Driver's cab / Wiper and washer

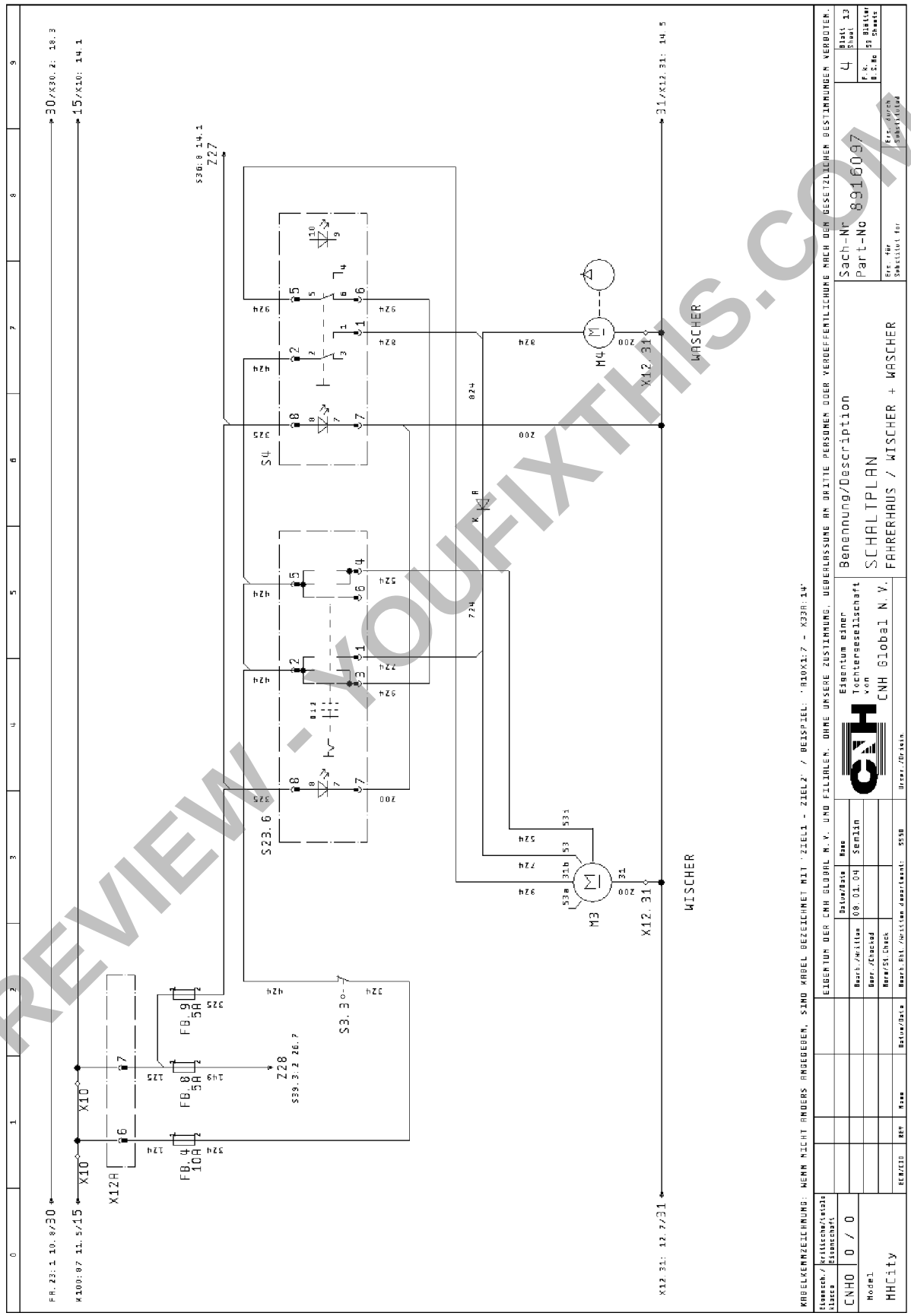
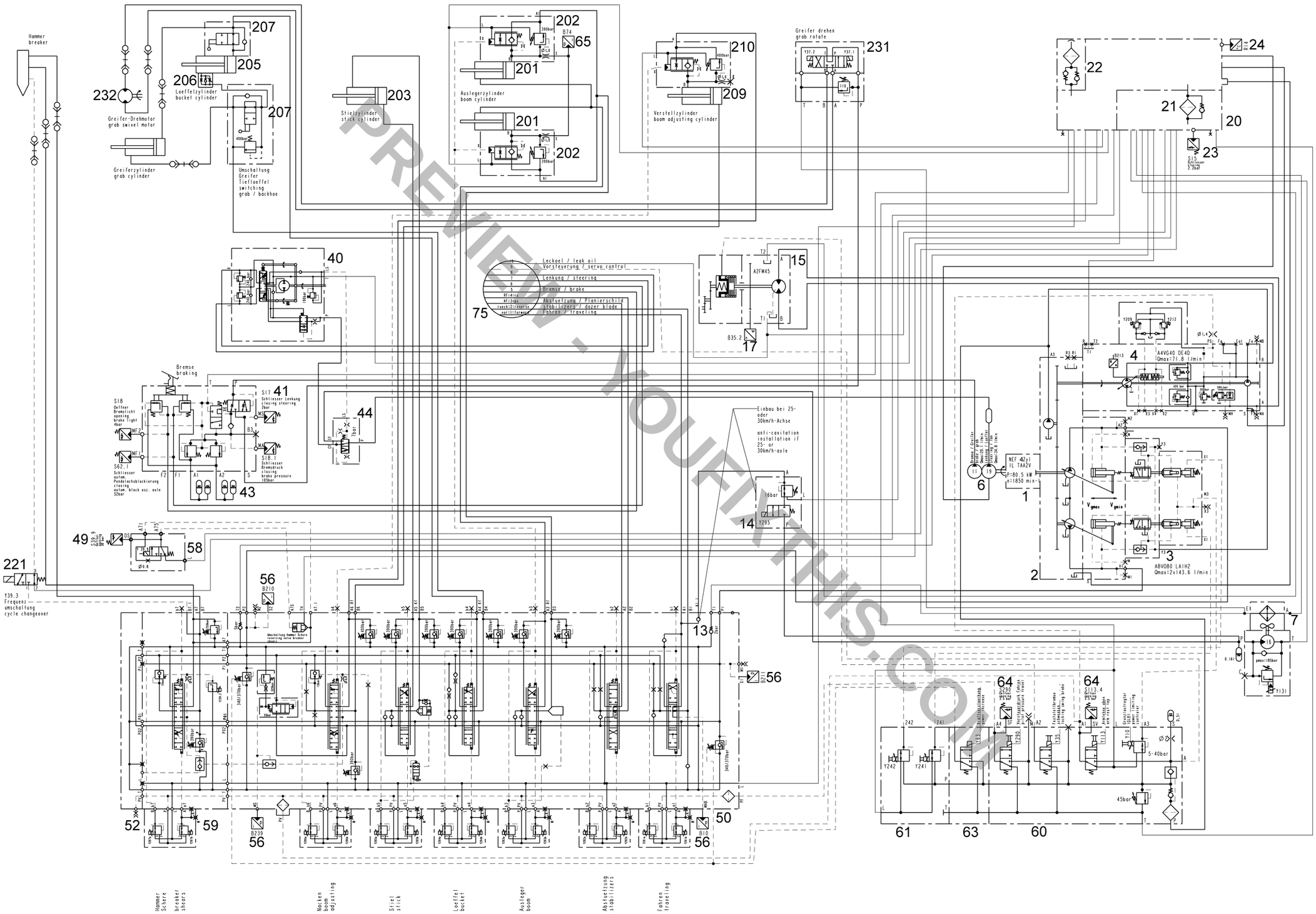


