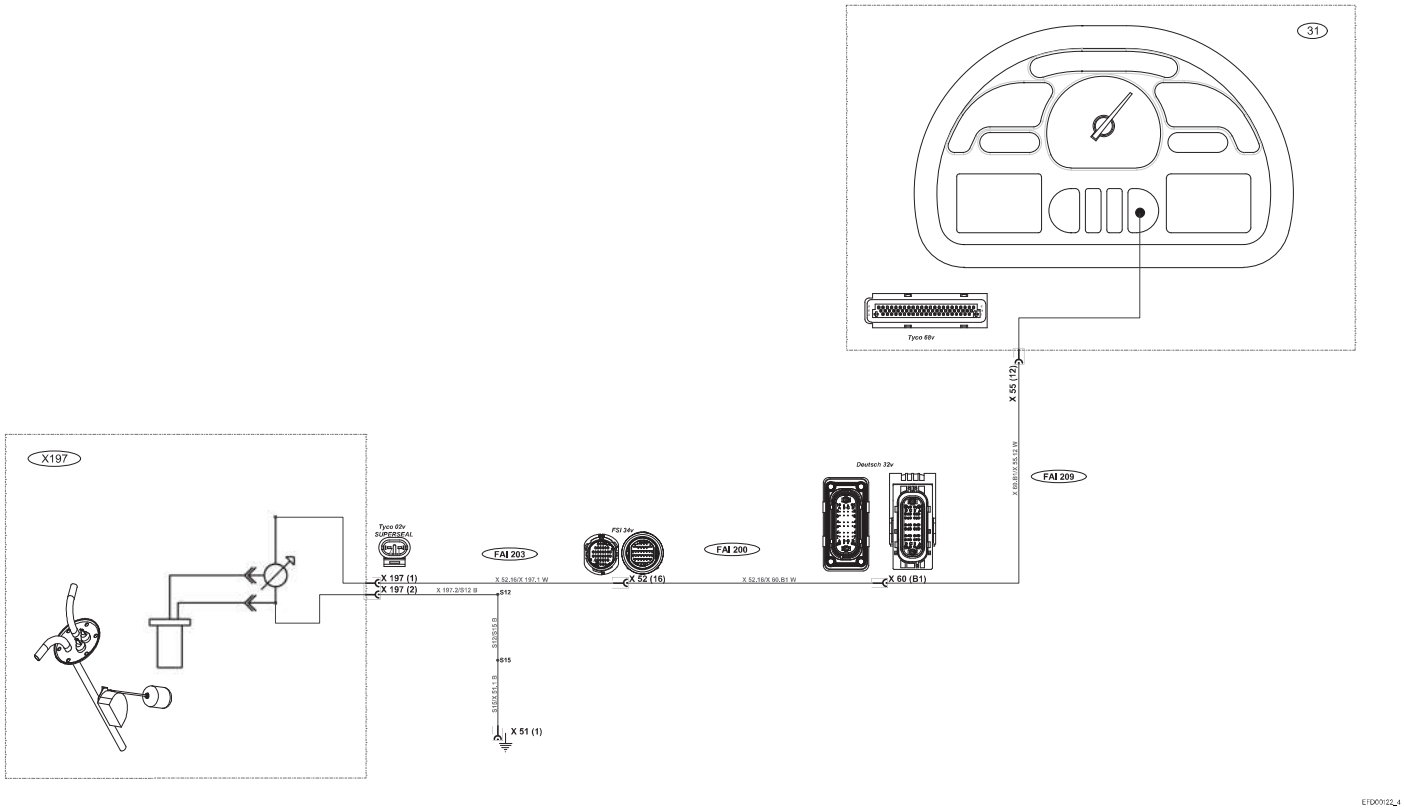


Fig. 27.

I027535

2.36 EFD00128_15 - Cab power socket_2/2

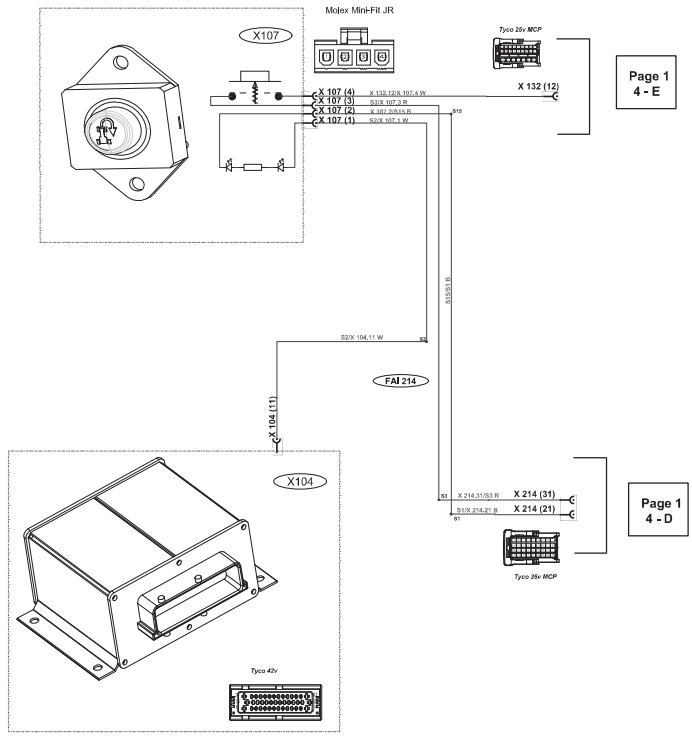


Fig. 37.

