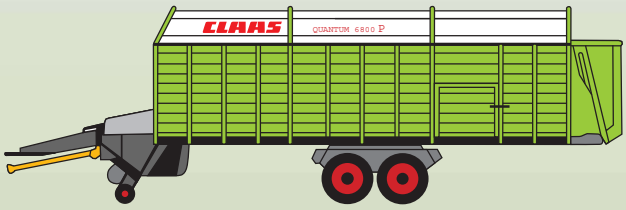
CLAAS



QUANTUM 3500 - 6800

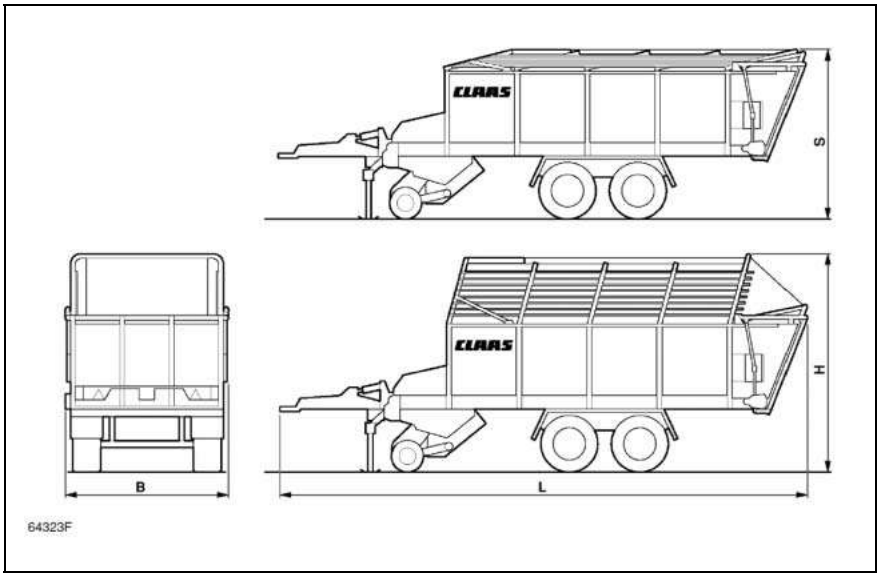
Technical Systems

SERVICE & PARTS

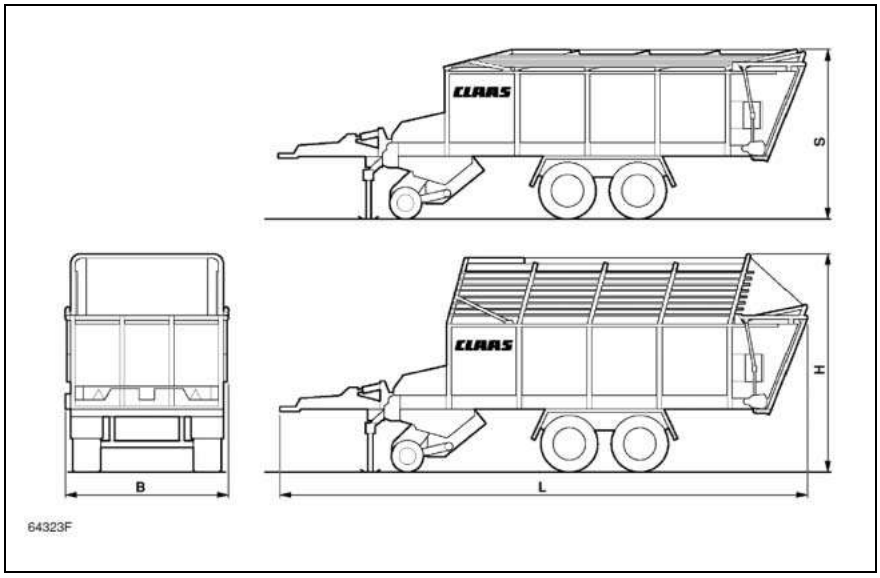
Chapters

1.0 QUANTUM 2500 K, 2500 P, 3500 K, 3500 P, 3800 K, 3800 P

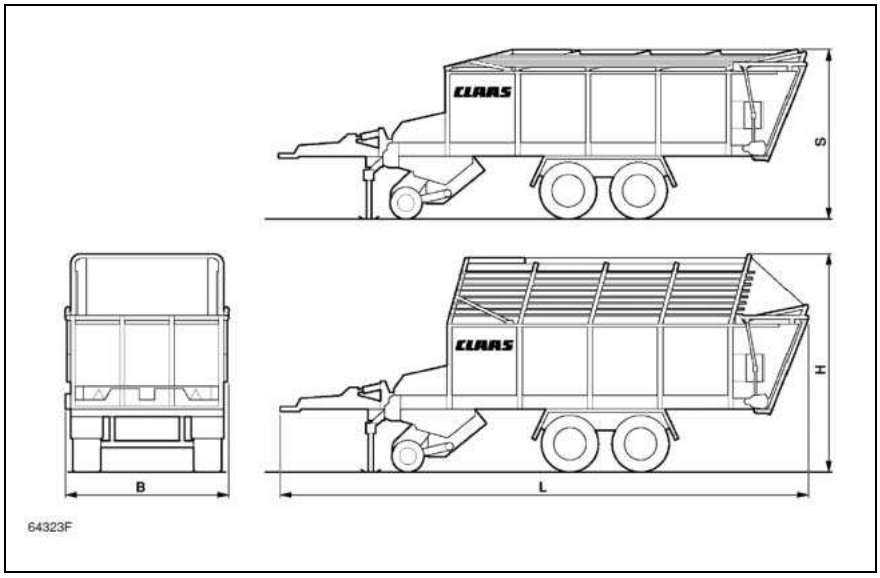
1.1 QUANTUM 3500 K, 3500 P, 3500 S, 3800 K, 3800 P, 2500 K, 2500 P



		QUANTUM 3500 K	QUANTUM 3500 P	QUANTUM 3500 S
Length (L)	mm	8,100	8,100	8,200
Width (B)	mm	2,550	2,550	2,550
Height (H) – dry forage assembly folded up	mm	3,410	3,600	3,600
Height (S) – dry forage assembly folded down	mm	2,600	3,050	3,050
Track width	mm	1,850	1,850	1,850
Pick-up width	mm	1,800	1,800	1,800
Platform height	mm	1,180	1,180	1,180
Loading capacity (acc. to DIN 11741)	m^3	26.6	28	25.6
Kerb weight	kg	5,160	5,200	5,860
Permissible total weight (Rückmatic / compressed air)		8,000/11,000	8,000/11,000	8,000/11,000
Number of cutting knives		33	33	33
Shortest theoretical length of cut	mm	45	45	45
Number of pick-up tines per tine bar		26	26	26
Tine spacing	mm	61	61	61
PTO speed	min^{-1}	1,000	1,000	1,000
Tyres - Rückmatic up to 40 km/h or - compressed air up to 40 km/h - compressed air up to 60 km/h		19.0/45-17 500/50-17 10 PR 555/45-17 10 PR 500/50-17 10 PR	19.0/45-17 500/50-17 10 PR 500/50-17 10 PR 500/50-17 10 PR	19.0/45-17 500/50-17 10 PR 555/45-17 10 PR 555/45-17 10 PR
Tyre pressure - with tyres 500/50-17 555/45-17 19.0/45-17	bar bar bar	3.5 3.0 3.0	3.5 3.0 3.0	3.5 3.0 3.0
Tightening torque of wheel nuts - wagon wheels	Nm	300	300	300
Sound pressure level	dB(A)	70	70	70

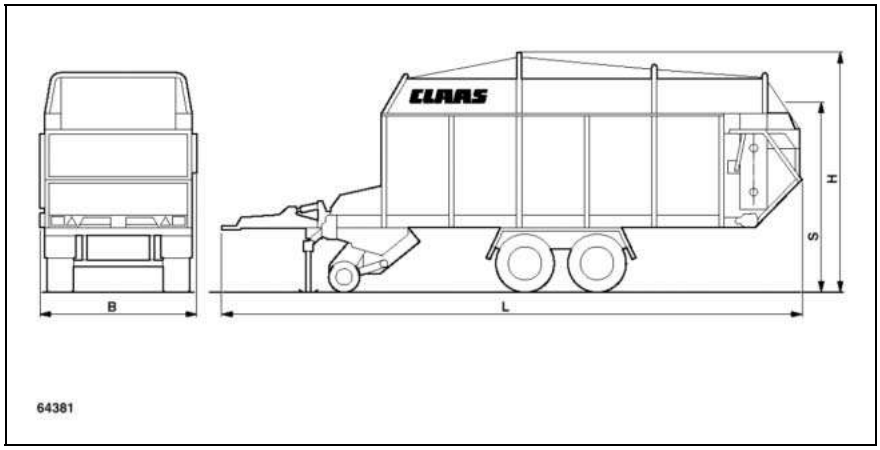


		QUANTUM 2500 K	QUANTUM 2500 P
Length (L)	mm	8,100	8,100
Width (B)	mm	2,550	2,550
Height (H) – dry forage assembly folded up	mm	3,410	3,600
Height (S) – dry forage assembly folded down	mm	2,600	3,050
Track width	mm	1,850	1,850
Pick-up width	mm	1,800	1,800
Platform height	mm	1,180	1,180
Loading capacity (acc. to DIN 11741)	m^3	26.6	28
Kerb weight	kg	4,500	4,750
Permissible total weight (Rückmatic / compressed air)		8,000/11,000	8,000/11,000
Number of cutting knives		33	33
Shortest theoretical length of cut	mm	40	40
Number of pick-up tines per tine bar			26
Tine spacing	mm	61	61
PTO speed	min^{-1}	540	540
Tyres - Rückmatic up to 40 km/h		15.0/55-17	15.0/55-17
		19.0/45-17	19.0/45-17
or		500/50-17 10 PR	500/50-17 10 PR
- compressed air up to 40 km/h		500/50-17 10 PR	500/50-17 10 PR
- compressed air up to 60 km/h		555/45-17 10 PR	555/45-17 10 PR
Tyre pressure - with tyres 500/50-17	bar	3.5	3.5
555/45-17	bar	3.0	3.0
9.0/45-17	bar	3.0	3.0
15.0/55-17	bar	3.5	3.5
Tightening torque of wheel nuts - wagon wheels M18x1.5	Nm	270	270
M20x1.5	Nm	380	380
Sound pressure level	dB(A)	70	70

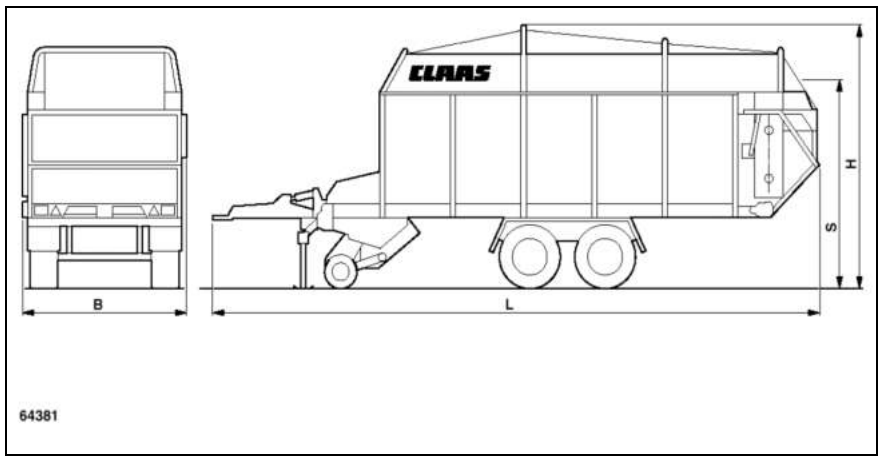


		QUANTUM 3800 K	QUANTUM 3800 P
Length (L)	mm	9,250	9,250
Width (B)	mm	2,550	2,550
Height (H) – dry forage assembly folded up	mm	3,410	3,600
Height (S) – dry forage assembly folded down	mm	2,600	3,050
Track width	mm	1,850	1,850
Pick-up width	mm	1,800	1,800
Platform height	mm	1,180	1,180
Loading capacity (acc. to DIN 11741)	m^3	31.8	33.2
Kerb weight	kg	5,550	5,650
Permissible total weight (compressed air)		11,000	11,000
Number of cutting knives		33	33
Shortest theoretical length of cut	mm	45	45
Number of pick-up tines per tine bar		26	26
Tine spacing	mm	61	61
PTO speed	min^{-1}	1.000	1.000
Tyres - compressed air up to 40 km/h - compressed air up to 60 km/h		 500/50-17 10 PR 555/45-17 10 PR	 500/50-17 10 PR 555/45-17 10 PR
Tyre pressure - with tyres 500/50-17 555/45-17 19.0/45-17	bar bar bar	3.5 3.0 3.0	3.5 3.0 3.0
Tightening torque of wheel nuts - wagon wheels M18x1.5 M20x1.5	Nm	 270 300	 270 300
Sound pressure level	dB(A)	70	70

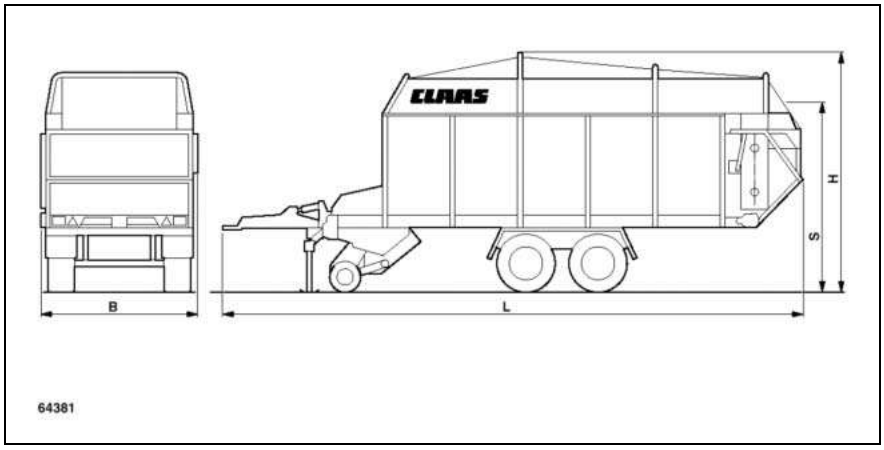
1.2 QUANTUM 5500 S-18, 5500 S-16, 5500 S, 4500 S, 6800 S



		QUANTUM 5500 S-18	QUANTUM 5500 S-16	QUANTUM 6800 S
Length (L)	mm	9,250	9,250	10,500
Width (B)	mm			
- Standard		2,550	2,550	2,550
- with tyres 700/45-22.5		2,720	-	2,720
- with tyres 600/55-R26.5		-	-	2,550
- with tyres 700/50-R26.5		-	-	2,750
- with tyres 800/40-R26.5		-	-	2,930
Height (H) - dry forage assembly folded up	mm	3,990	3,930	3,990
- with tyres 800/40-R26.5	mm	-	-	4,000
Height (S) - dry forage assembly folded up	mm	3,290	3,230	3,290
- with tyres 800/40-R26.5	mm	-	-	3,300
Track width - with tyres 22.5	mm	1,950	1,950	1,950
- with tyres 26.5	mm	-	-	2,000
Pick-up width	mm	1,800	1,800	1,800
Platform area	mm	2,160 x 5,700	2,160 x 5,700	2,160 x 5,700
Loading capacity (acc. to DIN 11741)	m^3	31	31	38
Kerb weight				
with tyres 800/40-R26.5	kg	8,340	7,600	8,810
incl. forced steering	kg	-	-	9,350
Permissible total weight		18,000	16,000	20,000
Number of cutting knives		33	33	33
Shortest theoretical length of cut	mm	45	45	45
Number of pick-up tines per tine bar		26	26	26
Tine spacing	mm	61	61	61
PTO speed	min^{-1}	1,000	1,000	1,000

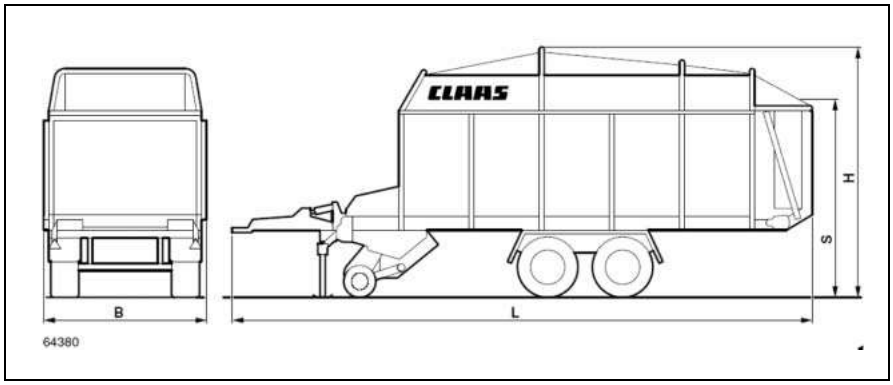


		QUANTUM 5500 S-18	QUANTUM 5500 S-16	QUANTUM 6800 S
Tyres:				
- up to 40 km/h without AGS		700/45-22.5 12PR	555/45-17 154F	700/45-22.5 12PR
		-	-	700/50-R26.5
		-	-	800/40-R26.5
- up to 50 km/h without AGS		600/55-22.5 12PR	550/45-R22.5	-
- up to 60 km/h without AGS		650/50-R22.5 12PR	555/45-17 154F	650/50-R22.5 12PR
		-	-	600/55-R26.5
- up to 60 km/h air suspension		-	500/55-20 12PR	-
- Pick-up wheels		16x6.5-8 4PR	16x6.5-8 4PR	16x6.5-8 4PR
Tyre pressure	bar			
- with tyres: 555/45-17		-	3.0	-
500/55-20		-	4.5	-
600/55-22.5		3.0	-	3.0
550/45-R22.5		-	3.0	-
650/50-R22.5		3.0	-	3.0
700/45-22.5		1.5	-	1.5
600/55-R26.5		-	-	3.0
700/50-R26.5		-	-	1.5
800/40-R26.5		-	-	1.5
Pick-up wheels		2.5	2.5	2.5
Tightening torque of wheel nuts	Nm			
M18 x x1.5		-	270	-
M20 x 1.5		380	-	-
M22 x x1.5		510	-	510
Sound pressure level	dB(A)	70	70	70

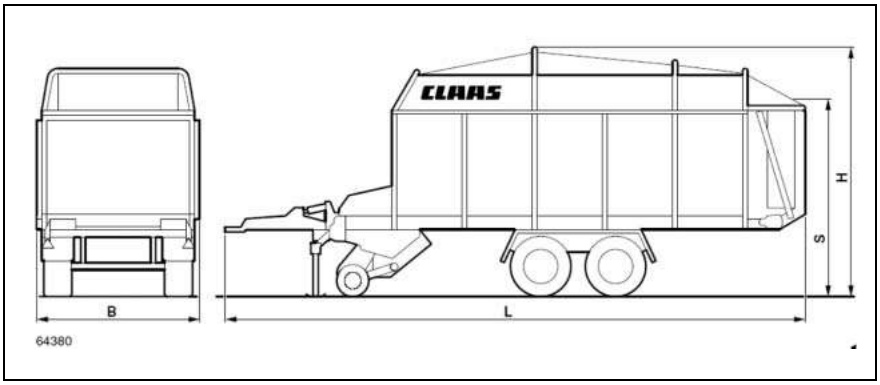


		QUANTUM 5500 S	QUANTUM 4500 S
Length (L)	mm	9,250	8,160
Width (B)	mm	2,550	2,550
Height (H) – dry forage assembly folded up – dry forage assembly folded down	 mm mm	 3,840 3,040	 3,840 3,040
Track width	mm	1,850	1,850
Pick-up width	mm	1,800	1,800
Platform height	mm	1,240	1,240
Platform area	mm	2,160 x 5,700	2,160 x 4,700
Loading capacity (acc. to DIN 11741)	m^3	31	26,3
Kerb weight	kg	6,920	6,500
Permissible total weight		13,000	11,000
Number of cutting knives		33	33
Shortest theoretical length of cut	mm	45	45
Number of pick-up tines per tine bar		26	26
Tine spacing	mm	61	61
PTO speed	min^{-1}	1,000	1,000
Tyres - up to 40 km/h without AGS - up to 60 km/h without AGS - up to 80 km/h with AGS - up to 60 km/h air suspension - Pick-up wheels		555/45-17 146F 555/45-17 146F 555/45-17 146F 555/45-17 146F 16x6.5-8 4PR	500/50-17 10PR 555/45-17 146F 555/45-17 146F - 16x6.5-8 4PR
Tyre pressure - with tyres 500/50-17 555/45-17 500/55-20 16x6.5-8	bar bar bar	- 3.0 - 2.5	3.5 3.0 - 2.5
Tightening torque of wheel nuts – wagon wheels	Nm	300	300
Sound pressure level	dB(A)	70	70

1.3 QUANTUM 6800 P, 6500 P, 5500 P-18, 5500 GT, 5500 P, 4500 P

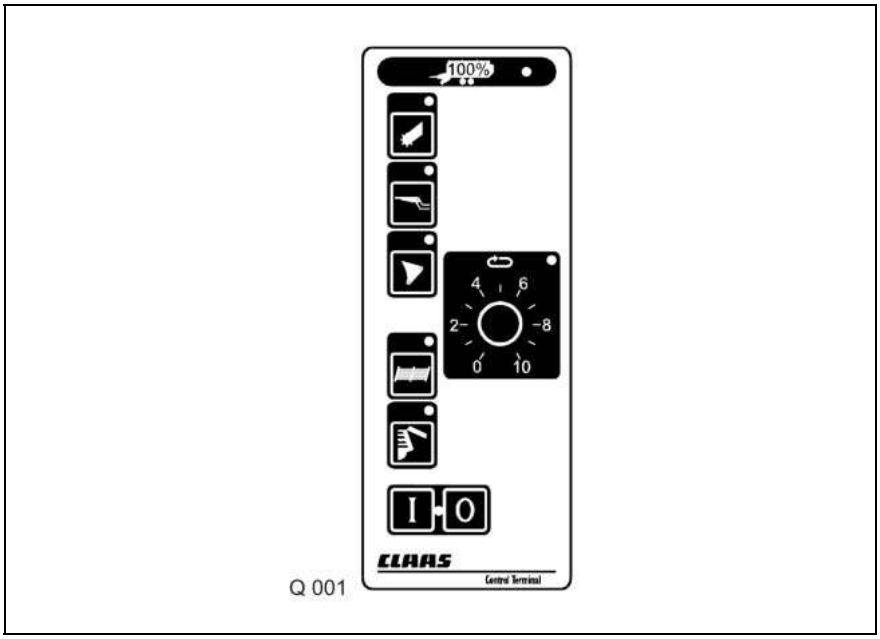


		QUANTUM 6800 P	QUANTUM 6500 P	QUANTUM 5500 P-18
Length (L)	mm	10,180	10,019	9,250
Width (B)	mm	2,550	2,550	2,550
Height (H) – dry forage assembly folded up	mm	3,990	3,950	3,990
Height (S) – dry forage assembly folded down	mm	3,290	3,190	3,290
Track width	mm	1,950	1,950	1,950
Pick-up width	mm	1,800	1,800	1,800
Platform height	mm	1,240	1,240	1,490
Platform area	mm	2,160 x 7,600	2,160 x 7,550	2,160 x 6,550
Loading capacity (acc. to DIN 11741)	m^3	40	45.7	34
Kerb weight	kg	8,030	7,440	7,240
Permissible total weight	kg	20,000	16,000	18,000
Number of cutting knives		33	33	33
Shortest theoretical length of cut	mm	45	45	45
Number of pick-up tines per tine bar		26	26	26
Tine spacing	mm	61	61	61
PTO speed	min^{-1}	1,000	1,000	1,000
Tyres - up to 40 km/h without AGS		700/45-22.5 12PR	2x 500/50-17 14PR	-
		700/50-R26.5	4x 8.25 R70 14PR	-
- up to 50 km/h without AGS		-	-	600/55-22.5 12PR
- up to 60 km/h without AGS		650/50-22.5 12PR	-	650/55-22.5 12PR
- up to 80 km/h with AGS		-	-	-
- up to 60 km/h air suspension		-	-	-
- Pick-up wheels		16x6.5-8 4PR	16x6.5-8 4PR	16x6.5-8 4PR
Tyre pressure - with tyres				
555/45-17	bar	-	4.5	-
500/55-20		-	4.5	-
600/55-22.5		3.0	-	3.0
650/50-R22.5		3.0		3.0
700/45-22.5		1.5		1.5
600/55-R26.5		3.0	-	-
700/50-R26.5		1.5	-	-
800/40-R26.5		1.5	-	-
Pick-up wheels		2.5	2.5	2.5
Tightening torque of wheel nuts	Nm	300	300	300
Sound pressure level	dB(A)	70	70	70



		QUANTUM 5500 GT	QUANTUM 5500 P	QUANTUM 4500 P
Length (L)	mm	8,860	8,860	7,770
Width (B)	mm	2,550	2,550	2,550
Height (H) – dry forage assembly folded up	mm	3,800	3,800	3,800
Height (S) – dry forage assembly folded down	mm	3,040	3,040	3,040
Track width	mm	1,900	1,850	1,850
Pick-up width	mm	1,800	1,800	1,800
Platform height	mm	1,240	1,240	1,240
Platform area	mm	2,160 x 6,500	2,160 x 6,550	2,160 x 5,400
Loading capacity (acc. to DIN 11741)	m^3	34	34	29.3
Kerb weight	kg	6,550	6,200	5,740
Permissible total weight	kg	16,000	13,000	11,000
Number of cutting knives		33	33	33
Shortest theoretical length of cut	mm	45	45	45
Number of pick-up tines per tine bar		26	26	26
Tine spacing	mm	61	61	61
PTO speed	min^{-1}	1,000	1,000	1,000
Tyres - up to 40 km/h without AGS		555/45-17 154F	555/45-17 146F	500/50-17 10PR
- up to 50 km/h without AGS		550/45-R22.5	-	-
- up to 60 km/h without AGS		555/45-17 145F	555/45-17 146F	555/45-17 146F
- up to 60 km/h air suspension		500/55-20 12PR		-
- Pick-up wheels		16x6.5-8 4PR	16x6.5-8 4PR	16x6.5-8 4PR
Tyre pressure				
- with tyres 500/50-17	bar	-	-	3.5
550/45-R22.5		-	-	3.0
555/45-17		4.5	3.0	3.0
500/55-20		3.5	3.0	-
550/45-17 154F		3.0	-	-
Pick-up wheels		2.5	2.5	2.5
Tightening torque of wheel nuts	Nm			
M18 x 1.5		270	270	270
M20 x 1.5		380	380	380
Sound pressure level	dB(A)	70	70	70

1.0 QUANTUM 2500 K, 2500 P, 3500 K, 3800 K, 3800 P, 3500 S



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Caution! When draining oil over a more extended period than usual (tractor – forage wagon – floor conveyor), the pump system of the tractor must be known (see “Prior to operation – Hydraulic system”).

The buttons on the control box are only used to pre-select the different functions of the forage wagon. Operating the single-acting control valve on the tractor will activate the desired function.

Between the different operations, the single-acting control valve of the tractor must be switched back to the neutral position.
Only then a new function can be pre-selected on the control box.

The floor conveyor is controlled using the double-acting control valve on the tractor.
On the S-wagon, the floor conveyor speed can be varied using the rotary knob. This knob has no function on the K and P wagons!

1.1 Control box short instructions

Control system ON

Control system OFF

Loading operation

Pick-up up/down

Dry crop top up/down
(Quantum 3500 K only)

Wagon full indicator

Knife frame

Opens / closes the cutting trough

Opens the cutting trough totally

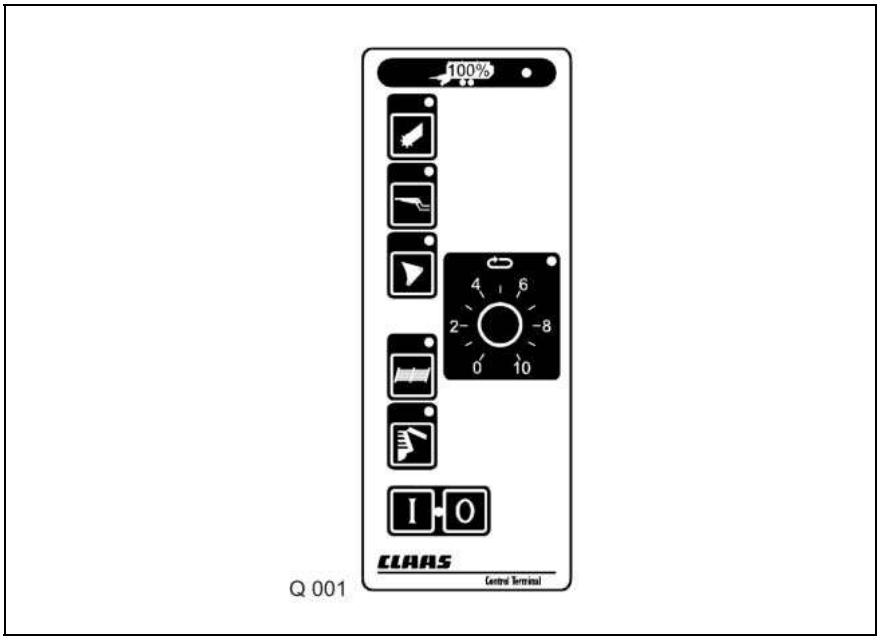
Unloading operation

Opens / closes the tailgate

Articulated drawbar

Drawbar up/down

1.2 Operation



Loading operation 

Use this key of the control box to switch on the control unit. The red indicator light lights up.

Pick-up lowered/raised 

Use this key to pre-select the pick-up mode. The pick-up can now be raised and lowered using the single-acting control valve. Switch on the pto for loading.

Attention The pick-up will only remain in floating position if the pick-up mode is pre-selected on the control box and the single-acting control valve is set to floating position.

Quantum 3500 K / 3800 K / 3500 P / 3800 P — To switch off the rotor and the pick-up the pto must be disengaged.

Quantum 3500 S — Raising the pick-up will automatically disengage the rotor and the pick-up.

Dry crop top (QUANTUM 2500 K, 3500 K only) 

Use this key to pre-select the dry crop top mode. To erect the dry crop top, pressurize the single-acting control valve. To lower it, set the system to the float position.

Floor conveyor

The floor conveyor is controlled using the double-acting control valve on the tractor. To set the floor conveyor to forwards or reverse, set the double-acting control valve to the raise or lower position.

Floor conveyor speed

QUANTUM 3500 S:
The floor conveyor speed can be varied using the rotary knob provided the pick-up or the tailgate has been pre-selected.

QUANTUM 3500 K / P, 2500 K / P, 3800 K / P:
If the tractor is fitted with a flow rate controller, this can be used to vary the floor conveyor speed.
The knob on the control unit has no function on the K and P wagons.

Opening the knife frame

If a blockage occurs in the conveyor channel (cut-out clutch of the universal drive shaft is activated), switch off the pto.

Use this key to select the cutting mechanism mode. Set the lever on the single-acting control valve to the float position in order to open the knife frame.

Engage the pto to clear the blockage. Once the channel is free, close the knife frame again by moving the lever on the single-acting control valve to the pressure setting.

If the knife frame has to be totally lowered (e.g. for repair work or for the replacement of knives), first set the single-acting valve to the float position and then press these two buttons simultaneously.

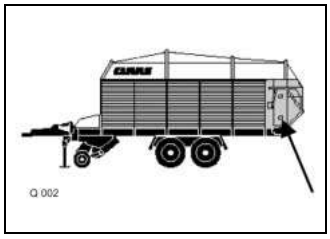
To close the knife frame, set the control unit to the pressure setting.

Attention

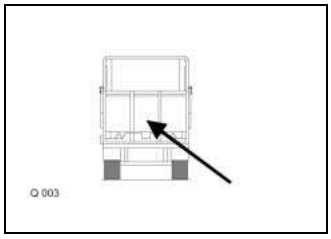
If the knife frame is totally open, it must be closed very carefully and slowly. When folding up the frame, ensure that the cutting knives will not collide with the rotor tines.

"Wagon full" indicator

The load space is filled when the "wagon full" indicator of the display flashes (see figure). Switch off the floor conveyor, raise the pick-up and switch off the universal drive shaft.



QUANTUM 3500 S



QUANTUM 3500 P / K
2500 P / K
3800 P / K

Unloading operation

Use this key of the control box to switch on the control unit. The indicator light lights up.

Silo operation

For silo operation raise the wagon at the front with the articulated drawbar. Use this key for pre-selecting the articulated drawbar and set the single-acting control valve to the pressure setting. When unloading is complete, lower the wagon again. Set the control unit to the float position.

Discharging the load
QUANTUM 3500 S

Attention If the swash plates are folded down, opening the tailgate is not allowed.

Open the tailgate before unloading. Use this key for pre-selecting the tailgate and set the single-acting control valve to the pressure setting.

Open the tailgate to enable activation of the shredder drums via the pto. Then initiate the floor conveyor using the double-acting control valve. The floor conveyor speed can be varied using the rotary knob. To close the tailgate, the set the single-acting control valve to the float position until the tailgate has closed completely.

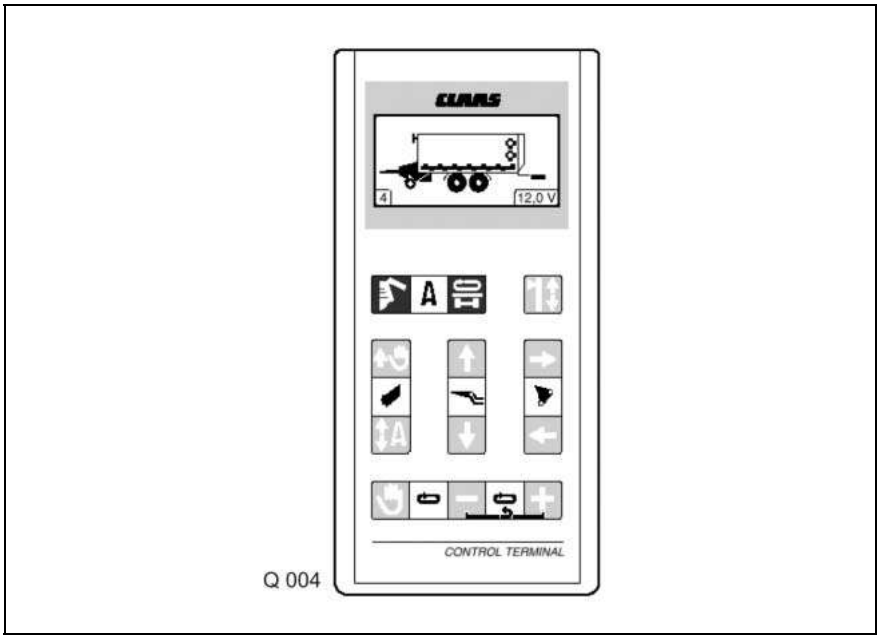
Discharging the load
QUANTUM
2500 K / P
3500 K / P
3800 K / P

Open the tailgate before unloading. Use this key for pre-selecting the tailgate and set the single-acting control valve to the pressure setting.

Initiate the floor conveyor using the double-acting control valve. To close the tailgate, the set the single-acting control valve to the float position until the lock has engaged.
To reverse the floor conveyor, move the lever of the double-acting control valve to the opposite direction. If the tractor is fitted with a flow rate controller, this can be used to vary the floor conveyor speed.

2.0 QUANTUM 4500 S / 5500 S / S-16 / S-18 / 6800 S

Control light (rear wheel) flashes when steering axle is locked (reverse travel)



Caution:

1. Electric System
   Connect the 2-pole plug with the tractor = on-board voltage to the distributor box.

2. To switch on the control box, the hydraulic system must be pressurized = (2 bar switch) on-board voltage from the distributor box to the control box.

The pump system of the tractor must be known (see chapter “Before operating the hydraulic system”).

12 V On-board voltage display (10.8 V min., 15.5 V max.)

4 Display of floor conveyor speed

3. Flashing wheel
   The axle’s straight position is blocked by means of the cross conveyor key and a 3/2 way valve = flashing wheel.

QUANTUM with a separate hydraulic connection (single-acting) do not have this equipment.

2.1 Control box short instructions

Pick-up up/down
The pick-up disengages when raised.

Setting filling mode/
automatic filling ON/OFF

Loading operation/ manual

Raise the pick-up.
The pick-up does not disengage when raised,
benefit: this is easier on the dog clutch.

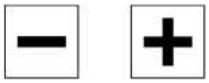
Pick-up down

Floor conveyor ON/
save floor conveyor speed

Floor conveyor speed

Speed down

Speed up
(Option S = quick unloading via 2-speed motor)

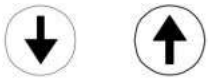


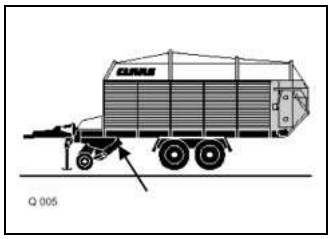
Reverse conveyor floor

Cutting mechanism

Open knife frame 1st position

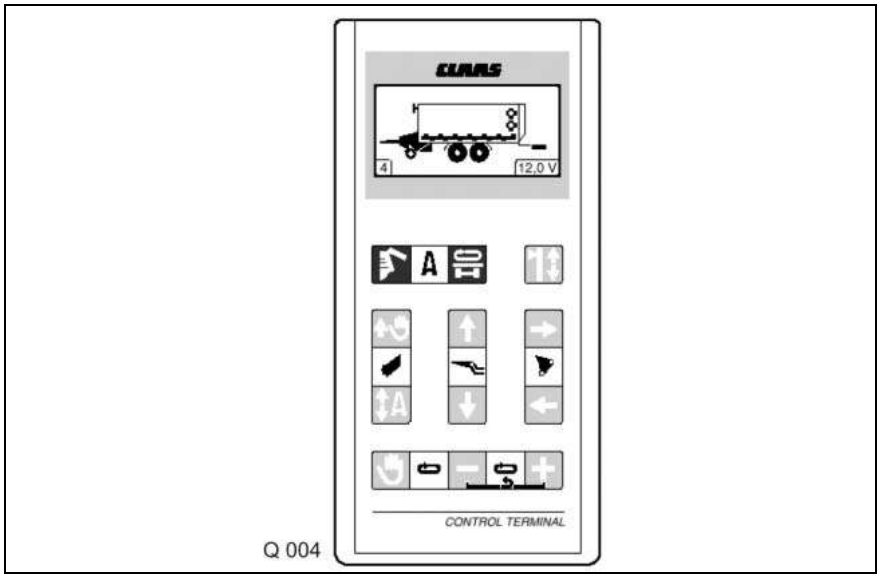
Close knife frame 1st position





Open knife frame 2nd position

Close knife frame 2nd position



Q 004

Unloading operation

Unloading operation start/stop

Turning direction of cross conveyor belt and locking/unlocking of steering axle.

Articulated drawbar

Articulated drawbar up

Articulated drawbar down

2.2 Operation

Loading operation

To switch on the control unit, set the hydraulic system to the pressure setting. The display shows the forage wagon. Switch on the pto shaft.

Pick-up up/down

This button is used for lowering the pick-up to the float position. The wagon is automatically loaded. Pressing this button again raises the pick-up and the loading process is stopped. With the pto switched on, the pick-up drive and the rotor are automatically switched off when raising the pick-up. They are restarted when lowering the pick-up.

Manually changing the pick-up working width

In difficult ground and crop conditions, the pick-up can be raised during loading by means of this button. The pick-up is no longer in the float position.

The pick-up is lowered again using this button.

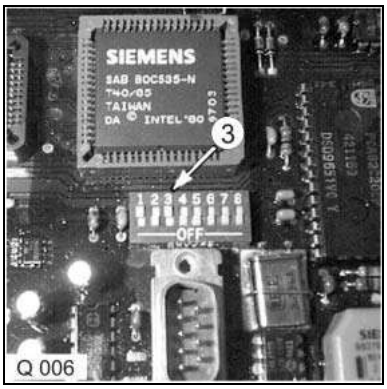
Adjusting the load space filling
(up to serial no.)

Attention:
From serial no. … there are no reed switches available for half-loading the front panel. However, the wiring loom remains unchanged = the plugs for the reed switches are available. The switching options include only “Full loading” and “Manual loading”.

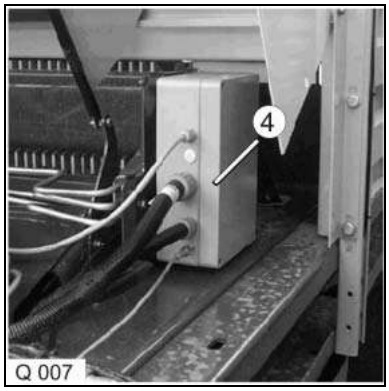
This button can be used to vary the loading mode.
Its functions depends on the position of micro switch (3) located in the front part of the control box (4).

Micro switch (3) in lower position (OFF / standard setting):

This button on the control box enables switching back and forth between full and half loading.

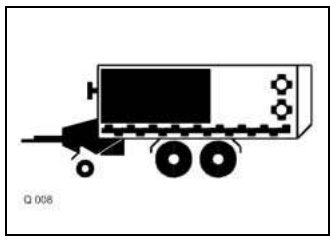


3 Micro switch
For micro switch position see chapter 13 “Electric System”.



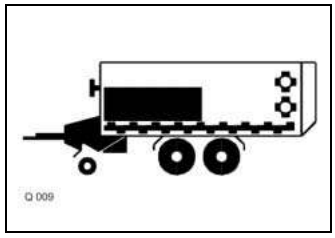
4 Control box

The black filling bar ceases to apply from serial no. and installation of EPROM 350 812-5.



Upper position
(e.g. for loading dry fodder): The floor conveyor is switched on when the cover plates are raised. All 3 plates are linked with one another.

The black filling bar ceases to apply from serial no. and installation of EPROM 350 812-5.



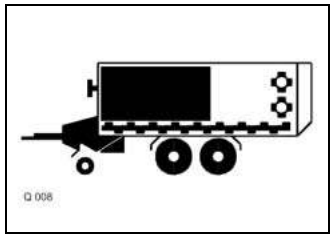
Lower position
(e.g. for loading green fodder and silage): The floor conveyor is switched on when the feelers at the front wall are lifted.

The floor conveyor will run until the feelers and/or the top plate are free again.

Micro switch (3) in top position:

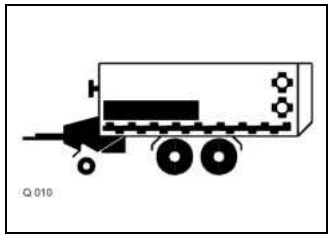
Using this button allows switching between fully loading the wagon and deactivating the automatic filling.

The black filling bar ceases to apply from serial no. and installation of EPROM 350 812-5.



Upper position
(e.g. for loading dry fodder): The floor conveyor is switched on when the centre top plate is raised.

The black filling bar ceases to apply from serial no. and installation of EPROM 350 812-5.



The filling indicator disappears:
The automatic filling mode is deactivated; the floor conveyor has to be operated manually.

To adjust the micro switch, switch off the control box and the oil supply from the tractor. Then open the distributor box located in the front part of the wagon and switch over using a small screwdriver. Close the box and connect the oil supply to the tractor.

Adjusting the load space filling
(from serial no.)

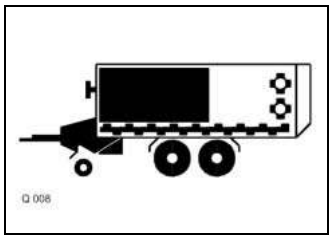
Attention:
From serial no. … there are no reed switches available for half-loading the front panel. However, the wiring loom remains unchanged = the plugs for the reed switches are available.

This button can be used to vary the loading mode. Its functions depends on the position of micro switch (3) located in the front part of the control box (4).

Micro switch (3) in lower position (OFF / standard setting):

Using this button allows switching back and forth between fully loading the wagon and manual loading (under visual control).

The black filling bar ceases to apply from serial no. and installation of EPROM 350 812-5.



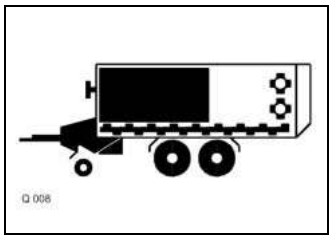
Upper position
(e.g. for loading dry fodder): The floor conveyor is switched on when the cover plates are raised. All 3 plates are linked with one another.

The floor conveyor will run until the feelers and/or the top plate are free again or the manual actuation is shut down..

Micro switch (3) in top position:

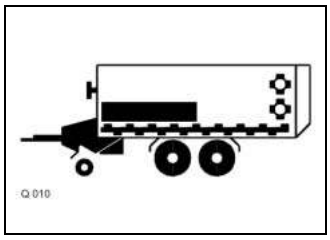
Using this button allows switching between fully loading the wagon and deactivating the automatic filling.

The black filling bar ceases to apply from serial no. and installation of EPROM 350 812-5.



Upper position
(e.g. for loading dry fodder): The floor conveyor is switched on when the cover plates are raised. All 3 plates are linked with one another.

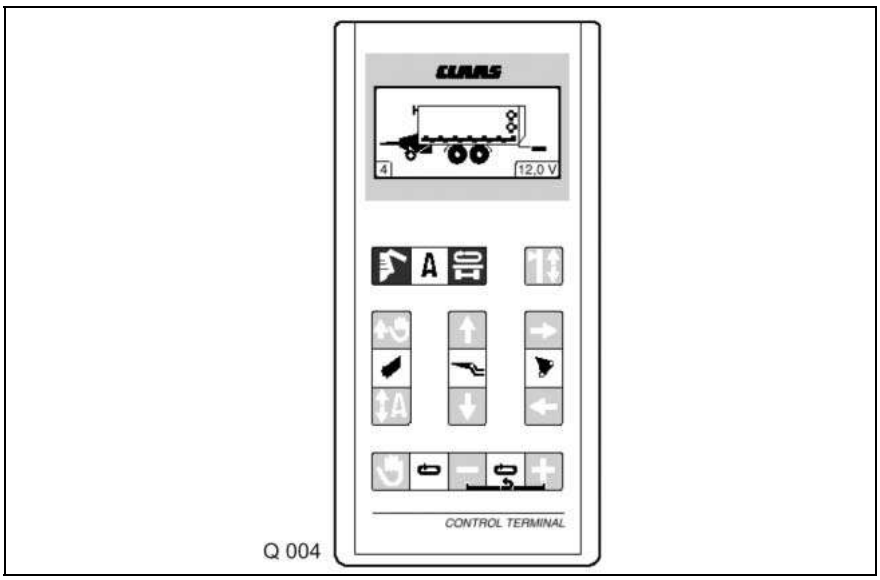
The black filling bar ceases to apply from serial no. and installation of EPROM 350 812-5.



The filling indicator disappears:
The automatic filling mode is deactivated; the floor conveyor has to be operated manually.

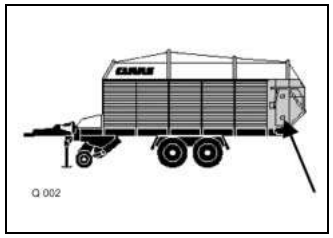
To adjust the micro switch, switch off the control box and the oil supply from the tractor. Then open the distributor box located in the front part of the wagon and switch over using a small screwdriver. Close the box and connect the oil supply to the tractor.

The black filling bar ceases to apply from serial no. and installation of EPROM 350 812-5.



Floor conveyor
End of loading operation

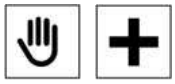
When the crop presses against the lower shredder drum, it is moved backwards slightly. The switch (6) closes and the floor conveyor is automatically switched off. The filling indicator on the display is flashing. Raise the pick-up and switch off the universal drive shaft.



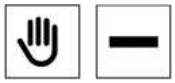
Manual operation of floor conveyor

If the automatic filling mode is not used or the load space is only to be partially filled, the floor conveyor can be operated manually using this key. Here the floor conveyor speed is always as previously set.

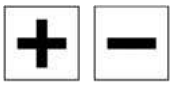
Adjusting the floor conveyor speed



Pressing this button increases the floor conveyor speed of all further runs.



Pressing this button decreases the floor conveyor speed of all further runs.



The floor conveyor can also be reversed during loading by simultaneously pressing both buttons. Reversing is always carried out at speed 9.

After the floor conveyor has been reversed, the floor conveyor speed must be increased by pressing this button.

Open / close knife frame

The floor conveyor speed is displayed at the bottom left in the control panel display. It can be adjusted within the range from 0 to 9: 0 – 9 (standstill – fast)

Open the cutting frame by means of this button (1st stage). Engage the pto to clear the blockage.

As soon as the conveyor channel is free, close the cutting frame by pressing this key. Press this key until the display shows a totally closed knife frame.

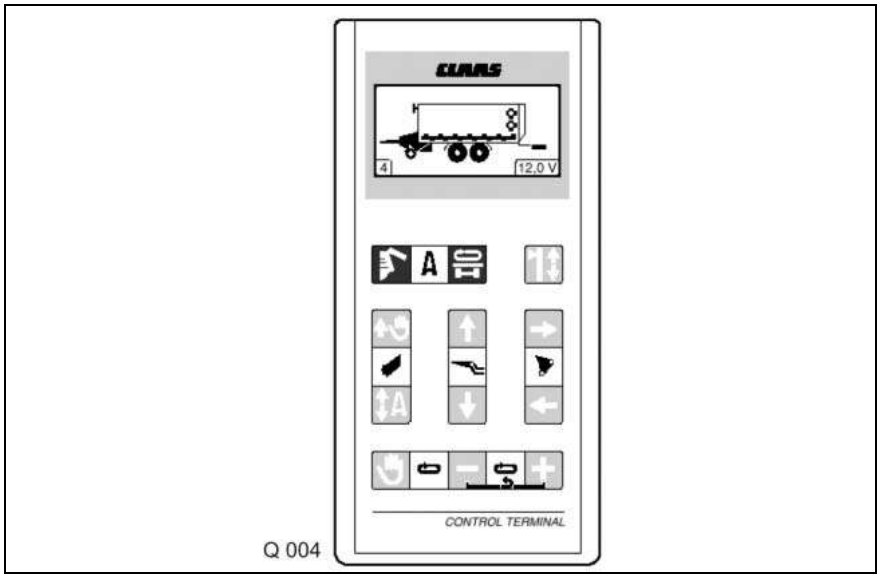
If the knife frame is to be completely lowered (2nd stage, e.g. for repairs or dismounting the rotor), this key must be pressed above the cutting trough.

Close the knife frame by pressing this key above the knife frame.

Attention!

If the knife frame is totally open, it must be closed very carefully and slowly.
When folding up the frame, ensure that the cutting knives will not collide with the rotor tines.

The black filling bar ceases to apply from serial no. and installation of EPROM 350 812-5.



Q 004

Unloading in silo operation

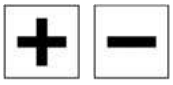
To switch on the control unit, set the hydraulic system to the pressure setting. The display shows the forage wagon.

Press this button to raise the wagon over the articulated drawbar at the front.

When unloading is complete, use this key to lower the wagon again. The floor conveyor switches to the 4th stage.

Discharge of the load space

Switch on the pto shaft. Press this button for unloading. The tailgate opens, the shredder drums start running and the floor conveyor is switched on after a short delay. To stop the unloading process, press this button again.
Any blockage of the shredder drums (the cut-out clutch of the universal drive shaft is activated) by the material requires reversing the floor conveyor.



Press these buttons simultaneously to reversing the floor conveyor. After the floor conveyor has been reversed, the floor conveyor speed must be increased by pressing the + button.

Pressing this button increases the floor conveyor speed. By increasing the speed numbers up to speed 9 and pressing this key once again, an “S” appears in the control panel display = quick conveyor speed due to 2-speed hydraulic motor.

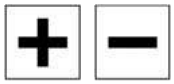
Pressing this button decreases the floor conveyor speed.

When pressing this key during the whole unloading process, the adjusted floor conveyor speed is saved for further unloading processes.

Unloading by means of cross conveyor belt

Pull out the cross conveyor belt before unloading and lock it to the lower back cover. Connect the hydraulic hoses to the hydraulic motor.

Switch on the pto for unloading with the cross conveyor belt and press this key. The shredder drums start running and the floor conveyor is switched on after a short delay.
To stop the unloading process, press this button again.
Any blockage of the shredder drums (the cut-out clutch of the universal drive shaft is activated) by the material requires reversing the floor conveyor.



Press these buttons simultaneously to reversing the floor conveyor.

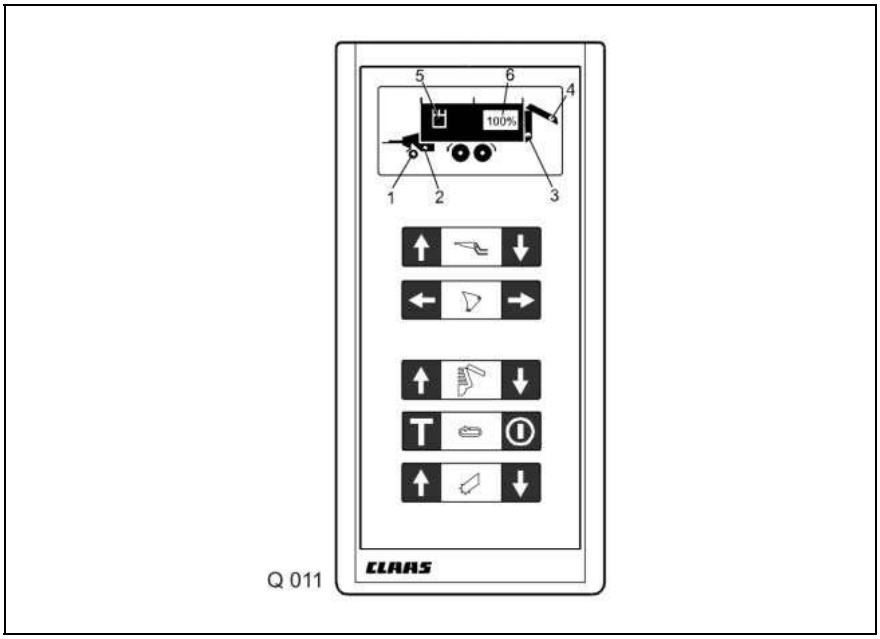
Pressing this button increases the floor conveyor speed.

Pressing this button decreases the floor conveyor speed.

When pressing this key during the whole unloading process, the adjusted floor conveyor speed is saved for further unloading processes.

This key enables changing the direction of rotation of the cross conveyor belt.
From serial no.: …. with solenoid valve 62, the trailing axle can be blocked with this key.

3.0 QUANTUM 4500 P / 5500 P / 5500 P-16 / 5500 P-18 / 5500 GT / 6800 P



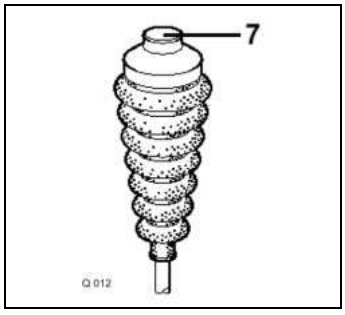
Attention:

1. Electric System
   Connect the control box to the forage wagon by means of the control cable. Plug the 2-pole plug (series equipment) into the socket outlet of the tractor and of the forage wagon. On-board voltage from the distributor box to the control box = 10.8 V min.

2. Hydraulic System
   To switch on the control unit, set the hydraulic system to the pressure setting (2 bar switch).
   The pump system of the tractor must be known (see chapter “Prior to operation”).