Fig. 13

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Bolts with standard thread DIN 13 – 13

Thread nominal Ø	Material quality	Tightening torques M_A in Nm		
		total 0.10 [1]	total 0.12 [2]	total 0.16 (L) [3]
M 5	8.8 10.9 12.9	4.9 7.3 8.5	5.5 8.1 9.5	6.5 9.5 11.2
M 6	8.8 10.9 12.9	8.5 12.5 14.5	9.5 14 16.5	11.2 16.5 19.5
M 8	8.8 10.9 12.9	20.5 30 35	23 34 40	27 40 47
M 10	8.8 10.9 12.9	41 60 71	46 68 79	55 80 94
M 12	8.8 10.9 12.9	71 104 195	79 117 215	94 140 260
M 16	8.8 10.9 12.9	170 250 300	195 280 330	230 340 400
M 20	8.8 10.9 12.9	350 490 580	390 560 650	470 670 780
M 24	8.8 10.9 12.9	600 850 1000	670 960 1120	800 1140 1350
M 30	8.8 10.9 12.9	1190 1700 2000	1350 1900 2250	1600 2300 2700
M 36	8.8 10.9 12.9	2100 3000 3500	2350 3300 3900	2800 4000 4700

[1] Screw and/or nut electro-galvanized.

[2] Screw black-plated or phosphatized, thread oiled.

[3] Screws with liquid screw fixer, e.g. Loctite 242, 243.

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Fault codes

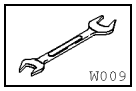
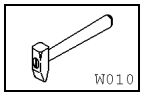
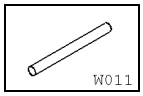
9000 (German)
9011 ESX checksum fault
9012 ESX cutoff fault
9013 SPI communication of ESX defective
9014 SPI bus of ESX reserved
9015 Checksum fault on initialization of ESX system monitoring
9016 Plausibility fault on initialization of ESX system monitoring
9017 ESX reset through user watchdog
9018 ESX reset through system watchdog
9019 ESX hardware fault
9020 Checksum fault during readout of ESX fault memory
9021 Fault in reading of ESX fault memory
9022 ESX value outside valid range
9023 Supply voltage of ESX operation amplifier and multiplexer defective
9024 ESX temperature outside permitted range
9025 Processor configuration faulty due to ESX hardware
9026 Multiplexer or ESX A/D converter defective.
9027 Threshold voltage of ESX inputs faulty
9028 ESX frame potential faulty
9029 Supply voltage of ESX watchdog module defective
9030 Frame potential at BTS module of ESX faulty
9031 ESX relay defective
9032 ESX watchdog module cannot switch off relay
9033 ESX watchdog module defective
9034 CPU of ESX defective
9035 ESX flags cannot be set
9036 ESX flags cannot be scanned
9037 ESX arithmetic unit defective
9038 ESX multiplier defective
9039 Fault in CPU test sequence of ESX
9040 External RAM or ROM of ESX defective
9041 Shadow memory module of ESX defective
9042 Net current measurement on start of ESX faulty
9043 Cyclic net current measurement of ESX faulty
9044 Internal RAM defective on start of ESX
9045 Cyclic internal RAM test of ESX defective
9046 Ignition lock input status of ESX faulty
9047 Cyclic diagnosis of ESX faulty

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Boom cylinder

Removing the boom cylinder

	19 mm 36 mm
	Hammer
	Brass drift

- Place the equipment safely on the ground and secure the machine against inadvertent movements.
- Shut off the engine.
- Secure the machine against inadvertent starting, e.g. with a warning sign attached to the machine.
- Remove the leakage oil lines, if any (1).

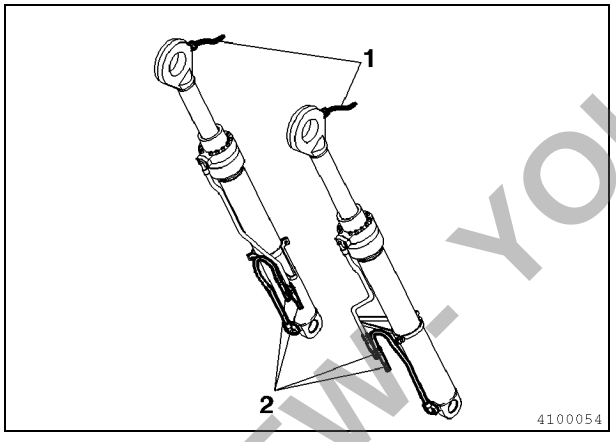


Fig. 1

- Attach the cylinder with a rope to a crane and lift slightly so that the cylinder is load-relieved and cannot drop during the removal.

Weight of the boom cylinder:

129 kg MHCity Monoblock boom
128 kg MHCity Boom adjusting
155 kg MHPlus Monoblock boom
150 kg MHPlus Boom adjusting
174 kg MH5.6 Monoblock boom
170 kg MH5.6 Boom adjusting

Wear protective equipment such as goggles and helmet to protect yourself against metal splinters resulting from hammering.

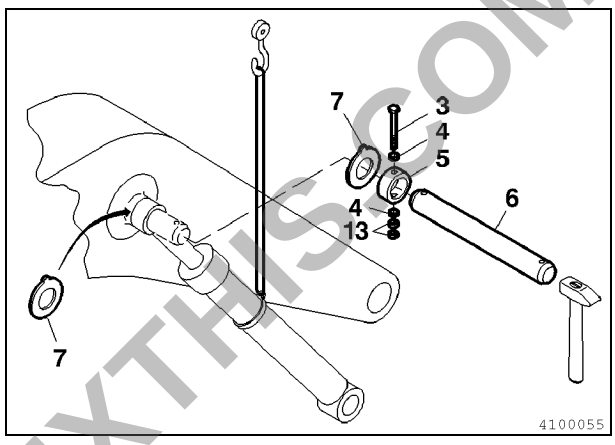


Fig. 2

- Slacken the nuts (13) and remove screw (3) and washers (4).
- Use hammer and brass drift to drive pin (6) inwards until the boom cylinder is clear. Remove the spacer rings (7) in the process.
- Move the piston rod fully into the boom cylinder and secure it to the cylinder barrel to prevent it from moving.
- Shut off the engine and depressurize all hydraulic components by moving the cylinders with the control levers gently in both directions, the engine being off, but the ignition on.
- Detach the hoses from the pipes and close the hose, pipe and cylinder openings with plugs.

