

Operating Manual

High Performance – Dispersing and Homogenizing Devices with
LAB INLINE CHAMBER



Introduction

Dear user,
thank you for buying a brand product of ART. We are glad that you have chosen a high quality product of the MICCRA-series. Please read through the safety precautions in this manual to guarantee the correct operation of this product. Please keep this manual always at hand for future second helpings..

As an operator please care for the fact:

- that you have noted and fully understood all rules of the chapter 2 „safety“.
- that you know all business instructions and rules of the relevant target group before starting your work.
- that no unauthorized persons have access to the product.
- that you have access to this technical documentation at any time and without problems.
- that before starting the work on a MICCRA system the briefing of the new staff takes place by a competent person either verbally, and/or by the present technical documentation.
- For your own protection: let yourself confirm the briefing in writing from your assistants.

- You find a blank in the supplement of this documentation -

Timeliness of information

Progressive technology and the high quality level of our devices are guaranteed by a constant advancement. Possible variations may arise between this operating manual and your device. We can not expel errors completely furthermore. Please understand that no legal claims can be derived from the information, illustrations and descriptions herein.

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A reprint -also in extracts- is not allowed.

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1 General Information

The MICCRA-Series offers a wide variety of potential applications in science, research, manufacturing and other areas. They can be used to process dispersions and emulsions as well as for other capable of flow media. It either can be operated as a hand-held or a post mounted device.

The present flow chamber is an Inline Dispersing device, which can be operated with the drives MICCRA D-9 and MICCRA D-15. The operation of this unit consisting of chamber and drive takes place in horizontal position on a super-structure. ***Please consider that the flow chamber is not self-priming and the recommended drives are unsuitable for continuous operation.***

Functional principle

The MICCRA system is based on the rotor-stator principle. The R/S System consisting of a Stator fixed to a bracket in the chamber and the internal Rotor fixed with the axle of this unit.

The coaxial slots on the stator, available with different spacing, account for the size reduction and mixing of the different phases/substances. The sample's degree of fineness increases as the spacing of the slits decreases. The material is sucked into the head axially and due to the rotor's enormous rpm rate and circumferential or peripheral speed accelerated right after. The centrifugal acceleration between the outer rotor wall and the inner stator wall propels the material through the stator's shearing slots/apertures.

The enormous shearing stress results from the immense acceleration of the particles and their abrupt deceleration at the stator teeth. Thus, the material is shredded and mixed at the same time resulting in shortening the preparation times in the second range to a few seconds.

Short preparation times and finest Product qualities result from implementing the rotor/stator method.

The system is suited for low-, and medium viscous media. For high-viscosity media/fluids please use an upstream pump.

The standard Rotor/Stator compilation of the chamber is suitable for many In-Line applications. The chamber however is designed according to the modular system with the classical dispersing tools of ART, i.e. the tool head components can be exchanged if necessary against other stator and/or rotor types of the ART programme.

2 Safety

This operation manual contain fundamental indications for the initiation, operation and maintenance of the MICCRA-SERIE. For the operator it is indispensably to read this manual thoroughly before getting started the real work. The manual is always to be kept at hand in the place of action.

Proper use

Under Proper use we understand the exclusive operating and pursuing of the instruments in accordance with the instructions in this manual. Every in addition going use is not respected as "Proper use". Please pay attention to the technical specifications in accordance with chapter „ TECHNICAL DATA „.

General safety Instructions

Dispersing drives as well as all accessories e.g. Dispersing Tools are leaving our company in perfect technical safe condition. The perfect function and operational safety of all components can only be guaranteed if with proper use the standard practice safety precautions as well as the special security indications in this manual are considered.

If you suppose that a safe operation is not guaranteed anymore, please stop and protect the device against unintentional operation.

A safe operation is not possible anymore, if the device...