I027554

2.46 EFD00136_33 - NA indicators and hazard warning lights

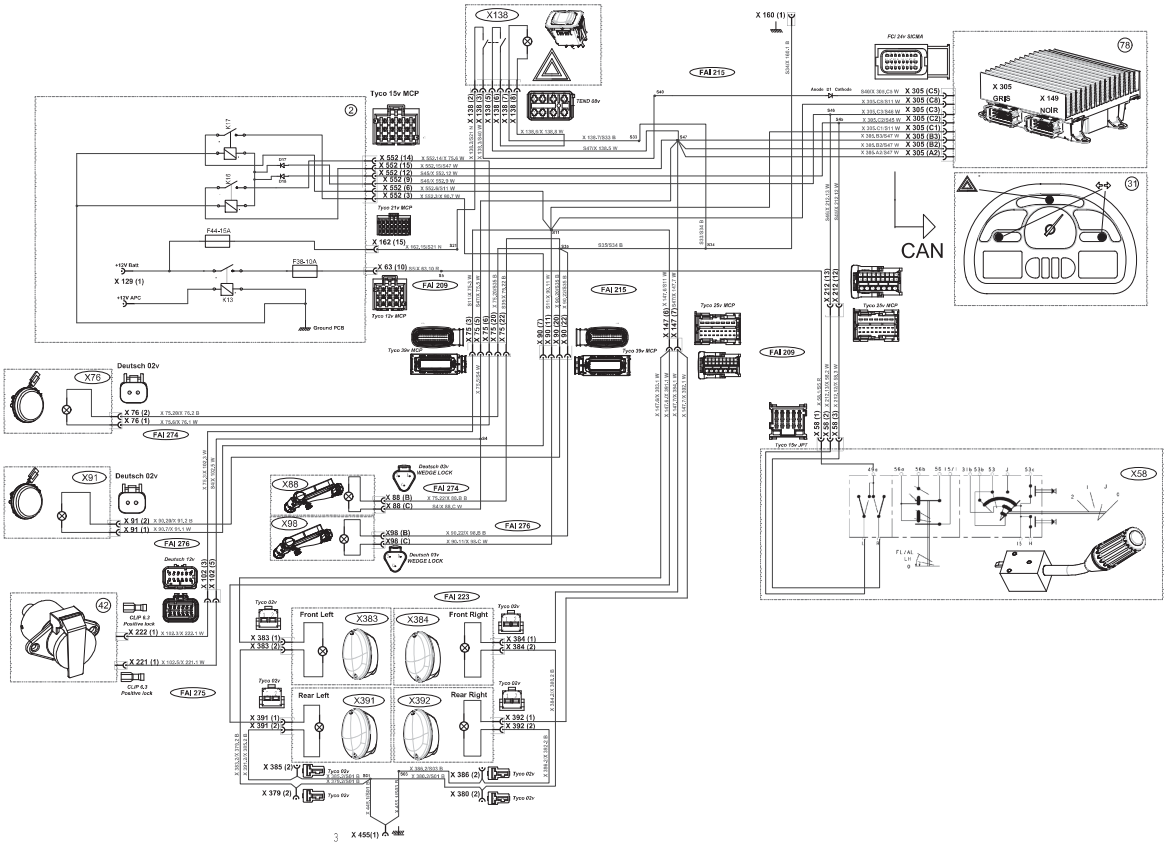


Fig. 47.

