technical documentation

technische Dokumentation

Draft Version

V100

universal mixer

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Contents

Foreword

These operating instructions are designed to familiarize the user with the machine/plant and its designated use.

The instruction manual contains important information on how to operate the machine/plant safely, properly and most efficiently. Observing these instructions helps to avoid danger, to reduce repair costs and downtimes and to increase the reliability and life of the machine/plant.

The instruction manual is to be supplemented by the respective national rules and regulations for accident prevention and environmental protection.

The operating instructions must always be available wherever the machine/plant is in use.

These operating instructions must be read and applied by any person in charge of carrying out work with and on the machine/plant, such as

- **operation** including setting up, troubleshooting in the course of work, evacuation of production waste, care and disposal of fuels and consumables
- **maintenance** (servicing, inspection, repair) and/or
- **transport**

In addition to the operating instructions and to the mandatory rules and regulations for accident prevention and environmental protection in the country and place of use of the machine/plant, the generally recognized technical rules for safe and proper working must also be observed.

This manual was prepared with utmost care. In case you should find out any mistakes however, we would be glad to receive corresponding notice from you.

1 Safety instructions

1.1 General instructions

These operating instructions provide the necessary information to install, operate, maintain and repair the described machine.

Qualified personnel concerned with the installation, operation, maintenance and repair of the plant in the user's company, must have read and understood these operating instructions, but particularly the chapter on safety instructions.

According to these operating instructions, qualified personnel must have received competent training on all aspects of installing, commissioning, operating, maintaining and repairing the plant or have the equivalent qualifications.

The DIOSNA-machine/plant has been built in accordance with state-of-the-art standards and the recognized safety rules. Nevertheless, its use may constitute a risk to life and limb of the user or of third parties, or cause damage to the machine and to other material property.

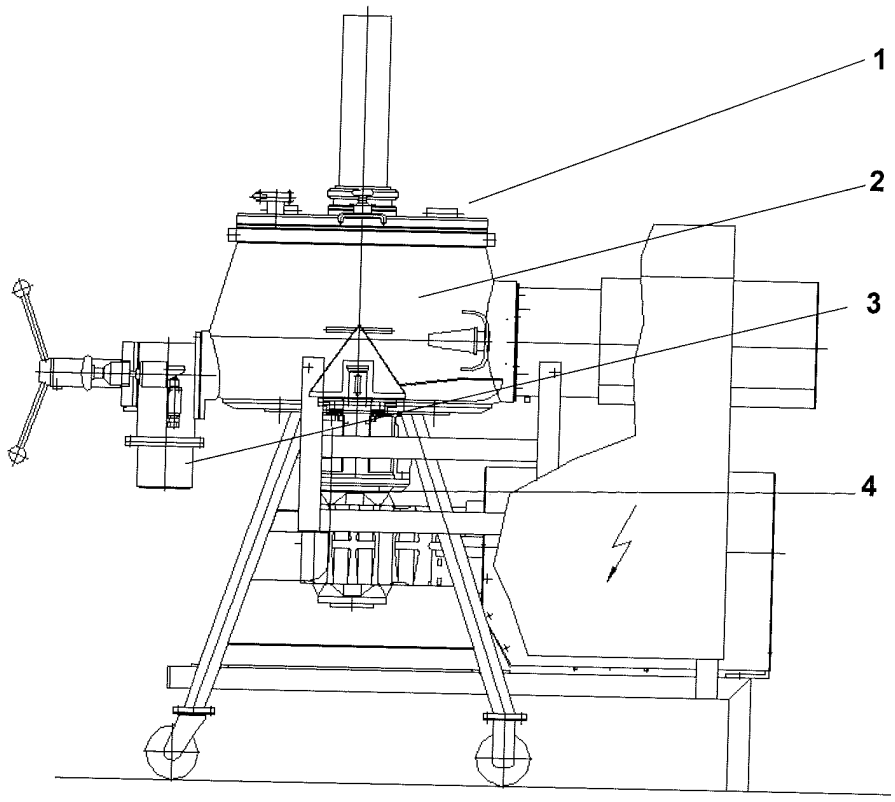

Fig. 1-1 Hazardous point on the Universal mixer

1	Area of movement of the container lid:	Danger of being crushed and knocked
2	Area of movement within the container:	Danger of being cut, crushed, pulled-in and knocked
3	Area of movement of the outlet:	Danger of being cut, crushed, pulled-in and knocked
4	Driving mechanism of the tools:	Danger of being crushed and pulled-in
	+ see chapter - Danger by the batch	

1.2 Danger by the batch

Danger that toxic components escape through openings (lid, service openings, etc.) or sockets and degasing filter not being installed correctly, when corresponding product are mixed and granulated.

The degasing filter must be equipped with a hood, and the plant must be connected to an extraction system at site, especially when fine grained, toxic, gaseous products are processed.

Danger that dust and gas (toxic) escape through non dust-proof or gas-proof connections during discharge and feeding of the machine.

⚠ **If alcohol is used as granulating liquid for mixers with automatic feeding, the mixer lid must be opened after every mixing cycle. Possible residual mixing material must be removed. If this is not done there is danger of explosion.**

1.3 Work and safety instructions

The machine must only be used in technically sound condition in accordance with its designated use and the instructions set out in the operating manual, and only by trained personnel who are fully aware of the risks involved in operating the machine/plant. Any functional disorders, especially those affecting the safety of the machine/plant, should therefore be rectified immediately.

Never make any modifications, additions or conversions at the machine which might affect safety without the supplier's approval. This also applies to the installation and adjustment of safety devices and valves as well as to weld-ing work on load-bearing elements.

The feed intakes for connection by the customer are fitted with provisional protection against manual intervention. They may only be removed after the final connection.

Be careful when handling hot materials! (risk of burning or scalding)! The personnel must be equipped with safety clothing protecting the body as well as with protective gloves and protection mask for the face! Unprotected personnel must keep off the 5 m danger area around the machine!

The machine must not be cleaned with a jet of water (see chapter on cleaning).

Doors and flaps must be locked to ensure that only authorized and trained staff can open them.

1.4 Examination

The operator must ensure that an expert checks all safety devices, locks and couplings for their safe condition at regular intervals, but at least once a year. The result of these examinations must be recorded in a test certificate (a simple note with date and a signature).

1.5 Warnings and symbols

The following things and designations are used in the manual to designate instructions of particular importance:

(refers to special information and/or orders and prohibitions directed towards preventing damage)

In addition to the operating instructions, observe and instruct the user in all other generally applicable legal and other mandatory regulations relevant to accident prevention and environmental protection.

2 Details concerning the machine

2.1 Manufacturer's address

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2.2 Designation of the types

Example of type designation:

V 100 V = Universal mixer 100 = type number

2.3 Technical specifications

The machine is equipped with a fixed container and a vertical axis.

The principal machine parts are:

- **Mixing bowl**
  The vertical, thick-walled bowl is designed cylindrical with an upper conical part which cause an optimal vortex-like movement of the material. The transitions of the vertical part to the conical one and to the bottom are rounded to assure optimal streaming of the product.
  The bottom, the strengthened container rim, the gear connection, the shaft passages and the discharge opening are machined precisely to keep narrowest tolerances.
- **Mixer lid**
  Completely hinged. The lid closes dust-free by means of quick fasteners and a seal made of silicone at the lid rim. The lid is equipped with an inspection flap and a filter.
  From size V 25 on actuation of the lid is facilitated by means of gas springs. The operation of the machine at open lid is avoided by a limit switch.
- **Outlet**
  The outlet housing is flanged laterally to the bowl flushing with the bowl bottom. The outlet is closed by means of a cylindrical piston, circumferentially equipped with a seal made of NBR. It is actuated by means of a threaded spindle.
  The front part is hinged and can be swung aside together with the closing piston to ease cleaning and inspection. Operation of the machine with open housing is prevented by a limit switch.