- shows a transportation damage
- was stored under unsuitable conditions for a long time
- shows visible damages
- not works anymore like described in this manual

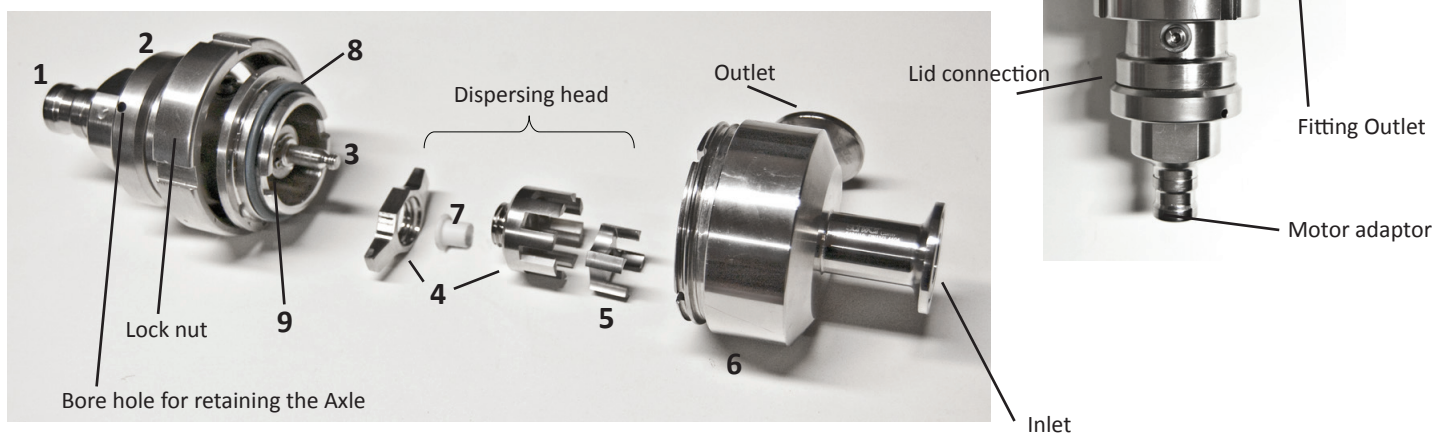
In such doubtful cases please get in touch with your supplier or with us directly. Together we'll care for a quick remedy. Activated warranties, repair- and maintenance works may be done only by persons or workshops which were authorised by us moreover. Apart from that the works will be carried out by ART itself. For losses which provable have appeared from disregard of this indication, we take over no liability. In such cases the warranty expires immediately.

Obligations of the operator

The operator is responsible for, that following laws and directives are kept with the contact with hazardous materials:

- EC-directives of the industrial safety
- National laws of the industrial safety
- Accident prevention regulations
- Security data sheets of the chemicals- manufacturers

Construction of the In-Line chamber



1	Motor adaptor	6	Housing Cover
2	Housing	7	PTFE-bearing
3	Axle	8	O-Ring
4	Stator with bracket	9	Single acting mech. seal
5	Rotor		

