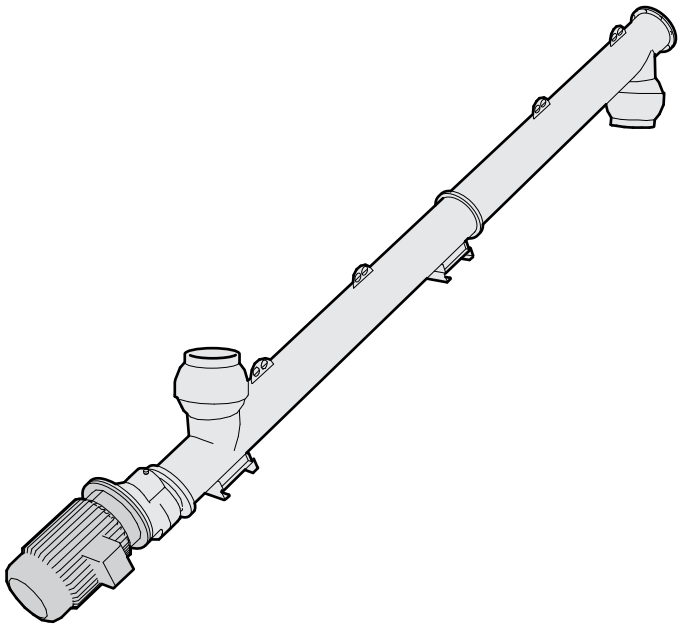
EN

ES
(ES, ESV)

HIGH PERFORMANCE SCREW FEEDERS AND CONVEYORS

ASSEMBLY AND MAIN INSTRUCTIONS FOR USE AND MAINTENANCE

2



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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

Symbol representation	Symbol description
	**Danger sign:** indicates danger of electric shock caused by the presence of powered components inside the junction box or control panel.
	**Obligation:** read this Manual before carrying out any action on the equipment concerned.
	**Forbidden:** indicates that it is forbidden to lubricate or adjust moving parts.
	**Danger:** 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.
	**Information:** indicates the direction of rotation of the electric motor.
	**Obligation:** indicates the hooking points for lifting each section of the equipment concerned.
	**Forbidden:** indicates it is forbidden to introduce hands into the equipment.

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.

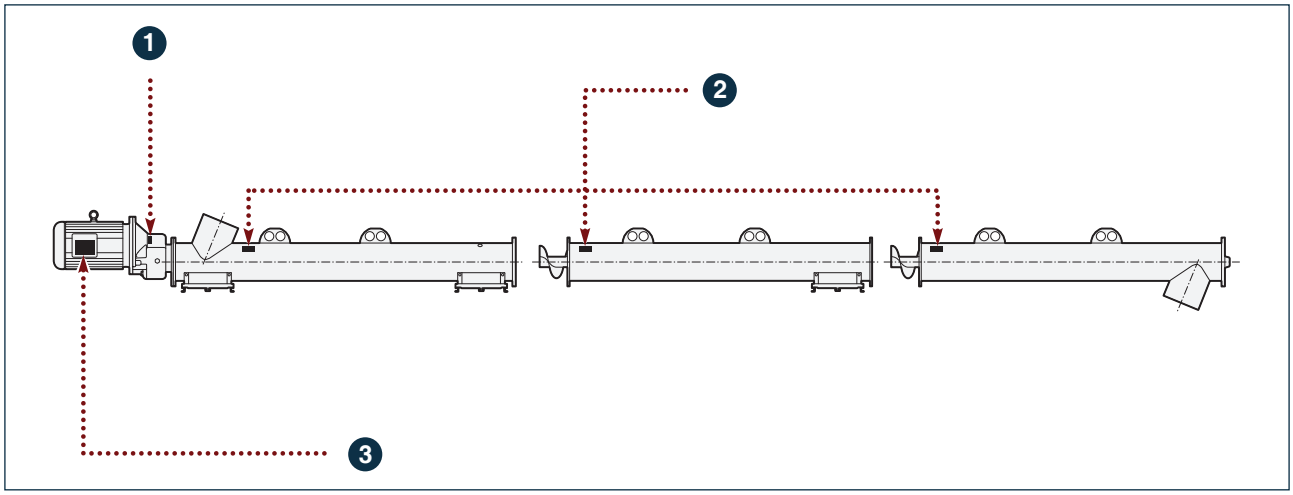
- **Ensure that the equipment concerned is disconnected from all the mains and appropriate devices are used to prevent these from being reconnected accidentally.**
- **Ensure that all the moving parts of the equipment have come to a complete stop.**
- **Ensure the temperature of the equipment concerned 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.**

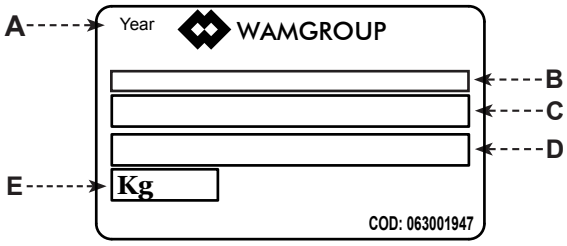
1.4 Manufacturer's data and identification of equipment

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 it.

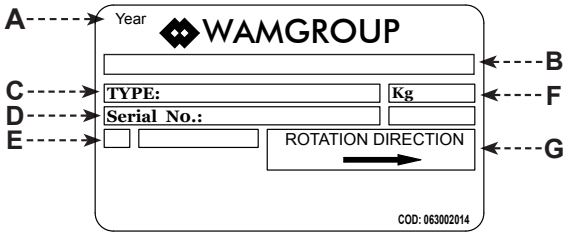
The ID plates shown identify the equipment concerned and its main components.
The plates show the reference necessary for operating safety.





1 - Gear reducer identification plate

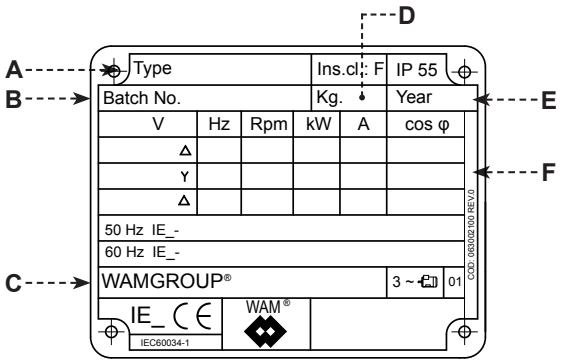
A) Year of manufacture
B) Manufacturer's name and address
C) Identification of gear reducer
D) Production batch
E) Weight of gear reducer



2 - Identification plate of screw conveyor

The plate is affixed on the screw conveyor or on each one of its sections if there are a number of sections.

A) Year of manufacture
B) Manufacturer's name and address
C) Type of screw conveyor
D) Serial No.
E) Progressive number of the section (if the screw consists of a number of sections)
F) Weight of the screw conveyor
G) Direction of conveyor rotation



3 - Motor identification tag

A) Electric motor identification
B) Production batch
C) Manufacturer's name and address
D) Weight of the 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.

2.1 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.

2.3 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.

It is strictly forbidden to walk or placing any improper load on the equipment.

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

The screw conveyor consists of an external fixed part and an inner rotary part. The inner rotary part is made up of a helicoid flighting wound around a central shaft, and is equipped with bearings, gear motor, motors and all the accessories necessary for its correct working. The external fixed part may have a closed circular (tubular) or open semi-circular (trough) cross-section and always has at least one inlet and one outlet point. Depending on a predefined modularity, it is possible to have different shapes and sizes.

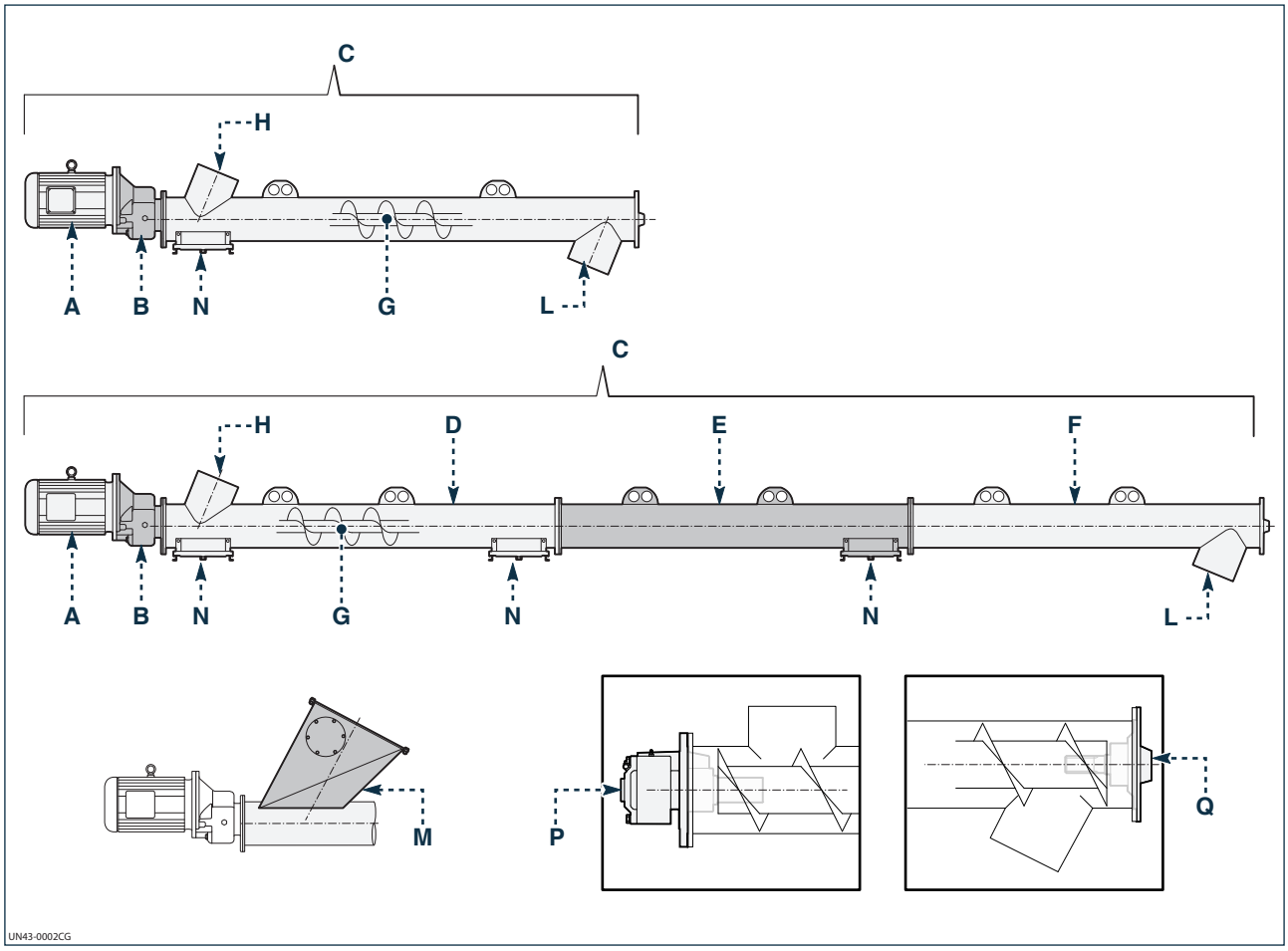
The screw conveyor is designed for being integrated with other systems in the context of a plant in order to obtain a well defined application.

The screw conveyor is used for conveying bulk powders having different particle size from an inlet point A to an outlet point B, specifically: to extract, convey, lift, feed or a combination of these operations.

Important

The terms “equipment”, “screw feeder” or “screw conveyor” used in this manual refer to the same machine.
As components meant for installation in a plant, the screw feeders/conveyors - not fully provided with safety means - have to be considered “partly completed machinery”. Therefore, they do not bear an EC marking.
It is forbidden to start the equipment unless the machine/plant in which it is to be installed has been declared compliant with the Directive 2006/42/EC and further modifications.

3.2 Main components



A) Electric motor
B) Gear reducer with integrated end bearing assembly
C) Screw feeder/conveyor
D) Loading section
E) Intermediate section (whose number depends on the distance between the inlet and outlet spouts)
F) Unloading section
G) Screw (auger, worm-on-pipe)
H) Inlet spout
L) Outlet spout
M) Hopper inlet
N) Inspection hatch
P) Flanged inlet end bearing assembly (XTE)
Q) Flanged outlet end bearing assembly (XTA)

3.3 Operating principle

The drive unit (**A** + **B**) transmits the rotary movement to the screw (**G**) which conveys the material fed through the inlet spout (**H**) towards the outlet spout (**L**).

3.4 Permitted use

The “**ES**” or “**ESV**” screw feeder/conveyor has to be used in discontinuous batch-type operation for feeding and conveying of cement or materials having similar bulk density, particle size, flowability and abrasiveness.

The “**ES**” screw feeder/conveyor is designed for feeding and conveying of material.

The “**ESV**” screw feeder is similar to the “**ES**” screw feeder/conveyor but it has a special loading hopper (volumetric hopper) into which a membrane level indicator can be fitted to indicate the presence of material in such a manner as to obtain a more accurate volumetric feeding.

The screw feeders/conveyors have to be installed and used with a maximum installation angle of 60°.

In case of installation angle that exceeds 45°, please refer to application limit indication of the Technical Manual.

The screw feeders/conveyors have to be used without internal excess pressure or negative pressure.

Every other use must be considered as improper and therefore not permitted.

3.5 Improper use not permitted

Do not start operating the screw feeder/conveyor until the plant or equipment in which it is incorporated was declared compliant to the relevant national and local legislative provisions in force.

It is forbidden to use the screw feeder/conveyor in potentially inflammable or explosive atmospheres (ATEX).

It is forbidden to install and use the screw feeder/conveyor in a vertical position, and, however, with an installation angle exceeding 60°.

It is forbidden to use the screw feeder/conveyor for food products (flour and grits).

It is forbidden to use the screw feeder/conveyor for granular products (rubble, sand, gravel, etc.).

It is forbidden to use the screw feeder/conveyor for inflammable (magnesium powder, etc.) or explosive products.

It is forbidden to use the screw feeder/conveyor for materials which can cause bacteriological contamination.

It is forbidden to use the screw feeder/conveyor for hot materials with temperatures exceeding + 40 °C and cold products with temperatures below - 20 °C.

3.6 Noise level

The noise level of the “**ES**” and “**ESV**” screw feeders/conveyors does not exceed 80 dB(A), the value measured at a distance of 1 m, in the most unfavourable 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 limits permitted by law.

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.

3.8 Overall dimensions and technical features

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

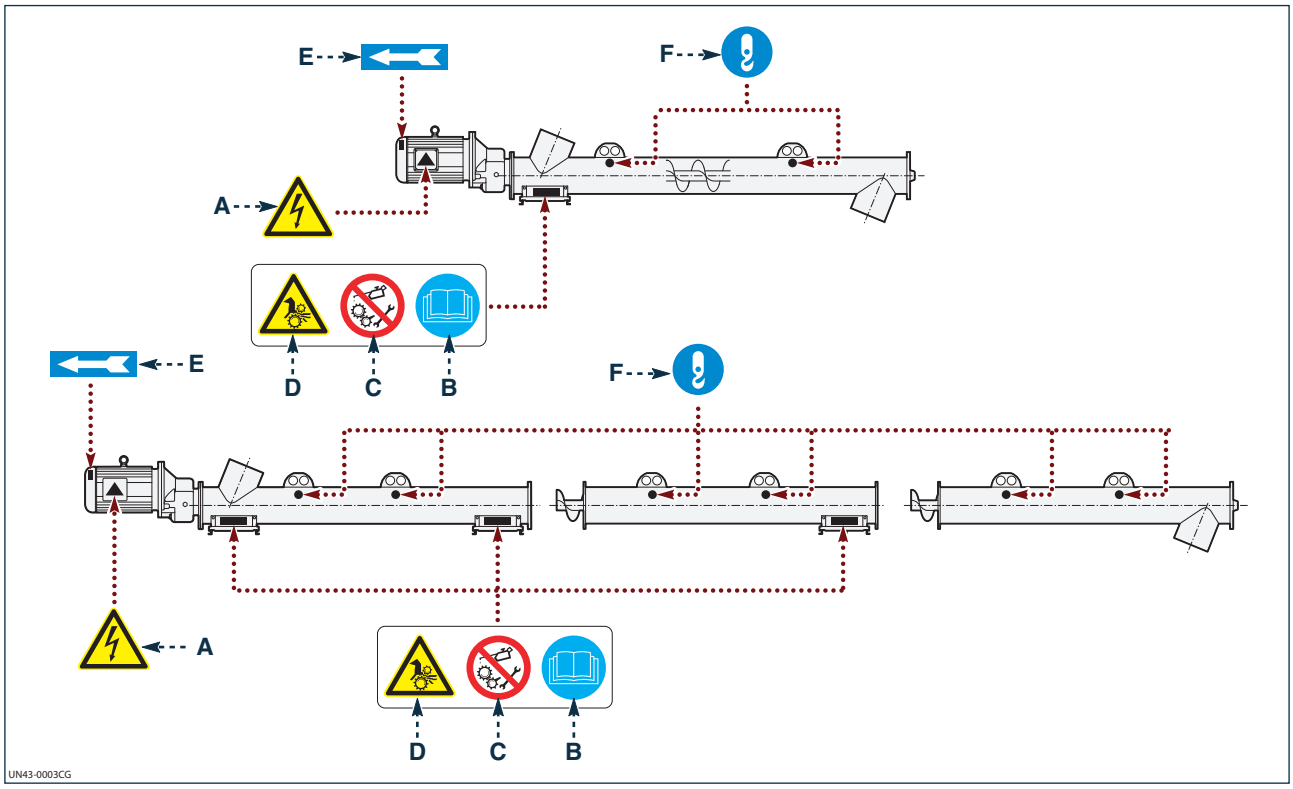
The shipping documents show the diameter and length of the screw feeder/conveyor in addition to the Serial number and identification codes.

The information regarding the technical features of the “**ES**” and “**ESV**” screw feeder/conveyors, depending on their diameter and length, is given in Chapter 10.

3.9 Safety and information signs

Danger - Warning

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



A) Danger sign: indicates danger of electric shock because of powered components presence inside the junction box.

B) Obligation: read this Manual before carrying out any action on the equipment concerned.

C) Forbidden: indicates that it is forbidden to lubricate or adjust moving parts.

D) Danger: indicates danger of serious injury to limbs if the screw is exposed. Before opening the inspection hatch(es), isolate the equipment concerned from the mains supply.

E) Information: indicates the direction of rotation of the electric motor.

F) Obligation: indicates the hooking points for lifting each section of the equipment concerned.

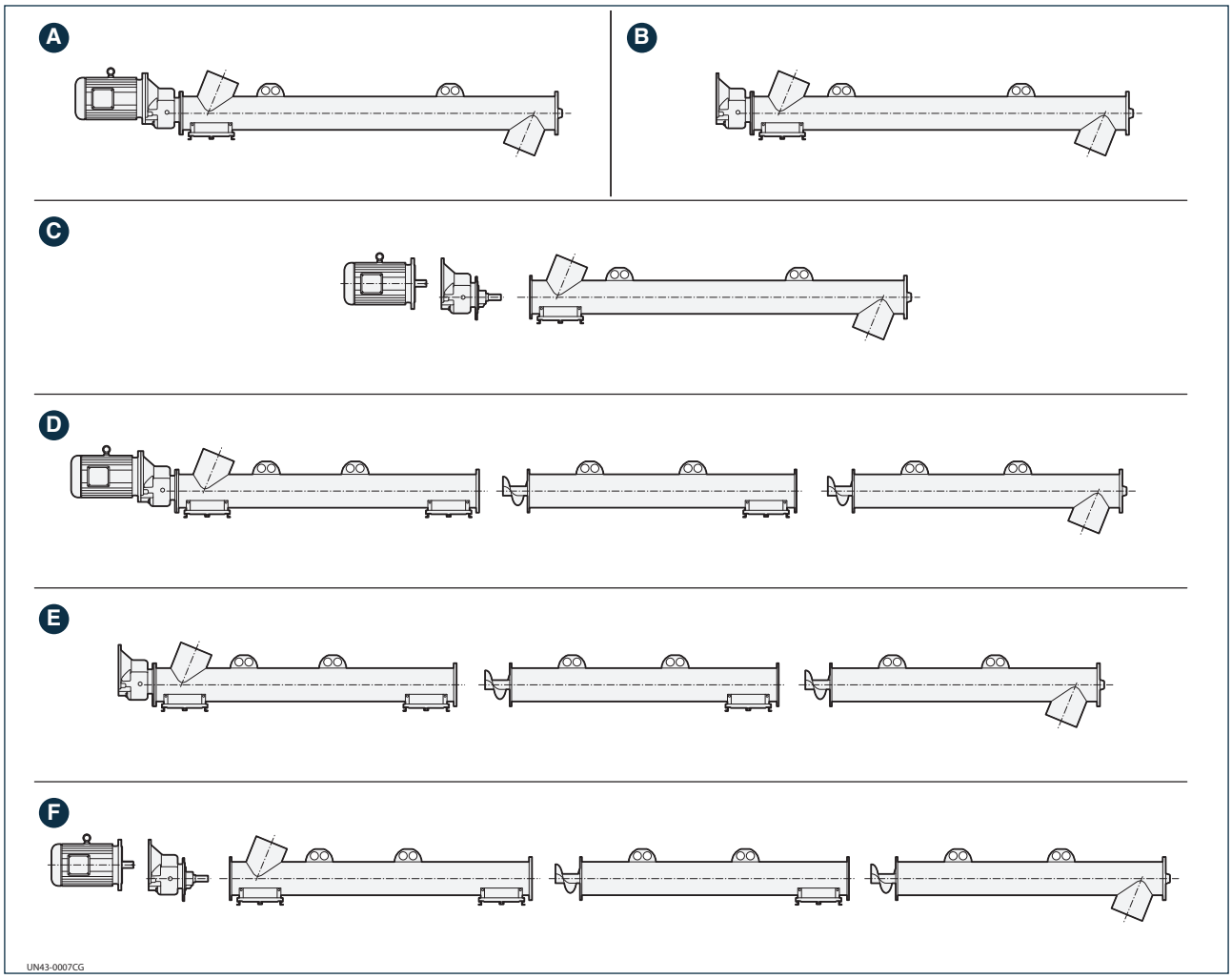
3.10 Safety devices

Access to the inspection hatches is not necessary while using the equipment concerned. Their use represents extraordinary use as they were provided for removing foreign bodies and accumulated material from the screw feeder/conveyor or for extraordinary maintenance operations.

The screw feeder/conveyor is shipped with the inspection hatch(es) closed with a bolted device which needs to be unlocked by means of a spanner (wrench) as envisaged by the Standards concerning fixed protections.

4.1 Type of packaging

Depending on the type of supply required in the order, the equipment concerned can be sent in the configurations indicated.



A) Complete screw conveyor: The screw feeder/conveyor consists of a single section including the electric motor and the gear reducer mounted on it.

B) Incomplete screw conveyor: the screw feeder/conveyor consists of a single section with the gear reducer mounted without the electric motor (the customer will have to purchase and fit the electric motor).

C) Screw conveyor disassembled: The screw feeder/conveyor consists of a single section with the electric motor and the gear reducer disassembled.

D) Complete screw conveyor in more sections: The screw feeder/conveyor consists of a number of sections (loading, intermediate and unloading). The electric motor and gear reducer are mounted.

E) Incomplete screw conveyor in more sections: The screw feeder/conveyor consists of a number of sections (loading, intermediate and unloading). The gear reducer is mounted without the electric motor (the customer will have to purchase and fit the electric motor).

F) Complete screw conveyor in more sections: The screw feeder/conveyor consists of a number of sections (loading, intermediate and unloading). In this case the electric motor and gear reducer are disassembled.

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

To facilitate shipment, the screw feeder/conveyor can be divided into several packages that are suitably protected. An “assembly kit” containing the nuts and bolts and gaskets necessary for a correct assembly is supplied with the screw feeder/conveyor.

The mobile sections of the screw feeder/conveyor are secured by means of blockers which have to be removed during pre-assembly.

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

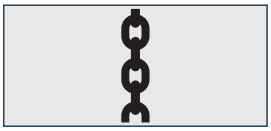
The signs for safe lifting and handling are shown on all the packages.

The list provides the description and symbols envisaged on the packing.

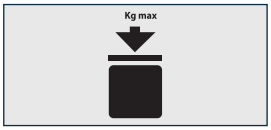
A) Fragile: indicates that the package has to be handled and lifted carefully to avoid damage.