I027588

2.56 EFD00144_6 - Lighting module and power supply

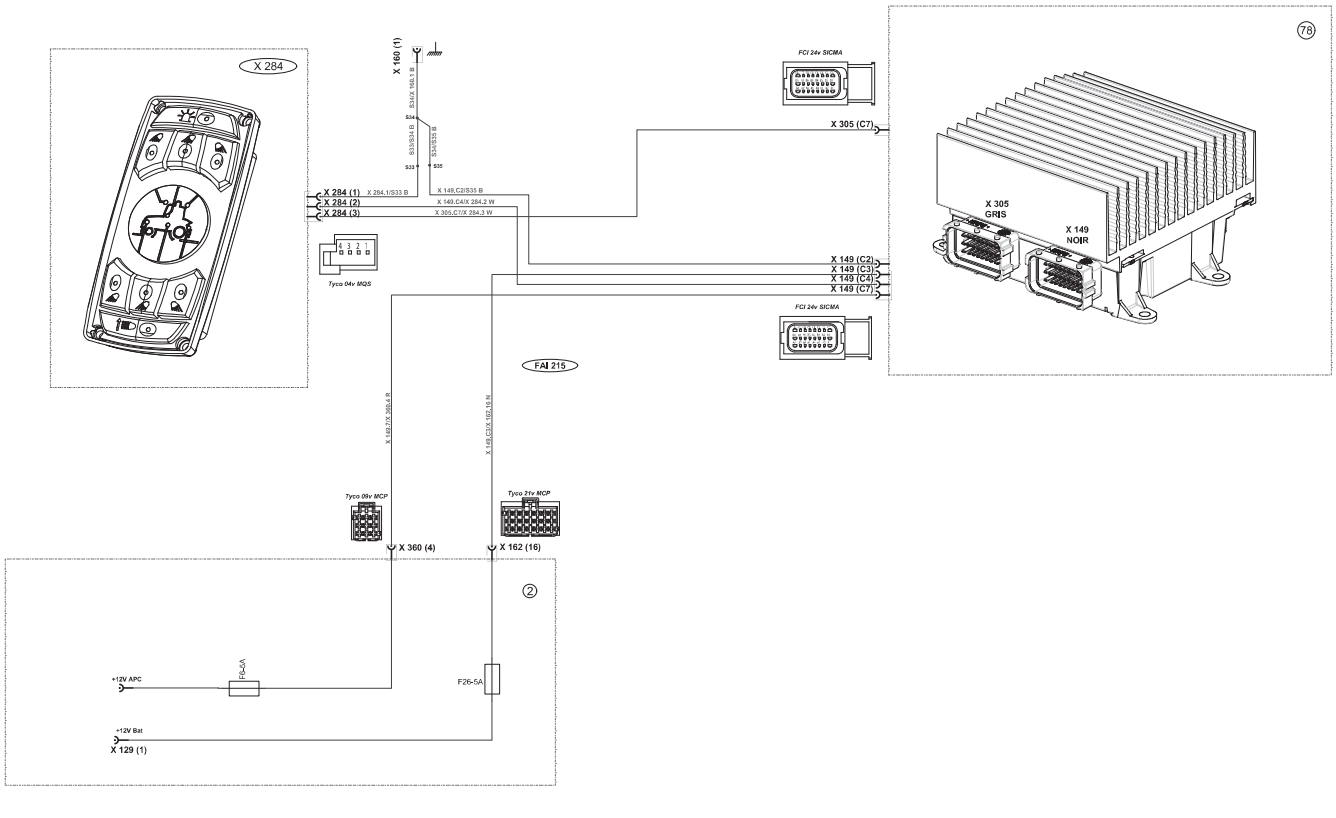
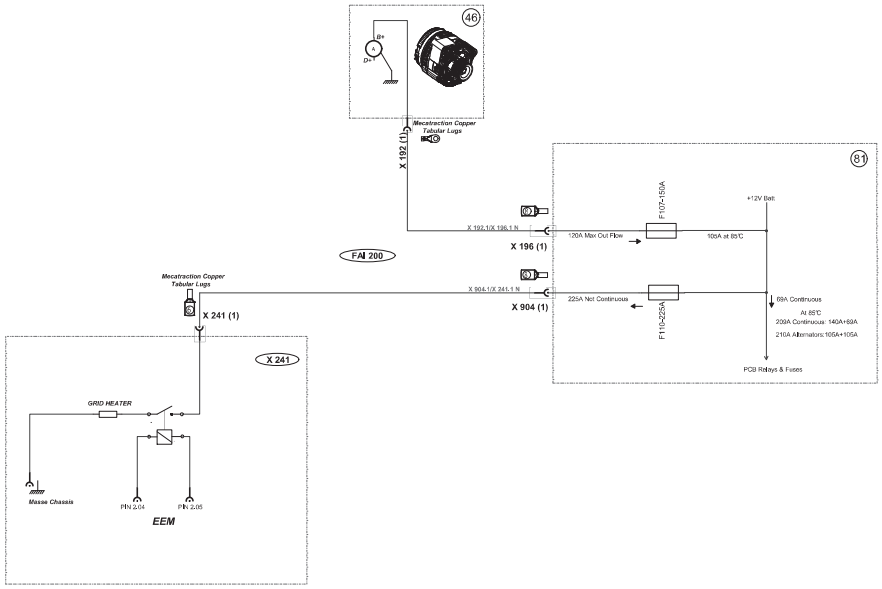


Fig. 57.

I027605

2.66 EFD00153_15 - AGCO Power preheating power supply



EFD00153_15

Fig. 67.

