

Operating Instructions

AHCA-67007-2-en-1609

Conditioner

Feeder/Mixer/Retentioner

AHHA - 60

AHCA - 200/400/700

AHVA - 700/1300/2000



Machine No.: yy yyy yyy
Customer
Street 99
Country 9999 City



Original Operating instructions

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Table of contents

1	Important information.....	1-5
1.1	Scope of validity.....	1-5
1.2	Supporting documents.....	1-5
1.3	Contact.....	1-6
1.4	Personnel qualification.....	1-6
1.4.1	Mechanics	1-6
1.4.2	Electricians	1-6
1.4.3	Welders	1-6
1.5	Typographical conventions.....	1-7
1.5.1	Explanation of the warning instructions.....	1-7
2	Safety	2-8
2.1	Designated use.....	2-8
2.2	Technical condition	2-9
2.3	ATEX ID.....	2-9
2.4	Personnel qualification.....	2-9
2.5	Securing the machine against unexpected start-up	2-9
2.6	Safety devices	2-9
2.7	Safety signs	2-9
2.8	Safe work environment.....	2-10
2.8.1	Slipping and stumbling hazard	2-10
3	Technical data.....	3-11
3.1	Ambient conditions	3-11
3.2	Operating materials	3-11
3.2.1	Gear oil.....	3-11
3.3	Airborne sound emission	3-11
3.3.1	Measured data	3-11
3.3.2	Operating conditions	3-11
3.4	Weights.....	3-12
3.4.1	Feeder	3-12
3.4.2	Mixer.....	3-12
3.4.3	Retentioner	3-12
3.5	Planning instructions.....	3-13
3.5.1	Mixer.....	3-13
3.5.2	Retentioner	3-16
3.6	Dimensions	3-18
3.6.1	Feeder AHHA-60.....	3-18
3.6.2	Mixer AHCA-200	3-19
3.6.3	Mixer AHCA-400	3-20
3.6.4	Mixer AHCA-700	3-21
3.6.5	Retentioner AHVA-700.....	3-22
3.6.6	Retentioner AHVA-1300.....	3-23

3.6.7	Retentioner 2000	3-24
3.7	Electrical specifications.....	3-25
3.7.1	Feeder	3-25
3.7.2	Mixer.....	3-25
3.7.3	Retentioner	3-25
3.8	Pneumatic system	3-25
4	Description	4-26
4.1	Identification.....	4-26
4.1.1	Nameplate	4-26
4.1.2	Specification key.....	2
4.1.3	ATEX ID for use in Ex zone 22.....	2
4.1.4	ATEX ID without approval for potentially explosive zone.....	2
4.2	Overview	3
4.3	Function	3
4.3.1	Temperature sensor unit PT100.....	3
4.4	Protective devices.....	4
4.4.1	Key-operated locking unit.....	4
4.4.2	Monitoring of heating mats	4
4.5	Safety warning notices.....	5
4.6	Options.....	5
4.6.1	Heating mats	5
4.6.2	Hot air	5
5	Transport.....	6
5.1	Packaging symbols	6
5.2	Checking the delivery	6
5.3	Intermediate storage.....	6
5.4	Lifting instructions	6
6	Installation.....	8
6.1	Site conditions	8
6.2	Positioning of the machines.....	8
6.2.1	Screwing.....	8
6.2.2	Connection	9
6.2.3	Machine transitions	10
6.3	Connection of utilities.....	10
6.3.1	Electrical systems.....	10
6.3.2	Steam and Liquids.....	11
6.3.3	Compressed air connections.....	11
6.4	Earthing.....	12
7	Commissioning.....	13
7.1	Checking commissioning.....	13
7.1.1	Checking feeder bearing	14
7.1.2	Checking mixer bearing.....	14
7.1.3	Checking retentioner bearing	15
7.2	Checking safety devices	15
7.2.1	Checking interlock switch.....	15
7.2.2	Residual current circuit breaker.....	16
7.3	Commissioning without product.....	16
7.4	Conformity.....	17
7.4.1	Checking EC- Conformity.....	17

8	Operation	19
8.1	Operation	19
8.2	Operating modes	19
8.3	Starting and stopping	19
	8.3.1 Service mode	19
	8.3.2 Automatic mode	20
	8.3.3 Starting after EMERGENCY STOP	20
	8.3.4 Stopping in service mode	20
8.4	Production interruption/end	21
9	Troubleshooting	22
9.1	Messages	22
9.2	Drive	22
9.3	Heating mats	23
9.4	Mixer coupling	23
	9.4.1 Permissible shaft displacement and alignment	24
10	Maintenance	25
10.1	Cleaning	25
	10.1.1 Cleaning schedule	25
10.2	Lubrication	25
	10.2.1 Lubrication schedule	25
	10.2.2 Shaft bearing	26
10.3	Maintenance	26
	10.3.1 Maintenance schedule	26
	10.3.2 Changing gear oil	27
	10.3.3 Checking torque support	27
11	Repair	28
11.1	Replacement of paddles	28
11.2	Setting bearing with labyrinth seal	30
	11.2.1 Feeder bearing	30
	11.2.2 Mixer bearing	31
	11.2.3 Retentioner bearing	32
12	Decommissioning	33
12.1	Shutting down	33
12.2	Dismantle	33
12.3	Storing	33
12.4	Disposal	33
	12.4.1 Disposal of operating material	33
	12.4.2 Disposing of machine	33
13	Spare parts	34
13.1	Inventory of spare parts	34
13.2	Spare parts identification	34
13.3	Order instructions	34

1 Important information

1.1 Scope of validity

Type	Designation
AHHA -60	Feeder
AHCA -200	Mixer
AHCA -400	
AHCA -700	
AHVA -700	
AHVA -1300	Retentioner
AHVA -2000	

1.2 Supporting documents

The following documents are part of these Operating instructions:

Designation	Identification number
Spare parts catalog	AHCA - 8130
Frequency converter	Refer to the documentation Supplied by the manufacture
Gear motor	Refer to the documentation Supplied by the manufacture
Steam fittings	DADA-65601

1.3 Contact

- ▶ In case of inquiries, please contact the after-sales service department of manufacturer.
- ▶ Have the instructions at hand.

Bühler AG

Customer Service Grains & Foods

CH-9240 Uzwil, Switzerland

Phone: +41 71 955 3040

Fax: +41 71 955 3305

Service.gp@buhlergroup.com

Buhler (Changzhou) Machinery Co., Ltd.

Address: Tianmu Lake Industrial Park, Liyang City, Jiangsu Province, China

Tel: +86-519-87966666

Fax: +86-519-87966000

1.4 Personnel qualification

1.4.1 Mechanics

Personnel that work on mechanical devices must be technically trained or have completed training provided by the manufacturer.

1.4.2 Electricians

Personnel that work on electrical devices must be technically trained or have completed training provided by the manufacturer.

1.4.3 Welders

Personnel that carry out welding work on equipment must be technically trained.

1.5 Typographical conventions

1.5.1 Explanation of the warning instructions

DANGER

Type and source of danger
Danger will result in death or serious injury.
▶ Actions for protecting against danger.

WARNING

Type and source of danger
Danger can result in death or serious injury.
▶ Actions for protecting against danger.

CAUTION

Type and source of danger
Danger can result in injury.
▶ Actions for protecting against danger.

NOTICE

Type and source of danger
Danger can result in property damage.
▶ Actions for protecting against property damage.

2 Safety

2.1 Designated use

- ▶ The machines of the conditioning system are intended to feed, mix and retain compressed products upstream of pellet presses in the following sectors:
- ▶ Mixed feed industry:
All common mixed feed, laboratory animal food, mineral compounds, dog food, fish food, prawn food, mixtures with ground straw, etc.
- ▶ Roughage industry:
(Only in connection with mixed feed factory or sugar factory Straw min. 60 % feed quota necessary)
Grass, straw, sugar beet slices, complete maize plants (ground), brewer's grains, olive marc.
- ▶ Seed oil industry:
All common break stocks and expellers, corn germ, delinted cottonseed hills, peanut shells
- ▶ Milling:
Bran, mill residues, corn gluten
- ▶ Product EX-characteristics, within whose limits the processed products must lie.

Designation and, if known, material no. from BIA material database	Feed products Milling products and further products	
	div	Unit
Grain size mean value		[µm]
Combustion class	≤5	BZ
Lower explosion limit	≥15	g/m ³
Ignition temperature	≥300	[°C]
Smoldering temperature	≥275	[°C]
Min. ignition energy	> 10	[MJ]
KSt value	< 150	Bar m/s

The machines are part of a production plant and are integrated in the plant's safety concept.

- ▶ Always use the machine in compliance with its intended use.
- ▶ Always operate the machine in accordance with these Operating instructions.

- ▶ The Conditioner is designed only to process the products in the contractually agreed field of application. Any use beyond that is considered contrary to its designated use.

2.2 Technical condition

If the machine is operated in defective condition, the safety, function and availability are impaired.

- ▶ Never operate the machine unless it is in proper technical condition.
- ▶ Always comply with the maintenance plan.
- ▶ Always use the original spare parts as listed in the Spare parts catalog.
- ▶ If the operating behaviour of the machine changes, check the machine for faults.
- ▶ Remedy all faults immediately.
- ▶ Never carry out unauthorised conversions or modifications to the machine.

2.3 ATEX ID

The ATEX ID indicates the conditions required for integrating the machine into an Ex zone or connecting the machine to an Ex zone.

- ▶ Observe the identification plate.

2.4 Personnel qualification

Unqualified personnel cannot identify risks and thus are subject to greater dangers.

- ▶ Always assign the activities listed in these Operating instructions to technically qualified personnel.
- ▶ The owner/operator must ensure that the personnel comply with the locally valid regulations and laws pertaining to safety and safety-conscious work.
- ▶ The owner/operator must assign responsibilities and tasks and inform personnel of these assignments. Give keys and passwords to authorised personnel only.

2.5 Securing the machine against unexpected start-up

If the machine starts up unexpectedly, individuals working on the machine could be injured severely

- ▶ Set the safety switch to “0” and lock it.
- ▶ Remove the key and keep it with you

2.6 Safety devices

If safety devices are not functioning effectively, people are at risk

Before opening the machine, ensure that all safety devices are functioning effectively.

2.7 Safety signs

If safety signs are not noticeable, people are at risk.

- ▶ Replace safety signs which are not noticeable.

- ▶ Do not remove or cover safety signs

2.8 Safe work environment

2.8.1 Slipping and stumbling hazard

Slippery surfaces and stumbling hazards can result in serious accidents.

- ▶ Always keep walkways, grips, steps, railings, platforms and ladders free of grease, oil, and other dirt.
- ▶ Never climb or walk on the machine and do not use it for storage. Use the provided steps and platforms only.
- ▶ Wear anti-slip safety shoes.

3 Technical data

3.1 Ambient conditions

Description	Value	Unit
Temperature range	10...+50	°C
Relative humidity, maximum	95	%

3.2 Operating materials

3.2.1 Gear oil

Refer to the documentation supplied by the manufacturer

3.3 Airborne sound emission

3.3.1 Measured data

Measured values (maximum values)

Designation	Value	Unit
¹⁾ Permanent sound pressure level at workplace Leq=	96.6	dB(A)
Equivalent sound pressure level in area around the machine Leq=	80	dB(A)
Measuring surface measure Leq=	16.6	dB(A)

1) according to ISO 6081

3.3.2 Operating conditions

Designation	Value	Unit
Product	cattle feed (coarse)	
Throughput	10	t/h
Speed	375	1/min
Settings	with retentioner AHVA	

3.4 Weights

3.4.1 Feeder

Description	Value	Unit
AHHA 60/1	165	kg
AHHA 60/2	170	kg
AHHA 60/3	200	kg

3.4.2 Mixer

Description	Value	Unit
AHCA 200	500	kg
AHCA 400	750	kg
AHCA 700	1200	kg

3.4.3 Retentioner

Description	Value	Unit
AHVA 700	850	kg
AHVA 1300	1070	kg
AHVA 2000	1800	kg

3.5 Planning instructions

- ▶ The conditioner is always integrated into a production line and is operated together with upstream or downstream machines.
- ▶ If inlets and outlets for the conditioning system are not supplied by Bühler, they are to be designed in accordance with our specifications and regulations.