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

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



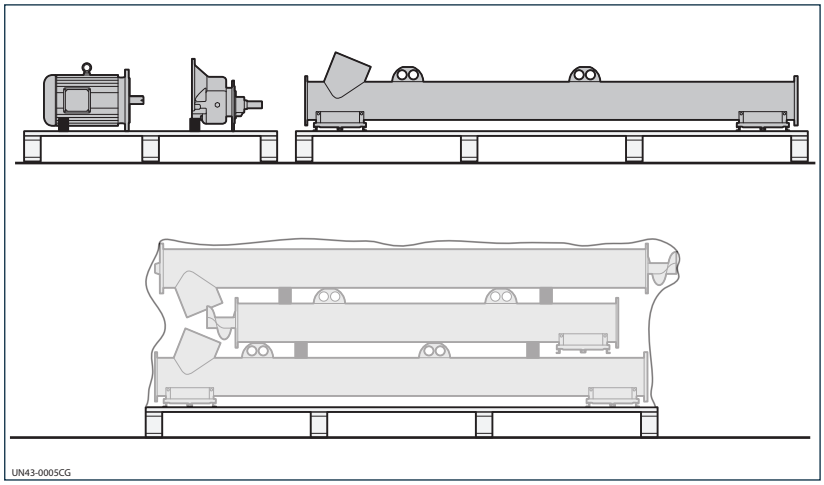
D) Stacking limit: indicates the maximum stacking load of the packages.



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

The packaging material has to be disposed off or recycled in compliance with the standards in force.

The illustration shows the type of packaging commonly used for shipping to far destination, by sea or air.



4.2 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.

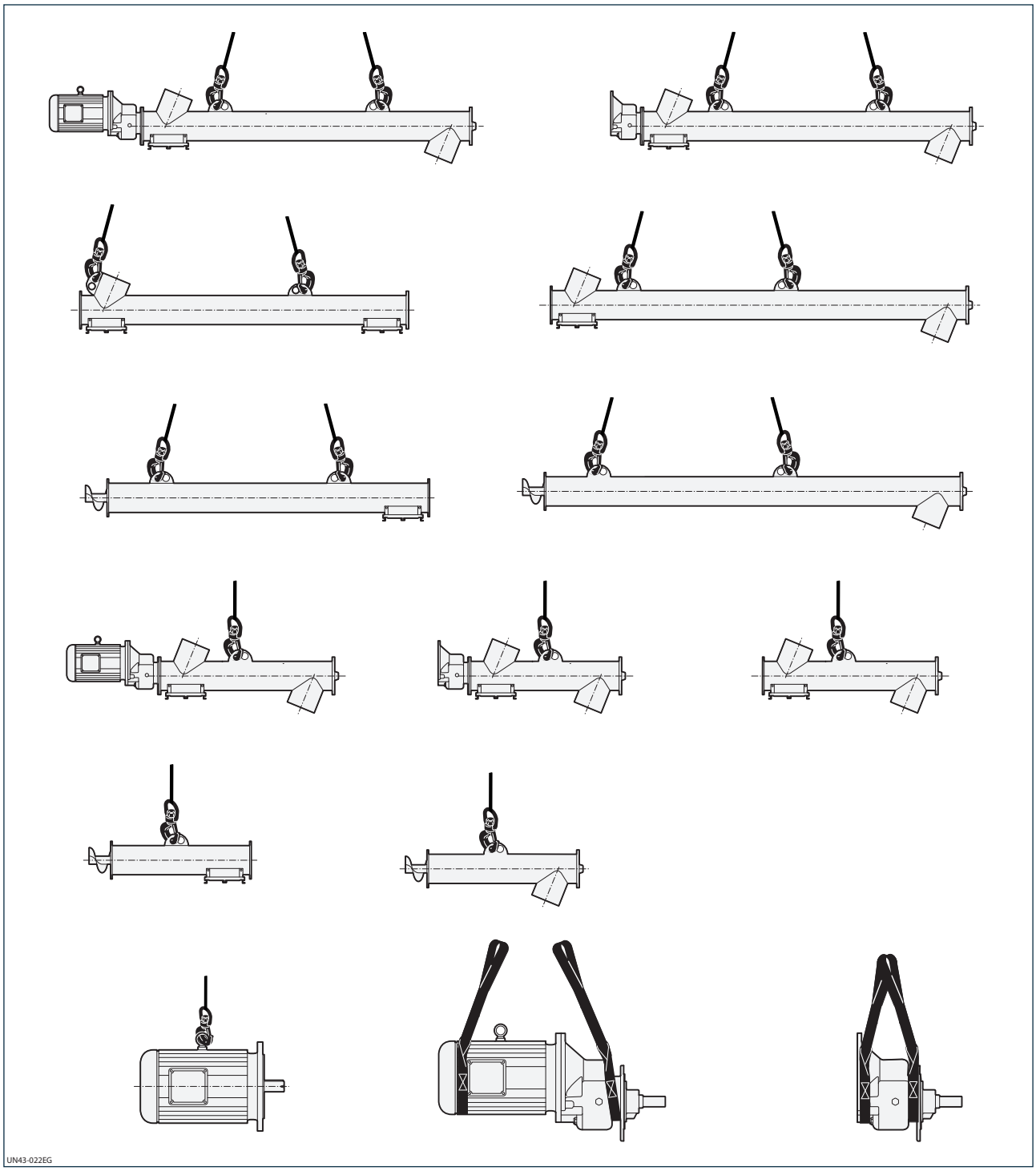
4.3 Lifting and unloading methods

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.

Harness the packages according to the indications and symbols applied on them or harness the sections of the equipment concerned on the basis of their structure.

The illustration shows the screw feeder's/conveyor's lifting points according to the configurations envisaged and the lifting points of the electric motor and the gear reducer if they are separately supplied.



Unload the packages from the means of transport and place them on a flat surface which can ensure the stability.

5.1 Recommendations for installation

If before assembly it is envisaged a long storing period, place the equipment on a pallet protected from inclement weather conditions. Avoid moist and salty environments.

Danger - Warning

The installation operations have to 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 installation, define a safety plan which complies with the laws in force regarding workplace safety.

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

Define, on the basis of the configuration of the equipment concerned, the assembly method, if the gear reducer and electric motor require preassembly or the sections are to be preassembled (loading, intermediate, unloading).

Check, and if damaged, repair the coupling surfaces.

Clean the coupling surfaces thoroughly.

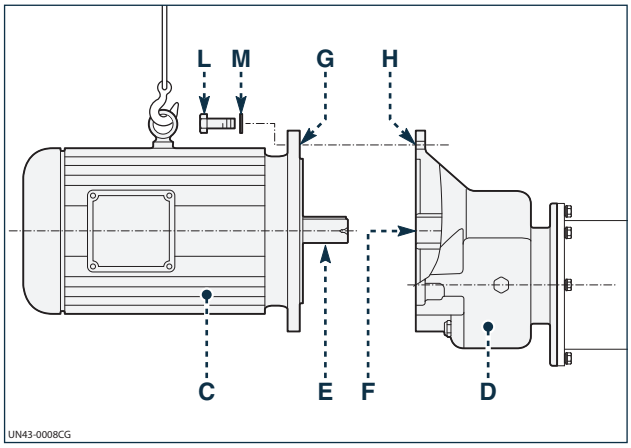
5.2 Preassembling the electric motor

Danger - Warning

Before carrying out the operations, read the safety prescriptions and the safety recommendations for installation.

Proceed as described.

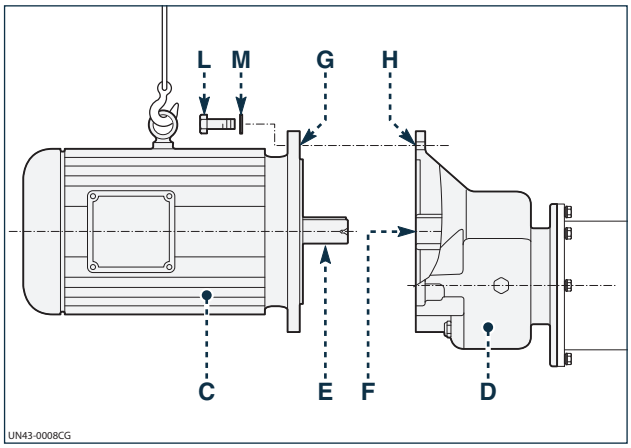
1) Place the one-piece screw feeder/conveyor or section with gear reducer assembled without electric motor in a horizontal position.
2) Place the electric motor (**C**) near the gear reducer connecting flange.
3) Lubricate the shaft (**E**) of the electric motor and the seat (**F**) of the gear reducer with the prescribed lubricant (see “Table of lubricants and sealants”).
4) Apply the prescribed sealant (see “Table of lubricants and sealants”) on the coupling surfaces (**G** and **H**).
5) Fit the electric motor on the gear reducer.



Important

Do not force the coupling and do not use improper means as this will damage the coupling and the contact surfaces.

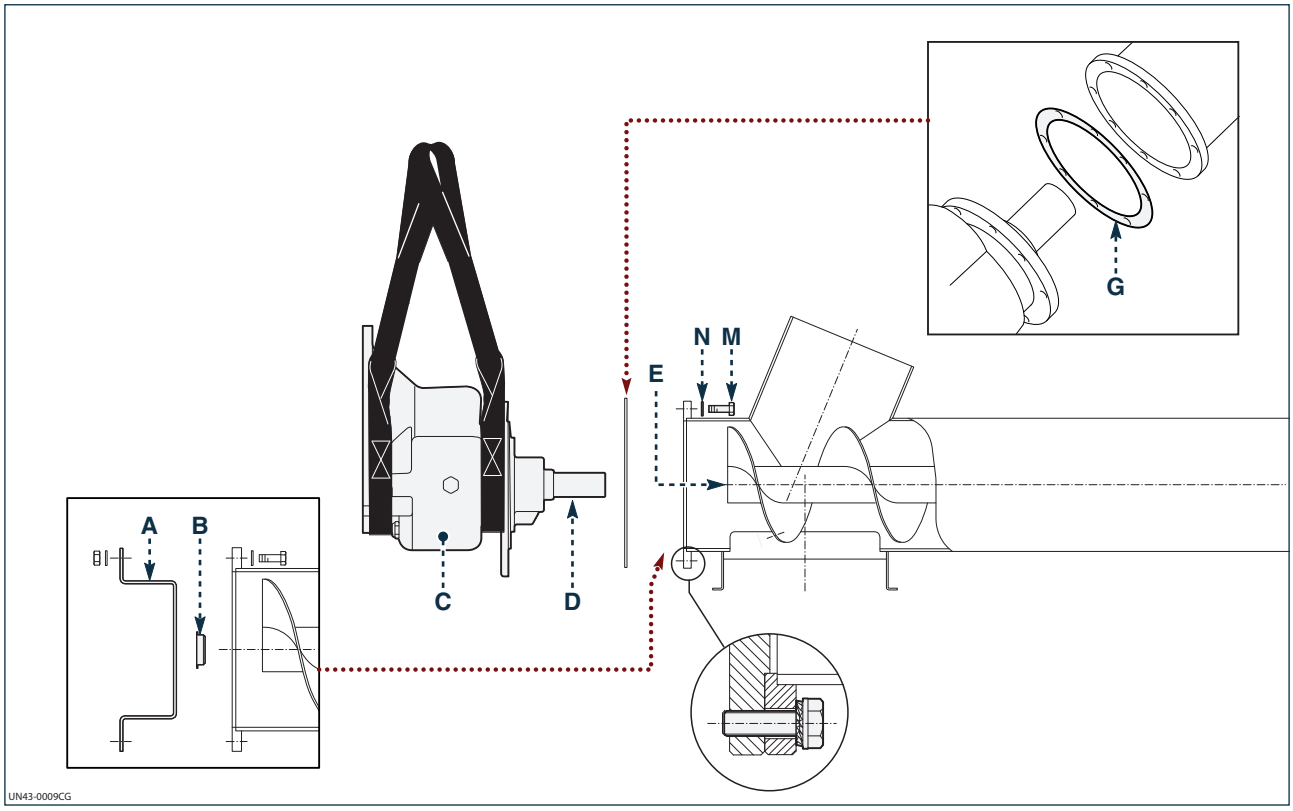
7) Insert bolts (**L**) and washers (**M**) in all the bores provided in the connecting flange.
8) Tighten the bolts (**L**) by applying the indicated tightening torque (see “Nuts and bolts tightening torques Table”).



5.3 Preassembling the gear reducer

Danger - Warning

Before carrying out the operations, read the safety prescriptions and the safety recommendations for installation.



Proceed as described.

1) Place the one-piece screw feeder/conveyor or section prearranged for gear reducer assembly.

2) Remove the blocker (**A**) and the cap (**B**).

Danger - Warning

Removing the blockers will release the screw or helicoid flighting which might slip out of the external tube and cause serious injury to the operator concerned or to those directly involved in the operations.

3) Position the gear reducer (**C**) near the connecting flange of the section concerned of the screw feeder/conveyor.

4) Lubricate the shaft (**D**) of the gear reducer and the seat (**F**) of the screw with the prescribed lubricant (see “Table of lubricants and sealants”).

5) Fit the gasket (**G**).

6) Fit the gear reducer (**C**) inserting the shaft (**D**) in the coupling (**E**) of the screw and bring the gear reducer near the terminal end to align these.

Important

Do not force the coupling and do not use improper means as this will damage the coupling and the contact surfaces.

7) Insert bolts (**M**) and washers (**N**) in all the bores provided in the connecting flange.

8) Tighten the bolts (**M**) by applying the indicated tightening torques (see “Nuts and bolts tightening torques Table”).

9) Close the inspection hatch if it was opened earlier.

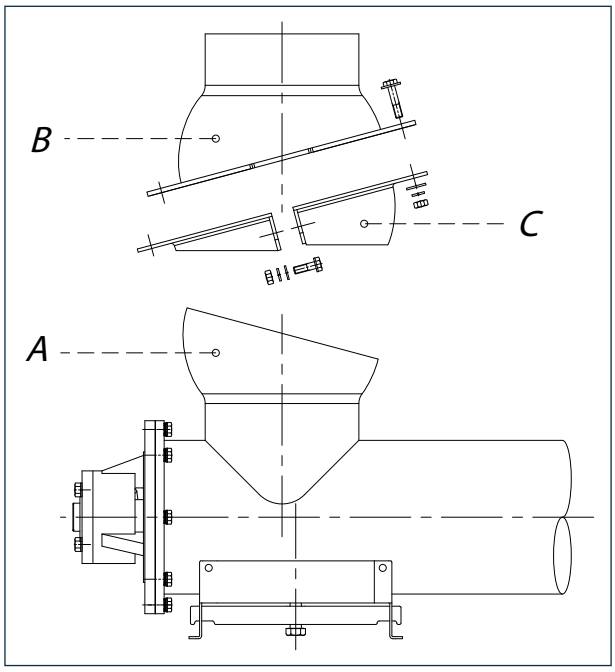
10) Fit the electric motor (see “Preassembling the electric motor”).

5.4 Preassembling modular Universal Inlet XBU

On customer’s demand a modular universal inlet can be provided which consists of:

- A fix bottom section (**A**)
- An upper mobile section (**B**)
- Fixing clamp (made up by two semi-spherical shells) (**C**)
- The nuts and bolts required for assembly.

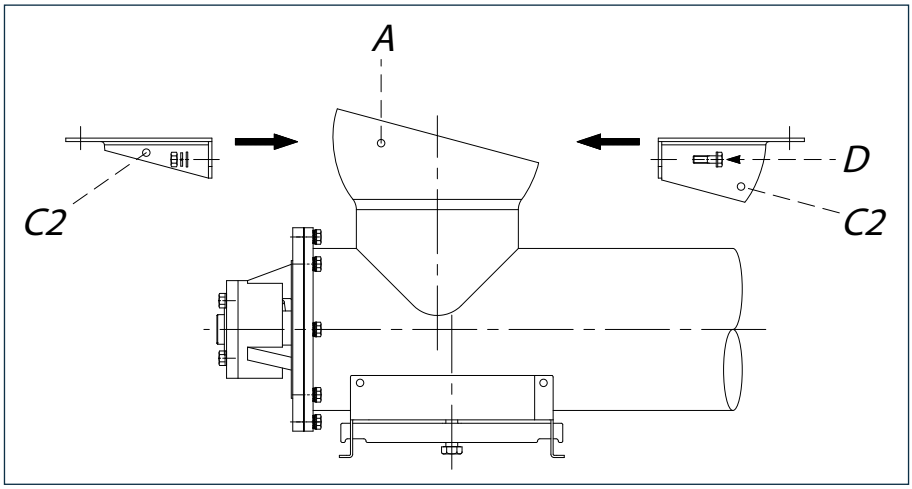
The fixed section is welded to the external tube of the screw feeder/conveyor on the preset position, those mobile and the bolts and nuts are provided unmounted as an assembly kit. This inlet has to be assembled following the predetermined configuration that depends on the final angle of installation of the screw feeder/conveyor inside the plant.



Danger - Warning

Before carrying out the operation, read the general safety requirements and the shipping and handling safety recommendations.

Follow the indications bellow:

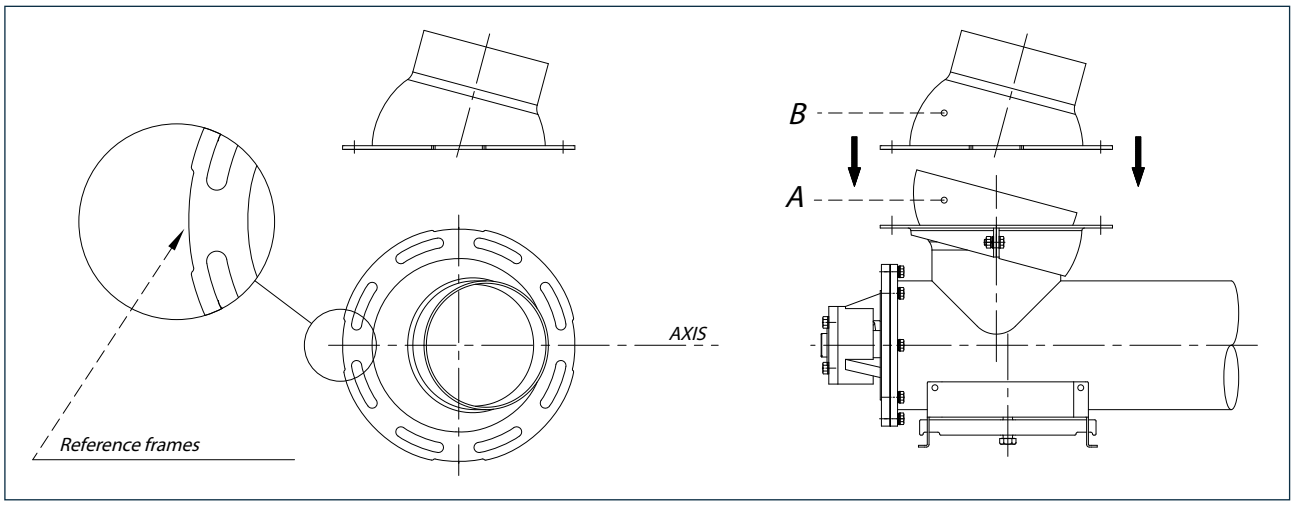


1) Place the screw feeder/conveyor, if provided with a single section, or the single loading section on the floor or on any horizontal flat surface in a steady, safe position.

2) Position the two semi-spherical shells (**C1**) and (**C2**) of the fixing clamp under and around the spherical part (**A**) of the inlet side welded on the screw feeder/conveyor.

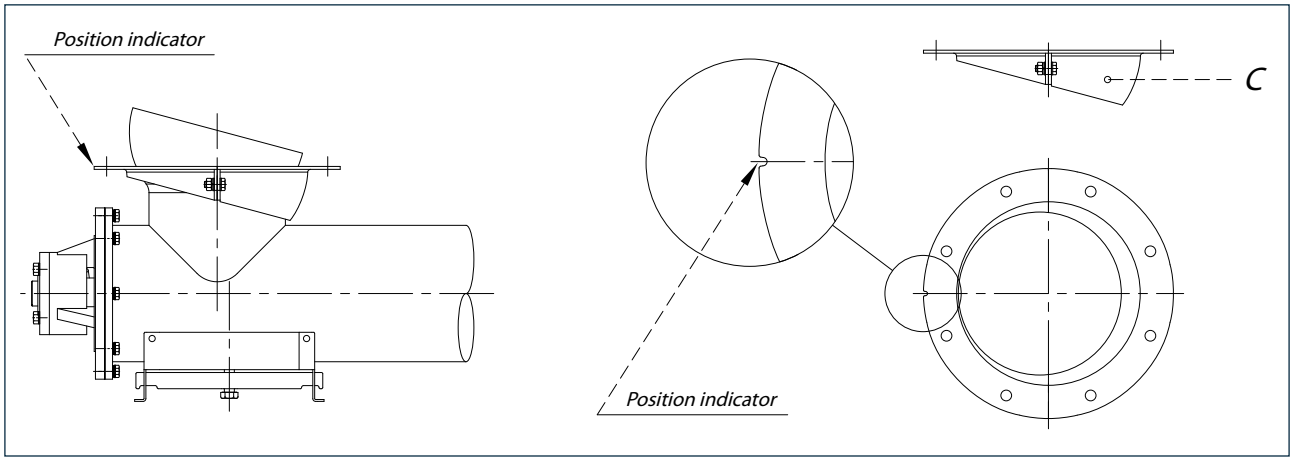
3) Join the two semi-spherical shells by inserting the bolts (**D**) inside the bores present on the two connecting flanges.

4) Screw the nuts by using the indicated tightening torques (see “Nuts and bolts tightening torques Table”) paying attention to perfectly match the two semi-spherical shells.

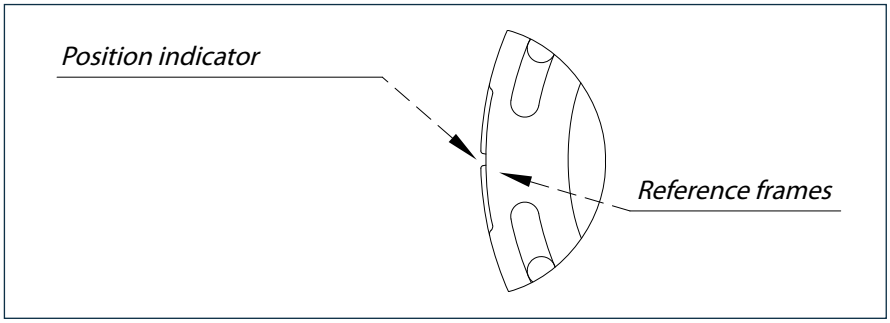


5) Identify on the edge of the upper mobile section of the flange (**B**), the 4 “Reference notches” positioned at 90° of each other.

6) Place the upper mobile section (**B**) of the inlet, oriented along the longitudinal axis of the screw feeder/conveyor, on the bottom part (**A**) as shown in the drawing.

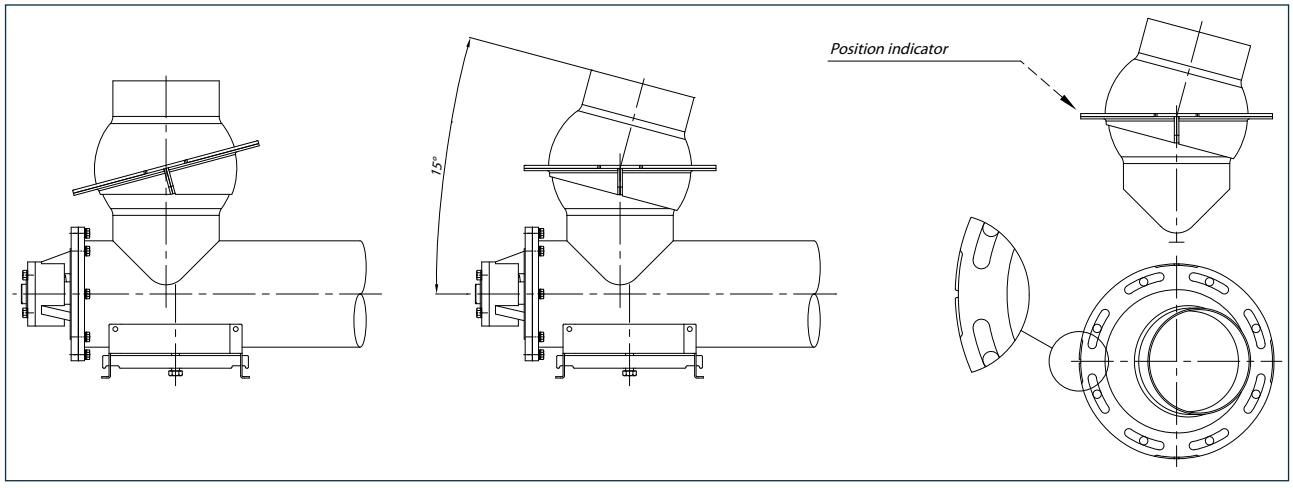


7) Identify, on the edge of the fixing clamp's flange (**C**), the reference notch named "Position indicator".