I027314

2.76 EFD00169_8 - Controller power supply_3/5 (active suspended cab Autotronic 5)

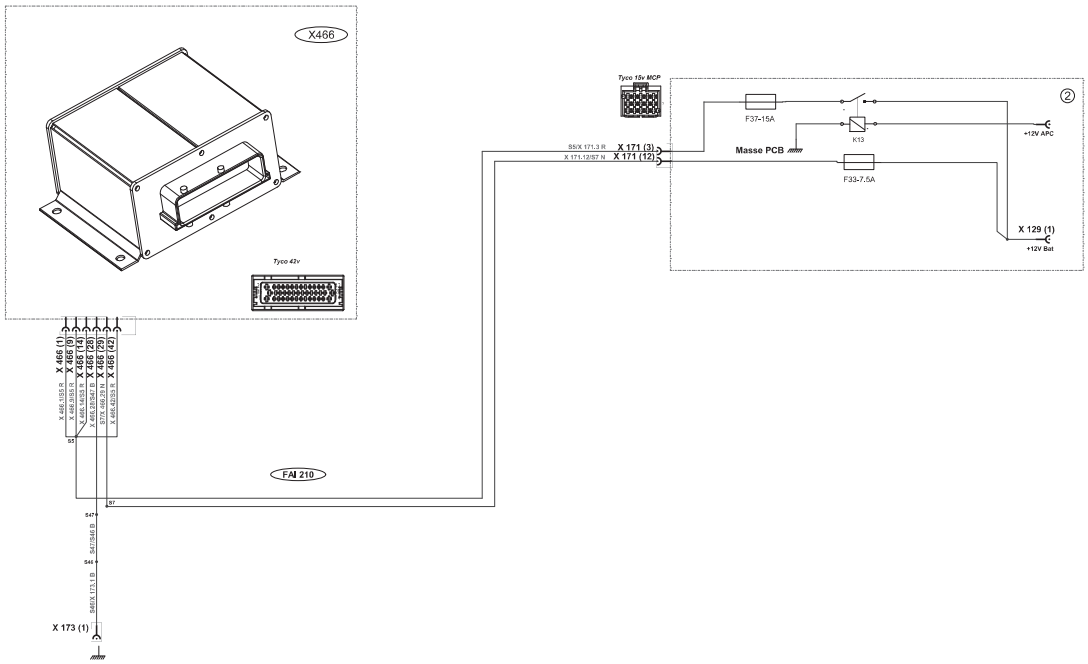


Fig. 77.