3.5.1 Mixer

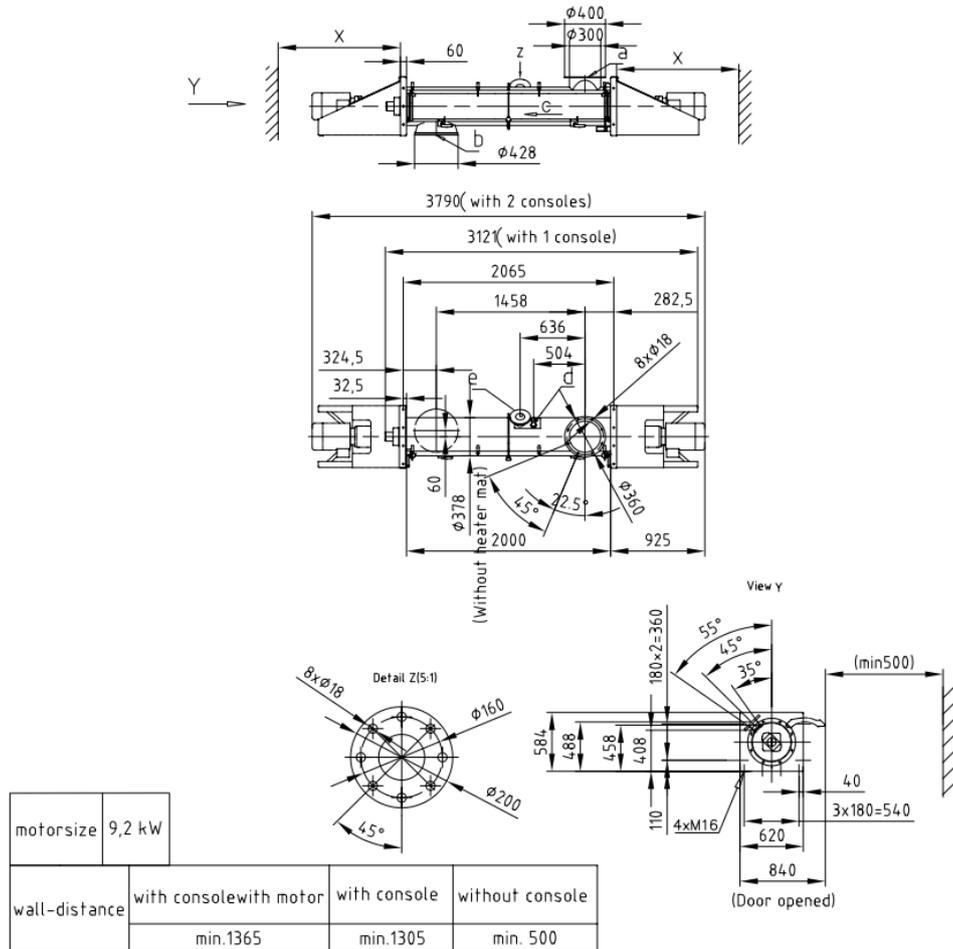


Fig. 3.1 Installation plan Mixer 200

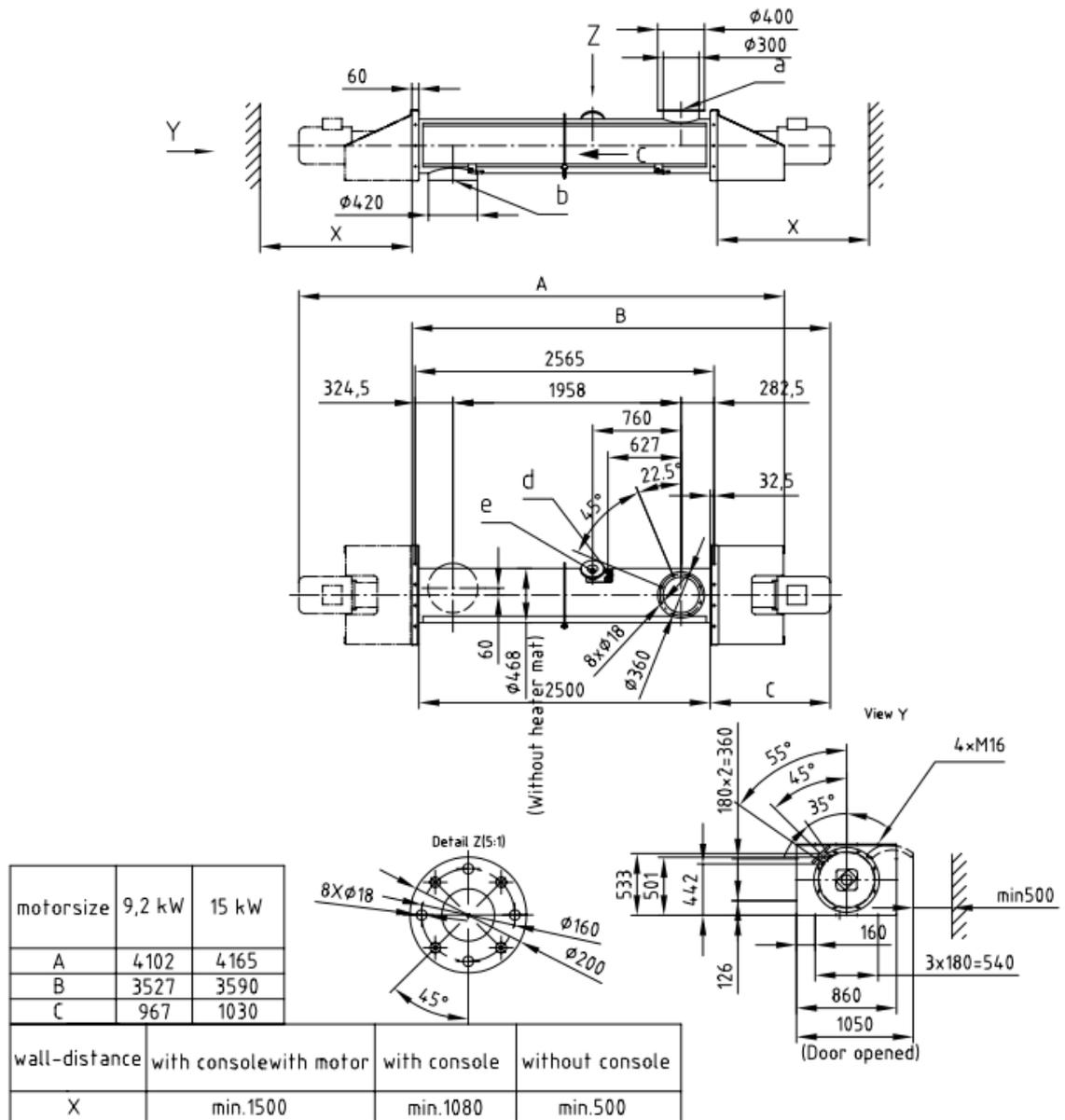


Fig. 3.2 Installation plan Mixer 400

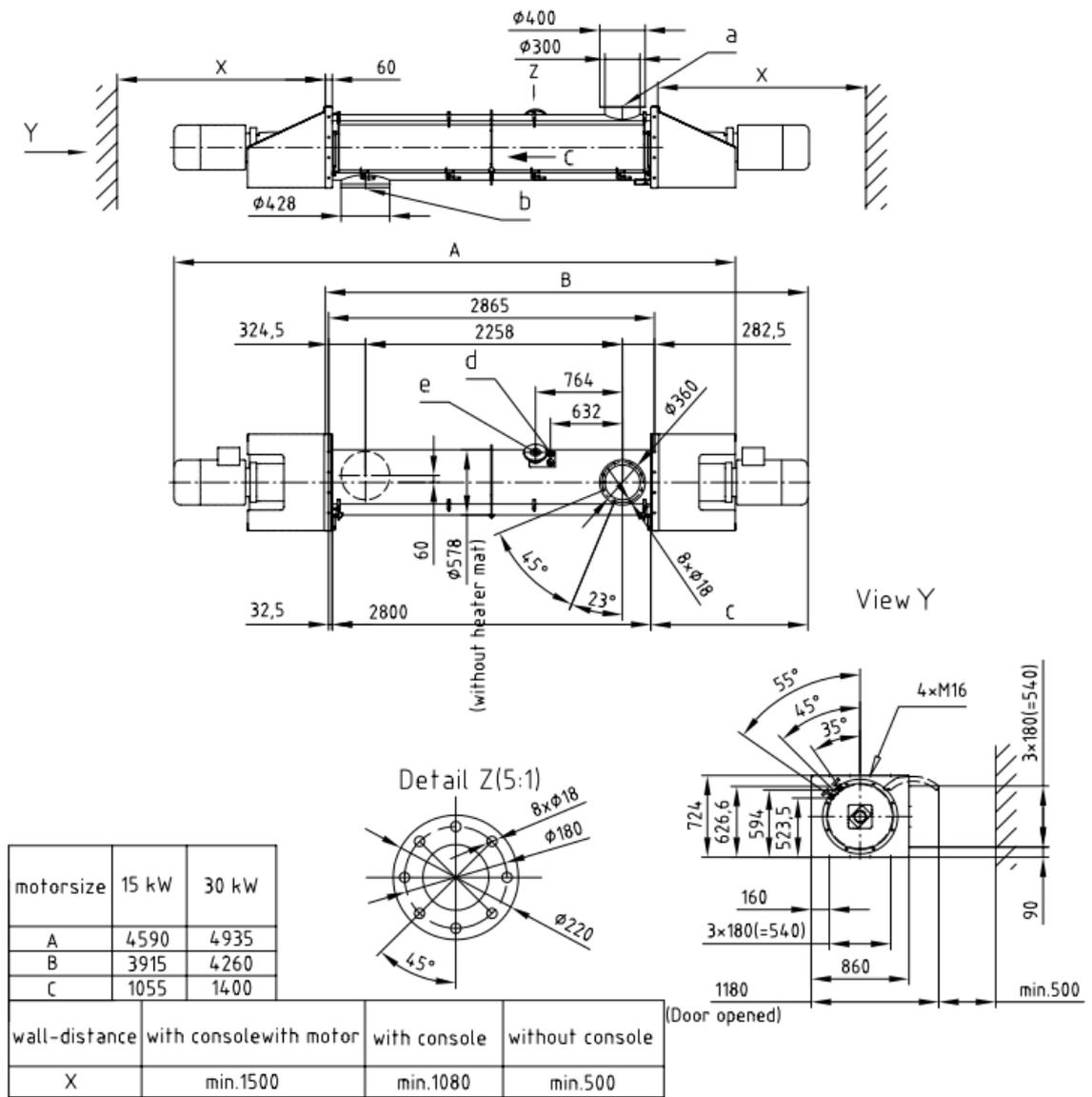


Fig. 3.3 Installation plan Mixer 700

3.5.2 Retentioner

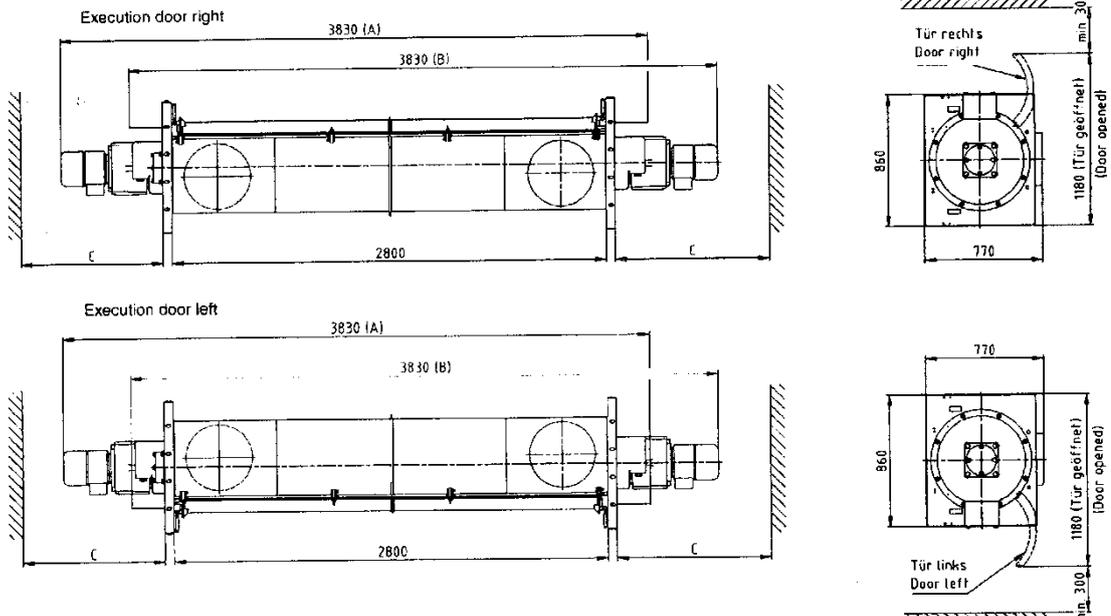


Fig.3.5 Installation plan Retentioner 700

A: Motor inlet side
B: Motor outlet side

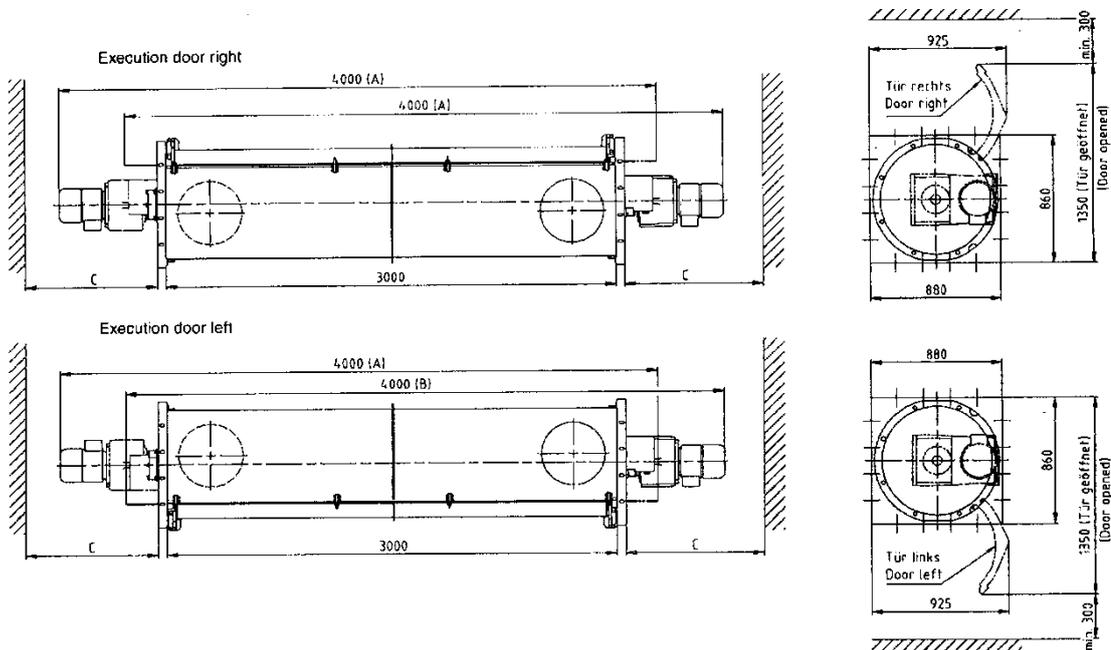


Fig.3.6 Installation plan Retentioner 1300

A: Motor inlet side
B: Motor outlet side

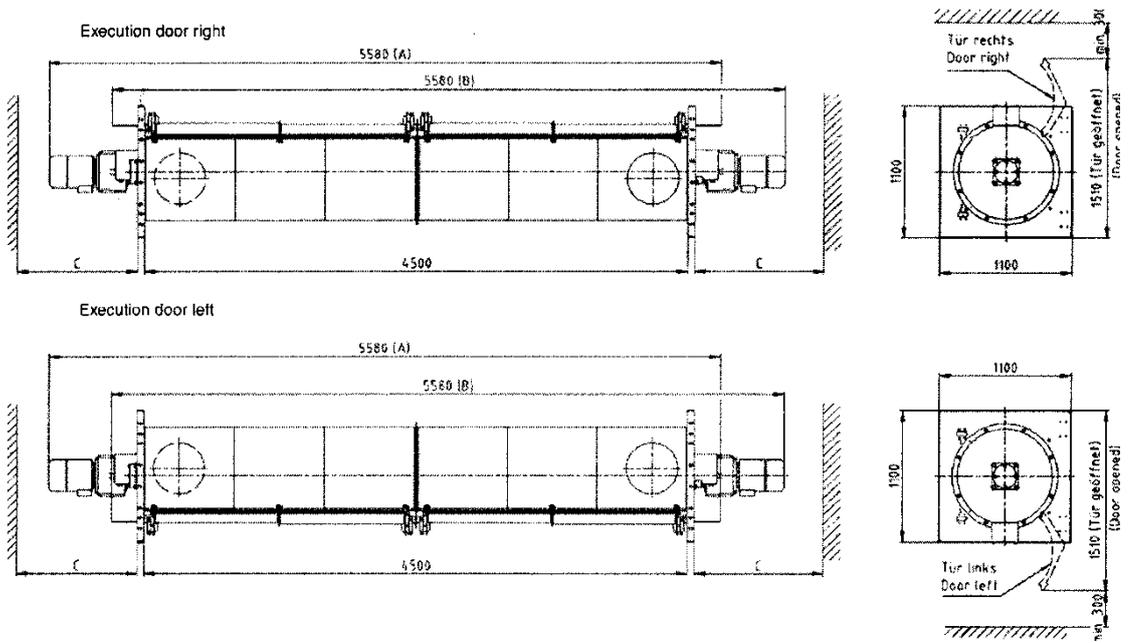


Fig.3.7 Installation plan Retentioner 2000

A: Motor inlet side
 B: Motor outlet side

3.6 Dimensions

3.6.1 Feeder AHHA-60

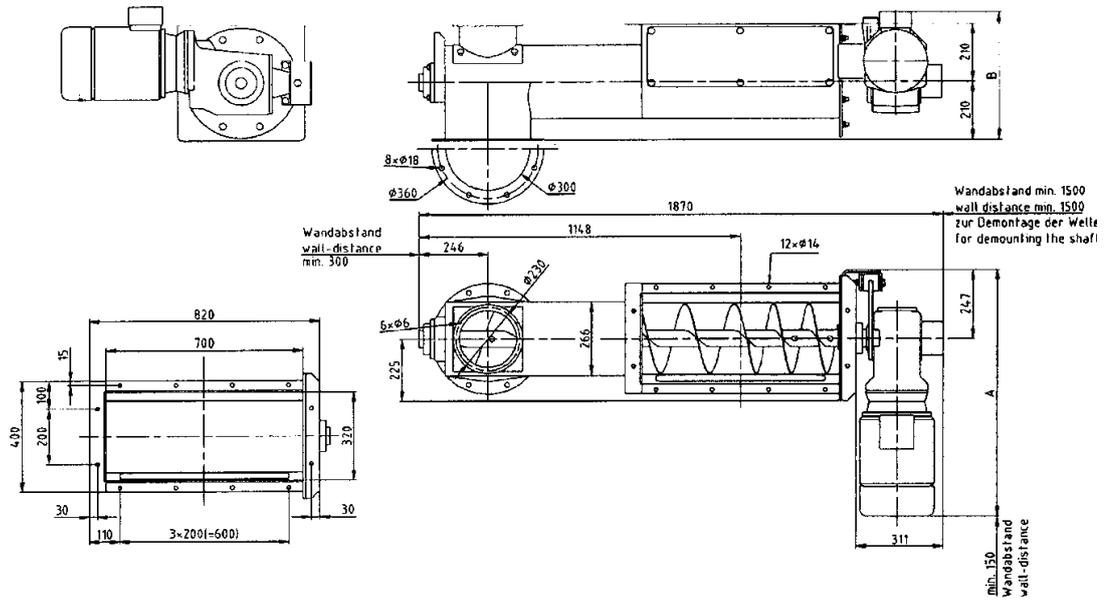


Fig.3.8 Dimensioned drawing Feeder 60

Motor size	2.2kW	4.0kW	5.5kW
	(60/1)	(60/2)	(60/3)
A	770	790	890
B	450	462	487

3.6.2 Mixer AHCA-200

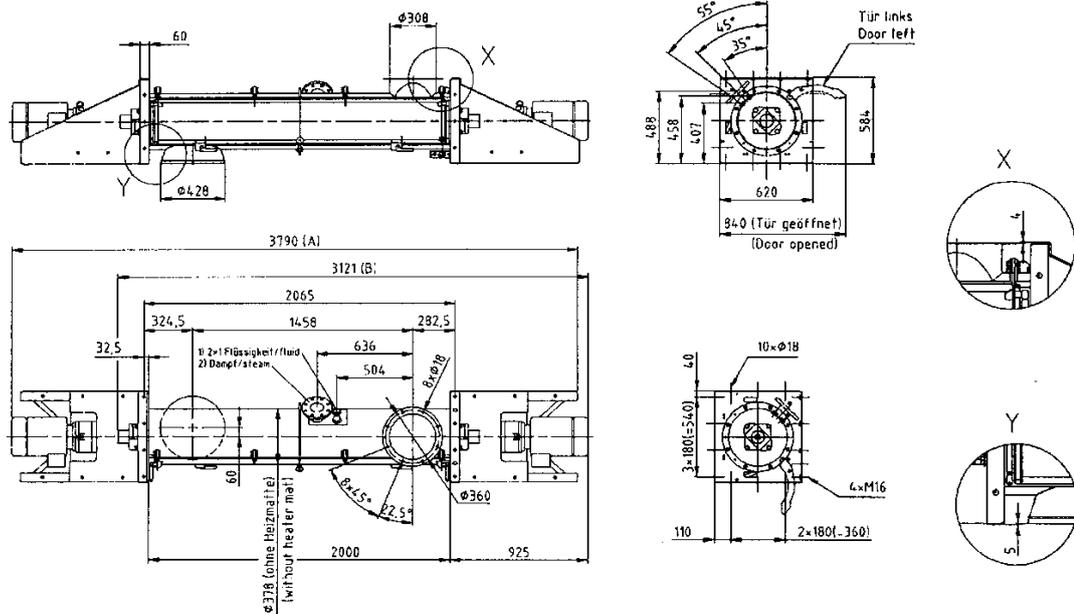


Fig.3.9 Dimensioned drawing Mixer 200 left

- A: with 2 consoles
- B: With 1 console
