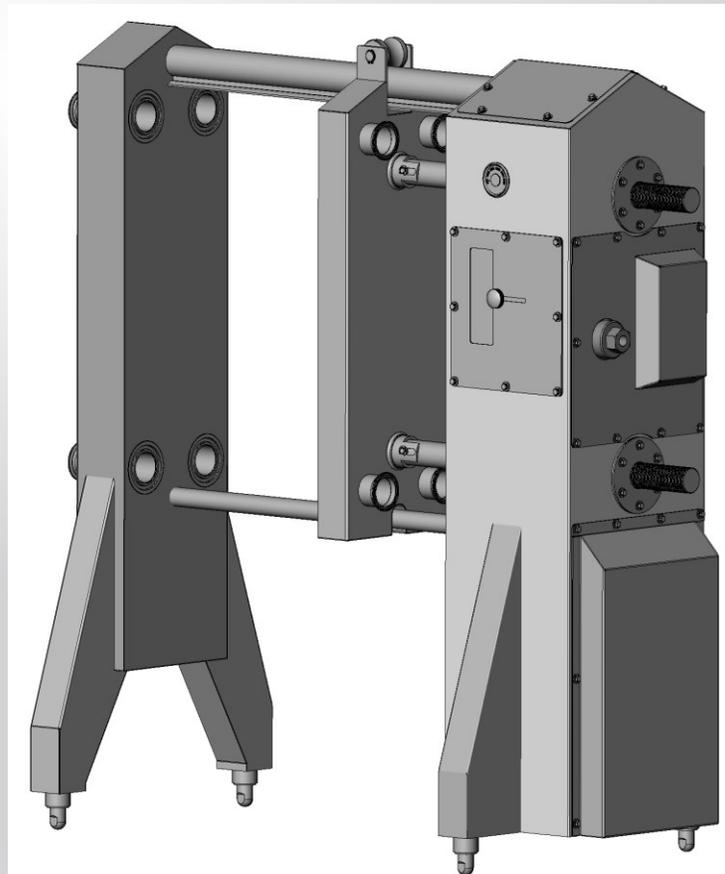




AGC Model Pro21-H

Operation and Maintenance Manual



proflow^{sanitary}
SERIES

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Scope:

This manual is intended to be a supplement to the **AGC Heat Transfer Proflow** Operation Manual. The information provided here is for the normal operation and installation of the AGC Model Pro21-H Plate Heat Exchanger. Please read and follow all safety instructions contained in this manual. Failure to follow all safety recommendations could result in serious injury to the operator or cause damage to the press. If you need additional information or spare parts for this or any other equipment built by AGC please contact your local AGC distributor.

Receiving and Inspection:

Each AGC frame is assembled and fully tested at the factory prior to shipping. After testing, the unit is prepared for shipping. When the press leaves the factory it is in perfect condition. Upon arrival, carefully inspect the frame for any damage that may have occurred during shipping. If the frame was damaged during shipping report this to AGC immediately. In most cases the frame is shipped assembled with the plates in a separate crate. Because each frame can weigh over 2,500 pounds, only qualified and licensed forklift truck drivers should lift and position the frame. Figure 1 shows the major frame components. Depending on the application, your frame may or may not be equipped with one or more terminals.

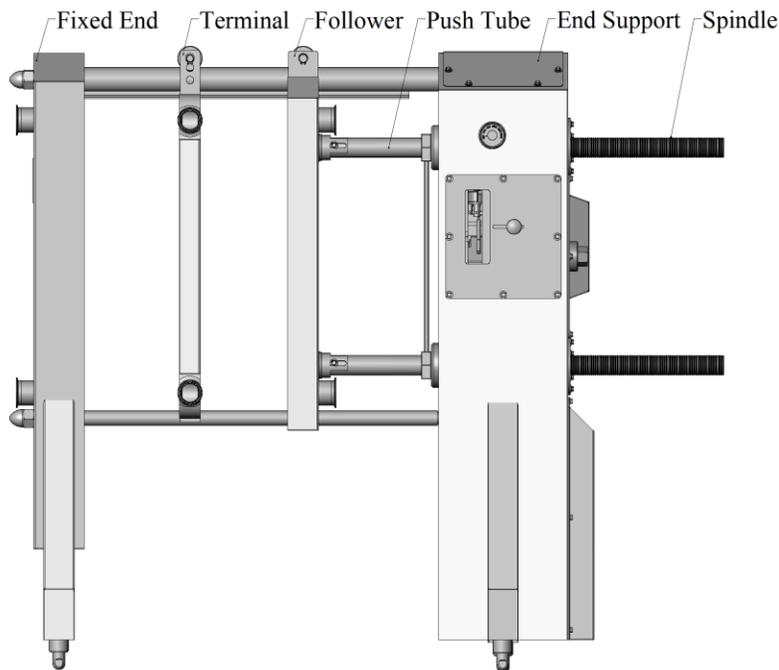


Figure 1
Major Frame Components

Locate the drawing package that was shipped with your frame. This drawing package contains important information specific to your frame. If your frame was delivered without a

drawing package, contact AGC or your local AGC distributor for a replacement package prior to installing the frame.

Frame Placement:

The Pro21-H frame should be located on a firm flat surface capable of supporting the press and all of its contents when full. Ensure that adequate space is left around the frame for maintenance and plate installation/removal. The drawing package will show the clearance required for the spindle shafts to be fully retracted. This is the required minimum dimension for the end support.

Each frame is equipped with adjustable ball feet to compensate for minor floor variations. To adjust the ball foot height, turn the base of the foot clockwise to raise and counter clockwise to lower. **CAUTION:** Never exceed the maximum port height dimension shown on the streaming diagram. If this dimension is exceeded, the leg could disengage from the socket and the frame could tip.

When moving the frame, the top rail can provide a good lifting point. However, when using the top rail as a lifting point, exercise caution to prevent damaging the plate hanger. Do not attempt to lift a frame using the port nozzles as a lifting point. Lifting a frame by the port nozzles could crack the nozzles causing leaks. Moving a frame that is fully populated with plates is not recommended.

Normal Operation:

The AGC Model Pro21-H (Hydraulic) end support is designed to provide easy opening and closing of the Model Pro21 Plate Heat Exchanger. As with all plate heat exchangers, the unit must be cooled below 90° F and relieved of all internal pressure before opening. **Failure to follow this safety warning could result in serious injury to the operator or damage to the plates and/or plate gaskets.**

The hydraulic end support uses an electric motor to power the hydraulic pump. The hydraulic system is used only when opening or closing the frame and should not be operated when the press is processing product, during the cleaning cycle (CIP), or any time fluids are being circulated through the plate pack.