Floor conveyor 2-stage motor
(option for P forage wagons)

The self-loading forage wagon is equipped with a 2-stage motor to double the speed of the conveyor and shorten the time needed to unload the remainder.
When unloading starts, the floor conveyor is switched on by this button.



After about two thirds of the crop have been unloaded, the speed of the floor conveyor can be doubled. To do this, press switch (7).

The second speed stage only runs as long as the switch is being pressed. When it is released, the conveyor continues to run at normal speed.

3.1 Control box short instructions

Loading operation

Pick-up down

Pick-up up. The pick-up does not switch off.

Floor conveyor ON/OFF when loading, tailgate must be closed.

Knife frame

Open knife frame

Close knife frame
When pressing both keys simultaneously, the knife frame is opened completely.

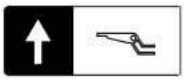
Unloading operation

Open tailgate

Close tailgate

Floor conveyor ON/OFF when unloading, tailgate must be open.

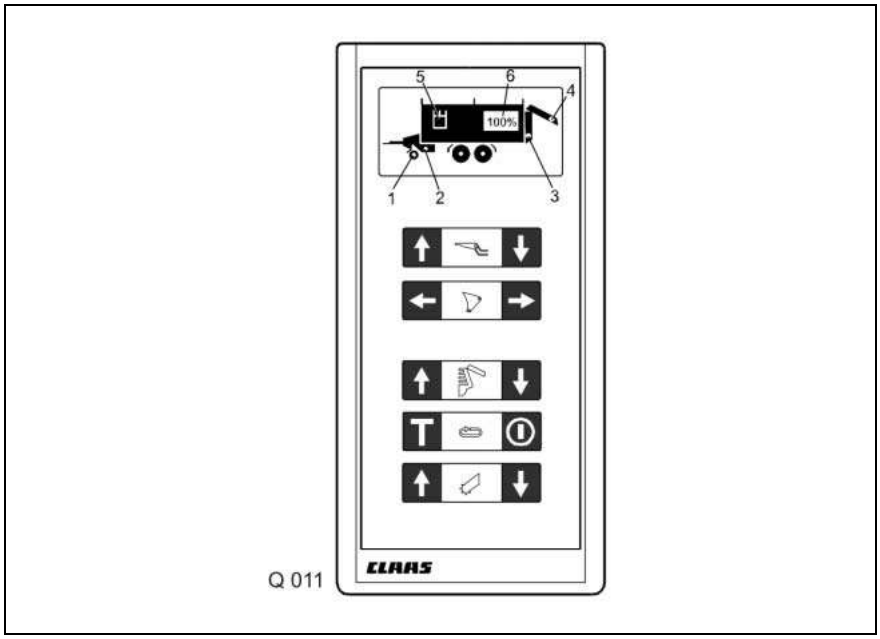
Articulated drawbar



Articulated drawbar up

Articulated drawbar down

Indicator lights (LEDs)



1 Green: Pick-up lowered – floating position

2 Red: Knife frame open

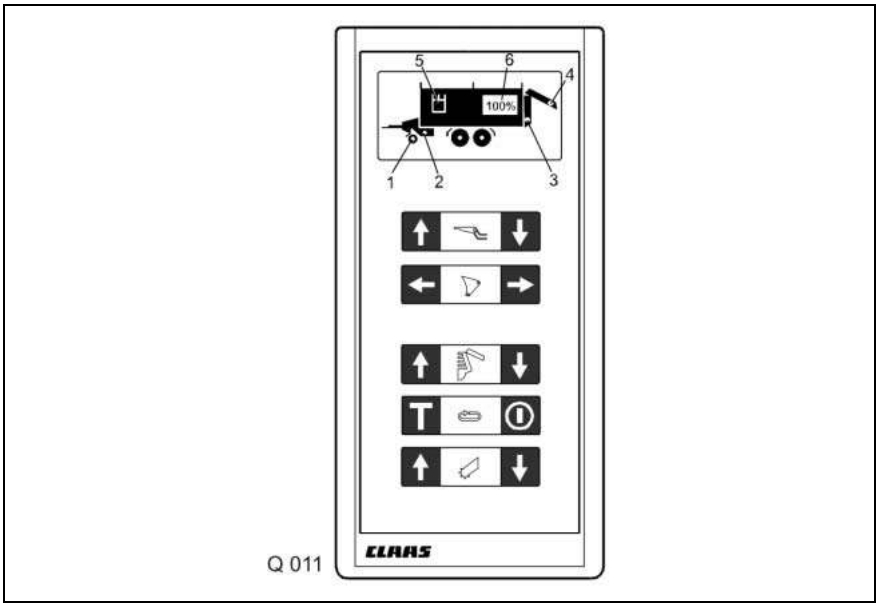
3 Red, flashing: Tailgate closed

4 Green, flashing: Tailgate open

5 Red (approx. 3 sec.): Oil in circulation, wagon is ready for use

6 Red, flashing: Wagon is 100% filled

3.2 Operation



Loading operation

Pick-up down

Press this key.
The pick-up is lowered and remains in floating position. The green indicator light on the control box is illuminated.

Pick-up up

Press this key.
The pick-up is raised – it does not switch itself off.

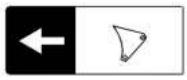
Hydraulic opening of the knife frame

If a blockage occurs in the conveyor channel (cut-out clutch of the universal drive shaft is activated), switch off the pto.

Use this key to open the knife frame. The red indicator light is illuminated.

Re-engage the pto. As soon as the conveyor channel is free, close the knife frame by pressing this key.

If the knife frame has to be totally lowered (e.g. for removing knives or the rotor), press these two buttons simultaneously.



Press this key to close the knife frame again.

Important! If the knife frame is totally open, it must be closed very carefully and slowly. When folding up the frame, ensure that the cutting knives will not collide with the rotor tines.

Engaging the floor conveyor for loading

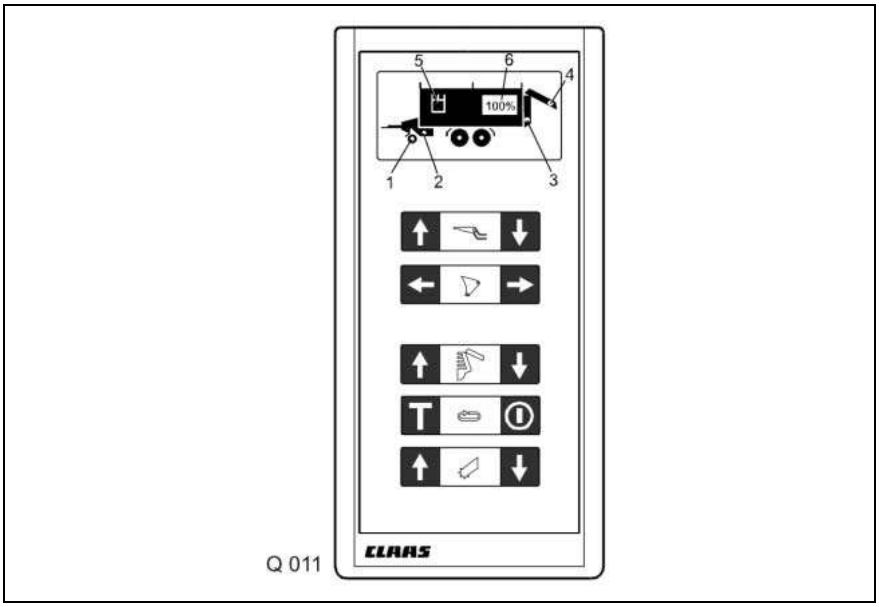
Press this key to fill the load space. The floor conveyor will run to the rear as long as the key is pressed.

The floor conveyor speed depends on the tractor's pto speed.

Important! During the loading operation, the tailgate must be completely closed, otherwise the floor conveyor cannot be operated with the push button.

As soon as the crop pushes the tailgate slightly to the rear, the floor conveyor is disengaged by a solenoid switch. The red LED (100%) on the control box starts flashing. The floor conveyor drive can only be re-engaged after the tailgate has been opened.

Unloading operation



Opening the tailgate

Press this key until the tailgate is open.
The green indicator light on the control panel will flash.

Discharge of the load space

Press this key to discharge the load space.
The floor conveyor will travel to the rear as long as this key is pressed once more.
Control the floor conveyor speed by means of the tractor's speed.

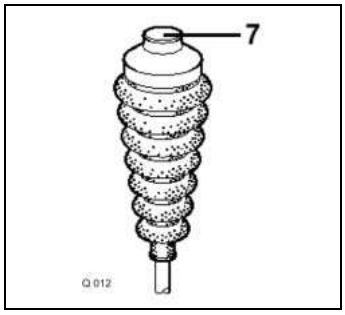
Important! During the unloading operation the tailgate must be completely open and the green indicator light must flash, otherwise the floor conveyor cannot be operated.

Closing the tailgate

Press this key until the red indicator light starts flashing.
The tailgate is lowered due to its weight (i.e. without hydraulic pressure) as long as this key is pressed.
Release this key when the red indicator light on the control panel starts flashing. Hydraulic pressure builds up and the tailgate is locked. The red LED (100%) is no longer illuminated.

Floor conveyor 2-stage motor
(option for P forage wagons)

The self-loading forage wagon is equipped with a 2-stage motor to double the speed of the conveyor and shorten the time needed to unload the remainder.
When unloading starts, the floor conveyor is switched on by this button.



After about two thirds of the crop have been unloaded, the speed of the floor conveyor can be doubled. To do this, press switch (7).

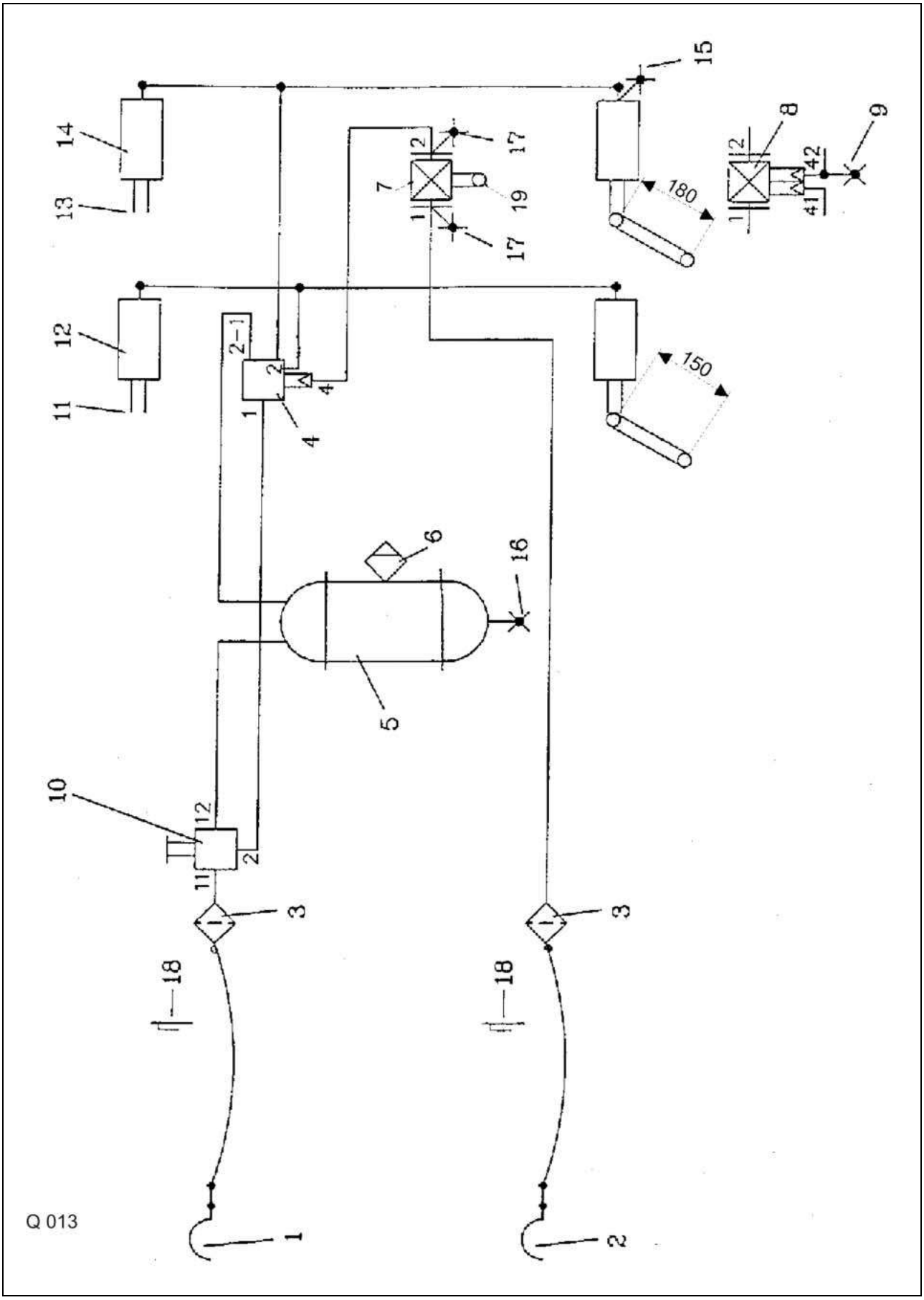
The second speed stage only runs as long as the switch is being pressed. When it is released, the conveyor continues to run at normal speed.

1.0 Compressed air circuit diagrams

1.1 QUANTUM 5500P/S-16 40 km/h, 16 to, (steering axle)

1 Red service line hose coupler “Accumulator”
2 Yellow service line hose coupler “Brake”
3 Filter
4 Trailer brake valve
5 Compressed air accumulator (40 litres)
6 Dewatering valve, manual
7 ALB (automatic load-dependent brake-power), mechanically controlled
8 ALB (automatic load-dependent brake-power), pneumatically controlled
9 Simulation connection (when using item 8)
10 Release valve
11 Link joint (round hole)
12 Diaphragm cylinder (20”)
13 Link joint (elongated hole)
14 Diaphragm cylinder (16”)
15 Test port (M16x1.5) for cylinder pressure
16 Test port (M22x1.5)
17 Test port (M12x1.5)
18 Dummy coupler
19 Block spring (when using item 7 only)

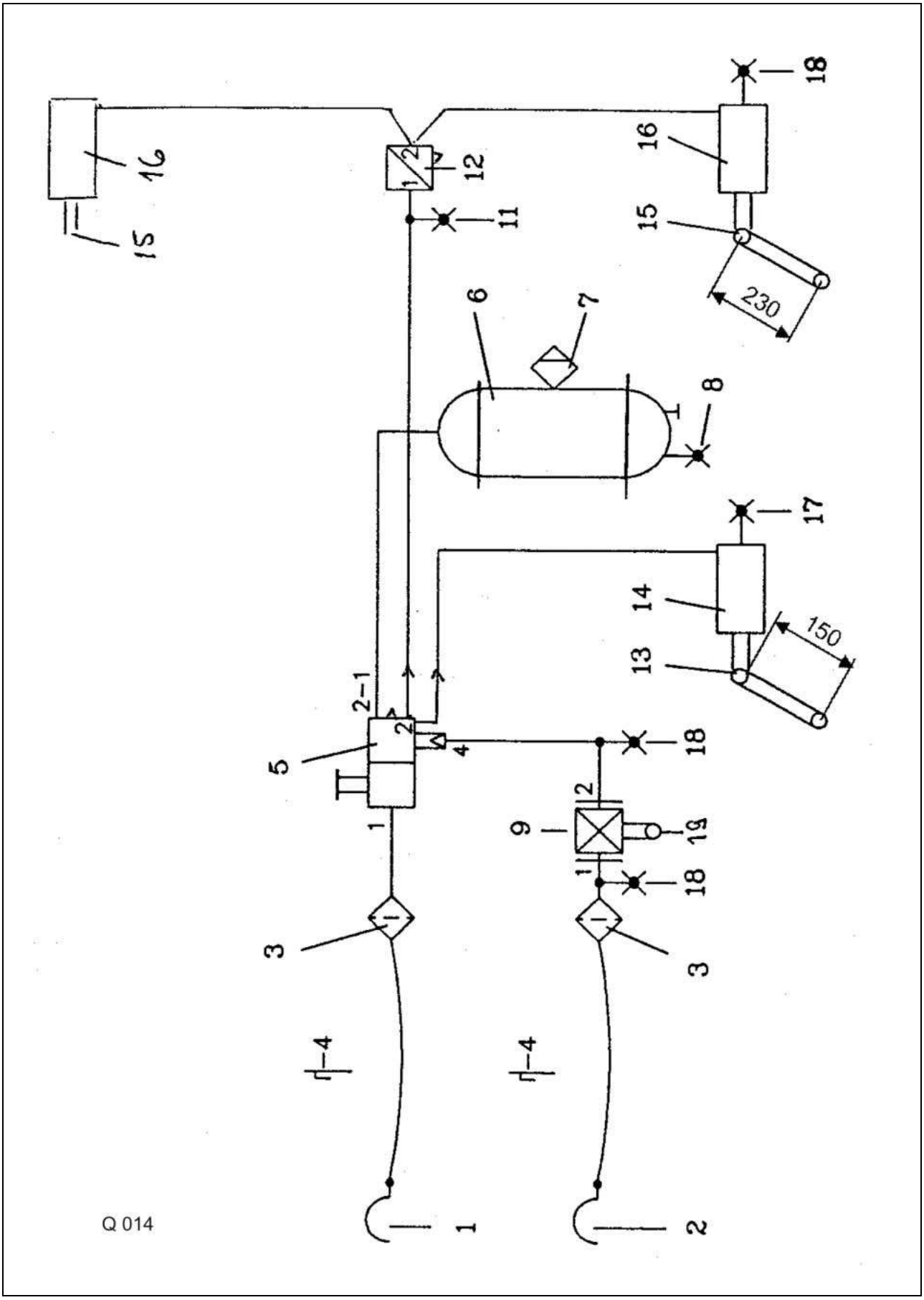
5500P/S-16 40 km/h, 16 to, (Steering axle)



1.2 QUANTUM 2500K/P, 3500P/S/K, 3800K/P, 4500S/P 40 km/h (steering axle)

1 Red service line hose coupler “Accumulator”
2 Yellow service line hose coupler “Brake”
3 Filter
4 Dummy coupler
5 Trailer brake valve with release valve
6 Compressed air accumulator (20 litres)
7 Dewatering valve, manual
8 Test port (M22x1.5)
9 ALB (automatic load-dependent brake-power), mechanically controlled
11 Test port
12 Adjusting valve
13 Link joint
14 Diaphragm cylinder (20”)
15 Link joint
16 Piston cylinder ∅ 80
17 Test port (M16x1.5)
18 Test port (M12x1.5)
19 Block spring

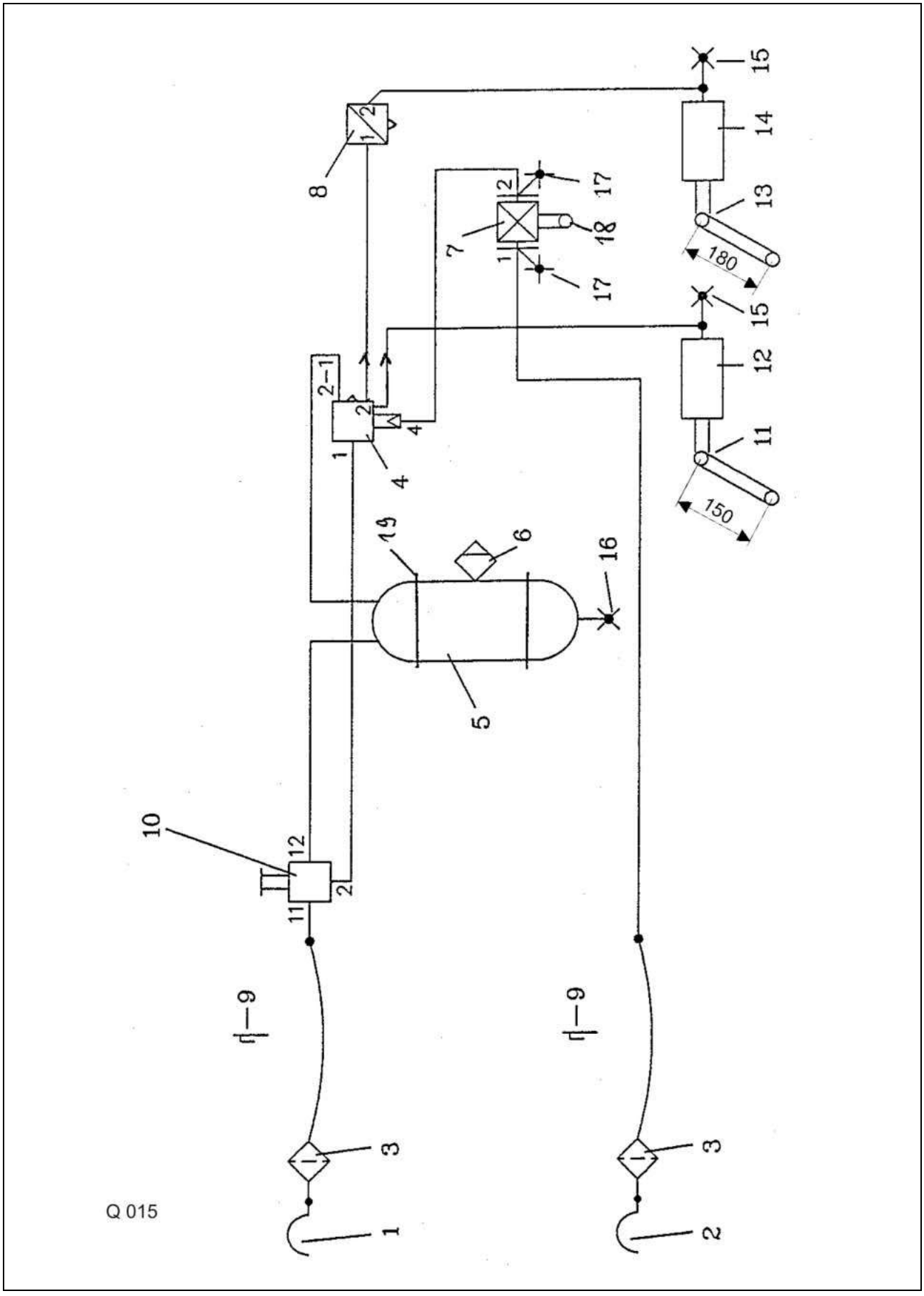
2500K/P, 3500P/S/K, 3800K/P, 4500S/P 40 km/h (steering axle)



1.3 5500P/S 40km/h, 13 to, (steering axle)

1 Red service line hose coupler “Accumulator”
2 Yellow service line hose coupler “Brake”
3 Filter for piping
4 Trailer brake valve
5 Compressed air accumulator (20 litres)
6 Dewatering valve, manual
7 ALB (automatic load-dependent brake-power), mechanically controlled
8 Adjusting valve
9 Dummy coupler
10 Release valve
11 Link joint
12 Diaphragm cylinder (20”)
13 Link joint (elongated hole)
14 Diaphragm cylinder (20”)
15 Test port (M16x1.5)
16 Test port (M22x1.5)
17 Test port (M12x1.5)
18 Block spring for dual-axle steering
19 Tension band ∅ 206

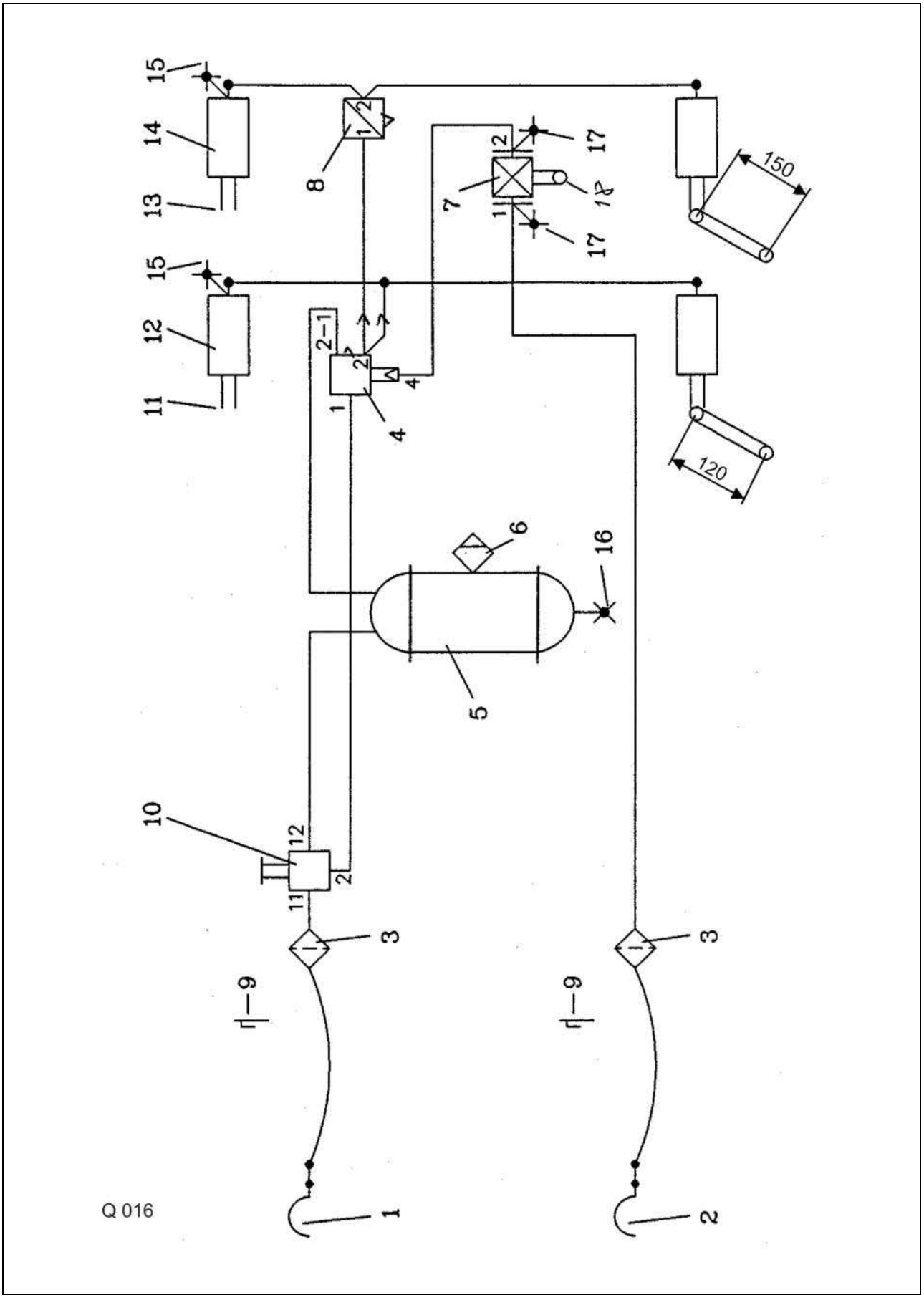
5500P/S 40 km/h, 13 to, (steering axle)



1.4 5500P-18/S –18, 60 km/h

1 Red service line hose coupler “Accumulator”
2 Yellow service line hose coupler “Brake”
3 Filter for piping
4 Trailer brake valve
5 Compressed air accumulator (60 litres)
6 Dewatering valve, manual
7 ALB (automatic load-dependent brake-power), mechanically controlled
8 Adjusting valve
9 Dummy coupler
10 Release valve
11 Link joint
12 Diaphragm cylinder (24”)
13 Link joint (elongated hole)
14 Diaphragm cylinder (24”)
15 Test port (M16x1.5)
16 Test port (M22x1.5)
17 Test port (M12x1.5)
18 Block spring for dual-axle steering

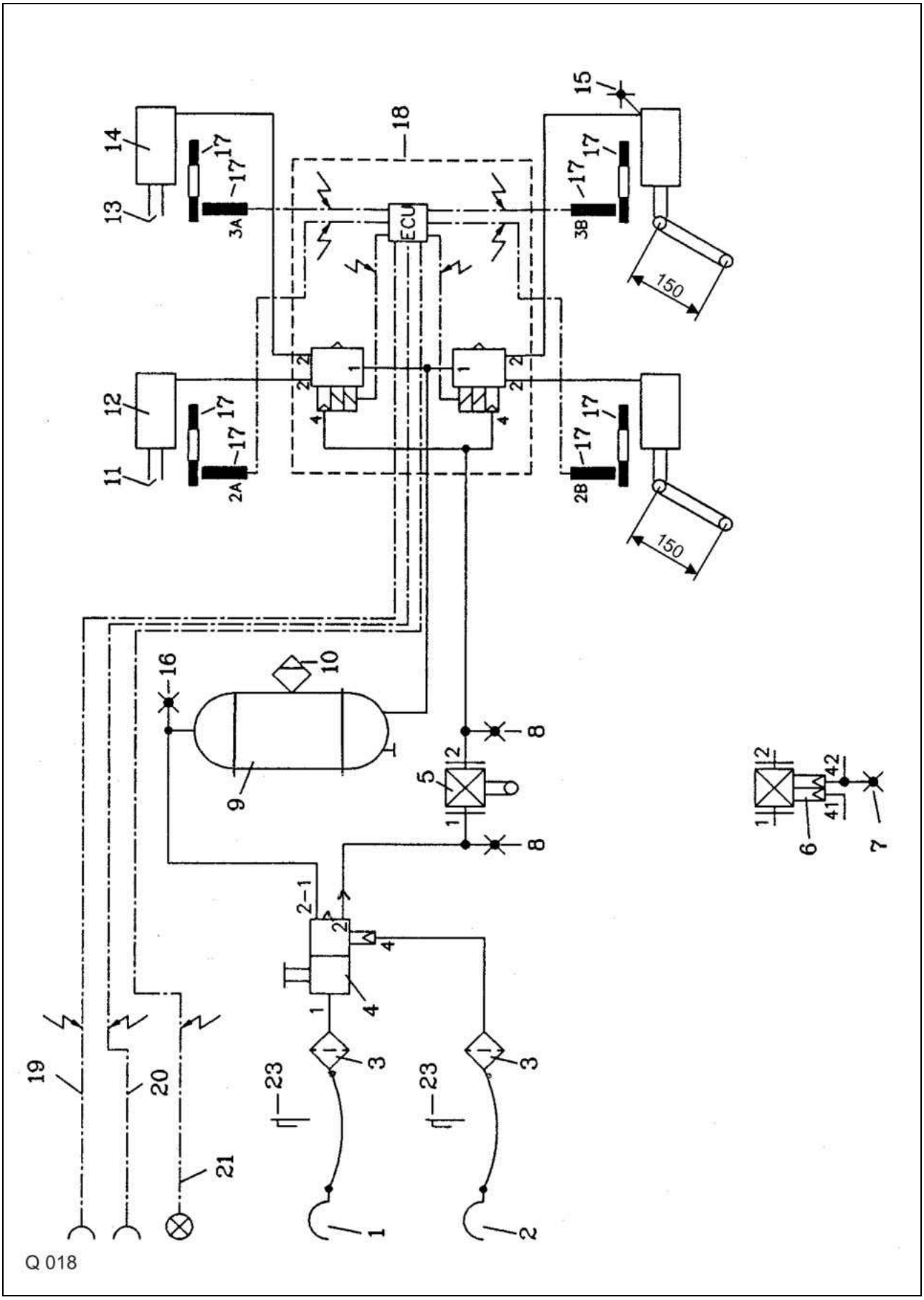
5500 P-18/ S-18, 60 km/h



1.5 5500P/S 80 km/h (ABS)

1 Red service line hose coupler “Accumulator”
2 Yellow service line hose coupler “Brake”
3 Filter
4 Trailer brake valve with release valve
5 ALB (automatic load-dependent brake-power), mechanically controlled (alternative to item 6)
6 ALB (automatic load-dependent brake-power), pneumatically controlled (alternative to item 5)
7 Simulation connection (when using item 6 only)
8 Test port (M16x1.5)
9 Compressed air accumulator (60 litres)
10 Dewatering valve, manual
11 Link joint (elongated hole)
12 Diaphragm cylinder (24”)
13 Link joint (elongated hole)
14 Diaphragm cylinder (24”)
15 Test port (M16x1.5)
16 Test port (M22x1.5)
17 Pole and sensor
18 4S/2M – module kit (ABS control unit)
19 12 m power supply cable (ISO 7638) for drawbar trailer / forage wagon
20 12 m power supply cable (ISO 1186) option
21 Warning lamp, green
22 12 m cable for warning lamp
23 Dummy coupler

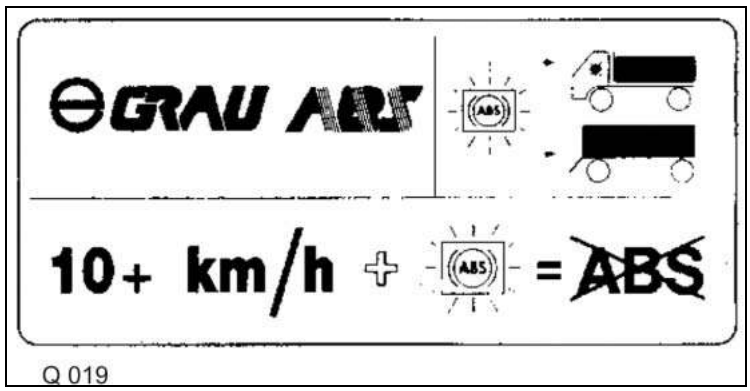
5500P/S 80 km/h (ABS)



1.5.1 Functional test

Time of testing?

- After assembly of the ABS (anti-lock braking system) on the vehicle
- § 29 inspection of vehicles and trailers (S.I. = Safety inspection)
- In Germany as of 11.2000 / HU)
- When control lamp lights up (see a workshop to find the fault)



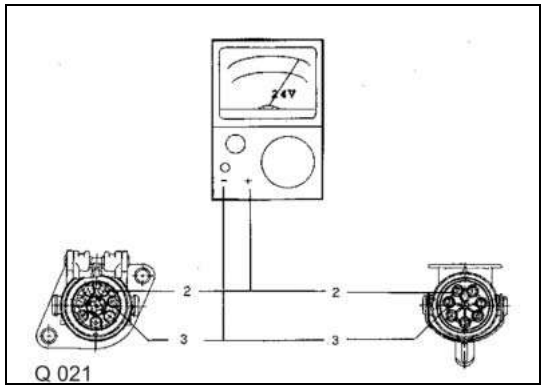
Q 019

Testing possibilities

- with an external test device

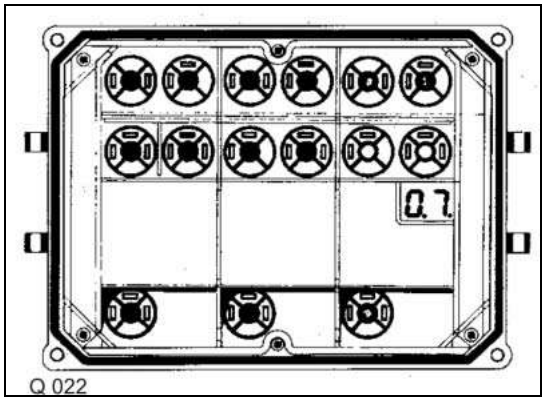
Q 020

- with a multimeter.



Q 021

- Fault indication via an integrated LED display in the control device. If an error LED lights up, contact the service dept. of HALDEX in Denkendorf.



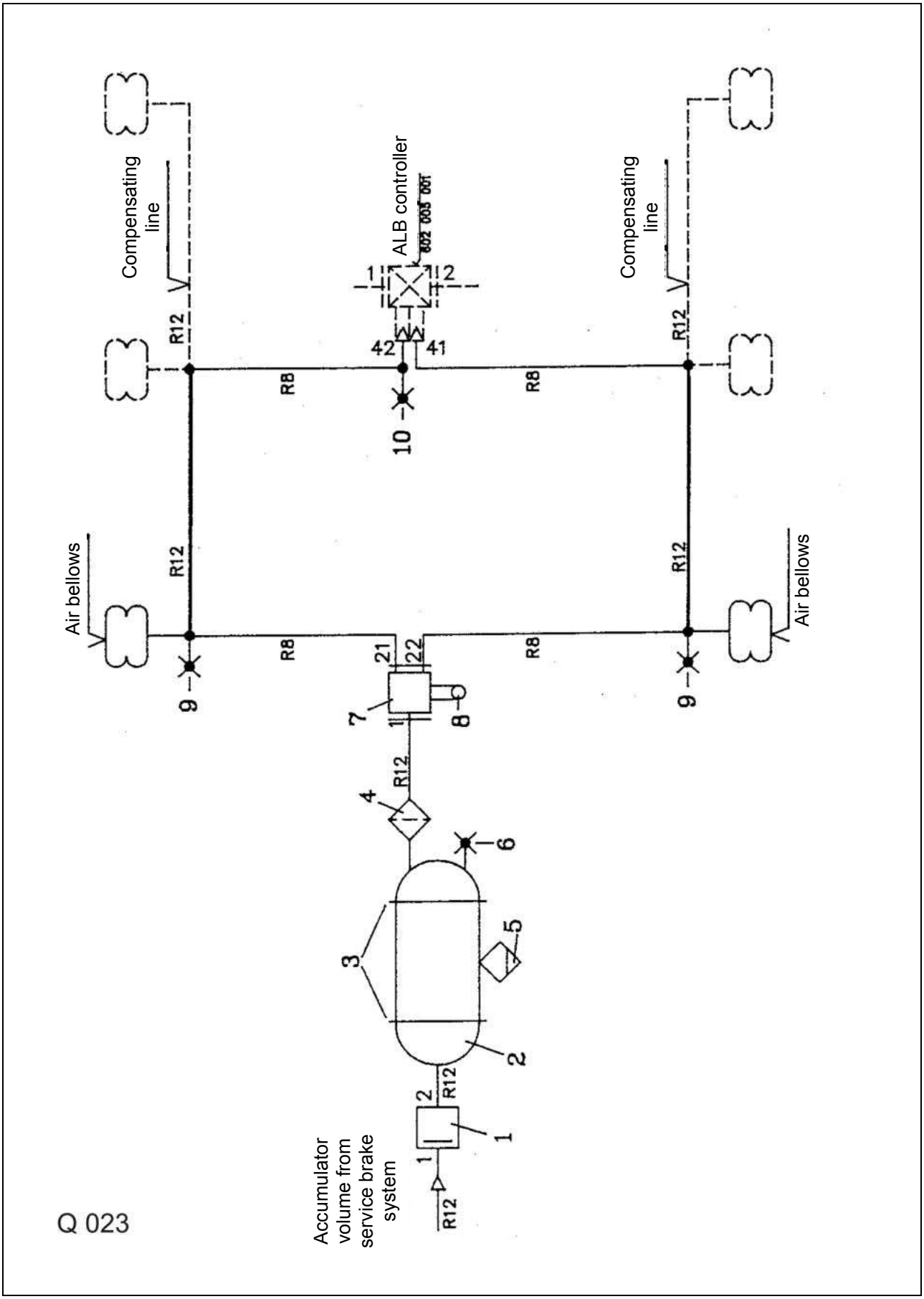
1.6 Compressed air system with level regulating valve

1.6.1 Up to serial no.

1 Overflow valve (6 bar)
2 Compressed air reservoir
3 Tension band with support
4 Filter
5 Dewatering valve, manual
6 Test port (M22x1.5)
7 Compressed air valve
8 Articulation (axle)
9 Test port (M12x1.5)
10 Simulation connection

BBA (service braking system) = Compensating line

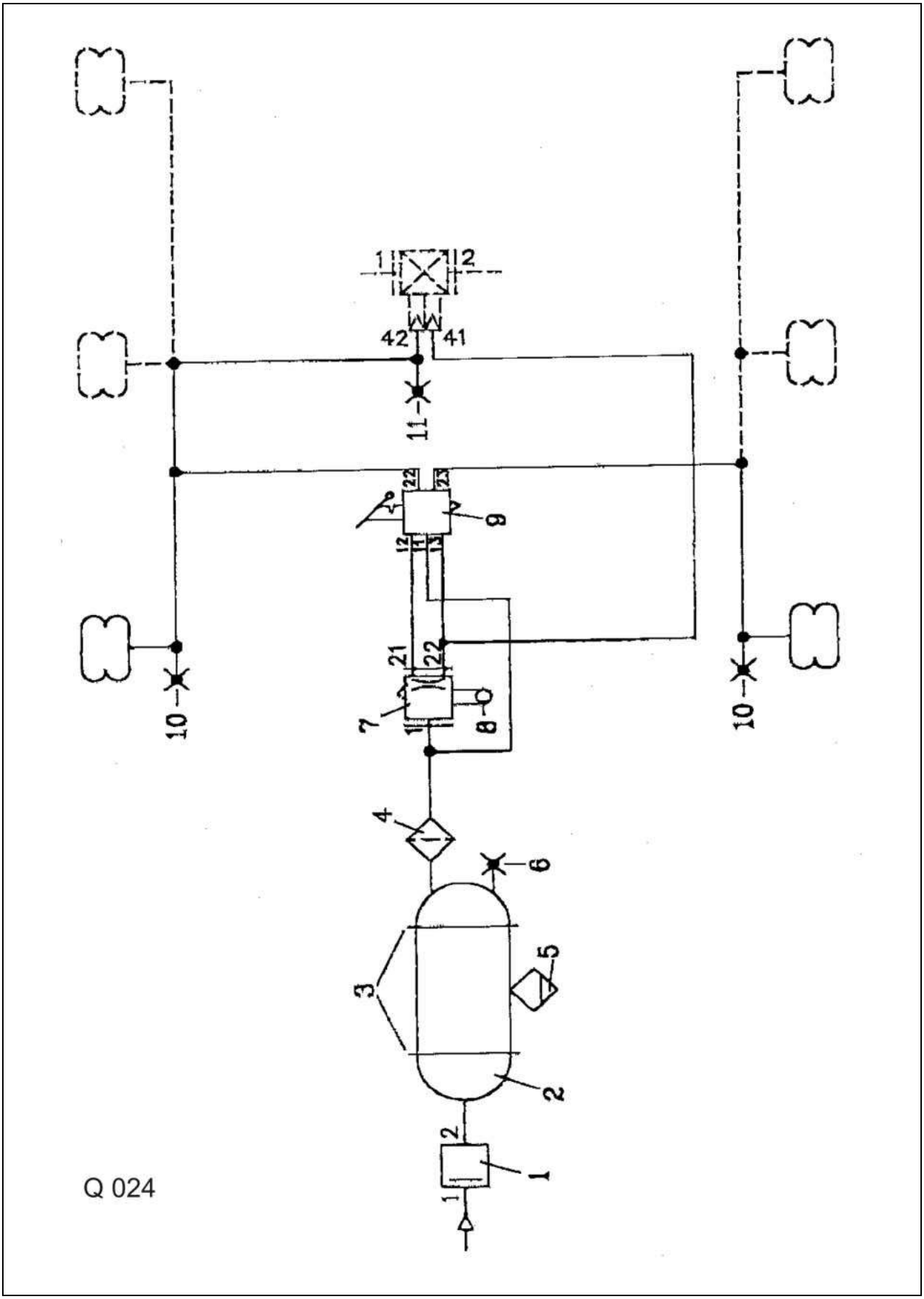
Compressed air system with level regulating valve, up to serial no.



1.6.2 From serial no.

1 Overflow valve (6 bar)
2 Compressed air reservoir
3 Tension band with support
4 Filter
5 Dewatering valve, manual
6 Test port (M22x1.5)
7 Compressed air valve
8 Articulation (axle)
9 Raise/lower control valve
10 Test port (M12x1.5)
11 Simulation connection

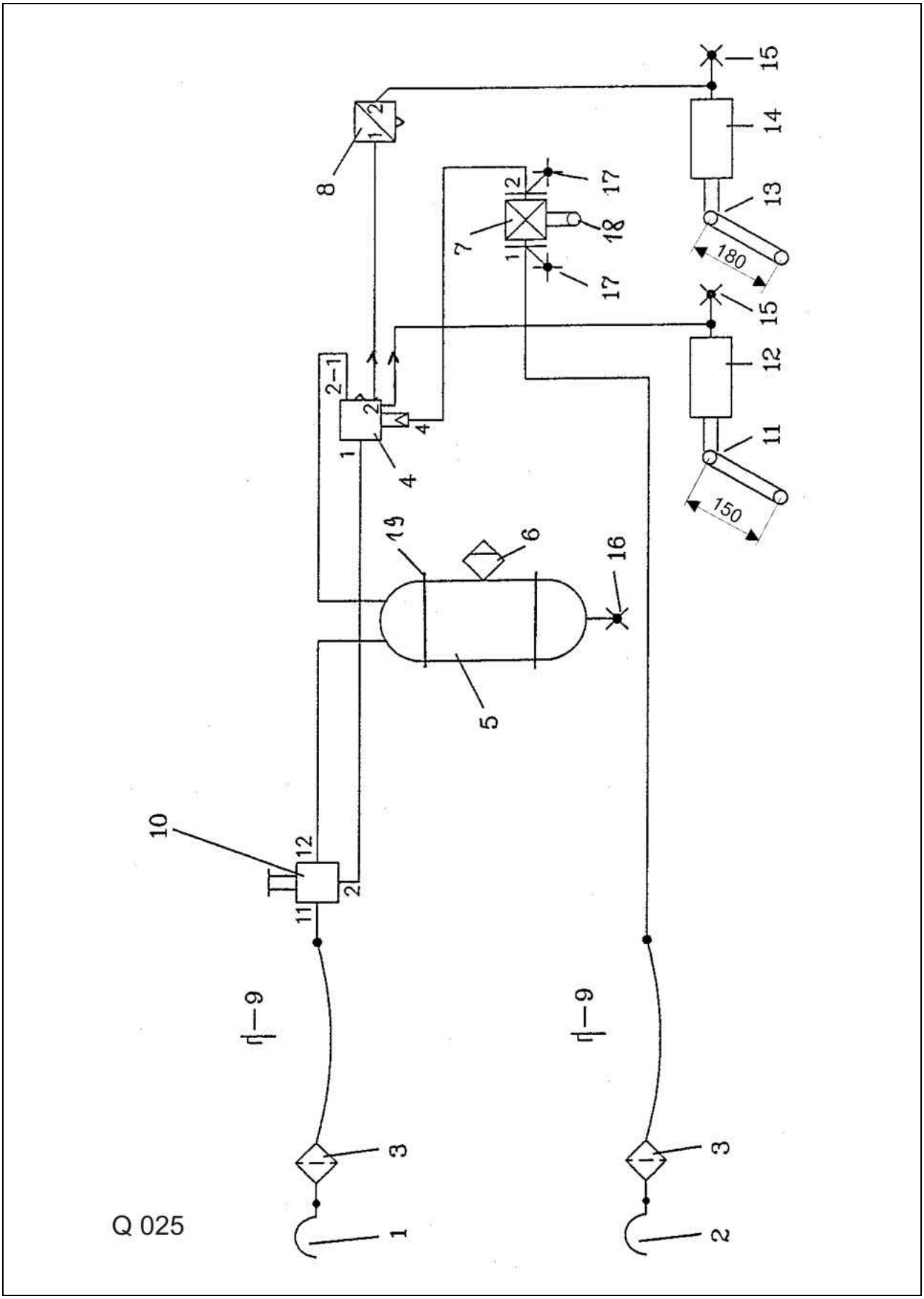
Compressed air system with level regulating valve, from serial no.



1.7 5500 P/S 50/60 km/h

1 Red service line hose coupler “Accumulator”
2 Yellow service line hose coupler “Brake”
3 Filter
4 Trailer brake valve
5 Compressed air accumulator (60 litres)
6 Dewatering valve, manual
7 ALB (automatic load-dependent brake-power), mechanically controlled
8 Adjusting valve
9 Dummy coupler
10 Release valve
11 Link joint (round hole)
12 Diaphragm cylinder
13 Link joint (elongated hole)
14 Diaphragm cylinder
15 Test port (M16x1.5) for cylinder pressure
16 Test port (M22x1.5)
17 Test port (M12x1.5)
18 Block spring (M16x1.5)

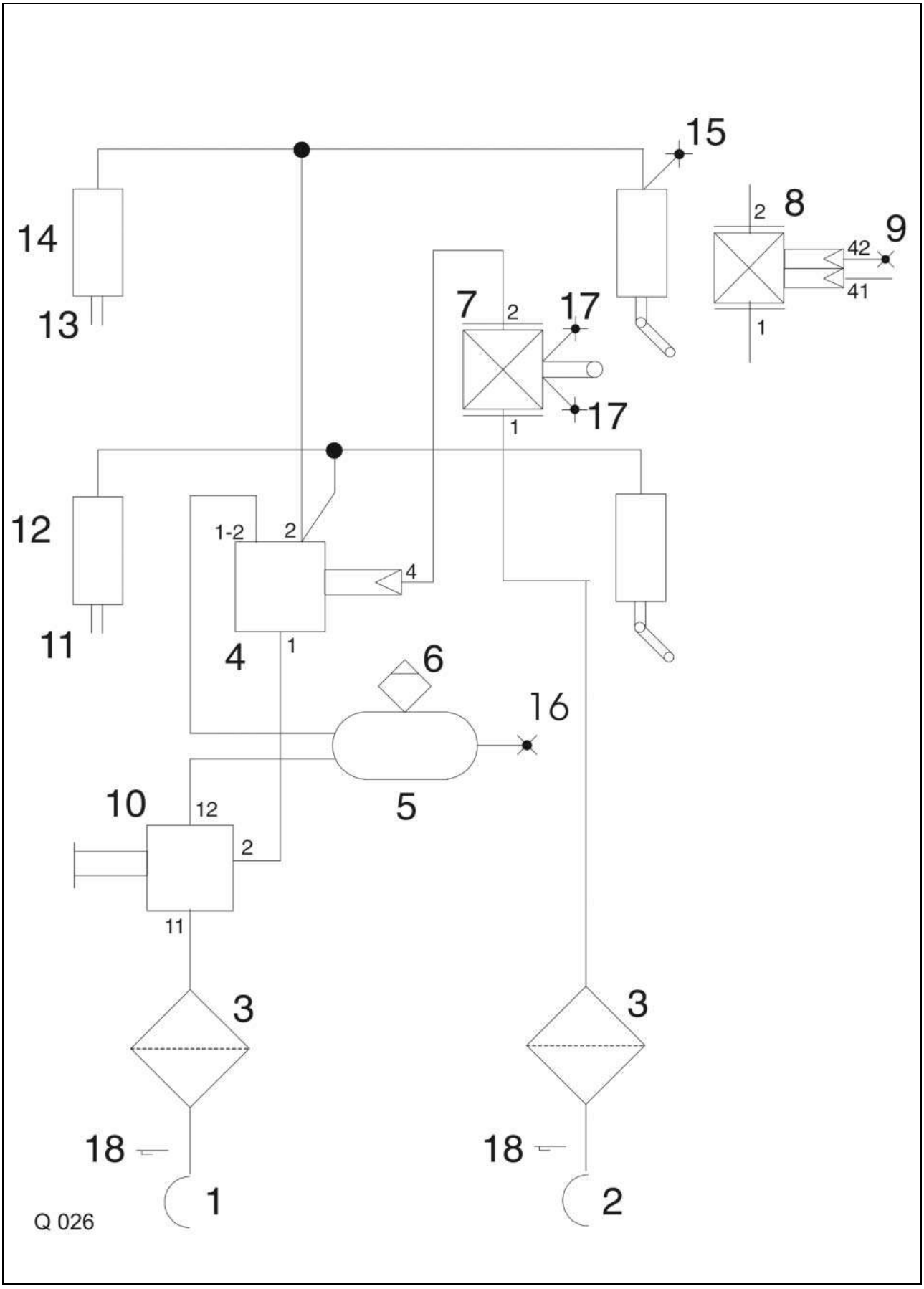
5500 P/S 50/60 km/h



1.8 5500 S, 40/60 km/h

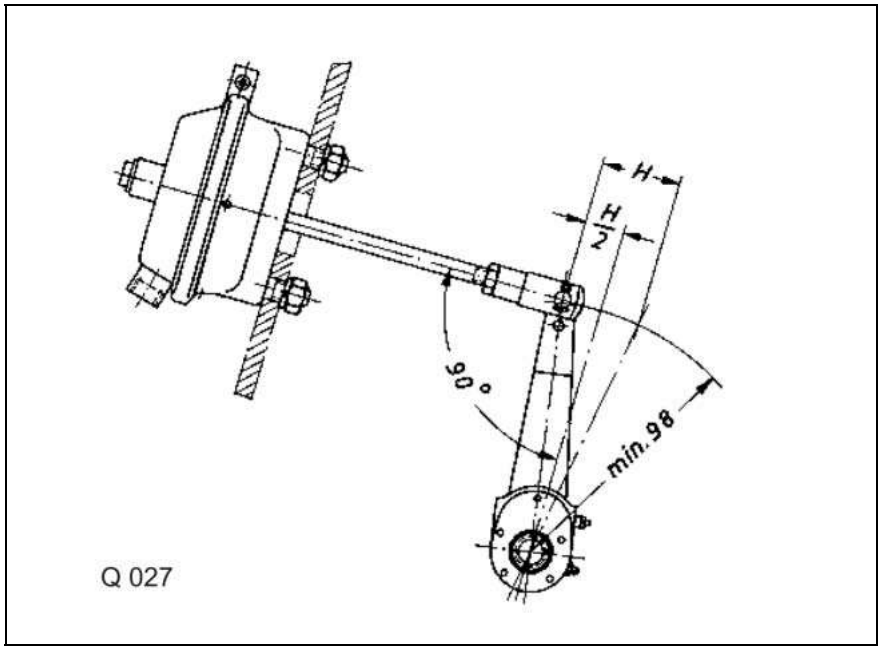
1 Red service line hose coupler “Accumulator”
2 Yellow service line hose coupler “Brake”
3 Filter
4 Trailer brake valve
5 Compressed air accumulator (60 litres)
6 Dewatering valve, manual
7 ALB (automatic load-dependent brake-power), mechanically controlled
8 Adjusting valve
9 Dummy coupler
10 Release valve
11 Link joint (round hole)
12 Diaphragm cylinder
13 Link joint (elongated hole)
14 Diaphragm cylinder
15 Test port (M16x1.5) for cylinder pressure
16 Test port (M22x1.5)
17 Test port (M12x1.5)
18 Block spring (M16x1.5)

5500 S 40/60 km/h



2.0 Adjustments

2.1 Diaphragm cylinder



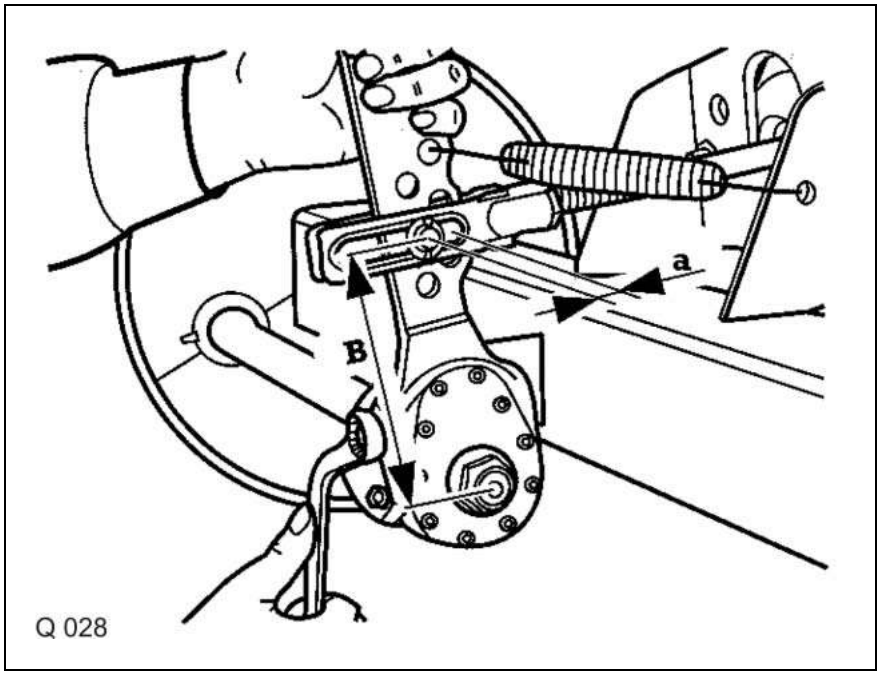
With half a piston stroke (H/2), the piston rod must be placed at right angles (90°) to the brake lever in order to obtain a good mechanical efficiency.
When the brake is appropriately adjusted, the piston stroke must not exceed 1/3 to 1/2 of the overall stroke when fully braking the machine.

