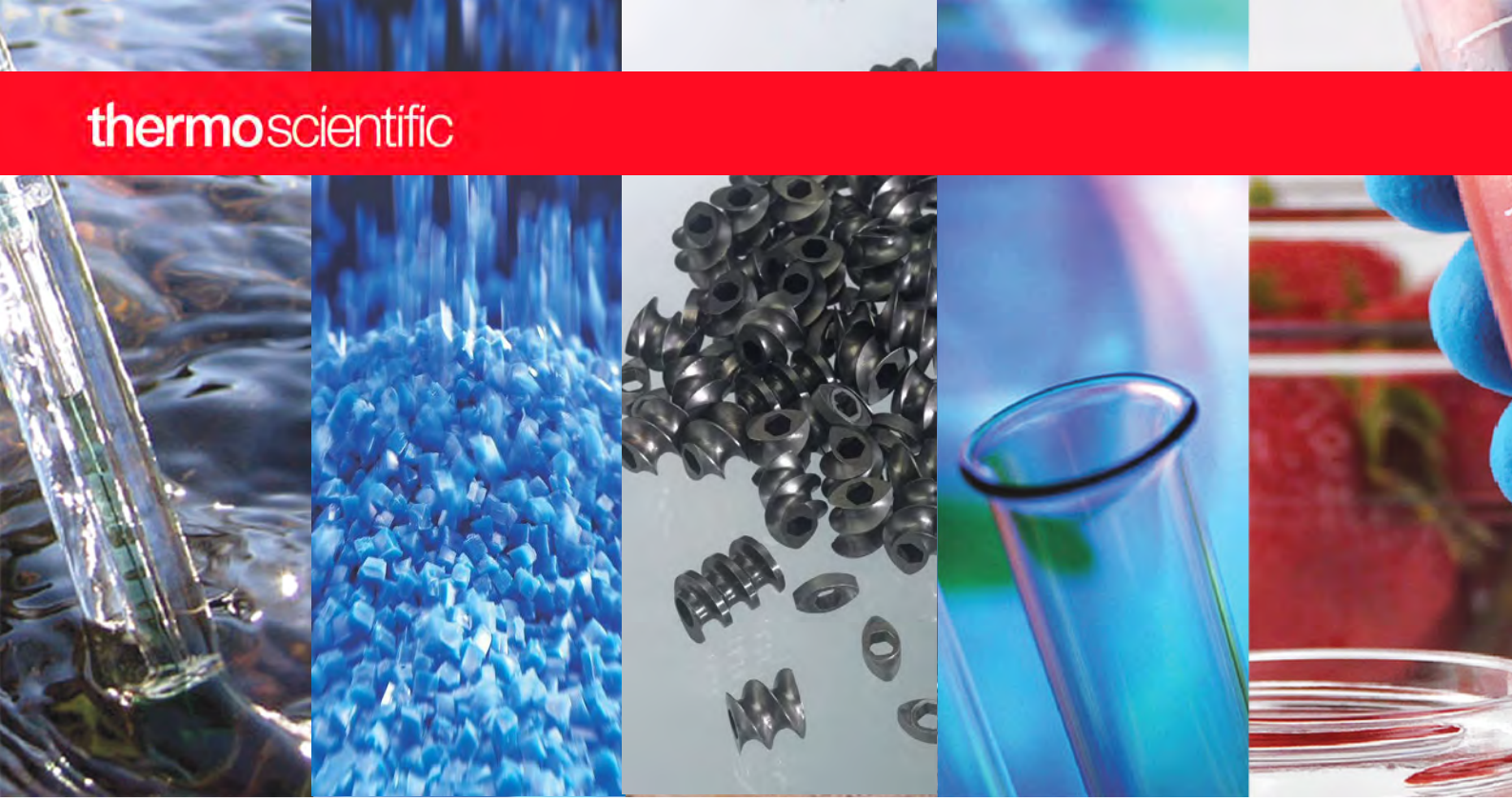

Thermo Scientific

HAAKE PolyLab QC

Instruction Manual

005-2787 Version 1.4 September 2022

ThermoFisher SCIENTIFIC

Konformitätserklärung
Declaration of Conformity
Déclaration de conformité

075-8249

Produktbezeichnung **Product name** **Nom du produit**	**Identifikation** **Identification** **Identification**
PolyLab QC, 3x400 V (IE3)	567-0058

Hersteller **Manufacturer** **Fabricant**	**Thermo Electron (Karlsruhe) GmbH** **Dieselstraße 4** **D – 76227 Karlsruhe** **Germany**
Dokumentationsbevollmächtigte Person **Authrised person for technical file** **Personne autorisée à constituer le dossier technique**	**Henry Eisenlohr** **Thermo Electron (Karlsruhe) GmbH**

CE

Richtlinie
Directive
Directive

2006/42/EG	**Maschinenrichtlinie** **Machinery directive** **Directive des machines**

Konform zu weiteren Richtlinien
Conform to other directives
Conforme aux autres directives

2014/30/EU	**Richtlinie für elektromagnetische Verträglichkeit** **Electromagnetic Compatibility Directive** **Directive relative à la compatibilité électromagnétique**
2011/65/EU	**RoHS**

Folgende harmonisierte Normen wurden angewandt:
Following harmonized standards are used:
On a appliqué les normes harmonisées suivantes :

EN ISO 12100:2010	Sicherheit von Maschinen - Grundbegriffe, allgemeine Gestaltungsleitsätze Safety of machinery – basic concepts, general principles for design Sécurité des machines – Termes de base, principes généraux de conception
EN 60204-1:2018	Sicherheit von Maschinen - Elektrische Ausrüstung von Maschinen – Teil 1 Safety of machinery – electrical equipment of machinery – Part 1 Sécurité des machines – Equipement électrique des machines – Partie 1
EN 61326-1: 2013	Elektrische Mess-, Steuer-, Regel- und Laborgeräte - EMV-Anforderungen, Teil 1 Allgemeine Anforderungen Electrical equipment for measurement, control and laboratory use EMC-requirements, Part 1 general requirements Equipement électrique de mesure, de commande, de régulation et appareils de laboratoire - Exigences CEM, Partie 1 Exigences générales

Wir erklären in unserer ausschließlichen Verantwortung, dass das Produkt, auf das sich diese Erklärung bezieht, mit den oben genannten Normen, normativen Dokumenten und den Bestimmungen der genannten Richtlinien übereinstimmt. Die Prüfprotokolle werden bei Thermo Electron (Karlsruhe) 10 Jahre aufbewahrt.

We declare under our sole responsibility, that this product to which this declaration relates is in conformity with the a.m. standards or other normative documents and is following the provisions of the a.m. directives.
All test certificates will be kept by Thermo Electron (Karlsruhe) for 10 years.

Nous déclarons, sous notre seule responsabilité, que le produit auquel cette déclaration fait référence est conforme aux normes susmentionnées, aux autres documents normatifs et aux dispositions des directives citées.
Les procès-verbaux de vérification sont conservés pendant 10 ans chez Thermo Electron (Karlsruhe).

Name Thobias Geissler	04.02.2022	Thermo Electron (Karlsruhe) GmbH Dieselstr. 4 * 76227 Karlsruhe Tel. + 49-721-4094-444, Fax + 49-721-4094-418
Unterschrift Signature Signature Geschäftsleitung/ Business Management Direction commerciale	Datum Date Date	Hersteller Manufacturer Fabricant

UK Declaration of conformity

We, Thermo Electron (Karlsruhe) GmbH, part of Thermo Fisher Scientific
Dieselstraße 4
76227 Karlsruhe
Germany

an ISO9001 certified company

declare under our sole responsibility that the Klicken oder tippen Sie hier, um Text einzugeben.

Product Name:	PolyLab QC, 3x400 V (IE3)
Model:	567-0058
Declaration ID:	**075-8249**

Meets the provisions of the regulations:

Supply of Machinery (Safety) Regulations 2008

Electromagnetic Compatibility Regulations 2016

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

using to the following standards and normative documents:

EN ISO 12100:2010	Safety of machinery – basic concepts, general principles for design
EN 60204-1:2018	Safety of machinery – electrical equipment of machinery – Part 1
EN 61326-1:2013	Electrical equipment for measurement, control and laboratory use EMC-requirements, Part 1 general requirements

Place and Date of issue: Karlsruhe, 04.02.2022

Name: Thobias Geissler

Function:
Product Line Manager

Signature

China RoHS Declaration

Identification 标识	Product name 产品名称	Declaration ID
567-0058	PolyLab QC, 3x400 V (IE3)	**075-8249**

Part name 零件号	Toxic or Hazardous substances and elements 有毒或危险物质或元素					
	Lead 铅 (Pb)	Mercury 汞 (Hg)	Cadmium 镉 (Cd)	Hexavalent Chromium 六价铬 (Cr^{6+})	Polybrominated biphenyls 多溴联苯 (PBB)	Polybrominated diphenyl ethers 多溴联苯醚 (PBDE)
Mechanics 机械类	o	o	o	o	o	o
Electronics 电子类	x	o	o	o	o	o

o: Indicates that this toxic or hazardous substance contained in all of the homogenous materials for this part is below the limit requirement in SJ/T 11363-2006

o: 表明该产品中，无任何一种有毒或危险物含量高于限量标准 SJ/T 11363-2006

x: Indicates that this toxic or hazardous substance contained in at least one of the homogenous materials for this part is above the limit requirement in SJ/T 11363-2006

x: 表明该产品中，至少有一种有毒或危险物含量高于限量标准 SJ/T 11363-2006

☐ ☒ ☐

Konformitätserklärung
Declaration of Conformity
Déclaration de conformité

075-8165

Produktbezeichnung **Product name** **Nom du produit**	**Identifikation** **Identification** **Identification**
Rheomix 600 QC Rheomix 610 QC Rheomix 3000 QC Rheomix 3010 QC	567-1110 567-1120 567-1150 567-1160

Hersteller **Manufacturer** **Fabricant**	**Thermo Electron (Karlsruhe) GmbH** **Dieselstraße 4** **D – 76227 Karlsruhe** **Germany**
Dokumentationsbevollmächtigte Person **Authrised person for technical file** **Personne autorisée à constituer le dossier technique**	**Henry Eisenlohr** **Thermo Electron (Karlsruhe) GmbH**

Richtlinie
Directive
Directive

2006/42/EG	**Maschinenrichtlinie** **Machinery directive** **Directive des machines**

Konform zu weiteren Richtlinien
Conform to other directives
Conforme aux autres directives

2014/30/EU	**Richtlinie für elektromagnetische Verträglichkeit** **Electromagnetic Compatibility Directive** **Directive relative à la compatibilité électromagnétique**
2011/65/EU	**RoHS**

ThermoFisher SCIENTIFIC

D06165

EG-Konformitätserklärung
EC Declaration of Conformity
Déclaration CE de conformité

075-8164

Produktbezeichnung **Product name** **Nom du produit**	**Identifikation** **Identification** **Identification**
Rheomex 19/25 QC	567-2110

Hersteller **Manufacturer** **Fabricant**	**Thermo Electron (Karlsruhe) GmbH** **Dieselstraße 4** **76227 Karlsruhe – Germany**
Dokumentationsbevollmächtigte Person **Authorised person for technical file** **Personne autorisée à constituer le dossier technique**	**Henry Eisenlohr** **Thermo Electron (Karlsruhe) GmbH** **Dieselstraße 4** **76227 Karlsruhe – Germany**

CE

Richtlinie
Directive
Directive

2006/42/EG	**Maschinenrichtlinie** **Machinery directive** **Directive des machines**

Konform zu weiteren Richtlinien
Conform to other directives
Conforme aux autres directives

2014/30/EU	**Richtlinie für elektromagnetische Verträglichkeit** **Electromagnetic Compatibility Directive** **Directive relative à la compatibilité électromagnétique**
2011/65/EU	**RoHS**

Folgende harmonisierte Normen wurden angewandt:
Following harmonized standards are used:
On a appliqué les normes harmonisées suivantes:

EN ISO 12100:2010	Sicherheit von Maschinen - Grundbegriffe, allgemeine Gestaltungsleitsätze Safety of machinery – basic concepts, general principles for design Sécurité des machines – Termes de base, principes généraux de conception
EN 60204-1:2018	Sicherheit von Maschinen - Elektrische Ausrüstung von Maschinen – Teil 1 Safety of machinery – electrical equipment of machinery – Part 1 Sécurité des machines – Equipement électrique des machines – Partie 1
EN 61326-1: 2013	Elektrische Mess-, Steuer-, Regel- und Laborgeräte - EMV-Anforderungen, Teil 1 Allgemeine Anforderungen Electrical equipment for measurement, control and laboratory use EMC-requirements, Part 1 general requirements Equipement électrique de mesure, de commande, de régulation et appareils de laboratoire - Exigences CEM, Partie 1 Exigences générales

Wir erklären in unserer ausschließlichen Verantwortung, dass das Produkt, auf das sich diese Erklärung bezieht, mit den oben genannten Normen, normativen Dokumenten und den Bestimmungen der genannten Richtlinien übereinstimmt. Die Prüfprotokolle werden bei Thermo Electron (Karlsruhe) 10 Jahre aufbewahrt.

