KRAMER

System Handbook

Telehandlers

2706/KT276

Machine model	**418-02**
From serial no.	**418 02 0011**
Version	**1.0**
Doc. Number	**1000363122**
Language	**[en]**

Torque values for metric fine-pitch thread

Screws/bolts and nuts

The specified tightening torques only apply if:

- If a coefficient of friction of μ ges = 0.14 is attained in combination with the thread lubricant. A surface protection, for example A3C+L, Dacromet or Termosil, is recommended for this.
- No other tightening torque is specified in the text.
- No additional screw locks, for example MK screws or a liquid screw lock, are used.

Torque settings in Nm (ft.lb)				
Property class		**8.8**	**10.9**	**12.9**
Designation/dimensions				
Hex head screws ISO 8765, ISO 8876 Hexagon nuts ISO 4032	M8 x 1	26 (19,2)	38,5 (28,4)	45 (33,2)
	M10 x 1	54 (39,8)	79 (58,3)	92,5 (68,2)
	M10 x 1.25	51 (37,6)	74,5 (54,9)	88 (64,9)
	M12 x 1.25	90,5 (66,7)	134 (98,8)	156 (115,1)
	M12 x 1.5	87 (64,2)	128 (94,4)	150 (110,6)
	M14 x 1.5	143 (105,5)	210 (154,9)	246 (181,4)
	M16 x 1.5	219 (161,5)	323 (238,2)	378 (278,8)
	M18 x 1.5	331 (244,1)	470 (346,7)	551 (406,4)
	M18 x 2	313 (230,9)	446 (329)	522 (385)
	M20 x 1.5	459 (338,5)	655 (483,1)	766 (565)
	M22 x 1.5	622 (458,8)	886 (653,5)	1037 (764,9)
	M24 x 1.5	809 (596,7)	1152 (849,7)	1348 (994,2)
	M24 x 2	778 (573,8)	1108 (817,2)	1297 (956,6)
	M27 x 1.5	1173 (865,2)	1672 (1233,2)	1956 (1442,7)
	M27 x 2	1135 (837,1)	1617 (1192,6)	1892 (1395,5)
	M30 x 2	1580 (1165,3)	2251 (1660,3)	2634 (1942,7)
	M33 x 2	2116 (1560,7)	3015 (2223,7)	3528 (2602,1)
	M36 x 2	2773 (2045,3)	3951 (2887,6)	4623 (3409,7)
	M39 x 2	3557 (2623,5)	5067 (3737,2)	5930 (4373,7)

E.3 Safety instructions

Pay particular attention to the following

The information in this System Manual must be read and observed in order to avoid risks to all persons who use, maintain, repair, service or inspect this machine.

In particular, read this section on safety.

Safety symbols and signal words

Explanation

The following symbol identifies safety instructions. It is used for warning against potential personal risk or danger.

DANGER

DANGER identifies a situation causing death or serious injury if it is not avoided.

Consequences in case of non-observance.

► Avoidance of injury or death.

WARNING

WARNING identifies a situation that can cause death or serious injury if it is not avoided.

Consequences in case of non-observance.

► Avoidance of injury or death.

CAUTION

CAUTION identifies a situation that can cause injury if it is not avoided.

Consequences in case of non-observance.

► Avoidance of injury.

NOTICE

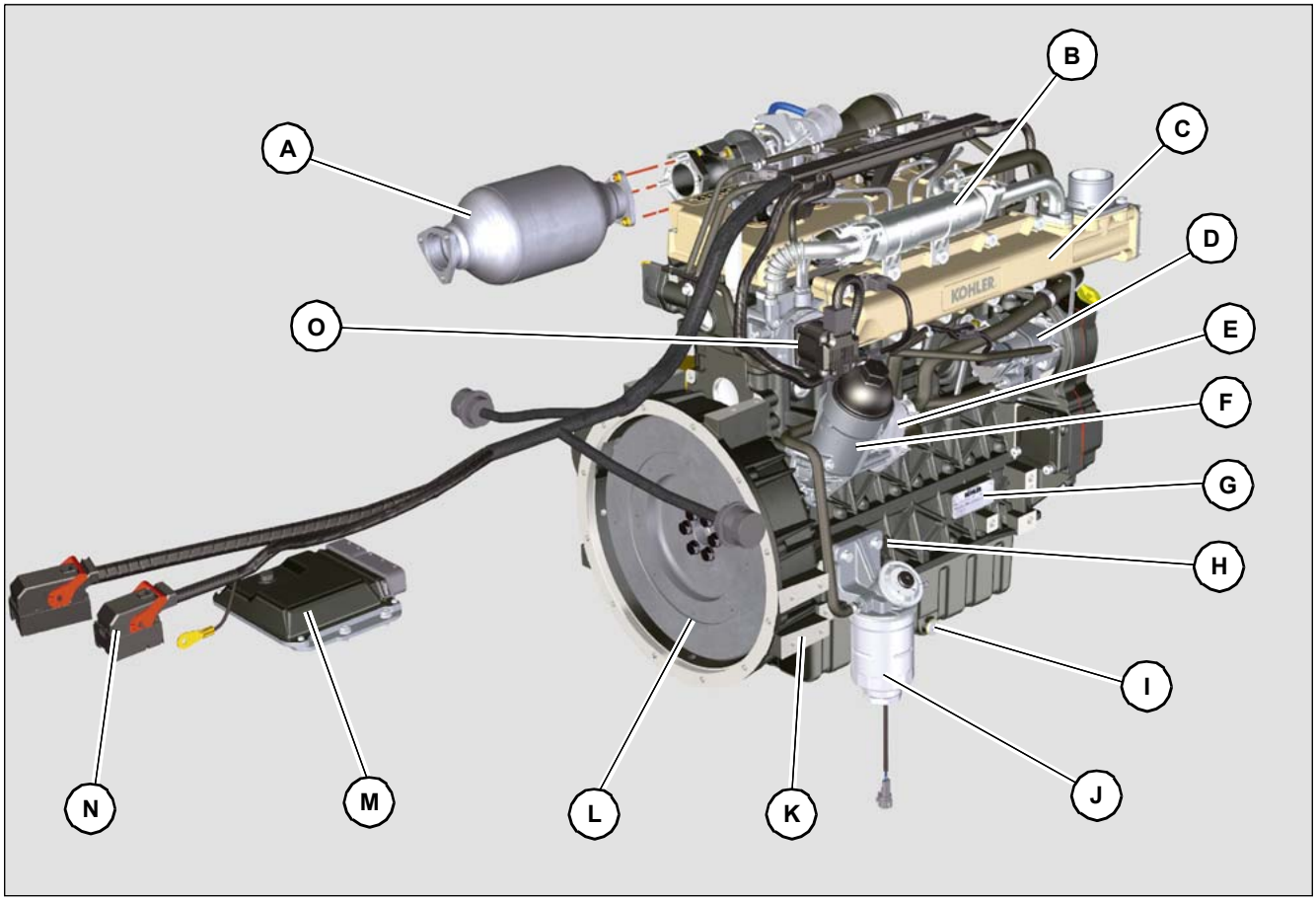
NOTICE identifies a situation that causes damage to the machine if it is not observed.

► Avoidance of damage to property.

The warning and safety signs attached to the machine provide important information for safe operation. Compliance is for your safety.

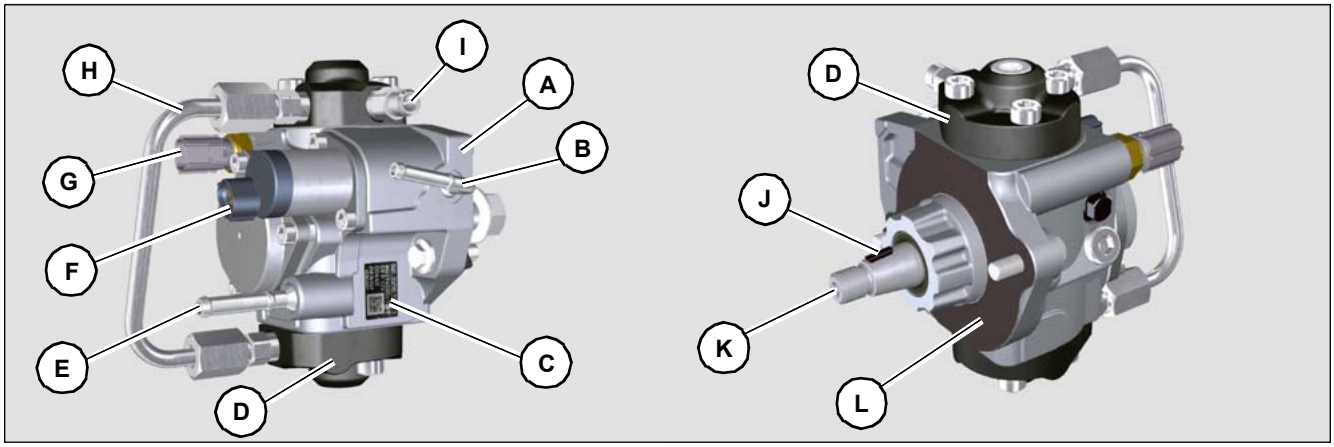
2.3 Diesel engine overview

View from the right



Pos.	Component
A	SCR catalytic converter
B	EGR cooler
C	Suction collector pipe
D	High-pressure pump for fuel injection
E	Engine oil cooler
F	Engine oil filter
G	Engine type label
H	Oil dipstick
I	Oil drain plug
J	Fuel filter
K	Flange bell
L	Flywheel
M	Engine control unit
N	Engine wiring harness
O	EGR valve

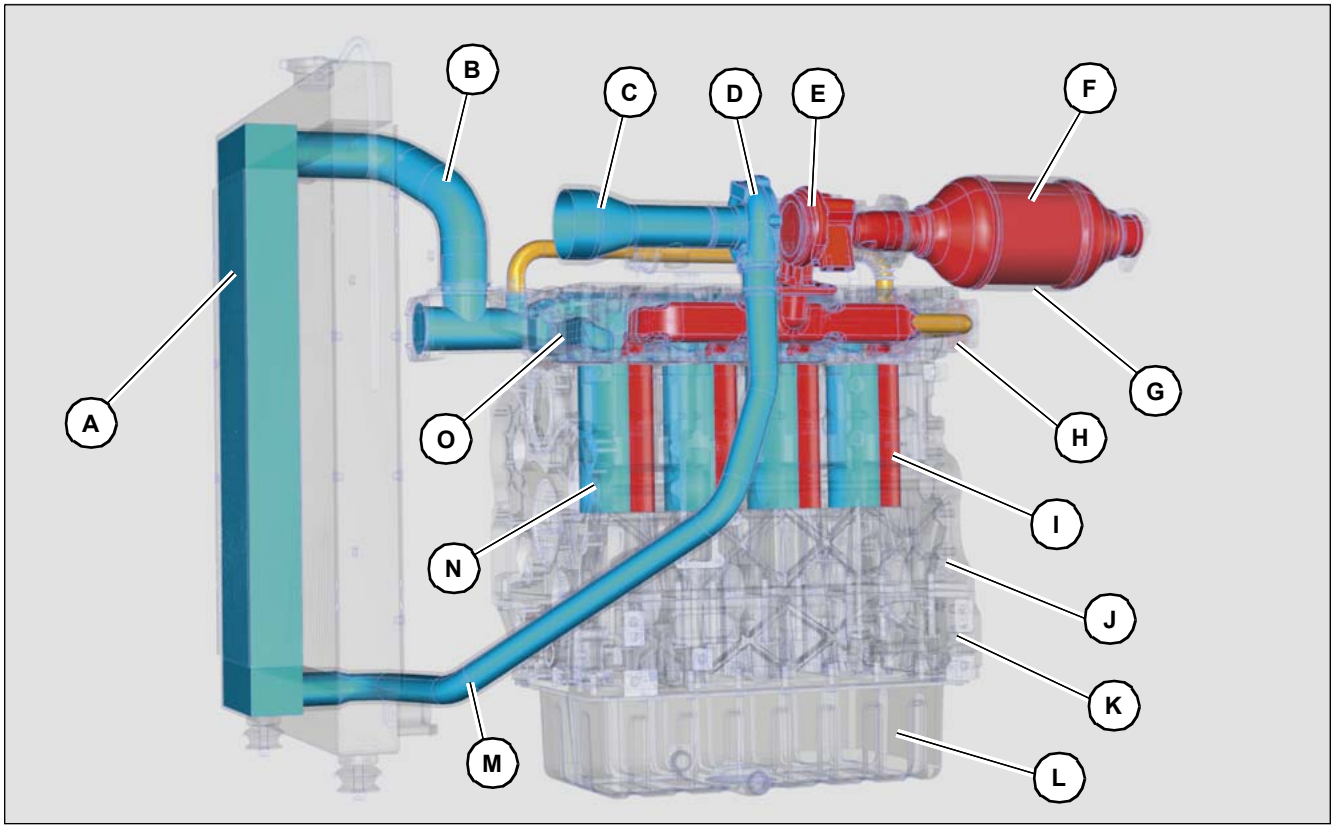
Overview of high-pressure pump



Pos.	Component
A	High-pressure pump
B	Fuel reflux connection
C	Type plate with QR code
D	Position of injection pump elements
E	Fuel supply connection
F	Control valve for fuel suction
G	Fuel temperature sensor
H	Connecting line, position of injection pump elements **D**
I	High pressure connection (outlet) to common rail
J	Wedge to position the shaft at the pump gearbox
K	Shaft
L	Gasket

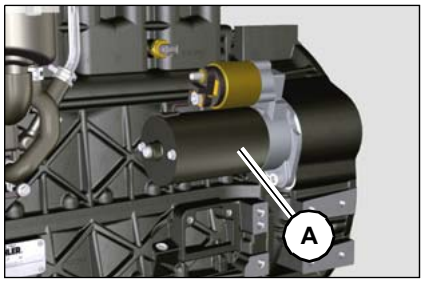
2.7 Intake and exhaust system

Overview of suction and exhaust circuit



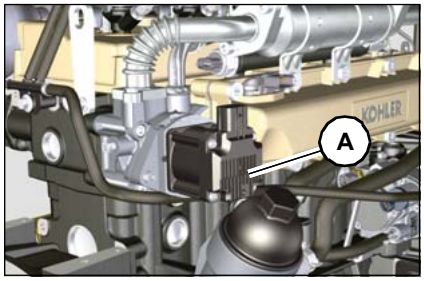
Colour	Description
	Suctioned-up air
	Returned exhaust
	Ejected exhaust

Function description of starter motor



Technical data	
Volt	12 V
Power	2 kW
Direction of rotation	Counter-clockwise (view from distributor side)

Function description of EGR valve



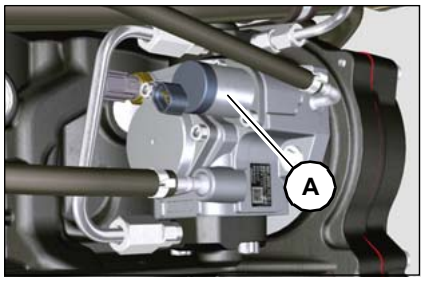
The EGR valve **A** is for exhaust gas recirculation.

The opening and closing of the EGR valve **A** is controlled by the motor control unit **N005**, and depends on the parameters: acceleration, diesel engine speed and the required performance.

A control unit is integrated in the EGR valve **A**, which executes an independent function test whenever the ignition is switched on.

In the event of a malfunction, a signal is sent to the motor control unit **N005** and a warning message appears in the display **P014**.

Function description of control valve for fuel suction

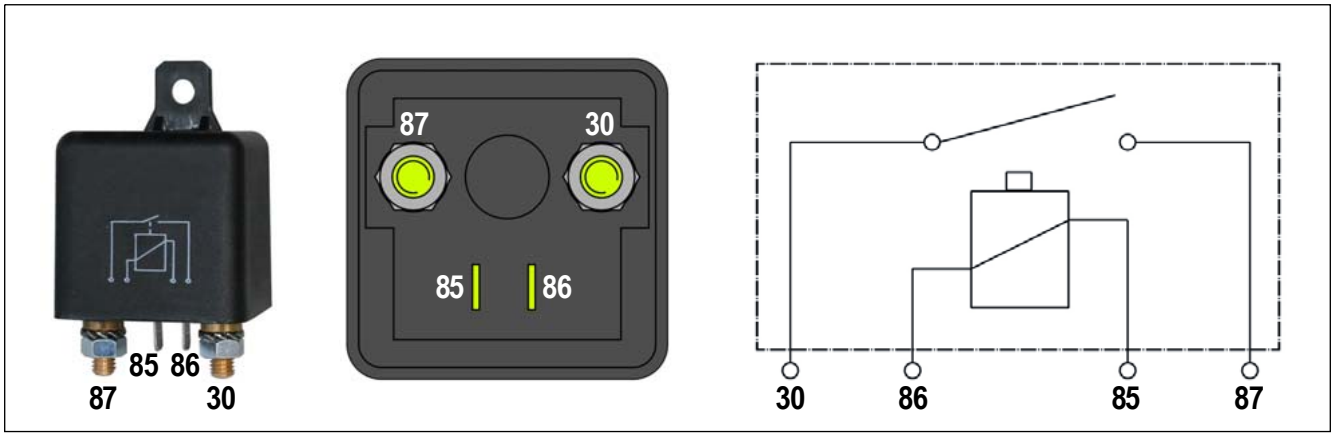


The control valve for fuel intake **A** is mounted to the high pressure pump.

The control valve for fuel intake **A** is controlled by the motor control unit **N005**, which regulates fuel intake based on the pressure of fuel in the common rail, restricting the supply of fuel to the high pressure pump.

A digital signal changes the opening width of the valve, relative to the required supply of fuel to the common rail.

High current relay K001



PIN	Connection	to PIN	Measuring range
30	On-board voltage F001/100A	–	12 V
85	Input from preheating start switch **S001**	Clamp (15)	12 V
86	Ground		
87	Output to printed circuit board **N033**	X2	12 V

Function description

The entire electrics of the vehicle are supplied with electricity via the high current relay **K001**.

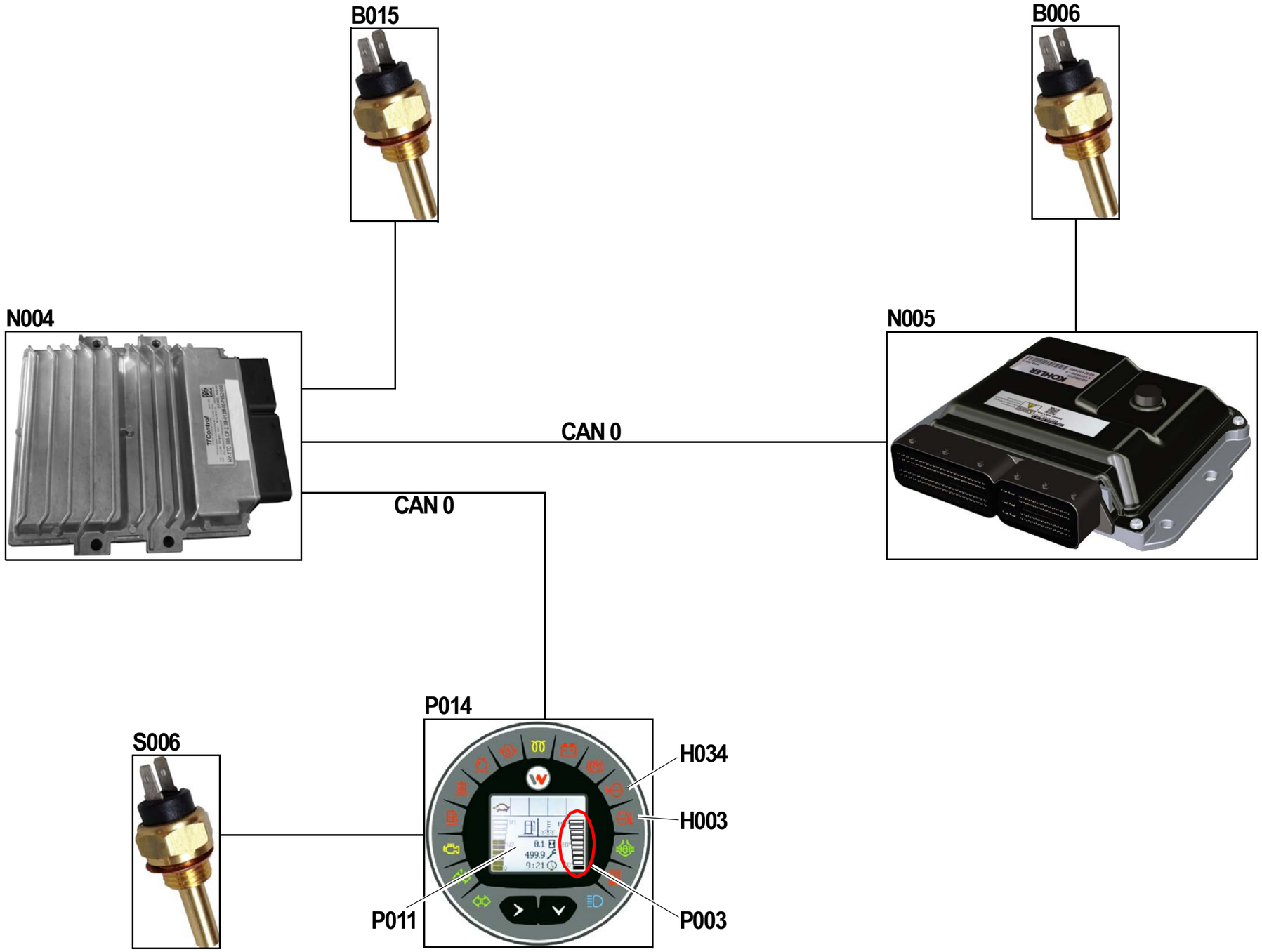
Function

When the ignition is started, the solenoid of the high current relay **K001** is energized via the clamp **85** from the pre-heating start switch**S001**. This closes the high current relay **K001** and connects the clamps **30** and **87**.

The current coming from battery **G002** via fuse**F002** and the high current relay **K001** reaches the printed circuit board **N033** and thus provides the entire electronics of the vehicle with current.

3.1 Cooling control

Visco fan



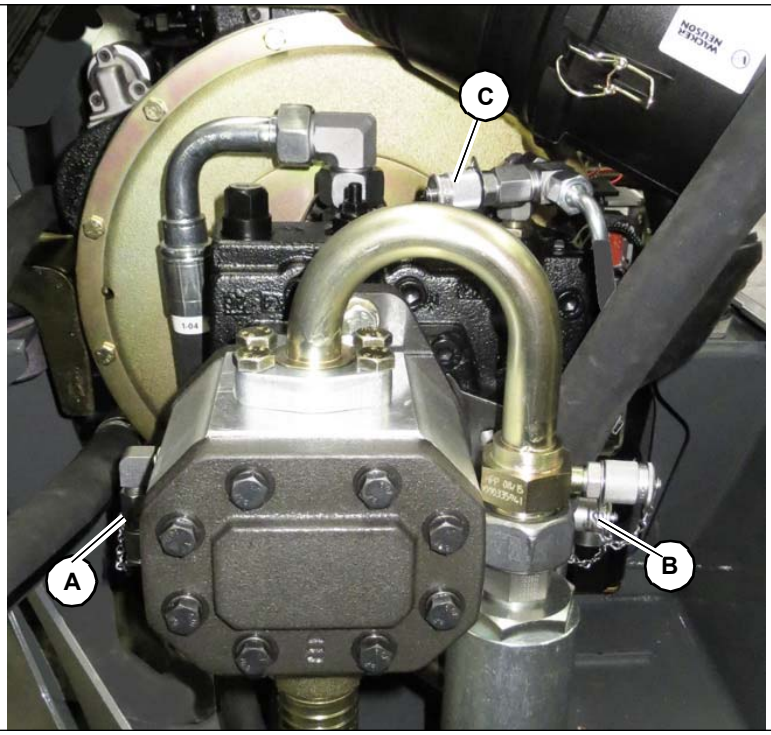
Gear pump (auxiliary drive) 012

Component	Remarks
012	11ccm/U (0.67 in^3)

Function description

The gear pump (auxiliary drive) **012** is responsible for the oil supply of the hydraulic trailer brake and fan motor.

Test connections: drive variable displacement motor VII



Pos.	Component	Remarks
A	Reverse test connection	High-pressure side MaA
B	Forward test connection	High-pressure side MaB
C	Boost-pressure test connection	-

4.4 Error descriptions

Boost pressure not attained

Error descriptions

The supply for the boost pressure is provided by the integrated boost pump **001**. The boost pressure is limited by the boost pressure valve **037** at the hydraulic pump **VII.** The boost pressure fills the closed circuit and is needed to regulate hydraulic pump **VII**.

The following items need to be checked

1. Oil supply of charge pump from suction return filter **026.**
2. Seal connection M3 on the hydraulic pump **VII in order to exclude external loads**.
3. Boost pressure valve **037**
4. Flush valve **060** and scouring slide **059**
5. High-pressure valves **040/041**

If the boost pressure is not attained after these test points

6. Tightly connect the high pressure lines to the drive pump **VII** .
   - ➥ **Boost pressure available:**
     error in variable displacement motor **VIII**
   - ➥ **Boost pressure not available:**
     error in hydraulic pump **VII**

High pressure not attained

The flow of oil is conveyed by the hydraulic pump **VII** to the high-speed gearbox **VIII**. The high pressure relief is provided via high-pressure valves **040**/**041** on the hydraulic pump **VII**.

The following items need to be checked

1. Read error memory.
2. Boost pressure available.
3. Check current feed supplied to proportional valves **Y004/Y005** at the drive pump **VII**
4. Swap high pressure valves **040**/**041** .
5. Measure the control piston pressure at the drive pump **VII** M4 and M5.
   - ➥ Connection thread for M4/M5 ISO 11926-1-7/16-20

If the high pressure is not attained after these test points

6. Tightly connect the high pressure lines to the drive pump **VII** .
   - ➥ **High pressure not available:**
     defect in hydraulic pump **VII**
   - ➥ **High pressure available:**
     continue troubleshooting for variable displacement motor **VIII**

Speed ranges

The different driving speeds are possible in forward and reverse and are switched between turtle/hare mode with the 1st/2nd speed switch **S021**. These are dependent on the respective steering mode, for safety reasons.

A signal is sent from the 1st/2nd speed switch **S021** to the steering electronics **D001**, which relays it to the traction electronics **N001** and the mini-relay **K058**. A signal is also sent from the mini-relay **K058** to the traction electronics **N001**. The traction electronics **N001** then switches the drive ranges, taking account of the relevant steering mode.

If errors are detected in the system, the travelling drive is reduced to turtle mode or switched to save mode - i.e. the vehicle stops - depending on the type of error.

Via the speed sensor **B009** the driving speed is measured at the variable displacement motor **VIII** and communicated to the traction electronics **N001** and the controller **N004.**

The traction electronics **N001** processes the data for the load stabiliser and the speed limiter.

The controller **N004** processes the data and sends them as a CAN message to the display **P014**. The driving speed is shown in the display **P011**.

Driving speeds with variable displacement motor VIII

Speed range	Speed	Steering mode
Snail	0 – 7 kph (0 – 4.3 mph)	All-wheel/front wheel/crab steering
Tortoise	0–15 km/h (0–9.3 mph)	All-wheel/front wheel/crab steering
Hare	0–30 km/h (0–18.6 mph)	All-wheel, front wheel

6.1 Functional characteristics of brakes

Brake/inching pedal

The brake-inching pedal consists of 3 components

Foot pedal, displacement piston **030**, inching sensor **R002**

Via the foot brake, a force (F) is applied to the displacement piston. By adjusting the position of the displacement piston, the brake fluid is conveyed to the brake calliper at the differential of the rear axle. At the same time as when the foot pedal is activated, a turn potentiometer for inching is also activated. The ascertained value is transmitted to the traction electronics **N001**, which subsequently reduce the volume flow of the hydraulic pump. This causes the speed of the vehicle to be slowed down.

Release the parking brake

When the parking brake is released, the parking brake switch **S011** triggers the enabling signal for the diesel engine to start and drive

Starting interlock

The machine will not start unless the parking brake is applied.

Monitoring the parking brake

Activating the switch **S011** and the indicator light **H018** causes the parking brake to be displayed when it is applied.

Service brake

Foot-operated, hydraulic disc brake at the rear axle inlet.

Parking brake

Manual mechanical disc brake at rear axle input

Inch sensor R002

When the brake pedal is operated, first the inching sensor **R002** is activated by means of a rod assembly. After the brake pedal travels a path of approx. 30 mm (1.18 in), the main brake cylinder**030** is activated. This means that via the inching sensor **R002** at the brake pedal, the traction electronics **N001** receive a check-back signal to reduce the variable displacement pump **VII** according to a characteristic curve. The vehicle's speed is slowed down.

For an inch value of 2000 digits, the drive electronics **N001** switches an output signal to the relay **K030** for the brake lights.

Hydraulic trailer brake valve 140

The trailer brake valve **140** is controlled via the main brake cylinder **030**. By operating the brake pedal, first the inching sensor **R002** is activated by means of a rod assembly and the signal is conveyed to the traction electronics **N001**. The traction electronics **N001** control the proportional valve **Y113** for trailer advancement. The further the brake pedal is pushed, the higher the electric current at the proportional valve **Y113** for trailer advancement. This increases the pressure (advancement) on the trailer brake valve **140.** At the same time, the pressure applied to the trailer brake valve **140** by the main brake cylinder is increased.

Checking the diesel engine speed

Test feature	Note	Remarks	Rated value
Min. idling speed	Diagnosis tool	–	940 – 960 min^{-1} (rpm)
Max. idling speed	Diagnosis tool	–	2550 – 2650 min^{-1} (rpm)

Checking

1. Apply the parking brake.
2. Connect diagnosis tool
3. Start the diesel engine.
4. Read the diesel engine speed using the diagnosis tool.

- Rated idle speed, bottom (idling speed).
- Rated idle speed, top (full throttle).

