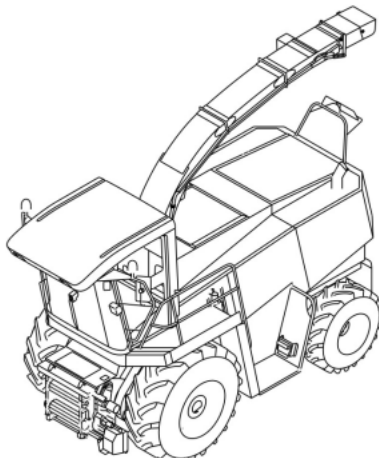


TECHNICAL SYSTEMS

Jaguar II *Speedstar*

Pre-series training

***CLAAS* ACADEMY**



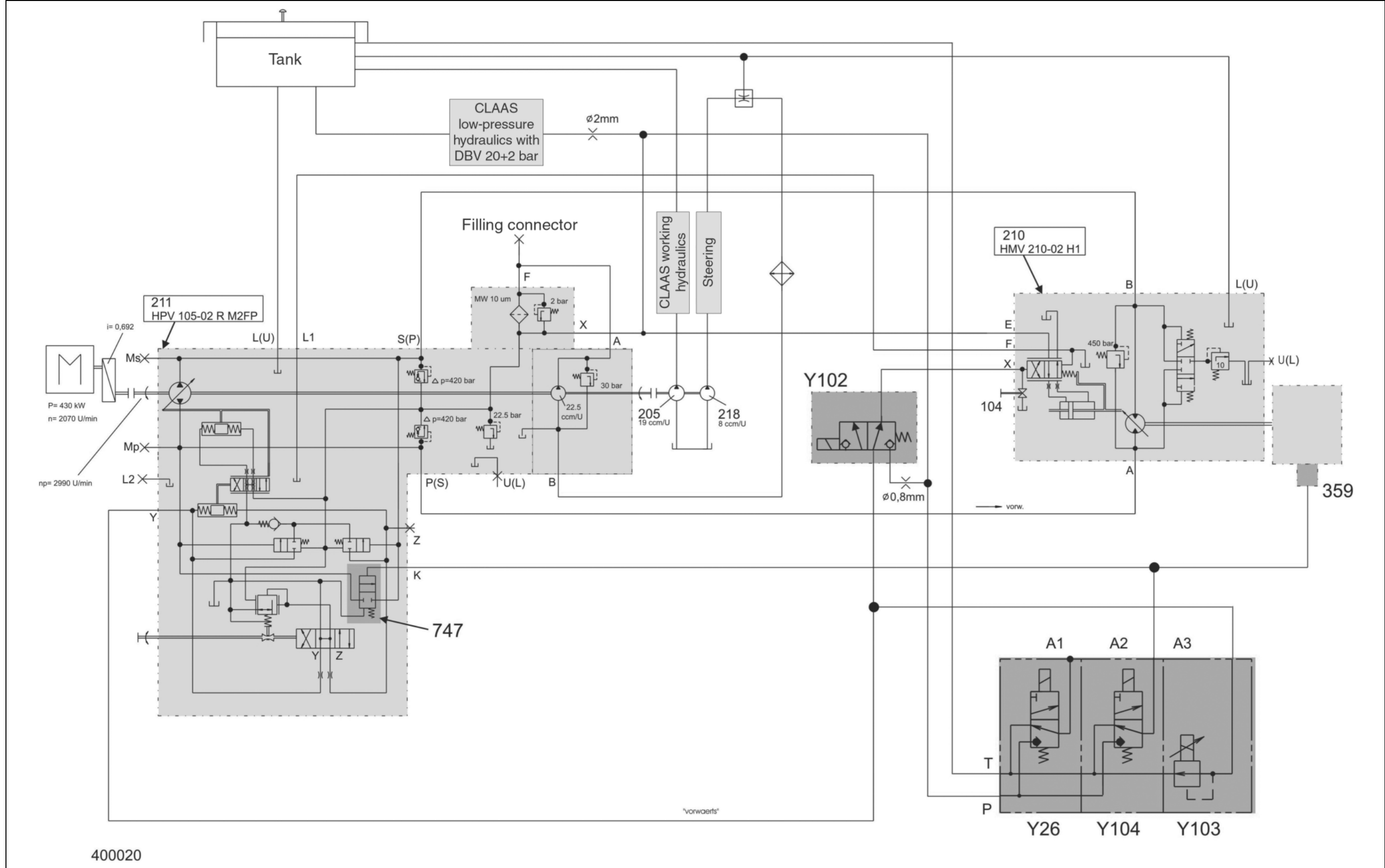
JAGUAR 900 / 40
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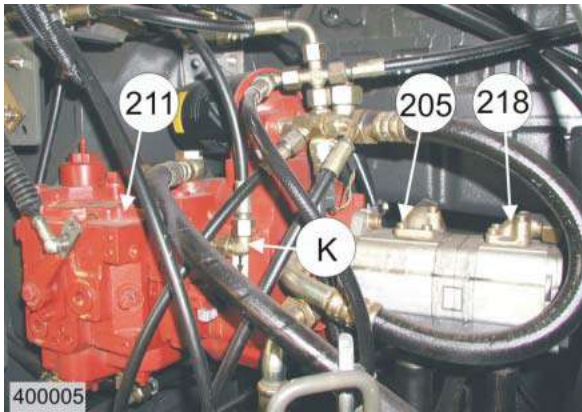
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Hydraulic circuit diagram



Item	Designation	Remark
104	Bleed valve	For the control pressure line
210	Ground drive variable displacement motor	Designation HMV 210-02 (Manufacturer: LINDE) HMV = High-pressure motor, adjustable. Maximum input volume 210 cm ³ /rev.
211	Ground drive variable displacement pump	Designation: HPV 105-02 (Manufacturer: LINDE) HPV = High-pressure pump, adjustable Maximum displaced volume 105 cm ³ /rev.
359	Locking cylinder	Is installed on the gearbox. It locks and unlocks the shifter rail.
747	Short-circuit valve	Is integrated in the ground drive variable displacement pump (211). When the hydrostatic ground drive is twisted, it connects the two high-pressure circuits in order to allow shifting the gears.
Y26	Main drive solenoid valve	Actuates the main drive clutch.
Y102	Solenoid valve	Protects the hydrostatic drive against excess rpm values.
Y103	Solenoid valve - brake valve	Reduces the ground speed while braking and at v > 40.5km/h.
Y104	Solenoid valve - servo gearshift	Unlocks the shifter rail inside the transmission in order to allow shifting the gears.



Components

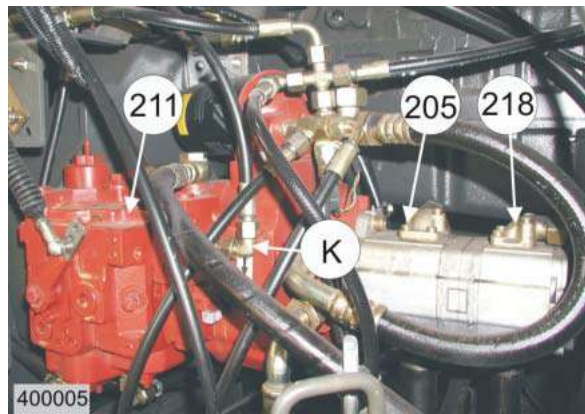
Ground drive variable displacement pump

Specifications:

Pump type:	High-pressure pump, adjustable, HPV 105-02
Maximum displaced vol.	105 cm ³ /rev.
Maximum operating press.	420 bar
Maximum speed	2890 rpm
Swivel angle	21°
Adjustment	mechanical - hydraulic and max. press. control
Feed pump	22.5 cm ³ /rev.
Pressure filter	10 µm
Filter bypass valve	2 bar Δp

Picture

205	Working hydraulics pump 19 cm ³ , $n_{\max} = 2890$ rpm
211	Ground drive variable displacement pump
218	Steering hydraulics pump 8 cm ³ , $n_{\max} = 2890$ rpm
K	Port for short-circuit valve (747)



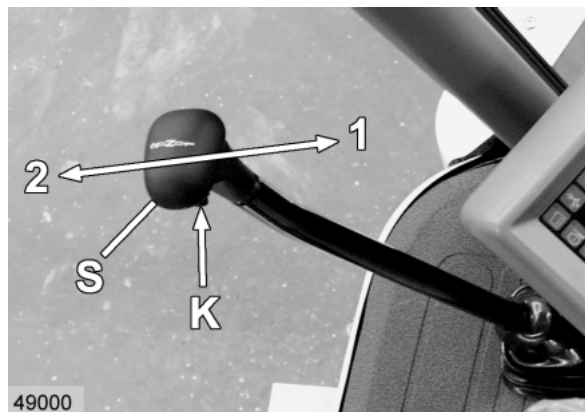
Short-circuit valve (747)

The short-circuit valve is integrated in the ground drive variable displacement pump (211). It is hydraulically actuated (port K).

Function

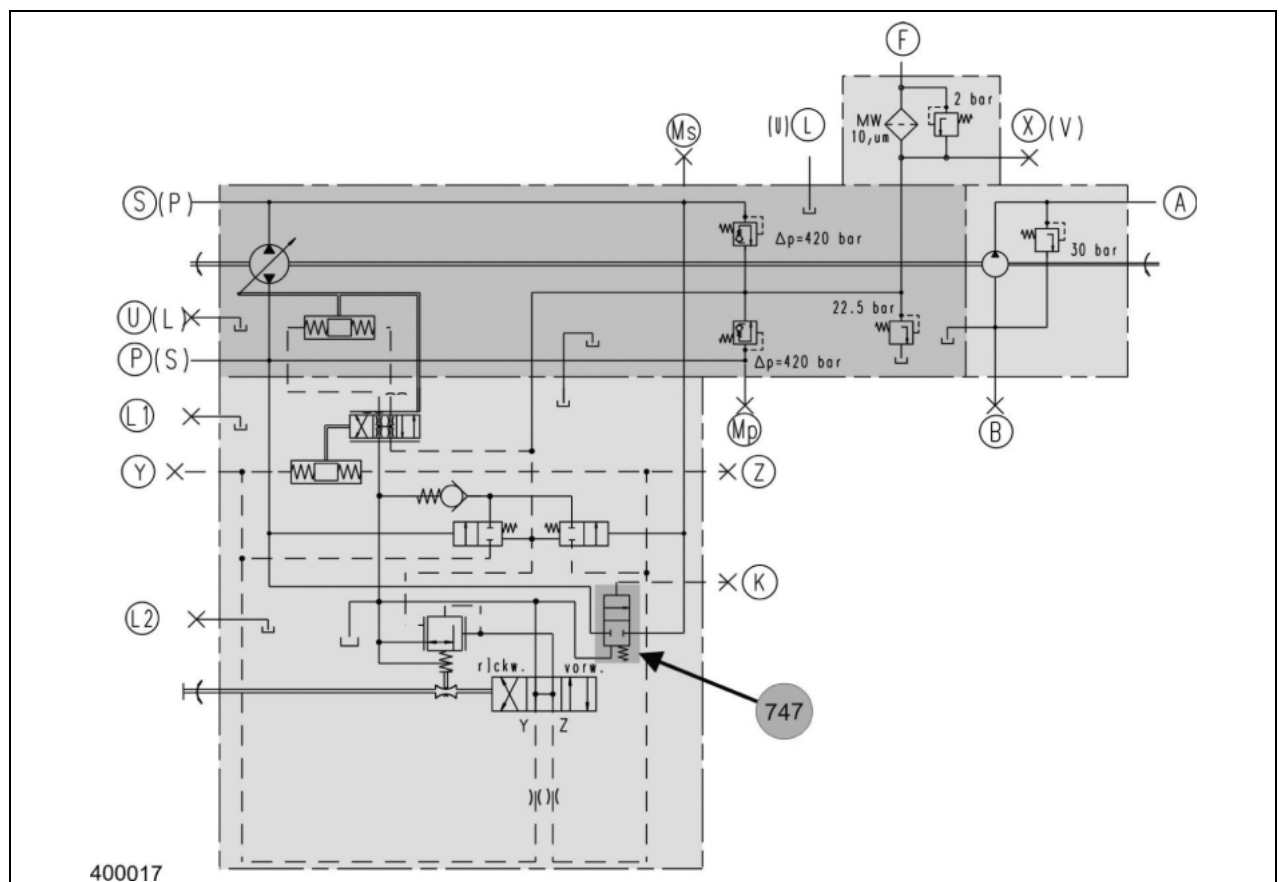
When stopping on an upward or downward slope, pressure differences may arise in the two high-pressure circuits, consequently "twisting" the hydrostatic ground drive. Engaging the first gear would not be possible now.

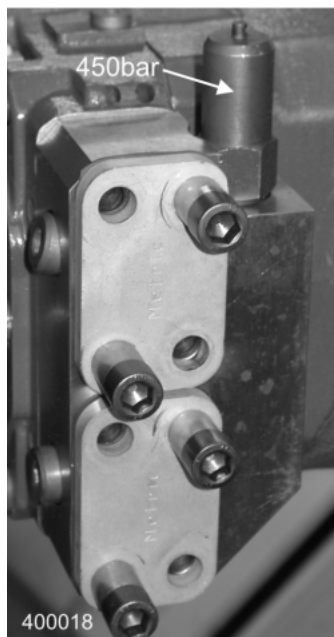
To engage a gear, the ground speed control lever must be set to position N as otherwise no electric signal can be sent from pushbutton (K) on the gearshift lever.



Keep pushbutton (K) on the gearshift lever pressed. During this, current flows through the servo gearshift solenoid valve (Y104). It switches and directs the full pressure from the low-pressure circuit (19^{+5} bar) to the shifter rail locking cylinder (359) and at the same time to the short-circuit valve (747). The latter switches and connects the two high-pressure circuits of the hydrostatic ground drive.

The "twisting" is therefore removed and engaging the gear becomes possible.

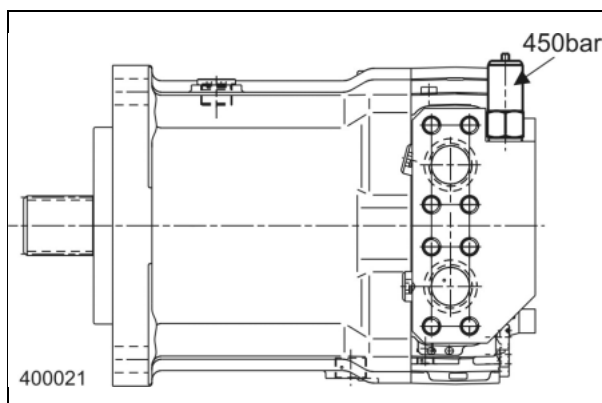


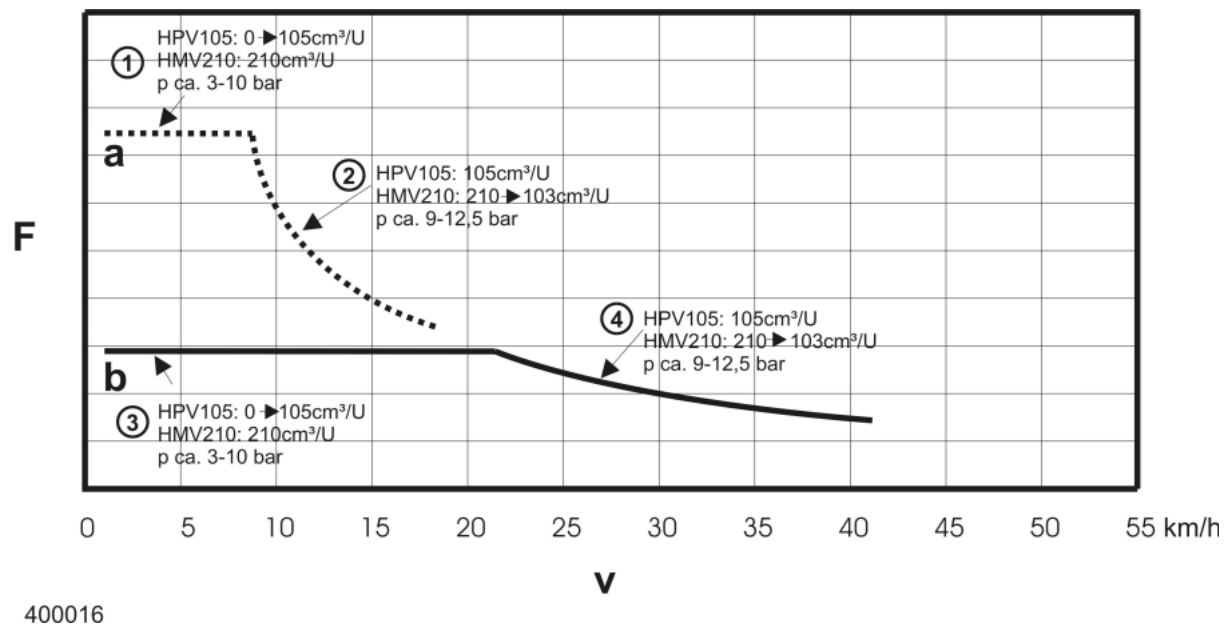
Ground drive variable displacement motor HMV 210**Ground drive variable displacement motor****Specifications:**

Type	High-pressure motor, adjustable HMV 210.
Maximum input volume	210 cm ³ /rev.
Minimum input volume	103 cm ³ /rev.
Hydraulic adjustment	variable

Location**Pressure relief valve**

The pressure relief valve (450 bar) is mounted to the ground drive variable displacement motor by means of a flange.





