Liquiflo™ Chemical Processing Pumps

INSTALLATION, OPERATION & MAINTENANCE MANUAL

Temperature Control Jacket & Dual Kan®

Temperature Control Jacket

Temperature control jackets (also called heat jackets) are available for the H, 3 and Max-Series pumps, for both mag-drive and sealed configurations, with threaded (NPT/BSPT) or flanged (ANSI/DIN) ports. The jacket is a bolt-on aluminum jacket that surrounds the outside of the pump. It is cast for H12-H14 & 312-314 pumps and machined from billet for H1-H9, 31-39 & Max-Series pumps. (Note: Models H1-H9 & 31-39 formerly used a two-piece, cast aluminum jacket; see photo). See table below for more information.

Temperature Control Jacket Specifications

Part Number	Fits Pump Models	Jacket Port Size (NPT)	Approx. Weight (lbs)	Max Jacket Pressure (PSIG)	Max Temp. (°F)
H3-HJ	H1, H3 & 31, 33	1/2" [1]	6	150	500
H5-HJ	H5R, H5F & 35R, 35F	1/2" [1]	7	150	500
H7-HJ	H7N, H7R, H7F & 37R, 37F	1/2" [1]	9	150	500
H9R-HJ	H9R & 39R	1/2" [1]	10	150	500
H9F-HJ	H9F & 39F	1/2" [1]	11	150	500
312-HJ [3]	H12R, H12F & 312R, 312F	3/4" [2]	25	150	500
314-HJ [3]	H14 & 314	3/4" [2]	30	150	500
MAX3-HJ	M0, M1, M2 & M3	3/8" [1]	12	150	500
MAX4-HJ	M4	3/8" [1]	14	150	500
MAX5-HJ	M5	3/8" [1]	16	150	500
MAX6-HJ	M6	3/8" [1]	18	150	500
MAX7-HJ	M7	3/8" [1]	19	150	500
MAX8-HJ	M8	3/8" [1]	20	150	500

1 Male NPT **2** Female NPT **3** Jacket for Flanged pumps only

Note: Obsolete Heat Jacket for Models H1-H9 & 31-39 is shown above. Refer to page 8 for specifications and installation procedure.

Use

The temperature control jacket can be used for both heating and cooling applications. Hot fluid (water, oil, steam) or cold fluid can be circulated through the jacket. The fluid flow through the jacket can be in either direction.

Installation

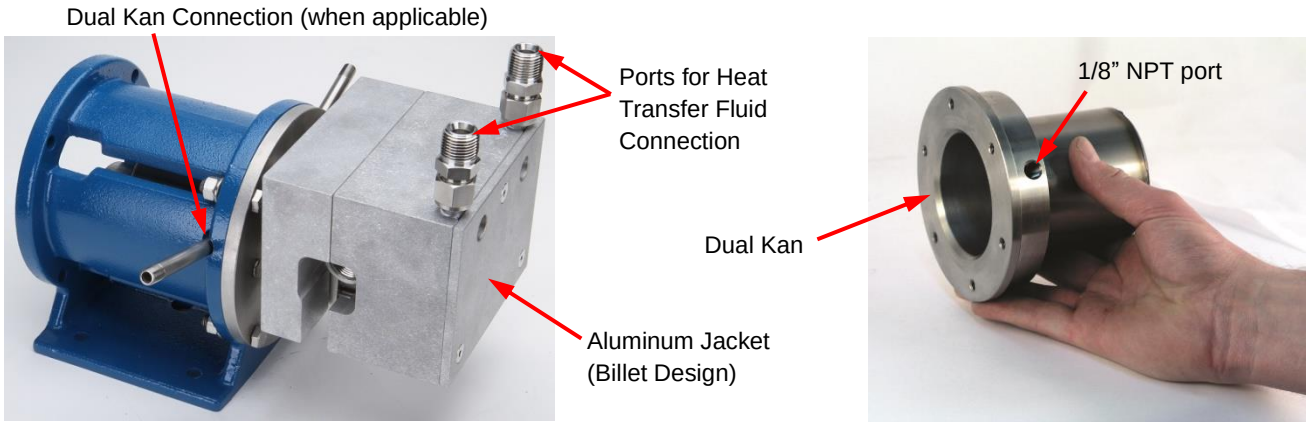
Models H1-H9 & 31-39: Refer to procedure on page 3.

Models H12 & 312: Refer to procedure on page 5.

Models H14 & 314: Refer to procedure on page 6.

Models M0 thru M8: Refer to procedure on page 7.

Note: Air gaps between the external pump housing and internal surface of the jacket will prevent efficient heat transfer. Therefore, when installing the jacket, it is suggested to apply a sufficient layer of heat transfer compound between the jacket and pump housing to facilitate better heat transfer. However, heat transfer paste is messy and quickly cures into a solid, which requires immediate jacket installation after application of the paste, and which makes it difficult to later isolate and service the pump. An alternative method successfully applied in the field is to use crumpled aluminum foil to fill the voids. This increases metal-to-metal contact and significantly improves heat transfer efficiency. Heat transfer direction is from jacket to pump for heating applications and from pump to jacket for cooling applications.