Opening or closing the press is done by using the open/close valve, which is accessible through a splashguard located on the side of the end support (see figure 2). This is a three-position (open/neutral/close) valve equipped with detents that will hold the valve either in the open or closed position for a majority of the closing or opening process. It has been set at the factory to close the press to the “dead-hard” condition when the valve is held in the closed position. When the plates are new it is permissible to operate the unit at or below the start dimension, but never below the minimum. After years of service and depending on the amount of operating pressure, valve movement or starting and stopping of pumps, the plates contact points may begin to show normal wear. If this condition exists you may find the hydraulic system will tighten the unit below the originally installed dimension or even below the minimum dimension (not normally) to obtain a “dead-hard” condition. Refer to the operator maintenance section for instructions on adjusting the hydraulic system pressure.

In the event of a power failure, the press can be opened or closed manually by turning the hex on the sprocket drive shaft. Rotate clockwise to open, and counter clockwise to close. Note: Because of the gear reduction used in the closing mechanism, manually opening or

closing the frame isn't practical and should only be considered as an option in extreme circumstances.

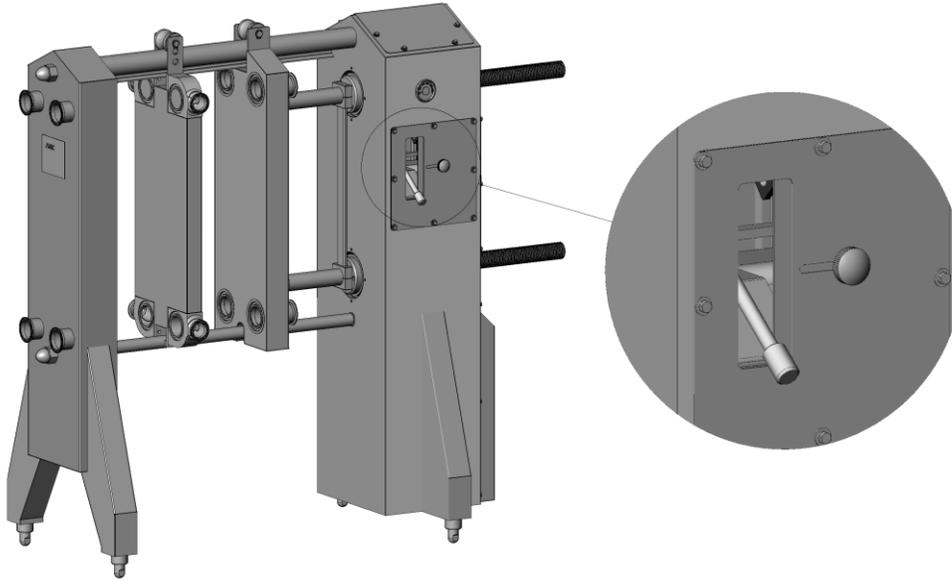


Figure 2
Open/Close Lever

Closing the Frame:

After all the plates and any terminals are installed into the frame it can be closed. Refer to the streaming diagram that was provided with the heat exchanger to determine the proper plate configuration and piping requirements. The Pro21-H will provide enough closing power to compress the plate pack to the factory recommended minimum or “dead-hard” dimension. The press is equipped with a pressure gauge that provides information on how much pressure is being developed in the system as the plate pack compresses. This pressure is associated with the amount of resistance the plates are providing to the spindle screws. The streaming diagram will have a start dimension and a minimum dimension. Figure 3 shows where this information is listed on the drawing. Note: The dimensions for each frame will be listed on the streaming diagram shipped with that frame.

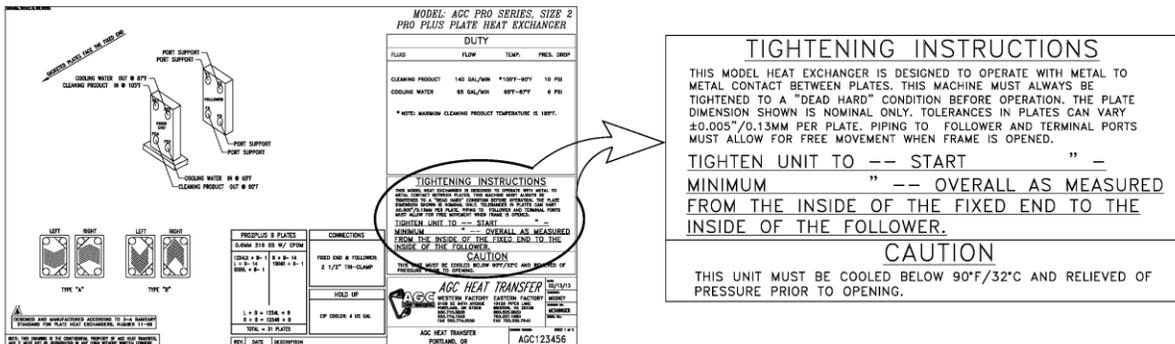


Figure 3
Streaming Diagram Sample

To close the frame, apply power to the hydraulic power unit. Before closing the press the operator should make sure all pipes and lines are clear and the plates are in the correct arrangement per the drawing. Move the open/close lever to the upper locked position. This lock or detent will hold the valve in position until the frame is approximately one to two inches from the start dimension. If this is the first time closing a new press or the first closure after installing new plates the compressed dimension should be observed and compared to that shown on the drawing. Hold the handle in the closed position and continue closing until the unit stalls. After the unit stalls you will be at the “dead-hard” dimension, which is between the start and minimum dimension for a new unit. You are now ready for operation. It should also be noted that as the plates compress, it is normal for the plate pack to make crackling noises. This is caused by the plates sliding along the support rail and is not a cause for alarm. After the hydraulic unit has stopped closing (stalled) disconnect power to the unit and make a note of the actual “dead-hard” dimension as shown in figure 4. If this dimension is below the minimum and the plates are installed per the drawing, you should consider purchasing a new plate pack or obtain a professional opinion from one of our factory engineers as to the actual condition of the plates.

Installation of new gaskets and/or plates is recommended if external leakage is observed when operating at the minimum dimension or below.

