English

Original Instructions

Installation, Operation and Maintenance Instructions

W Range - Mono™

OMMP/008/01
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ATEX Warning Statements

PUMPS AND PUMP UNITS

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 Mono Pumps Limited before commencing with installation and commissioning.

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 that 90ºC (194ºF) the maximum surface temperature will not exceed 90ºC (194ºF) provided the pump is installed, operated and maintained in accordance with this manual. Where the process fluid temperature exceeds 90ºC (194ºF) the maximum surface temperature will be equal to the maximum process fluid temperature.

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.

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.

All electrical equipment, including control and safety devices, should be suitably rated for the environment in to which they are installed.

Where there may be a risk of an accumulation of explosive gases or dust non-sparking tools should be used for installation and maintenance.

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 Mono Pumps Limited.

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 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. A control system that will shut the pump down if the motor current or temperature exceed specified limits. 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.

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.

ATEX Warning Statements

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.

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.

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.

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.

The pump and its components have been designed to ensure safe operation within the guidelines covered by legislation. Accordingly Mono Pumps Limited have declared the machine safe to use for the duty specified as defined by the Declaration of Incorporation or Conformity that is issued with this instruction manual.

The use of replacement parts that are not manufactured by or approved by Mono Pumps Limited 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.

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EC Declaration as defined by Machinery Directive 2006/42/EC.

The following harmonised standards are applicable: BS EN 809, BS EN ISO 12100 Parts 1 & 2

EC Declaration of Incorporation

This declaration is only valid when partly completed machinery has been supplied.

In this case, the machinery meets the requirements of the said directive and is intended for incorporation into other machinery or for assembly with other machinery in order to constitute relevant machinery as defined by the said directive including any amendments, which are valid at the time of supply.

IMPORTANT

This machinery must not be put into service until the relevant machinery into which it is to be incorporated has been declared in conformity to the said directive.

This declaration is only valid when the machinery has been installed, operated and maintained in accordance with these instructions and safety guidelines contained within as well as instructions supplied for equipment assembled with or intended for use with this equipment.

EC Declaration of Conformity

This declaration is not valid for partly completed machinery that has been supplied.

In this case the machinery meets the requirements of the directive including any amendments which are valid at th of supply.

We further declare that, where applicable, said machiner meets the requirements of:

The EMC Directive 2004/108/EC
The Low Voltage Directive 2006/95/E
The Pressure Equipment Directive 2005/88/EC
The Outdoor Noise Directive 2000/14/EC
and subsequent amemdments
The Drinking Water Directive 98/83/EC

IMPORTANT

This declaration is only valid when the machinery has be installed, operated and maintained in accordance with th instructions and safety guidelines contained within as we instructions supplied for equipment assembled with or intended for use with this equipment.

Mr A. Morris - Engineering Manager - PDS
for Mono Pumps Limited, Greengate Way, Middleton, Manchester, England, M24 1SA.

INSTALLATION

1.1 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.

1.2.1. 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, Mono 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.

1.2.2. 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

All ranges excluding P Range Mono 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 P Range Pumps Only

The P range pumps are intended for vertical installation. Care must be taken when lifting the pump into the vertical position. Normally ‘P’ range pumps will be designed with a sole plate that will be bolted to the customers framework. If the pump is to be mounted in any way other than described above, confirmation of the installation must be agreed with Mono Pumps Limited. All the pipework should be independently supported.

1.3.1 HANDLING

During installation and maintenance, attention must be paid to the safe handling of all items. Where a pump or its components weigh in excess of 20 kg (45lb) it is recommended that suitable lifting tackle should be used to ensure that personal injury or damage to components does not occur.

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.

1.3.2 STORAGE AND INFREQUENT OPERATION

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

SHORT TERM STORAGE

Where a pump has to be stored for 6 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.

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.

IMMEDIATELY PRIOR TO INSTALLATION AND STARTING

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

1.4 ELECTRICAL

Electrical connection should only be made using equipment suitable for both rating and environment. Where any doubts exist regarding the suitability of equipment, Mono Pumps Limited, should be consulted before proceeding. Normally the Mono 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 2) or pressurising upstream equipment. (Check direction arrow on pump nameplate). The electrical installation should include appropriate isolating equipment to ensure that the pump unit is safe to work on.

1.5 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.

IMPORTANT

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

1.6 GENERAL SAFETY

GREAT CARE MUST BE TAKEN TO PROTECT ALL ELECTRICAL EQUIPMENT FROM SPLASHING WHEN HOSING DOWN. WHERE MONO PUMPS LIMITED HAVE SUPPLIED A BARESHAFT PUMP THE ONUS IS ON THE USER TO FIT ADEQUATE GUARDS IN COMPLIANCE WITH THE REQUIREMENTS OF THE RELEVANT REGULATIONS.

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 2), 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)

1.7 DUTY CONDITIONS

Pumps should only be installed on duties for which Mono Pumps Limited 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, MONO PUMPS LIMITED SHOULD BE CONTACTED AND THEIR RECOMMENDATIONS SOUGHT IN THE INTEREST OF APPLICATION, SAFETY OF PLANT, EFFICIENCY AND PUMP LIFE.

2. 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 restarting.

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.

2.1 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.

2.2 PUMP ROTATION DETAILS

PUMP RANGE	BI-DIRECTIONAL	COMMENT
E	Yes	†
Monobloc B	Yes	†
Monobloc C	Yes	†
Merlin Industrial	Yes	†
S, SL	Yes	†
LF	Yes	†*
W	No	
Merlin Widethroat	No	**
MM ML	No	**
MS	No	**
G	No	*
CB/SB	No	
Placer	No	
Grout Injection	No	**
P	No	*
CP01	No	*
CP0025, CP0800, CP1600	No	*

DIRECTIONS OF ROTATION

BEFORE THE DIRECTION OF ROTATION IS CHANGED, MONO PUMPS LIMITED MUST BE CONSULTED SO THAT THE SUITABILITY OF THE PUMP CAN BE CONFIRMED WHEN OPERATING ON THE NEW DUTY.

2.3.1. 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 3 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 small leakage of fluid.

Typical Leakage Rates from Packed Glands

Up to 50mm (2") shaft diameter	2 drops per minute
50 – 75mm (2 - 3") shaft diameter	3 drops per minute
75 – 100mm (3 - 4") shaft diameter	4 drops per minute
100 – 125mm (4 - 5")shaft diameter	5 drops per minute
125 – 160mm (5 - 6.3") 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 pumps materials of construction.

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

CARE IS REQUIRED WHEN ADJUSTING THE GLAND WHILST PUMP IS RUNNING.

2.3.2 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.For details of constant level oiler please refer to Section 4 page 23.

2.4. GUARDS

In the interests of safety, and in accordance with the U.K. Health and Safety at Work Act 1974, all guards must be replaced after necessary adjustments have been made to the pump.

2.5 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.

2.6 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 (122°F).

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

2.7 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 the actual pump unit noise levels are ascertained once the unit is installed and running at duty conditions

2.8 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 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.

2.9 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 & bushes
3. Use of appropriate belts & pulleys correctly tensioned.

2.10 CLEANING PRIOR TO OPERATION

i. Non Food Use

During the commissioning of a new pump or recommissioning 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:

This procedure should not be used on the CP Pump Range. Please consult our application engineers for a suitable procedure.

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 (167°F) for 20 mins
2. Water rinse @ 80°C (176°F) for 20 mins
3. Acid wash @ 50°C (122°F) for 20 mins
4. Water rinse @ 80°C (176°F) 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 (4.9 to 6.6 ft/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.

2.11 WIDETHROAT PUMPS

Specific pumps may 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.

2.12 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.

2.13 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.

2.14 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 that 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.

2.15 MAINTENANCE OF WEARING COMPONENTS

2.15.1 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.

2.15.2 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.

2.15.3 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.

It is essential to replace all the joint items with genuine Mono parts to ensure maximum life.

2.15.4 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.

2.16 MECHANICAL SPEED VARIATORS

Refer to the manufacturers instructions.

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

3.0 ASSEMBLY AND DISMANTLING

Section 4 contains 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.

3.1 USE OF ITEMS NOT APPROVED OR MANUFACTURED BY MONO PUMPS LIMITED

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

As a consequence Mono Pumps Limited have declared the machine safe to use for the duty specified as defined by the Declaration of Incorporation or Conformity that is issued with this Instruction Manual.

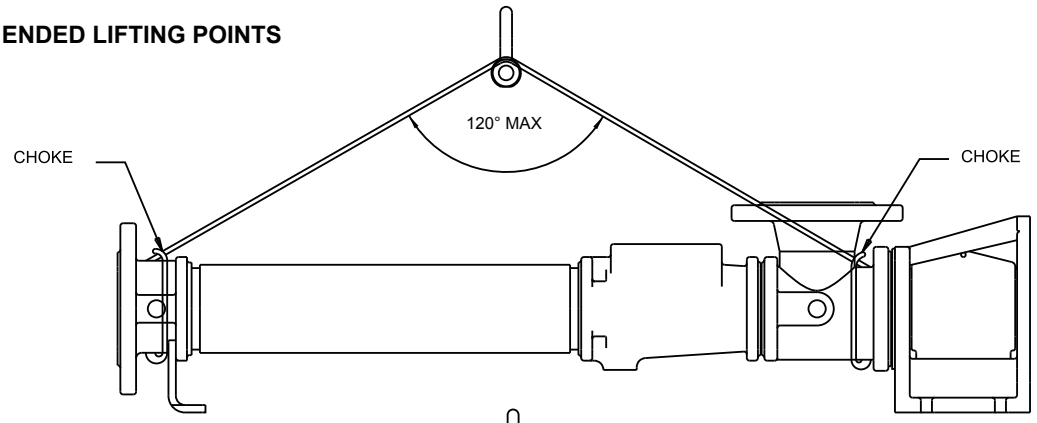
The use of replacement items that are not approved by or manufactured by Mono Pumps Limited may affect the safe operation of the pump and it may therefore become a safety hazard to both operators and other equipment. In these instances the Declaration provided will therefore become invalid. The guarantee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

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.

3.2 RECOMMENDED LIFTING POINTS

1



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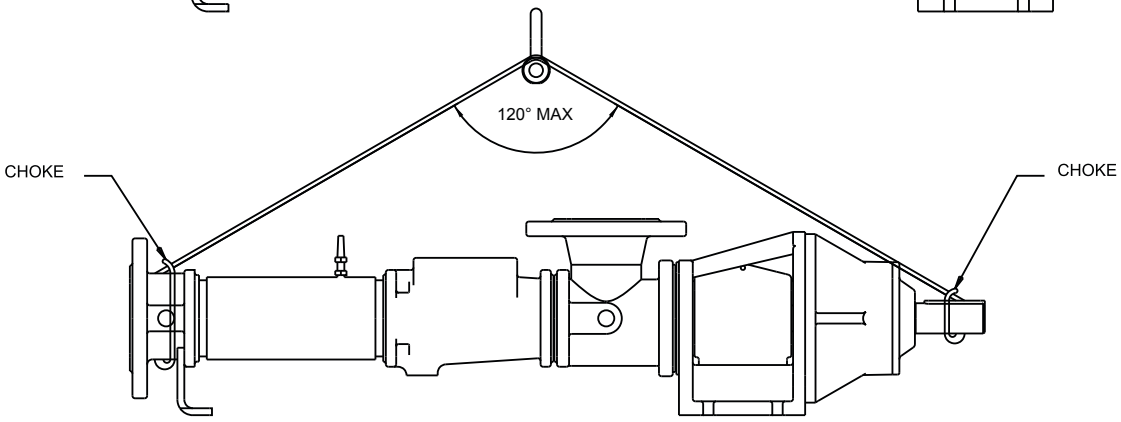

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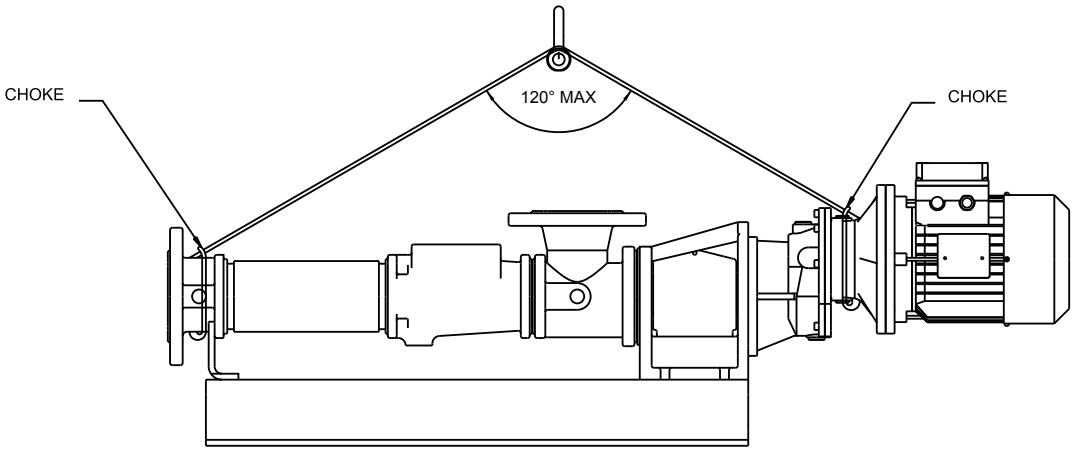

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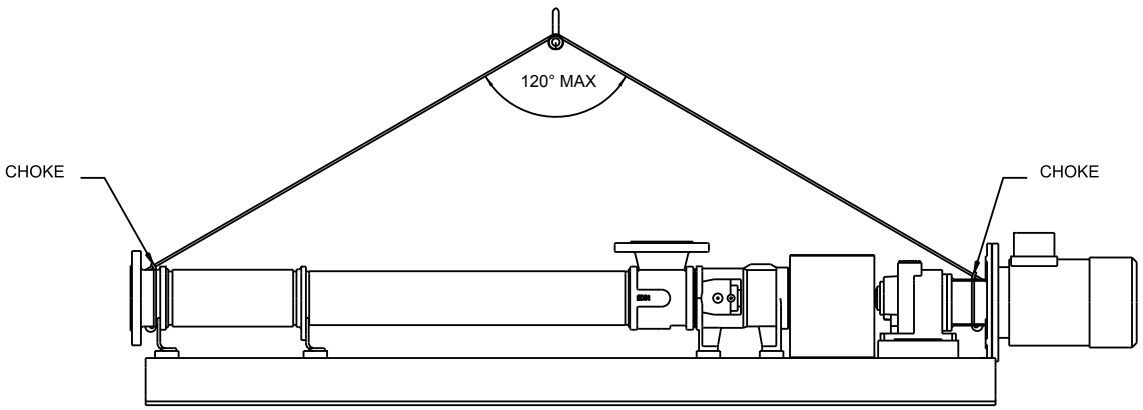


3.3 PUMP AND WEAR PARTS WEIGHTS - METRIC.

NOTE:
Weights are for guidance purpose only.
Please refer to the documentation issued with your pump or spares.

W Range - Standard Auger

Model	Weight (kg)					
	Bloc Pump	Bareshaft Pump	Stator	Rotor	Auger/ Conveyor	Shaft
W032	32.0	40.0	1.5	1.4	2.1	0.7
W034	44.0	57.0	3.5	3.0	2.6	1.6
W041	65	78	2.0	2.8	4.4	0.7
W042	54	67	3.8	4.7	4.4	1.6
W044	77	90	7.8	9.3	3.2	2.9
W051	75	83	4.2	5.4	2.5	1.6
W052	85	98	8.3	9.3	4.6	2.9
W054	128	151	16.2	16.8	7.1	4.4
W061	112	125	7.6	9.3	4.6	2.9
W062	141	163	14.5	15.7	8.9	4.4
W064	208	238	28.2	29.2	14.3	4.4
W071	139	161	10.3	14.7	16.8	4.4
W072	167	190	19.5	24.5	16.8	4.4
W074	286	319	38.0	49.3	15.4	8.7
W081	138	178	13.9	19.9	16.8	4.4
W082	221	251	26.4	34.4	15.4	8.7
W084	347	381	51.4	66.4	17.7	9.5
W091	220	250	21.8	28.5	18.3	8.7
W092	288	318	41.4	48.3	18.3	8.7
W101	257	287	29.4	43.6	18.3	8.7
W102	369	402	55.8	71.1	29.1	9.5
W121	377	410	55.0	75.2	28.4	9.5

W Range - Large Auger

Model	Weight (kg)					
	Bloc Pump	Bareshaft Pump	Stator	Rotor	Auger/ Conveyor	Shaft
W042	85	97	3.8	4.7	13.2	1.6
W044	106	119	7.8	9.3	13.2	2.9
W052	111	123	8.3	9.3	18.2	2.9
W054	150	171	16.2	16.8	18.2	4.4
W062	180	220	14.5	15.7	38.2	4.4
W064	243	272	28.2	29.2	34.8	4.4
W072	221	243	19.5	24.5	42.6	4.4
W074	350	370	38.0	49.3	42.6	8.7
W082	302	331	26.4	34.4	65.9	8.7
W084	441	450	51.4	66.4	65.9	9.5
W092	351	379	41.4	48.3	77.4	8.7
W102		520	55.8	71.1	105.3	9.5
W104		665	2 x W102	160.0	77.4	23.4
W122		670	136.0	141.0	77.4	23.4
W124		940	2 x W122	270.0	77.4	52.0
W151		635	90.0	152.0	66.6	23.4
W154			2 x 186	500		44
W161		700	120.0	183.0	66.6	23.4

3.4 PUMP AND WEAR PARTS WEIGHTS - IMPERIAL.

NOTE:
Weights are for guidance purpose only.
Please refer to the documentation issued with your pump or spares.

W Range - Standard Auger

Model	Weight (lb)					
	Bloc Pump	Bareshaft Pump	Stator	Rotor	Auger/ Conveyor	Shaft
W032	70.5	88	3.3	3.1	4.6	1.5
W034	97	126	7.7	6.6	5.7	3.5
W041	143	172	4.5	6.2	9.7	1.5
W042	119	148	8.5	10.4	9.7	3.5
W044	170	198.5	17.2	20.5	7.1	6.4
W051	165	183	9.3	12	5.5	3.5
W052	187	216	18.3	20.5	10	6.4
W054	282	333	35.7	37	15.7	9.7
W061	247	275.5	16.8	20.5	10	6.4
W062	311	359	32	34.6	19.6	9.7
W064	458.5	525	62.2	64.4	31.5	9.7
W071	306	355	22.7	32.4	37	9.7
W072	368	419	43	54	37	9.7
W074	630.5	703	83.8	108.7	34	19.2
W081	304	392	30.6	43.9	37	9.7
W082	487	553	58.2	75.8	34	19.2
W084	765	840	113	146.4	39	20.9
W091	485	551	48	62.8	40.3	19.2
W092	635	701	91.3	106.5	40.3	19.2
W101	566.5	633	65	96	40.3	19.2
W102	813.5	886	123	157	64.2	20.9
W121	831	904	121	165.8	62.6	20.9

W Range - Large Auger

Model	Weight (lb)					
	Bloc Pump	Bareshaft Pump	Stator	Rotor	Auger/ Conveyor	Shaft
W042	187.4	213.8	8.4	10.4	29.1	3.5
W044	233.7	262.3	17.2	20.5	29.1	6.4
W052	244.7	271.2	18.3	20.5	40.1	6.4
W054	330.7	377	35.7	37	40.1	9.7
W062	396.8	485	32	34.6	84.2	9.7
W064	535.7	600	62.2	64.4	76.7	9.7
W072	487.2	535.7	43	54	93.9	9.7
W074	771.6	815.7	83.8	108.7	93.9	19.2
W082	665.8	729.7	58.2	75.8	145.3	19.2
W084	972.2	992	113.3	146.4	145.3	20.9
W092	773.8	835.6	91.3	106.5	170.6	19.2
W102		1146.4	123	156.7	232.1	20.9
W104		1466	2 x W102	352.7	170.6	51.6
W122		1477.1	300	310.9	170.6	51.6
W124		2072.3	2 x W122	595.2	170.6	114.6
W151		1400	198.4	335	146.8	51.6
W154			2 x 186	1102		97
W161		1543	264.6	403.4	146.8	51.6

Diagnostic Chart

SYMPTOMS	POSSIBLE CAUSES
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.
LIST OF CAUSES	**REMEDIAL ACTIONS**
1. INCORRECT DIRECTION OF ROTATION	1. REVERSE MOTOR
2. PUMP UNPRIMED	2. BLEED SYSTEM OF AIR/GAS
3. INSUFFICIENT N.P.S.H. AVAILABLE	3. INCREASE SUCTION HEAD OR REDUCE SPEED/TEMP.
4. PRODUCT VAPORISING IN SUPPLY LINE	4. INCREASE N.P.S.H. 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. FOOTVALVE/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

Drawing Reference Numbers

COMMON		COMMON		ALL EXCEPT W088, W104, W122 W154 & W161		W088, W104, W122 W154 & W161 ONLY	
DRG. REF	DESCRIPTION	DRG. REF	DESCRIPTION	DRG. REF	DESCRIPTION	DRG. REF	DESCRIPTION
01A	BODY	P601	HEX HEAD BOLT	P101	HEX HEAD BOLT / STUD	P101	BEARING
01B	BEARING HOUSING	P602	SPRING WASHER	P102	SPRING WASHER	P102	BEARING
01C	BEARING HOUSING	P603	PLAIN WASHER	P103	PLAIN WASHER	P103	LIPSEAL
01D	BEARING HOUSING	P604	HEX NUT	P104	HEX NUT	P104	LIPSEAL
02A	G/BOX MOUNTING BRACKET			P105	DRIVE SCREW	P105	HEX HEAD BOLT
02B	BEARING MOUNTING PLATE	P701	BEARING	P106	HEX HEAD BOLT	P106	HEX NUT
02C	BEARING BLOCK	P702	BEARING	P107	SPRING WASHER	P107	PLAIN WASHER
02D	BEARING BLOCK	P703	LIPSEAL	P108	PLAIN WASHER	P108	SPRING WASHER
06A	NAMEPLATE (SOG)	P704	LIPSEAL	P109	HEX NUT	P110	PLAIN WASHER
08A	GLAND FOLLOWER	P705	SPRING RTNG CLIP	P110	BEARING	P111	HEX HEAD BOLT
10A	GLAND PACKING / MECH SEAL	P706	SPRING RTNG CLIP	P111	BEARING	P112	SPRING WASHER
10B	ROTARY SHAFT LIPSEAL (optional)	P707	SPRING RTNG CLIP	P112	LIPSEAL		
11A	BEARING COVER	P708	SPRING RTNG CLIP	P113	LIPSEAL	P201	HEX HEAD BOLT
11B	BEARING COVER	P709	KEY	P120	HEX HEAD BOLT	P202	HEX NUT
11C	BEARING COVER	P710	KEY	P121	SPRING WASHER	P203	PLAIN WASHER
12A	ANTI ROTATION RING	P711	PIN	P122	PLAIN WASHER	P211	PLUG
15A	THROWER GUARD	P712	PIN	P123	HEX NUT		
15B	GUARD (GEARS)	P713	GREASE NIPPLE	P124	HEX HEAD BOLT	P402	TOR. SEAL RING
15C	GUARD (COUPLING)	P714	GREASE NIPPLE	P125	SPRING WASHER	P405A	TIE SEALING COVER
17A	ADAPTOR RING	P715	GREASE NIPPLE			P405B	TIE SEALING COVER
20B	GASKET GLAND	P716	HEX HEAD BOLT	P201	PLUG	P406A	TIE SEALING COVER
20E	GASKET - BEARING MTG PLATE	P717	SPRING WASHER	P202	HEX HEAD BOLT	P406B	TIE SEALING COVER
20F	GASKET - BEARING BLOCK	P718	PLAIN WASHER	P203	PLAIN WASHER	P407	KEY
20G	GASKET - BEARING BLOCK	P719	HEX HEAD BOLT	P204	HEX NUT	P420	LOCKNUT
20H	GASKET - THROAT / FEED CHBR	P720	SPRING WASHER			P421	LOCKING WASHER
20M	GASKET - ACCESS PORT	P721	PLAIN WASHER	P401	TOROIDAL SEAL RING	P422	SKT HD CAP SCREW
22A	STATOR	P722	STUD	P402	TOROIDAL SEAL RING	P423	SKT HD CAP SCREW
23A	THROAT	P723	SPRING WASHER	P403	SPIRAL RET RING	P424	SKT HD CAP SCREW
23B	FEED CHAMBER	P724	PLAIN WASHER	P404	SPIRAL RET RING	P425	SKT HD CAP SCREW
24A	END COVER	P725	HEX NUT	P405	TIE SEALING COVER	P426	SEALING WASHER
25A	ROTOR	P726	HEX HEAD BOLT	P406	TIE SEALING COVER	P427	SEALING WASHER
27A	COUPLING ROD BUSH (ROTOR)	P727	SPRING WASHER	P407	KEY	P428	SEALING WASHER
27B	COUPLING ROD BUSH (SHAFT)	P728	PLAIN WASHER	P420	LOCKNUT	P429	SEALING WASHER
27C	BUSH (ROTOR)	P729	HEX NUT	P421	LOCKING WASHER	P430	SKT HD CAP SCREW
27D	BUSH (SHAFT)	P730	STUD	P422	SKT HD CAP SCREW	P431	TAPER PLUG
28A	SEALING COVER (ROTOR)	P731	SPRING WASHER	P423	SKT HD CAP SCREW		
28B	SEALING COVER (SHAFT)	P732	PLAIN WASHER			P501	TAPER PLUG
29A	COUPLING ROD PIN (ROTOR)	P733	HEX NUT	P501	TAPER PLUG	P502	TAPER PLUG
29B	COUPLING ROD PIN (SHAFT)	P734	GRUB SCREW	P502	TAPER PLUG	P503	HEX NUT
29C	SHAFT PIN	P735	DRIVE SCREW	P503	SPRING WASHER	P504	SPRING WASHER
32A	DRIVE SHAFT	P736	PLAIN WASHER	P504	PLAIN WASHER	P505	PLAIN WASHER
32B	STUB SHAFT (GEARS)			P505	HEX NUT	P506	HEX NUT
32C	STUB SHAFT (GEARS)	P801	STUD	P506	SPRING WASHER	P507	SPRING WASHER
32D	STUB SHAFT (BLANK)	P802	SPRING WASHER	P507	PLAIN WASHER	P508	PLAIN WASHER
32E	STUB SHAFT (BLANK)	P803	PLAIN WASHER	P508	HEX NUT	P509	HEX NUT
38F	AUGER ADAPTER SLEEVE (ROTOR)	P804	COUPLING G"B" FLANGE	P509	HEX HEAD BOLT	P510	SPRING WASHER
38G	AUGER ADAPTER SLEEVE (SHAFT)	P805	COUPLING G"B" FLANGE	P510	SPRING WASHER	P511	PLAIN WASHER
35A	BEARING SPACER	P806	COUPLING INSERT	P511	PLAIN WASHER	P512	HEX NUT
35B	YOKE SHAFT	P807	GRUB SCREW	P512	HEX NUT	P513	SPRING WASHER
38A	CONVEYOR ASSEMBLY	P808	GRUB SCREW	P513	HEX HEAD BOLT	P514	PLAIN WASHER
38B	COUPLING END			P514	SPRING WASHER	P515	STUD
38C	COUPLING END			P515	PLAIN WASHER	P516	HEX NUT
38D	DRIVE FLANGE			P516	HEX NUT	P517	SPRING WASHER
38E	PADDLE SHAFT			P517	STUD	P518	PLAIN WASHER
12B	ANTI ROTATION RING			P518	PLAIN WASHER	P519	HEX HEAD BOLT
42A	THROWER			P519	SPRING WASHER	P521	SPRING WASHER
59A	ACCESS PORT COVER			P520	HEX NUT	P522	PLAIN WASHER
62A	SUPPORT FOOT			P530	SKT HD CAP SCREW	P530	HEX HEAD BOLT
62B	SUPPORT FOOT			P531	PLAIN WASHER	P531	PLAIN WASHER
65A	GLAND SECTION			P532	SPRING WASHER	P532	SPRING WASHER
66A	ABUTMENT RING					P540	CLAMP
75A	SLEEVE (ROTOR)					P550	HEX HEAD BOLT
75B	SLEEVE (SHAFT)					P551	HEX NUT
76A	ADAPTOR FLANGE						
78A	SPUR GEAR					W154 ONLY	
95A	TIE BAR					DRG. REF.	DESCRIPTION
95C	TIE BAR					P435	C'SUNK SCREW
						P436	C'SUNK SCREW
						P437	TOR. SEAL RING
						P438	TOR. SEAL RING

IMPORTANT NOTE

THE DRAWING REFERENCES SHOWN GIVE THE DESCRIPTION OF ALL THE PARTS DETAILED ON THE DRAWINGS SECTION OF THE BOOK.