- 1) Liquid connection 2x1"
- 2) Steam connection NW80/PN16

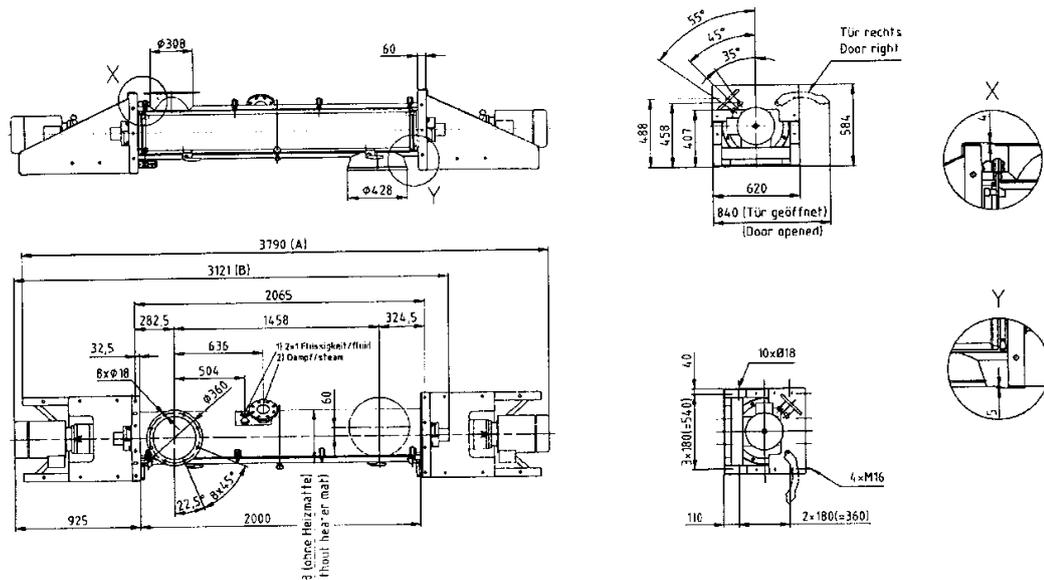


Fig.3.10 Dimensioned drawing Mixer 200 right

- A: with 2 consoles
- B: With 1 console
- 1) Liquid connection 2x1"
- 2) Steam connection NW80/PN16

3.6.3 Mixer AHCA-400

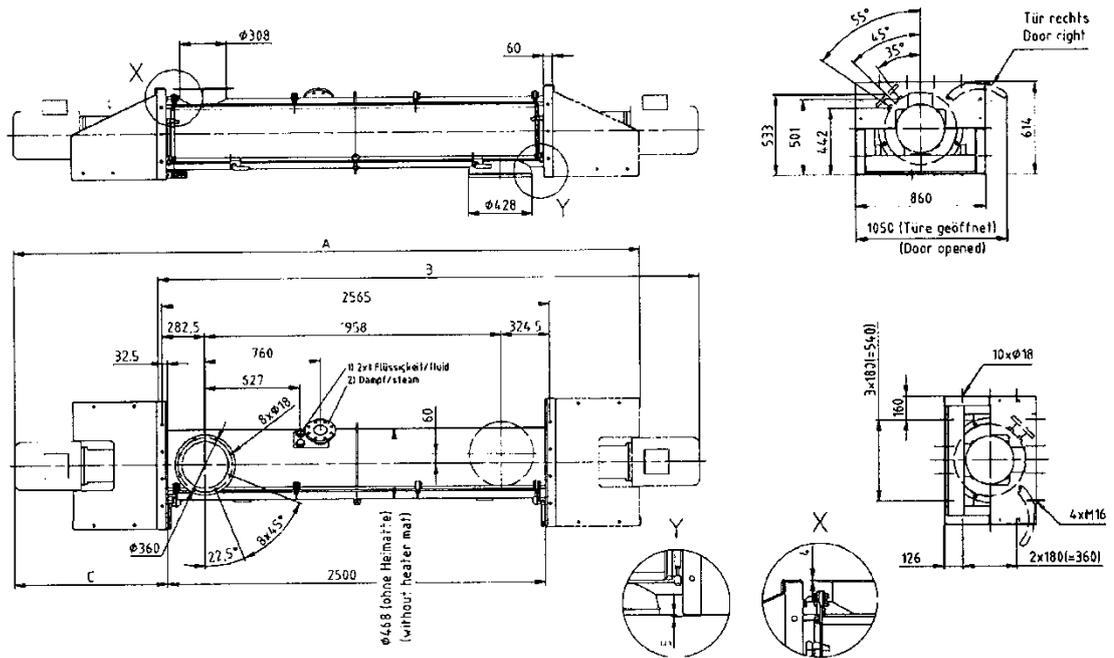


Fig.3.11 Dimensioned drawing Mixer 400 left

Motor size	9.2kW	15kW	1) Liquid connection 2×1"
A	4110	4170	2) Steam connection NW80/PN16
B	3540	3600	A : with 2 consoles
C	990	1050	B : with 1 consoles

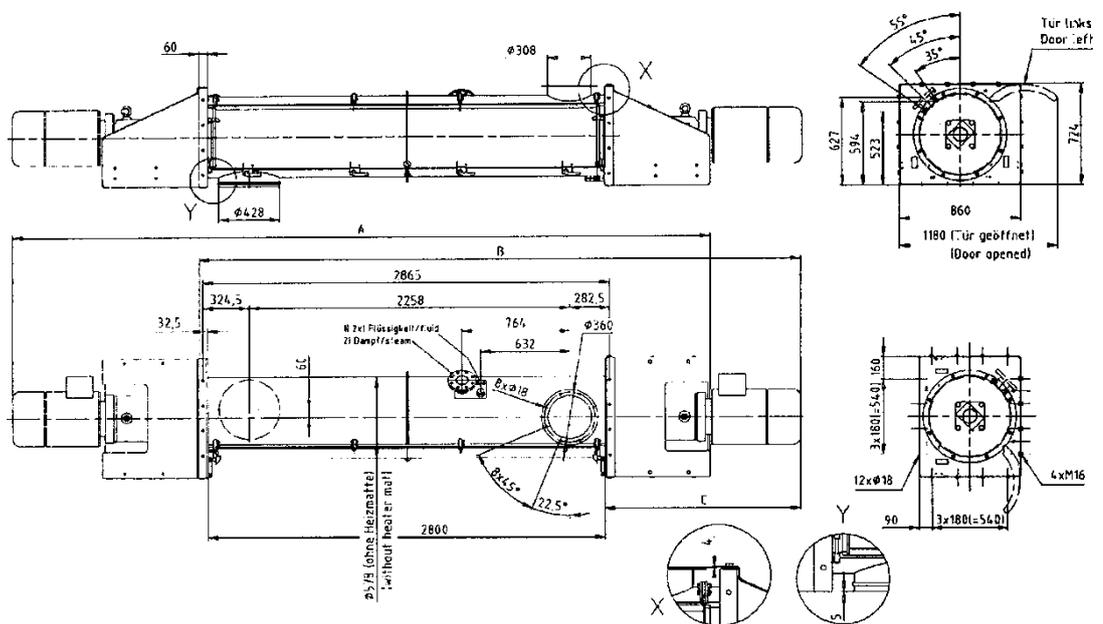


Fig.3.12 Dimensioned drawing Mixer 400 right

Motor size	9.2kW	15kW	1) Liquid connection 2×1"
A	4110	4170	2) Steam connection NW80/PN16
B	3540	3600	A : with 2 consoles
C	990	1050	B : with 1 consoles

3.6.4 Mixer AHCA-700

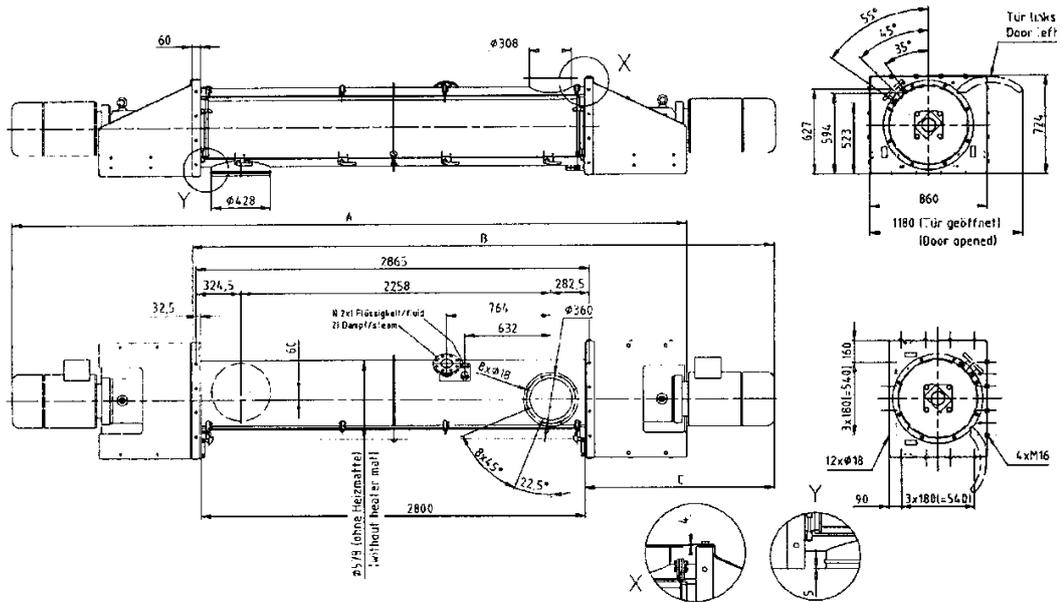


Fig.3.13 Dimensioned drawing Mixer 700 left

Motor size	15kW	30kW	1)Liquid connection 2×1"
A	4590	4935	2)Steam connection NW80/PN16
B	3915	4260	A : with 2 consoles
C	1055	1400	B : with 1 consoles