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All test certificates will be kept by Thermo Electron (Karlsruhe) for 10 years.

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Name Thobias Geissler 	08.09.2022 Karlsruhe	Thermo Electron (Karlsruhe) GmbH Dieselstr. 4 * 76227 Karlsruhe Tel. + 49-721-4094-444, Fax + 49-721-4094-418
Unterschrift Signature Signature Produktlinienleiter Product Line Manager Chef de ligne de produits	Ort und Datum Place and Date Lieu et date	Hersteller Manufacturer Fabricant

UK Declaration of conformity

We, Thermo Electron (Karlsruhe) GmbH, part of Thermo Fisher Scientific
Dieselstraße 4
76227 Karlsruhe
Germany

an ISO9001 certified company

declare under our sole responsibility that the

Product Name:	Rheomex 19/25 QC
Model:	567-2110
Declaration ID:	**075-8164**

Meets the provisions of the regulations:

Supply of Machinery (Safety) Regulations 2008

Electromagnetic Compatibility Regulations 2016

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

using to the following standards and normative documents:

EN ISO 12100:2010	Safety of machinery – basic concepts, general principles for design
EN 60204-1:2018	Safety of machinery – electrical equipment of machinery – Part 1
EN 61326-1:2013	Electrical equipment for measurement, control and laboratory use EMC-requirements, Part 1 general requirements

Place and Date of issue: Karlsruhe, 08.09.2022

Name: Thobias Geissler

Function:
Product Line Manager

Signature

China RoHS Declaration

Identification 标识	Product name 产品名称	Declaration ID
567-2110	Rheomex 19/25 QC	**075-8164**

Part name 零件号	Toxic or Hazardous substances and elements 有毒或危险物质或元素					
	Lead 铅 (Pb)	Mercury 汞 (Hg)	Cadmium 镉 (Cd)	Hexavalent Chromium 六价铬 (Cr^{6+})	Polybrominated biphenyls 多溴联苯 (PBB)	Polybrominated diphenyl ethers 多溴联苯醚 (PBDE)
Mechanics 机械类	o	o	o	o	o	o
Electronics 电子类	x	o	o	o	o	o

o: Indicates that this toxic or hazardous substance contained in all of the homogenous materials for this part is below the limit requirement in SJ/T 11363-2006

o: 表明该产品中，无任何一种有毒或危险物含量高于限量标准 SJ/T 11363-2006

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Les procès-verbaux de vérification sont conservés pendant 10 ans chez Thermo Electron (Karlsruhe).

Name Thobias Geissler 	23.06.2022	Thermo Electron (Karlsruhe) GmbH Dieselstr. 4 * 76227 Karlsruhe Tel. + 49-721-4094-444, Fax + 49-721-4094-418
Unterschrift Signature Signature Geschäftsleitung/ Business Management Direction commerciale	Datum Date Date	Hersteller Manufacturer Fabricant

UK Declaration of conformity

We, Thermo Electron (Karlsruhe) GmbH, part of Thermo Fisher Scientific
Dieselstraße 4
76227 Karlsruhe
Germany

an ISO9001 certified company

declare under our sole responsibility that the

Product Name:	Rheomix 600 QC Rheomix 610 QC Rheomix 3000 QC Rheomix 3010 QC
Model:	567-1110 567-1120 567-1150 567-1160
Declaration ID:	**075-8165**

Meets the provisions of the regulations:

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using to the following standards and normative documents:

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EN 60204-1:2018	Safety of machinery – electrical equipment of machinery – Part 1
EN 61326-1:2013	Electrical equipment for measurement, control and laboratory use EMC-requirements, Part 1 general requirements

Place and Date of issue: Karlsruhe, 23.06.2022

Name: Thobias Geissler

Function:
Product Line Manager

Signature

China RoHS Declaration

Identification 标识	Product name 产品名称	Declaration ID
567-1110 567-1120 567-1150 567-1160	Rheomix 600 QC Rheomix 610 QC Rheomix 3000 QC Rheomix 3010 QC	**075-8165**

Part name 零件号	Toxic or Hazardous substances and elements 有毒或危险物质或元素					
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Read first

Important notes

Connection to three-phase current

IMPORTANT Extruders which are delivered without a plug have to be connected to the threephase current at the customer side. Electrical connection must only be carried out by a certified electrician.

Be sure to connect the phases properly. Refer to the wiring diagram of the device for more information.

If a phase is missing or the rotary field is not correctly connected, a message will be displayed at the bottom of the screen after the extruder starts. As long as the error is not resolved, the following malfunctions will occur:

- Extruder drive does not start.
- Extruder does not heat.
- Existing cooling pumps does not start.
- Connected feeders and vacuum pumps does not start.

Device earthing

IMPORTANT Before final installation, a suitable protection earth cable with terminal has to be connected to the ground connector at the extruder. Make sure that the communicating devices have faultless potential balance.

Earth Conductors with leakage current (AC or DC) > 10 mA

Equipment with a protective conductor current exceeding or likely to exceed 10 mA (leakage current) must meet requirements centered on the provision of a high integrity protective conductor arrangement, which is to be realized by one or more of the following:

- A single protective conductor having a csa (cross-sectional area) of not less than 10 mm^2 copper.
- If there is a single protective conductor have a csa of less than 10 mm^2 copper, a second protective conductor is to be used with at least the same csa.

Earth conductors with leakage current < 10 mA

Equipment with a protective conductor current less than 10 mA (leakage current) must meet requirements centered on the provision of a high integrity protective conductor arrangement, which is to be realized by one or more of the following, see Table 1:

Table 1. Cross-Sectional Area - Minimum cross-sectional area

Cross-Sectional Area S of conductor (copper)	Minimum Cross-Sectional Area Sp of protective conductor (copper) on external connection point
S ≤ 2.5 mm²	2.5 mm²
2,5 mm² < S ≤ 16 mm²	S
16 mm² < S ≤ 35 mm²	≥ 16 mm²
S> 35 mm²	S/2

Residual Current Devices

Use only AC-DC sensitive residual current operated protective devices (Type B RCDs) to power the extruder.

Drive controller

The DC link capacitors can lose their electrical strength due to long storage times.

IMPORTANT Material damage due to reduced electrical strength! Reduced electrical strength can cause considerable material damage when switching on the drive controller.
Reform drive controllers in storage annually or before commissioning.

Annual reforming

To prevent damage to stored drive controllers, almost all manufacturer recommends connecting stored devices to the supply voltage once per year for one hour.

Contents

Preface

This guide describes how to install and control the HAAKE PolyLab QC System torque rheometer.

Related documentation

This user guide:

- explains the meaning and use of the warnings in the user guide,
- explains the use of the device and makes the danger clear, which may arise from failure to observe these operating instructions for you and others,
- provides information on the prevention of hazards.

Please note in addition to this manual:

- the applicable laws and regulations,
- the statutory accident prevention regulations,
- the prohibition, warning and mandatory signs and the warnings on the instrument.

Safety and special notices

Make sure that you follow the cautions and special notices presented in this guide. Cautions and special notices appear in boxes; those concerning safety or possible damage also have corresponding caution symbols.
This manual uses the following types of cautions and special notices.

CAUTION Highlights hazards to humans, property, or the environment. Each CAUTION notice is accompanied by an appropriate CAUTION symbol.

IMPORTANT Highlights information necessary to prevent damage to software, loss of data, or invalid test results; or may contain information that is critical for optimal performance of the system.

Note Highlights information of general interest.

Tip Highlights helpful information that can make a task easier.

The HAAKE PolyLab QC user guide contains the following caution-specific symbols (Table 1).

Table 1. Caution-specific symbols and their meanings

Symbol	Meaning
	**Hot surface:** Before touching allow any heated components to cool.
	**Pinch point:** Keep hands away from the specified areas.
	**Risk of electric shock:** This instrument uses voltages that can cause electric shock and/or personal injury. Before servicing, shut down the instrument and disconnect it from line power. While operating the instrument, keep covers on.
	**Heavy object:** The HAAKE PolyLab QC weighs over 140 kg; never try to move the instrument from the lab bench; you can suffer personal injury or damage the instrument.
	**Risk of eye injury:** Eye injury could occur from splattered chemicals or airborne particles. Wear safety glasses when handling chemicals or servicing the instrument.
	**Risk of hands injuries:** Hands injuries could occur from splattered chemicals or burns from high temperature. Always wear protective gloves when using/operating the instrument.
	**Risk of injury to the feet:** Always wear safety shoes.

Unpacking

Are the shock sensors red?

If a shipment is received in visibly damaged condition (i.e. the shock sensors indicate that the goods have been handled inappropriately in transit), be certain to make a notation on the delivering carrier's receipt and have his agent confirm the damage on your receipt. Otherwise, the damage claim may be refused.

If concealed damage or pilferage is discovered, notify the carrier immediately and retain the entire shipment intact for inspection.

Before returning the device

Inform the vendor (minor damage can often be rectified on site). Subject to authorization by Thermo Fisher Scientific, the goods are to be returned franco domicile.

Space requirements

Place the HAAKE PolyLab QC on a level floor where it is convenient to operate:
Base dimensions: 660 x 750 mm

IMPORTANT Not to be placed on a base of inflammable material.

Contacting us

There are several ways to contact Thermo Fisher Scientific for the information you need.

If you have any questions regarding installation or technical issues, please contact the helpdesk. You will find the contact form at:

https://tfs-3.secure.force.com/materialcharacterization/

❖ **To contact Technical Support or Sales, Germany and International**

Company	Thermo Electron (Karlsruhe) GmbH Part of Thermo Fisher Scientific
Adress	Pfannkuchstraße 10-12
	76185 Karlsruhe, Germany
Phone	+49(0)721 4094 444
Fax	+49(0)721 4094 300
E-mail	support.mc.de@thermofisher.com
Internet	www.thermofisher.com

❖ **To contact Technical Support or Sales, USA/Canada**

Company	Thermo Fisher Scientific
Adress	2 Radcliff Road
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Phone	+1 603 436 9444
Fax	+1 603 436 8411
E-mail	info.mc.us@thermofisher.com

❖ **To contact Technical Support or Sales, UK**

Company	Thermo Fisher Scientific
Adress	Ion Path, Road 3
	Cheshire, CW7 3GA
Phone	+44(0)1606548100
Fax	+44(0)1606548101
E-mail	info.mc.uk@thermofisher.com

❖ **To contact Technical Support or Sales, France**

Company	Thermo Electron S.A.S.
Adress	16 Av du Quebec
	91440 Villebon Sur Yvette
Phone	+33(0)160924800
E-mail	info.mc.fr@thermofisher.com

❖ **To contact Technical Support or Sales, Benelux**

Company	Thermo Fisher Scientific
Adress	Takkebijsters 1
	4817 BL Breda
Phone	+31(0)765795555
E-mail	info.mc.nl@thermofisher.com

❖ **To contact Technical Support or Sales, China**

Company	Thermo Fisher Scientific
Adress	Building 6, No. 27
	XinJinqiao Rd., Shanghai 201206
Phone	+86(21) 68654588
Fax	+86(21) 64457830
E-mail	info.mc.china@thermofisher.com

❖ **To contact Technical Support or Sales, Japan**

Company	Thermo Fisher Scientific
Adress	C-2F, 3-9, Moriya-cho, Kanagwa-KU
	Yokohama, 221-022
Phone	+81 45 453 9170
Fax	+81 45 453 9082
E-mail	info.mc.jp@thermofisher.com

❖ **To contact Technical Support or Sales, India**

Company	Thermo Fisher Scientific
Adress	403-404, Delphi-B Wing, Hiranandani Business Park
	Powai, Andheri (E), Mumbai - 400076
Phone	+91 22 6680 3000
Fax	+91 22 6680 3001
E-mail	info.mc.in@thermofisher.com

Find software and firmware updates to download at www.rheowin.com.

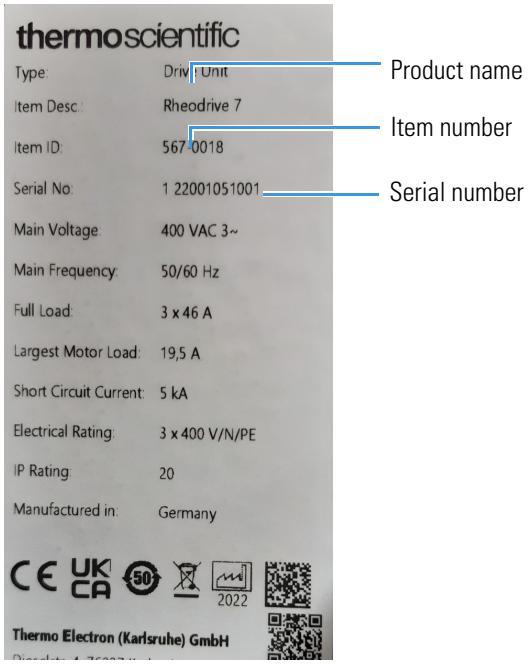
Quality Assurance

Dear customer,
Thermo Fisher Scientific implements a Quality Management System certified according to DIN/EN/ISO 9001 ff. This guarantees the presence of organizational structures which are necessary to ensure that our products are developed, manufactured and managed according to our customers expectations. Internal and external audits are carried out on a regular basis to ensure that our QMS is fully functional. We also check our products during the manufacturing process to certify that they are produced according to the specifications as well as to monitor correct functioning and to confirm that they are safe. This is why we initiate this monitoring process of important characteristics already during manufacturing and record the results for future reference.
The test protocol approved that this unit has fulfilled all requirements at the time of final manufacturing.

