



011.04.4

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## Introduction

Flexible, compatible, systematic:

Step by step from the simplest starter model mi2.1 up to the top equipped half-automated mi2.3.

### **The Evolution of the melt index measurement!**

The mi2 melt indexer series can carry out measurements according to ISO 1133 and ASTM D1238, procedures B, as well as ISO 1133 and ASTM D1238 procedure C for the "Half Height / Half Diameter" standard and ASTM D3364. Also the manual procedure A is possible to perform.

Three device types are available:

- mi2.1 – basic device
- mi2.2 – basic device with electrical weight lifting unit
- mi2.3 – basic device with weight selection and electrical weight lifting unit. The weights remains always inside the device

### **The technical highlights**

- Brilliant 14.48 cm (5.7") Color-VGA Touch screen display for the operation, program control and display of the measurement results
- Ergonomic compact housing
- High-precision timer with a resolution better than 0.001 s
- Temperature control algorithm, resolution 0 to 320 °C: 0.01 °C, 320 to 500 °C: 0.1 °C
- High-resolution position transducer to measure volume output

### **Additional features for all mi2 device types:**

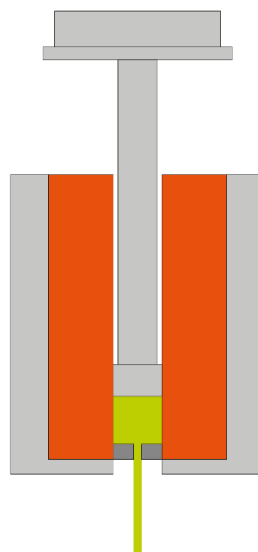
- Single weight mode for tests with one weight
- Free selectable test range from 50 to 0 mm before the capillary
- Storage of up to 500 parameter sets with 3000 measurements for each parameter set
- Capillary holder for easy and quick changing of the capillary
- Base weight 0.325 kg
- Electrically heated test chamber for high precision and stability of the test barrel temperature
- 5 Calibration settings for set temperatures with dedicated parameter files
- Manual and timer-programmable on/off override switch for the heaters
- Built-in USB-connection (Data Stick) for data back-up
- Serial connection to communicate with the optional balance
- Ethernet-connection (LAN)
- Integrated Web-Server
- Wide range of optional accessories

## Application

The melt flow indexer mi2.x is controlled via the integrated touch screen panel. In the stand-alone mode the panel is used to define the test plans, select the test plans and monitor the results. It is also possible to print out the results with a printer connected via LAN. Optionally, the test device can also be operated with a PC and our measuring software "miCONNECT". The software is particularly advantageous when working with many different materials, with a high volume of measurements or when analysing the measurement results.

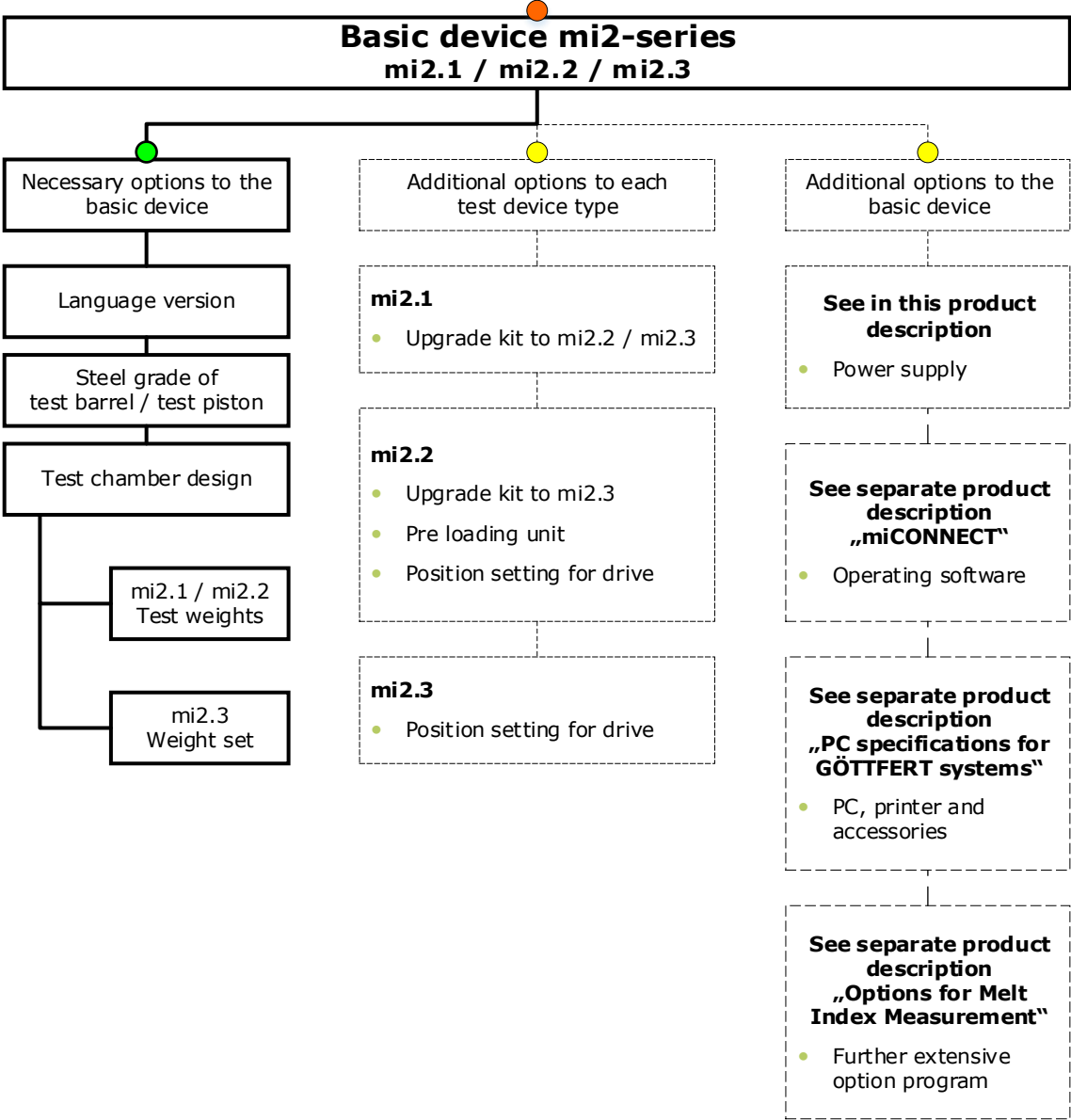
In the basic configuration the device automatically measures the melt volume flow rate (MVR) in  $\text{ccm}/10\text{min}$  according to ISO 1133 procedure B or ASTM D1238 procedure B. Plastic granulate, powder or grit is melted in the heated test cylinder and pressed out of a capillary with the test piston and a constant load weight. Meanwhile, the test piston feed rate is measured. The MVR is converted to the melt flow rate (MFR) in  $\text{g}/10\text{min}$  using the melt density in  $\text{g}/\text{ccm}$ . If the test device is equipped with an optional melt cutting unit, the melt density can be determined during the MVR test, so that the MVR and MFR can be easily converted afterwards. Alternatively, the melt cutting unit can also be used to determine the MFR directly according to ISO 1133-1 method A or ASTM D1238 procedure A.

