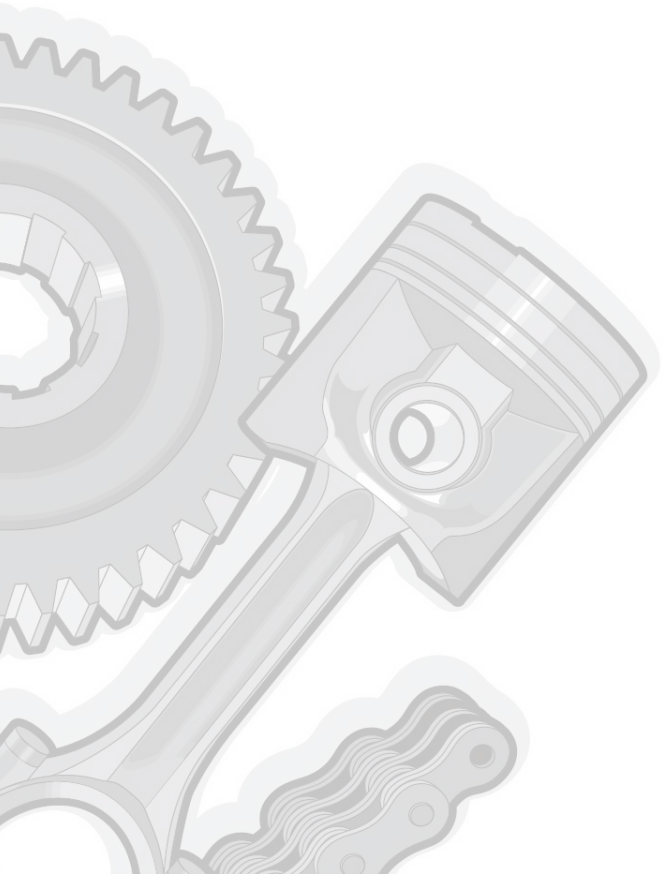
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HANDLING YOUR WORLD

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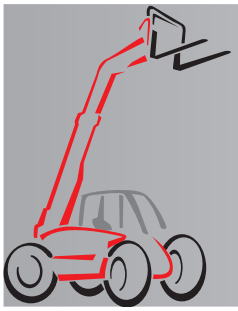
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- *GENERAL INSTRUCTIONS AND SAFETY NOTICE*

- *GENERAL CHARACTERISTICS AND SPECIFICATIONS*

- *GENERAL LOCATION*

- *GENERAL CONTROL AND ADJUSTMENT*



GENERAL LOCATION

pages

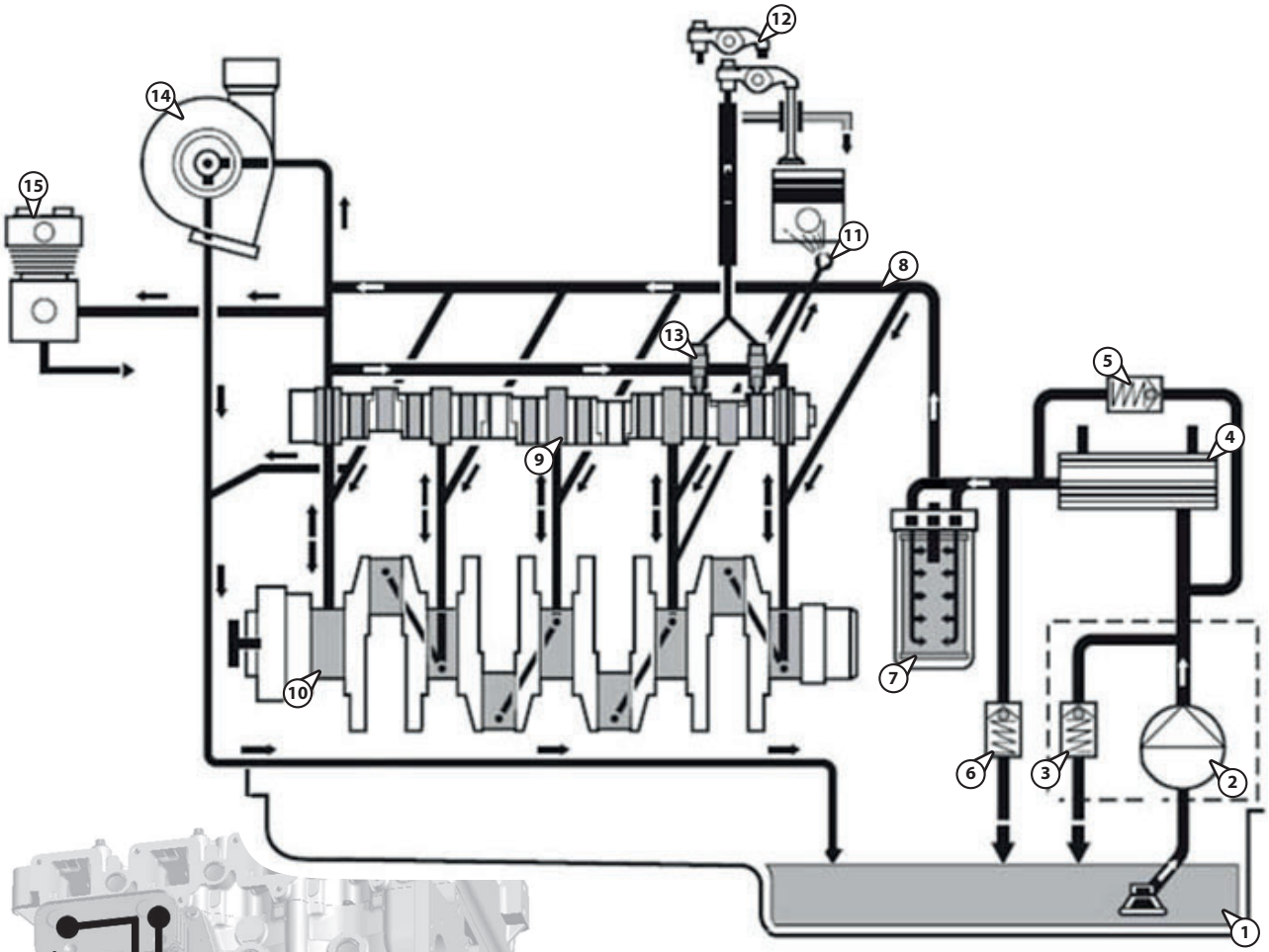
LOCATION OF NAME AND IDENTIFICATION PLATE 2

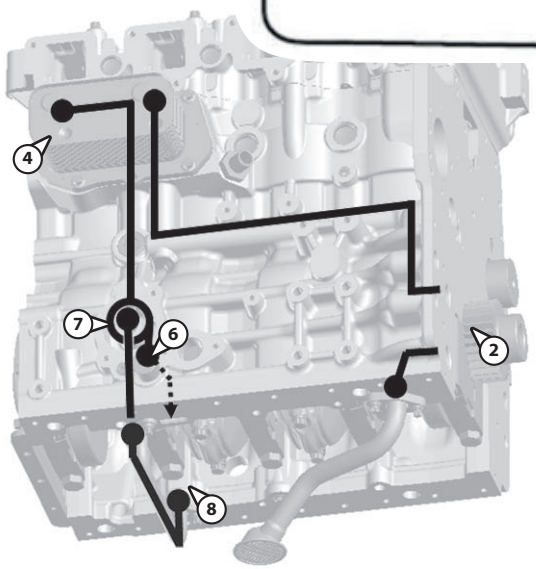
LUBRICATION CIRCUIT

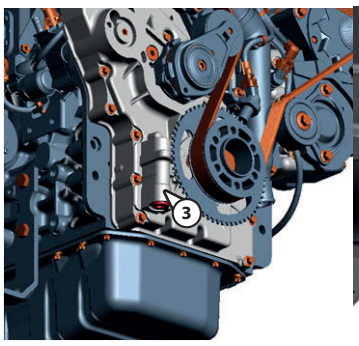
The oil pressure and volume flow rate ensure lubrication of the engine and also, to a large extent, engine cooling. The pressure relief valve opens at 9 bar and the maximum oil temperature in the sump is 125°C.

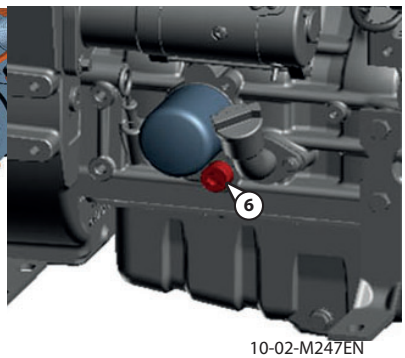
Key:

1 - Oil sump
2 - Oil pump
3 - Pressure relief valve
4 - Oil cooler
5 - By-pass valve
6 - Pressure control valve
7 - Oil filter
8 - Main oil gallery
9 - Camshaft bearing
10 - Crankshaft bearing
11 - Piston cooling nozzle
12 - Rocker arm
13 - Hydraulic tappets
14 - Turbocompressor
15 - Air compressor (optional)







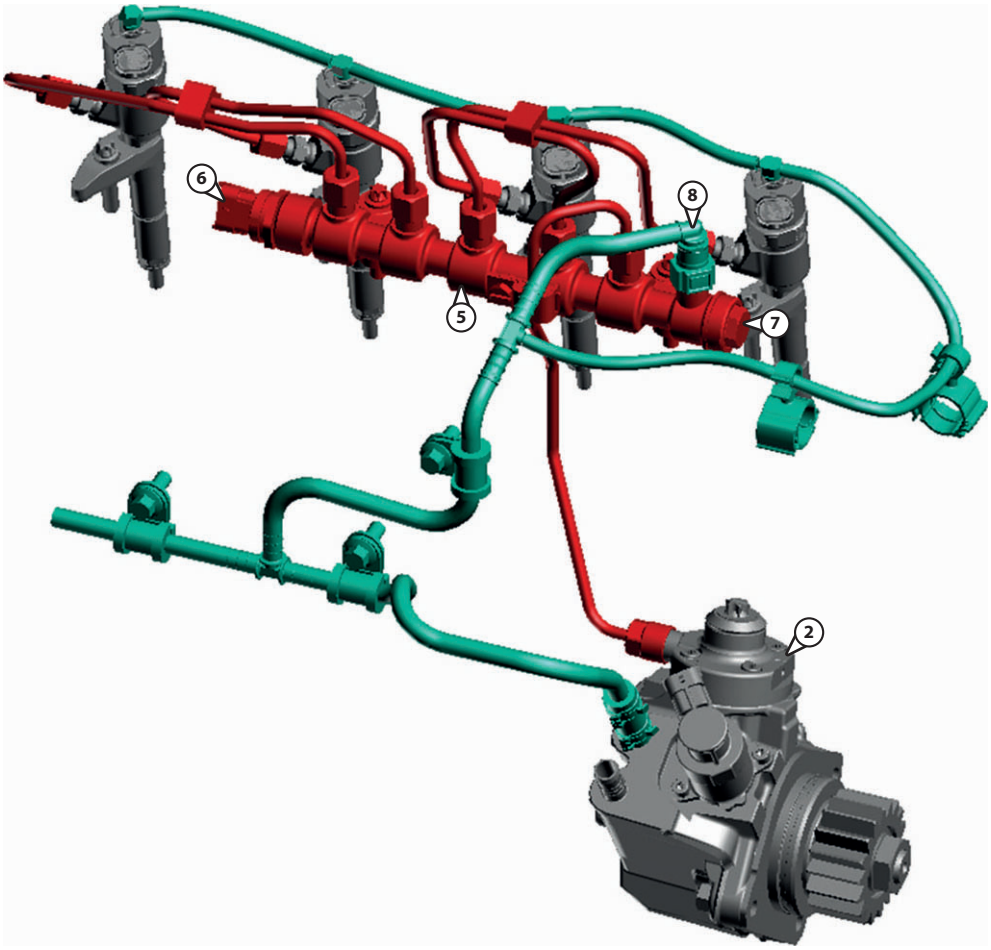


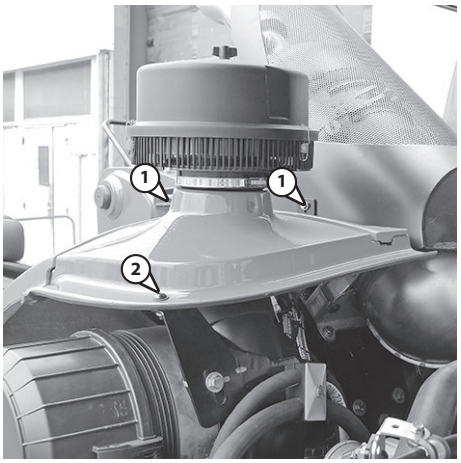
FUEL INJECTION CIRCUIT

Key:

1 - Low pressure fuel supply
2 - High pressure pump
3 - MPROP (magnetic proportional valve)
4 - FCU (Fuel Control Unit) return
5 - High pressure fuel rail
6 - High pressure fuel line pressure sensor
7 - Pressure Relief Valve (PRV)
8 - PRV return
9 - Injector electrical connector
10 - High pressure fuel supply
11 - Injector return

Red circuit = 350 - 1800 bar
Green circuit = low pressure return



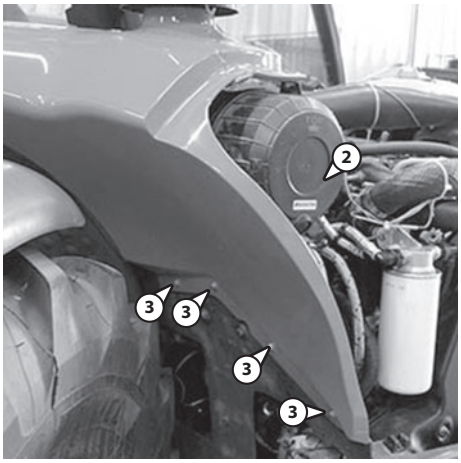


H – FIXED ENGINE COVER REMOVAL

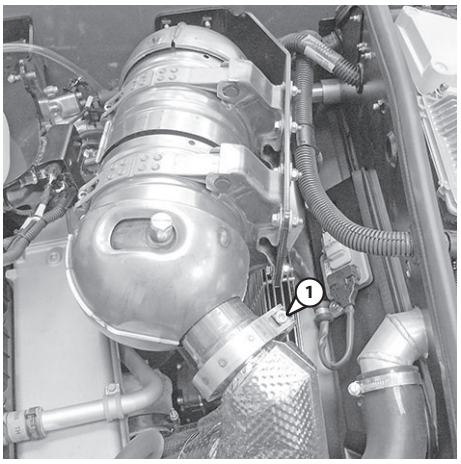
⇒ Carry out the "MOVABLE ENGINE COVER REMOVAL" operation ◅ A

Remove the 2 screws from the exhaust guard (Item1).

Remove the screws (Item 2).



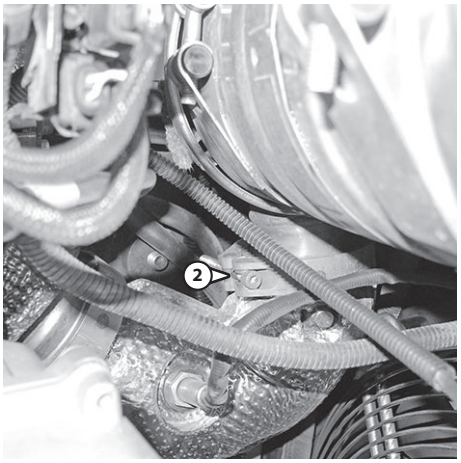
Remove the 4 screws (Item 3).



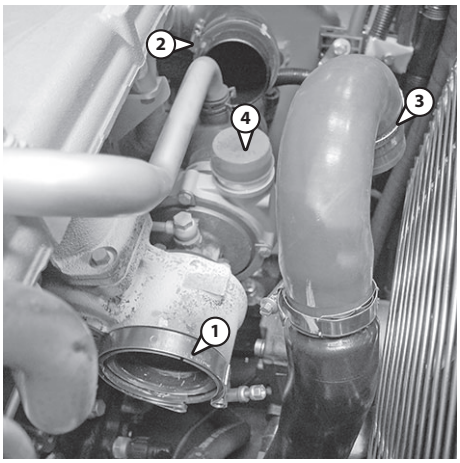
I – EXHAUST REMOVAL / REFIT

⇒ Carry out the "MOVABLE ENGINE COVER REMOVAL" operation ◅ A

Unscrew the DOC inlet clamp (Item 1).



Unscrew the DOC outlet clamp (Item 2).



R – TURBO REMOVAL

Loosen the exhaust pipe hose clamp (Item 1) of move the hose to one side.
Loosen the turbo side air inlet hose clamp (Item 2), plug the turbo inlet port.

Loosen the turbo air outlet hose clamp (Item 1) and insert a plug (Item 4).

647549 (Deutz TCD/TC 3.6 L4 engine-EU level IV / US EPA Tier 4) - Turbocompressor Removal - Refit

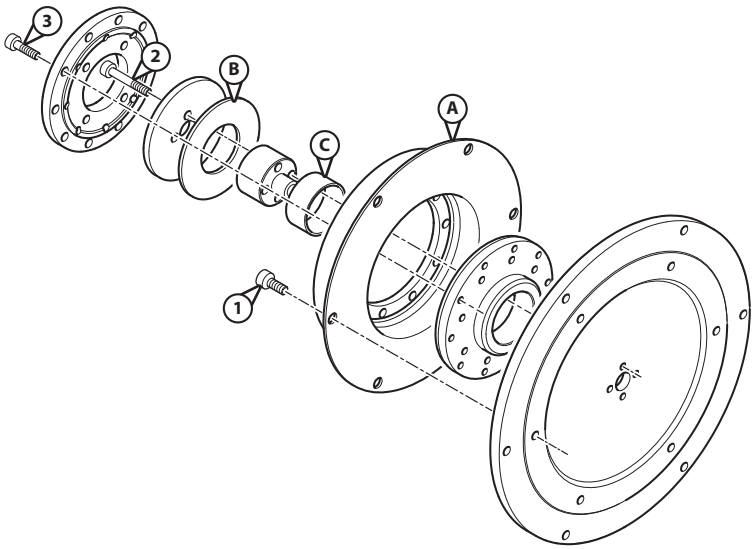
S – ENGINE SHOCK ABSORBER REMOVAL

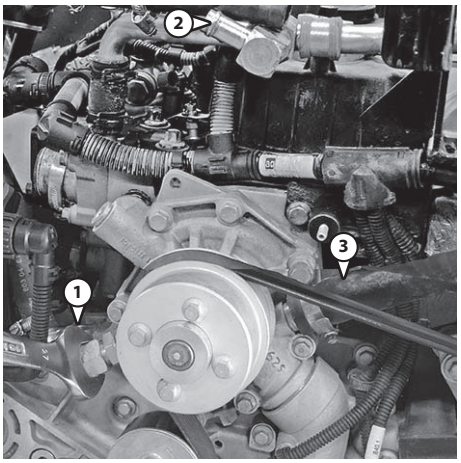
Remove the transmission universal joint.
Unscrew the screws (Item 1, Item 2 and Item 3) in that order to change the shock absorber components:

C - Damper **D -** Seal **E -** Bush

Tightening torque:

Screw no. 1: 35 N.m, 5/16-25
Screw no. 2 : 35 N.m with medium thread lock
Screw no. 3: 35 N.m with medium thread lock



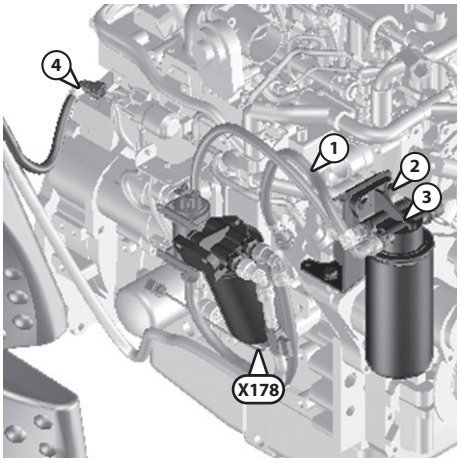


C – HEATING CIRCUIT

Disconnect the lower hose (Item 1).
Disconnect the upper hose (Item 2).

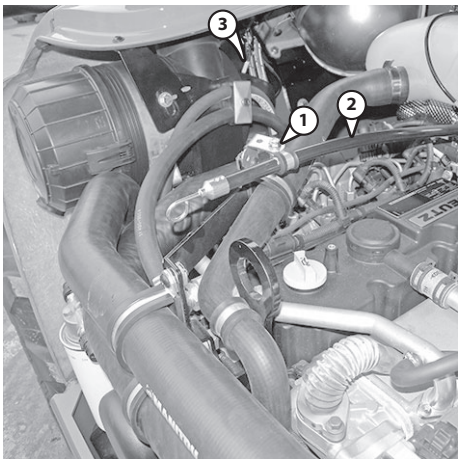
Disconnect the engine water filling hose (Item 3).

Near to the boom, remove the strut, 2 screws.

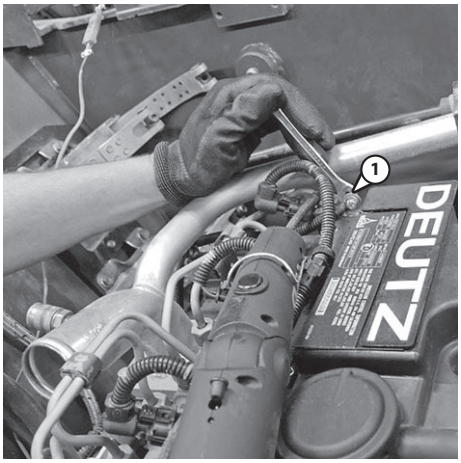


D – DIESEL FUEL CIRCUIT

On the diesel filter support bracket, disconnect the engine supply hose (Item 1), plug the opening on the filter, remove the 2 screws (Item 2) and tilt the diesel filter / support bracket assembly backwards (Item 3).
Disconnect the fuel return hose (Item 4).
Disconnect the water presence connector X178 and clogging connector X166A and X166B (Item 4).

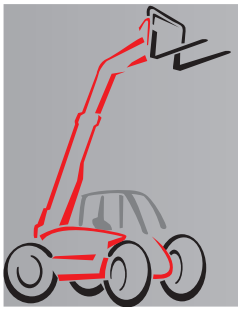


Undo the clamp (Item 1) securing the engine oil dipstick tube (Item 2) and remove the dipstick.
Disconnect the water presence connector X178 and clogging connector X166A and X166B (Item 3).



E – ELECTRICITY

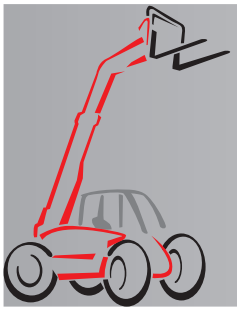
Disconnect the engine connector X277 (Deutz/Manitou wiring harness connection).
Disconnect the pre-heating cable harness (Item 1) X167.



SPECIFIC ENGINE TOOLING

pages

FAN BELT FITTING TOOL 2
ELECTRONIC TENSION METER. 2
ADDITIONAL ENGINE TOOLS. 2

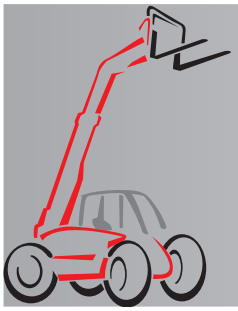


TRANSMISSION CONTROL AND ADJUSTMENT

pages

TIGHTENING TORQUE 2

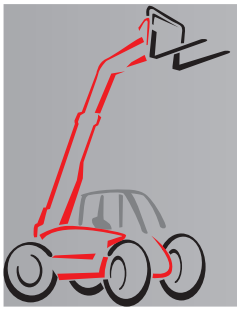
– MECHANICAL TRANSMISSION 2



SPECIFIC TRANSMISSION TOOLING

pages

BASIC MANOMETER SET 2
DIGITAL MANOMETER SET 3
GEAR BOX REMOVAL TOOLS 4



BRAKE CHARACTERISTICS AND SPECIFICATIONS

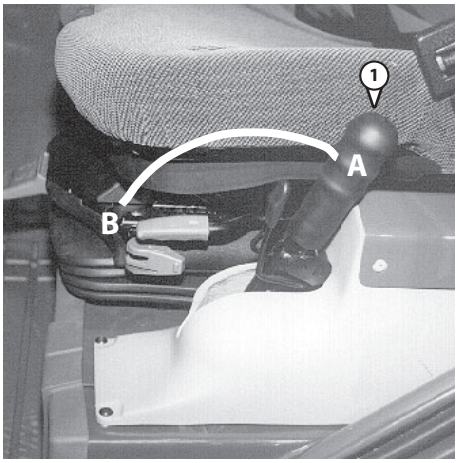
pages

SERVICE BRAKE **2**

PARKING BRAKE **3**

PARKING BRAKE

CONTROL AND ADJUSTMENT

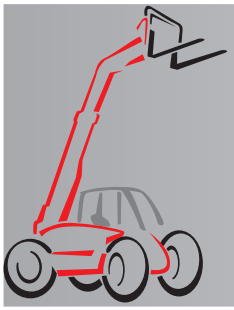


For public highway certified (HRT) lift trucks

- Place the lift truck on level ground with the rated load in the transport position.
- Check braking by locking the parking brake (Item 1) in position A.
- Pull on the lift truck rear towing pin with a minimum force of 3500 daN. The wheels of the lift truck must not rotate.
- Carry out adjustments if necessary:
  - Progressively tighten the end of the lever (Item 1) and recheck braking.
  - Repeat the operation until the correct braking adjustment is obtained.

