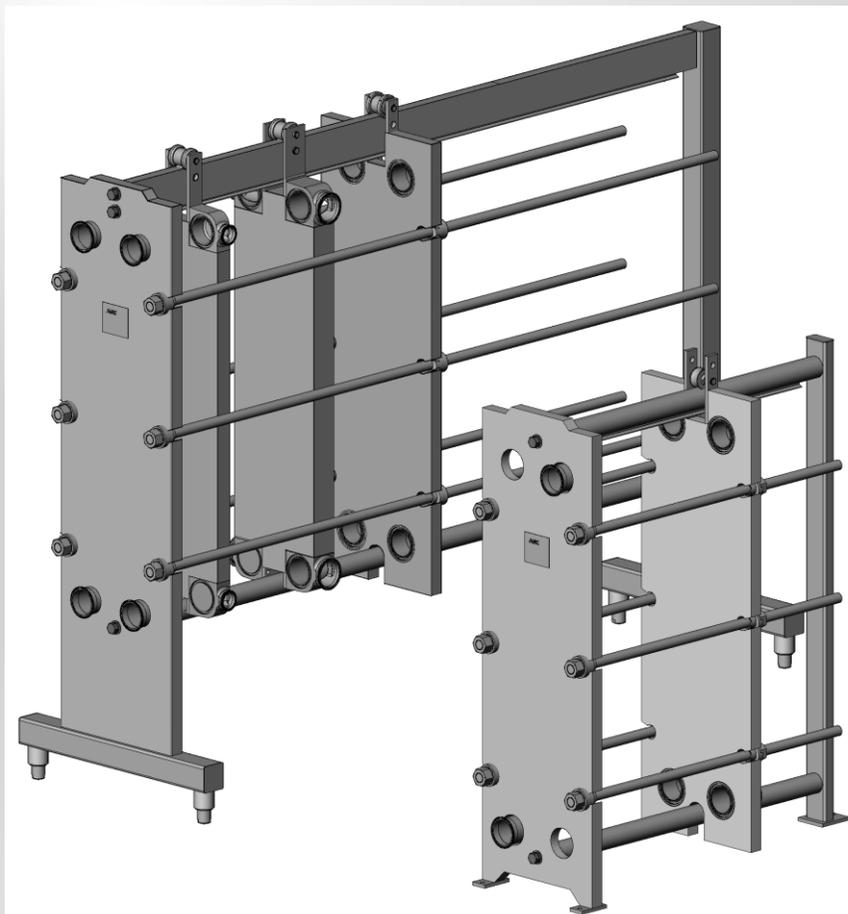




AGC Model AR56

Operation and Maintenance Manual



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Revised 07/01/20

Scope:

This manual is a supplement to the AGC Heat Transfer ProFlow plate heat exchanger manual. We recommend you read the ProFlow manual first because it will provide you with a basic understanding of plate heat exchangers and define the technical terms used in this document. The information provided within this manual describes the installation, operation, and maintenance of the AGC Heat Transfer AR56 tiebolt style heat exchangers. Currently 6 (six) different models of the AR56 tiebolt style heat exchangers are available and this manual covers all 6.

Please read this manual carefully before installing your heat exchanger. Pay particular attention to the safety instructions and the initial startup procedures. Failure to follow all safety recommendations could result in injury to the operator or cause damage to the heat exchanger.

Receiving and Inspection:

Each AGC heat exchanger is assembled and fully tested at the factory prior to shipping. Once the unit has successfully passed all tests it is prepared for shipping. Every AGC heat exchanger is thoroughly inspected to ensure it is in perfect condition before leaving the factory. Upon arrival, carefully inspect your new heat exchanger for any damage that may have occurred during shipping. If the press was damaged during shipping make sure the damage is annotated on the shipping documents. Also, report any damage to AGC immediately. To aid you in describing where any damage may have occurred, figure one shows the major components of a typical AR56 frame with one terminal.

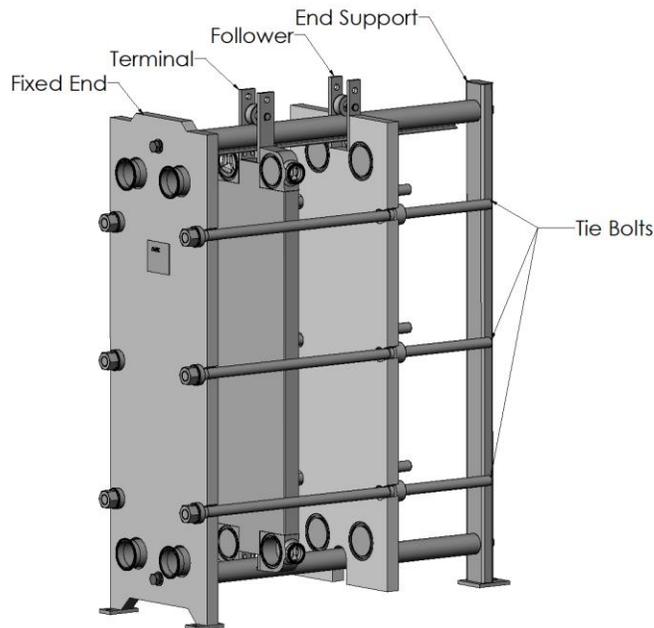


Figure 1
Major Frame Components

Page one shows the unit serial number, the duty, plate type, plate count, gasket type, connection type, connection size, and the tightening dimension. Revisions are also listed on page one. Page two of the drawing shows how the fluids pass through the heat exchanger. (The ProFlow manual describes how to read this flow diagram). If the unit is small, such as the unit in figure two, a front and side view of the heat exchanger will be shown as well. For larger units the front and side views are shown on page three or page four.

The second document in the drawing package is a plate punching diagram. This diagram will show you how to identify each Pro5 plate either by its configuration number (stamped at the top of each plate) or by looking at the plate noting which ports have been opened. Since the Pro5 plate is a diagonal flow plate, each plate will be either a right or left hand plate.

The final document in the drawing package is the ProFlow manual. The ProFlow manual has information about the AGC Heat Transfer product line and a more in-depth discussion about plate heat exchangers in general.

Frame Placement:

Locate the AR56 frame on a firm flat surface capable of supporting the press and all of its contents when full. If possible, the frame should remain strapped to the shipping skid until it is near its final location. Once the press is positioned cut the metal bands holding it to the shipping skid and, using an appropriately sized lifting strap, carefully lift the press off the skid. The top rail can be used as a lifting point. Never lift the press by the tiebolts. These bolts are in slots and are not designed to support the weight of the frame for lifting. When locating the heat exchanger, ensure that adequate space is left around the frame for maintenance and for plate installation/removal. Also include enough space to allow the AGC Fatboy™ wrench to fully swing. See figure 3.

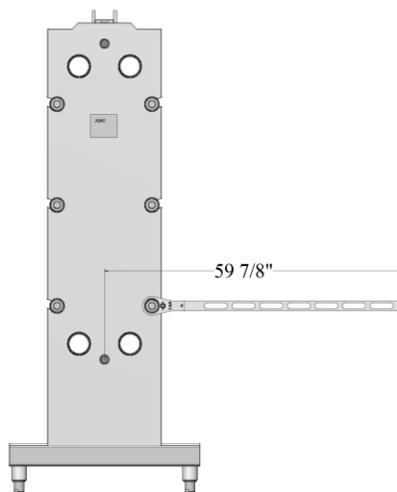


Figure 3
Wrench Space Requirement

The AR56-SH, AR56-S, AR56-SH200 and AR56-S200 frames are equipped with adjustable ball feet. These feet are adjusted by turning the base clockwise to lower and counterclockwise to raise the press. The ball feet should be adjusted so the ports are level from side to side. Figure 4 shows a spirit level placed across the ports to establish level.

