WBN
RIBBON BLENDER MIXERS
WBN

INSTALLATION
OPERATION AND
MAINTENANCE

WAMGROUP S.p.A.
Via Cavour, 338
41030 Ponte Motta
Cavezzo (MO) - ITALY

+ 39 / 0535 / 618111
fax + 39 / 0535 / 618226
e-mail info@wamgroup.com
internet www.wamgroup.com

Manual No. MAP.175.--.M.EN Issue: A1
Latest Update: June 2012
ORIGINAL INSTRUCTIONS IN ENGLISH
All the products described in this catalogue are manufactured according to *WAMGROUP S.p.A. Quality System procedures*. The Company’s Quality System, certified in July 1994 according to International Standards *UNI EN ISO 9002* and extended to the latest release of *UNI EN ISO 9001*, ensures that the entire production process, starting from the processing of the order to the technical service after delivery, is carried out in a controlled manner that guarantees the quality standard of the product.

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SUMMARY

1.0 GENERAL INFORMATION ...................................................................................................................... 1
   1.1 Scope of the Manual .......................................................................................................................... 1
   1.2 Symbols ............................................................................................................................................. 2
   1.3 Glossary and terminology .................................................................................................................. 4
   1.4 Manufacturer’s data and identification of equipment ......................................................................... 5
   1.5 Request for assistance ....................................................................................................................... 6
   1.6 Warranty ............................................................................................................................................. 6
   1.7 Exclusion of responsibility .................................................................................................................. 6

2.0 INFORMATION REGARDING SAFETY ................................................................................................... 7
   2.1 General safety prescriptions .............................................................................................................. 7
   2.2 Safety prescriptions for transport and handling .................................................................................. 7
   2.3 Safety prescriptions for installation .................................................................................................... 8
   2.4 Safety prescriptions for use and operation ......................................................................................... 8
   2.5 Safety prescriptions for maintenance and replacement of components ............................................ 8

3.0 TECHNICAL INFORMATION .................................................................................................................10
   3.1 General description of the equipment ..............................................................................................10
   3.2 Main components ..............................................................................................................................11
   3.3 Operating principle ...........................................................................................................................12
   3.4 Permitted use ................................................................................................................................... 13
   3.5 Improper use not permitted .............................................................................................................. 13
   3.6 Noise level ........................................................................................................................................ 14
   3.7 Environmental operating limits ......................................................................................................... 14
   3.8 Overall dimensions and technical features ...................................................................................... 14
   3.9 Safety and information signs ............................................................................................................ 15
   3.10 Safety devices ................................................................................................................................ 16
   3.11 Residual risks ................................................................................................................................ 18

4.0 INFORMATION REGARDING HANDLING AND TRANSPORT ............................................................. 21
   4.1 Type of packaging ............................................................................................................................. 21
   4.2 Factory tests ..................................................................................................................................... 22
   4.3 Reception of goods ............................................................................................................................ 22
   4.4 Storing the equipment ....................................................................................................................... 22
   4.5 Dimensions and weight of packed equipment .................................................................................. 23
   4.6 Lifting and unloading methods ........................................................................................................ 23
   4.7 Handling the equipment ................................................................................................................... 23
   4.8 Lifting points .................................................................................................................................... 24
   4.9 Unpacking and disposal of the packaging ......................................................................................... 25
## 5.0 INSTALLATION AND FIXING

5.1 Recommendations for installation ................................................................. 26
5.2 Checking the blocking system of the key locking device with solenoid .......... 32
5.3 Pipe connections ......................................................................................... 33
5.4 Venting with a filter bag .............................................................................. 35
5.5 Connecting the heat exchange unit lines (jacketed version) ......................... 36
5.6 Compressed air features .............................................................................. 37
5.7 Compressed air supply for additional discharge flap at outlet ..................... 40
5.8 Adjusting opening and closing time of discharge flap at outlet .................... 41
5.9 Supplementary outlet pneumatic supply ...................................................... 41
5.10 Electrical connection ................................................................................. 42
5.11 Important requirements the electrician shall observe ................................. 43
5.12 Controls ...................................................................................................... 44
5.13 Testing ........................................................................................................ 44

## 6.0 INFORMATION REGARDING USE

6.1 Production Start-up ..................................................................................... 46
6.2 Clearing the mixer following a blockage ..................................................... 46
6.3 Using the equipment .................................................................................... 47
6.4 How to fill with material ............................................................................. 47
6.5 Making the first filling ................................................................................ 47
6.6 Accidental mixer shutdown ........................................................................ 48
6.7 Heat exchange (jacketed mixers) ................................................................. 49
6.8 Adding additives ......................................................................................... 50
6.9 How to discharge the material .................................................................... 50
6.10 Liquid injecting device (option) ................................................................. 51
6.11 Sample draw .............................................................................................. 53
6.12 Prolonged machine shutdown after assembly ............................................. 54
6.13 Possible reuse after long shutdowns ......................................................... 54

## 7.0 INFORMATION REGARDING MAINTENANCE

7.1 Maintenance ............................................................................................... 55
7.2 Tests and checkings to be carried out on-site .............................................. 56
7.3 Periodic checkings ...................................................................................... 57
7.4 Cleaning the mixer ..................................................................................... 58
7.5 Cleaning the equipment (the machine) ....................................................... 58
7.6 Tightening packing of the end bearings ...................................................... 59
7.7 Tightening the drive belts (found with CI) .................................................. 59
8.0 REPLACEMENT OF PARTS ................................................................. 61
  8.1 Safety recommendations for replacement .................................................. 61
  8.2 Checking parts subjected to wear on the flexible coupling..................... 61
  8.3 Rotor shaft bearings ................................................................................. 62
  8.4 End bearing assembly on drive unit side .................................................. 62
  8.5 Installing the end bearing assembly ........................................................... 63
  8.6 End bearing assembly opposite drive unit side ........................................... 65
  8.7 Changing the packing .............................................................................. 66
  8.8 Changing the packing on the end bearing assemblies type “SW” ................. 67
  8.9 Greasing .................................................................................................. 68
  8.10 Drive unit lubrication ............................................................................. 69
  8.11 Scheduled overhaul .............................................................................. 70
  8.12 Sample draw maintenance (option) ............................................................ 71
  8.13 Replacing the piston on the sample draw operated manually .................. 71
  8.14 Replacing the piston on the pneumatic sample draw ................................. 72
  8.15 Cleaning procedure for the liquid injection suction nozzle of the inlet liquid injection lance 72
  8.16 Dismantling and taking out of service ....................................................... 73
  8.17 Returning the equipment (the machine) .................................................... 73
  8.18 Demolition and disposal .......................................................................... 73

9.0 INFORMATION REGARDING FAULTS ............................................. 74
  9.1 Trouble-shooting ..................................................................................... 74
  9.2 Check-list in case of fault ........................................................................ 75

10.0 TECHNICAL DATA .............................................................................. 77

11.0 SPARE PARTS ...................................................................................... 89

A ATTACHMENTS ....................................................................................... 99
  A1 Nuts and bolts tightening torque Table ..................................................... 99
  A2 Lubricants and sealants Table ................................................................. 100
  A3 Gear reducer lubricants Table ................................................................. 101
  A4 Declaration of Incorporation ................................................................... 102
1.0 GENERAL INFORMATION

1.1 Scope of the Manual

This Manual has been prepared by the Manufacturer to provide the operating technical information for installation, operation and maintenance of the equipment concerned.

The Manual, which is an integral part of the equipment concerned, must be preserved throughout the life of the equipment in a known easily accessible place, available for consultation whenever required.

If the Manual is lost, damaged or becomes illegible, contact the Manufacturer for a copy specifying the serial number of the equipment.

If the equipment concerned changes ownership, the Manual has to be handed over to the new owner as part of the equipment supply.

The Manual is meant for specialist technical personnel appointed and authorized by the Manufacturer, owner and installer to act on the equipment concerned for which specific technical skills in the sector concerned are necessary (electrical, mechanical, etc.).

The illustrations may differ from the actual structure of the equipment concerned but do not interfere with the explanation of the operations.

In case of doubt, contact the Manufacturer for explanations.

The Manufacturer reserves the right to make changes to the Manual without the obligation to provide prior notification, except in case of modifications concerning the safety level.

The technical information included in this Instruction Manual is the property of the Manufacturer and therefore has to be considered as confidential.

It is forbidden to use the Manual for purposes other than those strictly linked to the operation and maintenance of the equipment concerned.

This information is provided by the Manufacturer in the original language (English) and can be translated into other languages to satisfy legislative and/or commercial requirements.
1.2 Symbols

To highlight certain parts of the text, for purposes of safety, or to indicate important information, certain symbols are used, the meaning of which is described below.

It is important to comply with and scrupulously follow the information highlighted by the symbols.

**Danger - Warning**

Indicates situations of serious danger which, if ignored, can be risky for the health and safety of persons.

**Caution**

Indicates that appropriate behaviour must be adopted to avoid posing risk for the health and safety of persons and avoid causing economic damage.

**Important**

Indicates particularly important technical information which must not be ignored.
## List of safety and information symbols

<table>
<thead>
<tr>
<th>Symbol representation</th>
<th>Symbol description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Danger sign:</strong></td>
<td>indicates danger of electric shock caused by the presence of powered components inside the junction box or control panel.</td>
</tr>
<tr>
<td><strong>Obligation:</strong></td>
<td>read this Manual before carrying out any action on the equipment concerned.</td>
</tr>
<tr>
<td><strong>Forbidden:</strong></td>
<td>indicates that it is forbidden to lubricate or adjust moving parts.</td>
</tr>
<tr>
<td><strong>Danger:</strong></td>
<td>indicates danger of serious injury to limbs if the internal moving parts of the equipment are exposed. Before opening inspection or maintenance hatches or doors isolate the equipment concerned from the electrical energy sources.</td>
</tr>
<tr>
<td><strong>Information:</strong></td>
<td>indicates the direction of rotation of the electric motor.</td>
</tr>
<tr>
<td><strong>Obligation:</strong></td>
<td>indicates the hooking points for lifting each section of the equipment concerned.</td>
</tr>
<tr>
<td><strong>Forbidden:</strong></td>
<td>indicates it is forbidden to introduce hands into the equipment.</td>
</tr>
</tbody>
</table>
1.3 Glossary and terminology

**Operator:** person appropriately trained and authorized by the Production Manager for setting up the equipment concerned and carrying out routine maintenance.

**Installer:** organization with specialized technicians and appropriate equipment for carrying out risk-free installation and extraordinary maintenance.

**Specialist technician:** person responsible for and authorized by the Manufacturer, owner or installer to act on the equipment; must have specific technical skills depending on the sector concerned (electrical, mechanical etc.). The specialist technician, in addition to being familiar with the working of the equipment concerned, must be familiar with the working of the plant or equipment on which the equipment concerned is installed.

**Routine maintenance:** includes all the actions necessary to keep the equipment in good working conditions, to ensure greater operating durability and to keep the safety requisites constant.

**Extraordinary maintenance:** all the actions meant to keep the equipment in perfect working order.

**Setting in safety conditions:** all the precautions the authorized personnel must adopt before acting on the equipment concerned.

The precautions are listed below.

- Ensure that the equipment concerned is disconnected from all the mains and appropriate devices are used to prevent these from being reconnected accidentally.
- Ensure that all the moving parts of the equipment have come to a complete stop.
- Ensure the temperature of the equipment concerned is such that it does not burn.
- Provide appropriate lighting in the area around the operations.
- Wait for the material to be handled inside the equipment or machine concerned to settle down completely.
1.4 Manufacturer’s data and identification of equipment

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**Important**

Do not change the data on the identification plate.

Keep the ID plates clean, intact and legible as regards the data they contain.

If the ID plate is damaged or is no longer legible (even just one informative element on it) contact the Manufacturer for a new ID plate and replace.

The ID plates shown identify the equipment concerned and its main components. The plates show the reference necessary for operating safety.

---

**1 - Drive unit identification plate**

A) Year of manufacture  
B) Manufacturer’s name and address  
C) Identification of drive unit  
D) Production batch  
E) Weight of drive unit

---

**2 - Identification plate of mixer**

A) Year of manufacture  
B) Manufacturer’s name and address  
C) Type of mixer  
D) Serial No.  
E) Weight of the mixer
1.0 GENERAL INFORMATION

3 - Motor identification tag
A) Electric motor identification
B) Production batch
C) Manufacturer’s name and address
D) Weight of electric motor
E) Year of manufacture
F) Technical data

1.5 Request for assistance

For all technical assistance, contact the Manufacturer’s service network.
For all requests, provide the equipment identification data, the type of problem encountered and all other information which could be useful for identifying the problem.

1.6 Warranty

The conditions for validity and applicability of the warranty are specified in the sales contract.

1.7 Exclusion of responsibility

The equipment is delivered according to the specifications indicated by the Buyer in the order and the conditions valid at the time of purchase.

The Manufacturer shall not accept responsibility for safety of persons or objects and operation failure of the equipment if the loading/unloading operations from trucks, transport, positioning at the site, use, repairs, maintenance etc. have not been carried out in compliance with the warnings described in this Manual, and in accordance with the national legislation in force.

