



English

Original Instructions

# Installation, Operation and Maintenance Instructions

TR Muncher

# Spares & Service Contact Details

## Mono UK

<b>Spares</b>	+44 (0)161 214 2380 (direct line 8.15 am – 5.00 pm)
<b>E-mail</b>	spares@mono-pumps.com
<b>Service</b>	+44 (0)161 214 2390 (direct line 8.15 am – 5.00 pm)
<b>E-mail</b>	customerservices@mono-pumps.com
<b>Service</b>	+44 (0)161 339 9000 (24 hrs)

## Mono Australia

	<b>Telephone</b>	<b>Facsimile</b>
<b>Melbourne</b>	(03) 9580 5211	(03) 9580 9036
<b>Sydney</b>	(02) 9521 5611	(02) 9542 3649
<b>Brisbane</b>	(07) 3350 4582	(07) 3350 3750
<b>Adelaide</b>	(08) 8447 8333	(08) 8447 8373
<b>Perth</b>	(08) 9479 0444	(08) 9479 0400
<b>Darwin</b>	(08) 8984 3099	(08) 8947 0540
<b>Tasmania</b>	0417 345 814	(03) 6330 2051
<b>E-mail</b>	ozsales@mono-pumps.com	

## Mono New Zealand

<b>Spares &amp; Service</b>	+64 (0)9 829 0333
<b>E-mail</b>	info@mono-pumps.co.nz

## Monoflo USA

<b>Spares &amp; Service</b>	+1 713 466 7999
<b>E-mail</b>	inquire@monoflo.com

## Monoflo South America

<b>Spares &amp; Service</b>	+54 4296 8997	+54 4284 0323
<b>E-mail</b>	inquire@monoflo.com	

## Mono China

	<b>Telephone</b>	<b>Facsimile</b>
<b>Beijing</b>	+86 (0) 10 6461 1115	+86 (0) 10 8486 8481
<b>Shanghai</b>	+86 (0) 21 5915 7168	+86 (0) 21 5915 6863
<b>E-mail</b>	monoshanghai@nov.com	

# Tools

For servicing and maintenance work on the Muncher the following tools are recommended.

**SB Muncher:**

Metric Hexagon Keys - Range 6mm-8mm  
Metric Spanners - Range 10mm-36mm  
Torque Wrench

**Series A Muncher:**

Metric Hexagon Keys - Range 6mm-8mm  
Metric Spanners - Range 10mm-36mm  
Torque Wrench

**Series F Muncher:**

Metric Hexagon Keys - Range 6mm-8mm  
Metric Spanners - Range 10mm-36mm  
Torque Wrench  
Mono Locknut Key - Item No.s MQ F06A 9750, CF F06A 9755 and MM F06A 9760

**TR Muncher:**

Metric Hexagon Keys - Range 6mm-14mm  
Metric Spanners - Range 10mm-36mm  
Torque Wrench

**Series R Muncher:**

Metric Hexagon Keys - Range 5mm-14mm  
Metric Spanners - Range 10mm-36mm  
Torque Wrench

All equipment should be in good working condition with no signs of excessive wear.

# ATEX Warning Statements

## GRINDERS

Due to the nature and design of grinding and macerating equipment it is possible that certain objects may enter the cutters, from the process stream, with the potential to cause sparking or jamming of the cutter assembly.

Where a grinder 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 grinder 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 grinder 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.

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 grinder 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.

To minimise the risk of sparking or temperature rises due to mechanical or electrical overload the following control and safety devices should be fitted. A control system that will shut the grinder down if the motor current or temperature exceed specified limits or a jam of the cutter stack occurs. This may include a system that reverses the machine in order to clear any such jam. 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.

It is important that the grinder rotates in the correct direction to give an efficient grinding operation. This must be checked on installation and commissioning and after any maintenance has been carried out. Failure to observe this may lead to mechanical or electrical overload.

When fitting drives, couplings, and guards to a grinder unit it is essential that these are correctly fitted, aligned and adjusted in accordance with the O&M instructions. Failure to do so may result in sparking due to unintended mechanical contact or temperature rises due to mechanical or electrical overload.

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.

# ATEX Warning Statements

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 grinder 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, seals, other wearing parts and lubrication is essential.

The grinder 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 grinder 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.

# Introduction

## TR Muncher

This information and all the information contained herein, are the exclusive property of Mono Pumps Ltd, and contain information of a proprietary nature. It is provided for the sole purpose of transmitting the information contained to the designated recipient.


This information is to be used only as specified in the instrument of transmittal. It is not to be reproduced, copied in whole, or in part, nor is information it contains to be disclosed in any manner without the written consent of Mono Pumps Ltd. Its use for any other reason than the specified shall be a violation of the agreement with the recipient concerning the legal rights of Mono Pumps Ltd.

Mono Pumps Ltd reserves the right to make changes, which may obsolete certain parts of this manual.

The manual gives a guide to the operation and maintenance of the TR Muncher given that all Health and Safety and good engineering practices are observed.

The information below is for contract No. \_\_\_\_\_  
supplied.

and gives the duty for which the equipment is

 <b>The Muncher®</b>	<b>WARNING</b>
MODEL No. <input type="text"/>	<b>ENSURE THIS MACHINE IS</b>
CONTRACT No. / Date <input type="text"/>	<b>ELECTRICALLY ISOLATED AND</b>
DUTY / LIQUID <input type="text"/>	<b>CANNOT BE STARTED PRIOR TO</b>
<b>Martin Street, Audenshaw, Manchester M34 5DQ</b>	<b>REMOVING ANY FITMENT, GUARD OR</b>
<b>Tel : 0161 339 9000 Fax : 0161 344 0727</b>	<b>INSPECTION COVER AND THAT ALL</b>
<b>www.mono-pumps.com</b>	<b>ITEMS SO REMOVED ARE REPLACED</b>
<b>MADE IN ENGLAND</b>	<b>PRIOR TO RESTARTING.</b>

# Index

<b>SECTION 1</b>	<b>INSTALLATION</b>
<b>SECTION 2</b>	<b>START-UP PROCEDURE</b>
<b>SECTION 3</b>	<b>DISMANTLING AND ASSEMBLY ADVICE</b>
<b>SECTION 4</b>	<b>WIRING DIAGRAM</b> <b>DRAWING REF. No.'s / TORQUE DATA</b> <b>ASSEMBLY / RE-ASSEMBLY ADVICE AND STACKING ARRANGEMENT</b> <b>PUMP CODING</b>
<b>SECTION 5</b>	<b>DISMANTLING AND ASSEMBLY DIAGRAMS</b>
<b>SECTION 6</b>	<b>EXPLODED VIEWS</b>
<b>SECTION 7</b>	<b>SECTIONAL ARRANGEMENTS</b>
<b>SECTION 8</b>	<b>GENERAL ARRANGEMENTS</b>
<b>SECTION 9</b>	<b>LIFTING AND GUARDING DIAGRAMS</b>

## 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 has been supplied.

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

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

The EMC Directive 2004/108/EC  
The Low Voltage Directive 2006 /95/E  
The Pressure Equipment Directive 97/23/EC  
The Outdoor Noise Directive 2005/88/EC  
The Drinking Water Directive 99/83/EC

#### **IMPORTANT**

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.



**Mr C. Q. Griffiths - Engineering Services Manager.  
for Mono Pumps Limited, Martin Street, Audenshaw,  
Manchester England, M34 5JA**

# Installation, Operation & Maintenance Instructions

## 1.0 INSTALLATION

### 1.1 INSTALLATION & SAFETY RECOMMENDATIONS

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

#### 1.1.1 OPERATING PRINCIPLE

##### The Muncher

The Muncher is a slow speed, high torque grinder designed to operate in the water, waste and bio-waste industries. All Munchers have two shafts operating at differential speeds. Each shaft is fitted with identical interleaving cutters and spacers.

#### 1.2 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 Munchers 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 the Muncher components.

#### 1.3 SYSTEM DESIGN AND INSTALLATION

At the system design stage, consideration must be given to the provision of filler plugs, and the installation of non-return and/or isolating valves where applicable.

Series 'F' AND 'H' Munchers are horizontal dry waste machines and must be fixed rigidly and horizontally either to the ground, or to a rigid system.

TR Pipeline models are designed for horizontal installation only.

Series 'A', SB and 'R' open channel models do not require fixing to the ground and can be supported either by the concrete channel or by steel supports bolted to the concrete channel walls.

Series 'A', SB and 'R' pipeline models can be installed at any attitude.

Pipework to and from the unit should be independently supported and not rely on the Muncher as a means of support. Wherever possible when installed in a vertical pipe system the Muncher unit should be independently supported.

#### 1.4

#### HANDLING



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

**A weight table is included at the end of this section.**

**Lifting illustrations are contained in this document -Section 8.**

#### NOTE

**DO NOT ATTEMPT TO LIFT MUNCHER USING ONLY ONE LIFTING LUG. EXTREME CAUTION SHOULD BE OBSERVED FOR PERSONNEL SAFETY WHEN LIFTING HEAVY OBJECTS.**

**BY DESIGN THE CUTTERS HAVE SHARP EDGES. GREAT CARE MUST BE TAKEN WHEN HANDLING. THE USE OF PROTECTIVE GLOVES IS RECOMMENDED.**



#### 1.5

#### STORAGE

Munchers are despatched from our factory with the cutter chamber sprayed with a moisture repellent coating and ready for immediate installation and operation.

Should the machine be stored or left stationary for any length of time it is recommended that the cutter bank is re-sprayed with anti-rust lubricant and that the shafts are rotated monthly.

Removing the motor cowl and turning the fan by hand is the easiest way to rotate the shafts.

Failure to do this may result in a higher frequency of reversals and in extreme cases the machine to seize due to the tight running clearances of the individual cutting elements during commissioning and initial start-up.

The starter panel if supplied should be stored in a controlled dry environment to prevent moisture build-up causing corrosion of contactors and other metallic components.



# Installation, Operation & Maintenance Instructions

See manufacturer instructions for motor/gearbox/drive and panel storage procedures.

## NOTE:



The Muncher must be protected by a PLC control unit set up to the correct operating philosophy. Only PLC's supplied or approved by Mono Pumps Limited should be used. Failure to observe this requirement may cause premature machine failure and could invalidate the warranty of the machine. It is also important that the PLC be correctly wired into the panel.

Please refer to Wiring Diagram – Section 4, Page 1.



## IMMEDIATELY PRIOR TO INSTALLATION AND STARTING

**Before installing the Muncher please ensure that all plugs and inspection plates are replaced.**

## 1.6 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.



Earthing points will be provided on electric drives (if supplied) and it is essential that these are correctly connected. The electrical installation should include appropriate isolating equipment to ensure that the unit is safe to work on.

## 1.7 GENERAL SAFETY



**GREAT CARE MUST BE TAKEN TO PROTECT ALL ELECTRICAL EQUIPMENT FROM SPLASHING WHEN HOSING DOWN. WHERE MONO PUMPS LIMITED HAVE SUPPLIED A BASIC MUNCHER 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. When commissioning the plant, all joints in the system must be checked thoroughly for leakage.

If, when starting, the Muncher does not appear to operate correctly, the plant must be shut down immediately and the cause of the malfunction established before operations are recommenced.

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

## NOTE:

**NEVER inspect or work on or near the cutter chamber without first isolating and locking the machine.**

## GUARDS



In the interests of safety, and in accordance with relevant legislation, all guards must be replaced after necessary adjustments have been made.

It is strongly recommended that a Series 'F' or 'H' horizontal dry Muncher system should incorporate: -

- A steel (or similar) feed hopper with a minimum base to top height of 1.0 metre or a minimum height of 1.5 metres from floor level.
- A steel (or similar) lower delivery chute, which is inaccessible without tools.
- A protective grid mounted over the Muncher and conveyor system, especially where overhead walkways are present.
- Emergency stop buttons positioned within easy reach of all operating staff.

**The recommended extent of enclosure is illustrated in this document - Section 8.**

## 1.7.1 WARNING /CONTROL DEVICE

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

## 1.7.2 NOISE LEVELS

The noise sound pressure level will not exceed 70dB at one metre distance from the Muncher. This is based on a typical installation and does not necessarily include noise from other sources or any contribution from building reverberation.

## 1.8 EXPLOSIVE PRODUCTS/ HAZARDOUS ATMOSPHERES



In certain instances the product being treated 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.

# Installation, Operation & Maintenance Instructions

## 1.9 LUBRICATION

The gearmotor(s) is supplied with the correct type and quantity of lubricant in the gearbox but should be checked before use. For further data see separate information supplied by manufacturer.

Series 'F' and 'H' bearings and rotary shaft seals are lubricated via greasing points on each bearing housing. The correct quantity of grease is reached when excess can be seen around the outer lipseal. Other models have sealed for life bearings that do not require maintenance.

Gears should be inspected periodically to see if grease replenishment is necessary, and if so, grease should be added via the grease nipple until the housing is two thirds full.

Only use recommended lubricant shown below for Muncher shaft gears, bearings and rotary seals.

BP Energrease LC2 (-30°C to 180°C).

At the following intervals, bearings, gears and seal assembly inspection should take place along with lubricant replenishment;

Series 'F', 'H', 'R' - 7,500 hrs

Series 'A', SB, TR - 10,000 hrs



**PIPELINE MUNCHERS SHOULD BE ISOLATED BY CLOSING LINE VALVES PRIOR TO SERVICING.**

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

# Weights

Muncher	Type	Gear Unit / Class	M/C Size (kW)	Weight (kg)
Series A	CA202AA	IP55	1.5	241
	CA203AA			251
	CA205AA			276
	CA206AA			286
	CA210AA			351
	CA215AA			400
	CA202AB	IP55	2.2	254
	CA203AB			264
	CA205AB			284
	CA206AB			294
	CA210AB			369
	CA215AB			439
	CA202AC	IP55	4.0	265
	CA203AC			275
	CA205AC			295
	CA206AC			305
	CA210AC			380
	CA215AC			450
Series F	CF306RJS7B2	Nord IP55	11	780
	CF310RMS7B2		7.5 & 11	1180
Series H	CH06	Nord IP55	11 & 15 / 15 & 22	1800
	CH09			2300
	CH12			2800
SB	Pipeline CB201	IP55	1.1	205
			1.5	207
			2.2	244
		IP55	1.1	208
			1.5	244
			2.2	248
	Channel CB201A	IP55	1.1	155
			1.5	190
			2.2	195
		IP67 & 68	1.1	200
1.5			225	
2.2			260	
TR	CT201D	IP55	1.5	175
			2.2	180
	CT203C	IP55	1.5	290
			2.2/4.0	340
	CT203D	IP55	1.5	290
			2.2/4.0	340
	CT203E	IP55	1.5	290
			2.2/4.0	340
	CT205F	IP55	1.5	345
			2.2/4.0	390
	CT205G	IP55	1.5	345
			2.2/4.0	390
R	CR145A	IP55	7.5	800

# Installation, Operation & Maintenance Instructions

## 2.0 START-UP PROCEDURE



**By the nature of the equipment and its operating environment the Muncher can be an extremely dangerous machine. It is vital that operators are conversant with these Operation and Maintenance Instructions prior to working with the machine.**

Where applicable:

- 1) Check the foundation bolts are secure once the machine is installed in its correct operating position.
- 2) Check the gearbox lubricant, remove the plug and fit the air vent to prevent gearbox pressurisation. Not applicable to submersible drive units.
- 3) Check all electrical connections for continuity and earthing and that installation is in accordance with relevant regulations and circuit diagrams.
- 4) If a feed hopper is fitted, check that it is secure and installed correctly, and that no personnel can gain access to the moving parts of the machine.
- 5) Always ensure that machine is guarded in accordance with PD5304: 2000 Safety of Machinery requirements before any attempt is made to operate.
- 6) On start-up check the direction of rotation of the cutters. The cutters should rotate towards the centre when viewed from the inlet side.



### NOTE:

**If it is necessary to remove any inspection cover to observe the action – EXTREME CARE should be observed when carrying out this procedure.**

- 7) Check that the Muncher stops when "STOP" button(s) are activated.
- 8) Check for reverse rotation of cutters when "REVERSE" button is activated.
- 9) Start up the machine. On initial start-up, allow machine to run for approximately 45 minutes.



### NOTE:



**NEVER inspect or work on or near the cutter chamber without first isolating and locking the machine.**

- 10) Start the feed system to the machine. Care should be taken not to overburden the machine. Adjust feed to maintain only the smallest practical reservoir of material in cutter banks.
- 11) After a further 10 minutes of running, stop the machine, switch off and lock the main isolator. Check the tightness of all securing bolts. Re-check every 500 hours of operating time.
- 12) Check the tightness of all cables and connections. Re-check every 500 hours of operating time.
- 13) Observe manufacturers guidelines with regard to gearbox lubricant initial renewal and subsequent intervals.
- 14) In the event of machine overload (jam), the controller is programmed to activate the following procedure:-
  - i) Momentarily reverse rotation to clear the condition, then return to normal operation.
  - ii) If overload re-occurs within 60 seconds, reverse rotation to clear the condition, then return to normal operation.
  - iii) If a third overload occurs within 60 seconds of the first, machine shutdown in reverse mode and energise alarm circuit.
- 15) After machine shutdown, isolate and lock off. Inspect machine, removing any obstruction and press the "RESET" button.
- 16) The machine can now be re-started as 9) above.

# Installation, Operation & Maintenance Instructions

## 3.0 DISMANTLING AND ASSEMBLY

Section 3 contains the steps to dismantle and re-assemble the Muncher. All fastenings must be tightened securely and where identified the appropriate torque figures should be used.

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

The Muncher and its components have been designed to ensure that the machine 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 machine 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.

### 3.2 DISMANTLING ADVICE

(Refer to specified drawings).

**CAUTION: When servicing the Muncher, be certain that the mains isolator is off and padlocked. Serious injury could result from accidental start-up.**

- 1) Disconnect wiring at motor(s) terminal box(es) and tag leads for identification.
- 2) Pipeline models - Isolate the Muncher pipeline by closing line valves before and after the machine.
- 3) If necessary, the Muncher may be completely removed from installation using the recommended lifting equipment.
- 4) Pipeline models - Replace the pull back assembly with the maintenance period screen (MPS) if required.
- 5) When dismantling cutters and spacers, take careful note of the position and orientation of each component.

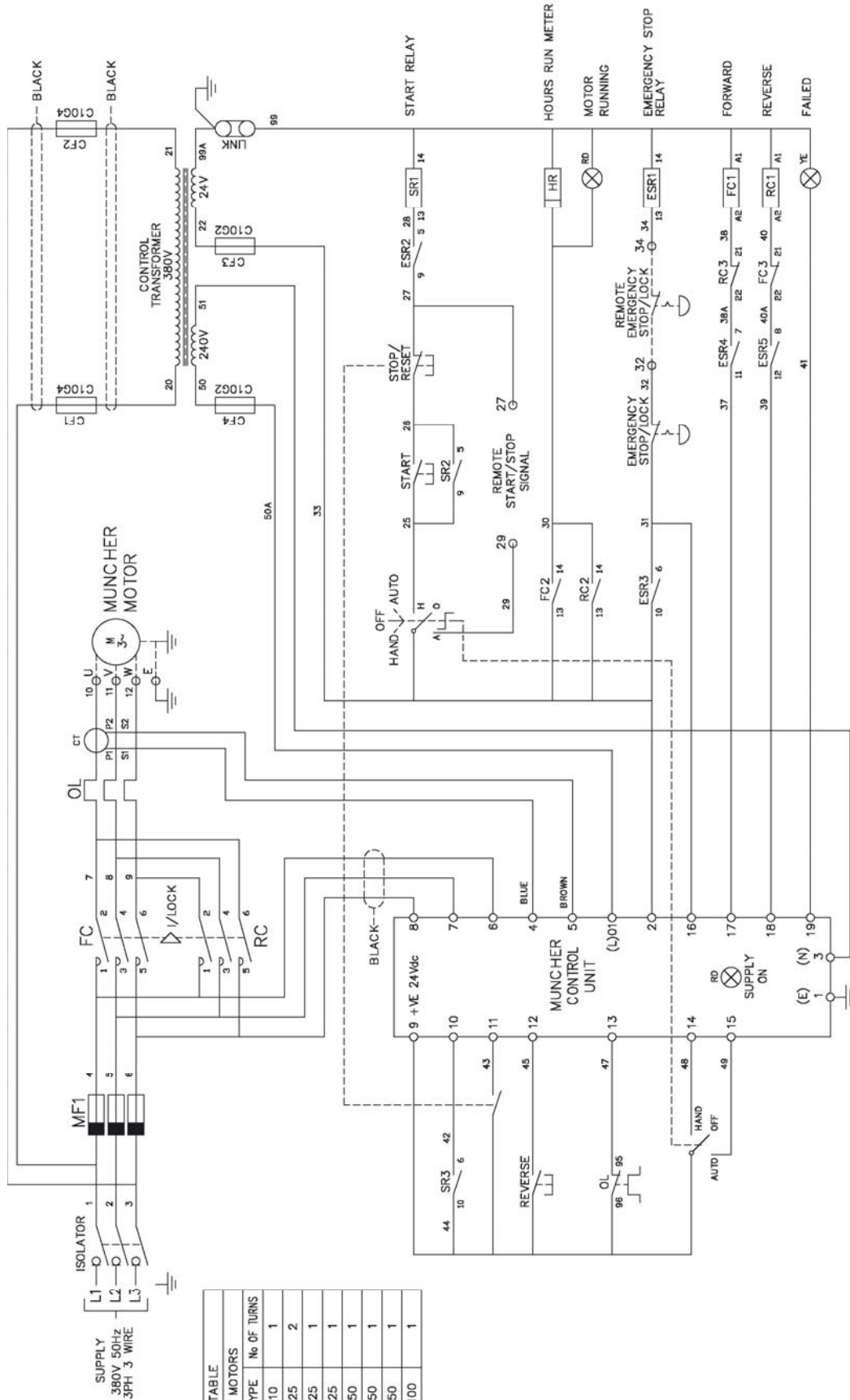
## 3.3 CLEANING / INSPECTION

- 1) Steam clean and disinfect all parts of the Muncher excluding motor, seal assemblies, gear drive unit and bearings.
- 2) Remove any gasket material from joint faces.
- 3) Housings should be cleaned thoroughly.
- 4) Inspect all parts for excessive wear and replace if necessary.
- 5) Sealed bearings cannot be re-greased, replace if necessary.
- 6) Check and if necessary replace the internal 'O'-rings, lipseals and mechanical seals.
- 7) Inspect gears for wear and damage and replace if necessary.
- 8) All cutters and spacers must be clean and free from cracks or excessive wear.
- 9) Shafts should be clean and any burrs filed off for easier stacking. Inspect shafts for excessive wear of hexagonal portion. Replace if necessary.

## 3.4 REASSEMBLY ADVICE

- 1) Lubricate all bores, shafts and seals on re-assembly.
- 2) Lubricate gears on re-assembly with the specified lubricant.
- 3) Reconnect wiring at motor(s) terminal box(es) using tag leads for identification.
- 4) Re-open system isolation valves.
- 5) On completion of assembly, run through the 'initial start-up' procedure in section 2.