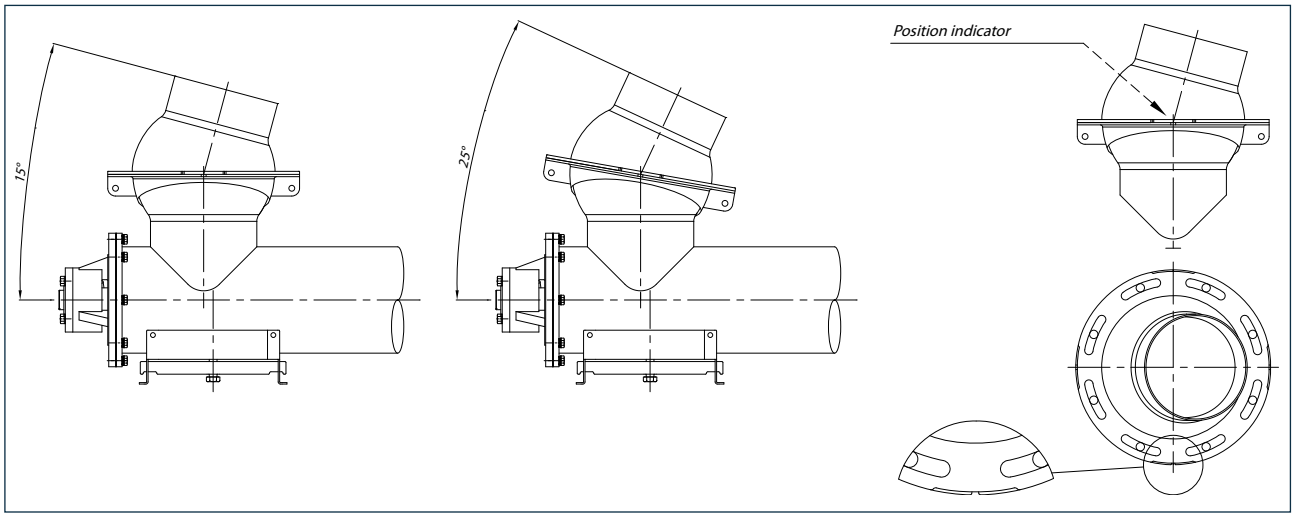


8) Depending on the installing pitch of the screw feeder/conveyor, rotate the fixing clamp to place the "Position indicator" inside the corresponding "Reference notches". (See the following drawings)

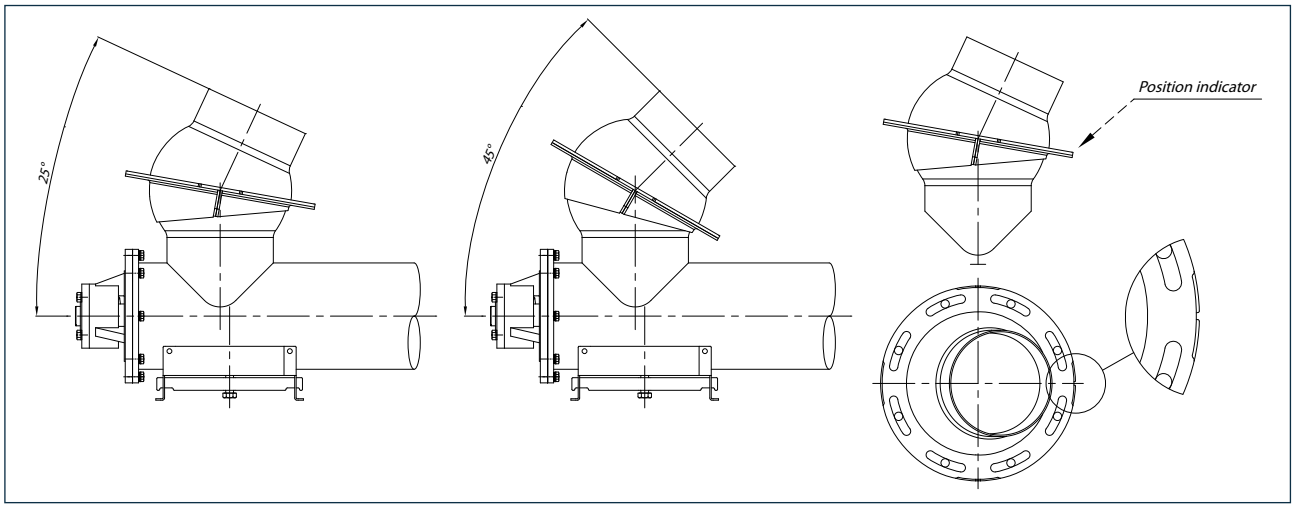
SCREW CONVEYOR ANGLE OF INSTALLATION 0° ≤ α ≤ 15° α ± 2°



SCREW CONVEYOR ANGLE OF INSTALLATION 15° ≤ α ≤ 25° α ± 2°

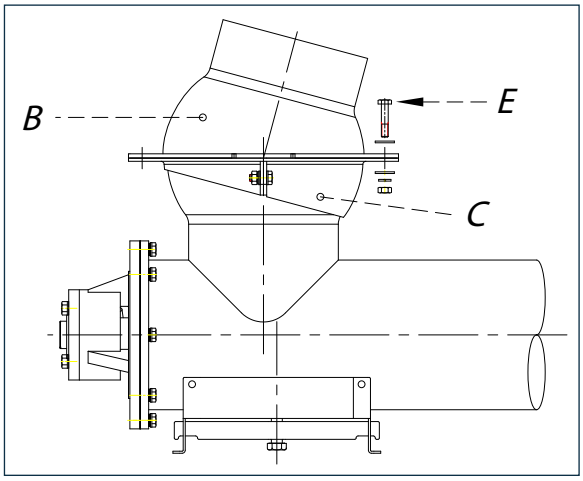


SCREW CONVEYOR ANGLE OF INSTALLATION 25° ≤ α ≤ 45° α ± 2°



9) Once identified the matching position of the upper mobile section of the inlet (**B**) and the fixing clamp (**C**), join the two parts by inserting the bolts (**E**) and their washers in all the bores provided on the connecting flanges.

10) Tighten slightly the bolts so as to allow mobility to the mobile and the fix sections and also a possible adjustment of the feeder/conveyor axis that might be necessary in order to definitively position it. Remember that the inlet so assembled, apart from the installation angle variation, allows a lateral swing of ± 45°.



Important

Once the screw feeder/conveyor has been fixed in its final position, tighten completely all the bolts (E) using the indicated tightening torques (see "Nuts and bolts tightening torques Table").

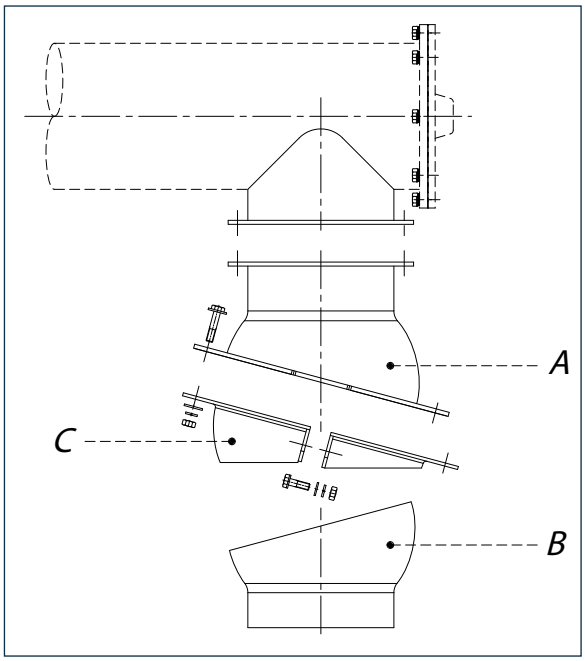
5.5 Preassembling modular Universal Outlet XBK

On customer's request, as an option, a universal modular outlet can be provided. With the screw feeder/conveyor an assembly kit is provided consisting of:

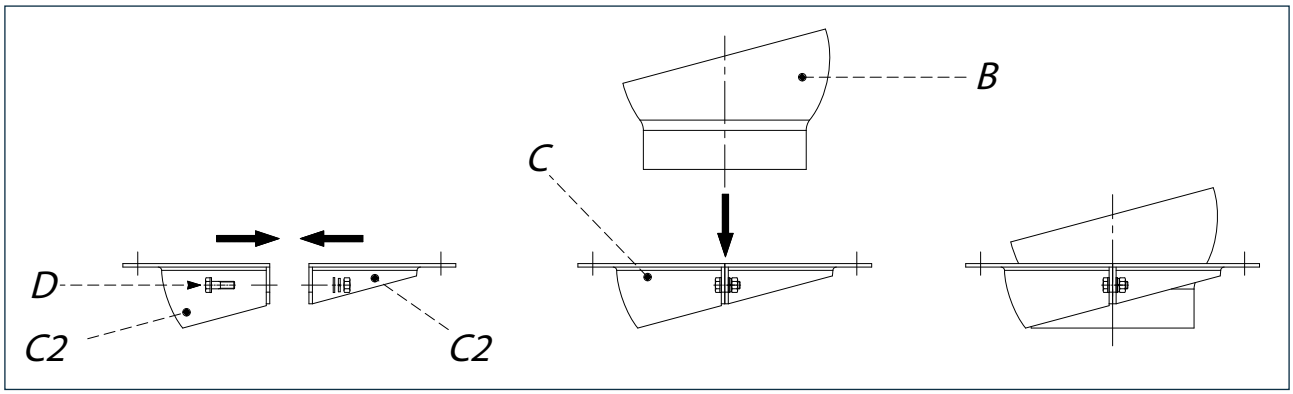
- A fix upper part (**A**)
- An bottom mobile section (**B**)
- Fixing clamp (made up by two semi-spherical shells) (**C**)
- The nuts and bolts required for assembly

This outlet has to be assembled following the predetermined configuration that depends on the final angle of installation of the screw feeder/conveyor inside the plant.

Once assembled, it has to be bolted to the flange of the outlet, already preset to this purpose, welded on outlet section of the screw feeder/conveyor.



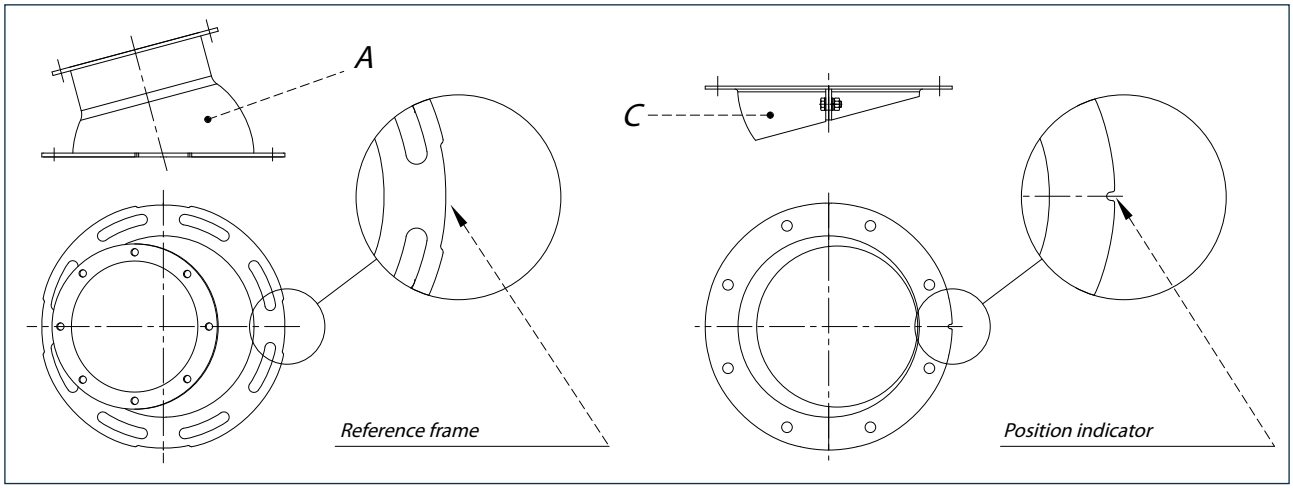
Follow the indications bellow:



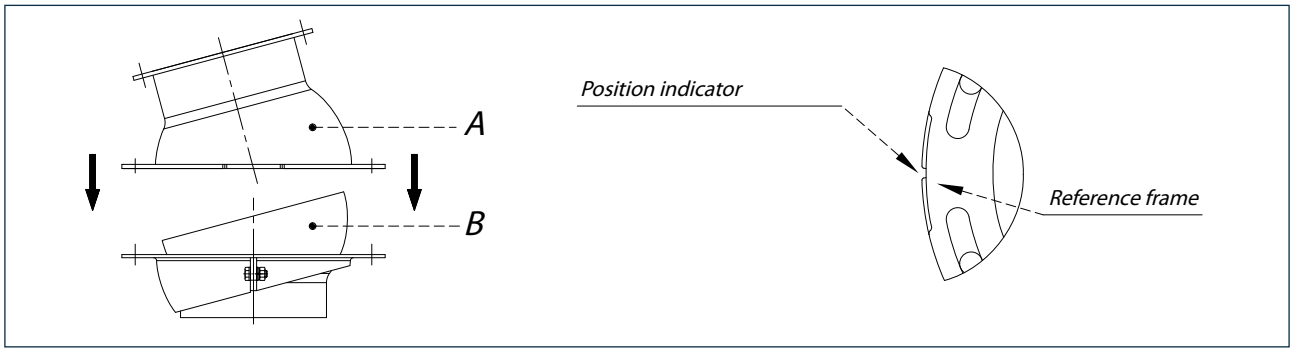
1) Join the two semi-spherical shells (**C1**) and (**C2**) of the fixing clamp by inserting the bolts (**D**) inside the bores present on the two connecting flanges and tighten the nuts using the indicated tightening torques (see "Nuts and bolts tightening torques Table") paying attention to perfectly match the two semi-spherical shells.

2) Insert the bottom mobile section (**B**) in the fixing clamp (**C**).

3) Consulting the following drawing:
Identify on the edge of the fixed upper section of the flange (**A**), the 4 "Reference notches" positioned at 90° of each other. Identify, on the edge of the fixing clamp's flange (**C**), the reference notch named "Position Indicator".

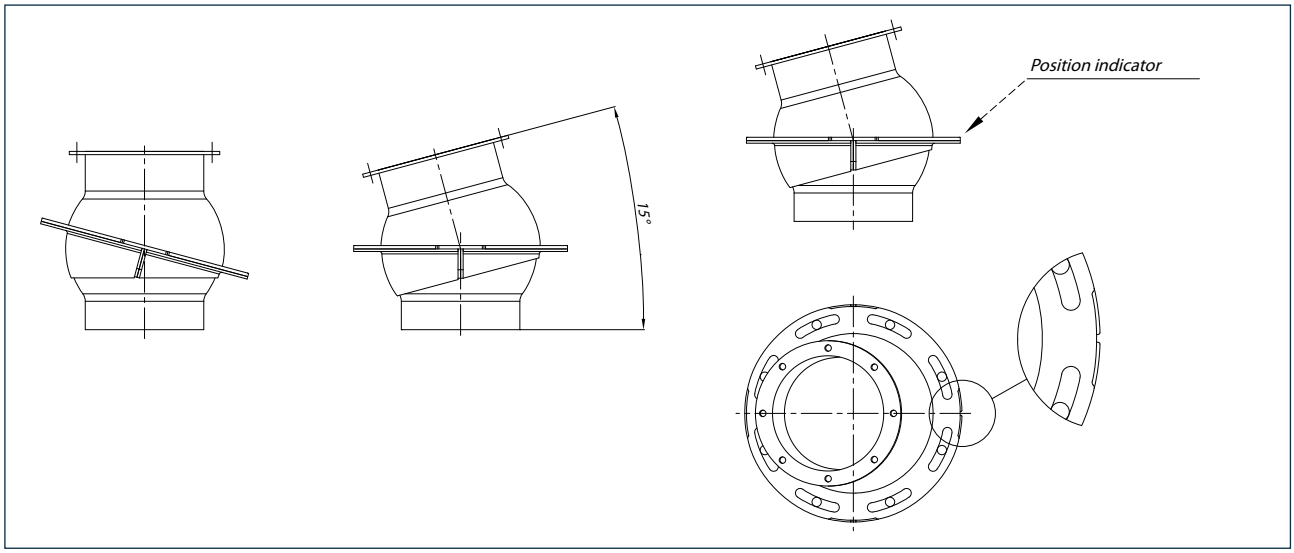


4) Place the upper fixed section (**A**) of the outlet on the bottom section (**B**), oriented along the longitudinal axis of the screw feeder/conveyor, as shown on the drawing.

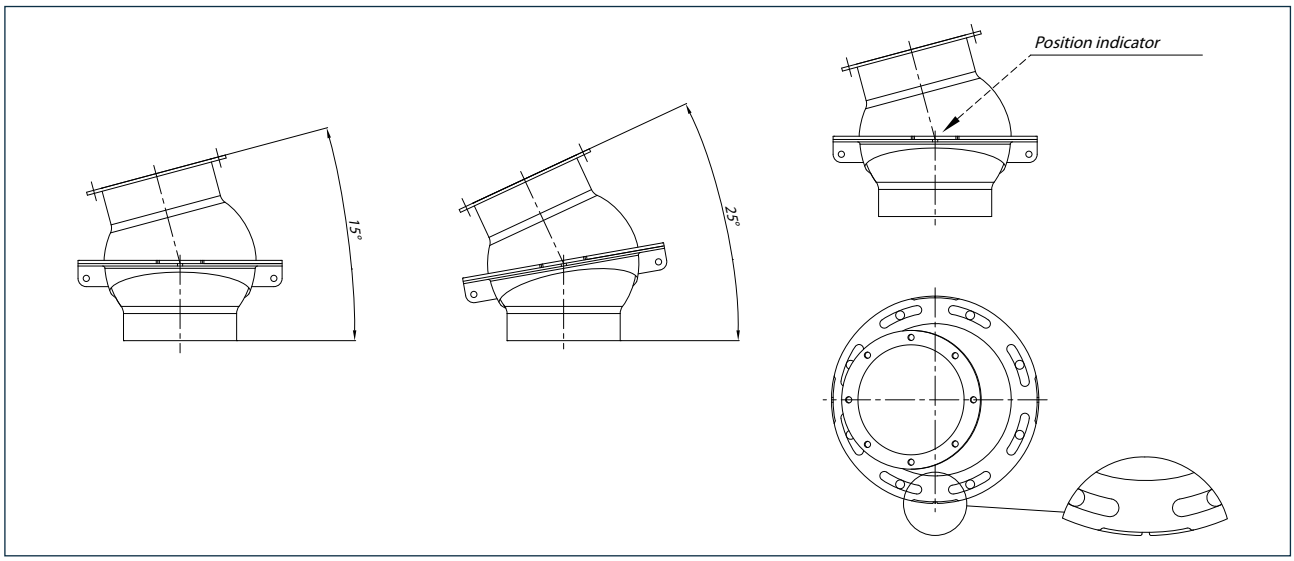


5) On the basis of the angle installation of the screw feeder/conveyor, rotate the fixing clamp to place the “Position indicator” inside the corresponding “Reference notches”. (See the following drawings)

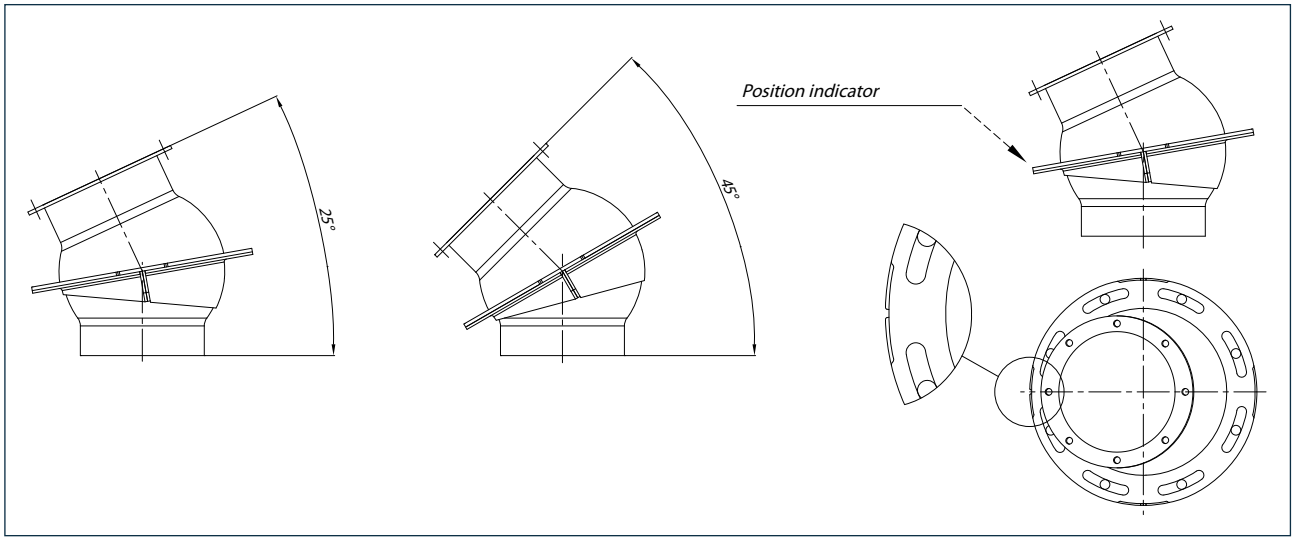
SCREW CONVEYOR ANGLE OF INSTALLATION **0° ≤ α ≤ 15°** **α ± 2°**



SCREW CONVEYOR ANGLE OF INSTALLATION 15° ≤ α ≤ 25° α ± 2°

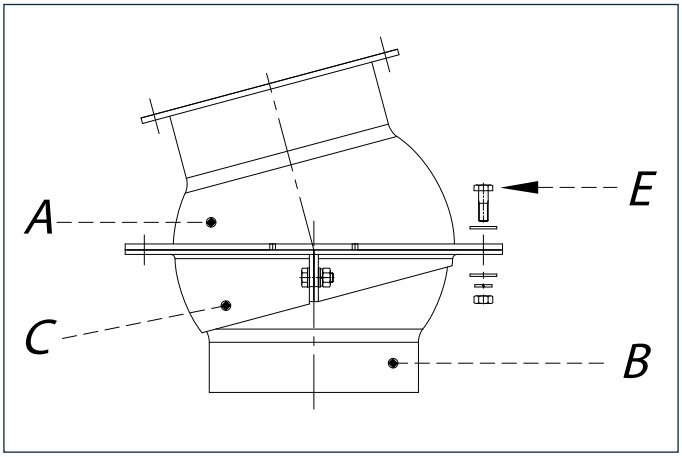


SCREW CONVEYOR ANGLE OF INSTALLATION 25° ≤ α ≤ 45° α ± 2°



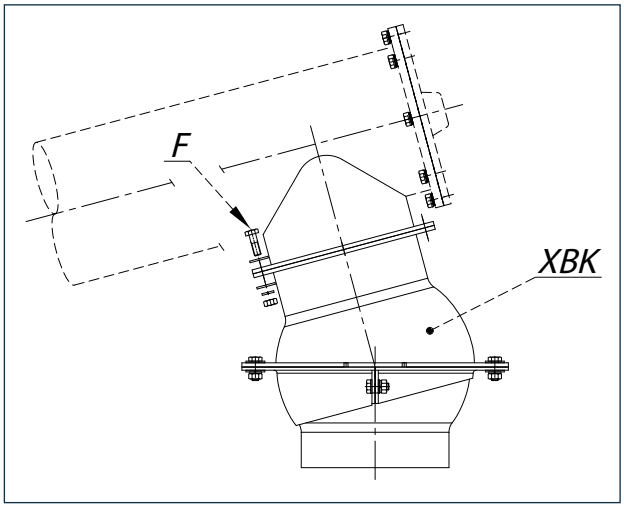
6) Once identified the matching position of the upper fixed section of the inlet (**A**) and the fixing clamp (**C**), join the two parts by inserting the bolts (**E**) and their washers in all the bores provided on the connecting flanges.

7) Tighten slightly the bolt so as to allow the movement of the mobile section (**B**) and the fixed section (**A**) and a possible adjustment of the feeder's/conveyor's axis orientation that might be necessary in order to definitively position it. It should be borne in mind that the so assembled outlet, besides the installation angle variation, also allows a lateral swing of ± 45°.



8) Join the universal XBK spout which has just been assembled to the outlet of the screw feeder/conveyor by inserting the bolts (**F**) in all the bores provided on the connecting flanges.