Likewise, the Manufacturer shall not accept any responsibility if the equipment concerned is used:
- improperly;
- by unauthorized persons and/or persons not sufficiently trained for installation, operation and maintenance;
- with modifications made to the original configuration without the Manufacturer’s permission;
- with spare parts that are not original or are not specific for the model;
- without maintenance;
- non-pursuant to the regulatory standards and national or local legislation on the matter of occupational safety;
- non-pursuant to the recommendations in this Manual or on the warning and danger plates applied on the equipment.
2.0 INFORMATION REGARDING SAFETY

2.1 General safety prescriptions

Read the Instruction Manual carefully and strictly follow the instructions it includes, especially those regarding safety.

Most accidents at the workplace are caused by negligence, failure to follow the most elementary safety regulations and incorrect or improper use of tools and equipment.

Accidents can be prevented and avoided by taking due care, using suitable equipment and adopting adequate preventive measures.

Apply and comply with the standards in force regarding workplace hygiene and safety.

The personnel trained for and authorized for the operations has to have the psychological/physical requisites, experience in the sector concerned and the necessary technical skills for carrying out the operations assigned to them.

All workers involved in any kind of operation must be prepared, trained and informed as regards the risks and the behaviour to be adopted.

Pay attention to the meaning of the notices applied on the equipment, keep these legible and respect the information indicated.

Use instruments, equipment and tools that have been approved and are intrinsically safe, and cannot alter the safety level of the operations or damage the equipment during installation, use and maintenance.

Modifications to the equipment components should not be made for any reason whatsoever, without the Manufacturer’s permission.

2.2 Safety prescriptions for transport and handling

Carry out all the handling and transport operations in accordance with the procedures and instructions shown on the packaging and in the Manual supplied.

All the operations must be performed by qualified authorized personnel.

Those authorized to carry out the handling operations must have the capabilities and experience required to adopt all the necessary measures to guarantee one’s safety and the safety of persons directly involved in the operations.

The chosen features of the lifting and handling means (crane, bridge crane, forklift truck etc.) must take into account the weight to be handled, the dimensions and the gripping points.

During lifting use only accessories such as eyebolts, hooks, shackles, spring hooks, belts, slings, chains, ropes etc., that have been certified and are suitable for the weight to be lifted.

During handling respect the prescriptions applicable for handling loads.

Keep the position of the equipment concerned or the sections and the loose components horizontal, keep the load low and make all the necessary movements gently.

Avoid sudden manoeuvres, dangerous oscillations and rotations, accompanying the movements manually and place the load gently on the ground.
2.0 INFORMATION REGARDING SAFETY

2.3 Safety prescriptions for installation

Before starting with installation, a “Safety Plan” must be implemented to safeguard the personnel directly involved and those who carry out operations in the surrounding area.

All the laws must be strictly applied, especially those concerning workplace safety.

Before proceeding with installation operations, mark off the work area to prevent access by unauthorized persons.

The electrical connections must be made in compliance with the standards and laws in force.

The person in charge of making the electrical connections has to ensure that the required standards and laws are respected before testing.

2.4 Safety prescriptions for use and operation

Do not tamper with the equipment concerned by using any kind of device to obtain performances different from those designed.

All unauthorized changes can affect the health of people and the integrity of the equipment.

The operators have to exclusively wear protective clothing and have to be equipped with appropriate individual protection devices for carrying out the operations and as required by the safety and work accident prevention standards.

Before use, ensure that all the safety devices are installed and that they are working properly.

During operations, prevent access to the work area by unauthorized persons.

Remove all obstacles or sources of danger from the work area.

2.5 Safety prescriptions for maintenance and replacement of components

![Danger - Warning]

Before carrying out any operation on the equipment concerned, ensure it is switched off and disconnected from all mains and use suitable devices to prevent the possibility of the power sources being activated accidentally.

Maintain the equipment concerned in the conditions of utmost efficiency compliant with the maintenance plan provided by the Manufacturer.

Good maintenance apart from preserving the functional features and essential safety features over time, will also allow extending the working life of the equipment concerned and achieving the best possible performance.

Strictly follow the procedures indicated in the Manual, especially those concerning safety.

Ensure that all the safety devices are active and working properly.

Mark off the work area in such a manner as to prevent the access of unauthorized persons.

Replace the worn and damaged components exclusively with original spare parts, whose safety, reliability and interchangeability have been undoubtedly established.
Apart from invalidation of the warranty, the Manufacturer declines all responsibility for damage to objects and harm to persons deriving from the use of non-original spare parts or due to modifications made during repairs without express written authorization.

Use the oil and lubricants recommended by the Manufacturer.

Do not dump polluting material (oil, grease, paint, plastic etc.) in the environment, but carry out waste separation disposal depending on the chemical composition of the various products in compliance with the legislation in force.

On completion of maintenance or replacement operations, before resuming production, check that no foreign bodies (rags, tools etc.) have been left inside the equipment concerned.
3.1 General description of the equipment

WBN Tubular Batch-Type Ribbon Blenders consist of a horizontal, single shaft double counter-pitch ribbon screw housed in a tubular mixing drum, a central inlet or a rectangular shape inlet port across the entire length of the mixing drum, an outlet with central discharge port, a venting spout, two drum closing end plates that carry flanged end bearing assemblies complete with integrated adjustable shaft sealing unit, and a drive unit complete with power transmission.
3.2 Main components
1) Drive unit  
2) Additive inlet or air venting  
3) Material inlet port  
4) Inspection hatch  
5) Mixing chamber  
6) Discharge port  
7) End plate  
8) Pneumatic actuator OPEN / CLOSED discharge valve  
9) Tool rotor shaft  
10) End bearing assembly  
11) Sample draw (optional)

OPTION: Available version with large hopper inlet with cover.

**3.3 Operating principle**

The WBN Tubular Batch-Type Ribbon Blender is based on the principle of mechanical fluidisation of the product.

The particular shape, position and rotation speed of the mixing tools, creates a centrifugal vortex motion, which allows the materials to be projected in a three-dimensional way and to merge with each other. This ensures that components with a different particle size and bulk density are perfectly blended and mixed with high precision within the shortest possible time.

WBN Blenders are used for mixing dry powders, granules or short fibres, for moistening, agglomerating or granulating the same materials, or for mixing liquids or pastes with low viscosity.
3.4 Permitted use

This mixer has been designed specifically to handle powder material.

It can be used to handle moist material, but the standard version is not suitable for working with completely liquid mixtures. If the equipment is to handle this kind of material, this must be specified when the order is placed so that the necessary modifications can be made.

This equipment is appropriate for use in an area not classified for the presence of combustible dust and gas / vapour / mist inflammable and it is inappropriate to handle combustible products.

3.5 Improper use not permitted

The mixer can be used only for the purposes expressly envisaged by the Manufacturer.

Do not use the equipment if:

- It has not be anchored correctly to the floor.
- The pipe work has not been correctly connected.
- The connection to the mains has not been done correctly.
- The connection to the compressed air supply has not been done correctly.
- The mixer has imperfect or not fully sharpened tools. This will reduce the grinding capacity and increase the torque absorbed by the motor.
- Do not climb on top of the mixer even if it is not working. Apart from the danger of falls, there is the real risk of damaging the mixer.
- Do not work on the electric motor unless you have first disconnected the equipment from the mains. Electric connections and all electric work must be carried out by qualified personnel only.
- There is a real risk of electrocution.
- Do not wash the equipment using a jet of water, as this could reach the electric parts.
- Do not use the equipment to mix suspicious materials such as, chemically aggressive, flammable, explosive or dangerous for the equipment or its operator.
- Do not operate the mixer with its chamber under pressure or under vacuum.
- Do not use the equipment in areas where there is a risk of fire or explosion.
- Do not pressurize the mixing chamber or create a vacuum inside of it because the equipment must not be used under these conditions.
- Do not exceed a temperature of +150°C in the mixer for drying purposes.
3.6 Noise level

The noise level of WBN mixers does not exceed 83 dB(A), the value measured at a distance of 1 m in the most unfavorable position.

Danger - Warning

Depending on the installation site, the installer must adopt suitable systems (barriers, etc.), if necessary, to maintain the noise levels within the legally permitted limits.

3.7 Environmental operating limits

Unless otherwise specified, the equipment concerned may be used only within the limits indicated.
- Altitude: less than 1,000 m at sea level
- Environmental temperature: between -20°C and +40°C
- Cold climates: with temperature less than 5°C use oil and lubricants suitable to the operating temperature.

Generally protect the equipment appropriately according to the prevailing conditions.

3.8 Overall dimensions and technical features

For exact identification of the equipment concerned, see the identification plate

The transport document shows the serial number and identification codes.

Information regarding the technical features of mixers, depending on their size, is given in Chapter 10.
3.9 Safety and information signs

**Danger - Warning**

Follow the signs on the plates. Ensure the plates are legible; otherwise clean them and replace the damaged ones, applying them in their original position.

**Danger - Warning**

Electric equipment can cause death or severe personal injury. Do not touch the equipment when it is moving because there are rotating elements, electrical devices and components that can reach high temperatures. Observe the warnings written on the stickers. Failure to do so can cause serious injury or death. Check that the stickers are always present and completely readable. If they are not, replace them.

NB: See the page 3, 1.2 Symbols

Fig. 4
3.10 Safety devices

**Danger - Warning**

Before using the equipment, check that all safety devices are intact and correctly positioned. They could have been damaged during shipping. Do not tamper with the safety devices. At the beginning of each work shift, check that all safety devices are present and working. Otherwise, inform the maintenance manager.

Fig. 5
The inspection hatches of the mixer have double safety devices:

1) Key operated door lock with electromagnet.
   Prevents the hatch being opened when the mixer is running.
   When the hatch is open the motor will not start.
   Before starting up the mixer, check that the door lock device is operational.

![Danger Warning]

When the mixer is delivered, the electro-magnetic device is not activated. Before using the mixer, the device must be adjusted.

2) Guard for moving parts protection.
   All fans, pulleys and couplings are protected by guards to prevent accidental contact.

3) Rotor guards.
   These guards prevent accidental contact with the rotor shaft.

Emergency push-button
Install an emergency push-button next to the mixer, in case the control panel is installed far from the equipment.
The purpose of this push-button is to stop the equipment whenever necessary.

Work station
The operator does not have to be present at all times.
In case of emergency, the operator must push one of the Emergency Stop Buttons which must be located in the following positions:
- On the mixer if the power supply control board is fairly distant.
- On the control panel of the mixer (when designed for this).
- On the electric control panel of the plant.
3.11 Residual risks

The main risks that using a mixer might imply are indicated below.
On the basis of the use of the mixer, the installer must inform the operators by means of specific signals, regarding the residual risks:

**Mechanical risk**
For maintenance operations, it is compulsory for the operator to always use personal protection equipment. Special warning notices on each section of the equipment indicate the obligatory personal protection equipment:

<table>
<thead>
<tr>
<th>GLOVE ARE COMPULSORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAFETY FOOTWEAR ARE COMPULSORY</td>
</tr>
</tbody>
</table>

**Presence of possible residual high temperature after mixer stop**
During the course of maintenance and cleaning operations and in certain operating sections, the operator might touch very hot parts of the mixer, with the equipment stopped. Special warning notices, located at strategic points indicate the risk due to the presence of very hot surfaces and the obligation for the operator to wear personal protection equipment, especially protective gloves.

The potentially hot parts (high temperature) are indentified as follows:
- Main electrical motor;
- Gear reducer;
- Rotor supports placed by the bearings;
- Agitators placed by the bearings.
Presence of potentially hazardous dust

In the event of both routine and extraordinary maintenance, the operator must wear suitable personal protection equipment, particularly, use a safety mask for the respiratory tract depending on the type of dust filtered as well as gloves and clothing.

For more details, refer to the safety chart of the material handled.

In certain handling of dust, where hazardous substances are present, the operator concerned who has to access the equipment for routine and extraordinary maintenance operations must wear suitable protective devices as indicated on the notices provided.

All maintenance operations inside the mixer (or outside but with parts of the mixer open) MUST BE done with the plant stopped and in the absence of airborne dust; it is therefore necessary to open the mixer after allowing enough time for the dust to settle. In case of operations involving heating (welding, cutting) it is necessary to clean the mixer first, removing all dust deposits (the layers, the deposits and accumulated combustible powder MUST be considered as any other source which can result in an explosive atmosphere). Authorization for execution of operations involving heating MUST be given by technical personnel specialized and trained in the risk of explosion of powders, capable of checking residual risk, suitability of tools and a knowledge of the procedures. The person in charge of safety shall issue a written “Fire Permit” to the operator.
Hazards deriving from pressurized circuits (hydraulic, pneumatic)
During maintenance and/or repair operations pressure must be discharged from the plants and accumulators (if present), according to the instructions given along with the components and in the related user manuals.