2.2 Adjusting the rod adjuster

2.2.1 Standard rod adjuster

Every 1000 operating hours

Checking and adjusting the operating clearance of the wheel brakes



- continuous checks needed
- every 1 to 3 weeks, depending on operating hours

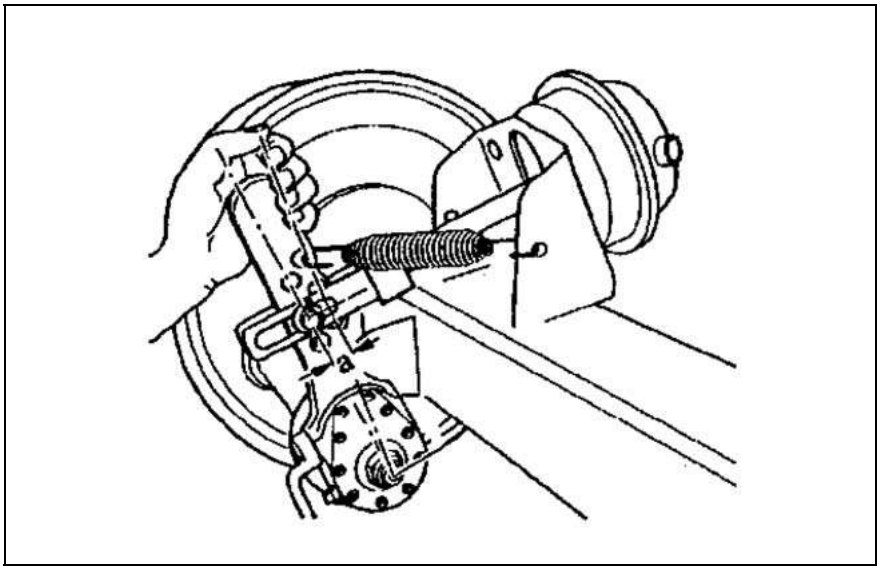
Operate the rod adjuster by hand in direction of pressure. If the free play of the diaphragm cylinder pressure rod is 35 mm max., the wheel brake needs to be re-adjusted.
The adjustment is made on the re-adjusting hexagon of the rod adjuster. Set the free play “a” to 10 ... 12% of the connected brake lever length „B“.
Example: Lever length B = 150 mm corresponds to a free play of 15 ... 18 mm.

With automatic rod adjusters, the re-adjustment of the wheel brake is made automatically when the brake cams have twisted by approx. 15%.

2.2.2 Automatic rod adjuster

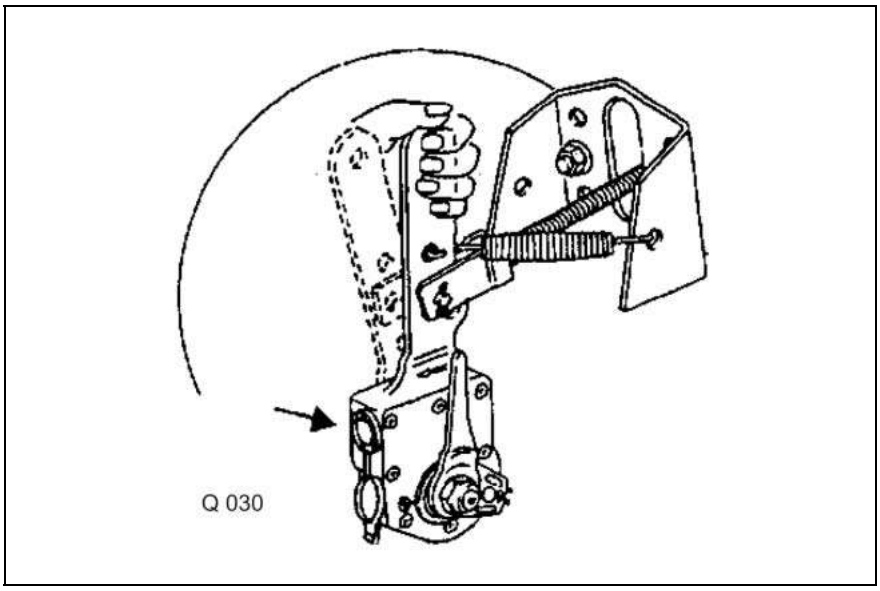
Every 1000 operating hours

Checking and adjusting the operating clearance of the wheel brakes



The basic adjustment is the same as for the standard rod adjuster. The adjustment is made automatically when the brake cams have twisted by approx. 15°. The ideal lever adjustment (if the cylinder attachment cannot be influenced) is approx. 15% before reaching the right angle.
The empty stroke “a” should be approx. 10% of the lever arm.

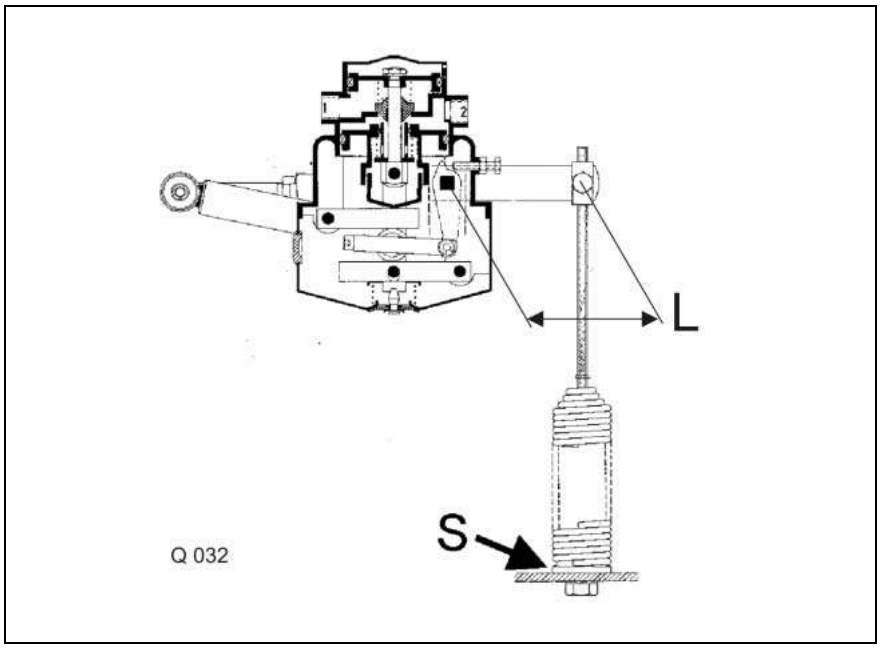
Functional check



Each time the brake linings are changed, at least once a year. Remove the rubber cap. Turn back the adjusting screw (arrow) using a ring spanner by approx. 3/4 turns. The free play should be at least 45 mm, with a lever length of 150 mm.
Operate the brake lever several times by hand. The automatic adjustment must run smoothly, i.e. you will hear the gear coupling lock in and the adjusting screw will turn slightly clockwise on the reverse stroke. Fit the cap. Grease it using ECO-Li 91.

2.3 Brake-power regulator (ALD)

Identification plate (left) for ALB regulator and air suspension



The automatic load-dependent brake-power regulator (ALB) has the function of automatically adjusting the brake pressure applied, depending on the load condition of the forage wagon.

To compensate setting of the vehicle's springs, a 5 mm washer (S) has been placed under the tension spring of the brake cable. When the vehicle's spring has set by approx. 5 mm, this washer (S) can be removed.

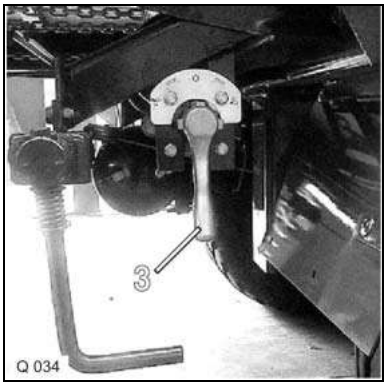
The lever length (dimension L, see identification plate of ALB regulator) has to be adjusted according to the manufacturer's instructions.

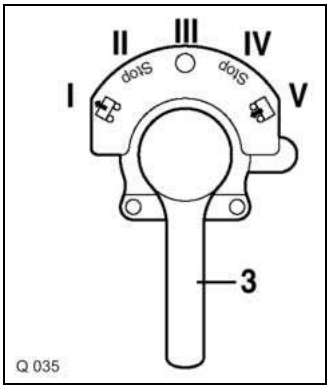
2.4 Air suspension

2.4.1 Lifting and lowering device

Forage wagons with air-suspension axles are equipped with valves for lifting and lowering operations.
Actuate the valve via the rotary slide (3) in order to remove foreign objects between the rubber bellows (1) and the spring bell (2) (Fig. 18).

After operating the lifting and lowering device, the valve should be set to the “travel” position before starting. The travelling height is regulated automatically.

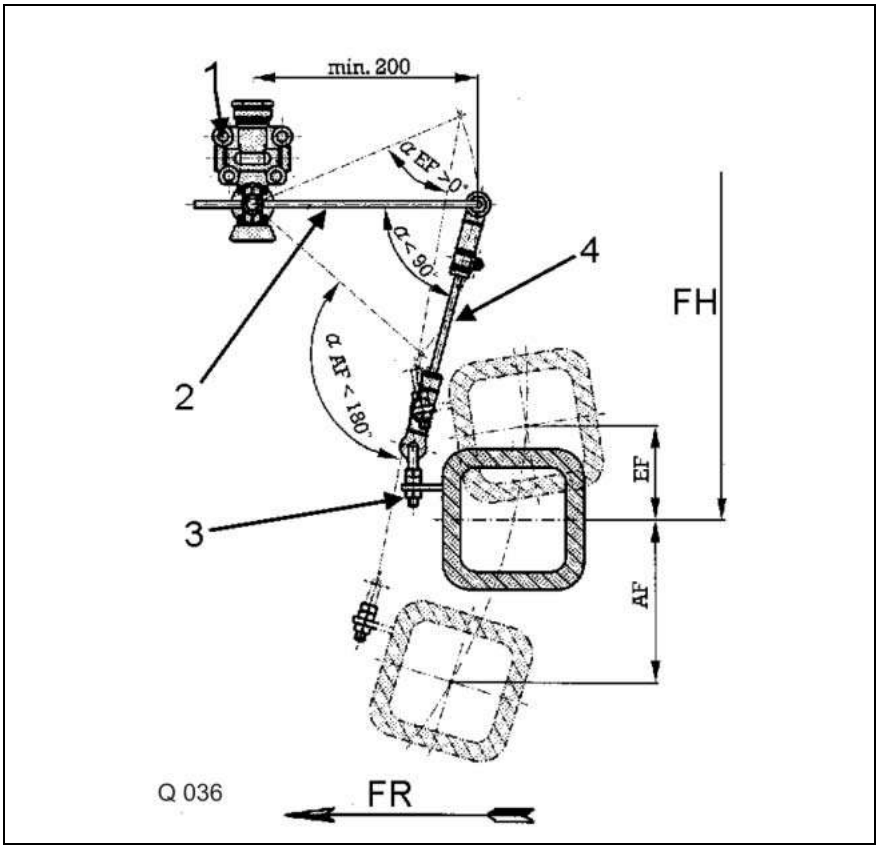




Rotary slide positions:

I	Lifting
II	Stop
III	Travelling
IV	Stop
V	Lowering

2.4.2 Air suspension valve



1 Frame support
2 Valve lever
3 Adjusting screw
4 Drive link

AF Rebounding
EF Compression +
FH Driving height = from lower edge of frame to the centre of the axle body
FR Direction of travel

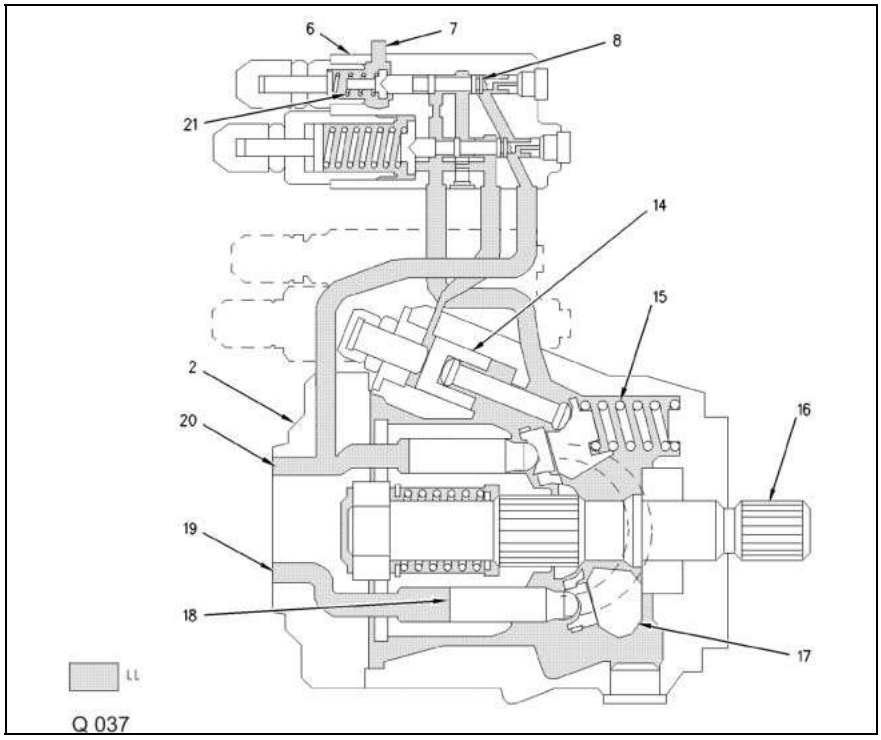
Check the driving height (FH) given on the identification plate (on the right-hand side of the axle frame) of the air-suspended assembly at regular intervals.

The driving height must not be changed, otherwise damage could occur to the components of the axle assembly.

The angle α (< 90°) between the valve lever and the drive link (4) must be adjusted in a way so that the valve rod does not turn over if the air-suspended bellows completely rebounds. The driving height can be adjusted at the adjusting screw (3).

1.0 LS pump

1.1 Initial position (Motor Off)



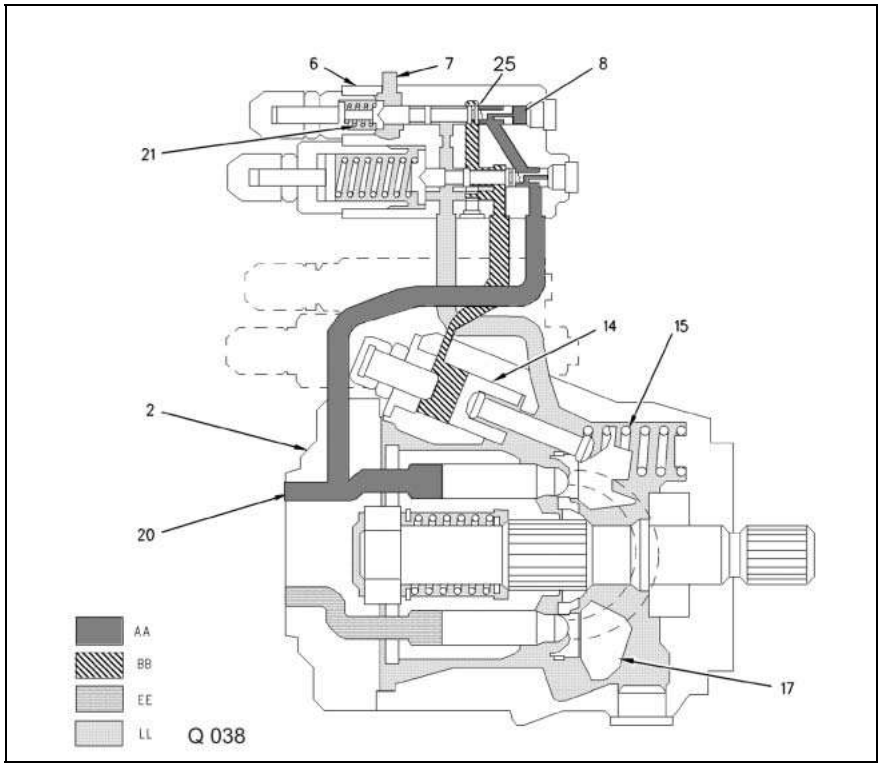
2 Working hydraulics pump (LS pump)
6 Compensating valve
7 Input (load pressure from signal network)
8 Volume flow controller
14 Control ram
15 Control spring
16 Pump drive
17 Swash plate
18 Ram
19 Pump input
20 Pump output (in the bottom plate of the control devices)
21 Compression spring (margin pressure)

As the motor is shut down, there is no pressure in the hydraulic system.

The compression spring (21) has pushed the volume flow controller (8) to the end stop on the right. Due to this position, the upper side of the control ram (14) is connected with the tank via the volume flow controller (8).

The control spring (15) has moved the swash plate (17) to its maximum position.

1.2 Low pressure standby



2 Working hydraulics pump (LS pump)
6 Compensating valve
7 Input (load pressure from signal network)
8 Volume flow controller
14 Control ram
15 Control spring
17 Swash plate
18 Ram
19 Pump input
20 Pump output (in the bottom plate of the control devices)
21 Compression spring (margin pressure)
25 Control edge

AA Oil supply
BB Pressure-reduced oil
EE Feed oil from the feed pump
LL Tank (pressureless)

All control units are in their neutral position. At the beginning, the swash plate (17) is in its maximum swung-out position (see also “Motor OFF”)

As soon as the motor is started, the pump delivers the maximum volume flow to the spools of all control units.

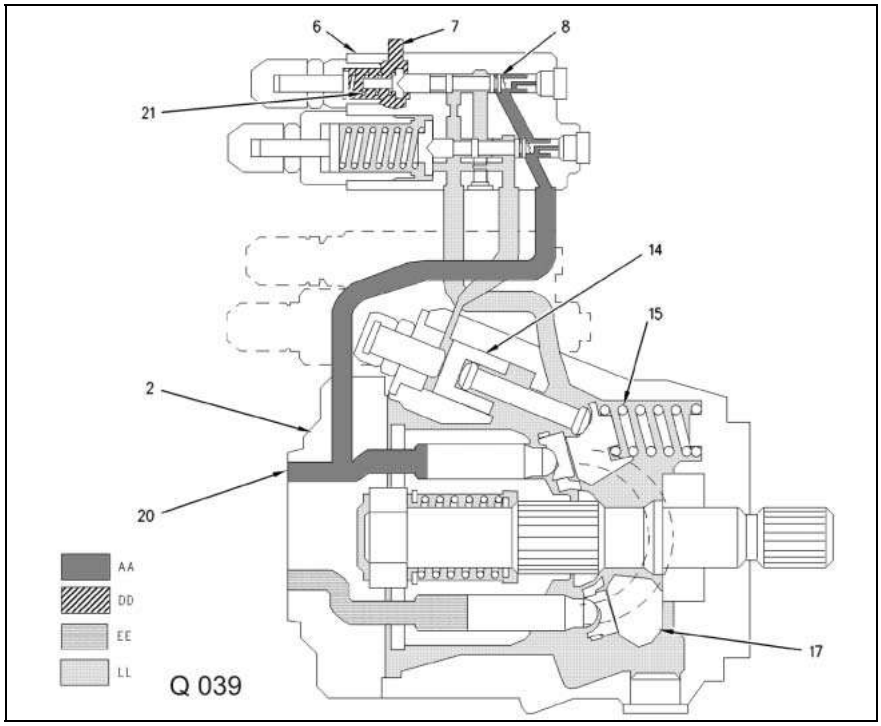
As the spools completely shut off the flow, the pressure rises the acts upon the right side of the volume flow controller (8) which is moved to the left against the compression spring (21).
The control edge (25) is now opened, enabling the pressure to access the top face of the control ram (14). Now the swash plate (17) is moved to the “Minimum pump capacity” position against the control spring (15).
This process takes 10 milliseconds.

In this pump position, the following happens:
Only such a volume flow is generated that is enough to compensate leakage losses;
The pressure required for actuation of a consumer is maintained.

Since each control unit is in its neutral position, the load pressure input (7) is pressureless (connected to the tank). To move the volume flow controller, the pump pressure only has to overcome the spring (21). The pressure required for this is xxx bar (see technical data of tractor) and is referred to as the “Low-pressure standby”.

The pump remains in the “Low-pressure standby” position until a control unit is actuated. In this position, the pump requires only little drive energy.

1.3 A control device is actuated = start of LS pump delivery



2 Working hydraulics pump (LS pump)
6 Compensating valve
7 Input (load pressure from signal network)
8 Volume flow controller
14 Control ram
15 Control spring
17 Swash plate
18 Ram
19 Pump input
20 Pump output (in the bottom plate of the control devices)
21 Compression spring (margin pressure)

AA Oil supply
BB Pressure-reduced oil
EE Feed oil from the feed pump
LL Tank (pressureless)

When a control device is actuated, requiring an increased flow from the pump, the pump pressure drops slightly.

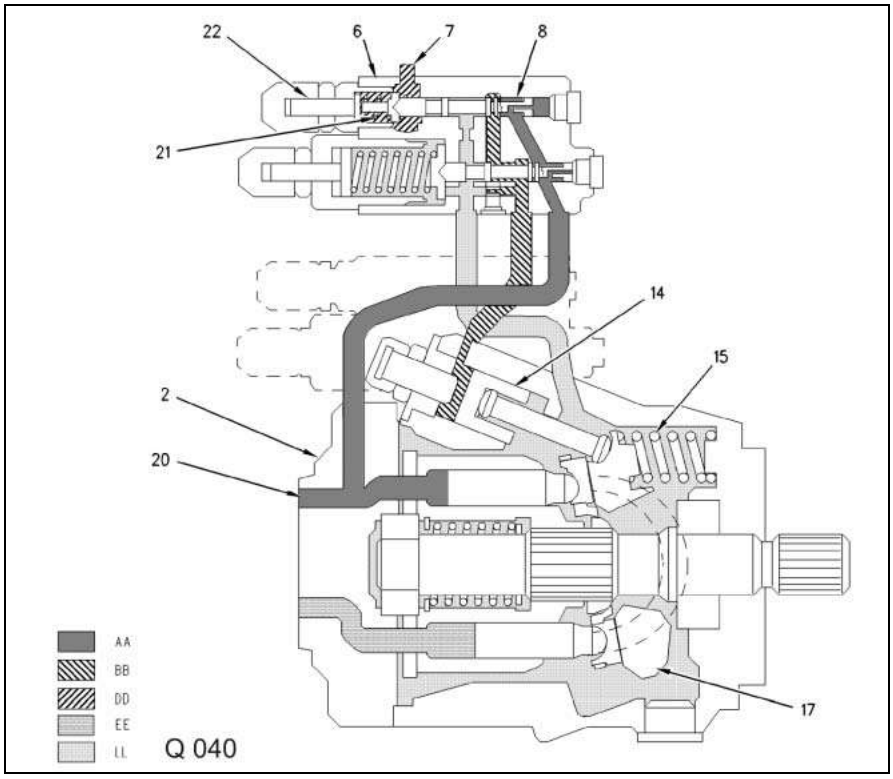
The following condition results at the volume flow controller (8):
the pump pressure acts on the right-hand face end
the load pressure + the spring force of the compression spring act in the spring space (Margin pressure) (21).

Since the load pressure + the spring force of the compression spring (Margin pressure) (21) is higher than the pump pressure on the right face end, the volume flow controller (8) is moved to the right up to the stop.
As a consequence:
the free circulation of the pump pressure to the control ram is blocked.
the control ram (14) is connected to the tank (no pressure on ram face).
the swash plate (17) is tilted aside by the control spring (15).

The pump now pumps a higher volume flow. This process is referred to as “Upstroking”. The volume flow of the pump is determined by the restrictor effect of the open spool cross-section or by the setting of the flow divider of an additional control unit.

Reduced flow requirement
When the spool cross-section is reduced (the volume flow is to be reduced), the load pressure at the input (7) drops. This changes the force ratio at the volume flow controller (8), actuating the volume flow controller to the left against the spring, according to the pressure drop. The control ram (14) is pressurized and the swash plate (17) is set to a more horizontal position - the pump performs a downstroke until the volume flow requirement is met.

1.4 Constant volume flow



2 Working hydraulics pump (LS pump)
6 Compensating valve
7 Input (load pressure from signal network)
8 Volume flow controller
14 Control ram
15 Control spring
17 Swash plate
20 Pump output (in the bottom plate of the control devices)
21 Compression spring (margin pressure)
22 Adjusting screw

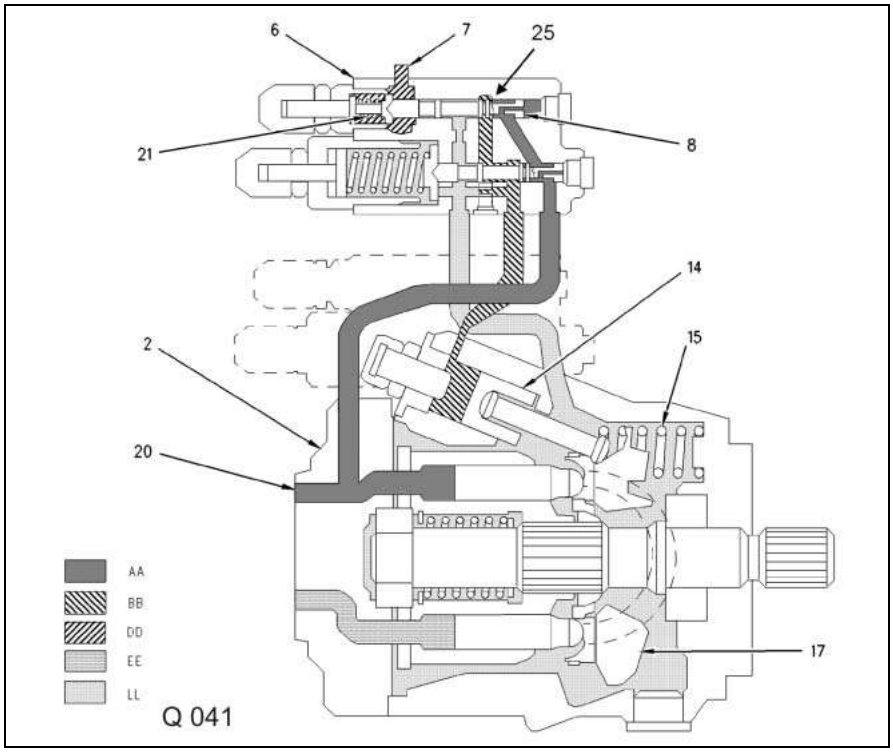
AA Oil supply
BB Pressure-reduced oil
DD Control oil
EE Feed oil from the feed pump
LL Tank (pressureless)

When a constant load is required from a port (constant consumer), the volume flow controller (8) is actuated to a stable position.
This keeps both the pressure on the top face of the control ram (14) and the position of the swash plate (17) constant. As long as the position of the swash plate (17) remains unchanged, the pump delivers a constant flow.

The following pressures now result on the volume flow controller (8):
the load pressure (signal) + spring force of the compression spring (margin pressure) (21) on the left side.
Pump pressure on the right side.

The difference in pressure is the differential pressure corresponding to the spring force of the compression spring (21).

1.5 Downstroking



2 Working hydraulics pump (LS pump)
6 Compensating valve
7 Input (load pressure from signal network)
8 Volume flow controller
14 Control ram
15 Control spring
17 Swash plate
20 Pump output (in the bottom plate of the control devices)
21 Compression spring (margin pressure)
25 Control edge

AA Oil supply
BB Pressure-reduced oil
DD Control oil
EE Feed oil from the feed pump
LL Tank (pressureless)

Downstroking of the LS pump is performed under the following conditions:

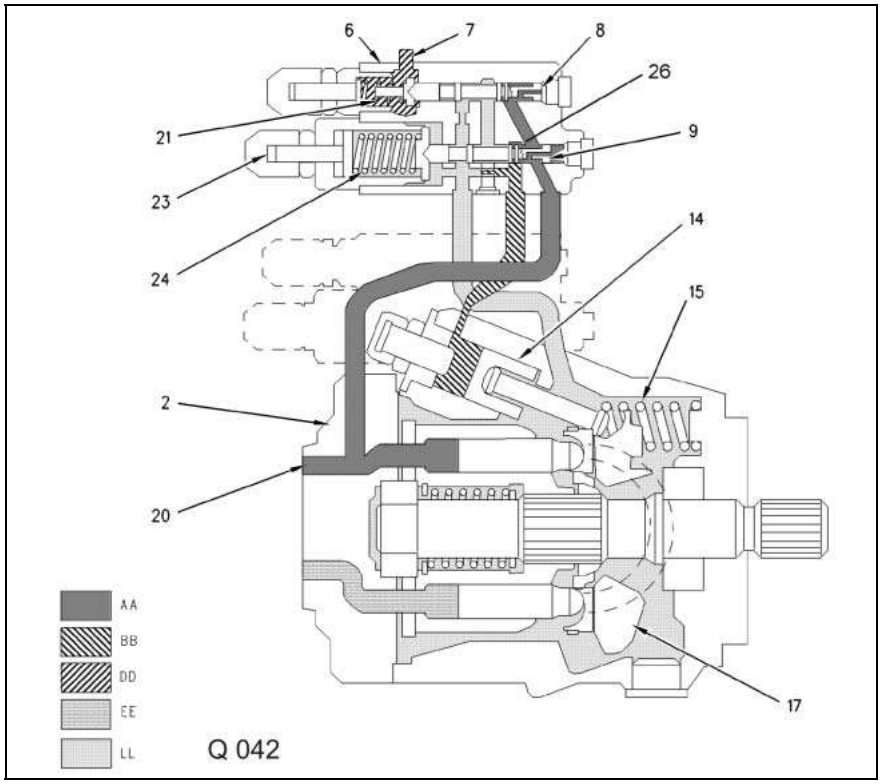
- a control unit is set to the neutral position. No volume flow is required.
- an additional control unit is set to the fine control range. A smaller volume flow is required.
- in parallel operation, a control unit is actuated to the neutral position or to the fine control range. A smaller volume flow is required.

The pump must perform a downstroke whenever a smaller volume flow is needed.
This will always happen when the pressure on the right face end of the volume flow controller (8) is higher than on the left face (in the spring space).
In this case, the volume flow controller (8) is moved to the left against the compression spring (21), opening the control edge (25).
This results in a rising pressure on the top face of the control ram (14) that sets the swash plate (17) to a more vertical position against the control spring (15) – the volume flow is reduced.

When the spool cross-section is reduced (fine control range), the load pressure at the input (7) drops.
This changes the force ratio at the volume flow controller (8) so that the volume flow controller is actuated to the left against the spring, according to the pressure drop.
The control edge (25) is opened, thus pressurizing the control ram (14).
The swash plate (17) is set to a more horizontal position and the pump performs a downstroke until the volume flow requirement is met.
A pump downstroke is triggered not only by the change of load pressure (signal).

An example:
When operating two control units in parallel, the load pressure values are 140 bar and 100 bar.
The pump pressure adjusts to a load pressure of 140 bar + spring pressure (spring 21).
Both the volume flow controller (8) and the swash plate (17) are in a constant position. The pump delivers the volume flow required for both consumers.
When the second control unit (load pressure 100 bar) is now set to the neutral position, the volume flow must decrease since only the first hydraulic circuit needs to be supplied.
This is achieved by disconnecting a hydraulic circuit, leading to a short-time increase of the pump pressure. The volume flow controller (8) is now actuated to the left, the control edge (25) opens and the pressure on the top face of the control ram rises. The swash plate (17) is set to a more horizontal position, thus reducing the volume flow.

1.6 Maximum pressure limitation (pressure relief valve function)



2 Working hydraulics pump (LS pump)
6 Compensating valve
7 Input (load pressure from signal network)
8 Volume flow controller
9 Pressure controller
14 Control ram
15 Control spring
17 Swash plate
20 Pump output (in the bottom plate of the control devices)
21 Compression spring (margin pressure)
23 Adjusting screw
24 Compression spring
26 Control edge

AA Oil supply
BB Pressure-reduced oil
DD Control oil
EE Feed oil from the feed pump
LL Tank (pressureless)

The pressure in the tractor's hydraulic system is limited e.g. to 200 bar in order to prevent component damage. This function is ensured by pressure controller (9).

During normal operation (working pressure < max. pressure), the pressure controller (9) is pushed to the right up to the stop by compression spring (24).

When e.g. a control unit is actuated and the cylinder reaches its limit position, the load pressure at input (7) rises until it is equal to the pressure at the pump output (20).

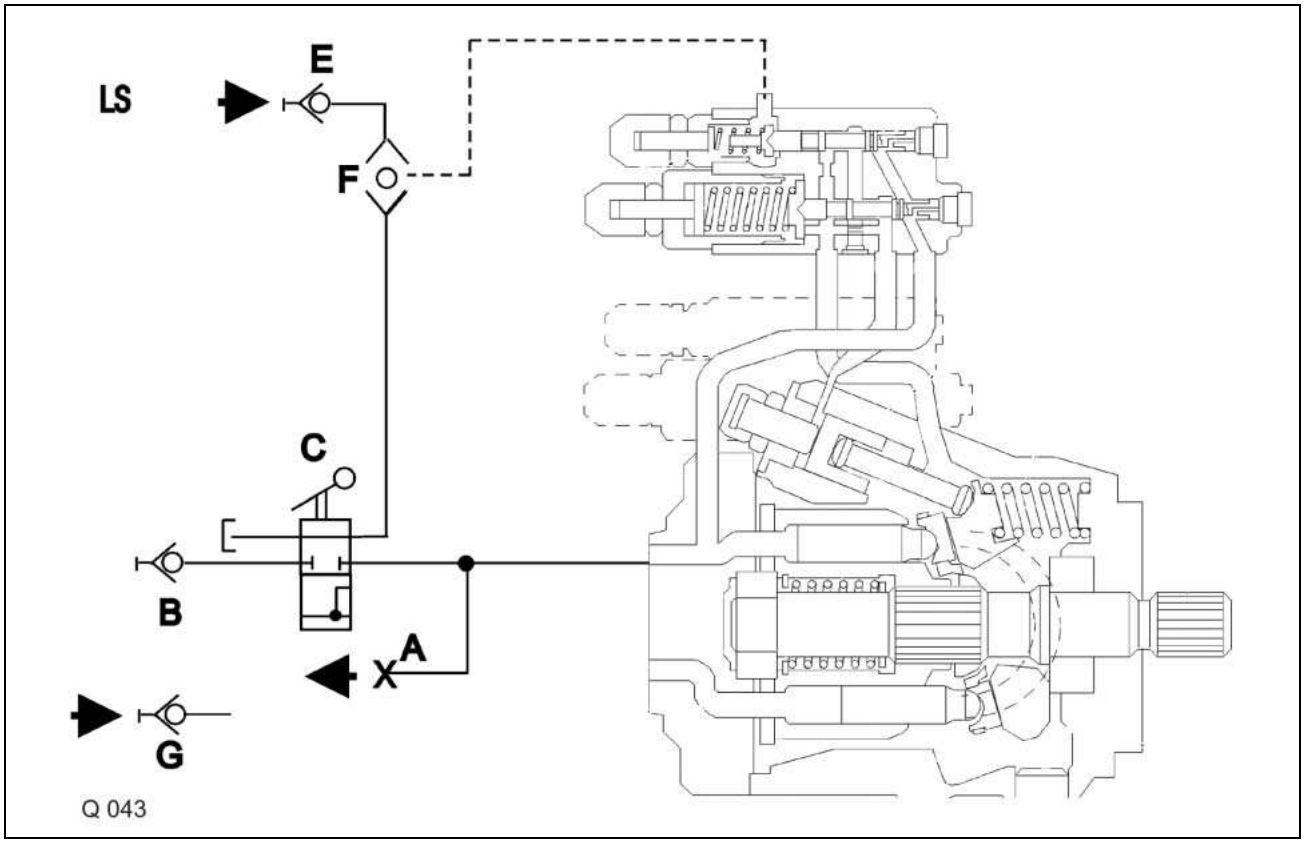
Under such pressure conditions:

- the volume flow controller (8) is pushed to the right up to the stop by compression spring (21).
- the pressure controller (9) is pushed to the left up to the stop against compression spring (24).
  This movement occurs at a pressure of e.g. 200 bar. The control edge (26) is now opened, enabling the pump pressure to act upon the top face of the control ram (14). The swash plate (17) is now actuated against the control spring (15) to its end position "Min. delivery".

The LS pump now delivers the lowest volume flow against the maximum pressure.
The hydraulic system remains at the max. pressure level as long as the additional control unit is set to the neutral position.

1.7 Connecting the self-loading forage wagon (hydraulic supply)

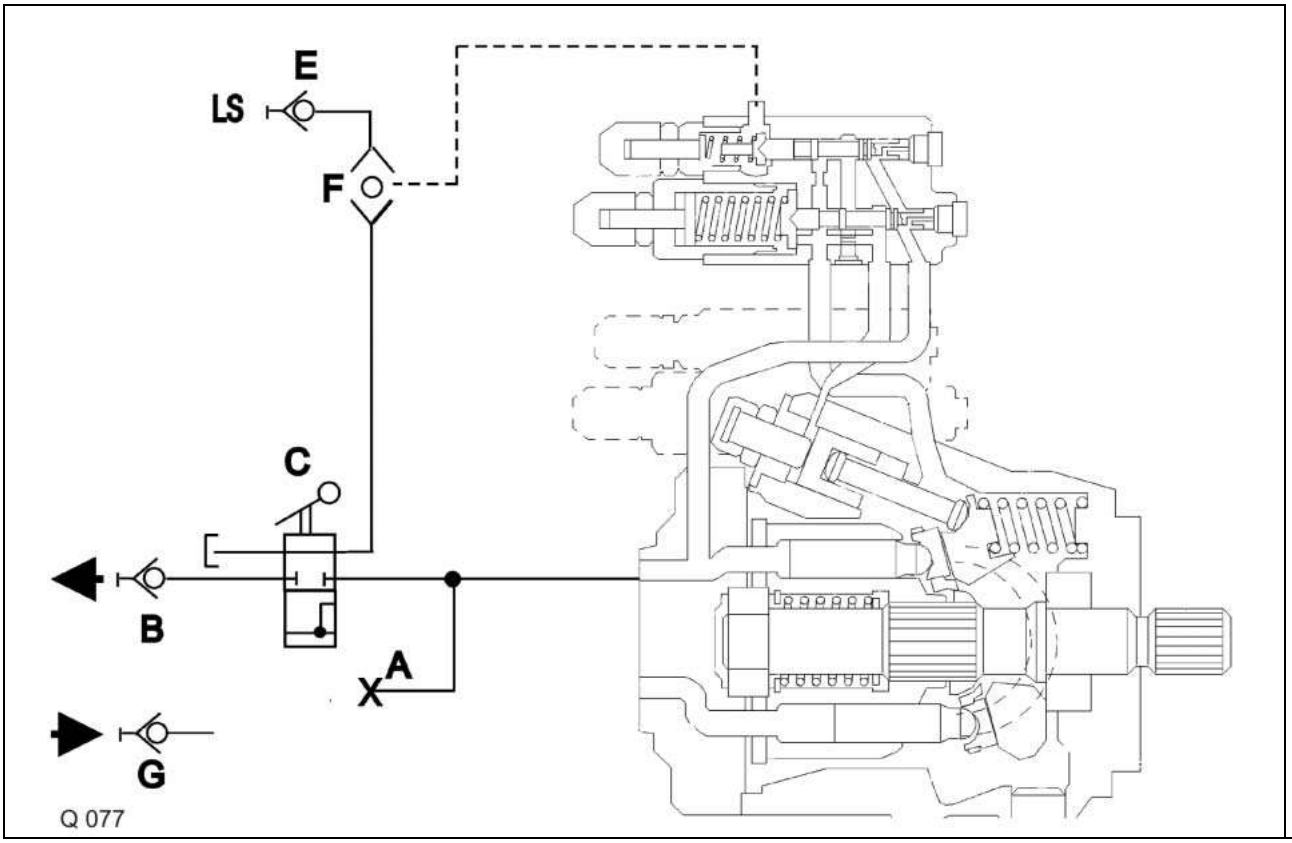
1.7.1 Hydraulic supply via the power beyond port



Item	Designation	Remark
A	Power beyond port	On the tractor. Directs the volume flow from the pump directly to the forage wagon.
B	Coupler socket	On the tractor. Is not used.
C	Additional control unit (e)	On the tractor. Is not used.
D	LS signal line	Directs the load pressure from a port on the forage wagon to the LS pump.
E	LS signal port	On the tractor. The signal line (load pressure) of the forage wagon is connected here.
F	Shuttle valve	Is pressed down by the signal pressure. The signal pressure is directed to the pump via the signal line (D).
G	Pressureless return line	On the tractor. Directs the returning oil flow to the tractor.

1.7.2 Hydraulic supply via the power beyond port

The connection points between forage wagon and tractor are:
Pressureless return line (G) = oil return from forage wagon to tractor
Coupler socket (B) = oil supply via additional control unit



Item	Designation	Remark
A	Power beyond port	On the tractor. Is not used (closed).
B	Coupler socket	On the tractor. Directs the volume flow from the LS pump to the forage wagon (via the additional control unit).
C	Additional control unit	On the tractor. Controls the volume flow from the pump via the coupler socket (B) to the forage wagon. In the neutral position, the LS signal line (D) is connected to the tank = no pressure build-up is possible. In working position: • the volume flow from the pump is directed to the forage wagon • the load pressure of a consumer on the forage wagon is directed into the LS pump via the LS signal line (D).
D	LS signal line	Directs the load pressure from a port on the forage wagon to the LS pump.
E	LS signal port	On the tractor. Is not used.
F	Shuttle valve	Is pressed up by the signal pressure. The signal pressure is directed to the pump via the signal line (D).
G	Pressureless return line	On the tractor. Directs the returning oil flow to the tractor.

2.0 QUANTUM 3500K / 3800K / 3500P / 3500S

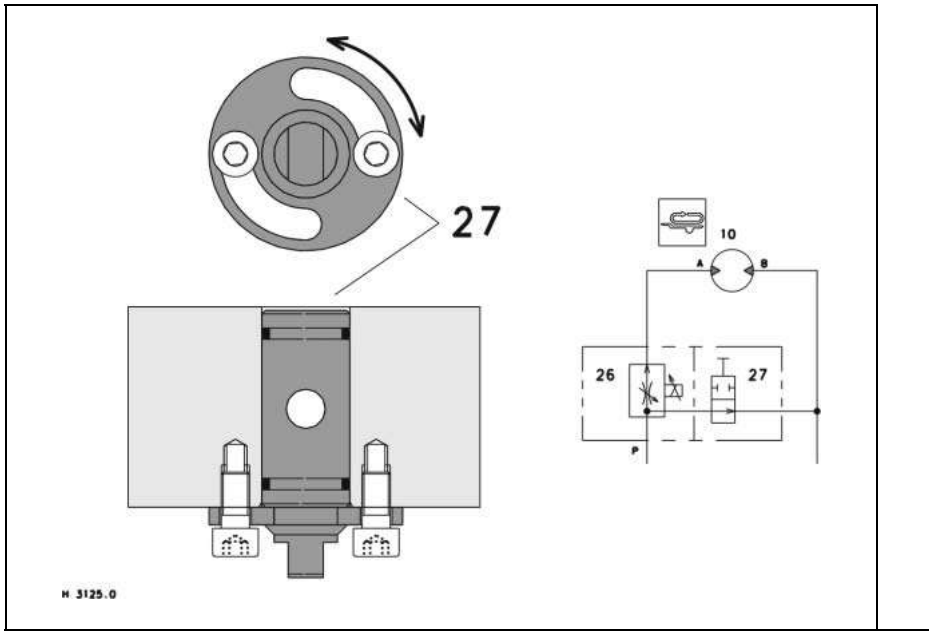
2.0.1 Prior to operation

As the various tractor types are equipped with different hydraulic systems, it is imperative to observe the Operator's Manual of the tractor. This is the only way to avoid damage to the hydraulic system of the tractor.

Important:
QUANTUM 3500S only

- Absolutely avoid any overheating of the tractor hydraulic system.
- Do not disregard any warning signals possibly appearing on the tractor.
- The forage wagon hydraulic system must be adapted to the tractor hydraulic system.

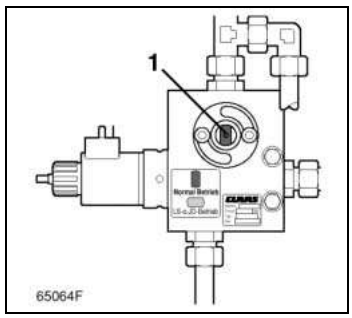
This is done using shut-off tap 27. In its ex-works delivery condition, the forage wagon hydraulic system is set to suit tractors with an open hydraulic system (standard system).



2.0.1 Fixed displacement pump

Tractors with fixed displacement pump = open hydraulic system (standard system on forage wagons).

The shut-off tap (1) is set counterclockwise to the left-hand limit stop = Free circulation of oil.



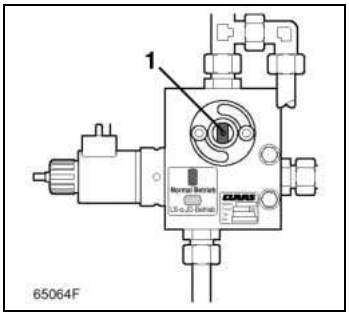
2.0.3 Constant-pressure pump

Tractors with constant-pressure pump = closed hydraulic system
(e.g. John Deere 50/55 series):
Adjust shut-off tap (1) clockwise to the right limit stop = Oil flow stopped.

2.0.4 Power beyond port

Adjust shut-off tap (1) clockwise to the right limit stop = Oil flow stopped.

Observe the tractor manufacturer's connection instructions.



2.1 3500K, 2500K, 2800K

2.1.1 Circuit Diagram

1 2/2 way raise/lower pick-up directional solenoid valve
2 2/2 way raise/lower articulated drawbar directional solenoid valve
3 2/2 way raise/lower knife frame directional solenoid valve
4 2/2 way dry crop top type P directional solenoid valve
5 2/2 way raise/lower tailgate directional solenoid valve

T Tractor
7 Pump with pressure relief valve
8 4/3-way valve
9 3/3-way valve

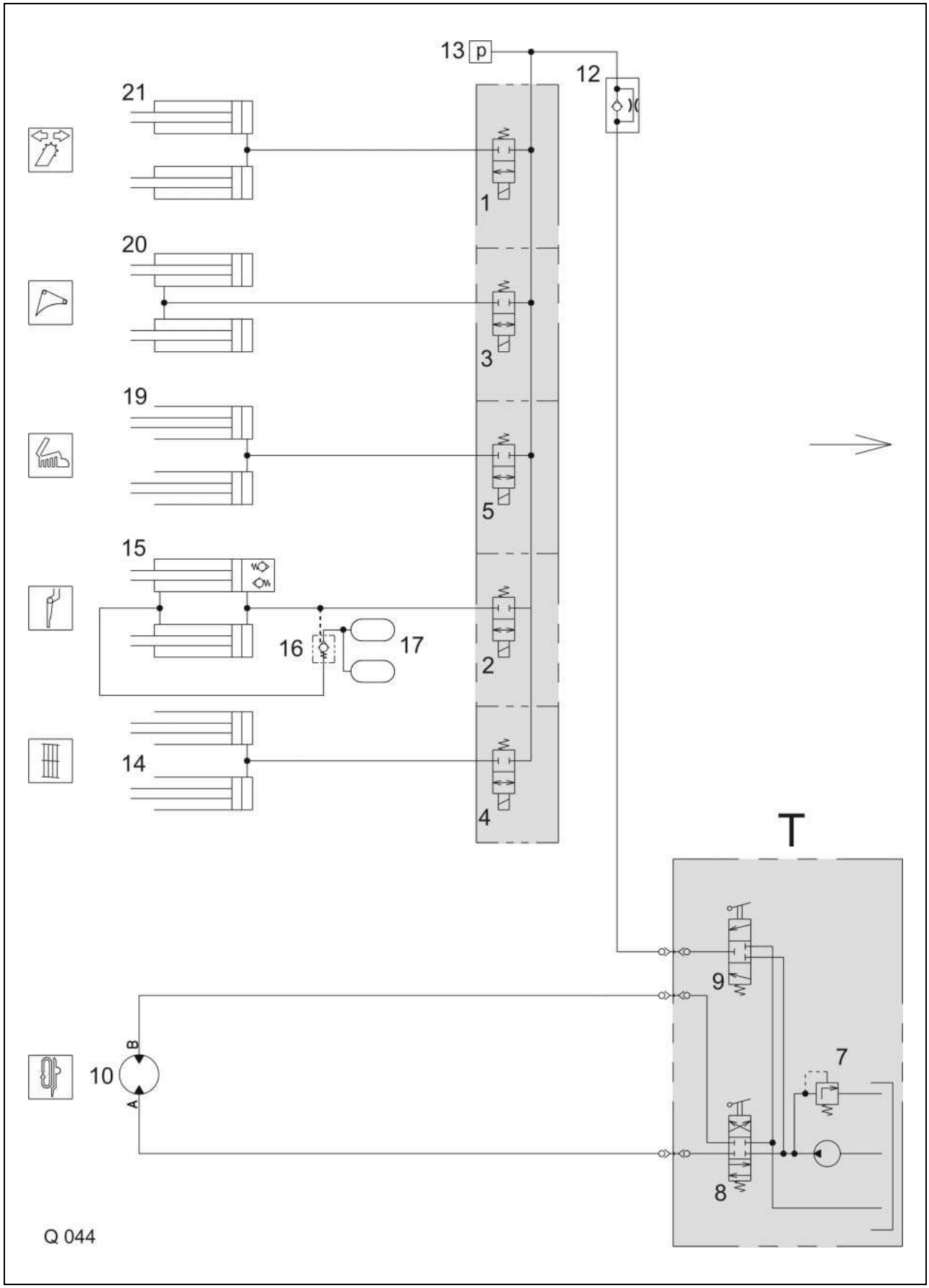
10 Hydraulic motor 100 cm³
12 One-way restrictor valve
13 Oil pressure switch 30 bar (knife frame up), not on 2500 K
14 Dry crop cylinder
15 Articulated drawbar cylinder
16 Hydraulically pilot-controlled non-return valve (lock-up valve unit)
17 Accumulator 40 bar (second accumulator added on serial no.)
19 Tailgate cylinder
20 Knife frame cylinder
21 Raise / lower pick-up cylinder

Swing up the knife frame

 - Press the key

The cylinders (20) are actuated in order to swing up the cutting frame. In this process a pressure is built up that is detected by oil pressure switch (13). When the pressure rises above 30 bar, the oil pressure switch is actuated and directs the signal to the CCT (**C**LAAS **C**ontrol **T**erminal).
The signal from the oil pressure switch overrides the reed switch signal so the knife frame can completely swing up. Otherwise the knife frame would only swing up to the reed switch position.

3500 K, 2500 K, 3800 K

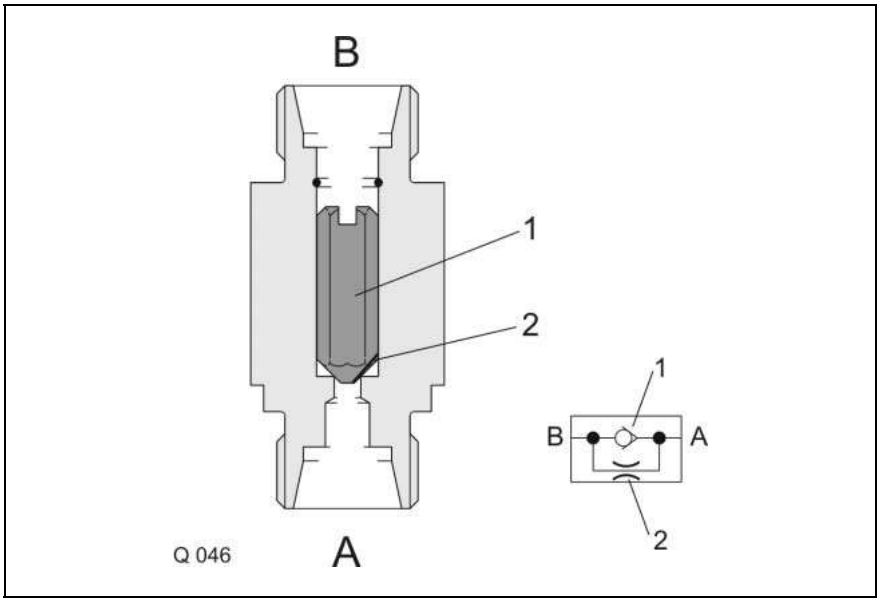


2.1.2 One-way restrictor valve

One-way restrictor valves are hydraulic components for controlling consumer speeds.

Speeds can be influenced only by modifying the volume flow:

- a low volume flow results in low speed,
- a high volume flow results in high speed.



Item	Designation	Remark
1	Valve	Designed as a hexagon, the hexagon areas allow the free circulation and the hexagon points guide the valve in the bore.
2	Restrictor	Designed as a notch in the valve seat.
A	Port	When the volume flow enters via port (A), the valve (1) is forced open and a high volume flow passes unrestrictedly over the hexagon areas of valve (1) to port (B).
B	Port	When the volume flow enters via port (B), the valve (1) is pressed onto the seat so that only a low volume flow passes over the restrictor (2) to port (A).

