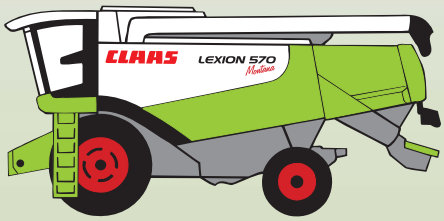
CLAAS



LEXION 570 - 520 MONTANA

Up to serial number: **582 00092**
581 00082
580 00049

Technical Systems

Electric System

SERVICE & PARTS

Key to diagram:

		Centr. term. comp. position
	Modules	
A08	AUTOCONTOUR module (CAC)	
A09	AUTOPILOT module	
A10	Fieldwork computer module (BIF/CAB)	
A12	Speed monitor module (DZW)	
A16	Reel controller module (HAS)	
A17	Engine adaptation module (ADM)	
A21	YIELD METER module (LEM)	
A25	Sieve adjustment module	
A28	Uni-spreader module (VGS)	
A33	Sidefinder module	
A34	Grain tank module	
A37	Electro-hydraulic gearshift (EHS) module	
A45	Ground drive hydraulic motor brake restrictor module (HBM)	
	Electronic components	
DI	Warning device diode PCB	
D0	Master valve diode PCB	
DS	Diagnosis (63-pin) VIA	
ST1	Connecting cable (ribbon cable)	Connection between basic PCB and module PCB / Interconnection list on page ZE-6
ST2	Connecting cable (ribbon cable)	
ST3	Connecting cable (ribbon cable)	
ST4	Connecting cable (ribbon cable)	
	Fuses	
F1	Dipped headlights circuit	Z 4
F2	Sieve adjustment module 12 V control unit	G 2
F3	CAN connection of performance monitor	A 7-8
F4	+12 V electronic unit	A 8
F5	12 V air conditioner fan	X-Y 2
F6	Spare (plug MU)	K-L 2
F7	CAC module	A 7
F8	Reel module	A 6
F9	Yield meter	F 2
F10	Yield meter	F 2
F11	Inside work lights	V-W 2
F12	Work lights relay	C-D 2
F13	Cigarette lighter	K 6
F14	Seat socket	G-H 7
F15	Dipped headlights / Full beam	Y 4
F16	12 V CAB/DZW	A 9
F17	Electronic unit plus RIO	M 6
F18	Cutterbar quick stop	L 2
F19	Engine speed switch	G 6
F20	All-wheel drive 12 V switch	E 2
F21	Threshing mechanism relay	L 6
F22	Threshing mechanism ON	I-J 7
F23	Hazard warning switch 30	I-J 6
F24	Hazard warning switch 15	I 6
F25	Fan speed relay	N 6
F26	Reel controller	S 6
F27	Upper/lower sieve	A 2-3
F28	Autopilot switch	H 7
F29	Ground speed control lever limit switch 12 V	H 6
F30	Brake light switch 12 V / Sieve pan light	W-X 6

Key to diagram:

		Centr. term. comp. position
	Modules	
A08	AUTOCONTOUR module (CAC)	
A09	AUTOPILOT module	
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A16	Reel controller module (HAS)	
A17	Engine adaptation module (ADM)	
A21	YIELD METER module (LEM)	
A25	Sieve adjustment module	
A28	Uni-spreader module (VGS)	
A33	Sidefinder module	
A34	Grain tank module	
A35	MONTANA control unit module	
A36	MONTANA gearshift control module	
A45	Ground drive hydraulic motor brake restrictor module (HBM)	
	Electronic components	
DI	Warning device diode PCB	
D0	Master valve diode PCB	
DS	Diagnosis (63-pin) VIA	
ST1	Connecting cable (ribbon cable)	Connection between basic PCB and module PCB / Interconnection list on page ZE-6
ST2	Connecting cable (ribbon cable)	
ST3	Connecting cable (ribbon cable)	
ST4	Connecting cable (ribbon cable)	
	Fuses	
F1	Dipped headlights circuit	Z 4
F2	Sieve adjustment module 12 V control unit	G 2
F3	CAN connection of performance monitor	A 7-8
F4	+12 V electronic unit	A 8
F5	12 V air conditioner fan	X-Y 2
F6	Spare (MU connector)	K-L 2
F7	CAC module	A 7
F8	Reel module	A 6
F9	Yield meter	F 2
F10	Yield meter	F 2
F11	Inside work lights	V-W 2
F12	Work lights relay	C-D 2
F13	Cigarette lighter	K 6
F14	Seat socket	G-H 7
F15	Dipped headlights / Full beam	Y 4
F16	12 V CAB/DZW	A 9
F17	Electronic unit plus	M 6
F18	Cutterbar quick stop	L 2
F19	Engine speed switch	G 6
F20	All-wheel drive 12 V switch	E 2
F21	Threshing mechanism relay	L 6
F22	Threshing mechanism ON	I-J 7
F23	Hazard warning switch 30	I-J 6
F24	Hazard warning switch 15	I 6
F25	Fan speed relay	N 6
F26	Reel controller	S 6
F27	Upper/lower sieve	A 2-3
F28	Autopilot switch	H 7
F29	Ground speed control lever limit switch 12 V	H 6
F30	Brake light switch 12 V / Sieve pan light	W-X 6

Pin assignment in modules

Module A16 – Reel controller

Pin	Function	Component	Measuring variable	Direction	Circuit diagram no.
1	Raise reel	Y22	12 V	Output	21
2	Earth (GND)	32	Earth	Input	6
3	CAN high	-	-	-	6
4	Front attachment reverse signal	S57	12 V	Input	17
5	Reel speed signal	B17	0.4 V – 4.6 V	Input	22
6	---	---	---	---	---
7	---	---	---	---	---
8	Reference voltage	---	5 V	Output	---
9	---	---	---	---	---
10	Snapping plates actual value signal	B55	0.25-4.75 V	Input	21
11	---	---	---	---	---
12	Front attachment dampening	Y97	12 V	Output	31
13	Reel speed -	Y96	12 V	Output	22
14	Lower reel	Y23	12 V	Output	21
15	Electronic unit	F8	12 V / 1 A	Input	6
16	CAN low	-	-	-	6
17	Cutterbar identification signal	F49	12 V	Input	22
18	Power	F26	12 V / 15 A	Input	21, 22, 31
19	---	---	---	---	---
20	Power	F26	12 V / 15 A	Input	21, 22, 31
21	Reel height actual value signal	B39	0.25-4.75 V	Input	24
22	Variable displacement pump actual value signal	B73	0.25-4.75 V	Input	22
23	---	---	---	---	---
24	---	---	---	---	---
25	Reel speed +	Y95	12 V	Output	22

Module A37 – Electro-hydraulic gearshift (EHS) - 3-speed manual gearbox

Pin	Function	Component	Measuring variable	Direction	Circuit diagram no.
1	1st gear	Y107	12 V	Output	44
2	GND	-31	Earth	Input	44
3	CAN high	-	-	-	6
4	2nd gear	Y108	12 V	Output	44
5	3rd gear	Y123	12 V	Output	44
6	Master valve	Y77	12 V	Output	4, 44
7	Ground speed control lever neutral	Z57	12 V	Input	1, 44
8	Gearbox power supply actual value switch	Z82, Z83, Z95, Z96, Z97	12 V, limited to 200 mA	Output	44
9	Brake circuit pressure	Z79,Z80	12 V	Input	44
10	Gearbox switch 2nd/3rd/neutral	Z97	12 V	Input	44
11	1st gear engaged gearbox switch	Z82	12 V	Input	44
12	2nd gear engaged gearbox switch	Z83	12 V	Input	44
13	3rd gear engaged gearbox switch	Z95	12 V	Input	44
14	Gearbox neutral signal	H63	12 V	Output	44
15	Electronic unit +	F17	12 V	Input	6
16	CAN low	-	-	-	6
17	1st gear / neutral gearbox switch	Z96	12 V	Input	44
18	1st gear engaged signal	H60	12 V	Output	44
19	2nd gear engaged signal	H61	12 V	Output	44
20	Power	F75	12 V / 15 A	Input	44
21	Gear selection 1st/2nd gear	S70	12 V	Input	44
22	Gear selection 1st/2nd gear	S70	12 V	Input	44
23	Gear selection 3rd gear / neutral	S71	12 V	Input	44
24	Gear selection 3rd gear / neutral	S71	12 V	Input	44
25	3rd gear engaged signal	H62	12 V	Output	44