For non HRT certified lift trucks

- Place the lift truck on a slope of at least 15 % with the rated load in the transport position.
- Check braking by locking the parking brake (Item 1) in position A.
- The adjustment is correct when the lift truck remains stationary on the slope.
- Carry out adjustments if necessary:
  - Depress the service brake pedal, unblock and release the parking brake (Item 1) in position B.
  - Progressively tighten the end of the lever (Item 1) and recheck braking.
  - Repeat the operation until the correct braking adjustment is obtained.



BOOM COMPONENTS LOCATION

pages

LOCATION OF THE DUPLEX BOOM MAIN COMPONENTS 2

50

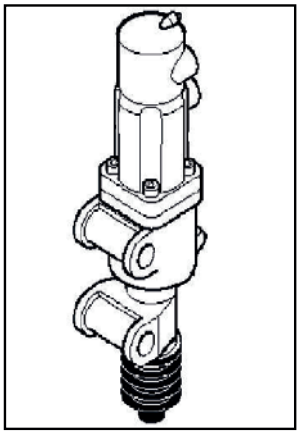
HYDRAULICS

- *HYDRAULIC CHARACTERISTICS AND SPECIFICATIONS*
- *HYDRAULIC SCHEMATIC DIAGRAMS*
- *HYDRAULIC COMPONENTS LOCATION*
- *HYDRAULIC CONTROL AND ADJUSTMENT*
- *HYDRAULIC COMPONENTS REMOVAL*
- *HYDRAULIC SPECIFIC TOOLING*



MASTER CYLINDER WITH ASSISTANCE

Values for information purposes only.

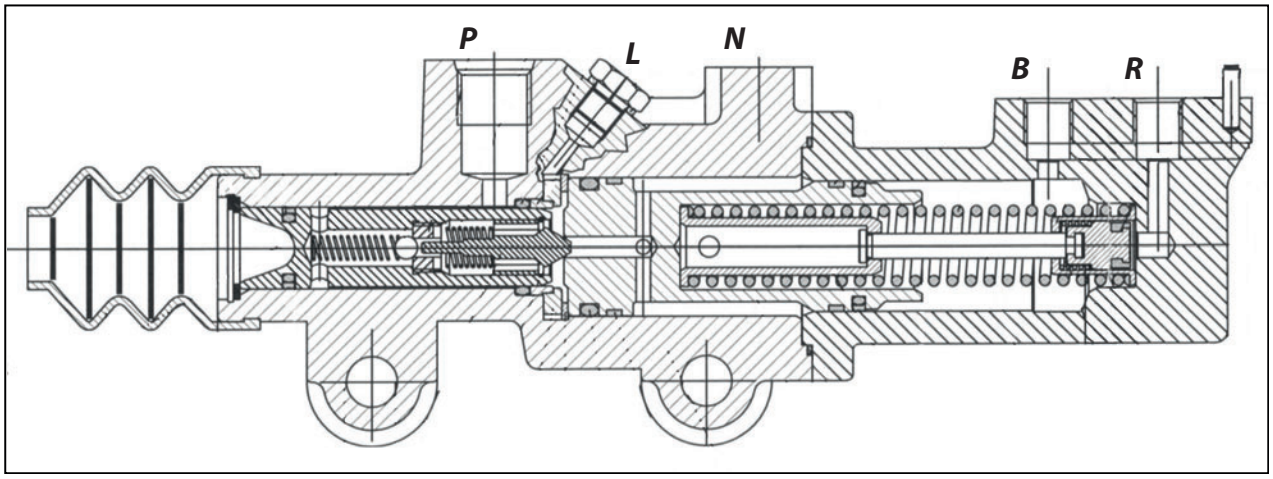


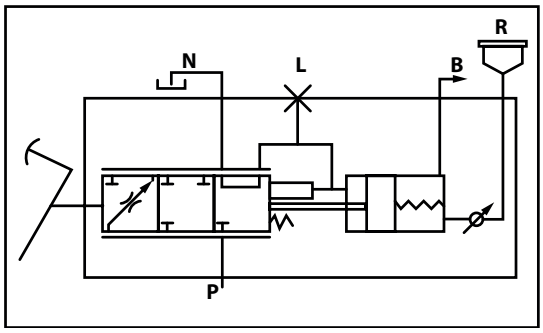
1 - Part :

- To send the pressure fluid in order to push the brake pistion that will stop the wheels.

- To add the mechanical force (pedal) and the hydraulic force in order to help the driver.

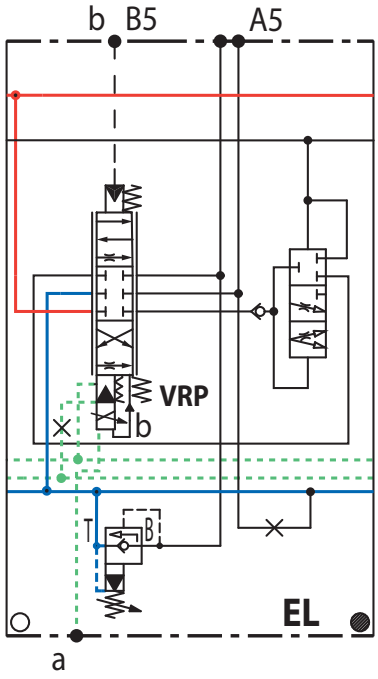
2 - Description :





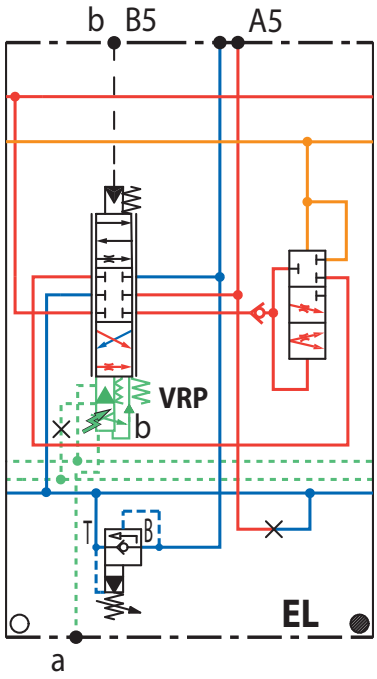
P - Assistance pressure
L - Pilot pressure (LS line)
N - Return to the tank line
B - Brake pressure
R - LHM tank

Notes : _____



Electro-hydraulic controller ("Rest" state)

- The hydraulic pressure arrives at the entry module with pump stand-by pressure.
- The Pressure balance ensures communication between the main pressure line through the valveblock to the receiver feed.
- It takes the receiver pressure and communicates it to the pump.
- There is a priority between the receiver feed and pressure information transmission to avoid any rapid pressure increase as a result of a delay in slide opening relative to pump control.



Electro-hydraulic controller (Setting "b")

KEY

Item	Designation	Position on diagram	Characteristics
AC	Accumulator	O27, G36	
BA	Accumulator unit	K39	
BRVI	Fan reverse control unit Y42: Fan direction reversal EV Y43: Fan control EV	K10	
CA	Suction strainer	S16	125 µm absolute
CSP	Counterbalance valve	I31	
CR (O)	Trailer hook (option)	C17, C19, C26	
D	Distributor	Q39	
EA	Attachment element a (Y18): Neg. direction proportional EV b (Y17): Pos. direction proportional EV	Q33	
EA (O)	Attachment element (option)	Q29	
EE	Inlet element Y20 : hydraulic cut-off EV (VS - safety valve)	Q25	
EF	Closing element	Q38	
EI	Tilting element	Q27	
EL	Lifting element b (Y19): Lowering proportional EV	Q35	
ET	Telescope element	Q31	
EVAA (O)	Rear attachment electrovalve (option)	C16, C18, C21, C23	
EVP (O)	Pilot electrovalve (option)	Q22	
EVTDF (O)	Telescope head electrovalve (option)	C37, C39	
EV (S1)	Electrovalve (solenoid 1)	G35	
EV (S2)	Electrovalve (solenoid 2)	I32	
FDAV	Front disc brake	I2	
FDAR	Rear disc brake	I22	
FEMS	EMS head filter	M39	
FR	Return filter	Q18	15 µm absolute
M	Engine	I17	◅ 10 - ENGINE
MA	Manipulator	O2,O40	
MC	Master cylinder	A3	
N	Level	S11	
REAR OPTION-1	Single-acting option (rear attachment plug)	C28	
REAR OPTION-2	Double-acting option (rear attachment plug)	C27	
REAR OPTION-3	Hydraulic hook option (rear attachment plug)	C25	
REAR OPTION-4	Double + single rear predisposition option (rear attachment plug)	A23	
REAR OPTION-5	2 double rear predispositions option (rear attachment plug)	A20	
REAR OPTION-6	Towing hook + double rear predisposition option (rear attachment plug)	A18	
REAR OPTION-7	Towing hook + single rear predisposition option (rear attachment plug)	A15	
FRONT OPTION-1	Hydraulic locking option (front attachment connector)	C33	
FRONT OPTION-2	Telescope head electrovalve option (front attachment connector)	C36	
FRONT OPTION-3	Telescope head electrovalve and hydraulic locking option (front attachment connector)	A38	
P	Hydraulic pump	G13	
PCR	Cooling circuit pump	K15	
PD	Steering pump	C10	
PFR	Trailer brake connector integrated in the VAFR	E4	
PP	Pressure test port	O25	
PRES	Pressure switch	E12	
PRES (O)	Pressure sensitive switch (option)	G34	
PRF (O)	Leakage return connector (option)	O37, O39, O 40	
R	Hydraulic tank	S11	Capacity 135 ℓ Average level 110 ℓ Steering reserve 12 ℓ