Please inform us if, despite our precautionary measures, you should find any product defects. You can thus help us to avoid such faults in future.

The following specifications shoul be giveb when product enquiries are made:

Unit name - printed on the front of the unit and specified on the name plate
Part number and Serial number - on the name plate



WEEE Compliance

This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2012/19/EU. It is marked with the following symbol:

Thermo Fisher Scientific has contracted with one or more recycling/disposal companies in each EU Member State, and this product should be disposed of or recycled through them.

Information concerning the CE sign

Thermo Scientific measuring and control instruments carry the CE sign which confirms that they are compatible with the EU guideline (electromagnetic compatibility). Our quality assurance system is certified according to DIN / ISO 9001 ff.

It was tested according to the strict EMV test requirements (EMV requirements for electrical equipment for measuring technology, conduction technology and laboratory usage).

Our strict standards regarding operating quality and the resulting considerable amount of time and money spent on development and testing reflect our commitment to guarantee the high level of quality of our products even under extreme electromagnetic conditions.

Practice however also shows that even units which carry the CE sign such as monitors or analytical instruments can be affected if their manufacturers accept an interference (e.g. the flimmering of a monitor) as the minimum operating quality under electromagnetic compatibility conditions. For this reason we recommend you to observe a minimum distance of approx. 1 m from such units.

Safety notes and warnings

The PolyLab QC corresponds to the relevant safety regulations. However you are solely responsible for the correct handling and proper usage of the instrument.

IMPORTANT

- The users must read and understand the operating instructions before the start-up of the PolyLab QC.
- This instruction manual must be carefully studied! It contains important information on the connection to the local mains supply, correct unit usage and safe handling.
- Ensure that this manual is always at hand for every unit operator.
- Check for transportation damage during unpacking. Do not try to start up a damaged unit.
- Not to be placed on a base of inflammable material.
- Repairs, alterations or modifications must only be carried out by specialist personnel. Considerable damage can be caused by improper repairs. The Thermo Fisher Scientific service department is at your disposal for repair work.
- All connections of the system are suitable for Thermo Fisher Scientific components only because of their specific current and voltage conditions.
- The unit must be used only on a surface that is free of cables and hoses or any objects that might cause someone to stumble.
- Movement of the PolyLab QC should only be even and smooth floors and by two people.
- Make sure it does not tip over.
- Only use this unit solely for the intended application.
- Do not operate the unit with wet or oily hands.
- Start the measuring sensor only at operating temperature!

CAUTION Rotating parts! Do not reach into the feed opening!

CAUTION

- Many units parts can become hot as a result of normal unit functioning – there is a high risk of burns! Please ensure that adequate contact protection is provided.
- Do not move the unit from the position where it was set up during operation or when it is still hot.

CAUTION

- Fire-resistant (cotton) clothing, safety shoes, and heat-resistant gloves should be worn.
- Do not clean the mixer without wearing heat protective gloves and safety glasses!
- The kneader rotors / screws must only be cleaned when the unit is standing still.

CAUTION

- To disconnect the instrument from the mains, first switch the instrument off, then unplug the power supplies mains cable from the wall socket.Ensure that this manual is always at hand for every unit operator.
- Complete separation from the mains is required when:
  - all dangers caused by this device are to be avoided,
  - repairs or maintenance work is about to be carried out.

CAUTION

- The machine should be used only in rooms equipped with an adequate extraction system.
- ”Hot plug-in” is not permitted, can lead to damages at the plug contacts. Switch off drive unit before plugging or unplugging feeders.
- Dependent on the temperature and the substance to be measured toxic gases can be set free.
- Start the motor only at temperature above melting point of materials residual of the barrel.
- Do not cool down the unit while the feeding device is still put on.
- Do not move the unit from the position where it was set up during operation or when it is still hot.

CAUTION

- The measurement kneader is only allowed to be filled when the filler hopper is in place.
- In case of testing combustible materials the machine must be operated at temperatures below the inflammation point of the tested material.
- It is prohibited to test energetic or explosive materials with this machine.
- Water cooling of the feeding zone or any other zone can cause harm to the operator and damage the machine in case a hose bursts. Avoid that water penetrates the machine. I case of flooding the machine shut down and disconnect the mains to ovoid harm to the operator and the machine by a short circuit.
- The adjusted temperature must be above the dew point by cooling of the feeding zone.
- In case of testing decomposing materials the machine must be operated at temperatures below the decomposition temperature of the tested material.
- For repair work it is necessary to shut off the compressed-air connection.
- The hoses and screw connections have to be checked at regular intervals. The worm must be inserted only when the machine is standing still.
- To prevent damage to stored drive controllers, almost all manufacturer recommends connecting stored devices to the supply voltage once per year for one hour.

Unit Description

The HAAKE PolyLab QC is a modern digitalised torque rheometer, equipped with advanced computer control.

Figure 1. The HAAKE PolyLab QC torque rheometer

The PolyLab QC has a drive unit with integrated variable temperature control and interchangeable measuring sensors.

The measuring sensors are mounted on a standardised mechanical interface, where the software automatically detects and configures it after the electrical connection. The automatic detection of the measuring sensors prevents operator error as well as enabling optimised temperature control parameters. When the attachment is detected, all boundary values for that measuring sensors are imported and set as alarm values.

Definition

- Base unit: Drive unit
- Measuring sensor: Extruder sensor (Rheomex QC) or Mixer sensor (Rheomix QC)
- PolyLab QC: Complete system consisting of base unit, measuring sensor and software
- Installation: Setting up and connection of the base unit,as well as mechanical and electrical connection of the measuring sensor with the base unit

Installation

This chapter describes how to unpack the instrument and setup the instrument for the first time.

IMPORTANT Read this chapter completely before starting the installation.

Space Requirements

After unpacking place the HAAKE PolyLab QC on a level floor where it is convenient to operate:
Base dimensions: 660 x 750mm

CAUTION Heavy object: the HAAKE PolyLab Qc weights over 138 kg. Never try to move the instrument; you can suffer personal injury or damage the instrument.
You need for lifting and setting up the device a forklift.

CAUTION Not to be placed on a base of inflammable material.

Ambient conditions according to EN 61010

The ambient conditions under which the HAAKE PolyLab QC is operated must fulfill the following requirements:

- Indoors, at a maximum altitude of 2000 meters above sea level.
  (Operation at higher altitudes is allowed as long as all other requirements are fulfilled.)
- Ambient temperature 5 °C < $T_{ambient}$< 40 °C.
- Relative humidity < 80% at 31 °C (< 50% at 40 °C).
- Excess voltage category II, contamination level 2.
  (contamination level 2: usual, non-conductible contamination; temporary conductivity due to condensation should be expected.)
- Voltage deviations of ± 10% are permissible.

Set up the HAAKE PolyLab QC (bench model)

The following tools are required to set up the PolyLab QC:

- spanner wrench (size 13 and 24)
- lifting device (chain hoist, forklift)
- spirit level

The following working steps must be observed:

1. Remove the packing.
2. Loosen the screws with spanner wrench (size 13) and remove the transport angle brackets.
3. Lift out the unit from the packing.

Note The bench model must be used with a lab bench with a load bearing capacity of 140 kg + the weight of the measuring sensor.

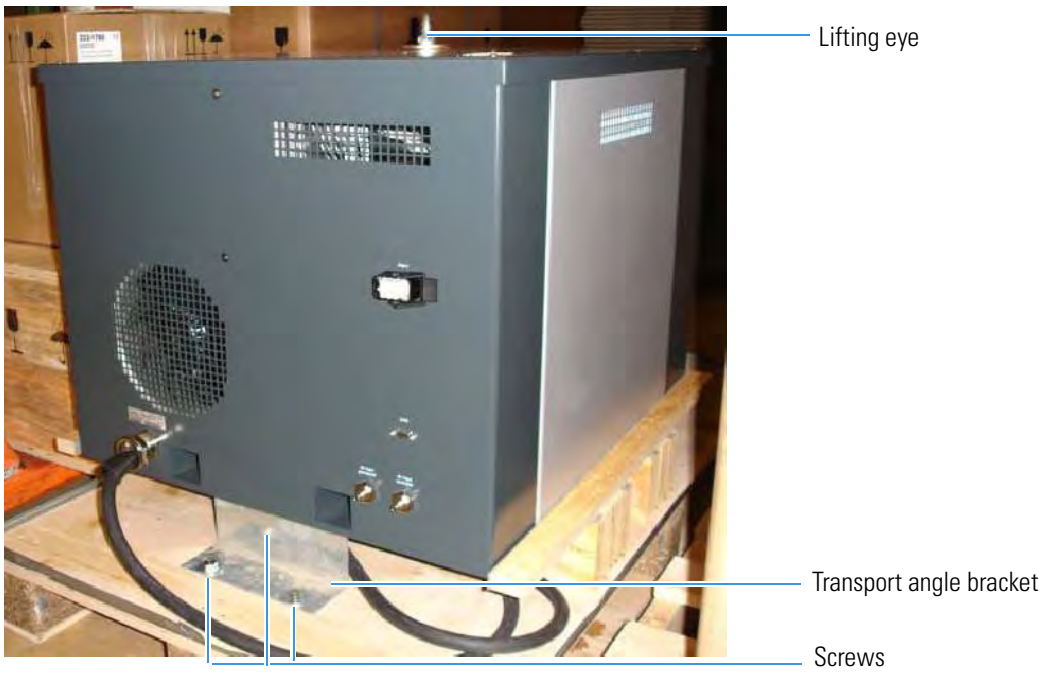
Note The unit must be set up so that the power and air connections are easily accessible.

Lift with chain hoist

The following working steps must be observed:

1. Screw the lifting eye into the threaded opening in the lid and tighten by hand (see Figure 2).

Figure 2. Preparing the PolyLab QC for lifting.

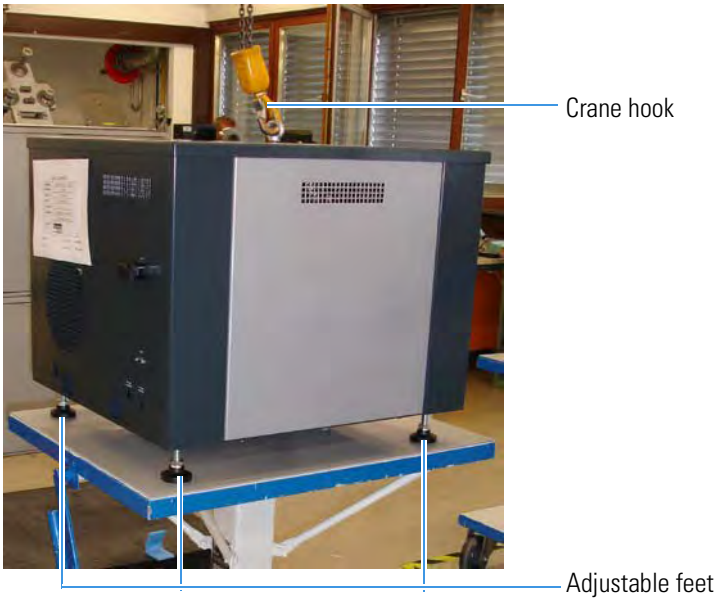


IMPORTANT The unit weights 138 kg. The hoist must have a load capacity ≥ 138 kg.

The lifting lug is used to lift the instrument out of (into) the packaging and place it on the laboratory bench or on the base frame (order no. 567-0053).

2. Insert the crane hook into the lifting eye (see Figure 3).

Figure 3. Preparing the PolyLab QC for lifting.



Note The unit must only be lifted by the provided lifting eye (with- out any add-ons) and placed on the lab bench or floor stand.

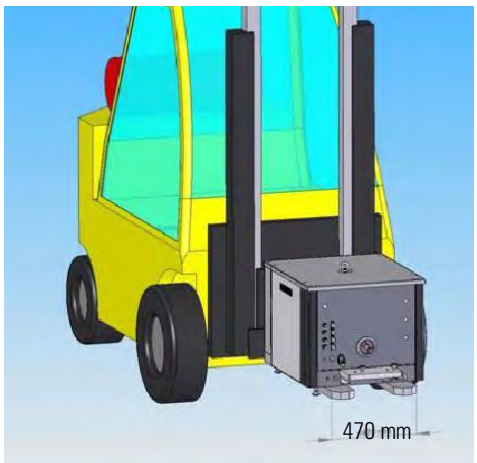
IMPORTANT Do not stand under the load during lifting.

Lifting using a forklift truck

Note When approaching with the forklift, be especially careful of the feet and the power cable. The distance between the forks must be less than 470 mm (see Figure 4).

Note Do not approach and lift from the side as this could damage side parts.

Figure 4. The forklift truck



If there is insufficient space to insert the forks, the adjustable feet can be unscrewed up to 100 mm clearance height.