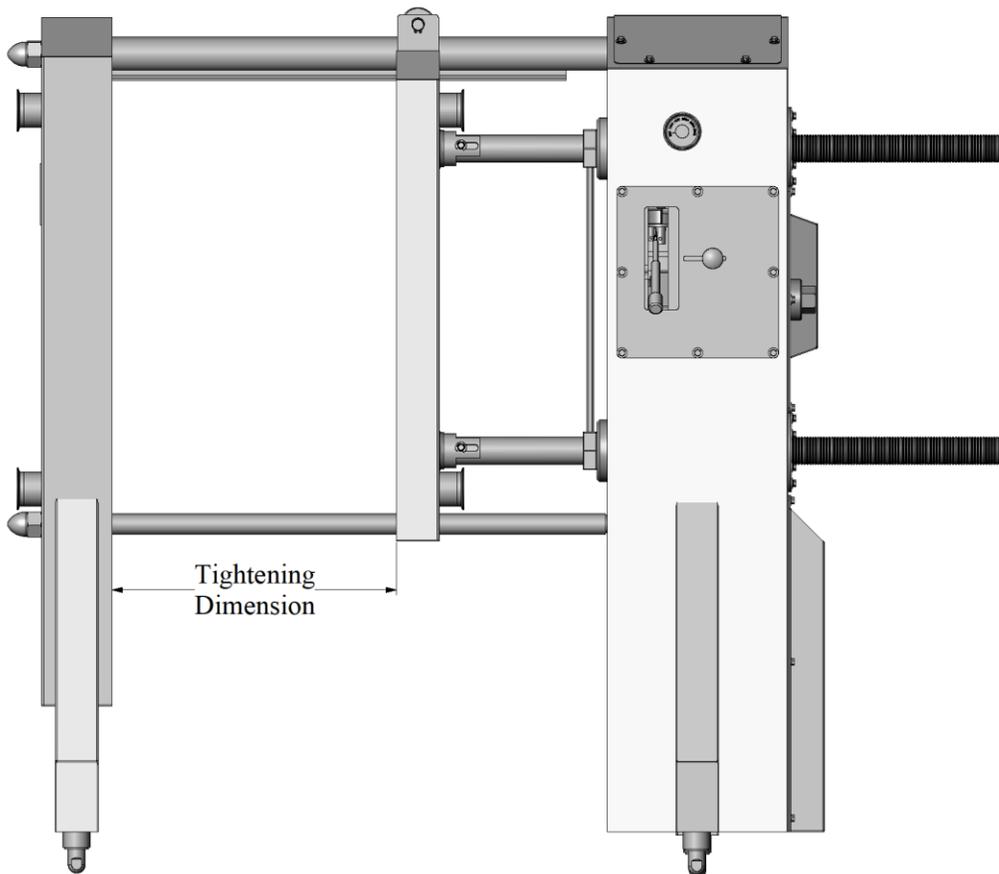


Figure 4
Tightening Dimension

The heat exchanger should be pressure tested to check for leaks. If the pressure check passes, the frame is ready to be put into service.

Opening the Frame:

To open the frame, apply power to the hydraulic power unit. Move the open/close lever down to the open position. The handle is equipped with detents that will hold the lever in the open position after the unit is opened slightly. The spindle shafts will start to retract and the follower will move back toward the end support. The follower will only move back as the plate pack expands to its uncompressed state. As the spindles retract the pushtubes may disengage from the spindles. This could allow the pushtube to rotate about the supporting pin causing the pushtube to swing down (see figure 5). Caution should be exercised when opening the frame to prevent injury by the pushtube.

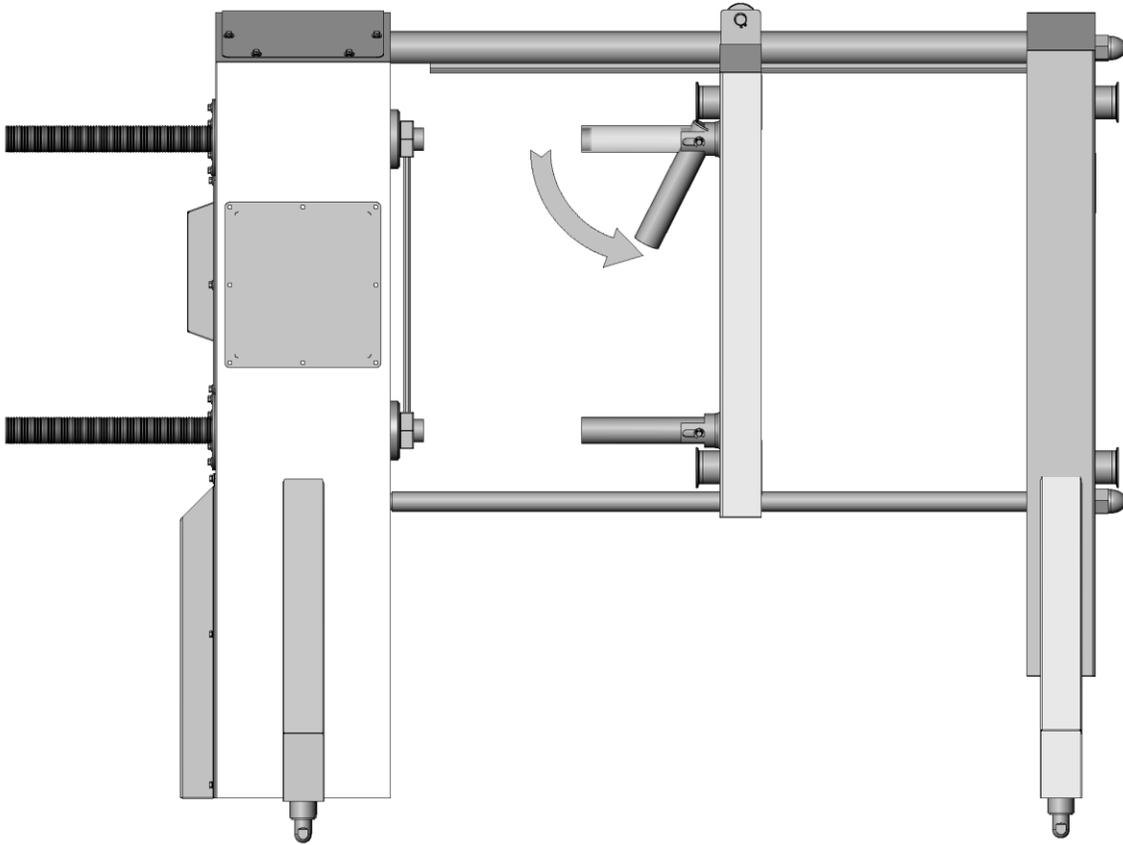


Figure 5
Pushtube Swing

When retracting the spindles, it is recommended to back the spindles out only to the point that the plates can be removed. Once the spindles have been adequately retracted the handle should be moved to the center (neutral) position.

Electrical Connections:

Only a qualified electrician following all applicable local regulations should make the electrical connections to the motor. Because each installation is different, no holes are predrilled at the factory for electrical connections. The frame is designed with adequate spacing for a conduit to run from either the top or the bottom. The top cover is 14-gauge sheet metal and will support a conduit connector if power is routed through the top of the frame. The electrical motor is a 230/460V 3 phase 5 horsepower NEMA 184T frame unit. The hydraulic power unit is self-contained and can be removed for maintenance or during initial installation to allow easier access to the electrical connections as shown in figure 6. To remove the reservoir assembly, remove the two fasteners located at the back of the tank. The assembly will slide out as shown in the figure. After connecting the motor, return the reservoir to its original location and secure it.