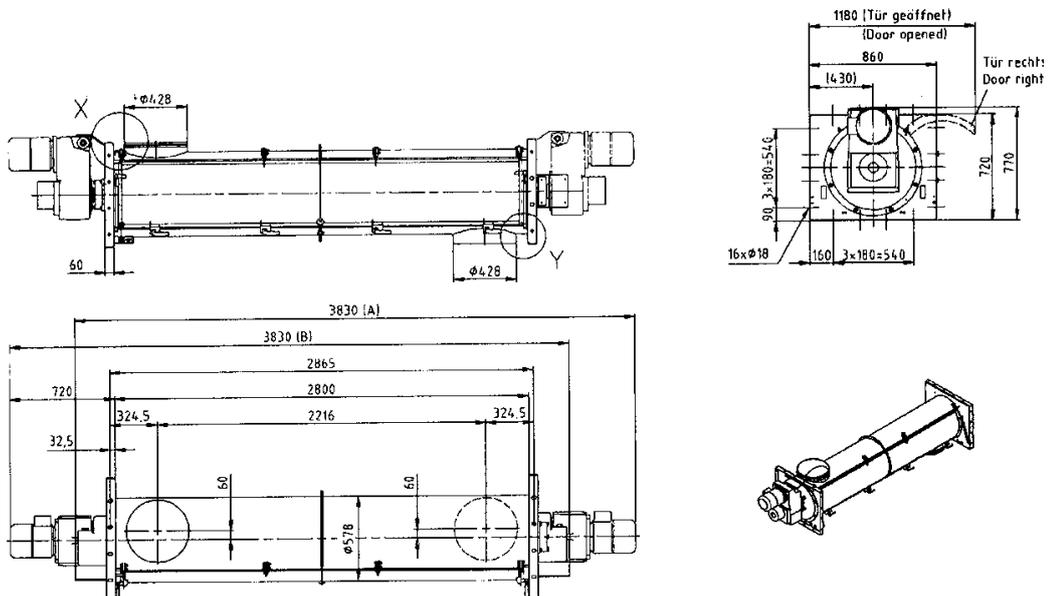
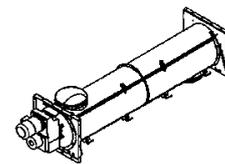


Fig.3.14 Dimensioned drawing Mixer 700 right

Motor size	15kW	30kW	1)Liquid connection 2×1"
A	4590	4935	2)Steam connection NW80/PN16
B	3915	4260	A : with 2 consoles
C	1055	1400	B : with 1 consoles



3.6.5 Retentioner AHVA-700

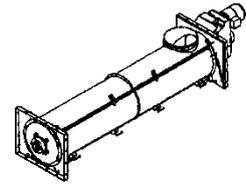
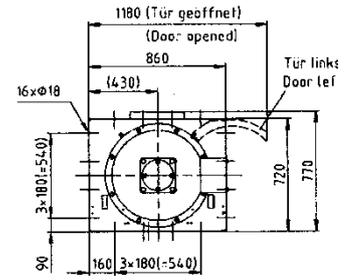
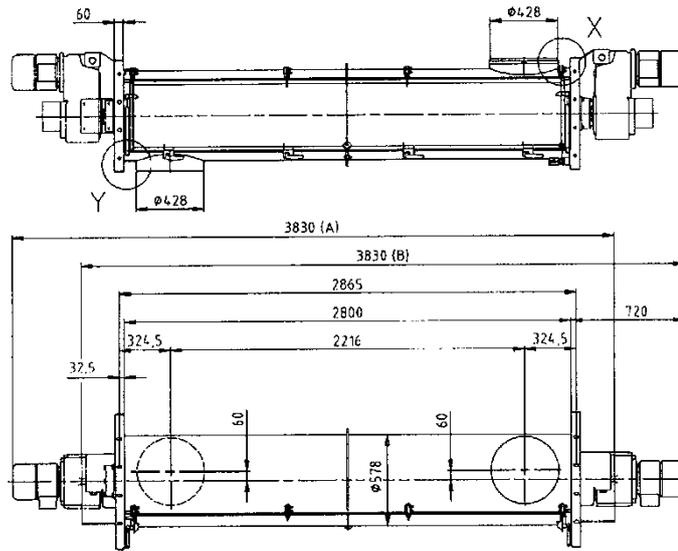


Fig.3.16 Dimensioned drawing Retentioner 700 left

A: Motor inlet side
B: Motor outlet side

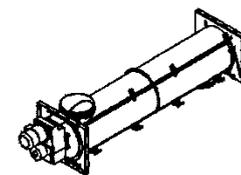
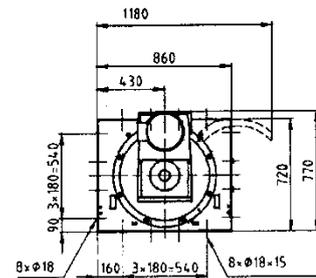
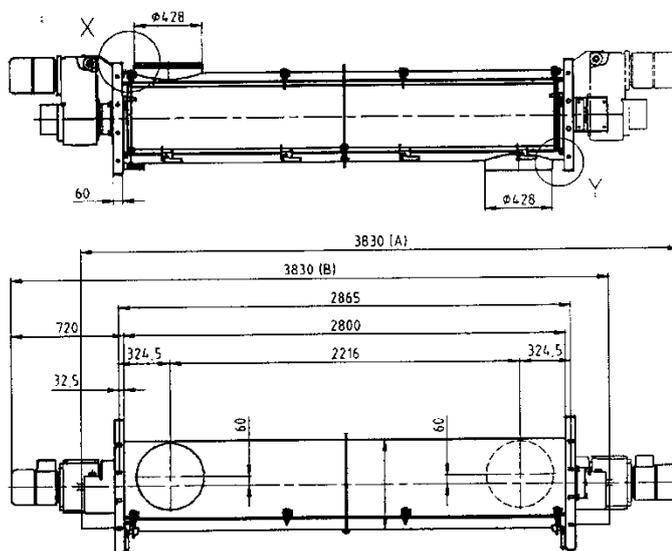


