

PANTHER 170-200



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1 General information

1.1 Description

This Panther is exclusively designed for CPT (related) operations. The CPT push frame allows to push-in or pull-out CPT tubes with a diameter of 36 mm, as well as casing tubes with a diameter of 55 mm. The maximum bore of the CPT push frame is 96 mm.

1.2 Terms and conditions

Geomil applies the terms and conditions of the Metaalunie to the delivered products. These are the standard conditions of delivery and payment issued by the 'Metaalunie', referred to as the METAALUNIE CONDITIONS and previously as the SMECOMA CONDITIONS, filed at the Registry of the District Court in Rotterdam on 1 January 2008. Terms and conditions are available upon request.

*Alteration to article 14 Warranty 14.1: Geomil warrants the proper execution of the agreed performance for a period of two years after delivery or completion.

*Alteration to article 14 Warranty 14.2: If it transpires that the delivered construction or the materials used are unsound, the contractor shall repair or replace them. The parts which the contractor is to repair or replace must be sent to him free of charge. The dismantling and assembly of these parts and any travelling and accommodation expenses incurred shall be borne by the customer. This does not apply to the delivered construction or materials inside the Netherlands.

1.3 Warranty of quality

A warranty of two years applies on all by Geomil Equipment delivered materials, provided the maintenance of the CPT push frame is conform to the maintenance schedule assigned to Geomil Equipment.

In case the equipment is located outside The Netherlands, the warranty applies exclusive of travel- and accommodation expenses.

This warranty does not apply for the materials provided by the user, or for materials provided by third parties.

Normal wear and tear is also excluded from this warranty.

1.4 Training

Working with this crawler requires qualified personnel. Geomil recommends a two-person crew.

Geomil Equipment strongly recommends training and can provide and/or support such training.

1.5 Redistribution

When the owner redistributes/sells on the delivered equipment to third parties, the responsibility for the equipment fully lies with the owner. Translation of any documents by the owner of the equipment also applies to this rule. Translated documents must be marked with 'translation' (e.g. 'ORIGINAL MANUAL' -> 'TRANSLATION OF THE ORIGINAL MANUAL').

1.6 CE-marking

This CPT machine is designed and constructed according to the Machine Directive 2008/42/EG.

Any alterations made by the owner, to this machine as delivered, immediately invalidates the CE marking.

Without the CE marking all warranties applied and responsibilities by Geomil Equipment BV are invalidated.

In case the owner wants alterations to be implemented on the machine, a written request must be handed over to Geomil Equipment BV.

Alterations to this machine can only be executed after written approval by Geomil Equipment BV.





1.7 Options

This manual has been designed for the PANTHER 170-200 range.

Some options mentioned in the manual may not be installed on the actual crawler.

2 Safety requirements

2.1 Table of safety and precautionary terms

	<p>Information</p> <p>Additional information for the user.</p>
	<p>Attention</p> <p>A note with additional information for the user. Alerts the user to potential problems.</p>
	<p>Caution</p> <p>The product could be in danger. This signifies possible damage to the product if the user does not carefully comply with the procedures.</p>
	<p>Danger</p> <p>Warning for danger. The user could be in danger or do serious damage to the product. A warning signifies damage to the user or to the product, if the user does not carefully comply with the instructions.</p>

2.2 Recommended safety precautions

	<p><i>Necessary knowledge of safety and operation instructions.</i></p>		<p><i>Wear working gloves.</i></p>
	<p><i>Wear working clothes.</i></p>		<p><i>Wear eye protection.</i></p>
	<p><i>Wear safety shoes with steel toe caps.</i></p>		<p><i>Wear hearing protection.</i></p>

2.3 High-risk situations

2.3.1 Levelling

- Stay away from the levelling jacks while levelling.
- Level and lower the crawler evenly. **Never** extend or retract the levelling jacks one by one.

2.3.2 Driving the crawler

- Stay away from the tracks while (un-)loading and driving the crawler.
- While driving the crawler it is prohibited for any person(s) to be present in the working cabin.
- Make sure that the CPT push frame and the bellows are fully retracted.
- Make sure that the support tube, the friction reducer, the cone etc. are removed from the push frame foundation.
- Make sure that levelling jacks are completely retracted.

2.3.3 Transport truck

- Loading and unloading the crawler to and from the transport truck **must** be done by using the remote control, standing **outside** the crawler, standing **alongside** the truck.
- When loading/unloading the crawler make sure that there is nobody in the vicinity of the crawler.
- Make sure when transporting the crawler there are no loose items on the transport truck and in the crawler.

2.3.4 CPT push frame

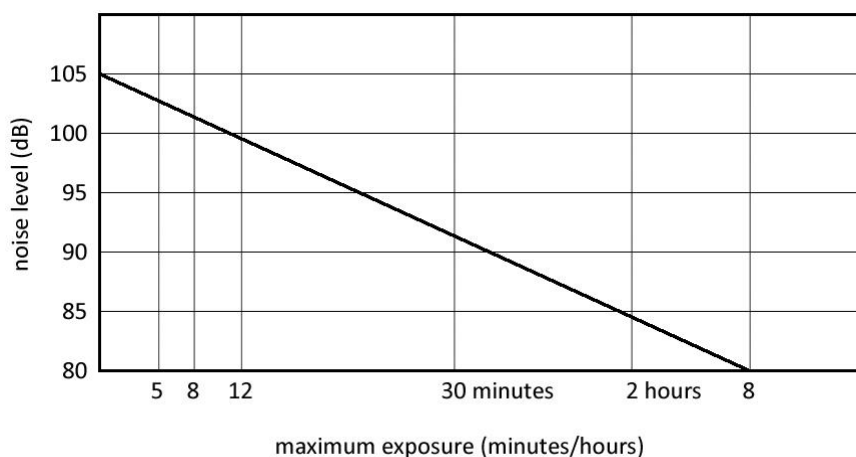
- Keep hands and fingers clear from moving parts while un-/screwing, pushing and pulling CPT tubes.

2.3.5 CPT tubes

- Make sure that the CPT tubes are properly joined (shoulder to shoulder) to avoid fracture at the threaded ends.
- Handle the CPT tubes (protruding length) carefully when other persons are nearby.

2.3.6 Noise level

- Max. noise level 72 dBa (measured at the work area).
- When working for more than 3 hours per day at 83 dBa, wear hearing protection.
- Never let the engine run in a closed area.



2.3.7 Other possible situations



- Ensure yourself that the underground is clear of services.
- Locate the obstacle(s) by manually pre-digging or pre-drilling, adhere to local regulations!
- If pre-drilling or pre-digging is done, it is recommended the ground is surveyed to a depth below where the obstacle lies, with a minimum of 1.50 m below ground level.
- In case of a thunderstorm, do not perform CPT's or any work in an open area, considering the possibility of electrocution.
- If it is known that the site is polluted, protective clothing such as gas masks, gloves etc. is obligatory.
- Always return and secure all parts to their appropriate position after use.
- Wear eye protection when using the compressed-air gun.

3 Transport

3.1 Transport on flatbed truck


It is advised to transport the crawler on a flatbed truck. Make sure to properly secure the crawler during transport with appropriate lashing means. Only use the 4 lashing points on the far edges of the crawler (SWL = 8 mT)!


3.2 Unloading the crawler

	<ul style="list-style-type: none"> • Always use the remote control to drive the crawler. • Make sure to keep a safe distance while driving the crawler (at least 1m). • While driving the crawler it is prohibited for any person(s) to be present in the work cabin. • While unloading the crawler from the transport truck, keep a safe distance from the truck. • While unloading the crawler from the transport truck, it is prohibited to be present on the loading deck of the transport truck.
	<p>Always place the transport vehicle on an even and steady horizontal surface before</p> <p>Loading/unloading the crawler to/from the transport truck.</p>

Step	Action	Information	Remark(s)	Fig.	Switch/item
1.	Place the transport on an even and steady horizontal surface			-	-
2.	Lock the wheels of the transport truck and lower the ramps			-	-
3.	Prepare the crawler for driving		Refer to chapter 10	-	-
4.	Choose low speed on the remote control		Refer to chapter 5	-	-
5.	Gently drive the crawler off the transport truck		Refer to chapter 10	-	-
6.	Clear the transport truck completely			-	-

3.3 Loading the crawler

	<ul style="list-style-type: none"> • Always use the remote control to drive the crawler. • Make sure to keep a safe distance while driving the crawler (at least 1m). • While driving the crawler it is prohibited for any person(s) to be present in the work cabin. • While loading the crawler onto the transport truck, keep a safe distance from the truck. • While loading the crawler onto the transport truck, it is prohibited to be present on the loading deck of the transport truck.
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	<p>Always place the transport vehicle on an even steady horizontal surface before Loading/unloading the crawler to/from the transport vehicle.</p>
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Step	Action	Information	Remark(s)	Fig.	Switch/item
1.	Place the transport truck on an even and steady horizontal surface			-	-
2.	Lock the wheels of the transport truck and lower the ramps			-	-
3.	Make sure the tracks are clean. Remove any dirt or debris if necessary			-	-
4.	Choose slow driving on the remote control			53 CW pos. 3,4	Hare: fast driving Snail: slow driving
5.	Gently drive the crawler on to the transport truck		Refer to chapter 10	-	-
6.	Shut down the crawler		Refer to chapter 9	-	-
7.	Secure the crawler on the transport truck			-	-


4 Safety circuit


The crawler is equipped with a safety circuit.

The safety circuit consists of:


- 1 emergency switch on the remote control (Fig. 53 CW, item 5)
- 1 emergency switch on the control cabinet (Fig. 53 DS, item 20)
- Main power switch (Fig. 53 DS, item 1)
- Main circuit breaker (Fig. 53 DT, item 3)


4.1 Emergency switches on the remote control

	<p>The emergency switch operates as a system stop.</p> <p>Which means that after activating the emergency switch all movement is stopped. (tracks will be shut down) The engine will keep running.</p>
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	<p>Press an emergency switch to deactivate the tracks.</p>	<p>Pull out the switch to release</p> <p>Rotate the switch clockwise to release</p>	<p>Fig. 53 CW, item 5</p> <p>Fig. 53 CW, item 5</p>
<p>After pressing an emergency switch press the reset switch on the Scanreco (Fig. 53 CW, item 5), to release the system</p>			

4.2 Emergency switches on the control cabinet


	<p>The emergency switch operates as a system stop.</p> <p>Which means that after activating the emergency switch all movement is stopped. The engine will be shutdown.</p>
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	<p>Press an emergency switch to deactivate the machine.</p>	<p>Pull out the switch to release Rotate the switch clockwise to release</p>	<p>Fig. 53 DS, item 20 Fig. 53 DS, item 20</p>
<p>After pressing an emergency switch, release as described above and start up the system as during a normal start-up.</p>			

4.3 Main power switch


The main power switch is located on the control cabinet.
(Fig. 53 DS, item 1)


4.4 Main circuit breaker

	<p>The crawler is equipped with a main circuit breaker inside the work cabin.</p> <p>The main circuit breaker is located on the front control panel, at the bottom of the control cabinet (Fig. 53 DT, item 3).</p> <ul style="list-style-type: none"> • The main circuit breaker switch must be in the "ON" position when operating the crawler (the key is locked in). • Set the main circuit breaker switch to the "OFF" position and take out the key when not operating the crawler over a longer period of time. • When servicing the powerpack or electrical installation the main circuit breaker key must be removed and a padlock must be locked in the main circuit breaker to prevent another key to be placed.
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5 Remote control

With the crawler a remote control (Fig. 53 CW) is supplied. The controller works as a radio controlled control (or can work with a cable attached). Driving the crawler is only possible by using the remote control. Other functions, such as adjustment of engine RPM and levelling are installed on the control cabinet.

	The remote control is equipped with an electronic output adjustment.	
	The adjustment applies to all levers.	
	To adjust: use the switch (Fig. 53 CW, item 4): (push left to decrease output, push right once to increase to maximum)	
	Led not flashing:	0x/sec Maximum
	Led flashes:	1x/sec Minimum
For further detailed information, refer to Scanreco manual.		

	<p>If the remote control receiver loses contact with the remote control, the system will go into an emergency stop.</p>
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5.1 *Activating the remote control*

Step	Action	Information	Remark(s)	Fig.	Switch/item
1.	Unlock emergency switch on remote		Turn clockwise	53 CW	5
2.	Press activation switch			53 CW	6
	Activation light is lit			53 CW	

5.2 *Deactivation of remote control*

Step	Action	Information	Remark(s)	Fig.	Switch/item
1.	Press emergency switch on remote		Press to activate	53 CW	5
	Activation light is dimmed			53 CW	6

5.3 *Activation of wired remote control*

The remote control supplied with the crawler can also work with a cable attached. The remote control is supplied with a 5-meter remote control cable.

The wired remote control should be operated as follows:

Step	Action	Information	Remark(s)	Fig.	Switch/item
1.	Connect remote control cable to Scanreco control box located inside the powerpack.				
2.	Connect remote control cable to Scanreco remote control		Connect to left side of Scanreco		
3.	Switch the Scanreco setting to manual		Left side of receiver		
4.	Unlock emergency switch on remote		Turn clockwise	53 CW	5
5.	Press activation switch			53 CW	6
	Activation light is lit			53 CW	

5.4 De-activation of wired remote control

Step	Action	Information	Remark(s)	Fig.	Switch/item
1.	Press emergency switch on remote		Press to activate	53 CW	5
	Activation light is dimmed			53 CW	
2.	Disconnect remote control cable from Scanreco remote control		Disconnect from left side of Scanreco		
3.	Disconnect remote control cable from control cabinet located inside the powerpack.				
4.	Switch the Scanreco setting to auto		Left side of receiver		
5.	Store the remote control and remote control cable on their proper location				

5.5 Remote control functions

#	Explanation	Remark(s)	Fig.	Switch/item
1.	Track left	Lever up: left track forward Lever down: left track backward	53 CW	1
2.	Track right	Lever up: right track forward Lever down: right track backward	53 CW	2
3.	Micro control	Refer to chapter 5	53 CW	4
4.	Micro control light	Refer to chapter 5	53 CW	
5.	Emergency switch	Stops all driving processes	53 CW	5
6.	Activation switch	Activate remote control	53 CW	6
7.	Activation light	Indication of active remote control	53 CW	
8.	Fast / Slow driving	Switch up: fast driving Switch down: slow driving	53 CW	3

6 Control Cabinet

The crawler is equipped with a control cabinet (Fig. 53 DE) and consists of the following parts:

#	Explanation	Information	Remark(s)	Fig.	Switch/item
1.	Top control panel			53 DR	3
2.	Levelling gauge			53 DR	2
3.	Front control panel			53 DR	1

In this chapter a short explanation is given of the control cabinet functions.

6.1 Top control panel

#	Explanation	Information	Remark(s)	Fig.	Switch/item
1.	Main power switch			53 DS	1
2.	Lever to operate the push frame at high speed		Move forwards to lower the push frame	53 DS	2
3.	Lever to operate the push frame at CPT speed		Move forwards to lower the push frame	53 DS	3
4.	Lever to open/close the catching clamp			53 DS	4
5.	Max. CPT push force valve		Screw clockwise to increase the Max. CPT force	53 DS	5
6.	Flow regulator valve		Screw clockwise to decrease the push frame CPT speed	53 DS	6
7.	Lever to operate levelling jack		Controls levelling jack front left	53 DS	7
8.	Lever to operate levelling jack		Controls levelling jack rear	53 DS	8
9.	Lever to operate levelling jack		Controls levelling jack front right	53 DS	9
10.	Enable regeneration filter		Enable regeneration of diesel particulate filter	53 DS	10
11.	Disable regeneration filter		Disable regeneration of diesel particulate filter	53 DS	11
12.	System pressure gauge			53 DS	12
13.	Catch clamp pressure gauge			53 DS	13
14.	CPT pressure gauge			53 DS	14
15.	Flash lights			53 DS	15
16.	Working lights			53 DS	16
17.	Sounding light			53 DS	17
18.	Main power switch			53 DS	18
19.	Fuel level meter			53 DS	19
20.	Emergency stop			53 DS	20

6.2 *Front control panel*

#	Explanation	Information	Remark(s)	Fig.	Switch/item
1.	Battery charger Scanreco			53 DT	1
2.	Battery charger on / off			53 DT	2
3.	Main circuit breaker			53 DT	3

7 Alarms and warnings

7.1 System

7.1.1 Emergency switch

Step	Action	Information	Remark(s)	Fig.	Switch/item
1.	An emergency switch is activated		On remote control	53 CW	5
2.	Driving process is disabled			-	-

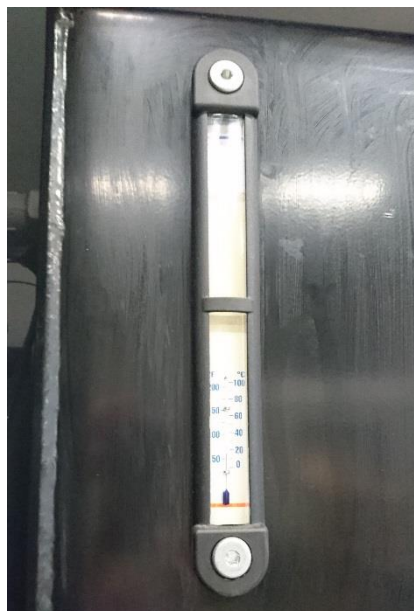
To continue:

Step	Action	Information	Remark(s)	Fig.	Switch/item
3.	Unlock emergency switch		Pull out	53 CW	5

7.1.2 Hydraulic oil level

During the use of the Panther the hydraulic oil level and temperature should be monitored with regular intervals (approx. 1 hour).

The hydraulic oil level and temperature can be monitored visually on the level/temperature gauge positioned on the oil tank inside the powerpack.



When during operations the hydraulic pump starts to make noise, IMMEDIATELY stop the engine. The noise might be caused a lack of hydraulic oil which will destroy the pump in a matter of seconds!


To fill the oil tank:

Step	Action	Information	Remark(s)	Fig.	Switch/item
1.	Make sure all cylinders are completely retracted			-	-
2.	Check if the engine is not running		Refer to chapter 9	-	-
3.	- Open the upper welding socket on the side of the tank - square fill hatch on top of the power pack housing		Remove the plug Remove the bolts	-	-
4.	When filling through the welding socket open the tank breather filter		Turn counter clockwise	-	-
5.	Fill the oil tank with oil		Use only recommended oils!	5 A	-
	Fill the tank until the oil level reaches the top blue line of the oil level gauge		Do not overfill the oil tank!		
6.	Replace the tank breather filter			-	-
7.	Close the oil tank			-	-

7.1.3 Hydraulic oil temperature

The limits regarding oil temperature depend on the hydraulic oil type; the standard setting is oil type VG46, of which the operating temperatures are displayed below.

If another oil type is used, please contact Geomil Equipment BV to change the oil temperature settings.

	Oil temperature = normal	No warnings; normal operation; (< 65 degrees Celsius)
	Oil temperature = hot	Warning; operator intervention needed; (65-75 degrees Celsius)
	Oil temperature = critical	Warning; shutdown the system to protect vehicle; (> 75 degrees Celsius)

7.2 CPT

For warnings during CPT testing refer to the CPTest manual

7.3 Engine

Engine warnings are displayed on the Deepsea control panel. For engine warnings refer to the Deepsea/JCB manual.

8 System start-up and shutdown

8.1 Start-up

To start-up the system, operate as follows:

Step	Action	Information	Remark(s)	Fig.	Switch/item
1.	Set main circuit breaker to 'ON' position			53 DT	3
	Horizontal → 'OFF' position Vertical → 'ON' position				
2.	Activate main power switch			53 DS	1

8.2 Shutdown

Before system shutdown, check the following:

Step	Action	Information	Remark(s)	Fig.	Switch/item
1.	De-activate main power switch			53 DS	4
2.	Set main circuit breaker to 'OFF' position			53 DT	3
	Horizontal → 'OFF' position Vertical → 'ON' position				

9 Engine

9.1 Engine controls

The engine is controlled using a Deepsea E400 control unit (Fig. 53 DU), which is located on the control cabinet (Fig. 53 DR).

	<p>Make sure all hydraulic controls are in neutral position before starting the engine</p>
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The engine can be started as follows:

Step	Condition	Information	Remark(s)	Fig.	Switch/item
1.	Make sure all hydraulic controls are in neutral			53 DS	2, 3, 4, 7, 8, 9
2.	Start the engine		Push start button	53 DU	6
3.	Increase the engine rpm if required			53 DU	7
	Hare, rpm up; Turtle, rpm down		Maximum = 1800 Minimum = 900	53 DU	7,8


The engine can be stopped as follows:

Step	Condition	Information	Remark(s)	Fig.	Switch/item
1.	Decrease the engine rpm to stationary			53 DU	8
	Hare, rpm up; Turtle, rpm down		Maximum = 1800 Minimum = 900	53 DU	7, 8
2.	Stop the engine		Push stop button	53 DU	4
	If necessary, the engine starts a cool down period of a maximum of 1 minute. During this minute the engine will run on idle speed. Afterwards the engine will shut down automatically.				
	If necessary, push the stop button twice to stop the engine immediately.				
3.	Turn off ignition key		Turn switch counter-clockwise	53 DM	1

10 Driving the crawler

	<ul style="list-style-type: none"> • Always use the remote control to drive the crawler. • Make sure to keep a safe distance while driving the crawler (at least 1 m). • While driving the crawler it is prohibited for any person(s) to be present in the work cabin.
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In case anything goes wrong during driving:

	Release all levers	Process is halted immediately	53 CW	1 and 2
	Use the lever(s) to proceed	Lever(s) down: driving backwards; Lever(s) up: driving forwards	53 CW	1 and 2
	Press the emergency switch	Process is stopped Immediately;	53 CW	5
	Restart the system to proceed	Refer to chapter 7		

To drive the crawler, proceed as follows:

Step	Condition	Information	Remark(s)	Fig.	Switch/item
1.	Check if the system is active		refer to chapter 8	-	-
2.	Check if the remote control is active		press and hold to activate	53 CW	6
	Activation light is lit			53 CW	
3.	Check if the engine is running		Refer to chapter 9	-	-
4.	Increase the engine rpm's			53 DM	7
	Hare, rpm up; Turtle, rpm down.		Maximum = 2200 Minimum = 800		

Step	Condition	Information	Remark(s)	Fig.	Switch/item
5.	Take the remote control		STEP OUT OF THE CRAWLER	-	-
6.	Drive the crawler with both track levers			53 CW	1 and 2
	If necessary, select "snail" for slow driving		Switch down	53 CW	3,4



- The crawler has two driving speeds, fast (hare) and slow (snail).
- “Fast” is used for driving in straight lines and on hardened surfaces when the need for torque is limited.
- “Slow” is used for turning on soft surfaces when the need for torque is high.
- “Slow” enables the crawler to be controlled more precise than “fast”




- NEVER turn the crawler on its place, always turn in smooth arcs
- NEVER exceed the inclinations as prescribed in the IVA Johann manual


11 Levelling the crawler

The crawler can be levelled with the control cabinet.

11.1 Levelling the crawler with the control cabinet

	<ul style="list-style-type: none"> When levelling the crawler with the control cabinet make sure the levelling jacks are clear of obstacles No persons are allowed in the direct vicinity of the crawler during levelling
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In case anything goes wrong during the 'LEVELLING' process:

	Release the handle	Process is halted immediately	53 DS	7, 8 and/or 9
	Use the handle to continue levelling.	Joystick down: levelling jack(s) down; Joystick up: levelling jack(s) up	53 DS	7, 8 and/or 9

Before preparing the crawler for levelling, check the following:

Step	Condition	Information	Remark(s)	Fig.	Switch/item
1.	System is active		Refer to chapter 8	-	-
2.	Engine is running		Refer to chapter 9	-	-

Then operate as follows:

	<p>Max levelling deviation 7 degrees! Level the crawler evenly; never fully extend the levelling jacks one by one!</p>
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Step	Action	Information	Remark(s)	Fig.	Switch/item
1.	Use the desired levelling jacks to operate the levelling jacks		Lever up = levelling jack up	53 DS	7, 8 and/or 9
2.	Use the spirit level on the right side of the control cabinet to level the Panther			-	-

12 Preparing for CPT

Before preparing the crawler for CPT, check the following:


Step	Condition	Information	Remark(s)	Fig.	Switch/item
1.	System is active		Refer to chapter 8	-	-
2.	The engine is running		Refer to chapter 9	-	-
3.	The crawler is levelled		Refer to chapter 11	-	-

Then operate as follows:


Step	Action	Information	Remark(s)	Fig.	Switch/item
1.	Carefully extend the bellows by raising the Push frame		Use the CPT lever for better control	53 DS	3
2.	Lock the bellow guiding rods			F53 V	4A
3.	Place the support tube with the CPT equipment			F50 Y, F50 Z	-
4.	In case of electric logging: connect the cables and adjust the logging equipment		see referring manuals	-	-

13 CPT/pulling

13.1 Manual operation

	<p>NEVER put your hand or fingers inside the bridge in reach of the clamp in order to prevent serious injuries.</p>
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In case anything goes wrong during manual operation:

	Release the joystick	Process is halted immediately	53 DS	2, 3
	Use the joystick to continue levelling.	Joystick down: CPT push frame down; Joystick up: CPT push frame up	53 DS	2, 3

13.1.1 CPT



Before starting the 'CPT' operation, check the following:

Step	Condition	Information	Remark(s)	Fig.	Switch/item
1.	System is active		Refer to chapter 8	-	-
2.	The engine is running		Refer to chapter 9	-	-
3.	The crawler is levelled		Refer to chapter 11	-	-
4.	The reversing pieces are turned to PUSH				

Then operate as follows:

Step	Action	Information	Remark(s)	Fig.	Switch/item
5.	Mount a new CPT tube			-	-
6.	Raise the push frame		Use lever (pos. 2) for a faster upward movement of the Push frame	53 DS	2 or 3
7.	Open the catching clamp			53 DS	4
8.	Move the push frame down and perform one CPT stroke			53 DS	3
	Optionally adjust the CPT speed with the flow control valve			53 DS	6
	Optionally adjust the maximum push force			53 DS	5
9.	Close the catching clamp			53 DS	4
10.	Continue from step 5			-	-

13.1.2 Pulling

	<p>Pulling the CPT tubes</p> <p>After the CPT operation has ended, the tubes should be withdrawn as soon as possible. Otherwise the increasing shaft friction could make pulling the tubes impossible.</p>
	<p>Pull the tubes after reaching the desired depth, or when an alarm (e.g. overload alarm) is displayed on the computer screen. Terminate the CPT in the data acquisition software (see referring manuals).</p>

Operate as follows:

Step	Action	Information	Remark(s)	Fig.	Switch/item
1.	Close the catching clamp			53 DS	4
2.	Remove the mech. Clamp spacers				
3.	Turn the reversing pieces to PULL				
4.	Place the spacers				
5.	Open the catching clamp			53 DS	4
6.	Raise the push frame (to pull the CPT tube)			53 DS	2
7.	Close the catching clamp			53 DS	4
8.	Lower the push frame			53 DS	2
9.	Raise the push frame in order to close the clamp			53 DS	3
10.	Remove the CPT tube			-	-
11.	Open the catching clamp			53 DS	4
12.	Continue from step 7			-	-


14 Preparing for transport

Before preparing for transport, check the following:

Step	Condition	Information	Remark(s)	Fig.	Switch/item
1.	System is active		Refer to chapter 8	-	-
2.	Engine is running		Refer to chapter 9	-	-


Then operate as follows to remove the support tube with cone:

Step	Action	Information	Remark(s)	Fig.	Switch/item
1.	Remove the support tube with cone, friction reducer		Reverse the steps	50 P	-
2.	Carefully raise the push frame completely			53 DS	2 or 3
	make sure the cylinders reach end of stroke;		Push frame lifts bellows;	53 V	
3.	Unlock the bellow guiding rods			53 V	
4.	Remove the support tube with cone friction reducer from the removal tool			50 P	

	<p>Support tube tool</p> <ul style="list-style-type: none"> Always secure the support tube tool by completely turning it. DO NOT use the tool when it is partially secured
-------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------


Then operate as follows to lower the bellows:

5.	Carefully retract the bellows by lowering the push frame			53 V	
	Make sure that the bellows construction is tight in its housing			-	-
6.	Lower the Panther to ground level			-	-

	<p>Levelling Jacks:</p> <ul style="list-style-type: none"> Make sure the levelling jacks are fully retracted! Lower the crawler evenly. NEVER retract the jacks fully one by one!!
-------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------




Operate as follows to drive the crawler:

3.	Check if the remote control is active	Press and hold to activate	53 CW	6
	Activation light is lit		53 CW	6
4.	Check if the engine is running	Refer to chapter 9	-	-
5.	Increase the engine rpm's		53 DM	7
	Hare, rpm up; Turtle, rpm down.	Maximum = 2200 Minimum = 800	53 DM	7
6.	Take the remote control	STEP OUT OF THE CRAWLER	-	-
7.	Drive the crawler with both track levers		53 CW	1 and 2
	If necessary, select "snail" for slow driving	Switch down	53 CW	3

	<ul style="list-style-type: none"> • Always use the remote control to drive the crawler. • Always drive the vehicle standing outside the crawler. • Make sure to keep a safe distance while driving the crawler. • While driving the crawler it is prohibited for any person(s) to be present in the work cabin.
------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Step	Action	Information	Remark(s)	Fig.	Switch/item
8.	Load the crawler onto the transport truck		Refer to chapter 3.3	-	-
9.	Stop the engine		Refer to chapter 9	-	-
10.	Shutdown the control system		Refer to chapter 8	-	-
11.	Switch off the main power		Refer to chapter 8.2	-	-
12.	Leave the cabin		Ensure all electrics are turned off (light, air conditioner, etc.)	-	-
13.	Lock the cabin			-	-

15 Maintenance

	<ul style="list-style-type: none"> • Perform a daily visual inspection. • Never use force when assembling or disassembling. • Repair any possible mechanical damages suffered and remove dirt from all moving parts. • Ensure that all CPT material (cones, tubes, and rods) remains operational. After use, clean them thoroughly and lubricate them well.
	<p>Main circuit breaker</p> <ul style="list-style-type: none"> • Before performing welding and/or maintenance activities make sure the engine is OFF. • Take out the main circuit breaker key and keep it with you.
	<p>Remarks concerning the environment</p> <p>Dispose of used oil, grease, defective batteries etc. through a recognized processing company.</p>

15.1 Maintenance interval

When	What	Remark(s)
after 1 st 250 working hours	first check-up; exchange hydraulic oil filter element	contact Geomil
after 1000 working hours	service interval; maintenance (small)	contact Geomil
after 2000 working hours	service interval; maintenance (large)	contact Geomil

15.2 Maintenance summary

#	Activity	Refer to:	Maintenance interval
1.	Clean/ tidy up working cabin and CPT push frame		Daily
2.	Visual inspection of working cabin, CPT push frame and outside of crawler. Check for leaks, breaks, loose components etc.		Daily
3.	Visual inspection of engine compartment, check for leaks, breaks, loose components etc.		Weekly
4.	Check the waste fluid level in the drip tray, drain if necessary	Chapter 16.5	Weekly
5.	Check hydraulic oil level on gauge in power pack		Weekly
6.	Check dirt indicator on return line filter		Weekly
	Check dirt indicator on return line filter with engine running		
7.	Tension tracks	IVA JOHANN manual	Weekly
8.	Lubricate levelling jacks ball joints	Chapter 15.8	Weekly
9.	Check engine oil level	JCB manual	Weekly
10.	Check engine coolant level	JCB manual	Weekly
11.	Check for water in engine water separator filter	JCB manual	Weekly
12.	Change return line filter elements when dirt indicator is in red area or after:	Chapter 15.5.2	500 H or every 2-3 months
13.	Remove water from air tank	Chapter 15.7.1	500 H or every 2-3 months
14.	Change compressor air filter	Chapter 15.7.1	1000 H or every 6-12 months
15.	Change tank breather filter	Chapter 15.5.1	1000 H or every 6-12 months
16.	Change engine oil and filter	JCB manual	250 H or every 6-12 months
17.	Change engine fuel filter	JCB manual	500 H or every 6-12 months
18.	Change engine air filter	JCB manual	500 H or every 6-12 months
19.	Change hydraulic oil	Chapter 15.6.3	1500 H or every 12-18 months
20.	Change engine coolant	JCB manual	3000 H or every 2 years
21.	Replace batteries when required or after	-	3000 H or every 2 years
22.	Replace relays when required	-	-

15.3 Spare parts

When ordering spare parts, please state:

1. Product
2. Serial number
3. Part number
4. Figure number

15.4 Consumables

#	Part description	Part number	Brand	Brand number
1.	Hydraulic oil	7010000046	BP	BARTRAN HV 46
2.	Teflon oil	9703020301	Interflon	Fin Lube EP
3.	Ball bearing grease	9703020306	SHELL	Darina (or equivalent)
4.	Return line filter element	2022051752	PARKER	Parker MXA7511424 Spare Element 10Q

15.5 Maintenance activities

15.5.1 Engine

Maintenance of the engine in accordance with the JCB instructions.

When ordering spare parts, state the serial number. The serial number can be found on the engine in the vicinity of the dipstick.

15.5.2 Undercarriage

Maintenance of the undercarriage in accordance with the IVA JOHANN instructions.

When ordering spare parts, state the serial number. The serial number can be found on one of both sides of the undercarriage near the centre of the main undercarriage frame.

15.5.3 Final drives

Maintenance of the final drives in accordance with the IVA JOHANN instructions.

When ordering spare parts, state the serial number. The serial number can be found on the front of the final drive gearbox.

15.5.4 Batteries

The batteries are maintenance free.

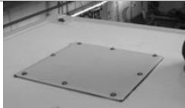
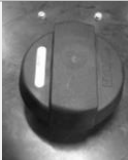
15.6 Hydraulic system


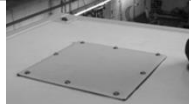
Exchange the oil- and air filter element after approximately the first 500 working hours.

Renew the oil-and air filter element every 2000 working hours or if the dirt-indicator needle of the filter stays in the red area while the oil is at working temperature.

15.6.1 Tank breather filter




To replace the tank breather filter:

Step	Action	Information	Remark(s)	Fig.	Switch/item
1.	Check if the engine is not running		Refer to chapter 9	-	-
2.	Open the square fill hatch on top of the power pack housing		Remove the bolts	-	
3.	Open the tank breather filter		Turn counter-clockwise		

4.	Replace the filter element	Only use HYDAC ELF filter elements!	-	
	Replacement filter (element): 2022100332 – ELF P7 F 3 W			
5.	Close the fill hatch		-	


15.6.2 Return line filter

To replace the return line filter elements:



Step	Action	Information	Remark(s)	Fig.	Switch/item
1.	Check if the engine is not running		Refer to chapter 9	-	-
2.	Open back right door of the power pack housing, as seen from the back of the crawler		Insert key and unlock, pull out handle and turn (counter) clockwise	-	
3.	Place a container under the return line filter to avoid spilling oil			-	-
4.	Unscrew the return line filters elements		Use a strap wrench	53 CT	
5.	Replace the old element with new ones		Use only PARKER filter elements!	-	-
	Replacement filter (element): 2022051752 – PARKER MX1591410				
6.	Tighten the filter element according to PARKER instructions		Use a strap wrench	-	
7.	Close the power pack doors			-	-
8.	Dispose the old element and spilled oil thought through a recognized processing company.			-	-

15.6.3 The hydraulic oil

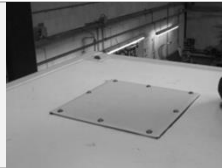


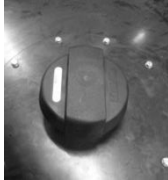


Every 1000 working hours, take hydraulic oil samples and replace the hydraulic oil when necessary. (See chapter Technical specifications for more information).

	<p>Never start the engine with an empty hydraulic oil tank</p>
	<p>Caution: Hydraulic oil can be hot!</p> <p>Always check if oil temperature is at an acceptable level (< 38 °C) before any action is taken.</p>

To replace the hydraulic oil





Step	Action	Information	Remark(s)	Fig.	Switch/item
1.	Make sure all cylinders are completely retracted		Refer to chapter 14	-	-
2.	Check if the engine is not running		Refer to chapter 9	-	-
3.	Open back right door of the power pack housing, as seen from the back of the crawler		Insert key and unlock, pull out handle and turn (counter) clockwise	-	
4.	Connect a drain hose to the tank drain valve		Remove cover plug, 1 ¼" BSP thread fitted to drain valve	53 CT	
5.	Open the drain valve to empty the oil tank			-	-
	Draining can take up to 30-60 minutes, depending on oil temperature. Collect the oil in a suitable container, the oil content of the oil tank is approx. 350 litres!				
6.	After draining the oil close the drain valve and remove the drain hose.			-	-

(Re)fill the oil tank as follows:

Step	Action	Information	Remark(s)	Fig.	Switch/item
7.	Open the square fill hatch on top of the power pack housing		Remove the bolts	-	
8.	Open the tank breather filter		Turn counter clockwise	53 CT	
9.	Fill the oil tank with oil		Use only recommended oils!	5 A	-
10.	Fill the tank until the oil level reaches the top blue line of the oil level gauge			-	
		Do not overfill the oil tank! The oil contents of the oil tank is approx. 350 litres!		-	-
11.	Replace the tank breather filter			-	
12.	Close the fill hatch			-	
13.	Close all power pack doors.		Insert key and unlock, pull out handle and turn (counter) clockwise	-	

15.7 Fuel system

To refill the fuel tank

Step	Action	Information	Remark(s)	Fig.	Switch/item
1.	Check if the engine is not running		Refer to chapter 9	-	-
2.	Open back door * of the power pack housing, as seen from the back of the crawler * Left / right depends on model		Insert key and unlock, pull out handle and turn (counter) clockwise	-	
3.	Remove the filler cap		Insert key and unlock, turn filler cap counter clockwise and remove filler cap	-	
4.	Refill the fuel tank. Do not overfill the fuel tank! The fuel content of the fuel tank is approx. 300 litres!			-	-
5.	Place the filler cap		Place filler cap, turn filler cap clockwise and lock with key	-	
6.	Close back door * of the power pack housing, as seen from the back of the crawler * Left / right depends on model		Turn handle (counter) clockwise and push in handle and lock with key	-	

15.8 *Electrical system*

The electrical system of the crawler is for the majority of components maintenance free.

15.8.1 *Fuses and relays*

The crawler is equipped with fuses and relays to protect and control the electrical system (see fig. 53 DH). In case of malfunction or electrical power failure it is possible to reset the fuses by flipping the switch upward. The relays can be manually controlled by pushing the button.

Furthermore, the system is equipped with a ground fault earth interrupter, in case a short circuit is made.

This is an automatic switch which will be re-activated as soon as the short circuit is resolved.

15.9 *Pneumatic system*

The pneumatic system in the crawler consists of a separate air compressor inside the power pack, with an integrated air tank and regulator valve. The air tank is connected to the air gun in the working cabin.

15.9.1 *Removing water from the air tank*

Every 500 working hours remove the water from the air tank. This water accumulates as a result of condensation in the air tank. This can be done by opening the small black screw located in the frame tube of the compressor (this tube acts as air tank).

15.10 *Levelling jacks*

Once a month, lubricate the ball joints of the levelling jacks.

Use ball-bearing grease (for example Shell Darina or equivalent).

15.11 *Snaptite PL*

The Snaptite PL (push-lock) spring should be replaced when required (spring broken or losing spring force). To replace the Snaptite PL follow the following procedure:

Step	Action	Information	Remark(s)	Fig.	Switch/item
5.	Carefully extend the bellows by raising the Push frame		Use the CPT lever for better control	53 DS	3
6.	Lock the bellow guiding rods			F53 V	4A
7.	Place the support tube with the CPT equipment			F53 Y, F53 Z	-
8.	In case of electric logging: connect the cables and adjust the logging equipment		see referring manuals	-	-







Step	Action	Information	Remark(s)	Fig.	Switch/item
1.	Move the CPT push frame to its highest position			53 DS	2
2.	Open the catching clamp			53 DS	4
3.	Stop the engine		Refer to chapter 9		
4.	Open floor behind CPT push frame		Remove sealant and screws		
5.	Remove all 4 "ALLEN BOLT M8x75" from the hydraulic catching clamp			50 V	4 (4x)
6.	Slide the hydraulic catching clamp cylinder backward			50 V	3
7.	Remove all 4 "COUNTERSUNK BOLT M16x35" from the "LID SNAPTITE"			50 V	10 (4x)
8.	Remove the "LID SNAPTITE"			50 V	19
9.	Remove the "SNAPTITE RETAINING RING"			50 V	22
10.	Remove the "SNAPTITE PL"			50 V	20
11.	Installation of the "SNAPTITE PL" is in reverse order of steps 5 to 11				

15.12 *Removal of the power pack housing*

For large overhaul/repair activities the power pack housing can be removed.

Contact Geomil for instructions.

16 Practical suggestions

	<p>Before driving off</p> <p>Make sure that the CPT push frame, the bellows construction and the levelling jacks have been fully retracted.</p>
	<p>Maintenance</p> <p>Never perform welding work on the oil tank while the reservoir is filled with oil.</p> <p>If the tank has to be welded, drain the oil.</p> <p>After welding, clean the tank thoroughly.</p>
	<p>CPT tubes</p> <p>Make sure that the CPT tubes are properly screwed together (shoulder to shoulder), to avoid fracture at the threaded ends.</p> <p>Always use a supporting tube between the vehicle and ground level in order to avoid bending the tubes.</p>
	<p>Pulling the CPT tubes</p> <p>After the CPT has ended, the tubes should be withdrawn as soon as possible. Otherwise the increased shaft friction could make pulling the tubes impossible.</p>
	<p>Avoid damage</p> <p>Prevent mechanical damages and fouling of all moving parts.</p> <p>Never use force while placing or securing the measuring elements.</p>
	<p>Prevent dirt</p> <p>It is strongly recommended to use a mudwiper through which the CPT tubes are driven into the ground. When the tubes are retracted, they will be swept clean.</p>

17 Dismantling/disassembly

Contact Geomil Equipment BV for further details.

18 Appendices

18.1 Technical specifications

18.1.1 Push frame 200kN

Subject	Details			
Capacity	Maximum pushing capacity: 200 kN Maximum pulling capacity: 250 kN			
Hydraulic cylinders push frame	2 double-acting cylinders	bore	ø 100 mm	
		piston rod	ø 70 mm	
		stroke	1150 mm	
		working area	bottom side	71.4 cm ²
			piston side	40 cm ²
CPT speed	0-3 cm/s;			
Unloaded speeds	0-10 cm/s;			

18.1.2 Hydraulic system

Subject	Details		
Hydraulic levelling jacks	4 double-acting cylinders equipped with integrated counterbalance valves	bore	ø 125 mm
		piston rod	ø 90 mm
		stroke	750 mm
Control valve	PARKER K220-2 (Electrical) + PARKER K220-1 L90-6 (Mechanical)		
Pump	Parker PV140		

18.1.3 Dimensions

The transport dimensions are:

Subject	Details
Length	6010 mm
Width	2495 mm
Height	3100 mm
Mass	± 21100 kg

18.2 Summary of drawings

Drawing No.	Subject
0053501159	Hydraulic diagram Panther-200-Classic
0053911098	General arrangement Panther-200 Classic

18.3 Figures

figure No.	Subject
5 A	Recommended oils
53 DR	Control cabinet
53 DS	Control cabinet top panel
53 DT	Control cabinet front panel
53 CW	Remote control
53 DU	Deepsea E400 Panther Classic
50 AA	CPT push frame
50 Y	Support tube placement procedure
50 Z	Mudwiper tube preparation
53 U	Engine compartment drain point
53 V	Bellows procedure

18.3.1 Fig. 5 A - Recommended oils

FIG. 5 A

RECOMMENDED HYDRAULIC FLUIDS
EMPFOLHENE OELSORTEN
HUILES HYDRAULIQUES RECOMMANDÉES
AANBEVOLEN OLIESOORTEN

* ALL MINERAL HYDRAULIC FLUIDS ACCORDING TO THE FOLLOWING SPECIFICATIONS
* ALLE MINERALE HYDRAULISCHE VLOEISTOFFEN OVEREENKOMSTIG DE VOLGENDE SPECIFICATIES
HVLP ACCORDING 51524 Part 3
ISO CLASSIFICATION L-HV ACCORDING ISO 6743/4
Vickers 1-286-S AND 1-2952-S
Cincinnati Milacron P68, P69, P70

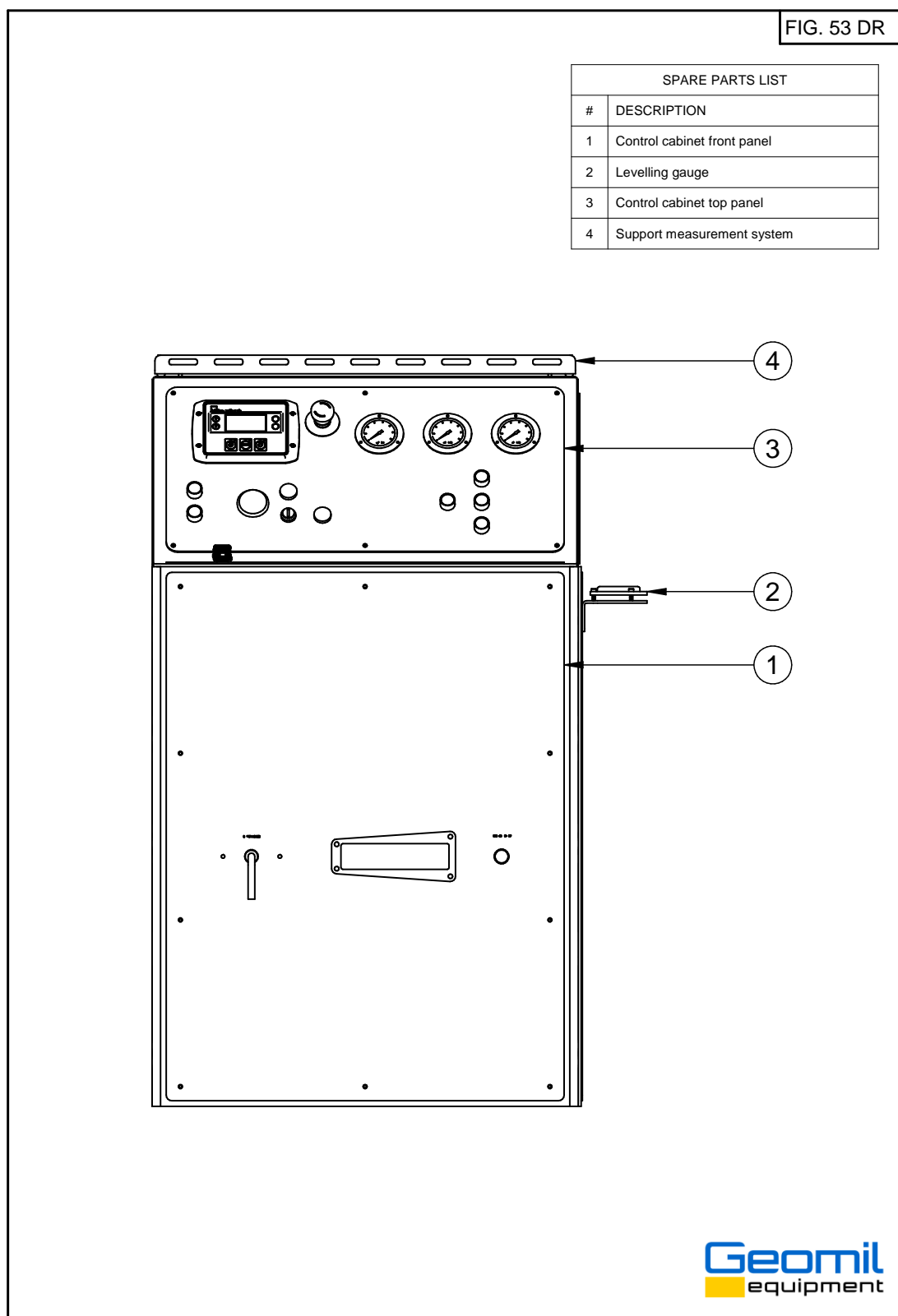
* ANALYSE RESULTS	
* GEANALYSEERD MEETRESULTAAT	
Viscosity at 40° C	± 46 mm ² /s
Viscosity Index	> 150

- * All these fluids provide a high degree of equipment protection, over a wide operating temperature.
- * Al deze vloeistoffen zorgen voor een hoog niveau van bescherming, over een breed temperatuurbereik.

* GEOMIL EQUIPMENT RECOMMENDS	
* GEOMIL EQUIPMENT BEVEELT AAN	
SHELL	TELLUS T46
BP	BARTRAN HV 46
BP	BIOHYD SE - S - 32

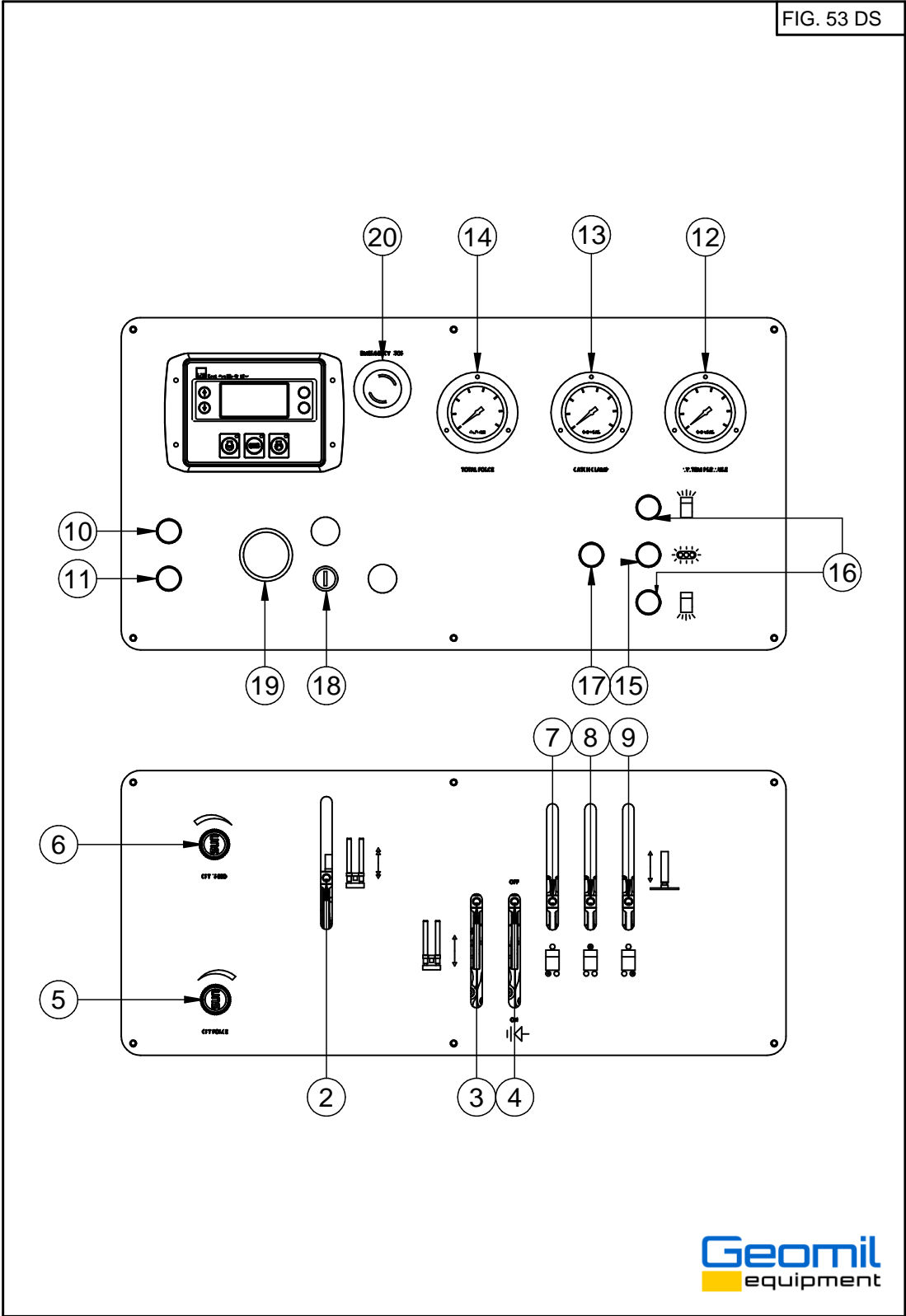
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18.3.2 Fig 53 DR - Control cabinet



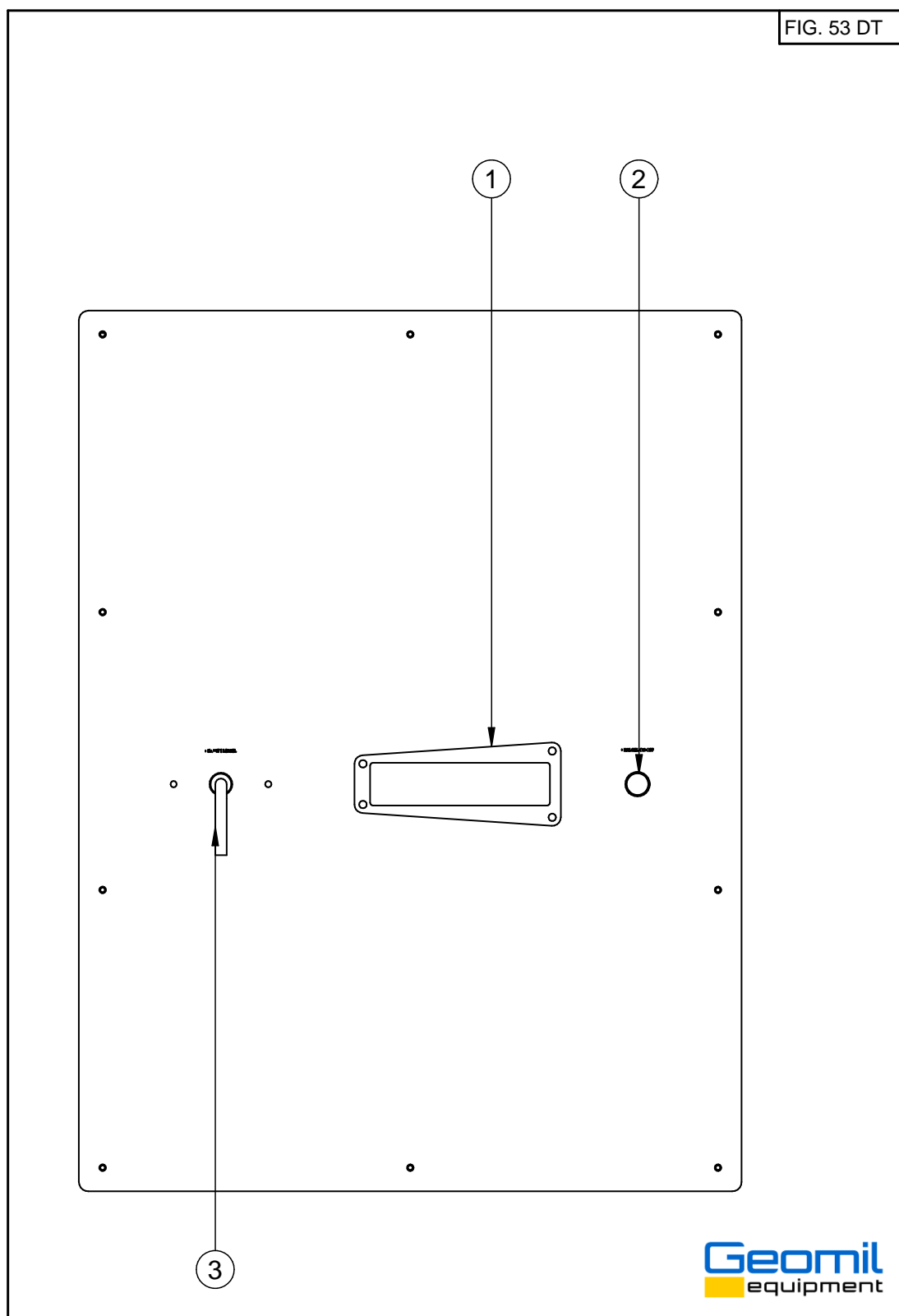
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18.3.3 Fig. 53 DS - Control cabinet top panel



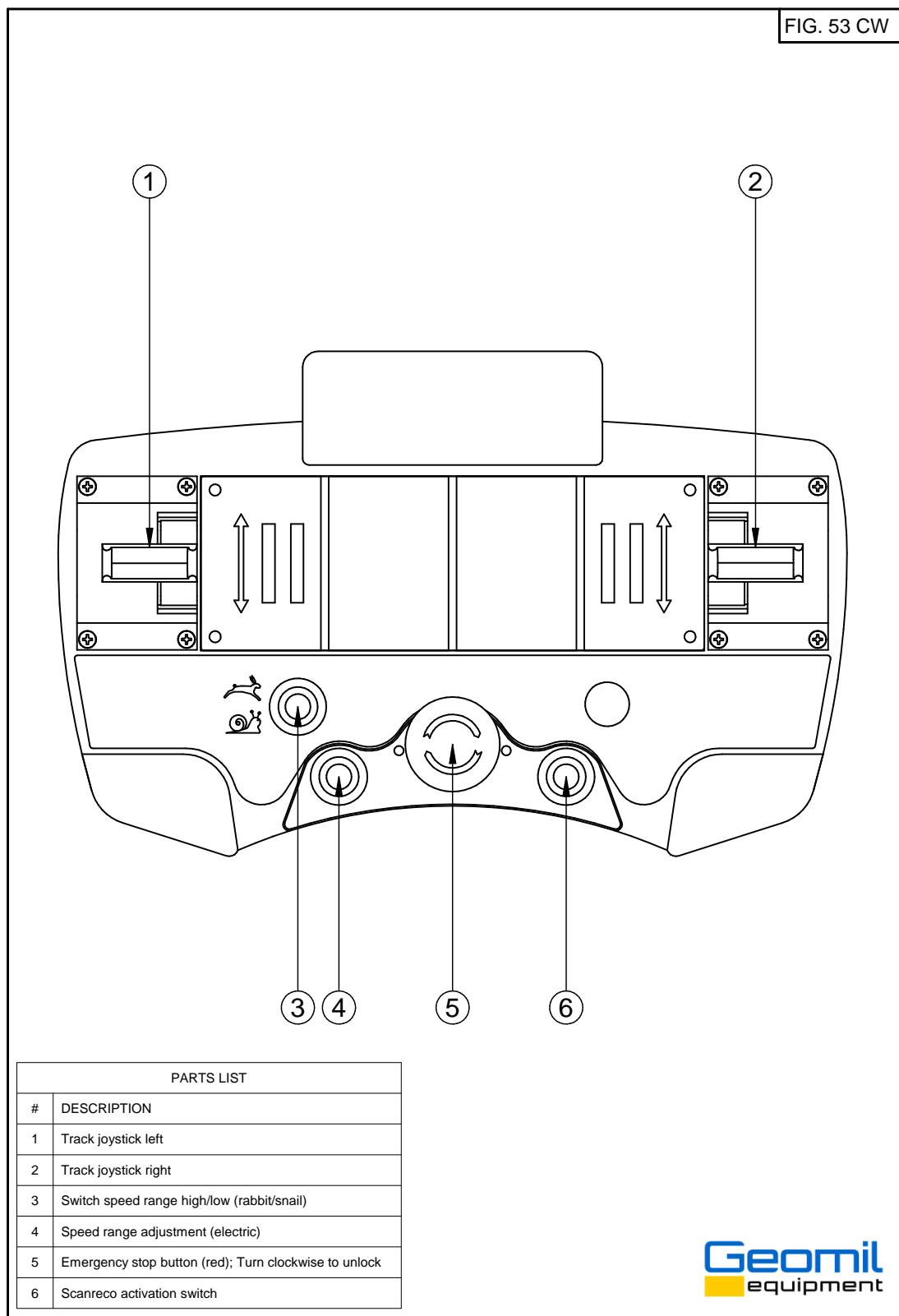
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18.3.4 Fig. 53 DT - Control cabinet front panel



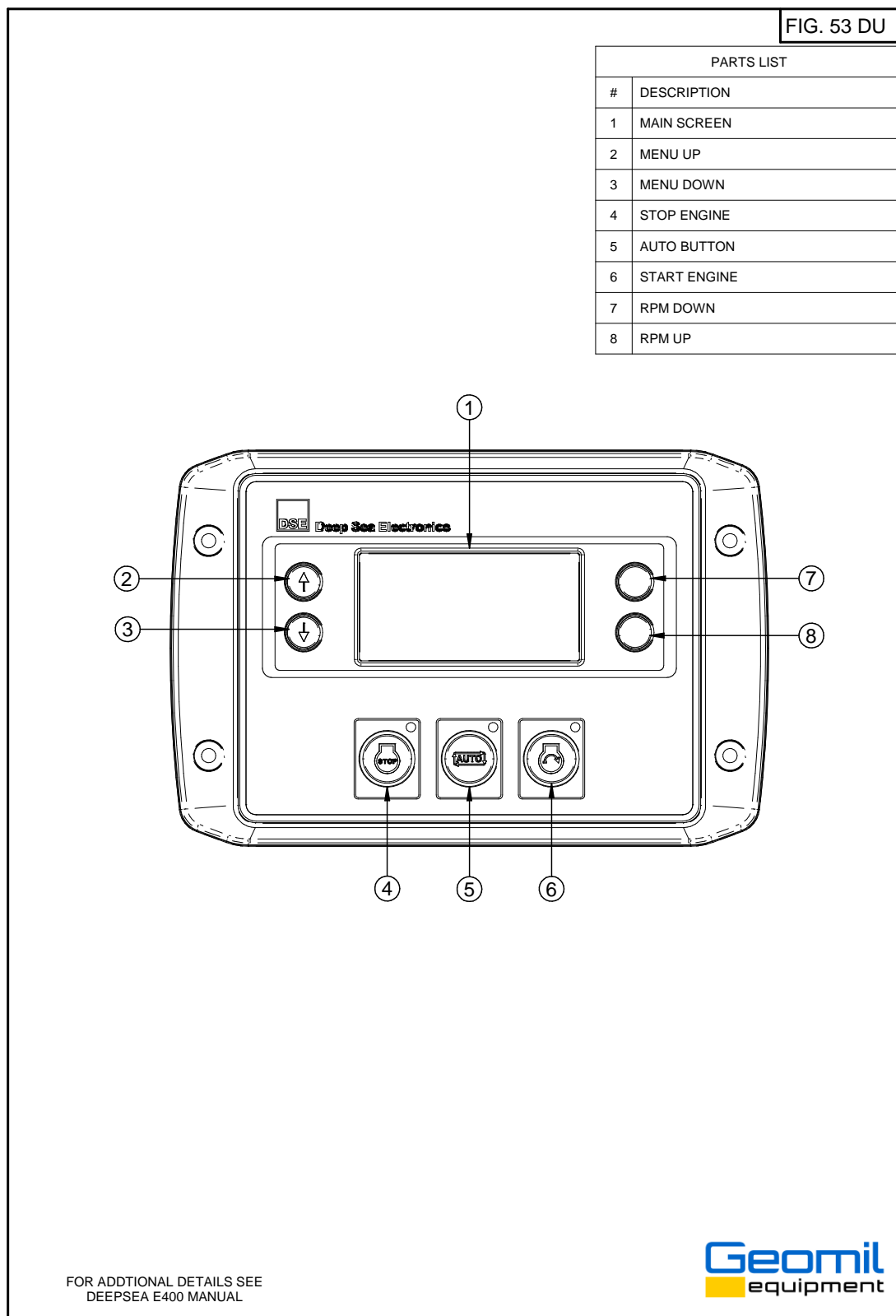
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18.3.5 Fig. 53 CW - Remote control



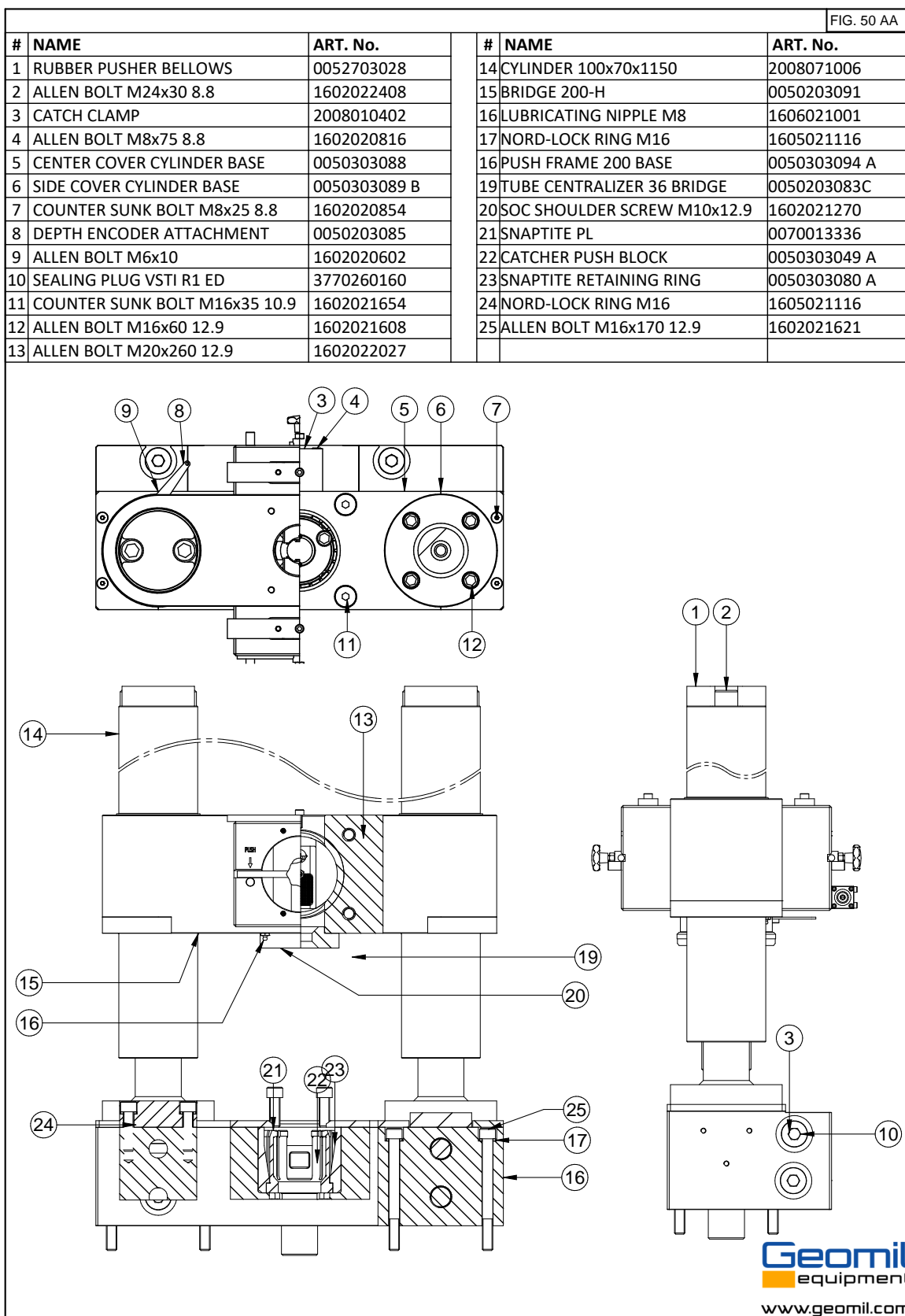
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18.3.6 Fig. 53 DU – Deepsea E400 Panther Classic



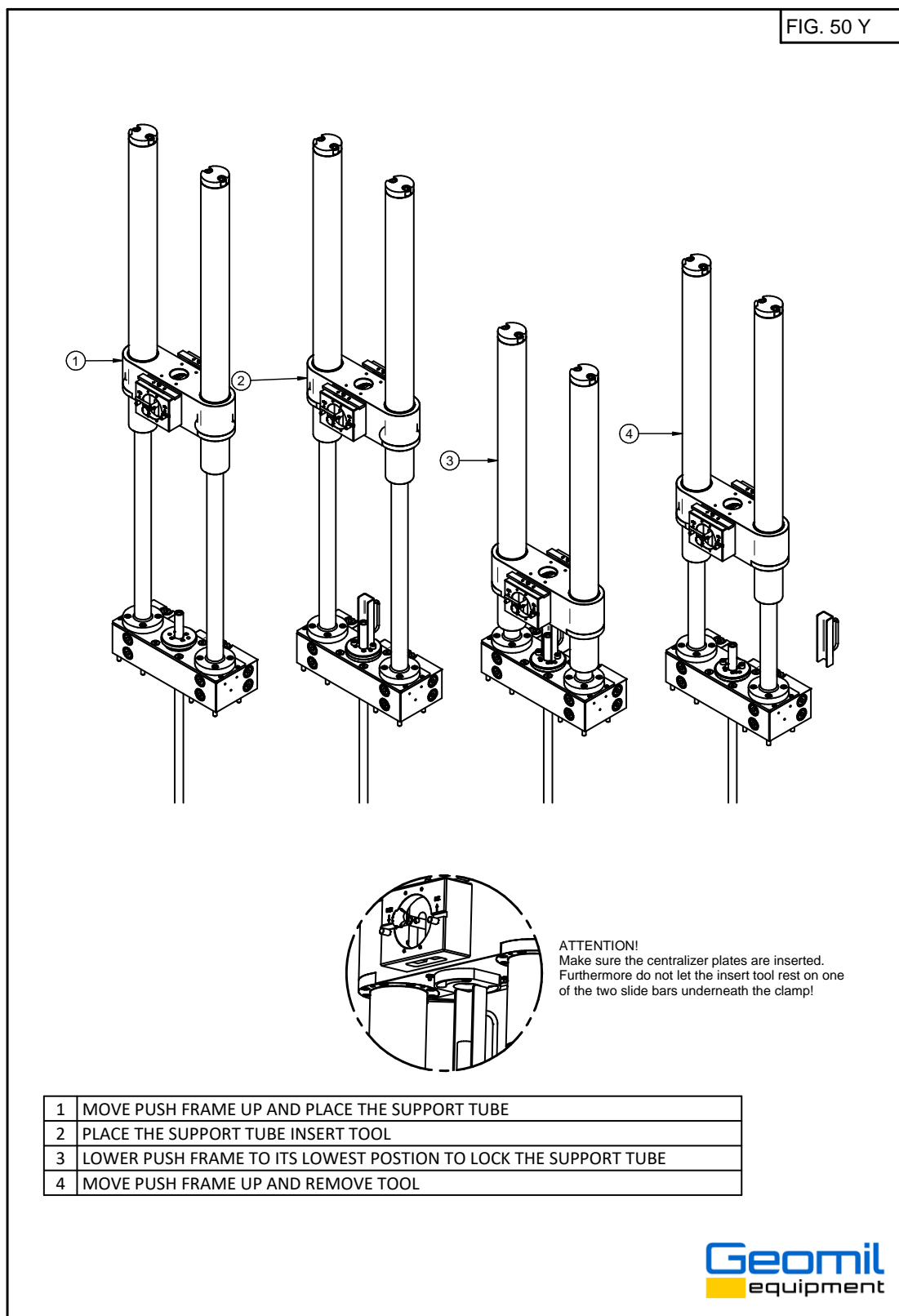
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18.3.7 Fig. 50 AA - CPT push frame



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18.3.8 Fig. 50 Y - Support tube placement procedure



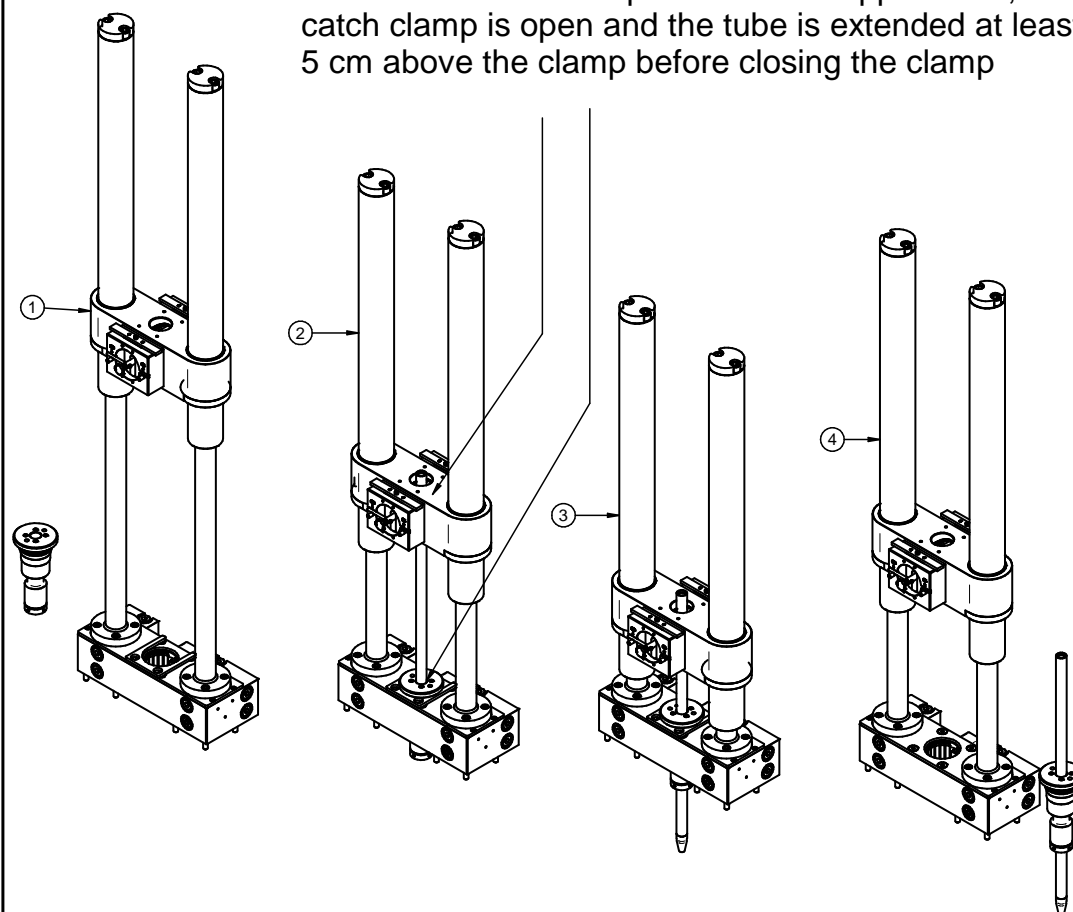
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18.3.9 Fig 50 Z - Mudwiper tube preparation

FIG. 50 Z

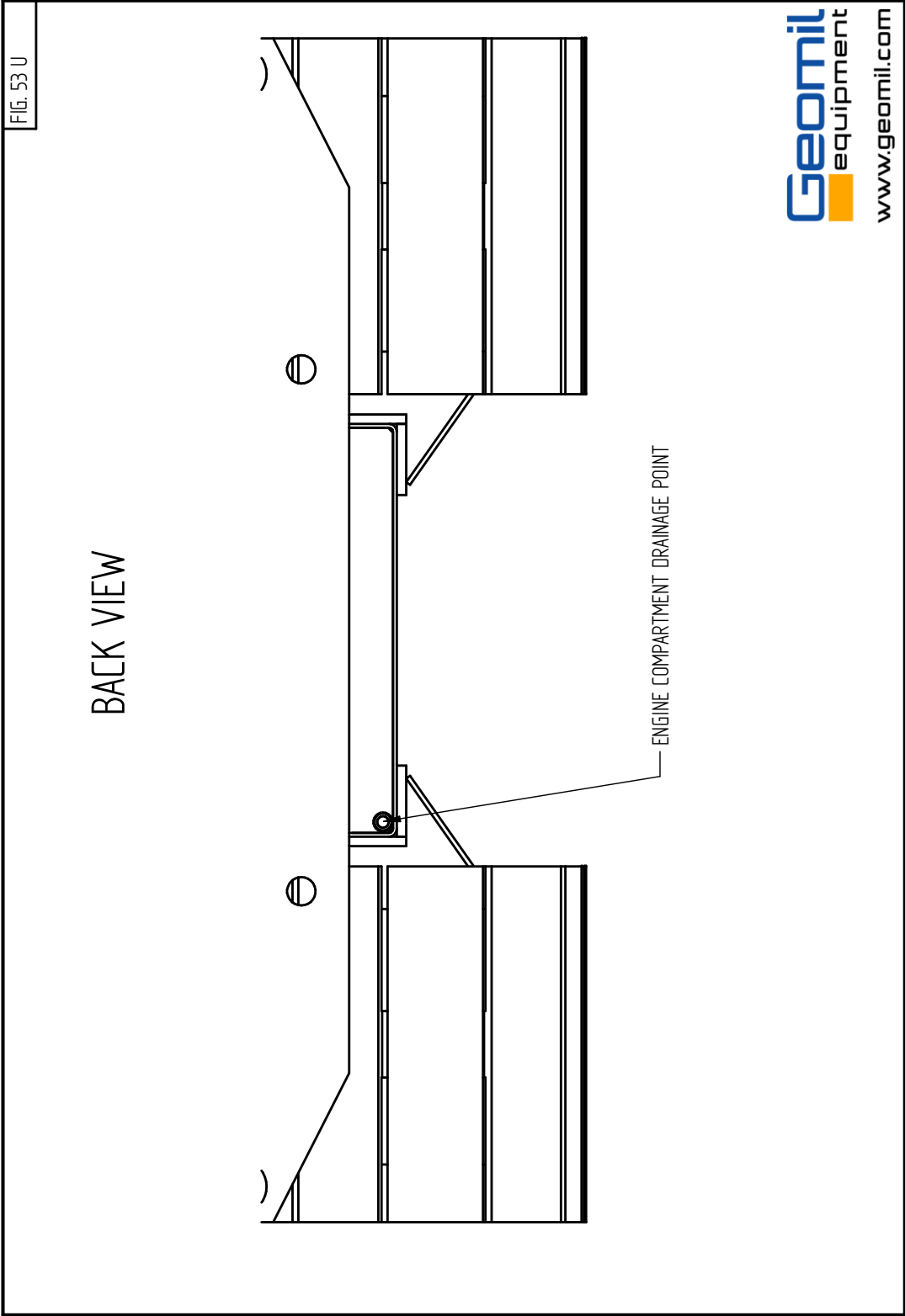
ATTENTION!

Make sure the tube is placed in the support tube, the catch clamp is open and the tube is extended at least 5 cm above the clamp before closing the clamp

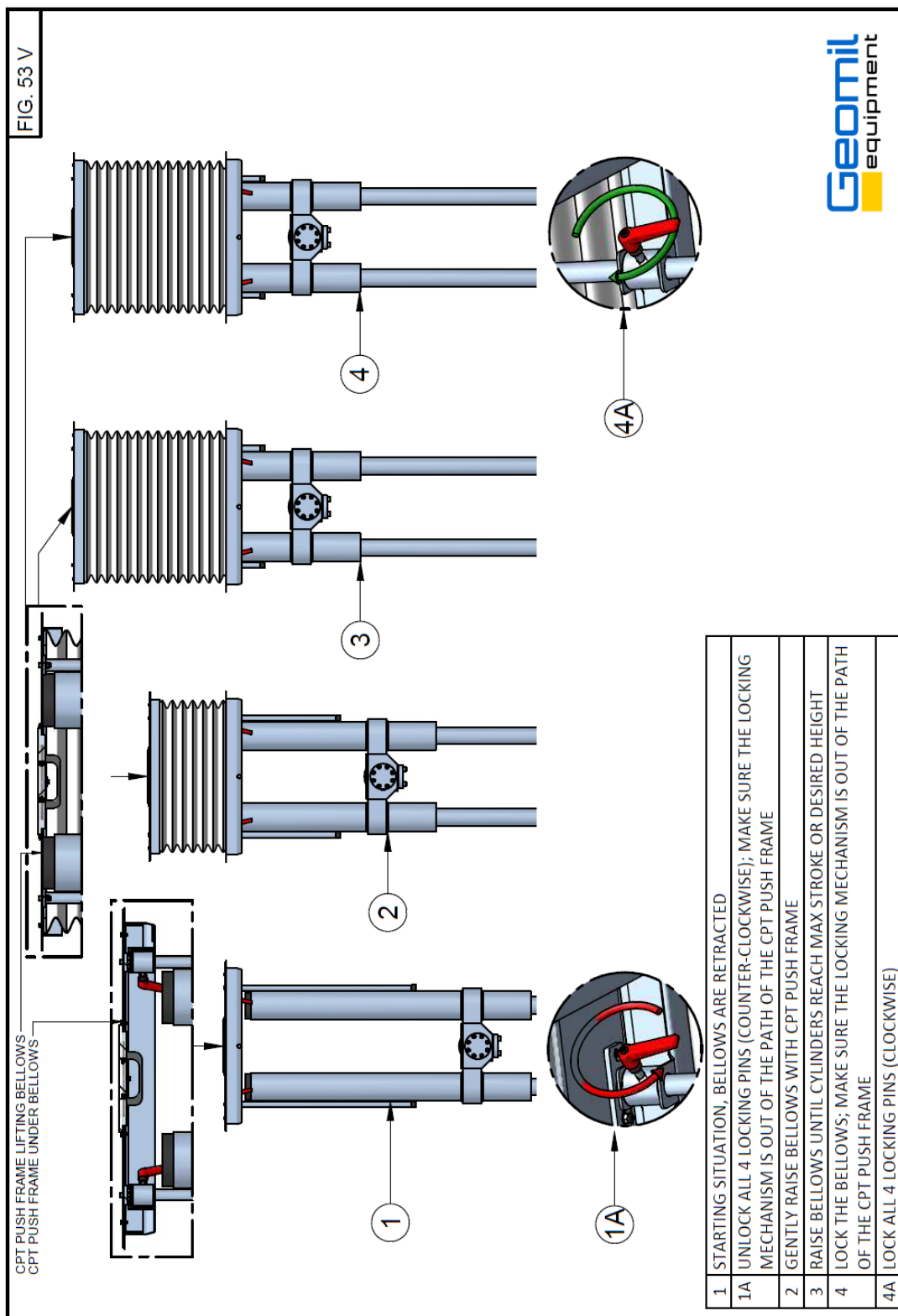


1	MOVE PUSH FRAME UP AND PLACE THE ANTI LOCKING PLATE
2	OPEN THE CLAMP, MOVE THE PUSH FRAME DOWN AND PLACE A TUBE WITH THE MUD WIPER STRETCHER THROUGH THE CLAMP AND IN THE SUPPORT TUBE
3	CLOSE THE CLAMP AND PUSH THE TUBE THROUGH THE MUD WIPER
4	MOVE PUSH FRAME UP AND REMOVE THE SUPPORT TUBE WITH THE TUBE

18.3.10 Fig 53 U - Engine compartment drain point



18.3.11 Fig. 53 V - Bellows procedure



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