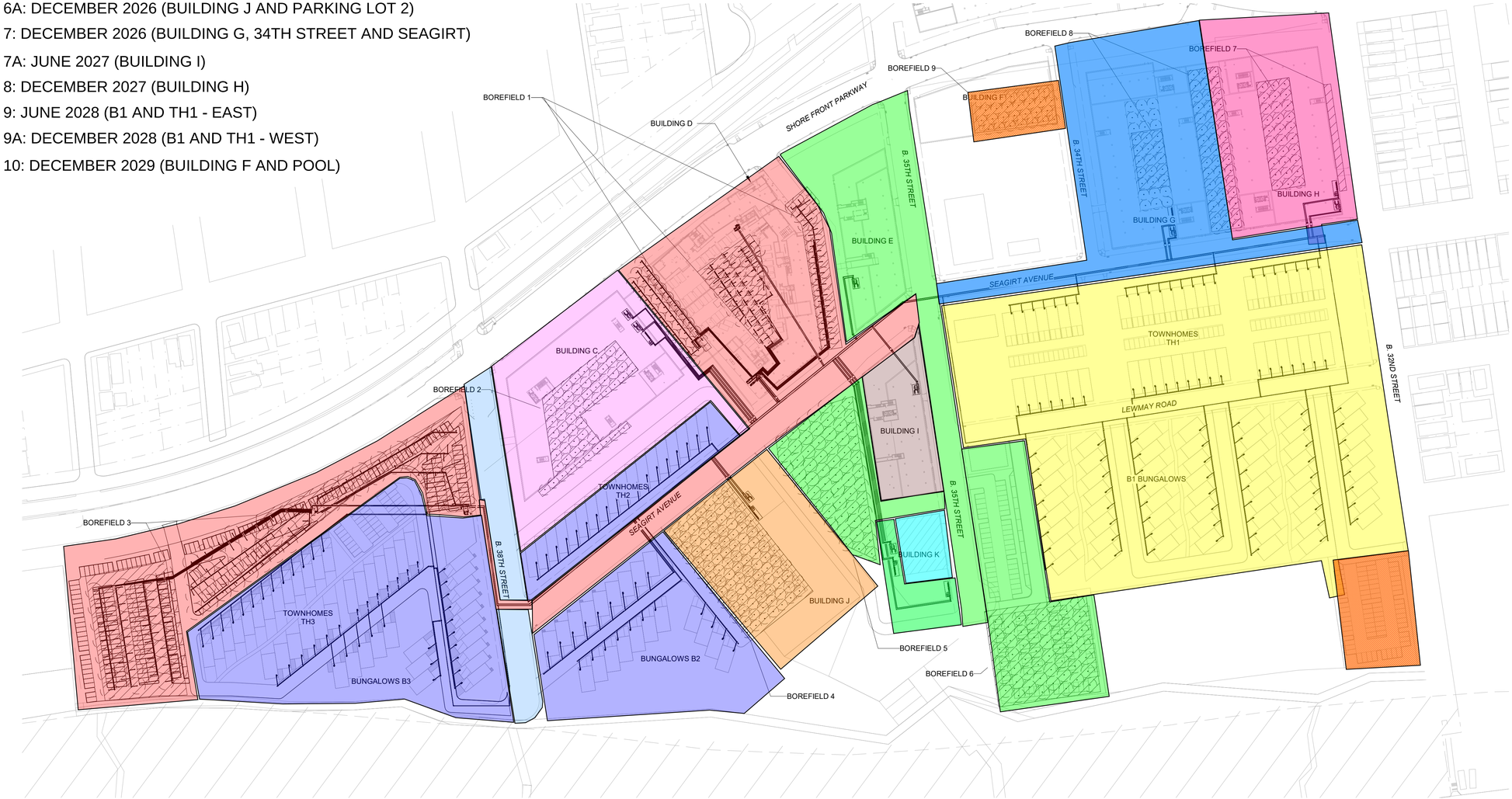
- PHASE 3: DECEMBER 2023 (BUILDING D, PARKING LOT 1, AND SEAGIRT AVENUE)
- PHASE 3A: APRIL 2024 (38TH STREET PENDING FUNDING)
- PHASE 4: DECEMBER 2024 (BUILDING E, 35TH STREET, AND PARKING LOT 3)
- PHASE 4A: DECEMBER 2025 (BUILDING K)
- PHASE 5: DECEMBER 2025 (BUILDING C)
- PHASE 6: JUNE 2026 (B2, B3, TH2, AND TH3)
- PHASE 6A: DECEMBER 2026 (BUILDING J AND PARKING LOT 2)
- PHASE 7: DECEMBER 2026 (BUILDING G, 34TH STREET AND SEAGIRT)
- PHASE 7A: JUNE 2027 (BUILDING I)
- PHASE 8: DECEMBER 2027 (BUILDING H)
- PHASE 9: JUNE 2028 (B1 AND TH1 - EAST)
- PHASE 9A: DECEMBER 2028 (B1 AND TH1 - WEST)
- PHASE 10: DECEMBER 2029 (BUILDING F AND POOL)



N

NOTES:

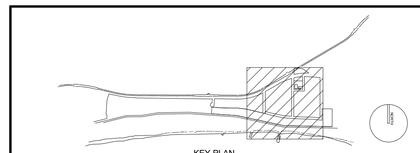
1. ALL PIPING ROUTED MIN. 4'-0" BELOW FINISHED GRADE. FINAL INVERTS TO BE COORDINATED WITH SITE GRADING PLAN.

ARVERNE EAST GEOTHERMAL SITE PLAN - ALL PHASES

1" = 100'-0"

0 50' 100' 200'

SCALE: 1" = 100'-0"



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: -
DATE: MARCH 2023

CDM Smith
CDM Smith NY Inc
14 Wall Street, Suite 1702
New York, NY 10005
Tel: (212) 785-9123

ZBF GEOTHERMAL

ARVERNE EAST GEOTHERMAL AMBIENT LOOP

OVERALL GEOTHERMAL PLAN

PROJECT NO.
FILE NAME:

SHEET NO.
GT-100

100% DD SUBMITTAL - NOT FOR CONSTRUCTION

Appendix D

Equipment Cutsheets

Technical specification

Gasketed Plate Heat Exchanger

Project ref:	Arvern East Living- Rockaways.NY SD	ALICE 5.0.1.01
Line ref:	B1.1,2,3,4,5,6,7-HX-1	AHRI LLHE PHE 1.3
Model:	AQ2T-PFG	Page: 1(2)
No of units:	7	Date: 02/25/2023

Specification of 1 exchanger out of 7 Connected In Parallel.

		Hot side	Cold Side
Fluid:		25.0% Prop.glycol IIR	25.0% Prop.glycol IIR
Density:	lb/ft³	63.21	63.26
Specific heat capacity:	Btu/(lb·°F)	0.9460	0.9436
Thermal conductivity:	Btu/(ft·h·°F)	0.2780	0.2775
Viscosity inlet:	cP	1.43	1.75
Viscosity outlet:	cP	1.67	1.50
Volume flow rate:	GPM	40.1	40.0
Inlet temperature:	°F	100.0	87.0
Outlet temperature:	°F	90.0	97.0
Pressure drop:	psi	5.1	5.1
Heat exchanged:	kBtu/h	191.9	
LMTD:	°F	3.0	
Heat transfer coefficient:	Btu/(ft²·h·°F)	662.6	
Heat transfer area:	ft²	96.5	
Relative directions of fluids:		Countercurrent	
Connection positions and flow directions:		S1->T1	T4->S4
Connections: S1,S4,T1,T4		ASME B1.20.1 - 2-11.5 NPT, ALLOY 316L, 101 mm	
Number of passes:		2	2
Effective margin:	%	0.5	
Effective fouling resistance * 10000:	ft²·h·°F/Btu	0.077	
External loads according to API:		No loads	
Design pressure (MAWP):	psi	150	150
Test pressure:	psi	196	196
Design temperature max.:	°F	150.1	150.1
Design temperature min. (MDMT):	°F	-18.0	-18.0
Channel arrangement:		1*15H +1*16H	1*15H +1*16H
Pressure vessel approval:		ASME UM-stamp	
Number of plates:		63	
Nominal A-dimension:	mm	214	
Extension capacity:		12 plates	
Plate material/thickness:		ALLOY 304/0.4 mm	
Gasket material and attachment:		NBRP ClipGrip™	NBRP ClipGrip™
Approx. outer dimensions (L x W x H)	in	31.9 x 13.0 x 34.6	
Approx. weight, empty / operating:	lb	412 / 471	
Approx. weight, full of water:	lb	470	
Type of package:		Skid base + box	
Approx. packed weight:	lb	535.459	

Technical specification

Gasketed Plate Heat Exchanger

Project ref:	Arvern East Living- Rockaways.NY SD	ALICE 5.0.1.01
Line ref:	B1.1,2,3,4,5,6,7-HX-1	AHRI LLHE PHE 1.3
Model:	AQ2T-PFG	Page: 2(2)
No of units:	7	Date: 02/25/2023

Specification of 1 exchanger out of 7 Connected In Parallel.

Accessories added to configuration — Quantity

Accessories

Equipment

Protecting sheet Aluminum	1
Protection tube Plastic	1

Labels

Additional marking on nameplate	7

Documents & services

Documents

Documents Alfa Laval-Instruction manual Industrial line S-1AHRI	1

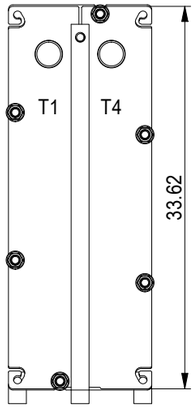
This Heat Exchanger is certified by the AHRI Liquid to Liquid Heat Exchangers Certification Program, based on AHRI Standard 400. AHRI certified units are subject to rigorous and continuous testing, have performance ratings independently measured and are third-party verified. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

AHRI CERTIFIED® www.ahridirectory.org
Liquid to Liquid Heat Exchangers
AHRI Standard 400

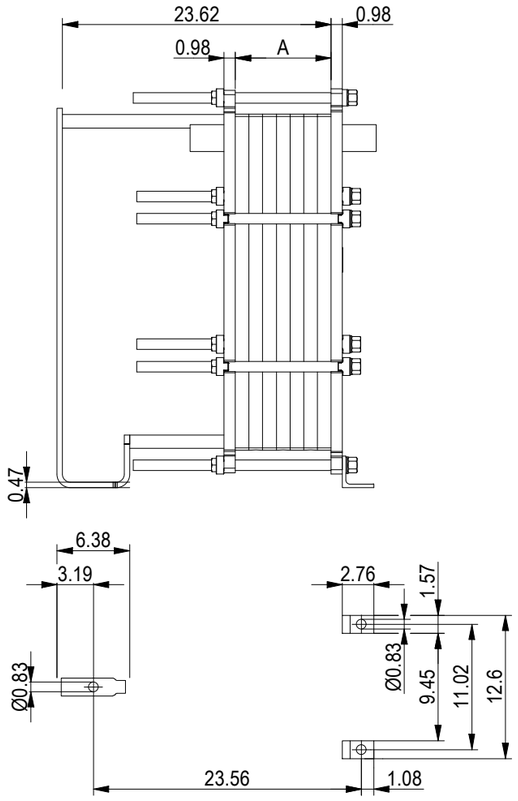
QPID 247 ea

PRESSURE PLATE

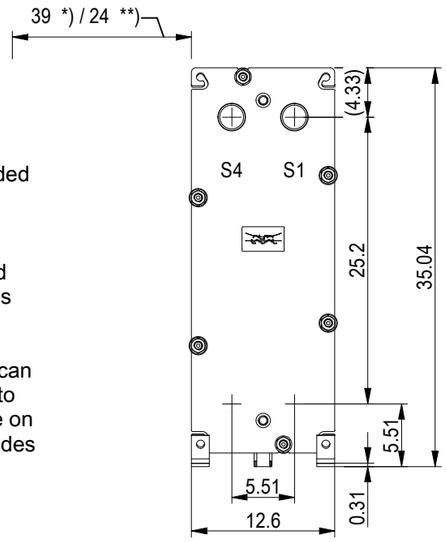
(MOVABLE)



Space between pressure plate and supporting column should be kept free from fixed installations!



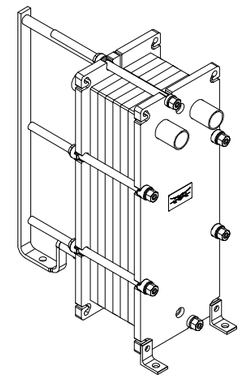
FRAME PLATE

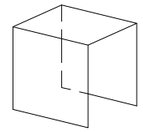


*)
Recommended free space for opening and closing to be applied on both sides

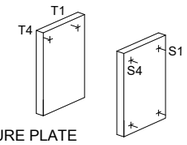
**)
Free space can be reduced to this distance on one of the sides

All dimensions in inches





PROTECTION SHEET

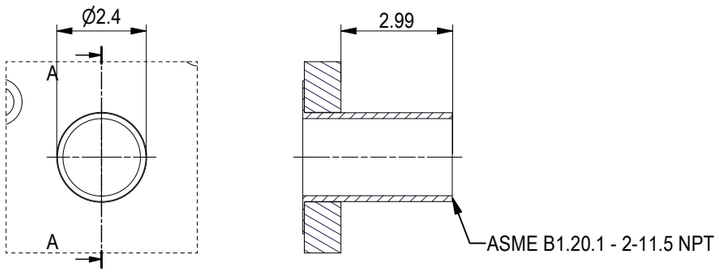


PRESSURE PLATE

FRAME PLATE

ASME B1.20.1 - 2-11.5 NPT, ALLOY 316L, 101 mm
S1, S4, T1, T4

A-A:



TIGHTENING BOLTS	4 x M20, L = 18.9 in 2 x M20, L = 18.9 in
A	214 mm +1%/-1%
APPROX. OUTER DIMENSIONS	
LENGTH	31.9 in
WIDTH	13.0 in
HEIGHT	34.6 in
APPROX. WEIGHTS	
NET WEIGHT, EMPTY	412 lb
WEIGHT FULL OF WATER	470 lb
PLATE MATERIAL	ALLOY 304
PLATE THICKNESS	0.4 mm
GASKET	NBRP ClipGrip™
AREA OF HEAT SURFACE	96.5 ft²

HEAT EXCHANGED 191.9 kBtu/h NO. OF UNITS 7

SIDE	MEDIA		INLET	TEMP.	OUTLET	TEMP.	FLOW RATE	PRES. DROP	LIQUID VOL.	DESIGN PRESSURE MAX.	DESIGN PRESSURE MIN.	DESIGN TEMPERATURE MAX.	DESIGN TEMPERATURE MIN.	TEST PRESSURE	OPERATING MAX. TEMP.
1	25.0% Prop.glycol IIR		S1	100.0 °F	T1	90.0 °F	40.1 GPM	5.1 psi	0.462 ft³	150 psi	0 psi	150.1 °F	-18.0 °F	196 psi	100.0 °F
2	25.0% Prop.glycol IIR		T4	87.0 °F	S4	97.0 °F	40.0 GPM	5.1 psi	0.462 ft³	150 psi	0 psi	150.1 °F	-18.0 °F	196 psi	97.0 °F

ALFA LAVAL

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DRAWING
GASKETED PLATE HEAT EXCHANGER

AQ2T-PFG

ASME
Code Section VIII Div.1

AHRI CERTIFIED™ www.ahridirectory.org
Liquid to Liquid Heat Exchangers
AHRI Standard 400

MAWP 150 psi at 150.1 °F
MDMT -18.0 °F at 150 psi
Designed and constructed in accordance with the 2021 ASME Code.

Arvern East Living- Rockaways.NY SD
B1.1,2,3,4,5,6,7-HX-1

Do not use this drawing for foundation bolting or piping layout

DATE 2/25/23
REVISION 0

Technical specification

Gasketed Plate Heat Exchanger

Project ref:	Arvern East Living- Rockaways.NY SD	ALICE 5.0.1.01
Line ref:	B2.1,2,3; B3.1,2,3-HX-1	AHRI LLHE PHE 1.3
Model:	AQ1L-FG	Page: 1(2)
No of units:	6	Date: 02/25/2023

Specification of 1 exchanger out of 6 Connected In Parallel.

		Hot side	Cold Side
Fluid:		25.0% Prop.glycol IIR	25.0% Prop.glycol IIR
Density:	lb/ft³	63.21	63.26
Specific heat capacity:	Btu/(lb·°F)	0.9460	0.9436
Thermal conductivity:	Btu/(ft·h·°F)	0.2780	0.2775
Viscosity inlet:	cP	1.43	1.75
Viscosity outlet:	cP	1.67	1.50
Volume flow rate:	GPM	30.1	30.0
Inlet temperature:	°F	100.0	87.0
Outlet temperature:	°F	90.0	97.0
Pressure drop:	psi	3.3	3.3
Heat exchanged:	kBtu/h	143.9	
LMTD:	°F	3.0	
Heat transfer coefficient:	Btu/(ft²·h·°F)	569.6	
Heat transfer area:	ft²	84.2	
Relative directions of fluids:		Countercurrent	
Connection positions and flow directions:		S1->S2	S3->S4
Connections: S1,S2,S3,S4		ASME B1.20.1 - 1 1/4-11.5 NPT, ALLOY 316, 101 mm	
Number of passes:		1	1
Effective margin:	%	0.3	
Effective fouling resistance * 10000:	ft²·h·°F/Btu	0.046	
External loads according to API:		No loads	
Design pressure (MAWP):	psi	150	150
Test pressure:	psi	196	196
Design temperature max.:	°F	150.1	150.1
Design temperature min. (MDMT):	°F	-18.0	-18.0
Channel arrangement:		1*53 H	1*53 H
Pressure vessel approval:		ASME UM-stamp	
Number of plates:		107	
Nominal A-dimension:	mm	235	
Extension capacity:		2 plates	
Plate material/thickness:		ALLOY 304/0.4 mm	
Gasket material and attachment:		NBRP Clip-on	NBRP Clip-on
Approx. outer dimensions (L x W x H)	in	23.2 x 7.9 x 31.5	
Approx. weight, empty / operating:	lb	256 / 286	
Type of package:		Skid base + box (domestic)	
Approx. packed weight:	lb	315.525	

Technical specification

Gasketed Plate Heat Exchanger

Project ref:	Arvern East Living- Rockaways.NY SD	ALICE 5.0.1.01
Line ref:	B2.1,2,3; B3.1,2,3-HX-1	AHRI LLHE PHE 1.3
Model:	AQ1L-FG	Page: 2(2)
No of units:	6	Date: 02/25/2023

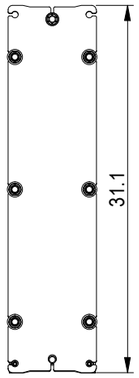
Specification of 1 exchanger out of 6 Connected In Parallel.

Accessories added to configuration	Quantity
Accessories	
Equipment	
Protecting sheet Aluminum	1
Labels	
Additional marking on nameplate	6
Documents & services	
Documents	
Documents Alfa Laval-Instruction manual Industrial line S-1 AHRI	1

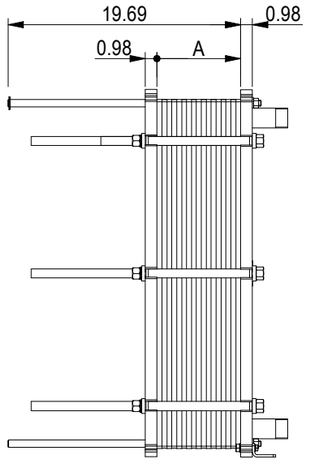
QPID 247 ea

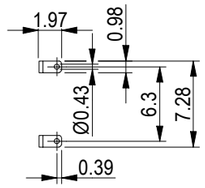
PRESSURE PLATE

(MOVABLE)

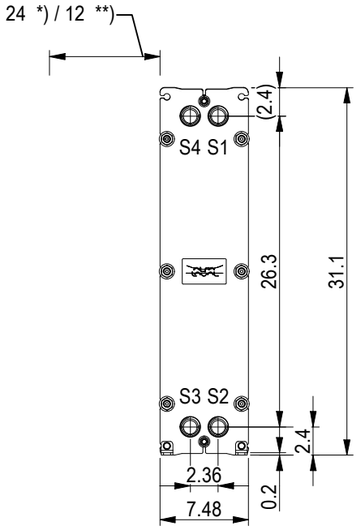


Space between pressure plate and supporting column should be kept free from fixed installations!





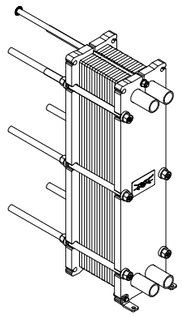
FRAME PLATE

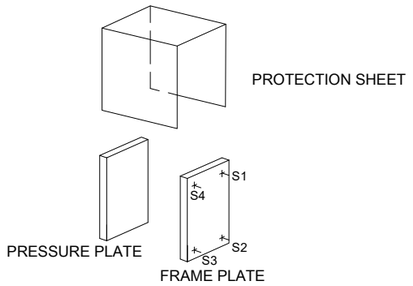


*)
Recommended free space for opening and closing to be applied on both sides

**)
Free space can be reduced to this distance on one of the sides

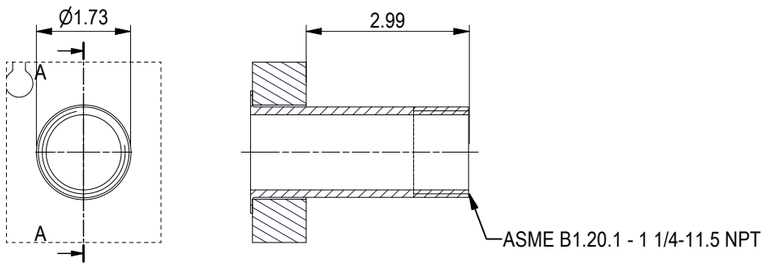
All dimensions in inches





ASME B1.20.1 - 1 1/4-11.5 NPT, ALLOY 316, 101 mm
S1, S2, S3, S4

A-A:



TIGHTENING BOLTS	4 x M16, L = 18.9 in 2 x M16, L = 18.9 in
A	235 mm +1%/-1%
APPROX. OUTER DIMENSIONS	
LENGTH	23.2 in
WIDTH	7.9 in
HEIGHT	31.5 in
APPROX. WEIGHTS	
NET WEIGHT, EMPTY	256 lb
WEIGHT FULL OF WATER	286 lb
PLATE MATERIAL	ALLOY 304
PLATE THICKNESS	0.4 mm
GASKET	NBRP Clip-on
AREA OF HEAT SURFACE	84.2 ft²

HEAT EXCHANGED 143.9 kBtu/h NO. OF UNITS 1

SIDE	MEDIA		INLET	TEMP.	OUTLET	TEMP.	FLOW RATE	PRES. DROP	LIQUID VOL.	DESIGN PRESSURE MAX.	DESIGN PRESSURE MIN.	DESIGN TEMPERATURE MAX.	DESIGN TEMPERATURE MIN.	TEST PRESSURE	OPERATING MAX. TEMP.
1	25.0% Prop.glycol IIR		S1	100.0 °F	S2	90.0 °F	30.1 GPM	3.3 psi	0.232 ft³	150 psi	0 psi	150.1 °F	-18.0 °F	196 psi	100.0 °F
2	25.0% Prop.glycol IIR		S3	87.0 °F	S4	97.0 °F	30.0 GPM	3.3 psi	0.232 ft³	150 psi	0 psi	150.1 °F	-18.0 °F	196 psi	97.0 °F

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DRAWING
GASKETED PLATE HEAT EXCHANGER

AQ1L-FG

ASME
Code Section VIII Div.1

AHRI CERTIFIED™ www.ahridirectory.org
Liquid to Liquid Heat Exchangers
AHRI Standard 400

MAWP 150 psi at 150.1 °F
MDMT -18.0 °F at 150 psi
Designed and constructed in accordance with the 2021 ASME Code.

Arvern East Living- Rockaways.NY SD
B2.1,2,3; B3.1,2,3-HX-1

Do not use this drawing for foundation bolting or piping layout

DATE 2/25/23
REVISION 0

Technical specification

Gasketed Plate Heat Exchanger

Project ref:	Arvern East Living- Rockaways.NY SD	ALICE 5.0.1.01
Line ref:	D-HX-1	AHRI LLHE PHE 1.3
Model:	AQ6T-BFG	Page: 1(2)
No of units:	1	Date: 02/25/2023

		Hot side	Cold Side
Fluid:		25.0% Prop.glycol IIR	25.0% Prop.glycol IIR
Density:	lb/ft³	63.21	63.26
Specific heat capacity:	Btu/(lb·°F)	0.9460	0.9436
Thermal conductivity:	Btu/(ft·h·°F)	0.2780	0.2775
Viscosity inlet:	cP	1.43	1.75
Viscosity outlet:	cP	1.67	1.50
Volume flow rate:	GPM	701.8	700.0
Inlet temperature:	°F	100.0	87.0
Outlet temperature:	°F	90.0	97.0
Pressure drop:	psi	9.8	8.8
Heat exchanged:	kBtu/h	3,357.5	
LMTD:	°F	3.0	
Heat transfer coefficient:	Btu/(ft²·h·°F)	754.2	
Heat transfer area:	ft²	1,483.9	
Relative directions of fluids:		Countercurrent	
Connection positions and flow directions:		S1->S2	S3->S4
Connections: S1,S2,S3,S4		Flange ASME B16.5 NPS 6 Class 150 lining ALLOY 316	
Number of passes:		1	1
Effective margin:	%	0.1	
Effective fouling resistance * 10000:	ft²·h·°F/Btu	0.009	
External loads according to API:		No loads	
Design pressure (MAWP):	psi	150	150
Test pressure:	psi	196	196
Design temperature max.:	°F	150.1	150.1
Design temperature min. (MDMT):	°F	-18.0	-18.0
Channel arrangement:		1*(78H+26MH)	1*(78H+26ML)
Pressure vessel approval:		ASME U-stamp	
Number of plates:		209	
Nominal A-dimension:	mm	589	
Extension capacity:		30 plates	
Plate material/thickness:		ALLOY 304/0.4 mm	
Gasket material and attachment:		NBRP ClipGrip™	NBRP ClipGrip™
Approx. outer dimensions (L x W x H)	in	61.8 x 26.0 x 72.8	
Approx. weight, empty / operating:	lb	3,049 / 3,766	
Approx. weight, full of water:	lb	3,756	
Type of package:		Skid base	
Approx. packed weight:	lb	3,227.574	

This Heat Exchanger is certified by the AHRI Liquid to Liquid Heat Exchangers Certification Program, based on AHRI Standard 400. AHRI certified units are subject to rigorous and continuous testing, have performance ratings independently measured and are third-party verified. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

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Liquid to Liquid Heat Exchangers
AHRI Standard 400

Technical specification

Gasketed Plate Heat Exchanger

Project ref:	Arvern East Living- Rockaways.NY SD	ALICE 5.0.1.01
Line ref:	D-HX-1	AHRI LLHE PHE 1.3
Model:	AQ6T-BFG	Page: 2(2)
No of units:	1	Date: 02/25/2023

Accessories added to configuration — Quantity

Accessories

Equipment

Lifting device Wire	1
Protecting sheet Aluminum	1
Protection tube Plastic	1

Labels

Additional marking on nameplate	1

Documents & services

Documents

Documents Alfa Laval-Instruction manual Industrial line L-A	1 AHRI

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Technical specification

Gasketed Plate Heat Exchanger

Project ref:	Arvern East Living- Rockaways.NY SD	ALICE 5.0.1.01
Line ref:	DRY COOLER-HX-1	AHRI LLHE PHE 1.3
Model:	AQ6T-BFG	Page: 1(2)
No of units:	1	Date: 02/25/2023

		Hot side		Cold Side
Fluid:		25.0% Prop.glycol IIR		25.0% Prop.glycol IIR
Density:	lb/ft³	63.21		63.26
Specific heat capacity:	Btu/(lb·°F)	0.9460		0.9436
Thermal conductivity:	Btu/(ft·h·°F)	0.2780		0.2775
Viscosity inlet:	cP	1.43		1.75
Viscosity outlet:	cP	1.67		1.50
Volume flow rate:	GPM	751.9		750.0
Inlet temperature:	°F	100.0		87.0
Outlet temperature:	°F	90.0		97.0
Pressure drop:	psi	9.8		8.8
Heat exchanged:	kBtu/h		3,597.3	
LMTD:	°F		3.0	
Heat transfer coefficient:	Btu/(ft²·h·°F)		750.1	
Heat transfer area:	ft²		1,598.6	
Relative directions of fluids:			Countercurrent	
Connection positions and flow directions:		S1->S2		S3->S4
Connections: S1,S2,S3,S4			Flange ASME B16.5 NPS 6 Class 150 lining ALLOY 316	
Number of passes:		1		1
Effective margin:	%		0.3	
Effective fouling resistance * 10000:	ft²·h·°F/Btu		0.036	
External loads according to API:			No loads	
Design pressure (MAWP):	psi	150		150
Test pressure:	psi	196		196
Design temperature max.:	°F	150.1		150.1
Design temperature min. (MDMT):	°F	-18.0		-18.0
Channel arrangement:		1*(84H+28MH)		1*(84H+28ML)
Pressure vessel approval:			ASME U-stamp	
Number of plates:			225	
Nominal A-dimension:	mm		635	
Extension capacity:			14 plates	
Plate material/thickness:			ALLOY 304/0.4 mm	
Gasket material and attachment:		NBRP ClipGrip™		NBRP ClipGrip™
Approx. outer dimensions (L x W x H)	in		61.8 x 26.0 x 72.8	
Approx. weight, empty / operating:	lb		3,139 / 3,911	
Approx. weight, full of water:	lb		3,901	
Type of package:			Skid base	
Approx. packed weight:	lb		3,317.574	

This Heat Exchanger is certified by the AHRI Liquid to Liquid Heat Exchangers Certification Program, based on AHRI Standard 400. AHRI certified units are subject to rigorous and continuous testing, have performance ratings independently measured and are third-party verified. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

AHRI CERTIFIED® www.ahridirectory.org
Liquid to Liquid Heat Exchangers
AHRI Standard 400

Technical specification

Gasketed Plate Heat Exchanger

Project ref:	Arvern East Living- Rockaways.NY SD	ALICE 5.0.1.01
Line ref:	DRY COOLER-HX-1	AHRI LLHE PHE 1.3
Model:	AQ6T-BFG	Page: 2(2)
No of units:	1	Date: 02/25/2023

Accessories added to configuration — Quantity

Accessories

Equipment

Lifting device Wire	1
Protecting sheet Aluminum	1
Protection tube Plastic	1

Labels

Additional marking on nameplate	1

Documents & services

Documents

Documents Alfa Laval-Instruction manual Industrial line L-A	1

HRI

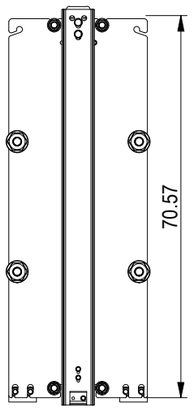
This Heat Exchanger is certified by the AHRI Liquid to Liquid Heat Exchangers Certification Program, based on AHRI Standard 400. AHRI certified units are subject to rigorous and continuous testing, have performance ratings independently measured and are third-party verified. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

AHRI CERTIFIED® www.ahridirectory.org
Liquid to Liquid Heat Exchangers
AHRI Standard 400

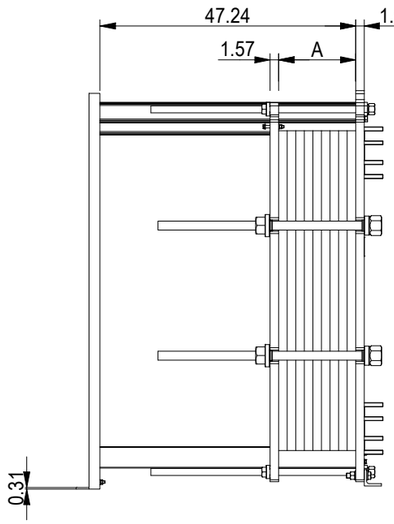
QPID 247 ea

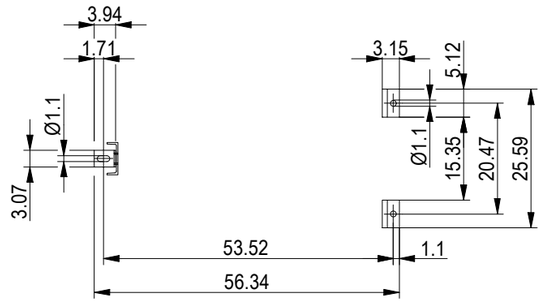
PRESSURE PLATE

(MOVABLE)



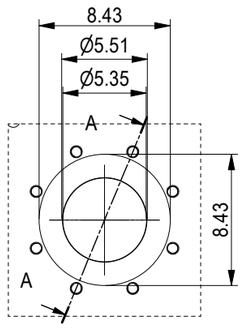
Space between pressure plate and supporting column should be kept free from fixed installations!





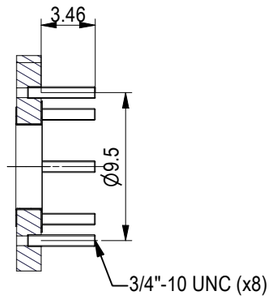
ASME B16.5 Class 150 NPS 6

S1, S2, S3, S4

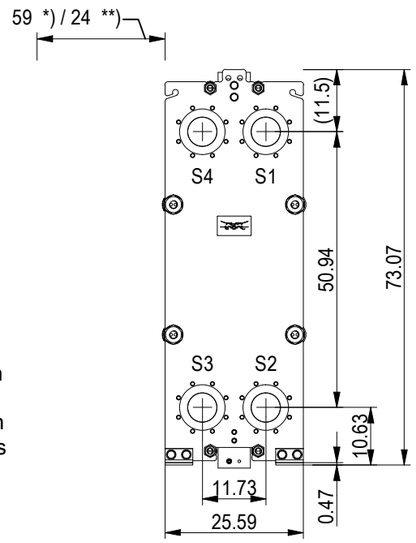


A-A:

ALLOY 316



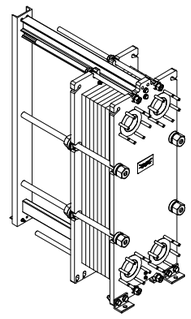
FRAME PLATE

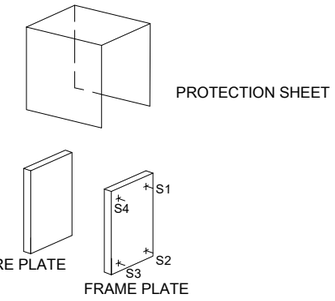


*)
Recommended free space for opening and closing to be applied on both sides

**)
Free space can be reduced to this distance on one of the sides

All dimensions in inches





TIGHTENING BOLTS	4 x M39, L = 50.9 in
	4 x M30, L = 40.2 in
A	635 mm +1%/-1%
APPROX. OUTER DIMENSIONS	
LENGTH	61.8 in
WIDTH	26.0 in
HEIGHT	72.8 in
APPROX. WEIGHTS	
NET WEIGHT, EMPTY	3139 lb
WEIGHT FULL OF WATER	3901 lb
PLATE MATERIAL	ALLOY 304
PLATE THICKNESS	0.4 mm
GASKET	NBRP ClipGrip™
AREA OF HEAT SURFACE	1598.6 ft²

HEAT EXCHANGED 3597.3 kBtu/h NO. OF UNITS 1

SIDE	MEDIA	CHANNEL	INLET	TEMP.	OUTLET	TEMP.	FLOW RATE	PRES. DROP	LIQUID VOL.	DESIGN PRESSURE MAX.	DESIGN PRESSURE MIN.	DESIGN TEMPERATURE MAX.	DESIGN TEMPERATURE MIN.	TEST PRESSURE	OPERATING MAX. TEMP.
1	25.0% Prop.glycol IIR	MH	S1	100.0 °F	S2	90.0 °F	751.9 GPM	9.8 psi	6.10 ft³	150 psi	0 psi	150.1 °F	-18.0 °F	196 psi	100.0 °F
2	25.0% Prop.glycol IIR	ML	S3	87.0 °F	S4	97.0 °F	750.0 GPM	8.8 psi	6.10 ft³	150 psi	0 psi	150.1 °F	-18.0 °F	196 psi	97.0 °F

www.alfalaval.com

DRAWING
GASKETED PLATE HEAT EXCHANGER

AQ6T-BFG

ASME
Code Section VIII Div.1

AHRI CERTIFIED™ www.ahridirectory.org
Liquid to Liquid Heat Exchangers
AHRI Standard 400

MAWP 150 psi at 150.1 °F
MDMT -18.0 °F at 150 psi
Designed, constructed and stamped in accordance with 2021 ASME.

Arvern East Living- Rockaways.NY SD
DRY COOLER-HX-1

Do not use this drawing for foundation bolting or piping layout

DATE 2/25/23
REVISION 0

Technical specification

Gasketed Plate Heat Exchanger

Project ref:	Arvern East Living- Rockaways.NY SD	ALICE 5.0.1.01
Line ref:	E-HX-1	AHRI LLHE PHE 1.3
Model:	AQ4L-FG	Page: 1(2)
No of units:	1	Date: 02/25/2023

		Hot side		Cold Side
Fluid:		25.0% Prop.glycol IIR		25.0% Prop.glycol IIR
Density:	lb/ft³	63.21		63.26
Specific heat capacity:	Btu/(lb·°F)	0.9460		0.94
Thermal conductivity:	Btu/(ft·h·°F)	0.2780		0.277
Viscosity inlet:	cP	1.43		1.75
Viscosity outlet:	cP	1.67		1.50
Volume flow rate:	GPM	310.8		310.0
Inlet temperature:	°F	100.0		87.0
Outlet temperature:	°F	90.0		97.0
Pressure drop:	psi	9.8		9.9
Heat exchanged:	kBtu/h		1,486.9	
LMTD:	°F		3.0	
Heat transfer coefficient:	Btu/(ft²·h·°F)		829.7	
Heat transfer area:	ft²		597.4	
Relative directions of fluids:			Countercurrent	
Connection positions and flow directions:		S1->S2		S3->S4
Connections: S1,S2,S3,S4			FLANGE ASME B16.5 150# NPS 4 Stainless steel	
Number of passes:		1		1
Effective margin:	%		0.3	
Effective fouling resistance * 10000:	ft²·h·°F/Btu		0.031	
Design pressure (MAWP):	psi	150		150
Test pressure:	psi	195		195
Design temperature max.:	°F	104.0		150.1
Design temperature min. (MDMT):	°F	-18.0		-18.0
Channel arrangement:		1*(30MH+26L)		1*(30ML+26L)
Pressure vessel approval:			ASME	
Number of plates:			113	
Nominal A-dimension:	mm		274	
Extension capacity:			16 plates	
Plate material/thickness:			ALLOY 304/0.40 mm	
Gasket material and attachment:		NBRP Clip-on		NBRP Clip-on
Approx. outer dimensions (L x W x H)	in		45.1 x 18.9 x 75.7	
Approx. weight, empty / operating:	lb		1,764 / 1,992	
Approx. weight, full of water:	lb		1,989	
Type of package:			SKID BASE LYING	
Approx. packed weight:	lb		1,847.78	

Technical specification

Gasketed Plate Heat Exchanger

Project ref:	Arvern East Living- Rockaways.NY SD	ALICE 5.0.1.01
Line ref:	E-HX-1	AHRI LLHE PHE 1.3
Model:	AQ4L-FG	Page: 2(2)
No of units:	1	Date: 02/25/2023

Accessories added to configuration — Quantity

Accessories

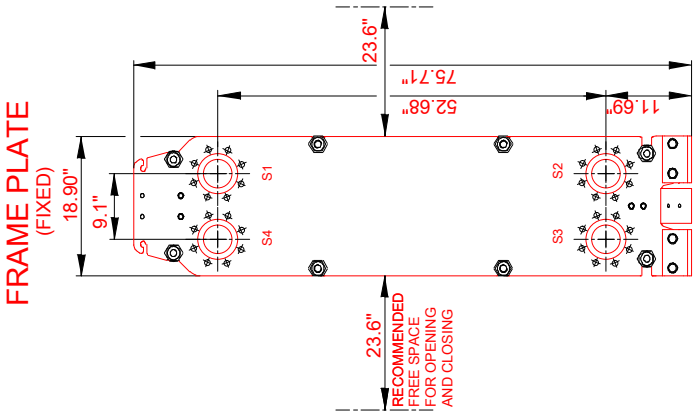
Equipment

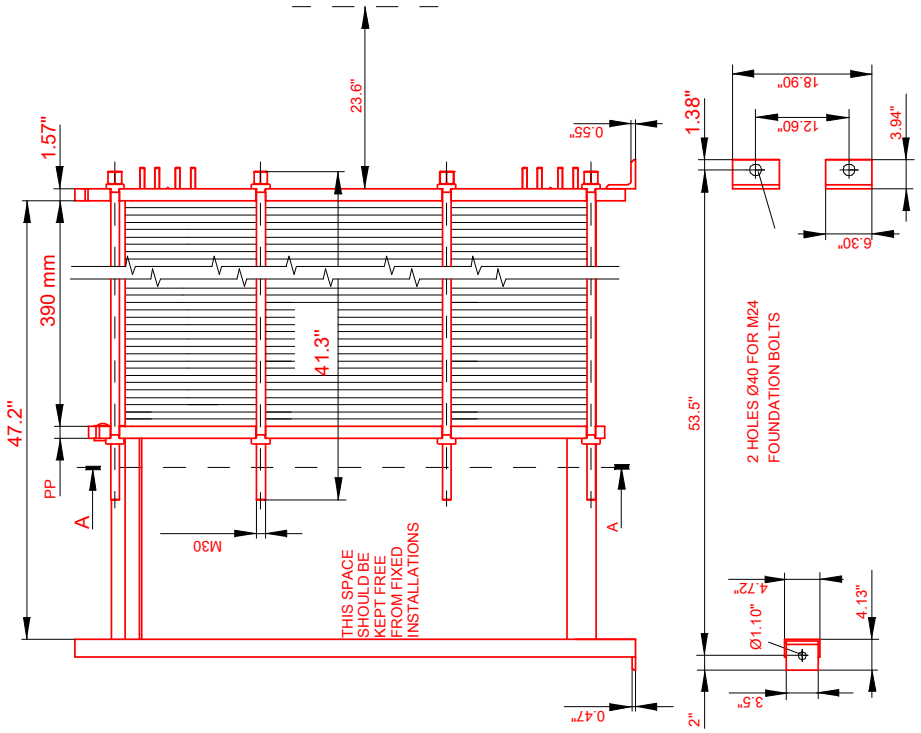
Feet Standard	1
C_Standard_ProtectionSheet AL	1

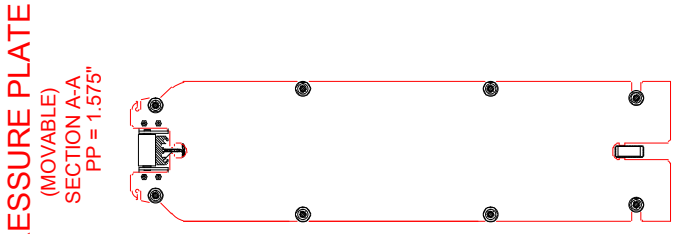
Labels

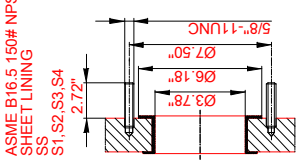
Additional marking on nameplate	1

	SIDE 1	SIDE 2
TEST PRESSURE	195.0 psi	195.0 psi
DESIGN PRESSURE	150 psi	150 psi
MAX TEMPERATURE	104.0 °F	150.1 °F
MIN TEMPERATURE	-18.0 °F	-18.0 °F
GASKET	NBRP Clip-on	
PLATE MATERIAL	ALLOY 304	
PLATE THICKNESS	0.40 mm	
HEAT LOAD	2110.4 kBtu/h	









ALL DIMENSIONS IN INCHES

Do not use this drawing for foundation bolting or piping layout.

SIDE	MEDIA		INLET	TEMP.	OUTLET	TEMP.	FLOW RATE	PRESSURE DROP
1	25.0% Prop.glycol	IIR	S1	100.0 °F	S2	90.0 °F	441.1 GPM	9.9 psi
2	25.0% Prop.glycol	IIR	S3	87.0 °F	S4	97.0 °F	440.0 GPM	10.0 psi

PLATE HEAT EXCHANGER

PRESSURE VESSEL APPROVAL ASME

AQ4L-FG

www.alfalaval.com

CUSTOMER NAME / REF. NO.

COMPANY / REF.
SRS Enterprises, Inc.
Arvern East Living- Rockaways.NY SD
G-HX-1

TOTAL LENGTH	56.9 in
TOTAL WIDTH	18.9 in
TOTAL HEIGHT	75.7 in
WEIGHT WITH WATER	2318 lb

RISKCATEGORY N/A

AHRI CERTIFIED® www.ahridirectory.org
Liquid to Liquid Heat Exchangers
AHRI Standard 400

DATE 02/25/2023
REV 0

Technical specification

Gasketed Plate Heat Exchanger

Project ref:	Arvern East Living- Rockaways.NY SD	ALICE 5.0.1.01
Line ref:	G-HX-1	AHRI LLHE PHE 1.3
Model:	AQ4L-FG	Page: 1(2)
No of units:	1	Date: 02/25/2023

		Hot side	Cold Side
Fluid:		25.0% Prop.glycol IIR	25.0% Prop.glycol IIR
Density:	lb/ft³	63.21	63.26
Specific heat capacity:	Btu/(lb·°F)	0.9460	0.94
Thermal conductivity:	Btu/(ft·h·°F)	0.2780	0.277
Viscosity inlet:	cP	1.43	1.75
Viscosity outlet:	cP	1.67	1.50
Volume flow rate:	GPM	441.1	440.0
Inlet temperature:	°F	100.0	87.0
Outlet temperature:	°F	90.0	97.0
Pressure drop:	psi	9.9	10.0
Heat exchanged:	kBtu/h	2,110.4	
LMTD:	°F	3.0	
Heat transfer coefficient:	Btu/(ft²·h·°F)	822.1	
Heat transfer area:	ft²	855.7	
Relative directions of fluids:		Countercurrent	
Connection positions and flow directions:		S1->S2	S3->S4
Connections: S1,S2,S3,S4		FLANGE ASME B16.5 150# NPS 4 Stainless steel	
Number of passes:		1	1
Effective margin:	%	0.3	
Effective fouling resistance * 10000:	ft²·h·°F/Btu	0.031	
Design pressure (MAWP):	psi	150	150
Test pressure:	psi	195	195
Design temperature max.:	°F	104.0	150.1
Design temperature min. (MDMT):	°F	-18.0	-18.0
Channel arrangement:		1*(41MH+39L)	1*(41ML+39L)
Pressure vessel approval:		ASME	
Number of plates:		161	
Nominal A-dimension:	mm	390	
Extension capacity:		45 plates	
Plate material/thickness:		ALLOY 304/0.40 mm	
Gasket material and attachment:		NBRP Clip-on	NBRP Clip-on
Approx. outer dimensions (L x W x H)	in	56.9 x 18.9 x 75.7	
Approx. weight, empty / operating:	lb	1,997 / 2,322	
Approx. weight, full of water:	lb	2,318	
Type of package:		SKID BASE LYING	
Approx. packed weight:	lb	2,080.78	

Technical specification

Gasketed Plate Heat Exchanger

Project ref:	Arvern East Living- Rockaways.NY SD	ALICE 5.0.1.01
Line ref:	G-HX-1	AHRI LLHE PHE 1.3
Model:	AQ4L-FG	Page: 2(2)
No of units:	1	Date: 02/25/2023

Accessories added to configuration — Quantity

Accessories

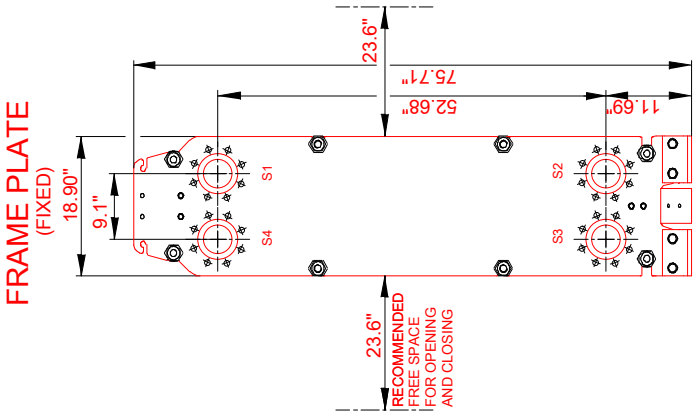
Equipment

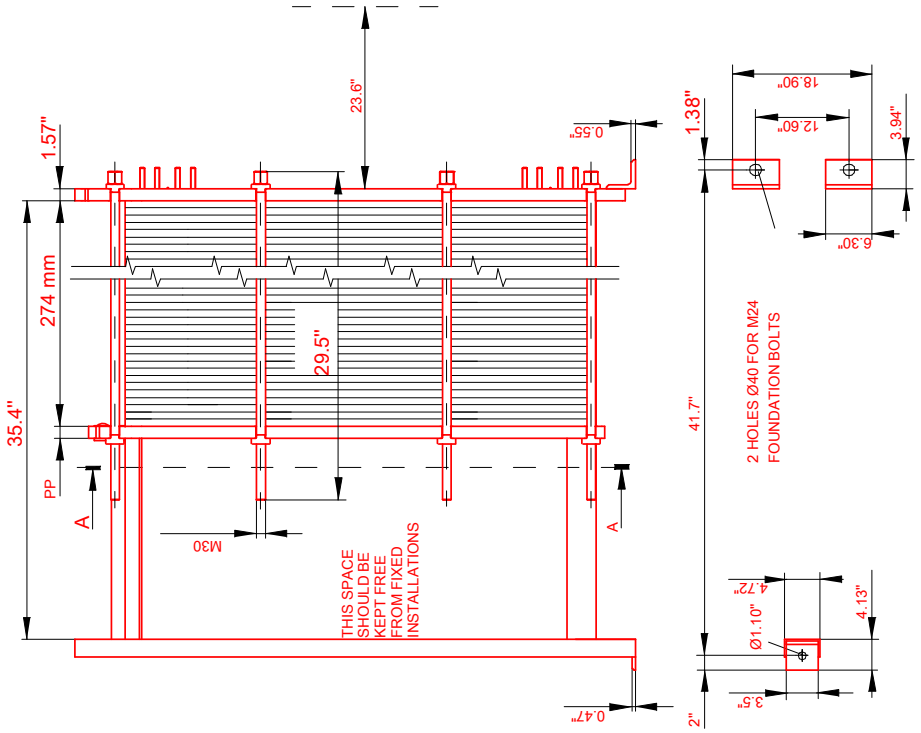
Feet Standard	1
C_Standard_ProtectionSheet AL	1

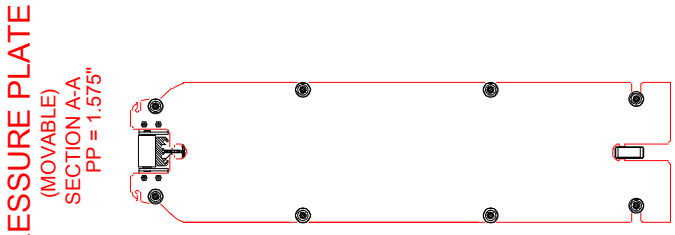
Labels

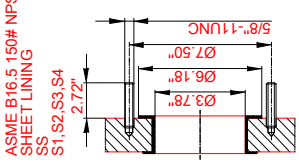
Additional marking on nameplate	1

	SIDE 1	SIDE 2
TEST PRESSURE	195.0 psi	195.0 psi
DESIGN PRESSURE	150 psi	150 psi
MAX TEMPERATURE	104.0 °F	150.1 °F
MIN TEMPERATURE	-18.0 °F	-18.0 °F
GASKET	NBRP Clip-on	
PLATE MATERIAL	ALLOY 304	
PLATE THICKNESS	0.40 mm	
HEAT LOAD	1486.9 kBtu/h	









ALL DIMENSIONS IN INCHES

Do not use this drawing for foundation bolting or piping layout.

SIDE	MEDIA	INLET	TEMP.	OUTLET	TEMP.	FLOW RATE	PRESSURE DROP
1	25.0% Prop.glycol IIR	S1	100.0 °F	S2	90.0 °F	310.8 GPM	9.8 psi
2	25.0% Prop.glycol IIR	S3	87.0 °F	S4	97.0 °F	310.0 GPM	9.9 psi

PLATE HEAT EXCHANGER

PRESSURE VESSEL APPROVAL ASME

AQ4L-FG

www.alfalaval.com

CUSTOMER NAME / REF. NO.

COMPANY / REF.
SRS Enterprises, Inc.
Arvern East Living- Rockaways.NY SD
E-HX-1

TOTAL LENGTH	45.1 in
TOTAL WIDTH	18.9 in
TOTAL HEIGHT	75.7 in
WEIGHT WITH WATER	1989 lb

RISKCATEGORY N/A

AHRI CERTIFIED® www.ahridirectory.org
Liquid to Liquid Heat Exchangers
AHRI Standard 400

DATE 02/25/2023
REV 0

Technical specification

Gasketed Plate Heat Exchanger

Project ref:	Arvern East Living- Rockaways.NY SD	ALICE 5.0.1.01
Line ref:	H-HX-1	AHRI LLHE PHE 1.3
Model:	AQ4L-FG	Page: 1(2)
No of units:	1	Date: 02/25/2023

		Hot side		Cold Side
Fluid:		25.0% Prop.glycol IIR		25.0% Prop.glycol IIR
Density:	lb/ft³	63.21		63.26
Specific heat capacity:	Btu/(lb·°F)	0.9460		0.94
Thermal conductivity:	Btu/(ft·h·°F)	0.2780		0.277
Viscosity inlet:	cP	1.43		1.75
Viscosity outlet:	cP	1.67		1.50
Volume flow rate:	GPM	571.4		570.0
Inlet temperature:	°F	100.0		87.0
Outlet temperature:	°F	90.0		97.0
Pressure drop:	psi	9.8		9.8
Heat exchanged:	kBtu/h		2,734.0	
LMTD:	°F		3.0	
Heat transfer coefficient:	Btu/(ft²·h·°F)		802.5	
Heat transfer area:	ft²		1,135.6	
Relative directions of fluids:			Countercurrent	
Connection positions and flow directions:		S1->S2		S3->S4
Connections: S1,S2,S3,S4			FLANGE ASME B16.5 150# NPS 4 Stainless steel	
Number of passes:		1		1
Effective margin:	%		0.1	
Effective fouling resistance * 10000:	ft²·h·°F/Btu		0.008	
Design pressure (MAWP):	psi	150		150
Test pressure:	psi	195		195
Design temperature max.:	°F	104.0		150.1
Design temperature min. (MDMT):	°F	-18.0		-18.0
Channel arrangement:		1*(49MH+57L)		1*(49ML+57L)
Pressure vessel approval:			ASME	
Number of plates:			213	
Nominal A-dimension:	mm		516	
Extension capacity:			69 plates	
Plate material/thickness:			ALLOY 304/0.40 mm	
Gasket material and attachment:		NBRP Clip-on		NBRP Clip-on
Approx. outer dimensions (L x W x H)	in		68.7 x 18.9 x 75.7	
Approx. weight, empty / operating:	lb		2,247 / 2,676	
Approx. weight, full of water:	lb		2,670	
Type of package:			SKID BASE LYING	
Approx. packed weight:	lb		2,330.78	

Technical specification

Gasketed Plate Heat Exchanger

Project ref:	Arvern East Living- Rockaways.NY SD	ALICE 5.0.1.01
Line ref:	H-HX-1	AHRI LLHE PHE 1.3
Model:	AQ4L-FG	Page: 2(2)
No of units:	1	Date: 02/25/2023

Accessories added to configuration — Quantity

Accessories

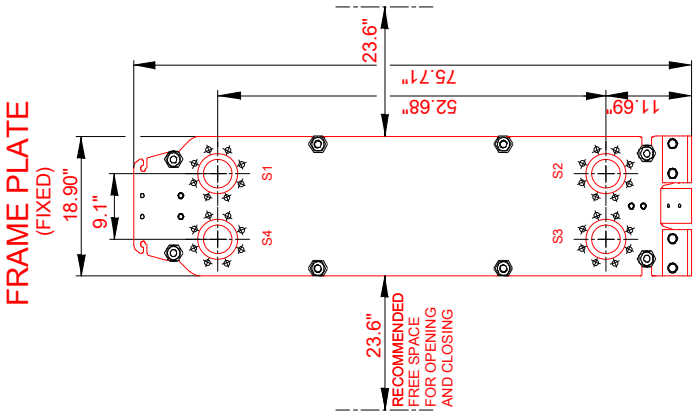
Equipment

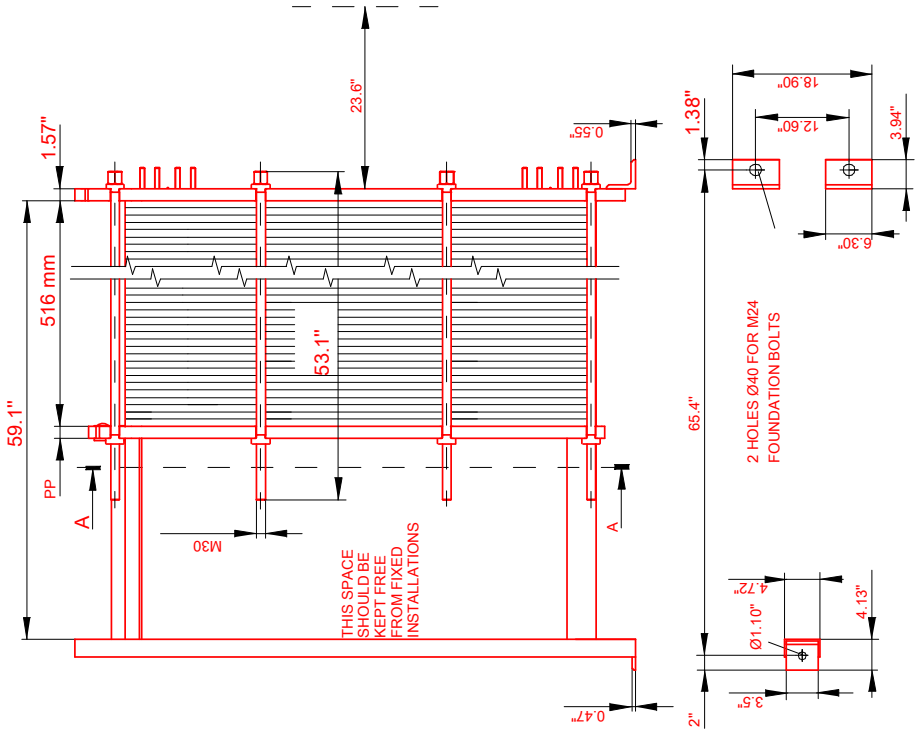
Feet Standard	1
C_Standard_ProtectionSheet AL	1

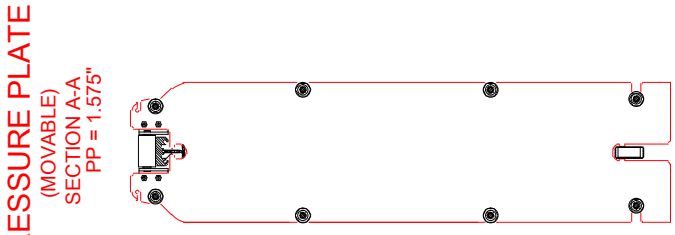
Labels

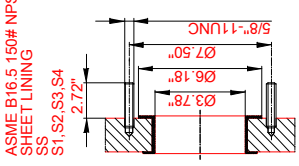
Additional marking on nameplate	1

	SIDE 1	SIDE 2
TEST PRESSURE	195.0 psi	195.0 psi
DESIGN PRESSURE	150 psi	150 psi
MAX TEMPERATURE	104.0 °F	150.1 °F
MIN TEMPERATURE	-18.0 °F	-18.0 °F
GASKET	NBRP Clip-on	
PLATE MATERIAL	ALLOY 304	
PLATE THICKNESS	0.40 mm	
HEAT LOAD	2734.0 kBtu/h	









ALL DIMENSIONS IN INCHES

Do not use this drawing for foundation bolting or piping layout.

SIDE	MEDIA		INLET	TEMP.	OUTLET	TEMP.	FLOW RATE	PRESSURE DROP
1	25.0% Prop.glycol	IIR	S1	100.0 °F	S2	90.0 °F	571.4 GPM	9.8 psi
2	25.0% Prop.glycol	IIR	S3	87.0 °F	S4	97.0 °F	570.0 GPM	9.8 psi

PLATE HEAT EXCHANGER

PRESSURE VESSEL APPROVAL ASME

AQ4L-FG

www.alfalaval.com

CUSTOMER NAME / REF. NO.

COMPANY / REF.
SRS Enterprises, Inc.
Arvern East Living- Rockaways.NY SD
H-HX-1

TOTAL LENGTH	68.7 in
TOTAL WIDTH	18.9 in
TOTAL HEIGHT	75.7 in
WEIGHT WITH WATER	2670 lb

RISKCATEGORY N/A

AHRI CERTIFIED® www.ahridirectory.org
Liquid to Liquid Heat Exchangers
AHRI Standard 400

DATE 02/25/2023
REV 0

Technical specification

Gasketed Plate Heat Exchanger

Project ref:	Arvern East Living- Rockaways.NY SD	ALICE 5.0.1.01
Line ref:	I-HX-1	AHRI LLHE PHE 1.3
Model:	AQ4L-FG	Page: 1(2)
No of units:	1	Date: 02/25/2023

		Hot side		Cold Side
Fluid:		25.0% Prop.glycol IIR		25.0% Prop.glycol IIR
Density:	lb/ft³	63.21		63.26
Specific heat capacity:	Btu/(lb·°F)	0.9460		0.94
Thermal conductivity:	Btu/(ft·h·°F)	0.2780		0.277
Viscosity inlet:	cP	1.43		1.75
Viscosity outlet:	cP	1.67		1.50
Volume flow rate:	GPM	260.7		260.0
Inlet temperature:	°F	100.0		87.0
Outlet temperature:	°F	90.0		97.0
Pressure drop:	psi	9.8		9.9
Heat exchanged:	kBtu/h		1,247.1	
LMTD:	°F		3.0	
Heat transfer coefficient:	Btu/(ft²·h·°F)		830.5	
Heat transfer area:	ft²		500.5	
Relative directions of fluids:			Countercurrent	
Connection positions and flow directions:		S1->S2		S3->S4
Connections: S1,S2,S3,S4			FLANGE ASME B16.5 150# NPS 4 Stainless steel	
Number of passes:		1		1
Effective margin:	%		0.5	
Effective fouling resistance * 10000:	ft²·h·°F/Btu		0.057	
Design pressure (MAWP):	psi	150		150
Test pressure:	psi	195		195
Design temperature max.:	°F	104.0		150.1
Design temperature min. (MDMT):	°F	-18.0		-18.0
Channel arrangement:		1*(26MH+21L)		1*(26ML+21L)
Pressure vessel approval:			ASME	
Number of plates:			95	
Nominal A-dimension:	mm		230	
Extension capacity:			34 plates	
Plate material/thickness:			ALLOY 304/0.40 mm	
Gasket material and attachment:		NBRP Clip-on		NBRP Clip-on
Approx. outer dimensions (L x W x H)	in		45.1 x 18.9 x 75.7	
Approx. weight, empty / operating:	lb		1,691 / 1,883	
Approx. weight, full of water:	lb		1,881	
Type of package:			SKID BASE LYING	
Approx. packed weight:	lb		1,774.78	

Technical specification

Gasketed Plate Heat Exchanger

Project ref:	Arvern East Living- Rockaways.NY SD	ALICE 5.0.1.01
Line ref:	I-HX-1	AHRI LLHE PHE 1.3
Model:	AQ4L-FG	Page: 2(2)
No of units:	1	Date: 02/25/2023

Accessories added to configuration — Quantity

Accessories

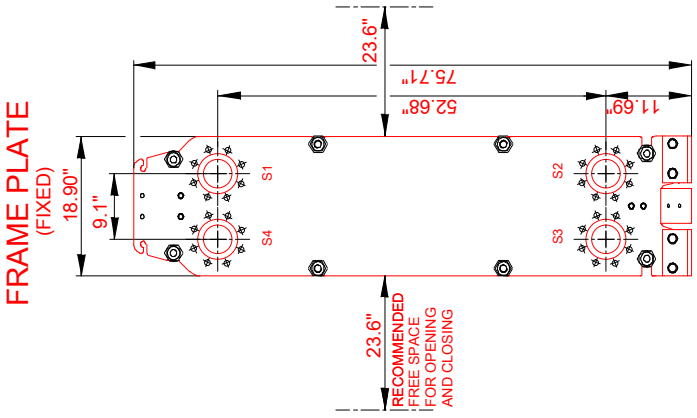
Equipment

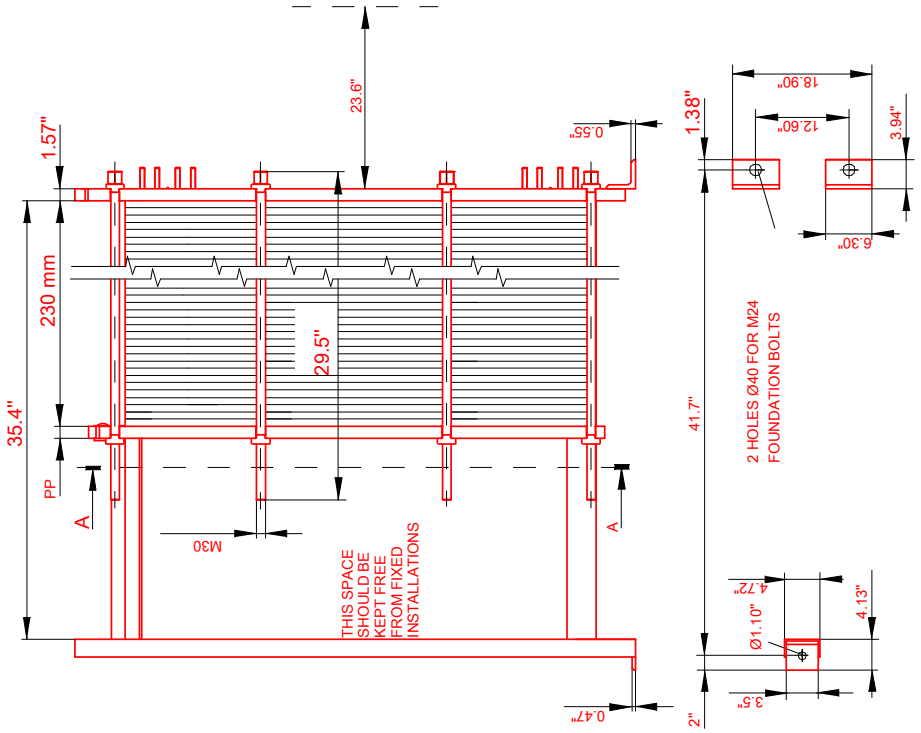
Feet Standard	1
C_Standard_ProtectionSheet AL	1

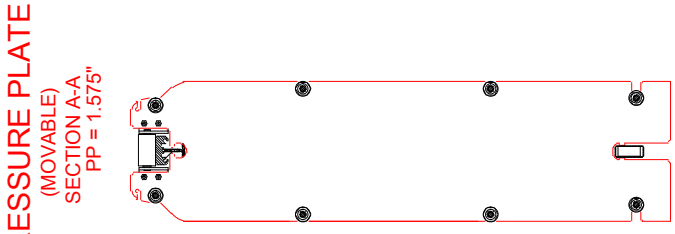
Labels

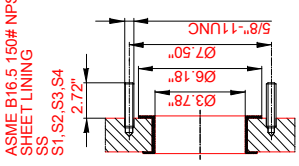
Additional marking on nameplate	1

	SIDE 1	SIDE 2
TEST PRESSURE	195.0 psi	195.0 psi
DESIGN PRESSURE	150 psi	150 psi
MAX TEMPERATURE	104.0 °F	150.1 °F
MIN TEMPERATURE	-18.0 °F	-18.0 °F
GASKET	NBRP Clip-on	
PLATE MATERIAL	ALLOY 304	
PLATE THICKNESS	0.40 mm	
HEAT LOAD	1247.1 kBtu/h	









ALL DIMENSIONS IN INCHES

Do not use this drawing for foundation bolting or piping layout.

SIDE	MEDIA		INLET	TEMP.	OUTLET	TEMP.	FLOW RATE	PRESSURE DROP
1	25.0% Prop.glycol	IIR	S1	100.0 °F	S2	90.0 °F	260.7 GPM	9.8 psi
2	25.0% Prop.glycol	IIR	S3	87.0 °F	S4	97.0 °F	260.0 GPM	9.9 psi

PLATE HEAT EXCHANGER

PRESSURE VESSEL APPROVAL ASME

AQ4L-FG

www.alfalaval.com

CUSTOMER NAME / REF. NO.

COMPANY / REF.
SRS Enterprises, Inc.
Arvern East Living- Rockaways.NY SD
I-HX-1

TOTAL LENGTH	45.1 in
TOTAL WIDTH	18.9 in
TOTAL HEIGHT	75.7 in
WEIGHT WITH WATER	1881 lb

RISKCATEGORY N/A

AHRI CERTIFIED® www.ahridirectory.org
Liquid to Liquid Heat Exchangers
AHRI Standard 400

DATE 02/25/2023
REV 0

Technical specification

Gasketed Plate Heat Exchanger

Project ref:	Arvern East Living- Rockaways.NY SD	ALICE 5.0.1.01
Line ref:	K-HX-1, TH1-1,2,3,4,5,6, TH3-1,2,3	AHRI LLHE PHE 1.3
Model:	AQ2L-FG	Page: 1(2)
No of units:	10	Date: 02/25/2023

Specification of 1 exchanger out of 10 Connected In Parallel.

		Hot side	Cold Side
Fluid:		25.0% Prop.glycol IIR	25.0% Prop.glycol IIR
Density:	lb/ft³	63.21	63.26
Specific heat capacity:	Btu/(lb·°F)	0.9460	0.9436
Thermal conductivity:	Btu/(ft·h·°F)	0.2780	0.2775
Viscosity inlet:	cP	1.43	1.75
Viscosity outlet:	cP	1.67	1.50
Volume flow rate:	GPM	90.2	90.0
Inlet temperature:	°F	100.0	87.0
Outlet temperature:	°F	90.0	97.0
Pressure drop:	psi	9.5	9.5
Heat exchanged:	kBtu/h	431.7	
LMTD:	°F	3.0	
Heat transfer coefficient:	Btu/(ft²·h·°F)	832.1	
Heat transfer area:	ft²	172.9	
Relative directions of fluids:		Countercurrent	
Connection positions and flow directions:		S1->S2	S3->S4
Connections: S1,S2,S3,S4		ASME B1.20.1 - 2-11.5 NPT, ALLOY 316L, 101 mm	
Number of passes:		1	1
Effective margin:	%	0.7	
Effective fouling resistance * 10000:	ft²·h·°F/Btu	0.089	
External loads according to API:		No loads	
Design pressure (MAWP):	psi	150	150
Test pressure:	psi	196	196
Design temperature max.:	°F	150.1	150.1
Design temperature min. (MDMT):	°F	-18.0	-18.0
Channel arrangement:		1*(12H+20ML)	1*(12H+20MH)
Pressure vessel approval:		ASME UM-stamp	
Number of plates:		65	
Nominal A-dimension:	mm	144	
Extension capacity:		23 plates	
Plate material/thickness:		ALLOY 304/0.4 mm	
Gasket material and attachment:		NBRP Clip-on	NBRP Clip-on
Approx. outer dimensions (L x W x H)	in	31.9 x 13.0 x 51.6	
Approx. weight, empty / operating:	lb	602 / 665	
Approx. weight, full of water:	lb	664	
Type of package:		Skid base + box	
Approx. packed weight:	lb	714.215	

Technical specification

Gasketed Plate Heat Exchanger

Project ref:	Arvern East Living- Rockaways.NY SD	ALICE 5.0.1.01
Line ref:	K-HX-1, TH1-1,2,3,4,5,6, TH3-1,2,3	AHRI LLHE PHE 1.3
Model:	AQ2L-FG	Page: 2(2)
No of units:	10	Date: 02/25/2023

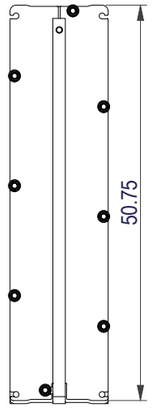
Specification of 1 exchanger out of 10 Connected In Parallel.

Accessories added to configuration	Quantity
Accessories	
Equipment	
Protecting sheet Aluminum	1
Protection tube Plastic	1
Labels	
Additional marking on nameplate	10
Documents & services	
Documents	
Documents Alfa Laval-Instruction manual Industrial line S-1 AHRI	1

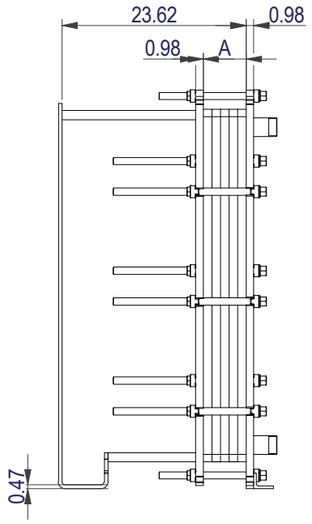
QPID 247 ea

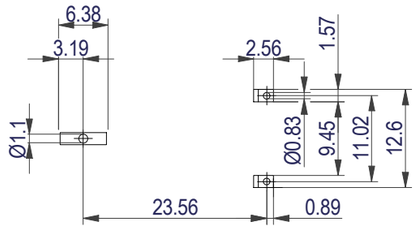
PRESSURE PLATE

(MOVABLE)

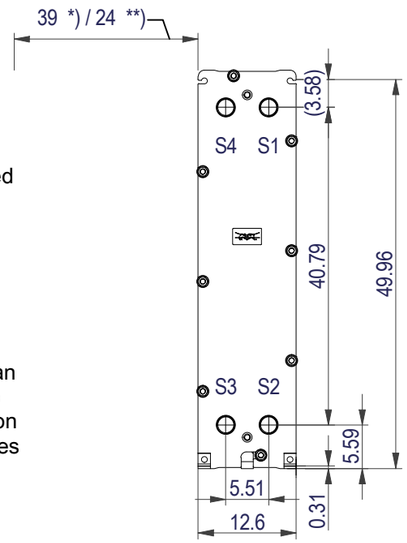


Space between pressure plate and supporting column should be kept free from fixed installations!





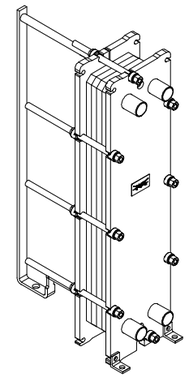
FRAME PLATE

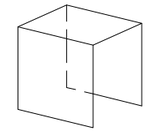


*)
Recommended free space for opening and closing to be applied on both sides

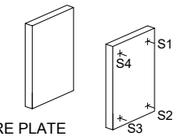
**)
Free space can be reduced to this distance on one of the sides

All dimensions in inches





PROTECTION SHEET

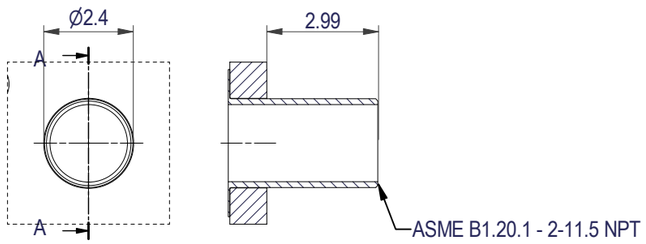


PRESSURE PLATE

FRAME PLATE

ASME B1.20.1 - 2-11.5 NPT, ALLOY 316L, 101 mm
S1, S2, S3, S4

A-A:



TIGHTENING BOLTS	6 x M20, L = 18.9 in 2 x M20, L = 13.0 in
A	144 mm +1%/-1%
APPROX. OUTER DIMENSIONS	
LENGTH	31.9 in
WIDTH	13.0 in
HEIGHT	51.6 in
APPROX. WEIGHTS	
NET WEIGHT, EMPTY	602 lb
WEIGHT FULL OF WATER	664 lb
PLATE MATERIAL	ALLOY 304
PLATE THICKNESS	0.4 mm
GASKET	NBRP Clip-on
AREA OF HEAT SURFACE	172.9 ft²

HEAT EXCHANGED	431.7 kBtu/h	NO. OF UNITS	10						DESIGN PRESSURE		DESIGN TEMPERATURE		TEST	OPERATING
SIDE	MEDIA		INLET	TEMP.	OUTLET	TEMP.	FLOW RATE	PRES. DROP	LIQUID VOL.	MAX.	MIN.	MAX.	MIN.	PRESSURE	MAX. TEMP.
1	25.0% Prop.glycol IIR		S1	100.0 °F	S2	90.0 °F	90.2 GPM	9.5 psi	0.490 ft³	150 psi	0 psi	150.1 °F	-18.0 °F	196 psi	100.0 °F
2	25.0% Prop.glycol IIR		S3	87.0 °F	S4	97.0 °F	90.0 GPM	9.5 psi	0.490 ft³	150 psi	0 psi	150.1 °F	-18.0 °F	196 psi	97.0 °F

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DRAWING
GASKETED PLATE HEAT EXCHANGER

AQ2L-FG

ASME
Code Section VIII Div.1

AHRI CERTIFIED™ www.ahridirectory.org
Liquid to Liquid Heat Exchangers
AHRI Standard 400

MAWP 150 psi at 150.1 °F
MDMT -18.0 °F at 150 psi
Designed and constructed in accordance with the 2021 ASME Code.

Arvern East Living- Rockaways.NY SD
K-HX-1, TH1-1,2,3,4,5,6, TH3-1,2,3

Do not use this drawing for foundation bolting or piping layout

DATE 2/25/23
REVISION 0

Technical specification

Gasketed Plate Heat Exchanger

Project ref:	Arvern East Living- Rockaways.NY SD	ALICE 5.0.1.01
Line ref:	TH2-HX-1	AHRI LLHE PHE 1.3
Model:	AQ2L-FG	Page: 1(2)
No of units:	1	Date: 02/25/2023

		Hot side	Cold Side
Fluid:		25.0% Prop.glycol IIR	25.0% Prop.glycol IIR
Density:	lb/ft³	63.21	63.26
Specific heat capacity:	Btu/(lb·°F)	0.9460	0.9436
Thermal conductivity:	Btu/(ft·h·°F)	0.2780	0.2775
Viscosity inlet:	cP	1.43	1.75
Viscosity outlet:	cP	1.67	1.50
Volume flow rate:	GPM	220.6	220.0
Inlet temperature:	°F	100.0	87.0
Outlet temperature:	°F	90.0	97.0
Pressure drop:	psi	9.9	9.9
Heat exchanged:	kBtu/h	1,055.2	
LMTD:	°F	3.0	
Heat transfer coefficient:	Btu/(ft²·h·°F)	816.2	
Heat transfer area:	ft²	430.9	
Relative directions of fluids:		Countercurrent	
Connection positions and flow directions:		S1->S2	S3->S4
Connections: S1,S2,S3,S4		ASME B1.20.1 - 2-11.5 NPT, ALLOY 316L, 101 mm	
Number of passes:		1	1
Effective margin:	%	0.2	
Effective fouling resistance * 10000:	ft²·h·°F/Btu	0.024	
External loads according to API:		No loads	
Design pressure (MAWP):	psi	150	150
Test pressure:	psi	196	196
Design temperature max.:	°F	150.1	150.1
Design temperature min. (MDMT):	°F	-18.0	-18.0
Channel arrangement:		1*(18H+61ML)	1*(18H+61MH)
Pressure vessel approval:		ASME UM-stamp	
Number of plates:		159	
Nominal A-dimension:	mm	353	
Extension capacity:		33 plates	
Plate material/thickness:		ALLOY 304/0.4 mm	
Gasket material and attachment:		NBRP Clip-on	NBRP Clip-on
Approx. outer dimensions (L x W x H)	in	49.6 x 13.0 x 51.6	
Approx. weight, empty / operating:	lb	869 / 1,018	
Approx. weight, full of water:	lb	1,016	
Type of package:		Skid base + box	
Approx. packed weight:	lb	993.782	

Technical specification

Gasketed Plate Heat Exchanger

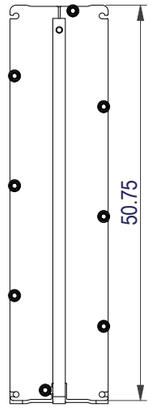
Project ref:	Arvern East Living- Rockaways.NY SD	ALICE 5.0.1.01
Line ref:	TH2-HX-1	AHRI LLHE PHE 1.3
Model:	AQ2L-FG	Page: 2(2)
No of units:	1	Date: 02/25/2023

Accessories added to configuration	Quantity
Accessories	
Equipment	
Protecting sheet Aluminum	1
Protection tube Plastic	1
Labels	
Additional marking on nameplate	1
Documents & services	
Documents	
Documents Alfa Laval-Instruction manual Industrial line S-1 AHRI	1

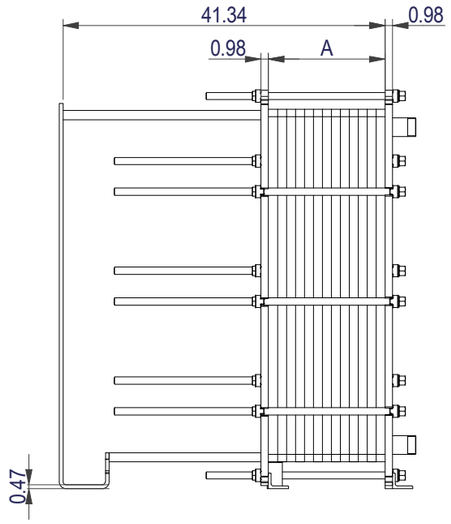
QPID 247 ea

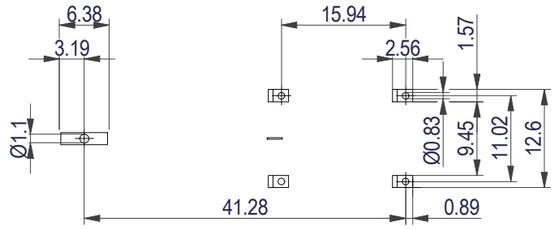
PRESSURE PLATE

(MOVABLE)



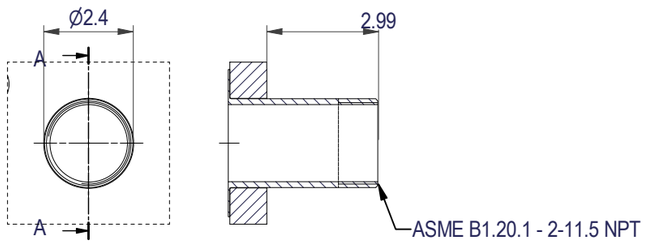
Space between pressure plate and supporting column should be kept free from fixed installations!



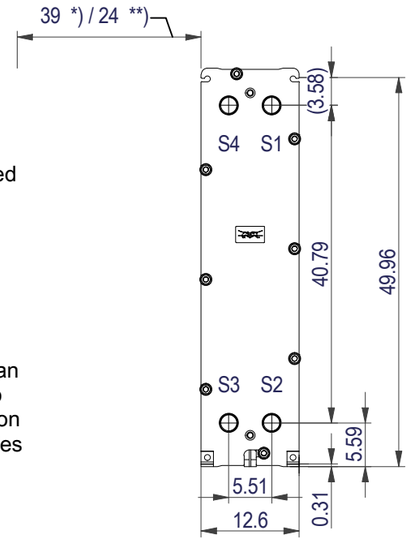


ASME B1.20.1 - 2-11.5 NPT, ALLOY 316L, 101 mm
S1, S2, S3, S4

A-A:



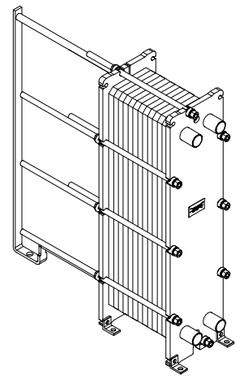
FRAME PLATE

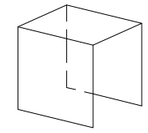


*)
Recommended free space for opening and closing to be applied on both sides

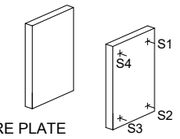
**)
Free space can be reduced to this distance on one of the sides

All dimensions in inches





PROTECTION SHEET



PRESSURE PLATE

FRAME PLATE

TIGHTENING BOLTS	6 x M20, L = 36.6 in 2 x M20, L = 24.8 in
A	353 mm +1%/-1%
APPROX. OUTER DIMENSIONS	
LENGTH	49.6 in
WIDTH	13.0 in
HEIGHT	51.6 in
APPROX. WEIGHTS	
NET WEIGHT, EMPTY	869 lb
WEIGHT FULL OF WATER	1016 lb
PLATE MATERIAL	ALLOY 304
PLATE THICKNESS	0.4 mm
GASKET	NBRP Clip-on
AREA OF HEAT SURFACE	430.9 ft²

HEAT EXCHANGED	1055.2 kBtu/h	NO. OF UNITS	1						DESIGN PRESSURE		DESIGN TEMPERATURE		TEST	OPERATING
SIDE	MEDIA		INLET	TEMP.	OUTLET	TEMP.	FLOW RATE	PRES. DROP	LIQUID VOL.	MAX.	MIN.	MAX.	MIN.	PRESSURE	MAX. TEMP.
1	25.0% Prop.glycol IIR		S1	100.0 °F	S2	90.0 °F	220.6 GPM	9.9 psi	1.19 ft³	150 psi	0 psi	150.1 °F	-18.0 °F	196 psi	100.0 °F
2	25.0% Prop.glycol IIR		S3	87.0 °F	S4	97.0 °F	220.0 GPM	9.9 psi	1.19 ft³	150 psi	0 psi	150.1 °F	-18.0 °F	196 psi	97.0 °F

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DRAWING
GASKETED PLATE HEAT EXCHANGER

AQ2L-FG

ASME
Code Section VIII Div.1

AHRI CERTIFIED™ www.ahridirectory.org
Liquid to Liquid Heat Exchangers
AHRI Standard 400

MAWP 150 psi at 150.1 °F
MDMT -18.0 °F at 150 psi
Designed and constructed in accordance with the 2021 ASME Code.

Arvern East Living- Rockaways.NY SD
TH2-HX-1

Do not use this drawing for foundation bolting or piping layout

DATE 2/25/23
REVISION 0

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Split-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4300 0813-020.0 with Suction Guide, Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	M-1,2	Configuration:	Single
Service:	AMBIENT LOOP	Suction pressure:	0 ft
Location:	BLDG D	Fluid:	Propylene Glycol: 25
Qty:	2	Operating temperature:	60 °F
Total system flow:	950 USgpm	Duty flow per pump:	950 USgpm
System head:	50 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	83.18 %	Safety factor % head:	0 %
NPSHR:	6.29 ft	Total Absorbed Power:	14.4 hp
Min. maintained system pressure*:	20 ft	Impeller diameter:	12.03 in
PElvl:	Not applicable	ERvl:	Not applicable
Standby qty:	0	Pump/motor run qty:	1
Outlet velocity:	6.09 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Bronze Fitted	Impeller:	Bronze
Rating:	ANSI-125	Pump shaft:	416 Stainless Steel
Connections:	Inlet: 8in, Outlet: 8in	Flush line:	Braided Stainless Steel
Casing (volute):	Cast Iron	Casing gasket:	Confined Non-Asbestos Fiber

Mechanical seal data

Seal type:	Outside Balanced	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-SSC AB2	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	Viton
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS)****:	2000 PPM

Electrical data

Supplier:		Insulation class:	Class F Insulation
Size:	20 hp	Motor type:	Inverter Duty
Frame size:	286TC	Efficiency:	NEMA Premium 12.12
Enclosure:	ODP	Power supply:	208/3/60
Operating speed @ 100% flow:	1084 rpm	Operating speed @ 50% flow***:	775 rpm

***Based on minimum pressure setting of 40% of design head.

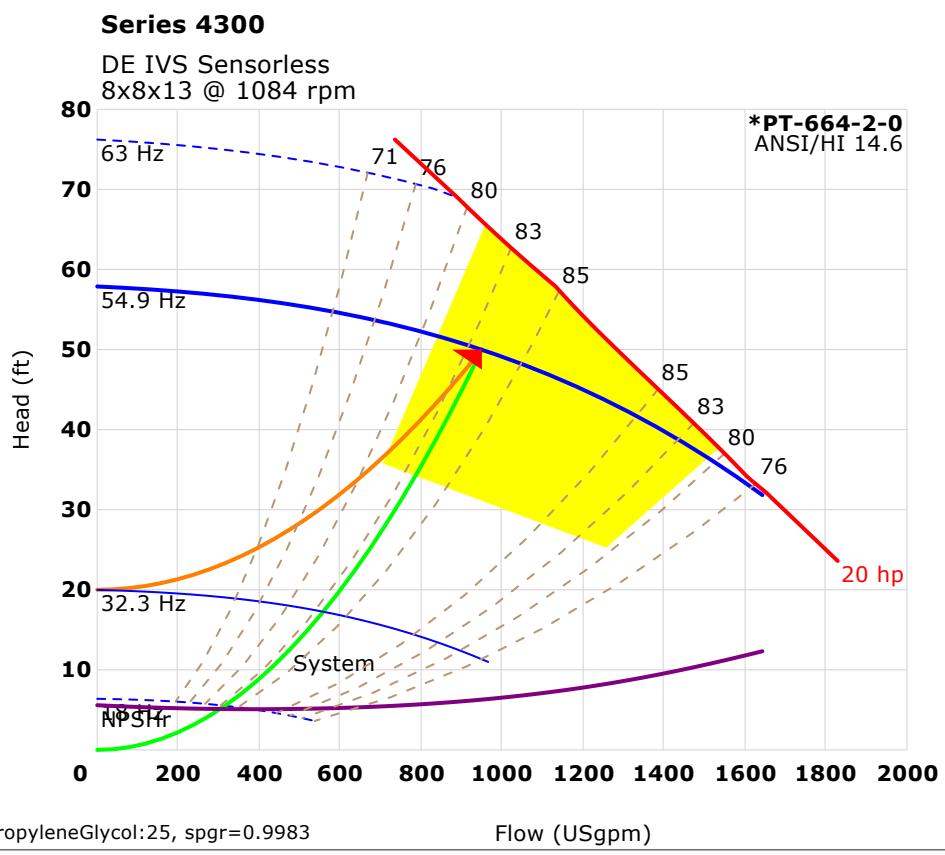
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid

IVS controller data

Sensorless control:	Yes - Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet MS/TP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current)
Fused disconnect switch:	Integrated Fused Disconnect	Digital inputs:	4 (programmable)
Control orientation:	L1	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Fan cooled through back channel
Absorbed Power/BHP at 50% load/flow and 55% of design head:	7.92 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	No	EMI/RFI control:	Integrated filter to meet EN61800-3
		Harmonic suppression:	Integrated DC link reactor**

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field.
** The IVS control is a low harmonic control with a built-in DC link reactor equivalent in performance to a 5% AC line reactor. This does not guarantee performance to any system wide harmonic specification or the costs to meet a system wide specification. If supplied with the system electrical details, Armstrong will run a computer simulation of the system wide harmonics. If system harmonic levels are exceeded, Armstrong can also recommend additional harmonic mitigation and the cost for such mitigation.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 54.89 Hz:
NPSHR: 6.29 ft
Intersection Pt: 950 usgpm @ 50 ft
bhp=14.4 hp, eff=83.18 %%,
%bepq=78 %%

2. Control (QPC) @ 50.36 Hz:
NPSHR: 5.16 ft
Intersection Pt: 831.25 USgpm @ 42.97 ft
bhp=10.95 hp, eff=82.26%,
%bepq=74.5%

3. Control (QPC) @ 45.84 Hz:
NPSHR: 4.11 ft
Intersection Pt: 703 USgpm @ 36.43 ft
bhp=7.99 hp, eff=80.76%,
%bepq=69.17%

4. Control (QPC) @ 41.31 Hz:
NPSHR: 3.17 ft
Intersection Pt: 560.5 USgpm @ 30.44 ft
bhp=5.52 hp, eff=77.88%,
%bepq=61.13%

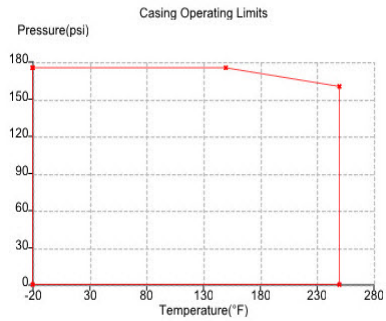
5. Control (QPC) @ 36.79 Hz:
NPSHR: 2.39 ft
Intersection Pt: 389.5 USgpm @ 25.04 ft
bhp=3.48 hp, eff=70.73%,
%bepq=47.51%

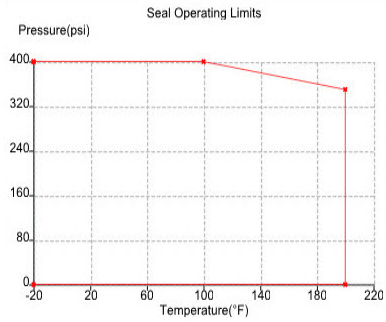
6. Hmin: 20 ft 32.27 Hz:
NPSHR: 1.93 ft
Intersection Pt: 0 USgpm @ 20 ft
(Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	950 USgpm	67.48 ft	81.15%
Design point	950 USgpm	50 ft	83.18 %
50% average flow (with default load profile)	475 USgpm	27.5 ft	75 %
Motor Capability @ Rated Speed	18.36 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 200 ˚F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless Bundle:	Yes	DEPC Parallel Sensorless:	No
Energy Performance Bundle:	No	Protection Bundle:	No
Dual Season Setup:	No	Zone Optimization Bundle:	No

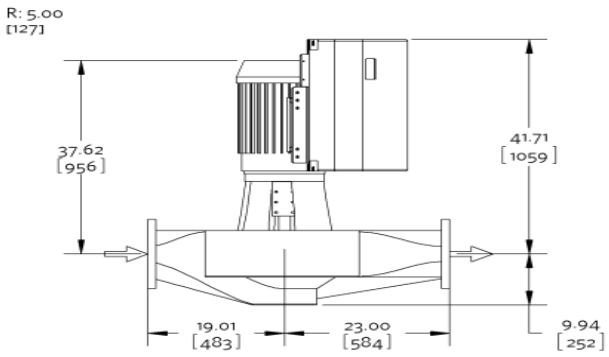
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1min:	N/A	H2min:	N/A
Maximum Flow:	N/A	Minimum Flow:	N/A

Optional Services

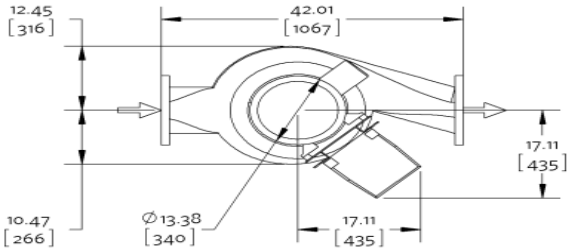
On-Site Pump Commissioning:	Cost not Included	Extended Warranty:	No
Pump Manager:	Yes	Include Spare Parts Qty:	0

Dimensional data (not for construction)

Side view

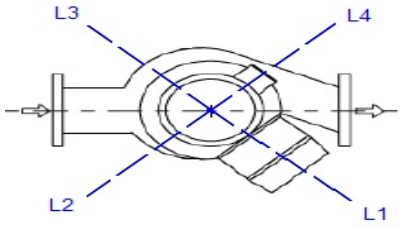


Top view



Inverter motor type: Inverter duty

Weight: 1184 lb [537.05 kg], Units of measure: inches [millimeters]
· R = minimum lifting clearance required above motor
· Coupling guard and flush line (not shown) are supplied
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	8	ANSI-125	13.50	8	11.75	0.75
Outlet	8	ANSI-125	13.50	8	11.75	0.75

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
The program has defaulted to a NEMA Premium Efficiency motor supplied with NEMA MG-1 Part 31.4.4.2 insulation standards for inverter-fed polyphase motors.
OSHPD Seismic Certification OSP-0422-10
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Integrated Fused Disconnect
Pre-Wired Control Bridge: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Submittal

Ref. #: SQFGQ002934_1

Suction guide

Model: SG-88

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
M-1,2	2	SG-88	8 in	8 in	950 USgpm	0.87 ft	Design Envelope Sensorless 4300 0813-020.0

*at design flow

Materials of construction

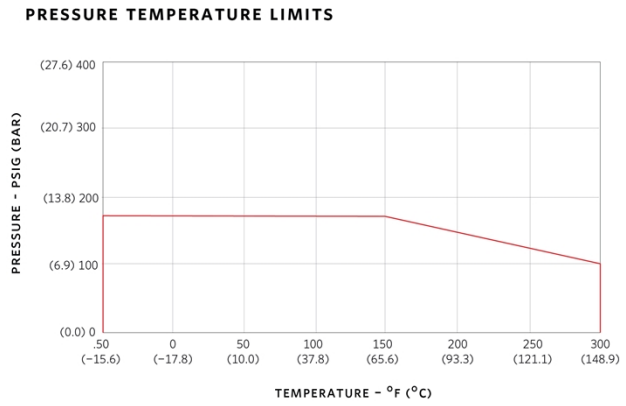
SG-88

Body:	Cast iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast iron	Strainer:	Stainless Steel,0.125"(3mm)Perf..
Cover plate:	Cast iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-88-Suction Guide-ANSI-125

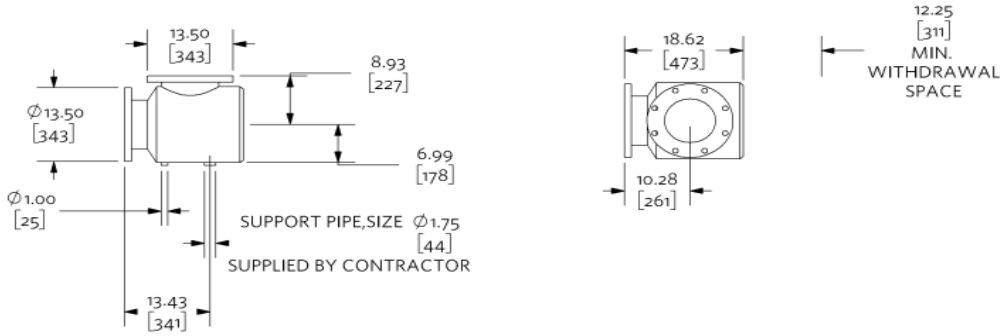


Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

Dimensional data (not for construction)

SG-88	Weight: 213 lb [96.62 kg]
Side view	Top view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-8FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
M-1,2	2	FTV-8FA	8 in	Angle	Flanged	950 USgpm	2.8 ft	Design Envelope Sensorless 4300 0813-020.0

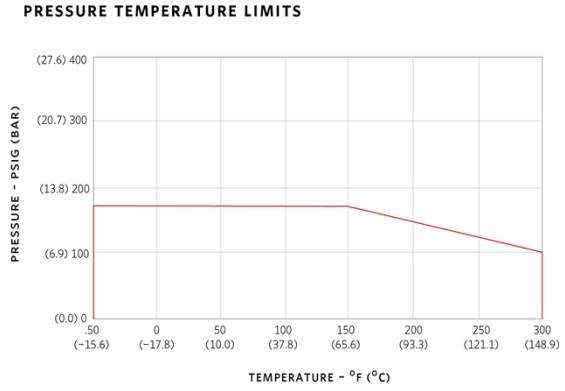
*at design flow

Materials of construction

FTV-8FA-Flo-Trex Valve-ANSI-125-Angle			
Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

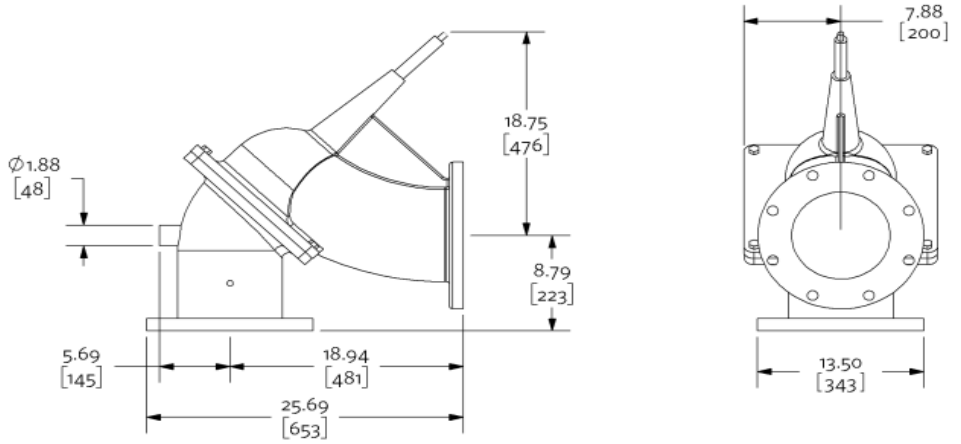
FTV-8FA-Flo-Trex Valve-ANSI-125-Angle



Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-8FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 344 lb [156.04 kg]
Side view	Front view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Close-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4380 0610-007.5 with Suction Guide, Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	BF1-1,2	Configuration:	Single
Service:	BOREFIELD	Suction pressure:	0 ft
Location:	BLDG D	Fluid:	Propylene Glycol: 25
Qty:	2	Operating temperature:	60 °F
Total system flow:	520 USgpm	Duty flow per pump:	520 USgpm
System head:	35 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	77.66 %	Safety factor % head:	0 %
NPSHR:	7.14 ft	Total Absorbed Power:	5.91 hp
Min. maintained system pressure*:	14 ft	Impeller diameter:	10.19 in
Standby qty:	0	Pump/motor run qty:	1
PEIvl:	Not applicable	ERvl:	Not applicable
Outlet velocity:	5.77 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Bronze Fitted	Impeller:	Bronze
Rating:	ANSI-125	Casing gasket:	Confined Non-Asbestos Fiber
Connections:	Inlet: 6in, Outlet: 6in	Flush line:	Braided Stainless Steel
Casing (volute):	Cast Iron, E-coated	Stub shaft:	Stainless steel

Mechanical seal data

Seal type:	Inside Single Spring	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-ssc L EPSS 2A	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS) ****:	2000 PPM

Electrical data

Supplier:		Insulation class:	Class F Insulation
Size:	7.5 hp	Motor type:	Inverter Duty
Frame size:	254JM	Efficiency:	NEMA Premium 12.12
Enclosure:	ODP	Power supply:	208/3/60
Operating speed @ 100% flow:	1173 rpm	Operating speed @ 50% flow***:	790 rpm

***Based on minimum pressure setting of 40% of design head

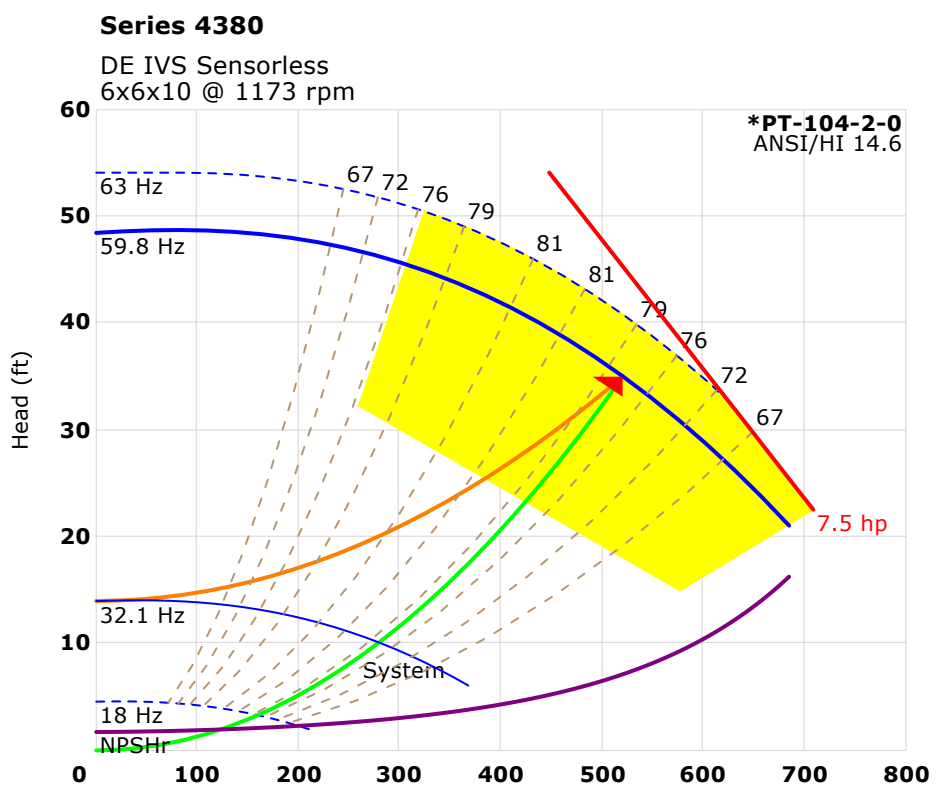
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid.

IVS controller data

Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet MS/TP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current)
Fused disconnect switch:	Integrated Fused Disconnect	Digital inputs:	4 (programmable)
Control orientation:	L1	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Fan cooled through back channel
Absorbed Power/BHP at 50% load/flow and 55% of design head:	3.25 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	Yes	EMI/RFI control:	Integrated filter to meet EN61800-3
		Harmonic suppression:	Integrated DC link reactor**

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field. ** The IVS control is a low harmonic control with a built-in DC link reactor equivalent in performance to a 5% AC line reactor. This does not guarantee performance to any system wide harmonic specification or the costs to meet a system wide specification. If supplied with the system electrical details, Armstrong will run a computer simulation of the system wide harmonics. If system harmonic levels are exceeded, Armstrong can also recommend additional harmonic mitigation and the cost for such mitigation.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 59.8 Hz:
NPSHR: 7.14 ft
Intersection Pt: 520 usgpm @ 35 ft
bhp=5.91 hp, eff=77.66 %%,
%bepq=119 %%

2. Control (QPC) @ 54.26 Hz:
NPSHR: 5.61 ft
Intersection Pt: 455 USgpm @ 30.08 ft
bhp=4.37 hp, eff=78.88%,
%bepq=114.02%

3. Control (QPC) @ 48.73 Hz:
NPSHR: 4.16 ft
Intersection Pt: 384.8 USgpm @ 25.5 ft
bhp=3.09 hp, eff=80.14%,
%bepq=107.17%

4. Control (QPC) @ 43.2 Hz:
NPSHR: 2.82 ft
Intersection Pt: 306.8 USgpm @ 21.31 ft
bhp=2.04 hp, eff=80.64%,
%bepq=96.62%

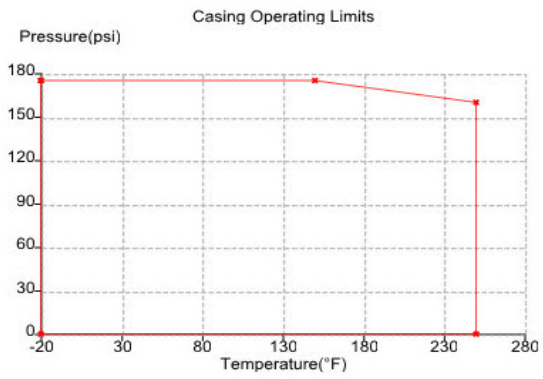
5. Control (QPC) @ 37.67 Hz:
NPSHR: 1.64 ft
Intersection Pt: 213.2 USgpm @ 17.53 ft
bhp=1.2 hp, eff=78.23%,
%bepq=77.35%

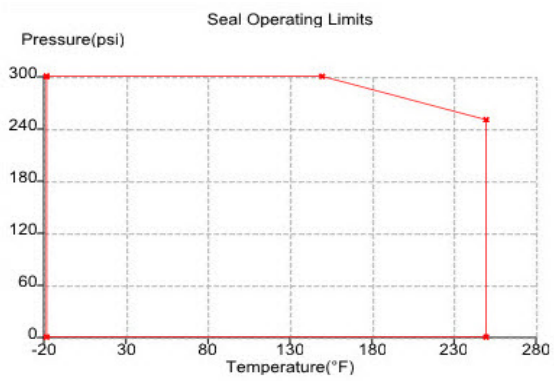
6. Hmin: 14 ft 32.14 Hz:
NPSHR: 0.64 ft
Intersection Pt: 0 USgpm @ 14 ft
(Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	520 USgpm	43.12 ft	79.64%
Design point	520 USgpm	35 ft	77.66 %
50% average flow (with default load profile)	260 USgpm	19.25 ft	80.08 %
Motor Capability @ Rated Speed	7.32 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 250 F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless bundle:	Yes	DEPC Parallel sensorless:	No
Energy performance bundle:	No	Protection bundle:	No
Dual season setup:	No	Zone optimization bundle:	No

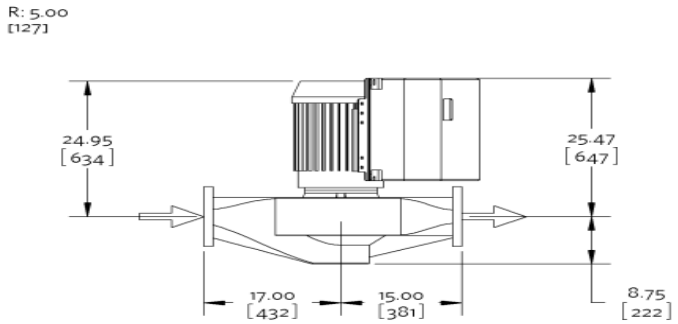
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1 min:	N/A	H2 min:	N/A
Maximum flow:	N/A	Minimum flow:	N/A

Optional Services

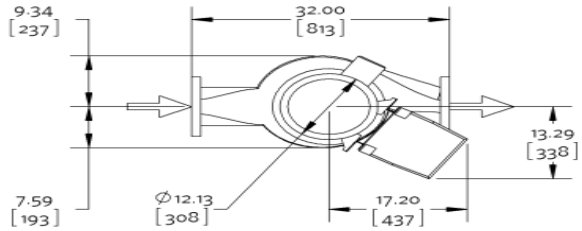
On-site pump commissioning:	Cost not Included	Extended warranty:	No
Pump manager:	Yes	Include spare parts qty:	0

Dimensional data (not for construction)

Side view

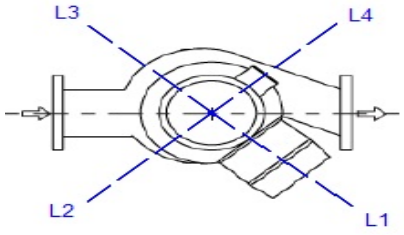


Top view



Inverter motor type: Inverter duty

Weight: 734 lb [332.94 kg], Units of measure: inches [millimeters]
· Not to scale
· R = minimum lifting clearance required above motor
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	6	ANSI-125	11.00	8	9.50	0.75
Outlet	6	ANSI-125	11.00	8	9.50	0.75

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
The program has defaulted to a NEMA Premium Efficiency motor supplied with NEMA MG-1 Part 31.4.4.2 insulation standards for inverter-fed polyphase motors.
OSHPD Seismic Certification OSP-0422-10
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Integrated Fused Disconnect
Space Heater: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Submittal

Ref. #: SQFGQ002934_1

Suction guide

Model: SG-66

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
BF1-1,2	2	SG-66	6 in	6 in	520 USgpm	0.8 ft	Design Envelope Sensorless 4380 0610-007.5

*at design flow

Materials of construction

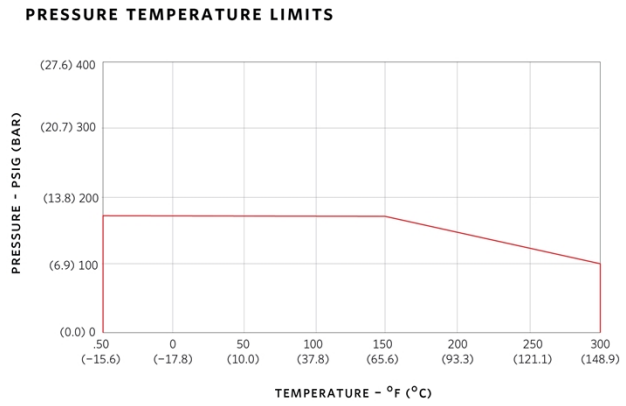
SG-66

Body:	Cast iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast iron	Strainer:	Stainless Steel,0.125"(3mm)Perf..
Cover plate:	Cast iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-66-Suction Guide-ANSI-125

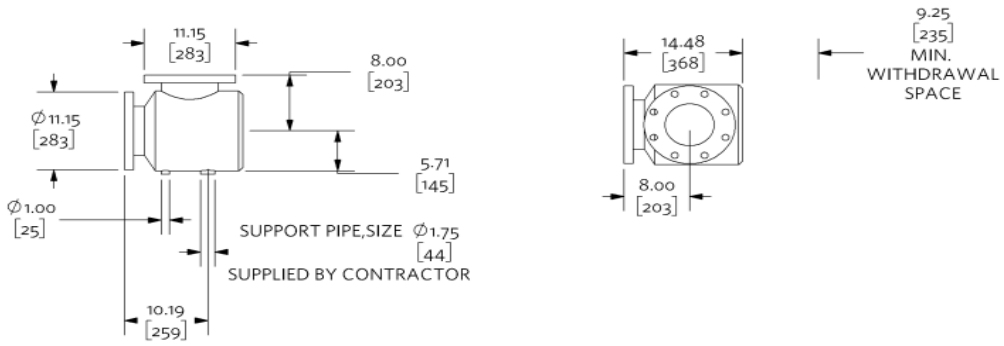


Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

Dimensional data (not for construction)

SG-66	Weight: 141 lb [63.96 kg]
Side view	Top view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-6FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
BF1-1,2	2	FTV-6FA	6 in	Angle	Flanged	520 USgpm	2.9 ft	Design Envelope Sensorless 4380 0610-007.5

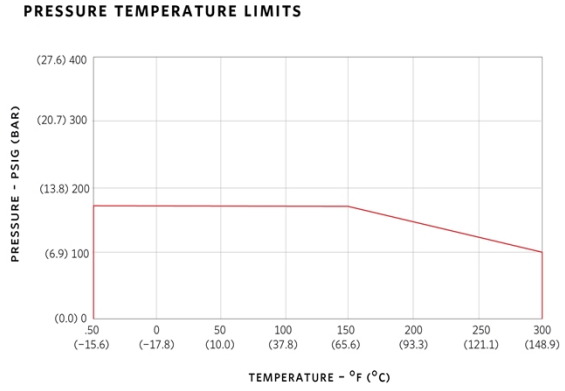
*at design flow

Materials of construction

FTV-6FA-Flo-Trex Valve-ANSI-125-Angle			
Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

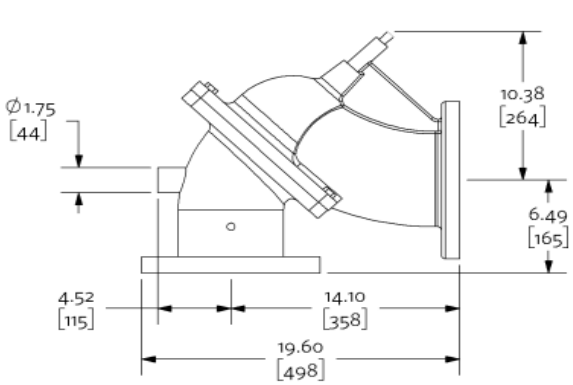
FTV-6FA-Flo-Trex Valve-ANSI-125-Angle

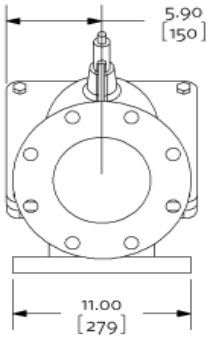


Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-6FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 167 lb [75.75 kg]
Side view	Front view





Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Close-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4380 0610-007.5 with Suction Guide, Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	BF2-1,2	Configuration:	Single
Service:	BOREFILED	Suction pressure:	0 ft
Location:	BLDG C	Fluid:	Propylene Glycol: 25
Qty:	2	Operating temperature:	60 °F
Total system flow:	390 USgpm	Duty flow per pump:	390 USgpm
System head:	35 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	80.62 %	Safety factor % head:	0 %
NPSHR:	4.14 ft	Total Absorbed Power:	4.27 hp
Min. maintained system pressure*:	14 ft	Impeller diameter:	10.19 in
Standby qty:	0	Pump/motor run qty:	1
PEIvl:	Not applicable	ERvl:	Not applicable
Outlet velocity:	4.33 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Bronze Fitted	Impeller:	Bronze
Rating:	ANSI-125	Casing gasket:	Confined Non-Asbestos Fiber
Connections:	Inlet: 6in, Outlet: 6in	Flush line:	Braided Stainless Steel
Casing (volute):	Cast Iron, E-coated	Stub shaft:	Stainless steel

Mechanical seal data

Seal type:	Inside Single Spring	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-ssc L EPSS 2A	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS) ****:	2000 PPM

Electrical data

Supplier:		Insulation class:	Class F Insulation
Size:	7.5 hp	Motor type:	Inverter Duty
Frame size:	254JM	Efficiency:	NEMA Premium 12.12
Enclosure:	ODP	Power supply:	208/3/60
Operating speed @ 100% flow:	1085 rpm	Operating speed @ 50% flow***:	762 rpm

***Based on minimum pressure setting of 40% of design head

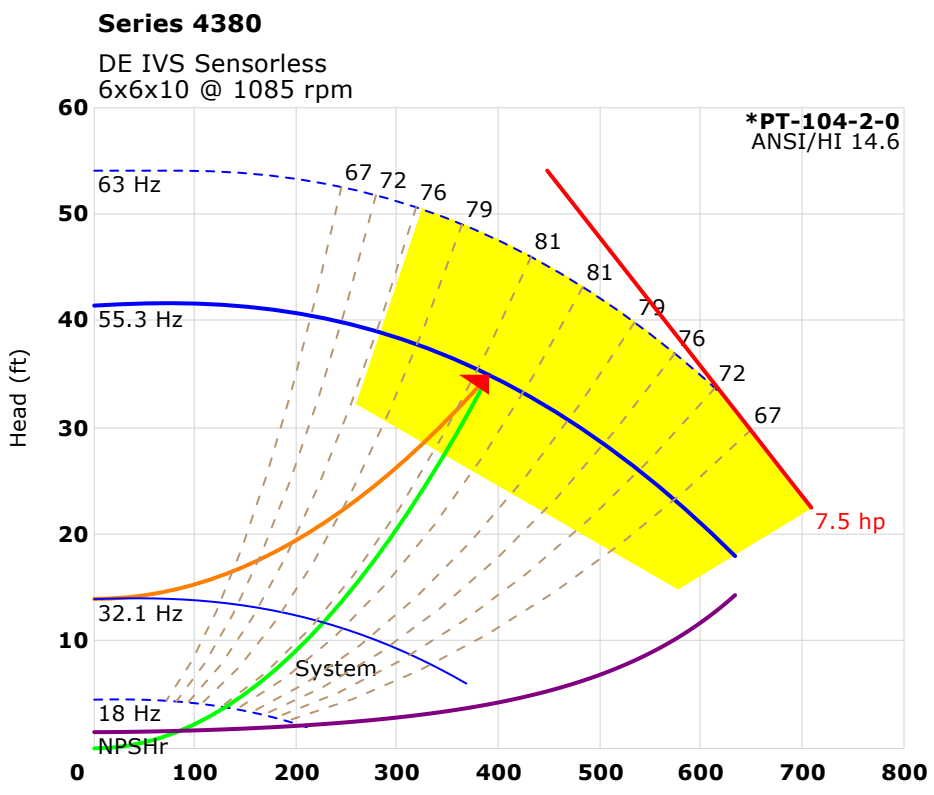
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid.

IVS controller data

Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet MS/TP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current)
Fused disconnect switch:	Integrated Fused Disconnect	Digital inputs:	4 (programmable)
Control orientation:	L1	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Fan cooled through back channel
Absorbed Power/BHP at 50% load/flow and 55% of design head:	2.35 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	Yes	EMI/RFI control:	Integrated filter to meet EN61800-3
		Harmonic suppression:	Integrated DC link reactor**

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field. ** The IVS control is a low harmonic control with a built-in DC link reactor equivalent in performance to a 5% AC line reactor. This does not guarantee performance to any system wide harmonic specification or the costs to meet a system wide specification. If supplied with the system electrical details, Armstrong will run a computer simulation of the system wide harmonics. If system harmonic levels are exceeded, Armstrong can also recommend additional harmonic mitigation and the cost for such mitigation.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 55.31 Hz:
NPSHR: 4.14 ft
Intersection Pt: 390 usgpm @ 35 ft
bhp=4.27 hp, eff=80.62 %%,
%bepq=96 %%

2. Control (QPC) @ 50.68 Hz:
NPSHR: 3.34 ft
Intersection Pt: 341.25 USgpm @ 30.08 ft
bhp=3.22 hp, eff=80.44%,
%bepq=91.7%

3. Control (QPC) @ 46.04 Hz:
NPSHR: 2.58 ft
Intersection Pt: 288.6 USgpm @ 25.5 ft
bhp=2.33 hp, eff=79.79%,
%bepq=85.36%

4. Control (QPC) @ 41.41 Hz:
NPSHR: 1.88 ft
Intersection Pt: 230.1 USgpm @ 21.31 ft
bhp=1.59 hp, eff=77.8%,
%bepq=75.86%

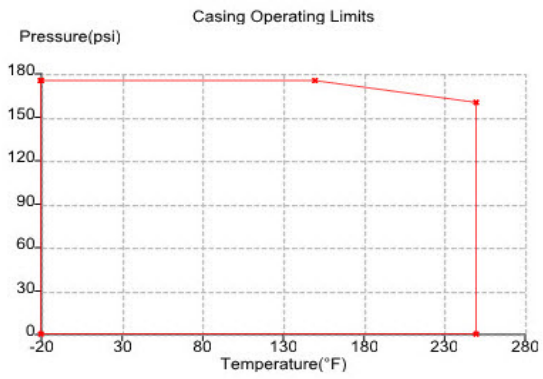
5. Control (QPC) @ 36.77 Hz:
NPSHR: 1.23 ft
Intersection Pt: 159.9 USgpm @ 17.53 ft
bhp=0.99 hp, eff=71.1%,
%bepq=59.46%

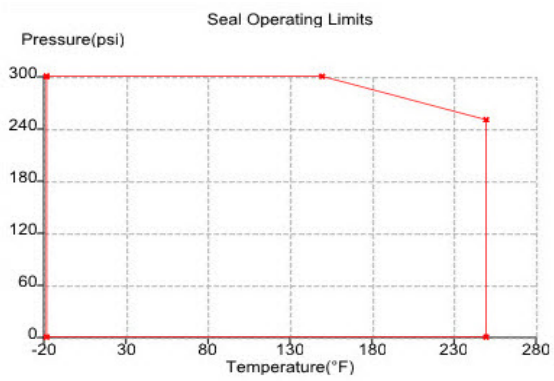
6. Hmin: 14 ft 32.14 Hz:
NPSHR: 0.64 ft
Intersection Pt: 0 USgpm @ 14 ft
(Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	390 USgpm	50.2 ft	79.36%
Design point	390 USgpm	35 ft	80.62 %
50% average flow (with default load profile)	195 USgpm	19.25 ft	75.3 %
Motor Capability @ Rated Speed	6.92 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 250 F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless bundle:	Yes	DEPC Parallel sensorless:	No
Energy performance bundle:	No	Protection bundle:	No
Dual season setup:	No	Zone optimization bundle:	No

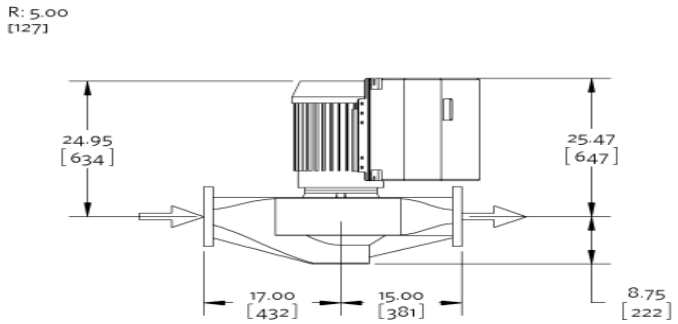
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1 min:	N/A	H2 min:	N/A
Maximum flow:	N/A	Minimum flow:	N/A

Optional Services

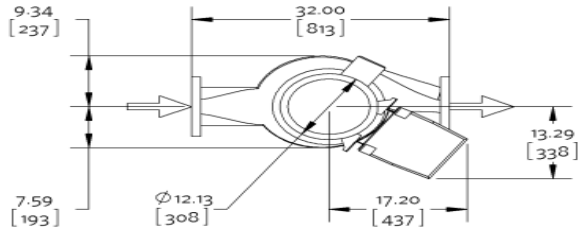
On-site pump commissioning:	Cost not Included	Extended warranty:	No
Pump manager:	Yes	Include spare parts qty:	0

Dimensional data (not for construction)

Side view

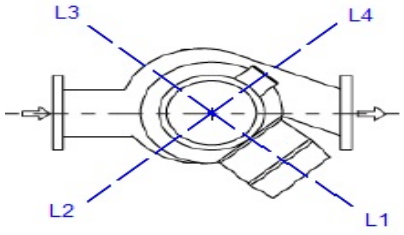


Top view



Inverter motor type: Inverter duty

Weight: 734 lb [332.94 kg], Units of measure: inches [millimeters]
· Not to scale
· R = minimum lifting clearance required above motor
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	6	ANSI-125	11.00	8	9.50	0.75
Outlet	6	ANSI-125	11.00	8	9.50	0.75

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
The program has defaulted to a NEMA Premium Efficiency motor supplied with NEMA MG-1 Part 31.4.4.2 insulation standards for inverter-fed polyphase motors.
OSHPD Seismic Certification OSP-0422-10
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Integrated Fused Disconnect
Space Heater: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Submittal

Ref. #: SQFGQ002934_1

Suction guide

Model: SG-66

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
BF2-1,2	2	SG-66	6 in	6 in	390 USgpm	0.45 ft	Design Envelope Sensorless 4380 0610-007.5

*at design flow

Materials of construction

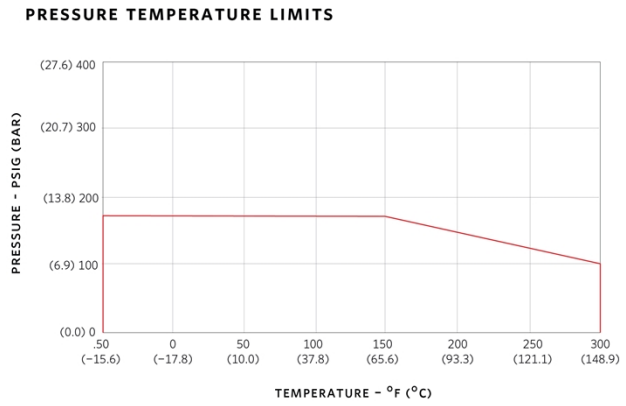
SG-66

Body:	Cast iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast iron	Strainer:	Stainless Steel,0.125"(3mm)Perf..
Cover plate:	Cast iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-66-Suction Guide-ANSI-125

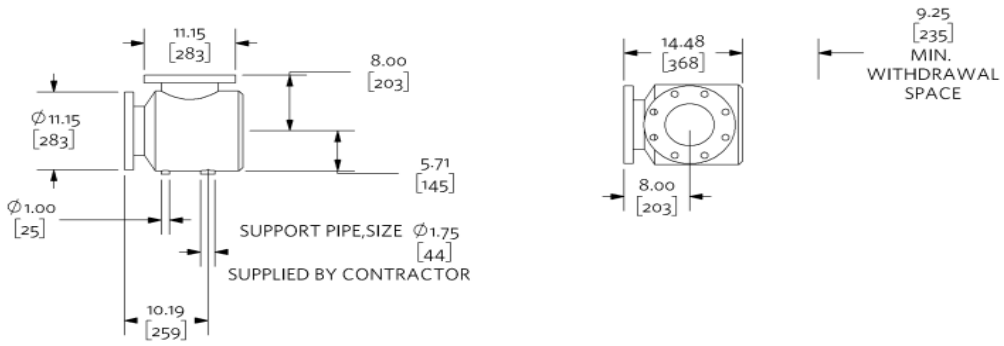


Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

Dimensional data (not for construction)

SG-66	Weight: 141 lb [63.96 kg]
Side view	Top view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-6FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
BF2-1,2	2	FTV-6FA	6 in	Angle	Flanged	390 USgpm	2.8 ft	Design Envelope Sensorless 4380 0610-007.5

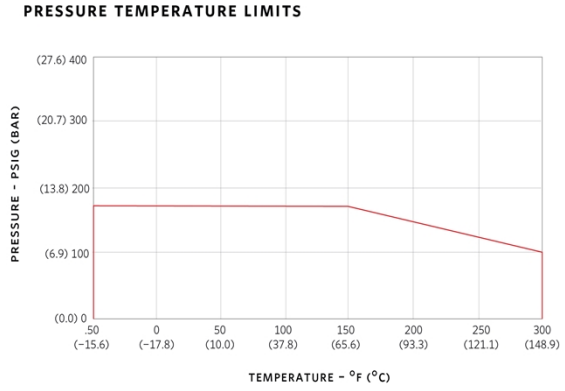
*at design flow

Materials of construction

FTV-6FA-Flo-Trex Valve-ANSI-125-Angle			
Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

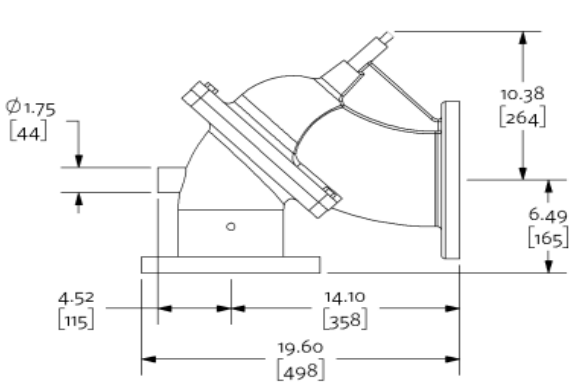
FTV-6FA-Flo-Trex Valve-ANSI-125-Angle

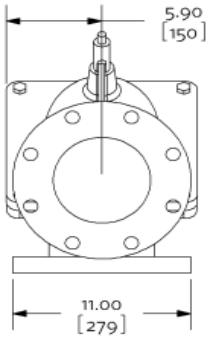


Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-6FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 167 lb [75.75 kg]
Side view	Front view





Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Split-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4300 0611-010.0 with Suction Guide, Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	BF3-1,2	Configuration:	Single
Service:	BOREFIELD	Suction pressure:	0 ft
Location:	BLDG A3	Fluid:	Propylene Glycol: 25
Qty:	2	Operating temperature:	60 °F
Total system flow:	700 USgpm	Duty flow per pump:	700 USgpm
System head:	35 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	78.37 %	Safety factor % head:	0 %
NPSHR:	7.23 ft	Total Absorbed Power:	7.88 hp
Min. maintained system pressure*:	14 ft	Impeller diameter:	11.5 in
PElvl:	Not applicable	ERvl:	Not applicable
Standby qty:	0	Pump/motor run qty:	1
Outlet velocity:	7.77 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Bronze Fitted	Impeller:	Bronze
Rating:	ANSI-125	Pump shaft:	416 Stainless Steel
Connections:	Inlet: 6in, Outlet: 6in	Flush line:	Braided Stainless Steel
Casing (volute):	Cast Iron, E-coated	Casing gasket:	Confined Non-Asbestos Fiber

Mechanical seal data

Seal type:	Outside Balanced	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-SSC AB2	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	Viton
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS)****:	2000 PPM

Electrical data

Supplier:		Insulation class:	Class F Insulation
Size:	10 hp	Motor type:	Inverter Duty
Frame size:	256TC	Efficiency:	NEMA Premium 12.12
Enclosure:	ODP	Power supply:	208/3/60
Operating speed @ 100% flow:	1089 rpm	Operating speed @ 50% flow***:	726 rpm

***Based on minimum pressure setting of 40% of design head.

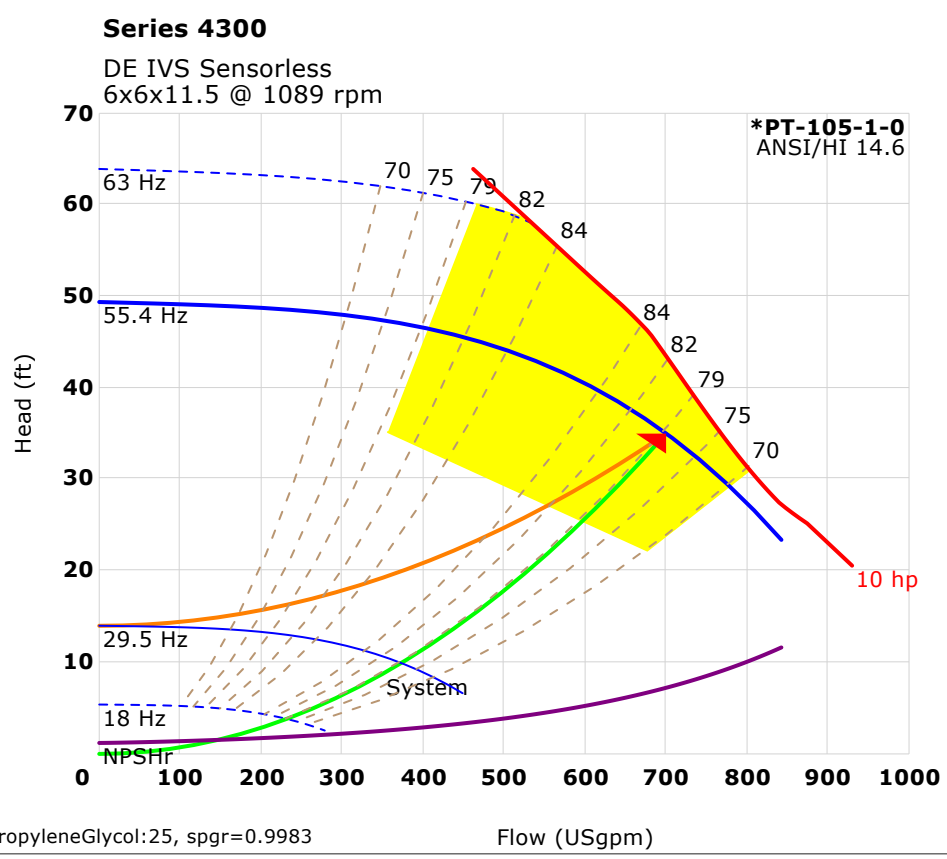
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid

IVS controller data

Sensorless control:	Yes - Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet MS/TP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current)
Fused disconnect switch:	Integrated Fused Disconnect	Digital inputs:	4 (programmable)
Control orientation:	L1	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Fan cooled through back channel
Absorbed Power/BHP at 50% load/flow and 55% of design head:	4.33 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	Yes	EMI/RFI control:	Integrated filter to meet EN61800-3
		Harmonic suppression:	Integrated DC link reactor**

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field.
** The IVS control is a low harmonic control with a built-in DC link reactor equivalent in performance to a 5% AC line reactor. This does not guarantee performance to any system wide harmonic specification or the costs to meet a system wide specification. If supplied with the system electrical details, Armstrong will run a computer simulation of the system wide harmonics. If system harmonic levels are exceeded, Armstrong can also recommend additional harmonic mitigation and the cost for such mitigation.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 55.37 Hz:
NPSHR: 7.23 ft
Intersection Pt: 700 usgpm @ 35 ft
bhp=7.88 hp, eff=78.37 %%,
%bepq=120 %%

2. Control (QPC) @ 50.2 Hz:
NPSHR: 5.75 ft
Intersection Pt: 612.5 USgpm @ 30.08 ft
bhp=5.78 hp, eff=80.35%,
%bepq=121.94%

3. Control (QPC) @ 45.02 Hz:
NPSHR: 4.3 ft
Intersection Pt: 518 USgpm @ 25.5 ft
bhp=4.02 hp, eff=82.77%,
%bepq=115%

4. Control (QPC) @ 39.84 Hz:
NPSHR: 2.94 ft
Intersection Pt: 413 USgpm @ 21.31 ft
bhp=2.63 hp, eff=84.25%,
%bepq=104.15%

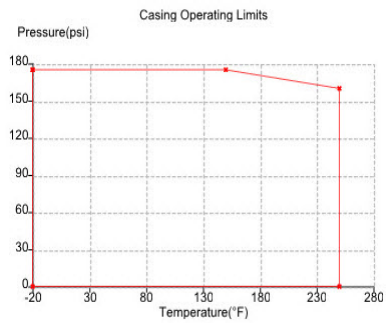
5. Control (QPC) @ 34.66 Hz:
NPSHR: 1.67 ft
Intersection Pt: 287 USgpm @ 17.53 ft
bhp=1.54 hp, eff=82.13%,
%bepq=83.26%

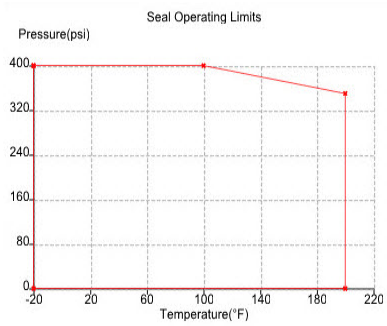
6. Hmin: 14 ft 29.48 Hz:
NPSHR: 0.46 ft
Intersection Pt: 0 USgpm @ 14 ft
(Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	700 USgpm	45.18 ft	82.51%
Design point	700 USgpm	35 ft	78.37 %
50% average flow (with default load profile)	350 USgpm	19.25 ft	83.93 %
Motor Capability @ Rated Speed	8.94 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 200 ˚F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless Bundle:	Yes	DEPC Parallel Sensorless:	No
Energy Performance Bundle:	No	Protection Bundle:	No
Dual Season Setup:	No	Zone Optimization Bundle:	No

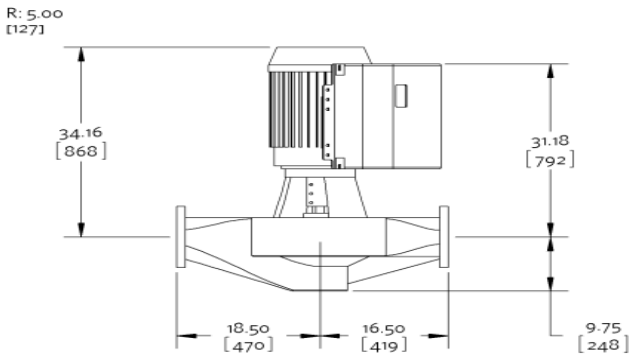
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1min:	N/A	H2min:	N/A
Maximum Flow:	N/A	Minimum Flow:	N/A

Optional Services

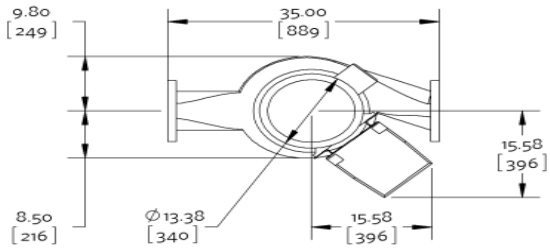
On-Site Pump Commissioning:	Cost not Included	Extended Warranty:	No
Pump Manager:	Yes	Include Spare Parts Qty:	0

Dimensional data (not for construction)

Side view

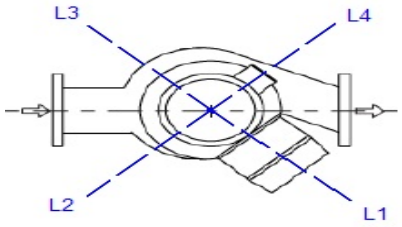


Top view



Inverter motor type: Inverter duty

Weight: 879 lb [398.71 kg], Units of measure: inches [millimeters]
· R = minimum lifting clearance required above motor
· Coupling guard and flush line (not shown) are supplied
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	6	ANSI-125	11.00	8	9.50	0.75
Outlet	6	ANSI-125	11.00	8	9.50	0.75

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
The program has defaulted to a NEMA Premium Efficiency motor supplied with NEMA MG-1 Part 31.4.4.2 insulation standards for inverter-fed polyphase motors.
OSHPD Seismic Certification OSP-0422-10
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Integrated Fused Disconnect
Pre-Wired Control Bridge: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Submittal

Ref. #: SQFGQ002934_1

Suction guide

Model: SG-66

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
BF3-1,2	2	SG-66	6 in	6 in	700 USgpm	1.46 ft	Design Envelope Sensorless 4300 0611-010.0

*at design flow

Materials of construction

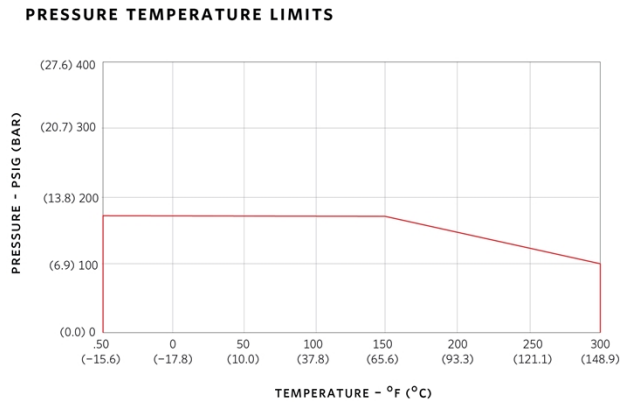
SG-66

Body:	Cast iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast iron	Strainer:	Stainless Steel,0.125"(3mm)Perf..
Cover plate:	Cast iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-66-Suction Guide-ANSI-125

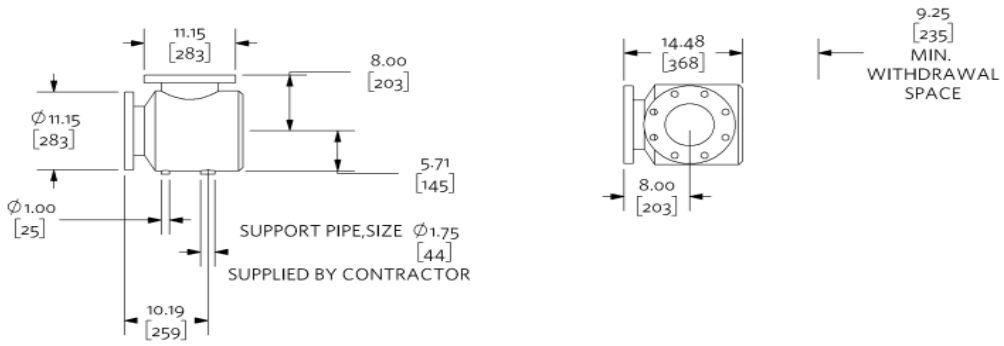


Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

Dimensional data (not for construction)

SG-66	Weight: 141 lb [63.96 kg]
Side view	Top view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-6FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
BF3-1,2	2	FTV-6FA	6 in	Angle	Flanged	700 USgpm	3.35 ft	Design Envelope Sensorless 4300 0611-010.0

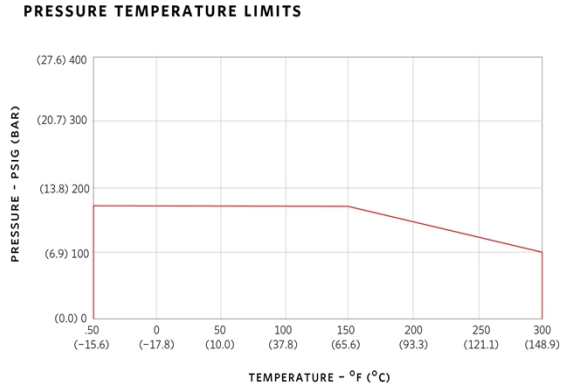
*at design flow

Materials of construction

FTV-6FA-Flo-Trex Valve-ANSI-125-Angle			
Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

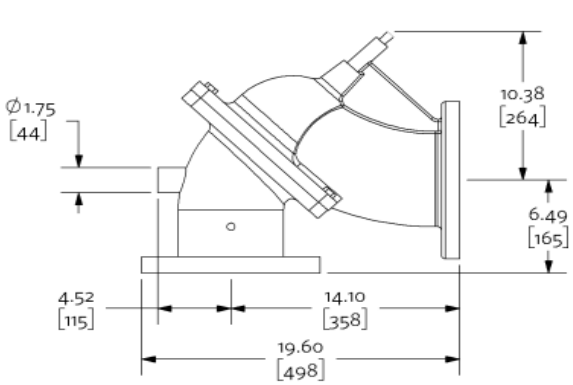
FTV-6FA-Flo-Trex Valve-ANSI-125-Angle

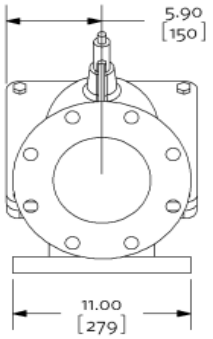


Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-6FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 167 lb [75.75 kg]
Side view	Front view





Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Close-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4380 0305-005.0 with Suction Guide, Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	BF5-1,2	Configuration:	Single
Service:	BOREFIELD	Suction pressure:	0 ft
Location:	BLDG K	Fluid:	Propylene Glycol: 25
Qty:	2	Operating temperature:	60 °F
Total system flow:	260 USgpm	Duty flow per pump:	260 USgpm
System head:	35 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	81.3 %	Safety factor % head:	0 %
NPSHR:	9.87 ft	Total Absorbed Power:	2.82 hp
Min. maintained system pressure*:	14 ft	Impeller diameter:	4.96 in
Standby qty:	0	Pump/motor run qty:	1
PEIvl:	0.45	ERvl:	55
Outlet velocity:	11.28 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Low Pressure Ductile Iron	Impeller:	316 Stainless Steel
Rating:	ANSI-125	Casing o-ring:	EPDM
Connections:	Inlet: 3in, Outlet: 3in	Flush line:	Braided Stainless Steel
Casing (volute):	Ductile Iron, E-coated	Stub shaft:	316 Stainless Steel

Mechanical seal data

Seal type:	Inside Single Spring	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-ssc L EPSS 2A	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS) ****:	2000 PPM

Electrical data

Supplier:	Armstrong	Insulation class:	Class F Insulation
Size:	5 hp	Motor type:	Permanent Magnet
Frame size:	IEC112	Efficiency:	IE5
Enclosure:	TEFC	Power supply:	208/3/60
Operating speed @ 100% flow:	2429 rpm	Operating speed @ 50% flow***:	1666 rpm

***Based on minimum pressure setting of 40% of design head

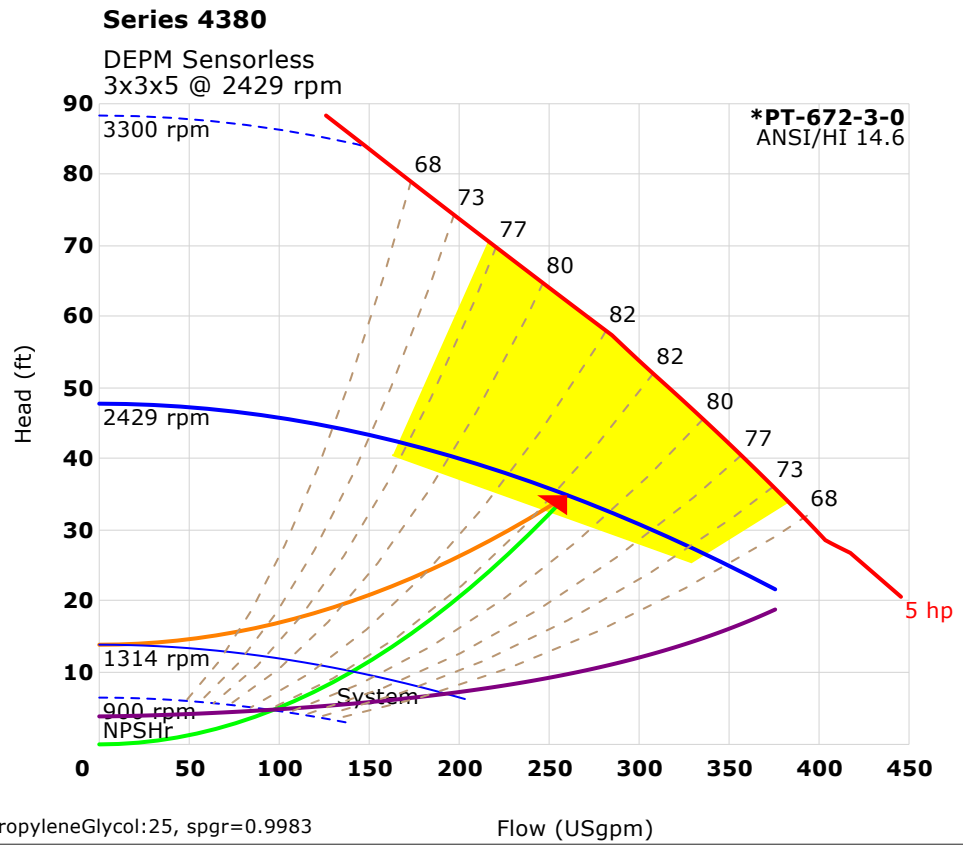
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid.

DEPM controller data

Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet MS/TP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current or voltage)
Fused disconnect switch:	Loose Supply	Digital inputs:	2 (programmable)
Control orientation:	L5	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Not Applicable
Absorbed Power/BHP at 50% load/flow and 55% of design head:	1.55 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	Yes	EMI/RFI control:	Integrated filter to meet EN61800-3

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 2024 rpm:
NPSHR: 9.87 ft
Intersection Pt: 260 usgpm @ 35 ft
bhp=2.82 hp, eff=81.3 %%,
%bepq=109 %%

2. Control (QPC) @ 2206 rpm:
NPSHR: 7.78 ft
Intersection Pt: 227.5 USgpm @ 30.08 ft
bhp=2.11 hp, eff=81.62%,
%bepq=104.44%

3. Control (QPC) @ 1983 rpm:
NPSHR: 5.86 ft
Intersection Pt: 192.4 USgpm @ 25.5 ft
bhp=1.52 hp, eff=81.64%,
%bepq=97.85%

4. Control (QPC) @ 1760 rpm:
NPSHR: 4.14 ft
Intersection Pt: 153.4 USgpm @ 21.31 ft
bhp=1.02 hp, eff=80.67%,
%bepq=87.64%

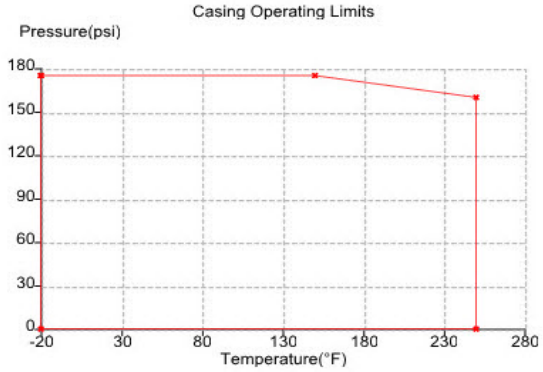
5. Control (QPC) @ 1537 rpm:
NPSHR: 2.62 ft
Intersection Pt: 106.6 USgpm @ 17.53 ft
bhp=0.62 hp, eff=75.83%,
%bepq=69.64%

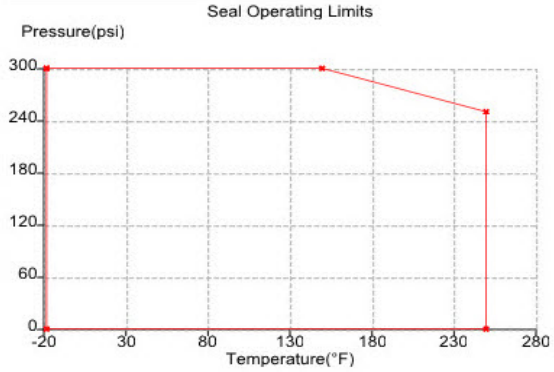
6. Hmin: 14 ft 1314 rpm:
NPSHR: 1.15 ft
Intersection Pt: 0 USgpm @ 14 ft
(Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	260 USgpm	62.24 ft	80.76%
Design point	260 USgpm	35 ft	81.3 %
50% average flow (with default load profile)	130 USgpm	19.25 ft	79.06 %
Motor Capability @ Rated Speed	4.1 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 250 F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless bundle:	Yes	DEPC Parallel sensorless:	No
Energy performance bundle:	No	Protection bundle:	No
Dual season setup:	No	Zone optimization bundle:	No

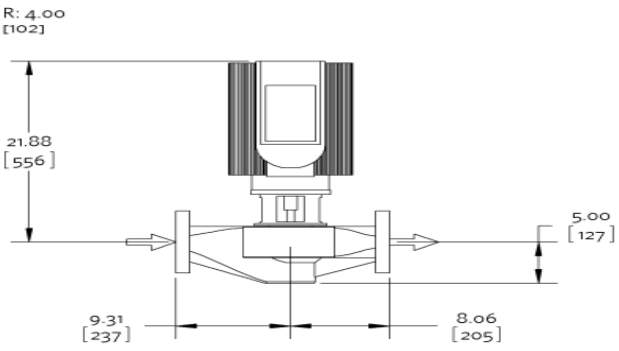
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1 min:	N/A	H2 min:	N/A
Maximum flow:	N/A	Minimum flow:	N/A

Optional Services

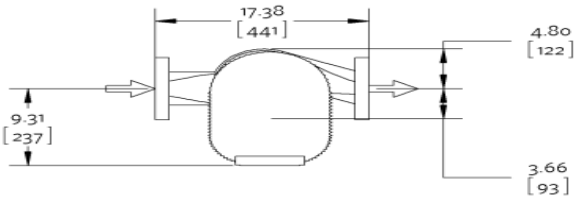
On-site pump commissioning:	Cost not Included	Extended warranty:	No
Pump manager:	Yes	Include spare parts qty:	0

Dimensional data (not for construction)

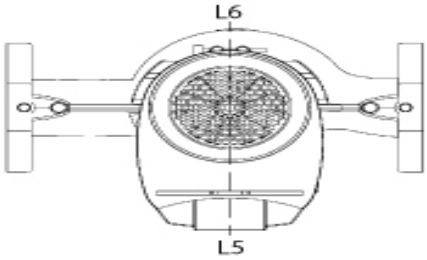
Side view



Top view



Weight: 99 lb [44.91 kg], Units of measure: inches [millimeters]
· Not to scale
· R = minimum lifting clearance required above motor
· Coupling guard and flush line (not shown) are supplied
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	3	ANSI-125	7.50	4	6.00	0.625
Outlet	3	ANSI-125	7.50	4	6.00	0.625

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Loose Supply
Space Heater: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Design Envelope pumps offer industry-leading efficiency and performance management capabilities for significantly reduced energy consumption. Armstrong has undertaken a multi-year project to transition our pump offering to an integrated design that use Design Envelope Permanent Magnet technology for even greater operating cost savings. In the sizes currently equipped with Design Envelope Permanent Magnet motors, the pumps are also more compact and lighter than our standard Design Envelope pumps.

Please note that depending on the pump sizes, your shipment may include a combination of:

- Design Envelope Permanent Magnet pumps
- Design Envelope Permanent Magnet pumps with IVS controls
- Design Envelope Pumps with Premium efficiency induction motors and IVS controls

DISCONNECT CONFIGURATION

Site electrical input voltage : _____

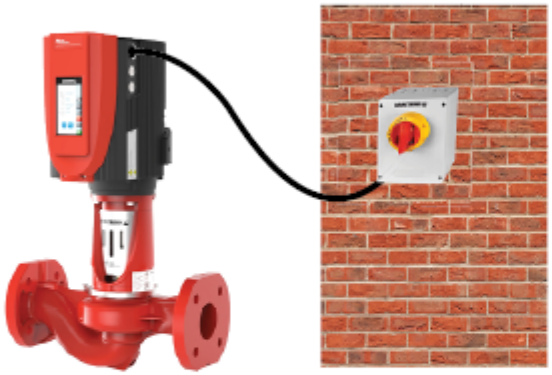
Number of 1PH 200-240V motors : ☐ 2hp & lower: _____

Number of 3PH 200-240V motors : ☐ 10hp & lower: _____

Number of 3PH 380-480V motors : ☐ 10hp & lower: _____

Number of 3PH 575-660V motors : ☐ 10hp & lower: _____

FUSED DISCONNECT FOR WALL MOUNTING



TECHNICAL DATA

Enclosure: UL/NEMA 4 X rated

Terminals

Number of poles: 3-poles, ground

Terminal size acceptability: Copper conductors only, 75°C, 14-8AWG

Electrical/Environmental

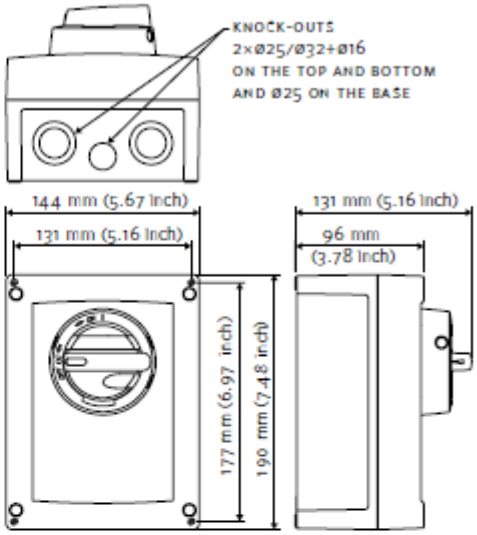
Up to 600V / Up to 60A, 50/60Hz

Minimum short circuit rating: 10kA

Ambient operating temperature: -10°C to +50°C (+14°F to +122°F)

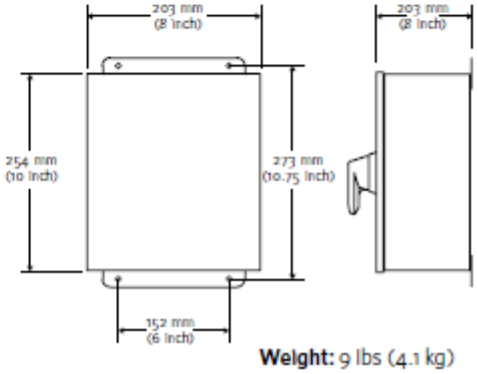
Ambient storage temperature: -30°C to +65°C (-22°F to +149°F)

30A DISCONNECT



Weight: 3.5 lbs (1.6 kg)

60A DISCONNECT



Weight: 9 lbs (4.1 kg)

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 1PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - FRAME 71

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
0.33	0.25	30A	6A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	2.0	1.6
0.5	0.37		6A		2.6	2.0
0.75	0.55		10A		3.3	2.9
1	0.75		10A		4.8	4.0
1.5	1.1		15A		7.1	5.8
2	1.5		20A		9.3	7.6

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
1	0.75	30A	10A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	3.1	2.7
1.5	1.1		10A		4.2	3.7
2	1.5		15A		6.0	4.8
3	2.2		20A		8.8	7.2
5	4		30A		15.7	14.0
7.5	5.5	60A	50A	J FAST-ACTING	20.7	18.5
10	7.5		60A	RK1 FAST-ACTING	28.1	25.1

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
3	2.2	30A	20A	CC FAST-ACTING	7.4	6.4
5.5	4		30A		14.2	12.6
7.5	5.5		30A		19.0	16.6
10	7.5		30A		26.2	23.0

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - FRAME 71

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
0.33	0.25	30A	5A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	1.3	0.8
0.5	0.37		5A		1.6	1.1
0.75	0.55		6A		1.9	1.5
1	0.75		6A		2.5	2.0
1.5	1.1		10A		4.1	3.5
2	1.5		10A		5.3	3.9
3	2.2		10A		6.5	5.8
4	3		15A		6.1	4.9
5	4		20A		9.2	7.1
7.5	5.5		25A		12.5	8.2
10	7.5		30A		18.5	14.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
1	0.75	30A	6A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	2.1	1.7
1.5	1.1		6A		2.8	2.3
2	1.5		10A		4.8	4.1
3	2.2		10A		6.5	5.8
4	3		15A		6.1	4.9
5	4		20A		9.2	7.1
7.5	5.5		25A		12.5	8.2
10	7.5		30A		18.5	14.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
3	2.2	30A	10A	CC FAST-ACTING	3.9	3.2
4	3		10A		5.4	4.2
5.5	4		15A		7.1	5.7
7.5	5.5		15A		9.5	7.6
10	7.5		25A		13.6	11.3
15	11		30A		18.8	15.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 575-600V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM MOTORS

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				575 VAC	600 VAC
1	0.75	30A	5A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	1.6	1.3
1.5	1.1		6A		2.2	1.8
2	1.5		8A		2.0	1.6
3	2.2		10A		3.4	2.8
5	4		20A		5.5	4.9
7.5	5.5		25A		7.2	6.0
10	7.5		30A		9.8	9.4

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 575-600V INPUT POWER FOI USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2 MOTORS

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				575 VAC	600 VAC
1	0.75	30A	5A	CC FAST-ACTING	1.6	1.5
1.5	1.1		6A		2.1	2.0
2	1.5		6A		2.6	2.6
3	2.2		6A		3.5	3.2
5	4		15A		5.7	5.3
7.5	5.5		15A		7.5	7.4
10	7.5		30A		10.8	10.1

All cabling and must comply with national and local regulations on cable cross-sections and ambient temperature

Submittal

Ref. #: SQFGQ002934_1

Suction guide

Model: SG-43

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
BF5-1,2	2	SG-43	4 in	3 in	260 USgpm	2.82 ft	Design Envelope Sensorless 4380 0305-005.0

*at design flow

Materials of construction

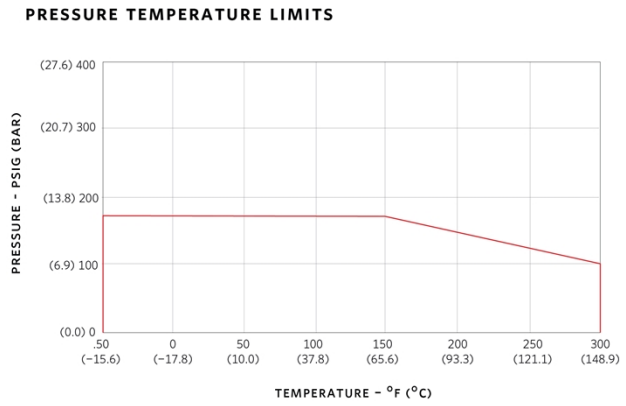
SG-43

Body:	Cast iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast iron	Strainer:	Stainless Steel,0.125"(3mm)Perf..
Cover plate:	Cast iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-43-Suction Guide-ANSI-125

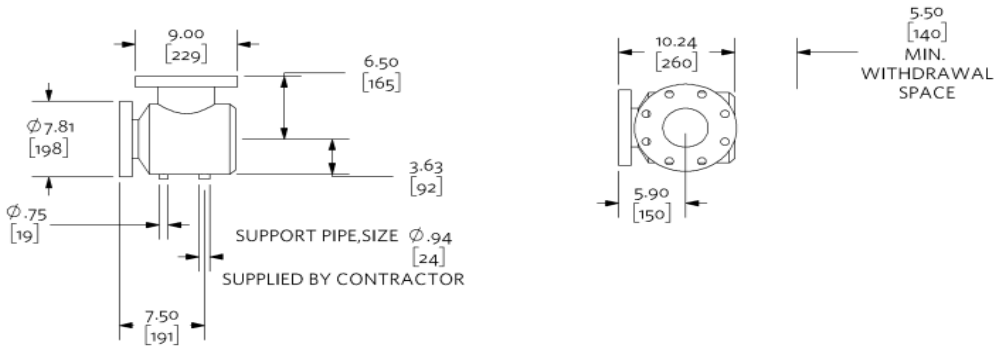


Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

Dimensional data (not for construction)

SG-43	Weight: 52 lb [23.59 kg]
Side view	Top view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-4FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
BF5-1,2	2	FTV-4FA	4 in	Angle	Flanged	260 USgpm	3.18 ft	Design Envelope Sensorless 4380 0305-005.0

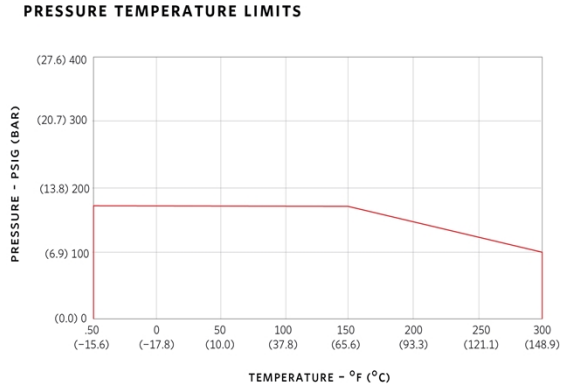
*at design flow

Materials of construction

FTV-4FA-Flo-Trex Valve-ANSI-125-Angle			
Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

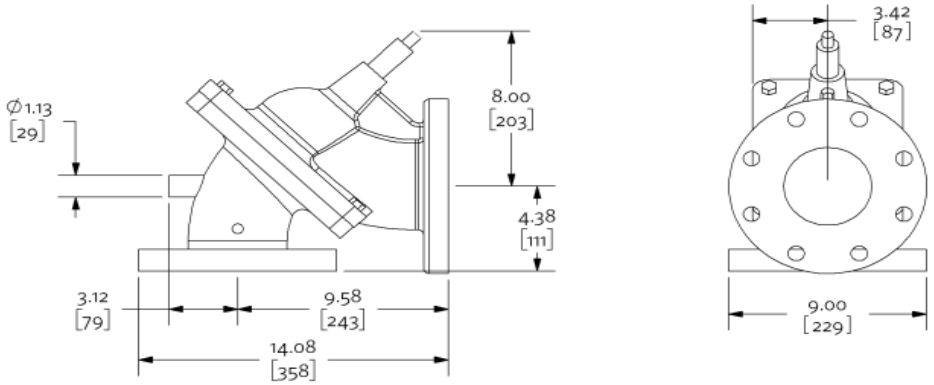
FTV-4FA-Flo-Trex Valve-ANSI-125-Angle



Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-4FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 59 lb [26.76 kg]
Side view	Front view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Spare Parts and Kits					
Design Envelope Seal Parts Kits					
Armstrong PN#	**Description**	**Includes**	**Item Size**	**Weights (lb\kg)**	**Image**
89975000-900K	Seal-kit 0.625 2A c-Ssc316epdL	Mech Seal, V- Clamp, O-ring, Capscrew & Washer	2A - 0.625"	2.8 lb [1.27 kg]	

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Close-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4380 0408-007.5 with Suction Guide, Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	BF6-1,2	Configuration:	Single
Service:	BOREFIELD	Suction pressure:	0 ft
Location:	BLDG A2	Fluid:	Propylene Glycol: 25
Qty:	2	Operating temperature:	60 °F
Total system flow:	390 USgpm	Duty flow per pump:	390 USgpm
System head:	35 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	75.13 %	Safety factor % head:	0 %
NPSHR:	9.88 ft	Total Absorbed Power:	4.58 hp
Min. maintained system pressure*:	14 ft	Impeller diameter:	7.38 in
Standby qty:	0	Pump/motor run qty:	1
PEIvl:	0.492358086	ERvl:	50.76419135
Outlet velocity:	9.83 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Bronze Fitted	Impeller:	Bronze
Rating:	ANSI-125	Casing gasket:	Confined Non-Asbestos Fiber
Connections:	Inlet: 4in, Outlet: 4in	Flush line:	Braided Stainless Steel
Casing (volute):	Cast Iron, E-coated	Stub shaft:	Stainless steel

Mechanical seal data

Seal type:	Inside Single Spring	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-ssc L EPSS 2A	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS) ****:	2000 PPM

Electrical data

Supplier:		Insulation class:	Class F Insulation
Size:	7.5 hp	Motor type:	Inverter Duty
Frame size:	213JP	Efficiency:	NEMA Premium 12.12
Enclosure:	ODP	Power supply:	208/3/60
Operating speed @ 100% flow:	1588 rpm	Operating speed @ 50% flow***:	1101 rpm

***Based on minimum pressure setting of 40% of design head

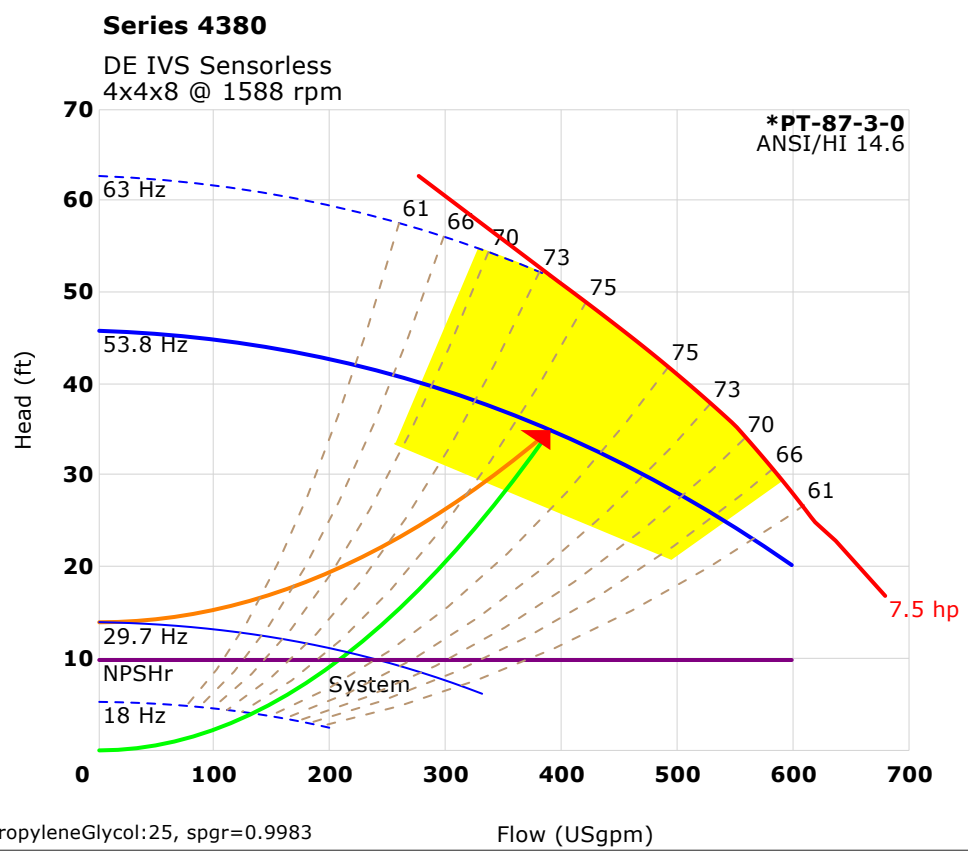
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid.

IVS controller data

Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet MS/TP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current)
Fused disconnect switch:	Integrated Fused Disconnect	Digital inputs:	4 (programmable)
Control orientation:	L1	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Fan cooled through back channel
Absorbed Power/BHP at 50% load/flow and 55% of design head:	2.52 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	No	EMI/RFI control:	Integrated filter to meet EN61800-3
		Harmonic suppression:	Integrated DC link reactor**

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field. ** The IVS control is a low harmonic control with a built-in DC link reactor equivalent in performance to a 5% AC line reactor. This does not guarantee performance to any system wide harmonic specification or the costs to meet a system wide specification. If supplied with the system electrical details, Armstrong will run a computer simulation of the system wide harmonics. If system harmonic levels are exceeded, Armstrong can also recommend additional harmonic mitigation and the cost for such mitigation.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 53.83 Hz:
NPSHR: 9.88 ft
Intersection Pt: 390 usgpm @ 35 ft
bhp=4.58 hp, eff=75.13 %%,
%bepq=98 %%

2. Control (QPC) @ 49.01 Hz:
NPSHR: 8.28 ft
Intersection Pt: 341.25 USgpm @ 30.08 ft
bhp=3.45 hp, eff=74.89%,
%bepq=93.24%

3. Control (QPC) @ 44.2 Hz:
NPSHR: 6.79 ft
Intersection Pt: 288.6 USgpm @ 25.5 ft
bhp=2.51 hp, eff=74.03%,
%bepq=87.05%

4. Control (QPC) @ 39.38 Hz:
NPSHR: 5.42 ft
Intersection Pt: 230.1 USgpm @ 21.31 ft
bhp=1.73 hp, eff=71.59%,
%bepq=77.73%

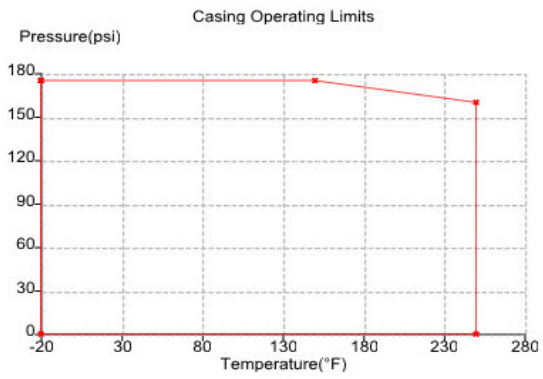
5. Control (QPC) @ 34.56 Hz:
NPSHR: 4.19 ft
Intersection Pt: 159.9 USgpm @ 17.53 ft
bhp=1.1 hp, eff=64.27%,
%bepq=61.43%

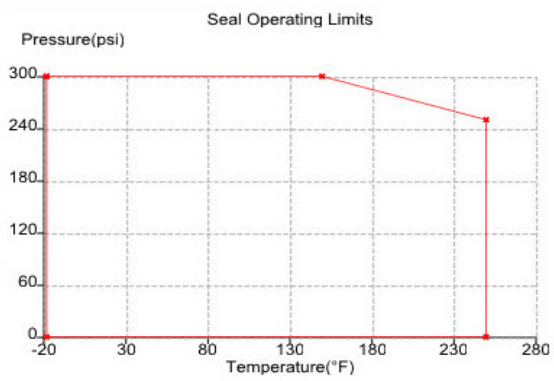
6. Hmin: 14 ft 29.75 Hz:
NPSHR: 3.02 ft
Intersection Pt: 0 USgpm @ 14 ft
(Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	390 USgpm	42.59 ft	74.63%
Design point	390 USgpm	35 ft	75.13 %
50% average flow (with default load profile)	195 USgpm	19.25 ft	68.79 %
Motor Capability @ Rated Speed	6.44 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 250 F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless bundle:	Yes	DEPC Parallel sensorless:	No
Energy performance bundle:	No	Protection bundle:	No
Dual season setup:	No	Zone optimization bundle:	No

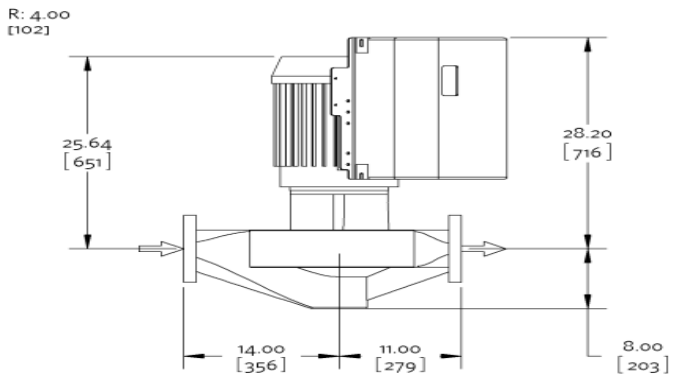
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1 min:	N/A	H2 min:	N/A
Maximum flow:	N/A	Minimum flow:	N/A

Optional Services

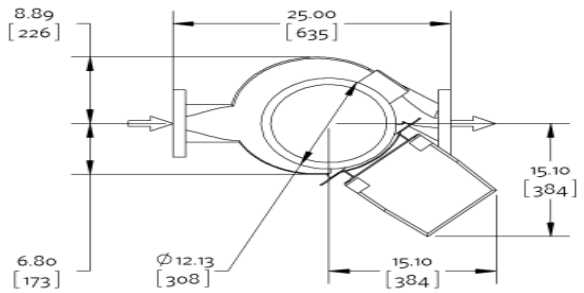
On-site pump commissioning:	Cost not Included	Extended warranty:	No
Pump manager:	Yes	Include spare parts qty:	0

Dimensional data (not for construction)

Side view

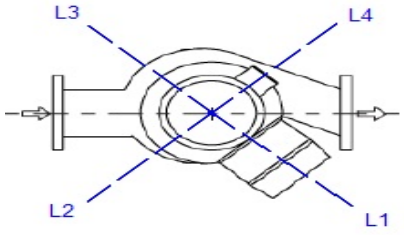


Top view



Inverter motor type: Inverter duty

Weight: 436 lb [197.77 kg], Units of measure: inches [millimeters]
· Not to scale
· R = minimum lifting clearance required above motor
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	4	ANSI-125	9.00	8	7.50	0.625
Outlet	4	ANSI-125	9.00	8	7.50	0.625

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
The program has defaulted to a NEMA Premium Efficiency motor supplied with NEMA MG-1 Part 31.4.4.2 insulation standards for inverter-fed polyphase motors.
OSHPD Seismic Certification OSP-0422-10
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Integrated Fused Disconnect
Space Heater: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Submittal

Ref. #: SQFGQ002934_1

Suction guide

Model: SG-44

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
BF6-1,2	2	SG-44	4 in	4 in	390 USgpm	1.85 ft	Design Envelope Sensorless 4380 0408-007.5

*at design flow

Materials of construction

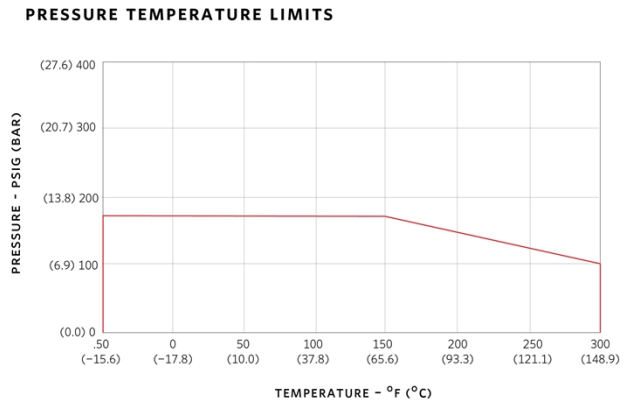
SG-44

Body:	Cast iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast iron	Strainer:	Stainless Steel,0.125"(3mm)Perf..
Cover plate:	Cast iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-44-Suction Guide-ANSI-125

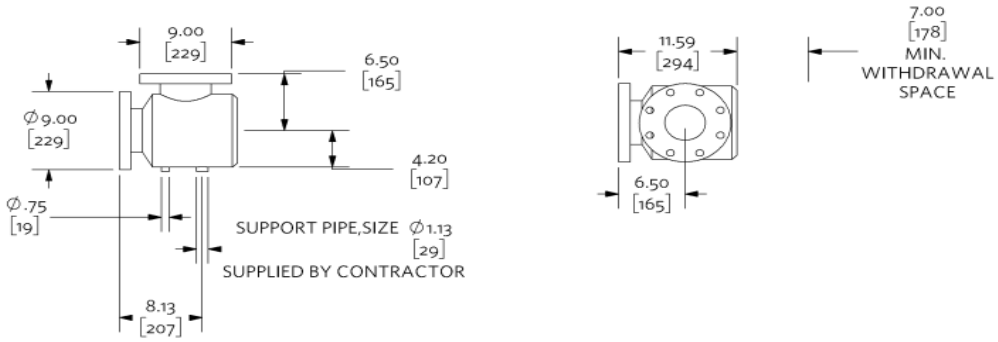


Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

Dimensional data (not for construction)

SG-44	Weight: 72 lb [32.66 kg]
Side view	Top view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-4FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
BF6-1,2	2	FTV-4FA	4 in	Angle	Flanged	390 USgpm	5.26 ft	Design Envelope Sensorless 4380 0408-007.5

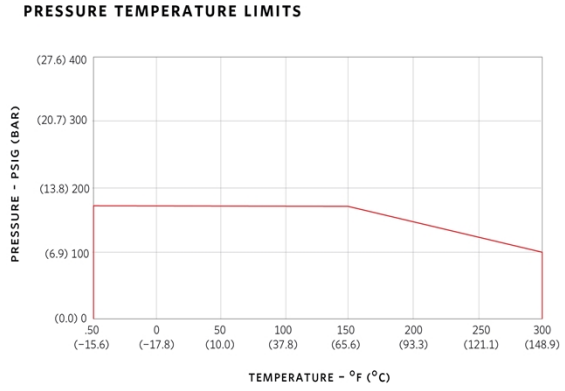
*at design flow

Materials of construction

FTV-4FA-Flo-Trex Valve-ANSI-125-Angle			
Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

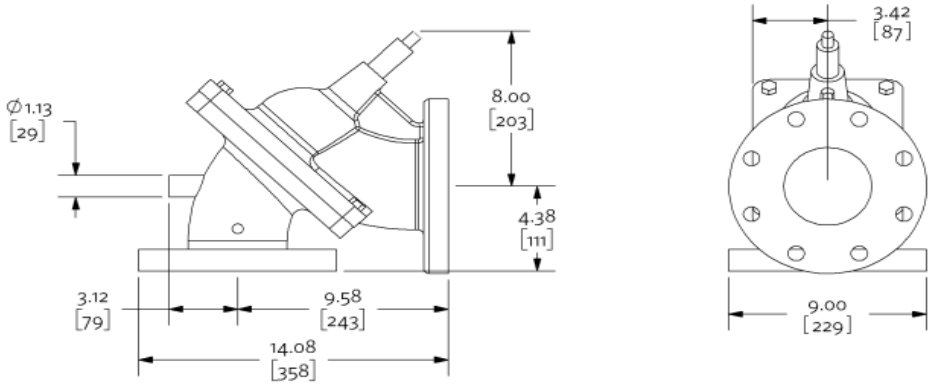
FTV-4FA-Flo-Trex Valve-ANSI-125-Angle



Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-4FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 59 lb [26.76 kg]
Side view	Front view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Close-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4380 0305-005.0 with Suction Guide, Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	BF7-1,2	Configuration:	Single
Service:	BOREFIELD	Suction pressure:	0 ft
Location:	BLDG H	Fluid:	Propylene Glycol: 25
Qty:	2	Operating temperature:	60 °F
Total system flow:	260 USgpm	Duty flow per pump:	260 USgpm
System head:	35 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	81.3 %	Safety factor % head:	0 %
NPSHR:	9.87 ft	Total Absorbed Power:	2.82 hp
Min. maintained system pressure*:	14 ft	Impeller diameter:	4.96 in
Standby qty:	0	Pump/motor run qty:	1
PEIvl:	0.45	ERvl:	55
Outlet velocity:	11.28 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Low Pressure Ductile Iron	Impeller:	316 Stainless Steel
Rating:	ANSI-125	Casing o-ring:	EPDM
Connections:	Inlet: 3in, Outlet: 3in	Flush line:	Braided Stainless Steel
Casing (volute):	Ductile Iron, E-coated	Stub shaft:	316 Stainless Steel

Mechanical seal data

Seal type:	Inside Single Spring	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-ssc L EPSS 2A	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS) ****:	2000 PPM

Electrical data

Supplier:	Armstrong	Insulation class:	Class F Insulation
Size:	5 hp	Motor type:	Permanent Magnet
Frame size:	IEC112	Efficiency:	IE5
Enclosure:	TEFC	Power supply:	208/3/60
Operating speed @ 100% flow:	2429 rpm	Operating speed @ 50% flow***:	1666 rpm

***Based on minimum pressure setting of 40% of design head

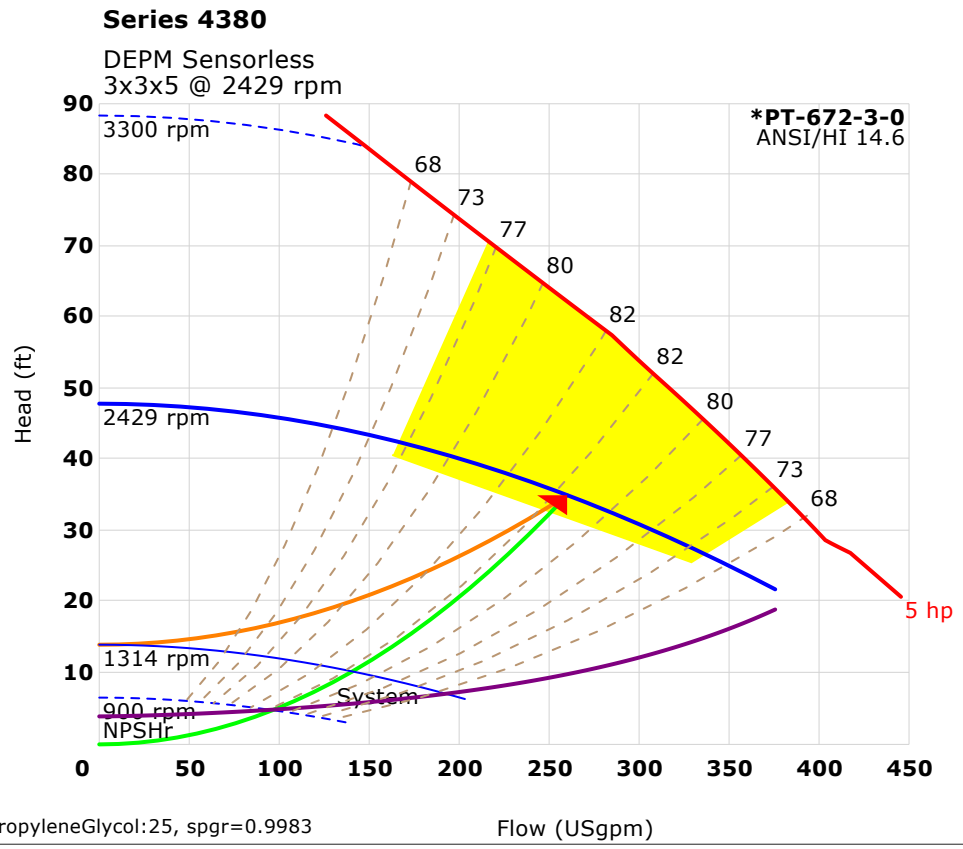
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid.

DEPM controller data

Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet MS/TP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current or voltage)
Fused disconnect switch:	Loose Supply	Digital inputs:	2 (programmable)
Control orientation:	L5	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Not Applicable
Absorbed Power/BHP at 50% load/flow and 55% of design head:	1.55 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	Yes	EMI/RFI control:	Integrated filter to meet EN61800-3

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 2024 rpm:
NPSHR: 9.87 ft
Intersection Pt: 260 usgpm @ 35 ft
bhp=2.82 hp, eff=81.3 %%,
%bepq=109 %%

2. Control (QPC) @ 2206 rpm:
NPSHR: 7.78 ft
Intersection Pt: 227.5 USgpm @ 30.08 ft
bhp=2.11 hp, eff=81.62%,
%bepq=104.44%

3. Control (QPC) @ 1983 rpm:
NPSHR: 5.86 ft
Intersection Pt: 192.4 USgpm @ 25.5 ft
bhp=1.52 hp, eff=81.64%,
%bepq=97.85%

4. Control (QPC) @ 1760 rpm:
NPSHR: 4.14 ft
Intersection Pt: 153.4 USgpm @ 21.31 ft
bhp=1.02 hp, eff=80.67%,
%bepq=87.64%

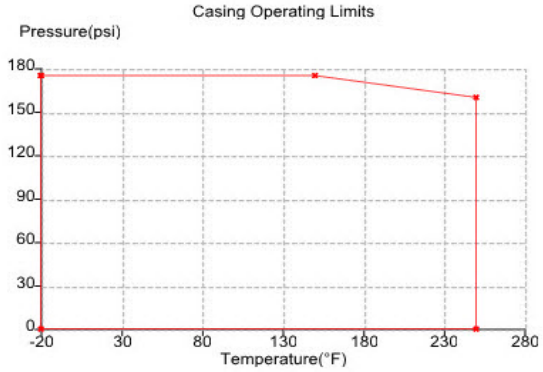
5. Control (QPC) @ 1537 rpm:
NPSHR: 2.62 ft
Intersection Pt: 106.6 USgpm @ 17.53 ft
bhp=0.62 hp, eff=75.83%,
%bepq=69.64%

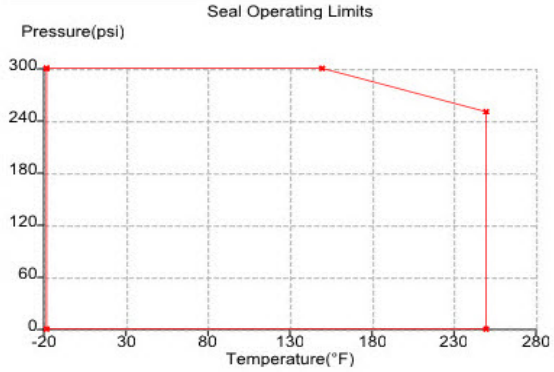
6. Hmin: 14 ft 1314 rpm:
NPSHR: 1.15 ft
Intersection Pt: 0 USgpm @ 14 ft
(Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	260 USgpm	62.24 ft	80.76%
Design point	260 USgpm	35 ft	81.3 %
50% average flow (with default load profile)	130 USgpm	19.25 ft	79.06 %
Motor Capability @ Rated Speed	4.1 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 250 F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless bundle:	Yes	DEPC Parallel sensorless:	No
Energy performance bundle:	No	Protection bundle:	No
Dual season setup:	No	Zone optimization bundle:	No

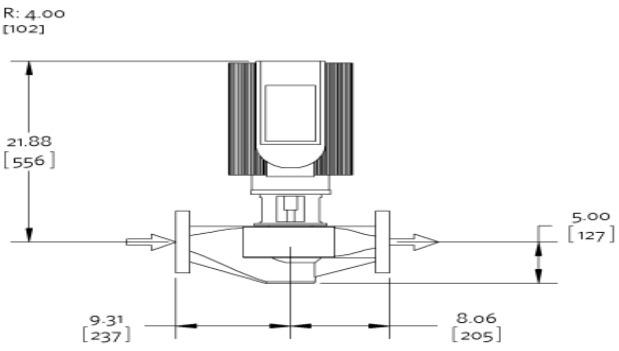
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1 min:	N/A	H2 min:	N/A
Maximum flow:	N/A	Minimum flow:	N/A

Optional Services

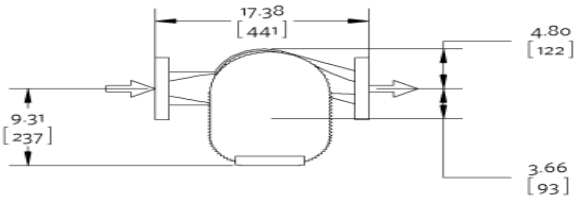
On-site pump commissioning:	Cost not Included	Extended warranty:	No
Pump manager:	Yes	Include spare parts qty:	0

Dimensional data (not for construction)

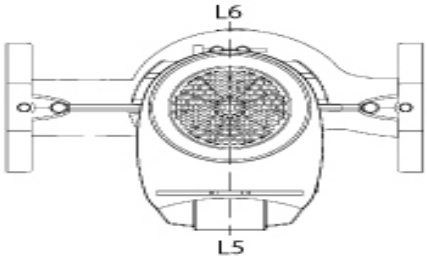
Side view



Top view



Weight: 99 lb [44.91 kg], Units of measure: inches [millimeters]
· Not to scale
· R = minimum lifting clearance required above motor
· Coupling guard and flush line (not shown) are supplied
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	3	ANSI-125	7.50	4	6.00	0.625
Outlet	3	ANSI-125	7.50	4	6.00	0.625

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Loose Supply
Space Heater: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Design Envelope pumps offer industry-leading efficiency and performance management capabilities for significantly reduced energy consumption. Armstrong has undertaken a multi-year project to transition our pump offering to an integrated design that use Design Envelope Permanent Magnet technology for even greater operating cost savings. In the sizes currently equipped with Design Envelope Permanent Magnet motors, the pumps are also more compact and lighter than our standard Design Envelope pumps.

Please note that depending on the pump sizes, your shipment may include a combination of:

- Design Envelope Permanent Magnet pumps
- Design Envelope Permanent Magnet pumps with IVS controls
- Design Envelope Pumps with Premium efficiency induction motors and IVS controls

DISCONNECT CONFIGURATION

Site electrical input voltage : _____

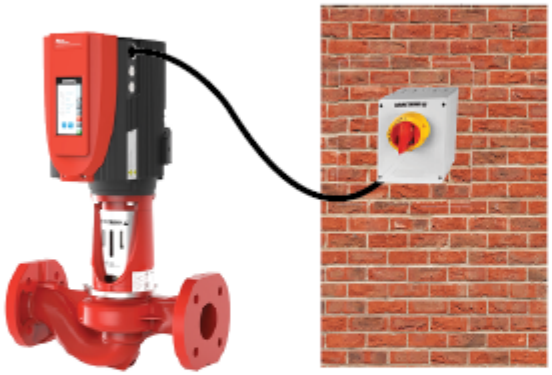
Number of 1PH 200-240V motors : ☐ 2hp & lower: _____

Number of 3PH 200-240V motors : ☐ 10hp & lower: _____

Number of 3PH 380-480V motors : ☐ 10hp & lower: _____

Number of 3PH 575-660V motors : ☐ 10hp & lower: _____

FUSED DISCONNECT FOR WALL MOUNTING



TECHNICAL DATA

Enclosure: UL/NEMA 4 X rated

Terminals

Number of poles: 3-poles, ground

Terminal size acceptability: Copper conductors only, 75°C, 14-8AWG

Electrical/Environmental

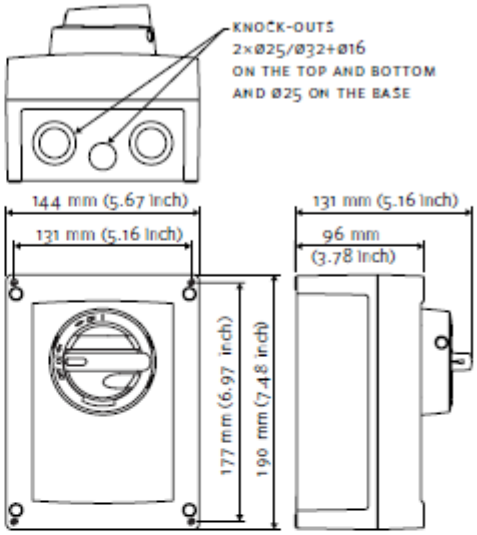
Up to 600V / Up to 60A, 50/60Hz

Minimum short circuit rating: 10kA

Ambient operating temperature: -10°C to +50°C (+14°F to +122°F)

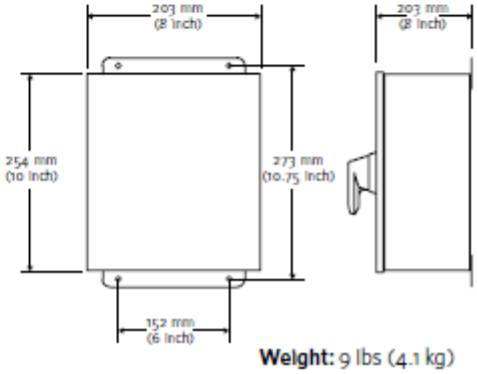
Ambient storage temperature: -30°C to +65°C (-22°F to +149°F)

30A DISCONNECT



Weight: 3.5 lbs (1.6 kg)

60A DISCONNECT



Weight: 9 lbs (4.1 kg)

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 1PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - FRAME 71

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
0.33	0.25	30A	6A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	2.0	1.6
0.5	0.37		6A		2.6	2.0
0.75	0.55		10A		3.3	2.9
1	0.75		10A		4.8	4.0
1.5	1.1		15A		7.1	5.8
2	1.5		20A		9.3	7.6

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
1	0.75	30A	10A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	3.1	2.7
1.5	1.1		10A		4.2	3.7
2	1.5		15A		6.0	4.8
3	2.2		20A		8.8	7.2
5	4		30A		15.7	14.0
7.5	5.5	60A	50A	J FAST-ACTING	20.7	18.5
10	7.5		60A	RK1 FAST-ACTING	28.1	25.1

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
3	2.2	30A	20A	CC FAST-ACTING	7.4	6.4
5.5	4		30A		14.2	12.6
7.5	5.5		30A		19.0	16.6
10	7.5		30A		26.2	23.0

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - FRAME 71

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
0.33	0.25	30A	5A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	1.3	0.8
0.5	0.37		5A		1.6	1.1
0.75	0.55		6A		1.9	1.5
1	0.75		6A		2.5	2.0
1.5	1.1		10A		4.1	3.5
2	1.5		10A		5.3	3.9
3	2.2		10A		6.5	5.8
4	3		15A		6.1	4.9
5	4		20A		9.2	7.1
7.5	5.5		25A		12.5	8.2
10	7.5		30A		18.5	14.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
1	0.75	30A	6A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	2.1	1.7
1.5	1.1		6A		2.8	2.3
2	1.5		10A		4.8	4.1
3	2.2		10A		6.5	5.8
4	3		15A		6.1	4.9
5	4		20A		9.2	7.1
7.5	5.5		25A		12.5	8.2
10	7.5		30A		18.5	14.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
3	2.2	30A	10A	CC FAST-ACTING	3.9	3.2
4	3		10A		5.4	4.2
5.5	4		15A		7.1	5.7
7.5	5.5		15A		9.5	7.6
10	7.5		25A		13.6	11.3
15	11		30A		18.8	15.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 575-600V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM MOTORS

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				575 VAC	600 VAC
1	0.75	30A	5A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	1.6	1.3
1.5	1.1		6A		2.2	1.8
2	1.5		8A		2.0	1.6
3	2.2		10A		3.4	2.8
5	4		20A		5.5	4.9
7.5	5.5		25A		7.2	6.0
10	7.5		30A		9.8	9.4

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 575-600V INPUT POWER FOI USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2 MOTORS

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				575 VAC	600 VAC
1	0.75	30A	5A	CC FAST-ACTING	1.6	1.5
1.5	1.1		6A		2.1	2.0
2	1.5		6A		2.6	2.6
3	2.2		6A		3.5	3.2
5	4		15A		5.7	5.3
7.5	5.5		15A		7.5	7.4
10	7.5		30A		10.8	10.1

All cabling and must comply with national and local regulations on cable cross-sections and ambient temperature

Submittal

Ref. #: SQFGQ002934_1

Suction guide

Model: SG-43

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
BF7-1,2	2	SG-43	4 in	3 in	260 USgpm	2.82 ft	Design Envelope Sensorless 4380 0305-005.0

*at design flow

Materials of construction

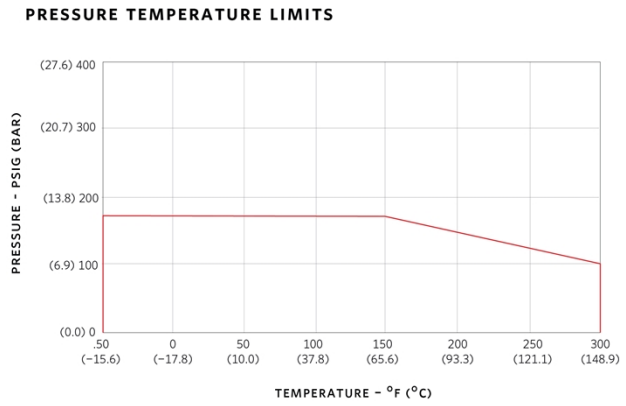
SG-43

Body:	Cast iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast iron	Strainer:	Stainless Steel,0.125"(3mm)Perf..
Cover plate:	Cast iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-43-Suction Guide-ANSI-125

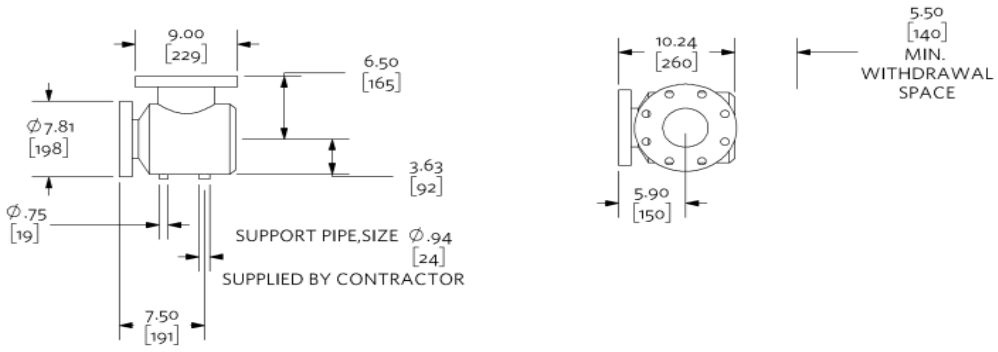


Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

Dimensional data (not for construction)

SG-43	Weight: 52 lb [23.59 kg]
Side view	Top view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-4FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
BF7-1,2	2	FTV-4FA	4 in	Angle	Flanged	260 USgpm	3.18 ft	Design Envelope Sensorless 4380 0305-005.0

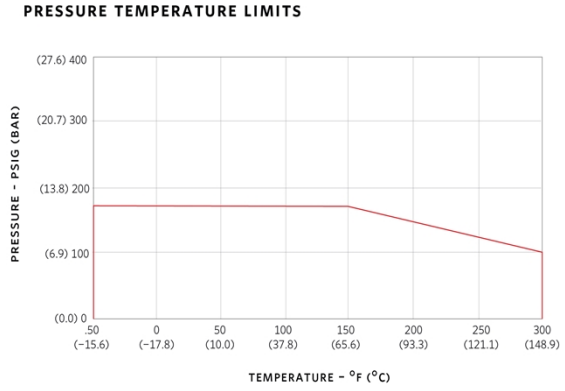
*at design flow

Materials of construction

FTV-4FA-Flo-Trex Valve-ANSI-125-Angle			
Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

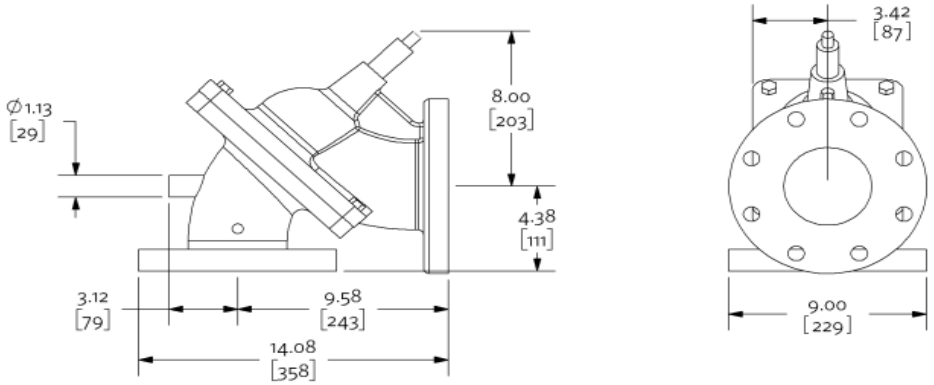
FTV-4FA-Flo-Trex Valve-ANSI-125-Angle



Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-4FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 59 lb [26.76 kg]
Side view	Front view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Spare Parts and Kits					
Design Envelope Seal Parts Kits					
Armstrong PN#	**Description**	**Includes**	**Item Size**	**Weights (lb\kg)**	**Image**
89975000-900K	Seal-kit 0.625 2A c-Ssc316epdL	Mech Seal, V- Clamp, O-ring, Capscrew & Washer	2A - 0.625"	2.8 lb [1.27 kg]	

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Close-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4380 0610-007.5 with Suction Guide, Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	BF8-1,2	Configuration:	Single
Service:	BOREFIELD	Suction pressure:	0 ft
Location:	BLDG G	Fluid:	Propylene Glycol: 25
Qty:	2	Operating temperature:	60 °F
Total system flow:	480 USgpm	Duty flow per pump:	480 USgpm
System head:	35 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	79.29 %	Safety factor % head:	0 %
NPSHR:	6.06 ft	Total Absorbed Power:	5.34 hp
Min. maintained system pressure*:	14 ft	Impeller diameter:	10.19 in
Standby qty:	0	Pump/motor run qty:	1
PEIvl:	Not applicable	ERvl:	Not applicable
Outlet velocity:	5.33 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Bronze Fitted	Impeller:	Bronze
Rating:	ANSI-125	Casing gasket:	Confined Non-Asbestos Fiber
Connections:	Inlet: 6in, Outlet: 6in	Flush line:	Braided Stainless Steel
Casing (volute):	Cast Iron, E-coated	Stub shaft:	Stainless steel

Mechanical seal data

Seal type:	Inside Single Spring	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-ssc L EPSS 2A	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS) ****:	2000 PPM

Electrical data

Supplier:		Insulation class:	Class F Insulation
Size:	7.5 hp	Motor type:	Inverter Duty
Frame size:	254JM	Efficiency:	NEMA Premium 12.12
Enclosure:	ODP	Power supply:	208/3/60
Operating speed @ 100% flow:	1143 rpm	Operating speed @ 50% flow***:	780 rpm

***Based on minimum pressure setting of 40% of design head

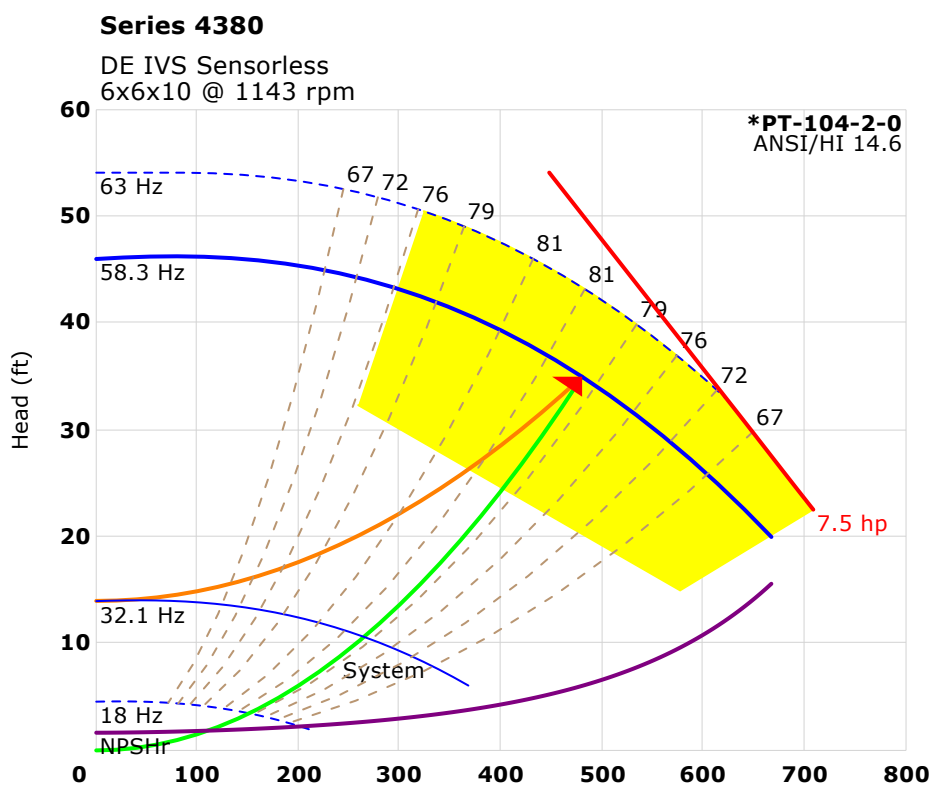
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid.

IVS controller data

Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet MS/TP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current)
Fused disconnect switch:	Integrated Fused Disconnect	Digital inputs:	4 (programmable)
Control orientation:	L1	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Fan cooled through back channel
Absorbed Power/BHP at 50% load/flow and 55% of design head:	2.94 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	Yes	EMI/RFI control:	Integrated filter to meet EN61800-3
		Harmonic suppression:	Integrated DC link reactor**

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field. ** The IVS control is a low harmonic control with a built-in DC link reactor equivalent in performance to a 5% AC line reactor. This does not guarantee performance to any system wide harmonic specification or the costs to meet a system wide specification. If supplied with the system electrical details, Armstrong will run a computer simulation of the system wide harmonics. If system harmonic levels are exceeded, Armstrong can also recommend additional harmonic mitigation and the cost for such mitigation.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 58.27 Hz:
NPSHR: 6.06 ft
Intersection Pt: 480 usgpm @ 35 ft
bhp=5.34 hp, eff=79.29 %%,
%bepq=112 %%

2. Control (QPC) @ 53.04 Hz:
NPSHR: 4.79 ft
Intersection Pt: 420 USgpm @ 30.08 ft
bhp=3.98 hp, eff=80.07%,
%bepq=107.67%

3. Control (QPC) @ 47.82 Hz:
NPSHR: 3.59 ft
Intersection Pt: 355.2 USgpm @ 25.5 ft
bhp=2.83 hp, eff=80.61%,
%bepq=101.03%

4. Control (QPC) @ 42.59 Hz:
NPSHR: 2.48 ft
Intersection Pt: 283.2 USgpm @ 21.31 ft
bhp=1.89 hp, eff=80.37%,
%bepq=90.58%

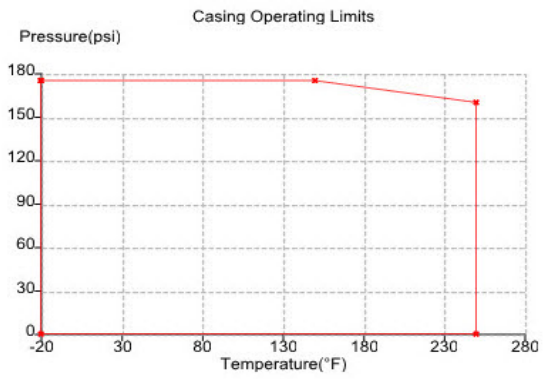
5. Control (QPC) @ 37.36 Hz:
NPSHR: 1.5 ft
Intersection Pt: 196.8 USgpm @ 17.53 ft
bhp=1.13 hp, eff=76.69%,
%bepq=72.08%

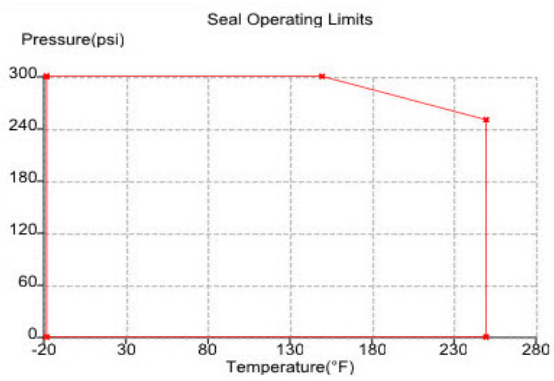
6. Hmin: 14 ft 32.14 Hz:
NPSHR: 0.64 ft
Intersection Pt: 0 USgpm @ 14 ft
(Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	480 USgpm	45.63 ft	80.62%
Design point	480 USgpm	35 ft	79.29 %
50% average flow (with default load profile)	240 USgpm	19.25 ft	79.26 %
Motor Capability @ Rated Speed	7.19 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 250 F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless bundle:	Yes	DEPC Parallel sensorless:	No
Energy performance bundle:	No	Protection bundle:	No
Dual season setup:	No	Zone optimization bundle:	No

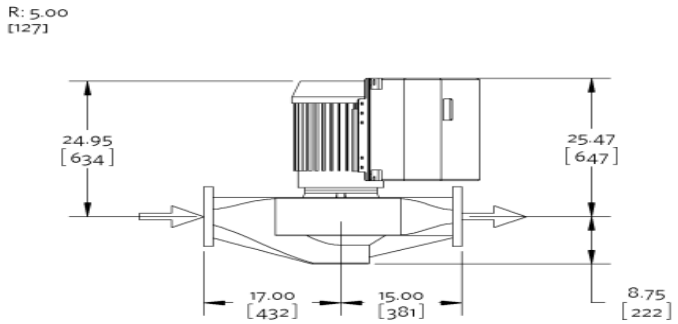
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1 min:	N/A	H2 min:	N/A
Maximum flow:	N/A	Minimum flow:	N/A

Optional Services

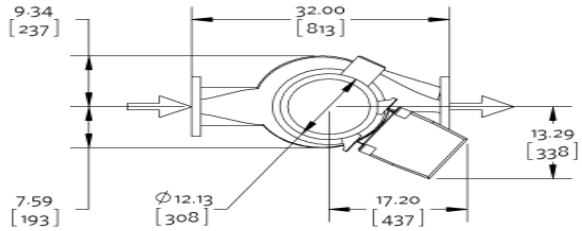
On-site pump commissioning:	Cost not Included	Extended warranty:	No
Pump manager:	Yes	Include spare parts qty:	0

Dimensional data (not for construction)

Side view

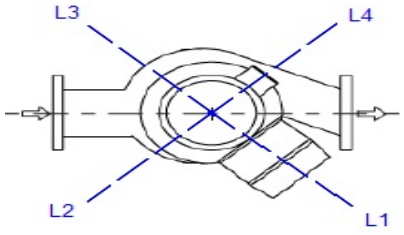


Top view



Inverter motor type: Inverter duty

Weight: 734 lb [332.94 kg], Units of measure: inches [millimeters]
· Not to scale
· R = minimum lifting clearance required above motor
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	6	ANSI-125	11.00	8	9.50	0.75
Outlet	6	ANSI-125	11.00	8	9.50	0.75

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
The program has defaulted to a NEMA Premium Efficiency motor supplied with NEMA MG-1 Part 31.4.4.2 insulation standards for inverter-fed polyphase motors.
OSHPD Seismic Certification OSP-0422-10
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Integrated Fused Disconnect
Space Heater: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Submittal

Ref. #: SQFGQ002934_1

Suction guide

Model: SG-66

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
BF8-1,2	2	SG-66	6 in	6 in	480 USgpm	0.69 ft	Design Envelope Sensorless 4380 0610-007.5

*at design flow

Materials of construction

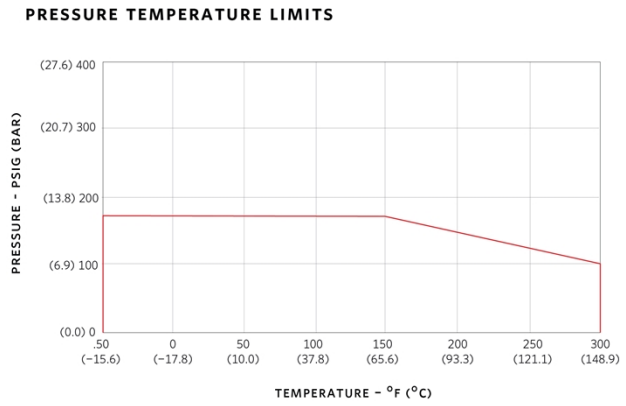
SG-66

Body:	Cast iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast iron	Strainer:	Stainless Steel,0.125"(3mm)Perf..
Cover plate:	Cast iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-66-Suction Guide-ANSI-125

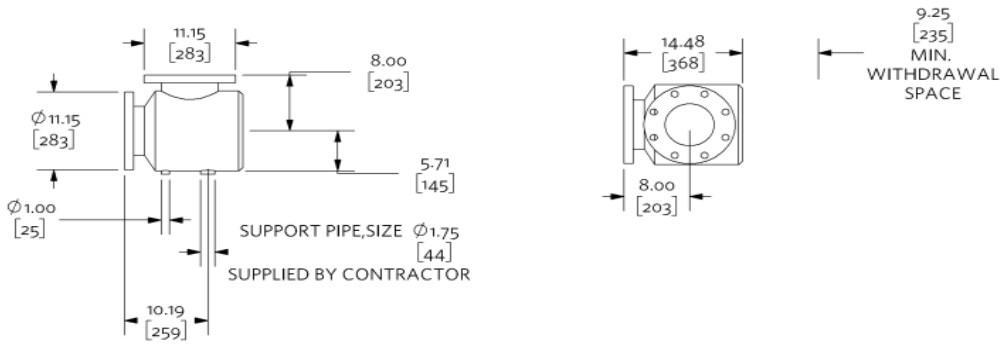


Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

Dimensional data (not for construction)

SG-66	Weight: 141 lb [63.96 kg]
Side view	Top view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-6FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
BF8-1,2	2	FTV-6FA	6 in	Angle	Flanged	480 USgpm	2.8 ft	Design Envelope Sensorless 4380 0610-007.5

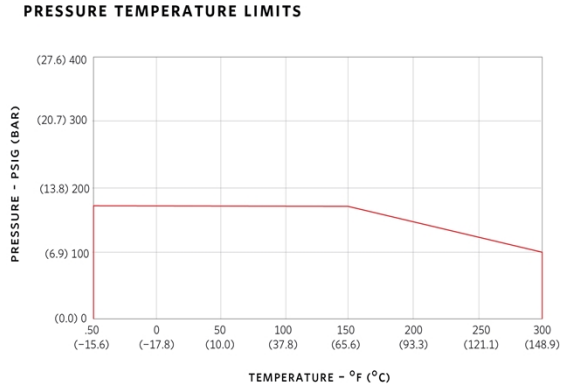
*at design flow

Materials of construction

FTV-6FA-Flo-Trex Valve-ANSI-125-Angle			
Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

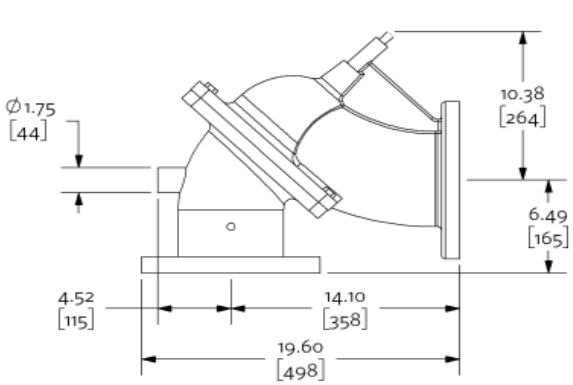
FTV-6FA-Flo-Trex Valve-ANSI-125-Angle

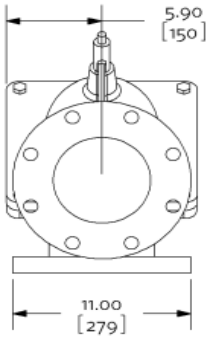


Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-6FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 167 lb [75.75 kg]
Side view	Front view





Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Close-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4380 0205-002.0 with Suction Guide, Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	BF10-1,2	Configuration:	Single
Service:	BOREFIELD	Suction pressure:	0 ft
Location:	BLDG E	Fluid:	Propylene Glycol: 25
Qty:	2	Operating temperature:	60 °F
Total system flow:	130 USgpm	Duty flow per pump:	130 USgpm
System head:	35 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	76.68 %	Safety factor % head:	0 %
NPSHR:	5.62 ft	Total Absorbed Power:	1.5 hp
Min. maintained system pressure*:	14 ft	Impeller diameter:	4.42 in
Standby qty:	0	Pump/motor run qty:	1
PEIvl:	0.43	ERvl:	57
Outlet velocity:	12.43 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Low Pressure Ductile Iron	Impeller:	316 Stainless Steel
Rating:	ANSI-125	Casing o-ring:	EPDM
Connections:	Inlet: 2in, Outlet: 2in	Flush line:	Braided Stainless Steel
Casing (volute):	Ductile Iron, E-coated	Stub shaft:	316 Stainless Steel

Mechanical seal data

Seal type:	Inside Single Spring	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-ssc L EPSS 2A	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS) ****:	2000 PPM

Electrical data

Supplier:	Armstrong	Insulation class:	Class F Insulation
Size:	2 hp	Motor type:	Permanent Magnet
Frame size:	IEC90S	Efficiency:	IE5
Enclosure:	TEFC	Power supply:	208/3/60
Operating speed @ 100% flow:	2780 rpm	Operating speed @ 50% flow***:	1916 rpm

***Based on minimum pressure setting of 40% of design head

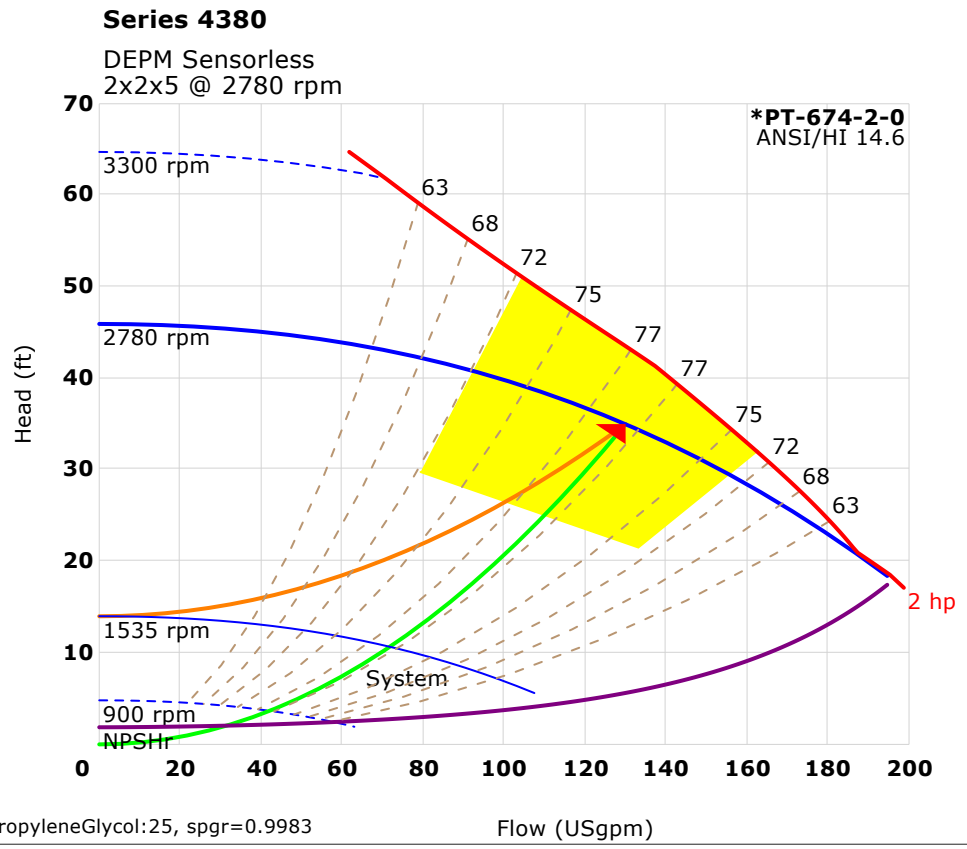
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid.

DEPM controller data

Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet MS/TP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current or voltage)
Fused disconnect switch:	Loose Supply	Digital inputs:	2 (programmable)
Control orientation:	L5	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Not Applicable
Absorbed Power/BHP at 50% load/flow and 55% of design head:	0.82 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	Yes	EMI/RFI control:	Integrated filter to meet EN61800-3

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 2317 rpm:
NPSHR: 5.62 ft
Intersection Pt: 130 usgpm @ 35 ft
bhp=1.5 hp, eff=76.68 %%,
%bepq=98 %%

2. Control (QPC) @ 2531 rpm:
NPSHR: 4.34 ft
Intersection Pt: 113.75 USgpm @ 30.08 ft
bhp=1.13 hp, eff=76.62%,
%bepq=93.78%

3. Control (QPC) @ 2282 rpm:
NPSHR: 3.17 ft
Intersection Pt: 96.2 USgpm @ 25.5 ft
bhp=0.81 hp, eff=76.13%,
%bepq=87.81%

4. Control (QPC) @ 2033 rpm:
NPSHR: 2.14 ft
Intersection Pt: 76.7 USgpm @ 21.31 ft
bhp=0.55 hp, eff=74.43%,
%bepq=78.45%

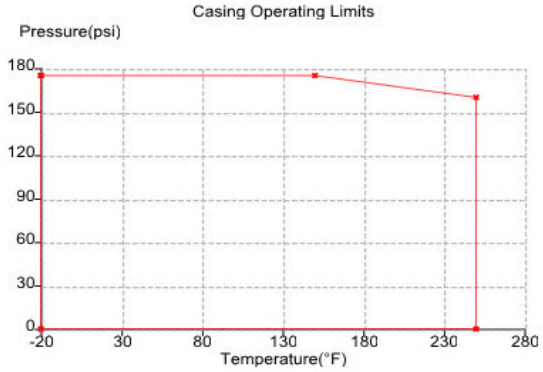
5. Control (QPC) @ 1784 rpm:
NPSHR: 1.29 ft
Intersection Pt: 53.3 USgpm @ 17.53 ft
bhp=0.34 hp, eff=68.88%,
%bepq=62.12%

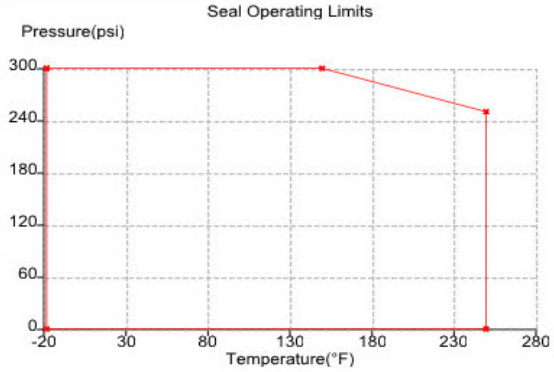
6. Hmin: 14 ft 1535 rpm:
NPSHR: 0.57 ft
Intersection Pt: 0 USgpm @ 14 ft
(Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	130 USgpm	43.51 ft	76.39%
Design point	130 USgpm	35 ft	76.68 %
50% average flow (with default load profile)	65 USgpm	19.25 ft	72.32 %
Motor Capability @ Rated Speed	1.73 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 250 F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless bundle:	Yes	DEPC Parallel sensorless:	No
Energy performance bundle:	No	Protection bundle:	No
Dual season setup:	No	Zone optimization bundle:	No

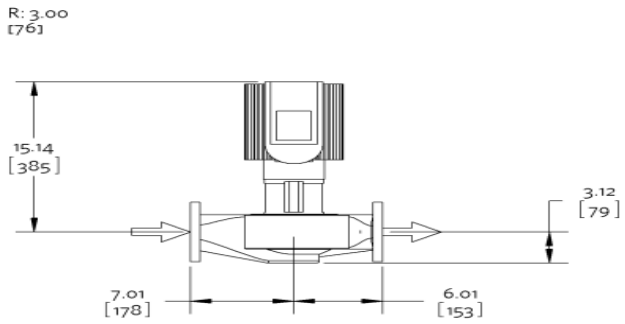
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1 min:	N/A	H2 min:	N/A
Maximum flow:	N/A	Minimum flow:	N/A

Optional Services

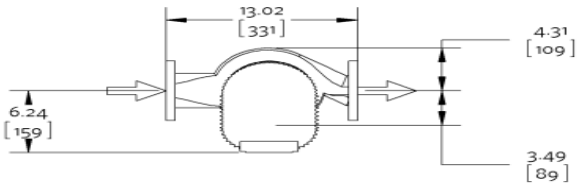
On-site pump commissioning:	Cost not Included	Extended warranty:	No
Pump manager:	Yes	Include spare parts qty:	0

Dimensional data (not for construction)

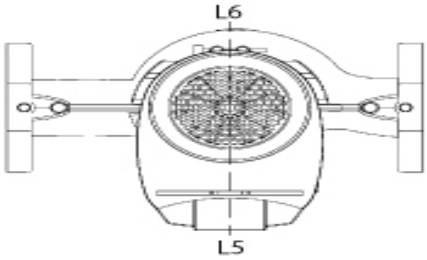
Side view



Top view



Weight: 63 lb [28.58 kg], Units of measure: inches [millimeters]
· Not to scale
· R = minimum lifting clearance required above motor
· Coupling guard and flush line (not shown) are supplied
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	2	ANSI-125	6.00	4	4.75	0.625
Outlet	2	ANSI-125	6.00	4	4.75	0.625

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Loose Supply
Space Heater: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Design Envelope pumps offer industry-leading efficiency and performance management capabilities for significantly reduced energy consumption. Armstrong has undertaken a multi-year project to transition our pump offering to an integrated design that use Design Envelope Permanent Magnet technology for even greater operating cost savings. In the sizes currently equipped with Design Envelope Permanent Magnet motors, the pumps are also more compact and lighter than our standard Design Envelope pumps.

Please note that depending on the pump sizes, your shipment may include a combination of:

- Design Envelope Permanent Magnet pumps
- Design Envelope Permanent Magnet pumps with IVS controls
- Design Envelope Pumps with Premium efficiency induction motors and IVS controls

DISCONNECT CONFIGURATION

Site electrical input voltage : _____

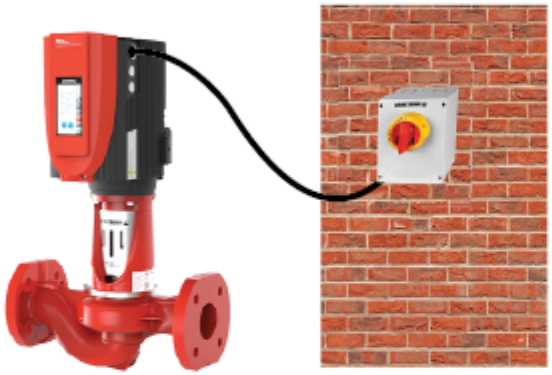
Number of 1PH 200-240V motors : ☐ 2hp & lower: _____

Number of 3PH 200-240V motors : ☐ 10hp & lower: _____

Number of 3PH 380-480V motors : ☐ 10hp & lower: _____

Number of 3PH 575-660V motors : ☐ 10hp & lower: _____

FUSED DISCONNECT FOR WALL MOUNTING



TECHNICAL DATA

Enclosure: UL/NEMA 4 X rated

Terminals

Number of poles: 3-poles, ground

Terminal size acceptability: Copper conductors only, 75°C, 14-8AWG

Electrical/Environmental

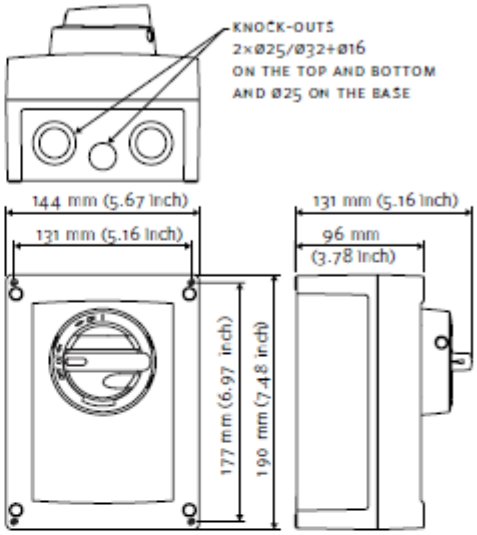
Up to 600V / Up to 60A, 50/60Hz

Minimum short circuit rating: 10kA

Ambient operating temperature: -10°C to +50°C (+14°F to +122°F)

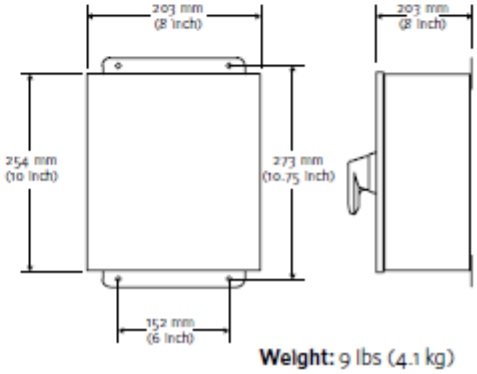
Ambient storage temperature: -30°C to +65°C (-22°F to +149°F)

30A DISCONNECT



Weight: 3.5 lbs (1.6 kg)

60A DISCONNECT



Weight: 9 lbs (4.1 kg)

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 1PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - FRAME 71

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
0.33	0.25	30A	6A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	2.0	1.6
0.5	0.37		6A		2.6	2.0
0.75	0.55		10A		3.3	2.9
1	0.75		10A		4.8	4.0
1.5	1.1		15A		7.1	5.8
2	1.5		20A		9.3	7.6

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
1	0.75	30A	10A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	3.1	2.7
1.5	1.1		10A		4.2	3.7
2	1.5		15A		6.0	4.8
3	2.2		20A		8.8	7.2
5	4		30A		15.7	14.0
7.5	5.5	60A	50A	J FAST-ACTING	20.7	18.5
10	7.5		60A	RK1 FAST-ACTING	28.1	25.1

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
3	2.2	30A	20A	CC FAST-ACTING	7.4	6.4
5.5	4		30A		14.2	12.6
7.5	5.5		30A		19.0	16.6
10	7.5		30A		26.2	23.0

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - FRAME 71

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
0.33	0.25	30A	5A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	1.3	0.8
0.5	0.37		5A		1.6	1.1
0.75	0.55		6A		1.9	1.5
1	0.75		6A		2.5	2.0
1.5	1.1		10A		4.1	3.5
2	1.5		10A		5.3	3.9
3	2.2		10A		6.5	5.8
4	3		15A		6.1	4.9
5	4		20A		9.2	7.1
7.5	5.5		25A		12.5	8.2
10	7.5		30A		18.5	14.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
1	0.75	30A	6A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	2.1	1.7
1.5	1.1		6A		2.8	2.3
2	1.5		10A		4.8	4.1
3	2.2		10A		6.5	5.8
4	3		15A		6.1	4.9
5	4		20A		9.2	7.1
7.5	5.5		25A		12.5	8.2
10	7.5		30A		18.5	14.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
3	2.2	30A	10A	CC FAST-ACTING	3.9	3.2
4	3		10A		5.4	4.2
5.5	4		15A		7.1	5.7
7.5	5.5		15A		9.5	7.6
10	7.5		25A		13.6	11.3
15	11		30A		18.8	15.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 575-600V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM MOTORS

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				575 VAC	600 VAC
1	0.75	30A	5A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	1.6	1.3
1.5	1.1		6A		2.2	1.8
2	1.5		8A		2.0	1.6
3	2.2		10A		3.4	2.8
5	4		20A		5.5	4.9
7.5	5.5		25A		7.2	6.0
10	7.5		30A		9.8	9.4

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 575-600V INPUT POWER FOI USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2 MOTORS

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				575 VAC	600 VAC
1	0.75	30A	5A	CC FAST-ACTING	1.6	1.5
1.5	1.1		6A		2.1	2.0
2	1.5		6A		2.6	2.6
3	2.2		6A		3.5	3.2
5	4		15A		5.7	5.3
7.5	5.5		15A		7.5	7.4
10	7.5		30A		10.8	10.1

All cabling and must comply with national and local regulations on cable cross-sections and ambient temperature

Submittal

Ref. #: SQFGQ002934_1

Suction guide

Model: SG-32

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
BF10-1,2	2	SG-32	3 in	2 in	130 USgpm	1.81 ft	Design Envelope Sensorless 4380 0205-002.0

*at design flow

Materials of construction

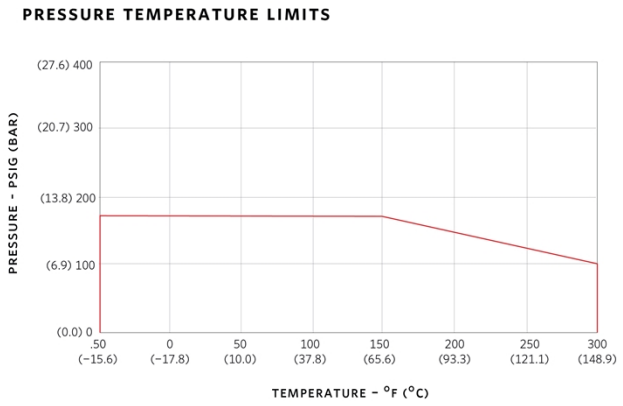
SG-32

Body:	Cast iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast iron	Strainer:	Stainless Steel,0.125"(3mm)Perf..
Cover plate:	Cast iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-32-Suction Guide-ANSI-125

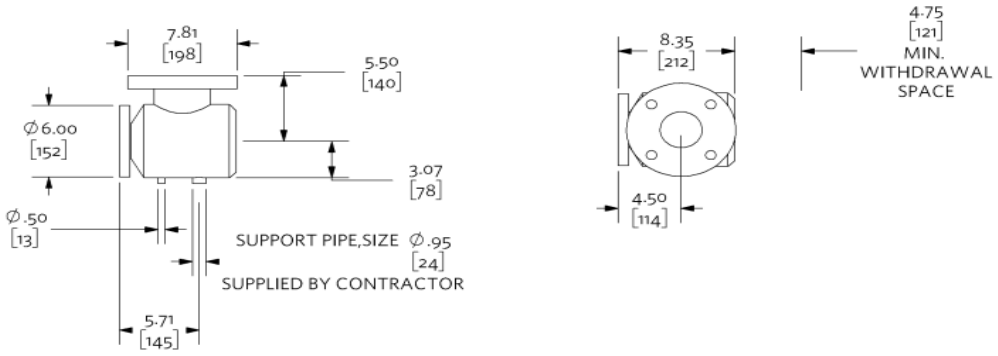


Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

Dimensional data (not for construction)

SG-32	Weight: 31 lb [14.06 kg]
Side view	Top view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-3FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
BF10-1,2	2	FTV-3FA	3 in	Angle	Flanged	130 USgpm	3 ft	Design Envelope Sensorless 4380 0205-002.0

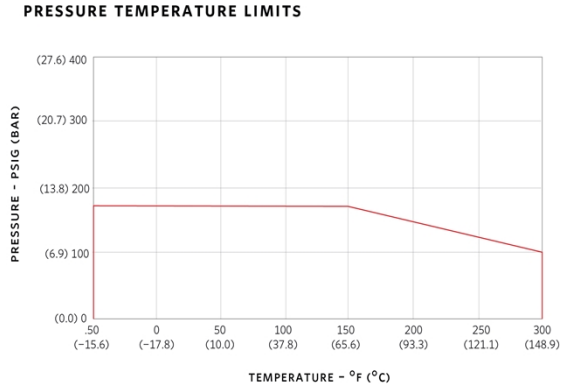
*at design flow

Materials of construction

FTV-3FA-Flo-Trex Valve-ANSI-125-Angle			
Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

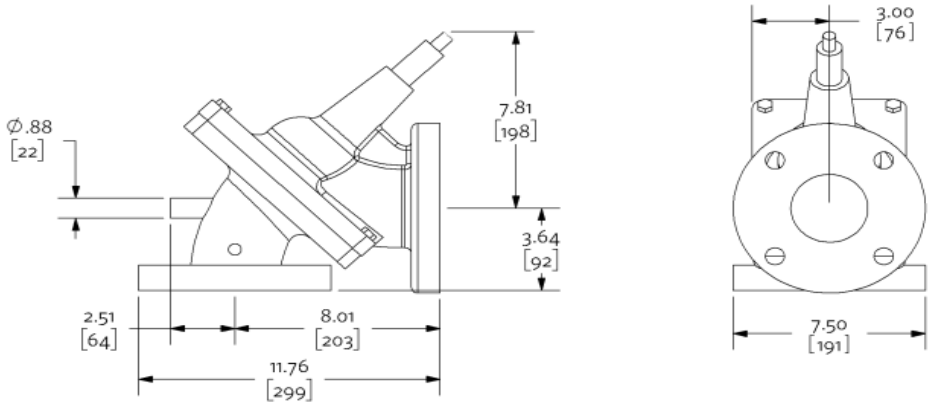
FTV-3FA-Flo-Trex Valve-ANSI-125-Angle



Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-3FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 39 lb [17.69 kg]
Side view	Front view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Spare Parts and Kits					
Design Envelope Seal Parts Kits					
Armstrong PN#	**Description**	**Includes**	**Item Size**	**Weights (lb\kg)**	**Image**
89975000-900K	Seal-kit 0.625 2A c-Ssc316epdL	Mech Seal, V- Clamp, O-ring, Capscrew & Washer	2A - 0.625"	2.8 lb [1.27 kg]	

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Close-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4380 0608-005.0 with Suction Guide, Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	C-1,2	Configuration:	Single
Service:	BLDG TAKEOFF	Suction pressure:	0 ft
Location:	BLDG C	Fluid:	Propylene Glycol: 25
Qty:	2	Operating temperature:	60 °F
Total system flow:	480 USgpm	Duty flow per pump:	480 USgpm
System head:	25 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	77.11 %	Safety factor % head:	0 %
NPSHR:	4.41 ft	Total Absorbed Power:	3.92 hp
Min. maintained system pressure*:	10 ft	Impeller diameter:	8.19 in
Standby qty:	0	Pump/motor run qty:	1
PEIvl:	Not applicable	ERvl:	Not applicable
Outlet velocity:	5.33 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Bronze Fitted	Impeller:	Bronze
Rating:	ANSI-125	Casing gasket:	Confined Non-Asbestos Fiber
Connections:	Inlet: 6in, Outlet: 6in	Flush line:	Braided Stainless Steel
Casing (volute):	Cast Iron, E-coated	Stub shaft:	Stainless steel

Mechanical seal data

Seal type:	Inside Single Spring	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-ssc L EPSS 2A	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS) ****:	2000 PPM

Electrical data

Supplier:		Insulation class:	Class F Insulation
Size:	5 hp	Motor type:	Inverter Duty
Frame size:	215JP	Efficiency:	NEMA Premium 12.12
Enclosure:	ODP	Power supply:	208/3/60
Operating speed @ 100% flow:	1168 rpm	Operating speed @ 50% flow***:	835 rpm

***Based on minimum pressure setting of 40% of design head

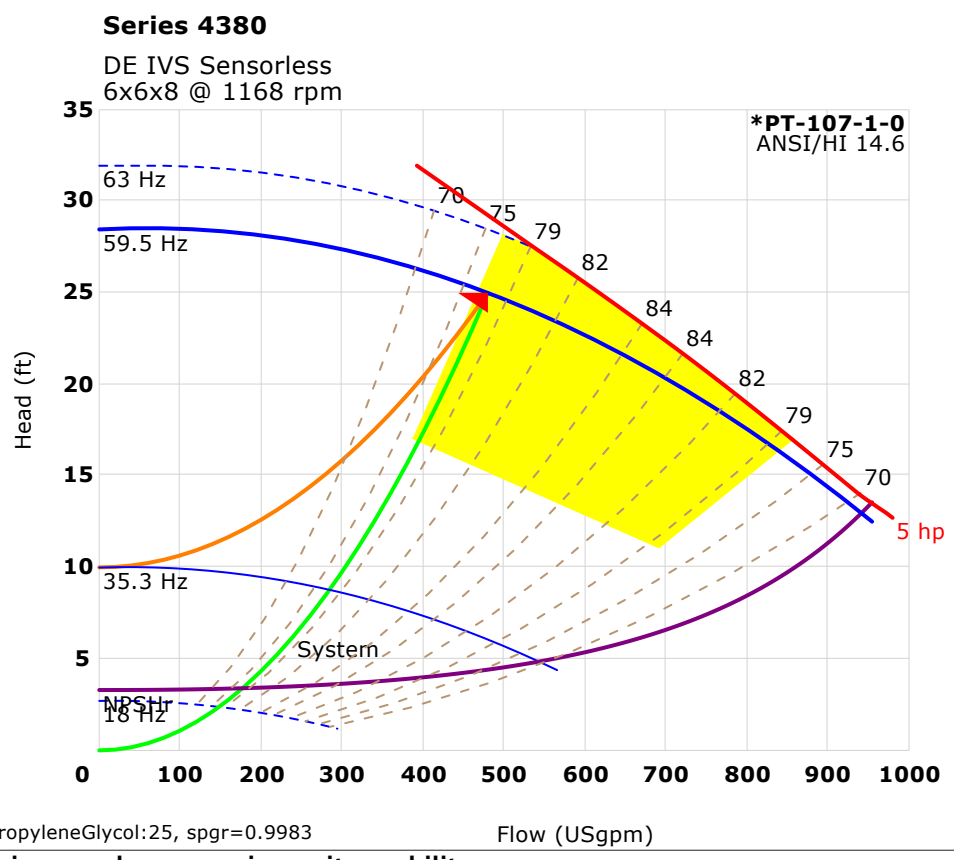
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid.

IVS controller data

Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet MS/TP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current)
Fused disconnect switch:	Integrated Fused Disconnect	Digital inputs:	4 (programmable)
Control orientation:	L1	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Fan cooled through back channel
Absorbed Power/BHP at 50% load/flow and 55% of design head:	2.16 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	No	EMI/RFI control:	Integrated filter to meet EN61800-3
		Harmonic suppression:	Integrated DC link reactor**

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field. ** The IVS control is a low harmonic control with a built-in DC link reactor equivalent in performance to a 5% AC line reactor. This does not guarantee performance to any system wide harmonic specification or the costs to meet a system wide specification. If supplied with the system electrical details, Armstrong will run a computer simulation of the system wide harmonics. If system harmonic levels are exceeded, Armstrong can also recommend additional harmonic mitigation and the cost for such mitigation.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 59.54 Hz:
NPSHR: 4.41 ft
Intersection Pt: 480 usgpm @ 25 ft
bhp=3.92 hp, eff=77.11 %%,
%bepq=71 %%

2. Control (QPC) @ 54.69 Hz:
NPSHR: 3.89 ft
Intersection Pt: 420 USgpm @ 21.48 ft
bhp=3.02 hp, eff=75.35%,
%bepq=67.91%

3. Control (QPC) @ 49.84 Hz:
NPSHR: 3.35 ft
Intersection Pt: 355.2 USgpm @ 18.21 ft
bhp=2.25 hp, eff=72.6%,
%bepq=62.93%

4. Control (QPC) @ 44.99 Hz:
NPSHR: 2.82 ft
Intersection Pt: 283.2 USgpm @ 15.22 ft
bhp=1.6 hp, eff=67.83%,
%bepq=55.62%

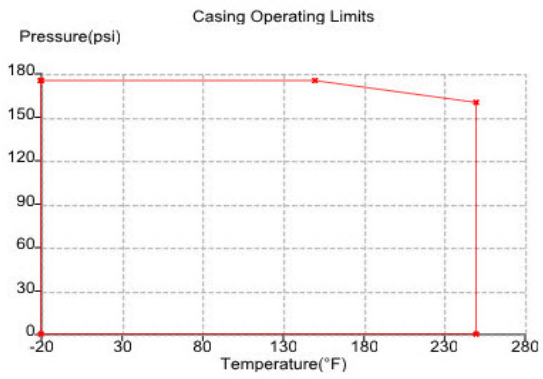
5. Control (QPC) @ 40.15 Hz:
NPSHR: 2.3 ft
Intersection Pt: 196.8 USgpm @ 12.52 ft
bhp=1.07 hp, eff=57.87%,
%bepq=43.3%

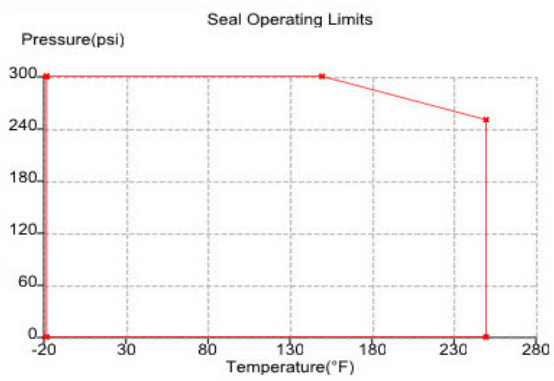
6. Hmin: 10 ft 35.3 Hz:
NPSHR: 1.8 ft
Intersection Pt: 0 USgpm @ 10 ft
(Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	480 USgpm	12.38 ft	83.36%
Design point	480 USgpm	25 ft	77.11 %
50% average flow (with default load profile)	240 USgpm	13.75 ft	63.55 %
Motor Capability @ Rated Speed	4.7 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 250 F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless bundle:	Yes	DEPC Parallel sensorless:	No
Energy performance bundle:	No	Protection bundle:	No
Dual season setup:	No	Zone optimization bundle:	No

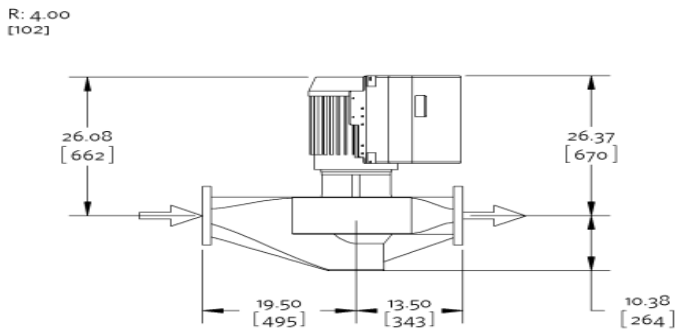
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1 min:	N/A	H2 min:	N/A
Maximum flow:	N/A	Minimum flow:	N/A

Optional Services

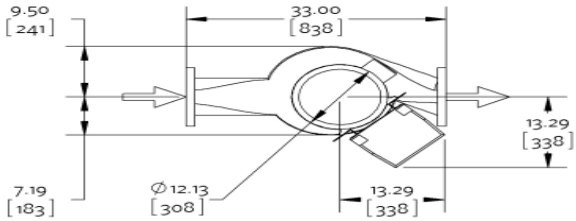
On-site pump commissioning:	Cost not Included	Extended warranty:	No
Pump manager:	Yes	Include spare parts qty:	0

Dimensional data (not for construction)

Side view

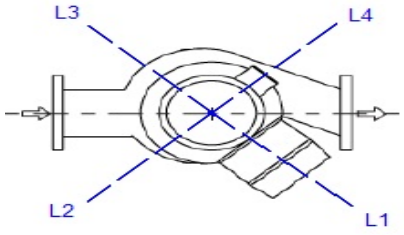


Top view



Inverter motor type: Inverter duty

Weight: 554 lb [251.29 kg], Units of measure: inches [millimeters]
· Not to scale
· R = minimum lifting clearance required above motor
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	6	ANSI-125	11.00	8	9.50	0.75
Outlet	6	ANSI-125	11.00	8	9.50	0.75

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
The program has defaulted to a NEMA Premium Efficiency motor supplied with NEMA MG-1 Part 31.4.4.2 insulation standards for inverter-fed polyphase motors.
OSHPD Seismic Certification OSP-0422-10
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Integrated Fused Disconnect
Space Heater: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Submittal

Ref. #: SQFGQ002934_1

Suction guide

Model: SG-66

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
C-1,2	2	SG-66	6 in	6 in	480 USgpm	0.69 ft	Design Envelope Sensorless 4380 0608-005.0

*at design flow

Materials of construction

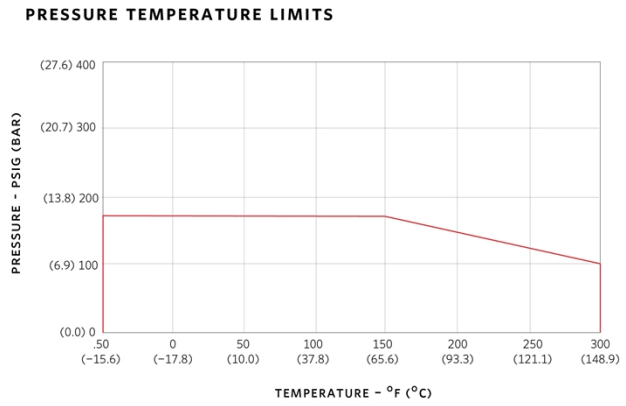
SG-66

Body:	Cast iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast iron	Strainer:	Stainless Steel,0.125"(3mm)Perf..
Cover plate:	Cast iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-66-Suction Guide-ANSI-125

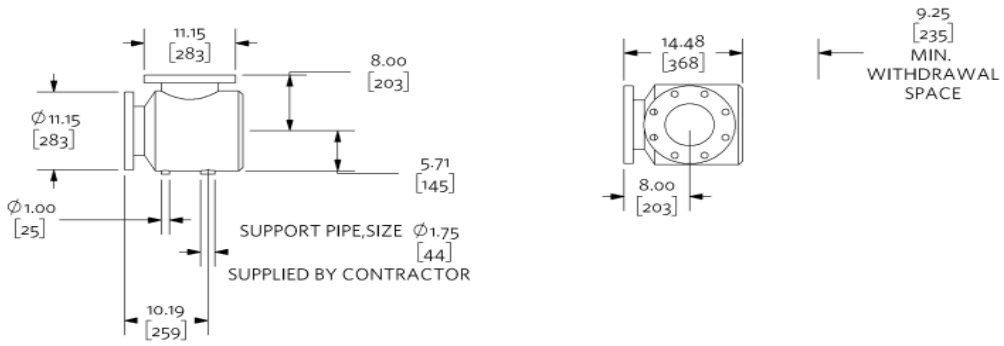


Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

Dimensional data (not for construction)

SG-66	Weight: 141 lb [63.96 kg]
Side view	Top view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-6FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
C-1,2	2	FTV-6FA	6 in	Angle	Flanged	480 USgpm	2.8 ft	Design Envelope Sensorless 4380 0608-005.0

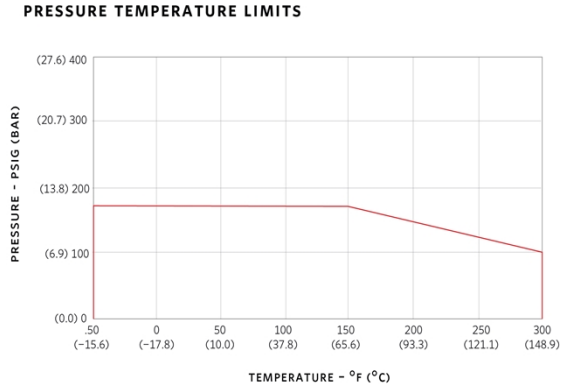
*at design flow

Materials of construction

FTV-6FA-Flo-Trex Valve-ANSI-125-Angle			
Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

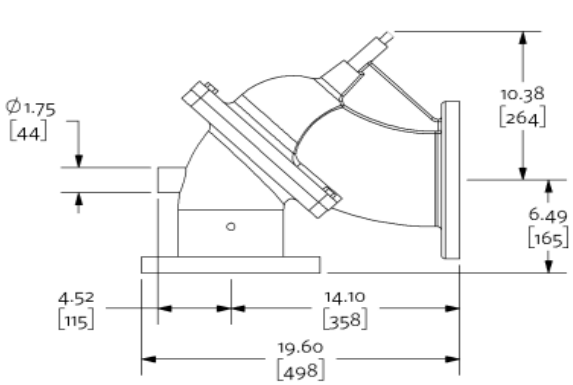
FTV-6FA-Flo-Trex Valve-ANSI-125-Angle

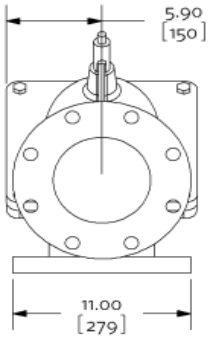


Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-6FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 167 lb [75.75 kg]
Side view	Front view





Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Split-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4300 0608-010.0 with Suction Guide, Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	D-1,2	Configuration:	Single
Service:	BLDG TAKEOFF	Suction pressure:	0 ft
Location:	BLDG D	Fluid:	Propylene Glycol: 25
Qty:	2	Operating temperature:	60 °F
Total system flow:	700 USgpm	Duty flow per pump:	700 USgpm
System head:	25 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	77.08 %	Safety factor % head:	0 %
NPSHR:	8.06 ft	Total Absorbed Power:	5.72 hp
Min. maintained system pressure*:	10 ft	Impeller diameter:	7.02 in
PElvl:	0.468152665	ERvl:	53.18473354
Standby qty:	0	Pump/motor run qty:	1
Outlet velocity:	7.77 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Bronze Fitted	Impeller:	Bronze
Rating:	ANSI-125	Pump shaft:	416 Stainless Steel
Connections:	Inlet: 6in, Outlet: 6in	Flush line:	Braided Stainless Steel
Casing (volute):	Cast Iron, E-coated	Casing gasket:	Confined Non-Asbestos Fiber

Mechanical seal data

Seal type:	Outside Balanced	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-SSC AB2	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	Viton
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS)****:	2000 PPM

Electrical data

Supplier:		Insulation class:	Class F Insulation
Size:	10 hp	Motor type:	Inverter Duty
Frame size:	215TC	Efficiency:	NEMA Premium 12.12
Enclosure:	ODP	Power supply:	208/3/60
Operating speed @ 100% flow:	1515 rpm	Operating speed @ 50% flow***:	1035 rpm

***Based on minimum pressure setting of 40% of design head.

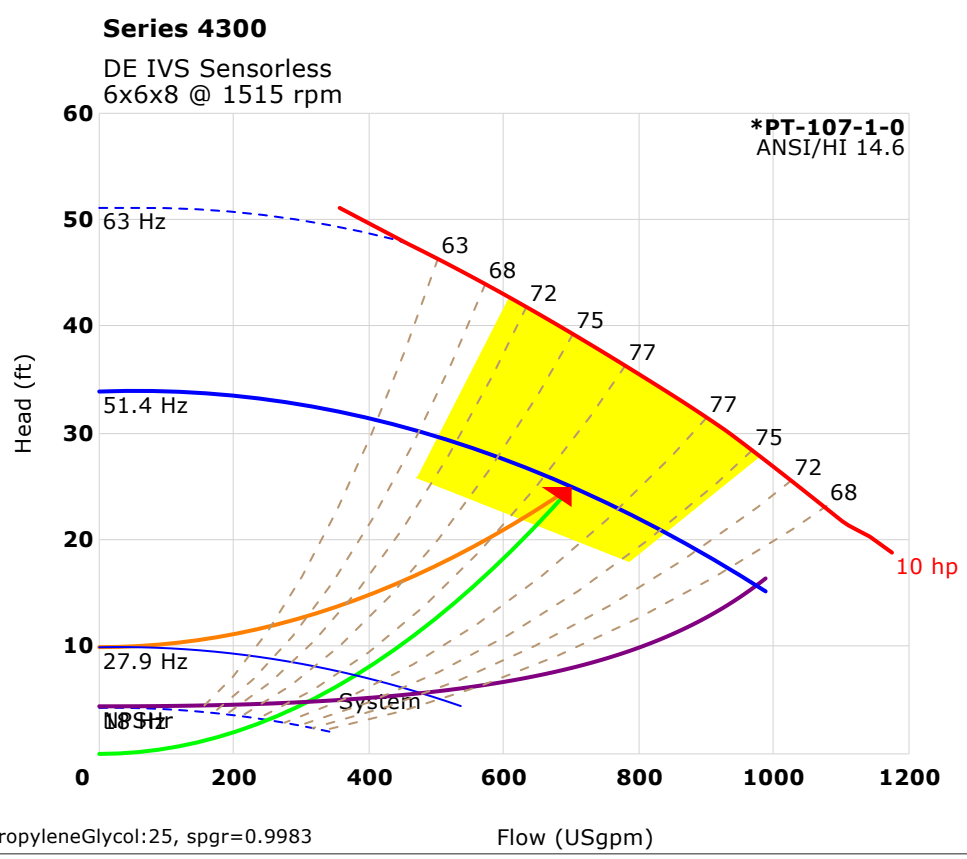
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid

IVS controller data

Sensorless control:	Yes - Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet MS/TP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current)
Fused disconnect switch:	Integrated Fused Disconnect	Digital inputs:	4 (programmable)
Control orientation:	L1	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Fan cooled through back channel
Absorbed Power/BHP at 50% load/flow and 55% of design head:	3.15 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	No	EMI/RFI control:	Integrated filter to meet EN61800-3
		Harmonic suppression:	Integrated DC link reactor**

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field.
** The IVS control is a low harmonic control with a built-in DC link reactor equivalent in performance to a 5% AC line reactor. This does not guarantee performance to any system wide harmonic specification or the costs to meet a system wide specification. If supplied with the system electrical details, Armstrong will run a computer simulation of the system wide harmonics. If system harmonic levels are exceeded, Armstrong can also recommend additional harmonic mitigation and the cost for such mitigation.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 51.36 Hz:
NPSHR: 8.06 ft
Intersection Pt: 700 usgpm @ 25 ft
bhp=5.72 hp, eff=77.08 %%, %bepq=99 %%

2. Control (QPC) @ 46.66 Hz:
NPSHR: 6.87 ft
Intersection Pt: 612.5 USgpm @ 21.48 ft
bhp=4.32 hp, eff=76.73%, %bepq=94.82%

3. Control (QPC) @ 41.96 Hz:
NPSHR: 5.66 ft
Intersection Pt: 518 USgpm @ 18.21 ft
bhp=3.14 hp, eff=75.86%, %bepq=88.93%

4. Control (QPC) @ 37.27 Hz:
NPSHR: 4.46 ft
Intersection Pt: 413 USgpm @ 15.22 ft
bhp=2.16 hp, eff=73.42%, %bepq=79.66%

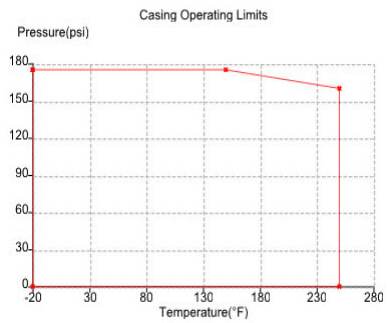
5. Control (QPC) @ 32.57 Hz:
NPSHR: 3.29 ft
Intersection Pt: 287 USgpm @ 12.52 ft
bhp=1.37 hp, eff=66.06%, %bepq=63.41%

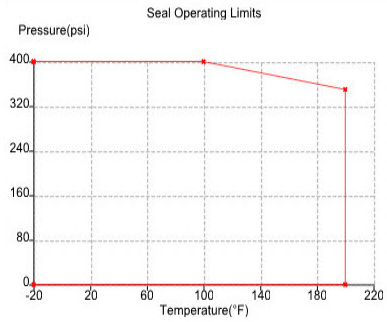
6. Hmin: 10 ft 27.88 Hz:
NPSHR: 2.2 ft
Intersection Pt: 0 USgpm @ 10 ft (Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	700 USgpm	40.83 ft	74.41%
Design point	700 USgpm	25 ft	77.08 %
50% average flow (with default load profile)	350 USgpm	13.75 ft	70.6 %
Motor Capability @ Rated Speed	8.33 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 200 ˚F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless Bundle:	Yes	DEPC Parallel Sensorless:	No
Energy Performance Bundle:	No	Protection Bundle:	No
Dual Season Setup:	No	Zone Optimization Bundle:	No

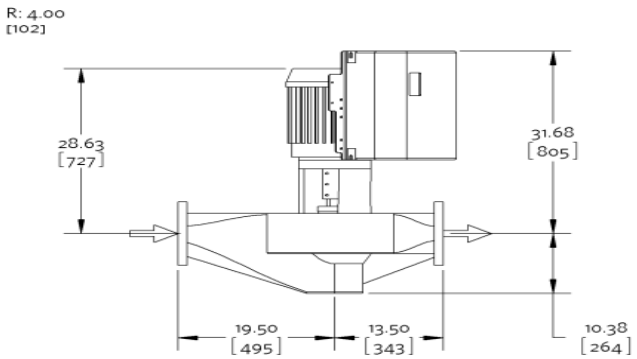
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1min:	N/A	H2min:	N/A
Maximum Flow:	N/A	Minimum Flow:	N/A

Optional Services

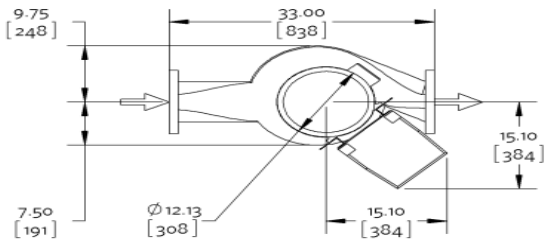
On-Site Pump Commissioning:	Cost not Included	Extended Warranty:	No
Pump Manager:	Yes	Include Spare Parts Qty:	0

Dimensional data (not for construction)

Side view

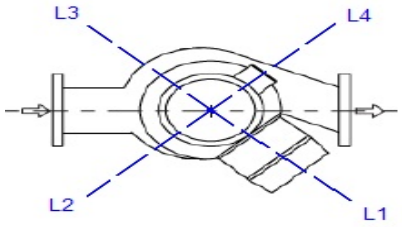


Top view



Inverter motor type: Inverter duty

Weight: 620 lb [281.23 kg], Units of measure: inches [millimeters]
· R = minimum lifting clearance required above motor
· Coupling guard and flush line (not shown) are supplied
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	6	ANSI-125	11.00	8	9.50	0.75
Outlet	6	ANSI-125	11.00	8	9.50	0.75

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
The program has defaulted to a NEMA Premium Efficiency motor supplied with NEMA MG-1 Part 31.4.4.2 insulation standards for inverter-fed polyphase motors.
OSHPD Seismic Certification OSP-0422-10
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Integrated Fused Disconnect
Pre-Wired Control Bridge: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Submittal

Ref. #: SQFGQ002934_1

Suction guide

Model: SG-66

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
D-1,2	2	SG-66	6 in	6 in	700 USgpm	1.46 ft	Design Envelope Sensorless 4300 0608-010.0

*at design flow

Materials of construction

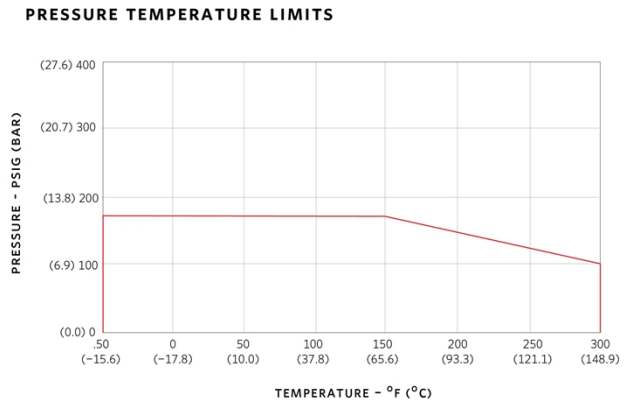
SG-66

Body:	Cast iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast iron	Strainer:	Stainless Steel,0.125"(3mm)Perf..
Cover plate:	Cast iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-66-Suction Guide-ANSI-125

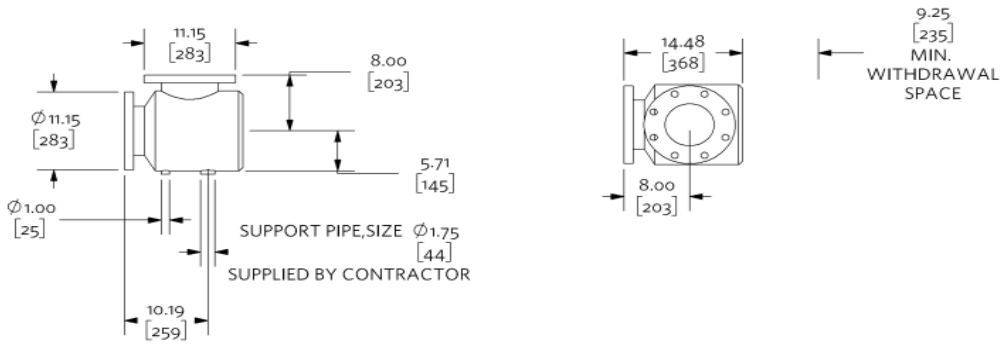


Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

Dimensional data (not for construction)

SG-66	Weight: 141 lb [63.96 kg]
Side view	Top view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-6FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
D-1,2	2	FTV-6FA	6 in	Angle	Flanged	700 USgpm	3.35 ft	Design Envelope Sensorless 4300 0608-010.0

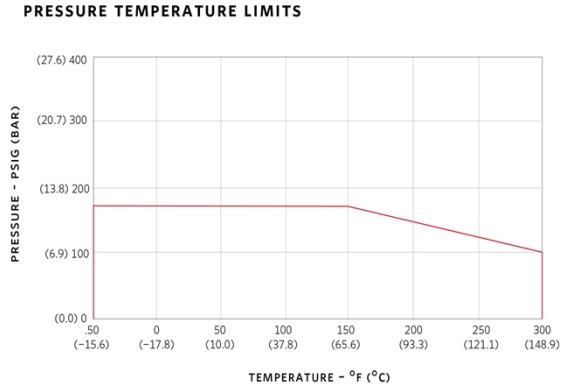
*at design flow

Materials of construction

FTV-6FA-Flo-Trex Valve-ANSI-125-Angle			
Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

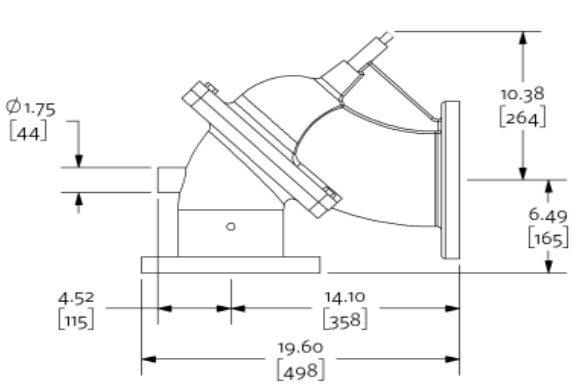
FTV-6FA-Flo-Trex Valve-ANSI-125-Angle

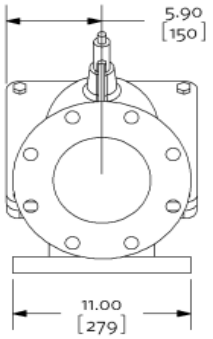


Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-6FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 167 lb [75.75 kg]
Side view	Front view





Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Close-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4380 0408-003.0 with Suction Guide, Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	E-1,2	Configuration:	Single
Service:	BLDG TAKEOFF	Suction pressure:	0 ft
Location:	BLDG E	Fluid:	Propylene Glycol: 25
Qty:	2	Operating temperature:	60 °F
Total system flow:	310 USgpm	Duty flow per pump:	310 USgpm
System head:	25 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	78.81 %	Safety factor % head:	0 %
NPSHR:	5.16 ft	Total Absorbed Power:	2.48 hp
Min. maintained system pressure*:	10 ft	Impeller diameter:	8.19 in
Standby qty:	0	Pump/motor run qty:	1
PEIvl:	Not applicable	ERvl:	Not applicable
Outlet velocity:	7.81 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Bronze Fitted	Impeller:	Bronze
Rating:	ANSI-125	Casing gasket:	Confined Non-Asbestos Fiber
Connections:	Inlet: 4in, Outlet: 4in	Flush line:	Braided Stainless Steel
Casing (volute):	Cast Iron, E-coated	Stub shaft:	Stainless steel

Mechanical seal data

Seal type:	Inside Single Spring	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-ssc L EPSS 2A	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS) ****:	2000 PPM

Electrical data

Supplier:		Insulation class:	Class F Insulation
Size:	3 hp	Motor type:	Inverter Duty
Frame size:	213JP	Efficiency:	NEMA Premium 12.12
Enclosure:	ODP	Power supply:	208/3/60
Operating speed @ 100% flow:	1148 rpm	Operating speed @ 50% flow***:	812 rpm

***Based on minimum pressure setting of 40% of design head

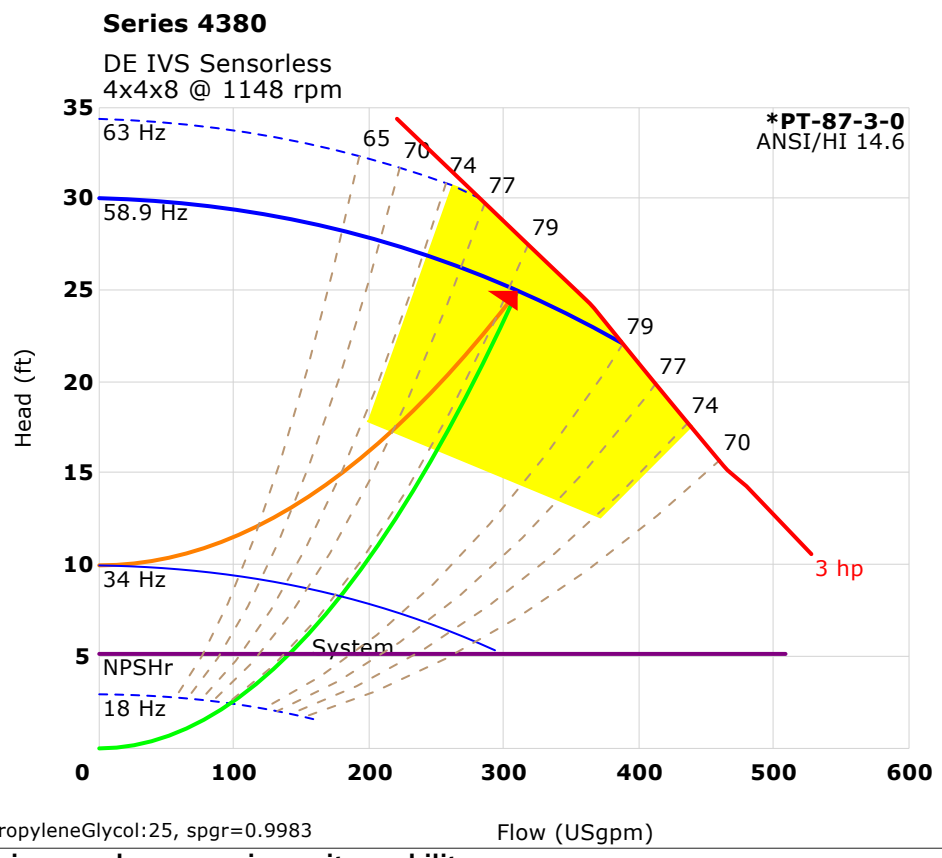
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid.

IVS controller data

Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet MS/TP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current)
Fused disconnect switch:	Integrated Fused Disconnect	Digital inputs:	4 (programmable)
Control orientation:	L1	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Fan cooled through back channel
Absorbed Power/BHP at 50% load/flow and 55% of design head:	1.36 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	No	EMI/RFI control:	Integrated filter to meet EN61800-3
		Harmonic suppression:	Integrated DC link reactor**

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field. ** The IVS control is a low harmonic control with a built-in DC link reactor equivalent in performance to a 5% AC line reactor. This does not guarantee performance to any system wide harmonic specification or the costs to meet a system wide specification. If supplied with the system electrical details, Armstrong will run a computer simulation of the system wide harmonics. If system harmonic levels are exceeded, Armstrong can also recommend additional harmonic mitigation and the cost for such mitigation.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 58.87 Hz:
NPSHR: 5.16 ft
Intersection Pt: 310 usgpm @ 25 ft
bhp=2.48 hp, eff=78.81 %%,
%bepq=89 %%

2. Control (QPC) @ 53.89 Hz:
NPSHR: 4.36 ft
Intersection Pt: 271.25 USgpm @ 21.48 ft
bhp=1.88 hp, eff=78.23%,
%bepq=84.67%

3. Control (QPC) @ 48.91 Hz:
NPSHR: 3.61 ft
Intersection Pt: 229.4 USgpm @ 18.21 ft
bhp=1.37 hp, eff=76.97%,
%bepq=78.69%

4. Control (QPC) @ 43.92 Hz:
NPSHR: 2.92 ft
Intersection Pt: 182.9 USgpm @ 15.22 ft
bhp=0.95 hp, eff=74.12%,
%bepq=69.71%

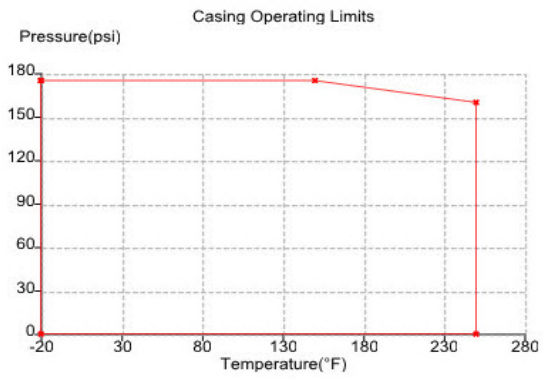
5. Control (QPC) @ 38.94 Hz:
NPSHR: 2.3 ft
Intersection Pt: 127.1 USgpm @ 12.52 ft
bhp=0.6 hp, eff=66.6%,
%bepq=54.57%

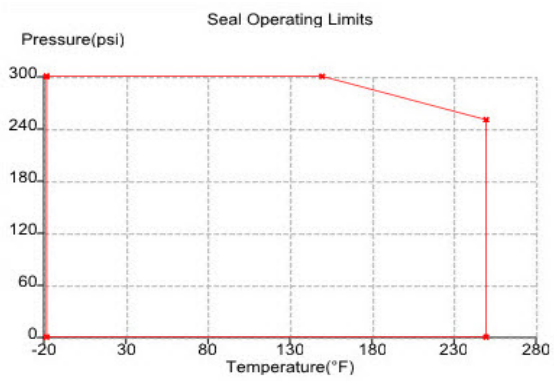
6. Hmin: 10 ft 33.96 Hz:
NPSHR: 1.72 ft
Intersection Pt: 0 USgpm @ 10 ft
(Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	310 USgpm	28.21 ft	78.32%
Design point	310 USgpm	25 ft	78.81 %
50% average flow (with default load profile)	155 USgpm	13.75 ft	71.17 %
Motor Capability @ Rated Speed	2.77 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 250 F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless bundle:	Yes	DEPC Parallel sensorless:	No
Energy performance bundle:	No	Protection bundle:	No
Dual season setup:	No	Zone optimization bundle:	No

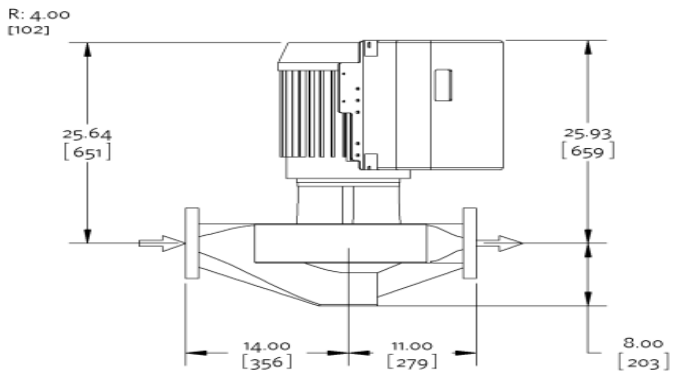
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1 min:	N/A	H2 min:	N/A
Maximum flow:	N/A	Minimum flow:	N/A

Optional Services

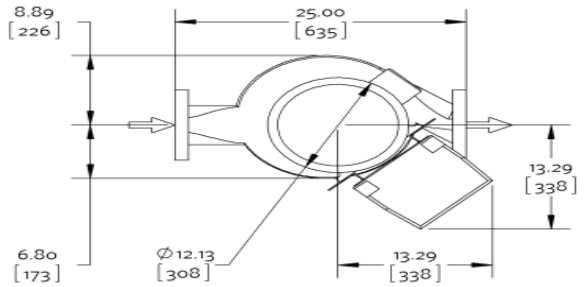
On-site pump commissioning:	Cost not Included	Extended warranty:	No
Pump manager:	Yes	Include spare parts qty:	0

Dimensional data (not for construction)

Side view

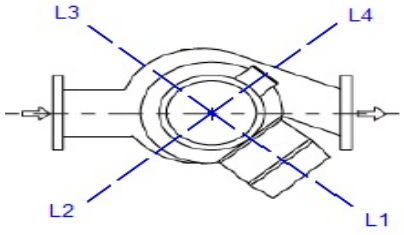


Top view



Inverter motor type: Inverter duty

Weight: 410 lb [185.97 kg], Units of measure: inches [millimeters]
· Not to scale
· R = minimum lifting clearance required above motor
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	4	ANSI-125	9.00	8	7.50	0.625
Outlet	4	ANSI-125	9.00	8	7.50	0.625

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
The program has defaulted to a NEMA Premium Efficiency motor supplied with NEMA MG-1 Part 31.4.4.2 insulation standards for inverter-fed polyphase motors.
OSHPD Seismic Certification OSP-0422-10
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Integrated Fused Disconnect
Space Heater: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Submittal

Ref. #: SQFGQ002934_1

Suction guide

Model: SG-44

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
E-1,2	2	SG-44	4 in	4 in	310 USgpm	1.17 ft	Design Envelope Sensorless 4380 0408-003.0

*at design flow

Materials of construction

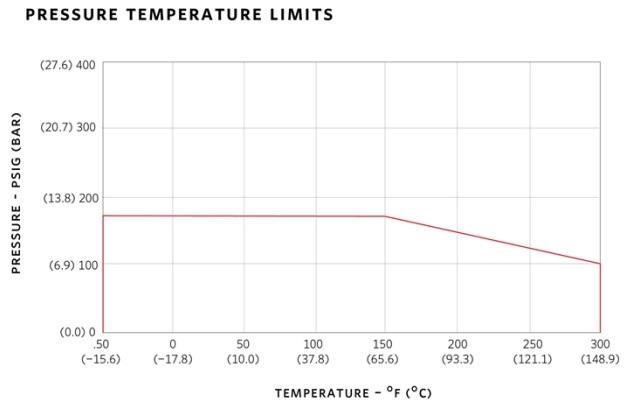
SG-44

Body:	Cast iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast iron	Strainer:	Stainless Steel,0.125"(3mm)Perf..
Cover plate:	Cast iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-44-Suction Guide-ANSI-125

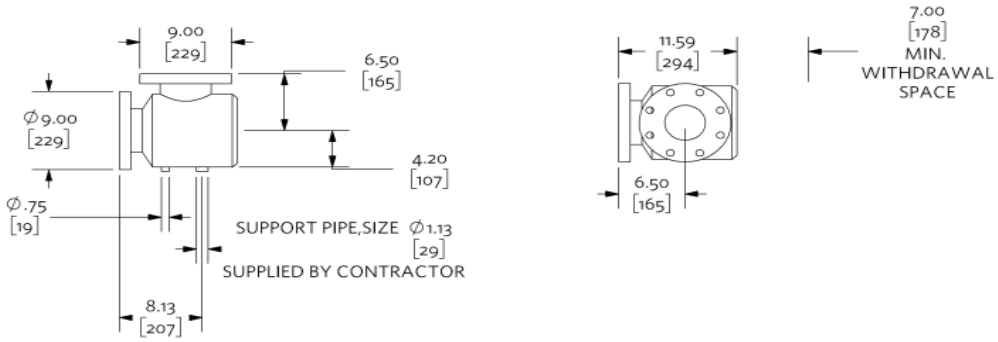


Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

Dimensional data (not for construction)

SG-44	Weight: 72 lb [32.66 kg]
Side view	Top view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-4FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
E-1,2	2	FTV-4FA	4 in	Angle	Flanged	310 USgpm	3.81 ft	Design Envelope Sensorless 4380 0408-003.0

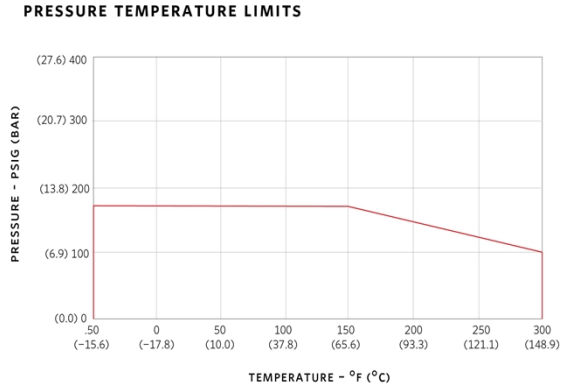
*at design flow

Materials of construction

FTV-4FA-Flo-Trex Valve-ANSI-125-Angle			
Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

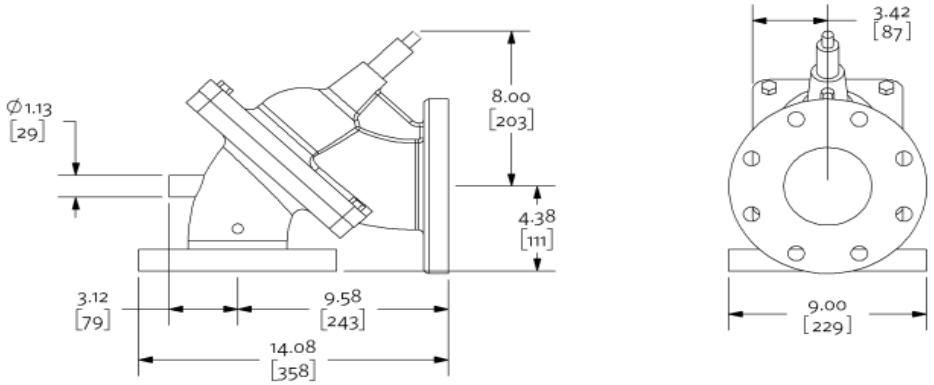
FTV-4FA-Flo-Trex Valve-ANSI-125-Angle



Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-4FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 59 lb [26.76 kg]
Side view	Front view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Close-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4380 0610-005.0 with Suction Guide, Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	G-1,2	Configuration:	Single
Service:	BLDG TAKEOFF	Suction pressure:	0 ft
Location:	BLDG G	Fluid:	Propylene Glycol: 25
Qty:	2	Operating temperature:	60 °F
Total system flow:	440 USgpm	Duty flow per pump:	440 USgpm
System head:	25 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	77.63 %	Safety factor % head:	0 %
NPSHR:	5.47 ft	Total Absorbed Power:	3.57 hp
Min. maintained system pressure*:	10 ft	Impeller diameter:	10.19 in
Standby qty:	0	Pump/motor run qty:	1
PEIvl:	Not applicable	ERvl:	Not applicable
Outlet velocity:	4.89 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Bronze Fitted	Impeller:	Bronze
Rating:	ANSI-125	Casing gasket:	Confined Non-Asbestos Fiber
Connections:	Inlet: 6in, Outlet: 6in	Flush line:	Braided Stainless Steel
Casing (volute):	Cast Iron, E-coated	Stub shaft:	Stainless steel

Mechanical seal data

Seal type:	Inside Single Spring	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-ssc L EPSS 2A	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS) ****:	2000 PPM

Electrical data

Supplier:		Insulation class:	Class F Insulation
Size:	5 hp	Motor type:	Inverter Duty
Frame size:	215JP	Efficiency:	NEMA Premium 12.12
Enclosure:	ODP	Power supply:	208/3/60
Operating speed @ 100% flow:	992 rpm	Operating speed @ 50% flow***:	667 rpm

***Based on minimum pressure setting of 40% of design head

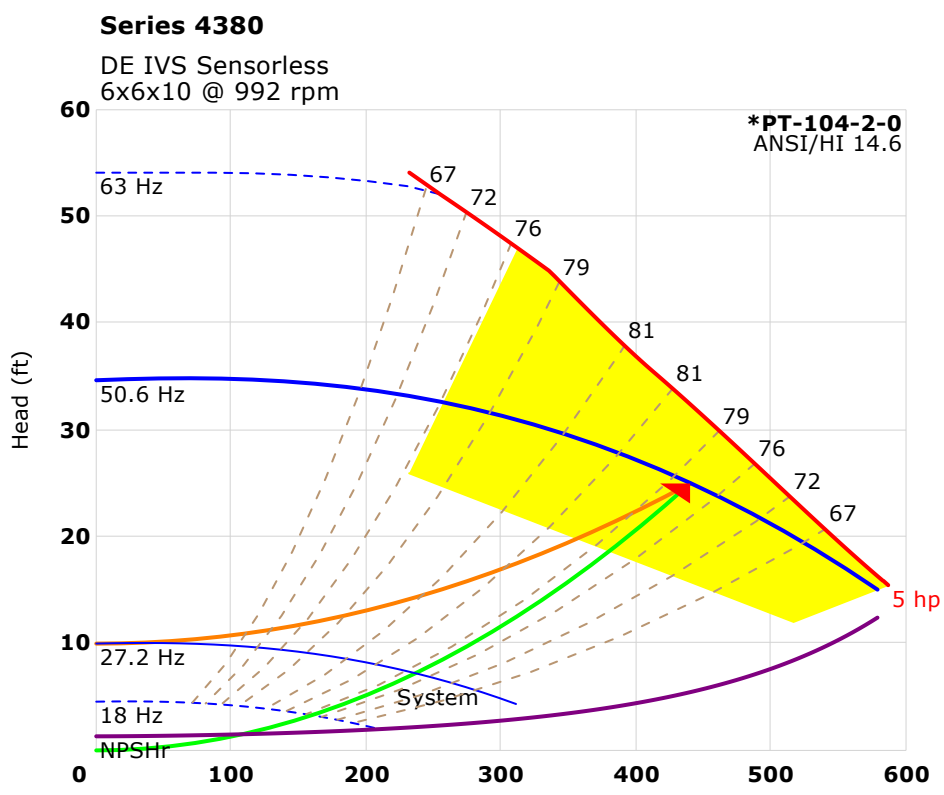
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid.