2.2 3500P, 2500P, 3800P

2.2.1 Circuit Diagram

1 2/2 way raise/lower pick-up directional solenoid valve
2 2/2 way raise/lower articulated drawbar directional solenoid valve
3 2/2 way raise/lower knife frame directional solenoid valve
4 2/2 way dry crop top type P directional solenoid valve
5 2/2 way raise/lower tailgate directional solenoid valve

T Tractor
7 Pump with pressure relief valve
8 4/3-way valve
9 3/3-way valve

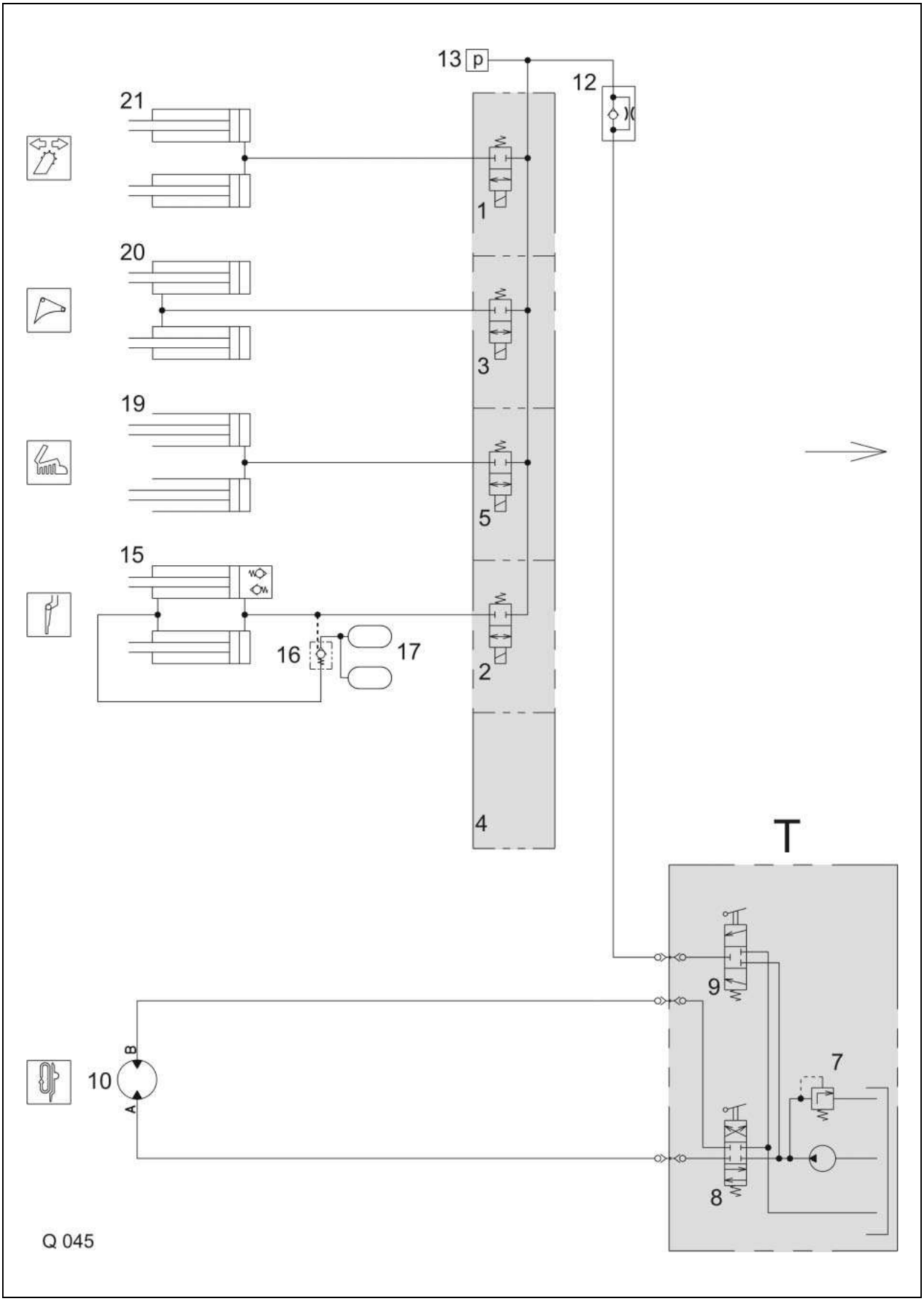
10 Hydraulic motor 100 cm³
12 One-way restrictor valve
13 Oil pressure switch 30 bar (knife frame up), not on 2500 K
14 Dry crop cylinder
15 Articulated drawbar cylinder
16 Hydraulically pilot-controlled non-return valve (lock-up valve unit)
17 Accumulator 40 bar (second accumulator added on serial no.)
19 Tailgate cylinder
20 Knife frame cylinder
21 Raise / lower pick-up cylinder

Swing up the knife frame

 - Press the key

The cylinders (20) are actuated in order to swing up the cutting frame. In this process a pressure is built up that is detected by oil pressure switch (13). When the pressure rises above 30 bar, the oil pressure switch is actuated and directs the signal to the CCT (**C**LAAS **C**ontrol **T**erminal).
The signal from the oil pressure switch overrides the reed switch signal so the knife frame can completely swing up. Otherwise the knife frame would only swing up to the reed switch position.

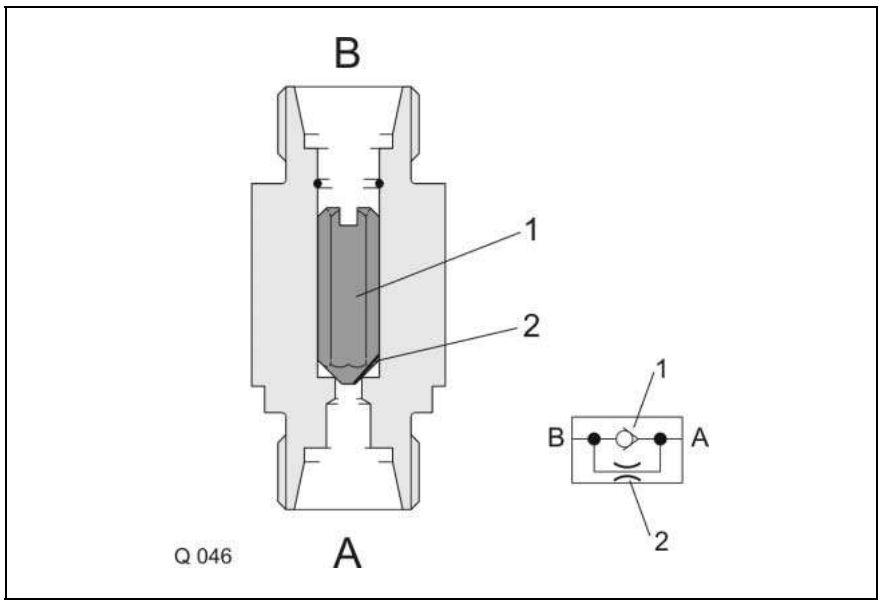
3500 K, 2500 K, 3800 P



2.2.2 One-way restrictor valve

One-way restrictor valves are hydraulic components for controlling consumer speeds.

Speeds can be influenced only by modifying the volume flow:
a low volume flow results in low speed
a high volume flow results in high speed.



Item	Designation	Remark
1	Valve	Designed as a hexagon, the hexagon areas allow the free circulation and the hexagon points guide the valve in the bore.
2	Restrictor	Designed as a notch in the valve seat.
A	Port	When the volume flow enters via port (A), the valve (1) is forced open and a high volume flow passes unrestrictedly over the hexagon areas of valve (1) to port (B).
B	Port	When the volume flow enters via port (B), the valve (1) is pressed onto the seat so that only a low volume flow passes over the restrictor (2) to port (A).

2.3 3500S

2.3.1 Circuit Diagram

1 2/2 way raise/lower pick-up directional solenoid valve
2 2/2 way raise/lower articulated drawbar directional solenoid valve
3 2/2 way raise/lower knife frame directional solenoid valve
4 2/2 way dry crop top type P directional solenoid valve
5

T Tractor
7 Pump with pressure relief valve
8 4/3-way valve
9 3/3-way valve

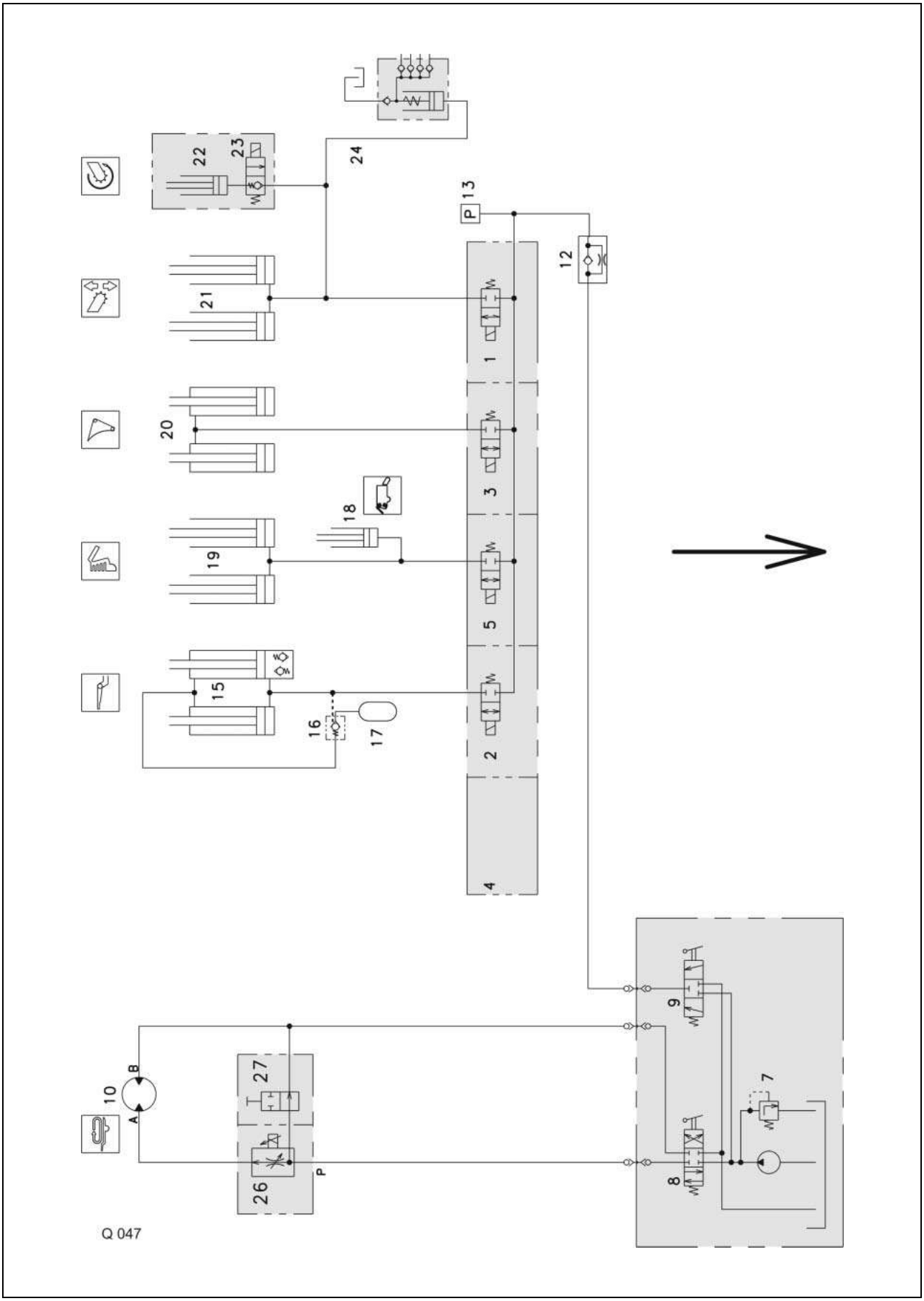
10 Hydraulic motor 100 cm³
12 One-way restrictor valve
13 Oil pressure switch 30 bar (knife frame up), not on 2500 K
14 Dry crop cylinder
15 Articulated drawbar cylinder
16 Hydraulically pilot-controlled non-return valve (lock-up valve unit)
17 Accumulator 40 bar
18 Shredder drums On coupler cylinder = Pressure/Off S-type
19 Tailgate cylinder
20 Knife frame cylinder
21 Raise / lower pick-up cylinder
22
24 Lubricating pump option
26 Flow control valve
27 Shut-off tap (John-Deere screw = constant P or LS system)

Swing up the knife frame

 - Press the key

The cylinders (20) are actuated in order to swing up the cutting frame. In this process a pressure is built up that is detected by oil pressure switch (13). When the pressure rises above 30 bar, the oil pressure switch is actuated and directs the signal to the CCT (**C**LAAS **C**ontrol **T**erminal).
The signal from the oil pressure switch overrides the reed switch signal so the knife frame can completely swing up. Otherwise the knife frame would only swing up to the reed switch position.

3500 S

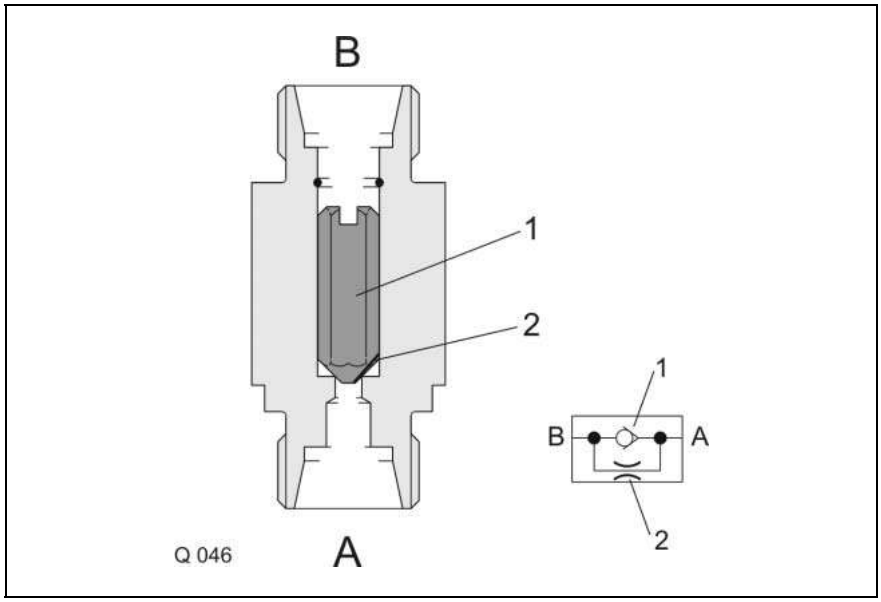


2.3.2 One-way restrictor valve

One-way restrictor valves are hydraulic components for controlling consumer speeds.

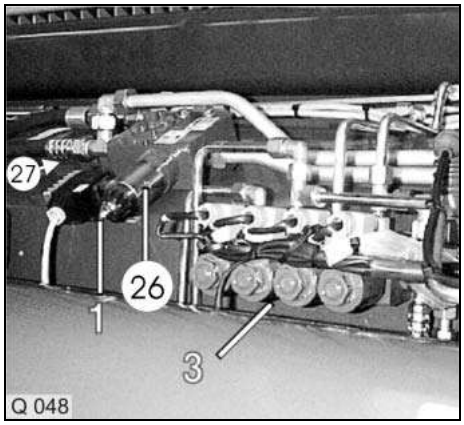
Speeds can be influenced only by modifying the volume flow:

- a low volume flow results in low speed
- a high volume flow results in high speed.



Item	Designation	Remark
1	Valve	Designed as a hexagon, the hexagon areas allow the free circulation and the hexagon points guide the valve in the bore.
2	Restrictor	Designed as a notch in the valve seat.
A	Port	When the volume flow enters via port (A), the valve (1) is forced open and a high volume flow passes unrestrictedly over the hexagon areas of valve (1) to port (B).
B	Port	When the volume flow enters via port (B), the valve (1) is pressed onto the seat so that only a low volume flow passes over the restrictor (2) to port (A).

2.3.3 Flow control valve with shut-off tap (only on 3500S)

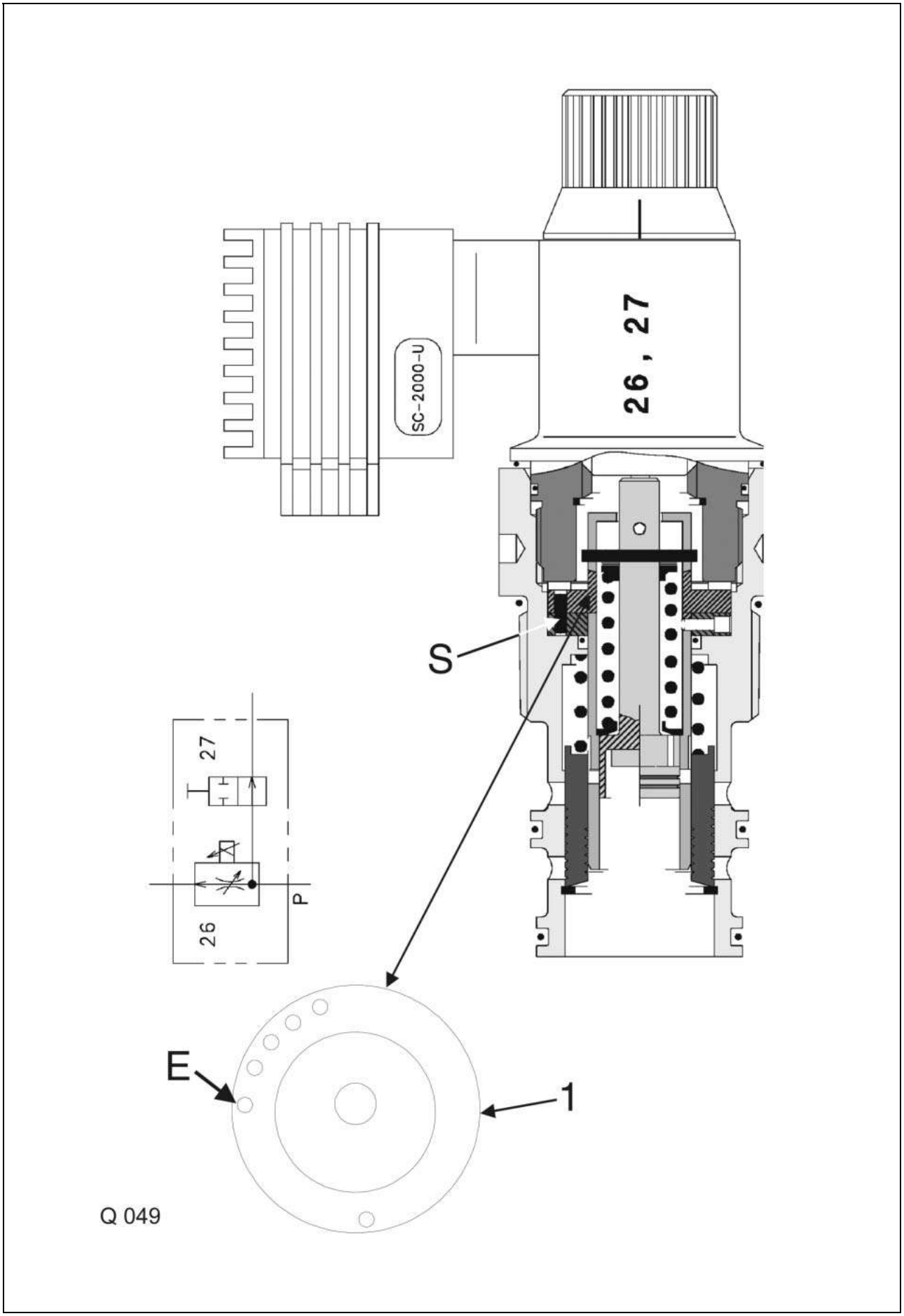


1 Emergency operation
3 Control block
26 Flow control valve
27 Shut-off tap (system screw = constant pressure or LS system). Close tap on constant pressure or LS hydraulic systems.

The flow control valve (26) controls the rotational speed of the hydraulic floor conveyor motor.
The solenoid coil of the flow control valve (26) is controlled via a potentiometer in the CCT.
According to the potentiometer position, a constant volume flow to the hydraulic motor is defined.
A constant volume flow generates a constant speed of the hydraulic motor. The adjusting plate (1) is fastened in the bore (E) with pin (S).

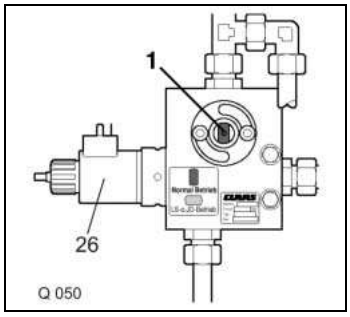
Emergency operation

If the electric system fails, the forage wagon functions may be operated using the flow control valve (2) and the control block (3).
Turn the screw (1) on the flow control valve (26) in until it is flush.
Set the double-acting control valve for the floor conveyor on the tractor under pressure.


SC-2000-U
26, 27
S
27
26
P
E
1
Q 049

2.3.4 Shut-off tap

Tractors with fixed displacement pump or LS pump without control line = open hydraulic system (standard system):
The shut-off tap (1) is adjusted counterclockwise to the left limit stop (ex-works setting) = Free circulation of oil.

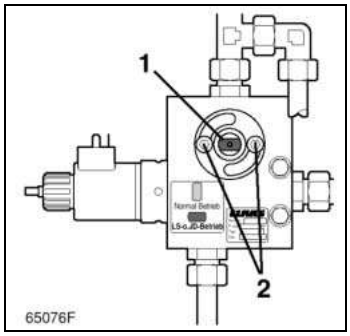


1 Shut-off tap
26 Flow control valve (QUANTUM 3500S only)

Important: In the two following systems, the pressure relief valve of the forage wagon must be set higher than the pressure relief valve of the tractor:

- Tractor with constant-pressure pump = closed hydraulic system. Adjust shut-off tap (1) clockwise to the right limit stop = Oil circulation blocked.
  To this end, slacken off screws (2), turn shut-off tap (1) to the right and fasten screws again.

- Tractor with LS pump and directional control valve port: Adjust shut-off tap clockwise to the right limit stop = Oil flow stopped. To this end, slacken off screws (2), turn shut-off tap (1) to the right and fasten screws again.



3.0 QUANTUM 4500S / 5500S / S-16 / S-18 / 6800S

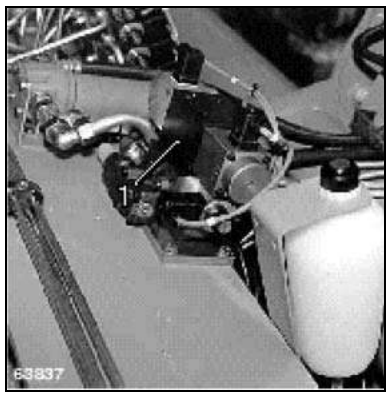
3.0.1 Prior to operation

As the various tractor types are equipped with different hydraulic systems, it is imperative to observe the Operator's Manual of the tractor. This is the only way to avoid damage to the hydraulic system of the tractor.

Attention:

- Absolutely avoid any overheating of the tractor hydraulic system.
- Do not disregard any warning signals possibly appearing on the tractor.
- The forage wagon hydraulic system must be adapted to the tractor hydraulic system.

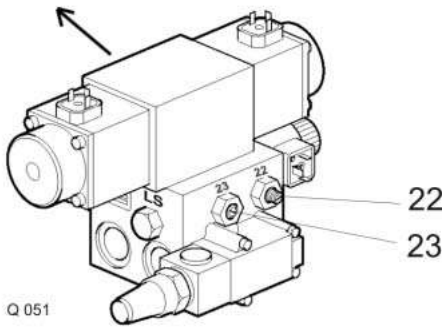
This is done on the hydraulic valve block (1). In its ex-works delivery condition, the forage wagon hydraulic system is set to suit tractors with an open hydraulic system (standard system).



Tractors with fixed displacement pump or LS pump without control line = open hydraulic system (standard system in QUANTUM):

- Unscrew set screw **22** on the hydraulic valve block (1)
- Fully screw in set screw **23** on the hydraulic valve block (1).

3.0.2 Fixed displacement pump



Attention: In the two following systems, the pressure relief valve of the forage wagon must be set higher than the pressure relief valve of the tractor:

3.0.3 Constant-pressure pump

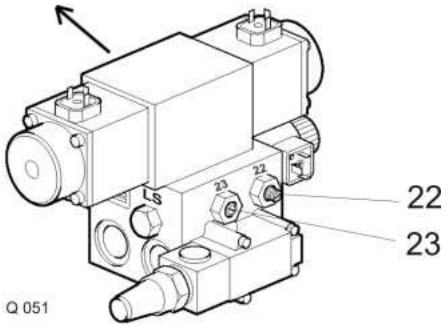
Tractors with constant-pressure pump = closed hydraulic system (e.g. John Deere 50/55 series):

- Fully screw in set screw **22** on the hydraulic valve block (1).
- Unscrew set screw **23** on the hydraulic valve block (1)

3.0.4 Power beyond port

Tractor with LS pump and CLAAS LS control line = Power beyond port:

- Fully screw in set screw **22** on the hydraulic valve block (1).
- Unscrew set screw **23** on the hydraulic valve block (1)



Connect the control line to the LS port of the control valve on the forage wagon and to the LS port of the tractor.
The control line can be purchased from the CLAAS spare parts service:

- 1x 238 665.0 Threaded bushing
- 1x 238 788.0 Elbow nipple
- 1x 607 230.0 Hydraulic hose
- 1x 913 322.0 Hydraulic hose
- 1x 607 298.0 Plug

Free circulation
(solenoids not energized)

Remark: Oil supply from the tractor is via the additional control unit, port (P).

The most favourable way of connecting is to let the return oil from the forage wagon flow into a direct port to the tank (pressureless return line). The oil quantity from the tractor should not exceed approx. 60 l/min., as otherwise the circulation pressure and consequently the oil temperature may increase.
The normal circulation pressure is below 20 bar (at an oil temperature of 50°C). The oil pressure switch (2) activates the electric system (terminal) at a circulation pressure of 2 bar.

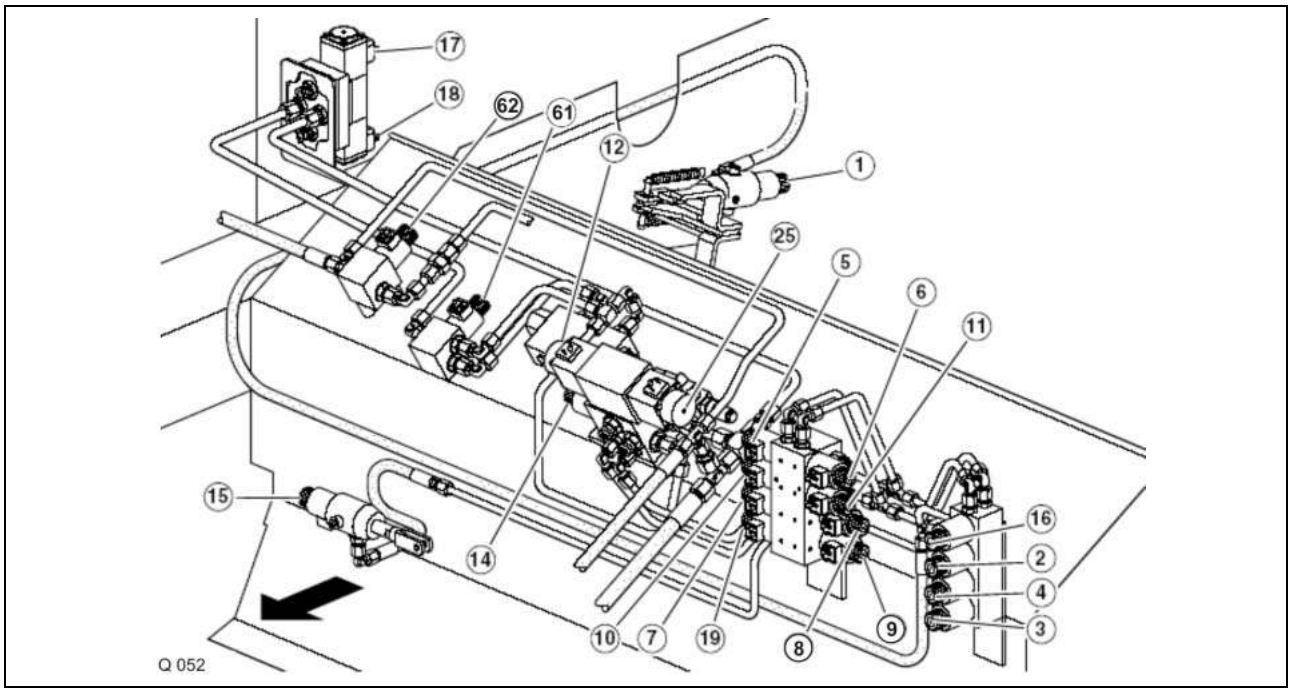
3.1 Survey

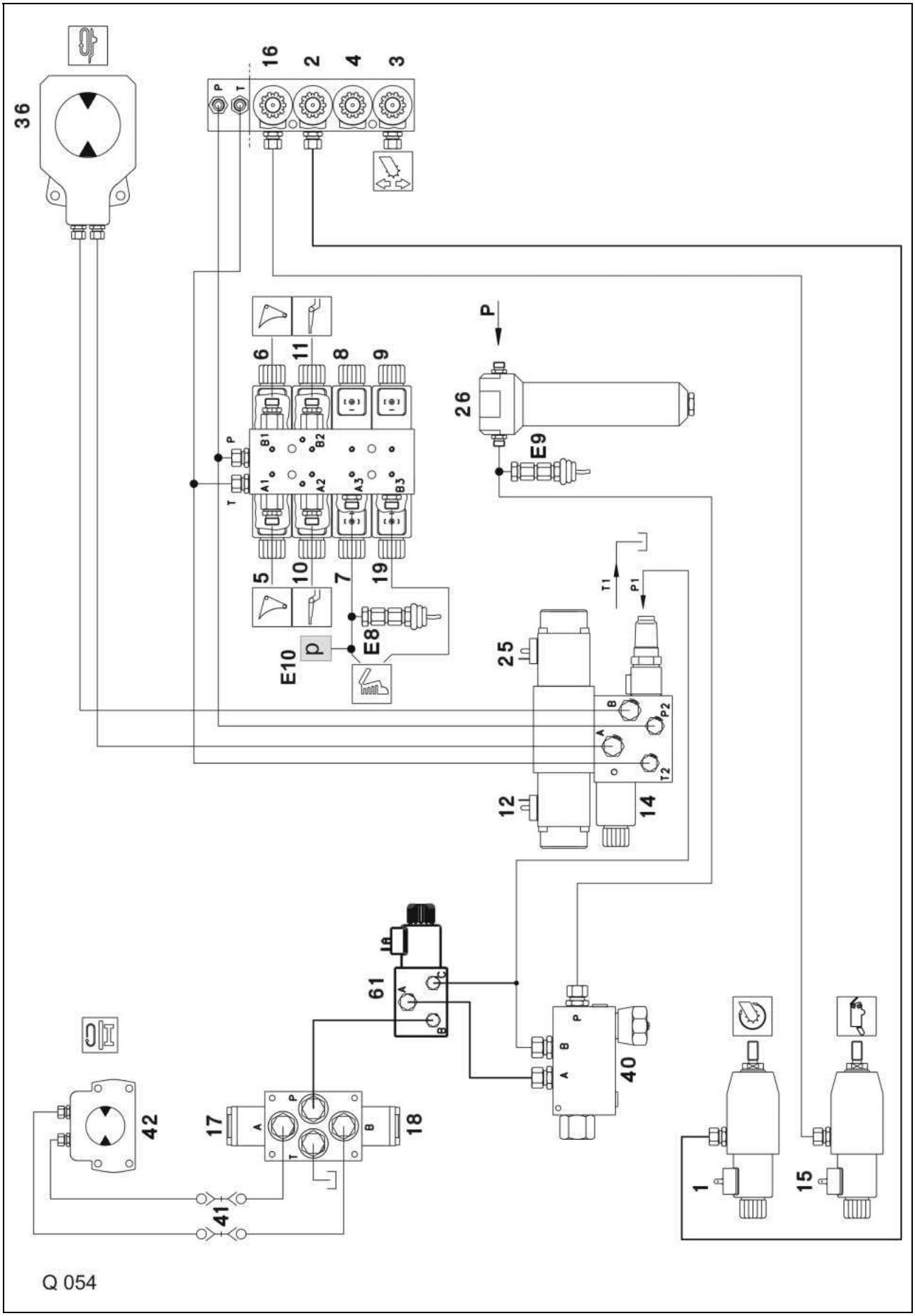
3.1.1 Without 2-speed floor conveyor motor

1 3/2 way pick-up drive On solenoid valve
2 3/2 way pick-up drive Off solenoid valve
3 3/2 way lower pick-up solenoid valve
4 3/2 way raise pick-up solenoid valve
5 3/2 way open knife frame solenoid valve
6 3/2 way close knife frame solenoid valve
7 3/2 way open tailgate solenoid valve
8 3/2 way close tailgate solenoid valve
9 3/2 way tailgate pressureless solenoid valve
10 3/2 way raise articulated drawbar solenoid valve
11 3/2 way lower articulated drawbar solenoid valve
12 4/3 way reverse floor conveyor solenoid valve
14 3/2 way master valve solenoid valve
15 3/2 way shredder drums drive solenoid valve
16 3/2 way shredder drums drive Off solenoid valve
17 4/3 way left cross conveyor belt solenoid valve (option)
18 4/3 way right cross conveyor belt solenoid valve (option)
19 3/2 way lock tailgate solenoid valve
25 4/3 way floor conveyor forward proportional solenoid valve
26 Filter
36 DANFOSS OMR 125 floor conveyor hydraulic motor
40 3 way flow control valve
41 Hydraulic couplers
42 Hydraulic motor, cross conveyor belt
61 3/2 way cross conveyor belt option solenoid valve
62 3/2 way trailing axle solenoid valve
63 Trailing axle cylinder
64 Non-return valve

E8 Oil pressure switch 150 bar, tailgate open
E9 Oil pressure switch 2 bar, terminal switch-over contact
E10 Oil pressure switch 30 bar (from serial no.)

A Working line
B Working line
P Pump port (feed line)
T Tank port (return line)




36
16
2
4
3
P
T
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11
8
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B1
B2
A1
A2
A3
B3
5
10
7
19
E10
E8
26
E9
25
T1
P1
P2
T2
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42
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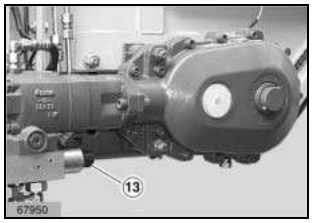
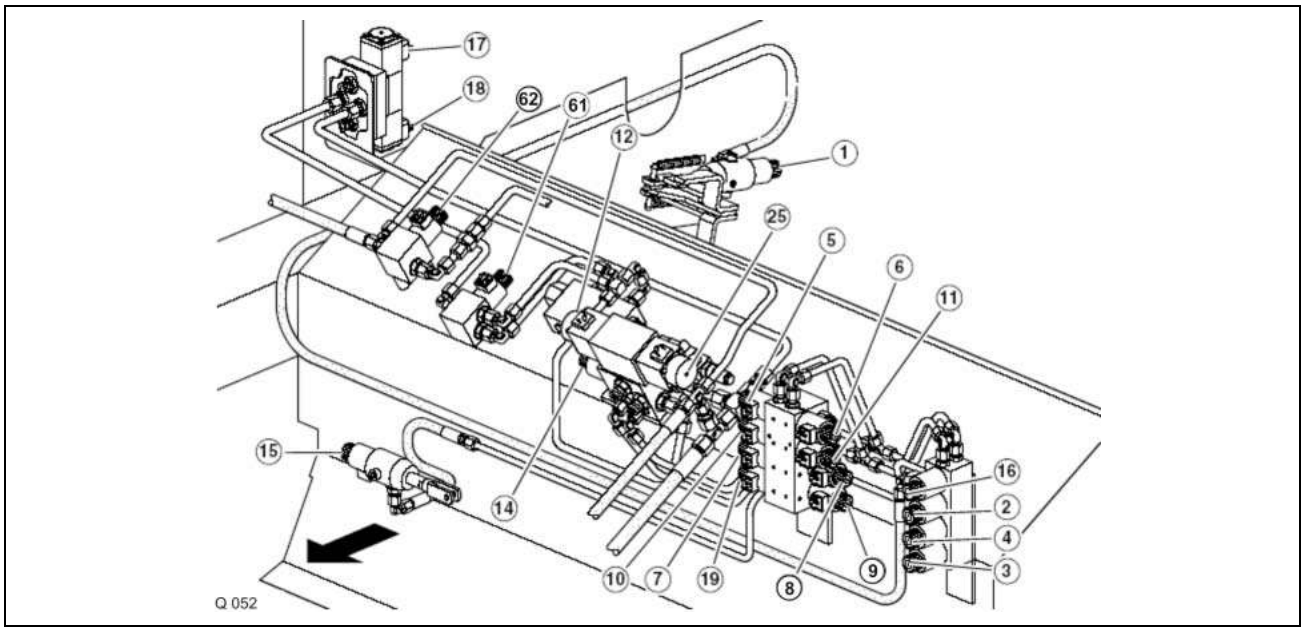
15

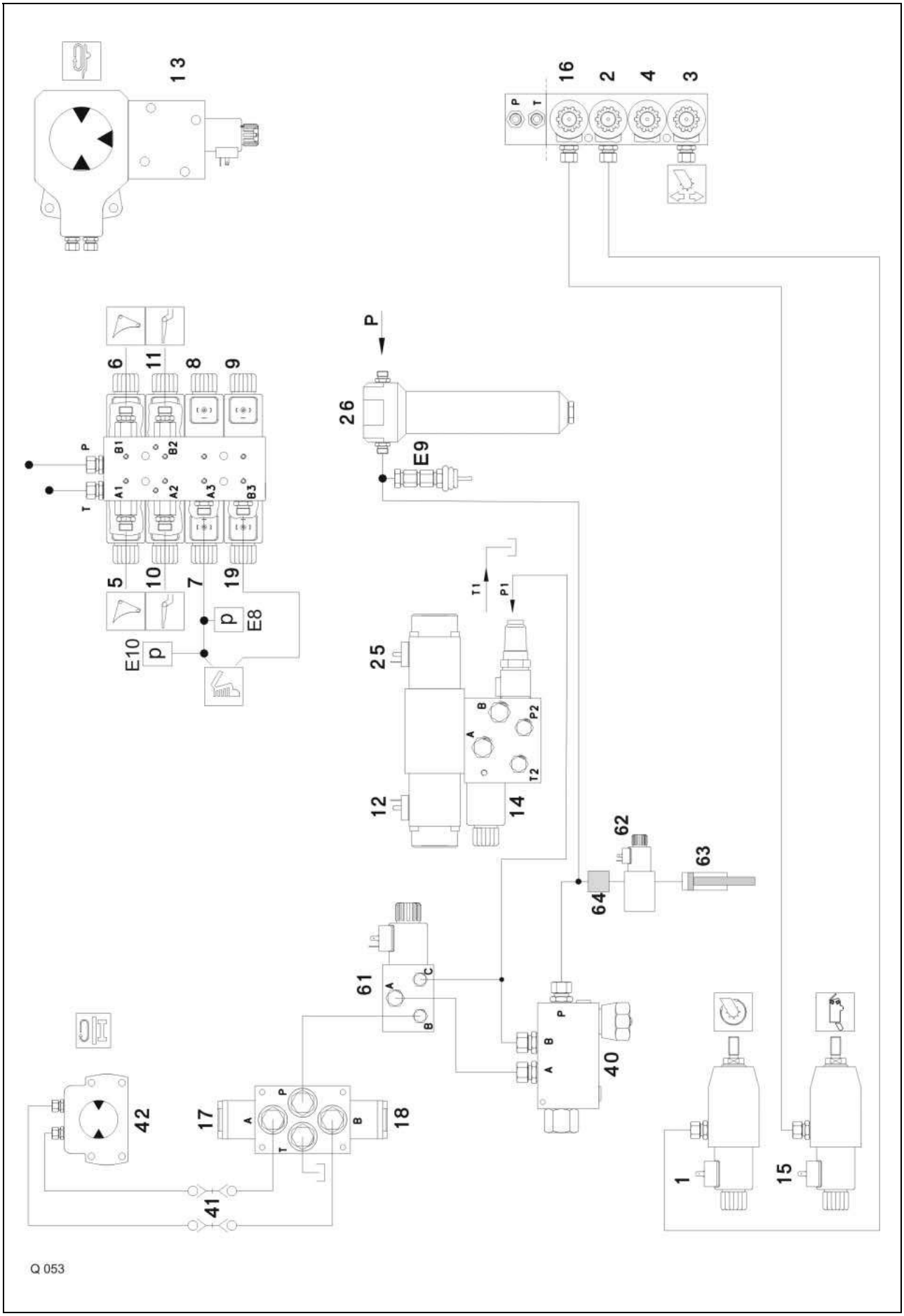
Q 054

3.1.2 With 2-speed floor conveyor motor



1 3/2 way pick-up drive On solenoid valve
2 3/2 way pick-up drive Off solenoid valve
3 3/2 way lower pick-up solenoid valve
4 3/2 way raise pick-up solenoid valve
5 3/2 way open knife frame solenoid valve
6 3/2 way close knife frame solenoid valve
7 3/2 way open tailgate solenoid valve
8 3/2 way close tailgate solenoid valve
9 3/2 way tailgate pressureless solenoid valve
10 3/2 way raise articulated drawbar solenoid valve
11 3/2 way lower articulated drawbar solenoid valve
12 4/3 way reverse floor conveyor solenoid valve
13 Eaton 2-speed floor conveyor hydraulic motor 80/160 cm³.
On QUANTUM 6800 P/S: Eaton 2-speed hydraulic motor 95/195 cm³
14 3/2 way master valve solenoid valve
15 3/2 way shredder drums drive solenoid valve
16 3/2 way shredder drums drive Off solenoid valve
17 4/3 way left cross conveyor belt solenoid valve
18 4/3 way right cross conveyor belt solenoid valve
19 3/2 way lock tailgate solenoid valve
25 4/3 way floor conveyor forward proportional solenoid valve
26 Filter
40 3 way flow control valve
41 Hydraulic couplers
42 Hydraulic motor, cross conveyor belt
61 3/2 way cross conveyor belt option solenoid valve
62 3/2 way trailing axle solenoid valve
63 Trailing axle cylinder
64 Non-return valve
E8 Oil pressure switch 150 bar, tailgate open
E9 Oil pressure switch 2 bar, terminal switch-over contact
E10 Oil pressure switch 30 bar, for interior lighting
A Working line
B Working line
P Pump port (feed line)
T Tank port (return line)




13
16
2
4
3
P
T
6
11
8
9
B1
B2
A1
A2
A3
B3
P
T
5
10
7
19
E10
E8
26
P
E9
T1
P1
25
B
P2
A
T2
12
14
62
63
64
61
C
A
B
P
A
B
40
42
17
P
A
T
B
18
41
1
15
Q 053

3.2 Circuit Diagram

3.2.1 Without cross conveyor belt (without 2-speed floor conveyor motor)

1 3/2 way pick-up drive On solenoid valve
2 3/2 way pick-up drive Off solenoid valve
3 3/2 way lower pick-up solenoid valve
4 3/2 way raise pick-up solenoid valve
5 3/2 way open knife frame solenoid valve
6 3/2 way close knife frame solenoid valve
7 3/2 way open tailgate solenoid valve
8 3/2 way close tailgate solenoid valve
9 3/2 way tailgate pressureless solenoid valve
10 3/2 way raise articulated drawbar solenoid valve
11 3/2 way lower articulated drawbar solenoid valve
12 4/3 way reverse floor conveyor solenoid valve
14 3/2 way master valve solenoid valve
15 3/2 way shredder drums drive solenoid valve
16 3/2 way shredder drums drive Off solenoid valve
19 3/2 way lock tailgate solenoid valve
20 Pressure balance
21 Pressure relief valve 200 bar
22 Shut-off valve
23 Shut-off valve
24 Restrictor
25 4/3 way floor conveyor forward proportional solenoid valve
26 Filter
27 Hydraulic couplers
28 Tractor pump
29 Tractor oil tank
30 Knife frame hydraulic cylinder
31 Articulated drawbar hydraulic cylinder
32 Tailgate hydraulic cylinder
33 Shredder drums drive hydraulic cylinder
34 Pick-up drive hydraulic cylinder
35 Pick-up hydraulic cylinder
36 DANFOSS OMR 125 floor conveyor hydraulic motor
39 Load sensing port
60 Lock-up valve unit
62 3/2 way trailing axle solenoid valve
63 Trailing axle cylinder
64 Non-return valve

E8 Oil pressure switch 150 bar, tailgate open
E9 Oil pressure switch 2 bar, terminal switch-over contact
E10 Oil pressure switch 30 bar, for interior lighting (from serial no.)

A Working line
B Working line
P Pump port (feed line)
T Tank port (return line)

4500S / 5500S / S-16 / S-18 / 6800S

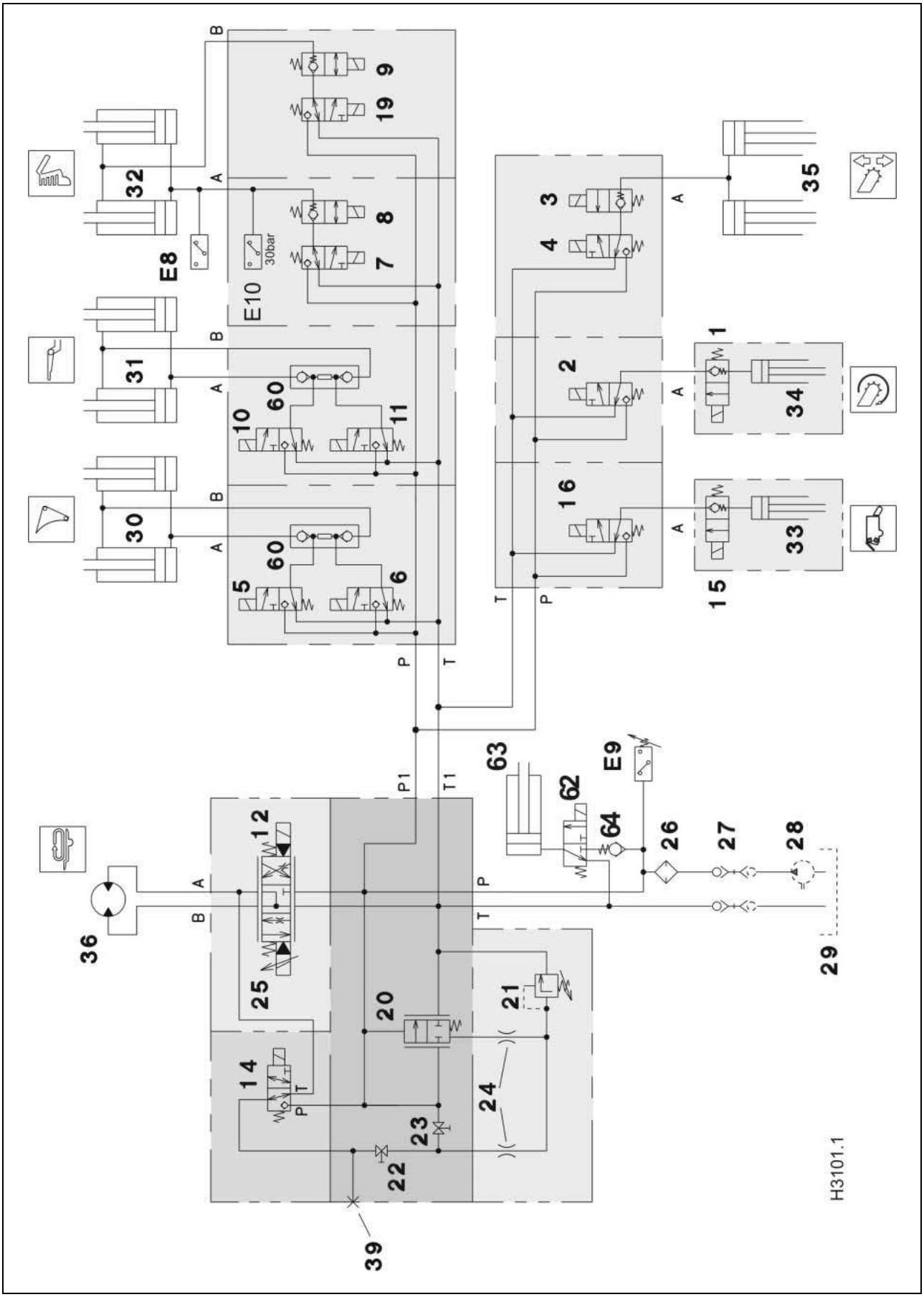
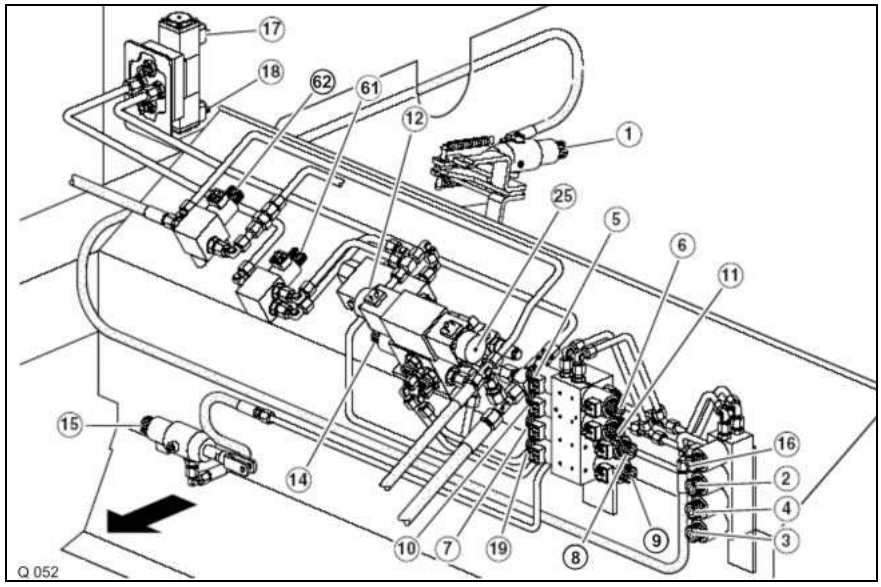
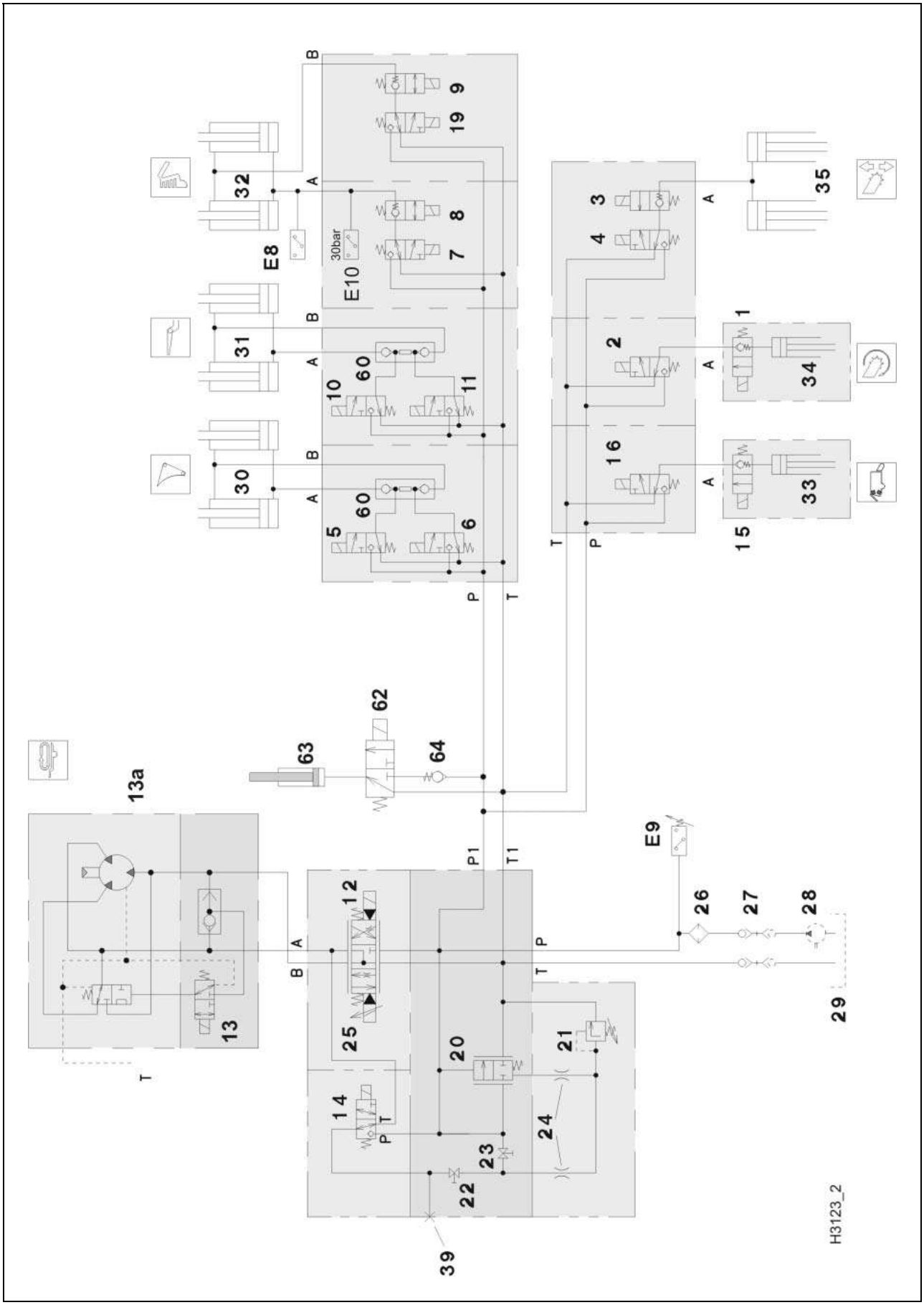


Table: **QUANTUM S with 2-speed motor and cross conveyor belt**
Function of solenoid coils

Function	Solenoid valve energized:		
Shredder drums On	-	15	-
Shredder drums Off	14	16	-
Open tailgate	14	7	9
Lower tailgate	-	8	9
Lock tailgate	14	8	19
Raise articulated drawbar	14	10	-
Lower articulated drawbar	14	11	-
Floor conveyor forward	14	25	-
Reverse floor conveyor	14	12	-
2-speed floor conveyor	14	13	25
Pick-up On	-	1	-
Pick-up Off	14	2	-
Raise pick-up	14	4	-
Lower pick-up (floating position)	-	3	-
Right cross conveyor belt	14	18	61
Left cross conveyor belt	14	17	61
Open knife frame	14	5	-
Close knife frame	14	6	-
Block trailing axle	14	62	-