3 Initiation

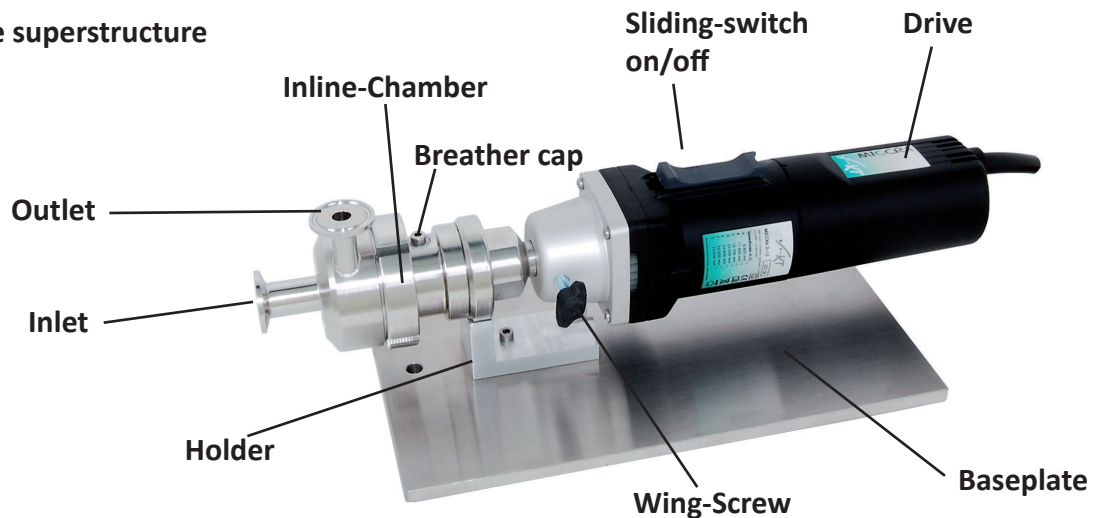
Scope of Supply

- Flow chamber: delivered in the immediately ready for use condition incl. accessories. (1 Allen Key SW4, 2-part opening tool).
- Superstructure AE300, consisting of Baseplate and holder incl. Screws (3 hexagon sockets each with washer, Allen Keys SW5, SW8).
- For the operation of the Inline chamber the following components are required in addition: Drive MICCRA D-9 or MICCRA D-15. Drives were delivered together with following accessories: (Bar with washer, hexagonal nut, Flat spanner).

Horizontal Setup

- The dispersing unit consisting of InLine chamber and drive will be operated in the horizontal position after mounting it onto the superstructure AE300.
- The holder will be mounted at the superstructure first. Please insert the enclosed hexagonal bolt M10x20 through the central bore hole of the holder into the thread hole of the chamber and fasten it with the Allen Key SW8 tightly.
- Please connect the chamber with the holder afterwards with the superstructure by using the delivered hexagonal bolts. Both bolts M6x30 incl. washer should be inserted through the outer bore holes of the holder and be screwed into the superstructure. Tighten them with an Allen Key SW5. The motor adaptor of the chamber is aligned to the centre of the plate.

Assembling the superstructure



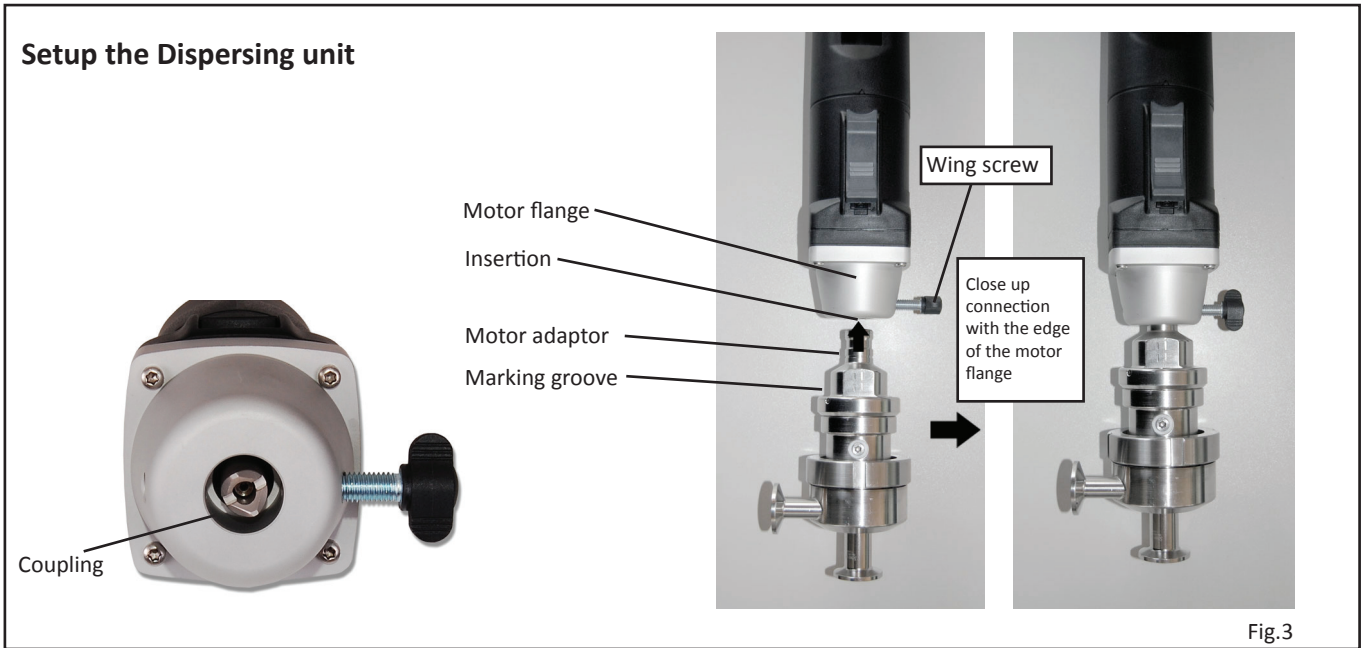
Connecting the drive with the InLine chamber