Module A37 – Electro-hydraulic gearshift (EHS) - 2-speed manual gearbox

Pin	Function	Component	Measuring variable	Direction	Circuit diagram no.
1	1^{st} gear	Y107	12 V	Output	44
2	GND	-31	Earth	Input	44
3	CAN high	-	-	-	6
4	2^{nd} gear	Y108	12 V	Output	44
5	---	---	---	---	---
6	Master valve	Y77	12 V	Output	4,44
7	EHS release signal (gearshift release)	A49	12 V	Input	1,44
8	Gearbox actual value switch power supply	Z82,Z83, Z96	12 V, limited to 200 mA	Output	44
9	EHS release signal (gearshift release)	A49	12 V	Input	1,44
10	---	---	---	---	---
11	1^{st} gear engaged gearbox switch	Z82	12 V	Input	44
12	2^{nd} gear engaged gearbox switch	Z83	12 V	Input	44
13	---	---	---	---	---
14	Gearbox neutral signal	H63	12 V	Output	44
15	Electronic unit +	F17	12 V	Input	6
16	CAN low	-	-	-	6
17	Gearbox switch neutral	Z96	12 V	Input	44
18	1^{st} gear engaged signal	H60	12 V	Output	44
19	2^{nd} gear engaged signal	H61	12 V	Output	44
20	Power	F75	12 V / 15 A	Input	44
21	Gear selection $1^{st}/2^{nd}$ gear	S70	12 V	Input	44
22	Gear selection $1^{st}/2^{nd}$ gear	S70	12 V	Input	44
23	---	---	---	---	---
24	Gear selection neutral	S71	12 V	Input	44
25	---	---	---	---	---

01a

Main power supply,
diesel engine electric starting motor

Description of function:

Starting

The safety start switch circuit of this engine is identical with the one used on the mechanically controlled engines.
The engine controller module (A15) is activated via relay K51 by the ignition lock (S64). During the starting procedure, the engine controller module (A15) receives the speed signal from the sensor provided on the camshaft and starts the injection.

Engine monitoring

All sensors relevant for operation and monitoring of the engine are mounted on the engine wiring loom. Only the water level sensor is connected to the CLAAS wiring loom.
The engine controller module (A15) transmits the signals for displaying the engine speed, coolant level and the coolant temperature to the CAB module (A10) via the CAN bus J1939. The CAN module (A10) converts this signal to the CLAAS CAN bus, thus allowing display on the terminal.

Engine diagnosis

The number of engine errors occurred and the corresponding error codes can be displayed in the terminal. Further diagnosis is carried out via the diagnosis plug in the central terminal compartment, using the Caterpillar diagnosis tool CAT-ET. The display of error codes can also be activated by the diagnosis LED (D2) after actuating the rocker switch (U22).

Diesel engine speed adjustment

The diesel engine speed depends on the position of switch S35. Three positions are possible, i.e. idle speed, half throttle and full throttle.
When third gear is engaged, gearbox switch Z95 cuts the power supply to the CAB module (A10) and the diesel engine speed is reduced – road travel (see also diagram 44). The maximum speed which can be achieved now is country-specific and can be configured using the Claas diagnosis system CDS.

LEXION Type	Idle speed (S35)	Half throttle* (S35)	Full throttle at no load (S35)	20 km/h (Z95)	25 km/h (Z95)
510-530	1200 rpm	1500 rpm	2100 rpm	1522 rpm	1903 rpm
540-570	1200 rpm	1500 rpm	2100 rpm	1568 rpm	1960 rpm
580	1200 rpm	1500 rpm	2080 rpm	1781 rpm	2080 rpm

*- Indicated speed valid only for „Front attachment OFF“.
In case of “Front attachment ON”, the idle speed rpm value is used.

Note: The speeds specified above apply to wheel-equipped machines. Other speeds apply to MTS- or steel track-equipped machines.

02d

Starting the diesel engine, diesel engine electric starting motor

CATERPILLAR -
C6.6

Description of function:

Starting

The engine controller module (A15) is activated via relay K51 by the ignition lock (S64). During the starting procedure, the engine controller module (A15) receives the speed signal from the sensor provided on the camshaft and starts the injection.

Engine monitoring

All sensors relevant for operation and monitoring of the engine are mounted on the engine wiring loom. Only the water level sensor is connected to the CLAAS wiring loom.
The engine controller module (A15) transmits the signals for displaying the engine speed, the coolant level and the coolant temperature to the CAB module (A10) via the CAN bus J1939. The CAN module (A10) converts this signal to the CLAAS CAN bus, thus allowing display on the terminal.

Engine diagnosis

The number of engine errors occurred and the corresponding error codes can be displayed in the terminal. Further diagnosis is carried out via the diagnosis plug in the central terminal compartment, using the Caterpillar diagnosis tool CAT-ET. The display of error codes can also be activated by the diagnosis LED (D2) after actuating the rocker switch (U22).

Diesel engine speed adjustment

The diesel engine speed depends on the position of switch S35 and of the 2nd gear actual value switch (Z83) – see also circuit diagram 42s.
If full throttle speed is selected and the 2nd gear engaged (signal input A36 / pin 4), the connection between A10/18 and A10/19 inside the Montana gearshift control module (A36) is cut (pins 10 and 11) – see also circuit diagram 42s.
The full throttle speed is reduced to road travel speed, depending on the country version. The maximum speed which can be achieved now can be configured using the Claas diagnosis system CDS.

LEXION Type	Idle speed (S35)	Full throttle at no load (S35)	20 km/h (Z83)	25 km/h (Z83)
Montana 570-520	1200 rpm	2100 rpm	1568 rpm	1960 rpm

Error code list J 1939: 2/8

SPN	FMI	Description
105		**Engine Charge Air Temperature**
	0	Charge air temperature too high
	3	Charge air temperature sensor, open circuit or shorted to battery +
	4	Charge air temperature sensor, shorted to ground
	15	High charge air temperature, warning
	16	High charge air temperature (engine power throttled down)
106		**Engine Boost Pressure**
	3	Boost pressure sensor open circuit or shorted to battery +
	4	Boost pressure sensor shorted to ground
	10	Boost pressure sensor, open circuit of 5 V power supply
108		**Atmospheric Pressure Sensor**
	3	Atmospheric pressure sensor open circuit or shorted to battery +
	4	Atmospheric pressure sensor shorted to ground
	13	Atmospheric pressure sensor calibration failure
110		**Coolant Temperature**
	0	High coolant temperature derate
	3	Coolant temperature sensor open circuit or shorted to battery +
	4	Coolant temperature sensor shorted to ground
	14	Coolant temperature too high
	15	High coolant temperature warning
	16	High coolant temperature derate
111		**Coolant Level**
	1	Low engine coolant level
	3	Coolant level sensor open circuit or shorted to battery +
	4	Coolant level sensor shorted to ground
	17	Low engine coolant level warning
152		**ADEMIII ECM**
	12	ECM fault
157		**Commonrail Fuel Pressure**
	3	Fuel pressure sensor, open circuit or shorted to battery +
	4	Fuel pressure sensor, shorted to ground
158		**Ignition Plus**
	0	Terminal 15 overvoltage
	1	Terminal 15 undervoltage
158		**Ignition Plus, Starting**
	2	Plus input of terminal 15 or 50 unstable

Description of function:

Activation of road travel	During road travel, the safety rocker switch (S52) must be locked in order to cut the power supply for all unnecessary electrical and hydraulic functions.
Master valve	In order to be able to build up the necessary working pressure for many hydraulic controls, the neutral hydraulic circulation must be blocked (see also the "Hydraulic system" section). In this case, the solenoid coil (Y77) is actuated directly via the diode PCB (DO) and the ground drive hydraulic motor brake restrictor module (A45). A LED (D5) provided on the diode PCB indicates the activation of the circuit.

04t

Road travel activation, master valve

Montana 570-520

- with integrated MONTANA control unit

Description of function:

Connectors	Connector A is connected with signal inputs from switches whose actuated or non-actuated states allow the terminal to identify the machine functions. The analogue signals of the machine sensors are converted by the corresponding modules (A10/A12) and read by the terminal as digital signals from the CAN bus system.