Diagram

Tractive force (F) / Ground speed (v)

Curve a

1st forward gear is engaged, the ground speed control lever is set from its 0 position to the front.

Point 1:

Upon starting, the ground drive variable displacement pump HPV 105 swivels from 0 towards 105 cm³/rev. input volume. The ground drive variable displacement motor HMV stands at 210 cm³/rev. input volume.

Here:

- maximum tractive force is achieved;
- the max. ground speed is approx. 8 km/h.

Point 2:

The ground drive variable displacement pump HPV 105 stands at 105 cm³/rev. input volume. The ground drive variable displacement motor HMV swivels from 210 cm³/rev. to 103 cm³/rev. input volume.

Here:

- the tractive force decreases;
- the ground speed increases to up to approx. 18 km/h.

Curve b

2nd forward gear is engaged, the ground speed control lever is set from its 0 position to the front.

Point 3:

Upon starting, the ground drive variable displacement pump HPV 105 swivels from 0 towards 105 cm³/rev. input volume. The ground drive variable displacement motor HMV stands at 210 cm³/rev. input volume.

Here:

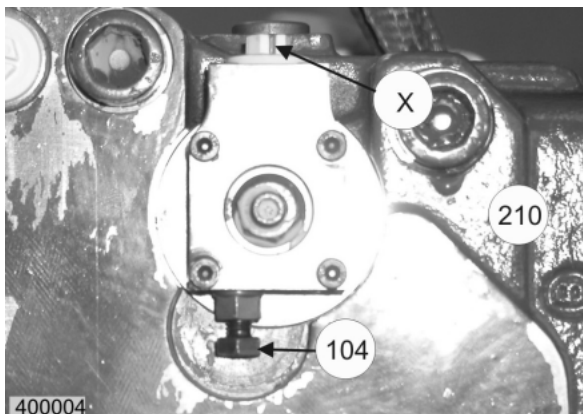
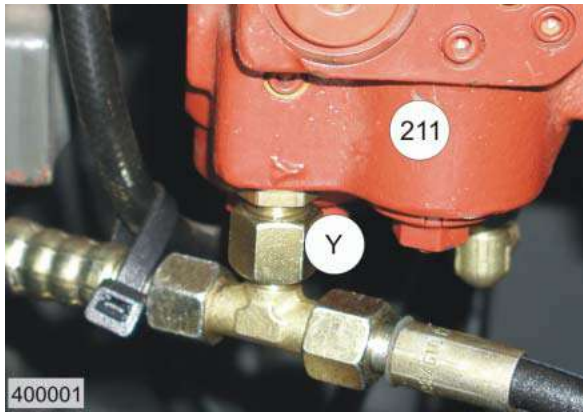
- the tractive force is less than in first gear;
- the max. ground speed is approx. 22 km/h.

Point 4:

The ground drive variable displacement pump HPV 105 stands at 105 cm³/rev. input volume. The ground drive variable displacement motor HMV swivels from 210 cm³/rev. to 103 cm³/rev. input volume.

Here:

- the tractive force decreases;
- the ground speed increases to up to approx. 40 km/h.



Control pressure line

Function

The control pressure line connects port (Y) on the ground drive variable displacement pump (211) with port (X) on the ground drive variable displacement motor (210).

Pressure is built up in the control pressure line when the ground speed control lever is pushed to the front while moving forward:

- At a control pressure of 3...10 bar, the ground drive variable displacement pump is adjusted between 0 and 105 cm³/rev.
- At a control pressure below 9 bar, the ground drive variable displacement motor remains in its initial position = 210 cm³/rev. input volume.
- Starting from a control pressure of 9 bar, the adjustment of the ground drive variable displacement motor starts.
- At a control pressure of 9...12.5 bar, the ground drive variable displacement motor is adjusted between 210 and 103 cm³/rev. input volume.

When the input volume is reduced, the ground speed of the JAGUAR increases while the tractive force is decreased at the same time.

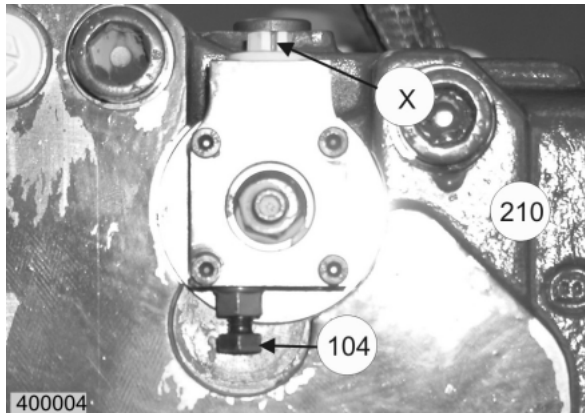
Measuring the control pressure

1. Install a suitable pressure gauge in the control pressure circuit (measuring range 0 ... 60 bar).
2. Start diesel engine and let it run at idle speed.
3. Set gearshift lever to N position.
4. Push the ground speed control lever fully to forward travel.
5. The control pressure should be 14 ... 14.5 bar.

Bleeding the control pressure circuit

Bleeding is necessary:

- after opening or replacing the control pressure line;
- after replacing the ground drive variable displacement pump and/or the ground drive variable displacement motor;
- when the maximum ground speed is not reached;
- when the vehicle reacts sluggishly to actuating the ground speed control lever.

**Bleeding the control pressure circuit**

1. Stop the engine, remove ignition key.
2. Set gearshift lever to N position.
3. Another person removes the lock and unscrews the bleed valve (104) on the ground drive variable displacement motor by approx. 1 turn.
4. Start the engine and let it run at minimum rpm.
5. Block machine by actuating the service brake and the parking brake.
6. Push ground speed control lever fully to the front for 1 minute.
7. After this, the other person closes and locks the bleed valve (104).

During the bleeding procedure, the pump constantly forces oil (volume flow) through the control pressure line (port X) to the ground drive variable displacement motor (210).

Here the oil and the air contained in is bled into the body of the ground drive variable displacement motor (210); no oil leaks from the bleed screw (104).

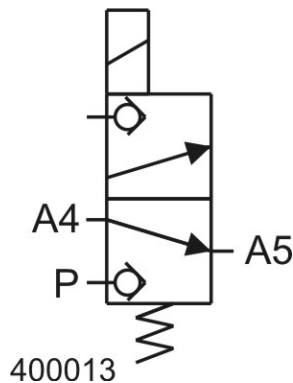
If the bleed screw (104) remains open by mistake after bleeding, the maximum ground speed is not reached as the necessary control pressure (in the control pressure line) cannot be built up.



Solenoid valve (Y102)

Location

The ground drive rpm protection solenoid valve (Y102) is installed behind the tailgate locking.



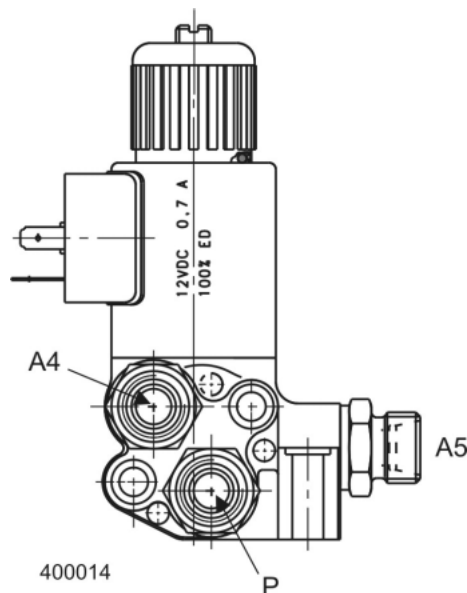
Design and function

Solenoid valve (Y102) protects the hydrostatic ground drive against excessive rpm values.

A4 Control pressure line port from ground drive variable displacement pump, port Y

A5 Port to ground drive variable displacement motor, port X

P Port for low-pressure hydraulics. A 0.8 mm orifice plate is integrated into the screw fitting which avoids sudden pressure build-up inside the control pressure line when the solenoid valve is switched.

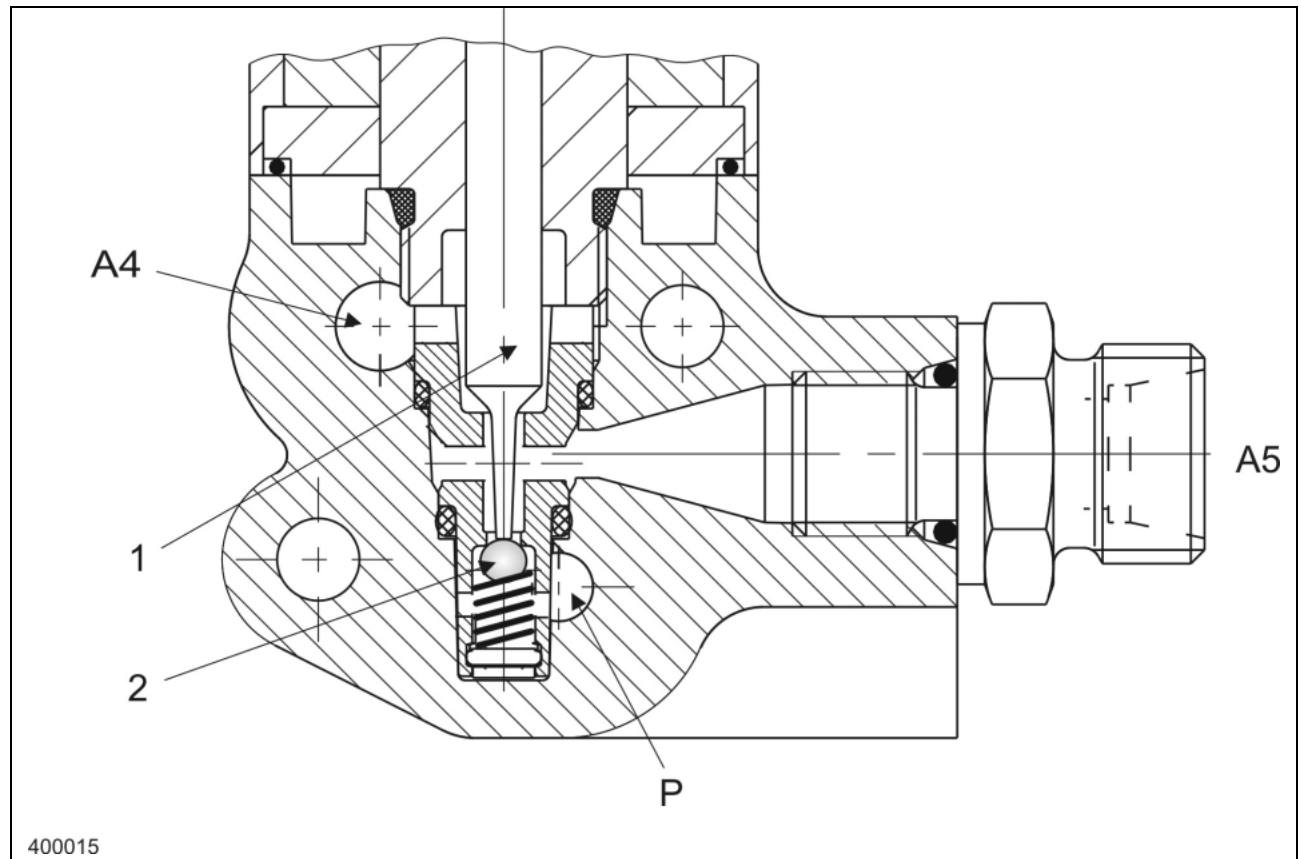


No current flowing through solenoid valve Y102 ($n_{Eng} < 2160$ rpm):

- The pressure in the low-pressure hydraulic circuit is available at port (P).
- The connection from port (A4) to port (A5) is open. The control pressure is directed via port (A5) to port (X) of the ground drive variable displacement motor.

Current flowing through solenoid valve Y102 ($n_{Eng} > 2250$ rpm):

- Port (P) is connected to port (A5). The pressure in the low-pressure hydraulic system is directed via port (A5) to port (X) of the ground drive variable displacement motor.
- Port (A4) is blocked.



Speed of diesel engine < 2160 rpm

At a diesel engine speed of < 2160 rpm, no current flows through solenoid valve (Y102). The control pressure from the ground drive variable displacement pump (211) enters at port (A4) and via the open conical seat of the solenoid plunger (1) is transmitted to port (A5). From port (A5), the control pressure is directed to port (X) of the ground drive variable displacement motor (210).

Speed of diesel engine > 2250 rpm

The speed of the diesel engine increases when the ground speed control lever is pulled to the rear at full throttle. During this, the control pressure falls, making the ground drive variable displacement motor (210) swivel to the maximum input volume. The oil (volume flow) flowing back to the ground drive variable displacement pump (211) from the ground drive variable displacement motor (210) increases and raises the speeds of ground drive variable displacement pump (211) and diesel engine.

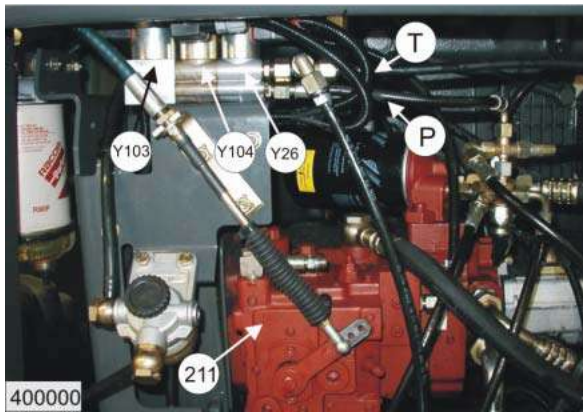
When the diesel engine speed increases to above 2250 rpm, current flows through the solenoid valve. The solenoid plunger (1) now pushes the ball (2) against the spring and the existing pressure in the low-pressure hydraulic circuit and opens the circuit. During this process, the connection from (P) to (A5) is opened. At the same time, the cone of the solenoid plunger (1) closes the connection to port (A4).

The pressure of the low-pressure hydraulic circuit (19^{+5} bar) available at port (P) is directed to port (A5). From here, the pressure travels on to port (X) of the ground drive variable displacement motor (210).

The ground drive variable displacement motor (210) now swivels from maximum to minimum input volume.

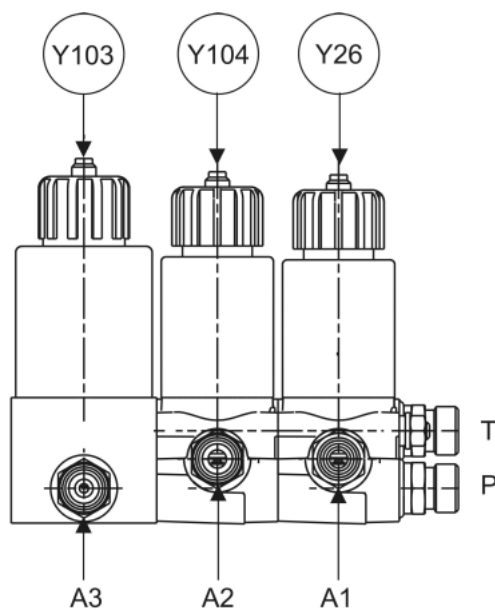
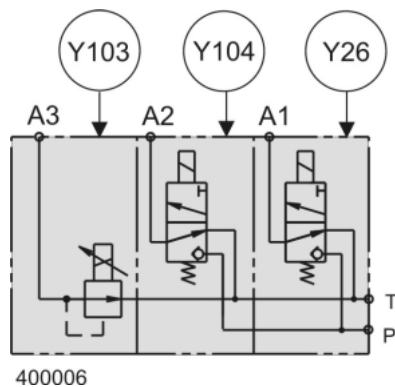
The oil (volume flow) now flowing back from ground drive variable displacement motor (210) to the ground drive variable displacement pump (211) becomes less, thus reducing the speeds of ground drive variable displacement pump (211) and diesel engine.

When the diesel engine speed falls to below 2160 rpm, no more current flows through the solenoid valve which returns to its initial position.



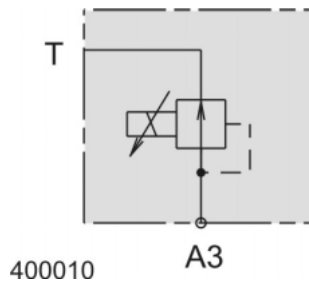
Valve block

The valve block (Y26, Y103, Y104) is located above the ground drive variable displacement pump (211).