Caution!

A faulty connection of the chamber and the drive and an incomplete insertion of the Motor adaptor of the chamber into the motor flange of the drive may cause serious dangers in the entire system. Therefore please take care of proper connection of chamber and drive:

- Unscrew the wing screw at the motor flange of the drive as far as it is no more visible at the insertion (s. fig. 3, down left). Push the motor flange of the drive (if necessary agitating by hand) slightly and up to the aiming position into the motor adaptor of the InLine chamber.
- **The marking groove in the Shaft must close up concisely with the lower edge of the motor flange!** (s. fig. 3, down right) Apart from that the axle of the tool and the clutch will be strongly damaged by starting the drive. Thus will make the continuation of your work impossible.
- Make sure the connection is proper by tighten the wing screw.



Connecting net supply

Before connecting power supply pay attention to the fact that:

- the information on the power rating plate (s. fig. 4) corresponds with the information of the net socket. If not please do not put the system into operation!
- that the sliding switch at the drive is in the **“OFF-position”** (Position0).

Connecting Media In- and Outflow

- connect the inlet and outlet fittings of the InLine chamber with the supply lines and/or hoses. Take care of leak tightness of the connections and the locked seat of the hoses.
- **the flow chamber is not self-priming!** That means the media inflow takes place only by gravity. The media tank has to be placed with an appropriate height level above to the chamber to ensure a proper Inflow.

It is advisable to place the receptacle below the chamber level

due to the dispersing process the medium will be sucked into the chamber continuously so that the media tank could be placed to a more convenient position for the further operation.

Filling the chamber



Caution!
The chamber should never run dry!
Do not operate the chamber unfilled!

The R/S working head in the chamber never should run dry. Otherwise the mechanical sealing, PTFE bearing and the axle as well will be destroyed w.o. the cooling effect of the media!

Therefore do fill the InLine chamber before getting started w.o. exception!

- Thereto let medium flow into the chamber till it comes out the outlet. The chamber is filled then and can be put into operation afterwards.
- Please consider: **Bubble free filling of the chamber is essential.** Bubbles in the chamber may impair the dispersing process on the one hand and the risks of run dry the PTFE bearing resp. the mech. sealing on the other hand.
- The minimum filling capacity for the closed loop operation amounts approx. to 1l depending on the used line- or hosing system.

Switching On/Off

- Before Initiation the dispersing drive please make sure the proper connection of drive and chamber as well as the necessary filling of the chamber with media!
- Switch on the drive according to the following appropriate data at lowest speed adjustment (Level "A").
- increase the speed only at max. filling of the InLine chamber and adjust it afterwards to your required working process.