06b

CAN bus, module power supply

for diesel engine
Daimler - Chrysler DC 502 LA

- **without** electro-hydraulic ground drive (EFA)

Key to diagram: Coordinates

A1	AGROCOM Terminal	2-i-17
A8	AUTOCONTOUR module (CAC)	2-i-20
A9	AUTOPILOT module	2-i-20
A10	Fieldwork computer module (BIF/CAB))	2-i-20
A12	Speed monitor module (DZW)	2-i-20
A13	Performance monitor module (DKG)	4-p-20
A15	Electronic engine control module	3-p-18
A16	Reel controller module (HAS)	2-i-20
A21	YIELD METER module (LEM)	2-i-20
A25	Sieve adjustment module	2-i-20
A27	VARIO module	8-f-20
A28	Uni-spreader module (VGS)	2-i-20
A30	Terminal	3-g-17
A37	LEXION electro-hydraulic gearshift module (EHS)	2-i-20
A38	Rotor RIO module	4-n-20
A45	Ground drive hydraulic motor brake restrictor module (HBM)	4-i-20
A46	Deflector adjustment RIO module	5-t-16
A49	Ground drive module	3-g-17
A64	Teleservice module	3-g-17
A65	GPS pilot terminal	3-g-17
A66	GPS pilot module (GPB)	3-g-17
B50 L	AUTOPILOT left laser sensor	6-e-25
B50 R	AUTOPILOT right laser sensor	6-e-11
DS	Diagnosis plug (63-pin) VIA	3-i-20
XM	Caterpillar Diagnosis connector	4-i-20
K14	Threshing mechanism relay	4-i-20
K49	Road travel main relay	4-i-20
K52	Power supply relay	4-i-20
K51	Power supply relay	4-i-20
K56	Electronic unit plus relay	4-i-20
R14	CAN bus terminal resistor	3-q-18
XFL	External CAN bus connection (e.g. flagging box, Agrocom terminal, etc.)	3-h-17
XGSM	External CAN bus connection Bus (e.g. GSM modem)	3-h-17
XQ	Performance monitor connector	5-p-20
XA	Multifunction coupling A connector	7-f-20
XB	Multifunction coupling B connector	7-f-20
XC	Multifunction coupling C connector	7-f-20
XD	CAN bus terminal connector (7-pin)	3-g-17
XD-2	CAN bus connector (8-pin)	4-i-17
XV3	AUTOPILOT variant plug connector	7-f-20
XKV	Reel speed controller plug-in connection	2-i-20
XOUT	Engine wiring loom plug-in connection	2-i-20
XIN		

Measured value table:

Item	Component	Measured value	Remark
R14	Resistor	approx. 120 Ω	
K56	Remote control relay 15 A 30 A	95±10 Ω	(Pin 86/1 – 85/2) (Pin 87a/4 – 30/3) (Pin 87/5 – 30/3)

Key to diagram: Coordinates

A1	AGROCOM Terminal	2-i-17
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A25	Sieve adjustment module	2-i-20
A27	VARIO module	8-f-20
A28	Uni-spreader module (VGS)	2-i-20
A30	Terminal	3-g-17
A37	LEXION electro-hydraulic gearshift module (EHS)	2-i-20
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A45	Ground drive hydraulic motor brake restrictor module (HBM)	4-i-20
A46	Deflector adjustment RIO module	5-t-16
A49	Ground drive module	3-g-17
A64	Teleservice module	3-g-17
A65	GPS pilot terminal	3-g-17
A66	GPS pilot module (GPB)	3-g-17
B50 L	AUTOPILOT left laser sensor	6-e-25
B50 R	AUTOPILOT right laser sensor	6-e-11
DS	Diagnosis plug (63-pin) VIA	3-i-20
XM	Caterpillar diagnosis connector	4-i-20
DM	Daimler-Chrysler diagnosis connector	2-i-20
K14	Threshing mechanism relay	4-i-20
K49	Road travel main relay	4-i-20
K52	Power supply relay	4-i-20
K51	Power supply relay	4-i-20
K56	Electronic unit plus relay	4-i-20
R14	CAN bus terminal resistor	2-i-20
XFL	External CAN bus connection (e.g. flagging box, Agrocom terminal, etc.)	3-h-17
XGSM	External CAN bus connection Bus (e.g. GSM modem)	3-h-17
XQ	Performance monitor connector	5-p-20
XA	Multifunction coupling A connector	7-f-20
XB	Multifunction coupling B connector	7-f-20
XC	Multifunction coupling C connector	7-f-20
XD	CAN bus terminal connector (7-pin)	3-g-17
XD-2	CAN bus connector (8-pin)	4-i-17
XV3	AUTOPILOT variant plug connector	7-f-20
XKV	Reel speed controller plug-in connection	2-i-20

Measured value table:

Item	Component	Measured value	Remark
R14	Resistor	approx. 120 Ω	
K56	Remote control relay 15 A 30 A	95±10 Ω	(Pin 86/1 – 85/2) (Pin 87a/4 – 30/3) (Pin 87/5 – 30/3)

Key to diagram: Coordinates

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A12	Speed monitor module (DZW)	2-i-20
A13	Performance monitor module (DKG)	4-p-20
A15	Electronic engine control module	3-p-18
A16	Reel controller module (HAS)	2-i-20
A21	YIELD METER module (LEM)	2-i-20
A25	Sieve adjustment module	2-i-20
A27	VARIO module	8-f-20
A28	Uni-spreader module (VGS)	2-i-20
A30	Terminal	3-g-17
A37	LEXION electro-hydraulic gearshift module (EHS)	2-i-20
A38	Rotor RIO module (RIO)	4-n-20
A45	Ground drive hydraulic motor brake restrictor module (HBM)	4-i-20
A46	Deflector adjustment module (RIO)	5-t-16
A51	Radial spreader module	5-s-18
A64	Teleservice module	3-g-17
A65	GPS pilot terminal	3-g-17
A66	GPS pilot module (GPB)	3-g-17
B50 L	AUTOPILOT left laser sensor	6-e-25
B50 R	AUTOPILOT right laser sensor	6-e-11
DS	Diagnosis plug (63-pin) VIA	3-i-20
XM	Caterpillar Diagnosis connector	4-i-20
K14	Threshing mechanism relay	4-i-20
K49	Road travel main relay	4-i-20
K52	Power supply relay	4-i-20
K51	Power supply relay	4-i-20
K56	Electronic unit plus relay	4-i-20
R14	CAN bus terminal resistor	3-q-18
XFL	External CAN bus connection (e.g. flagging box, Agrocom terminal, etc.)	3-h-17
XGSM	External CAN bus connection Bus (e.g. GSM modem)	3-h-17
XQ	Performance monitor connector	5-p-20
XA	Multifunction coupling A connector	7-f-20
XB	Multifunction coupling B connector	7-f-20
XC	Multifunction coupling C connector	7-f-20
XD	CAN bus terminal connector (7-pin)	3-g-17
XD-2	CAN bus connector (8-pin)	4-i-17
XV3	AUTOPILOT variant plug connector	7-f-20

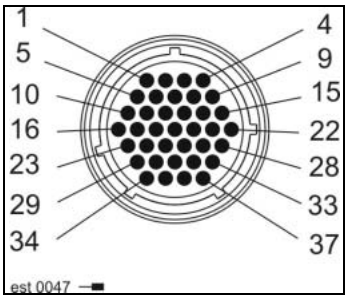
a - for versions with deflector adjustment
b - for versions with radial spreader

Measured value table:

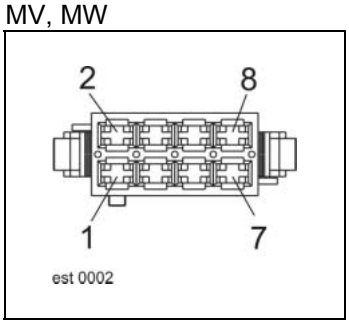
Item	Component	Measured value	Remark
R14	Resistor	approx. 120 Ω	
K56	Remote control relay 15 A 30 A	95±10 Ω	(Pin 86/1 – 85/2) (Pin 87a/4 – 30/3) (Pin 87/5 – 30/3)

Connector pin definition:

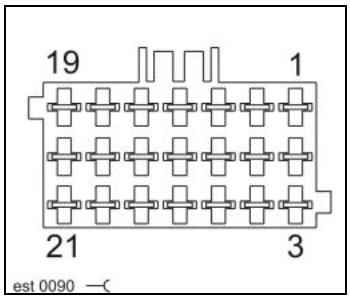
Connector B, E



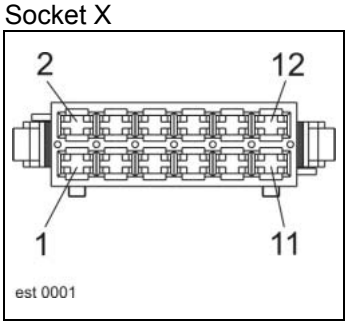
Socket MO, MP, MR, MU, MV, MW



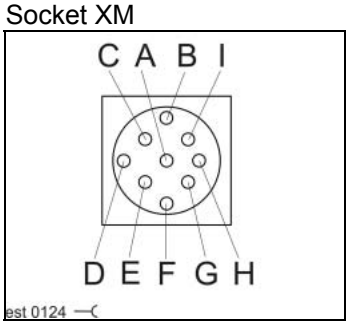
Socket SL



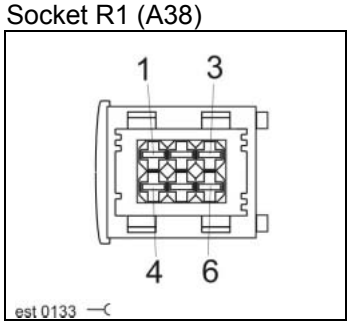
Socket X



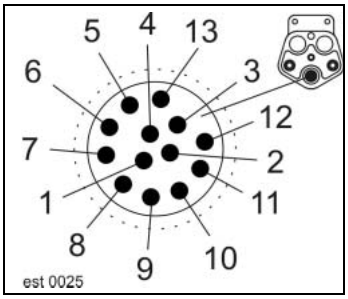
Socket XM



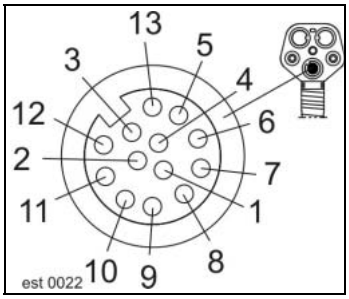
Socket R1 (A38)



