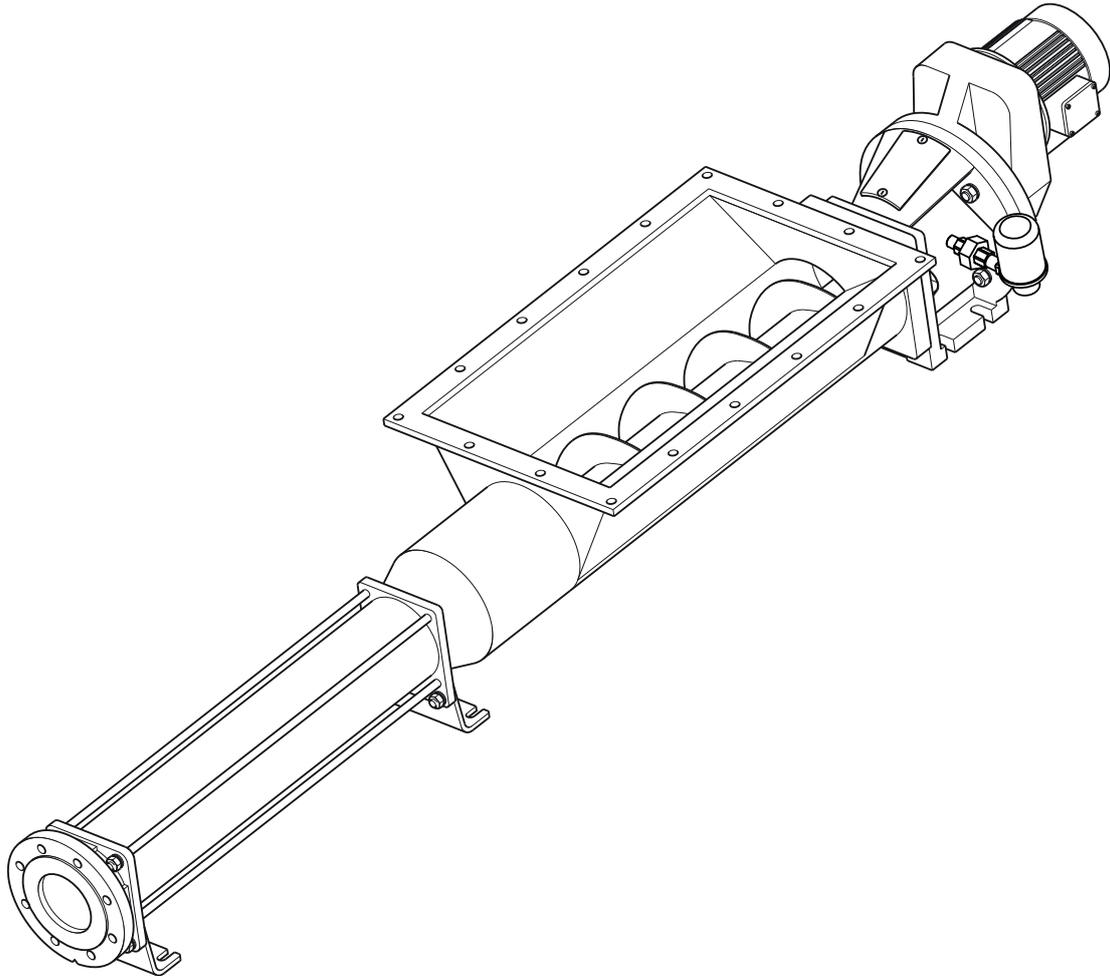


---

## PC Cake Pump

---

1339-00



310190010001-01 08.2023

en

---

## Installation, Operating and Maintenance Instructions

---

**EN: Declaration of Conformity**  
**DE: Konformitätserklärung**  
**FR: Déclaration de Conformité**  
**ES: Declaración de Conformidad**  
**IT: Dichiarazione di conformità**  
**NL: Overeenkomstigheidsverklaring**  
**SV: Försäkran om överensstämmelse**  
**NO: Samsvarserklæring**  
**FI: Vaatimustenmukaisuusvakuutus**  
**RU: Заявление о соответствии**

**EN: Manufacturer / Address:**  
**DE: Hersteller / Adresse:**  
**FR: Fabricant / Adresses:**  
**ES: Fabricante / Dirección:**  
**IT: Costruttore / Indirizzo:**  
**NL: Fabrikant / Adres:**  
**SV: Tillverkare / Adress:**  
**NO: Produsent / Adresse:**  
**FI: Valmistaja / Osoite:**  
**RU: Изготовитель / Адрес**

Sulzer Pump Solutions Ireland Ltd. / Clonard Road, Wexford, Ireland.

**EN: Name and address of the person authorised to compile the technical file to the authorities on request:**  
**DE: Name und Adresse der Person, die berechtigt ist, das technische Datenblatt den Behörden auf Anfrage zusammenzustellen:**  
**FR: Nom et adresse de la personne autorisée pour générer le fichier technique auprès des autorités sur demande:**  
**ES: Nombre y dirección de la persona autorizada para compilar a pedido el archivo técnico destinado a las autoridades:**  
**IT: Il nome e l'indirizzo della persona autorizzata a compilare la documentazione tecnica per le autorità dietro richiesta:**  
**NL: Naam en adres van de persoon die geautoriseerd is voor het op verzoek samenstellen van het technisch bestand:**  
**SV: Namn och adress på den person som är auktoriserad att på begäran utarbeta den tekniska dokumentsamlingen till myndighe terna:**  
**NO: Navn og adresse på den personen som har tillatelse til å sette sammen den tekniske filen til myndighetene ved forespørsel:**  
**FI: Viranomaisten vaatiessa teknisten tietojen lomaketta lomakkeen valtuutetun laatijan nimi ja osoite:**  
**RU: Ф.И.О и адрес лица, уполномоченного составлять техническую документацию по требованию органов власти:**

James Wall,  
 Head of Product Safety and Regulations Flow Equipment,  
 Sulzer Management AG,  
 Neuwiesenstrasse 15,  
 8401 Winterthur,  
 Switzerland.

**EN: Declare under our sole responsibility that the products:**  
**DE: Erklärt eigenverantwortlich, daß die Produkte:**  
**FR: Déclarons sous notre seule responsabilité que les produits:**  
**ES: Declaramos bajo nuestra exclusiva responsabilidad que los productos:**  
**IT: Dichiariamo sotto la nostra esclusiva responsabilità che i prodotti:**  
**NL: Verklaren geheel onder eigen verantwoordelijkheid dat de produkten:**  
**SV: Försäkrar under eget ansvar att produkterna:**  
**NO: Erklærer på eget ansvar, at følgende produkter:**  
**FI: Vakuutamme yksinomaan omalla vastuullamme, että seuraavat tuotteet:**  
**RU: Заявляем со всей полнотой ответственности, что изделия:**

**EN: PC Cake Pump**  
**DE: PC Trichterpumpe**  
**FR: Pompe à cake PC**  
**ES: Bomba PC de alimentación forzada y fangos deshidratados**  
**IT: PC pompa monovite con rompiponte**

**NL: PC Cakepump**  
**SV: PC trågpump**  
**NO: PC tørrslampumpe**  
**FI: Tiivistetyn lietteen pumppu**  
**RU: Винтовой кековый насос**

**EN:** To which this declaration relates are in conformity with the following standards or other normative documents  
**DE:** Auf die sich diese Erklärung bezieht, den folgenden und/oder anderen normativen Dokumenten entsprechen  
**FR:** Auxquels se réfère cette déclaration sont conformes aux normes ou à d'autres documents normatifs  
**ES:** Objeto de esta declaración, están conformes con las siguientes normas u otros documentos normativos  
**IT:** Ai quali questa dichiarazione si riferisce sono conformi alla seguente norma o ad altri documenti normativi  
**NL:** Waarop deze verklaring betrekking heeft, zijn in overeenstemming met de volgende normen of andere normatieve documenten  
**SV:** Som omfattas av denna försäkran är i överensstämmelse med följande standarder eller andra regelgivande dokument  
**NO:** Som dekkes av denne erklæringen, er i samsvar med følgende standarder eller andre normative dokumenter  
**FI:** Joihin tämä vakuutus liittyy, ovat seuraavien standardien sekä muiden sääntöamäärävien asiakirjojen mukaisia  
**RU:** К которым применимо данное заявление, соответствуют следующим стандартам или нормативным документам.

- EN:** As defined by Machinery Directive 2006/42/EC, Low Voltage Directive 2014/35/EU, Outdoor Noise Directive 2000/14/EC amended by 2005/88/EC, RoHS 2011/65/EU and (EU) 2017/2102, WEEE 2012/19/EU.
- DE:** Wie definiert in Maschinenrichtlinie 2006/42/EG, Niederspannungsrichtlinie 2014/35/EU, Richtlinie 2000/14/EG über Geräuschemissionen geändert durch Richtlinie 2005/88/EG, RoHS 2011/65/EU und (EU) 2017/2102, WEEE 2012/19/EU.
- FR:** Comme définie par directive Machines 2006/42/CE, directive Basse tension 2014/35/UE, Directive sur le bruit extérieur 2000/14/CE, amendée par la directive 2005/88/CE, RoHS 2011/65/UE et (UE) 2017/2102, DEEE 2012/19/UE.
- ES:** Como se establece en Directiva sobre maquinaria 2006/42/EC, Directiva sobre bajo voltaje 2014/35/UE, Directiva sobre el ruido 2000/CE enmendada por 2005/88/CE, RoHS 2011/65/UE y (UE) 2017/2102, RAEE 2012/19/UE.
- IT:** Come definito in Direttiva Macchina 2006/42/CE, Direttiva Bassa tensione 2014/35/UE, Direttiva sull'emissione acustica ambientale 2000/14/CE modificata dalla direttiva 2005/88/CE, RoHS 2011/65/UE e (UE) 2017/2102, RAEE 2012/19/UE.
- NL:** Zoals gedefinieerd door de machinerichtlijn 2006/42/EC, laagspanningsrichtlijn 2014/35/EU, Geluidsemisierichtlijn 2000/14/EG gewijzigd door 2005/88/EG, RoHS 2011/65/EU en (EU) 2017/2102, AEEA 2012/19/EU.
- SV:** Såsom definierats av Maskindirektiv 2006/42/EG, Direktiv om lågspänning 2014/35/EU, Utomhusbullerdirektivet 2000/14/EC ändrat av 2005/88/EC, RoHS 2011/65/EU och (EU) 2017/2102, WEEE 2012/19/EU.
- NO:** I henhold til maskindirektiv 2006/42/EF, lavspennings direktivet 2014/35/EU, Utendørsstøydirektiv 2000/14/EU endret av 2005/2005/88/EU, RoHS 2011/65/EU og (EU) 2017/2102, WEEE 2012/19/EU.
- FI:** Määritetty näissä normeissa: Konedirektiivi 2006/42/EY, Matalajännittdirektiivi 2014/35/EU, Ulkona käytettävien laitteiden melupäästöjä koskeva direktiivi 2000/14/EY, jota on muutettu direktiivillä 2005/88/EY, RoHS 2011/65/EU ja (EU) 2017/2102, WEEE 2012/19/EU.
- RU:** В соответствии с директивой по механическому оборудованию 2006/42/ЕС, директивой по низковольтным устройствам 2014/35/ЕU, Директива по внешнему шуму 2000/14/ЕС, дополненная 2005/88/ЕС, RoHS 2011/65/ЕU и (ЕU) 2017/2102, WEEE 2012/19/ЕU.

EN ISO 12100:2010, EN 809:1998 + A1:2009 + AC:2010



Brendan Sinnott  
General Manager,  
Sulzer Pump Solutions Ireland Ltd.  
25-07-2023

## UKCA Declaration of Conformity

**Manufacturer:** Sulzer Pump Solutions Ireland Ltd.

**Address:** Clonard Road, Wexford, Ireland

**Declare under our sole responsibility that the product:**

PC Cake Pump

**To which this declaration relates is in conformity with the following standards or other normative documents as defined by:**

Supply of Machinery (Safety) Regulations 2008, S.I. 2008 No 1597

Electrical Equipment (Safety) Regulations 2016, S.I. 2016 No 1101

Noise Emission in the Environment by Equipment for use Outdoors Regulations 2001, S.I. 2001 No 3957

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012, S.I. 2012 No 3133

The Waste Electrical and Electronic Equipment (Amendment) (No. 2) Regulations 2018, S.I. 2018 No 1214

BS EN ISO 12100:2010, BS EN 809:1998 + A1:2009 + AC:2010



Brendan Sinnott  
General Manager,  
**Sulzer Pump Solutions Ireland Ltd.**  
04-02-2022

## PC Cake Pump

### Table of contents

<b>1</b>	<b>ATEX warning statements .....</b>	<b>7</b>
1.1	Pumps and pump units .....	7
<b>2.</b>	<b>Installation .....</b>	<b>8</b>
<b>2.1</b>	<b>Installation and safety recommendations .....</b>	<b>8</b>
<b>2.1.1</b>	<b>General .....</b>	<b>8</b>
<b>2.1.2</b>	<b>System design &amp; installation .....</b>	<b>8</b>
<b>2.2</b>	<b>Handling .....</b>	<b>8</b>
<b>2.3</b>	<b>Storage and infrequent operation .....</b>	<b>9</b>
<b>2.3.1</b>	<b>Short term storage .....</b>	<b>9</b>
<b>2.3.2</b>	<b>Long term storage .....</b>	<b>9</b>
2.4	Electrical .....	9
2.5	Pressure relief valves and non-return valves .....	10
2.6	General safety .....	10
2.7	Duty conditions .....	10
<b>3</b>	<b>Start-up procedure .....</b>	<b>10</b>
3.1	Dry running .....	10
3.2	Gland packing .....	11
3.3	Mechanical seals - all pumps .....	11
3.4	Guards .....	11
3.5	Warning / Control device .....	11
3.6	Pump operating temperature .....	11
3.7	Noise levels .....	11
3.8	Lubrication .....	12
<b>3.9</b>	<b>Pump units .....</b>	<b>12</b>
<b>3.10</b>	<b>Cleaning prior to operation .....</b>	<b>12</b>
<b>3.11</b>	<b>Cake pumps .....</b>	<b>13</b>
<b>3.12</b>	<b>Explosive products/hazardous atmospheres .....</b>	<b>13</b>
<b>3.13</b>	<b>Access ports .....</b>	<b>13</b>
<b>3.14</b>	<b>Adjustable stators .....</b>	<b>13</b>
<b>3.15</b>	<b>Maintenance of wearing components .....</b>	<b>13</b>
<b>3.15.1</b>	<b>Rotor and stator .....</b>	<b>13</b>
<b>3.15.2</b>	<b>Drive shaft - packed gland .....</b>	<b>14</b>
<b>3.15.3</b>	<b>Coupling rod joints .....</b>	<b>14</b>
<b>3.15.4</b>	<b>Flexishaft drive pumps .....</b>	<b>14</b>
<b>3.16</b>	<b>Mechanical speed variators .....</b>	<b>14</b>

**4.0 Assembly and dismantling ..... 14**

**4.1 Use of items not approved or manufactured by Sulzer ..... 14**

**4.2 Disposal of worn components ..... 14**

**5 Pump coding ..... 15**

**6 Recommended lifting points ..... 16**

**7 Pump and wear part weights (kg) ..... 17**

**7.1 Standard auger ..... 17**

**7.2 Large auger ..... 17**

**8 Diagnostic chart ..... 18**

**9 Drawing reference numbers ..... 19**

9.1 All models ..... 19

9.2 All except W88, WA4, WB2, WC4 & WD1 ..... 20

9.3 WC4 only ..... 20

9.4 W88, W04, W22, W54 & WD1 only ..... 21

**10 Exploded view drawings ..... 22**

10.1 Standard bareshaft, all sizes except W74, W84, W88, WA2, WA4, WB1, WB2, WB4, WC1, WD1 ..... 22

10.2 Large auger bareshaft, all sizes except W74, W84, W88, WA2, WB4 ..... 23

10.3 Standard bareshaft WA2 only ..... 24

10.4 Standard close coupled ..... 25

10.5 Large auger close coupled ..... 26

10.6 W34 ..... 27

10.7 Standard bareshaft W74, W84, WA2, WB1 only ..... 28

10.8 Large auger bareshaft W74, W84, WA2 ..... 29

10.9 Standard bareshaft W88, WA4, WB2, WB4, WC1, WD1 only ..... 30

10.10 Joint detail W088, WA4, WB2, WB4, WC1, WD1 only ..... 31

10.11 Joint detail WC4 only ..... 32

10.12 Stator assembly W88, WA4, WB4 only ..... 33

10.13 Bridge breaker ..... 34

10.14 Mechanical seal ..... 35

**11 Tightening torques (Nm) ..... 36**

**12 Dismantling procedures ..... 37**

**13 Assembly procedures ..... 49**

**14 Dismantling procedures - bridge breaker ..... 62**

**15 Assembly procedures - bridge breaker ..... 65**

**16 Helical flight conveyor drive joint lubrication ..... 70**

**17 Recommended lubrication and service intervals ..... 71**

**18 Setting lengths for mechanical seals ..... 72**

## Symbols and notices used in this booklet:



Presence of dangerous voltage.



Non-compliance may result in personal injury.

### NOTE

*Important information for particular attention.*

## 1 ATEX warning statements

### 1.1 Pumps and pump units

1. Where a pump or pump unit is to be installed in a potentially explosive atmosphere ensure that this has been specified at the time of purchase and that the equipment has been supplied accordingly and displays an ATEX nameplate or is supplied with a certificate of conformity. If there is any doubt as to the suitability of the equipment please contact Sulzer before commencing with installation and commissioning.
2. Process liquids or fluids should be kept within specified temperature limits otherwise the surface of pump or system components may become an ignition source due to temperature rises. Where the process liquid temperature is less than 90 °C the maximum surface temperature will not exceed 90 °C provided the pump is installed, operated and maintained in accordance with this manual. Where the process fluid temperature exceeds 90 °C the maximum surface temperature will be equal to the maximum process fluid temperature.
3. Cavities that could allow the accumulation of explosive gases, such as under guards, should where possible, be designed out of the system. Where this is not possible they should be fully purged before any work is carried out on the pump or system.
4. Electrical installation and maintenance work should only be carried out by suitably qualified and competent persons and must be in accordance with relevant electrical regulations.
5. All electrical equipment, including control and safety devices, should be suitably rated for the environment into which they are installed.
6. Where there may be a risk of an accumulation of explosive gases or dust, non-sparking tools should be used for installation and maintenance.
7. In addition to causing permanent damage to the stator, dry-running of the pump could generate a rapid rise in the temperature of the stator tube or barrel, which could become an ignition source. It is therefore essential that a dry-run protection device be fitted. This must shut the pump down immediately should a dry-run situation occur. Details of suitable devices are available from Sulzer.
8. To minimise the risk of sparking or temperature rises due to mechanical or electrical overload the following control and safety devices should be fitted in addition to a dry-run protection system:
  - (a) a pressure relief system whereby the pump can not generate pressures in excess of the maximum rated pressure or an over-pressure device which should shut the pump down when the maximum discharge pressure is exceeded.
  - (b) a control system that will shut the pump down if the motor current or temperature exceed specified limits.
  - (c) an isolator switch that will disconnect all electrical supply to the motor and ancillary electrical equipment and be capable of being locked in the off position.
 All control and safety devices should be fitted, operated and maintained in accordance with the manufacturer's instructions. All valves on the system should be open when the pump is started, otherwise serious mechanical overload and failure may result.
9. It is important that the pump rotates in the direction indicated on the nameplate. This must be checked on installation and commissioning and after any maintenance has been carried out. Failure to observe this may lead to dry-running or mechanical or electrical overload.
10. When fitting drives, couplings, belts, pulleys and guards to a pump or pump unit it is essential that these are correctly fitted, aligned, and adjusted, in accordance with the manufacturer's instructions. Failure to do so may result in sparking due to unintended mechanical contact or temperature rises due to mechanical or electrical overload or slipping of drive belts. Regular inspection of these parts must be carried out to ensure they are in good condition and replacement of any suspect part must be carried out immediately.

11. Mechanical seals should be suitably rated for the environment. The seal and any associated equipment, such as a flushing system, must be installed, operated, and maintained in accordance with the manufacturer's instructions.
12. Where a packed gland seal is fitted this must be correctly fitted and adjusted. This type of seal relies on the process liquid to cool the shaft and packing rings, so a constant drip of liquid from the gland section is required. Where this is undesirable an alternative seal type should be fitted.
13. Failure to operate or maintain the pump and ancillary equipment in line with the manufacturer's instructions may lead to premature and potentially dangerous failure of components. Regular inspection, and where necessary replacement, of bearings and lubrication is essential.
14. The pump and its components have been designed to ensure safe operation within the guidelines covered by legislation. Accordingly, Sulzer have declared the machine safe to use for the duty specified as defined by the Declaration of Conformity that is issued with this instruction manual.
15. The use of replacement parts that are not manufactured by or approved by Sulzer may affect the safe operation of the pump and it may therefore become a safety hazard to both operators and other equipment. In these circumstances the Declaration provided will become invalid. The guarantee referenced on the Terms and Conditions of Sale will also be invalidated.

## 2. Installation

### 2.1 Installation and safety recommendations

In common with other items of process plant a pump must be installed correctly to ensure satisfactory and safe operation. The pump must also be maintained to a suitable standard. Following these recommendations will ensure that the safety of personnel and satisfactory operation of the pump is achieved.

#### 2.1.1 General

When handling harmful or objectionable materials, adequate ventilation must be provided in order to disperse dangerous concentrations of vapours. It is recommended that wherever possible, Sulzer pumps should be installed with provision for adequate lighting, thus ensuring that effective maintenance can be carried out in satisfactory conditions. With certain product materials, a hosing down facility with adequate draining will simplify maintenance and prolong the life of pump components.

Pumps operating on high temperature duties should be allowed to cool sufficiently before any maintenance is carried out.

#### 2.1.2 System design & installation

At the system design stage, consideration must be given to provision of filler plugs, and the installation of non-return and/or isolating valves. Pumps cannot be reliably used as non-return valves. Pumps in parallel and those with high static discharge head must be fitted with non-return valves.

The pumps must also be protected by suitable devices against over-pressure and dry-running.

##### i. Horizontal mounting

Sulzer PC pumps are normally installed in a horizontal position with baseplates mounted on a flat surface, grouted-in and bolted, thus ensuring firm fixing and a reduction in noise and vibration.

The unit should be checked after bolting down to ensure that the alignment of the pump to its prime mover is correct.

##### ii. Vertical mounting

If it is intended to mount any pump in a vertical position, please consult Sulzer prior to ordering. Where a mechanical seal is fitted it must be provided with a suitable quench system.

## 2.2 Handling



**During installation and maintenance, attention must be paid to the safe handling of all items.**

For safe handling of both bareshaft pumps and pump units (pump/gearbox/motor etc.) slings should be used. The position of the slings will depend upon the specific pump/unit construction and should be carried out by personnel with the relevant experience to ensure that the pump is not damaged and injury to personnel does not occur.

If eyebolts do exist then these should only be used for lifting the individual components for which they are supplied.

**ATTENTION!** *Observe the total weight of the Sulzer units and their attached components! (see nameplate for weight of base unit).*

The duplicate nameplate provided must always be located and visible close to where the pump is installed (e.g. at the terminal boxes / control panel where the pump cables are connected).

**NOTE:** *Lifting equipment must be used if the total unit weight and attached accessories exceeds local manual lifting safety regulations.*

The total weight of the unit and accessories must be observed when specifying the safe working load of any lifting equipment! The lifting equipment, e.g. crane and chains, must have adequate lifting capacity. The hoist must be adequately dimensioned for the total weight of the Sulzer units (including lifting chains or steel ropes, and all accessories which may be attached). The end user assumes sole responsibility that lifting equipment is certified, in good condition, and inspected regularly by a competent person at intervals in accordance with local regulations. Worn or damaged lifting equipment must not be used and must be properly disposed of. Lifting equipment must also comply with the local safety rules and regulations

**NOTE!** *The guidelines for the safe use of chains, ropes and shackles supplied by Sulzer are outlined in the Lifting Equipment manual provided with the items and must be fully adhered to.*

## 2.3 Storage and infrequent operation

The situation where a pump is used infrequently is also covered by the instructions in this section.

### 2.3.1 Short term storage

Where a pump has to be stored for six months or less then the following steps are advised:

1. Store pump inside wherever possible or if this is not feasible then provide protective covering. Do not allow moisture to collect around the pump.
2. Remove the drain plug if fitted. Any inspection plates fitted should also be removed to ensure that the suction housing can drain and dry completely.
3. Loosen the packed gland and inject sufficient grease into the stuffing box. Tighten the gland nut hand tight. If a water flush system is to be used do not grease. A small amount of light oil is recommended for these.
4. See manufacturers instructions for motor/gearbox/drive instructions for storage procedures.

### 2.3.2 Long term storage

If the pump is to be kept in storage for more than six months, then in addition to the above, the following procedures should be carried out regularly (every 2 - 3 weeks if possible):

1. If practicable rotate the pump at least three quarters of one revolution to avoid the rotor setting in the stator.
2. Note, however, that the pump is not to be rotated for more than two revolutions each time because damage could be caused to the rotor/stator elements.



**Before installing the pump after storage please ensure that all plugs and inspection plates are replaced and that excess grease/oil is removed from the stuffing box.**

## 2.4 Electrical



**Electrical connection should only be made using equipment suitable for both rating and environment.**

**Where any doubts exist regarding the suitability of equipment, Sulzer should be consulted before proceeding. Normally the Sulzer pump should be installed with starting equipment arranged to give direct-on-line starting.**

**Earthing points will be provided on electric drives (if supplied) and it is essential that these are correctly connected. When the motor is being wired and checked for rotation, the start/stop sequence must be instantaneous to prevent dry running (see Section 3) or pressurising upstream equipment (check direction arrow on pump nameplate). The electrical installation should include appropriate isolating equipment to ensure that the pump, drive and motor, or macerator grinder motor is safe to work on.**

## 2.5 Pressure relief valves and non-return valves

1. It is recommended that a suitable safety device is installed on the discharge side of the pump to prevent over-pressurisation of the system.
2. It is also recommended that a non-return valve is installed on the discharge side of the pump to prevent reverse flow through the system.

When both are installed it is advised that the relief valve is positioned closer to the pump than the non-return valve.



**The pump must never run against a closed inlet or outlet valve, as this could result in mechanical failure.**

## 2.6 General safety



**All guards and removable maintain-in-place covers must be in place and securely fitted while the machine is running.**



**Great care must be taken to protect all electrical equipment from splashing when hosing down. Where Sulzer have supplied a bareshaft pump the onus is on the user to fit adequate guards in compliance with the requirements of the relevant regulations.**



**Inspection port covers/ports must not be opened while the machine is running.**

All nuts and bolts, securing flanges and base mounting fixtures must be checked for tightness before operation. To eliminate vibration, the pump must be correctly aligned with the drive unit, and all guards must be securely fixed in position. When commissioning the plant, all joints in the system must be checked thoroughly for leakage.

If, when starting, the pump does not appear to operate correctly (see Section 3), the plant must be shut down immediately and the cause of the malfunction established before operations are recommenced. It is recommended that, depending upon plant system operation, either a combined vacuum and pressure gauge or a vacuum gauge only be fitted to the pump inlet port, and a pressure gauge fitted to the outlet port. These will then continuously monitor the pump operating conditions.

May contain substances from the ECHA SVHC Candidates List (REACH - Regulation (EC) No. 1907/2006).

## 2.7 Duty conditions

Pumps should only be installed on duties for which Sulzer have specified the materials of construction, flow rates, pressure, temperature, speed etc. Where dangerous materials are to be pumped, consideration must be given to the safe discharge from relief valves, gland drains etc.



**If the duty should be changed, Sulzer should be contacted and their recommendations sought in the interest of application, safety of plant, efficiency, and pump life.**

## 3 Start-up procedure

Pumps must be filled with liquid before starting. The initial filling is not for priming purposes, but to provide the necessary lubrication of the stator until the pump primes itself. When the pump is stopped, sufficient liquid will normally be trapped in the rotor/stator assembly to provide lubrication upon re-starting.

If however, the pump has been left standing for an appreciable time, moved to a new location, or has been dismantled and re-assembled, it must be refilled with liquid and given a few turns before starting. The pump is normally somewhat stiff to turn by hand owing to the close rotor/stator fit. However, this stiffness disappears when the pump is running normally against pressure.