Hazard generated by noise
The user and employer shall follow the legal standards as regards protection from daily personal exposure of operators to noise (in Italy L.D.277/91).
4.0 INFORMATION REGARDING HANDLING AND TRANSPORT

4.1 Type of packaging

The type of packaging is selected according to the type of supply, the transport means used, the quantity of goods shipped and the destination.

To facilitate shipment, the mixer may be packed separately in a number of packages that are suitably protected. An “assembly kit” containing the nuts and bolts and gaskets necessary for correct assembly is supplied together with the mixer.

The mobile parts of the sections of the mixer are secured by means of retainers which must be removed during pre-assembly.

The packages can be loaded separately on the transport vehicle or fixed to a pallet, protected suitably, or inside a container for shipment to a far destination or for transport by sea or air.

The signs for safe lifting and handling are shown on all the packages.

The list shows the description and symbols envisaged on the packaging.

A) **Fragile**: indicates that the package must be handled and lifted carefully to avoid damage.

B) **Centre of gravity**: indicates the position of the centre of gravity of the package.

C) **Harness**: indicates the correct position harness for lifting the package.

D) **Stacking limit**: indicates the maximum stacking load of the packages.

E) **Weight**: indicates the maximum weight of the package.

The packing material has to be disposed off or recycled in compliance with the standards in force.
4.0 INFORMATION REGARDING HANDLING AND TRANSPORT

The illustration shows the type of packing mostly used for shipping to far destinations, by sea or air.

4.2 Factory tests

The equipment in your possession has been tested at our factory to verify that all moving parts function properly. During these tests, there have been carried out off-load runs.

4.3 Reception of goods

On receiving the goods, ensure that the type and quantity correspond to the data present on the acknowledgement of order.

Possible damage has to be immediately communicated in writing in the space provided to this purpose in the waybill.

The carrier is obliged to accept the complaint and leave the Customer a copy of the waybill.

If the supply is “free destination” a copy of the waybill and of the complaint shall be sent to the Manufacturer or to the forwarder.

If the damages are not claimed immediately on receipt of the goods, your request for compensation may not be accepted.

4.4 Storing the equipment

If the equipment is not immediately installed, it must be stored in an area that is protected from unfavourable weather conditions, moisture, extreme temperature changes, and where it is not accessible to unauthorized personnel.

Make sure the floor onto which the equipment is placed can safely support it.
4.5 Dimensions and weight of packed equipment

Check the weight of the packed equipment in the shipping documents, since the equipment dimensions vary according to the versions.

4.6 Lifting and unloading methods

**Danger - Warning**

Carry out the lifting and handling operations according to the information indicated on the equipment and in the Manufacturer’s Operation Manual.

The person authorized for unloading operations has to make sure all the necessary measures are adopted to ensure his or her safety and the safety of other persons directly involved.

Use means and accessories (ropes, hooks, shackles etc.) suitable for the load to be lifted.

Pay attention in the lifting phase to balance the load to avoid uncontrolled movements which could cause work injuries to persons.

Do not stack the packages as they are not sized for that purpose.

Do not drag or push the entire or sections of the equipment as it will damage them.

Before lifting and handling the load, read the relevant information indicated in the “Information regarding safety” Chapter.

4.7 Handling the equipment

**Danger - Warning**

The equipment must be handled with a fork-lift truck if it is anchored onto a pallet or inside a crate.

Hoist the equipment using a forklift truck with an adequate carrying capacity.

Widen the forks to obtain the maximum stability of the load during hoisting and shipping.

When handling the equipment, always keep the load as low as possible to obtain greater stability and visibility.

If the mixer has a heat exchange system, remove the liquid inside of it.

The equipment is anchored to a wooden pallet using bolts which must be removed prior to installation.

Harness the package according to the indications and symbols applied on the package or harness the sections of the equipment concerned on the basis of its structure.

The illustration shows the mixer lifting points according to the configurations envisaged and the lifting points of the motor and gear reducer when they are supplied separately.
4.8 Lifting points

**Danger - Warning**

Sling the equipment and its drive unit only as shown in fig. 7.
The sling angles must not exceed 30°.
Before lifting a mixer equipped with a heat exchange system, remove the liquid from this latter so as not to strain the hoisting points excessively.

Fig. 7
4.9 Unpacking and disposal of the packaging

Remove the nylon wrapping from the equipment, along with the pallet or any other packaging material used, and remember that these materials must be disposed off in accordance with the local laws. Please be reminded that:

- The nylon film, if burned, produces toxic fumes;
- The pallet, such as any other wooden packing material, can be reused.

List of material supplied
The following material is contained inside the packing:
- 2 "Spare Parts Catalogue”;
- 2 "Instruction Manual”;
- 1 can of epoxy paint used to paint the mixer.
5.1 Recommendations for installation

**Danger - Warning**

The installation operations must be carried out by a technician specialized in such activities. Provide appropriate safety measures and use suitable equipment to prevent risk of work accident to persons involved in the operations and to those nearby. Harness and handle the sections of the equipment concerned as described and shown in the “Unloading and lifting method” paragraph.

Before starting the installation phase, define a safety plan which complies with the laws in force regarding workplace safety.

The specialist technician, authorized by the installer or owner, must assess whether the area has been prepared correctly and whether the necessary installation equipment is available (crane, etc.).

**Preparing the foundations**

After the order, the Manufacturer sends the Client a diagram of the foundations which shows the overall measurements and the distance between centres of the anchoring points.

If the diagram is missing, it must be immediately required to the Manufacturer, indicating the serial number of the mixer.

In fig. 8, a foundation plan is represented, as an example, where the drive unit is not “en bloc” with the mixer.

---

**Fig. 8**

---
Concrete foundations

When using concrete support structures, it is necessary to use appropriate anchor bolts (fig. 10). Where the equipment leans on the foundations, steel plates (1), which are the same size as the contact surface of the mixer, must be used (fig. 11).

The size of the support structure must be greater than the contact surface of the mixer (fig. 9).

The foundation must be set up minimum 3 weeks before the mixer is installed to allow for the concrete to settle.
Fabricated foundations

If the equipment is installed at height, there is usually a fabricated supporting structure.

**Danger - Warning**

Verify the static and dynamic conditions of the beams in relation to the type of mounting procedure carried out.

Drill the bores as shown in the foundation drawing two sizes larger than the anchoring bolts to facilitate installation.

**Danger - Warning**

Do not weld the drive unit, mixer or both to the fabricated foundation because vibration will not guarantee safe fixing.

**NOTE:** When calculating the size of the support structure, take any additional load factors such as hoppers into account. If these loads apply "en bloc" to the mixer, they must be converted into dynamic loads.

**Heavy loads applied to the foundations and to the mixer support structures**

For the proper sizing of the foundations, consult the values indicated in the load capacity charts which have been delivered with the drawings for the approval of the project.

There are two types of charts:

1) “Total load” chart with drive unit integrated to the mixer.
2) “Total load” chart with drive unit separated from the mixer.

The loads transferred from the mixer to the support structure are all specified in these charts (vertical loads and horizontal loads).

When calculating the size of the support structure and of the foundations, it is important to take into consideration the horizontal loads which are caused by the torque and by the material mixed inside the mixer.

The nature of the horizontal loads vary on the basis of:
- installed power;
- number of revolutions per minute (rpm);
- number of tools;
- bulk density of the mixed material;
- flow of the mixed material.

**NOTE:** If the load capacity diagram is not delivered, contact immediately and request one from the Manufacturer, specifying the mixer serial number.

The mixer support structure and the foundations must be correctly calculated using the load capacity chart supplied by the Manufacturer.
5.0 INSTALLATION AND FIXING

LOADS ON FOUNDATIONS FOR MIXERS WITH NON-INTEGRATED DRIVE UNIT

<table>
<thead>
<tr>
<th>PARAMETERS OF PROJECT</th>
<th>DENSITY kg/dm³</th>
<th>FILLING %</th>
<th>SPEED (r.p.m.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VERTICAL LOADS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) STATIC LOAD OF THE MIXER</td>
<td>daN ...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) DYNAMIC LOAD OF THE MIXER (VERTICAL)</td>
<td>daN ...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) LOAD ON MIXER SUPPORTS FOR DEFLECTING TORQUE (VERTICAL)</td>
<td>daN ...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) STATIC LOAD OF THE DRIVE UNIT</td>
<td>daN ...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) DYNAMIC LOAD OF THE DRIVE UNIT (VERTICAL)</td>
<td>daN ...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6) LOAD DRIVE UNIT SUPPORTS FOR DEFLECTING TORQUE (VERTICAL)</td>
<td>daN ...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HORIZONTAL LOADS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7) HORIZONTAL DYNAMIC LOAD OF THE MIXER (PERPEND. TO THE AXIS)</td>
<td>daN ...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8) HORIZONTAL DYNAMIC LOAD OF THE MIXER (THRUST)</td>
<td>daN ...</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LAYOUT FOR THE DISTRIBUTION OF THE VERTICAL DYNAMIC LOADS ON THE SUPPORTS

---

Fig. 12
Positioning of the equipment
Leave enough space at the opposite drive side so that you can dismantle the rotor. An easy way to calculate the space needed is to leave two and a half times the length of the mixing chamber. Once the equipment has been installed, use the paint in the kit to repaint, as needed. Ensure that the safety devices and guards are complete, operative and in position.

Place the vibration damping plates
Use vibration damping plates only when they are needed to reduce vibration in the mixer support structure. The rubber vibration damping plates have a very high elastic memory. They must be the same size as the mixer contact footprint, at least 10 mm thick and with a hardness higher than 60 Shore. Do not use silicone rubber for the vibration dampers since this kind of rubber remains deformed even after it has discharged the load that has crushed it. The use of vibration damping plates is permitted only if the design calls for a chassis that couples the drive to the mixer "en bloc". The vibrations plates must be installed between the chassis and the foundation. Tighten the mixer fixing hardware until the thickness of the rubber has been reduced by 1 mm. Avoid more extensive deformation of the rubber since this will negatively affect the elasticity of the rubber. When the vibration dampers are installed, all the feed lines to the mixer must be fitted with flexible sleeves to prevent vibration from being transmitted to them. These sleeves must be installed as close to the mixer as possible to reduce the weight of the line on the mixer.

Levelling
Ensure the foundations of the equipment are leveled. The foundation must have good horizontal level performance but it is essential that it is perfectly flat. Problems with flatness will show up when the mixer is coupled to the drive. The equipment’s fixing screws would deform the chassis by discharging abnormal stress to the flexible coupling.

Anchoring the equipment to the foundation
Once the foundation has been prepared with its link rods, place the equipment on it and anchor it firmly.
Checking correct flexible coupling alignment

The drive can be coupled to the mixer in the following ways:

**A)** Drive unit "en bloc" with the mixer by means of the frame.

Flexible coupling alignment has been carried out by the Manufacturer. However, once the mixer is installed and before starting it, check everything carefully following the steps indicated hereafter at point **B)** for a drive separated from the mixer.

**B)** Drive separated from the mixer.

Move the drive up to the mixer and shim its contact points on the foundation until the two pins slide inside the half-couplings and they are correctly seated.

Use the measurement "H" for the type of coupling installed as detailed in the chart on fig. 31.

Check parallelism between the faces of the half-couplings at four points 90° from each other using a feeler "1" fig. 13 for the distance "H".

Check the half-couplings for concentricity using a gauge "2" as shown in fig. 13.

Under normal conditions, it is permitted:

- angle out-of-alignment less than 1°;
- parallel or radial out-of-alignment calculated with the following formula since it is coupling size-specific.

\[
\text{Out-of-alignment} \leq \frac{F}{1000} \text{ (mm)}.
\]

**NOTE:** An angle or concentricity error between the two half-couplings will generate excessive stress on pin "3", the mount bearings and the gear reducer and it will cause these parts to deteriorate rapidly.

<table>
<thead>
<tr>
<th>Type</th>
<th>F</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
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<td>3</td>
</tr>
<tr>
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<td>140</td>
<td>3</td>
</tr>
<tr>
<td>E 160 P</td>
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<td>E 350 P</td>
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<td>7</td>
</tr>
<tr>
<td>E 110 P</td>
<td>1100</td>
<td>7</td>
</tr>
</tbody>
</table>
5.2 Checking the blocking system of the key locking device with solenoid

![Fig. 14 A and B]

**Danger - Warning**

Before starting up the mixer, check the key to ensure it is turned to “lock” position (device activated) Fig. 14 A.

To carry out operations inside the mixer in case of voltage failure it is necessary to ask for the assistance of a specialized technician to the purpose of disabling the safety device.

In order to disable the safety device, turn the triangular key clockwise in “unlock” position as indicated in fig. 14 B.

Take all measure necessary to safely operate inside the mixer.

At the end of the operation, enable the safety device by turning the triangular key in the original position (fig. 14 A).
5.3 Pipe connections

Each mixer has a number of flanges mounted on the top and bottom and the various supply lines will be connected to these.

- The pipe or hopper that feed the material inside the mixer chamber “3” will be connected to the inlet port “2”.
- Material discharge (pipe, hopper or screw feeder) will be connected to port “4”.
- Port “1” can be used as:
  - Additional inlet (for additives);
  - Venting spout inside the mixer.