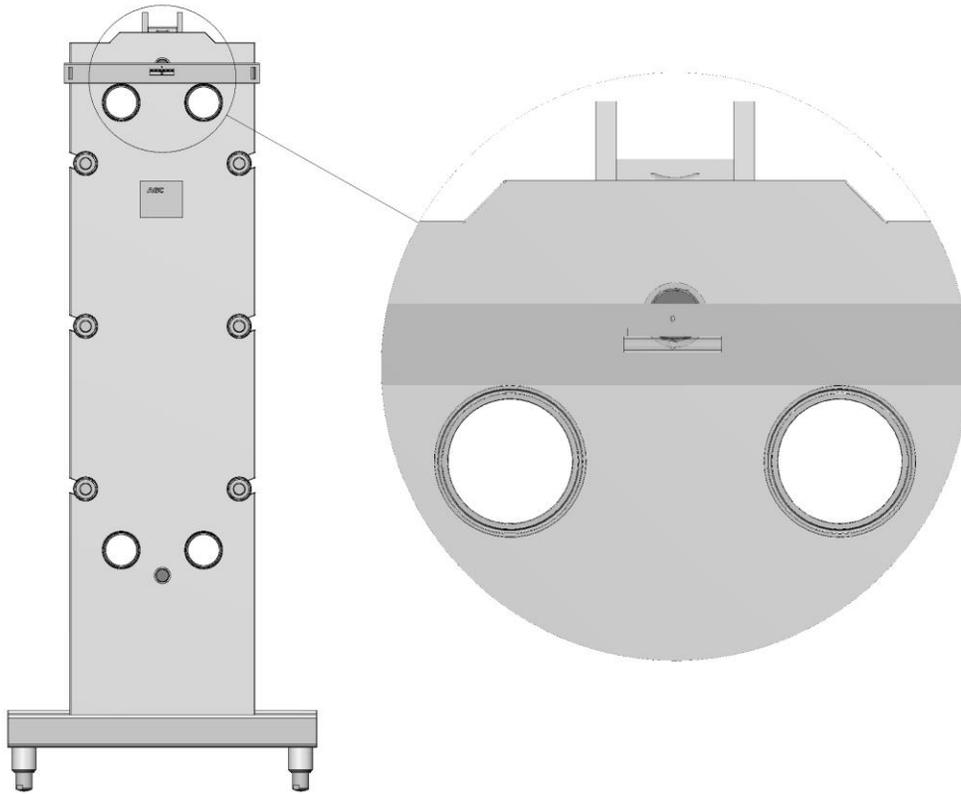


Figure 4
Port Leveling

Once the ports are level the heat exchanger should be adjusted so it will drain properly. This is done by adjusting the ball feet to establish a slope from end to end. Figure 5 shows a press adjusted to drain forward to the fixed end.

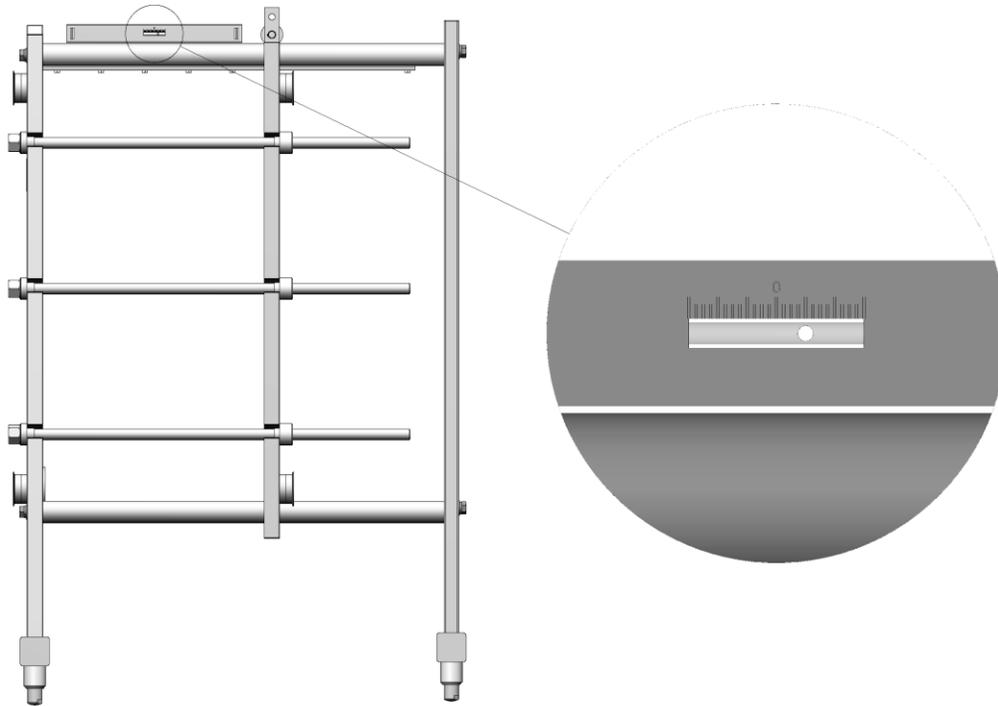


Figure 5

Frame Adjusted to Drain to Fixed End

Consult the onsite Plant Engineer or Project Manager to determine how much slope and which direction (toward the fixed end or follower) is appropriate for your installation.

The AR56-I and AR56-F frames are built with flat foot pads that are designed to be bolted to the floor. Therefore, no provisions for leveling are designed into the frame. However, these frames can be leveled by adding an appropriate amount of filler material under each foot pad as required.

Frame Connections:

Careful planning during the installation of your new heat exchanger will help ensure years of trouble free operation. All piping connections should be well supported and carefully aligned with the ports on the heat exchanger. Misaligned pipes or pipes that are not properly supported can lead to connection failures or cracks in the welded joints. When laying out a new installation, include enough breaks in the piping so service and maintenance can be completed easily. The piping connected to the follower should be configured with joints that are easy to remove so the follower can be fully retracted. This will provide enough space for clear inspection of the heat exchanger plates. The streaming diagram will show where all external connections should be made. Figure 6 shows page one of a typical streaming diagram for a multi section heat exchanger.

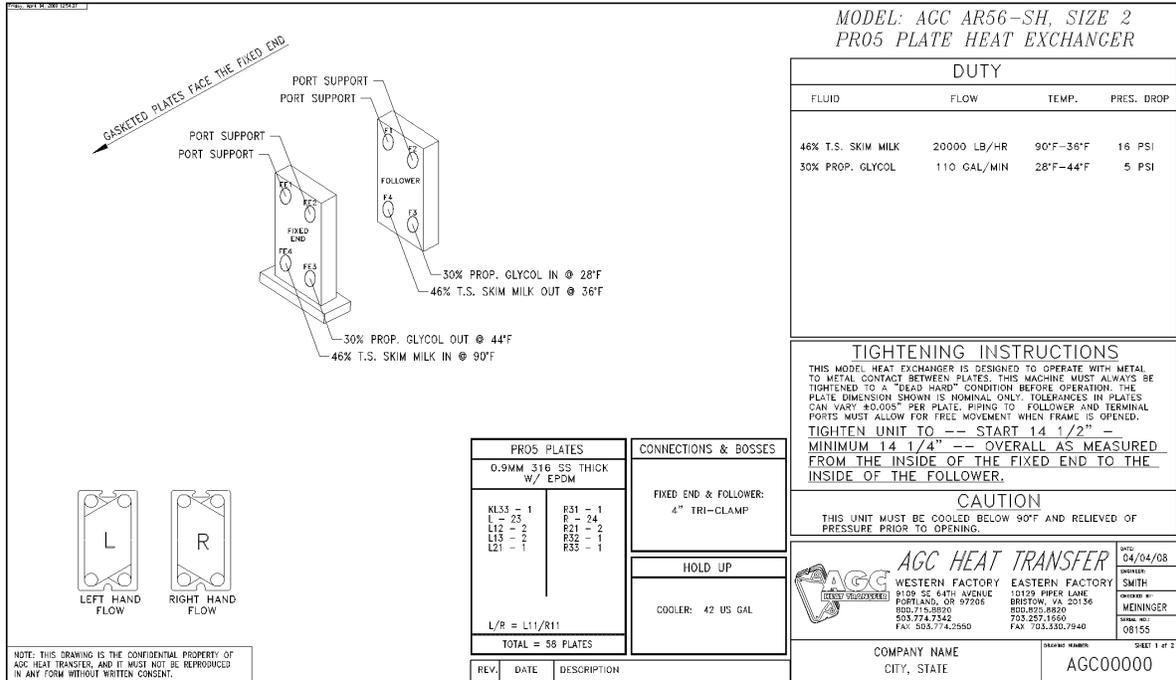


Figure 6

Typical Streaming Diagram

Notice that all ports have labels that clearly state what is to be connected to each one.

Normal Operation:

The AR56 series heat exchangers are tiebolt style frames. This means the press is closed by using 6 tiebolts to compress the plates. For this type of frame it is important for each tiebolt to take an equal share of the load. After your heat exchanger is in place and all plates have been installed you should check the compressed dimension. The dimension for your heat exchanger is listed on the first page of your streaming diagram. Figure 7 shows where the tightening dimension is located on the drawing.