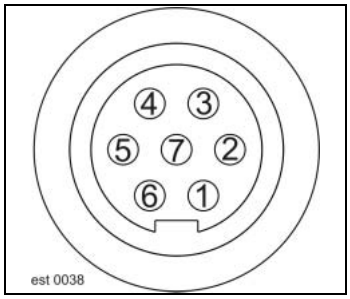
Connector XA



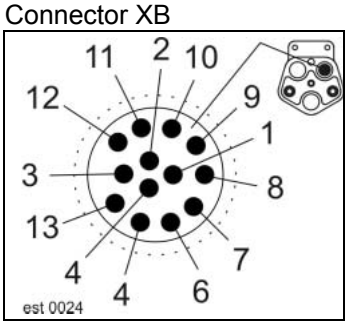
Socket XA



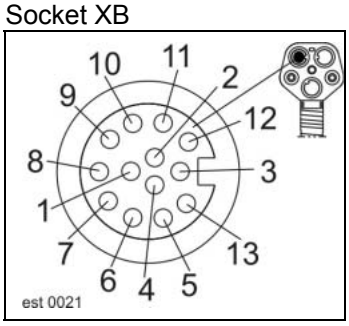
Socket XD



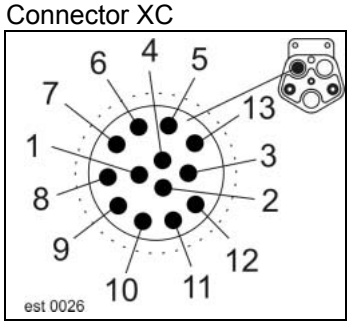
Connector XB



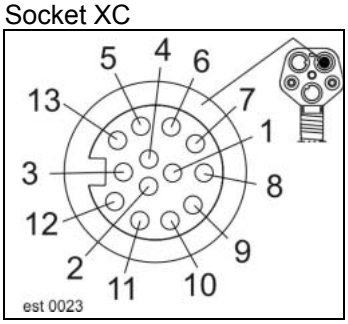
Socket XB



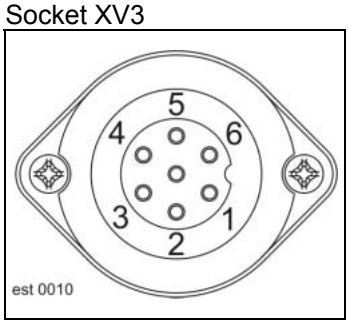
Connector XC



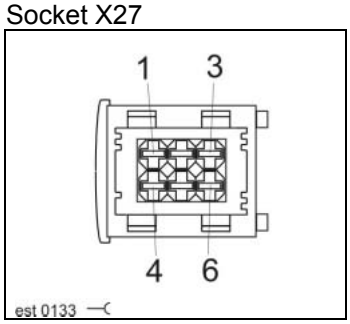
Socket XC



Socket XV3



Socket X27

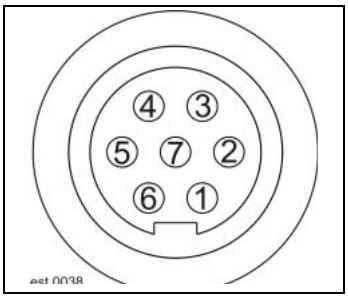


Interconnection list:

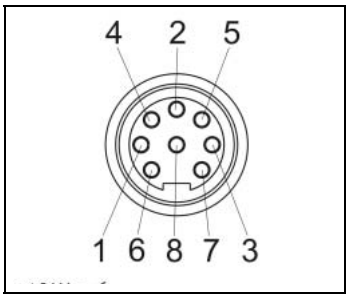
from	to 1	to 2	to 3	to 4	to 5	mm²	Colour
A35-1						1.5	rd-wh
A35-14						1.5	br
A35-15						1.5	rd-wh
A35-23						1.0	ye
A35-24						1.0	br-bl
A35-25						1.0	wh-pi
A35-26						1.0	br-bl
A35-28						1.5	br
A35-29						1.0	rd-bk
A35-37						1.0	bk-bl
A35-38						1.0	wh-or
A35-39						1.0	bk-or
A35-40						1.0	wh-vi
A40-13						0.75	ye
A40-14						1.5	rd-bk
A40-27						0.75	wh-or
A40-28						1.5	br
A40-40						0.75	or
A40-41						0.75	gr
A41-1						1.0	bk-bl
A41-2						1.0	br-bl
A41-3						0.75	wh-or
A41-4						0.75	gr
B2	F17 a	MO 5	SL 14			1.5	bk-bl
B 13	A10 40	A12 3	MP 3	A16 3	A8 3	1.0	or
	MO 7	E 31	MU 3	MV 3	MW 3		
	A28 3	MR 3	SL 4	A25 3	A45 3		
	DS 62	A 19					
B 14	A 20	A10 13	A12 16	MP 4	A16 16	1.0	ye
	B 14	MO 4	E 30	MU 4	MV 4		
	DS 63	A28 16	MR 4	SL 5	A25 16		
	A 20	A10 13	A12 16	MP 4	A16 16		
	MO 4	E 30	MU 4	MV 4			
B24	B 24	F03 a	MU 1			1.5	bk
B25	31 Earth					1.5	br-bl

Connector pin definition:

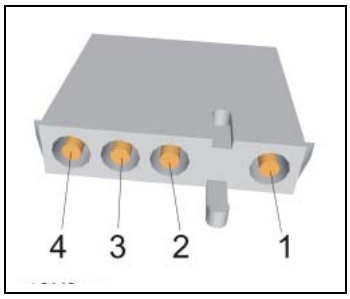
Socket XD



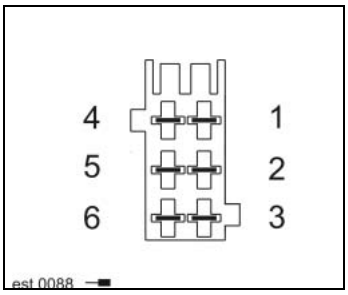
Connector XD2



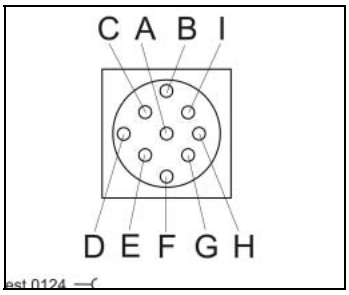
Connector XFL



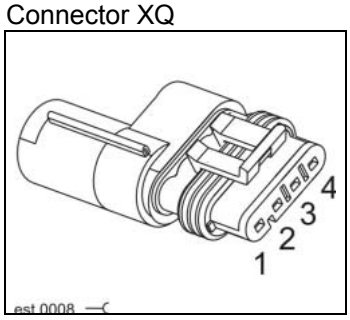
Connector XGSM



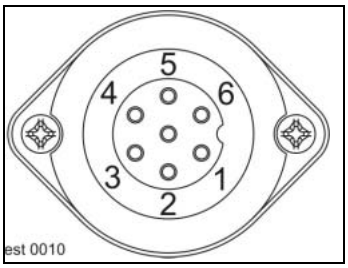
Socket XM



Connector XQ



Socket XV3



08a

Concave adjustment /
Threshing drum variable-speed drive

Interconnection list:

from	to 1	to 2	to 3	to 4	to 5	mm²	Colour
B 3	F67 a					1.5	bk-vi
P 13	F29 a					1.5	bk
P 14	A10 17					1.0	bl-or
P 15	A10 33					1.0	bl
XR -1						1.5	wh-bl
XR -2						1.5	wh-rd
XR -3						0.75	gn-gr
XR -4						0.75	gn
XR -5						0.75	gn-br
X-1						1.0	wh-rd
X-2						1.0	wh-bl
X-3						1.0	gn-gr
X-4						1.0	gn
X-5						1.0	gn-br

12a

Deflector adjustment

13b

Straw and chaff spreader

Radial spreader

15a

Grain tank unloading /
Grain tank unloading aid

Interconnection list:

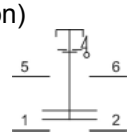
from	to 1	to 2	to 3	to 4	to 5	mm²	Colour
E 1	-31					1.5	br
E 12	-31					1.5	br
E 20	N 1	H 4				1.5	vi
H 4	N 1	E 20					
N1	E 20	H 4				1.5	br-wh
O 1	F36 a					2.5	bk-bl
XA-1						1.5	br
XA-2						1.5	br
XA-13						1.5	br
XB-8						1.5	vi

Description of function: 1/2

Front attachment ON/OFF

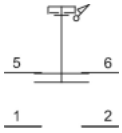
Relay K49 must be actuated by the road travel circuit and the threshing mechanism must be actuated by relay K14 as pre-conditions for the front attachment drive. The threshing mechanism ON signal is read in by the fieldwork computer module (A10) – Circuit diagram 7a.