Description of hydraulic trailer brake

Hydraulic components

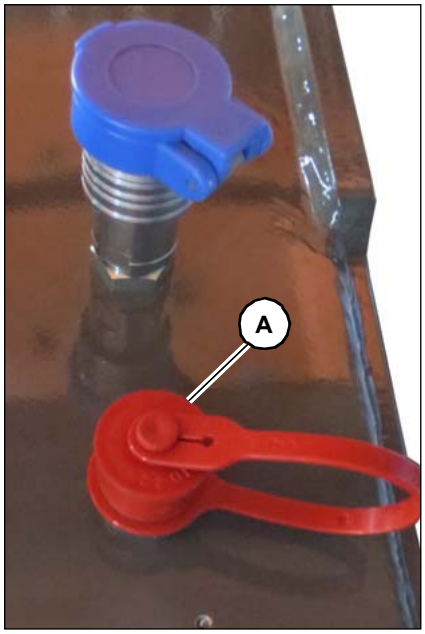
Pos.	Component	Remarks
012	Fan fixed displacement pump	11 ccm/U (0.67 in^3)
001	Charge pump	12 ccm/U (0.73 in^3)
030	Master brake cylinder	ATV_oil
140	Trailer brake valve (France)	120–140 bar (1740.45–2030.53 psi)
161	Brake calliper, rear axle	–
162	2-fold valve block, only for hydraulic trailer brakes (Y113, Y047)	Parking brake, differential lock
V	Hydraulic trailer brake connection	–

Electrical components

Pos.	Component	Measured value
H018	Indicator light, parking brake	Indicating instrument
H078	Combined brake light (H020)	–
H079	Combined brake light (H021)	–
K030	Brake lights switching relay	12 V
R002	Inching angle of rotation sensor	5 V
N001	Drive electronics	H1 AC control
N004	Controller N004	TTC580-CB
S011	Hand-brake switch, parking brake	12 V

Pos.	Component	Designation
CAN1	CAN1 – Work hydraulics	–
CAN0	CAN0 – Drive	–

6.6 Safety instructions for hydraulic trailer brake



Important safety instructions

- Plug coupling **A** for the hydraulic trailer brake is installed at the rear of the machine (on the left in travel direction).
- The hydraulic trailer brake is operated with the machine's service brake!

Notice

The parking brake has **no** effect on the hydraulic trailer brake!

Notice

Only trailers with hydraulic brakes that are certified for a braking pressure of a maximum 150 bar (2175.6 psi) at full braking may be used!

Information

The hydraulic trailer brake is certified for public roads in Germany (StVZO German road traffic regulations) provided it is adapted to the tractor!
The maximum road travel speed is limited to 25 km/h (15.5 mph) in Germany (according to German traffic regulations).

► Refer to the National Type Approval (Germany), the Data Confirmation (Germany) or the licence certificate (Germany) for the applicable provisions!

► Get informed on and follow the legal regulations of your country, or have country-specific final acceptance performed!

Checking the diesel engine speed

Test feature	Note	Remarks	Rated value
Min. idling speed	Diagnosis tool	–	940 – 960 min^{-1} (rpm)
Max. idling speed	Diagnosis tool	–	2550 – 2650 min^{-1} (rpm)

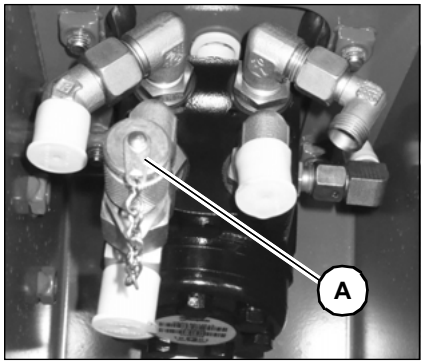
Checking

1. Apply the parking brake.
2. Connect diagnosis tool
3. Start the diesel engine.
4. Read the diesel engine speed using the diagnosis tool.

- Rated idle speed, bottom (idling speed).
- Rated idle speed, top (full throttle).

Steering pressure: checking and adjusting

Test feature	Note	Rated value
Steering pressure	Max. diesel engine speed	160–190 bar (2320.6–2755.72 psi)



Pos.	Component	Remarks
A	Steering pressure test port	–

1. Connect the pressure gauge to the test connection **A**.
2. Start diesel engine and bring it up to full speed.
3. Turn steering to end stop
   ➥ Read the pressure off the pressure gauge

Description of steering system

Hydraulic components

Pos.	Component	Remarks
IV	Steering system	OSPD 60/200 DN
XXVI	Steering mode valve	–
001.1	Fixed displacement pump of steering system	36 ccm/U (2.196 in³)
008	Priority valve	–
018	Front axle steering cylinder	–
019	Rear axle steering cylinder	–

Electrical components

Pos.	Component	Remarks
N001	Drive electronics	H1 AC control
N004	Controller N004	TTC580-CB
S172	Steering mode lever limit switch (crab steering)	–

Pos.	Component	Designation
CAN1	CAN1 – Work hydraulics	–
CAN0	CAN0 – Drive	–

Functional description

Steering cylinder **018/019** is a rod cylinder with one piston. The piston is fixed to the piston rod. The power transmission and the speed of the piston rod are the same on both sides.

In the steering cylinders, the synchronisation is done via bypass.

At the end of the respective steering cylinder, a groove is milled into the cylindrical tube on the left and right side. If the steering system is rotate to the steering lock, the piston sealing ring enters the groove This means that the oil from the loaded side flows into the de-pressurized cylinder chamber. As a result, the oil is led to the second steering cylinder until this is also at the steering stop. If both are on the steering stop, the steering system is synchronised, and the oil is used for steering. This is clearly noticeable because the steering wheel in the end lock is easy to turn.

If you would like to check the cylinder for internal leakage, make sure that the steering cylinder is not in the end position.

Rear additional control circuit

The rear additional circuit can be designed as follows:

1. Only tipper
   - ➥ Raise tipper **Y044** and lower tipper **Y045**
2. Only hitch
   - ➥ Raise hitch **Y044** and lower hitch **Y045**
   - ➥ Unlocking valve **Y047** for auto hitch locking cylinder **093**.
3. Tipper and hitch
   - ➥ Raise hitch **Y044** and lower hitch **Y045**
   - ➥ Unlocking valve **Y047** for auto hitch locking cylinder **093**
   - ➥ Lower tipper additional valve **Y116**
4. Tipper and fourth control circuit in the rear
   - ➥ Raise tipper **Y044** and lower tipper **Y045**
   - ➥ Tipper auto hitch reversing valve **Y046**
5. Tipper, fourth control circuit (rear), and auto hitch
   - ➥ Raise hitch **Y044** and lower hitch **Y045**
   - ➥ Unlocking valve **Y047** for auto hitch locking cylinder **093**
   - ➥ Lower tipper additional valve **Y116**
   - ➥ Tipper auto hitch reversing valve **Y046**

Triangle rear hitch

A triangle rear hitch is attached to the rear of the telehandler for raising, lowering, and pulling attachments in floating position. Control via an additional control units in the rear of the telehandler. The function can only be used if the operator is in the seat. By unlocking with the switch **S184** the rear hitch control lever **B105** is released.

The individual valves are controlled via the operator's controls:

1. Rear hitch control lever **B105**
   - ➥ Rear hitch proportional valve for raising **Y117** and lowering **Y118**
2. Rear hitch circuit breaker **S183**
   - ➥ Lower with floating position rear hitch solenoid valve **Y129**
3. Lower rear hitch via rear operation
   - ➥ Lower rear hitch proportional valve **Y118**
4. Operation with the rear touch controls for raising/lowering
   - ➥ Touch button **S159** Raise
   - ➥ Touch button **S160** lower

Rear lifting mechanism load pressure sensor B102

If the rear hitch is overloaded (e.g. by an extended telescopic arm), all hydraulic and drive functions except for the retraction of the telescopic arm will be switched off. A corresponding flashing warning symbol will be displayed on the main page of the display unit. The telescopic arm must be completely retracted by the operator. Only when the limit switch **S116** responds are all hydraulic and drive functions released.

Pressure accumulator 077

Important information

Membrane and hydraulic accumulators are pressure tanks in accordance with the European Pressure Equipment Directive 97/23/EC. Hydraulic accumulators are exclusively for the purpose of accumulating and discharging hydraulic fluids. Membrane or hydraulic accumulators consist of a fluid and a gas section with a membrane as gas-tight separating element.

DANGER

If the pressure accumulator is not filled correctly there is a risk of explosion! If pressure accumulators are filled with oxygen or air, they can explode!

This can result in serious injuries or even death.

► Only fill pressure accumulators with nitrogen.

Information

No welding or mechanical work may be carried out on the pressure accumulator!

We recommend checking the pretensioning pressure annually. This inspection may only be carried out by a skilled person with the respective qualification!

Component	Function	Remarks
077	Pilot control pressure accumulator	Gas filling overpressure 10 bar (145 psi)

Function description

Pressure accumulator **077** is the supply pressure for the pilot control. If the diesel engine fails this ensures that an emergency lowering manoeuvre can be carried out. It is also needed in order to release pressure from the individual control circuits.

Functional characteristics: hose burst valve for tipping cylinder 088

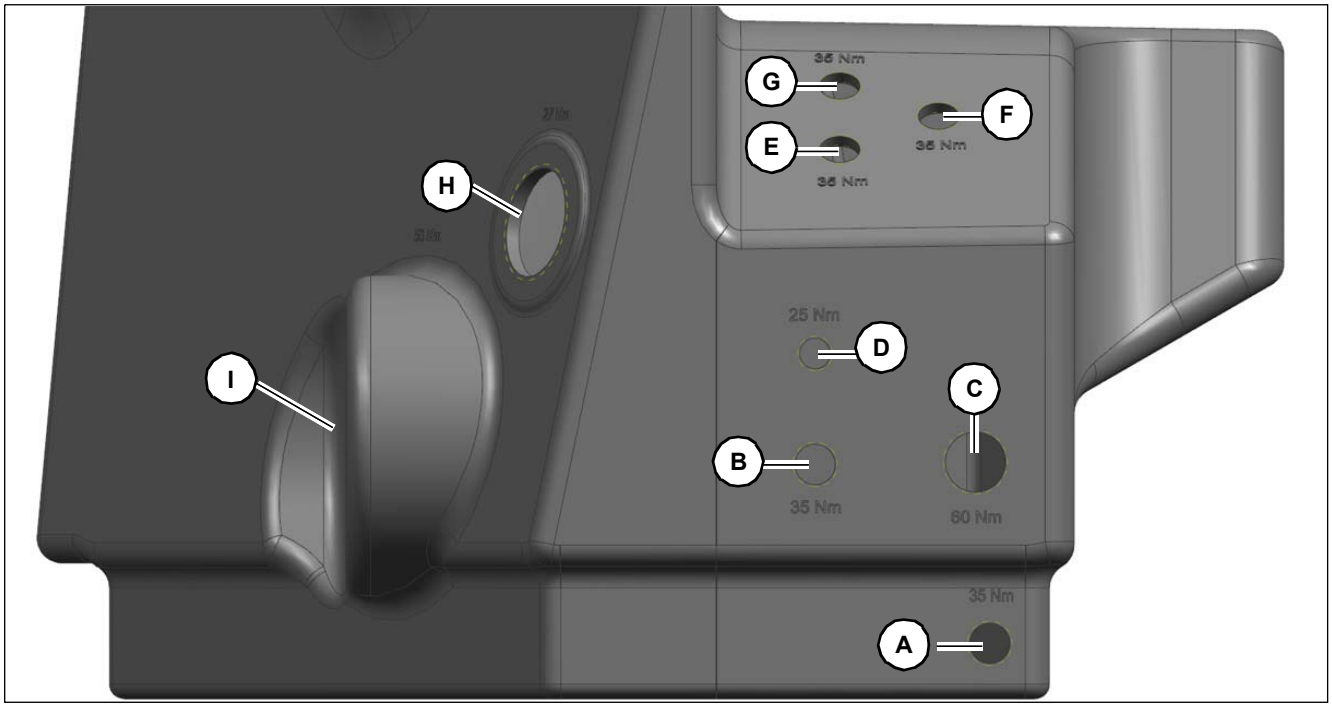
Valve **088** covers the hose burst valve function at the lifting cylinder **087**. The hose burst valve prevents the load from being dumped out in the event of a break in the line on the bottom side of tilt ram 087.

Function

When tipping the telescopic arm, the volume flow from the control unit **XIII** (connection **A4**) coming from connection **A** to **A1**can flow into valve **088** via the non-return valve. To tilt out the boom a volume flow must be enabled from the bottom side of tilt ram **087** back to control unit **XIII**, this flow direction is initially blocked by the non-return valve in valve **088**. If tilting out is intended, the pressure on the rod side of the tilt ram **087** opens valve **088** via port **X** on the valve. The control pressure for the opening process is applied by a throttle and dissipated via a non-return valve in order to reduce vibrations.

A secondary valve is additionally integrated into valve **088**. In the event of external loads that are too heavy or a shock load that would cause too high a pressure being exerted on the bottom side of tilt ram **087**, the hose burst valve is also opened until the peak pressure has dissipated.

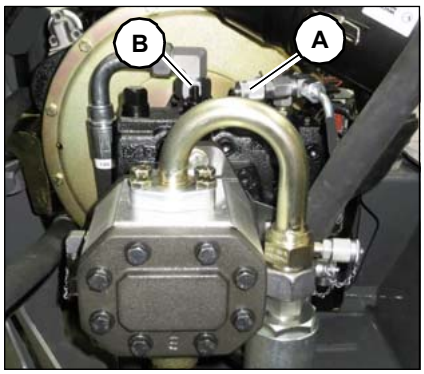
Hydraulic oil tank XX



Pos.	Function	Tightening torque
A	Drain plug	35 Nm (25.8 ft.lb)
B	Locked	35 Nm (25.8 ft.lb)
C	Non-return valve **016** (2 bar (29 psi)) leakage oil of the hydraulic pump**VII**	60 Nm (44.3 ft.lb)
D	Pressure switch **S007**	25 Nm (18.4 ft.lb)
E	Leakage oil for auto hitch **092**, trailer brake valve **140**	35 Nm (25.8 ft.lb)
F	Hydraulic trailer brake, reverse travel LS control line	35 Nm (25.8 ft.lb)
G	Reverse travel steering system **IV**	35 Nm (25.8 ft.lb)
H	Preheating	27 Nm (19.9 ft.lb)
I	Intake of constant pump of work hydraulics/steering system	50 Nm (36.9 ft.lb)

Boost pressure (pilot control pressure): checking and setting

Test feature	Note	Rated value
Boost pressure	Max. diesel engine speed	30 – 32 bar (435.113–464.121 psi)



Checking

1. Put on parking brake
2. Connect sensor to test port **A** for boost pressure
3. Bring diesel engine up to full diesel engine speed
4. Ascertain boost pressure at full engine speed

There is a pressure difference of approx. 4 – 7 bar (58.01 – 101.52 psi) between the lower and upper idling speed

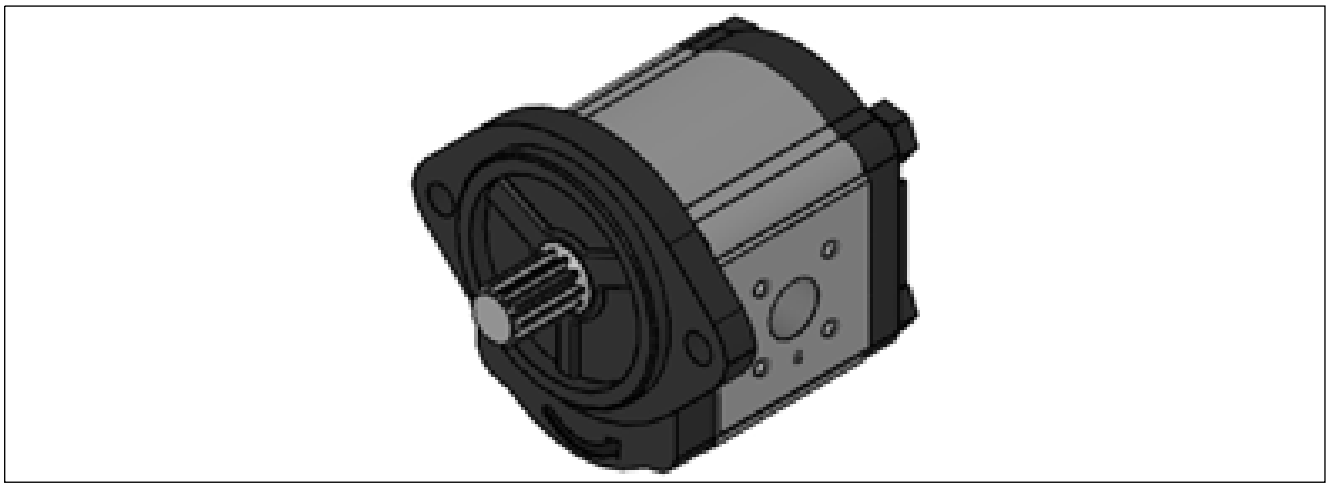
Adjustment

Required tools

- Hexagon socket AF 4
- Ring wrench AF 13

1. Boost pressure too low
   ➥ Screw in boost pressure valve **B**
2. Boost pressure too high
   ➥ Unscrew boost pressure valve **B**

Gear pump working hydraulics I



Component	Remarks	System pressure
I	36 ccm/U (2.196 in³)	230–250 bar (2320.6 – 2755.72 psi)

Function description

The gear pump for working hydraulics **I** supplies the steering orbitrol **IV** and the main control unit **XIII** with oil via the priority valve **008**. The oil flow is filtered by a high-pressure filter **167** directly after the gear pump **I**.

Functional characteristics: hose burst valve for extension cylinder 090

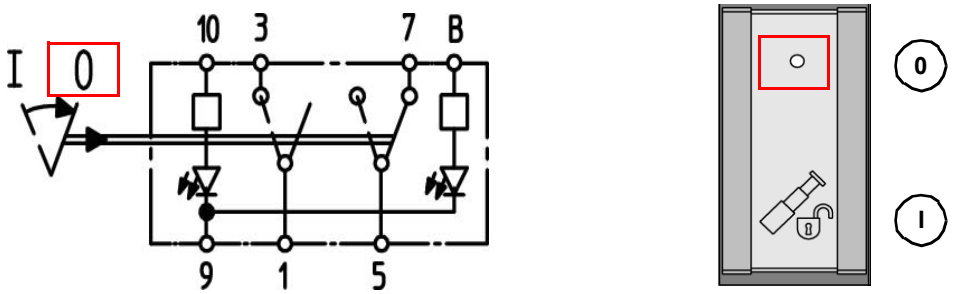
Valve **090** covers the hose burst valve function at the push-out ram **089**. The hose burst valve prevents the load from being retracted in the event of a break in the line on the bottom side of the push-out ram **089**.

Function

When the telescopic arm is extend, the volume flow coming from the control unit **XIII** (connection **A2**) from connection **A** to **A1** in valve **090** can flow via the non-return valve. To tilt in the boom a volume flow must be enabled from the bottom side of the push-out ram **089** back to control unit **XIII**, this flow direction is initially blocked by the non-return valve in valve **090**. In an intentional retraction manoeuvre, the pressure on the rod side of the push-out ram **089** opens the valve. The control pressure for the opening process is applied by a throttle and dissipated via a non-return valve in order to reduce vibrations.

A secondary valve is additional integrated into valve **090**. In the event of external loads that are too heavy or a shock load that would cause too high a pressure being exerted on the bottom side of push-out ram **089**, the hose burst valve is also opened until the peak pressure has dissipated.

Touch button S084 - hydraulic shut-down



PIN	Connection	to PIN	Measuring range	
			not actuated (0)	actuated (I)
1	Output to controller N004	XE15 (1-16) S084 (B)	–	5 V
3	Input from controller N004	XE04 (2-21)	5 V	5 V
5	Output to controller N004	XE15 (1-40)	5 V	–
7	Input from controller N004	XE04 (2-21)	5 V	5 V
9	Lights	–	Earth (cab)	Earth (cab)
10	Lighting F018/10 A	–	12 V	12 V
B	Lighting for control	–	0 V	5 V

- ➥ If button **S084** is pressed in bucket mode, retraction of the boom is stopped.
- ➥ If button **S084** is pressed in fork-lift mode, retraction is stopped during lowering of the boom.
- ➥ If the touch button **S084** is actuated in manual mode, the lowering movement is continued with reduced speed.

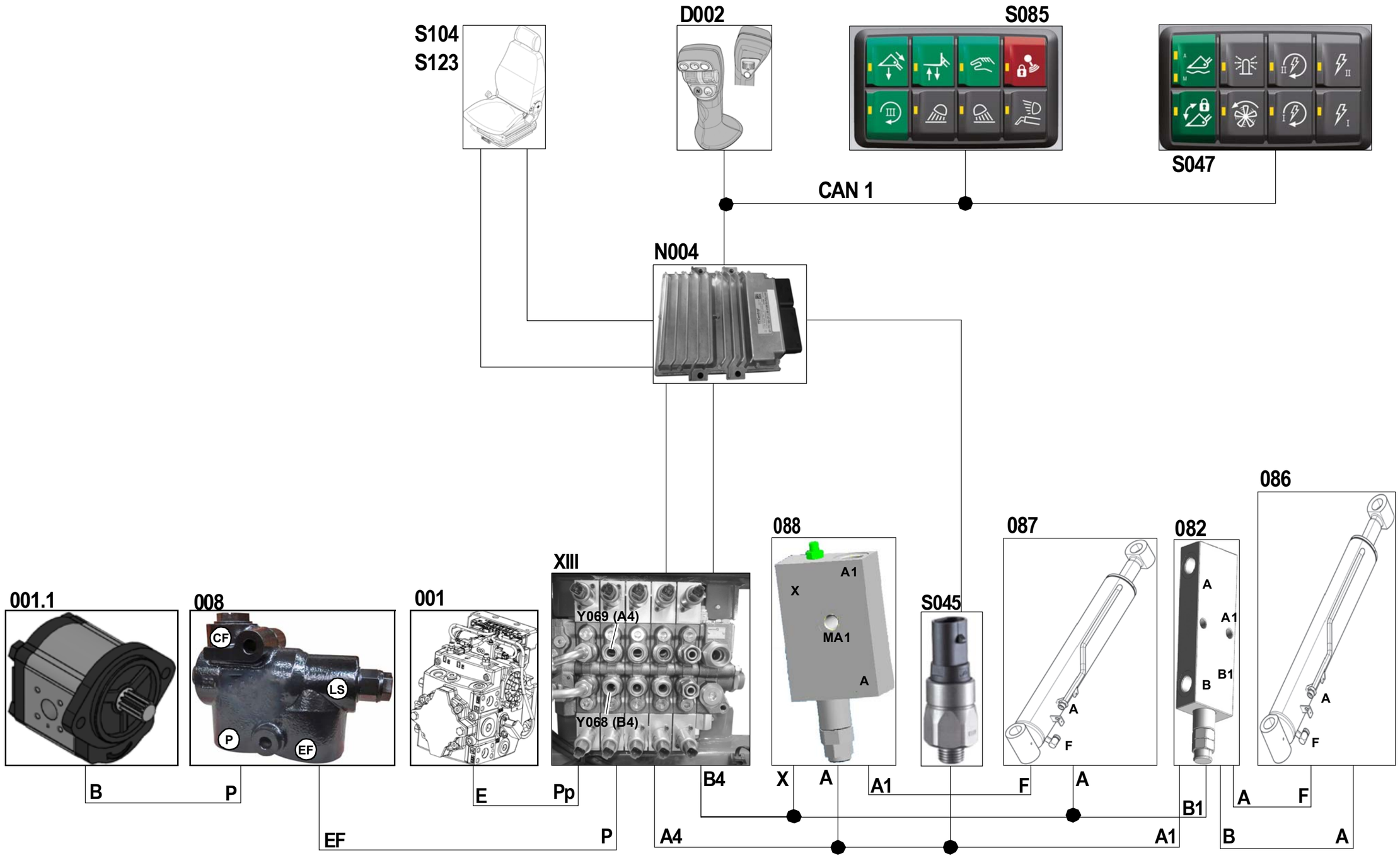
Function description

When pressed, the touch button **S084** switches off the overload limit up to 60 s. The functions will then be controlled normally again.

In the case of an error, the bucket mode becomes active. Combined movements are stopped.

8.6 Control of tipping cylinder/tipping cylinder lock

Overview: control of tipping cylinder/tipping cylinder lock



Functional characteristics: anti-cavitation valve for tipping and compensation cylinder 082

In order to keep the load at the same angle in relation to the vehicle when the boom is raising, tilt ram **087** is coupled to the compensation cylinder **086**. During this manoeuvre, the anticavitation valve **082** ensures that no unwanted side effects are incurred. It prevents the full pressure from the bottom side of tilt ram **087** from impacting the bottom side of the compensation cylinder **086** when the load stabiliser is switched on and the tilt-in function is also activated. This could cause the boom to be raised. Cavitation can occur in the bottom side of the lift cylinder **085.** If subsequently, the dump out function were operated, the boom would drop suddenly. Furthermore, it prevents the full pressure from the bottom side of tilt ram **087** from impacting the bottom side of the compensation cylinder during a tilt-in manoeuvre against a block. This could lead to distortion and an overload of the steel structure of the boom.

Function

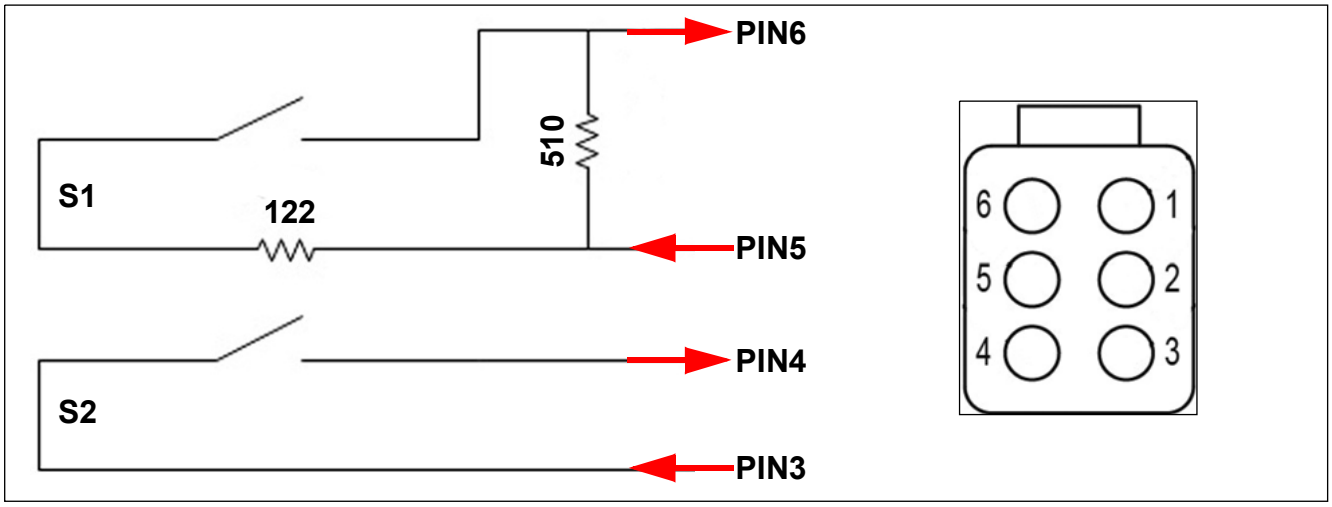
When the boom is raised, pressure is exerted on the rod side of the compensation cylinder **086**. The pressure is exerted via connection **B** onto anti-cavitation valve **082**, thereby controlling it. The oil from the bottom side of tilt ram **087** can flow afterwards to the bottom side of the compensation cylinder **086** via the anticavitation valve **082**. If the telescopic arm is lowered, oil from the bottom side of the compensating cylinder **086** can flow via connection A via the non-return valve to connection **A1** and the bottom side of the tipping cylinder **087**.

If there is high pressure at the bottom side of the tipping cylinder **087** and no pressure on the rod side of the tipping cylinder **087** and compensation cylinder **086**, the anti-cavitation valve **082** acts like a pressure-reducing valve and reduces the pressure from connection **A1** to **A** by 190 bar (2755.7 psi).

Operator presence switch S104

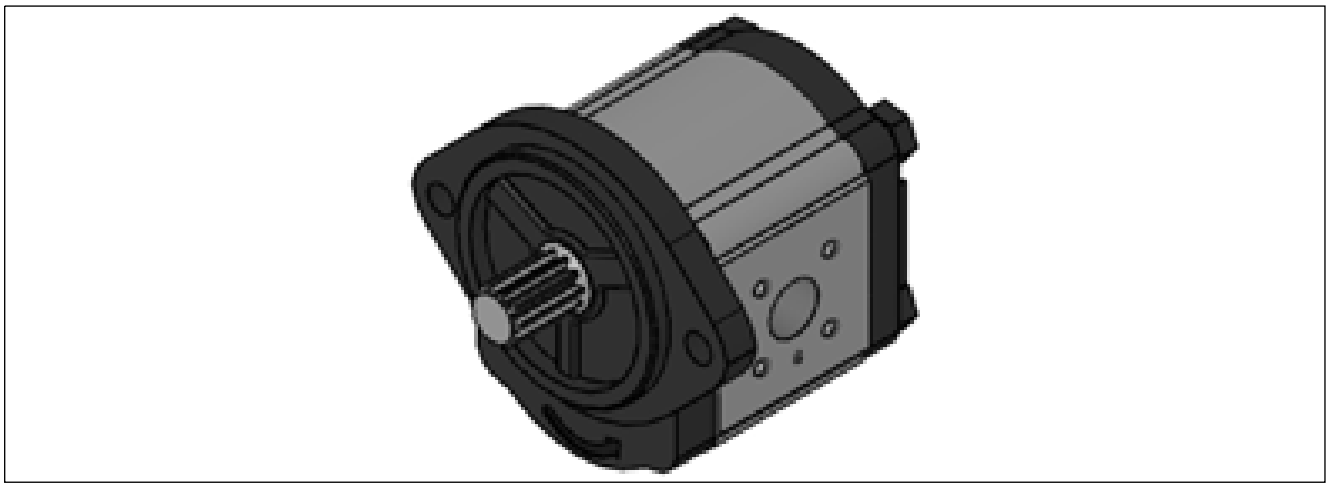
The seat contact switch **S104** is composed of two switches that have been put into a single casing.