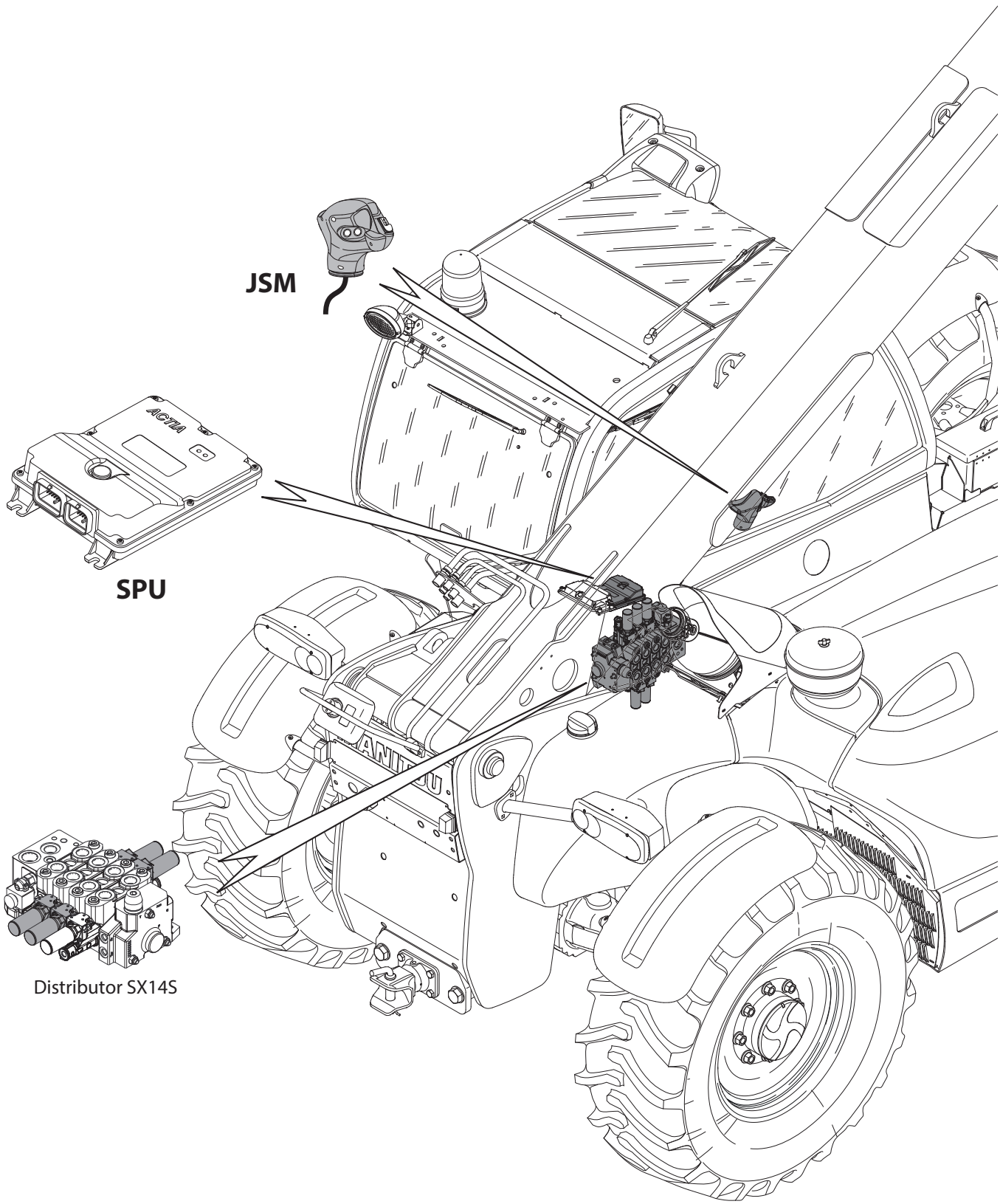
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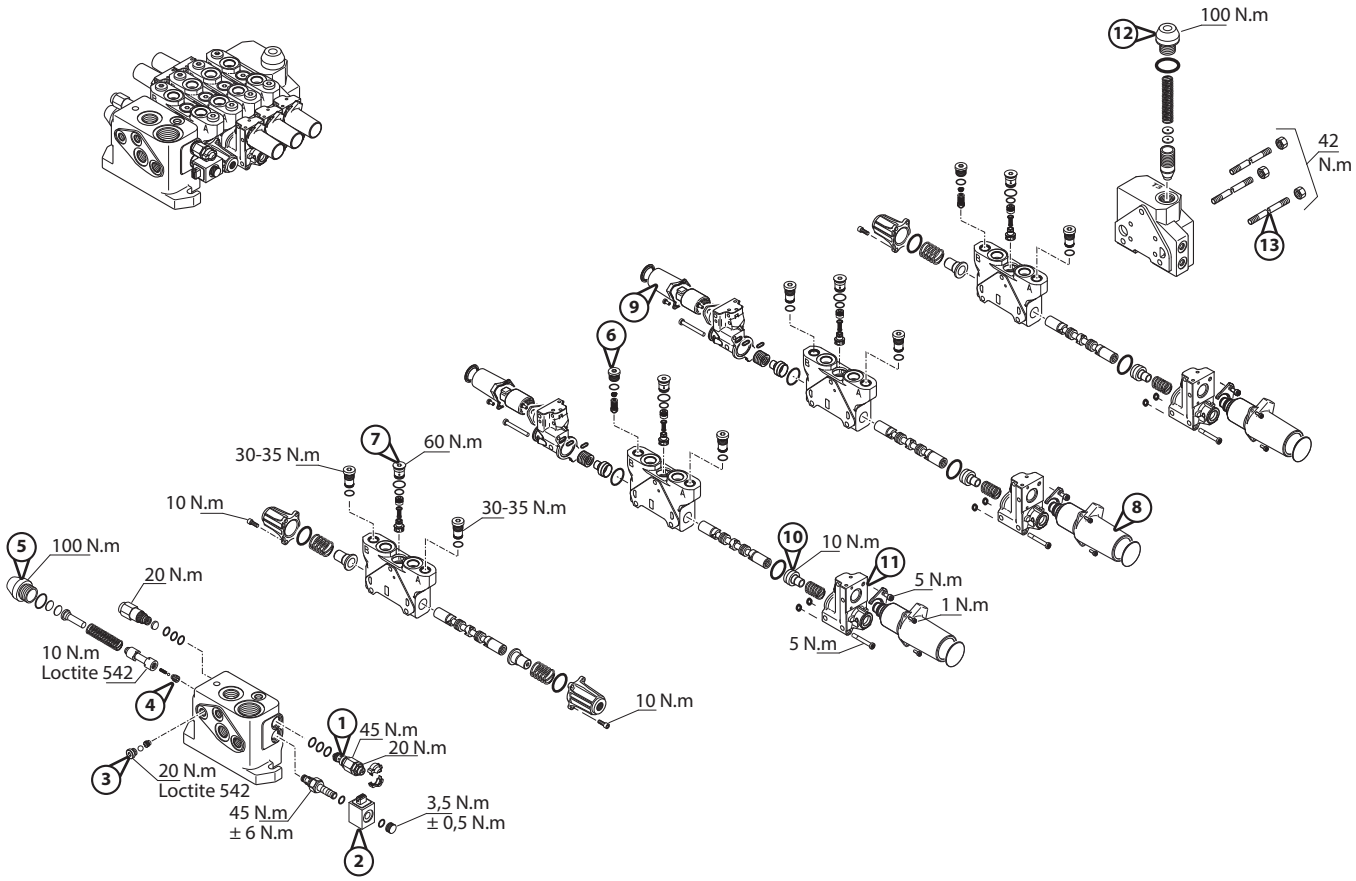
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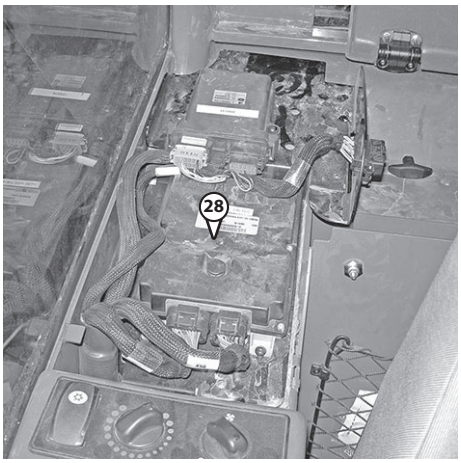
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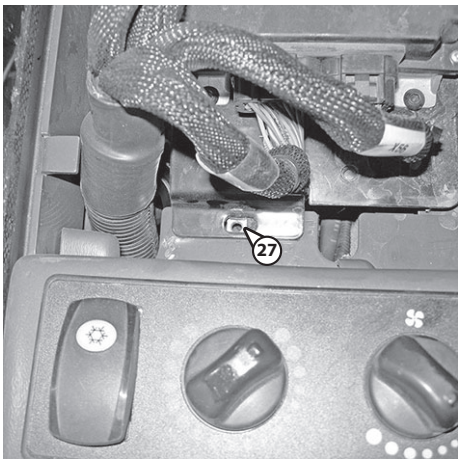

JSM
SPU
Distributor SX14S



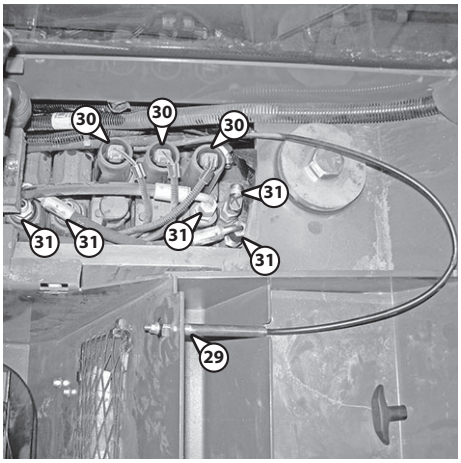
1 - Relief valve
2 - Flow regulator
3 - DLS/LS Selector
4 - Priority valve seat
5 - Priority valve plug
6 - Anti-shock valve
7 - Balance plug
8 - Hydraulic control unit
9 - Return spring housing
10 - EMS module control piston
11 - EMS module
12 - Flushing valve plug
13 - Tie-bolt nuts

70





Remove the screws (Item 27) and tilt the SPU support forward (Item 28).

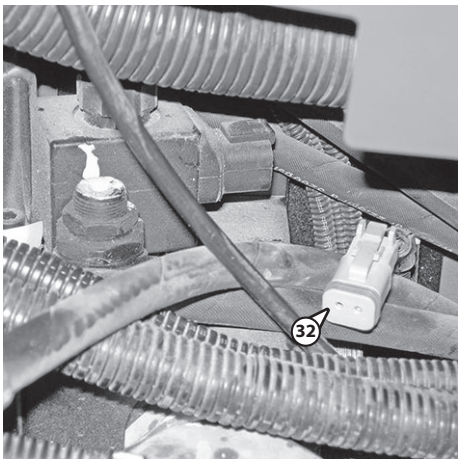


(According to option), remove the cab hydraulic hook cable (Item 29)
(According to option) Disconnect the two or three connectors X28, X35, (X92) (Item 30)

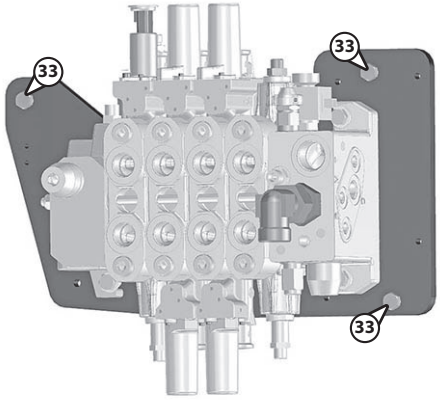
Locate their positions to ensure they are correctly reconnected

(According to option) Disconnect the four or five control hoses (Item 31) from the upper part of the distributor.

Locate their positions to ensure they are correctly reconnected



Disconnect the safety valve connector (X23) (Item 32)

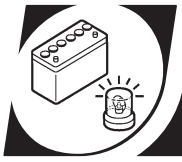


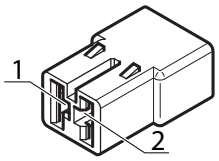
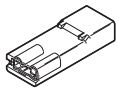
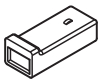
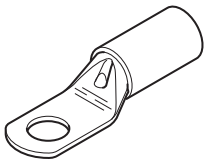
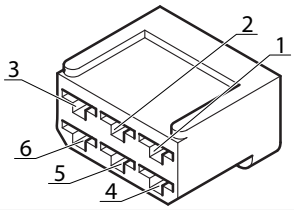
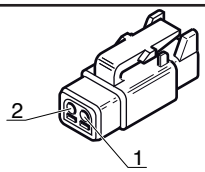
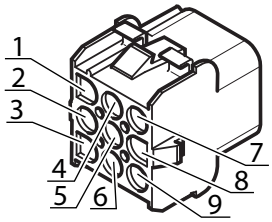
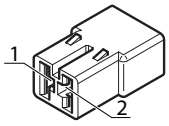
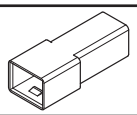
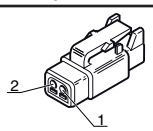
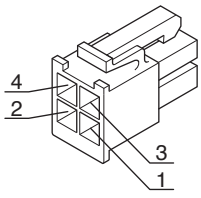
Remove the screw securing the distributor support bracket to the frame (Item 33)

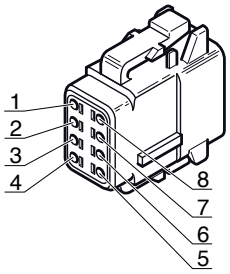
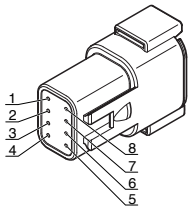
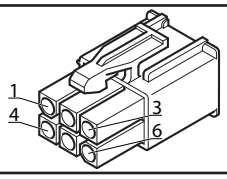
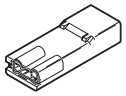
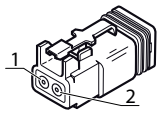
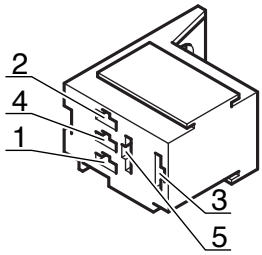
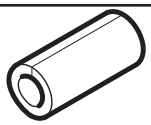
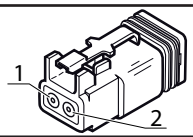
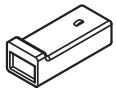
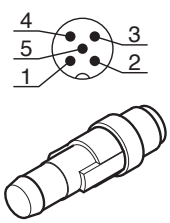
70

ELECTRICITY

- *ELECTRICAL CHARACTERISTICS AND SPECIFICATIONS*
- *ELECTRICAL SCHEMATIC DIAGRAMS*
- *ELECTRICAL COMPONENTS LOCATION*
- *ELECTRICAL CONTROL AND ADJUSTMENT*
- *ELECTRICAL COMPONENTS REMOVAL*
- *ELECTRICAL TROUBLESHOOTING*
- *ELECTRICAL SPECIFIC TOOLING*