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VDO

This menu item is used for calibrating the engine characteristic. After confirming the VDO selection with the SET key, the following texts are displayed:

Step	Display text	Remarks
1	START CALIBRATION	
2	calibration of lower speed range	
3	calibration of upper speed range	
4	calibration 20% engine speed	
5	calibration 40% engine speed	
6	calibration 60% engine speed	
7	calibration 80% engine speed	
8	calibration finished	

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Grid Heater / Filter Heater

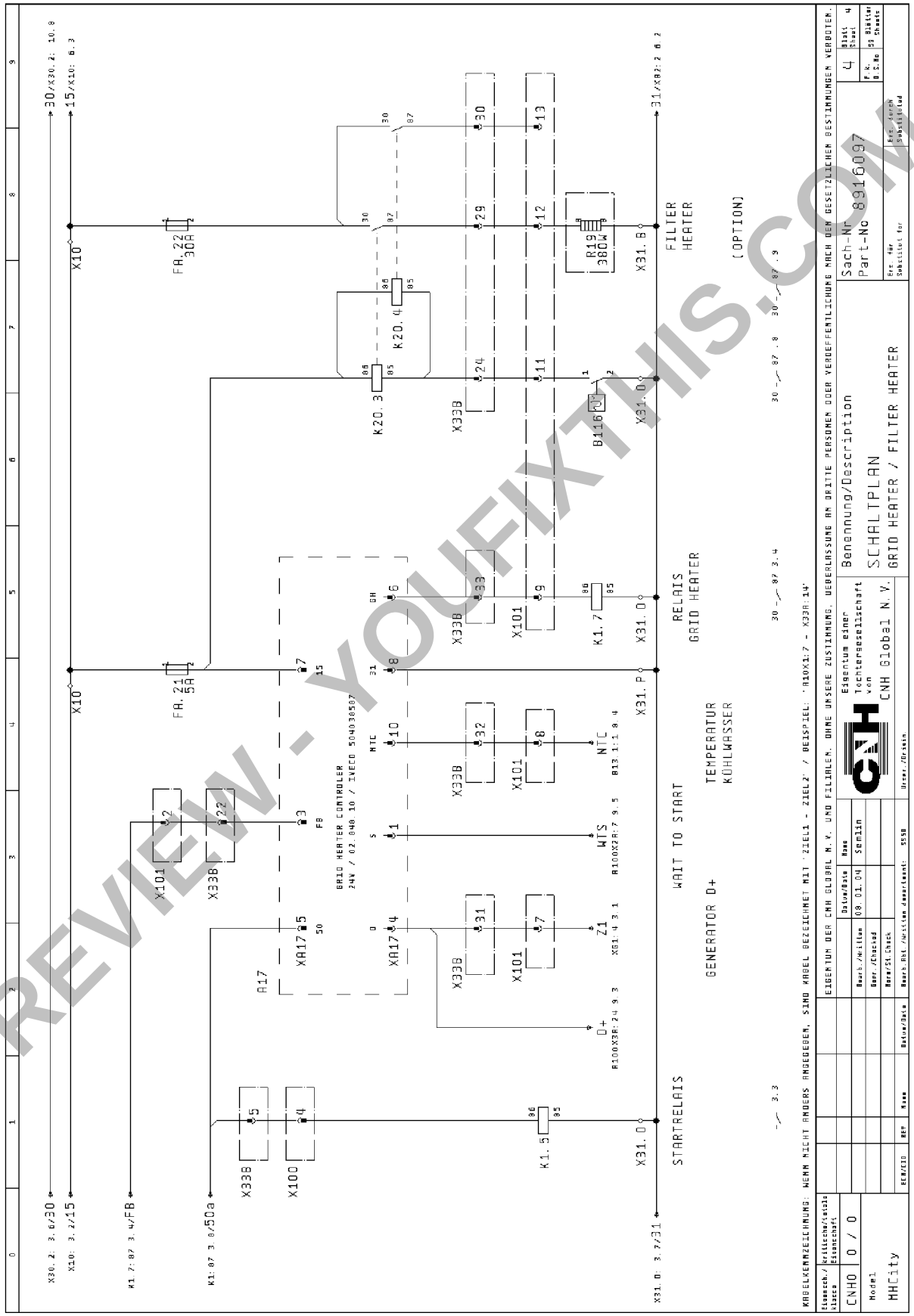
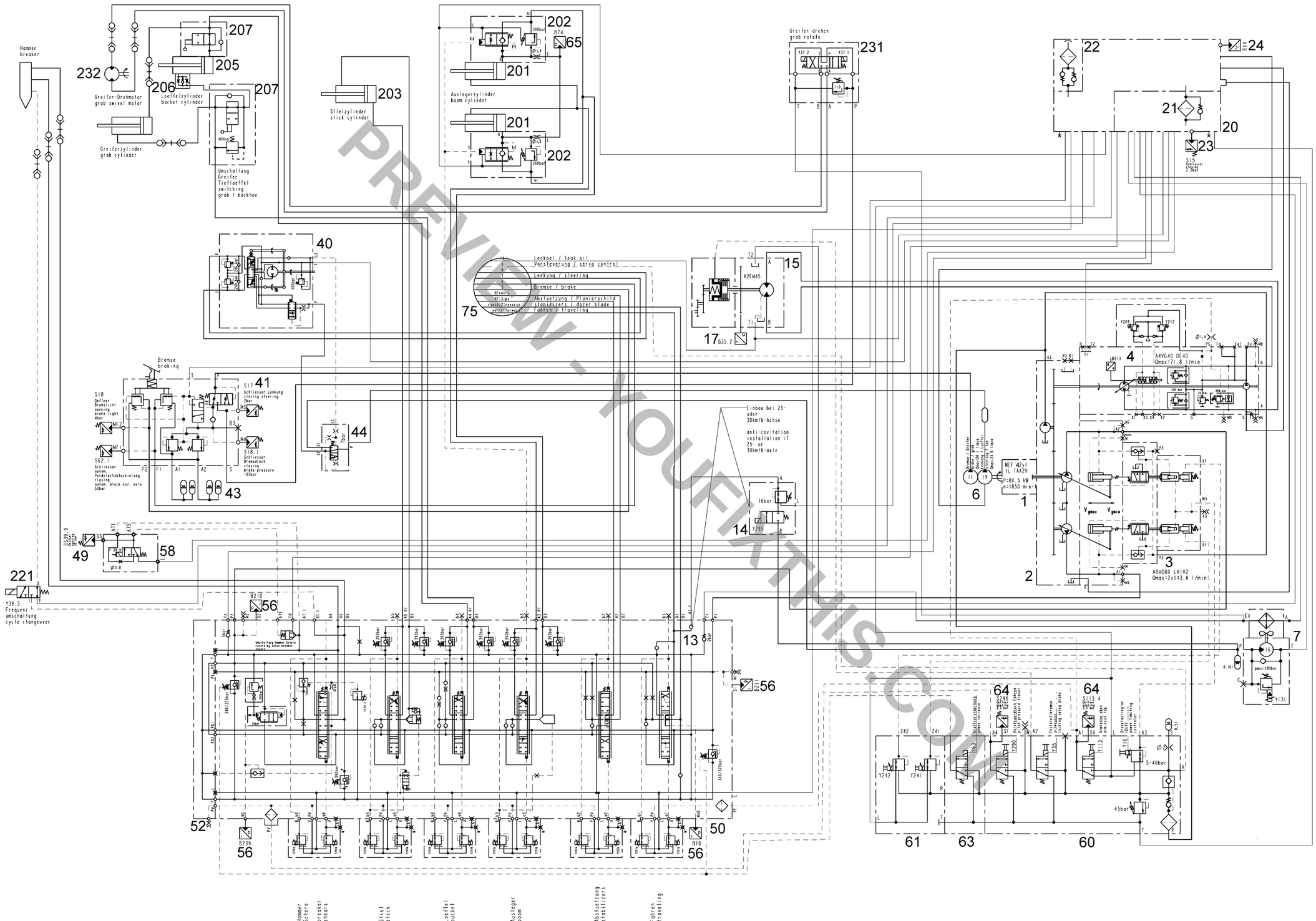