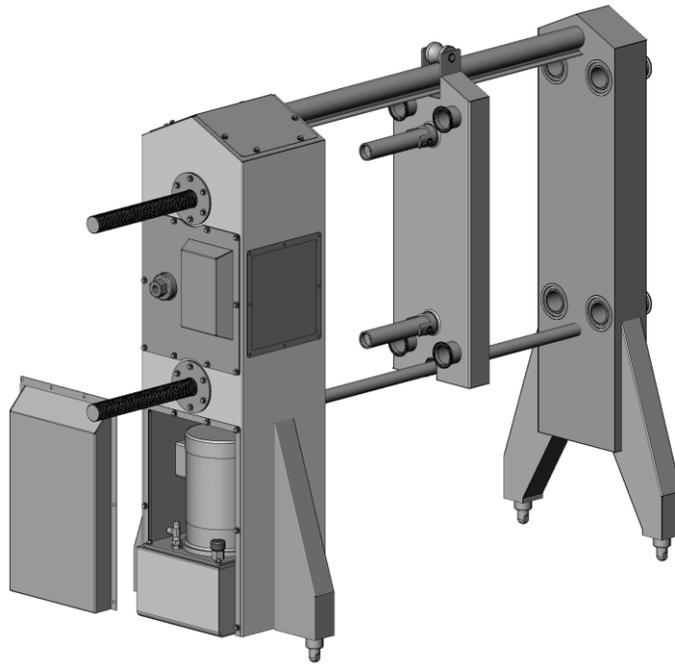


Figure 6
Reservoir Assembly

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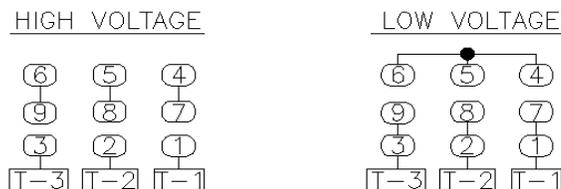


Figure 7
Wiring Diagram

If the rotation of the motor is incorrect, the pump will not produce pressure and the system will not operate. To reverse the rotation of the motor, swap T-2 and T-3 at the motor.

Hydraulic Power Unit:

After the electric motor is connected, the hydraulic power unit and associated components can be tested/verified. The Pro21-H hydraulic power unit is capable of producing a maximum of 3500 psi. This maximum pressure is regulated down using a pressure-regulating valve. This valve is pre-set at the factory to match the system requirements for closing a new plate pack. As the plates and gaskets age it may be necessary to adjust the hydraulic system pressure. To adjust the pressure follow the procedure described in the Operator Maintenance section of this manual.

Typically the press is shipped from the factory with a full reservoir. However, if the press is shipped disassembled, the oil will be shipped in a separate container. Prior to testing the motor, ensure the hydraulic reservoir is full. The tank capacity is four gallons and should be run full. To check the oil, remove the breather cap. The cap is fitted with a dipstick. The oil level should be visible on the stick near the full indicator line.

The Pro21-H is equipped with a pressure gauge visible to the operator during normal operation. This gauge shows the pressure being developed by the hydraulic system. If after applying power to the electric motor, no hydraulic pressure is developed the most probable cause is incorrect motor rotation. To change the rotation of the motor, refer to the Electrical Connections portion of this manual.

Upgrading a Manual Frame:

If you are upgrading a manual frame by installing the AGC Model Pro21-H end support it will be necessary to remove the manual end support. The procedure described here is a basic overview of the steps necessary to complete this task. It is assumed that the persons performing this work are qualified in the safe handling of heavy machine components. Great caution must be exercised when removing the component parts of the Pro21. The follower is the heaviest component, weighing in excess of 400 pounds, and could cause serious injury if mishandled.

Prior to opening the frame all pressure should be relieved and the frame must be cooled to a safe opening temperature. After the frame is cooled below 90° F the plates, terminals if any, and follower must be removed. To remove the terminals and follower, the frame should be stood upright on flat stable ground. The terminals are held in place by one stainless steel support pin.

Removing the Terminal:

1. Support the weight of the terminal with rigging suitable to support 500 lbs. At the factory a cinch-type sling and a forklift truck are used. The cinch strap is placed approximately in the center of the terminal and then a forklift is used to lift the terminal slightly. The roller pin is then removed. The port nozzles are not suitable lifting points. Attempting to lift the terminal by the nozzles could damage the nozzles.
 - a. To remove the roller pin first remove the circlip and set collars.
 - b. Slide the pin out of the roller.
 - c. Tilt the terminal bottom until the terminal clears the bottom rail.
 - d. Lower the terminal until the hanger clears the top rail.
2. Repeat step one above for all other terminals.

3. The procedure for removing the follower is similar to removing the terminals. As with the terminals, the port nozzles are not suitable lifting points. Attempting to lift the follower by the nozzles could damage the nozzles causing internal leaks in the follower.
4. Using rigging capable of supporting 500 lbs, support the weight of the follower. As with the terminals, a cinch strap is used to support the follower.
 - a. Lift the follower enough to remove the support pins. Once the support pins and rollers are removed, tilt the bottom of the follower enough to slide it over the bottom rail.
 - b. Remove the follower from the frame.

The next step is to remove the manual end support. This is accomplished by laying the frame on its side supported by blocks. One set of blocks should be 18½” tall. The other should be 24¾” tall. The shorter blocks will support the fixed end. The larger blocks should be placed under each rail.

Once the frame is supported on the ground, the end support can be removed by removing the two large acorn nuts holding the rails. Using a forklift carefully slide the end support off the rails.

The Pro21-H end support can now be installed by carefully sliding the end support onto the rails. After the end support is on the rails the acorn nuts can be replaced. The top rail is tightened down hard, however the **bottom rail is tightened only enough to ensure the frame members are parallel**. Over-tightening the bottom rail will damage the rail cladding and prevent the frame from operating properly.

Operator Maintenance:

The unit is designed to operate reliably with little operator maintenance. However, when servicing the frame observe all lockout/tagout regulations prescribed by your company. In addition, you should **NEVER OPEN THE PRESS WHEN IT IS PRESSURIZED OR WHEN IT IS HOT**. The press must be cooled below 90° F prior to opening.

A good preventative maintenance schedule will minimize or eliminate major mechanical problems. Operating the press regularly will help to keep the mechanical components in good working order. The press has three (3) lube points (figure 10) that should be lubed monthly.