### 3.1 Dry running



**Never run the pump in a dry condition even for a few revolutions or the stator will be damaged immediately. Continual dry running could produce some harmful or damaging effects.**

### 3.2 Gland packing

Where a pump is supplied fitted with gland packing (manufactured from a non-asbestos material), the gland will require adjustment during the initial running-in period. Newly packed glands must be allowed to run-in with only finger-tight compression on the gland follower nuts. This should continue for about three days. The gland follower should be gradually tightened over the next week to achieve a leakage rate as shown in the table below. Gland followers should be adjusted at regular intervals to maintain the recommended leakage flow rate.

Under normal working conditions a slight drip from the gland under pressure assists in cooling and lubricating the packing. **A correctly adjusted gland will always have a small leakage of fluid.**



**When properly adjusted, packed gland sealing systems will always have a small leakage of potentially hazardous fluid. Adequate personal protective equipment must be worn at all times to prevent injury from hazardous leakage.**

Typical leakage rates from packed glands:

Up to 50mm shaft diameter	2 drops per minute
50 ... 75mm shaft diameter	3 drops per minute
75 ... 100mm shaft diameter	4 drops per minute
100 ... 125mm shaft diameter	5 drops per minute
125 ... 160mm shaft diameter	6 drops per minute

A gland drip is, however, undesirable when handling corrosive, degreasing, or abrasive materials. Under these conditions the gland must be tightened the minimum amount whilst the pump is running, to ensure satisfactory sealing when under pressure, or to stop entry of air when under suction conditions.

The gland leakage of toxic, corrosive or hazardous liquids can cause problems of compatibility with the construction materials of the pumps.

Provision of a gland drain should be considered, especially for the leakage of hazardous products.



**Care is required when adjusting the gland whilst the pump is running.**

### 3.3 Mechanical seals - all pumps

When a mechanical seal is fitted to the pump it may be necessary to provide a barrier fluid to some part of the seal. This should be provided in line with the seal manufacturers instructions.

Where a pump is supplied without a drive, it is necessary to fit the mechanical seal (supplied separately) prior to fitting the gearbox and motor.

### 3.4 Guards



**In the interests of safety, all guards must be replaced after necessary adjustments have been made to the pump.**

### 3.5 Warning / Control device

Prior to operating the pump, if any warning or control devices are fitted, these must be set in accordance with their specific instructions.

### 3.6 Pump operating temperature

The range of temperatures the pump surfaces will develop is dependent upon factors such as product temperature and ambient temperature of the installation. There may be instances where the external pump surface can exceed 50 °C.

In these instances, personnel must be made aware of this and suitable warnings/guarding used.

### 3.7 Noise levels

1. The sound pressure level should not exceed 85dB at one metre distance from the pump.
2. This is based on a typical installation and does not necessarily include noise from other sources or any contribution from building reverberation or installation pipework.
3. It is recommended that the actual pump unit noise levels are ascertained once the unit is installed and running at duty conditions.

### 3.8 Lubrication

Pumps fitted with bearings should be inspected periodically to see if grease replenishment is necessary, and if so, grease should be added until the chambers at the ends of the bearing spacer are approximately one third full.

Periodic bearing inspection is necessary to maintain optimum bearing performance. The most expedient time to inspect is during periods of regular scheduled equipment downtime for routine maintenance, or downtime for any other reason.

Under tropical or other arduous conditions however, a more frequent examination may be necessary. It is therefore advisable to establish a correct maintenance schedule or periodic inspection.

BP LC2 / Mobilgrease XHP 222 or their equivalent must be used for replenishment.

### 3.9 Pump units

Where a pump unit is dismantled and re-assembled, consideration must be given to ensure that where appropriate the following steps are covered.

1. Correct alignment of pump/gearbox.
2. Use of appropriate couplings and bushes.
3. Use of appropriate belts and pulleys correctly tensioned.

### 3.10 Cleaning prior to operation

#### i. Non-food use

During the commissioning of a new pump or re-commissioning of an overhauled pump, it is advisable to clean the pump prior to the initial operation of the pump in the process.

#### ii. Food use

When a pump has been supplied for a food application, it is important to ensure that the pump is clean prior to initial operation of the pump.

Therefore, it is important that a clean-in-place treatment is executed on the pump at the following times:

1. When the pump is first commissioned for use.
2. When any spare components are fitted into the wetted area of the pump.

#### **A recommended CIP procedure is as follows:**

**Caustic wash:** LQ94 ex Lever Diversey or equivalent 2% concentration.

**Acid wash:** P3 Horolith 617 ex Henkel Ecolab or equivalent 1% concentration.

#### **Procedure:**

1. Caustic wash @ 75 °C for 20 mins
  2. Water rinse @ 80 °C for 20 mins
  3. Acid wash @ 50 °C for 20 mins
  4. Water rinse @ 80 °C for 20 mins
- CIP flow rates (hence pump speeds) should be maximised to achieve highest level of cleanability. A C.I.P. liquid velocity of 1.5 to 2.0 m/s is required for removal of solids and soiling. Pumps fitted with CIP by-pass ports will permit higher flow rates without the need to increase pump speed.
  - The use of neat active caustic and acid chemicals is not recommended. Proprietary cleaning agents should be used in line with manufacturers instructions.
  - All seals and gaskets should be replaced with new if disturbed during maintenance.
  - Pump internals should be regularly inspected to ensure hygienic integrity is maintained, especially with respect to elastomeric components and seals, and replaced if necessary. The four stages constitute one cycle and we recommend that this cycle is used to clean the pump before use on food.

Once the pump has been commissioned, the cleaning process will depend upon the application. The user must therefore ensure that their cleaning procedures are suitable for the duty for which the pump has been purchased.

### 3.11 Cake pumps

Cake pumps have auger feed screws, with or without a bridge breaker system to feed the pumping element. If the pump installation requires that these cannot be enclosed, care must be taken to ensure personnel cannot gain access whilst the pump is operating. If this is not possible an emergency stop device must be fitted nearby.

### 3.12 Explosive products/hazardous atmospheres

In certain instances the product being pumped may well be of a hazardous nature.

In these installations consideration must be given to provide suitable protection and appropriate warnings to safeguard personnel and plant.

### 3.13 Access ports



**Where access ports are fitted then the following steps must be followed prior to removal:**

1. Pump must be shut down and the electrical supply isolated.
2. Protective clothing should be worn, especially if the pumped product is obnoxious.
3. Remove access plate with care, utilising where possible, drip trays to collect product leakage.

Access ports are included to assist in removing blockages and to allow a visual check on the components within the suction chamber. It is not to be considered as an additional method in dismantling the pump. Re-assembly of the plate should be completed using new gaskets prior to the pump being switched on.

### 3.14 Adjustable stators

If adjustable stators are fitted then the following steps must be followed for adjusting the clamping devices.

The adjustable stator assembly is designed to give an even compression around the stator circumference. It is designed to be used when pump performance reduces through wear to an unacceptable level, to restore the required flow rate.

The stator compression is increased using the following steps:

1. Release the six locking screws half a turn.
2. Tighten the eight clamp screws until adjustment allowed by releasing the lock screws has been taken up.
3. Repeat steps 1 and 2 until the pump performance has been restored to its former level.

#### **NOTE**

***It is imperative that when adjusting the stator, only sufficient pressure is placed on the stator to enable the capacity of the pump to be reinstated. Over-tightening of the stator could easily result in damage to the driver by overload and so extreme care must be taken when carrying out these adjustments. It is therefore advisable to make the adjustment while the pump is running and power readings can be monitored.***

#### **Removal of adjustable stator :**

The procedure for removal of an adjustable stator is the same as that of a standard one, except it is necessary to remove the clamp plates before the stator can be twisted off the rotor.

This can be done by undoing the clamp screws; then releasing the clamp plate by using the locking screws as jacking screws to remove the clamp plates.

Re-assembly will be done using the reverse procedure.

### 3.15 Maintenance of wearing components

#### 3.15.1 Rotor and stator

The wear rate on these components is dependent on many factors, such as product abrasivity, speed, pressure etc. When pump performance has reduced to an unacceptable level one or possibly both items will need replacing.

### 3.15.2 Drive shaft - packed gland

The wear rate of the gland area is dependent on many factors such as product abrasivity and speed. Regular gland maintenance will maximise the life of the shaft. Replacement of both the gland packing and shaft will be necessary when shaft sealing becomes difficult to achieve.

### 3.15.3 Coupling rod joints

Regular maintenance and lubrication will maximise life of the joints.

Replacement of one or both joint assemblies, and possibly the coupling rod, may be necessary when wear is apparent.

To ensure maximum life, it is essential to replace all the joint items with genuine Sulzer parts.

### 3.15.4 Flexishaft drive pumps

With this design there are no wearing items to replace in the drive train, however, if during routine inspection the shaft is visibly damaged / distorted or the protective coating is damaged, then this item should be replaced to avoid unexpected breakdowns.

## 3.16 Mechanical speed variators

Refer to the manufacturers instructions.

These machines require regular maintenance, which typically includes weekly adjustment through the full speed range.

## 4.0 Assembly and dismantling

Sections 12 - 15 contain the steps to dismantle and re-assemble the pump. All fastenings must be tightened securely and when identified the appropriate torque figures should be used (see Section 11).

### 4.1 Use of items not approved or manufactured by Sulzer

The pump and its components have been designed to ensure that the pump will operate safely within the guidelines covered by legislation.

As a consequence, Sulzer have declared the machine safe to use for the duty specified as defined by the Declaration of Conformity that is issued with this Instruction Manual.

The use of replacement items that are not approved by or manufactured by Sulzer may affect the safe operation of the pump and it may therefore become a safety hazard to both operators and other equipment. In these instances the declaration provided will therefore become invalid. The guarantee referenced in the Terms and Conditions of Sale will also be invalidated if replacement items are used that are not approved or manufactured by Sulzer.

### 4.2 Disposal of worn components



When replacing wearing parts, please ensure disposal of used parts is carried out in compliance with local environmental legislation. Particular care should be taken when disposing of lubricants.



## 6 Recommended lifting points

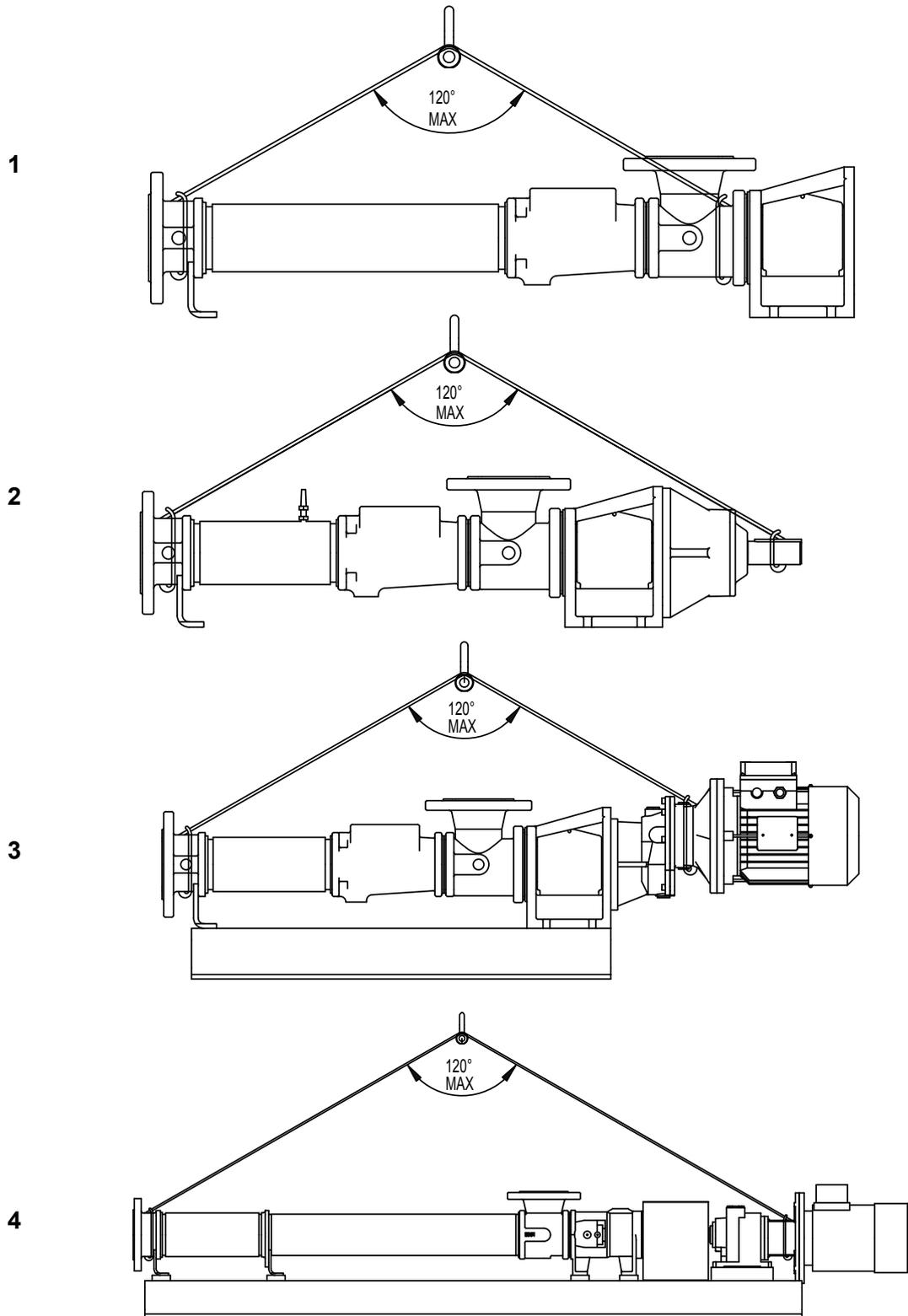


Figure 1. recommended lifting points

\*Choke

## 7 Pump and wear part weights (kg)

### 7.1 Standard auger

Model	Close coupled pump	Bareshaft pump	Stator	Rotor	Auger / Conveyor	Shaft
W32	32.0	40.0	1.5	1.4	2.1	0.7
W34	44.0	57.0	3.5	3.0	2.6	1.6
W41	65.0	78.0	2.0	2.8	4.4	0.7
W42	54.0	67.0	3.8	4.7	4.4	1.6
W44	77.0	90.0	7.8	9.3	3.2	2.9
W51	75.0	83.0	4.2	5.4	2.5	1.6
W52	85.0	98.0	8.3	9.3	4.6	2.9
W54	128.0	151.0	16.2	16.8	7.1	4.4
W61	112.0	125.0	7.6	9.3	4.6	2.9
W62	141.0	163.0	14.5	15.7	8.9	4.4
W64	208.0	238.0	28.2	29.2	14.3	4.4
W71	139.0	161.0	10.3	14.7	16.8	4.4
W72	167.0	190.0	19.5	24.5	16.8	4.4
W74	286.0	319.0	38.0	49.3	15.4	8.7
W81	138.0	178.0	13.9	19.9	16.8	4.4
W82	221.0	251.0	26.4	34.4	15.4	8.7
W84	347.0	381.0	51.4	66.4	17.7	9.5
W91	220.0	250.0	21.8	28.5	18.3	8.7
W92	288.0	318.0	41.1	48.3	18.3	8.7
WA1	257.0	287.0	29.4	43.6	18.3	8.7
WA2	369.0	402.0	55.8	71.1	29.1	9.5
WB1	377.0	410.0	55.0	75.2	28.4	9.5

### 7.2 Large auger

Model	Close coupled pump	Bareshaft pump	Stator	Rotor	Auger / Conveyor	Shaft
W42	85.0	97.0	3.8	4.7	13.2	1.6
W44	106.0	119.0	7.8	9.3	13.2	2.9
W52	111.0	123.0	8.3	9.3	18.2	2.9
W54	150.0	171.0	16.2	16.8	18.2	4.4
W62	180.0	220.0	14.5	15.7	38.2	4.4
W64	243.0	272.0	62.2	29.2	34.8	4.4
W72	221.0	243.0	19.5	24.5	42.6	4.4
W74	350.0	370.0	38.0	49.3	42.6	8.7
W82	302.0	331.0	26.4	34.4	65.9	8.7
W84	441.0	450.0	51.4	66.4	65.9	9.5
W92	351.0	379.0	41.4	48.3	77.4	8.7
WA2	-	520.0	55.8	71.1	105.3	9.5
WA4	-	665.0	2 x WA2	160.0	77.4	23.4
WB2	-	670.0	136.0	141.0	77.4	23.4
WB4	-	940.0	2 x WB2	270.0	77.4	52.0
WC1	-	632.0	90.0	152.0	66.6	23.4
WC4	-	-	2 x 186	500.0	-	44.0
WD1	-	700.0	120.0	183.0	66.6	23.4

**8 Diagnostic chart**

<b>Symptoms</b>	<b>Possible causes</b>
1. NO DISCHARGE	1. 2. 3. 7. 26. 28. 29.
2. LOSS OF CAPACITY	3. 4. 5. 6. 7. 8. 9. 10. 22. 13. 16. 17. 21. 22. 23. 29
3. IRREGULAR DISCHARGE	3. 4. 5. 6. 7. 8. 13. 15. 29.
4. PRIMING LOST AFTER START	3. 4. 5. 6. 7. 8. 13. 15
5. PUMP STALLS AT START UP	8. 11. 24.
6. PUMP OVERHEATS	8. 9. 11. 12. 18. 20
7. MOTOR OVERHEATS	8. 11. 12. 15. 18. 20.
8. EXCESSIVE POWER ABSORBED BY PUMP	8. 11. 12. 15. 18. 20
9. NOISE AND VIBRATION	3. 4. 5. 6. 7. 8. 9. 11. 13. 15. 18. 19. 20. 22. 23. 27. 31
10. PUMP ELEMENT WEAR	9. 11.
11. EXCESSIVE GLAND OR SEAL WEAR	12. 14. 25. 30.
12. GLAND LEAKAGE	13. 14.
13. SEIZURE	9. 11. 12. 20.
<b>List of causes</b>	<b>Remedial actions</b>
1. Incorrect direction of rotation	1. Reverse motor
2. Pump unprimed	2. Bleed system of air/gas
3. Insufficient NPSH available	3. Increase suction head or reduce speed/temp.
4. Product vaporising in supply line	4. Increase NPSH available (see 3 above)
5. Air entering supply line	5. Check pipe joints/gland adjustment
6. Insufficient head above supply vessel outlet	6. Raise vessel/increase pipe size
7. Foot valve/strainer obstructed or blocked	7. Clean out suction line/valves
8. Product viscosity above rated figure	8. Decrease pump speed/increase temp.
9. Product temp. above rated figure	9. Cool the product
10. Product viscosity below rated figure	10. Increase pump speed/reduce temp.
11. Delivery pressure above rated figure	11. Check for blockages in delivery line
12. Gland overtight	12. Adjust gland see o&m instructions
13. Gland undertight	13. Adjust gland see o&m instructions
14. Gland flushing inadequate	14. Check fluid flows freely into gland
15. Pump speed above rated figure	15. Decrease pump speed
16. Pump speed below rated figure	16. Increase pump speed
17. Belt drive slipping	17. Re-tension belts
18. Coupling misaligned	18. Check and adjust alignment
19. Insecure pump/drive mounting	19. Check and tighten all pump mountings
20. Shaft bearing wear/failure	20. Replace bearings
21. Worn pump element	21. Fit new parts
22. Relief valve chatter	22. Check condition of valve/renew
23. R.V. incorrectly set	23. Re-adjust spring compression
24. Low voltage	24. Check voltage/wiring sizes
25. Product entering packing area	25. Check packing condition and type
26. Drive train breakage	26. Check and replace broken components
27. Negative or very low delivery head	27. Close delivery valve slightly
28. Discharge blocked/valve closed	28. Reverse pump/relieve pressure/clear blockages
29. Stator turning	29. Replace worn parts/tighten up stator bolts
30. Stuffing box 'eats' packing	30. Check for worn shaft and replace
31. Vee belts	31. Check and adjust tension or replace

## 9 Drawing reference numbers

### 9.1 All models

Drawing reference	Description	Drawing reference	Description
01A	Body	38C	Coupling end
01B	Bearing housing	38D	Drive flange
01C	Bearing housing	38E	Paddle shaft
01D	Bearing housing	12B	Anti-rotation ring
02A	Gear box mounting bracket	42A	Thrower
02B	Bearing mounting plate	59A	Access port cover
02C	Bearing block	62A	Support foot
02D	Bearing block	62B	Support foot
06A	Nameplate (SOG)	65A	Gland section
08A	Gland follower	75A	Sleeve (rotor)
10A	Gland packing / mech seal	75B	Sleeve (shaft)
10B	Rotary shaft lipseal (optional)	76A	Adaptor flange
11A	Bearing cover	78A	Spur gear
11B	Bearing cover	95A	Tie bar
11C	Bearing cover	95C	Tie bar
12A	Anti-rotation ring	P601	Hex head bolt
15A	Thrower guard	P602	Spring washer
15B	Guard (gears)	P603	Plain washer
15C	Guard (coupling)	P604	Hex nut
17A	Adaptor ring	P701	Bearing
20B	Gasket gland	P702	Bearing
20E	Gasket - bearing mounting plate	P703	Lipseal
20F	Gasket - bearing block	P704	Lipseal
20G	Gasket - bearing block	P705	Spring retaining clip
20H	Gasket - throat / feed chamber	P706	Spring retaining clip
20M	Gasket - access port	P707	Spring retaining clip
22A	Stator	P708	Spring retaining clip
23A	Throat	P709	Key
23B	Feed chamber	P710	Key
24A	End cover	P711	Pin
25A	Rotor	P712	Pin
27A	Coupling rod bush (rotor)	P713	Grease nipple
27B	Coupling rod bush (shaft)	P714	Grease nipple
27C	Bush (rotor)	P715	Grease nipple
27D	Bush (shaft)	P716	Hex head bolt
28A	Sealing cover (rotor)	P717	Spring washer
28B	Sealing cover (shaft)	P718	Plain washer
29A	Coupling rod pin (rotor)	P719	Hex head bolt
29B	Coupling rod pin (shaft)	P720	Spring washer
29C	Shaft pin	P721	Plain washer
32A	Drive shaft	P722	Stud
32B	Stub shaft (gears)	P723	Spring washer
32C	Stub shaft (gears)	P724	Plain washer
32D	Stub shaft (blank)	P725	Hex nut
32E	Stub shaft (blank)	P726	Hex head bolt
38F	Auger adapter sleeve (rotor)	P727	Spring washer
38G	Auger adapter sleeve (shaft)	P728	Plain washer
35A	Bearing spacer	P729	Hex nut
35B	Yoke shaft	P730	Stud
38A	Conveyor assembly	P731	Spring washer
38B	Coupling end	P732	Plain washer

Drawing reference	Description	Drawing reference	Description
P733	Hex nut	P803	Plain washer
P734	Grub screw	P804	Coupling G"B" flange
P735	Drive screw	P805	Coupling G"B" flange
P736	Plain washer	P806	Coupling insert
P801	Stud	P807	Grub screw
P802	Spring washer	P808	Grub screw

## 9.2 All except W88, WA4, WB2, WC4 & WD1

Drawing reference	Description	Drawing reference	Description
P101	Hex head bolt / stud	P407	Key
P102	Spring washer	P420	Locknut
P103	Plain washer	P421	Locking washer
P104	Hex nut	P422	Socket head cap screw
P105	Drive screw	P423	Socket head cap screw
P106	Hex head bolt	P501	Taper plug
P107	Spring washer	P502	Taper plug
P108	Plain washer	P503	Spring washer
P109	Hex nut	P504	Plain washer
P110	Bearing	P505	Hex nut
P111	Bearing	P506	Spring washer
P112	Lipseal	P507	Plain washer
P113	Lipseal	P508	Hex nut
P120	Hex head bolt	P509	Hex head bolt
P121	Spring washer	P510	Spring washer
P122	Plain washer	P511	Plain washer
P123	Hex nut	P512	Hex nut
P124	Hex head bolt	P513	Hex head bolt
P125	Spring washer	P514	Spring washer
P201	Plug	P515	Plain washer
P202	Hex head bolt	P516	Hex nut
P203	Plain washer	P517	Stud
P204	Hex nut	P518	Plain washer
P401	Toroidal seal ring	P519	Spring washer
P402	Toroidal seal ring	P520	Hex nut
P403	Spiral retaining ring	P530	Socket head cap screw
P404	Spiral retaining ring	P531	Plain washer
P405	Tie sealing cover	P532	Spring washer
P406	Tie sealing cover		

## 9.3 WC4 only

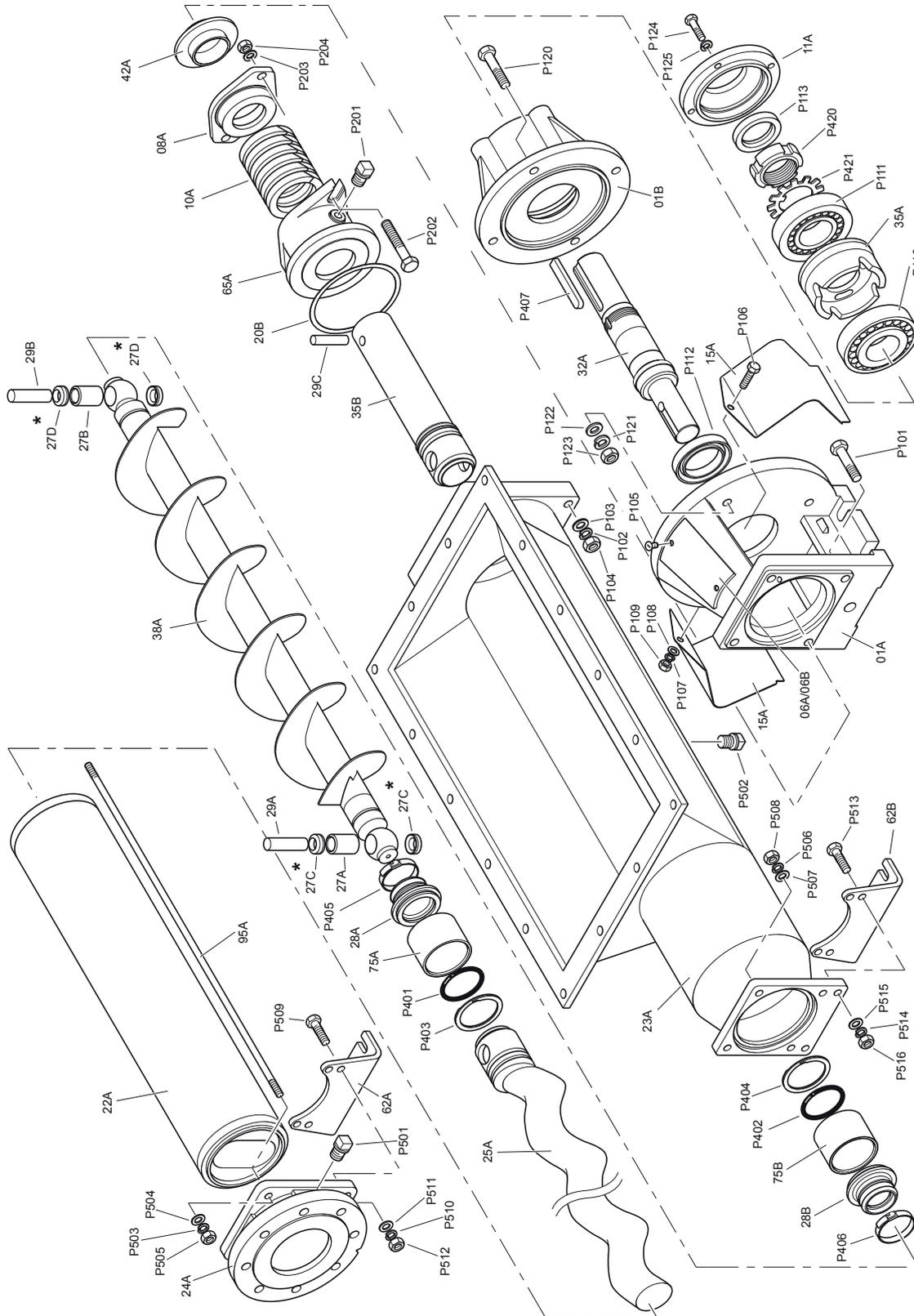
Drawing reference	Description	Drawing reference	Description
P435	Countersunk screw	P437	Toroidal seal ring
P436	Countersunk screw	P438	Toroidal seal ring