Design

- 211 Ground drive variable displacement pump
- Y26 Main drive clutch solenoid valve, 12 Volt, 0.7 A, 100% actuated time
- Y103 Ground drive brake valve solenoid valve 12 Volt, PWM-controlled
- Y104 Servo gearshift solenoid valve 12 Volt, 0.7 A, 100% actuated time.
Controls the short-circuit valve (747) in the ground drive variable displacement pump (211) and the locking cylinder (359).
- A1 Port towards main drive clutch
- A2 Port towards locking cylinder of shifter rail and towards short-circuit valve (747) in the ground drive variable displacement pump (211).
- A3 Control pressure port
- P Low-pressure hydraulic system port
- T Tank



Solenoid valve Ground drive brake valve

The ground drive brake valve (Y103) solenoid valve reduces the ground speed in forward travel:

- when **both** foot pedals of the service brake are pressed down
- at a ground speed above 40.5 km/h.

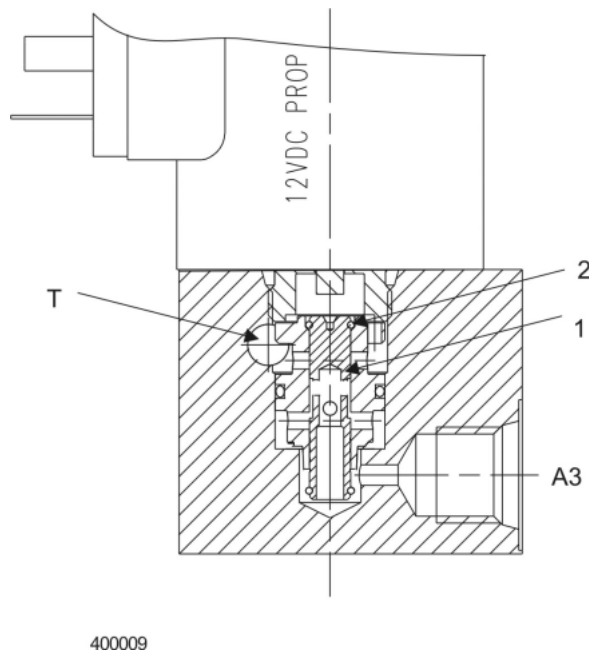
Function

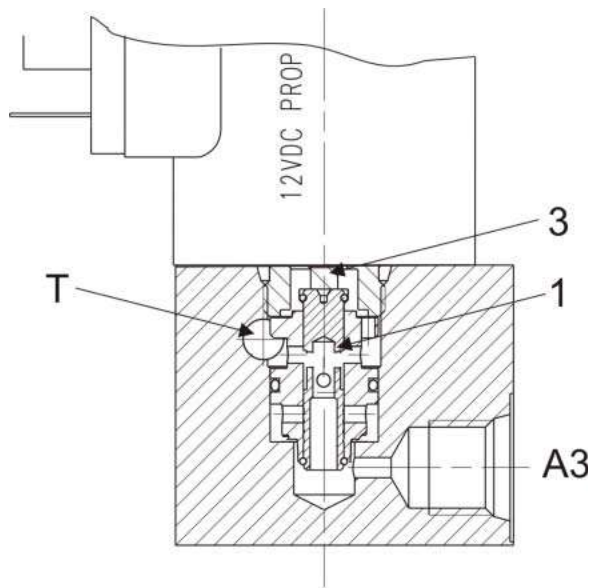
When no current flows through the solenoid valve, the position of the control piston (1) is defined by the stop of the circlip (2).

With the ignition switched on, current flows through the solenoid valve.

The solenoid actuates the control piston (1) downward (see position of control piston in the drawing).

The connection from port (A3) to the tank (T) is blocked.





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Brakes

When pressing both brake pedals of the service brake down, both brake switches on the brake pedals are actuated.

Only by this procedure, current will stop flowing through solenoid valve (Y103).

The control pressure available under the control piston (1) pushes the control piston (1) upwards. Now the control pressure port (A3) is connected with tank (T).

The pressure in the control line decreases, making the ground drive variable displacement motor (210) swivel towards maximum input volume – the ground speed is reduced.

Speed limit

At a ground speed of 40.5 km/h, the ground speed signal from the CIS is fed to the solenoid valve as a PWM signal.

With this PWM signal, the control piston (1) will assume a position where the connection from the control pressure line to the tank (T) is opened.

The control pressure decreases according to this opening of the control piston (1).

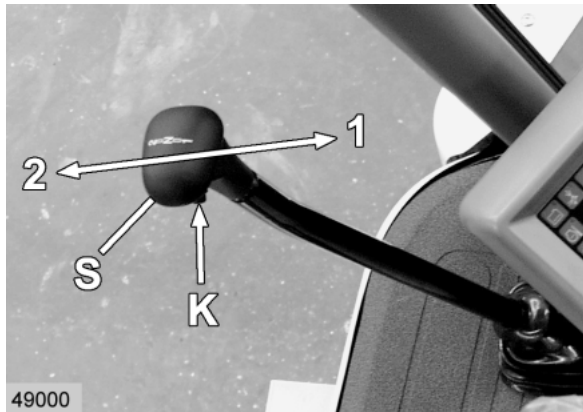
As the control pressure decreases, the ground drive variable displacement motor (210) swivels towards maximum input volume, thus reducing the ground speed.

This control behaviour occurs in a control window of 40⁺¹ km/h.

Protective function

When driving downhill, the ground drive variable displacement motor (210) is not driven by the diesel engine any more, but vice versa, making the diesel engine speed and the ground speed increase.

The solenoid valve also becomes active here and swivels the ground drive variable displacement motor (210) towards maximum input volume at a ground speed above 40.5 km/h, thus reducing ground speed.



Servo gearshift solenoid valve

The servo gearshift solenoid valve (Y104) unlocks the shifter rail in the gearbox in order to engage the gear.

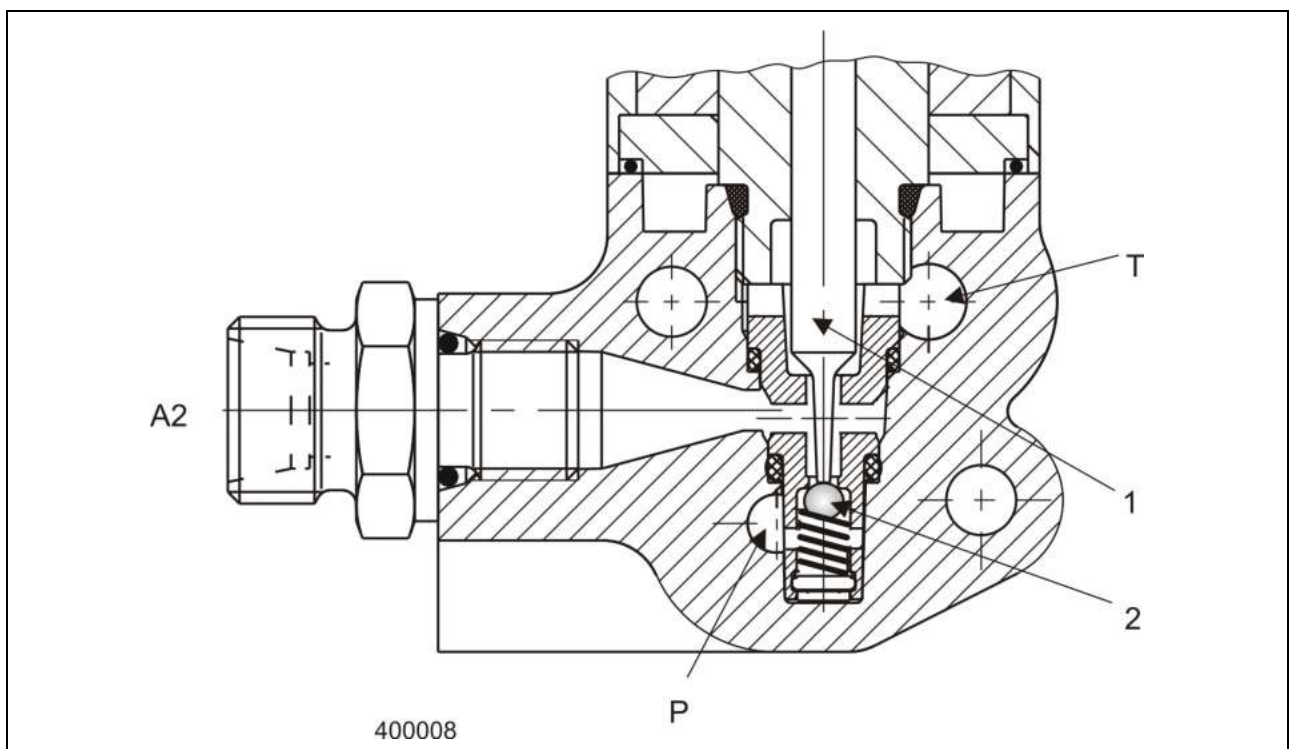
Current flows through the solenoid valve when the pushbutton (K) at the gearshift (S) lever is pressed. To do this, the ground speed control lever must be in neutral position (N).

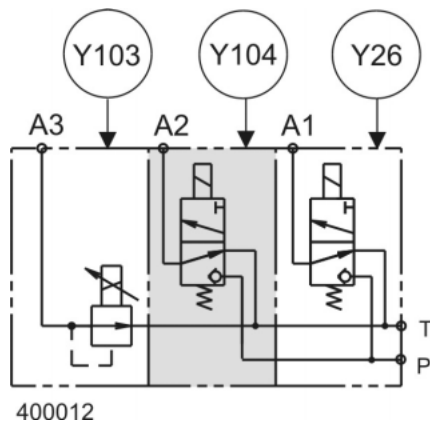
1 = 1st gear

2 = 2nd gear

S = Gearshift lever

K = Pushbutton





Function

With no current flowing, the ball (2) keeps port (P) closed. The pressure available in the low-pressure hydraulic circuit acts below the ball via port (P) and forces it on its seat.

Port (A2) is connected to the tank (T).

A2 = Port to locking cylinder (359) and to short-circuit valve (747) in the ground drive variable displacement pump (211).

With current flowing through the solenoid valve, the solenoid plunger (1) forces the ball (2) against the spring and the available pressure and opens the circuit.

During this process,

- the connection from (P) to (A2) is opened.
- the cone of the solenoid plunger (1) closes the connection to the tank (T).

Via port (A2), the locking cylinder (359) of the shifter rail is actuated.

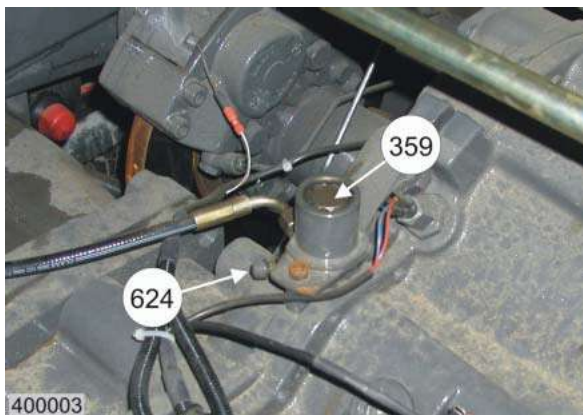
The shifter rail is unlocked, allowing a gearshift to be carried out.

After the solenoid valve is switched off, the ball (2) is pressed on its seat by the spring.

This

- blocks the connection from port (P) to port (A2).
- connects the interlocking cylinder (359) via port (A2) to the tank (T).

The shifter rail in the gearbox is locked.



Bleeding the energizing circuit of the locking cylinder (359).

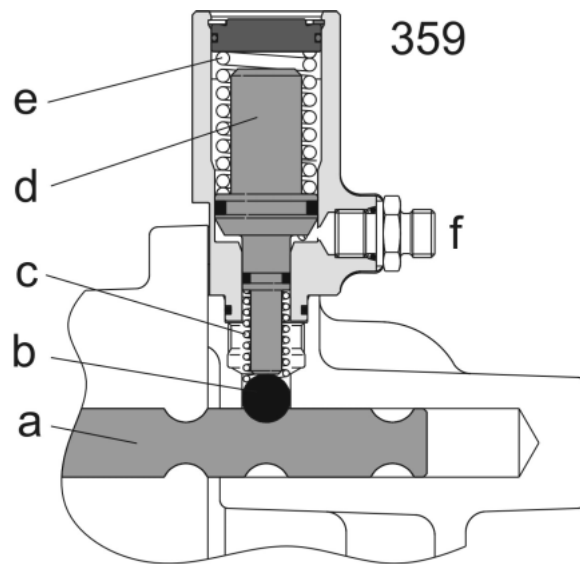
The energizing circuit must be bled:

- after opening the energizing circuit
- when engaging a gear is possible only after extended actuation of pushbutton (K) on the gearshift lever.

Bleeding procedure

1. Set ground speed control lever to N position.
2. Block machine by actuating the service brake and the parking brake.
3. Start diesel engine and let it run in idle speed.
4. Push pushbutton K at the gearshift lever.
5. Another person opens the bleed valve (624).
6. Continue bleeding procedure until oil comes out without bubbles. Collect any oil from the system.
7. Close bleed valve (624).

Note: Check oil level in hydraulic oil tank and top up if necessary.



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Locking cylinder (359)

Design

- a Shifter rail
- b Ball
- c Pressure spring
- d Piston
- e Pressure spring
- f Port

Function

Shifter rail is locked

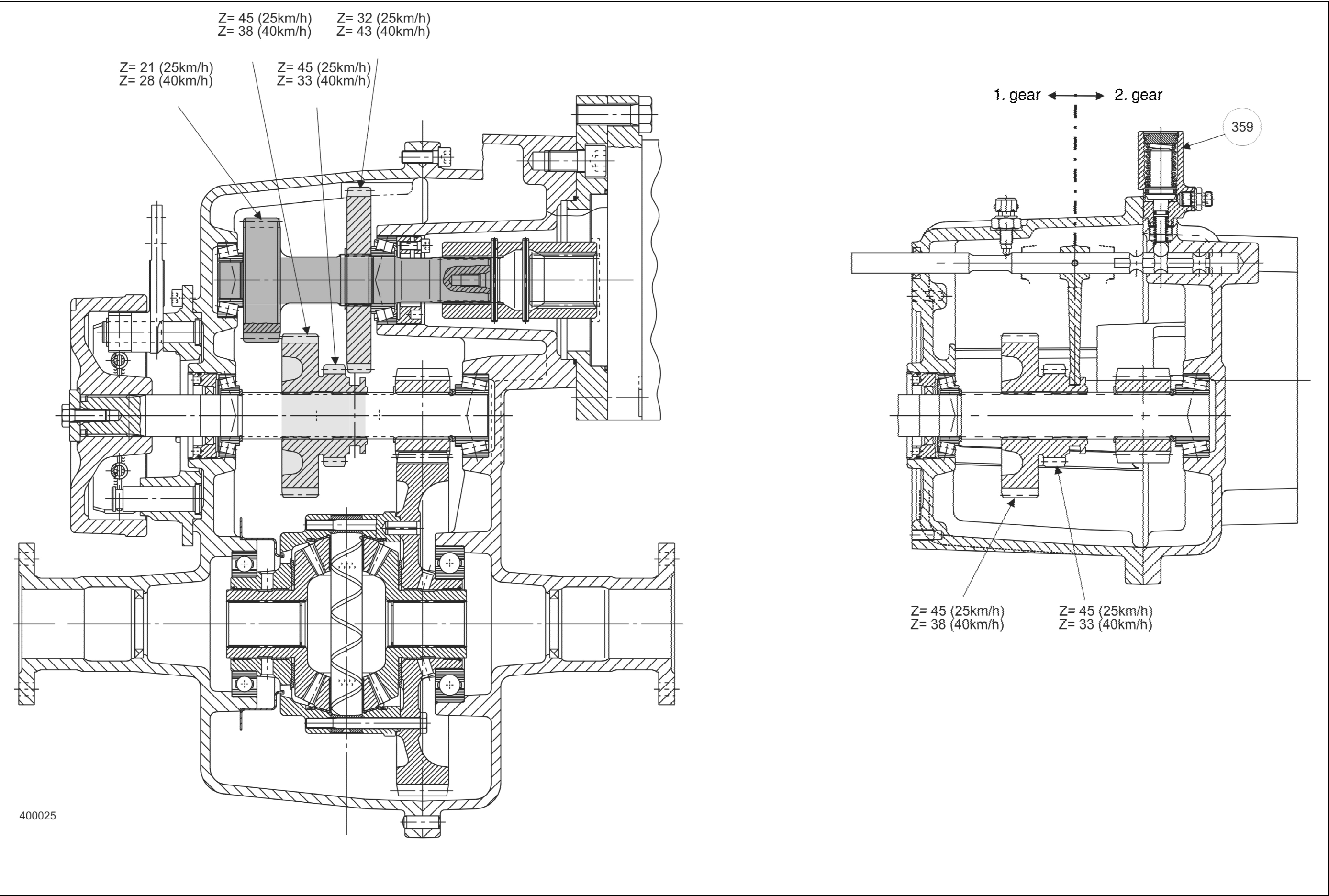
No compressed oil is available at port (f). Pressure spring (e) forces the piston (d) on the ball (b) which locks the shifter rail (a).