- **Mixing tool**
  The mixing tool is made of one piece, with three blades, running close to the bowl bottom. The tool is fastened to the vertical drive shaft.
- **Chopper**
  The chopper is installed in the bowl wall. It is made of one piece with two blades. It is screwed to the horizontal drive shaft.
- **Drive**
  The chopper is driven by a three-phase motor, from size V 200 on pole-changing for two speeds.
- **Shaft seals**
  The two shaft seals are designed as air purge seals. An air stream keeps the mixing material away from the mechanical sealing area. The air quantities are adjustable and are measured and controlled.
- **Machine frame**
  The machine frame is designed as pipe construction. The mixing bowl is mounted in the frame. The gear motor is placed below the bowl. The switch cabinet is fixed laterally to the frame. The frame is made of stainless steel
- **Electrical Equipment**
  The electrical equipment consists of a fixed switch cabinet in protection class IP 54, provided with:
  1 power unit with all necessary fuses, motor protection devices and contactors
  1 set of operating elements, incl. the main switch and a timer
  1 connection for the power supply
  The electrical lines at the machine are installed ready for operation.
- **Pneumatic Equipment**
  Incl. a maintenance unit with connection for the air supply. The pneumatic devices (see shaft seals) and the compressed air lines at the machine are installed ready for operation.
- **Operating safety**
  Operating safety is guaranteed by manufacture according to the regulations for prevention of accidents of the Professional Association (UVV) and the CE machinery guidelines. Limit switches or safety grids prevent the running mixing tools from being touched. The electrical equipment complies with the relevant European-standards, especially EN 60 204, part 1.

2.4 Technical data

Type, Universal mixer		V 100
Container capacity	ltrs	122
Max. useful contents	ltrs	110
Compressed air supply	bar	7 - 10
Continuous sound pressure level	dB(A)	74
Drive, mixing tool		
Design		B 3
Protection class		Ex II 2G/2D T4 IP65
Capacity, P	kW	7,5
Current, I_n	A	14,3
Speed	rpm	153
Drive, chopper tool (Option)		
Design		B 5
Protection class		Ex II 2G/3D IP55
Capacity, P	kW	2,25 / 2,9
Current, I_n	A	5,1 / 5,8
Speed n	rpm	1500 / 3000
Gear		
Type		BK
Type size		40
i=		9,31
Weight		
Machine	kgs	abt. 1000
Mixing tool	kgs	abt. 15
Fusing (injection)		
400 V	A (1)	22
3/PE~50 Hz	mm^2 Cu	4

(1) slow

Air consumption (Volume at atmospheric pressure)

- Outlet/Lid actuation: (for 10 charges per hour) . . . . . .max. 0.22 m^3/h
- Air purged seal of the main shaft at the mixing tool . . . abt. 4 - 6 m^3/h
- Air purged seal of the main shaft at the chopper . . . . . abt. 3 - 5 m^3/h
  (The pressure of the air supplied for the air purged seals (>6 bar) is reduced to 2 bar over pressure.)

The quantity of air escaping at the air purged seals is to be adjusted by the throttle non-return valve to prevent the mixing material from penetrating into the sealing area. (see drawing)
This is to be determined under operating conditions. (see chapter Setting into operation)

Lubricants

- Gear oil, consumption for 1 change of oil . . . . . approx. 3,5 ltrs
  (see operating instruction of the manufacturer)

2.5 Dimensions

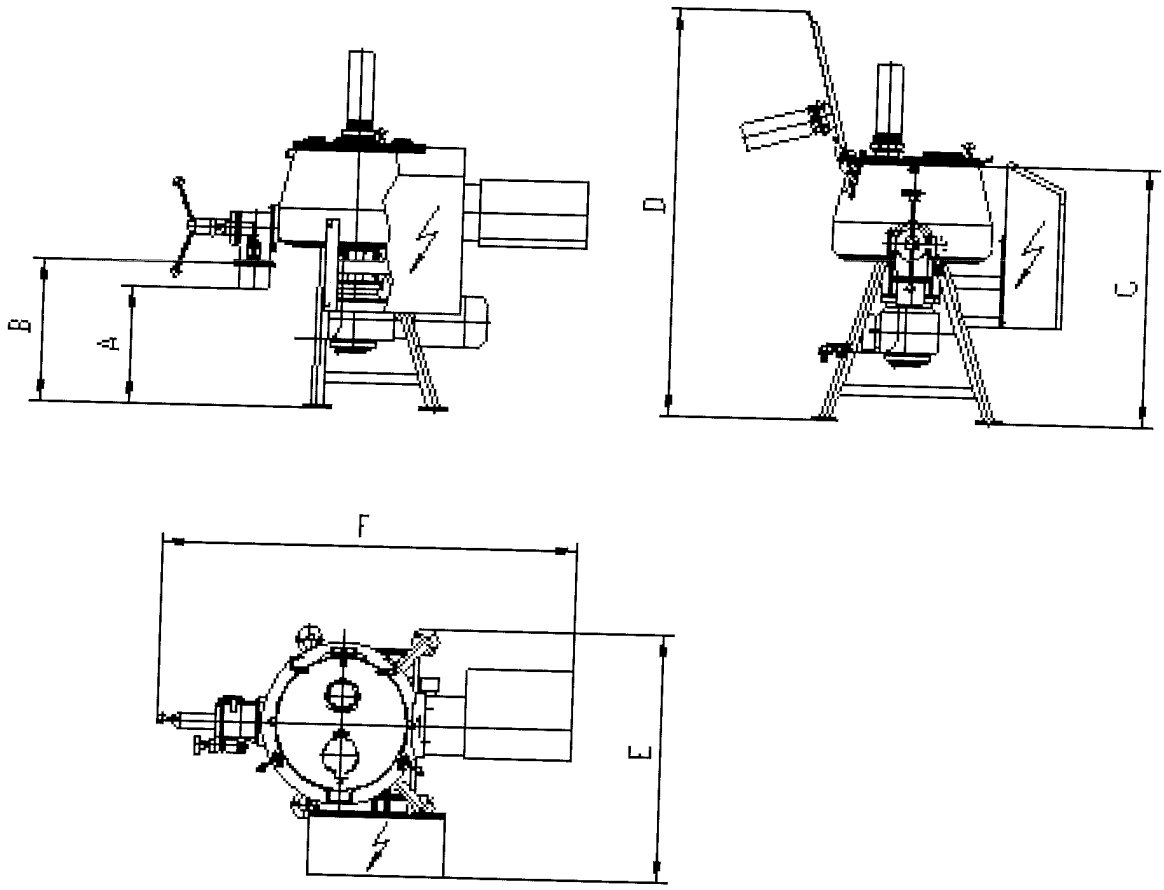


Fig. 2-1 Dimensions Front view

Tabelle 1: Basic design

type / dimension	A	B	C	D	E	F
V 10	550	-	850	1230	900	1270
V 25	595	600	925	1365	930	1510
V 50	515	620	995	1550	950	1610
V 100	515	520	1125	1770	1075	1800
V 200	565	650	1200	2050	1200	2150

3 Operation of the machine as directed

The machine is designed exclusively for intensive mixing and wetting of powdery and flowing materials as well as granules.

⚠ **Operation for other purposes is no use as directed.**

Operating the machine/plant within the limits of its designated use also involves observing the instructions set out in the operating manual and complying with the inspection and maintenance directives.

Combustible and hazardous powders, granules and liquids must only be used in the scope of the classification 94/9/EG (ATEX) indicated at the type plate and the operating instructions.

If the machine (plant) is not provided with information in the sense of 94/9/EG, the processing of combustible, hazardous powders, granules and liquids is considered to be irregular use.

The only permissible gases for the air purged seal and the gas stripping openings are:

- air, for non flammable or normal inflammable dusts (see chapter 3.1 + 3.2)
- nitrogen, if easily inflammable dusts and combustible liquids, gases and vapours are used.