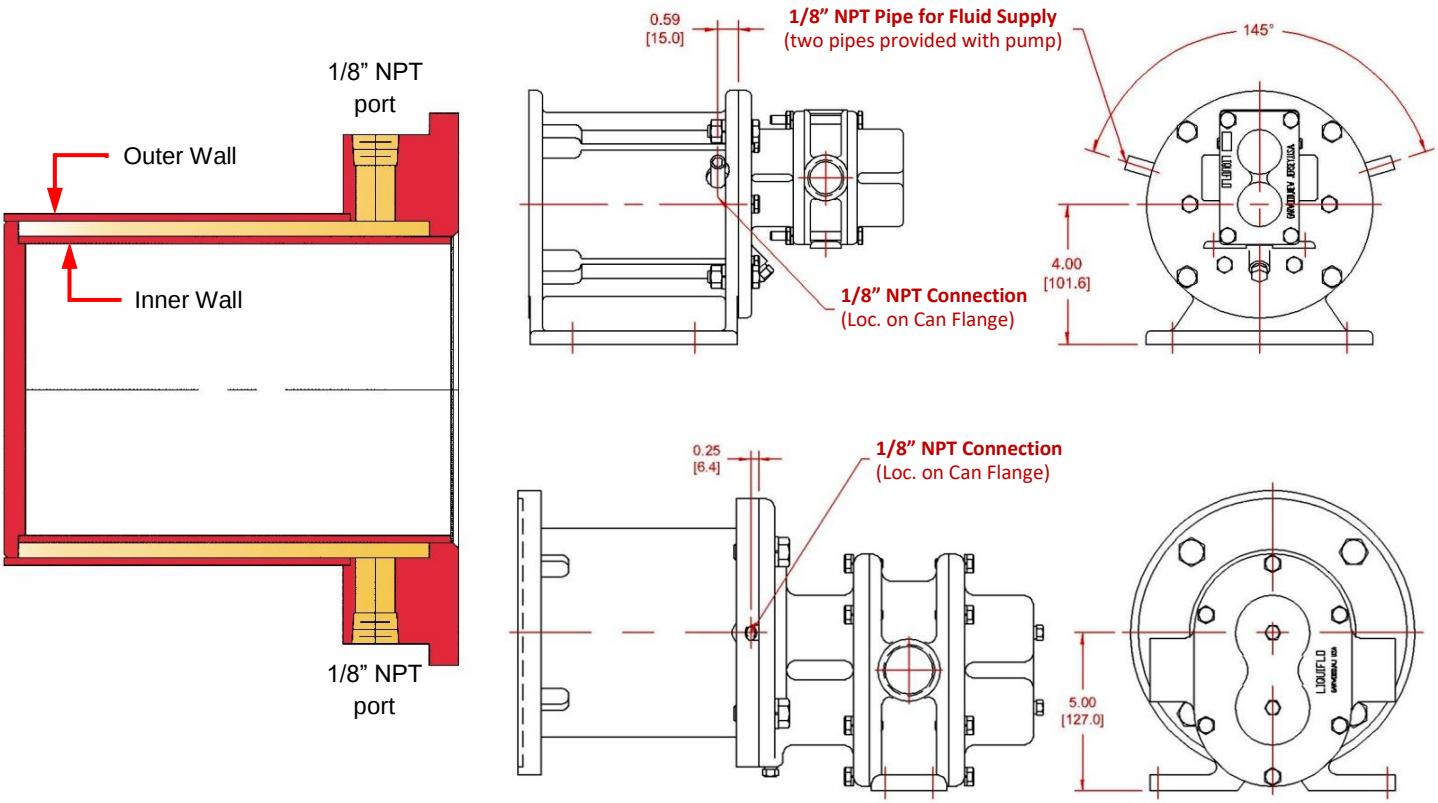


Dual Kan®

The Dual Kan is a standard option for the H-Series and 3-Series pumps. It is a **double-walled containment can** used to precisely control the temperature of a **mag-drive** pump. The jacketed containment shell can be utilized for both heating and cooling applications. The Dual Kan and Heat Jacket work independently; either one or both can be utilized to control pump temperature. For critical applications requiring precise temperature control, both devices are suggested. For example: to prevent a liquid, such as molten sulfur, from solidifying if the temperature becomes too low, or from polymerizing if the temperature becomes too high.

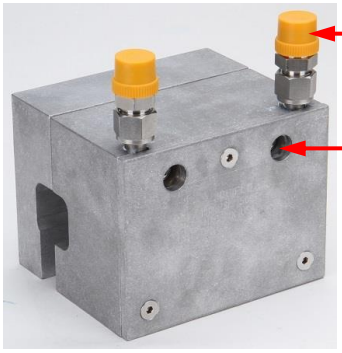
Installation

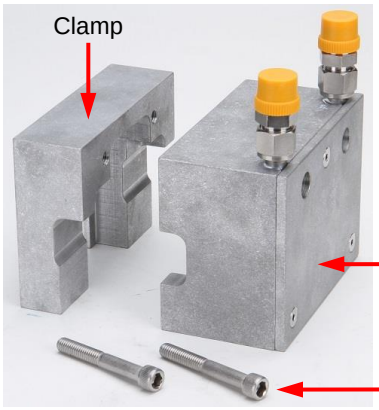
The Dual Kan comes installed to the pump. To use, connect the two **1/8” NPT ports** to a source of hot or cold fluid (e.g., water, glycol, oil or steam). Flow through the Dual Kan can be in either direction. The pressure of the jacket fluid should not exceed 50 PSIG. Maximum use temperature is 500°F. The ports on each side are oriented 17.5° from the horizontal center line for H1-H9 (and 31-39) pump sizes and on the horizontal center line for H12-H14 (and 312-314) sizes, as shown below.

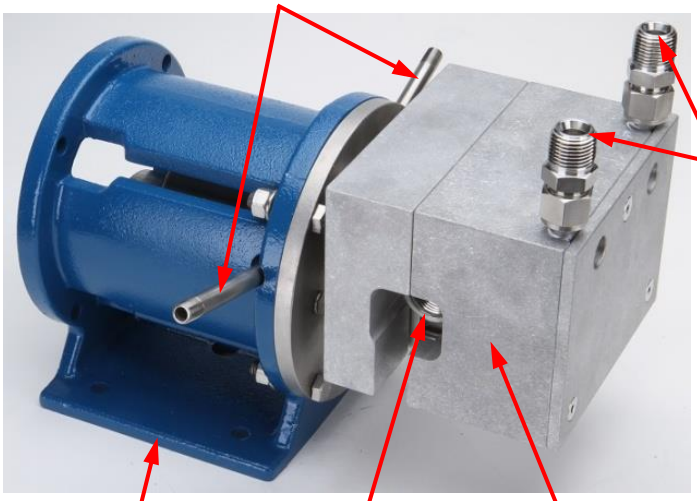


Temperature Control Jackets for H1-H9 & 31-39 Pump Models

The Jackets for these pumps are delivered pre-assembled from the factory as shown in the upper-left photo.







Installation Procedure:

1) Remove the two 3/8-16 Screws to detach the Jacket Assembly from the Clamp. (Note: Do not remove the three smaller screws on the Jacket Assembly.)

2) Separate the jacket components. (Note: Jacket H9R-HJ has one Spacer between the Jacket Assembly and the Clamp. Jacket H9F-HJ has two Spacers. See diagrams on page 4.)