Each plant must be fitted with a vent since the equipment has an air blowing system inside for the bearings and the blenders.

Furthermore, if the material is discharged from a hopper, when dropped causes a considerable and sudden increase of pressure, this must be able to be vented through opening “1”.

If port “1” is used as an air vent, venting can be:
- With a filter bag;
- With a centralized dust collecting plant.
Fig. 16
5.4 Venting with a filter bag

This is the system used with mixers that operate for just a few hours per day and deal with granular products that do not generate a lot of dust.
On the other hand, this system is not recommended with large size mixers (mixing large amounts of material) and for intensive use (round the clock).
Clean the filter bag on a regular basis. The frequency of these operations will depend on the material mixed and the amount of the time the plant operates.

Release the fixing strap “1”, remove the filter bag “2” and wash thoroughly with an ordinary, non-toxic and non-polluting detergent.
Repeat the washing until the bag is perfectly clean and then dry it.

Danger - Warning
Do not use the filter bag when it is wet. It will not filter efficiently.
Do not operate the mixer without a filter. A large quantity of material will be dispersed into the surrounding work environment.

Venting with a central filtering plant
This is particularly indicated with medium and large-sized mixers with a fairly intensive work schedule.
The plant must not generate a vacuum at the vent opening and should, therefore, be a static filtering plant.
It must also have a filter element cleaning system to ensure continuous filter cleaning.
5.5 Connecting the heat exchange unit lines (jacketed version)

On customer request, the mixer can be equipped with a heat exchange jacket to cool or heat the material to be mixed.

Heat exchange takes place by fluid recirculation. Connect the infeed fluid line to flange “1” and the outfeed fluid line to flange “2”.

Make the connections using lines with rubber sleeves suitable for this purpose to prevent vibration from being transmitted to lines by the equipment.

We recommend installing:
- An infeed and outfeed thermometer on the fluid line to check the temperature differential between infeed and outfeed.
- A gauge on the fluid outfeed to check load loss caused by the heat exchanger jacket coil.
- A flowrate gauge on the fluid outfeed line.
- A stop valve on the infeed and outfeed lines to be able to shut the supply off if there is a problem.

When the coil is filled for the first time with fluid, vent (through the air bleeders) any air in the circuit. Before bleeding the air from the circuit, run the fluid through the coil and the circuit for a couple of hours.

If the fluid is to be heated, install a pressure release valve on the infeed line or the outfeed line. This valve should be set for 4 bar.

Locate this valve so that if it discharges, the liquid is drained away and not directed towards the operators.

When the heat exchange liquid exceeds a temperature of +60°C, the mixer chamber, hatches, feed and discharge pipes must be insulated with adequate material to prevent heat loss and protect those who touch the mixer from being burnt.
5.6 Compressed air features

The compressed air, for end bearings and mixers, if provided, shall be:

**Clean:** with no residues that might damage the solenoid valves of the mixer.

**Moisture free:** a condensation drain tap should be employed.

**Oil free:** oily substances contained in the air might cause the early and irreversible clogging of the components.

The compressed air, for pneumatic supply shall be:

**Clean:** with no residues that might damage the solenoid valves of the mixer.

**Moisture free:** a condensation drain tap should be employed.

**Oiled:** oily substances contained in the air help to move pneumatic supply, this can be obtained by using an oiler (B - Fig.19) in the pneumatic panel.

*Connecting the purging system of the end bearing assemblies shaft seals*

Fig. 20, 21 illustrate some typical pneumatic layouts.

**NOTE:** End bearing assemblies will almost always require air purging.

Install a small control panel, as shown in fig. 20, to ensure correct air purging (or nitrogen if this is required).

Solenoid “1” that turns the entire system on, must be powered before the material reaches the mixing chamber in order to guarantee air flow; air blowing must continue as long as the product remains inside the mixer.

The end bearing assemblies use 1,5 Nm³/h and up to 21 Nm³/h per hour each depending on their size.

- It is forbidden to install grease nipples or lubrication points along the air purging line since this could cause the formation of encrustations inside the mixer formed from material and lubricant.
- On the contrary, we recommend installing a condensation drain tap (A - Fig. 19).
- Size the air line for the total hourly consumption of the two end bearing assemblies installed.
- Air pressure must be adjust on the basis of the material to be mixed (recommended pressure = 1,5 bar).

The user is in charge with deciding the proper pressure values suitable to the specific application pressure. In general terms, with material having high particle size, the pressure can be set to the lowest values. With material having low particle size and low dust content, the pressure has to be increased.
Before connecting the compressed air to the mixer, the pipeline shall be emptied out.

In order to carry out a correct air (or nitrogen) insufflation, install a small panel, according to drawing 19.
Pneumatic layout for shaft seals of end bearing assemblies (customer’s responsibility)

1) Pressure reducer and solenoid, condensation drain tap and gauge
2) Flow meters

Discharge port pneumatic layout

1) Filter unit
2) Solenoid
3) Actuator
4) Coil
5) Magnetic limit switch
5.7 Compressed air supply for additional discharge flap at outlet

Material discharge flap valve “1” is operated by an actuator “2” that must be connected to the compressed air supply circuit.

- Install an air filter/pressure reducer/condensation drain tap/lubricator and connect it to solenoid “3”.
Set the air pressure at 6 bar. This pressure should be increased if the material has a high powder content or when the seals of the hatch begin to wear and there is a problem with holding the seal.

- Use a “Rylsan” hose whose diameter suits the fitting, connect the air line “A” to fitting “3” on the solenoid and connect the solenoid energizing wires to coil “4”.

Fig. 22

Fig. 23
If there is a blackout, the outlet can still be opened or closed turning screw “5” 90°.
- There are two magnetic limit switches inside box n° 6 that enable the two hatches open/closed signals to be generated on the electric control board.
These limit switches can operate with DC or AC.
They give an ON/OFF contact.
Please be reminded that the limit switches are actually switches and should always be installed in series with a charge (resistive, inductive or condensive).

5.8 Adjusting opening and closing time of discharge flap at outlet

There are two adjustable vents “1” on the actuator “2” installed on the material outlet hatch control.
- Use these vents to find the correct hatch opening and closing speed.
This speed should not be too high or too low since these conditions can cause excessive mechanical wear on the seal.

5.9 Supplementary outlet pneumatic supply

The outlet “1” of the material is operated by the cylinder “2” that has to be connected to the air supply line (see Fig. 25).
- Install a group filter-reducer-separator-oiler of the air and connect it to the solenoid valve “3”.

Adjust the air pressure to 6 bar. Such pressure has to be increased if the material is very dusty, or, in case the gasket of the outlet gets worn and creates sealing problems.

- Using a “Rylsan” pipe that suits the fitting diameter, couple to the connection “4” of the solenoid valve (Fig. 26) the air supply and connect solenoid mains wires to coil “5”.

In case of blackout, it is possible to open/close the outlet by turning 90° the adjusting screw inside the solenoid valve.

- There are two magnetic limit switches on the pneumatic cylinder “2” (Fig. 27) that enable the two hatch open/hatch close signals to be generated on the electric control board. These limit switches can operate with DC or AC. They give an ON/OFF contact.

Don’t forget that the limit switch sensors “1” are actually switches and should always be installed in series with a charge (resistive, inductive or condensive).

In case of blackout, it is possible to open/close the outlet by turning the adjusting screw of the solenoid valves.

### 5.10 Electrical connection

**Installing the inverter**

When motor RPM has to be changed, an inverter should be installed using the soft-start option as this allows a gradual start and replaces the hydraulic coupling.

The inverter should be installed in the drive unit between the electric motor and the direct or offset gear reducer. The inverter is not recommended when the transmission has a hydraulic coupling.
5.11 Important requirements the electrician shall observe

- The electrical motor must always be directly started up to allow the mixer to be turned on with a full load.
- A star-delta connection is not recommended.
- The total power absorbed by the mixer must be lower than the power available on the mains.
- The circuit relays to be installed in the control board on the responsibility of the installer, must be rated for the nominal rating power of the corresponding motors.
- Connect the earthing circuit to all points (1) specifically provided by the Manufacturer.
- Connect to an efficient earthing circuit.

Check that the electrical main supply corresponds to the voltage given on the equipment's identification plate. Any installation, maintenance or repair operation involving electrical components must be carried out exclusively by specialized and expressly authorized personnel.

Carry out the electrical connection to a line with an efficient earthing circuit.

If there are a number of equipments connected in series, to calculate the maximum nominal absorption of the installation in terms of power, add up all the absorption in amps given on the identification plates of all the electrical motors. Remember that at start up, the value obtained can be multiplied by seven.

Fig. 28
5.12 Controls

General information

Normally, the mixers are not supplied with a control panel, but its controls are included in the main electric control panel that runs the entire plant of which the mixer is part.

It is responsibility of the installer or user to add on this component and install a main switch that will cut off the electrical power supplied to the mixer.

This switch must have a safety keylock to prevent it from being turned on by accidentally.

**NOTE:** If the mixer has its own control panel, refer to the connections and descriptions of the controls in the enclosed electric manual.

5.13 Testing

**Important**

When installation is complete, authorized personnel must carry out a general test to make sure the safety conditions have been completely satisfied.

**How to start the mixer for the first time**

Before starting to use the mixer, always start it the first time under no load conditions making all the checkings described below:

- Ensure there are no foreign bodies in the mixing chamber such as packing stops, tools, etc.
- Check all electrical connections including those for the safety devices.
- Ensure the inspection hatch is installed correctly.
- Lubricate all grease nipples as described on page 68.

Greasing and lubricating should always be carried out after a long shut-down period.

- Ensure there is oil inside the gear reducer (refer to the Operating and Maintenance Manual).
- Ensure the hydraulic coupling is filled with oil (refer to the Operating and Maintenance Manual).
- Ensure the packings are correctly adjusted (see page 59).
- Ensure the mixer motor rotates in the correct direction. This should be in the direction shown by the arrow on the mixer (see fig. 4 on page 15).
- Ensure the sample draw (if installed) is closed (see page 53).
- Considering the high rating installed, start the motor using the start button. If the moving parts meet no obstacle (they begin to rotate), switch the mixer’s power supply on.
- Run the equipment (on empty) for at least an hour to check for any overheating, vibration or abnormal noise.

**Check:**

- If the temperature of the end bearing assemblies and seals doesn’t exceed 45-50°C;
- The tools are not touching against the walls of the mixer.

The equipment can now begin its operation.
Shutting-down

To stop the equipment in case of an emergency, press the emergency STOP button on the plant’s electric control panel or near the mixer.

In normal conditions, press the “STOP” button and switch the power supply “OFF” at the main switch.

This cuts off power supply to the equipment and stops it.

The “power supply on” indicator light will turn off.

**Important**

A thick gluey substance may be noticed flowing out from the bottom of the gear reducer.

This is not caused by a fault in the gear reducer or bearings, but is the exceeding liquid that the seals fitted on the final shaft are impregnated with.

This treatment ensures a longer lasting sealing.

The leakage may be noticed during start up and may continue for a few hours of service before it disappears but it does not affect the correct working of the equipment in any manner whatsoever.
6.1 Production Start-up

Before starting up the mixer the operator in charge and authorized for the production must ensure the safety devices installed are present, working properly and that the operating conditions are followed (hatches closed, inlet and outlet spouts connected correctly or protected, etc.).

Start up the mixer with no load and feed material gradually to reach the required production.

**Important**

In case of excessive noise, strong vibrations, etc. stop the mixer and report the problem to the person in charge authorized for restoring the correct working.

Do not use the mixer if faulty.

6.2 Clearing the mixer following a blockage

If, during normal operation, the mixer motor is found to be moving gradually under force and then comes to a complete stop, it is highly probable that the problem is caused by a blockage.

**Danger - Warning**

The authorized operator must strictly apply all the laws on the matter of workplace safety and adopt appropriate protective measures against work accidents.

Specifically, do not insert the hands into the inlet, outlet and into the inspection hatch if the rotor shaft is not safely blocked.

**Danger - Warning**

Disconnect the mixer from all electric supplies and use appropriate means to prevent it from being reconnected accidentally.
6.3 Using the equipment

Prescriptions

**Danger - Warning**

The equipment must be used exclusively by trained personnel.
First of all, the operator must check that the guards are in position and all safety devices are present and efficient.
Carry out a number of empty run cycles, helped by an expert operator, to gain the experience and knowledge required to run the equipment.

Preliminary adjustments
Refer to chapter regarding Adjustments and Checkings to carry out at first start up.
The following pages provide information on how to use the equipment correctly.

6.4 How to fill with material

The optimum use of the mixer requires that the material should be filled in when the tools are in rotation. Starting the mixer filled with material would require a much more powerful drive unit.