Fig.3.17 Dimensioned drawing Retentioner 700 right

A: Motor inlet side
B: Motor outlet side

3.6.6 Retentioner AHVA-1300

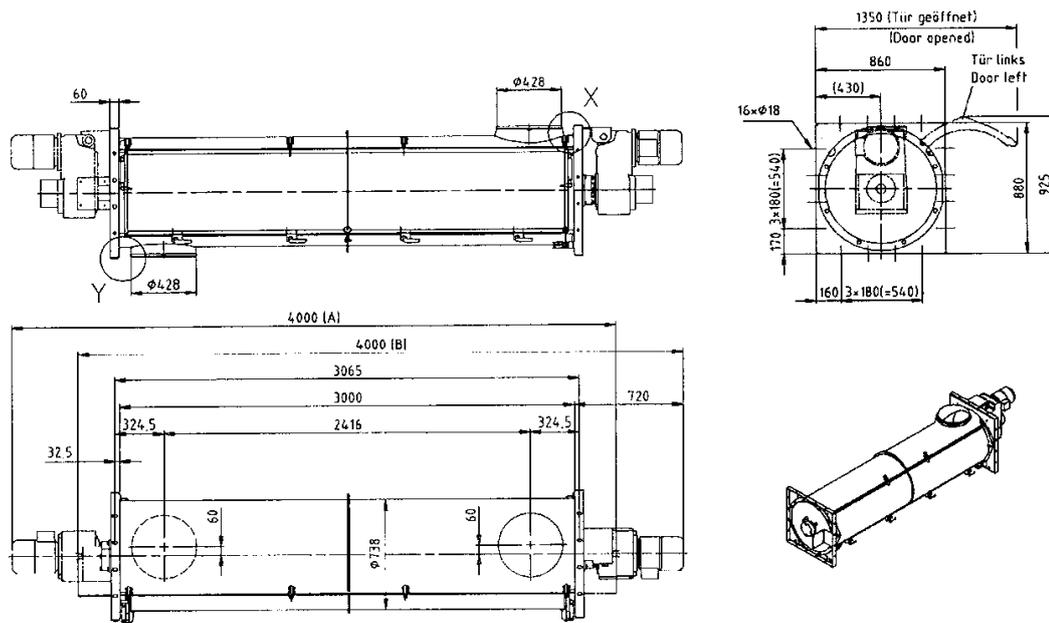


Fig.3.18 Dimensioned drawing Retentioner 1300 left

A: Motor inlet side
B: Motor outlet side

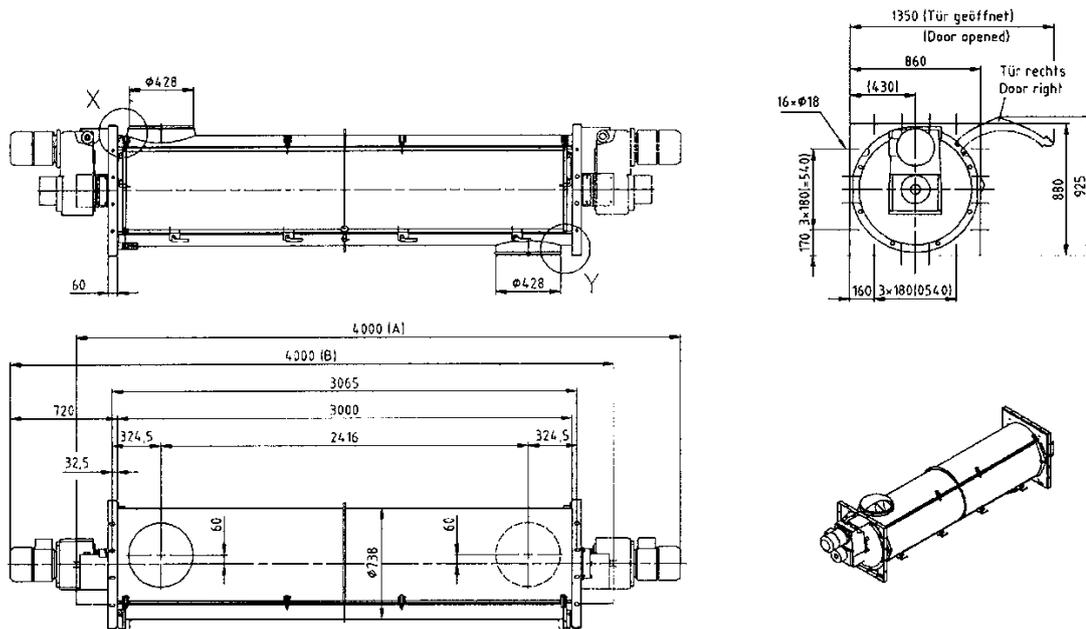


Fig.3.19 Dimensioned drawing Retentioner 1300 right

A: Motor inlet side
B: Motor outlet side

3.6.7 Retentioner 2000

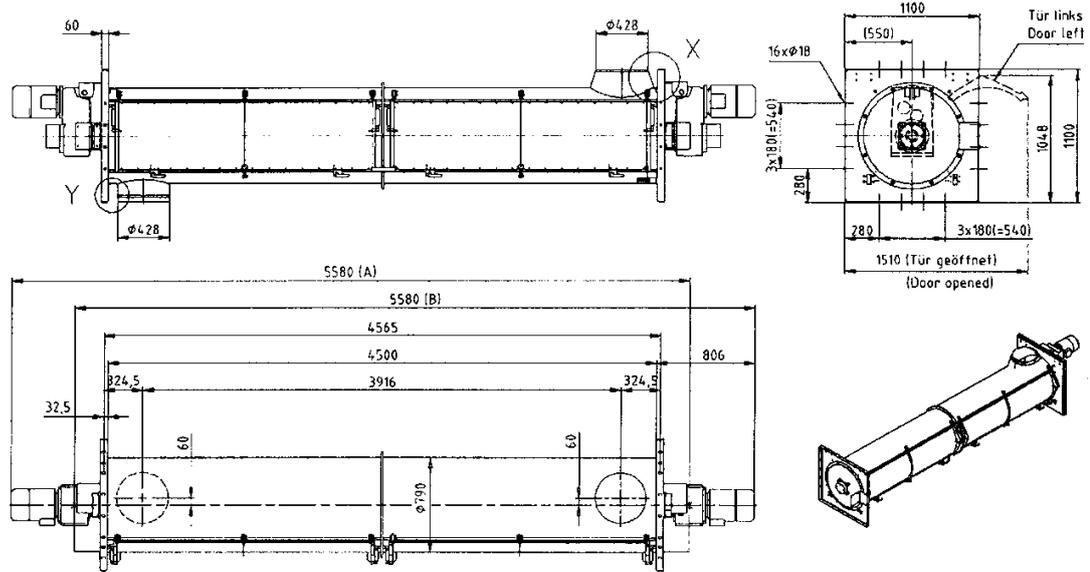


Fig.3.20 Dimensioned drawing Retentioner 2000 left

A: Motor inlet side
B: Motor outlet side

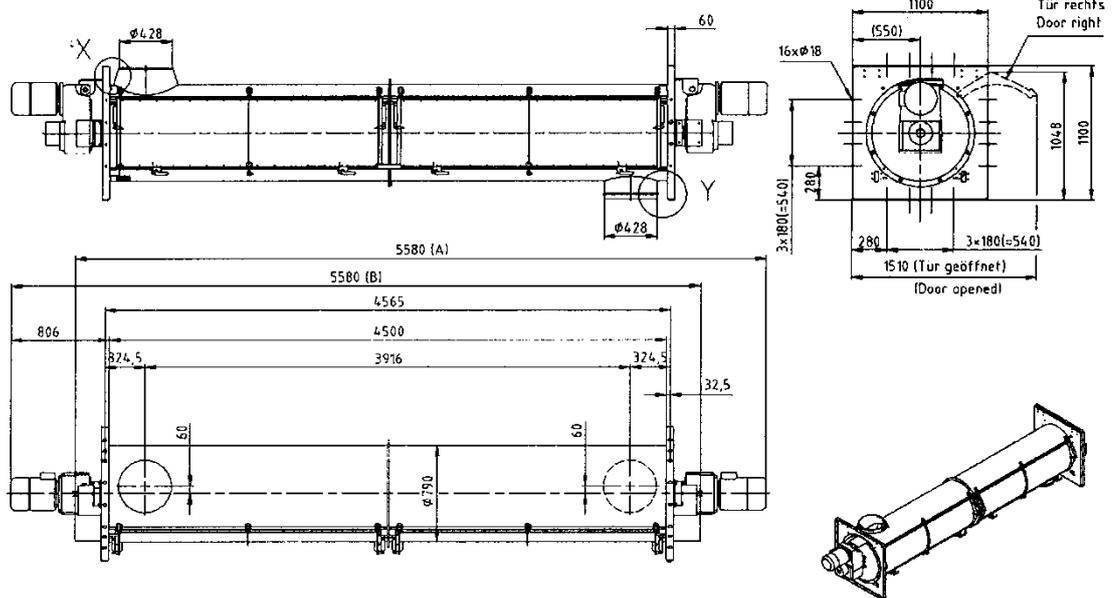


Fig.3.21 Dimensioned drawing Retentioner 2000 right

A: Motor inlet side
B: Motor outlet side

3.7 Electrical specifications

3.7.1 Feeder

Description	Value	Unit
AHHA -60/1	2.2	kW
AHHA -60/2	4.0	kW
AHHA -60/3	5.5	kW

3.7.2 Mixer

Description	Value	Unit
AHCA -200	9.2	kW
AHCA -400	9.2 / 15.0	kW
AHCA -700	15.0 / 30.0	kW

3.7.3 Retentioner

Description	Value	Unit
AHVA -700	2.2	kW
AHVA -1300	4.0	kW
AHVA -2000	5.5	kW

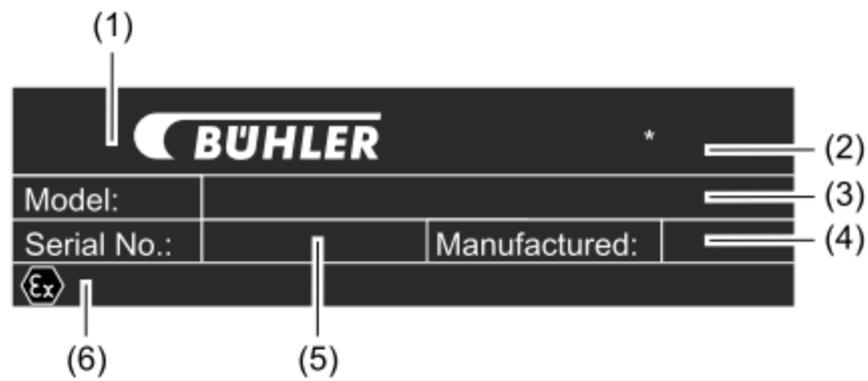
3.8 Pneumatic system

Description	Value	Unit
Pressure	4.0	Bar
Connection diameter	T ½	Zoll
Air consumption	2	NI/h

4 Description

4.1 Identification

4.1.1 Nameplate



- (1) Manufacturer
- (2) Place of manufacture
- (3) Machine type
- (4) Year of Manufacture
- (5) Machine number
- (6) ATEX designation

Position Feeder



Position Mixer



Position Retentioner



4.1.2 Specification key

AHHA -60 Ex

AHHA Feeder

60 Volume of machine in liters

Ex Approval for potentially explosive zone

AHCA -400-Ex

AHCA Mixer

200, 400, Volume of machine in liters

700

Ex Approval for potentially explosive zone

AHVA -1300-Ex

AHVA Retentioner

700, 1300, Volume of machine in liters

2000

Ex Approval for potentially explosive zone

4.1.3 ATEX ID for use in Ex zone 22

The ATEX ID indicates the conditions required for integrating the machine into an Ex zone or connecting the machine to an Ex zone.

 II 3/3D T=135 °C X

Explanation of symbols:

 — ATEX symbol

II — Device group

3/ — Internal category 3

/3 — External category 3

D — Dust atmosphere

T — Maximum expected surface temperature in °C in normal operation at full load with an ambient temperature of 40 °C.

X — Instructions in the Operating instructions for maintaining explosion protection equipment are indicated with the Ex symbol.

4.1.4 ATEX ID without approval for potentially explosive zone

 II 3/-D T135°C

Explanation of symbols:

 — ATEX symbol

II — Device group

3/ — Internal category 3

/- — No approval for use within an Ex zone

D — Dust atmosphere

T — Maximum expected surface temperature in °C in normal operation at full load with an ambient temperature of 40 °C.

X — Instructions in the Operating instructions for maintaining explosion protection equipment are indicated with the Ex symbol.

4.2 Overview

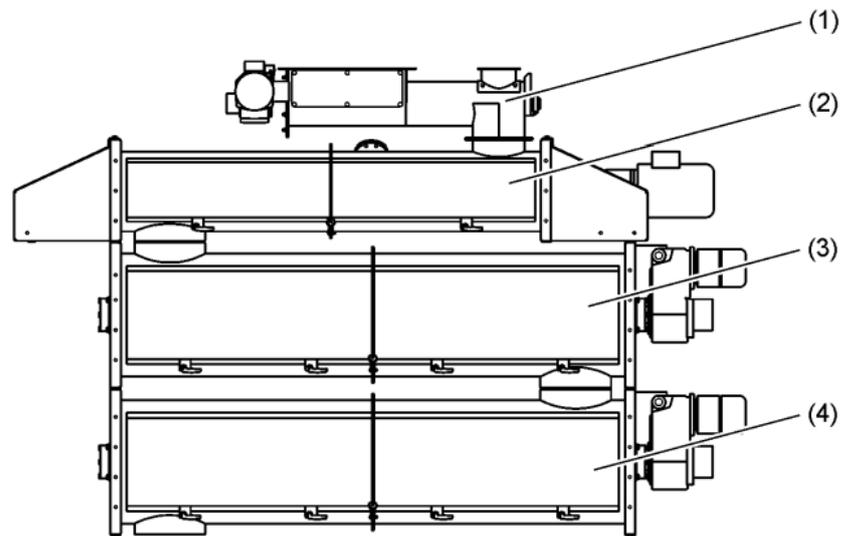


Fig.4.1 Design

- (1) Feeder
- (2) Mixer
- (3) Retentioner 1 (optional)
- (4) Retentioner 2 (optional)

4.3 Function

- ▶ The product to be processed is fed into the mixer via the feeder unit.
- ▶ Steam and liquids are introduced into the product at high circumferential speed in the mixer.
- ▶ In the retentioner, the conditioned product is maintained at a certain temperature for a defined time. It is designed in 1 or 2 dwell sections.

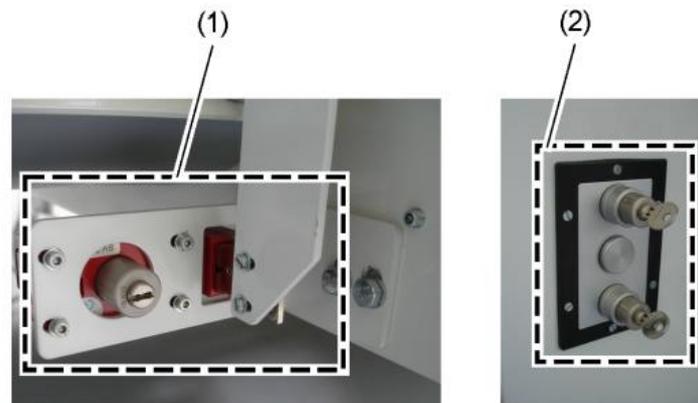
4.3.1 Temperature sensor unit PT100

The temperature sensor unit PT100 consists of a temperature sensor and a pneumatic cylinder that cleans the sensor automatically

4.4 Protective devices

4.4.1 Key-operated locking unit

The locking unit with separate installed key box prevents the mixer and retentioner doors from being opened during operation.



(1) Locking unit

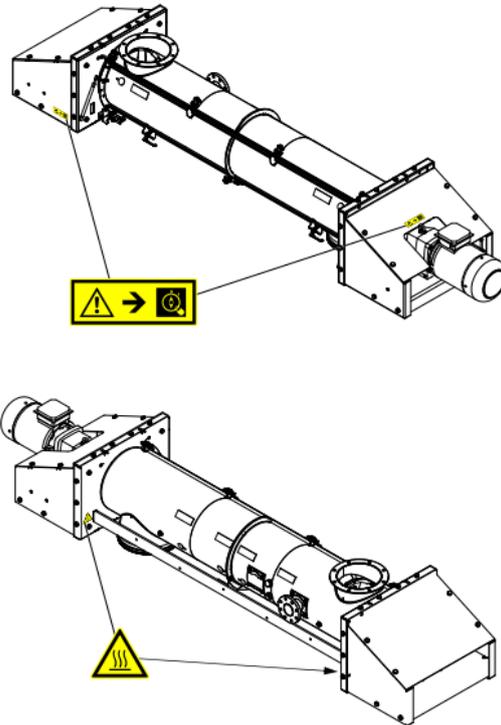
(2) Key box

- ▶ To start the mixer and retentioner motors, all keys of the interlocking mechanisms must be removed from the mixer and retentioner doors. The keys can only be removed when the doors are closed. The keys must be inserted into the key box and turned to the left.
- ▶ At the same time as the retentioner and mixer motors start up, all keys are electro-magnetically locked in the key box and can therefore not be removed during operation.
- ▶ After the retentioner and mixer motors are switched off, release of the key box is delayed by a timing delay so that it is not possible to remove the keys and thus open the retentioner and mixer doors before the retentioner and mixer motors are at a standstill.

4.4.2 Monitoring of heating mats

- ▶ If the heating mats are damaged, the residual current breaker deactivates the mats

4.5 Safety warning notices



4.6 Options

4.6.1 Heating mats

Mixer and retentioner can be equipped with heating elements.

Heating mats are electrical resistance heaters, which are sealed in a silicone mat and stuck directly onto the surfaces to be heated.

- ▶ They heat the machine surface
- ▶ They reduce condensation in the machine
- ▶ The temperature of the heating mats is regulated via the control system and a temperature sensor, which is built into the heating elements

4.6.2 Hot air

The hot air system is regulated via the control system.

The conditioner system is heated before production start

- ▶ Prevents condensation in the machines

Steam is extracted on feeder outlet and pellet mill inlet during production

The conditioner system is heated after production

- ▶ Drying out of the machines reduces condensation and improves the hygienic conditions in the system.

5 Transport

5.1 Packaging symbols



1

1、 This side up



2

2、 Protect from moisture

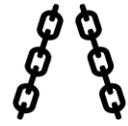


3



4

4、 Fragile



5

5、 Attach here

- ▶ Observe the packaging symbols.

NOTICE

- ▶ The transport must only be handled by persons who are familiar with and trained for this task.

5.2 Checking the delivery

- ▶ Check the delivery for completeness according to the delivery note.
- ▶ Report any missing parts or transport damage. See Chapter "**Fehler! Verweisquelle konnte nicht gefunden werden. Fehler! Verweisquelle konnte nicht gefunden werden.**".

5.3 Intermediate storage

- ▶ Observe the packaging symbols.
- ▶ Leave the machine and machine parts in the original packaging until beginning the installation.
- ▶ Do not store the machine outdoors.
- ▶ Protect the machine from the effects of weather.
- ▶ Avoid temperature fluctuations.
 - Temperature fluctuations cause corrosion from condensation.
- ▶ If the machines or installation assemblies are not installed immediately after delivery, they must be stored carefully in a sheltered, vibration-free place.
- ▶ The machine must never be placed directly on the ground.

5.4 Lifting instructions

DANGER

- ▶ Do not pass beneath suspended loads.

NOTICE

- ▶ The crane and lifting gear has to be checked for the required design and the permissible load capacity.
- ▶ Use only the specified points of suspension for lifting the machine.
- ▶ Use only the transport devices supplied.

NOTICE

- ▶ Generally the transport weights in the shipping papers apply and have to be observed!

NOTICE

- ▶ Only lift machine with assembling devices supplied (Fig. 5.1) !
- ▶ Only transport machine separately (Fig. 5.1, 5.3) !
- ▶ Do not lay ropes, chains etc. around the housing (Fig. 5.2) !

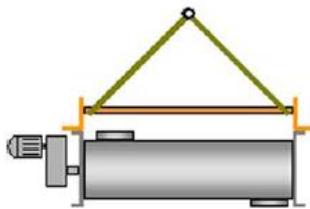


Fig. 5.1

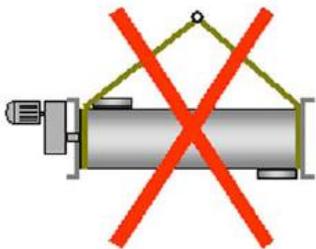


Fig. 5.2

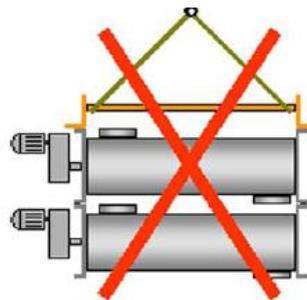
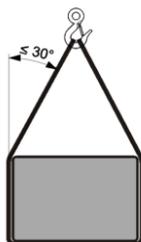


Fig. 5.3



6 Installation

6.1 Site conditions

- ▶ Space requirements, floor openings, bearing surfaces, floor loads according to separate planning instructions.

NOTICE

- ▶ Perfect functioning and operational safety of the Conditioner depend largely on how it is installed on site!
- ▶ There must be enough space around the Conditioner for cleaning, maintenance and service (see installation diagram).
- ▶ If parts of the Conditioner are not at working height, work platforms and steps must be available for operation and maintenance.
- ▶ Quick, unhindered access to the cleaning doors must be ensured (see installation diagram).
- ▶ There must be enough space to replace shaft segments of the mixer (see installation diagram).
- ▶ Observe floor load

6.2 Positioning of the machines

6.2.1 Screwing

1. Align feeder, mixer and retentioner with spirit level.
2. Mounting onto press or mixer/retentioner onto each other:

NOTICE

- ▶ The machines expand differently when they heat up. Therefore, the following is to be observed when bolting the machines together.