9) Screw the nuts using the indicated tightening torques (see “Nuts and bolts tightening torques Table”)



Important

Once the screw feeder/conveyor has been fixed in its final position, tighten completely all the bolts (E) using the indicated tightening torques (see “Nuts and bolts tightening torques Table”).

5.6 Complete assembly of screw feeder/conveyor

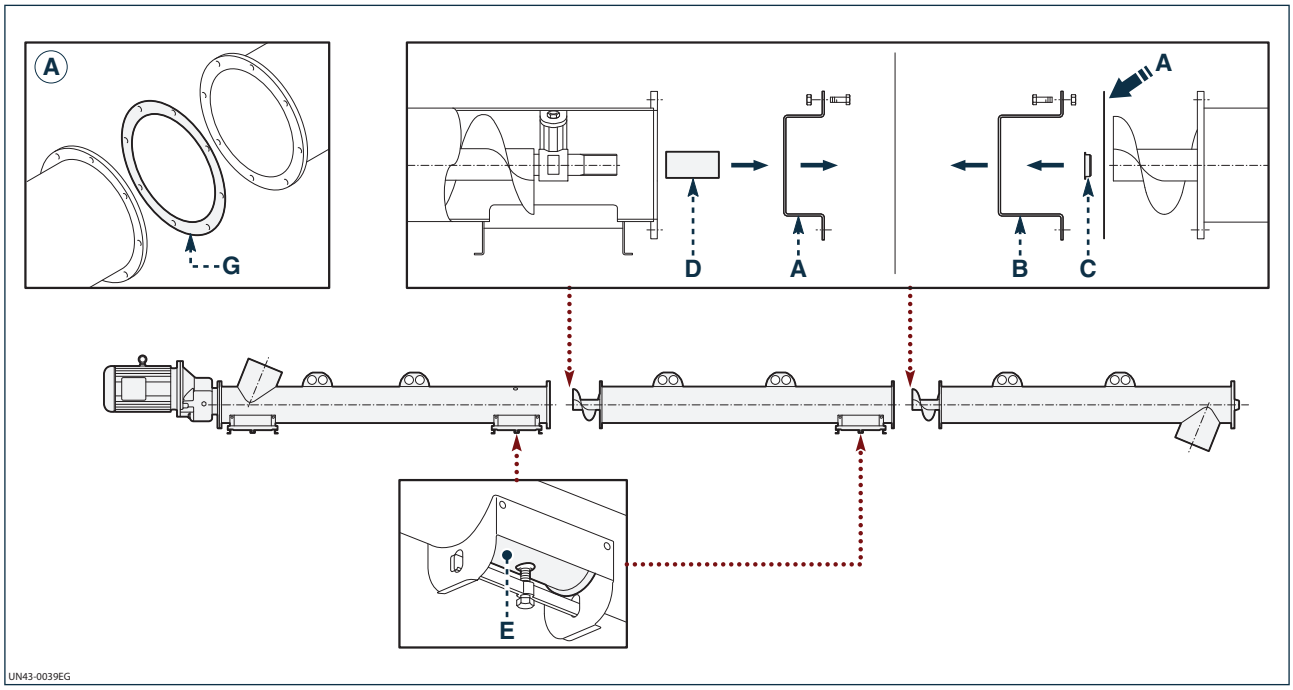
Danger - Warning

Before carrying out the operations, read the safety prescriptions and the safety recommendations for installation, handling and shipping.
Harness the components as described and shown in the “Lifting and unloading method” Chapter.

If the screw feeder/conveyor is supplied complete (in a one-piece section) it can be directly installed in the plant.

If the screw feeder/conveyor is supplied in a number of sections, these must be assembled to form the complete screw feeder/conveyor before installing it in the plant.

Check if the gear reducer and the electric motor need to be preassembled (see “Preassembling gear motor” and/or “Preassembling the electric motor”).



Proceed as described.

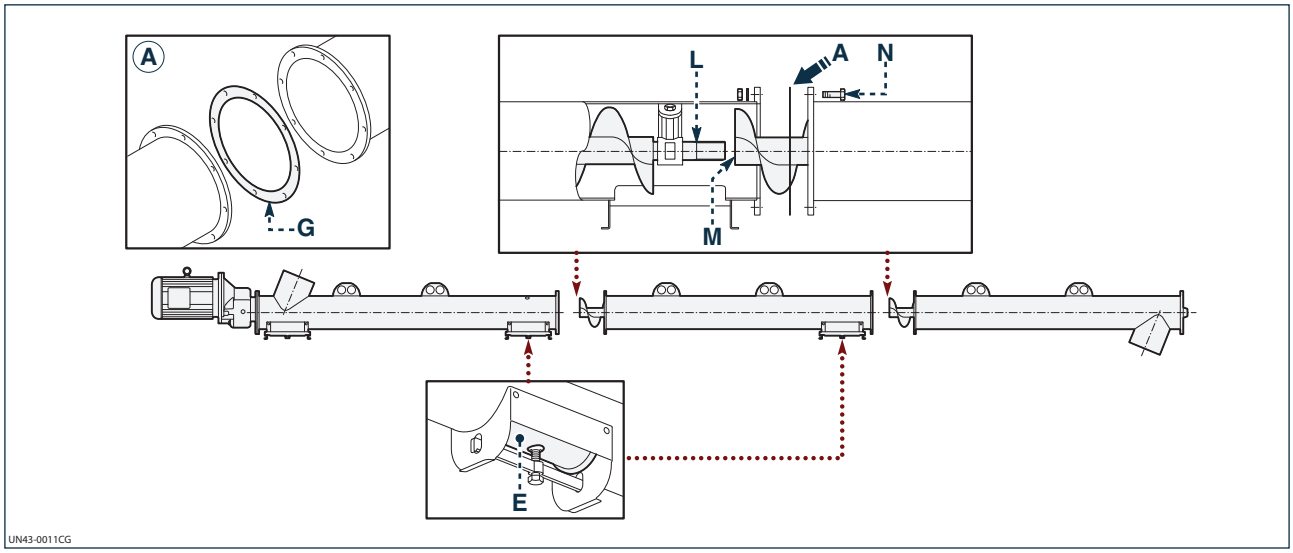
1) Position the inlet section, the intermediate section(s) and the outlet section in sequence and steady on a flat surface.
The position in the screw feeder/conveyor and the assembly sequence are shown on the identification tag applied on each section (see “identification tag”)

2) Assemble in sequence, starting from the inlet section.

3) Remove the blockers (**A** and **B**), remove the caps (**C**) that protect the bushes and the protection (**D**) of the shafts.

Danger - Warning

Removing the blockers will release the screw which might slip out of the external tube and cause serious injury to the operator concerned or to those directly involved in the operations.
Remove the bolts the bushes, if present (for splined and bolted couplings only).



4) Open the inspection hatch (**E**).

Danger - Warning

Provide the appropriate safety measures to avoid risk of shearing of the hands due to contact with the screw.

5) Ensure that the screw and the shaft are properly matched.
6) Lubricate the shaft (**L**) and the related seat (**M**) with the prescribed lubricant (see “Table of lubricants and sealants”).
7) Assemble screw sections so that flight ends face each other at 180° as shown in figure above.
8) Fit the gasket (**G**) supplied in the “assembly kit” and join the two sections, inserting the bush of the screw gently on the intermediate bearing shaft until they match.

Important

Do not force the coupling and do not use improper means as this will damage the coupling and the contact surfaces.

9) Insert the bolts (**N**), supplied in the “assembly kit”, in all bores provided in the connecting flanges.
10) Tighten the nuts by using the tightening torques indicated (see “Nuts and bolts tightening torques Table”) ensuring that the two flanges are perfectly aligned.
11) Ensure that the intermediate bearing is positioned approximately between the 2 screws.
12) Close the inspection hatch (**E**). Screw on the locking screw using the recommended tightening torque (see “Nuts and Bolts Tightening Torque Table”).
13) Assemble the other section(s) in the same manner to complete the screw feeder/conveyor.
14) When the operation described above is finished, ensure that all the bolts are tightened and all the inspection hatches are closed.

Important

If the screw feeder/conveyor is provided with surface treatment for repainting (as requested in the order) carry out the painting before the installation (see “Painting” Chapter).

5.7 Installation and fixing of the equipment

- *Lifting the screw*

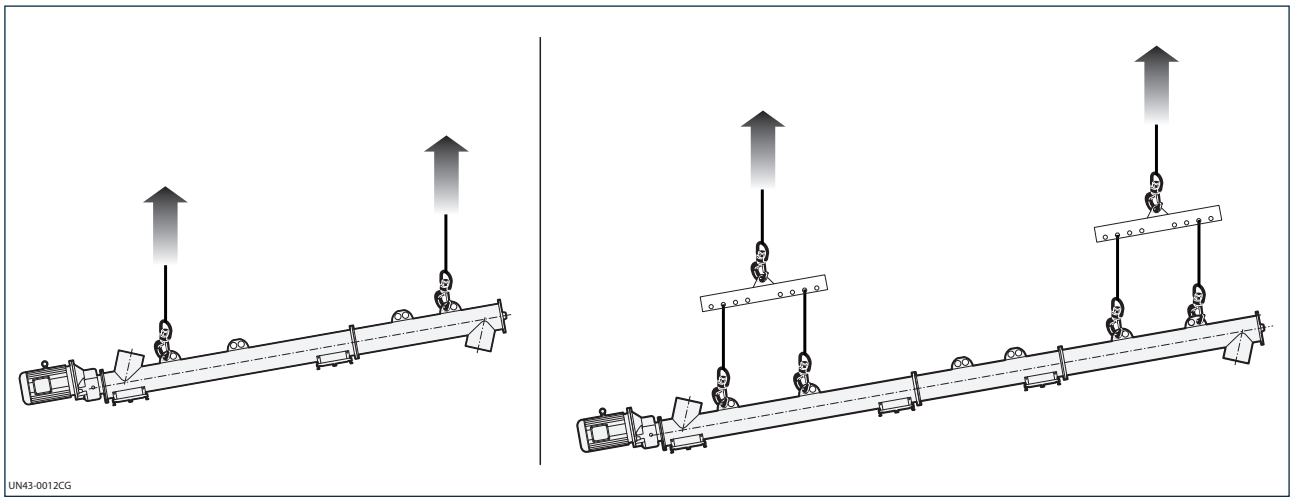
Danger - Warning

Carry out the lifting and handling operations according to the information indicated on the equipment and in the Manufacturer's Operation Manual.
The specialist technician authorized for carrying out the installation has to make sure all the necessary measures are adopted to ensure his or her own safety and the safety of other persons directly involved.
The laws regarding workplace safety must be strictly followed.
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.

For positioning the screw feeder/conveyor use at least two lifting means.

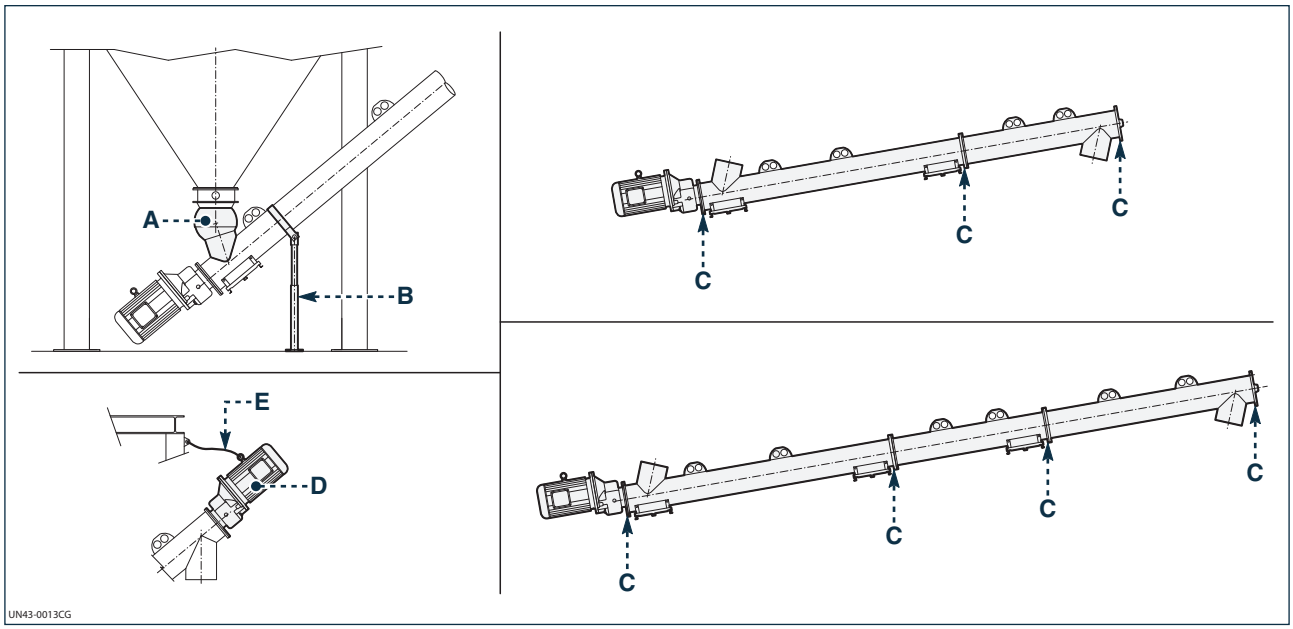
On the basis of the screw feeder/conveyor configuration, use suitable lifting eyes.

The illustration shows the types of harness depending on the configuration of the screw feeder/conveyor.



- *Fixing the screw*

The illustration shows the fixing and support points depending on the screw feeder/conveyor configuration.



- The inlet and outlet spouts are supplied according to the Customer's specifications and have to be connected properly in compliance with the standards in force.

Important

In the presence of modular universal spouts, if the real inclination will be different of the one expected, incompatible though to the installation angle permitted by the preassembling of the spout previously carried out, do not force the installation for any reason, but adapt the preassembling of the spout to the new installation angle (see "Preassembling Modular Universal Spout").

- On carrying out the connections, adopt the measures necessary to avoid causing work injuries on people, especially while using the screw feeder/conveyor.
- In the presence of modular universal spouts, tighten all the connecting bolts between flanges and their components. (see "Preassembling Modular Universal Spout" and "Nuts and bolts tightening torques Table"):
- The Universal Inlet (**A**) either modular or not, cannot be considered as being a support of the screw feeder/conveyor, but it has to be sustained by an appropriate support (**B**).
  At the end of the operations, seal the half-shells of the universal spout with suitable sealant.
- The screw feeder/conveyor must be supported symmetrically in at least two points (**C**) for each section.

If one or more sections are longer than 5 metres, they have to be supported in at least 3 points.
The supports have to be designed so as to support the load and to avoid vibrations; use anti-vibration supports and joints, if necessary.

Important

After carrying out the installation, check if there are misalignments and deviations to be corrected. A maximum deviation of the screw of 1.5 mm for every 3 metres length is allowed in respect of the longitudinal axis.

Danger - Warning

In case of installation of the electric motor (D) at a height, support the electric motor with a second fixing point (E) different from the motor flange. The installer must also:

- **provide suitable access structures and adopt appropriate measures against falling from a height in compliance with the laws in force or;**
- **indicate in the Manual the usage of an appropriate mobile work platform.**

5.8 Electrical connection

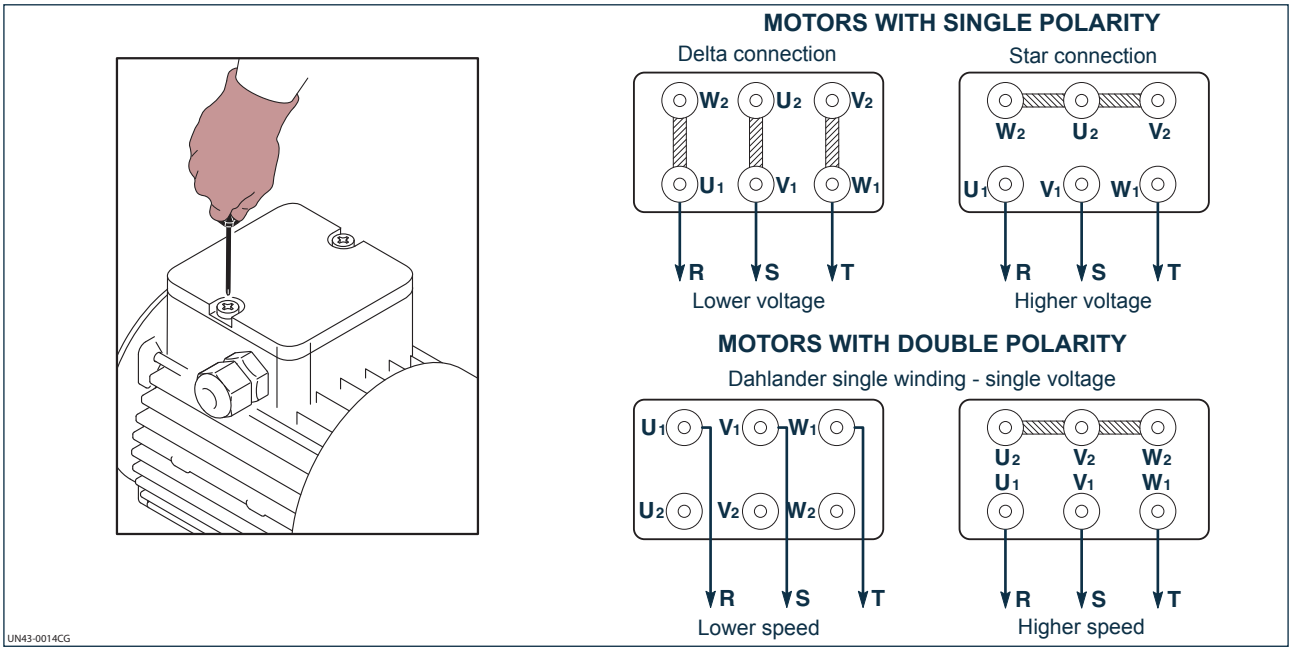
Danger - Warning

The equipment is not provided with an electrical system. Connection to the mains has to be carried out by an electrician.
Provide mains supply to the equipment concerned according to the compliant current legislation and take into consideration the safety measures required by the installation environment and the envisaged operating conditions.
Before carrying out the connection ensure that the mains voltage and frequency correspond to those indicated on the electric motor rating plate.
Disconnect from the mains before carrying out any work and use suitable devices so that there cannot be an accidental reconnection.

Use electric cables having cross section appropriate to the power absorption of the motor of the equipment concerned.

The type of motor connection depends on the voltage value available to be applied; please, refer to the wiring diagram provided for each motor.

The illustration shows the wiring diagrams of the motors envisaged.



The installer will have to provide to interfacing the equipment with the necessary controls: start/stop, emergency stop, reset after an emergency stop, in compliance with the regulatory standards in force.

Important

The IE2 motors referred to within the EC640/2009 Directive if used within the European Economic Area have to be exclusively powered by means of an inverter under the sole responsibility of the purchaser.

In the testing phase, ensure that the motor rotation corresponds to the direction of rotation indicated by the arrow applied on the motor.
If the rotation is inverse, invert the cable connections in the junction box.

Disconnect the mains before each intervention and use suitable devices to prevent an accidental reconnection of the equipment.

Ensure that the protection devices are present and working each time the equipment is started up.
During these checks make sure the rotation of the screw feeder/conveyor cannot damage the personnel or the equipment.

The installer must connect the equipment to the earthing system of the plant.

5.9 Inspection

Important

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

The authorized personnel must also check:
- that the linearity error of the screw feeder/conveyor remains within the values indicated (see “Preassembling the screw feeder/conveyor” paragraph);
- that no tools or other material have been forgotten inside the screw feeder/conveyor;
- that the fixing screws have been tightened using the prescribed torque;
- the level of oil in the gear reducer is correct.

Before starting to operate the screw feeder/conveyor:
- Ensure that the plant in which the screw feeder/conveyor is installed is compliant to the Directive 2006/42/EC and to the relevant directives, the safety standards in force and those specifically applicable.
- Ensure that the inlet and outlet spouts of the screw feeder/conveyor are connected to the final equipment or plant in order to prevent access to hazardous areas.
- Ensure that the inspection hatches are locked with the bolts supplied inserted in their original position.
- Ensure that the operating conditions were met.

Run empty the screw feeder/conveyor to ensure that the direction of rotation of the screw or helicoid flighting is correct; if it is reversed comparing to what indicated on the motor plate, stop the screw feeder/conveyor and consult the “Electrical connection” paragraph.

Operate the screw feeder/conveyor for about 5/10 minutes to ensure it works properly.
In the presence of:
- unusual noise;
- excessive vibrations;
- overheating of bearings;
- overheating of the motor and/or gear reducer;
- friction of the screw against the inner walls of the tube, stop the screw feeder/conveyor and remove the cause of the malfunctioning.

Important

It might happen that a sticky substance leaks out from the bottom of the gear unit.
The leak is not caused by a fault or malfunction of the drive unit or bearings, but is the excess liquid with which the seals fitted on the final shafts were soaked.
This treatment ensures a longer lasting sealing.
The leakage may appear during the start-up and may continue for a few hours of service before it disappears but it does not affect the correct working of the screw feeder/conveyor in any manner whatsoever.

6.1 Production Start-up

Before starting up the screw feeder/conveyor the operator in charge and authorized for the production must ensure that the safety devices installed are present, in working order and that the operating conditions are respected (doors closed, inlet and outlet spouts connected correctly or protected,etc.).

Start up the screw feeder/conveyor without load and feed material gradually to reach the required production.

Important

In case of excessive noise, strong vibrations, etc. stop the screw feeder/conveyor and report the problem to the person in charge authorized to restore the correct working.
Do not use the equipment if damaged.

6.2 Clearing the screw feeder/conveyor following a blockage

If, during normal operation, the screw feeder/conveyor motor gets gradually stressed and then comes to a complete stop, it is highly probable that the screw feeder/conveyor got clogged.

Danger - Warning

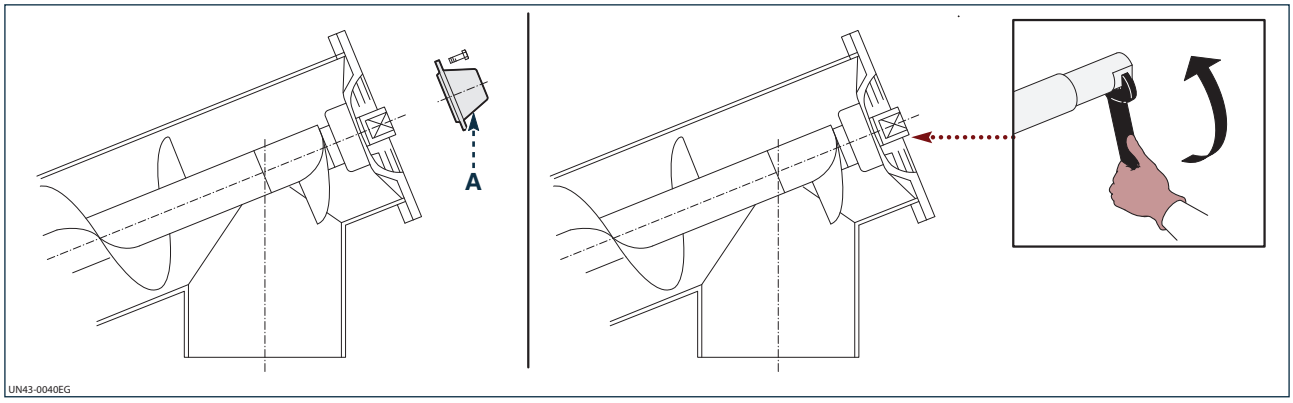
The authorized operator must strictly apply all the laws regarding workplace safety and adopt appropriate protective measures against work accidents.
Specifically, do not insert the hands into the inlet spout, outlet spout or into the screw through the inspection hatch if the screw has not been blocked safely using external means.

Danger - Warning

Disconnect the equipment from all mains and use the appropriate means to prevent it from being reconnected accidentally.

Proceed as described.

- Close the valve provided above the inlet spout.
- Remove the outlet sleeve and ensure that the outlet spout is not obstructed by material or deposits and clean it using a tool, if necessary.



1) Remove the protective hood (**A**) of the shaft.

2) Turn the screw manually by applying a suitable tool (spanner/wrench) on the drive unit shaft.
The direction of rotation is anticlockwise seen from the loading side.
If this is not enough, open the inspection hatches and allow the material from inside the screw feeder/conveyor to flow out; this can be done by tapping on the external tube with a rubber mallet.

Danger - Warning

Never insert the hands inside the screw feeder/conveyor.

Try again to rotate the screw manually and repeat the operation until this is no longer possible.

When it becomes easy to rotate the screw without much force it means the screw feeder/conveyor is clear.

3) Close the inspection hatches and restore the safety devices. Screw on the locking screws using the recommended tightening torque (see “Nuts and Bolts Tightening Torque Table”).