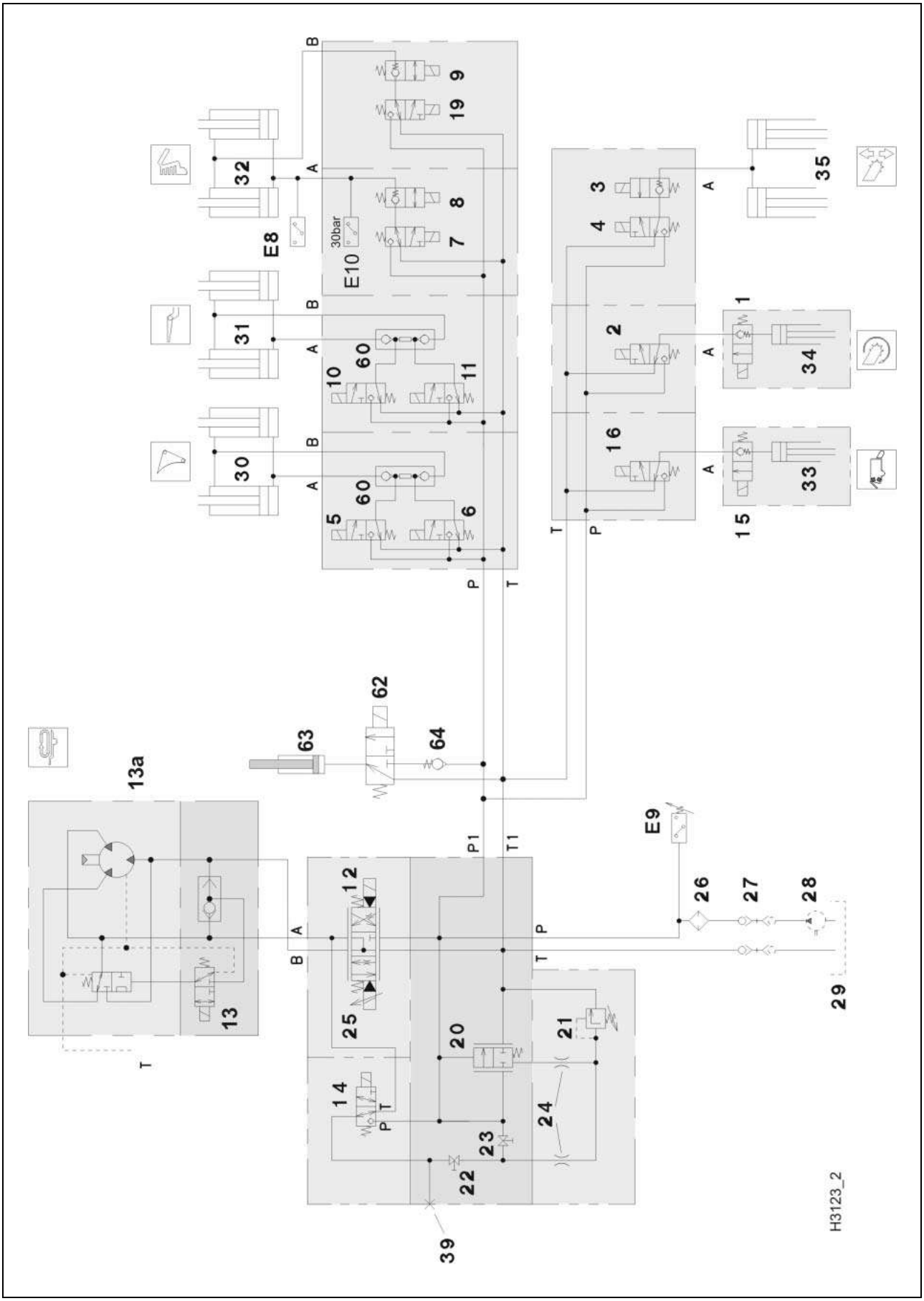
4500S / 5500S / S-16 / S-18 / 6800S



3.2.1 Without cross conveyor belt (with 2-speed floor conveyor motor)

1	3/2 way pick-up drive On solenoid valve
2	3/2 way pick-up drive Off solenoid valve
3	3/2 way lower pick-up solenoid valve
4	3/2 way raise pick-up solenoid valve
5	3/2 way open knife frame solenoid valve
6	3/2 way close knife frame solenoid valve
7	3/2 way open tailgate solenoid valve
8	3/2 way close tailgate solenoid valve
9	3/2 way tailgate pressureless solenoid valve
10	3/2 way raise articulated drawbar solenoid valve
11	3/2 way lower articulated drawbar solenoid valve
12	4/3 way reverse floor conveyor solenoid valve
13	3/2 way floor conveyor 2nd speed On solenoid valve
13a	Eaton 2-speed floor conveyor hydraulic motor 80/160 cm³
14	3/2 way master valve solenoid valve
15	3/2 way shredder drums drive solenoid valve
16	3/2 way shredder drums drive Off solenoid valve
19	3/2 way lock tailgate solenoid valve
20	Pressure balance
21	Pressure relief valve 200 bar
22	Shut-off valve
23	Shut-off valve
24	Restrictor
25	4/3 way floor conveyor forward proportional solenoid valve
26	Filter
27	Hydraulic couplers
28	Tractor pump
29	Tractor oil tank
30	Knife frame hydraulic cylinder
31	Articulated drawbar hydraulic cylinder
32	Tailgate hydraulic cylinder
33	Shredder drums drive hydraulic cylinder
34	Pick-up drive hydraulic cylinder
35	Pick-up hydraulic cylinder
39	Load sensing port
60	Lock-up valve unit
62	3/2 way trailing axle solenoid valve
63	Trailing axle cylinder
64	Non-return valve
E8	Oil pressure switch 150 bar, tailgate open
E9	Oil pressure switch 2 bar, terminal switch-over contact
E10	Oil pressure switch 30 bar, for interior lighting (from serial no.)
A	Working line
B	Working line
P	Pump port (feed line)
T	Tank port (return line)

4500S / 5500S / S-16 / S-18 / 6800S

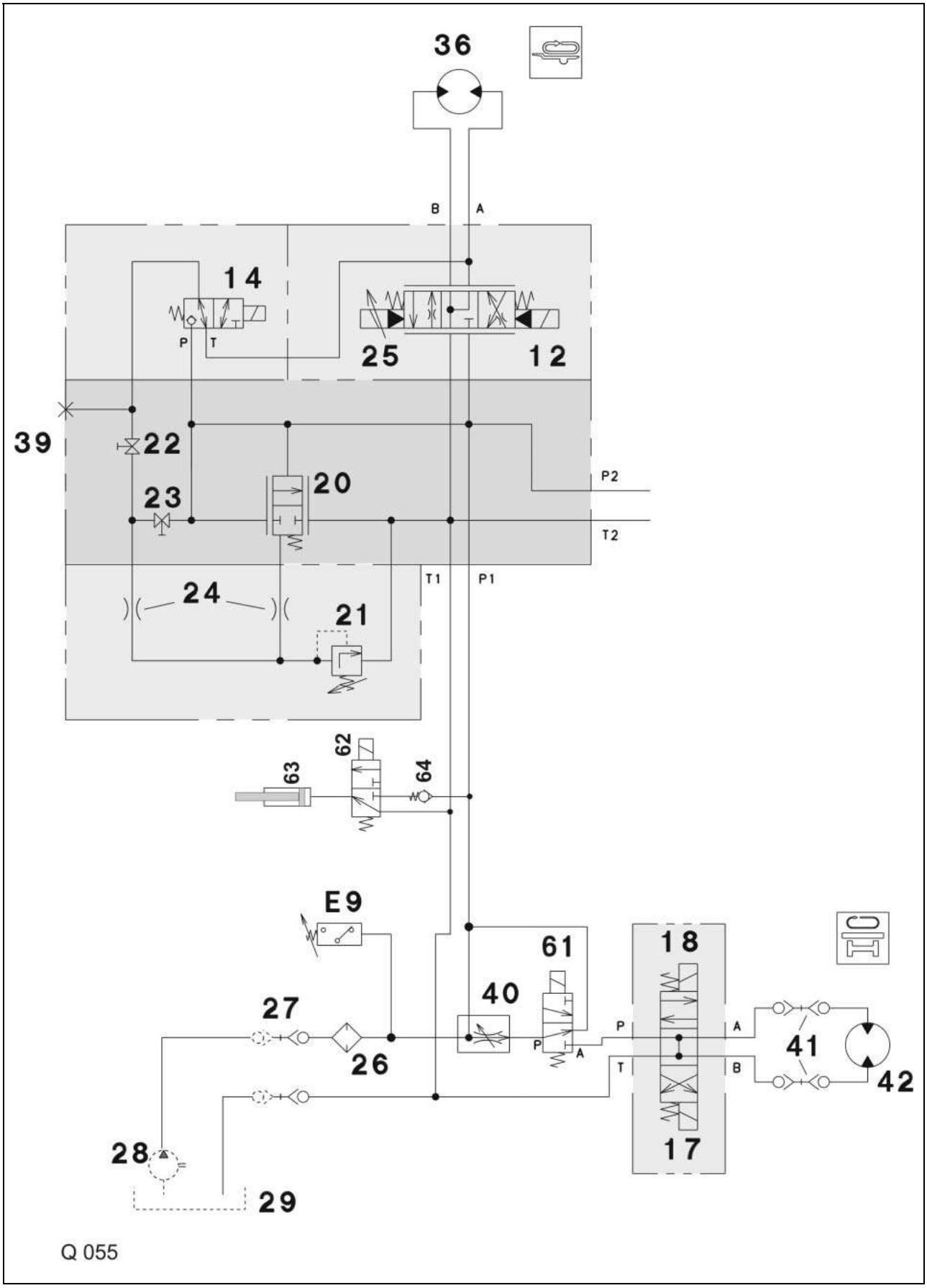


3.2.3 Without cross conveyor belt (without 2-speed floor conveyor motor)

12	4/3 way reverse floor conveyor solenoid valve
14	3/2 way master valve solenoid valve
17	4/3 way left cross conveyor belt solenoid valve
18	4/3 way right cross conveyor belt solenoid valve
20	Pressure balance
21	Pressure relief valve 200 bar
22	Shut-off valve
23	Shut-off valve
24	Restrictor
25	4/3 way floor conveyor forward proportional solenoid valve
26	Filter
27	Hydraulic couplers
28	Tractor pump
29	Tractor oil tank
36	DANFOSS OMR 125 floor conveyor hydraulic motor
39	Load sensing port
40	3 way flow control valve
41	Hydraulic couplers
42	Hydraulic motor, cross conveyor belt
61	3/2 way cross conveyor belt option solenoid valve
62	3/2 way trailing axle solenoid valve
63	Trailing axle cylinder
64	Non-return valve
E9	Oil pressure switch 2 bar, terminal switch-over contact
P	Pump port (feed line)
T	Tank port (return line)

Constant flow to motor = 28 l/min.
Protection by pressure relief valve on tractor.

4500S / 5500S / S-16 / S-18 / 6800S



3.3 Control block

12 4/3 way reverse floor conveyor solenoid valve
14 3/2 way master valve solenoid valve
20 Pressure balance
21 Pressure relief valve 200 bar
22 Shut-off valve
23 Shut-off valve
24 Restrictor
25 4/3 way floor conveyor forward proportional solenoid valve
39 Load sensing port

A Working line
B Working line
P Pump port (feed line)
T Tank port (return line)

Constant flow to motor = 28 l/min.
Protection by pressure relief valve on tractor.

Note:

Depending on the type of pump and/or tractor, the shut-off valves 22 and 23 must be set as follows:

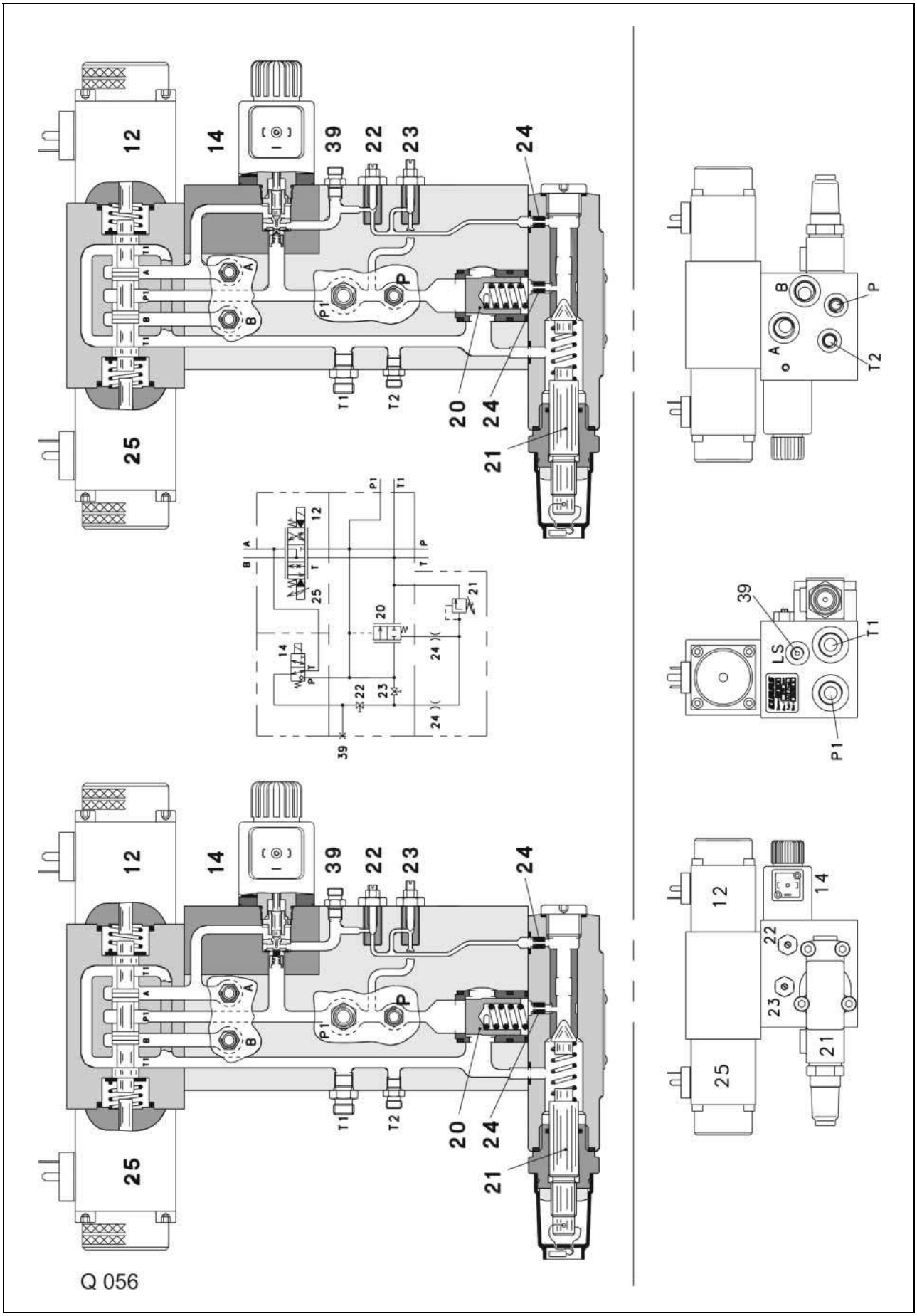
Constant-pressure pump:	22 shut-off	23 open
Fixed displacement pump:	22 open	23 shut-off
Load sensing pump:	22 shut-off	23 open = connect LS control line to port 39

Pressure balance, pressureless circulation, solenoids not activated.

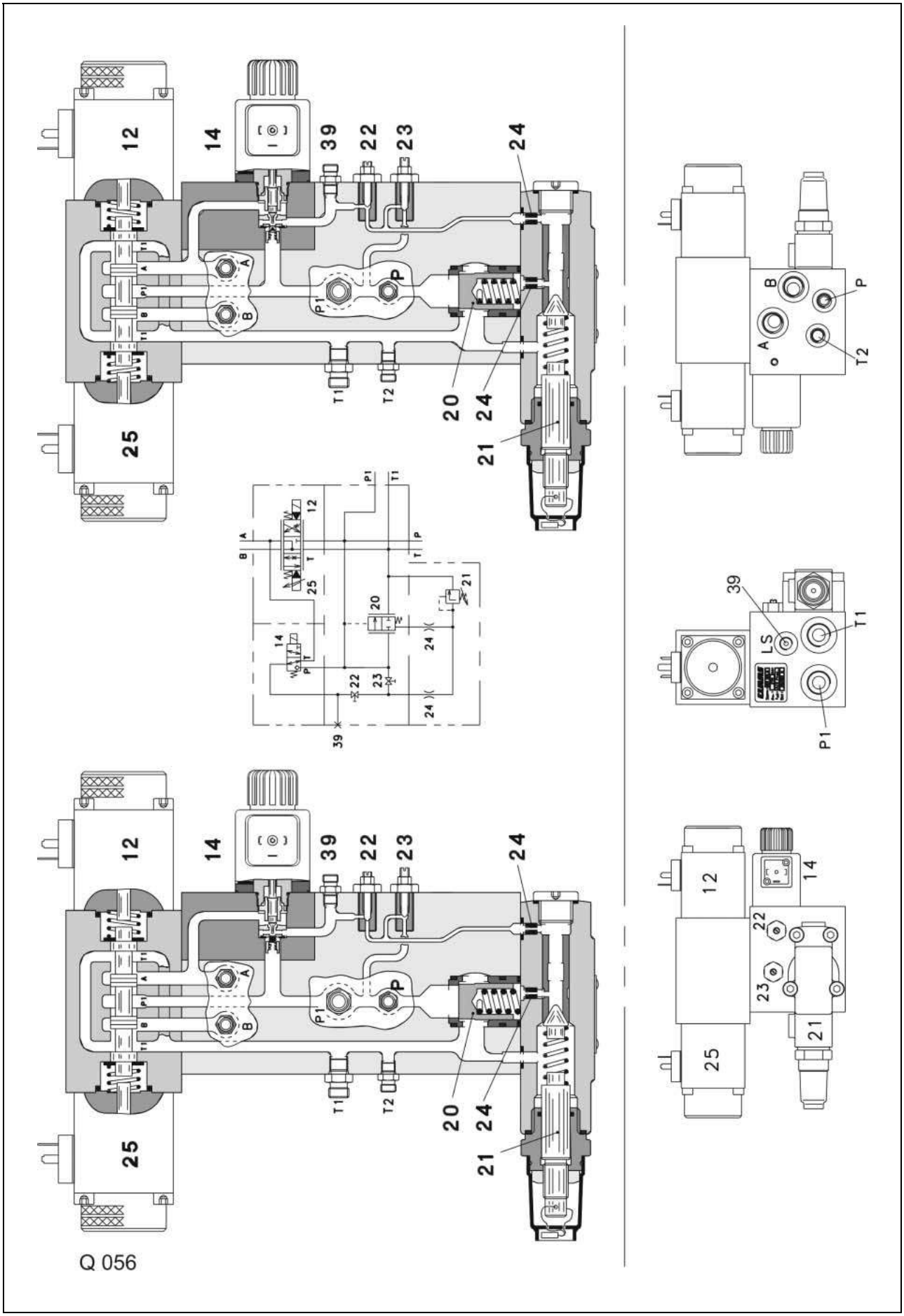
Shut-off valve 22 is open, shut-off valve 23 is shut off and LS port 39 is closed.
The control spool of pressure balance 20 is connected with P. The spring space is connected with the closed shut-off valve via restrictors 24.

Example: Fixed displacement pump

The control spool of pressure balance 20 moves against the spring, thus releasing a large cross-section towards T.
The pump circulation pressure is approx. 7 bar.
The restrictor combination 24 defines the pressure ratios at a max. flow rate of 65 l/min. at the proportional 4/3 way solenoid valve 25.


12
14
39
22
23
24
25
20
21
T1
T2
P
P1
A
B
LS
Q 056

Pressure balance, pressure build-up, floor conveyor forward, pressure relief valve 200 bar	In neutral position, the ports A, B and T of the 4/3 way solenoid valve are connected with one another. When solenoid 25 is activated, P1 is connected with A and B with T1. Vie the deactivated solenoid valve 14, the open shut-off valve 22 and the restrictors 24, the system pressure from the hydraulic motor acts on the rear side of pressure balance 20 (spring space). The force available in the spring space of the pressure balance now exceeds the opening force - pressure balance 20 remains closed. Oil flows from P1 to A to the hydraulic motor. When the system pressure rises to above 200 bar, the pressure relief valve 21 opens.
Reverse conveyor floor	The solenoid valves 14 and 12 are activated. The pressure balance 20 assumes the closed condition. Oil flows from P to the floor conveyor hydraulic motor via the activated solenoid valve 12. The floor conveyor is reversed at maximum speed.
3/2 way master valve solenoid valve	This valve (14) deactivates the pressureless circulation and/or switches the pressure balance function off. If pressure must be built up for moving a unit, this valve (14) is activated along with others. The system pressure P1 is held by the ball. The pressure balance line is connected with the return line via the 4/3 way solenoid valve from A to T1. When solenoid 14 is activated, the connection from A to T1 is shut off and the ball is opened. The system pressure therefore acts on the rear side of pressure balance 20, shutting off the circulation and building up pressure.



Q 056

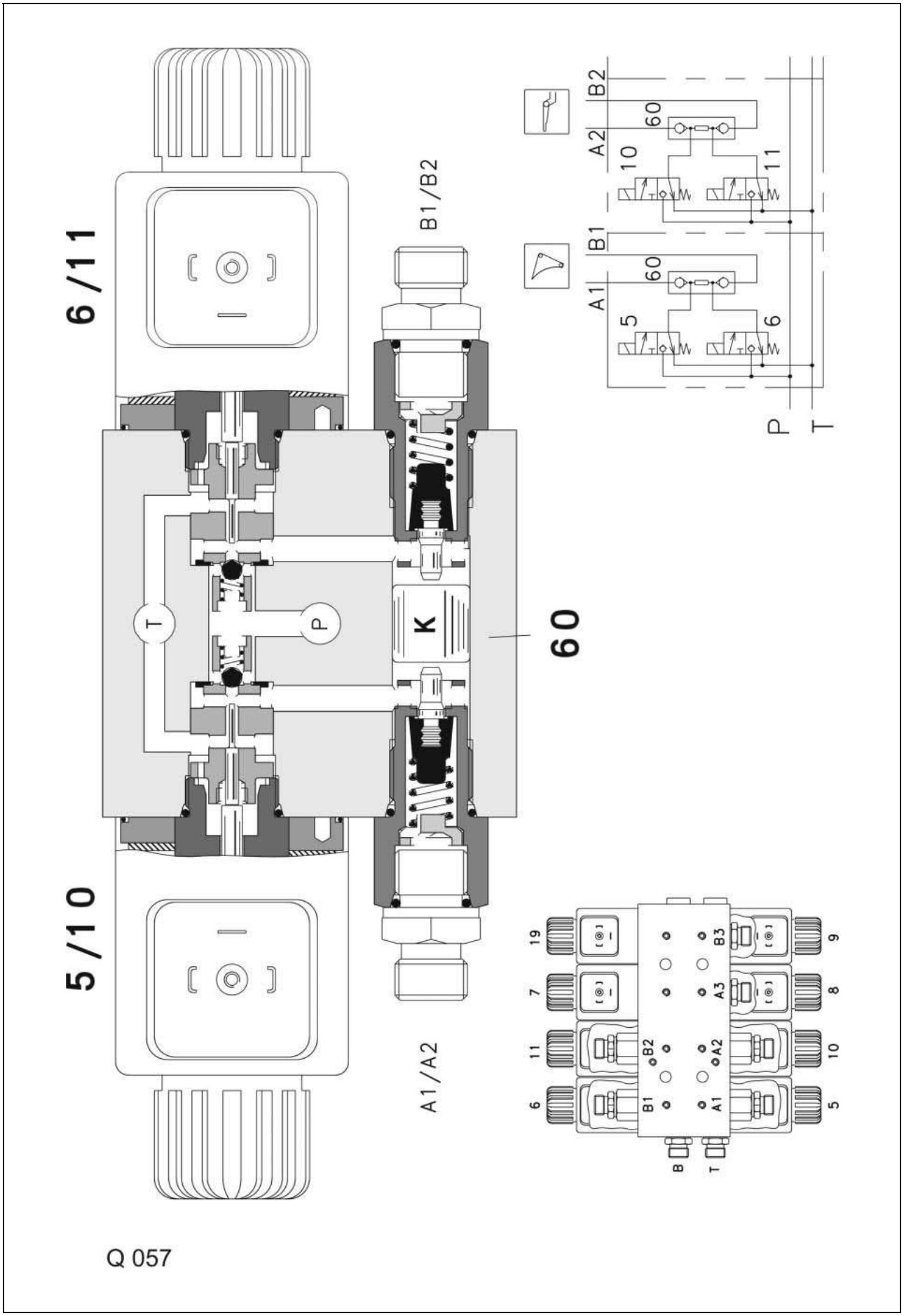
3.4 4/3 way solenoid valve (knife frame, raise/lower articulated drawbar)

Key to diagram

5	3/2 way open knife frame solenoid valve
6	3/2 way close knife frame solenoid valve
7	3/2 way open tailgate solenoid valve
8	3/2 way close tailgate solenoid valve
9	3/2 way tailgate pressureless solenoid valve
10	3/2 way lower articulated drawbar solenoid valve
11	3/2 way raise articulated drawbar solenoid valve
19	3/2 way tailgate pressure solenoid valve
60	Lock-up valve unit
A1	Working cylinder
A2	Working cylinder
B1	Working cylinder
B2	Working cylinder
P	Pump
T	Tank
K	Ram

Function

Neutral	The solenoid coils are without voltage. Oil is applied at port P. The oil from the working cylinder is available at the non-return valves of lock-up valve unit 60, ports A1/A2 and B1/B2. The valves are closed, the oil is consequently trapped.
Open knife frame or raise articulated drawbar (see also circuit diagram)	The master valve (14) controls the pressure build-up and solenoids 5 or 10 switch (12 Volt). The pilot spool of solenoid valves (5) or (10) opens the ball. Oil flows from P to the lock-up valve unit 60 via the ball. The right non-return valve is opened by ram K when pressure is built up. The return line from the hydraulic cylinders to the tank is free. The oil flows to the hydraulic cylinders via the left non-return valve A1/A2. The hydraulic cylinders extend. The displaced oil flows back to the tank via pilot spool 6 or 11.
Close knife frame or lower articulated drawbar	Opposite function.


6/11
5/10
B1/B2
A1/A2
60
T
P
K
B2
A2
B1
A1
10
11
5
6
P
T
19
7
11
6
9
8
10
5
B3
A3
B2
A2
B1
A1
B
T

Q 057

3.5 3/3 way solenoid valve (open/close tailgate)

Key to diagram

5	3/2 way open knife frame solenoid valve
6	3/2 way close knife frame solenoid valve
7	3/2 way open tailgate solenoid valve
8	3/2 way close tailgate solenoid valve
9	3/2 way tailgate pressureless solenoid valve
10	3/2 way lower articulated drawbar solenoid valve
11	3/2 way raise articulated drawbar solenoid valve
19	3/2 way tailgate pressure solenoid valve
A	Working cylinder
H	Lift valve
P	Pump
S	Lower valve
T	Tank

Tailgate function

Neutral

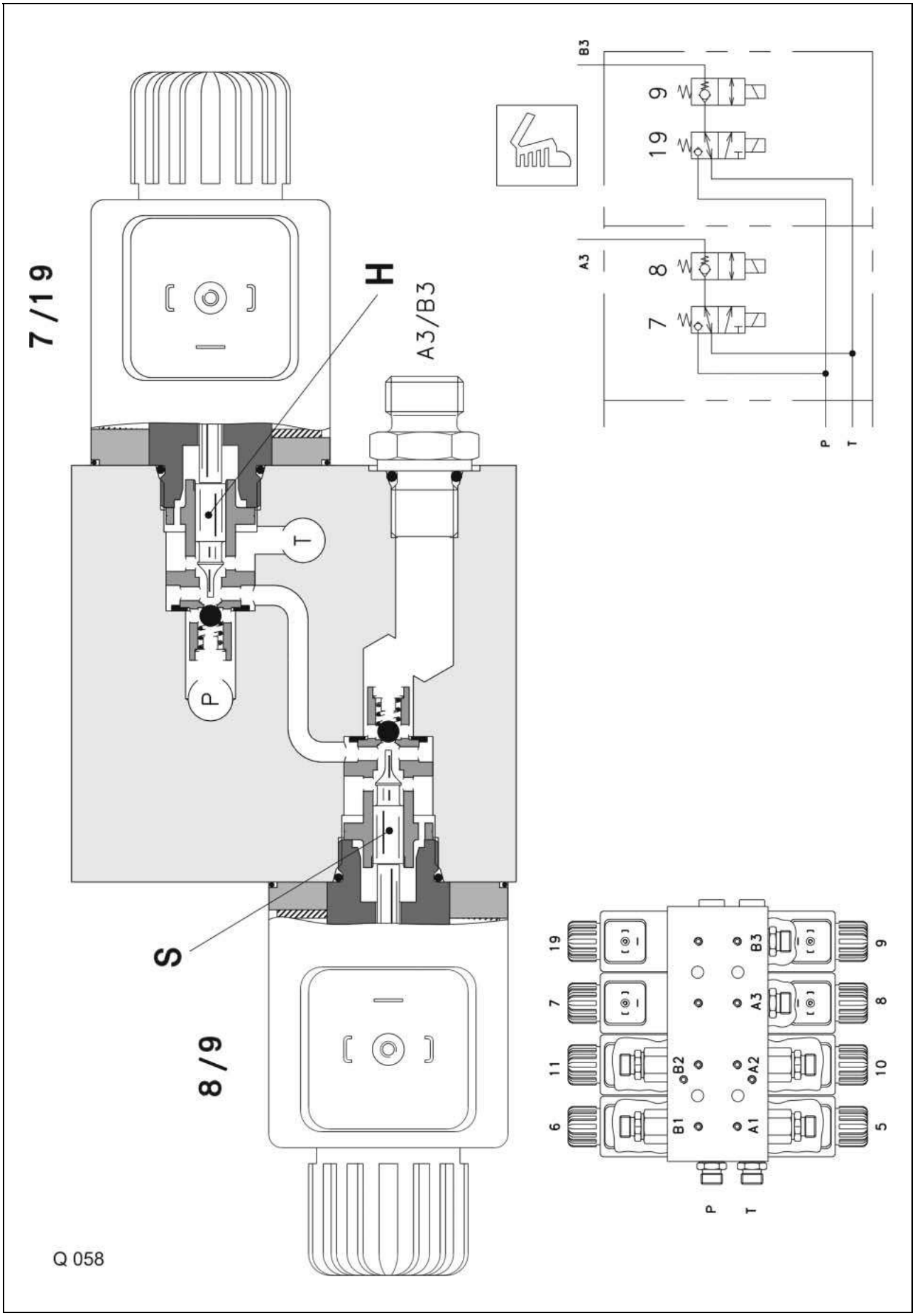
The master valve (14) and the solenoid valves switched off.
The locked pressure from the working cylinder is applied to the closed ball of valve insert S.

Lifting

The solenoid coils (7, 9 and 14) switch.
Pilot spool H opens the ball.
Oil flows from P to port A via the ball.
The oil flows to the hydraulic cylinders. The hydraulic cylinders extend.

Lowering

The solenoid coils (8 and 9) switch. Pilot spool S opens the ball.
Oil flows from A to valve insert H via the ball.
The pilot spool moves upwards and clears the return line to port T. The hydraulic cylinders retract.


7/19
8/9
H
S
A3/B3
T
P
B3
A3
19
9
8
7
P
T
B1
B2
A1
A2
Q 058

3.6 Valve block (pick-up and shredder drum)

Key to diagram	1	3/2 way pick-up drive On solenoid valve
	2	3/2 way pick-up drive Off solenoid valve
	3	3/2 way lower pick-up solenoid valve
	4	3/2 way raise pick-up solenoid valve
	15	3/2 way shredder drums drive solenoid valve
	16	3/2 way shredder drums drive Off solenoid valve
	33	Shredder drums drive hydraulic cylinder
	34	Pick-up drive hydraulic cylinder
	A	Working cylinder
	P	Pump port (feed line)
	T	Tank port (return line)

Function

See also hydraulic system circuit diagram

Pick-up raise

The solenoid valves 14 and 4 are activated.
The pressure balance 20 assumes the closed condition. Oil flows from P1 to the hydraulic cylinders 35 via the activated solenoid valve 4 and the deactivated solenoid valve 3.
The pick-up is raised.
When solenoid valve 4 is switched off, the oil is trapped in the cylinders by solenoid valve 3. The pick-up position is thus maintained.

Lower pick-up and floating position

Solenoid valve 3 is activated.
Oil flows back to T1 from hydraulic cylinders 35 via the deactivated solenoid valve 4.
The pick-up is lowered.
In floating position, solenoid valve 3 remains activated.

Pick-up On

Solenoid valve 1 is activated.
Oil flows back to T1 from hydraulic cylinder 34 via the deactivated solenoid valve 2.
The pick-up is switched on.

Pick-up Off

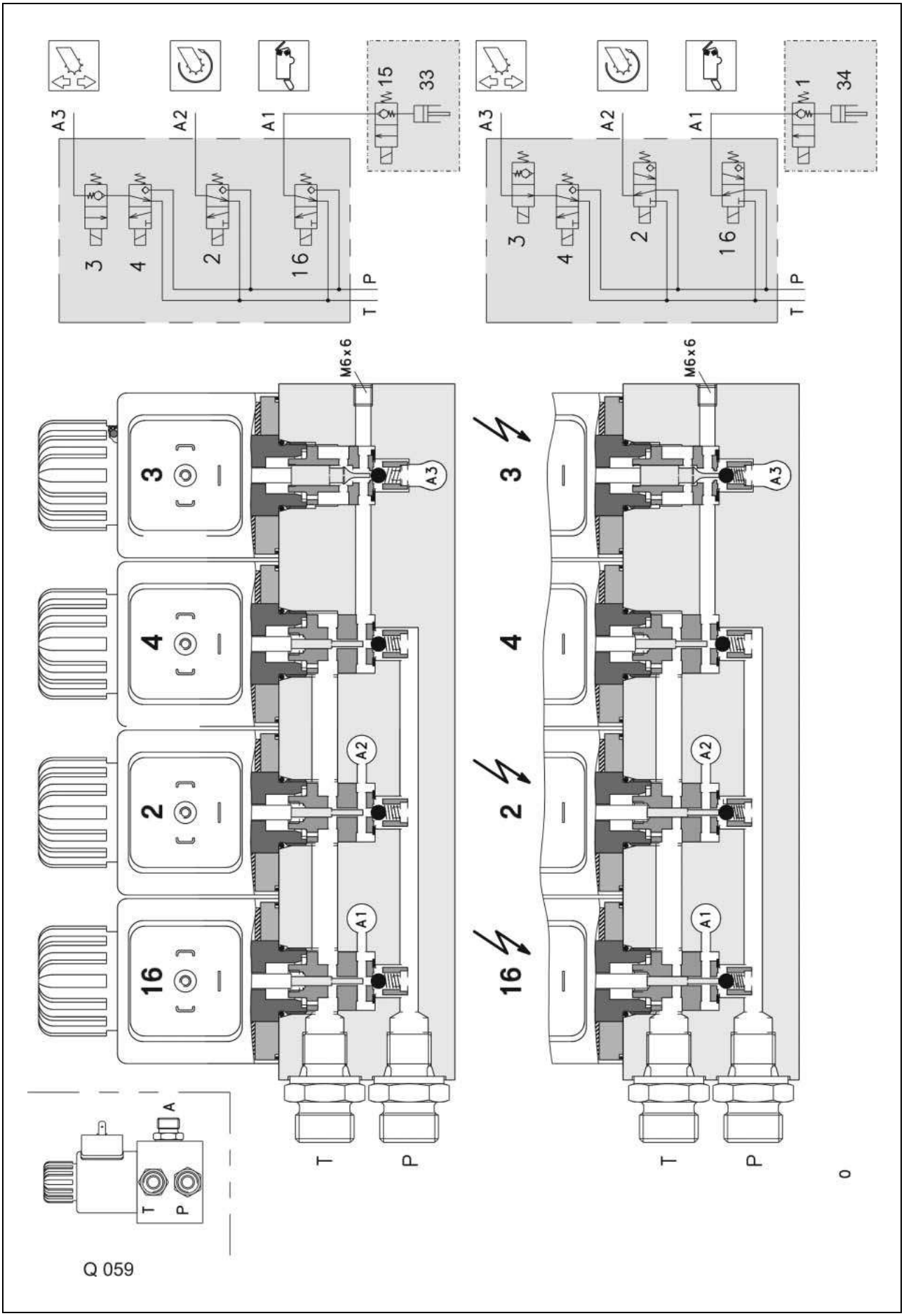
Solenoid valve 2 is activated.
Oil flows to hydraulic cylinder 34 from P1 via the deactivated solenoid valve 1.
The hydraulic cylinder is extended and the pick-up is switched off.

Shredder drums On

Solenoid valve 15 is activated.
Oil flows back to T1 from hydraulic cylinder 33 via the deactivated solenoid valve 16.
The shredder drums are switched on.

Shredder drums Off

Solenoid valve 16 is activated.
Oil flows to hydraulic cylinder 33 from P1 via the deactivated solenoid valve 15.
The hydraulic cylinder is extended and the shredder drums are switched off.


A3
A2
A1
15
33
3
4
2
16
T
P
M6x6
A3
A2
A1
3
4
2
16
T
P
1
34
0
A
T
P
Q 059

3.7 Pick-up and shredder drum engagement cylinder

Key to diagram

1	3/2 way pick-up drive On solenoid valve
15	3/2 way shredder drums drive solenoid valve
33	Shredder drums drive hydraulic cylinder
34	Pick-up drive hydraulic cylinder
A	Consumer On
B	Consumer Off

Function

See also hydraulic system circuit diagram

Pick-up On

Solenoid valve 1 is activated.
Oil flows back to T1 from hydraulic cylinder 34 via the deactivated solenoid valve 2.
The pick-up is switched on.

Pick-up Off

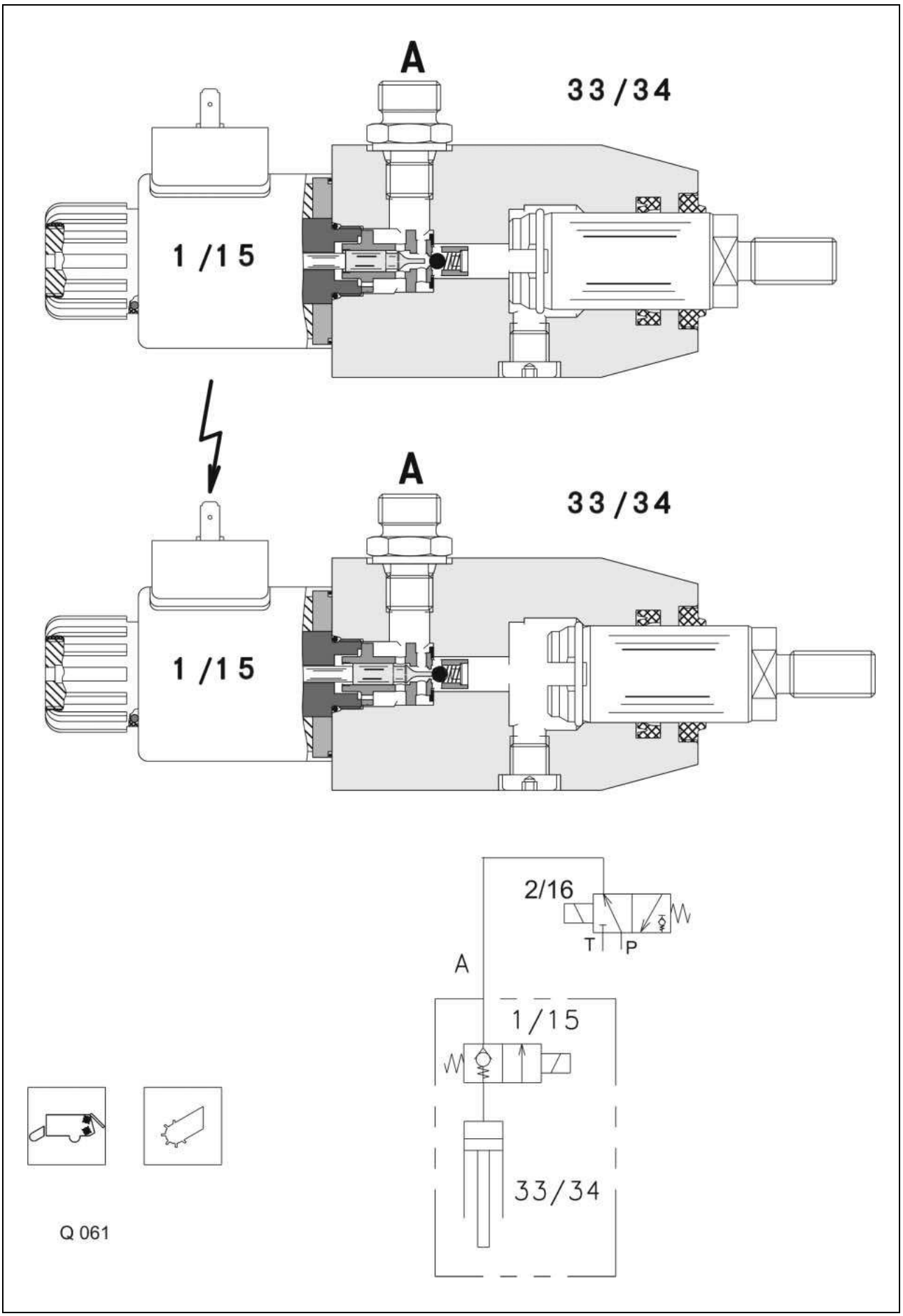
Solenoid valve 2 is activated.
Oil flows to hydraulic cylinder 34 from P1 via the deactivated solenoid valve 1.
The hydraulic cylinder is extended and the pick-up is switched off.

Shredder drums On

Solenoid valve 15 is activated.
Oil flows back to T1 from hydraulic cylinder 33 via the deactivated solenoid valve 16.
The shredder drums are switched on.

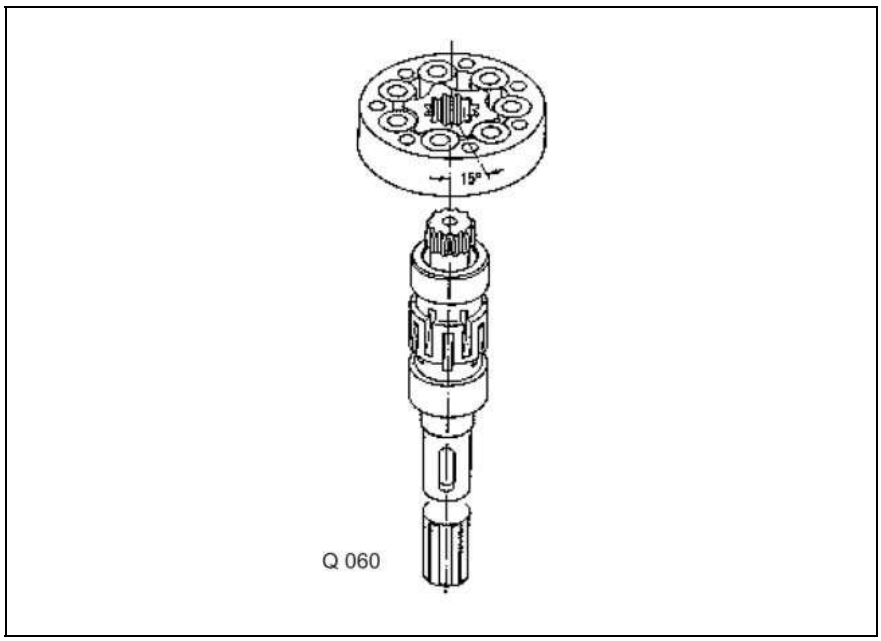
Shredder drums Off

Solenoid valve 16 is activated.
Oil flows to hydraulic cylinder 33 from P1 via the deactivated solenoid valve 15.
The hydraulic cylinder is extended and the shredder drums are switched off.


A
33/34
1/15
A
33/34
1/15
2/16
T
P
A
1/15
33/34
Q 061

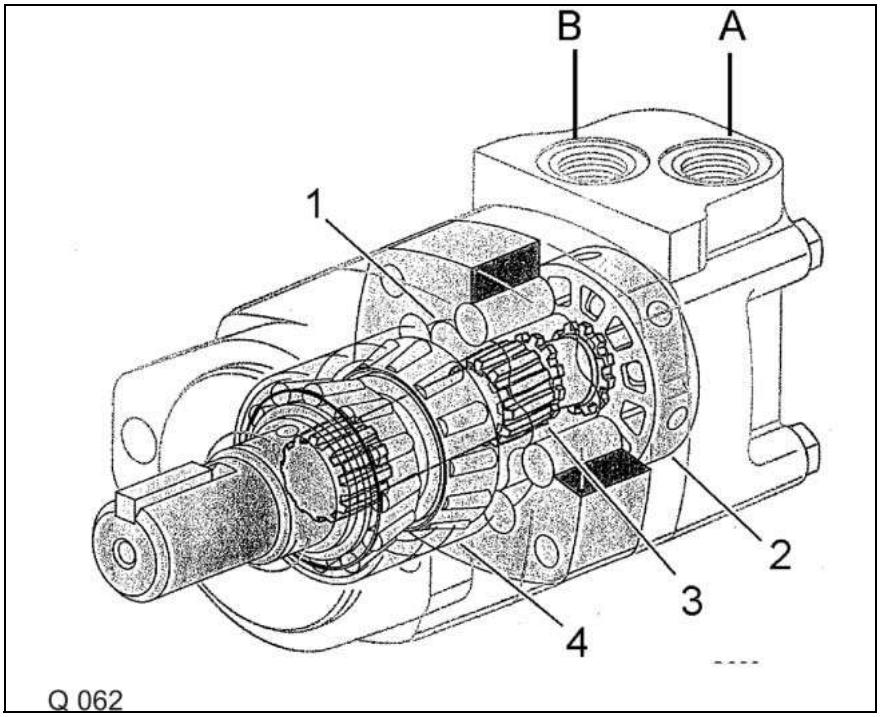
3.8 DANFOSS OMR 125 floor conveyor hydraulic motor (single-speed motor)

Install the gear set so that the tip of one rotor tooth is aligned with the transverse axis of the motor housing.
This ensures that one tooth tip of the rotor is 15° to the left of the key/groove of the cylindrical shaft or from the tip of the spline of the multi-spline shaft (correct direction of rotation).



3.9 2-speed motor

Design



1 Geroler @ Rotor
2 Axial distributor valve
3 Universal drive shaft (drive)
4 Output shaft and bearing

The 2-speed motor works according to the Orbit principle (e.g. Danfoss steering). The 2-speed motor is switched over by a 3/2 way valve.
When the 3/2 way valve is actuated, opposite chambers inside the motor are connected (80 cm^3, 95 cm^3 on QUANTUM 6800 P/S).
This results in a high output speed and a low torque. When the 3/2 way valve is not actuated, all chambers inside the motor are active (160 cm^3, 195 cm^3 on QUANTUM 6800 P/S). This results in a low output speed and a high torque.

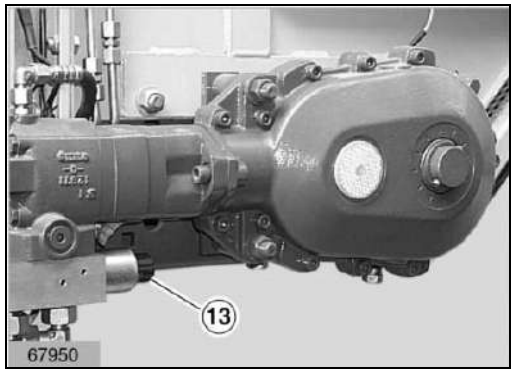
Note

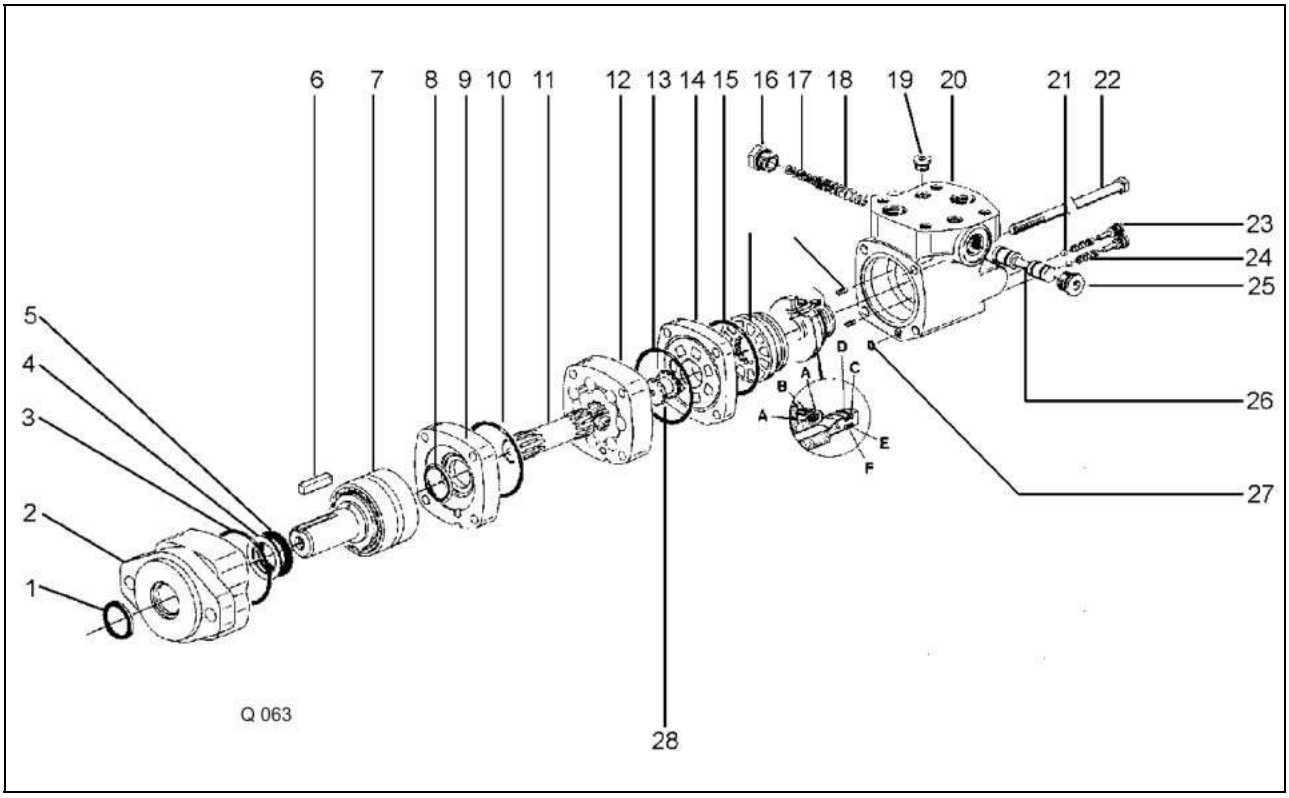
If the motor cannot be switched to a “faster” speed, the following tests should be carried out:

- Return pressure
- Pressure in the leakage line (thin line)

The pressure in the leakage line should be at least 7 bar below the return line pressure since otherwise the motor does not switch over to the “faster” speed.

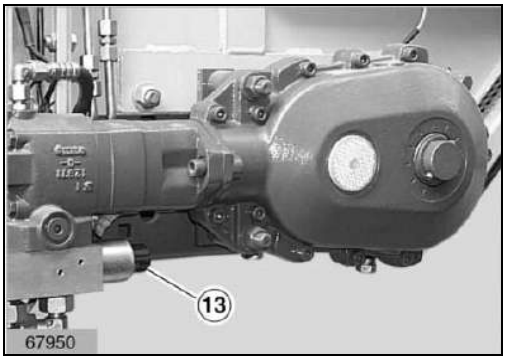
13 2-speed motor

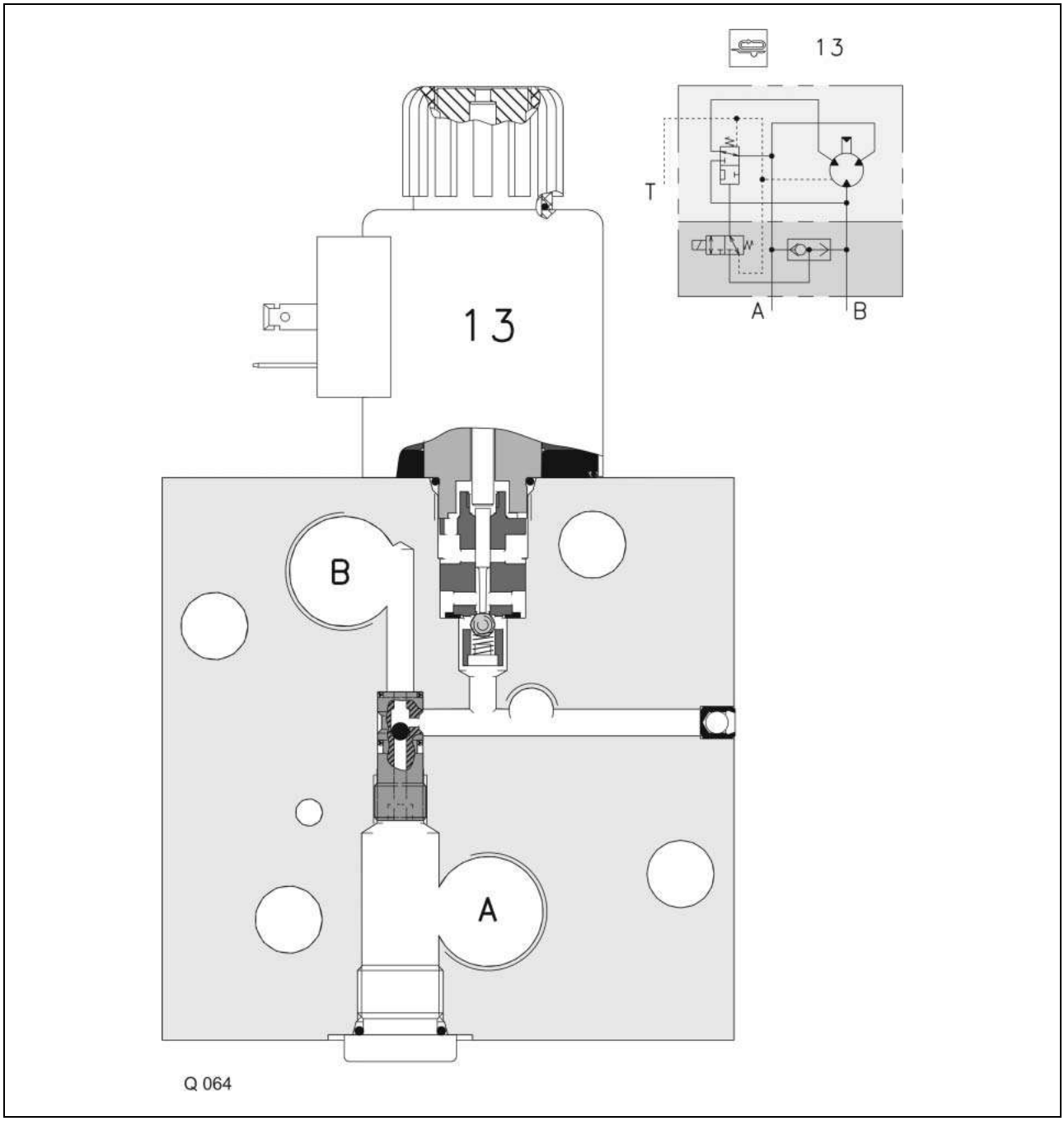




1	Dust seal
2	Bearing housing
3	Seal
4	Back-up ring
5	Shaft seal ring
6	Woodruff key
7	Output shaft and bearing
8	Output shaft head seal
9	Lock-up plate
10	Seal
11	Drive
12	Geroler
13	Seal
14	Distributor plate
15	Seal
16	Plug
17	Compression spring
18	Compression spring
19	Plug
20	Valve body
21	Control ball
22	Screw
23	Plug
24	Compression spring
25	Plug
26	Control spool
27	Seal
28	Valve drive

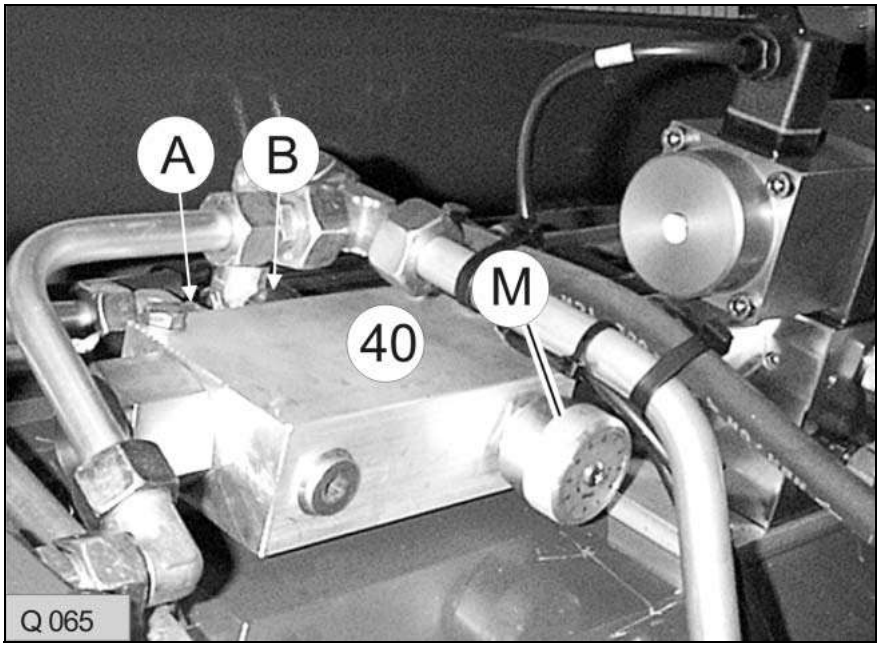
13 3/2-way valve. Controls the 2-speed Eaton hydraulic motor 80/160 cm³ (on QUANTUM 6800 P/S = 195 cm^3) for floor conveyor drive.