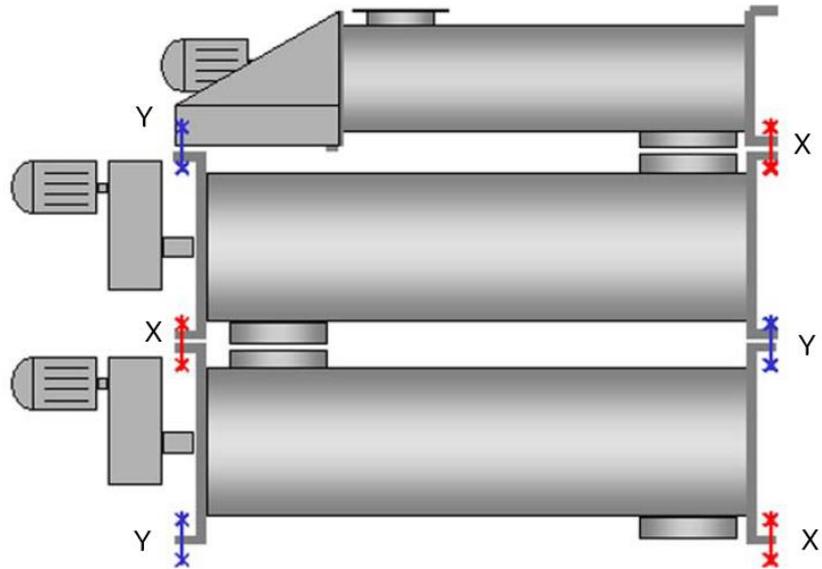


Fig. 6.1

Observe longitudinal expansion, bolt tightly onto product pass, bolt opposite side down loosely with stop/locking bolts, insert washers supplied in between.

X= Tighten connection bolts fully

Y= Do not tighten connection bolts fully

Retentioner 2000:

support retentioner at center with retaining bracket supplied

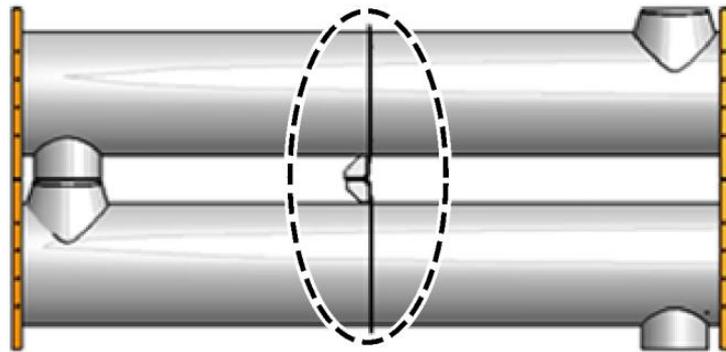


Fig 6.2

3. Installation of machines up or down on separate supports:

with long (soft) supports: bolt the machines tightly on both sides; otherwise proceed according to point 2.

6.2.2 Connection

- ▶ Install effective protection against foreign bodies as close as possible upstream of the Conditioner (magnet and if possible heavy particle separator).

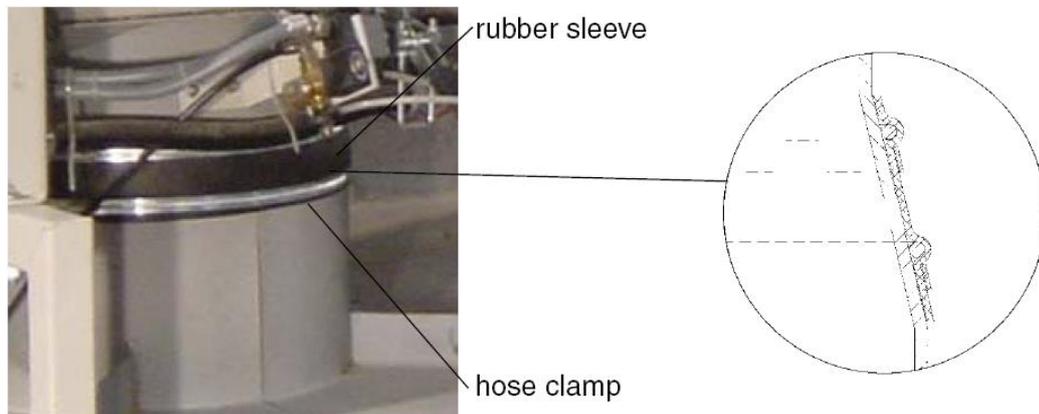


Fig. 6.2

NOTICE

- ▶ The nozzles must not be subjected to loads.

Transition from mixer to retentioner or from retentioner to retentioner

- ▶ All weight forces are absorbed by the side panels.
- ▶ The outlet of the mixer and the inlet and outlet of the retentioner do not absorb any forces and are not located directly next to one another. The distance between them should be approx. 10 mm.
- ▶ This gap is covered with an elastic sleeve, which is connected to the nozzles with pipe clips (see Fig. 6.2).

6.2.3 Machine transitions

The feeder is supplied with a connection flange for the surge hopper

Parts upstream and downstream the conditioning system must be designed in a such a way that is it not possible to reach into the machine during operation. The specifications according to EN 294 must be observed

6.3 Connection of utilities

6.3.1 Electrical systems

Electrical work should be performed by an electrician



Fig 6.3

Apart from the main motor, all electrical components are pre-wired in the terminal box

6.3.2 Steam and Liquids

- ▶ Steam and up to 2x3 % liquids can be added to the mixer AHCA-200/-400/-700.
 - ▷ Steam addition: 0...5 % of press throughput
 - ▷ Molasses addition: 0...3 % of press throughput
 - ▷ Water addition: 0...3 % of press throughput
 - ▷ Fat addition: 0...3 % of press throughput
- ▶ The values for additions greatly depend on the compressibility of the product and are to be adjusted accordingly.

NOTICE

- ▶ Connections for steam are to be made by the customer in accordance with local regulations.
- ▶ The regulations for quality and quantity of steam are to be observed.
- ▶ Insulate supply and drainage lines and check for air-tightness after connecting and flush well in order to remove dirt.

NOTICE

- ▶ Connect fittings to the machine preferably with a flexible sleeve, in order to prevent transmission of vibrations.

6.3.3 Compressed air connections

- ▶ The pre-condition for correct working is correct supply of compressed air.
- ▶ Compressed air for fittings.

6.4 Earthing

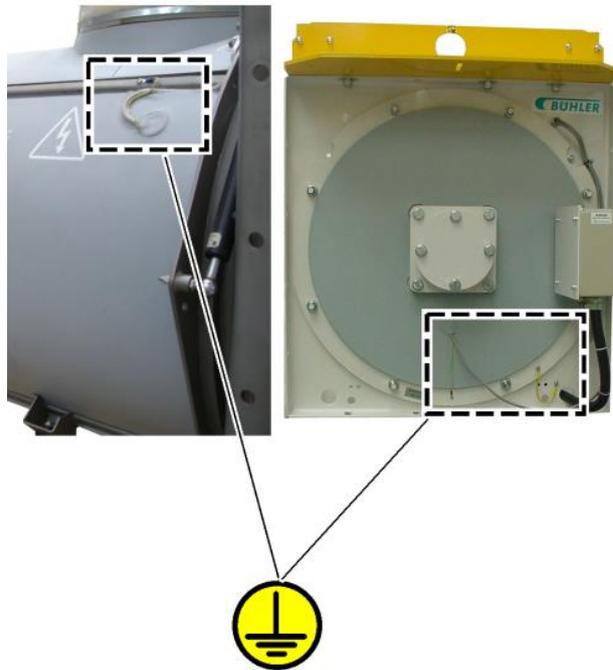


Fig 6.4

Check:

- ▶ The contact washer must pierce through the coating to ensure electrical conductivity
- ▶ Inspect the screw connection
- ▶ Resistance across butt joints may not exceed 10 Ohms. If resistance exceeds 10 Ohms restore electrical conductivity

7 Commissioning

7.1 Checking commissioning

No. Check

-
- | | |
|----|--|
| 1 | All transport aids and assembly fixings have been removed. |
| 2 | Electrical installation has been carried out and checked by an authorized, qualified electrician. |
| 3 | All electrical terminal boxes and plug sockets are closed. |
| 4 | Machine is earthed to the building |
| 5 | Motors are turning in correct direction. |
| 6 | Mixer motor is in line with paddle shaft. |
| 7 | All control elements, safety devices, and warning systems are working properly. |
| 8 | A lockable safety switch is present, and personnel have a matching padlock. |
| 9 | All screwed/bolted connection have been tightened as specified. See Chapter "installation". |
| 10 | The machines are fitted on scaffolding and lifting gear such that longitudinal expansion of the machine due to heat is possible. |
| 11 | There are no foreign objects in the machine. |
| 12 | All gear motors, bearing etc. have been filled with lubricant. |
| 13 | Lubricant fill levels are correct. |
| 14 | All connections for the lines are leak tight. |
| 15 | Coupling clearance is correct. |
| 16 | Bearing is set correctly. |
| 17 | Clearance between paddle and housing is correct. |
-

7.1.1 Checking feeder bearing

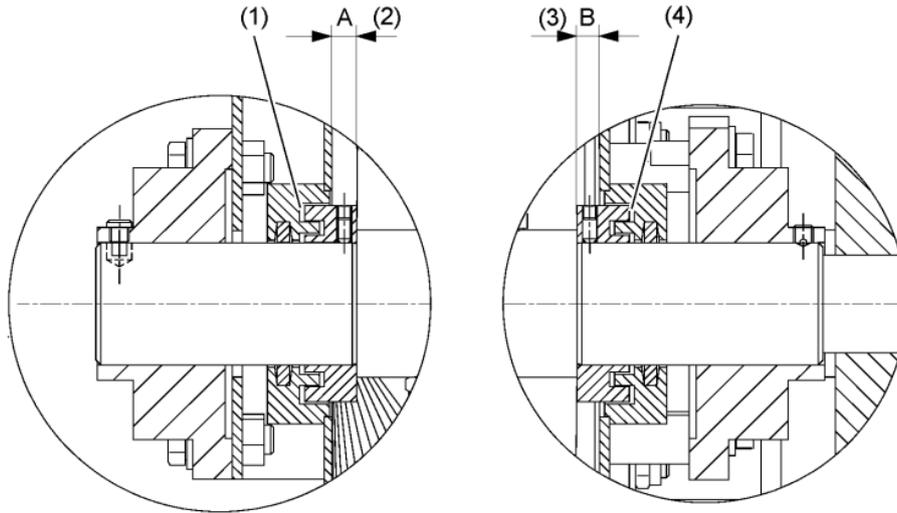


Fig. 7.1 Bearing Feeder

- (1) Floating bearing, gap 2mm
- (2) Floating bearing, A = 11mm
- (3) Fixed bearing, B = 10
- (4) Fixed bearing, gap 2mm

7.1.2 Checking mixer bearing

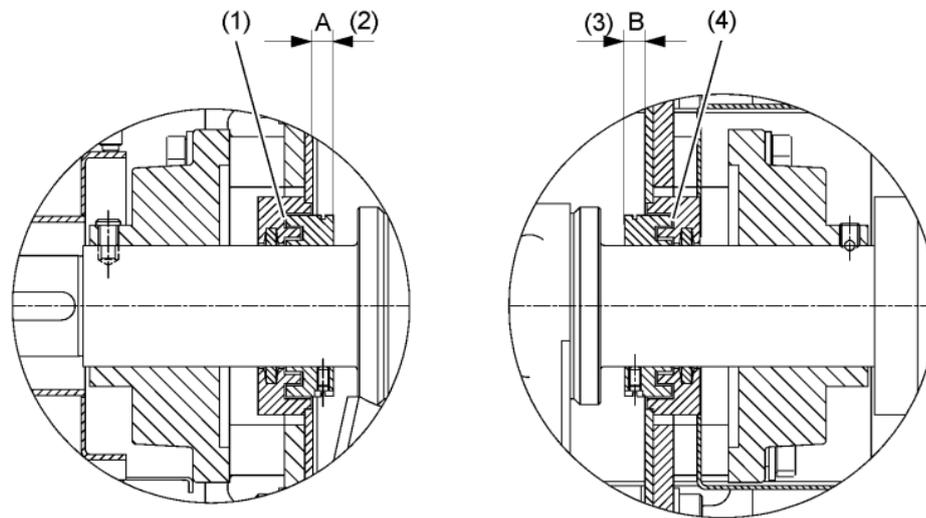


Fig. 7.2 Bearing Mixer

- (1) Floating bearing, gap 2mm
- (2) Floating bearing, A = 11mm
- (3) Fixed bearing, B = 10
- (4) Fixed bearing, gap 2mm

7.1.3 Checking retentioner bearing

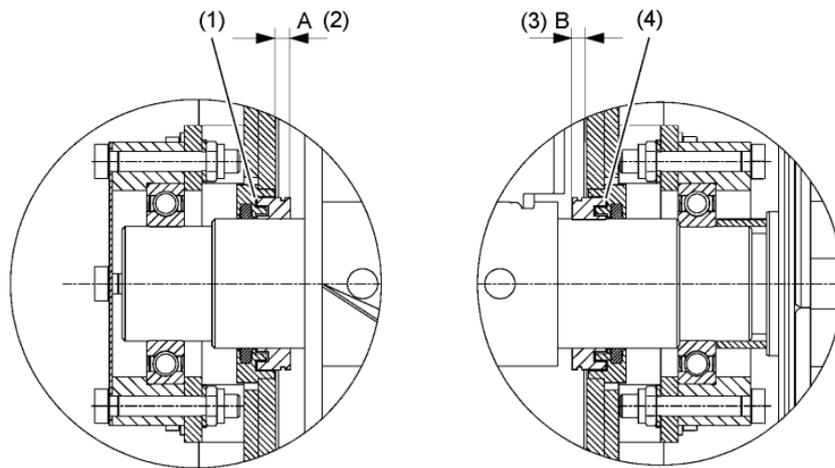


Fig. 7.3 Bearing Retentioner

- (1) Floating bearing, gap 2mm
- (2) Floating bearing, A = 11mm
- (3) Fixed bearing, B = 10
- (4) Fixed bearing. gap 2mm

7.2 Checking safety devices

7.2.1 Checking interlock switch

Run function test for mixer and retentioner door interlock switch separately.