4) Refit the protective hood on the gear shaft.

5) Reconnect the outlet spout to the utility expected.

Restart the screw feeder/conveyor by following the procedure described in the “Production Start-up” paragraph.

6.3 Machine shutdown at the end of the work cycle

Empty the screw feeder/conveyor of the material contained to prevent it from hardening before stopping the screw feeder/conveyor.

Deactivate the mains from the screw feeder/conveyor from the control panel of the plant or equipment in which it is installed.

To restart the screw feeder/conveyor, consult the “Production Start-up” paragraph.

6.4 Long shutdowns of the equipment

When the screw feeder/conveyor has to remain unused for long periods, proceed as described below.

1) Empty the screw feeder/conveyor of the product contained to prevent it from hardening.
2) Clean the screw feeder/conveyor (see “Cleaning the screw feeder/conveyor”).
3) Grease the equipment.
4) Repair the damaged or worn mechanical elements.
5) Deactivate the mains.

6.5 Reuse after long shut-downs

Important

If the equipment is to be used in different conditions and with materials other than the previous application, ensure the “Permitted use” indications are complied with.

Before reusing the screw feeder/conveyor after a long shutdown, proceed as described below:

1) Check the main nuts and bolts to make sure they are tightened properly.
2) Check all oil levels.
3) Start up the equipment (see “Production Start-up”).

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 near by.
Set the equipment concerned in safety condition.
Wear suitable personal protection equipment; in this regard, consult the person in charge of production activites safety.

- Scheduled maintenance Table

Component	Operation to be carried out	Daily	Every month	Every six months	Every two years	Manual reference
Safety devices	Performance check	•				
Inspection hatches	Checking the condition	•				
Flanged end bearing assembly	Checking the seal	•				
Gear reducer	Checking the seal	•				
Gear reducer	Checking the temperature		•			
Gear reducer	Checking oil level		•			
Flanged end bearing assembly	Checking overheating		•			
Intermediate bearings	Checking overheating		•			
Greasing devices	Checking the condition			•		
Safety and information signs	Checking the condition and legibility			•		
Intermediate bearings and bushes	Checking the condition				•	
Gear reducer	Changing oil	*				

* Change the oil the first time after the first 500 hours of service.
Subsequently change the oil after 2,500 hours.

7.1 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.

7.2 Lubrication

- Outlet end bearing assembly "XTA" (with drive unit at load)
Must not be greased because the bearing is filled with long-life grease.

- Inlet end bearing assembly "XTB" (with drive unit at outlet)
Grease approximately every 200 hours and change the grease approx. every 7,500 hours (see "Lubricants Table").
Replace the bearings after 20,000 hours.
Bearings cannot be supplied loose. In this case a complete end bearing assembly is supplied as spare part.

- Intermediate bearing
The intermediate bearing of the "**ES**" screw feeder/conveyor is greased permanently and does not require subsequent greasing for a normal working of the equipment.
The bearing assembly is, however, provided with a bore for greasing.

- Seals
Grease the seals that require this (see "Lubricants Table") at start-up and periodically (every 8 hours).

7.3 Gear reducer lubrication

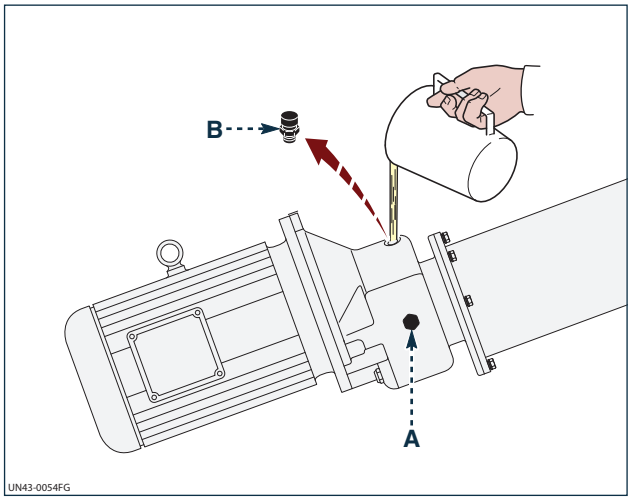
The WAM® M4_series gear reducers are filled with oil and are provided with level, drainage and venting plugs.

- Checking the oil level

Proceed as described.

1) Check the correct level of oil in the drive unit through the level indicator (**A**).
The oil must reach the line in the middle of the level indicator.

2) If necessary, add oil through the bore in the filler plug (**B**) to the correct level.



Important

Before adding the oil, wipe carefully the filler plug and the inlet area to prevent contamination of the lubricant.
Add the same kind of oil as the one already contained (see "Lubricants Table").

After filling up, change the sealing washer and screw on the filler cap (**B**) with the prescribed torque, indicated in the "Tightening torques Table".

7.4 Changing the oil

Important

Do not dump used oil in the environment but dispose it off in accordance with the laws in force regarding the matter.

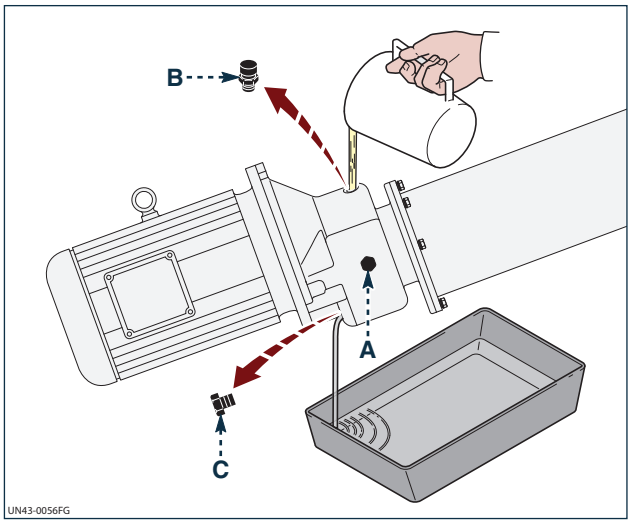
Proceed as described.

1) Place a container of adequate capacity under the drainage plug (**C**).

2) First remove the filler plug (**B**) then the drainage plug (**C**).

3) Drain out the oil completely from the gear reducer.

4) Screw the drainage cap (**C**) with the prescribed torque, see “Tightening torques Table”, taking care to replace the sealing washer.



Important

Before adding the oil, wipe carefully the filler plug and the inlet area to prevent contamination of the lubricant.
For the features of the oil, see the “Lubricants Table”.

5) Fill oil through the bore in the filler plug (**B**).
The oil must reach the line in the middle of the level indicator (**A**).

6) Replace the sealing washer and screw the filler cap (**B**) with the prescribed torque (see “Tightening torques Table”).

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 Replacing the electric motor

Replace the electric motor with a new one having the same structural and functional features.
If the motor is supplied by the Manufacturer, ask for original spare parts to ensure the safety and functionality of the equipment.

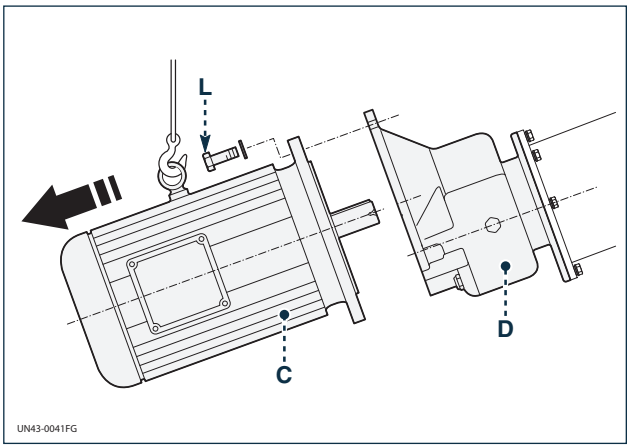
Disassembly

Danger - Warning

Set the screw feeder/conveyor in safety condition (see glossary and terminology).
Harness the electric motor appropriately and use suitable lifting means.

Proceed as described.

1) Open the junction box and disconnect the mains connection cables from the motor terminals.
2) Harness the motor safely in such a way as to avoid dangerous oscillations.
3) Slacken the bolts (**L**) that fasten the motor (**C**) to the gear reducer (**D**) .
4) Dismantle the motor from the gear reducer using a moderate decoupling force (do not use a screwdriver or levers as they can damage the flanges).



Assembly

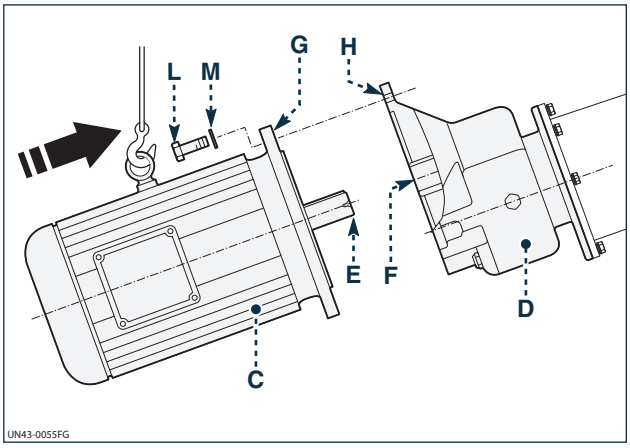
Proceed as described.

1) Wipe the coupling surfaces of the new motor and gear reducer thoroughly.

2) Lubricate the shaft (**E**) of the electric motor and the corresponding seat (**F**) of the gear reducer with the prescribed lubricant (see “Table of lubricants and sealants”).

3) Apply the prescribed sealant (see “Table of lubricants and sealants”) on the coupling surfaces (**G** and **H**).

4) Fit the motor on the gear reducer.



Important

Do not force the coupling and do not use improper means as this will damage the coupling and the contact surfaces.

5) Insert the bolts (**L**) and washers (**M**) in all the bores provided in the connecting flange.

6) Tighten the bolts (**L**) by applying the indicated tightening torques (see “Nuts and bolts tightening torques Table”).

7) Make the electrical connection and, on start-up, ensure that the screw rotates in the correct direction (see “Electrical connection”).

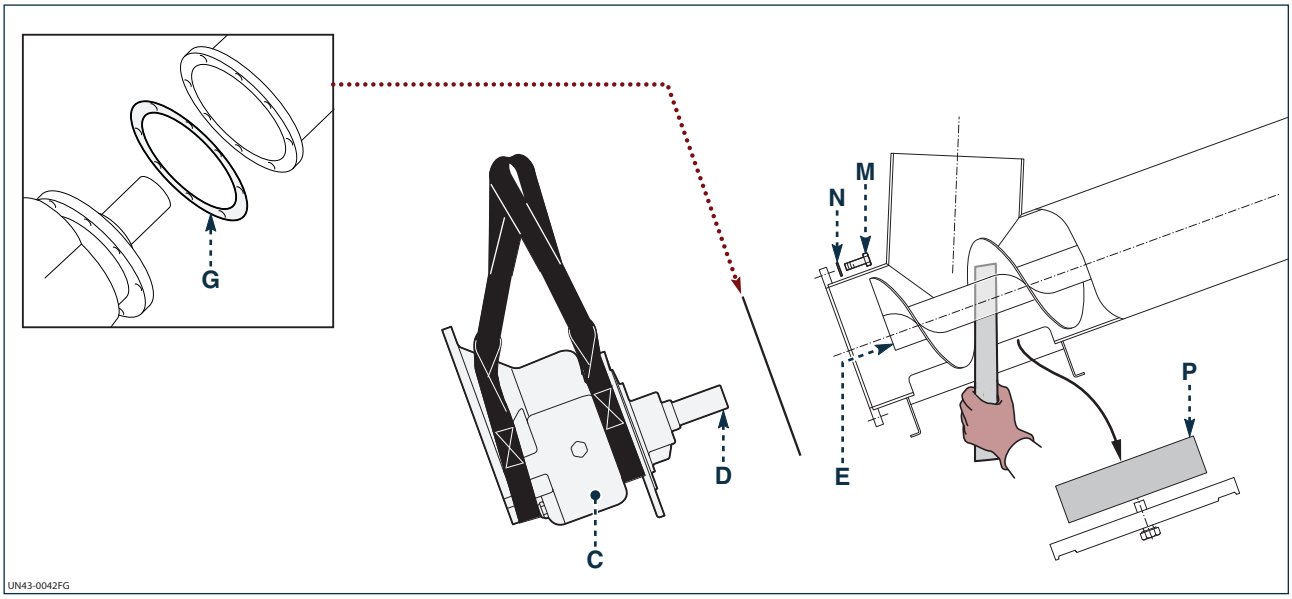
8.3 Replacing the gear reducer

Dismantling of the drive unit at inlet

Danger - Warning

Set the screw feeder/conveyor in safety condition (see glossary and terminology).
Harness the gear reducer appropriately and use suitable lifting means.

The illustration shows the gear reducer at the load.



Proceed as described.

1) Dismantle the electric motor (see “Replacing the electric motor”).

2) Open the inspection hatch (**P**).

Danger - Warning

Before dismantling the drive unit, block the conveyor screw through the inspection hatch, using appropriate external means, to prevent it from slipping out of the tube and causing work injuries to the persons directly involved in the operations.

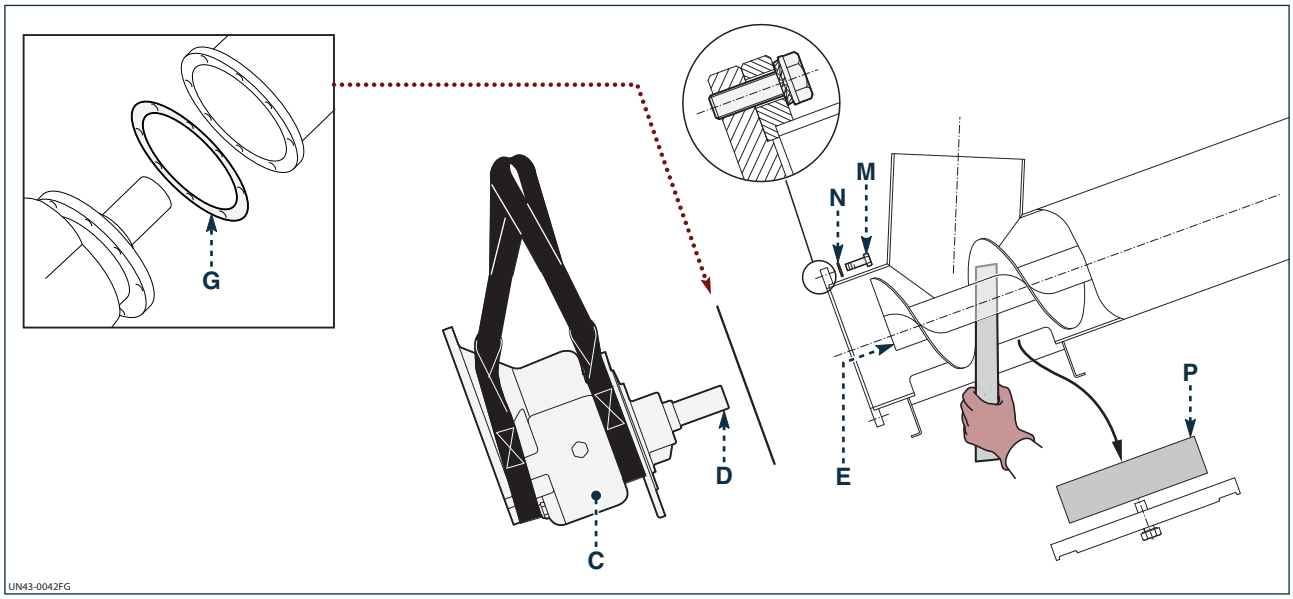
3) Harness the motor safely in such a way as to avoid dangerous oscillations.

4) Slacken the fastening bolts (**M**).

5) Remove the washers (**N**) and the gasket (**G**).

6) Dismantle the gear reducer (**C**).

Assembling phase of the gear reducer at inlet



Proceed as described.

1) Wipe the contact surfaces thoroughly.

2) Lubricate the shaft (**D**) of the gear reducer and the relative seat (**E**) of the screw with the prescribed lubricant (see “Table of lubricants and sealants”).

3) Fit the new gasket (**G**) supplied with the spare drive unit.

4) Fit the gear reducer, by inserting the shaft in the screw shaft coupling and bring the gear reducer near the end flange so that the relative centerings match.

Important

Do not force the coupling and do not use improper means as this will damage the coupling and the contact surfaces.

5) Insert the bolts (**M**) and washers (**N**) in all the bores provided in the connecting flanges.

6) Tighten the bolts (**M**) by applying the indicated tightening torque (see “Nuts and bolts tightening torques Table”).

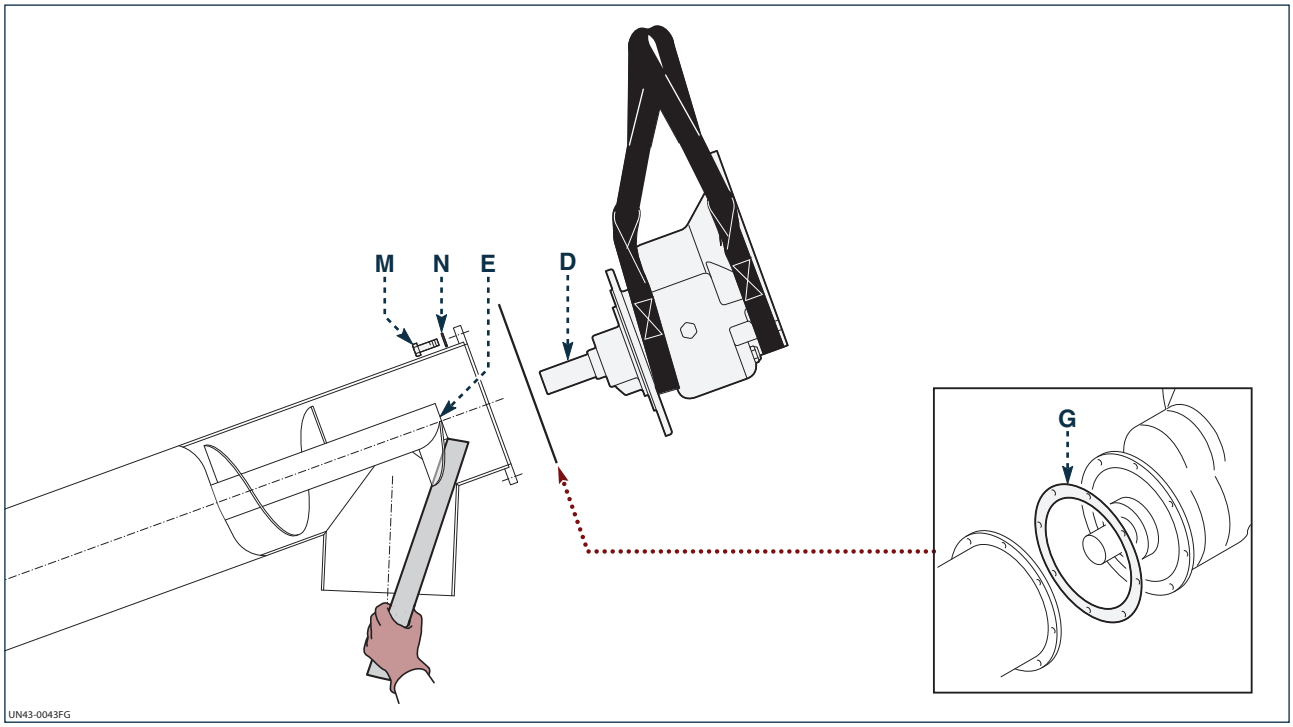
7) Close the inspection hatch (**P**) and screw on the locking screw using the recommended tightening torque (see “Nuts and Bolts Tightening Torque Table”).

8) Fit the electric motor (see “Preassembling the electric motor”).

Dismantling the drive unit at outlet

Danger - Warning

Before dismantling the drive unit, block the screw through the outlet spout, using adequate external means, to prevent it from causing work injuries to persons directly involved in the operations.



Proceed as described.

1) Dismantle the electric motor (see “Replacing the electric motor”).

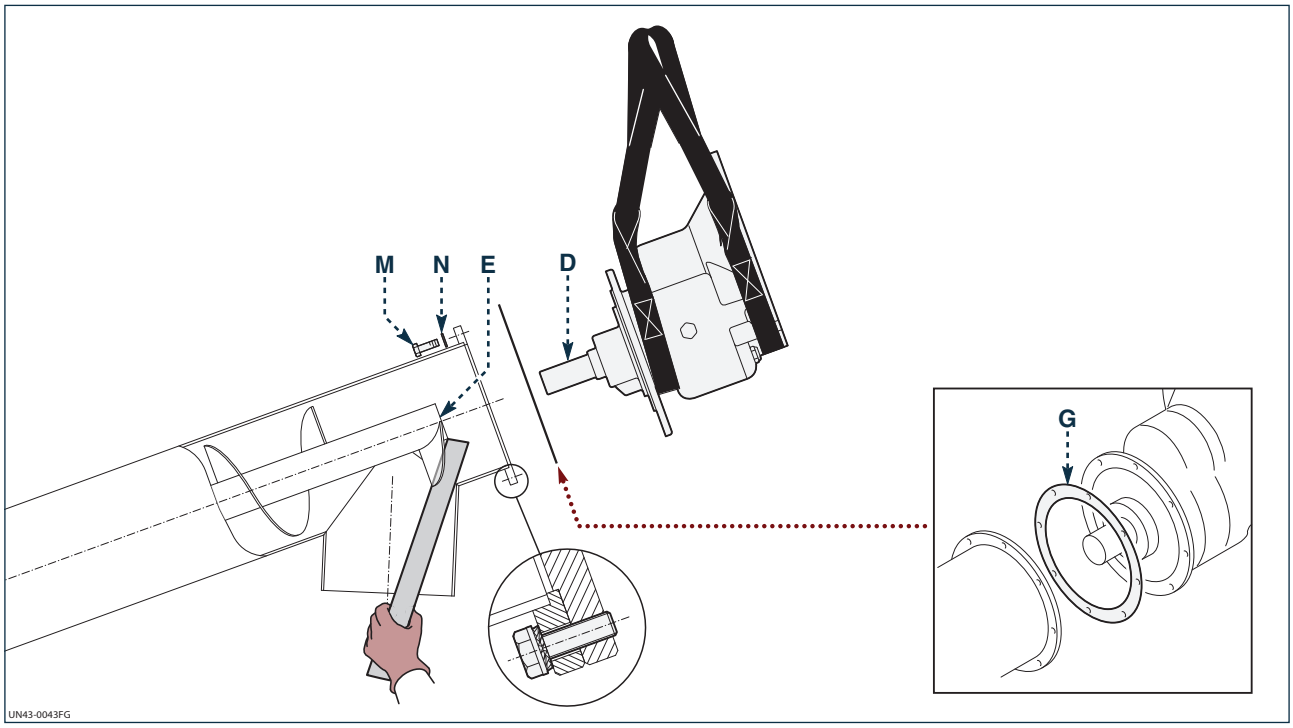
2) Harness the motor safely in such a way as to avoid dangerous oscillations.

3) Slacken the fastening bolts (**M**).

4) Remove the washers (**N**) and the gasket (**G**).

5) Dismantle the gear reducer.

Assembling the gear reducer at the outlet



Proceed as described.

1) Wipe the contact surfaces thoroughly.

2) Lubricate the shaft (**D**) of the drive unit and the relative seat (**E**) of the screw with the prescribed lubricant (see “Table of lubricants and sealants”).

3) Fit the new gasket (**G**) supplied with the spare gear reducer.

4) Fit the gear reducer, by inserting the shaft in the screw shaft coupling and bring the gear reducer near the end flange so that the relative centerings match.

Important

Do not force the coupling and do not use improper means as this will damage the coupling and the contact surfaces.

5) Insert the bolts (**M**) and washers (**N**) in all the bores provided in the connecting flanges.

6) Tighten the bolts (**M**) by applying the indicated tightening torque (see “Nuts and bolts tightening torques Table”).

7) Fit the electric motor (see “Preassembling the electric motor”).

8.4 Replacing the gear reducer seal

The gear reducers directly connected to the screw feeder/conveyor are provided with a cartridge seal.

Disassembly

Danger - Warning

Set the equipment concerned in safety condition (see glossary and terminology).

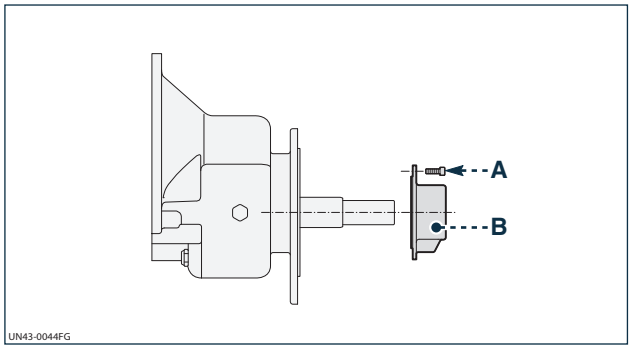
Proceed as described.