With the melt flow index testing device mi2.x most technically used thermoplastics can be measured with high precision and repeatability. The high-resolution transducer is also perfectly suited for low MVR values below  $0.2 \text{ ccm}/10\text{min}$ . Even very high MVR values can be measured with an optional capillary plug.



**Important:** Because of the high temperatures hazardous melt gases can be produced during the measurement. Therefore a suitable, sufficiently dimensioned exhaust system is necessary at the installation sight.

Device configuration



Legend:

- Basic system
- Necessary options: This units are necessary
- Optional units: Choice of measurement enhancing additional sub systems

## Necessary options

The basic test device is no functioning instrument without the following optional units:

**Please take the following order information from this product description "mi2-series".**

- English version or German version
- Steel grade of test barrel / test piston
- Test chamber design
- Test weights for mi2.1 and mi2.2 from 1.000 to 21.600 kg (manual positioning)
- Weights sets for mi2.3

## Optional units

The GÖTTFERT Melt Flow Indexers are already equipped with large basic functions. Our extensive option program provides a more detailed characterization of the test materials as well as supplementing accessories to the completion of the basic equipment.

**Please take the following order information from this product description "mi2-series".**

### mi2.x

- Power supply

### mi2.1

- Upgrade kit to mi2.2 (electrical weight lifting unit)
- Upgrade kit to mi2.3 (weight selection with weights and electrical weight lifting unit)

### mi2.2:

- Upgrade kit to mi2.3 (weight selection with weights)
- Pre loading unit (mechanical)
- Sensor controlled manual position setting for drive

### mi2.3:

- Sensor controlled manual position setting for drive

**Please take the following order information from the separate product description "miCONNECT".**

- Operating software miCONNECT

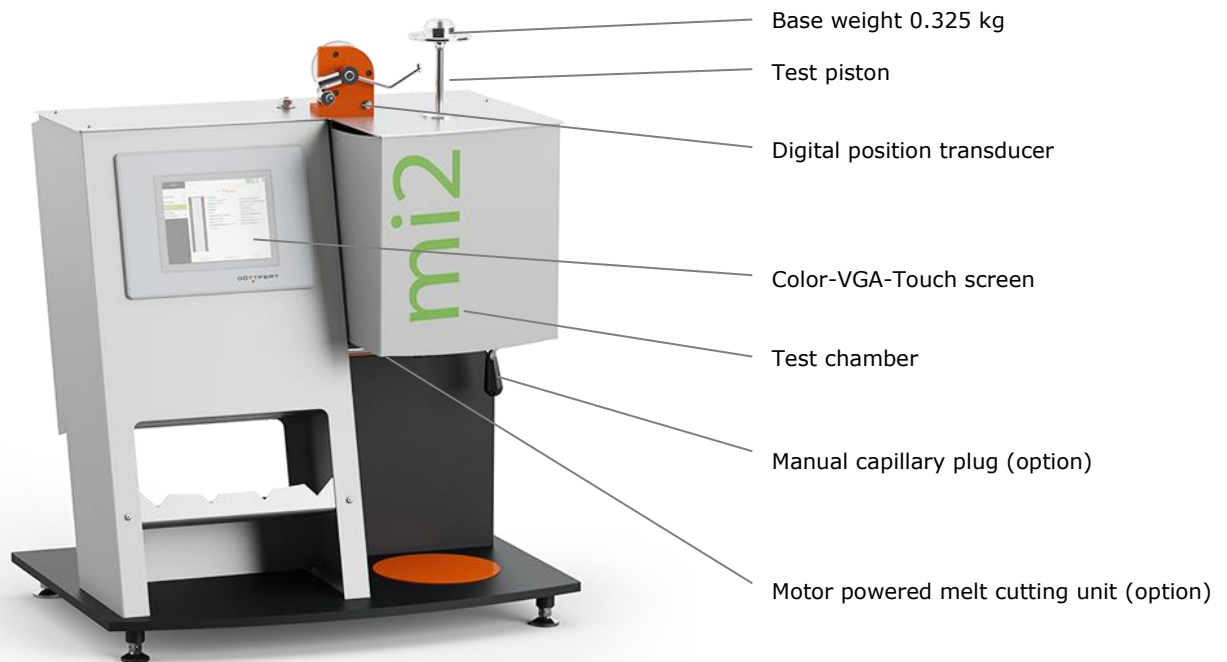
**Please take the following order information from the separate product description "PC specifications for GÖTTFERT systems".**

- PC, printer and accessories

**Please take the following order information from the separate product description "Options for Melt Index Measurement".**

- Melt cutting unit
- Manually or heatable capillary plug
- Nitrogen purge
- Connection for gas aspiration
- Balance
- Uninterrupted Power Supply
- Capillary
- Upgrade kit for measurement according to ASTM D3364
- Plug gauge
- Test piston
- Fixing units
- Feeding units
- Accu-cleaning device or pneumatic cleaning device
- Temperature control
- Machine table
- Barcode Scanner
- Reference material
- Heat protection gloves
- Protective goggles

## Set up device type mi2.1



Picture: overall view mi2.1

The basic device mi2.1 consists of the following components:

### Housing

Ergonomic compact housing for safe test and maintenance procedures. The 4 feet are adjustable in height, which facilitates leveling of the equipment

### Test chamber

The insulated test chamber is heated with two heating circuits. The test barrel is easily accessible from top and below for cleaning

### Test barrel

With serial number, diameter 9.55 mm

### Capillary

Capillary, 2.095 mm diameter, 8 mm length, constructed from tungsten carbide and serial number engraved. The capillaries are not resistant against acid. It should be used only a solvent-based cleaner. The maximum allowed cleaning temperature of 550 °C must not be exceeded!

### Capillary holder

The capillary is held and released by the capillary holder, which works simply and fast. Thus the test channel can be cleaned user friendly.