6.5 Making the first filling

Once the checkings and tests previously described have been made, the equipment is ready for its first work cycle.
- Make a first mixer filling at 30% of its maximum capacity.
Do not leave the equipment during the entire mixing cycle so that it is possible to intervene in case of emergency.
- The subsequent loads should be gradually increased from the initial 30% to the full load the mixer is rated at.
Remember that the mixer cannot be filled beyond 70% of its theoretic geometric volume.
- The first eight hours of operation should be supervised carefully and all problems such as vibrations, abnormal heating, etc. noted and rectified.
6.0 INFORMATION REGARDING USE

6.6 Accidental mixer shutdown

**Danger - Warning**

Carrying out operations inside the mixer, exposing though wholly or partly your body, can be dangerous. Should this be necessary, electrical power must be cut off using the main switch, which must be equipped with a safety key that prevents the mixer from starting up accidentally. This key must be kept by the same person who intervenes on the mixer. In addition, the mixing tool shafts must also be securely blocked by appropriate brake shoes.

To prevent personal injury, the operator must wear appropriate personal safety devices, such as breathing masks, safety goggles, etc.

If the mixer accidentally stops due to an emergency, for instance, or sudden power failure, and since the mixer has not been designed to start up when completely full, then:

- If the rotor shaft does not move, disconnect the power without waiting for the circuit breaker on the main board to trip.
- Wait until the hydraulic coupling (if installed) has cooled down and repeat the starting procedure.

If the total shutdown condition persists, open the inspection hatch and remove manually the material from the mixing drum.

**NOTE:** Open the hatch when power supply is disconnected.

Now repeat manual start up with the assistance of an expert operator.

**Danger - Warning**

It is strictly forbidden trying to unblock the mixer by turning the mixing tool shafts in the opposite direction.
6.7 Heat exchange (jacketed mixers)

If the mixer is provided with a heat exchange jacket, then it is called “Mixer-Conditioner” if the material is to be cooled or “Mixer-Drier” if the material has to be heated.

“Mixer-Conditioner” correct heat exchange operations

⚠️ Danger - Warning

The heat exchange jacket must operate at an internal pressure of 3 bar because it has been tested to 5 bar.

It is forbidden to operate at pressures higher than 3 bar.

To prevent condensation forming in the mixing chamber, the temperature of the cooling liquid must not be much lower than the temperature of the material to be mixed.

Let’s suppose, for example, that we have:
- A material infeed temperature of 60°C.
- Required material outfeed temperature of 30°C.
- The temperature of the heat exchange liquid = 5°C.

At these temperatures, it is likely that condensation will be forming inside the mixing chamber (especially when dealing with materials having a very high intrinsic moisture content).

The temperature of the heat exchange fluid will have to be raised from +5°C to +18°C.

In order to leave the mixing cycle time unchanged (or the conditioning time), increase the volume of heat exchange liquid to compensate for the increase in discharge liquid temperature.

“Mixer-Drier” correct heat exchange operations

The standard “Mixer-Drier” is designed to work at temperatures up to +110°C. If higher temperatures have to be handled, this should be specified when the equipment is ordered.

There can be used three types of exchange fluid:
- Hot water: the liquid does not exceed +100°C.
- Steam: used for temperatures above 100°C.
- Diathermic oil: the liquid is used for temperatures above 100°C.

⚠️ Danger - Warning

If steam or diathermic oil is used as heat exchange liquid, be careful not to exceed a liquid temperature of +110°C since the standard Mixer-Drier cannot handle higher temperatures.

The Mixer-Drier can be used to maintain the temperature of the material handled constant or to increase the temperature.
6.8 Adding additives

⚠️ Danger - Warning
In case of manual addition of additives by means of loading hopper for instance, the operator shall use eye and respiratory tracts protections.
The turbulence created inside the mixer could cause dangerous leakages of powder and sometimes this can be toxic.

For additive addition operation, use the proper inlet provided to this purpose.
Similarly, to add liquids, use the nozzles provided precisely for this purpose.
If your mixer does not have these options, contact the Manufacturer for the modifications to the mixer that may be required.

6.9 How to discharge the material

- The materials must be unloaded into the mixing chamber while the tools are rotating.
- Shut the outlet only when the mixing chamber is completely empty.
- Closing the outlet when the material is being discharged can cause excessive strain on the hatch mechanism and thus an early wear on the seal.
6.10 Liquid injecting device (option)

Liquid injection must be done only with the mixer in motion.

**Danger - Warning**

Do not use the system to add flammable, explosive or toxic additives.

*Adding liquids through the inlet port*

The liquid adding device installed on the inlet port is particularly suitable when the liquid to be injected has low viscosity (for example, water) in order to increase the moisture content of the material to be mixed.

The pressure of the liquid must be between a minimum 1 and a maximum 10 bar.

Nozzle “1” atomizes the liquid to be injected to prevent the formation of lumps, improving thus the quality of the mixture.
Adding liquids from the hopper cover

A = Tap open

Fig. 30
6.11 Sample draw

A sample draw (option) will be supplied only if required when the mixer is ordered.
The purpose of the sample draw (when new mixtures or special materials are being handled) is to remove part of the material being mixed to verify it. Sampling must, therefore, be done when the mixer is in motion.

*Manually operated sample draw*

Pull the knob “1” to discharge material from the outlet “2”.
When the sampling is finished, close the outlet valve.

*Pneumatic sample draw*

Use push-button “1” to remove a sample of material from the outlet “2”.
6.0 INFORMATION REGARDING USE

6.12 Prolonged machine shutdown after assembly

- Set the equipment in safety condition before startup.
- Before starting up the equipment, check the condition of the electrical and pneumatic system and all parts the working of which may be affected by prolonged shutdowns.

6.13 Possible reuse after long shutdowns

- Avoid damp, salty environments during equipment shutdowns.
- Place the equipment on a wooden platform and store it protected from unfavorable weather conditions.
- Set the equipment in safety conditions before starting it up.
- Before starting up the equipment check the conditions of the electrical and pneumatic system components and all parts the working of which may be affected by long shutdowns.
- Before starting up the equipment carry out a complete cleaning cycle in accordance with the indications in the powder safety chart.
- If the equipment operates in conditions and with materials different from the previous application, check the compatibility of this use according to the indications in the INDICATIONS FOR USE section.
Danger - Warning

Before carrying out any maintenance activity, activate all the safety devices to ensure the safety of the persons involved in the operations and those nearby.
Set the equipment concerned in safety condition.
Wear suitable personal protection equipment; in this regard, consult the person in charge of production activities safety.

7.1 Maintenance

7.0 INFORMATION REGARDING MAINTENANCE

Danger - Warning

Any maintenance operation, lubrication or cleaning must be carried out with the equipment stopped and disconnected from the electric and compressed air supply sources. Maintenance and service operations must only be done by specialized and authorized service engineers.
All heavy parts must be hoisted and handled using approved lifting equipment with adequate carrying capacity.
Ensure that sections or parts of the equipment are held by appropriate slings and hooks.
Ensure there are no bystanders near the load to be lifted.

Remember that careful maintenance compliant to the recommended schedule and a correct use of the equipment are essential conditions to guarantee the high performance of the equipment.
In order to ensure constant and regular operation of the equipment and to avoid cancellation of the warranty, any part replacement must be made exclusively with original spares.

Inspections performed at the factory
Your equipment has been fully tested in our factory to ensure it will work correctly when you start it up. Particularly, the following checkings were made by the Manufacturer:

Tests made before the equipment is actually operated:
- Verifying that operating voltage corresponds to that requested with the order.
- Checking the serial number.
- Ensuring all tag plates and stickers are in place.
- Checking the safety mechanisms.
- Checking the tightening of all nuts and bolts.
- Checking drive alignments.
- Dimensional checking.
- Checking paintwork and rust treatment.
- Checking of the packaging.

Tests made with the equipment running
- Empty running general test for about an hour.

These tests and checkings are designed to highlight any problems or faults.
7.0 INFORMATION REGARDING MAINTENANCE

7.2 Tests and checkings to be carried out on-site

To ensure that the equipment has not been damaged during shipping and installation, make the following checkings:

**Before starting the equipment**
- Ensure the voltage indicated on the Serial plate corresponds to that of your mains supply.
- Check the door lock mechanism.
- Check if all the danger and caution plates and stickers are in place and intact.
- Ensure the packing gland is not blocked by the end bearing seals. It must be manually tightened without using wrenches.
- Check mixer drive - rotor alignment.

**With the equipment running**
- Ensure the protections and safety devices are intact and working properly. They could have been damaged or their settings altered during shipping or installation.
- Check correct tightening level of the packing.
- Check the temperature of the various components when running under normal conditions. No part should be excessively hot.
- Run the equipment on empty (no material in the mixer) for at least an hour and check that all parts work correctly.

Remember that the mixer can handle a very wide range of materials. This means, however, that its expendable materials can wear at considerably different rates. The recommended maintenance schedule must therefore be flexible.

It is always better to plan routine maintenance operations and carry it out rather than having to intervene in emergency situations. This has advantages from a financial point of view but is also far more convenient as it allows working on the equipment without having to stop it during full production times.

Labour costs represent a large part of the expense when a equipment has to be dismantled. The actual parts replaced will have low costs.

A good solution is to contact the Manufacturer’s technical staff and set up a service schedule with your engineers for the replacement of all material subject to wear and tear.
7.3 Periodic checkings

**Danger - Warning**
Before carrying out any operation on the equipment, make sure it is set in safety condition.

**Before each start-up**
- Check the electromagnetic key operated door lock.
- If nitrogen blowing is envisaged, check the correct flow of the gas from the pipes inside the mixer.
- If the thermocouples are controlled by indicators present on the electric panel, ensure sure they are working.

**Before every work shift**
- Check that all protections are present and efficient.
- Check the end bearings and agitators for signs of overheating and/or abnormal noise, and replace them if necessary.

**After every work shift**
- Thoroughly clean the mixer and the mixing chamber.

**Weekly (every 50 hours of operation)**
- Check the packings. If the stuffing box temperature exceeds 40 to 50°C, adjust it again.
  If further tightening is not possible, replace the packing.
- Check the tension of the drive belts by following the indications in the relevant manual and check them for wear.
- Check the oil level in the gear reducer.
- Check the locking of the fixing screws of the mixer tools and agitator tools.
- Ensure there is no rubbing between the mixing tools and the chamber.
- Ensure there is no rubbing between the grinder/agitator bushing and the inside of the chamber.
- Check the wear-proof plastic lining of the mixing tools and/or the chamber if present in the mixer and repair if necessary.
- Remove possible powder residue.
- Check the condition of the inflated gaskets and make sure there is no blockage along the pipes.
- Check the condition of the inspection hatch gaskets, make sure they are not worn or encrusted with material.
  Clean or replace the gaskets, if necessary.

**Monthly (every 150 hours of operation)**
- Remove the half casing covering the flange and check the end bearing assemblies for leakage.
  If you note leakages, tighten the packing or replace it.
Every six months (every 1000 hours of operation)
- Check all wear parts listed below and change them as required:
  - Tools;
  - Inspection hatch seals;
  - Discharge port seals;
  - Shaft seal packings.
Check that the alignment between the drive unit and the mixer is correct and check the rubber elements in the flexible coupling.

Yearly (every 2000 hours of operation)
- Check and replace as needed the rubber parts of the hydraulic coupling.

7.4 Cleaning the mixer

Danger - Warning
Disconnect the equipment from mains and make sure it cannot be accidentally started.
Use non-flammable and non-toxic detergents.
If the mixer is used for food products, non-toxic detergents suitable for cleaning parts in contact with food products must be used.
Do not point the water jet directly on electric components.

7.5 Cleaning the equipment (the machine)

Clean the outside part of the equipment (the machine) using a vacuum cleaner to prevent dispersal of dust in the environment and in the surrounding area; or use a moist cloth.
Do not use compressed air.
Wash the equipment (the machine), after vacuuming the dust, with a low-pressure water jet.
7.6 Tightening packing of the end bearings

Check correct seal packing as follows:
- Slacken off locking nuts “1” and tighten screw “2” manually without using a wrench.
- Start the equipment and run it empty for 15-20 minutes with the seal packing tightened manually as described above.
- With the equipment running, tighten both the bearing screws “2” through one turn.
- Tighten back locking nuts “1”.

**NOTE:** Adjust the parallelism between the packing gland and seal flange.

7.7 Tightening the drive belts (found with CI)

**Danger - Warning**

Disconnect the equipment from mains.

Remove the guard to access the belts.  
Grab the belt with two fingers half way between the pulleys and turn it as much as you can using only those two fingers.  
The belt is tensioned correctly when you can turn the belt up to 90° (see fig. 34).
If you cannot do so, slacken off nuts (1) fig. 35 and tension the belt correctly using the nuts (2).

Danger - Warning

Before tightening nuts (1), check the parallelism between motor support plate (3) and the gear reducer (Fig. 35).

---

Fig. 35
8.1 Safety recommendations for replacement

**Danger - Warning**

The replacement operations must be carried out by a specialist authorized technician with specific skills in the sector concerned (mechanical, electrical etc).

Before carrying out any operation, provide suitable safety measures and use the appropriate equipment to prevent risk of work injuries to persons involved in the operations and those nearby.