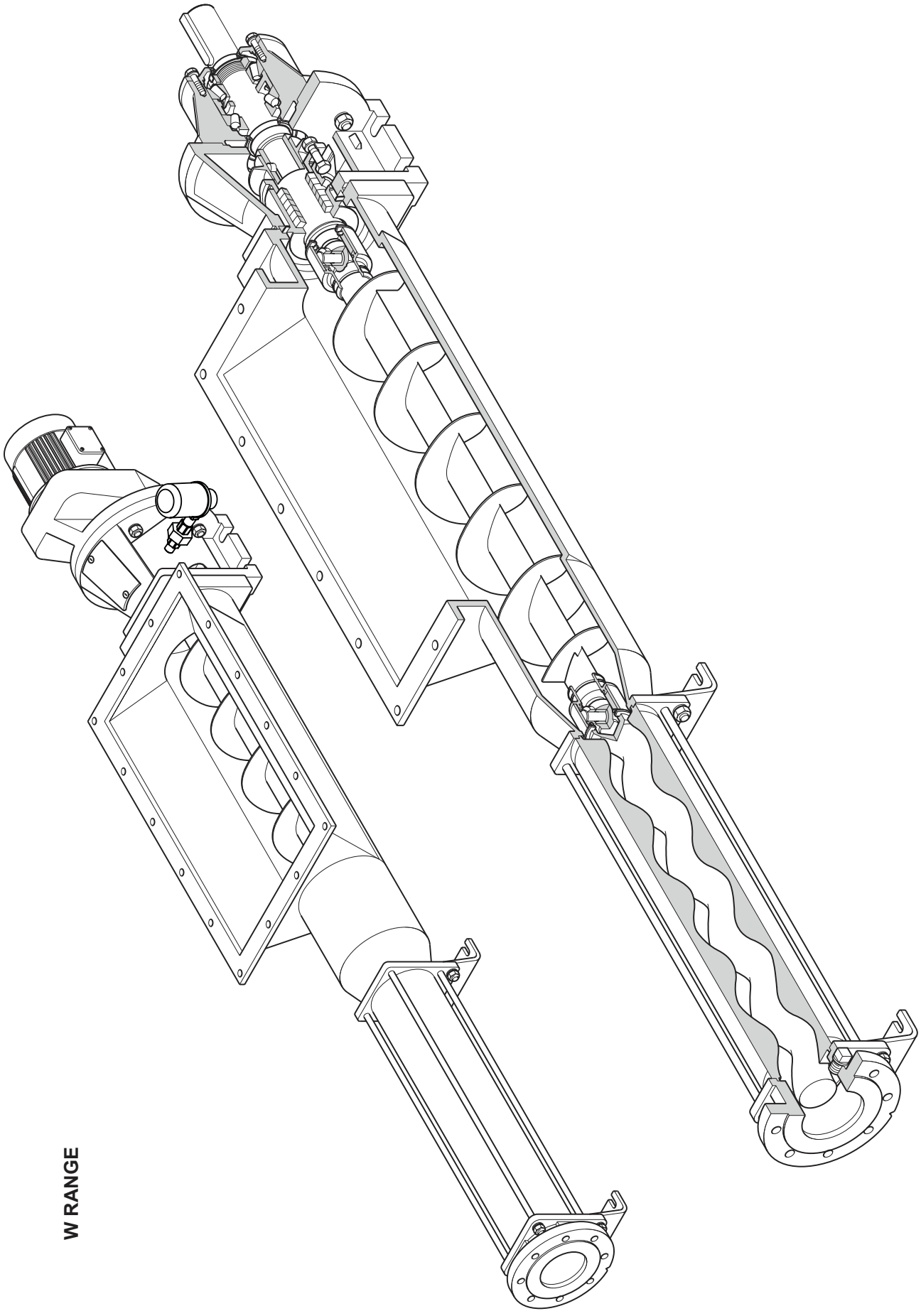
THEREFORE SOME OF THE REFERENCES MAY NOT BE SHOWN ON ANY ONE.

Pump Coding

FEATURES	DESCRIPTION	BASIC PUMP CODE										STANDARD				
		1	2	3	4	5	6	7	8	9	10	/	12	13	14	15
BODY MATERIALS	Cast Iron	C														
	Stainless Steel	S														
PUMP DESIGN	Widethroat		W													
NOMINAL PUMP CAPACITY AT MAXIMUM SPEED AND ZERO PRESSURE	1.2 m³/h (5 USGPM) @ 350 rev/min			0	3											
	5.1 m³/h (22.5 USGPM) @ 350 rev/min			0	4											
	10.2 m³/h (45 USGPM) @ 350 rev/min			0	5											
	17.5 m³/h (77 USGPM) @ 350 rev/min			0	6											
	28.5 m³/h (126 USGPM) @ 350 rev/min			0	7											
	34 m³/h (150 USGPM) @ 300 rev/min			0	8											
	40 m³/h (176 USGPM) @ 250 rev/min			0	9											
	49 m³/h (216 USGPM) @ 200 rev/min			1	0											
	86 m³/h (379 USGPM) @ 200 rev/min			1	2											
	155 m³/h (683 USGPM) @ 200 rev/min			1	5											
	215 m³/h (947 USGPM) @ 200 rev/min			1	6											
PUMP STAGES	One					1										
	Two					2										
	Four					4										
	Six					6										
	Eight					8										
PRIME MOVER ARRANGEMENTS AND BUILD SELECTION	Monobloc Body Options						A									
							B									
							C									
							D									
	Bareshaft						H									
MECHANICAL SEAL PUMP DESIGN	Standard Auger							J								
	Large Auger							H								
	Ribbon Auger							K								
	Bridge Breaker Drive Options							D								
								E								
PACKED GLAND PUMP DESIGN	Standard							S								
	Large Auger							L								
	Ribbon Auger							R								
	Bridge Breaker Drive Options							B								
								C								
DESIGN NUMBER	Mark 1								1							
	Mark 2 February 2007								2							
STATOR MAT'L	RA, RR etc.									A						
ROTATING PARTS	1, 3, 4, 5, 8										3					
TYPICAL BASIC PUMP CODING	Cast Iron Widethroat size 06 four stage. Mechanical seal, Monobloc Build C with bridge Breaker option E, Natural rubber stator, Code 4 rotating parts.	C	W	0	6	4	C	E	1	A	4					
PRIME MOVER AND PORT OPTIONS	'G' - Standard Bloc	C	W	0	6	4	C	E	1	A	4	/	G			
	'H' - Standard Bareshaft															
	'C' - Bareshaft - Mono Australia Only															
	'A' - ANSI + Access Ports															
	'E' - Standard ANSI															
	'J' - Japan															
FULL PUMP CODING TO BE STAMPED ON PUMP NAMEPLATE																

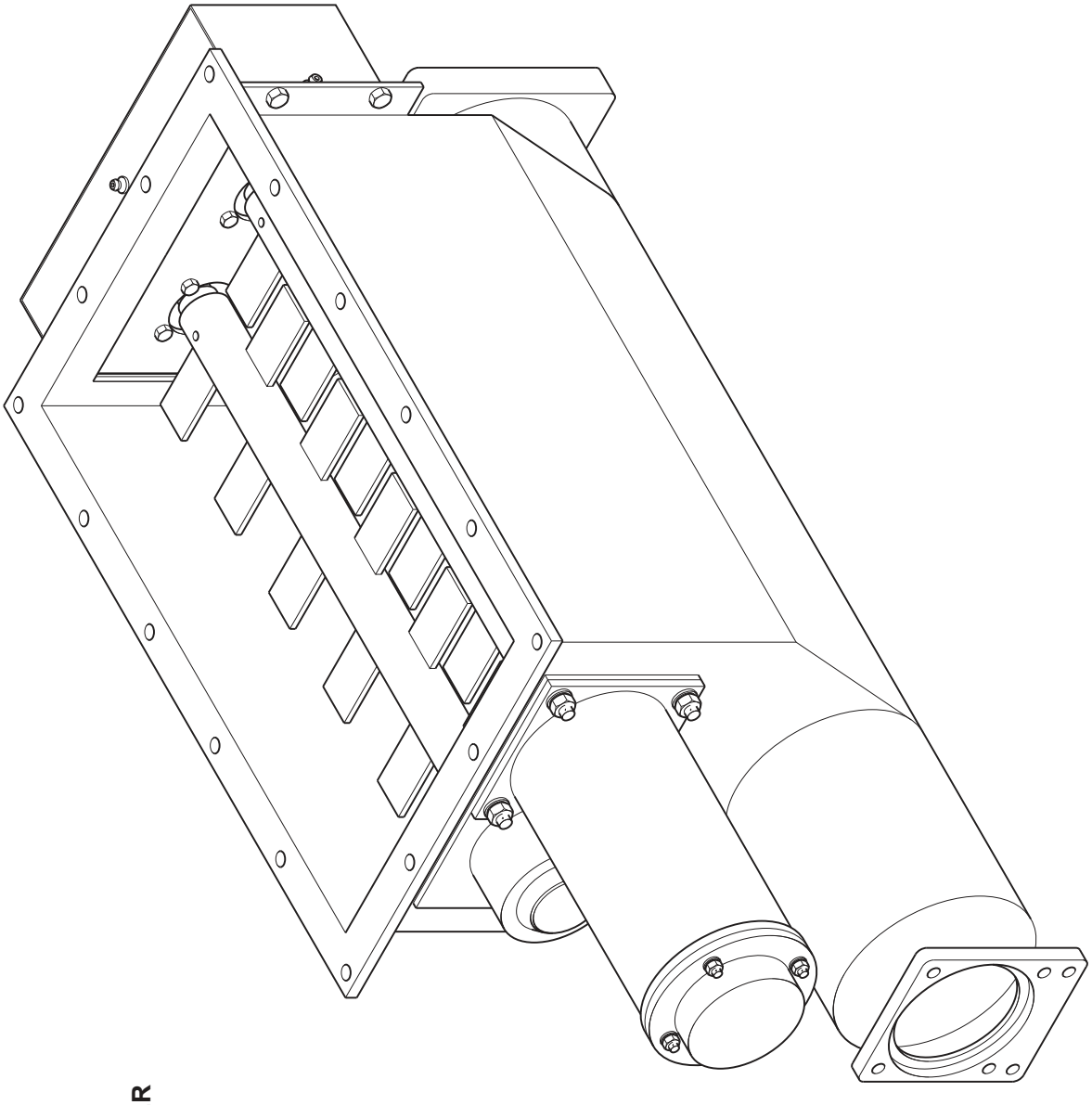
Pump Sizes W032, W034 available Standard Pump Design only.