Fig. 4

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Bolts with metric fine thread DIN 13 – 13

Thread nominal Ø	Material quality	Tightening torques M_A in Nm		
		total 0.10 [1]	total 0.12 [2]	total 0.16 (L) [3]
M 8x1	8.8 10.9 12.9	22 32 38	24.5 36 43	30 43 51
M 10x1	8.8 10.9 12.9	45 67 78	52 76 89	62 91 107
M 10x1.25	8.8 10.9 12.9	43 64 74	49 72 84	58 86 100
M 12x1.25	8.8 10.9 12.9	77 112 130	87 125 150	104 150 180
M 14x1.5	8.8 10.9 12.9	121 175 205	135 200 235	165 240 280
M 16x1.5	8.8 10.9 12.9	180 270 310	205 300 360	250 370 430
M 20x1.5	8.8 10.9 12.9	380 540 630	430 620 720	530 750 880
M 22x1.5	8.8 10.9 12.9	510 720 840	580 820 960	700 1000 1170
M 24x2	8.8 10.9 12.9	640 920 1070	730 1040 1220	890 1250 1500
M 27x2	8.8 10.9 12.9	940 1350 1550	1070 1500 1800	1300 1850 2150
M 30x2	8.8 10.9 12.9	1370 1940 2270	1490 2120 2480	1740 2480 2900

[1] Screw and/or nut electro-galvanized.

[2] Screw black-plated or phosphatized, thread oiled.

[3] Screws with liquid screw fixer, e.g. Loctite 242, 243.

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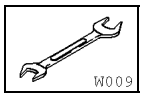
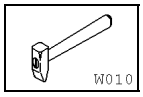
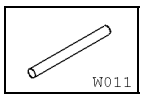
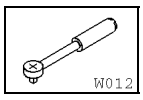
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9048 Other diagnostic fault at ESX
9055 Read machine information from ESX memory
9056 Read options from ESX memory
9057 Read configuration parameters from ESX memory
9058 Read pump diagram parameters from ESX memory
9059 Read equipment parameters from ESX memory
9060 Read servo control parameters from ESX memory
9061 Read mode parameters from ESX memory
9062 Read control block parameters from ESX memory
9063 Read main pump parameters from ESX memory
9064 Read slewing pump parameters from ESX memory
9065 Read component parameters from ESX memory
9066 Read fault range 1 from ESX memory
9067 Read fault range 2 from ESX memory
9068 Read fault range 3 from ESX memory
9069 Write equipment information into ESX memory
9070 Write options into ESX memory
9071 Write configuration parameters into ESX memory
9072 Write pump diagram parameters into ESX memory
9073 Write equipment parameters into ESX memory
9074 Write servo control parameter into ESX memory
9075 Write mode parameters into ESX memory
9076 Write control block parameters into ESX memory
9077 Write main pump parameters into ESX memory
9078 Write slewing pump parameters into ESX memory
9079 Write component parameters into ESX memory
9080 Write fault range 1 into ESX memory
9081 Write fault range 2 into ESX memory
9082 Write fault range 3 into ESX memory
9083 Read machine settings from ESX memory
9084 Write machine settings into ESX memory
9085 Machine settings contradictory
9086 Machine settings not in admissible range
9087 Read hammer configuration from ESX memory
9088 Write hammer configuration into ESX memory
9089 hammer configuration data contradictory
9090 hammer configuration data not in admissible range
9091 Read milling configuration from ESX memory
9092 Write milling configuration into ESX memory

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Refitting the boom cylinder

	19 mm 36 mm
	Hammer
	Brass drift
	Torque wrench

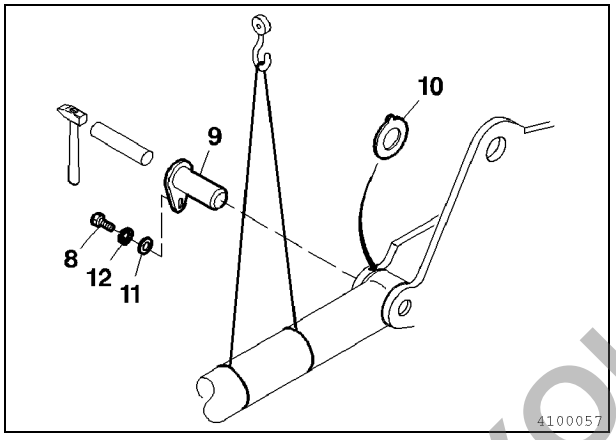


Fig. 4

- Refit the boom cylinder on the A-frame using a crane.
- Insert spacers (10) and pin (9) and fasten pin (9) with screw (8), washer (11) and lock-washer (12).
- Refit the other boom cylinder on the A-frame in the same way.
- Re-attach the hydraulic hoses to the pipes of the boom cylinders.

  Tightening torque: 175 Nm

Fill the hydraulic reservoir up to the prescribed level with hydraulic oil.

Let the engine run at idling and check the hose connections for oil leaks.

Bleed the hydraulic system.

- To bleed the hydraulic circuit, move the piston rods of the cylinders several times slowly in an and out.

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POWER

This menu item is used for calibrating the power characteristic of the diesel engine. After confirming the POWER selection with the SET key (Fig. 2), the following instructions are displayed one after another:

Step	Display text	Remarks
1	START CALIBRATION	
2	Close bucket	Shift control lever (69) to the left (fill bucket)
3	Calibration ongoing	
4	Release joystick	Joystick (69) to neutral position
5	Calibration done	