Shifter rail is unlocked

The solenoid valve (Y104) has switched, making compressed oil flow below the piston (d) via port (f).

Piston (d) is actuated upwards against pressure spring (e).

Ball (b) is now loaded by the pressure spring (c) only. The shifter rail (a) may be actuated against this spring force.



Contents

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Learning the average vibration axis	3
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Components	4
Function	4



Functioning

During transport travel with a heavy front attachment, pitching (vibrations) may occur. This applies especially in case of high ground speeds on uneven roads.

This causes the following:

- driving comfort is considerably deteriorated
- driving safety is reduced and
- the mechanical load on the machine is very high.

Pitching movements change the pressure in the hydraulic cylinders of the front attachment.

These pressure variations are detected by a pressure sensor, transmitted to the CONTOUR module as a signal and processed there.

According to those signals, the CONTOUR module controls the solenoid valves which raise or lower the front attachment.

Slightly raising or lowering the front attachment counteracts the pitching movements.

Counteracting the vibrations presents the following benefits:

- high driving comfort
- safe driving behaviour
- smaller mechanical load.



Operation

Learning the average vibration axis

1. Switch off main drive switch (S25).
2. Set switch (S52) to road travel position.
3. Raise the front attachment to approx. 400 mm.
4. Keep CAC switch (S38) "Cutting height control / Automatic ground pressure control" pressed for approx. 5 seconds until a 3-fold warning tone sounds. The position of the average vibration axis has been learnt.

In this position of the front attachment,

- the pressure in the hydraulic cylinders "Front attachment raise/lower" is detected by sensor (B2) "Ground pressure Oil pressure" and
- the position of the front attachment is detected by sensor (B35) "Feed rake conveyor position".

Both signals are transmitted to the CONTOUR module (A11).

The learned "average vibration axis" is permanently stored in the CONTOUR module (A11). Even switching the ignition on and off cannot delete it. The value stored can only be overwritten by another learning procedure.



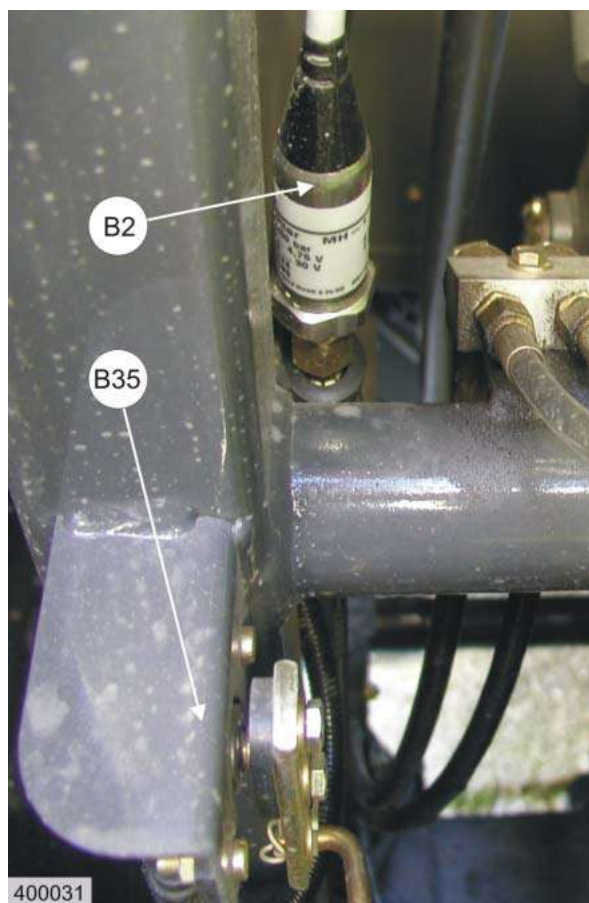
Activating the vibration dampening

1. Switch off main drive switch (S25).
2. Switch on road travel switch (S52).
3. Set the front attachment to an arbitrary height.
4. Actuate CAC switch (S38) "Cutting height control / Automatic ground pressure control". The front attachment is now set to the "average vibration axis".



The activated vibration dampening is indicated by the letters "A" (see arrows) in the display. The left bar chart shows the ground pressure and the right bar chart the position of the front attachment.

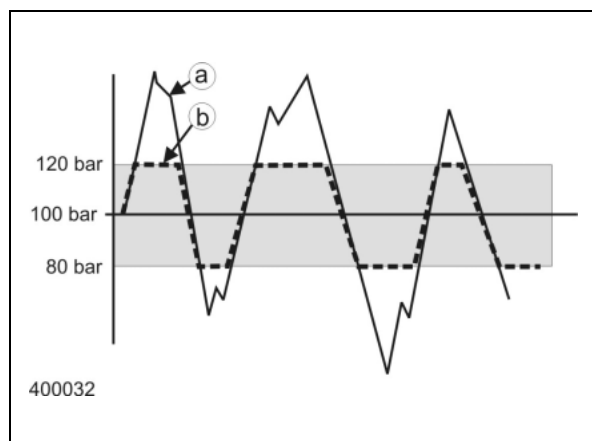
The vibration dampening is deactivated by manually raising or lowering the front attachment.



Components

B2 Sensor “Ground pressure Oil pressure” is mounted at the front right on the feed rake conveyor. It detects the pressure in the hydraulic cylinders “Raise / lower front attachment” and transmits the signal to the CONTOUR module (A11).

B35 Sensor “Feed rake conveyor position” is mounted at the front right on the feed rake conveyor. It detects the position of the front attachment and transmits the signal to the CONTOUR module (A11).



Function

The following example explains how the vibration dampening works:
After the average vibration axis has been learnt, the pressure in the “Front attachment raise / lower” cylinders is 100 bar. This pressure is detected by sensor (B2) “Ground pressure Oil pressure”. A pressure tolerance range of ± 20 bar is stored in the CONTOUR module (A11). The pressure peaks occurring while travelling (curve a) are beyond the pressure tolerance range.

The CONTOUR module controls the solenoid valves for raising or lowering the front attachment accordingly.

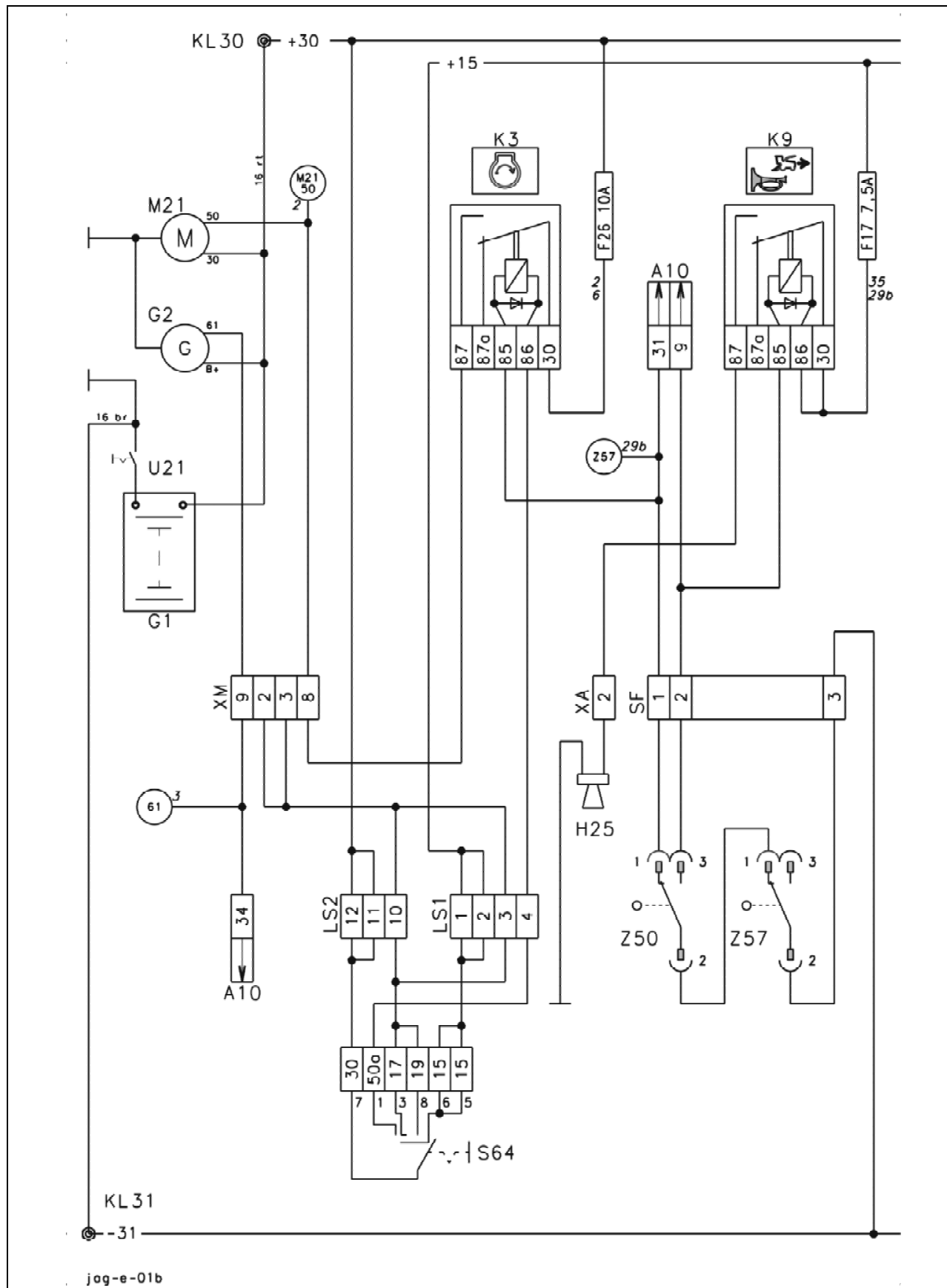
Slightly raising or lowering the front attachment counteracts the pitching movements to such an extent that the pressure remains inside the stored pressure tolerance range of ± 20 bar (curve b).

If the pressure is within the stored pressure tolerance range of ± 20 bar, but the front attachment moves too far away from the average vibration axis in its compensating movements, it is returned by the position sensor.

1b

**Main power supply,
Diesel engine electric starting motor,
Reversing horn**

Designations:



A10	Fieldwork computer module (CAB)	3-d-10
G1	Battery	5-f-10
G2	Alternator	4-j-10
H25	Reversing horn	4-c-12
K3	Starting relay	3-d-10
K9	Back-up light	3-d-10
M21	Starter on OM457	4-i-12
	on OM502	4-h-12
S64	Ignition switch	3-c-11
U21	Battery isolating switch	5-f-10
Z50	Reversing horn	3-d-10
Z57	Starting lock for ground speed control lever	3-d-10

SPEEDSTAR machine:

As far as this circuit is concerned, the Jaguar standard version is different from the SPEEDSTAR because of reference Z57 on circuit diagram 29b. With the ground speed control lever in neutral position, earth is connected to relay K37 via this current path (see circuit diagram 29b).

Table of measured values:

Item	Component	Measured value	Remark
K3 K9	Remote control relay 10 A 20 A	70 - 100 Ω	(Pin 86/1 – 85/2) (Pin 87a/4 – 30/3) (Pin 87/5 – 30/3)

Functional description:

Diesel engine electric starting motor

As a starting lock, relay K3 is connected to earth only if the switches (Z50/Z57) on the ground speed control lever are in neutral position. The ignition switch (S64) now switches the diesel engine electric starting motor (M21) via relay K3 with +50a.

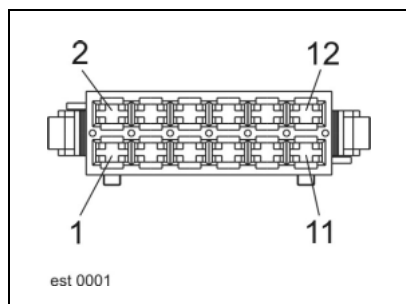
Note: The fieldwork computer module (A10) is informed by switch (Z50) about the reverse travel so it stops the area counter.

The fieldwork computer module (A10) is informed by switch (Z50) about forward travel in order to release the autopilot and silaging agent pump function only then. In addition, this signal automatically lowers the diesel engine speed to idle speed when road travel is activated and the ground speed control lever is in neutral position.

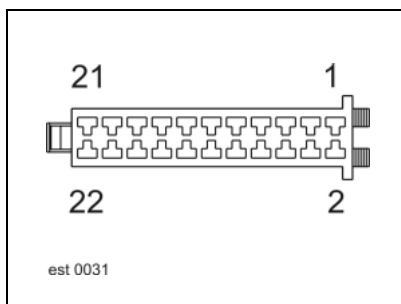
The fieldwork computer module (A10) is informed by the alternator (G2) about the charge voltage in order to release a corresponding error message via CAN BUS in the terminal if necessary.

Connector pin definition

Connector XA



Connector XM

**Interconnection list**

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
XM-2	XM-3	LS1-3	LS2-10			-	-
XM-3	XM-2	LS1-3	LS2-10			-	-
XM-8	K3-87					1.5	blk-ye
XM-9	DI-12	K58-86	A10-34	DS-54		1	bl

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
XA-2	K9-87					1.5	bl-gn

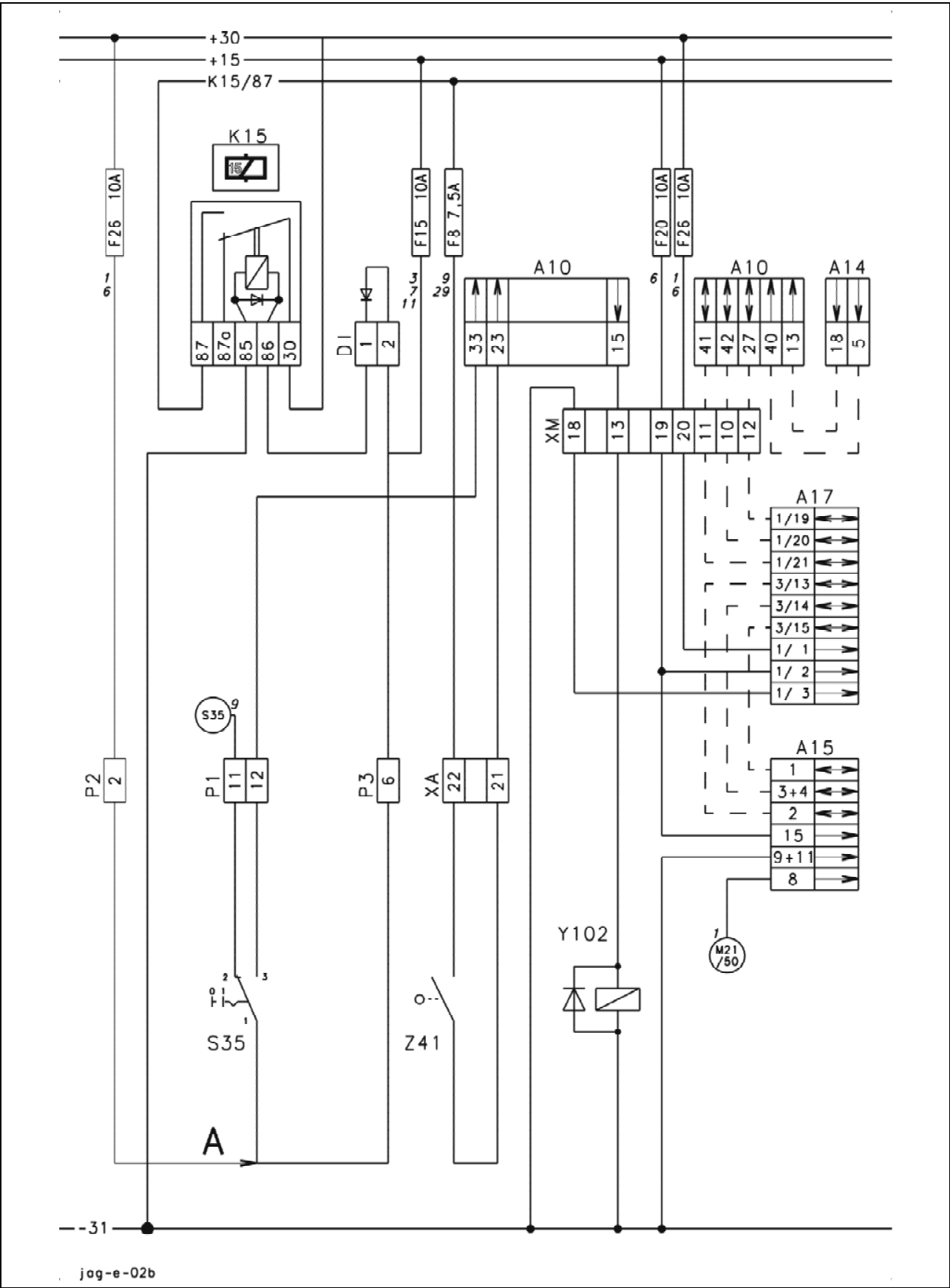
From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
SF-1	K3-85	A10-31	K37-85			1	ye
SF-2	K9-85	A10-9				1	br
SF-3	31					1	blk

2b

**Starting the diesel engine,
Diesel engine speed adjustment,
Ground drive speed protection**

for Jaguar Speedstar

2b - Starting the diesel engine, Diesel engine speed adjustment, Ground drive speed protection



Designations:

A10	Fieldwork computer module (CAB)	3-d-10
A14	Intake controller module	3-d-10
A15	Engine control module	on OM457 4-h-10
	on OM502	4-i-10
A17	Engine adaption module	3-c-10
DI	Diode pcb warning device	3-c-10
K15	Ignition (15)	3-d-10
S35	Engine speed adjustment	3-d-10
Y102	Ground drive speed protection	4-j-11
Z41	Engine speed reduction for road travel	5-e-11

Notes:

A - Starting with machine no. 492-0133, F26 is replaced by F15 for power supply of this function.