3.10 3 way cross conveyor belt flow control valve

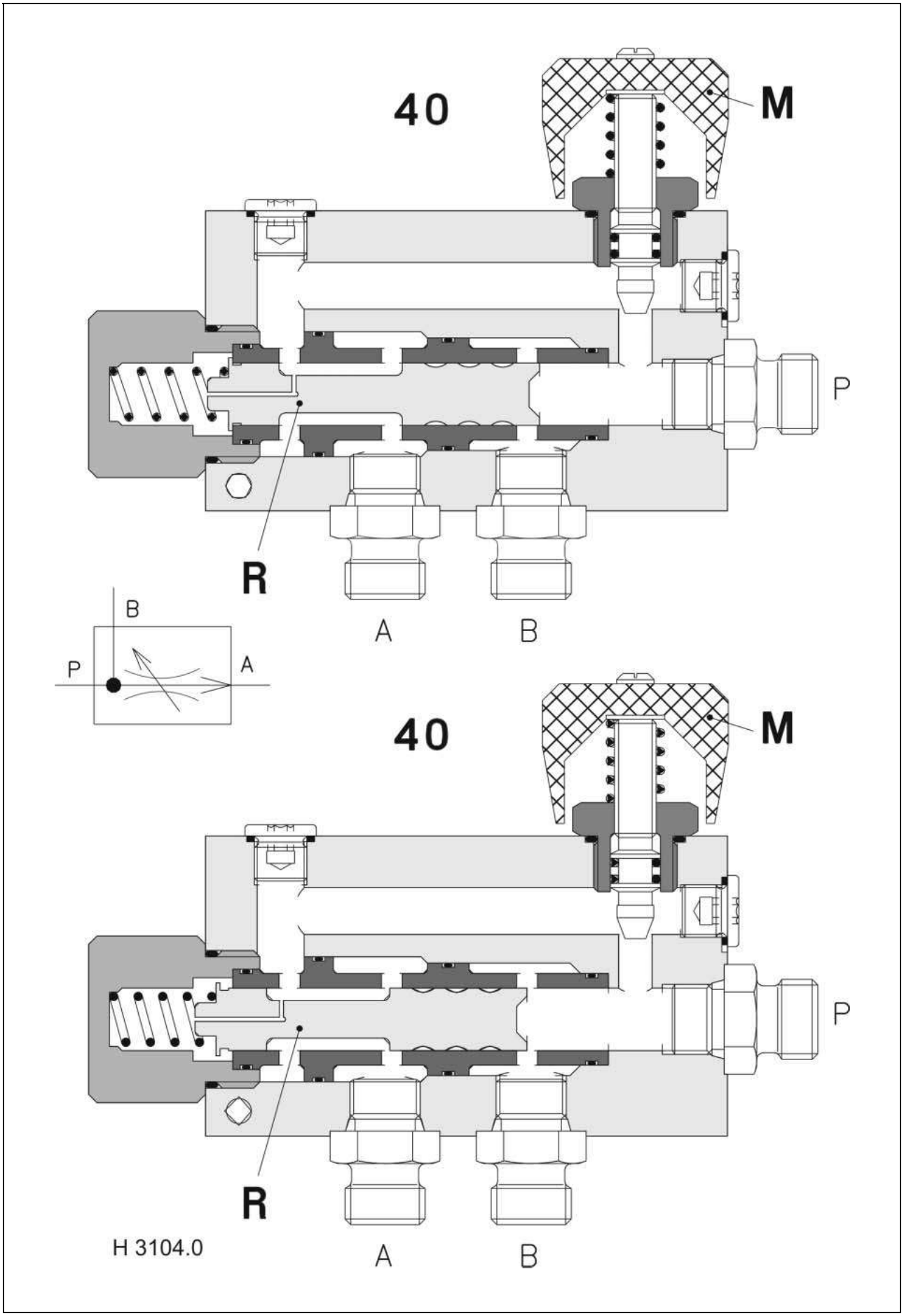
Design



40 3 way flow control valve

A Constant flow port
B Residual flow port
M Belt speed valve
P Pump port (feed line)
R Control spool

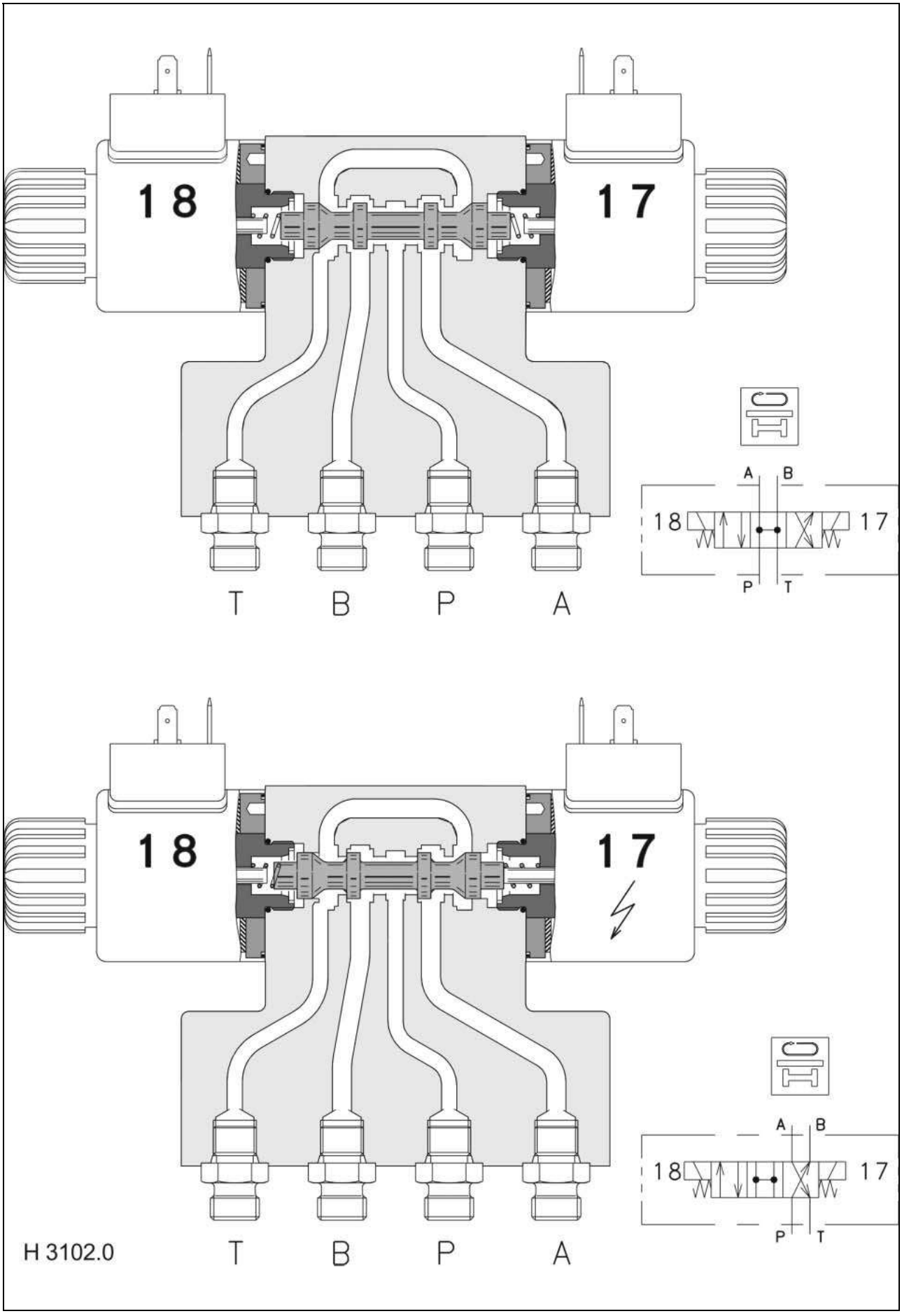
Constant flow to motor = 28 l/min.
Protection by pressure relief valve on tractor.


40
M
P
R
A
B
B
P
A
40
M
P
R
A
B
H 3104.0

3.11 4/3 way solenoid valve (cross conveyor belt)

Design	40	3 way flow control valve
	A	Constant flow port
	B	Residual flow port
	M	Belt speed valve
	P	Pump port (feed line)
	R	Control spool

Constant flow to motor = 28 l/min.
Protection by pressure relief valve on tractor.

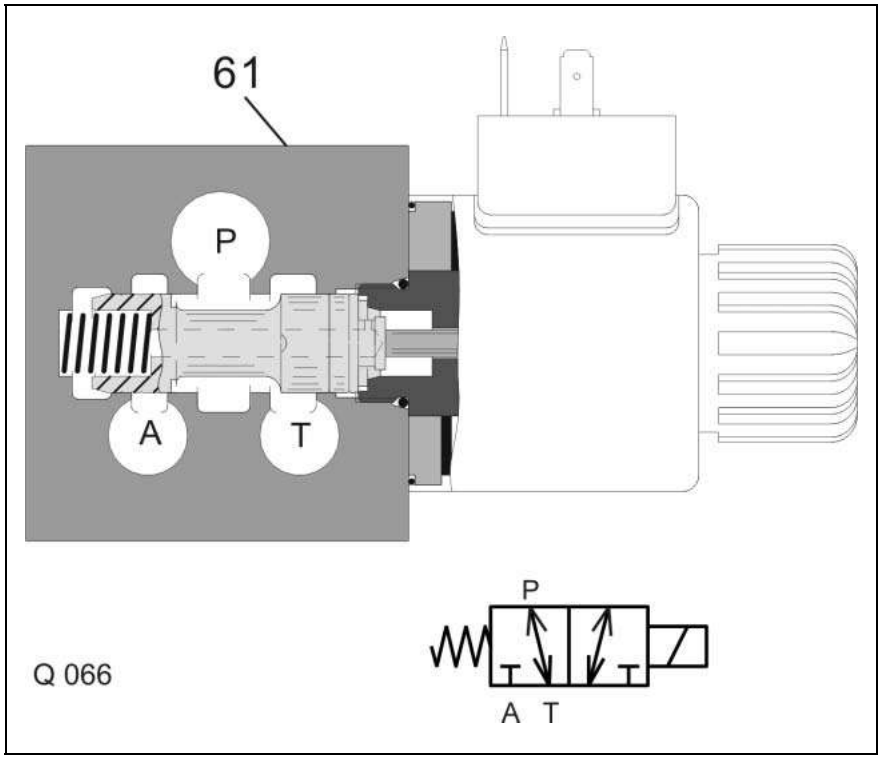

18
17
T
B
P
A
A
B
18
17
P
T
18
17
T
B
P
A
A
B
18
17
P
T
H 3102.0

3.12 3/2 way solenoid valve (cross conveyor belt) QUANTUM S

Design

61 3/2 way solenoid valve (cross conveyor belt)

A Motor port (42)
P Pump port (28)
T Tank port



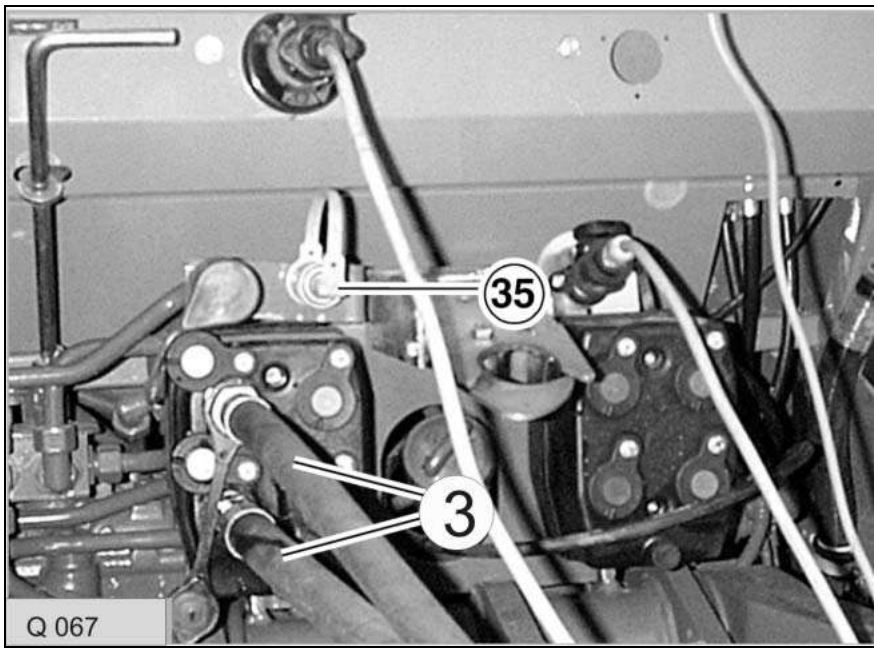
4.0 QUANTUM 4500P / 5500P / 5500 P-16 / 5500 P-18 / 5500GT / 6500P / 6800P

4.0.1 Prior to operation

In this system, the setting of the tractor's pressure relief valve must be at least 5 bar below the setting or pressure relief valve (8).

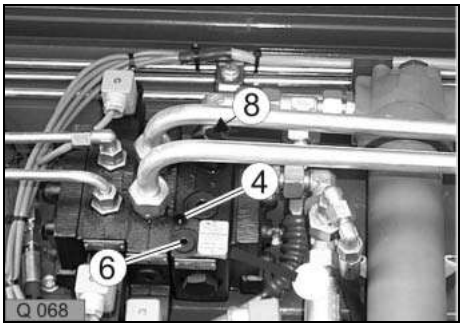
When the pressure relief valve (8) responds, the tractor pump starts delivering. This may result in overheating of the hydraulic oil.

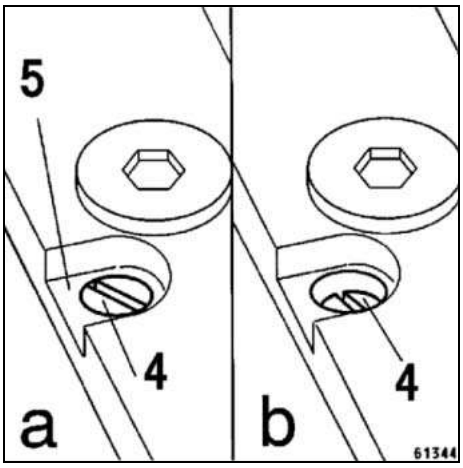
3 Hydraulic hoses
35 LS port (control line)



Important!

- Clean the hose couplers of the hydraulic hoses (3) and the oil outlets on the tractor before each hitching.
- Connect the two hydraulic hoses (3) to a double-acting control unit or a single-acting control unit with a free return line.
- The pressurized line is identified by a red marking.
- Never apply pressure to the return line (not marked).
- Oil quantity from the tractor max. 60 l/min





Tractors with fixed displacement pump or LS pump without control line = open hydraulic system (standard system).
Set screw (4) is not screwed in (the screw head is flush with the surface (5)).

Attention **The pressure relief valve of the forage wagon must be set higher than that of the tractor's pressure relief valve.**

Tractors with constant-pressure pump = closed hydraulic system (e.g. John Deere 50/55 series, Ford series 40):
Fully screw set screw (4) into the directional control valve up to the stop.

Tractor with LS pump and LS- control line (Power beyond):
Fully screw set screw (4) into the directional control valve up to the stop.
Connect the control line of the LS port of tractor to the LS port (6) of forage wagon control valve. The control line can be purchased from the CLAAS spare parts service:

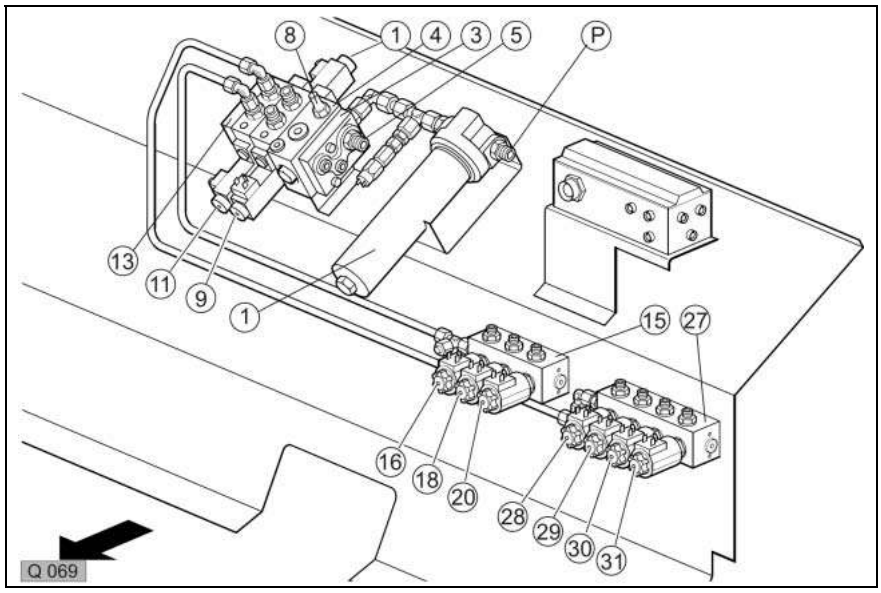
- 1 x 213,280.0 Threaded bushing
- 1 x 238 788.0 Elbow nipple
- 1 x 607,230.0 Hydraulic hose
- 1 x 913 322.0 Hydraulic hose
- 1 x 607 298.0 Plug

4.1 Circuit Diagram

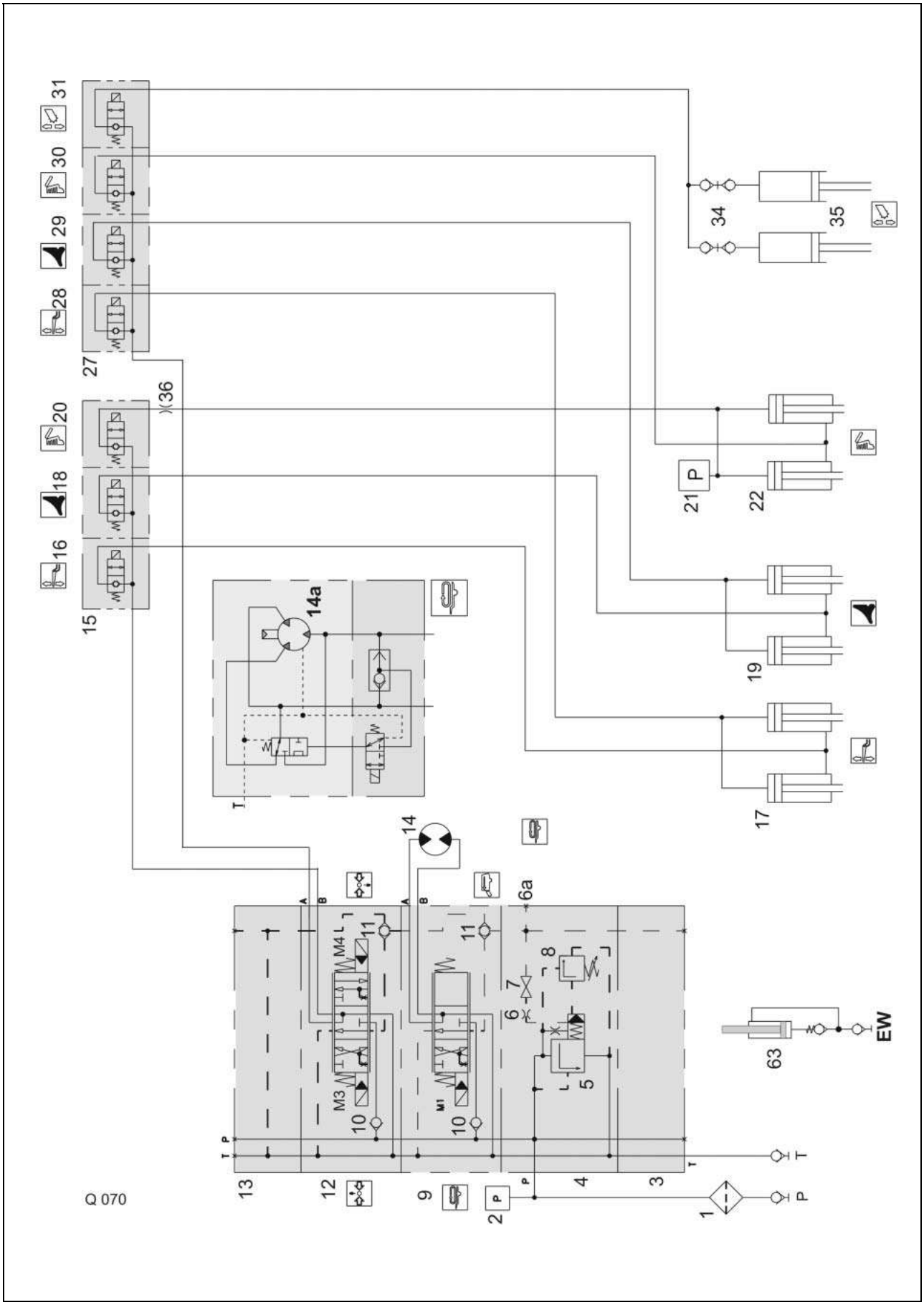
P Tractor port (feed line)
T Tractor port (return line)
EW Tractor port (single acting)

1 Oil filter (110 l, 10 micro, resists diff. pressure of 30 bar)
2 Oil pressure switch 2 bar (normally open contact)
3 Connecting plate, BUCHER LU 08 PO OM 22
4 Circulation and pressure relief valve, Bucher LU 08 SBL-OM 22
5 Circulation valve spool
6 Orifice plate ø 0.8 mm, 0.6 l/min. control oil
6a LS port (load sensing)
7 Shut-off screw (closed hydraulic system, e.g. John Deere)
8 Pressure relief valve (p = 200 bar)
9 4/3 way proportional solenoid valve, Bucher LP O8 E 4D 6363 OM 18 G12/12
10 Non-return valve
11 Load change valve
12 4/3 way solenoid valve, LM 08 E 4D 1010 OM 18612 (10 l/min.)
13 Connecting plate, BUCHER LU 08 PUT OM 22
14 Hydraulic motor, DANFOSS OMR 125 or OMR 160
14a Eaton 2-speed floor conveyor hydraulic motor 80/160 cm³
15 Seated valves, right block
16 2/2 way lower articulated drawbar solenoid valve
17 Articulated drawbar hydraulic cylinder
18 2/2 way close knife frame solenoid valve
19 Knife frame hydraulic cylinder
20 2/2 way open tailgate solenoid valve
21 Oil pressure switch 150 bar (normally open contact)
22 Tailgate hydraulic cylinder
27 Seated valves, left block
28 2/2 way raise articulated drawbar solenoid valve
29 2/2 way open knife frame solenoid valve
30 2/2 way close tailgate solenoid valve
31 2/2 way raise/lower pick-up solenoid valve
34 Couplers
35 Pick-up hydraulic cylinder
36 Orifice plate

M1 Floor conveyor forward solenoid coil
M2 Pressure port B solenoid coil
M3 Pressure port A solenoid coil



4500P / 5500P / 5500 P-16 / 5500 P-18 / 5500GT / 6500P / 6800P



4.2 Function

4.2.1 Free circulation (solenoids not energized)

Oil supply from the tractor is via port (P).

The most favourable way of connecting is to let the return oil from the forage wagon flow into a direct port to the tank (pressureless return line). The oil quantity from the tractor should not exceed approx. 60 l/min., as otherwise the circulation pressure and consequently the oil temperature may increase.
The normal circulation pressure is below 20 bar (at an oil temperature of 50°C).

The oil pressure switch (2) activates the electric system at a circulation pressure of 2 bar. A red control light in the control box lights up for 3 seconds.
The electric system is now ready for operation.

From port (P), the pump flow is directed to the circulation valve (4) via filter (1).
As the solenoids of the 4/3 way solenoid valves (9) and (12) are de-energized, the flow returns to the tank via the spool (5) of the circulation valve (4).
The spring space of the spool (5) is relieved via the control bore (orifice plate 6, shut-off screw 7, load change valves 11 and the spools of the 4/3 way solenoid valves (9) and (12)).

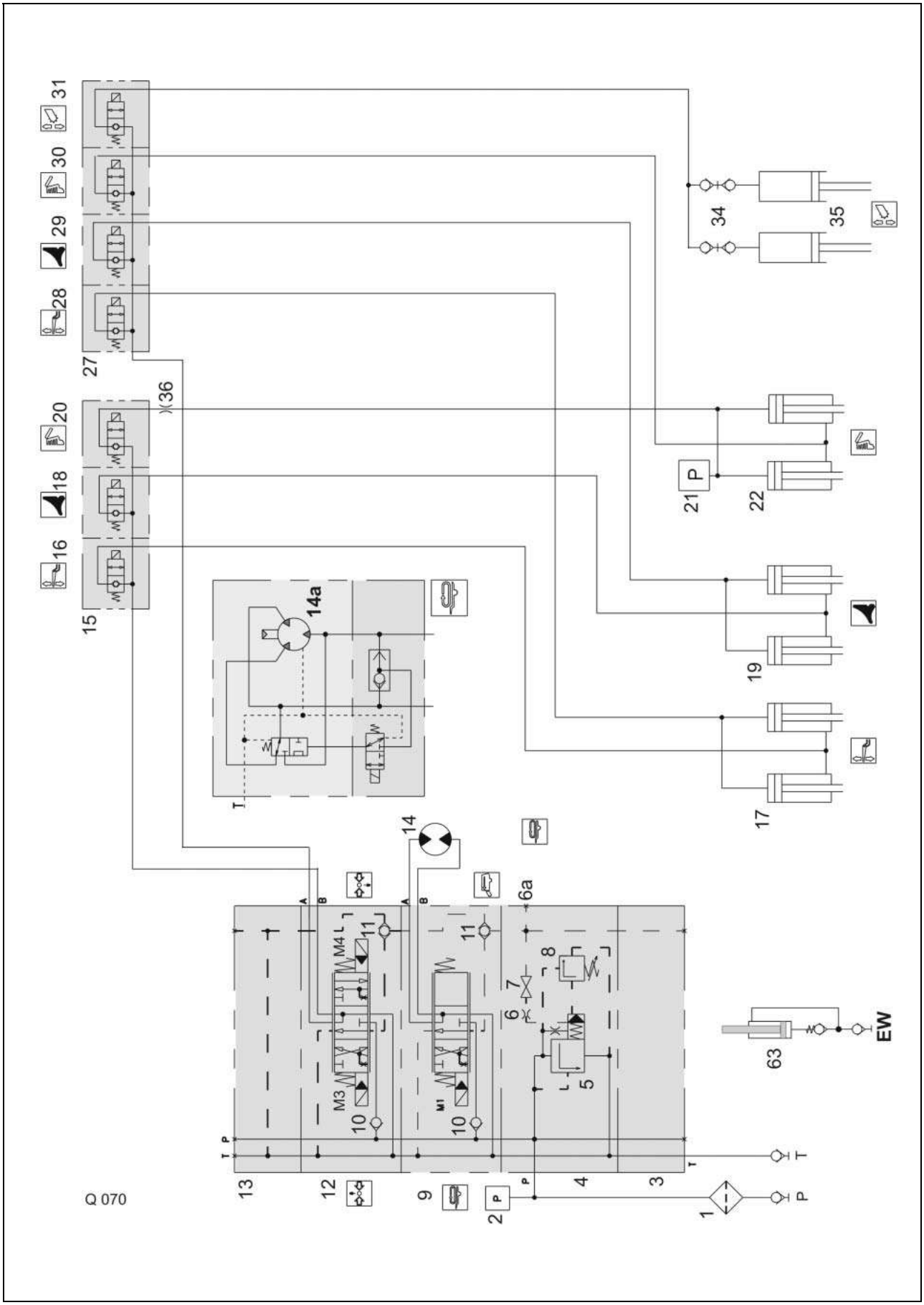
Note: On tractors with a closed hydraulic system (constant pressure system), the shut-off screw (7) must be fully screwed in.
The tractor's hydraulic pump is reset by the backside build-up of pressure.

On tractors with a power beyond port, the shut-off screw (7) must be fully screwed in.
The LS pump is controlled by building up pressure in the control line (port 6a). The control line ends at the control unit of the LS pump.
This ensures that the LS pump will always make the required volume flow available.

4.2.2 Loading and unloading the wagon (floor conveyor On)

The solenoid valve (9 – M1) is actuated. The flow from the pump flows to the hydraulic motor (14) via the spool of the solenoid valve (9).
The volume flow to the hydraulic motor (14) is determined by the volume flow of the tractor's hydraulic pump. When the hydraulic motor (14) reaches a pressure of 200 bar, the pressure relief valve (8) opens.
The spool of circulation valve (5) controls the volume flow into the tank.

4500P / 5500P / 5500 P-16 / 5500 P-18 / 5500GT / 6500P / 6800P



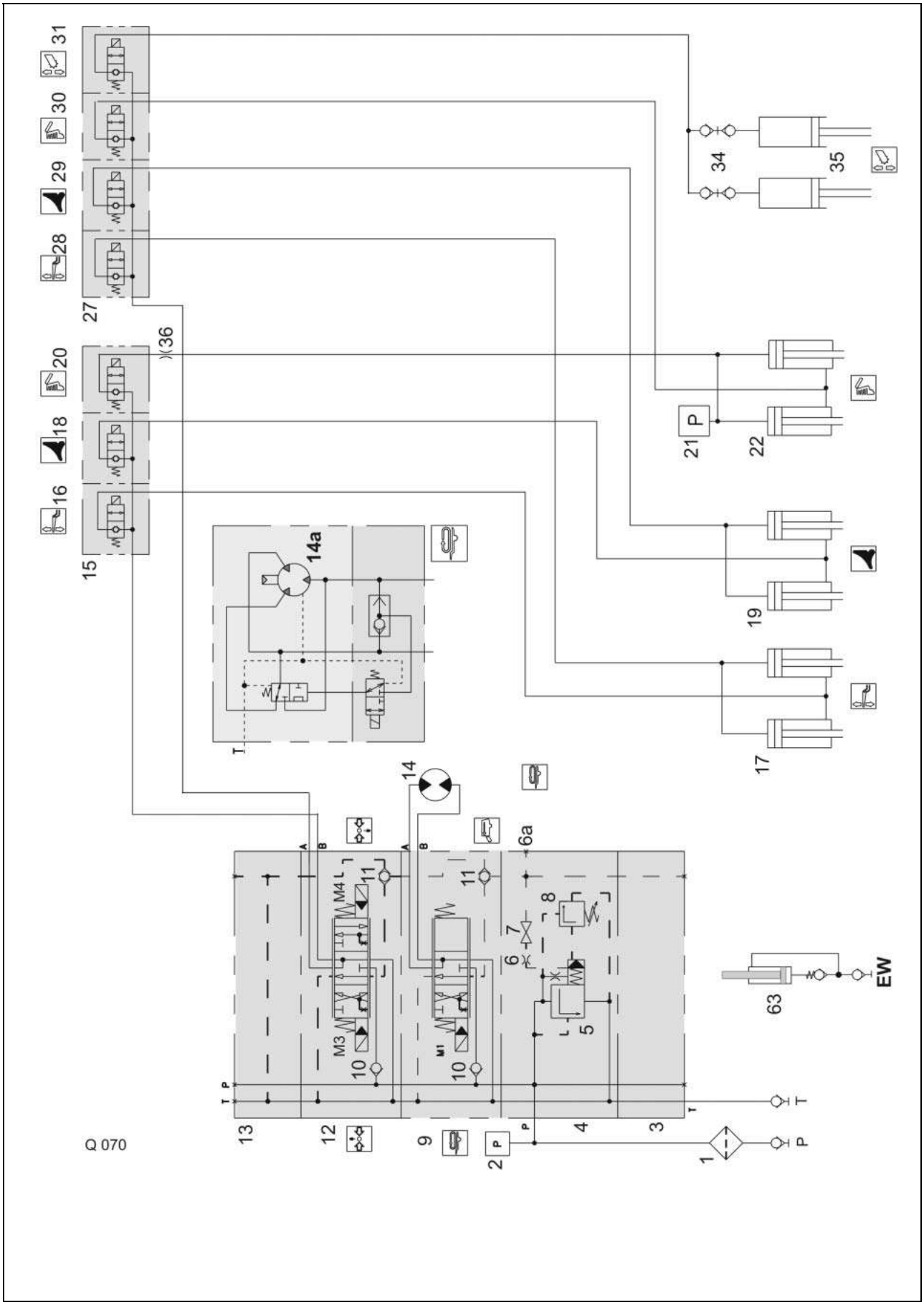
4.2.3 Close knife frame

Solenoid valves (12-M3), (18) and (29) are energized.
The volume flow (10 l/min.) flows to the hydraulic cylinders (19) via port B of solenoid valve (12) and from there via solenoid valve (18).
The backside build-up of pressure moves the spool (5) of circulation valve (4) back against the volume flow.
The oil displaced from the hydraulic cylinders (19) flows back into the tank via solenoid valve (29) and port A of solenoid valve (12).
The knife frame is closed.
When the hydraulic cylinders hit their limit stop, the pressure relief valve (8) opens. The spool (5) of the circulation valve (4) opens and the volume flows back into the tank via the circulation valve (4).
When switching off, the solenoid valves (18) and (29) switch first and then, after a delay, the solenoid valve (12-M3).

4.2.4 Open knife frame

Solenoid valves (12-M4), (18) and (29) are energized.
The volume flow (10 l/min.) flows to the hydraulic cylinders (19) via port A of solenoid valve (12) and from there via solenoid valve (29).
The backside build-up of pressure moves the spool (5) of circulation valve (4) back against the volume flow.
The oil displaced from the hydraulic cylinders (19) flows back into the tank via solenoid valve (18) and port B of solenoid valve (12).
The knife frame is opened.
When the reed switch is actuated, the control light flashes and the solenoids (12-M4), (18) and (29) are switched off.
When the reed switch cable is disconnected, the knife frame can be opened until the cylinders hit their limit stop.
From forage wagon no. …, both buttons (close and open) must be pressed simultaneously.
There is no need for the cable to be disconnected any more.
When switching off, the solenoid valves (18) and (29) switch off first and then, after a delay, the solenoid valve (12-M4).

4500P / 5500P / 5500 P-16 / 5500 P-18 / 5500GT / 6500P / 6800P



4.2.5 Raise pick-up

Solenoid valve (12-M4) and solenoid valve (31) are activated.
The volume flow from the pump (10 l/min.) flows to the hydraulic cylinders (35) via port A of solenoid valve (12) and from there via solenoid valve (31).
The backside build-up of pressure moves the spool (5) of circulation valve (4) back against the volume flow from the pump.
The pick-up is raised.
When the hydraulic cylinders hit their limit stop, the pressure relief valve (8) opens. The spool (5) of the circulation valve (4) opens and the volume flows back into the tank via the circulation valve (4).
When switching off, the solenoid valves (31) and, after a delay, solenoid valve (12-M4) are switched off first.

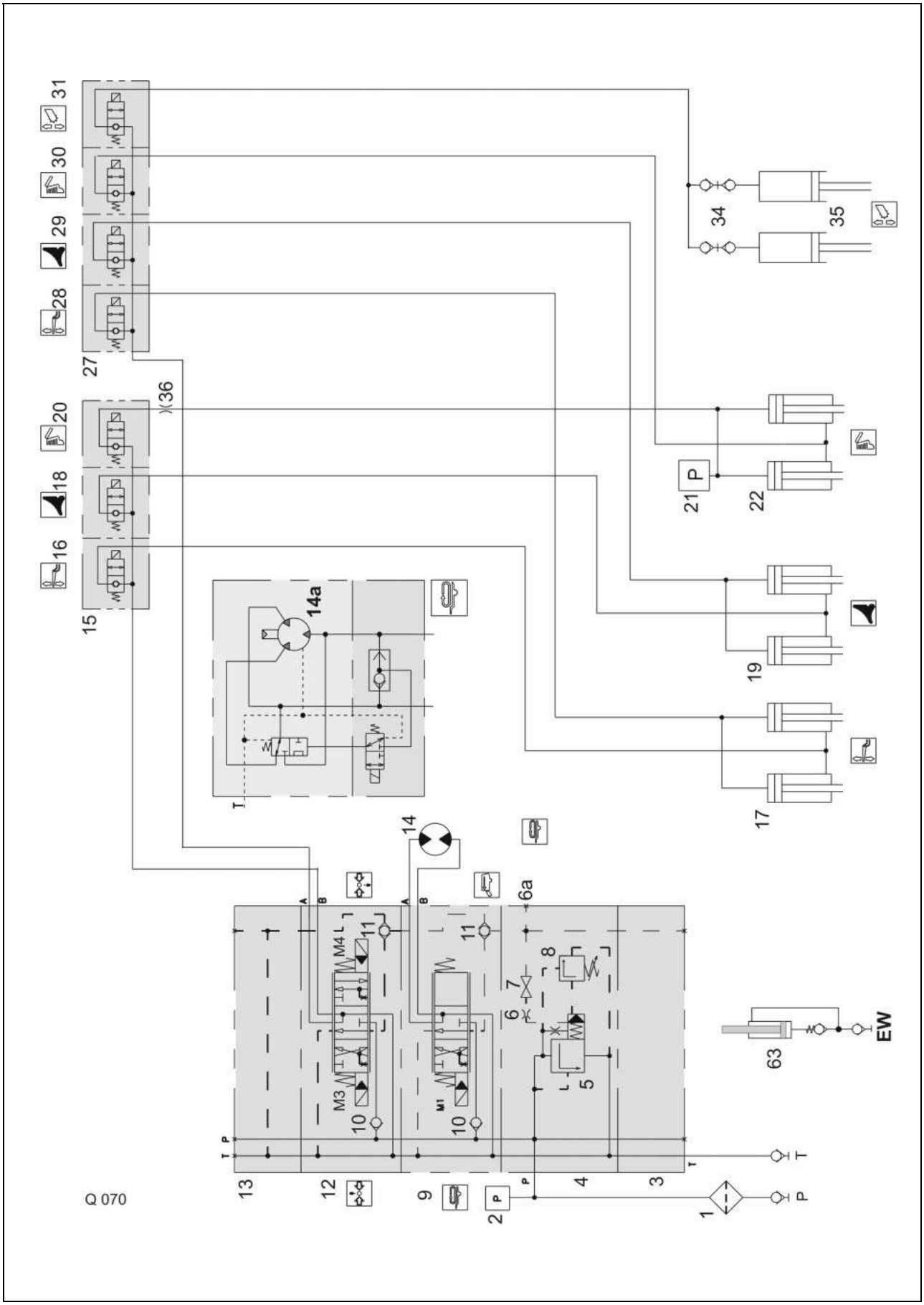
4.2.6 Pick-up lower

The solenoid valve (31) is actuated.
The displaced oil from the hydraulic cylinders (35) flows back to the tank via the activated solenoid valve (31). The pick-up is lowered.

4.2.7 Floating position

The solenoid valve (31) is actuated.
In the floating position, the pick-up follows the ground contours so that the hydraulic cylinders (35) are raised or lowered.
Oil is either taken in or displaced by the activated solenoid valve (31) and the deenergized solenoid valve (12).
A control light (green) in the control box indicates that the pick-up has been lowered (floating position).

4500P / 5500P / 5500 P-16 / 5500 P-18 / 5500GT / 6500P / 6800P



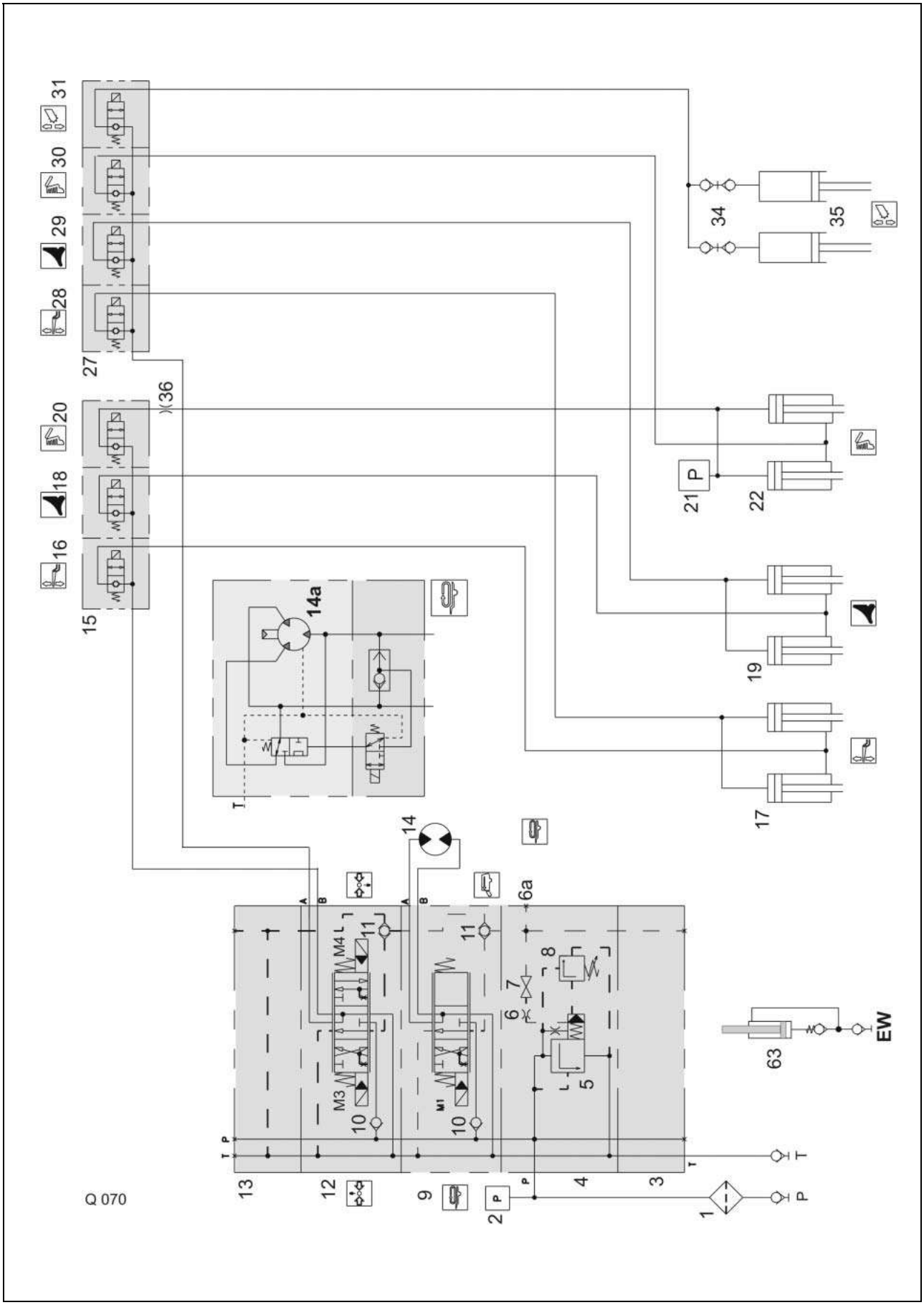
4.2.8 Raise articulated drawbar

Solenoid valves (12-M4), (16) and (28) are energized.
The volume flow from the pump (10 l/min.) flows to the hydraulic cylinders (17) via port A of solenoid valve (12) and from there via solenoid valve (28).
The backside build-up of pressure moves the spool (5) of circulation valve (4) back against the volume flow from the pump.
The oil displaced from the hydraulic cylinders (17) flows back into the tank via solenoid valve (16) and port B of solenoid valve (12).
The articulated drawbar is raised.
When the hydraulic cylinders hit their limit stop, the pressure relief valve (8) opens. The spool (5) of the circulation valve (4) opens and the volume flow from the pump flows back into the tank via the circulation valve (4).
When switching off, the solenoid valves (16) and (28) switch off first and then, after a delay, the solenoid valve (12-M4).

4.2.9 Lower articulated drawbar

Solenoid valves (12-M3), (16) and (28) are energized.
The volume flow from the pump (10 l/min.) flows to the hydraulic cylinders (17) via port B of solenoid valve (12) and from there via solenoid valve (16).
The backside build-up of pressure moves the spool (5) of circulation valve (4) back against the volume flow.
The oil displaced from the hydraulic cylinders (17) flows back into the tank via solenoid valve (28) and port A of solenoid valve (12).
The articulated drawbar is lowered.
When the hydraulic cylinders hit their limit stop, the pressure relief valve (8) opens. The spool (5) of the circulation valve (4) opens and the volume flows back into the tank via the circulation valve (4). When switching off, the solenoid valves (16) and (27) switch first and then, after a delay, the solenoid valve (12-M3).

4500P / 5500P / 5500 P-16 / 5500 P-18 / 5500GT / 6500P / 6800P



4.2.10 Open tailgate

Solenoid valves (12-M3), (20) and (30) are energized.
The volume flow from the pump (10 l/min.) flows to the hydraulic cylinders (22) via port B of solenoid valve (12) and from there via solenoid valve (20).
The backside build-up of pressure moves the spool (5) of circulation valve (4) back against the volume flow.

The oil displaced from the hydraulic cylinders (22) flows back into the tank via the activated solenoid valve (30) and port A of solenoid valve (12).
The tailgate is raised.

At the limit stop of the tailgate, the 150 bar oil pressure switch (21) closes. The control light on the switch console flashes (tailgate open).
When the hydraulic cylinders hit their limit stop, the pressure relief valve (8) opens. The spool (5) of the circulation valve (4) opens and the volume flows back into the tank via the circulation valve (4).

When switching off, the solenoid valves (20) and (30) switch first and then, after a delay, the solenoid valve (12-M3).

4.2.11 Close tailgate

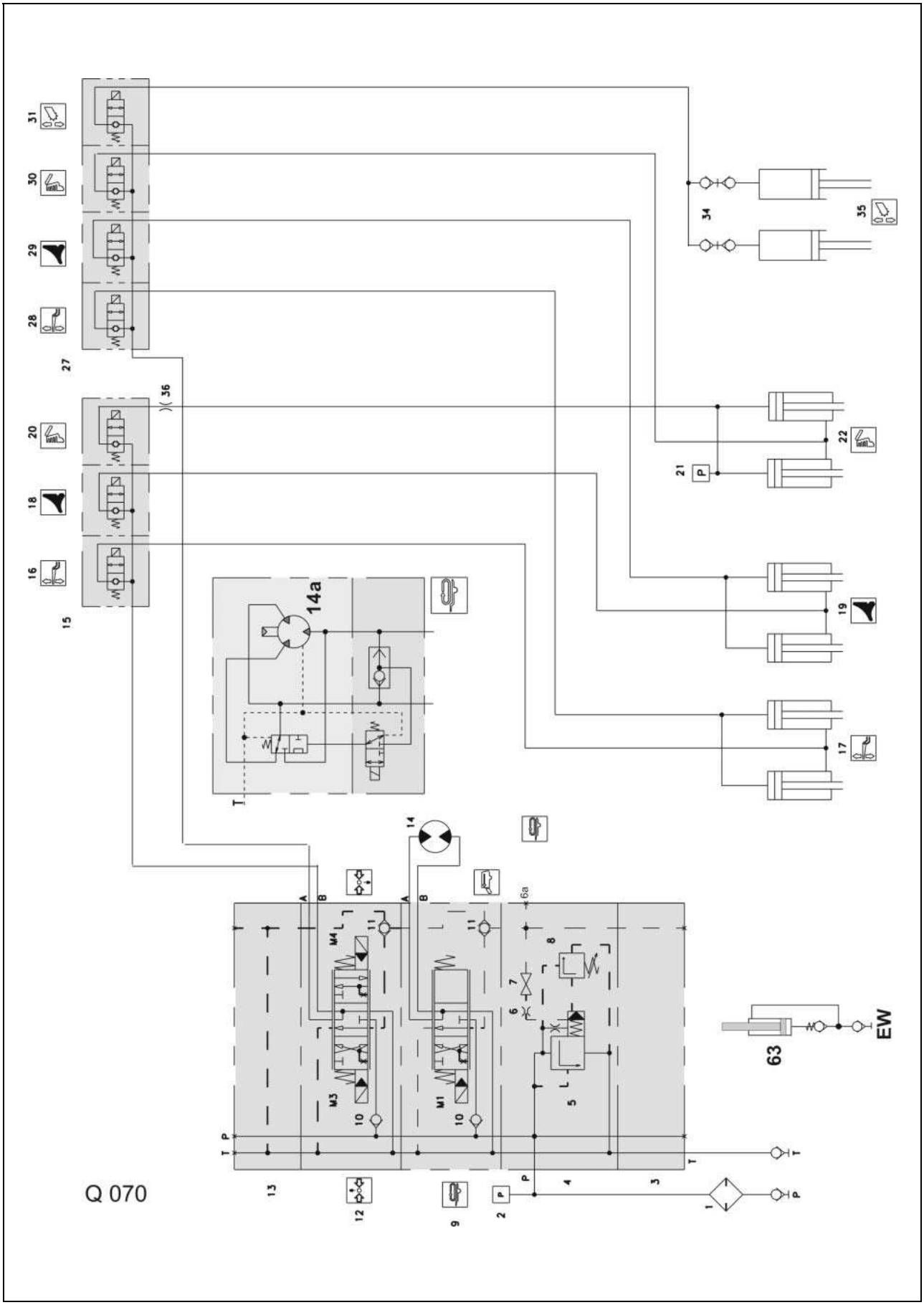
Solenoid valves (20) and (30) are energized.
Due to the tailgate's dead weight, the oil from the hydraulic cylinders is displaced towards the tank via solenoid valve (20) and port B of the deactivated solenoid valve (12).

When the reed switch is closed, the solenoid valve (12 – M4) switches.
The volume flow (10 l/min.) flows to the hydraulic cylinders (22) via port A of solenoid valve (12) and from there via the activated solenoid valve (30).

The backside build-up of pressure moves the spool (5) of circulation valve (4) back against the volume flow.
The tailgate is locked by pressure.

The oil displaced from the hydraulic cylinders (22) flows back into the tank via solenoid valve (20) and port B of solenoid valve (12).
Solenoid valves (12-M4), (20) and (30) are deactivated by a clock-controlled circuit in the module.

4500P / 5500P / 5500 P-16 / 5500 P-18 / 5500GT / 6500P / 6800P



4.3 Circulation valve with pressure relief valve

P	Tractor port (feed line)
T	Tractor port (return line)
Y	Control bore
5	Circulation valve spool
6	Orifice plate
7	Shut-off screw
8	Pressure relief valve (200 bar)
LS	Load sensing port

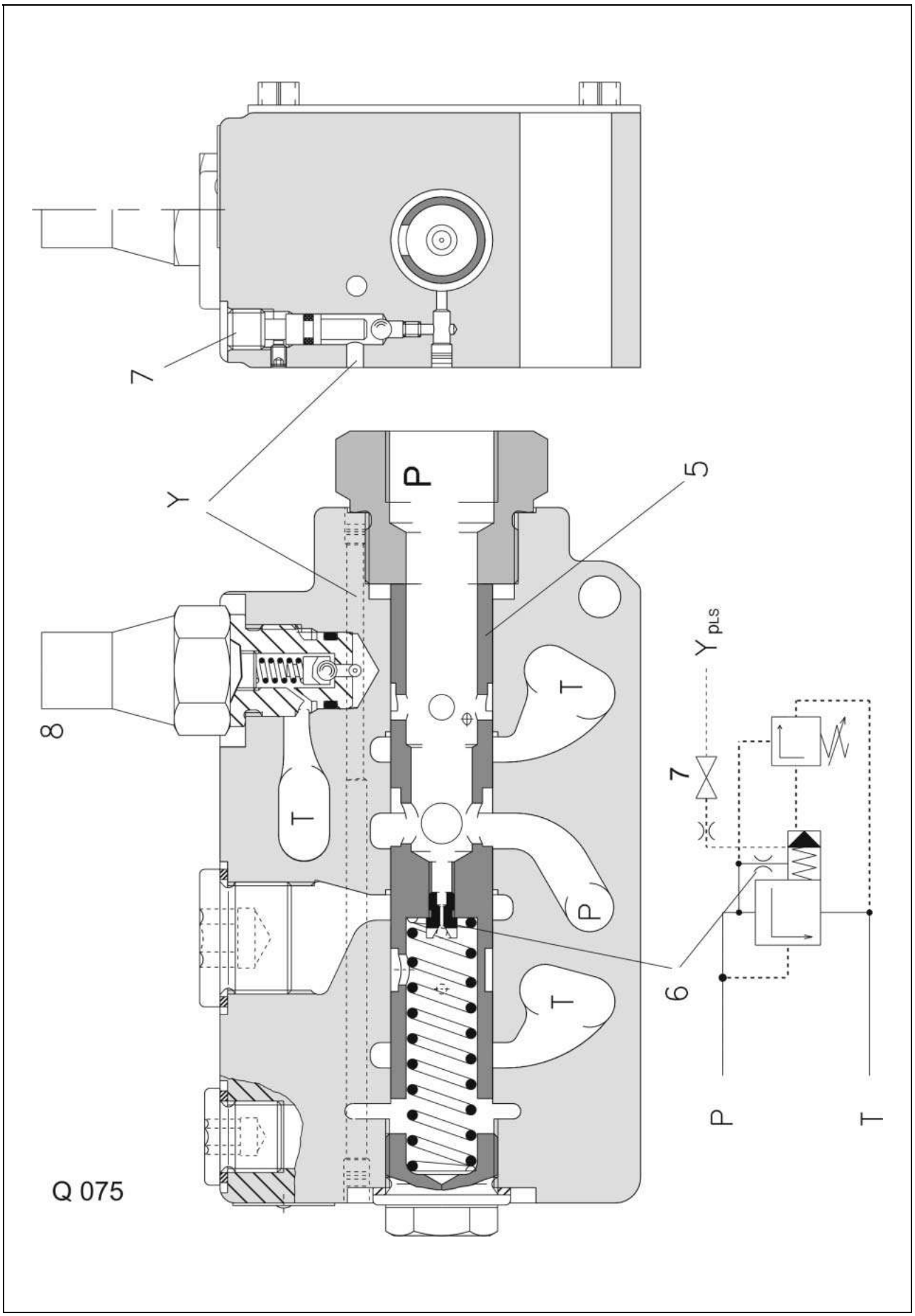
Circulation

The shut-off screw (7) it not screwed in.

The control bore (Y) is opened by the deactivated downstream solenoid valve.
Building-up of pressure is not possible in the spring space behind the orifice plate (6).
The circulation valve spool (5) is controlled against the spring by the flow and opens the connection from P to T.

Control position

A consumer is activated.
The working pressure builds up backwards against the pump. This pressure also acts in the spring space of circulation valve spool (5) via control bore (Y).
The spring moves the circulation valve spool (5) back so that only the residual flow can return to T.
When the working pressure exceeds 200 bar (set value of pressure relief valve), the pressure relief valve (8) opens.
The control oil now flows to the return line via the pressure relief valve (8).
The circulation valve spool (5) is moved back so that the residual flow can return to T without the pressure available at the consumer will collapse.