I027504

2.86 EFD00176_6 - ALO NA loader_1/2

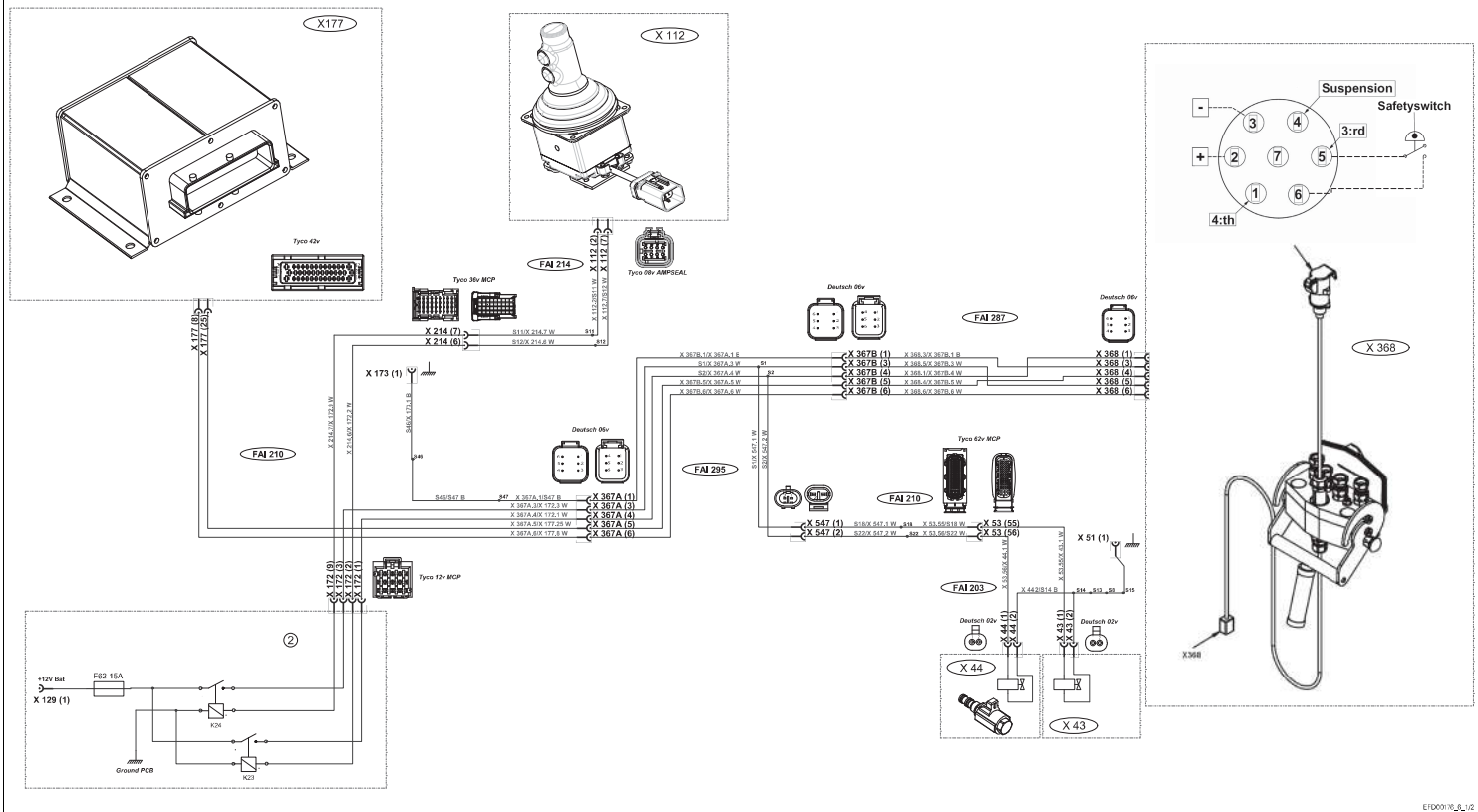


Fig. 87.

I027627

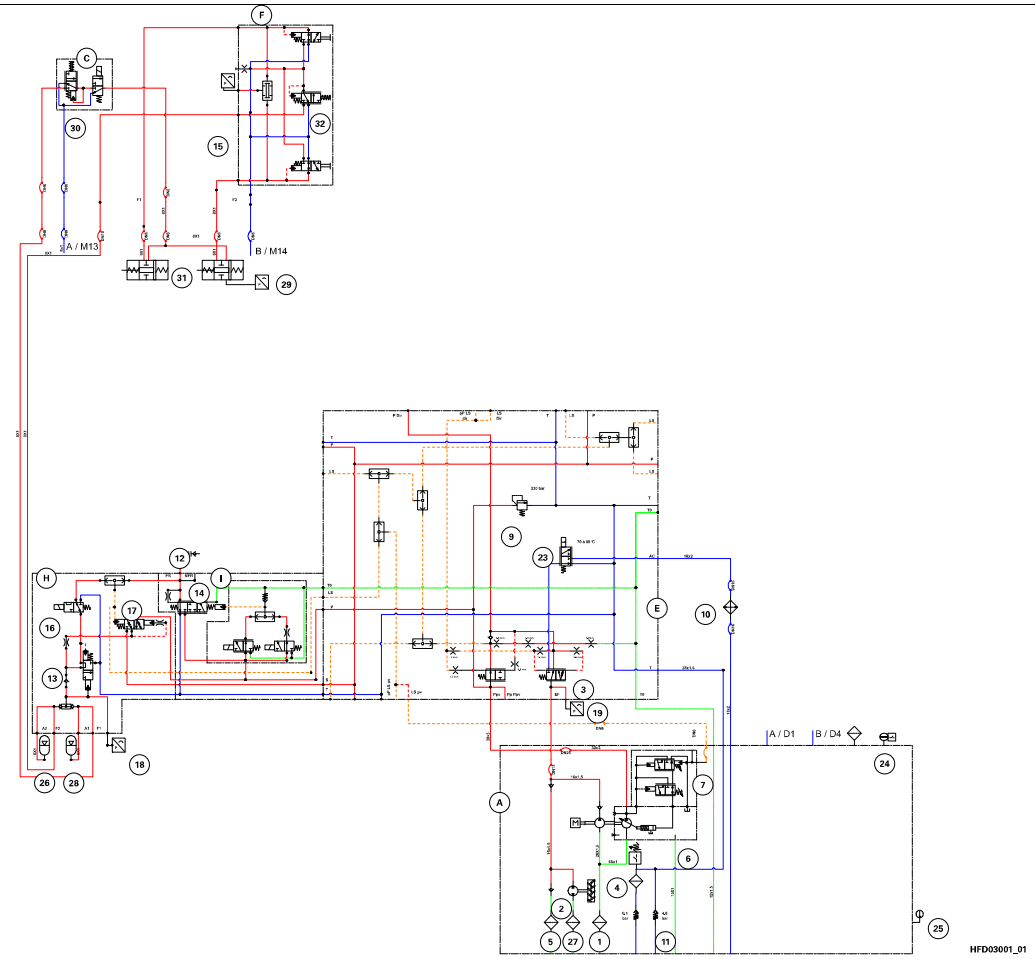


Fig. 5.