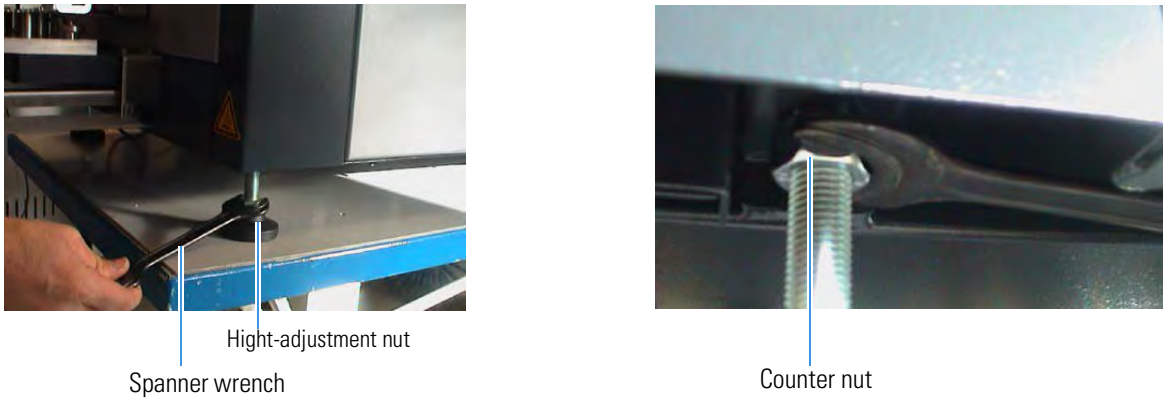
Note The PolyLab QC must be adjusted to horizontal, depending on the evenness of the installation site floor. This adjustment is generally only necessary before the unit's initial start-up.

Figure 5. Adjustment of the PolyLab QC.

The following working steps must be observed:

1. Ensure that the unit is standing at the right height and is level (see spirit level), by adjusting the adjustable feet.
2. Adjust the correct height with spanner wrench (size 24) and height-adjustment nut at the adjustable feet.
3. Then fix the height by tightening the counter nuts.

Figure 6. Adjustment of the PolyLab QC.



Set up the rack for PolyLab QC

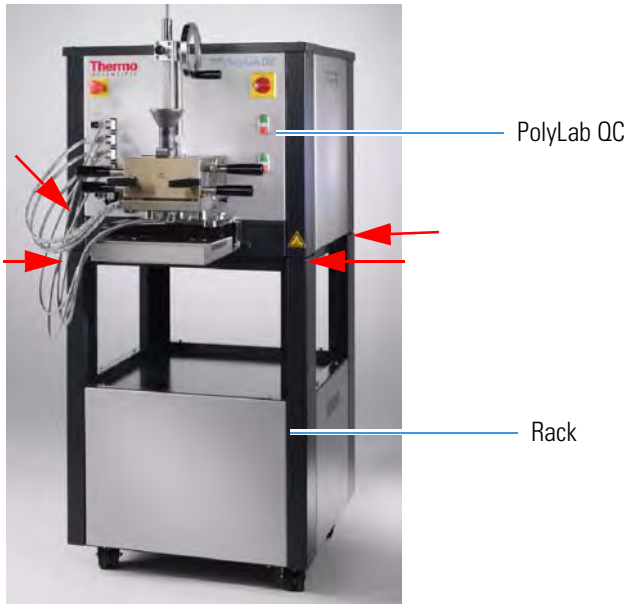
The following working steps must be observed:

1. Install the adjustable feets of the PolyLab QC on the rack.

Figure 7. Adjustment of the rack.

2. Screw the PolyLab QC on the rack with four screws (see Figure 8 - direction of arrow).

Figure 8. Assembly of parts (the PolyLab QC with the rack).



Note The PolyLab QC must be adjusted to horizontal, depending on the evenness of the installation site floor. This adjustment is generally only necessary before the unit's initial start-up.

3. The correct elevating adjustment see Figure 5 and Figure 6.

Connecting the drive unit to the mains

IMPORTANT The connection must only be carried out by authorized personnel.

In order to secure a trouble-free operation even with high interference emissions the PolyLab QC contains a sophisticated mains filter. Therefore, no FI-protection (fault current protection switch) may be installed in the mains supply.

The HAAKE PolyLab QC is equipped with the latest drive technology. This includes a frequency converter which functions as the drive control. This frequency converter generates high-frequency interference to the mains supply. Various mains filters have been fitted to prevent this mains interference. The motor is driven by the frequency converter via pulsing currents. The connection cables are shielded. The capacitors in the mains filters and the capacitive coupling in the shielded cables cause high-frequency and mains frequency leakage currents.

These leakage currents however mean that a residual current operated device (FI) cannot be used.

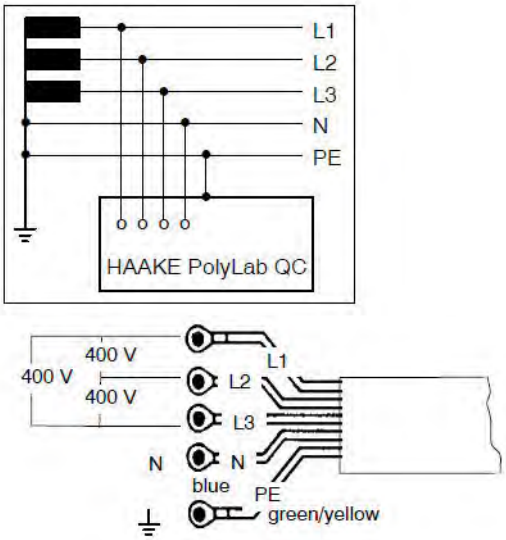
The user's safety is however also guaranteed without FI. The unit is designed and manufactured according to the valid VDE regulations and the EN61010 standard (electrical measuring, control and laboratory units), EN60204-1 (Electrical equipment of machines). Only VDE- and UL-approved components are used. The housing is connected sufficiently with the protective earth. Every unit is subjected to a safety test before delivery. During this safety test the protective conductor resistors are tested under load and an insulation test with a test voltage of 1900 V DC is carried out. Given the correct connections, the safety of the user with respective to dangerous voltages is guaranteed.

Compare the local mains voltage with the specifications on the name plate. Voltage deviations of ± 10% are permissible. The socket must be rated as suitable for the total power consumption of the unit.

TN-S mains supply, 3-phase system

3 x 400 V, N PE (3-phase mains supply with a neutral and a protective earth conductor).

Figure 9. TN-S mains supply.



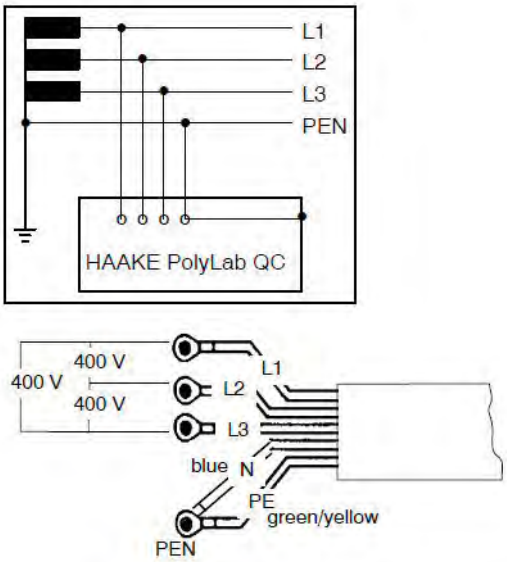
Connect the conductors to the corresponding terminals.

Note Grounding is absolutely necessary before connection with the mains supply.

TN-C mains supply, 3-phase system

3 x 400 V, PEN (3-phase mains supply with a combined neutral and protective earth conductor).

Figure 10. TN-C mains supply.



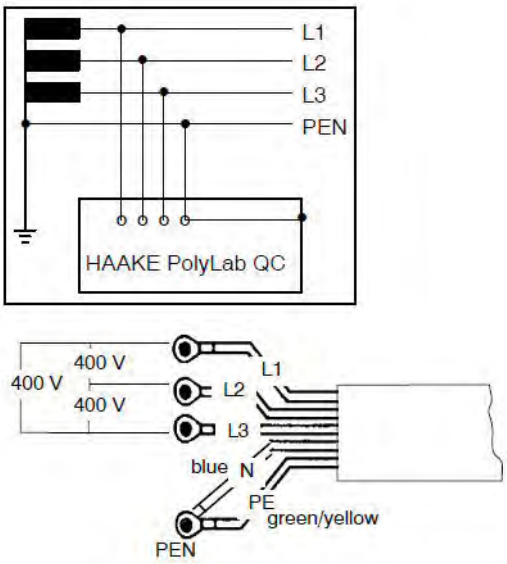
1. Make a shorting bridge between the neutral N and the grounding PE conductors, and connect them to the grounding terminal.

2. Connect the live conductors to the live terminals. Grounding is absolutely necessary before connection with the mains supply.

TT mains supply, 3-phase system

3 x 400 V, N (3-phase mains supply with a neutral).

Figure 11. TT mains supply.



1. Connect the PE conductor or the potential equalization socket to a separate earthing line terminal.

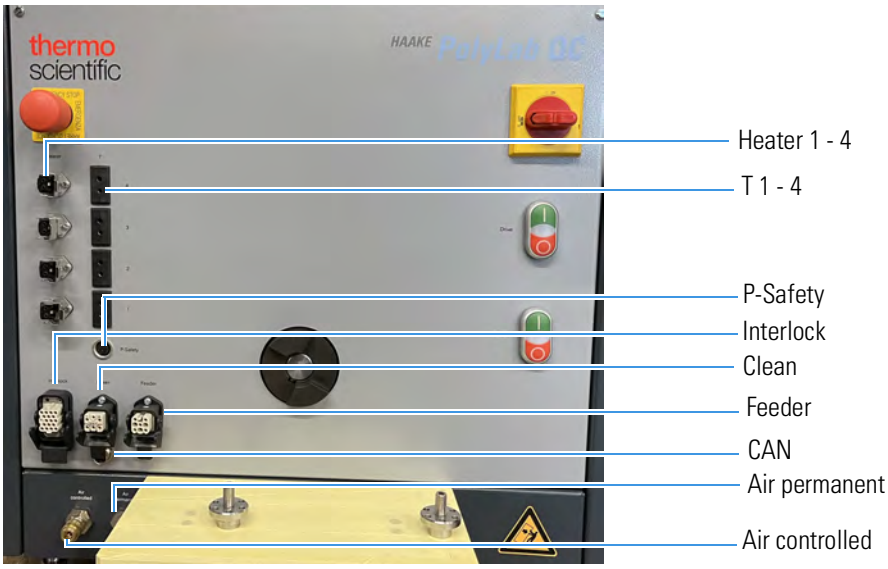
2. Connect the live conductors to the live terminals.

Note Grounding is absolutely necessary before connection with the mains supply.

Panel of the PolyLab QC

Description for connectors of the PolyLab QC on the front side see Figure 12.

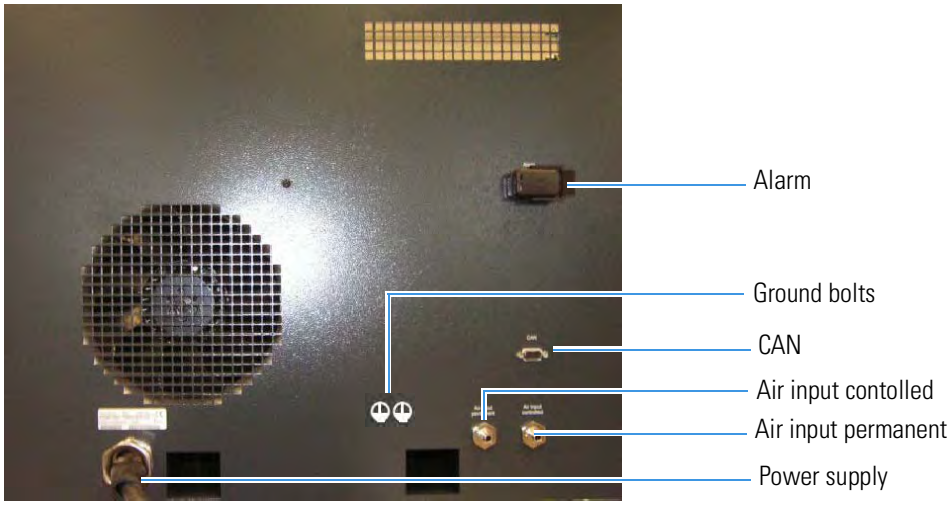
Figure 12. Panel of the PolyLab QC - Front side



Heater 1 - 4: Connectors for heater zones
T 1 - 4: Control Thermocouple ports
P-Safety: Connection for safety pressure sensor
Interlock: Connection for safety components on mixer and extruder
Clean: Connection for two-handed operation (cleaning - optional accessory)
Feeder: Port for feeder devices (switch off drive unit before plugging or unplugging feeders)
CAN: Connection for sensors
Air permanent: Connection for intake cooling or pneumatic filling device
Air controlled: Connection for cooling zone (measuring sensor)

Description for connectors of the PolyLab QC on the rear side see Figure 13.