⚠ **If easily inflammable dusts and combustible liquids, gases and vapours are used, a special inerting device (nitrogen supply and control by Diosna) has to be equipped and additional measures at the building are necessary to protect the personnel against danger caused by nitrogen**

3.1 Designation of the machine V 100 384-004 (94/9/EG, Atex)

⟨Ex⟩ II 3 (o)D 140°C (10°C<Ta<40°C)

Group of devices	II	Equipment Group No use in underground, mines or in areas with firedamp use.
Category	3	For zone 22 short-time frequency of the ex-atmosphere
	o	Outside - assembly area and filter waste air
Ex atmosphere	D	Dust
Temperature class		140 °C permitted surface temperature
Ambient temperature		(10°C<Ta<40°C) - Temperature must be between 10° and 40° degrees (assembly area)

⟨Ex⟩ II 2 (o)G IIA/B T3 (10°C<Ta<40°C)

Group of devices	II	Equipment Group No use in underground, mines or in areas with firedamp use
Category	2	For zone 1 occasional frequency of the ex-atmosphere
	o	Outside - assembly area and filter waste air
Ex atmosphere	G	Gas
	IIA/B	Explosion group of gassing and steams
Temperature class	T3	200°C permitted surface temperature
Ambient temperature		(10°C<Ta<40°C) - Temperature must be between 10° and 40° degrees (assembly area)

⟨Ex⟩ II 2 (i)D 140°C (10°C<Ta<40°C)

Group of devices	II	Equipment Group No use in underground, mines or in areas with firedamp use
Category	2	For zone 21 occasional frequency of the ex-atmosphere
	i	Inside - Mixer feeding and discharging
Ex atmosphere	D	Dust

Temperature class	140 °C permitted surface temperature
Ambient temperature	(10°C<Ta<40°C) - Temperature must be between 10° and 40° degrees (assembly area)

⚠ **Organisational measures must be taken to avoid dust clouds and dust deposits.**

3.2 Definition of raw materials/products according to substance code data

3.2.1 General information

Basically, the application ranges differ as follows:

- Combustible dusts (normally inflammable, only basic protective measures)
- Combustible dusts (very easily inflammable, additional protective measures)
- Combustible dusts with solvents (hybrid mixtures)

If one of the stipulated restrictions cannot be guaranteed with adequate safety, effective avoidance of ignition sources cannot be ensured. As a rule, additional protective measures are then required.

3.2.2 Combustible dusts (normally inflammable)

In the case of solvent-free applications, dry, combustible dusts are processed in the air. Potential explosive dust-air combinations arise through the rubbed-off parts of

- Granulates (active ingredients and excipients such as lactose and starches) and
- Powder

With normally inflammable dusts, preventive protective measures are suitable for the equipment.

V 100 - 384-004

⚠ **Only normally inflammable dust can be used in this machine**

very easily inflammable dusts and combustible solvents can only be used with original Diosna Inerting-Device

Limit values for deposited dust (normally inflammable)			
Code number	**Limit value**	**Unit**	**Comment**
Combustion code	≤ 5	-	Reference to significant tendency to ignite
Specific volume resistance	/	Ωm	No restriction N.B.: Special requirements relating to electrical operating equipment must be stipulated with conductive dusts (< 10^4 Ωm).
Glow temperature (ignition temperature of a 5 mm layer)	> 215	°C	**Maximum surface temperature 140 °C** N.B.: maximum permissible glow temperature must lie within a safety clearance (generally 75 °C) above the surface temperature
Self-inflammatory temperature (1.000 ml)	According to the process	°C	The self-inflammatory temperature (1.000 ml) must lie above the process temperature.

Limit values for swirling dust (normally inflammable)			
Code number	**Limit value**	**Unit**	**Comment**
Lower explosive limit	/	g/m³	No restriction
Oxygen limit concentration	/	Vol.-%	Irrelevant
Minimum ignition energy (measured without inductivity)	> 3	mJ	No ignition-sensitive substances N.B.: The temperature-related minimum ignition energy must be used.
Ignition temperature of dust cloud	> 250	°C	Maximum surface temperature 140 ° The surface temperature must not exceed 2/3 of the ignition temperature. Regardless of the maximum surface temperature, substances with ignition temperatures below 250 °C are classed as very easily ignitable.
Maximum explosion excess pressure	/	bar	Irrelevant
Dust constants K_{St}	< 300	bar m s^{-1}	Irrelevant if minimum ignition energy and ignition temperature are set, otherwise do not provide pre-ventive protection for any St 3 dusts
Dust explosion class	St 1 and 2	-	Irrelevant if minimum ignition energy and ignition temperature are set, otherwise do not provide pre-ventive protection for any St 3 dusts

Examples for normally inflammable dust:					
Substance	**Lactose (2041)**	**Maize starch (2072)**	**Milk sugar (2100)**	**Potato starch (2070)**	**Wheat flour 550 (2093)**
Combustion code < 5	3	2	5	2	Similar: 2
Ignition temperature of the deposition in °C > 215°C	>450	>450	melts	>450	>450
Self-inflammatory temperature > process temperature (>100°C)	>140	>140	>140	>140	>140
Minimum ignition energy > 3mJ	80 similar >10	295	14	>3200	>100 similar >10
Inflammatory temperature of dust cloud in °C > 250°C	450°C	520	440	520	470
If minimum inflammatory energy and ignition temperatures are unknown:					
Dust constants K_{St} < 300 barm/s	29	128	75	89	42
Dust explosion class < St3	St1	St1	St1	St1	St1

Source: Brenn- und Explosionskenngrößen von Stäuben, Bielefeld 1987 (Erich Schmidt Verlag GmbH & Co.), www/hvbg.de/service/datenbank/.../ GESTIS-StAUB-EX-Datenbank (database) and Inburex (Hamm)

The calculation is made according to VDI 2263 sheet 1 and the future European standards for a fraction with a particle size of less than 63 µm (the substance examples partly correspond to other particle sizes). The minimum ignition energy is to be determined without inductivity in the discharge environment.

Furthermore, the addition of the following substances is to be excluded:

- **Combustible liquids**
- **Explosives or chemically unstable substances (they do not come under directive EU 94/9/EC)**
- **Fire-promoting substances (e.g. peroxides according to ADR/ GGVS 5.1)**
- **Impact- and friction-sensitive substances (e.g. substances according to ADR/GGVS 4.1)**
- **Deflagrant substances (exothermic degradation reaction), e.g. certain dye pigments**
- **Sulphur**

Furthermore, the substances used must not trigger any exothermic chemical reactions under the stipulated technical conditions either through interaction with each other or with the equipment materials.

3.2.3 Combustile dusts (very easily inflammable)

Feeding and Discharging from/to areas with excluded media

The machine (384-004) can be use in an assembly surrounding with following dusts and liquids/vapors in the atmospere.

Limit values for deposited dust (very easily inflammable) - assembly areas			
Code number	**Limit value**	**Unit**	**Comment**
Combustion code	≤ 5	-	Reference to extreme tendency to ignite (deflagration cannot be stopped by inertisation)
Specific volume resistance	/	Ωm	No restriction N.B.: Special requirements relating to electrical operating equipment must be stipulated with conductive dusts (< 10^4 Ωm).
Glow temperature (ignition temperature of a 5 mm layer)	> 215	°C	Maximum surface temperature 140 °C N.B.: maximum permissible glow temperature must lie within a safety clearance (generally 75 °C) above the surface temperature
Self-inflammatory temperature (1.000 ml)	/	°C	No restriction

Limit values for swirled dust (very easily inflammable) - assembly areas			
Code number	**Limit value**	**Unit**	**Comment**
Lower explosive limit	/	g/m³	No restriction
Oxygen limit concentration	/	Vol.-%	No restriction
Minimum ignition energy (measured without inductivity)	/	mJ	No restriction
Ignition temperature of dust cloud	> 210	°C	Maximum surface temperature 140 °C N.B.: Restriction through max. surface temperature: permissible ignition temperature must not exceed the surface temperature (°C) x 1.5
Maximum explosion excess pressure	/	bar	No restriction

Dust constants K_{St}	/	bar m s^{-1}	No restriction
Dust explosion class	/	-	No restriction

The calculation is carried out according to VDI 2263 sheet 1 or the future European standards for a fraction with a particle size below 63 µm. The minimum ignition energy must be determined without inductivity in the unloading environment.