Item	Diagram
X71	
X72A X72B X73A X73B	
X74 X75	
X76A X76B	
X77	
X78	
X79	
X80	
X81	
X82	
X83	

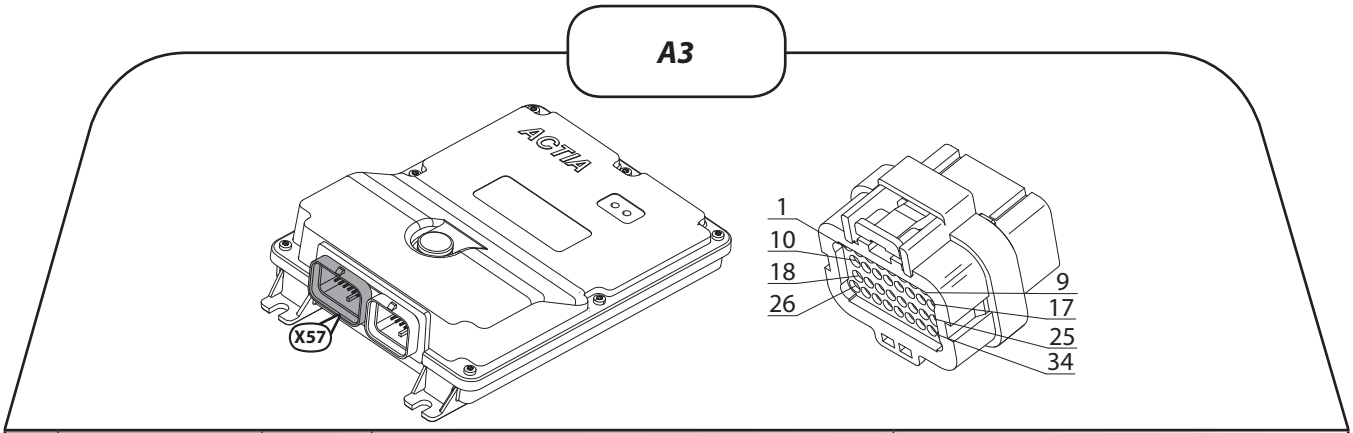
Item	Diagram
X87	
X87 Distributor	
X89 X90	
X91	
X92 X93	
X95	
X96	
X97	
X98	
X99	

MAIN ECU - SPU 25-15 - A3

Key :

APC : Post contact power
+BAT : Permanent supply
GND : Ground

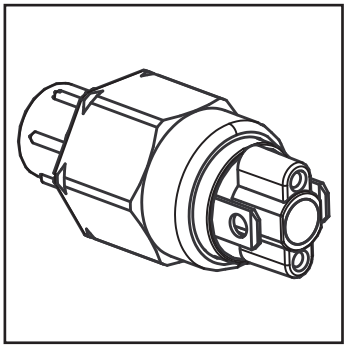
NO : Normally Open
NC : Normally Close
S.P.U. : Safety Power Unit

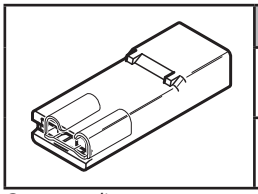


Pin N°	Type	Active state	Function on carriage	Remarks
1	CAN 1 High		CAN H J1939	
2	CAN 1 Low		CAN L J1939	
3	Supply	APC	ECU supply	Cut-off by emergency stop
4	Supply	APC	ECU supply	Cut-off by emergency stop
5	Proportional output	0V to 12V	Retracting telescope proportional electrovalve	
6	Proportional output	0V to 12V	Flow regulation electrovalve (VRD)	
7	Logic output	APC	Security electrovalve (VS)	
8	Supply	APC	ECU supply	
9	Supply	APC	ECU supply	
10	CAN 2 High		CAN H - not used	
11	CAN 1 120 Ω		CAN termination resistance	Connected to CAN 1 Low in harness *
12	Logic input	APC	JSM Switch 1 (NO)	EV TDF *
13	Analog input	0V to 12V	Forced operation potentiometer	
14	Logic input	APC	Reverse direction FNR contact (NO)	
15	Logic input	APC	Retracted telescope sensor (NO) *	
16	Analog input	1V à 11V	JSM roller 2 potentiometer	Attachment
17	Logic output	APC	Transmission cut-off relay	
18	CAN 2 Low		CAN L - not used	
19	Logic input	GND	Lock attachment switch (NO)	
20	Logic input	APC	Thermo-contacts hydraulic and transmission oil (NO)	Cut-off by emergency stop and digital code
21	Logic input	GND	Overload detection (NO) *	
22	Logic input	APC	Forward direction FNR contact (NO)	
23	Logic input	APC	Retracted telescope sensor (NC) *	
24	Logic input	APC	neutral roller 2 contact (NO)	Attachment
25	Proportional output	0V to 12V	Fandrive proportional electrovalve	
26	LIN Interface		Not used	
27	CAN 2 120 Ω		CAN termination resistance - not used	
28	Ground		Ground	CAN Shield
29	Proportional output	0V to 12V	Outputing télescope proportional electrovalve	
30	Logic output	APC	Levelling correction cut electrovalve* Fandrive reversal electrovalve*	Cut according to the boom angle
31	Ground	GND	Ground	
32	Logic output	APC	Tilting neutralization electrovalve (VCI) *	
33	Logic output	APC	Forced operation activation lamp	
34	Ground ECU		ECU ground	

* Depending on version, see on the electrical diagram

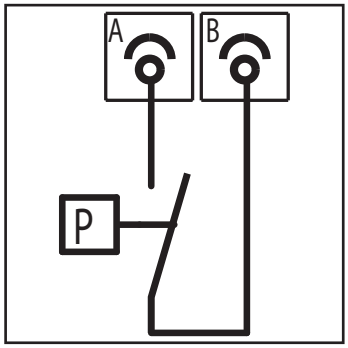
B11 STOP PRESSURE SWITCH X73 A and B





Corresponding connector

PIN	Function
A	12 V power supply
B	Stop Light Control



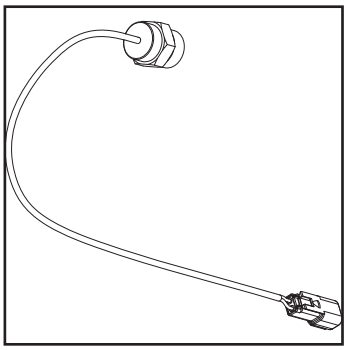
Diagram

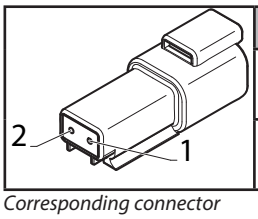
Note :

- The Pressure switch contact closes at a pressure of 3 ± 0,4 bar in the braking circuit.

Notes: _____

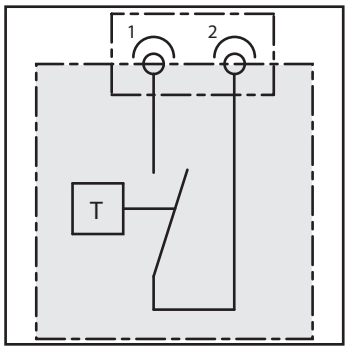
B31 75°C HYDRAULIC TEMPERATURE SENSOR X247





Corresponding connector

PIN	Function
1	NO switch info output
2	Power supply



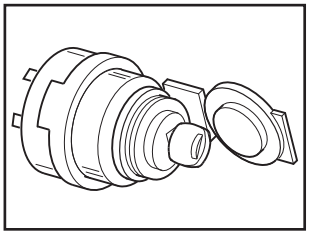
Diagram

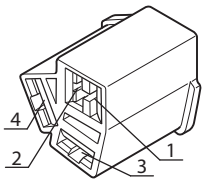
	Typical
Tolerance	± 3,5
Activation threshold	75 °C
Deactivation threshold	60 °C

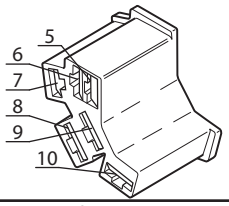
Comments:

Notes: _____

S2 STARTER IGNITION SWITCH X54 / X55

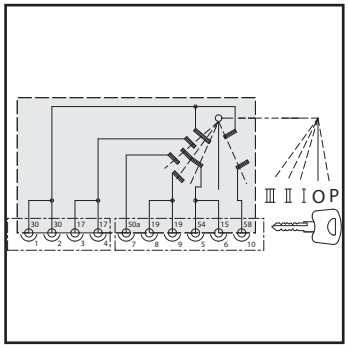






Corresponding connector

PIN	Function
1	+ Battery
2	+ Battery
3	Un used
4	Shunt preload
5	+ After contact (+APC)
6	+ After contact (+APC)
7	Starter
8	Shunt preheating
9	Preheating control relay
10	Un used



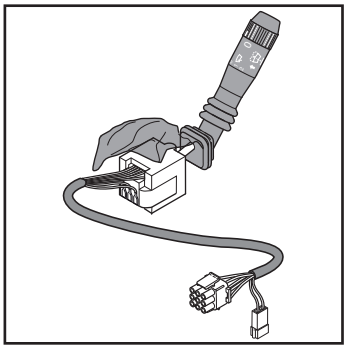
Diagram

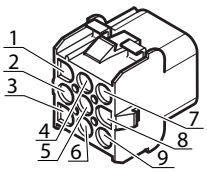
Note :
Voltage drop : 300 mV

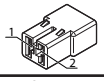
POSITION / PIN	III	II	I	O	P	Maxi - 12 V
7 (50a)	x					18 A / 1min
8 (19)	x	x				70 A / 3.5min
9 (19)	x	x				70 A / 3.5min
5 (54)	x	x	x			65 A / ∞
6 (15)	x	x	x			65 A / ∞
10 (58)					x	8 A / ∞
x -> PIN = 12 V						

Notes: _____

S4 WIPER COMMUTATOR SWITCH X79 / X80

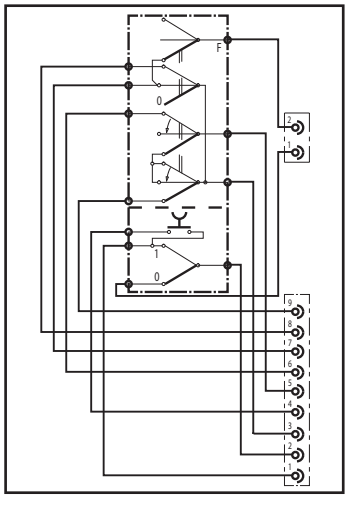






Corresponding connector

PIN	Function
1	Rear windscreen wiper and windscreen washer power supply
2	Rear screen wiper control
3	Front windscreen wiper power supply
4	Rear screen washer
5	Front screen washer supply
6	Front screen washer control
7	Front screen wiper speed 1
8	Front screen wiper speed 2
9	Intermittent
1	Rear screen wiper parking
2	Front windscreen wiper parking

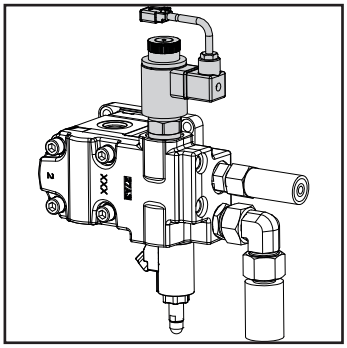


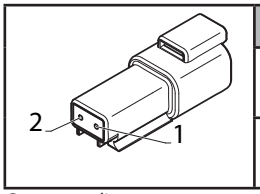
Diagram

	Typical
Voltage	12 V
Consumption	As per outputs

Notes: _____

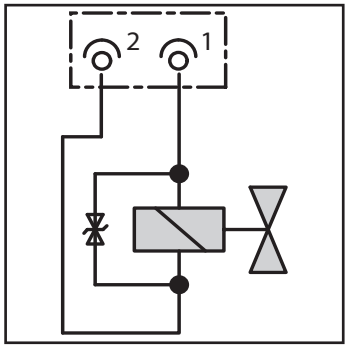
Y42 FAN DRIVE REVERSAL ELECTROVALVE X253





Corresponding connector

PIN	Function
1	Power supply
2	Ground



Diagram

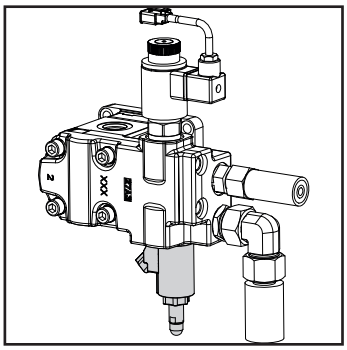
	Typical
Supply voltage	12 V
Coil resistance (at 20 °C)	5,8 Ω (8,6 Ω Hot)
Tolerance	10 %
Consumption	1,4 A

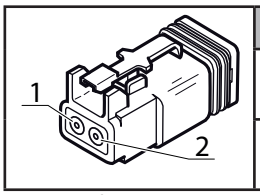
Comments:

Electrovalve control is by current variation. Voltage is indicative only.