Driver not seated on the seat



PIN	Component	To PIN	Measuring range
1	Board voltage F038/25A (for air cushioned seat option)	–	12 V
2	Ground	Cabin	Ground
3	On-board voltage F014/5A	–	12 V
4	Signal to controller N004	XE15 (1-39)	0 V
5	Output from controller N004	XE15 (1-04)	12 V
6	Signal to the controller N004	XE04 (2-44)	2 – 3 V

Gear pump working hydraulics I



Component	Remarks	System pressure
I	36 ccm/U (2.196 in³)	230–250 bar (2320.6 – 2755.72 psi)

Function description

The gear pump for working hydraulics **I** supplies the steering orbitrol **IV** and the main control unit **XIII** with oil via the priority valve **008**. The oil flow is filtered by a high-pressure filter **167** directly after the gear pump **I**.

Description of joystick D002 (version 2)

Function description

The joystick is used to operate the loader unit as well as various additional functions.

The loader unit can only be completely operated by the control lever if:

1. the seat contact switch is actuated (operator in the seat)
2. Starter ON
3. the diesel engine is on
4. Lock for long-haul travel **S085** off

Front side of joystick D002

Pos.	Component	Function
A	Tip switch **S109**	Operation of electric circuit 1 of the 7-pole Front power outlet
B	Roller **S034/035**	Forward/reverse drive and neutral
C	Tip switch **S135**	Reduce speed level e.g. from hare to turtle
D	Tip switch **S136**	Increase speed level e.g. from turtle to hare
E	Tip switch **S110**	Reversing valve (front telescopic arm)
F	Roller **S038/039**	Extend/retract telescopic arm
G	Tip switch **S092**	Bucket repositioning

Reverse of joystick D002

Pos.	Component	Function
H	Roller **S030/031**	Unlock/lock third control circuit
I	Tip switch **S025**	Differential lock (**Y009**)

Description of 3rd control circuit

Hydraulic components

Pos.	Component	Remarks
XIII	Main control unit (hydraulics)	HDS24
001	Boost pump	12 ccm/U (0.732 in³)
001.1	Constant pump work hydraulics	36 ccm/U (2.196 in³)
008	Priority valve	–
077	Pilot control pressure accumulator	210 bar (3045.79 psi)
091	Lock cylinder	–
134	Pressure relief of 3rd control circuit	–

Electrical components

D002	Joystick	CAN 1
N004	Controller	HY-TTC 580-CP
N023	Oil volume setting	CAN 1
S033	Continuous operation of 3rd control circuit	CAN 1
S040	Quickhitch lock push button	5 V
S085	Joystick cut-off	CAN 1
S104	Operator presence switch	–
S123	Seat belt contact switch	–
S127	Pressure relief	12 V
Y016	Proportional valve (lock)	4,7 Ω
Y017	Proportional valve (unlock)	4,7 Ω
Y025	Quickhitch lock solenoid valve	12 V
Y106	Solenoid valve (pressure relief)	12 V

Pos.	Component	Designation
CAN1	CAN1 – Work hydraulics	–
CAN0	CAN0 – Drive	–

Description of joystick D002 (version 1)

Functional characteristics of joystick (handle)

The joystick is used to operate the loader unit as well as various additional functions.

The loader unit can only be completely operated by the control lever if:

1. the seat contact switch is actuated (operator in the seat)
2. Starter ON
3. the diesel engine is on
4. Lock for long-haul travel **S085** off

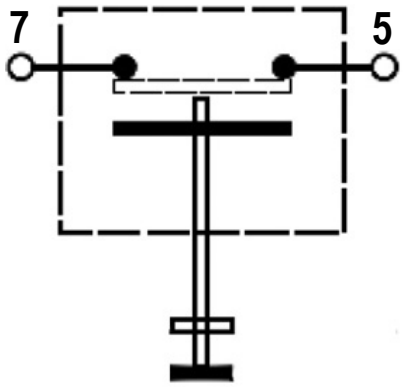
Front side of joystick D002

Pos.	Component	Function
A	Tip switch **S066**	The drive is deactivated (neutral)
B	Roller **S034/035**	Forward/reverse travel
C	Tip switch **S135**	Reduce speed level e.g. from hare to turtle
D	Tip switch **S136**	Increase speed level e.g. from turtle to hare
E	Tip switch **S110**	Reversing valve (front telescopic arm)
F	Roller **S038/039**	Extend/retract telescopic arm
G	Tip switch **S092**	Bucket repositioning

Reverse of joystick D002

Pos.	Component	Function
H	Roller **S030/031**	Unlock/lock third control circuit
I	Tip switch **S025**	Differential lock (**Y009**)

Switch S127 (touch button) - pressure relief



Switch S127 (tip switch) pressure relief not pressed

PIN	Component	PIN	Measuring range
5	On-board voltage F082/3A	X402 (6)	12 V
7	Output to solenoid valve Y106	XR05 (4)	0 V

Switch S127 (tip switch) pressure relief pressed

PIN	Component	PIN	Measuring range
5	On-board voltage F082	X402 (6)	12 V
7	Output to solenoid valve Y106	XR05 (4)	12 V

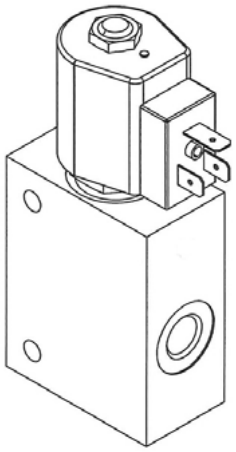
Function description

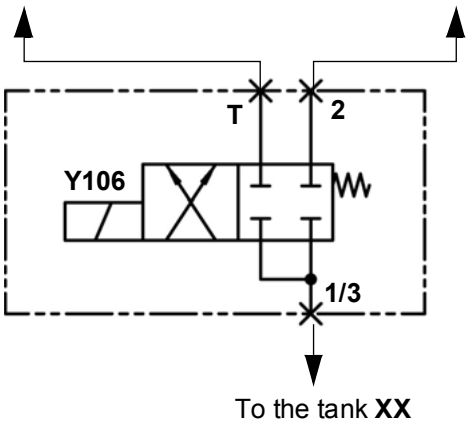
Pressure relief is required in order to relieve the pressure in the 3rd control circuit so that the hydraulic lines can be connected or disconnected.

Electric control

If button **S127** is pressed, voltage is supplied to solenoid valve **Y106**.

Relief valve 134 (Y106)





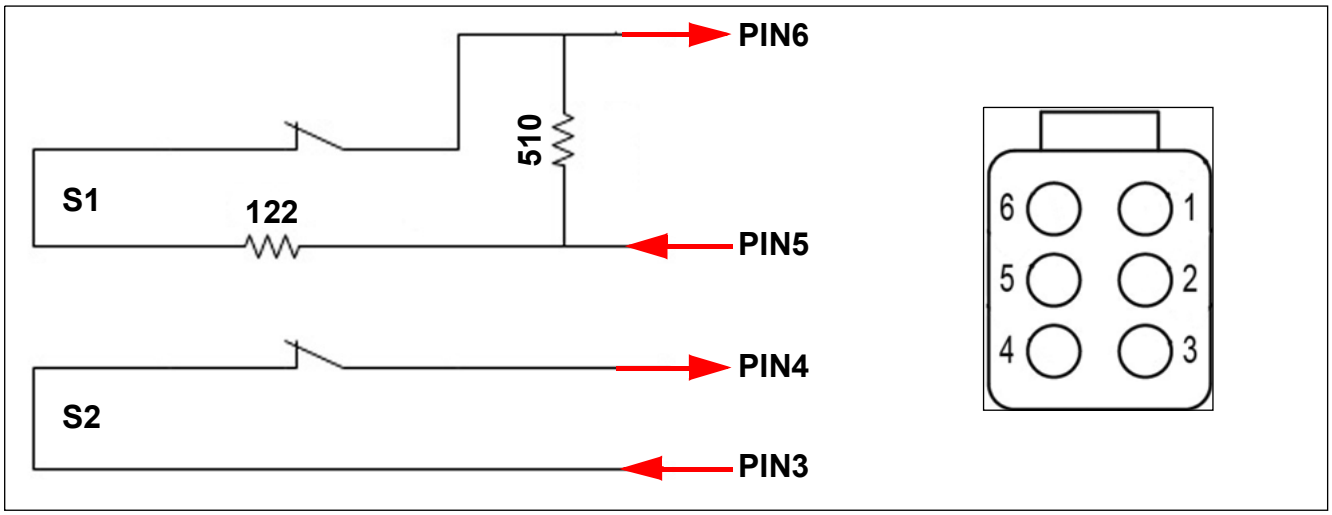
Connection	Power supply
T	Input from section A1
2	Input from section B1
1/3	Output to tank **XX**

Component	Function	Remarks
Y106	Solenoid valve (pressure relief)	12 V

Function description

With touch button **S127** on the telescopic arm, the pressure in the third control circuit is reduced via the relief valve **134** in order to be able to attach the quick hitch facility.

Driver seated on the seat



PIN	Component	To PIN	Measuring range
1	Board voltage F038/25A (for air cushioned seat option)	–	12 V
2	Ground	Cabin	Ground
3	On-board voltage F014/5A	–	12 V
4	Signal to the controller N004	XE15 (1-39)	12 V
5	Output from controller N004	XE15 (1-04)	12 V
6	Signal to the controller N004	XE04 (2-44)	5 – 7 V

If a voltage of 5–7 V is applied to plug XE15 (1-04) and a voltage of 12 V to plug XE15 (1-39), the operator is in the operator's seat.

Seat contact switch closed

The vehicle can be used to its full extent

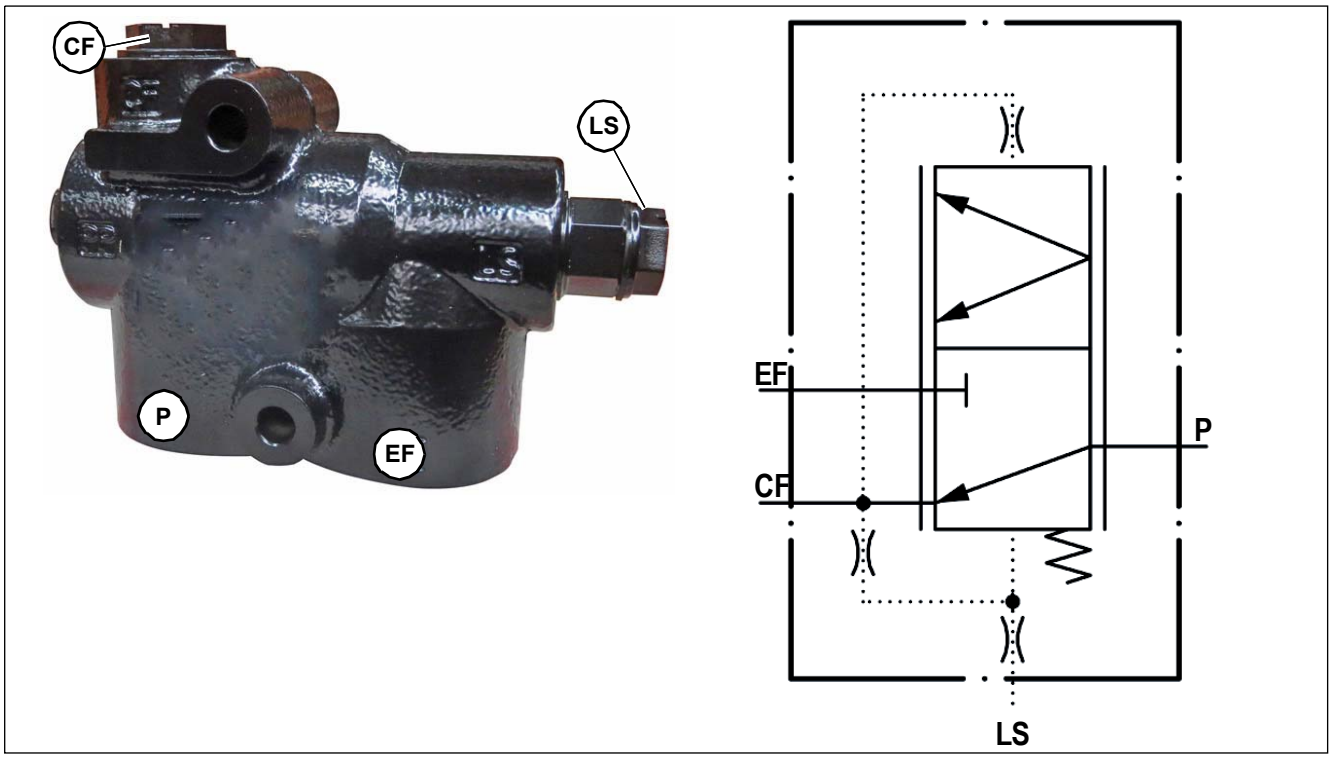
Machine runs without the driver on the seat

➥ The valves for the additional control circuits continue to be energised but have to be switched on before (operator on the seat)

If the operator leaves the seat for longer than 3 s, the following functions will be stopped.

1. Retraction **Y023,** extension **Y024** of telescopic arm
2. Raising **Y066,** lowering **Y067** of telescopic arm
3. Fill shovel **Y068,** Empty shovel **Y069**
4. Locking **Y016,** unlocking **Y017**
5. If the lowering function**Y067** is still active after 3 s, the lowering speed is throttled in relation to the driving speed until the standstill of the lowering movement.
6. Below a speed of 7 km/h (4.3 mph), the drive is switched into neutral if the operator leaves the seat for more than 5 s.
7. If the driving speed is below 0.5 km/h (0.3 mph), after 1 s, it will be switched to neutral and a warning tone will sound.
8. A warning signal sounds at speeds over 7 km/h (4.3 mph)

Priority valve 008



Connection	Power supply
P	Input from gear pump, working hydraulics **I**
LS	Input from steering orbitrol **IV**, port **LS**
CF	Output to steering orbitrol **IV**, port **P**
EF	Output to main control unit **XIII**, port **P1**

Function description

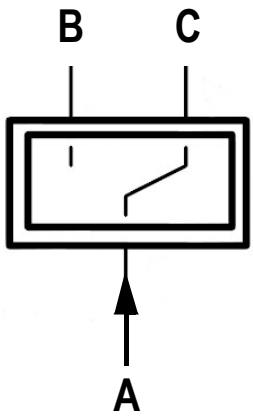
The priority valve **008** is responsible for dividing the oil flow from the gear pump work hydraulics **I into** the steering system and work hydraulics. Here, the oil is primarily supplied to the steering system **IV**.

Function

The oil flow coming from the gear pump **I** passes through port **P** and an internal duct of the priority valve **008** to the control spool. The control spool is then pushed against the spring via the area ratio and the oil flow is distributed evenly between the steering orbitrol **IV** and the main control unit **XIII**..

As soon as the steering orbitrol **IV** is actuated it generates an LS signal, which acts on the control spool of the priority valve **008**. Through the combination of the spring force and the LS signal the control spool is pushed back towards the initial position and the steering assumes priority. This can mean that functions of the working hydraulics are executed more slowly during steering.

Belt contact switch S123 (option)



PIN	Connection	KCN (PIN)	Measuring range	
			buckled in	Not buckled in
A	On-board voltage F014/5A	–	12 V	12 V
B	Input to controller N004	XE15 (1-15)	10 V	0 V
C	Output to switching relay K110	K110 (86)	0 V	12 V

Seat belt not fastened

- Diesel engine cannot be started.
- The travel direction cannot be selected.

The following proportional valves are not energized.

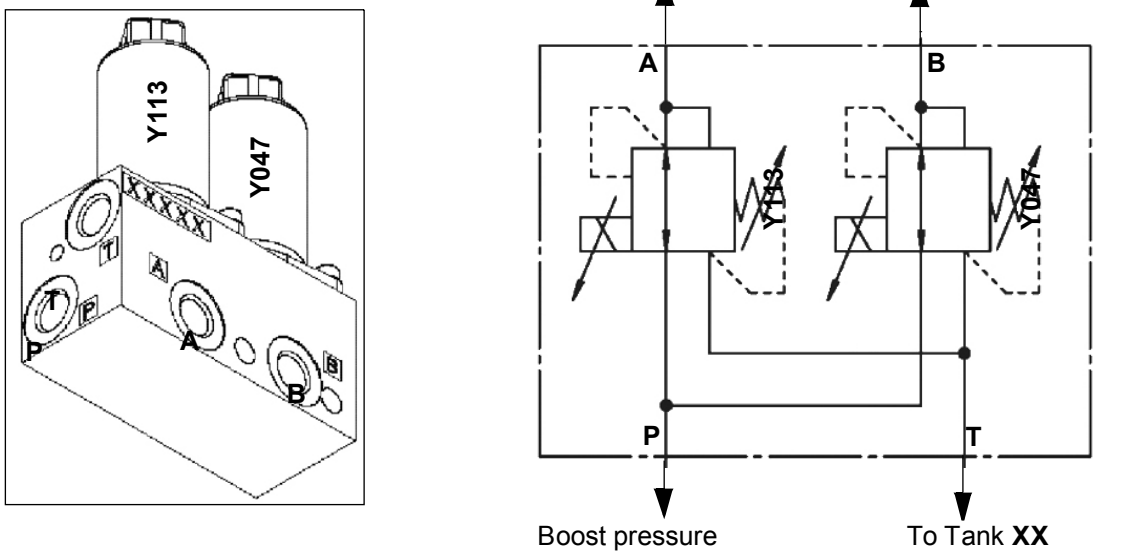
1. Raising **Y066,** lowering **Y067** of telescopic arm
2. Fill shovel **Y068,** Empty shovel **Y069**
3. Retraction **Y023,** extension **Y024** of telescopic arm
4. Locking**Y016,** unlocking **Y017**
5. Solenoid valve for quickhitch lock **Y025**

Upper/lower rear additional control circuit

1. Raising **Y044** or lowering **Y045** tipper or raising **Y044** or lowering **Y045** auto hitch
2. Auto hitch tipper switch-over **Y046**

- Unlock auto hitch **Y047**

Valve block 129 (Y047/Y113)



Connection	Power supply
A	Output advancement brake, rear axis
B	Output of locking cylinder **093** unlock auto hitch
P	Boost pressure
T	Output to tank **XX**

Component	Function	Remarks
Y047	Auto-Hitch unlock solenoid valve	12 V
Y113	Solenoid valve (hydraulic trailer brake)	PWM

Function description

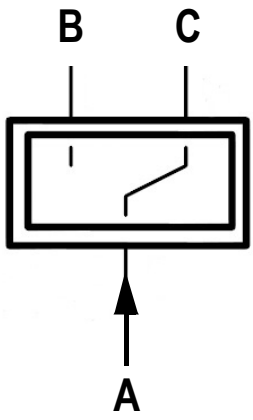
Solenoid valve Y047

Through the unlock auto hitch solenoid valve **Y047**, the locking cylinder **093** is opened via the boost pressure. The unlock auto hitch solenoid valve**Y047** is energized via the touch button **S131** lower auto hitch.

Proportional valve Y113

With the proportional valve **Y113** hydraulic trailer brake, the boost pressure is transmitted to the trailer brake valve **140**. The trailer is thus loaded depending on the brake pressure of a brake overfeed.

Belt contact switch S123 (option)



PIN	Component	KCN (PIN)	Measuring range	
			buckled in	Not buckled in
A	On-board voltage F014/5A	–	12 V	12 V
B	Input to controller N004	XE15 (1-15)	10 V	0 V
C	Output to switching relay K110	K110 (86)	0 V	12 V

Seat belt not fastened

- Diesel engine cannot be started.
- The travel direction cannot be selected.

The following proportional valves are not energized.

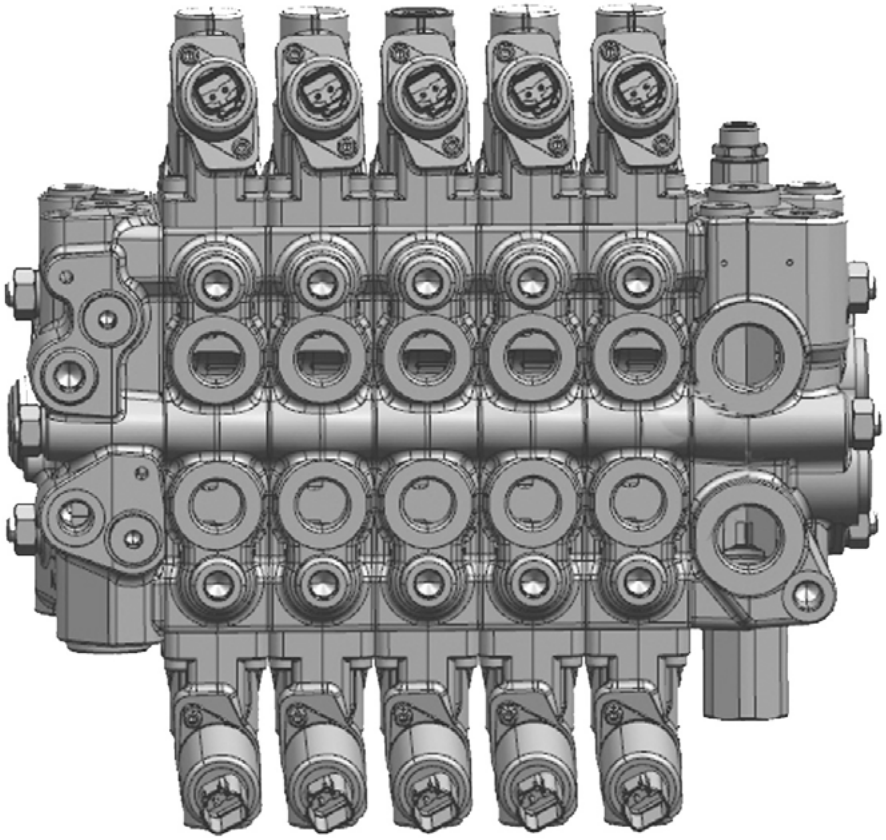
1. Raising **Y066,** lowering **Y067** of telescopic arm
2. Fill shovel **Y068,** Empty shovel **Y069**
3. Retraction **Y023,** extension **Y024** of telescopic arm
4. Locking **Y016,** unlocking **Y017**
5. Solenoid valve for quickhitch lock **Y025**

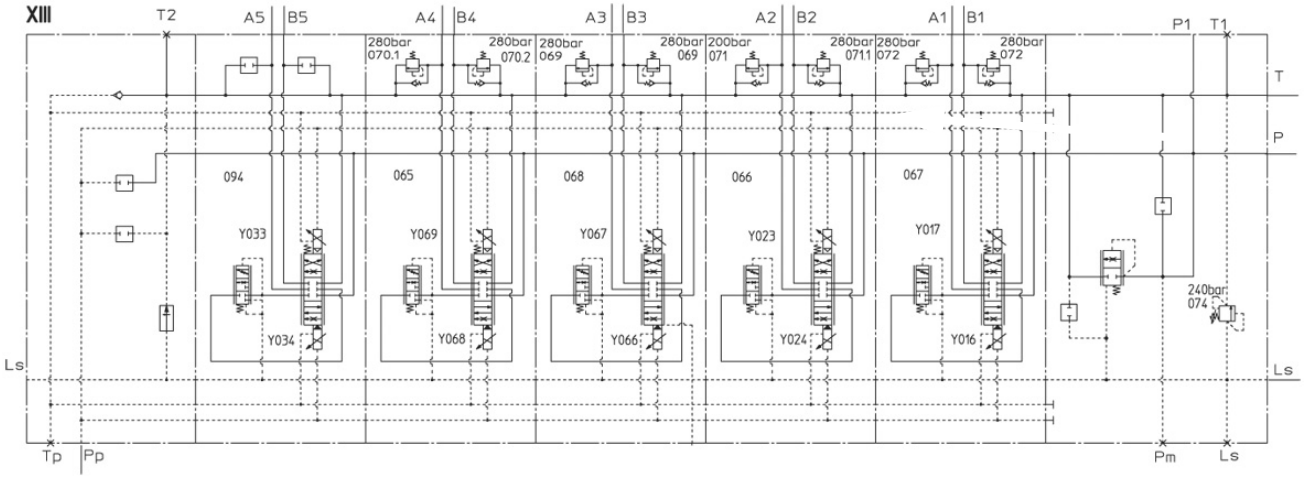
Upper/lower rear additional control circuit

1. Raising **Y044** or lowering **Y045** tipper or raising **Y044** or lowering **Y045** auto hitch
2. Auto hitch tipper switch-over **Y046**

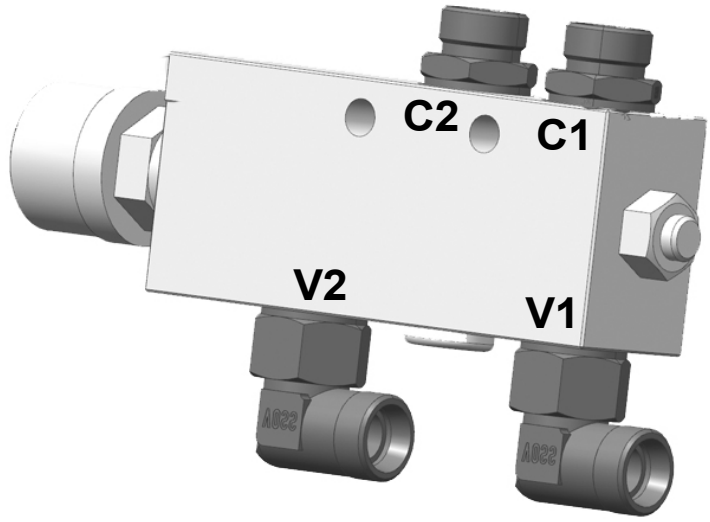
- Unlock auto hitch **Y047**

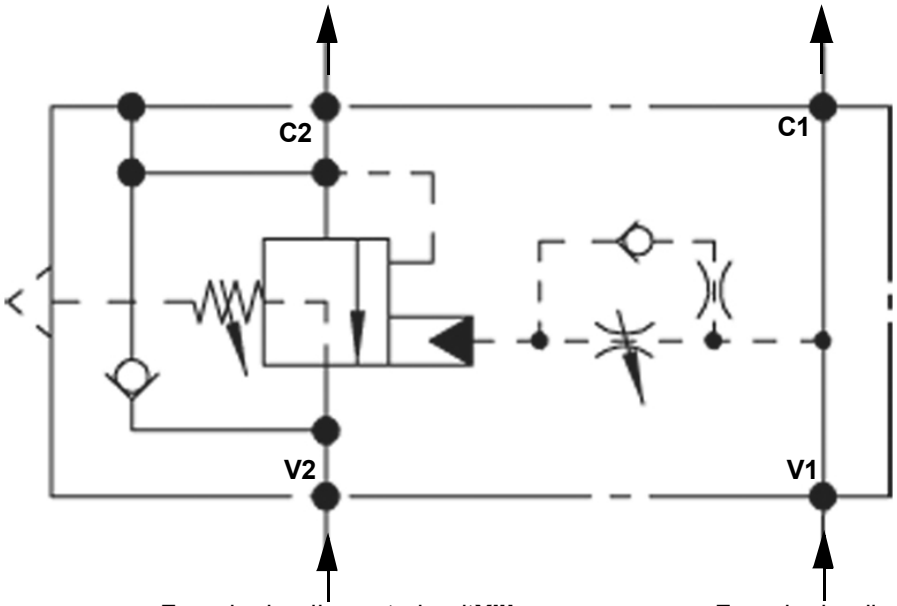
Hydraulic control unit XIII





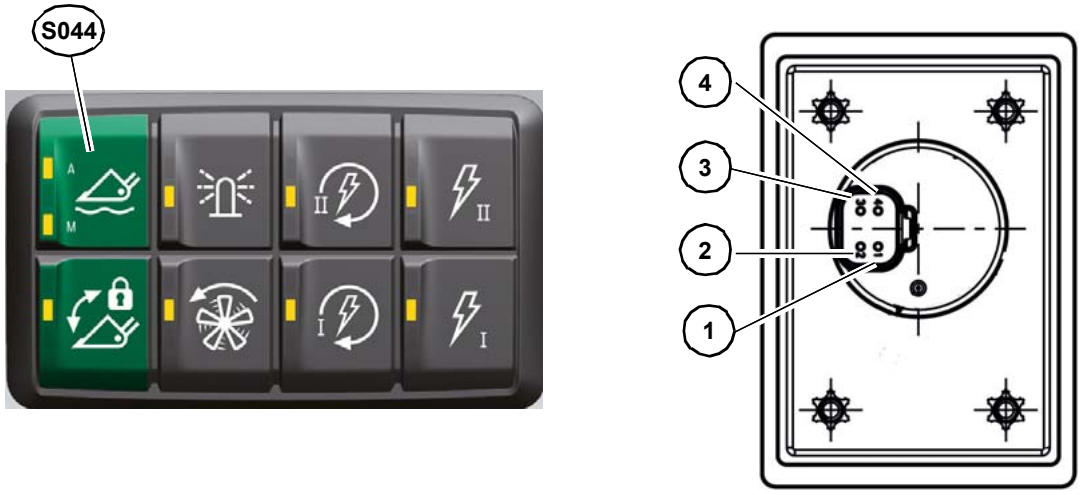
Hose burst valve for push-out ram 090





Connection	Power supply
C1	Output to push-out ram **089** (rod side)
C2	Output to push-out ram **089** (bottom side)
V1	Input from hydraulic control unit **XIII** (B2)
V2	Input from hydraulic control unit **XIII** (A2)

Touch button S044 – load stabiliser in the keypad D004



PIN	Connection	Measuring range
1	Voltage supply F032/5 A	12 V
2	Ground	Cabin
3	CAN 1	high
4	CAN 1	low

Function description

The load stabiliser can be switched of via the touch button **S044** in either continuous or automatic function. The load stabiliser is used to damp the boom in order to ensure smooth handling even at high speeds. If the function is active, the touch button **S044** lights up.

Continuous function is switched on

With the touch button **S044** on the keypad **D004** a CAN message (CAN1) is sent to controller **N004**. From controller **N004**, the solenoids **Y020**/ **Y021** are energized with 12 V.

The PIN 1-77 outlet on the controller **N004** energizes the solenoid **Y020** (2)

The PIN 1-56 outlet on the controller **N004** energizes the solenoid **Y021** (2)

Automatic function

The load stabiliser is activated from a speed of 7 km/h.

The signal from the speed sensor **B009** is sent from the traction electronics **N001** to the controller **N004** via CAN 0. From 7 km/h, solenoids **Y020 Y021**are supplied with 12 V by the controller **N004**.

The PIN 1-77 outlet on the controller **N004** energizes the solenoid **Y020** (2).