3) If using **heat transfer compound** (HTC), apply a ¼" layer between the pump housing and inside surface of the jacket. Alternatively, **crumpled aluminum foil** can be used to fill the gaps between the pump housing and jacket. (Refer to Note on page 1.)

4) With the pump secured to a base, install the jacket components to the pump housing as shown above.

5) Secure the jacket to the pump housing using two 3/8-16 screws and a **5/16" Allen wrench**.

6) Remove the plastic thread protectors from the jacket connectors; then connect the jacket to the heat transfer fluid supply pipes. (Note: Teflon tape or pipe sealant is suggested.)

Temperature Control Jacket Specifications

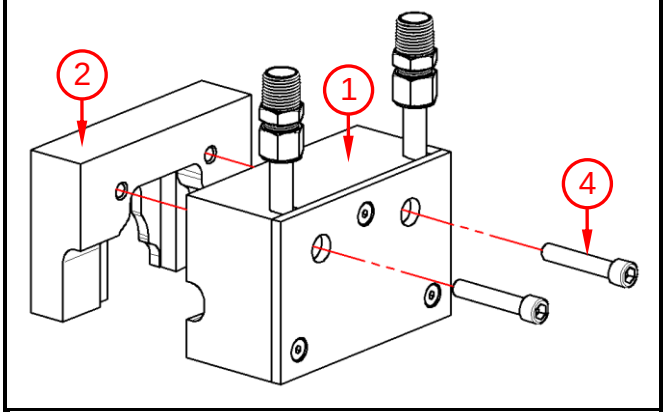
Jacket Part No.	For Pump Models	Approx. Weight	Material	Port Size	Max Pressure	Max Temperature
H3-HJ	**H1, H3 & 31, 33**	6 lb.	**Jacket:** Aluminum Alloy 6061-T6511; **Heat Exchanger Tube & Connectors:** 316 Stainless Steel; **Screws:** 18-8 Stainless Steel	1/2" MNPT	150 PSIG	500 °F
H5-HJ or H5-HJ-SF*	**H5R/F & 35R/F**	7 lb.				
H7-HJ	**H7N/R/F & 37R/F**	9 lb.				
H9R-HJ	**H9R & 39R**	10 lb.				
H9F-HJ	**H9F & 39F**	11 lb.				

* Jacket for pump with Sanitary Fittings.

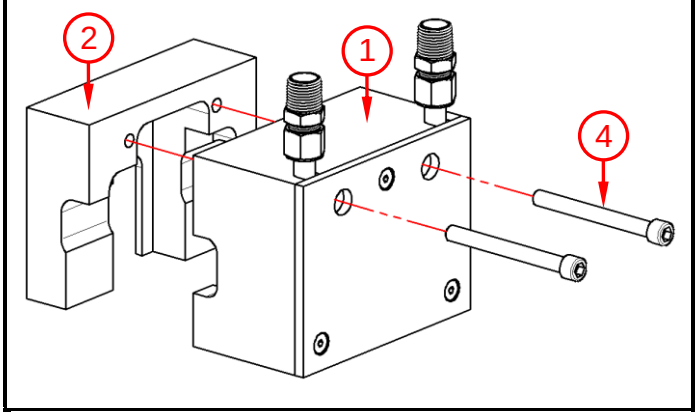
Temperature Control Jackets for H1-H9 & 31-39 Pump Models (Continued)

Exploded View Diagrams

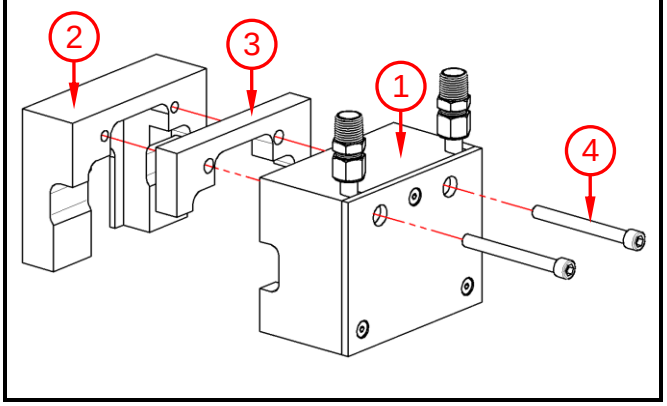
H3-HJ, H5-HJ or H5-HJ-SF*



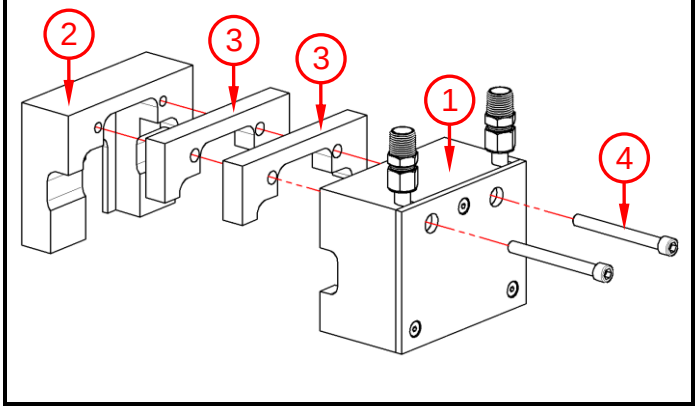
H7-HJ



H9R-HJ



H9F-HJ



Parts & Quantities for Temperature Control Jackets

Part #	Part Name	H3-HJ	H5-HJ or H5-HJ-SF*	H7-HJ	H9R-HJ	H9F-HJ
1	Jacket Assembly	1	1	1	1	1
2	Clamp	1	1	1	1	1
3	Spacer	NA	NA	NA	1	2
4	Screw, Mounting	2	2	2	2	2