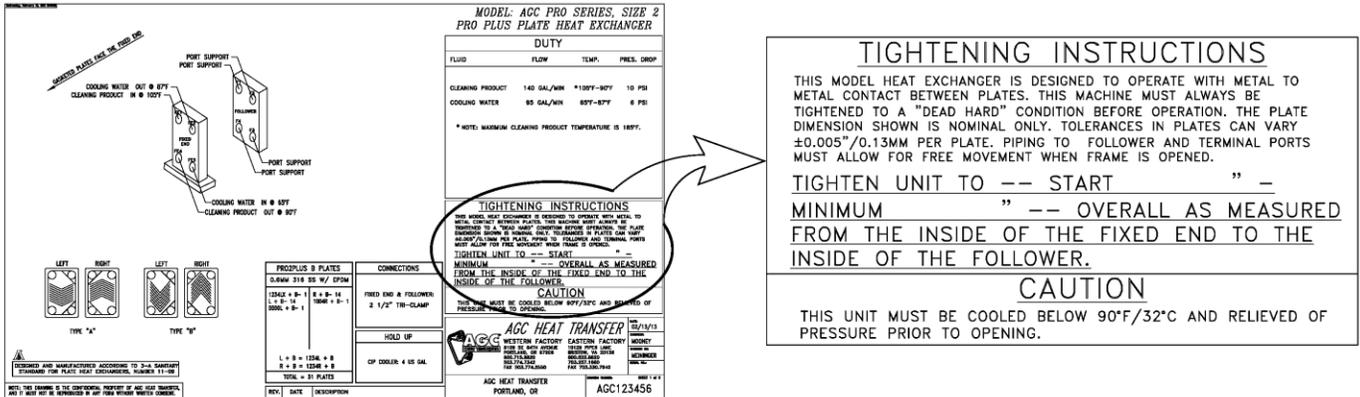


Figure 7
Tightening Instructions

Most new plate packs will seal at the start dimension. As the plates and gaskets wear it may be necessary to compress or close the press further. You should never exceed the minimum dimension shown on the streaming diagram. If your press is closed to the minimum dimension and leaks are noticed contact AGC Heat Transfer for technical assistance. Closing the press beyond the minimum dimension could cause permanent damage to the plates, frame, or both. When measuring the compressed dimension it is a good practice to take the measurement in several locations on the inside of the fixed end and follower as shown in figure 8.

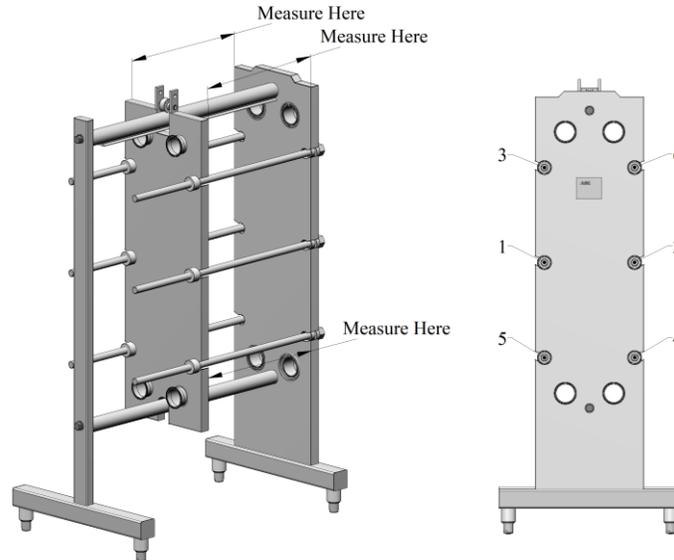


Figure 8

Tightening Location and Sequence

Measure top and bottom as well as front and back. The heat exchanger is designed operate at its top efficiency when it is closed to a metal to metal condition. This means the rubber plate gaskets are fully compressed and the plates contact points are fully engaged with each adjacent plate. In this condition, the plate gap is uniform and the plate is fully supported. To maintain this condition all tiebolts should be tightened equally and in sequence. Following the sequence shown in figure 8, tighten each tiebolt in small increments so the follower remains parallel to the fixed end. As the press approaches the start dimension smaller increments at each bolt will make for easier closing.

After the press is closed and all connections are made to the heat exchanger the unit is ready to be pressure checked. Consult the onsite Plant Engineer or Project Manager for the correct procedure on pressure testing the press.

Opening the Heat Exchanger:

Before opening this or any other heat exchanger you must verify the temperature in the unit is below 90° F and that the unit has been relieved of all internal pressure. Failure to follow this safety warning could result in serious injury to the operator or damage to the plates and gaskets. All pipes/connections should be disconnected from the heat exchanger before the tiebolts are loosened.

Prior to opening the press, inspect the tiebolts to ensure they are free from dirt or excessive dust. Also check that lubrication is present on each tiebolt. Opening or closing the tiebolts without lubrication may cause permanent damage to them. As with closing, small increments on each bolt will make the process easier and prevent damage to the press or any of its parts. The tiebolts should be loosened using the same sequence as for tightening. See figure 8 for the bolt sequence. The closer the unit is to the minimum dimension the more torque will be required on the Fatboy™ wrench. Once the plates are completely uncompressed, the tiebolts can be lifted from their slot. Handle the tiebolts with care so the

threads are not damaged. The follower can now be moved back toward the end support and the plates can be inspected or removed.

Operator Maintenance:

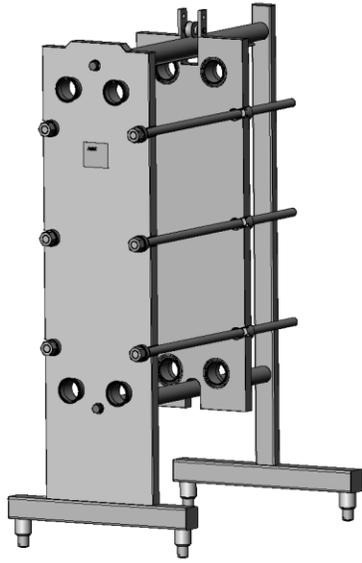
All AGC Heat Transfer heat exchangers are designed to require minimal operator maintenance. As long as the unit is operated within the pressure and temperature limits the only maintenance required is routine cleaning, lubrication and inspection. We recommend the unit be leak checked annually using the PlateCheck™ field service provided by AGC Heat Transfer. This service is performed onsite by factory trained service engineers. The PlateCheck™ service provides a thorough inspection of all parts of the heat exchanger. After the service is complete, a detailed written report is provided on the condition of the heat exchanger. This preventative maintenance service greatly reduces unscheduled down time by keeping the heat exchanger in peak operating condition.

Model Features:

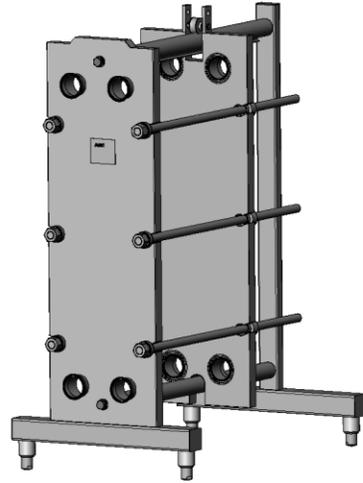
The AR56 tiebolt frame is offered in 6 different models (see figure 9). Regardless of the model chosen, each AR56 frame will accept the AGC Pro5 and/or the AGC Pro5+ heat exchanger plates and one or more AGC terminal(s). Additionally, all AGC heat exchangers can be fitted with special removable port nozzles. This feature is particularly useful in applications where the product erodes the stainless steel nozzles. AR56 frames size 5 and above are shipped with a special high capacity top rail. The high capacity top rail provides the extra strength necessary to support the large number of plates typically installed in these large size frames.

The AR56-S and AR56-SH are stainless steel clad frames. Both models conform to the current 3A sanitary standards. The factory installs ports at all eight locations (4 on the fixed end and 4 on the follower) on each model of these frames. The un-used ports are capped using sanitary caps and clamps. This makes it very easy to expand the heat exchanger in the field to increase capacity or to add other processes to the frame. The major difference between the –S and –SH frames is the height of the port centers. The –SH frame is the high leg version. These frames are rated to safely withstand internal pressures up to 200 PSI. Both style frames are equipped with adjustable ball feet.