- Inactive function (S95 in rest position)



When not actuated, the front attachment OFF switch (S54) and the front attachment ON/OFF switch (S95) are open.

- Activating the front attachment

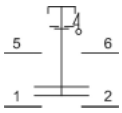


The front attachment ON/OFF switch (S95) is unlocked and pulled upwards.

Using pins 5 and 6 in the front attachment ON/OFF switch (S95), voltage is connected to the fieldwork computer module (A10 – pin 5) as a signal. In order to ensure smooth start-up of the front attachment and to avoid strain on the drive components, the fieldwork computer module (A10 –pin 3) actuates the solenoid coil (Y88) in a modulated way (PWM) – Front attachment ON.

Note: The front attachment circuit depends on the closed seat contact switch (Z5).

- Front attachment is actuated



Front attachment ON/OFF switch (S95) in rest position:

The front attachment clutch solenoid coil (Y88) remains activated.

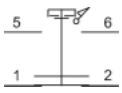
- Stopping the front attachment

Press the front attachment STOP button (S54) on the multifunction handle to the first contact point:

Earth is connected to the fieldwork computer module (A10) as a signal. The fieldwork computer module (A10) cuts the power supply to the solenoid coil (Y88) – Front attachment OFF.

Front attachment quick stop

When actuating the STOP pushbutton (S54) on the multi-function handle to the second stage, the front attachment quick stop solenoid coil (Y101) is actuated via relay K15 in addition to the "Front attachment OFF" function.



The same applies to the actuation of the front attachment ON/OFF switch (S95 – pins 1+2) in the operating panel. When S95 is actuated beyond the spring-centred centre position, the voltage signal to the fieldwork computer module (A10) is interrupted (front attachment OFF) and at the same time, K15 is actuated (quick stop ON).

The master valve (Y77) is also actuated via the diode PCB (DO) in parallel with the solenoid coil (Y101) because this function requires that pressure is built up in the system.

18a

Front attachment variable-speed drive

Description of function: **1/2**

Radial spreader in working or swathing position

With the road travel circuit unlocked and only with the threshing mechanism disengaged, switch (U13) is supplied with power.
The position control of the radial spreader requires that another pre-condition is fulfilled: No signal from the straw chopper speed sensor B28 (uni-spreader) is identified on the CAN bus for at least 2 seconds.
When the radial spreader is in transport position, it moves to the swathing position first after switch U13 is actuated. To achieve this, the radial spreader module (A51) actuates solenoid coil Y184 until it reaches its end position - actual value switch Z59 is closed on pins 1 and 4.

If switch U13 is actuated one more time after the swathing position is identified - actual value switch Z59 is closed on pins 1 and 4 - the radial spreader module (A51) actuates the solenoid coil Y185 until the working position is identified - actual value switch Z58 is closed on pins 1 and 4.

When switch U13 is pressed repeatedly, the radial spreader again changes between working and swathing position - toggle function.

The master valve (Y77) is also actuated via the diode PCB (DO) in parallel with the solenoid coils (Y184/Y185) because this function requires that pressure is built up in the system.

Radial spreader in transport position

With the road travel circuit unlocked and only with the threshing mechanism disengaged, switch (U14) is supplied with power.
The position control of the radial spreader requires that another pre-condition is fulfilled: No signal from the straw chopper speed sensor B28 (uni-spreader) is identified on the CAN bus for at least 2 seconds.

When the straw chopper switch is actuated while in rest position (U14 = radial spreader in transport position), the radial spreader moves to transport position.
To achieve this, the radial spreader module actuates the solenoid coils Y185 and Y174. The actual value switches Z58 and Z59 are not actuated any more (closed on pins 2 and 3).

When the correct transport position is reached, the actual value switch Z60 is actuated (closed on pin 1 and 4).

The master valve (Y77) is also actuated via the diode PCB (DO) in parallel with the solenoid coil (Y185) because this function requires that pressure is built up in the system.

20a

Front attachment raise/lower, cross levelling

Interconnection list:

from	to 1	to 2	to 3	to 4	to 5	mm²	Colour
M 1	A8 19					0.5	gn-rd
M 2	K6 85					0.5	gn-bk
M 3	A8 5					0.5	ye-bl
M 4	K5 85					0.5	ye-bk
MA 3	K7 85					1.5	gn-wh
MA 4	K8 85					1.5	gn-ye
MA 6	K9 85					1.0	bl-vi
MA 7	K10 85					1.0	bl-ye
MA 10	-31					1.5	br
MQ 3	K8 87	A8 1	SL 10			1.5	rd-vi
MQ 4	K7 87	A8 14	SL 11			1.5	bk-pi
MQ 8	-31					1.5	br
SL 10	K8 87	A8 1	MQ 3				
SL 11	K7 87	A8 14	MQ 4				
V 5	K5 87	A8 12	DO 8	DS 5		1.5	wh-rd
V 6	K6 87	A8 13	DS 6			1.5	wh-bk
V 11	-31					2.5	br
V 12	-31					2.5	br
X8-1						0.5	gn-rd
X8-2						0.5	gn-bk
X8-3						0.5	ye-bl
X8-4						0.5	ye-bk
X8-25						1.5	br
XE-31						1.5	rd-vi
XE-L						1.5	bk-pi
XE-R						1.5	br

Description of function:

Reel adjustment

When the road travel circuit is unlocked, the relays K1, K2, K3, and K4 are supplied with voltage on pin 30 and pin 86. The corresponding pushbutton (S37a/b/c/d) controls the relay K1, K2, K3 or K4 and thus the respective solenoid coil (Y22/Y23/Y24/25).

The master valve (Y77) is also actuated via the diode PCB (DO) in parallel with one of the solenoid coils (Y22/Y23/Y24/25) because this function requires that pressure is built up in the system.

If the automatic cutterbar system is activated, the automatic reel controller module (A16) ensures actuation of the solenoid coils (Y22/Y23) and control of the master valve (Y77). In the process, the setting for the reel height in the terminal (A30) is compared to the actual value of the sensor (B39) (see also diagram 24).

Important! An automatic function for horizontal reel adjustment is available only for VARIO cutterbars (see also diagram 21b).

21c

Reel adjustment
Folding cutterbar

Interconnection list:

from	to 1	to 2	to 3	to 4	to 5	mm²	Colour
E 1	-31					1.5	br
E 8	K3 87	DO 4	DS 22			1.5	gn-rd
E 9	K4 87	DO 5	DS 23			1.5	gn-bl
E 12	-31					1.5	br
E 17	N 2	DO 6	DS 31			1.5	vi-gr
E 18	N 3	DO 7	DS 32			1.5	vi-ye
E 21	F49 a	K9 30	K9 86	K10 30	K10 86	1.5	bl-rd
E 28	A16 10					0.75	bl-wh
E 36	-31					1.5	br
M 7	K1 85					0.5	rd-bk
MA 1	K3 85					0.5	gr-rd
MA 10	-31					1.5	br
N 2	E 17	DO 6	DS 31			1.5	b-ye
N 3	E 18	DO 7	DS 32			1.5	br-vi
X8-7						0.5	rd-bk
X8-11						0.5	gr-rd
X8-25						1.5	br
XA-9						1.5	gn-rd
XA-10						1.5	gn-bl
XA-13						1.5	br
XB-5						1.5	vi-gr
XB-6						1.5	vi-ye
XB-9						1.5	bl-rd
XC-4						0.75	bl-wh
XC-12						1.5	gn-bk
XV1-1						0.75	br
XV1-4						0.75	or-wh
XV1-6						0.75	rd-ye

Description of function: 1/2

Reel variable-speed drive

The hydraulic reel speed control is realised using a variable displacement-type axial piston pump. The pump drive and therefore the sense of rotation depends on the front attachment. A CAN signal is transmitted to the reel controller module (A16) by the +/- pushbuttons provided that the function pre-selection rotary switch (T11) is set to the reel symbol. Module (A16) now actuates the solenoid coils (Y95 or Y96) using pulse-width modulation, depending on the required swivel angle of the variable displacement pump. The sensor (B73) transmits the swivel angle of the variable displacement pump to module (A16).