**Test piston with test weight 0.325 kg**

With serial number. This test weight is affixed atop the ISO or ASTM specified piston. The assembly has a total weight of 0.325 kg. The test piston shaft has reference rings as reference marks for the ISO and ASTM standard measuring zones

**Digital position transducer**

High-resolution digital encoder to measure piston speed and melt volume output

**Color-VGA-Touch screen**

For the input of parameters, for program control and for the display of results

**Compact I/O-Module**

For control and to receive input signals

**Temperature Controller**

The test chamber temperature is controlled by a special temperature control algorithm. The temperature set points are entered via the touch screen display. During the test, the temperatures are displayed on the screen with a 0.01 °C resolution

**USB Connections**

Used for data back-up on an USB flash drive in ASCII-Format.

**Ethernet-connection**

LAN connection and communication with MFRHost software or with a networkable printer. Also for use as FTP or Web-Server

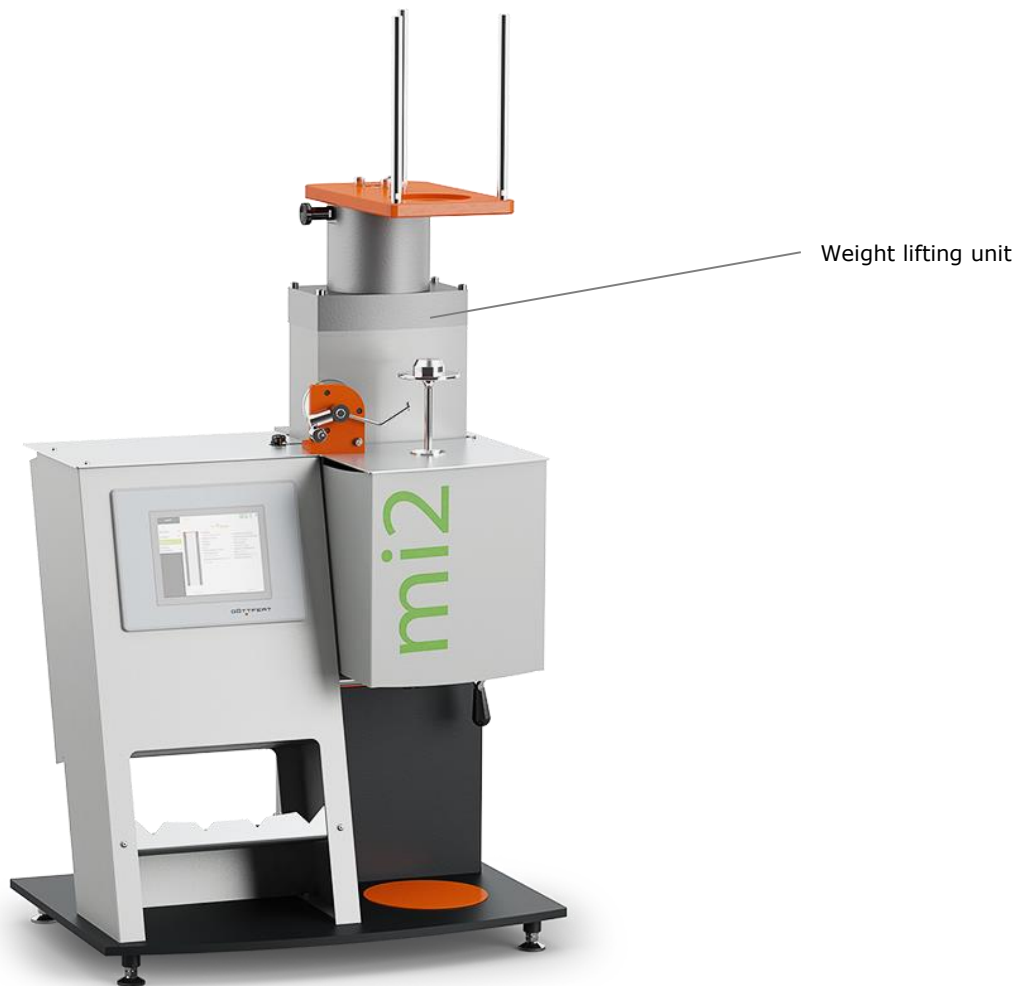
**Serial Connection**

Connection to a balance

**Intelligent service monitoring**

The service data are stored and monitored in the test device.  
The test device automatically notifies the operator when a new service is necessary.

## Set up device type mi2.2



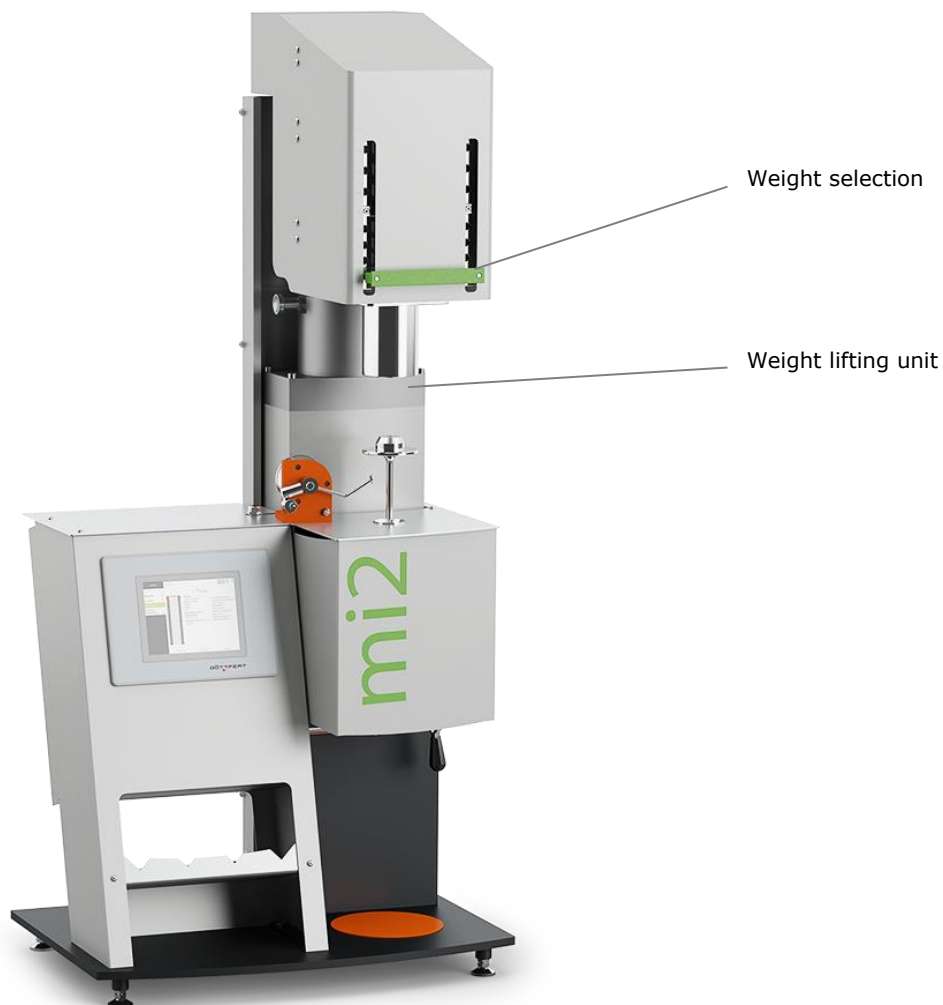
Picture: overall view mi2.2

The test device mi2.2 consists of the basic device mi2.1 (see above) and the following components:

### **Weight lifting unit**

The control of the electrical test weight lifting unit is done via the menu at the touch screen monitor. The reception of the weight lifting unit can receive any test weight from 1.000 kg up to 21.600 kg. For cleaning of the test barrel the test weight can be swiveled together with the reception side wards to guarantee free access to the test barrel.