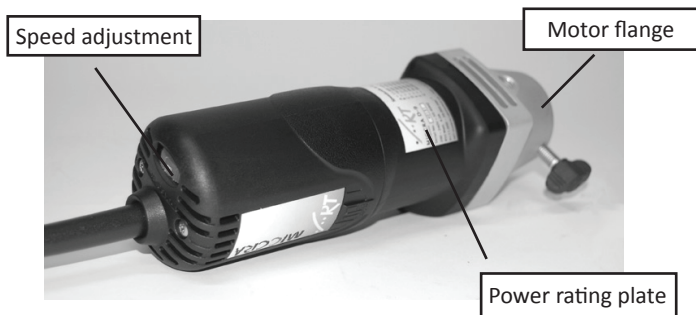
Mode of Operation

The drives MICCRA D-9 and D-15 has two modes of operation:

- **Momentary operation**
For turning on the drive push the ON/OFF-switch (sliding switch) in front of the housing with light pressure downwards and hold in this position. In order to switch off the drive let go.
- **Continuous**
For turning on the drive push the ON/OFF-switch (sliding switch) in front of the housing with light pressure downwards and press it then inwards, till switch engages. In order to switch off the switch press it at the upper end inwards.

Speed adjustment

With the adjusting wheel the desired speed can be changed before turning on and during the operation (infinitely from A to G;). The adjusting wheel is on top of the housing. The pertinent speeds are indicated on the power rating plate laterally at the drive



Level	Speed D-9	Speed D-15
A	11.000 min-1	8.800 min-1
B	16.000 min-1	11.600 min-1
C	21.000 min-1	16.700 min-1
D	25.000 min-1	20.600 min-1
E	29.000 min-1	24.600 min-1
F	35.000 min-1	29.600 min-1
G	39.000 min-1	33.600 min-1

Operation of the drive

- Depending on the kind of connection the medium passes through the chamber right after switching on the drive either on a through flow or a closed loop mode. In the closed loop mode the procedure is terminated with reaching the desired dispersing result by switching the drive off.
- In the through flow mode the danger of running dry the system exists: the dispersing system must be switched off immediately, as soon as the supply of medium ends into the chamber, in order to prevent running dry the PTFE bearing and the mechanical seal!



Caution!
Do not operate the chamber unfilled!

After work done

- Clean the flow chamber after conclusion of the working process! Flush in addition the chamber with a suitable liquid some minutes. Thus medium remainders are rinsed out and thus determining the rotary parts in the interior is prevented. In regular intervals and as a function of the kind of the used medium however opening and dismantling of the chamber is necessary, in order to clean the interiors of the chamber housing and the frame cover as well as the components of the dispersion head carefully.
- In particular the strong stressed parts of the chamber like PTFE bearing, Rotor and Stator of the dispersing head (s. Fig. 1) are to be examined regularly.

4 Disassembling InLine chamber

The dismantling of the chamber is necessary for cleaning, maintenance and the examination of the wear parts as well as for the retooling the chambers dispersing head.

- First of all remove the in- and outflow Lines of the chamber.
- Unplug Net supply and take out the drive from the chamber. The chamber now can be opened and disassembled without the need of removing the chamber from the superstructure.
- Open the chamber (comp. Fig.1 and 5): Loose the lock nut by using the delivered hook wrench (as in image nr. 1) and take the housing cover out the housing carefully w.o. damaging the O-Ring.
- Dismantling the dispersing head (s. below and Fig.1): Put the delivered retainer of the opening tools set between the teeth of dispersing head and lock it first. Now insert the Pin type socket wrench in such a way into the motor adaptor that the axle pin is seized exactly. Turn the wrench anticlockwise and hold the retainer at the same time in order to remove the rotor from the screwed end of the Axle.
- After unscrewing the Rotor take out the Stator along with the bracket from the Axle. (Pos. 4).



Caution!

Risk of injury by sharp edges! While dismantling and assembling the tool grab rotor and Stator always with a rag or fabric glove.

- Attention: The Stator has a left hand thread! Remove Stator by turning it into the clockwise direction from the bracket.
- Detach PTFE bearing from Stator bore hole in the end.