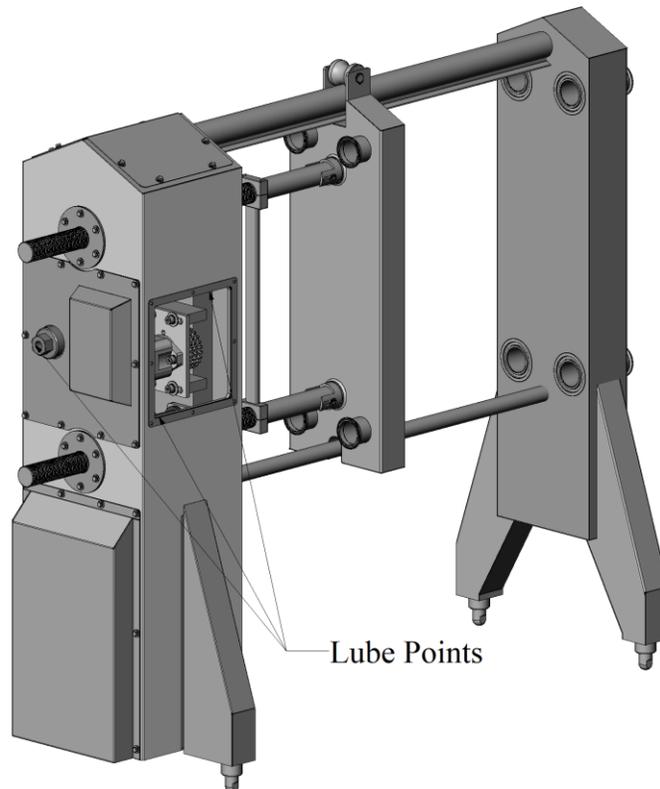


Figure 10
Lube Points

Press Monthly Lube/Inspection:

1. Lockout/Tagout the voltage supply to the press.
2. Remove the side maintenance cover by removing the 8 bolts holding the cover.
3. Inspect the door gasket for tears or cracks. Replace as required. Both covers use the same gasket (AGC Part Number 11015233).
4. Inspect drive chains for excessive wear or defects. Lubricate chain with food grade chain lubricant.
5. Inspect hydraulic hoses for signs of leakage or swelling. Replace hoses as necessary. (Contact AGC for appropriate part number.)
6. Locate grease fittings as shown in figure 10. Using food grade grease, lube the three points liberally.
7. Replace the covers removed in steps 2 and 3 above.
8. Inspect the spindle shafts for signs of wear.
9. Apply food grade grease to the exposed threads of the spindle shaft.
10. Remove lockout/tagout device and return press to service.

Because the spindle screws only receive lubrication when they are being moved, the press should be opened/operated once a month. If the procedures in your plant don't allow for opening the press monthly, at a minimum the spindle shafts should be moved out and back to distribute grease.

Spindle Preventative Maintenance:

1. Read all instructions in this procedure before beginning maintenance.
2. Relieve press of all internal product/media pressure.
3. Ensure press is cooled below 90° F.
4. Measure and record the compressed dimension of the plate pack (see figure 4).
5. Apply power to the hydraulic power unit.
6. Open splashguard on back of end support and slide the control valve handle out.
7. Move the control valve handle down while measuring the compressed dimension of the plate pack. You will be opening the press approximately ½”.
8. Move the control handle to the upper position to return the plate pack to the compressed dimension measured in step 4 above. Do not exceed the minimum dimension listed on your drawing.
9. Return handle to neutral position and close splashguard door.
10. Remove power from the hydraulic power unit and return press to normal operation.

Hydraulic System:

The hydraulic system is self contained and should require little operator maintenance. The oil should be checked regularly and changed after approximately 4000 hours of use. When changing the oil, use only good quality foam inhibited hydraulic oil (Grade 46). Use of lesser grade oils could lead to mechanical malfunctions within the hydraulic power system.

The unit is set at the factory to close the press to a “dead-hard” condition. As the plates, gaskets, and system components age, it may become necessary to adjust the hydraulic system pressure to achieve complete press closure or the “dead-hard” condition. The open/close valve is equipped with an adjusting screw (figure 11).

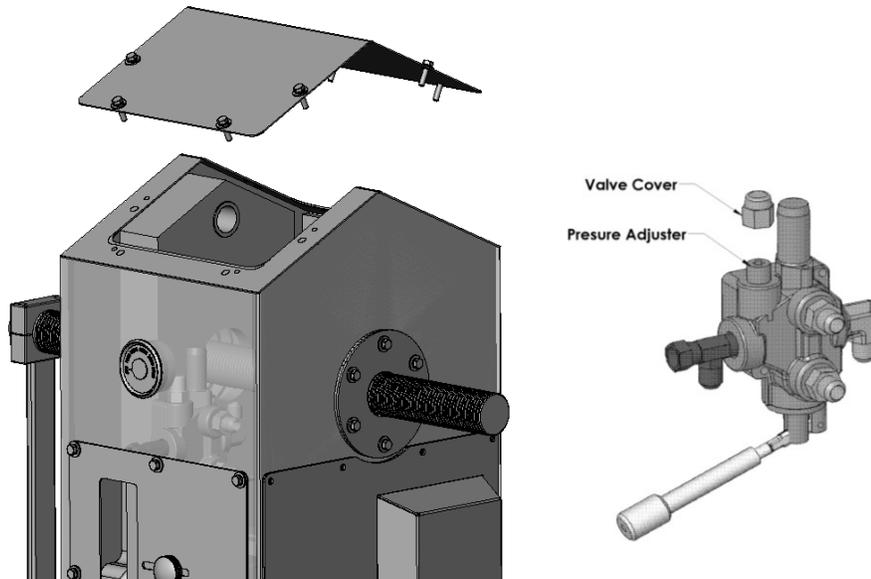


Figure 11
System Pressure Adjustment

To access the adjusting screw, remove the top cover from the end support. This will provide access to the valve body. Remove the aluminum valve cover as shown in figure 11. Note: This cap is fitted with an o-ring seal, and hydraulic fluid will seep around the adjusting screw during the adjustment. Turning the screw clockwise increases the system pressure. As a point of reference, a ¼ turn on the adjusting screw will increase system pressure by as much as 250 psi. Adjust the system pressure in small increments. A new Pro21-H with new plates requires approximately 700 psi to close to the “dead-hard” condition. When adjusting the system pressure, monitor the compressed dimension and note the pressure indicated on the pressure gauge. The minimum dimension shown on the streaming diagram will not normally be exceeded. After the pressure is set to the required level, replace the adjusting screw cap and operate the hydraulic system inspecting for system leaks. If no leaks are detected, replace the cover panel and return the press to normal operation.

Parts List:

Replacement parts for the Model Pro21-H can be ordered from AGC or your local AGC distributor. Most parts are in stock and can be shipped within 24 hours from time of order. Some components have had engineering revisions, so when ordering spare parts be sure to have your unit specific information available.