SPEEDSTAR machine:

As far as this circuit is concerned, the Jaguar standard version is different from the SPEEDSTAR because of the additional solenoid coil Y102 (see functional description of ground drive speed protection).

Table of measured values:

Item	Component	Measured value	Remark
K15	Remote control relay	75 - 125 Ω 70 A	(Pin 86/1 – 85/2) (Pin 87/5 – 30/3)
Y102	Solenoid coil	0.7 A 17 Ω	

Functional description:**Starting procedure**

The engine control module (A15) receives the starting signal through the diesel engine starter circuit (M21/50). During the starting process, the engine control module (A15) assumes control of the diesel engine due to the corresponding sensors on the engine wiring loom.

Speed adjustment

Switch (S35) transmits the engine speed adjustment to the fieldwork computer module (A10). The fieldwork computer module (A10) transmits this information as a CAN BUS signal via the engine adaption module (A17) to the engine control module (A15) which in turn adjusts the corresponding speed of the diesel engine.

When the 2nd gear is engaged in the manual transmission, the fieldwork computer module (A10) receives no more power from switch (Z41). The fieldwork computer module (A10) transmits this information as a CAN BUS signal via the engine adaption module (A17) to the engine control module (A15), which in turn adjusts the road travel speed of the diesel engine.

Note: The fieldwork computer module (A10) is also informed about the position of the ground speed control lever (Z50) and of the road travel switch (S52). This automatically reduces the engine speed to idle speed when road travel is selected and the ground speed control lever is in neutral position.

Further dependencies of the speeds of main drive and intake can be taken from the table below:

Switch		Function					
		No-load speed		Road travel speed	Working speed *	Full load speed	
		A	B			A	B
Road travel	S52		yes		no		no
2nd gear of manual transmission	Z41		yes	yes		no	yes
Diesel engine speed	S35	low		high	high	high	high
Main drive	S25				on	off	on
Intake	S55			off			on
Ground speed control lever in neutral position	Z50/ Z57		yes				

* Is freely set at the terminal between 1800 rpm and 2080 rpm.

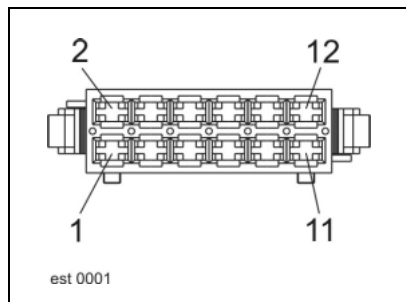
Ground drive speed protection

The current engine speed is transmitted by CAN bus J1939 via the engine adaption module (A17) to the fieldwork computer module (A10). If the speed is above 2250 rpm, solenoid Y102 is supplied with power. If the speed falls below 2160 rpm, power supply is cut off by the fieldwork computer module A10.

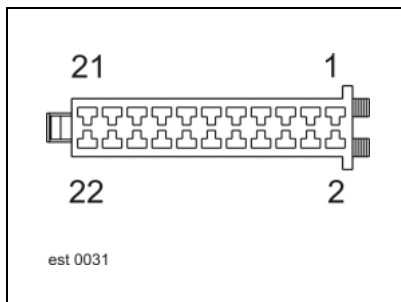
This protects the hydrostatic drive against excessive rpm values. (for functional description see "Hydraulic system").

Connector pin definition

Connector XA



Connector P1, P2, P3, XM

**Interconnection list**

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
P1-11	K33-86					0.75	br-ye
P1 12	A10-33					0.75	br-gn

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
A - P2-2	F26-A	XM-20	K3-30	DS-4	P2-2	0.75	or-blk

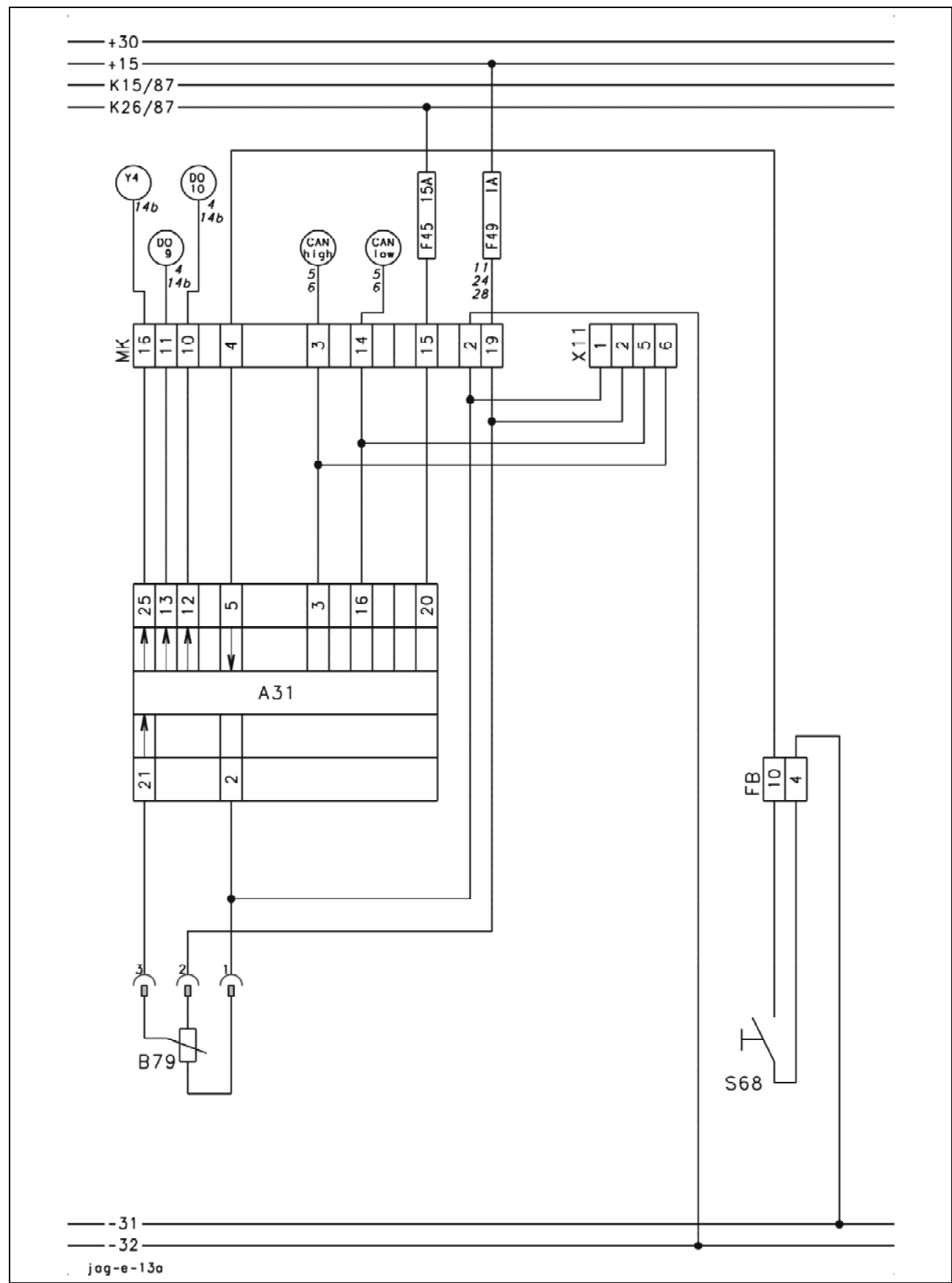
From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
P3-6	K58-30	DI-2	F15-A	P3-14		0.75	blk-gn

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
XA-21	A10-23					0.75	ye-blk
XA-22	P2-1	F8-A	K34-30	K6-30		0.75	blk

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
XM-10	A10-42					0.75	br-gn
XM-11	A10-41					0.75	ye
XM-12	A10-27					0.75	or
XM-13	A10-15	ZS8				1.0	vi-wh
XM-18	H3-7	K15-85	K17-85	FA-7		0.75	br-ye
XM-19	F20-A					1.5	blk-wh
XM-20	F26-A	K3-30	DS-4			1.5	rd-wh

13a**Automatic slewing of upper discharge chute
for JAGUAR SPEEDSTAR**

13a - Automatic slewing of upper discharge chute for JAGUAR SPEEDSTAR



Designations:

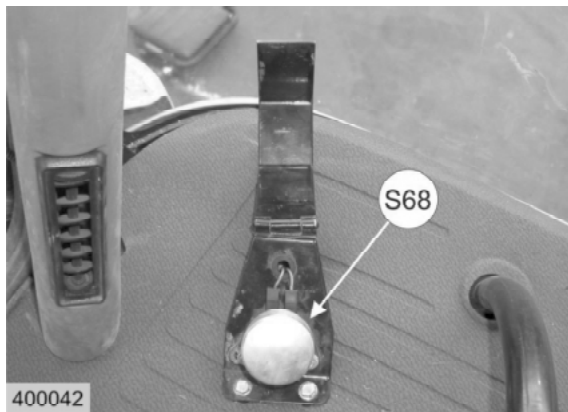
- A31 Discharge control module 3-d-10
- B79 Slewing angle of upper discharge chute (actual value) 2-e-11
- S68 Execute upper discharge chute control 3-c-12
- X11 Isolation point of discharge control 1-c-11
- Y4 Slow / fast rotation of upper discharge chute 3-f-12

Table of measured values:

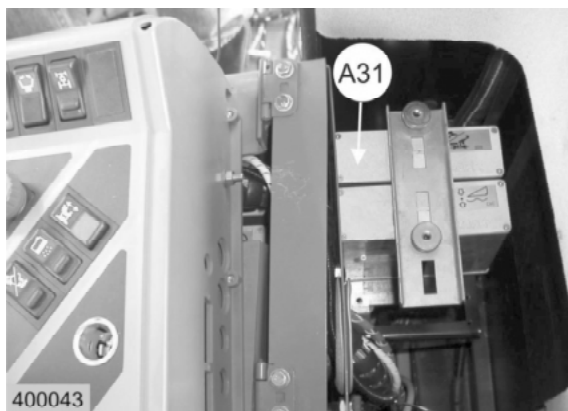
Item	Component	Measured value	Remark
B5	Pressure sensor	0.25 - 4.75 V linear	0 - 250 bar linear
B79	Sensor	12 V 0.25 V - 4.75 V	(Pin 1-2) (Pin 1-3)
Y4	Solenoid coil	3.8 A 3.2 Ω	

Functional description:

The upper discharge chute slewing angle sensor (actual value) B79 detects the current rotating angle of the upper discharge chute and transmits this value to the discharge control module A31.



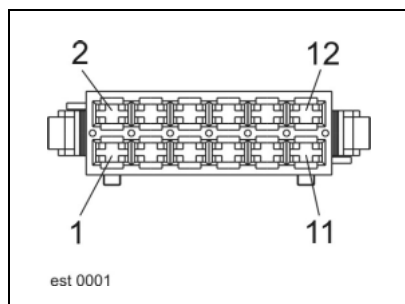
Foot switch S68 "Execute upper discharge chute control" activates the automatic slewing via the discharge control module A31.



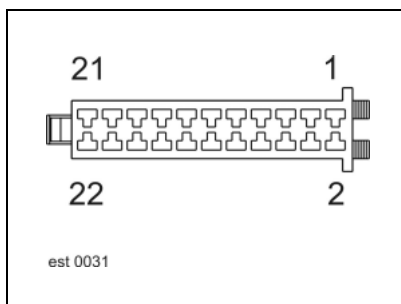
The end limit stops for slewing the upper discharge chute stored in the CLAAS Information System (CIS) are transmitted to the discharge control module A31 via the CAN bus.

Connector pin definition

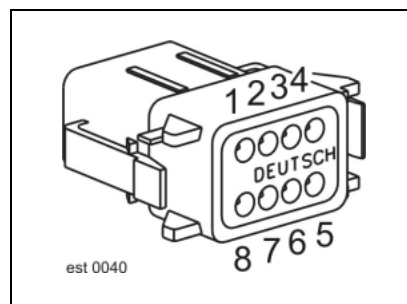
Connector FB



Connector MK



Plug X11

**Interconnection list**

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
FB-4	-31					1.5	br
FB-10	MK-4	DS-27				1.5	br-rd

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
MK-2	-32						
MK-3	C5/ACT3	A10-40	A9-3	MG-8	J1-1	-	-
MK-3	A14-5	A11-3	C1-6	KC-6	CI-3	-	-
MK-4	FB-10	DS-27				1.5	br-rd
MK-8	H4-2	A9-11				1.5	br-rd
MK-10	H3-9	K30-87	DO-10	DS-14		1.5	wh-gn
MK-11	H3-8	K31-87	DO-9	DS-13		1.5	wh-ye
MK-14	C-4/ACT-4	A10-13	A14-18	A9-16	A11-16	-	-
MK-14	MK-14	MG-7	C1-7	J2-1	KC-7/CI-4	-	-
MK-15	F45-A						
MK-16	H3-10	K29-87	DS-12			1.5	wh-vi
MK-19	F49-A	XA-17	C1-3	FB-17	DS-51	1.0	rd-bl

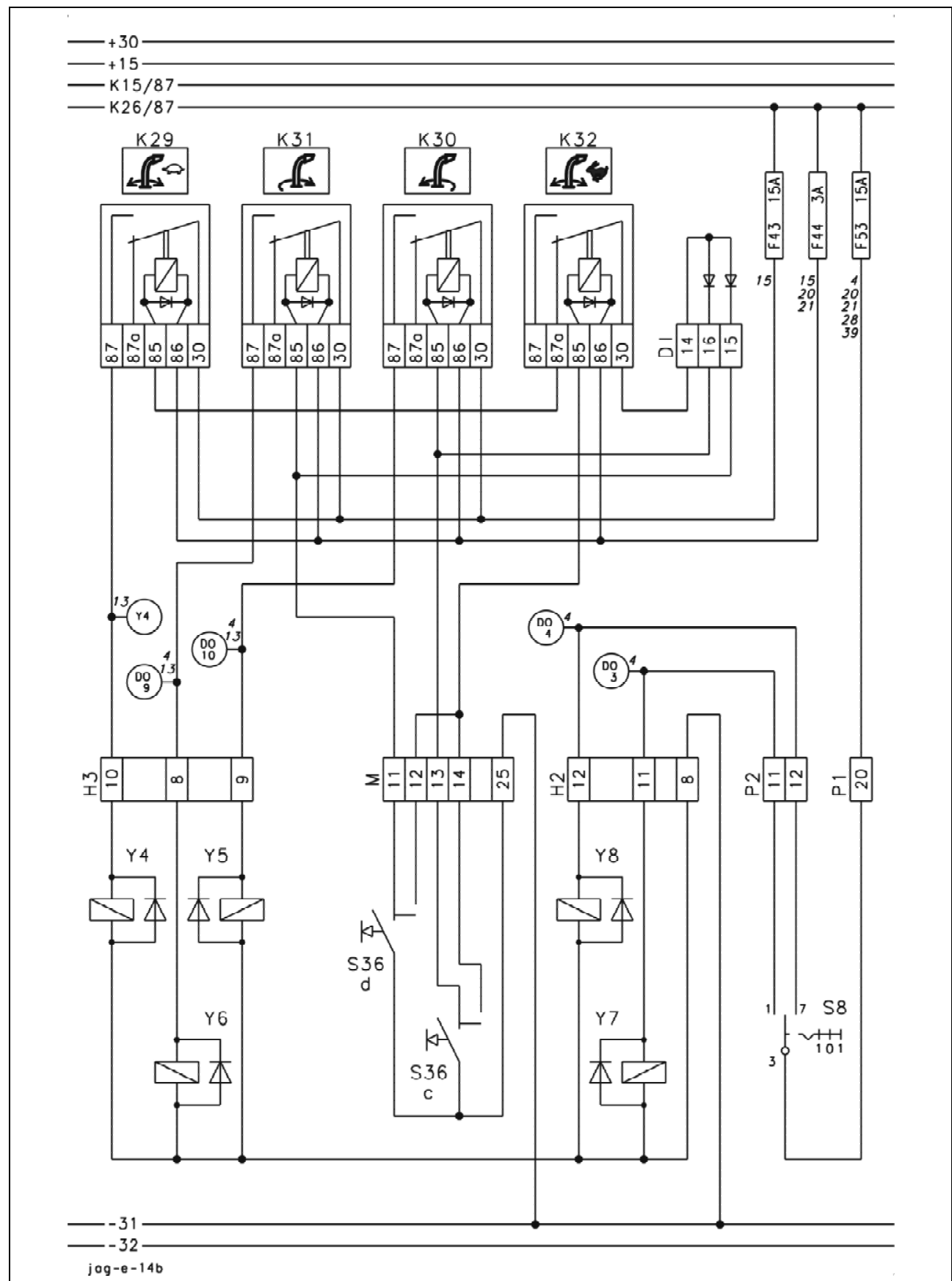
Interconnection list for connector MK – Discharge control module A31

from	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
MK-2	A31-2	X11-1	B79-1			1.0	br
MK-3	A31-3	X11-6				1.0	or
MK-4	A31-5					1.0	br-rd
MK-8	A31-9					1.0	br-vi
MK-10	A31-12					1.0	rd-blk
MK-11	A31-13					1.0	rd-wh
MK-14	A31-16	X11-5				1.0	ye
MK-15	A31-20					1.0	blk
MK-16	A31-25					1.0	wh-vi
MK-19	X11-2	B79-2				1.0	blk-vi
A31-21	B79-3					1.0	gn-ye