I026795

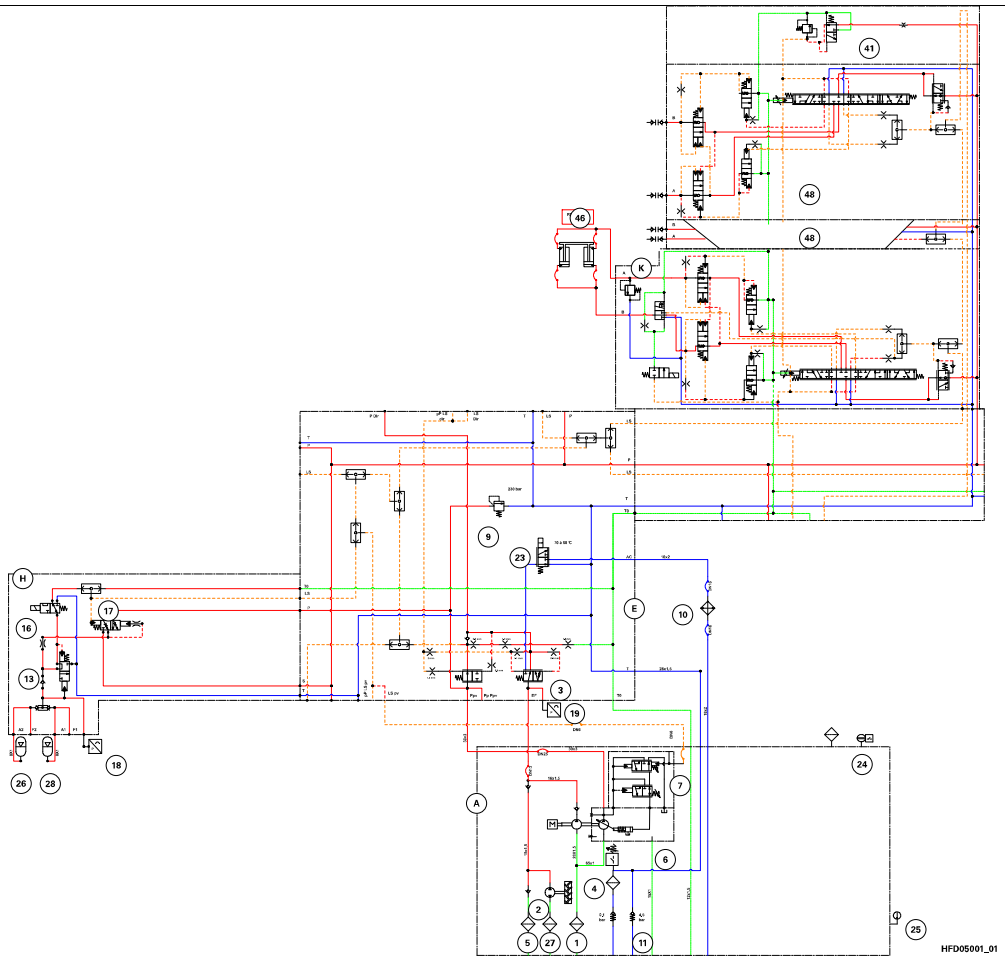


Fig. 10.