Dismantling chamber and removing dispersing head

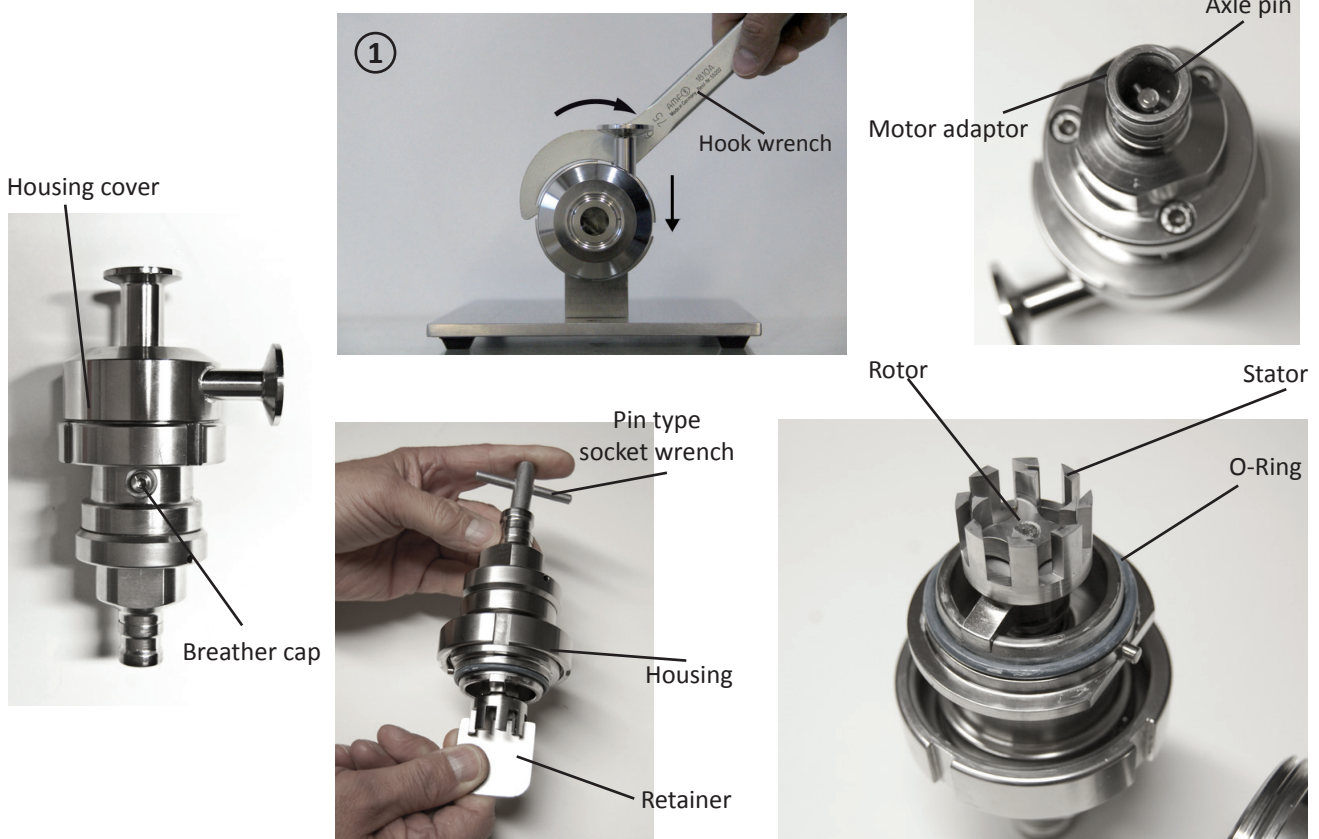


Fig. 5

- The resuming disassembly of the chamber housing, in which the mechanical seal (Fig.1, Pos.10) and the Axle's bearing are located, is reserved to ART.
- The assembly takes place in reverse order of the disassembling.