The PIN 1-56 outlet on the controller **N004** energizes the solenoid **Y021** (2).

Touch button S125 – stacking mode in the keypad D003

PIN	Connection	Measuring range
1	Voltage supply F032/5 A	12 V
2	Ground	Cabin
3	CAN 1	high
4	CAN 1	low

Function description

In fork-lift mode, 2 functions are always executed during the raising/ lowering processes. These functions are raise &extend and lower & retract. If the function is active, the touch button**S125** lights up.

This enables a vertical movement (vertical raising/lowering).

Raising in fork-lift mode

Using the joystick **D002**, a CAN message is transmitted to the controller **N004.** The controller **N004** controls the raising **Y066** and extending **Y024** proportional valve via a tube characteristic. The characteristic curve is influenced by the angle.

Lowering in fork-lift mode

Using the joystick **D002**, a CAN message is transmitted to the controller **N004**. The controller **N004** controls the lower **Y067** and retract **Y023** proportional valves via a tube characteristic. The characteristic curve is influenced by the angle.

Lowering in fork-lift mode in the event of an overload

In the event of an overload, the boom is retracted quicker. If the push-out ram is operated additionally via the roller **S038** (extend), then the extend function goes into overload and the boom retracts automatically.

The hose burst valve **XV** for the lifting cylinder **085** is opened during the lowering function via the pilot control pressure.

Colour definition

Colour	Meaning
	High pressure
	Low pressure
	Boost pressure/pilot pressure

Legend for hydraulic diagram for electrically reversible third control circuit

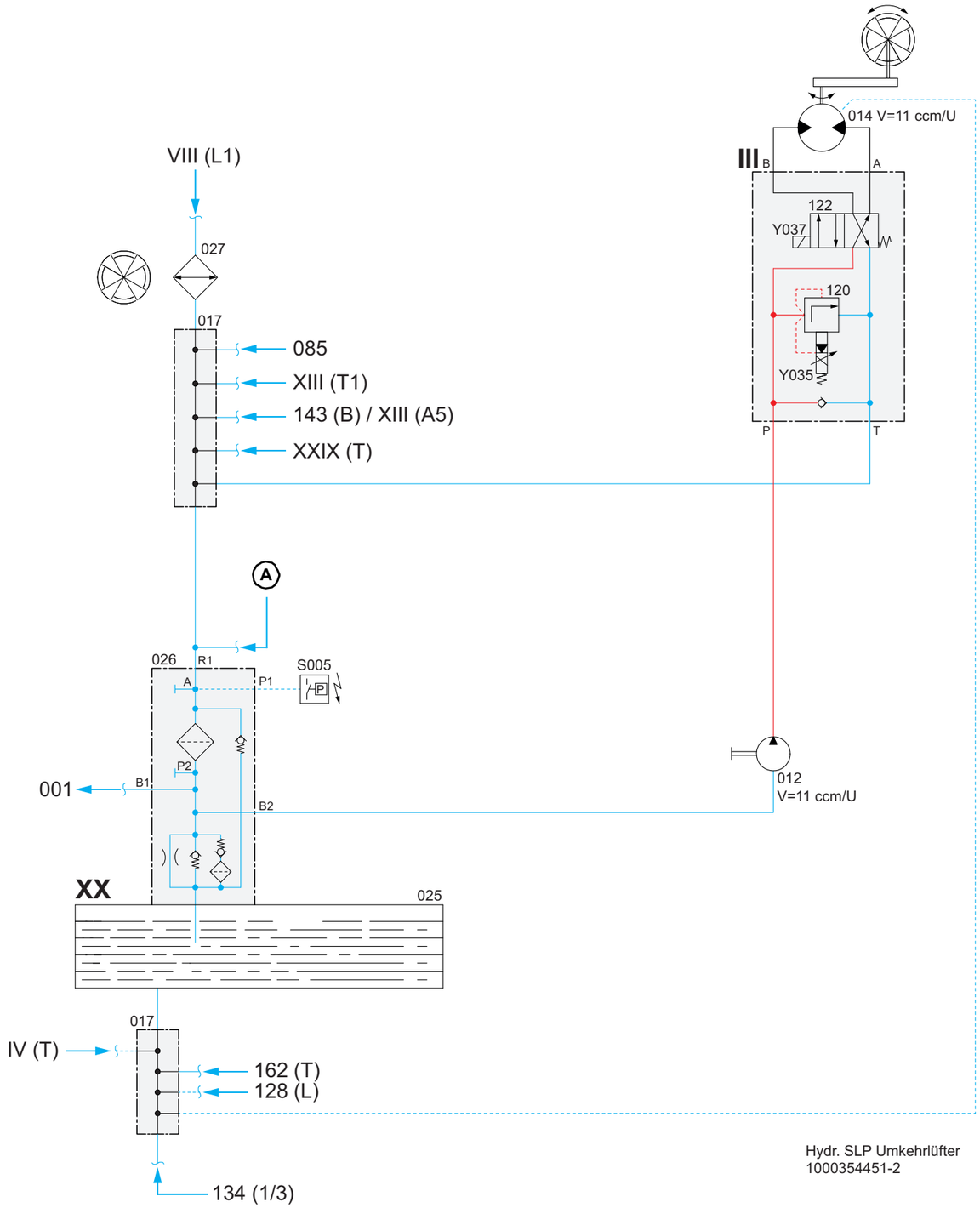
Main components

Pos.	Component
XIII	Main control unit (hydraulics)
XX	Reservoir
XXIX	Additional control unit (rear hydraulics)

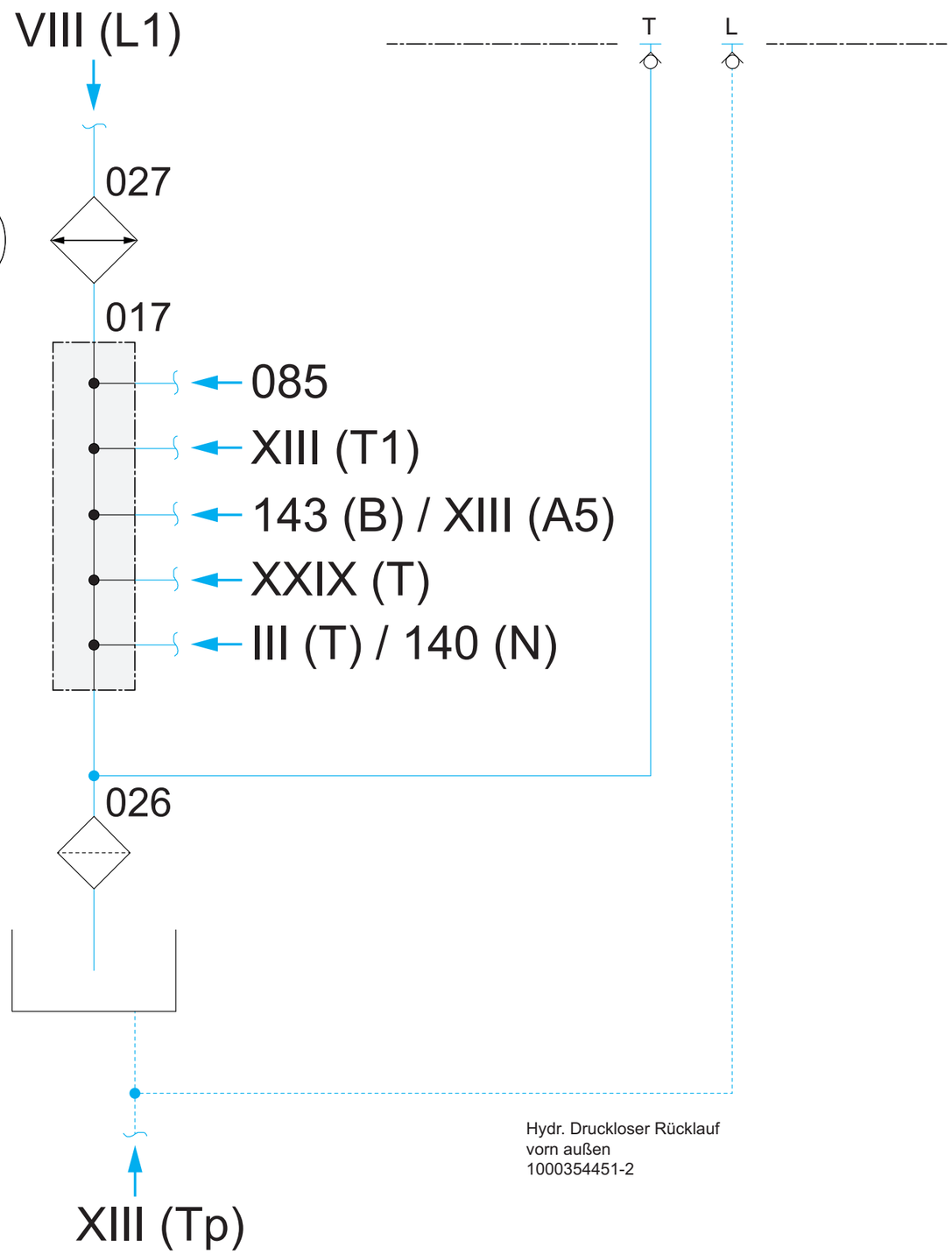
Components

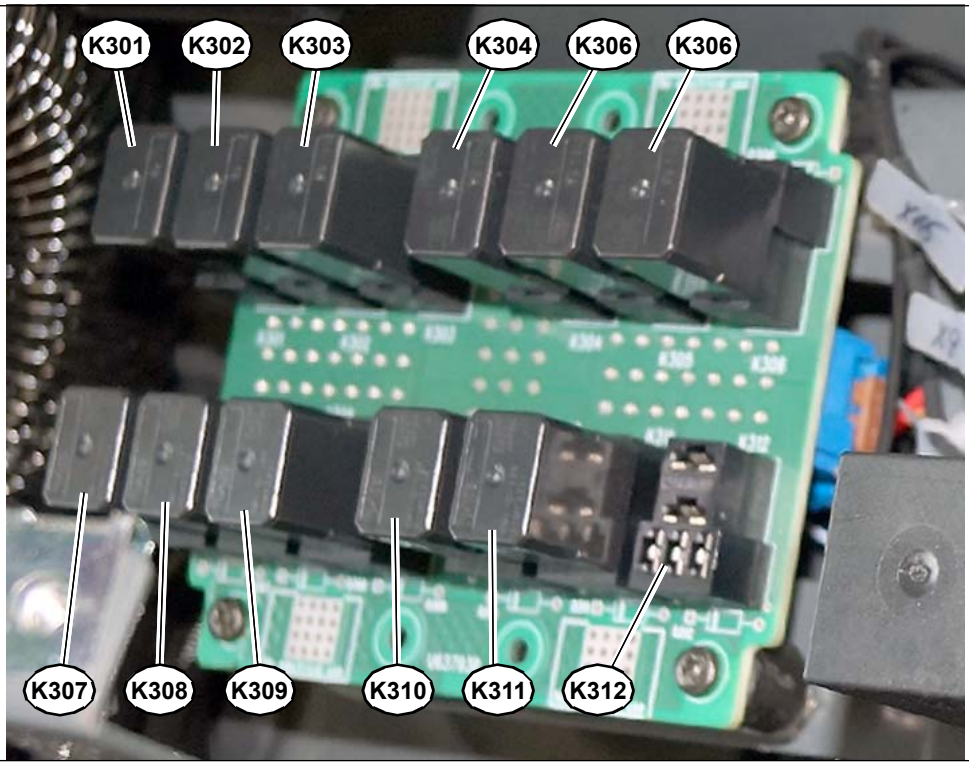
Pos.	Component
001	Boost pump
001.1	Constant pump hydraulics
016	Non-return valve
017	Manifold block
067	Control spool, 3rd control circuit
072	Secondary valve 3rd control circuit, lock/unlock
074	LS pressure relief valve
077	Emergency lowering pressure accumulator
091	Lock cylinder
117	(Y025) 2/2 Solenoid valve, quickhitch lock
133	(Y051) 6/2 multiple way valve for switch-over of front 4th control circuit (lock/unlock)
Y016	Proportional valve (lock)
Y017	Proportional valve (unlock)
Y025	Quickhitch lock solenoid valve
Y051	Solenoid valve for switch-over of front 4th control circuit (lock/unlock)

Hydraulic diagram of reversing fan



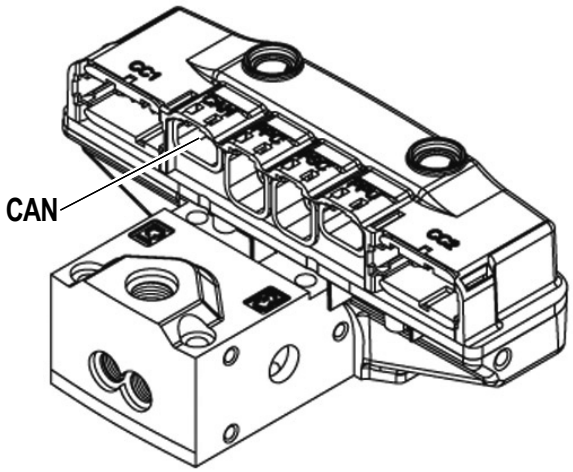
Open return hydraulic diagram

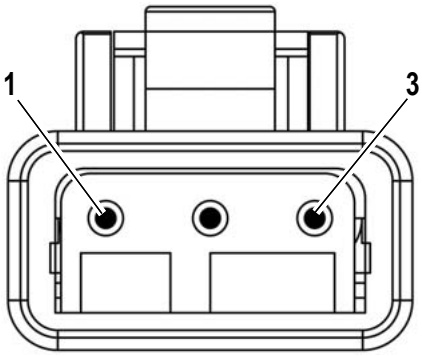




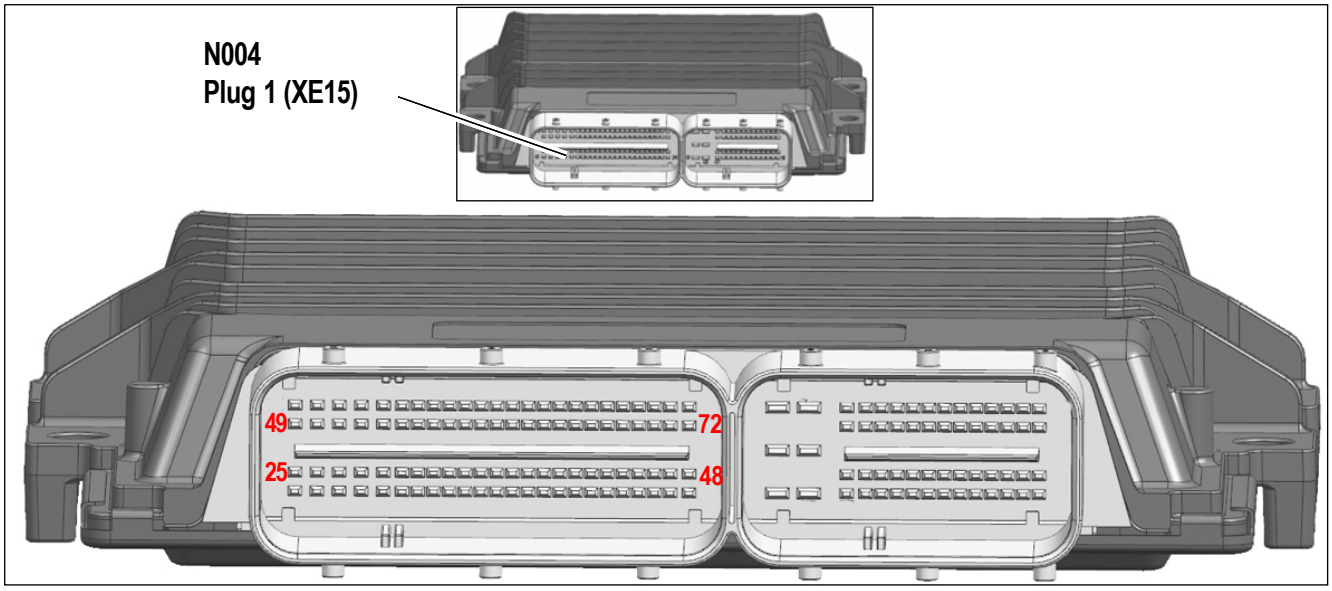
Switching relay no.	Slot no.	Protected circuit
K048	K301	Front working light
K047	K302	Rear working light
K049	K303	Boom working lights
K033	K304	Window heating
K016	K305	7-pole plug receptacle (front)
K101	K306	7-pole plug receptacle (front) circuit 1
K102	K307	7-pole plug receptacle (front) circuit 2
	K308	Not assigned
K003	K309	Reversing warning system
K114	K310	Rotating beacon
K030	K311	Brake
	K312	Not assigned

Pin assignment traction electronics N001, connector CAN

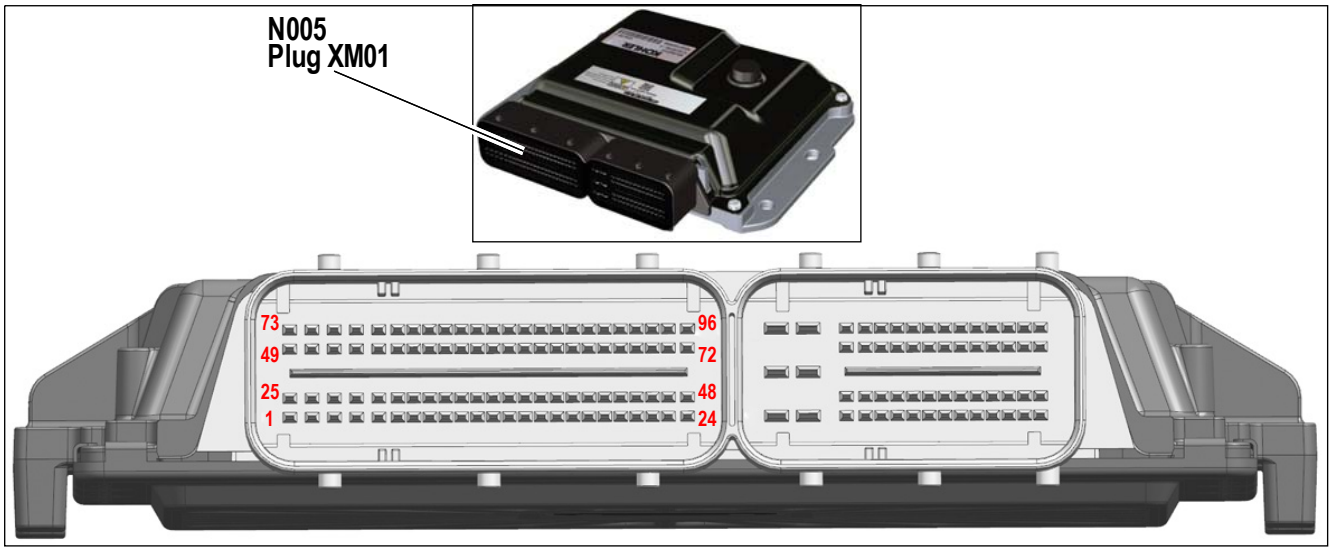




PIN	Cable colour	Measurand	Component (PIN)	Description
1	WH	CAN 0 High	–	Vehicle CAN 0
2	BK	CAN 0 Low	–	Vehicle CAN 0
3	–	–	–	–



PIN	Input/output	Compo-nent	Description
1-49	Output to work lights switching relay	K048 (3)	12 V
1-50	Speed sensor Signal 1	B009 (3)	5 V
1-51	–	–	–
1-52	Output of oil temperature switch cooling	K049 (3)	12 V
1-53	–	–	–
1-54	Output lock quick change plate	Y016 (2)	PWM
1-55	Output 7-pole front socket	K101 (3)	12 V
1-56	Output load stabiliser solenoid valve	Y021 (2)	12 V
1-57	Output fan (reversing)	Y035 (2)	PWM
1-58	Output 7-pole front socket main relay	K016 (3)	12 V
1-59	Output reversing valve additional control circuit	Y046 (2)	12 V
1-60	Output solenoid valve hydraulic trailer brake	Y113 (2)	PWM
1-61	–	–	–
1-62	Output rear hydraulics lowering mode solenoid valve	Y129 (2)	PWM
1-63	Output fan reversal solenoid valve	Y037 (2)	12 V
1-64	–	–	–
1-65	Output proportional valve, retract telearm	Y023 (2)	PWM
1-66	Output unlock auto hitch solenoid valve	Y047 (2)	12 V
1-67	Output control lamp for bucket repositioning	H083	CAN
1-68	Output lower proportional valve	Y067 (2)	PWM
1-69	–	–	–
1-70	–	–	–
1-71	Output empty shovel proportional valve	Y069 (2)	PWM
1-72	Output lower rear hitch solenoid valve (inner)	Y118 (2)	PWM

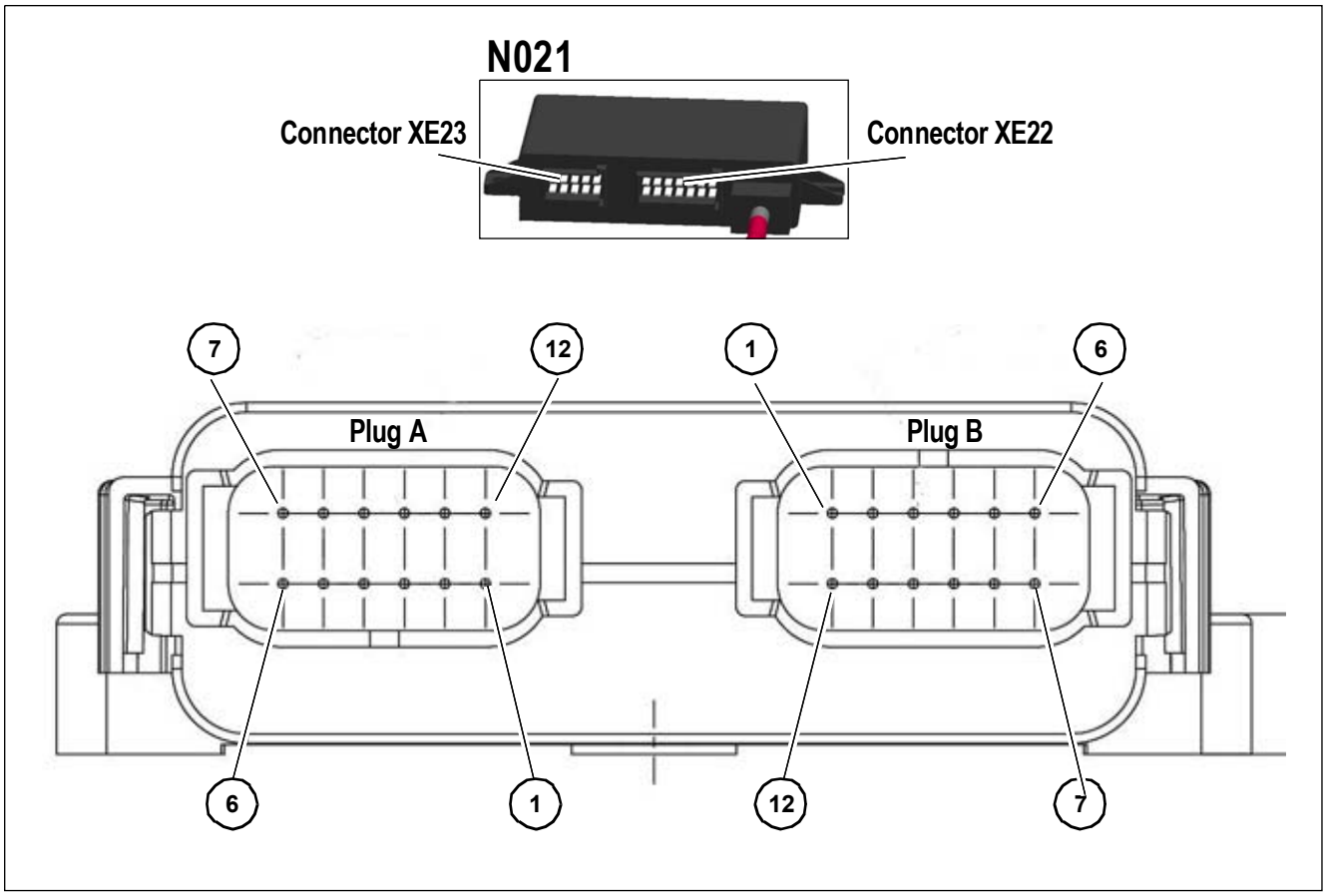


PIN	Input/output	Component	Description
49	Input of injector 1-4	Y060 (1) Y061 (1) Y062 (1) Y063 (1)	Sensor ground
50	–	–	–
51	Output injector 4	Y063 (2)	Signal
52	–	–	–
53	–	–	–
54	–	–	–
55	–	–	–
56	–	–	–
57	–	–	–
58	–	–	–
59	–	–	–
60	–	–	–
61	Signal T-MAP sensor	B021 (1)	Signal
62	–	–	–
63	Output to rail pressure supply solenoid valve	Y076 (2)	Signal
64	–	–	–
65	–	–	–
66	–	–	–
67	–	–	–
68	–	–	–
69	–	–	–
70	–	–	–
71	Output from air intake surface heater	R041	Signal
72	–	–	–

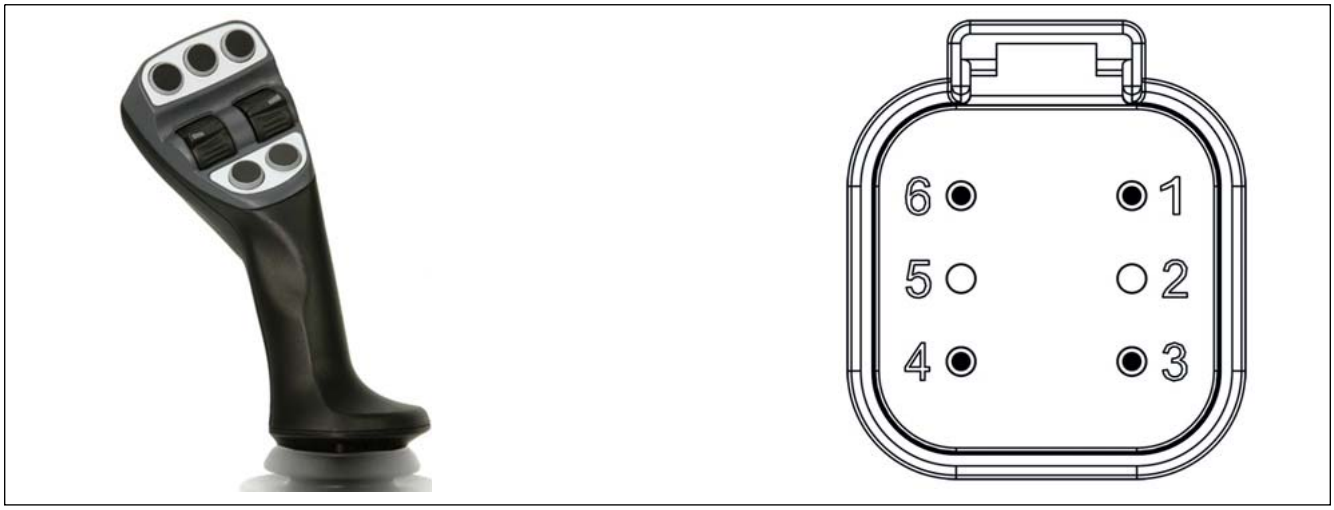
Element description of the drive interlock N021

Compo-nent	Component
K104	Switching relay for operator presence switch
K105	Parking brake switching relay
K146	Belt contact switch relay
N004	Operating hydraulics electronics
N005	Diesel engine electronics
N021	Immobiliser
S001	Preheating start switch
S011	Handbrake switch
S104	Operator presence switch
S123	Seat belt contact switch
W002	Drive interlock aerial

Pos.	Component	Designation
CAN0	CAN0 – Drive	–



Joystick D002



Pin assignment of Joystick D002

PIN	Connection	Measuring range
1	Ground (KL31)	Ground/cab
2	Voltage supply F010/3 A (KL30)	12 V
3	Switched voltage supply F032/5 A (KL15)	12 V
4	–	–
5	CAN 1	low
6	CAN 1	high

Functional characteristics of circuit breaker S031

With the circuit breaker **S027,** three different circuits can be selected in the position **II** .

Circuit 1

- With the switch/touch button**S027** in position **I** circuit 1 (display in display) can be selected.

1. If the switch **S031** is pressed to the left, a CAN message is sent to the work hydraulics electronics **N004**.
2. Via a CAN message, this is sent to the display **P014** and the front plug receptacle electronics**N032** .
3. The front plug receptacle electronics**N032** controls the relay **K 098** PIN (86). Thus the PIN **D** of the front plug receptacle**XX03** is powered with 12 volts.

Circuit 2

- With the switch / touch button **S027** in position **II,** select the circuit 2 (shown in display).