7
Y
P
5
8
T
T
P
T
6
Y pLS
7
P
T
Q 075

4.4 4/3 way Proportional solenoid valve

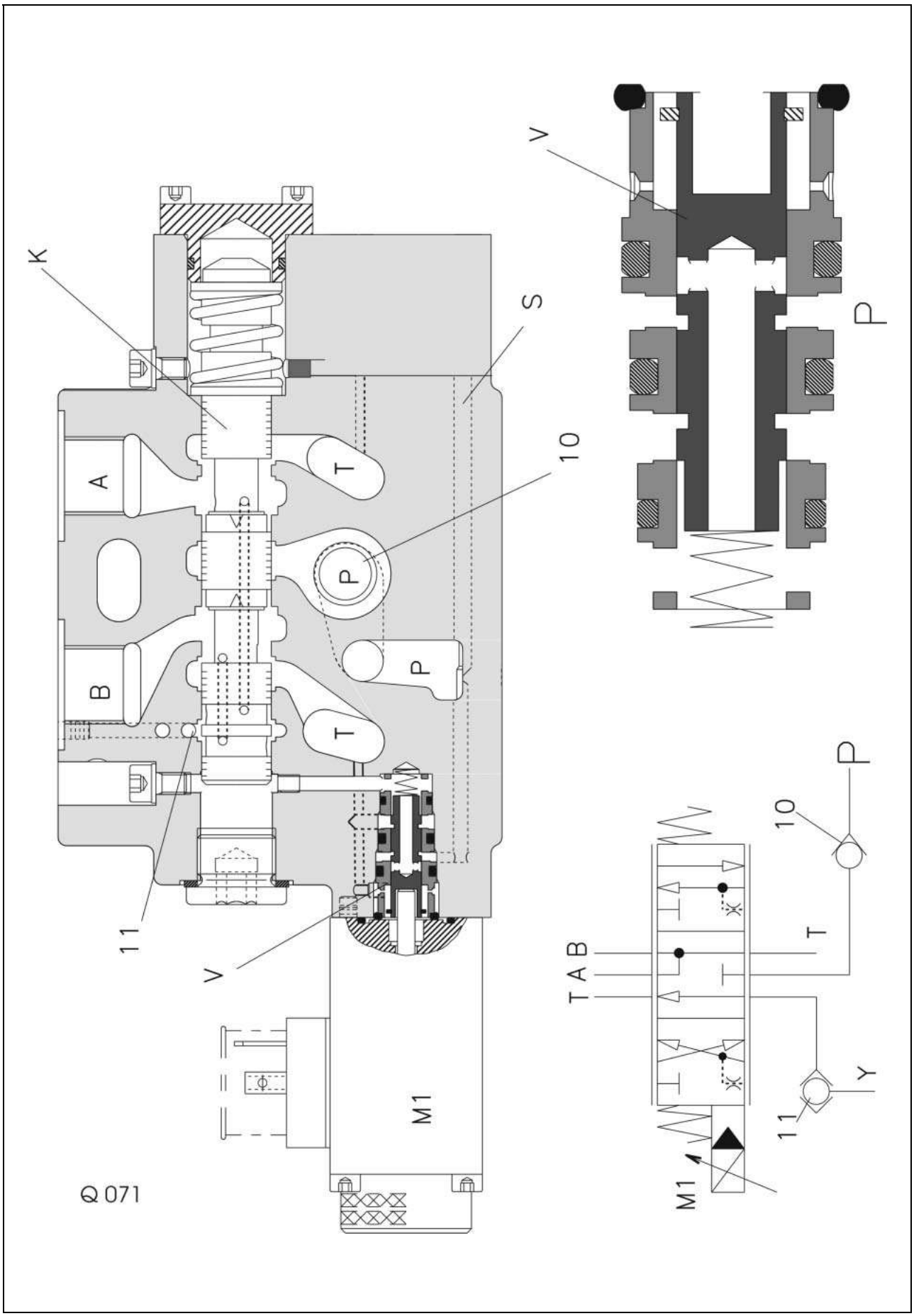
P	Tractor port (feed line)
T	Tractor port (return line)
A	Consumer port (reverse)
B	Consumer port (forward)
S	Bore
K	Control spool
V	Pilot valve
Y	Control bore
10	Non-return valve
11	Load change valve
M1	Solenoid coil (proportional control)

Neutral

Solenoid coil (M1) is switched off.
The circulation pressure (P) is available at control spool (K) and at the pilot valves (V) via bore (S).
The control oil returns to the tank (T) via the load change valve (11).

Floor conveyor forward

Solenoid (M1) is controlled proportionally from the switch console by means of a potentiometer via the electronic unit. The iron core pushes the spool in the pilot valve (V) open against the spring.
This opens the connection from (P) to the control spool (K) via bore (S) and pilot valve (V).
Pressure is applied at the bottom face of the control spool (K) and actuates it upwards against the compression spring.
Volume flow now flows from P to the hydraulic motor via port (B). The return oil from the hydraulic motor flows to tank T via port (A).
The control of the control spool (K) depends on the oil quantity available at the control spool (K).
The longitudinal bore in the control spool (K) connects B with the circulation valve spool (5) of the upstream valve via the load change valve (11).


K
S
V
P
A
B
T
P
T
10
11
V
M1
Q 071
P
10
T
T A B
Y
11
M1

4.5 4/3 way solenoid valve

P	Tractor port (feed line)
T	Tractor port (return line)
A	Consumer port
B	Consumer port
S	Bore
K	Control spool
V	Pilot valve
Y	Control bore
10	Non-return valve
11	Load change valve
M3	Solenoid coil
M4	Solenoid coil

Neutral

Both solenoids are deactivated.
The circulation pressure (P) is available at control spool (K) and at the pilot valves (V) via bore (S).
The control oil returns to the T via the load change valve (11).

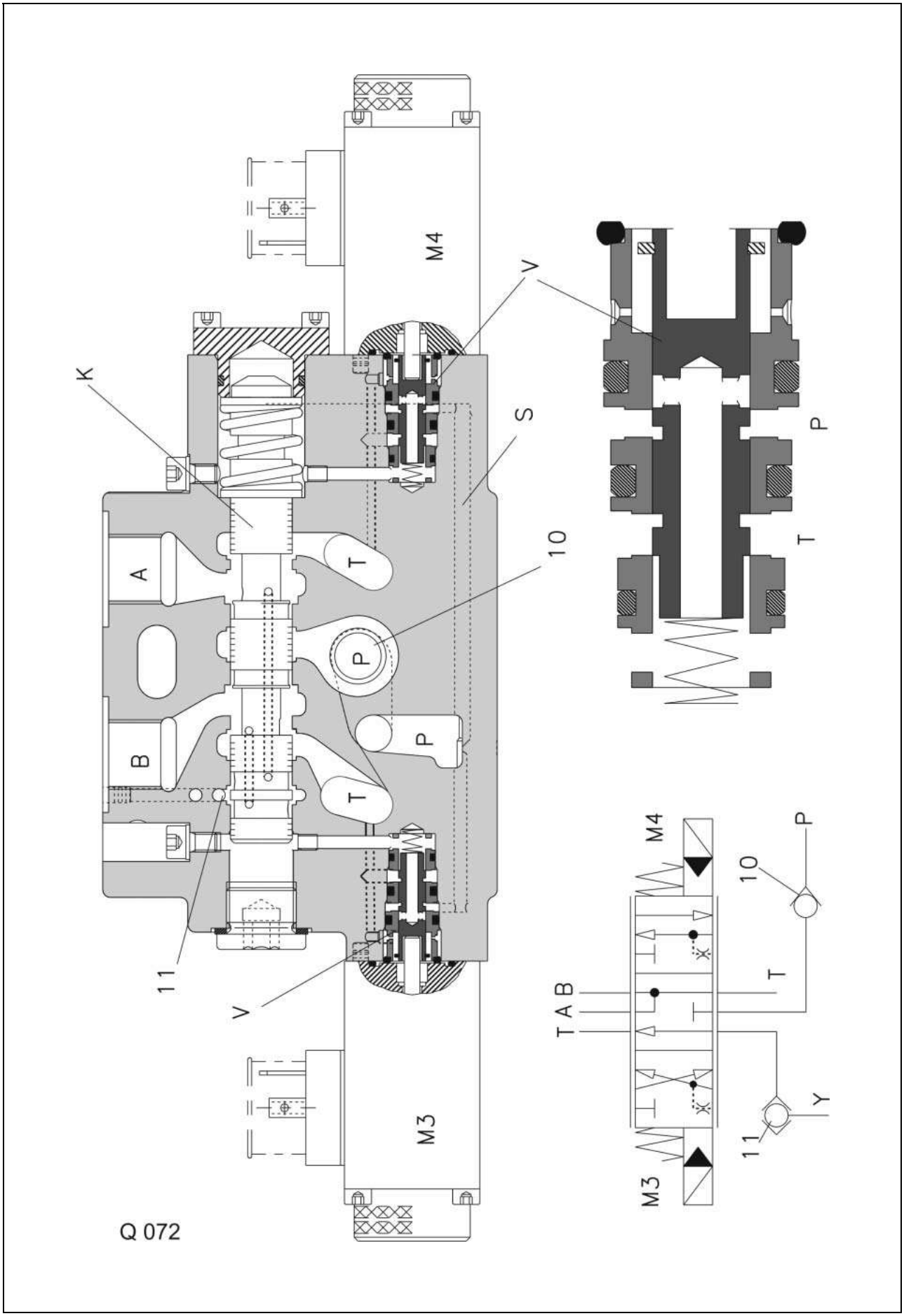
Pressure build-up port B

Solenoid (M3) is activated.
The iron core pushes the spool in the pilot valve (V) open against the spring.
This opens the connection from (P) to the control spool (K) via bore (S) and pilot valve (V).
Pressure is applied at the face end of control spool (K) and actuates it against the compression spring.
Volume flow now flows from P via port (B) to the seated valves 15 in the right block.
The return oil from the seated valve 27 in the left block flows to tank T via port (A).

The longitudinal bore in the control spool (K) connects B with the circulation valve spool (5) of the upstream valve via the load change valve (11).

Pressure build-up port A

Solenoid (M4) is activated.
The iron core pushes the spool in the pilot valve (V) open against the spring.
This opens the connection from (P) to the control spool (K) via bore (S) and pilot valve (V).
The pressure in the right spring space of the control spool (K) actuates control spool K.
Volume flow now flows from P via port (A) to the seated valves 27 in the left block.
The return oil from the seated valve 15 in the right block flows to tank T via port (B).
The longitudinal bore in the control spool (K) connects port (A) with the circulation valve spool (5) of the upstream valve (load signal line Y) via the load change valve (11).


M4
V
K
S
A
T
10
P
B
P
T
11
V
M3
Q 072
M4
10
P
T A B
T
Y
11
M3

4.6 2/2 way solenoid valve (seated valve)

4.6.1 Up to serial no.

A	Cylinder port
P-R	Pressure or return line port
VS	Seated valve
I	Solenoid deactivated
II	Solenoid activated

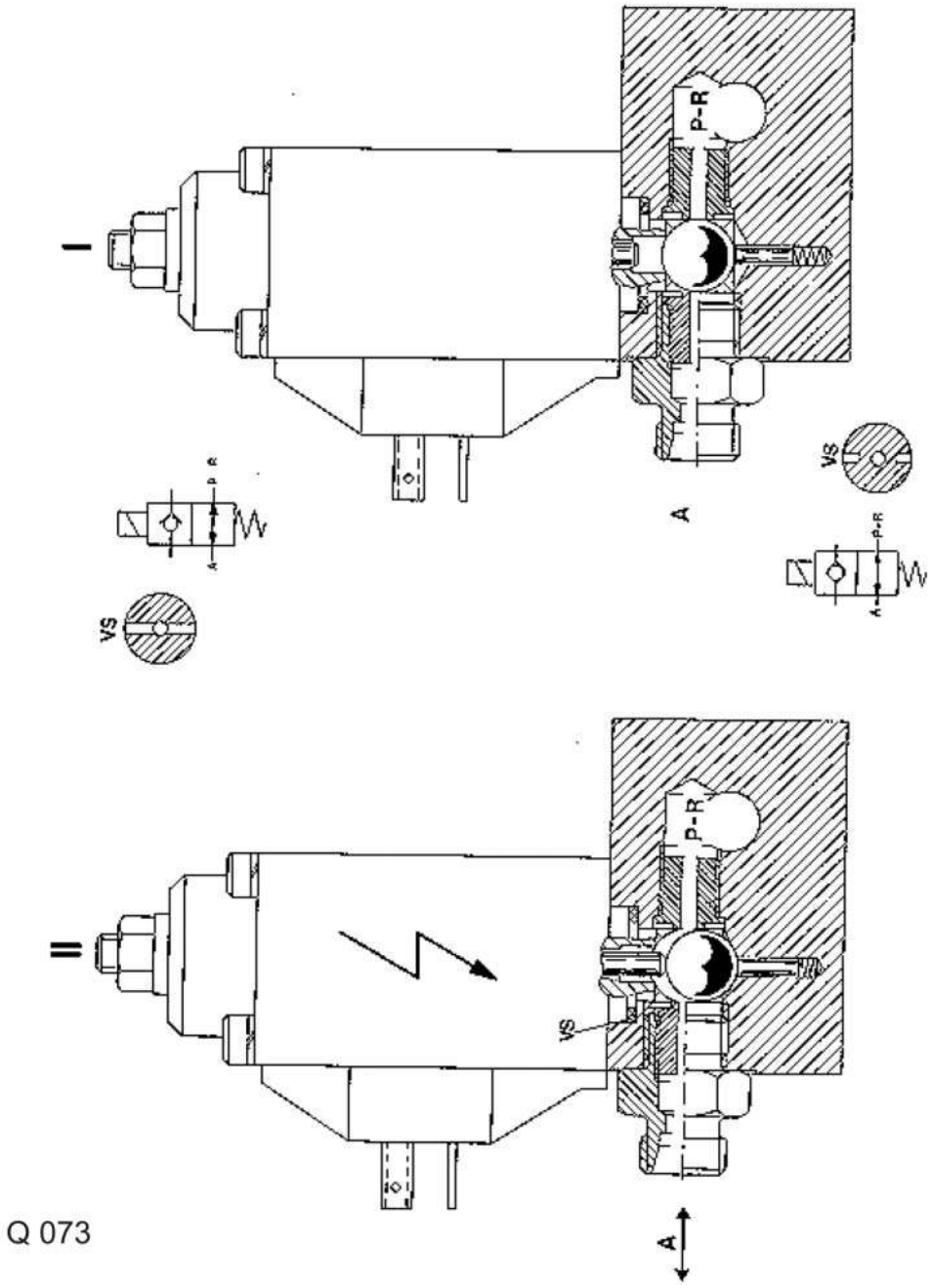
Function

When the solenoid is deactivated, the load pressure of the cylinder (acting at port A) presses the ball into its seat.
The connection from port (A) to port (P-R) is blocked.
This ensures that no oil can escape from the cylinder, which would result in a lowering motion.

When the solenoid is activated, the iron core pushes the ball downward against the spring-loaded ram.
The oil can

- flow from P to A = raising
- or from A to R = lowering

The valve can be switched manually at the adjusting screw of the solenoid.



Q 073

4.6.2 from serial no.

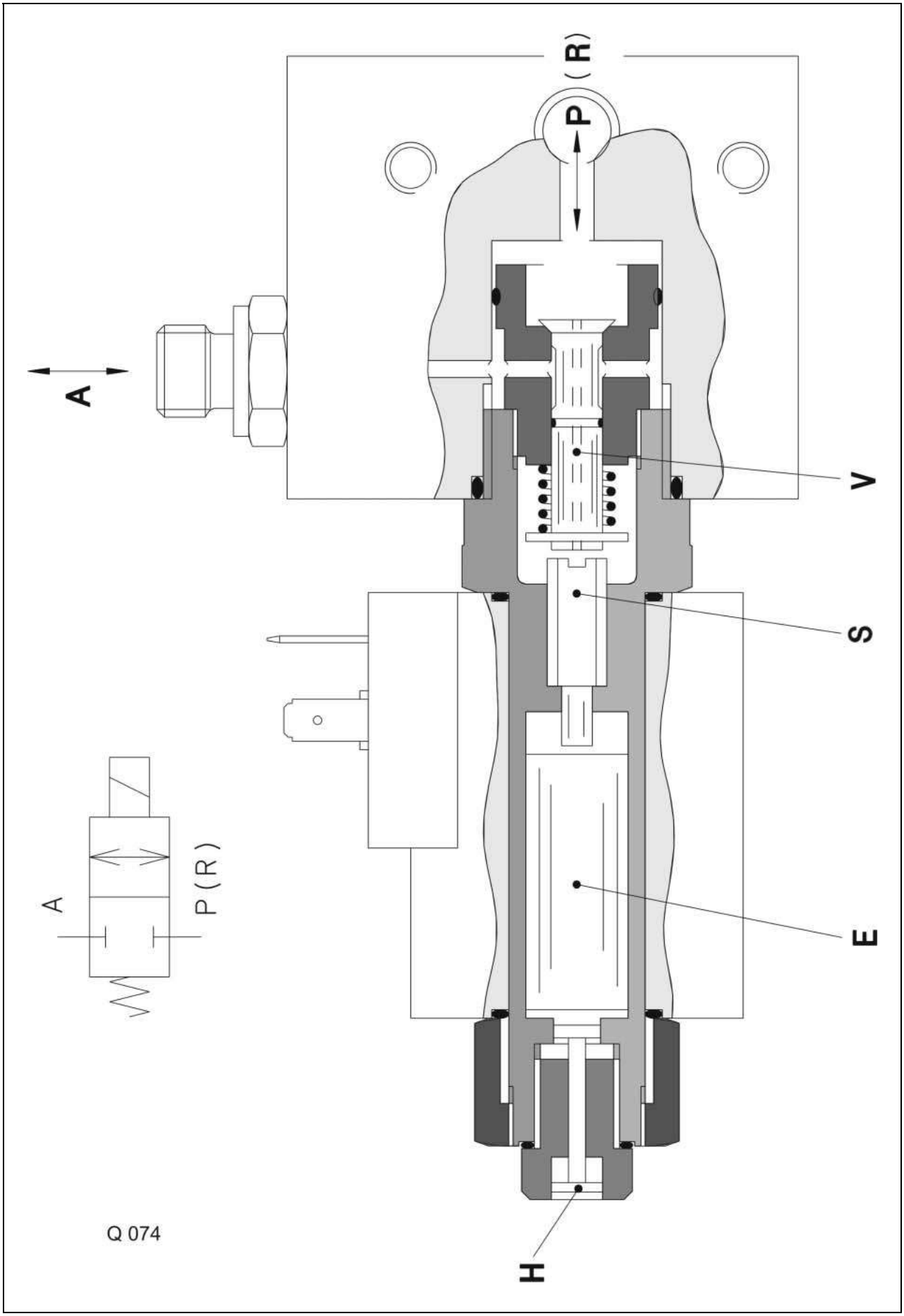
H Manual actuation of iron core (E)
E Iron core
S Ram
V Valve
P Pump port
R Return line port
A Cylinder port

Function

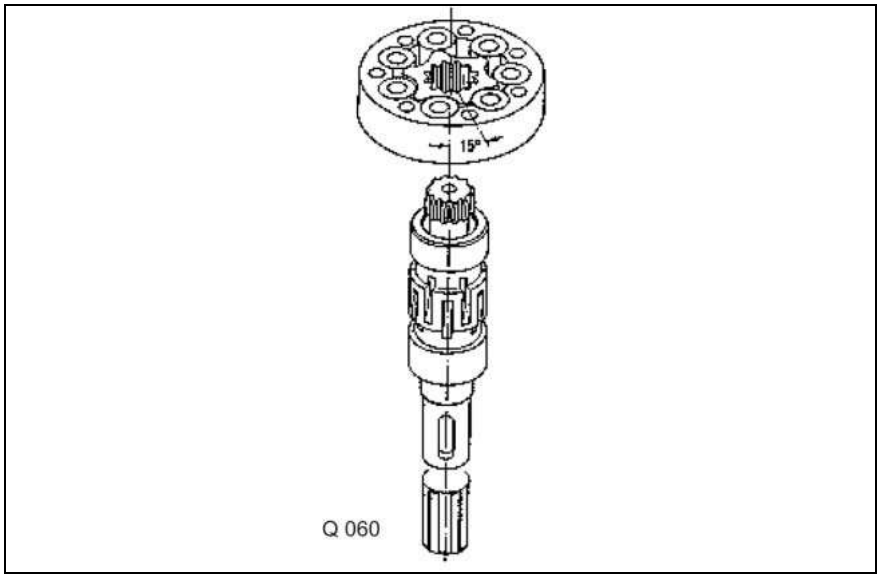
The valve (V) is pulled down by the compression spring (see figure). In this process, the tapered valve seat closes the connection from port (A) to port (P-R).
When the solenoid is deactivated, the load pressure of the cylinder (acting at port A) is available in the rod end space of valve (V). The load pressure cannot open the valve (V).
The connection from port (A) to port (P-R) is blocked.
This ensures that no oil can escape from the cylinder, which would result in a lowering motion.
When the solenoid is activated, the iron core (E) presses the valve (V) upwards via the ram (S).
The oil can

- flow from P to A = raising
- or from A to R = lowering

With manual operation, the valve (V) can be switched by hand.


P (R)
A
V
S
E
H
A
P (R)
Q 074

4.7 DANFOSS OMR 125 hydraulic motor



Install the gear set so that the tip of one rotor tooth is aligned with the transverse axis of the motor housing.
This ensures that one tooth tip of the rotor is 15° to the left of the key/groove of the cylindrical shaft or from the tip of the spline of the multi-spline shaft (correct direction of rotation).

4.8 Faults and remedies

4.8.1 Control system (LP/LM08 with SV02)

a System screw turned in
b System screw turned out
c Control spool jams
d Nozzle plugged
e Pressure valve will not close
f Insufficient electric power supply
g Pressure reducer works stiffly
h Control spool works stiffly
i Electric contact is not interrupted
k Solenoid will not switch
l Seated valve will not close
m Hydraulic motor defective
n Sealing plate, sealing nut or O-ring defective
o Block twisted, tie rods tightened too much

	Circulation valve with pressure relief valve					Directional control valve				Seated valve				
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**k**	**l**	**m**	**n**	**o**
With open hydraulic system: Tractor system pressure or 170 bar pressure build-up with deactivated control units	1													
With oil supply from “John Deere tractors”: Steering “wanders”		2												
Hydraulic motor – does not run						4	3					8		
Hydraulic motor – runs only in one direction								3						
Hydraulic motor – does not stop							3	6						
Hydraulic motor – does not reach max. speed						5								
Cylinder – no function										4				
Cylinder – does not remain pressure-tight											7			
No function from any cylinder						4	3							
No function from cylinders or motor			3	3										
Oil heating up	1													
External leaks													8	9

Eliminating the faults

1 Back off screw
2 Turn in screw
3 Remove and clean
4 Check electric system, operate emergency shut-off
5 Insufficient electric power supply or pump capacity too low
6 Electric contact not interrupted, remove plug
7 Replace valve block
8 Replace
9 Check tie rod tightening torque (30 Nm)

4.8.2 No working function
LP/LM08

Fault	Cause	Remedy
No or insufficient pressure build-up in all consumers	Spool of circulation/pressure relief valve jams Pressure pilot control valve does not close because of • Foreign object between seat and ball • Valve seat pressed out • O-ring of pressure pilot valve unit damaged • Orifice plate in spool of circulation/pressure relief valve clogged	• Clean • Check tie rod tightening torque (30 Nm) • Remove and clean • Replace pressure pilot valve unit • Replace O-ring • Clean
System pressure build-up	• Operating pressure is higher than preset safety pressure • 3 way directional control valve connected as 4 way valve	• Increase pressure setting • Replace valve
Oil supply to one consumer is too low or too high	• Incorrect control spool installed	• Replace spool
Oil supply to all consumers too low	• Electric power supply not correct	• Check electric controller
Oil supply to valve with the largest flow range is not achieved	• Pump oil delivery too low	• Check pump and suction line
One consumer has no function	• Solenoid is not switching • Spool of pressure reduction valve jams • Control spool works stiffly	• Check electric system • Check solenoid • Remove and clean • Remove and clean
Various valves switch irregularly	• Control spool works stiffly	• Remove and clean • Check tie rod tightening torque (30 Nm)

4.8.3 No working function with multiple actuation

Fault	Cause	Remedy
Function only at consumer with lowest pressure demand	• Pump oil delivery too low • Non-return valve in load signalling line leaking as it does not close its ball or its ball is missing	• Replace or clean pump Install ball if missing
Insufficient function at one consumer	• Ram of directional control valve works stiffly	• Remove and clean

4.8.4 Consumers lower

Fault	Cause	Remedy
Internal leak at the directional control valve too high	• Control spool or valve body worn	• Replace directional control valve

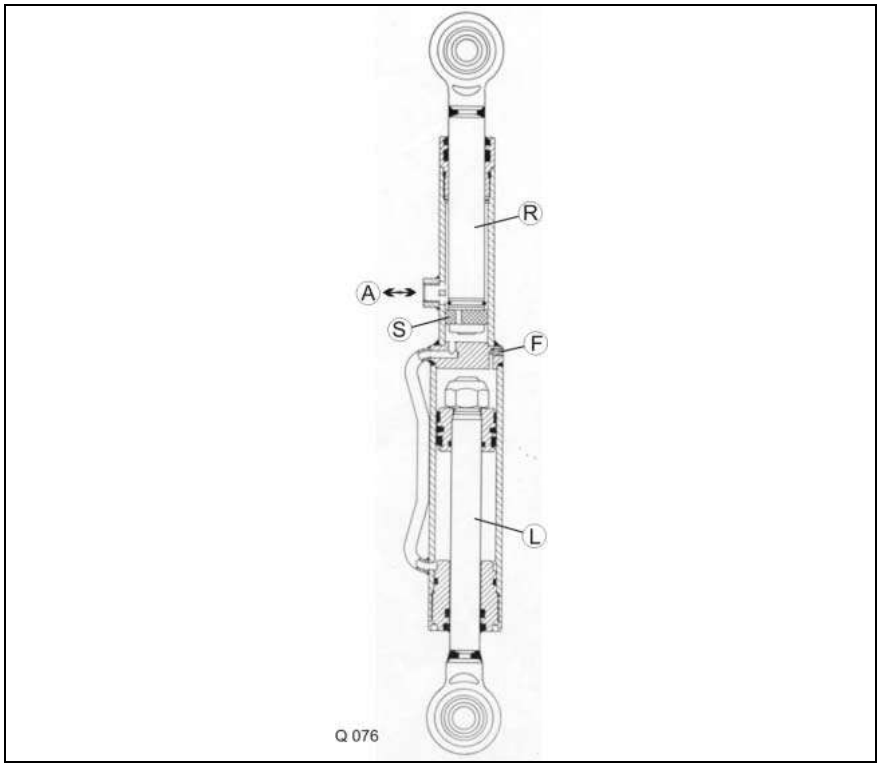
4.8.5 Oil heating-up

Fault	Cause	Remedy
System pressure build-up in neutral position	• Incorrect valve mounting plate, no control oil return Z - T	• Replace plate
Circulation pressure too high	• Directional control valve does not return fully to the neutral position as connecting screws are tightened too much (30 Nm)	• Reduce tightening torque

4.8.6 External oil leaks

Fault	Cause	Remedy
Oil leak between plates	• Sealing plate damaged	• Replace
	• Foreign object between O-ring and seal surface	• Clean
	• Seal surface damaged, possibly due to a blow on the edge	• Dress surface
Oil leak at solenoid	• Sealing damaged	• Replace
Oil leak at pressure pilot valve unit	• Sealing nut not locked or cutting edge of drain plug damaged	• Tighten or replace
	• Sealing nut damaged	• Replace
Oil leak at screw plug	• Screw plug loose • Copper seal damaged	• Tighten • Replace

4.9 Arresting cylinder for trailing axle



A Working cylinder port
F Filter
L Ram rod
R Ram rod
S Guide bushing

Function

Connect port (A) to the single-acting control valve of the tractor.

Forward travel:
Set the additional control unit to the floating position. Due to the toe-in (approx. 3 mm) and the friction, the land wheels are steered automatically.
In this process, the ram rod (R) is either pulled or pushed. The additional control unit of the tractor displaces or sucks in the oil.

Reverse travel:
Oil flows to the cylinder. The ram rod (L) extends. The land wheels are set to straight ahead travel and arrested.

5.0 QUANTUM 6800

5.1 Forced steering

110 Oil tank
215 Hydraulic pump (hand pump)
218 Steering hydraulics pump
323 Steering hydraulic cylinder
506 Steering accumulator
641 Shut-off valve
917 Steering pressure gauge

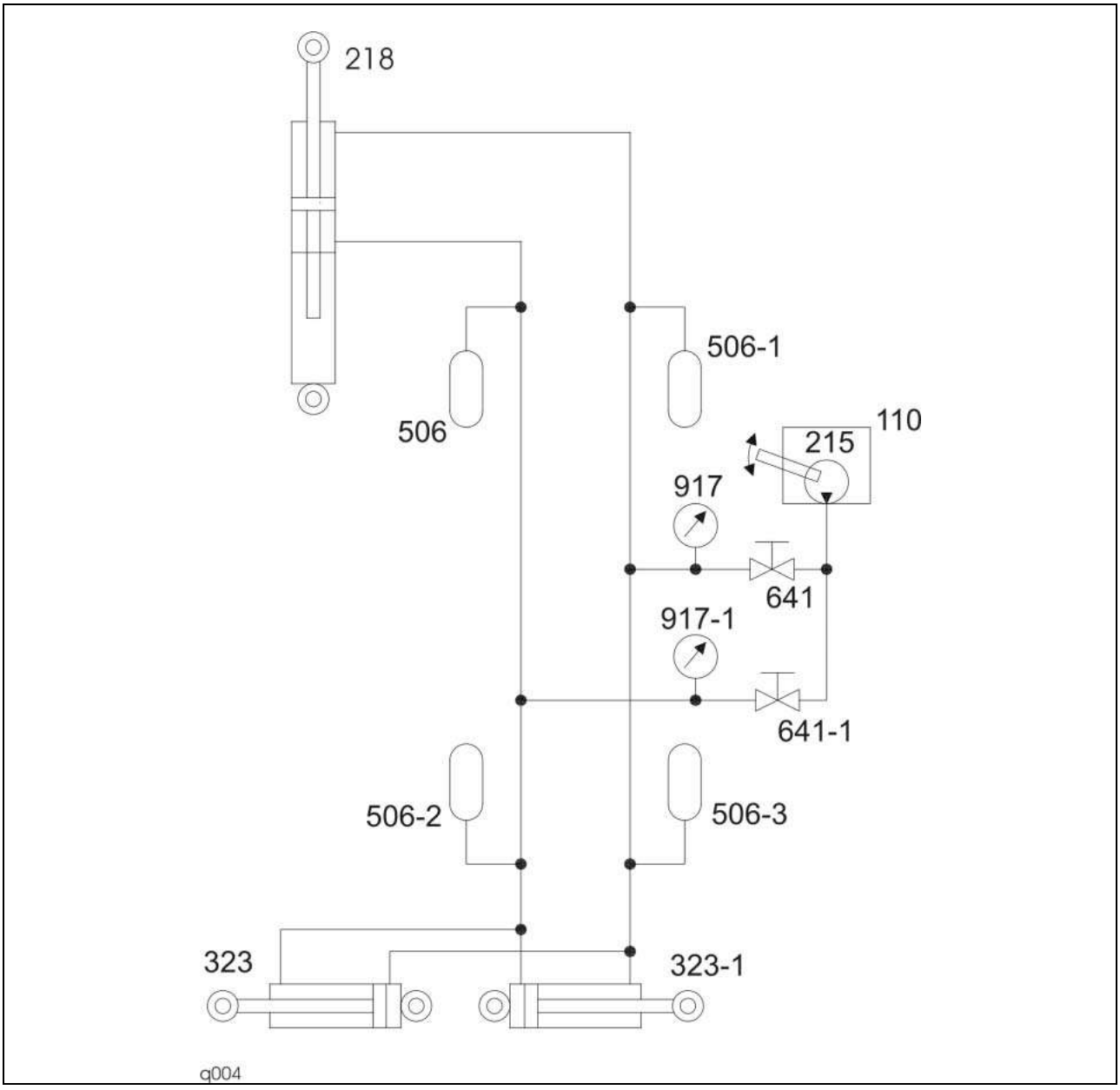
5.1.1 Function

Steering

When cornering, the steering hydraulics pump (master cylinder) 218 is guided by force. It supplies steering cylinder 323 with pressurized oil, depending on the steering direction.

Bleeding and pressurising the forced steering system

Please refer to the Operator's Manual for further information on bleeding and pressurizing the forced steering system.

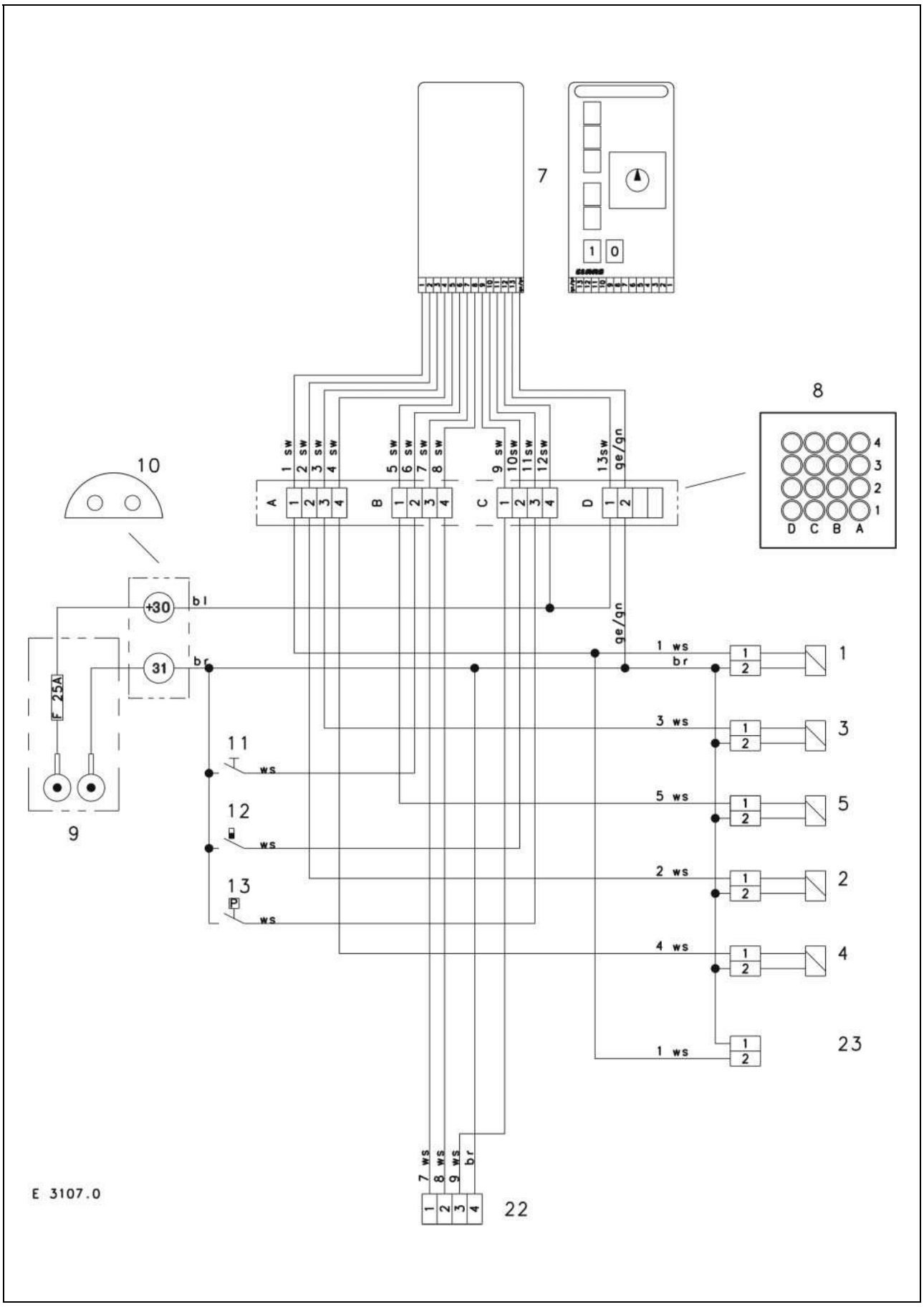


1.0 QUANTUM 2500 K, 2500 P, 3500 K, 3500 P, 3500S, 3800 K, 3800 P

1.1 3500 K, 3800 K, 2500 K – circuit diagram

1 Raise / lower pick-up solenoid valve
2 Articulated drawbar solenoid valve
3 Knife frame solenoid valve
4 K-type dry crop top solenoid valve
5 Tailgate solenoid valve
7 Control box
(operating panel, 10K potentiometer is active on S wagon only)
8 Main plug connector, 16 pins, plug/outlet
9 Set of cables, enclosed, fused socket outlet
10 Plug, 2-pin
11 “Wagon full” alarm switch
12 Knife frame reed contact
13 Oil pressure switch (raise knife frame) Not on 2500K
22 Plug for 3500 S floor conveyor speed
23 Pick-up drive and rotor On/Off solenoid valve, only for 3500 S

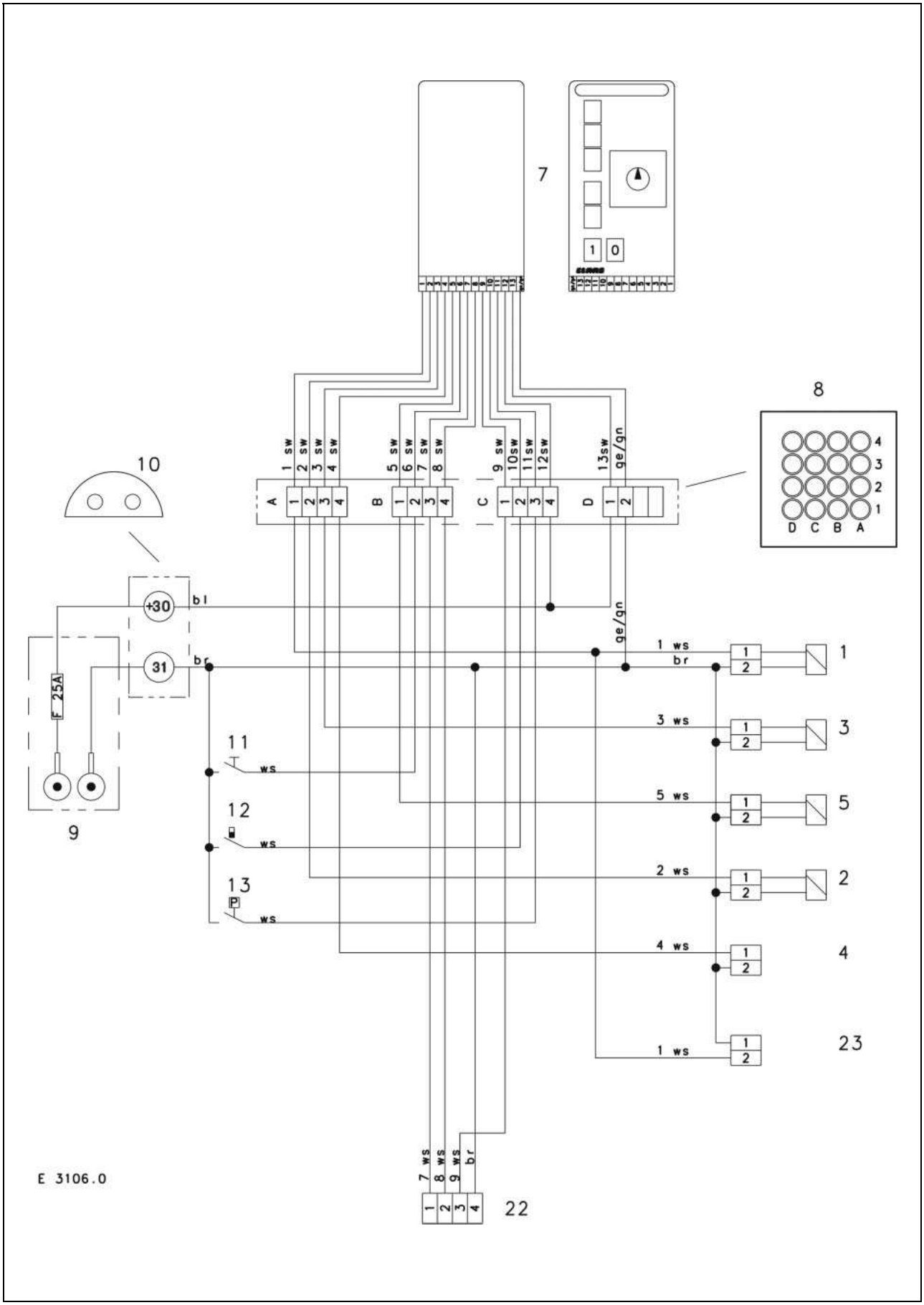
3500K / 3800K / 2500K



1.2 3800 P, 3500 P, 2500 P – circuit diagram

1 Raise / lower pick-up solenoid valve
2 Articulated drawbar solenoid valve
3 Knife frame solenoid valve
4 K-type dry crop top solenoid valve
5 Tailgate solenoid valve
7 Control box
(operating panel, 10K potentiometer is active on S wagon only)
8 Main plug connector, 16 pins, plug/outlet
9 Set of cables, enclosed, fused socket outlet
10 Plug, 2-pin
11 “Wagon full” alarm switch
12 Knife frame reed contact
13 Oil pressure switch (raise knife frame) Not on 2500P
22 Plug for 3500 S floor conveyor speed only
23 Pick-up drive and rotor On/Off solenoid valve, only for 3500 S

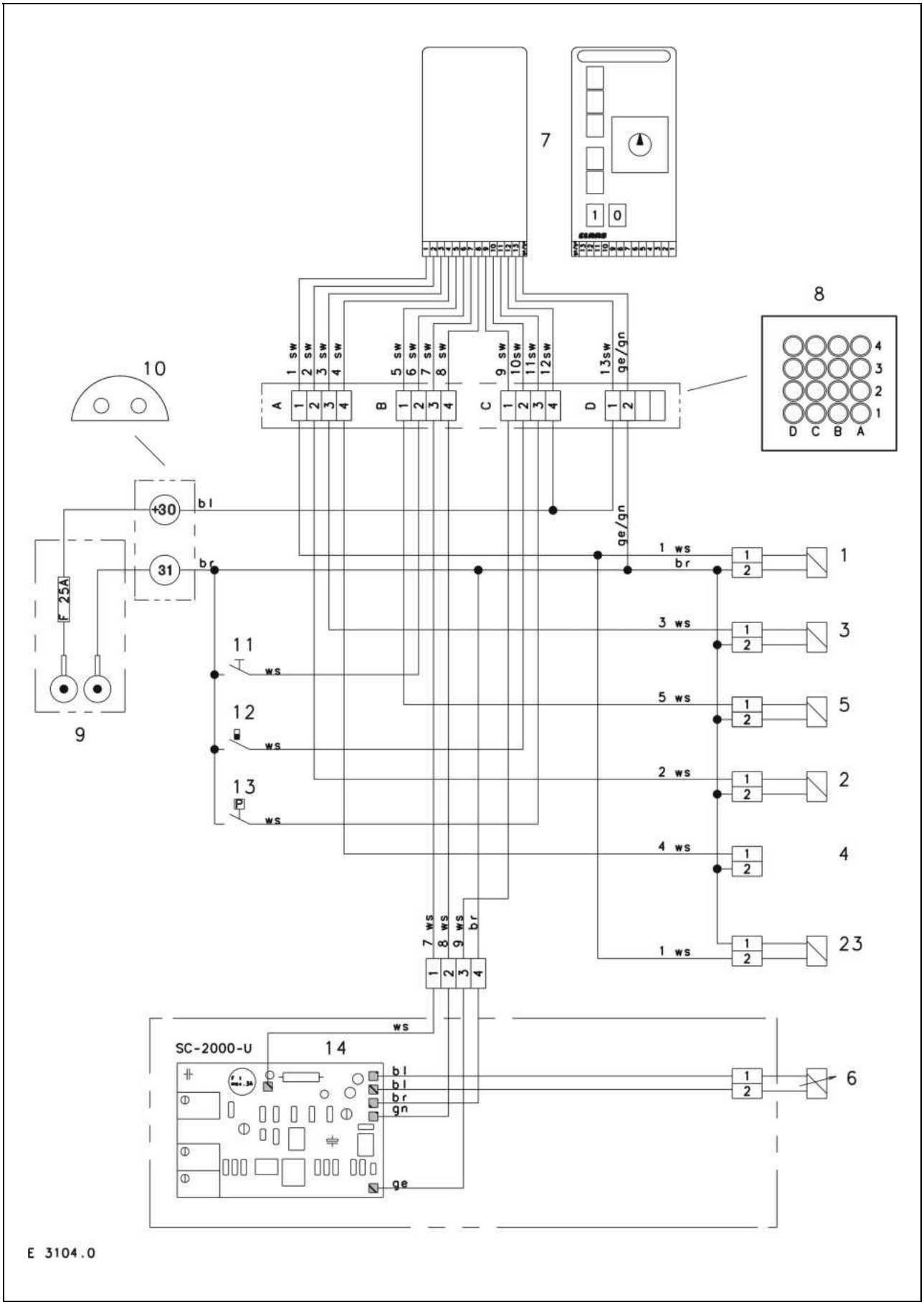
3500P / 2500P / 3800P



1.3 3500 S – circuit diagram

1 Raise / lower pick-up solenoid valve
2 Articulated drawbar solenoid valve
3 Knife frame solenoid valve
4 K-type dry crop top solenoid valve
5 Tailgate solenoid valve
6 Proportional solenoid valve, S-type floor conveyor
7 Control box
(operating panel, 10K potentiometer is active on S wagon only)
8 Main plug connector, 16 pins, plug/outlet
9 Set of cables, enclosed, fused socket outlet
10 Plug, 2-pin
11 “Wagon full” alarm switch
12 Knife frame reed contact
13 Oil pressure switch (raise knife frame)
14 Chopper amplifier (prop.) for floor conveyor, only for 3500S
23 Pick-up drive and rotor On/Off solenoid valve, only for 3500 S

3500S


7
8
10
9
11
12
13
14
SC-2000-U
F 25A
+30
31
A
B
C
D
1 sw
2 sw
3 sw
4 sw
5 sw
6 sw
7 sw
8 sw
9 sw
10sw
11sw
12sw
13sw
ge/gn
1 ws
3 ws
5 ws
2 ws
4 ws
1 ws
7 ws
8 ws
9 ws
bl
br
ws
gn
ge
1
3
5
2
4
23
6
E 3104.0

1.4 Chopper amplifier SC-2000-U

Board layout

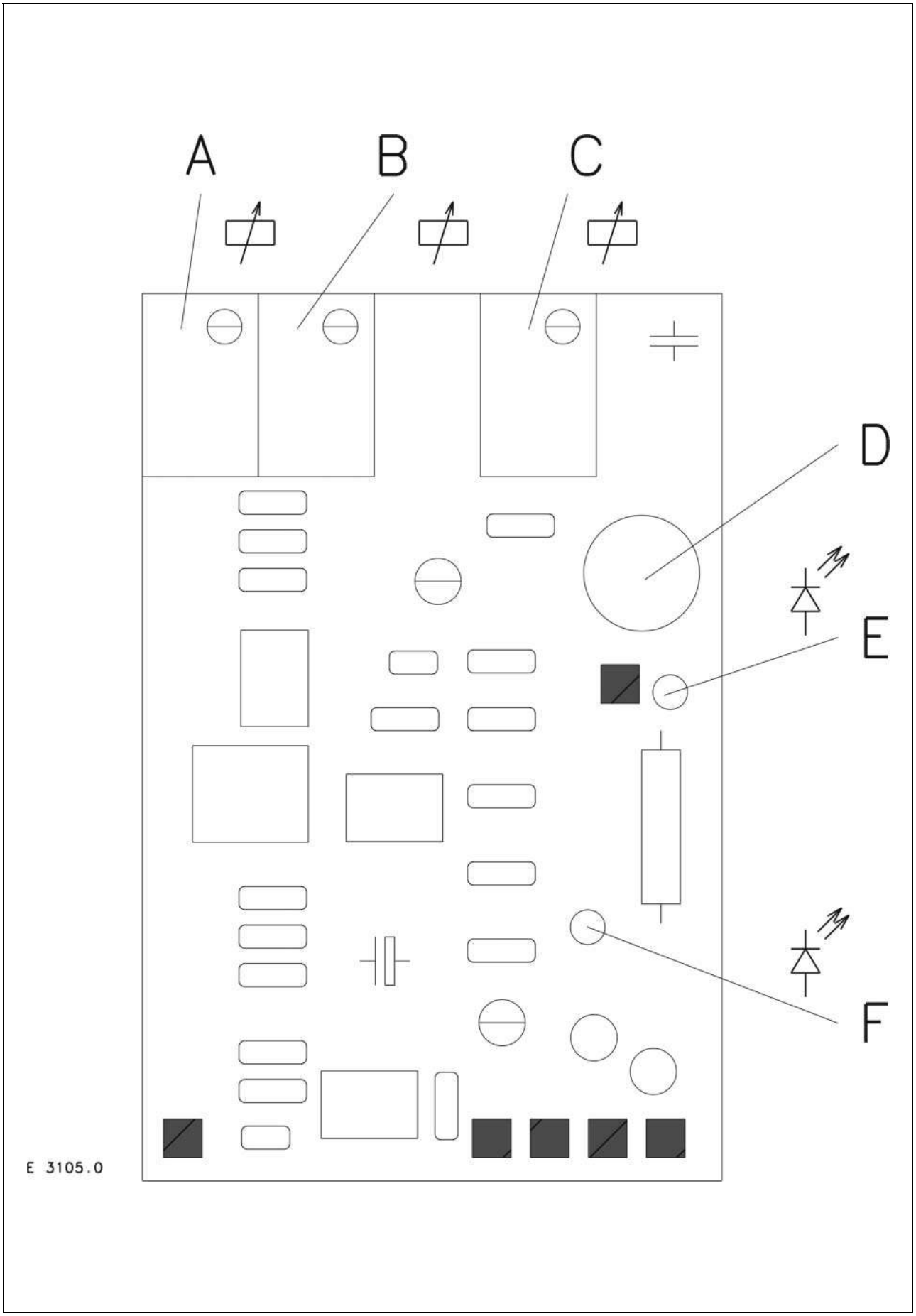
A Max. current potentiometer (I max.) = fast floor conveyor speed
B Response current potentiometer (I min.) = floor conveyor starts
C Ramp potentiometer (delayed or fast start of floor conveyor 0-5 sec.)
D Fuse 3.15 A (manufacturer: Wieckmann)
E LED lights up when power supply and fuse are o.k.
F LED (output check) lights up more intensely in relation to the output current.

Potentiometer setting

In general: Clockwise = more = +
Counterclockwise = less = -

Important: When turning counterclockwise, the potentiometers can be turned beyond their limit stop.

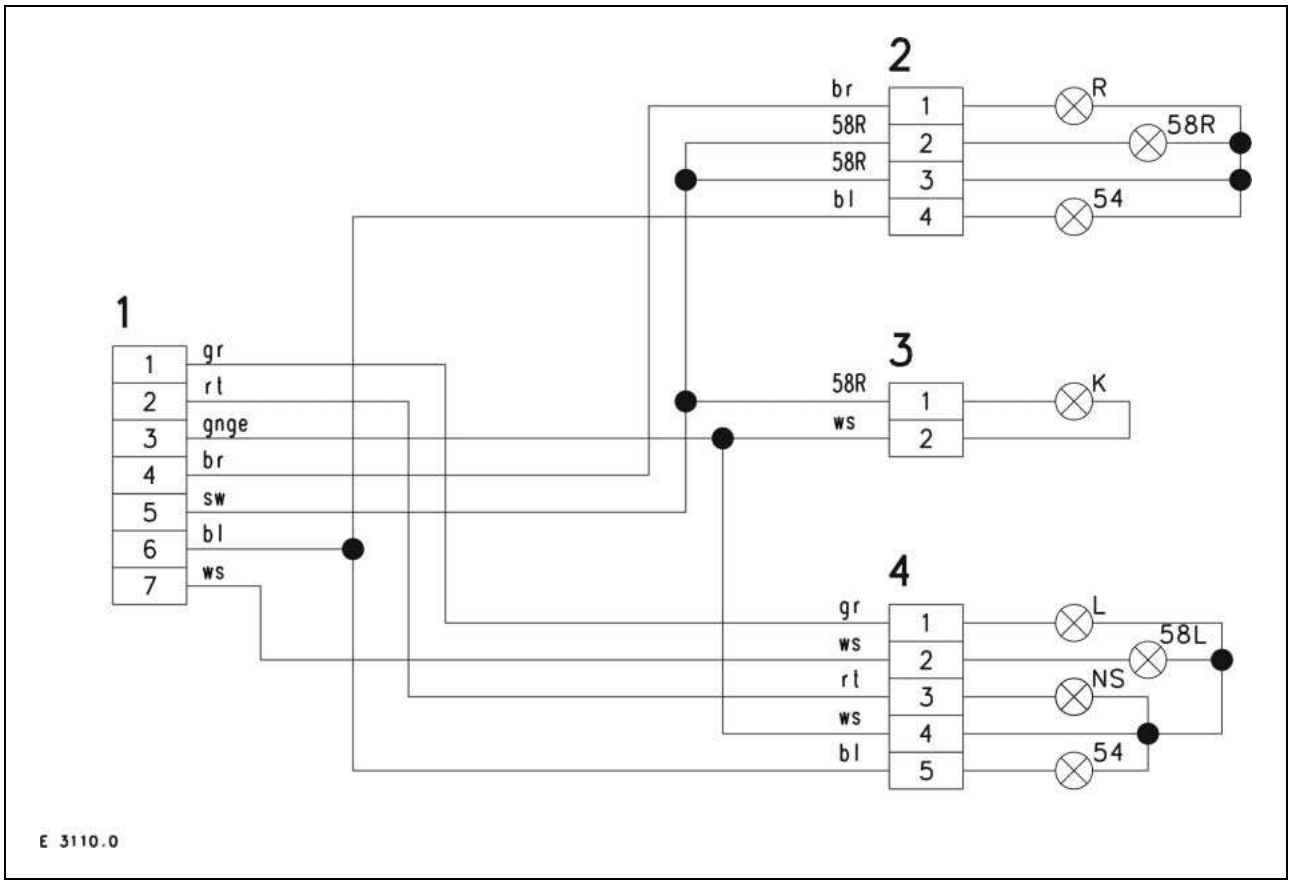
1. Set potentiometer in switch console to max. position (10).
2. Switch on tractor pto.
3. Supply forage wagon with oil.
4. Connect multimeter (ampere) in series with the coil.
5. Adjust potentiometer B until the multimeter displays 1.9 A. Then slightly back off potentiometer in switch console and watch for floor conveyor speed to decrease visibly.
6. Set potentiometer in switch console to 1.5.
7. Adjust potentiometer B [w1]until the multimeter displays approx. 0.44 A and the floor conveyor starts.
8. Potentiometer C is not needed for the forage wagon, the potentiometer therefore can be set to the left stop (i.e. direct start of floor conveyor). The potentiometer influences the start time of the floor conveyor from 0-5 sec. (advantageous e.g. in case of a flywheel drive)
9. The board can be run at 1-35 V. LED E lights up when the power supply and the fuse are o.k.
10. LED F lights up more intensely in relation to the amperage (approx. 0.44 A to 1.9 A) output - coil.