The AR56-F and AR56-I are powder coated mild steel frames. These frames are designed to be bolted to the factory floor or other support structure. They utilize the Pro5 heat exchanger plate and can be configured to have any of the eight available ports used. Typically these models are shipped from the factory with ports installed at the active ports only. The un-used ports are blanked using a powder coated steel blanking disk. The major difference between the –F and –I models is the tiebolt material. The –F frame has stainless steel tiebolts with a silicon-bronze nut. The –I frame has galvanized tiebolts with a stainless steel nut. Additional connecting ports can be ordered from the AGC factory if the frame needs to be expanded or restreamed. New port nozzles may require some welding onsite depending on the connections.



AR56-SH



AR56-S



AR56-F



AR56-I

Figure 9
AR56 Tiebolt Frame Assemblies

Parts List:

Replacement parts for any AGC AR56 frame can be ordered from AGC Heat Transfer or from your local AGC Distributor. Most parts are in stock and can be shipped within 24 hours from the time we receive your order. Some parts have been revised so it is important to have your unit model and serial number available when placing an order for spare or replacement parts. All models of the AR56 heat exchangers have some parts that are common as well as model specific parts. The following parts diagrams are separated by model when appropriate. Most of the field replaceable parts are listed in this manual. If the part you need is not listed on the following pages contact your local AGC distributor or the AGC Heat Transfer Factory.

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

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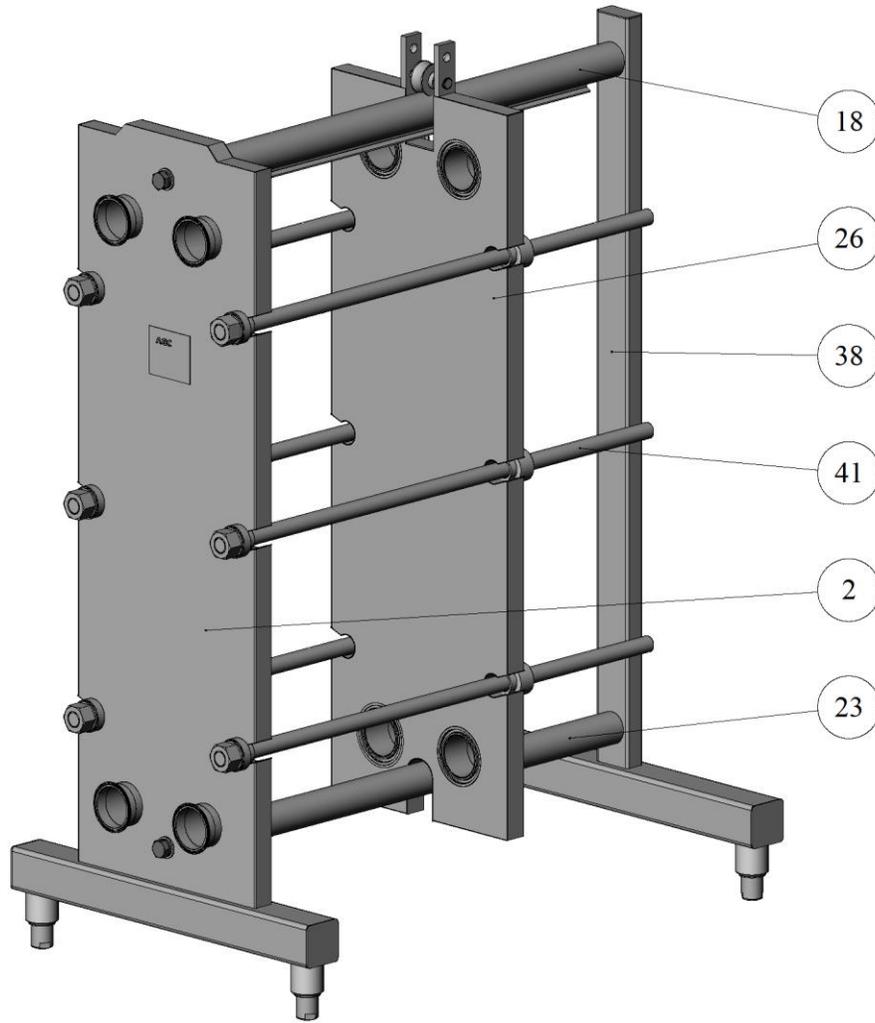
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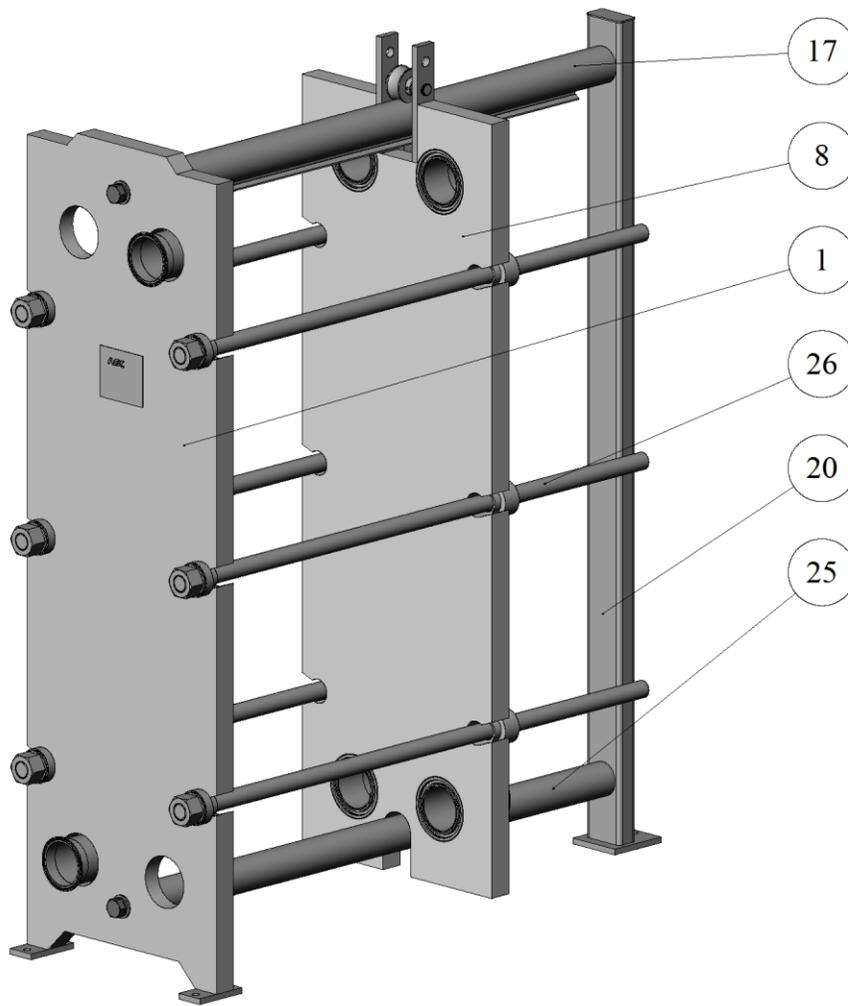
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Item	Part Number	Description	Quantity
2	11006106	AR56-S Fixed End Assembly	1
18	See Chart on Page 16	AR56 Upper Rail Assembly	1
23	See Chart on Page 16	AR56 Bottom Rail Assembly	1
26	11006300	AR56-S Follower Assembly	1
38a*	11006235	AR56-S End Support Assembly (standard rail)	1
38b*	11006230	AR56-S End Support Assembly (high capacity rail)	1
41	See Chart on Page 19	AR56-S Tiebolt	6