Figure 13. Panel of the PolyLab QC - Rear side



Alarm: Connection for status indication
Ground bolts: (2x) in order to connect the base unit with earth or the peripheral units with earth
CAN: communication port to your PC or notebook

Air input controlled:	Cooling air support recommended values: 2-3 bar (max. 8 bar)
Air input permanent:	Cool air support (intake cooling or pneumatic filling device) recommended values: 2-3 bar (max. 8 bar)
Power supply:	Connector for PolyLab QC

Measuring sensor - Rheomix QC

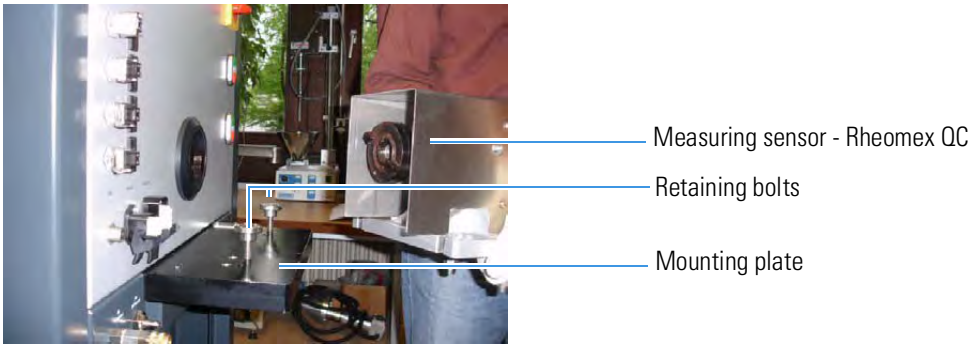
Fixing and replacing of the measuring sensor

IMPORTANT Fixing/replacing the measuring sensor must be carried out by two people, see Figure 14.

CAUTION Always wear protective gloves when replacing the measuring add-on!
Danger of burns!

Figure 14. The measuring sensor Rheomix QC

Figure 15. The measuring sensor Rheomex QC



To mount the measuring sensor follow the instructions below:

1. Place the measuring sensor onto the mounting plate as far as the retaining bolts see Figure 15.
2. Screw the round nut into the depression of the unit rack by hand, see Figure 16.

Figure 16. Mounting of the measuring sensor

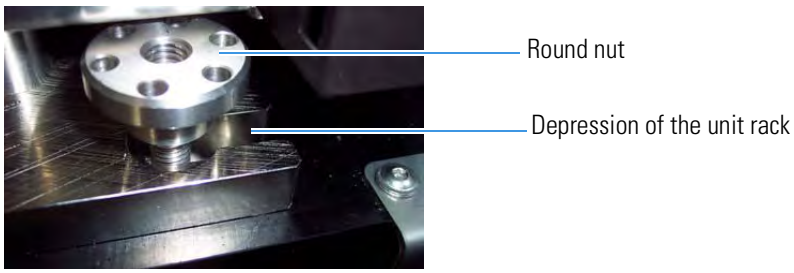
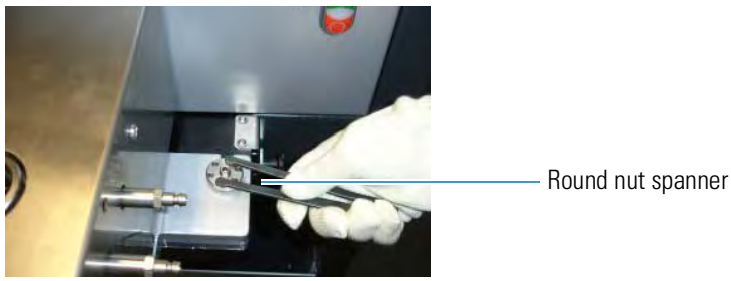


Figure 17. Mounting of the measuring sensor



3. Tighten the round nut with a round nut spanner see Figure 17.

Inserting the rotors into the mixer sensor

CAUTION Always wear protective gloves! Danger of burns!

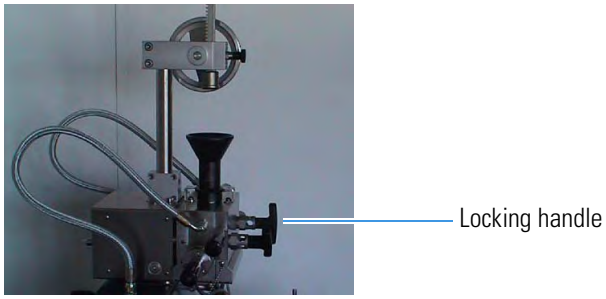
CAUTION Rotors must only be mounted when the unit is standing still.

IMPORTANT The rotors are marked with either 'L' (left side of mixer) and 'R' (right side of mixer). The right-hand rotor is fitted with a protecting device to prevent it from being confusedwith a pin on the shaft (for Rheomix 540/600/610 only).

To insert the rotors into the mixer sensor follow the instructions below:

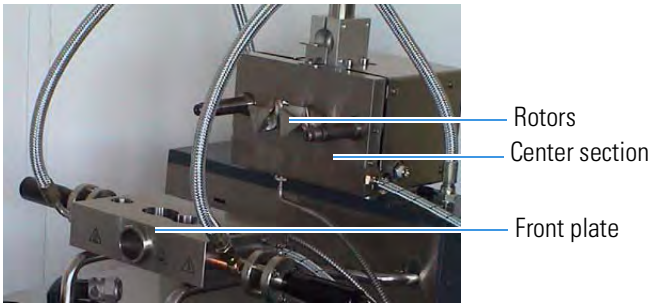
1. Remove the two locking handle on the front plate see Figure 18.

Figure 18. The locking handle



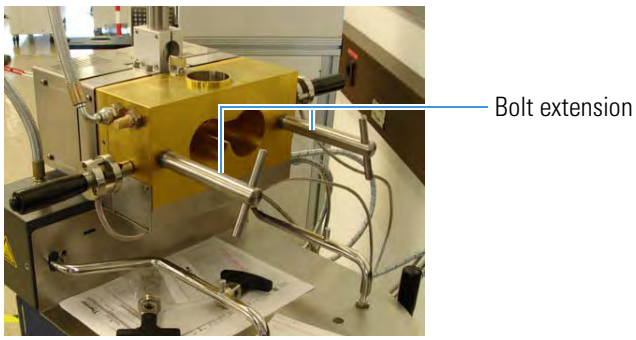
2. Slide the front plate and center section off the holding studs using the handles.

Figure 19. The measuring sensor



IMPORTANT Use the bolt extension at the Rheomix 3000/3010, see Figure 20.

Figure 20. The bolt extension



3. Turn the rotors to make sure the shaft has cleared the locking pin.
4. Properly position the rotors with the seat almost flush against the back plate of the mixer.

Rotors may then be locked into place by manually turning the left rotor counterclockwise and the right rotor clockwise. (To remove the rotors, reverse this procedure.)

5. Slide front plate and center section back on again and close with the two locking levers.

IMPORTANT Tighten the locking handles after achievement of the operating temperature with a torque wrench.
max. thightening torque = 70 Nm (Rheomix 3000/3010) max. thightening torque = 50 Nm (Rheomix 540/600/610)

6. Check the front surface of the rotor. It must not stand out over mixer chamber.

Connecting the cooling air support

Connect the external compressed air system to the ”Air Input” for cooling air support of the center section.

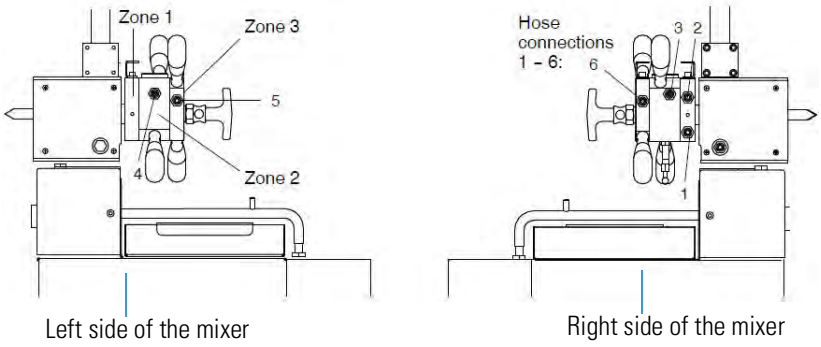
The air consumption is up to 15 l/min depending on the set temperature and pressure.

Note The mixer front plate (zone 3) and the rear plate (zone 1) will not be cooled. The air pressure influences the displayed melt temperature in the empty mixer sensor. Recommended air pressure is approx. 3 bar.

Liquid temperature control for Rheomix 610 QC / 3010 QC

The mixer sensors Rheomix 610 QC and Rheomix 3010 QC are temperature controlled with liquid.

Figure 21. The bolt extension



To connect the hose connection of the mixer are two 1-meter hose and two 1.5-meter hoses required.

To connect the hose connection follow the instructions below:

1. Connect hose connection (1) of the rear plate (zone 1) with the pump outlet of the circulator using a 1.5 meter hose.
2. Connect hose connection (2) of the rear plate with hose connection (3) of the center section (zone 2) using a 1 meter hose.
3. Connect hose connection (4) of the center section (zone 2) with hose connection (5) of the front plate (zone 3) using a 1 meter hose.
4. Connect hose connection (6) of the front plate (zone 3) with the pump inlet of the circulator using a 1.5 meter hose.
5. Insert the melt temperature sensor from the center section (zone 2) into port (TM) of the drive unit QC.

Note For temperatures above 60 °C use the optional set with insulated metal hoses:
up to 200 °C order no. 557-1151
over 200 °C order no. 557-1124

Connecting the temperature sensor of the external circulator temperature measurement

To connect follow the instruction steps:

1. Screw the temperature sensor with spacer disks into the measuring hole on the underside of the centre chamber.
2. Insert the temperature sensor plug into the socket provided for it on the thermostat (see the operating instructions of the circulator).

❖ **Recommended Heat Transfer Liquids**

- under 90 °C water

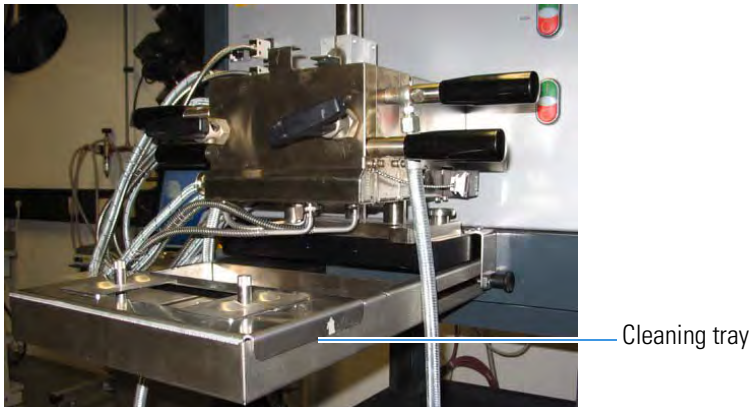
- up to 200 °C Synth200 (order no. 999-0226)
- over 200 °C Min350 (order no. 082-5204)

❖ **Recommended Thermo Scientific Circulators**

Thermo Fischer Scientific offers various thermostat models in different temperature ranges. Please contact the manufacturer for more information.

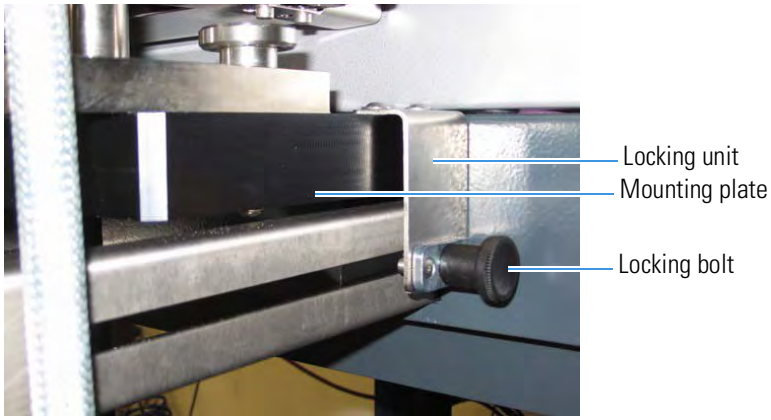
Mixer cleaning try with holder (optional accessory order no. 567-1080)

Figure 22. The cleaning tray



❖ **To mount the cleaning try**

Figure 23. The cleaning tray



To connect follow the instruction steps:

1. Insert the cleaning tray in the openings underneath the mounting plate.
2. Screw the locking unit tightly onto the mounting plate.
3. Fix the cleaning tray with the locking bolts.