## Set up device type mi2.3



Picture: Overall view mi2.3

The test device mi2.3 consists of the basic device mi2.1 (see above) and the following components:

### **Weight selection**

The weights 1.200 (1.000; 1.050); 2.160; 3.800; 5.000; 10.000; (12.500; 15.000); 21.600 kg are selected manually by a drive handle and remains always in the device. Customer specific weight sets can be configured on request.

### **Weight lifting unit**

The control of the electrical weight lifting unit is done via the menu at the touch screen monitor. The weight lifting unit is used for positioning as well as for removal the selected test weights quick and precise. For cleaning of the test barrel the weight selection system can be swiveled with the reception side wards to guarantee free access to the test barrel.

## Operating Software of test device

### Stand-Alone operation on the touch screen

Measurement and Visualization Program for Melt Indexer is used to configure and control the whole measurement process, the graphical presentation, the evaluation and the report generation.

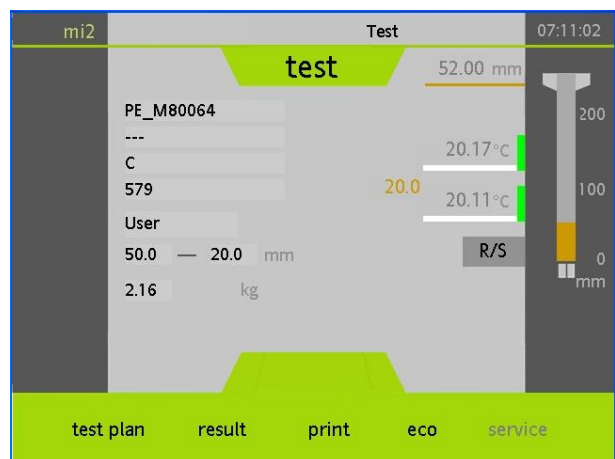
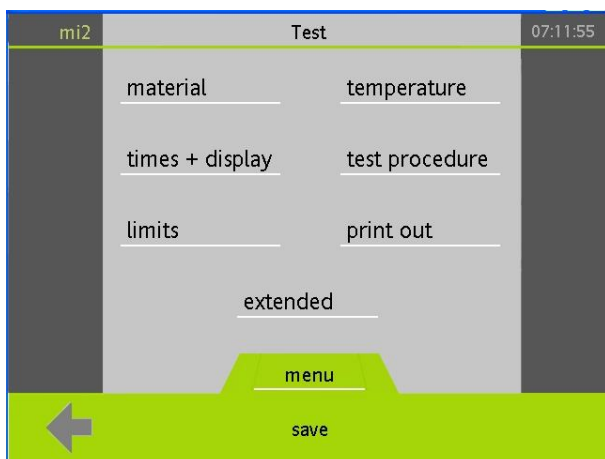
### Features

In addition to the basic functions the operating software provides numerous features such as:

- Structured, self explaining menu navigation
- Intelligent Service Monitoring
- Menu navigation available in several languages
- RemoteNet

### Structured, self explaining menu navigation

The menu structure on the touch screen is kept simple. Only relevant information is displayed. More complex operations such as the creation of a test plan follow a self-explanatory scheme. Various password-protected operator levels from basic user to administrator ensure that only trained personnel can perform important settings.



### Menu navigation at the touchscreen

The following languages are available in the menu on the touchscreen:

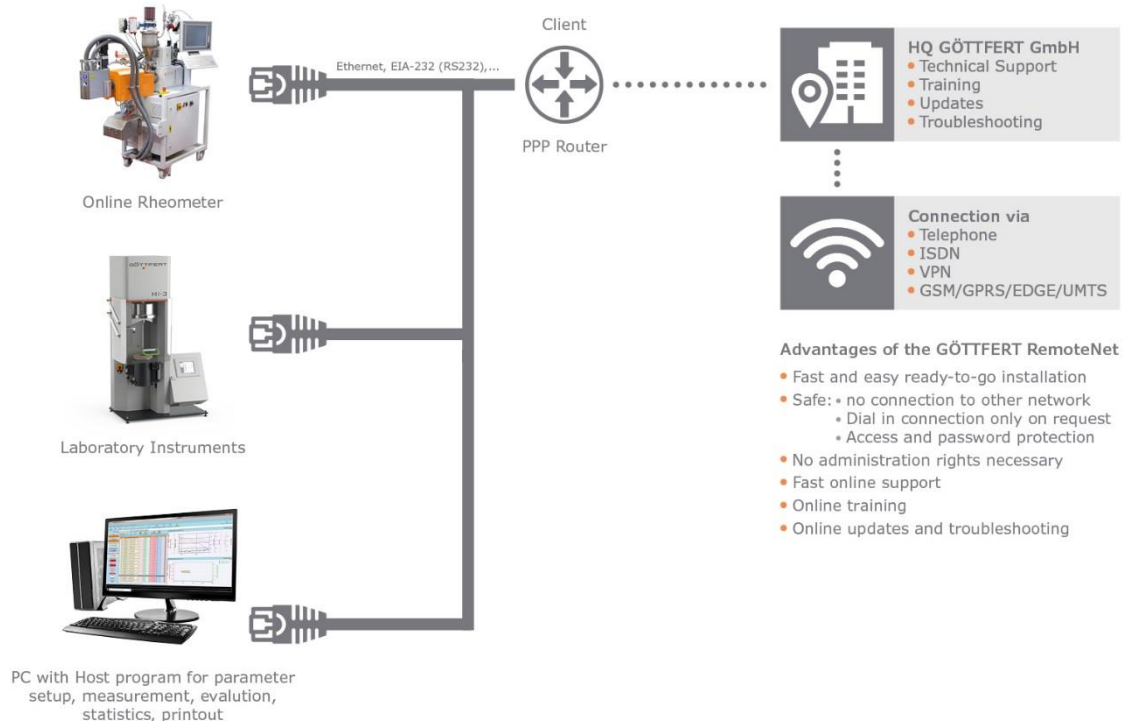
German, english, chinese, french, spanish, hungarian, polish, czech, russian, Korean, farsi and Japanese.