## 9.4 W88, W04, W22, W54 & WD1 only

Drawing reference	Description	Drawing reference	Description
P101	Bearing	P430	Socket head cap screw
P102	Bearing	P431	Taper plug
P103	Lipseal	P501	Taper plug
P104	Lipseal	P502	Taper plug
P105	Hex head bolt	P503	Hex nut
P106	Hex nut	P504	Spring washer
P107	Plain washer	P505	Plain washer
P108	Spring washer	P506	Hex nut
P110	Plain washer	P507	Spring washer
P111	Hex head bolt	P508	Plain washer
P112	Spring washer	p509	Hex nut
P201	Hex head bolt	P510	Spring washer
P202	Hex nut	P511	Plain washer
P203	Plain washer	P512	Hex nut
P211	Plug	P513	Spring washer
P402	Tor. seal ring	P514	Plain washer
P405	Tie sealing cover	P515	Stud
P406	Tie sealing cover	P516	Hex nut
P407	Key	P517	Spring washer
P420	Locknut	P518	Plain washer
P421	Locking washer	P519	Hex head bolt
P422	Socket head cap screw	P521	Spring washer
P423	Socket head cap screw	P522	Plain washer
P424	Socket head cap screw	P530	Hex head bolt
P425	Socket head cap screw	P531	Plain washer
P426	Sealing washer	P532	Spring washer
P427	Sealing washer	P540	Clamp
P428	Sealing washer	P550	Hex head bolt
P429	Sealing washer	P551	Hex nut

**10 Exploded view drawings**

**10.1 Standard bareshaft, all sizes except W74, W84, W88, WA2, WA4, WB1, WB2, WB4, WC1, WD1**

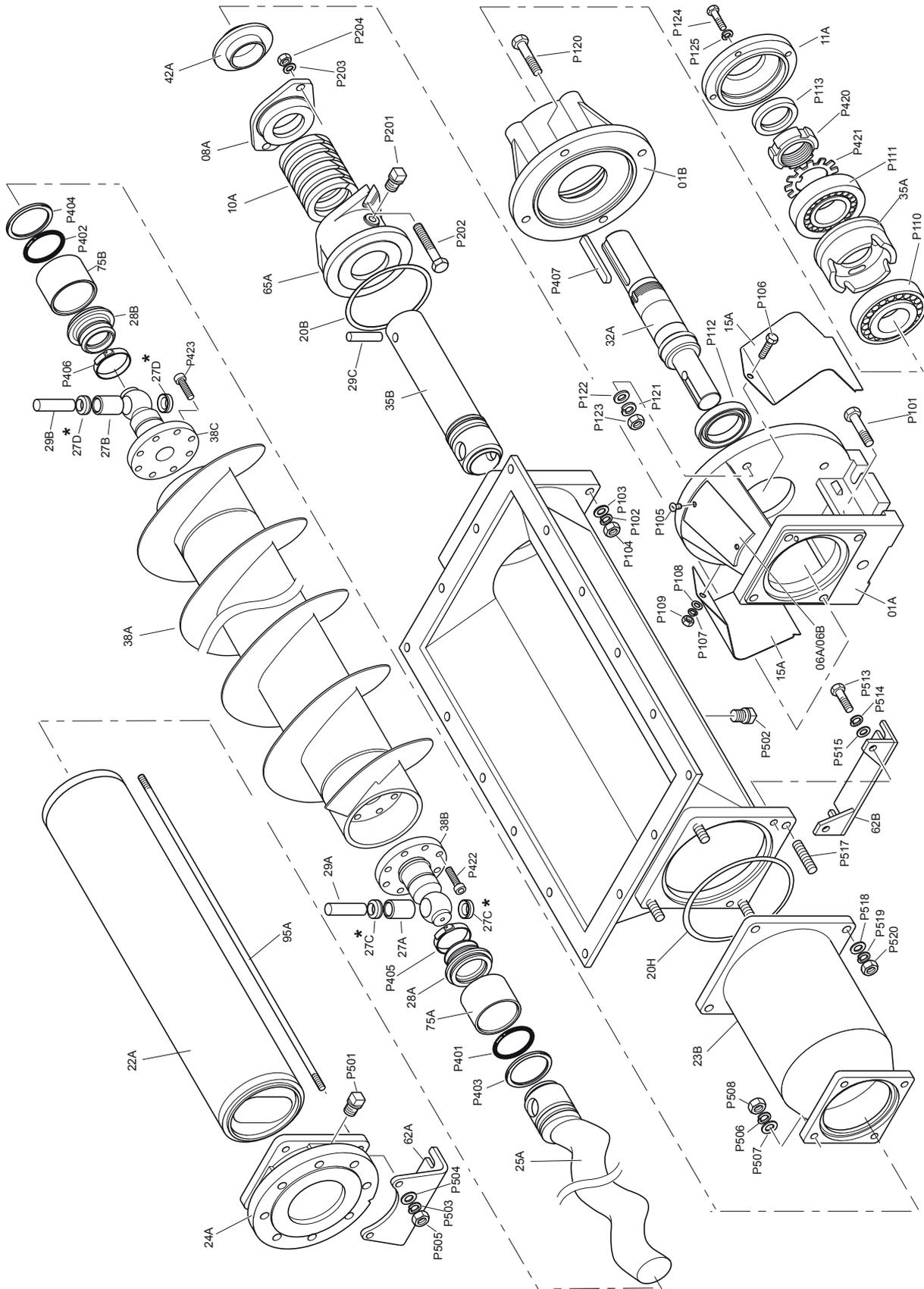


1340-00

\* where fitted

## 10.2 Large auger shaft, all sizes except W74, W84, W88, WA2, WB4

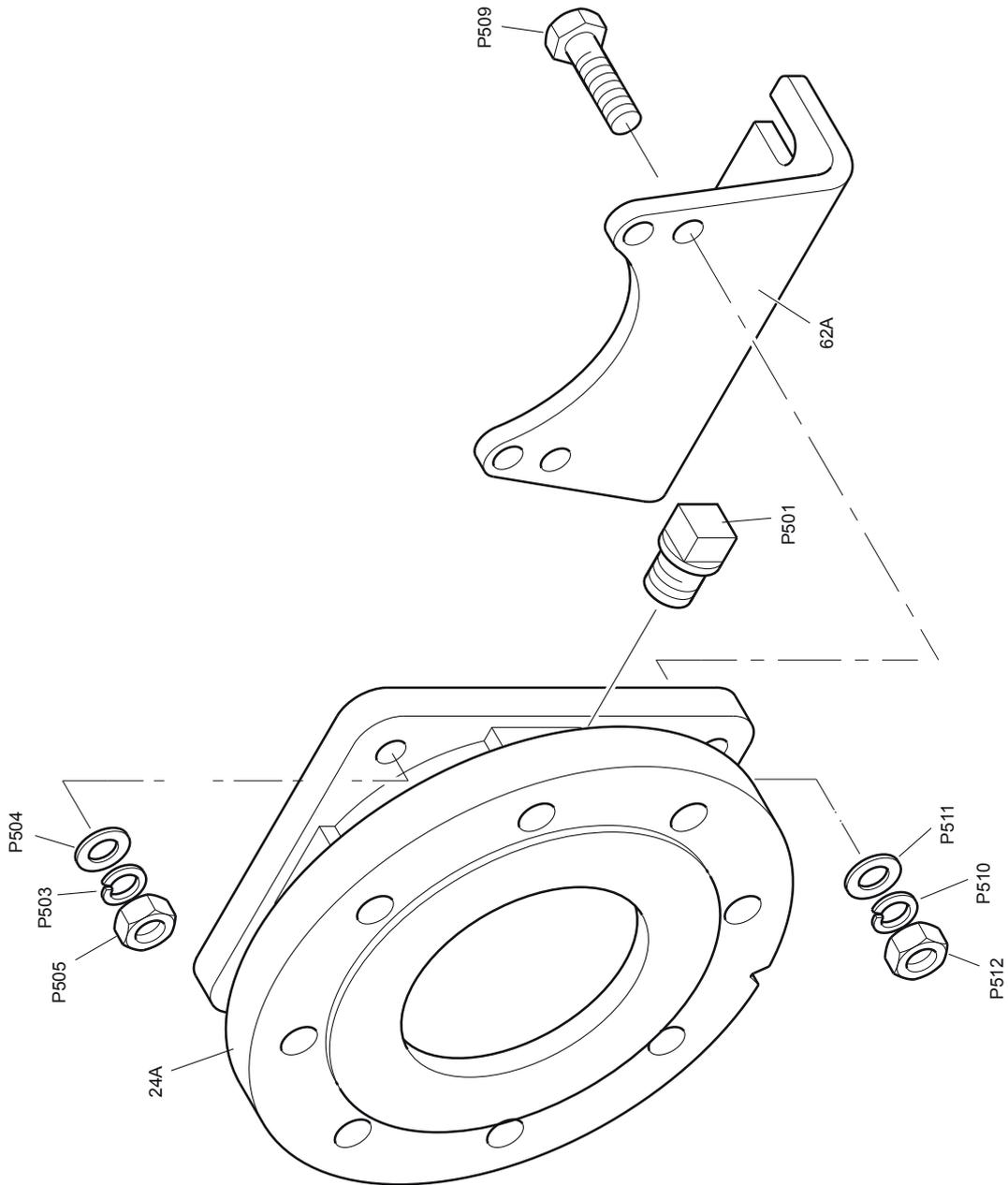
1341-00



\* where fitted

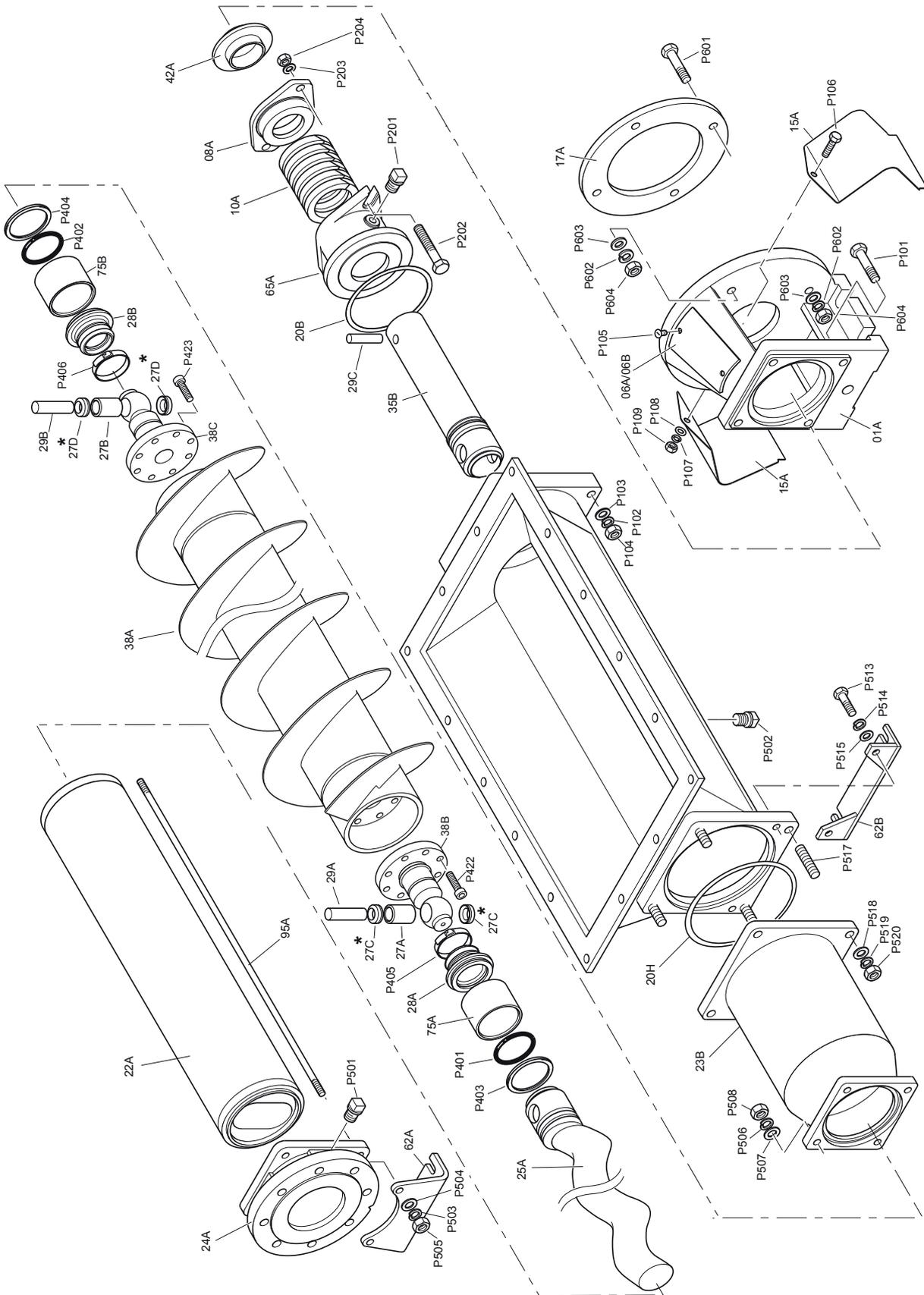
**10.3 Standard bareshaft WA2 only**

1342-00





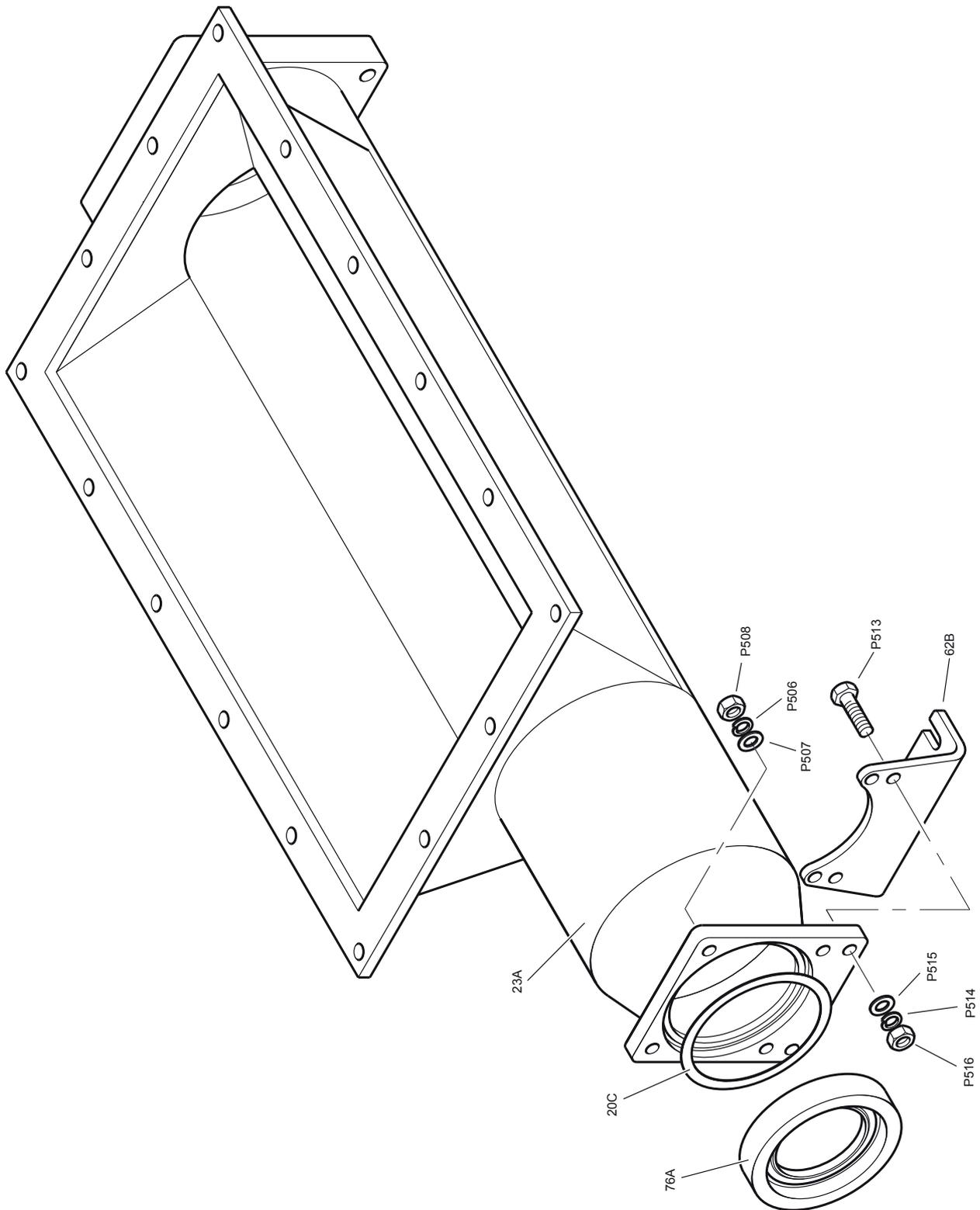
**10.5 Large auger close coupled**



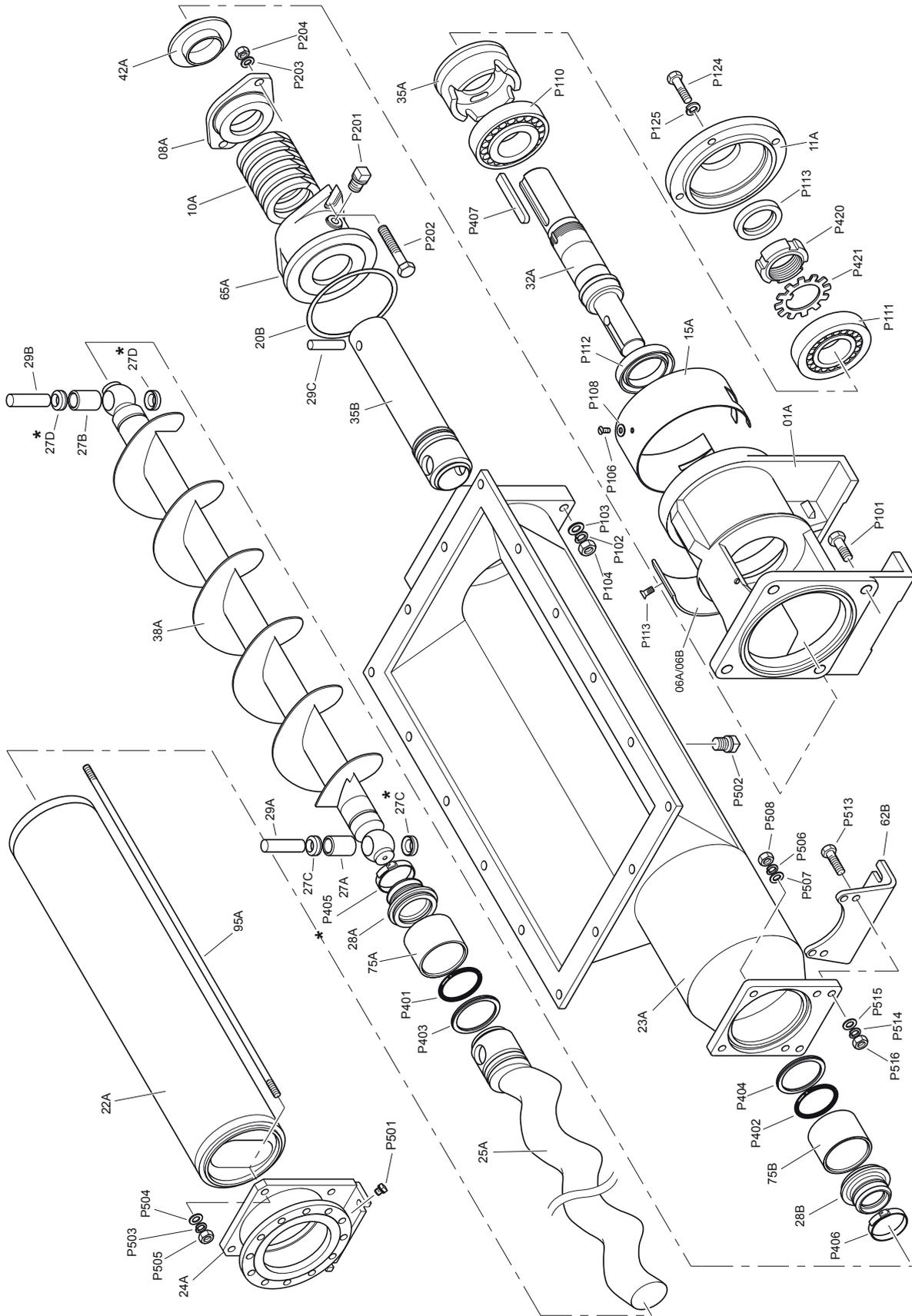
\* where fitted

1344-00

## 10.6 W34



**10.7 Standard shaft W74, W84, WA2, WB1 only**



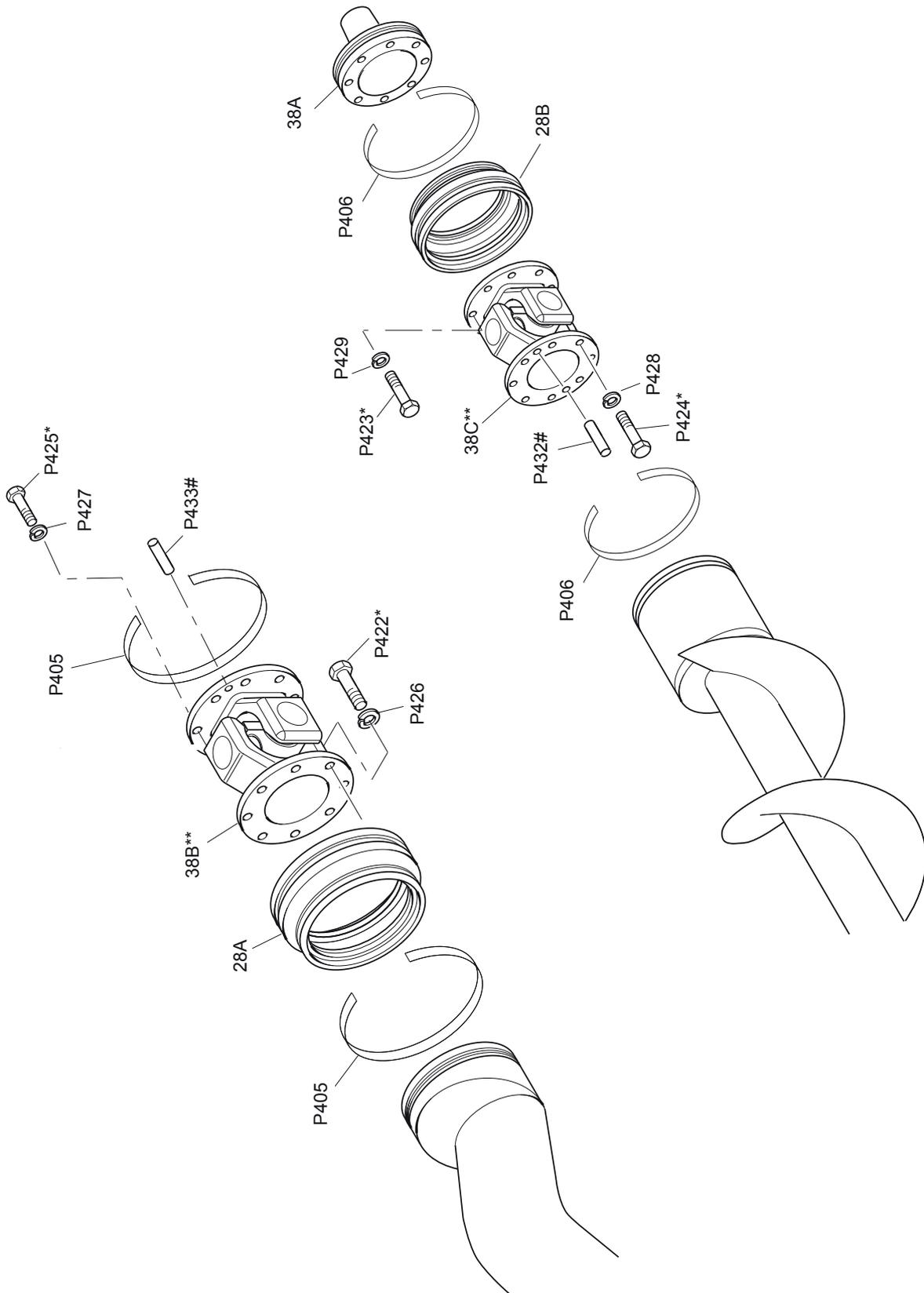
1346-00

\* where fitted





10.10 Joint detail W088, WA4, WB2, WB4, WC1, WD1 only



1349-00

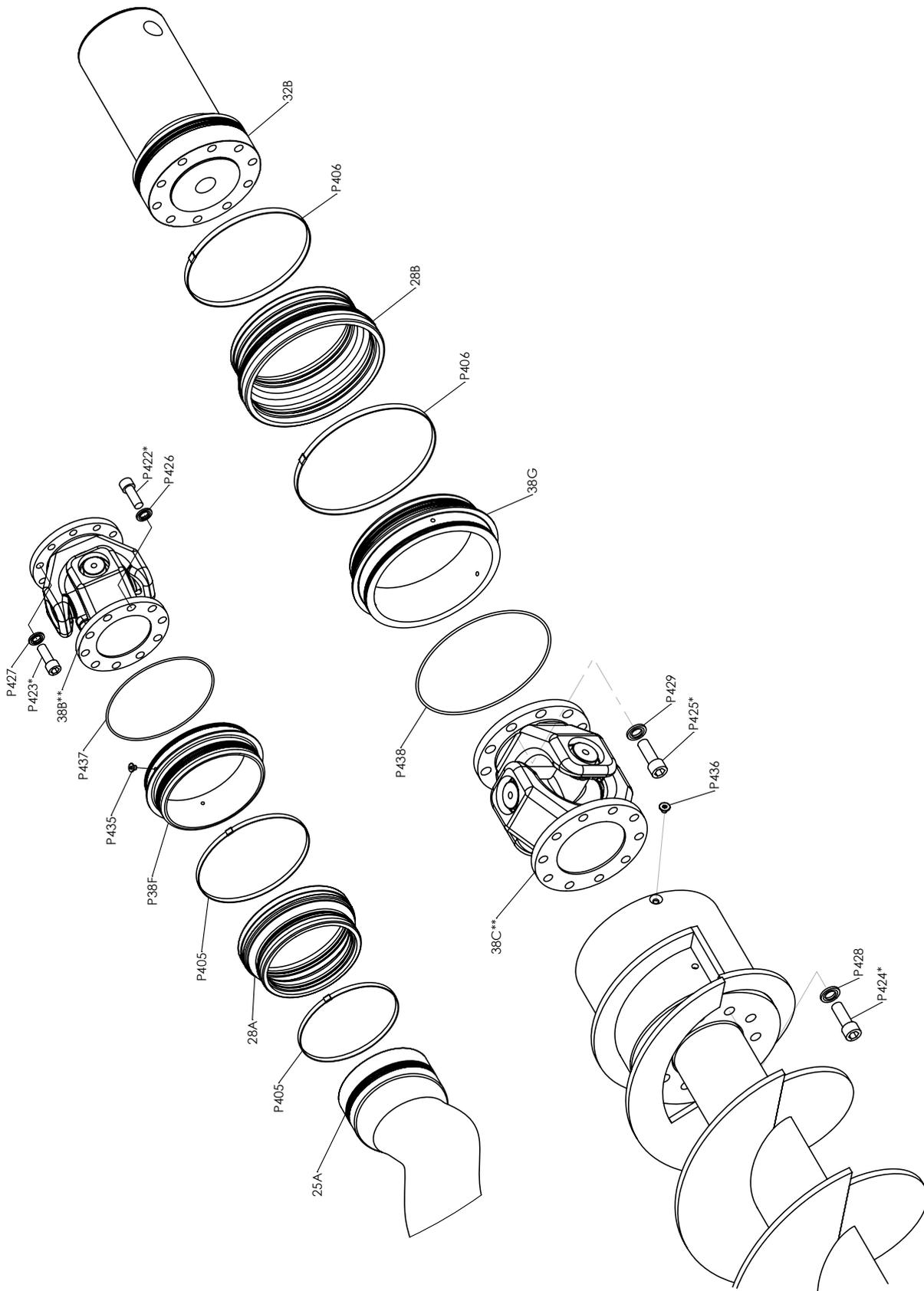
\* P422, P423, P424 and P425 to be fitted using Loctite 242 applied to the threads.

\*\* Flange face of 38B and 38C to be sealed using Loctite 574.