* End support is offered in 2 options, select option based on Upper Rail

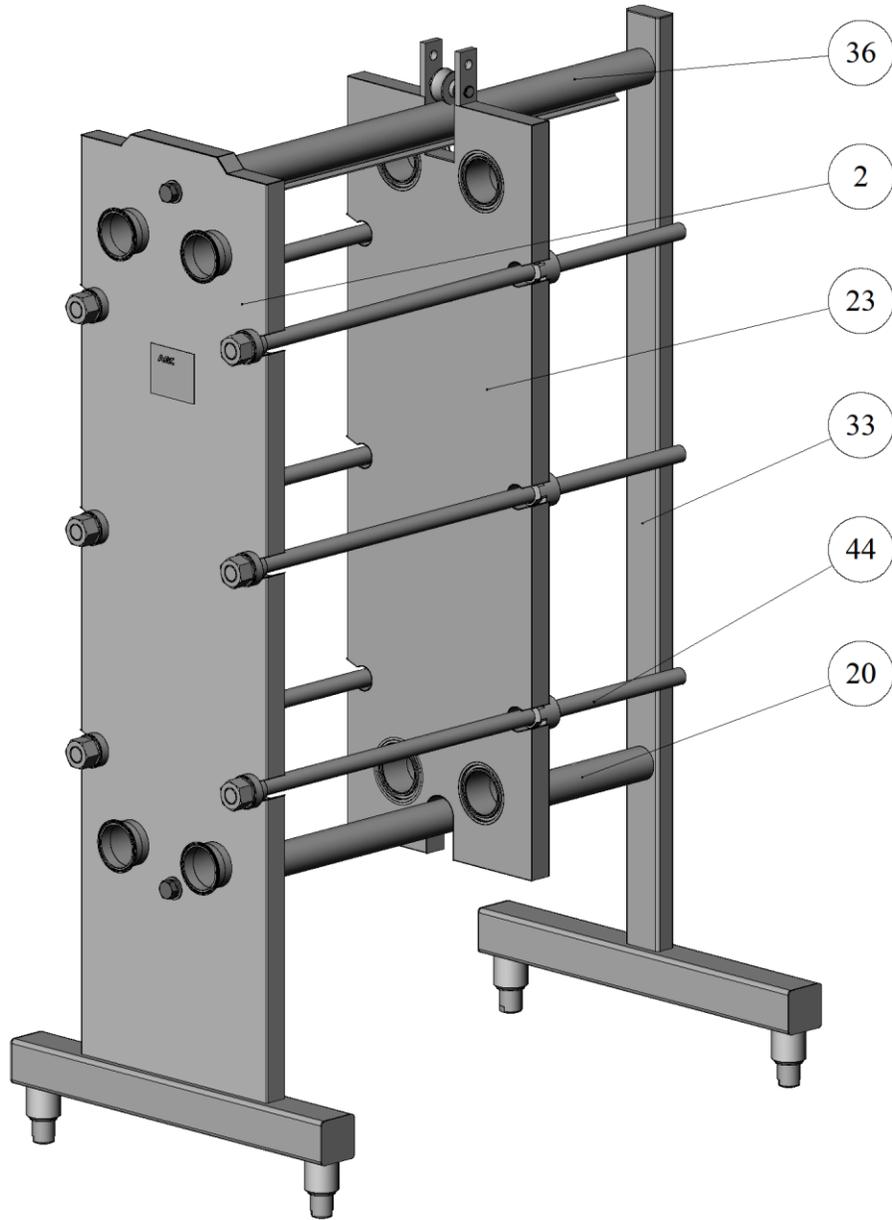
AR56-S Frame Components



Item	Part Number	Description	Quantity
1	11005100	AR56-F Fixed End Assembly	1
8	11005200	AR56-F Follower Assembly	1
17	See Chart on Page 16	AR56 Upper Rail Assembly	1
20a*	11005300	AR56-F End Support Assembly (standard rail)	1
20b*	11005400	AR56-F End Support Assembly (high Capacity Rail)	1
25	See Chart on Page 16	AR56 Bottom Rail Assembly	1
26	See Chart on Page 18	AR56-F Tiebolt Assembly	6

* End support is offered in 2 options, select option based on Upper Rail

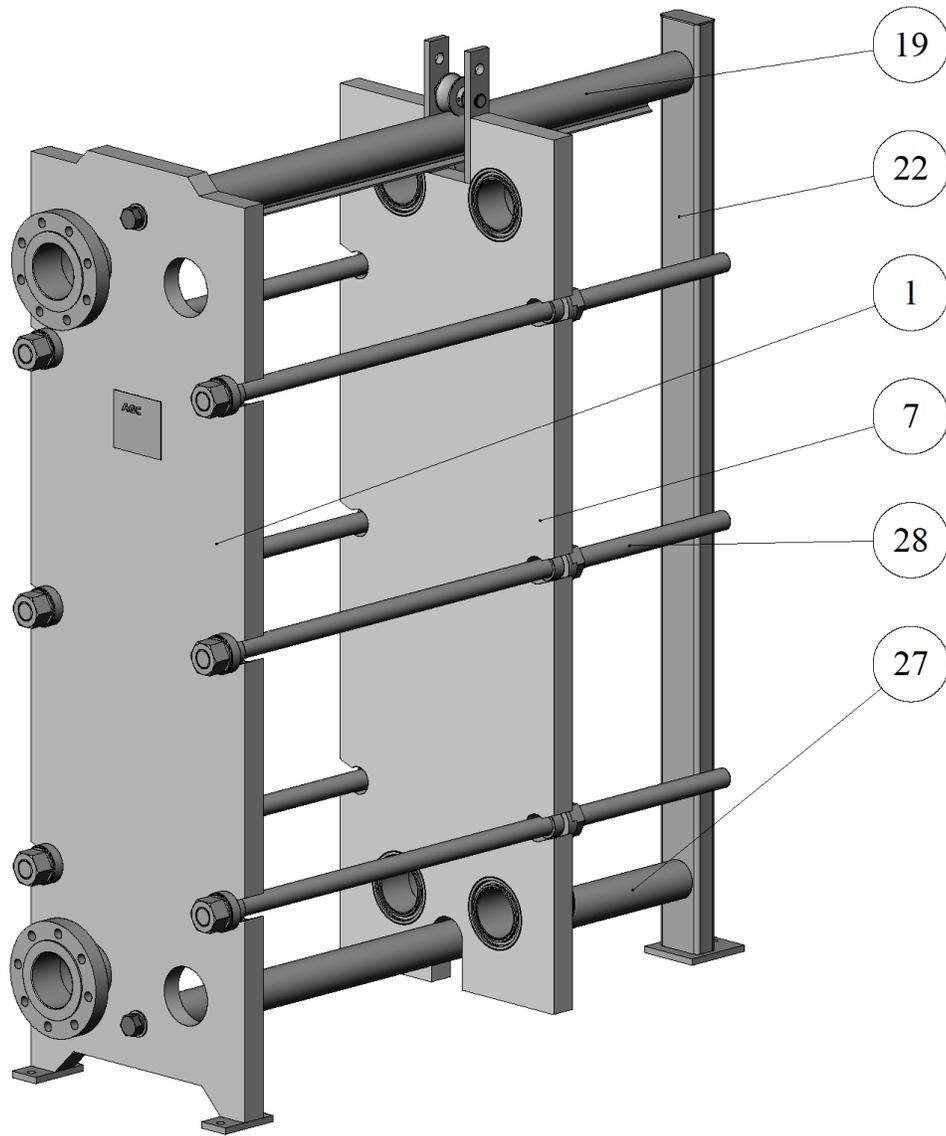
AR56-F Frame Components



Item	Part Number	Description	Quantity
2	11006201	AR56-SH Fixed End Assembly	1
20	See Chart on Page 16	AR56 Bottom Rail Assembly	1
23	11006300	AR56-S Follower Assembly	1
33*	11006250	AR56-SH End Support Assembly (standard rail)	1
33*	11006240	AR56-SH End Support Assembly (high capacity rail)	1
36	See Chart on Page 16	AR56 Upper Rail Assembly	1
44	See Chart on Page 19	AR56-S Tiebolt Assembly	6