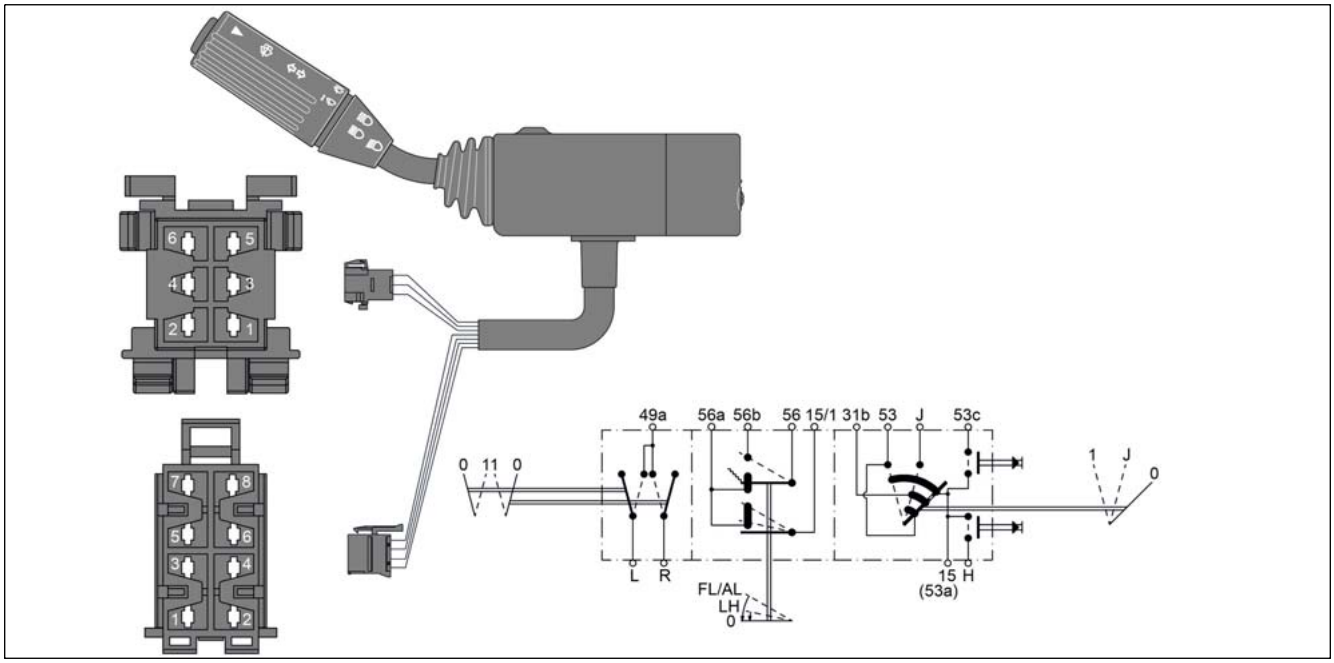
1. If the switch **S031** is pressed to the left, a CAN message is sent to the work hydraulics electronics **N004**.
2. Via a CAN message, this is sent to the display **P014** and the front plug receptacle electronics **N032**.
3. The front plug receptacle electronics **N032** controls the relay **K100** PIN (86. Thus the PIN **F** of the front plug receptacle **XX03** is powered with 12 volts.

Circuit 3

- With the switch/touch button**S027** in position **III** circuit 3 (display in display) can be selected.

1. If the switch **S031** is pressed to the left, a CAN message is sent to the work hydraulics electronics **N004**.
2. Via a CAN message, this is sent to the display **P014** and the front plug receptacle electronics**N032**.
3. The front plug receptacle electronics**N032** controls the relay **K 096** PIN (86). Thus the PIN **H** of the front plug receptacle**XX03** is powered with 12 volts.

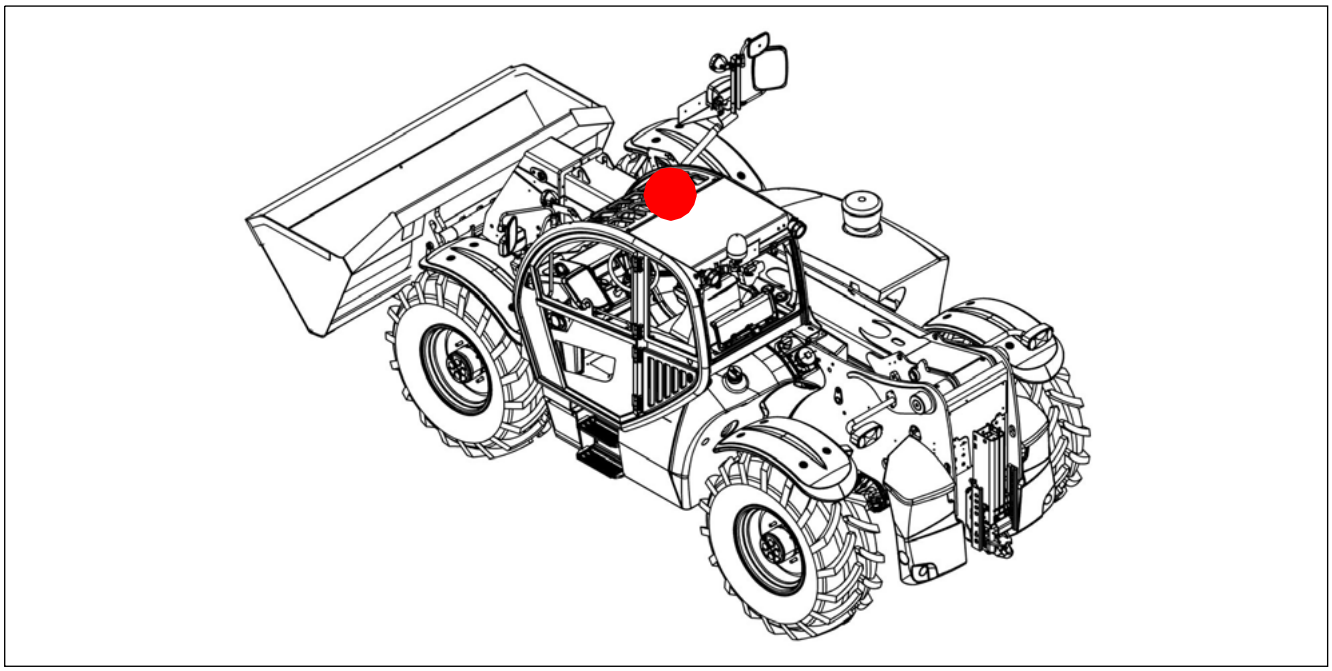
Steering-column control lever S012



Pin assignment of plug XL00

PIN	Connection S012	Component	Measuring range
1	L	Output to left headlight H076 (5) Output to left tail light H078 (1) Output to rear socket XX01 (1) Output to front socket XX02 (L1)	12 V
2	R	Output to right headlight H077 (5) Output to right tail light H079 (1) Output to rear socket XX01 (4) Output to front socket XX02 (6)	12 V
3	49a	Input from warning light switch S019 (49a)	12 V
4	15/1	Input F016/20A	12 V
5	56b	Input F021/7,5A	12 V
6	56a	Output display instrument P014 (22)	12 V

9.14 Adjusting the safe load indicator P006



	Value	KCN	Remark/designation	
		P006	Safe load indicator	
For non-specified tightening torques, see chapter “Introduction/tightening torques”				

Information

Position a load of **approx. 1300 – 1800 kg** (2866 – 3968 lb) in front of the machine so that it can be picked up without having to move the machine

The machine must not be moved during the entire calibration procedure!

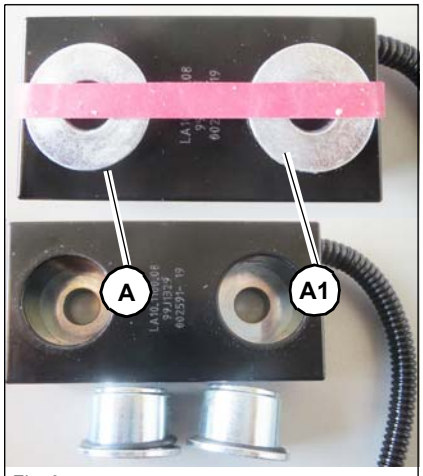


Fig. 3

- When delivered, the bushings are affixed with a rubber band.
- If bushings fall out of the load sensor **B008** check that the surface has not suffered any deformation or damage. If there is no damage or deformation to be seen, clean bushings and load sensor **B008** thoroughly.

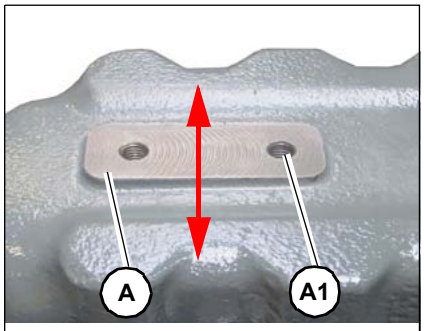


Fig. 4

It is essential that the following steps are observed:

1. Rethread both threads **A1** (M10) at 90 ° to the installation surface **A** on the rear axle.
2. Clean the installation surface **A** across to the axle with sandpaper (180 graining) (shiny metallic). See fig. 212
   ➥ All remains of adhesive must be fully removed from the installation surface **A**.
3. Blow clean the threaded bores **A1** thoroughly.
4. Check the depth of thread with a hexagon head cap screw M10 x 20 mm. Screw the screw fully by hand.
   ➥ The thread length is OK if the screw head of the hexagon head cap screw rests completely on the installation surface **A**.

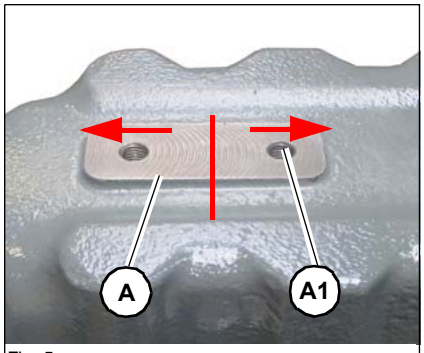


Fig. 5

5. Wipe the mounting surface **A** at the rear axle with a lint-free cloth, dampened with Loctite® 7063, wiping away from the centre of the surface.
6. Blow clean the threaded bores **A1** again thoroughly.
7. Wipe the mounting surface **A** at the rear axle with a lint-free cloth, dampened with Loctite® 7063, wiping away from the centre of the surface.

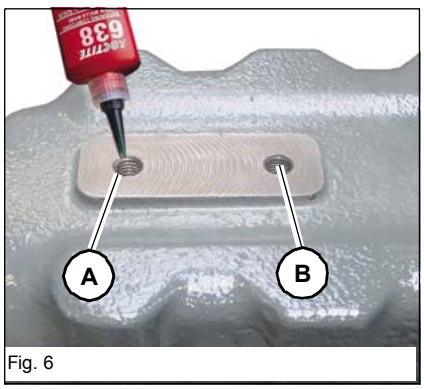
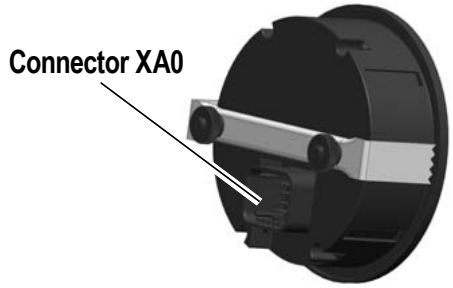
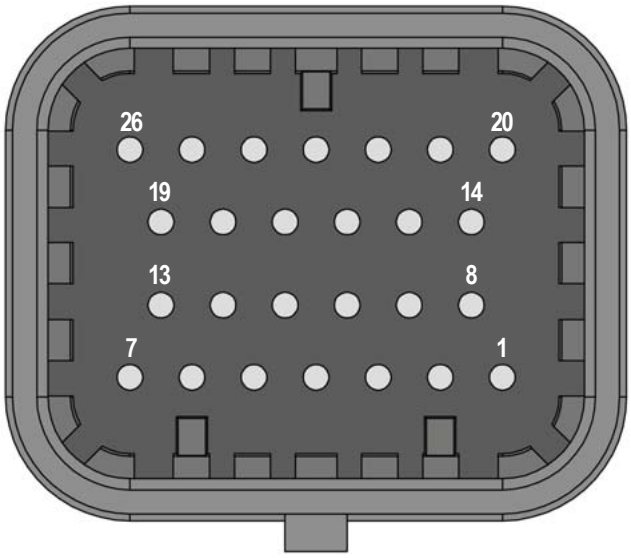


Fig. 6

8. Apply a drop of Loctite® 638 each to both threads **A** and **B** .

Pin assignment indicating instrument P014, connector XA01





PIN	Measurand	Component (PIN)	Description
17	Input signal	S006 (1)	Temperature switch, hydraulic oil
18	Input signal	K010 (31)	Turn indicator relay
19	Input signal	K010 (49)	Turn indicator relay
20	Input on-board voltage	F023/3 A	K001/tl.15
21	Ground		
22	Input signal	S012 (56a)	Steering-column control lever
23	CAN 0 Low	–	Vehicle CAN
24	CAN 0 High	–	Vehicle CAN
25	–	–	–
26	–	–	–

SheetName	SheetName 1	SheetName 2
BMK_02	Betriebsmittelverzeichnis	-
BMK_03	Betriebsmittelverzeichnis	-
BMK_04	Betriebsmittelverzeichnis	-
BMK_05	Betriebsmittelverzeichnis	-
BMK_06	Betriebsmittelverzeichnis	-
BMK_07	Betriebsmittelverzeichnis	-
BMK_08	Betriebsmittelverzeichnis	-
BMK_09	Betriebsmittelverzeichnis	-
BMK_10	Betriebsmittelverzeichnis	-
BMK_11	Betriebsmittelverzeichnis	-
BMK_12	Betriebsmittelverzeichnis	-
BMK_13	Betriebsmittelverzeichnis	-
BMK_14	Betriebsmittelverzeichnis	-
BMK_15	Betriebsmittelverzeichnis	-
BMK_16	Betriebsmittelverzeichnis	-
BMK_17	Betriebsmittelverzeichnis	-
BMK_18	Betriebsmittelverzeichnis	-
BMK_19	Betriebsmittelverzeichnis	-

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	date	name
User		lnzkraum
Proved		
Reading station		

Blattverzeichnis
-

Mat.-Nr. 1000364531 Doc.-Nr. 2060093317

Revision
Ersetzt Version
Gewicht in [kg]

+CB -P006		Lastanzeige OMD II	
PIN	SIGNAL	DESCRIPTION	Ref-PAGE
1		PWR +	/34.C4
2		GND	
3	-VE	Cutoff output S1	/34.A3
4	-VE	Sensor 1	/34.E2
5	+VE	Sensor 2	/34.A1
6		Sensor	/34.E2
7		CAN H	/16.C2
8		CAN L	

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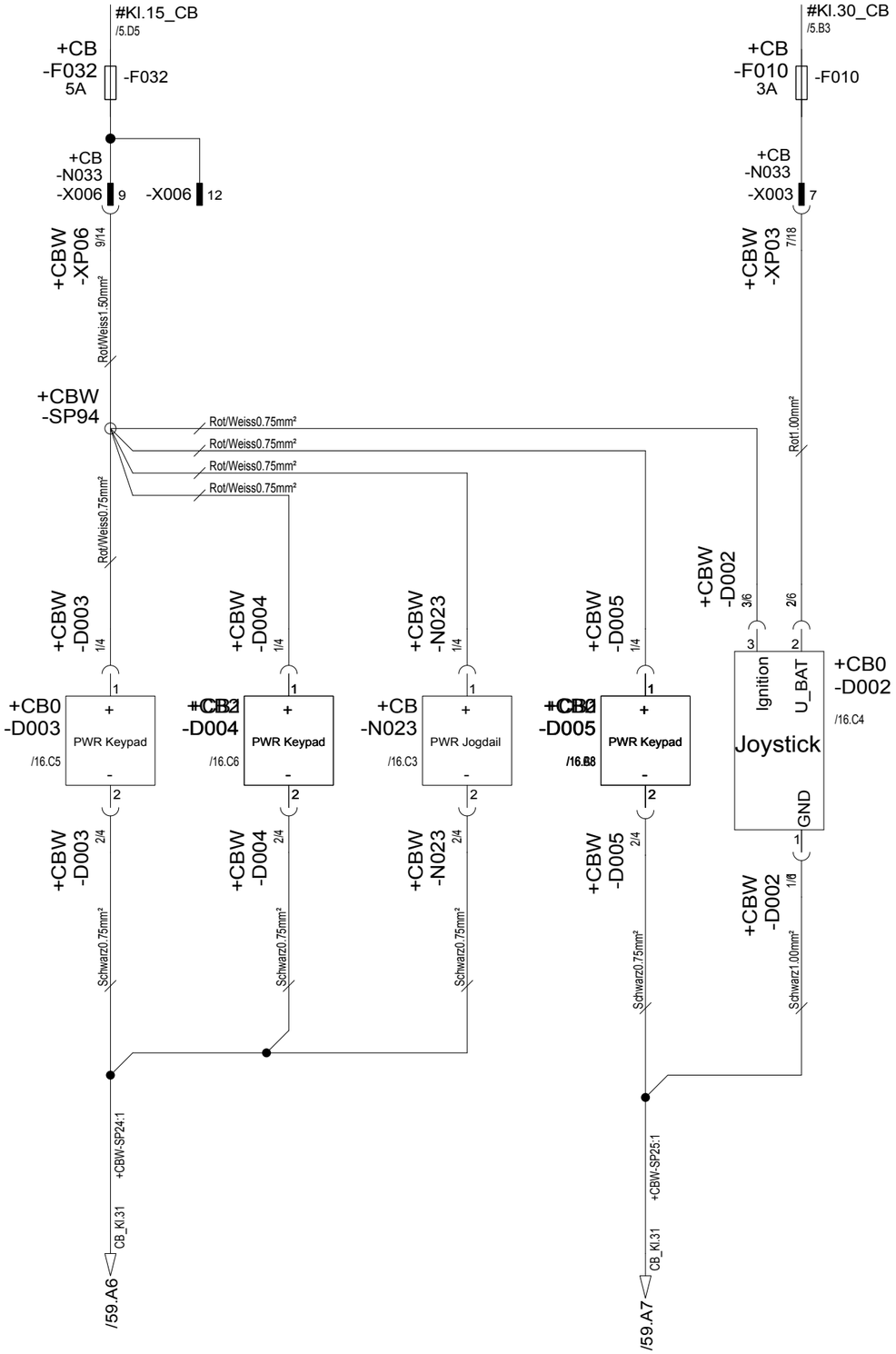
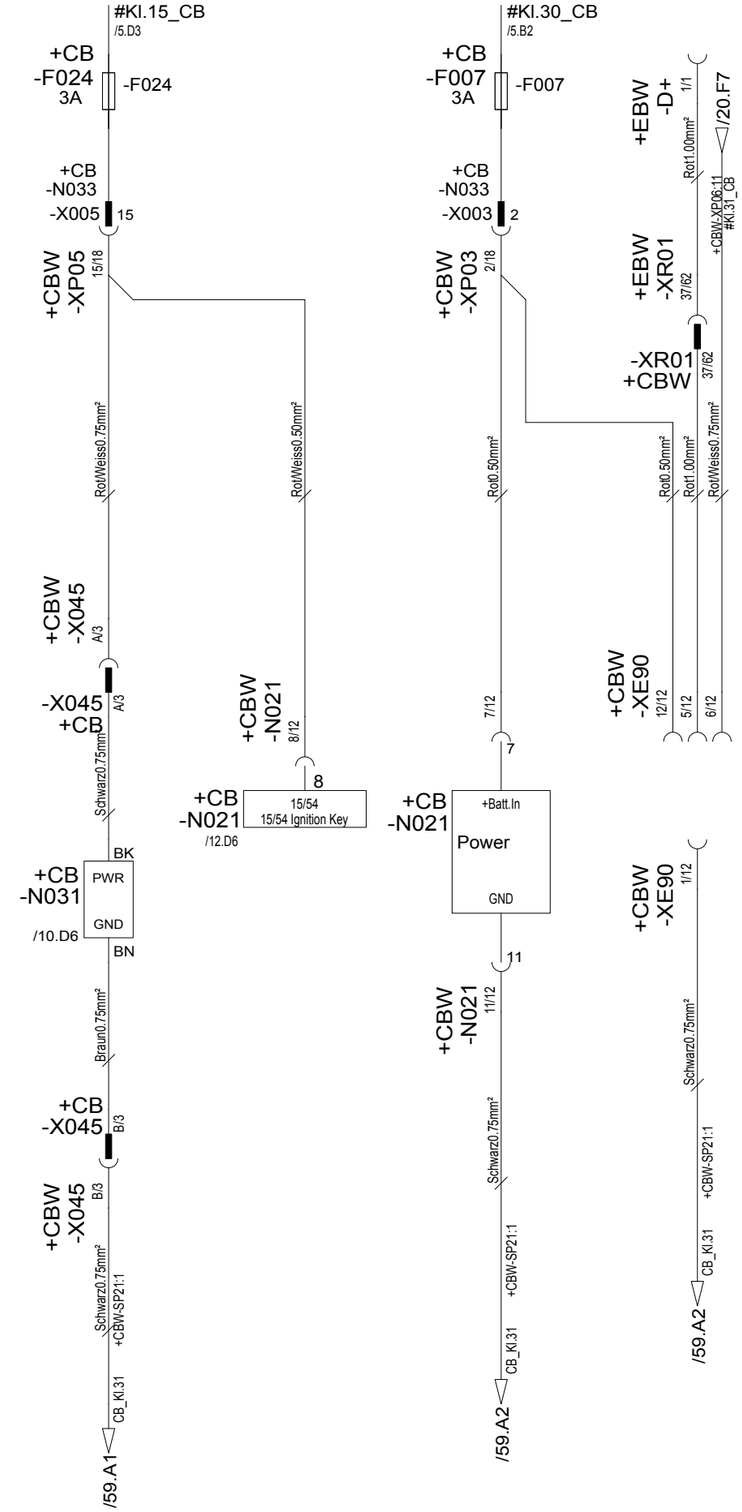
Safe load indicator OMD II

Mat.-Nr. 1000364531 Doc.-Nr. 2060093317

Revision	03
Ersetzt Version	02
Gewicht in [kg]	

A3





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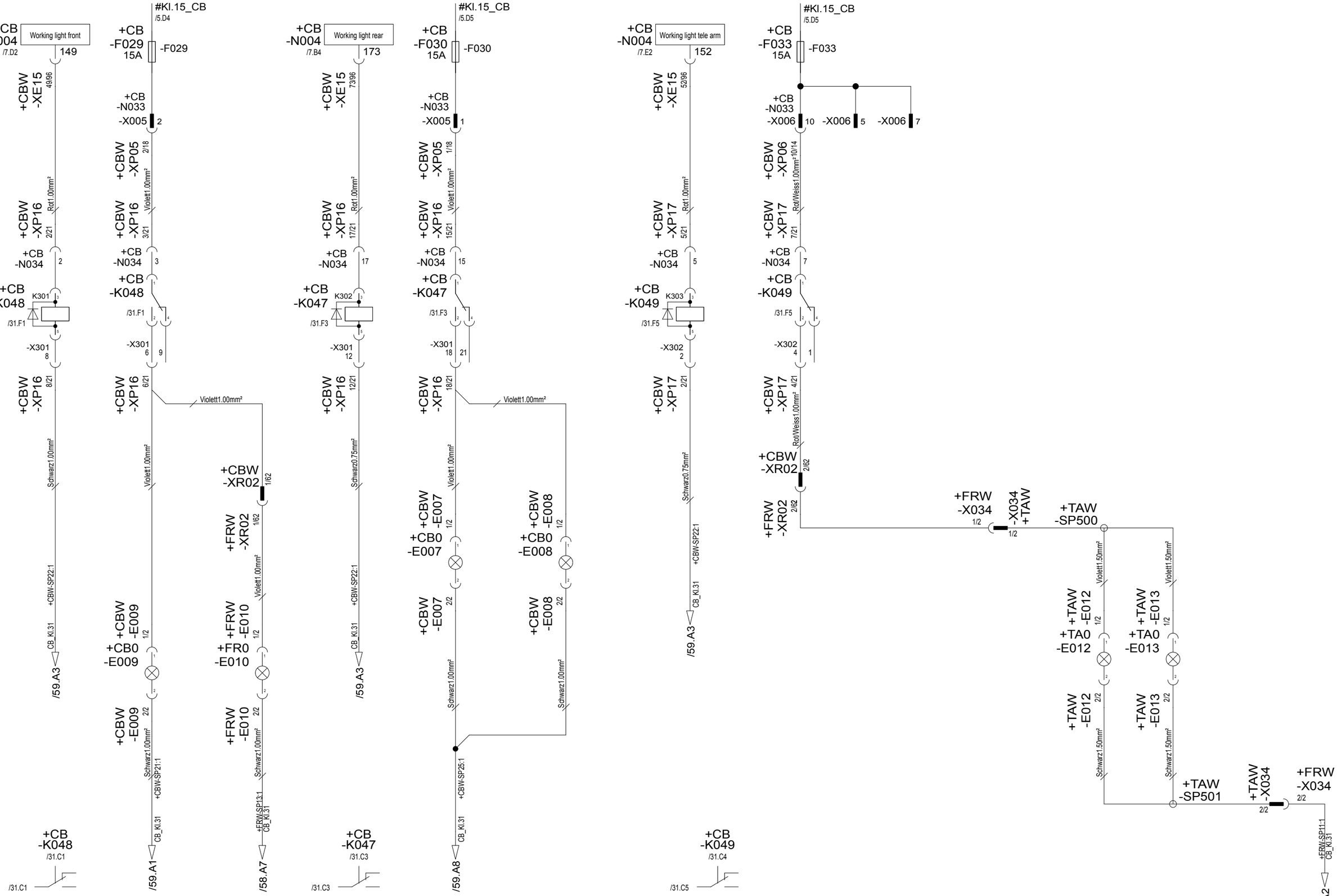
Supply Control valve

Mat.-Nr. 1000364531 Doc.-Nr. 2060093317

Revision	03
Ersetzt Version	02
Gewicht in [kg]	



1	2	3	4	5	6	7	8

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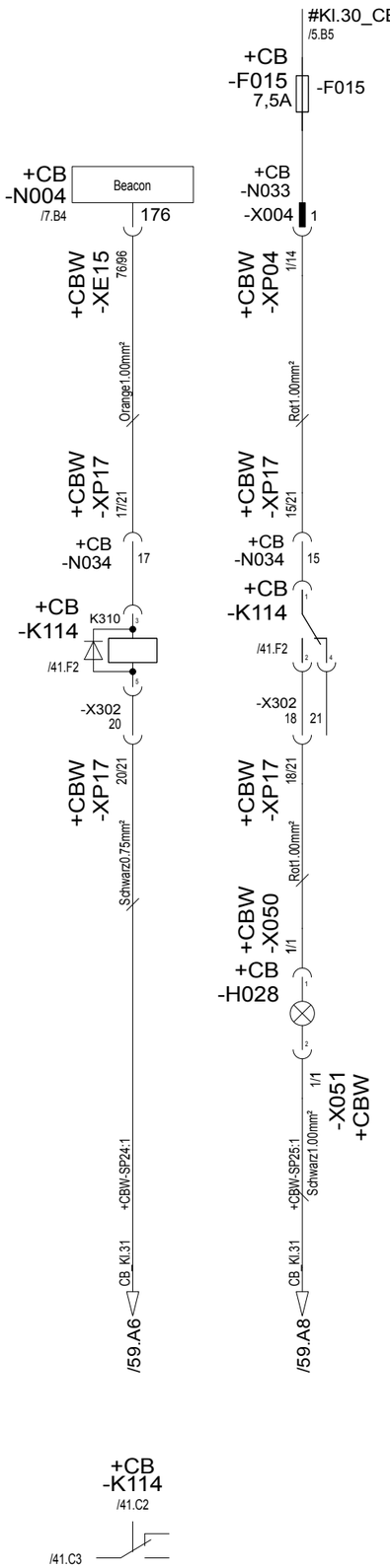
Working head lamps

Mat. -Nr. 1000364531

Doc. -Nr. 2060093317

Revision	03
Ersetzt Version	02
Gewicht in [kg]	



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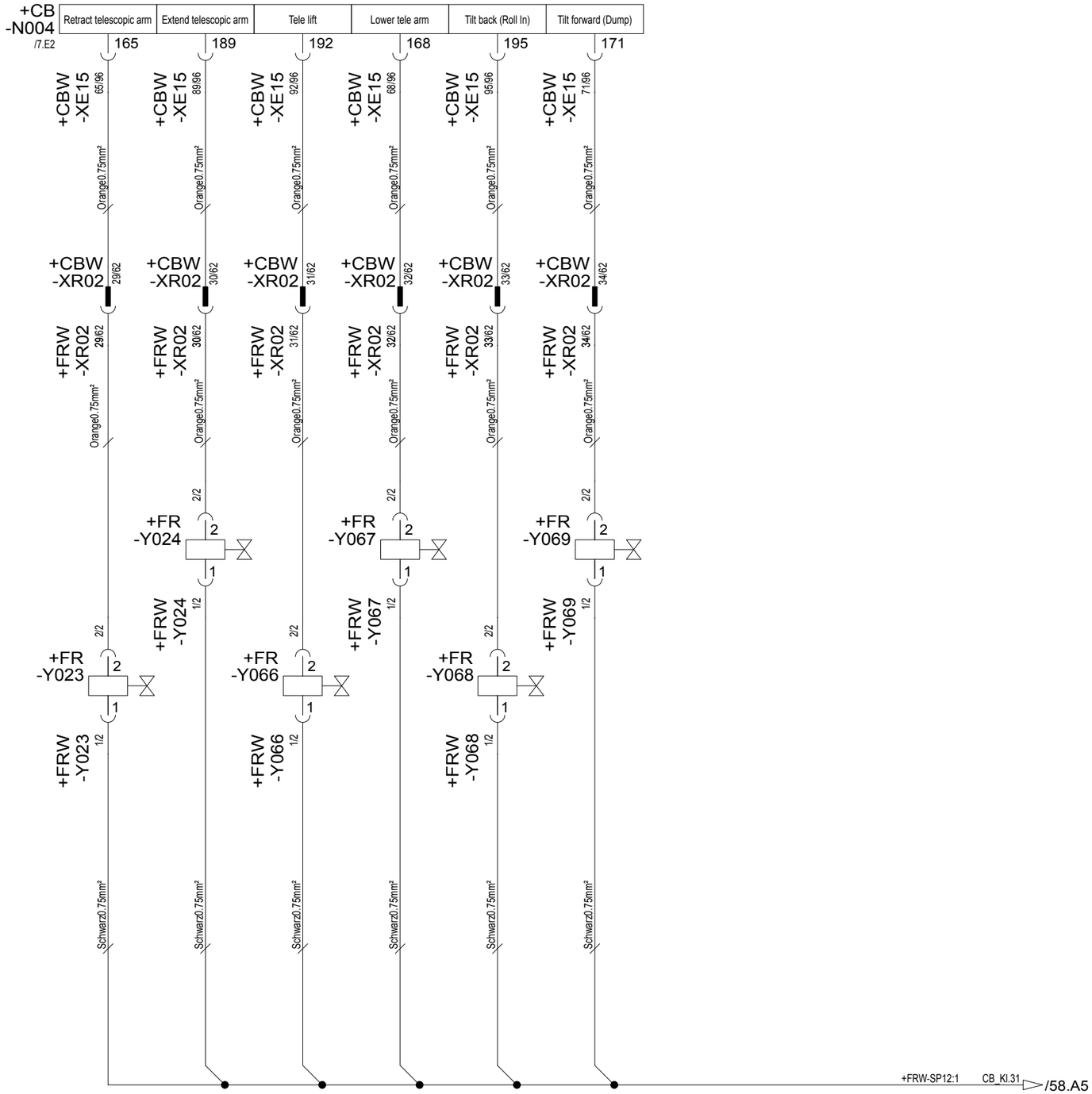
Reading station		