1) Dismantle the electric motor (see “Replacing the electric motor”).

2) Dismantle the gear reducer from the screw feeder/conveyor (see “Replacing the gear reducer”).

3) Slacken the bolts (**A**).

4) Remove the worn cartridge seal (**B**).



Assembly

Proceed as described.

1) Wipe the shaft and coupling surfaces thoroughly.

2) Fit the new cartridge seal.

3) Insert the bolts (**A**) with the washers in all the bores provided in the connecting flanges.

4) Fit the gear reducer (see “Replacing the gear reducer”).

5) Fit the electric motor (see “Replacing the electric motor”).

8.5 Replacing the flanged end bearing assembly

The flanged end bearing assemblies are of three types.
A) flanged end bearing assembly "**XTA**": is always mounted only at the screw feeder/conveyor outlet end.
B) flanged end bearing assemblies "**XTE - XTB**": can only be mounted at the inlet end.

Disassembling the flanged end bearing assembly at outlet

Danger - Warning

Set the equipment concerned in safety condition (see glossary and terminology).

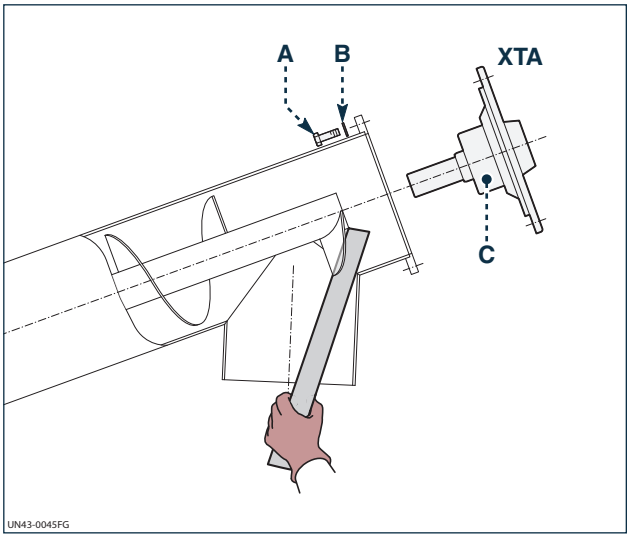
Danger - Warning

To prevent the screw from moving and causing work accident, block it using adequate external means.

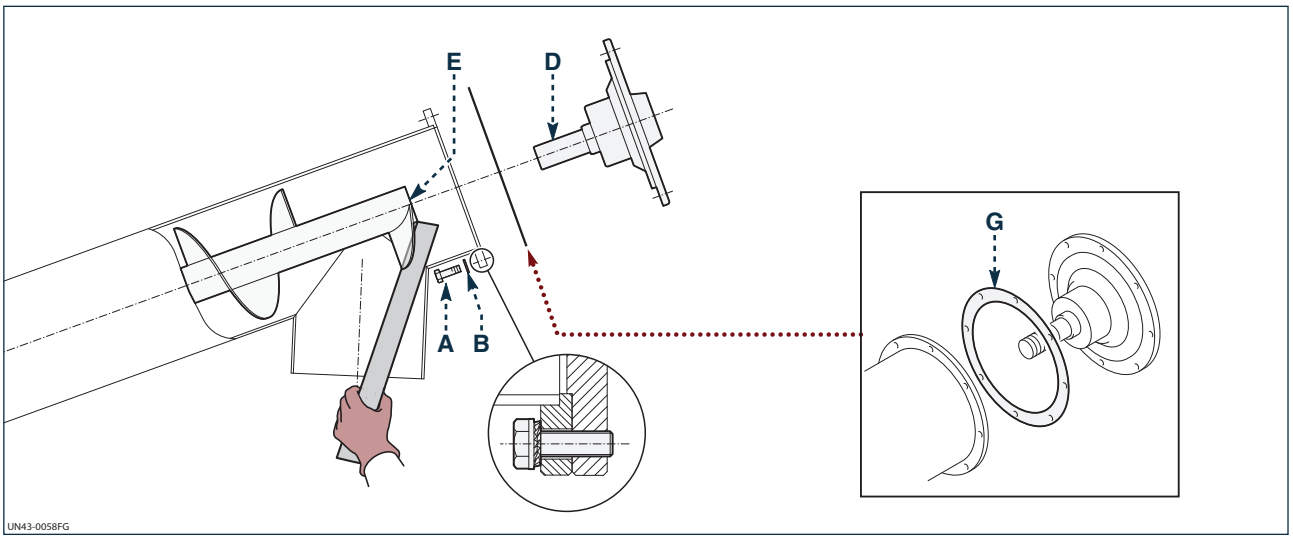
Proceed as described.

1) Slacken the fastening bolts (**A**) and remove the washers (**B**).

2) Remove the flanged end bearing assembly (**C**).



Assembling the flanged end bearing assembly at outlet



Proceed as described.

1) Wipe the coupling surfaces thoroughly.

2) Lubricate the shaft (**D**) of the flanged end bearing assembly and the relative seat (**E**) of the screw shaft coupling with the prescribed lubricant (see “Table of lubricants and sealants”).

3) Fit the new gasket (**G**) supplied with the spare drive unit.

4) Fit the new spare flanged end bearing assembly, by inserting the shaft in the screw shaft coupling and bring the gear reducer near the end flange so that the relative centerings match.

Important

Do not force the coupling and do not use improper means as this will damage the coupling and the contact surfaces.

5) Insert the washers (**B**) and bolts (**A**) in all the bores provided in the connecting flanges.

6) Tighten the bolts (**A**) by applying the indicated tightening torque (see “Nuts and bolts tightening torques Table”).

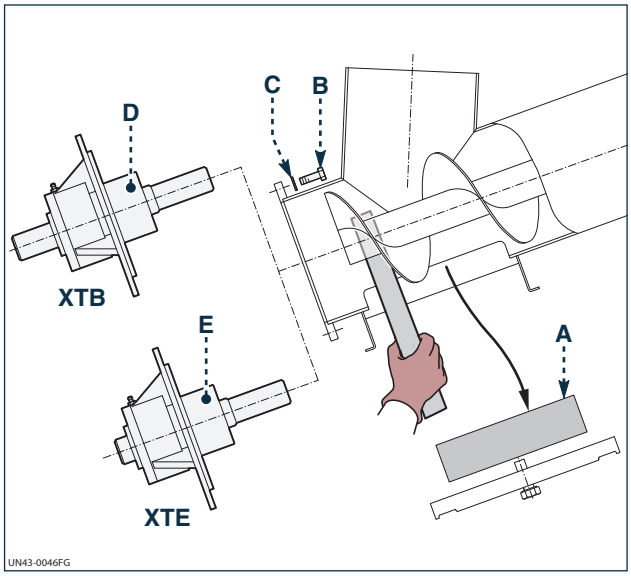
Assembling the flanged end bearing assembly at inlet

Danger - Warning

Set the equipment concerned in safety condition (see glossary and terminology).

The illustration shows the flanged end bearing assemblies “**XTE - XTB**” mounted at the inlet.

1) Open the inspection hatch (**A**).



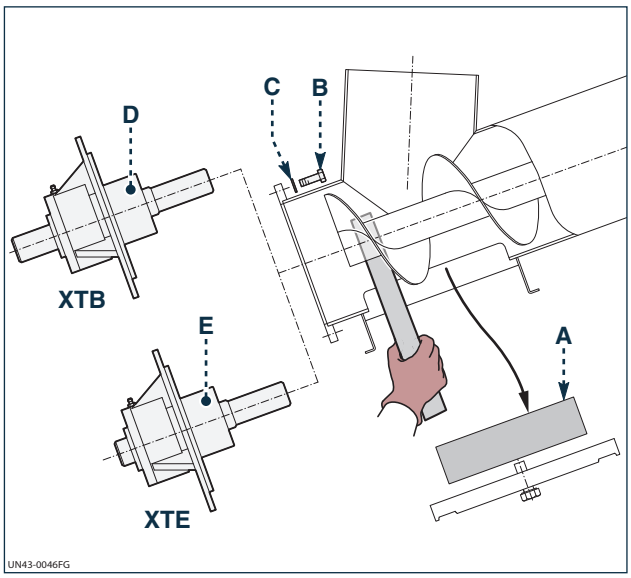
Danger - Warning

Before dismantling the flanged end bearing assembly, block the screw through the inspection hatch, using adequate external means, to prevent it from slipping out of the tube and causing work injuries to persons directly involved in the operations.

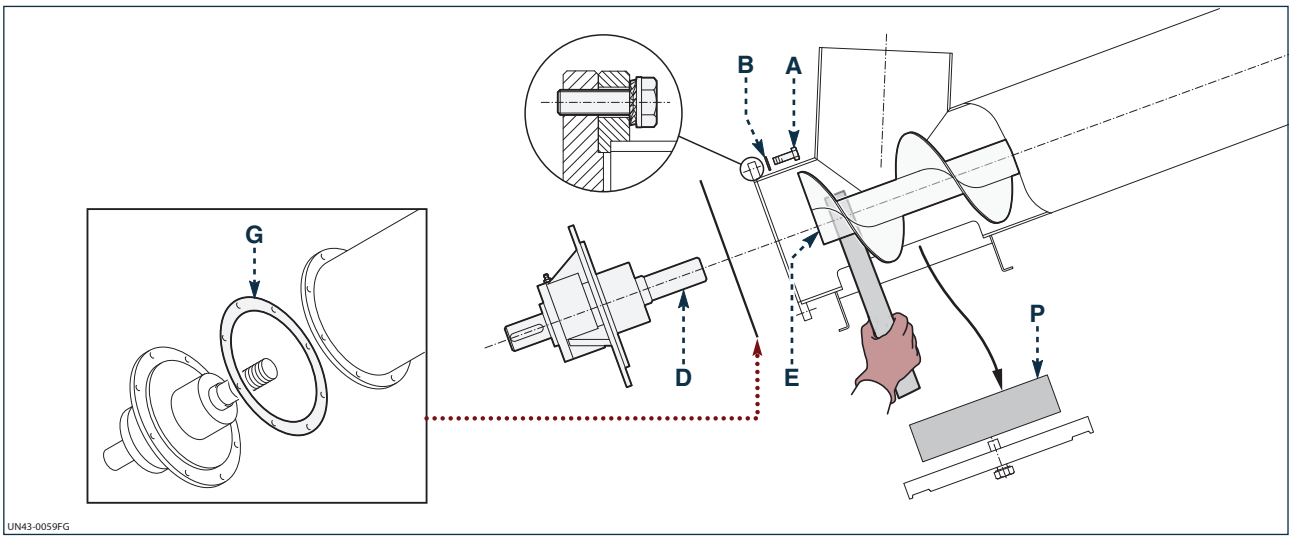
2) Block the screw by means of a suitable external means through the inspection hatch.

3) Slacken the fastening bolts (**B**) and remove the washers (**C**).

4) Remove the flanged end bearing assembly (**D**) or (**E**).



Assembling the flanged end bearing assembly at inlet



Proceed as described.

1) Wipe the coupling surfaces thoroughly.

2) Lubricate the shaft (**D**) of the flanged end bearing assembly and the relative shaft coupling bush (**E**) of the screw with the prescribed lubricant (see “Table of lubricants and sealants”).

3) Fit the new gasket (**G**) supplied with the spare gear reducer.

4) Fit the new spare flanged end bearing assembly, by inserting the shaft in the screw shaft coupling bush and bring the gear reducer near the end flange so that the relative centerings match.

Important

Do not force the coupling and do not use improper means as this will damage the coupling and the contact surfaces.

5) Insert the washers (**B**) and bolts (**A**) in all the bores provided in the connecting flanges.

6) Tighten the fastening bolts (**A**) by applying the indicated tightening torque (see “Nuts and bolts tightening torques Table”).

7) Remove the block on the screw.

8) Close the inspection hatch (P). Screw on the locking screw using the recommended tightening torque (see “Nuts and Bolts Tightening Torque Table”).

8.6 Replacing the flanged end bearing seal

Only the "**XTB**" and "**XTE**" flanged end bearing assemblies are provided with seal units.

The seals of the flanged end bearing assemblies may be of two types:

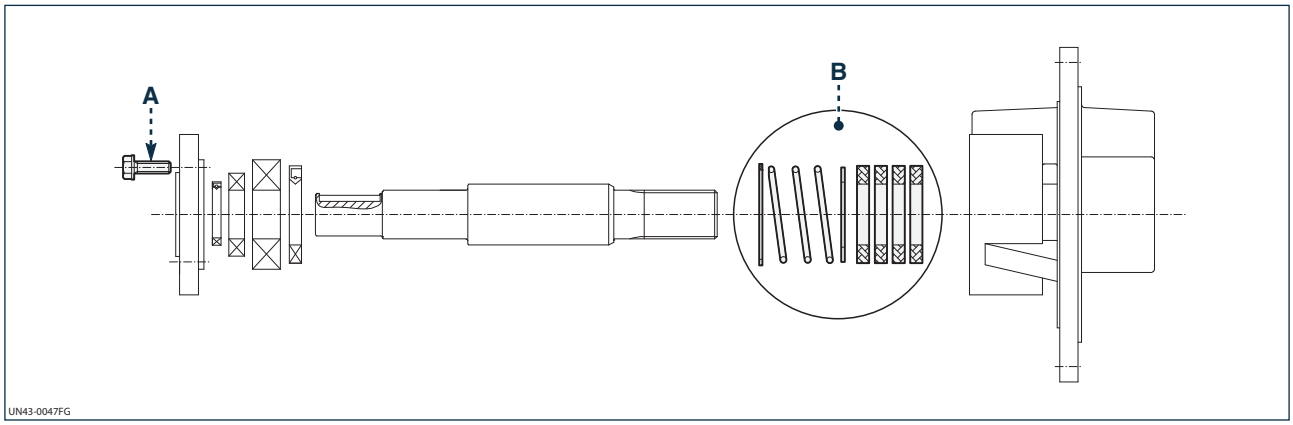
- seal incorporated in flanged end bearing assembly
- cartridge seal

Disassembling the seal incorporated in the flanged end bearing assembly

Danger - Warning

Set the equipment concerned in safety condition (see glossary and terminology).

The illustration shows the seal incorporated in the flanged end bearing assembly.



Proceed as described.

1) Dismantle the flanged end bearing assembly from the screw feeder/conveyor (see "Replacing the flanged end bearing assembly").

2) Slacken the bolts (**A**), open the end bearing assembly and remove all the components.

3) Clean and check all the parts thoroughly, replace if there are signs of wear.

Assembling the seal incorporated in the flanged end bearing assembly

Proceed as described.

1) Wipe the coupling surfaces thoroughly.

2) Fit the new seal (**B**) and the components dismantled earlier repeating the dismantling procedure in reverse order.

3) Tighten the bolts (**L**) by applying the indicated tightening torque (see "Nuts and bolts tightening torques Table").

4) Grease the bearings through the grease nipple.

5) Refit the flanged end bearing assembly on the screw feeder/conveyor (see "Replacing the flanged head").

Disassembling the sealing cartridge

Danger - Warning

Set the equipment concerned in safety condition (see glossary and terminology).

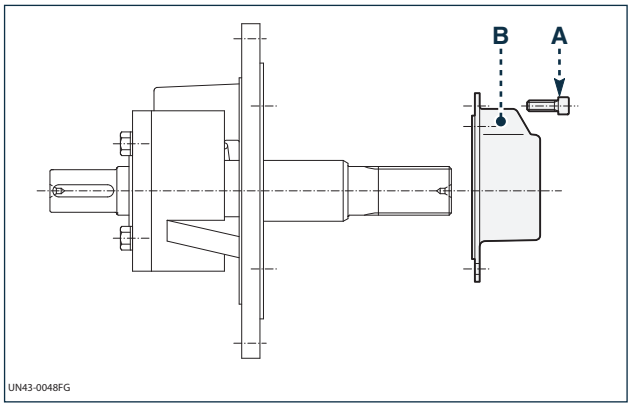
The illustration shows the flanged end bearing assembly with the cartridge seal.

Proceed as described.

1) Dismantle the flanged end bearing assembly from the screw feeder/conveyor (see “Replacing the flanged end bearing assembly”).

2) Slacken the bolts (**A**).

3) Remove the cartridge seal (**B**).



Assembling the cartridge seal

Proceed as described.

1) Wipe the shaft and coupling surfaces thoroughly.

2) Fit the new cartridge seal.

3) Tighten the bolts (**A**) by applying the indicated tightening torque (see “Nuts and bolts tightening torques Table”).

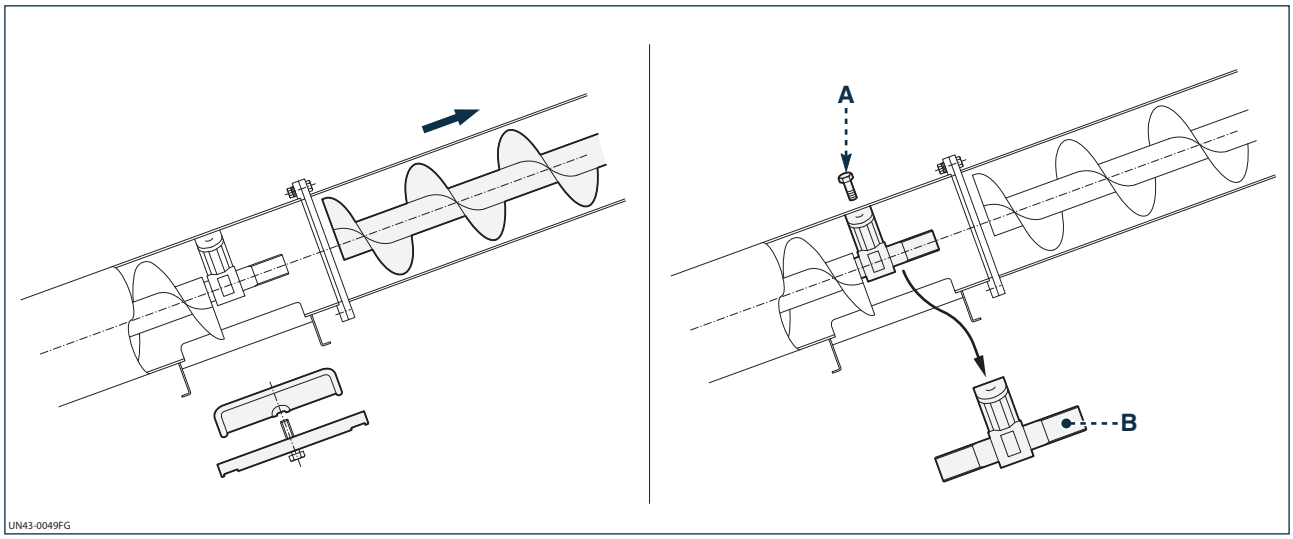
4) Refit the flanged end bearing assembly on the screw feeder/conveyor (see “Replacing the flanged end bearing assembly”).

8.7 Replacing the intermediate bearing assembly

Disassembly

Danger - Warning

Set the equipment concerned in safety condition (see glossary and terminology).



Proceed as described.

1) Open the inspection hatch under the intermediate bearing assembly to be replaced.

2) Open the screw feeder/conveyor from the side nearest the intermediate bearing assembly to be replaced; evaluate whether it is economical to replace the drive unit (see “Replacing the drive unit”) or the flanged end bearing assembly (see “Replacing the flanged end bearing assembly”).

Danger - Warning

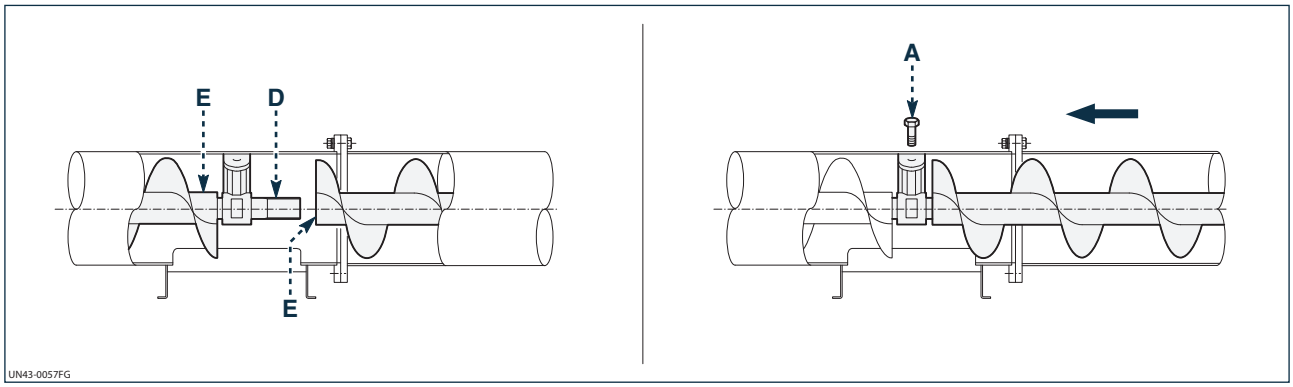
Provide adequate safety measures to prevent risk of accident caused by accidental movement of the screw.

3) Move the screw feeder/conveyor or section to the minimum possible extent to allow disassembly of the intermediate bearing assembly.

4) Slacken the bolts (**A**).

5) Remove the coupling shaft still engaged and remove the intermediate bearing assembly (**B**) through the inspection hatch.

Assembly



Proceed as described.

1) Lubricate the ends of the shaft (**D**) of the new intermediate bearings and the bushes (**E**) of the screws with the prescribed lubricant (see “Table of lubricants and sealants”).

2) Fit the new intermediate bearing assembly inserting one end of the shaft into the shaft coupling bush of the screw already in position.

3) Assemble screw sections so that flight ends face each other at 180° as shown in figure above and slowly insert the connecting bush of the screw removed earlier on the free end of the intermediate bearing shaft so that it fits flush.

4) Close the screw feeder/conveyor by fitting the component removed earlier (drive unit or flanged end bearing assembly) referring to paragraphs “Replacing the drive unit” or “Replacing the flanged end bearing assembly”.

5) Through the inspection hatch, position the intermediate bearing in the direction of the bores present on the external tube, insert the bolts (**A**) and “pull” one then the other alternately to obtain the prescribed tightening torque (see “Nuts and bolts tightening torques Table”).

6) Close the inspection hatch. Screw on the locking screw using the recommended tightening torque (see “Nuts and Bolts Tightening Torque Table”).

8.8 Replacing the screw

For replacement of the screw or a screw section (inlet, intermediate, outlet), the screw feeder/conveyor must be dismantled from the plant or from the equipment in which it is installed and the work has to be carried out on the ground.

Danger - Warning

Replace the screw according to the information in the Manufacturer's Operation Manual.
The specialist technician authorized for replacement operations has to make sure all the necessary measures are adopted to ensure his safety and the safety of other persons directly involved.
The laws regarding workplace safety have to be strictly followed.
Use means and accessories (crane, ropes, hooks, shackles, etc.) suitable to 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.

Disassembling the screw feeder/conveyor from the plant

Danger - Warning

Set the equipment concerned in safety condition (see glossary and terminology).

Proceed as described.

Disconnect the mains supply cable from the junction box of the electric motor.

Harness the screw feeder/conveyor depending on its configuration (see “Lifting method”).

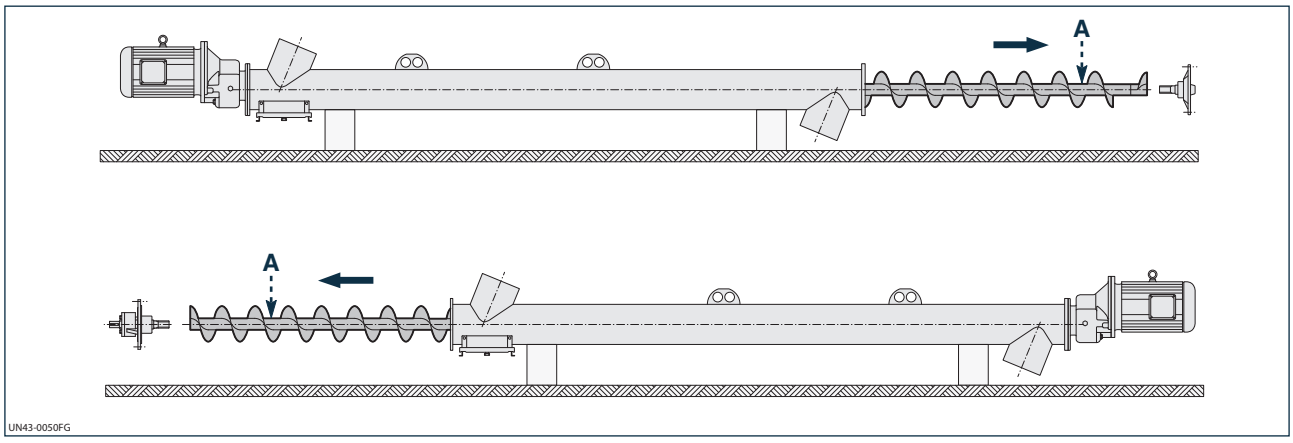
Separate the inlet and outlet spouts from the plant or equipment.