* End support is offered in 2 options, select option based on Upper Rail

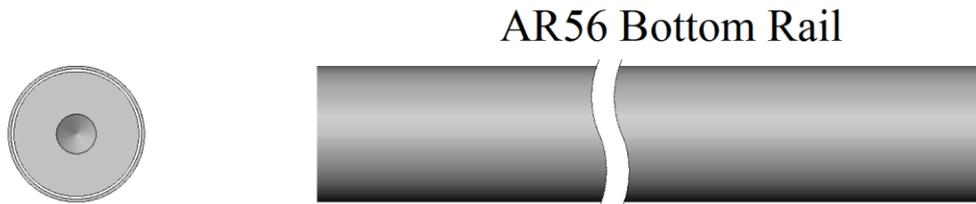
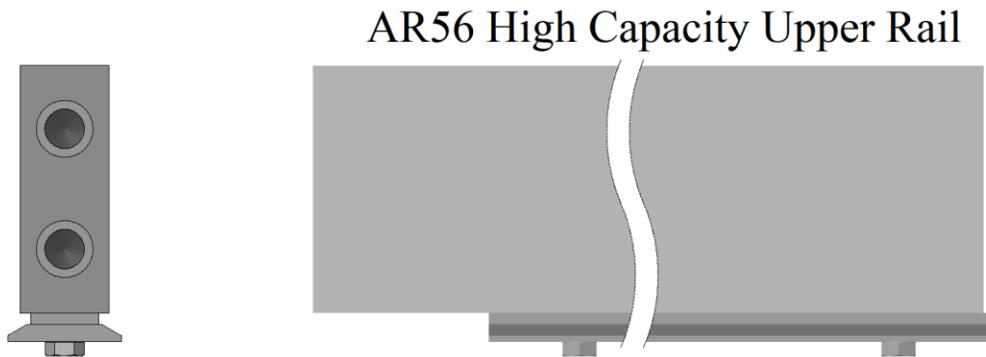
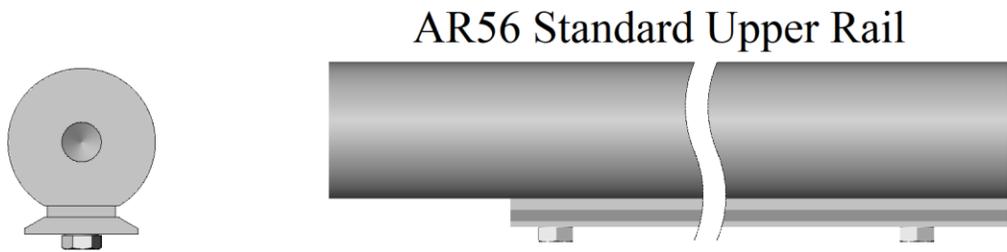
AR56-SH Frame Components



Item	Part Number	Description	Quantity
1	11005100	AR56-I Fixed End Assembly	1
7	11005200	AR56-I Follower Assembly	1
19	See Chart on Page 17	AR56 Upper Rail Assembly	1
22*	11005300	AR56-I End Support (standard rail)	1
22*	11005400	AR56-I End Support Assembly (high capacity rail)	1
27	See Chart on Page 17	AR56 Bottom Rail Assembly	1
28	See Chart on Page 19	AR56-I Tiebolt Assembly	6

*End support is offered in 2 options, select option based on upper rail

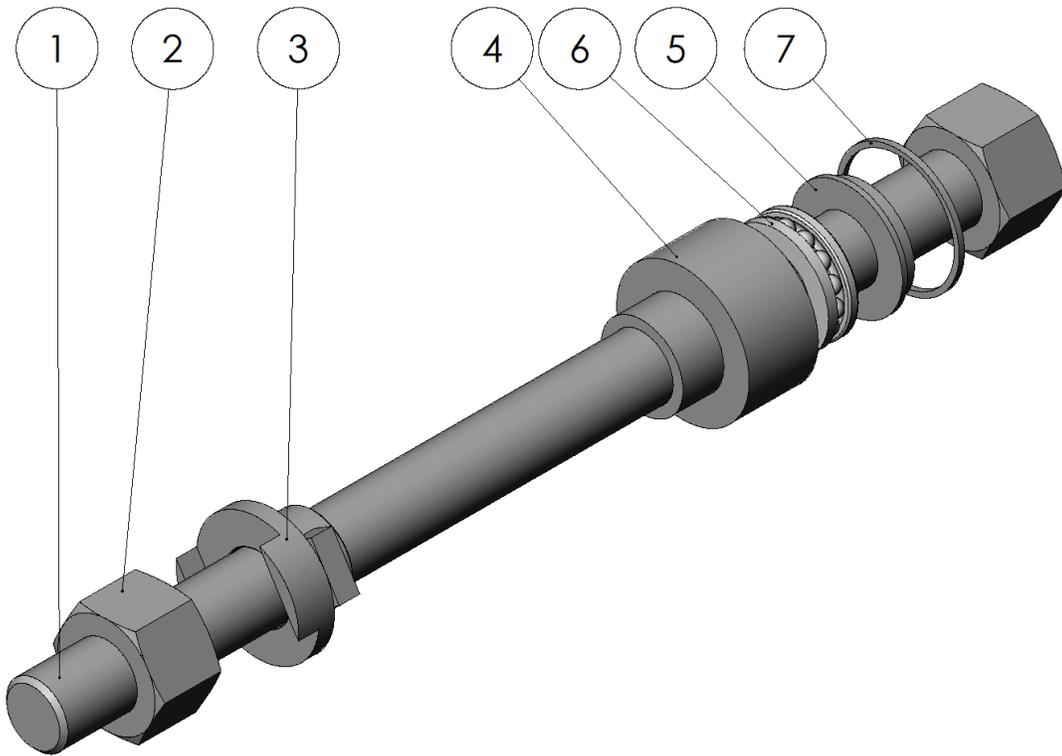
AR56-I Frame Components



Rail Size	Rail Length	Bottom Rail	Standard Upper Rail	High Capacity Upper Rail
1	36 Inches	11008040	11008000	-----
2	55 Inches	11008041	11008001	-----
3	80 Inches	11008042	11008002	-----
4	95 Inches	11008043	11008003	-----
5	116 Inches	11008044	-----	11002400
6	140 Inches	11008045	-----	11008007

*Note: All rails shipped without bolts and washers unless specifically ordered.

AR56 Rail Size Chart
(All AR56 Tiebolt Frame Models)

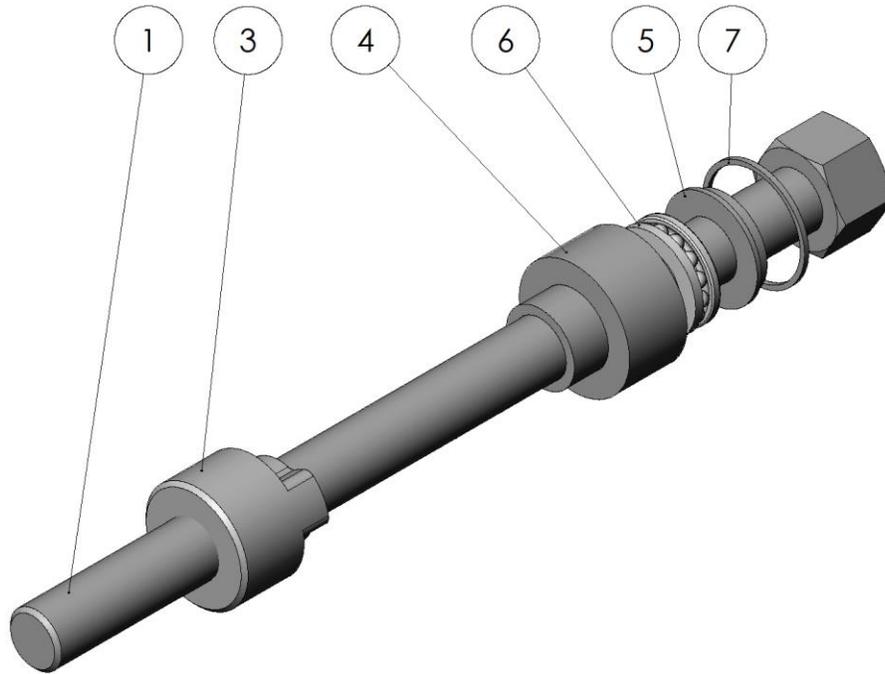


Item	Quantity	Part Number	Description
1	1	See Size Chart	AR56-I Tiebolt Base
2	1	DG112C	Heavy Hex Nut
3	1	11015102	AR56-I Tiebolt Locking Insert
4	1	11023021	Tie Bolt Bearing Housing
5	1	11023022	Tiebolt Bearing Retainer Cap
6	1	11008822	Tiebolt Ball Bearing
7	1	11023023	Tiebolt Bearing Retainer Ring

AR56-I Tiebolt Assembly Size Chart			
Tiebolt Size	Overall Length	Tiebolt Base Part Number	Complete Assembly Part Number
1	36 Inches	11015156	11025040
2	48 Inches	11015157	11025041
3	72 Inches	11015158	11025042
4	95 Inches	11015159	11025043
5	116 Inches	11015160	11025044
6	140 Inches	11015161	11025045

*Note: To order a complete tiebolt assembly use complete assembly part number for desired size.