A
B
C
D
E
F
E 3105.0

1.5 Lighting

1 7-pin plug
2 4-pin plug, right-hand rear lights
3 2-pin plug, rear number plate light
4 5-pin plug, right-hand rear lights

R Turn signals, right-hand
L Turn signals, left-hand
58R Taillights, right-hand
58L Taillights, left-hand
54 Brake light
K Rear number plate light
NS Rear fog light



2.0 QUANTUM 4500 S / 5500 S / S-16 / S-18 / 6800 S

2.1 Circuit Diagram

2.1.0 up to serial no.:

H **Hydraulic valves, see also hydraulic circuit diagram**

X4-1	2 Pick-up drive On solenoid
X4-2	Pick-up drive Off solenoid
X4-3	Lower pick-up solenoid
X4-4	Raise pick-up solenoid
X4-5	Open knife frame solenoid
X4-6	Close knife frame solenoid
X4-7	Open tailgate solenoid
X4-8	Close tailgate solenoid
X4-9	Tailgate pressureless solenoid
X4-10	Raise articulated drawbar solenoid
X4-11	Lower articulated drawbar solenoid
X4-12	Reverse floor conveyor solenoid
X5-13	Floor conveyor fast 2-speed motor solenoid (option)
X5-14	Master valve solenoid
X5-15	Shredder drum drive On solenoid
X5-16	Shredder drum drive Off solenoid
X5-17	Left cross conveyor belt solenoid
X5-18	Right cross conveyor belt solenoid
X5-19	Tailgate pressure solenoid
X5-25	Floor conveyor forward solenoid

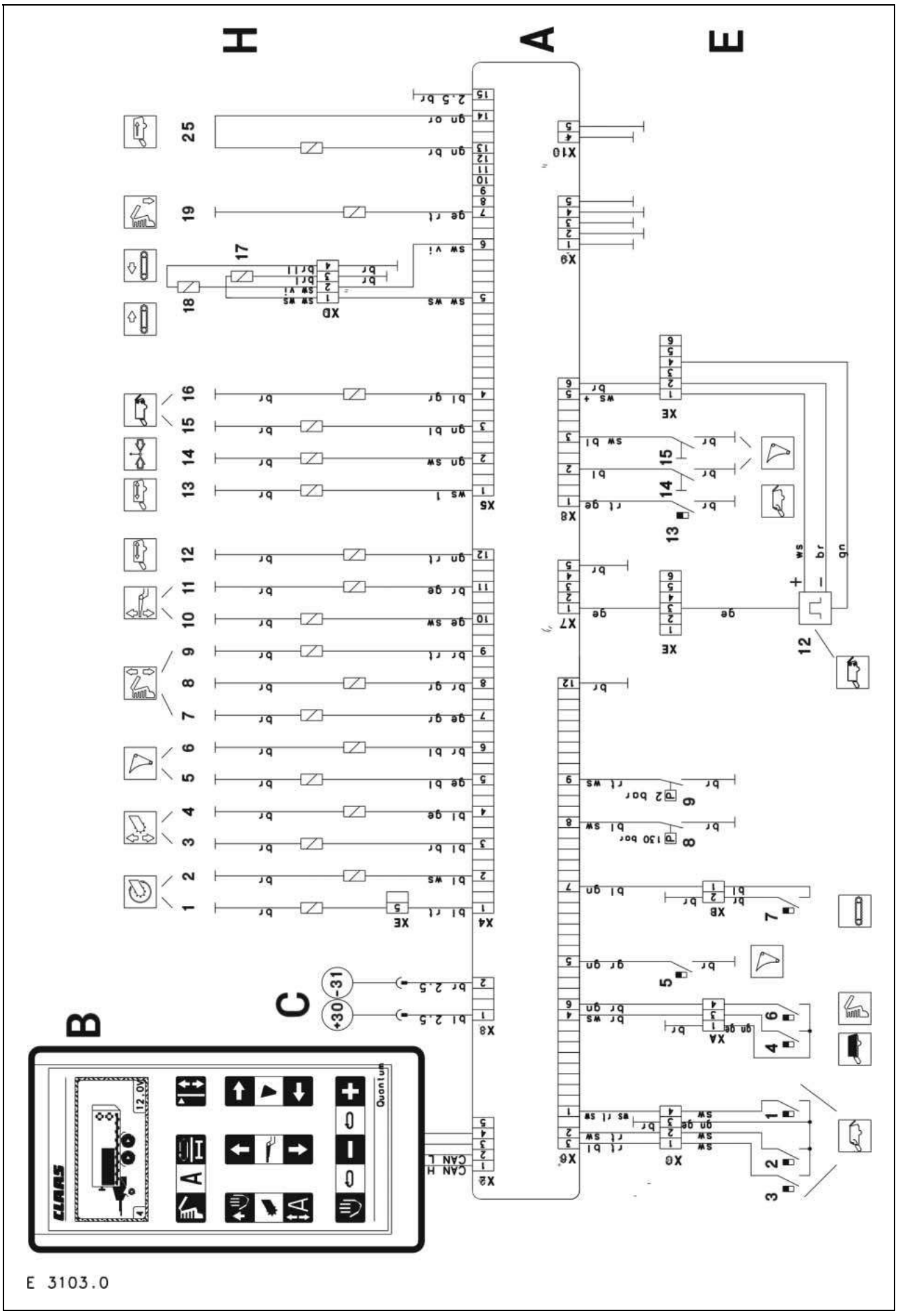
E **Electric switches**

X6-1	2 height alarm centre On reed switches (up to serial no.)
X6-2	2 height alarm top On reed switches
X6-3	2 height alarm centre Off reed switches (up to serial no.)
X6-4	Wagon full reed switch
X6-5	Knife frame reed switch
X6-6	Lock tailgate reed switch
X6-7	Cross conveyor belt reed switch (option)
X6-8	130 bar oil pressure switch, tailgate
X6-9	2 bar oil pressure switch
X7-12	Shredder drum speed sensor
X8-13	3 height alarm top Off reed switches
X8-14	Knife frame open switch
X8-15	Knife frame closed switch

A	Central terminal compartment
B	Switch console
C	Tractor power supply

XA	Plug connector on wagon
XB	Plug connector on wagon
XC	Plug connector on wagon
XD	Plug connector on wagon
XE	Plug connector on wagon

4500S / 5500S / S-16 / S-18 / 6800S



2.1.1 From serial no.:

H **Hydraulic valves, see also hydraulic circuit diagram**

X4-1	2 Pick-up drive On solenoid
X4-2	Pick-up drive Off solenoid
X4-3	Lower pick-up solenoid
X4-4	Raise pick-up solenoid
X4-5	Open knife frame solenoid
X4-6	Close knife frame solenoid
X4-7	Open tailgate solenoid
X4-8	Close tailgate solenoid
X4-9	Tailgate pressureless solenoid
X4-10	Raise articulated drawbar solenoid
X4-11	Lower articulated drawbar solenoid
X4-12	Reverse floor conveyor solenoid
X5-13	Floor conveyor fast 2-speed motor solenoid (option)
X5-14	Master valve solenoid
X5-15	Shredder drum drive On solenoid
X5-16	Shredder drum drive Off solenoid
X5-17	Left cross conveyor belt solenoid
X5-18	Right cross conveyor belt solenoid
X5-19	Tailgate pressure solenoid
X5-25	Floor conveyor forward solenoid
X5-26	Diodes P600K (6 A)
X5-61	Cross conveyor belt On/Off solenoid
X5-62	Trailing axle solenoid

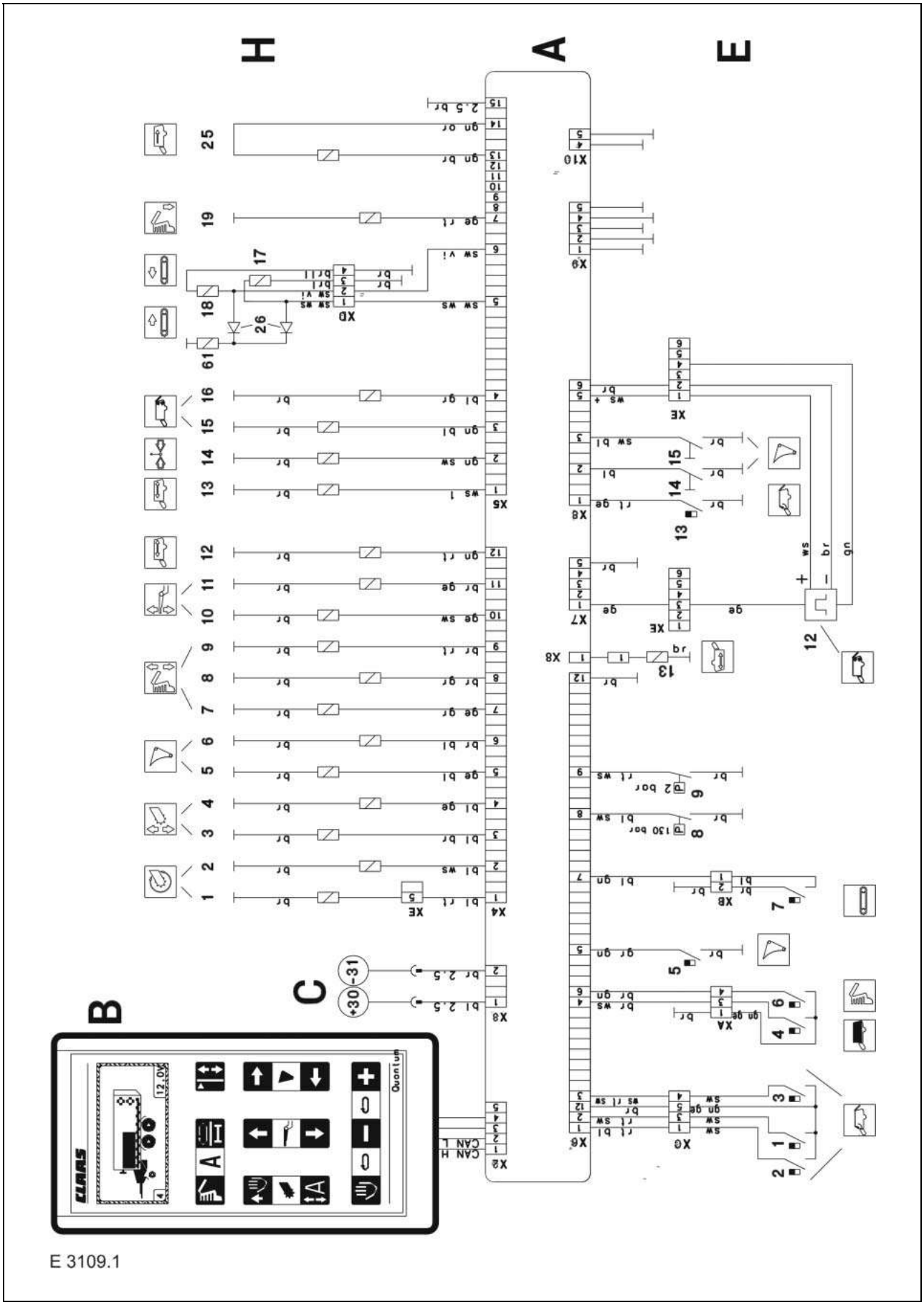
E **Electric switches**

X6-1	2 height alarm centre On reed switches, NO contact (up to serial no.)
X6-2	2 height alarm top On reed switches, NO contact
X6-3	2 height alarm centre Off reed switches, NO contact (up to serial no.)
X6-4	Wagon full reed switch
X6-5	Knife frame reed switch
X6-6	Lock tailgate reed switch
X6-7	Cross conveyor belt reed switch (option)
X6-8	150 bar oil pressure switch
X6-9	2 bar oil pressure switch
X7-12	Shredder drum speed sensor
X8-13	3 height alarm top Off reed switches, NO contact
X8-14	Knife frame open switch
X8-15	Knife frame closed switch

A	Central terminal compartment
B	Switch console
C	Tractor power supply

XA	Plug connector on wagon
XB	Plug connector on wagon
XC	Plug connector on wagon
XD	Plug connector on wagon
XE	Plug connector on wagon

4500S / 5500S / S-16 / S-18 / 6800S



E 3109.1

2.2 Diagnosis

2.2.1 Activation

The diagnosis system serves for verifying the inputs and outputs of the electro-hydraulic control system.
To turn the diagnosis system on, press these three buttons simultaneously and activate the pressure at the control unit at the same time.
The input check appears on the display.

Jump from input check to output check using this button.

Move the cursor to the channel to be checked using these buttons.

Bridge the associated (reed) switches for checking the inputs. The channel number is inverted on the display.

Switch on the valves using this button for checking the outputs.

IMPORTANT! To protect the control system, a maximum of three valves may be actuated at the same time.

Use this button to switch the valves off.

This button will switch off all valves. (Emergency OFF)

To turn the diagnosis system off, depressurize the hydraulic system.

2.2.2. Input assignment

Circuit	Reed contact no. in display
Reed contacts:	
Height alarm top On	1
Height alarm top Off	13
Height alarm bottom On	2 (up to serial no.)
Height alarm bottom Off	3 (up to serial no.)
Wagon full alarm (shredder drums)	4
Knife frame position	5
Close tailgate	6
Cross conveyor belt	7
Oil pressure switch:	
150 bar tailgate open	8
2 bar control system On/Off	9
Shredder drum speed monitor (switch on pto)	12
Knife frame open pushbutton	14
Knife frame close pushbutton	15
Switch closed = Number inverted	

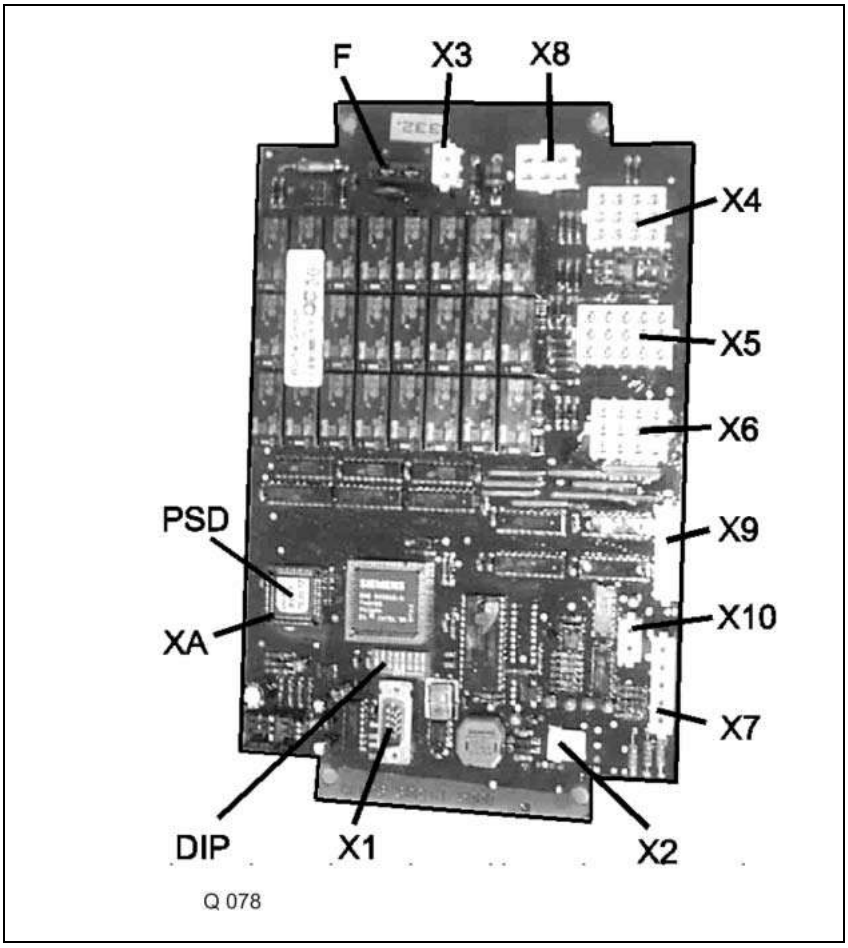
2.2.3 Output assignment

Circuit	Solenoid valve no. in display
Pick-up On	1
Pick-up Off	2+14
Pick-up down	3
Pick-up up	4+14
Open knife frame	5+14
Close knife frame	6+14
Open tailgate	7+9+14
Lower tailgate	8
Lock tailgate	8+19+14
Raise articulated drawbar	10+14
Lower articulated drawbar	11+14
Floor conveyor proportional	25
Floor conveyor 2nd stage	13+25
Floor conveyor reverse slowly	12+14
Floor conveyor reverse quickly	13+14+12
Shredder drums On (engage pto)	15
Shredder drums Off	16+14

2.2.4 Emergency operation

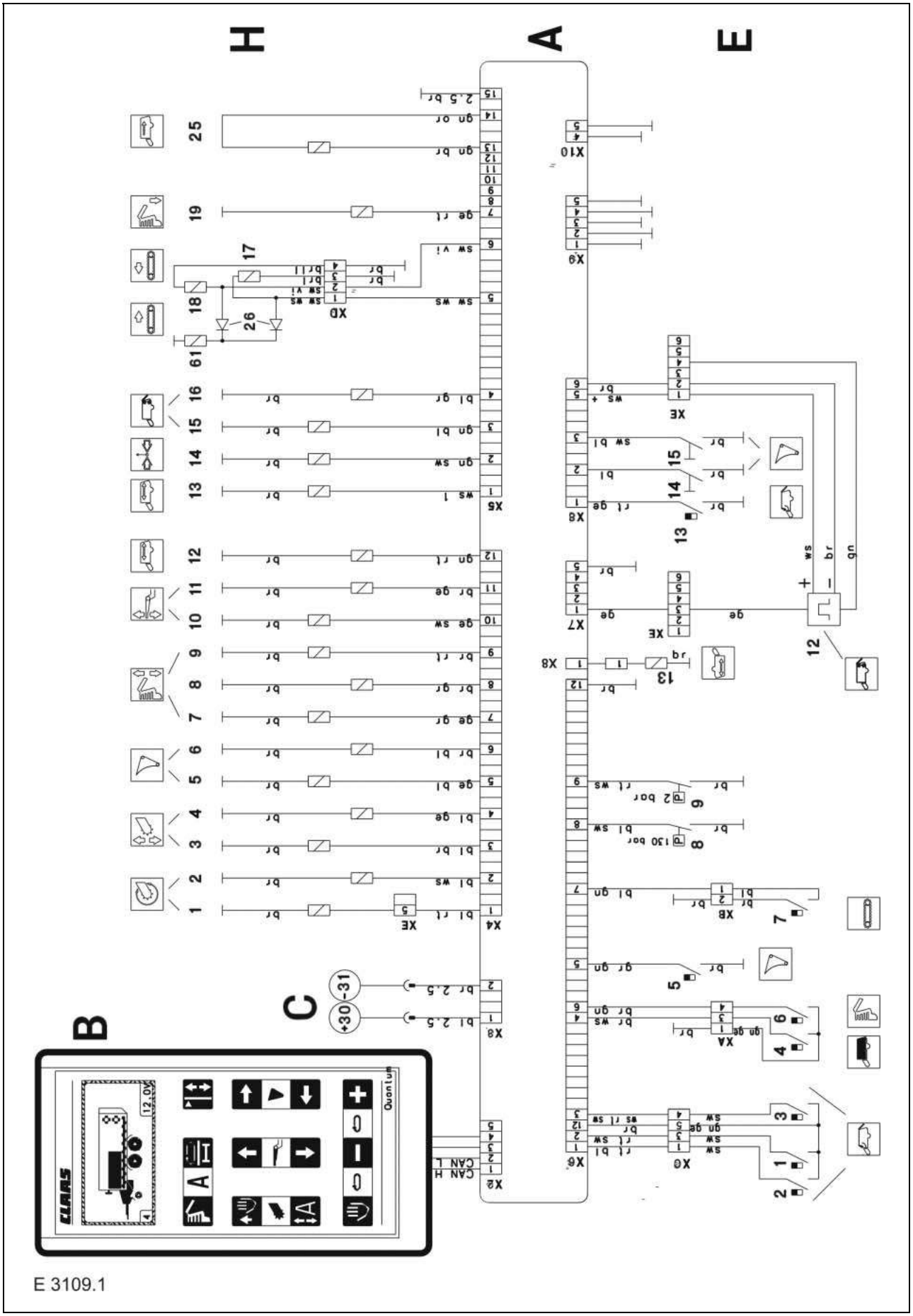
Operation	Valve
Pick-up On	1
Pick-up Off	2+14
Pick-up down	3
Pick-up up	4+14
Open knife frame	5+14
Close knife frame	6+14
Open tailgate	7+9+14
Lower tailgate	8
Lock tailgate	8+19+14
Tailgate pressureless	9
Raise articulated drawbar	10+14
Lower articulated drawbar	11+14
Floor conveyor proportional	25
Floor conveyor 2nd stage (fast)	13+25
Floor conveyor reverse slowly	12+14
Floor conveyor reverse quickly	13+14+12
Hydraulic pressure	14
Shredder drums On	15
Shredder drums Off	16+14
Left cross conveyor belt	17+14+26
Right cross conveyor belt, fast	18+14+26
Steering axle	20+14
	21 - 24

2.3 QUANTUM S power board (A)



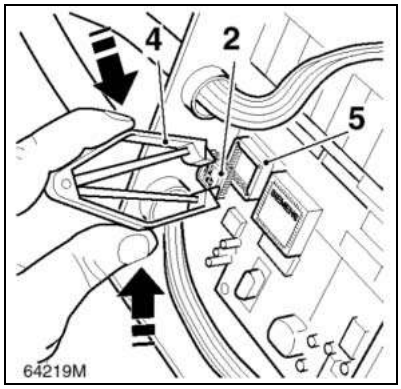
Plug X1	Canon	9-pin	Not used
Plug X2	Lumberg	5-pin	Switch console
Plug X3	AMP	2-pin	+30, -31
Plug X4	AMP	12-pin	Solenoid valve 1-12
Plug X5	AMP	15pin	Solenoid valve 13-25
Plug X6	AMP	12-pin	Reed contact 1-11 oil pressure switch
Plug X7	AMP	5-pin	Speed sensor
Plug X8	AMP	6-pin	Reed contact 13-15 oil pressure switch
Plug X9	AMP	5-pin	-
Plug X10	AMP	2-pin	-
SD			Program component (Eprom)
F			15 A fuse
XA			Caution: Pay attention to mounting surface

4500 S / 5500 S / S-16 / S-18 / 6800 S

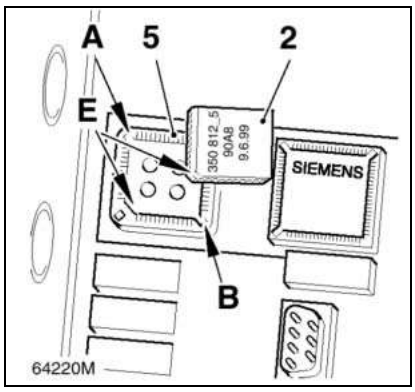


E 3109.1

2.3.1 Replacement of EPROM



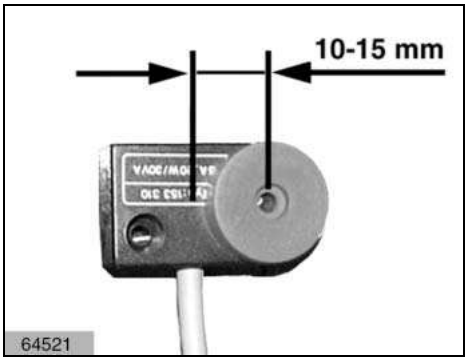
Take the PSD (2) out of the frame (5) using a special PLCC IC withdrawing tool (4).
The PLCC IC withdrawing tool (4) is available at an electronics specialist (e.g.: Conrad Electronic, order no.: 14 94 70-44).
Insert metal points of the extraction tool (4) into the frame corners (A and B). Carefully pres the withdrawing tool (4) together using your fingers. The PSD (2) can now be pulled out of the frame (5).



Important! The PSD (2) can only be inserted into the frame (5) in one position.

The bevelled corner (E) of the EPROM must be accurately placed upon the bevelled corner (E) of the frame.
Avoid tilting when inserting the PSD since otherwise contacts may be damaged.

2.4 Setting of reed switches



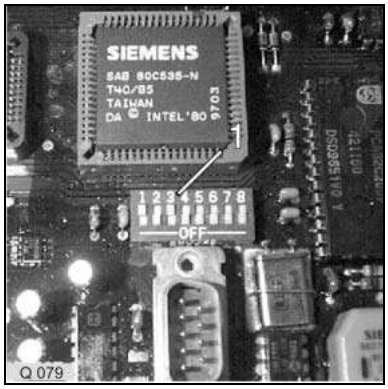
To ensure flawless function of the reed switches, the position of each switch relating to the associated magnet must be correct.

Adjust setting as follows:

- Move the reed switch and/or the magnet to the position where the switching operation is to take place.
- Set the distance between the reed switch and the magnet to 1-3 mm
- The magnet must be set to an offset of approx. 10-15 mm to the centre of the reed switch since the centre of a reed switch is in a dead field.

2.5 Dip switches

2.5.1 Table 1



Dip switch	Position	Factory pre-set position	Meaning for QUANTUM	Meaning for SPRINT
1	Off (bottom)	On (top)	Test program (by manufacturer only)	Test program
2	On (top)		When extending the articulated drawbar, the floor conveyor speed changes to speed 1 (floor conveyor standstill); after this, the programmed speed will be re-activated. When retracting the articulated drawbar, the floor conveyor speed changes to speed 4; after this, the programmed speed will be re-activated.	When extending the articulated drawbar, the floor conveyor speed changes to speed 1 (floor conveyor standstill); after this, the programmed speed will be re-activated. When retracting the articulated drawbar, the floor conveyor speed changes to speed 4; after this, the programmed speed will be re-activated.
2	Off (bottom)	Off (bottom)	When extending the articulated drawbar, the floor conveyor speed must be reduced to 4 (floor conveyor running), the programmed speed will not be activated. When retracting the articulated drawbar, the floor conveyor speed changes to speed 4; after this, the programmed speed will be re-activated.	When extending the articulated drawbar, the floor conveyor speed must be reduced to 4 (floor conveyor running), the programmed speed will not be activated. When retracting the articulated drawbar, the floor conveyor speed changes to speed 4; after this, the programmed speed will be re-activated.
3	On (top)		Automatic filling (level 2), may be deactivated by means of height alarm button (key button housing 970 917.1).	not possible
3	Off (bottom)		Automatic filling (level 1), may be changes from partial to complete filling by means of height alarm button (key button housing 970 917.1).	Basic position
4	On (top)		not possible	Automatic filling activated (triangular flap with one OFF switch and two ON switches)
4	Off (bottom)	Off (bottom)	Automatic filling activated (metal top and tine sensor with two OFF switches and two ON switches)	not possible

Dip switch	Position	Factory pre-set position	Meaning for QUANTUM	Meaning for SPRINT
5	On (top)		Operation of knife frame only by means of key button housing 970 917.1, including complete opening or closing	Operation of knife frame by means of key button housing 970 917.1, including complete opening or closing
5	Off (bottom)	Off (bottom)	Knife frame may be operated by means of key button housing 970 917.1 to remove plugging, complete opening and closing of knife frame by pushbutton 972 234.0.	Pushbutton 972 234.0 not provided
6	On (top)		2-speed motor may be started manually (9+S)	not possible
6	Off (bottom)	Off (bottom)	2-speed motor may be started manually (9+S)	Basic position
7		Off (bottom)	Spare (not used yet)	Spare (not used yet)
8	On (top)	Off (bottom)	Spare (not used yet)	Spare (not used yet)

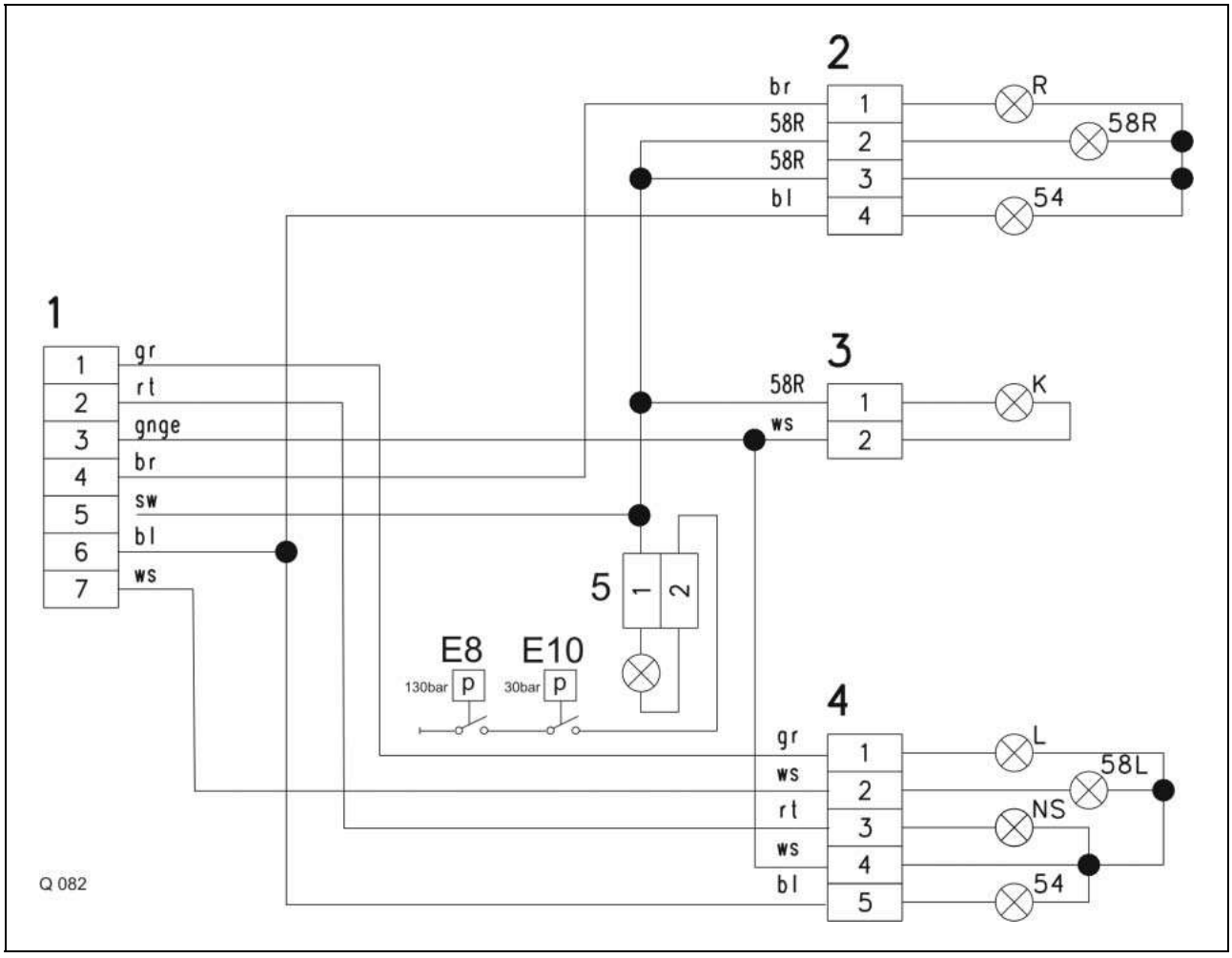
2.5.2 Table

Dip switch	Position	Factory pre-set position 1999 series	Setting for QUANTUM, corresponds to factory pre-set position for 1999 series	Setting for SPRINT
1	Off (bottom)			
2	On (top)			On (top)
2	Off (bottom)	Off (bottom)	Off (bottom)	
3	On (top)			
3	Off (bottom)	Off (bottom)	Off (bottom)	Off (bottom)
4	On (top)			On (top)
4	Off (bottom)	Off (bottom)	Off (bottom)	
5	On (top)			On (top)
5	Off (bottom)	Off (bottom)	Off (bottom)	
6	On (top)			Off (bottom)
6	Off (bottom)	Off (bottom)	Off (bottom)	
7	On (top)			
7	Off (bottom)	Off (bottom)	Off (bottom)	Off (bottom)
8	On (top)			
8	Off (bottom)	Off (bottom)	Off (bottom)	Off (bottom)

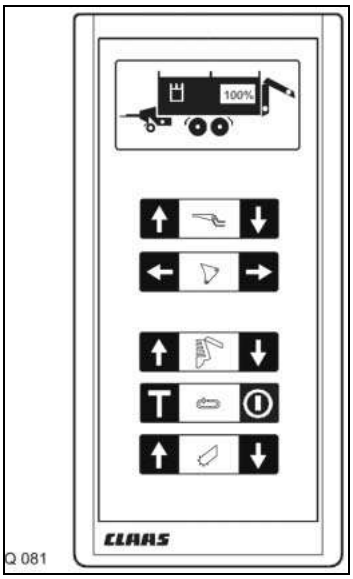
2.6 QUANTUM S lighting

1 7-pin plug
2 4-pin plug, right-hand rear lights
3 2-pin plug, rear number plate light
4 5-pin plug, right-hand rear lights
5 2-pin plug, interior lighting

E8 130 bar oil pressure switch, tailgate
E10 30bar oil pressure switch, for loading space lighting
(only on 5500S / -18 / 6800S, from serial no.)
R Turn signals, right-hand
L Turn signals, left-hand
58R Taillights, right-hand
58L Taillights, left-hand
54 Brake light
K Rear number plate light
NS Rear fog light



3.0 QUANTUM 4500 P / 5500 P / 5500 P-16 / 5500 P-18 / 5500 GT / 6500 P / 6800 P

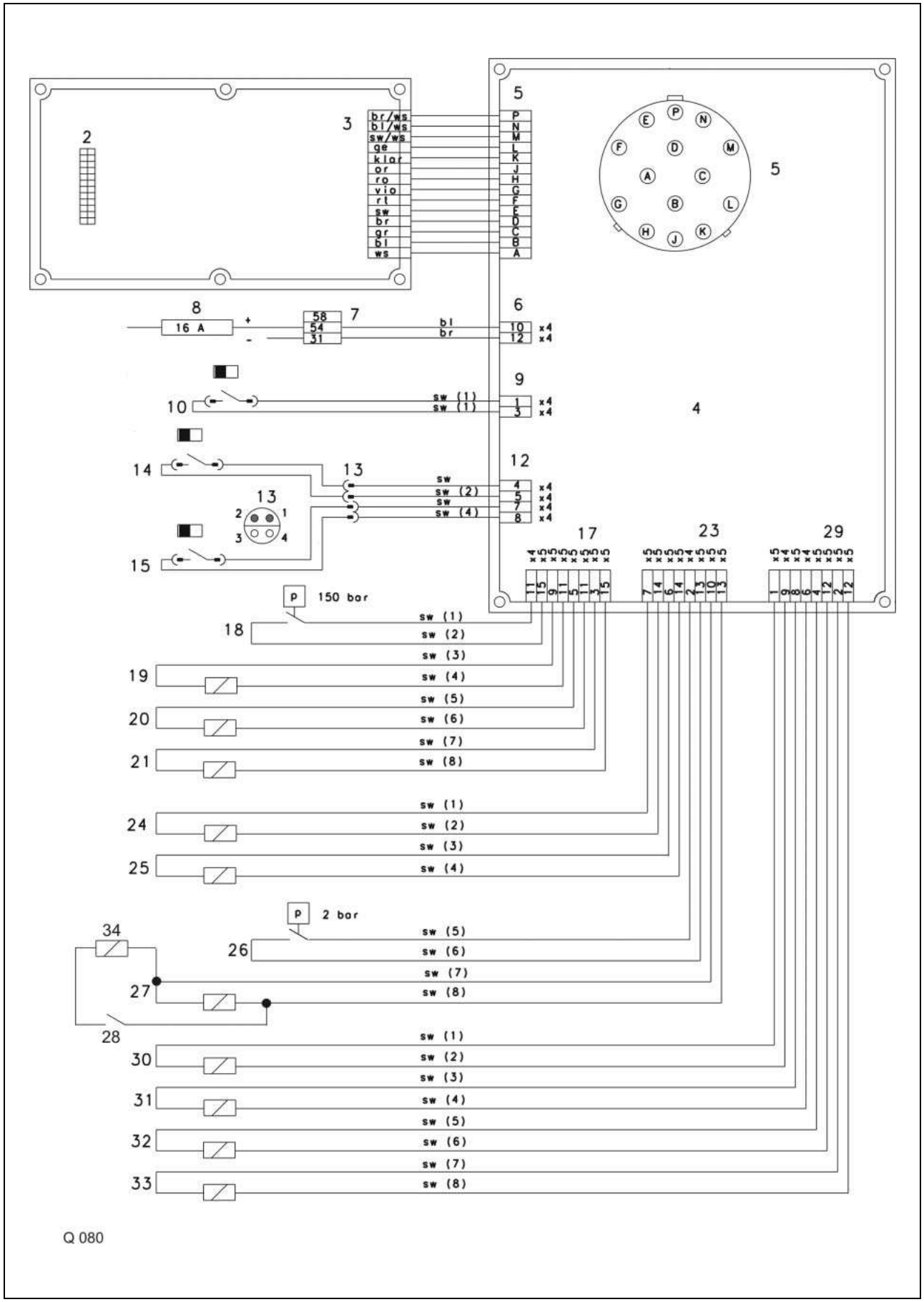


3.1 Circuit Diagram

A Raise articulated drawbar pushbutton
B Lower articulated drawbar pushbutton
C Close knife frame pushbutton
D Open knife frame pushbutton
E Open tailgate pushbutton
F Close tailgate pushbutton
G Floor conveyor ON/OFF pushbutton when loading, tailgate must be closed.
H Floor conveyor ON/OFF pushbutton when unloading, tailgate must be open.
J Raise pick-up pushbutton
K Lower pick-up pushbutton
L Indicator light (green), pick-up bottom – floating position
M Indicator light (red), knife frame open
N Indicator light (flashing red), tailgate closed
O Indicator light (flashing green), tailgate open
P Light field (hydraulic system), lights up in red for approx. 3 sec., ready for operation, oil circulating
R Light field (100%), flashing red – wagon full or tailgate open

1 Key button housing
2 24-pin plug connector, between lid and box
3 14-pin plug connector, designation of wire colours on the board
4 Distributor box
5 Connection of wiring loom to key button housing
6 Connection of wiring loom to power supply from tractor
7 3-pin plug connector
8 16 A fuse
9 Connection of wiring loom to knife frame reed switch
10 Knife frame reed switch
11
12 Connection of wiring loom to tailgate and wagon full reed switch …

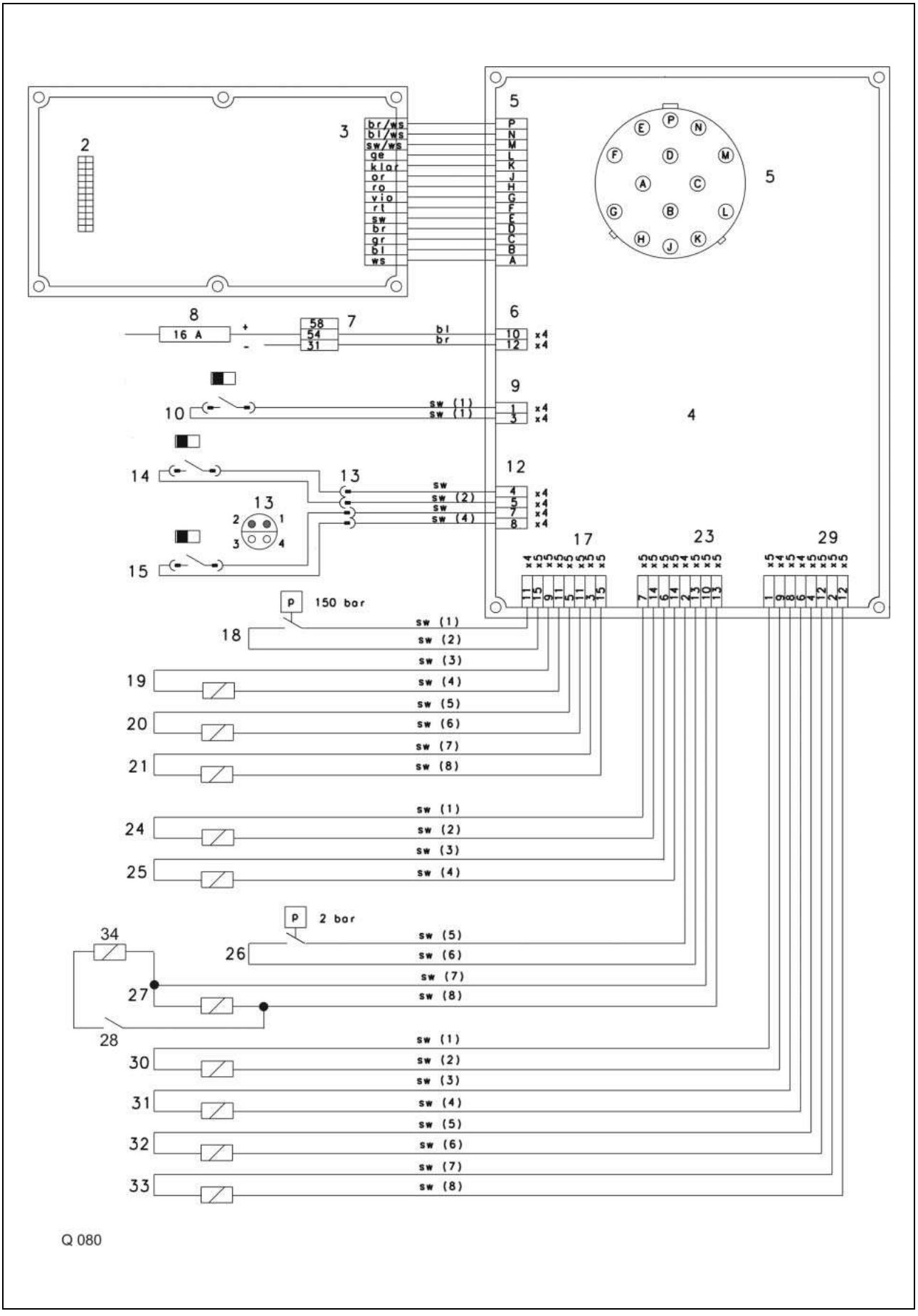
QUANTUM 4500 P / 5500 P / 5500 P-16/ 5500 P-18 / 5500 GT / 6500 P / 6800 P



	13	Plug connector
	14	Wagon full reed switch (push-on receptacles, marked red)
	15	Tailgate lock reed switch (push-on receptacles, marked white)
	16	
	17	Connection of wiring loom to right-hand seated valves and 150 bar switch
	18	150 bar switch (NO contact, E)
	19	Tailgate open solenoid (coil resistance = 5.4 Ω)
	20	Knife frame close solenoid (coil resistance = 5.4 Ω)
	21	Articulated drawbar down solenoid (coil resistance = 5.4 Ω)
	22	
	23	Connection of wiring loom to 4/3 way solenoid valves and 2 bar switch
	24	Pressure B solenoid (coil resistance = 6.4 Ω)
	25	Pressure A solenoid (coil resistance = 6.4 Ω)
	26	2 bar switch (NO contact, E)
	27	Floor conveyor solenoid (coil resistance = 6.4 Ω)
	28	2-speed motor switch (option)
	29	Connection of wiring loom to left-hand seated valves
	30	Raise pick-up solenoid (coil resistance = 5.4 Ω)
	31	Tailgate close solenoid (coil resistance = 5.4 Ω)
	32	Knife frame open solenoid (coil resistance = 5.4 Ω)
	33	Articulated drawbar open solenoid (coil resistance = 5.4 Ω)
	34	2-speed motor solenoid coil (option)
	X1	15-pin AMP plug (in distributor box)
	X4	12-pin AMP plug (in distributor box)
	X5	15-pin AMP plug (in distributor box)

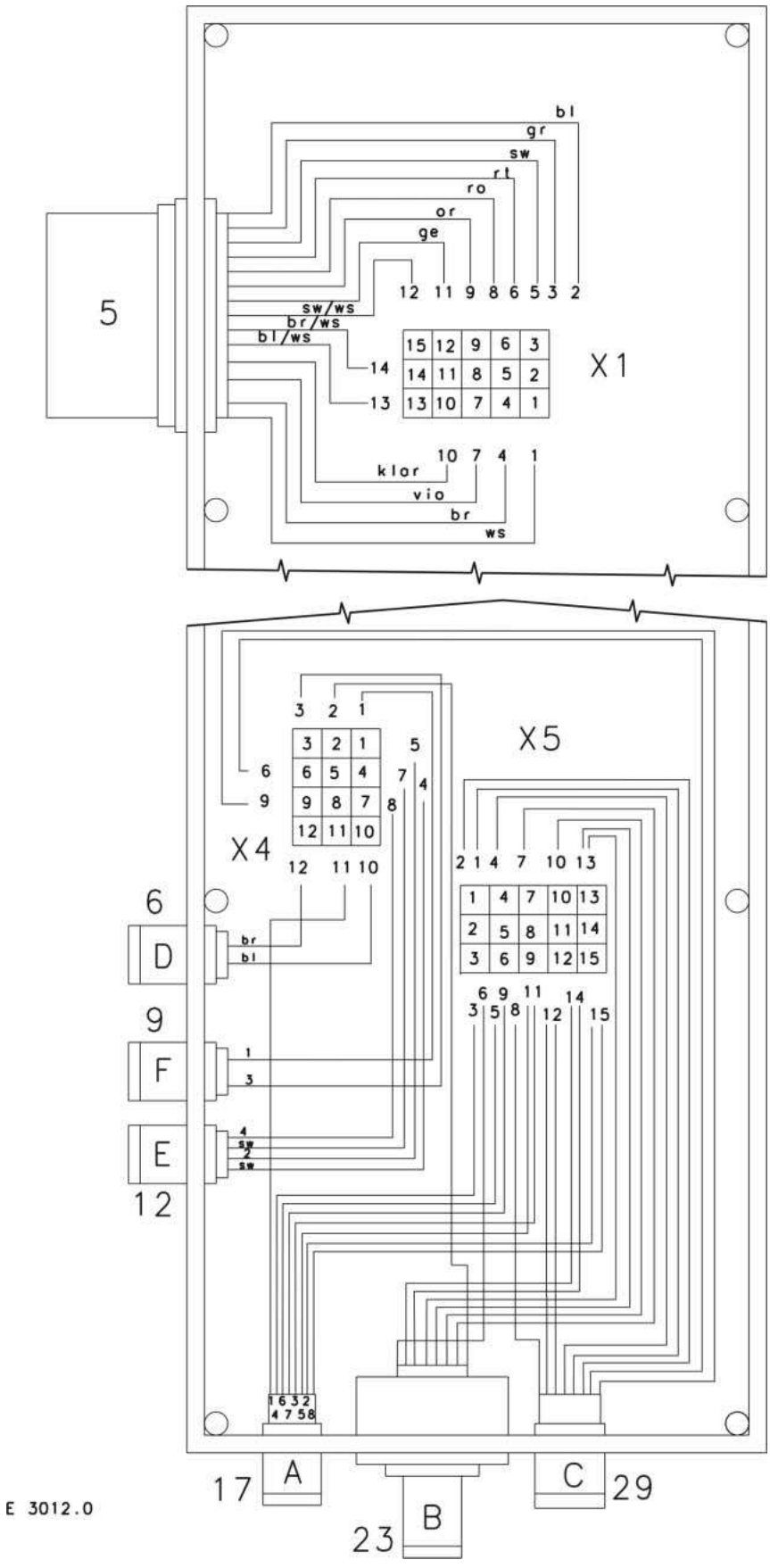
Wire colours	rt	red
	sw	black
	br	brown
	ws	white
	bl	blue
	gr	grey
	ge	yellow
	gn	green
	ro	pink
	or	orange
	viol	violet

4500 P / 5500 P / 5500 P-16 / 5500 P-18 / 5500 GT / 6500 P / 6800 P



3.2 QUANTUM P distributor box

A	Articulated drawbar up pushbutton
B	Articulated drawbar down pushbutton
C	Close knife frame pushbutton
D	Open knife frame pushbutton
E	Open tailgate pushbutton
F	Close tailgate pushbutton
5	Connection of wiring loom to key button housing
6	Connection of wiring loom to power supply from tractor
9	Connection of wiring loom to knife frame reed switch
12	Connection of wiring loom to tailgate and wagon full reed switch
17	Connection of wiring loom to right-hand seated valves and 150 bar switch
23	Connection of wiring loom to 4/3 way solenoid valves and 2 bar switch
29	Connection of wiring loom to left-hand seated valves
X1	15-pin AMP plug (in distributor box)
X4	12-pin AMP plug (in distributor box)
X5	15-pin AMP plug (in distributor box)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3.3 Trouble and remedy

For power supply, the set of cables with 16 A fuse and 2-pin socket outlet included in the shipping package must be installed on the tractor.
Power supply should be by means of the original set of cables since a corresponding cable cross-section is required.

A voltage converter is required for tractors with a 24 V system.

The forage wagon control unit is without any function, indicator light (P) does not light up (3 seconds).

- Check fuse (8 = 16 A) in power supply cable on tractor.
- Check power supply cable for correct polarity.
- Check plug connections on key button housing and distributor box for a tight fit.
- Check 2 bar switch (26 - NO contact, E).

The floor conveyor cannot be switched on when loading

- Check the oil supply from the tractor (has the directional control valve been switched on, have the couplers been properly connected?)
- Check if the tailgate is fully closed (must be closed by pressure, 100% of light field must be Off).
- Check if a fault has been produced by manual switching of solenoid (27), if a hydraulic or electric fault has occurred.
- Check the coil and the iron core of the solenoid (27).
- Coil resistance = 6.4 Ω.
- Check the voltage on solenoid without and then with a consumer connected (voltage drop = bad contacts)

The floor conveyor cannot be switched on when unloading

- Check the oil supply from the tractor (has the directional control valve been switched on, have the couplers been properly connected?)
- Check if the tailgate is fully open.
- The green indicator light (O) must flash.
- Check 150 bar switch (18 - NO contact, E).
- Check if a fault has been produced by manual switching of solenoid (27), if a hydraulic or electric fault has occurred.
- Check the coil and the iron core of the solenoid (27).
- Coil resistance = 6.4 Ω.
- Check the voltage on solenoid without and then with a consumer connected (voltage drop = bad contacts)

The tailgate will not close. The indicator light (N) will not flash.

The tailgate close pushbutton (F) must be pressed until the red indicator light flashes in the key button housing.

- Check the bottom reed switch (15) on the tailgate, short-circuit cable.
- Check the plug connections according to the circuit diagram.

The forage presses strongly against the tailgate.
The floor conveyor can still be switched on. The light field (100%) will not flash.

- Check reed switch (14 – wagon full)
- Check the plug connections according to the circuit diagram

The knife frame opens too far (up to the hydraulic cylinders' limit stop).
The cutterbar open indicator light (M) will not light up.

- Check reed switch (10 – knife frame)
- Check the plug connections according to the circuit diagram.

The faults
- Pick-up up/down
- Articulated drawbar up/down
- Knife frame open/close
- Tailgate open/close

can be checked as follows.

Manually actuate the corresponding solenoid(s).
Find out if the fault is in the hydraulic or in the electric system. Hydraulic fault = see „Hydraulic System" chapter.

Electrical fault:
- Check the plug connections according to the circuit diagram
- Check the coil and the iron core of the corresponding solenoid. Values = see key to circuit diagram
- Check voltage on solenoid without and then with a consumer connected (voltage drop = bad contacts).

Emergency operation

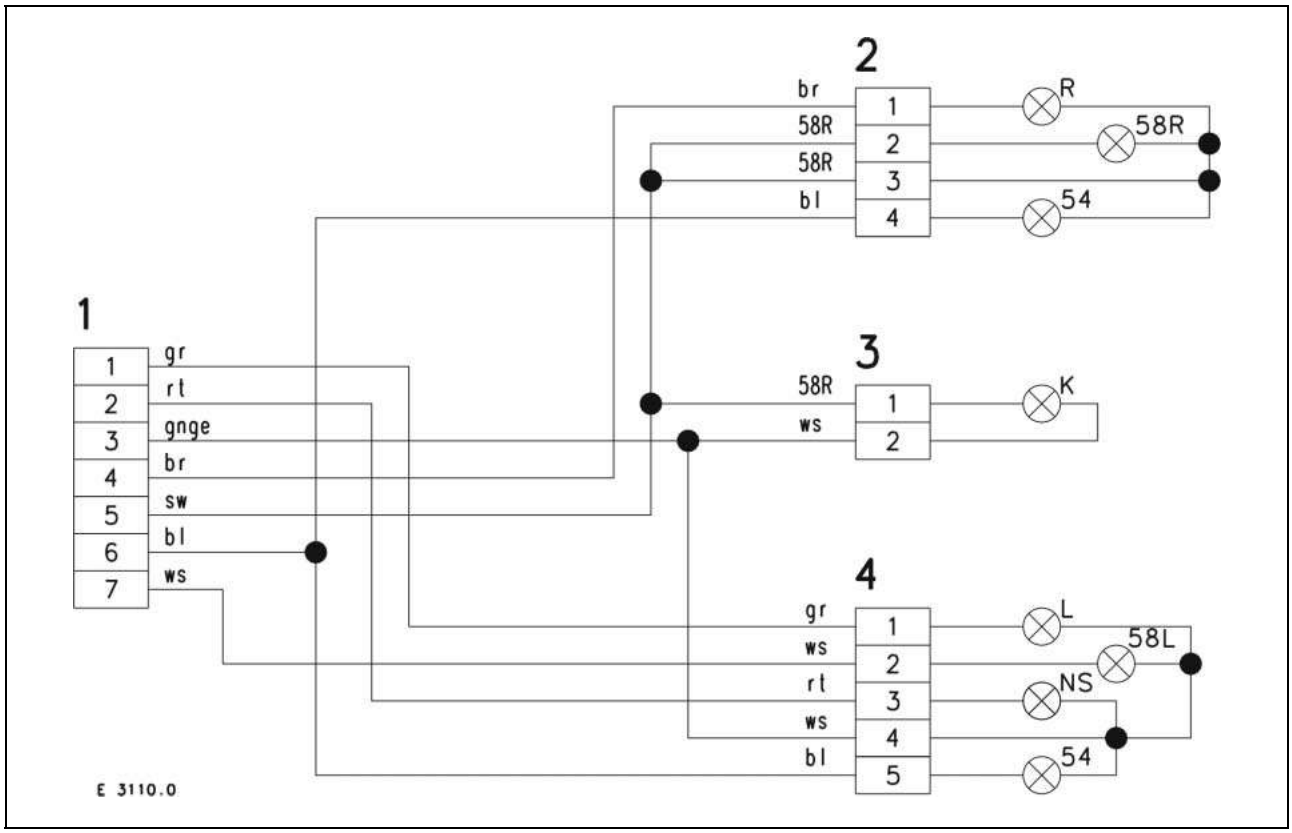
For manual actuation, the following solenoids must be actuated:

Function	**Solenoid valve**
Pick-up up	1+10
Pick-up down	10
Open knife frame	1+5+8
Close knife frame	2+5+8
Open tailgate	2+6+9
Close tailgate	1+6+9
Raise articulated drawbar	2+4+7
Lower articulated drawbar	1+4+7
Floor conveyor On	3
Floor conveyor Off	Do not press 3 any more

3.4 QUANTUM P
Lighting

1 7-pin plug
2 4-pin plug, right-hand rear lights
3 2-pin plug, rear number plate light
4 5-pin plug, right-hand rear lights

R Turn signals, right-hand
L Turn signals, left-hand
58R Taillights, right-hand
58L Taillights, left-hand
54 Brake light
K Rear number plate light
NS Rear fog light



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