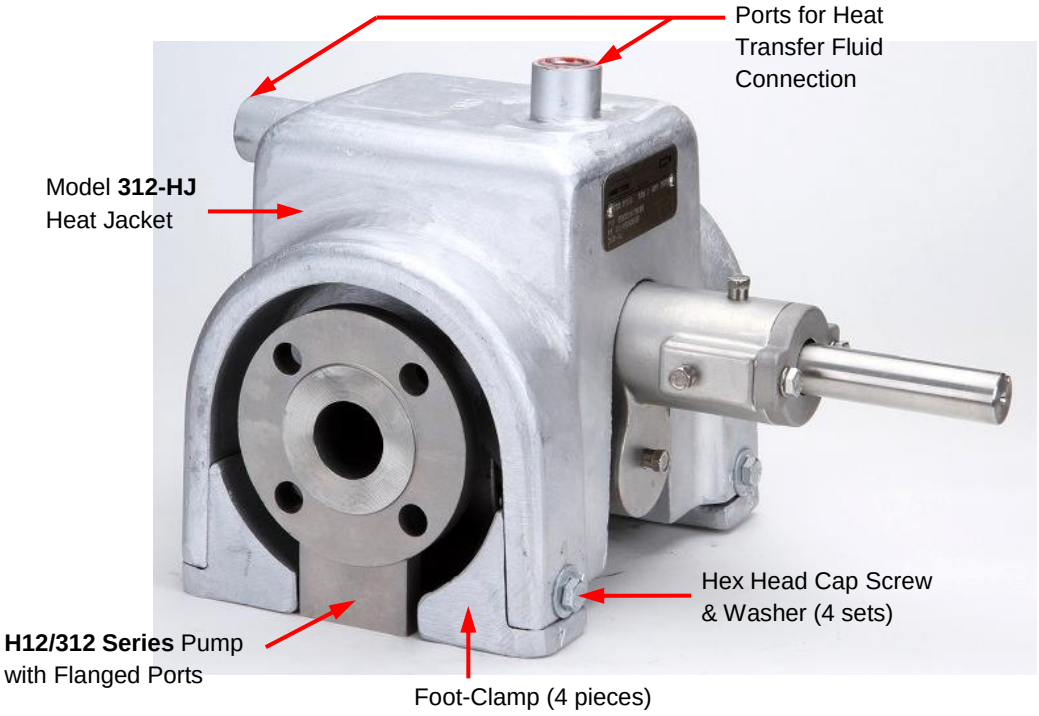
Mounting Screw Specifications

Jacket Part No.	For Pump Models	Screw Description	Material	Max Torque	
				in-lb	N-m
H3-HJ	H1, H3 & 31, 33	3/8-16 UNC x 2 SHCS	18-8 SS	236	26.7
H5-HJ or H5-HJ-SF*	H5R/F & 35R/F	3/8-16 UNC x 2 SHCS			
H7-HJ	H7N/R/F & 37R/F	3/8-16 UNC x 2-3/4 SHCS			
H9R-HJ	H9R & 39R	3/8-16 UNC x 3-1/2 SHCS			
H9F-HJ	H9F & 39F	3/8-16 UNC x 4-1/4 SHCS			

* Jacket for pump with Sanitary Fittings. SHCS = Socket Head Cap Screw

Temperature Control Jacket for H12 & 312 Pump Models

These pump models use a cast aluminum Temperature Control Jacket that mounts to the top of the pump housing, as shown below.



Installation Procedure:

1) Remove the four aluminum foot-clamps from the jacket by removing four screws with a **9/16" wrench**. (Note: the foot-clamps have notches and numbers that correspond to the notches and numbers on the aluminum jacket. This feature is helpful when reattaching the foot-clamps.)

2) If using **heat transfer compound** (HTC), apply a ¼" to ½" layer between the pump housing and jacket. Alternatively, **crumpled aluminum foil** can be used to fill the gaps between the pump housing and jacket. Additional foil can be added after the jacket is installed. (Refer to Note on page 1.)

3) With the pump secured to a base, install the jacket to the pump housing with orientation as shown above. Ensure that the jacket is properly seated and centered on the pump housing. **Caution: The jacket is heavy.**

4) Reattach the four aluminum foot-clamps to the jacket (refer to Step 1). (Note: The Maximum Torque Specification of the 3/8-16 x 1-1/2 Hex Head Cap Screws is 236 in-lbs or 26.7 N-m).

5) Remove the plastic thread protectors from the jacket ports; then connect the jacket to the heat transfer fluid supply pipes. (Note: Teflon tape or pipe sealant is suggested.)

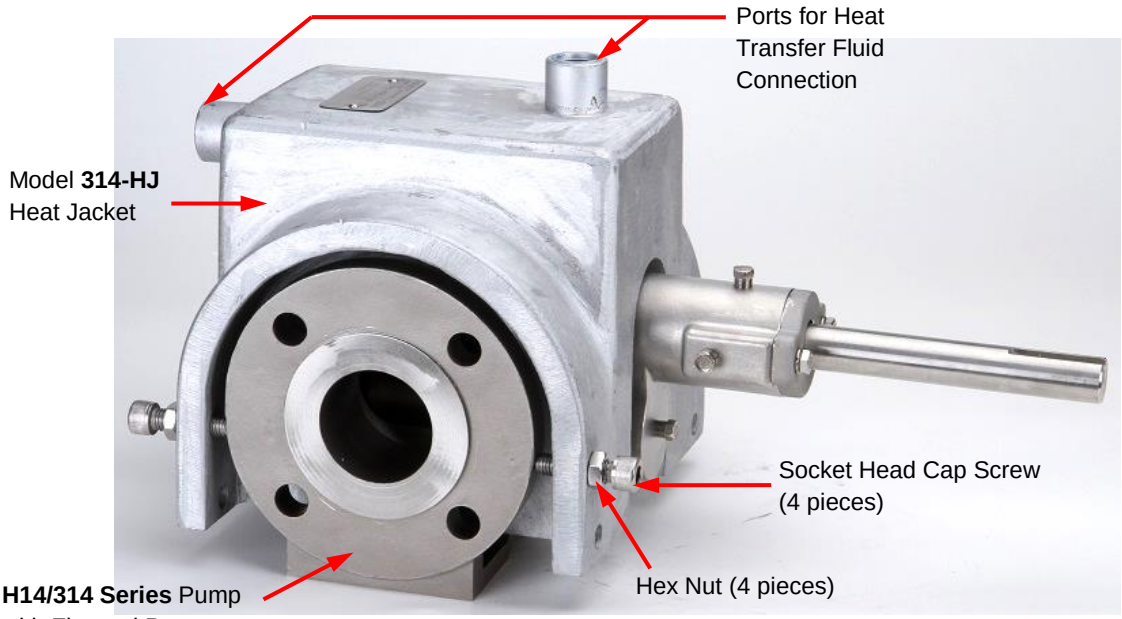
Temperature Control Jacket Specifications

Jacket Part No.	For Pump Models	Approx. Weight	Material	Port Size	Max Pressure	Max Temperature
312-HJ*	**H12R/F & 312R/F**	25 lb.	**Jacket:** Aluminum Alloy Grade A356.2 **HX:** SA-178 Carbon Steel; **Bolts & Washers:** 18-8 SS	3/4" FNPT	150 PSIG	500 °F

* Jacket for Flanged pumps only. HX = Heat Exchanger

Temperature Control Jacket for H14 & 314 Pump Models

These pump models use a one-piece, cast aluminum Temperature Control Jacket that mounts to the top of the pump housing, as shown below.