Remove all the supports of the screw feeder/conveyor.

Lift and place the screw feeder/conveyor on the ground on a flat surface to ensure stability.

Depending on the length of the screw feeder/conveyor (see Chap. 10) the screw to be replaced may be in one piece or made up of a number of sections; inlet, intermediate and/or outlet.

Disassembling the one piece screw



Proceed as described.

1) Dismantle the flanged end bearing assembly (see “Disassembling the flanged end bearing assembly”).

2) Remove the screw (**A**) from the external tube.

Danger - Warning

Provide appropriate safety measures to prevent risk of work accidents caused by accidental movement of the screw.
Harness the screw appropriately and use suitable lifting means.

Assembling the screw

Important

Before carrying out the assembly, check the length of the new spare screw; its length must be equal to the length of the screw to be replaced ± 1 mm.

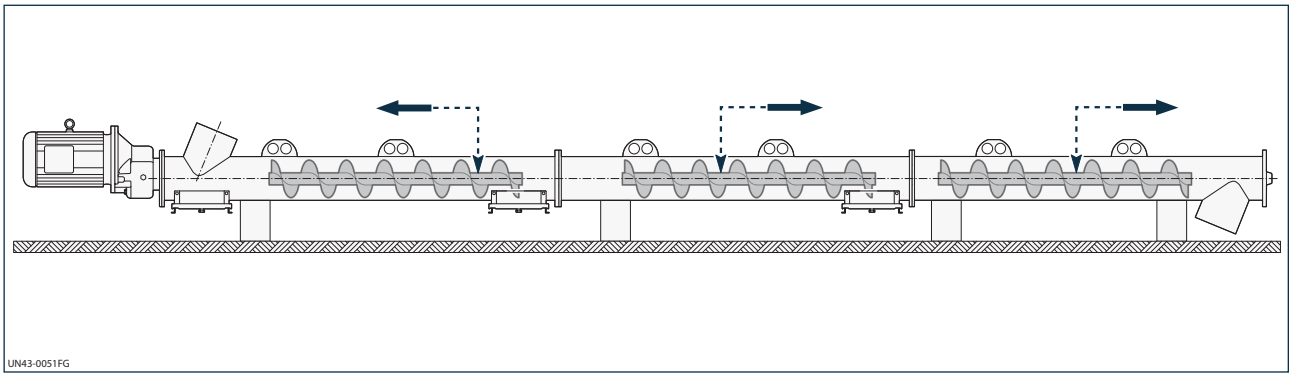
Proceed as described.

1) Insert the new screw into the tube.
Take care while inserting the screw in the correct direction because the screw is not symmetrical.

2) Fit the flanged end bearing assembly (see “Replacing the flanged end bearing assembly”).

3) Close the inspection hatch. Screw on the locking screw using the recommended tightening torque (see “Nuts and Bolts Tightening Torque Table”).

Disassembling the screw in more sections



The specialist technician authorized for carrying out the replacement has to evaluate whether it is appropriate to replace the drive unit or the flanged end bearing assembly.

Proceed as described.

1) Disassemble the gear motor or flanged end bearing assembly (see “Replacing the gear motor” or “Replacing the flanged end bearing assembly”).

Danger - Warning

Set the screw feeder/conveyor in safety condition (see glossary and terminology).
Harness the screw appropriately and use suitable lifting means.

2) Dismantle the intermediate bearings which interfere with the disassembly of the screw section to be replaced (see “Replacing intermediate bearings”).
3) Remove in sequence the screw sections to reach the damaged or worn section to be dismantled.

Assembling the screw

Important

Before carrying out the assembly, check the length of the new spare screw(s); the length must be equal to the length of the screw(s) to be replaced ± 1 mm.

Proceed as described.

1) Insert the sections dismantled in sequence replacing the damaged or worn screw sections with new screw sections inside the tube.
   Pay attention to the direction of insertion as the inlet and outlet screws are not symmetrical and have a specific direction for assembly.
2) Mount the intermediate bearings dismantled earlier (see “Replacing intermediate bearing”).
3) Assemble the drive unit or flanged end bearing assembly (see “Replacing gear reducer” or “Replacing flanged end bearing assembly”).
4) Close all the inspection hatches using the locking bolts provided.
5) Installation of screw feeder/conveyor in the plant (see “Installation and fixing of screw feeder/conveyor”).
6) Connect the electric mains cable (see “Electric connection”).

8.9 Replacing the external tube

For replacement of the external tube of the screw feeder/conveyor or a section of the tube (inlet, intermediate, outlet) the screw feeder/conveyor has to be dismantled from the plant or the equipment on which it is installed.

Danger - Warning

Replace the external tube according to the information in the Manufacturer’s Operation Manual.
The specialist technician authorized for replacement operations has to make sure all the necessary measures are adopted to ensure his safety and the safety of other persons directly involved.
The laws regarding workplace safety must be strictly followed.
Use means and accessories (crane, 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 accident to persons.

Disassembling the screw conveyor from the plant

Danger - Warning

Set the equipment concerned in safety condition (see glossary and terminology).

Proceed as described.

Disconnect the mains supply cable from the junction box of the electric motor.

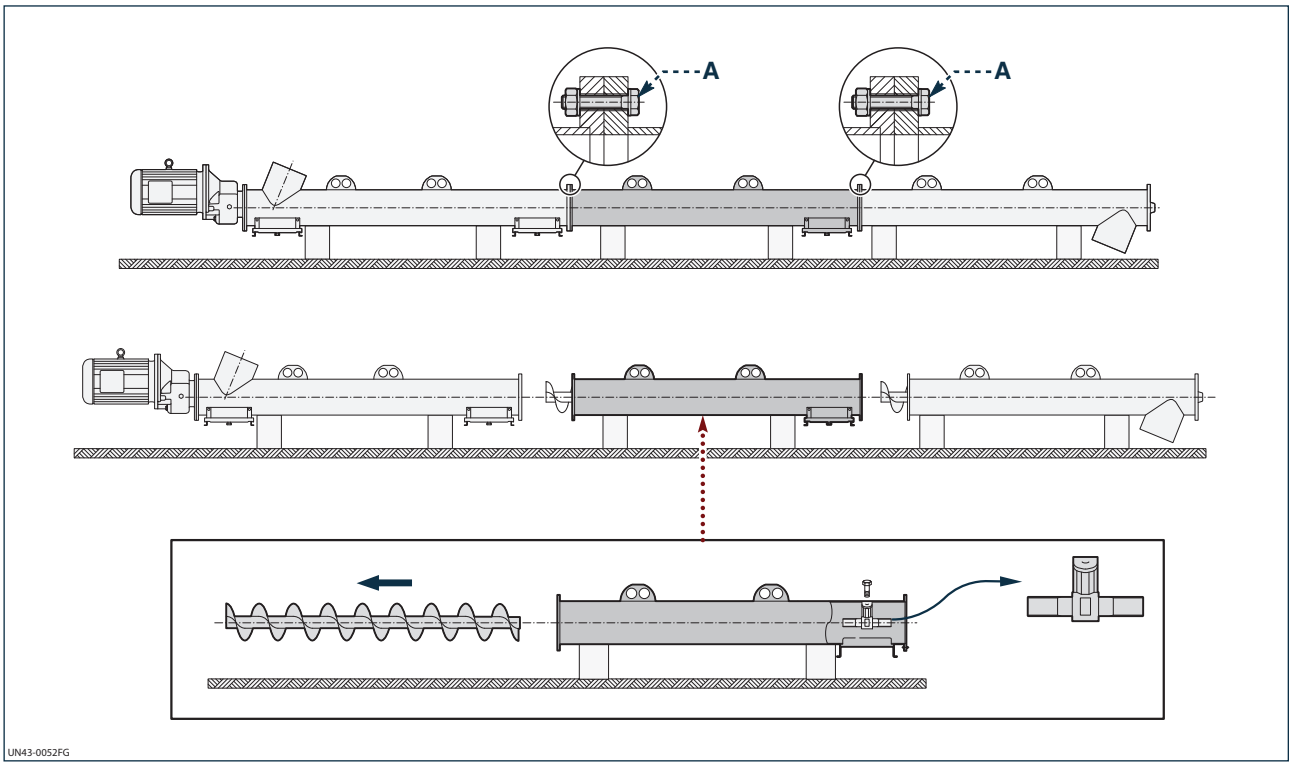
Harness the screw feeder/conveyor on the basis of its configuration (see “Lifting method”).

Separate the inlet and outlet spouts from the plant or equipment.

Remove all the supports of the screw feeder/conveyor.

Lift and place the screw feeder/conveyor on the ground on a flat surface to ensure stability.

Disassembling the damaged external tube



Proceed as described.

1) Divide the screw feeder/conveyor in such a manner as to isolate the damaged section by unscrewing the bolts (**A**) of the flange concerned.

2) If necessary, remove the intermediate bearings (see “Replacing intermediate bearing”).

3) If necessary, remove the drive unit or flanged end bearing assembly (see “Replacing drive unit” or “Replacing flanged end bearing assembly”).

4) Remove the screw from the damaged external tube.

Assembly

Important

Before carrying out the assembly, check the length of the external tube.

The length has to be within the tolerance range ± 2 mm as compared to the damaged tube.

The sections of the screw are not symmetrical, so if they are removed they must be remounted in the correspondent section.

Proceed as described.

1) Insert the screw paying attention to the direction of the screw inside the new spare external tube.

2) Refit the components that were disassembled (see specific references such as, for example, “Replacing the drive unit, ”Replacing the flanged end bearing assembly”, “Replacing the intermediate bearing”, etc).

3) Join the screw feeder/conveyor section with the others (see “Complete assembly of screw feeder/conveyor”).

4) Close all the inspection hatches. Screw on the locking screw using the recommended tightening torque (see “Nuts and Bolts Tightening Torque Table”).

5) Installation of screw feeder/conveyor in the plant (see “Installation and fixing of screw feeder/conveyor”).

6) Connect the mains supply cable (see “Electric connection”).

8.10 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).

8.11 Dismantling and disposal

Dismantling 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.

PROBLEM	PROBABLE CAUSE	POSSIBLE REMEDY
The motor does not start	1) No connection	1) Check the fuses, replace if damaged
	2) Defective motor or defect in mains	2) Repair or replace defective part
	3) Presence of a generator	3) Check generator power
	4) Presence of an inverter which cuts the starting torque	4) Consult inverter Supplier
The motor starts but then stops	1) Direction of rotation incorrect	1) Reverse polarity (see "Electrical connection")
	2) Obstruction	2) Clean the screw feeder/conveyor (see "Clearing the screw feeder/ conveyor following a jam")
	3) Feedrate or throughput rate too high	3) Check amperage and throughput. If both are too high, consult Manufacturer's Customer Service
	4) Motor burnt out	4) Find the cause (see point 3) then repair or replace
	5) Flanged end bearing assembly or gear reducer defective	5) Find the reason (see point 2), may be normal wear; replace the part
	6) Outlet spout blocked	6) Clean the outlet spout (see "Clearing the screw feeder/ conveyor following a jam")
The motor "starts up" but the screw feeder/conveyor does not convey the material	1) The pinion or output shaft of the drive unit is defective	1) Find the reason and replace the damaged part
	2) Direction of rotation incorrect	2) Reverse polarity (see "Electrical connection")
The drive unit overheats	1) Quantity of oil insufficient inside drive unit	1) Check and restore correct level (see "Lubricating the drive unit")

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.

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.

1) Information necessary

a) Description of problem

b) Photo showing the entire screw feeder/conveyor and how it is installed

c) Feed rate of screw feeder or throughput rate of screw conveyor

d) Does the screw feeder/conveyor start up without any problem after long shutdowns?

e) If there is a butterfly valve at the outlet ensure that:
- the valve axis and the screw feeder/conveyor axis are parallel
- the valve opens completely when the screw feeder/conveyor starts up

f) Is the oulet spout free of encrustations which reduce the cross-section?

g) Is the vent of the weigh hopper into which the screw feeder/conveyor unloads material sized correctly, clean and does it work properly?

2) Checking the silo

a) What is the inclination angle of the cone?

b) How much material does it contain?

c) Is the silo provided with a bridge-breaker baffle plate?

d) Is the silo provided with an aeration/fluidisation system?
How many nozzles or pads are present on the cone, how are they arranged and what is their distance from the outlet flange of the silo?
What is its operating pressure and operating cycle?

e) Is the silo provided with a vibrator or a hammering device?
What is its operating cycle?

3) Checking the electrical part

a) Are voltage variations possible due to simultaneous start-up of various pieces of equipment?

b) Is the plant equipped with a power generator?

c) The thermal protection of the electric motor inside the panel has delayed action. Is its adjustment in line with the data on the motor rating plate?

d) Check the power input of the motor without load, at breakaway current and when the screw feeder/conveyor is operating at full speed!!

4) Checking the screw feeder/conveyor

a) Has the screw feeder/conveyor been assembled correctly?
Are all the inspection hatches in the bottom position?

b) Has the screw feeder/conveyor been fixed correctly?

c) Does the screw sag? Have the parameters of alignment been checked?

5) Checking the product

a) Product description?

b) Density? (kg/dm^3)

c) Particle size? (µm/mm)

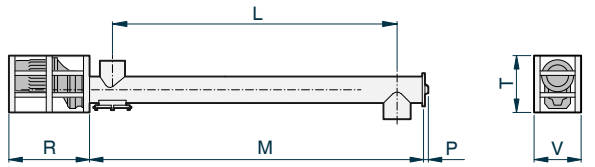
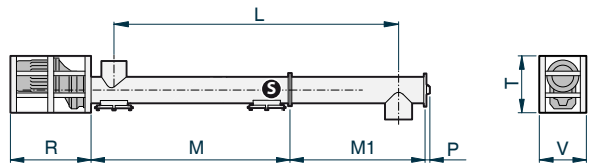
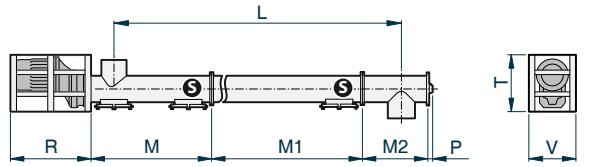
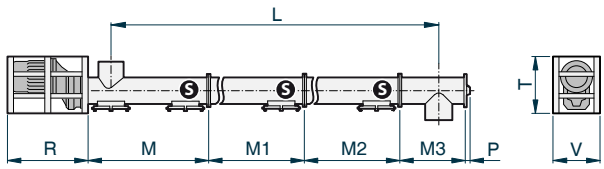
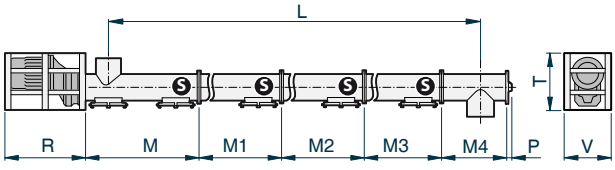
d) Moisture? (%)

e) Flowability?

f) Compressibility?

g) Abrasiveness?

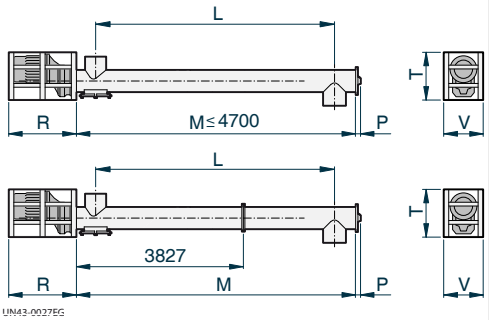
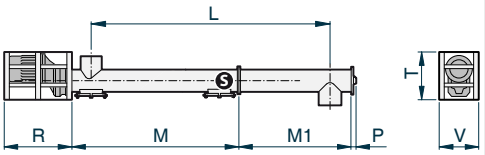
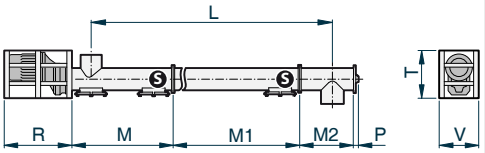
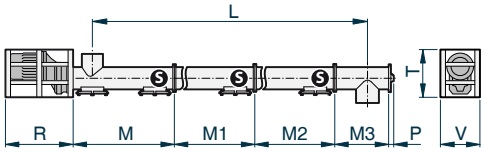
10.1 Composition

ES 114 - 139	L	P	M	M_1	M_2	M_3	M_4	R max	V max	T max
 UN43-0036EG	500 - 3,300 (3,040-3,140)	56	760 - 3,560 (3,300-3,140)	-	-	-	-	800	500	600
 UN43-0035EG	(3,050-3,150) 3,310 - 6,300 (3,040-3,140)	56	3,234	336 - 3,326	-	-	-	800	500	600
 UN43-0034EG	(6,050-6,150) 6,310 - 9,300 (9,040-9,140)	56	3,234	502 - 3,492	2,834	-	-	800	500	600
 UN43-0033EG	(9,050-9,150) 9,310 - 12,300 (12,040-12,140)	56	3,234	502 - 3,492	3,000	2,834	-	800	500	600
 UN43-0032EG	(12,050-12,150) 12,310 - 15,300 (15,040-15,140)	56	3,234	502 - 3,492	3,000	3,000	2,834	800	500	600

- The data between brackets refer to ESV screw feeders and depend on the diameter and angle of installation.

S = Intermediate bearings position

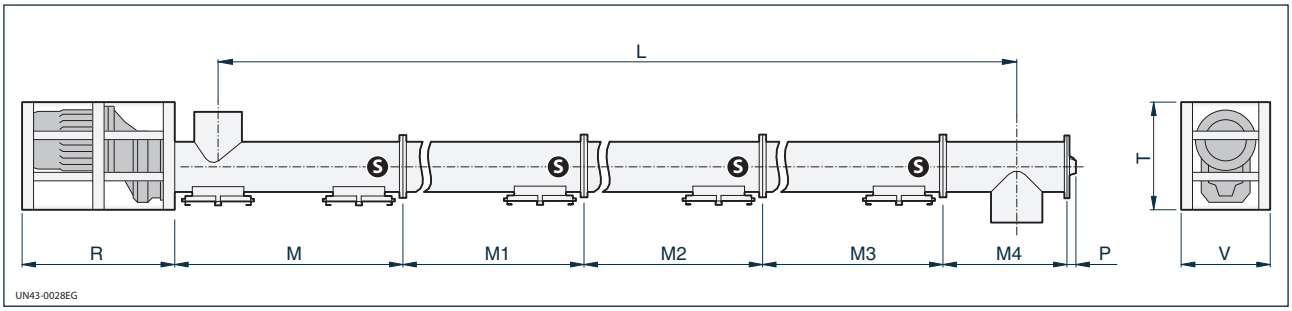
10.1 Composition

ES 168 - 193 - 219 - 273	L	ø	P	M	M_1	M_2	M_3	R max	V max	T max
 UN43-0027EG	500 - 4,500 (4,260-4,420)	168	40	800 - 4,800	-	-	-	950	500	600
		193		820 - 4,820						
		219		840 - 4,840						
		273		900 - 4,900						
 UN43-0026EG	(4,270-4,430) 4,510 - 7,500 (7,260-7,420)	168	40	3,827	983 - 3,973	-	-	950	500	600
		193			1,003 - 3,993					
		219			1,023 - 4,013					
		273			1,083 - 4,073					
 UN43-0025EG	(7,270-7,430) 7,510 - 11,500 (11,260-11,420)	168	40	3,827	556 - 4,096	3,427 [a] * - 3,877 [b]	-	950	500	600
		193			576 - 4,116	3,427 [a] * - 3,877 [b]				
		219			596 - 4,136	3,427 [a] ** - 3,877 [b]				
		273			656 - 4,196	3,427 [a] ** - 3,877 [b]				
	* a) 7,510 mm < L < 11,000mm b) 11,010 mm < L < 11,500mm					** a) 7,510 mm < L < 10,900mm b) 10,910 mm < L < 11,500mm				
 UN43-0024EG	(11,270-11,430) 11,510 - 15,500 (15,260-15,420)	168	40	3,827	964 - 4,054	3,592 [c] ¤ - 4,042 [d]	3,427 [e] ¤ - 3,877 [f]	950	500	600
		193			984 - 4,074	3,592 [c] ¤ - 4,042 [d]	3,427 [e] ¤ - 3,877 [f]			
		219			1,004 - 4,094	3,592 [c] ¤¤ - 4,042 [d]	3,427 [e] ¤¤ - 3,877 [f]			
		273			1,064 - 4,154	3,592 [c] ¤¤ - 4,042 [d]	3,427 [e] ¤¤ - 3,877 [f]			
	¤ c) 11,510 mm < L < 14,600mm d) 14,610 mm < L < 15,500mm e) 11,510 mm < L < 14,600mm f) 14,610 mm < L < 15,500mm					¤¤ c) 11,510 mm < L < 14,500mm d) 14,510 mm < L < 15,500mm e) 11,510 mm < L < 14,500mm f) 14,510 mm < L < 15,500mm				

- The data between brackets refer to ESV screw feeders and depend on the diameter and angle of installation.

S = Intermediate bearings position

10.1 Composition

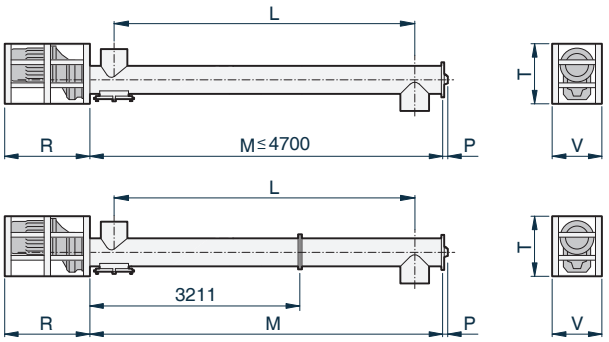
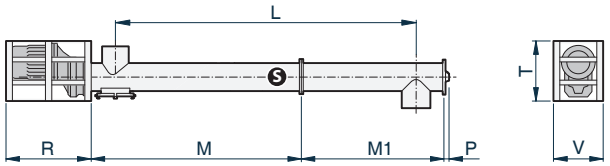
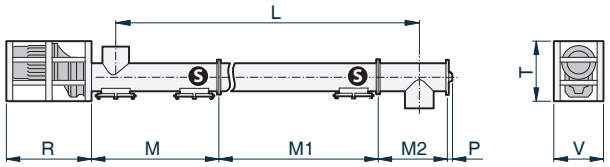


L	Ø conv.	P	M	M_1	M_2	M_3	M_4	R max	V max	T max
(15,270-15,430) 15,510 - 18,000 (17,760-17,920)	168	40	3,827	1,372 - 3,862	3,592	3,592	3,427	950	500	600
	193			1,392 - 3,882	3,592	3,592	3,427			
	219			1,412 - 3,902	3,592	3,592	3,427			
	273			1,472 - 3,962	3,592	3,592	3,427			

- The data between brackets refer to ESV screw feeders and depend on the diameter and angle of installation.