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Sensor power supply

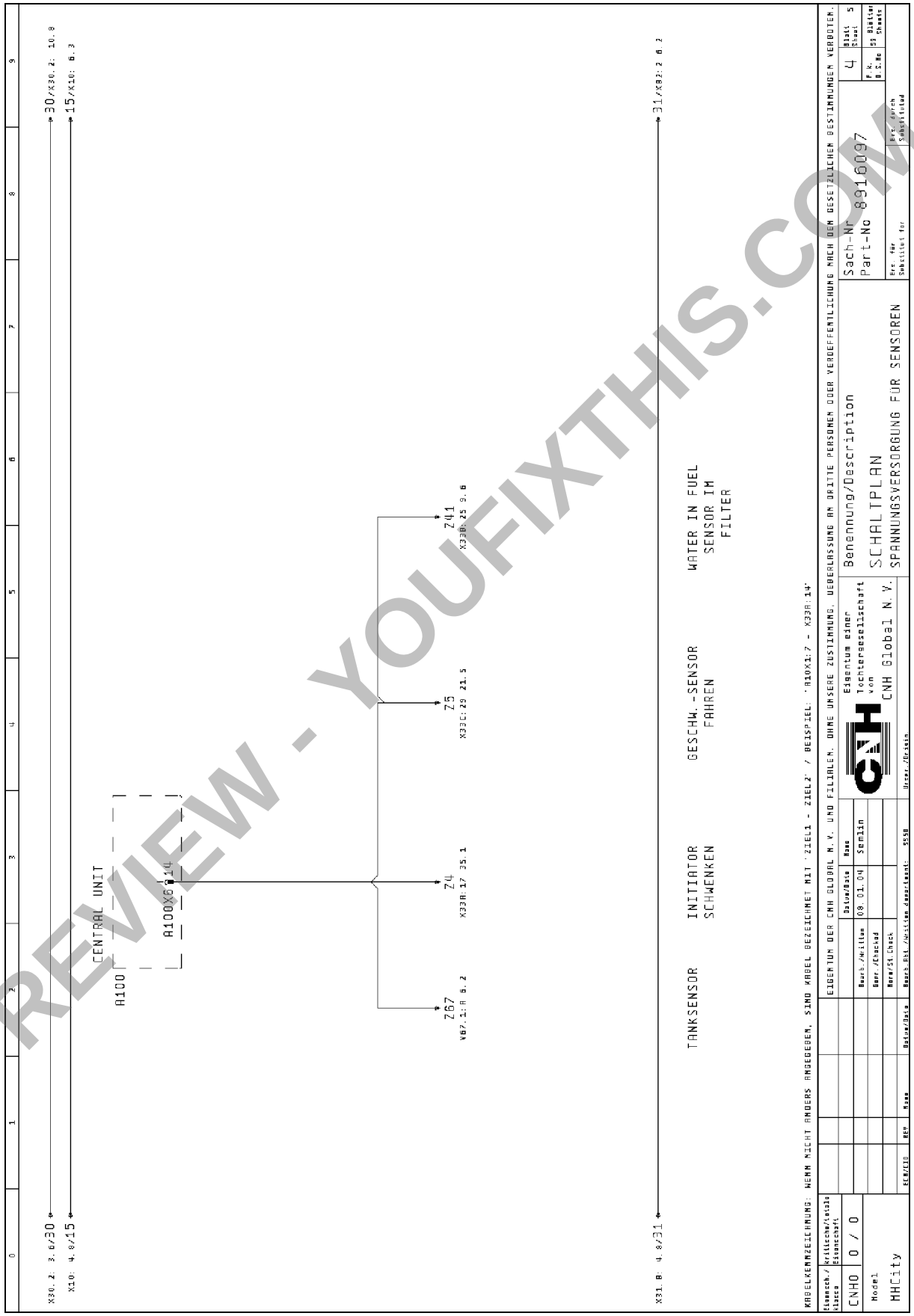
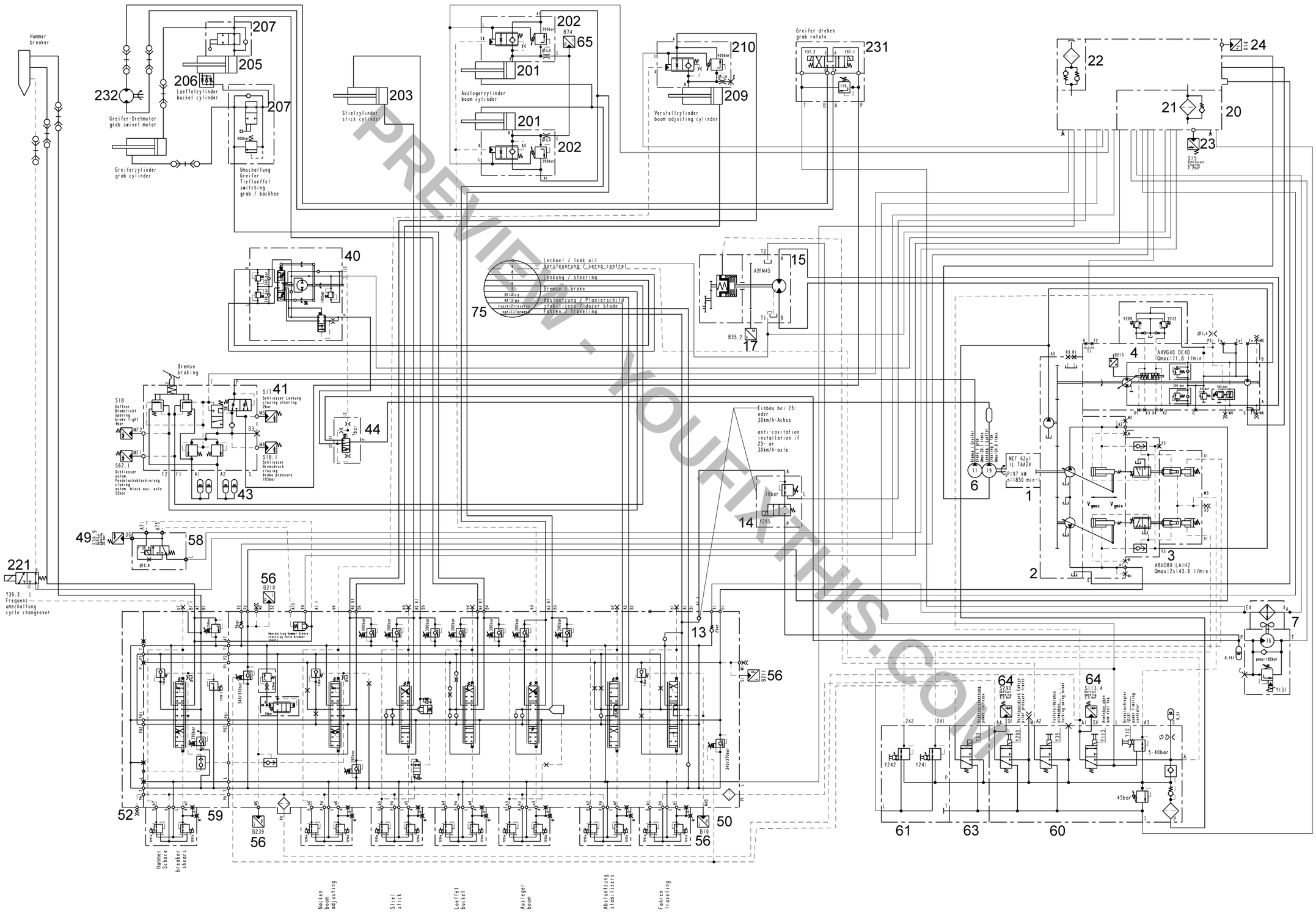