Contact information is provided below or visit our website for more information:

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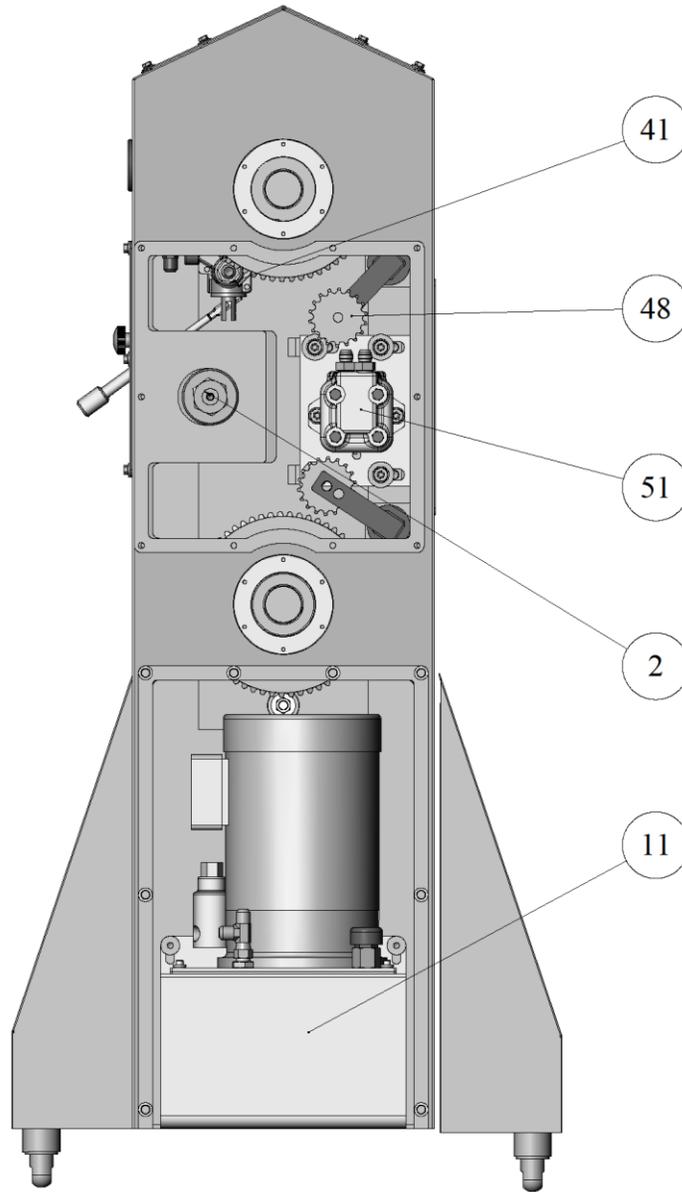
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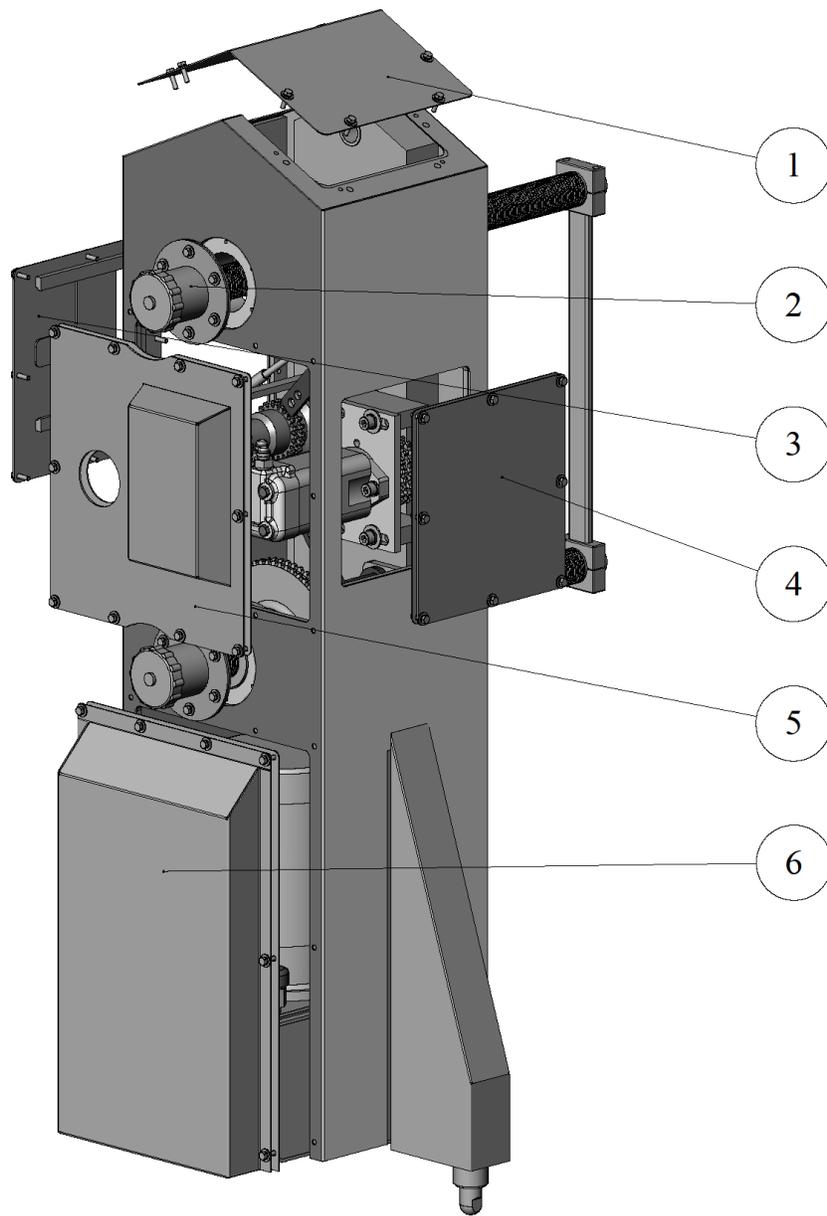
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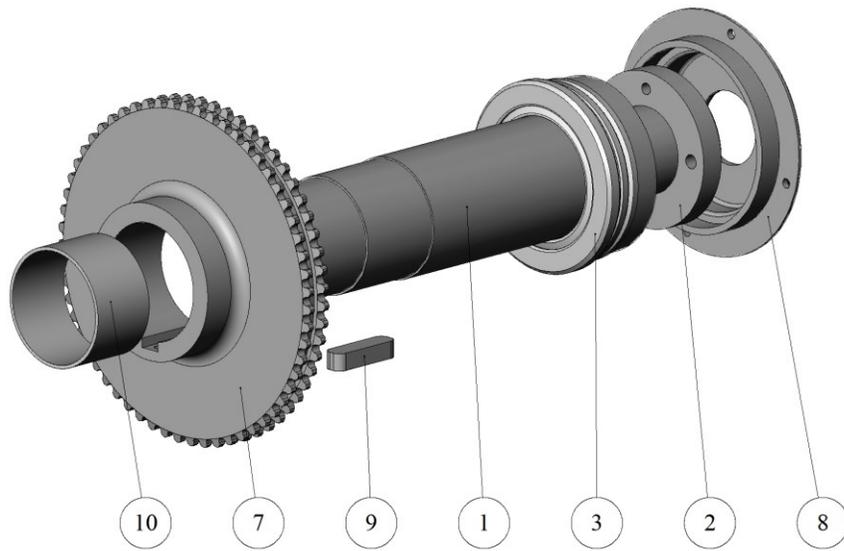
Item	Quantity	Part Number	Description
2	1	11021353	Sprocket Drive Shaft
11	1	11110319	Hydraulic Power Unit
41	1	LS755T4JRHHA	Hydraulic Control Valve
48	2	88835	Chain Tensioner
51	1	104-1007-006	Hydraulic Motor

