PROCESSING





General

Aim: To demonstrate structure and purpose of the Operating Manual and to instruct the operator on its use.



Figure 0-1 MZ 190

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1. Overview / Operating Manual and Documentation

The Operating Manual is arranged in chapters and may contain several folders.

Part 1 Operating Manual

- 1 Description of the Machine
- 2 Safety Regulations
- 3 Structure and Functions
- 4 Operating Modes and Controls
- 5 Commissioning
- 6 Operating
- 7 Maintenance
- 8 Repairs
- 9 Recycling
- 10 Transport

Part 2 Components

- 1 Parts Lists
- 2 Drawings
- 3 Vacuum System
- 4 Sealing Liquid Unit, Mechanical Seal
- 5 CIP-Cleaning, Conveying Pump
- 6 Instrumentation, Fittings, Pneumatic, Compressed Air
- 7 Heating-/Cooling Units, Vessel and Piping, Blending Vessel and Mixer
- 8 Drives and Gears
- 9 Components in the Switchgear
- 10 Certificates

Detailed table of contents will be found in the pretitle sequence of each part.



2. Purpose of the FrymaKoruma Operating Manual

These operating manuals serve to explain how to use the machine as stipulated and safely. All persons who may be involved in operating, maintaining or repairing the machine must be familiar with its functions, system parts and particular features, in order to,

- Operate the machine safely,
- Avoid personal injury,
- Avoid damaging the system or the environment,
- Achieve high quality of products and efficiency.

In order to avoid accidents and damage, every operator of the machine must read and observe these manuals.

Always refer to the operating manuals before performing new or unfamiliar actions on the machine. If you are uncertain that you can work and perform operations on the machine safely and in the correct way, we recommend that you contact the FrymaKoruma customer service.

Target group

These operating manuals are intended for all persons, who may operate, maintain or service the machine, who must be familiar with its functions, system parts and particular features. FrymaKoruma offers training courses for system operators on the premises of the customer or manufacturer.

Storing the operating manual

Operators must always have access to the operating manuals. The operating manuals must therefore be kept with the machine or close to it. This also applies to operators who only occasionally use the unit, for example maintenance personnel.

Assessment of the operating manual by the user

FrymaKoruma has attempted to make these operating manuals user-friendly and comprehensible. Should you find anything incomprehensible or find any mistakes in this document despite our efforts, please let the FrymaKoruma customer service know.

We appreciate all information which helps us to improve these operating manuals.



3. Product Identification / Name Plate

There is a name plate on the machine, showing the **type designation** and the **serial number**. This information serves for proper identification of the machine. The type designation is also displayed on the bottom line of the operating manual.

CE

CE- Sign

In the original state, the machines correspond to the requirements of the EC directives. These machines are built and tested according to the rules of technique.

CE Conformity Declaration

Without permission of FrymaKoruma, no changes or alterations to the machine or to system components are to be implemented.

For modifications of programs or of process control or the process itself, the approval of FrymaKoruma is required.

Furthermore, conformity is guaranteed only with the use of original spare parts.

4. Customer Service / After-Sales Service

Please always indicate the above mentioned **serial number** and **type** on all correspondence, enquiries, especially when ordering spare parts.

5. Manufacturer Postal Address / Customer Service / Representative

- FrymaKoruma AG
- Theodorshofweg
- 4310 Rheinfelden
- Switzerland

Phone: +41 (0)61 836 41 41 Fax: +41 (0)61 831 20 00

E-Mail: frymakoruma@romaco.com Internet: http://www.frymakoruma.com

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The copyright applies to structure and text as well as the layout.

"Translation of the Original Operating Manual"

Declaration of incorporation



Declaration of incorporation

in accordance with the EC Directive for Machinery 2006/42/EEC, Appendix II 2B

FrymaKoruma AG P.O. Box 164 CH-4310 Rheinfelden Switzerland

We hereby declare that the supplied version of

Product	: Toothed colloid mill
Туре	: MZ 190
Serial number	: 102192
Year of manufacture	: 2013
for the production of	: Chemical Product

is in accordance with the following relevant regulations:

Harmonised standards which have been applied, in particular

- DIN EN ISO 12100: 2010, Safety of machinery
- DIN EN 60204: 2006, Electrical equipment of industrial machines

Technical documentation is available. The operating manual for the components is available. Documentation responsible person: R. Allenspach, FrymaKoruma AG

"The parts of the machine may not be put into operation until the control system has been completed, installed and connected to the shipment mentioned above and all requirements of the EC Machinery Directive have been fulfilled."

Rheinfelden, 25.01.2013

Director Product and Technology FrymaKoruma AG Thomas Merle

Einbauerklärung-e

Spare parts

□ Inquiry No.



□ Order No..

Customer	Invoice Address:	
VAT no.		
Delivery		
Address:		
	Your reference	
	Phone no.	

Machine

Typ of machine	Serial No.	Year of construction

Specification of spare parts

Part no.	Quant.	Drawing/Pos. No.	Description

FrymaKoruma AG, CH-4310 Rheinfelden Fax: +41 61 836 41 69



Technical Data, Equipment Data Sheets, Layout Plan, P + I Diagram	
Safety Regulations Risk and Hazards, General Safety Recommendations Qualification and Requirements to the Staff	
Structure and Functions Principle / Description of the Machine and Main Process Functions of individual Units and Parts	
Operating Modes and Controls Controls for Operating and Primary Set-up, Operating Modes	
Commissioning Instruction for Assembly and Primary Set-up Wiring Diagram	
Operation Operating and Possibilities. Data Input / Run of Programs / Trouble Shooting, Operating Instructions of the Operating Panel	
Maintenance Service Plan, Supplies and Accessories Service Operations, Cleaning	
Repairs Recognising of Troubles, Judging and Trouble Shooting Instruction of Repairs	
Recycling	



1 Description of the Machine

Objective: To give the user basic information about the machine and its order-specific application.

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1.1 Introduction

Machine design

Toothed colloid mills are used mainly for the wet grinding of liquid to highly viscous suspensions. Dependent on the application, the mills are either in vertical or horizontal design.



The gap between the rotor and stator was set in the factory. To enable adjusting the grinding gap of the grinding unit to suit the application in hand, spacers can be used to make a fixed adjustment. As an option, a stepless adjustment system that uses a thread is available to permit manual or automatic adjustment of the grinding gap.

The different colloid grinding sets permit optimum adaptation to the product being processed. The standard grinding set is universal in use. The coarse-toothed grinding set is ideal for grinding coarse solids in suspensions, whereas the cross-toothed grinding set brings a higher grinding and dispersion effect.

The feed product is fed either via a hopper or with the aid of a pump.



1.1.1 Order-specific application

It is not permitted to use the machine contrary to the order-specific application!

- The order-specific application is stipulated in the order confirmation.
- The order-specific application is the production of emulsions, dispersions or suspensions, whereby the design parameters of the machine must be adhered to (i.e. the limit values regarding pressure, temperature and filling level, the current loading value for processing units and the product viscosity).
- The materials used for the process and for cleaning must be compatible with the construction materials of the machine and its components.
- The machine may only be used with the software programs delivered by FrymaKoruma and for the order-specific processes.

The prior written consent of FrymaKoruma is required for all applications that are not specified here.

1.1.2 Non-order-specific application

An application that is not contractually agreed upon or whose scope exceeds the application(s) named here is considered a non-order-specific application.

Danger! It is not permitted:



to process or use materials that are reactive, flammable or explosive, or which could form such mixtures in use; This also includes the use of detergents.

Notice: In the case of machines with no explosion protection, the electric circuits and units are not designed for operation with such materials.



to process or use materials that are harmful or toxic and which could escape from the machine into the atmosphere;



to process or use materials that release harmful or toxic substances during processing which are detrimental to health or could damage the

Notice: The machine has no devices which prevent the release of such substances.

Warning against an incorrect, non-order-specific application!

Notice: Besides uncontrollable reactions which under unfavourable circumstances could cause serious personal injury, damage to the machine is also possible, e.g. machine overload or the fracture of stressbearing components, damage to sliding ring seals, homogeniser and pumps, etc.

environment (e.g. lead, chlorine, mercury, tin, zinc).



Conscious misuse

The machine must never be subjected to the following situations in operation:

• where the permissible limit pressure value is exceeded;

Exceeding the permissible operating pressure limit values can lead to damage.

- where the permissible filling level is exceeded;
- where chemical reactions are performed which lead to the permissible temperature and pressure limit values being exceeded;
- where the intermediate and end products of chemical reactions cause damage to the construction materials (elastomers, plastics or metals);
- where the specified process limit values*, i.e. temperature, pressure and filling level, are not adhered to.

* The user is responsible for monitoring the process parameters and limit values. The standard machine design is not equipped with redundant components which trigger an automatic emergency shut-down in the event of technical malfunctions. If the lack of redundant components leads to impermissible risks in operation, the user is responsible for taking suitable measures to eliminate these risks.



1.1.3 Safety measures



If using wax, grease or similar substances, make sure that the respective flash or ignition point is not exceeded.

The user is responsible for monitoring the process temperature. The standard machine design is not equipped with redundant components which trigger an automatic emergency shut-down in the event of technical malfunctions. If the lack of redundant components leads to impermissible risks in operation, the user is charged with taking suitable measures to eliminate these risks.

• Safety data sheets must be available for every material processed or used.

Hazards

The hazard plan in Section 2.5.2 lists permanent or unexpected hazards.

Product purity



The product components processed in the machine must not contain any tramp material. Any tramp material must be removed or restrained by suitable means (e.g. filter, visual control, etc.) before it enters the machine.

Notice: Dependent on the nature of the tramp material or material particles that penetrate the machine, they are ground to end-product fineness in the homogeniser. Metallic particles or stones, etc. can damage the processing units or the fittings.

Machine operation:

Control panel at the machine, control cabinet with EMERGENCY-STOP.