1. Turn on the control system.
2. Start mixer or retentioner motor.
3. With motor running check that
 - ▶ Mixer or retentioner door cannot be opened.
 - ▶ Mixer or retentioner door is locked.
 - ▶ Key cannot be removed from the key box built into the switch cabinet.
4. Switch off mixer or retentioner motor.
5. With mixer or retentioner motor running down check that
 - ▶ after 18 seconds, key cannot be removed from the key box built into the switch cabinet.
 - ▶ after 22 seconds, key can be removed from the key box built into the switch cabinet.
6. With mixer or retentioner motor stationary check that
 - ▶ if a key in the key box is turned to the right
→the motor does not start.

After a successful interlock switch check (with the retentioner option), perform the following steps.

1. Turn on the control system.
2. Start mixer motor.
3. Start retentioner motor.
4. Switch retentioner motor off:
 - ▶ After 10 seconds: switch mixer motor off.
 - ▶ After 28 second, check that a key cannot be removed from the key box built into the switch cabinet.
 - ▶ After 31 seconds, check that a key can be removed from the key box built into the switch cabinet.

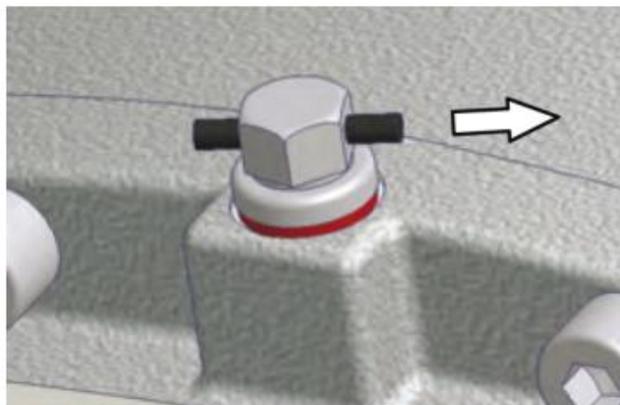
7.2.2 Residual current circuit breaker

1. Switch on control system and conditioner power section
2. Check function of residual current circuit breaker with test key.
 - ▶ Residual current circuit breaker must switch off within 3 seconds

7.3 Commissioning without product

The following checks must be carried out before initial start-up:

1. It must be possible to turn rotors by hand:
 - (1) Feeder:→ does not move freely
 - (2) Mixer:→move freely
 - (3) Retentioner:→does not move freely
2. Check direction of rotation of motor, feeder, mixer, retentioner in service mode (viewed in product flow direction).
 - (1) Feeder:→counter-clockwise
 - (2) Mixer:→clockwise
 - (3) Mixer, Plus option:→counter-clockwise/clockwise
 - (4) Retentioner:→clockwise
3. Gearing: activate pressure bleeder by pulling packing.



4. Check frequency converter data. See corresponding parameter sheets in operating instructions DFCB/DFBB
5. Check main motor switch.
6. Check settings and function of steam, liquid and hot air fitting.
7. After completion, check compressed air mains supply for air-tightness.
8. Check parameter setting on control system. See also operating instructions DFCB/DFBB.
9. Check temperature sensor.
10. Check function of heating mats safety cut-out.

7.4 Conformity

7.4.1 Checking EC- Conformity

Operate the machine in the European Union only if EC Conformity has been checked and confirmed using the following checklist.

Checklist

NO.	Check
1	The operator has been informed that the operating instructions must be accessible to the personnel at all times.
2	The operator is responsible for instruction the personnel.
3	Assembly and installation have been carried out in accordance with the operating instructions.
4	Warning and signs are attached so they are clearly visible.
5	A lockable safety switch has been fitted. The personnel are in possession of the padlock for this.
6	Access to the machine's inner danger zones via connection openings is prevented by the connected parts, which can only be removed with a tool.
7	All accessible parts carrying steam are insulated, have protection against contact or are fitted with a caution sign stating "Hot surface".
8	All panel heaters are insulated, have protection against contact or are fitted with a caution sign stating "Hot surface".
9	The door with a quick release fastener on the mixer and retentioner can only be opened after unlocking with the transfer key. The transfer key in the switch cabinet can only be removed when in position "0" and when the drive is at a standstill.
10	If the door is open, no drive belonging to the conditioner system (feeder, mixer, retentioner) can be started.

11 If the EMERGENCY STOP button is pressed, the safety switch is in position "0" or the door on the mixer or retentioner is open, the steam inlet valve is blocked(not energised).

8 Operation

8.1 Operation

The machines are operated using the pellet mill or plant control

8.2 Operating modes

The machine is operated in service of automatic mode

In automatic mode, two operation modes are integrated in the Bühler process control

- Normal mode
- Hygienisation mode

8.3 Starting and stopping



DANGER

- ▶ Do not put the machine into operation without complete safety covers.

NOTICE

- ▶ When the cleaning doors are open, the machines of the Conditioner cannot be started.

1. Close cleaning doors, lock key in key box.

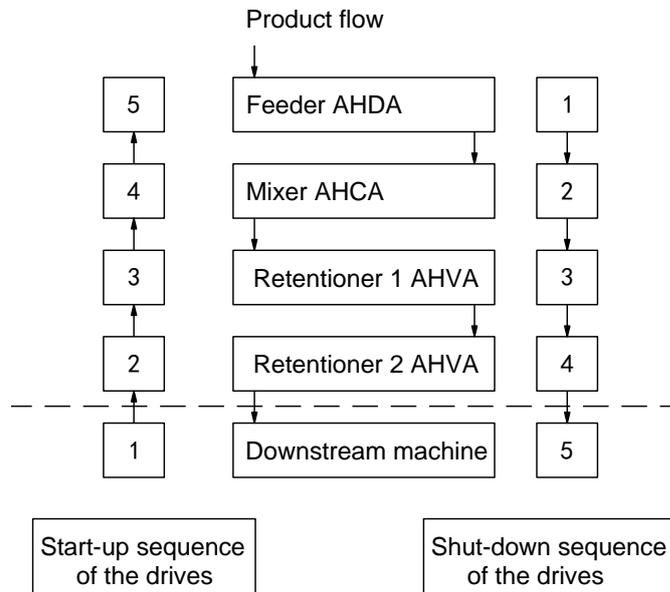
8.3.1 Service mode

2. Start in service mode, operational check without addition of steam:

Start-up of the system in accordance with the diagram below (against product flow)

- ▶ Retentioner (do not forget to set speed)
- ▶ Mixer
- ▶ Feeder (e.g. start up with 10%), bypass pellet mill if possible

Starting and stopping the Conditioner in Service mode:



8.3.2 Automatic mode

1. Start-up in automatic mode, normal mode, with addition of steam.
 - ▷ Specifications for dosage and conditioning temperature (see DFCB).
 - ▷ If possible in the start-up phase, bypass the pellet mill, then directly onto the pellet mill.
2. Check: increase in conditioning temperature, adjust to rated temperature; observe press.
3. With two retentioners: check on both frequency converters of the retentioners whether the second retentioner is running faster!
4. Bag with an average dosage and add tonnage to %-dosage, with general density 0.5 to/m³
5. Start-up of additional liquid installations when the line is running correctly.
6. With option steam meter: start-up of steam meter, pay particular attention to the minimum value of the meter (from what weight the instrument displays a reading).
7. Start-up in automatic mode hygienisation mode (optional with retentioner).

8.3.3 Starting after EMERGENCY STOP

1. Rectify the cause of the fault
2. Rest EMERGENCY STOP button
3. Restart the machine

8.3.4 Stopping in service mode

1. Interrupt product infeed system
2. Deplete machines
3. Switch off machines. Note the sequence (see chapter 8.2.1)
4. Switch off heating mats and hot air system

5. Secure machines so that they cannot be started unexpectedly

8.4 Production interruption/end

After end of production or in the event of long interruptions (> 4 hrs.), it must be ensured that the heating mats and hot air system are switched off

9 Troubleshooting

9.1 Messages

Fault	Cause	Remedy
Alarm 008 - 041		▶ See DFCB alarm messages.

9.2 Drive

Fault	Cause	Remedy
Unusual running noises, vibrations	Too little oil	▶ Contact Bühler customer service.
	Bearing damage	▶ Contact Bühler customer service.
	Gear damage	▶ Contact Bühler customer service.
Oil leaking from Gearbox or motor	Seal defective	▶ Contact Bühler customer service.
Oil leaking from pressure bleeder valve	Incorrect oil level or incorrect, contaminated oil.	▶ Change oil. ▶ Use oil compensator reservoir (option OA)
	Unfavourable operating states	▶ Contact Bühler customer service.
Gearbox is too hot.	Unfavourable installation conditions or gearing damage	▶ Contact Bühler customer service.
Shocking when switched on, vibrations.	Motor coupling defective	▶ Replace elastomer gear rim.
	Gearbox fastening loose.	▶ Tighten motor and gearbox fastening bolts
	Rubber part defective.	▶ Replace rubber part.
Power output shaft not turning although motor is turning.	Rupture in gearbox.	▶ Contact Bühler customer service.
	Motor coupling defective.	▶ Contact Bühler customer service.
	Shrink disk slips.	▶ Contact Bühler customer service.

9.3 Heating mats

Fault	Cause	Remedy
No heating output	Connection torn off. Heating elements defective.	►Check the connections. ►Measure the current Compare values with rating details Replace heating mat

9.4 Mixer coupling

Fault	Cause	Remedy
Vibrations, change in running noise	Permissible displacement values exceeded	►Check the coupling alignment. If necessary, correct. See chapter "permissible shaft displacement and alignment dimensions."
Increased wear.	Coupling is being operated under incorrect conditions.	►Check alignment of coupling and rubber parts. Replace if necessary. See chapter "Permissible shaft displacement and alignment dimensions."
Increased operating temperature.		►Check the coupling alignment. See chapter "Permissible shaft displacement and alignment dimensions."

9.4.1 Permissible shaft displacement and alignment

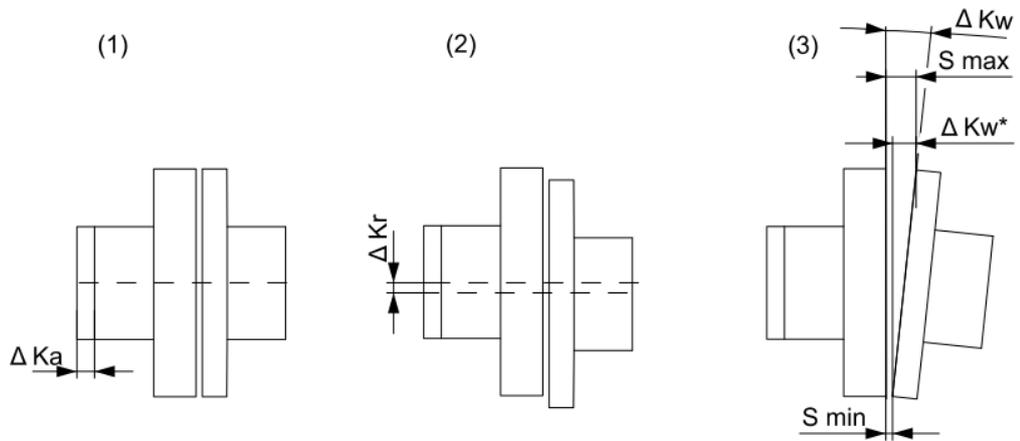


Fig. 9.1

- (1) Axial displacement
- (2) Radial displacement
- (3) Angular displacement

Coupling size		40	63	100	
Dimension	Unit	Speed[rpm]			
s min	mm	2	2	2	
s max	mm	4	6	6	
ΔKa	mm	2	4	4	
ΔKr and	mm	500	0.4	0.4	0.5
		1000	0.4	0.4	0.4
ΔKw	°	500	0.2	0.2	0.2
		100	0.2	0.2	0.1

10 Maintenance

 **DANGER**

- ▶ Perform all maintenance, cleaning and inspection work with the machine at a standstill only (all machine movements have to be stopped).
- ▶ The service or the local switch must be set to 《0》 and locked; at least one key of the safety door lock must be removed from the key box.

10.1 Cleaning

10.1.1 Cleaning schedule

Interval	Machine part	Duration	Measure
120 h/once a week	Machine surfaces	_:_	➤ Clean(dry)
	Gear motor	_:_	➤ Clean cooling fins.
	Steam connections	_:_	➤ Check for leak tightness
			➤ Clean(dry)
	Inlet area	_:_	➤ Clean(dry)
	Temperature sensor	_:_	➤ Check for deposits
			➤ Clean with spatula.

10.2 Lubrication

10.2.1 Lubrication schedule

Interval	Machine part	Duration	Measure
	Gear motors	_:_	➤ Check oil level before commissioning
3000h/ 6 months	Gear motors	_:_	➤ Check the oil level.
			➤ Add grease if drive shaft is exposed.
6000h/ Once a year	Gear motors	_:_	➤ Replace lubrication distributor (with IEC standard motor attachment only).
12000h/	Gear motors	_:_	➤ Change oil.

2 years	Shaft bearing	∴	➤ Check, relubricate if necessary.
---------	---------------	---	------------------------------------

10.2.2 Shaft bearing

The plain bearing assembly has lifelong lubrication. The bearing does not need relubricating under normal operating conditions.

Relubricating bearing under the following conditions.

- Continuous operation at high temperature (operating temperature in excess of +70°C).
- Very damp or dirty environment.

10.3 Maintenance

10.3.1 Maintenance schedule

DANGER

Explosion hazard!

- ▶ For all maintenance and service work, no explosive atmosphere must exist.
- ▶ Maintenance and service work may only be carried out by qualified, specialist personnel.

DANGER

Installation and maintenance work is only to be carried out when the gear train is stationary. The drive must be free of voltage and protected against being switched on inadvertently.

Interval	Machine part	Duration	Measure
	Gear motor	∴	➤ Every 10 years: general overhaul
120h/once a week	Gear motor	∴	➤ Check for leak tightness ➤ Check for noise and vibrations
240h/2 weeks	Coupling	∴	➤ Check for wear.

500 h/once a month	<input type="checkbox"/> EMERGENCY STOP Button	:_	➤ Check for correct operation
	<input type="checkbox"/> Locking device		
	<input type="checkbox"/> Residual current circuit breaker,		
	Heating mats		
3000 h/6 months	Mixer and retentioner shaft	:_	➤Check axial and radial clearance to housing
			➤Check paddles for wear
	Heating mat	:_	➤Check for correct operation
6000h/once a year	Mixer and retentioner	:_	➤Check retaining bolts
	Torque support	:_	➤Check rubber buffer
	Temperature	:_	Check for correct operation
	Door seals	:_	Check, replace if necessary.