The switch can be performed directly and without a restart of the system



### RemoteNet

If needed a worldwide direct connection with the device PC can be realized via the Internet or where required via telephone line. Even the connection into the test device is possible and fulfills the support completely. A special Software, which has to be installed on a PPP Router (test device PC) allows us to control, to check settings, to run updates or to handle problems of the PC after the release of the user – in a safe way! The display of the device status, the adjustment of calibration values or even updates of the test device firmware are easy to perform. Of course this system can also be taken for training purposes. The Software can be sent to you together with a detailed instruction on request, the files can also be downloaded under [www.goettfert.com](http://www.goettfert.com).



## miCONNECT (option)

miCONNECT is the follow-up software of MFRHost. miCONNECT enables the central management of parameters and measured values for the MELT FLOW INDEXERS mi2-series, MI-3, MI-4 and mi40.

The software works with a server-based data management including database.

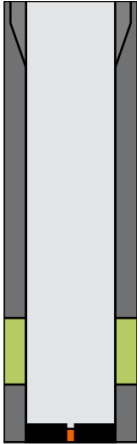
A browser-based visualization and control system allows easy and comfortable use by the user from his workstation.

The parameterization is done via a user interface which is displayed in a standard browser.

For more details please refer to the separate product description "miCONNECT".

Messen

sim extern 1Step
--- 9/10 min  
0 mm
0 °C  
0 °C ?

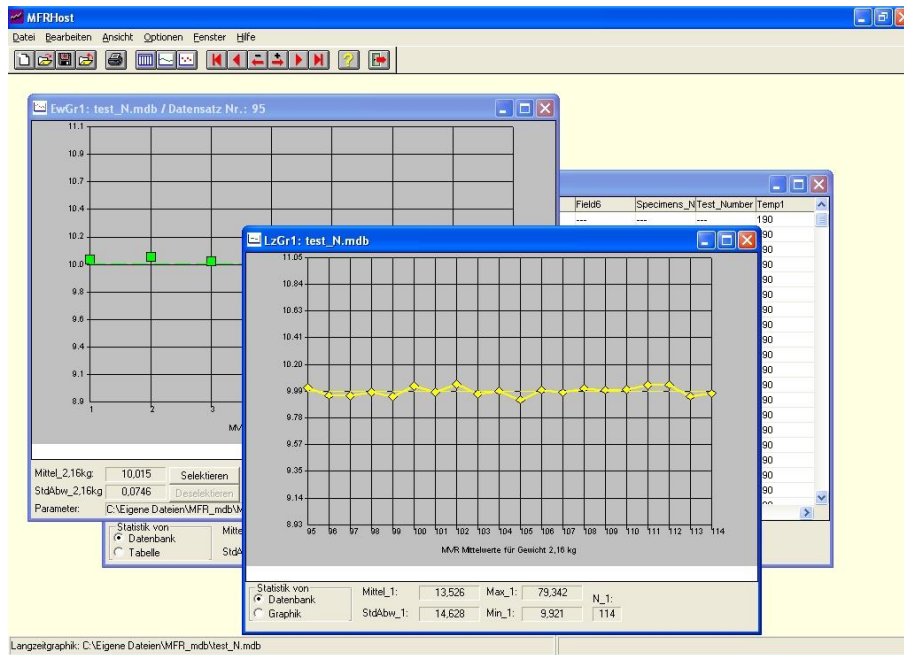


0.0 mm

Name	<input type="text" value="sample Material"/>	Messpunkt-Nr.
Probe	<input type="text" value="sample Probe"/>	Prüftemperatur 190 °C +/- 1 °C
Charge	<input type="text" value="sample Charge"/>	Benutzer admin
Lot	<input type="text" value="sample Lot"/>	

## MFRHost PC-Operating Software (option)

Optionally the device can be controlled with the PC-Software package MFRHost. Especially if you are doing a lot of tests, have a lot of different samples from different customers or if you want to analyze the data in more detail, the software is advantageous. The software consists of three modules: MFRPara to create, edit and show test plans, MFRCom to run tests on up to 4 different melt indexers and MFRHost to analyze the data afterwards. For more details please see the separate product description "MFRHost".



## Technical Data

<b>Standards</b>	ISO 1133 ASTM D1238 ASTM D3364
<b>Barrel</b>	
Diameter	9.555 - 0.01 mm (0.376 inches)
Length	168 mm (6.6142 inches)
<b>Capillary</b>	
Diameter / Length	2.095 ± 0.003 mm (0.0825 inches) / 8 ± 0.025 mm (0.315 inches)
Diameter / Length (Option)	1.05 ± 0.005 mm (0.0413 inches) / 4 ± 0.025 mm (0.1575 inches) 2.096 ± 0.005 mm / 4 + 0.05 mm with inlet angle 120° for ASTM D3364
Material	Tungsten carbide
Cleaning temperature	Max. 550 °C
<b>Test Piston</b>	
Diameter	9.48 - 0.01 mm (0.3732 inches)
Length	220 ± 0.2 mm (8.6614 inches) 202.6 ± 0.2 mm for ASTM D3364
<b>Weights</b>	
Test weights	0.325 kg (1.000 kg, 1.050 kg, 1.200 kg, 2.160 kg, 3.800 kg, 5.000 kg, 10.000 kg, 12.500 kg, 15.000 kg, 21.600 kg as option for mi2.1 and mi2.2, fix installed at mi2.3) 20.000 kg for ASTM D3364
Tolerance	± 0.5 %
<b>Control</b>	
Local	14.48 cm (5.7") Colour-VGA-Touch screen IPC
PC (Option)	miCONNECT, connection via LAN



## Heater

Temperature range	5 °C above room temperature up to 400 °C (752 °F), optional up to 500 °C (932 °F)
Temperature acquisition	via 16-Bit converter
Sensors	PT100 1/3DIN
Heater circuits	2
Controller	special algorithm
Resolution	0 up to 320 °C: 0.01 °C 320 up to 500 °C: 0.1 °C
Variation over time in usable range	Less ±0.1 °C
Spatial distribution in usable range (0-70 mm before the die)	60 up to 400 °C: < 0.2 °C 400 up to 500 °C: < 0.3 °C

## Measurement

Resolution digital position transducer	0.025 mm / impulse, with 20000 impulses per revolution, freely user selectable MI test range from the surface to 50 mm above the die
Resolution time measurement	1 millisecond, time basis 48 MHz Quartz, precision 50 ppm

## Power supply

Voltage	1 x 230 V AC (already included in basic device) 1 x 115 V AC (option) Other on request
Tolerance	±10 %
Frequency	50 Hz - 60 Hz
Protective Earthing	Earth resistance less than 5 Ohm
Short-time breaks	Less than 10 msec
Power consumption	approx. 870 W / 1 kW
Standby power	Heated at an ambient temperature of 25 °C 190 °C < 130 W 230 °C < 140 W 300 °C < 220 W

**Important:** Please note that a residual current circuit breaker (RCD) connected in series in the company network must be a selective RCD!