Solvent limit values (also refer to tables for very easily inflammable dust 1 to 4 for hybrid mixtures)			
Code number	**Limit value**	**Unit**	**Comment**
Relative vapour density (air = 1)	> 1		Relative vapour density over 1 is anticipated only with short-chain gases
Flame point	/	°C	No restriction
Lower explosive limit	> 40	g/m³	Lower values can affect zone division
Minimum ignition temperature	> 0.1	mJ	Also compare explosion group
Ignition temperature	> 200 (> 135)	°C	Stipulation of the temperature class for the respective system (T3 or T4)
Temperature class	T1 - T3 (T4)		Stipulation for the respective system
Explosion group	IIA und IIB		No substances in substance category IIC
Maximum explosive excess pressure	/	bar	Irrelevant (is triggered by the dust)
Gas constants K_G	/	barm/s	Irrelevant (inerting, pressure-shock proof construction)
Oxygen limit concentration	> 8	Vol.-%	Lower values only feasible for exotic applications (CO, H_2)

Furthermore, the addition of the following substances is to be excluded:

- **Explosives or chemically unstable substances (they do not come under directive EU 94/9/EC)**
- **Fire-promoting substances (e.g. peroxides according to ADR/ GGVS 5.1)**
- **Impact- and friction-sensitive substances (e.g. substances according to ADR/GGVS 4.1)**
- **Deflagrant substances (exothermic degradation reaction), e.g. certain dye pigments**

- **Sulphur**

Use of the machine only in closed condition (outlet, lid), no feeding or discharging in atmosphere with these media.

3.2.4 Organisational measures

Observance of maintenance intervals

Inspection of the mixing are regarding impurities and defects at the tools before and after operation

Use of aspiration and functional check

Non-conductive hoses must be earthed safely

Check of earthing in connection with maintenance works, defects must be removed immediately

Check of earthing after maintenance works

During feeding safe operation of the aspiration must be guaranteed

Spillings must be avoided

It is urgently recommended to switch the chopper off during feeding and discharging

4 Description of the machine - functions

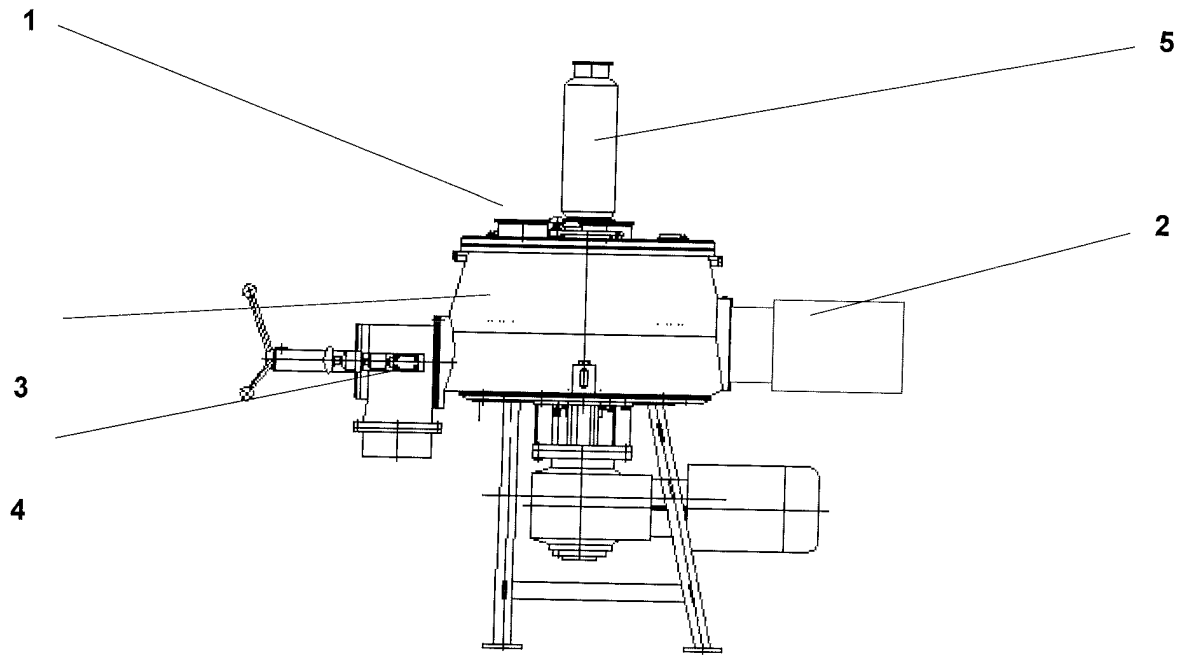


Fig. 4-1 DIOSNA-Pharma Mixer

The machine is equipped with a fixed container and vertical axis.

1	Feeding is effected through the opened lid .
2	The chopper tool is driven by an electro-motor.The chopper crushes lumps and compacts the moistened material.
3	The mixing tool is driven by an electro-gearmotor, equipped with two speeds. The mixing tool is to mix the powder intensively with the additives.
4	To discharge the mixing material the outlet can be opened while the mixer motor is running. The outlet will be opened manually.
5	The air escapes from the container through a filter with suction cap.

The machine is operated with a switch cabinet at the machine frame.

All functions of the machine can be done by an operator panel.

5 Description of the protective devices

Main switch:
The machine is disconnected from the mains by actuating the main switch.

Interruption in the event of danger:
Program flow is interrupted with actuation of the EMERGENCY STOP key. The machine can only be restarted after the EMERGENCY STOP key has been unlocked.

Drive (Mixing tool/chopper):
The motors are protected by overcurrent relays/PTC Thermistors.
If they are tripped due to overloading, a fault in the power supply or too high temperature, the machine will be once again operable after approx. 1 minute. However, it is advisable to find the fault to avoid major damage.

Lid protection:
The lid of the machine is equipped with a limit switch.

- the mixer cannot be started when the lid is open but only when it is closed.
- the mixing tool has come to a standstill when the lid is opened.
- the outlet can only be opened if the lid is open.

The delay time of the lid actuation is set to the max. slow-down time of the mixing tool at works. The delay time must not be changed.

The container rim must be kept free from any impurities when the lid is lowered.

Outlet protection:
The outlet housing of the machine is equipped with a limit switch.
It is to effect that:

- the mixer cannot be started with the outlet housing open.
- the tool(s) has (have) come to standstill before the outlet housing(s) is (are) opened.
- the outlet piston cannot be actuated with the outlet housing open.

Openings in the lid:
The openings in the mixer lids are equipped with protection bars which prevent the running mixing tools from being touched.

Discharge opening:
The discharge opening is protected by gratings to prevent access to the tool.

Pneumatics:
The machine can only be run, when the operating pressure exceeds ca. 6 bar. This is ensured by a pressure controller.

6 Transport

The machine is supplied in a fully assembled condition, ready for connection, usually on a wooden frame.

Packing depends on the mode of transport (by truck, in container or in wooded case).

Transport with a lifting truck: The machine can be lifted with a lifting truck by using the wodden Frame.

Installation in the production area

Transportation with lifting gear: The machine can be lifted by suitable-belts.

⚠ **Ensure adequate lifting capacity! (see chapter for technical data).**

⚠ **Ensure that the machine does not tilt while it is being transported.**

1 The machine must be set up on a firm level base.

2 Collect pneumatic hoses and electrical cables according to the electrical circuit diagrams.

Make connections according to:

electrical circuit diagram,	see drawing:	3-384-773-003-02
pneumatic control,	see drawing:	3-384-882-03

7 Erecting and setting into operation

All maintenance work on the machine must only be performed after the main switch has been turned off and is safeguarded.

7.1 Setting up

The machine must be set up on a firm level base. The machine is anchored with foundation bolts.