# Dowels P432 and P433 to be fitted using Loctite 638 or equivalent.

**10.11 Joint detail WC4 only**

1350-00

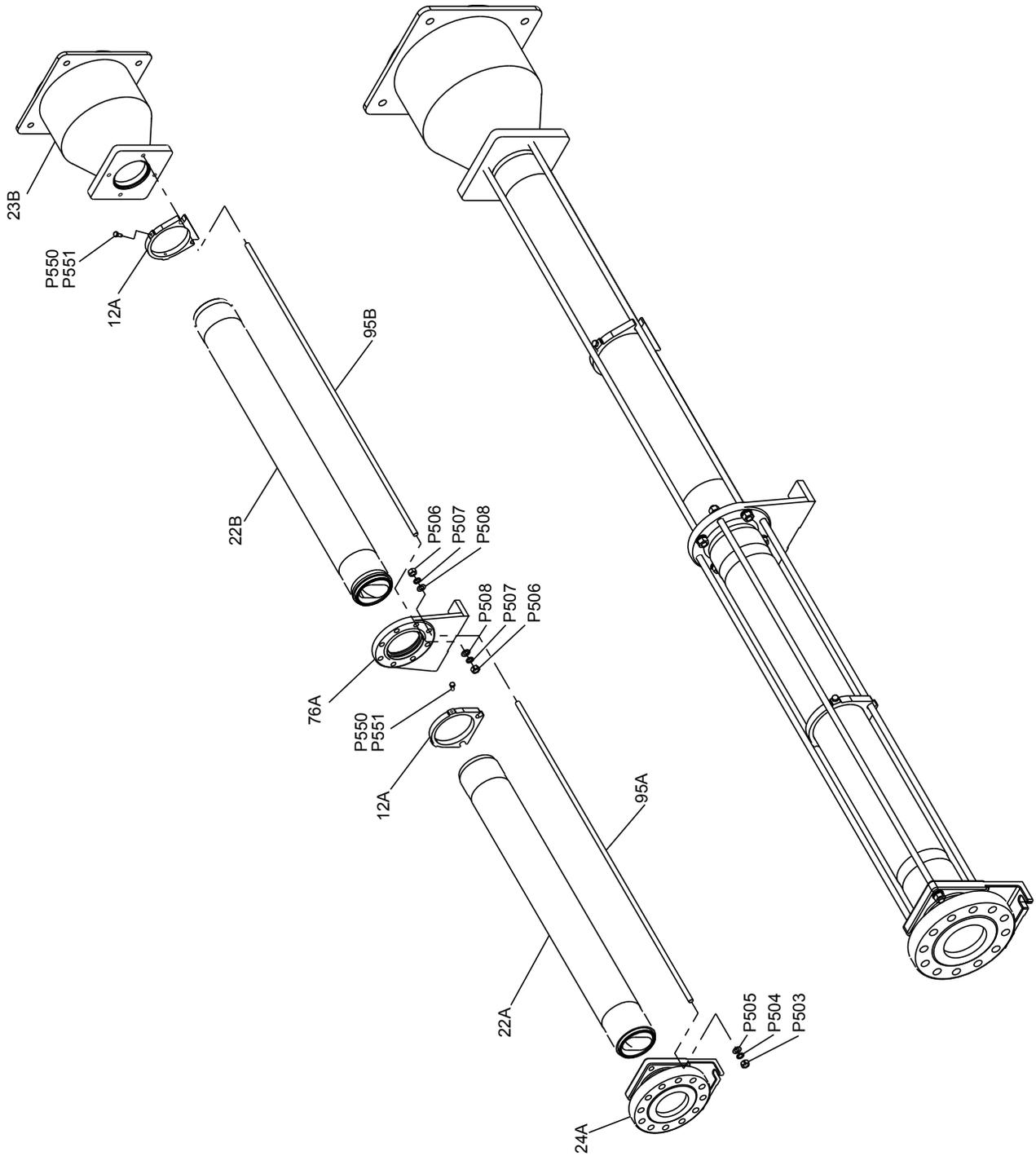


\* P422, P423, P424, P425, P435 and P436 to be fitted using Loctite 242 applied to the threads.

\*\* Flange face of 38B and 38C to be sealed using Loctite 574.

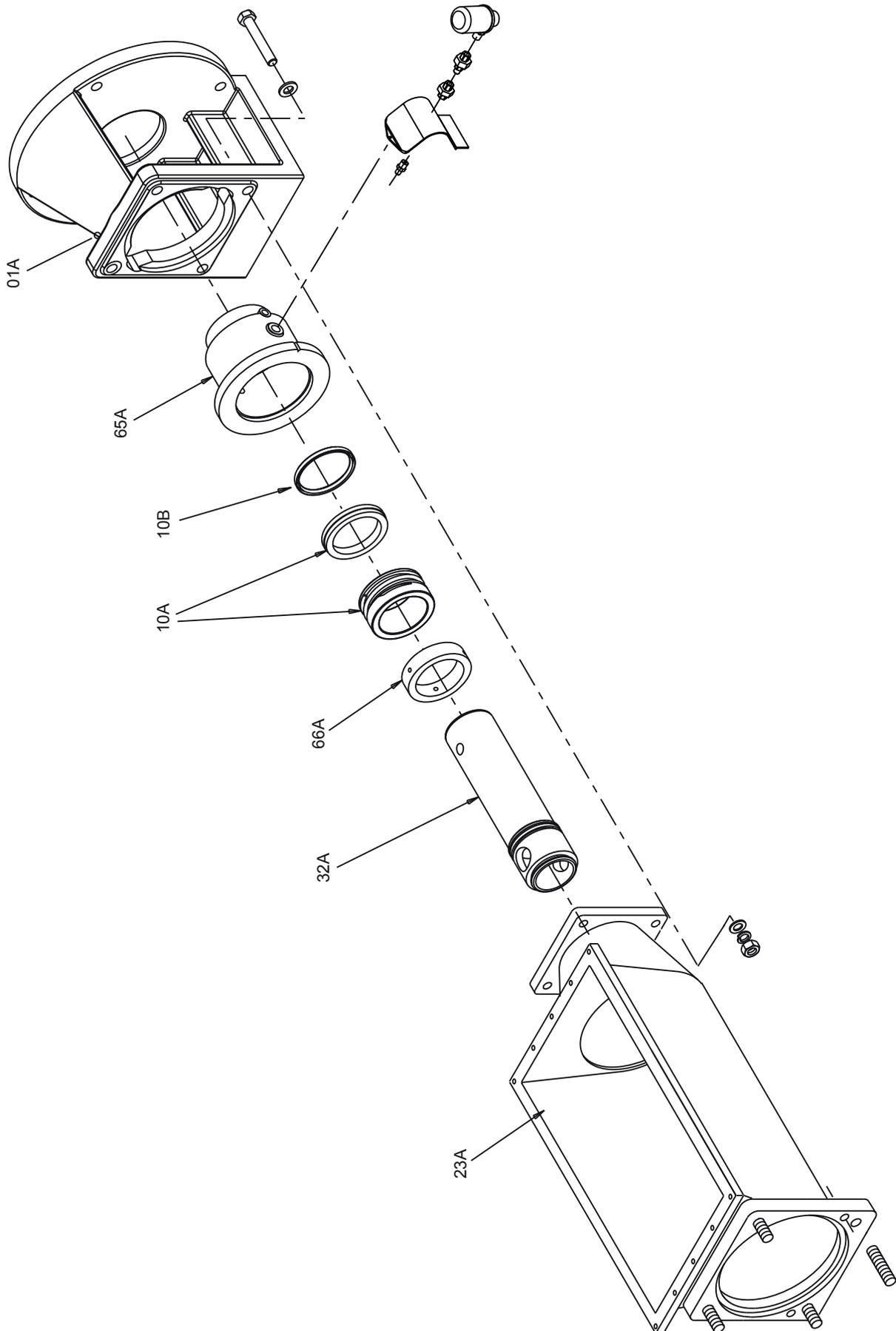
## 10.12 Stator assembly W88, WA4, WB4 only

1351-00





## 10.14 Mechanical seal



1353-00

**11 Tightening torques (Nm)****Key:**

A = Body / Suction chamber

B = Body / Bearing housing

C = Bearing cover

D = Coupling end / Conveyor assembly

E = Drive-end cap screw

F = Stator tie bars

G = Throat / Feed chamber

H = Pump driver mounting bolts

I = Gearbox mounting bracket bolts

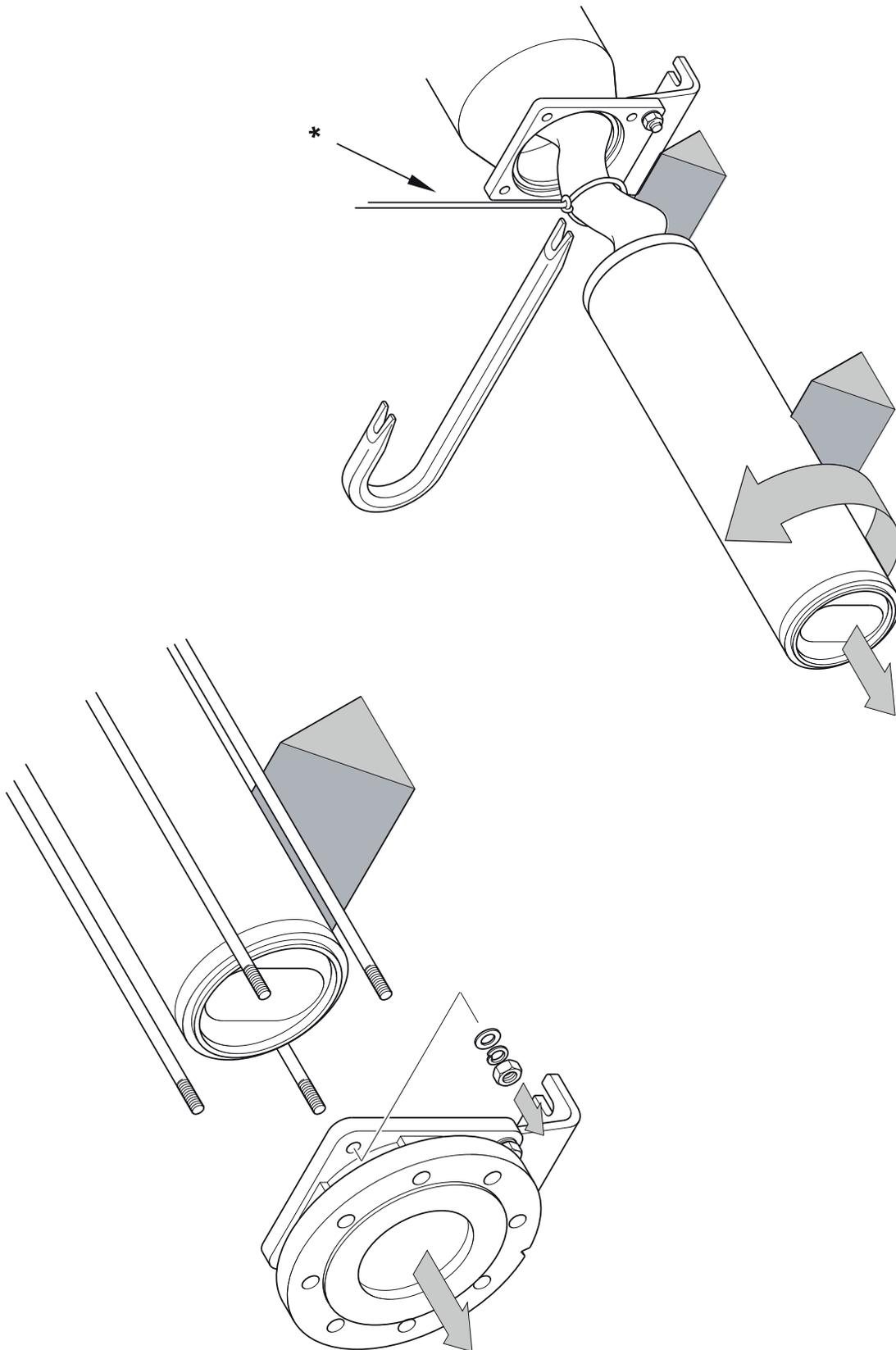
J = Guard gears

K = Bridge breaker mounting bolts

Pump	A		B	C		D		E	F		G		H	I	J	K
	P101 (P104)	P120	P105	P111	P124	P422 P423	P424 P425	P430	P503	P505 P508	P516	P520	P601	P725	P730	P801
W31	11	7.5	-	-	2	-	-	-	-	7	-	-	7.5	-	-	-
W32	11	7.5	-	-	2	-	-	-	-	7	-	-	7.5	-	-	-
W34	11	13	-	-	9	-	-	-	-	11	-	-	13	-	-	-
W41	11	13	-	-	9	16	-	-	-	11	-	36	13	13	7.5	7.5
W42	11	13	-	-	9	16	-	-	-	11	-	36	13	13	7.5	7.5
W44	21	20	-	-	9	16	-	-	-	24	-	36	20	13	7.5	7.5
W51	11	13	-	-	9	16	-	-	-	11	-	36	13	13	7.5	7.5
W52	21	20	-	-	9	31	-	-	-	11	-	36	20	13	7.5	7.5
W54	36	60	-	-	9	31	-	-	-	40	-	36	60	13	7.5	7.5
W61	21	20	-	-	9	31	-	-	-	11	-	36	20	13	7.5	7.5
W62	36	60	-	-	9	55	-	-	-	24	-	75	60	13	7.5	7.5
W64	90	82	-	-	9	55	-	-	-	75	-	75	82	13	7.5	7.5
W71	36	60	-	-	9	55	-	-	-	24	-	75	60	13	7.5	7.5
W72	36	60	-	-	9	55	-	-	-	24	-	75	60	13	7.5	7.5
W74	176	-	-	-	17	55	-	-	-	75	-	75	-	13	7.5	7.5
W81	30	60	-	-	9	55	-	-	-	40	-	75	60	13	7.5	7.5
W82	90	82	-	-	9	55	-	-	-	40	-	176	82	13	7.5	7.5
W84	176	-	-	-	17	55	-	-	-	120	-	176	-	13	7.5	7.5
W88	-	-	305	17	-	180	180	557	190	-	450	-	-	20	7.5	7.5
W91	90	82	-	-	9	55	-	-	-	75	-	176	82	20	7.5	7.5
W92	90	82	-	-	9	55	-	-	-	75	-	176	82	20	7.5	7.5
WA1	90	82	-	-	9	55	-	-	-	75	-	176	82	20	7.5	7.5
WA2	176	-	-	-	17	55	-	-	-	75	-	450	-	20	7.5	7.5
WA4	-	-	305	17	-	180	180	557	190	-	450	-	-	20	7.5	7.5
WB1	176	-	-	-	17	-	-	-	-	120	-	-	-	20	7.5	7.5
WB2	-	-	305	17	-	180	180	557	120	-	450	-	-	-	-	-
WB4	-	-	305	17	-	320	180	1000	300	-	450	-	-	-	-	-
WC1	-	-	305	17	-	180	180	557	190	-	450	-	-	-	-	-
WC4	-	-	305	17	-	320	320	-	550	-	450	-	-	-	-	-
WD1	-	-	305	17	-	180	180	557	190	-	450	-	-	-	-	-

## 12 Dismantling procedures

### 12.1

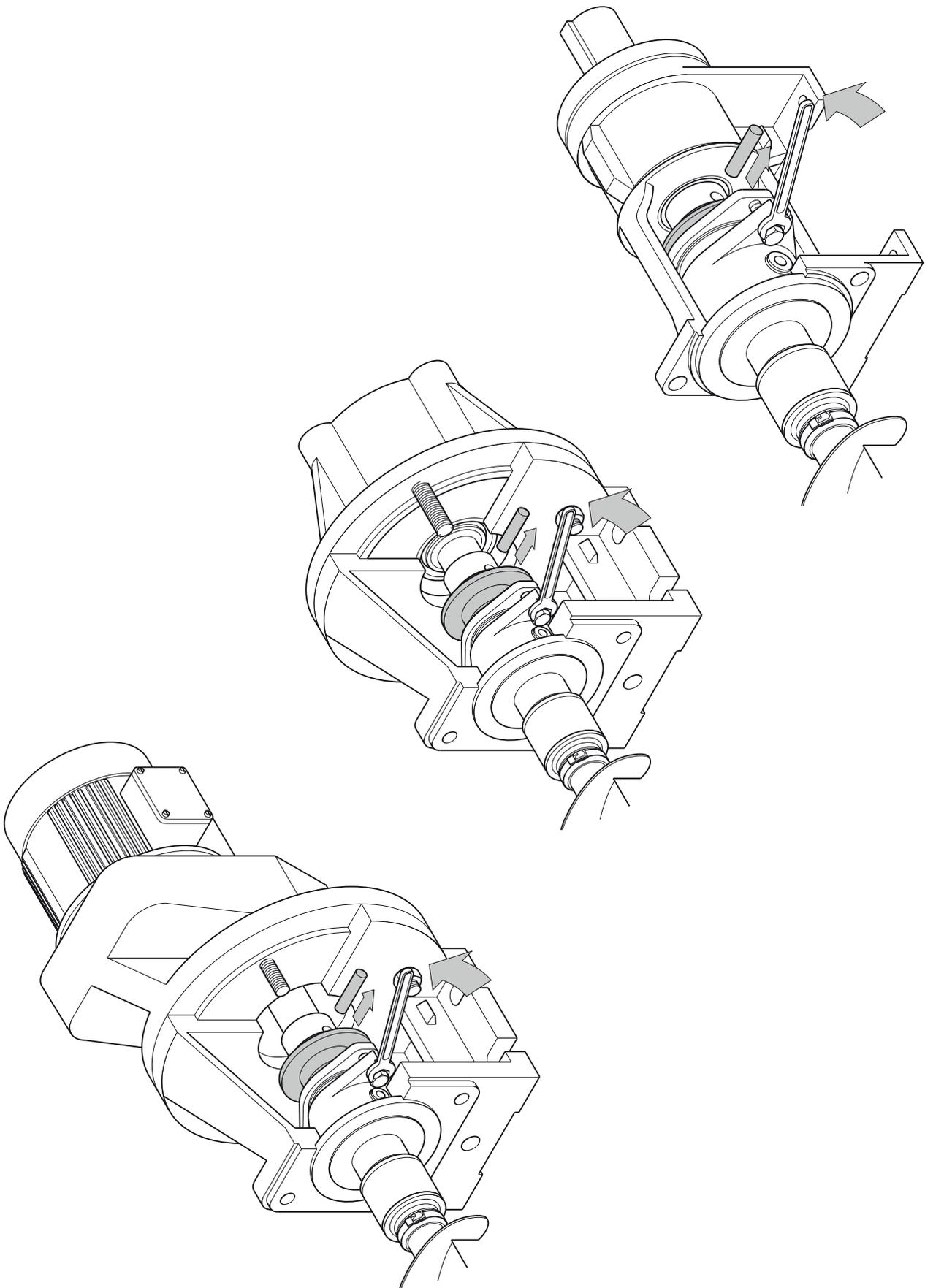


1354-00

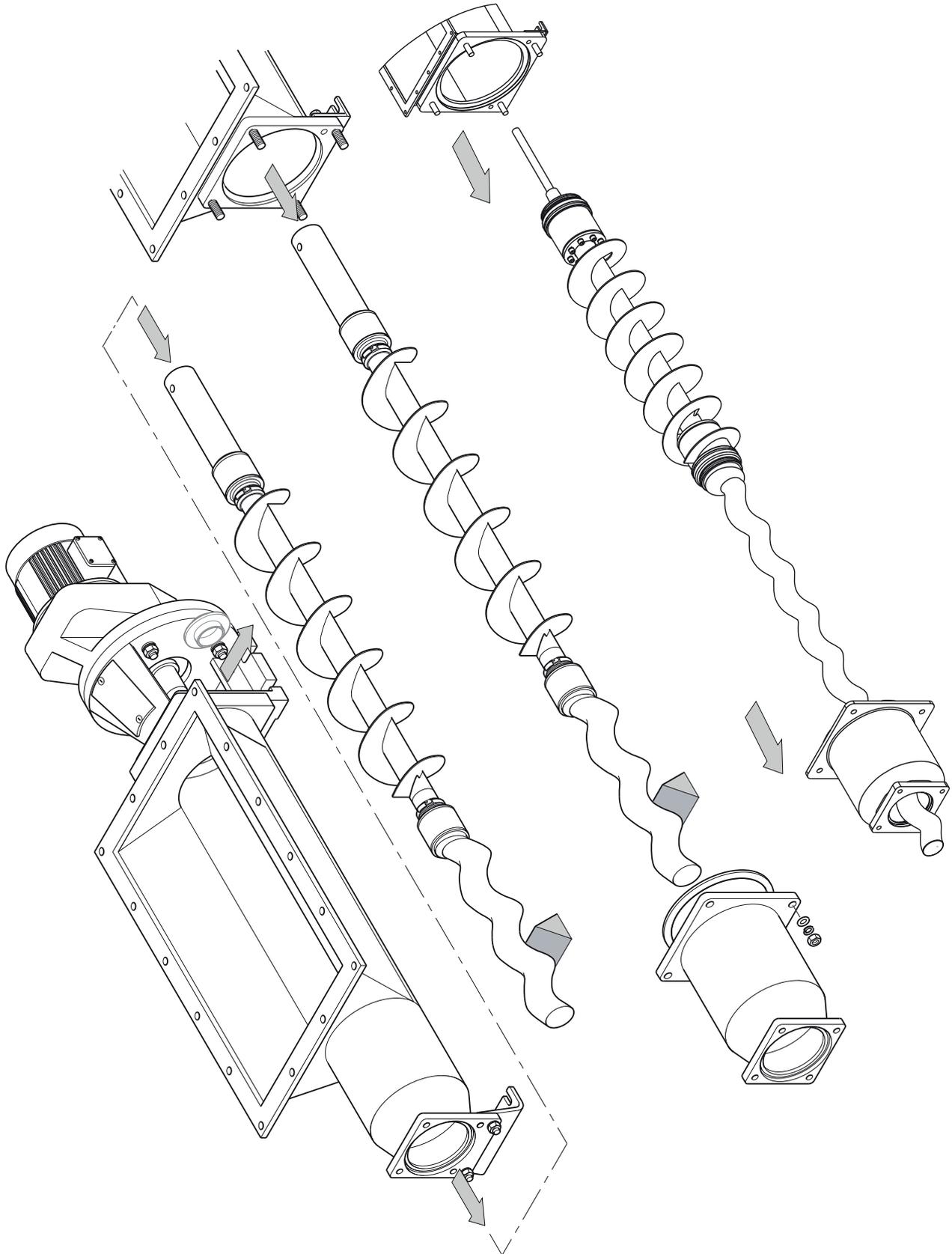
\* Support / sling

12.2

1.355-00

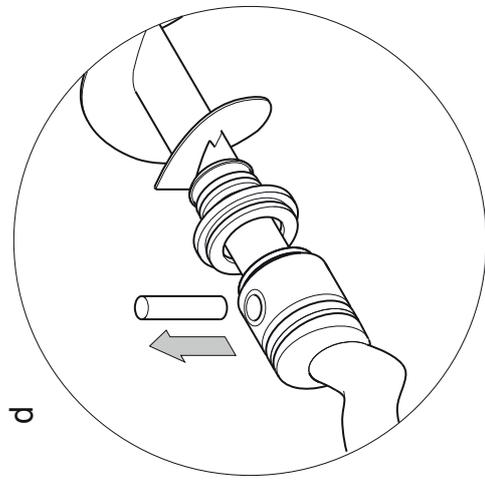
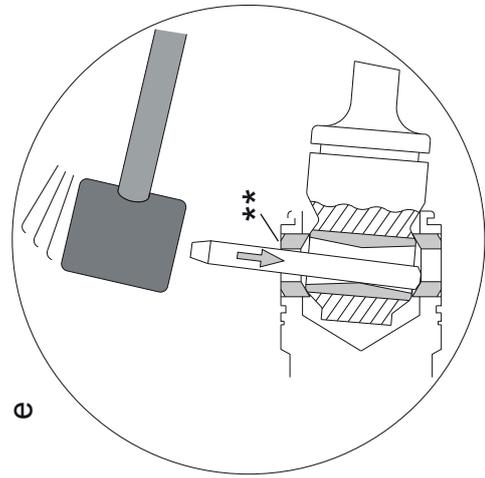
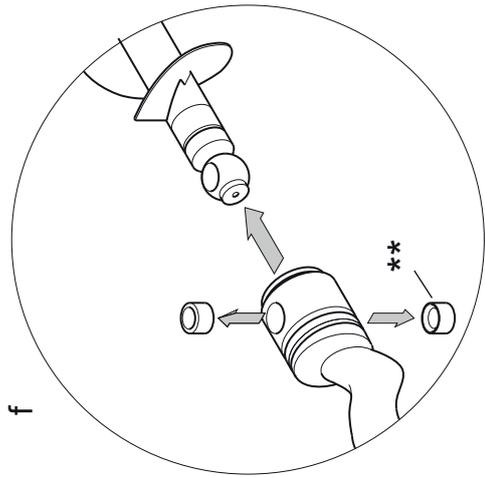
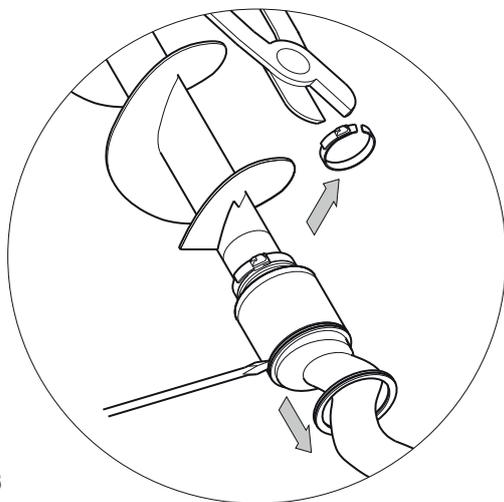
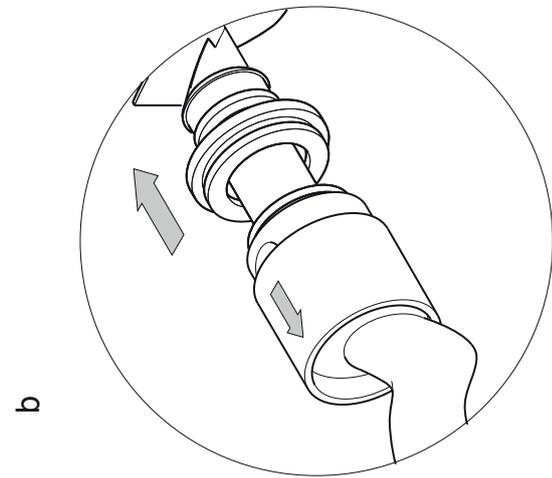
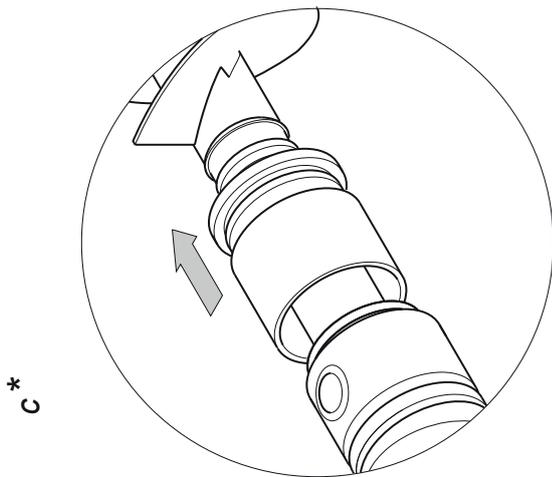