**Ambient conditions**

Ambient temperature	+ 10 °C up to + 40 °C
Air humidity	max. 90 % not-condensing
Protection class	IP20

<b>Sound pressure level</b>	< 70 dB (A)
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**Dimensions device type mi2.1**

Width	510 mm (20.0787 inches)
Depth	380 mm (14.9606 inches)
Height	625 mm (24.6063 inches)
Weight	approx. 45 kg

**Dimensions device type mi2.2**

Width	510 mm (20.0787 inches)
Depth	430 mm (16.9291 inches)
Height	1025 mm (40.3543 inches)
Weight	approx. 75 kg

**Dimensions device type mi2.3**

Width	510 mm (20.0787 inches)
Depth	430 mm (16.9291 inches)
Height	1120 mm (44.0945 inches)
Weight	approx. 105 kg

**Finish**

Front and cover plates	Light grey RAL 7035
Frame and ground plate	Anthracite grey RAL 7016
Position transducer covering, Weight reception (option)	Pure orange RAL 2004

## Supplied accessories

### mi2 series

- 1 User information (on CD-ROM)
- 1 Mains cable
- 1 Transport rails
- 1 Distance holder for calibration
- 1 Pair of tweezers
- 1 Touch Screen Stick for PDAs
- 1 Mirror
- 1 Alignment support
- 1 Capillary (standard) with storage box
- 1 Plug gauge according to ISO 1133
- 1 Reamer for die cleaning
- 1 Material filler
- 1 Brass brush
- 1 Material compressor
- 1 Steel brush with handle
- 1 Cleaning piston with handle
- 1 Cleaning cloth
- 1 Pair of heat protection gloves

## Order information

### ● Basic device

Each test device consists of the following components:

- Basic device
- Power supply 1x230 V (1L+N+PE); 50-60 Hz

### **Melt Flow Indexer mi2.1**

Order number .....5.71.1101

### **Melt Flow Indexer mi2.2**

Order number .....5.71.1102

### **Melt Flow Indexer mi2.3**

Order number .....5.71.1103

● **Necessary optional units to basic device**

**Language version and user information**

**Version**

**English Version mi2.1**

Marking and user information\* (on CD) in English, operating manual on paper format.

Order number ..... 5.71.004

**German Version mi2.1**

Marking and user information\* (on CD) in German, operating manual on paper format.

Order number ..... 5.71.003

**English Version mi2.2**

Marking and user information\* (on CD) in English, operating manual on paper format.

Order number ..... 5.71.025

**German Version mi2.2**

Marking and user information\* (on CD) in German, operating manual on paper format.

Order number ..... 5.71.024

**English Version mi2.3**

Marking and user information\* (on CD) in English, operating manual on paper format.

Order number ..... 5.71.027

**German Version mi2.3**

Marking and user information\* (on CD) in German, operating manual on paper format.

Order number ..... 5.71.026

## Additional user information in paper format

### Additional user information\* mi2.1, english, on paper format

Complete printed English user information\* in single A4 ring binder.

One user information\* on CD belongs to standard scope of the basic instrument.

Order number ..... 5.71.006

### Additional user information\* mi2.1, german, on paper format

Complete printed German user information\* in single A4 ring binder.

One user information\* on CD belongs to standard scope of the basic instrument.

Order number ..... 5. 71.005

### Additional user information\* mi2.2, english, on paper format

Complete printed English user information\* in single A4 ring binder.

One user information\* on CD belongs to standard scope of the basic instrument.

Order number ..... 5.71.033

### Additional user information\* mi2.2, german, on paper format

Complete printed German user information\* in single A4 ring binder.

One user information\* on CD belongs to standard scope of the basic instrument.

Order number ..... 5. 71.032

### Additional user information\* mi2.3, english, on paper format

Complete printed English user information\* in single A4 ring binder.

One user information\* on CD belongs to standard scope of the basic instrument.

Order number ..... 5.71.035

### Additional user information\* mi2.3, german, on paper format

Complete printed German user information\* in single A4 ring binder.

One user information\* on CD belongs to standard scope of the basic instrument.

Order number ..... 5. 71.034

### \* Standard scope of supply user information:

- Operating manual
- Technical documentation
- Program documentation (Software)
- Calculation basis

Note: Any further order related documents are available on request. Invoicing will be made at actual effort/expense basis.

Please contact us for details.

## Steel grades of test barrel / test piston

To ensure optimal performance and longevity the steel grade of the test barrel and piston has to be adapted to your application. Please choose according to the following table.

If no information was given to us during the order procedure we will select **steel grade No. 5** automatically. Here it is the part number with the addition "Standard".

**Important:** If corrosive, abrasive or filled materials will be measured, a different steel grade has to be chosen! Please contact us in advance to clarify this!

### Applicable steel grade types, comparison table:

Steel grade	Hardness	Abrasion resistance	Acid resistance	Temperature range / Test material
<b>Steel grade 1S</b>	★	★	★★★★★★	Up to 500 °C, e.g. ETFE and PVDF
<b>Steel grade 2</b>	★★	★★	★★★★★★	Up to 500 °C, e.g. PVDF
<b>Steel grade 3</b>	★★★	★★★	★★★★★★	Up to 500 °C, e.g. PVDF (up to 250 °C), PVC, PLA, Bio polymers
<b>Steel grade 4</b>	★★★★★★	★★★★★★	★★★★	Up to 500 °C, e.g. PEEK, as well as >30 % glass fiber filled PA6, PPT and PP
<b>Steel grade 5S</b> (Standard)	★★★★★★	★★★	★★	Up to 500 °C, suitable for all thermosets and elastomers without abrasive and aggressive behaviour

**Note:**

Capillaries have a nickel share, so they are corrosion resistant

★ = less suitable  
★★★★★★ = very good suitable

Please contact us for more details.

