MANITOU

HANDLING YOUR WORLD

647820EN-USM14(A-11/2020)
(EUROPEAN UNION, AND AUSTRALIA)

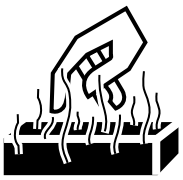
SERVICE MANUAL

160 ATJP RC ST5 S1
160 ATJP ST5 S1

00.4. SAFETY

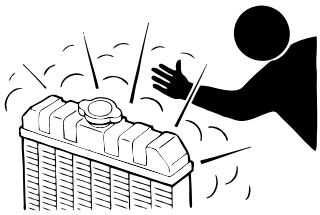
00.4.1 MAINTENANCE RULES

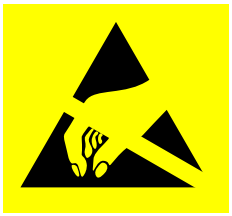
Do not carry out any work on the machine unless you have been trained and have the knowledge required for it. Be aware of all information plates on the machine and notices in the operator's manual.



⚠ CAUTION

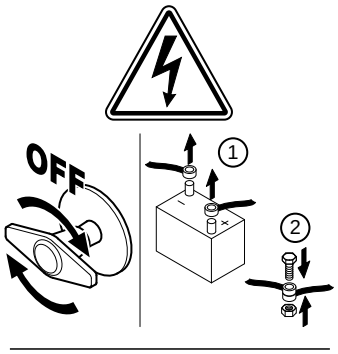
If you have to carry out work on the machine before it has had the time to cool down, be careful not to burn yourself on parts or hot liquids.





⚠ CAUTION

Protect the electronic components from static discharge.

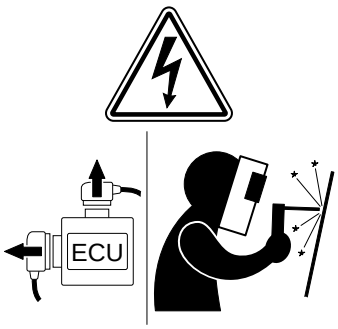


⚠ WARNING

Before carrying out any operation on an electrically powered component, activate the battery isolating switch.

⚠ CAUTION

Operate the battery cut-off no less than 30 seconds after turning off the ignition with the ignition key.



⚠ WARNING

If the truck does not have a battery isolating switch, disconnect the battery terminals then group them together.

Item	Unit	Values
H4	mm	260
D4	mm	7,020
S3	mm	12420

00.6.3 LUBRICANTS AND FUEL

Table 13. Lubricants and fuel

DESCRIPTION	CAPACITY	RECOMMENDATION
DIESEL ENGINE		
Diesel engine oil	5.1L	MANITOU OIL 15W40 API CH4 (-15 °C to 40 °C)
Cooling Circuit	4.3 L	COOLANT -35 °C
Fuel Tank	51 L	GNR HP DIESEL
HYDRAULICS		
Hydraulic oil tank	53L	MANITOU ISO VG 46 HYDRAULIC OIL (-15 °C to 35 °C)
TRANSMISSION		
Reduction gearbox	0.8L	MANITOU MECHANICAL TRANSMISSION FLUID SAE80W90 (-20 °C to 50 °C)
FRONT AXLE		
Differential	4L	SPECIAL MANITOU OIL FOR IMMERSED BRAKES
Wheel reduction gear	2 x 0.8 L	MANITOU MECHANICAL TRANSMISSION FLUID SAE80W90 (-20°C to 50°C)
Wheel Gear Reducer Pivots		MANITOU BLACK MULTI-PURPOSE GREASE (-20°C to 50°C)
Oscillation bearings		MANITOU BLACK MULTI-PURPOSE GREASE (-20°C to 50°C)
REAR AXLE		
Differential	4.8 L	SPECIAL MANITOU OIL FOR IMMERSED BRAKES
Wheel reduction gear	2 x 0.8 L	MANITOU MECHANICAL TRANSMISSION FLUID SAE80W90 (-20°C to 50°C)
Wheel Gear Reducer Pivots		MANITOU BLACK MULTI-PURPOSE LUBRICANT
LIFTING STRUCTURE		
General greasing		MANITOU MULTI-PURPOSE BLACK GREASE (-20°C to 50°C and higher)
Greasing the telescopic arm		MANITOU MULTI-PURPOSE BLACK GREASE (-20°C to 50°C and higher)
Slewing ring gear bearings		MANITOU MULTI-PURPOSE BLACK GREASE (-20°C to 50°C and higher)
Gear teeth of the slewing ring gear		MANITOU MULTI-FUNCTIONAL EXTREME PRESSURE GREASE (-20 °C to 50 °C and higher)
Turntable rotation motor	0.85 L	MANITOU MECHANICAL TRANSMISSION FLUID SAE80W90 (-20 °C to 50 °C)

00.7. REFERENCE INFORMATION

00.7.1 EXPLANATION OF SYMBOLS

⚠ DANGER

Indicates an imminent hazardous situation which, if not avoided will result in death or serious injury.

⚠ WARNING

Indicates a potentially hazardous situation which, if not avoided, may result in death or serious injury.

Stage designation	*Value*
Speed level 1/5	1,450 rpm
Speed level 2/5	1,850 rpm
Speed level 3/5	2,250 rpm
Speed level 4/5	2,650 rpm
Speed level 5/5	3,000 rpm

4. Make the adjustments from the "Calibration" screen, choose the "Engine Accel Calibration" menu.

   This calibration is to be performed on a machine with oil temperature greater than 40 °C.

5. Adjust the stages one by one, starting with stage 5/5. Activate the acceleration, adjust the engine speed value then deactivate the acceleration.
6. Check and adjust the accelerator cable tension if it is not possible to adjust the stage. Repeat the operations for all stages, then confirm.

10.3.3 ADJUST THE ALTERNATOR BELT TENSION

1. Check the belt tension between the pulleys of the crankshaft and of the alternator.
2. Under normal pressure applied by the thumb (98 N), belt movement (1) should be between 10 and 12 mm.
3. Loosen screws (2) and (3) by two to three turns.
4. Swivel the alternator assembly so as to obtain the required belt tension.
5. Retighten screws (2) and (3) (22 N.m).

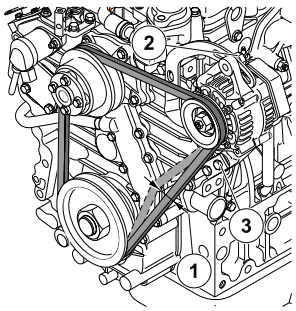


Figure 6: Alternator belt tension adjustment

10.4. REMOVAL

10.4.1 PLACING THE STRUT

1. From the Base console, raise arms 1/2 until the upper hinge (1) is one meter above the counterweight.

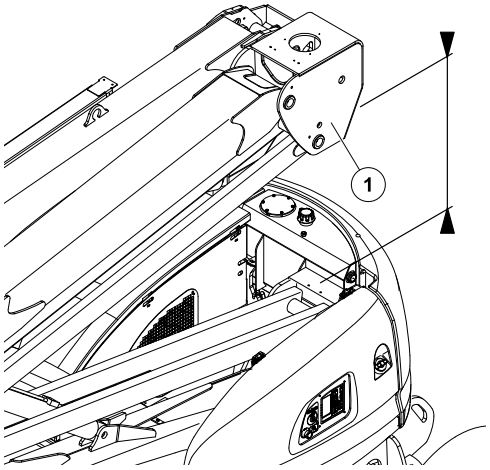


Figure 7: Distance between counterweight and upper hinge

2. Climb onto the chassis, remove the locking pin, manually raise the maintenance arm (2) and place the retaining strut (3).
3. From the Base console, lower arms 1/2 until the upper hinge (1) comes into contact with the maintenance arm, then release the controls.

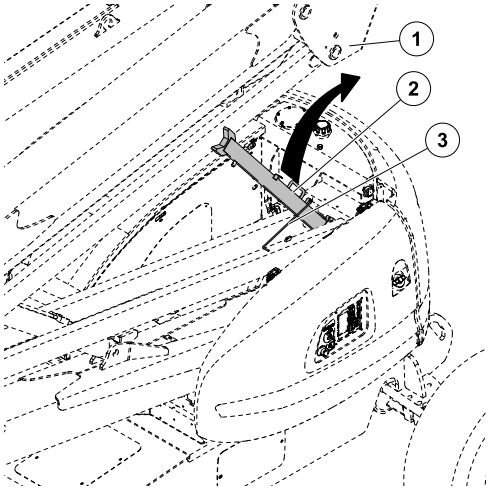


Figure 8: Placing the strut

4. Switch off the engine.

10.4.2 REMOVING THE ENGINE ACCESS COVERS

1. Remove the battery cover (1).
2. Disconnect the battery's negative terminal, then the positive terminal.

20. TRANSMISSION

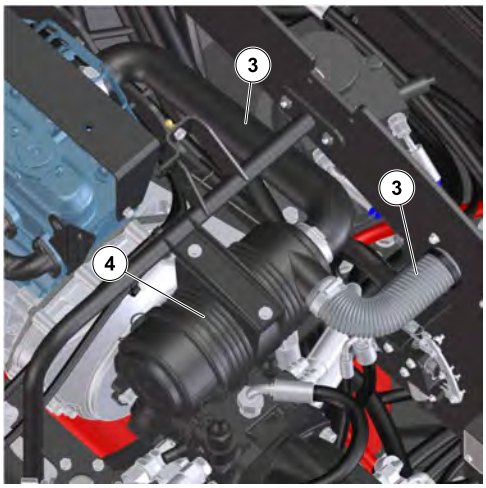
20.1. CHARACTERISTICS AND SPECIFICATIONS

20.1.1 SUPPLIER DOCUMENTATION

Additional Supplier Documentation is available for this section. Refer to the section 00.3. List of Supplier documentation, page 10 for a list of the equipment documents.

20.2. LOCATION

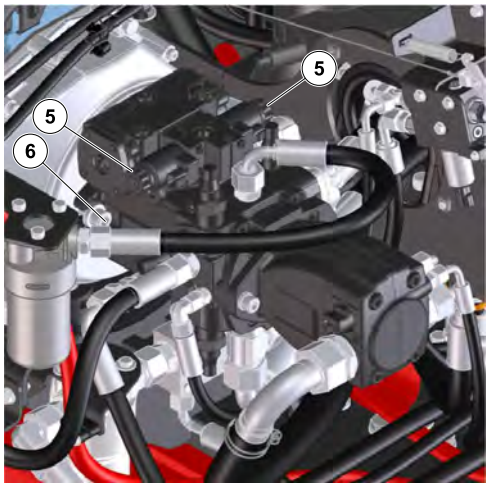
6. Remove the complete air filter (4).



7. Locate and disconnect the hydrostatic pump control wiring harnesses (5).
8. Place a drain pan under the pumps.
9. Locate, remove and plug the hydraulic hoses connected to the hydrostatic pump and the auxiliary pump.

When shut down, the pressure in these hoses is low to nil.

10. Slowly undo the nut of the hose or its fastening screws, a quarter-turn at a time, to release the residual pressure.
11. Once the pressure has fallen, remove the hose completely, plug it and proceed to the next one.
12. Place a sling hung from a hoist around the two pumps.
13. Remove the screws connecting the pump to the engine (6).



14. Remove the pumps.

20.4.2 REMOVING THE HYDROSTATIC MOTOR

1. Place the platform in the transport position on level ground.
2. Switch off the engine and power off the platform.
3. Remove the cover plate (1).

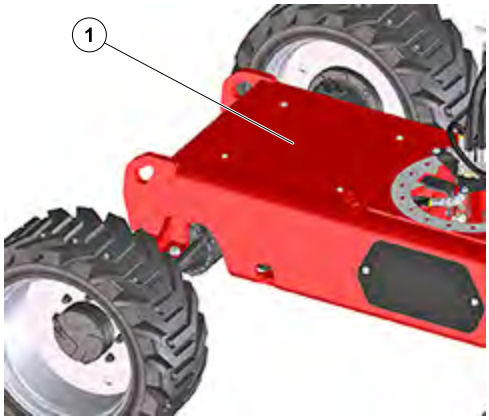


Figure 42: Location of hydrostatic motor cover plate

4. Identify, remove and plug the motor supply hoses (2).

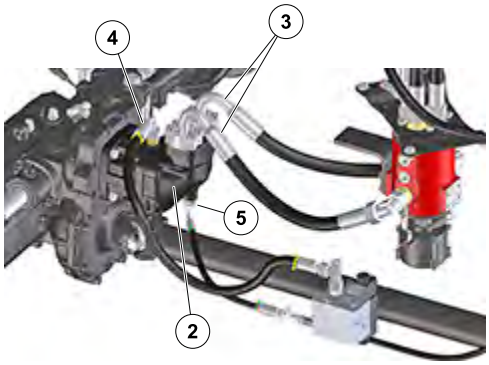
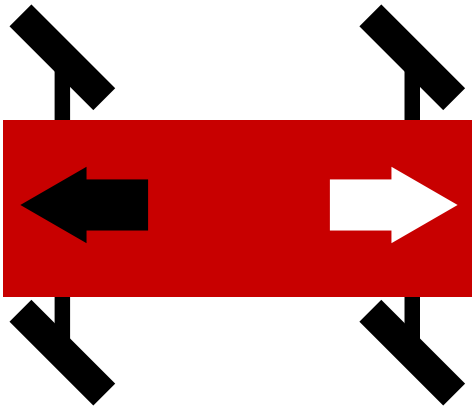


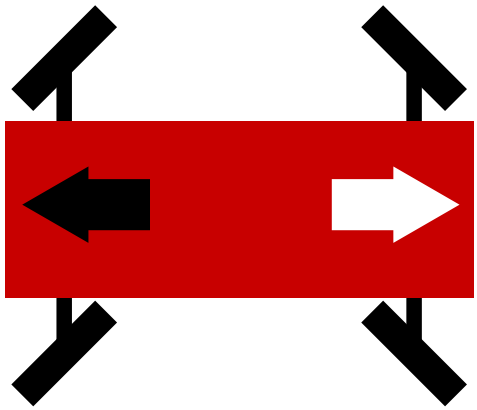
Figure 43: Hydrostatic motor hoses

5. Place a drain pan under the motor.
6. Slowly undo the hose fastening screws (3), a quarter-turn at a time, to release the residual pressure.
7. Once the pressure has fallen, fully remove the hoses and cap them with rags.
8. Remove the drain hose (4) and cap it with an 8S male plug.
9. Remove the flushing hose (5) and cap it with an 8S male plug.

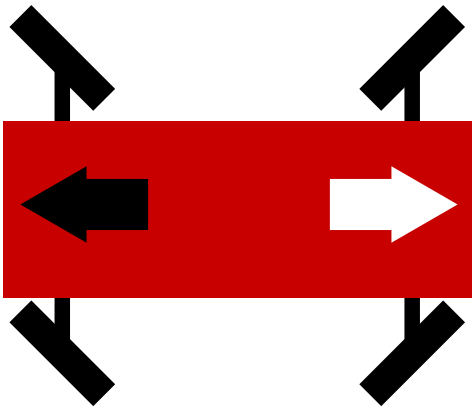
k. 2 wheel mode -> Turn the front axle wheels to the right as far as the mechanical stop.



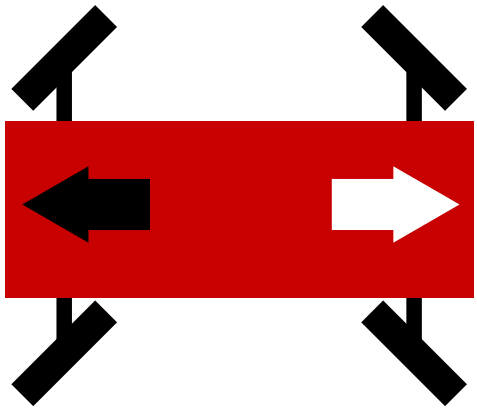
m. 4 wheel mode -> Turn the rear axle wheels to the left as far as the mechanical stop.



l. 2 wheel mode -> Turn the front axle wheels to the left as far as the mechanical stop.



n. 2 wheel mode -> Turn the front axle wheels to the right as far as the mechanical stop.



70.2.1 HYDRAULIC DIAGRAM (160 ATJP RC ST5 S1 — ATJ 46P RC T4 S2 — 160 ATJP ST5 S1)

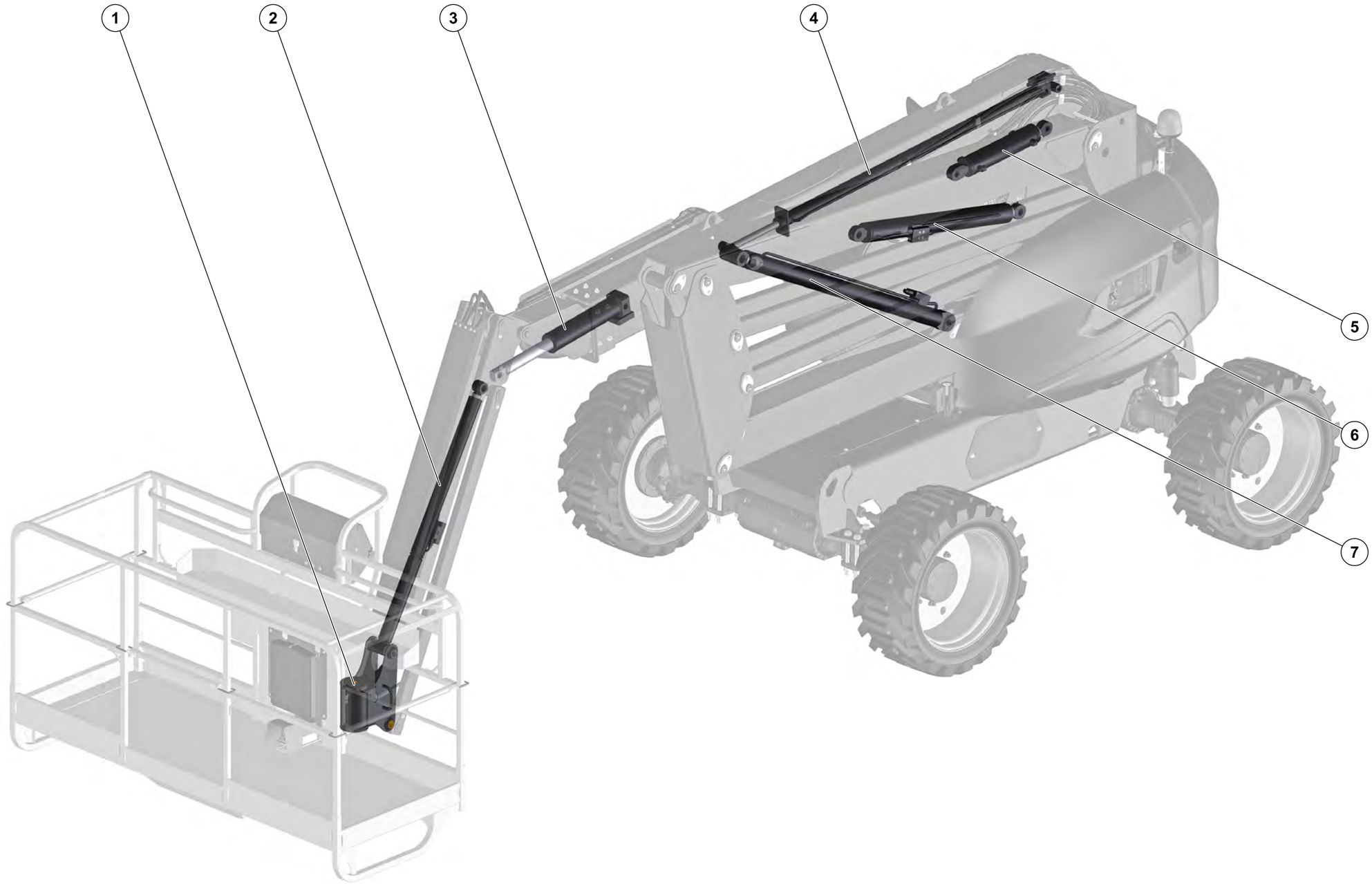
KEY

Table 14. Key to components

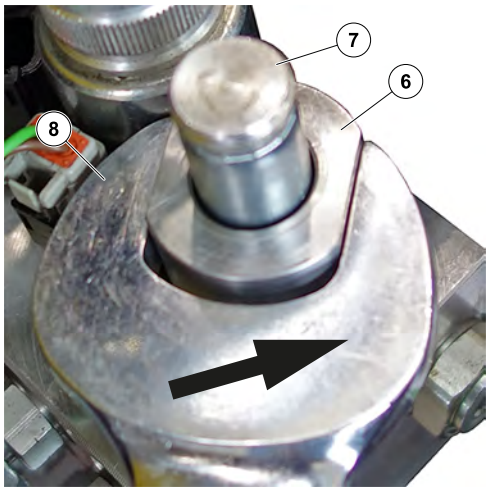
Item	Components	Position on diagram	Specifications
A1	Hydrostatic pump A10VG45	B2	
A2	Auxiliary pump LS 18 cm3	B5	
A3	Backup electric pump	A6	
AV	Front axle	I6	-
B1	PVG32 proportional valve bank	D3	-
B2	4WD Chassis function block	J3	-
B3	Backup pump block	A6	-
B4	Engine speed proportional block	E6	-
B5	Distributor block	E8	
B6	Generator option block	B8	
B7	Steer & Rotate Option Block	C11, H11	
B8	2WD Chassis function block	H9	
BDIF	Differential Lock	I2	
C1	Turntable rotation motor	D10	
C2	Hydraulic Travel Motor	H2	
C3	Basket Rotation Cylinder	D10	
C4	6-Path Rotating Joint	G5	
D1	Lower arm 1/2 lifting cylinder valve block	E3	
D2	Telescope cylinder valve block	E3	
D3	Upper arm 3 lifting cylinder valve block	F4	
D4	Jib lifting valve block	D8	
D5	Tilting cylinder /jib valve block	D8	
D6	Turntable rotation motor valve block	D9	
D7	Basket rotation cylinder valve block	D10	
D8	Oscillation cylinder valve block	H6, I6	
DIR	Steering: 2-wheel, 4-wheel, crab	H6	
DR	RH Wheel	J2, J6	
F1	Oil tank + suction strainer	C4	
F2	Intake Filter 10 µm nominal	A4	
F3	Pressure filter 10 µm absolute	B1	
F4	Oil Radiator	A1	
F5	Pressure switch	J6	
F6	Check valve	J5	
FR	Brake	I2	
G	Generator	C7	
GA	LH Wheel	H2, H6	
M	Engine	B2	Idle speed: 1,250 rpm Max. speed: 3,000 rpm
OPT G	Generator Option	B7	
OPT S&R	Steer & Rotate option	B10	

70.3.3 LOCATION OF HYDRAULIC COMPONENTS IN THE ARMS

Figure 67: Location of hydraulic components in the arms

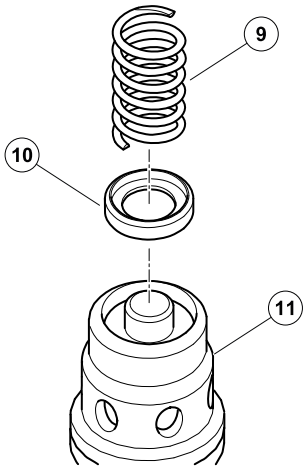


7. Loosen the first solenoid core with an open-ended wrench (8).



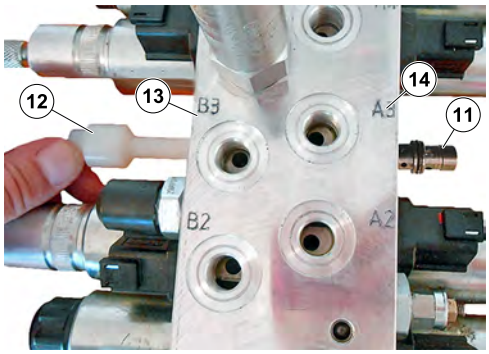
8. Unscrew the first solenoid core (7) by hand.

9. Discard the solenoid core (7) and the spring (9).



10. Repeat the steps above for the second solenoid core.
11. Push the valve body (11) in with the positioning tool (12).

Check the direction: push the valve body (11) in from the direction of the "B" holes (13) and take it out from the direction of the "A" holes (14).



12. Discard the thrust washers (10) and the valve body (11).

70.5.2 *Removing the distributor block*, page 89

70.5.4 PREPARING FOR CYLINDER REMOVAL

1. Place the platform on level ground.
2. From the base control panel and, depending on the cylinder to be removed, raise arms 1/2, raise arm 3, extend the telescope or extend the jib.
3. Hold by wedging or by means of a sling hung from a hoist.
4. For the jib (1), tilting (2), compensating (4) and telescope cylinders:

Item	Fuse/relay	Description	values
5	FU103 — F3	Ground-level display screen and control panel in the platform	5 A fuse
7	FU104 — F4	Worklight power supply (option)	5 A fuse
8	FU105 — F5	Backup pump button	10 A fuse
9	FU106 — F6	Ground level display screen	5 A fuse
10	FU107 — F7	Key switch	10 A fuse
11	FU108 — F8	Diesel engine power supply	30 A fuse
6	K1	Immobilizer (option)	12 V 35 A Relay
12	K2	Diesel engine stop	12 V 35 A Relay
13	K3	General electrical power supply	12 V 35 A relay

Figure 116: Location of ground control panel Fuses/Relays box

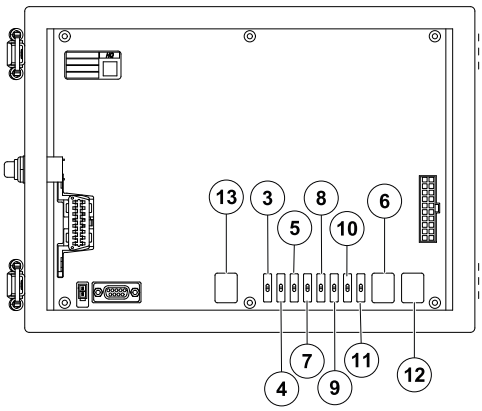


Figure 117: Location of fuses and relays in the box

Item	Description	DIAG1	DIAG2	DIAG3	DIAG4	DIAG5	DIAG6	DIAG7	DIAG8
SW304	Selec. 3 p: RH basket rotation							F7	
SW306	Selec. 3 p: Jib lifting							F8	
SW314	Selec. 2 p: Worklight ON/OFF			B9					
SW315	Selec. 2 p: Driving light ON/OFF			B10					
SW316	SMS anti-crush contact			B13					
UC234	Base control panel ECU	A1	A1	G11	A1	A12	A14	A2	A6
UD22	Screen / keypad UD22		C14						
UD70	Screen / keypad UD70 Base control panel	C14							
UPC130	Basket control panel ECU	H13	I13	B8		I13	H12	H7	C9
UR01	Fuse Relay card	F2		F2	F2	F2	F2	F2	F2
X100	Base control panel => jib hinge link connector	F10	G6			F5	F4	F3	E4
X103	Base control panel => arm - turntable - telescope sensor link connector				F4				
X105	AMP1 harness/UPC102 harness Start PB link connector			H13					
X106	AMP3 harness/remote control emergency stop link connector			I10					
X109	Chassis / rotating joint / turntable connector				F11	D5		D8	
X118	Engine harness/UR02 connector		F6						
X200	Jib/basket link connector	G10	G8			H5	G4	G3	G4
X300	Basket control panel to jib connections connector	H10	H11			J12	I10	I7	D13 / D9
X301	Basket control panel / DM pedal basket overload connector					G8	G6	H5	D11

Table 23. List of diagrams

Id	Description
Diag. 1	Power supplies, backup pump emergency stop
Diag. 2	CAN BUS network
Diag. 3	Signals – Generator – Easy Manager (Track Unit)
Diag. 4	Sensor inputs
Diag. 5	Forward
Diag. 6	Proportional movements
Diag. 7	Auxiliary proportional movements
Diag. 8	Hydraulic safety overload

80.3. LOCATION

Harness no.	Component ID	Description
	SV106	RH steering SV
	SV108	RH turntable rotation SV
	SV110	Basket tilting extension SV
	SV112	RH Basket rotation SV
	SV114	Jib extend SV
	X105	Worklight (option)
	X106	Driving light
	AC111	flashing light (SPS option)
	SV124	Steering control SV
	AC105	Rotating beacon light
7	X301 L204	Basket control panel
	DS301	Overload sensor 1
	DS302	Overload sensor 2
	PB306	Dead man pedal pushbutton
8	X103	Base control panel - UC234
	IS200	telescope retraction sensor
	IS207	arm sensor

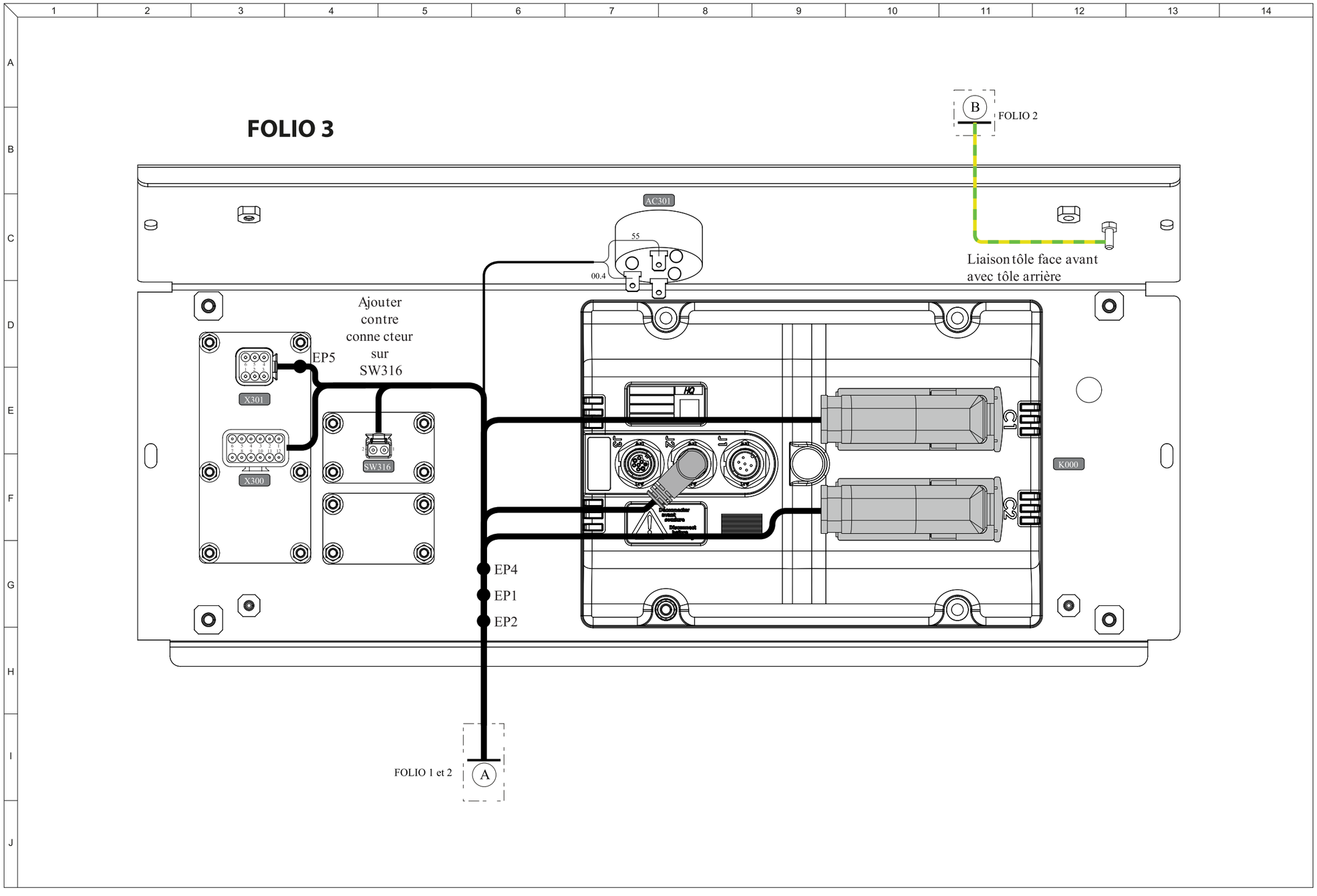
Table 24. List of Harnesses

Item	Description
1	Chassis harness
2	Harness AMP1
3	Harness AMP2
4	Harness AMP3
5	Intermediate harness base to upper arm
6	CAN bus harness upper arm to basket
7	Basket harness
8	Arm sensor extension harness

80.3.5 LOCATIONS OF CONTROLS, BASE CONTROL PANEL INDICATORS AND WIRING

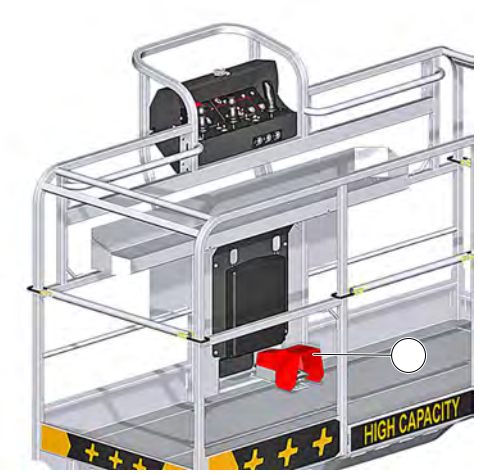
Item	*Designation*	*Base control panel controls and indicator lamps*	*Base control panel wiring*
AU101	Base control panel emergency stop button	C4	B12–C12
DIAG	OBDII diagnostic plug	-	D2
IN109	Jib up	B6	-
IN110	Jib lowering	B6	-
IN111	Telescope retraction	B6	-
IN112	Telescope extension	B6	-
IN113	3 Arm up	B6	-
IN114	3 Arm down	B6	-
IN115	Arm Raised 1/2	C6	-
IN116	Arm Lowered 1/2	C6	-
IN117	LH turntable rotation	C6	-
IN118	RH turntable rotation	C6	-
IN119	Tilting - Crowding	D6	-
IN120	Tilting - Dumping	D6	-
J1	Control panel front link connector	-	D7
J2	Pocket + reprogramming connector	-	E2–E3
J7	Backup pump pushbutton link connector	-	E2
PB100	Start pushbutton (Base)	C4	C12-D12
SW100	Base / basket panel selector	D4	E13
SW101	Force engine rpm	D4	D12
SW102	Ignition key	D4	-
SW103	Base/basket backup pump pushbutton	C3	-
U120	UC234 card		
UD110	UD70 card	-	E9-E10
XXxxx	Ground display screen control keys	B6 to D6	-
XXx-A	Rapid access to maintenance menu (gray background)	B6	-
	Maintenance is required (orange background). Rapid access to maintenance menu	-	-
	Upward navigation in the menu	-	-
	Move up on the page	-	-
XXx-B	Upward navigation in the menu	C6	-
	Downward navigation in the menu	-	-
	Move down on the page	-	-

Figure 145: Basket control panel wiring: Folio3



Sub-Group	Number	Description	Value	Minimum Value	Maximum Value	Overall number
	1	Saving machine parameters	0	0	1	31
	2	Restoring machine parameters	0	0	1	32
	3	Restore basic factory values	0	0	1	33
LANGUAGE PARAME-TERS	0	Language parameters	0	0	1	34
INPUT MANAGE-MENT	0	Engine Speed Calcul Coeff	5.64	5.64	5.64	35
	1	Engine rpm filter delay	5	0	50	36
	2	Working travel joystick filter	10	0	100	37
	3	Slow (tortoise) transport travel joystick filter	15	0	100	38
	4	Fast (hare) transport travel joystick filter	25	0	100	39
	5	Ramp transport travel joystick filter	25	0	100	40
	6	Fuel sensor filter	50	0	100	41
	7	Tilt release time delay OFF (s)	0.5	0.0	3.0	42
	8	Backup pump request time delay OFF (s)	0.5	0.0	5.0	43
	9	Overload time delay ON (s)	1.0	0.0	5.0	44
	10	Overload time delay OFF (s)	1.0	0.0	5.0	45
	11	Boom limit switch time delay ON (s)	0.2	0.0	3.0	46
	12	Boom limit switch time delay OFF (s)	0.5	0.0	3.0	47
	13	Arm down limit switch time delay ON (s)	0.2	0.0	3.0	48
	14	Arm down limit switch time delay OFF (s)	0.5	0.0	3.0	49
	15	Arm 3 down limit switch time-out ON (s)	0.2	0.0	3.0	50
	16	Arm 3 down limit switch time-out OFF (s)	0.2	0.0	3.0	51
	17	Arm 3 up limit switch time-out ON (s)	0.2	0.0	3.0	52
	18	Arm 3 up limit switch time-out OFF (s)	0.2	0.0	3.0	53
INPUT REVERSAL	0	Overload 1 direction reversal	1	1	1	54
	1	Overload 2 direction reversal	1	1	1	55
	2	Base select Dead Man direction reversal	0	0	0	56
	3	Battery charge direction reversal	0	0	0	57
	4	High water temperature direction reversal	1	0	1	58
	5	Low oil pressure direction reversal	1	0	1	59
	6	Rear axle aligned direction reversal	0	0	1	60

Sub-Group	Number	Description	Value	Minimum Value	Maximum Value	Overall number
	4	APC-BAT power supply difference error threshold (V)	2.00	1.00	10.00	326
	5	High water temperature warning time delay ON (s)	20.0	0.0	600.0	327
	6	High water temperature warning time delay OFF (s)	4.0	0.0	600.0	328
	7	Engine low oil pressure warning time delay ON (s)	20.0	0.0	600.0	329
	8	Engine low oil pressure warning time delay OFF (s)	4.0	0.0	600.0	330
	9	Battery charge problem warning time delay ON (s)	10.0	0.0	600.0	331
	10	Battery charge problem warning time delay OFF (s)	2.0	0.0	600.0	332
	11	Low level 1 fuel warning threshold (l)	10	0	60	333
	12	Low fuel level 1 warning time delay ON (s)	8.0	0.0	60.0	334
	13	Low fuel level 1 warning time delay OFF (s)	8.0	0.0	60.0	335
	14	Low level 2 fuel warning threshold (l)	7	0	60	336
	15	Low fuel level 2 warning time delay ON (s)	8.0	0.0	60.0	337
	16	Low fuel level 2 warning time delay OFF (s)	8.0	0.0	60.0	338
	17	Very low fuel level warning threshold (l)	4	0	60	339
	18	Very low fuel level warning time delay ON (s)	4.0	0.0	60.0	340
	19	Very low fuel level warning time delay OFF (s)	4.0	0.0	60.0	341
	20	Battery/W charge problem warning Time Delay ON (s)	8.0	0.0	60.0	342
	21	Battery/W charge problem warning Time Delay OFF (s)	2.0	0.0	60.0	343
	22	Engine OFF Time Delay warning (s)	20	0	1800	344
	23	Unlock safety time delay blocked ON (s)	30.0	0.0	600.0	345
	24	Backup Pump Time Delay Blocked ON (s)	120.0	0.0	3,000.0	346
	25	Overload warning Time Delay ON (s)	1.0	0.0	2.0	347
	26	Overload warning Time Delay OFF (s)	1.0	0.0	5.0	348
	27	Working Tilt warning Time Delay ON (s)	0.2	0.0	60.0	349
	28	Working Tilt warning Time Delay OFF (s)	1.0	0.0	60.0	350



ACCESS TO BASE SCREEN PAGE

Management of this function is accessed through the screen pages: Specific Function / Stop&Go Function

Then several choices:

- Function activation/deactivation
- Automatic stop/start of engine

STOP&GO MANAGEMENT

Estimation of battery charge level

The battery charge level is only estimated with the engine not started. There are 4 battery charge levels:

Designation	*Description*
Critical	+BAT voltage < 11.3 V for at least 5s
Insufficient	+BAT voltage < 11.6 V for at least 5s
Low	+BAT voltage < 12.0 V for at least 5s
Normal	when the battery charge level is not one of the other 3

Activation of Stop & Go mode

Stop & Go mode is active if all of the following conditions are met:

- The "Stop & Go" option is activated.
- The engine has been started for at least 10 minutes (configurable) since powering on.
- Furthermore, if the battery charge is estimated at Critical or Insufficient level, Stop & Go mode will be deactivated (once the engine has restarted) until the system is turned off.
- The "Stop & Go" option is deactivated if the engine is in Regeneration mode.

Engine automatic stop conditions

When Stop & Go mode is active, the engine can stop automatically if all of the following conditions are met for at least 30 seconds (configurable):

- Dead man not pressed (pedal in basket and Base/ Basket selector released).
- No engine speed forcing activated (Snow mode inactive).
- No SMS movement stop in progress.
- The generator is not running.
- The arms 1/2 are not fully lowered.
- The last Dead Man activated is the pedal in the basket.
- The engine hood is closed.
- Battery charge was estimated at Normal or Low level (for Low level: the engine must have been running for at least 30 minutes to authorize shutdown).
- No regeneration in progress

Engine automatic restart conditions

When Stop & Go mode is active, the engine restarts automatically if at least one of the following conditions is met:

90. CHASSIS

90.1. CONTROL AND ADJUSTMENT

90.1.1 CHECK SLEWING RING GEAR PLAY

Measure the tilting play: In order to determine the amount of wear, it is advisable to measure the play of the turntable rotation slewing ring gear (1).

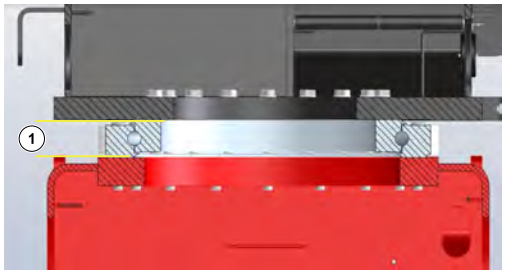
Apply the preparation and safety instructions before performing this operation.

A measurement is taken when the machine is commissioned for the first time. It will serve as a basis for subsequent checks. Refer to the Commissioning sheet.

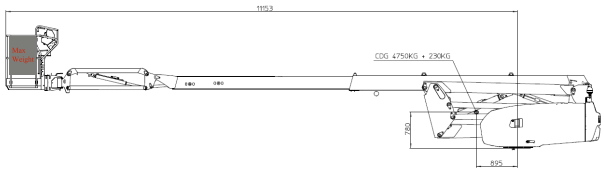
Machine :		CONTRÔLE REFERENCE MACHINE MISE EN SERVICE
S/N :		Date :
		Heure machine :
MESURES	Arrière -> Avant : axe longitudinal *	
	Arrière -> Avant : axe transversal *	
	CONTROLEUR	
	SOCIETE	
	SIGNATURE	

* indiquer la valeur du jeu mesuré (mm)

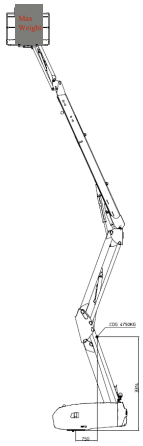
1. Check the pre-stessing of the bolts. Starting from a certain position, select and mark a measuring point. The measurement is taken between the supporting structure and the slewing ring gear bolted to the superstructure (1). The measurement must be taken as close as possible to the slewing ring gear to avoid the influence of elastic deformations.



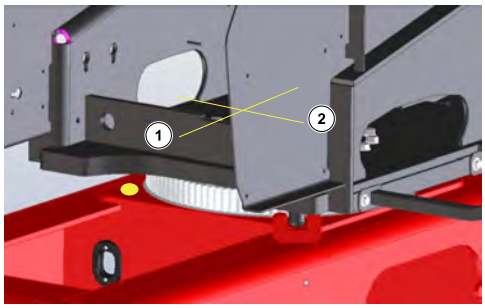
2. To zero out the dial gauge, which must be accurate to within 0.01 mm, position the dial gauge at the point where the maximum rearward torque (A) applies.



3. Then, create a forward torque (B) by positioning the machine at full elevation, for example.



4. Then take the measurement along the longitudinal axis (1) and lateral axis (2) of the machine.



The play measurement is thus the value displayed between the forward and rearward torque of the machine. The reference values are noted in a table that follows the machine's Maintenance file. This measurement must be repeated as recommended in the Instruction Manual and performed under the most identical conditions of the original measurement.