Fig. 5

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Tightening torques ALPP100

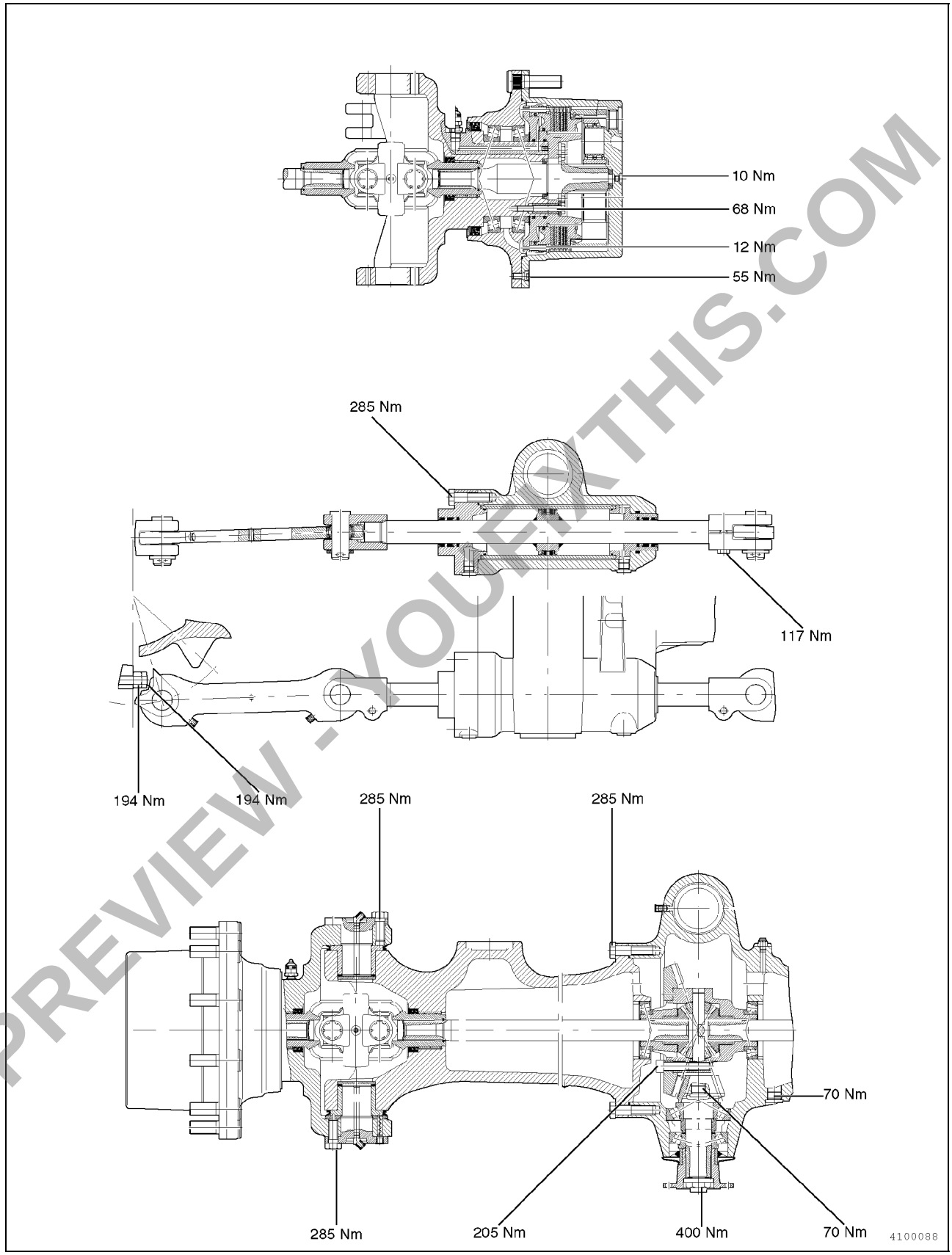


Fig. 8

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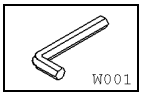
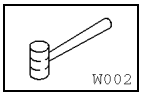
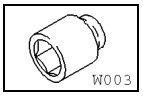
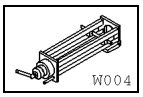
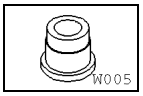
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9093 Milling configuration data contradictory
9094 Milling configuration data not in admissible range
9095 Read slewing range limit from ESX memory
9096 Write slewing range limit into ESX memory
9097 Slewing range limit contradictory
9098 Slewing range limit not in admissible range
9103 Write control block solenoids calibration into ESX memory
9104 Write proportional demand solenoids calibration into ESX memory
9105 Write slewing pump solenoids calibration into ESX memory
9106 Write calibration of pressure relief valve solenoid for attachment into ESX memory
9107 Write analogy input calibration into ESX memory
9108 Write control block calibration into ESX memory
9109 Write proportional demand control calibration into ESX memory
9110 Write slewing pump calibration into ESX memory
9117 Excavator type not initialised
9118 Excavator type: faulty CAN data
9119 Read excavator type from ESX memory
9120 Write excavator type into ESX memory
9121 Excavator type contradictory
9122 Excavator type not in admissible range
9123 Read equipment configuration from ESX memory
9124 Write equipment configuration into ESX memory
9125 Equipment configuration contradictory
9126 Equipment configuration not in admissible range
9127 Read keyboard field status from ESX memory
9128 Write keyboard field status into ESX memory
9129 Keyboard field status contradictory
9130 Keyboard field status not in admissible range
9131 Read optional equipment from ESX memory
9132 Write optional equipment into ESX memory
9135 Read configuration of specific components from ESX memory
9136 Write configuration of specific components into ESX memory
9139 Read software options from ESX memory
9140 Write software options into ESX memory
9141 Read configuration results from ESX memory
9142 Write configuration results into ESX memory
9143 Immobilizer release in ESX not correct
9144 System status not available on start of ESX
9145 Inadmissible change in system status of ESX requested

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Dismantling the boom cylinder

 W001	12 mm Allen key 14 mm Allen key 6 mm Allen key
 W002	Plastic hammer
 W003	80 mm hex socket insert 85 mm hex socket insert 95 mm hex socket insert
 W004	Special tool (W004) see list of special tools
 W005	Special tool (W005) see list of special tools

Before dismantling, read all safety and working instructions in the corresponding chapter.

- Lift the cylinder with a crane onto a workbench and fix in horizontal position.
- Drain off all the hydraulic oil from the cylinder into a suitable recipient.

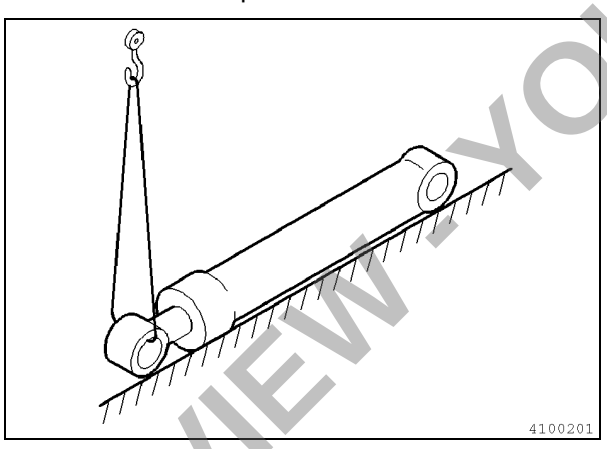


Fig. 3

When drawing out the piston rod, make sure not to damage the seals and guides by jamming the rod.

- Pull out piston rod (11) of the cylinder to the limit stop securing the end of the rod with a sling attached to a crane.
- Remove retaining screws (8) of rod guide (7).

(12 mm Allen key for MHCity)
(14 mm Allen key for MHPlus-MH5.6).

- Drive rod guide (7) with a plastic hammer out of cylinder barrel (12).
- Attach piston rod (11) to special tool (W004). Mark the position of adjusting nut (24) with respect to piston rod (11).
- Remove retaining screw (22) and ball (23) from nut (24).

(6 mm Allen key)

IMPORTANT: *Remove the two toe-ins on retaining screw (22), which were applied after tigthening of the screw with hammer and chisel by reboring.*

- Loosen nut (24) and screw off using special tool (W004) and the 80 mm (MHCity) / 85 mm (MHPlus) / 95 mm (MH5.6) hex socket insert.
- Withdraw piston (15), spacer disk (21) and damper bearing (13) from piston rod (11). Withdraw also damper seal (14).
- Withdraw seal (17), guide rings (19) and (20), O-ring (18) and the two backing rings (16) from piston (15).