The machine must be set up in such a manner that the surrounding area can be easily cleaned.

- Space requirements - see chapter for dimensions!

7.2 Connecting conditions

The operating voltage for the machine is specified on the type plate. This voltage must coincide with the operating voltage of the three-phase mains at the point of installation.

Please refer to the chapter for technical data for the ratings of the fuses to be installed by the customer.

The permanent connection must only be installed by a qualified electrician in conformity with EN 60204, DIN VDE 0100, or equivalent connecting conditions.

7.2.1 Supply media and connections

Compressed air (air gap seal):	Connection 1/2'' Pressure 7 - 10 bar 25 m_N^3/h
Voltage supply:	3/PE 400V Connection: 4 x 4mm^2 Fusing 25A

7.3 Setting into operation/Functional testing

Before start-up the following works have to be done:

1. Open compressed air supply line (7-10 bar necessary).
2. Turn on the main switch
3. Regulator check (Mixing tool + chopper): 2 bar

After the first test with material the sealing areas are to be checked and the flow is to be increased or reduced, if necessary.

The flow rate is indicated at the flowmeter and is regulated at the throttle return valves.

With the lid open the air flow is reduced.

⚠ **When the actual value falls below the limit value, the concerned motor is switched off.**

Start-up without mixing material:

1. Close container lid, outlet and outlet housing.
2. Start - see chapter: Control/control description

After all functions of the machine have been checked in a test run, especially the correct direction of rotation of the motors (the directional arrows placed above the outlets/choppers outside the container have to be paid attention to).

In case of wrong rotational direction, two phases of the electrical supply must be exchanged by an electrical expert.

Functional testing, see chapter:
- Description of the protective devices
- Control (control description)

7.4 Cleaning

The machine must not be cleaned with a jet of water, as this can result in damage to the electrical and mechanical systems (e.g. bearings).

If water or other liquids are used for cleaning, the container and all other parts must be dried completely afterwards, either by means of warm air or by wiping them dry to avoid any electro-chemical corrosion.

This measure must also be taken with stainless steel machines and especially for longer times of standstill.

Use only a gentle, commercially available laboratory detergent (for metall, glass and plastic) to clean.

Use dust-free cleaning rags!

Do not interrupt main air supply when feeding or cleaning the container.

Incorrect cleaning invalidates the guarantee!

Advices for washing the needle felt filter hoses

Washing process:	Gentle washing at 40°C or manual washing Strong mechanical stress must be avoided absolutely; washing is to be done with high water level, perhaps in washing bags. Careful and sufficient rinsing is necessary in any case.
Washing additive:	Fine washing agent with high dispersing power for dusts
Drying:	at maximally 60°C, at room temperature
Note:	According to the preceding mechanical and chemical stress the washing process can result in a modification of the felt structure and the surface condition.

Washed, tested filter material does not fulfill the critera according to BIA Certificate category G/C any more.

Only to be done by authorized, trained personnel with personal safety clothes (face and body protection, gloves etc.).

7.5 Setting out of operation

To set the machine out of operation the following steps must be done:

1.) Dislock the lid

2.) Open the outlet

3.) Shut down the voltage

4.) Close the supply media connections

Before the machine is set into longer stand still times, measures for corrosion protection must be taken.

8 Control

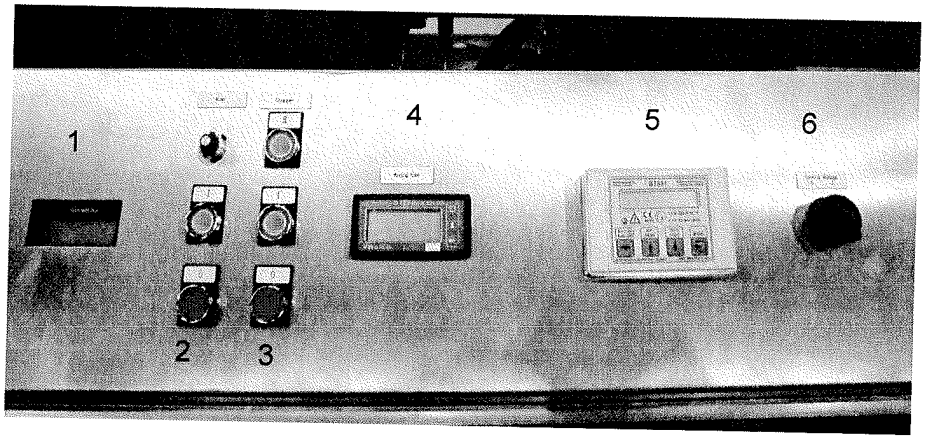
General

All supply lines of the switching elements (limit switches, valves etc.) installed at the mixer are connected on a terminal strip in the switch cabinet.

The electrical supply line is to be led through a cable duct being installed in the switch cabinet and to be clamped to the terminals L1, L2, L3 (N) and PE.

The switching elements necessary for the control are mounted on a detachable mounting plate in the switch cabinet resp. in the door of the switch cabinet. The minimum cross section of the flexibles lines being used for wiring is 1 mm² Cu.. The line ends are equipped with cable sokkets.

8.1 Structure of the control



1	Actual value of mixer speed
2	Push buttons mixer motor mixer on potentiometer for mixer speed off
3	Push buttons chopper motor speed 1 on speed 2 on off
4	Mixing time, Timer
5	Operating panel, air/ gas rinsing
6	Control On/Off

8.2 Operation of the control

- The machine is ready for operation when the main switch, the control switch (6) has been switched on. The air/ gas rinsing starts automatically.
- The mixing procedure, the sequence of additives, the batch size, and the mixing time differ from one formulation to the next, and should be determined through test runs.
- The signal lamp of the active functional keys light.

Function of the keys

Mixer motor: The machine can be started with the key [I].

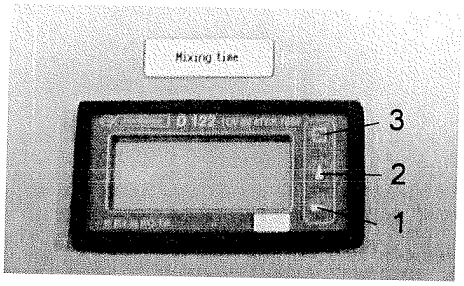
Chopper motor 1st speed / 2nd speed: The machine can be started with the [I] key. The chopper can be switched on if the mixer motor runs.

Chopper motor 1st speed / 2nd speed: The machine can be started with the [I] key or the [II].

OFF key Mixer: The motor is switched off, when the Off button is actuated. The timer is reset to the starting position. Direct switching back from the second to the first speed is possible.

OFF key chopper: The motor is switched off, when the Off button is actuated.

Timer



1. Hit the key (1) to enter the menu: Li H appears
2. Then push the enter key (3) and the actual value of the Mixer is shown
3. By pushing key (3) once again you can changes the value
4. The arrow key (2) change the actual digit
5. With the arrow key (1) you can jump from one digit to another
6. Then push the enter key (3) and rESEt appears
7. A further push of key (3) changes the value

Timing commences with machine start and is switched off when the preselected time has been reached. The timer is activated via the mixing tool.

Operating panel, Air/ Gas Rinsing

On/ Off key start the rinsing. After 9,5 min. the switchbox is totaly rinsed and the mixer can be started.

By a second push the machine step into stand by, but th switchbox is still rinsed.

Only authorized personnel can change the settings of the air/ gas rinsing.

If air escapes through a leakage, more air rinse into the switchbox.

After opening and closing the switchbox the rinsing starts again.

⚠ **If the motor protection system has responded to an overload, then the machine is only operable again after a cooling off period of approx. 60 seconds. However, it is advisable to find out why the motor protection system was tripped (see chapter on the elimination of faults).**

9 Maintenance and repairs

All maintenance work on the machine must only be performed after the main switch has been turned off and is safeguarded.
Be careful when handling hot materials!