## 12.3



1356-00

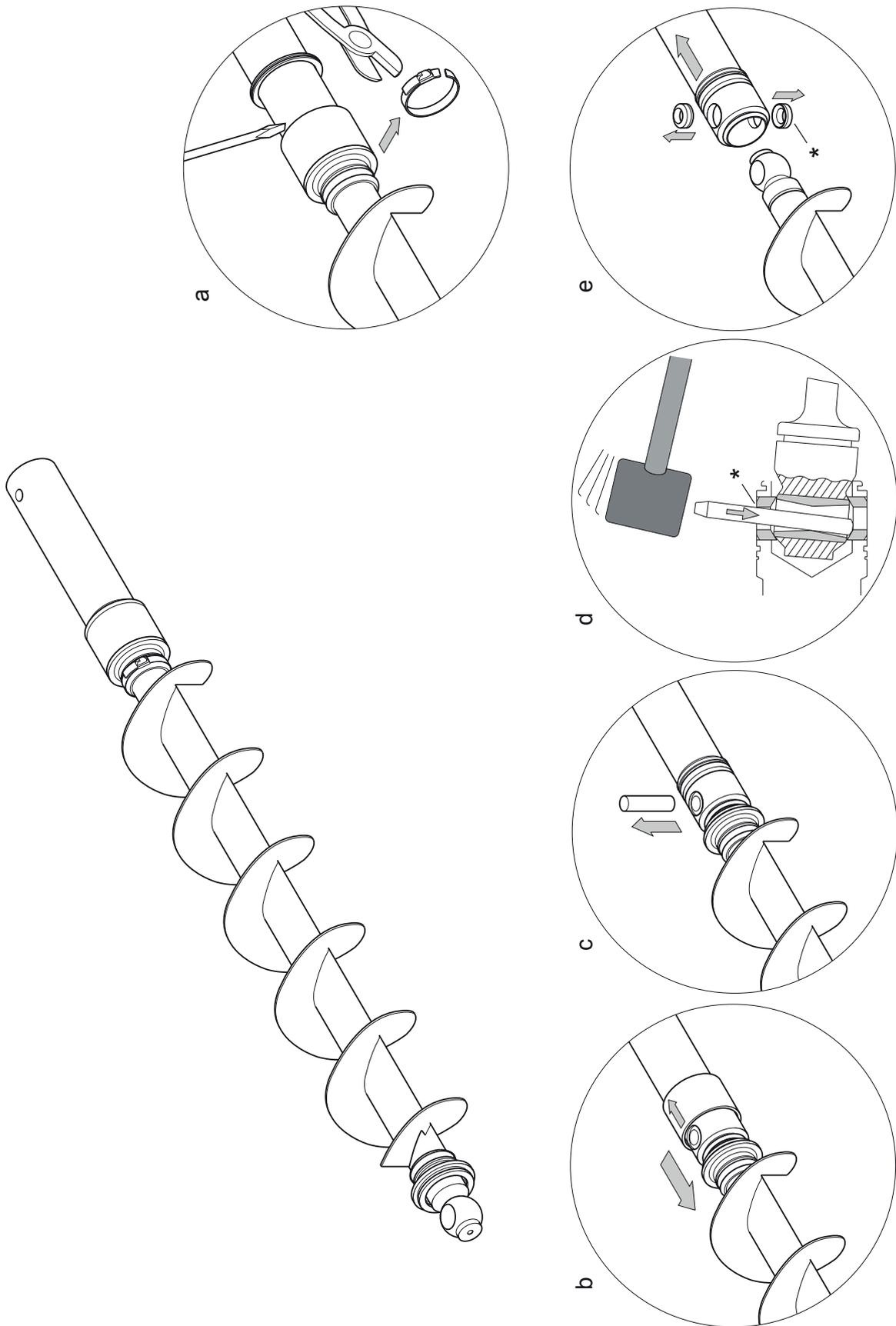
12.4



1.357-00

\* Certain models only \*\* Fitted

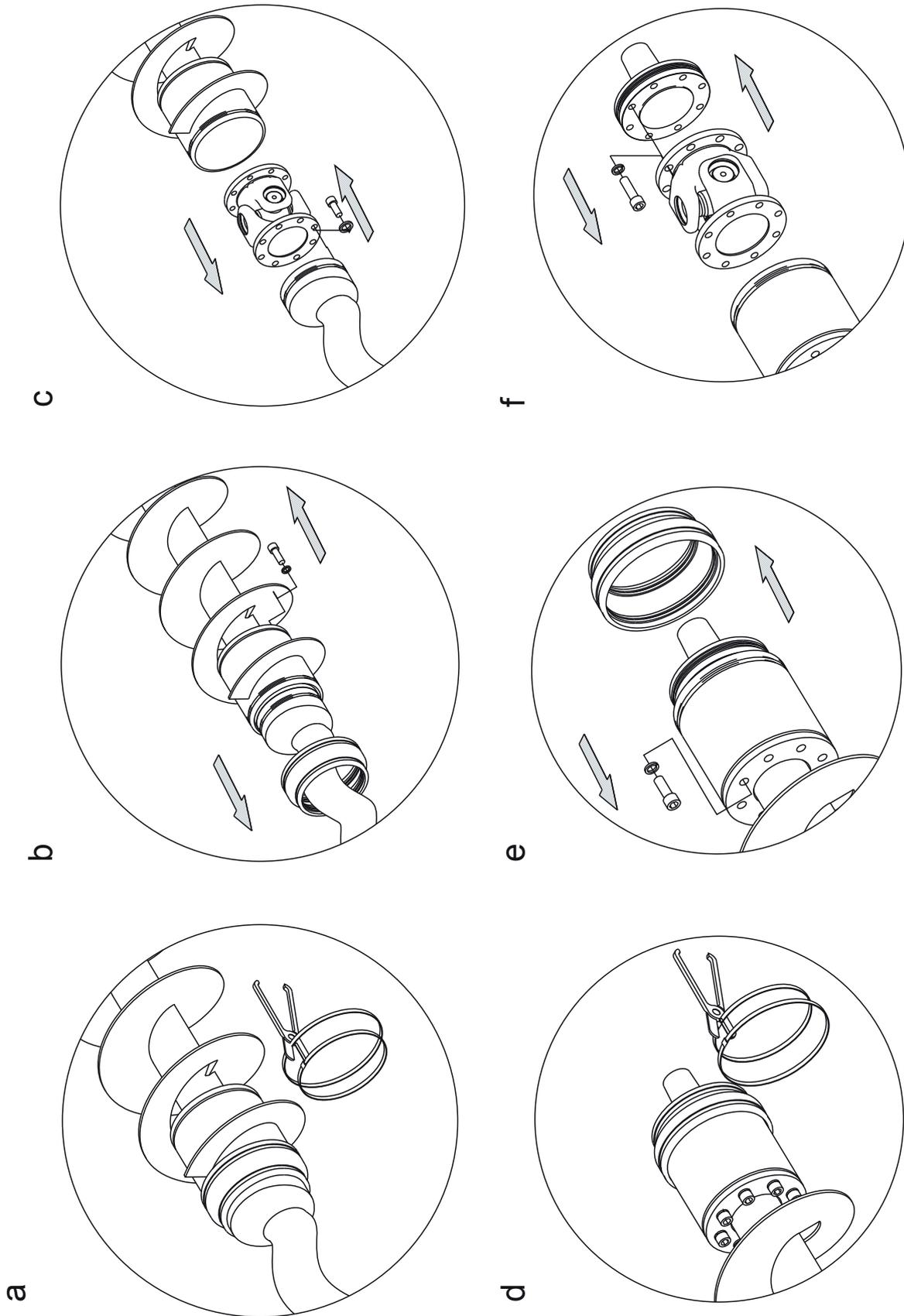
## 12.5



1358-00

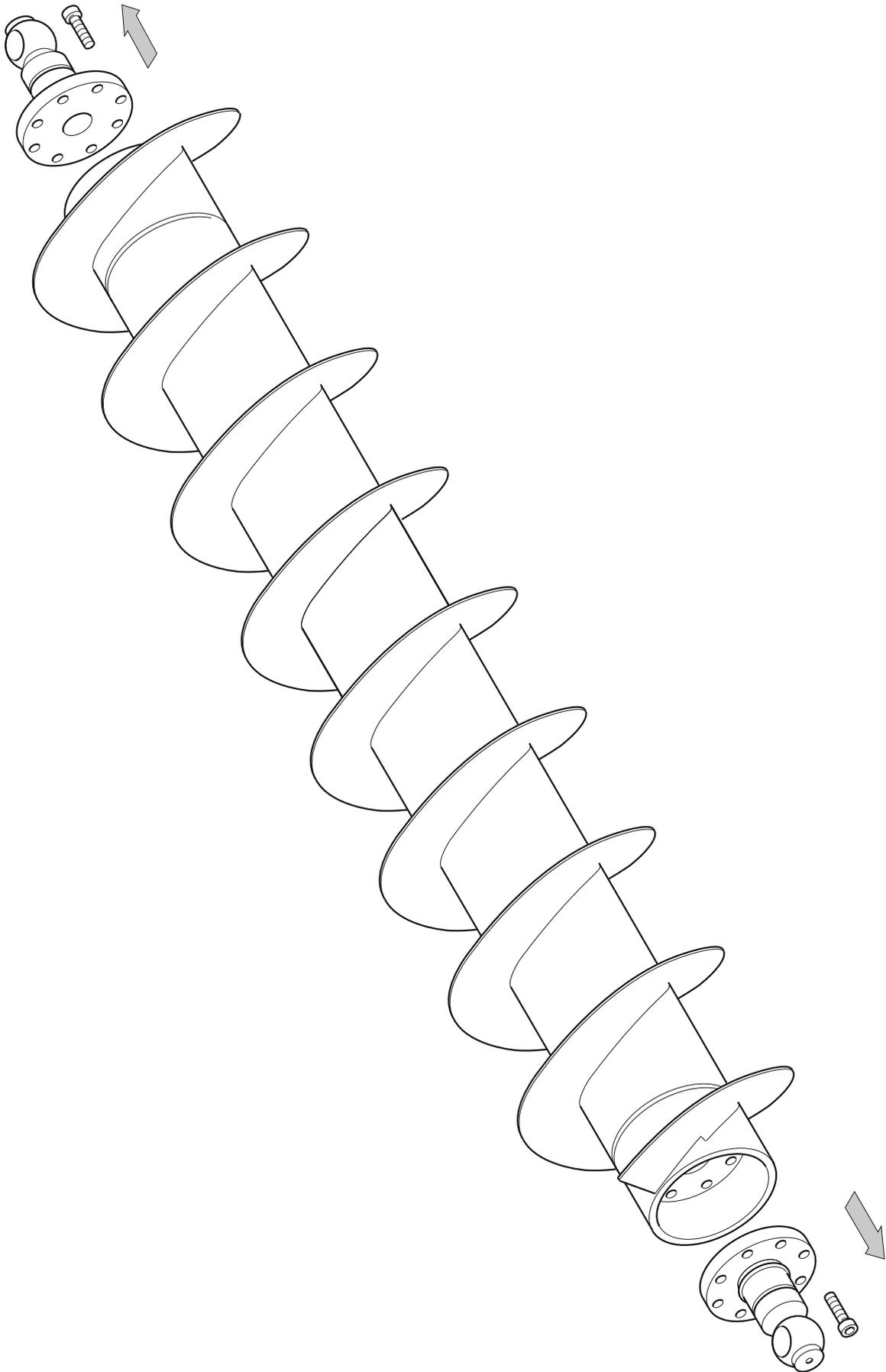
\* Fitted

**12.6 W88, WA4, WB2, WB4, WC1, WD1 (cardan joint types only)**



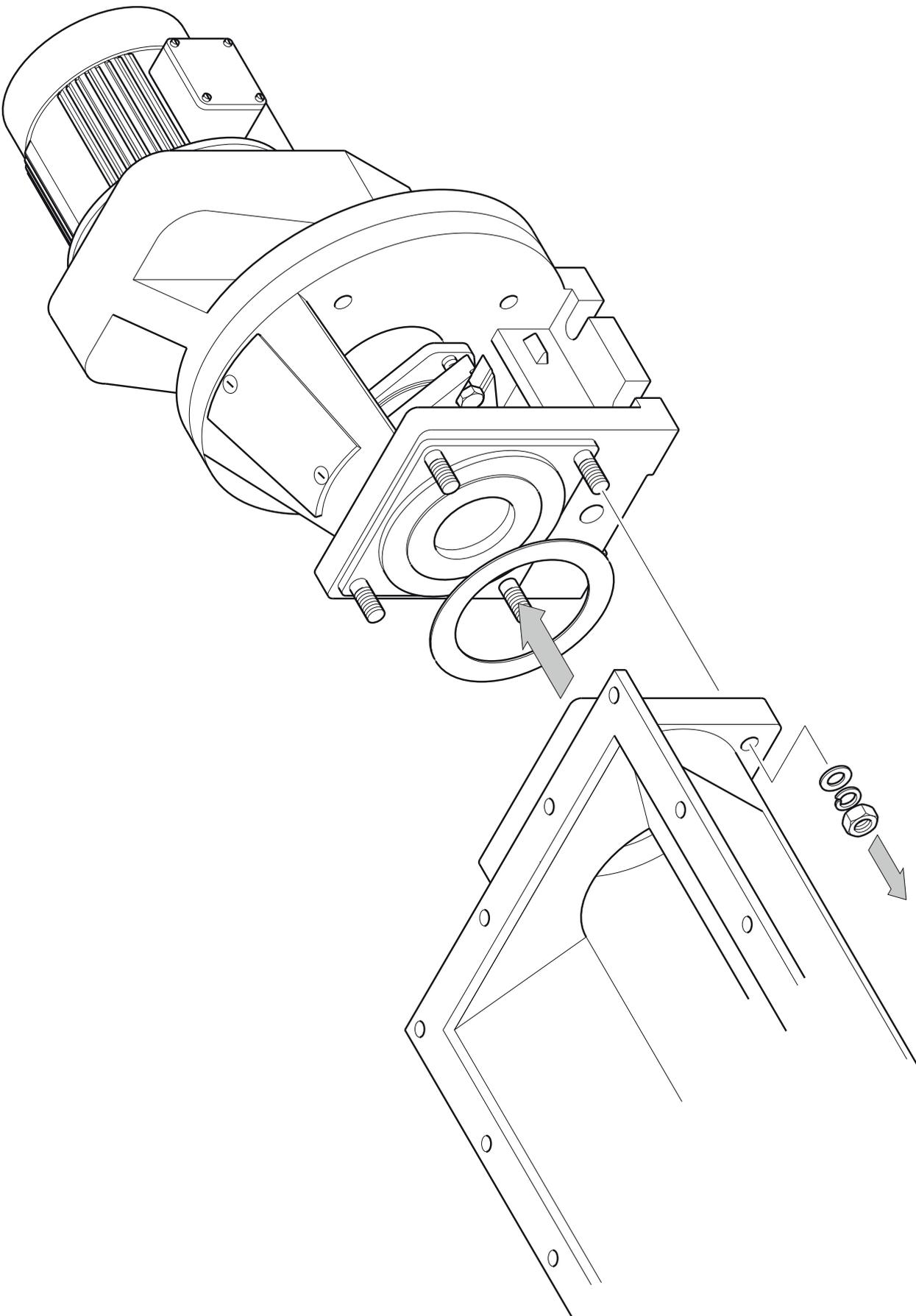
1.359-00

12.7 Large auger



1360-00

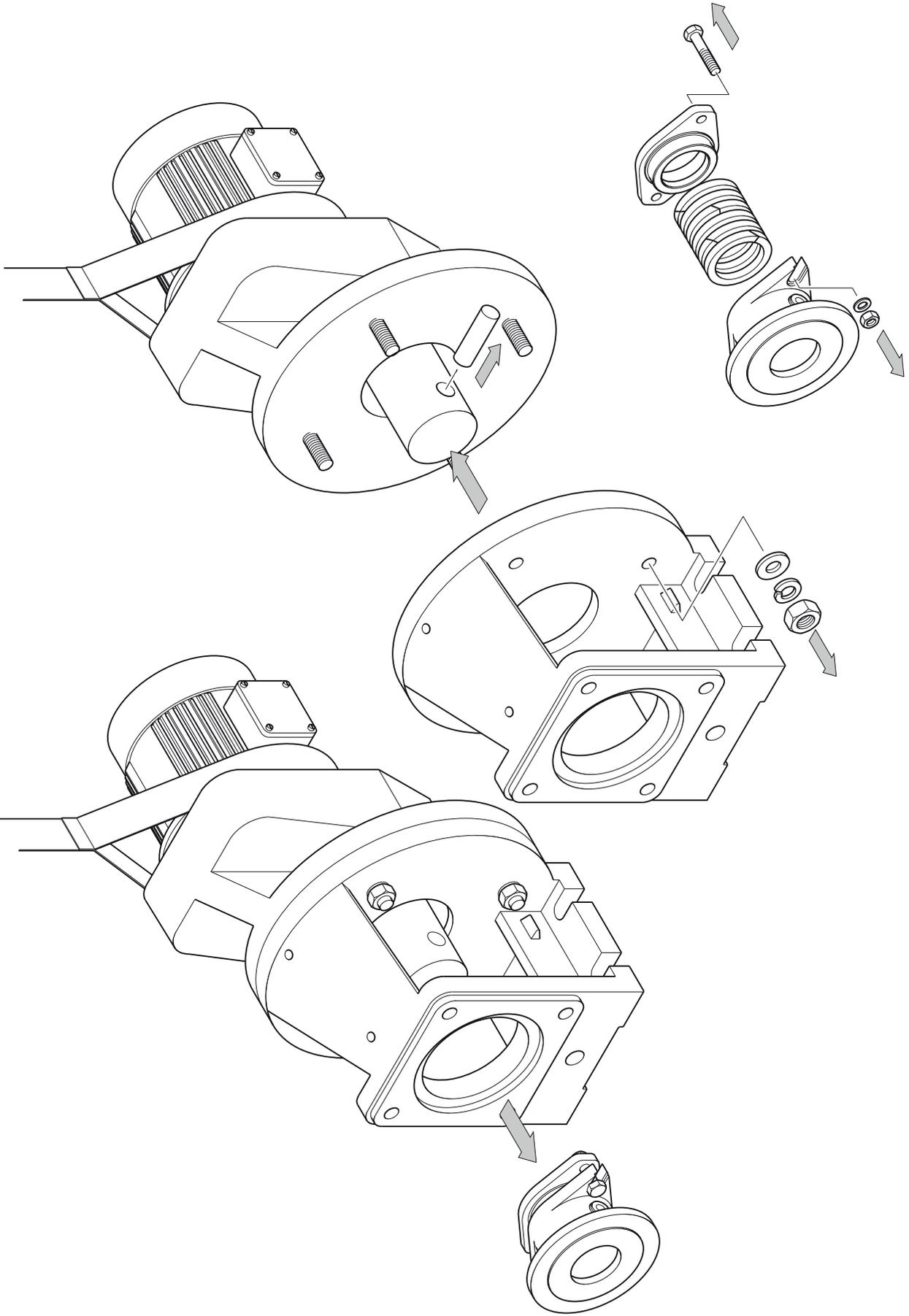
12.8



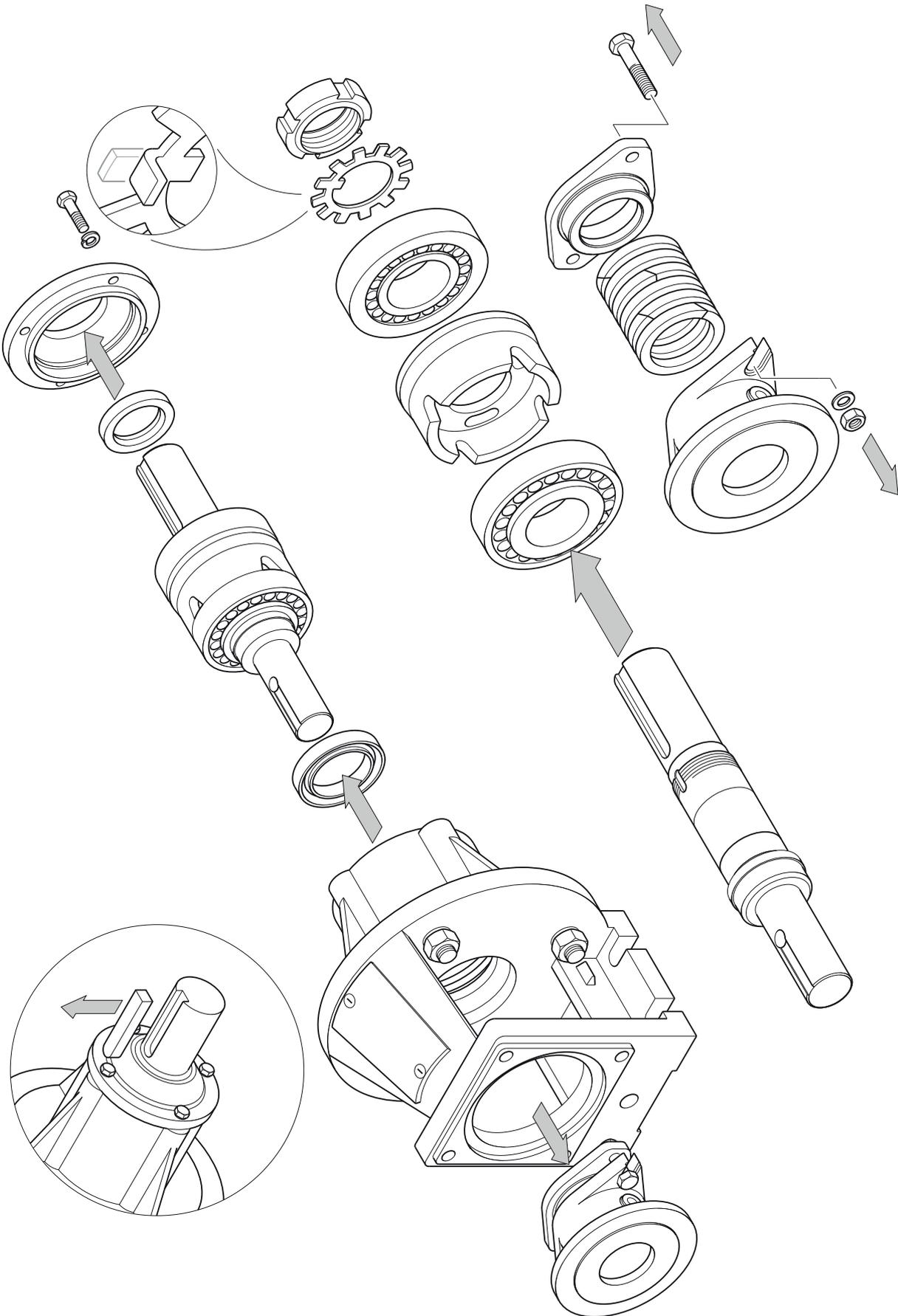
1361-00

**12.9 Close coupled only**

1362-00



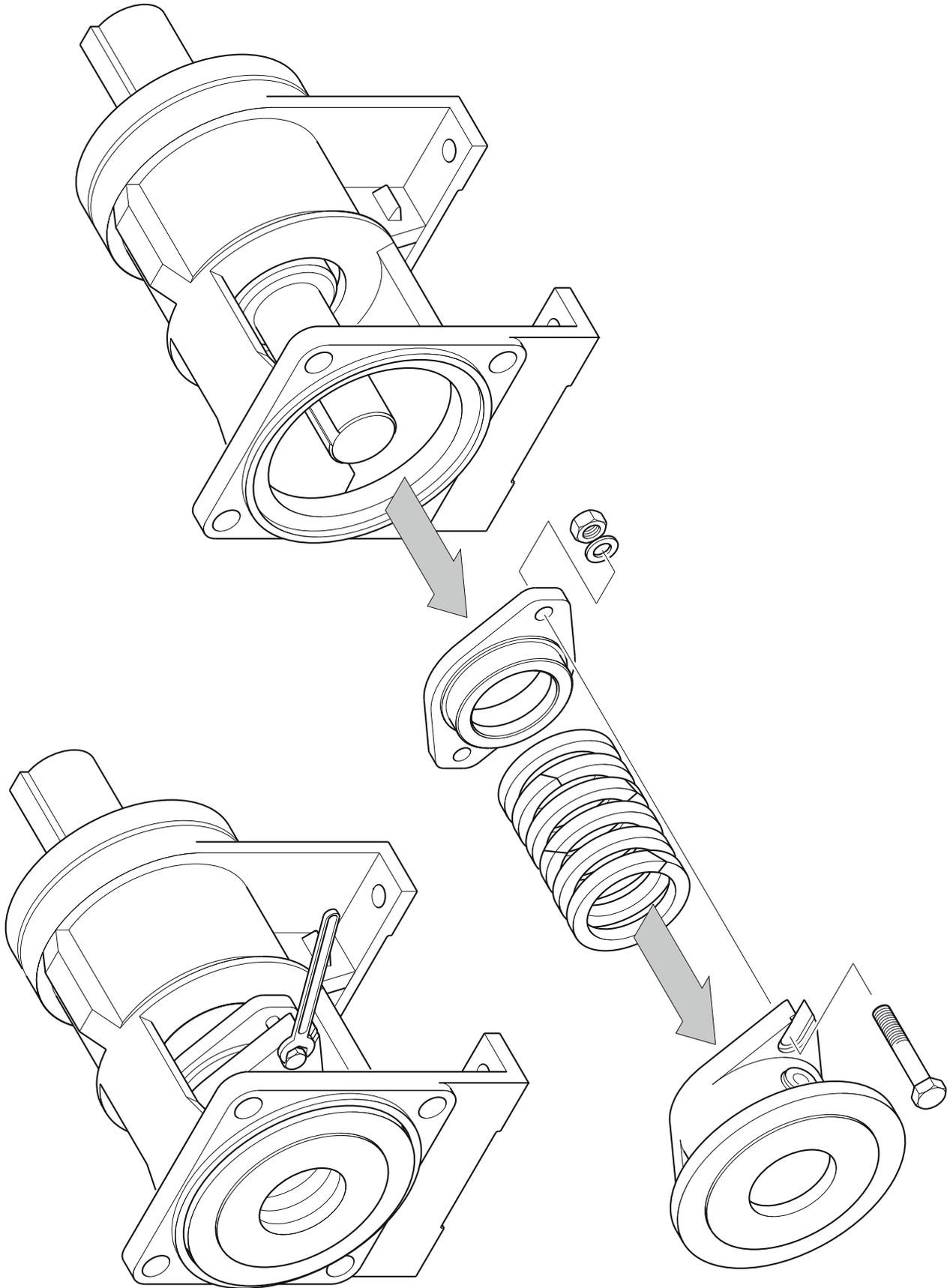
**12.10 Bareshaft only**



1.363-00

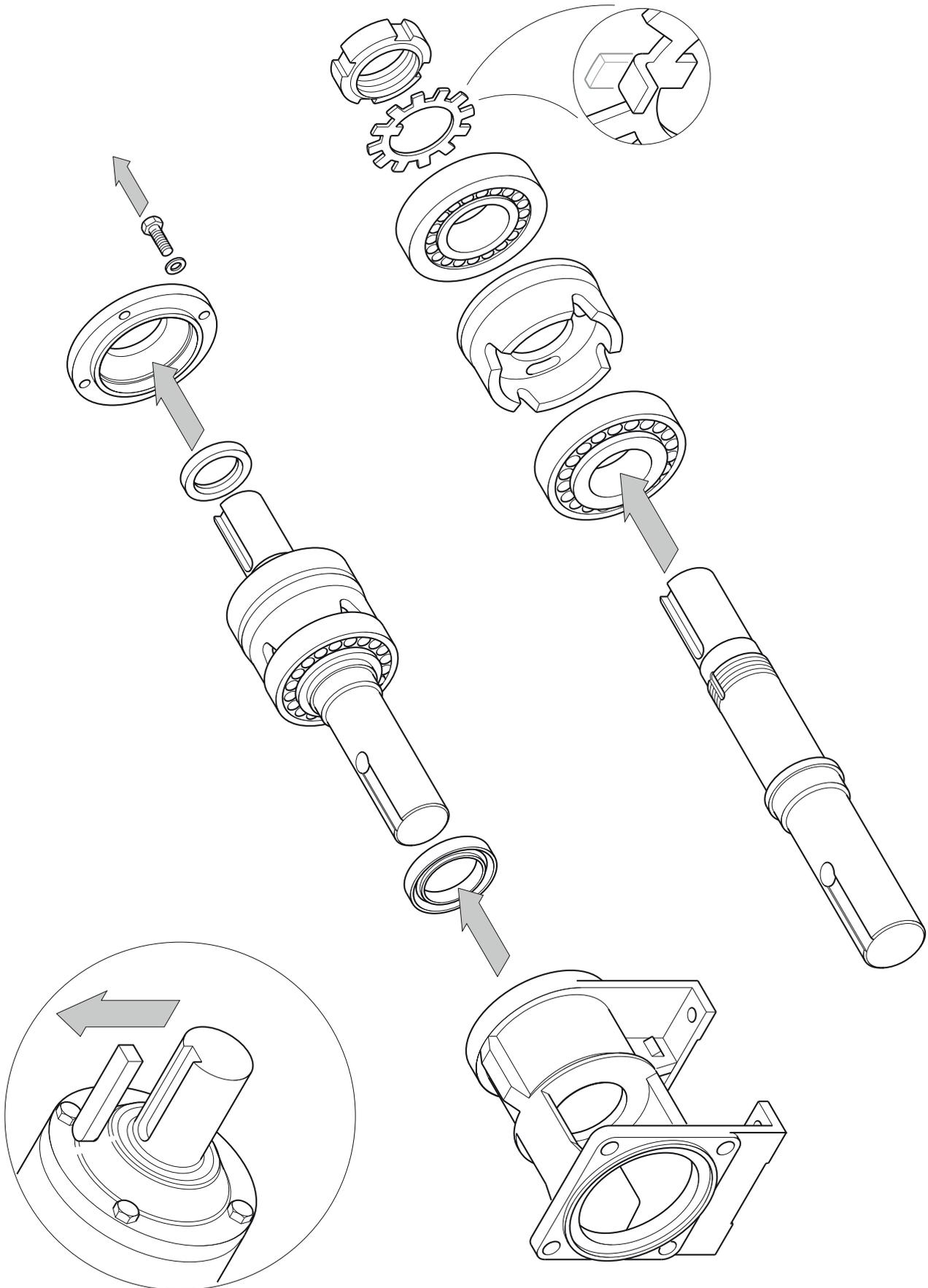
**12.11 Bareshaft W74, W84, W88, WA2, WA4, WB1, WB2, WB4, WC1, WD1 only**