Notes: _____

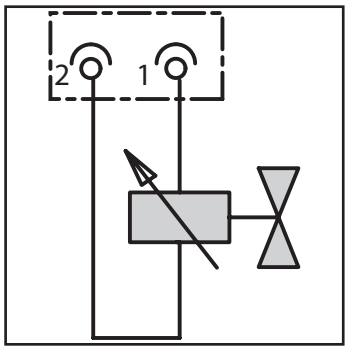
Y43 FAN DRIVE CONTROL ELECTROVALVE X252





Corresponding connector

PIN	Function
1	Power supply
2	Ground



Diagram

	Min.	Typical	Max.
Supply voltage	0		7,2 V (at 65°)
Resistance (at 20 °C)		4,6 Ω	
Tolerance		10 %	
Consumption			1,2 A

Comments:

Notes: _____

DIAGRAM 1 (Start-up / Customer Digicode)

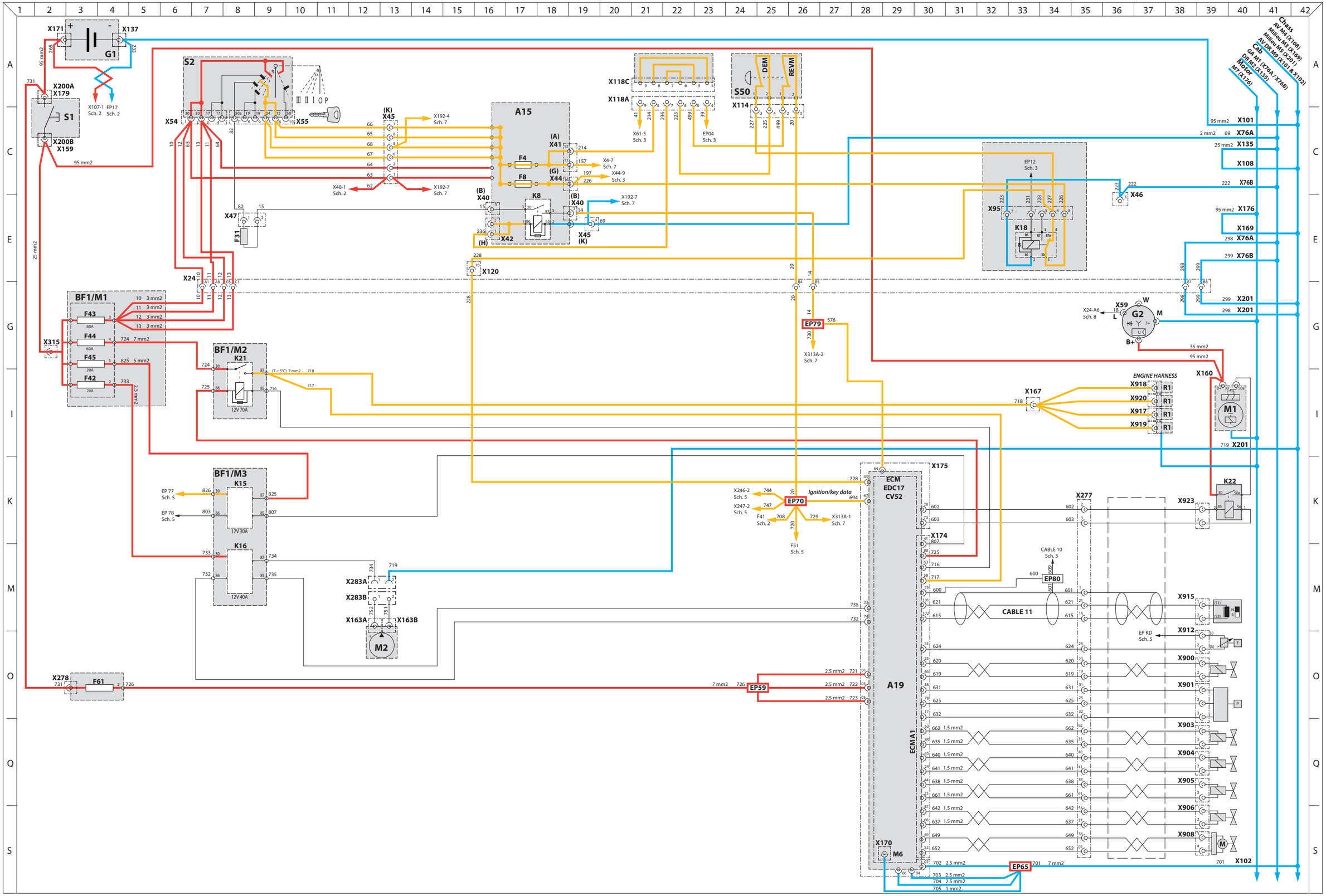
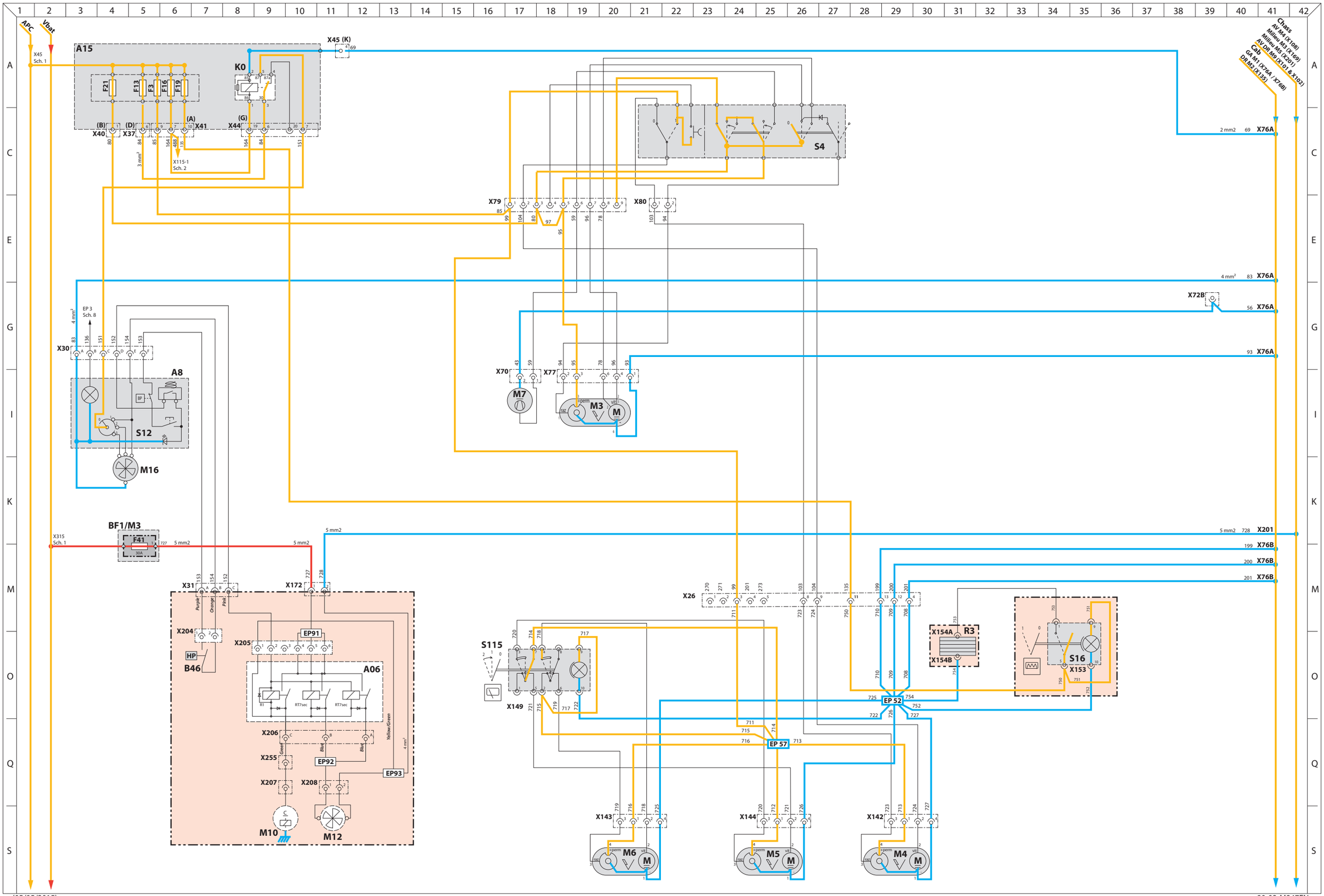
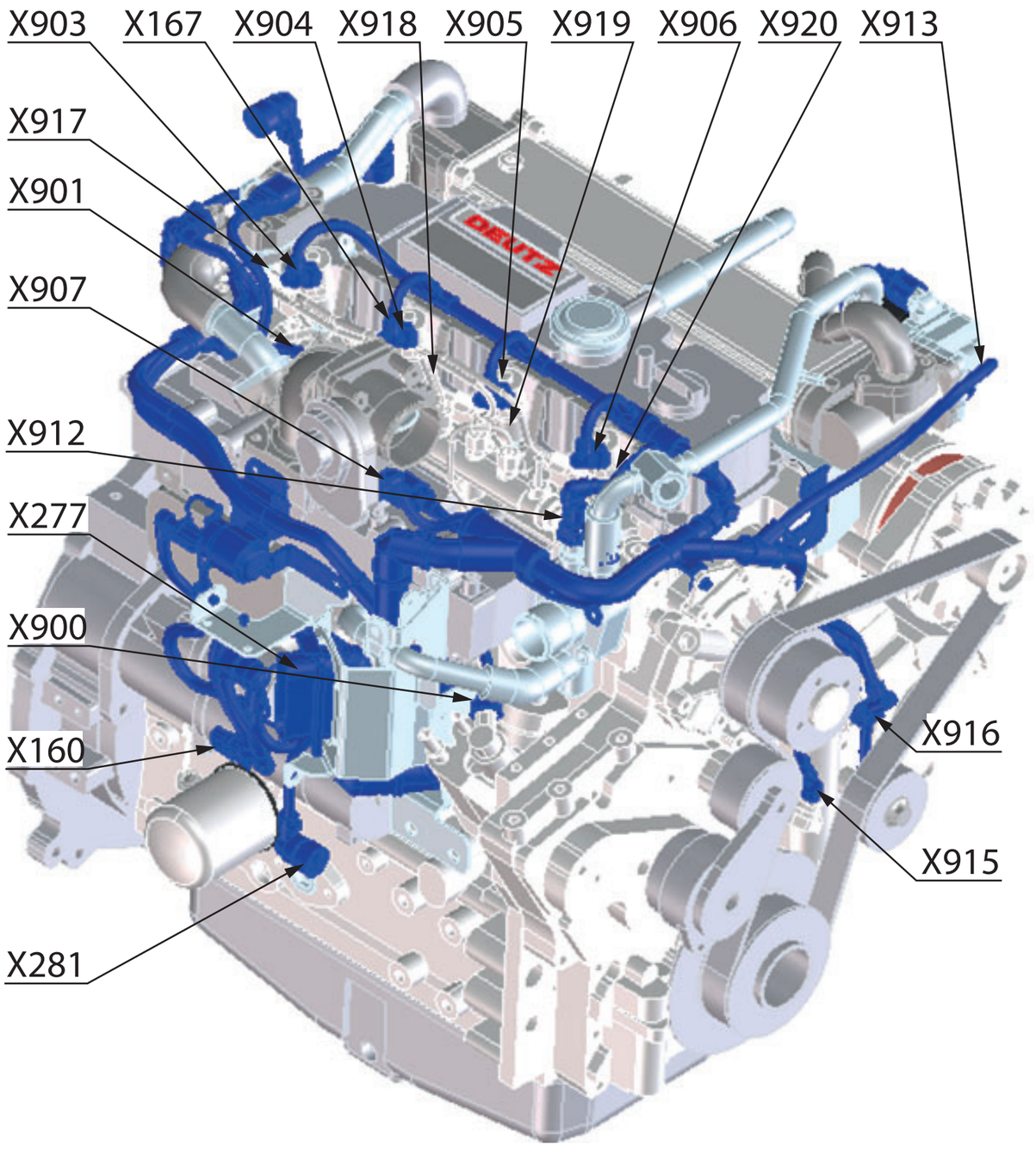