Rotating beacon

Mat.-Nr. 1000364531 Doc.-Nr. 2060093317

Revision	03
Ersetzt Version	02
Gewicht in [kg]	



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User		Inzschwn
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Reading station		

valve Telescopic boom

Mat.-Nr. 1000364531

Doc.-Nr. 2060093317

Revision	03
Ersetzt Version	02
Gewicht in [kg]	

A3

BMK	Ort	Position	Identifier_Text	SAP_ArticleNumber
-D002	+CBW	/21.D4	Plug connector Joystick	1000027431
-D003	+CB0	/21.D1	CAN Keypad 1	1000335104
-D003	+CBW	/21.C1	Plug connector CAN Keypad 1	1000104286
-D004	+CB1	/21.D2	CAN Keypad 2	1000335105
-D004	+CB2	/21.D2	CAN Keypad 2	1000335107
-D004	+CBW	/21.C2	Plug connector CAN Keypad 2	1000104286
-D005	+CB0	/21.D3	CAN Keypad 3.3	1000335110
-D005	+CB1	/21.D3	CAN Keypad 3.2	1000335109
-D005	+CB2	/21.D3	CAN Keypad 3.1	1000335108
-D005	+CBW	/21.C3	Plug connector CAN Keypad 3	1000104286
-D+	+EBW	/21.A7	Dynamo positive	1000050024
-E007	+CB0	/31.D3	Rear working light left	1000270919
-E007	+CBW	/31.D3	Plug connector Rear working light left	1000270365
-E008	+CB0	/31.D4	Rear working light right	1000270919
-E008	+CBW	/31.D4	Plug connector Rear working light right	1000270365
-E009	+CB0	/31.D1	Front working light left	1000270919
-E009	+CBW	/31.D1	Plug connector Front working light left	1000270365
-E010	+FR0	/31.D2	Front working light right	1000270919
-E010	+FRW	/31.D2	Plug connector Front working light right	1000270365
-E012	+TA0	/31.D7	Working head lamps Telescopic boom	1000270919
-E012	+TAW	/31.D7	Plug connector Working head lamps Telescopic boom	1000270365
-E013	+TA0	/31.D7	Working head lamps Telescopic boom	1000270919
-E013	+TAW	/31.D7	Plug connector Working head lamps Telescopic boom	1000270365
-E014	+CB	/30.C1	Interior light	1000051952
-E015	+CB	/46.D3	12 V power outlet	1000187512
-E015	+CBW	/46.C3	Plug connector 12 V power outlet	1000095323
-E016	+CB	/30.C2	License plate	1000283787
-E016	+CBW	/30.C2	Plug connector License plate	1000104286
-E016.1	+CB	/30.C2	License plate	1000283787
-F001	+N025	/35.A5	fuse 100A	1000191490
-F002	+N025	/35.A6	fuse 100A	1000191490

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Betriebsmittelverzeichnis
-

Mat.-Nr. 1000364531 Doc.-Nr. 2060093317

Revision
Ersetzt Version
Gewicht in [kg]

A3

BMK	Ort	Position	Identifier_Text	SAP_ArticleNumber
-SP103	+CBW	/55.D3	Splice	
-SP104	+CBW	/49.D7	Splice	
-SP105	+CBW	/49.D7	Splice	
-SP107	+CBW	/49.B7	Splice	
-SP108	+CBW	/49.B7	Splice	
-SP109	+CBW	/16.D3	Splice	
-SP110	+CBW	/16.D3	Splice	
-SP111	+CBW	/15.C3	Splice	
-SP112	+CBW	/15.C3	Splice	
-SP113	+CBW	/28.E3	Splice	
-SP114	+CBW	/23.D4	Splice	
-SP115	+CBW	/13.D2	Splice	
-SP203	+EBW	/27.D4	Splice	
-SP205	+EBW	/35.C6	Splice	
-SP208	+EBW	/35.A3	Splice	
-SP209	+EBW	/20.A2	Splice	
-SP211	+EBW	/27.D1	Splice	
-SP215	+EBW	/17.C2	Splice	
-SP216	+EBW	/17.C2	Splice	
-SP217	+EBW	/20.B4	Splice	
-SP220	+EBW	/17.C4	Splice	
-SP221	+EBW	/17.D4	Splice	
-SP222	+EBW	/27.B3	Splice	
-SP223	+EBW	/24.C2	Splice	
-SP500	+BHW	/50.C6	Splice	
-SP500	+TAW	/31.D7	Splice	
-SP501	+BHW	/50.D6	Splice	
-SP501	+TAW	/31.E7	Splice	
-V001	+EBW	/35.D3	Diode	1000308919
-V002	+EBW	/25.C3	Diode	1000336503
-X001	+CBW	/15.E3	diagnostics- connector	1000312071

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	date	name
User		Inzkraum
Proved		
Reading station		

Betriebsmittelverzeichnis
-

Mat.-Nr. 1000364531 | Doc.-Nr. 2060093317

Revision | Ersetzt Version | Gewicht in [kg] | A3

SheetName	SheetName 1	SheetName 2
30	illumination	
31	Working head lamps	
32	Indicating instrument	
33	Radio	
34	Safe load indicator system	
35	Electrical power supply	
36	PTO shaft	
37	Quickhitch facility	
38	Pressure relief	
39	Reversing light	
40	Load stabiliser	
41	Rotating beacon	
42	Horn and Light warning buzzer	
43	Differential lock	
44	Front power outlet 14-Pin	
45	Front power outlet 7-Pin	
46	Power outlet 12 V power outlet	
47	Steering mode switch	
48	switch illumination	
49	Travelling drive	
50	Sensor Telescopic boom	
51	valve Telescopic boom	
52	Rear three-point power lift	
53	Autohitch trailer coupling	
54	Trailer brake	
55	Turn indicator system	
56	Wiper system	
57	Earth Splice EBW	
58	Earth Splice FRW	
59	Earth Splice CBW	
BMK_01	Betriebsmittelverzeichnis	-

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Blattverzeichnis
-

Mat.-Nr. 1000364531 Doc.-Nr. 2060093317

Revision
Ersetzt Version
Gewicht in [kg]

+CB -N031		Camera Switch Box M9100167	
PIN		DESCRIPTION	Ref-PAGE
1		Switch Box	/14.C4
2			
3			
4			
BK		PWR	/21.D5
BN		GND	
GNYE		Trigger 1	
GY		Trigger 2	/39.C6
BU		Trigger 3	

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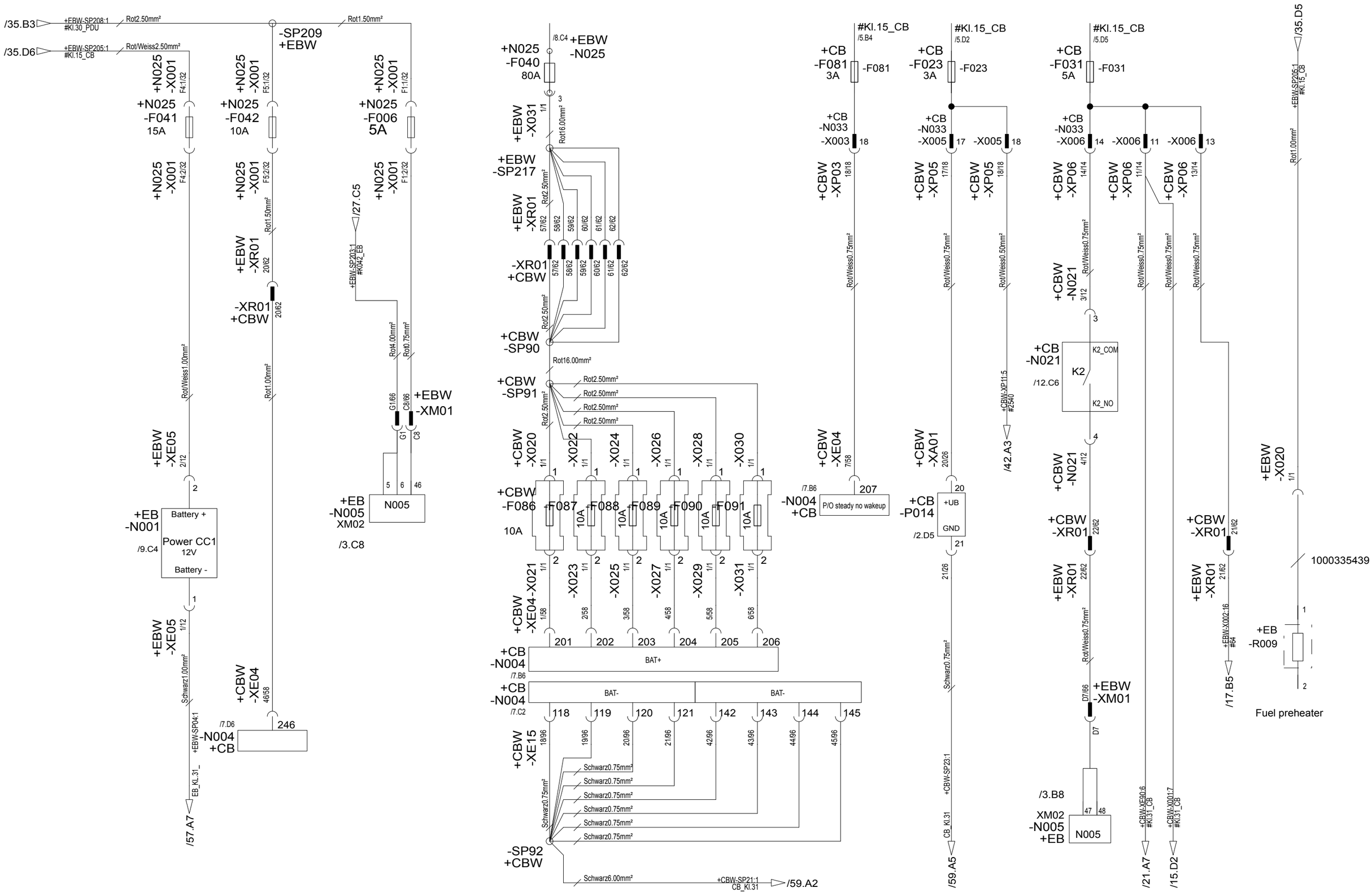
Reading station		

Camera

Mat.-Nr. 1000364531 Doc.-Nr. 2060093317

Revision	03
Ersetzt Version	02
Gewicht in [kg]	



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	date	name
User		Inzschwn
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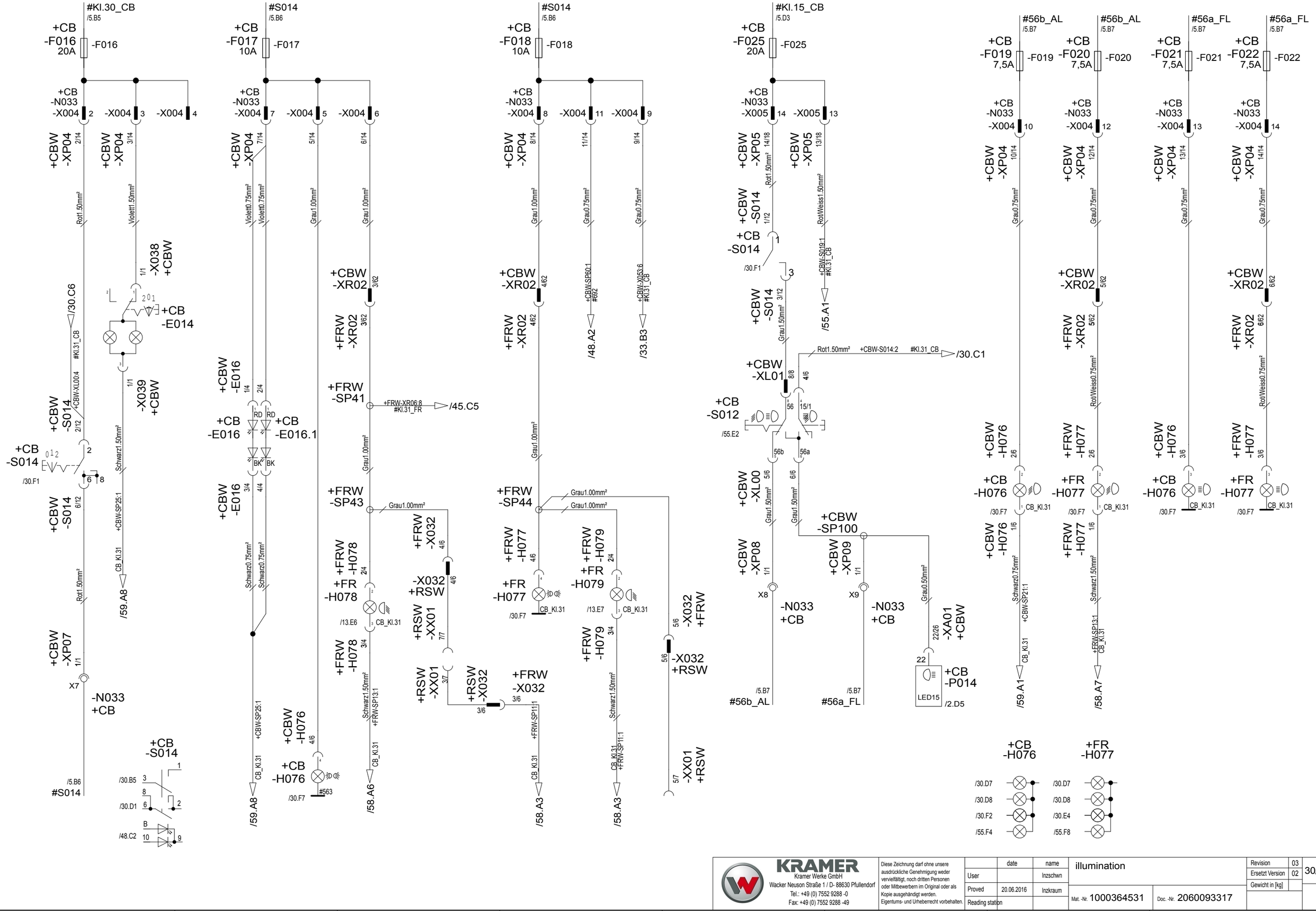
Supply Control valve

Mat.-Nr. 1000364531

Doc.-Nr. 2060093317

Revision	03
Ersetzt Version	02
Gewicht in [kg]	



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	date	name
User		Inzschwn
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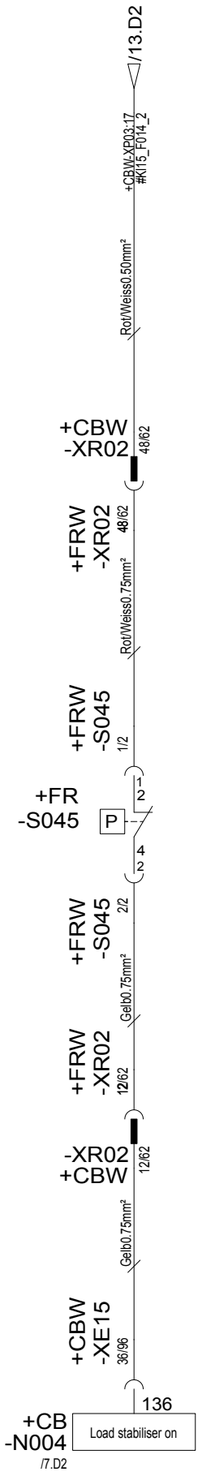
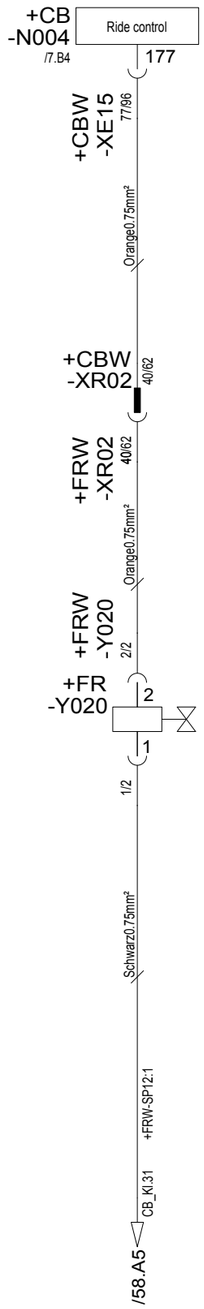
Reading station		

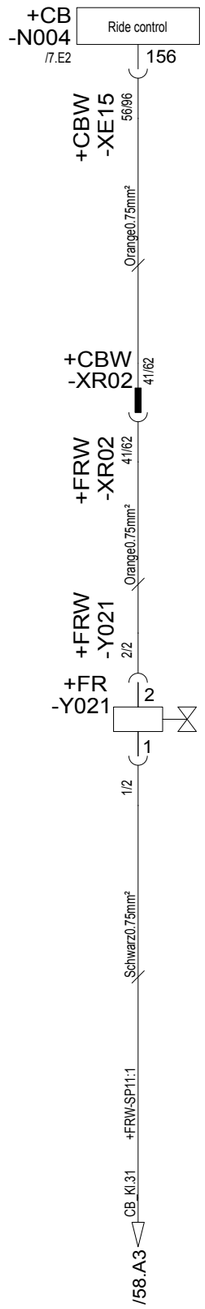
illumination

Mat. -Nr. 1000364531 Doc. -Nr. 2060093317

Revision	03
Ersetzt Version	02
Gewicht in [kg]	





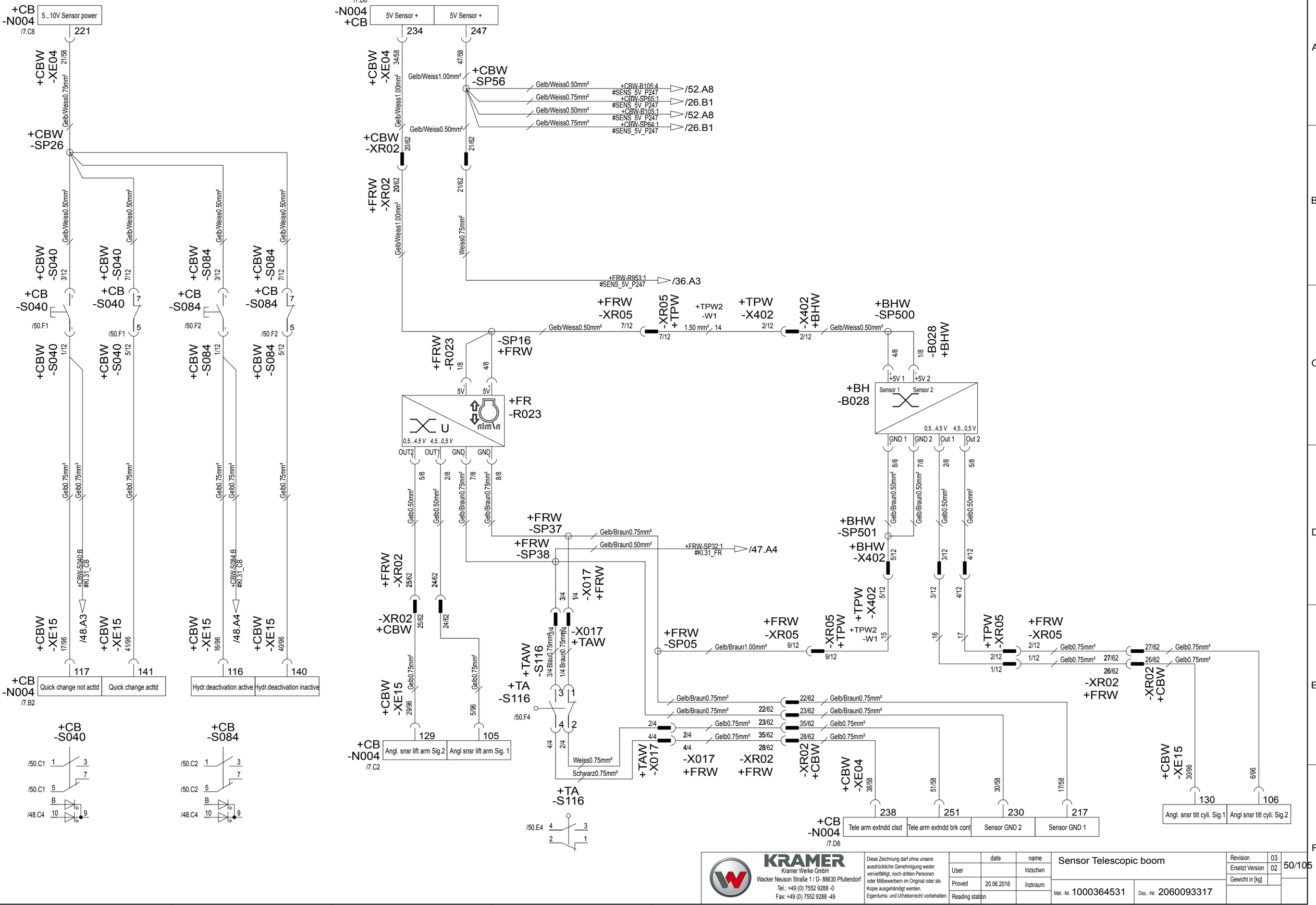


	date	name
User		Inzschwn
Proved	20.06.2016	Inzkraum
Reading station		

Load stabiliser

Revision	03
Ersetzt Version	02
Gewicht in [kg]	

Mat.-Nr. 1000364531 Doc.-Nr. 2060093317



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		User		Inzschwn		Ersetzt Version 02
		Proved	20.06.2016	Inzkraum		Gewicht in [kg]
		Reading station			Mat.-Nr. 1000364531 Doc.-Nr. 2060093317	50/105

BMK	Ort	Position	Identifier_Text	SAP_ArticleNumber
-A001	+CB	/33.C3	Radio	1000263879
B018	+CB	/5.D2	Main board (fuses & relays)	1000335043
-B001	+FR	/32.D2	Fuel gauge	1000243559
-B001	+FRW	/32.D2	Plug connector Fuel gauge	1000027438
-B002	+FR	/42.D3	Horn	1000269368
-B002	+FRW	/42.D3	Plug connector Horn	1000027438
-B003	+FR	/39.E5	Reversing warning system	1000027045
-B003	+FRW	/39.D5	Plug connector Reversing warning system	1000000464
-B008	+FR	/34.C1	Load sensor – strain gage	1000317698
-B008	+FRW	/34.D1	Plug connector Load sensor – strain gage	1000027429
-B009	+EB	/49.B3	Engine speed sensor Hydraulic motor	1000305506
-B009	+EBW	/49.D4	Plug connector Engine speed sensor Hydraulic motor	1000183226
-B011	+CB	/33.E2	speaker	1000029659
-B012	+CB	/33.E3	speaker	1000029659
-B015	+EBW	/24.D3	Plug connector Coolant level sensor	1000027429
-B015	+EN	/24.D3	Coolant level sensor	1000189283
-B016	+EBW	/24.C6	Plug connector Temperature sensor Hydraulic oil	1000027332
-B016	+EN	/24.D6	Temperature sensor Hydraulic oil Radiator fan	1000336644
-B018	+CB	/42.E4	Buzzer	1000322070
-B028	+BH	/50.D6	Angle transmitter Tilt cylinder	1000300036
-B028	+BHW	/50.C6	Plug connector Angle transmitter Tilt cylinder	1000262118
-B086	+FR	/14.B4	Rear camera	1000315902
-B087	+FR	/14.B5	Front camera	1000310478
-B102	+FR	/52.C4	Rear three-point linkage load pressure sensor	1000282161
-B102	+FRW	/52.D4	Plug connector Rear three-point linkage load pressure sensor	1000277498
-B104	+FR	/36.C2	Engine speed sensor PTO shaft CAN	1000335339
-B104	+FRW	/36.C2	Plug connector Engine speed sensor PTO shaft	1000337881
-B104.1	+FRW	/36.C2	Pin housing Engine speed sensor PTO shaft	1000085023
-B105	+CB	/52.C8	Potentiometer Three-point Rear linkage	1000335340
-B105	+CBW	/52.B8	Plug connector Potentiometer Rear linkage	1000238088
-D002	+CB0	/21.D4	Joystick with Control electronics	1000349290

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User		Inzkraum
Proved		
Reading station		

Betriebsmittelverzeichnis
-

Mat.-Nr. 1000364531 Doc.-Nr. 2060093317

Revision
Ersetzt Version
Gewicht in [kg]

BMK_01/105

A3

BMK	Ort	Position	Identifier_Text	SAP_ArticleNumber
-SP38	+FRW	/50.D4	Splice	
-SP40	+FRW	/13.D6	Splice	
-SP41	+FRW	/30.C3	Splice	
-SP43	+FRW	/30.D3	Splice	
-SP44	+FRW	/30.D4	Splice	
-SP46	+BHW	/37.D7	Splice	
-SP46	+FRW	/52.D6	Splice	
-SP56	+CBW	/50.A3	Splice	
-SP60	+CBW	/48.B2	Splice	
-SP62	+CBW	/24.E6	Splice	
-SP63	+CBW	/23.B4	Splice	
-SP64	+CBW	/26.B2	Splice	
-SP65	+CBW	/26.B2	Splice	
-SP66	+CBW	/26.D4	Splice	
-SP67	+CBW	/26.D4	Splice	
-SP68	+CBW	/28.D1	Splice	
-SP69	+CBW	/27.A7	Splice	
-SP70	+CBW	/27.B7	Splice	
-SP73	+CBW	/56.D2	Splice	
-SP75	+CBW	/56.D6	Splice	
-SP76	+FRW	/55.D7	Splice	
-SP77	+FRW	/55.D5	Splice	
-SP81	+CBW	/45.C2	Splice	
-SP90	+CBW	/20.C4	Splice	
-SP91	+CBW	/20.C4	Splice	
-SP92	+CBW	/20.F4	Splice	
-SP94	+CBW	/21.B1	Splice	
-SP97	+CBW	/23.D5	Splice	
-SP100	+CBW	/30.D6	Splice	
-SP102	+CBW	/55.D2	Splice	
-SP103	+CBW	/55.D3	Splice	

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	date	name
User		Inzkraum
Proved		
Reading station		

Betriebsmittelverzeichnis
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Mat.-Nr. 1000364531 Doc.-Nr. 2060093317

Revision
Ersetzt Version
Gewicht in [kg]

A3

SheetName	SheetName 1	SheetName 2
Inh_01	Blattverzeichnis	-
Inh_02	Blattverzeichnis	-
Inh_03	Blattverzeichnis	-
2	Display	
3	ECU connector	
4	Diesel engine	
5	main fuses circuit board	
6	relay circuit board	
7	MVCU TTC580	
8	Main distribution	
9	Travelling drive	
10	Camera	
11	Safe load indicator OMD II	
12	Immobiliser	
13	brake and Brake lights	
14	Camera	
15	CAN0 and diagnostics Cabin	
16	CAN1 and diagnostics Cabin	
17	CAN and diagnostics Motor	
18	CAN and diagnostics Chassis	
19	Central lubrication system	
20	Supply Control valve	
21	Supply Control valve	
22	Diesel particulate filter external	
23	Operator seat	
24	Diesel engine Cooling	
25	Diesel engine parts	
26	Diesel engine RPM throttle	
27	Diesel engine Start	
28	heating and Air conditioning	
29	Window heating	

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	date	name
User		Inzkraum
Proved		
Reading station		

Blattverzeichnis
-

Mat.-Nr. 1000364531 Doc.-Nr. 2060093317

Revision	
Ersetzt Version	Inh_01/105
Gewicht in [kg]	

A3

+EB -N001		Steuerung H1 Pumpe		
PIN	CON.	SIGNAL	DESCRIPTION	Ref-PAGE
1	CC1	PWR	Battery -	/20.D1
2	CC1		Battery +	
3	CC1		Sensor +	/49.C6
4	CC1		Sensor -	/49.D6
8	CC1		Sensor +	/49.A3
9	CC1		Sensor -	/49.E3
5	CC1	IN	Mtr RPM In (Frequency)	/49.E5
6	CC1	IN	Frwrd In (Digital)	
7	CC1	IN	Rvrs In (Digital)	
10	CC1	IN	Drv Pdl In (Analog-Norm)	/49.D6
11	CC1	IN		
12	CC1	IN	Ntrl In (Digital)	
11	CC2	IN	Md Swtch A In (Digital)	
2	CC2	IN	Md Swtch B In (Digital-Norm)	
12	CC2	IN		
7	CC2	IN	Inch In (Analog-Norm)	/49.B6
1	CC2	IN		
4	CC2	IN	Mtr Drctn In (Analog)	/49.E4
3	CC2	OUT	PROP/PCOR Out (PWM)	/49.A2
8	CC2	OUT	Mtr BPD Out (Digital)	/49.A2
9	CC2	OUT	Dgtl Out B2 -	/13.E5
10	CC2	OUT	Dgtl Out B1 +	
5	CC2		Sensor +	/49.A6
6	CC2		Sensor -	/49.B6

+EB -N001		Steuerung H1 Pumpe		
PIN	CON.	SIGNAL	DESCRIPTION	Ref-PAGE
1	CAN		High	/17.E2
2	CAN		Low	
3	CAN		Shield	
1	PPC			
2	PPC	IN		
3	PPC			
4	PPC			
5	PPC	IN		
6	PPC			
1	PPU		Sensor +	/49.A1
2	PPU	IN	Pmp RPM In (Frequency)	
3	PPU		Sensor -	
1	PSC		PWM C1 +	/49.C1
6	PSC		PWM C1 -	
2	PSC		PWM C2 +	/49.E1
5	PSC		PWM C2 -	
3	PSC	OUT	Digital Output A1 +	/39.A4
4	PSC	OUT	Digital Output A2 -	
1	CC3			
2	CC3			