Dismantling & Assembly Diagrams



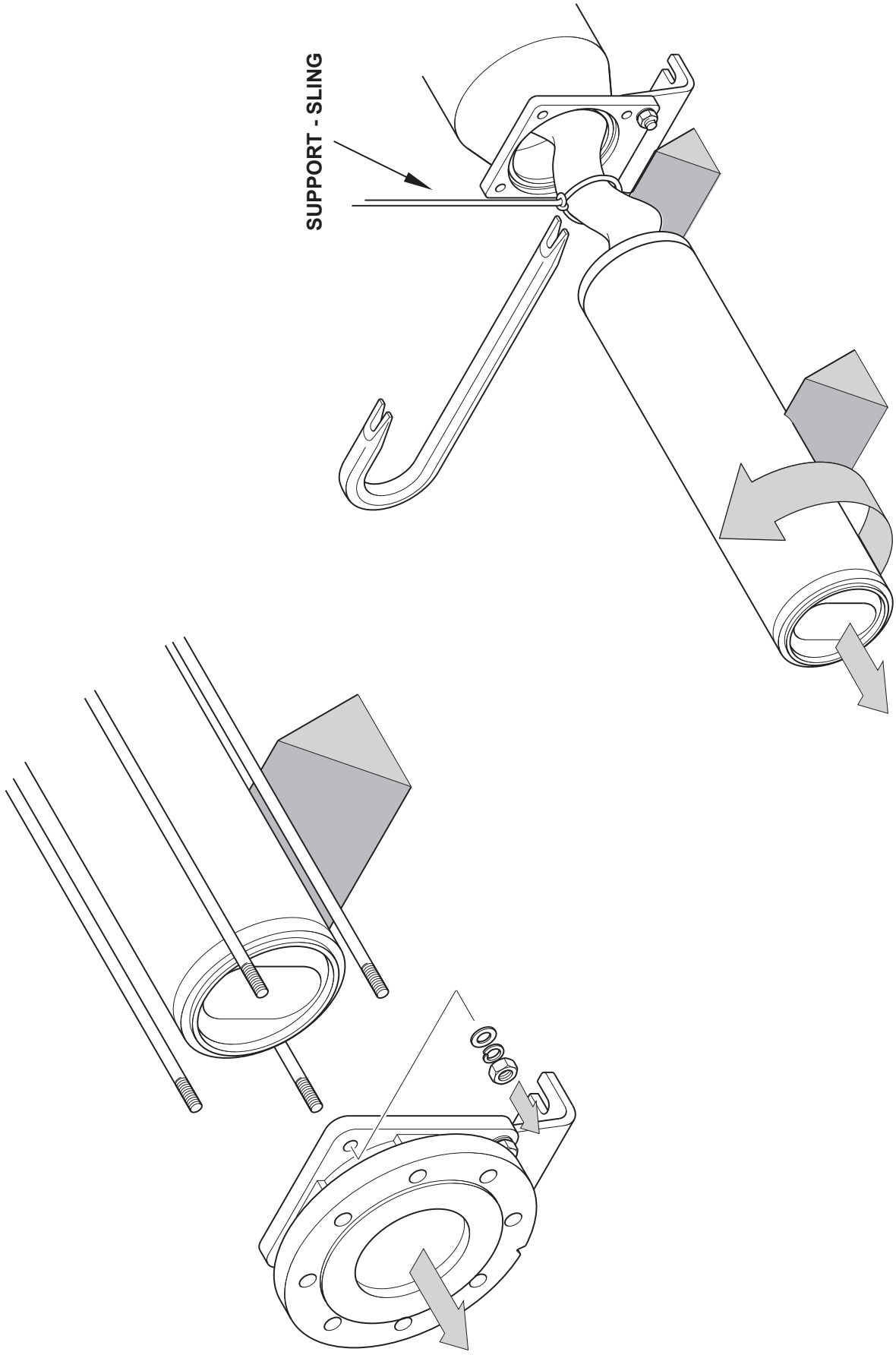
W RANGE

Dismantling & Assembly Diagrams

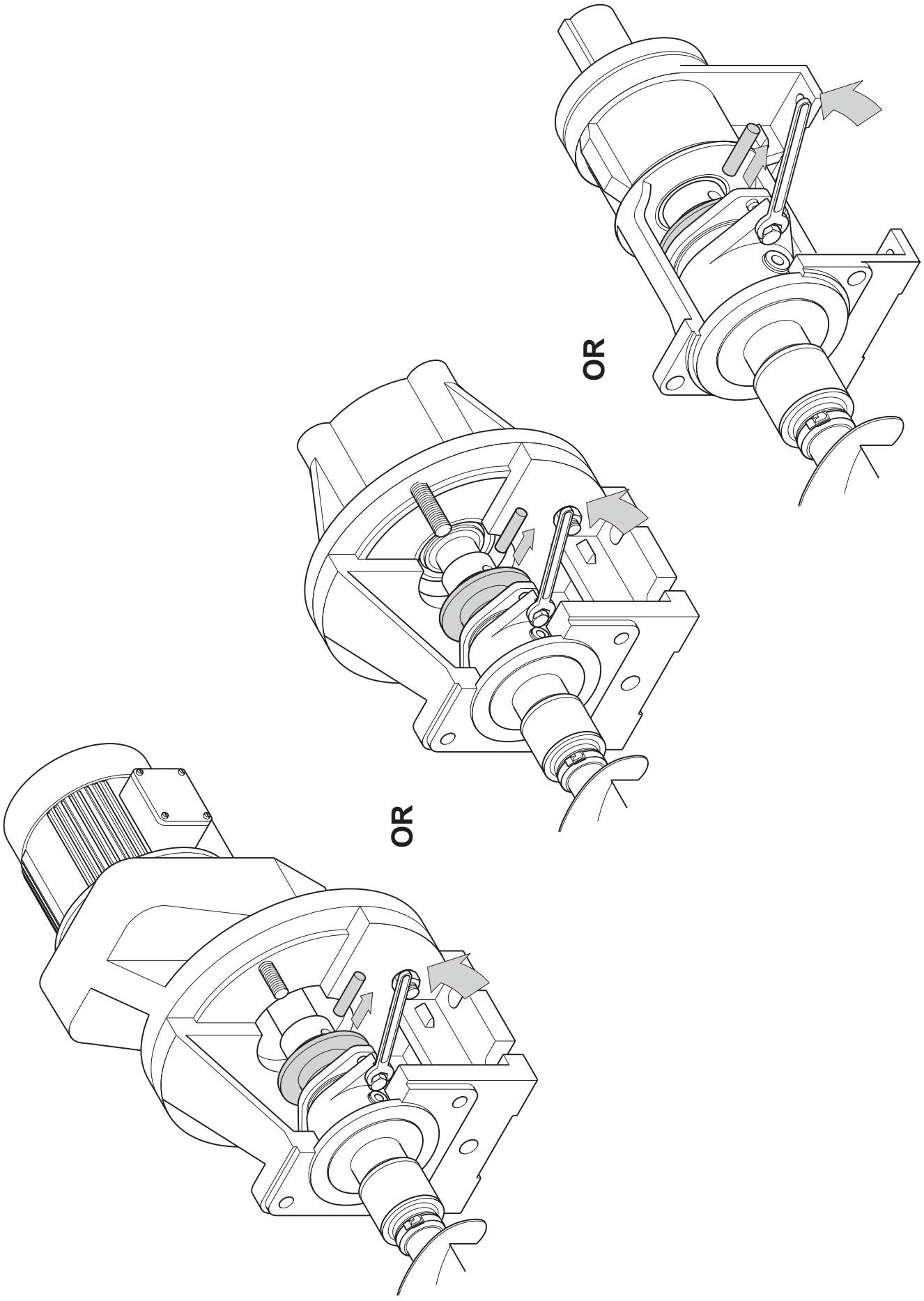


BRIDGE BREAKER

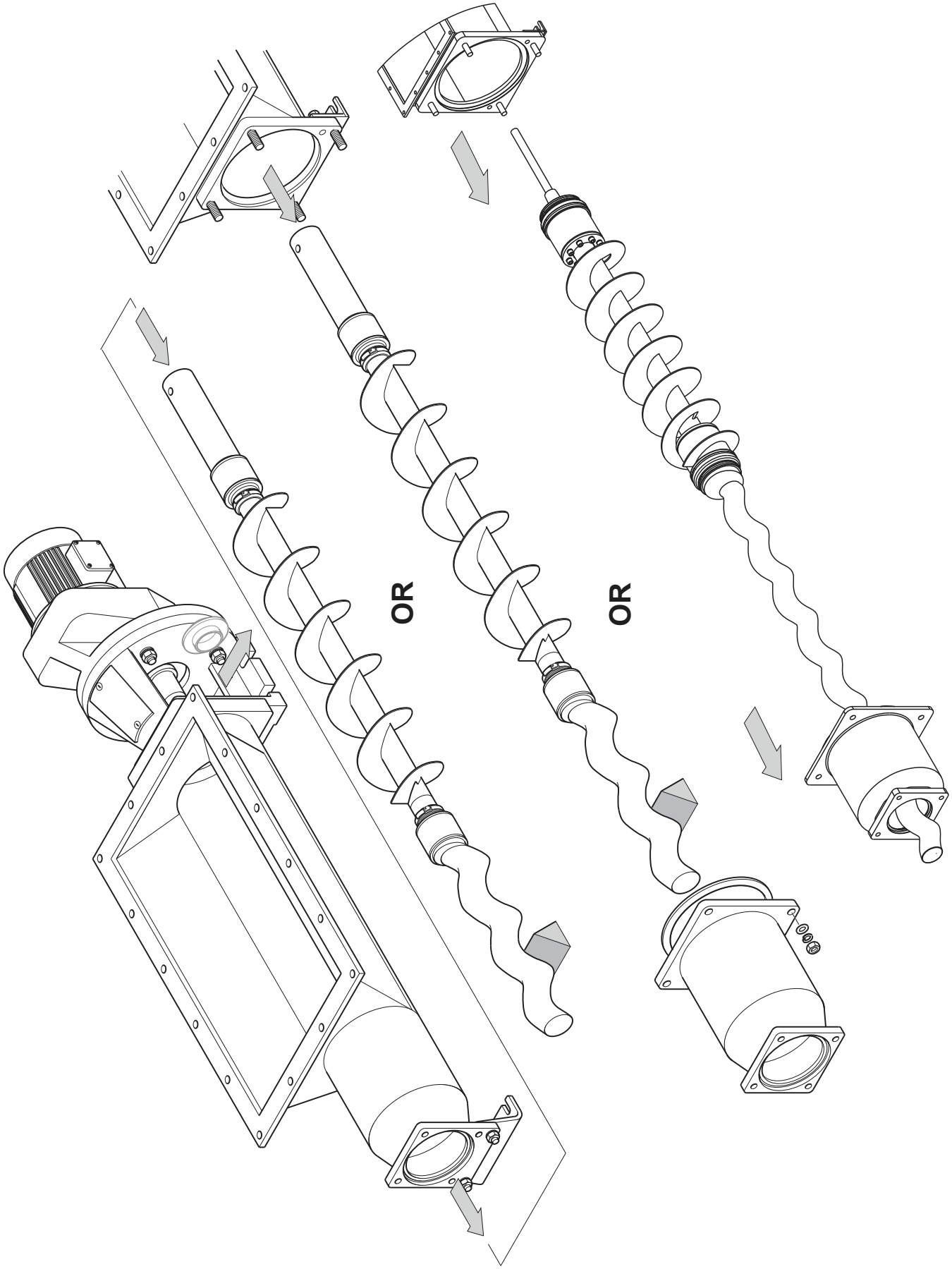
Dismantling & Assembly Diagrams



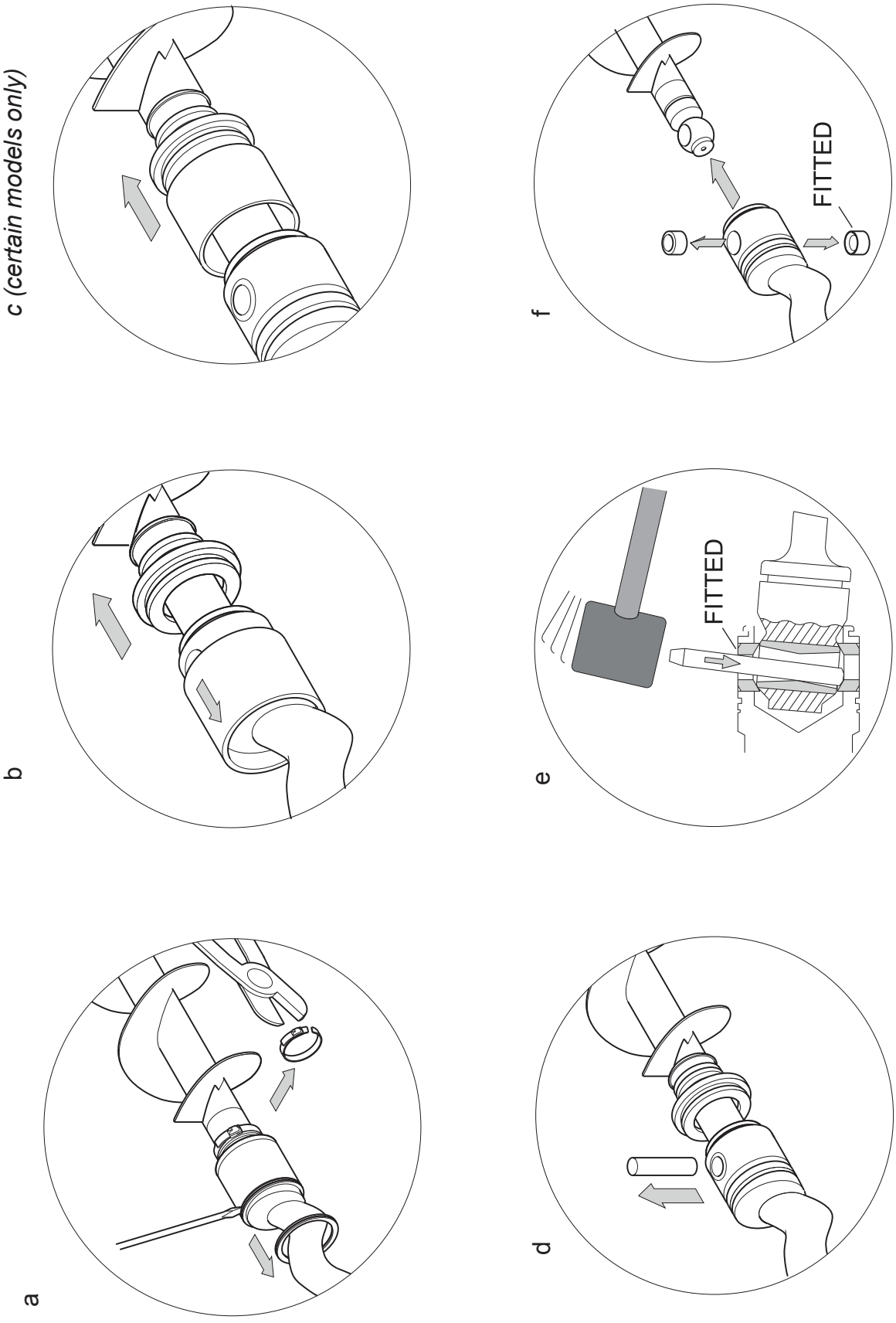
Dismantling & Assembly Diagrams



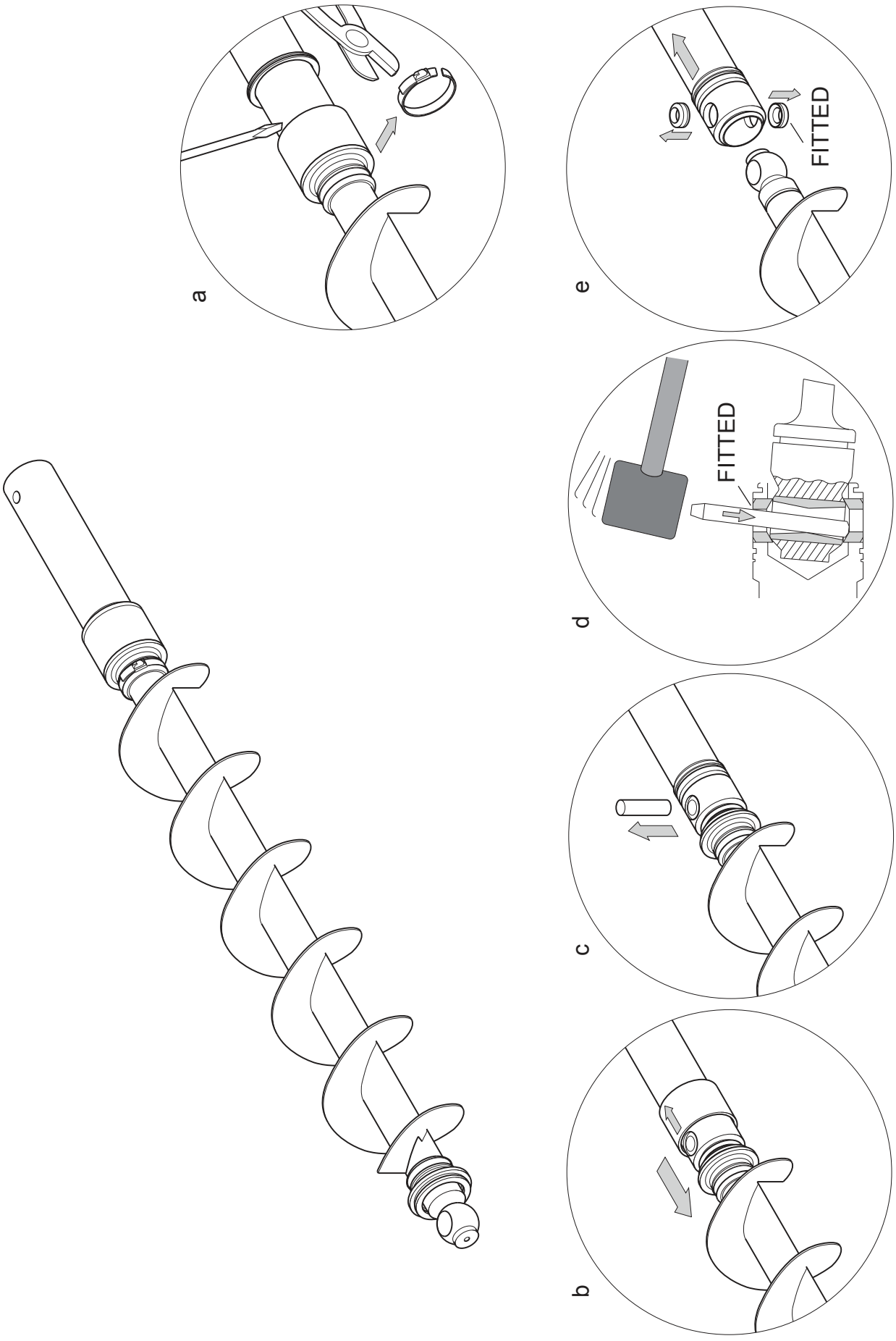
Dismantling & Assembly Diagrams



Dismantling & Assembly Diagrams

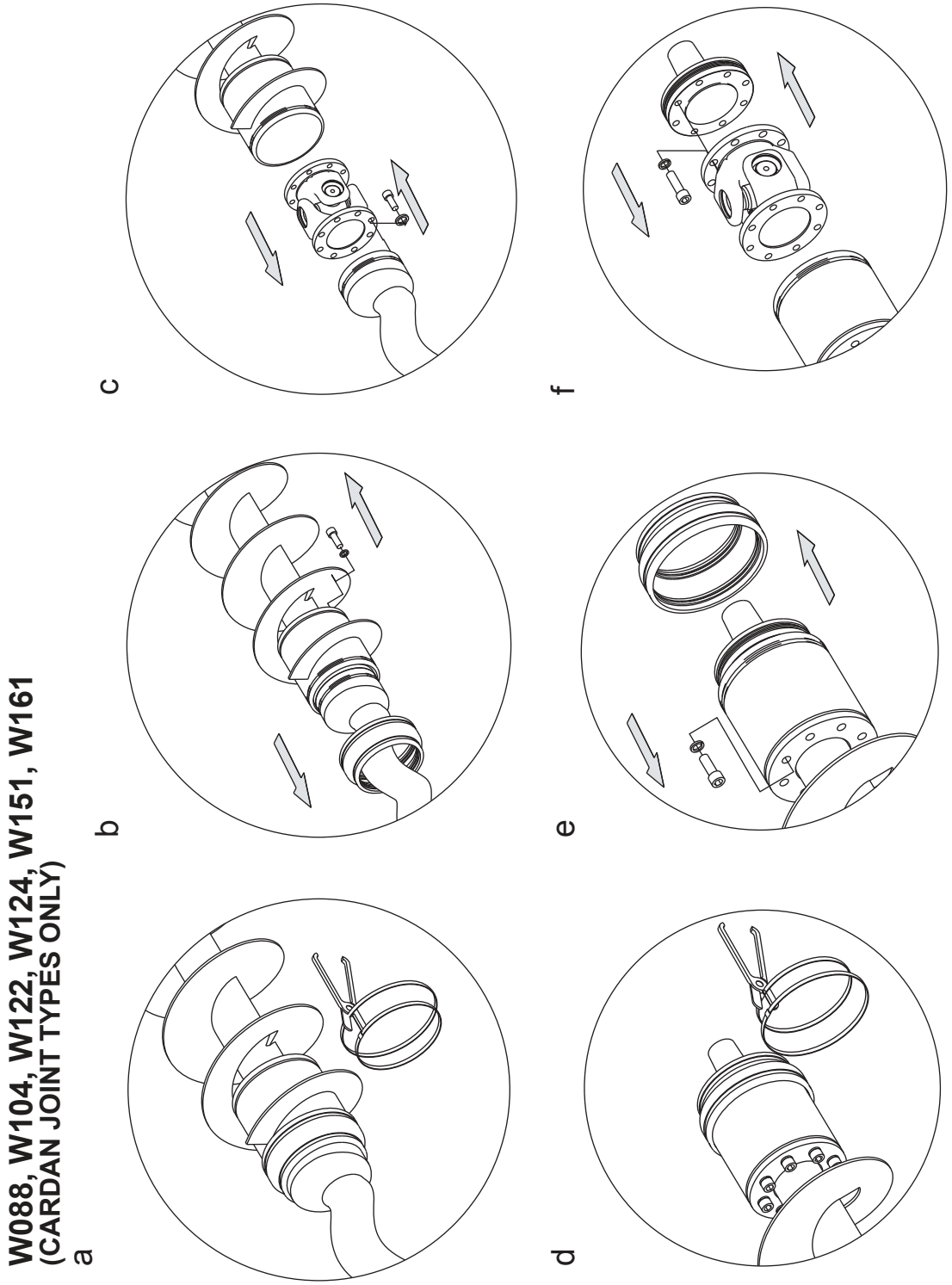


Dismantling & Assembly Diagrams

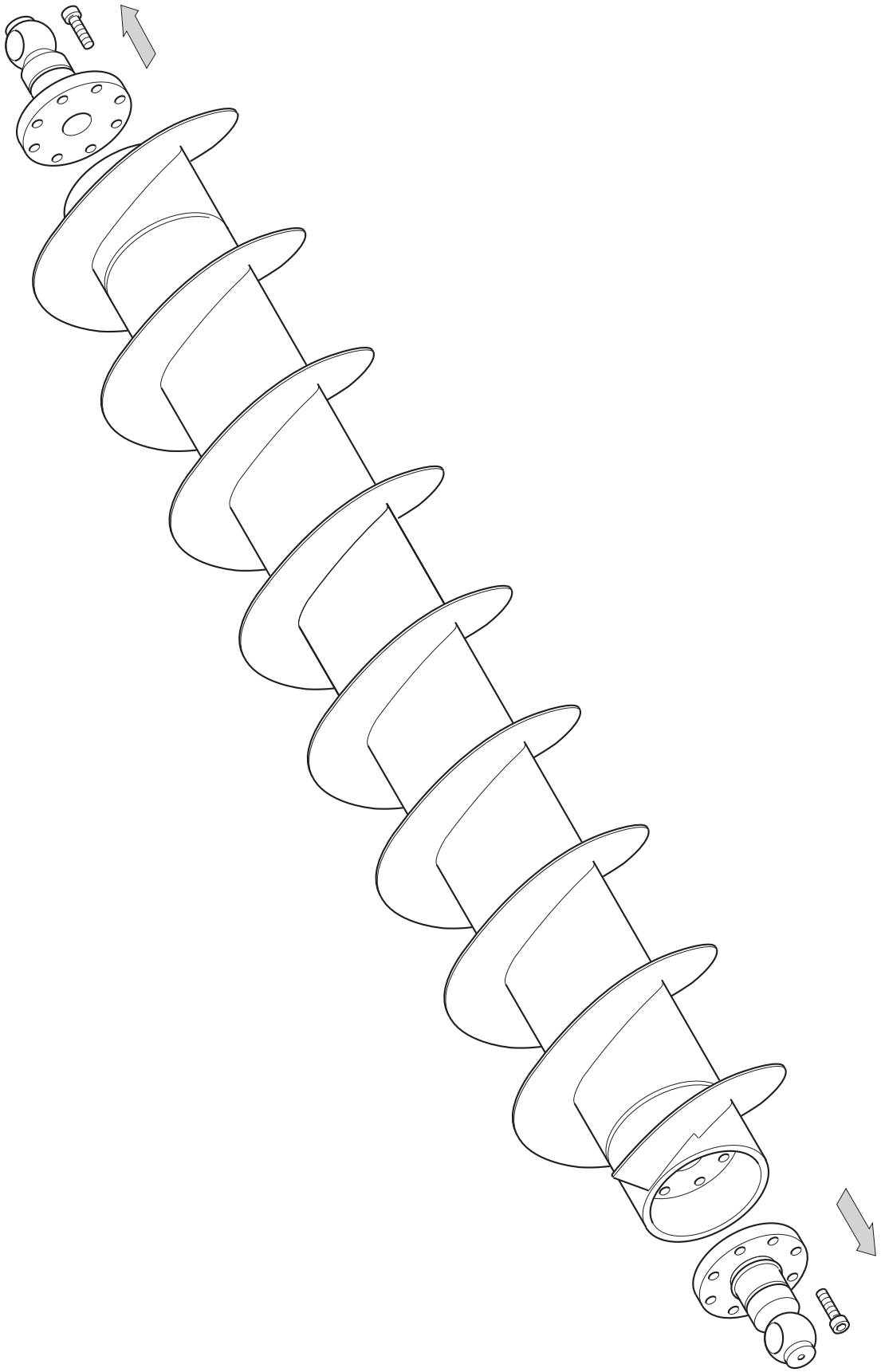


Dismantling & Assembly Diagrams

W088, W104, W122, W124, W151, W161
(CARDAN JOINT TYPES ONLY)

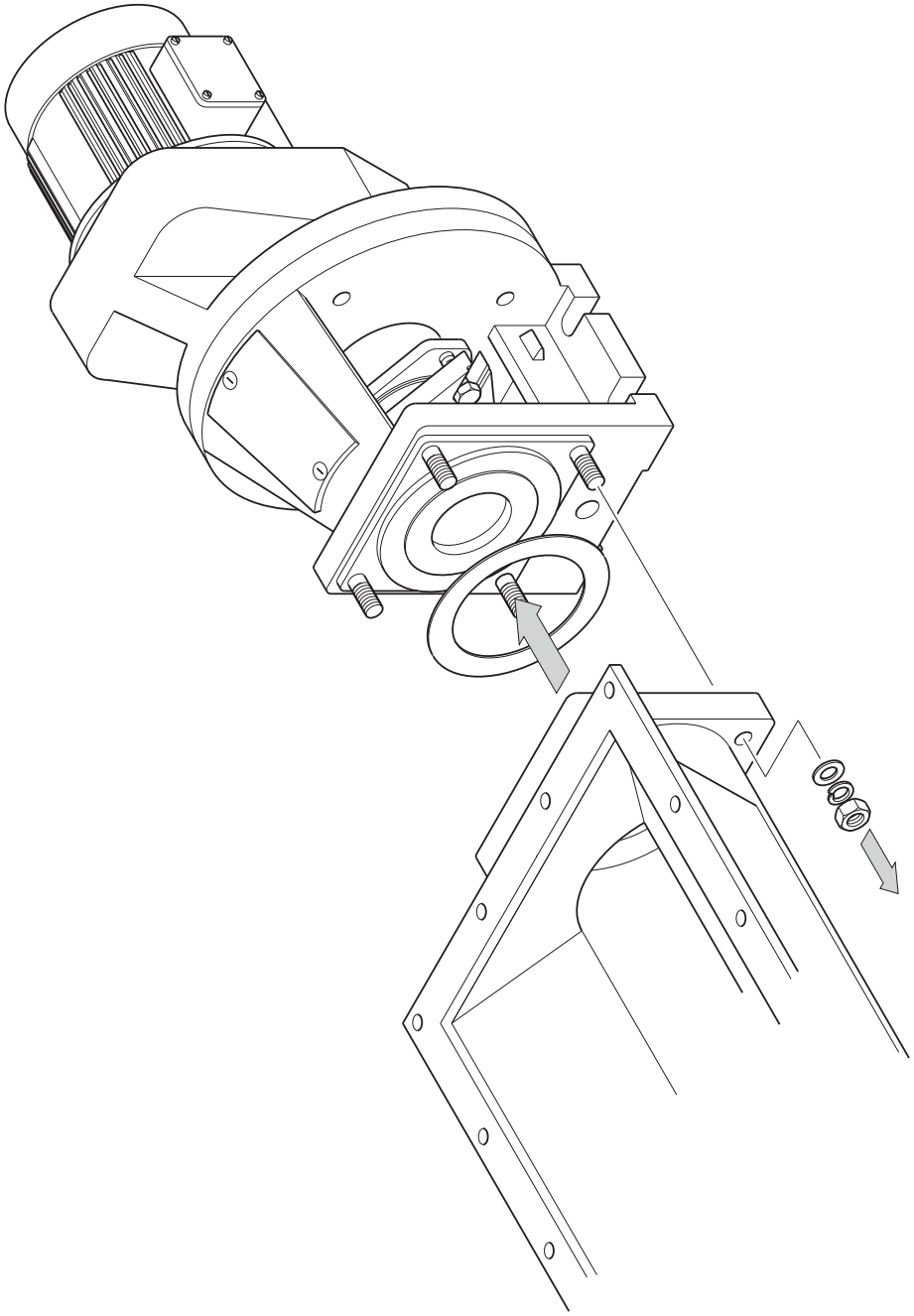


Dismantling & Assembly Diagrams

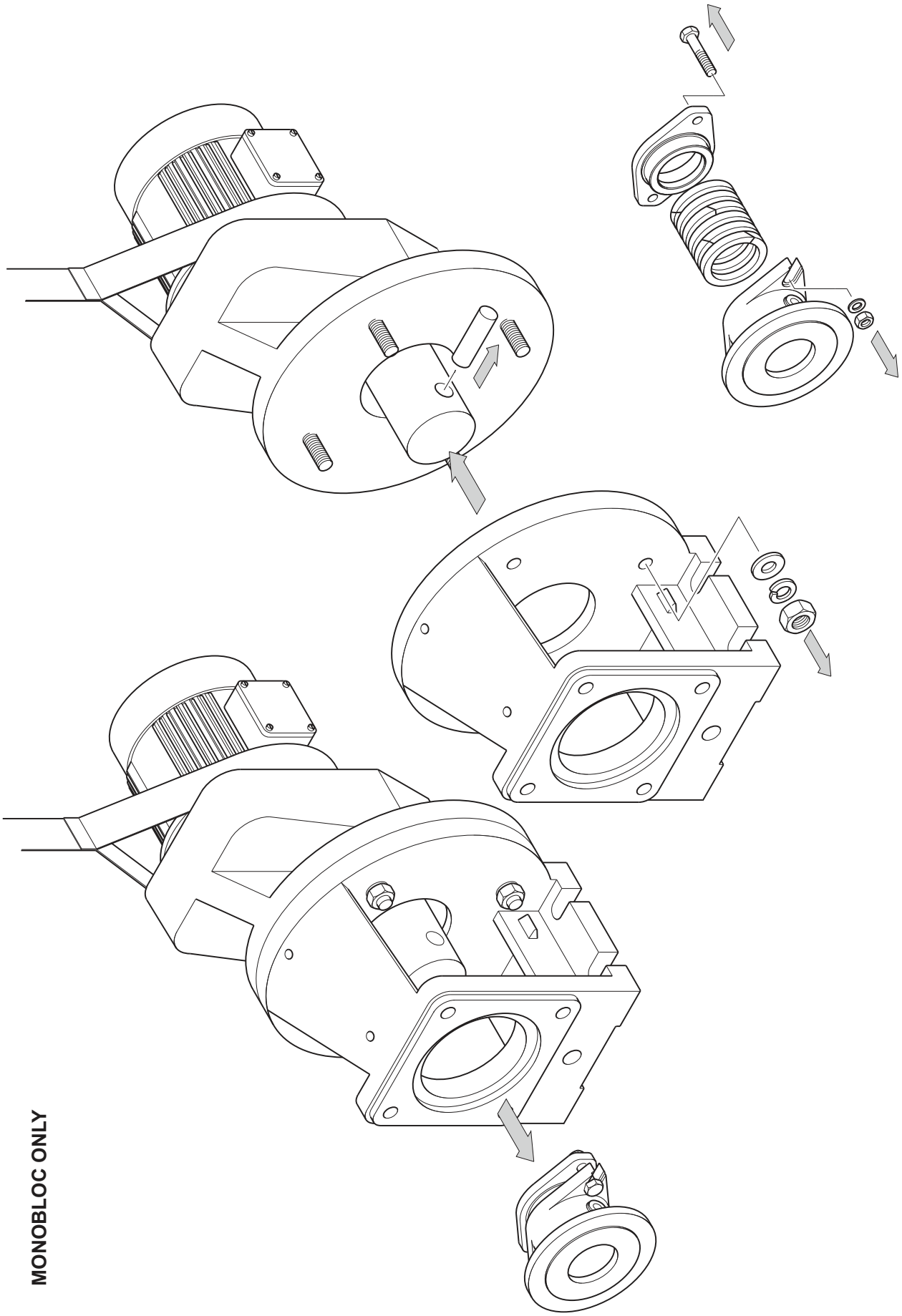


LARGE AUGER

Dismantling & Assembly Diagrams

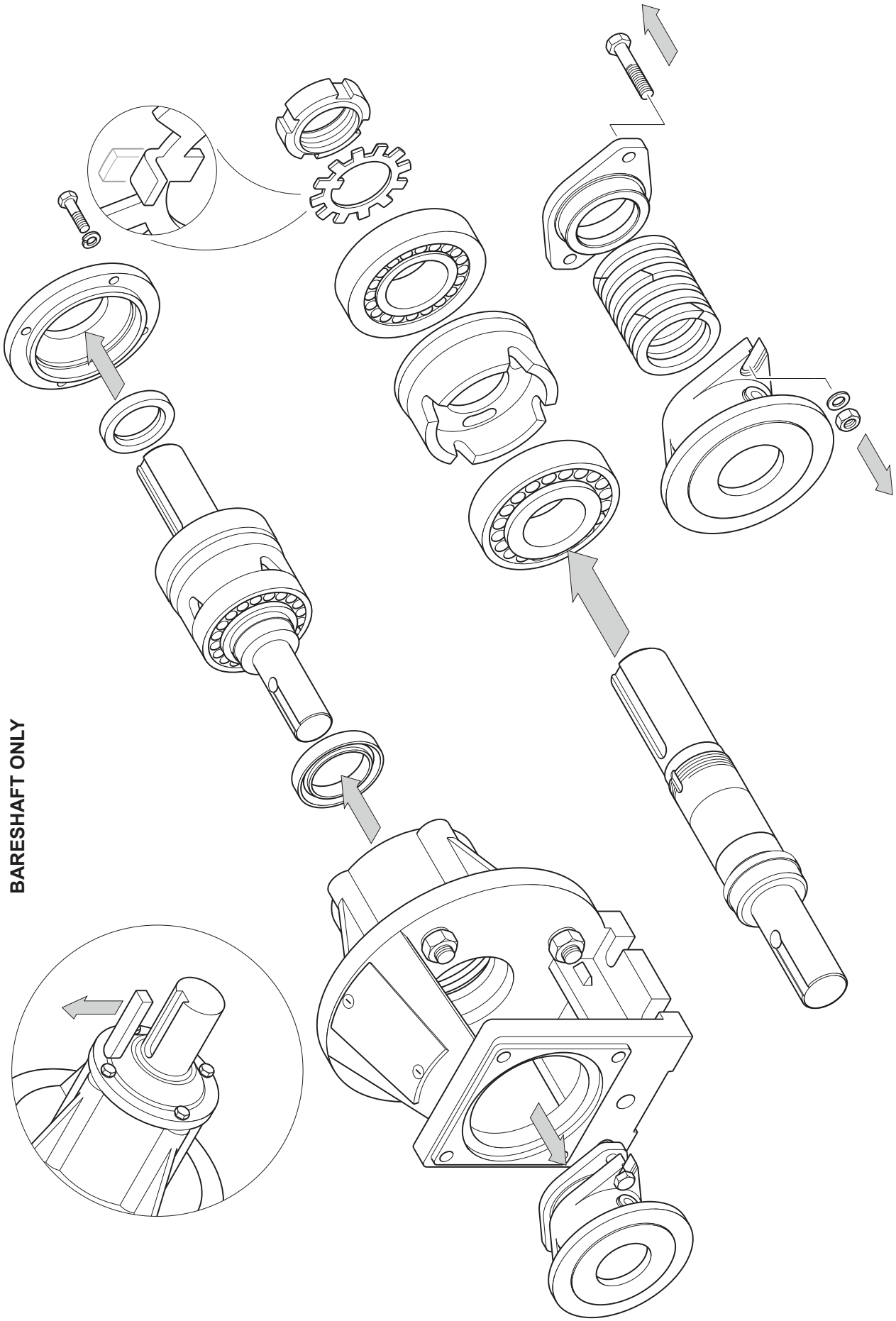


Dismantling & Assembly Diagrams

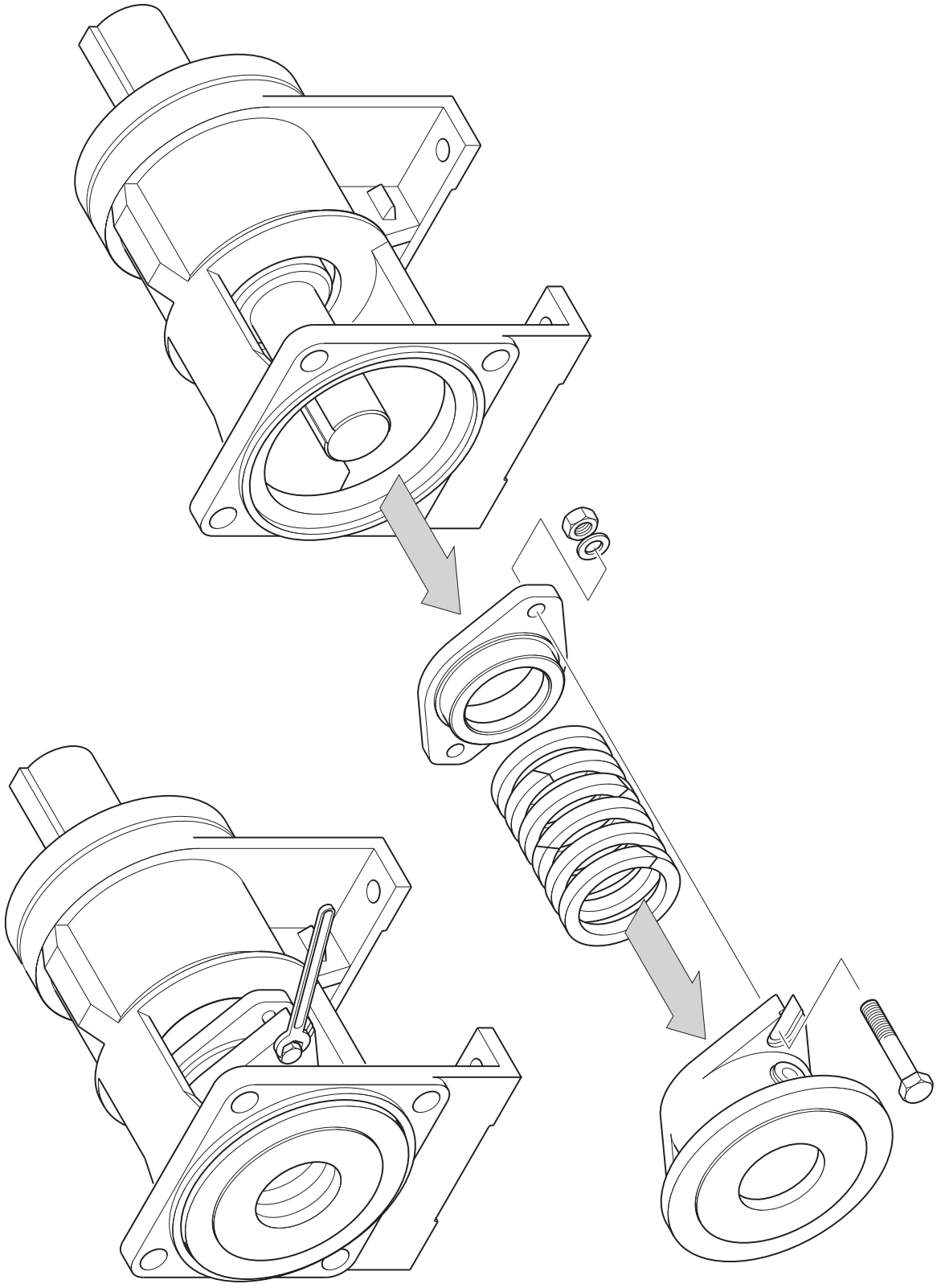


MONOBLOC ONLY

Dismantling & Assembly Diagrams

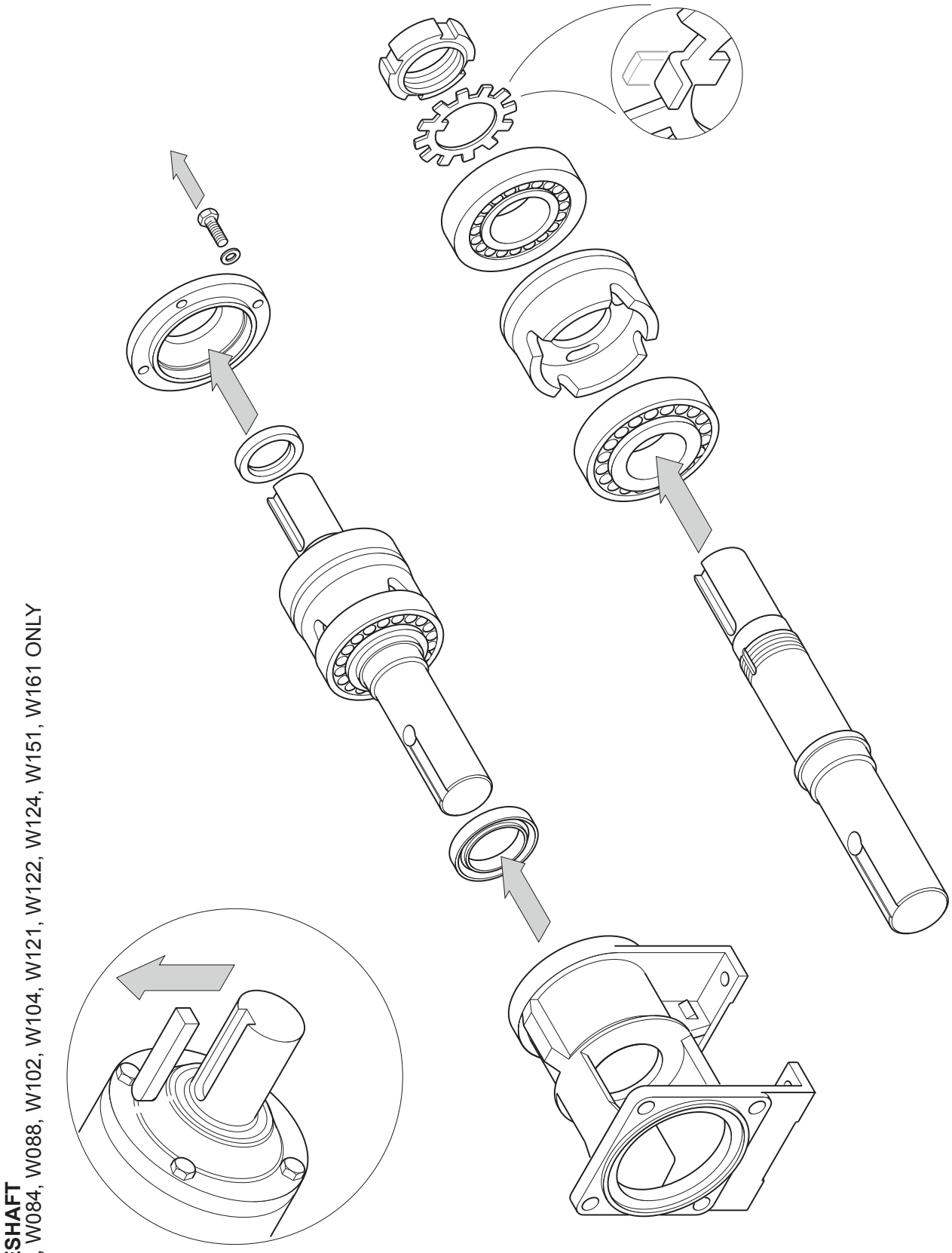


Dismantling & Assembly Diagrams



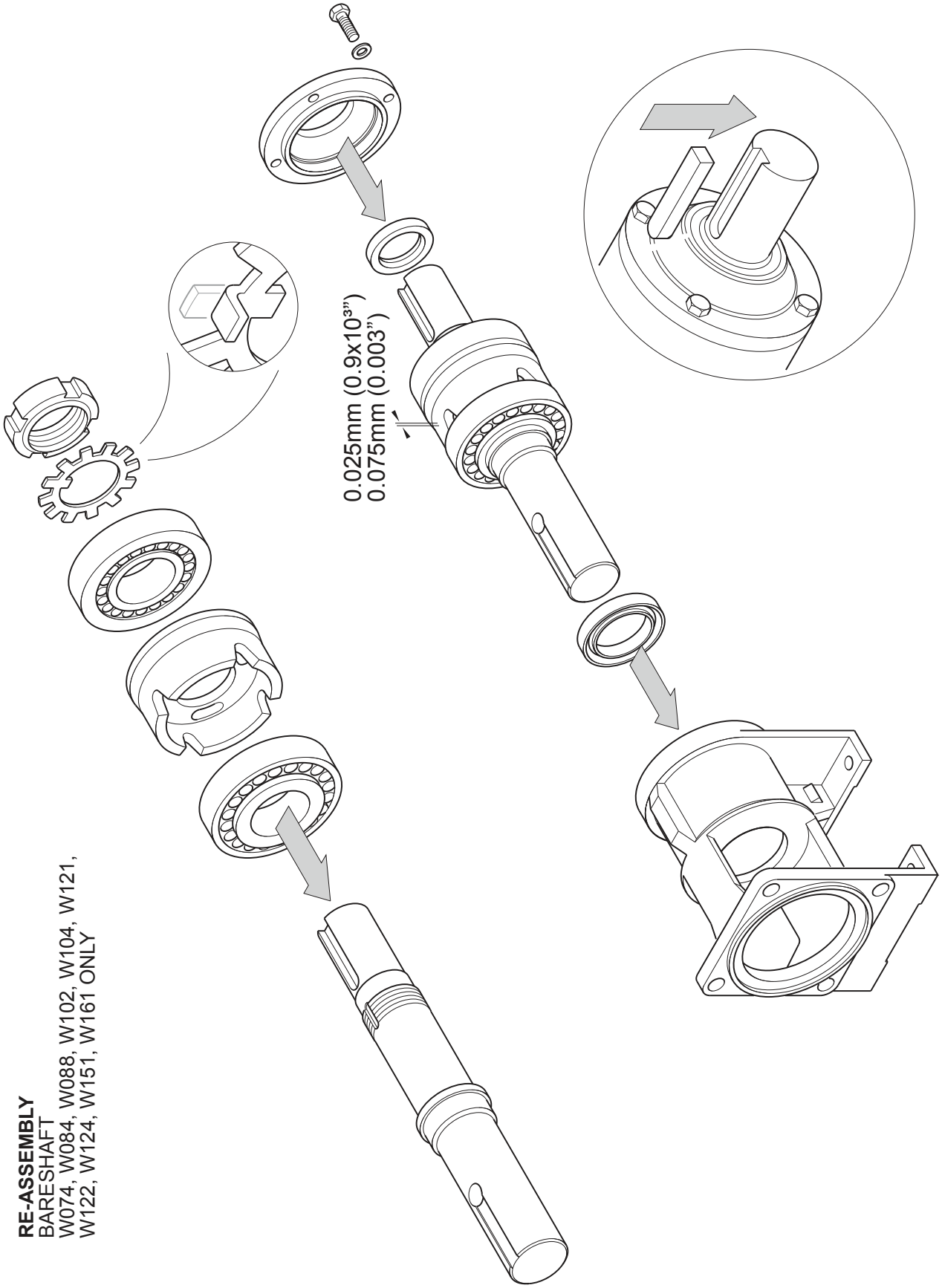
BARESHAFT
W074, W084, W088, W102, W104,
W121, W122, W124, W151, W161 ONLY

Dismantling & Assembly Diagrams



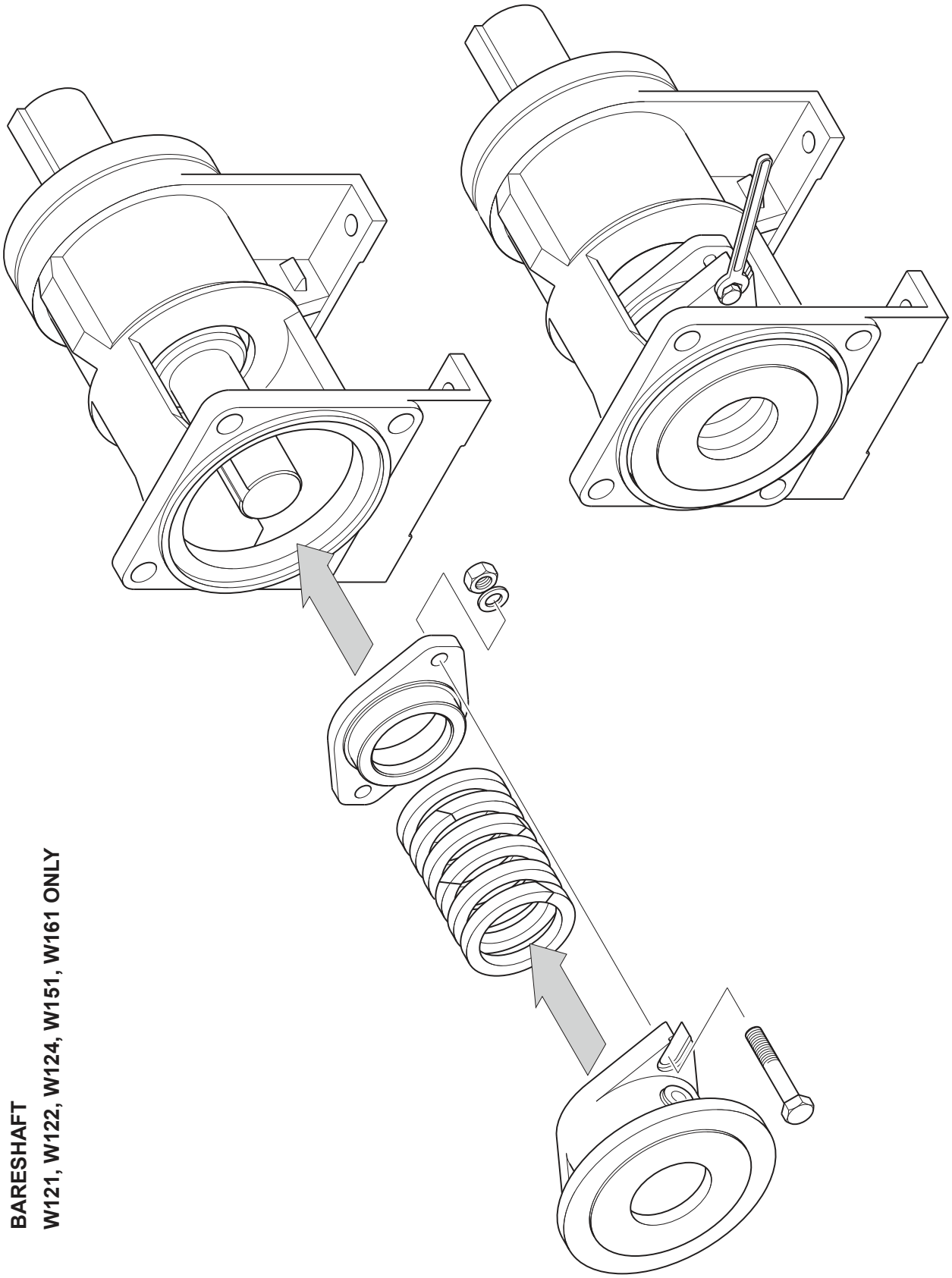
BARESHAFT
W074, W084, W088, W102, W104, W121, W122, W124, W151, W161 ONLY