1.1.4 Conformity with respect to safety

The machine conforms with the safety requirements of machines and systems as laid down in:

RL 98/37/EC	"Machines"
RL 89/391/EEC	"Improving safety and health protection"
RL 89/655/EEC	"Using machinery and plant"
EN 292-1	"Design guidelines for machines"

Electric safety

EN 60204 / 1007	"Electric equipment of industrial systems"
	Electric equipment of industrial systems
CEI/IEC 204-1:	
IEC 801-4	"The resistance of electric components against interference"



1.2 Technical specifications

1.2.1 Performance features

The data sheets are appended to the end of this Section.

1.2.2 Energy supply and infrastructure

Notice: The following energy and operating materials must be available in the specified amount and quality to ensure optimum machine operation.



Electrics

The electric data as well as the associated directives are given in Section 5.

Infrastructure / operating media

The appended P+I schematic contains details of the necessary media such as cooling water and hot water or steam, CIP water, and compressed air.



Water

To ensure personal hygiene and also the cleanliness of the process, both cold and hot running water should be available at the site of operation.



Hot water and cooling water, steam

Water quality*: To ensure optimum performance, we recommend the following: The electric conductivity should not exceed max. 500 μ S/cm. This will prevent electrolytic and normal corrosion.

The **pH-value** must be kept neutral, i.e. between **7.5 and 8**. To prevent calcium precipitation, the **water hardness** should be < 6° dH. (1° dH =17.8 ppm CaCO₃)

* The water used must be free from dirt and solid particles.



Compressed air

Compressed air is used for the pneumatic drives of the valves. Refer to the instructions of the compressed air supplier for details.

Control air

Control air is used for the pneumatic logical elements. It has a lower dew point and higher purity than compressed air.



Lubricating oils and greases

The lubricant table in Section 7 contains a list of suitable lubricants for the machine. Part 2 of the supplier documentation contains details of suitable lubricants for the non-Fryma components (gearboxes, motors, etc.).



1.2.3 Machine connections and interfaces

Refer to the installation drawing for details of the interfaces, connections and their dimensions, and to the relevant data sheet for details of quantities, temperatures and pressures.

1.2.4 Environment

This table must be filled out by the user in accordance with the information given in Section 2.4.1.

SPECIAL DANGERS	WHERE/WHAT	MEASURE	DOCUMENT
- Flammable materials	-	-	
- Explosive materials	-	-	
Harmful substances			
- Chem./biolog. effect	-		
- Dust	-		
 Asphyxiating gases 	-		
Protection against water and unintentional contact	entire system	motors IP 54	
- Explosion protection (motors)			
- Control cabinet			
- Control and power circuit			

Ambient temperature and air humidity

It should be possible to keep the **ambient temperature** between 18°C and 27°C at a **relative humidity** of less than 70%

With respect to the height above sea level, the **cooling system of the control cabinets** is laid out for an average ambient temperature of **max. 30° Celsius**.

Illumination

The average illumination intensity in the working area should be approx. 600 Lux/m².

1.3 Equipment

1.3.1 Accessories

1 set of tools

1.3.2 Extras

Extras as detailed in the order confirmation.

DATENBLATT 1 DATA SHEET 1 FEUILLE DES DONNEES 1



MASCHINE	MACHINE	MACHINE	MZ 190
Seriennummer	Serial number	Numéro seriel	102192
Baujahr	Year of construction	Année de construction	2013
Lärmemission	Noise level	Emission de sonore	76 dB(A)
Gewicht (Netto)	Weight (net)	Poids (net)	530 kg
Max. Betriebstemperatur	Max. operating temperature	Température max. de service	80°C
ELEKTRISCH	ELECTRICAL	ELECTRIQUES	
Betriebsspannung	Incoming supply	tension d'alimentation	400 V
Steuerspannung	Control voltage	tension de commande	V DC
Phasen	phases	phases	3
Frequenz	frequency	fréquence	50 Hz
Schutzart	Protection class	degré de protection	IP 55
WERKSTOFFE	MATERIAL	MATÉRIAUX	
Produktberührende Teile	Product-contacting parts	Partie en contact avec produit	1.4435/AISI 316L
Mahlelemente	Grinding element	éléments de broyage	1.4435/AISI 316L
Elastomere	Elastomere	Elastomères	FPM/FKM
ZULÄSSIGE ÜBERDRÜCKE	PERMISSIBLE PRESSURES	SURPRESSIONS ADMISSIBLES	
Produkt Einlass	Product inlet	Produit entre	6 bar
Produkt Auslass	Product outlet	Sortie de produit	6 bar
Doppelmantel	Double jacket	Double paroi	- bar
ANTRIEBSMOTOR	DRIVING MOTOR	MOTEUR D'ENTRAÎNEMENT	
Motor	Motor	Moteur	EMWB
Тур	Туре	Туре	RF225M-2MKF
Leistung	Power	Puissance	45 kW
Drehzahl	Speed	Vitesse	2955 min-1



2 Safety Regulations

Objective: To inform the user about the residual risks and dangers in using the system and to indicate generally valid safety measures.

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2.1 Layout

The level of danger resulting from a situation or action will be displayed with **signal words**.

DANGER	WARNING	CAUTION	NOTICE*	
Immediate threats Which can lead to grievous bodily harm or death.	Possible dangerous situation which could lead to serious injury or death.	Possible dangerous situation which could lead to slight bodily injuries. Also used to warn about property damages.	Possible critical or dangerous situation whereby the product or property could be damaged.	SIGNAL WORD
	HAZA	RD		RISK
Dangerous voltage	Risk of scalding	Hot surface		OM PLANT
Jamming	Squeezing	Do not switch on		HAZARD FR
Explosive material	Flammable material	No source of ignition	Wear gloves	M PROCESS DDUCT
Danger of suffocation	Poisonous/caustic	Wear protection mask	Wear safety goggles	HAZARD FRO

*"IMPORTANT" Operational messages for and other useful information, but not intended to warn of dangerous or critical situations.

Note: DANGER, WARNING, CAUTION, NOTICE are within the United States of America mandatory signal words.



2.2 Fundamentals

The machine complies with the state of the art and the officially recognised safety directives.

In spite of this, the following must be observed if risks are to be prevented:

- Install the machine in a correct and proper manner.
- Allow only skilled and authorised persons to operate the machine.
- Do not use the machine for any application other than that detailed in the order-specific application. This is featured in Section 1.1 of this operating manual.
- Keep the machine in perfect condition (maintenance as per instructions, do not make any impermissible modifications).
- Operate the machine in accordance with the instructions in this operating manual.
- The operator and external personnel must observe the warning notices.

2.3 General information

Warning signals - ALARMS



The standard version is not equipped with alarms. The motors or units equipped with temperature protection or an overload circuit breaker shut down in the event of an overload.

EMERGENCY-STOP functions and shut-down procedures

The **EMERGENCY-STOP** actuator serves to switch off the machine instantly and is accessible to everybody.



2.4 Organisational measures / personnel issues

2.4.1 User's obligations

The user is responsible for ensuring that the operators are conversant with the following safety instructions and that they are available for reference at all times:

- regulations on the handling of materials and substances* used for the process and for cleaning;
- first-aid measures to be carried out in the event of accidents with chemical substances or those involving electricity;
- the use of personal safety equipment.



* Note: This operating manual cannot make allowances for <u>hazardous substances employed by the user</u>. In many cases, these are not even known to FrymaKoruma (e.g. trade secrets).

In accordance with the industrial safety directive 89/391 EEC, the user must:

- undertake measures towards recognising and preventing hazards (risk analysis, risk prevention, especially occupational risks);
- provide all staff with relevant information and instruction.

In accordance with the 89/655 EEC directive governing the use of plant and equipment, the user is charged with the following:

- The employees must be made aware of any risks that might affect them during their work and also be made aware of the safety equipment available to them.
- If the user employs hazardous machines or materials, he must always prepare relevant operating instructions!



2.4.2 Requirements regarding the qualifications of the user

The machine may only be operated by skilled and qualified personnel. Should training be required, contact FrymaKoruma's customer service department for advice in this respect.

User profile/qualifications and permitted activities to do with the machine

The users of the machine should be qualified in accordance with the following examples:

Party responsible for the machine / plant manager

Responsible for the entire process and for ensuring that only permitted products and safe process parameters based on the machine specification and material safety data sheets are used. Special responsibility: Responsible for implementation of the 89/655 EEC directive governing the use of plant and equipment and also for instructing all machine users in issues of safety, in the prevention of risks and in the undertaking of safety measures.

Operator

Responsible for the correct use and operation of the machine and for preparation of the product recipes. The operator is conversant with starting up and shutting down the machine, with monitoring the process and with dealing with malfunctions and faults in the process sequence such that the safety is not compromised. Machine maintenance.

Servicing personnel (specialists)

Tasks: Performance of permitted servicing procedures.

2.5 Additional risks

Additional risks can be posed by the use of special operating materials, outside supplies, and accessories that are neither approved nor have been checked.

2.5.1 Transport



The instructions given in Section 10 must be observed during machine transport and installation.





General safety measures

Always wear personal safety clothing and equipment during operation!







2.5.3 Maintenance hazards / warning notices



General safety measures

Always wear personal safety clothing and equipment during operation!







3 Structure and Function

Objective: To inform the user about the design and principle of operation of the machine.

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3.1 Introduction

3.1.1 **Principle of operation**

The FrymaKoruma toothed colloid mill unites the principles of impact, cutting and attrition grinding.

The feed material is subjected to high shear and frictional forces between two toothed surfaces, one of which rotates at high speed. Besides these shear and frictional forces, the special toothing generates high-frequency oscillations. These oscillations exercise tensile and compression forces on the product particles, which causes the particles to burst and break up. The intensive turbulence in the grinding gap and the associated impact effect contribute to the high grinding and mixing effect of the machine.



Besides this fine grinding effect, the mill also effects a high degree of homogenisation, dispersion and emulsion as a function of the special toothing design.

The machine is extremely robust and basically comprises the drive motor in the form of a machine base, and the housing with grinding gap adjustment system and grinding set. All components are easy to exchange and clean. The stator of the standard version is formed by between 1 and 3 internally toothed steel rings. The rotor, which has a preliminary grinding and feed step, runs inside the stator at 3000 rpm and 50 Hz. The grinding gap can be set precisely by axially adjusting the stator or rotor.

The desired end-product fineness can be set by selecting a suitable toothing design as well as the size of the grinding gap.

The machine is a continuous-mode machine which displays a considerable pumping action, and can either be fed direct via the hopper as an open system or be integrated into a closed-circuit pipeline system.

Years of experience and testing have led to the development of standard, coarse and crosstoothing designs, meaning that dependent on the product, the optimum grinding, homogenising, dispersing or emulsifying effect is always guaranteed as a function of the selected toothing design.

The grinding sets are made of either hardened and wear-resistant chromium steel or rust- and acid-proof nickel-chromium steel. Because chromium steel is only rust-proof to a limited extent, corrosion (especially in the grooves) can occur to these grinding sets. In this case, it is good policy to clean and dry the grinding set daily, applying a light coat of grease if necessary.



3.2 Design

The Mill product line includes a number of different machine types that are applied to suit the process specification in hand. In the case of grinding and wet grinding, a choice can be made between the MZ toothed colloid mill, the MK corundum stone mill, and the ML perforated disc mill. The MZM toothed ring machine is available for emulsifying tasks.

The machines are in modular design so that, dependent on the machine size, the dispersing and grinding units are interchangeable.

In this way, can be converted into a toothed colloid mill, a corundum stone mill, or even a perforated disc mill.

3.2.1 Modules

Dependent on the product properties, the homogeniser can be equipped with special rotor and stator elements (processing elements) that are tailored to the individual product. This conversion or rather adaptation can be carried out by the customer's own personnel.





3.2.2 Electrical connection

First compare the Mill's voltage with your operational current.

The system must be connected up by a qualified electrician in accordance with the respective standards (EN...).



If the machine is in explosion-protected design, the control cabinet must be installed outside of the "Ex" zone.

In this case, the wiring between the control cabinet and the control panel must be carried out on site by the customer.

Assembly of the on-site control cabinet must meet the requirements of an "Ex" acceptance.



The earthing cables must also be connected up.

After the electrical connection has been carried out, the rotational direction of the driving motor of the mill and the feed pump must be checked (see arrows).



3.3 Function description

3.3.1 Product feed

Products can be fed via supply lines, hoppers, and pumps.

3.3.2 Product feed and circulation

Assuming that it is switched on, the product circulates through the homogeniser.

3.3.3 Product discharge

The product is emptied out of the machine via the product discharge. The pumping action of the homogeniser is utilised to accomplish this.

3.3.4 Cleaning

Great attention was paid to quick and easy cleaning. The machine was built with a minimum of dead zones to GMP standards and is furthermore equipped for CIP procedures. All parts which come into contact with the product are easily accessible for inspection and can either be easily removed or accessed for cleaning. Grooves, dead zones and recesses where product residues could accumulate were avoided wherever possible. This makes it possible to clean the machine using CIP procedures.

3.4 Safety equipment

The process takes place in an enclosed housing. Because of this, the possibility of personal injury during operation is small. Prerequisites for this are that the instructions in this operating manual are adhered to and that safety equipment, guards and covers, etc. are left in their original condition.



4 Controls and Indicators

Objective: To familiarise the user with all those elements needed for professional operation and for first commissioning. This familiarisation is the prerequisite for commissioning (Section 5) and operating (Section 6) the machine.

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4.1 Introduction

Although the machine offers several possibilities of influencing the process, there are only a few controls at the machine itself.

4.2 Warning signals and safety elements

4.2.1 Alarms



The standard machine version has no alarms.

Note: Visual (signal lamps) and acoustic alarms (hooter) do not form part of the standard delivery scope.

4.2.2 Safety switch

The security switch prevents starting of the dismantled machine.



4.3 Controls

4.3.1 Controls at the control cabinet/operating panel (option)



EMERGENCY-STOP

Pressing the EMERGENCY-STOP actuator instantly interrupts the power supply to all consumers.

Note: The EMERGENCY-STOP actuator remains in this position until it is reset (to this end, turn the mushroom head).

4.3.2 Controls in electric control cabinet (option)



SECURE the master switch AGAINST RESTARTING

When this warning notice appears in the operating manual, the machine must be switched off and secured against unauthorised restarting before any procedures can be carried out.

To this end:

- Switch off the master switch.
- Slide the switch guard on the handle until the perforated plate is exposed.
- Lock the master switch with a personal safety padlock.

The safety lock can accommodate up to 4 separate padlocks, thus providing individual protection for up to 4 persons.

Except for the case of malfunctions and faults (safety cut-outs), the control cabinet contains no operating elements.

Dependent on the scope of delivery, the control cabinet contains:

- Fuses and safety cut-outs, connection terminals
- Frequency converter for the homogeniser
- Heating controller
- Master switch

FrymaKoruma Operating Manual Controls and Indicators



The electrotechnical documentation in Section 5 contains details of the contents of the electric control cabinet.





4.3.3 Controls for adjusting the grinding gap

One revolution of the hand-wheel corresponds to an actual grinding gap regulation of 87 my. A dividing line on the scale corresponds to a grinding gap regulation of 150 my. Rotation of the handwheel in an anti-clockwise direction decreases the grinding gap; rotation in a clockwise direction increases it.

Subsequent to the grinding gap regulation, the handwheel is fixed by tightening the holding handle.



4.3.4 Mechanical seals controls

4.3.4.1 Single-acting mechanical seals

The single-acting mechanical consists of a simple mechanical seals enclosed in a housing. The installed mechanical seal can be used for dry running.



4.3.4.2 Double-acting mechanical seal (Option)

Function

The double-acting mechanical seal consists of a combination of two simple mechanical seals enclosed in a housing. Sealing liquid circulates inside this housing, that prevents the product penetrating the seal and simultaneously serves to cool the seal.

As the possibility of a slight leak cannot be entirely excluded, even when a double-acting sliding ring seal is installed (due to worn sliding rings or great difference in pressure), the sealing liquid must be compatible with the product. The sealing liquid may not be aggressive and its boiling point should be higher than 60°C. Water, oil and glycerine are commonly used as sealing liquid.

Standard scope of delivery

The filter sieve with shut-off valve a pressure gauge and a manual regulating valve.

Option



A pressure detector in conjunction with a motor protection switch checks the sealing pressure and stops the machine in a controlled manner before it runs dry.

Connecting the sealing/cooling liquid systems

Normal tap-water can be used as sealing and cooling liquid. When using tap-water, we advise you to fit a pressure reduction valve to balance pressure fluctuations in the circuit, thus protecting the seal.

The pressure of the sealing/cooling liquid must be 0,5 to 1 bar higher than pressure in the product zone and can be adapted by a regulating valve.



The sealing/cooling liquid flows at a set rate via the valve to prevent it rising above 60°C (Max. limit 70°C).

The flow rate should be about 1 - 4 l/min.





We advise you to install a pressure detector to prevent the gear being switched on without pressure of the sealing/cooling liquid. The pressure detector controls a contactor and only allows the gear to be switched on when there is a sufficient sealing pressure. If the sealing pressure drops below a certain level, the gear is immediately switched off to prevent the seal running dry.



The pressure detector is to be connected as per the manufacturer's instructions (refer here to the section for alien parts).



The filter sieve must be removed from time to time and cleaned. The length of the intervals depends largely on the field of application and must be determined by the user.



Possible kinds of connection see in the part 2 under drawings



4.3.5 Sealing liquid unit controls (option)

The sealing liquid unit is generally located next to the machine. The vessel contains the sealing liquid, the level of which is monitored by a level controller. The sealing liquid circulates automatically. Compressed air regulated by means of a pressure reduction valve (3) is fed into the vessel containing the sealing liquid.







Sealing liquid unit

- 1 Safety valve
- 2 Relief valve comp. gas
- 3 Control valve comp. gas
- 4 Manometer sealing liquid vessel
- 5 Level controller sealing liquid
- 6 Inspection glass sealing liquid level
- 7 Flowmeter sealing liquid
- $8 \, \text{Control valve} \text{cooling water} \\$
- 9 Emptying sealing liquid
- 10 Topping up sealing liquid


4.3.6 Exprotection



The flow detector has to be connected for safety reasons, so that a back draft can be prevented, which may lead to a overheating. It also ensures that there is no hollow space with explosive gas.





The flow of the sealing liquid through the mechanical seal has to be checked with a flow detector, so that here also no explosive gas can be produced.



If there are intermediate bearings they have to be greased via the lubricating nipple and checked for increased temperatures.



5 Commissioning

Objective: To inform the authorised user about commissioning in a professional manner.

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5.1 Introduction

In as far as agreed, skilled and experienced FrymaKoruma staff is available to install and commission the machine. The customer should always make use of this option if the requirements listed in Section 5.1.2 are not fulfilled. FrymaKoruma is not responsible for any damage caused by errors during commissioning.

5.1.1 Safety regulations

Pay attention to the safety regulations in Section 2.

Hazards caused by unprofessional installation

Any **electrical equipment** provided by the customer must meet the requirements stipulated in **EN** 60204-1/ IEC 204-1.

Any electrical equipment provided by the customer must meet the requirements stipulated in EN 60204-1/ IEC 204-1.

5.1.2 Personnel requirements

This section of the operating manual is directed at all those persons charged with or involved in the installation and first commissioning of the machine.

Every commissioning phase must be supervised by someone who has the requisite experience in installing and commissioning processing systems and machines. The associated procedures are to be carried out by skilled and qualified personnel.

5.1.3 Technical documentation

The machine is set up in accordance with:

- Installation drawing
- Wiring diagram



5.2 Installation

5.2.1 Prerequisites

Important: The machine cannot be operated without

• the electric energy and supplies listed in Section 1.2.2 of this operating manual.

5.2.2 Transport

Incoming goods inspection

Every delivery must be checked for transport damage immediately upon arrival. The number of packing units must also be checked against the delivery note. Any obvious damage or missing packing units must be reported to FrymaKoruma without delay.

Storage

Until its assembly and installation, store the machine such that it is protected against the weather, whereby the required ambient conditions as per Section 1.2.4 must be observed.

5.2.3 Site of installation

Transport mass and weight

Refer to the system dimension sheet and to the technical specifications in Section 1.2.1.

Site requirements

Floor: The floor at the site of installation must be completely even and free from irregularities, differences in level, and grooves that could pose a safety hazard. Floor coverings that are easy to clean are recommended. The ceilings, walls and floors must be clean and free from dust deposits.

Illumination

Average illumination intensity at site of installation: 600 Lux.

5.2.4 Handling, unpacking and cleaning

Transport and handling of the machine and components

Danger!



Pay attention to the information on transport stabilisation and the use of lifting units in Section 10.



5.3 Assembly

5.3.1 Interfaces between delivery and assembly

FrymaKoruma's delivery scope

FrymaKoruma delivers and assembles the components in accordance with the order confirmation. FrymaKoruma installs and tests the machine, which is usually delivered ready for connection. Dependent on the manner of transport and the destination, it may be necessary to remove individual components for transport. These must be replaced prior to commissioning.

On-site provisions*

The customer is charged with providing/carrying out the following:

- site of installation suitable for the machine;
- installing the components that were removed to facilitate transport;
- water supply for cooling and fresh water, hot water or steam;
- product connections;
- compressed air;
- ductings for the waste water or the dirty CIP water;
- the connection between the electrical control cabinet and the mains supply;
- the connections between the electrical control cabinet and the machine components;
- inspecting the assembly screws for tightness;

* unless otherwise agreed.



5.3.2 Installation and assembly

Assembly sequence

- Machine installation

The foundation where the machine is installed must be sound and even. Although a special foundation is generally not necessary, the foundation or floor must be capable of withstanding the load of the machine/system when full.

- Installation of removed components and connections

A list of the parts that were removed to facilitate transport is included with the shipping papers. These parts must be replaced in accordance with the drawings.

- Water supply for cooling and fresh water, hot water or steam
- Product connections
- Compressed air
- If applicable, leakage connections, e.g. for the sliding ring seal
- Ductings for the waste water or the dirty CIP water

- Media ducting and power connections

- The media connections are marked on the machine.
- The nominal diameters of the ductings should match the nominal diameters of the connections at the machine. If the ducting is long, choose a wider nominal diameter.
- The media ductings must be supported such that no impermissible loads or stresses act on the machine.
- Waste water ductings must be installed with a downwards gradient and must not be subject to any back pressure.
- Clean the ductings from tramp material or dirt before connecting to the machine.
- Wire up the electrical components.

Effect the electrical connections between the control cabinet and the machine components in accordance with the electrical wiring diagram.



- Checking the assembly screws

All assembly screws and bolts were tightened before the machine was shipped. However, because they can loosen during transport, all visible screws and bolts **must** be tightened. This applies in particular to:

- the screws used to secure the homogeniser;
- the screws at the motors, gearbox and pumps.

See Section 7.4.4.4 for details of checking the bolted connections.

5.3.3 Energy supply, resources

- Supply connections
- Cooling water, hot water, steam
- · Compressed air

Details on the **quantity and quality of the resources** are given in Section 1.2.2 "Energy supply and infrastructure".

- Mains power connection

For connecting up the electrical power supply, overcurrent circuit breakers as per EN 60204-1 must be available. Refer to the electrotechnical documentation for details. The control cabinet must be connected up to mains power by a qualified electrician.



With ex-protected designs, the control panel must be installed outside the potentially explosive area or room. In this case, the wiring between the control cabinet and the control panel must be carried out on site.

Earthing cables must also be installed.

- Rotational direction of three-phase motors

- The rotational direction must match the arrow indicating the direction of rotation.
- In view of the fact that the processing system is prewired and tested, all motors run in the correct direction if **the mains connection is executed such that the rotary field is in clockwise direction**.
- Homogeniser: motor shaft/fan in anticlockwise direction (to the left).
- Feed pump and CIP pump: see the arrow indicating the direction of rotation.

- Filling operating materials, lubricating and auxiliary materials

- Heat and cold transfer media
- Feed pump

Fill the gearbox with oil.

Pay attention to the instructions issued by the supplier.



5.4 First commissioning

During first commissioning, the machine must be inspected systematically for sources of errors that might be attributed to transport or installation procedures.

The system is generally tested by FrymaKoruma in accordance with Section 5.4.1. Because of this, not all tests need to be repeated by the customer.

In spite of this, tests 5.4.1.1 to 5.4.1.7 should be carried out at all events.

5.4.1 Measures prior to first commissioning

Default password setting*: See the operating panel manual. (*only applicable if delivery scope includes the operating panel as a special option)



Warning!

If a password is entered by an unauthorised person (user, third party), this can lead to machine damage. Personal injury is also possible.

	First commissioning checklist	YES	NO
5.4.1.1	Electrical connection		
	Check the mains voltage against the values in the wiring diagram		
	Check the function of master switch		
	Check the connection and directional rotation at the input terminals		

5.4.1.2	Safety equipment	
	Check the EMERGENCY-STOP actuator for function –	
	all electrical components must shut down instantly	
	After resetting the EMERGENCY-STOP actuator, no automatic system start-up is possible	

5.4.1.3	Connection and flow direction of media	
	Check the individual media and if OK, release one by one	
	Check each media ducting for leaks as per Section 5.4.1.6	



Function checks and controls Carry out the following checks:

5.4.1.4	Indicators / measuring equipment						
Speeds (rpm)						
Docianat	tion			Referen	ce value	Indicated value	
Designat	Designation			min.	max.	min.	max.
High-spe	High-speed machine (homogeniser) ± 5%						
Tempera	ture test points (i	n ⁰C)					
Temp. of	medium at inlet	± 2% (warm)					
Temp. of	medium at outlet	± 2% (cold)					

5.4.1.5	Leak control						
	Sealing integrity of installed shut-off components OK?	YES	NO				
	Sealing integrity of complete pipe work successfully checked						
	Sealing integrity of sliding ring seal checked in operation (visual control of leakage vessel)						

5.4.1.6	Electrical equipment				
	Measurement of current loading				
	Homogeniser				
Speed in	rpm at 50 Hz				
Current lo	Current loading (in no-load operation) A				
Current lo	Current loading with water at effective volume A				
	CIP pump				
Current lo	Current loading A				
Discharge pump					
Current lo	pading in no-load operation	А			

5.4.1.7	Novieus functions		Test OK		
	various functions	YES	NO		
Oil level of	finstalled gearboxes and hydraulic equipment OK				
Visual controls prior to start-up					



5.4.2 Commissioning

The controls listed in Section 5.4.1 must be carried out as part of first commissioning procedures.

Visual inspection: check for visible damage or leaks, etc.

• Turn the drive shafts over by hand and check for freedom of movement (no scraping or snagging). The drive shaft and gearbox bearings must not overheat.

Initial cleaning

This procedure removes commissioning residues such as lubricants and abrasives, etc. from the product chamber. Be sure to also clean the pipes and ductings during this process.

Recommended cleaning agent:

Hot water

It may be necessary to repeat the cleaning process several times to achieve the desired cleaning effect.

Activate the operating media:

- Cooling water open the shut-off valve
- Hot water/steam open the shut-off valve
- Compressed air open the shut-off valve



Caution

Always fill liquid into the product chamber before starting up! Avoid dry running!

Note: The homogeniser must never be allowed to run dry; this can cause serious damage.

5.5 Official acceptance

5.5.1 Acceptance criteria

The list of acceptance criteria forms part of the order. The acceptance procedure can take place on either FrymaKoruma's or the customer's premises.

5.5.2 Execution

An acceptance report is prepared and signed by both the purchaser and FrymaKoruma.



6 Operation

Objective: To assist the user in operating the machine as a production-scale machine. This includes safe operation, full use of the available options and cost-effective machine operation.

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6.1 Introduction

6.1.1 Safety regulations

Pay attention to the safety regulations in Section 2. The machine may only be used in the sense of its order-specific application. This section also includes additional application-specific safety instructions.



Secure (lock) the **master switch** against unauthorised switching on (see Section 8.1)

6.1.2 Personnel requirements

This section is directed at those persons who are responsible for the operation or safety of the machine.

Note: Upon request, FrymaKoruma is glad to train users in the operation and maintenance of their machines. This training is aimed at showing experienced staff all the working steps to ensure correct process management and safe operation of the machine.

6.2 Production sequence and organisation

Every company structures the operating sequence to suit its production range, structure, organisation and staff, whereby the product and process quality are documented in a suitable manner.

6.2.1 Cleaning sequence

We differentiate here between: open cleaning and enclosed or CIP (Cleaning In Place) cleaning process.

- a) Open cleaning is usually carried out manually and is always necessary for exposed surfaces, bin floors and open hoppers, etc.
- b) The enclosed or CIP process cleans the hoppers, ductings and components without them needing to be removed and cleaned manually.



The criteria governing the desired cleaning effect must be determined for every product and cleaning method!



Mechanical cleaning

Aims: To recover as much product as possible. To make sure as little product as possible pollutes the waste water.

- Wear protective overalls, gloves and goggles.
- Use a rubber or plastic scraper to remove any product residues.

Wet cleaning

- Add detergent or additives.
- Dependent on the product, heat the liquid. If expected to improve the cleaning effect, allow the machine to run.
- Drain off the liquid.

Visual inspection

Select the cleaning method to suit the type of product being processed. It may be necessary to repeat the cleaning process before the desired cleaning effect is achieved.

Cleaning new systems or cleaning after maintenance procedures

See Section 5.4.2.



6.3 Operation

6.3.1 Preliminary procedures

If applicable, install different processing elements to suit the product being processed. Refer to Section 7.4.4.3 for details of exchanging the processing elements.

6.3.2 Operating instructions

A typical operating sequence to manufacture the product includes the following steps:

- Fill the components into the machine
- Start up the processing units (pump, machine)
- Mix, homogenise, emulsify or grind the product
- Discharge the product and then switch off the machine
- Clean the system

Safety instructions



When working in the area of the open machine, always wear goggles to protect against splashes and spatter.

Caution!



Always fill the vessel with liquid to the minimum level before starting up the processing units. Never allow the machine to run dry!



6.4 System shut-down

6.4.1 Shut-down

- Shut down each individual unit by pressing the associated OFF switch on the operating panel.
- In addition, the system can also be switched off by means of the master OFF switch. Always use this method in the case of repairs, weekend shut-downs and holidays, etc.

6.4.2 Prolonged shut-downs

• Shut down the machine by switching off the master switch.

In addition:

- Close the shut-off valves for water, cooling water and compressed air
- Expand the pressure of the compressed air (set the pressure reducing valve to 0)
- Close the shut-off valve for compressed air

6.5 System start-up

Starting the machine:

- Turn the master switch to position "1"
- Reset the EMERGENCY-STOP actuator
- Press the start button



6.6 System monitoring

Checklist

Use the checklist in Section 7.

Independent of the availability of an automatic process control/recording system, it is good policy to check the following operating parameters regularly and to record them on a control sheet. This measure makes it possible to detect any trends in good time and to introduce any necessary countermeasures.

Batch number: Date / operator

Product: Recipe, amount/weight filled into machine, filling level

- Temperature of operating media
- Working pressure of operating media
- Homogeniser: power consumption, speed

Check the sliding ring seals, pipes, ductings, valves, and auxiliary units (e.g. sealing liquid vessel, pump) periodically for leaks.

Top up the operating materials as necessary (sealing liquid, gearbox oil, etc.).

Check the bearings of the individual units and pumps for unusual noises, elevated temperature and vibrations.

Record any special incidents.

6.7 Troubleshooting

The information on the following pages is intended to assist you in dealing with and correcting any faults or malfunctions.

The error messages displayed in the case of automatic systems are listed in the supplement supplied with the operating instructions of the operating panel.



POSSIBLE MACHINE FAULTS/MALFUNCTIONS

Explanation	of table headings:					
Column 1	"FAULTS", grouped by fault type or the faulty component					
Column 2	"POSSIBLE CAUSE(S)"					
Column 3	"MEASURES" to take in order to correct the fault.					
Column 4	"FIND IN" indicates where to look for details of the problem solution. The numbers refer to the section of the					
	operating manual, e.g. 5.3.1 OM refers to Section 5.3.1 in the operating manual.					
Column 5	"REPLACE Code" (1) = remove					
	The part may only be removed and replaced by personnel who are qualified to specifications.					
	O= operator					
	S= specialist (e.g. electrician, mechanic, electronic engineer, etc.)					
	F/M= specialist from FrymaKoruma or from the manufacturer of the part					
Column 6	"REPAIR Code"(2) = repair					
	The part may only be repaired by personnel who are qualified to specifications.					
	The codes are identical with those in Column 5.					
•	Warning:					



Procedures carried out by unauthorised persons can lead to the loss of warranty rights. If people, the environment or the product are endangered as a result, the product liability of the manufacturer becomes null and void.

	FAULTS		POSSIBLE CAUSE(S)	MEASURES	FIND IN	REPLACE	REPAIR
						Code(1)	Code(2)
1.	Electrical			See: electr. docs. and wir- ing diagram in control cabi- net	Section 5 OM		
1.1	Motor will not	a)	One phase not re-	 Check the connection 	5.3.1	S	S
	start or makes num- ming noises		ceiving current		5.3.3		
	ining hereec	b)	Fuse burnt out; motor	 Replace the fuse 	5.3.3	S	S
			contactor fails as a result of	 Activate the contactor 			
			tings.	- Check the contactor settings			
		c)	If with frequency con- verter	Check the settings against those in the supplier's man-ual	Manual	F/M	М
		d)	Motor defective	Repair or exchange the motor. Determine the cause.		S	М
		e)	Motor bearing defec- tive	Exchange		S	М
1.2	Wrong direction of rotation	a)	Mains or motor con- nection incorrect	Reverse the rotational direc- tion of the motors (it may be necessary to interchange 2 phases in the switch box)	5.4.3	S	-
1.3	Ragged running of motor in no-load operation	a)	If with frequency con- verter	Check the settings against those in the supplier's man- ual	Manual	F/M	М
		b)	Ball bearings defec- tive	Exchange all ball bearings		S	S
		c)	Fan blade damaged	Exchange		S	-

manufacturer becomes null and void.

d) Toothing too fine



POSSIBLE MACHINE FAULTS/MALFUNCTIONS

Explanation of	table headings:					
Column 1	"FAULTS", grouped by fault type or the faulty component					
Column 2	"POSSIBLE CAUSE(S)"					
Column 3	"MEASURES" to take in order to correct the fault.					
Column 4	"FIND IN" indicates where to look for details of the problem solution. The numbers refer to the section of the					
	operating manual, e.g. 5.3.1 OM refers to Section 5.3.1 in the operating manual.					
Column 5	"REPLACE Code" (1) = remove					
	The part may only be removed and replaced by personnel who are qualified to specifications.					
	O= operator					
	S= specialist (e.g. electrician, mechanic, electronic engineer, etc.)					
	F/M= specialist from FrymaKoruma or from the manufacturer of the part					
Column 6	"REPAIR Code"(2) = repair					
	The part may only be repaired by personnel who are qualified to specifications.					
	The codes are identical with those in Column 5.					
A	Warning:					
	Procedures carried out by unauthorised persons can lead to the loss of warranty rights. If people,					

the environment or the product are endangered as a result, the product liability of the

	FAULTS		POSSIBLE CAUSE(S)	MEASURES	FIND IN	REPLACE	REPAIR
						Code(1)	Code(2)
2.	Working area						
2.1	Strong vibrations in op-	a)	The shaft knocks	Align the shaft	8.4.1.2	0	
	eration					F	ACE REPAIR (1) Code(2) F F S S S S S
		b)	Tramp material has	Dismantle the machine, check	8.4.1.2	0	
			damaged the process- ing elements	the processing elements for damage and exchange if nec- essary		F	F
		c)	Bearings are worn	Exchange the bearings	8.4.1.2	S	S
2.2	Adjustment can only be moved with difficulty	a)	Adjusting thread gummed up	Unscrew the adjusting, clean the thread with a solvent and then regrease.		S	S
2.3	Product becomes too hot	a)		Widen the grinding gap		0	
		b)	Grinding elements are clogged	Use a solvent and wire brush to clean the grinding elements		0	
		c)	Grinding element is worn	Renew the grinding element		S	S

Install a coarse-toothed grind-

/:\

ing set.

s

S



7 Maintenance

Objective: To keep the machine in optimum condition and at a high level of availability. To increase the utilisation ratio by avoiding unscheduled downtime. To assist in the efficient scheduling of maintenance procedures and maintenance materials.

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7.1 Introduction

Maintenance procedures are to be carried out in accordance with the maintenance schedule.

7.1.1 Safety regulations

Pay attention to the safety regulations in Section 2.

This section (Section 7) also includes additional application-specific safety instructions. The maintenance and assembly aids featured in this section must be used according to specifications.

7.1.2 Personnel requirements

This section is directed at those persons who are responsible for the maintenance or safety of the machine.

The personnel delegated for maintenance procedures must be competent and adequately qualified for the work in hand. Wherever the maintenance schedule calls for specialists, these must be called in. The same applies to execution of the procedures reserved for FrymaKoruma's customer service division.

Note: Instructions on the fundamentals of maintenance are also given to machine operators during their introduction in machine operation.

7.2 Maintenance schedule

Configuration and contents of the maintenance schedule

The machine must be maintained regularly.

Column 1: The maintenance procedure and components.

Column 2: The work which must be carried out is described briefly here. The numbers refer to the section in the operating manual with explanations.

Columns 3 – 9 : Inspection and maintenance intervals.

"Job"	= '	after every job
"Daily"	=	every day
"Weekly"	=	every week
"Months"	=	at intervals of x months
"1 year/hour"	=	at intervals of x years or operating hours.

Column 10 or 11 indicates who is responsible for the maintenance. **Column 10:** Procedures that can be carried out by the operating personnel.

Column 11: Procedures that are reserved for FrymaKoruma specialists.

Consequences of non-observance or inadequate maintenance

Optimum products can only be manufactured with machines that are correctly and regularly maintained. Good maintenance means that the maintenance procedures are carried out before damage manifests itself and as described in this manual.

Faulty or inadequate maintenance can severely affect the availability of the machine and can lead to unscheduled downtime. The worst consequences of inadequate maintenance are accidents for which the user can be made liable.



Maintenance / S	Daily/Job	Weekly	Monthly	3 Months	6 Months	1 Year	3000 to 5000 hours / max. 2 years	Operator	Service specialist (Service engineer)	
Cle	eaning									
External area 7.4.2	1		х						х	
Product inlet area	7.4.2.2	х							х	
Working area		х							х	
Water supply filter						х			х	
Insp	ections									
Safety equip- ment	7.4.1 Function				х				x	
Product feed / units	7.4.4.2 Check screws			х					x	
Working area	7.4.4.3 Check proc- essing elements for wear				x					x
System sealing integrity	7.4.3 Op. materials 7.4.3 Sliding ring seal	x			x x				x x	
Product pump	Wear to bearings Sliding ring seal				x			x		x
Water filter	Pressure drop		х						х	
Lubricating intervals as per lubrica- tion schedule 115KN005										
Machine	Lubricate bearings							х	х	
Product pump	Change oil in gear- box							x	x	
Motors	Lubricate							х	х	



7.3 Operating materials and auxiliary equipment

7.3.1 Lubricants, cleaning agents

- Lubricants used by FrymaKoruma are listed in the appended lubrication schedule.
- The lubricants used by suppliers are listed in the respective documentation.

Sealing liquid (double-acting sliding ring seal)

The sealing liquid must be compatible with the product and free from solids. It must lack the tendency to precipitate, should have the maximum possible boiling point, be a good heat conductor and have a low viscosity.

A viscosity of 0.8 to max. 40 cSt (mm²/s) brings good results. The pressure downstream of the pump should be between 1 and 3 bar. The boiling point should be as high as possible. A difference in temperature of dT min. $60 - 80^{\circ}$ C with respect to the boiling point of the medium to be sealed should be aimed at.

The flow rate must be set such that in the case of water and similar liquids, a max. outlet temperature of 80°C is not exceeded. In the case of solvents or alcohol, a max. temperature difference of 60°C is permitted.

When selecting a sealing liquid, make sure that it is also compatible with the material of the sliding ring seal.

7.3.2 Measuring and test equipment

Contact FrymaKoruma's customer service division in the event of special problems.



7.4 Maintenance procedures

7.4.1 Safety test

Check the safety equipment for function and efficiency

- EMERGENCY-STOP actuator (Section 4.3.1)
- Interlock (safety limit switch) (Section 4.2.2)
- The control cabinets must be closed.
- Function of signal lamp and hooter, if applicable (Section 4.2.1)
- Are all covers (safety covers/guards/hoods) installed?

Electric connections

Check for any visible damage to the insulation:



Warning !

Damaged electric cables, connectors and units must be repaired by a qualified electrician.

7.4.2 Cleaning procedures

7.4.2.1 Cleaning the machine

Warning !

Never use liquids to clean electric components and units.



Switch electric units off before cleaning!

Exercise care during cleaning and replace any damaged parts.

7.4.2.2 Cleaning the working area

General cleaning

If the same recipe is always used, merely the product inlet will need cleaning after every batch. If, on the other hand, the recipe is changed, use one of the methods described in Section 6.2.1 to clean the entire system.

CIP procedures

See in this respect the information in Section 6.2.1.



7.4.3 Inspection, control and adjustment procedures

Objective: To maintain the sealing integrity and serviceability of the machine.

Sealing integrity of ductings containing operating media

(cold and hot water, steam, pneumatic)

Check to make sure there are no leaks in the ductings conveying media.

To this end, switch the units on (open the supply valves, activate the pump, etc.) and systematically check every medium circuit.

- Check all flange and bolted connections and tighten if necessary.
- Replace any defective seals and screws.
- Check the condition of the flexible hoses. Replace any defective hoses and those with visible damage (cracks, brittleness).

Meter to measure the leakage rate of sliding ring seals (only if fitted)

Every sliding ring seal (SRS) secretes a minimum amount of sealing liquid at the interface of the sliding ring surfaces. The leakage rate of a SRS is dependent on the mode of operation, the product, and the product-specific manufacturing process.

Because a double-acting SRS comprises an inner (product side) and outer (atmosphere side) SRS, leakage can occur at both sliding ring seals. The leakage rate in this case is a few millilitres per hour. A leak in the SRS itself increases the leakage rate.

The **leakage rate of the SRS on the product side** is only visible as a function of the level of liquid in the sealing liquid vessel. In order to determine a noticeable difference in level, a transparent sticker with graduated scale is stuck onto the inspection glass.

Exchanging seals

General recommendation:

Seals that have been in operation for some time and which were dismantled during this time should be replaced.



7.4.4 Inspection and exchange of subassemblies

7.4.4.1 Inspections, renewal or exchange

Refer to the respective drawings and parts lists in the documentation.

7.4.4.2 Checking the assembly screws

Vibrations can cause the assembly screws to loosen during transport and operation.



All assembly screws and bolts must be checked and tightened if necessary at commissioning and thereafter every month.

This applies particularly to the following screws:

- all visible screws
- screws on the working area
- screws on the drives (motors, gearbox)



7.4.4.3 Dismantling the machine

Inspecting, replacing or exchanging the processing elements

Area of responsibility: The processing elements may only be exchanged by experienced personnel or by those who have been given instruction by FrymaKoruma. Refer to the drawing delivered along with the machine.

The hopper, all feed ductings and the working area itself must be emptied and cleaned!

Shut off all power and media lines to the machine (steam, hot water, compressed air, etc.) at the main supply points.



Switch off the master switch and secure against restarting.

Stator

Remove the hopper and all feed ductings.



After detaching the screws the top can be removed























Rotor

Once the clamping screw has been released, the rotor can be pulled carefully off the shaft.









Sliding ring seal



















Checks:

For wear and damage to the processing tools. That rotor shaft runs true, without runout or bearing play. Replace parts depending on wear.



Assembly

Exchange the removed O-rings and seals for new ones. Refer to the lubrication schedule for details of permitted lubricants.



Assembly in reverse sequence to dismantling. All seating surfaces must be cleaned. Don't forget to insert the O-rings.



Notice!

Check to make sure that the grinding elements do not touch each other. Check the mechanical stop for the grinding gap adjustment system and reset if necessary.



7.4.4.4 Adjusting the grinding gap

Once the mill has been installed, check to make sure the grinding elements do not touch each other. If the grinding elements make contact while the drive motors are running, they will be destroyed and the main bearing unit of the mill can also become damaged.

To set the grinding gap, the motor is switched on for a few seconds and then switched off. In the idle running phase of the motor, the grinding gap is gradually narrowed until the grinding elements finally lightly touch, which makes itself noticeable by a slight grinding noise.

Now slacken off the adjusting by a 1/4 turn. This is the "contact" setting.

Now the scale is turned to "zero" and set.

This limit stop only needs to be adjusted when the colloid grinding set is reground or a new colloid grinding set is installed.



One revolution of the hand-wheel corresponds to an actual grinding gap regulation of 87 my.

A dividing line on the scale corresponds to a grinding gap regulation of 150 my. Rotation of the handwheel in an anti-clockwise direction decreases the grinding gap; rotation in a clockwise direction increases it.

Subsequent to the grinding gap regulation, the handwheel is fixed by tightening the holding handle.





7.4.4.5 Limit stop with scale



1.5 1.4 1.3

Alpha /2 = 5°





X = axial adjustment

S = grinding gap

17.211



7.4.4.6 Process control

The following aids are available to help remedy problems with the hardware or software:

- The operating instructions for the control unit appended to Section 6 contain details of how to proceed in the event of alarms as well as a list of the error messages.
- Additional descriptions of alarms are contained in the **supplier documentation**, e.g. for the frequency converter or other electronic equipment. This documentation is also appended to this operating manual.
- More information on how to correct defects and faults can be found in **Section 6.8** "**Troubleshooting**".
- The **electrotechnical documentation** is in the electrical control cabinet and also in Section 5.
- If the problem cannot be solved with the above aids, contact FrymaKoruma's customer service division for advice and assistance.



Appendix A: Mounting instructions for screw connection

1. Area of application

Valid for screw connections of FrymaKoruma units.

- 2. Screw fitting conditions
- 2.1 Tightening procedure: tighten in accordance with the torque.
- Screwing device, screwing class
 Tighten the screw connection in accordance with tightening torque M_A:
 Screwing device of screwing class B in accordance with DIN 25202.
- 2.3 Lubricants for screw connections The products listed are recommendations.

Lubricant	Supplier	Application
UH 84-201 H1	Klüber Lubrication AG (Schweiz) Thurgauerstrasse 39 CH-8050 Zürich Tel.: 01/302 79 79 / Fax: 01/302 57 45	Product area or adjacent components
NBU 8 EP H2	Klüber Lubrication AG (Schweiz) Thurgauerstrasse 39 CH-8050 Zürich Tel.: 01/302 79 79 / Fax: 01302 57 45	Components which are not in direct contact with products
NBU 30 PTM Staburags	Klüber Lubrication AG (Schweiz) Thurgauerstrasse 39 CH-8050 Zürich Tel.: 01/302 79 79 / Fax: 01302 57 45	Components which are not in direct contact with products
AUTOL TOP 2000	AGIP (Suisse) AG Verkaufsbüro Zürich Flüelastrasse 54 CH-8047 Zürich Tel.: 01/491 08 66 / Fax: 01/493 52 29	Components which are not in direct contact with products

2.4 Treatment/condition of surface.

Surfaces A, B,C, D have to be executed blank and primed without topcoat paint when the screw connections are under high stress (in accordance with specified tightening torque).



Connections in accordance with prescribed tightening torque. Always use a screwing device of screwing class B in accordance with DIN 25202 to tighten a screw connection with the prescribed tightening torque. Tightening procedure in accordance with section 2.1.

3.1 Entry in the drawing

 $M_A =$

Example: for M12 - A4-70 screw

Nm

Nm	M _A =	50
----	------------------	----



4. Securing screw connections using liquid glues

Guide values:

The tightening torque indicated in the drawing is generally based on a friction factor m_{total} of 0.1 (variation range $m_{total} = 0.1 - 0.12$).

If a lubricant other than those listed in the table in 2.3 is used, the variation range of the friction factor m_{total} must be calculated. Lubricants and friction factors beyond the variation range $m_{total} = 0.09 - 0.14$ should not be used without prior consideration.

5. Guide values - tightening torque's: screwing class B (torque wrench)

6. Exceptions to the validity of the guide values mentioned above:

a) All screw connections with special boundary conditions and under high stress:

- Friction factors m_{total}
- Special securing measures (e.g. liquid glues...)
- Different screwing classes and mounting tools
- high / low operating and mounting temperatures
- b) Anti-fatigue bolts, flange bolts with ribs...
- c) Materials with reduced admissible surface pressure (e.g. plastics...)
- d) Property class for screw and nut different from the one indicated

		Tię	ghtening torqu	ies	FM initial tension force for mounting			
	Screw	8.8	A2-70	A2-50	8.8	A2-70	A2-50	
M = metric		[Nm]	[Nm]	[Nm]	[N]	[N]	[N]	
Yield point		640 N/mm ²	450 N/mm ²	210 N/mm ²	640 N/mm ²	450 N/mm ²	210 N/mm ²	
М	4	2,5	1.8	0,85	4200	3080	1385	
М	5	5	3.6	1,65	6900	5070	2250	
М	6	8	6	2.8	9700	6930	3200	
М	8	21	15	6.7	17900	13000	5800	
М	10	40	28	13.2	28500	19800	9300	
М	12	70	50	23	41500	29500	13600	
М	16	170	120	56	78000	55000	25500	
М	18	245	165	77	98000	66000	30900	
М	20	340	235	108	126000	85680	39600	
М	24	590			182000			
М	30	1170			290000			
		Tię	<mark>ghtening torqu</mark>	ies	FM initial te	ension force fo	or mountina	
	Screw	8.8	A2-70	A2-50	8.8	A2-70	A2-50	
F =	fine thread	[Nm]	[Nm]	[Nm]	[N]	[N]	[N]	
F	8 x 1	21,6	15	6,8	19600	13500	6200	
F	10 x 1,25	42	29	13.8	30500	21200	10000	
F	12 x 1.25	75	52	24	46500	32200	14900	
F	16 x 1 <i>.</i> 5	180	123	57	85000	58000	27000	
F	18 x 1,5	270	177	84	114000	75000	35700	
F	20 x 1.5	380	250	117	144000	96000	45000	
F	24 x 2	635	-	-	203000	-	-	
F	30 x 2	1290	-	-	332000	-	-	
Lubricating Schedule



designation	lubricating grease FDA/USDA-H1 admissible						lubricating oil FDA/USDA-H1 admissible				lubricating grease FDA/USDA-H2		
	Klüberpaste UH1 84-201 (091109)	Klübersynth UH1 64-2403	Paraliq GTE 703 (091110)	Klübersynth UH1 14-151 (095656)	Klübersynth UH1 14-31	Klübersynth UH1 14-1600	Lubriplate FGL-2	Klüber- Summit HySyn FG-32	Klüberoil 4 UH1 220N (091113)	Klüber- synth UH1 4-18	Paraliq P 40-Spray	Staburags NBU 8 EP	Staburags NBU 12 (091111)
application	F 1/	Y	51/	-				(091112)					
	FK	X	FK	0									
Metal paired with metal	FK	X		0									
Metal paired with plastic			FK										
plastic paired with plastic			FK	X									
Seals	FK	X	FK	0	0			FK					
Mechanical seal sealing liquid								FK		0			
Radial shaft sealing rings NBR / FPM / MVQ (never EPDM)	FK												
Radial shaft sealing rings EPDM (Never MVQ / Silicone)			FK										
Labyrinth seals	FK	X	Х										
Rubbers NBR / FPM / MVQ (never EPDM)	FK	x											
Rubbers EPDM (never MVQ / Silicone) unsuitable for the paint industry			FK										
Gears						Х		FK	FK				
Spur-wheel, bevel gear						X			FK				
Worm gear						Х			FK				
Adjusting gear, small gears			0	X		Х		FK 🔿					
Roller bearing	0	0		FK	Х		Х					0	FK
for low speed range < 3000 U/min		о		FK			x					о	FK
for medium speed range ~ 3000 U/min				FK	0							0	FK
for high speed range > 3000 U/min					х							x	
Operational temp.> 80°C, Speed ≤ 3000 U/min							x						FK
Shaft, hub, connections				X									
Springs	Х												
Shaft serration	0			X									
Tensional connections	Х			X									

FK

used by FK

X especially appropriate

O appropriate



designation	Lubricating grease FDA/USDA-H1 admissible						lubricating oil FDA/USDA-H1 admissible			lubricating grease FDA/USDA-H2			
	Klüberpaste UH1 84-201 (091109)	Klübersynth UH1 64-2403	Paraliq GTE 703 (091110)	Klübersynth UH1 14-151 (095656)	Klübersynth UH1 14-31	Klübersynth UH1 14-1600	Lubripla- te FGL-2	Klüber- Summit HySyn FG-32	Klüberoil 4 UH1 220N (091113)	Klüber- synth UH1 4-18	Paraliq P 40- Spray	Sta- burags NBU 8 EP	Sta- burags NBU 12
application	, ,		· · /	· · ·			-	(091112)					(091111)
Friction bearing	FK	X	0	X					Х				
Solid metal	FK	0											
Sintered metal	FK	X							Х				
Plastic			Х	FK									
Hydraulic			Х					FK					
Pumps/devices			Х					FK					
Cylinder	FK		Х					X					
Valves			Х					FK					
Chains	FK					X		0	0				
Thermal contacts										Х			
Heat-carrying oil										Х			
Pneumatic	0		0	X	0			FK					
Cylinder			0	X									
Valves			Х										
Compressors								FK					
Atomised hydraulic oil								FK					
Screws/hinges/keyways	FK											Х	
Metal / Metal	FK											Х	
Metal / plastic	X											Х	
oil to prevent corrosion											FK		

used by FK

X especially appropriate

O Appropriate



FK

Vaseline must be used to lubricate rubbers in the paint industry.

Nomenclature:

- O Disco-differential gear made by Lenze / VAR-SPE adjusting gear made by Ringspann
- NORD-, SEW-, STÖBER Gears and PK-pumps, Transmital Bonfiglioli



8 Repairs

Objectives: To restore the machine to its optimum condition. To recognise and evaluate the sources of faults. To introduce troubleshooting measures. To remedy the fault in accordance with the scope of competence described in the servicing concept.

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8.1 Introduction

8.1.1 Safety regulations

Pay attention to the safety regulations in Section 2. This section (Section 8) also includes additional application-specific safety instructions. The servicing and assembly aids featured in this section must be used according to specifications.

WARNING!

Before starting work on the machine:

- 1) Empty the feed ductings and the working area
- 2) Clean if necessary



Use a safety lock to secure the master switch against unintentional restarting.

8.1.2 Personnel requirements

This section is directed at those persons who are responsible for the servicing or safety of the machine.

The personnel delegated for servicing procedures must be competent and adequately qualified for the work in hand. Wherever the maintenance schedule calls for specialists, these must be called in. The same applies to execution of the procedures reserved for FrymaKoruma's customer service division.

8.1.3 Servicing concept

The maintenance schedule in Section 7.2 applies also to the servicing procedures.



8.2 General information

8.2.1 Special tools, measuring and testing equipment

The accessories delivered with the machine are listed in Part 2 of this operating manual in the section "Legends / parts lists".

8.2.2 Spare parts and operating materials, repair kit

The spare parts and operating materials delivered with the system are listed in Part 2 of this operating manual in the section "Legends / parts lists".

8.3 Troubleshooting

8.3.1 Categorisation according to function sequence

A table with a description of the faults that can be diagnosed by the system along with the associated measures to remedy the faults is featured in Section 6.

8.4 Repairs

8.4.1 Dismantling and inspecting the units for wear



Contact FrymaKoruma's customer service division for advice and assistance.

Information on non-Fryma machine components and accessories is featured in the suppliers' documentation.



8.4.2 Working area

The part of the machine that is subject to a high degree of wear is the sliding ring seal. Exchange the sliding ring seal in accordance with the appended sectional drawing.

Dismantling

See Section 7.4.4.3 for details.

Inspections

Inspect the processing elements for wear. Check the rotor shaft for concentricity, radial run-out and end play, bearing play. Exchange parts as necessary.

Exchanging the sliding ring seals



Sliding ring seals can be exchanged by experienced or specially trained staff.

• Install new sliding ring seals in accordance with the manufacturer's instructions.

Exchanging the homogeniser bearings

These may only be exchanged by authorised persons (ex-protected motors).

To this end, the homogeniser must be dismantled and the motor removed. Push the shaft out of the bearings. Both bearings must be exchanged at the same time (according to the manufacturer).

Assembly

Exchange the removed O-rings and seals for new ones. Refer to the lubrication schedule for details of permitted lubricants.



8.4.3 Valves, control elements

Valves, controllers, sensors, pneumatics Generally speaking, it is only possible to exchange or replace prefabricated components or subassemblies. Refer to the operating instructions provided by the suppliers for details.

8.4.4 Tasks reserved for FrymaKoruma's service division

Only FrymaKoruma specialists are permitted to exchange or renew the following parts:



8.5 Electrical wiring diagrams

The electrical wiring diagrams for the machine are located in the control cabinet. A copy is also appended to Section 5 of this operating manual.



9 Recycling

Empty file

If you have any questions relating the recycling of the machine or units belonging to, please ask the customer service of FrymaKoruma AG.



10 Transport

Objective: To provide information on proper and professional machine transport.

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	10.2	TRANSPORTING THE MACHINE	2



10.1 Lifting the machine



- 1. The crane used to lift the machine must have a minimum load-bearing capacity as per the data sheet.
- 2. After loading the machine, proceed as described in Section 5.2.2.

10.2 Transporting the machine

Dependent on the means of transport, the system is delivered on a wooden pallet with or without side cage. The system can be lifted using a crane (or fork lift) to permit removing the transport frame.



Parts Lists	
Drawings	
Vacuum System Operating Instructions	
Sealing Liquid Unit, Mechanical Seal Operating Instructions	
CIP-Cleaning, Conveying Pump Operating Instructions	
Instrumentation Fittings Pneumatic, Compressed Air	
Heating-/Cooling Units Vessel and Piping Blending Vessel and Mixer	
Drives and Gears Operating Instructions	
Components in the Switchgear Operating Instructions	



1. PARTS LIST

Base frame	ENG-005315-(00)-(1)	RM 310129
Drive	ENG-036118-(01)-(1)	RM 310145
Housing	ENG-036118-(01)-(1)	RM 310131
Housing Top	ENG-036118-(01)-(1)	RM 310152
Mechanical seal	93-00-63-(04)-(1)	RM 310138
Grinding unit	ENG-036118-(01)-(1)	RM 310163
Product Inlet	ENG-036118-(01)-(1)	RM 310160
Product Outlet	ENG-036118-(01)-(1)	RM 310148

Spare parts

□ Inquiry No.



□ Order No..

Customer	Invoice Address:	
VAT no.		
Delivery		
Address:		
	Your reference	
	Phone no.	

Machine

Typ of machine	Serial No.	Year of construction

Specification of spare parts

Part no.	Quant.	Drawing/Pos. No.	Description

FrymaKoruma AG, CH-4310 Rheinfelden Fax: +41 61 836 41 69

Machine-No.

Legend



RM No. 310129	Ident-No. 651343	Description BASE FRAME	Drawing-	Drawing-No.			
Drawing/Pos.		Description	Ident-No.	Qty.	SP		
		BASE FRAME					
1		BASE FRAME HORIZONTAL	145183	1 STK			
2		LEVELLING LEG	011642	4 STK			
3		NUT	010365	4 STK			

Machine-No.

Legend



RM No. 310145	ldent-No. 691771	Description DRIVE		Drawing	Drawing-No.			
Drawing/Pos.			Description	Ident-No.	Qty.	SP		
ENG-036118-	-(00)		MOTOR ACCESSORIES					
1			M-MOTOR 45KW 400/690V 50HZ	210935	1 STK			
4			SCREW	010024	4 STK			
5			MOTOR CENTRIFUGAL DISC	000411	1 STK			
6			HEADLESS SCREW	010201	2 STK			
33			O-RING 137 R	050241	1 STK	А		

Legend



RM No. 310131	Ident-No. 691769	Description HOUSING		Drawing-No.				
Drawing/Pc	S.		Description	Ident-No.	Qty.	SP		
ENG-0361	18-(00)		HOUSING					
7			HOUSING AND LID, MZ-190/D	593010	1 STK			
ENG-0361	18-(00)		O-RINGE F. GEHAEUSE					
39			OUTLET SEAL	405212	1 STK	А		
40			O-RING 270 R	050279	1 STK	А		
121			O-RING 142 R	050245	1 STK	А		
122			O-RING 153 R	050123	1 STK	А		
1'213			O-RING 113 R	050230	1 STK	А		
93-89-12-(0	02)-(1)		SAFETY DEVICE					
1			PLATE	007036	1 STK			
2			SAFETY SWITCH	080026	1 STK	В		
3			HANDLE	080023	1 STK			
4			SCREW	011255	4 STK			
5			CHAIN	011233	1 M			
6			HAXAGON SOCKET SCREW	011617	1 STK			
7			NUT	010358	1 STK			
8			PIPE	070724	1 M			

Legend

Description



Drawing-No.

Machine-No.

RM No. Ident-No. 310152 691774

HOUSING, TOP Drawing/Pos. Ident-No. Qty. SP Description ENG-036118-(00) **UPPER PART** 020973 BALL COCK 1 STK 0 10 STATOR CARRIER 000306 1 STK 11 BOLT 000936 2 STK 12 SCREW 010109 3 STK 13 **GUIDE BUSHING** 000297 1 STK 14 FLANGE 000301 1 STK 15 **FIXING LEVER** 000300 1 STK HANDLE 1 STK 16 010456 SLIDING RING 1 STK В 17 000296 18 SCREW 010099 6 STK 19 HANDWHEEL 010477 1 STK SPRING COTTER 20 010273 2 STK 21 BOLT 000302 1 STK 26 SCALE 000305 1 STK 27 FLAT NUT 010882 4 STK 34 INLET STUD 000321 1 STK 144 CENTRIFUGAL DISC 009566 1 STK ENG-036118-(00) **ELESTOMERE UPPER PART** 29 **O-RING 113 R** 4 STK 050230 А 30 **O-RING 174 R** 050163 2 STK A 31 **O-RING** 050158 1 STK A 32 **O-RING 213 R** 050164 1 STK А 41 **O-RING 249 R** 050144 1 STK А

Machine-No.

Legend



RM No.Ident-No.310138691770	Description MECHANICAL SEAL, SEALING LIQU	Drawing	g-No.	
Drawing/Pos.	Description	Ident-No.	Qty.	SP
93-00-63-(04)-(1)	ELASTOMERE			
71	O-RING V 157	052784	1 STK	А
72	O-RING	050134	2 STK	Α
73	O-RING 234 R	050156	2 STK	А
93-00-63-(04)-(1)	MECHANICAL SEAL, DOUBLE ACTIN	G		
60	SLIDING RING	052439	1 STK	В
61	SLIDING RING (ROTOR)	051074	1 STK	В
62	SPACER SLEEVE	051092	1 STK	
63	SEALING ELEMENT (STATOR)	051064	1 STK	В
64	SEALING ELEMENT (STATOR)	051064	1 STK	В
65	PRESSURE SPRING	051054	1 STK	В
67	SCREW WITH PIN	000209	4 STK	
68	SEALING RING	010591	4 STK	А
105-90-37-(01)-(1)	SEALING LIQUID CONNECTION			
1	DIRT TRAP	021042	1 STK	
2	NIPPLE	020629	1 STK	
3	PIPE BEND	023866	1 STK	
4	THROUGH-WAY VALVE	021025	2 STK	
5	PIPE 3/8	070100	1 M	
6	PIPE 3/8	070100	1 M	
7	TEE	020614	1 STK	
7	TEE	020614	1 STK	
8	REDUCING SOCKET	022123	1 STK	
8	REDUCING SOCKET	022123	1 STK	
9	PRESSURE GAUGE	024283	1 STK	В
10	SLEEVE	020581	1 STK	
11	TEMPERATURE GAUGE 0-120 C	021138	1 STK	В
12	ADAPTER	022131	1 STK	
12	ADAPTER	022131	1 STK	
13	FLOW DETECTOR	083698	1 STK	
14	BUSH	020637	1 STK	
27	OVERFLOW VALVE 1-4 BAR	024786	1 STK	
28	ADAPTER	022131	1 STK	
29	NIPPLE	020630	1 STK	

Legend



RM No. 310163 Drawing/Pos ENG-036118	Ident-No. 691777	Description GRINDING UNIT	Drawing-No.						
Drawing/Pos.		Description	ldent-No.	Qty.	SP				
ENG-0361	18-(00)	GRINDING UNIT							
1'402		STATOR	040719	1 STK	В				
1'405		ROTOR, CROSS-CUT	041272	1 STK	В				
ENG-0361	18-(00)	HOLDING SCREW							
908		HOLDING SCREW	003213	1 STK					
		KEY SW24							
0		KEY	090104	1 STK					
0		SOCKET WRENCH	090127	1 STK					

Legend



RM No. 310160	Ident-No. 691775	Description INLET	Drawing	g-No.		
Drawing/Pc	S.	Description	Ident-No.	Qty.	SP	
ENG-0361	18-(00)	INLET				
0		FLANGE	022533	2 STK		
0		SCREW	011527	4 STK		
0		NUT	010365	4 STK		
ENG-0361	18-(00)	SEALING RING				
0		SEAL ND50	052140	1 STK	А	

Legend



RM No. 310148	Ident-No. 691773	Description OUTLET		Drawing		
Drawing/Pos	8.		Description	Ident-No.	Qty.	SP
ENG-03611	8-(00)		OUTLET			
0			FLANGE	022541	2 STK	
0			SCREW	011527	4 STK	
0			NUT	010365	4 STK	
632			SCREW	010110	4 STK	
1'601			DISCHARGE FLANGE DN 80	000047	1 STK	
ENG-03611	8-(00)		SEALING RING SMS			
0			SEAL NW65 ND40	052141	1 STK	А



2. DRAWINGS

PID	ENG-039393-(01)-(1)
Lavout	ENG-039392-(00)-(1)
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Working area	ENG-036118-(00)-(1)
Security switch	
Mechanical seal	
Sealing liquid connection	



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	Mase	FrymaKoruma	FrymaKoruma AG	ENG-0393	393-(01)
	Urs	prung: Zeichn.–Nr.	Artikel-Nr.	Anzahl Blatt:	1 von 1



(A) Sealing liquid inlet Rp 3/8'' (ISO 7-1)

B Sealing liquid outlet Rp 3/8'' (ISO 7-1)

© Product inlet 2 1/2" (DN65) ANSI B16,5 150lbs

D Product outlet 3" (DN80) ANSI B16,5 150lbs



	Fabr-Nr. 102192 KDV-Nr. 124990 10	Kunde: Grosvenor Chemicals	Wir behalten uns das Eigentums– und Urheberrecht vor.					
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Vrsp	orung: ZeichnNr.	Artikel-Nr.	Anzahl B	Slatt: 1	v∘n 1			





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Option: Sperrfluessigkeit Sealing liquid Liquide de barrage

C = Eintritt / inlett / entrée R3/8" ISO 7-1 D = Austritt / outlet / sortie R3/8" ISO 7-1

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3. VACUUM SYSTEM



4. SEALING LIQUID UNIT, MECHANICAL SEAL



5. CIP-CLEANING, CONVEYING PUMP, ACCESSORIES,



6. INSTRUMENTATION (P,T,F,L) FITTINGS (VALVES, SAFETY DEVICES) PNEUMATIC

FITTINGS

Security switch	Euchner NZ.VZ
Excess pressure valve	Samson Type 44-6
Flow monitor	Meister DKG



7. HEATING-/COOLING UNITS VESSEL AND PIPING BLENDING VESSEL AND MIXER



8. DRIVES AND GEARS

Motor		EMWB
Regreas	sing	EMWB



9. PARTS IN THE SWITCHGEAR





10. CERTIFICATES

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