DIAGRAM 6 (fan / air-conditioning / wipers)



Item	DESIGNATION	Position on harness layout							
		2D					3D		
		Assembly	Main	Cab	Engine	Additional	Engine 1	Engine 2	Gnd cons
X158	Engine diagnostic plug/Fuse box 1	O26			C30				
X159	Battery cut-off	M24							
X160	Cable + starter/alternator							O14	
X164	Air intake temperature sensor on hose	O19			G30				
X165	Fuel gage	O14			A3				
X166A	Air filter clogging info	O14			A3				
X166B	Air filter clogging ground	O14			A3				
X167	Glow plug conductor rail	O16			O11		K25	E17	
X168	Radiator water level	O23			I29				
X169	Engine unit ground on frame								
X170	Engine computer box ground	Q25			K25				
X171	Main display power supply via dashboard plate						E35		
X172	Air-conditioning predisposition	M23				Q31	I25		
X172A	Rotating beacon light - power supply				M23				
X174	Engine computer connector A1	O25			G40				
X175	Engine computer connector K1	Q25			M27		E42		
X176	Engine unit ground to frame								
X178	Presence of water in diesel fuel	O15			C10				
X179	Accelerator pedal potentiometer	I23	C8						Q20
X180	Indicator lamp harness/connector E on fuse plate		M22						I34
X183	Dashboard indicator lamps (16 way)		S13						
X184A	Battery charge indicator lamp interface		M23						
X184B	Battery charge indicator lamp interface		M22						
X185	Steering fault indicator		Q14						
X186	Fan reversal switch (Main harness)/Engine indicator lamp power supply (Plate harness)	I25	Q13						Q28
X187	Warning switch	I31							
X188	Lighting stalk switch	I31							
X189	Awaiting stalk switch-plate TUV diode	I31							
X190	Awaiting plate-commutator switch TUV diode	I31							
X191	Awaiting plate-working lights TUV diode	I31							
X192	Car radio power supply	G31							
X201	Right center frame ground	M9			G19				
X204	High pressure air-conditioning sensor					G38			
X205	Air-conditioning module - power supply and control					E32			
X206	Air-conditioning module - compressor and fan power supply					E31			
X207	Air-conditioning compressor	Q16			E5	Q29			
X208	Air-conditioning fan 1					E37			
X245	Boost air temperature sensor	O22			I24				
X246	Transmission oil temperature sensor				I38				
X247	Hydraulic oil temperature sensor				I37				
X248	Diesel filter						I25		
X252	Fan Drive control proportional EV	M23			I18				
X253	Fan Drive reversal electrovalve harness interface	O23			K19				
X255	Air-conditioning compressor power supply interface	M23			M24		I25		
X273	Distributor harness ground connection	K15				G15			
X277	Engine harness/main harness interface	Q15			G5			M14	
X278	Sealed maxifuse holder F61	O24			C24				
X279	Engine ECM power supply	M24			A29				

ENGINE HARNESS 2



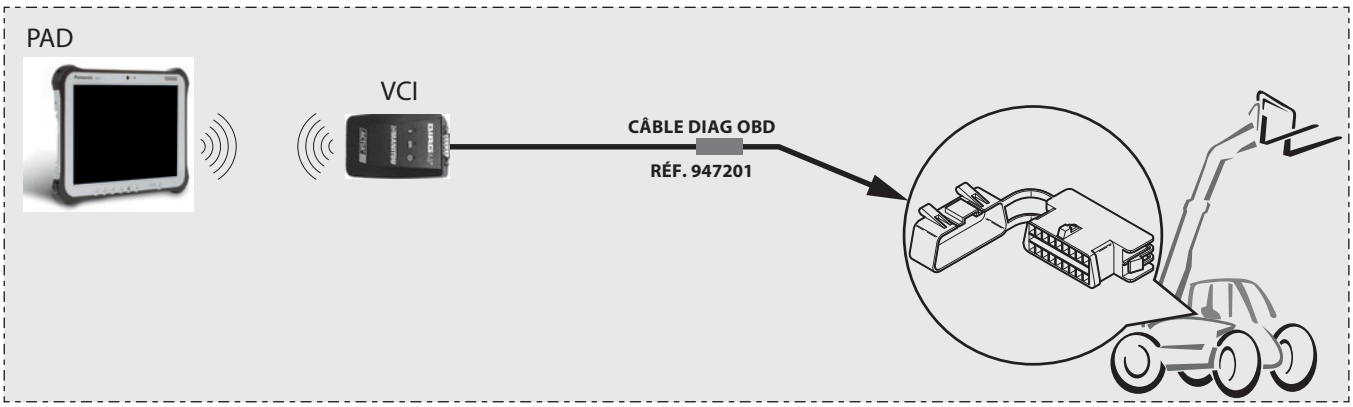
SPU 25-15				
PAD code	Code on machine screen		COMPONENT	CHARACTERISATION DESCRIPTION
Hexadecimal	Decimal			
	SPN	FMI		
013603	520502	03	Control electrovalve output	Signal voltage too high: + battery short circuit
013604	520502	04	Control electrovalve output	Signal voltage too low: ground short circuit
013605	520502	05	Control electrovalve output	Circuit impedance too high: open circuit
013707	520503	07	Control electrovalve operation error	Faulty actuator (mechanical problem)
014503	520517	03	Telescope retraction electrovalve output	Signal voltage too high: + battery short circuit
014504	520517	04	Telescope retraction electrovalve output	Signal voltage too low: ground short circuit
014505	520517	05	Telescope retraction electrovalve output	Circuit impedance too high: open circuit
014603	520518	03	Attachment line A control electrovalve output	Signal voltage too high: + battery short circuit
014604	520518	04	Attachment line A control electrovalve output	Signal voltage too low: ground short circuit
014605	520518	05	Attachment line A control electrovalve output	Circuit impedance too high: open circuit
014703	520519	03	Attachment line B control electrovalve output	Signal voltage too high: + battery short circuit
014704	520519	04	Attachment line B control electrovalve output	Signal voltage too low: ground short circuit
014705	520519	05	Attachment line B control electrovalve output	Circuit impedance too high: open circuit
014803	520520	03	Fan rotation direction reversal electrovalve output	Signal voltage too high: + battery short circuit
014804	520520	04	Fan rotation direction reversal electrovalve output	Signal voltage too low: ground short circuit
014805	520520	05	Fan rotation direction reversal electrovalve output	Circuit impedance too high: open circuit
014903	520521	03	Fan speed control electrovalve output	Signal voltage too high: + battery short circuit
014904	520521	04	Fan speed control electrovalve output	Signal voltage too low: ground short circuit
014905	520521	05	Fan speed control electrovalve output	Circuit impedance too high: open circuit
020102	520705	02	Forced operation button	Erratic signal value
020402	520708	02	Telescope head electrovalve activation button	Erratic signal value
020502	520709	02	Attachment line decompression button	Erratic signal value
021007	520720	07	Retracted telescope not detected	Faulty actuator (mechanical problem)
021402	520724	02	JSM FNR selector	Erratic signal value
021602	520726	02	Longitudinal stability display	Erratic signal value
02160C	520726	12	Longitudinal stability display	Faulty sensor or actuator
021702	520727	02	Aggravating movements contact 1	Erratic signal value
022202	520738	02	Override button	Erratic signal value
022402	520740	02	Retracted telescope sensor	Erratic signal value
022602	520742	02	Boom lifting angle sensor	Erratic signal value
022609	520742	09	Boom lifting angle sensor	Information not available on the CAN bus
022610	520742	16	Boom lifting angle sensor	Upper sensor signal value at normal value
022612	520742	18	Boom lifting angle sensor	Lower sensor signal value at normal value
022700	520743	00	Strain gauges	Upper sensor signal value at normal value
022701	520743	01	Strain gauges	Lower sensor signal value at normal value
022702	520743	02	Strain gauges	Erratic signal value
022709	520743	09	Strain gauges	Information not available on the CAN bus
02270A	520743	10	Strain gauges	Abnormal signal value variation for correct operation
022713	520743	19	Strain gauges	Transmitted signal value on CAN bus invalid
02320D	520754	13	Boom angle sensor calibration error	Out of range signal value defined by the calibration: Calibration not carried out or carried out incorrectly
024102	520769	02	Telescope roller sensor	Erratic signal value
024110	520769	16	Telescope roller sensor	Upper sensor signal value at normal value
024113	520769	19	Telescope roller sensor	Lower sensor signal value at normal value
024202	520770	02	Attachment roller sensor	Erratic signal value
024210	520770	16	Attachment roller sensor	Upper sensor signal value at normal value
024213	520770	19	Attachment roller sensor	Lower sensor signal value at normal value
024302	520771	02	Tilting movement slide contact	Erratic signal value
024402	520772	02	Attachment movement slide contact	Erratic signal value
024A05	520778	05	Air intake temperature sensor	Circuit impedance too high: open circuit
031101	520977	01	ECU power supply voltage	Lower sensor signal value at normal value
041609	521238	09	Longitudinal stability display	Information not available on the CAN bus
044009	521280	09	CAN bus fault	Information not available on the CAN bus
051500	521493	00	Computer	Upper sensor signal value at normal value
05150C	521493	12	Computer	Faulty sensor or actuator

Engine ECU					
Code KWP	**SPN**	**FMI**	**Blink code**	**ERROR DESCRISCRIPTIONS**	**ACTION**
956	677	3	512	"Starter relay high side. Short circuit to battery."	"Threshold for error detection is an internal ECU threshold. Check cabling and start relay and if necessary replace it, check connection cable and if necessary repair or replace it."
957	677	4	512	Starter relay high side short circuit to ground.	"Threshold for error detection is an internal ECU threshold. Check cabling and start relay and if necessary replace it, check connection cable and if necessary repair or replace it."
958	677	5	512	Starter relay low side no load error.	"Threshold for error detection is an internal ECU threshold. Check cabling and start relay and if necessary replace it, check connection cable and if necessary repair or replace it."
959	677	12	512	Starter relay powerstage over temperature.	"Threshold for error detection is an internal ECU threshold. Check cabling and start relay and if necessary replace it, check connection cable and if necessary repair or replace it . "
960	677	3	512	Starter relay low side short circuit to battery.	"Threshold for error detection is an internal ECU threshold. Check cabling and start relay and if necessary replace it, check connection cable and if necessary repair or replace it."
961	677	4	512	Starter relay low side short circuit to ground.	"Threshold for error detection is an internal ECU threshold. Check cabling and start relay and if necessary replace it, check connection cable of terminal 50 and if necessary repair or replace it."
973	523612	14	555	Softwarereset CPU SWReset_0	Threshold for error detection is an internal ECU threshold.
974	523612	14	555	Softwarereset CPU SWReset_1	Threshold for error detection is an internal ECU threshold.
975	523612	14	555	Softwarereset CPU SWReset_2	"Threshold for error detection is an internal ECU threshold. If possible the software update has to be done. Replace the ECU."
976	91	11	2-2-6	Plausibility error between APP1 and APP2 or APP1 and idle switch.	"Threshold for error detection is an internal ECU threshold. Check cabling, check accelerator pedal and pedal sensor and if necessary replace it, check connection cable and if necessary repair or replace it. When the PWM period APP_tiPWMPer is in between APP_ tiSRCLoPWMPer_C and APP_tiSRCHiPWMPer_C ."
978	29	2	1-2-6	"Plausibility error between sensor and idle switch, Acceleration Pedal Detection. In case of Hand Throttle with Low Idle Switch, it is the plausibility check between hand throttle and idle switch."	"Threshold for error detection is an internal ECU threshold. The accelerator pedal must have detected full load and idle plausibility at least once."
980	523550	12	515	Terminal 50 was operated too long	"Threshold for error detection is an internal ECU threshold. Check cabling, if sensor not working, check start switch and if necessary replace it, check connection cable and if necessary repair or replace it."
992	105	1	128	"Charged Air cooler down stream temperature. Temperature below lower physical threshold."	"actual temperature below -40°C? exchange sensor"
994	105	3	128	"Electrical error charged air temperature. Signal range check high.(SRC)"	"The sensor raw signal Air_uRawTCACDs (voltage) > Air_ SRCTCACDs.uMin_C. Check CAC-sensor and if necessary replace it, check connection cable and if necessary repair or replace it. "
995	105	4	128	"Electrical error charged air temperature. Signal range check low."	"The sensor raw signal Air_uRawTCACDs (voltage) is below Air_ SRCTCACDs.uMin_C. Check CAC-sensor and if necessary replace it, check connection cable and if necessary repair or replace it"
996	105	0	233	"Charged air cooler temperature. System reaction initiated. High charged air cooler temperature. Warning threshold exceeded."	"Check CAC system and clean it. Check fan functionality. Check cooling perfomance with temperature measurement."
997	105	0	233	"Low charged air cooler temperature. Shut off threshold exceeded."	Check CAC system and clean it. Check fan functionality. Check cooling perfomance with temperature measurement.
1007	412	3	682	"Electrical error EGR cooler downstream temperature. Signal range check high."	"Check wiring harness to TEGR-sensor. Exchange TEGR-sensor."
1008	412	4	682	"electrical error EGR cooler downstream temperature. Signal range check low."	"Check wiring harness to TEGR-sensor. Exchange TEGR-sensor."
1011	523960	0	771	Physical range check high for EGR cooler downstream temperature.	"EGR-Valve blocked open EGR-Valve actuator defect EGR-cooler defect (check for coolant water) Reed Valve defect Intake throttle blocked in closed position Exhaust pressure too high Check Nox-sensor upstream SCR catalyst dp venturi sensor defect "