1364-00



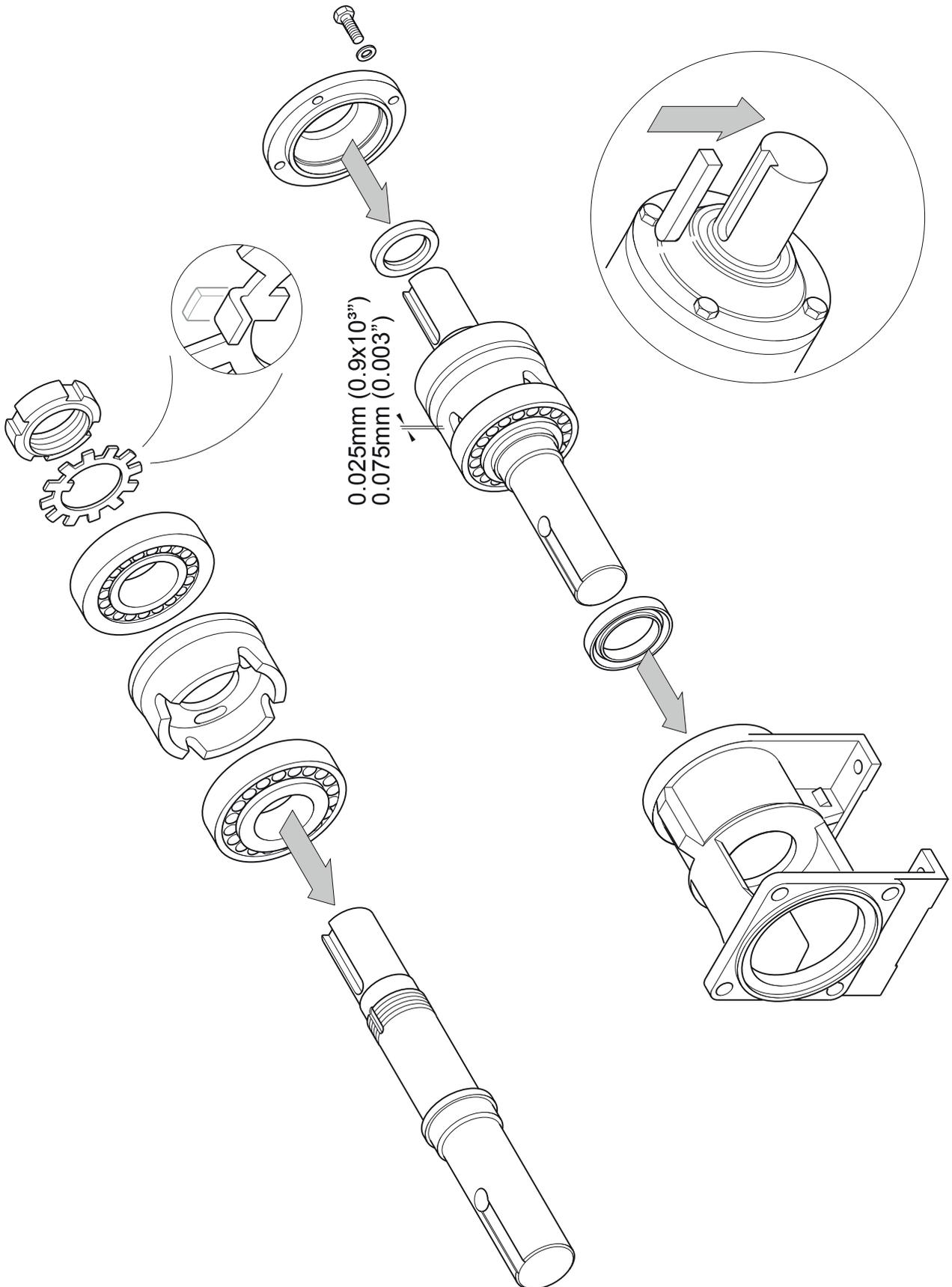
**12.12 Bareshaft W74, W84, W88, WA2, WA4, WB1, WB2, WB4, WC1, WD1 only**

1365-00



## 13 Assembly procedures

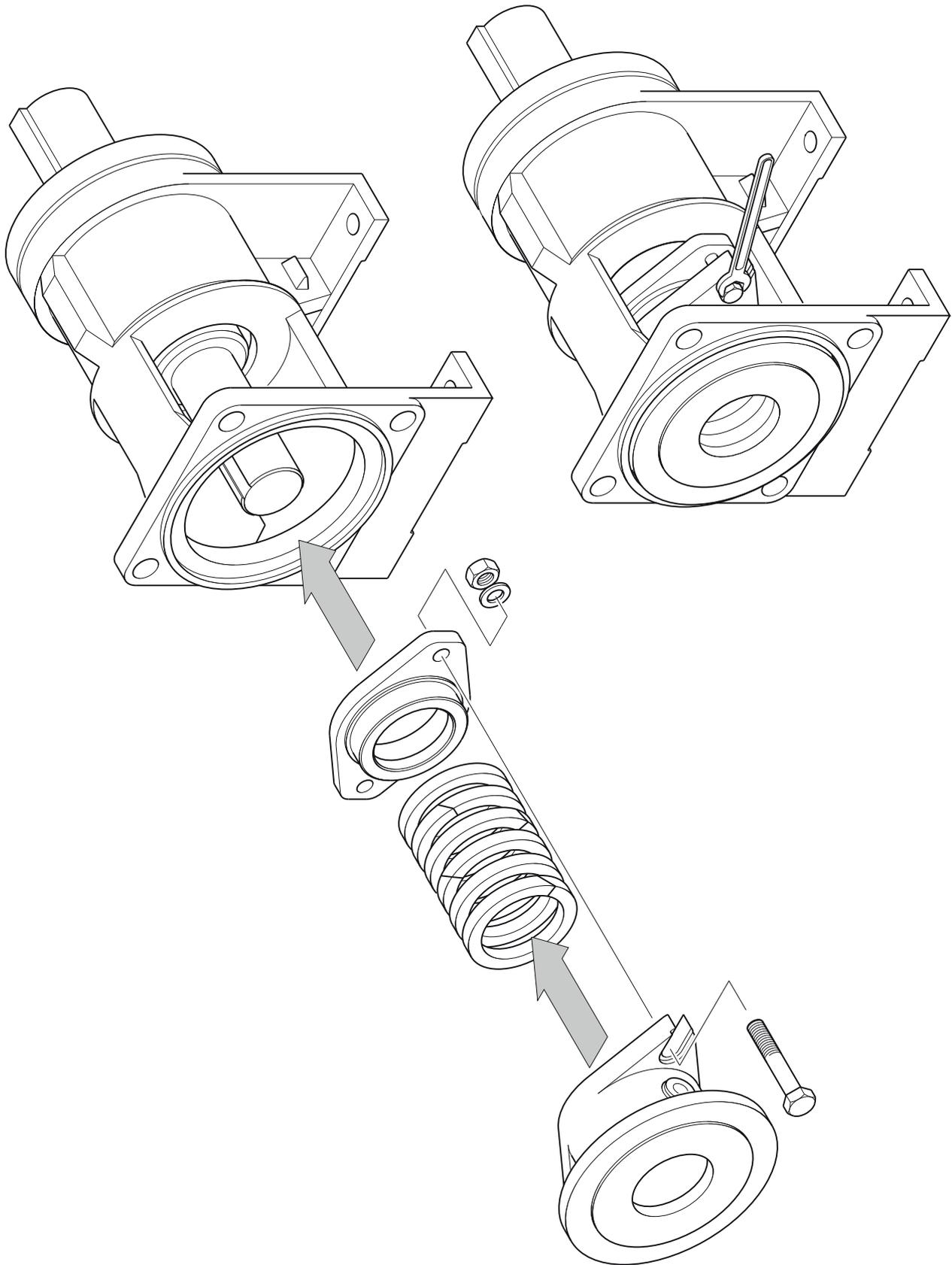
### 13.1 Bareshaft W74, W84, W88, WA2, WA4, WB1, WB2, WB4, WC1, WD1 only



1366-00

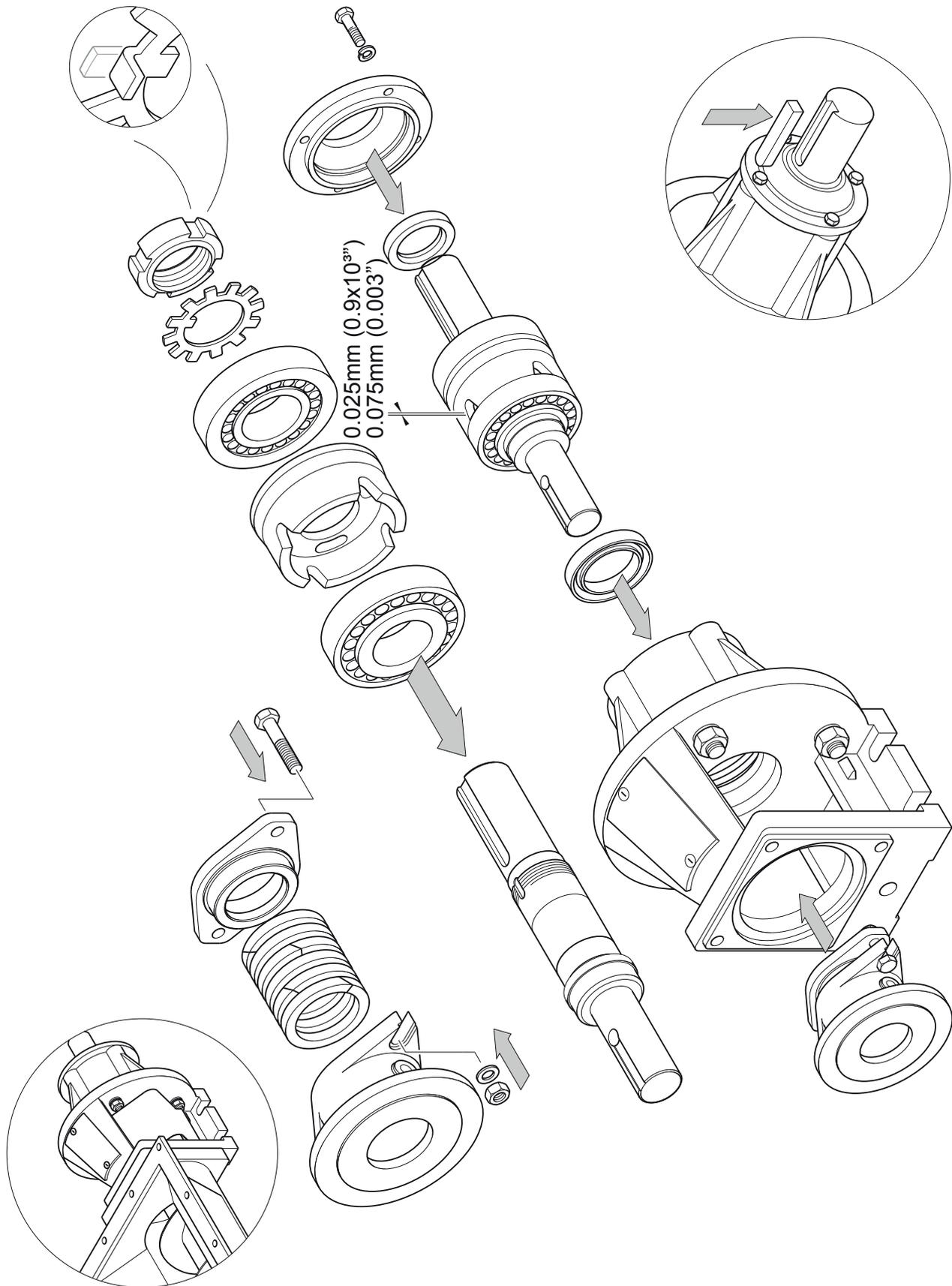
**13.2 Bareshaft WB1, WB2, WB4, WC1, WD1 only**