The personnel must be equipped with safety clothing protecting the body as well as with protective gloves and protection mask for the face! Unprotected personnel must keep off the 5 m danger area around the machine! (risk of burning or scalding)!

9.1 Maintenance plan

With extreme operating conditions p.e. high humidity, aggressive environment conditions and high fluctuation of temperature shorter maintenance intervals are advantageous.

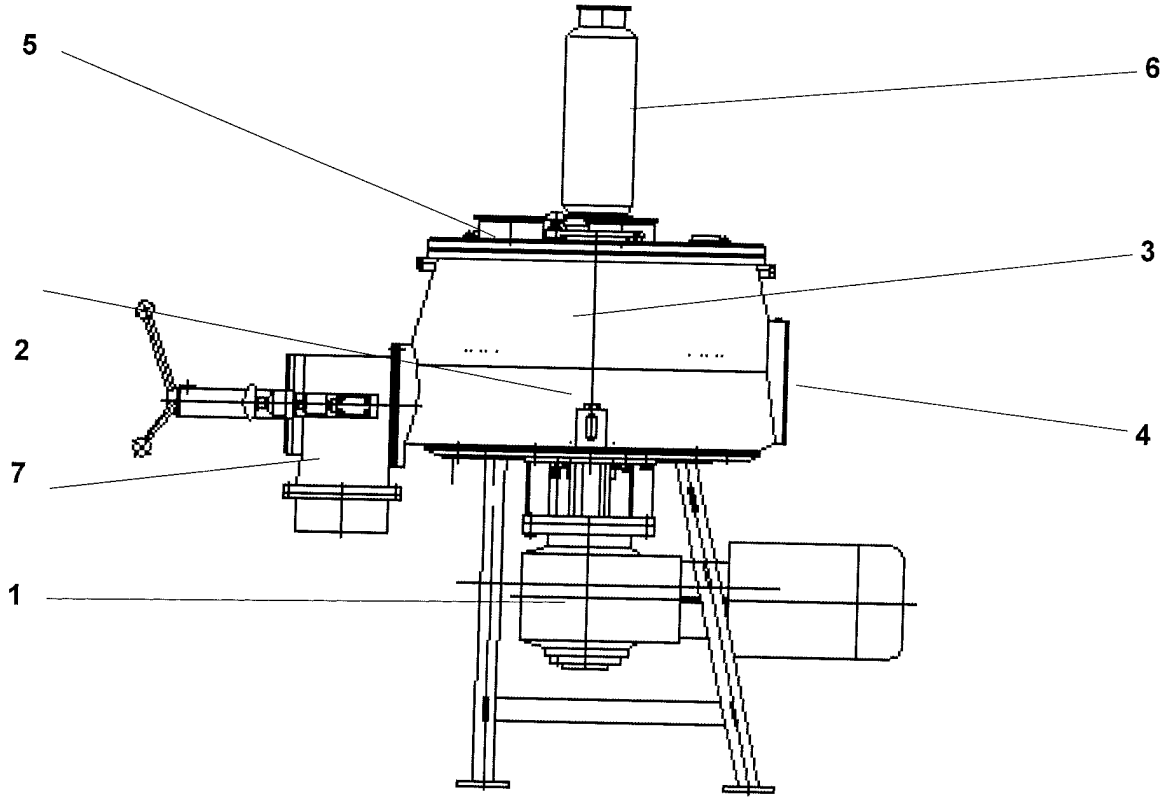


Fig. 9-1 Maintenance plan

1	Drive
2	Sealing
3	Bowl
4	Chopper bearing (Option)
5	Lid
6	Degassing filter
7	Outlet, pneumatic

9.2 Check list for preventive maintenance (every three months)

Designation of assembly group	Works to be done	Result		Remarks
		o.k.	not o.k.	
Frame 3-384-032-001	Visual check regarding corrosion Check regarding correct installation			
Three phase motor Mixing tool 8-06-0576	Visual check regarding cleanness, clean if necessary Visual check of the cable entries			
Drive 3-209-281-007	Visual check regarding damages Gear: check of oil level Oil change: (**see operating instruction of the manufacturer**)			
Sealing 3-384-204-001	Check of the mixer shaft seal regarding cleanness and damages (replace them if necessary)			
Mixing tool 5-503204	Visual check of the surface regarding damages Check of the distance of the bowl bottom, should be between 1-3 mm.			
Three phase motor Chopper 8-06-0414	Visual check regarding cleanness (clean if necessary) Visual check of the cable entries			
Chopper bearing (Option) 3-209-212-005	Smooth running of the shaft Check regarding running noise (replace bearing if necessary)			
Chopper tool (Option) 3-209-372-007	Visual check of the surface regarding damages Cutting edges sharp Tool blade deformed			
Bowl 3-384-412-002	Visual check of the surface regarding damages Check of the add-on pieces regarding correct installation			
Lid 3-384-520-003	Visual check of the surface regarding damages Check of the add-on pieces regarding correct installation Functional check of the tension lever			

Designation of assembly group	Works to be done	Result		Remarks
		o.k.	not o.k.	
Degassing filter 3-239-861-006	Check of the filter cloth regarding damages and cleanness (replace if necessary) Check of the connection regarding correct installation Check of the clamp seals			
Lid protection 3-385-581-001	Control of the function and cleanness (clean if necessary)			
Outlet 3-209-615-007	Check of the stripper sleeve regarding damages and cleanness Check of the O-ring regarding damages (replace if necessary) Check of the connections regarding damages			
Pneumatics 3-384-882-003	Check of the adjustments: FAL-M205 Function of the level indicator Check of the hoses regarding tightness Drain of condensate in the regulating valves			
Connecting lines electrics and pneumatics	Check of the condition and installation			

Dismount / Assemble tool

The mixing tool can be drawn from the shaft from above.

For this purpose a suitable lifting device should be used (crane, swivel arm) which can be positioned **directly above the mixing tool**.

Avoid touching the container wall

Before installation of the tools the cleaned shaft must provided with a thin grease film at any rate to prevent scuffing damages of the tools and the shaft.

Recommended lubricants: Klübersynth UH1 14-151; -45°C...+120°C, producer Klüber Lubrication

The tool must be reset onto the shaft carefully without tilting. If edge crushes or scuffing signs occur nevertheless, they must be removed, for example by polishing or scraping.

Shaft sealing of mixing tool

The sealing of the shaft is effected by means of an air purged seal. The sealing rings to seal the shafts are subject to normal wear. Depending on material and procedure their endurance is different. It is recommended to check them regularly especially within the first few months after starting and to replace them in due time.

If the seals must be renewed, proceed as follows:

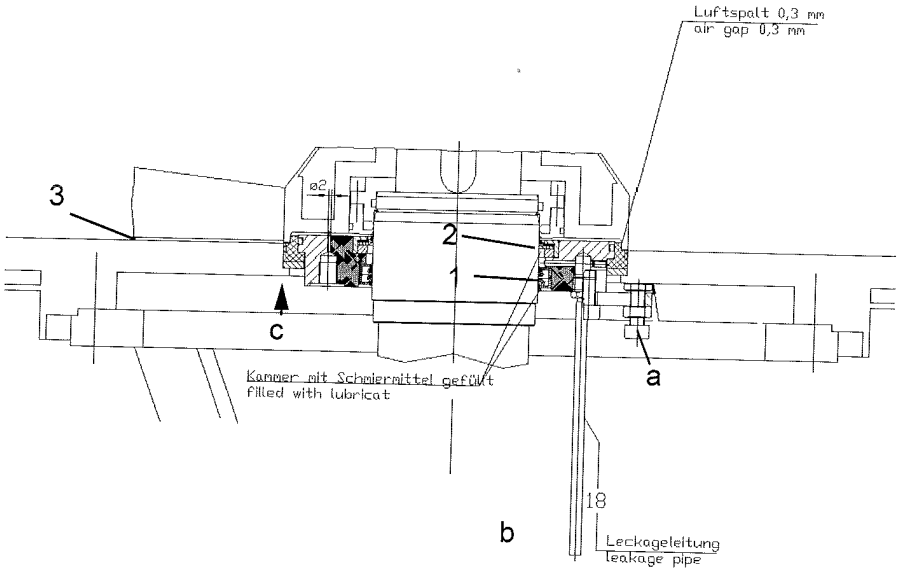


Fig. 9-2 Gasket

- Dismount tool.
- Machine frame: unscrew covering sheets.
- Remove the sealing as the following steps
  a) Remove the cylinder screws from inside the frame
  b) Disconnect the pipes of the air gap seal and the leakage pipe
  c) Force out the complete cover disc into the bowl