Pro21-H End Support Drive Components



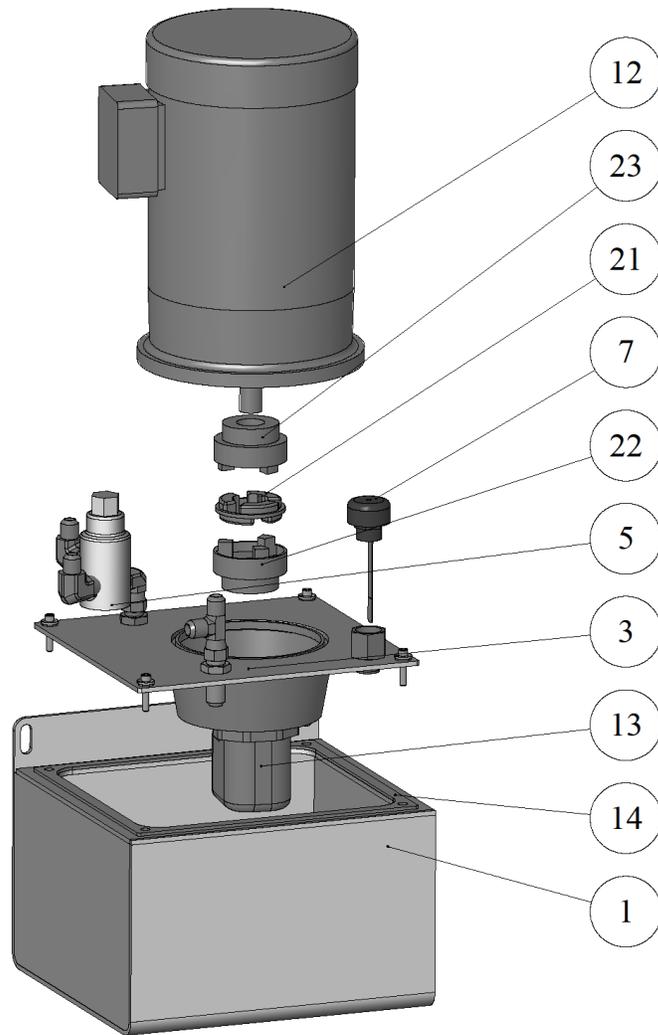
Item	Quantity	Part Number	Description
1	1	11015260	Pro21-H Top Cover with Gasket and Fasteners
2	2	11015237	Pro21-H Spindle Cover with Cap, Gasket and Fasteners
3	1	11015262	Pro21-H Sliding Door Cover with Gasket and Fasteners
4	1	11015261	Pro21-H Side Cover with Gasket and Fasteners
5	1	11015263	Pro21-H Motor Cover with Gasket and Fasteners
6	1	11015264	Pro21-H Bottom Cover with Gasket and Fasteners

Pro21-H Cover Assemblies



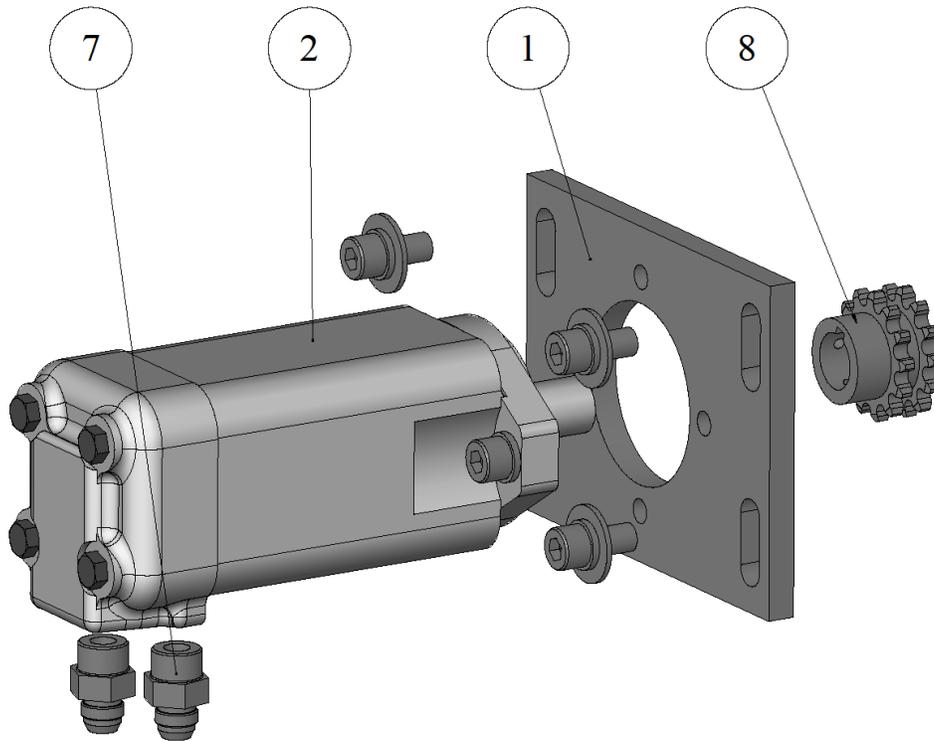
Item	Quantity	Part Number	Description
1	1	11015206	Pro21-H Spindle Drive
2	1	11015250	Pro21-H Spindle Nut
3	1	11110317	Thrust Bearing Assembly
7	1	11110277	60 Tooth Sprocket
8	1	11015207	Pro21-H Spindle Retainer
9	1	11110314	Sprocket Key
10	1	105379	Pro21-H Spindle Nut Bushing

Pro21-H Spindle Drive Nut Assembly



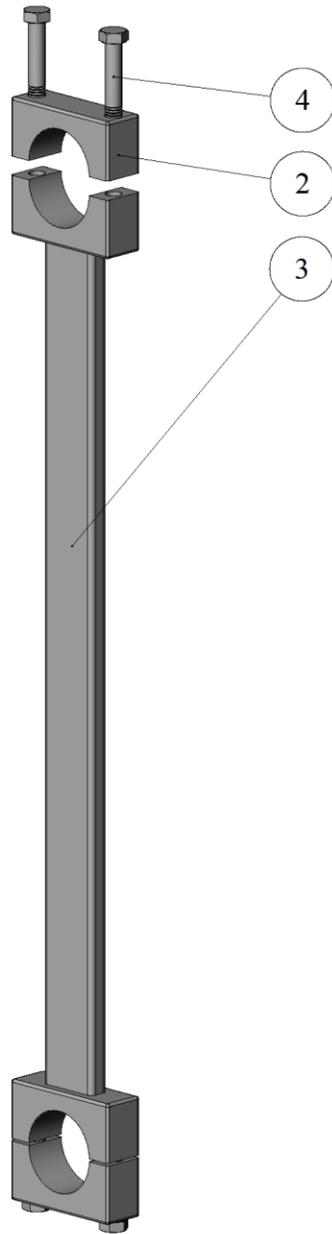
Item	Quantity	Part Number	Description
1	1	11110314	Reservoir Tank Body
3	1	11001132	Reservoir tank cover with Integrated Pump
5	1	PRNDR-1850	Pressure Relief Valve
7	1	11110486	Dip Stick with Breather
12	1	178945	Electric Motor
13	1	30210010	Delta Hi-Lo Gear Pump
14	1	11018441	Reservoir Tank Cover Gasket
21	1	M270	Coupling Insert
22	1	M2002006	Coupling Half .625 bore
23	1	M20010408	Coupling Half 1.125 bore

Pro21-H Reservoir Tank Assembly



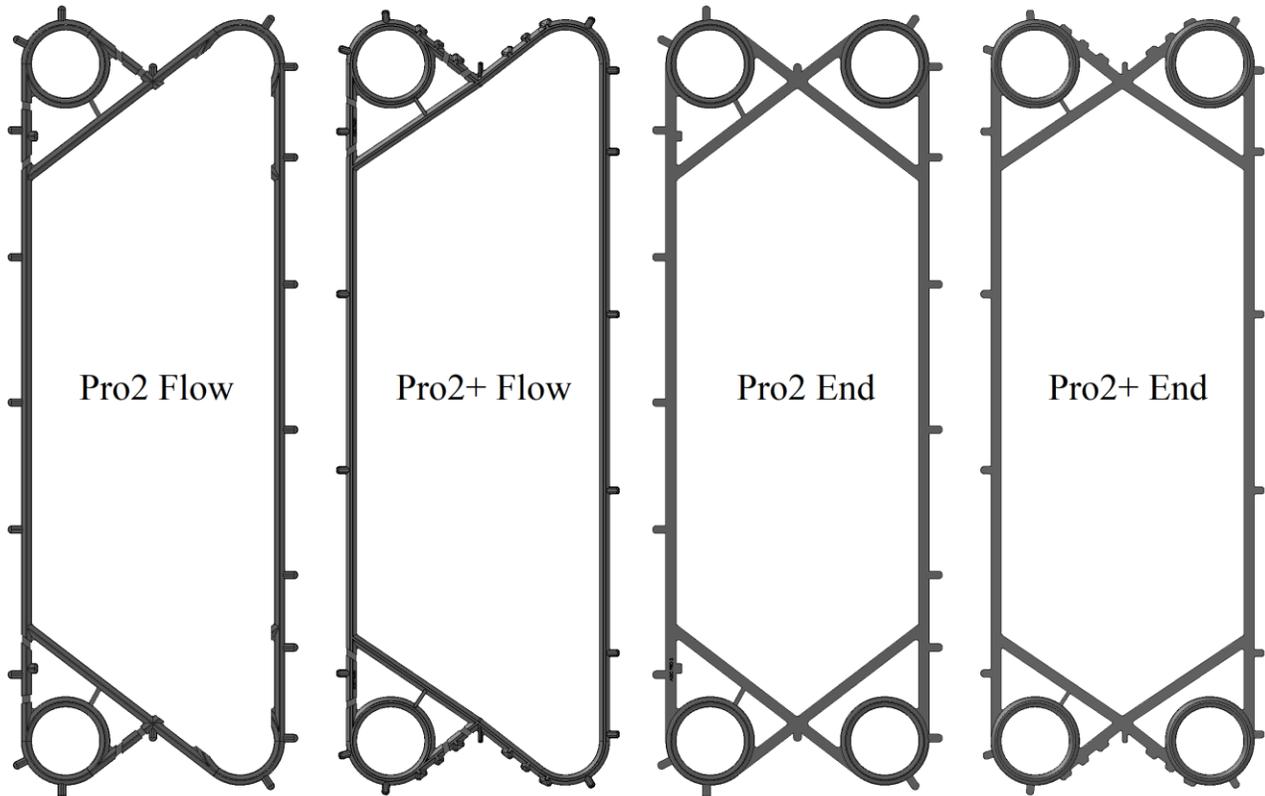
Item	Quantity	Part Number	Description
1	1	11110268	Motor Plate
2	1	104-1007-006	Hydraulic Motor
7	2	2216-12-12S	Motor Hose Fitting
8	1	D40B13H	Motor Sprocket

Pro21-H Motor Assembly



Item	Quantity	Part Number	Description
2	2	11015227	Reaction Bar End Cap
3	1	11015225	Reaction Bar Center Section
4	4	12009202	Reaction Bar Bolts

Pro21-H Reaction Bar Assembly



Gasket Type	NBR Part Number	EPDM Part Number
Pro2 Flow	AGPRO201N	AGPRO201E
Pro2+ Flow	AGPRO2P01N	AGPRO2P01E
Pro2 End	AGPRO202N	AGPRO202E
Pro2+ End	AGPRO2P02N	AGPRO2P02E
Pro2 Port	AGPRO203N	AGPRO203E

Pro2 and Pro2+ Gaskets

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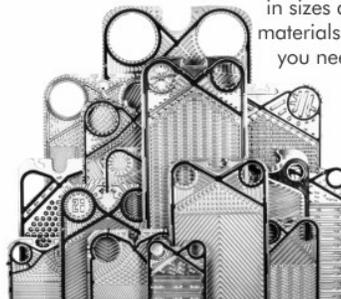
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