14b

**Upper discharge chute slew,
Upper discharge chute raise/lower**

14b - Upper discharge chute slew, Upper discharge chute raise/lower



Designations:

- DI Diode pcb warning device 3-c-10
- K29 Upper discharge chute slewing slow 3-c-10
- K30 Upper discharge chute left 3-c-10
- K31 Upper discharge chute right 3-c-10
- K32 Upper discharge chute slewing fast 3-c-10
- S8 Upper discharge chute raise / lower 3-c-10
- S36 Multifunction switch for upper discharge chute 3-c-11
- Y4 Upper discharge chute slewing slow / fast 3-f-12
- Y5 Upper discharge chute slewing left 3-f-12
- Y6 Upper discharge chute slewing right 3-f-12
- Y7 Upper discharge chute raise 3-f-12
- Y8 Upper discharge chute lower 3-f-12

SPEEDSTAR machine:

As far as this circuit is concerned, the Jaguar standard version is different from the SPEEDSTAR because of references Y4, DO9 and DO10 on circuit diagram 13. Upon activation of the automatic upper discharge chute slewing, the solenoid coils Y4, Y5 and Y6 are supplied with power according to the selected function via these current paths (see circuit diagram 13a).

Table of measured values:

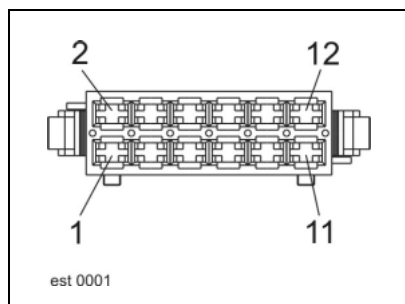
Item	Component	Measured value	Remark
K29	Remote control relay	70 - 100 Ω	Pin 86/1 – 85/2)
K30	10 A		(Pin 87a/4 – 30/3)
K31	20 A		(Pin 87/5 – 30/3)
K32			
Y4	Solenoid coil	3.8 A	
Y5		3.2 Ω	
Y6			
Y7			
Y8			

Functional description:

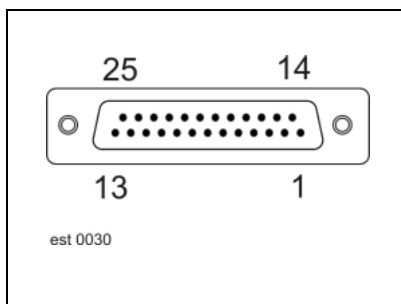
Upper discharge chute raise / lower	The functions for raising (Y7) and lowering (Y8) of the upper discharge chute are directly controlled by the rocker switch (S8).
Upper discharge chute slew	The switches (S36c/S36d) for slewing the upper discharge chute energise the respective relay (K30/K31) in both stages; the corresponding function (Y5/Y6) is then supplied with voltage.
Upper discharge chute slew slow / fast	<p>In the first switch stage (S36c/S36d), relay (K29) is additionally energised via diodes (DI/15-14 or DI/16-14) and relay (K32). The solenoid coil (Y4) thus energised (Y4) now reduces the oil flow in the valve and realises the "slow" function.</p> <p>In the second switch stage (S36c/S36d) the relay (K32) is energised and therefore, voltage supply to relay (K29) is interrupted. The unenergised solenoid coil (Y4) now releases the full oil flow in the valve and realises the "fast" function.</p>

Connector pin definition

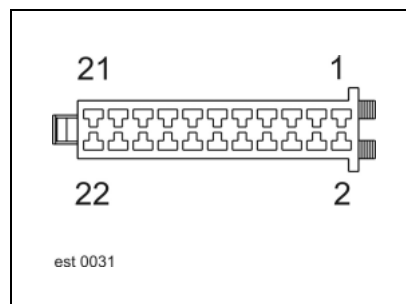
Connector H2, H3



Connector M



Connector MK, P1, P2

**Interconnection list**

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
H2-8	K7-31	K18-85	FB-4	FD-7		2.5	br
H2-11	P2-11	DO-3	DS-10			1.5	wh
H2-12	P2-12	DO-4	DS-11			1.5	wh-rd

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
H3-8	K31-87	DO-9	MK-11	DS-13		1.5	wh-ye
H3-9	K30-87	DO-10	MK-10	DS-14		1.5	wh-gn
H3-10	K29-87	MK-16		DS-12		1.5	wh-vio

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
M-11	K31-85	DI-15				0.14	gn-wh
M-12	M-14	K32-85				0.14	gr-br
M-13	K30-85	DI-16				0.14	gr-wh
M-14	M-12	K32-85				0.14	ye-br
M-25	K2-85	H1-2	MG-4	FD-11		0.14	blk

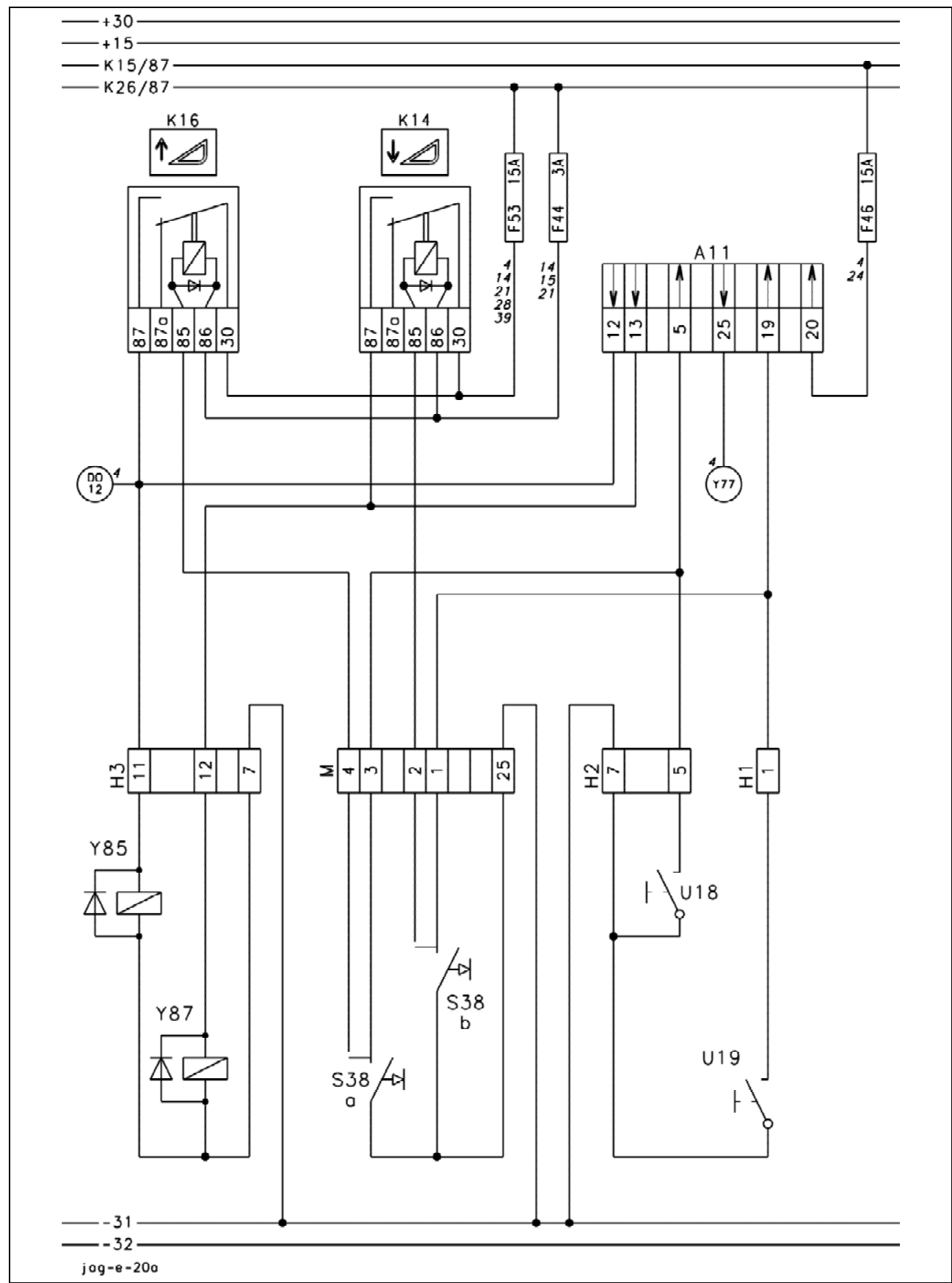
From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
MK-10	H3-9	K30-87	DO-10	DS-14		0.5	rd-blk
MK-11	H3-8	K31-87	DO-9	DS-13		0.5	rd-wh
MK-16	H3-10	K29-87	DS-12			0.5	wh-vi

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
P1-20	K17-30	K14-30	K16-30	A9-20		1.5	blk

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
P2-11	H2-11	DO-3	DS-10			1.5	wh-rd
P2-12	H2-12	DO-4	DS-11			1.5	wh

20a**Front attachment raise / lower****Vibration dampening for JAGUAR Speedstar**

20a - Front attachment raise / lower, Vibration dampening for Jaguar Speedstar



Designations:

- A11 CONTOUR module 3-d-10
- K14 Front attachment lower 3-c-10
- K16 Front attachment raise 3-c-10
- S38 Multifunction switch for front attachment 3-c-11
- U18 Front attachment raise 4-c-12
- U19 Front attachment lower 4-c-12
- Y85 Front attachment raise 3-g-12
- Y87 Front attachment lower 3-g-12

Table of measured values:

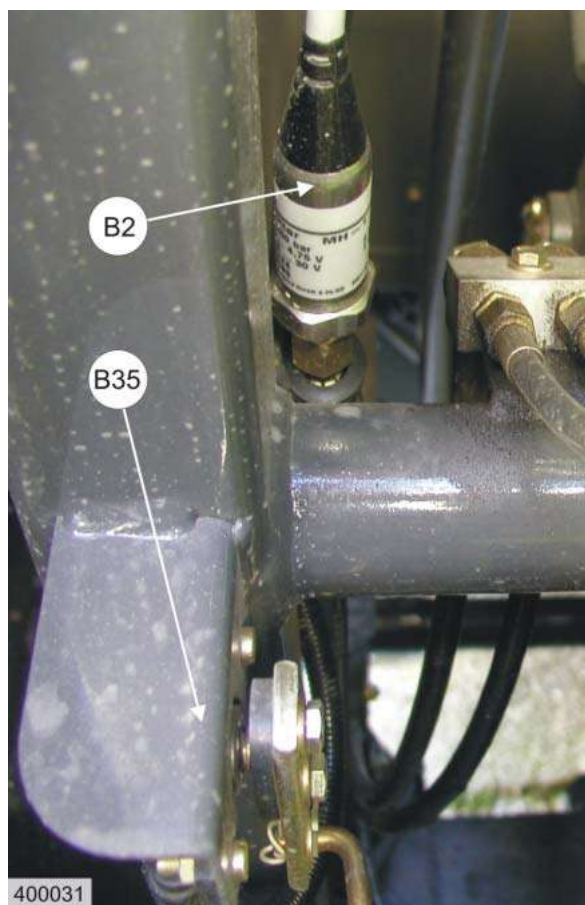
Item	Component	Measured value	Remark
K14 K16	Remote control relay 10 A 20 A	70 - 100 Ω	(Pin 86/1 – 85/2) (Pin 87a/4 – 30/3) (Pin 87/5 – 30/3)
Y85 Y87	Solenoid coil	3.8 A 3.2 Ω	

Functional description:**Front attachment raise / lower****Slow:**

The switches (S38a/S38b) for raising and lowering the front attachment in both stages activate the Contour module (A11). Then the module (A11) activates the respective function using a pulse width-modulated voltage (Y85/Y87).

Fast:

At the second stage of the switches (S38a/S38b), the corresponding relay (K14/K16) and consequently the respective function (Y85/Y87) is additionally activated using a constant voltage.

**Vibration dampening for Jaguar Speedstar**

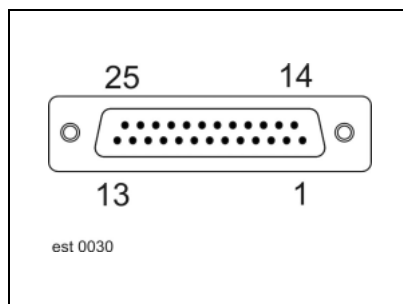
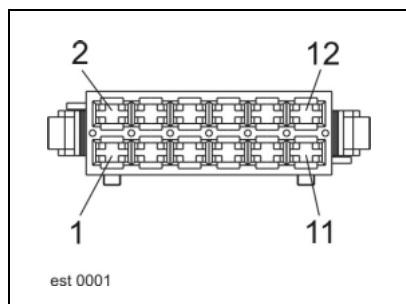
The sensors Ground pressure Oil pressure B2 and Feed rake conveyor position B35 detect the front attachment position and transmit the signal to the CONTOUR module A11 (see CONTOUR System circuit diagram).

When the front attachment moves too far away from the average vibration axis during road travel, the solenoid coils Y85 Front attachment raise and Y87 Front attachment lower are supplied with power via the CONTOUR module. The front attachment vibrations are dampened.