Note: After shutting down the front attachment, the reel speed slow solenoid valve (Y96) is energised for another 4 seconds in order to fully retract the ram in the reel drive control hydraulic cylinder (356) (zero displacement of pump). The accumulator (512) also supports this process.

Front attachment identification

The axial piston displacement pump is adjusted only if the cutterbar or maize picker with hydraulic down maize augers is engaged and activated. Front attachment identification is by means of reel controller module (A16) on pin 17. If a corresponding front attachment is identified, upon engaging the front attachment the pump swings to the position it had before it was shut down the last time, but at least to 1.2 Volt signal voltage of the reel speed control variable displacement pump sensor (B73). This corresponds to a reel speed of approx. 3.5 km/h (± Offset).

When working without a front attachment or with another non-identified front attachment, there is no adjustment of the axial piston displacement pump. It remains in its basic position.

Reverser drive

When the reversing function is active, a signal is connected to the reel controller module (A16) which makes the speed adjustment variable displacement pump swing to maximum delivery – circuit diagram 17a.

Automatic reel speed

Automatic reel speed control is assumed by the reel controller module (A16) which receives the necessary information about the vehicle's ground speed via the CAN bus connection with the fieldwork computer module (A10). The reel speed (B17) is now adjusted according to the ground speed and the differential speed set value on the CEBIS terminal (A30).

23b

MaxFlex cutting table adjustment

Interconnection list:

from	to 1	to 2	to 3	to 4	to 5	mm²	Colour
BB 8	A8 23					1.0	gr-rd
BB 9	A8 9					1.0	gn-vi
BB10	A8 8	E 25	B 31	DS 48			
BB12	A 34	B 33	Q 12	A8 2	A16 2	1.5	bl
	E 37	Bridge a	CB 2	Z 8			
BB 13	MR 5	B 30	MU 8	DS 57	F63 a	1.0	rd-gr
E 1	-31					1.5	br
E 12	-31					1.5	br
E21						1.5	bl
E 23	A16 21					0.75	wh-vi
E 24	A16 8					0.75	rd-wh
E 25	A8 8	BB 10	B 31	DS 48		0.75	rd-ye
E 26	A8 10					0.75	or-wh
E 27	A8 22					0.75	or-ye
E 36	-31					1.5	br
E37	-31	XC 13	BB12			0.75	br-bl
M 5	A8 6					0.5	ye-gr
M 6	A8 18					0.5	ye-rd
MA 10	-31					1.5	br
X8-5						0.5	vi-rd
X8-6						0.5	vi-bk
X8-25						1.5	br
X11-4						1.5	gn
X11-5							
X11-6						1.5	br
X11-7						1.5	ye-rd
X11-8						1.5	wh-gn
XB-9						0.75	bl
XB-11						0.75	wh-vi
XB-12						0.75	rd-wh
XC-1						0.75	rd-ye
XC-2						0.75	or-wh
XC-3						0.75	or-ye
XC-12						1.0	br
XC-13						1.0	bl-br
XV1-1						1.0	br
XV1-3						0.75	wh-vi
XV1-4						0.75	rd-wh
XV1-5						0.75	bl
XV2-1						0.75	br
XV2-2						0.75	rd-ye
XV2-3						0.75	or-wh
XV2-4						0.75	or-ye
XV2-6						0.75	rd-ye

Interconnection list:

from	to 1	to 2	to 3	to 4	to 5	mm²	Colour
B 19	A 7					1.0	bk-gr
B 33	A 34	BB 12	A8 2	A16 2	Q 12	1.0	pi-bl
	E 37	Bridge a	CB 2	Z 8			
BB 21	A 3					1.0	or-bk
BB 22	A 2					1.0	or-rd
BB 29	-31					1.5	br
MW 1	F02 a	MV 1	A25 15				
MW 2	-31						
MW 5	F56 a						
MW 7	DI 10						
SL 6	A 11	T 8	Y 2				
T 8	A 11	Y 2	SL 6			0.75	br-wh
U 4	-31					2.5	br
W 5	A 16					1.0	br-wh
W 9	A 15	DI 4				1.0	gn-rd
Y 2	A 11	T 8	SL 6			0.75	br-rd
Z 3	A10 6					1.0	rd-bk
Z 4	A10 32					1.0	gn-wh
Z 6	F64 a	B 1	BB 24	DS 51		1.0	gn-bl
Z 8	A 34	B 33	BB 12	A8 2	A16 2	1.0	rd-wh
	Q 12	E 37	Bridge a	CB 2			
X13-1						1.0	br
X13-2						1.0	or-bk
X13-3						1.0	or-rd

Description of function:

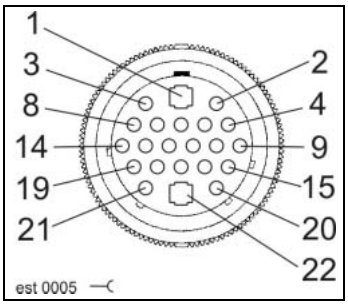
Hydraulic oil level warning (min.)	If the diesel engine is not started, the terminal (A30) recognizes an earth signal from the hydraulic oil level float switch (Z19) on pin 15 and displays the filling level alarm message. At the same time, the earth signal is sent to the pulse generator K57 through the diode PCB (DI).
Low-pressure hydraulics / Ground drive oil pressure warning	If the diesel engine is started, the terminal (A30) recognizes an earth signal from the oil pressure switch (Z46) on pin 15 and displays the oil pressure alarm message. At the same time, the earth signal is sent to the pulse generator K57 through the diode PCB (DI).
Hydraulic oil temperature warning	The earth signal of the hydraulic oil temperature switch (Z20) is connected to terminal (A30) and displayed as an alarm message (see Ground drive hydraulics metal detector warning).
Ground drive hydraulics metal detector warning	**Important!** The ground drive hydraulics metal detector sensors (B127) may be installed in parallel with the temperature switch (Z20) (option). Thus the hydraulic oil temperature warning can also be released by the ground drive hydraulics metal detector sensors (B127).
Montana brake oil pressure warning	The earth signal of the left / right brake circuit pressure switch (Z79/Z80) is connected to the terminal (A30) and displayed as an alarm message.
Straw jam warning	The earth signal of switch (Z61) is sent to the terminal (A30) and displayed as an alarm message.
Half-tracks steering position display	On machines equipped with half-tracks, connector X13 is connected with the microswitches (Z38/Z39) on the rear axle.
Hydraulic filter warning	The "Hydraulic filter plugged" alarm is released when switch (Z78) is closed for more than 5 seconds (engine temperature > 60°C).

27a

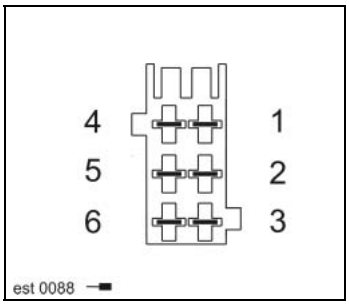
Yield meter / Grainmeter

Connector pin definition:

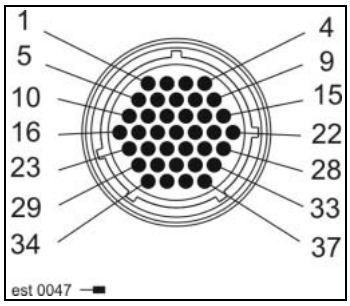
Socket C



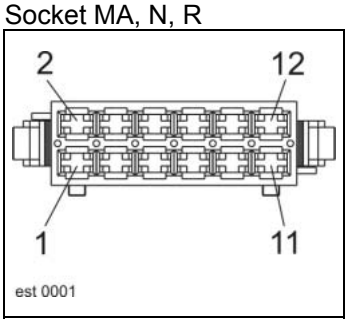
Socket CB



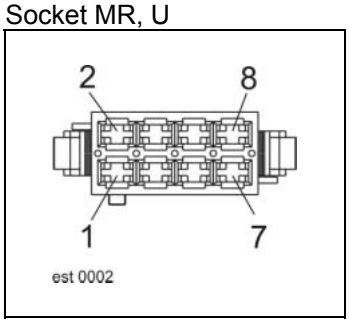
Connector E



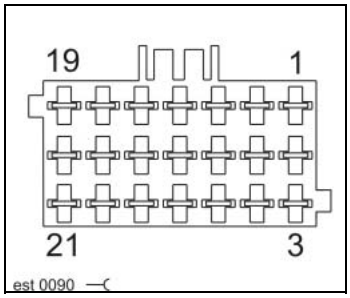
Socket MA, N, R



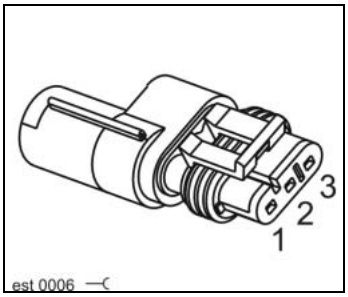
Socket MR, U



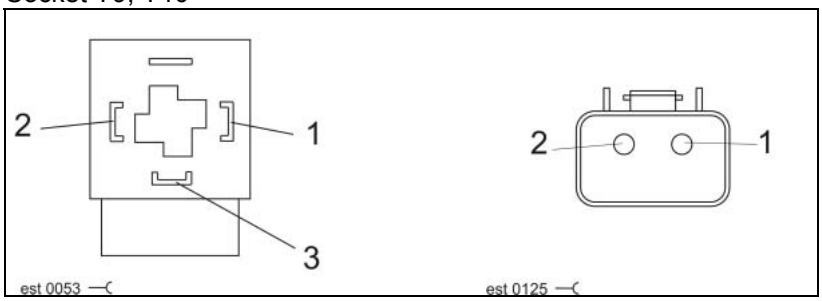
Socket P



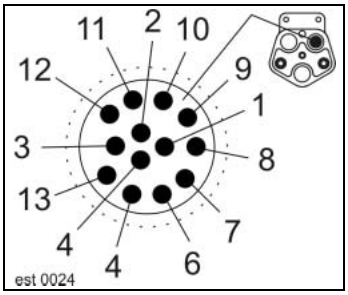
Socket B5



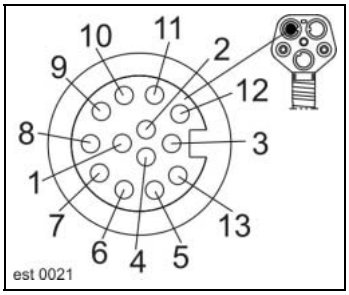
Socket Y9, Y10



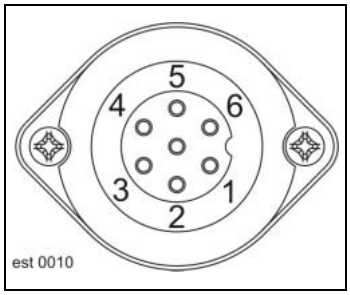
Connector XB



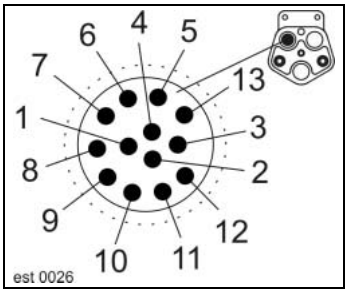
Socket XB



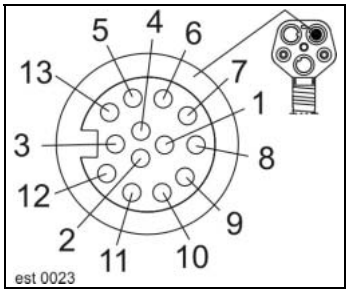
Socket XV3



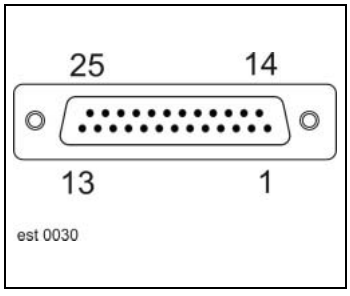
Connector XC



Socket XC



Socket X8



Interconnection list:

from	to 1	to 2	to 3	to 4	to 5	mm²	Colour
X8-17						0.5	ye-rd
X8-25						1.5	br
XB-13						1.0	wh-ye
XC-8						0.75	or-bl
XC-9						0.75	or-bk
XC-10						0.75	or-gn
XC-11						0.75	or-gr
XC-12						1.0	br
XV3-1						0.75	or-bl
XV3-2						0.75	or-bk
XV3-3						0.75	or-gn
XV3-4						0.75	or-gr
Y9-1						1.0	br
Y9-2						1.0	ye-bk
Y10-1						1.0	br
Y10-2						1.0	gn-bk

29a

Performance monitor

Description of function:

Grain tank extension (hydraulic)	When the road travel circuit is unlocked, relays (K31) and (K32) are supplied with power at pin 87. Earth is applied at pins 85 and 87a. The double push-button switch (S29) actuates the relays K31 and K32, actuating also the respective solenoid coil (Y182/Y183). Parallel to one of the solenoid coils (Y182/Y183), the diode PCB (DO) also actuates the master valve (Y77), since a buildup of pressure in the system is necessary for this function.
Grain tank full indicator / Warning beacon	The earth signal of the 70% microswitch (Z28) and 100% microswitch (Z27) is displayed as a corresponding message on the terminal (A30). If the 70 % full signal is activated via warning beacon (E47a/b) through switch (S40), the warning beacon is activated via microswitch (Z28) and relay K62.

32b

All-wheel drive - overdrive, fuel tank

32d

All-wheel drive - overdrive, fuel tank

with electro-hydraulic ground drive (EFA)

36a

Indicator system (Europe)

Interconnection list:

from	to 1	to 2	to 3	to 4	to 5	mm²	Colour
C1	F42a					1.5	bk
C2	F61 a	A33 4L				0.5	br-vi
C8	MI 5	K48 49a	K47 1	K47 2		1.5	rd-ye
C9	E 2	T 1	X 3	K47 5	MI 3	1.5	bk-wh
C10	MI 4	T 12	E 5	X 4	K47 7	1.5	bk-gn
C12	A33 2R					0.5	vi-rd
C16	-31					1.5	br
C17	K48 C2	K47 3	K47 6			0.35	bl-wh
C21	A33 4R					0.5	vi-gr
E1	-31					1.5	br
E2	MI 3	C 9	T 1	X 3	K47 5	1.5	bk-wh
E5	MI 4	T 12	C 10	X 4	K47 7	1.5	bk-gn
E12	-31					1.5	br
MI1	F24 a					1.5	bk-or
MI2	-31					2.5	br
MI3	C 9	E 2	T 1	X 3	K47 5	1.5	bk-wh
MI4	T 12	E 5	C 10	X 4	K47 7	1.5	bk-gn
MI5	K48 49a	C 8	K47 1	K47 2		1.5	wh-gn
MI6	K48 49					1.5	bk-gr
MI7	F23 a					2.5	rd
T1	MI 3	C 9	E 2	X 3	K47 5	1.5	bk-wh
T6	-31					1.5	br
T7	-31					1.5	br
T12	MI 4	E 5	C 10	X 4	K47 7	1.5	bk-gn
X-1	-31					2.5	br
X-3	MI 3	C 9	E 2	T 1	X 3	1.5	bk-wh
X-4	MI 4	T 12	E 5	C 10	X 4	1.5	bk-gn

38b

Automatic air conditioner

39a

Cab comfort equipment

- Operator's seat

Description of function: 1/5

Axle control system and front attachment control system

The system identifies the machine position using the inclination sensors B126-1 / B126-2 which transmit their values to the Montana module (A35) via an internal CAN bus. The solenoid coils (Y114, Y115, Y116, Y117) are actuated by the Montana module (A35) so that the machine is always in a vertical position by means of front axle movements. If the control system speed is not sufficient, the Montana module (A35) additionally actuates an oil quantity increase solenoid coil (Y118) in connection with the working hydraulics master valve (Y77) via the gear pre-selection module (A36) - circuit diagram 4s.

The position of the front attachment is adapted by rotating the front attachment frame (Y112, Y113) and by changing the cutting angle (Y110, Y111). This front attachment control system works independently of the AUTOCONTOUR system.
The Montana module (A35) receives the necessary feedback about the current position of the corresponding function from the respective angle sensors (B91, B92, B93, B94, B95).

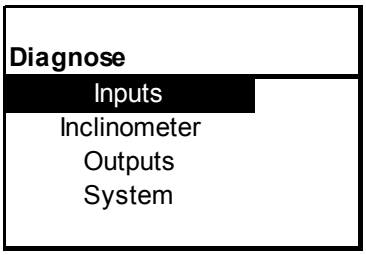
Important! All system calibrations using the Montana terminal (A41) require that the Montana control unit module A35 receives the signal from the unactuated parking brake (S93) - Circuit diagram 42s.

Axle control system diagnosis via Montana terminal A41

Call up the diagnosis menu with the menu key, the yellow cutting angle increase / decrease keys and the Enter key.

- Diagnosis inputs

Select the inputs section using the yellow keys and the Enter key.