Activate all the safety devices envisaged and prevent access to controls which, if activated, could cause work injuries to the persons involved in the operations.

8.2 Checking parts subjected to wear on the flexible coupling

If flexible coupling alignment was correctly done when the equipment was commissioned, the flexible parts “1” will last almost indefinitely.

Otherwise, these same elements will wear very quickly because they are subjected to abnormal stress.

If the flexible elements are worn:
- Disconnect the equipment from the electric power;
- Remove the guard;
- Change the flexible elements as described in manufacturer’s operating and maintenance manual;
- Reinstall the flexible coupling and check its alignment;
- Place back the casing.
8.3 Rotor shaft bearings

Danger - Warning

The bearings must be mounted and removed with the equipment disconnected from the electrical power mains using the keylock switch. Also disconnect the compressed air supply.

The keylock switch key must be kept by the authorized Service Engineer.

If compressed air is to be used for cleaning operations, always wear safety goggles and never exceed a pressure of 2 bar.

Do not use petrol (gasoline), solvents or other flammable liquids as detergents. Always use authorized non-flammable and non-toxic commercial products.

When the end bearings become too hot or make excessive noise, they will have to be checked.

Note that the bearings in the assemblies, given their low working speed, have been designed to work for a very large number of operation hours.

Thus, before changing the bearings, it is standard practice to first check whether the problem (noise) is caused by some other part, for example, continuous noise that does not increase in time or a steady beating, will not come from a bearing.

Once the support has been completely dismounted, clean all parts thoroughly, check for wear or nicks.

In particular, check the condition of the shaft which must not show any abnormal scratching or scoring.

Otherwise, contact the Manufacturer to assess the damage and decide on possible replacement.

NOTE: Replace all gaskets and seals (even if apparently in good condition) whenever you dismount the bearing assembly. Any leakage will cause an unscheduled equipment shut-down.

8.4 End bearing assembly on drive unit side

Dismantling the end bearing assembly

NOTE: Before dismantling the assembly:

- Disconnect the drive and the flexible pin coupling from the shaft (if present) using an adequately sized extractor.
- Dismantle the two guards “9”.
- Screw the seal gland all the way down to take up slack (due to packing wear) between the packing and the tool carrier rotor. Taking up the slack will enable the packing to support the tool carrier rotor and keep it centered.
- Slacken off screws “1” and remove the cover “2” with the seal “3”.
- Straighten the tang on the lock washer and remove the locking ring “4”.
- Unscrew bolts “5”.
- Dismantle the bearing fitted along with bearing “7” and seal “8” using an extractor tool.
- Dismantle bearing “7” from the mounting using the requisite extractor.
- If a rev counter is installed, remove the guard sensor “12” mounted on.
Slacken off screw “13” to release cam “14” from the tool carrier rotor. Normally the rev counter is installed in the mounting opposite the drive unit.

8.5 Installing the end bearing assembly

Follow these steps to install the end bearing assembly:
- Lubricate with oil: seal “8”, the outside ring of external bearing “7” and their seatings in the casing.
- Install seal “8”.
- Install bearing “7” in the mounting using a press.
- Install the assembly “6” and attach it to the mixer with screws “5”.
- Position the tool carrier rotor so as to observe gap “A” measurable before the maintenance operations (Fig. 38).
- Install the lock washer and manually screw locking ring “4”.
- Adjust internal bearing play as described below.

**Adjusting taper roller pivoted bearings**

This type of bearing is installed in “SW115”, “SW140”, “SW160” and “SW170” bearing assemblies on drive side.

- Use a feeler gauge to check play “B” (fig. 39) on the bearing under the following conditions:
  
  **A)** Not charged: with the locking ring slackened off.
  
  **B)** Charged: with the locking ring tightened and checking the decrease in clearance.

The play level for each type of bearing assembly is detailed in the table below.

For example: if we have to adjust the roller bearing for an “SW115” assembly.

- When the locking ring is slackened off, clearance “B” should be between 120 and 160 microns.
- When the locking ring is tightened, the clearance should be between 55 and 70 microns. It should never be less than 55 microns.

<table>
<thead>
<tr>
<th>Size</th>
<th>Bearing not charged</th>
<th>Reduction in play B (μm)</th>
<th>Minimum play</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW 170</td>
<td>160-220</td>
<td>90-130</td>
<td>70</td>
</tr>
<tr>
<td>SW 160</td>
<td>140-200</td>
<td>90-130</td>
<td>60</td>
</tr>
<tr>
<td>SW 140</td>
<td>130-180</td>
<td>75-100</td>
<td>55</td>
</tr>
<tr>
<td>SW 115</td>
<td>120-160</td>
<td>65-90</td>
<td>55</td>
</tr>
</tbody>
</table>

**Adjusting pivoted ball bearings**

This type of bearing is installed in “SM40”, “SM50” and “SM65” assemblies on drive unit side.

Clearance is adjusted on the basis of locking ring tightening "α".

- Spread grease on the thread and face of the locking ring.
- When the locking ring is turned to angle "α" the bearing is pressed into the tapered seating of the bushing.

Fig. 40 highlights locking ring tightening angles “α”.

<table>
<thead>
<tr>
<th>Type of bearing</th>
<th>α°</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW 100</td>
<td>120</td>
</tr>
<tr>
<td>SW 80</td>
<td>90</td>
</tr>
<tr>
<td>SW 65</td>
<td>70</td>
</tr>
<tr>
<td>SW 50</td>
<td>50</td>
</tr>
</tbody>
</table>
8.0 REPLACEMENT OF PARTS

- Lubricate with oil seal “3” and its seating in cover “2” (Fig. 37 page 63).
- Install seal “3” in cover “2”.
- Install the cover “2” in mounting “6”.
- Fill with grease using the grease pump (refer page 68 for details on the amount of grease to be used).
- If the bearing assembly has an air-purged seal, than reinstall the rilsan tube on the junction “11”.

8.6 End bearing assembly opposite drive unit side

Dismantling the bearing

NOTE: Before dismantling the assembly:

- Dismantle the two guards “9” (Fig. 41).
- Screw the seal gland all the way down to eliminate clearance (due to packing wear) between the packing and the tool carrier rotor.

Eliminating this clearance will enable the packing to support the tool carrier rotor and keep it centered.

- Slacken off screws “1” and remove the cover “2”.
- Unscrew screws “3”.
- Dismantle the bearing mount “4” together with bearing “5” and seal “6” using an extractor tool.
- Dismantle bearing “5” from the casing using the proper extractor.
- If a rev counter is installed, remove the guard on which sensor “12” is mounted.

Slacken off screw “13” to release cam “14” from the tool carrier rotor. Normally the rev counter is installed in the mounting opposite the drive unit.
Installing the bearing assembly (Fig. 41)

Follow these steps to install the bearing assembly:

- Lubricate with oil: seal “6”, the outside ring of external bearing and their seatings in the casing.
- Install seal “6”.
- Install bearing “5” in the mounting using a press.
- Fit bushing “10” by fixing it to rotor using bolt “8”.
- Install and screw down cover “2” on the mounting “4” using screws “1”.
- Fill with grease using the required grease gun.

Refer to pag. 103 for details on the amount of grease to use.

Dismantling and installing of the tool carrier rotor

**Danger - Warning**

Support the rotor adequately because when the bearings and seals are dismantled, the rotor could drop onto the casing and cause physical harm to the operator or be damaged.

- Remove the bearing from the drive unit side.
- Remove the bearing from the opposite drive unit side.
- Slacken off the packings at both the drive end and the opposite end and remove the seal assemblies.
- Support the mixing chamber properly and dismantle the end plate on the side opposite the drive unit.
- Change the tool carrier rotor, reinstall the end plate on the side opposite the drive unit.
- Install the packing glands and the packing without charging it, on both sides of the mixer.
- Install the drive unit side mounting.
- Install the mounting on the opposite drive unit side.
- Charge the packing.

8.7 Changing the packing

The packing is a square plaited strip that must be cut to the right length to ensure that the packing box is perfectly filled.

The cut should be made at 45° at both ends so that they overlap exactly. See fig. 42.
8.8 Changing the packing on the end bearing assemblies type “SW”

- Remove packing gland “4” by slackening nuts “2” and unscrewing screws “3”;
- Remove packing “5”.

Check bushing “6” for wear and replace it, if necessary, as follows:
- Remove the end bearing assembly;
- Remove packing seat “11” and bushing “9” completely;
- Unscrew screws “7” fitted at 90°;
- Remove the old bushing “6” and seal “8”;
- Fit new bushing “6” with seal “8” and lock using screws “7”;
- Apply a drop of Locktite on the threading of screws “7”;
- Fit bushing “9” and packing “5” in sequence;
- Fix packing gland seat “11”;
- Fit packing gland “4”;
- Tighten screws “3” and nuts “2” slightly;
- Tighten the packing gland.
8.9 Greasing

Greasing points

<table>
<thead>
<tr>
<th>Greasing points</th>
<th>Type of lubricant</th>
<th>Annual lubrication frequency</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>ESSO BEACON 2</td>
<td>3 times -</td>
<td>*</td>
</tr>
</tbody>
</table>

* See table

The table highlights the amount of grease to be used on bearings according to their size.

<table>
<thead>
<tr>
<th>END BEARING ASSEMBLIES (SW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bearing diameter mm</td>
</tr>
<tr>
<td>Amount of grease cc</td>
</tr>
</tbody>
</table>

Grease comparison chart

<table>
<thead>
<tr>
<th>ESSO</th>
<th>ELF</th>
<th>FINA</th>
<th>IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEACON 2</td>
<td>ROLEX A2</td>
<td>MARSONER 2</td>
<td>IP ATHESIA PL2</td>
</tr>
</tbody>
</table>
8.10 Drive unit lubrication

Mixers are available with different drives depending on size and specifications. The illustrations below summarize the available drive units.

---

Fig. 45
Refer to the information below for details on drive unit lubrication.

**PP / PO**
Check the oil level in the gear reducer, and, if installed, grease the electric motor (refer to the Manual).

**CI**
Check the oil level in the gear reducer, the hydraulic coupling and, if installed, grease the electric motor (refer to the Manual). Check drive belt tensioning and size. Check the rubber sections of the flexible coupling.

### 8.11 Scheduled overhaul

It is good standard operating practice, especially with mixers subjected to very intense work, to schedule regular overhauls timed to match up with normal plant downtimes. This kind of overhaul envisages a careful and thorough visual and instrument check-out (as needed) for all parts subject to wear. In particular, it is very important to replace all rubber parts (seals) on hatches, inlet and outlet and flexible couplings. It is equally important to replace all parts especially subject to wear and tear. Since the wearing of parts is closely related to the intensity of equipment operation, in addition to careful maintenance and lubrication, it is important that the operator should evaluate the proper timing for the replacement of the parts subjected to wear. To reduce maintenance work time, if the mixer is accidentally shut down (a non-scheduled stop), we recommend to keep the following parts in stock.

1. Kit of mixing tools
2. End bearing - motor side
2. End bearing - opposite motor side
1. Pneumatic actuator
1. Solenoid
1. Solenoid coil
1. Electromagnetic key operated door lock
2. End bearing shaft seals
   - Inspection hatch seal
   - Outlet seal (when envisaged)
1. Kit flexible coupling rubber elements (if installed)
1. Kit hydraulic coupling rubber elements (if installed)
1. Hydraulic coupling fuse plug
1. Drive belt kit (where installed)

It is advisable however to demand the Manufacturer to supply the recommended spare parts for the mixer ordered.
8.12 Sample draw maintenance (option)

**Danger - Warning**

Change the seal or the piston only when the mixer was shutted down and emptied.
Clean all exterior surfaces thoroughly using products suitable for the materials to be mixed.
Take special care not to damage the inside of the sample draw casing.
Do not insert tools into the outlet since this could damage the sample draw.

8.13 Replacing the piston on the sample draw operated manually

- Unscrew the four screws “1” and remove the cover and the pad from body “4” of the sample draw.
- Slacken off nuts “5” and unscrew piston “2”.
- Unscrew screws “6” and change gasket “7”.
- Install the sample draw following the dismantling operations in reversed order.
- Make some movements under no load conditions.
### 8.14 Replacing the piston on the pneumatic sample draw

**Danger - Warning**

Release the air pressure in the pneumatic circuit and disconnect the compressed air supply before working on the sample draw.

- Disconnect the pneumatic line form the sample draw cylinder.
- Remove screws “2” and pull out the plug “4” from the sample draw “3” together with its drive cylinder “5”.
- Slacken off nut “6” and unscrew plug “4”.
- Unscrew screw “7” and change gasket “8”
- Install the new plug and lock it in position ensuring that (when the pneumatic cylinder gets to the limit switch) the plug is at level “A” of the piston casing.
- Install the sample draw following the steps above in reversed order.
- Move the plug a little under no load conditions to clamp the seal.

### 8.15 Cleaning procedure for the liquid injection suction nozzle of the inlet liquid injection lance

**Danger - Warning**

Use non-toxic and non-flammable detergents or descalers.