  Withdraw now also rod guide (7) from piston rod (11).
- Withdraw O-ring (10) and backing rings (9) and (2) from the rod guide.

  Then, remove scraper ring (1), lip seal (3), damper ring (4), retaining ring (6) and bushing (5) from the rod guide using special tool (W005).

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PUMP DEMAND PRESSURE

This menu item is used for calibrating the pump demand pressure for the boom and stick cylinders. After confirming the PUMP DEMAND selection with the SET key, the display offers two selections: START CALIBRATION and DEFAULT. The individual steps are executed automatically one after another. After the calibration, the program returns automatically to the next higher menu.

Step	Display text	Remarks
1	START CALIBRATION	
2	Safety lever to bottom position 1	Move safety lever (72) downwards, electro-hydraulic pilot control ON.
3	Boom rising	Pull joystick (69) backwards, the boom rises
4	In max. position press <SET> key	Press the SET key when the boom / mono is in max. lifting position
5	Next step	
6	Calibration ongoing	
7	Measuring at test point pressure xxx bars	
8	Stick out	Move joystick (70) forwards, extend stick to the stop
9	In max. position press <SET> key	Press the SET key when the stick is in max. extended position
10	Next step	
11	Calibration ongoing	
12	Joysticks and pedals in neutral position	
13	Calibration successfully completed	
14	Safety lever to top position 0	Move safety lever (72) to position 0, electro-hydraulic pilot-control OFF
15	Calibration done	

Step	Display text	Remarks
1	DEFAULT	
2	Restore default data Successfully completed	

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SECTION 0

SAFETY INSTRUCTION

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SAFETY INSTRUCTIONS

Personal safety instructions

Observe the safety instructions



- **Read carefully through all safety instructions attached to the machine and observe them; read all safety instructions in this manual in addition.**
- **Safety instruction stickers/plates must be affixed, maintained and replaced when necessary.**
- **If a safety instruction sticker/plate or this manual is damaged or missing, obtain a replacement from your dealer. The procedure is the same as when ordering spare parts (it is essential to quote the machine type and the serial number).**
- **Familiarize yourself with the correct, safety-oriented procedure for operating the machine and its control elements.**
- **Allow only trained, qualified and authorized persons to operate the machine.**
- **Keep the machine in good working order.**
- **Unauthorized modifications to the machine may affect its efficiency and/or safety and reduce its service life.**
- **The instructions given in this Safety Instructions section are designed to show the fundamental safety procedures for the machine. However, they cannot cover all hazardous situations with which you may be confronted. If in doubt, consult your immediate superior before operating the machine or carrying out servicing work.**

Protection from noise



Sustained effects of noise may lead to impaired hearing or deafness.

Wear appropriate ear protectors such as earplugs or muffs for protection from disturbing or intolerable noise.

Preparing for emergencies



Be prepared for the event of a fire breaking out or an accident occurring.

Keep the first-aid box and the fire extinguisher readily accessible at all times.

Read the instructions for operating the fire extinguisher and learn how to use it properly.

Stipulate emergency procedures for the event of fire or accidents.

Keep the emergency numbers of doctors, emergency services, hospitals and the fire service in the immediate vicinity of the phone.

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Warnings and symbols

The following signs are used in the Workshop Manual to designate exceptionally important information:



Precautionary rules and measures designed to protect the operator and other persons from life-threatening hazards or injury and to prevent extensive damage to property.



Information and precautionary measures designed to prevent damage to the machine and other property.

Risks resulting from failure to observe the safety instructions



This hydraulic excavator has been built in accordance with state-of-the-art standards and recognized safety regulations.

Nevertheless, its use may constitute a risk if it continues to be operated despite damage being suspected or having occurred, or if it is inexpertly repaired.

There is then a risk of

- **life-threatening injury**
- **irreparable damage to the machine and other assets.**

The hydraulic excavator must be stopped immediately if suspected damage or damage that has occurred affects the safety of the operator, other persons at the excavator deployment site, or other assets. All components are carefully coordinated. Trouble-free operation and a long service life are assured only if original spare parts are used.

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Pedestal (Fuse box 2 on the right behind the driver's seat, Fig. 1)

FA.29	5 A	Hazard warning signal switch
FA.30	15 A	Blower / air conditioner compressor
FA.31	-	*- not used -*
FA.32	-	*- not used -*

Driver's cab (fuse-box 1 on the right beside the driver's seat, Fig. 2)

FB.1	10 A	**Option**: rotary beacon
FB.2	10 A	**Option**: floodlamp at the rear of driver's cab
FB.3	10 A	Floodlamp in front of driver's cab
FB.4	10 A	Wiper motor and wash pump
FB.5	5 A	Cab interior lighting
FB.6	7,5 A	24 V/12 V voltage converter supply for radio and socket
FB.7	2 A	Power supply for display and keyboard modules in cab
FB.8	5 A	**Option**: frequency switching solenoid
FB.9	5 A	Illumination of switches
FB.10	-	*- not used -*
FB.11	-	*- not used -*
FB.12	-	*- not used -*
FB.13	-	*- not used -*
FB.14	-	*- not used -*
FB.15	-	*- not used -*
FB.16	-	*- not used -*

Engine compartment

F 20	125 A	Grid-Heater

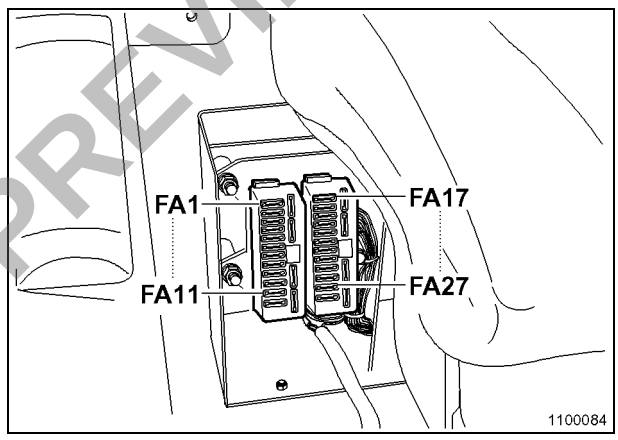


Fig. 1

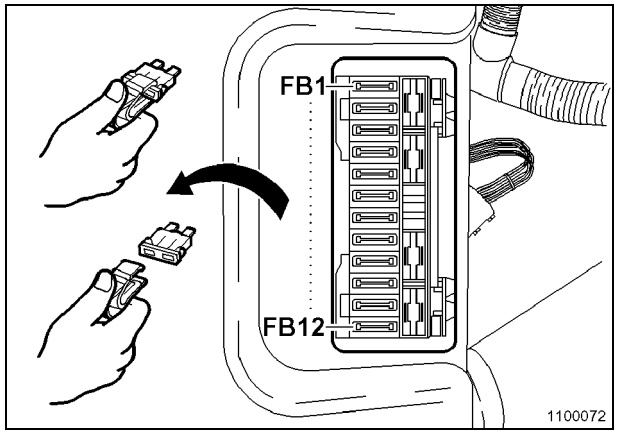


Fig. 2

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ESX CODING

Schematic

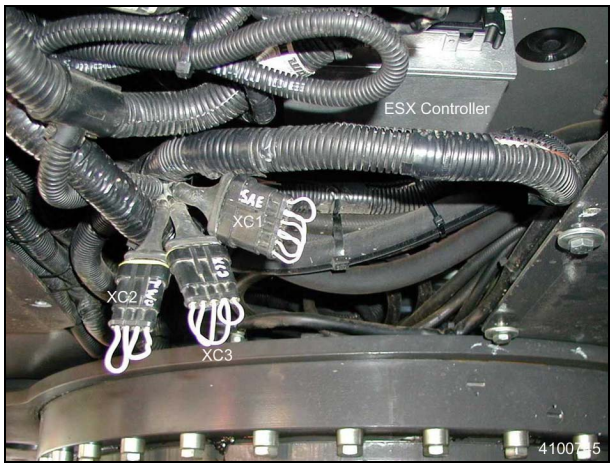


Fig. 1

Description

Coding of the ESX controller is performed at the factory of the manufacturer before the machines are delivered.

The cable harness to the ESX comprises connectors XC1, XC2 and XC3.

Connector XC1 permits changing the SAE control to other control systems by means of different coding jumpers.

Connector XC2 is equipped with coding jumpers for boom-adjusting equipment or for mono-block boom equipment.

If the boom (adjustable boom versus mono-block boom or vice versa) is replaced, the coding jumpers must also be replaced.

Connector XC3 is provided with the standard coding jumpers.

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Levelling blade cylinder (No. 115)

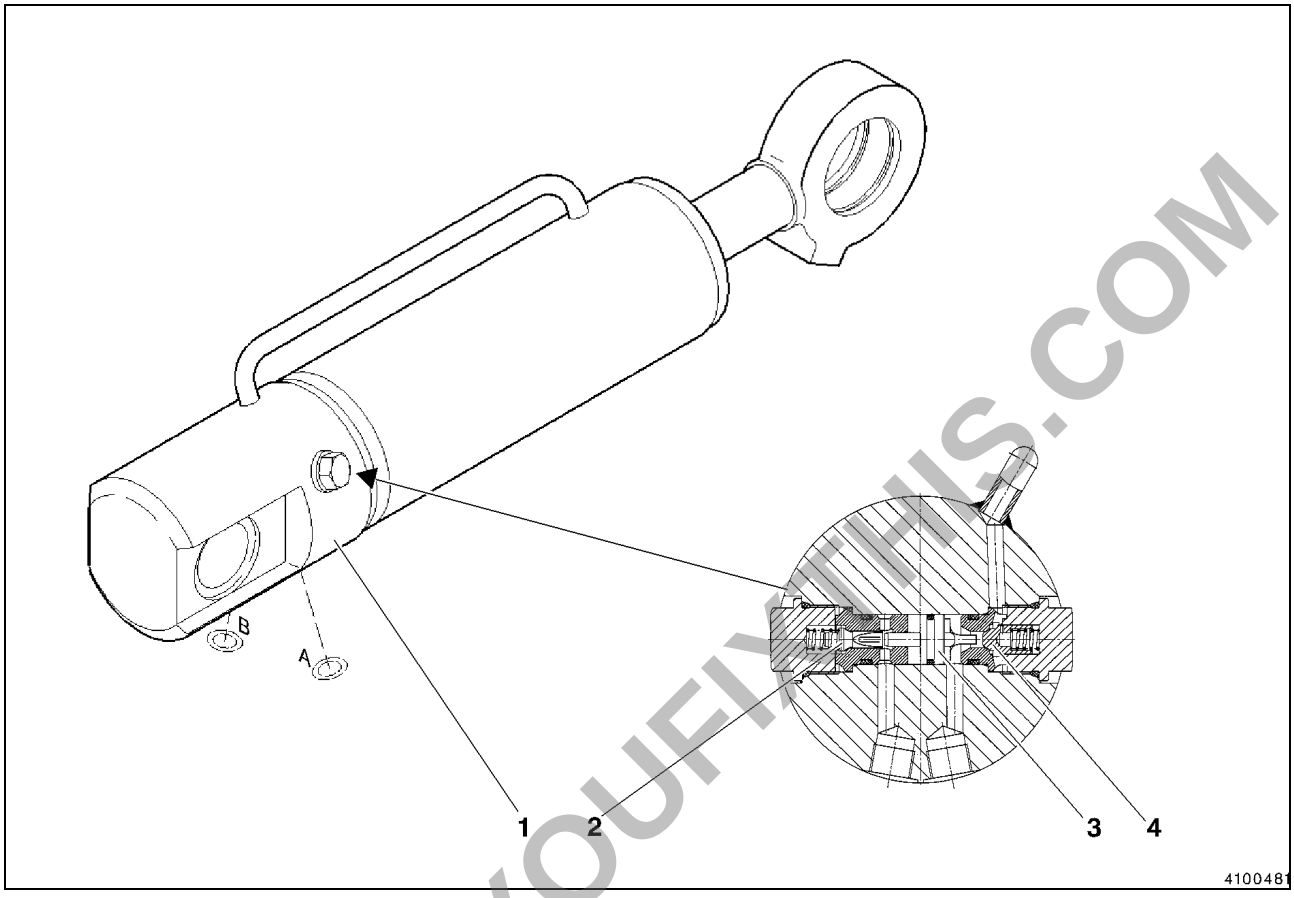


Fig. 1

Description

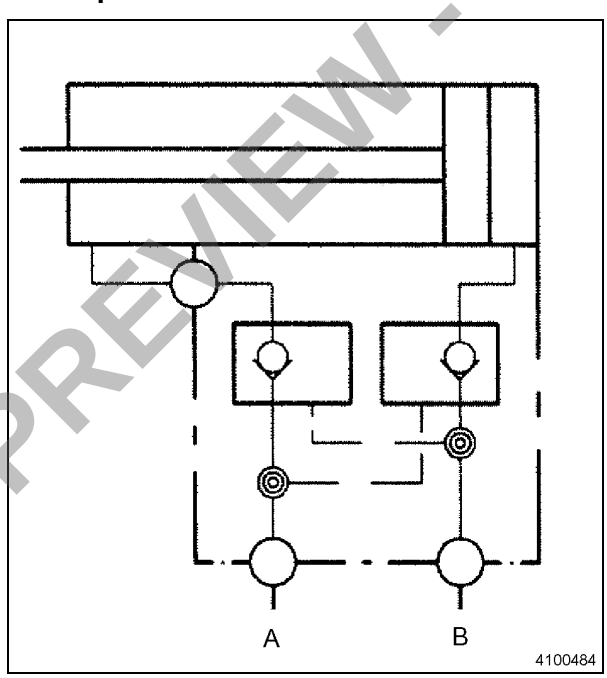


Fig. 2

Key

1 Levelling-blade cylinder, complete

2 Pilot-operated check valve on piston side

3 Control piston

4 Pilot-operated check valve on rod side

The double-acting cylinder with pilot-operated twin check valve is used for lifting and lowering of the levelling blade.

For lowering of the blade, oil flows to port B and is directly admitted via check valve (2) to the piston side. Check valve (4) is opened at the same time by control piston (3) for return oil discharge.

During lifting of the blade, the oil enters the cylinder at port A and flows via check valve (4) direct to the rod side and to control piston (3). The control piston opens check valve (2) for return oil discharge.

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