I026695

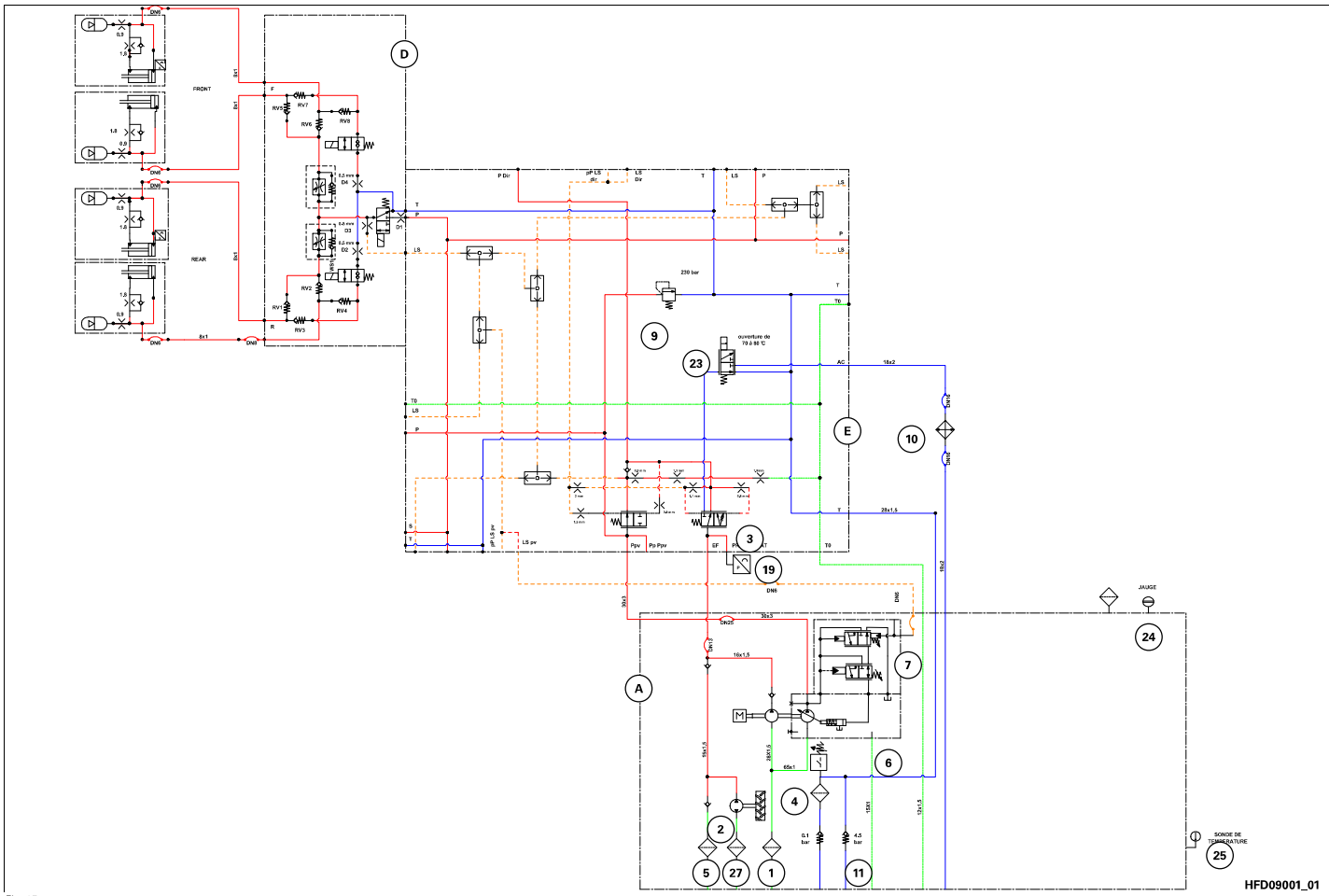


Fig. 15.

I028014

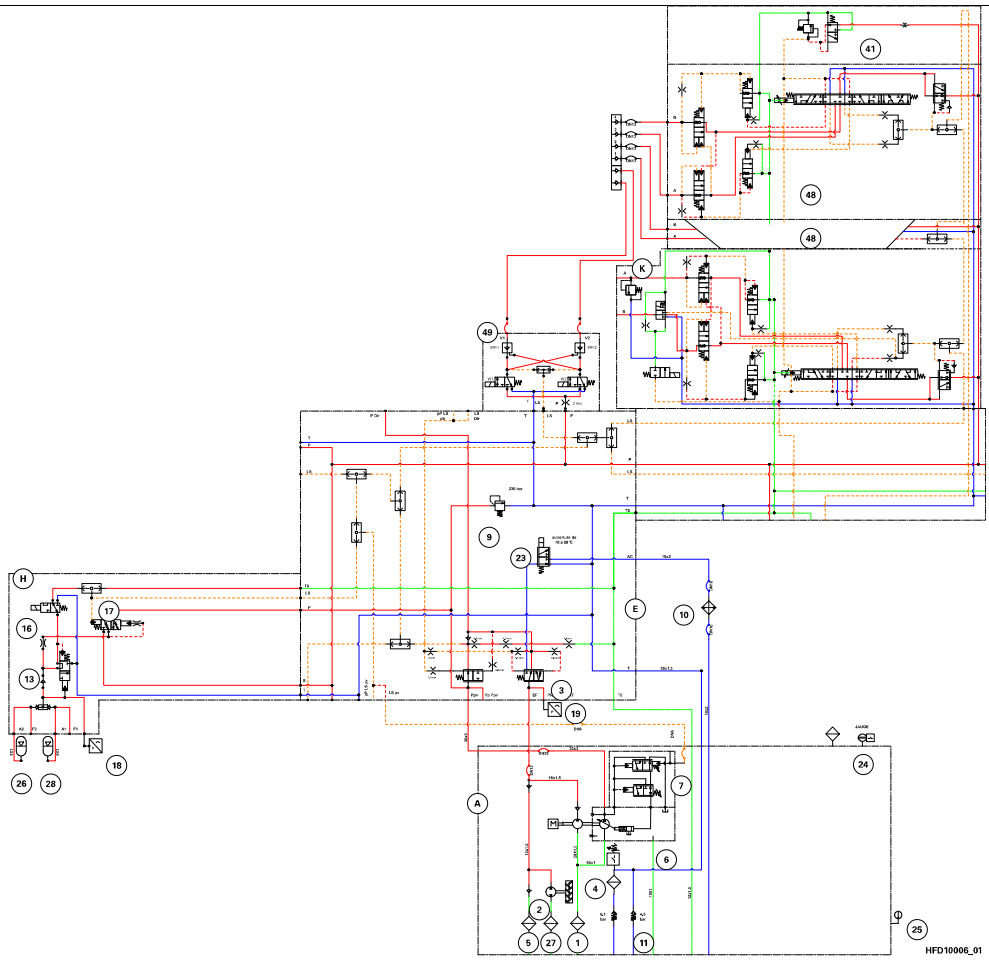


Fig. 20.

I028023

A - Adjustments

5 Bleeding the hydraulic trailer brake

(1) Rear left-hand brake
(2) Rear right-hand brake
(3) Trailer brake

1. The tractor brakes are bled via the bleed plugs located on the rear left-hand side of the tractor next to the auxiliary spool valves.