Dismantling & Assembly Diagrams



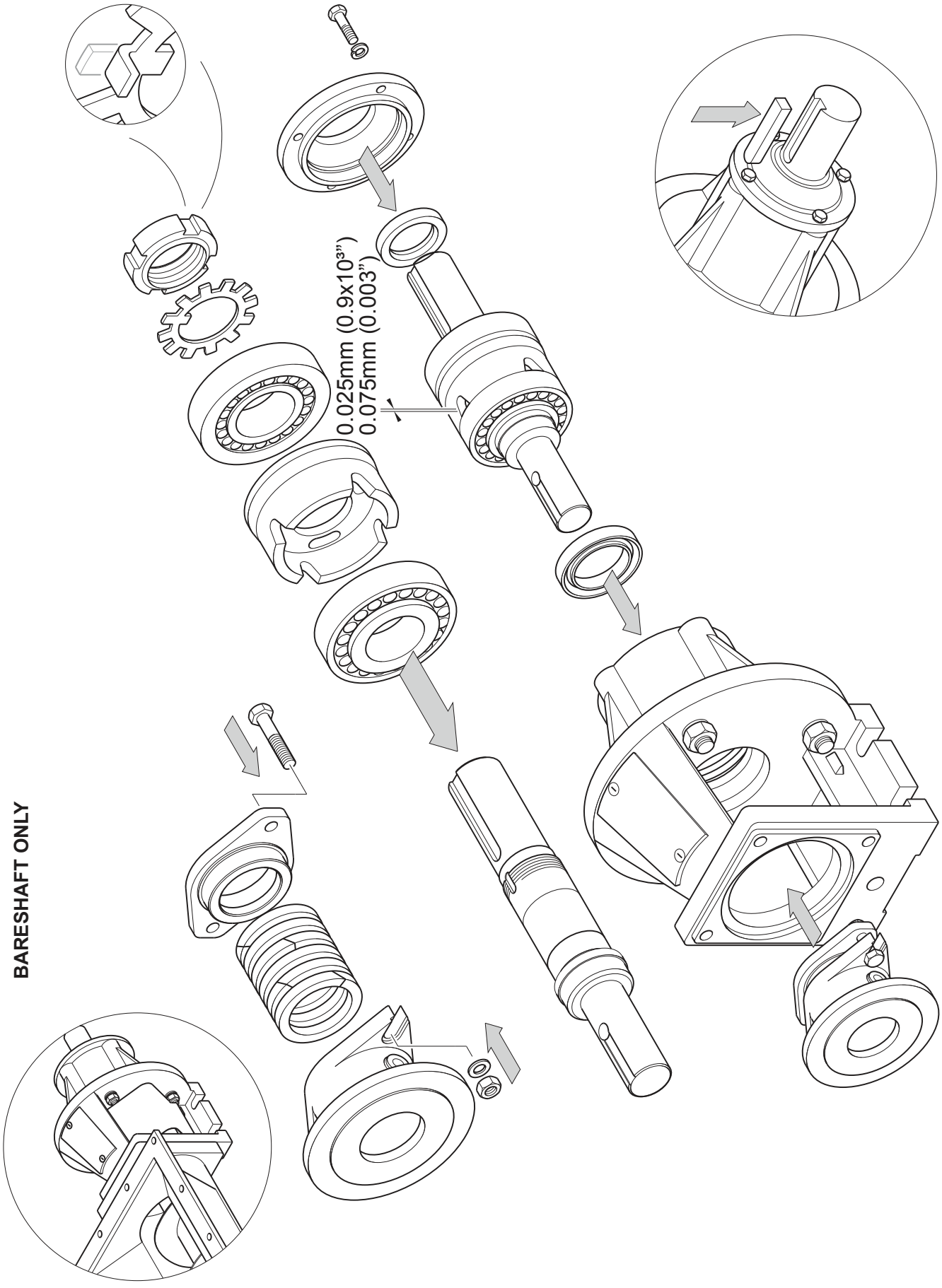
RE-ASSEMBLY
BARESHAFT
W074, W084, W088, W102, W104, W121,
W122, W124, W151, W161 ONLY

Dismantling & Assembly Diagrams

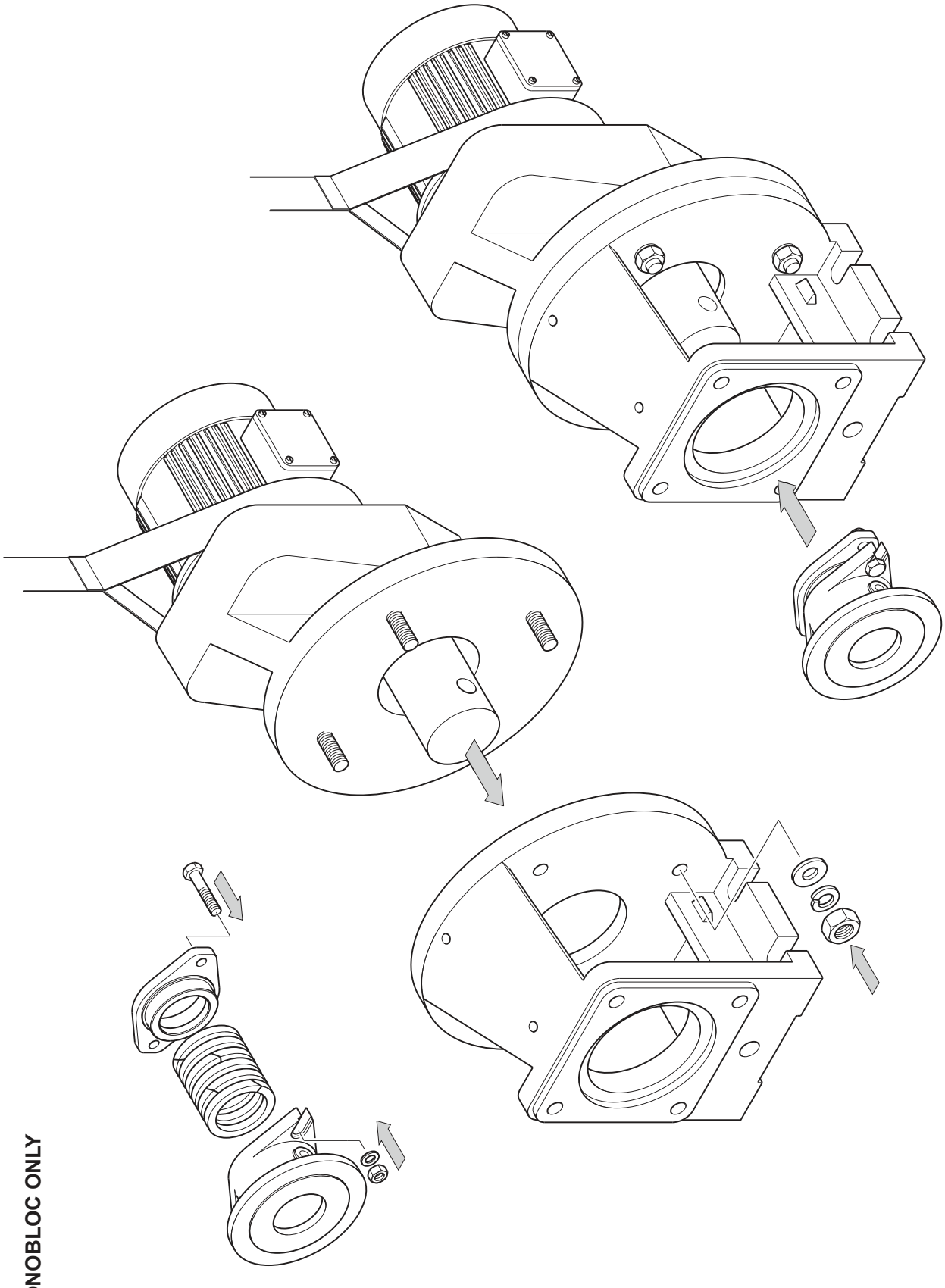


BARESHAFT
W121, W122, W124, W151, W161 ONLY

Dismantling & Assembly Diagrams

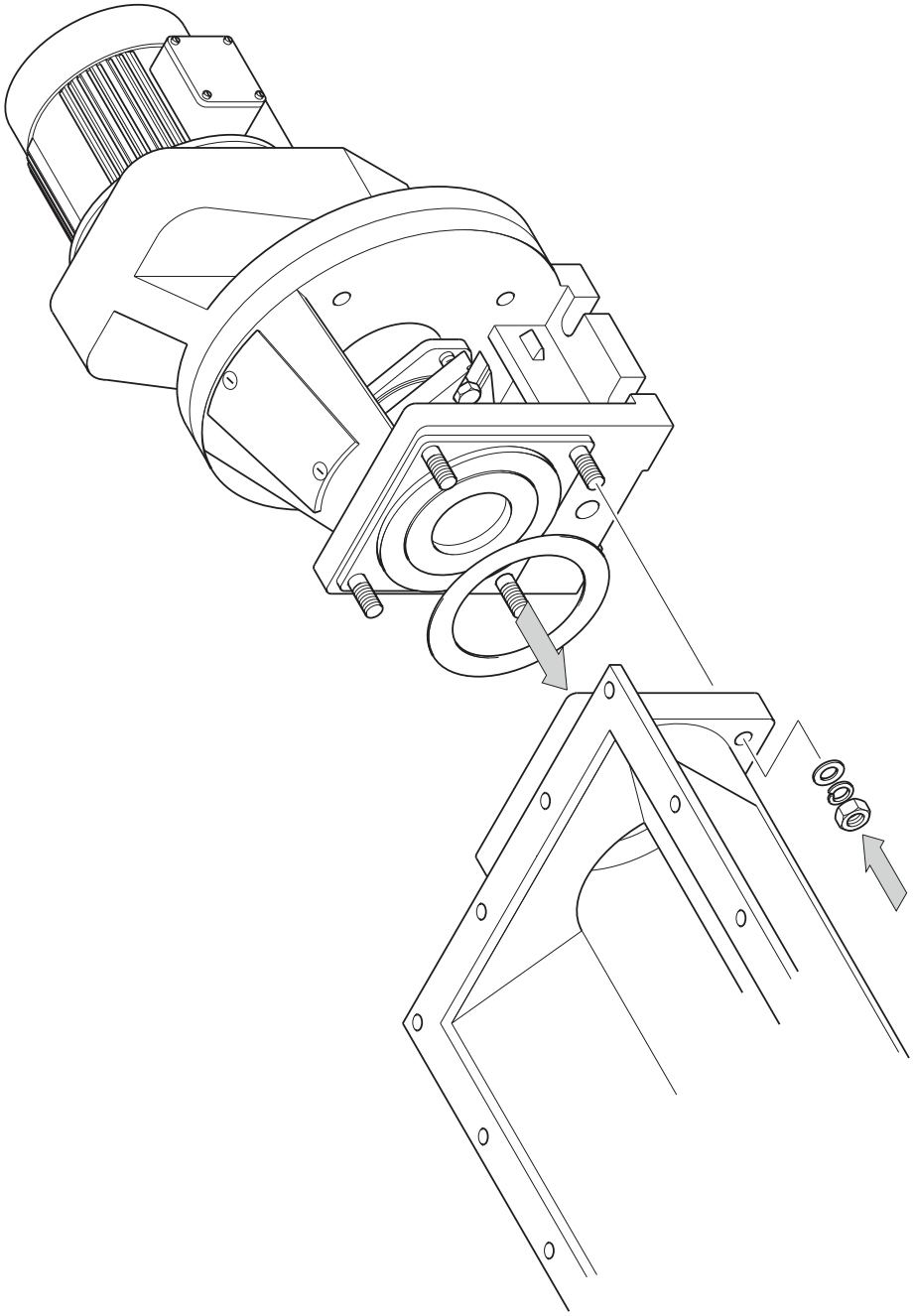


Dismantling & Assembly Diagrams

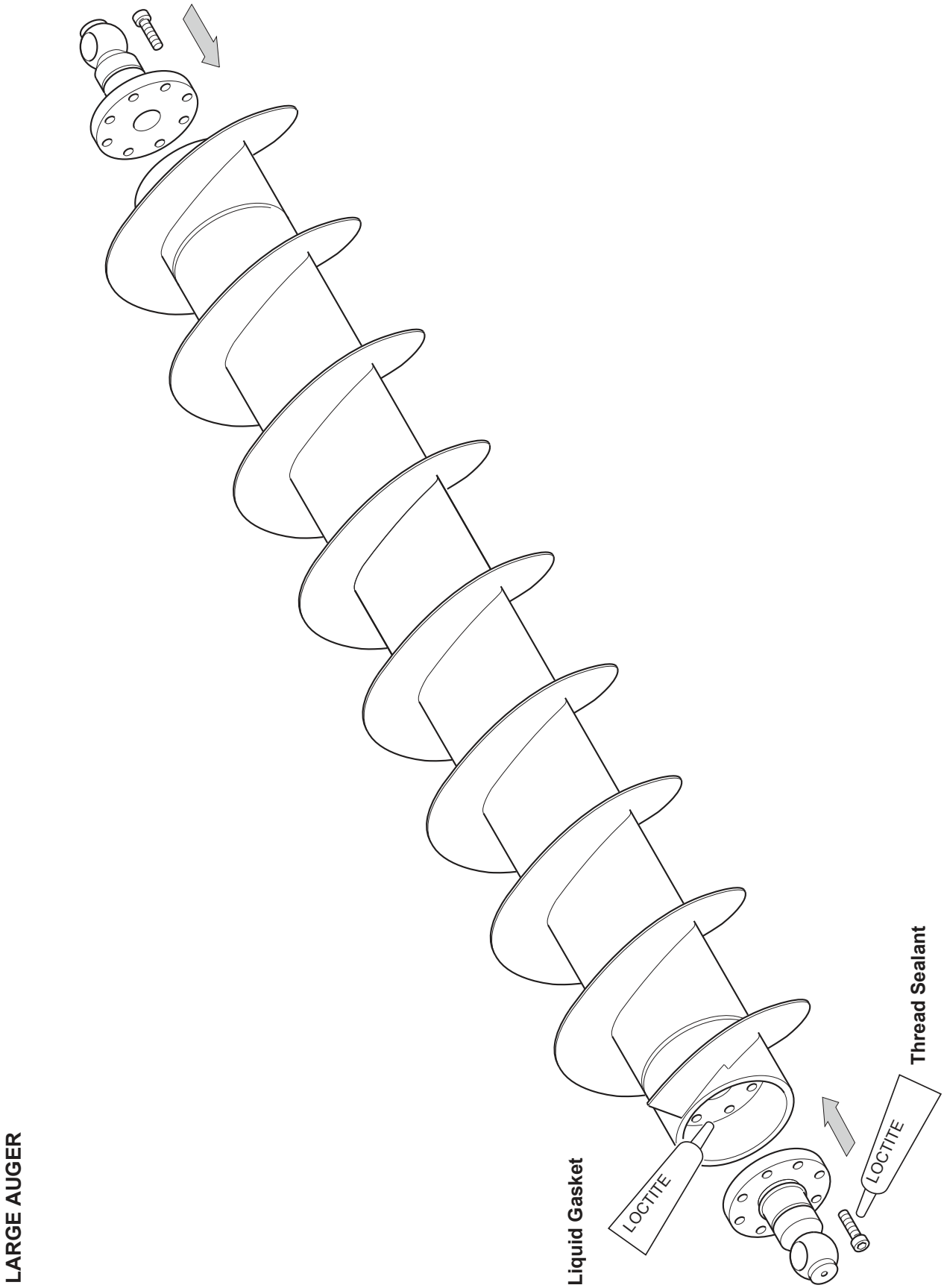


MONOBLOC ONLY

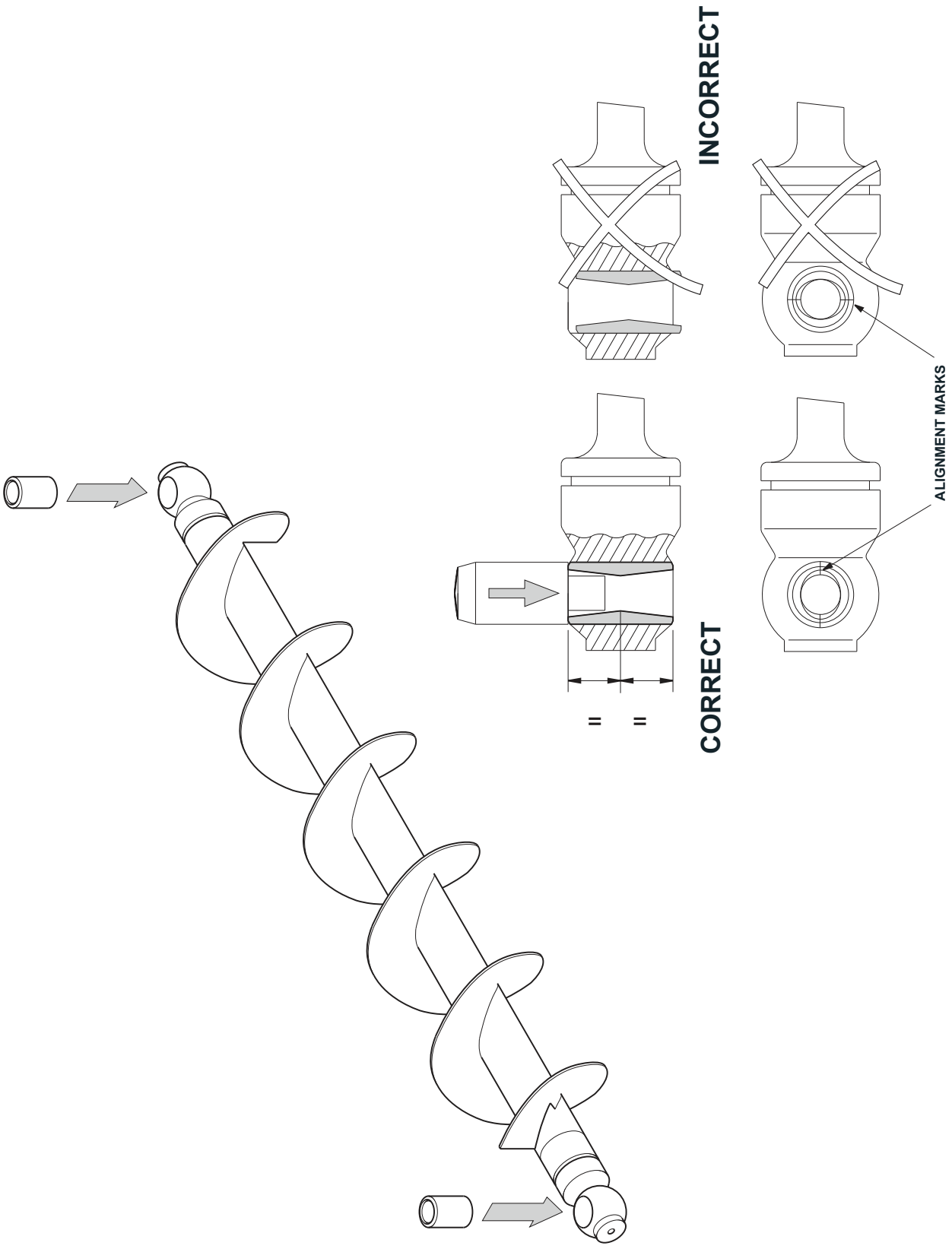
Dismantling & Assembly Diagrams



Dismantling & Assembly Diagrams



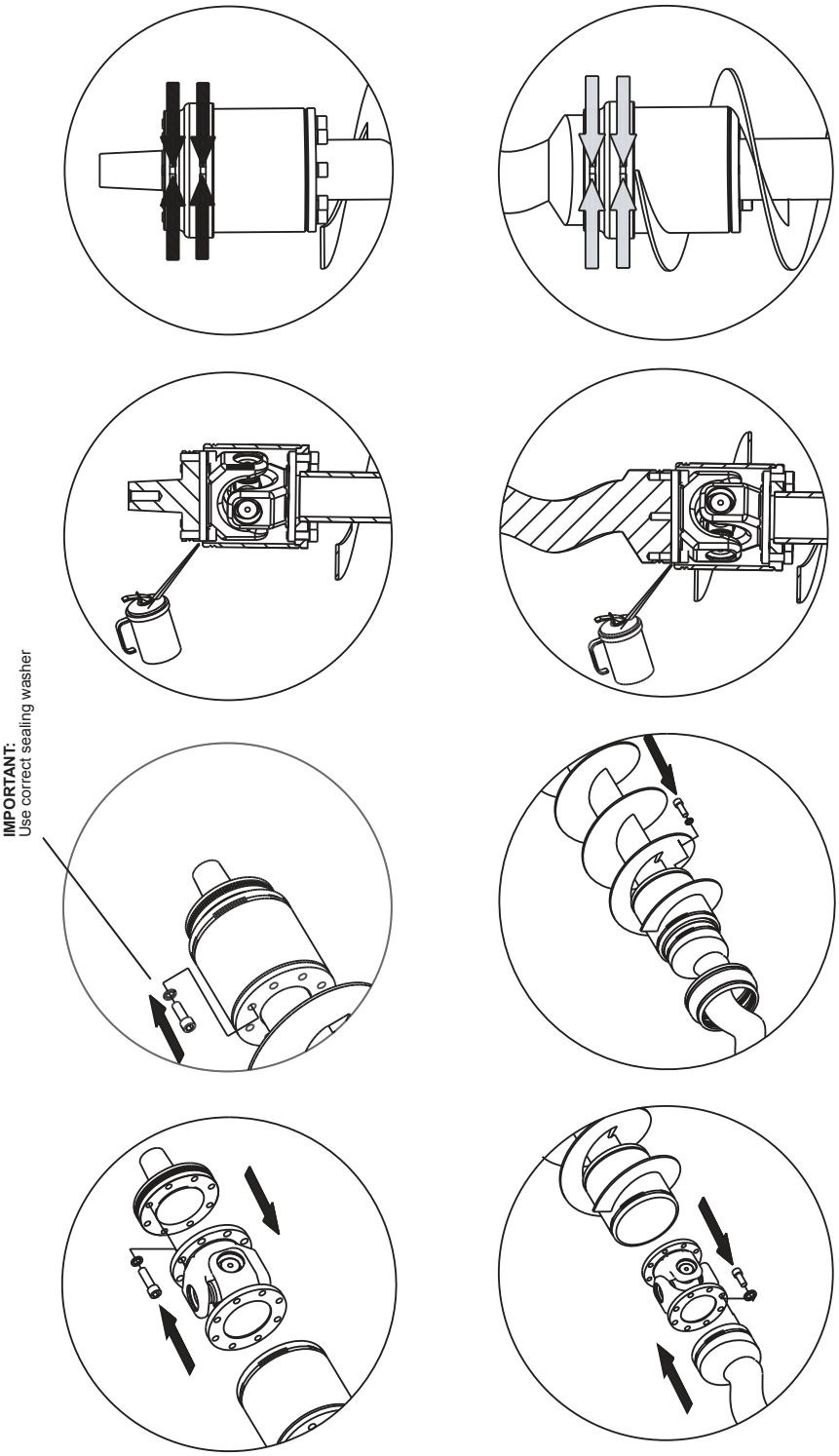
Dismantling & Assembly Diagrams



Dismantling & Assembly Diagrams

Dismantling & Assembly Diagrams

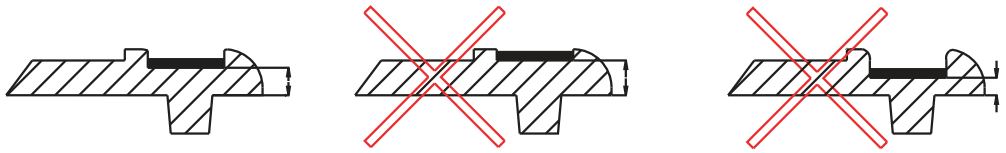
W088, W104, W122, W124, W151, W161
(CARDAN JOINT TYPES ONLY)
NOTE: Refer to Section 4, Page 45 for details of sealing compounds to be used

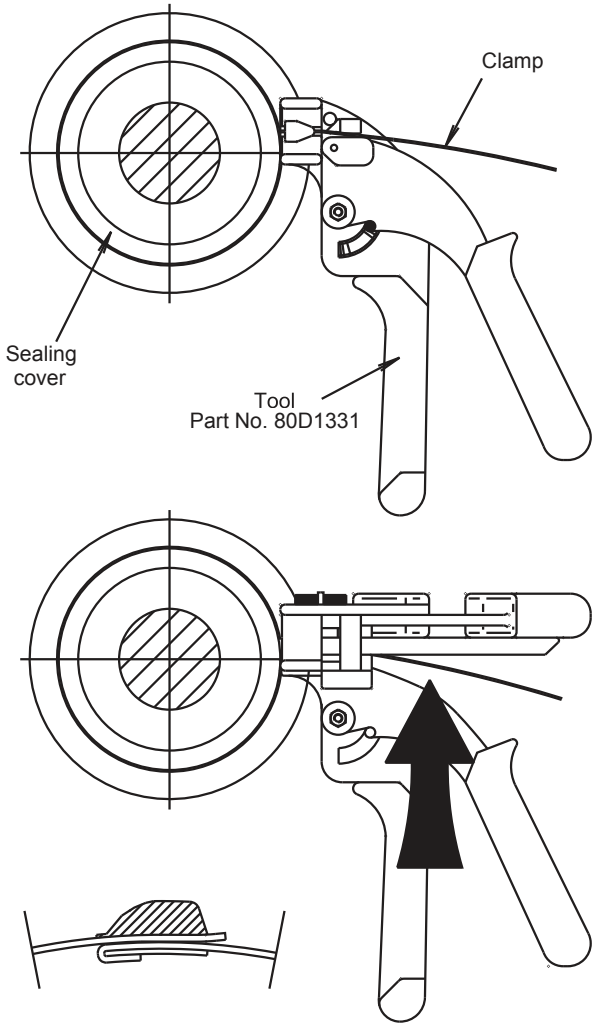


FITTING OF SEALING COVER RETAINING CLAMP

ALL EXCEPT W088, W104, W122, W124, W151, W154 & W161

Correct tension *Too loose* *Too tight*





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.

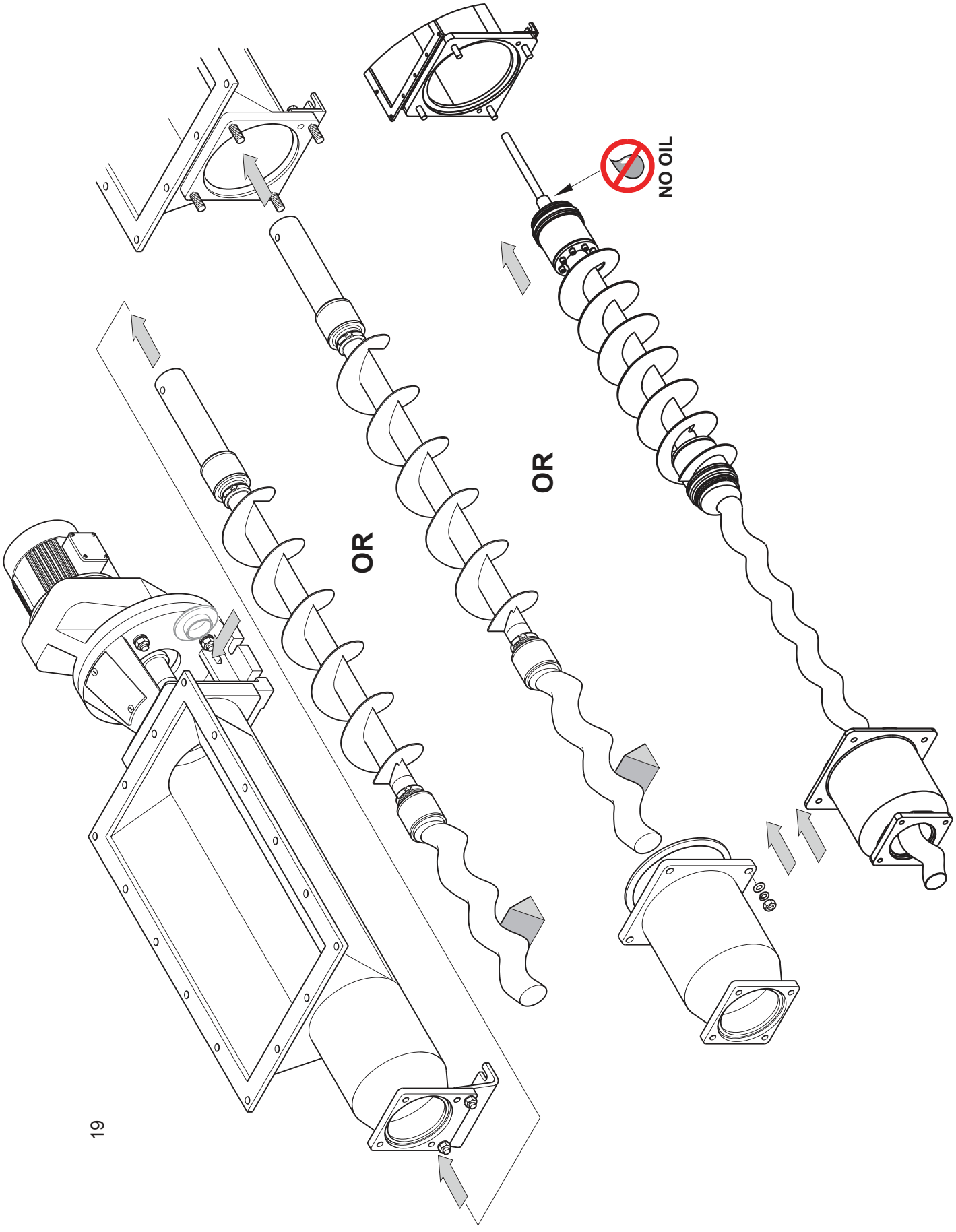
3.
Squeeze handles as many times as necessary to achieve correct tension.