1.367-00



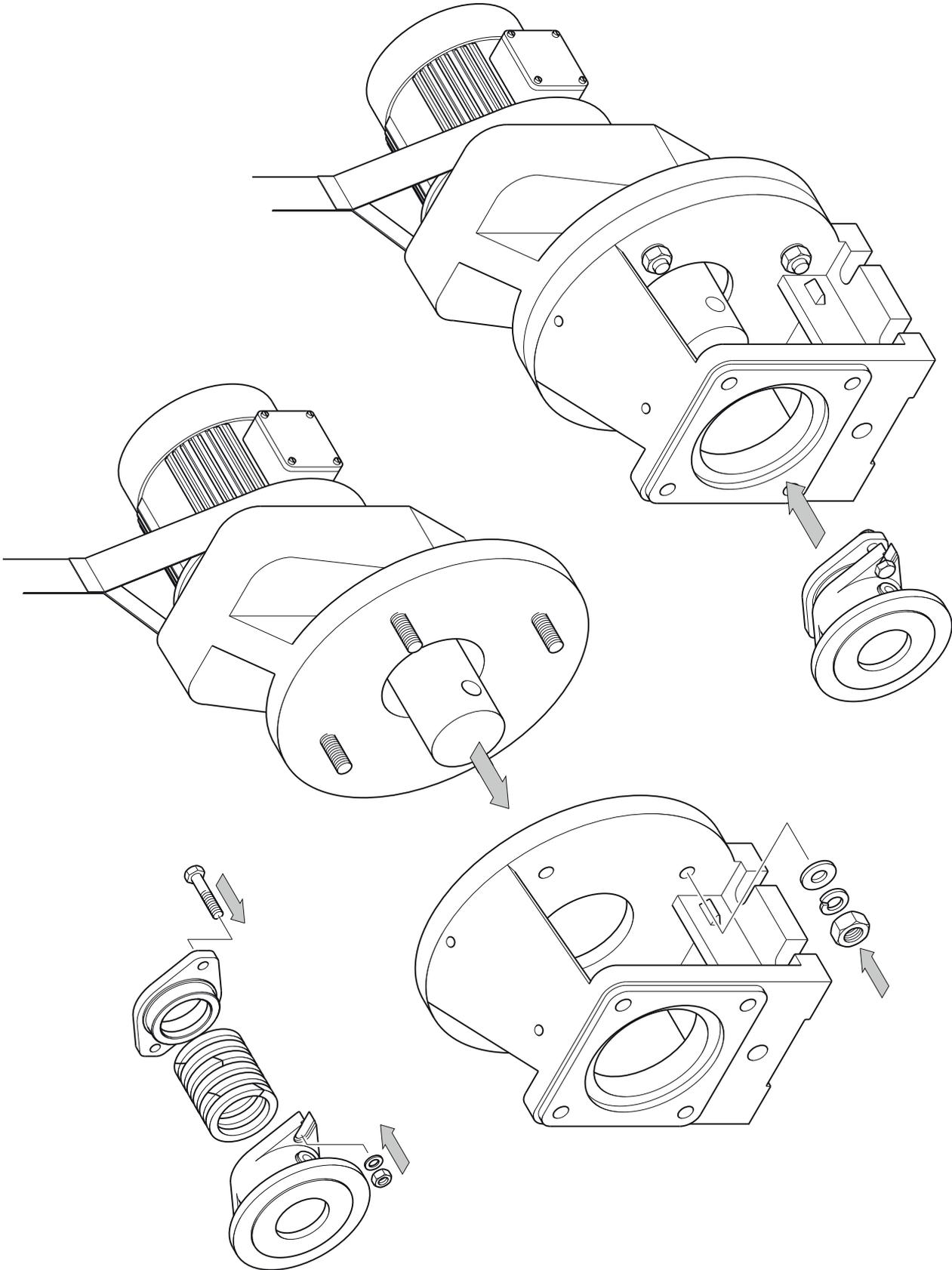
## 13.3 Bareshaft only

1368-00



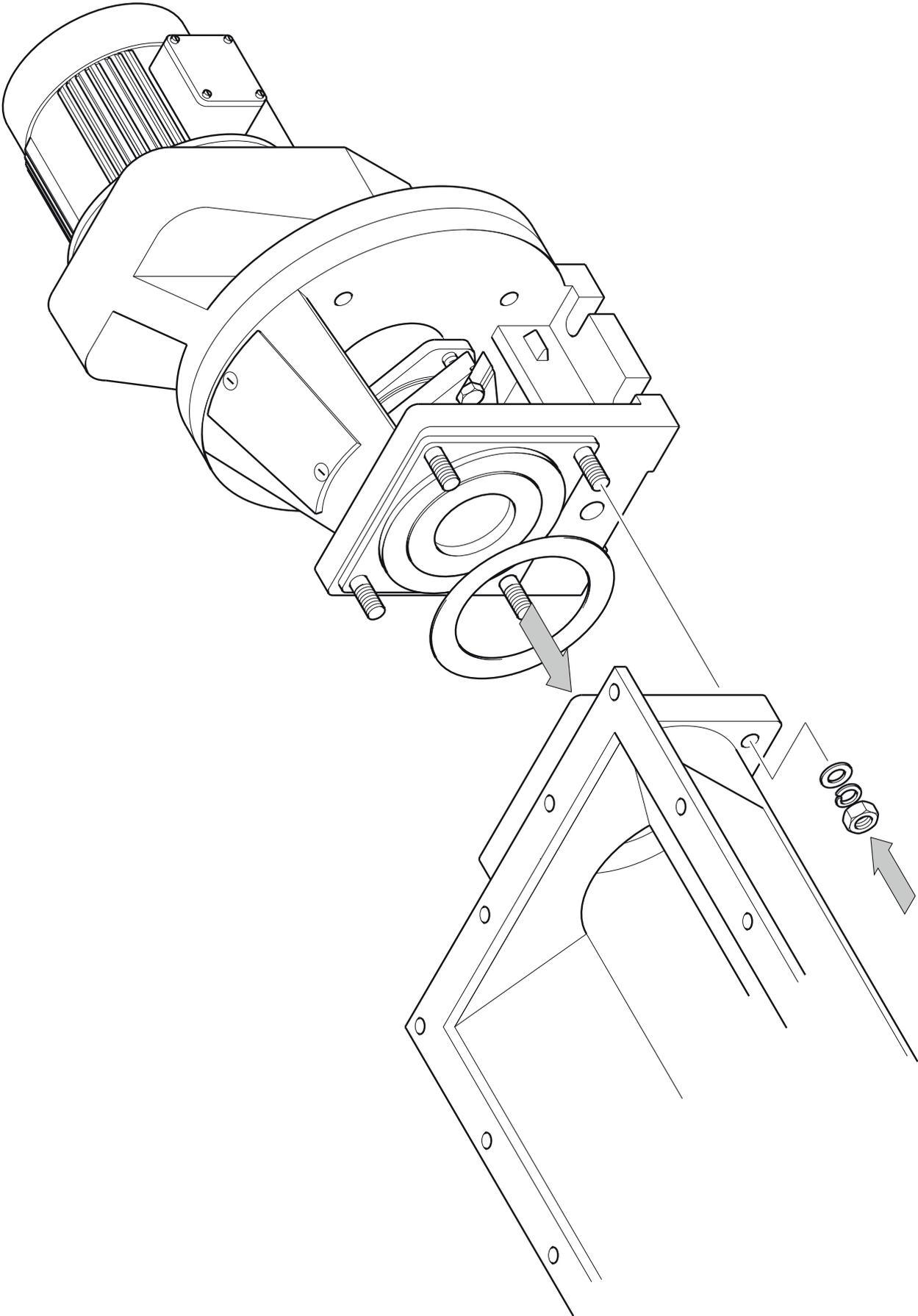
**13.4 Close coupled only**

1369-00

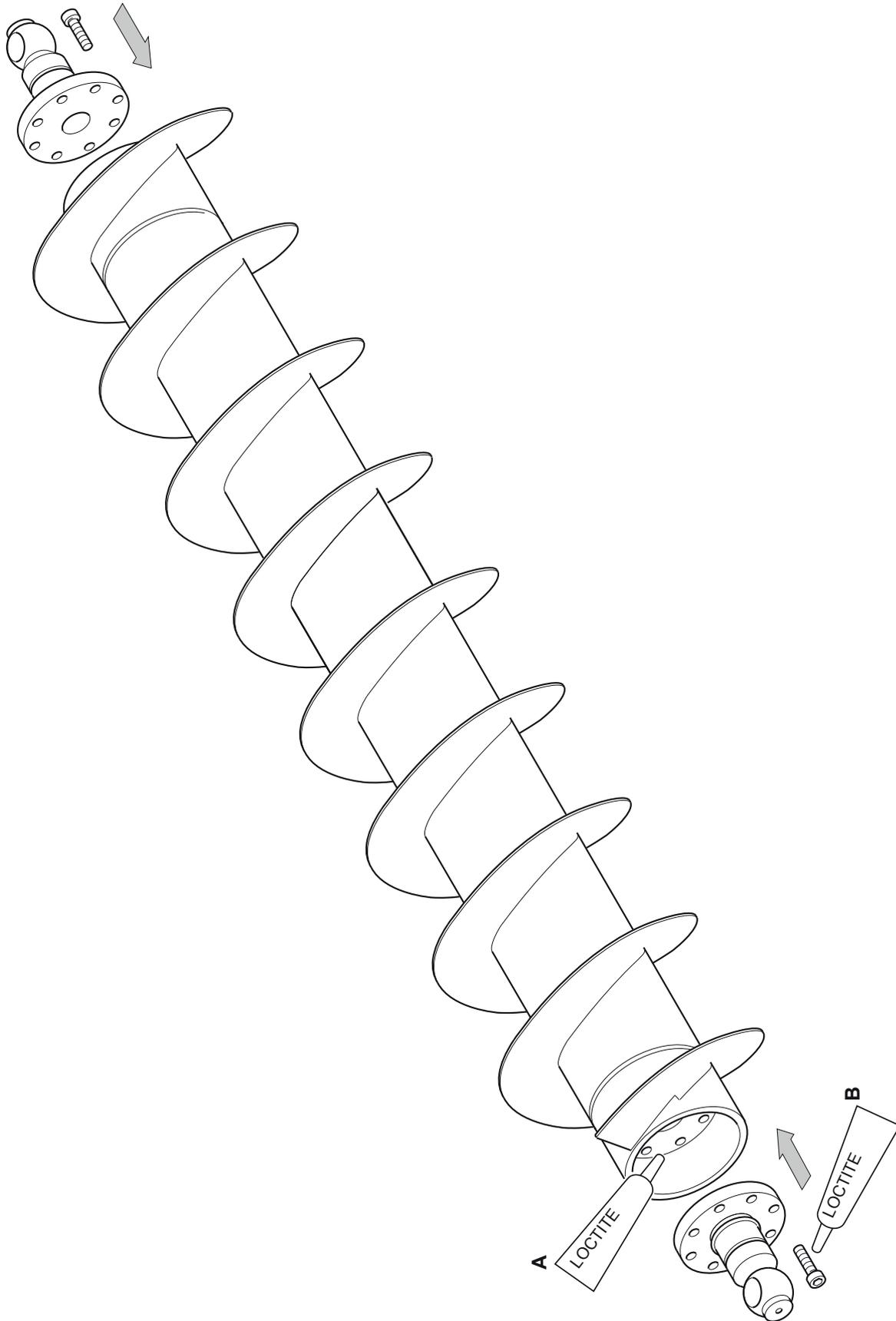


13.5

1370-00



**13.6 Large auger**

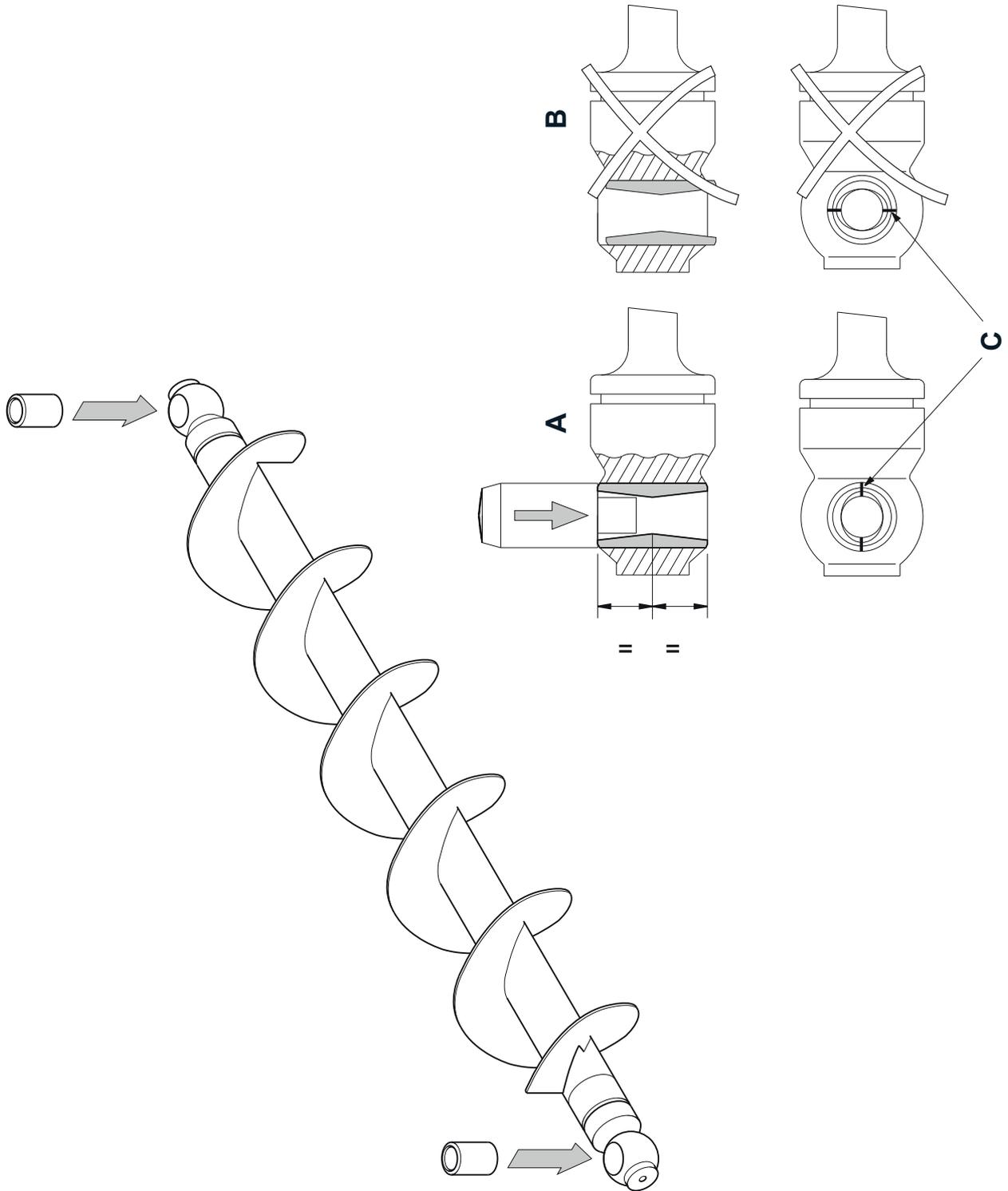


1371-00

A = Liquid gasket B = Thread sealant

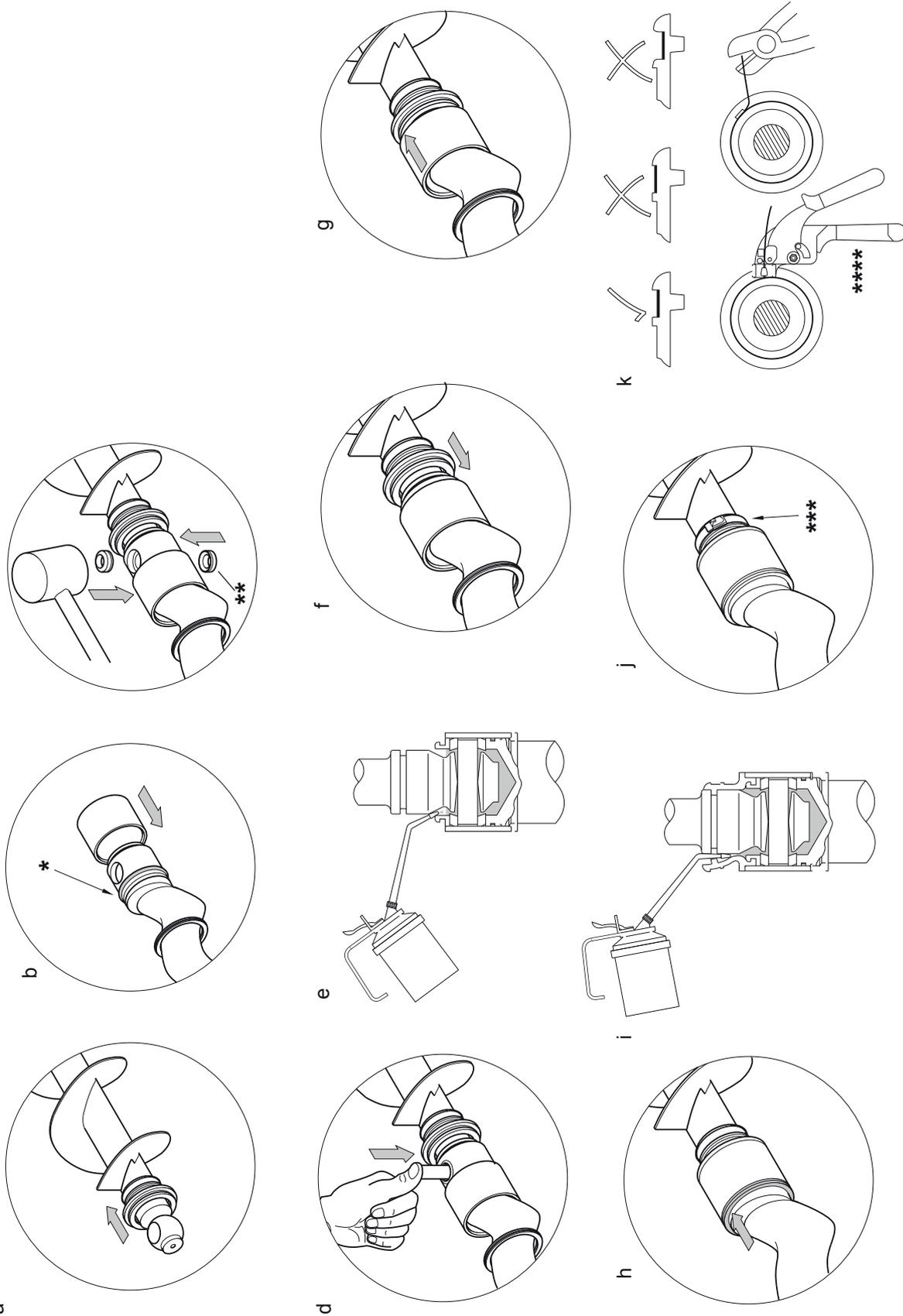
13.7

1372-00



A = Correct B = Incorrect C = Alignment marks

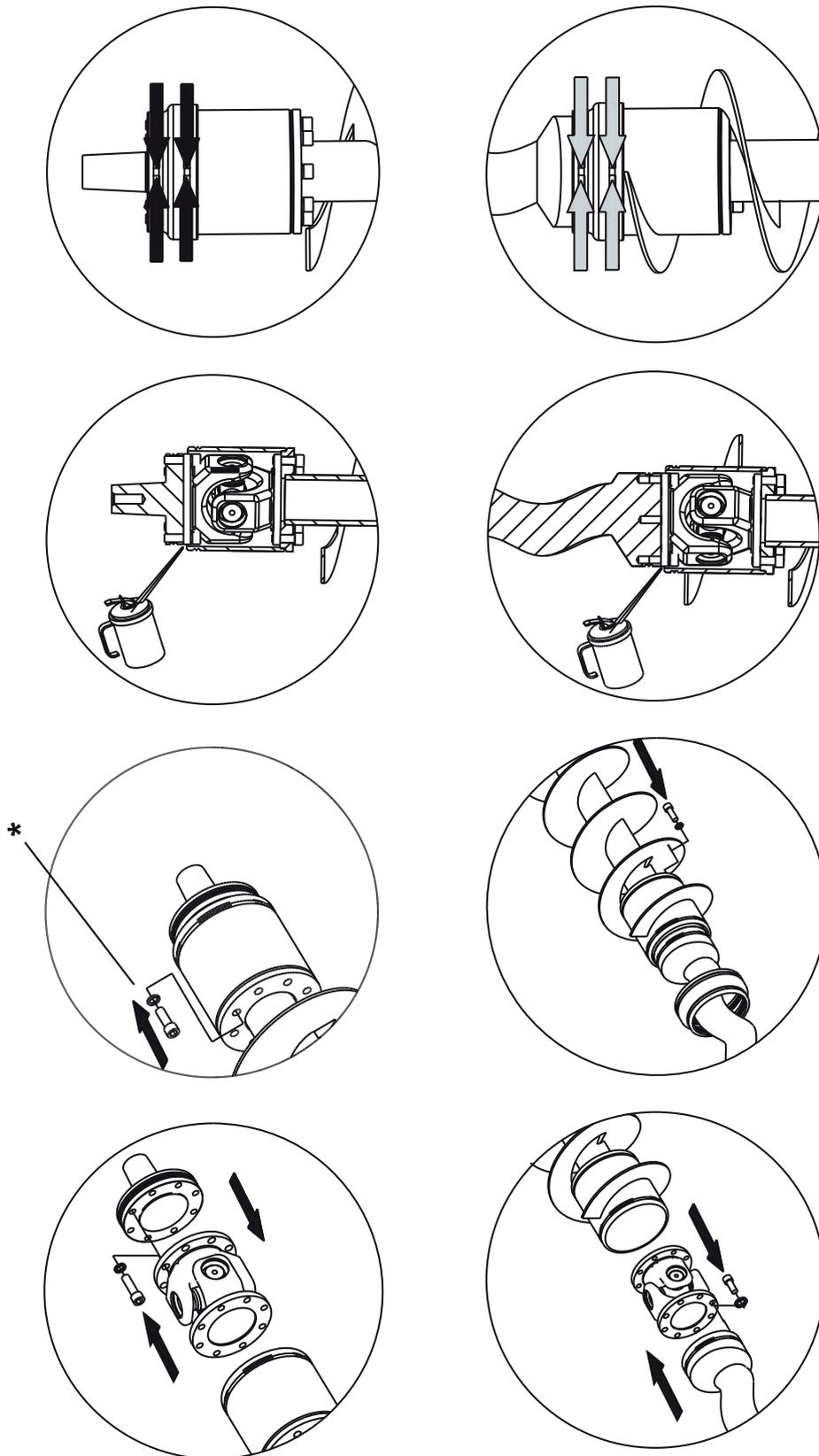
13.8



1373-00

\* Fit new sealing ring    \*\* Where fitted    \*\*\* Fit retaining clamp

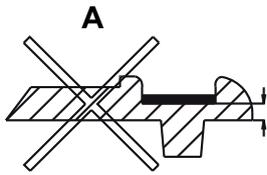
## 13.9 W88, WA4, WB2, WB4, WC1, WD1 (cardan joint types only)



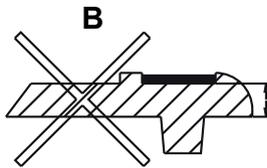
\* Important: use correct sealing washer.

Note: refer to pages 30 and 31 for details of sealing compounds to be used.

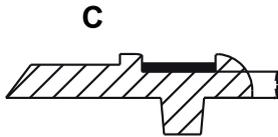
**13.10 Fitting of sealing cover retaining clamp**



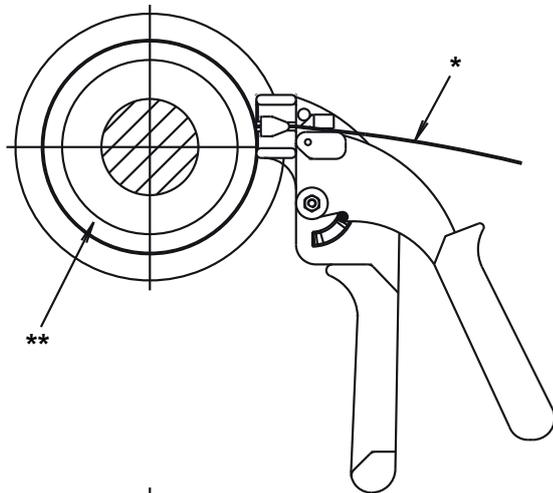
**A** = Tension too tight



**B** = Tension too loose



**C** = Correct tension

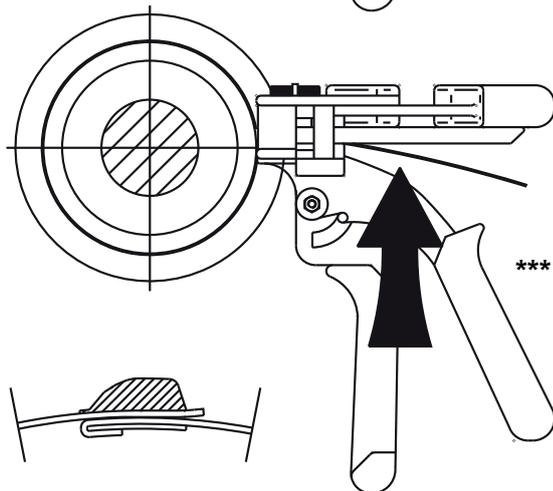


1. Loop clamp around sealing cover and insert tip through head. Pull clamp up snug on sealing cover by hand.

2. Place tool on clamp as shown.

3. Squeeze handles as many times as necessary to achieve correct tension.

4. To remove excess banding, rotate tool  $\frac{1}{4}$  -  $\frac{1}{2}$  turn whilst maintaining handle pressure. Alternatively cut with snips.



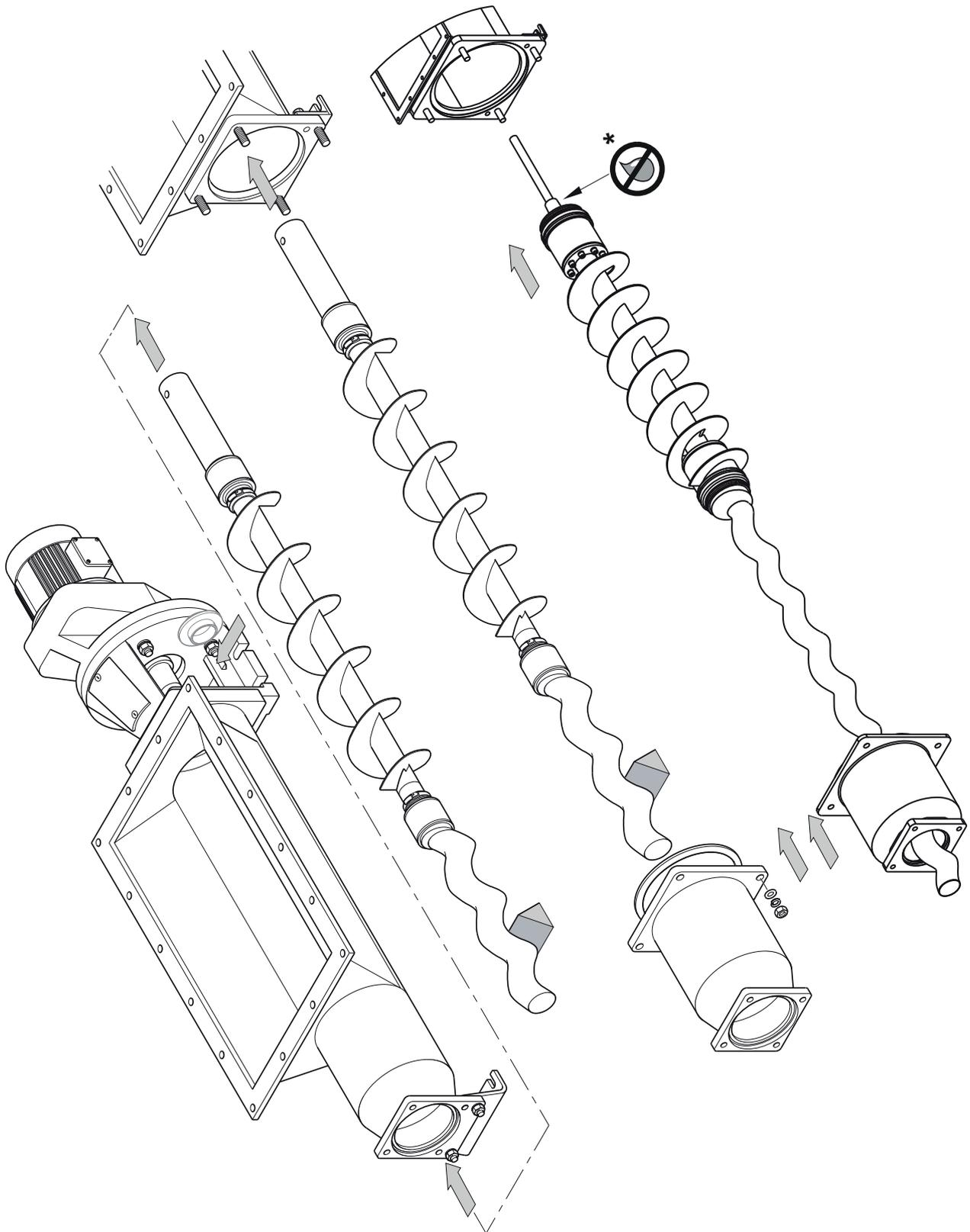
**Note:** Ensure cut off point is flush with end of buckle as shown opposite. Clamp may loosen if cut too short.

\* Clamp

\*\* Sealing cover

## 13.11

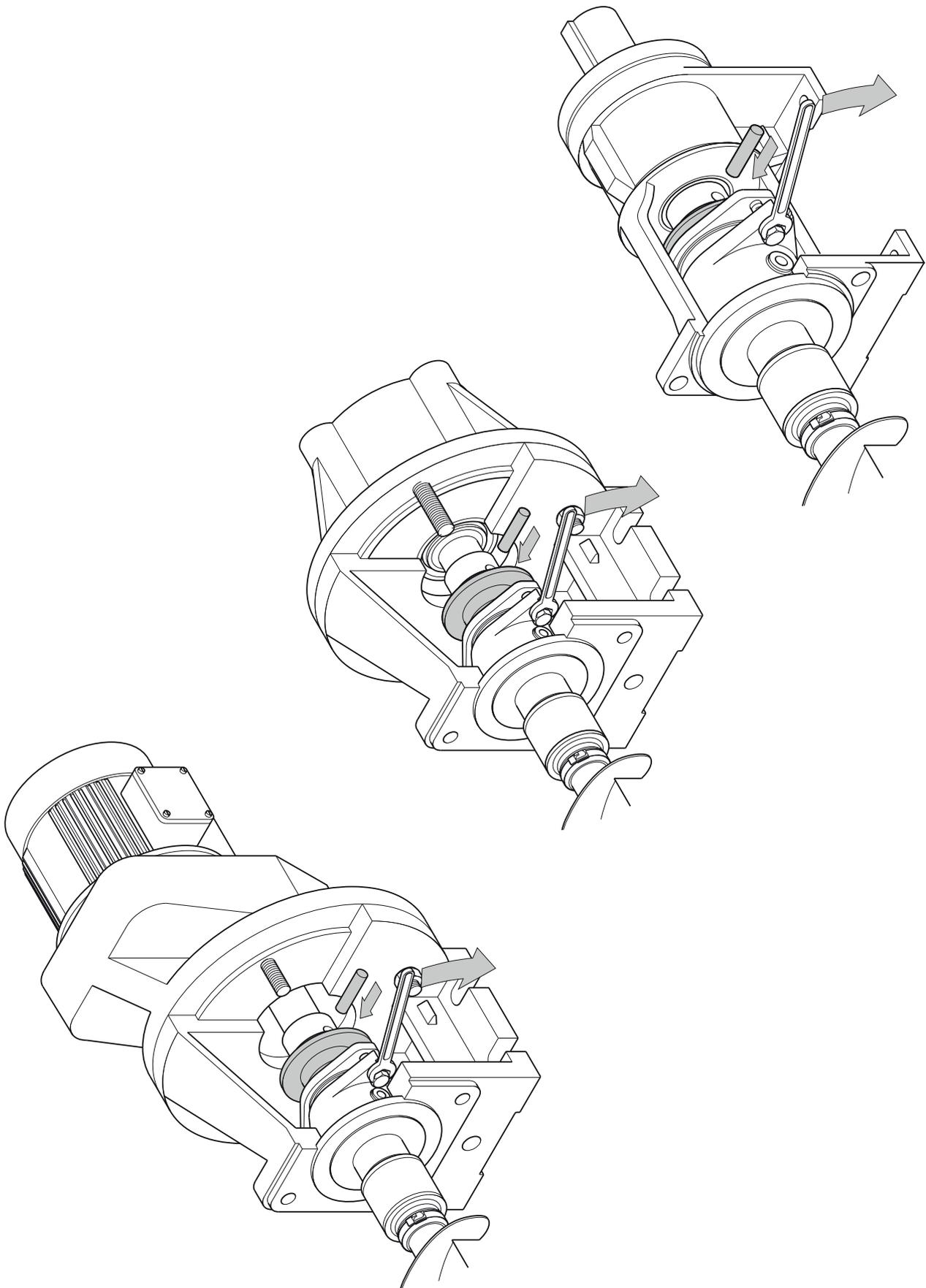
1376-00



\* No oil

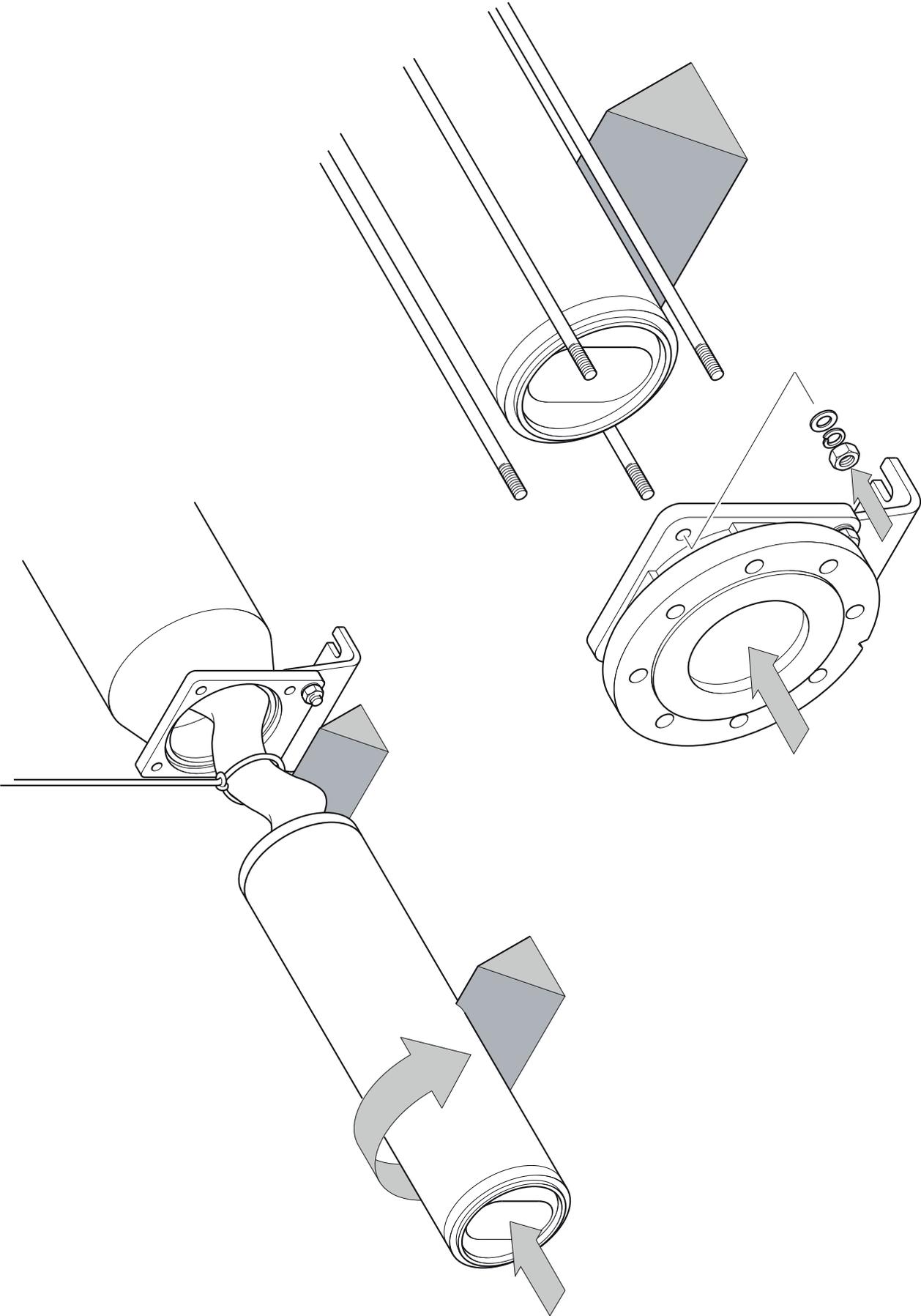
13.12

1377-00



13.13

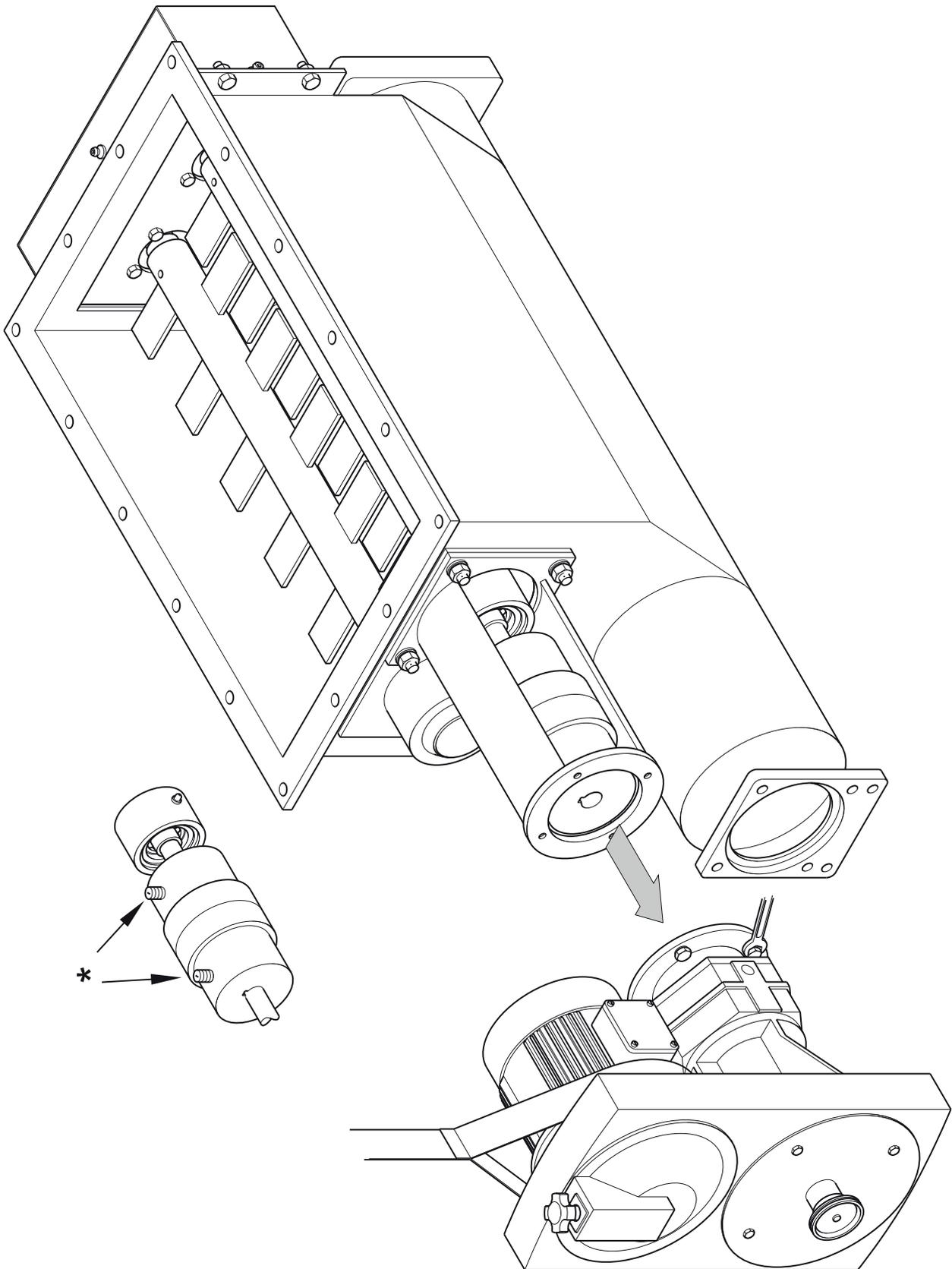
1378-00



## 14 Dismantling procedures - bridge breaker

### 14.1

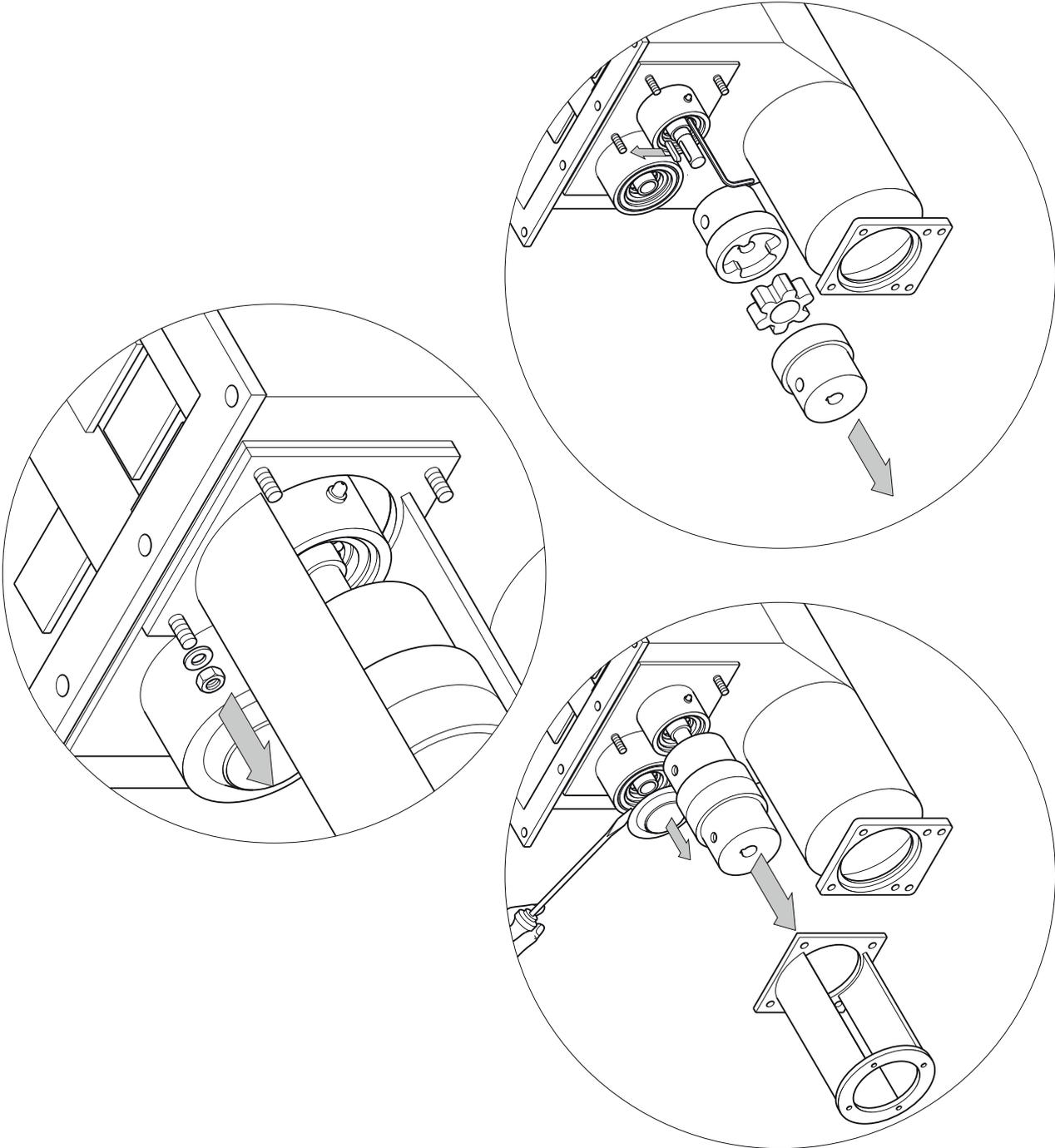
1379-00



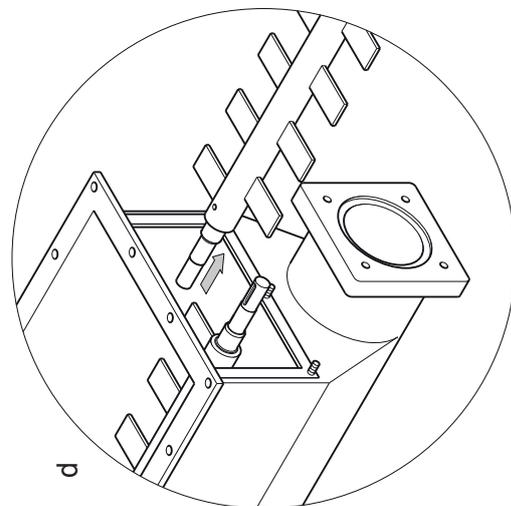
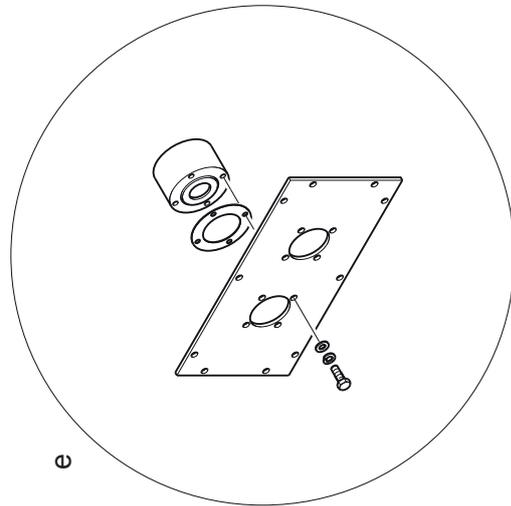
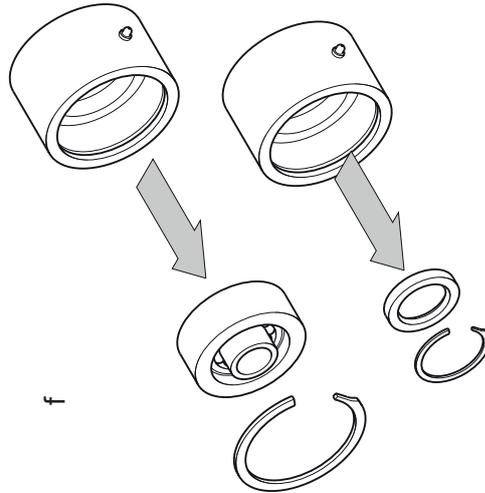
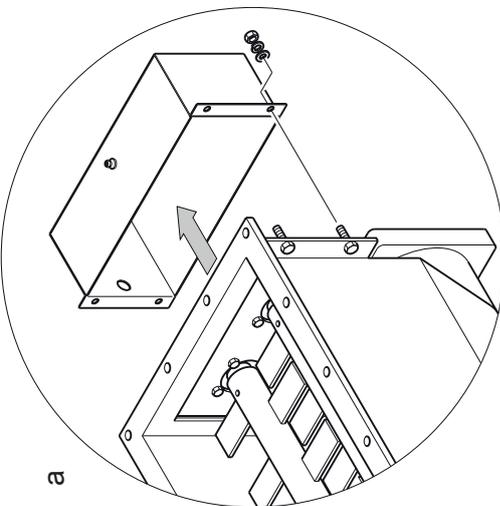
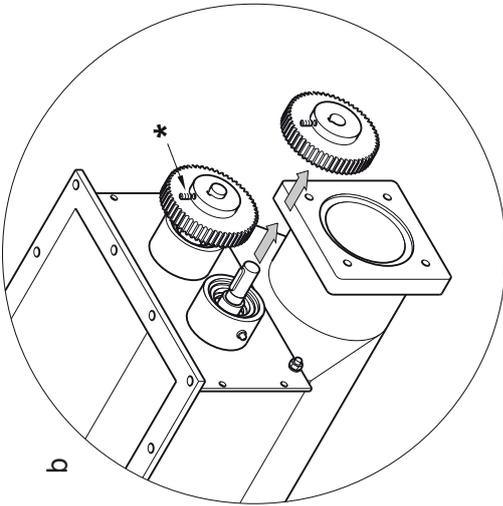
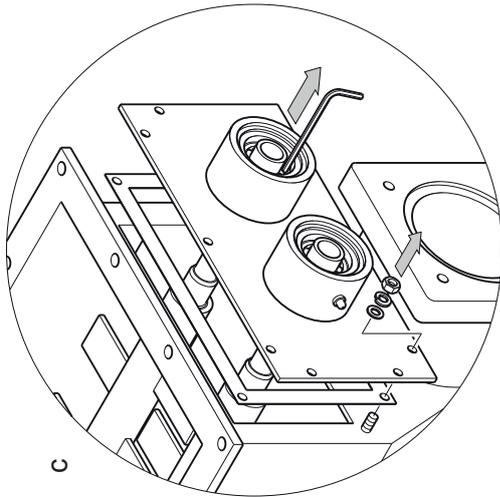
\* Loosen set screws

14.2

1380-00



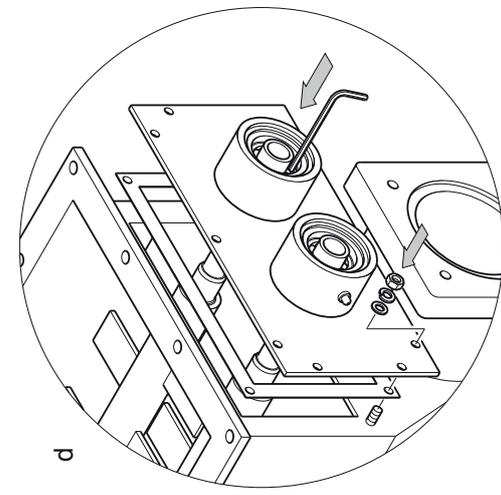
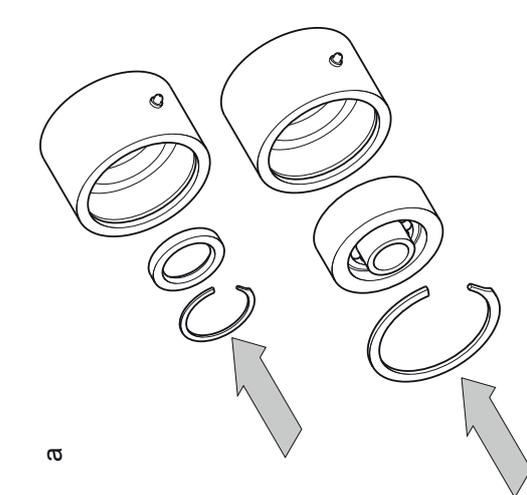
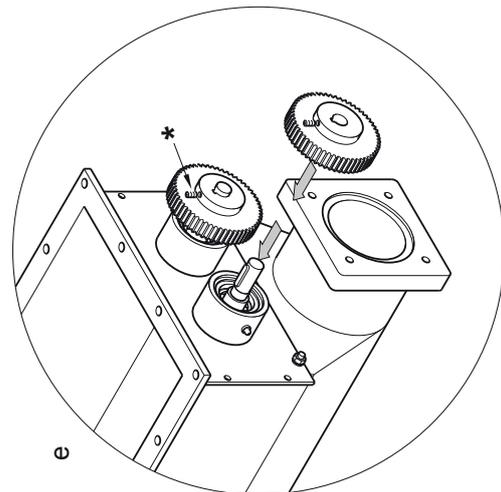
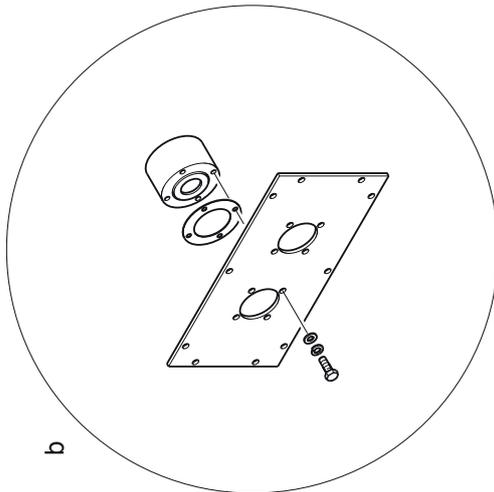
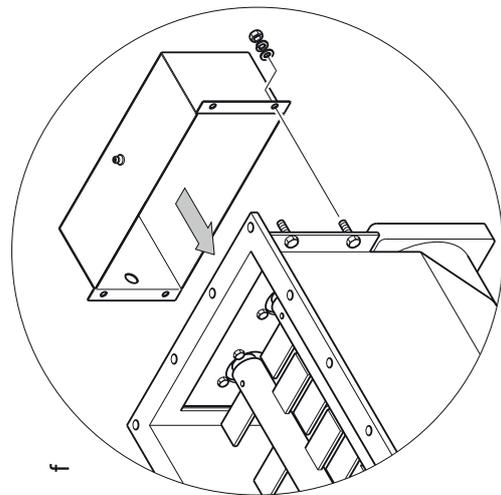
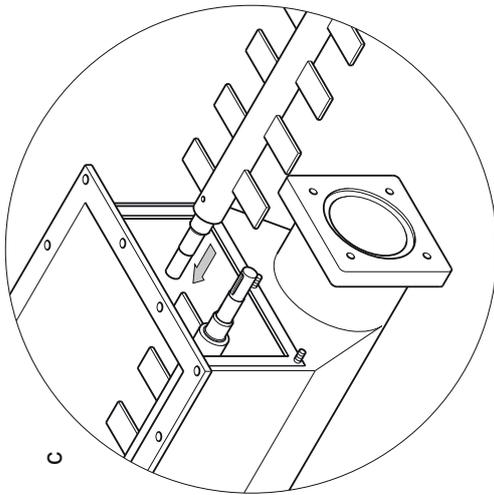
14.3



\* Loosen set screws

## 15 Assembly procedures - bridge breaker

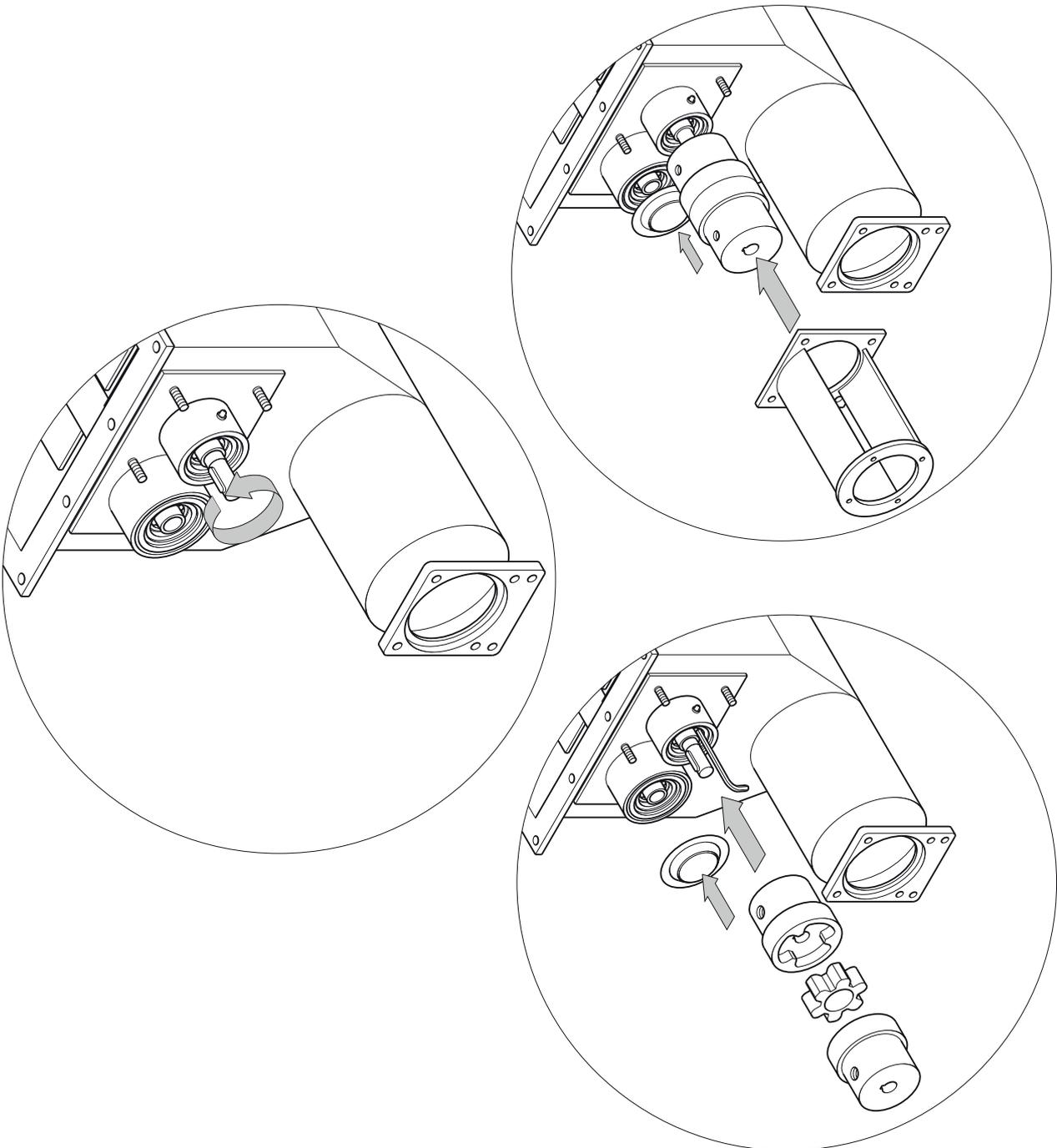
### 15.1



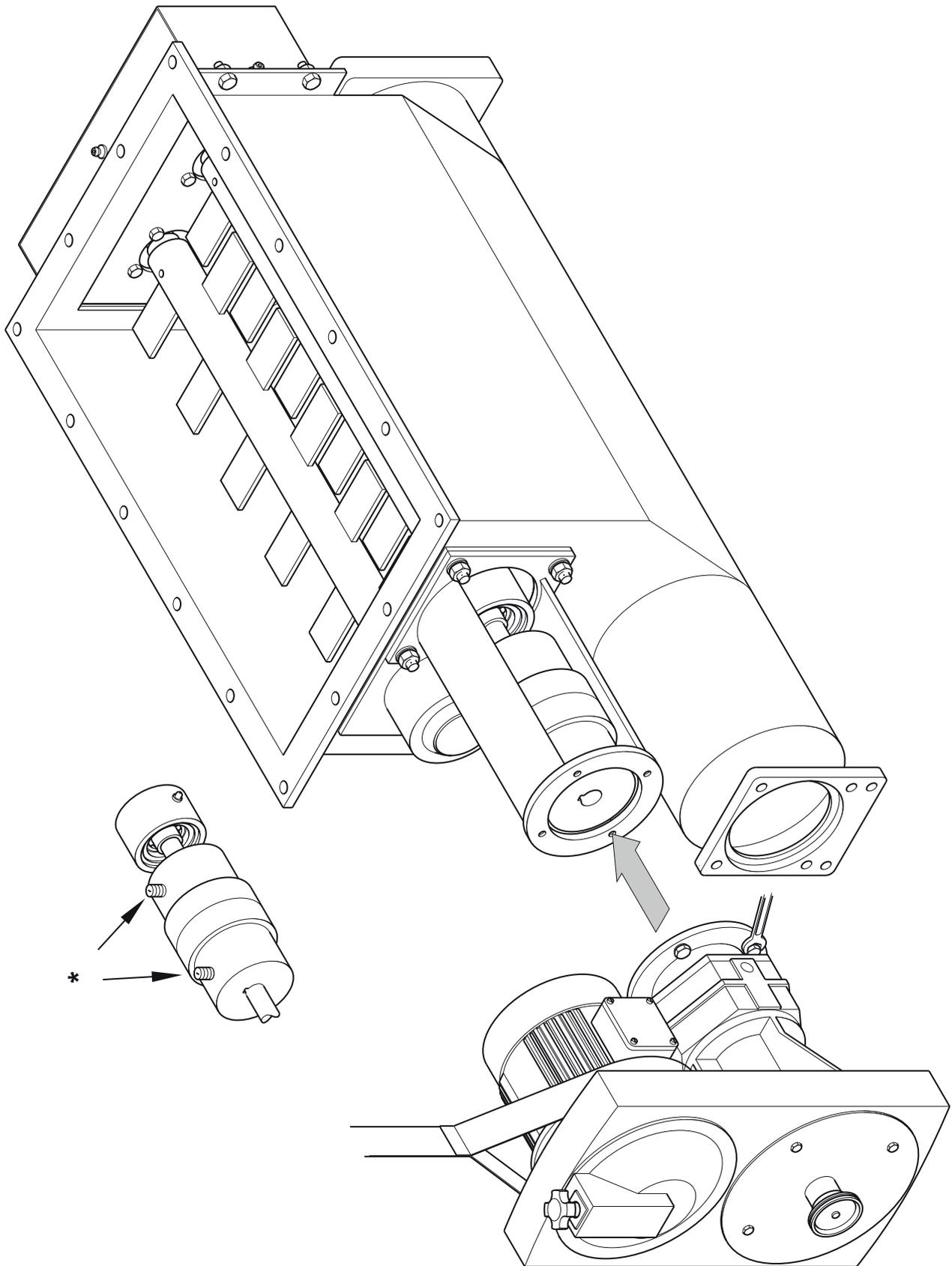
\* Tighten set screws

**15.2**

1383-00



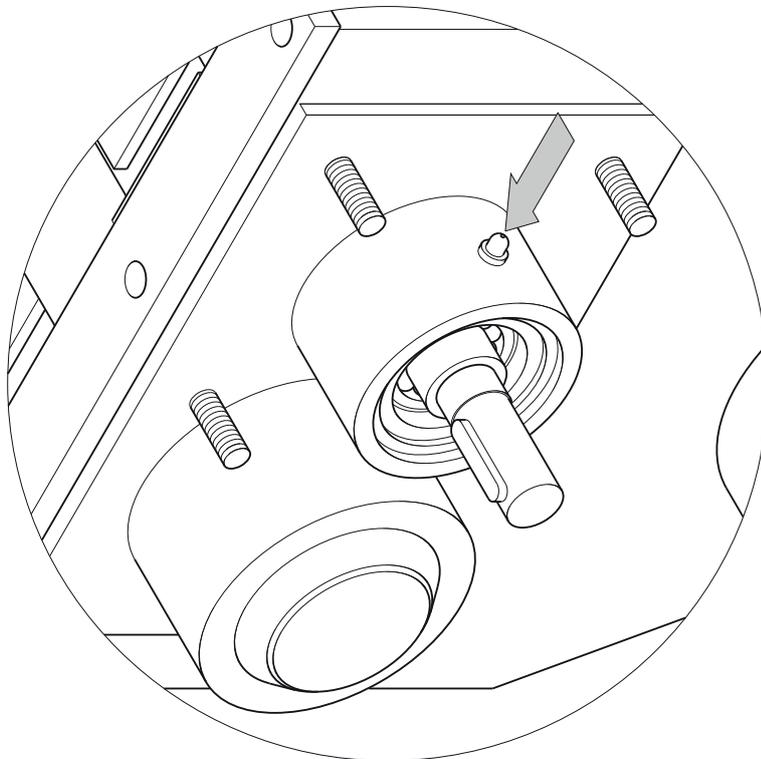
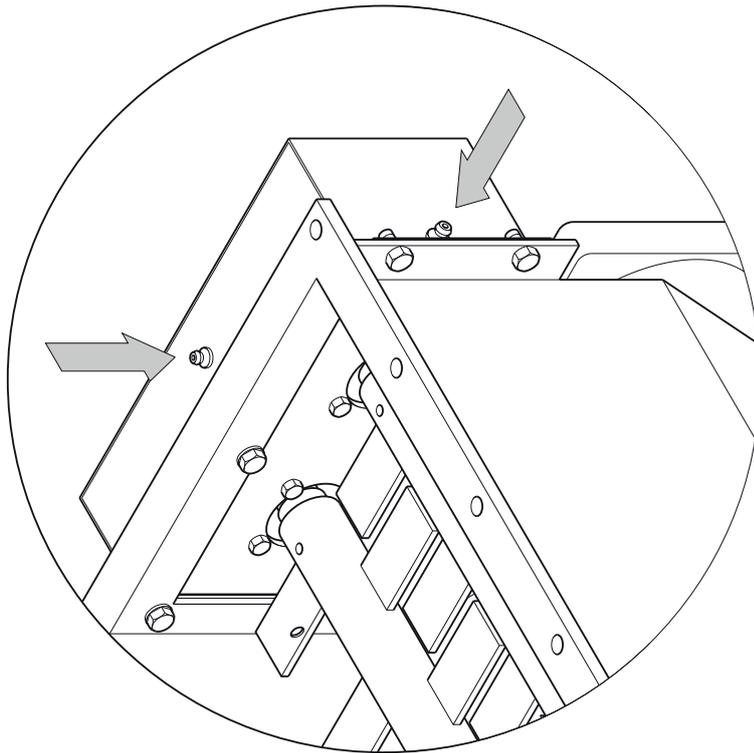
## 15.3



\* Tighten set screws

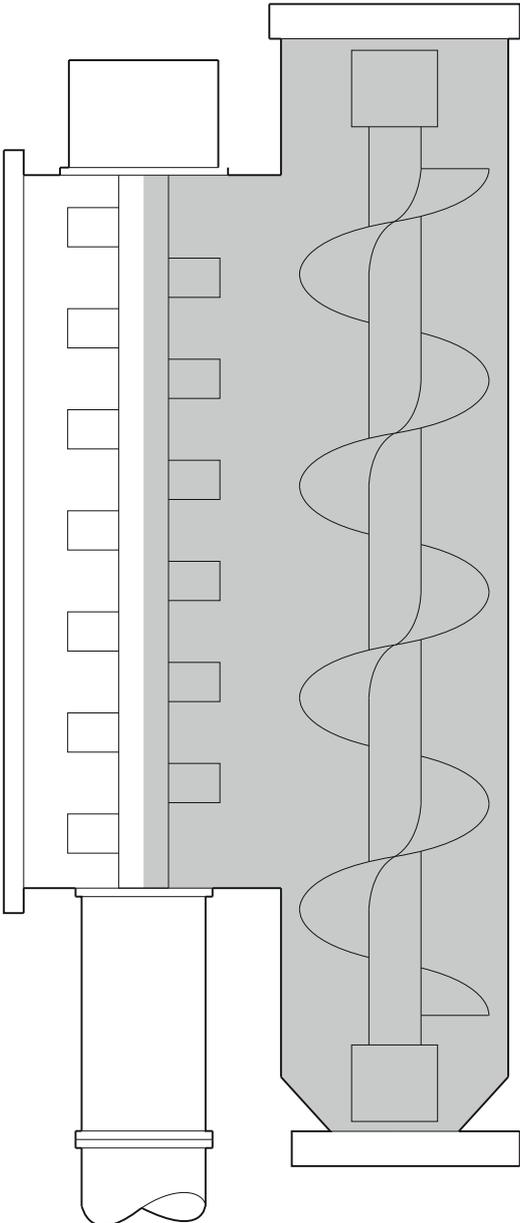
**15.4**

1385-00

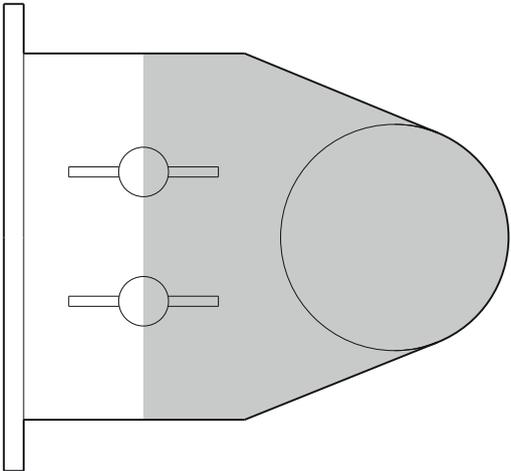


Above positions should be generously charged with the recommended grease using the grease nipples provided.

**15.5 Recommended product level when using pumps fitted with bridge breakers**



13865-00



**16 Helical flight conveyor drive joint lubrication**

Model	Joint lubrication capacity per joint (ml approx.)*	Non-food applications		Food applications	
		Recommended	Suitable alternative		
W31 W32	8	KLUBERSYNTH GH6-460 OIL	MOBIL GEAR OIL SHC 320	KLUBEROIL 4 UHI 460	
W34 W41 W42	15		MOBIL GEAR OIL SHC 320  MOBILITH SHC 007 SEMI-FLUID GREASE		
W44 W52 W61	30				
W54 W62 W71 W72 W81	40				
W64 W82 W91 W92 WA1	65				
W74 W84 W02 WA2	120				
W88 WA4 WB2 WB4 WC1 WD1	1500				MOBIL GEAR OIL SHC 320
WC4	4000				

\*Joint capacities are for guidance only. Joints should always be completely filled on assembly with recommended lubricants only. Insufficient or incorrect lubrications may result in premature wear.

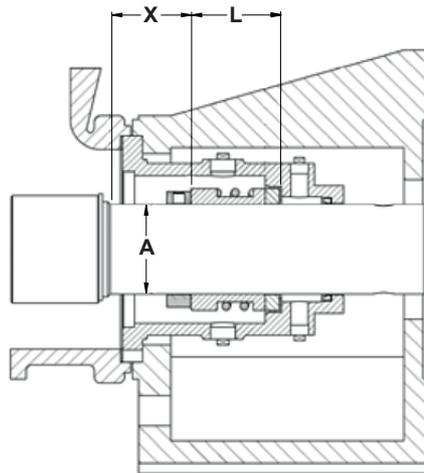
Where fitted, the mechanical seal constant level oiler should be filled with Klubersynth GH6-460 oil.

## 17 Recommended lubrication and service intervals

Components	Lubrication		Service comments
	All applications except food	Food applications only	
Pump drive joints	See section 16		Inspect and lubricate as necessary every 4000 operating hours.
Pump bearings (where fitted)	BP Energrease LC2 or Equivalent		Inspect and re-grease if necessary every 12 months.
Geared drivers (where fitted)	As recommended by the manufacturer		
Bridge breaker bearings (where fitted)	BP Energrease LC2 or Equivalent		Re-grease every 12 months.
Bridge breaker seal shaft assembly (where fitted)	BP Energrease LC2 or Equivalent	Rocol white food grease or equivalent	Re-charge every 3 months. Inspect and clean every 12 months.
Bridge breaker drive gears (where fitted)	BP Energrease LC2 or Equivalent		Re-grease every 3 months.
Mechanical seal constant level oiler (where fitted)	Klubersynth GH6-460		Check daily for the first week and weekly thereafter. Replenish as necessary.



Above service and lubrication intervals are for guidance only to ensure maximum component life. Pump will operate for considerably longer periods without attention depending on service conditions.

**18 Setting lengths for mechanical seals**

1298-00

Pump size	Drive type	A Shaft diameter mm	Seal part no.	L Seal working length mm	X Setting distance mm
<b>W31</b> <b>W32</b>	Pin joint	32	M032139G	42.50	16.0
<b>W34</b> <b>W41</b> <b>W42</b> <b>W51</b>	Pin joint	45	M045139G	45.07	41.0
<b>W44</b> <b>W52</b> <b>W61</b>	Pin joint	55	M055139G	47.50	34.5
<b>W54</b> <b>W62</b> <b>W71</b> <b>W72</b> <b>W81</b>	Pin joint	65	M065139G	52.50	33.5
<b>W64</b> <b>W82</b> <b>W91</b> <b>W92</b> <b>WA1</b>	Pin joint	85	M085139G	60.00	33.0
<b>W74</b> <b>W84</b> <b>WA2</b> <b>WB1</b>	Pin joint	85	M085139G	60.00	8.0

**NOTE**

*All seal working lengths are to DIN L1K dimensions. This table is not to be used for standard or DIN L1N working length seals. All seals use 'M' type seat except for 85 mm (3.3") which uses 'BS' type or 'M' type. This table is not necessarily compatible with any other seal type - please check with Sulzer.*