S = Intermediate bearings position

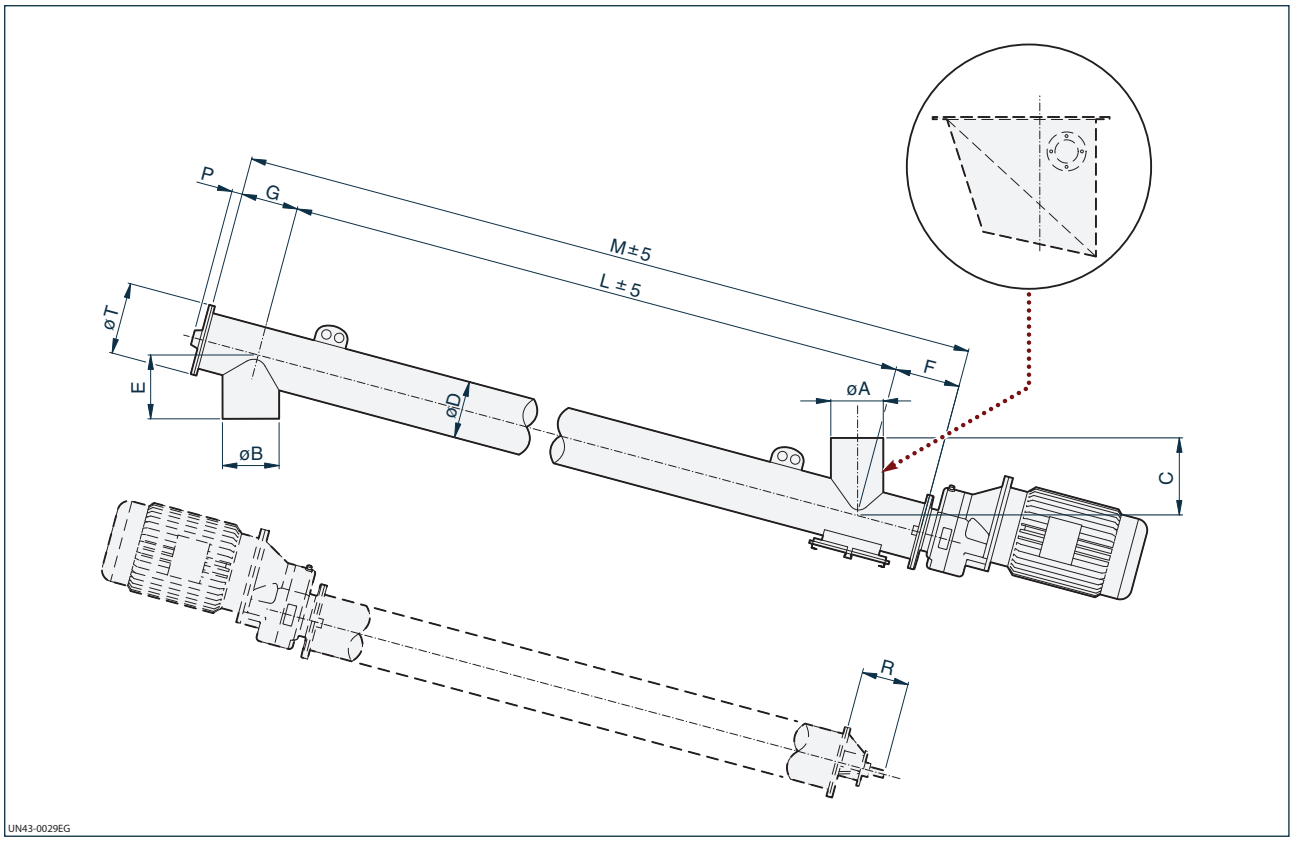
10.1 Composition

ES 323	L	P	M	M_1	M_2	R max	V max	T max
 UN43-0037EG	500 - 5,000	40	940 - 5,440	-	-	950	500	600
 UN43-0038EG	5,010 - 8,500	40	4,610	840 - 4,330	-	950	500	600
 UN43-0039EG	8,510 - 13,000	40	4,610	1,129 - 4,619	3,211[a] - 4,211[b]	950	500	600
	a) 8,510 mm ≤L ≤ 9,500 mm. b) 9,510 mm ≤L ≤ 13,000 mm.							

S = Intermediate bearings position

10.2 Dimensions

Overall dimensions



Ø D	114	139	168	193	219	273	323
P	56	56	40	40	40	40	40
Ø A	1)						
G	120	120	140	150	160	180	220
Ø B	1)						
F	140	140 (300-400)	160 (300-400)	170 (300-400)	180 (300-400)	220 (300-400)	220
L	2)						
Ø T	190	190	250	250	275	330	405
E	1)						
C	1)						
M	L + F + G						
R	131	131	173	173	173	173	173

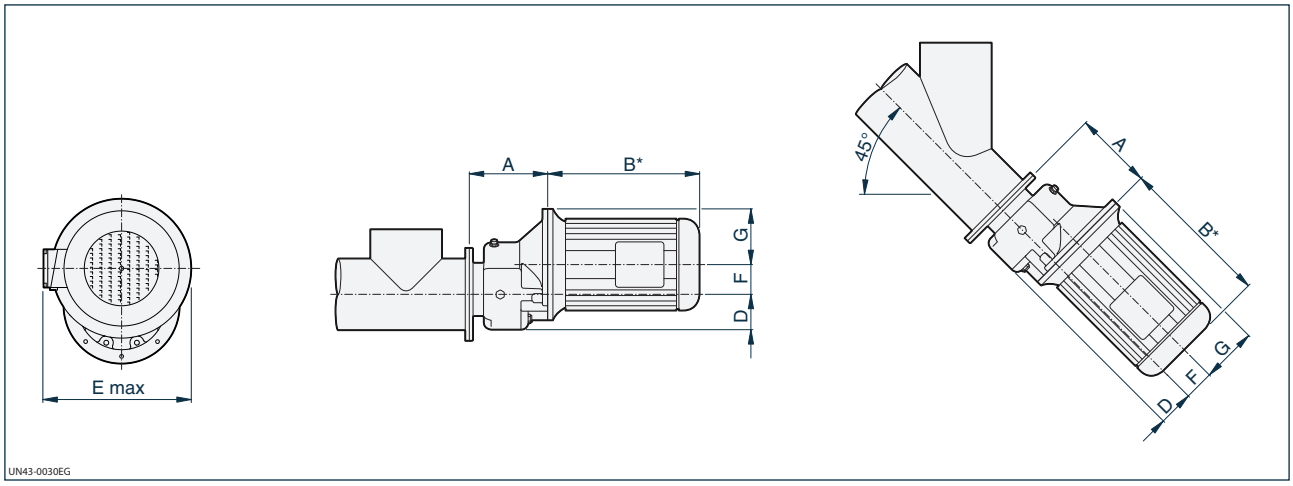
- The data between brackets refer to ESV screw feeders and depend on the diameter and angle of installation.

1) = See technical catalogue

2) = Rounded up to 10 mm

10.2 Dimensions

Drive unit overall dimensions



- On request, the screw feeder/conveyor is supplied with the drive unit on the outlet side (at the top). In such cases an XTB type drive unit is mounted at the opposite (inlet) end.

kW	A	B*	D	E	F	G
M 41						
1.1	157.5	260	80	255	63	100
1.5	157.5	275	80	255	63	100
2.2	167.5	320	80	305	63	125
3.0	167.5	320	80	305	63	125
4.0	167.5	340	80	315	63	125
M 43						
1.5	181	275	95	255	80	100
2.2	191	320	95	305	80	125
3.0	191	320	95	305	80	125
4.0	191	340	95	315	80	125
5.5	211	395	95	360	80	150
7.5	211	435	95	360	80	150
9.2	211	435	95	360	80	150
M 45						
3.0	210	320	120	305	100	125
4.0	210	340	120	315	100	125
5.5	230	395	120	360	100	150
7.5	230	435	120	360	100	150
9.2	230	435	120	360	100	150
11.0	260	490	120	430	100	175
15.0	260	535	120	430	100	175

kW	A	B*	D	E	F	G
M 47						
5.5	230	395	145	360	125	150
7.5	230	435	145	360	125	150
9.2	230	435	145	360	125	150
11.0	260	490	145	430	125	175
15.0	260	535	145	430	125	175
18.5	275	560	145	460	125	175
22	275	600	145	460	125	175
M 49						
11.0	302	490	185	440	160	175
15.0	302	535	185	440	160	175
18.5	302	560	185	470	160	175
22	302	600	185	470	160	175
30	302	665	185	510	160	200

NOTE: The power data (kW) refer to 4-pole motors according to IEC standards.

* With different brands ± 50 mm tolerances are possible.

10.3 Weights

Table of maximum weights of screw feeders/conveyors in one piece [kg]

Ø	Length [m]								Packaging
	Bare shaft				With drive unit				
	2	4	6	8	2	4	6	8	
114	70	115	160	210	120	170	205	275	25
139	90	155	210	270	170	225	285	345	25
168	125	200	260	330	195	265	335	450	30
193	135	210	280	355	210	280	410	480	30
219	150	230	320	390	280	360	455	535	35
273	190	280	380	460	310	420	540	650	40
323	210	320	430	550	360	485	680	810	40

Dimensions in mm

Table of maximum weights of modular screw conveyor [kg]

Ø	Bare shaft	With drive unit	Intermediate section	Packaging
	First or last section	First or last section		
114	90	170	80	25
139	120	210	100	25
168	165	320	140	30
193	180	330	155	30
219	200	380	170	35
273	235	494	200	40
323	320	680	280	40

Dimensions in mm

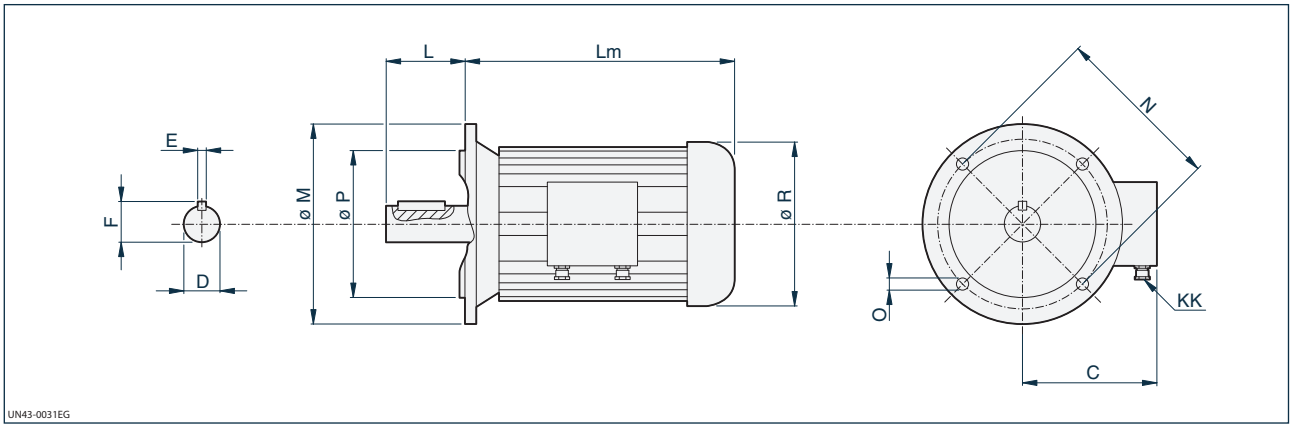
- The overall weight of the equipment is given by the sum of the first section plus the last, plus all the intermediate sections.
- If the screw feeder/conveyor is shipped in a crate or cage, add the weight of the packaging to the total weight of the screw feeder/conveyor.

10.3 Weights

Weight of drive units

Type	Output		Input																	
	ES	Ø Screw	80		90		100		112	132			160		180		200	225		
			0.55	0.75	1.1	1.5	2.2	3	4	5.5	7.5	9.2	11	15	18.5	22	30	37		
			[kg]																	
M 41	ES0	114	15.7		15.7		17.7			/			/		/		/	/		
		139																		
M 43	ES0	114	/		23		25			/			/		/		/	/		
		139																		
	ES1	168	24		24		26			29		/								
	ES2	193																		
	ES3	219	/		26.5		28.5			31										
M 45	ES1	168	/		/		36.5			40			44.5		/		/	/		
	ES2	193																		
	ES3	219					38.5			42.5			46.5							
	ES4	273					40.5			45.5			49.5							
	ES5	323					50			54			58							
M 47	ES1	168	/		/		/		/	54			59		59		/	/		
	ES2	193																		
	ES3	219								56			61		61					
	ES4	273								60			65		65					
	ES5	323								67.5			72.5		72.5					
M 49	ES3	219	/		/		/		/	/			101		101		108	/		
	ES4	273											103		103		110			
	ES5	323											112		112		119			

10.4 Electric motors

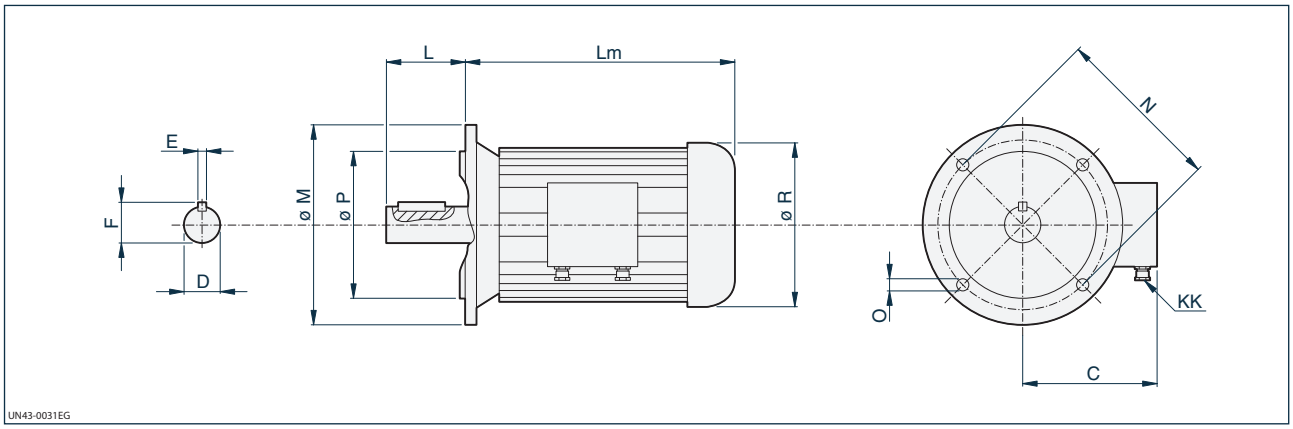


kW	Size	Code	C	D	E	F	L	Lm*	M	N	O	Bores nr	P	Q	R	[kg]	KK
			[mm]										[mm]				
1.1	90 S	MT0900S04145	155	24	8	27	50	248	200	165	12.5	4	130	3.5	180	25	M25x1.5
1.5	90 L	MT0900L04145	155	24	8	27	50	273	200	165	12.5	4	130	3.5	180	26	M25x1.5
2.2	100 LR	MT100LR04145	180	28	8	31	60	306	250	215	15	4	180	4	218	34	M25x1.5
3.0	100 LH	MT100LH04145	180	28	8	31	60	306	250	215	15	4	180	4	218	35	M25x1.5
4.0	112 M	MT1120M04145	190	28	8	31	60	334	250	215	15	4	180	4	218	44	M25x1.5
3.0 - 1.5	112 M	MT1120M48A45	190	28	8	31	60	334	250	215	15	4	180	4	218	47	M25x1.5
5.5	132 S	MT1320S04145	210	38	10	41	80	371	300	265	15	4	230	4	258	65	M25x1.5
3.3 - 2.2	132S	MT1320S48A45	210	38	10	41	80	371	300	265	15	4	230	4	258	65	M25x1.5
7.5	132 M	MT1320M04145	210	38	10	41	80	409	300	265	15	4	230	4	258	79	M25x1.5
4.4 - 3	132 M	MT1320M48A45	210	38	10	41	80	409	300	265	15	4	230	4	258	79	M25x1.5
9.2	132 ML	MT1320L04145	210	38	10	41	80	409	300	265	15	4	230	4	258	87	M25x1.5
11.0	160 M	MT1600M04245	255	42	12	45	110	485	350	300	19	4	250	5	300	118	M32x1.5
6.0 - 4.5	160 MA	MT160MA48A45	255	42	12	45	110	485	350	300	19	4	250	5	300	118	M32x1.5
8.5 - 6.0	160 MB	MT160MB48A45	255	42	12	45	110	485	350	300	19	4	250	5	300	118	M32x1.5
15.0	160 L	MT1600L04245	255	42	12	45	110	529	350	300	19	4	250	5	300	147	M32x1.5
10.0 - 7.5	160 L	MT1600L48A45	255	42	12	45	110	529	350	300	19	4	250	5	300	147	M32x1.5
18.5	180 M	MT1800M04245	285	48	14	51.5	110	543	350	300	19	4	250	5	340	173	M32x1.5
22	180 L	MT1800L04245	285	48	14	51.5	110	585	350	300	19	4	250	5	340	220	M32x1.5
15.0 - 10.0	180 L	MT1800L48A45	285	48	14	51.5	110	585	350	300	19	4	250	5	340	220	M32x1.5

- Cable glands are made of plastic.
  Junction box is on the LH side of the motor (seen from behind fan guard).

* With different brands ± 50 mm tolerances are possible.

10.4 Electric motors IE2 IEC 60034 - 30



kW	Size	Code	C	D	E	F	L	Lm*	M	N	O	Bores nr	P	Q	R	[kg]	KK
			[mm]										[mm]				
1.1	90 S	MT0900S041452	155	24	8	27	50	280	200	165	12.5	4	130	3.5	195	25	M25x1.5
1.5	90 L	MT0900L041452	155	24	8	27	50	295	200	165	12.5	4	130	3.5	195	26	M25x1.5
2.2	100 LR	MT100LR041452	180	28	8	31	60	340	250	215	15	4	180	4	218	34	M25x1.5
3.0	100 LH	MT100LH041452	180	28	8	31	60	340	250	215	15	4	180	4	218	35	M25x1.5
4.0	112 M	MT1120M041452	190	28	8	31	60	350	250	215	15	4	180	4	240	44	M32x1.5
5.5	132 S	MT1320S041452	210	38	10	41	80	390	300	265	15	4	230	4	275	65	M32x1.5
7.5	132 M	MT1320M041452	210	38	10	41	80	430	300	265	15	4	230	4	275	79	M32x1.5
9.2	132 ML	MT1320L041452	210	38	10	41	80	450	300	265	15	4	230	4	275	87	M32x1.5
11.0	160 M	MT1600M042452	255	42	12	45	110	560	350	300	19	4	250	5	335	118	M32x1.5
15.0	160 L	MT1600L042452	255	42	12	45	110	590	350	300	19	4	250	5	335	147	M32x1.5
18.5	180 M	MT1800M042452	285	48	14	51.5	110	600	350	300	19	4	250	5	380	173	M32x1.5
22.0	180 L	MT1800L042452	285	48	14	51.5	110	640	350	300	19	4	250	5	380	220	M32x1.5
30.0	200 L	MT2000L042452	310	55	16	59	110	710	400	350	19	4	300	5	420	255	M50x1.5

- Cable glands are made of plastic.
  Junction box is on the LH side of the motor (seen from behind fan guard).

* With different brands ± 50 mm tolerances are possible.

A1 Nuts and bolts tightening torques Table

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

Oil filler, drainage, venting, and level plugs in gear reducers	Tightening torque 16 ÷ 18 [Nm]
M16 locking screw for inspection hatches	Tightening torque 25 ÷ 30 [Nm]

A2 Lubricants and sealants Table

Lubricant and anti-rust paste for electric motor shaft and gear reducer bushing	KLUBER-PASTE 46 MR 401
	FLENDER MONTAGEPASTE
	NILS WEGA 3

Sealant for electric motor flange and gear reducer	LOCTITE 510
	LOXEAL 59-10

Lubricant anti-rust and anti-seizure grease for splined shafts and bushes	ALPEC 380	VISCOL S.p.A.
	EP graphite grease	
	NILS MARS	

Flanged end bearings lubricant	
Grease containing mineral oil thickened with lithium soap GREASE L2 type. Satisfies the classification requisites DIN 51502 K 2 K - 20	
Grease	**Brand**
GR - MU2	AGIP
ARALUP HL2	ARAL
BP - ENGERGREASE L 2	BP
CALYPSOLH 433	CALYPSOL
ANDOK B	ESSO
MOBILUX2	MOBIL OIL
MOBIPLEX 47	
TUCAN EP 2	NILS
ATOMIC RH	
ALVANIA2	SHELL
GLISSANDO FL20	TEXACO
MULTIFAX 2	

A3 Drive unit lubricants Table

Quantity of oil for each filling	
Gear reduction unit	Quantity [l]
M41	0.4
M43	0.9
M45	1.8
M47	3.0
M49	6.0

The Manufacturer uses mineral oil which has viscosity grade 220 in accordance with ISO VG.

Gear reducer oil in accordance with: ISO 12925/1 - DIN 51517/3 CLP 220	
Mineral oil	**Brand**
BLASIA 220	AGIP
DEGOL BG220	ARAL
ENERGOL GR - XP220	BP
NL GEAR COMPOUND 220	CHEVRON
SPARTAN EP 220	ESSO
REDUCTOR CLP 220 (*)	GAZPROMNEFT
MOBILGEAR 630	MOBIL OIL
RIPRESS EP 220	NILS
OMALA 220	SHELL
MEROPA 220	TEXACO

(*) 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 2,000 hours of operation;
- change the oil subsequently after 10,000 hours or every 5 years.

Gear reducer synthetic oil in accordance with: ISO 12925/1 - DIN 51517/3 CLP PG 220	
Synthetic oil	**Brand**
BLASIA S220	AGIP
DEGOL GS220	ARAL
ENERSYN HTX220	BP - MACH
SYNTHERMA P20	ELF
GLICOLUBE 220	ESSO
KLÜBERSYNTH GH 6-220	KLÜBER
SHC 630	MOBIL
RIPRESS SYNT 220	NILS
TIVELA OIL SC220	SHELL
PINNACLE E P 220	TEXACO

The lubricants brands are in alphabetic order without any reference to the product 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 Repainting

Important

Paint the electric motors or the gear reducer according to the indications given in the specific instruction Manuals provided by the motor and gear reducer manufacturers; otherwise the warranty will be invalid.

We recommend painting the screw feeder/conveyor after it is completely assembled before installation.

Important

Before repainting the equipment concerned, “mask” all the safety signs applied on the screw feeder/conveyor.
When the painting operation is complete, uncover the safety signs ensuring that they are all present as indicated in the “Safety signs and information” paragraph.
If even only one of these signs is partially covered, contact the Manufacturer for new signs and apply them in their original position (see “Safety signs and information”).

- Repainting painted surfaces with powder primer
If a finishing coat of 2K Epoxy (bicomponent), 2K Epoxy-vinyl (bicomponent) and 2K Polyurethane (bicomponent) paint is to be applied, it is enough to just remove the dirt that may have accumulated during shipping and storage.
Other types of finishing products can be applied, but it will be necessary to wipe the surface to be repainted with a matting Scotch Brite cloth.
After this operation, wipe the surface with a clean cotton cloth and ethyl alcohol or nitro solvent.
Then proceed with painting the surface of the equipment concerned with the selected finishing coat.

- Repainting painted surfaces with finishing powder coat
To obtain perfect adherence of the liquid paint on the existing powder paint, follow the operations described below.
- Wipe the screw feeder/conveyor with a cloth soaked in “anti-silicon solvent” defined as “solvent naphtha”.
- Wipe with a Scotch Brite sponge (3M or similar) and clean with nitro solvent.
- Dry the surface with a cloth.
- Repaint with liquid paint.

- Repainting painted surfaces with high-solid liquid paint
Repainting to be done on drive units, electric motors and end bearings.
To obtain perfect adherence of the liquid paint on the existing high-solid synthetic enamel, follow the operations described below.
- Degrease the surfaces with a cloth slightly moist with thinner.
- Repaint with high-solid synthetic enamel.
- To repaint with another type of paint, it is advisable to apply a base epoxy primer coat.

A5 Declaration of Incorporation

The manufacturer:

WAMGROUP S.p.A.

located in

Strada degli Schiocchi, 12 - I-41100 Modena (Mo) - Italy

under its own responsibility declares that:

ES (ES, ESV)

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

comply with the RES Directive 2006/42/EC
of the European Parliament and the Council of 17 May 2006 on machinery

1.1.1. - Definitions
1.1.2. - Principles of safety integration
1.1.3. - Materials and products
1.1.5. - Design of machinery to facilitate its handling
1.3.1. - Risk of loss of stability
1.3.2. - Risk of break-up during operation
1.3.3. - Risks due to falling or ejected objects
1.3.4. - Risks due to surfaces, edges or angles
1.3.7. - Risks related to moving parts
1.3.8. - Choice of protection against risks arising from moving parts
1.3.9. - Risks of uncontrolled movements
1.5.4. - Errors of fitting
1.5.5. - Extreme temperatures
1.5.6. - Fire
1.5.7. - Explosion
1.5.8. - Noise
1.5.9. - Vibrations
1.5.13. - Emissions of hazardous materials and substances
1.5.15. - Risk of slipping, tripping or falling
1.6.1. - Machinery maintenance
1.6.2. - Access to operating positions and servicing points
1.6.4. - Operator intervention
1.6.5. - Cleaning of internal parts
1.7.1. - Information and warnings on the machinery
1.7.2. - Warning of residual risks
1.7.4. - Instructions

and, where applicable, the requirements imposed by the following EC Directives
Directive 2004/108/EC of the European Parliament and the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility.
Directive 2006/95/EC of the European Parliament and the Council of 12 December 2006 on the approximation of the laws of the Member States relating to electrical equipment designed for use within certain voltage limits.

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:
UNI EN ISO 12100:2010

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 - I-41100 Modena (Mo) - Italy, 21/11/2014

The person authorized to provide the technical documentation:
Vainer Marchesini

The legal representative:
Vainer Marchesini