Connector pin definition

Connector H1, H2, H3,

Connector M

**Interconnection list**

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
H1-1	M-1	A11-19				1.5	gn-blk

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
H2-5	M-3	A11-5				1.5	gn-bl
H2-7	C-1	ZS-3	K21-85	K22-85		1.5	br

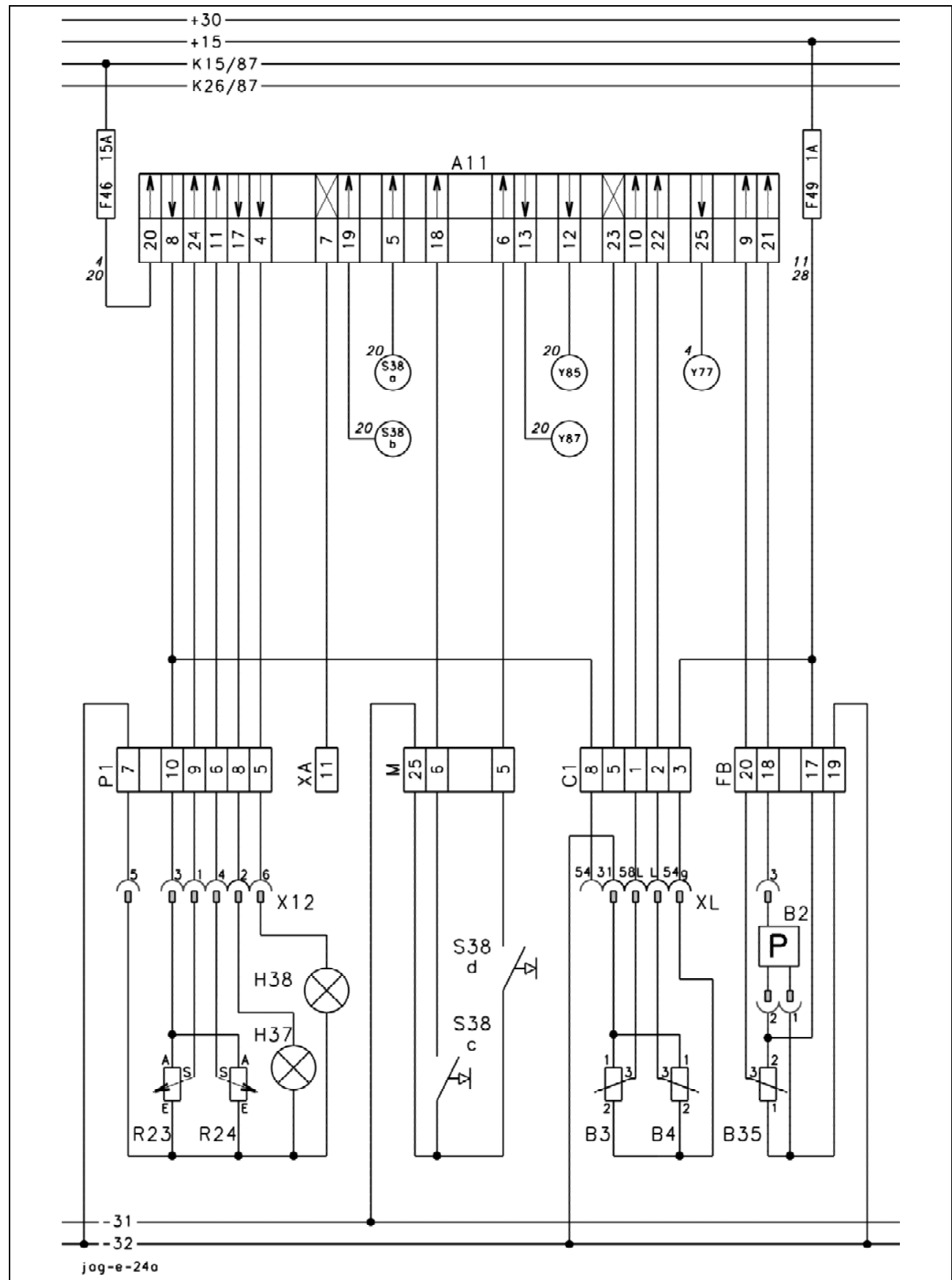
From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
H3-7	XM-18	K15-85	K17-85	FA-7		1.5	br
H3-11	K16-87	A11-12	DO-12	DS-5		1.5	gn
H3-12	K14-87	A11-13		DS-6		1.5	gn-wh

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
M-1	A11-19	H1-1				0.14	wh
M-2	K14-85					0.14	pi
M-3	A11-5	H2-5				0.14	vio
M-4	K16-85					0.14	gr
M-25	K2-85	H1-2	MG-4	FD-11		0.14	blk

24a

CONTOUR System

24a - CONTOUR System



Designations:

- A11 CONTOUR module 3-d-10
- B2 Ground pressure oil pressure 5-c-10
- B3 CONTOUR / sensing band left 7-a-14
- B4 CONTOUR / sensing band right 7-a-8
- B35 Feed rake conveyor position 5-c-10
- H37 Cutting height control 3-c-10
- H38 Cutting height preselection 3-c-10
- R23 Cutting height control (setpoint) 3-c-10
- R24 Cutting height preselection (setpoint) 3-c-10
- S38 Multi-function switch front attachment 3-c-11
- XL CONTOUR sensing band (front right fender) 4-c-10
- X12 Isolating point CONTOUR potentiometer 3-c-10

Table of measured values:

Item	Component	Measured value	Remark
B2	Pressure sensor	0.25 - 4.75 V linear	0 - 250 bar linear
B3 B4	Sensor	12 V 0.25 V - 4.75 V	(Pin 1-2) (Pin 1-3)
R23 R24	Potentiometer	4.70 kΩ 1.7 - 6.4 kΩ	(Pin A - E) Coil (Pin S - E) Slider

Functional description:

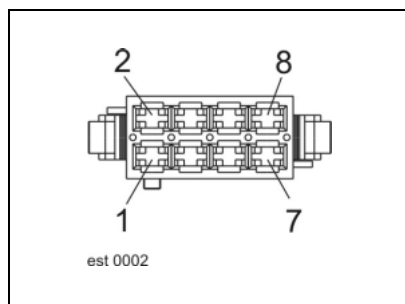
CONTOUR circuit

The pushbuttons (S38c/38d) activate the cutting height preselection or cutting height control functions in the CONTOUR module (A11). As a result, the necessary functions (Y85/Y87) are activated by the module (A11) until the setpoints (R23/R24) and the actual values (B3/B4/B35) of the respective sensors are identical (see also circuit diagram 20).

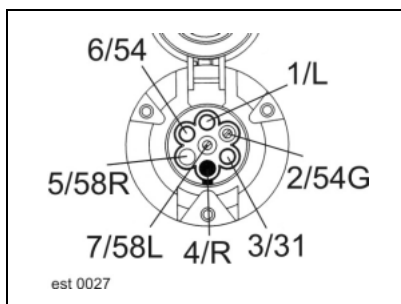
If building up pressure is necessary for the respective function, the circulation shut-off valve (Y77) is additionally energized by the CONTOUR module (A11) (see also circuit diagram 4).

Connector pin definition

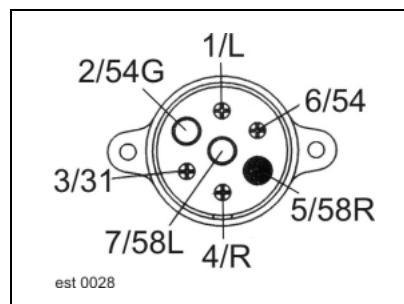
Connector C1



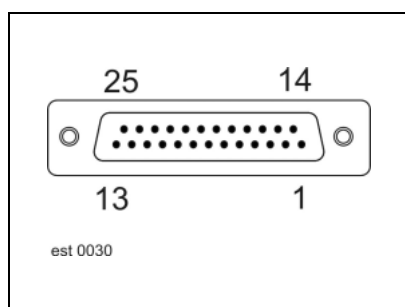
Plug XL



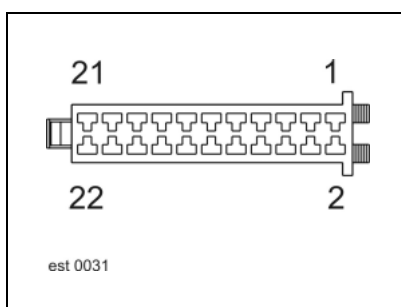
Connector XL



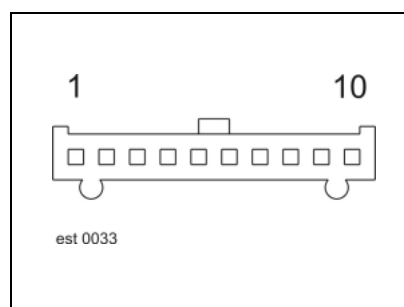
Connector M



Connector FB, P1, XA



Connector X12



Interconnection list

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
C1-1	A11-10					1	or-blk
C1-2	A11-22					1	or-ye
C1-3	F49-A	MK-19	FB-17	DS-51		1	rd-bl
C1-5	A11-23					-	-
C1-8	P1-10	A11-8	DS-48			1	rd-ye

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
FB-17	F49-A	MK-19	C1-3	DS-51		1	rd-bl
FB-18	A11-21					1	bl-vio
FB-19	A10-28	P1-7	KC-4			1	br-bl
FB-20	A11-9					-	-

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
M-5	A11-6					0.14	bl
M-6	A11-18					0.14	gn
M-25	K2-85	H1-2	MG-4	FD-11		0.14	blk

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
P1-5	A11-4					0.5	gr-rd
P1-6	A11-11					0.5	ye
P1-7	A11-28	FB-19	KC-4			1	br-gr
P1-8	A11-17					0.5	wh-gn
P1-9	A11-24					0.5	wh-gn
P1-10	A11-8	C1-8	DS-48			0.5	rd

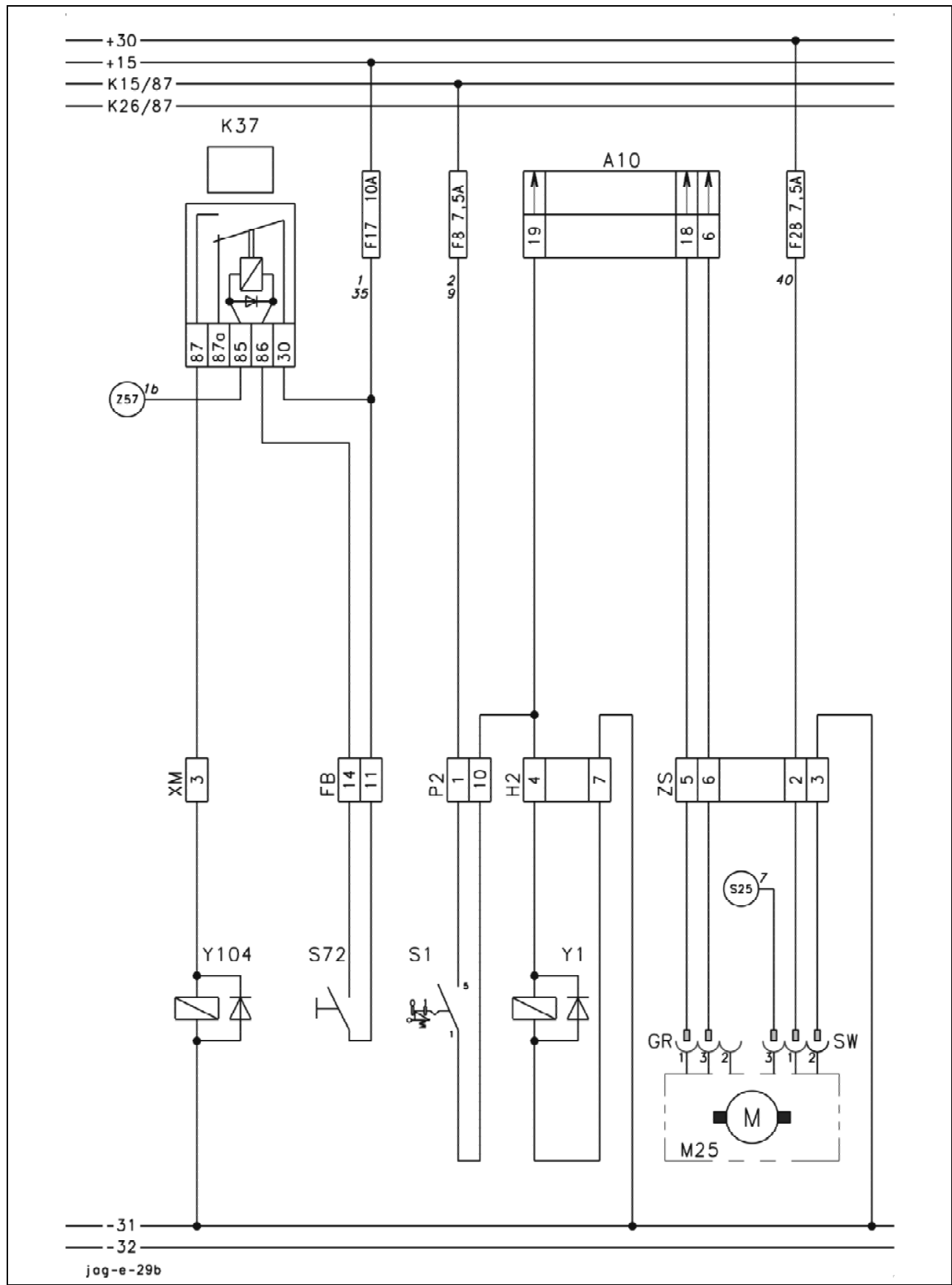
From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
XA-11	A11-7					-	-

29b

**All-wheel drive,
Central lubrication system**

Servo gearshift for Jaguar SPEEDSTAR

29b - All-wheel drive, Central lubrication system, Servo gearshift for Jaguar SPEEDSTAR



Designations:

- A10 Fieldwork computer module (CAB) 3-d-10
- M25 Central lubrication system 3-e-10
- K37 Servo gearshift 3-c-10
- S1 4-Trac (All-wheel) 3-c-10
- S72 Servo gearshift 3-c-10
- Y1 4-Trac (All-wheel) 4-e-10
- Y104 Servo gearshift 4-j-11
- Z57 Starting lock for ground speed control lever 3-d-10

SPEEDSTAR machine:

As far as this circuit is concerned, the Jaguar standard version is different from the SPEEDSTAR because of the following components:

K37 Servo gearshift
S72 Servo gearshift
Y104 Servo gearshift

and the link Z57 in circuit diagram 1b (see Functional description of servo gearshift).

Table of measured values:

Item	Component	Measured value	Remark
K37	Remote control relay 10 A 20 A	75 - 125 Ω	(Pin 86/1 – 85/2) (Pin 87a/4 – 30/3) (Pin 87/5 – 30/3)
M25	Engine lubrication system	6.5 A	I max.
Y1	Solenoid coil	0.75 A / 16 Ω	
Y 104	Solenoid coil	0.7 A 17 Ω	

Functional description:**Terminal display**

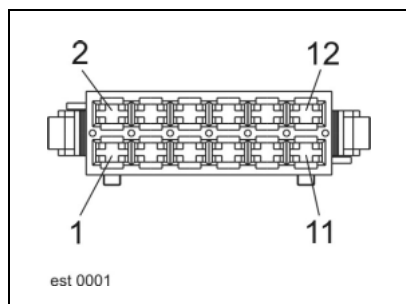
The fieldwork computer module (A10) displays the operating status or a functional disorder of the central lubrication system (M25) as well as the activated all-wheel drive (S1) in the terminal via the CAN-BUS.

Servo gearshift

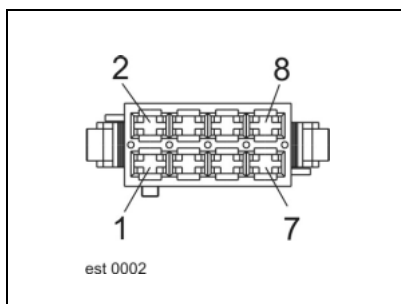
With the ground speed control lever Z57 in neutral position, earth is connected to relay K37, pin 85. Upon actuating the servo gearshift switch S72 on the gearshift lever, relay K37 connects power to solenoid Y104. The shifter rail in the gearbox is unlocked and engaging a gear is possible (for Functional description see "Hydraulic system").

Connector pin definition

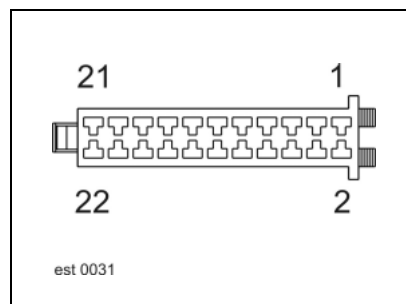
Connector FB, H2



Connector ZS



Connector P2, XM

**Interconnection list**

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
FB-11	F17-A/FB-9	K9-30	K9-86	K36-30	K37-30	1	bl-wh
FB-14	K37-86					1	blk

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
H2-4	P2-10	A10-19	DS-34			1	or-wh
H2-7	C-1	ZS-3	K21-85	K22-85		1.5	br

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
P2-1	F8-A	K34-30	K6-30	XA-22		1.5	blk
P2-10	H2-4	A10-19	DS-34			1	or-wh