**Test chamber design**

**Test chamber design for steel grade 5S**

For 400 °C  
 Order number .....5.71.1109

For 500 °C  
 Order number .....5.71.1110

**Test chamber design for steel grade 4**

For 400 °C  
 Order number .....5.71.1111

For 500 °C  
 Order number .....5.71.1112

**Test chamber design for steel grade 3**

For 400 °C  
 Order number .....5.71.1113

For 500 °C  
 Order number .....5.71.1114

**Test chamber design for steel grade 2**

For 400 °C  
 Order number .....5.71.1115

For 500 °C  
 Order number .....5.71.1116

**Test chamber design for steel grade 1S**

For 400 °C  
 Order number .....5.71.1117

For 500 °C  
 Order number .....5.71.1118

## Test weights for mi2.1 / mi2.2

To complete the basic devices mi2.1 and mi2.2 at least one test weight must be selected

### Test weight 0.500 kg

Only for mi2.1

Order number ..... 5.70.925

### Test weight 0.500 kg

Only for mi2.2

Order number ..... 5.07.140

### Test weight 1.000 kg

Order number ..... 5.07.132

### Test weight 1.050 kg

Order number ..... 5.07.133

### Test weight 1.200 kg

Order number ..... 5.07.123

### Test weight 2.160 kg

Order number ..... 5.07.124

### Test weight 3.800 kg

Order number ..... 5.07.125

### Test weight 5.000 kg

Order number ..... 5.71.099

### Test weight 10.000 kg

Order number ..... 5.07.127

### Additional weights for attaching to the test weight 10,000 kg:

#### Additional weight 2.500 kg

Total weight: 12.500 kg

Order number ..... 5.07.128

#### Additional weight 5.000 kg

Total weight: 15.000 kg

Order number ..... 5.07.129

#### Additional weight 11.600 kg

Total weight: 21.600 kg

Order number ..... 5.07.130



## Weight sets for mi2.3

To complete the basic device mi2.3 a weight set must be selected

### Weight set I

1.200 kg; 2.160 kg; 3.800 kg; 5.000 kg; 10.000 kg; 12.500 kg; 15.000 kg; 21.600 kg.

Order number ..... 5.71.146

### Weight set II

1.200 kg; 2.160 kg; 3.800 kg; 5.000 kg; 10.000 kg; 15.000 kg; 21.600 kg.

Order number ..... 5.71.147

### Weight set III

1.200 kg; 2.160 kg; 3.800 kg; 5.000 kg; 10.000 kg; 21.600 kg.

Order number ..... 5.71.165

**Also other weight combinations are possible. Please send us your requirements.**

## ● Additional options according to device type

### Upgrade kits

#### Upgrade kit for mi2.1 to mi2.2 (electrical weight lifting unit)

The control of the electrical weight lifting unit is done via the menu at the touch screen monitor. The reception of the weight lifting unit can receive any test weight from 1.000 kg up to 21.600 kg. For cleaning of the test barrel the test weight can be swiveled together with the reception side wards to guarantee free access to the test barrel.

The delivery also includes a suitable software-changing (CF-memory card) as well as the appropriate documentation.

Order number ..... 5.71.021

#### Upgrade kit for mi2.1 to mi2.3 (manual weight selection with weight lifting unit)

The weights 1.200 (1.000; 1.050); 2.160; 3.800; 5.000; 10.000; (12.500; 15.000); 21.600 kg are selected manually

by a drive handle and remains always in the device. Customer specific weight sets can be configured on request.

The control of the electrical weight lifting unit is done via the menu at the touch screen monitor. The weight lifting unit is used for positioning as well as for removal the selected test weights quick and precise.

For cleaning of the test barrel the weight selection system can be swiveled with the reception side wards to guarantee free access to the test barrel.

Order number ..... 5.71.022

**Upgrade kit for mi2.2 to mi2.3 (manual weight selection)**

The weights 1.200 (1.000; 1.050); 2.160; 3.800; 5.000; 10.000; (12.500; 15.000); 21.600 kg are selected manually by a drive handle and remains always in the device. Customer specific weight sets can be configured on request.

The weight lifting unit is used for positioning as well as for removal the selected test weights quick and precise.

For cleaning of the test barrel the weight selection system can be swiveled with the reception side wards to guarantee free access to the test barrel.

Order number ..... 5.71.018

**Pre loading unit for mi2.2**

With the option "pre-loading unit", highly viscous test material can be compacted with a high weight. By uniform force distribution, air inclusions are minimized and influences of the operator such as variable feeding force are avoided. The measurement runs afterwards with the selected test load. The tamping weights are held during the measurement by means of a lifting device. Through this application time and position similar measurements are possible. This results in higher accuracy and reproducibility.



Order Number ..... 5.71.016

## Weights for pre loading unit

### Test weights

**Test weights 2,160 kg**

Order number ..... 5.07.277

**Test weights 5,000 kg**

Order number ..... 5.07.263

**Test weights 10,000 kg**

Order number ..... 5.07.276

### Tamping weights

**Tamping weight 2,840 kg**

Order number ..... 5.07.278

**Tamping weight 5,000 kg**

Order number ..... 5.07.264

**Tamping weight 7,840 kg**

Order number ..... 5.07.279

**Tamping weight 11,600 kg**

Order number ..... 5.07.130

## Examples of possible weight combinations

Test weight	2.16 kg			5 kg		10 kg
	X					
Pre-loading weight 2.840 kg	X					
Pre-loading weight 5.000 kg				X	X	
Pre-loading weight 7.840 kg		X	X			
Pre-loading weight 11.600 kg			X		X	X
Pre-loading weight / Ejection weight	5 kg	10 kg	21.6 kg	10 kg	21.6 kg	21.6 kg

X = Used weights

If the support for the pre-loading is not swiveled in, the pre-loading weight can be used also as test weight and ejection weight.

**Also other weight combinations are possible. Please let us have your requirements.**

**Position setting for drive  
(active during the melting time)**

**Sensor controlled position setting for drive**

The easy to handle, manual position setting 45 – 100 mm before the die is carried out using the scaling at the back side of the device.

Advantages:

- Time-saving especially for tests with slow flowing materials
- Optimal test conditions as defined pre-position for ASTM test ranges, which starts 46 mm before the die
- Increased repeatability of test results due to same conditions for each measurement



For basic device mi2.2

Order number ..... 5.71.188

For basic device mi2.3

Order number ..... 5.71.189

**Additional options**

**Power supply**

The following power supplies are also available:

**Power supply 115 V~; 50-60 Hz**

Voltage: 1 x 115 V AC; (1L+N+PE)  
 Permissible voltage fluctuations: +/- 10 % (permissible range: 103,5 V...126,5 V)  
 Frequency: 50 - 60 Hz +/- 1 %  
 Power consumption: approx. 870 W

Order number ..... 5.71.252

**Note:**

The power supply connector of the test device is being supplied with an IEC socket. A power supply cable (2 m) in german/european design is included in the delivery (plug type E+F (CEE 7/7), socket type according to IEC60320-C13), see also figure 1. For the US american market the delivery contains a cable with a plug in type B (NEMA 5-15, 3-pole) and the same socket as above (according to IEC60320-C13), see also figure 2. Due to the huge number of worldwide different connection plugs the country relevant connection cable has to be provided by the customer.

Figure 1:



Figure 2:



**Residual current rating**

The test device operates with motor controller and line filters. These electronic parts have naturally a leakage current behaviour.

The power supply must be equipped according to DIN EN 50178 due to this higher leakage current of > 10 mA DC and > 3.5 mA AC with a fixed termination and a separate protective earthing conductor (min. 10 mm<sup>2</sup> Cu).

The use of a Residual Current protective Device (RCD) can lead to problems. In this case only AC/DC sensitive RCD (or also called RCCB (residual current circuit breaker)), type B according to IEC 60755, with a release current (residual current rating) of > 300 mA can be used.

However, false release activations can occur:

- When connecting servo amplifiers to the power line (short-termed single or two- phase operation by contact bouncing in the mains contactor)
- By higher frequented discharge currents appearing during operation with longer motor cables
- By strong asymmetries of the 3-phase-current system

It is the responsibility of the customer to ensure a connection that meets the applicable requirements for it (local directives). When a RCD with a release current of ≤ 300 mA is required, GÖTTFERT offers a suitable isolating transformer solution on request.

\*

The ratings indicated by the manufacturers of the protective switches (RCD) are to be seen as max. values, where the protective switch surely releases. Usually the protective switch releases already at about 60 % of the residual current rating.

## Note

GÖTTFERT GmbH provides full warranty for the function of machines that have been supplied as complete system that means with PC and printer by GÖTTFERT. PC means generally the complete system comprising of PC, monitor, keyboard, interfaces, mouse and if applicable joysticks.

Principally, we do not give a functioning guarantee for connecting externally supplied PCs and printers (non-GÖTTFERT supply).

If the customer provides the PC by himself, GÖTTFERT cannot guarantee the troublefree functioning of PC and GÖTTFERT unit. Service work, which will be essential due to appearing problems in regard to configuration, serial interfaces, connection cables, communication etc. do not belong to the warranty obligations and will therefore be invoiced on an actual expense basis.

Some GÖTTFERT devices require the application of PC extension cards. By default they are executed in full construction height, consequently the application of a mini Tower PC is necessary. If the customer provides a PC in „Small-Form-Factor“ format by himself, then low profile extension cards have to be used.

Please refer with the order if a PC with low profiles extension slots shall be used! GÖTTFERT is checking if low profile cards are available for the requested application and will offer these extension cards. Please specify the brand and type of the used PC when placing the order!

Due to the various printer executions that are available on the market, we do not give any function guarantee for printers not supplied by GÖTTFERT. Support for possible adjustments will be charged on an actual expense basis.

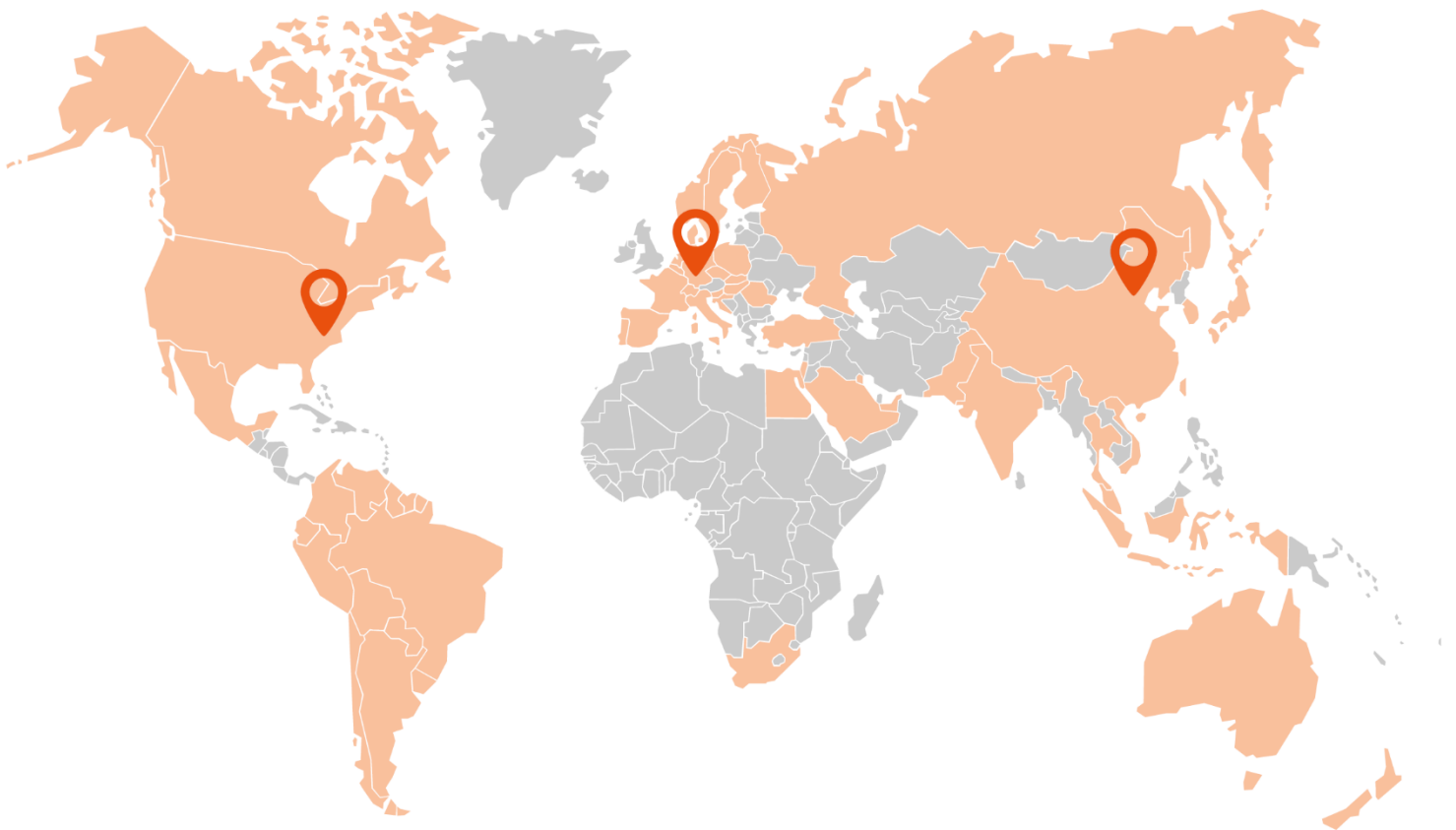
The required IP addresses have to be provided at the latest on the day of commissioning if you want to integrate the test machine, the PC or the printer into your network. Let your IT ensure that the network is configured accordingly.

All data are based on rated voltage and standard frequency as well as a surrounding temperature of +20 °C (+68 °F).

Subject to change due to technical developments.

Images may deviate from the original.

# THIS IS RHEOLOGY



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