5 Cleaning

- Flush the chamber with a suitable liquid some minutes after works done. With stronger impurities dismantle the chamber; in order to clean the interiors of the housing and the frame cover as well as the components of the dispersing head carefully.
- The flow chamber and all its construction units can be cleaned according to the well known methods. Use if necessary aids like a brush or something similar for cleaning but however no sharp edged objects. With water-insoluble substances the cleaning with a suitable solvent takes place. Consider safety precautions for handling the solvent.
- Wipe the drive occasionally with a damp cloth free of fuzz. Disinfect if required the housing with Isopropyl.
- Sterilization by heat effect is not possible. Chemical procedures like the disinfection with germ-killing solutions (Formalin, phenol, alcohol, etc.) are applicable in certain extent. For this the chamber can be operated with disinfection solution and for removing the disinfectant remainders flushed with germ-free water afterwards.

6 Maintenance

- The flow chambers components in particular the dispersing head parts has to be examined regularly for visible damages.
- The PTFE-bearing at the Stator is a wear out part: Are abrasions, in particular wear out grooves caused by the axle are visible the PTFE-bearing must be replaced.



Attention

The defect of the PTFE-bearing can cause serious damages of the dispersing head! Therefore control and with wear replace the bearing regularly.

- The Chambers Housing contains the Axle bearing and a single acting mechanical sealing. These parts are maintenance- wear but not wear free.
- The drives are maintenance- wear but not wear free too.

Repair- and Spare parts service

If problems or damages occur at the chamber please get in touch with us immediately. We make possible a remedy to solve the cause and will discuss the further action with you:

Tel. +49 7631 / 700 99 – 0
Fax +49 7631 / 70099 - 99
E-Mail service@miccra.com



Attention

Warranty/repair and maintenance achievements may be implemented by ART only or by persons and/or workshops, authorized for this by ART officially.

Mistakes which are to be led back on improper use or unauthorized handling of the buyer or third parties, are expelled by the warranty performance. The warranty expires in such cases immediately.

Sending back a default System by return

If the problems can not be remedied please send back the whole system for a survey and repair back to the following Address:

ART Prozess- & Labortechnik GmbH & Co. KG

Dept. of Goods receipt

Zienkener Str. 8a, 79379 Müllheim/Germany

Please consider:

- For an exact fault analysis, please note that the complete system with drive and chamber is needed. Therefore, please send back the complete system in case of repair. Should occasional repairs will last longer than 48h, we immediately will send you a spare device, so that you can keep go on working w.o. delays.
- All repair orders will be done in previous arrangement with you.
- Drives, tools, chambers must be cleaned thoroughly; otherwise the cleaning is subject to charge. We reserve ourselves to send back heavily contaminated devices by freight collect.
- to add the filled out document of compliance. You will find the document of compliance in the supplement of this manual. Without document of compliance we reserve ourselves to carry out no repair or maintenance on the device and to resent it back to your attention.
- Dispatch the devices in appropriate safe packing carriage paid to ART.

7 Technical Data

InLine chamber	DFK-1 (with 20 mm tool set)	DFK-1 (with 30 mm tool set)
Art.No.	upon request	upon request
Stator-Diameter	20 mm	30 mm
Rotor- Diameter	15 mm	23 mm
Rotor-Type	depending on application	depending on application
Rotor-/Stator type exchangeable	Yes	Yes
PTFE-bearing	P20	P20
Connection Inlet	Fitting DN15	Fitting DN15
Connection Outlet	Fitting DN10	Fitting DN10
Product-affecting material	SS 316L	SS 316L
Chamber volume	60 ml	60 ml
Weight	2,44 kg	2,48 kg
Dimensions (w.o Fitting)	68 / 98 mm (W / H)	68 / 98 mm (W / H)
Operation position	horizontal	horizontal
Flow rate(acc. to H2O)	1,8 l/min up to 18 l/min	1,8 l/min up to 18 l/min
Max. Circumferential speed	30 m/s	41 m/s
Max. pressure	8 bar	8 bar
reachable Vacuum	ca. 1 mbar	ca. 1 mbar
Max. ambient Product temperature	120 °C	120 °C
Mohs-hardness	Max. 6	Max. 6
Cleaning technique	cip-capable	cip-capable
Compatible drives of ART	MICCRA D-9 MICCRA D-15	MICCRA D-9 MICCRA D-15
Warranty	2 Years	2 Years