# Wiring Diagram



DRAWING NO:  
A3/EMCPIK/ENG

**Note:**

Other language versions may be available on request. Please contact Mono Pumps.

# Drawing Reference Numbers

## CT201

DRG. REF.	DESCRIPTION
0100	GEAR HOUSING
0300	MAIN BODY
0600	MUNCHER NAMEPLATE
1100	BEARING HOUSING
2010	GASKET
2016	GASKET
2017	GASKET
2500	CUTTER
3200	DRIVE SHAFT
3250	DRIVEN SHAFT
3500	SPACER
4700	BACK UP WASHER
4702	RETAINING WASHER
4750	LOCK WASHER
5900	END COVER
5901	INSPECTION COVER
6200	SUPPORT FOOT
7700	LIFTING LUG
7701	LIFTING LUG
7800	DRIVE GEAR
7801	DRIVEN GEAR

DRG. REF.	DESCRIPTION
P101	M10 x 30 STUD
P102	M10 x 35 STUD
P103	M10 SPRING WASHER
P104	M10 HEX NUT
P105	M10 x 30 HEX SOCKET CAPSCREW
P106	M10 x 35 HEX SOCKET CAPSREW
P107	M10 SPRING WASHER
P108	INT CIRCLIP 75MM
P109	EXTERNAL CIRCLIP - 40mm
P110	LIPSEAL 35 x 62 x 7
P111	RECT PAR KEY - 10 x 8 x 55
P112	M8 x 16 HEX SOCKET CAPSCREW
P113	M8 SPRING WASHER
P114	BEARING - 35 x 72 x 17
P115	EXTERNAL CIRCLIP - 35mm
P116	MECH SEAL
P117	M24 NYLOC NUT
P118	M10 x 25 HEX SOCKET CAPSCREW
P119	M10 SPRING WASHER
P400	M8 x 20 HEX SOCKET CAPSCREW
P401	M8 SPRING WASHER

DRG. REF.	DESCRIPTION
P500	RECT PAR KEY - 10x8x45
P501	M10 x 30 HEX HD SCREW
P502	M10 SPRING WASHER
P503	M10 HEX NUT
P504	M12 COLLARED EYEBOLT

### IMPORTANT NOTE: -

THE DRAWING REFERENCES SHOWN GIVE THE DESCRIPTION OF ALL THE PARTS DETAILED ON THE SECTIONAL DRAWINGS IN THIS SECTION OF THE BOOK. THEREFORE SOME OF THE REFERENCES MAY NOT BE SHOWN ON ANY ONE.

## Torque Tightening Table for Fasteners

DESCRIPTION	THREAD SIZE	PART No	MAX TIGHTENING TORQUE	
			Nm	lbf.ft
MAIN BODY / INSPECTION COVER NUT	M10 x 1.5	P103	56	41
TOP COVER PLATE BOLT	M10 x 1.5	P104	56	41
NYLOC NUT	M24 x 3	P106	230	170
MOTOR MOUNTING BOLT	M10 x 1.5	P501	56	41

Torque tolerances are +/- 5% of stated values.

## Assembly/Re-Assembly Advice

1. Use anti-seize compound on shafts.
2. Ensure correct orientation of bearing housing drain holes.
3. When viewed from drain holes side, driveshaft is to the right.
4. Where necessary use jacking screw holes to remove difficult components.
5. Observe the cutter stacking table guidelines below.

### CUTTER STACKING TABLE

MODEL / TOOTH WIDTH	DRIVE SHAFT				DRIVEN SHAFT			
	CUTTERS	SPACERS	START TOP	FINISH BOTTOM	CUTTERS	SPACERS	START TOP	FINISH BOTTOM
CT201 -W A2	14	15	CUTTER	SPACER	14	15	SPACER	SPACER
CT201 -W B2	10	10	SPACER	CUTTER	10	10	CUTTER	SPACER

# Drawing Reference Numbers

## CT203 & CT205

DRG.REF.	DESCRIPTION	DRG.REF.	DESCRIPTION
0100	BEARING HOUSING	P108	EXTERNAL CIRCLIP-55mm
0200	DATUM TUBE	P109	RECT PAR KEY - 16x10x47
0300	MAIN BODY	P110	LIPSEAL - 50x65x8
0600	MUNCHER NAMEPLATE	P111	10x25 DOWEL
1100	TOP COVER PLATE	P112	8x25 DOWEL
1160	SEAL RETAINING PLATE	P113	BEARING - 50x90x20
2000	MAIN BODY GASKET	P114	MECH SEAL -60mm
2010	INSPECTION COVER GASKET	P115	M16x45 HEX SOCKET CAP SCREW
2500	CUTTER	P116	M16 SPRING WASHER
3200	DRIVE SHAFT	P117	M16x45 HEX SOCKET CAP SCREW - L.H.
3250	DRIVEN SHAFT	P118	M16 SPRING WASHER
3500	SPACER	P119	M12x25 HEX HEAD SCREW
3650	SHAFT ENDCAP	P120	M12 SPRING WASHER
4750	SEAL RETAINING WASHER	P121	WARNING LABEL
5900	INSPECTION COVER	P122	No. 0 x 3/16" HD DRIVE SCREW
7800	DRIVE GEAR	P123	No. 0 x 3/16" HD DRIVE SCREW
7801	DRIVEN GEAR	P124	1/8" GREASE NIPPLE
P101	M8x55 HEX SOCKET CAP SCREW	P400	SEAL PLATE BOLT
P102	M8 SPRING WASHER	P401	SEAL PLATE WASHER
P103	M8x30 HEX SOCKET CAP SCREW	P402	SEAL PLATE SPRING WASHER
P104	M8 SPRING WASHER	P500	RECT PAR KEY - 14x9x105
P105	M12x50 HEX SOCKET CAP SCREW	P501	M12 x 30 HEX HEAD SCREW
P106	M12 SPRING WASHER	P502	M12 SPRING WASHER
P107	INTERNAL CIRCLIP-90mm	P503	M20 EYEBOLT

### IMPORTANT NOTE: -

THE DRAWING REFERENCES SHOWN GIVE THE DESCRIPTION OF ALL THE PARTS DETAILED ON THE SECTIONAL DRAWINGS IN THIS SECTION OF THE BOOK. THEREFORE SOME OF THE REFERENCES MAY NOT BE SHOWN ON ANY ONE.

## Torque Tightening Table for Fasteners

DESCRIPTION	THREAD SIZE	PART No.(s)	MAX. TIGHTENING TORQUE	
			Nm	lbf.ft.
TOP COVER PLATE BOLT	M8x1.25	P101	29	22
TOP COVER PLATE BOLT	M8x1.25	P103	29	22
BEARING HOUSING BOLT	M12x1.75	P105	101	76
DRIVESHAFT BOLT	M16x2	P115	125	92
DRIVEN SHAFT BOLT	M16x2 (L.H.)	P117	125	92
SEAL PLATE BOLT	M12x1.75	P119	101	76
INSPECTION COVER BOLT	M16x2	P400	125	92
MOTOR MOUNT BOLT	M12x1.75	P501	101	76

Torque tolerances are +/- 5% of stated values.

## Assembly/Re-Assembly Advice

1. Use anti-seize compound on shafts.
2. Ensure correct orientation of bearing housing drain holes.
3. When viewed from drain holes side, driveshaft is to the right.
4. Where necessary use jacking screw holes to remove difficult components.
5. Observe the cutter stacking table guidelines below.

### CUTTER STACKING TABLE

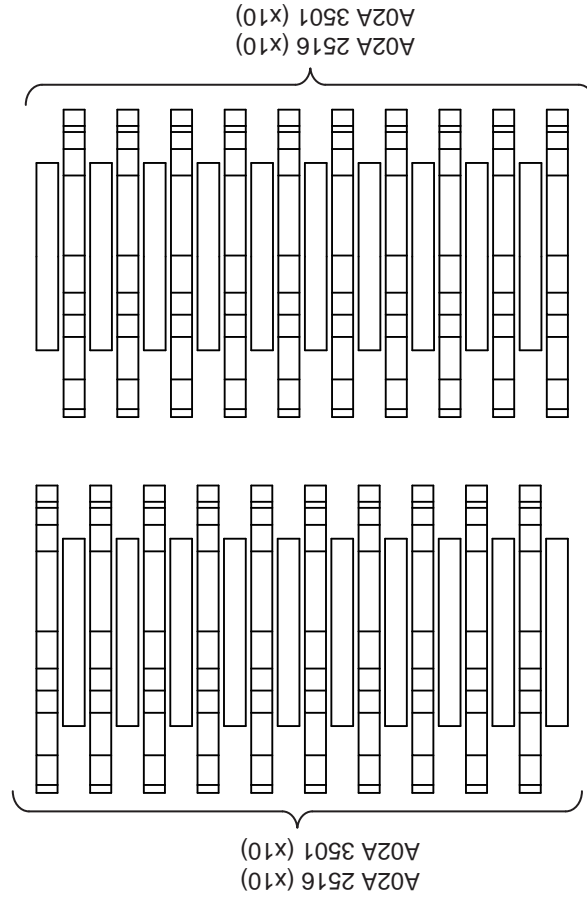
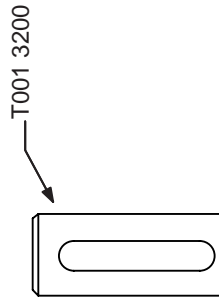
MODEL / TOOTH WIDTH	DRIVE SHAFT				DRIVEN SHAFT			
	CUTTERS	SPACERS	START TOP	FINISH BOTTOM	CUTTERS	SPACERS	START TOP	FINISH BOTTOM
CT203-W A2	22	21	CUTTER	CUTTER	21	22	SPACER	SPACER
CT203-W B2	15	15	SPACER	CUTTER	15	15	CUTTER	SPACER
CT205-W A2	36	35	CUTTER	CUTTER	35	36	SPACER	SPACER
CT205-W B2	25	25	SPACER	CUTTER	25	25	CUTTER	SPACER



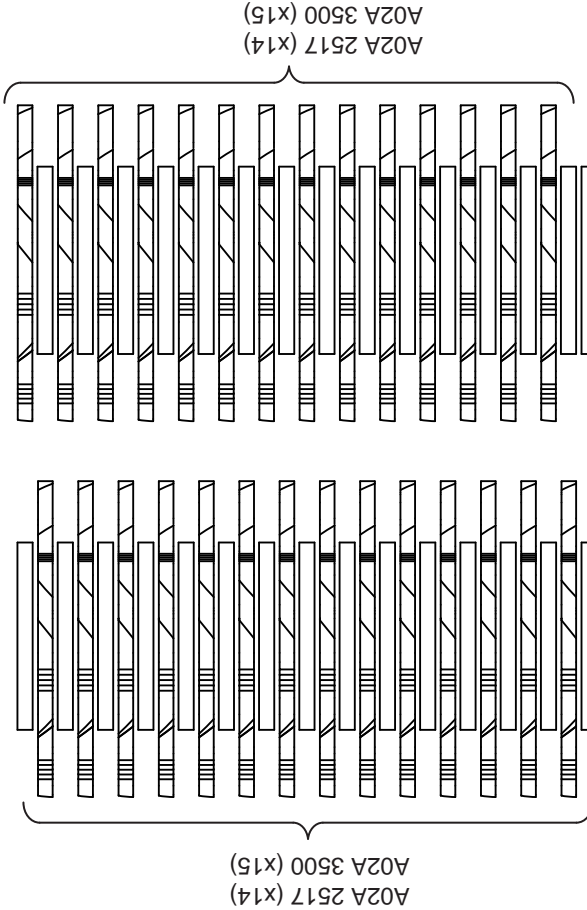
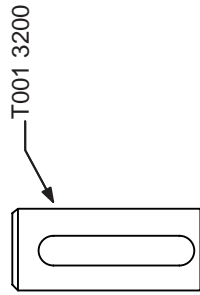
# Stacking Arrangement

## Cutter Stacks

150mm Throat, 8mm Cutters

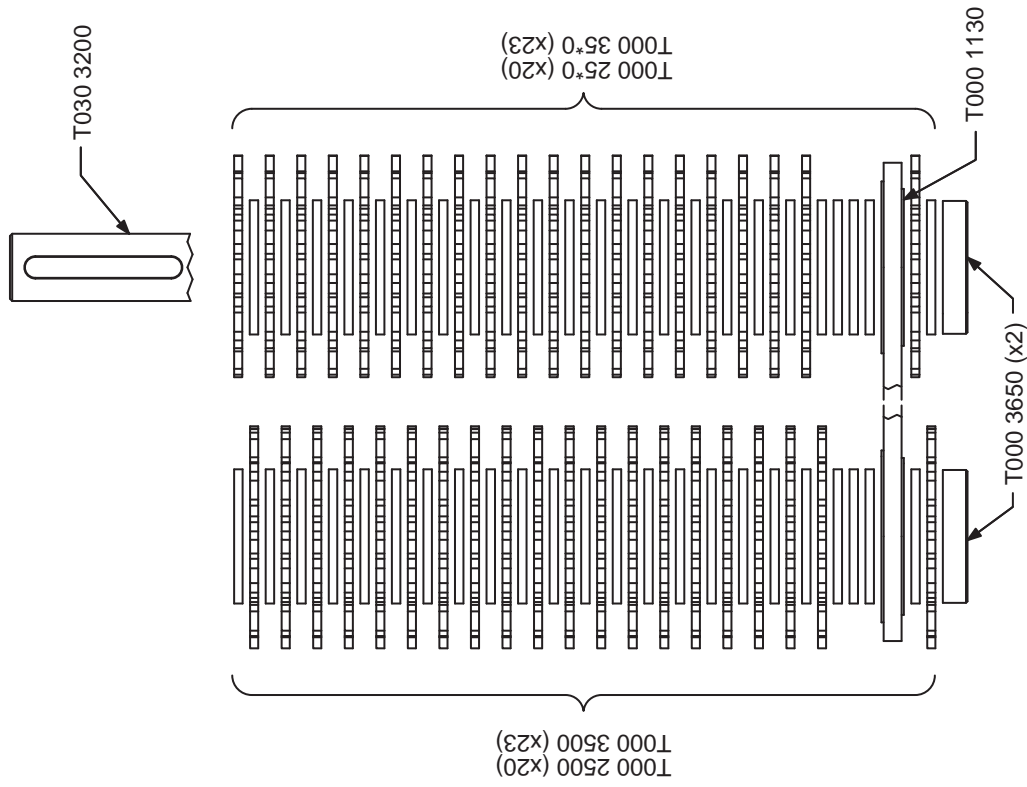


150mm Throat, 5.5mm Cutters

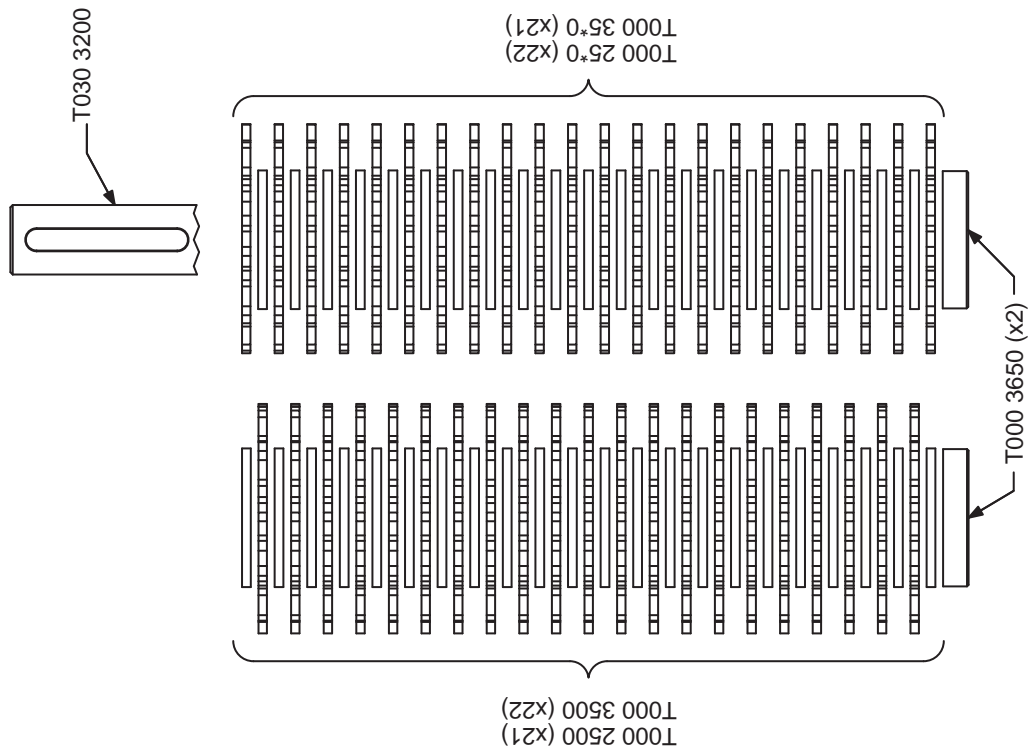


# Stacking Arrangement

300mm Throat, 5.5mm Cutters with Bottom Support Bearing

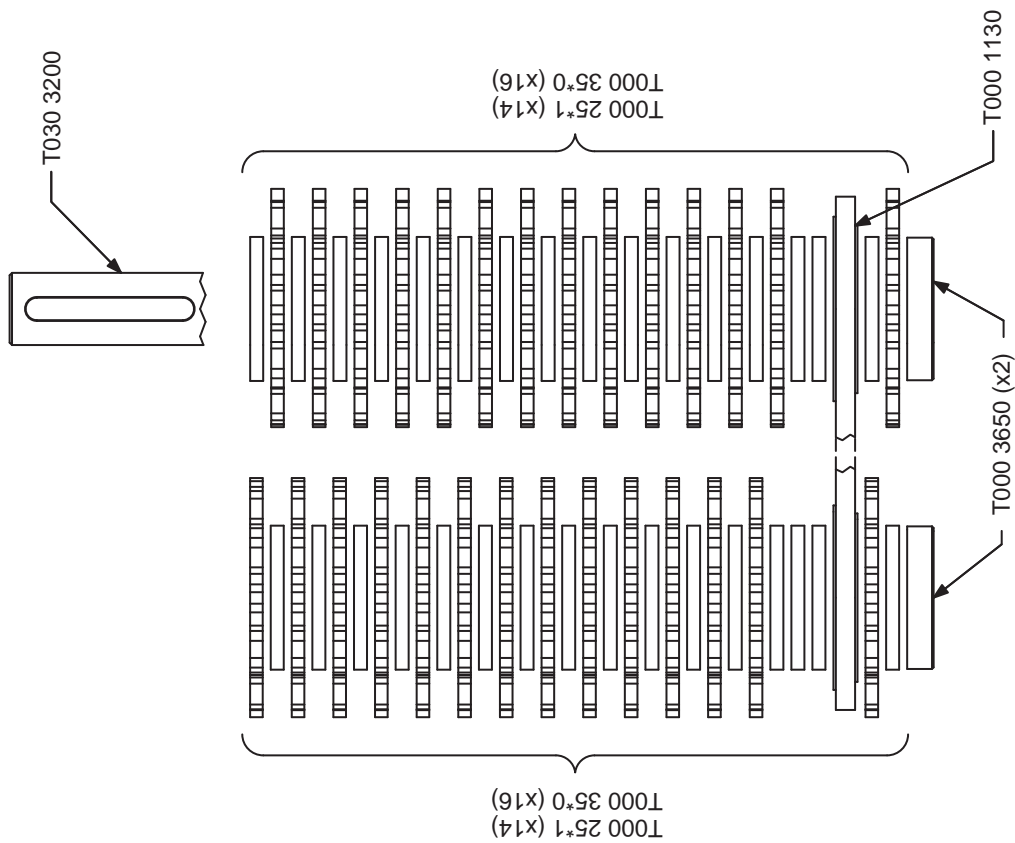


300mm Throat, 5.5mm Cutters

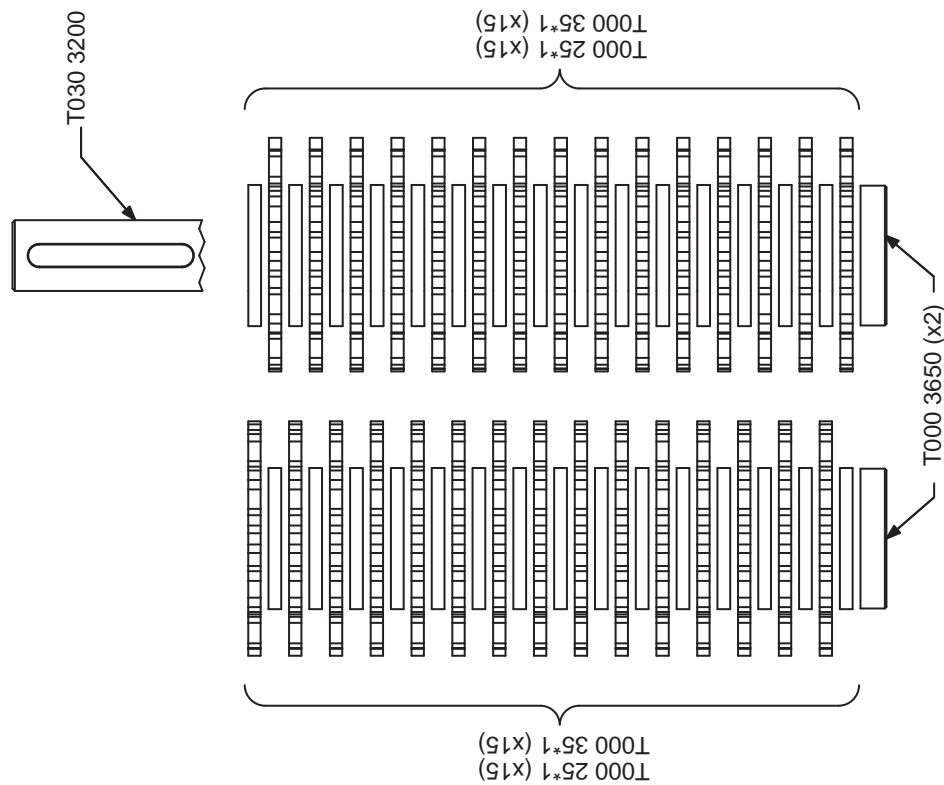


# Stacking Arrangement

300mm Throat, 8mm Cutters with Bottom Support Bearing

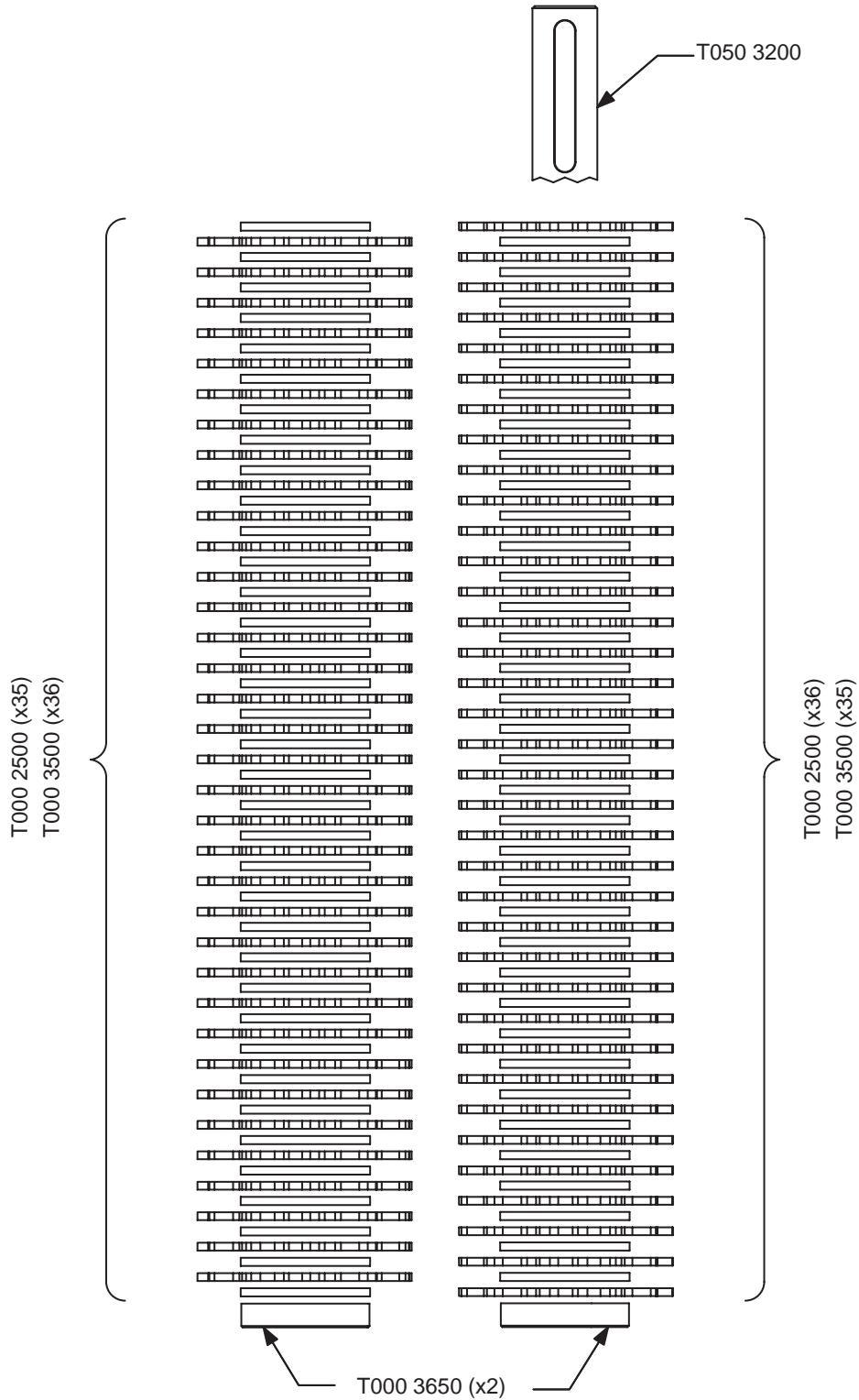


300mm Throat, 8mm Cutters



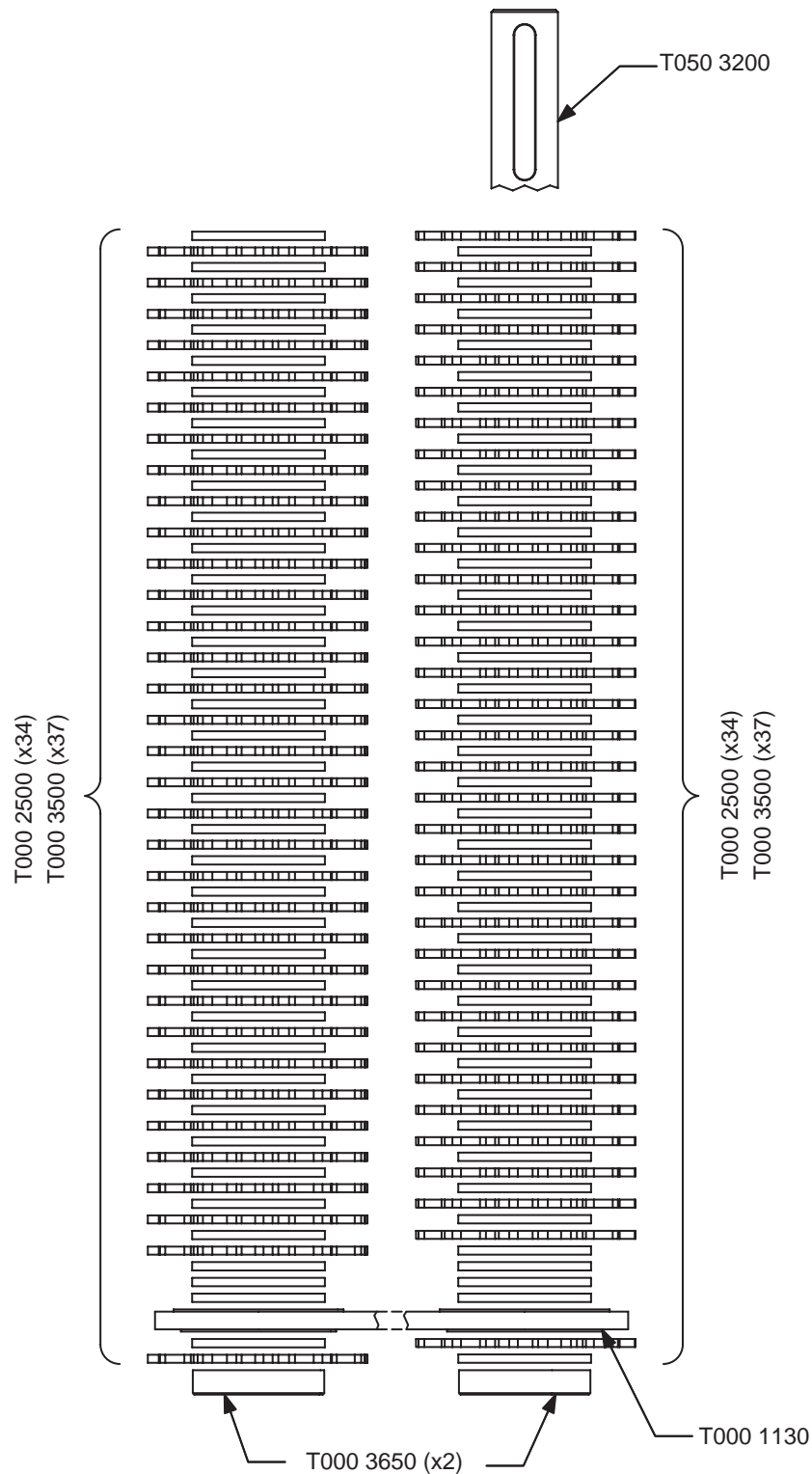
# Stacking Arrangement

500mm Throat, 5.5mm Cutters



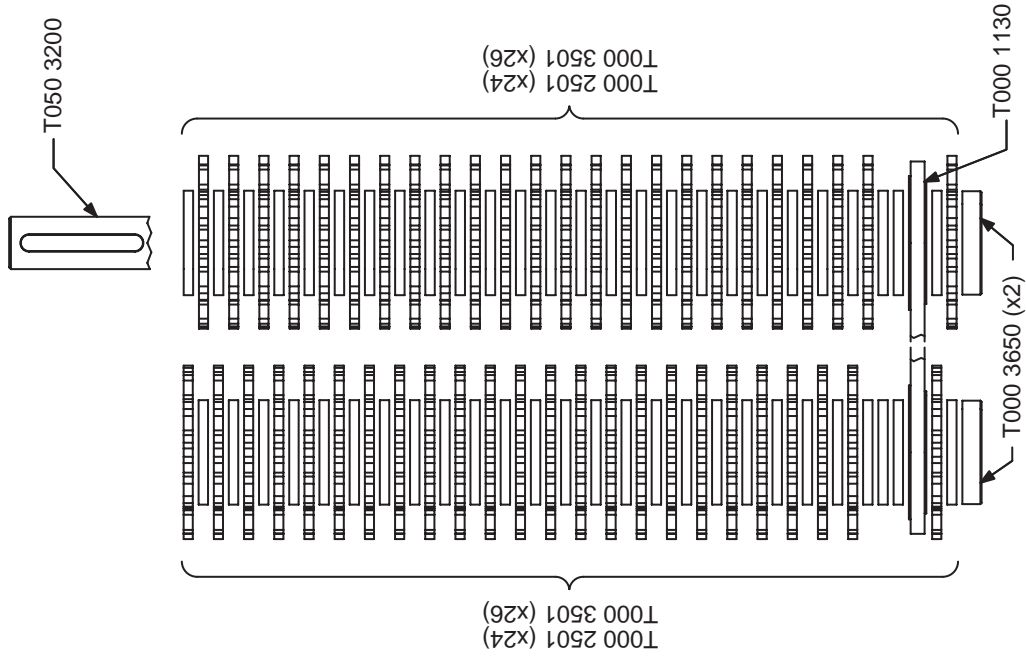
# Stacking Arrangement

## 500mm Throat, 5.5mm Cutters with Bottom Support Bearing

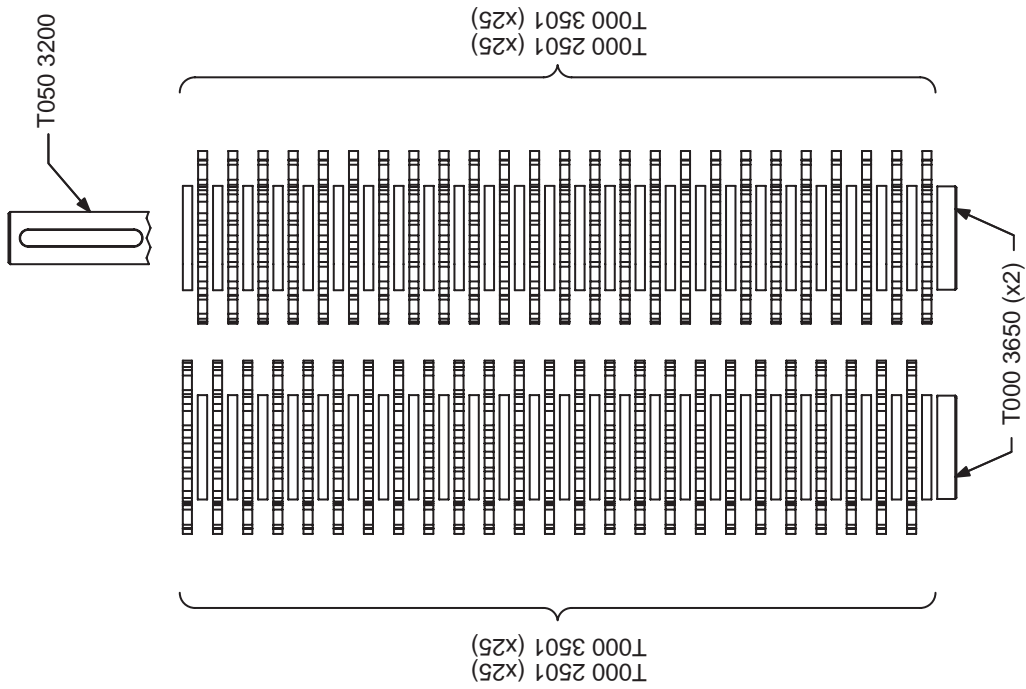


# Stacking Arrangement

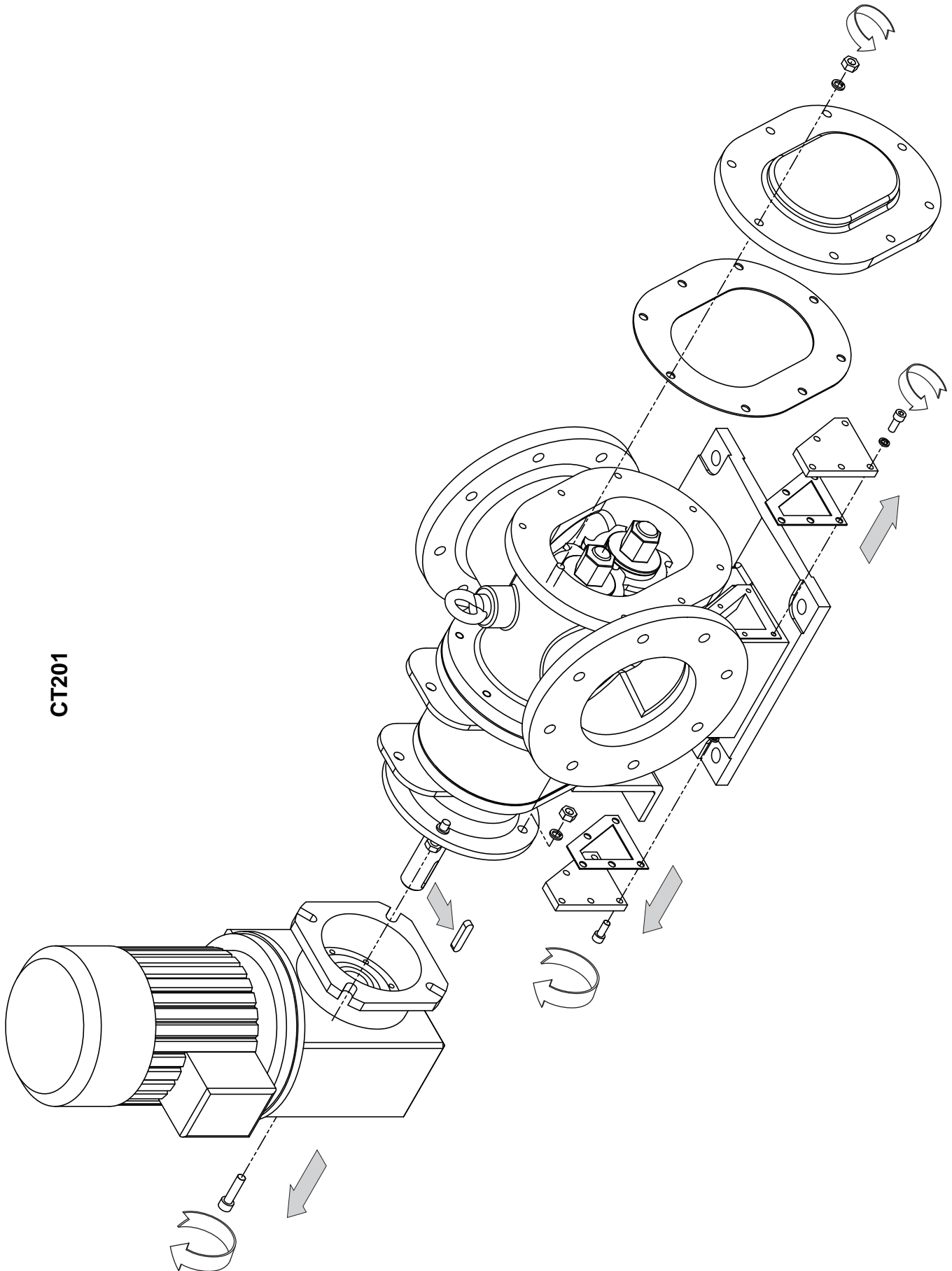
500mm Throat, 8mm Cutters with Bottom Support Bearing



500mm Throat, 8mm Cutters



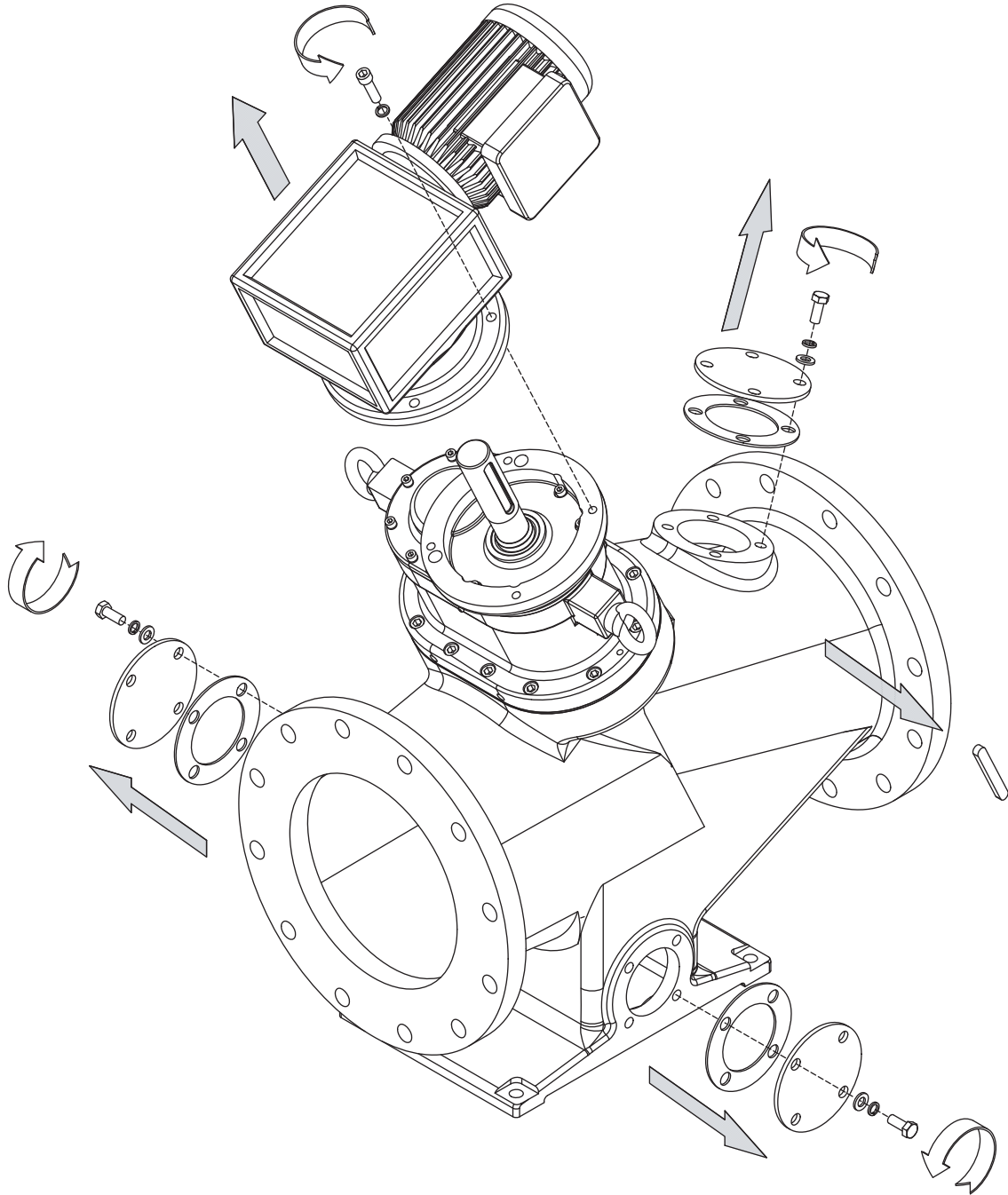
# Dismantling & Assembly Diagrams



CT201

# Dismantling & Assembly Diagrams

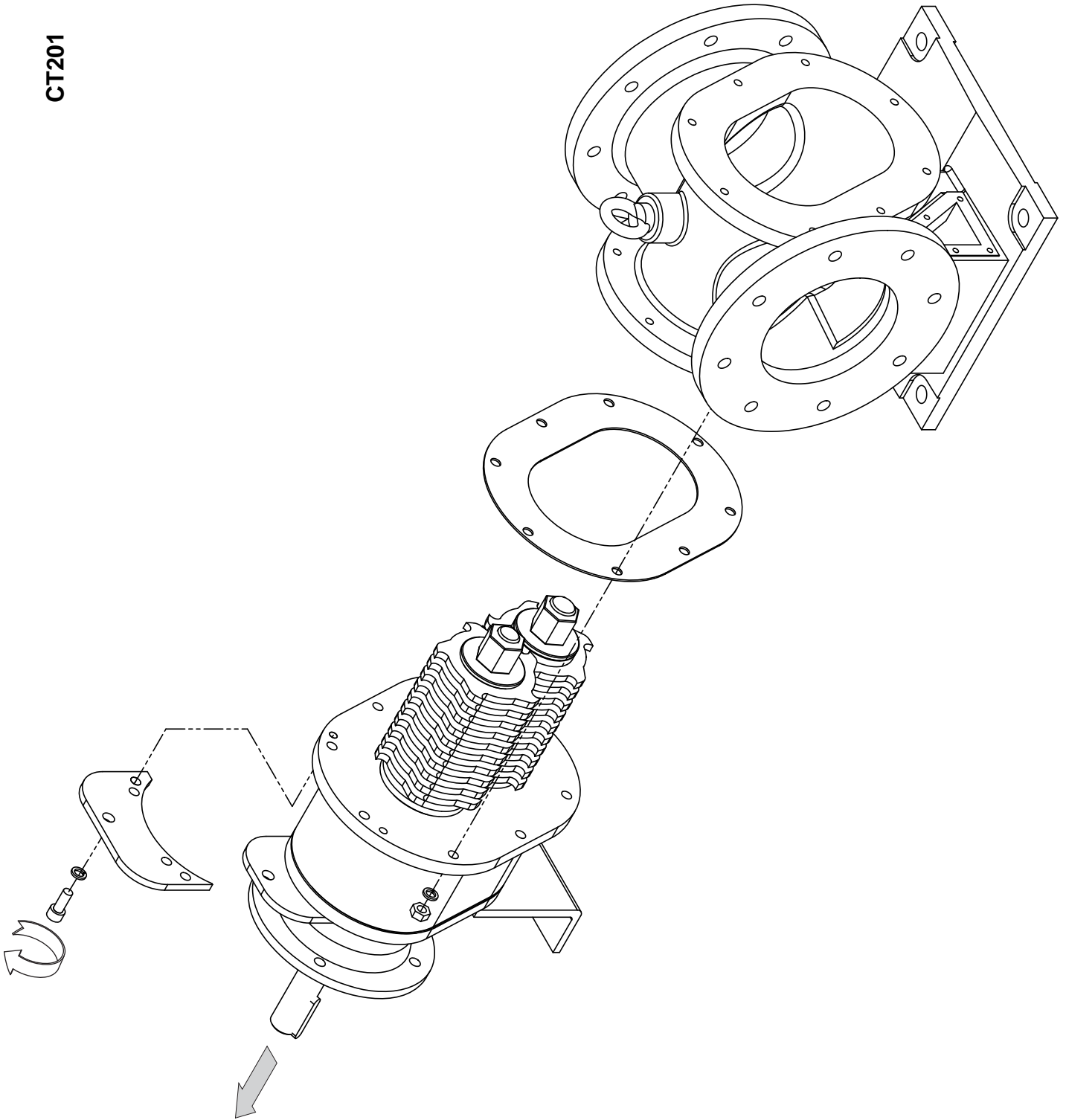
CT203 & CT205





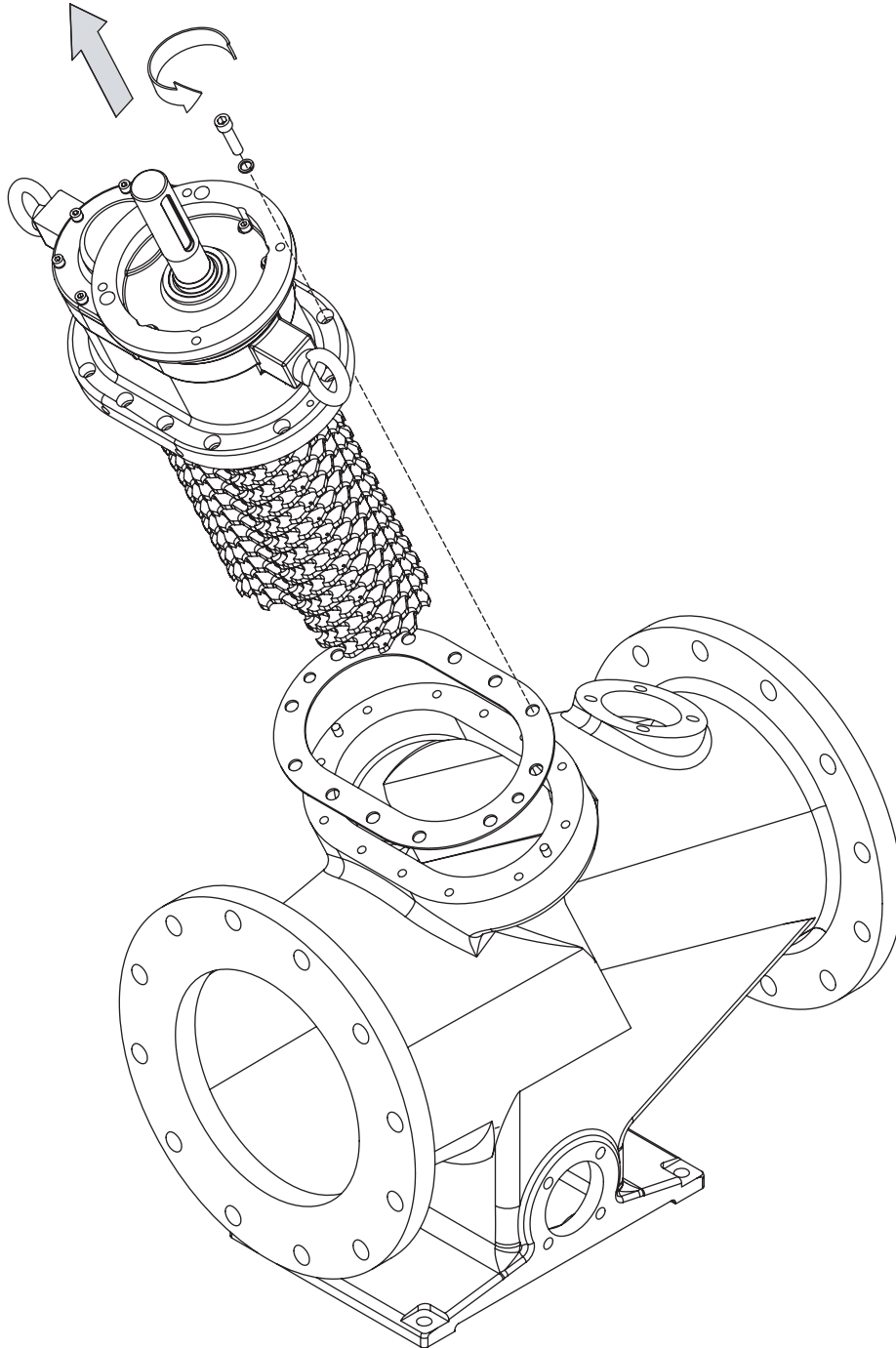
# Dismantling & Assembly Diagrams

CT201



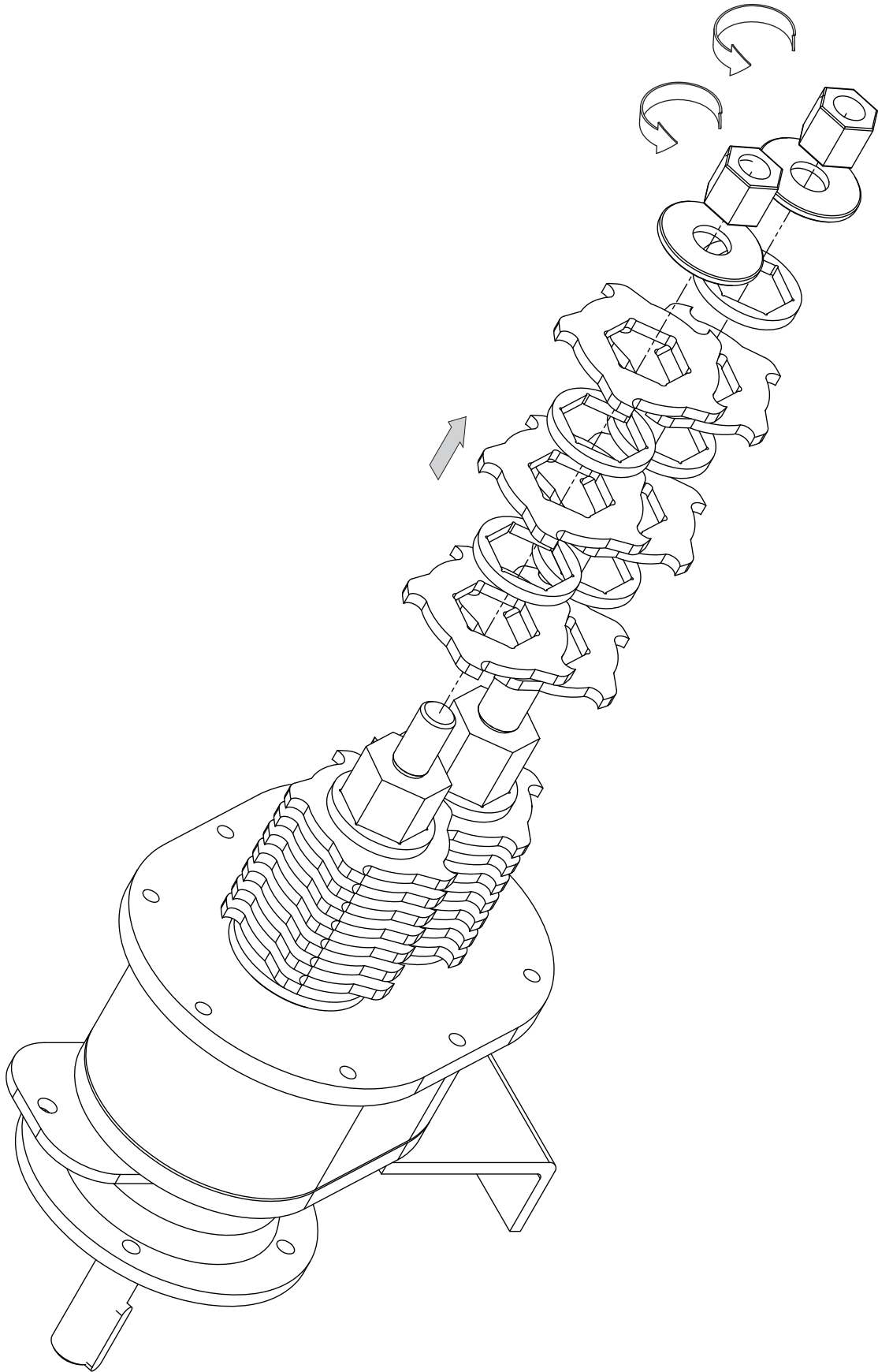
# Dismantling & Assembly Diagrams

## CT203 & CT205



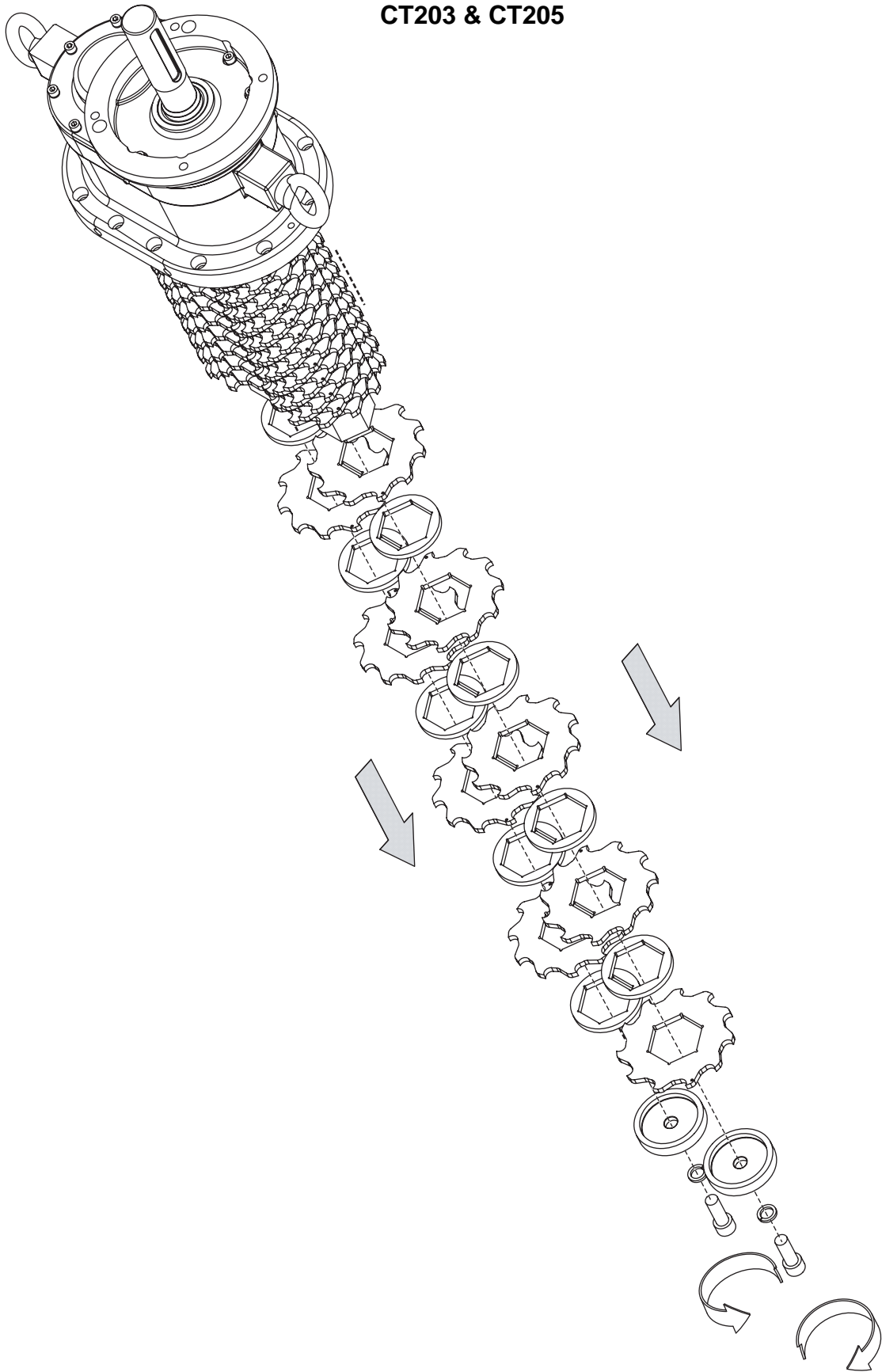
# Dismantling & Assembly Diagrams

CT201



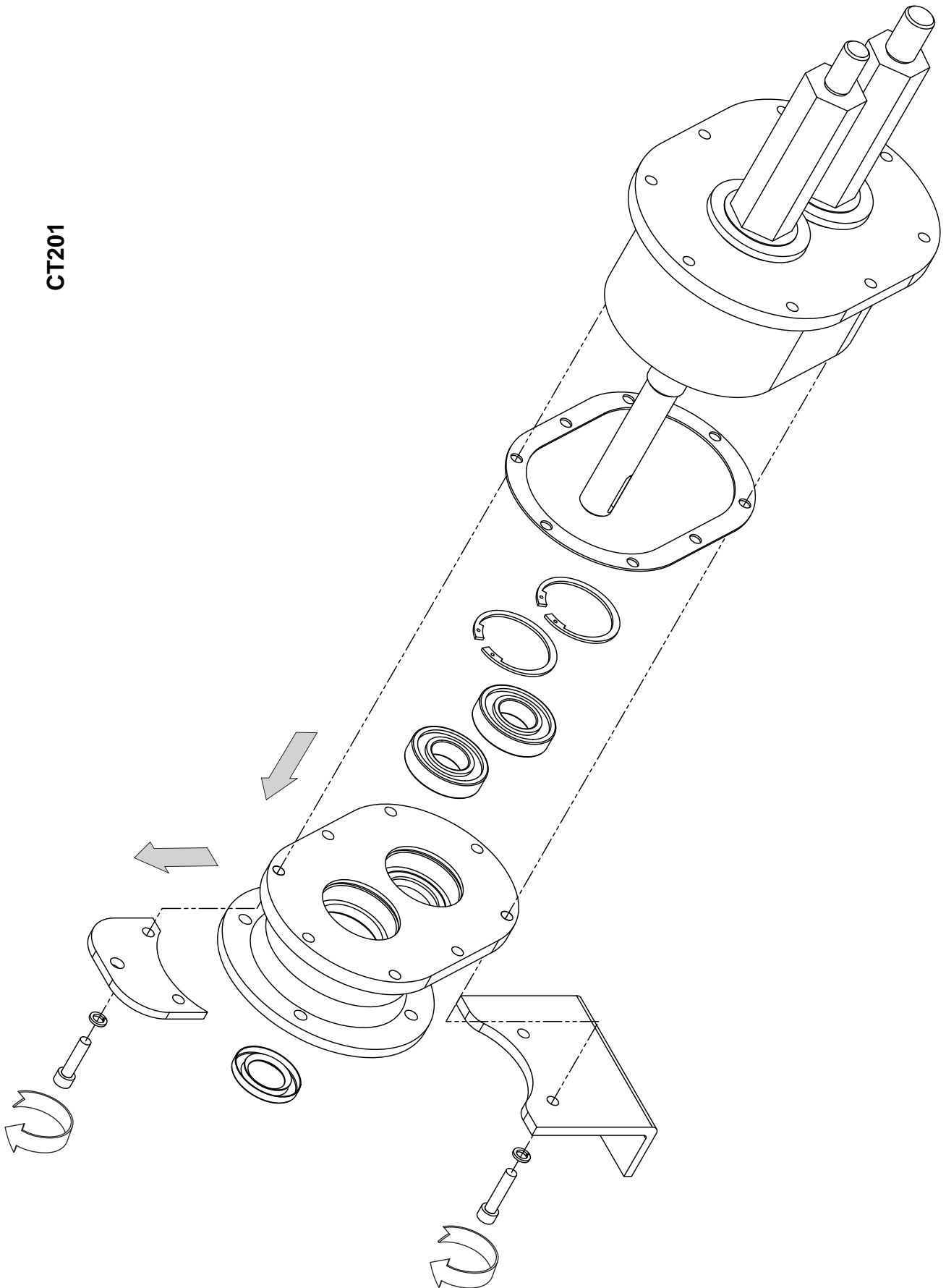
# Dismantling & Assembly Diagrams

CT203 & CT205



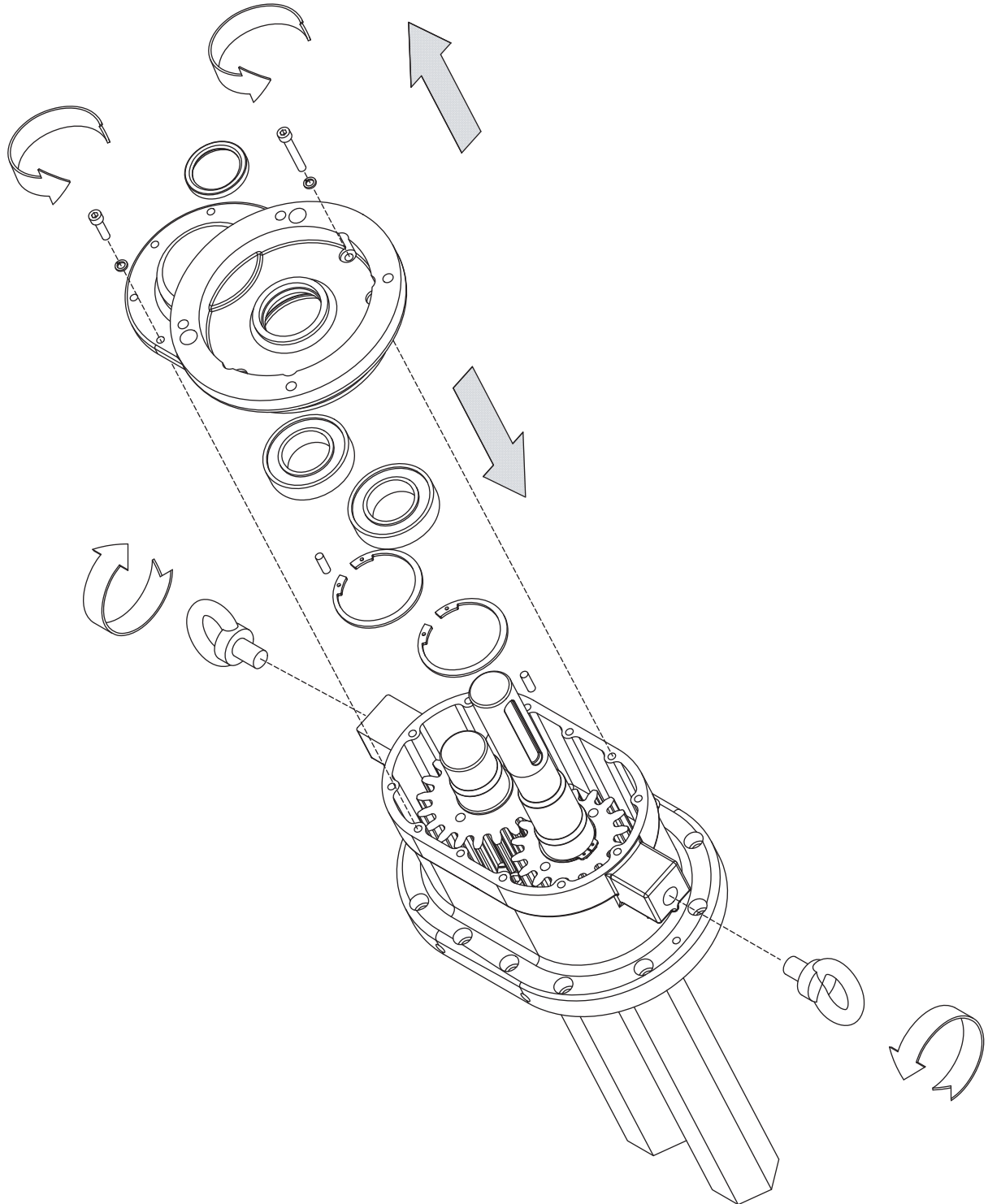
# Dismantling & Assembly Diagrams

CT201



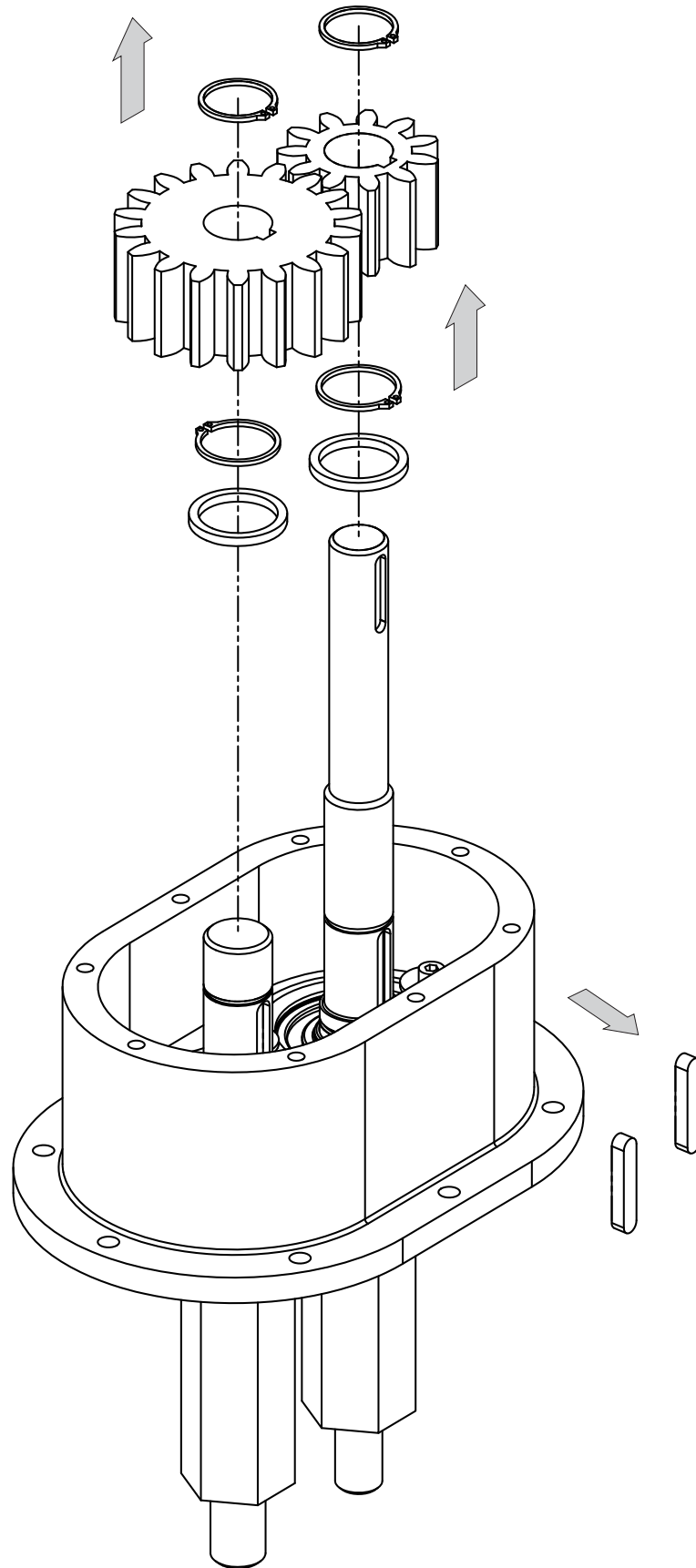
# Dismantling & Assembly Diagrams

## CT203 & CT205



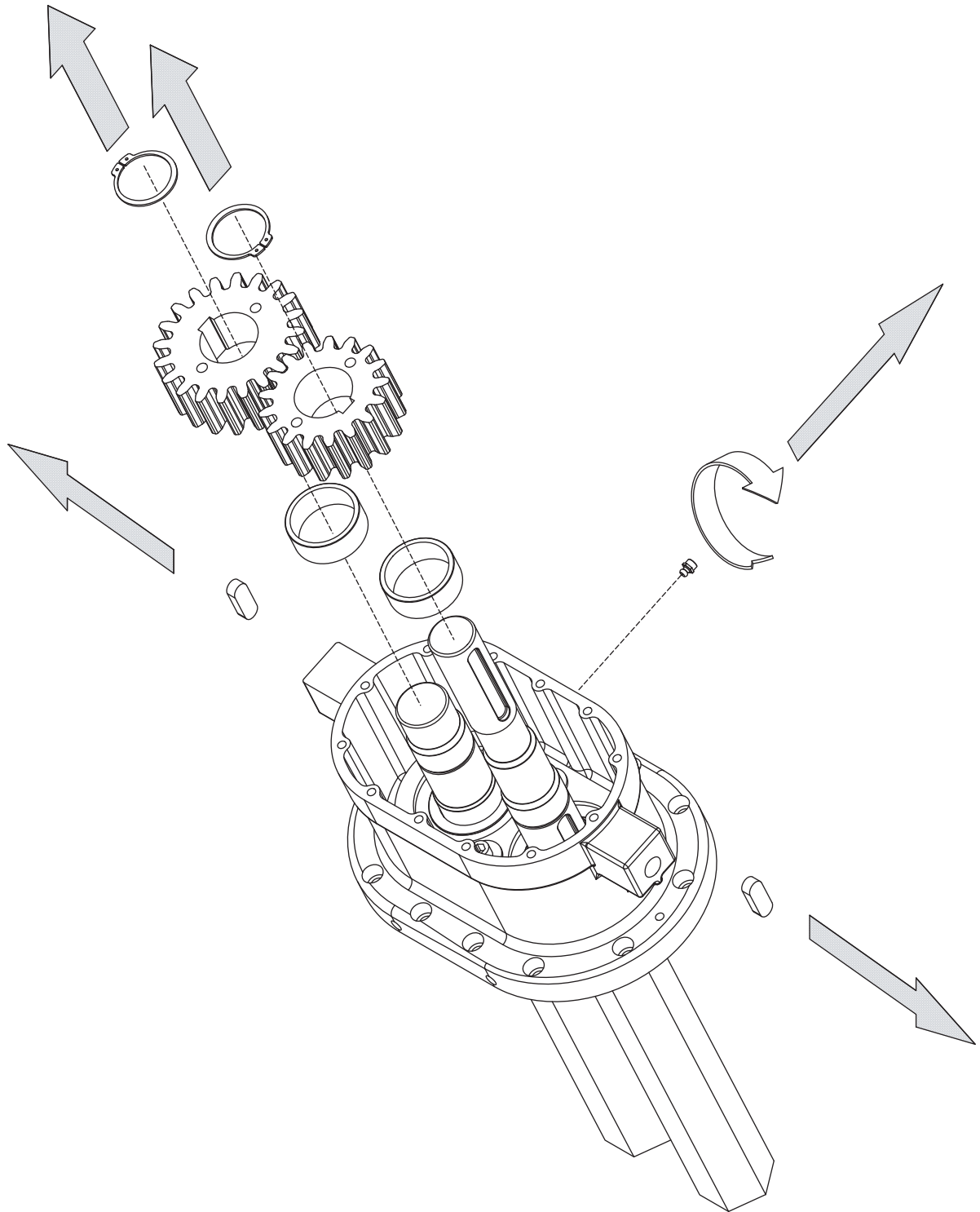
# Dismantling & Assembly Diagrams

CT201



# Dismantling & Assembly Diagrams

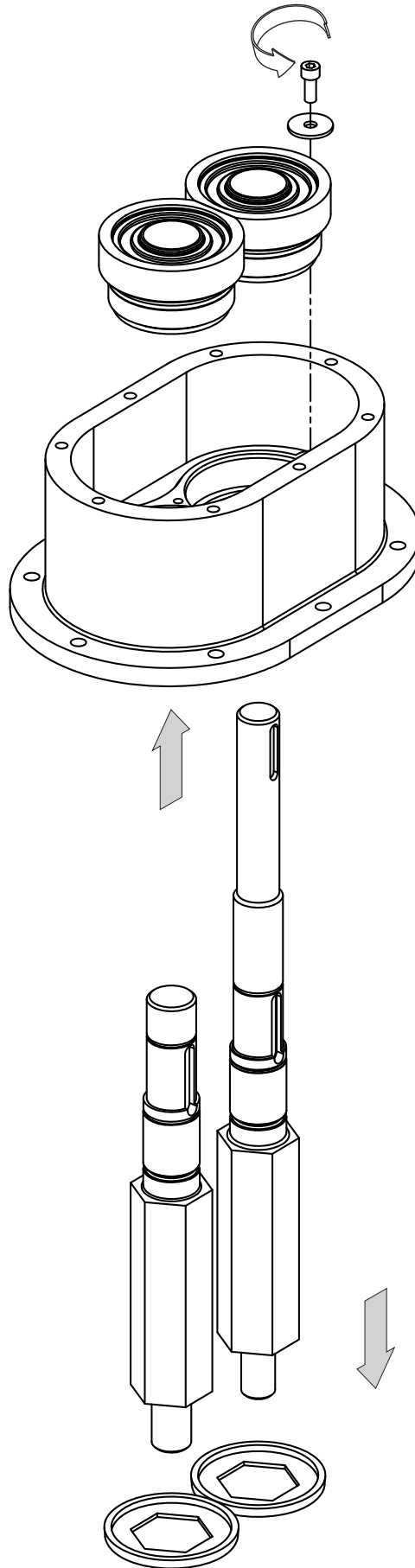
## CT203 & CT205





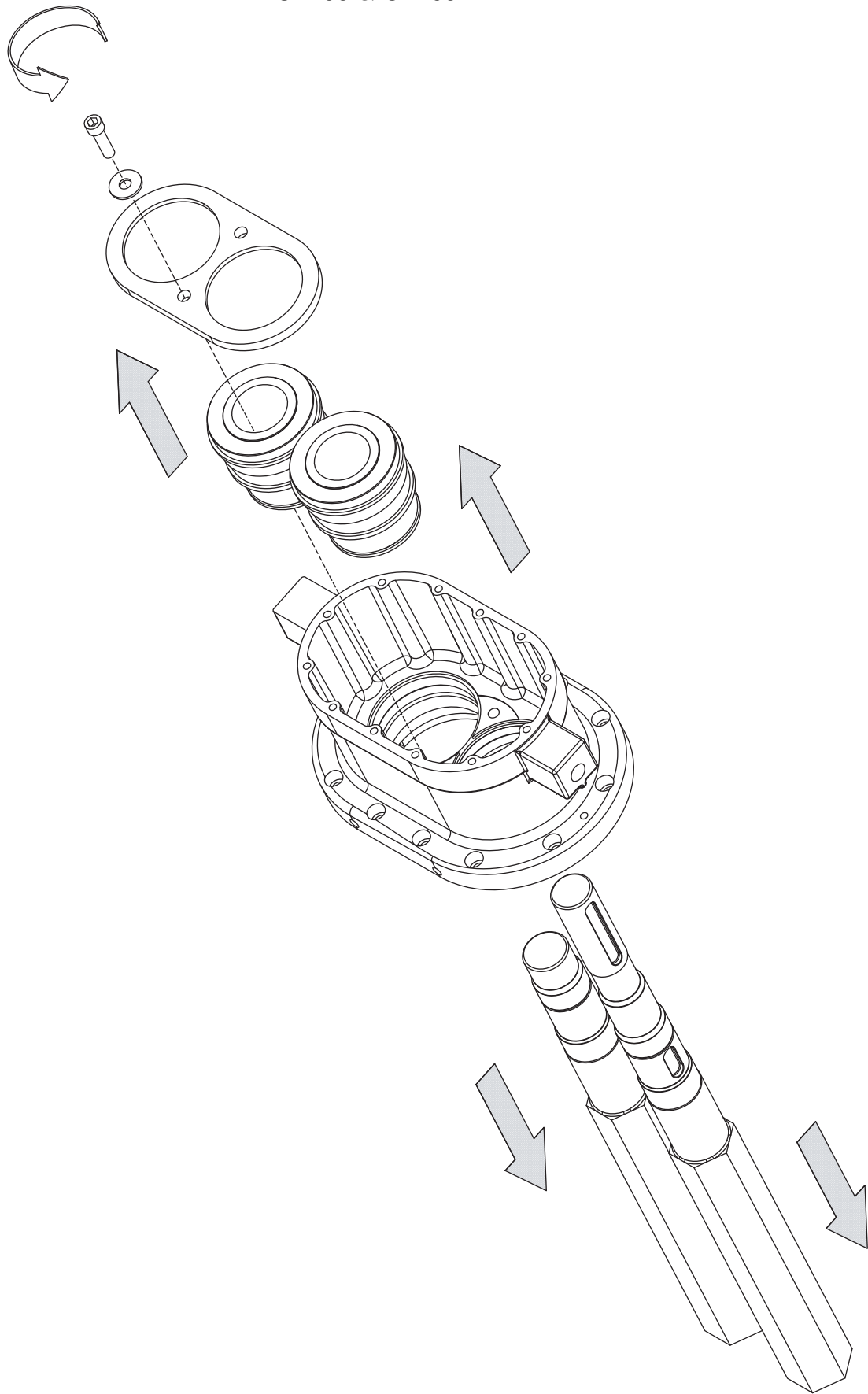
# Dismantling & Assembly Diagrams

CT201



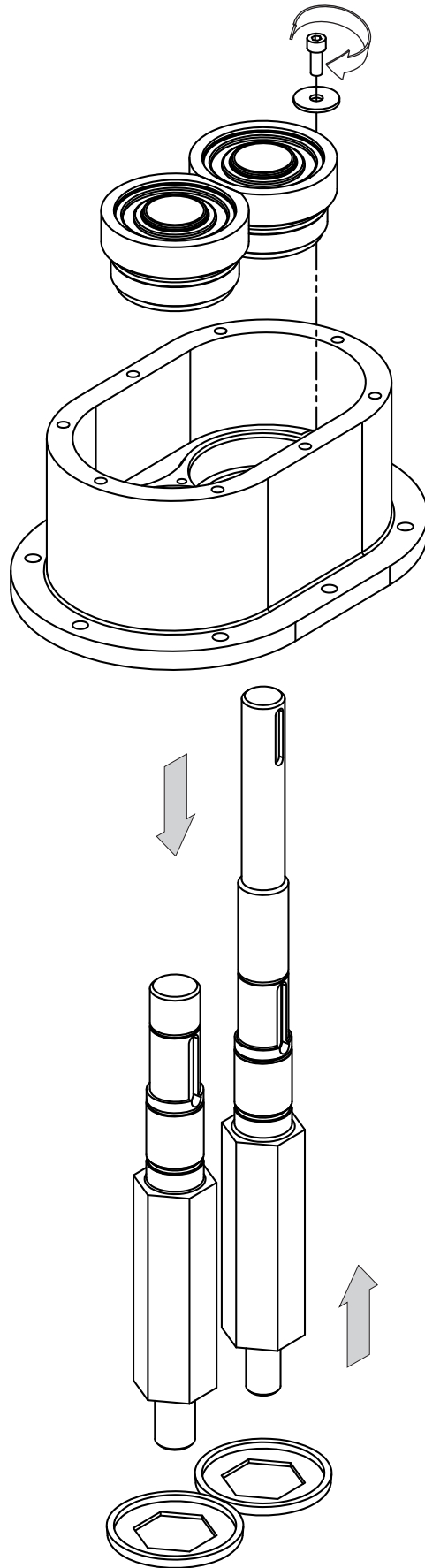
# Dismantling & Assembly Diagrams

CT203 & CT205



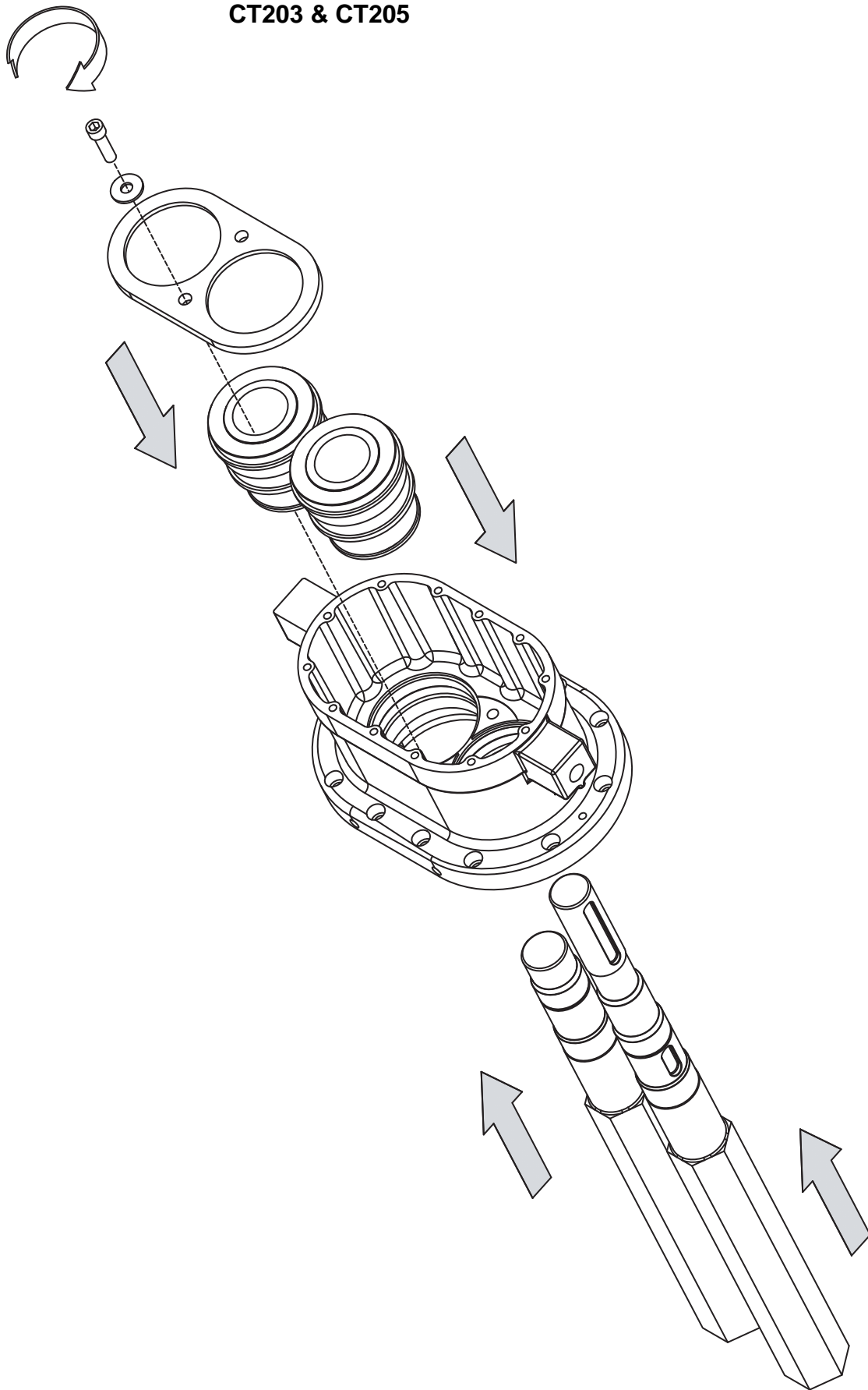
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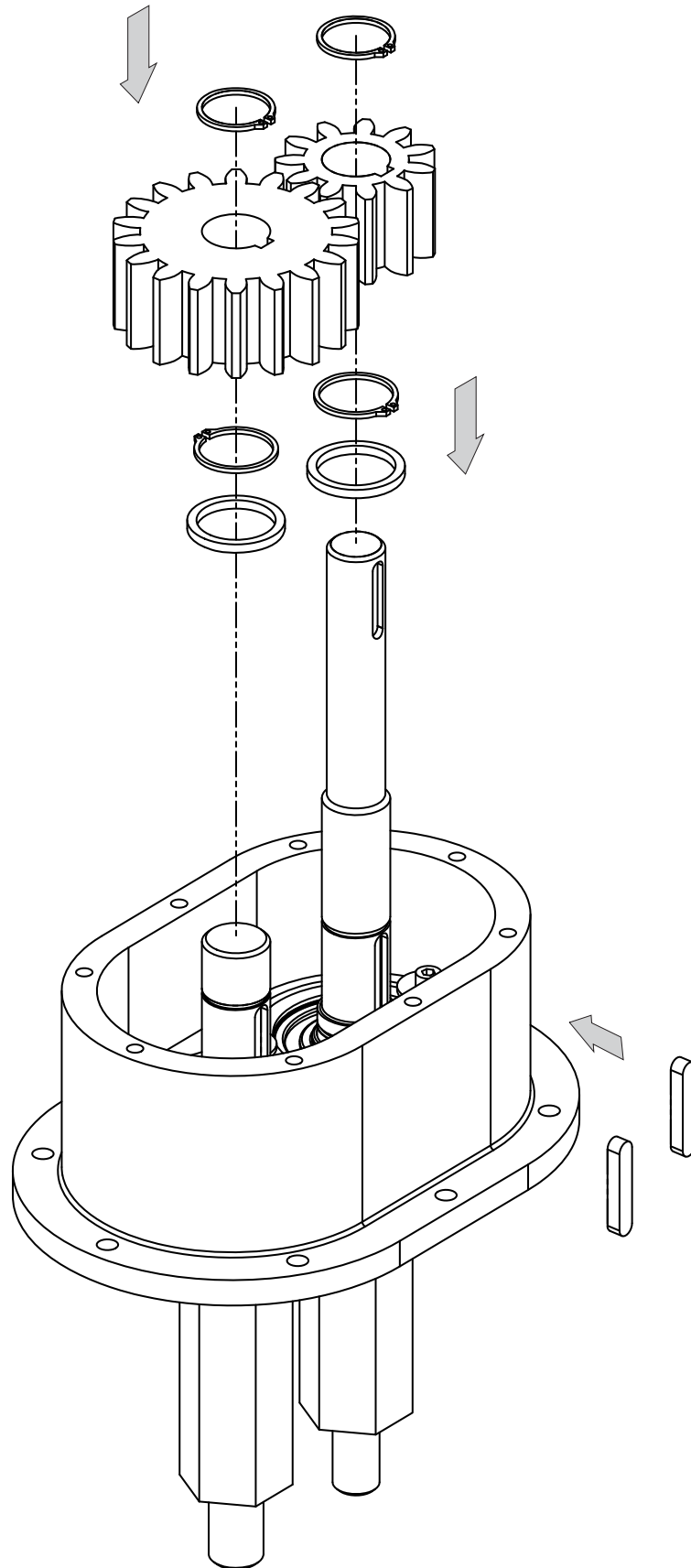
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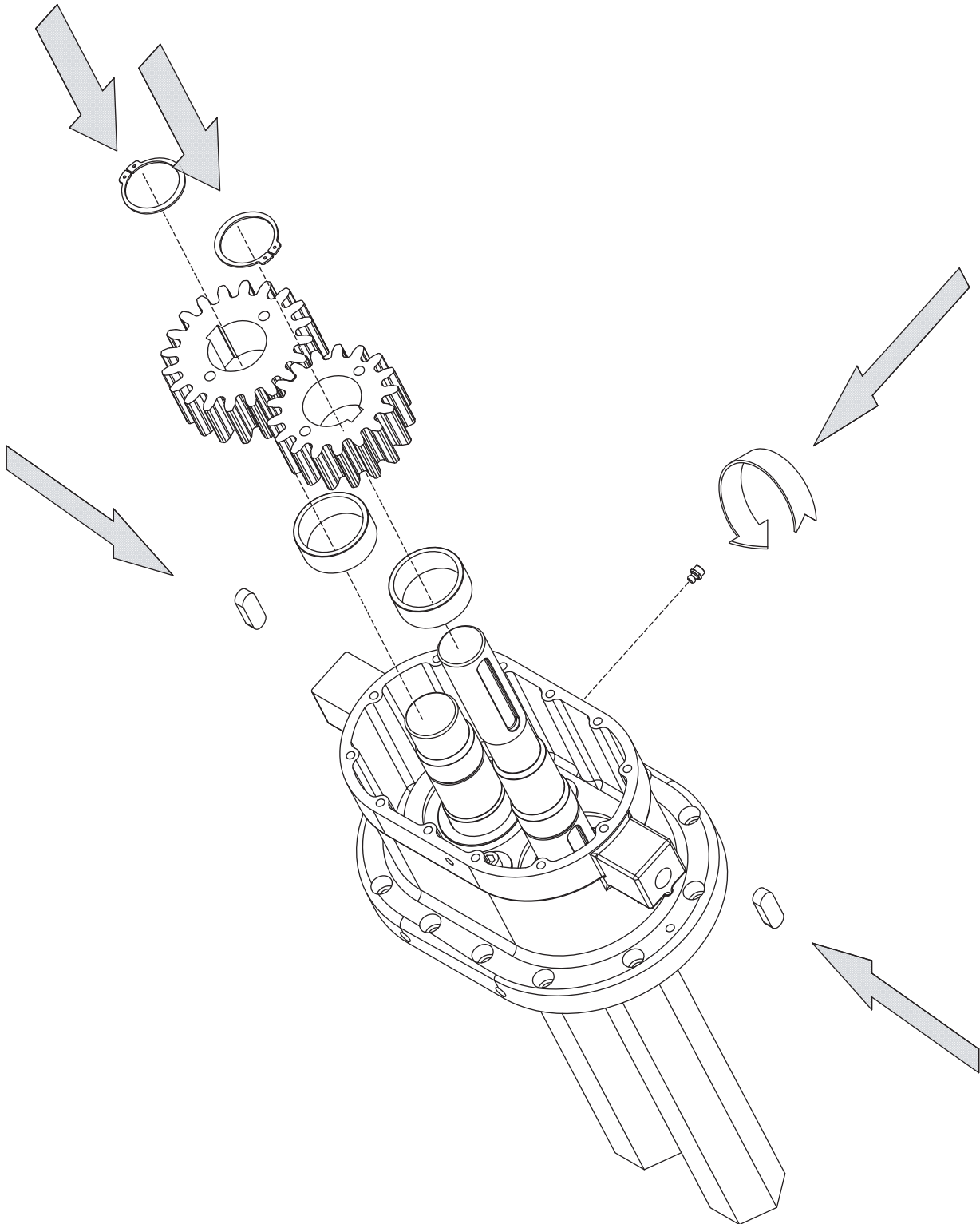
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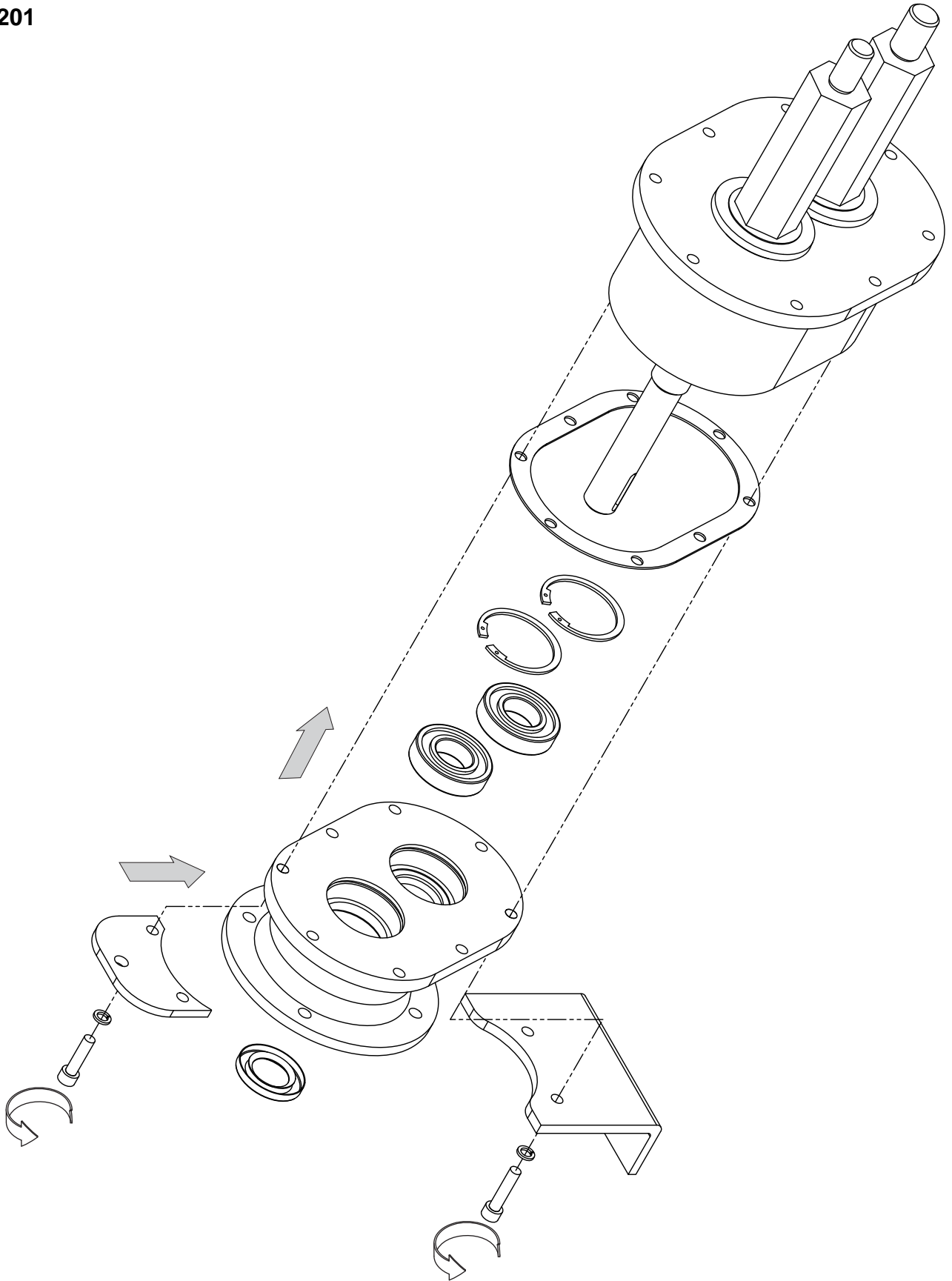
# Dismantling & Assembly Diagrams

CT203 & CT205



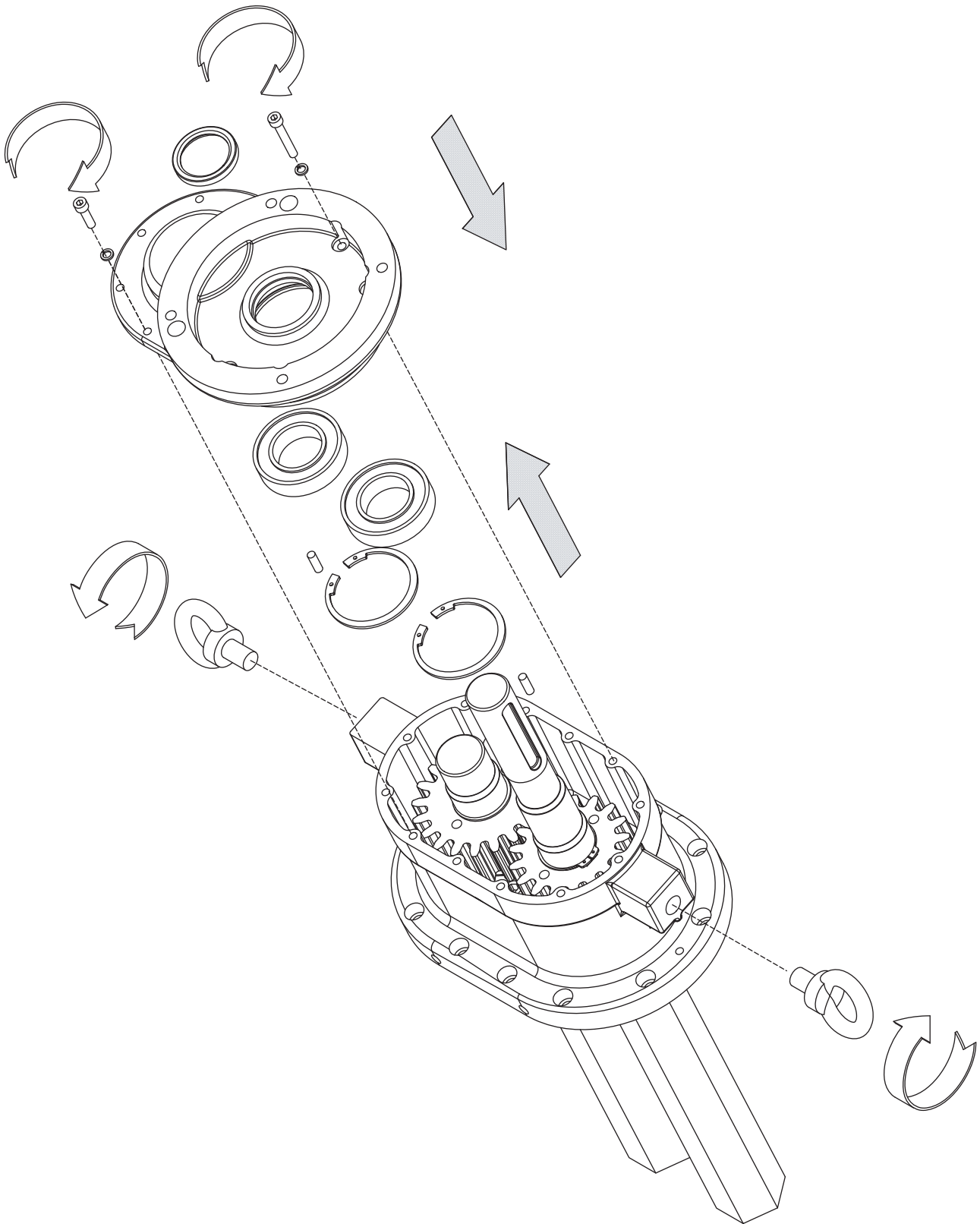
# Dismantling & Assembly Diagrams

CT201



# Dismantling & Assembly Diagrams

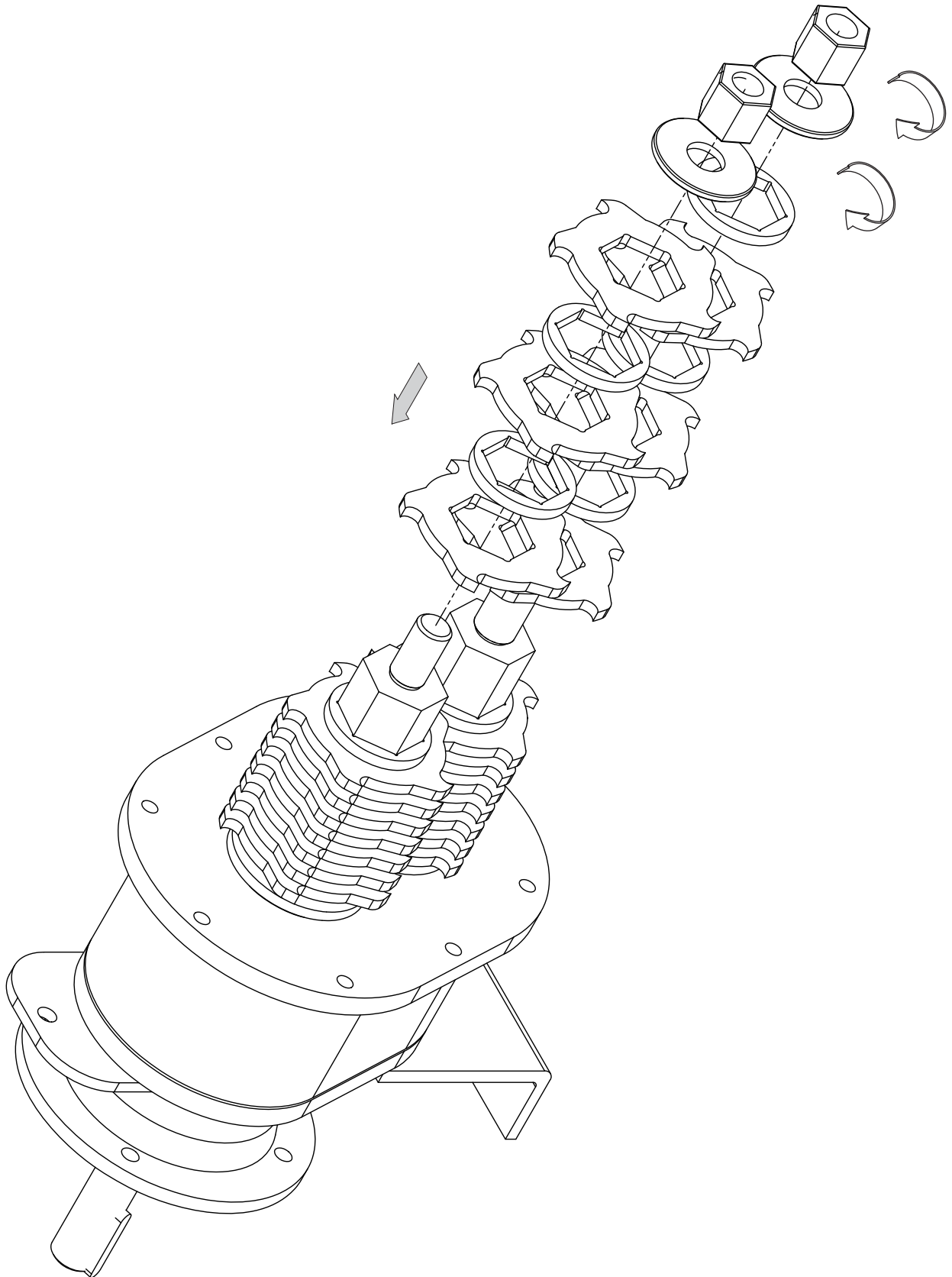
CT203 & CT205





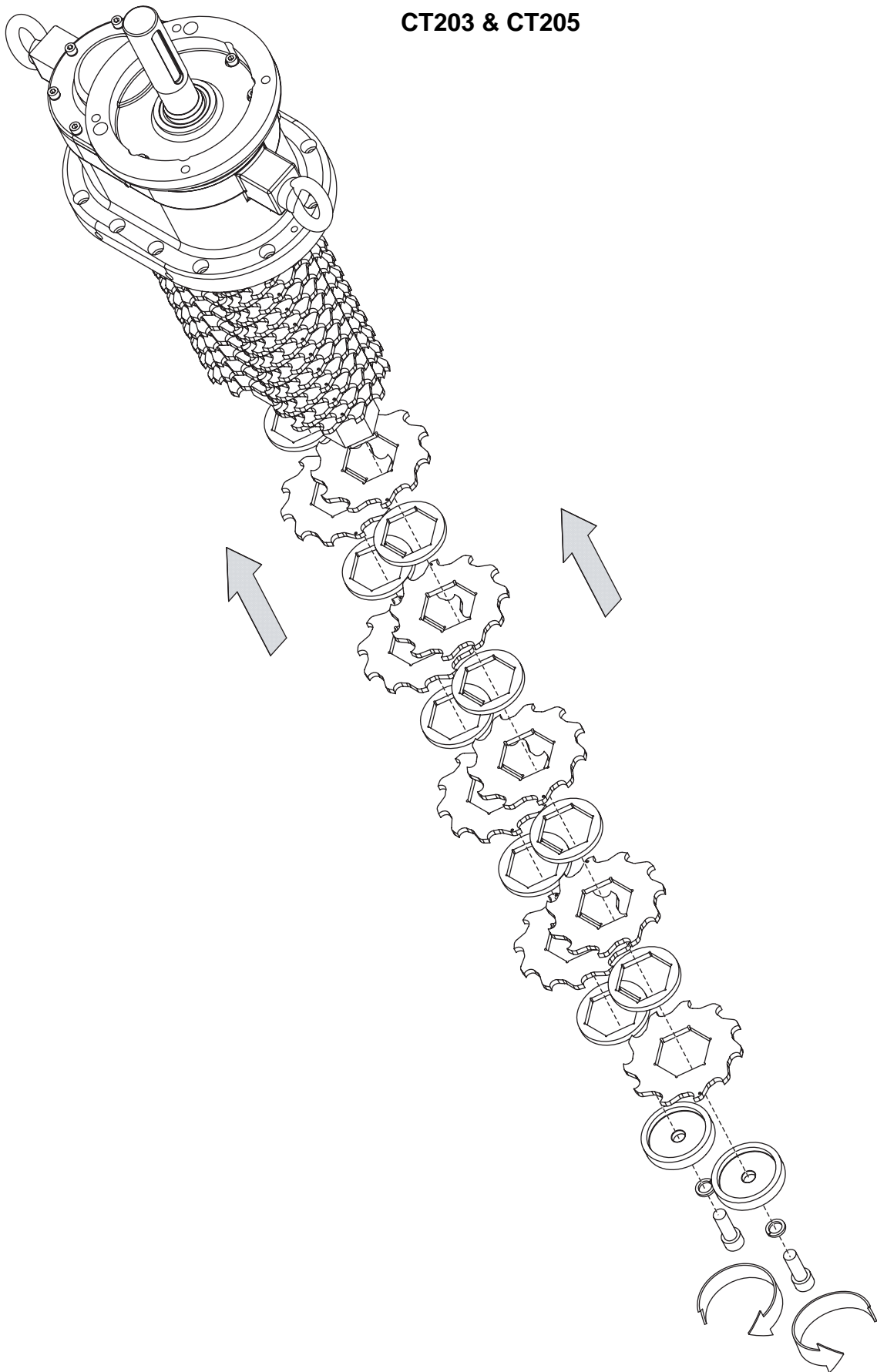
# Dismantling & Assembly Diagrams

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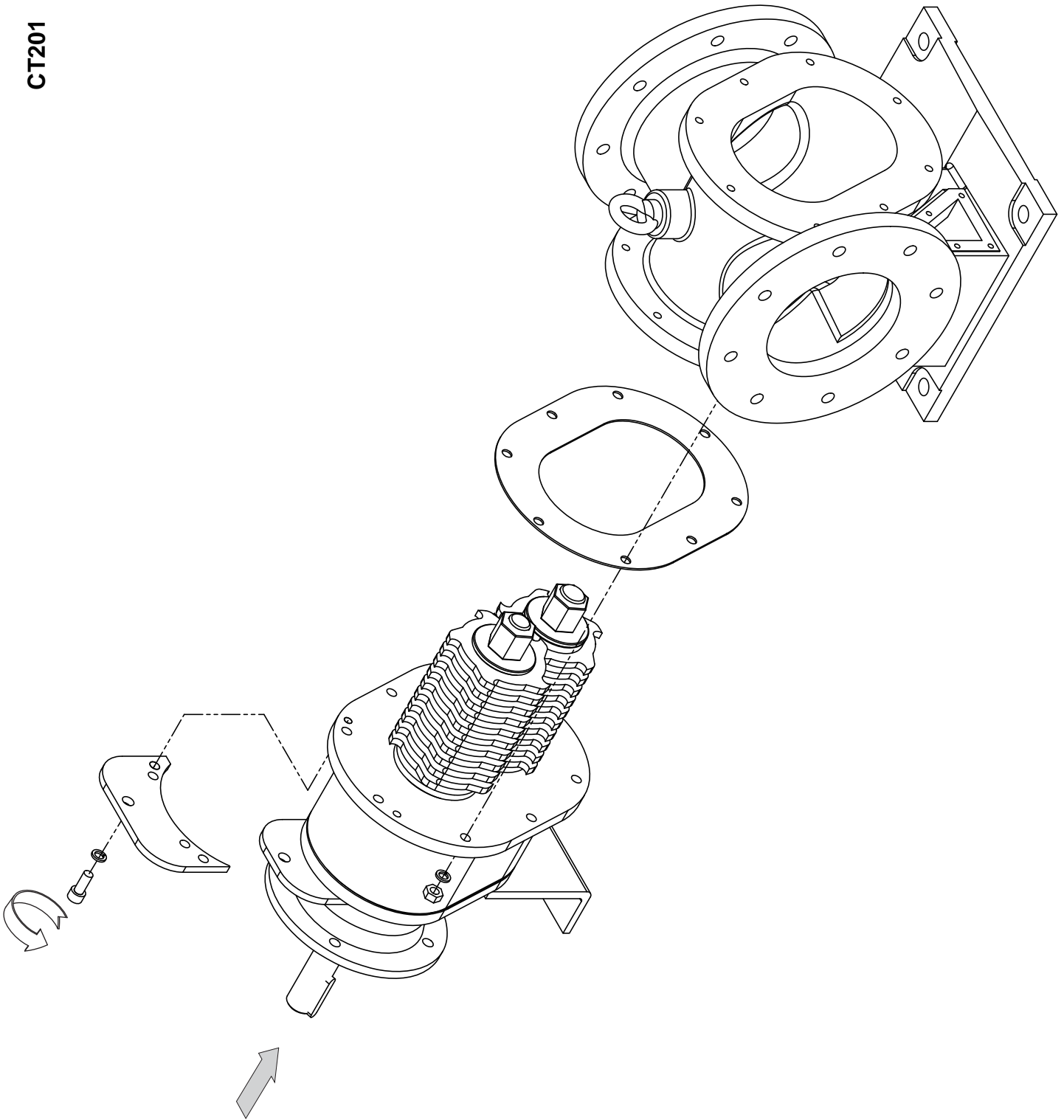
# Dismantling & Assembly Diagrams

CT203 & CT205



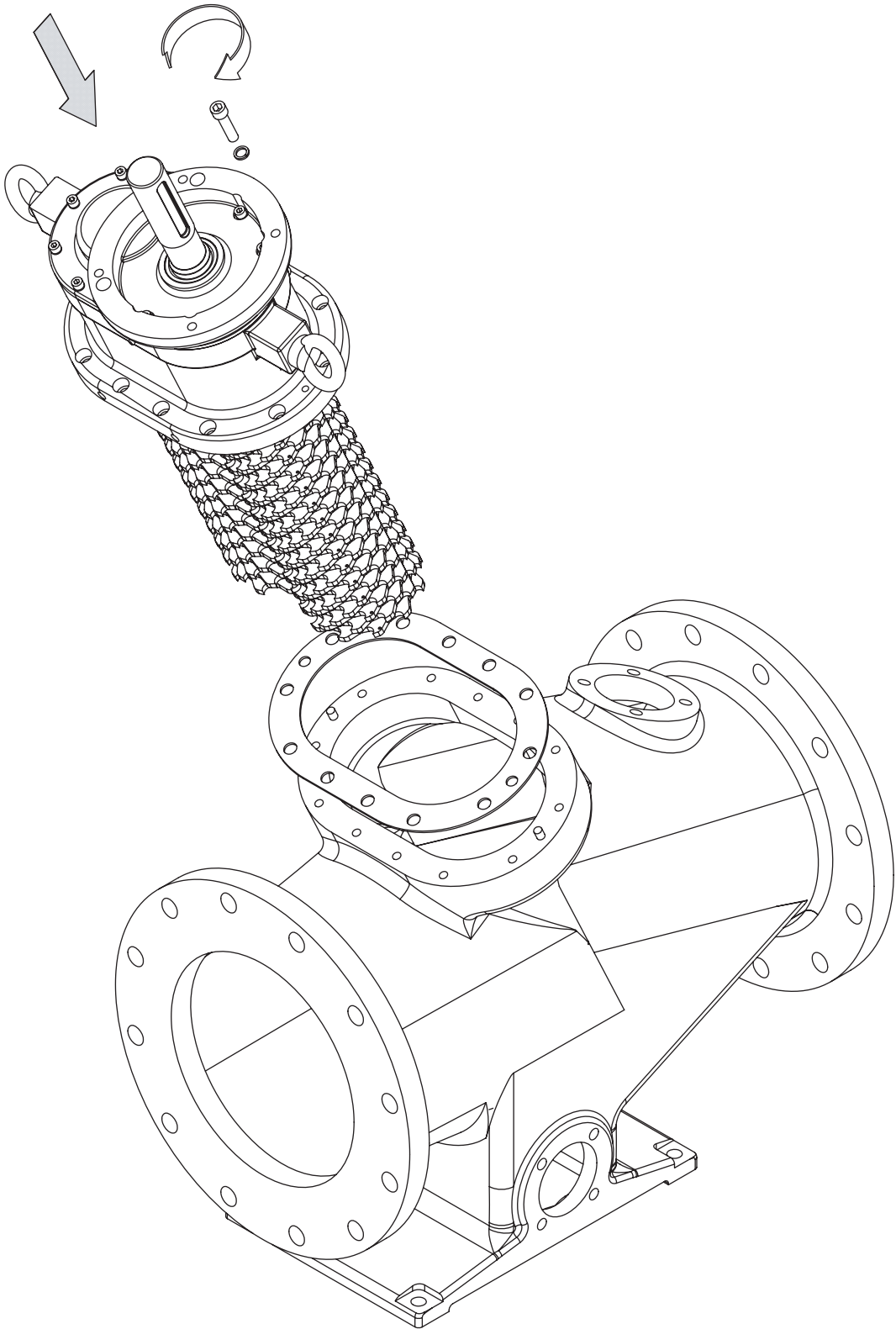
# Dismantling & Assembly Diagrams

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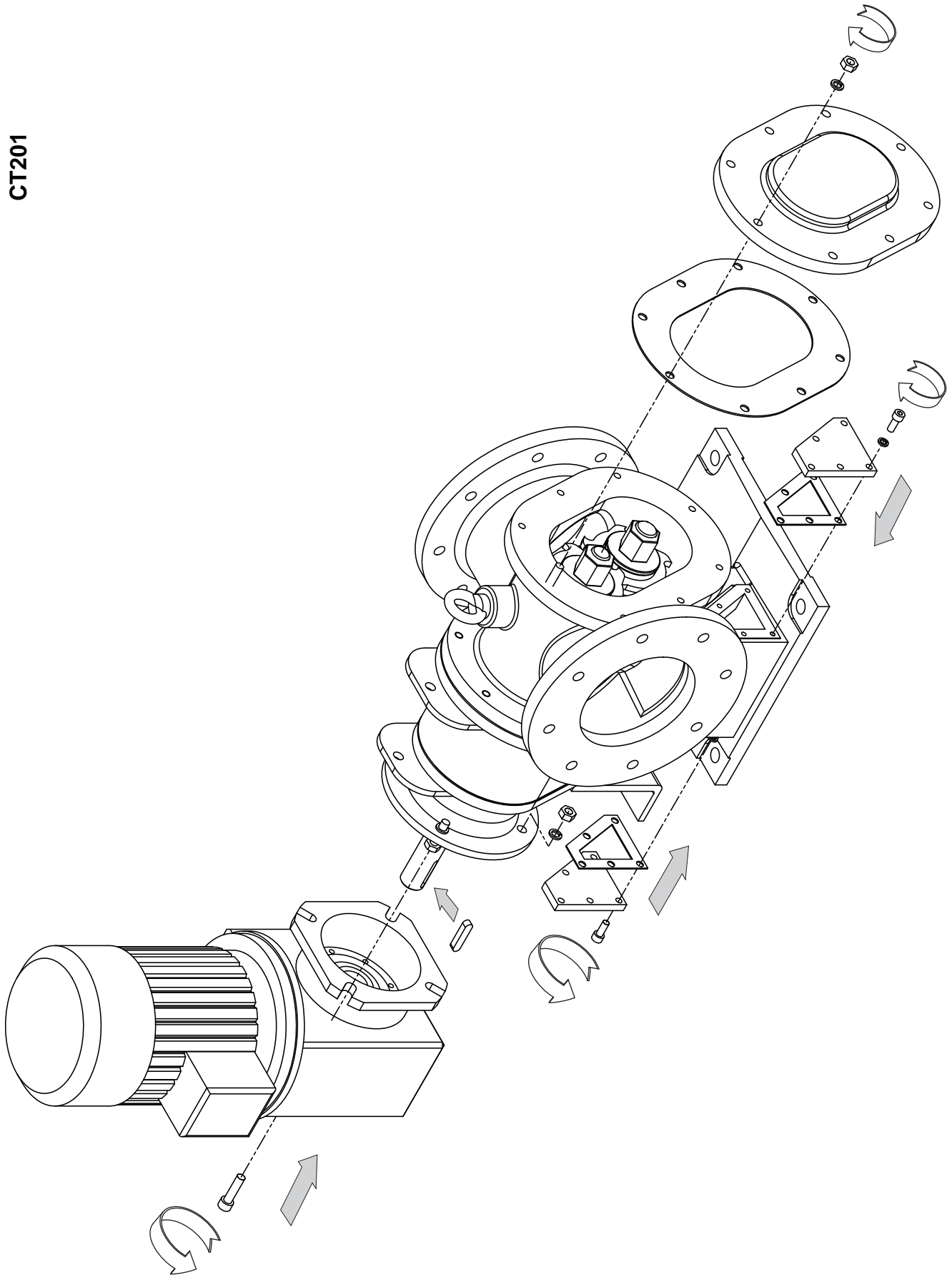
# Dismantling & Assembly Diagrams

CT203 & CT205



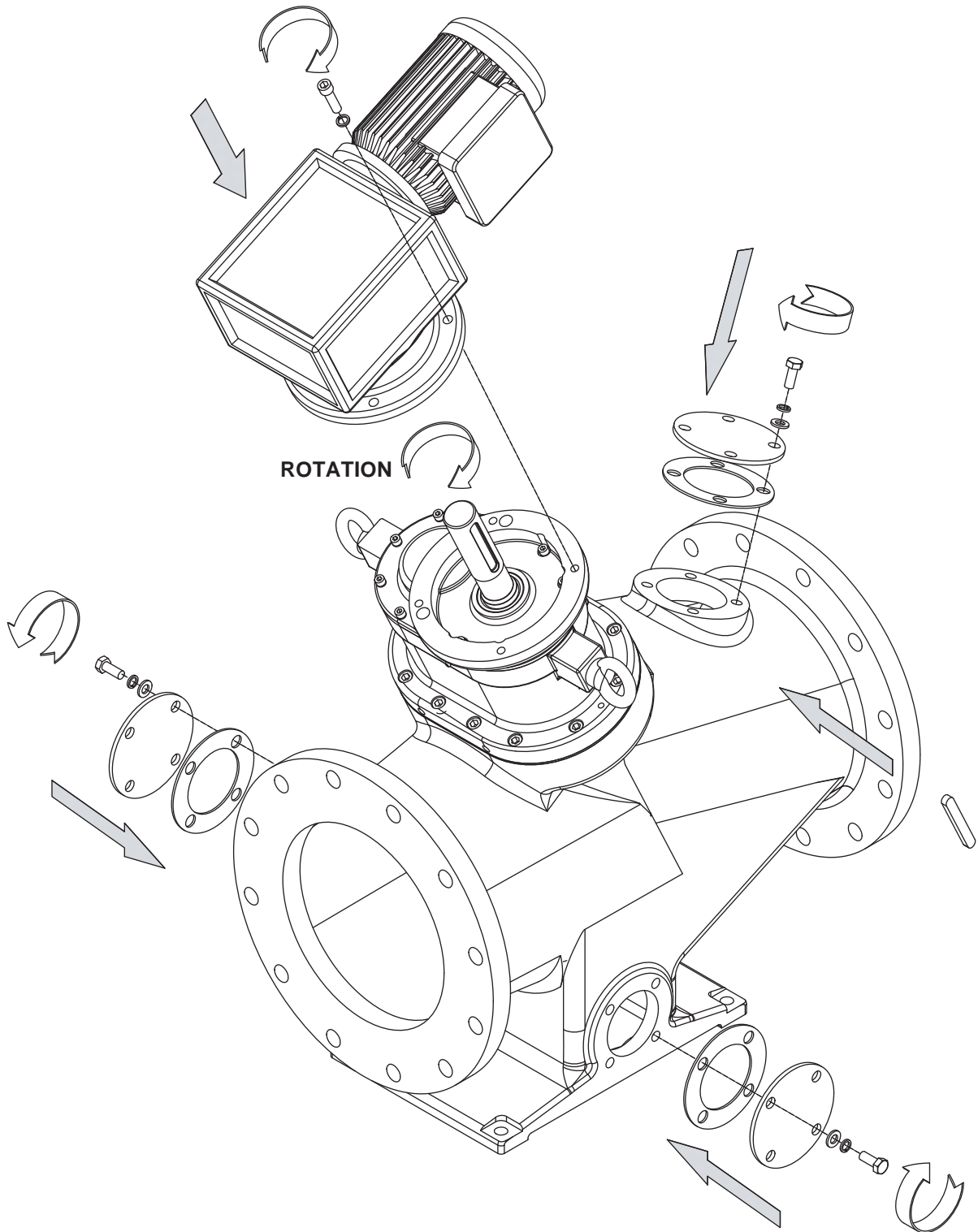
# Dismantling & Assembly Diagrams

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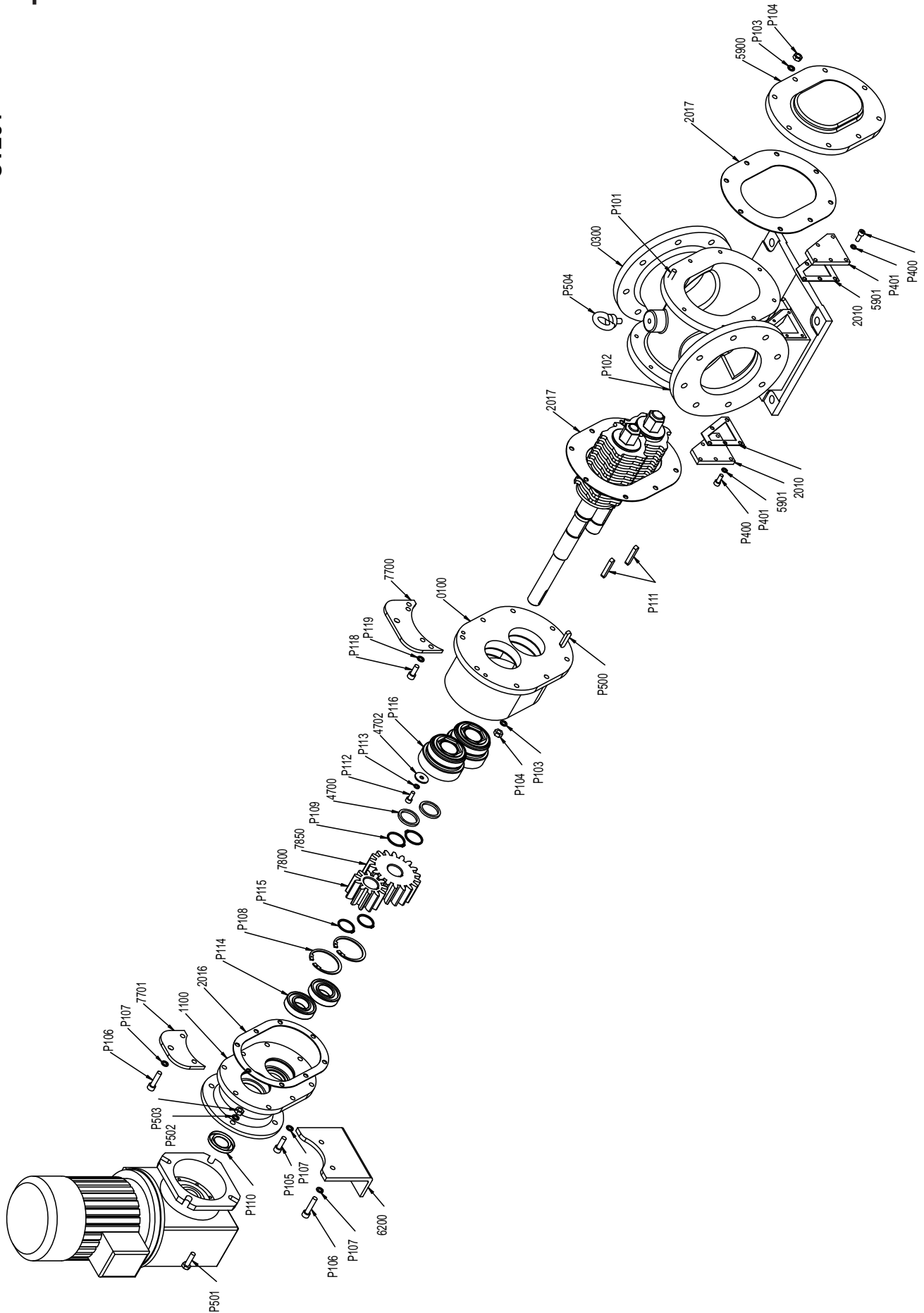
# Dismantling & Assembly Diagrams

CT203 & CT205



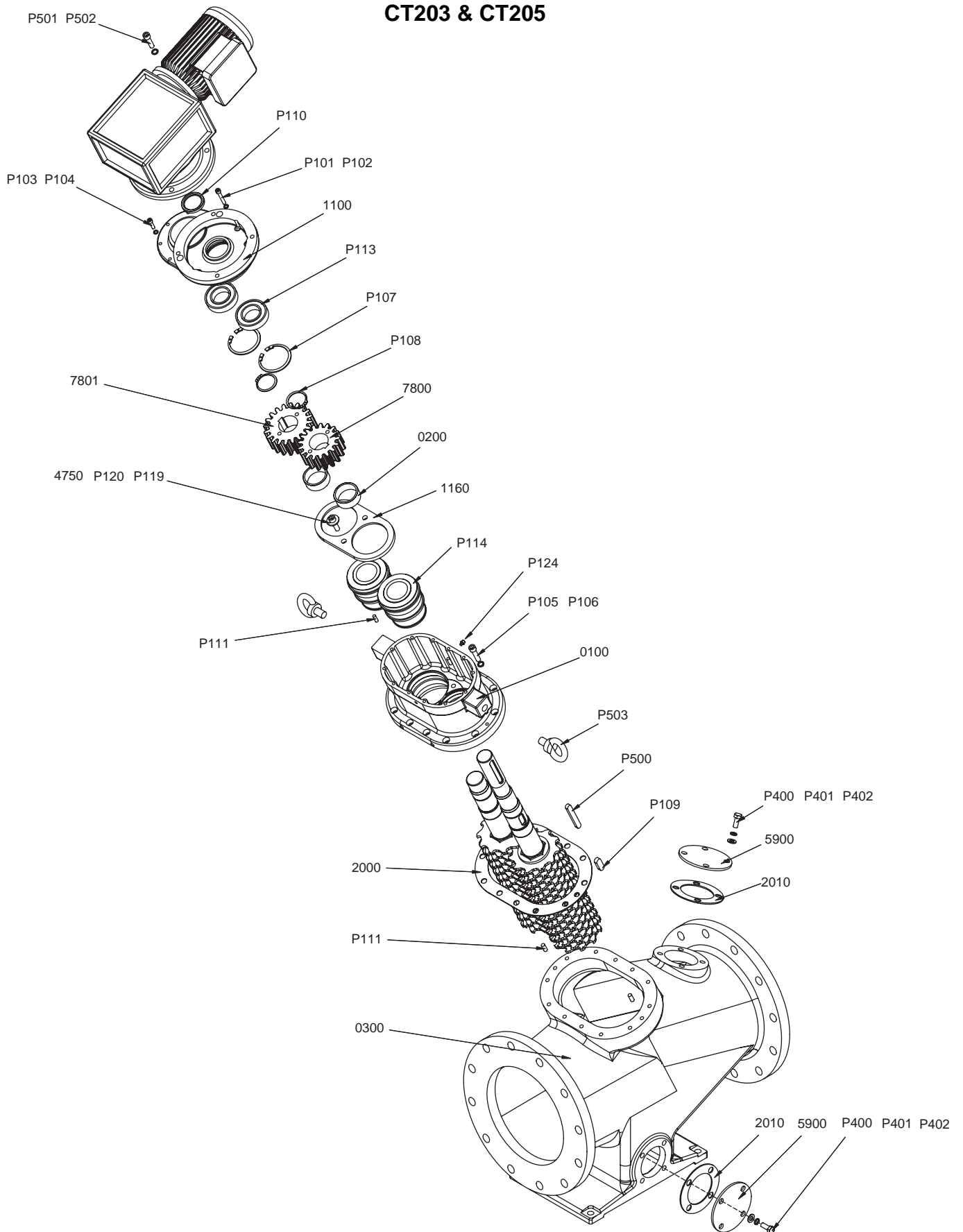
# Exploded Views

CT201



# Exploded Views

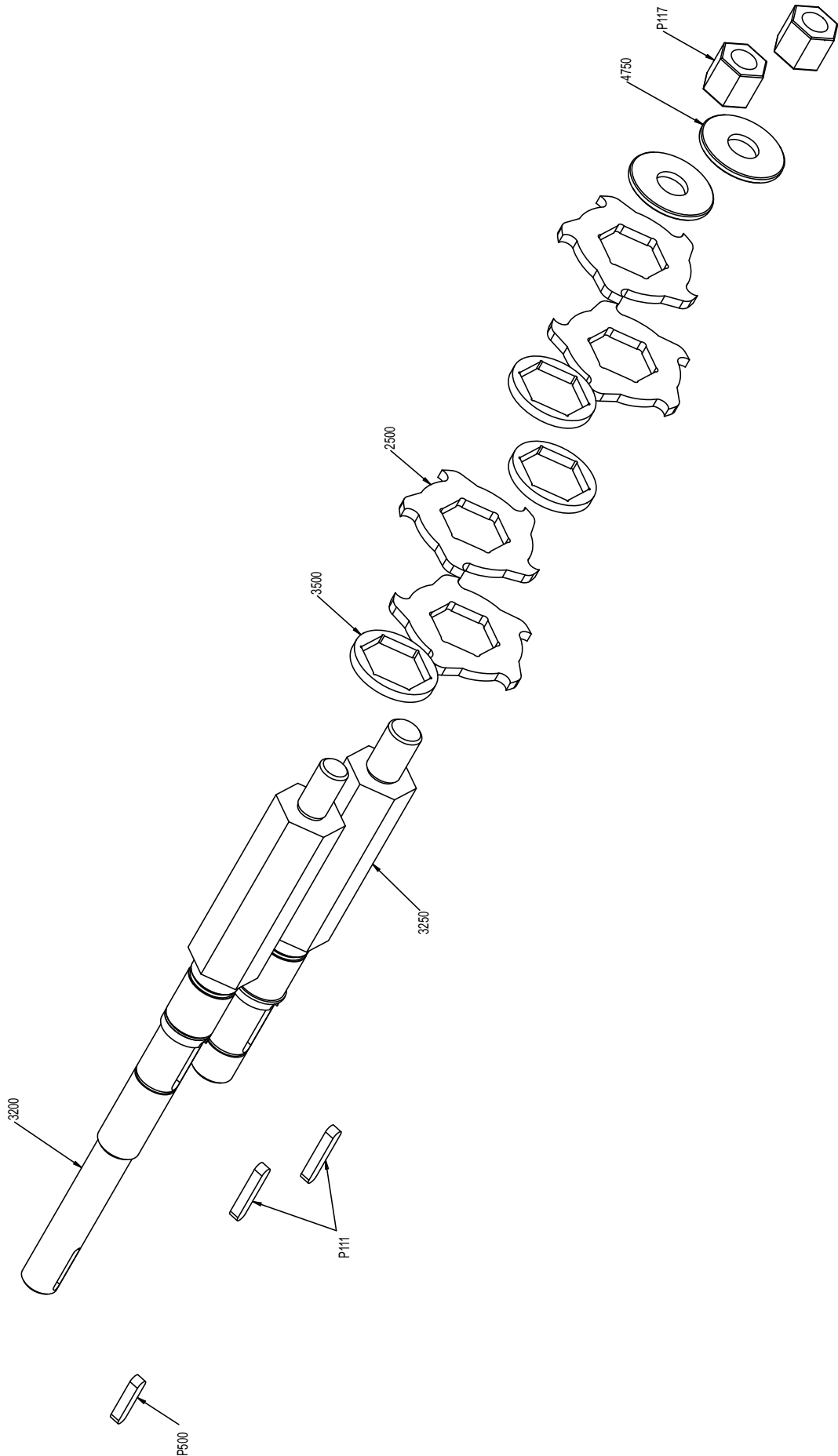
## CT203 & CT205



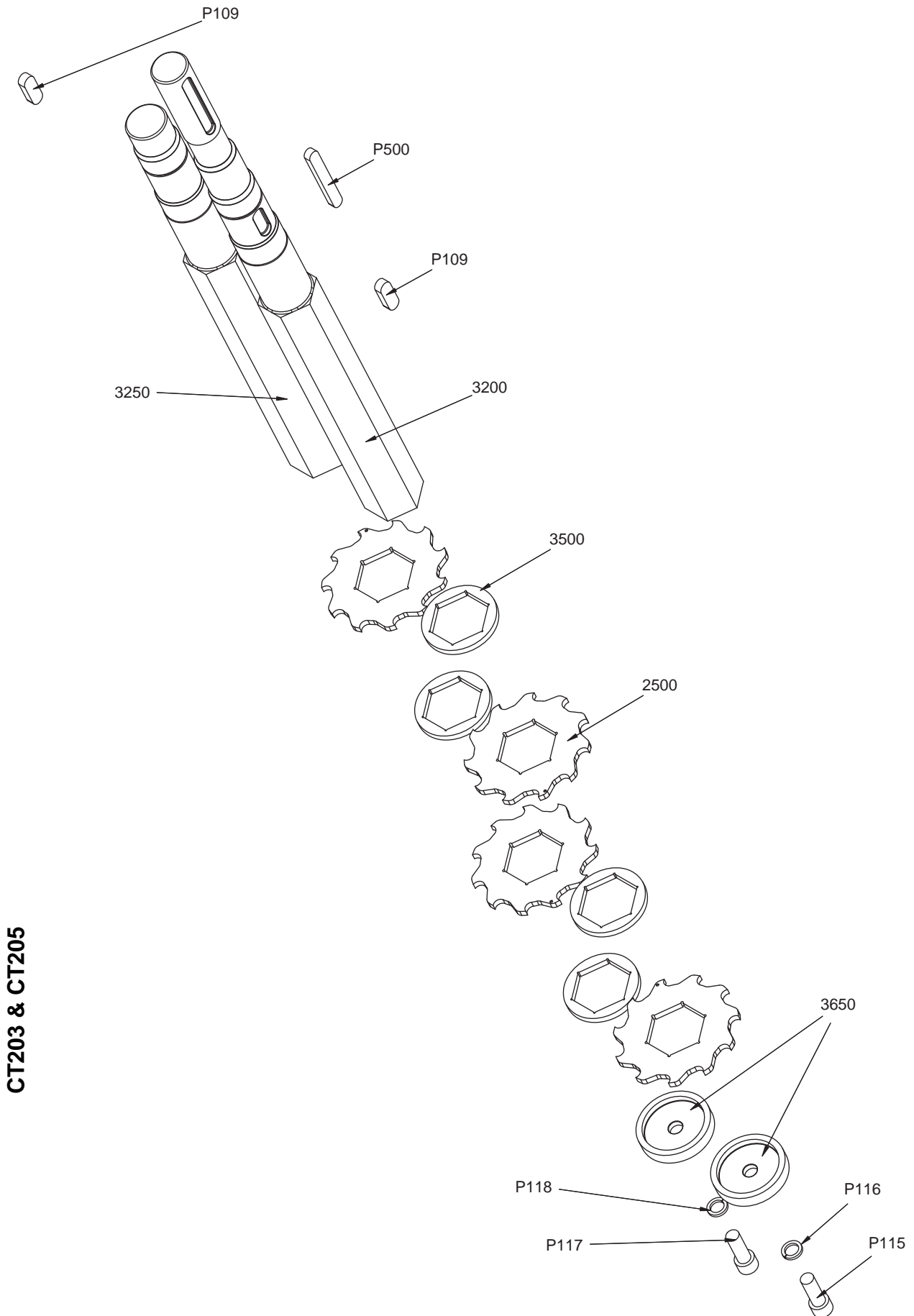


# Exploded Views

CT201



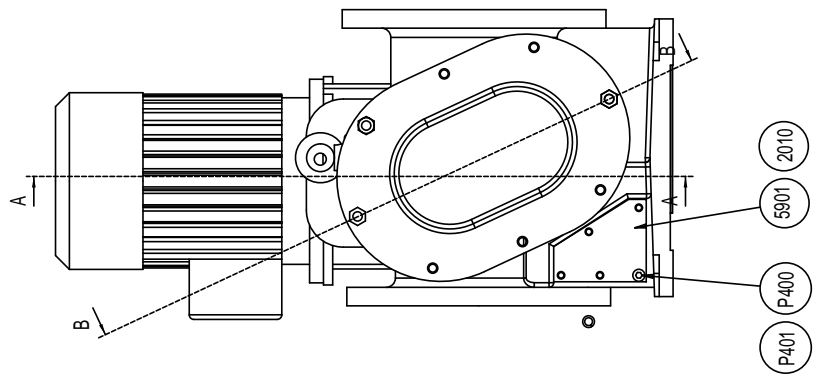
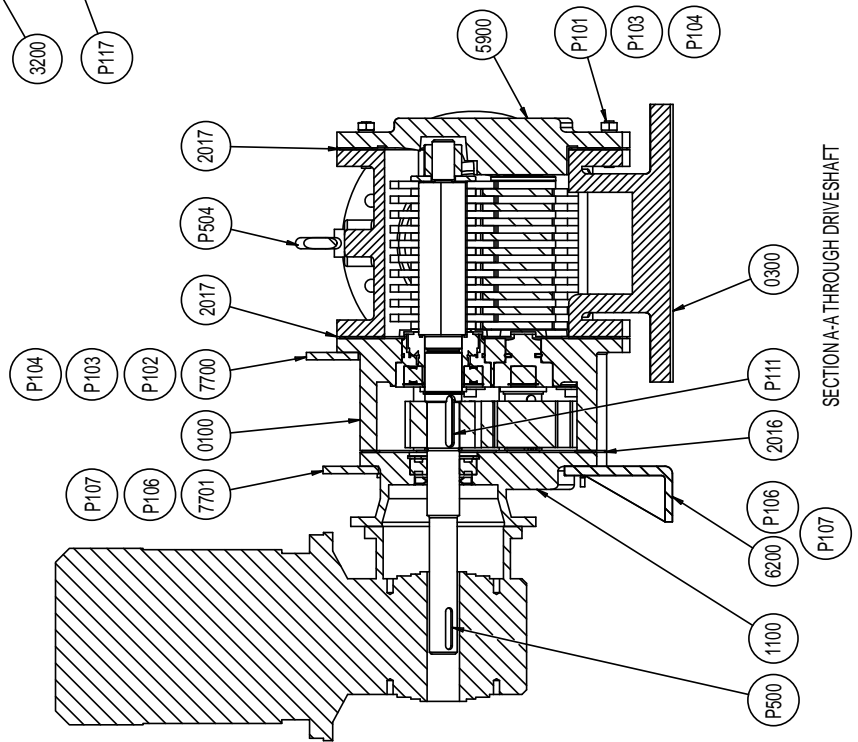
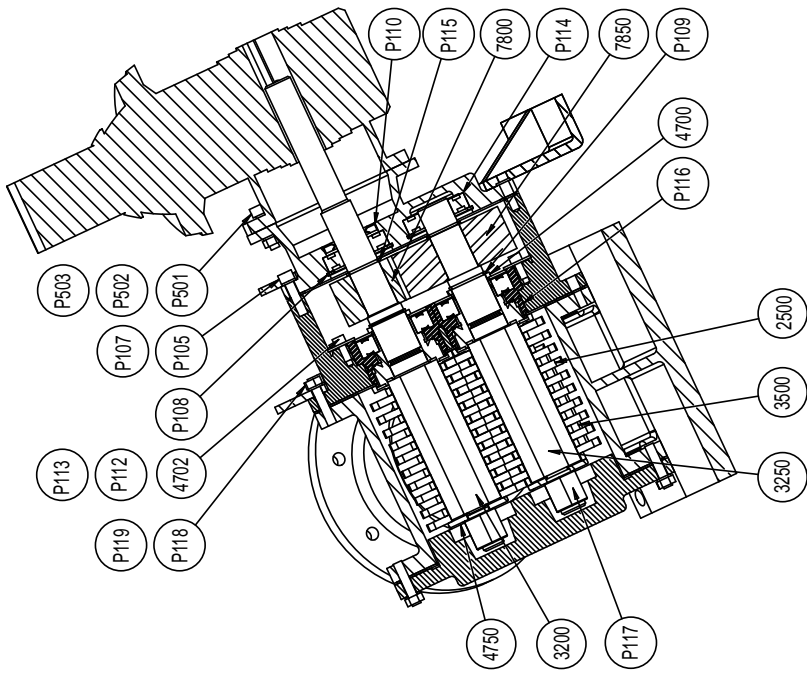
# Exploded Views



CT203 & CT205

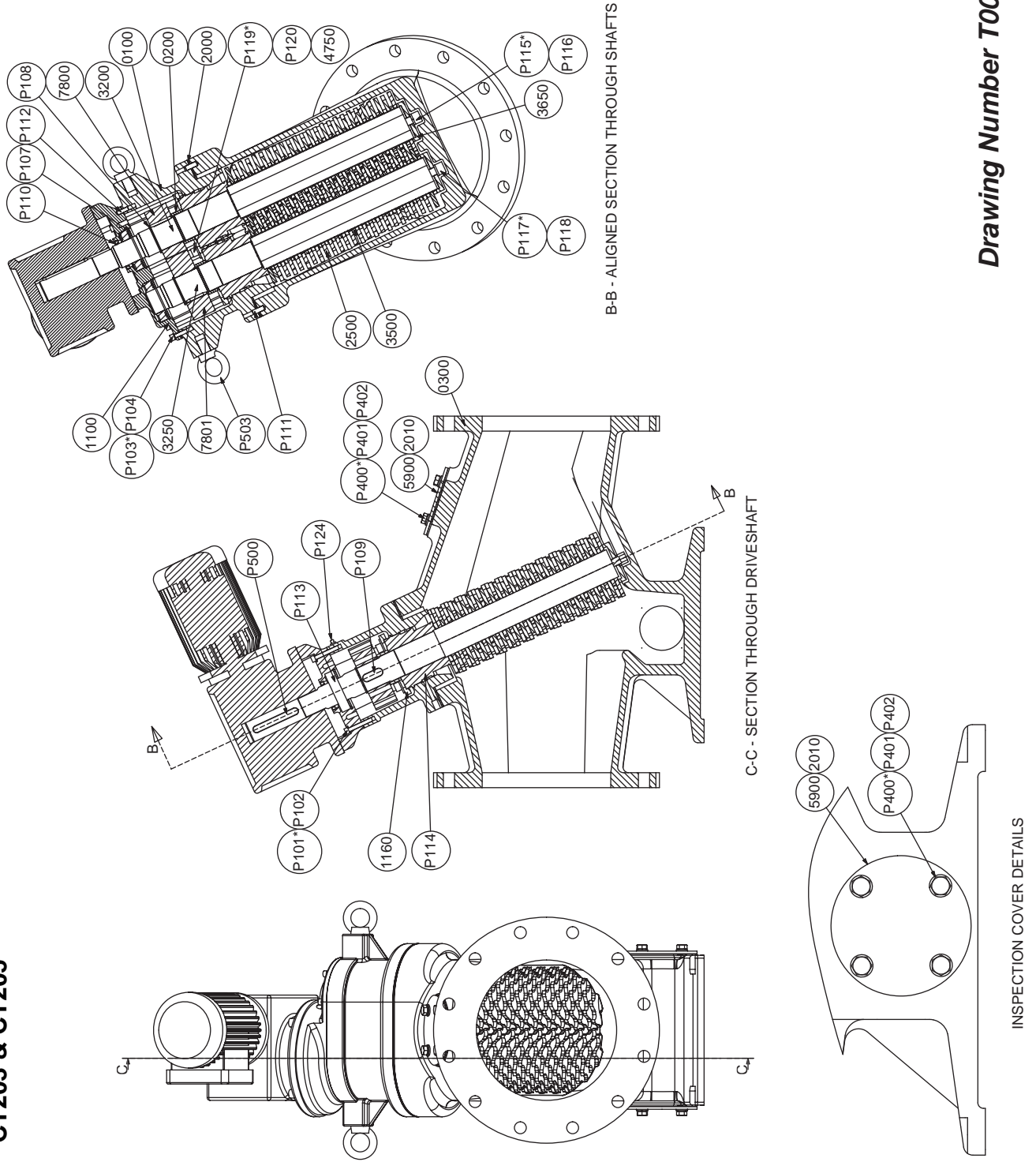
# Sectional Arrangement

CT201



# Sectional Arrangement

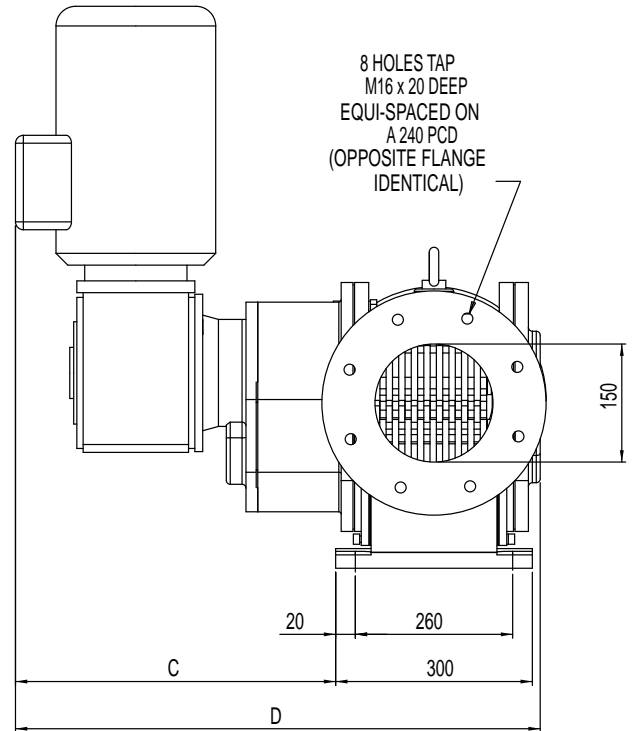
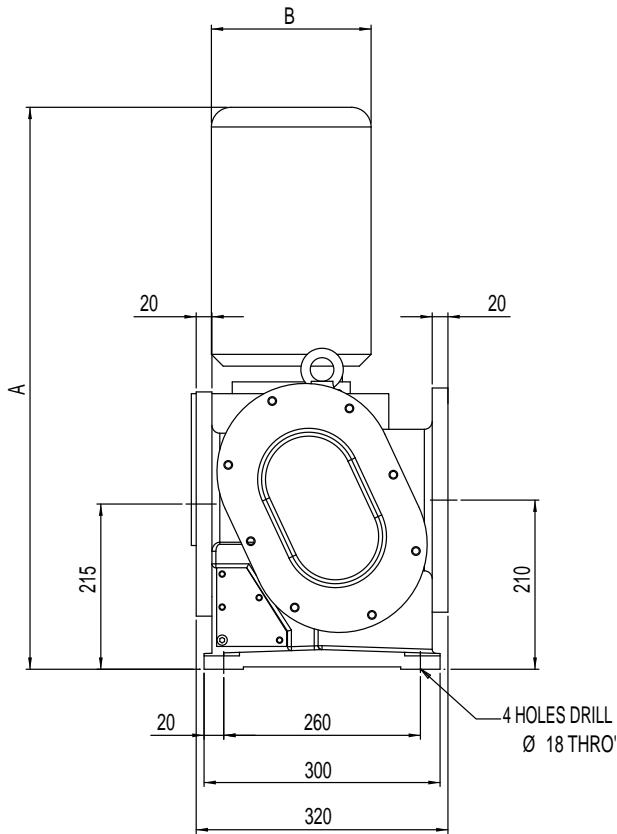
CT203 & CT205



Drawing Number T000 9800

# General Arrangement

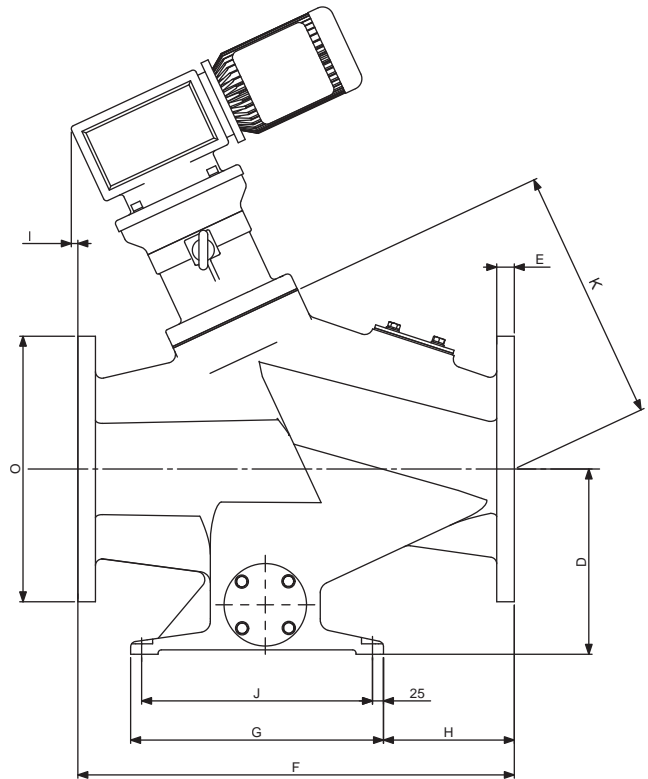
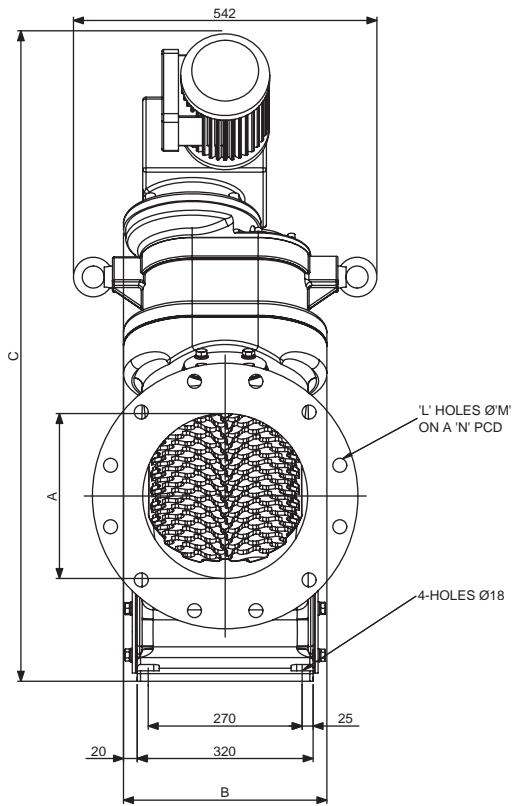
## CT201



Model No	kW	A	B	C	D	Wt Kg (Approx)
CT201D	1.5	700	186	382	682	140
CT201D	2.2	715	203	382	682	175

# General Arrangement

## CT203 & CT205



DIMS. IN mm

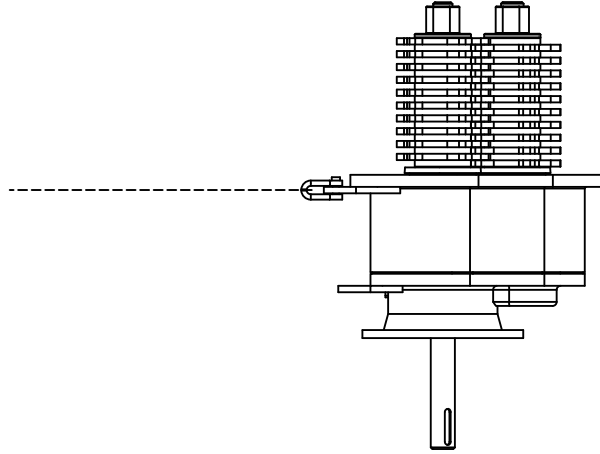
MODEL No.	kW	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Wt. Kg
CT203C	1.5	100	370	1020	205	24	489	410	124	140	360	363	8	18	180	220	290
CT203D		150	370	1050	230	25	540	410	155	40	360	354	8	22	240	285	290
CT203E		200	370	1050	256	29	591	410	205	16	360	341	12	22	295	343	290
CT205F		250	370	1190	281	32	692	460	205	30	410	494	12	26	355	406	345
CT205G		300	370	1190	332	32	794	460	263	-17	410	472	12	26	410	483	345
CT203C	2.2 - 4.0	100	395	1130	205	24	489	410	124	169	360	363	8	18	180	220	340
CT203D		150	395	1170	230	25	540	410	155	97	360	354	8	22	240	285	340
CT203E		200	395	1170	256	29	591	410	205	72	360	341	12	22	295	343	340
CT205F		250	395	1310	281	32	692	460	205	87	410	494	12	26	355	406	390
CT205G		300	395	1310	332	32	794	460	263	40	410	472	12	26	410	483	390

FLANGES DRILLED TO BS 4504 PN16

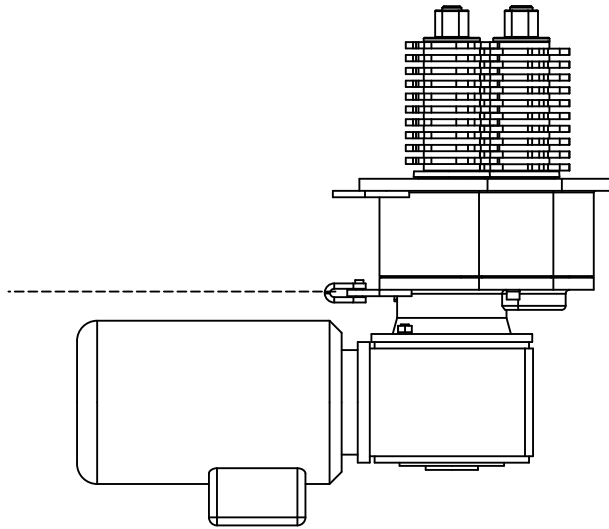
**Drawing Number T000 9900**

# Lifting & Guarding Diagrams

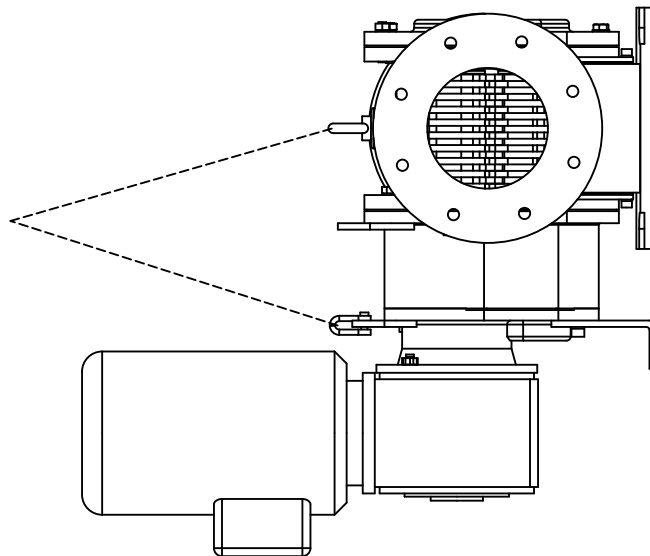
CT201



Cartridge Without Drive

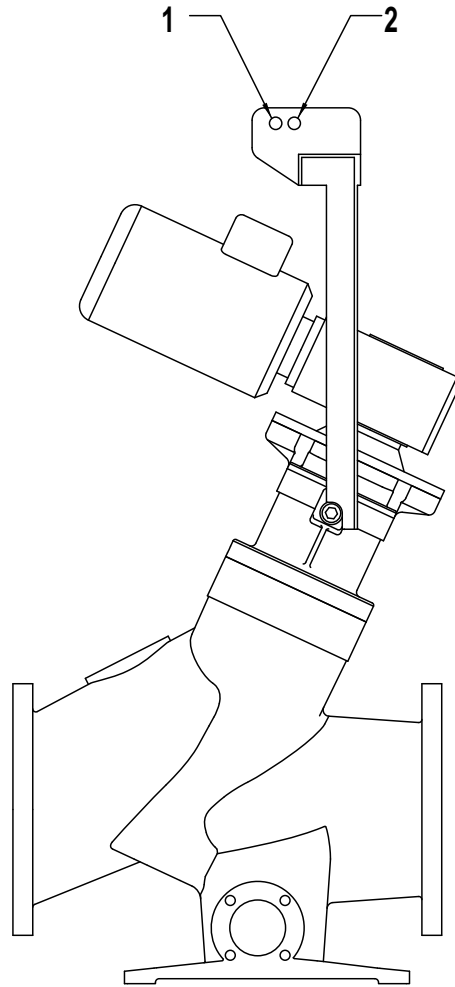


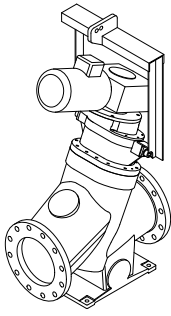
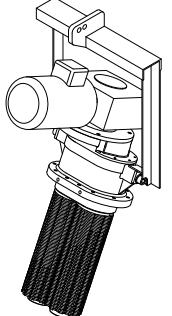
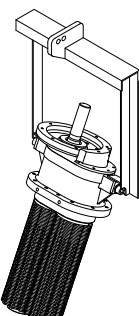
Cartridge With Drive



Full Muncher Assembly

# Lifting & Guarding Diagrams



			
<b>CT203</b>			
<b>CT205</b>			



#### **UK and Europe**

Mono Pumps Ltd, Martin Street, Audenshaw  
Manchester, M34 5JA, England  
T. +44 (0)161 339 9000  
E. info@mono-pumps.com

#### **Americas**

NOV Monoflo, 9606 Kirkton  
Houston, Texas 770495, USA  
T. +1 281 200 1200  
E. inquire@monoflo.com

#### **Monoflo SA**

Ing. Huergo 2239 - B1842GGW  
Monte Grande  
Buenos Aires  
Argentina  
T. +54 4296 8997  
F. +54 4284 0323  
E. inquire@monoflo.com

#### **Australasia**

Mono Pumps (Australia) Pty Ltd  
Mono House, 338-348 Lower Dandenong Road  
Mordialloc, Victoria 3195, Australia  
T. +61 (0)3 9580 5211  
E. ozsales@mono-pumps.com

Mono Pumps (New Zealand) Ltd  
PO Box 71-021, Fremlin Place, Avondale  
Auckland 7, New Zealand  
T. +64 (0)9 829 0333  
E. info@mono-pumps.co.nz

#### **Asia**

Mono Pumps Ltd, No. 500 YaGang Road  
Lujia Village, Malu, Jiading District  
Shanghai 201801, P.R. China  
T. +86 (0)21 5915 7168  
E. monoshanghai@nov.com

[www.mono-pumps.com](http://www.mono-pumps.com)



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