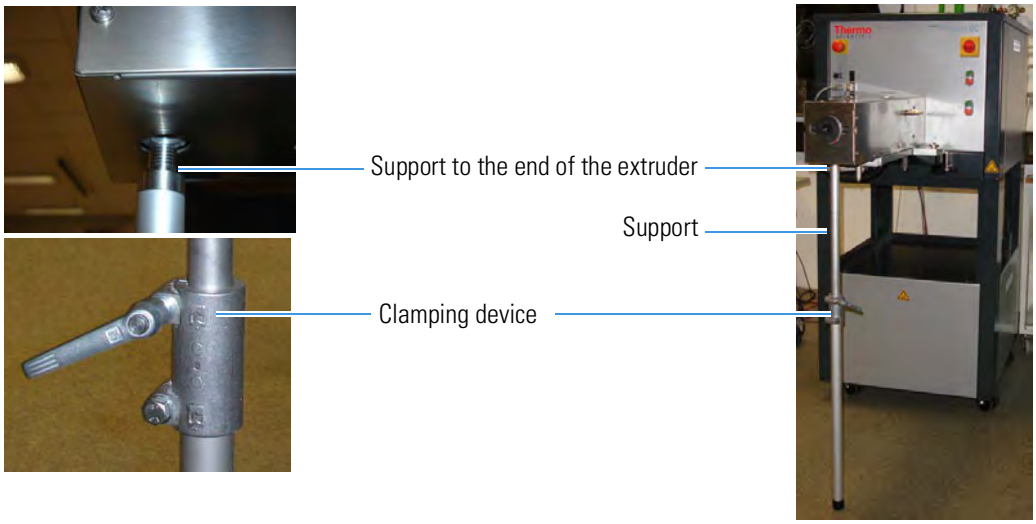
Measuring sensor - Rheomex QC

Mounting/replacing measuring sensor

See chapter "Measuring sensor - Rheomix QC" on page 15.

Mount support

Figure 24. The cleaning tray



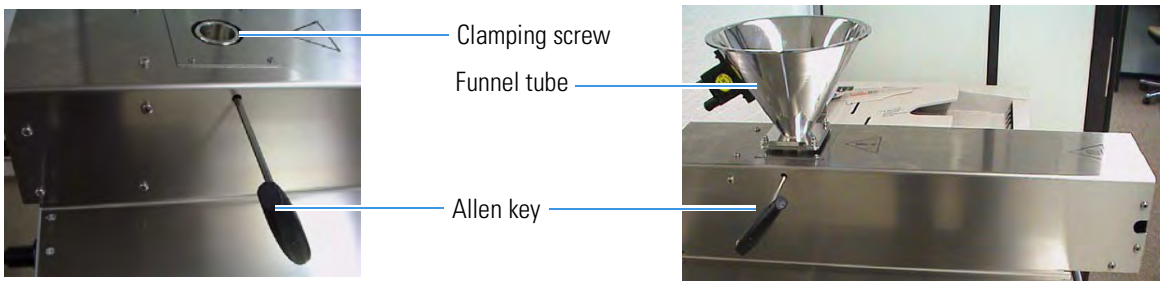
To mount follow the instruction steps:

1. Screw the support to the end of the extruder (Rheomex QC).
2. Adjust the support height using the clamping device.

CAUTION Mount the nozzle after adjusting the support heights. Danger of tipping!

Putting on the funnel tube

Figure 25. The funnel tube



Fix the funnel tube with the clamping screw on the filler plug by using the Allen key.

Note Put on the funnel tube before starting the extruder.

Inserting the screw

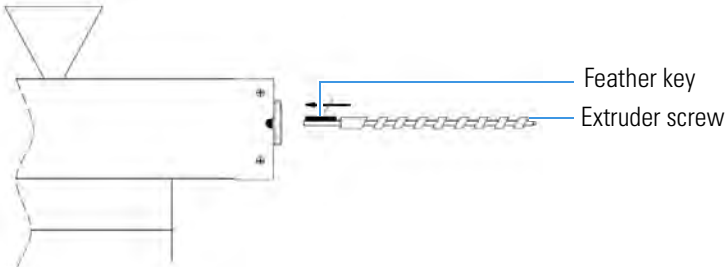
IMPORTANT The screw must be inserted only when the machine is standing still.

To insert follow the instruction steps:

1. Insert the screw into the extruder barrel, feather key end first, and slide in the screw until it rests against the bearing flange.
2. Now rotate the screw until the feather key and the bearing flange groove are exactly aligned.
3. Slide the screw back as far as it will go into the barrel.

IMPORTANT The screw should fit easily within the feather key groove of the bearing flange! If this is not the case, the screw and extruder sensor should be thoroughly cleaned.

Figure 26. Inserting the screw



Connecting the cooling air support

Connect the external compressed air system to the "Air Input" for cooling air support.

Note The air pressure to be set depends on the operating temperature and the processing behavior of the test substance. A setting guideline is 2 - 3 bar.

For Rheomex 19/25 QC the feed zone can be temperature controlled using either air or liquid.

- for air cooling, one of the two hose connection nozzles should be connected to the compressed air system (or the optional air distribution device) using an air hose.
- for liquid cooling, both hose connection nozzles should be connected to the temperature control circuit inlet and outlet nozzles of a circulator. Recommended flow rate for heat trans- fer liquid: approx. 20 - 50 liters per hour.

Note The adjusted temperature must be above the dew point.

Connecting the measuring sensor

Figure 27. The measuring sensors

Measuring sensor - Rheomix

Measuring sensor - Rheomex

Each heating circuit includes a regulating thermocouple and a heating connection.

The connections marked with a Heater (see "Panel of the PolyLab QC" on page 14) are used to connect to the of mixer and extruder heaters.
After inserting a heating plug, fasten it with the steel bracket.

Note Always use the steel bracket to prevent the plug from accidentally coming loose.

The regulating thermocouple T (see "Panel of the PolyLab QC" on page 14) must be connected together with the heating connectors.

IMPORTANT Follow the connection table (see connection table) when making the connections.

IMPORTANT Incorrect connection of the thermocouples can cause overheating and destroy the measuring system.

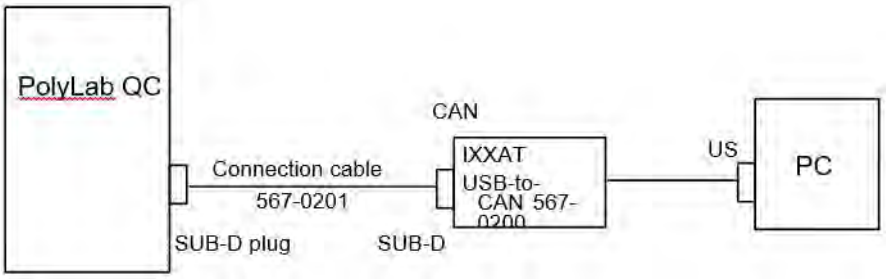
Table 2. Connection table

Measuring sensor	T1 Heater	T1 TC	T2 Heater	T2TC	T3 Heater	T3TC	T4 Heater	T4TC	T5 Heater	T5TC
Rheomix 600 QC	TS1	TS1	TS2	TS2	TS3	TS3	—	TM	—	—
Rheomix 610 QC	—	—	—	—	—	—	—	TM	—	—
Rheomix 3000 QC	TS1	TS1	TS2	TS2	TS3	TS3	—	TM	—	—
Rheomix 3010 QC	—	—	—	—	—	—	—	TM	—	—
Rheomix 19/25 QC	TS1	TS1	TS2	TS2	TS3	TS3	TSD1	TSD1	TSD2	TSD2

Connection of a PC or Notebook

The PC is connected to the basic unit via the CAN 20 socket with PolyLab QC.

Figure 28. Connection of a PC



Operation

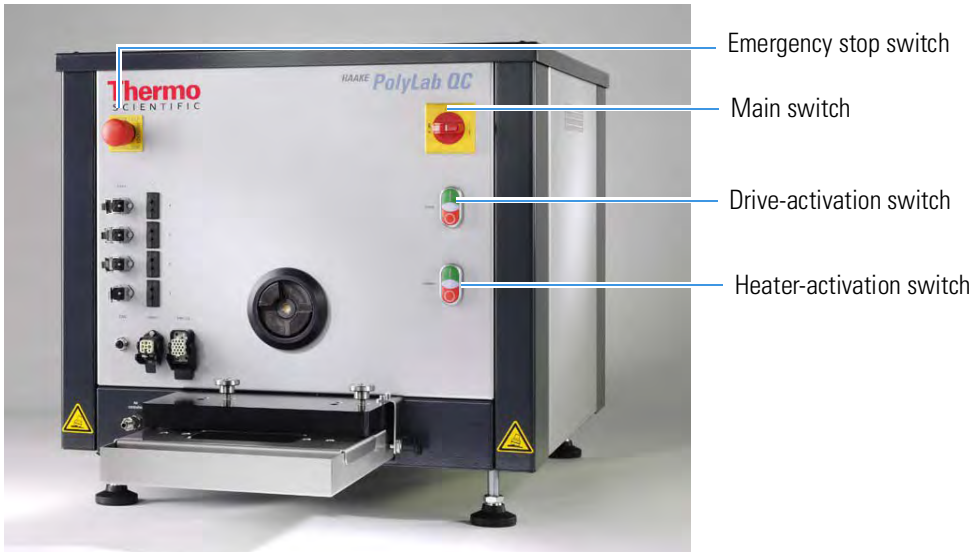
This chapter describes how to operate the device.

The HAAKE PolyLab QC without measuring sensors and software is not functional.

When the system has been installed completely, has been switched on and the monitor software runs, the software automatically detects the configuration and all unit specific limits and characteristic values are set accordingly.

Functional elements

Figure 29. Functional elements on the HAAKE PolyLab QC



Drive-activation switch:

- green → on
- red → off (green light is illuminated after actuation)

Heater - activation switch:

- green → on
- red → off (green light is illuminated after actuation; the heating is activated)

If the ”heater alarm” is activated, acknowledge with the red button.

Switching on

The following working steps must be observed:

1. Switch on the mains switch.
2. Press “Heater” switch,
   the green light is on, the heating is activated, the unit heats up to the last temperature set.
3. Start the software.

Note See separate instruction manual PolySoft OS.

4. Press “Drive” switch,
   the green light is on, the blower is activated.
5. The unit is ready for use.

Emergency stop switch

In case of a switch off an emergency situation please note the following:

1. Press the emergency stop switch.
   The mains supply for the drive is disconnected.
2. To restart the drive, pull out the emergency stop switch until the yellow outline under the emergency stop button is visible.
3. Reset the safety circuit by pressing the red "Drive" button and afterwards press the green "Drive" button approx. 10 seconds later.

If the green light on the switch does not light up, the following must be checked:

a. Emergency stop switch is pulled out (yellow outline visible).
b. The safety key is put in (Rheomix QC).
c. Interlock connection is put.
d. P-Safety - pressure sensor or dummy connector not plugged in.
e. Reset the safety circuit by pressing the red "Drive" button.

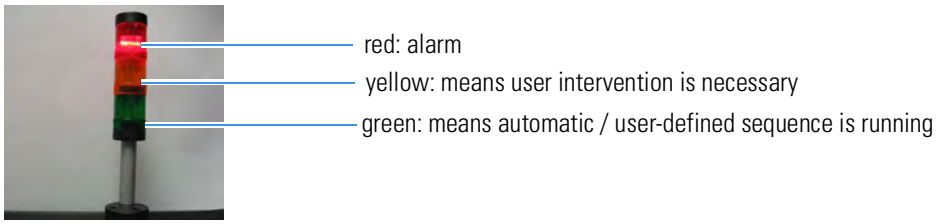
Note If the problem is not corrected, please call for service.

Signal light (optional accessory) order no. 567-0056

Signal light - optical information about the PolyLab QC’s operating status.

Connect the signal light to the alarm socket (rear of the PolyLab QC, see Figure 13).

Figure 30. The signal light



Measuring sensor Rheomix QC

Temperature control - Rheomix 600 QC, 610 QC and 3000 QC

The temperature of the electrically heated mixer sensor Rheomix 600 QC is set by the software.

Note See instruction manual of the monitor software.

The temperature of the liquid heated mixer sensor Rheomix 610 QC/ 3010 QC is set via the circulator.

Note Also see instruction manual of the circulator.

Heating up the mixer sensor

The following working steps must be observed:

1. Loosen the locking levers (so that the heat expansion can be compensated for).
2. Secure the locking levers tightly only once the set temperature has been reached.
3. Check at liquid tempered mixers the hose connections for leakage during the heating process.

Operating at temperatures > 300 °C

In this case the gearing unit of the mixer must be separately cooled with compressed air.

IMPORTANT The mixer may not be operated above 400 °C.

Follow the work steps:

1. Connect the cooling air connection at the gearing unit to the manually controlled air connection (Air output) at the mixer panel using an optional air hose (order no. 557-1122).
2. Adjust the cooling air flow by the rotating the manual cooling air knob at the control unit.

Note Operating at very high temperatures results in increased wear.

Weighing the sample

Mixers are not generally filled to a 100% full level. Empirical values of 65% to 90% (subject to the test substance) have proved effective. A value of 70% is frequently used as a standard value.

The sample weight is dependent on the net volume of the mixer chamber which in turn is dependent on the geometry of the rotors used.

Table 3 lists the net chamber volume with different rotors.

Table 3. Net chamber volume with:

	Roller rotors	Cam rotors	Sigma rotors	Banbury rotors
Rheomix 600 QC/610 QC	69 cm^3	85 cm^3	90 cm^3	78 cm^3
Rheomix3000 QC/3010 QC	310 cm^3	414 cm^3	541 cm^3	379 cm^3

If the melt density of the test substance is known, the sample weight can be determined using the following equation:

Sample weight = Melt density x Net chamber volume x Filling degree

Figure 31. Equation

$$m = \rho \cdot V_n \cdot 0{,}7$$

Sample weight for 70% filling level

Example:
Net chamber volume (Rheomix 600 QC) V_n with roller rotors = 69 cm^3
Material: Polyethylene with density of 0.92 g/cm^3
This yields a sample weight of: m = 0.92 g/cm^3 x 69 cm^3 x 0.7 = 44.4 g

Checking the sample weight

If the exact melt density of the test substance is unknown, it is possible to use an estimated value. The sample weight is then checked in a pretest:

1. Start pretest and wait until the test substance has completely melted.
2. Raise the ram and watch how the material moves in the chamber.

CAUTION

Wear safety glasses!

The following types of behavior can be observed:

- Aconstantly changing bulge of test material appearing in the chute opening.
  Correct sample weight!
- Anon-changing bulge of test material appearing in the chute opening which might even be pressed out of the chamber.
  Too much sample in the chamber!
- No bulge of test material to be seen in the chute opening. It might even be possible to see the blades of the rotors.
  Too little sample in the chamber!

Note The behavior described here is subject to the respective test material.

Running a test

CAUTION

Wear cotton clothing, safety shoes, and heat-resistant gloves!

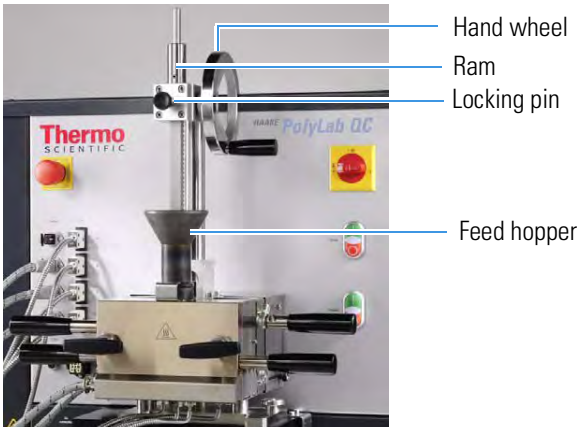
1. After the set temperature has been reached start the motor and set the desired set temperature at the control unit.
2. If torque measurement is to be carried out, the mixer sensor must be calibrated when unloaded at the set speed before the first test.

Note Calibration: see software instruction manual PolySoft OS.

The manual feeding device

IMPORTANT The measurement kneader is only allowed to be filled when the filler hopper is in place.

Figure 32. The manual feeding device



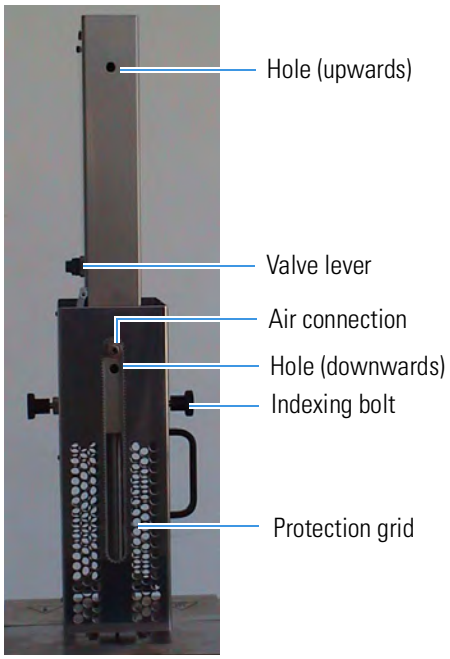
The next working steps:

3. Loosen the locking pin.
4. Raise the loading ram using the hand wheel.
   The locking pin should lock back into place once the loading pin is in the top position.
   If necessary, rotate the locking pin to lock.
5. Fix the feed hopper by rotating and fill in the weighed test substance using the loading tray.
6. Release the locking pin and lower the ram to force the test sample gradually into the center section of the mixer sensor until the locking pin locks into place in the bottom position.

The pneumatic feeding device

IMPORTANT The measurement kneader is only allowed to be filled when the filler hopper is in place.

Figure 33. The pneumatic feeding device



Note The standard version of the pneumatic feeding device is appropriate for mixer temperatures up to 300 °C.

Follow the work steps:

1. After the set temperature of the mixer has been adjusted the motor starts and the speed desired will be set at the basic unit.
2. In case of a torque measurement the empty mixer has to be calibrated at a set speed before the test run.

Note Calibration: see instruction manual monitor software.

3. Connect air connection at the rear of the feeding device with the compressed air hoses.

   Medium: (filtered compressed air)
   Max. permissible pressure: 9 bar
   Temperature range: 10 to 80 °C
   Shearing force at 6 bars: 1200 N
   Connection 1/4” / ø 8 mm

4. Unlatch the protection grid by pulling out the indexing bolt (2 pieces) and move to a lower position.
5. Lift the piston via the valve lever. When the ram has reached the upper position, set the lever to horizontal “Lock” position. Then move the protection grid to the upper position until the indexing bolt locks.
6. Fix the loading chute by rotating and fill in the weighed test substance using the loading tray.

7. Lower the protection grid and fill the mixer using the piston.

The speed of the piston can be adjusted manually for raising as well as lowering. Use a screwdriver to adjust the flow control valve at the pneumatic cylinder. You will find these in holes upwards and downwards at the rear of the device.

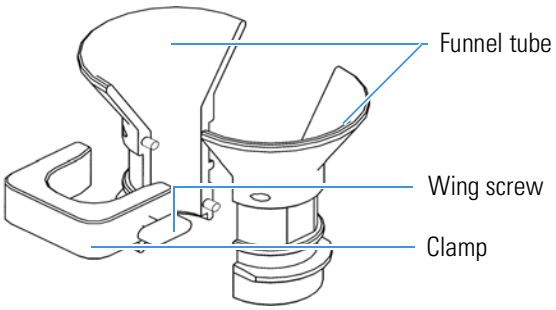
CAUTION After disconnection from compressed air supply the pneumatic cylinder stays under pressure!

IMPORTANT Work can only be done on the kneader when there is no pressure in the pneumatic system.

IMPORTANT Permitted torque at the piston rod 1.7 Nm.

How to handle the separated funnel tube (optional)

Figure 34. The funnel tube



Follow the work steps:

1. Fit both parts of the funnel tube using the pin connection.
2. Put clamp into nut and tighten it using the wing screw.
3. Screw the funnel tube to the mixing bowl.
4. After filling the mixer loosen the wing screw and take off the clamp.
5. Unlock and separate the funnel tube by unscrewing it.

Cleaning the mixer sensor

WARNING The pressure piston is only held securely in the upper and lower position. In the medium position a movement cannot be excluded due to the pressure drop.

WARNING Do not clean the mixer without wearing heat protective gloves, safety shoes and safety glasses.

IMPORTANT Highly reactive and corrosive substances must not be left in the kneader.

IMPORTANT The mixer sensor should only be cleaned with tools which will not damage the surface. Thermo Fisher Scientific supplies a complete set of cleaning instruments.

IMPORTANT Kneader rotors are only allowed to be cleaned when the unit is standing still.

IMPORTANT Important safety measures against rust in rooms with high humidity and temperature.
Degrease before use and oil after using the metal parts at the unit!

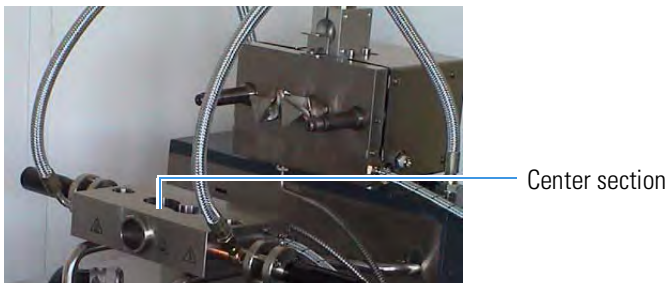
Note There is a wide range of cleaning substances available. Get in contact with Thermo Fisher Scientific for more detailed information.

Most samples are easier to remove from the mixer while still at test temperature.

Follow the next work steps:

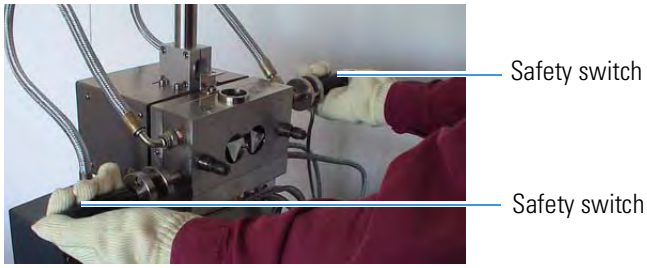
1. Switch motor off.
2. Drive rams upward.
3. Remove funnel tube.
4. Remove both locking levers.
5. Pull the key out of the lock switch.
6. Slide front plate off studs and position the plate on the mixer support rack. Scrape or brush sample away using appropriate cleaning tools. When the surface is clean, hang the front plate on the hook of the mixer support rack.

Figure 35. The center section



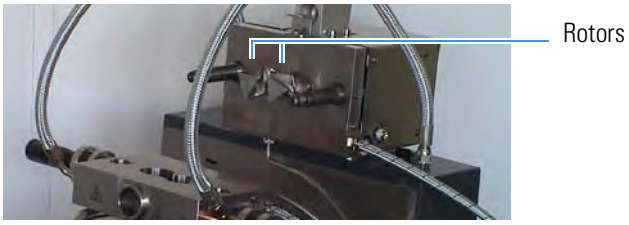
7. Place the center section on the support rack and scrape or brush away the sample using appropriate cleaning tools.

Figure 36. The safety switches



8. If the central chamber is hard to pull off, the rotors can be turned by pressing the safety switches on the knurled grips at the same time.

Figure 37. The safety switches



9. Remove rotors singly and clean rotor shaft, see See “Inserting the rotors into the mixer sensor” on page 16.
10. Clean back plate and bushings.

IMPORTANT Not push the material in to the hollow rotor shaft.

Note The rotors should be inserted directly back into the mixer after cleaning to avoid cooling down.

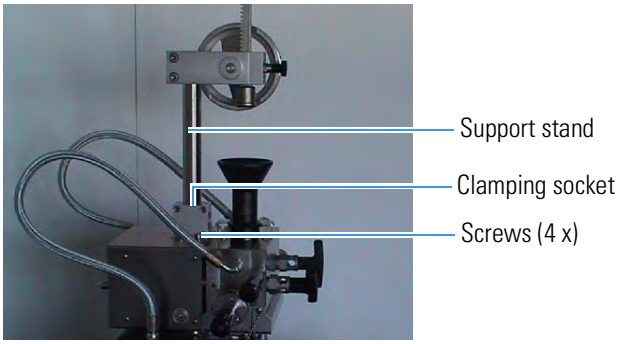
11. The kneading chamber and the front plate are screwed together again.
12. Put the key back into the locked switch.

Exchange of the filling device

Note If an automatic filling device is to be replaced by a manual one, it has first to be separated from the air pressure supply.

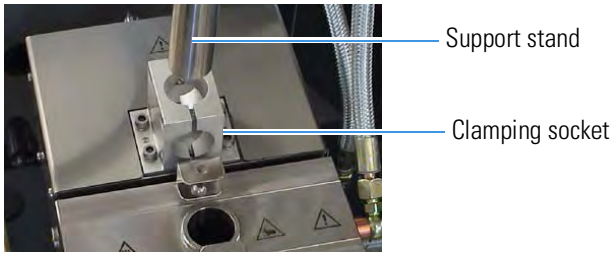
CAUTION After disconnection from compressed air supply the pneumatic cylinder stays under pressure.

Figure 38. The filling device



1. Unscrew the screws at the clamping socket.

Figure 39. The support stand and clamping socket



2. Pull the filling device up from the socket.
3. Position the support stand of the other device at the same place and press down as far as possible.
4. Adjust the device in the clamping socket by turning until the piston can easily be inserted in the mixer chamber without blocking.
5. Then fasten the clamping socket with the screws.

Measuring sensor Rheomix QC

Running a test

CAUTION

Wear cotton clothing, safety shoes, and heat-resistant gloves!

IMPORTANT Start the empty extruder sensor with approx. 5 rpm! Higher speeds can lead to a damage of the screw and of the barrel if no polymer melt is inside.

IMPORTANT Start the filled measuring sensors only at operating temperature! Feed material into the extruder only after having reached set temperature.

IMPORTANT Highly reactive and substances developing corrosion should not be left in the extruder.

IMPORTANT Operation at high temperatures results a higher degree of wear.

Extruder sensors with feed hopper Rheomex 19/10 OS, 19/25 OS, 19/33 OS

IMPORTANT These extruder sensors should not be operated at temperatures above 450 °C.

Follow the next work steps:

1. The operating temperature is set via the Monitor Software (see separate manual).
2. Activate the feed zone cooling (if necessary).
3. Tighten all screw fittings on the extruder (dies, melt sensors, etc.) after the operating temperature has been reached (after approx. 30 minutes).
4. Calibrate torque and pressure sensors (see instruction manual of the Monitor Software).