Installation Procedure:

1) If using **heat transfer compound** (HTC), apply a ¼" to ½" layer between the pump housing and jacket. Alternatively, **crumpled aluminum foil** can be used to fill the gaps between the pump housing and jacket. Additional foil can be added after the jacket is installed. (Refer to Note on page 1.)

2) With the pump secured to a base, install the jacket to the pump housing with orientation as shown above. Ensure that the jacket is properly seated and centered on the pump housing. **Caution: The jacket is heavy.**

3) Thread a 1/2-13 Hex Nut on each of four 1/2-13 x 1-3/4 Socket Head Cap Screws, such that the nut is close to the head of the screw.

4) Insert the four screws into the jacket so that the screws touch the pump flange. Then thread the four nuts by hand until they touch the jacket.

5) Tighten each nut using a **3/4" open-end wrench** and a **3/8" Allen wrench** to prevent the screw from rotating. (Note: The Maximum Torque Specification of the screws is 517 in-lbs or 58.4 N-m).

6) Remove the plastic thread protectors from the jacket ports; then connect the jacket to the heat transfer fluid supply pipes. (Note: Teflon tape or pipe sealant is suggested.)

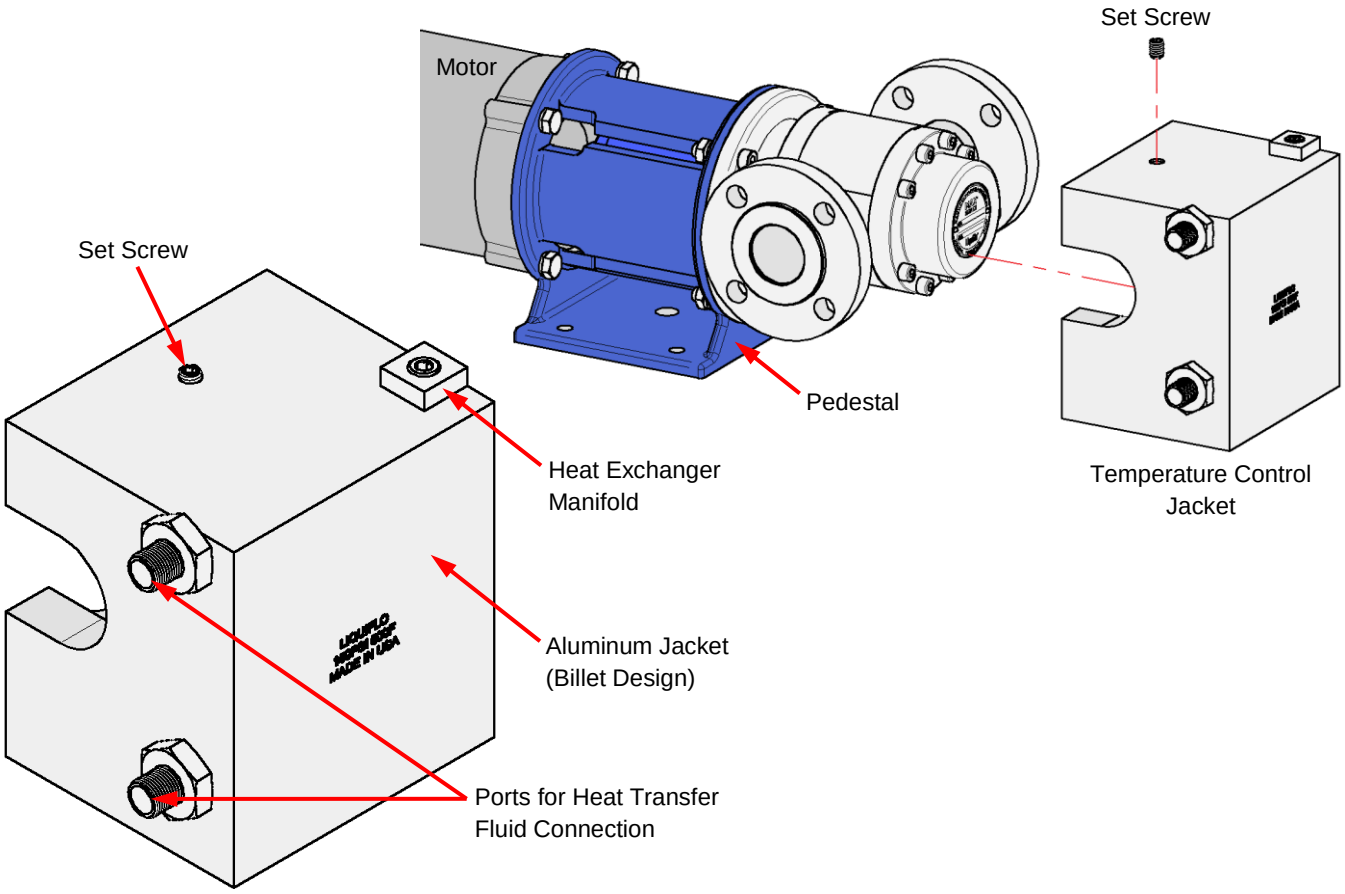
Temperature Control Jacket Specifications

Jacket Part No.	For Pump Models	Approx. Weight	Material	Port Size	Max Pressure	Max Temperature
314-HJ*	**H14F & 314F**	30 lb.	**Jacket:** Aluminum Alloy Grade A356.2; **HX:** SA-178 Carbon Steel; **Bolts & Nuts:** 18-8 SS	3/4" FNPT	150 PSIG	500 °F

* Jacket for Flanged pumps only. HX = Heat Exchanger

Temperature Control Jackets for Max® Series Pump Models

The Max® Series pump models, M0 thru M8, use a one-piece, factory-assembled Temperature Control Jacket that mounts to the front of the pump housing, as shown below.