Engine ECU					
Code KWP	**SPN**	**FMI**	**Blink code**	**ERROR DESCRISCRIPTIONS**	**ACTION**
1859	524175	0	993	SCR-CAT, Nox emissions above maximum threshold	"- Check DEF level in tank which should be higner than 12%. - Check DEF quality ComRxSCR_rAdBlu which shall be above 32.5 %. If it's below 24, then it's diluted urea in tank or even water => Exchange the fluid in the tank with right DEF quality. - Check DEF supply module: perform pressure test => Replace supply module - Check DEF dosing valve => perform injector test => Clean injector with water => Repeat injector test => Replace injector - Check NOx sensor downstream SCR catayst: check wiring and sensor itself. At warm engine and warm EAT-system (SCRT_ tCatAvrgExhGs > 250°C) in steady state, check sensed Nox-values: at ComRxSCR_stNOxRdyUs & ComRxSCR_stNOxRdyDs, ComRxSCR_rNOxUs must be > ComRxSCR_rNOxDs. ComRxSCR_ rNOxDs shall be < 100 ppm in steady state operation. => Exchange NOx-Sensor downstream of SCR catalyst - Check engine air path: dp venturi sensor, EGR cooler, EGR-Valve, Intake throttle, Turbocharger, piping for function and leakage. EGR line blocked? - Check engine speed sensors: Are camshaft and crankshaft sensors defect? - Check injection system: Is calculation of engine torque correct? Exchange SCR catalyst Exchange DOC"
1863	524177	7	995	SCR System, DEF suction line blocked	"Make sure that DEF lines, pump and tank are not frozen. Check for DEF level in the tank. Check DEF lines: Are all DEF lines connected? Is the suction line blocked? Is ther any leakage? Not only urea to the outside but also air into the lines, especially in the suction line! Perform SERDIA usecase ""pressure test"": Does the DEF pump work? => check wiring harness & PWM signal for pump. Does the urea pressure increase? All errors are already healed? If still unsuccessful so far: Check urea pressure sensor: At ignition on and SCR system state = 0 (""Init check""), SCR_pAbsAdapUPmpP shall be identical to EnvP_p. Fulfilled: Sensor okay! Check DEF pump filter: Is any dirt inside? Suspected components: Suction line PWM Powerstage has a defect and a default value which leads not to a rising pressure DEF pump pressure sensor defect DEF pump filter contains dirty parts "
1864	524178	7	996	SCR System, DEF pressure out of range	"Make sure that DEF lines, pump and tank are not frozen. Check for DEF level in the tank Check DEF lines: All lines connected? The right lines connected to the correct places? Suction line blocked? Is there any leakage? Not also urea to the outside but also air into the lines, especially in the suction line! Perform SERDIA usecase ""pressure test"": Does the DEF pump work properly? => check wiring harness & PWM signal for pump Does the DEF pressure rise? Is the error healed? If still unsuccessful so far: - Check DEF pressure sensor: At ignition on and SCR system state = 0 (""Init check""), SCR_pAbsAdapUPmpP shall be identical to EnvP_p. Fulfilled: Sensor okay! - Check reverting valve - Check DEF pump filter: dirt inside? Suspected components: DEF pump broken Reverting valve continously open DEF suction line, backflow line broken or connection swapped PWM Powerstage has a defect DEF pump pressure sensor broken"

CONNECTION TO TRUCK

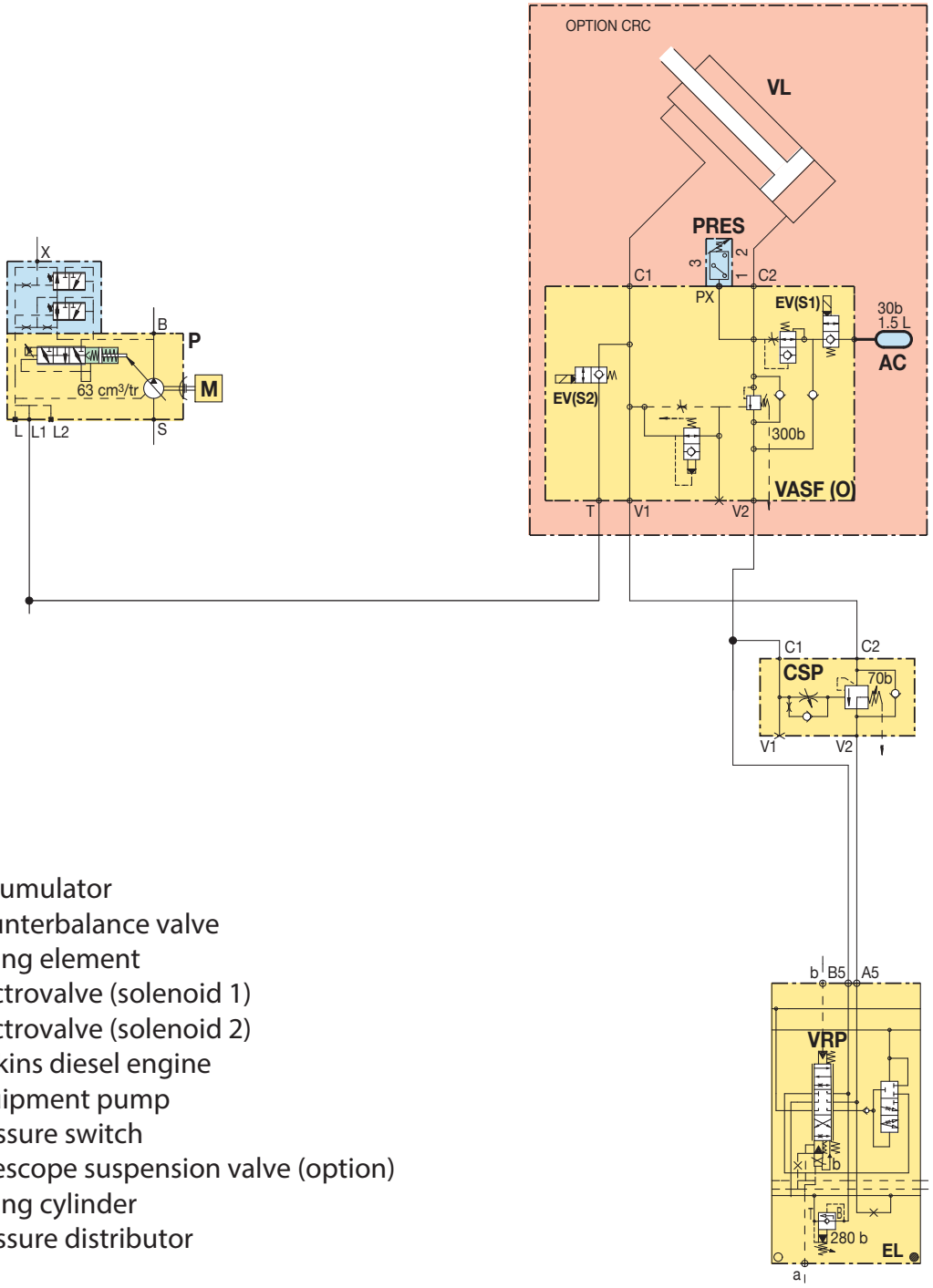
CASE 1



Note: The cable Ref. 947201 can diagnose the entire machine.

SCHEMATIC DIAGRAMS

HYDRAULIC SCHEMATIC DIAGRAMS FOR LSU TELEHANDLER

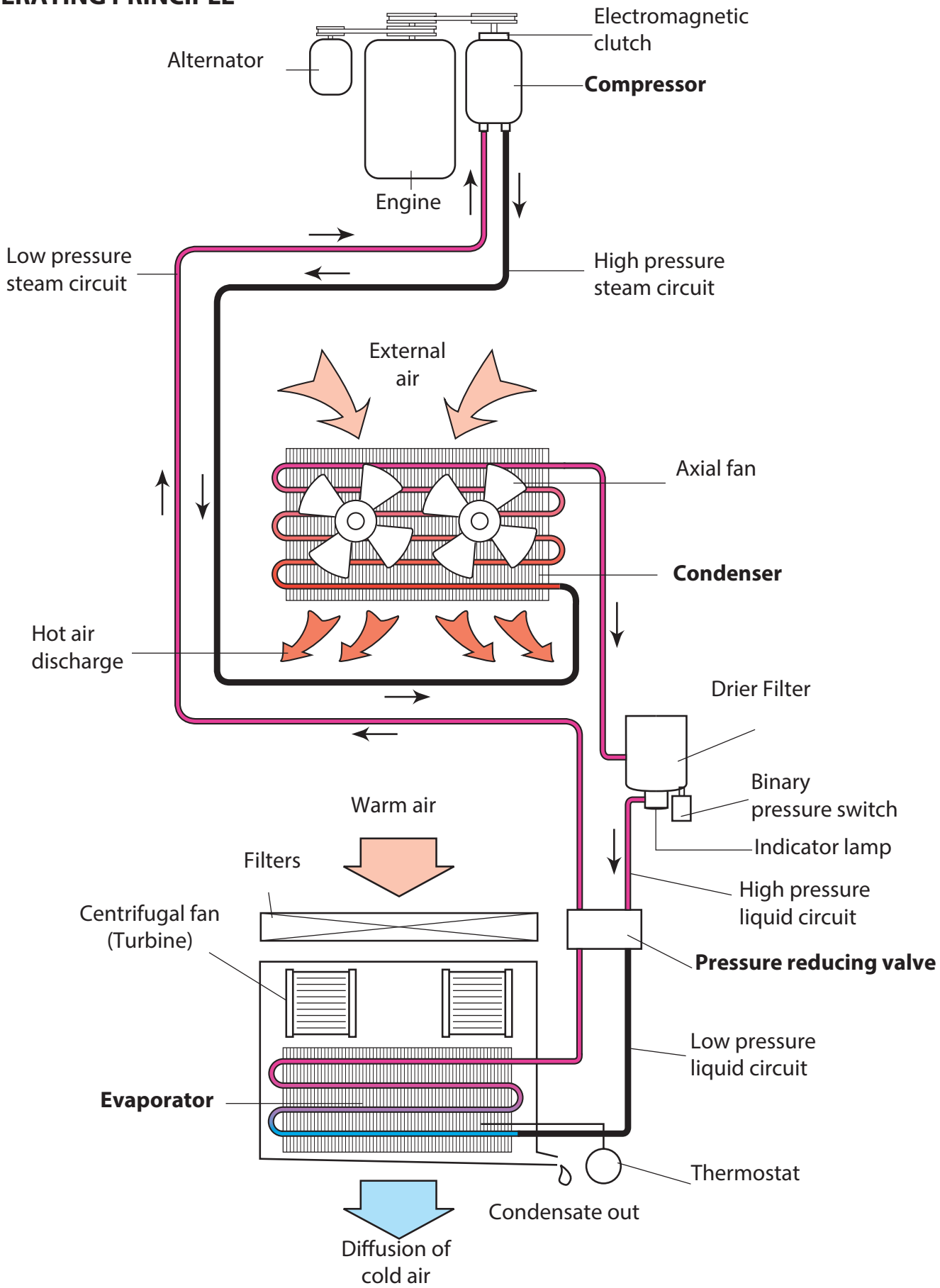


Key:

AC - Accumulator
CSP - Counterbalance valve
EL - Lifting element
EV (S1) - Electrovalve (solenoid 1)
EV (S2) - Electrovalve (solenoid 2)
M - Perkins diesel engine
P - Equipment pump
PRES - Pressure switch
VASF - Telescope suspension valve (option)
VL - Lifting cylinder
VRP - Pressure distributor

AIR-CONDITIONING OPTION

OPERATING PRINCIPLE



CAB

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