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User		Inzschwn
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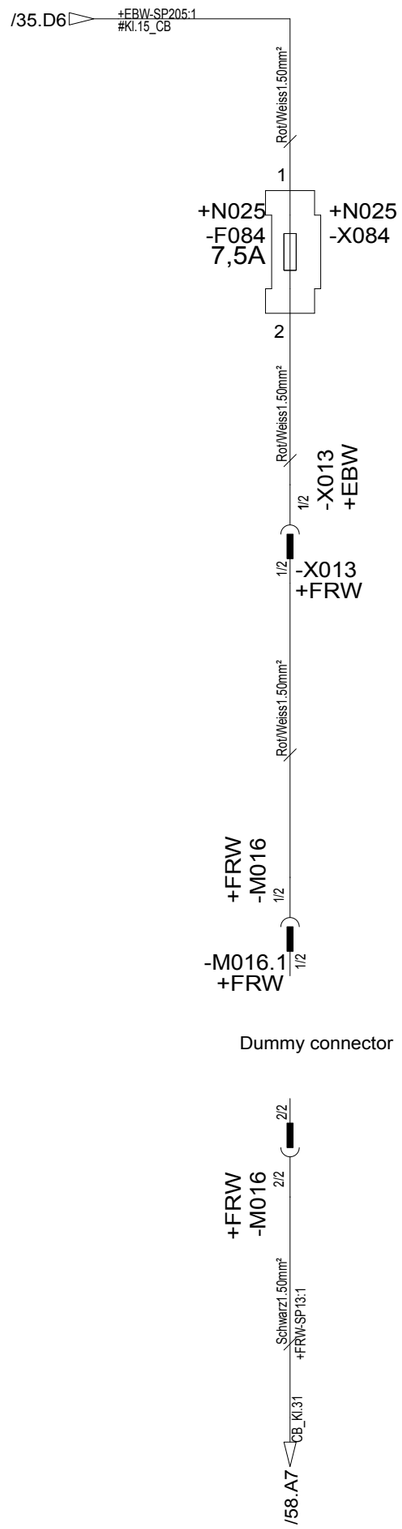
Reading station		

Travelling drive

Mat. -Nr. 1000364531 Doc. -Nr. 2060093317

Revision	03
Ersetzt Version	02
Gewicht in [kg]	



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	date	name
User		Inzstuea1
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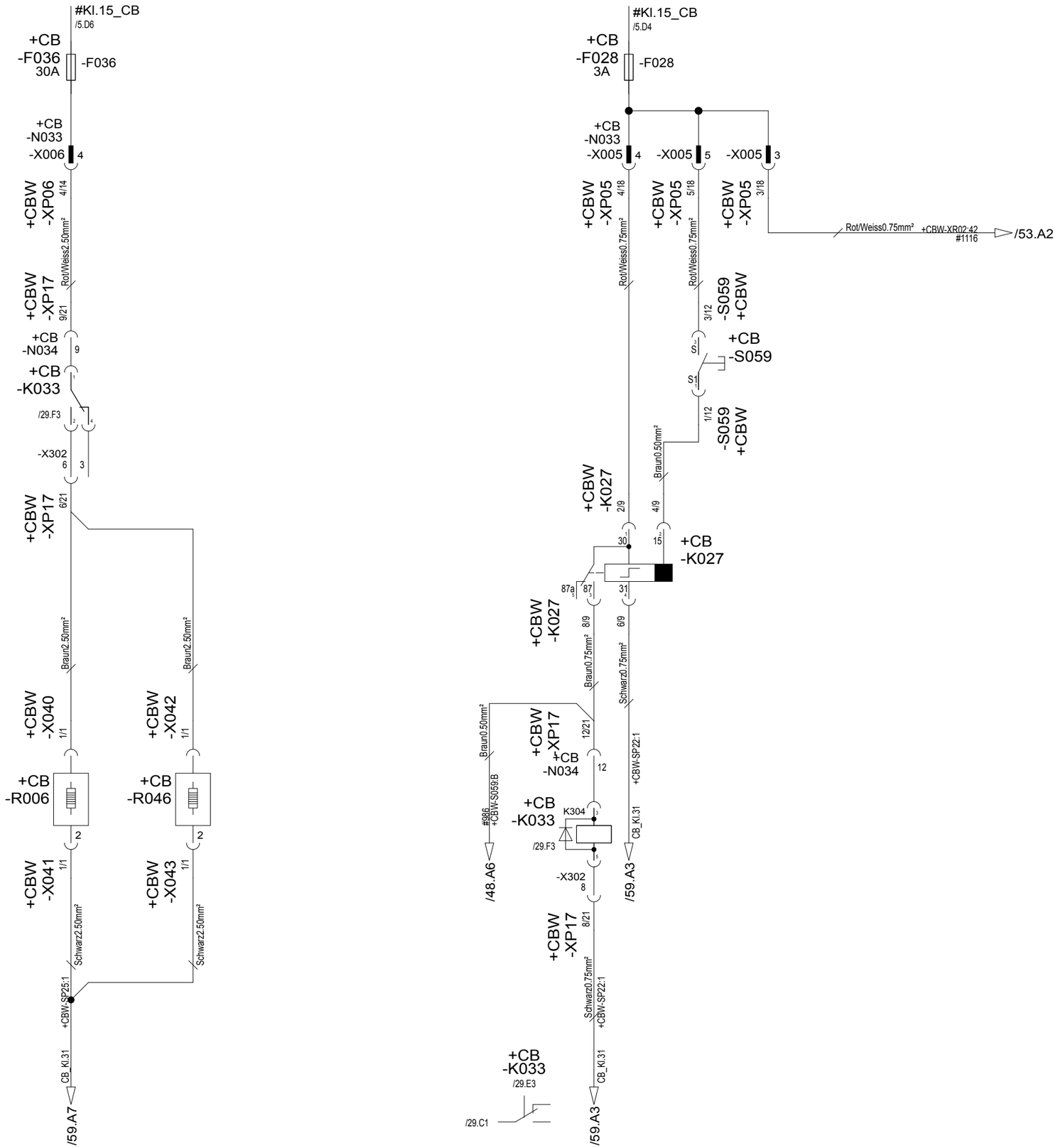
Reading station		

Central lubrication system

Mat.-Nr. 1000364531 Doc.-Nr. 2060093317

Revision	03
Ersetzt Version	02
Gewicht in [kg]	



1	2	3	4	5	6	7	8

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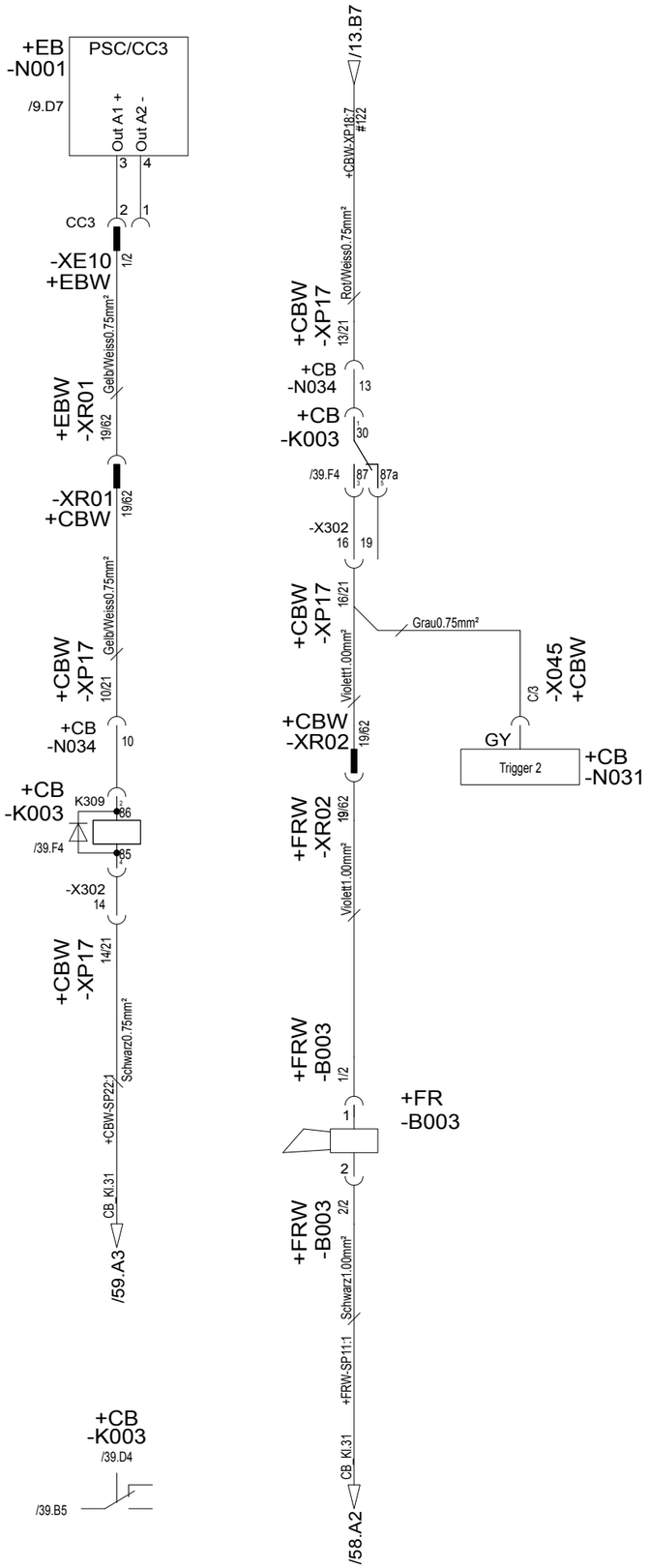
User		Inzschwn
Proved	20.06.2016	Inzkraum
Reading station		

Window heating

Mat.-Nr. 1000364531

Doc.-Nr. 2060093317

Revision	03
Ersetzt Version	02
Gewicht in [kg]	



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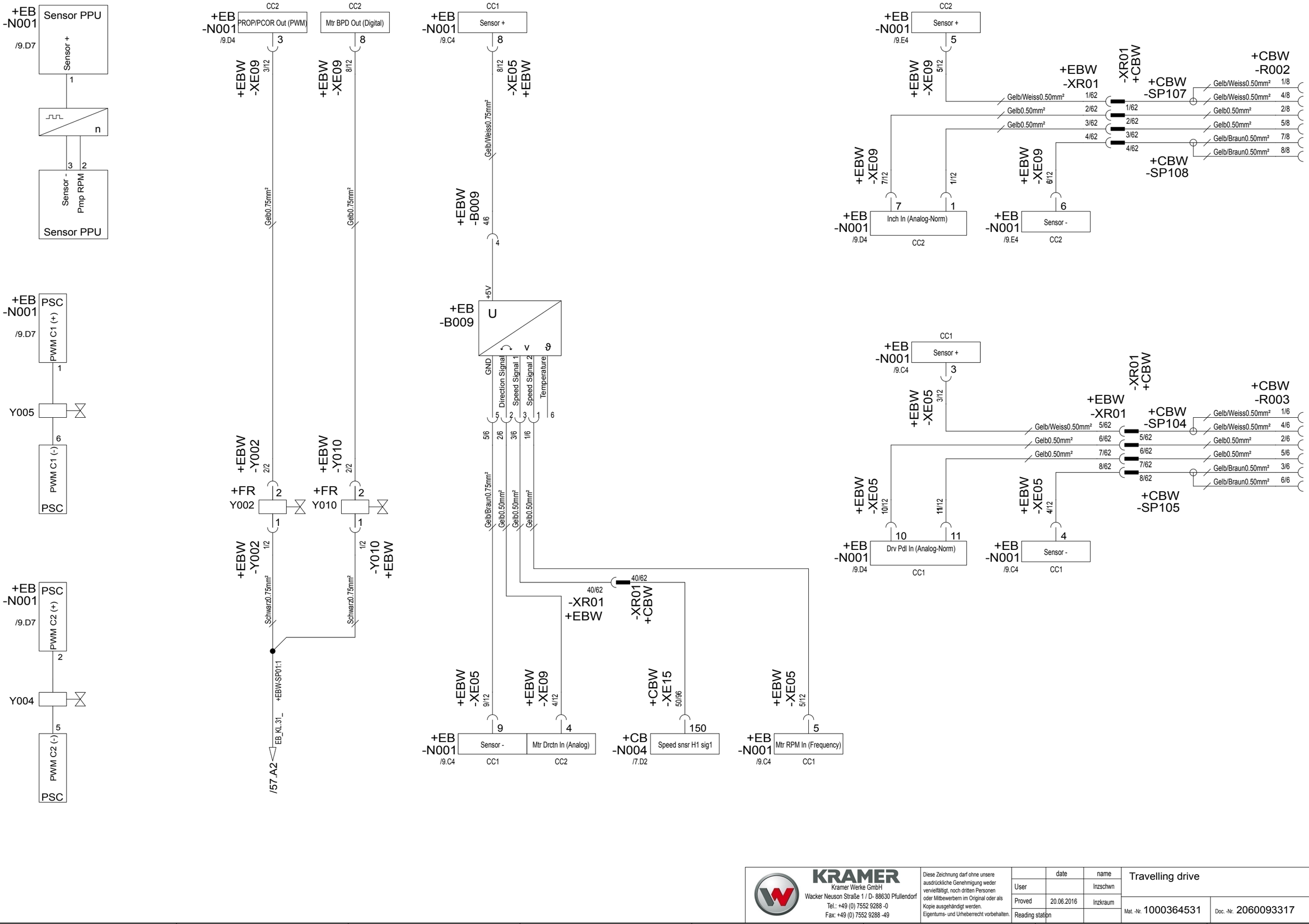
	date	name
User		
Proved	20.06.2016	Inzkraum
Reading station		

Reversing light

Mat.-Nr. 1000364531 Doc.-Nr. 2060093317

Revision	03
Ersetzt Version	02
Gewicht in [kg]	



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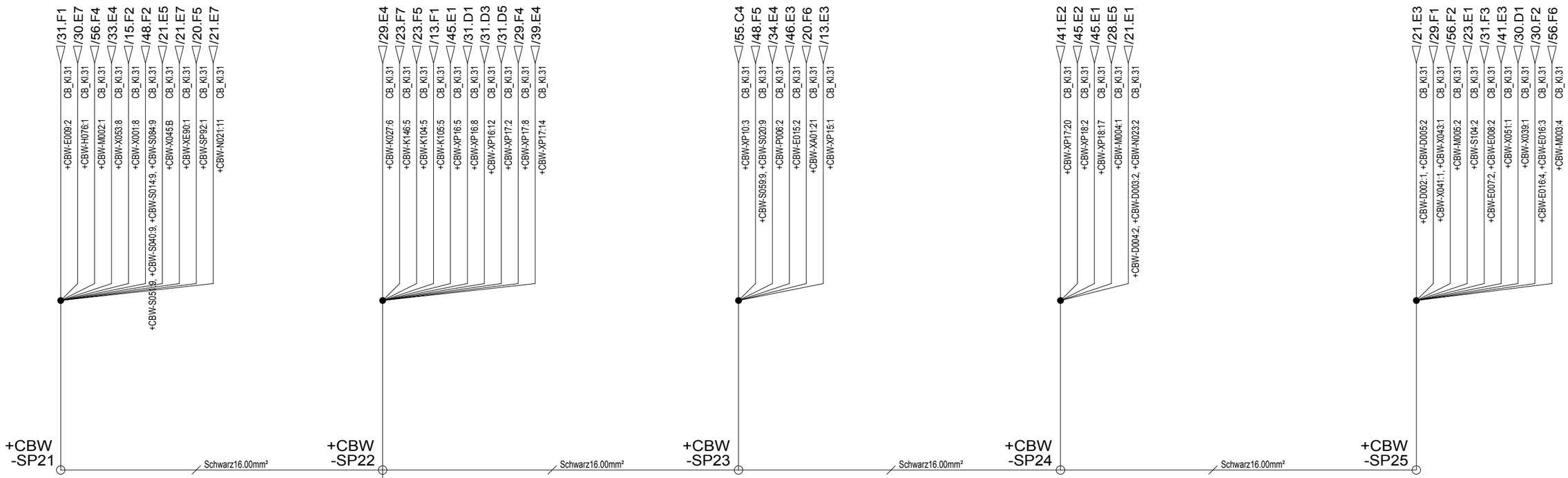
	date	name
User		Inzschwn
Proved	20.06.2016	Inzkraum
Reading station		

Travelling drive

Mat.-Nr. 1000364531

Doc.-Nr. 2060093317

Revision	03
Ersetzt Version	02
Gewicht in [kg]	



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User		Inzkraum
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Reading station		

Earth Splice CBW

Mat.-Nr. 1000364531 Doc.-Nr. 2060093317

Revision	03
Ersetzt Version	02
Gewicht in [kg]	

A3

BMK	Ort	Position	Identifier_Text	SAP_ArticleNumber
-S175	+FRW	/36.B3	Plug connector Rear button PTO shaft	1000051989
-S175.2	+FRW	/36.B3		1000265293
-SP01	+EBW	/57.C2	Splice	
-SP01	+N032	/44.C3	Splice	
-SP02	+EBW	/57.C4	Splice	
-SP02	+N032	/44.B3	Splice	
-SP03	+EBW	/57.C5	Splice	
-SP03	+N032	/44.B6	Splice	
-SP04	+EBW	/57.C7	Splice	
-SP04	+N032	/44.C2	Splice	
-SP05	+FRW	/50.E5	Splice	
-SP05	+N032	/44.E2	Splice	
-SP06	+FRW	/53.B2	Splice	
-SP07	+FRW	/52.B4	Splice	
-SP08	+FRW	/52.B5	Splice	
-SP09	+FRW	/52.D5	Splice	
-SP10	+FRW	/52.B6	Splice	
-SP11	+FRW	/58.C2	Splice	
-SP12	+FRW	/58.C4	Splice	
-SP13	+FRW	/58.C6	Splice	
-SP16	+FRW	/50.C3	Splice	
-SP21	+CBW	/59.C1	Splice	
-SP22	+CBW	/59.C3	Splice	
-SP22	+FRW	/18.D3	Splice	
-SP23	+CBW	/59.C4	Splice	
-SP23	+FRW	/18.D3	Splice	
-SP24	+CBW	/59.C6	Splice	
-SP25	+CBW	/59.C7	Splice	
-SP26	+CBW	/50.B1		
-SP32	+FRW	/47.B4	Splice	
-SP33	+FRW	/47.D4	Splice	

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	date	name
User		Inzkraum
Proved		
Reading station		

Betriebsmittelverzeichnis
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Mat.-Nr. 1000364531 Doc.-Nr. 2060093317

Revision
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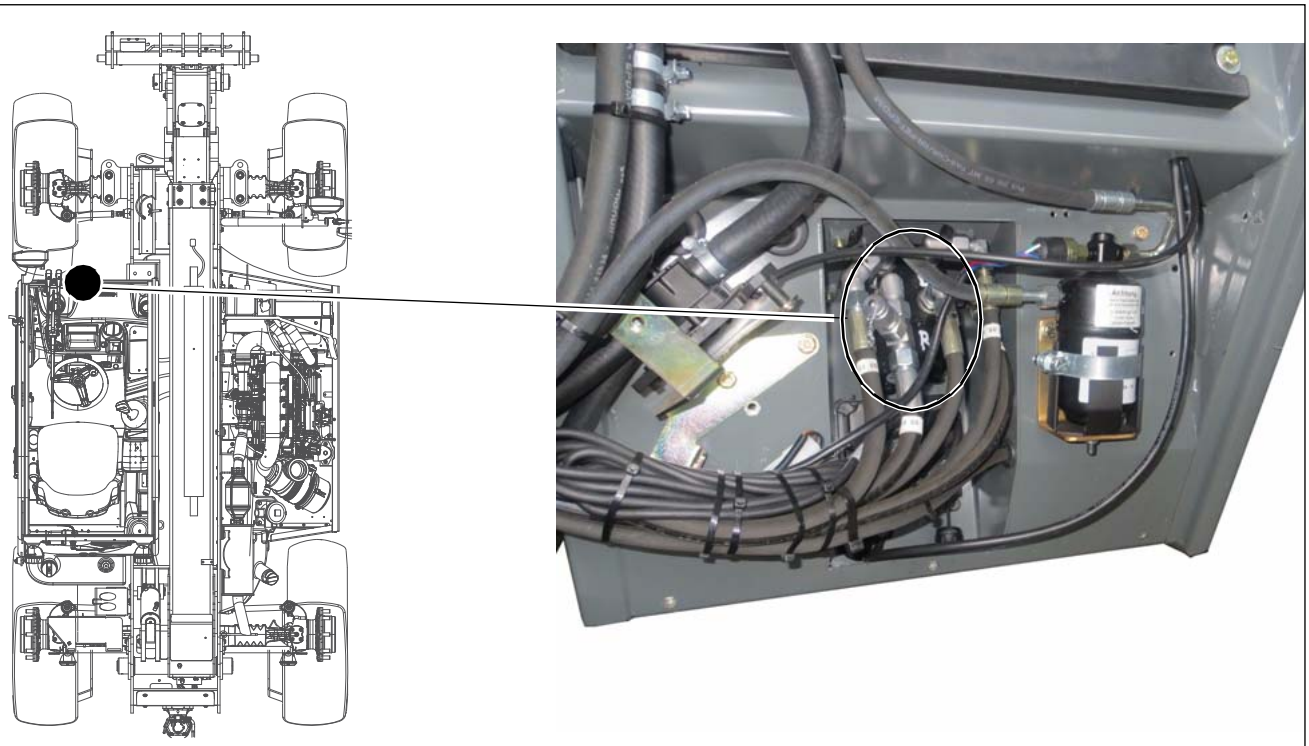
Gewicht in [kg]
A3

15 Heating/air conditioning

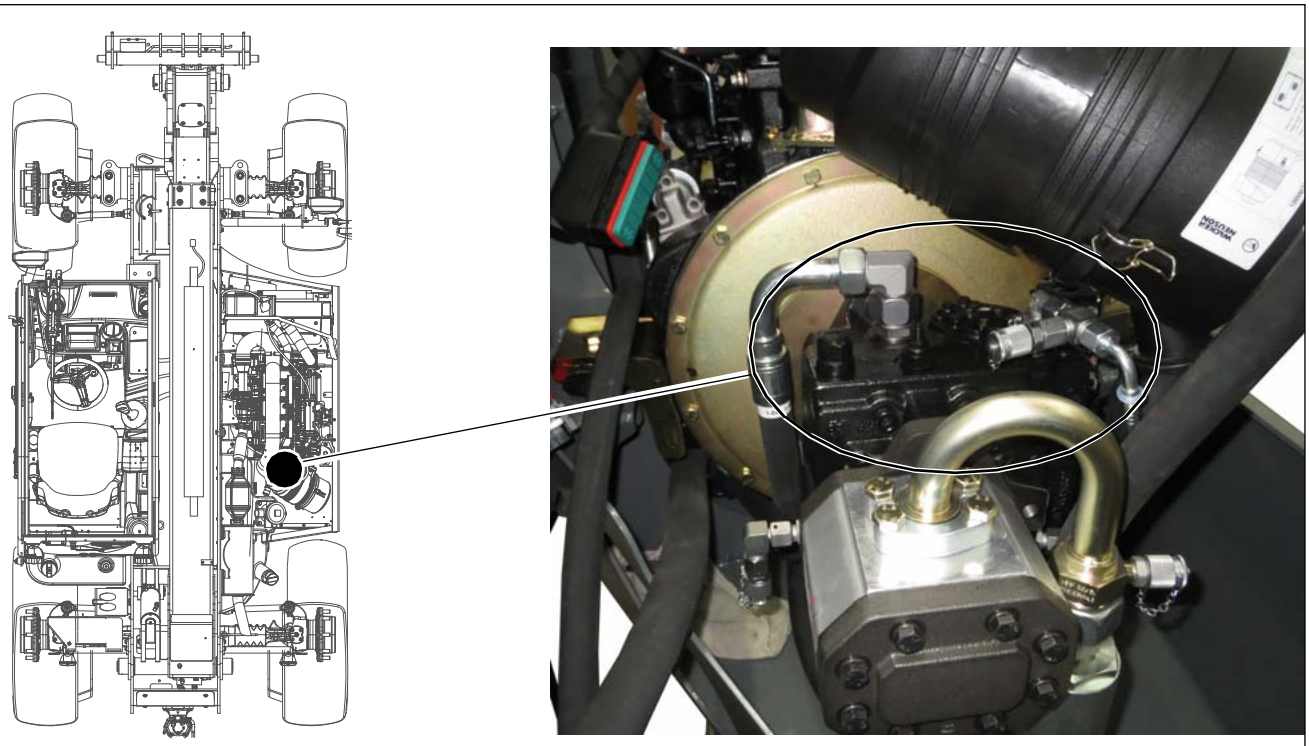
EID	Designation
B025	Crankshaft speed
B026	Telescopic boom sensor (extended, rear)
B027	Boom sensor (extended, centre)
B028	Position pickup for bucket repositioning
B029	Particulate filter temperature sensor
B030	Particulate filter temperature sensor
B031	Outside temperature sensor
B032	Cabin temperature sensor
B033	Air duct temperature sensor
B034	Fan control temperature sensor
B035	Pressure sensor (exhaust gas back pressure after turbocharger)
B036	Exhaust gas mass flow sensor
B037	Diesel particulate filter differential pressure
B038	DPF input temperature sensor
B039	Buzzer option
B040	Extend/retract boom scroll wheel (Hall sensor)
B041	3rd control circuit scroll wheel (Hall sensor)
B042	Forward/reverse travel scroll wheel (Hall sensor)
B051	Power brake sensor
B052	Compressed-air braking system sensor
B053	Atmospheric pressure sensor
B054	Accelerator pedal
B055	Charge-air pressure sensor
B056	Temperature sensor DOC intake temperature
B057	Intake air temperature sensor
B058	Exhaust chamber temperature sensor
B059	DPF outlet temperature sensor
B060	Control rod sensor
B061	Delta P sensor
B062	Weighing system proximity switch
B063	Weighing system proximity switch
B064	Piston base side pressure switch
B065	Piston rod side pressure switch
B066	Overload sensor
B067	Automatic engine speed setting sensor
B068	Fan speed sensor
D	**Electronics (electrical system)**
D001	Steering electronics

EID	Designation
S032	Function switch, 3rd control circuit
S033	Continuous operation of 3rd control circuit
S034	Forward driving push button
S035	Reverse driving push button
S038	Extend telescopic boom/front socket
S039	Retract boom/bucket repositioning
S040	Quickhitch lock push button
S041	Safe load indicator pressure switch
S042	Safe load indicator switch
S043	Backup warning signal pressure switch
S044	Load stabilizer switch
S045	Load stabiliser pressure switch
S046	Bucket repositioning pressure switch
S047	Tilt cylinder lock key-operated switch
S050	Air-conditioning fan switch
S051	Switch, air conditioning
S052	Air conditioning pressure switch
S053	Air conditioning pressure switch
S054	Air conditioning temperature switch
S055	Horn push button
S056	Switch, additional control circuit
S057	Switch, additional control circuit
S058	Water separator switch
S059	Rear window heating push button
S060	Telescopic boom working light switch
S061	Fuel preheater switch
S062	Mirror adjustment switch
S063	Float position/hose burst valve switch
S064	Reversing fan
S065	Parking brake switch
S066	Neutral push button
S067	Bucket repositioning/front socket push button
S068	Auto-Hitch/tipping trailer changeover switch
S069	Additional control circuit I-0-II switch
S070	Raise/lower tipping trailer I-0-II push button
S071	Auto-Hitch unlock push button
S072	Frame leveling switch
S073	Crab steering switch
S074	Fuel preheater temperature switch