4.
To remove excess banding, rotate tool ¼ - ½ turn whilst maintaining handle pressure. Alternatively cut with snips.

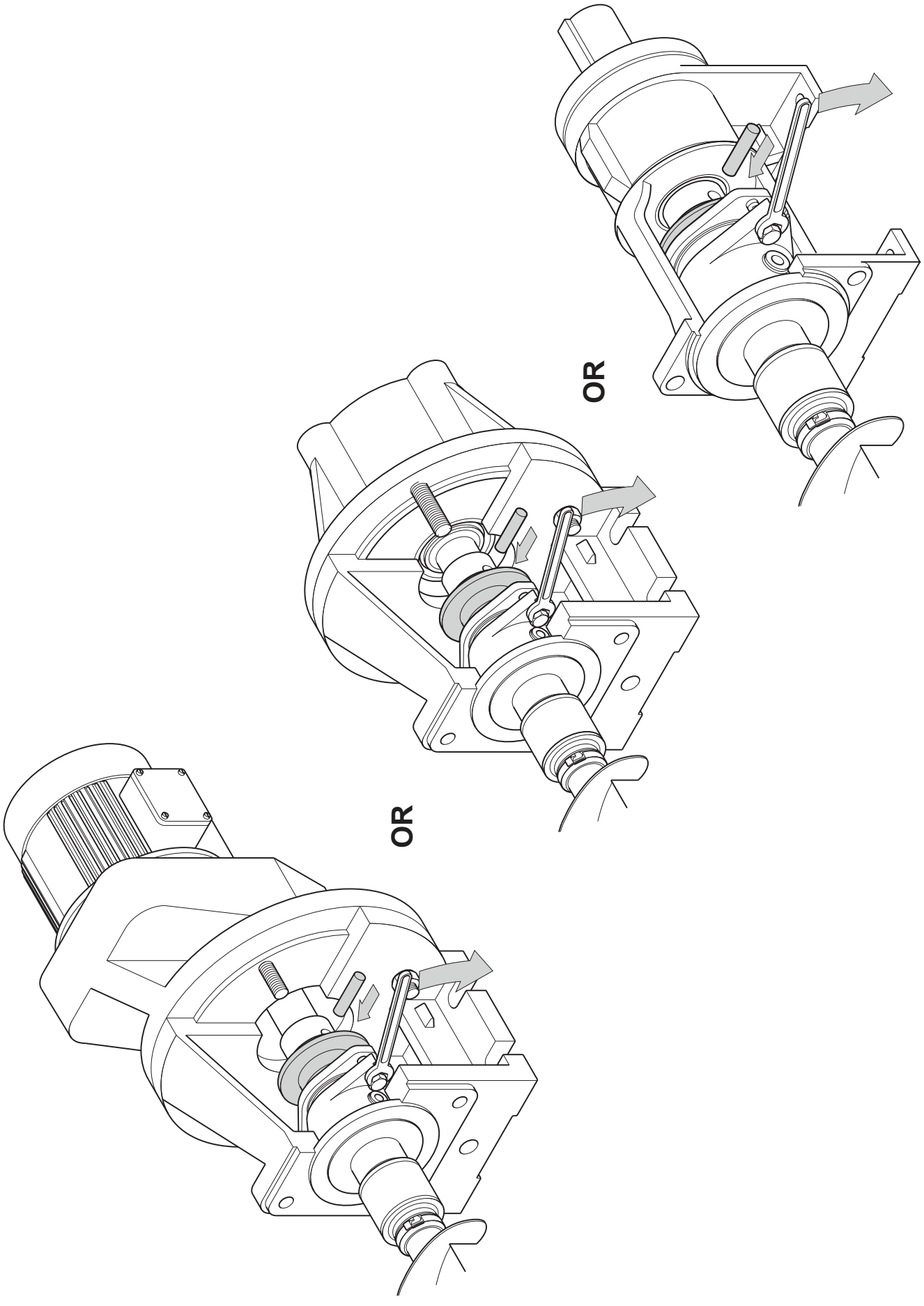
NOTE:
Ensure cut off point is flush with end of buckle as shown opposite. Clamp may loosen if cut too short.

FOR W088, W104, W122, W124, W151, W154 & W161 - REFER TO APPENDIX

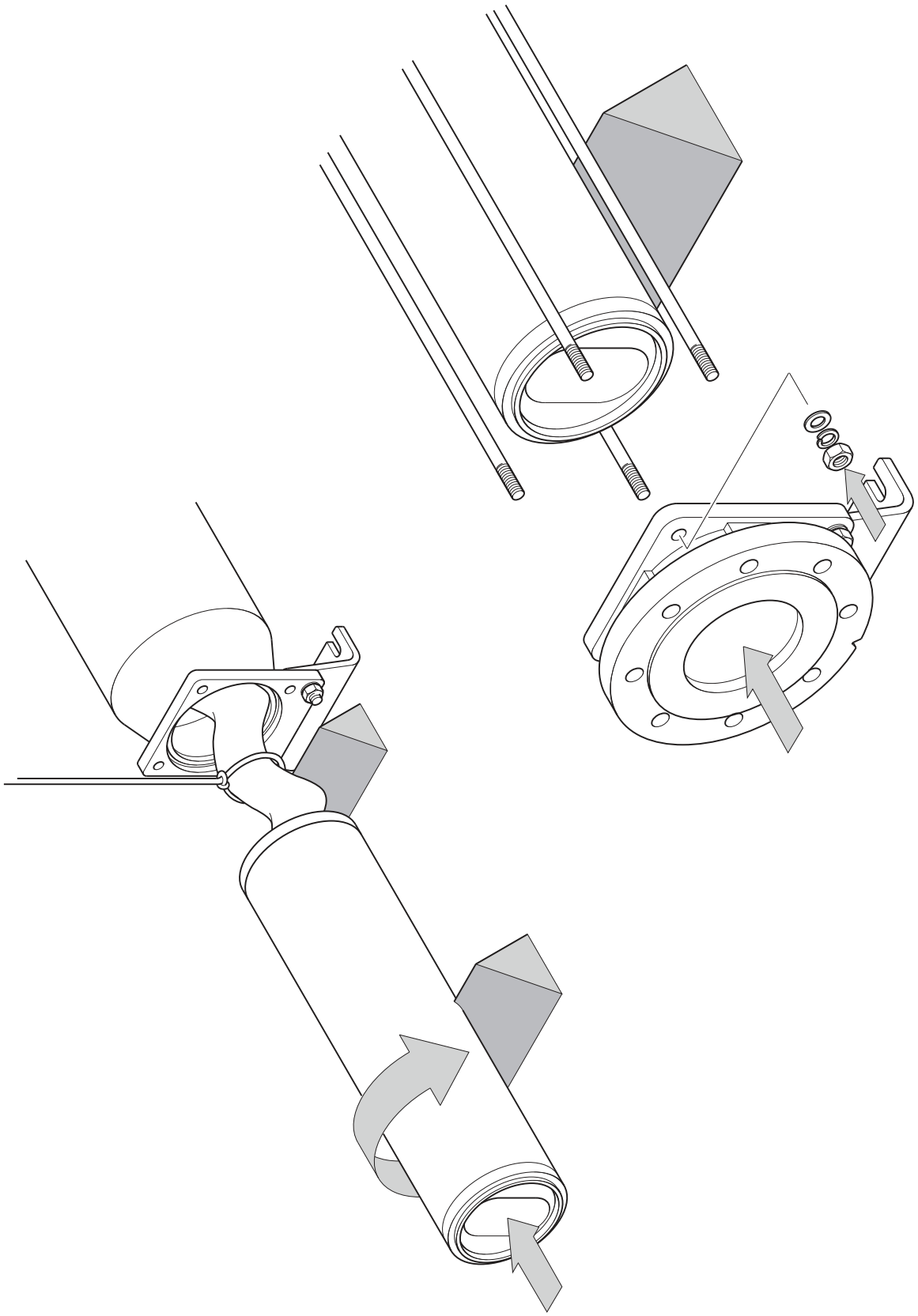
Dismantling & Assembly Diagrams



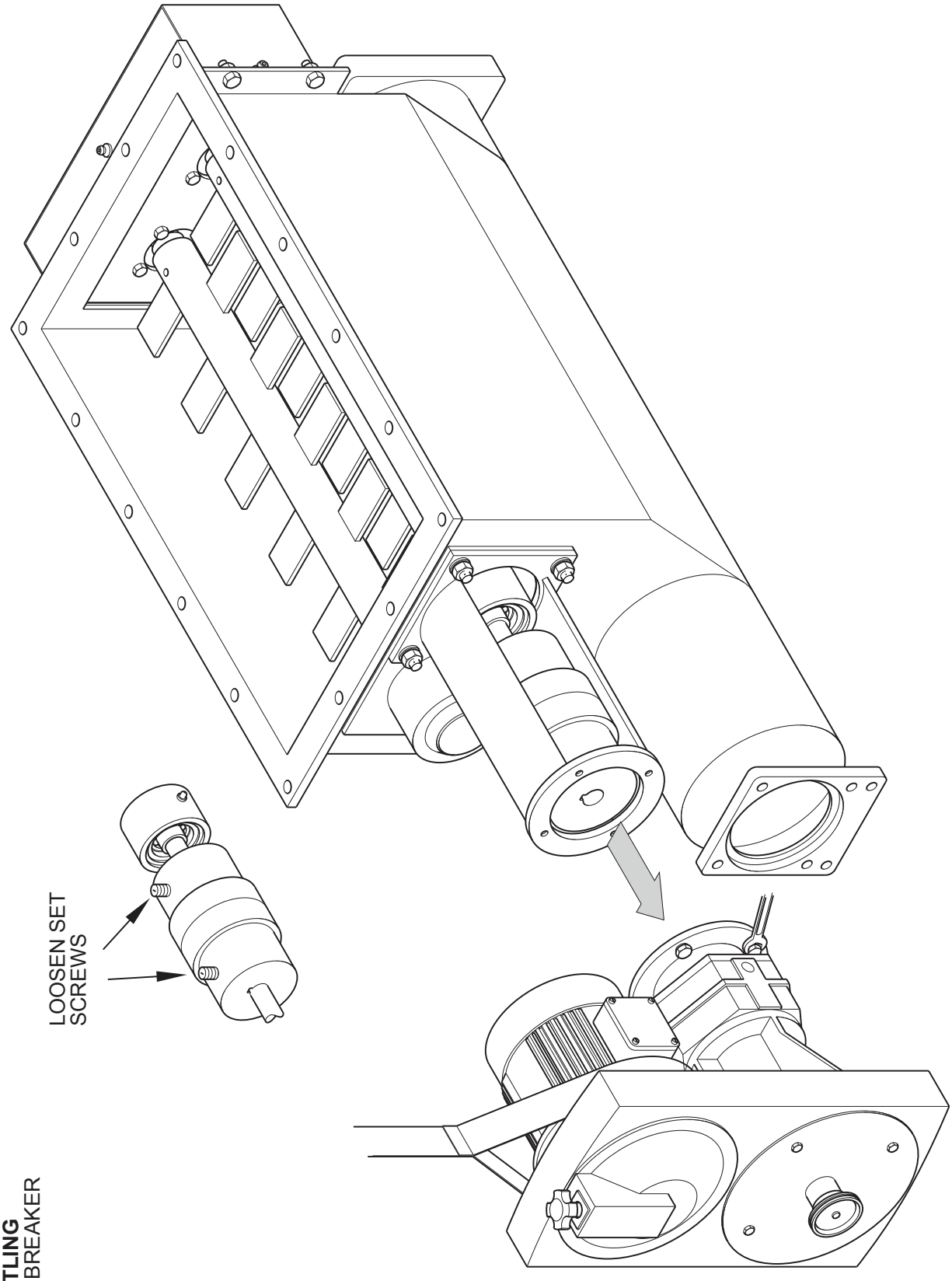
Dismantling & Assembly Diagrams



Dismantling & Assembly Diagrams

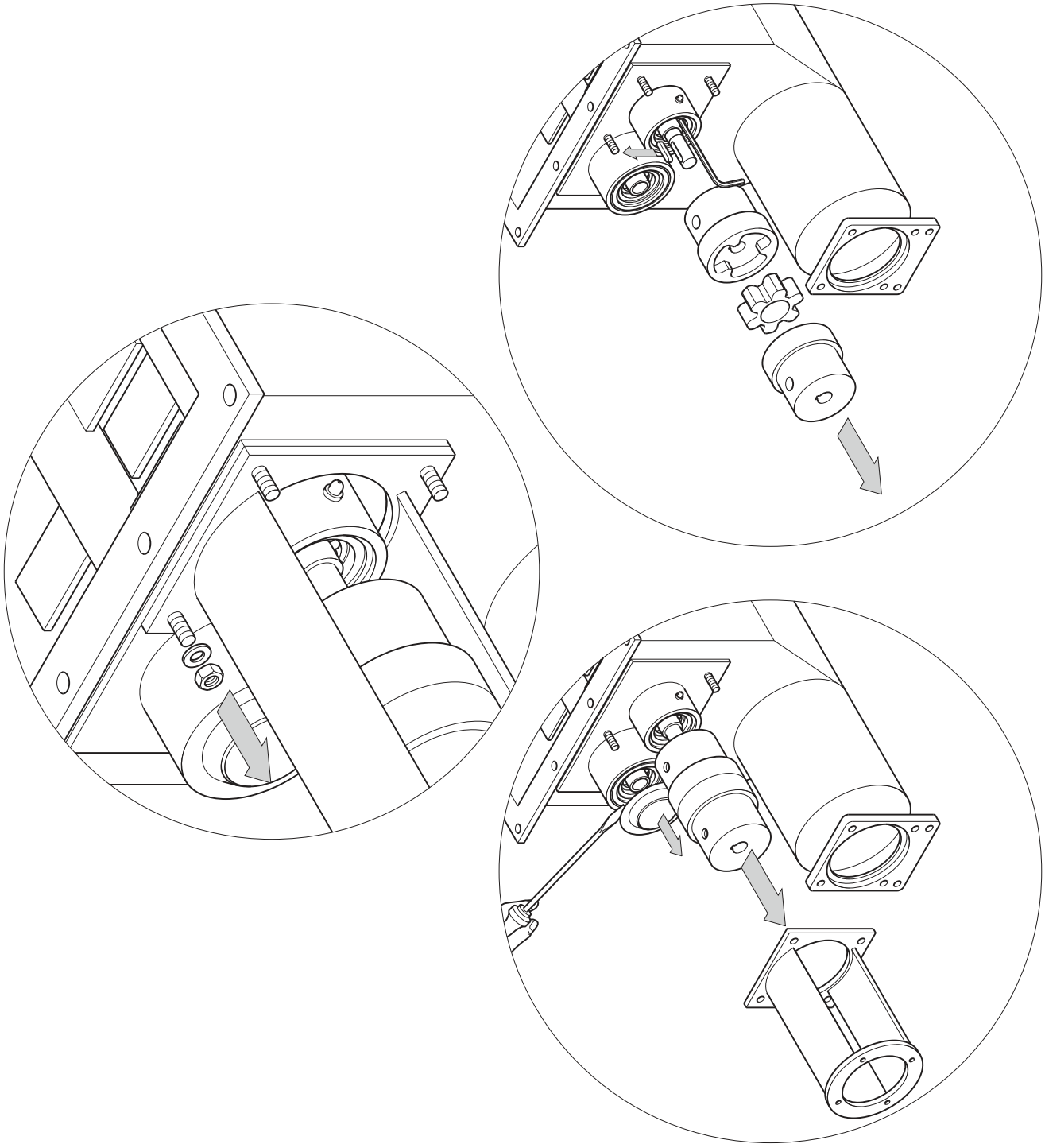


Dismantling & Assembly Diagrams

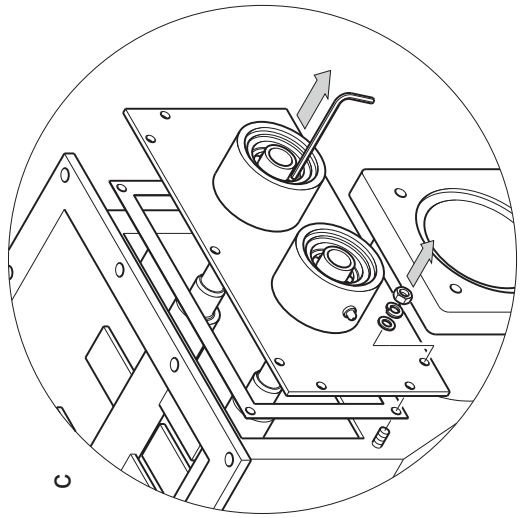


DISMANTLING
BRIDGE BREAKER

Dismantling & Assembly Diagrams



Dismantling & Assembly Diagrams



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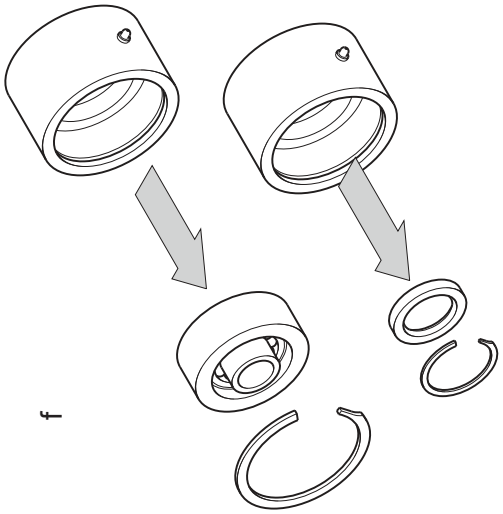

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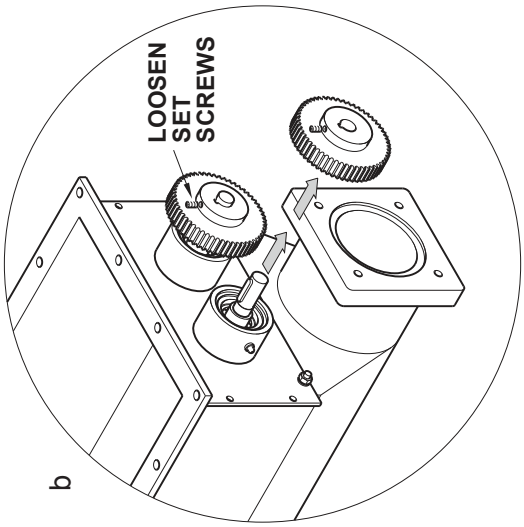

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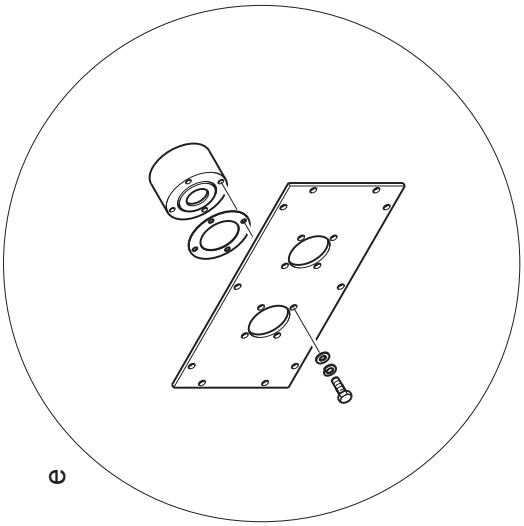

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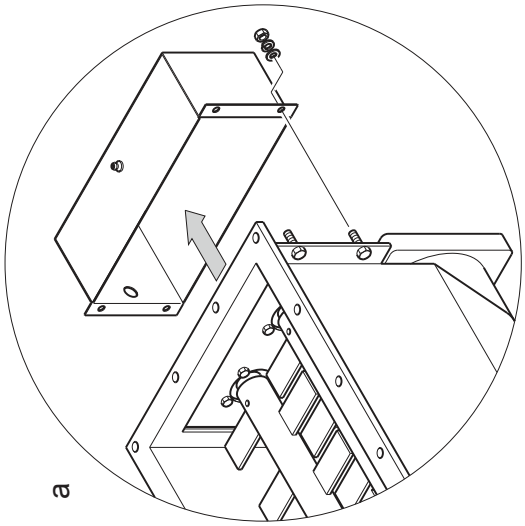

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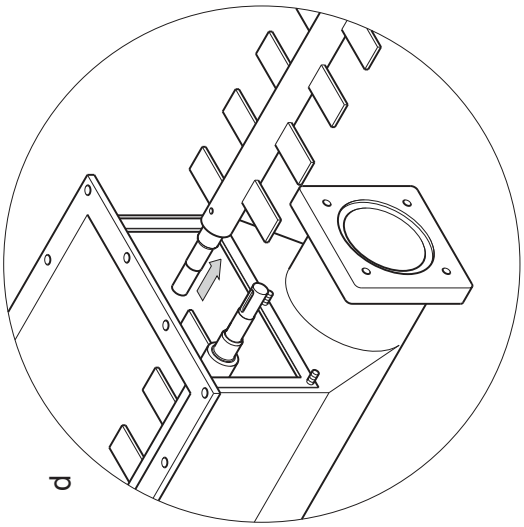
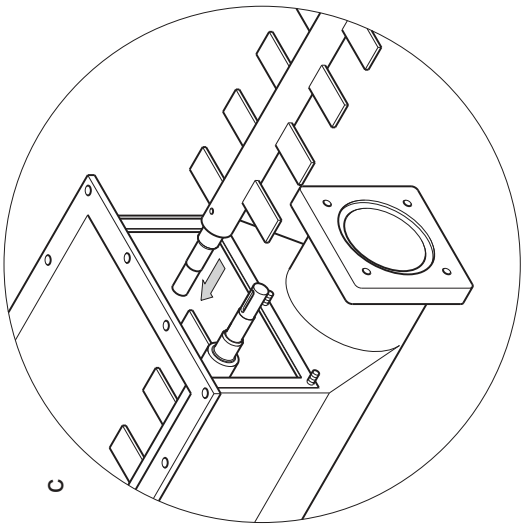


d

Dismantling & Assembly Diagrams

RE-ASSEMBLY
BRIDGE
BREAKER



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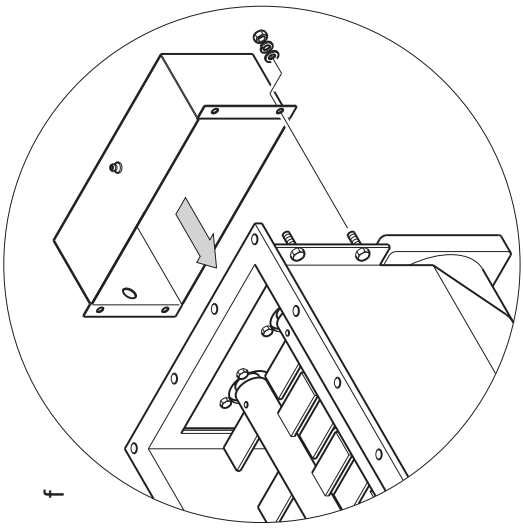

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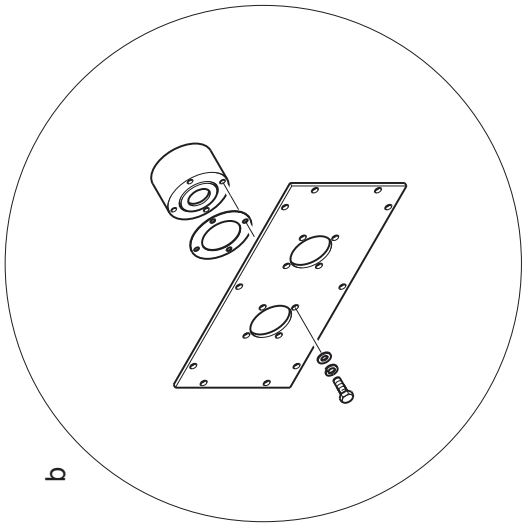

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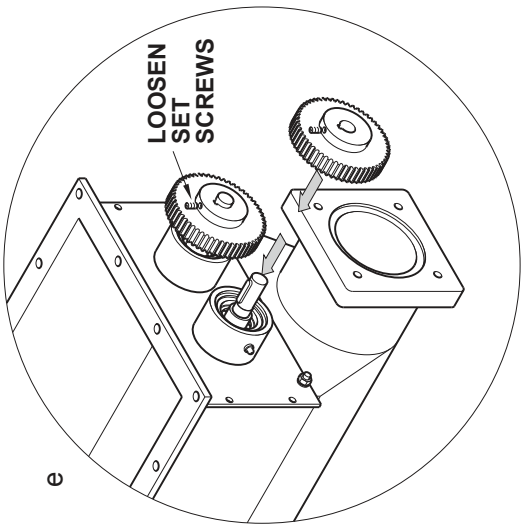

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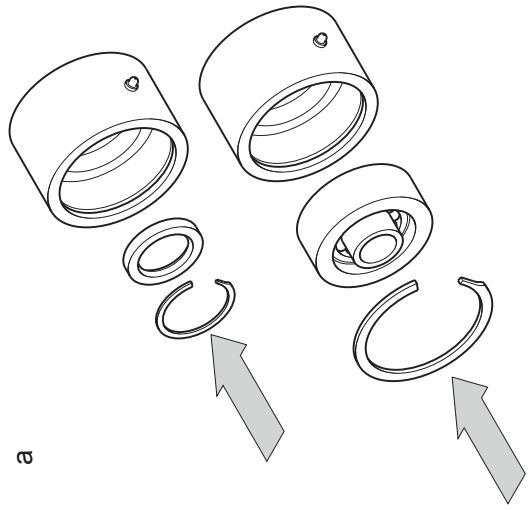