Installation Procedure:

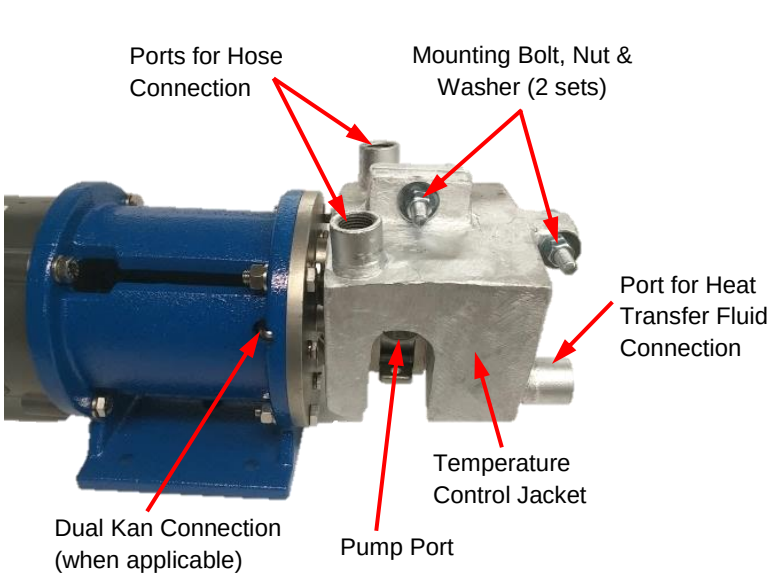
1) If using **heat transfer compound** (HTC), apply a ¼" layer between the pump housing and inside surface of the jacket. Alternatively, **crumpled aluminum foil** can be used to fill the gaps between the pump housing and jacket. (Refer to Note on page 1.)
2) With the pump secured to a base, install the jacket to the pump housing with orientation as shown above. Ensure that the jacket seats properly on the pump housing.
3) Secure the jacket to the pump housing by tightening the 3/8-16 x 1/2 Socket Head Set Screw with a **3/16" Allen wrench**.
4) Remove the plastic thread protectors from the jacket connectors; then connect the jacket to the heat transfer fluid supply pipes. (Note: Teflon tape or pipe sealant is suggested.)

Temperature Control Jacket Specifications

Jacket Part No.	For Pump Models	Approx. Weight (lb.)	Material	Port Size	Max Pressure	Max Temperature
MAX3-HJ	**M0-M3**	12	**Jacket:** Aluminum Alloy 6061-T6511; **Heat Exchanger Manifold:** 316 Stainless Steel; **Set Screw:** 18-8 Stainless Steel	3/8" MNPT	150 PSIG	500 °F
MAX4-HJ	**M4**	14				
MAX5-HJ	**M5**	16				
MAX6-HJ	**M6**	18				
MAX7-HJ	**M7**	19				
MAX8-HJ	**M8**	20				

Obsolete Heat Jackets for H1-H9 & 31-39 Pump Models

These pump models formerly used a two-piece, bolt-on, cast aluminum Temperature Control Jacket that mounts to the sides of the pump housing, as shown below. A braided stainless steel hose is used to connect the two halves of the jacket to complete the circuit for the heating or cooling fluid. Refer to the table below for more information.



Installation Procedure:

1) If using **heat transfer compound** (HTC), apply a ¼" layer between the pump housing and inside surface of each jacket piece. Alternatively, **crumpled aluminum foil** can be used to fill the gaps between the pump housing and jacket. (Refer to Note on page 1.)

2) With the pump secured to a base, install the jacket pieces to the pump housing with orientation as shown above. Ensure that both halves of the jacket are properly seated on the pump housing.

3) Bolt the two halves of the jacket together using two sets of bolts, nuts and washers. (Note: Bolt size is 3/8-16 x 2 HHCS; **wrench size is 9/16"**; Max Torque Specification of bolts is 236 in-lbs or 26.7 N-m).

4) Connect each half of the jacket with a hose, as shown above. Use Teflon tape or pipe sealant on the threads of the hose's MNPT connectors.

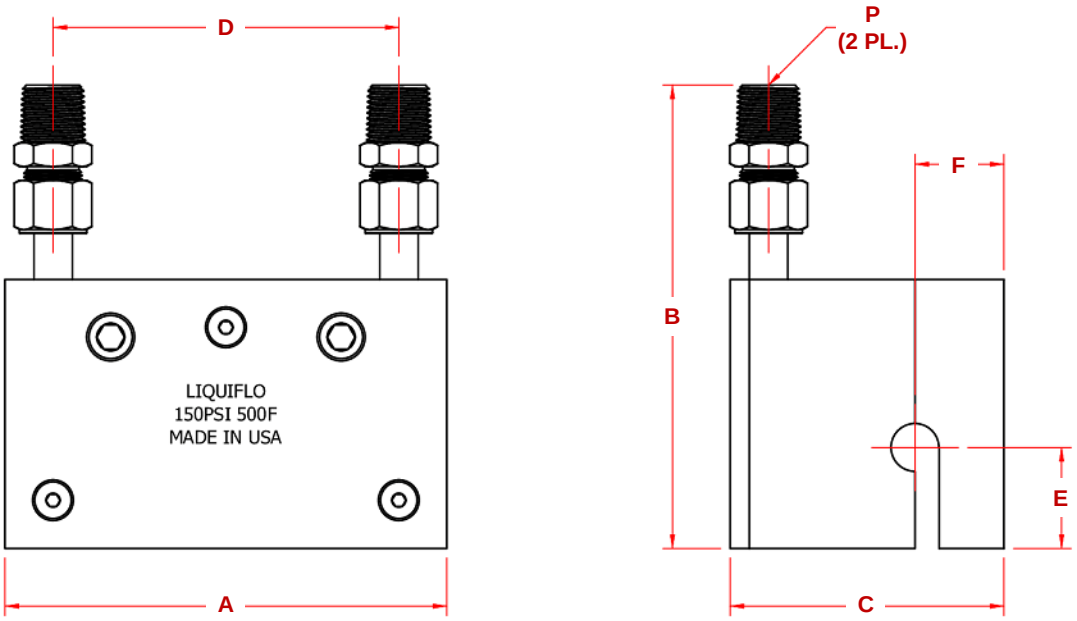
5) Remove the plastic thread protectors from the jacket connectors; then connect the jacket to the heat transfer fluid supply pipes. (Note: Teflon tape or pipe sealant is suggested.)