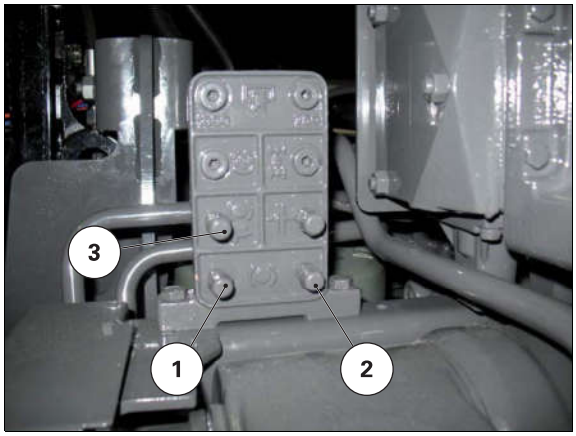


Fig. 7. I009721

1. Start the engine.
2. Connect a flexible pipe (preferably transparent) to the bleed plug and then connect it to the hydraulic tank.
3. Open the trailer brake bleed plug.
4. Press moderately on the coupled brake pedals, with pedal travel of approximately 20 mm.
   NOTE: *Never press the pedals down more than 25 mm when the bleed plugs are open. A jet of pressurised oil will spurt out of the bleed plugs.*
5. Let the air bleed out at the plugs.
6. Close the plug again when the fluid coming out no longer shows any trace of foam or air bubbles. Release the pedals.

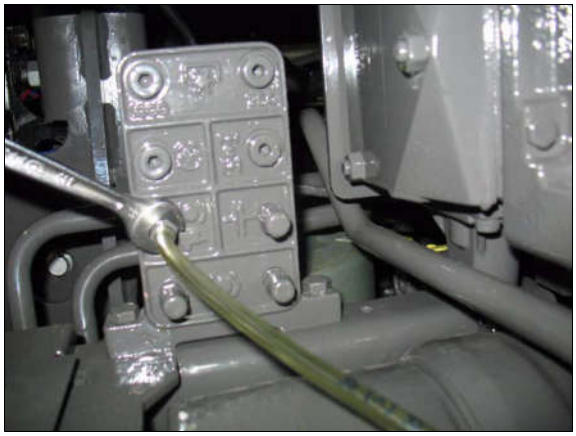


Fig. 8. I009723

7. Bleed the main brakes of the tractor (*see B, §2, page 10*).
8. Check the oil levels in the auxiliary hydraulics and gearbox.

4 Automatic disengagement of the differential and 4-wheel drive

General

This calibration enables a front wheel angle of 0 to be obtained for temporarily disengaging the differential lock and/or the 4-wheel drive front axle when the steering wheel is turned and these functions are engaged in automatic mode.
The 10° disengagement angle of the differential lock is set by the software. A different disengagement angle cannot be set.
The disengagement angle of the 4-wheel drive front axle can be modified during calibration.

NOTE: *If the calibration is not carried out, these functions may not be disengaged when the wheels are turned or they may disengage at an undesired angle.*

Calibration of the angle for the automatic disengagement function of the differential and the 4-wheel drive: Procedure

NOTE: *This function must be calibrated whenever one of the following elements is replaced or modified:*

- *angular sensor in the front axle*
- *front axle*
- *instrument panel.*

To select CAL2:

1. Start the engine.
2. Engage and release the clutch pedal in order to delete the "TC" "DC" display from the screen on the right-hand side of the instrument panel
3. The selected function is displayed in reverse video.
   Within the next 5 seconds, simultaneously press the keys on the Dash Control Center control keyboard.
   The screen opposite is displayed with 5 available texts and icons:
   - Calibrating the forward lever on the armrest. If the "OK" symbol is present, calibration has already been carried out
   - Calibration of the 0 angle for the automatic disengagement functions of the differential lock/4-wheel drive and the disengagement angle for the 4-wheel drive
   - Calibration of the suspended cab
   - "DC": Clear the error codes stored in the instrument panel
   - "TC": Clear the error codes stored in the TC (transmission controller)
   - "VL": Clears the calibration values

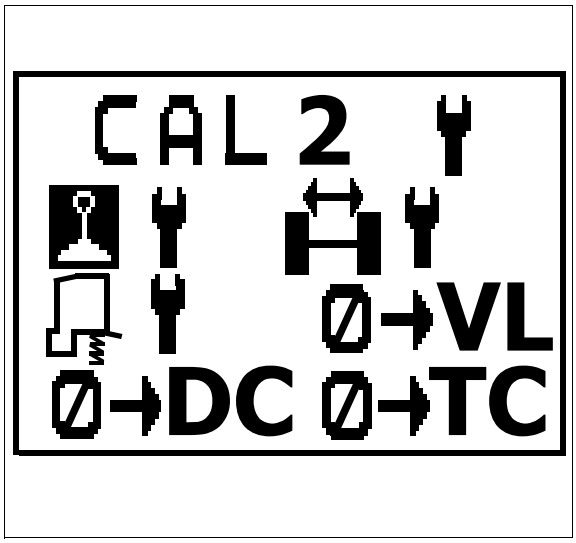


Fig. 5. I007461

4. Select the required function using the keys on the Dash Control Center control keypad and then press "OK".
5. Select the icon, press "OK" and the following screen is displayed: