

Service Instructions



Testomat® Modul CL
Testomat® Modul NH2CL



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Important safety information

- Please read the operating instructions and maintenance instructions carefully and completely prior to carrying out maintenance work at Testomat instruments.
- Observe the warning notices in these maintenance instructions and the operating instructions of the respective instrument.
- Always adhere to hazard warnings and safety tips when using reagents, chemicals and cleaning agents. Please adhere to the respective safety data sheet! Download the safety data sheets for the supplied reagents at <http://www.heylanalysis.de>.

Qualification of the staff

Maintenance work requires fundamental electrical and process engineering knowledge as well as knowledge of the respective technical terms. Assembly and commissioning should therefore only be carried out by a specialist or by an authorised individual supervised by a specialist.

A specialist is someone who due to his/her technical training, know-how and experience as well as knowledge of relevant regulations can assess assigned tasks, recognise potential hazards and ensure appropriate safety measures. A specialist should always adhere to the relevant technical regulations.

Warning notices in these instructions

The warning notices in these instructions warn the user about potential dangers to individuals and property resulting from incorrect handling of the instrument. The warning notices are structured as follows:



SIGNAL WORD!

Description of the type or source of danger

Description of the consequences resulting from non-observance

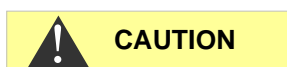
- Preventive measures. Always adhere to these preventive measures.
-



“**DANGER**” indicates an immediate hazardous situation which, if not avoided, will result in death or serious injury.



“**WARNING**” indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



“**CAUTION**” indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injuries or property damage.



“**NOTE**” indicates important information. If this information is not observed, it may result in an undesirable result or state.

Further documents

Testomat instruments are plant components. Therefore, always observe the documentation of the plant manufacturer.

General instructions

Regular maintenance is necessary to ensure trouble-free operation of the Testomat instrument. Regular visual inspections also increase operational reliability. Also refer to the notes in the operating instructions!

NOTE

Fix errors by yourself.

Experience has shown that many errors that occur in day-to-day operations you can fix by yourself.

This ensures that the instrument is soon working again. In this maintenance manual you will find possible causes of malfunctions and helpful hints for their elimination.

Overview of maintenance work to be executed

The maintenance intervals may vary depending on the water and pipeline quality.

Maintenance work	Monthly	Quarterly	Semi-annually	Annually
Cleaning sight-glass windows	X			
Cleaning measuring chamber / measuring chamber holder	X			
Cleaning the receiver optics			X	
Cleaning the controller/filter housing		X		
Cleaning the waste water line		X		
Checking the dosing pump incl. suction and pressure hoses			X	
Checking electrical and hydraulic connections			X	
Renewing the sealing kit (40124) and sight-glass windows				X

NOTE

Maintenance interval for the pump head

We recommend replacing the pump head after 2 years as the performance of the pump head can decrease due to wear-and-tear. Always replace the pump head if the maintenance message 25 or 26 is displayed.

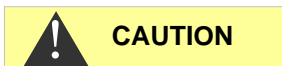
- Clean the measuring chamber at regular intervals (approx. every 6 months) and, if possible, replace the two seals of the measuring chamber holder and the sight-glass windows.
- If the water has high iron content, cleaning might be necessary more often.
- Only use a dry, lint-free cloth for cleaning.
- To carry out maintenance work after the error message “35 Fault soiling” or “33.Fault optics”, always confirm the error message with the Alarm function key.
- If maintenance is carried out after an instrument maintenance message (maintenance interval), maintenance must be confirmed with the Alarm function key.
- Wait at least 5 seconds before switching the instrument on and then off again at the main switch.
- A defective device, regardless of the guarantee period, can be serviced only when the device is dismantled and the error is described. Please also inform us of the reagent type currently in use, the batch number and the measured medium. Make no changes or modifications to the device that go beyond the scope of use specified in these instructions. Doing so will void the warranty. This applies particularly to the measuring chamber holder, the seal of which must remain undamaged. If you send the device in for repair, please completely empty the measuring chamber and remove the reagent bottles and the drain funnel.
Before dismantling, the type of error must be noted (error number, error effect, log file of the SD card).
- Once a protective device has been triggered (safety fuse), initially try resolving the cause of error (e.g. by replacing a defective valve), before reactivating the protective device. Frequent triggering always signifies an error, which under certain circumstances may also damage the device.

Prior to carrying out maintenance work

Carry out a visual inspection of the instrument:

- Is the cover of the unit (if present) always carefully closed?
- Is the instrument heavily soiled?
- Is there air inside the dosing hoses?
- Are the hose connections of the dosing pump free of leaks?
- Has the use-by date of the indicator expired?

Always make sure that the sight-glass windows are clean before inserting a new indicator bottle.



CAUTION

Cleaning agents

- Never use organic solvents to clean the measuring chamber or other plastic parts!
- Use an acidic cleaning agent for cleaning.
- Please observe the safety regulations when handling cleaning agents!

Permissible tools



Only use suitable tools for the work described, e.g., our tool set T2000 (Art. No. 40138) and our maintenance case T2000 (Art. No. 270338) with all necessary spare parts for regular maintenance.

Content of the tool kit T2000 (Art. no. 40138)

Size	Application	Art. no.
Torx, TX 20x100	Measuring chamber, snap-on installation	30991
Torx, TX 10x80	Measuring chamber holder	30992
Torx, TX 8x60	Display circuit board , measuring chamber holder	30993

Carrying out maintenance

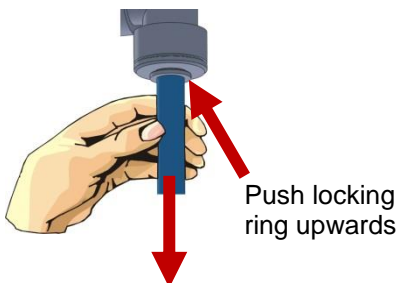
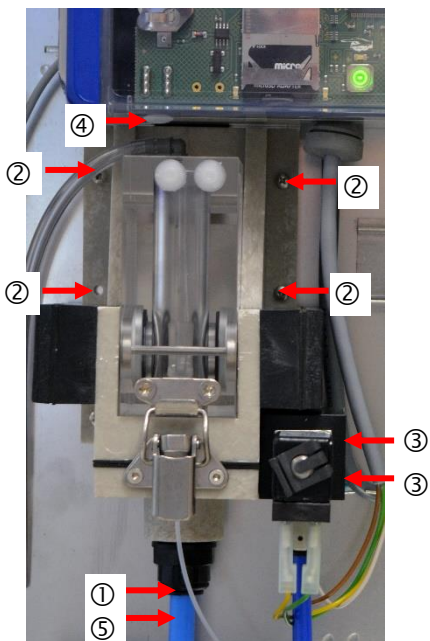
This service manual describes maintenance work that goes beyond the regular maintenance work described in the “Maintenance and repairs” chapter of the operating manual.

see Operating manual

- Cleaning the measuring chamber and the viewing window Page 41
- Cleaning the filter housing Page 41
- Changing an empty indicator bottle Page 42
- Firmware update Page 43

Removing and installing the measuring chamber holder

(Required tool: Torx 10, Tensioning and release aid, for John Guest connector, John Guest ICLT/2)



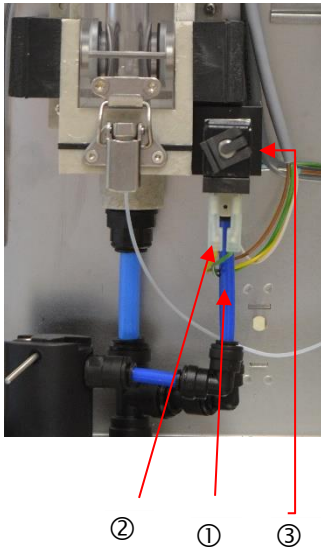
- Switch off the device and disconnect it from the power supply.
- Stop the water supply to the instrument.
- Drain the measuring chamber, if water has remained in it.
- Unhook the toggle type fastener.
- Tilt the measuring chamber upwards and remove it.
- Remove the stirring bar.
- Loosen the pressure hose ①.
- Loosen the four fastening screws of the measuring chamber holder ②.
- Loosen the valve block ③ from the measuring chamber holder (two fastening screws).
- Disconnect the plug from the flexible cable connection ④ on the base circuit board by pressing together and raising the two lateral levers.
- Unplug the flexible cable.
- Remove the measuring chamber holder from the front. To achieve this, remove the drain pipe ⑤ from the hose connection of the measuring chamber holder (see fig. push locking ring upwards).
- Install the new measuring chamber holder in reverse order.
- Ensure that the plug is locked into position after inserting the flexible cable connection.

Cleaning of clogged solenoid valves

When the solenoid valve is clogged with impurities, the measuring chamber is not properly emptied. In this case, the solenoid valve can be carefully cleaned.

For dismantling all Testomat devices, please proceed as follows:

- Switch off the device and disconnect it from the power supply.
- Shut off the water supply in the supply line to the Testomat device.
- Open the cover if present.
- Loosen the hose ① from the plug connector
- Loosen the 4 cable connectors ② from the coils of the solenoid valve.
- Loosen the 2 screws ③ that hold the solenoid valve in the housing. (Torx 10)
- Remove the solenoid valve forwards out of the housing.



To clean the solenoid valve, disassemble each side separately as follows:

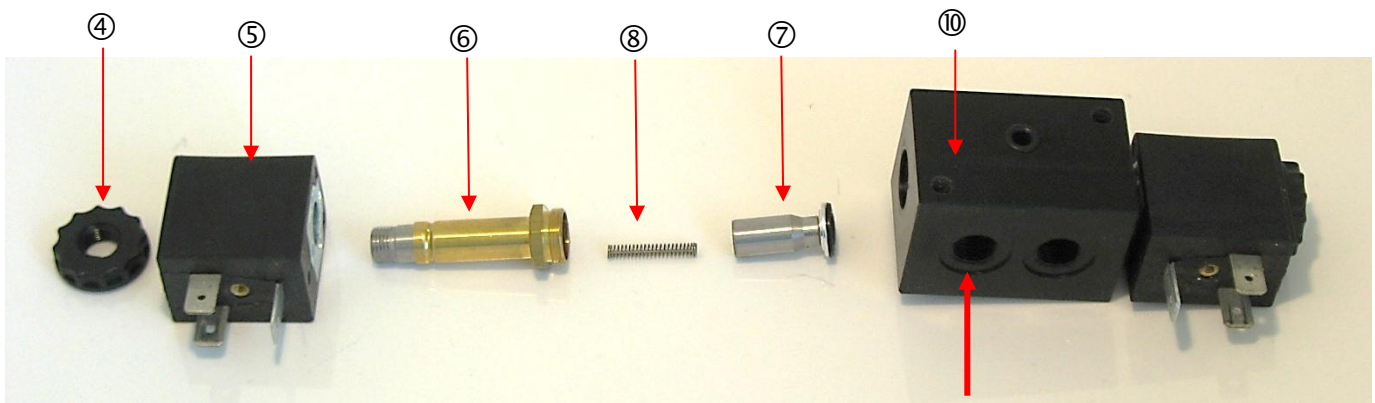
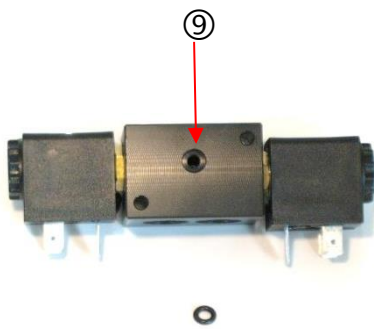
Start with the outlet side. On this side, the membrane of the valve core may get stuck in the drill hole when the valve is contaminated.

The problem can be resolved mostly by loosening the membrane and cleaning the drill hole.

- Unscrew the ④ knurled nut
- Pull off the ⑤ coil
- Unscrew the ⑥ anchor sleeve (SW 13)
- Carefully extract the ⑦ valve core, also called the anchor. Ensure that the spring is ⑧ not released.

If the membrane does not come loose and the anchor cannot be extracted, blow compressed air into the hole so that the membrane comes loose.

- When you blow compressed air through the valve and the valve block, make sure that the O-ring ⑨ is not lost from the drill hole to the measuring chamber. Therefore, remove the O-ring before every cleaning operation.



Blow in compressed air here

-
- When microbial contamination or deposits are present, clean the valve chamber and the parts of the valve ⑩ with a small brush (e.g. from our cleaning brush set, Art. No. 32287).
 - Carry out assembly by following the steps for dismantling of the same in reverse.
Make sure that you place the coil the right way round on to the anchor sleeve, as shown in the image above. The coil can be easily placed on to the anchor sleeve in only one direction.
 - Now disassemble the inlet side in the same way, as described for the outlet side.
 - Clean the inlet side, as described above.
 - After cleaning, reassemble all parts.

NOTE

Risk of interchanging parts

Do not interchange the inlet and outlet sides when mounting! The springs are not identical. The solenoid valve no longer works when it is incorrectly assembled.

Do not interchange the cable connectors of the inlet and outlet sides when reconnecting (inlet: yellow-green cable; outlet: brown-white cable). If necessary, take a photo prior to removal.

Ensure that the drill hole ⑨ appears in the solenoid valve to the measuring chamber.

Do not attempt to forcibly install the solenoid valve. If there are problems, check whether the solenoid valve has been properly assembled and screw on to the measuring chamber using the correct side.

- Reconstruct the solenoid valve by following the steps for dismantling of the same in reverse.

Additional cleaning instructions

Procedure in the event of corrosion:



Temporarily place the tie rod in a metal cleaning solution (no longer than 5 minutes, depending on the concentration). Subsequently, neutralise with plenty of clear water.

Under no circumstances must sandpaper be used!

It is far better to use metal-free cleaning fleece, e.g. from the company Rothenberger

Procedure in the event of crystalline deposits:

Place the tie rod in either vinegar essence, pre-dissolved granulated citric acid, or some limescale remover. In this case also, allow it to take effect for no longer than 5 minutes. Subsequently, neutralise with plenty of clear water, and, where appropriate, rework using metal-free cleaning fleece.

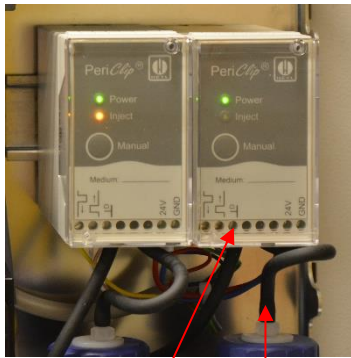


Prior to assembly:

Please wet the parts in direct contact with the medium with a fine water-repellent silicone grease or spray, e.g. Baysilone

It is resistant to water vapour, sulphur dioxide, dilute acids and alkalis, and also is physiologically indifferent, skin-friendly and has excellent dielectric properties.

When all of these instructions are implemented, older valves will also work again properly for a long time.



①

②



③

Repairing or replacing the dosing pump

A pump which does not function properly results in incorrectly measured values. If you have problems with the dosing pump, we recommend replacing it.

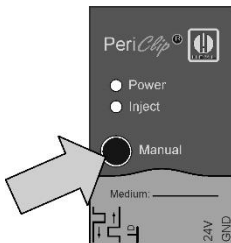
Proceed as follows to replace it:

- Switch off the device and disconnect it from the power supply
- Loosen the five cables of the terminal connections using a suitable screwdriver.
- Loosen the hose connections at the indicator bottle and at the measuring chamber holder.
- Collect the reagent in a container!
- Use a screwdriver to push the lock of the pump housing downwards and remove the housing from the top
- At first, place the replacement pump on top of the DIN rail and push the housing downwards until the lock engages
- Reconnect the cables (observe the colour sequence!)
- Reconnect the hose connections (note the suction and pressure side!)

Checking the dosing pump

Proceed as follows to check correct functioning and the dosing quantity of the dosing pump:

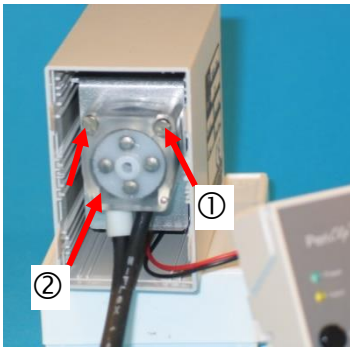
- Press the "HAND" key.
- Make sure that the measuring chamber is empty.
- Remove the pressure hose from the measuring chamber holder.
- Subsequently press the "Manual" key on the dosing pump.
- Observe if reagent leaks out of the tube.
- Collect the reagent in a container!



Replacing the pump head

To replace the pump head, proceed as described below:

- Remove the transparent cover.
- Open the housing with a suitable screwdriver (push down the snap-on fastening on both sides).
- Carefully pull-out the pump head with a drive mounting bracket.
- Loosen both screws ① at the pump head.
- Pull the pump head from the motor shaft.
- Place the new pump head on the shaft. The short hose with the stopper ② must be on the left-hand side.



NOTE



Anti-twist guard

Please observe the anti-twist guard on the motor shaft and the pump head during installation! The drill hole and the shaft each have a flat surface and only fit together in one position. Carefully turn the pump head into the correct position until the snap-in noses snap into the provided drill holes in the housing.



- Re-assemble the pump in reverse order. Make sure that wires or hoses are not trapped.

Do not place the drive mounting bracket on the top slide-in rail ③, as this could cause the pump head to come into contact with the circuit board.



Observe ESD safety precautions!

Replacing the backup battery

When the device is switched off the internal clock is powered by a lithium backup battery (CR2032 type), which is designed to have a service life of 10 years. After this period, it should be replaced for preventive reasons, and always ensuring a measured voltage $<2.3V$.

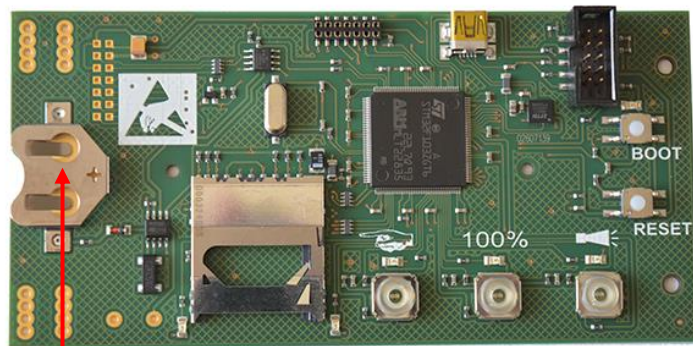
Change the battery on the controller board as follows:

- Switch off the device and disconnect it from the power supply
- Open the unit cover if present.
- Open the transparent cover to the board room.
- Using a non-conductive tool, carefully prise the used battery out of its mounting ①. Avoid damaging the circuit board with the sharp edge of a screwdriver.
- Insert a new battery and pay attention to the polarity.
- Close the transparent cover to the board compartment.

NOTE

Disposal of batteries

Batteries must be disposed of separately from the unit! Dispose of the batteries according to the guidelines of your country.

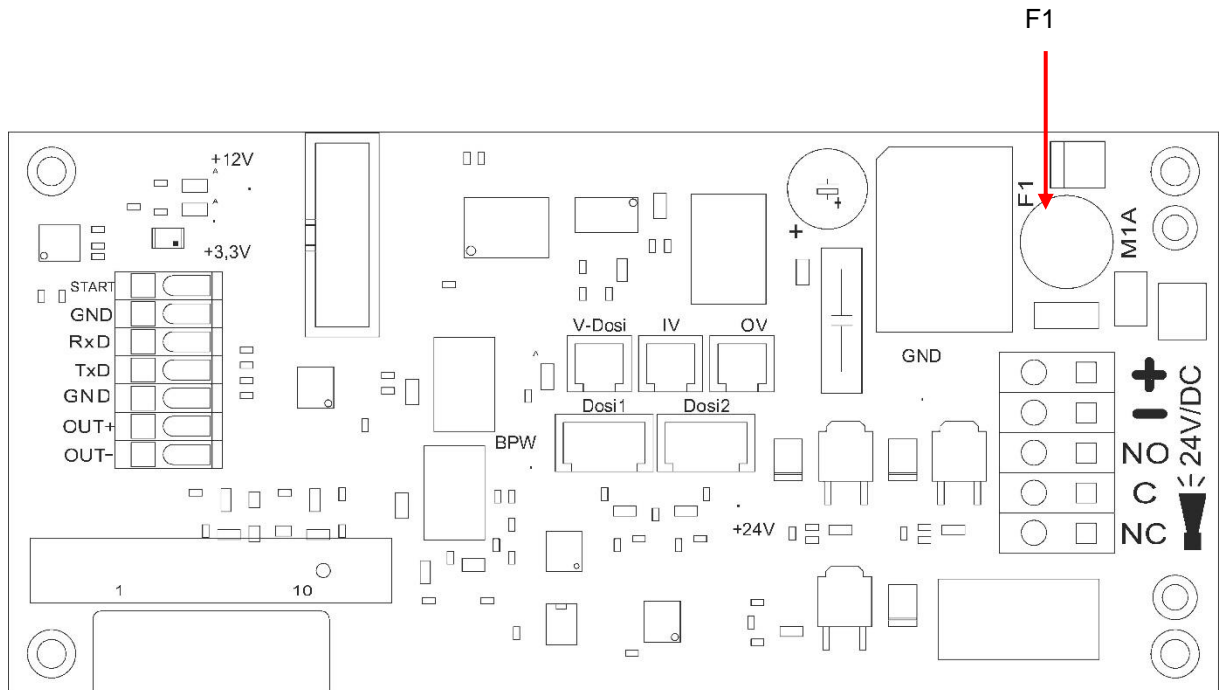


①

Replacing the fuse

This fuse protects the Testomat® Modul CL device or outputs against overload and short circuit.

The main fuse F1 (1 A MT) for outputs and equipment is located on the motherboard (behind the controller board).



Troubleshooting

In this section, you will find the most common error messages, possible causes and how to resolve them.

A complete table with all error messages, possible causes and troubleshooting measures can be found from page 35 onwards in the operating manual.

NOTE

Operation without cover / Measurement error under strong incidence of light

When installing and operating without the instrument cover (Art. No. 37798), avoid direct sunlight or strong incidence of light, as this may impair the measurement.

Error message “38 Water low”

Remedy:

- Check the inlet water (filter strainer, etc.) for foreign particles. If necessary, clean the filter strainer.
- The inlet pressure is too low (less than 1 bar). Remove the pressure valve body (see “Cleaning the controller/filter housing” on page 41).
- Typically 400 ml/min must flow through the measuring chamber to flush and fill the measuring chamber.
- Oxidation on the flex film in the measuring chamber holder. Replace the measuring chamber holder.

Error message “„33 Fault optics LED1” and „27 Fault optics LED2”

Remedy

- There is an error at the optical component. The receiver is defective. Replace the measuring chamber holder.
- Cold water (<8°C) combined with a warm and humid ambient temperature (>28-30°C) can lead to the formation of water drops on the sight-glass windows.

Error message “34 Fault turbid”

Remedy:

- Check whether the supplied measuring water is very turbid or soiled.
- Check whether the sight-glass windows are soiled and, if necessary, clean them.
- Make sure the flex film is dry. If you detect water damage, replace the measuring chamber holder.
- If necessary, install a filter (art. no. 11217) in the inlet of the instrument.

- Cold water (<8°C) combined with a warm and humid ambient temperature (>28-30°C) can lead to the formation of water drops on the sight-glass windows.

Error due to defective hardware

1. The dosing pump runs permanently.

Remedy:

- Check whether the broadband cable at the main and front board is loose or defective.

2. The inlet valve allows water to flow through it.

Remedy:

- Check whether the inlet valve is soiled.

3. The outlet valve allows water to flow through it.

Remedy:

- Check whether the outlet valve is soiled. Is there a permanent voltage on the valve?
Carry out a reset (see operating instructions on page 20).
If this fails to eliminate the error, replace the valve.

Spare parts for Testomat® Modul CL/ NH2CL

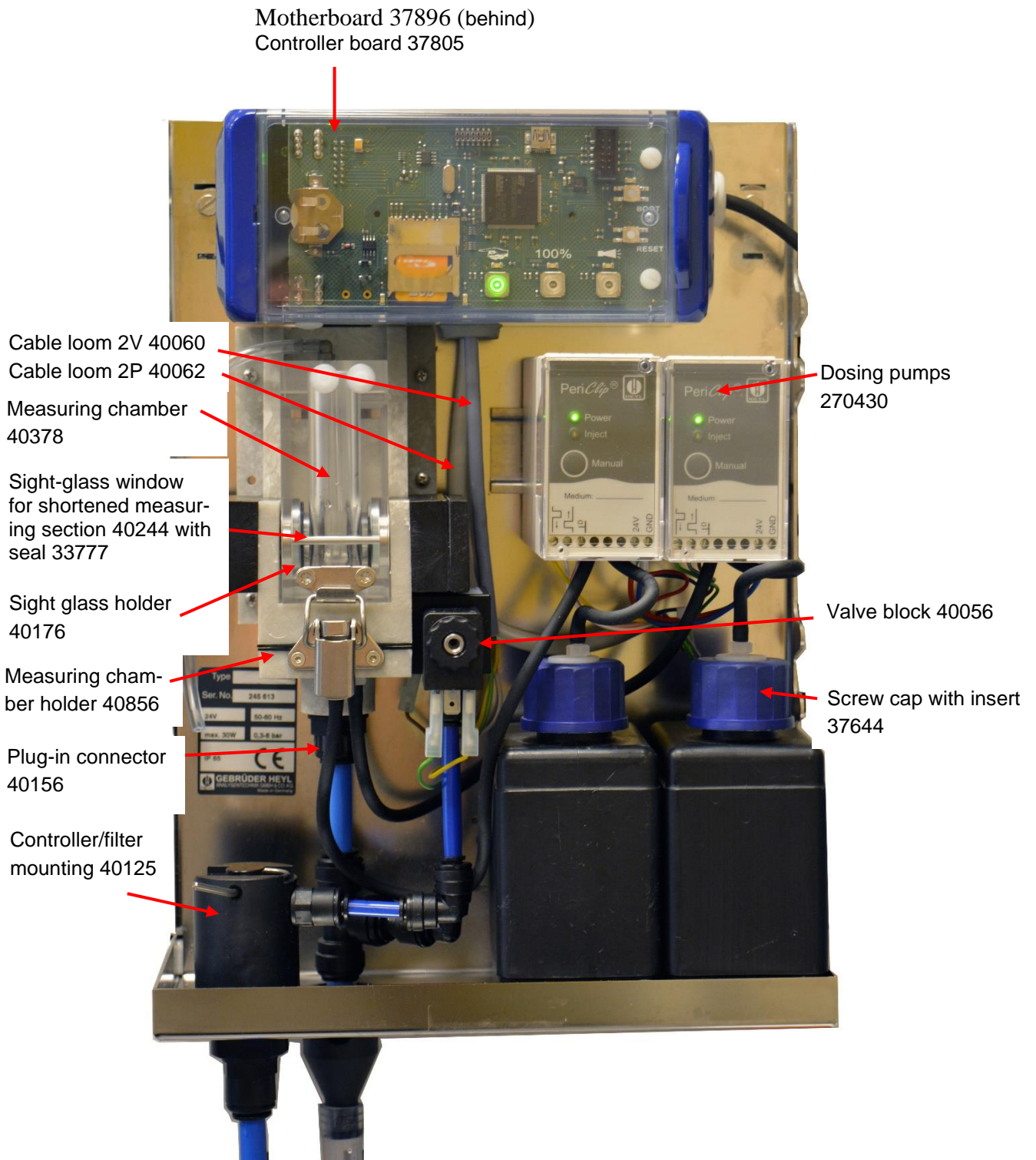
Caution!

Should you send your Testomat® Modul CL/NH2CL in for maintenance, please make sure that the measuring chamber has been emptied and the reagent bottles have been removed from the device. In addition, rinse the PeriClip® pump with water to remove residual reagents.

Pressure controller	
40125	Controller / Filter receiver, complete
40120	Controller / Filter receiver
40129	Controller plug T2000, complete
11225	Flow controller valve body
11270	Retaining pin 3x50 / 135 degree
11217	Inlet filter 19,5dx25
11218	Spring for inlet filter
40121	Inlet connector
40153	Screw-in connector G 1/4"
40150	Screw-in connector G 1/8"
Measuring chamber	
33777	Flat seal
40244	Sight-glass window for shortened measuring section
40176	Sight-glass holder
33253	Bolt M3x40, A2, DIN 965
40032	Latch fastener TL-17-201-52
11210	Plug for measuring chamber
40378	Measuring chamber with shortened measuring section, tested
Measuring chamber holder	
37856	Measuring chamber holder DUO
40050	Magnetic stirrer
40156	Screw-in connector 3/8" -10
40056	Solenoid valve, 2/2-way
Dosing pump PERIClip®	
270430	Dosing pump PERIClip, SP
40362	Pump head PERIClip, SP
Bottle connection/Suction device	
37644	Screw cap with insert for 500 ml bottle
Instrument spare parts	
31271	Fuse G-M, 5x20mm, M 1 A
37855	Base circuit board T-MU_GP_Chlor
37805	Control circuit board T-MU_Control
37734	Cable gland M16 x 1,5
37735	Nut M16x1,5 for cable gland
37832	Ribbon cable 2 x 7 pole
40060	Cable loom 2V for T2000
40062	Cable loom 2P for T2000
32187	Outlet funnel with snap lug
37774	Spacer ring for drain funnel
37798	Cover
Installation	
40153	Inlet for Testomat® Modul TH D=6
37581	Pipe, PE, D=6 d=4 L=5 m (5 m supply hose with 6 mm external diameter)

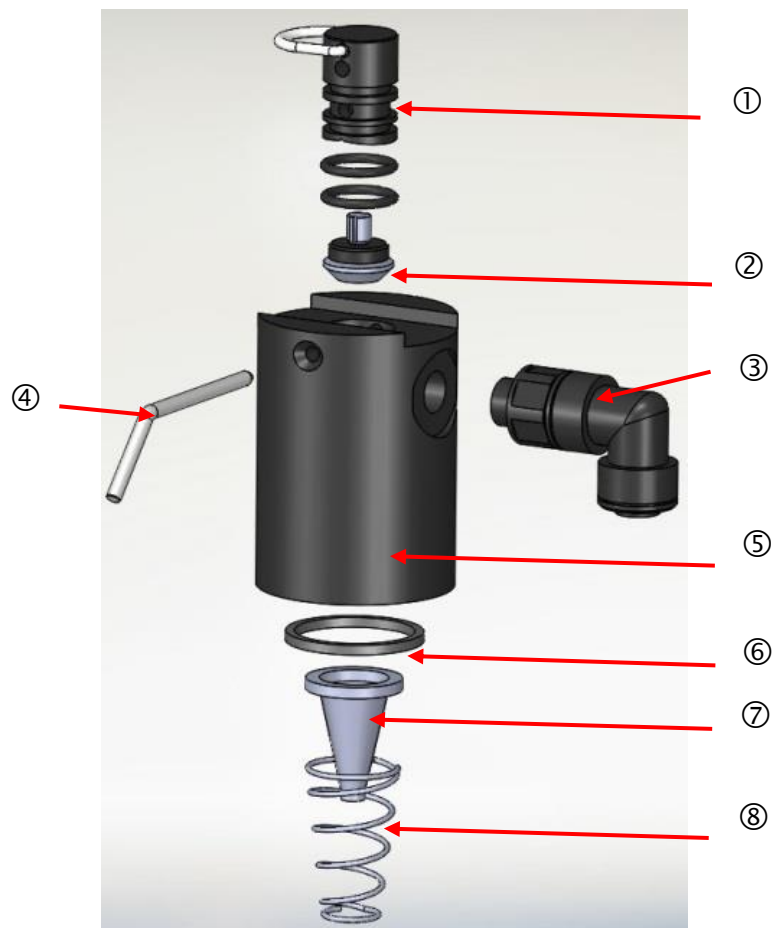
35715	Outlet hose 12 x 15 x 2000 mm (2 m outlet hose with 12 mm internal diameter)
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Component positions

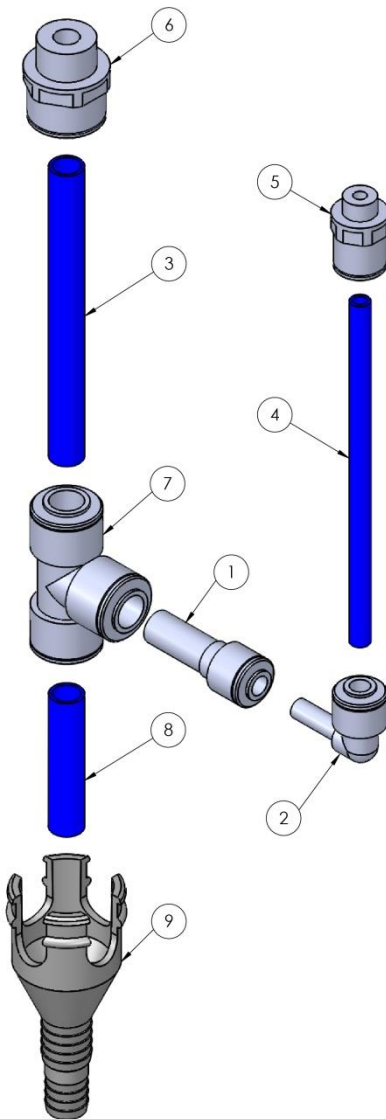


Controller/filter receiver

Item no.	Name	Article number	Quantity
1	Controller plug	40129	1
2	Flow controller valve body,	11225	1
3	Angled plug-in connector	40157	1
4	Locking pin	11270	1
5	Controller / filter receiver	40120	1
6	Flat seal 24x2	33777	1
7	Inlet filter	11217	1
8	Spring for inlet filter	11218	1



Drainage and piping



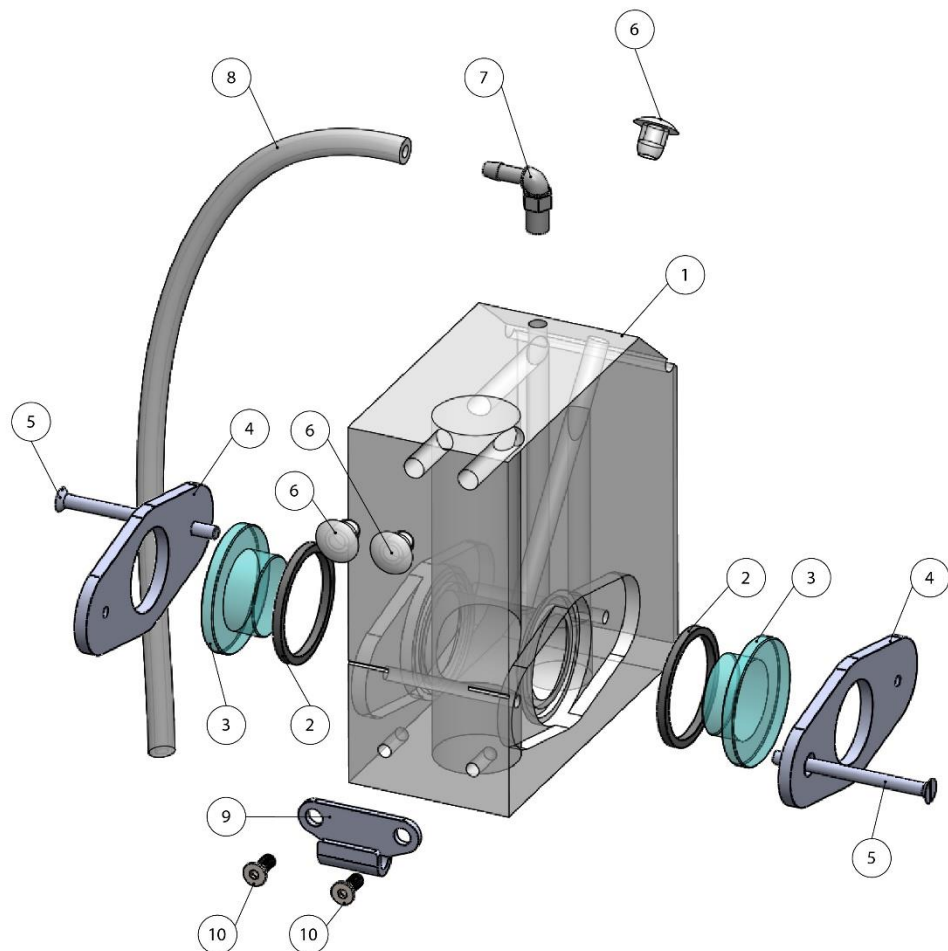
Item no.	Name	Article number	Quantity
1	Reducing connector 10-6	40152	1
2	Plug-in angular connector 6-6	40154	1
3	Pipe 10x98	40240	1
4	Pipe 6x115	40142	1
5	Plug-in connector G1/8" - 6	40150	1
6	Plug-in connector G3/8" - 10	40156	1
7	T connector 10	40112	1
8	Pipe 10x45	35863	1
9	Drain funnel	32187	1

Content of the gasket set T2000 (Art. no.: 40124)

Number, size	Position	Art. No.
1 x O-ring 18x2	Measuring chamber holder	33776
1 x O-ring 4.47x1.78	Valve block	33775
4 x flat seal 24x2	Pressure controller, measuring chamber and measuring chamber holder	33777
1 x O-ring 20x2	Inlet screw connection	11216
2 x O-ring 10.82x1.78	Controller plug	11249

Measuring chamber complete (40378)

Item no.	Name	Article number	Quantity
1	Measuring chamber housing	40020	1
2	Flat seal 24x2	33777	2
3	Sight-glass window with shortened measuring section	40244	2
4	Sight-glass holder,	40176	2
5	Bolt M3x40	33253	2
6	Plug for measuring chamber	11210	3
7	Angled plug-in connector	40320	1
8	Tube, PVC, 3,0/1,5, 200mm	35852	1
9	Latch fastener	40032	1
10	Bolt M4x8	33252	2



Checklist Testomat® Modul CL/NH2CL

Dear customers and service technicians,

The following checklist is no substitute for your expertise and experience applied to the process of troubleshooting. It should assist you and facilitate swifter and more systematic detection and logging of errors. No claim of completeness may be inferred from this list. We are grateful to receive supplementary feedback at any time.

Your device manufacturer

Block 1 / System and device data

	Testomat® Modul						
System type	Device type	Device number	Indicator type	Batch number	measured medium	Software version	Pump No.

Block 2 / error message and error history Please place a cross as appropriate (X)

What does the error history in the service monitor show?				
			(Text of the error history)	
Does an error message appear in the Service Monitor? e.g. "Water low" etc. (See instruction manual "Error messages / Troubleshooting")	Yes	No		
			(Text of the error message)	

Block 3 / Visual and functional check Please place a cross as appropriate (X) where applicable values / comments

Do the three green LEDs light up to indicate the voltage on the mother-board?	Yes	No	
Are the measuring chamber and hoses carrying water leakproof?	Yes	No	
Is the measuring chamber clean and free of film?	Yes	No	
Has the correct indicator type been programmed in?	Yes	No	Type:
Is the water pressure in the stipulated range (400 ml/min)? (See type plate of the device)	Yes	No	System pressure:
Is the outflow over the entire length laid to ensure no back pressure? (No "siphon effect!!!)	Yes	No	
Is the drain hose free? (Micro-organisms due to contamination etc.)	Yes	No	
Is the purge cycle / rinsing water quantity set such that Fresh water can always be measured?	Yes	No	Purge cycle:
Are the hoses to the dosing pump free of air bubbles? (Operate pump by hand / Perform manual analysis)	Yes	No	

PERFORM A (MANUAL) ANALYSIS

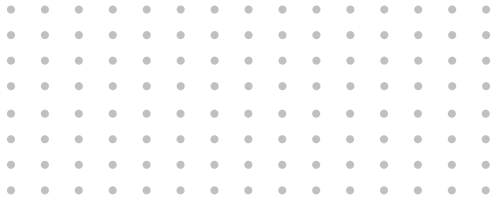
Does the water level rise uniformly when filling the measuring chamber up to the overflow hole (5 mm under the top edge of the measuring chamber)? (If no: check water pressure, water flow/flow regulator)	Yes	No	
Does the dosing pumps dose during an analysis? (LED on the pump comes on!)	Yes	No	Number of dosing strokes:
After the dosing process, is the reagent correctly mixed with the water in the measuring chamber? Check the stirrer	Yes	No	

PROGRAMMING DATA / OPERATING CONDITIONS

Is the Testomat continually supplied with mains voltage – except during maintenance work/emergency cases? (Intermediate switching off only with "Hand" button or "Stop",input)	Yes	No	
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More details of error messages and possible causes of errors can be found in the **operating instructions** under "Error messages / Troubleshooting"

After performing these tests, experience supports the assumption that the checked functions (Block 3) work flawlessly if the questions are answered with "Yes". We recommend carrying out these tests systematically during each inspection or any disruptions which arise.



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