IMPORTANT Calibration of the torque and pressure sensors should only be carried out when the extruder is not running and is empty.

5. Set the speed from 0 to about 5 revolutions.
6. When commencing a test, only fill enough material so that the screw is just covered. The torque and pressure curves should be observed during this process.
   The hopper can be filled as soon as the extrudate flows out of the die and no faults has been observed.
7. Set the desired speed.

Cleaning the extruder sensor

IMPORTANT The extruder sensor should only be cleaned using tools which will not damage the surface. Thermo Fisher Scientific supplies a complete set of cleaning instruments as a special accessory.

IMPORTANT Do not clean the extruder sensor without wearing heat protective gloves!

Most samples are easier to remove from the mixer while still at test temperature.

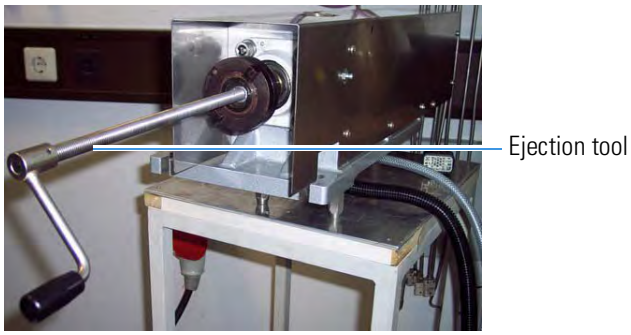
Note There is a range of cleaning substances available. Get in contact with Thermo Fisher Scientific for more detailed information.

Follow the next work steps:

1. Fill the barrel with the cleaning compound and extrude at medium speed (approx. 50 rpm).
2. Stop the motor.
3. Remove the die and clean immediately.
4. Extrude the cleaning mixture again.
5. Clean the feed hopper.

6. Switch off the control unit.
7. Loosen the locking lever and remove the measuring sensor.
8. Force out the screw from the back using the ejection tool (see Figure 40) and clean immediately.

Figure 40. The ejection tool



9. Clean the extruder barrel.

IMPORTANT Important safety measures against rust in rooms with high humidity and temperature.
Degrease before use and oil after using the metal parts at the unit!

Maintenance

Regular maintenance of the mixer parts will ensure accurate testing and long life of equipment.

Gears

The gears are lightly coated with high temperature lubricant.
Check the lubrication:

- every 2000 to 4000 hours or after 2 years,
- in case excessive leakage of test material through the bushings can be seen,
- when the mixer has been exposed to high temperatures or torque.

Note Operating at very high temperatures or torque results in increased wear.

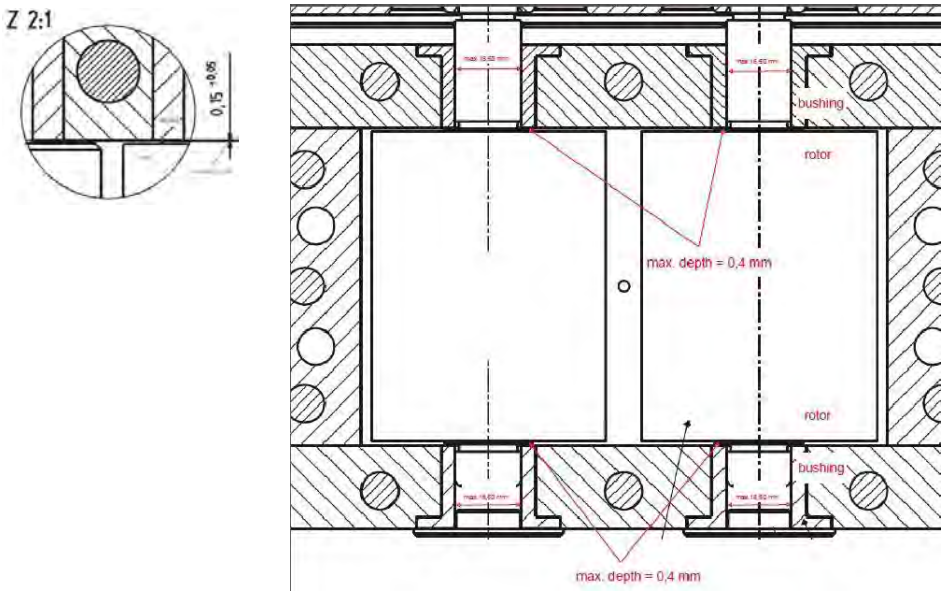
Changing the bushings at the mixer rear plate

If excessive leakage of test material through the bushings occurs, they should be replaced.

The bushing must be exchanged if the wear of at the bushings exceed following dimensions (see Figure 41):

Rheomix 540/600/610	max. inner ∅ = 17.5 mm max. depth. = 0.30 mm
Rheomix 3000/3010	
front bushings:	max. inner ∅ = 18.5 mm max. depth. = 0.40 mm
rear bushings:	max. inner ∅ = to be irrelevant max. depth. = 0.40 mm

Figure 41. The bushings

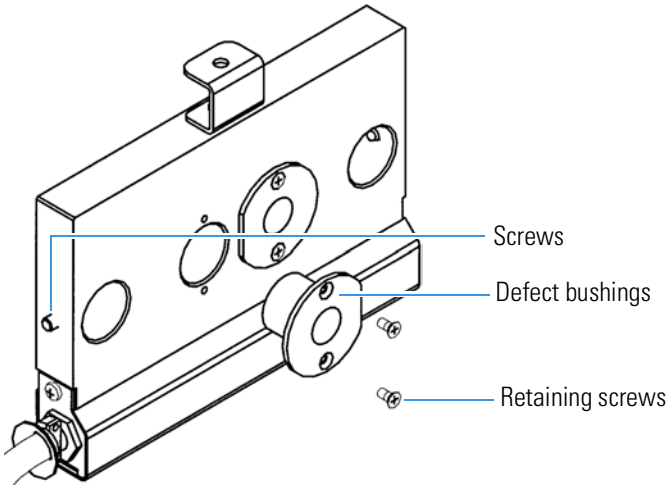


No special tools are required to remove the bushings.

Follow the next work steps:

1. Take off the rear. Therefore loosen set screws aside.

Figure 42. Changing the bushings



2. Loosen the retaining screws.
3. Press the defect bushings out from behind.
4. Insert new set of bushings.

Note Before the assembly the bushings and the fitting surfaces of the stud bolts should be lightly lubricated with anti-seize lubricant (order-no. 086-2314).

Note The new bushings should be easy to insert.

5. Re-fix with retaining screws.
6. Push rear onto the stay rods and fix the set screws.

A

Technical Specifications

This chapter contains the technical specifications for the HAAKE PolyLab QC and the optionally available accessories. For more detailed information contact your local sales representative or Thermo Fisher Scientific directly.

HAAKE PolyLab QC

Table 4 list the technical specifications of the HAAKE PolyLab QC.

Table 4. Technical specifications

Property		HAAKE PolyLab QC
Motor power	kW	3.8
Max. speed	min^{-1}	200
Max. torque	Nm	270
Heating zones		4 (configureted as controller or sensor)
Mains supply	V	3x400 ±10 %, 50-60 HZ, N, PE
Max. current	A	30
Dimensions (WxHxD)	mm	660 / 580 /750
Weight	kg	138

Table 5 list the safety specifications of the HAAKE PolyLab QC

Table 5. Safety specifications

Safety specifications according to the laboratory instrument standard EN61010 T1, T2.1 and EN60204-1	
Safety warnings and cut-off for	Motor Torque Speed

Measuring sensors

Table 6 lists the technical specifications of the measuring sensors.

Table 6. Technical specifications

Property		Rheomex 19/25 QC	Rheomix 600 QC	Rheomix 3000 QC
Max. torque	Nm	160	160	300
Max. speed	min^{-1}	200	200	200
Max. temperature	°C	450	400	400
Dimension (WxHxD)	mm	230x230x700	480x250x320	530x240x350
Weight	kg	38.5	24.5	43.0

Fuses

Table 7 list the fuses of the HAAKE PolyLab QC.

Table 7. Technical specifications

		HAAKE PolyLab QC
Fuses	**Manufacturer**	
F1	ABB	S203 - D20A
F2		S201 - D10A
F3		S201 - D10A
F4		S201 - D10A
F5		S201 - D10A
F6		S201 - D10A
F7		S201 - D10A
F8	Bourus	PTC 4A PFRA.400
F9		PTC 1.35A PFRX.135
F10		PTC 4A PFRA.400
F11		PTC 4A PFRA.400

GFX4 F1 - F4 FF32A spare fuses (Order no. 005-1211)

Pin assignment of the socket ”Feeder”

Table 8 list the pin assignment of the socket “Feeder“.

Table 8. Pin assignment

Pin number	Function
1	not connected
2	+24 V
3	GND (for 24 V)
4	Realese contact

Table 8. Pin assignment

Pin number	Function
5	Realese contact
6	L (240 V main voltage)
7	N (240 V main voltage)
8	PE

Pin assignment of the socket "Alarm"

Table 8 list the pin assignment of the socket "Alarm".

Table 9. Pin assignment

Pin number	Function
1	+24 V
2	GND
3	Alarm
4	Intervention is required
5	Run

Additional accessories for Rheomix QC

Table 10 lists the additional accessories of the Rheomix 600 QC/610 QC.

Table 10. Additional accesories of the Rheomix 600 QC/610 QC.

Description	Order number
Roller rotors	557-1030
Cam rotors	557-1031
Banbury rotors*	557-1053
Sigma rotors*	557-1032
Cleaning tools for mixer	557-2505
Rotor puller for roller rotors	557-1042
Weight (approx. 5 kg)	557-1121
Metal tube set, insulated to 200 °C	557-1151
Metal tube set, insulated over 200 °C	557-1124
Tool set	557-0061
Cooling hose for gear	557-1122
Set for external temperature measurement	557-1123

*For HAAKE Rheomix 600 only.

Table 11 lists the additional accessories of the Rheomix 3000 QC/3010 QC.

Table 11. Additional accesories of the Rheomix 3000 QC/3010 QC.

Description	Order number
Roller rotors	557-1034
Cam rotors	557-1035
Banbury rotors	557-1036
Sigma rotors	557-1037
Cleaning tools for mixer	557-2505
Rotor puller for roller rotors	557-1042
Weight (approx. 5 kg)	557-1121
Metal tube set, insulated to 200 °C	557-1151
Metal tube set, insulated over 200 °C	557-1124
Tool set	557-0061
Cooling hose for gear	557-1122
Set for external temperature measurement	557-1123

Spare parts for Rheomix QC

Table 12 lists the spare parts of the Rheomix 600 QC/610 QC.

Table 12. Spare parts of the Rheomi 600 QC/610 QC.

Description	Order number
Heating cartridge 250 W*	001-7642
Control thermocouple*	005-0934
Melt temperature thermocouple	005-0932
Sound absorber*	001-8349
Bushings, bronze	002-7769
Brush, bore 20 mm	003-0047
Brush, bore 35 mm	003-0314
Hand brush	001-9264
High temperature lubricant 100 g	779-0049
Anti-Seize mass	086-2341
Special lubricant	082-5248

*For HAAKE Rheomix 600 only.

Table 13 lists the spare parts of the Rheomix 3000 QC/3010 QC.

Table 13. Spare parts of the Rheomix 3000 QC/3010 QC.

Description	Order number
Heating cartridge 250 W (Zone 1+3)*	002-2367
Heating cartridge 160 W (Zone 2)*	002-2482
Control thermocouple*	005-0934
Melt temperature thermocouple*	005-0935
Melt temperature thermocouple**	005-0936
Sound absorber*	001-7882
Bushings, bronze	002-2348
Brush, bore 20 mm	003-0047
Brush, bore 60 mm	003-0315
Hand brush	001-9264
High temperature lubricant 100 g	779-0049
Anti-Seize mass	086-2341
Special lubricant	082-5248

*For HAAKE Rheomix 3000 only.
**For HAAKE Rheomix 3010 only.

Spare parts for Rheomex QC

Table 14 lists the spare parts of the Rheomex QC.

Table 14. Spare parts of the Rheomex QC.

Description	Order number
Air hose	001-8776
Grease gun	001-9400
Lubricant	082-5248
Screw ejection tool	001-8681
Stopper for sensor port	001-9060
Hexagon key	085-1696
Melt temperature sensor	567-2340
CAN connection cable straight 0.3 m	567-0110
CAN connection cable straight 0.6 m	567-0111
CAN connection cable straight 1.0 m	567-0112
CAN connection cable straight 2.0 m	567-0113
CAN connection cable straight 3.0 m	567-0114

Table 14. Spare parts of the Rheomex QC.

Description	Order number
CAN resistance M12	567-0130
T-connection piece CAN	567-0131
Y-connection piece CAN	567-0132
Hand brush	001-9264
Spatula, bronze	001-9266
Brush, bore	001-9318
Cleaning set for extruder/dies	557-2505
Hose connection (feed zone)	001-7970
Cartridge heater 250 W	005-0624
Fuse 6.3x32 FF 10 A 500 V	087-3590