8 Terms of Warranty

Declaration of warranty

Careful material choice and constant controls guarantee a perfect function of our sophisticated products. In order to be able to certify you a large as the legal prescribed warranty in the run-up already, please consider the following principles:

The warranty of the device encloses -without any further liability, particularly for consequential losses- the free substitute or the repair amounts to **2 Years** (24 months). The warranty limits itself to provable factory defects or material defects and comes into effect by purchase, or, if the delivery took place to an earlier moment, by the delivery of the article.

Expelled from the warranty performances are:

- Mistakes which are to be led back on improper use or unauthorized handling of the buyer or third parties.
- losses which have been caused by indispensable events.
- Lacks and defects which have appeared from normal wear, wrong connecting or wrong operation of the device are expelled also.

The warranty claim applies to the recovery of the functional readiness, but not on the assertion of further claims for damages.

Presupposition for the statement of the warranty obligation is the submission of the Invoice with purchase date. Please, keep your Invoice carefully. Please, send back the device freight or post-paid to our attention. Please, send us an entirely filled out copy of the following 2-sided form by fax in advance. Or send it to our address, so that the information is with us prior the arrival of the device or component. Please add another copy to the device / component and inform if necessary your forwarder.



Document of compliance

for ART Prozess- & Labortechnik GmbH & Co. KG / Dept. of Goods receipt
Zienkener Str. 8a * 79379 Muellheim/Germany *
Tel. +49 7631/70099-0 *
Fax +49 7631/70099-99

Statement to the safety and health compliance

Please fill out the document entirely!

1. reason for sending back the unit(s) (please mark)

- Test- or lended device
- case of warranty
- maintenance/service/agreed general overhaul
- Case of repair beyond the warranty performance
-

2. short description of the default

.....
.....
.....

3. Device/Component

Chamber: Drive: MICCRA D-.....Serial No:.....

Bought in;.....

At supplier).....

4. Details about the usedsubstances / biological materials

4.1 Descriptions

- a).....
- b).....
- c).....
- d).....

4.2 Precautionary measures with the contact with these materials:

- a).....
- b).....
- c).....
- d).....

4.3 Measures at contact with persons or release

- a).....
- b).....
- c).....
- d).....

4.4 On going and important information to be paid attention for:

- a).....
- b).....
- c).....

5. Statement to the hazardousness of the materials (please, mark appropriate):

- 5.1 For not poisonous, not radioactive, biologically harmless materials**

We assure, that a.m. Device / component...

- Contains neither poisonous nor other dangerous materials or inhere.
- Also perhaps occurred reaction products neither are poisonous, nor, represent otherwise an endangering.
- possible residues of dangerous substances were removed.
- 5.2 For poisonous, radioactive, biologically dubious or dangerous materials or otherwise dangerous materials**
- We assure that the dangerous materials, which came in contact with the a.m. device / component, are listed in 4.1 and all information are entire.

6. Way of transportation / Forwarder

Dispatched by (Name of the forwarder).....

Day of dispatch to ART.....

We declare that following measures were met:

- The device / component was freed from hazardous substances, so that with handling / repairs no endangering for the concerning persons exist.
- The device was packed safely and marked entirely.
- The forwarder was informed about the hazardousness of the goods. (If prescribed)

We assure that we appear and are responsible for all losses from incomplete and false information in opposite to ART, and release ART against possibly appearing damage claims of third parties.

We know that we are responsible in opposite to third parties - here particularly to the, with the handling and/or repair of the device/component entrusted assistant of ART - directly.

Name:.....

Company.....

Dept./Position:.....

Street:

ZIP Code/City:

Extension for possibly appearing further queries:.....

Date:.....

Signature:.....

Company stamp:

