English

Original Instructions

Installation, Operation and Maintenance Instructions

Series A Muncher - Mono™

OMMP/061/01
Rev 3, January 2019

Index

Revisions

Rev.	Date dd/mm/yy	Reason for Issue	Prepared By	Checked By	Approved By
1	24/01/2017	Re-numbered from WD001. Updated EC Declaration & added Authorised Distributors List	M. Bailey	M. Davies	A. Morris
2	09/10/2018	Updated adaptor stool part numbers on page 54. Removed Distributor pages & added link to website for current distributors on Spares and Service Contacts page.	M. Bailey	M. Bailey	M. Bailey
3	18/01/2019	Section 3.0 added for Disposal	M. Bailey	M. Bailey	M. Bailey
4					
5					

Spares and Service Contacts

UK

Spares	+44 (0)161 214 2380 (direct line 8.15 am – 5.00 pm)
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Service	+44 (0)161 214 2390 (direct line 8.15 am – 5.00 pm)
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E-mail	monofrance@nov.com

Australia

Melbourne	(03) 9773 7777
Sydney	(02) 8536 0900
Brisbane	(07) 3350 4582
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Perth	(08) 9320 5800
Darwin	(08) 8931 3300
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China

Beijing	+86 (0) 10 5707 0900
Shanghai	+86 (0) 21 3990 4558
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Distributors

For local distribution, please refer to our website:
www.mono-pumps.com/en-uk/sales_network

Tools

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

SB Muncher;
Metric Hexagon Keys - Range 6mm-8mm (0.24” - 0.31”)
Metric Spanners - Range 10mm-36mm (0.39” - 1.42”)
Torque Wrench

Series A Muncher;
Metric Hexagon Keys - Range 6mm-8mm (0.24” - 0.31”)
Metric Spanners - Range 10mm-36mm (0.39” - 1.42”)
Torque Wrench

Series F Muncher;
Metric Hexagon Keys - Range 6mm-8mm (0.24” - 0.31”)
Metric Spanners - Range 10mm-36mm (0.39” - 1.42”)
Torque Wrench
NOV Locknut Key - Item No.s MQ F06A 9750, CF F06A 9755 and MM F06A 9760

TR Muncher;
Metric Hexagon Keys - Range 6mm-14mm (0.24” - 0.55”)
Metric Spanners - Range 10mm-36mm (0.39” - 1.42”)
Torque Wrench

Series R Muncher;
Metric Hexagon Keys - Range 5mm-14mm (0.20” - 0.55”)
Metric Spanners - Range 10mm-36mm (0.39” - 1.42”)
Torque Wrench

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

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 your Supplier 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 that 90ºC (194ºF) the maximum surface temperature will not exceed 90ºC (194ºF) provided the grinder 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 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.

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 your Supplier has 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 your Supplier 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.

Inroduction

This information and all the information contained herein, are the exclusive property of your Supplier, 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 your Supplier. Its use for any other reason than the specified shall be a violation of the agreement with the recipient concerning the legal rights of your Supplier.

Your Supplier 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 Muncher given that all Health and Safety and good engineering practices are observed.

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

The following harmonised standards are applicable: BS EN ISO 12100: 2010

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 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 2014/30/EU
The Low Voltage Directive 2014/35/EU
The Pressure Equipment Directive 2014/68/EU

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 A. Morris - Director of Pump Technology for NOV PFT UK Ltd., Greengate Way, Middleton, Manchester, England, M24 1SA.

Intallation, Operation & Maintenance

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 is a slow speed, high torque grinder designed to operate in the water, waste and biowaste 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, your Supplier's 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 altitude.

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.

Lifting illustrations are contained in this document on page 13.

A weight table is included on pages 17 and 18.

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 dispatched 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.

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 your Supplier 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 on page 16.

IMMEDIATELY PRIOR TO INSTALLATION AND STARTING

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

For TR Munchers please see section 1.9.1 prior to starting for instructions on how to fit constant level oilers.

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, your Supplier 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 YOUR SUPPLIER HAS 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’ ONLY horizontal dry Muncher system should incorporate: -

a) A steel (or similar) feed hopper with a minimum base to top height of 1.0 metre (3.3 feet) or a minimum height of 1.5 metres (4.9 feet) from floor level.

b) A steel (or similar) lower delivery chute, which is inaccessible without tools.

c) A protective grid mounted over the Muncher and conveyor system, especially where overhead walkways are present.

d) Emergency stop buttons positioned within easy reach of all operating staff.

The recommended extent of enclosure is illustrated in this document on page 52 onwards (Series F or H ONLY).

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.

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) (-22°F to 356°F).

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.

1.9.1 All CT203 & CT205 TR Munchers require 2 constant level oilers to be fitted to the bearing housing in order to prevent the mechanical seals dry-running. The oilers will be supplied loose with the Muncher to avoid damage during transit, so upon receipt of the equipment they will need to be installed prior to operation. Instructions for fitting the oilers are as follows:

- Completely fill the two mechanical seal cavities through the upper ¼" BSP ports on the bearing housing as per lubrication schedule so that no air is left surrounding the mechanical seals. The two cavities are connected however it may be necessary to fill with oil through both ports due to the intricate path between the two mechanical seal cavities.
- Before attaching the oilers to the bearing housing, ensure the ¼" male nipple is fitted to each oiler and proceed to completely fill the oilers as per lubrication schedule
- Attach the oilers to the ¼" BSP ports and tighten until no oil leaks from the connection.
- Note the level of oil in the oiler and regularly check the oilers to ensure they have not emptied.

Because mechanical seals do have an expected leak rate the oilers will need to be re-filled with oil periodically. The precise level of oil in the oilers is not critical because as long as there is oil visible in the oiler then the seals will be quenched with oil

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) Prior to start up ensure all CT203 & CT205 TR Munchers have constant level oilers fitted as per section 1.9.1.

7) 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.

8) Check that the Muncher stops when "STOP" button(s) are activated.

9) Check for reverse rotation of cutters when "REVERSE" button is activated.

10) Start up the machine. On initial start-up, allow machine to run for approximately 45 minutes.

11) 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.

12) After a further 10 minutes of running, stop the machine, switch off and lock the main isolator. Check the tightness of all securing bolts. Recheck every 500 hours of operating time.

13) Check the tightness of all cables and connections. Re-check every 500 hours of operating time.

14) Observe manufacturers guidelines with regard to gearbox lubricant initial renewal and subsequent intervals.

15) 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.

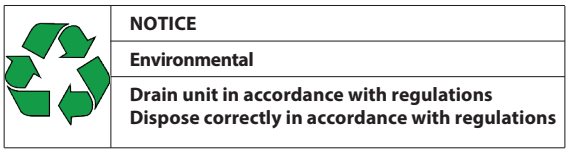
iii) If a third overload occurs within 60 seconds of the first, machine shutdown in reverse mode and energise alarm circuit.

16) After machine shutdown, isolate and lock off. Inspect machine, removing any obstruction and press the “RESET” button.

17) The machine can now be re-started as 10) above.

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

3.0 DISPOSAL OF WORN COMPONENTS



When replacing wearing parts, please ensure disposal of used parts is carried out in compliance with local environmental legislation.

Particilar care should be taken when disposing of lubricants.

4.0 DISMANTLING AND ASSEMBLY

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

4.1 USE OF ITEMS NOT APPROVED OR MANUFACTURED BY YOUR SUPPLIER

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 your Supplier has 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 your Supplier 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 your Supplier.

4.2 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.

4.3 CLEANING / INSPECTION

TR MUNCHERS ONLY

It is important to periodically inspect (timeframe dependant on usage) the trash trap for any grit build up. If grit is present in the trash trap the grit should

be removed and cleaned to ensure optimal care and working performance. See page 14 for more details.

ALL MUNCHERS

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.

4.4 REASSEMBLY ADVICE

1) Lubricate all bores, shafts and seals on reassembly.

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 on page 11.

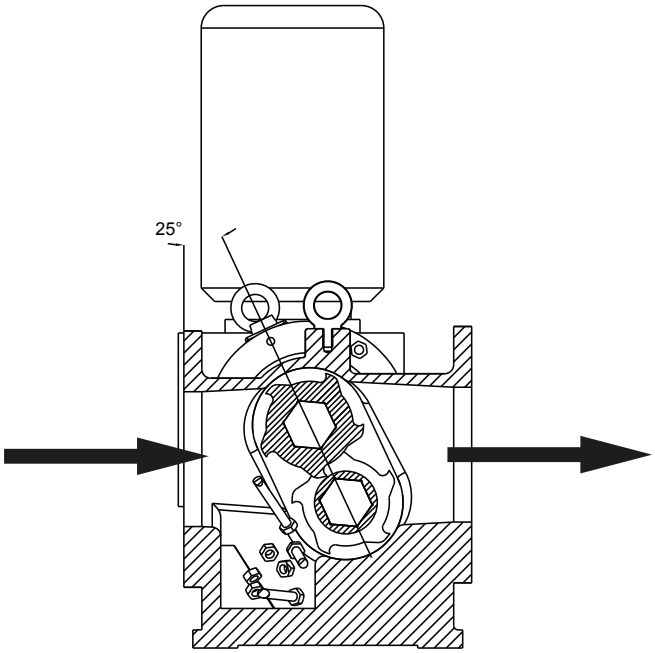
TR MUNCHERS ONLY

25° CUTTER STACK AND TRASH TRAP (CT201,CT206 & CT205 ONLY)

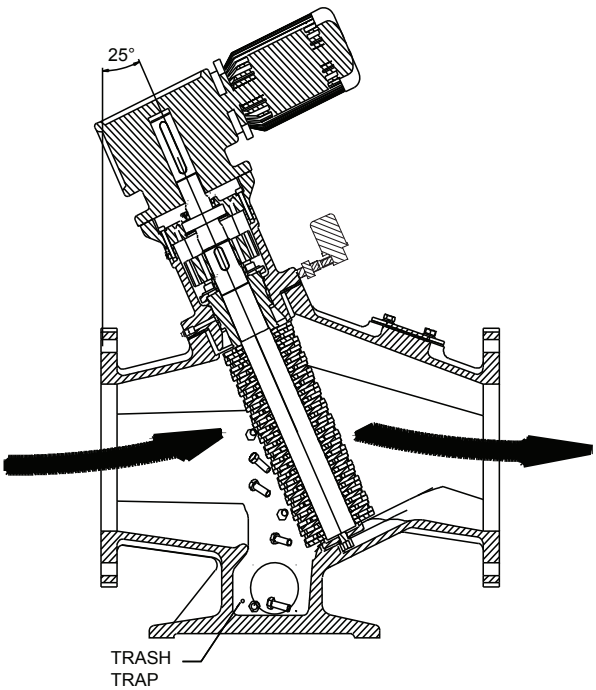
The cutter stack is inclined at 25° from the vertical axis to allow any unbreakable solids to drop clear of the cutters into the trash trap on reversal side of the cutter stacks. the solids can then be manually removed once the machine has been isolated (mechanically and electrically).

The unique internal trash trap built into the main body of the machine (patent pending), has access covers placed on either side for easy clean out.

Access cover plates drilled to suit standard NP16 50mm diameter flange to allow hosetail or similar to be fitted for flushing exercise when required.



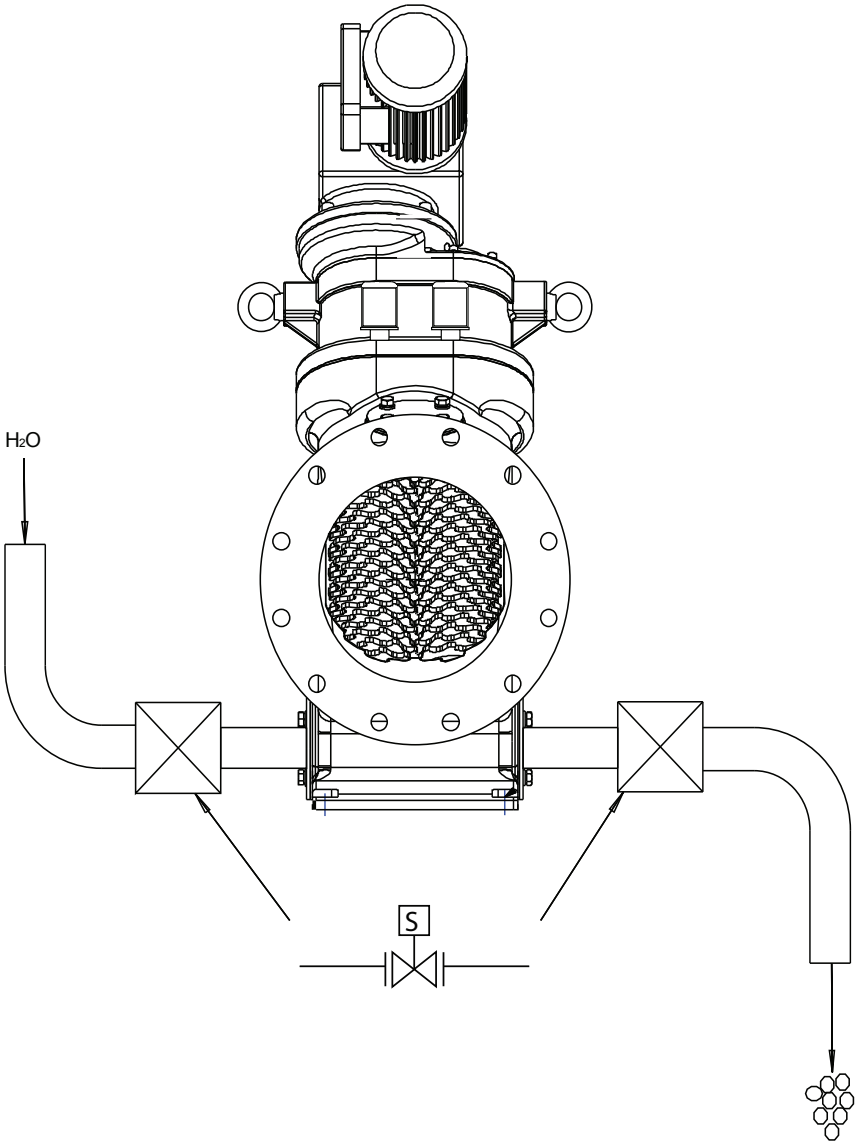
CT201



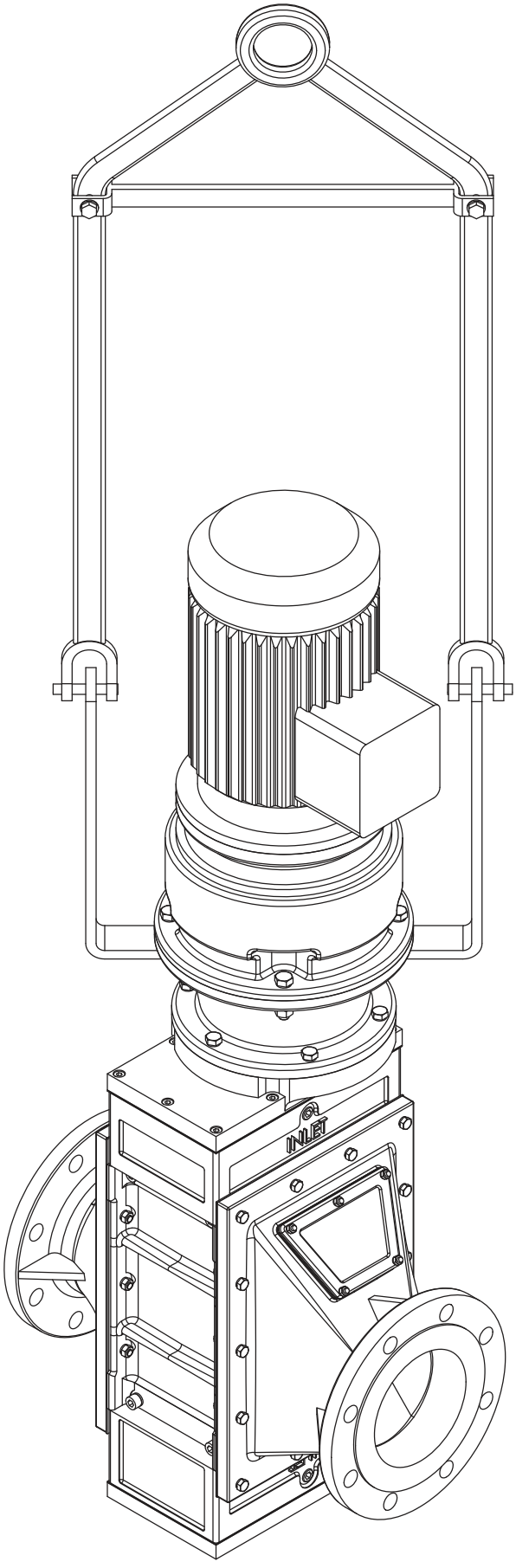
CT203 & CT205

CLEAN OUT FACILITY (TR MUNCHER ONLY)

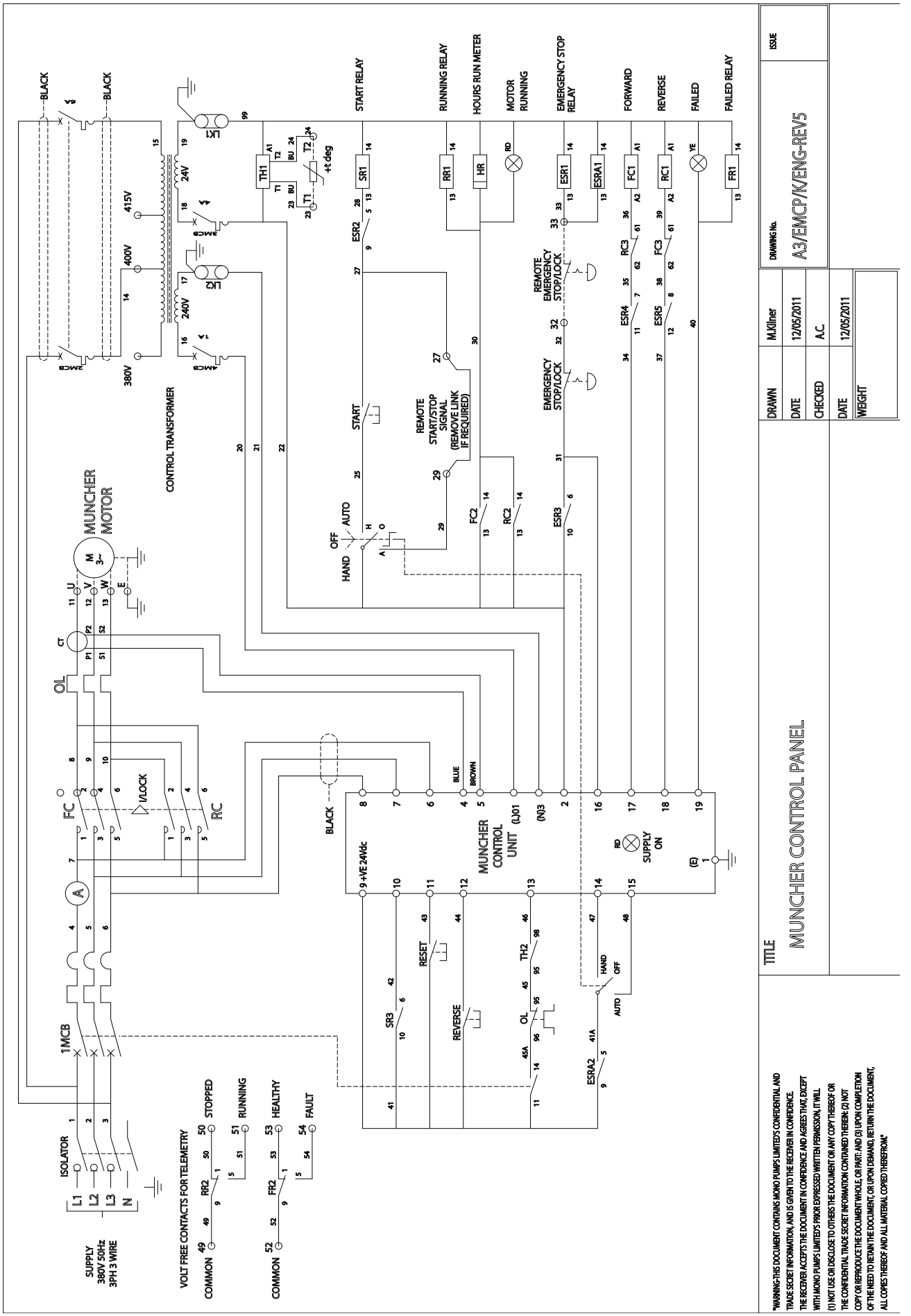
Using the two clean out access ports, flanged hoses and valves can be fitted to give an automatic flushing sequence at sites where grit/solids are known to cause problems.



Recommended Lifting



Wiring Diagram



Weights

Muncher	Type	Gear Unit / Class	M/C Size (kW)	Weight (kg)
Series A	CA202AA CA203AA CA205AA CA206AA CA210AA CA215AA	IP55	2	241 251 276 286 351 400
	CA202AB CA203AB CA205AB CA206AB CA210AB CA215AB	IP55	2	254 264 284 294 369 439
	CA202AC CA203AC CA205AC CA206AC CA210AC CA215AC	IP55	4	265 275 295 305 380 450
Series F	CF306RJS7B2 CF310RMS7B2	Nord IP55	11 7.5 & 11	780 1180
Series H	CH06 CH09 CH12	Nord IP55	11 & 15 15 & 22	1800 2300 2800
SB	Pipeline CB201	IP55	1.1 1.5 2.2	205 207 244
		IP55	1.1 1.5 2.2	208 244 248
	Channel CB201A	IP55	1.1 1.5 2.2	155 190 195
		IP67 & IP68	1.1 1.5 2.2	200 225 260
TR	CT203C	IP55	1.5 2.2 / 4.0	290 340
	CT203D	IP55	1.5 2.2 / 4.0	290 340
	CT203E	IP55	1.5 2.2 / 4.0	290 340
	CT205F	IP55	1.5 2.2 / 4.0	345 390
	CT205G	IP55	1.5 2.2 / 4.0	345 390
R	CR145A	IP55	8	800

Muncher	Type	Gear Unit / Class	M/C Size (HP)	Weight (lb)
Series A	CA202AA CA203AA CA205AA CA206AA CA210AA CA215AA	TEFC	2	531 553 608 630 773 881
	CA202AB CA203AB CA205AB CA206AB CA210AB CA215AB	TEFC	3	559 582 626 648 813 967
	CA202AC CA203AC CA205AC CA206AC CA210AC CA215AC	TEFC	5	584 606 650 672 837 992
Series F	CF306RJS7B2 CF310RMS7B2	TEFC	15 10 & 15	1719 2601
Series H	CH06 CH09 CH12	TEFC	15 & 20 / 20 & 30	3968 5070 6172
SB	Pipeline CB201	TEFC	1.5 2 3	451 456 537
		SUBMERSIBLE	1.5 2 3	458 537 546
	Channel CB201A	TEFC	1.5 2 3	341 418 429
		SUBMERSIBLE	1.5 2 3	440 496 573
TR	CT203P	TEFC	2 3 / 5	639 749
	CT203Q	TEFC	15 10 & 15	639 749
	CT203R	TEFC	15 10 & 15	639 749
	CT203S	TEFC	15 10 & 15	760 859
	CT203T	TEFC	15 10 & 15	760 859
R	CR145A	TEFC	10	1763

Part Numbers

DESCRIPTION	NOV PART NO.	DRG. REF
Bearing Housing	0100	01A
	0101	
	0112	
	0113	
Mid Housing	0175	01B
	0176	
	0177	
Nameplate	0600	06A
	0630	
Warning Nameplate	0650	06B
Bottom Cover Plate	1100	11A
Top Cover Plate	1150	11B
	1152	
Adapter Stool	1701	17A
	1708	
	1720	
	1721	
	1722	
	1723	
	1724	
	1725	
	1726	
Cover Plate Gasket	2000	20A
Side Rail Gasket	2010	20B
Mid Bearing Housing Gasket	2020	20C
Mounting Flange Gasket	2021	20D
Side Rail	2100	21A
	2101	
	2105	
	2106	
	2110	
	2111	
	2120	
	2121	
	2122	
	2123	
Cutter	2511	25A
	2513	
	2515	
	2516	
Drive Shaft	3200[1]	32A
	3201	
	3205	
	3206[2]	
	3251	

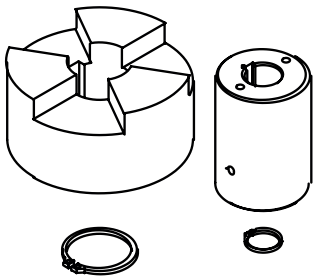
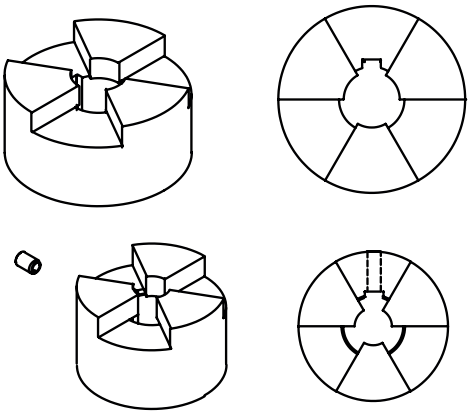
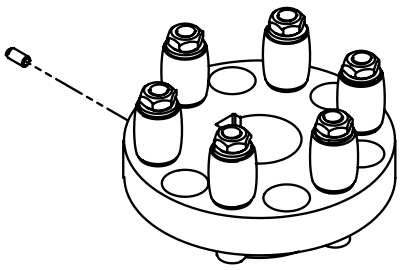
DESCRIPTION	NOV PART NO.	DRG. REF
Driven Shaft	3250[1]	32B
	3255	
	3256[2]	
	3500	
Spacer	3501	35A
	3502	
	3506	
	3551	
Shim Spacer	3503	35B
	3504	
Spacer (Mid Bearing)	3556[2]	35C
Sleeve (Mid Bearing)	3557[2]	35D
Retaining Washer	4702	47A
Lock Washer	4701	47B
Drive Gear	7800	78A
Driven Gear	7850	78B
Lifting Lug	9700	97A
Coupling Variations		
1 Piece Coupling	2690[1]	26C
	2691[1]	
	2692[1]	
	2695[1]	
	2696[1]	
	2697[1]	
	2698[1]	
	2699[1]	
2 Piece Coupling	2600	26A
	2601	26B
Pin & Buffer Coupling	80B06891[2]	P209
	80B06892[2]	
	80B06893[2]	
Seal Variations		
Mechanical Seal	M040127G[1]	P305
	M040127G-T[1]	
	M040127G-NORTH[1]	
	M040129G[1]	
	M040227G[2]	
	M040227G-T[2]	
	M040227G-NORTH[2]	
	M040229G[2]	

[1] - Machines prior to 21/09/2015

[2] - Machines after 21/09/2015

For more information contact your Supplier

Coupling Options

BEFORE 24/09/2015	AFTER **24/09/2015** Serial Number 801481	
CA202 - CA215	**CA202 - CA206**	**CA210 - CA215**
		

Torque Settings

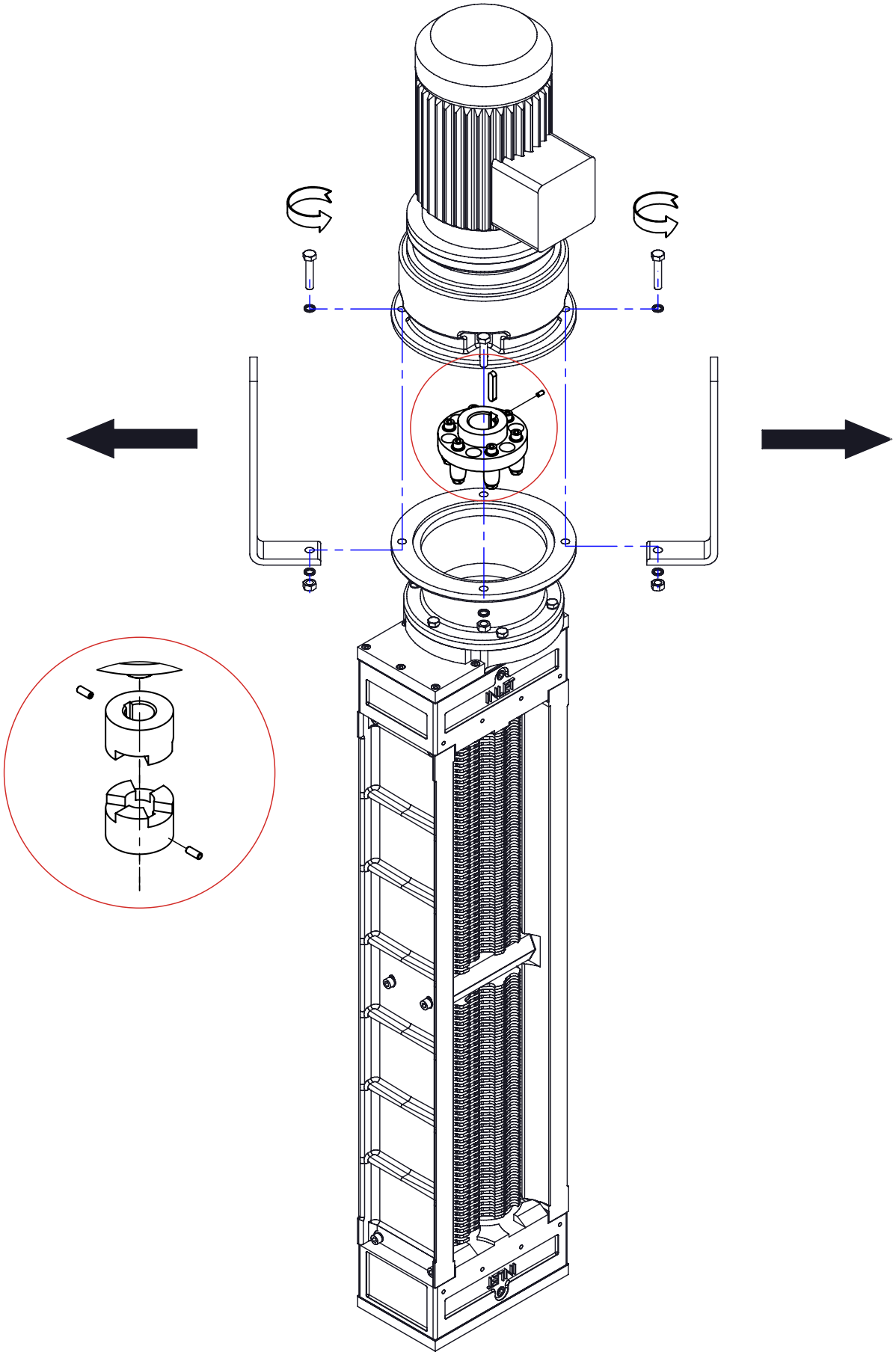
DESCRIPTION	THREAD SIZE	PART NO.	MAX. TIGHTENING TORQUE	
			Nm	Lbf.ft.
SLOTTED HEX NUT	M24 x 3	P106	230	170
SOCKET CAP SCREW	M10 x 1.5	P107	56	41
SOCKET CAP SCREW	M8 x 1.25	P108	29	22
HEX HEAD SCREW	M8 x 1.25	P109	29	22
SOCKET CAP SCREW	M10 x 1.5	P114	56	41
HEX HEAD BOLT	M12 x 1.75	P201	101	76
HEX HEAD BOLT	M12 x 1.75	P202	101	76
HEX HEAD SCREW	M10 x 1.5	P207	56	41
HEX HEAD SCREW	M8 x 1.25	P400	29	22
HEX HEAD BOLT	M8 x 1.25	P401	29	22
Torque tolerances are +/- 5% of stated values.				

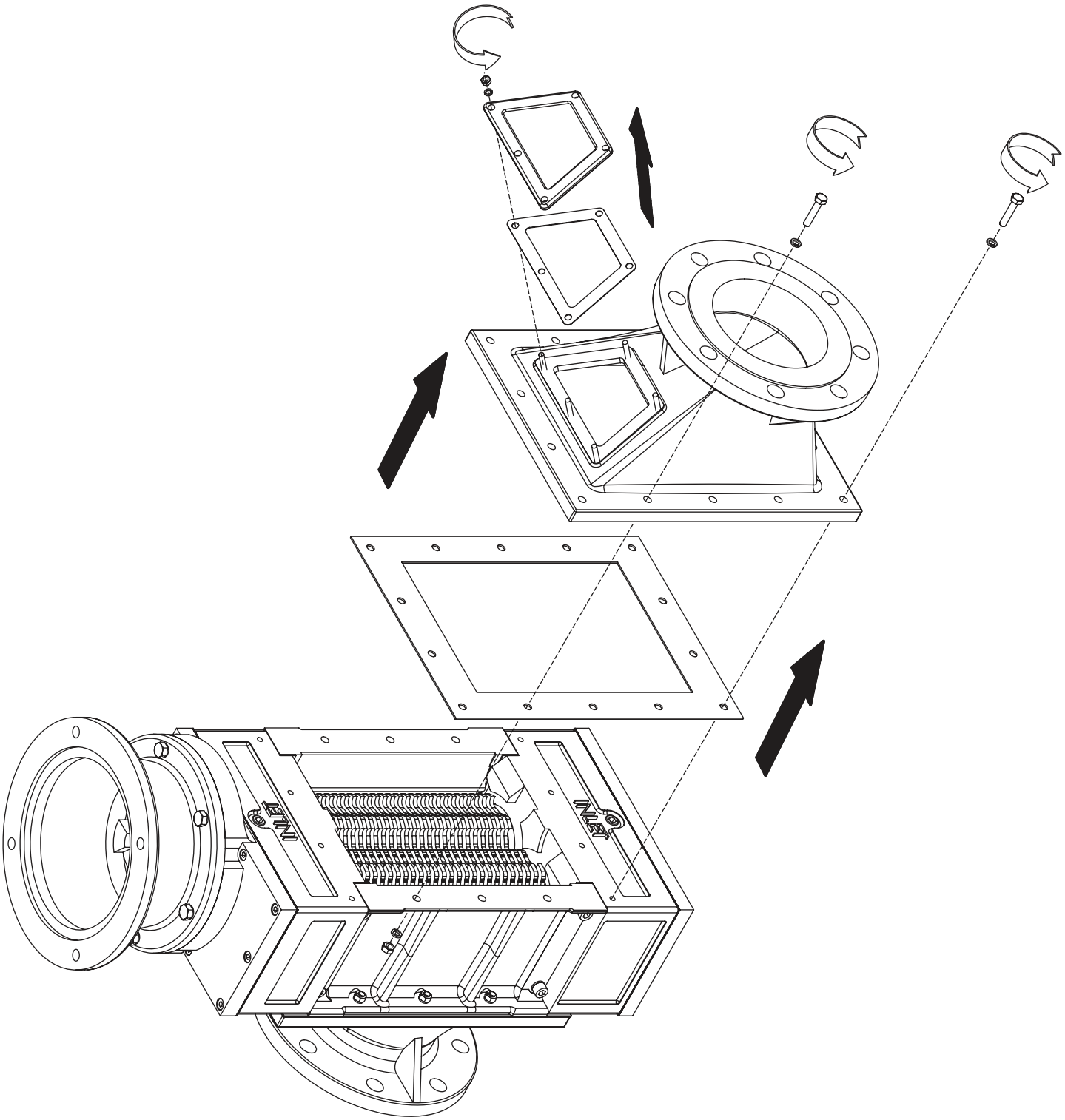
Muncher Coding Sheet

Features	Description	Basic Code												Variation		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Body Material	Cast Iron	C														
	Stainless Steel **	S														
	Gun Metal **	G														
Product	Series A Muncher		A													
Mark No.	2014			2												
Throat Size	200mm (8”)				0	2										
	300mm (12”)				0	3										
	500mm (20”)				0	5										
	600mm (24”)				0	6										
	1000mm (40”)				1	0										
	1500mm (60”)				1	5										
Machine Type and Flange Bore **(Metric Flanges Drilled to BS4504 PN16 and Imperial Flanges Drilled to ANSI B16.5 Class 150)**	Basic (Channel Type)						A									
	Pipeline 80 N.B. to BS4504						B									
	Pipeline 100 N.B. to BS4504						C									
	Pipeline 150 N.B. to BS4504						D									
	Pipeline 200 N.B. to BS4504						E									
	Pipeline 250 N.B. to BS4504						F									
	Pipeline 300 N.B. to BS4504						G									
	Upflow 80 N.B. to BS4504						H									
	Upflow 100 N.B. to BS4504						J									
	Upflow 150 N.B. to BS4504						K									
	Upflow 200 N.B. to BS4504						L									
	Pipeline 3” N.B. ANSI						N									
	Pipeline 4” N.B. ANSI						P									
	Pipeline 6” N.B. ANSI						Q									
	Pipeline 8” N.B. ANSI						R									
	Pipeline 10” N.B. ANSI						S									
	Pipeline 12” N.B. ANSI						T									
	Upflow 3” N.B. ANSI						U									
	Upflow 4” N.B. ANSI						V									
	Upflow 6” N.B. ANSI						W									
	Upflow 8” N.B. ANSI						Y									
Build Option	Refer to NOV							*								
Cutter	CAM								T							
	ETOS								W							
No. of Teeth	5 (ETOS Only)									5						
	7 (CAM Or ETOS)									7						
Thickness	5.5mm (0.2165”)										A					
	8.0mm (0.3150”)										B					
Material (Cutters)	Stainless Steel (ETOS Only)											1				
	Chromium Molybdenum Steel (CAM Only)											2				
Oblique													/			
Field Variation														V	A	R
Typical Code		C	A	3	0	2	B	*	T	7	B	2	/	1	2	3

**** Stainless Steel construction available with high flow side rails only**
Note: “X” in any column denotes a special variation.

Dismantling Drawings

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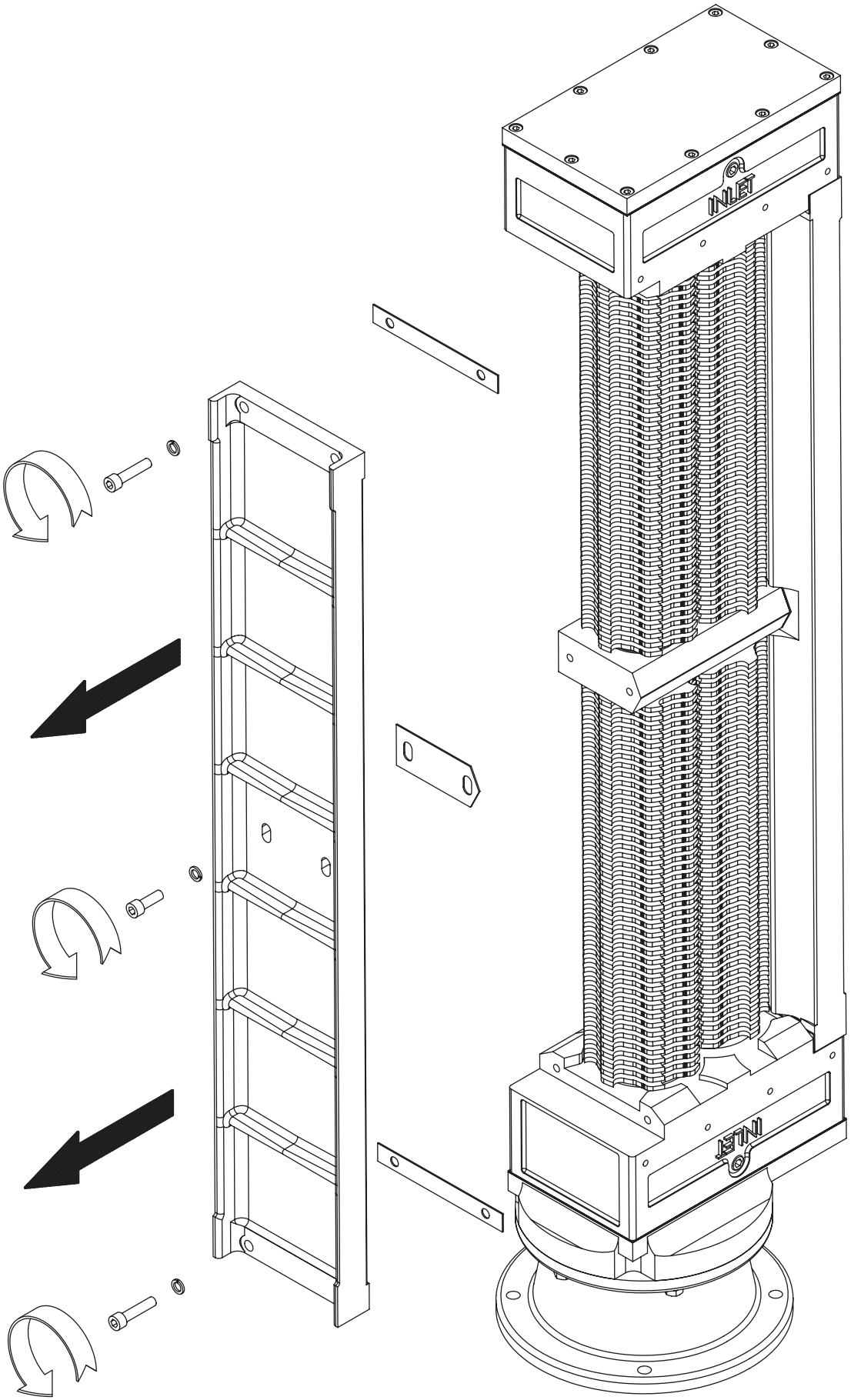
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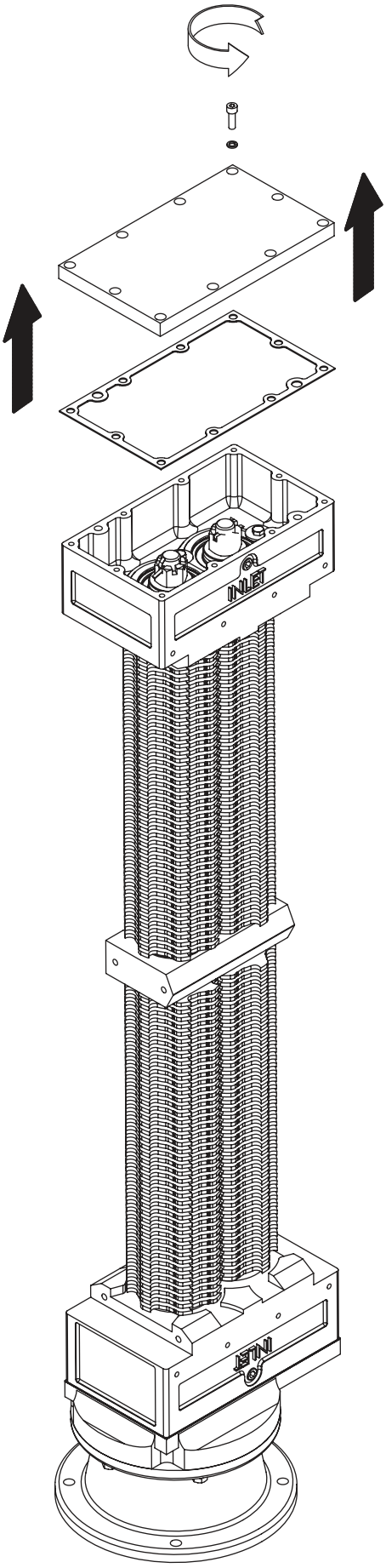
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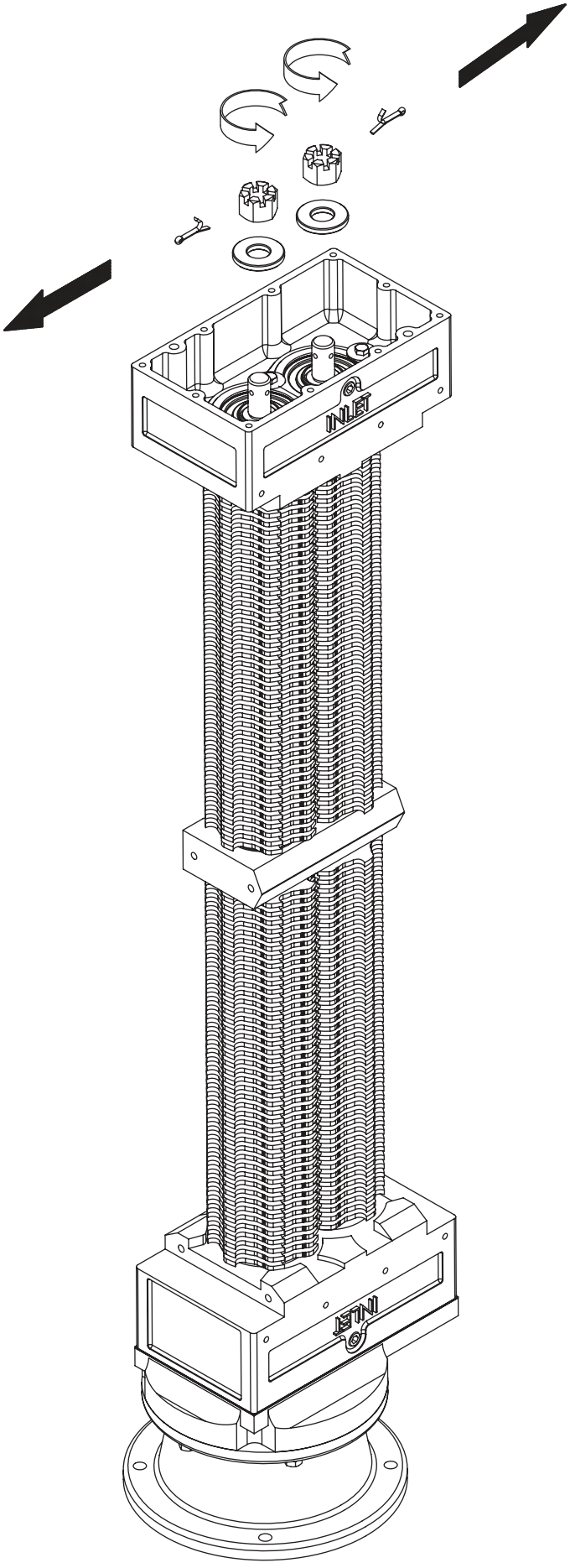
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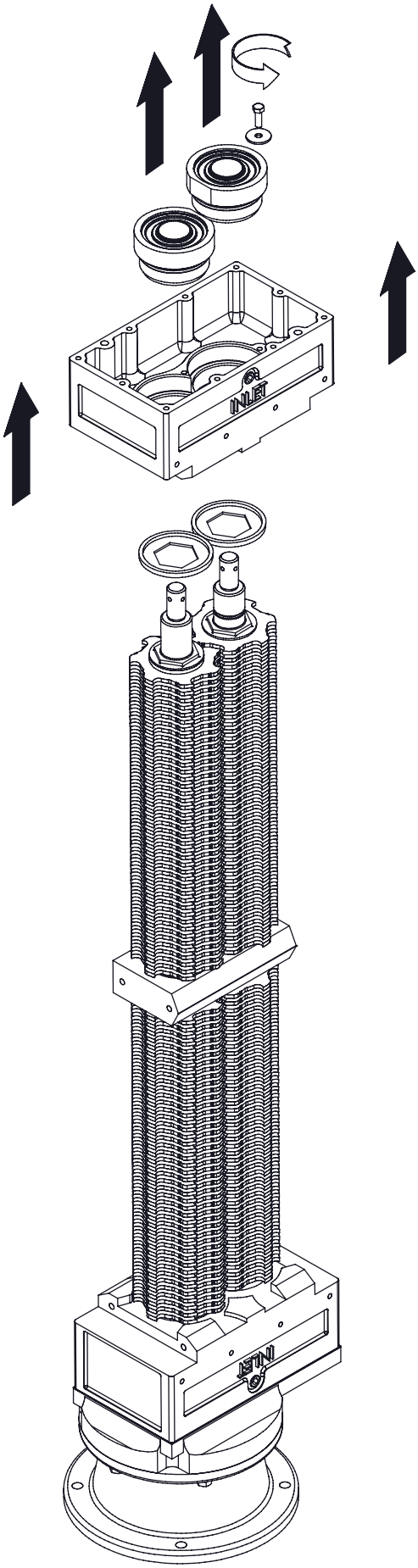
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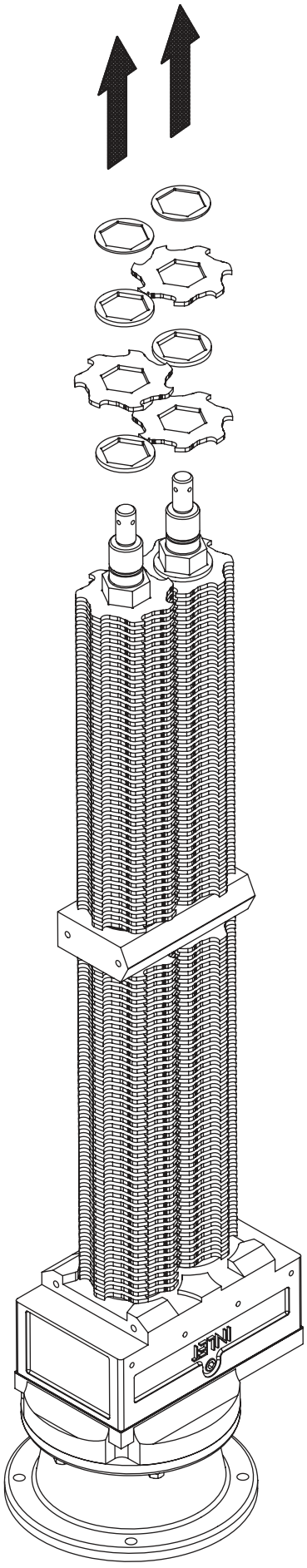
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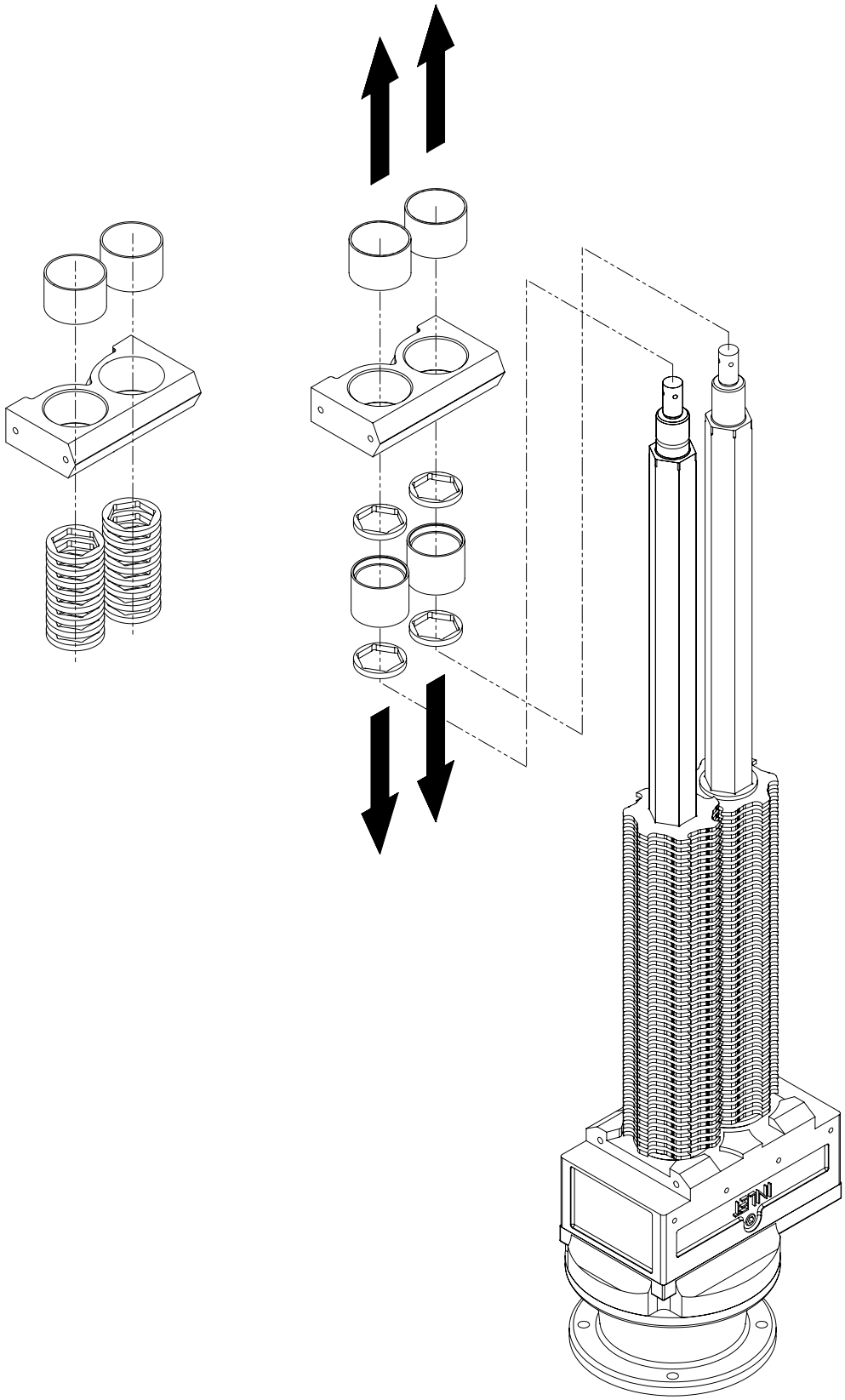
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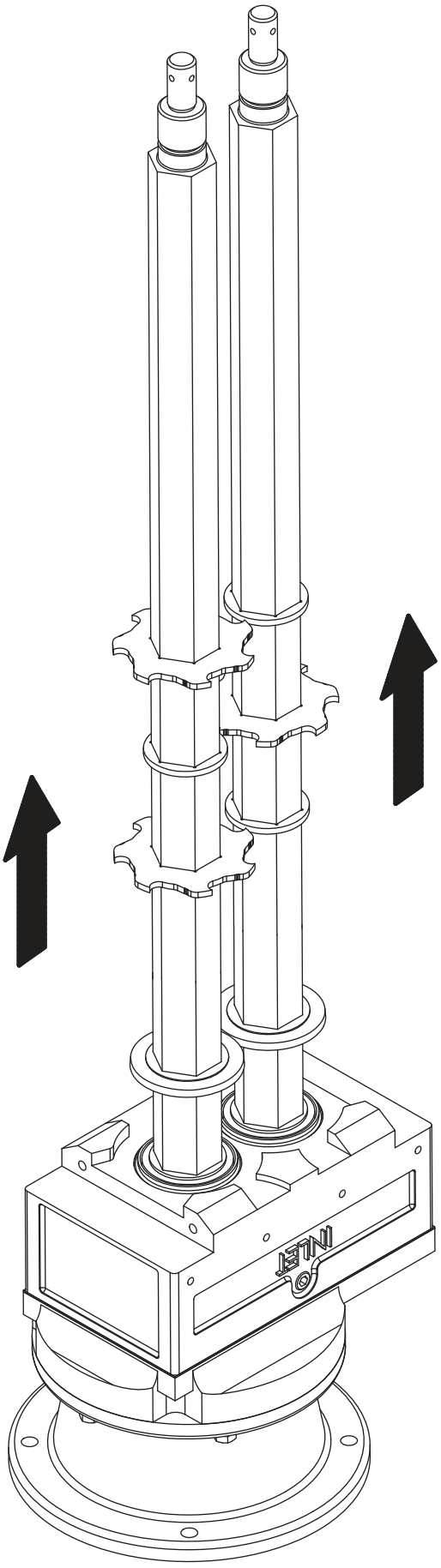

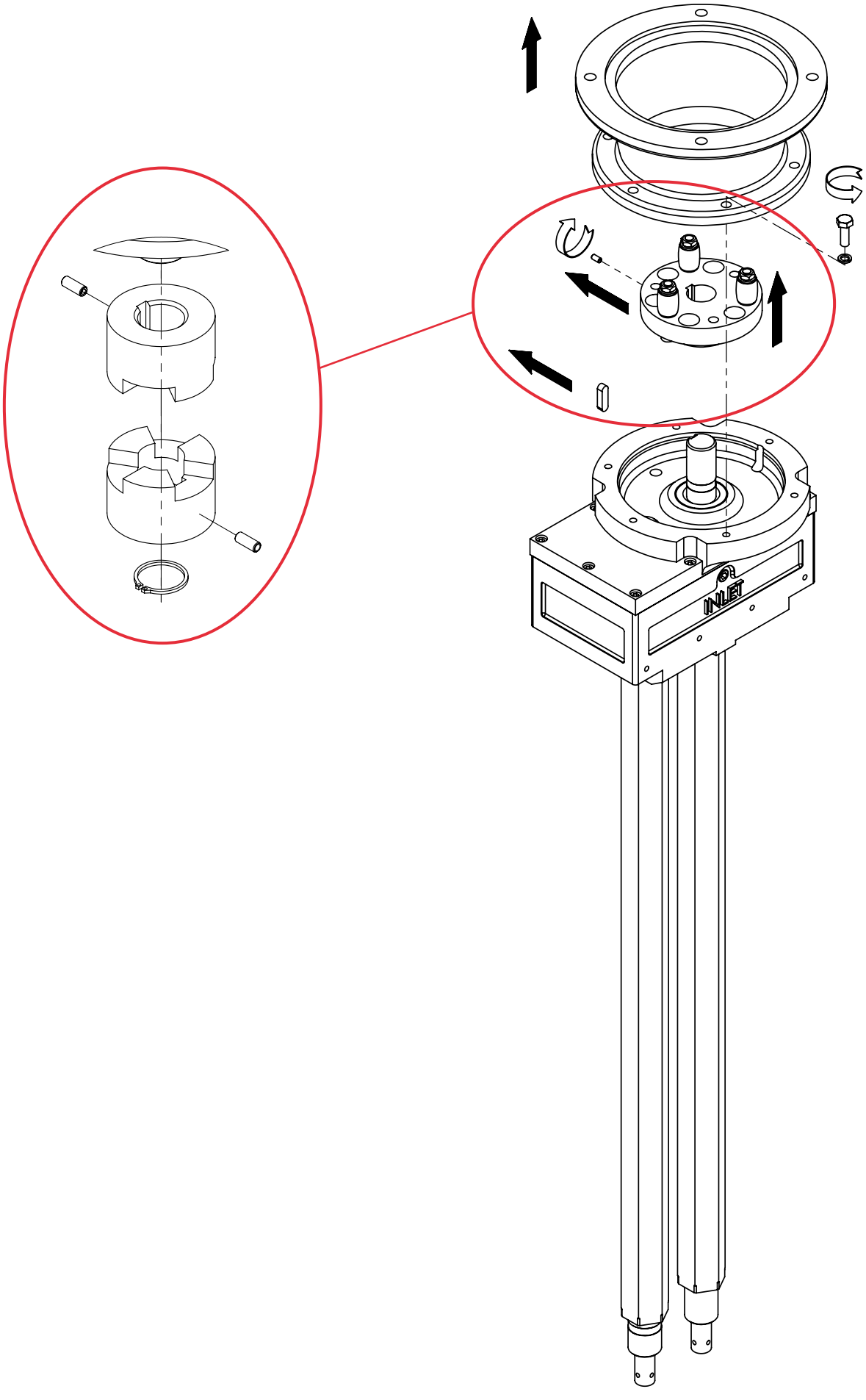
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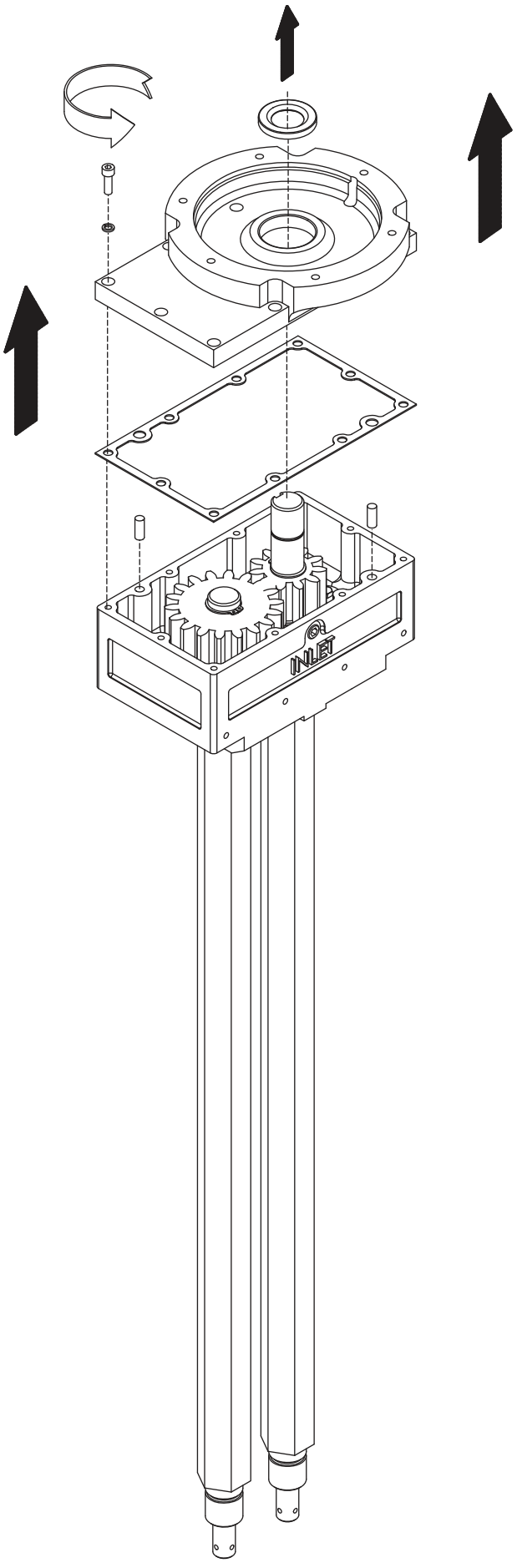
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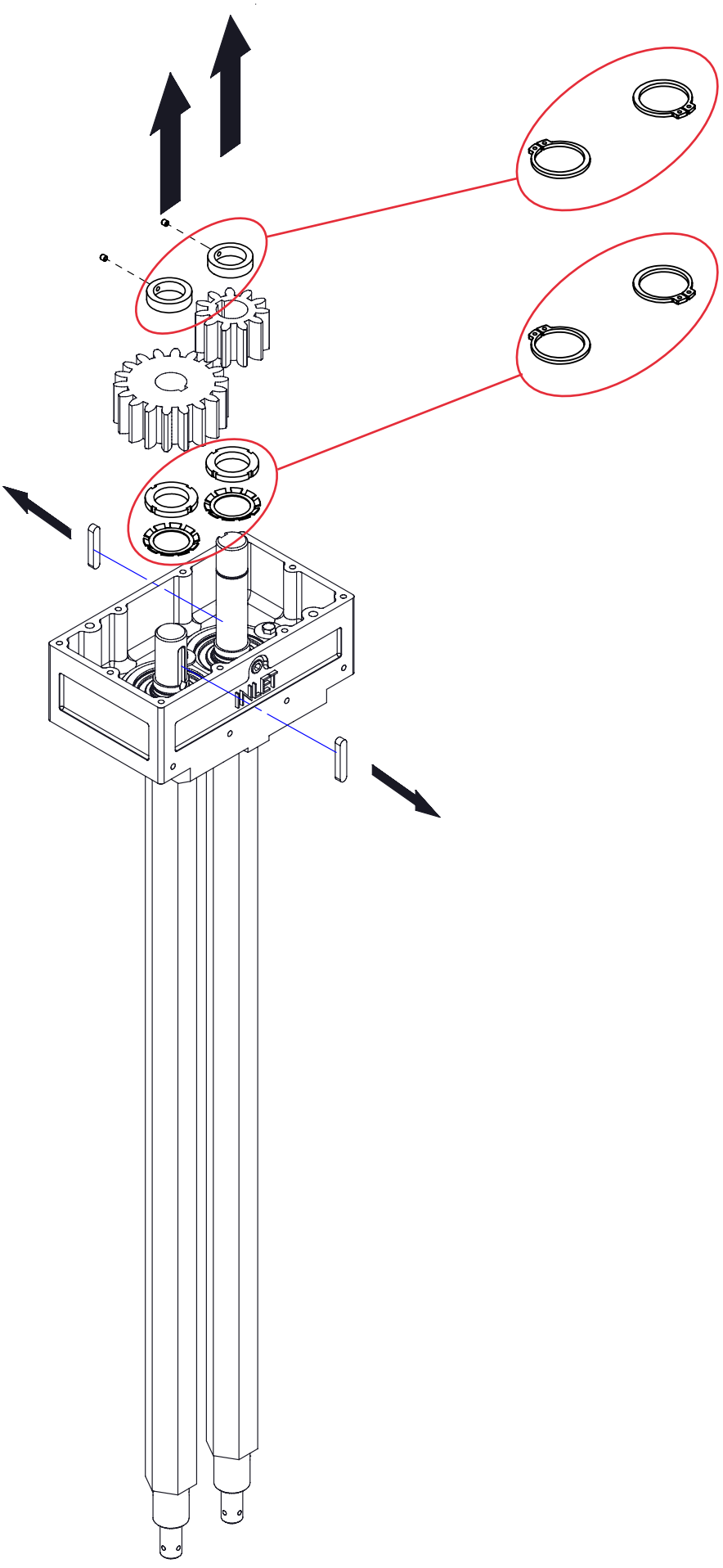
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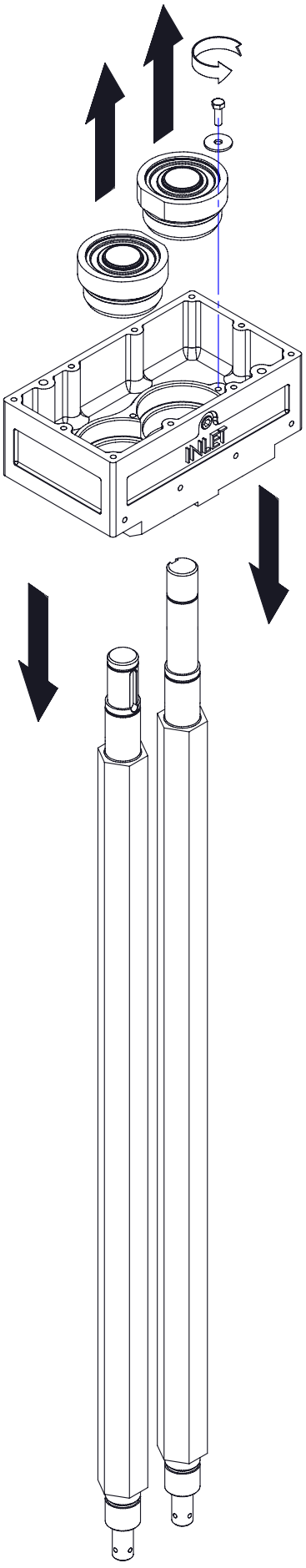
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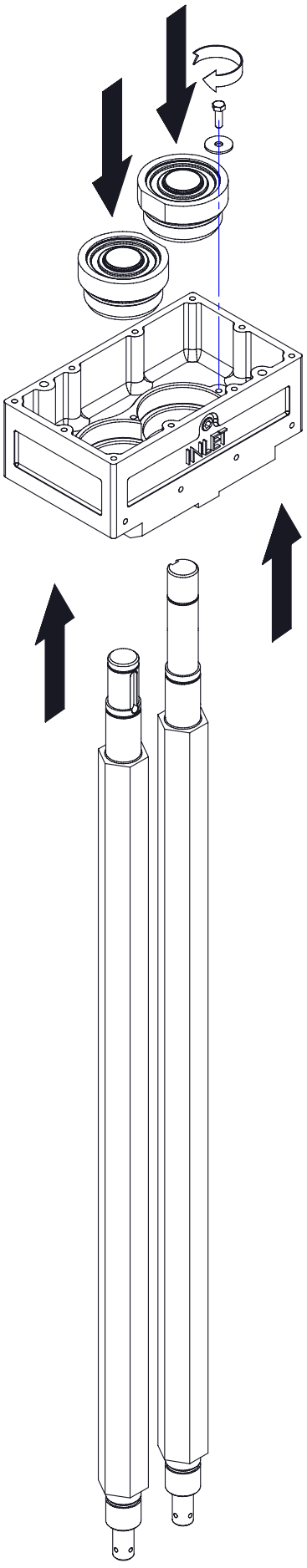
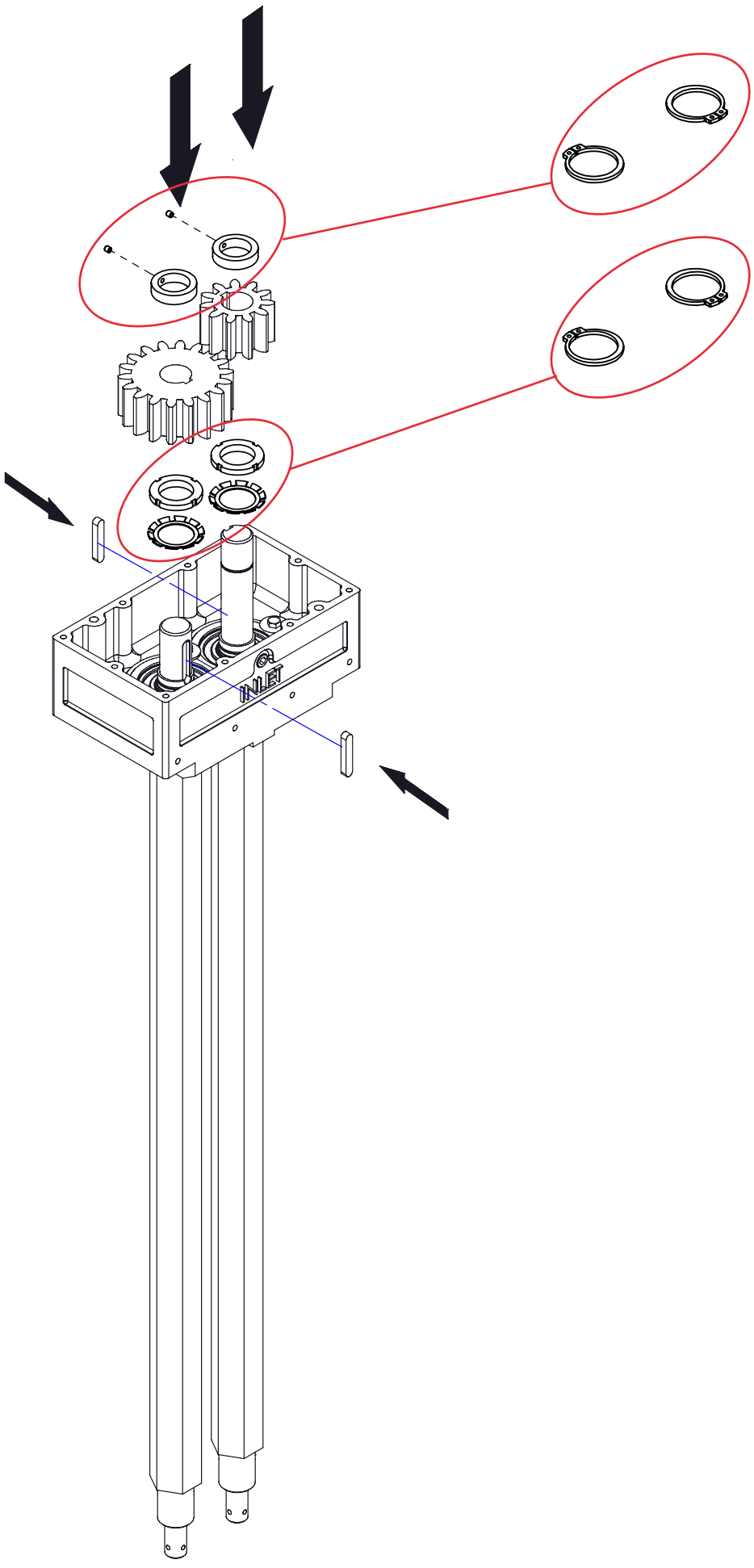
Assembly Drawings

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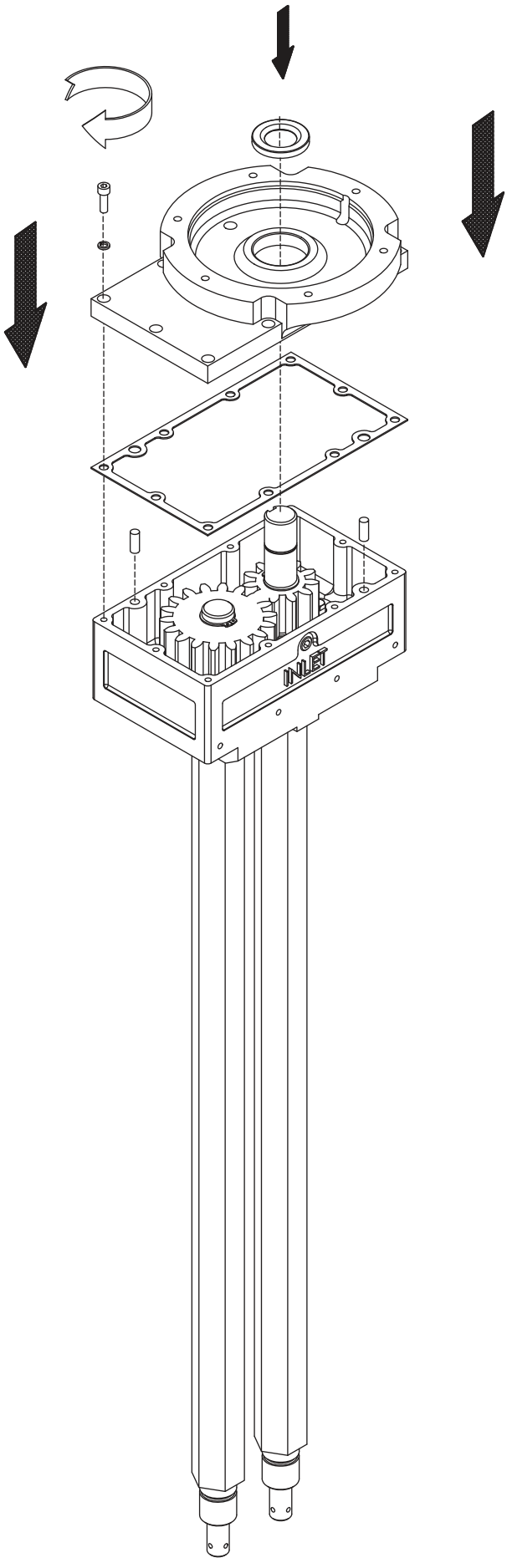
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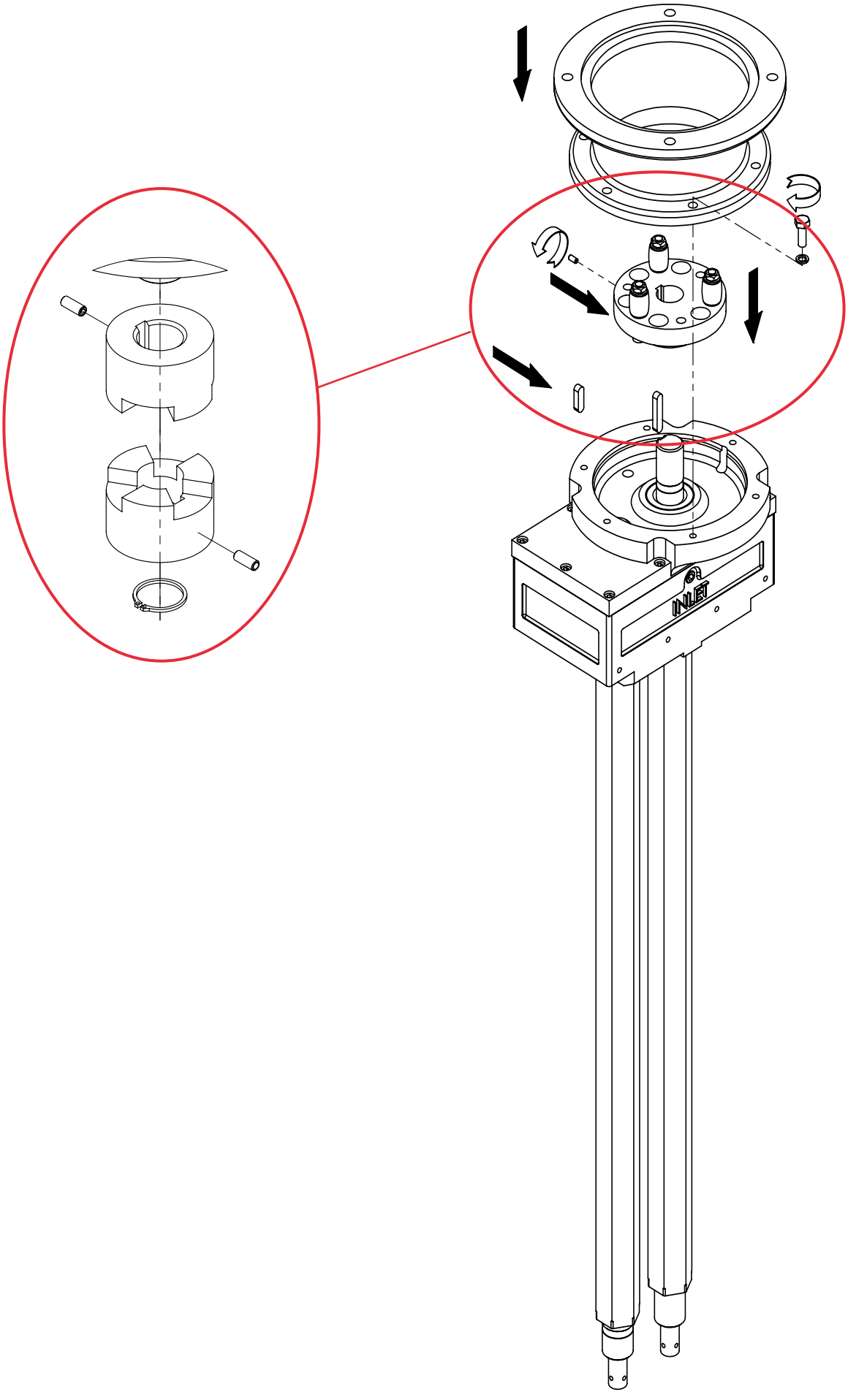
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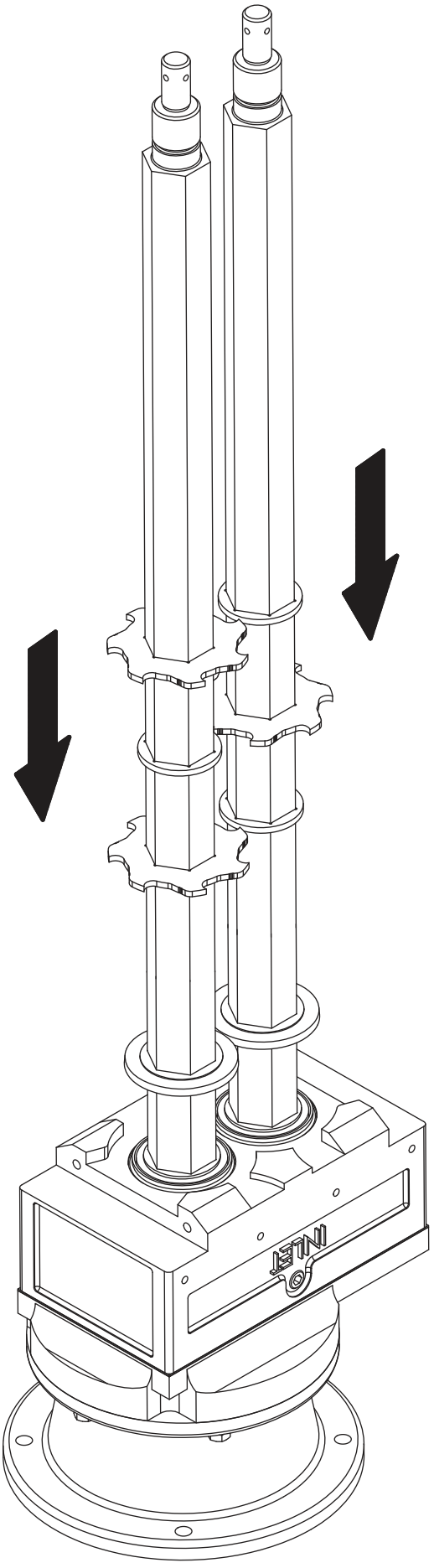
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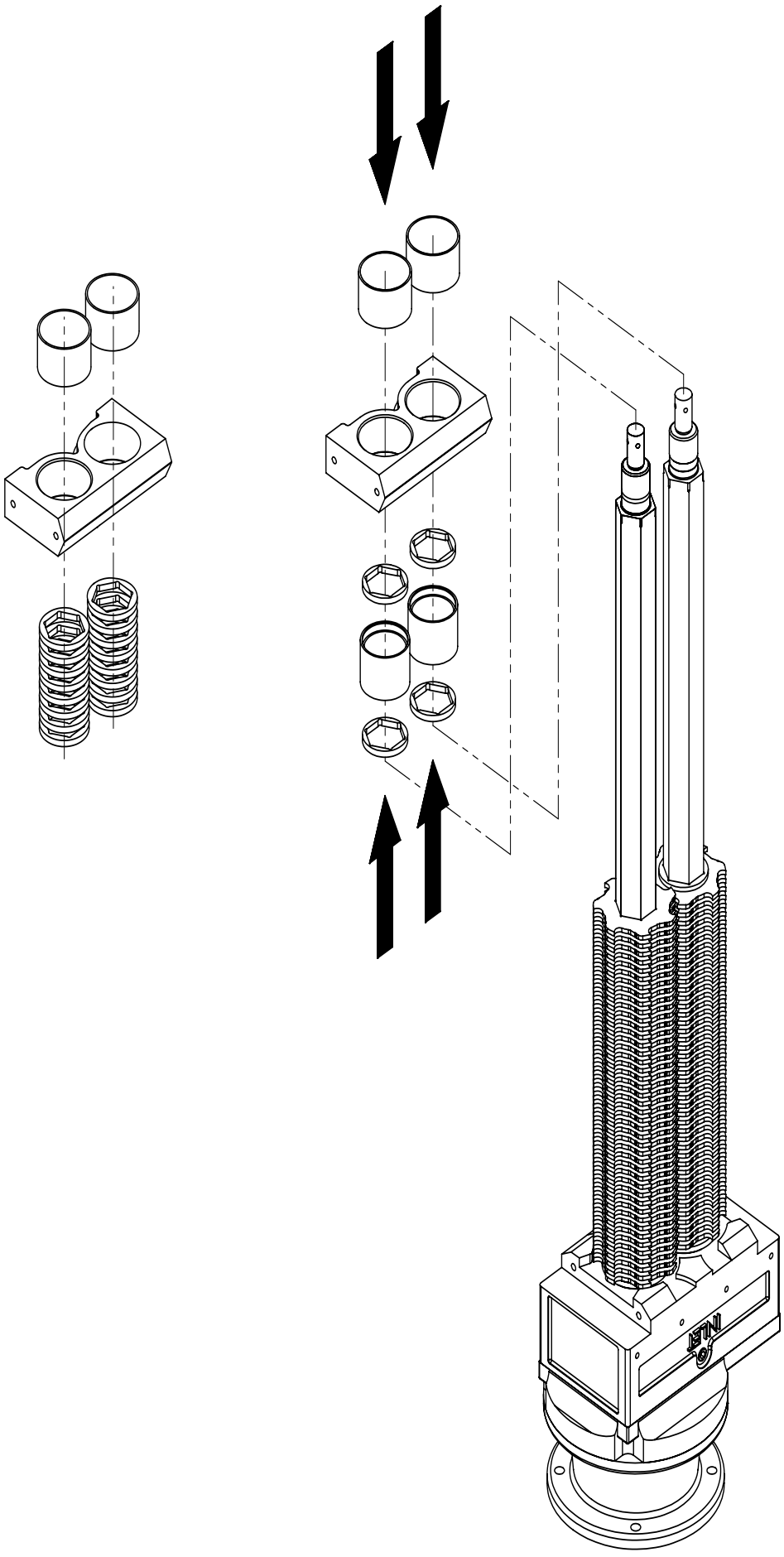

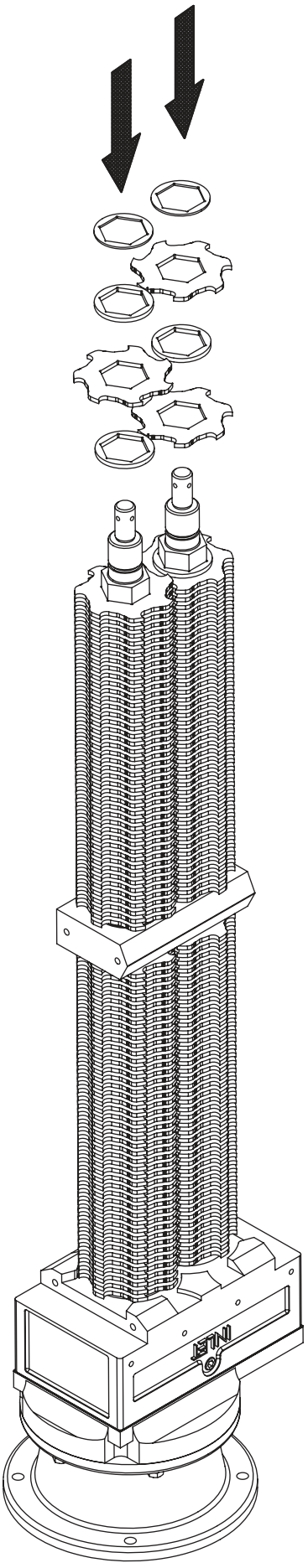

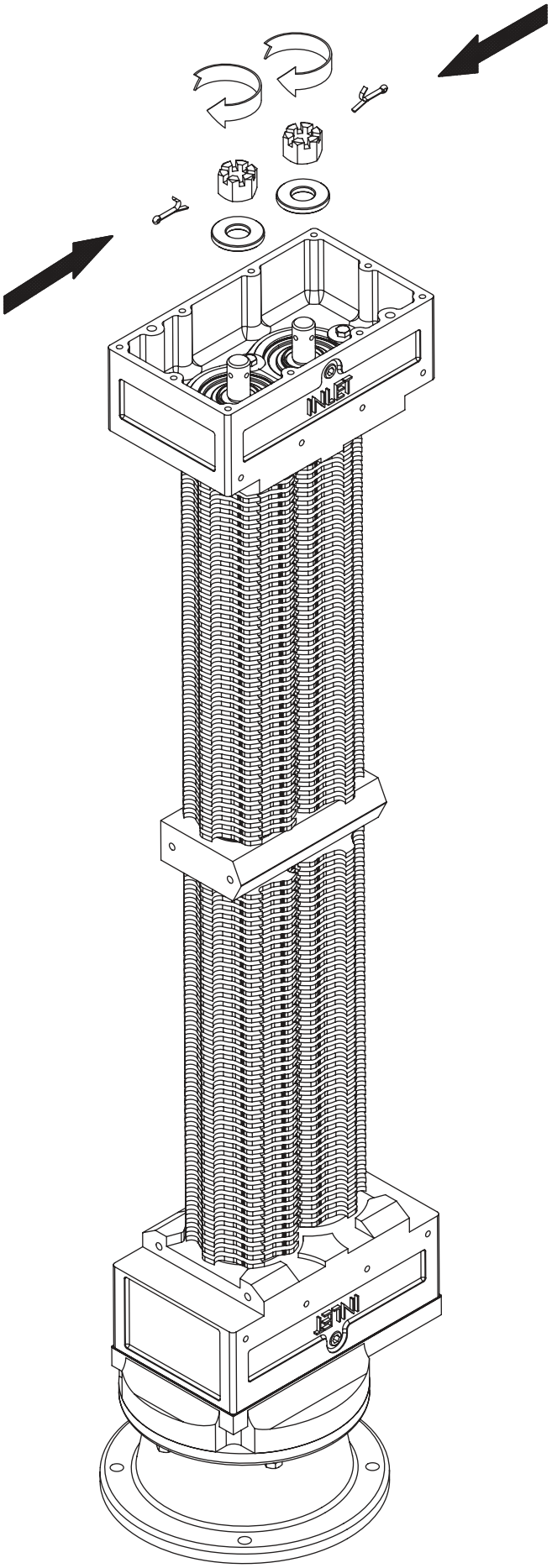
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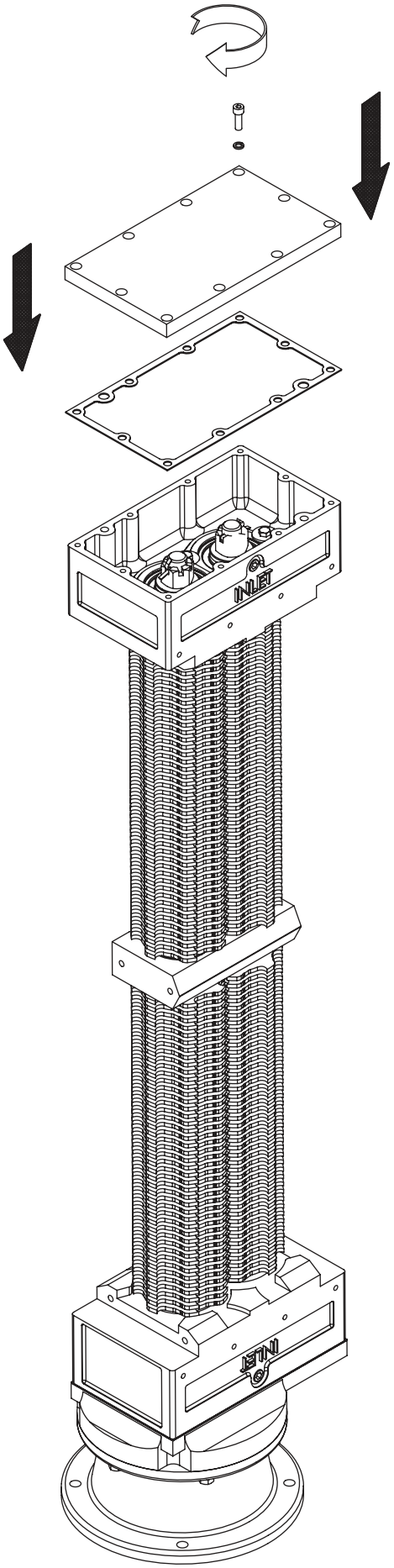
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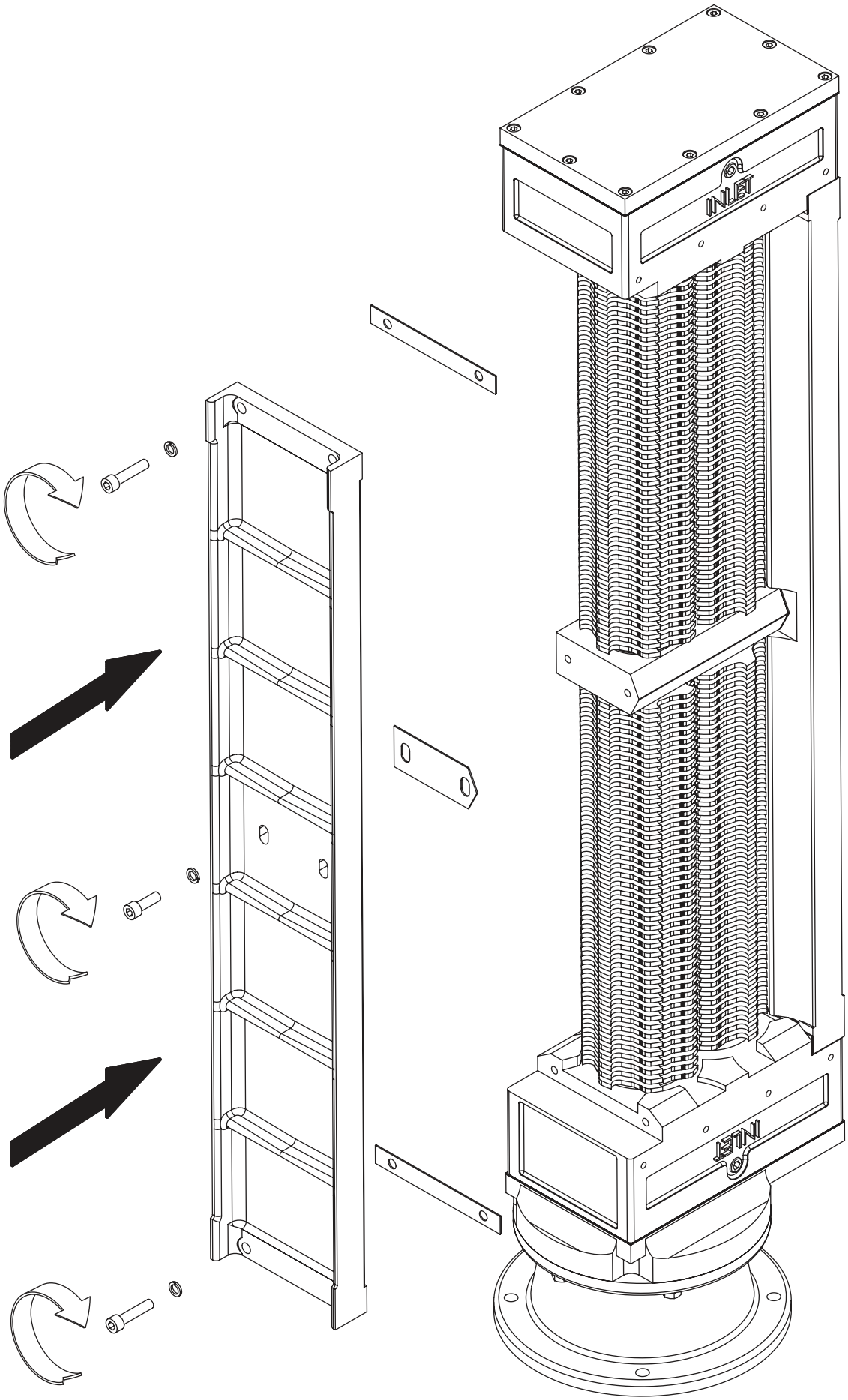
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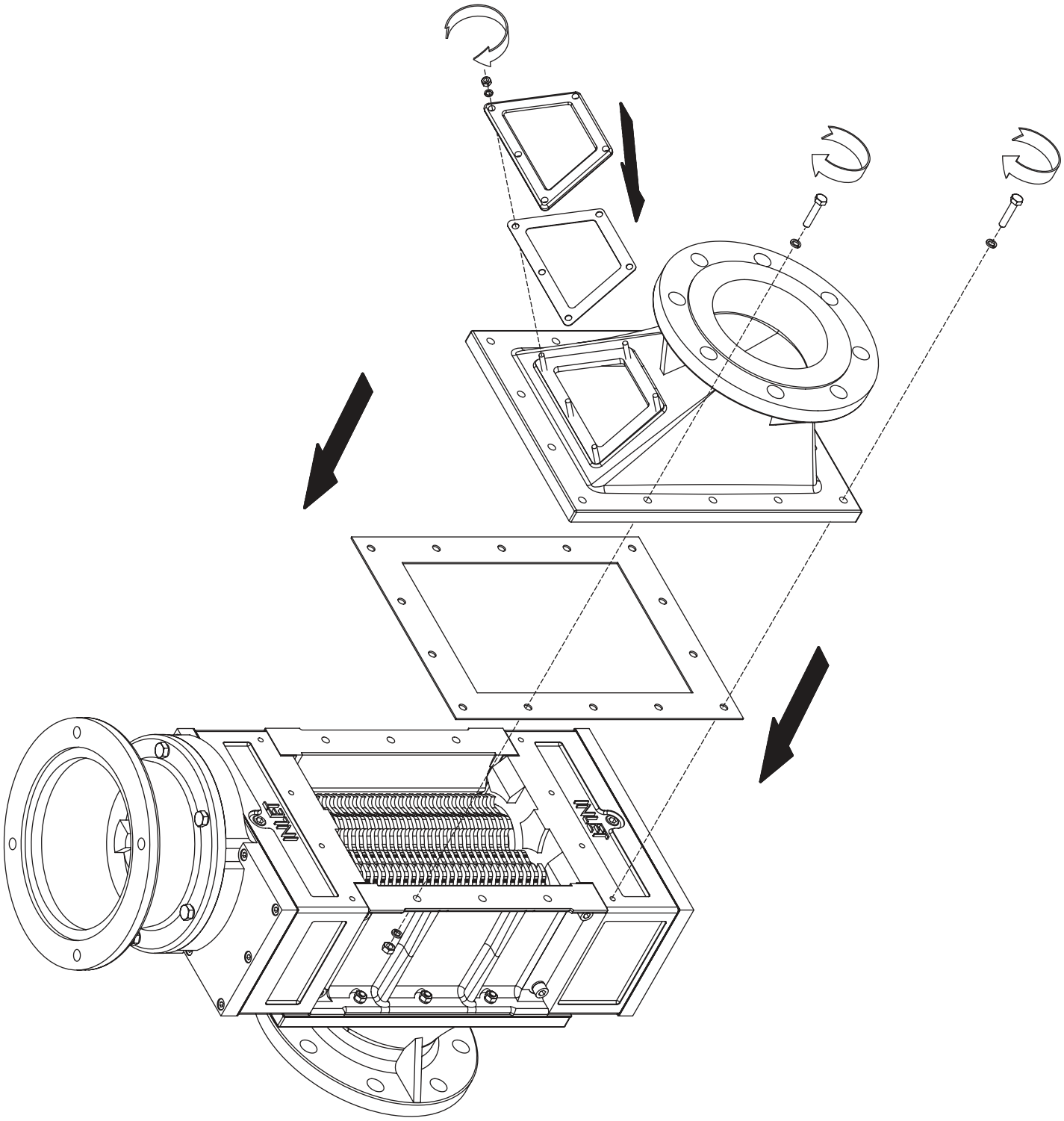
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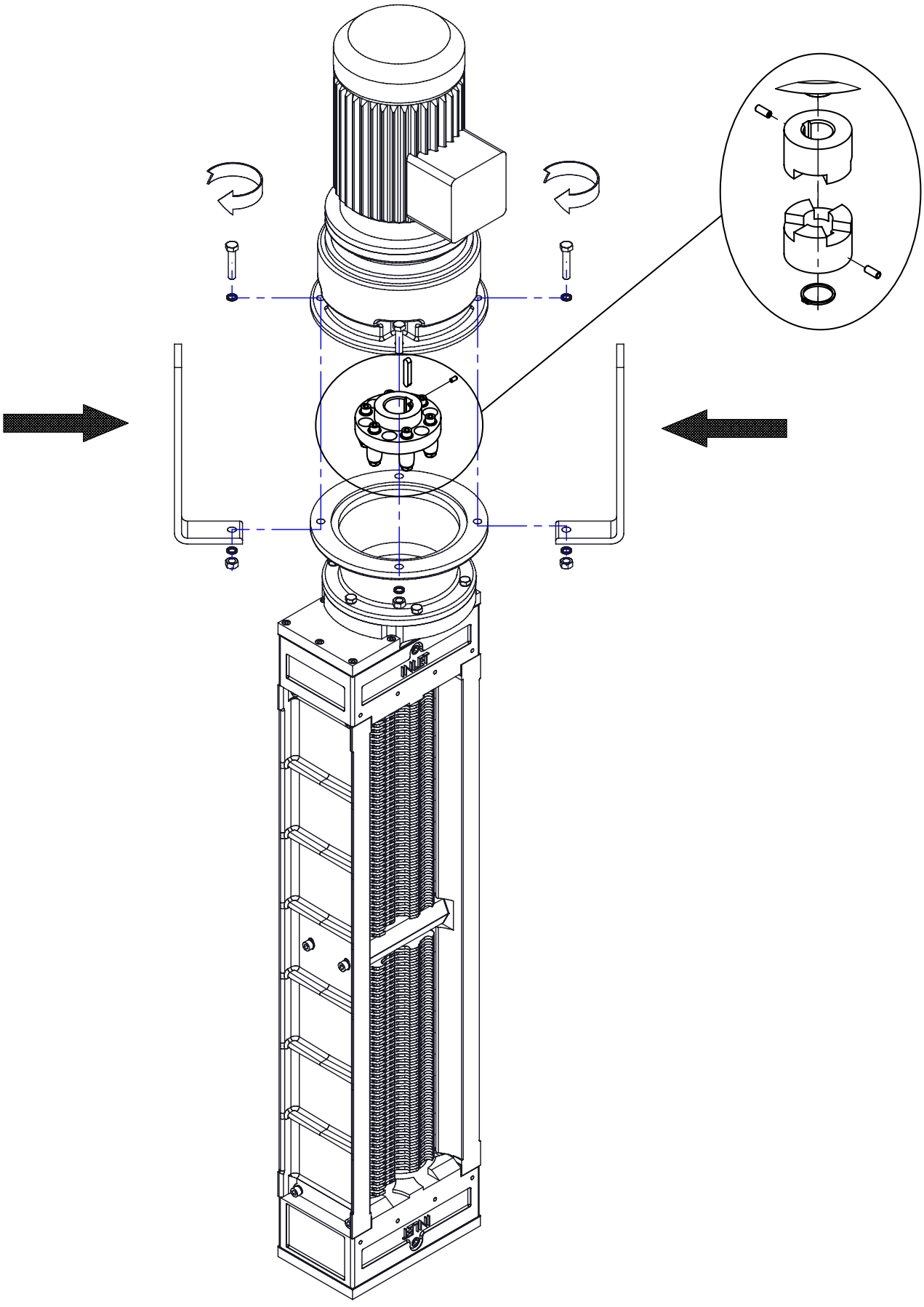
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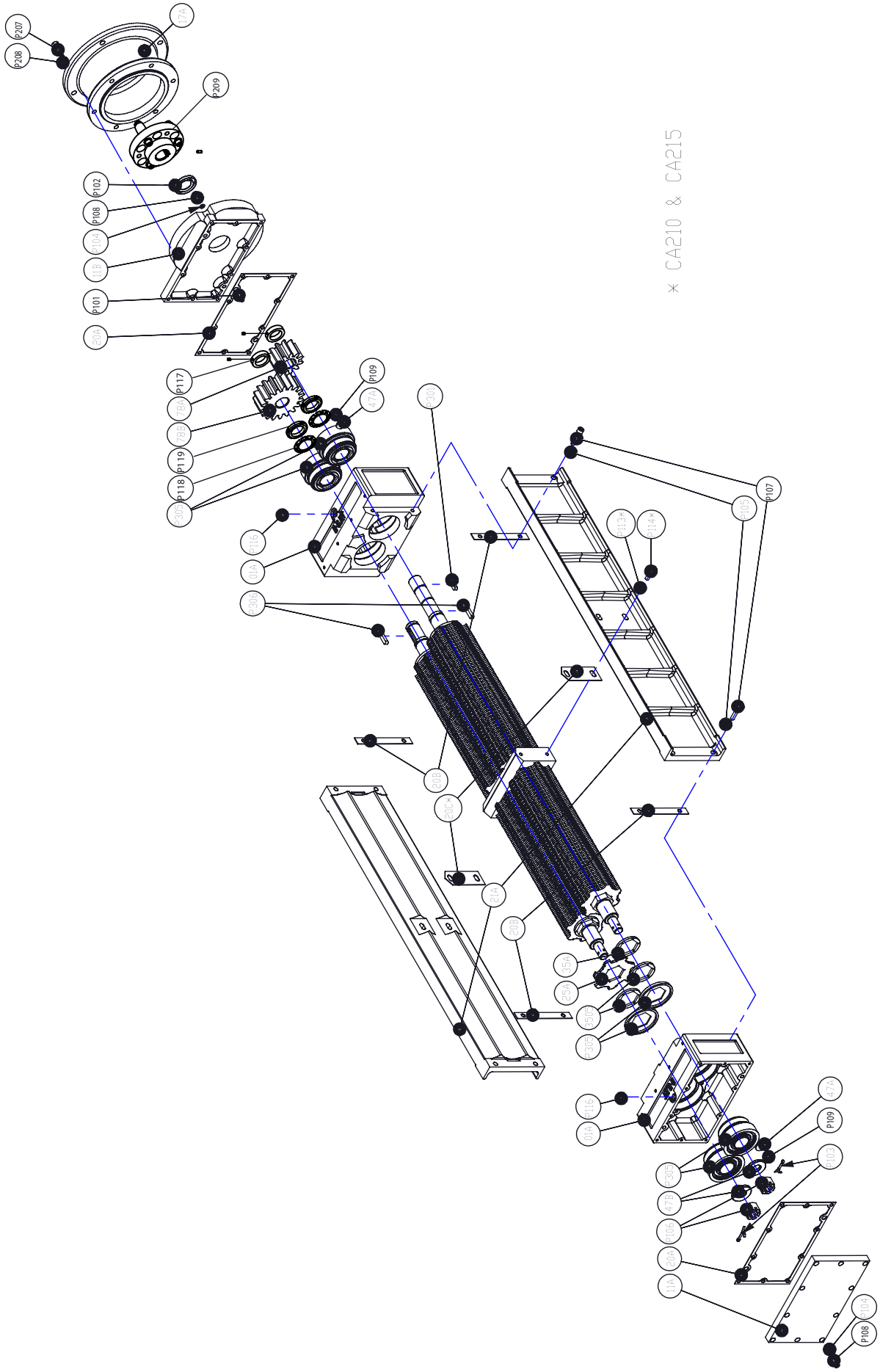
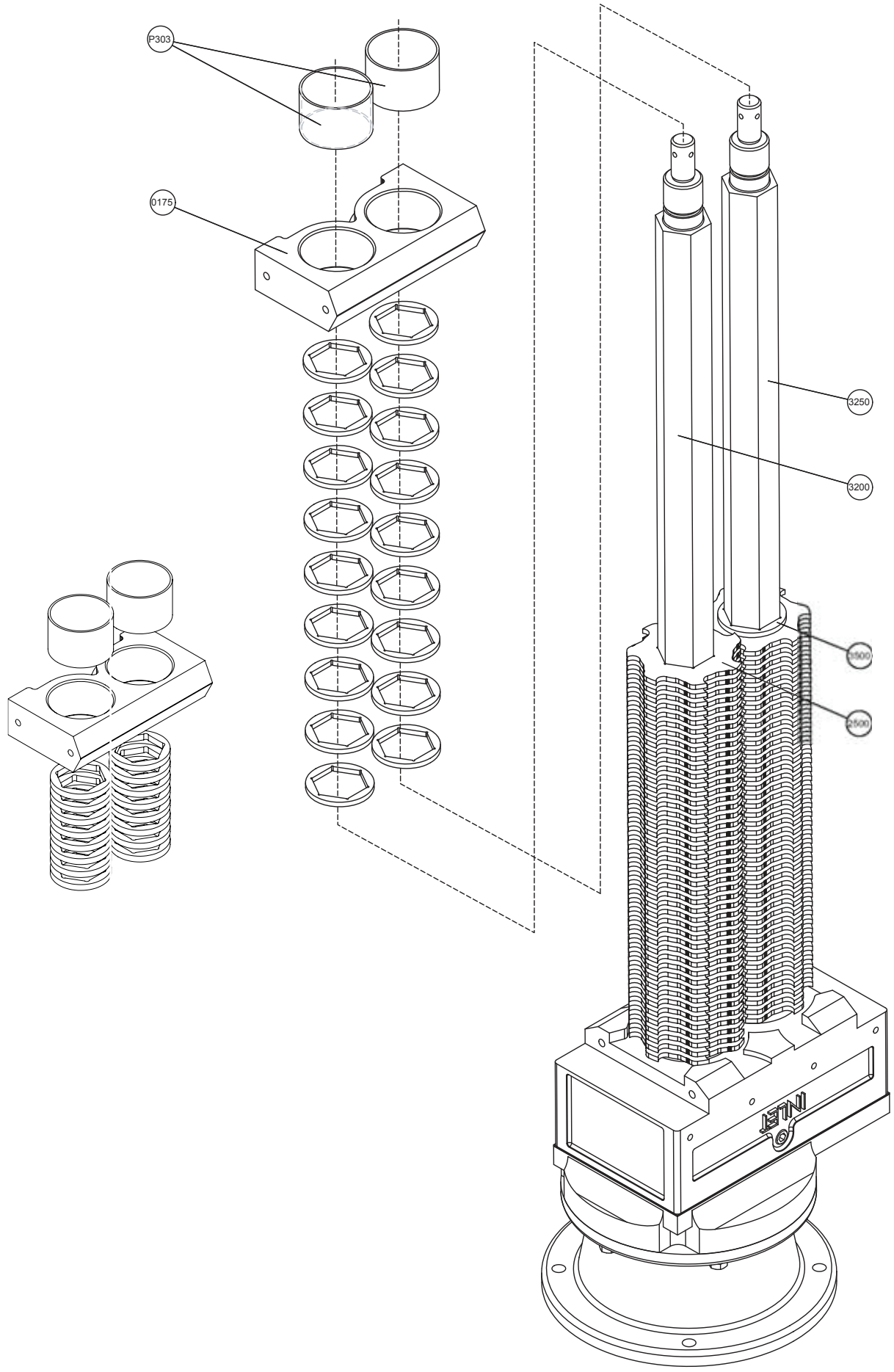
Exploded Views

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2500
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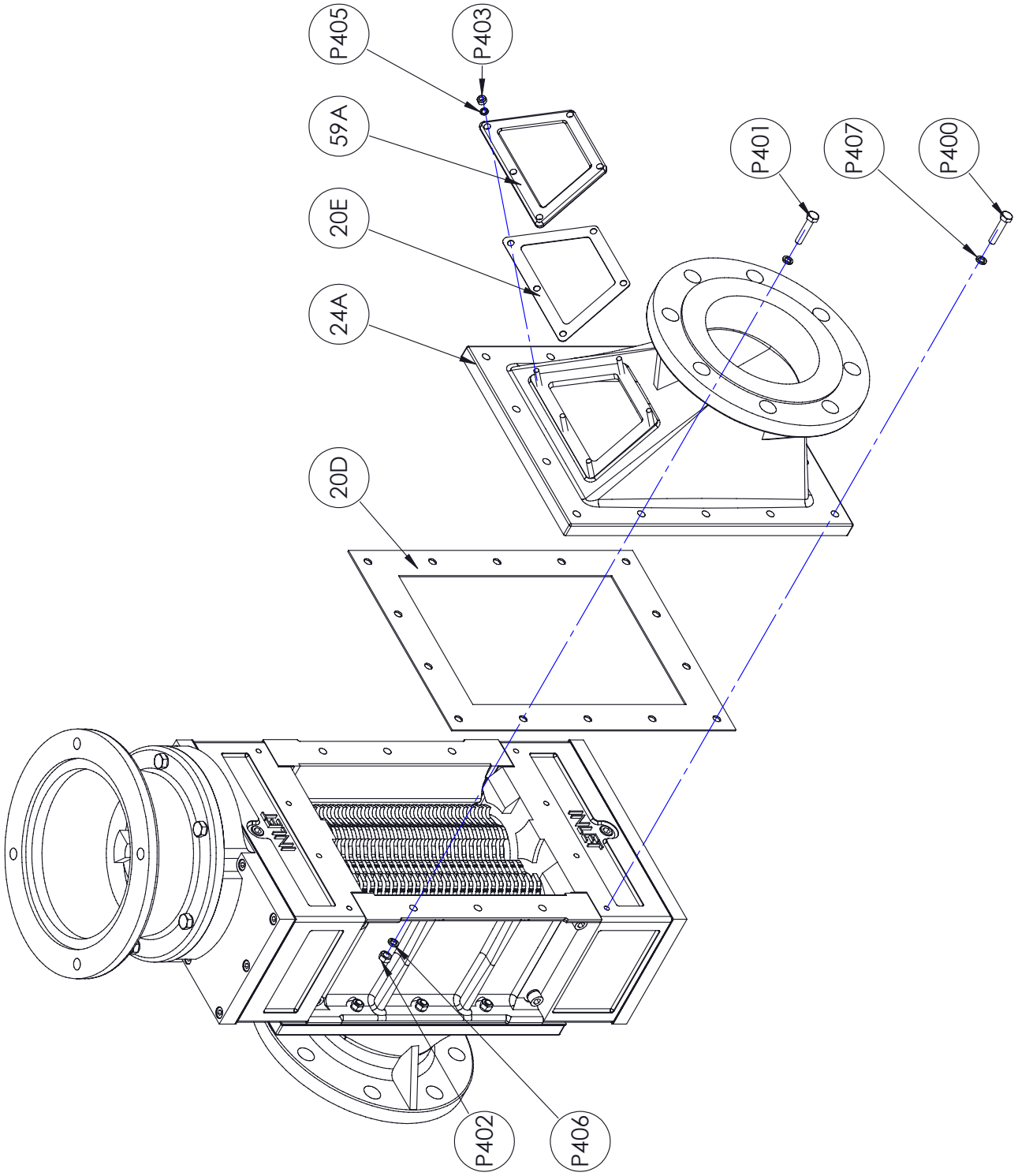
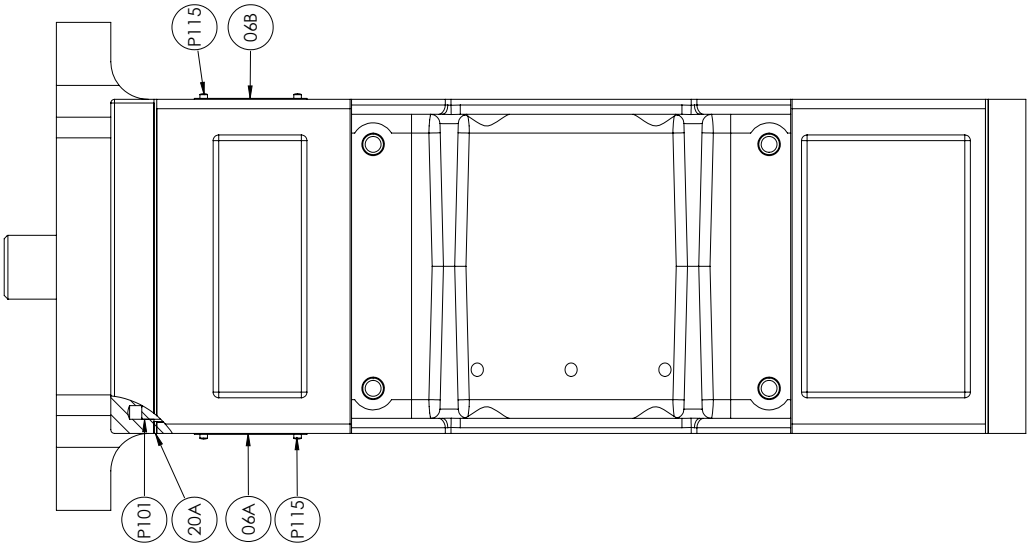
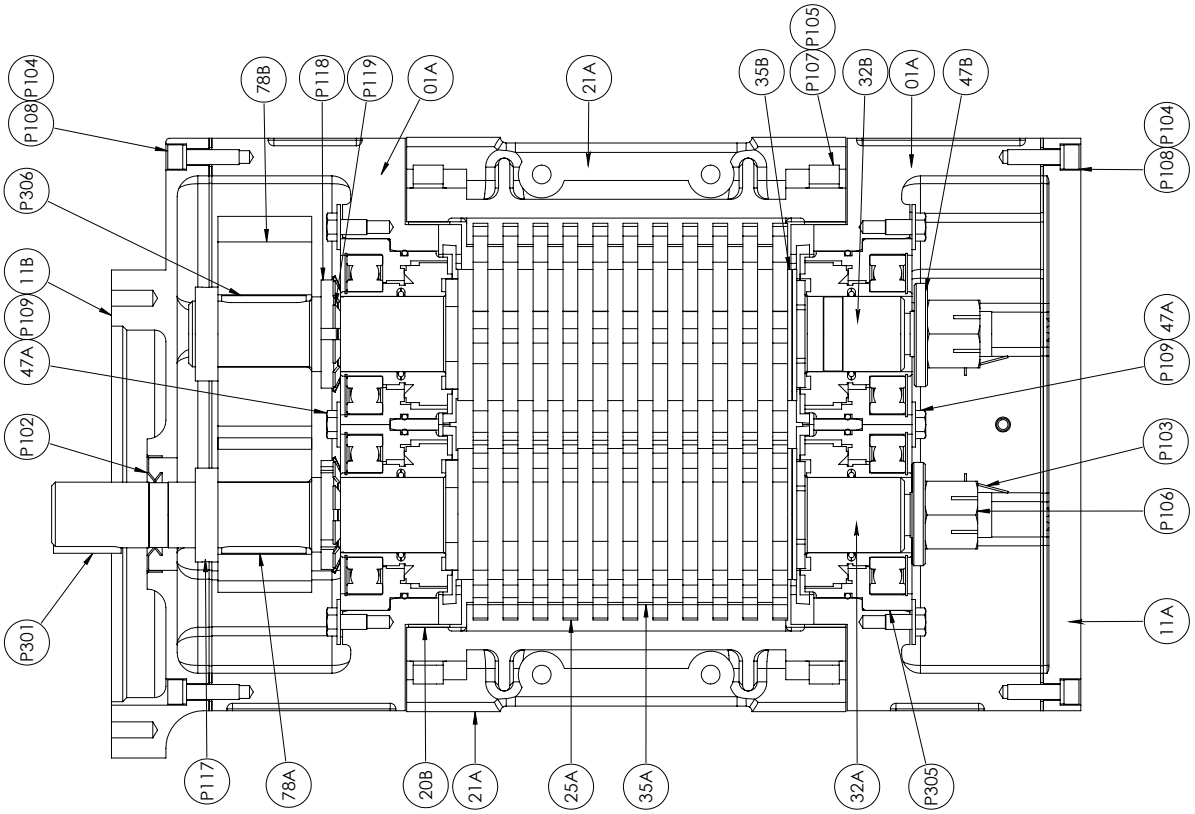

P405
P403
59A
20E
24A
20D
P401
P407
P400
P402
P406
INLET
OUTLET

Sectional Arrrangement

BODY PARTS		
ITEM	DESCRIPTION	QTY
01A	BEARING HOUSING	2
06A	NAMEPLATE (MUNCHER)	1
06B	NAMEPLATE (WARNING)	1
P305	MECHANICAL SEAL (INCL O-RINGS)	4
11A	COVER PLATE (BOTTOM)	1
11B	COVER PLATE (TOP)	1
20A	COVER PLATE GASKET	2
20B	SIDERAIL GASKET	4
47A	WASHER	8
47B	LOCK WASHER	2
78A	DRIVE GEAR	1
78B	DRIVEN GEAR	1
P101	DOWEL PIN	2
P102	ROTARY SHAFT LIPSEAL	1
P103	SPLIT COTTER PIN	2
P104	SGL COIL SPR WASHER	20
P105	ST STL SPR WASHER	8
P106	SLOTTED HEX NUT	2
P107	ST STL HEX SOC CAPSCREW	8
P108	ST STL HEX SOC CAPSCREW	20
P109	HEX HD SCREW	8
P113	ST STL SPR WASHER	4
P114	ST STL HEX SOC CAPSCREW	4
P115	DRIVESCREW	8
P116	HEX CSK PLUG	2
P117	ABUTMENT RING	2
P118	LOCK NUT	2
P119	LOCK WASHER	2
P301	RECT PAR KEY	1
P306	RECT PAR KEY	2

ROTATING PARTS		
21A	SIDERAIL	2
25A	CUTTER	*
32A	DRIVE SHAFT	1
32B	DRIVEN SHAFT	1
35A	CUTTER SPACER	*
35B	SHIM SPACER	*

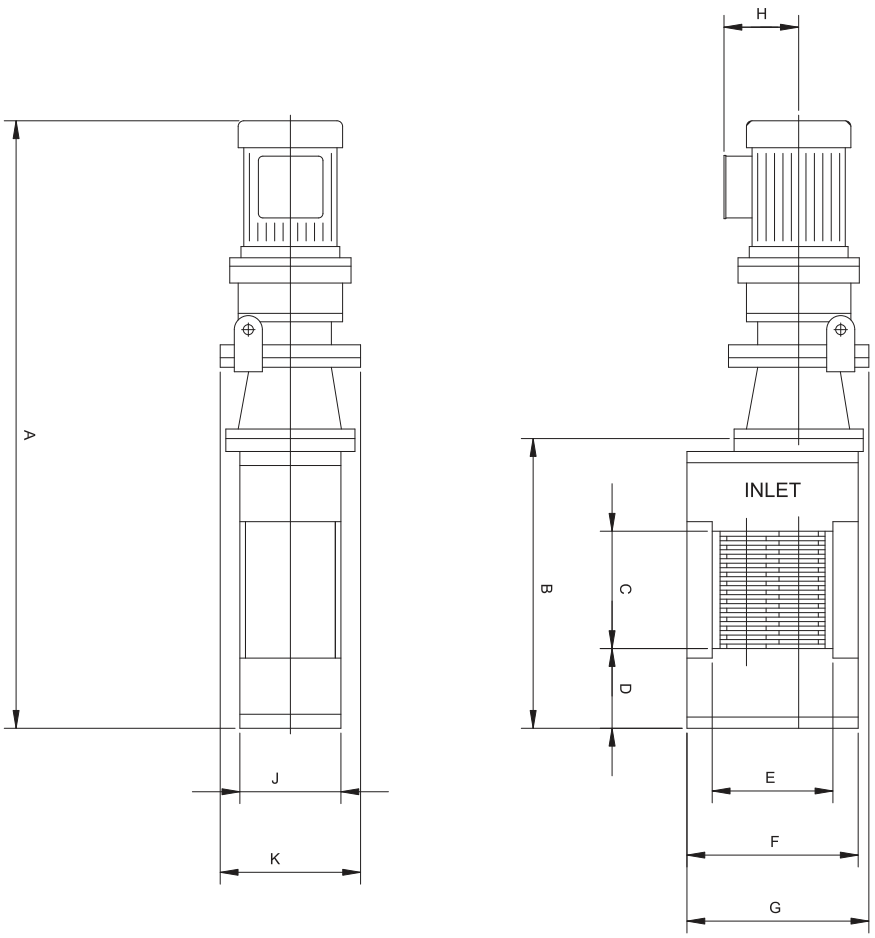




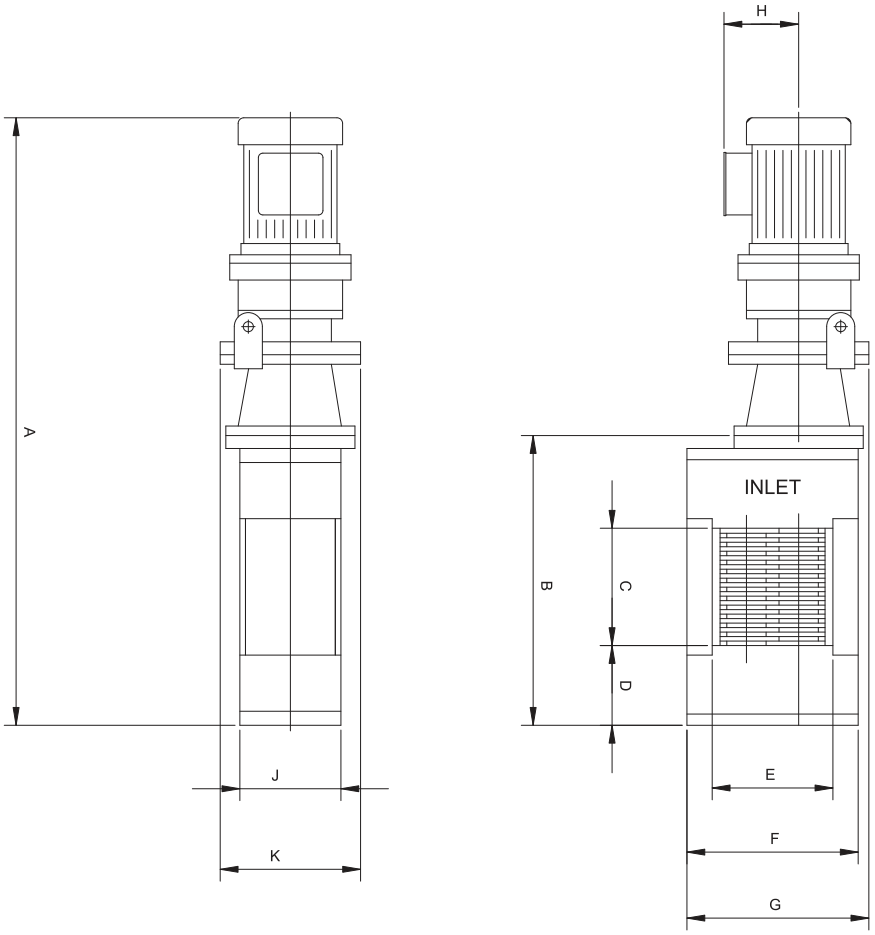
Adaptor Stool Coding

ADAPTOR STOOL CODE	ADAPTOR STOOL PART NO.	MUNCHER COUPLING PART NO.	GEARBOX COUPLING PART NO.	ONE PIECE	GEARBOX SHAFT DIAMETER	GEARBOX FLANGE/ P.C.D.
		SIZE CA202,CA203,CA205,CA206		SIZE CA210,-CA215		
G	CD A02A 1725	MS A02G 2626	MS A02G 2626	80B06891	35	250/215
H	CD A02A 1724	MS A02A 2601	MS A02A 2655	80B06892	40	250/215
J	CD A02A 1723	MS A02A 2601	MS A02B 2660	80B06893	45	250/215
K	CD A02A 1701	MS A02A 2600	MS A02A 2627		38	210/180
L	CD A02C 1701	MS A02A 2601	MS A02C 2627		48	260/230
M	CD A02B 1701	MS A02A 2601	MS A02B 2627		58	340/310

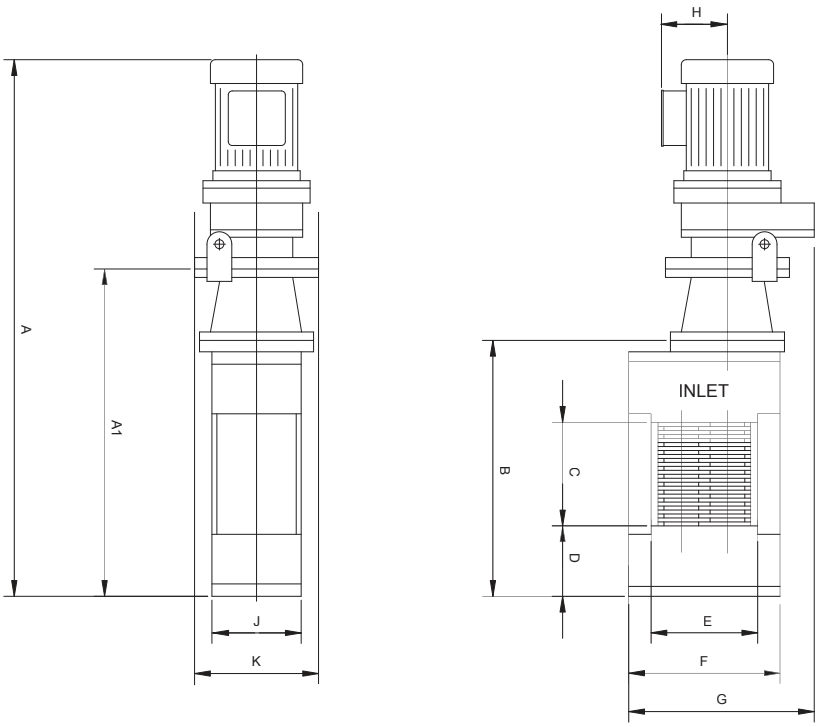
General Arrangements



MODEL	kW	DIM A mm	DIM B mm	DIM C mm	DIM D mm	DIM E mm	DIM F mm	DIM G mm (MAX)	DIM H mm (MAX)	DIM J mm	DIM K mm	MASS kg (MAX)	CONDUIT ENTRY mm
CA202AA	1.5	1059	515	175	155	215	305	350	145	178	260	159	21
CA203AA	1.5	1173	629	290	155	215	305	350	145	178	260	169	
CA205AA	1.5	1323	779	440	155	215	305	350	145	178	260	189	
CA206AA	1.5	1468	924	585	155	215	305	350	145	178	260	199	
CA210AA	1.5	1883	1339	1000	155	215	305	350	145	178	260	274	
CA202AB	2.2	1119	515	175	155	215	305	350	154	178	260	170	
CA203AB	2.2	1233	629	290	155	215	305	350	154	178	260	180	
CA205AB	2.2	1383	779	440	155	215	305	350	154	178	260	200	
CA206AB	2.2	1528	924	585	155	215	305	350	154	178	260	210	
CA210AB	2.2	1943	1339	1000	155	215	305	350	154	178	260	285	
CA215AB	2.2	2453	1849	1510	155	215	305	350	154	178	260	355	
CA202AC	4.0	1244	515	175	155	215	305	350	179	178	260	196	
CA203AC	4.0	1358	629	290	155	215	305	350	179	178	260	206	
CA205AC	4.0	1508	779	440	155	215	305	350	179	178	260	226	
CA206AC	4.0	1653	924	585	155	215	305	350	179	178	260	236	
CA210AC	4.0	2068	1339	1000	155	215	305	350	179	178	260	311	

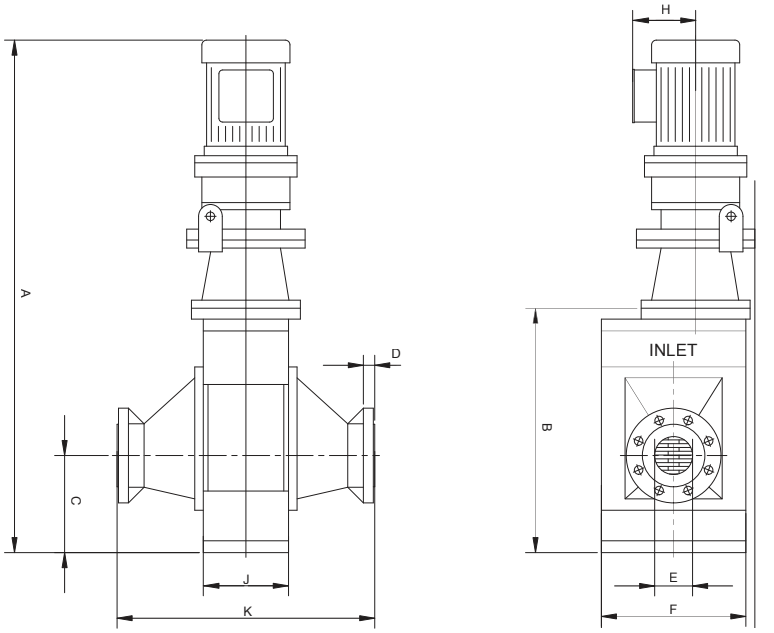


MODEL	MOTOR HP	DIM A inches	DIM B inches	DIM C inches	DIM D inches	DIM E inches	DIM F inches	DIM G inches (MAX)	DIM H inches (MAX)	DIM J inches	DIM K inches	MASS lb (MAX)	CONDUIT ENTRY inches
CA202AA	2.0	41.7	20.3	6.9	6.1	8.5	12.0	13.8	5.7	7.0	10.2	351	0.8
CA203AA	2.0	46.2	24.8	11.4	6.1	8.5	12.0	13.8	5.7	7.0	10.2	373	
CA205AA	2.0	52.1	30.7	17.3	6.1	8.5	12.0	13.8	5.7	7.0	10.2	417	
CA206AA	2.0	57.8	36.4	23.0	6.1	8.5	12.0	13.8	5.7	7.0	10.2	439	
CA210AA	2.0	74.1	52.7	39.4	6.1	8.5	12.0	13.8	5.7	7.0	10.2	605	
CA202AB	3.0	44.1	20.3	6.9	6.1	8.5	12.0	13.8	6.1	7.0	10.2	375	
CA203AB	3.0	48.5	24.8	11.4	6.1	8.5	12.0	13.8	6.1	7.0	10.2	397	
CA205AB	3.0	54.4	30.7	17.3	6.1	8.5	12.0	13.8	6.1	7.0	10.2	441	
CA206AB	3.0	60.2	36.4	23.0	6.1	8.5	12.0	13.8	6.1	7.0	10.2	463	
CA210AB	3.0	76.5	52.7	39.4	6.1	8.5	12.0	13.8	6.1	7.0	10.2	629	
CA215AB	3.0	96.6	72.8	59.4	6.1	8.5	12.0	13.8	6.1	7.0	10.2	783	
CA202AC	5.4	49.0	20.3	6.9	6.1	8.5	12.0	13.8	7.0	7.0	10.2	432	
CA203AC	5.4	53.5	24.8	11.4	6.1	8.5	12.0	13.8	7.0	7.0	10.2	455	
CA205AC	5.4	59.4	30.7	17.3	6.1	8.5	12.0	13.8	7.0	7.0	10.2	499	
CA206AC	5.4	65.1	36.4	23.0	6.1	8.5	12.0	13.8	7.0	7.0	10.2	521	
CA210AC	5.4	81.4	52.7	39.4	6.1	8.5	12.0	13.8	7.0	7.0	10.2	686	



MODEL	MOTOR kW	DIM A mm	DIM A1 mm	DIM B mm	DIM C mm	DIM D mm	DIM E mm	DIM F mm	DIM G mm (MAX)	DIM H mm (MAX)	DIM J mm	DIM K mm	MASS kg (MAX)
CA202AA	1.5	SEE DRIVE UNIT SPEC	634	515	175	155	215	305	SEE DRIVE UNIT SPEC	SEE DRIVE UNIT SPEC	178	260	121
CA203AA	1.5		748	629	290	155	215	305			178	260	131
CA205AA	1.5		898	779	440	155	215	305			178	260	151
CA206AA	1.5		1043	924	585	155	215	305			178	260	161
CA210AA	1.5		1458	1339	1000	155	215	305			178	260	236
CA202AB	2.2	SEE DRIVE UNIT SPEC	643	515	175	155	215	305	SEE DRIVE UNIT SPEC	SEE DRIVE UNIT SPEC	178	260	121
CA203AB	2.2		757	629	290	155	215	305			178	260	131
CA205AB	2.2		907	779	440	155	215	305			178	260	151
CA206AB	2.2		1052	924	585	155	215	305			178	260	161
CA210AB	2.2		1467	1339	1000	155	215	305			178	260	236
CA215AB	2.2		1977	1849	1510	155	215	305			178	260	306
CA202AC	4.0	SEE DRIVE UNIT SPEC	654	515	175	155	215	305	SEE DRIVE UNIT SPEC	SEE DRIVE UNIT SPEC	178	300	122
CA203AC	4.0		769	629	290	155	215	305			178	300	132
CA205AC	4.0		918	779	440	155	215	305			178	300	152
CA206AC	4.0		1063	924	585	155	215	305			178	300	162
CA210AC	4.0		1478	1339	1000	155	215	305			178	300	237

MODEL	MOTOR HP	DIM A inches	DIM A1 inches	DIM B inches	DIM C inches	DIM D inches	DIM E inches	DIM F inches	DIM G inches (MAX)	DIM H inches (MAX)	DIM J inches	DIM K inches	MASS lb (MAX)
CA202AA	2.0	SEE DRIVE UNIT SPEC	25.0	20.3	6.9	6.1	8.5	12.0	SEE DRIVE UNIT SPEC	SEE DRIVE UNIT SPEC	7.0	10.2	267
CA203AA	2.0		29.4	24.8	11.4	6.1	8.5	12.0			7.0	10.2	289
CA205AA	2.0		35.4	30.7	17.3	6.1	8.5	12.0			7.0	10.2	333
CA206AA	2.0		41.1	36.4	23.0	6.1	8.5	12.0			7.0	10.2	355
CA210AA	2.0		57.4	52.7	39.4	6.1	8.5	12.0			7.0	10.2	521
CA202AB	3.0	SEE DRIVE UNIT SPEC	25.3	20.3	6.9	6.1	8.5	12.0	SEE DRIVE UNIT SPEC	SEE DRIVE UNIT SPEC	7.0	10.2	267
CA203AB	3.0		29.8	24.8	11.4	6.1	8.5	12.0			7.0	10.2	289
CA205AB	3.0		35.7	30.7	17.3	6.1	8.5	12.0			7.0	10.2	333
CA206AB	3.0		41.4	36.4	23.0	6.1	8.5	12.0			7.0	10.2	355
CA210AB	3.0		57.8	52.7	39.4	6.1	8.5	12.0			7.0	10.2	521
CA215AB	3.0		77.8	72.8	59.4	6.1	8.5	12.0			7.0	10.2	675
CA202AC	5.4	SEE DRIVE UNIT SPEC	25.7	20.3	6.9	6.1	8.5	12.0	SEE DRIVE UNIT SPEC	SEE DRIVE UNIT SPEC	7.0	11.8	269
CA203AC	5.4		30.3	24.8	11.4	6.1	8.5	12.0			7.0	11.8	291
CA205AC	5.4		36.1	30.7	17.3	6.1	8.5	12.0			7.0	11.8	335
CA206AC	5.4		41.9	36.4	23.0	6.1	8.5	12.0			7.0	11.8	357
CA210AC	5.4		58.2	52.7	39.4	6.1	8.5	12.0			7.0	11.8	523



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MODEL	MOTOR kW	DIM A mm	DIM A1 mm	DIM B mm	DIM C mm	DIM D mm	DIM E mm	DIM F mm	DIM G mm (MAX)	DIM H mm (MAX)	DIM J mm	DIM K mm	MASS kg (MAX)
CA202BA	2	SEE DRIVE UNIT SPEC	634	515	205	24	80	305	SEE DRIVE UNIT SPEC	SEE DRIVE UNIT SPEC	178	544	149
CA202CA	2		634	515	205	24	100	305			178	544	150
CA202DA	2		634	515	205	24	150	305			178	544	152
CA203DA	2		748	629	230	24	150	305			178	544	167
CA203EA	2		748	629	255	24	200	305			178	584	179
CA205FA	2		898	779	280	24	250	305			178	684	224
CA206GA	2		1043	924	305	24	300	305			178	784	268
CA202BB	2	SEE DRIVE UNIT SPEC	643	515	205	24	80	305	SEE DRIVE UNIT SPEC	SEE DRIVE UNIT SPEC	178	544	149
CA202CB	2		643	515	205	24	100	305			178	544	150
CA202DB	2		643	515	205	24	150	305			178	544	152
CA203DB	2		757	629	230	24	150	305			178	544	167
CA203EB	2		757	629	255	24	200	305			178	584	179
CA205FB	2		907	779	280	24	250	305			178	684	224
CA206GB	2		1052	924	305	24	300	305			178	784	268
CA202BC	4	SEE DRIVE UNIT SPEC	654	515	205	24	80	305	SEE DRIVE UNIT SPEC	SEE DRIVE UNIT SPEC	178	544	150
CA202CC	4		654	515	205	24	100	305			178	544	151
CA202DC	4		654	515	205	24	150	305			178	544	153
CA203DC	4		768	629	230	24	150	305			178	544	168
CA203EC	4		768	629	255	24	200	305			178	584	180
CA205FC	4		918	779	280	24	250	305			178	684	225
CA206GC	4		1063	924	305	24	300	305			178	784	269

MODEL	MOTOR HP	DIM A inches	DIM A1 inches	DIM B inches	DIM C inches	DIM D inches	DIM E inches	DIM F inches	DIM G inches (MAX)	DIM H inches (MAX)	DIM J inches	DIM K inches	MASS lb (MAX)
CA202BA	2	SEE DRIVE UNIT SPEC	25	20	8	1	3	12	SEE DRIVE UNIT SPEC	SEE DRIVE UNIT SPEC	7	21	329
CA202CA	2		25	20	8	1	4	12			7	21	331
CA202DA	2		25	20	8	1	6	12			7	21	335
CA203DA	2		29	25	9	1	6	12			7	21	368
CA203EA	2		29	25	10	1	8	12			7	23	395
CA205FA	2		35	31	11	1	10	12			7	27	494
CA206GA	2		41	36	12	1	12	12			7	31	591
CA202BB	3	SEE DRIVE UNIT SPEC	25	20	8	1	3	12	SEE DRIVE UNIT SPEC	SEE DRIVE UNIT SPEC	7	21	329
CA202CB	3		25	20	8	1	4	12			7	21	331
CA202DB	3		25	20	8	1	6	12			7	21	335
CA203DB	3		30	25	9	1	6	12			7	21	368
CA203EB	3		30	25	10	1	8	12			7	23	395
CA205FB	3		36	31	11	1	10	12			7	27	494
CA206GB	3		41	36	12	1	12	12			7	31	591
CA202BC	5	SEE DRIVE UNIT SPEC	26	20	8	1	3	12	SEE DRIVE UNIT SPEC	SEE DRIVE UNIT SPEC	7	21	331
CA202CC	5		26	20	8	1	4	12			7	21	333
CA202DC	5		26	20	8	1	6	12			7	21	338
CA203DC	5		30	25	9	1	6	12			7	21	371
CA203EC	5		30	25	10	1	8	12			7	23	397
CA205FC	5		36	31	11	1	10	12			7	27	496
CA206GC	5		42	36	12	1	12	12			7	31	594

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