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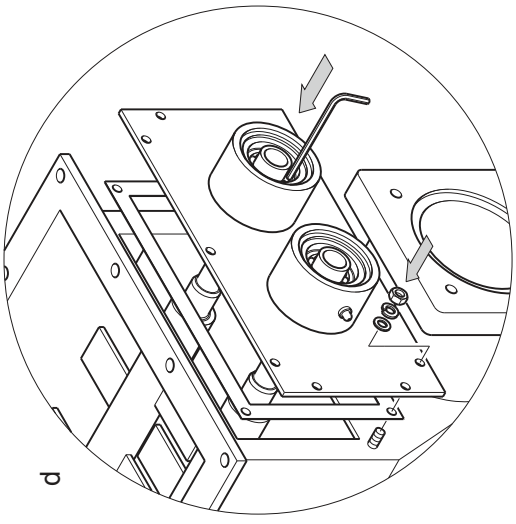
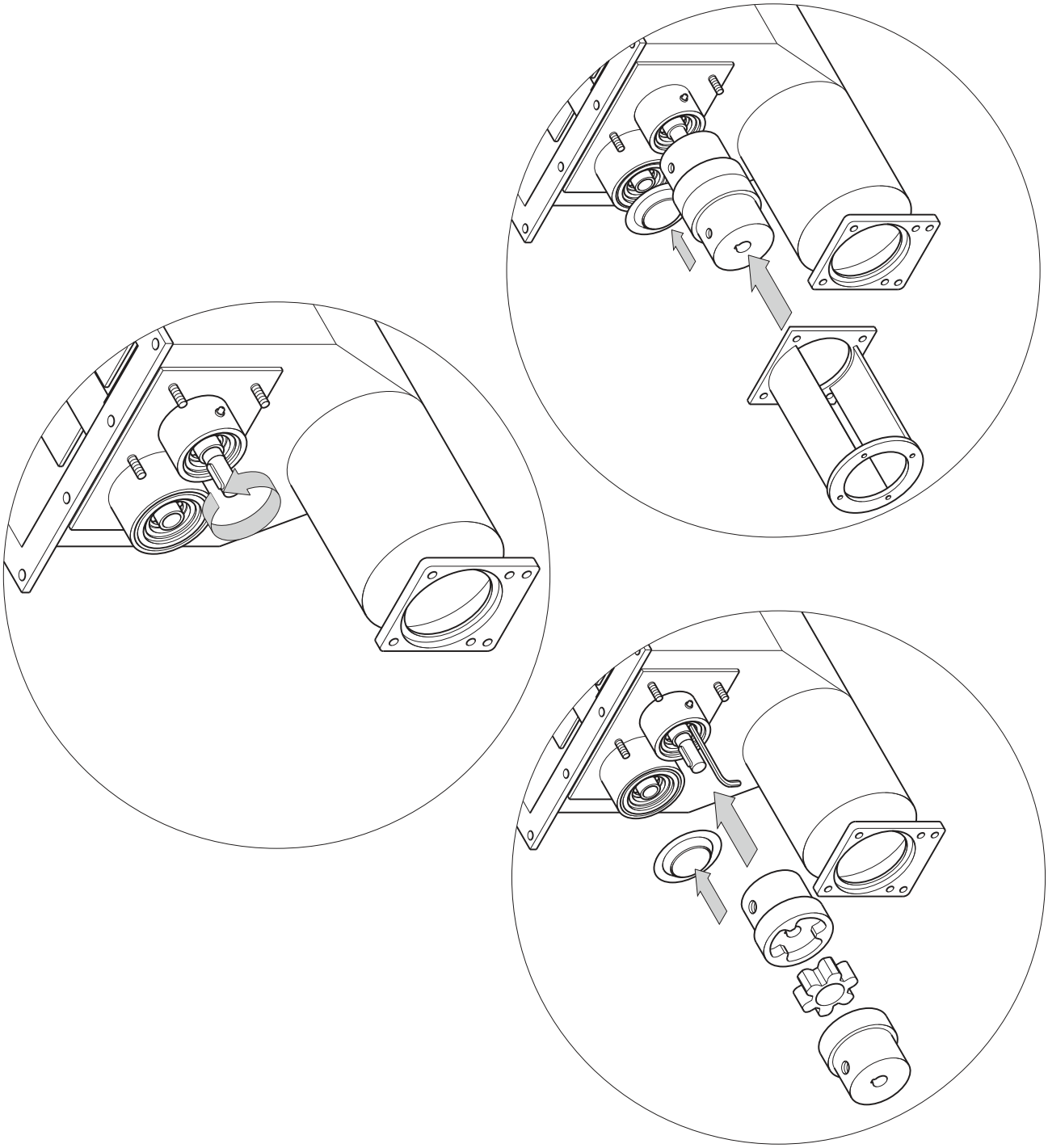
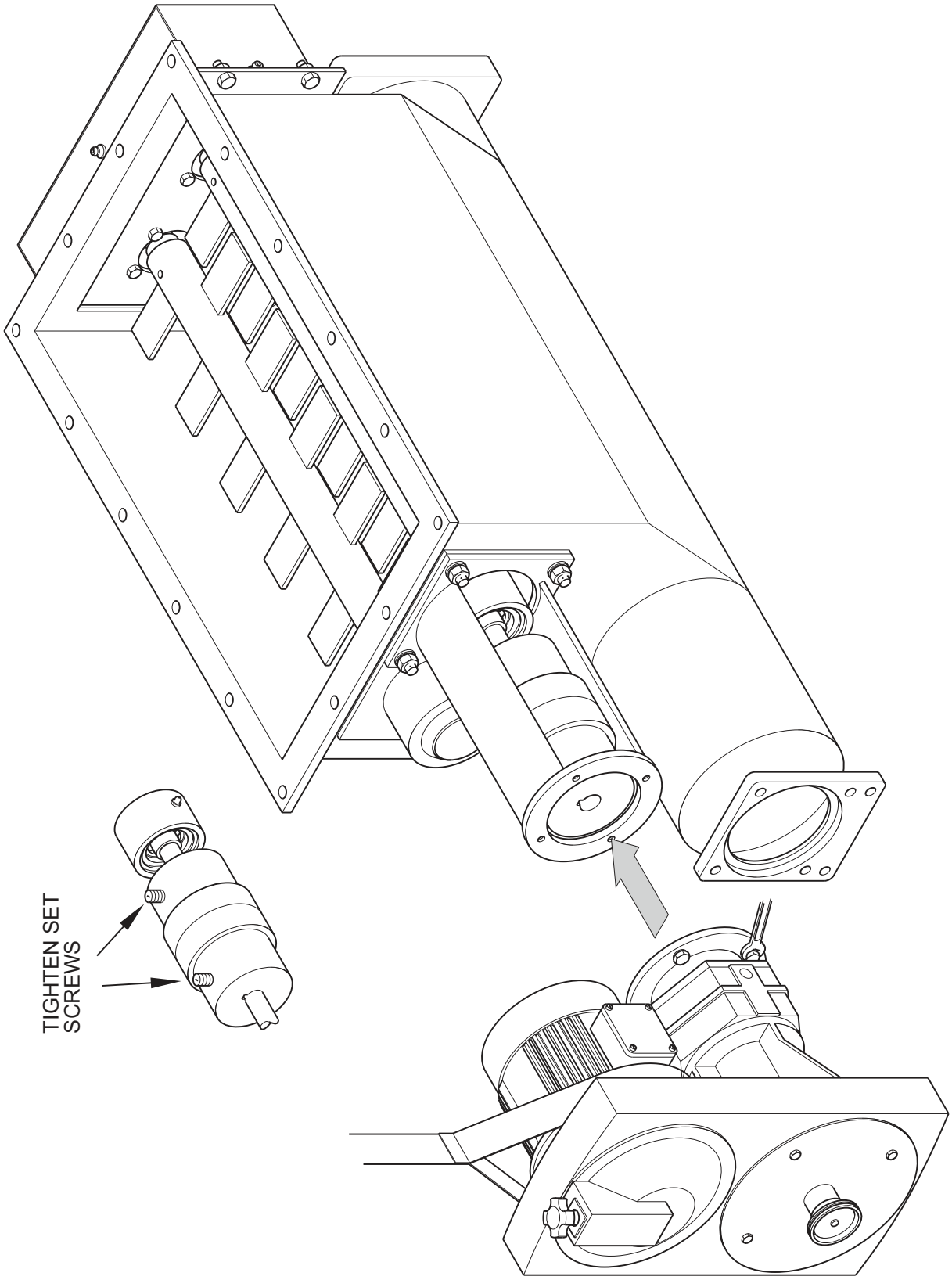


d

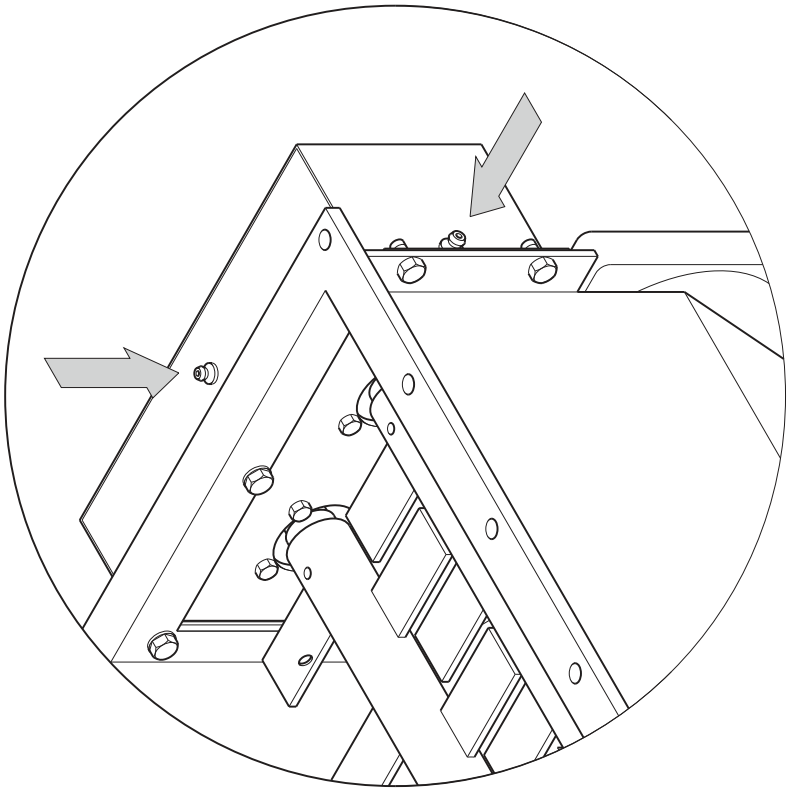
Dismantling & Assembly Diagrams



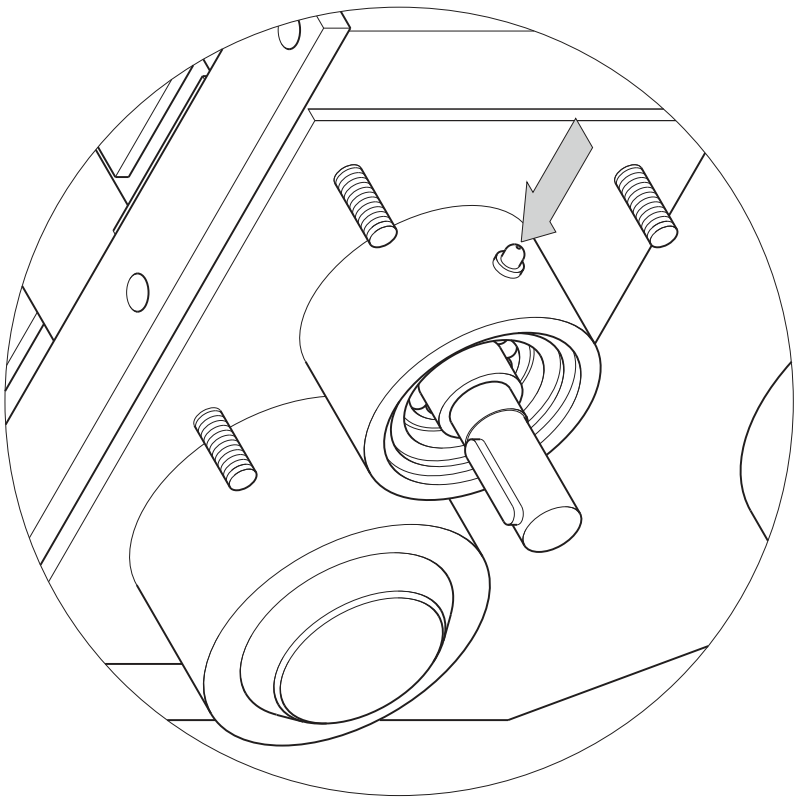
Dismantling & Assembly Diagrams



Dismantling & Assembly Diagrams

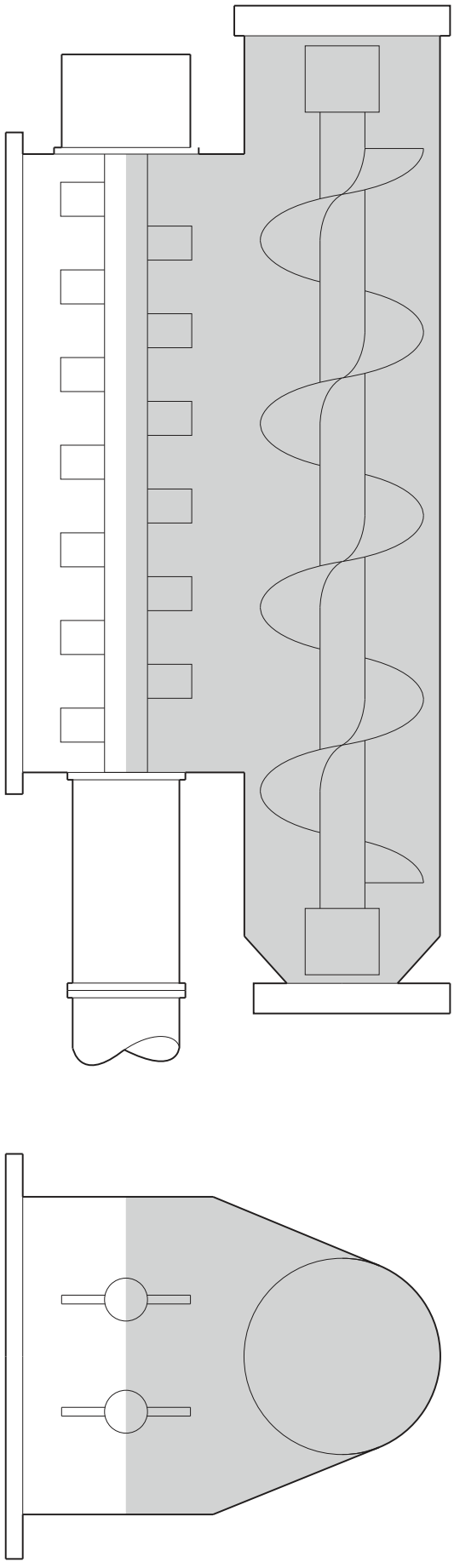


The following positions should be generously charged with the recommended grease using the grease nipples provided

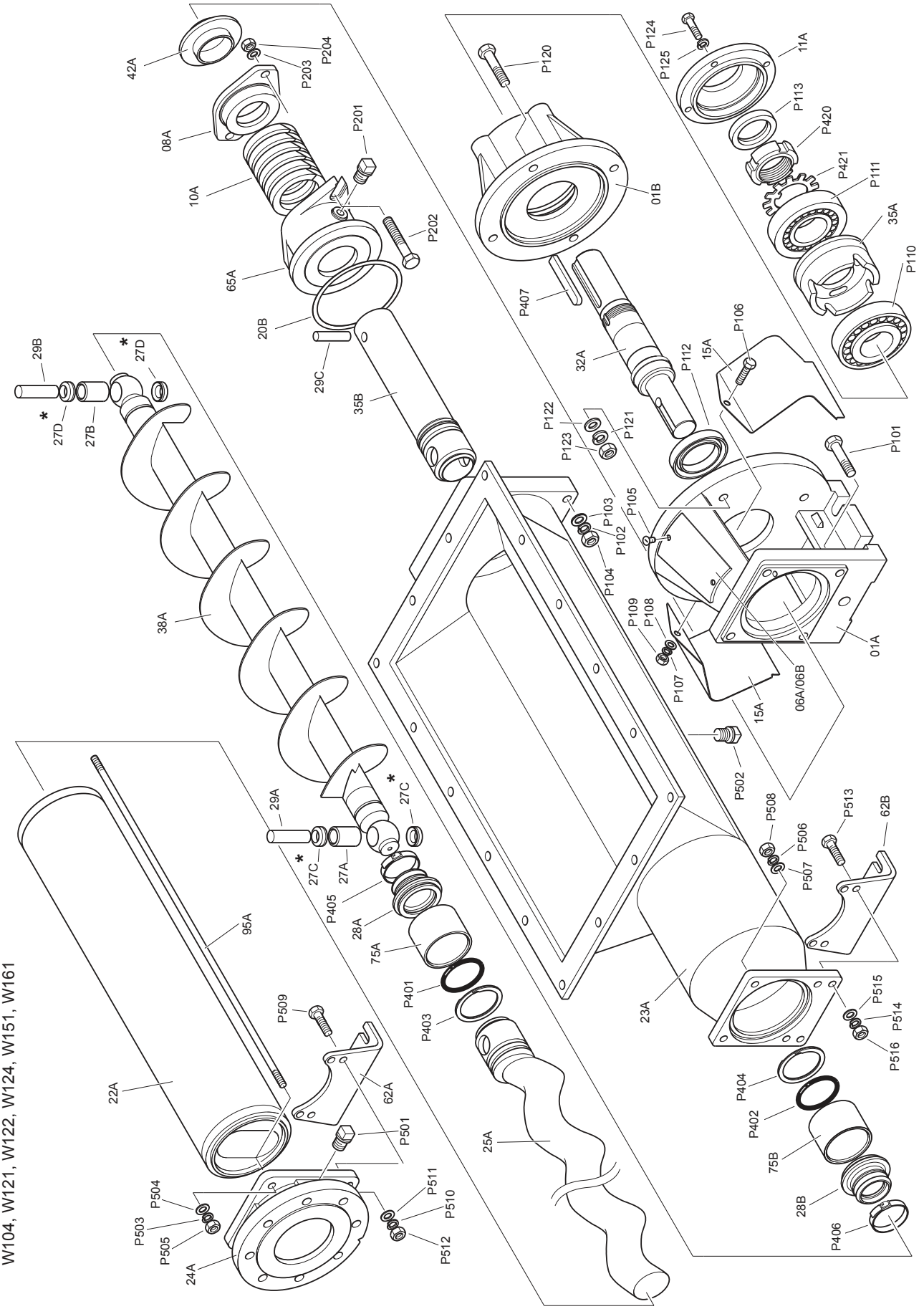


Dismantling & Assembly Diagrams

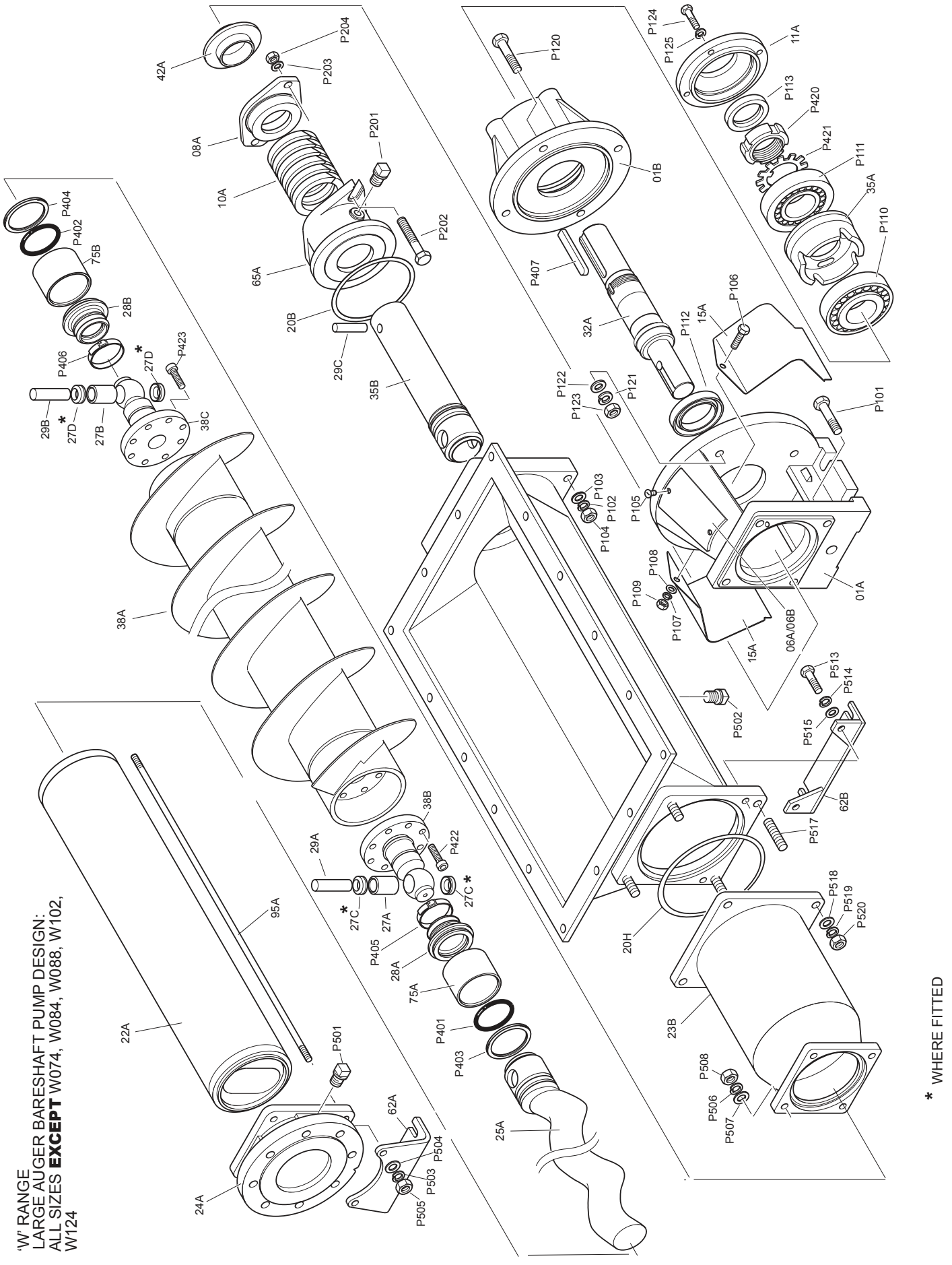
RECOMMENDED PRODUCT LEVEL WHEN USING
PUMPS FITTED WITH BRIDGE BREAKERS



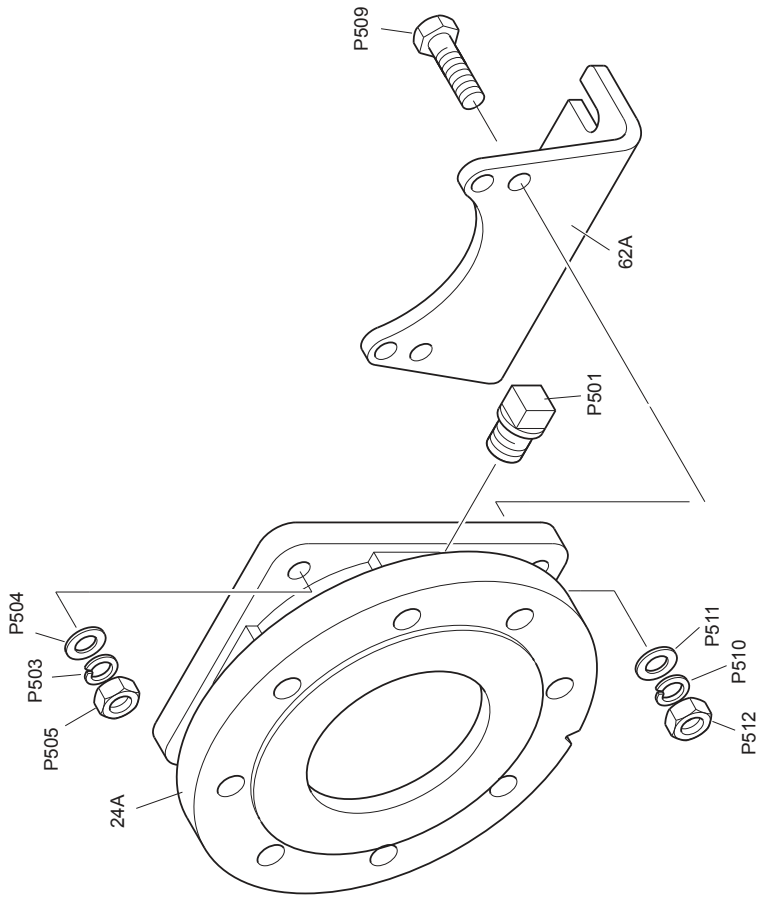
Exploded Views



Exploded Views

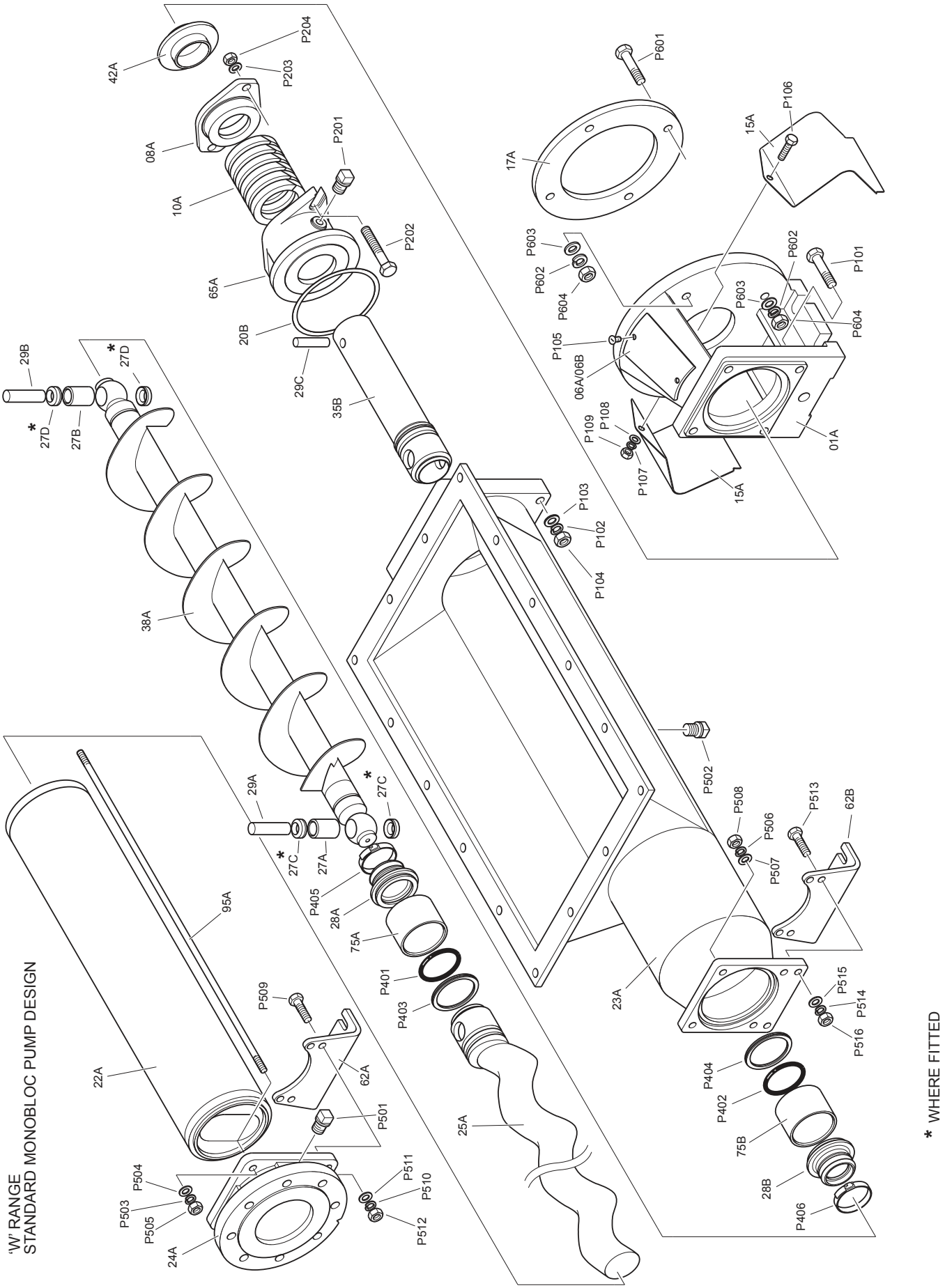


Exploded Views

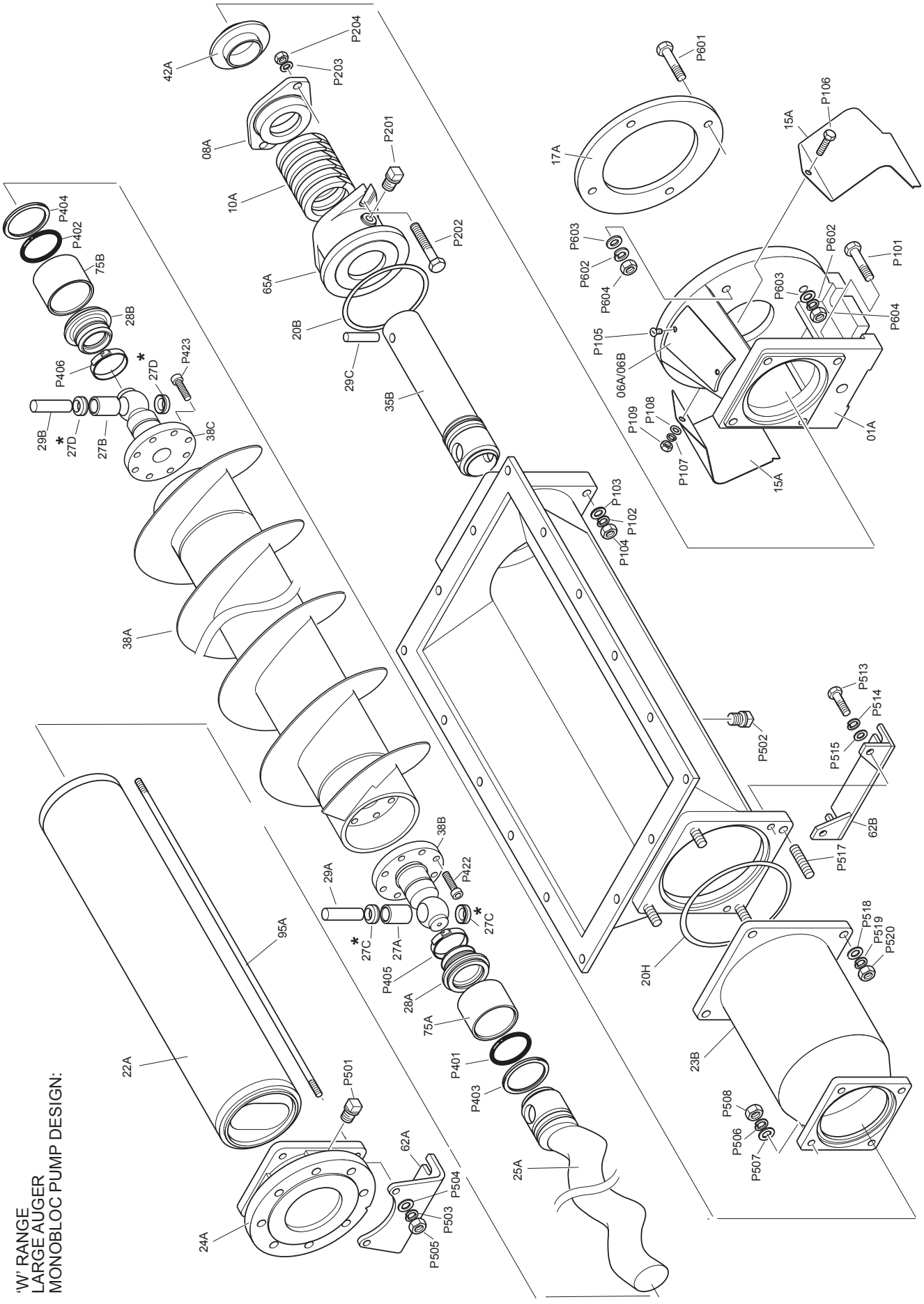


'W' RANGE
STANDARD BARESHAFT PUMP DESIGN:
W102 ONLY

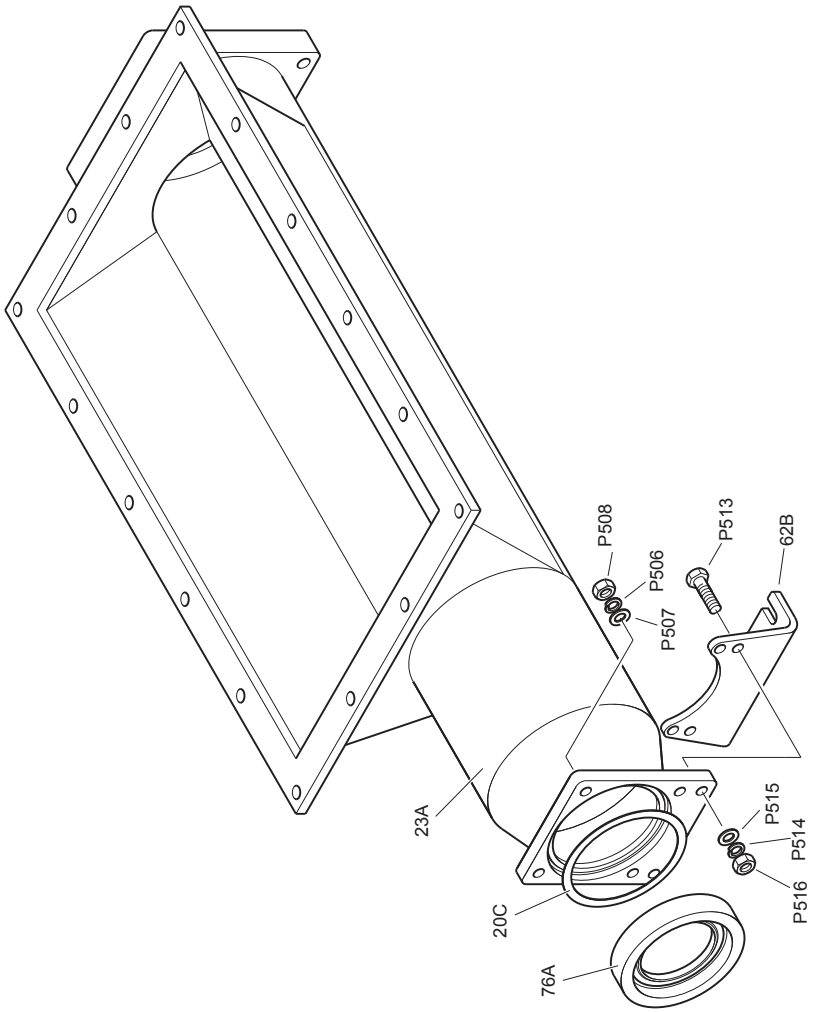
Exploded Views



Exploded Views

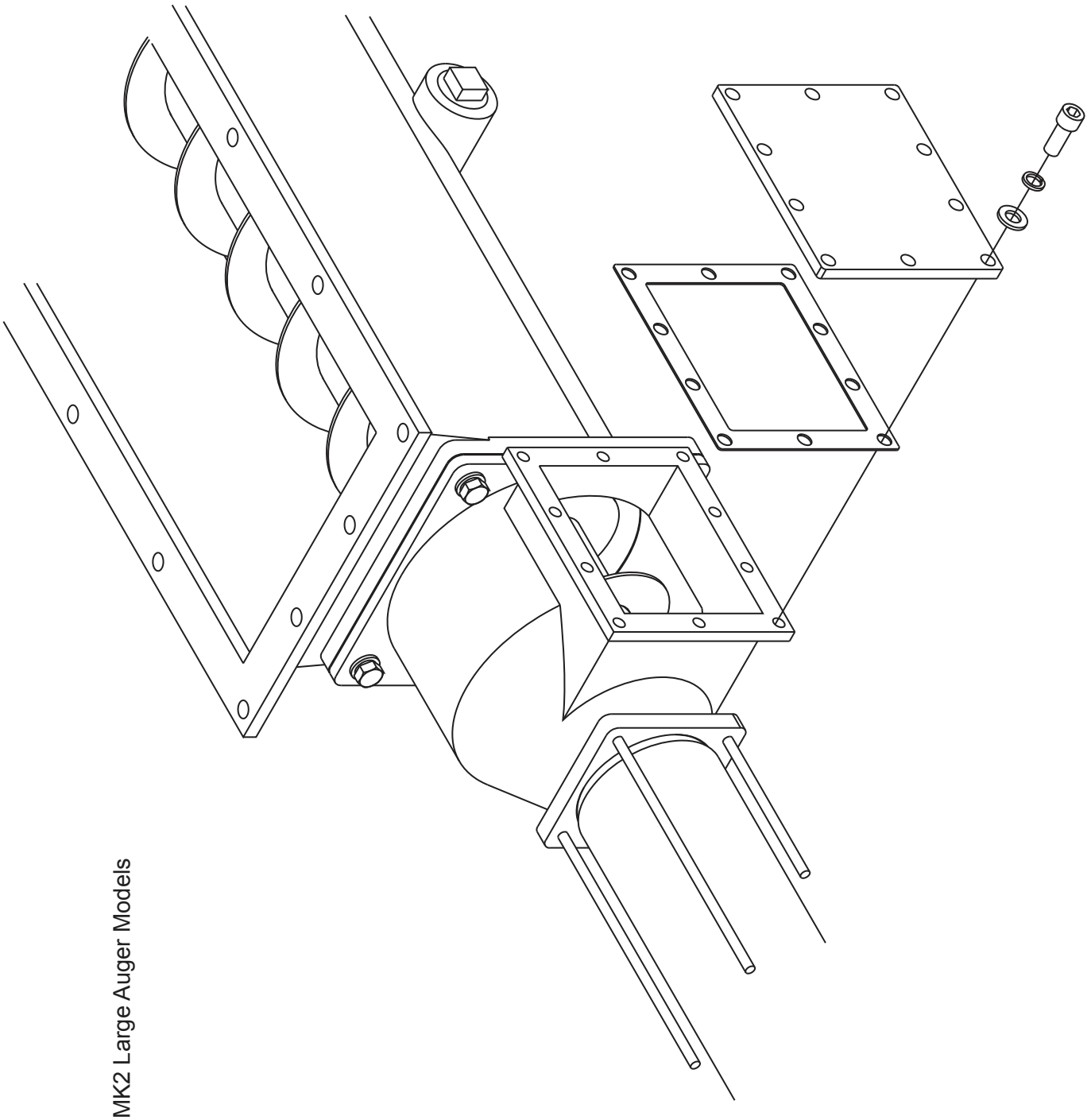


Exploded Views



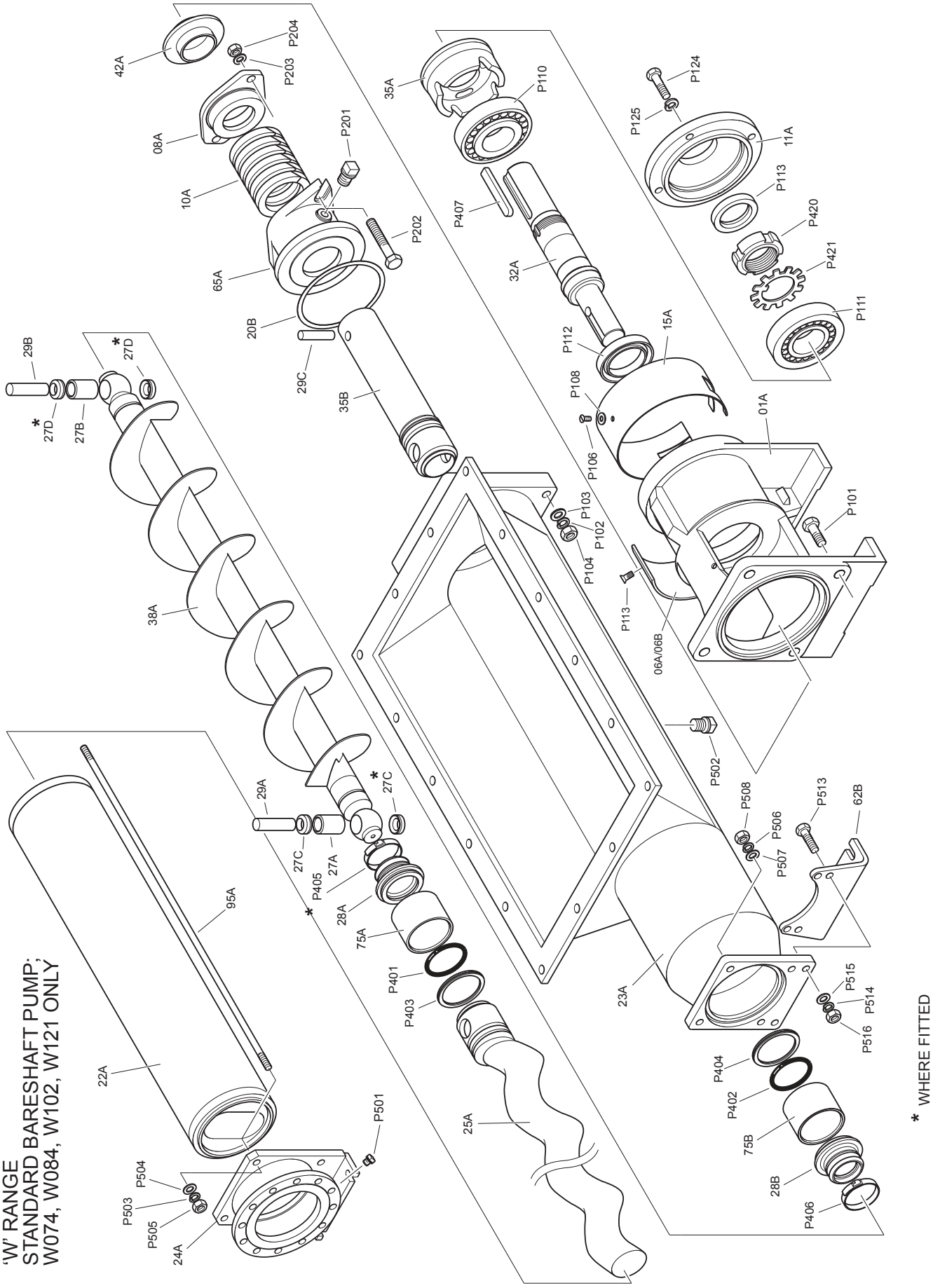
'W' RANGE
W034

Exploded Views

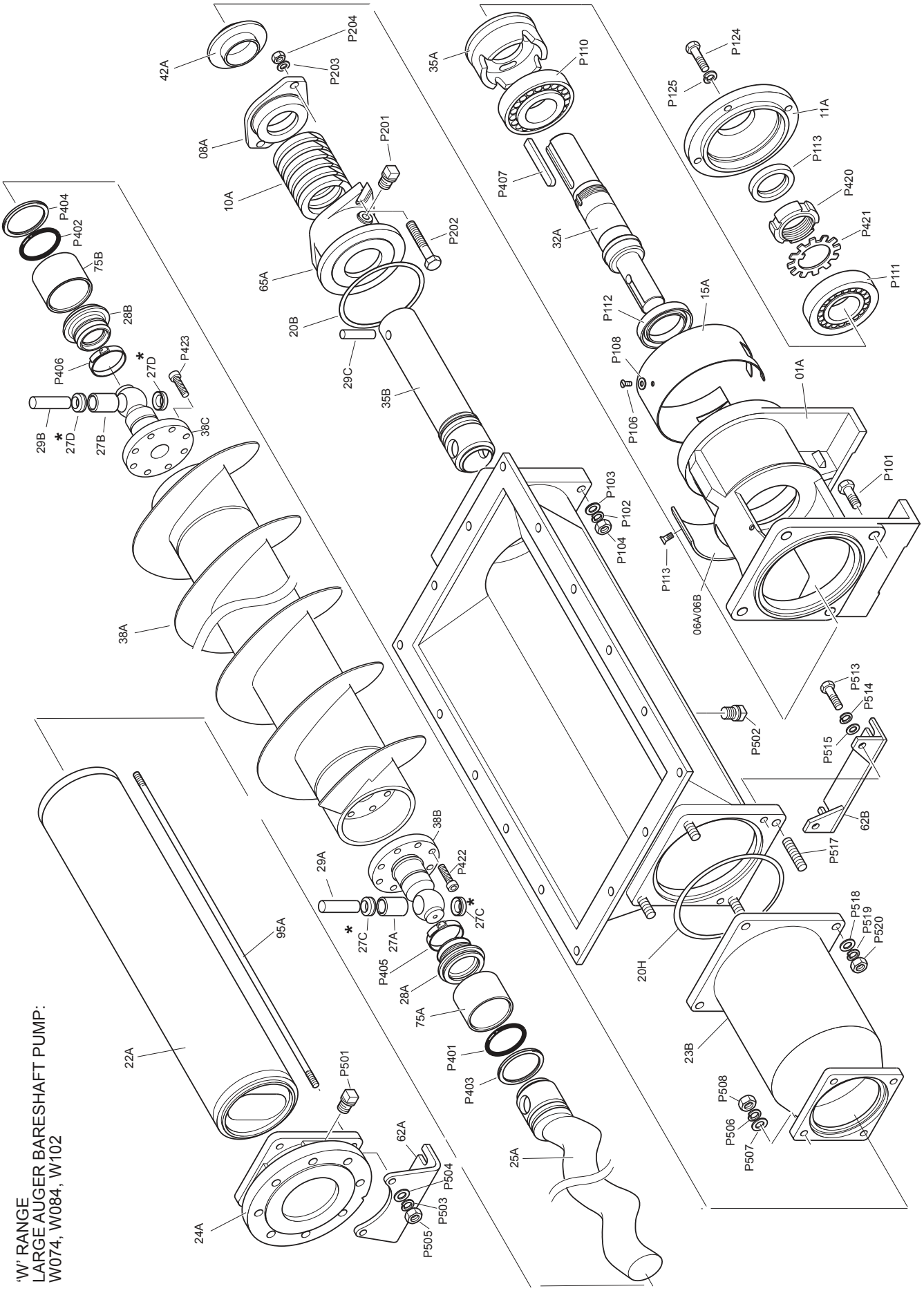


MK2 Large Auger Models

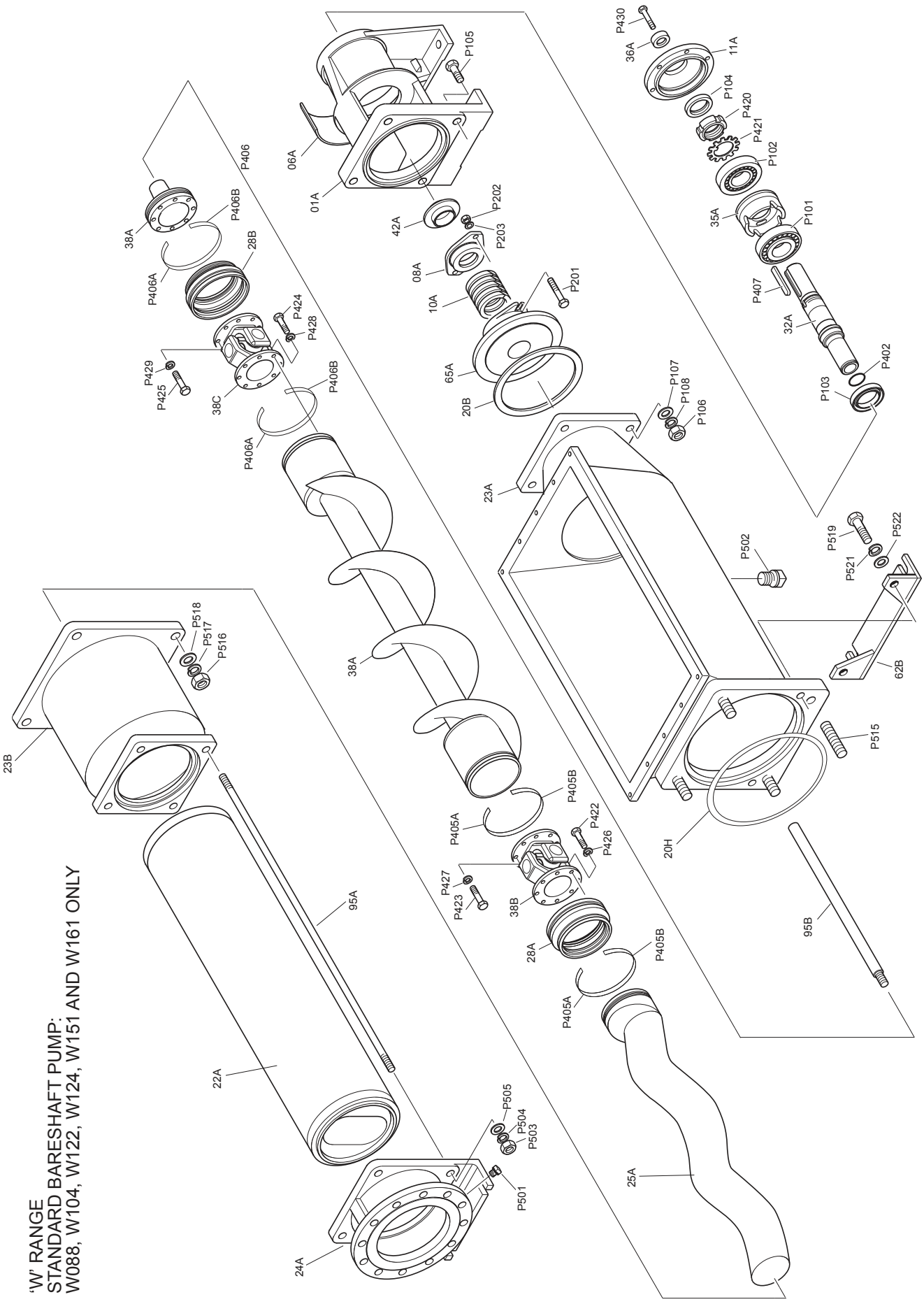
Exploded Views



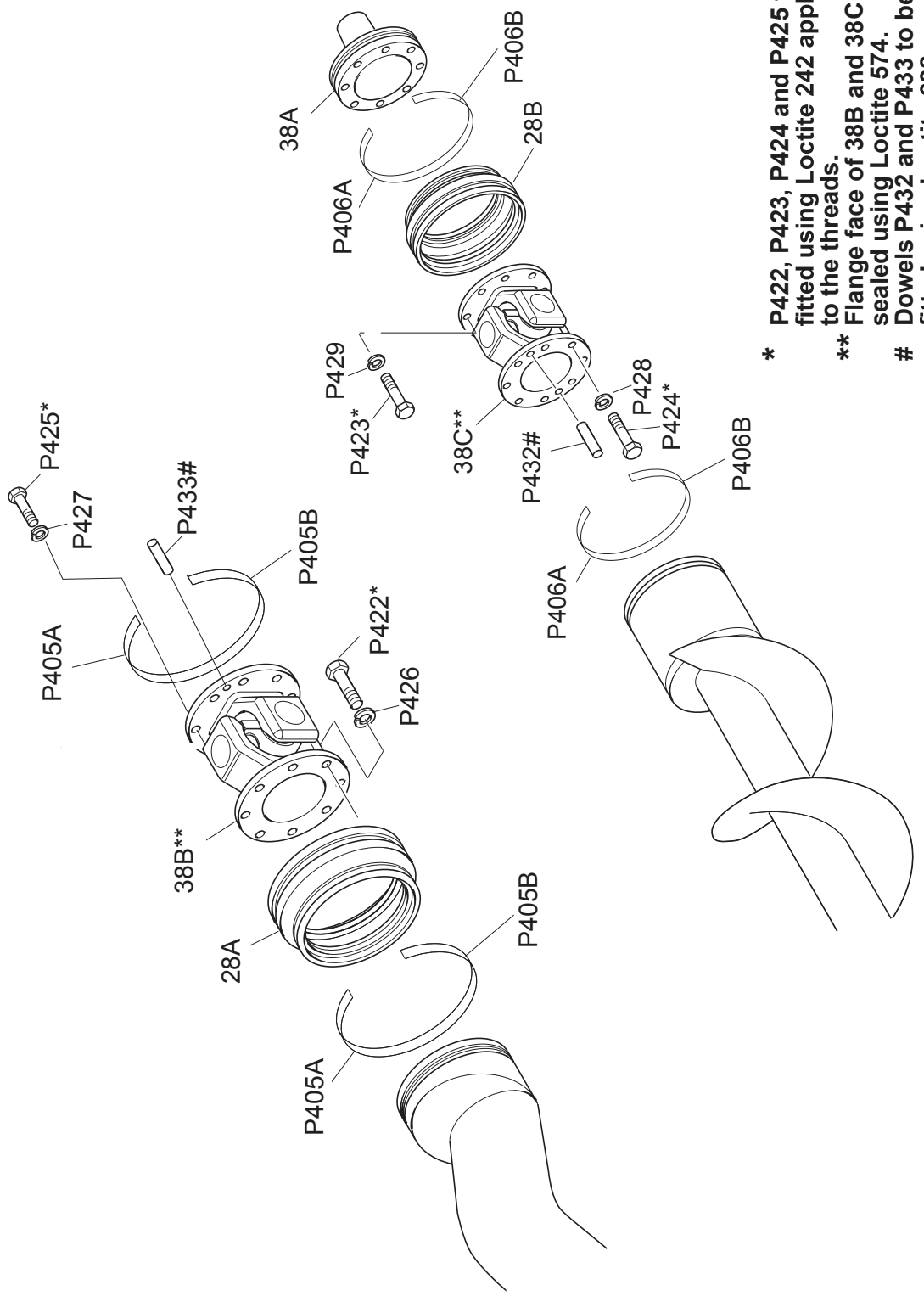
Exploded Views



Exploded Views



Exploded Views



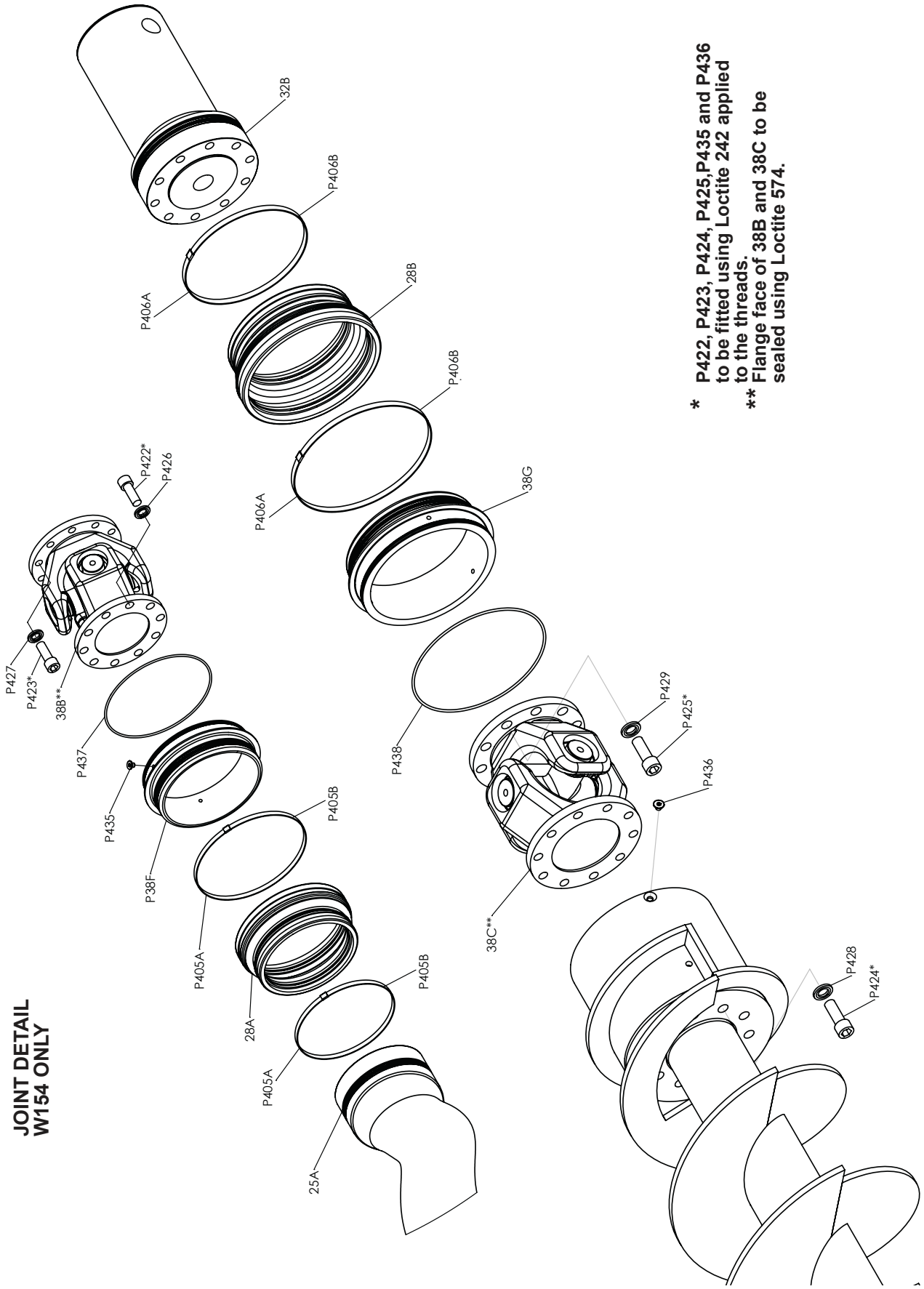
JOINT DETAIL
W088, W104, W122, W124, W151 and W161 ONLY

* **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.**

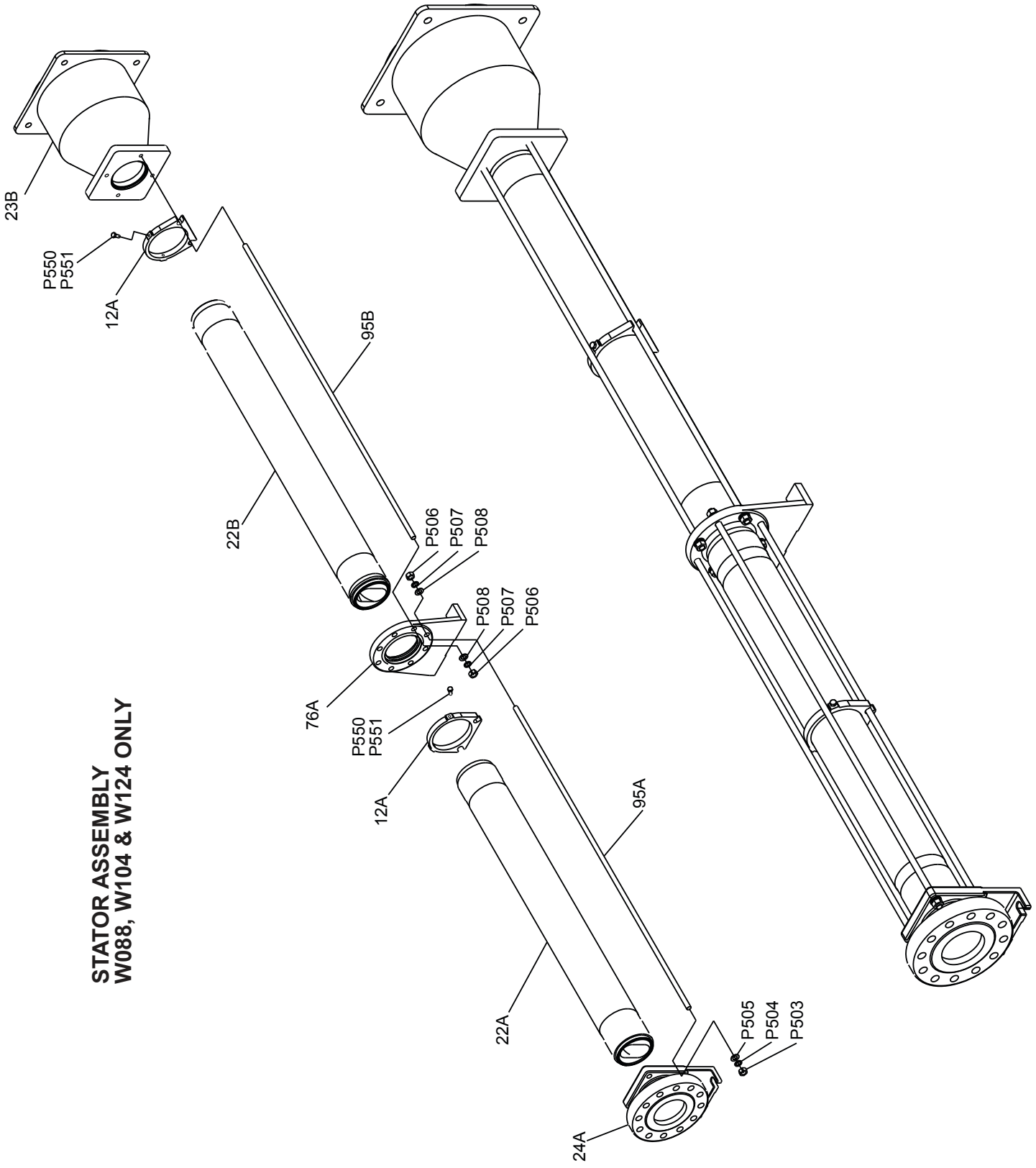
Exploded Views



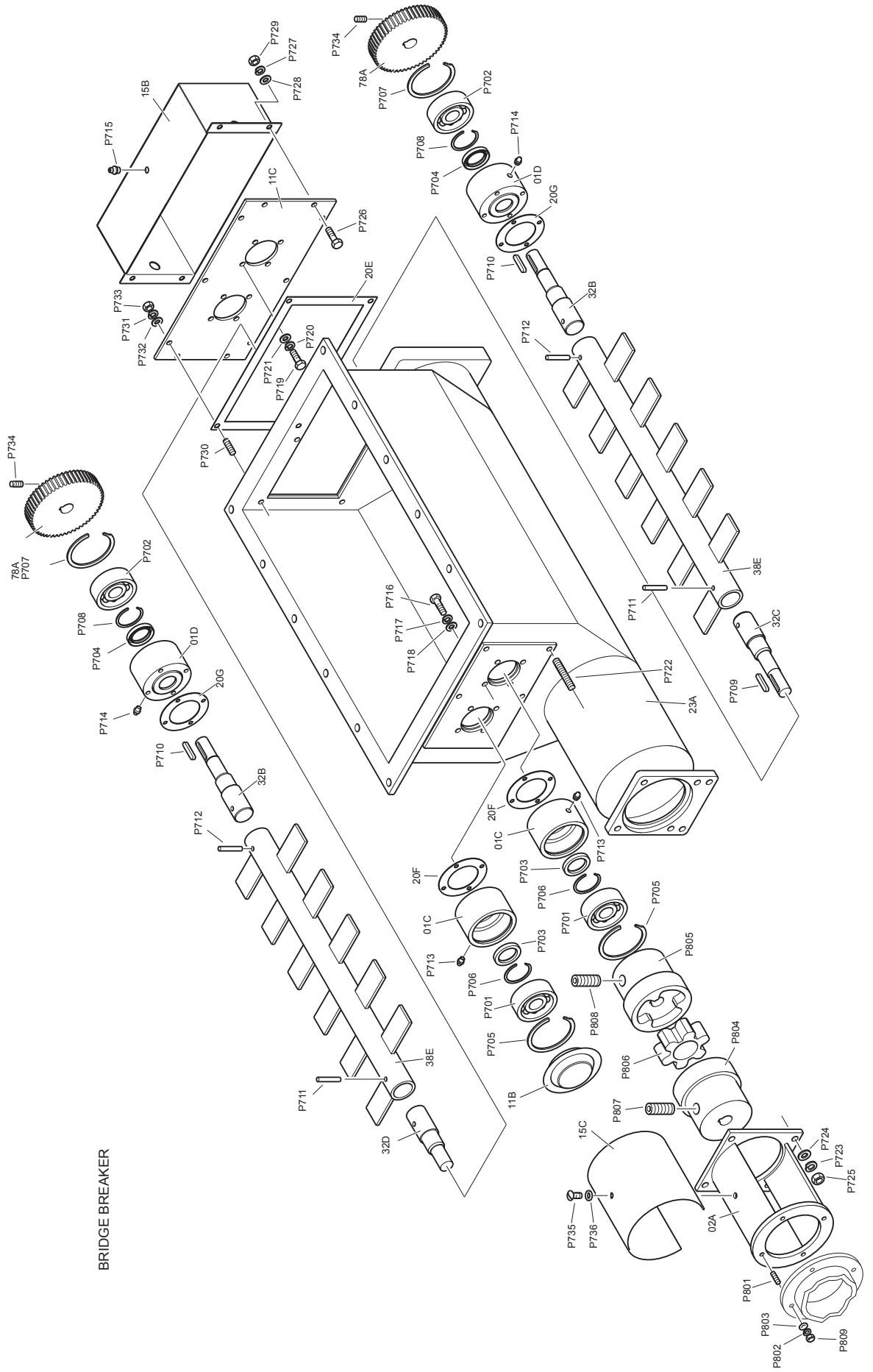
* P422, P423, P424, P425,P435 and P436 to be fitted using Loctite 242 applied to the threads.

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

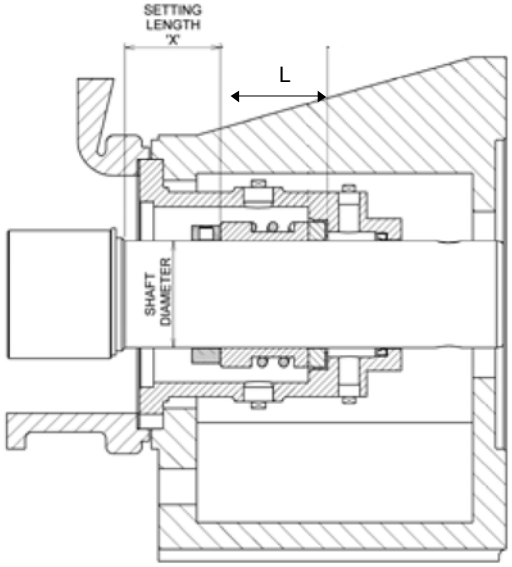
Exploded Views



Exploded Views



Setting Length - Mechanical Seal

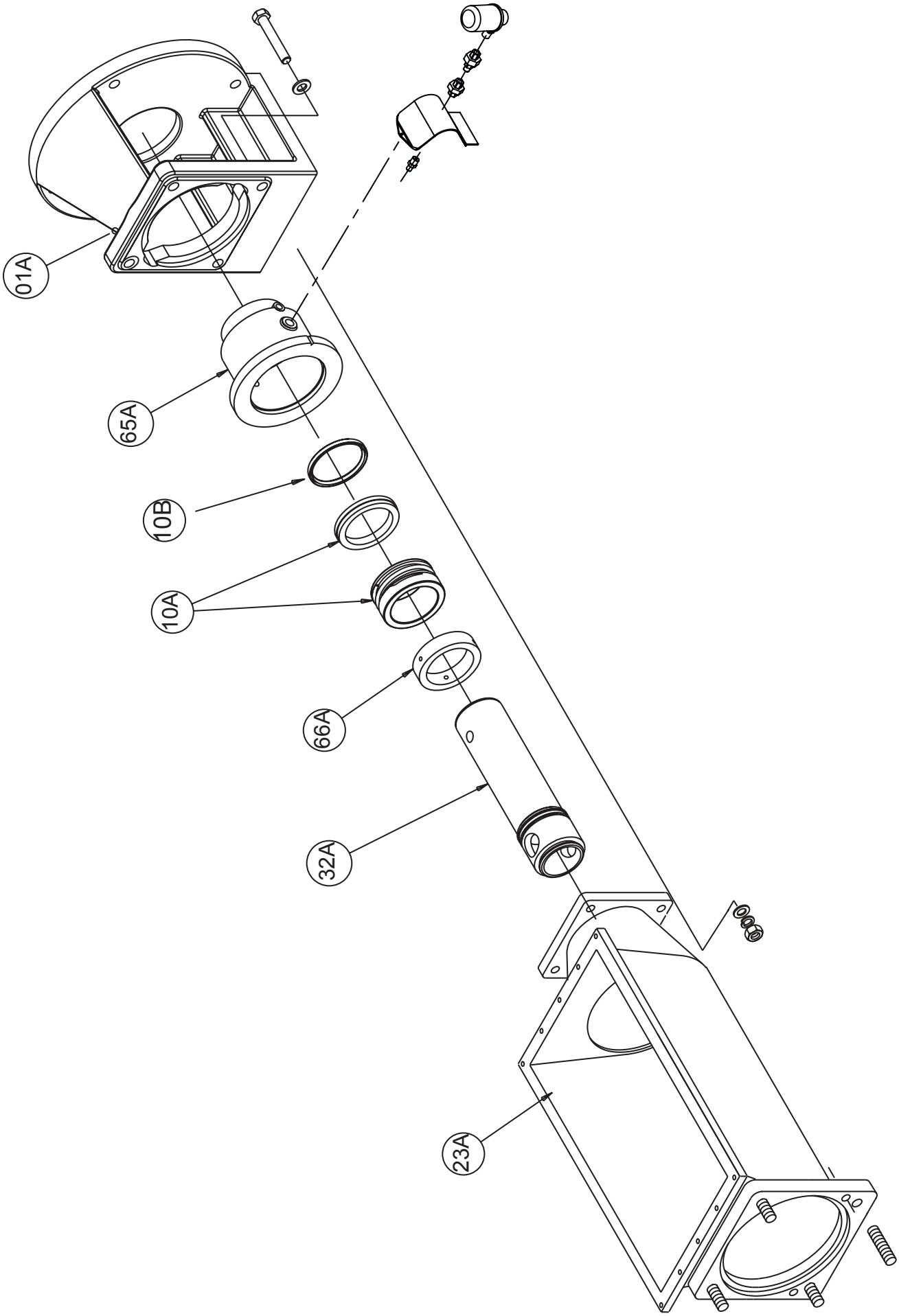


Pump Size	Drive Type	Shaft dia mm (inches)	Seal Part Number	Seal Work mm (inches)	Setting distance 'X' mm (inches)
W031 (MK2) W032 (MK2)	Pin Joint	32 (1.3")	M032139G	42.5 (1.7")	16.0 (0.63")
W034 W041 W042 W051	Pin Joint	45 (1.8")	M045139G	45.07 (1.78")	41.0 (1.6")
W044 W052 W061	Pin Joint	55 (2.2")	M055139G	47.5 (1.94")	34.5 (1.4")
W054 W062 W071 W072 W081	Pin Joint	65 (2.6")	M065139G	52.5 (2.1")	33.5 (1.3")
W064 W082 W091 W092 W101	Pin Joint	85 (3.4")	M085139G	60.0 (2.4")	33.0 1.29")
W074 W084 W102 W121	Pin Joint	85 (3.4")	M085139G	60.0 (2.4")	8.0 (0.3")

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 seats except for 85mmc (3.3") which uses 'BS' type or 'M' type.
This table is not necessarily compatible with any other seal type - check with Mono Pumps Technical Dept.

Exploded Views - Mechanical Seal



Helical Flight Conveyer Drive Joint Lubrication

PUMP MODEL	*JOINT LUBRICATION CAPACITY (APPROX.) (ml) PER JOINT	NON-FOOD APPLICATIONS ONLY		FOOD APPLICATIONS
		RECOMMENDED	SUITABLE ALTERNATIVE	
W031 W032	8	KLUBERSYNTH GH6-460 OIL	MOBILITH SHC 007 SEMI-FLUID GREASE MOBIL GEAR OIL SHC 320	KLUBEROIL 4UHI 460
W034 W041 W042	15			
W044 W052 W061	30			
W054 W062 W071 W072 W081	40			
W064 W082 W091 W092 W101	65			
W074 W084 W102 W121	120			
W088 W104 W122 W124 W151 W161	1500			
W154	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.

PUMP MODEL	*JOINT LUBRICATION CAPACITY (APPROX.) (in^3) PER JOINT	NON-FOOD APPLICATIONS ONLY		FOOD APPLICATIONS
		RECOMMENDED	SUITABLE ALTERNATIVE	
W031 W032	0.5	KLUBERSYNTH GH6-460 OIL	MOBILITH SHC 007 SEMI-FLUID GREASE MOBIL GEAR OIL SHC 320	KLUBEROIL 4UHI 460
W034 W041 W042	0.9			
W044 W052 W061	1.8			
W054 W062 W071 W072 W081	2.4			
W064 W082 W091 W092 W101	4.0			
W074 W084 W102 W121	7.3			
W088 W104 W122 W124 W151 W161	91.5			
W154	244			

Torque Tightening Figures - Metric

PUMP SIZE	BODY/SUCT CHAMBER ft/lbf		BODY BEARING HSG. ft/lbf	BEARING COVER ft/lbf		COUPLING END / CONVEYOR ASSEMBLY* ft/lbf		DRIVE END CAPSCREW ft/lbf	STATOR TIE BARS ft/lbf		THROAT /FEED CHAMBER ft/lbf		PUMP DRIVER MOUNTING BOLTS ft/lbf	GEARBOX MOUNTING BRACKET BOLTS ft/lbf	GUARD GEARS ft/lbf	BRIDGE BREAKER MOUNTING BOLTS ft/lbf
	P101 (P104)	P120	P105	P111	P124	P422 P423	P424 P425	P430	P503	P505 P508	P516	P520	P601	P725	P730	P801
W031	8	5.5	-	-	1.5	N/A	-	N/A	-	5	-	N/A	5.5	N/A	N/A	N/A
W032	8	5.5	-	-	1.5	N/A	-	N/A	-	5	-	N/A	5.5	N/A	N/A	N/A
W034	8	10	-	-	6.6	N/A	-	N/A	-	8	-	N/A	9.6	N/A	N/A	N/A
W041	8	10	-	-	6.6	12	-	N/A	-	8	-	26.5	9.6	10	5.5	5.5
W042	8	10	-	-	6.6	12	-	N/A	-	8	-	26.5	9.6	10	5.5	5.5
W044	15.5	15	-	-	6.6	12	-	N/A	-	17.7	-	26.5	14.8	10	5.5	5.5
W051	8	10	-	-	6.6	12	-	N/A	-	8	-	26.5	9.6	10	5.5	5.5
W052	15.5	15	-	-	6.6	23	-	N/A	-	8	-	26.5	14.8	10	5.5	5.5
W054	26.5	44	-	-	6.6	23	-	N/A	-	29.5	-	26.5	44	10	5.5	5.5
W061	15.5	15	-	-	6.6	23	-	N/A	-	8	-	26.5	14.8	10	5.5	5.5
W062	26.5	44	-	-	6.6	40.5	-	N/A	-	17.7	-	55.3	44	10	5.5	5.5
W064	66	60	-	-	6.6	40.5	-	N/A	-	55	-	55.3	60.5	10	5.5	5.5
W071	26.5	44	-	-	6.6	40.5	-	N/A	-	17.7	-	55.3	44	10	5.5	5.5
W072	26.5	44	-	-	6.6	40.5	-	N/A	-	17.7	-	55.3	44	10	5.5	5.5
W074	130	N/A	-	-	12.5	40.5	-	N/A	-	55	-	55.3	N/A	10	5.5	5.5
W081	22	44	-	-	6.6	40.5	-	N/A	-	29.5	-	55.3	44	10	5.5	5.5
W082	66	60	-	-	6.6	40.5	-	N/A	-	29.5	-	130	60.5	10	5.5	5.5
W084	130	N/A	-	-	12.5	40.5	-	N/A	-	88.5	-	130	N/A	10	5.5	5.5
W088	-	N/A	225	12.5	-	133	133	411	140	-	332	-	N/A	14.8	5.5	5.5
W091	66	60	-	-	6.6	40.5	-	N/A	-	55.3	-	130	60.5	14.8	5.5	5.5
W092	66	60	-	-	6.6	40.5	-	N/A	-	55.3	-	130	60.5	14.8	5.5	5.5
W101	66	60	-	-	6.6	40.5	-	N/A	-	55.3	-	130	60.5	14.8	5.5	5.5 5.5
W102	130	N/A	-	-	12.5	40.5	-	N/A	-	55.3	-	332	N/A	14.8	5.5	5.5 5.5
W104	-	N/A	225	12.5	-	133	133	411	140	-	332	-	N/A	14.8	5.5	5.5
W121	130	N/A	-	-	12.5	N/A	-	N/A	-	88.5	-	N/A	N/A	14.8	5.5	5.5
W122	-	N/A	225	12.5	-	133	133	411	88.5	-	332	-	N/A	N/A	N/A	N/A
W124	-	N/A	225	12.5	-	236	133	738	221	-	332	-	N/A	N/A	N/A	N/A
W151	-	N/A	225	12.5	-	133	133	411	140	-	332	-	N/A	N/A	N/A	N/A
W154	-	N/A	225	12.5	-	236	236	N/A	406	-	332	-	N/A	N/A	N/A	N/A
W161	-	N/A	225	12.5	-	133	133	411	140	-	332	-	N/A	N/A	N/A	N/A

Torque Tightening Figures - Imperial

PUMP SIZE	BODY/SUCT CHAMBER ft/lbf		BODY BEARING HSG. ft/lbf	BEARING COVER ft/lbf		COUPLING END / CONVEYOR ASSEMBLY* ft/lbf		DRIVE END CAPSCREW ft/lbf	STATOR TIE BARS ft/lbf		THROAT /FEED CHAMBER ft/lbf		PUMP DRIVER MOUNTING BOLTS ft/lbf	GEARBOX MOUNTING BRACKET BOLTS ft/lbf	GUARD GEARS ft/lbf	BRIDGE BREAKER MOUNTING BOLTS ft/lbf
	P101 (P104)	P120	P105	P111	P124	P422 P423	P424 P425	P430	P503	P505 P508	P516	P520	P601	P725	P730	P801
W031	8	5.5	-	-	1.5	N/A	-	N/A	-	5	-	N/A	5.5	N/A	N/A	N/A
W032	8	5.5	-	-	1.5	N/A	-	N/A	-	5	-	N/A	5.5	N/A	N/A	N/A
W034	8	10	-	-	6.6	N/A	-	N/A	-	8	-	N/A	9.6	N/A	N/A	N/A
W041	8	10	-	-	6.6	12	-	N/A	-	8	-	26.5	9.6	10	5.5	5.5
W042	8	10	-	-	6.6	12	-	N/A	-	8	-	26.5	9.6	10	5.5	5.5
W044	15.5	15	-	-	6.6	12	-	N/A	-	17.7	-	26.5	14.8	10	5.5	5.5
W051	8	10	-	-	6.6	12	-	N/A	-	8	-	26.5	9.6	10	5.5	5.5
W052	15.5	15	-	-	6.6	23	-	N/A	-	8	-	26.5	14.8	10	5.5	5.5
W054	26.5	44	-	-	6.6	23	-	N/A	-	29.5	-	26.5	44	10	5.5	5.5
W061	15.5	15	-	-	6.6	23	-	N/A	-	8	-	26.5	14.8	10	5.5	5.5
W062	26.5	44	-	-	6.6	40.5	-	N/A	-	17.7	-	55.3	44	10	5.5	5.5
W064	66	60	-	-	6.6	40.5	-	N/A	-	55	-	55.3	60.5	10	5.5	5.5
W071	26.5	44	-	-	6.6	40.5	-	N/A	-	17.7	-	55.3	44	10	5.5	5.5
W072	26.5	44	-	-	6.6	40.5	-	N/A	-	17.7	-	55.3	44	10	5.5	5.5
W074	130	N/A	-	-	12.5	40.5	-	N/A	-	55	-	55.3	N/A	10	5.5	5.5
W081	22	44	-	-	6.6	40.5	-	N/A	-	29.5	-	55.3	44	10	5.5	5.5
W082	66	60	-	-	6.6	40.5	-	N/A	-	29.5	-	130	60.5	10	5.5	5.5
W084	130	N/A	-	-	12.5	40.5	-	N/A	-	88.5	-	130	N/A	10	5.5	5.5
W088	-	N/A	225	12.5	-	133	133	411	140	-	332	-	N/A	14.8	5.5	5.5
W091	66	60	-	-	6.6	40.5	-	N/A	-	55.3	-	130	60.5	14.8	5.5	5.5
W092	66	60	-	-	6.6	40.5	-	N/A	-	55.3	-	130	60.5	14.8	5.5	5.5
W101	66	60	-	-	6.6	40.5	-	N/A	-	55.3	-	130	60.5	14.8	5.5	5.5
W102	130	N/A	-	-	12.5	40.5	-	N/A	-	55.3	-	332	N/A	14.8	5.5	5.5
W104	-	N/A	225	12.5	-	133	133	411	140	-	332	-	N/A	14.8	5.5	5.5
W121	130	N/A	-	-	12.5	N/A	-	N/A	-	88.5	-	N/A	N/A	14.8	5.5	5.5
W122	-	N/A	225	12.5	-	133	133	411	88.5	-	332	-	N/A	N/A	N/A	N/A
W124	-	N/A	225	12.5	-	236	133	738	221	-	332	-	N/A	N/A	N/A	N/A
W151	-	N/A	225	12.5	-	133	133	411	140	-	332	-	N/A	N/A	N/A	N/A
W154	-	N/A	225	12.5	-	236	236	N/A	406	-	332	-	N/A	N/A	N/A	N/A
W161	-	N/A	225	12.5	-	133	133	411	140	-	332	-	N/A	N/A	N/A	N/A

Recommended Lubrication & Service Intervals

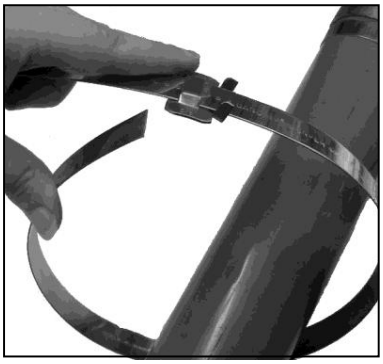
COMPONENTS	ALL APPLICATIONS EXCEPT FOOD	FOOD APPLICATIONS ONLY	SERVICE COMMENTS
PUMP DRIVE JOINTS	SEE SECTION 5 PAGE 2		INSPECT AND LUBRICATE AS NECESSARY EVERY 4000 OPERATING HOURS
PUMP BEARINGS (WHERE FITTED)	BP Energrease LC2 OR EQUIVALENT		INSPECT AND REGREASE IF NECESSARY EVERY 12 MONTHS
GEARED DRIVERS (WHERE FITTED)	AS RECOMMENDED BY THE MANUFACTURER		
BRIDGE BREAKER BEARINGS (WHERE FITTED)	BP Energrease LC2 OR EQUIVALENT		REGREASE EVERY 12 MONTHS
BRIDGE BREAKER SEAL SHAFT ASSEMBLY (WHERE FITTED)	BP Energrease LC2 OR EQUIVALENT	ROCOL WHITE FOOD GREASE OR EQUIVALENT	RECHARGE EVERY 3 MONTHS INSPECT AND CLEAN EVERY 12 MONTHS
BRIDGE BREAKER DRIVE GEARS (WHERE FITTED)	BP Energrease LC2 OR EQUIVALENT		REGREASE 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.
NOTE: 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.			

Appendix

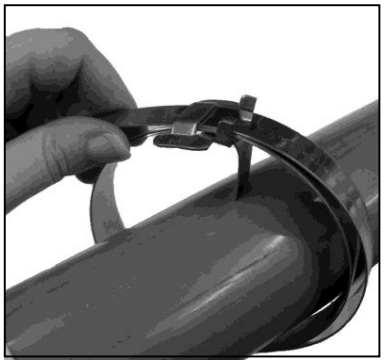
Operating Instructions

BAND-IT®

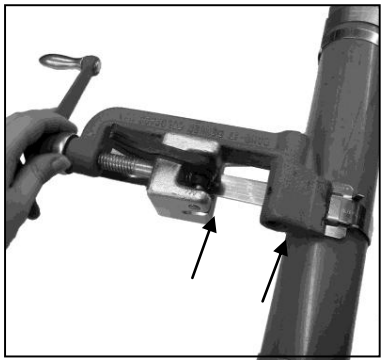
C00169 Hand Tool



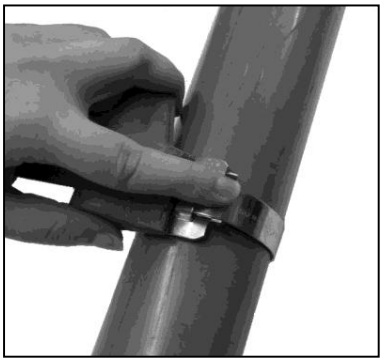
1. Band may be used from bulk roll as this *completely eliminates waste of band*. Slide buckle on band as shown, bringing end of band around object to be clamped and again through buckle. *NOTE: The tension screw thread should be lubricated regularly.*



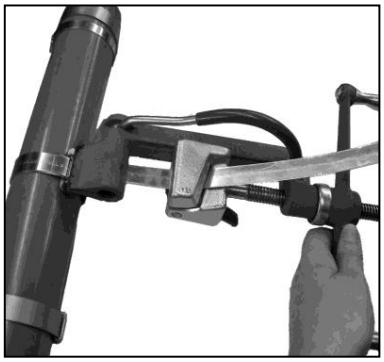
2. Continue band around object once more and again through buckle. *Double banding develops a great deal more radial compression than single banding.* Bend end of band under buckle.



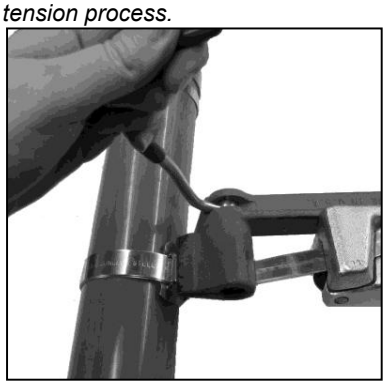
3. Place band in opening of tool nose and gripper block. Move into slot as far as possible, to avoid buckle sliding into tool nose. Tighten band clamp by turning the tension handle clockwise while holding band gripper tight against band. *NOTE: The spring load of the band gripper is not intended to secure and prevent band from slipping during tension process.*



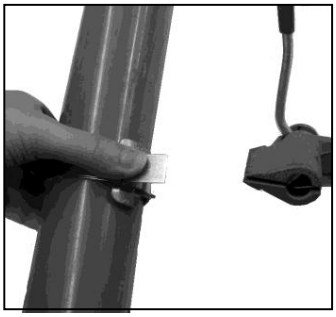
4. Place finger on BAND-IT Band at buckle bridge while tensioning with tool handle. When you feel BAND-IT Band stop moving through buckle as you are turning handle, *maximum pressure is being exerted by the BAND-IT Band* around object being clamped. *Stop turning handle.*



5. *Roll tool over buckle, backing off with tension handle throughout entire rolling operation*. Failure to back off with tension handle through-out entire course of roll-over may result in breaking of band. There is no loss of tension as band released is used up in the bend.



6. Pull cutting handle to cut the band.



7. Remove tool, holding stub of band down with thumb.

8. Hammer down buckle ears to hold band stub in place to complete BAND-IT clamp.

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Document # P05886 rev. G

Cleaning and Accessories

BAND-IT®

C00169 Hand Tool

Gripper Cleaning Instructions:

1. Remove gripper. Align gripper pin hole with notch in tool frame. Using a punch and hammer, punch pin out of slide block.

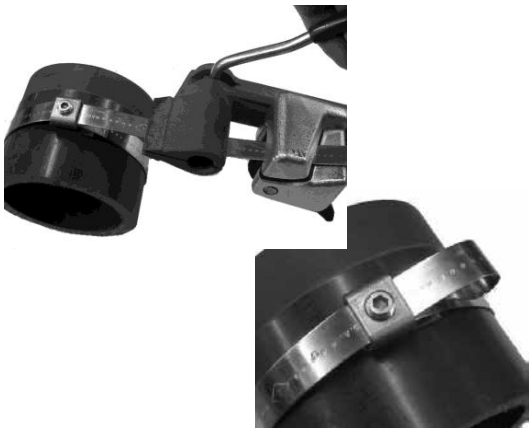
2. Using a wire brush, clean all foreign matter from teeth.

3. Replace pin. Gripper spring must be seated in tension screw hole. Align gripper hole with slide block hole, insert pin in hole and hammer pin in place.

Scru-Lokt Buckles:

1. The BAND-IT Scru-Lokt clamp, using the Scru-Lokt buckle, is applied in exactly the same way as the BAND-IT clamp except that the tool is not rolled over.

2. After tension is applied, insert set screw in Scru-Lokt buckle and tighten. To permit taking up Scru-Lokt clamp, or to re-use, a 3 inch (7.5 cm) stub should be left so that tool will be able to re-grip band later.



3. Where stub of band is left for Scru-Lokt clamp, it may be folded under as shown.

Tool Accessories:

JR Adapters: The JR adapters (J00169 and J05069 heavy duty) are used with the BAND-IT C00169 tool when BAND-IT JR. preformed clamps are used.

C04388 Close Quarter Tension Nut: In cramped quarters, use instead of tool tension handle.

NOTE: See general catalog or web site for instructions and ordering information.

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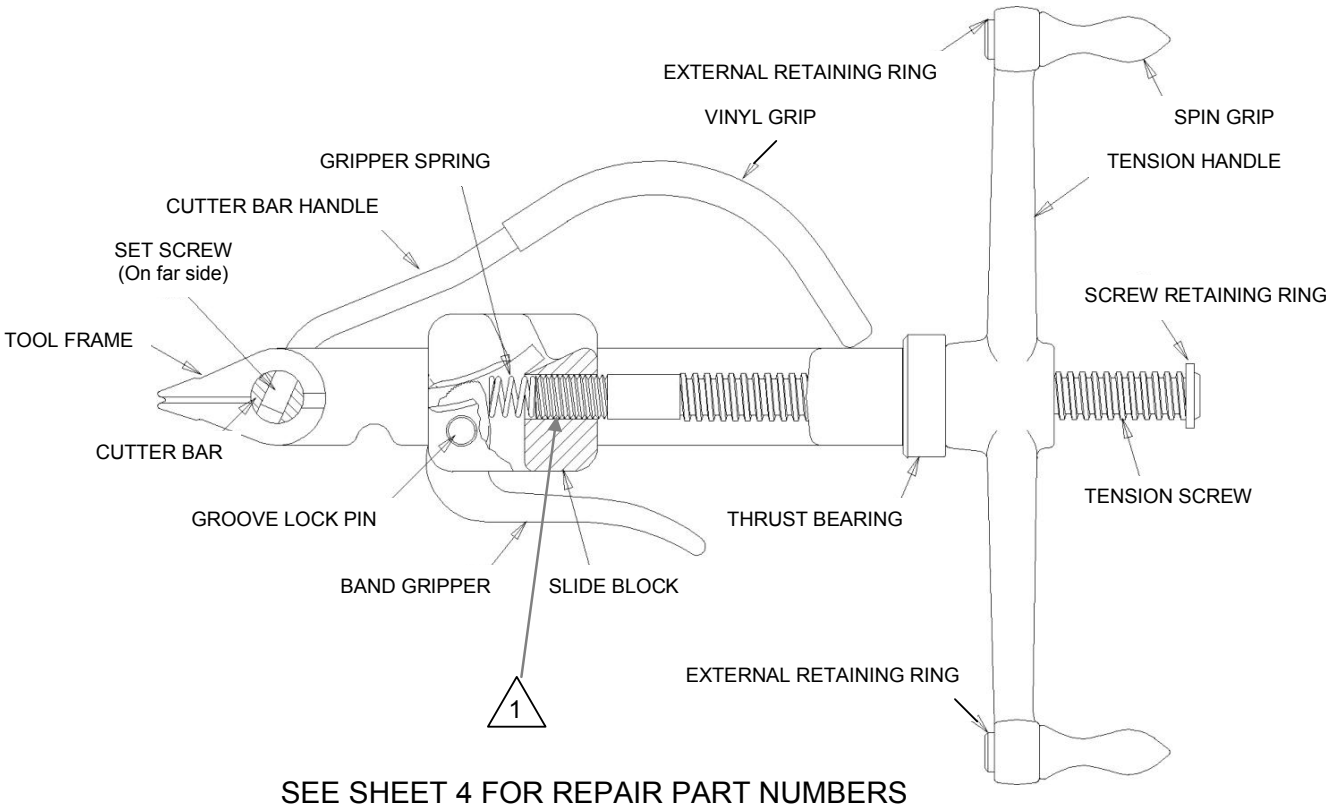
Tool Assembly Parts List

BAND-IT®

C00169 Hand Tool



SEE SHEET 4 FOR REPAIR PART NUMBERS

1. To assist in removing threaded parts, apply heat (softens locking compound).

2. When connecting the tension screw to the slide block, clean threads (male and female) of foreign matter, then apply two drops of medium strength locking compound (Loctite 242 or equiv.) onto male threads and connect parts together. Apply .03 oz. of food-grade white lubricant or equiv. to tension screw thread.

3. When connecting the set screw to the cutter bar, clean threads (male and female) of foreign matter, then apply one drop of medium strength locking compound (Loctite 242 or equiv.) onto male thread and connect parts together.

4. Kit # C00689 contains the Tension Handle Assembly and the Tension Screw. Both parts should be changed as a set to reduce accelerated wear. Review note 2.

5. Kit # C01899 contains the Band Gripper, Gripper Spring and Groove Lock Pin. Replace all parts as a new set to maximize tool performance. Periodic cleaning of band gripper teeth will improve tool performance.

6. Kit # C02499 contains the Slide Block, Groove Lock Pin, Band Gripper, Gripper Spring, and Tension Screw. Periodic cleaning of band gripper teeth will improve tool performance. Review note 2.

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Parts List and Warranty

BAND-IT

C00169 Hand Tool

REPAIR PARTS LIST FOR C00169	
PART #	DESCRIPTION
C01140	TOOL FRAME
C01687	THRUST BEARING
C02499	SLIDE BLOCK ASSEMBLY INCLUDES: SLIDE BLOCK, PIN, BAND GRIPPER, SPRING, TENSION SCREW.
C01899	KIT, GRIPPER ASSEMBLY INCLUDES: GRIPPER, PIN, AND GRIPPER SPRING
C05887	KIT, CUTTER BAR ASSEMBLY INCLUDES: CUTTER BAR HANDLE, VINYL GRIP, SET SCREW, AND CUTTER BAR
C00689	KIT, TENSION HANDLE AND SCREW

Refer to website for warranty information: http://www.band-it-idex.com/warranty.html

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