Obsolete Heat Jacket Specifications

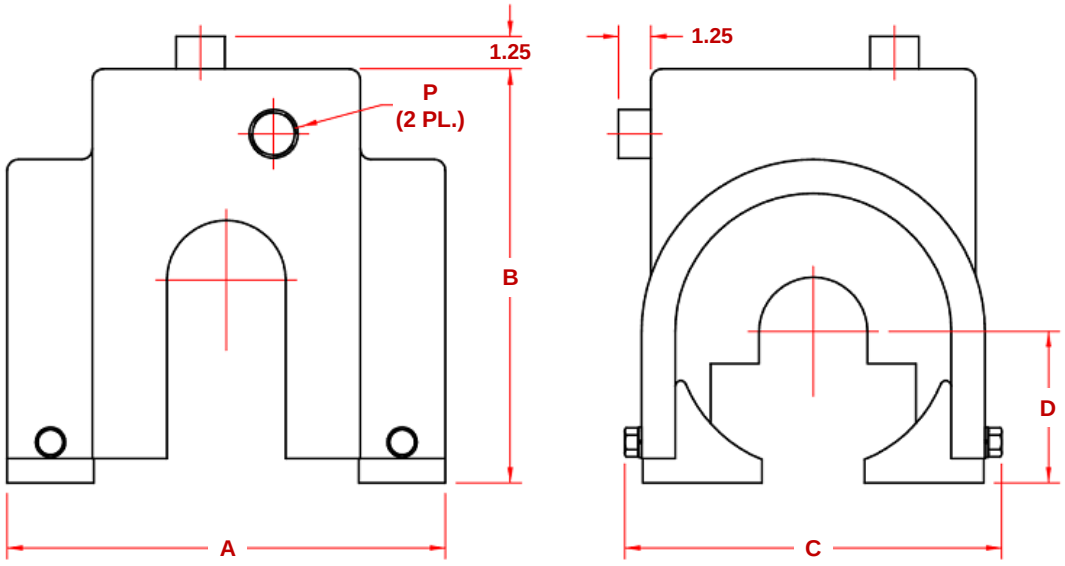
Jacket Part No.	For Pump Models	Approx. Weight	Material	Port Size	Max Pressure	Max Temperature
33-HJ	H1, H3 & 31, 33	6 lb.	**Jacket:** Aluminum Alloy Grade A356.2; **Heat Exchanger:** A285 Grade C Carbon Steel; **Hose:** 321 SS w/ 304 SS braided cover; **Bolts, etc.:** 18-8 SS	1/2" FNPT	150 PSIG	500 °F
35-HJ	H5R/F & 35R/F	7 lb.				
37-HJ	H7N/R/F & 37R/F	9 lb.				
39-HJ	H9R/F & 39R/F	11 lb.				

Dimensional Data for Temperature Control Jackets

Units: inches [mm]



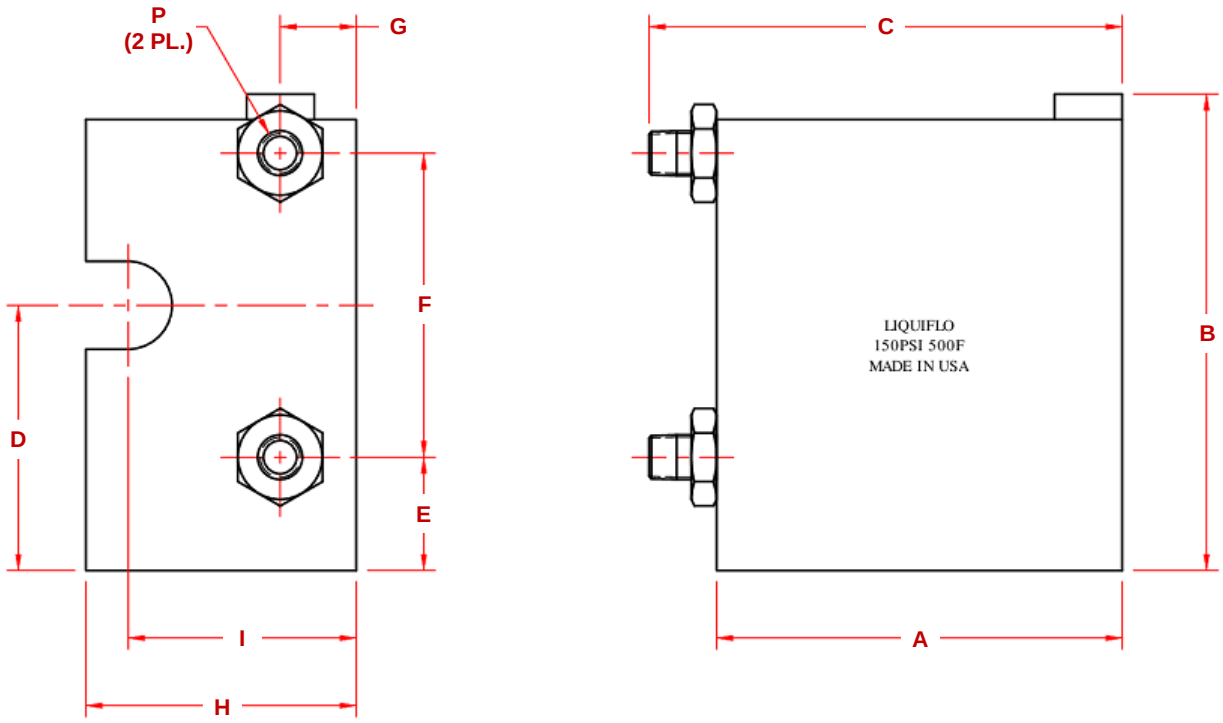
Jacket Part No.	Jacket Dimensions						
	A	B	C	D	E	F	P
H3-HJ	5.75 [146.1]	6.53 [165.9]	3.56 [90.4]	4.50 [114.3]	1.31 [33.3]	1.16 [29.5]	1/2” MNPT
H5-HJ	5.75 [146.1]	6.53 [165.9]	4.06 [103.1]	4.50 [114.3]	1.31 [33.3]	1.41 [35.8]	1/2” MNPT
H7-HJ	5.75 [146.1]	6.78 [172.2]	5.00 [127.0]	4.50 [114.3]	1.94 [49.3]	1.75 [45.5]	1/2” MNPT
H9R-HJ	5.75 [146.1]	6.78 [172.2]	5.75 [146.1]	4.50 [114.3]	1.94 [49.3]	2.13 [54.1]	1/2” MNPT
H9F-HJ	5.75 [146.1]	6.78 [172.2]	6.50 [165.1]	4.50 [114.3]	1.94 [49.3]	2.50 [63.5]	1/2” MNPT