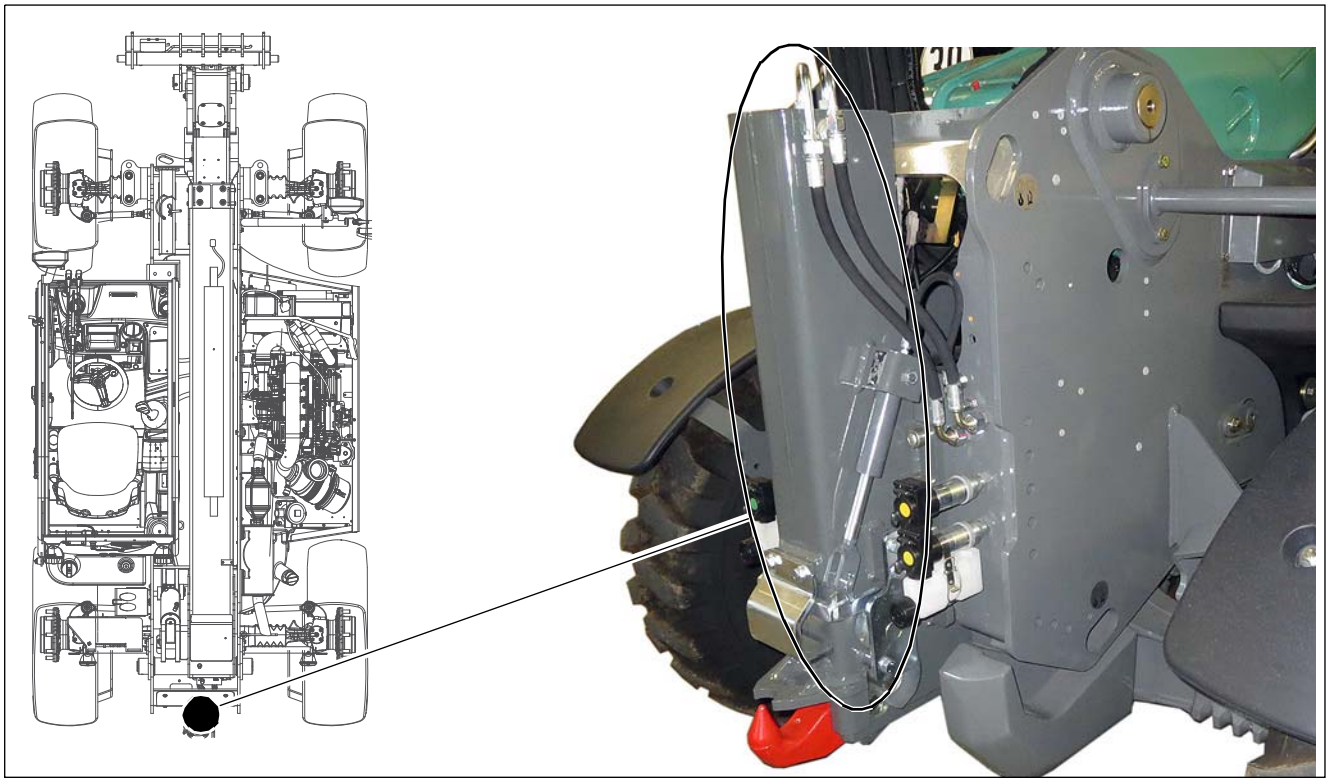
Steering orbitrol IV



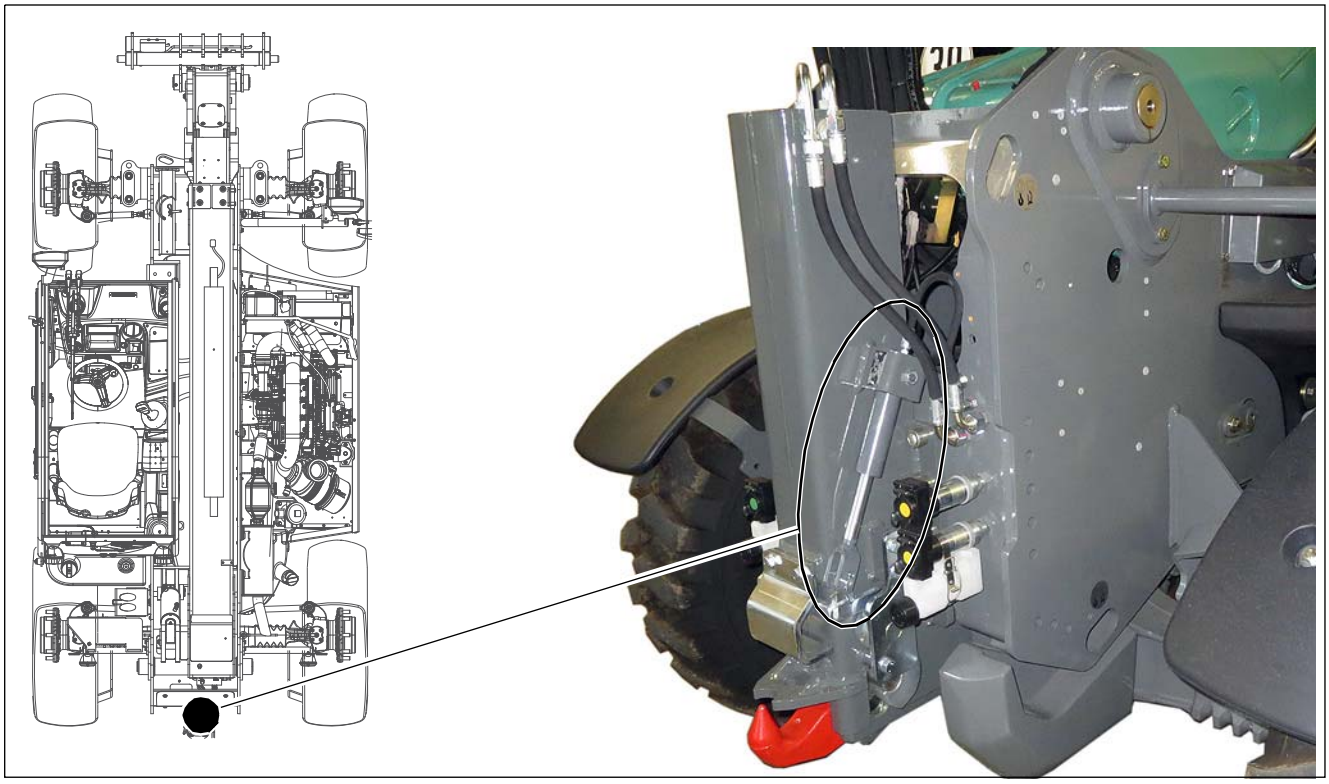
Travelling drive variable displacement pump VII



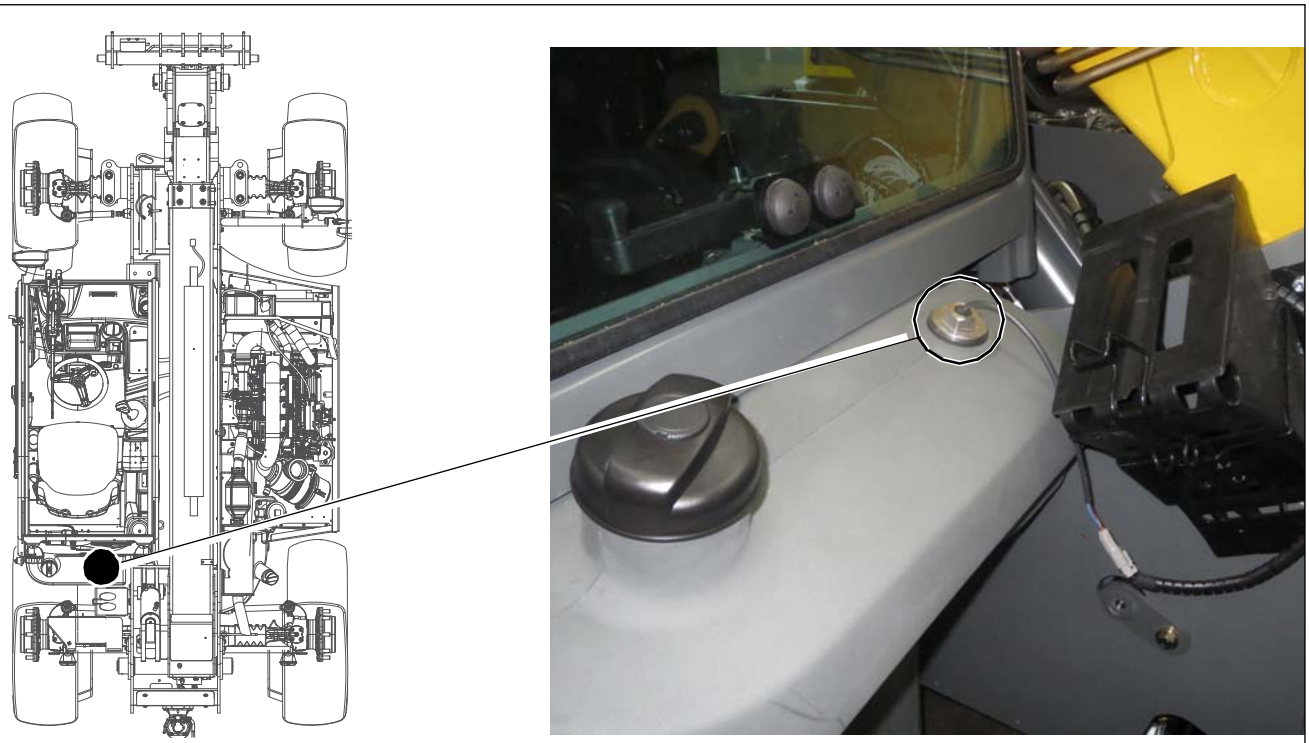
Autohitch ram 092



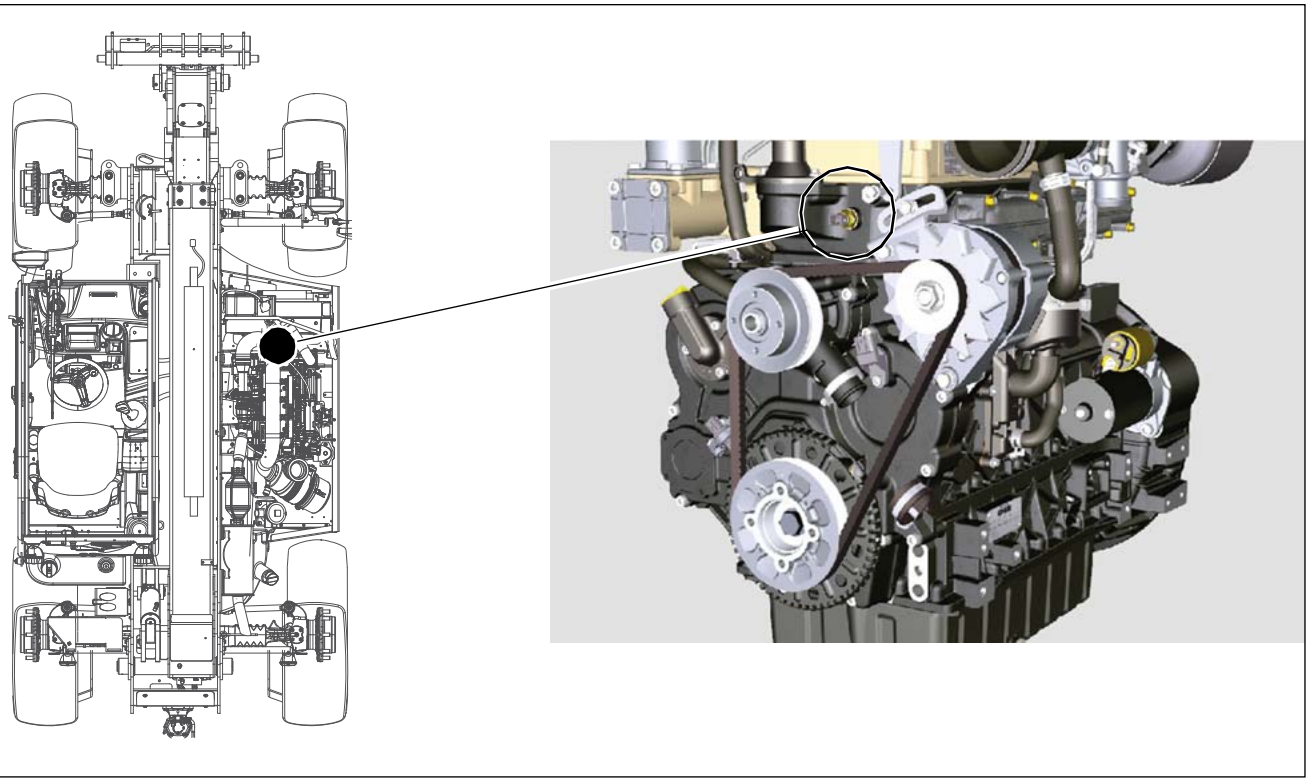
Autohitch locking cylinder 093



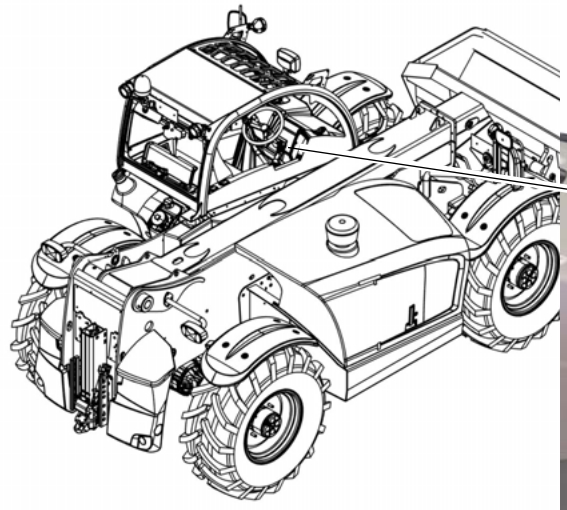
Level sensor B001 – fuel



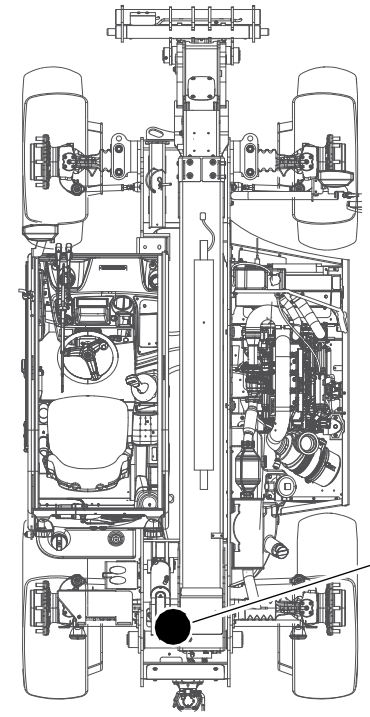
Temperature sensor B006 – engine

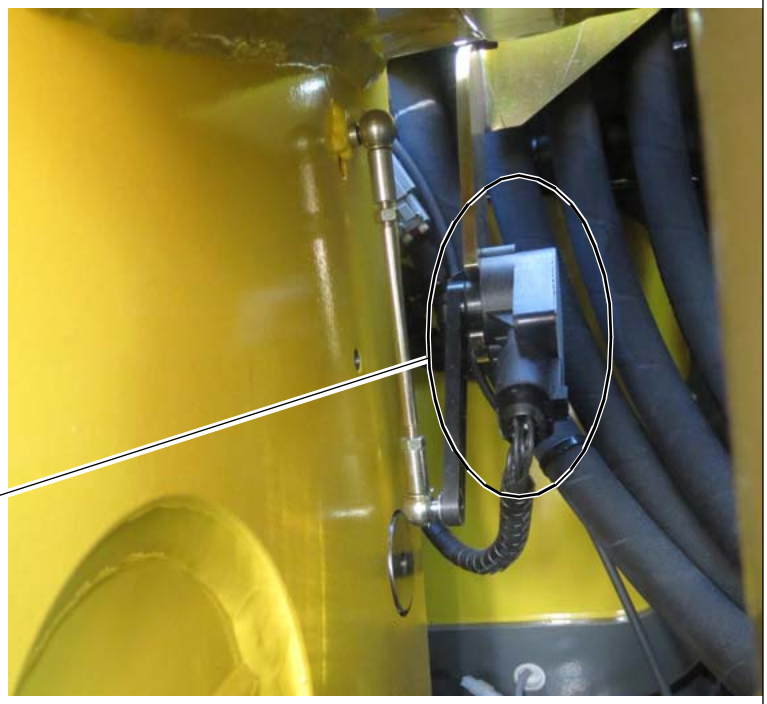


Kriegang potentiometer R003



Angle of rotation sensor R023 – lifting arm





22.2 Error codes for safe load indicator P006

Code	KCN	Designation	SPN	FMI	Alarm text	Information text			Error diagnosis text
						What kind of error has occurred?	How does the machine behave?	What can the user do?	
600	P006	Safe load indicator	516600	02	Implausible signal	Internal control unit error in control unit P006	1. Error message 600 in display 2. Overload cut-off active	1. Check fuse F021 2. Restart the machine 3. Check electrical plug connections	1. Check voltage supply to control unit P006, PIN 1 2. Check ground line at control unit D002 connector XE19, PIN 2
601	P006	Safe load indicator	516601	02	Implausible signal	Internal control unit error in control unit P006	1. Error message 601 in display 2. Overload cut-off active	1. Check fuse F021 2. Restart the machine 3. Check electrical plug connections	1. Check voltage supply to control unit P006, PIN 1 2. Check ground line at control unit D002 connector XE19, PIN 2
602	B008	Load sensor – strain gage	516602	10	Abnormal modification rate	Signal of overload sensor B008 sensor cell A to control unit P006 is outside the permissible range	1. Error message 602 in display 2. Overload cut-off active	1. Check fuse F021 2. Restart the machine 3. Check electrical plug connections	1. Check the signal line between load sensor B008, connector X009 and control unit P006 PIN 4. 2. Check the power supply between load sensor B008 connector X009 and control unit P006 PIN 6
603	B008	Load sensor – strain gage	516603	10	Abnormal modification rate	Signal of overload sensor B008 sensor cell B to control unit P006 is outside the permissible range	1. Error message 603 in display 2. Overload cut-off active	1. Check fuse F021 2. Restart the machine 3. Check electrical plug connections	1. Check the signal line between load sensor B008, connector X009 and control unit P006 PIN 5. 2. Check the power supply between load sensor B008 connector X009 and control unit P006 PIN 6
604	B008	Load sensor – strain gage	516604	10	Abnormal modification rate	The signals of the overload sensor B008 sensor cell A and B are outside the permissible range. Difference of sensor current in cells A & B > 30% for more than 5 seconds.	1. Error message 604 in display 2. Overload cut-off active	1. Check fuse F021 2. Restart the machine 3. Check electrical plug connections	1. Check the signal line between load sensor B008, connector X009 and control unit P006 PIN 5. 2. Check the signal line between load sensor B008, connector X009 and control unit P006 PIN 4. 3. Check the power supply between load sensor B008 connector X009 and control unit P006 PIN 6 4. Recalibrate safe load indicator.
605	P006	Safe load indicator	516605	02	Implausible signal	The voltage level at control unit P006 PIN 3 is outside the permissible range	1. Error message 605 in display 2. Overload cut-off active	1. Check fuse F021 2. Restart the machine 3. Check electrical plug connections	1. Check voltage supply to control unit P006, PIN 1 2. Check ground line at control unit D002 connector XE19, PIN 2 3. Signal line at control unit P006 PIN 3 rated voltage = 12 V for small 100% load
606	P006	Safe load indicator	516606	13	Not calibrated	The safe load indicator is not calibrated	1. Error message 606 in display 2. Overload cut-off active	1. Check fuse F021 2. Restart the machine 3. Check electrical plug connections	1. Calibrate

Code	KNC	Designation	SPN	FMI	Alarm text	Information text What kind of error has occurred?	Error diagnosis text
906		Sensor supply voltage	517906	16	Threshold passed	SenS1: system function monitoring, sensor power supply 1 monitoring – Signal 1 – threshold exceeded or 'SenS2: system function monitoring, sensor power supply 2 monitoring – Signal 2 – threshold exceeded or 'VarSenS3: system function monitoring, sensor power supply 3 monitoring – Signal 2 – threshold exceeded	1. Change ignition 2. Check the control unit connector, clean contacts, check pins for discolouration 3. Read error memory with KADIAS, check whether additional error codes have been entered, save error memory. 4. Repeat ignition change.
				18	Below threshold	SenS1: system function monitoring, sensor power supply 1 monitoring – Signal 1 – threshold undershot or 'SenS2: system function monitoring, sensor power supply 2 monitoring – Signal 2 – threshold undershot or 'VarSenS3: system function monitoring, sensor power supply 3 monitoring – Signal 2 – threshold undershot	1. Change ignition 2. Check the control unit connector, clean contacts, check pins for discolouration 3. Read error memory with KADIAS, check whether additional error codes have been entered, save error memory. 4. Repeat ignition change.
907		CAN Bus	517907	19	Faulty communication between components	E64: system function monitoring, Control unit CAN BUS 0 – transmit buffer overflow Data reception with active error status or E65: system function monitoring, Control unit CAN BUS 0 – receive buffer overflow Data reception with active error status or E61: system function monitoring, CAN BUS 0 control unit – BUS Off – No signal/missing component	1. Change ignition 2. Check the control unit connector, clean contacts, check pins for discolouration 3. Read error memory with KADIAS, check whether additional error codes have been entered, save error memory. 4. Repeat ignition change.
908		Eeprom	517908	12	Control error (controller)	E1: system function monitoring, control unit Eeprom memory error	1. Change ignition 2. Check the control unit connector, clean contacts, check pins for discolouration 3. Read error memory with KADIAS, check whether additional error codes have been entered, save error memory. 4. Repeat ignition change.
				19	Faulty communication between components	E64: system function monitoring, Control unit CAN BUS 0 – transmit buffer overflow Data reception with active error status or E65: system function monitoring, Control unit CAN BUS 0 – receive buffer overflow Data reception with active error status	

Code	KNC	Designation	SPN	FMI	Alarm text	Information text What kind of error has occurred?	Error diagnosis text
084	S135	Snail travel mode joystick touch button error	519084	7	Missing response of mechanical system or incorrect setting	S135: Snail joystick touch button – missing response of mechanical system or incorrect setting	Check the supply voltage for the joystick: 1. Check the line from joystick D002 Pin 2 to XP03 Pin 7 via fuse F010 (3A) to clamp 30. 2. Check the line from joystick D002 Pin 3 to XP06 Pin 9 via fuse F032 (5A) to clamp 15. 3. Check the line from Joystick D002 Pin 1 to ground. 4. Exchange joystick.
				19	Faulty communication between components	S135: Snail joystick touch button – faulty communication between components	Check the supply voltage for the joystick: 1. Check the line from joystick D002 Pin 2 to XP03 Pin 7 via fuse F010 (3A) to clamp 30. 2. Check the line from joystick D002 Pin 3 to XP06 Pin 9 via fuse F032 (5A) to clamp 15. 3. Check the line from Joystick D002 Pin 1 to ground. 4. Check the terminal resistance from CAN 1 on diagnostic connector X001 between Pin 4 (CAN 1 H) and Pin 3 (CAN 1 L). This should be 120 ohm. 5. Exchange joystick.
085	S136	Hare travel mode joystick touch button error	519085	7	Missing response of mechanical system or incorrect setting	S136: Hare joystick touch button – missing response of mechanical system or incorrect setting	Check the supply voltage for the joystick: 1. Check the line from joystick D002 Pin 2 to XP03 Pin 7 via fuse F010 (3A) to clamp 30. 2. Check the line from joystick D002 Pin 3 to XP06 Pin 9 via fuse F032 (5A) to clamp 15. 3. Check the line from Joystick D002 Pin 1 to ground. 4. Exchange joystick.
				19	Faulty communication between components	S136: Hare joystick touch button – faulty communication between components	Check the supply voltage for the joystick: 1. Check the line from joystick D002 Pin 2 to XP03 Pin 7 via fuse F010 (3A) to clamp 30. 2. Check the line from joystick D002 Pin 3 to XP06 Pin 9 via fuse F032 (5A) to clamp 15. 3. Check the line from Joystick D002 Pin 1 to ground. 4. Check the terminal resistance from CAN 1 on diagnostic connector X001 between Pin 4 (CAN 1 H) and Pin 3 (CAN 1 L). This should be 120 ohm. 5. Exchange joystick.
086	S137	Auto hitch position switch error	519086	2	Signal faulty or implausible	S137: Auto hitch position switch – both signals – data faulty or implausible	1. Check the signal line of auto hitch position switch S137 Pin 4 via fuse F028 (3A) up to main fuse board 12V64A X2. 2. Check the signal line of auto hitch position switch S137 Pin 3 to ground. 3. Check signal line of auto hitch position switch S137 Pin 2 up to control unit N004 Pin 133. 4. Check signal line of auto hitch position switch S137 Pin 1 up to control unit N004 Pin 109.

Code	KNC	Designation	SPN	FMI	Alarm text	Information text What kind of error has occurred?	Error diagnosis text
466	Y118	Lower triangle solenoid valve error	519466	6	Current too high or short circuit against machine ground	Y118: Lower triangle solenoid valve – short circuit to ground./current high	1. Check signal line at lower triangle solenoid valve Y118 Pin 2 up to control unit N004 Pin 172. 2. Check the signal line at lower triangle solenoid valve Y118 Pin 1 to ground.
				12	Control error (controller)	Y118: Lower triangle – control error (controller)	1. Change ignition 2. Check software version and update if necessary. 3. Check the control unit connection, clean contacts 4. Read error memory with KADIAS, check whether additional error codes have been entered, save error memory. 5. Repeat ignition change.
				28	Open circuit or short circuit against positive supply voltage	Y118: Lower triangle solenoid valve – open wiring or short circuit to plus	1. Check signal line at lower triangle solenoid valve Y118 Pin 2 up to control unit N004 Pin 172. 2. Check the signal line at lower triangle solenoid valve Y118 Pin 1 to ground.
468	Y120	PTO solenoid valve error	519468	6	Current too high or short circuit against machine ground	Y120: PTO solenoid valve – short circuit to ground./current high	1. Check signal line at PTO solenoid valve Y120 Pin 2 up to control unit N004 Pin 193. 2. Check the signal line at empty shovel solenoid valve Y120 Pin 1 to ground.
				12	Control error (controller)	Y120: PTO solenoid valve – internal error of control unit	1. Change ignition 2. Check software version and update if necessary. 3. Check the control unit connection, clean contacts 4. Read error memory with KADIAS, check whether additional error codes have been entered, save error memory. 5. Repeat ignition change.
				26	Signal outside the valid range	Y120: PTO solenoid valve – outside valid range	1. Check signal line at PTO solenoid valve Y120 Pin 2 up to control unit N004 Pin 193. 2. Check the signal line at empty shovel solenoid valve Y120 Pin 1 to ground.
				28	Open circuit or short circuit against positive supply voltage	Y120: PTO solenoid valve – open wiring or short circuit to plus	
477	Y129	Rear hydraulics lowering mode solenoid valve error	519477	3	Signal range exceeded or short circuit against positive supply voltage	Y129: Rear hydraulics lowering mode solenoid valve – short circuit to plus/voltage high	1. Check signal line at rear hydraulics lowering mode solenoid valve Y129 Pin 2 up to control unit N004 Pin 162. 2. Check the signal line at rear hydraulics lowering mode solenoid valve Y129 Pin 1 to ground.
				4	Under signal range or short circuit against machine ground / sensor ground	Y129: Rear hydraulics lowering mode solenoid valve – short circuit to ground./low voltage	
				12	Control error (controller)	Y129: Rear hydraulics lowering mode solenoid valve – internal error of control unit	1. Change ignition 2. Check software version and update if necessary. 3. Check the control unit connection, clean contacts 4. Read error memory with KADIAS, check whether additional error codes have been entered, save error memory. 5. Repeat ignition change.
				28	Open circuit or short circuit against positive supply voltage	Y129: Rear hydraulics lowering mode solenoid valve – open wiring or short circuit to plus	1. Check signal line at rear hydraulics lowering mode solenoid valve Y129 Pin 2 up to control unit N004 Pin 162. 2. Check the signal line at rear hydraulics lowering mode solenoid valve Y129 Pin 1 to ground.
850	K101	Chute UP switching relay error	519850	2	Signal faulty or implausible	K101: 7-pole front socket of switching relay Chute UP – Signal faulty or erratic	1. Check signal line of switching relay 7-pole front socket K101 Pin 3 up to control unit N004 Pin 155. 2. Check the signal line of switching relay 7-pole front socket K101 Pin 5 to ground.

22.5 Error code for diesel engine electronics N005

Code	Designation	SPN	FMI	Alarm text	Information text What kind of error has occurred?	Error diagnosis text
027	Exhaust gas recirculation error	27	7	Missing response of mechanical system or incorrect setting	-	1. Visual inspection of the engine wiring harness 2. Change ignition 3. Contact manufacturer
028	ASC accelerator pedal sensor	28	3	Signal range exceeded or short circuit against positive supply voltage	-	1. Visual inspection of the engine wiring harness 2. Change ignition 3. Contact manufacturer
			4	Under signal range or short circuit against machine ground / sensor ground	-	1. Visual inspection of the engine wiring harness 2. Change ignition 3. Contact manufacturer
			20	Signal value deviates upwards	-	1. Visual inspection of the engine wiring harness 2. Change ignition 3. Contact manufacturer
			21	Signal value deviates downwards	-	1. Visual inspection of the engine wiring harness 2. Change ignition 3. Contact manufacturer
029	Accelerator pedal sensor 2	29	3	Signal range exceeded or short circuit against positive supply voltage	-	1. Visual inspection of the engine wiring harness 2. Change ignition 3. Contact manufacturer
			4	Under signal range or short circuit against machine ground / sensor ground	-	1. Visual inspection of the engine wiring harness 2. Change ignition 3. Contact manufacturer
084	Vehicle speed sensor	84	2	Signal is faulty or irregular	-	1. Visual inspection of the engine wiring harness 2. Change ignition 3. Contact manufacturer
			5	Current too low or open wiring	-	1. Visual inspection of the engine wiring harness 2. Change ignition 3. Contact manufacturer
			8	Abnormal frequency, pulse width or period	-	1. Visual inspection of the engine wiring harness 2. Change ignition 3. Contact manufacturer
091	Accelerator pedal sensor 1	91	3	Signal range exceeded or short circuit against positive supply voltage	-	1. Visual inspection of the engine wiring harness 2. Change ignition 3. Contact manufacturer
091	Accelerator pedal sensor 2	91	4	Under signal range or short circuit against machine ground / sensor ground	-	1. Visual inspection of the engine wiring harness 2. Change ignition 3. Contact manufacturer
094	Fuel pressure sensor	94	3	Signal range exceeded or short circuit against positive supply voltage	-	1. Visual inspection of the engine wiring harness 2. Change ignition 3. Contact manufacturer
			6	Current too high or short circuit against machine ground	-	1. Visual inspection of the engine wiring harness 2. Change ignition 3. Contact manufacturer

Code	Designation	SPN	FMI	Alarm text	Information text What kind of error has occurred?	Error diagnosis text
081	CAN communication	518081	8	Abnormal frequency, pulse width or period	CAN communication - abnormal frequency - faulty pulse width or period	1. Change ignition 2. Check the terminal resistance from CAN 0 on diagnostic connector X001 between Pin 2 (CAN 0 H) and Pin 1 (CAN 0 L). This should be 120 ohm. 3. Check the plug connection on the control unit as well as the pins for discolouration.
			9	Abnormal update rate	CAN communication - abnormal update rate - time out of cyclical messages	1. Change ignition 2. Check the terminal resistance from CAN 0 on diagnostic connector X001 between Pin 2 (CAN 0 H) and Pin 1 (CAN 0 L). This should be 120 ohm. 3. Check the plug connection on the control unit as well as the pins for discolouration.
			10	Abnormal signal modification rate	CAN communication - abnormal rate of change - counter error	1. Change ignition 2. Check the terminal resistance from CAN 0 on diagnostic connector X001 between Pin 2 (CAN 0 H) and Pin 1 (CAN 0 L). This should be 120 ohm. 3. Check the plug connection on the control unit as well as the pins for discolouration.
			19	Faulty communication between components	CAN communication - received data with error status, message memory overflow	1. Change ignition 2. Check the terminal resistance from CAN 0 on diagnostic connector X001 between Pin 2 (CAN 0 H) and Pin 1 (CAN 0 L). This should be 120 ohm. 3. Check the plug connection on the control unit as well as the pins for discolouration.
			24	Logical error/software	CAN communication - logical SW error - faulty message	1. Change ignition 2. Check the terminal resistance from CAN 0 on diagnostic connector X001 between Pin 2 (CAN 0 H) and Pin 1 (CAN 0 L). This should be 120 ohm. 3. Check the plug connection on the control unit as well as the pins for discolouration.
082	CAN communication	518082	19	Faulty communication between components	CAN communication - MVCU machine control, received data with error status, message memory overflow	1. Change ignition 2. Check the terminal resistance from CAN 0 on diagnostic connector X001 between Pin 2 (CAN 0 H) and Pin 1 (CAN 0 L). This should be 120 ohm. 3. Check the plug connection on the control unit as well as the pins for discolouration.