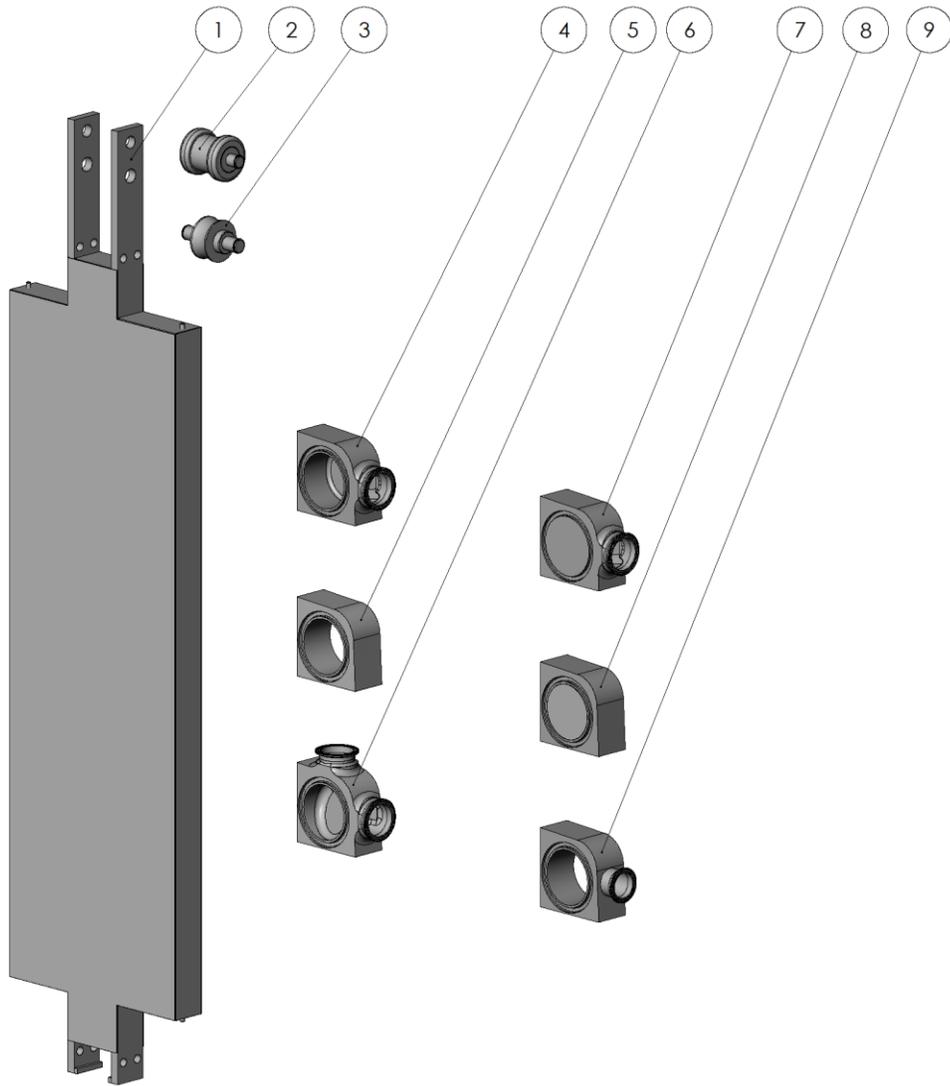
AR56-I Tiebolt Assembly



Item	Quantity	Part Number	Description
1	1	See Size Chart	AR56-F Tie Bolt Base
3	1	11015107	Tiebolt Locking Nut
4	1	11023021	Tiebolt Bearing Housing
5	1	11023022	Tiebolt Bearing Retainer Cap
6	1	11008822	Tiebolt Ball Bearing
7	1	11023023	Tiebolt Bearing Retainer Ring

AR56-F Tie Bolt Assembly Size Chart			
Tiebolt Size	Overall Length	Tiebolt Base Part Number	Complete Assembly Part Number
1	36 Inches	11015114	11025001
2	48 Inches	11015115	11025002
3	72 Inches	11015116	11025003
4	95 Inches	11015117	11025004
5	116 Inches	11015118	11025005
6	140 Inches	11015119	11025006

AR56-F-SH-S Tiebolt Assembly

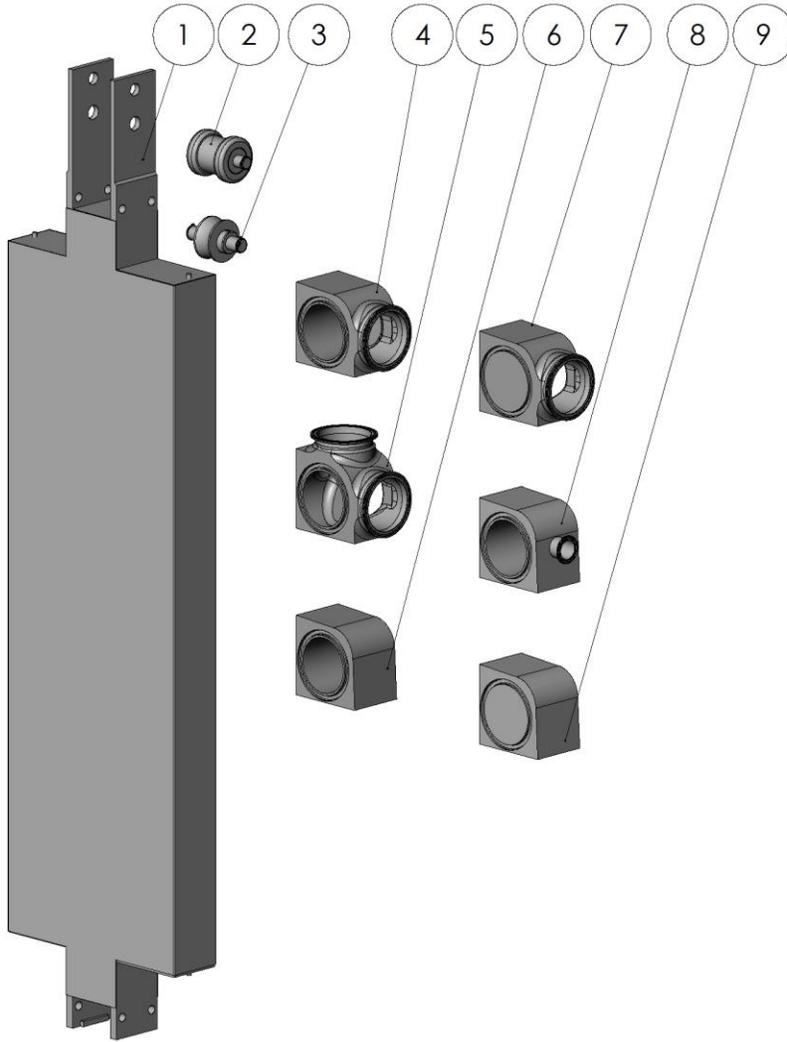


Item	Part Number	Description
1	11008450	Pro5 Standard Terminal Assembly without Bosses
2	11008553	Pro5 High Capacity Roller
3	11008551	AR51 Terminal Roller
4	11018561	Standard Pro5 Single Port Boss 'X' configuration
5	5997	Standard Pro5 Thru Port Boss
6	11008515	Standard Pro5 Double Port Boss
7	11008562	Standard Pro5 Single Port Boss 'V' configuration
8	11008563	Standard Pro5 Blank Port Boss
9	11008520	Standard Pro5 Thru Port Boss with 2" connection

Terminal measures 2-5/8" thick.

Standard Pro5 Terminal Bolt on Parts

(All Pro5 Frames)



Item	Part Number	Description
1	11008460	Pro5 Wide Terminal Assembly without Bosses
2	11008013	Pro5 High Capacity Roller Assembly
3	11008551	AR51 Terminal Roller
4	11008565	Wide Pro5 Single Port Boss 'X' configuration
5	11008522	Wide Pro5 Double Port Boss
6	11008513	Wide Pro5 Thru Port Boss
7	11008566	Wide Pro5 Single Port Boss 'V' configuration
8	11008556	Wide Pro5 Thru Port Boss with 2" connection
9	11008498	Wide Pro5 Blank Port Boss

Terminal measures 4-1/16" thick

Wide Pro5 Terminal Bolt on Parts

(All Pro5 Frames)