Jacket Part No.	Jacket Dimensions				
	A	B	C	D	P
312-HJ	10.13 [257.3]	9.56 [242.8]	8.71 [221.2]	3.50 [88.9]	3/4” FNPT
314-HJ	10.13 [257.3]	9.56 [242.8]	9.50 [241.3]	3.84 [97.5]	3/4” FNPT

Dimensional Data for Temperature Control Jackets (Continued)

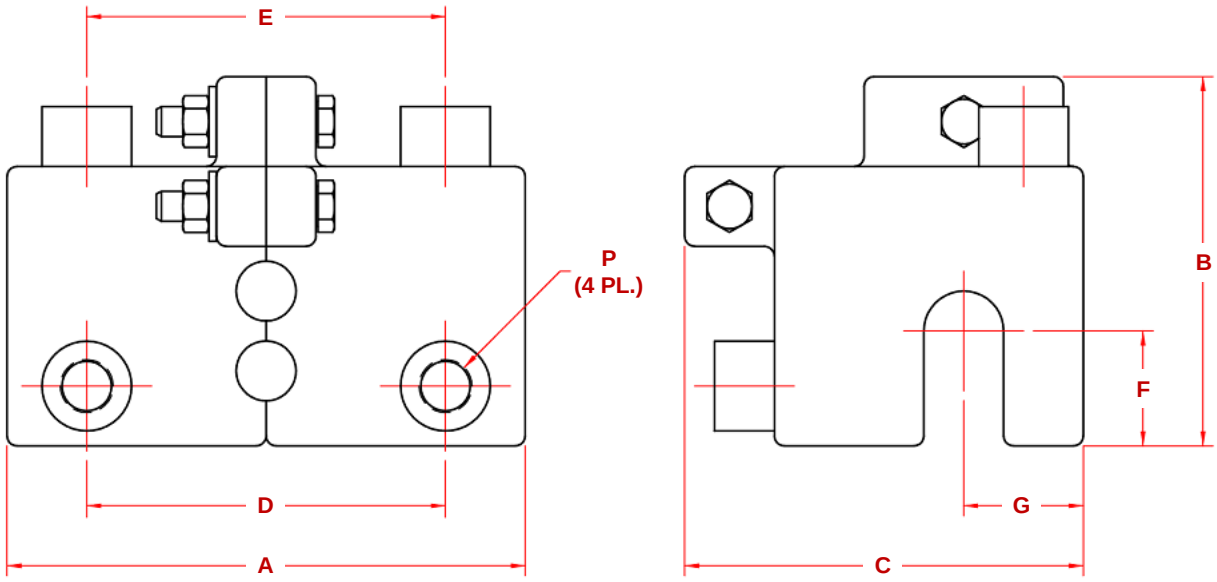
Units: inches [mm]



Jacket Part No.	Jacket Dimensions									
	A	B	C	D	E	F	G	H	I	P
MAX3-HJ	6.00 [152.4]	7.05 [179.1]	7.00 [177.8]	3.93 [99.7]	1.68 [42.5]	4.50 [114.3]	1.13 [28.6]	2.94 [74.6]	2.38 [60.3]	3/8" MNPT
MAX4-HJ	6.00 [152.4]	7.05 [179.1]	7.00 [177.8]	3.93 [99.7]	1.68 [42.5]	4.50 [114.3]	1.13 [28.6]	3.38 [85.7]	2.59 [65.9]	3/8" MNPT
MAX5-HJ	6.00 [152.4]	7.05 [179.1]	7.00 [177.8]	3.93 [99.7]	1.68 [42.5]	4.50 [114.3]	1.13 [28.6]	4.00 [101.6]	3.38 [85.7]	3/8" MNPT
MAX6-HJ	6.00 [152.4]	7.05 [179.1]	7.00 [177.8]	3.93 [99.7]	1.68 [42.5]	4.50 [114.3]	1.13 [28.6]	4.38 [111.1]	3.56 [90.5]	3/8" MNPT
MAX7-HJ	6.00 [152.4]	7.05 [179.1]	7.00 [177.8]	3.93 [99.7]	1.68 [42.5]	4.50 [114.3]	1.13 [28.6]	4.75 [120.7]	3.75 [95.3]	3/8" MNPT
MAX8-HJ	6.00 [152.4]	7.05 [179.1]	7.00 [177.8]	3.93 [99.7]	1.68 [42.5]	4.50 [114.3]	1.13 [28.6]	5.25 [133.4]	4.00 [101.6]	3/8" MNPT

Dimensional Data for Temperature Control Jackets (Continued)

Units: inches [mm]



Jacket Part No.*	Jacket Dimensions							
	A	B	C	D	E	F	G	P
33-HJ	6.50 [165.1]	4.63 [117.6]	4.63 [117.6]	4.50 [114.3]	4.50 [114.3]	1.44 [36.6]	1.13 [28.7]	1/2” FNPT
35-HJ	6.50 [165.1]	4.63 [117.6]	5.00 [127.0]	4.50 [114.3]	4.50 [114.3]	1.44 [36.6]	1.50 [38.1]	1/2” FNPT
37-HJ	6.50 [165.1]	5.38 [136.6]	6.13 [155.7]	4.50 [114.3]	4.50 [114.3]	2.00 [50.8]	1.94 [49.3]	1/2” FNPT
39-HJ	6.50 [165.1]	5.38 [136.6]	6.75 [171.5]	4.50 [114.3]	4.50 [114.3]	2.13 [54.1]	2.44 [62.0]	1/2” FNPT

* Obsolete Heat Jackets for H1-H9 & 31-39 pumps. Connecting Hose not shown (see page 8). See pages 3-4 and top of page 9 for replacement jacket.