Key to diagram: Coordinates

A42	MONTANA GEN II module	3-h-17
B91	Axle angle sensor, left	7-j-20
B92	Axle angle sensor, right	7-j-16
B93	Cutting angle sensor	7-e-17
B94	Montana cross levelling sensor	8-e-16
B126-1	Axle control system inclination sensor 1	
B126-2	Axle control system inclination sensor 2	
CAN Incl.	Inclinometer CAN line	
H65	Manual axle control MONTANA function preselection indicator light	3-h-17
H66	Manual front attachment control MONTANA function preselection indicator light	3-h-17
H67	Automatic MONTANA operation indicator light	3-h-17
K66	MONTANA relay	3-h-20
S79	Manual axle control MONTANA function preselection switch	3-h-17
S80	Manual front attachment control MONTANA function preselection switch	3-h-17
S81	Switch Rotate machine **or** front attachment to the left MONTANA	3-h-17
S82	Switch Rotate machine **or** front attachment to the right MONTANA	3-h-17
S83	Switch Raise machine **or** cutting angle MONTANA	3-h-17
S84	Switch Lower machine **or** cutting angle MONTANA	3-h-17
S85	Automatic MONTANA operation switch	3-h-17
S86	MONTANA neutral axle position switch	3-h-17
S93	Parking brake switch	3-h-17
XEa	Montana feed rake conveyor connector	5-g-17
Y110	Raise cutting angle solenoid coil	7-f-16
Y111	Lower cutting angle solenoid coil	7-f-16
Y112	Rotate front attachment to the right solenoid coil	7-f-16
Y113	Rotate front attachment to the left solenoid coil	7-f-16
Y114	Lower axle on left-hand side solenoid coil	7-h-18
Y115	Raise axle on left-hand side solenoid coil	7-h-18
Y116	Lower axle on right-hand side solenoid coil	7-h-18
Y117	Raise axle on right-hand side solenoid coil	7-h-18

Description of function:

Hydrostatic brake valve system

When the diesel engine speed exceeds the allowed maximum of 2230 rpm (e.g. downhill travel), the ground drive hydraulic motor (HBM) brake restrictor module A45 also receives this information from the fieldwork computer module (BIF/CAB) A10 via the CAN bus. Now the ground drive hydraulic motor (HBM) brake restrictor module A45 actuates the master valve (Y77) in order to put a greater load on the drive (see also diagram 4).
When the diesel engine speed exceeds 2300 rpm, the brake restrictor (Y124) is additionally actuated in order to restrict the high-pressure circuit in the ground drive. When the speed now drops below 2210 rpm, the brake restrictor (Y124) is deactivated.

Note: The function of the ground drive hydraulic motor (HBM) brake restrictor module A45 may be checked using terminal A30. In the menu "Settings – Max. no-load speed – Speeds learn – OK", the outputs to the master valve (Y77) and to the module A45 are automatically switched for 5 seconds.

Charging the brake pressure accumulator

The sensor/switch (B90) controls the brake system accumulator pressure and, if necessary, actuates the working hydraulics master valve (Y77) via the diode PCB D0 and the Ground drive hydraulic motor brake restrictor module (A45/pin5→pin2) in order to recharge the brake circuit accumulator – circuit diagram 04.

Parking brake

The parking brake (S93) is being actuated when solenoid coil (Y106) is not actuated.
Besides the warning signals for insufficient brake oil pressure, the applied parking brake (S93) is also displayed in the terminal.

Description of function: 1/2

Gearshift control

The gearshift control switch (S90) is supplied with power only if the signal of the ground speed control lever in neutral position (Z57) and of the applied parking brake (Z84/Z85) is applied to the MONTANA GEN II module (A42).

While shifting gears, the solenoid coils (Y121, Y122) are energized alternatingly at short intervals and the working hydraulics master valve (Y77) in parallel with them.
The high-pressure circuits in the ground drive are subject to pressure alternatingly, which sets the hydraulic motor slightly in rotation in one or the other direction. This makes engaging the gears in the gearbox (Y107, Y108) much easier.

The engaged gear is displayed in the operating panel (H60, H61) via the gearbox switches (Z82, Z83).

If none of the mechanical gears (Z82, Z 83) is engaged, no control oil pressure for the ground drive is built up since the MONTANA GEN II module (A42) does not actuate the solenoid coil (Y125).

Diesel engine speed adjustment – circuit diagram 2t

The diesel engine speed depends on the position of switch S35 and of the 2nd gear actual value switch (Z83).
When full throttle speed is activated and 2nd gear is engaged, the full throttle speed is reduced to road travel speed specifically for each country.

Swing angle of hydraulic motor and differential lock.

The hydraulic drive ranges resulting from the changed swivel angle in the hydraulic motor (S92, Y144) and the differential lock inside the axle (S94, Y105) are set manually without any influence from the gearshift control menu (A36).

1- Turn in the sensor manually up to the contact point.

2- Turn out the sensor by ¼ of a turn (min.) to ¾ of a turn (max.).
In this process, the sensor surfaces must be at an angle 22° with respect to the motor axis; (20°-30° are acceptable).

3- Tighten lock nut to 13 Nm.

Diagnosis

When a fault is detected, an error message is transmitted via the CAN bus and displayed in the CEBIS terminal (A30).
Moreover, the sensors can be displayed using the CLAAS Diagnosis System CDS.

Diagnosis table

CEBIS display	Cause	State	Description	Solution
CEBIS Alarm: GROUND DRIVE MODULE DEFECTIVE / FAILURE CEBIS info No signals from the ground drive module received by the system-bus. Check cable and fuse and restart the system by switching the ignition off and on again. Please contact the service department should this happen more often or become a constant failure!	Ground drive module (A49) defective	safe	Vehicle does not move any more. Ground drive/cut-off valve solenoid coil (Y143) is not energized.	Restart / Check power supply / Replace module
CEBIS Alarm: GROUND DRIVE FORWARD TRAVEL SOLENOID VALVE DEFECTIVE CEBIS info Check the function of electric and hydraulic control systems (fuse, switching relay, solenoid valve, hydraulic system leaks etc.) as well as the adjustable mechanism of the ground drive and remove defect if necessary.	Ground drive forward solenoid coil (Y141) defective - Module A49 pin 6 and pin 8			
	Broken wire	safe	Vehicle does not move any more. Ground drive/cut-off valve solenoid coil (Y143) is not energized.	Restart
	Short-circuit against battery or sensor voltage	safe	Vehicle does not move any more. Ground drive/cut-off valve solenoid coil (Y143) is not energized.	Restart
	Short-circuit against earth	safe	Vehicle does not move any more. Ground drive/cut-off valve solenoid coil (Y143) is not energized.	Restart

Description of function:

Electro-hydraulic gearshift

As a pre-condition for carrying out an electro-hydraulic drive range changeover, the signals of the actual value switch Z57 (ground speed control lever in neutral position), Z79 and Z80 (actuation of both service brakes) must be identified by the electro-hydraulic gearshift (EHS) module A37.

Module A37 (EHS) controls the solenoid coils Y107, Y108 and Y123 of the gear preselection correspondingly via switches S70 and S71.

The master valve (Y77) is also actuated via the diode PCB (DO) in parallel with the solenoid coils by module A37 (EHS) because these functions require that pressure is built up in the system.

The realization of the drive range changeover is controlled by module A37 (EHS) via the actual value switches Z82, Z83, Z95, Z97 and Z96.

Module A37 (EHS) performs several gearshift processes under program control for changing over the drive range if necessary if the changeover process is hindered by external influences on the gearshift.
If the selected gear cannot be engaged within 1 second, another attempt is made for engaging other gears.
An error message in terminal (A30) appears when the gear cannot be engaged within 4 seconds.
At the same time, the gearbox neutral signal light H63 flashes.

The gear engaged is indicated by the signal lights H60, H61, H62 and H63.

Supply voltage of gearshift actual value switches

The supply voltage of the gearshift actual value switches from pin 8 of module A37 (EHS) is 12 volt and is limited to a current consumption of 200 mA max.

Important! Suitable measuring devices must be used for error diagnosis.

Diagnosis

Errors occurred during the gearshift process are displayed as messages on terminal A30.

Gearshift logic EHS 3-speed:

	1st gear engaged	2nd gear engaged	3rd gear engaged	2nd and 3rd gear neutral position	1st gear neutral position
Designation	**Z82**	**Z83**	**Z95**	**Z97**	**Z96**
Switch type	NO contact	NO contact	Changeover contact	NO contact	NO contact
Module A37	Pin 11	Pin 12	Pin 13	Pin 10	Pin 17
1st gear	12 V (200 mA)	0 V	0 V	12 V (200 mA)	0 V
2nd gear	0 V	12 V (200 mA)	0 V	0 V	12 V (200 mA)
3rd gear	0 V	0 V	12 V (200 mA)	0 V	12 V (200 mA)
Neutral	0 V	0 V	0 V	12 V (200 mA)	12 V (200 mA)

45a

**Main lighting circuit,
taillight, position light**

47a

Work lights I

Description of function:

Reversing signal	When reversing, a voltage signal is connected to the BIF/CAB module A10 in addition to the reversing horn (H25) via the ground speed control lever reverse/reversing horn actual value switch (Z50). This serves for deactivating the area counter despite the active working position.

50a

Instrument lighting, broadcast receiver, mirror adjustment