On using compressed air for cleaning operation, protective goggles shall be employed in order to protect the eyes from solid fragments of mater projected by the air jet.

Limit the air pressure to 2 bar.
8.0 REPLACEMENT OF PARTS

Remove the liquid injection device and immerse it for the time required in a scale removing solution. Clean the nozzle with a jet of compressed air or replace it if necessary.

NOTE: Replace the nozzle with another having the same features and made from the same material.

8.16 Dismantling and taking out of service

Danger - Warning
As for installation, dismantling or scrapping operations that require to move the equipment must be done by specialized and expressly authorized personnel.

- Disconnect the electric supply upstream and then disconnect the electric motor power cables.
- The mixer can now be dismantled.
- If the equipment is to be scrapped, bear in mind that the mixer is made largely from steel, an electric motor with its copper windings and various electric parts.
- Remove and collect the lubricant contained inside the gear reducer.
- Proceed to completely dismantling the equipment, separating the component parts according to the materials they are made of.
- Send the materials to the nearest separate waste collection centres where they will be properly separated, and any polluting parts will be handled in compliance with the regulations in force in the country of installation.

8.17 Returning the equipment (the machine)

When returning the equipment (machine) use the original packaging if it has been preserved, otherwise fix the it on a pallet and cover it with nylon shrink-wrap, to protect it as best as possible from impact during transport. In any event, make sure there is no residue material inside the equipment (machine).

8.18 Demolition and disposal

Demolition of the equipment (machine) must be entrusted to personnel specialized in these activities and equipped with adequate skills.

Dismantle the components of the equipment (machine) concerned; if necessary contact the Manufacturer for further information.

The components dismantled have to be separated on the basis of the nature of the materials of which they consist, in compliance with the laws on the matter of “differential collection and disposal of wastes”.

With reference to the WEEE Directives, electrical and electronic components, marked with a special symbol, have to be disposed off in authorized collection centres meant for the purpose.

Unauthorized disposal of “Waste Electrical and Electronic Equipment” (WEEE) is punishable with fines governed by the laws concerning the matter.
### 9.1 Trouble-shooting

Minor problems can be solved without consulting a specialist.

The following Table contains a list of the most common problems, the possible causes and possible remedies. For particularly difficult actions which are not mentioned in the Table, contact the Manufacturer’s Customer Service Department.

**Danger - Warning**

Before carrying out any operation “set the equipment (machine) concerned in safety” (see “Glossary and terminology”), operate according to the indications on the “Operation and Maintenance Manual” and in accordance with and in compliance with the standards in force as regards health and safety.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Reason</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>The mixer does not start</td>
<td>Fuse(s) on electric control panel blown</td>
<td>Change blown fuse(s)</td>
</tr>
<tr>
<td></td>
<td>Circuit breaker tripped</td>
<td>Reset circuit breaker</td>
</tr>
<tr>
<td></td>
<td>Overload tripped</td>
<td>Reset overload</td>
</tr>
<tr>
<td></td>
<td>Inspection hatch open</td>
<td>Close hatch</td>
</tr>
<tr>
<td></td>
<td>Emergency stop button pressed</td>
<td>Reset emergency button</td>
</tr>
<tr>
<td>The mixer does not start discharge the material</td>
<td>No air in the pneumatic cylinder</td>
<td>Restore compress air supply</td>
</tr>
<tr>
<td></td>
<td>Faulty solenoid coil</td>
<td>Replace coil</td>
</tr>
<tr>
<td>The mixer is noisy</td>
<td>Incorrect clearance between plough tools and mixing chamber</td>
<td>Call MAP Technical Assistance</td>
</tr>
<tr>
<td></td>
<td>Faulty bearing</td>
<td>Repair the bearing(s) (see page 62)</td>
</tr>
<tr>
<td>The mixer stops during a mixing cycle</td>
<td>The amount of product is more than max. allowed</td>
<td>Remove product from the mixer until the right level is reached</td>
</tr>
<tr>
<td>Residue inside the mixing chamber</td>
<td>Worn tools</td>
<td>Change or adjust tools</td>
</tr>
<tr>
<td>The mixer does not mix the product properly</td>
<td>Incorrect product processing time inside the mixing chamber</td>
<td>Reset correct processing time</td>
</tr>
<tr>
<td></td>
<td>Excessive wear on tools</td>
<td>Replace or adjust tools</td>
</tr>
<tr>
<td>Excessive powder leaking from the inspection hatch</td>
<td>Worn seal</td>
<td>Replace seal</td>
</tr>
<tr>
<td>Powder leaks from the bearing seals</td>
<td>Seal gland incorrectly registered</td>
<td>Register the packings correctly (see p.59)</td>
</tr>
<tr>
<td></td>
<td>Worn packing</td>
<td>Replace the packing (see page 67)</td>
</tr>
<tr>
<td>During mixing, product leaks from the discharge door</td>
<td>Worn seal</td>
<td>Change seal</td>
</tr>
<tr>
<td></td>
<td>Insufficient air pressure</td>
<td>Increase air pressure</td>
</tr>
<tr>
<td></td>
<td>Leak in compressed air circuit</td>
<td>Repair or replace the worn parts</td>
</tr>
</tbody>
</table>
9.0 INFORMATION REGARDING FAULTS

If you have been unable to solve the problem on the equipment (machine) even after having carried out the operations suggested in paragraph “Trouble-shooting” please contact the plant technician/installer/or the Manufacturer.

If technical assistance is required, in addition to the equipment data, the plant technician/installer or Manufacturer will also need information concerning the plant in which the equipment (machine) is installed, its installation and its working, for better identification of the problem that has occurred.

Obviously many of the checking operations which are requested have already been performed in the various steps during installation, testing and start-up of the equipment (machine) concerned.

**Danger - Warning**

Before carrying out any operation “set the equipment (machine) concerned in safety” (see “Glossary and terminology”), operate according to the indications on the “Operation and Maintenance Manual” and in accordance with and in compliance with the standards in force as regards health and safety.

### 9.2 Check-list in case of fault

If you have been unable to solve the problem on the equipment (machine) even after having carried out the operations suggested in paragraph “Trouble-shooting” please contact the plant technician/installer/or the Manufacturer.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Reason</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bearings overheat</td>
<td>Worn or damaged bearings</td>
<td>Replace the bearings</td>
</tr>
<tr>
<td>Gear unit overheats</td>
<td>Scarce or excessive oil quantity in gear unit</td>
<td>Fill to correct level</td>
</tr>
<tr>
<td>Electric motor overheats</td>
<td>Worn or damaged bearings</td>
<td>Replace bearings</td>
</tr>
<tr>
<td>Excess temperature in the mixing chamber</td>
<td>Excessive mixing time</td>
<td>Reduce mixing time</td>
</tr>
<tr>
<td></td>
<td>Highly abrasive product</td>
<td>Reduce mixing time</td>
</tr>
<tr>
<td></td>
<td>Introduction of products that, when combined, create a chemical reaction</td>
<td>Ensure the temperature does not exceed max. permitted 150°C - 165°C</td>
</tr>
<tr>
<td>Mixer-drier does not heat the product</td>
<td>Heat exchange liquid is obstructed</td>
<td>Remove the obstruction to reset correct heat exchange liquid circulation</td>
</tr>
<tr>
<td></td>
<td>Air in the heat exchange liquid circuit</td>
<td>Vent the circuit</td>
</tr>
<tr>
<td>Mixer-conditioner does not cool the product</td>
<td>Heat exchange liquid is obstructed</td>
<td>Remove the obstruction to reset correct heat exchange liquid circulation</td>
</tr>
<tr>
<td></td>
<td>Air in the heat exchange liquid circuit</td>
<td>Vent the circuit</td>
</tr>
<tr>
<td>Product leaks from the sample draw</td>
<td>Word seal (manual sample draw)</td>
<td>Replace the seal (see page 71)</td>
</tr>
<tr>
<td></td>
<td>Worn plug (pneumatic sample draw)</td>
<td>Replace the piston (see page 72)</td>
</tr>
<tr>
<td>Product is not correctly moisturised</td>
<td>Spray nozzles clogged</td>
<td>Clean spray nozzles (see page 72)</td>
</tr>
</tbody>
</table>

### 1) Information necessary

a) Description of the problem

b) Photo showing the entire mixer and how it is installed

c) Throughput of the mixer
2) **Checking the electrical part**
   a) Are voltage variations possible due to simultaneous start-up of various equipments?
   b) Is the plant equipped with a power generator?
   c) The electric motor thermal protection inside the panel has delayed action.
   d) Check the power input of the motor without load at breakaway current and when the mixer is operating at a standard speed.

3) **Checking the mixer**
   a) Has the mixer been assembled correctly? Are all the inspection hatches in the correct position?
   b) Has the mixer been fixed correctly?

4) **Checking the material**
   a) Material description?
   b) Density? (kg/dm³)
   c) Particle size? (μm/mm)
   d) Moisture? (%)
   e) Flowability?
   f) Compressibility?
   g) Abrasiveness?
Weights and overall dimensions

Mixer with direct-mounted drive

<table>
<thead>
<tr>
<th>Type</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>Weight kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBN 75</td>
<td>1170</td>
<td>510</td>
<td>570</td>
<td>300</td>
</tr>
<tr>
<td>WBN 150</td>
<td>1870</td>
<td>630</td>
<td>724</td>
<td>492</td>
</tr>
<tr>
<td>WBN 300</td>
<td>2340</td>
<td>731</td>
<td>860</td>
<td>793</td>
</tr>
<tr>
<td>WBN 550</td>
<td>2544</td>
<td>930</td>
<td>1075</td>
<td>1146</td>
</tr>
<tr>
<td>WBN 800</td>
<td>2713</td>
<td>980</td>
<td>1151</td>
<td>1411</td>
</tr>
<tr>
<td>WBN 1100</td>
<td>3163</td>
<td>1100</td>
<td>1278</td>
<td>1987</td>
</tr>
<tr>
<td>WBN 2000</td>
<td>3904</td>
<td>1340</td>
<td>1455</td>
<td>2587</td>
</tr>
<tr>
<td>WBN 3000</td>
<td>4904</td>
<td>1340</td>
<td>1455</td>
<td>3387</td>
</tr>
</tbody>
</table>

dimensions in mm
Weights and overall dimensions

Mixer with direct-mounted drive

<table>
<thead>
<tr>
<th>Type</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Weight Kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBN 75</td>
<td>1380</td>
<td>570</td>
<td>649</td>
<td>828</td>
<td>300</td>
</tr>
<tr>
<td>WBN 150</td>
<td>1582</td>
<td>670</td>
<td>755</td>
<td>1019</td>
<td>500</td>
</tr>
<tr>
<td>WBN 300</td>
<td>1957</td>
<td>770</td>
<td>880</td>
<td>1058</td>
<td>700</td>
</tr>
<tr>
<td>WBN 550</td>
<td>2214</td>
<td>930</td>
<td>1111</td>
<td>1386</td>
<td>1185</td>
</tr>
<tr>
<td>WBN 800</td>
<td>2463</td>
<td>980</td>
<td>1151</td>
<td>1463</td>
<td>1450</td>
</tr>
<tr>
<td>WBN 1100</td>
<td>2841</td>
<td>1100</td>
<td>1277</td>
<td>1660</td>
<td>2000</td>
</tr>
<tr>
<td>WBN 2000</td>
<td>3114</td>
<td>1340</td>
<td>1475</td>
<td>1766</td>
<td>2540</td>
</tr>
<tr>
<td>WBN 3000</td>
<td>4114</td>
<td>1340</td>
<td>1475</td>
<td>1766</td>
<td>3400</td>
</tr>
</tbody>
</table>

Dimensions in mm

Fig. 49
Weights and overall dimensions

Mixer with separate drive

<table>
<thead>
<tr>
<th>Type</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBN 1100</td>
<td>2690</td>
<td>1100</td>
<td>1278</td>
<td>1460</td>
<td>700</td>
<td>1120</td>
<td>680</td>
</tr>
<tr>
<td>WBN 2000</td>
<td>2920</td>
<td>1340</td>
<td>1455</td>
<td>1675</td>
<td>800</td>
<td>1230</td>
<td>1050</td>
</tr>
<tr>
<td>WBN 3000</td>
<td>3920</td>
<td>1340</td>
<td>1455</td>
<td>1675</td>
<td>800</td>
<td>1230</td>
<td>1050</td>
</tr>
<tr>
<td>WBN 4800</td>
<td>4520</td>
<td>1500</td>
<td>1750</td>
<td>1850</td>
<td>800</td>
<td>1230</td>
<td>1050</td>
</tr>
<tr>
<td>WBN 6000</td>
<td>4840</td>
<td>1600</td>
<td>1860</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>WBN 8800</td>
<td>5390</td>
<td>1810</td>
<td>2130</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>WBN 10500</td>
<td>5630</td>
<td>1910</td>
<td>2160</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>WBN 15000</td>
<td>6124</td>
<td>2110</td>
<td>2445</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Dimensions in mm
Sample draw dimensions

Manual sample draw

![Diagram of Manual Sample Draw](image1)

Fig. 51

Pneumatic sample draw

![Diagram of Pneumatic Sample Draw](image2)

Fig. 52

Dimensions in mm
Electrical system

The electrical system is manufactured in compliance with the CEI-CENELEC-IEC standards and the symbols used in the diagram also comply with these standards.