- Check wearing part, replace defective parts, renew grease film before assembly.
  Mount the shaft sealing rings in opposite direction
  Fill the chamber between the rings with lubricant
- Press the „Garlock" sealing into the cover disc by using the old one as a tool.
  Fix the cover disc constantly with the scews (position a)
- After all check the distance between tool and bottom of the bowl.
  Near the cone: 0,5 mm
  At the tool tips: 0,1 mm

After placing the mixing tool at the shaft repeat a test run because the „Garlock“ sealing must grind in his housing

Provided the customer is not able to ensure competent dismantling and repair works, please call for the "DIOSNA" after-sales service.

Chopper-Shaft sealing

The sealing of the shaft is effected by means of an air purged seal. The shaft seal rings to seal the mixer shaft behind the air purged seal are subject to normal wear. Depending on material and procedure their endurac-ne is different. It is recommended to check them regularly especially within the first few months after starting and to replace them in due time.

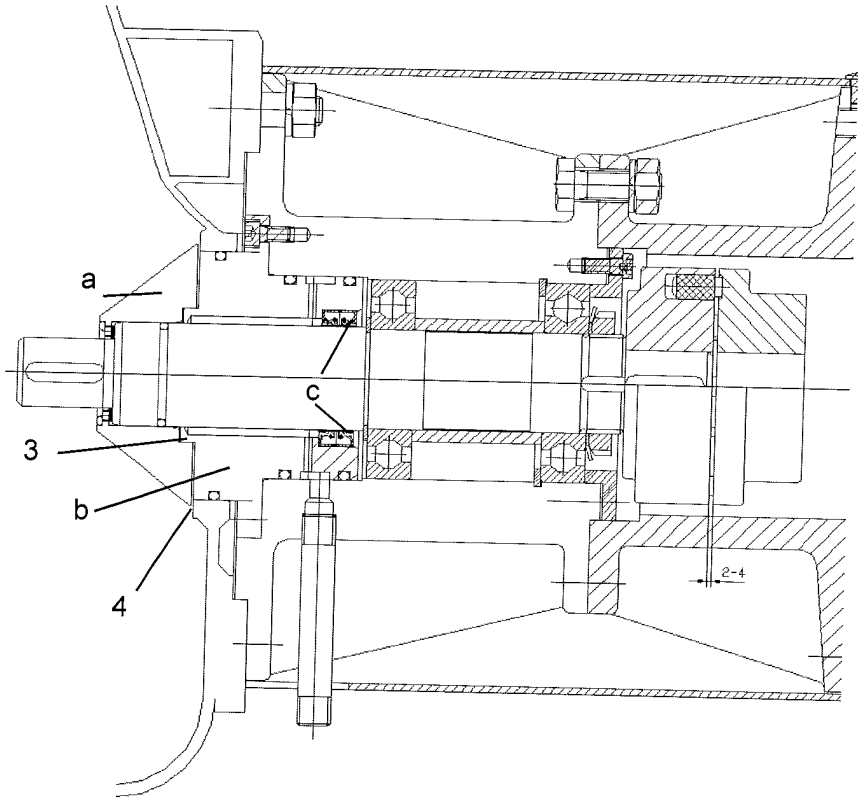


Fig. 9-3 Chopper-shaft sealing

If the seals must be renewed, proceed as follows:

- a) Dismount tool and the turbulence ring. Clean both.
- b) Turn out the sealing by using two long M5 screws. Screw them into both holes and the complete sealing comes out.
  c) Check wearing part, replace defective parts, renew grease film before assembly.

Mount the sealing as follows

1.) Mount the shaft sealing rings in opposite direction
Fill the chamber between the rings with lubricant

2.) Fix the sealing by using two M6 screws. Turn them constantly in.

3.) Check the gap at the shaft: approx 0,1 - 0,2 mm

4.) Mount the turbulence ring
Check the gab between ring and bowl wall: approx 0,3 mm

After placing the chopper tool at the shaft repeat a short test run

Provided the customer is not able to ensure competent dismantling and repair works, please call for the "DIOSNA" after-sales service.

9.3 Trouble shooting

FAULT	CAUSE	REMEDY
Machine does not start	Main fuses	Check, measure voltage; replace if necessary
	Main switch is not turned on	Turn on the main switch
	Air flow for mixer tool or chopper tool, FAL M205, M305	Adjustment of air supply and air flow. Check the pipes and hoses are not broken or damaged, check flow switch.
	Air pressure not sufficient	Adjustment of air pressure supply (7...10 bar necessary)
Operation is interrupted	Motor protection-has responded	Overload: Check power supply line and motor ventilation - Reduce batch size
	Main fuse has responded	Fuse rating too small (only use slow fuses); see chapter for technical data
	Air pressure not sufficient	Adjustment of air pressure supply (7...10 bar necessary)
	Outlet does not open or close	Lid protection, close the lid Outlet protection, close the outlet and lid -outlet housing handle - close the handle of the outlet housing completely
	(dried) product remains on the piston sealing	Clean outlet and change stripper if necessary, see spare parts list
	Product remaining on piston sealing	Remove product and clean the outlet
	Air flow for mixer tool or chopper tool, FAL M205	Adjustment of air supply and air flow. Check the pipes and hoses are not broken or damaged, check flow switch.
Tool touches container bottom	Tool not mounted correctly	Mount tool correctly

10 Version administration

Version	Reason of change	Date	Author
Draft		21.05.07	Schmit

The indicated positions with quantity (Quant) = 0 mean assembley groups.

The following positions until the next positions starting quantity (Quant) = 0 mean spare parts of this preceding assmembley group.

Assembley group/ Product: 1-384-003-EL Drawing:
Designation : Universal Mixer

Drawingpos.	Amt	Quant	Designation	Subject no.	Drawing	Product
	0	St	Direktantrieb	3-209-281-007		
7	1	St	Welle	6-6756	3-209-281-007	3-209-281-007
	0	St	Gasket	3-384-204-001		
3	1	St	Sealing disk	6-6753	3-384-204-001	3-384-204-001
5	1	St	Rotary shaft seal	8-119880	3-384-204-001	3-384-204-001
6	1	St	Cover hood	6-06-1124	3-384-204-001	3-384-204-001
7	1	St	STRIPPER	8-119504	3-384-204-001	3-384-204-001
10	1	St	SEALING RING	8-117991	3-384-204-001	3-384-204-001
12	1	St	SEALING RING	8-118070	3-384-204-001	3-384-204-001
13	1	St	SELF-CLOSING VALVE	8-103160	3-384-204-001	3-384-204-001
21	1	St	Sleeve	6-6740	3-384-204-001	3-384-204-001
23	1	St	Sealing ring	8-117805	3-384-204-001	3-384-204-001
	0	St	chopper bearing	3-209-212-005		
4	1	St	Dichtbuchse	6-5605	3-209-212-005	3-209-212-005
8	1	St	coupling housing	6-380588	3-209-212-005	3-209-212-005
21	1	St	SEALING RING	8-117788	3-209-212-005	3-209-212-005
22	1	St	SEALING RING	8-117918	3-209-212-005	3-209-212-005
26	2	St	Rotary shaft seal	8-121463	3-209-212-005	3-209-212-005

The indicated positions with quantity (Quant) = 0 mean assembley groups.

The following positions until the next positions starting quantity (Quant) = 0 mean spare parts of this preceding assmembley group.