10.3.2 Changing gear oil

NOTICE

Gearbox unit without oil drain plugs have lifelong lubrication. The oil does not have to be changed.

Gearbox units with standard spur gears of ATEX categories 3G and 3D do not have oil level plugs. Fill with new oil through threaded hole in pressure relieve valve.

Refer to manufacturer's details for volume

Working procedure according documentation of the manufacturer

10.3.3 Checking torque support

Check rubber parts on torque support

If there is a visible damage, such as crack on the rubber surface, have rubber parts replaced

11 Repair

Stop the machine for all maintenance and repair work

Set the safety switch to "0" and lock it.

Remove the key and keep it with you.

The following protective equipment must be worn during maintenance work

- Gloves
- Steel toe-capped boots
- Hard hat

DANGER

Inadequate maintenance.

Danger of explosion due to lack of ignition protection

- ▶ Do not make modifications to the machine.
- ▶ Do not use any potentially explosive products, resources or cleaning agents.
- ▶ Carry out maintenance, cleaning and lubrication correctly.
- ▶ Only use original spare parts.

11.1 Replacement of paddles

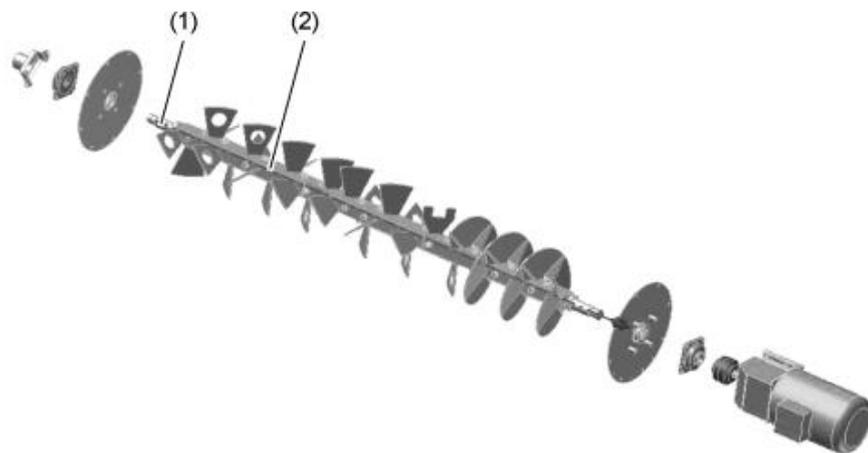
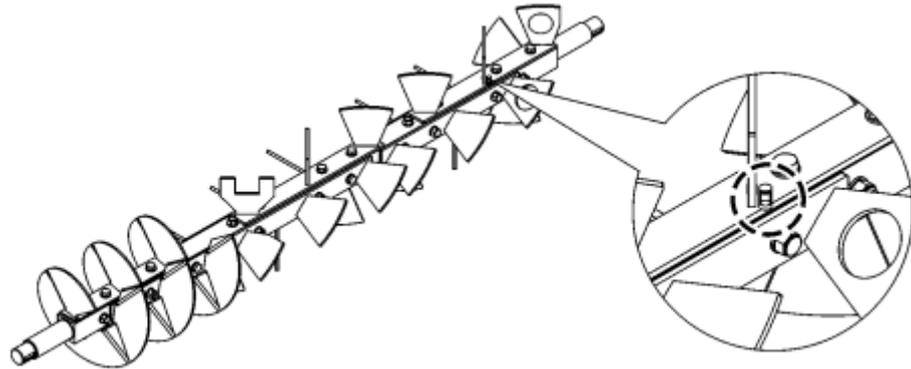


Fig 11.1 Mixer shaft

(1) shaft (2) Paddle track

1. Stop the machine.
2. Set the safety switch to "0" and lock it.

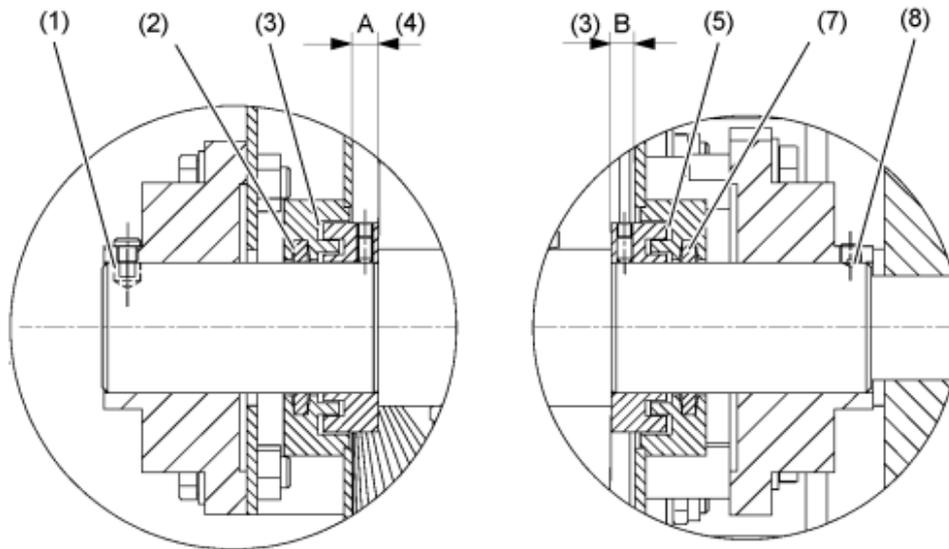
3. Open door.
4. Remove worn paddle track.
5. Fit new paddle track.
 - (2) The hole pattern is such that each paddle track can only be fitted in one place.
 - (3) Each paddle track has a bolt for positioning.



6. Check imbalance.
 - (4) When the shaft is turned, it must remain still in every position.
7. If the shaft has imbalance, contact the BUHLER customer service department.
8. Set clearance between paddle and housing
 - Axial clearance between paddle and side wall: min 5 mm.
9. Close door.

11.2 Setting bearing with labyrinth seal

11.2.1 Feeder bearing

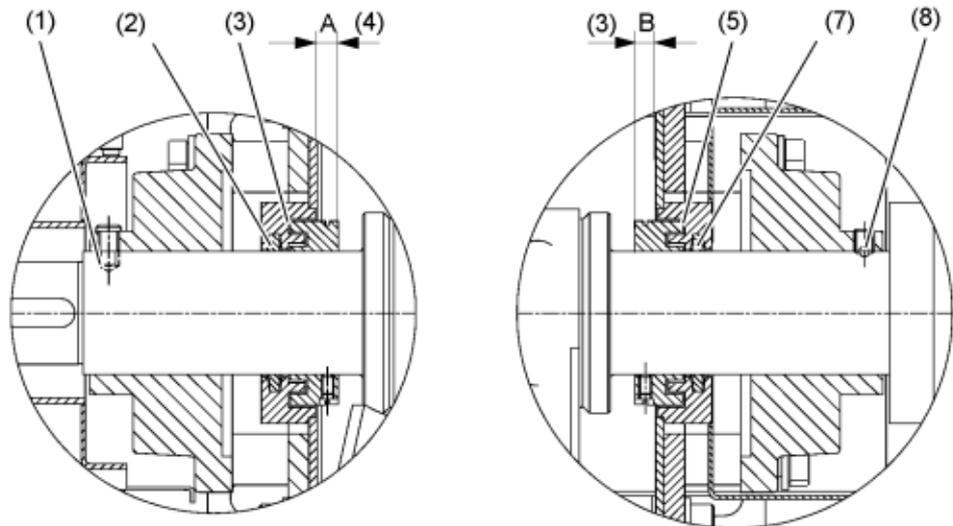


- (1) Hole 10 mm in diameter
- (2) Sealing ring for floating bearing
- (3) Labyrinth seal / float bearing gap
- (4) Float bearing, dimension A=11mm

- (5) Fixed bearing, dimension B=10mm
- (6) Labyrinth seal / fixed bearing gap
- (7) Sealing ring for fixed bearing
- (8) Hole

1. Fit floating bearing on opposite side to motor
2. Fit fixed bearing on motor side.
3. Fill sealing ring for floating bearing and fixed bearing with foodstuff grease.
4. Set dimension A in floating bearing to 11mm
5. Set gap to labyrinth seal in floating bearing and fixed bearing to 2mm.
6. Drill hole in shaft on floating bearing side, 10mm in diameter, 7 mm deep.
7. Set dimension B in fixed bearing to 10 mm.
8. Drill hole in shaft on fixed bearing side, 1...2 mm deep.
9. Screw down positioning bolt in hole.

11.2.2 Mixer bearing



(1)Hole 10 mm in diameter

(2)Sealing ring for floating bearing

(3)Labyrinth seal / floating bearing gap

(1) Floating bearing, dimension

A=11 mm

(5)Fixed bearing, dimension

B=10 mm

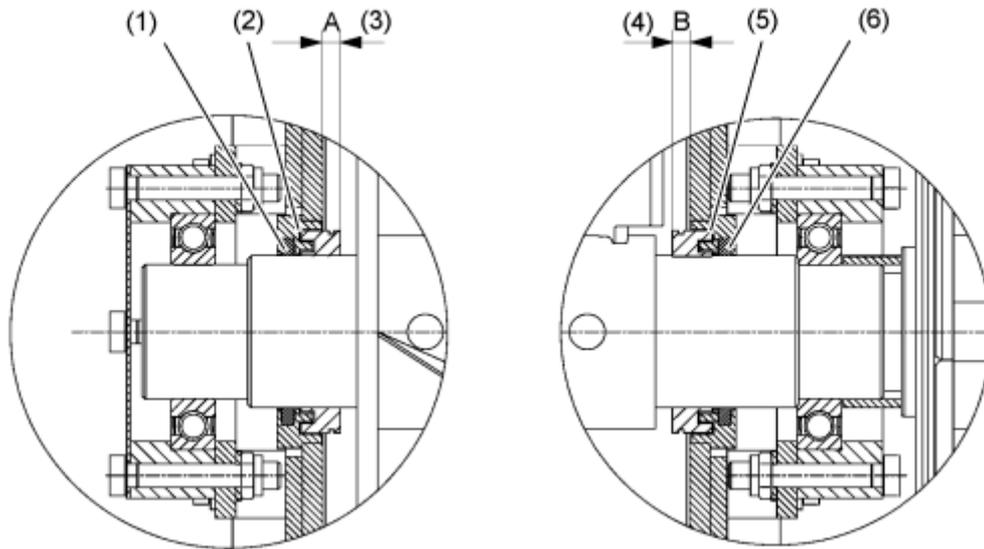
(6)Labyrinth seal / fixed bearing gap

(7)Sealing ring for fixed bearing

(8)Hole

1. Fit floating bearing on opposite to motor.
2. Fit fixed bearing on motor side.
3. Fill sealing ring for floating bearing and fixed bearing with foodstuff grease.
4. Set dimension A in floating bearing to 11 mm.
5. Set gap to labyrinth seal in floating bearing to 2 mm.
6. Drill hole in shaft bearing
7. Set dimension B in fixed bearing to 10 mm.
8. Set gap to labyrinth seal in fixed bearing to 1 mm.
9. Drill hole in shaft on fixed bearing side, 1...2 mm deep.
10. Screw down positioning bolt in hole.

11.2.3 Retentioner bearing



- (1) Sealing ring for floating bearing (4) Fixed bearing, dimension B=10mm
(2) Labyrinth seal / floating bearing gap (5) Labyrinth seal / fixed gap
(3) Floating bearing, dimension A=11 mm (6) Sealing ring for fixed bearing

1. Fit floating bearing on opposite side to motor.
2. Fit fixed bearing on motor side.
3. Fill sealing ring for floating bearing and fixed bearing with foodstuff grease.
4. Set dimension A in floating to 11 mm
5. Set gap to labyrinth seal in floating bearing and fixed bearing to 2mm
6. Set dimension B in fixed bearing to 10mm.

12 Decommissioning

12.1 Shutting down

1. Empty machine and remove product from machine.
2. Switch off the machine.
3. Disconnect the machine from the power supply.
4. Disconnect the heating mats from the power supply.
5. Disconnect machine from product supply and product outlet.
6. Clean the machine.
7. Treat shaft with corrosion protection.

12.2 Dismantle

Once work with the machine is complete (inspection, removal or disposal), the machine is disassembled in reverse order to the assembly process.

- Before starting the disassembly process, the person who is responsible must obtain instructions from the manufacturer for safe disassembly.
- The machine may only be disassembled in accordance with all accident prevention measures and only by instructed personnel. This personnel must be familiar with the safety precautions.

12.3 Storing

1. Shut down the machine.
2. Transport the machine to the storage site.
3. Observe the intermediate storage measure. See chapter "Temporary storage".

12.4 Disposal

12.4.1 Disposal of operating material

Remove operating material completely from the machine and dispose of them properly in accordance with the local legal requirements.

12.4.2 Disposing of machine

1. Dismantle machine into its components.
2. Sort components according to material and dispose of them in compliance with local applicable laws and regulations.

13 Spare parts

13.1 Inventory of spare parts

Stocking a supply of spare and wear parts is an important prerequisite for the machine to remain up and running.

Always use original spare parts as listed in the Spare parts catalog. Spare parts from third-party providers can have an adverse effect on the operating behaviour of the machine and on safety.

13.2 Spare parts identification

Code	Description
[C]	
V	Wear part <ul style="list-style-type: none">Parts that wear during normal operation.Parts that have to be replaced one or more times within a year.
E1	Very critical spare part <ul style="list-style-type: none">Parts that can cause the entire machine to fail if they fail or become defective.Parts that are safety-related.
E2	Problematic spare part <ul style="list-style-type: none">Parts that can greatly limit the functionality of the machine if they fail or become defective.The machine may continue to be operated for a short time.
E3	Normal spare part <ul style="list-style-type: none">Parts that can slightly limit the functionality of the machine if they fail or become defective.The machine may continue to be operated for a longer time.

13.3 Order instructions

Incomplete information in spare parts orders can result in incorrect deliveries.

An order for spare parts must include the following information:

- Machine No.
- Subassembly number or part No.
- Designation
- Quantity
- Motors: Manufacturer and motor number
- Gears: Manufacturer and gear number

In cases of uncertainty, please send a dimensioned drawing and a description.