If the mixer is supplied with its own electric control board, its wiring diagram is inside the control board.

If the mixer is supplied without a control board, the electric wiring diagram can be required to the supplier of the control board.

The diagrams given in fig. 53-57 illustrate typical electrical layouts.
Fig. 53

Wiring diagram

Electrical mains supply

General hatch interlock

General mixer
10 TECHNICAL DATA

WBN

MAP.175.—M.EN.  Issue: A1

Run mixer motor

Wiring diagram

Fig. 54
WBN

10 TECHNICAL DATA

MAP.175.—M.EN.  Issue: A1

Additional discharge port open/close solenoid
Discharge port open button
Discharge port close button
Inspection hatches closed
Discharge port closed sensor
Discharge port open sensor

Wiring diagram

Fig. 57
Electric layout legend

A - Mixer electric motor.
C - Inspection hatch limit switch (2).
D - Timer (not supplied by Manufacturer).
The timer is used to set the time for the electromechanical lock trip. It should be set (once you have determined how long the rotor takes to come to a complete stop when the mixer is empty) at a time 30% higher than the rotor stopping time noted).
E - Inspection hatch electromechanical locking (1).
F - 5-way monostable solenoid controls opening/closing of the additional discharge port.
G - Induction sensor: additional discharge port open.
H - Induction sensor: additional discharge port closed.
I - Rectifier (not supplied by Manufacturer).

NOTE:
1) The layout illustrates a single detail. If there are a number of the same parts, repeat the connection.
2) The layout illustrates the connections for a single limit switch.
If there are several, repeat the connections in series.
Auxiliary technical information

Mixer with additional discharge port

**NOTE:** Standard auxiliary connection voltage is 24 V DC.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Voltage</th>
<th>Installed drive power</th>
<th>Amperage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Key door lock mechanism with electromagnet</td>
<td>24 V DC</td>
<td>100 W (starting torque) - 4 W (operating power)</td>
<td>10 A</td>
</tr>
<tr>
<td>2</td>
<td>Electromagnet coil</td>
<td>24 V DC</td>
<td>6 W</td>
<td>0.25 A</td>
</tr>
<tr>
<td>3</td>
<td>Magnetic sensors (Reed)</td>
<td>3-250 V AC</td>
<td>50 W max</td>
<td>1 A max</td>
</tr>
</tbody>
</table>
Mixer casing

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUANT.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>End plate</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Mixing drum</td>
</tr>
</tbody>
</table>

Fig. 59
**Inspection hatch**

![Diagram of inspection hatch](image)

**Fig. 60**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUANT.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Door</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Seal</td>
</tr>
<tr>
<td>3</td>
<td>*</td>
<td>Locking hooks</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Electromagnetic lock</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>Key electromagnetic lock</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>Gas spring</td>
</tr>
</tbody>
</table>

* Quantity varies according to the hatch dimensions
Round outlet

Fig. 61

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUANT</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Actuator</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Joint</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>Hatch control shaft</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>Spacer</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>Bush</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>Spacer</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>Flap</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>Seal</td>
</tr>
</tbody>
</table>
## 11 SPARE PARTS

**Manual sample draw**

![Diagram of spare parts](image)

**Fig. 62**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUANT.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>HANDLE</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>SHAFT</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>FLANGE</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>SPRING</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>METAL DISK</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>LIP SEAL</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>METAL DISK</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>CASING</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>O-RING</td>
</tr>
<tr>
<td>*</td>
<td>1</td>
<td>HARDWAREKIT</td>
</tr>
</tbody>
</table>
### Pneumatic Sample Draw

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUANT.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>CYLINDER</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>TUBE</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>FLANGE</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>METAL DISK</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>LIP SEAL</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>METAL DISK</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>BODY</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>VALVE</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>O-RING</td>
</tr>
<tr>
<td>*</td>
<td>1</td>
<td>HARDWAREKIT</td>
</tr>
</tbody>
</table>

**Fig. 63**
Pneumatic outlet actuator

Fig. 64

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUANT.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1</td>
<td>PNEUMATIC ACTUATOR</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>FIXING PIECE</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>ELECTROVALVE</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>POSITION INDICATOR</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>COIL</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>MIXER CONNECTION BRACKET</td>
</tr>
</tbody>
</table>
Rotor shaft

Fig. 65
Shaft seal end bearing assembly

Fig. 66

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUANT.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>PACKING SEAT</td>
</tr>
<tr>
<td>2A</td>
<td>1</td>
<td>OR RING</td>
</tr>
<tr>
<td>2B</td>
<td>2</td>
<td>AIR BLOWING BUSH</td>
</tr>
<tr>
<td>2C</td>
<td>3</td>
<td>PACKING</td>
</tr>
<tr>
<td>2D</td>
<td>1</td>
<td>SHAFT PROTECTION BUSH</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>SEAL GLAND</td>
</tr>
</tbody>
</table>
End bearing assembly drive end

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUANT.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>COVER</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>SEAL</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>BEARING RING NUT</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>BEARING</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>CASING</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>GUARD</td>
</tr>
</tbody>
</table>
End bearing assembly opposite drive end

Fig. 68

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUANT.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>COVER FLANGE</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>BUSH</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>BEARING</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>SEAL</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>CASING</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>GUARD</td>
</tr>
<tr>
<td>*</td>
<td>1</td>
<td>HARDWARE KIT</td>
</tr>
</tbody>
</table>
### A1 Nuts and bolts tightening torque Table

<table>
<thead>
<tr>
<th>Thread diameter</th>
<th>Resistance Class 8.8 [Nm]</th>
<th>Resistance Class 10.9 [Nm]</th>
<th>Resistance Class 12.9 [Nm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>M6</td>
<td>9.5</td>
<td>13.0</td>
<td>16.0</td>
</tr>
<tr>
<td>M8</td>
<td>23.0</td>
<td>32.0</td>
<td>39.0</td>
</tr>
<tr>
<td>M10</td>
<td>46.0</td>
<td>64.0</td>
<td>77.0</td>
</tr>
<tr>
<td>M12</td>
<td>80.0</td>
<td>110.0</td>
<td>135.0</td>
</tr>
<tr>
<td>M14</td>
<td>125.0</td>
<td>180.0</td>
<td>215.0</td>
</tr>
<tr>
<td>M16</td>
<td>195.0</td>
<td>275.0</td>
<td>330.0</td>
</tr>
<tr>
<td>M18</td>
<td>270.0</td>
<td>390.0</td>
<td>455.0</td>
</tr>
<tr>
<td>M20</td>
<td>385.0</td>
<td>540.0</td>
<td>650.0</td>
</tr>
<tr>
<td>M22</td>
<td>510.0</td>
<td>720.0</td>
<td>670.0</td>
</tr>
<tr>
<td>M24</td>
<td>660.0</td>
<td>930.0</td>
<td>1100.0</td>
</tr>
<tr>
<td>M27</td>
<td>980.0</td>
<td>1400.0</td>
<td>1650.0</td>
</tr>
<tr>
<td>M30</td>
<td>1350.0</td>
<td>1850.0</td>
<td>2250.0</td>
</tr>
</tbody>
</table>

Oil filler, drainage, venting, and level plugs in gear reducers: **Tightening torque 16 -18 [Nm]**
## A2 Lubricants and sealants Table

<table>
<thead>
<tr>
<th>Description</th>
<th>Brand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lubricant and anti-rust paste for electric motor shaft and gear reducer bushing</td>
<td>KLBER-PASTE 46 MR 401</td>
</tr>
<tr>
<td></td>
<td>FLENDE</td>
</tr>
<tr>
<td></td>
<td>MONTAGEPASTE</td>
</tr>
<tr>
<td>Sealant for electric motor flange and gear reducer</td>
<td>LOCTITE 510</td>
</tr>
<tr>
<td></td>
<td>LOXEAL 59-10</td>
</tr>
<tr>
<td>Lubricant anti-rust and anti-seizure grease for splined shafts and bushes</td>
<td>APLEC 380</td>
</tr>
<tr>
<td></td>
<td>VISCOL S.p.A.</td>
</tr>
<tr>
<td></td>
<td>EP graphite grease</td>
</tr>
</tbody>
</table>

## Flanged head bearings lubricant

Grease containing mineral oil thickened with lithium soap GREASE L2 type. Satisfies the classification requisites DIN 51502 K 2 K - 20.

<table>
<thead>
<tr>
<th>Grease</th>
<th>Brand</th>
</tr>
</thead>
<tbody>
<tr>
<td>GR - MU2</td>
<td>AGIP</td>
</tr>
<tr>
<td>ARALUP HL2</td>
<td>ARAL</td>
</tr>
<tr>
<td>BP - ENGERGREASE L 2</td>
<td>BP</td>
</tr>
<tr>
<td>CALYPSOLH 433</td>
<td>CALYPSOL</td>
</tr>
<tr>
<td>ANDOK B</td>
<td>ESSO</td>
</tr>
<tr>
<td>MOBILUX2</td>
<td>MOBIL OIL</td>
</tr>
<tr>
<td>MOBIPLEX 47</td>
<td>SHELL</td>
</tr>
<tr>
<td>ALVANIA2</td>
<td>TEXACO</td>
</tr>
<tr>
<td>GLISSANDO FL20</td>
<td></td>
</tr>
<tr>
<td>MULTIFAX 2</td>
<td></td>
</tr>
</tbody>
</table>
# A3 Gear reducer lubricants Table

Refer to Manufacturer operation and maintenance information
The table below is only a general indication.

<table>
<thead>
<tr>
<th>Mineral oil</th>
<th>Brand</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLASIA 220 (*)</td>
<td>AGIP</td>
</tr>
<tr>
<td>DEGOL BG220</td>
<td>ARAL</td>
</tr>
<tr>
<td>ENERGOL GR - XP220</td>
<td>BP</td>
</tr>
<tr>
<td>NL GEAR COMPOUND 220</td>
<td>CHEVRON</td>
</tr>
<tr>
<td>SPARTAN EP 220</td>
<td>ESSO</td>
</tr>
<tr>
<td>MOBILGEAR 630</td>
<td>MOBIL OIL</td>
</tr>
<tr>
<td>OMALLA 220</td>
<td>SHELL</td>
</tr>
<tr>
<td>MEROPA 220</td>
<td>TEXACO</td>
</tr>
</tbody>
</table>

(*) First filling oil

For temperatures less than 0°C replace the mineral oil with synthetic oil having the same viscosity.
In this case:
- change the oil the first time after 2000 hours of operation;
- change the oil subsequently after 10000 hours or every 5 years.

<table>
<thead>
<tr>
<th>Synthetic oil</th>
<th>Brand</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLASIA S220</td>
<td>AGIP</td>
</tr>
<tr>
<td>DEGOL GS220</td>
<td>ARAL</td>
</tr>
<tr>
<td>ENERSYN HTX220</td>
<td>BP - MACH</td>
</tr>
<tr>
<td>SYNTERMA P20</td>
<td>ELF</td>
</tr>
<tr>
<td>GLICOLUBE 220</td>
<td>ESSO</td>
</tr>
<tr>
<td>KLÜBERSYNTH GH 6-220</td>
<td>KLÜBER</td>
</tr>
<tr>
<td>SHC 630</td>
<td>MOBIL</td>
</tr>
<tr>
<td>TIVELA OIL SC220</td>
<td>SHELL</td>
</tr>
<tr>
<td>PINNACLE E P 220</td>
<td>TEXACO</td>
</tr>
</tbody>
</table>

The lubricants brands are in alphabetic order without any reference to the quality.
The list does not cover the entire range of lubricants; therefore other lubricants can be used as long as they have the same technical features.
A4 Declaration of Incorporation

The manufacturer:

WAMGROUP S.p.A.

located in
Strada degli Schiocchi, 12 - 41100 (Mo) - Italy

under its own responsibility declares that:

WBN

Declaration Of Incorporation Of Partly Completed Machinery Annex II B 2006/42/CE Directive


and, where applicable, the requirements imposed by the following EC Directives


The relevant technical documentation is compiled in accordance with Annex VII B of the Machinery Directive 2006/42/EC

Harmonized standards, national standards and technical regulations in question:


The signing company is committed to provide, in response to a reasoned request by national authorities, relevant information on products covered by this declaration, without prejudice to the rights of intellectual property of the manufacturer. The information will be transmitted directly to the national authorities having requested.

It's forbidden to operate all these products before the machine, in which they will be installed, is declared in conformity with 2006/42/EEC AND SUBSEQUENT AMENDMENTS

Strada degli Schiocchi, 12 - 41100 (Mo) - Italy, 01/01/2010

The person authorized to provide the technical documentation:
Vainer Marchesini

The legal representative:
Vainer Marchesini

WAMGROUP S.p.A. - Strada degli Schiocchi, 12 - 41100 (Mo) - Italy