Assembley group/ Product:1-384-003-EL
Designation : Universal Mixer Drawing:

Drawingpos.	Amt	Quant	Designation	Subject no.	Drawing	Product
27	1	St	Shaft protection	8-147959	3-209-212-005	3-209-212-005
28	2	St	sealing ring	8-117885	3-209-212-005	3-209-212-005
29	2	St	deep groove ball	8-134956	3-209-212-005	3-209-212-005
36	1	St	flexible coupling	8-136362	3-209-212-005	3-209-212-005
	0	St	flexible coupling	8-136362		
	1	St	damping	8-136400		8-136362
	0	St	Zerhackerhaube	3-384-375-001		
6	1	mm	Square cord	9-232104	3-384-375-001	3-384-375-001
	0	St	Behälter	3-384-412-002		
6	2	St	SEALING RING	8-118773	3-384-412-002	3-384-412-002
	0	St	Deckel	3-384-520-003		
2	1	mm	Square cord	9-232083	3-384-520-003	3-384-520-003
10	2	St	Sliding bearing	8-134654	3-384-520-003	3-384-520-003
20	2	St	SHOK ABSORBER,DASHP	8-0552	3-384-520-003	3-384-520-003
30	1	St	Closure Cap	8-150614	3-384-520-003	3-384-520-003
31	1	St	Clamp 1 + 1,5"	8-150554	3-384-520-003	3-384-520-003
32	1	St	Sealing ring	8-150592	3-384-520-003	3-384-520-003
46	2	St	Sealing ring	8-117704	3-384-520-003	3-384-520-003

The indicated positions with quantity (Quant) = 0 mean assembley groups.

The following positions until the next positions starting quantity (Quant) = 0 mean spare parts of this preceding assmembley group.

Assembley group/ Product:1-384-003-EL Drawing:
Designation : Universal Mixer

Drawingpos.	Amt	Quant	Designation	Subject no.	Drawing	Product
49	2	St	Ball knob	8-116697	3-384-520-003	3-384-520-003
51	1	mm	Square cord	9-232083	3-384-520-003	3-384-520-003
54	1	St	Star grip	8-116835	3-384-520-003	3-384-520-003
100	2	St	End cap	8-6307	3-384-520-003	3-384-520-003
	0	St	degasing filter TCDN125	3-239-861-006		
006	1	St	filter hose	8-0318	3-239-861-006	3-239-861-006
007	1	St	SEALING RING	8-04-1117	3-239-861-006	3-239-861-006
008	1	St	ring	8-3773	3-239-861-006	3-239-861-006
	0	St	Deckelsicherung	3-385-581-001		
16	1	St	Star grip	8-116835	3-385-581-001	3-385-581-001
20	1	St	limit switch	8-03-0905	3-385-581-001	3-385-581-001
	0	St	outlet	3-209-615-007		
011	1	St	Disk	6-356381	3-209-615-004	3-209-615-007
021	1	St	STRIPPER	8-119472	3-209-615-004	3-209-615-007
023	1	mm	Square cord	9-232083	3-209-615-004	3-209-615-007
024	1	St	Sealing ring	8-117913	3-209-615-004	3-209-615-007
029	2	St	Ball knob	8-116796	3-209-615-004	3-209-615-007
030	15	St	Spring washer,	8-111525	3-209-615-004	3-209-615-007

The indicated positions with quantity (Quant) = 0 mean assembley groups.

The following positions until the next positions starting quantity (Quant) = 0 mean spare parts of this preceding assmembley group.

Assembley group/ Product:1-384-003-EL Drawing:
Designation : Universal Mixer

Drawingpos.	Amt	Quant	Designation	Subject no.	Drawing	Product
031	1	St	Sealing ring	8-117748	3-209-615-004	3-209-615-007
032	1	St	PRESSURE SPRING	8-143570	3-209-615-004	3-209-615-007
033	1	St	Star grip	8-116839	3-209-615-004	3-209-615-007
035	3	St	Sliding bearing	8-134654	3-209-615-004	3-209-615-007
036	1	St	Sealing ring	8-117761	3-209-615-004	3-209-615-007
039	1	St	limit switch	8-03-0905	3-209-615-004	3-209-615-007
043	1	St	SEALING RING	8-117813	3-209-615-004	3-209-615-007
	0	St	Schaltschrank EExp V100	3-384-773-003-04		
	1	St	Circuit breaker 1p	8FABB105-1		3-384-773-003-04
	2	St	thermistor protection	8FABB950-1		3-384-773-003-04
	1	St	RELEASE DEVICE	8FABB951		3-384-773-003-04
	1	St	Exi-switch amplifier	8FPHO923		3-384-773-003-04
	3	St	LAMP-SOCKET	8H3SIE007		3-384-773-003-04
	1	St	SAFETY LOCK	8SSTA212		3-384-773-003-04
	1	St	Ex-time relay	8UPHO916		3-384-773-003-04
	0	St	Pneumatic	3-384-882-003		
PIC-M882A	1	St	Filter regulating valve	8-3838	3-384-882-003	3-384-882-003
	0	St	Filter regulating valve	8-3838		

The indicated positions with quantity (Quant) = 0 mean assembley groups.

The following positions until the next positions starting quantity (Quant) = 0 mean spare parts of this preceding assmembley group.

Assembley group/ Product:1-384-003-EL Drawing:
Designation : Universal Mixer

Drawingpos.	Amt	Quant	Designation	Subject no.	Drawing	Product
	1	St	Filter cartridge	8-2992		8-3838
	0	St	Pneumatic	3-384-882-003		
PIC-M882B	1	St	Pressure control valve	8-3754	3-384-882-003	3-384-882-003
V-M205	1	St	3/2 WAY VALVE	8-04-0063	3-384-882-003	3-384-882-003
PAL-M882	1	St	Pressure switch	8-155221	3-384-882-003	3-384-882-003
PIC-M205A	1	St	Pressure control valve	8-3754	3-384-882-003	3-384-882-003
FAL-M205	1	St	Flow meter	8-04-0337	3-384-882-003	3-384-882-003
V-M205A	1	St	3/2 WAY VALVE	8-04-0063	3-384-882-003	3-384-882-003
V-M205B	1	St	Throttle check valve	8-131110	3-384-882-003	3-384-882-003
V-M205C	1	St	Throttle check valve	8-131110	3-384-882-003	3-384-882-003
FAL-M305	1	St	Flow meter	8-04-0337	3-384-882-003	3-384-882-003
V-M305A	1	St	3/2 WAY VALVE	8-04-0063	3-384-882-003	3-384-882-003
V-M305B	1	St	Throttle check valve	8-131110	3-384-882-003	3-384-882-003
V-M305C	1	St	Throttle check valve	8-131110	3-384-882-003	3-384-882-003
1001	3	St	SOLENOID COIL	8-03-0673	3-384-882-003	3-384-882-003
	0	St	Dosierberohrung	3-384-832-001		
1	1	m	hose MFA 3/4"	9-06-0075	3-384-832-001	3-384-832-001
4	1	St	SEALING RING	8-04-0805	3-384-832-001	3-384-832-001

The indicated positions with quantity (Quant) = 0 mean assembley groups.

The following positions until the next positions starting quantity (Quant) = 0 mean spare parts of this preceding assmembley group.

Assembley group/ Product:I-384-003-EL Drawing:
Designation : Universal Mixer

Drawingpos.	Amt	Quant	Designation	Subject no.	Drawing	Product
6	1	St	disk valve	8-6605	3-384-832-001	3-384-832-001
7	2	St	pipe connection	8-06-0388	3-384-832-001	3-384-832-001
9	6	St	sealing ring 3/4 inch	8-150594	3-384-832-001	3-384-832-001
15	1	St	Hollow Cone Nozzle	8-0776	3-384-832-001	3-384-832-001
16	1	St	Hollow cone nozzles	8-04-0443	3-384-832-001	3-384-832-001
	1	St	Hollow cone nozzles	8-04-0445	3-384-832-001	3-384-832-001