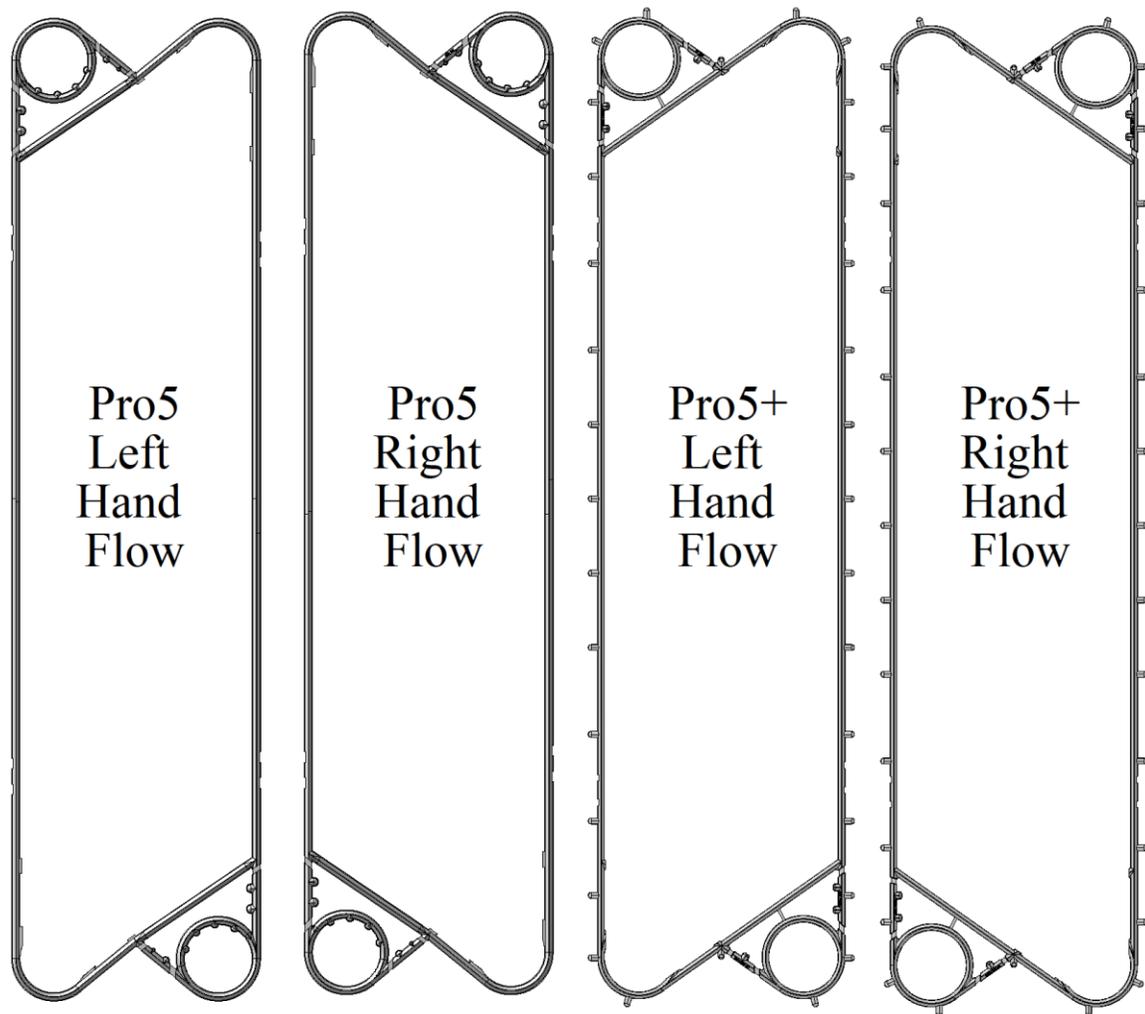


Plate Type	Part Number for NBR Gasket	Part Number for EPDM Gasket
Pro5 Right Hand	AGPRO501N	AGPRO501E
Pro5 Left Hand	AGPRO502N	AGPRO502E
Pro5+ Right Hand	AGPRO5P01N	AGPRO5P01E
Pro5+ Left Hand	AGPRO5P02N	AGPRO5P02E
Pro5 Port Gasket	AGPRO504N	AGPRO504E

Pro5 Flow Gaskets

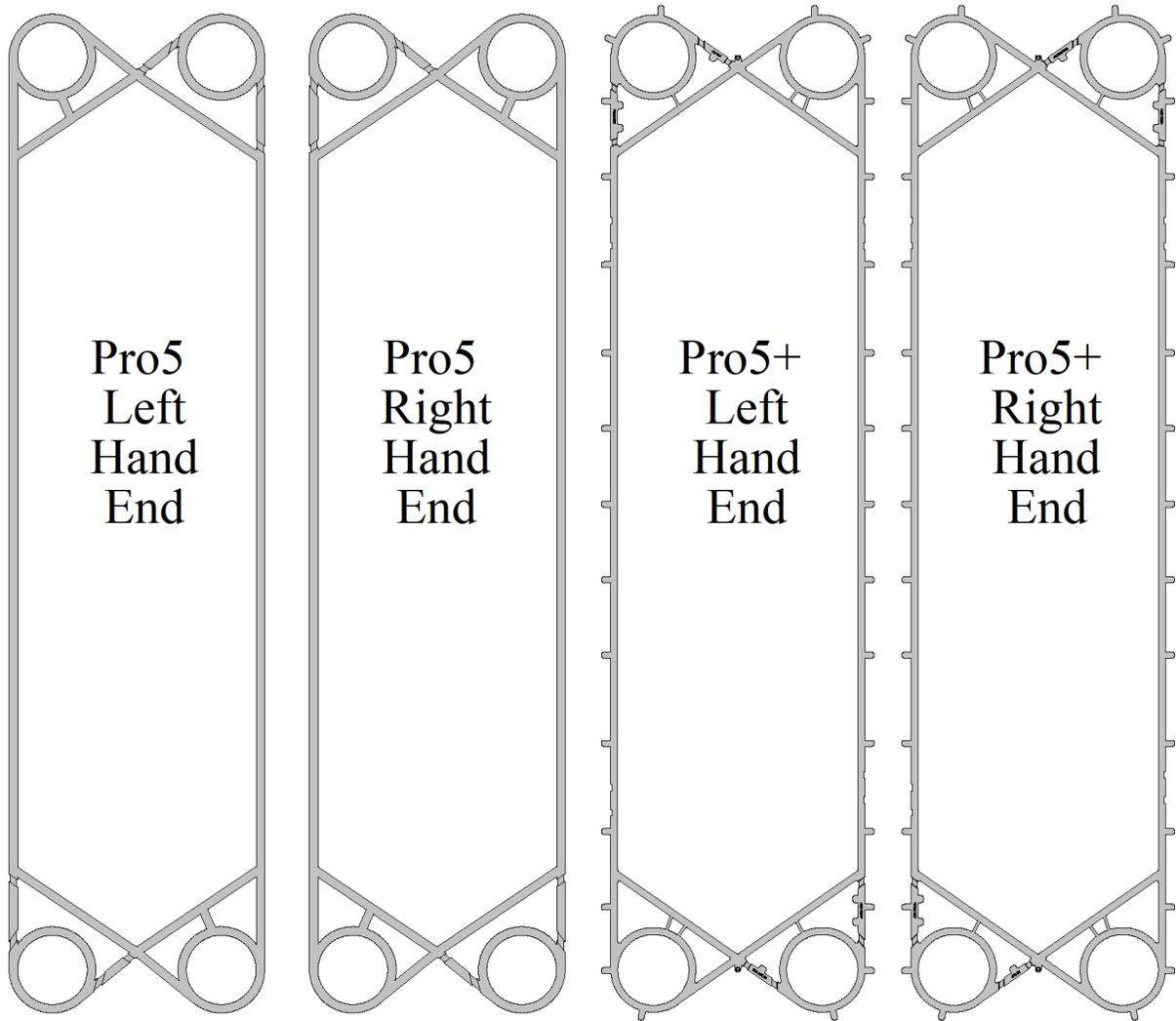


Plate Type	Part Number for NBR Gasket	Part Number for EPDM Gasket
Pro5 Right Hand End	AGPRO505N	AGPRO505E
Pro5 Left Hand End	AGPRO503N	AGPRO503E
Pro5+ Right Hand End	AGPRO5P04N	AGPRO5P04E
Pro5+ Left Hand End	AGPRO5P03N	AGPRO5P03E
Pro5 Port Gasket	AGPRO504N	AGPRO504E

Pro5 End Gaskets

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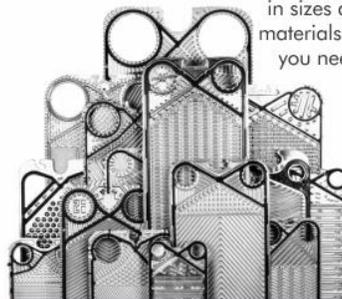
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