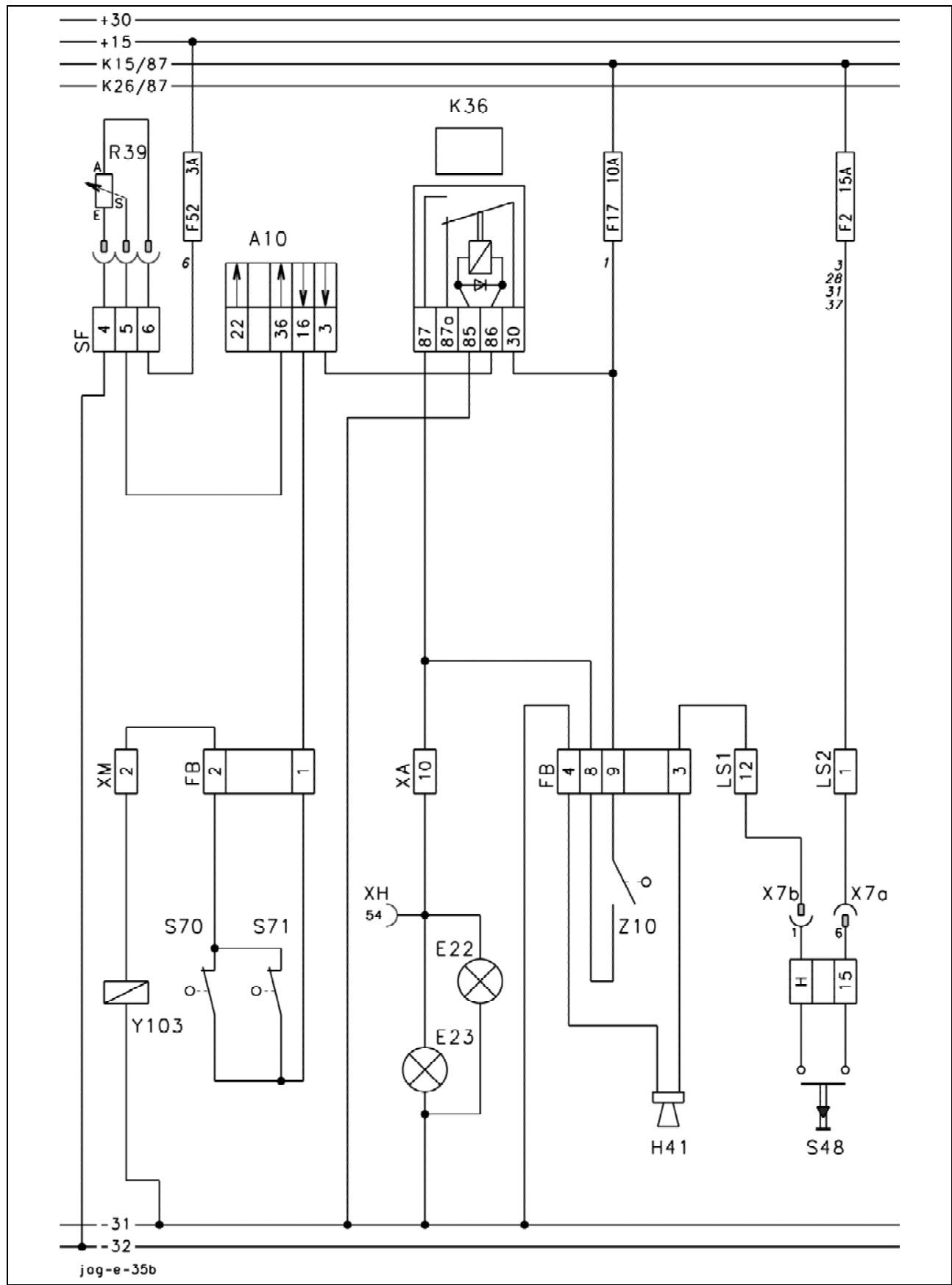
From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
ZS-2	F28-A	TEST-E				1.5	rd
ZS-3	C-1	H2-7	K21-85	K22 85		2.5	br
ZS-5	A10-18					1	vio-or
ZS-6	A10-6					1	gn-br

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
XM-3	K37-87					1	blk-br

35b

**Signal horn,
Brake light,
Ground drive brake valve**

35b - Signal horn, Brake light, Ground drive brake valve



Designations:

- A10 Fieldwork computer module (CAB) 3-d-10
- B16 Gearbox speed (ground speed) 5-d-11
- E22 Brake light left 6-j-13
- E23 Brake light right 6-j-9
- H41 Signal horn 4-c-12
- K36 Ground drive brake valve 3-d-10
- R39 Position of ground speed control lever 3-d-11
- S48 Signal horn 3-c-11
- S70 Brake pedal left 3-c-11
- S71 Brake pedal right 3-c-11
- XH Trailer light 6-j-11
- X7 Isolating point of control stalk 3-c-11
- Y103 Ground drive brake valve 4-j-11
- Z10 Brake light 4-c-11

SPEEDSTAR machine:

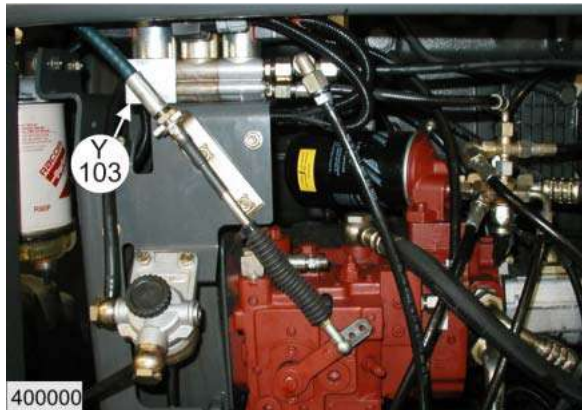
As far as this circuit is concerned, the Jaguar standard version is different from the SPEEDSTAR because of the following components:

- A10 Fieldwork computer module (CAB)
- K36 Ground drive brake valve
- R39 Position of ground speed control lever
- S70 Brake pedal left
- S71 Brake pedal right
- Y103 Ground drive brake valve

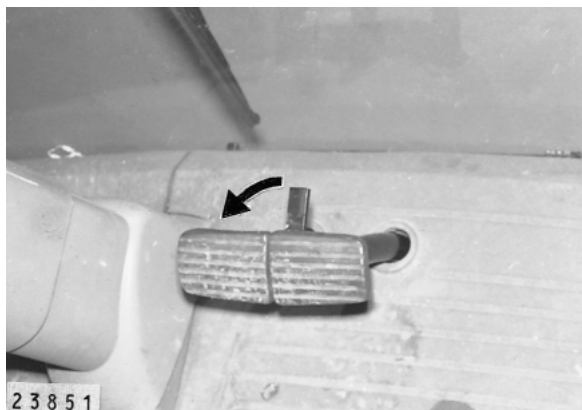
(see Functional description)

Table of measured values:

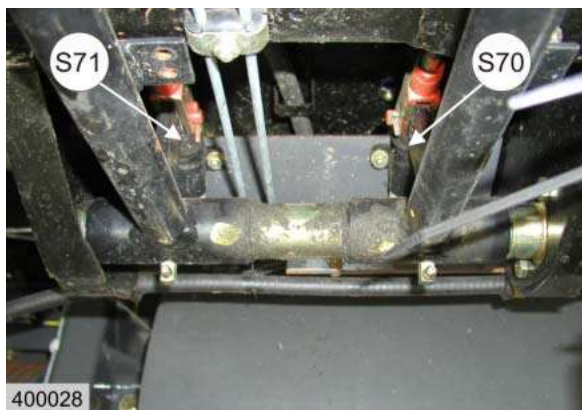
Item	Component	Measured value	Remark
B16	Sensor	1000 - 1200 Ω	inductive
K36	Remote control relay	75 - 125 Ω	(Pin 86/1 - 85/2) (Pin 87/5 - 30/3)
R39	Potentiometer	4.0 k Ω 1.7 - 5.7 k Ω	(Pin A - E) Coil (Pin S - E) Slider
Y103	Solenoid coil	1.9 A 6.3 Ω	

Functional description:**Speed limitation**

Using the gearbox speed sensor B16, the ground speed is determined in the fieldwork computer module (CAB). If this speed is above 40.5 km/h, solenoid Y103 (Ground drive brake valve) is supplied with a correspondingly lower voltage (PWM) in proportion to the increase of ground speed. The ground speed is reduced (for Functional description see "Hydraulic system").

**Caution:**

When travelling on public roads, the brake pedals **must** be coupled to each other in order to achieve equal braking effect on both drive wheels.

**Brakes**

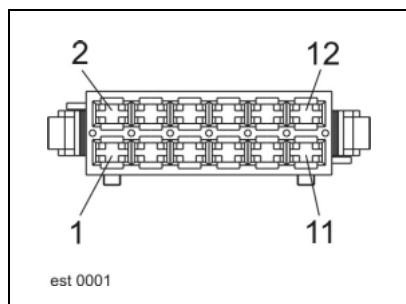
The brake pedal left (S70) and brake pedal right (S71) switches are shown in their built-in condition. During road travel, both switches are opened simultaneously upon actuating the coupled brake pedal.

The corresponding circuit is interrupted. The ground speed is reduced by means of solenoid "Ground drive brake valve" Y103 (for Functional description see "Hydraulic system").

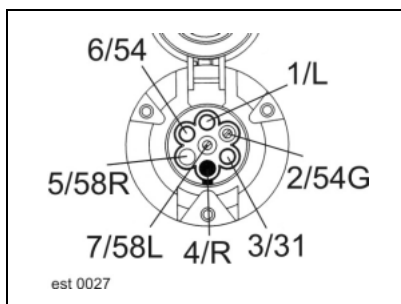
The ground speed control lever position potentiometer R39 transmits the position of the ground speed control lever to the fieldwork computer module A10. When the ground speed is considerably reduced, the fieldwork computer module A10 supplies the Ground drive brake valve relay K36 with power for a short time via pin 3. The relay is energized and the brake light is activated for a few seconds.

Connector pin definition

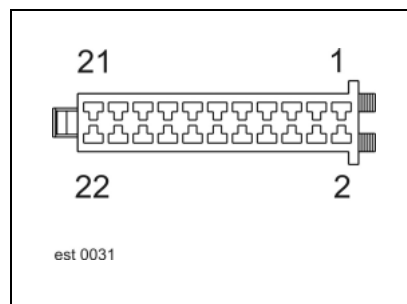
Connector LS1, LS2



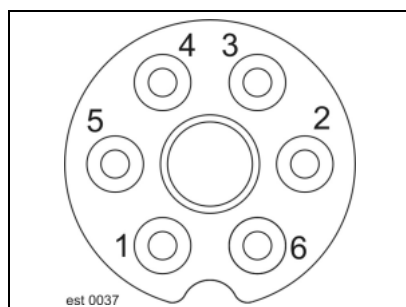
Plug XH



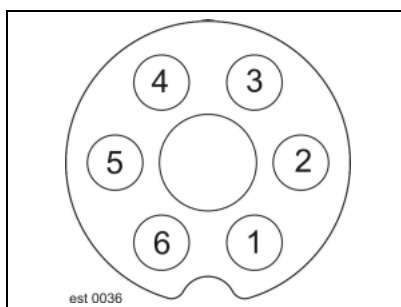
Connector FB, XA, XM



Connector X7a



Connector X7b

**Interconnection list**

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
FB-1	A10-16					1.5	blk-bl
FB-2	XM-2					1.5	vi-blk
FB-3	LS1-12					1.5	blk-ye
FB-4	H2-8	K7-31	K18-85	FD-7		1.5	br
FB-8	XA-10					1.5	blk-rd
FB-9	F17-A	K9-30	K9-86	K36-30	K37-30	1.5	blk

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
LS1-12	FB-3					1.5	blk-gr

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
LS2-1	F2-A	LS2-4				1.5	blk

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
SF-4	32						
SF-5	A10-36						
SF-6	A10-14	F52-A	DS-1				

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
XA-10	FB-8	K36-87				1.5	blk-rd

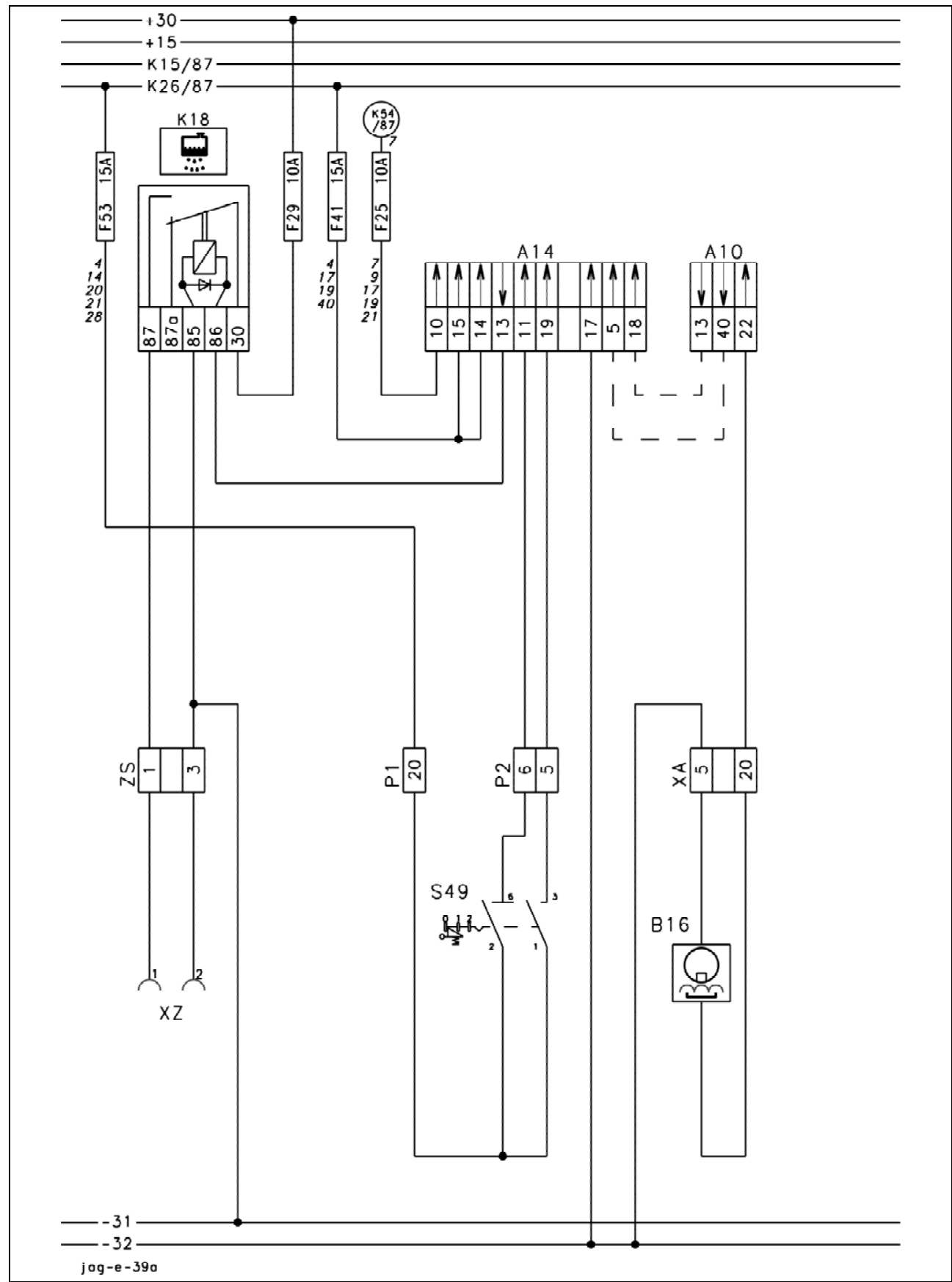
From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
XM-2	FB-2					1.5	vi-blk

39a

Silaging agent system

from machine serial no. 492-0133

39a - Silaging agent system from machine serial no. 492-0133



Designations:

- A10 Fieldwork computer module (CAB) 3-d-10
- A14 Intake controller module 3-d-10
- B16 Gearbox speed (ground speed) 5-d-11
- K18 Silaging agent additive 3-c-10
- S49 Silaging agent additive 3-c-10
- XZ Isolating point of silaging agent system 3-e-10

Table of measured values:

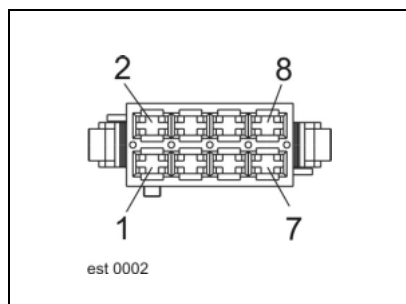
Item	Component	Measured value	Remark
K18	Remote control relay 40 A 60 A	90 - 120 Ω	(Pin 86/1 – 85/2) (Pin 87a/4 – 30/3) (Pin 87/5 – 30/3)
B16	Sensor	1000 - 1200 Ω	inductive

Functional description:

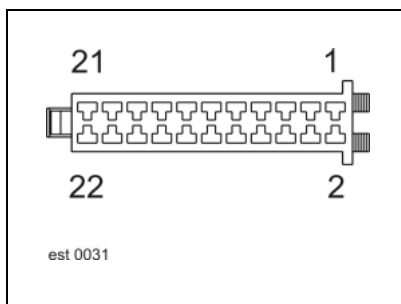
Silaging agent system	The intake controller module (A14) receives the information about the activated main drive (K54/87) via the CAN BUS from the fieldwork computer module (A10). Via the main switch (S49), the intake controller module (A14) now activates the silaging agent system (K18), provided the front attachment drive (S55) is actuated and the machine travels forward (B16). In addition to this, the CAN BUS signal from the CONTOUR module (A11) must be sent that the front attachment is in working position.
Flushing function	The flushing function is activated by the second step of main switch (S49) for approx. 10 minutes. The flushing function is terminated at any rate when the main switch (S49) is shut off.
Ground speed display	The ground speed of the machine (B16) is displayed via the fieldwork computer module (A10) via the CAN BUS on the terminal (A30).

Connector pin definition

Connector ZS



Connector P1, P2, XA

**Interconnection list**

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
P1-20	K17-30	K14-30	K16-30	A9-20		1.5	blk

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
P2-5	A14-19					0.75	vio-gn
P2-6	A14-11					0.75	vio-bl

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
XA-5	C1-4	DS-60	DS-61	FD-2		1.5	br-bl
XA-20	A10-22					0.75	rd-blk

From	to 1	to 2	to 3	to 4	to 5	mm ²	Colour
ZS 1	K18-87					1.5	rd-wh
ZS 3	C-1	H2-7	K21-85	K22-85		2.5	br

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