IVS controller data

Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet MS/TP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current)
Fused disconnect switch:	Integrated Fused Disconnect	Digital inputs:	4 (programmable)
Control orientation:	L1	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Fan cooled through back channel
Absorbed Power/BHP at 50% load/flow and 55% of design head:	1.96 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	Yes	EMI/RFI control:	Integrated filter to meet EN61800-3
		Harmonic suppression:	Integrated DC link reactor**

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field. ** The IVS control is a low harmonic control with a built-in DC link reactor equivalent in performance to a 5% AC line reactor. This does not guarantee performance to any system wide harmonic specification or the costs to meet a system wide specification. If supplied with the system electrical details, Armstrong will run a computer simulation of the system wide harmonics. If system harmonic levels are exceeded, Armstrong can also recommend additional harmonic mitigation and the cost for such mitigation.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 50.57 Hz:
NPSHR: 5.47 ft
Intersection Pt: 440 usgpm @ 25 ft
bhp=3.57 hp, eff=77.63 %%,
%bepq=119 %%

2. Control (QPC) @ 45.89 Hz:
NPSHR: 4.3 ft
Intersection Pt: 385 USgpm @ 21.48 ft
bhp=2.64 hp, eff=78.89%,
%bepq=114%

3. Control (QPC) @ 41.21 Hz:
NPSHR: 3.19 ft
Intersection Pt: 325.6 USgpm @ 18.21 ft
bhp=1.87 hp, eff=80.1%,
%bepq=107.48%

4. Control (QPC) @ 36.53 Hz:
NPSHR: 2.16 ft
Intersection Pt: 259.6 USgpm @ 15.22 ft
bhp=1.24 hp, eff=80.65%,
%bepq=96.81%

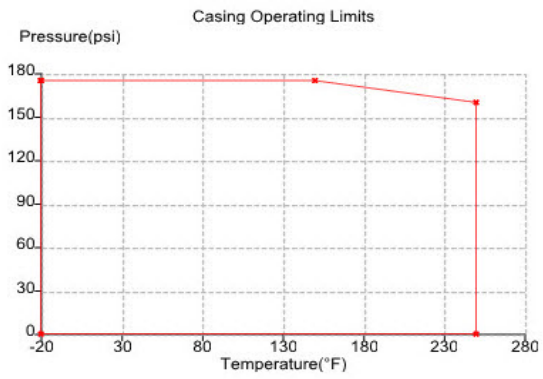
5. Control (QPC) @ 31.84 Hz:
NPSHR: 1.26 ft
Intersection Pt: 180.4 USgpm @ 12.52 ft
bhp=0.73 hp, eff=78.22%,
%bepq=77.3%

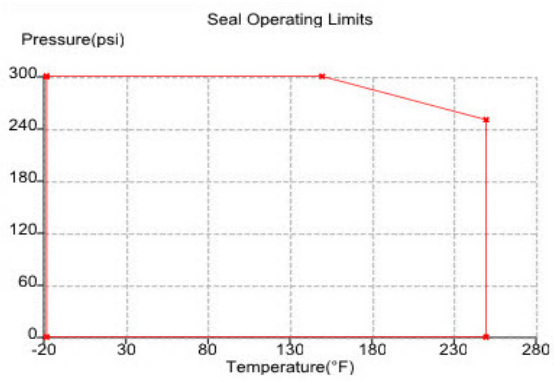
6. Hmin: 10 ft 27.16 Hz:
NPSHR: 0.49 ft
Intersection Pt: 0 USgpm @ 10 ft
(Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	440 USgpm	35.02 ft	80.4%
Design point	440 USgpm	25 ft	77.63 %
50% average flow (with default load profile)	220 USgpm	13.75 ft	80.11 %
Motor Capability @ Rated Speed	4.3 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 250 F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless bundle:	Yes	DEPC Parallel sensorless:	No
Energy performance bundle:	No	Protection bundle:	No
Dual season setup:	No	Zone optimization bundle:	No

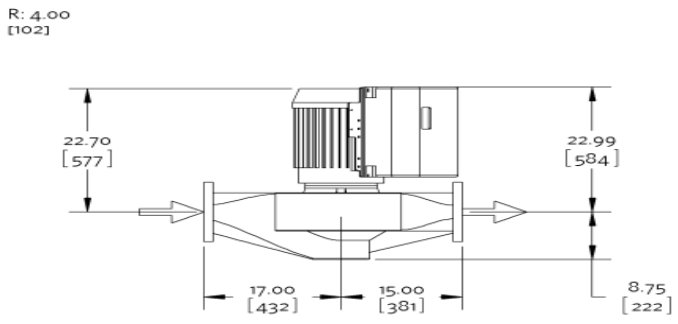
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1 min:	N/A	H2 min:	N/A
Maximum flow:	N/A	Minimum flow:	N/A

Optional Services

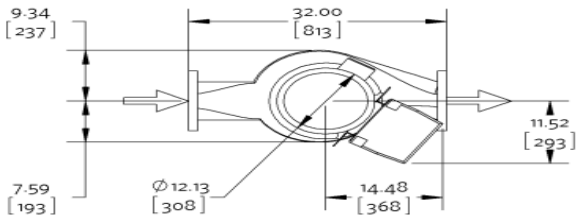
On-site pump commissioning:	Cost not Included	Extended warranty:	No
Pump manager:	Yes	Include spare parts qty:	0

Dimensional data (not for construction)

Side view

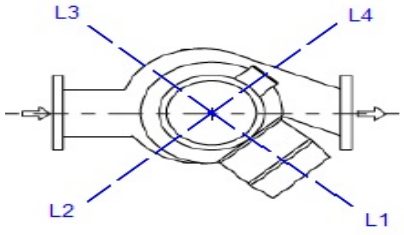


Top view



Inverter motor type: Inverter duty

Weight: 612 lb [277.6 kg], Units of measure: inches [millimeters]
· Not to scale
· R = minimum lifting clearance required above motor
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	6	ANSI-125	11.00	8	9.50	0.75
Outlet	6	ANSI-125	11.00	8	9.50	0.75

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
The program has defaulted to a NEMA Premium Efficiency motor supplied with NEMA MG-1 Part 31.4.4.2 insulation standards for inverter-fed polyphase motors.
OSHPD Seismic Certification OSP-0422-10
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Integrated Fused Disconnect
Space Heater: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Submittal

Ref. #: SQFGQ002934_1

Suction guide

Model: SG-66

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
G-1,2	2	SG-66	6 in	6 in	440 USgpm	0.58 ft	Design Envelope Sensorless 4380 0610-005.0

*at design flow

Materials of construction

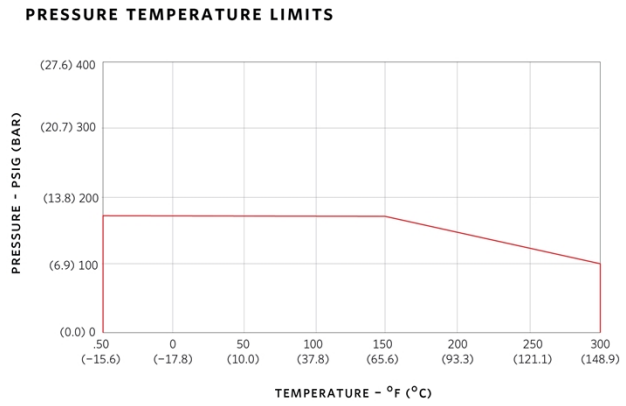
SG-66

Body:	Cast iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast iron	Strainer:	Stainless Steel,0.125"(3mm)Perf..
Cover plate:	Cast iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-66-Suction Guide-ANSI-125

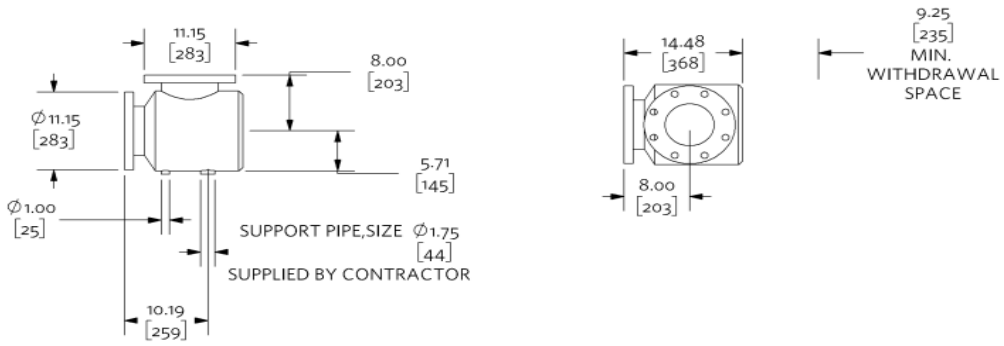


Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

Dimensional data (not for construction)

SG-66	Weight: 141 lb [63.96 kg]
Side view	Top view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-6FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
G-1,2	2	FTV-6FA	6 in	Angle	Flanged	440 USgpm	2.8 ft	Design Envelope Sensorless 4380 0610-005.0

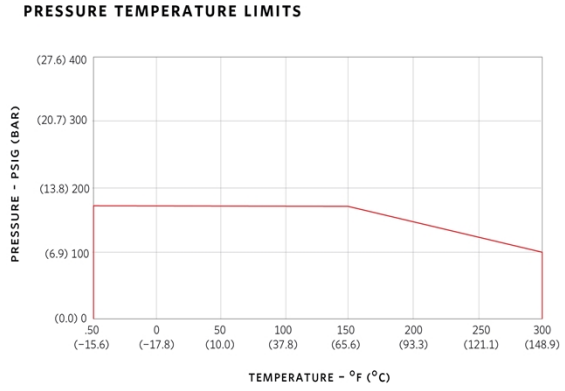
*at design flow

Materials of construction

FTV-6FA-Flo-Trex Valve-ANSI-125-Angle			
Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

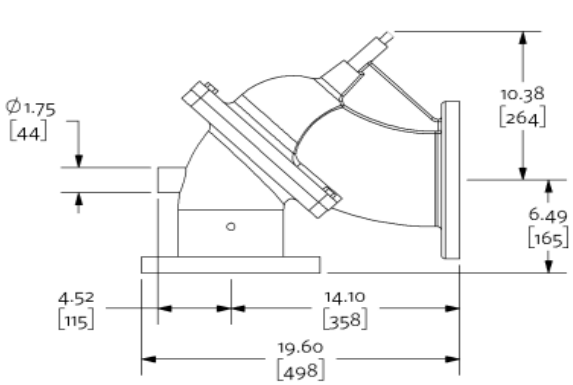
FTV-6FA-Flo-Trex Valve-ANSI-125-Angle

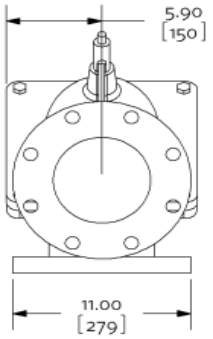


Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-6FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 167 lb [75.75 kg]
Side view	Front view





Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Split-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4300 0611-007.5 with Suction Guide, Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	H-1,2	Configuration:	Single
Service:	BLDG TAKEOFF	Suction pressure:	0 ft
Location:	BLDG H	Fluid:	Propylene Glycol: 25
Qty:	2	Operating temperature:	60 °F
Total system flow:	570 USgpm	Duty flow per pump:	570 USgpm
System head:	25 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	77.62 %	Safety factor % head:	0 %
NPSHR:	6.72 ft	Total Absorbed Power:	4.63 hp
Min. maintained system pressure*:	10 ft	Impeller diameter:	10.13 in
PElvl:	Not applicable	ERvl:	Not applicable
Standby qty:	0	Pump/motor run qty:	1
Outlet velocity:	6.33 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Bronze Fitted	Impeller:	Bronze
Rating:	ANSI-125	Pump shaft:	416 Stainless Steel
Connections:	Inlet: 6in, Outlet: 6in	Flush line:	Braided Stainless Steel
Casing (volute):	Cast Iron, E-coated	Casing gasket:	Confined Non-Asbestos Fiber

Mechanical seal data

Seal type:	Outside Balanced	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-SSC AB2	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	Viton
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS)****:	2000 PPM

Electrical data

Supplier:		Insulation class:	Class F Insulation
Size:	7.5 hp	Motor type:	Inverter Duty
Frame size:	254TC	Efficiency:	NEMA Premium 12.12
Enclosure:	ODP	Power supply:	208/3/60
Operating speed @ 100% flow:	1036 rpm	Operating speed @ 50% flow***:	692 rpm

***Based on minimum pressure setting of 40% of design head.

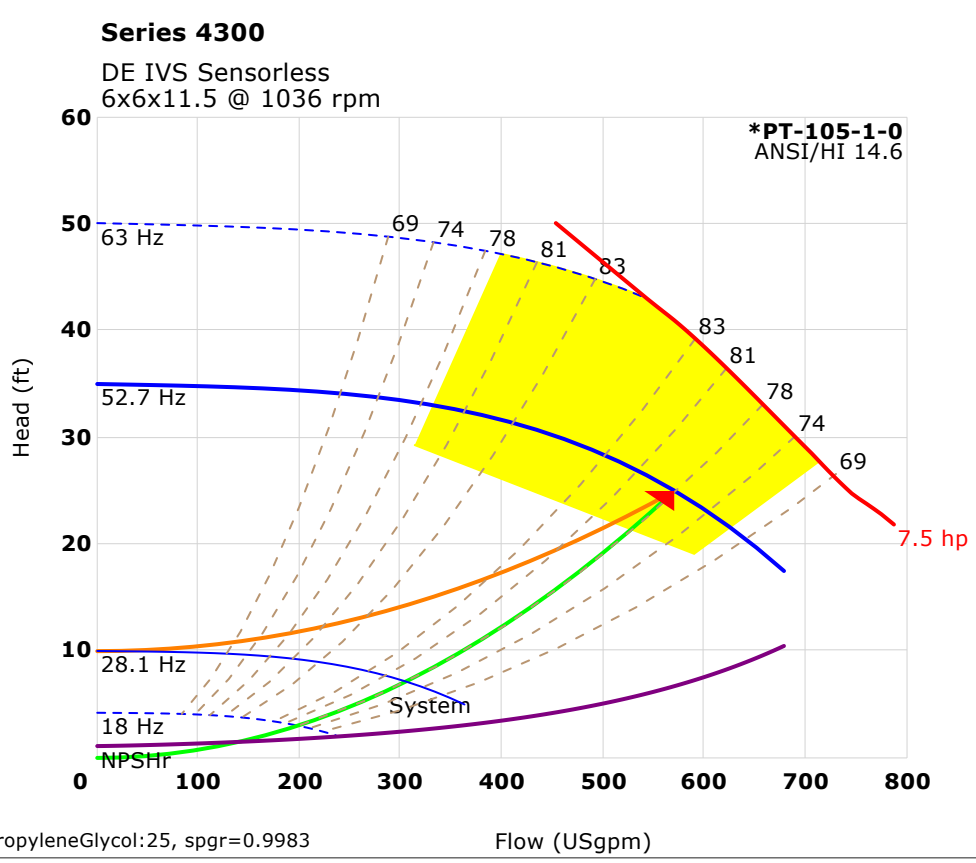
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid

IVS controller data

Sensorless control:	Yes - Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet MS/TP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current)
Fused disconnect switch:	Integrated Fused Disconnect	Digital inputs:	4 (programmable)
Control orientation:	L1	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Fan cooled through back channel
Absorbed Power/BHP at 50% load/flow and 55% of design head:	2.55 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	Yes	EMI/RFI control:	Integrated filter to meet EN61800-3
		Harmonic suppression:	Integrated DC link reactor**

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field.
** The IVS control is a low harmonic control with a built-in DC link reactor equivalent in performance to a 5% AC line reactor. This does not guarantee performance to any system wide harmonic specification or the costs to meet a system wide specification. If supplied with the system electrical details, Armstrong will run a computer simulation of the system wide harmonics. If system harmonic levels are exceeded, Armstrong can also recommend additional harmonic mitigation and the cost for such mitigation.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 52.68 Hz:
NPSHR: 6.72 ft
Intersection Pt: 570 usgpm @ 25 ft
bhp=4.63 hp, eff=77.62 %%, %bepq=120 %%

2. Control (QPC) @ 47.77 Hz:
NPSHR: 5.35 ft
Intersection Pt: 498.75 USgpm @ 21.48 ft
bhp=3.4 hp, eff=79.49%, %bepq=117.32%

3. Control (QPC) @ 42.87 Hz:
NPSHR: 4.01 ft
Intersection Pt: 421.8 USgpm @ 18.21 ft
bhp=2.37 hp, eff=81.7%, %bepq=110.77%

4. Control (QPC) @ 37.96 Hz:
NPSHR: 2.73 ft
Intersection Pt: 336.3 USgpm @ 15.22 ft
bhp=1.55 hp, eff=83.21%, %bepq=99.95%

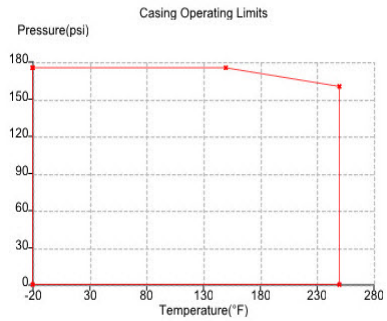
5. Control (QPC) @ 33.06 Hz:
NPSHR: 1.56 ft
Intersection Pt: 233.7 USgpm @ 12.52 ft
bhp=0.91 hp, eff=81.21%, %bepq=78.67%

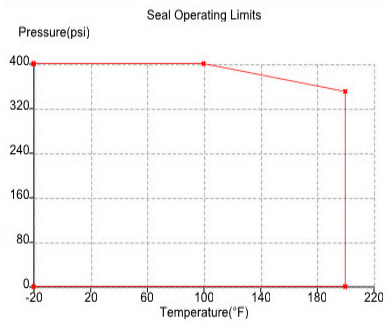
6. Hmin: 10 ft 28.15 Hz:
NPSHR: 0.43 ft
Intersection Pt: 0 USgpm @ 10 ft
(Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	570 USgpm	42.45 ft	83.24%
Design point	570 USgpm	25 ft	77.62 %
50% average flow (with default load profile)	285 USgpm	13.75 ft	82.88 %
Motor Capability @ Rated Speed	6.44 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 200 ˚F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless Bundle:	Yes	DEPC Parallel Sensorless:	No
Energy Performance Bundle:	No	Protection Bundle:	No
Dual Season Setup:	No	Zone Optimization Bundle:	No

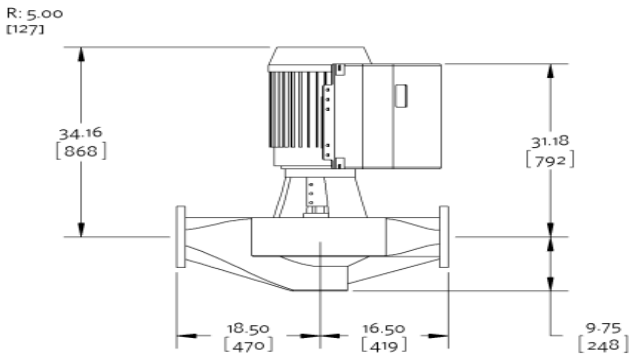
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1min:	N/A	H2min:	N/A
Maximum Flow:	N/A	Minimum Flow:	N/A

Optional Services

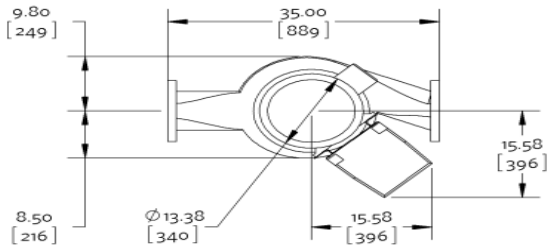
On-Site Pump Commissioning:	Cost not Included	Extended Warranty:	No
Pump Manager:	Yes	Include Spare Parts Qty:	0

Dimensional data (not for construction)

Side view

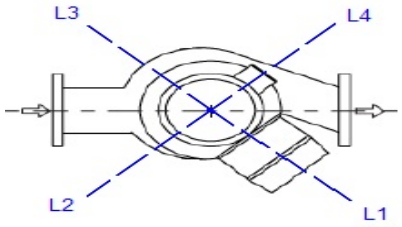


Top view



Inverter motor type: Inverter duty

Weight: 859 lb [389.64 kg], Units of measure: inches [millimeters]
· R = minimum lifting clearance required above motor
· Coupling guard and flush line (not shown) are supplied
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	6	ANSI-125	11.00	8	9.50	0.75
Outlet	6	ANSI-125	11.00	8	9.50	0.75

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
The program has defaulted to a NEMA Premium Efficiency motor supplied with NEMA MG-1 Part 31.4.4.2 insulation standards for inverter-fed polyphase motors.
OSHPD Seismic Certification OSP-0422-10
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Integrated Fused Disconnect
Pre-Wired Control Bridge: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Submittal

Ref. #: SQFGQ002934_1

Suction guide

Model: SG-66

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
H-1,2	2	SG-66	6 in	6 in	570 USgpm	0.97 ft	Design Envelope Sensorless 4300 0611-007.5

*at design flow

Materials of construction

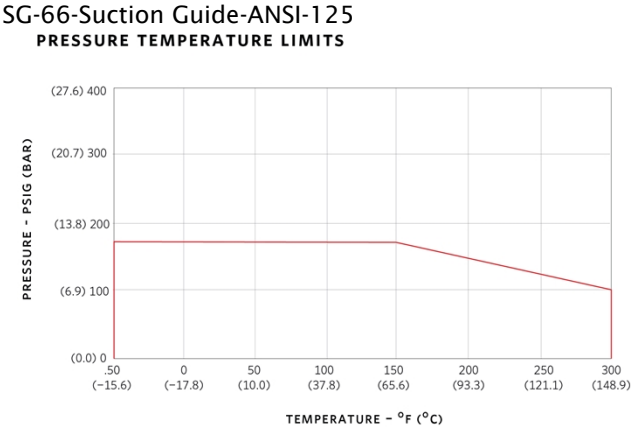
SG-66

Body:	Cast iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast iron	Strainer:	Stainless Steel,0.125"(3mm)Perf..
Cover plate:	Cast iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-66-Suction Guide-ANSI-125

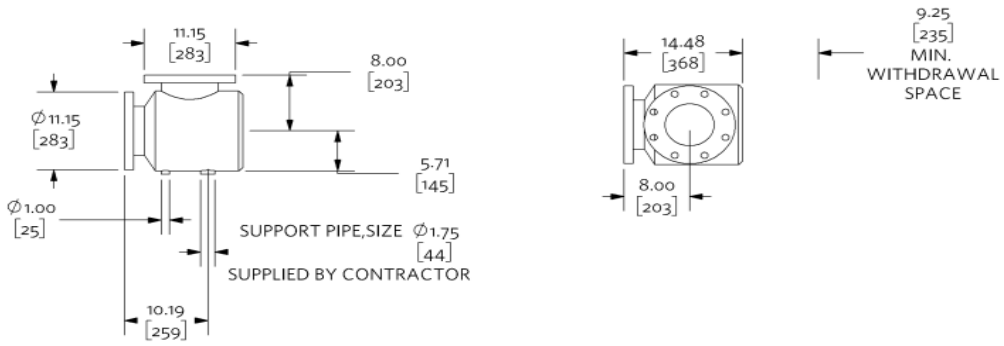


Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

Dimensional data (not for construction)

SG-66	Weight: 141 lb [63.96 kg]
Side view	Top view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-6FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
H-1,2	2	FTV-6FA	6 in	Angle	Flanged	570 USgpm	3.03 ft	Design Envelope Sensorless 4300 0611-007.5

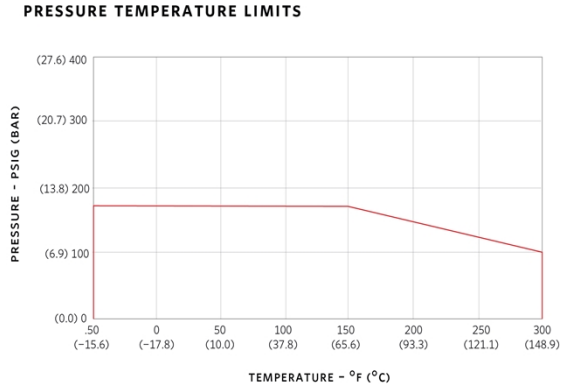
*at design flow

Materials of construction

FTV-6FA-Flo-Trex Valve-ANSI-125-Angle			
Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

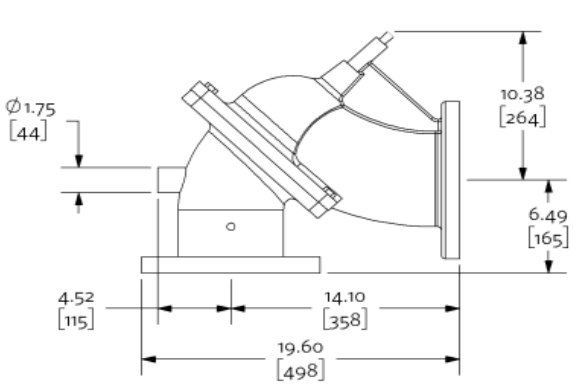
FTV-6FA-Flo-Trex Valve-ANSI-125-Angle

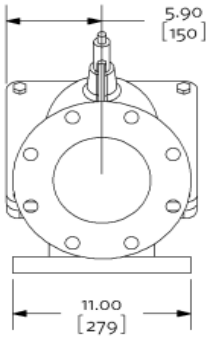


Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-6FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 167 lb [75.75 kg]
Side view	Front view





Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Close-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4380 0305-003.0 with Suction Guide, Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	I-1,2	Configuration:	Single
Service:	BLDG TAKEOFF	Suction pressure:	0 ft
Location:	BLDG I	Fluid:	Propylene Glycol: 25
Qty:	2	Operating temperature:	60 °F
Total system flow:	260 USgpm	Duty flow per pump:	260 USgpm
System head:	25 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	73.91 %	Safety factor % head:	0 %
NPSHR:	12.62 ft	Total Absorbed Power:	2.22 hp
Min. maintained system pressure*:	10 ft	Impeller diameter:	3.96 in
Standby qty:	0	Pump/motor run qty:	1
PEIvl:	0.45	ERvl:	55
Outlet velocity:	11.28 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Low Pressure Ductile Iron	Impeller:	316 Stainless Steel
Rating:	ANSI-125	Casing o-ring:	EPDM
Connections:	Inlet: 3in, Outlet: 3in	Flush line:	Braided Stainless Steel
Casing (volute):	Ductile Iron, E-coated	Stub shaft:	316 Stainless Steel

Mechanical seal data

Seal type:	Inside Single Spring	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-ssc L EPSS 2A	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS) ****:	2000 PPM

Electrical data

Supplier:	Armstrong	Insulation class:	Class F Insulation
Size:	3 hp	Motor type:	Permanent Magnet
Frame size:	IEC90	Efficiency:	IE5
Enclosure:	TEFC	Power supply:	208/3/60
Operating speed @ 100% flow:	2839 rpm	Operating speed @ 50% flow***:	1905 rpm

***Based on minimum pressure setting of 40% of design head

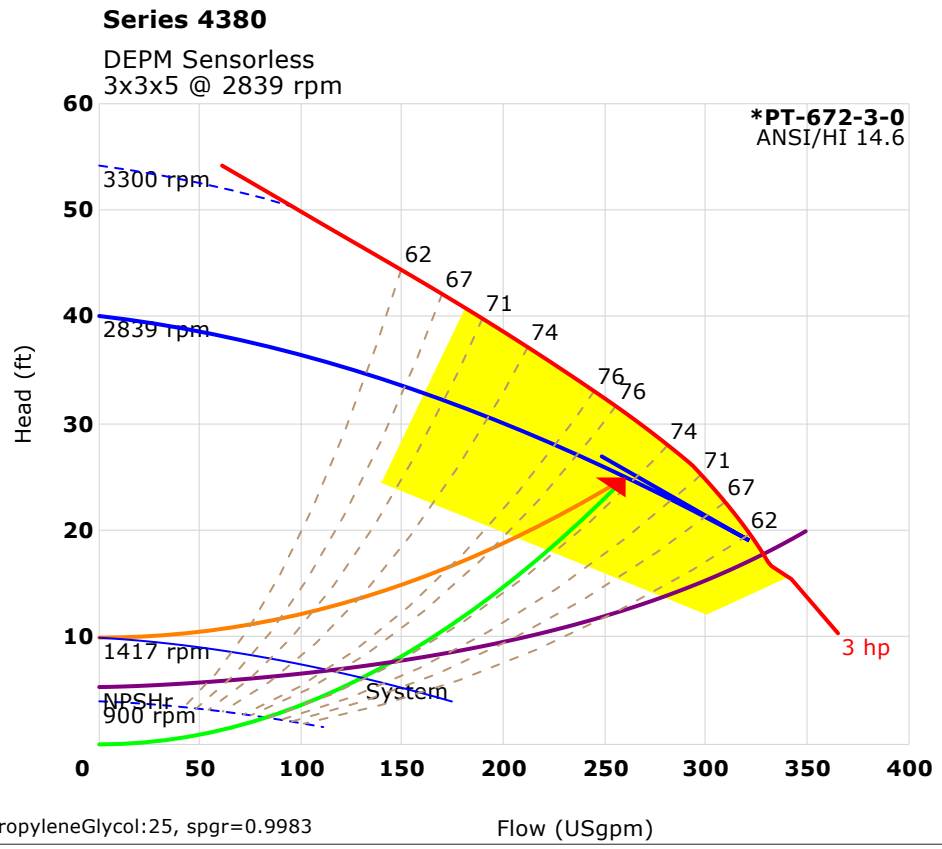
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid.

DEPM controller data

Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet MS/TP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current or voltage)
Fused disconnect switch:	Loose Supply	Digital inputs:	2 (programmable)
Control orientation:	L5	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Not Applicable
Absorbed Power/BHP at 50% load/flow and 55% of design head:	1.22 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	Yes	EMI/RFI control:	Integrated filter to meet EN61800-3

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 2366 rpm:
NPSHR: 12.62 ft
Intersection Pt: 260 usgpm @ 25 ft
bhp=2.22 hp, eff=73.91 %%, %bepq=113 %%

2. Control (QPC) @ 2555 rpm:
NPSHR: 9.97 ft
Intersection Pt: 227.5 USgpm @ 21.48 ft
bhp=1.65 hp, eff=74.8%, %bepq=108.46%

3. Control (QPC) @ 2270 rpm:
NPSHR: 7.52 ft
Intersection Pt: 192.4 USgpm @ 18.21 ft
bhp=1.17 hp, eff=75.48%, %bepq=101.99%

4. Control (QPC) @ 1986 rpm:
NPSHR: 5.3 ft
Intersection Pt: 153.4 USgpm @ 15.22 ft
bhp=0.78 hp, eff=75.06%, %bepq=92.05%

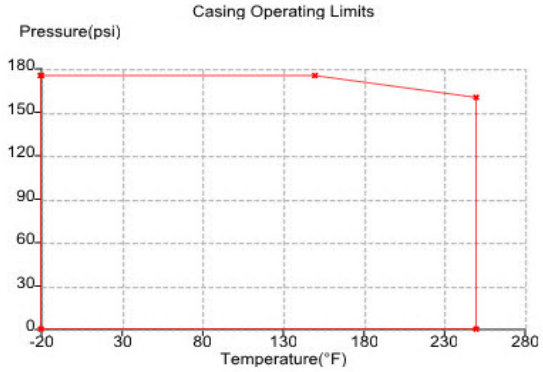
5. Control (QPC) @ 1702 rpm:
NPSHR: 3.32 ft
Intersection Pt: 106.6 USgpm @ 12.52 ft
bhp=0.48 hp, eff=70.57%, %bepq=74.11%

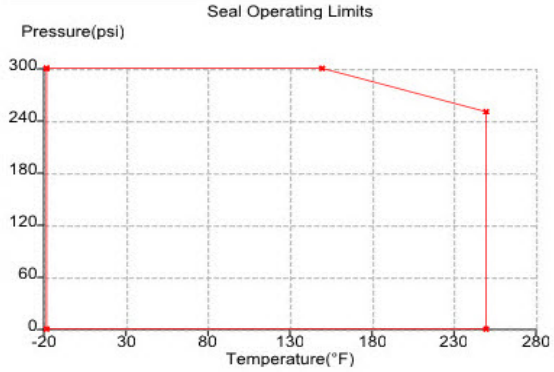
6. Hmin: 10 ft 1417 rpm:
NPSHR: 1.34 ft
Intersection Pt: 0 USgpm @ 10 ft (Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	260 USgpm	31.03 ft	75.17%
Design point	260 USgpm	25 ft	73.91 %
50% average flow (with default load profile)	130 USgpm	13.75 ft	73.66 %
Motor Capability @ Rated Speed	2.56 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 250 F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless bundle:	Yes	DEPC Parallel sensorless:	No
Energy performance bundle:	No	Protection bundle:	No
Dual season setup:	No	Zone optimization bundle:	No

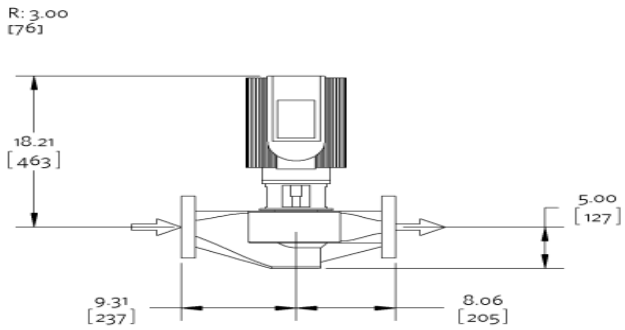
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1 min:	N/A	H2 min:	N/A
Maximum flow:	N/A	Minimum flow:	N/A

Optional Services

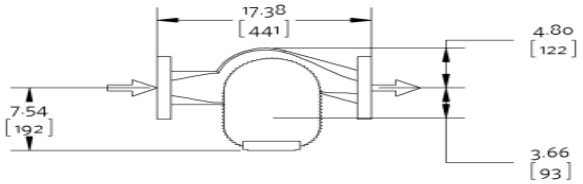
On-site pump commissioning:	Cost not Included	Extended warranty:	No
Pump manager:	Yes	Include spare parts qty:	0

Dimensional data (not for construction)

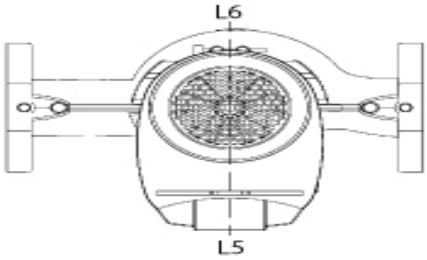
Side view



Top view



Weight: 89.32 lb [40.51 kg], Units of measure: inches [millimeters]
· Not to scale
· R = minimum lifting clearance required above motor
· Coupling guard and flush line (not shown) are supplied
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	3	ANSI-125	7.50	4	6.00	0.625
Outlet	3	ANSI-125	7.50	4	6.00	0.625

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Loose Supply
Space Heater: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Design Envelope pumps offer industry-leading efficiency and performance management capabilities for significantly reduced energy consumption. Armstrong has undertaken a multi-year project to transition our pump offering to an integrated design that use Design Envelope Permanent Magnet technology for even greater operating cost savings. In the sizes currently equipped with Design Envelope Permanent Magnet motors, the pumps are also more compact and lighter than our standard Design Envelope pumps.

Please note that depending on the pump sizes, your shipment may include a combination of:

- Design Envelope Permanent Magnet pumps
- Design Envelope Permanent Magnet pumps with IVS controls
- Design Envelope Pumps with Premium efficiency induction motors and IVS controls

DISCONNECT CONFIGURATION

Site electrical input voltage : _____

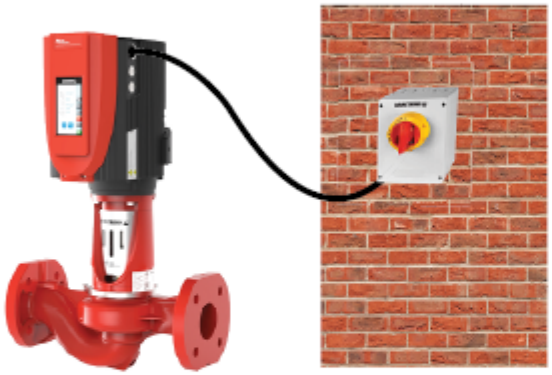
Number of 1PH 200-240V motors : ☐ 2hp & lower: _____

Number of 3PH 200-240V motors : ☐ 10hp & lower: _____

Number of 3PH 380-480V motors : ☐ 10hp & lower: _____

Number of 3PH 575-660V motors : ☐ 10hp & lower: _____

FUSED DISCONNECT FOR WALL MOUNTING



TECHNICAL DATA

Enclosure: UL/NEMA 4 X rated

Terminals

Number of poles: 3-poles, ground

Terminal size acceptability: Copper conductors only, 75°C, 14-8AWG

Electrical/Environmental

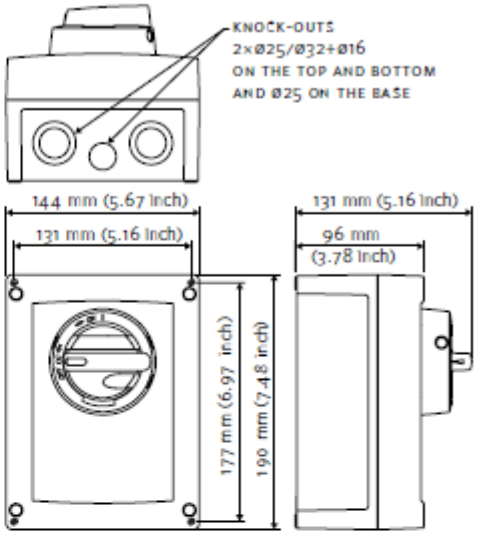
Up to 600V / Up to 60A, 50/60Hz

Minimum short circuit rating: 10kA

Ambient operating temperature: -10°C to +50°C (+14°F to +122°F)

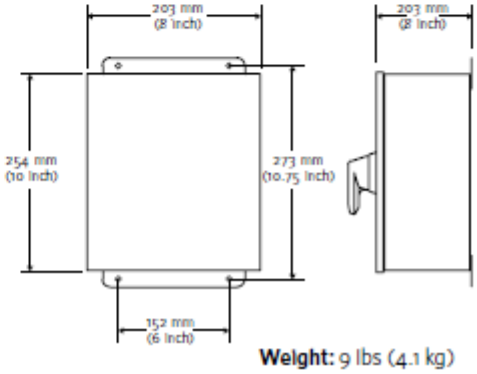
Ambient storage temperature: -30°C to +65°C (-22°F to +149°F)

30A DISCONNECT



Weight: 3.5 lbs (1.6 kg)

60A DISCONNECT



Weight: 9 lbs (4.1 kg)

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 1PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - FRAME 71

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
0.33	0.25	30A	6A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	2.0	1.6
0.5	0.37		6A		2.6	2.0
0.75	0.55		10A		3.3	2.9
1	0.75		10A		4.8	4.0
1.5	1.1		15A		7.1	5.8
2	1.5		20A		9.3	7.6

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
1	0.75	30A	10A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	3.1	2.7
1.5	1.1		10A		4.2	3.7
2	1.5		15A		6.0	4.8
3	2.2		20A		8.8	7.2
5	4		30A		15.7	14.0
7.5	5.5	60A	50A	J FAST-ACTING	20.7	18.5
10	7.5		60A	RK1 FAST-ACTING	28.1	25.1

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
3	2.2	30A	20A	CC FAST-ACTING	7.4	6.4
5.5	4		30A		14.2	12.6
7.5	5.5		30A		19.0	16.6
10	7.5		30A		26.2	23.0

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - FRAME 71

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
0.33	0.25	30A	5A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	1.3	0.8
0.5	0.37		5A		1.6	1.1
0.75	0.55		6A		1.9	1.5
1	0.75		6A		2.5	2.0
1.5	1.1		10A		4.1	3.5
2	1.5		10A		5.3	3.9
3	2.2		10A		6.5	5.8
4	3		15A		6.1	4.9
5	4		20A		9.2	7.1
7.5	5.5		25A		12.5	8.2
10	7.5		30A		18.5	14.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
1	0.75	30A	6A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	2.1	1.7
1.5	1.1		6A		2.8	2.3
2	1.5		10A		4.8	4.1
3	2.2		10A		6.5	5.8
4	3		15A		6.1	4.9
5	4		20A		9.2	7.1
7.5	5.5		25A		12.5	8.2
10	7.5		30A		18.5	14.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
3	2.2	30A	10A	CC FAST-ACTING	3.9	3.2
4	3		10A		5.4	4.2
5.5	4		15A		7.1	5.7
7.5	5.5		15A		9.5	7.6
10	7.5		25A		13.6	11.3
15	11		30A		18.8	15.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 575-600V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM MOTORS

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				575 VAC	600 VAC
1	0.75	30A	5A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	1.6	1.3
1.5	1.1		6A		2.2	1.8
2	1.5		8A		2.0	1.6
3	2.2		10A		3.4	2.8
5	4		20A		5.5	4.9
7.5	5.5		25A		7.2	6.0
10	7.5		30A		9.8	9.4

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 575-600V INPUT POWER FOI USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2 MOTORS

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				575 VAC	600 VAC
1	0.75	30A	5A	CC FAST-ACTING	1.6	1.5
1.5	1.1		6A		2.1	2.0
2	1.5		6A		2.6	2.6
3	2.2		6A		3.5	3.2
5	4		15A		5.7	5.3
7.5	5.5		15A		7.5	7.4
10	7.5		30A		10.8	10.1

All cabling and must comply with national and local regulations on cable cross-sections and ambient temperature

Submittal

Ref. #: SQFGQ002934_1

Suction guide

Model: SG-43

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
I-1,2	2	SG-43	4 in	3 in	260 USgpm	2.82 ft	Design Envelope Sensorless 4380 0305-003.0

*at design flow

Materials of construction

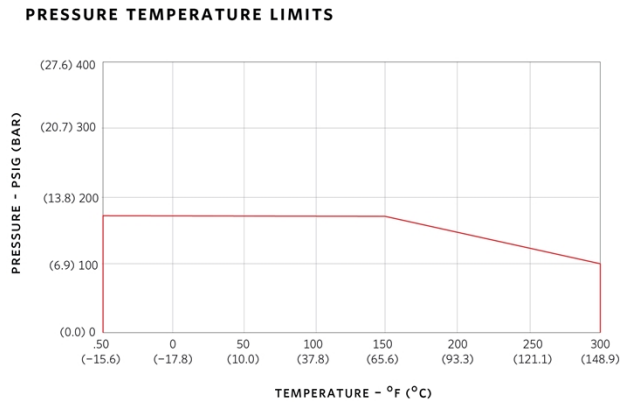
SG-43

Body:	Cast iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast iron	Strainer:	Stainless Steel,0.125"(3mm)Perf..
Cover plate:	Cast iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-43-Suction Guide-ANSI-125

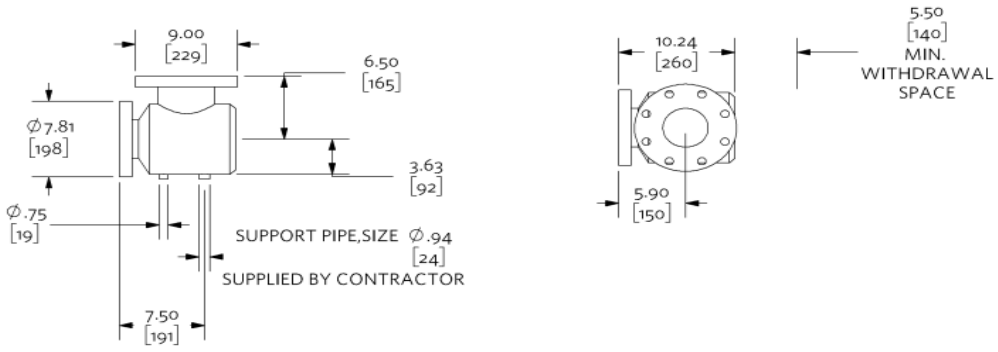


Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

Dimensional data (not for construction)

SG-43	Weight: 52 lb [23.59 kg]
Side view	Top view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-4FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
I-1,2	2	FTV-4FA	4 in	Angle	Flanged	260 USgpm	3.18 ft	Design Envelope Sensorless 4380 0305-003.0

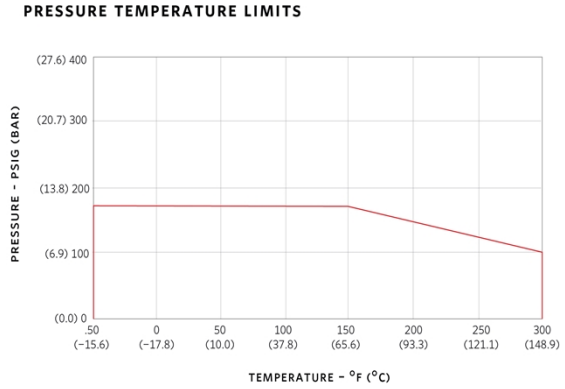
*at design flow

Materials of construction

FTV-4FA-Flo-Trex Valve-ANSI-125-Angle			
Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

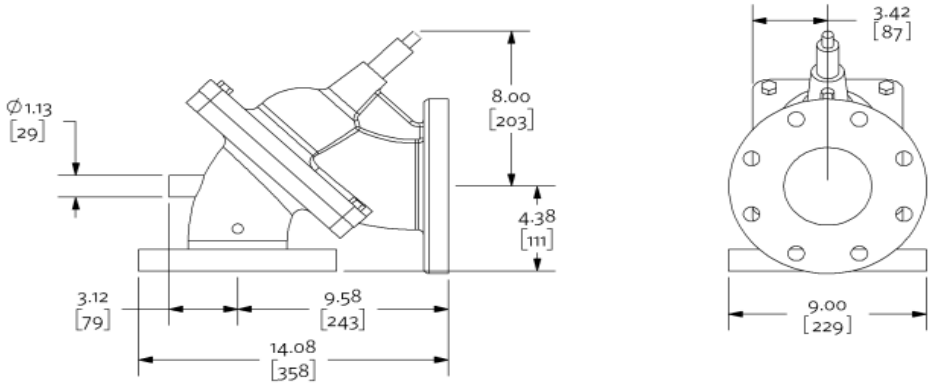
FTV-4FA-Flo-Trex Valve-ANSI-125-Angle



Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-4FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 59 lb [26.76 kg]
Side view	Front view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Spare Parts and Kits					
Design Envelope Seal Parts Kits					
Armstrong PN#	**Description**	**Includes**	**Item Size**	**Weights (lb\kg)**	**Image**
89975000-900K	Seal-kit 0.625 2A c-Ssc316epdL	Mech Seal, V- Clamp, O-ring, Capscrew & Washer	2A - 0.625"	2.8 lb [1.27 kg]	

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Close-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4380 0205-001.5 with Suction Guide, Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	K-1,2 TH1,2,3,4,5,6-1,2	Configuration:	Single
Service:	BLDG TAKEOFF	Suction pressure:	0 ft
Location:	BLDG K. TH1,2,3,4,5,6	Fluid:	Propylene Glycol: 25
Qty:	14	Operating temperature:	60 °F
Total system flow:	90 USgpm	Duty flow per pump:	90 USgpm
System head:	25 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	68.92 %	Safety factor % head:	0 %
NPSHR:	3.18 ft	Total Absorbed Power:	0.82 hp
Min. maintained system pressure*:	10 ft	Impeller diameter:	3.94 in
Standby qty:	0	Pump/motor run qty:	1
PEIvl:	0.43	ERvl:	57
Outlet velocity:	8.6 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Low Pressure Ductile Iron	Impeller:	316 Stainless Steel
Rating:	ANSI-125	Casing o-ring:	EPDM
Connections:	Inlet: 2in, Outlet: 2in	Flush line:	Braided Stainless Steel
Casing (volute):	Ductile Iron, E-coated	Stub shaft:	316 Stainless Steel

Mechanical seal data

Seal type:	Inside Single Spring	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-ssc L EPSS 2A	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS) ****:	2000 PPM

Electrical data

Supplier:	Armstrong	Insulation class:	Class F Insulation
Size:	1.5 hp	Motor type:	Permanent Magnet
Frame size:	IEC90S	Efficiency:	IE5
Enclosure:	TEFC	Power supply:	208/3/60
Operating speed @ 100% flow:	2572 rpm	Operating speed @ 50% flow***:	1809 rpm

***Based on minimum pressure setting of 40% of design head

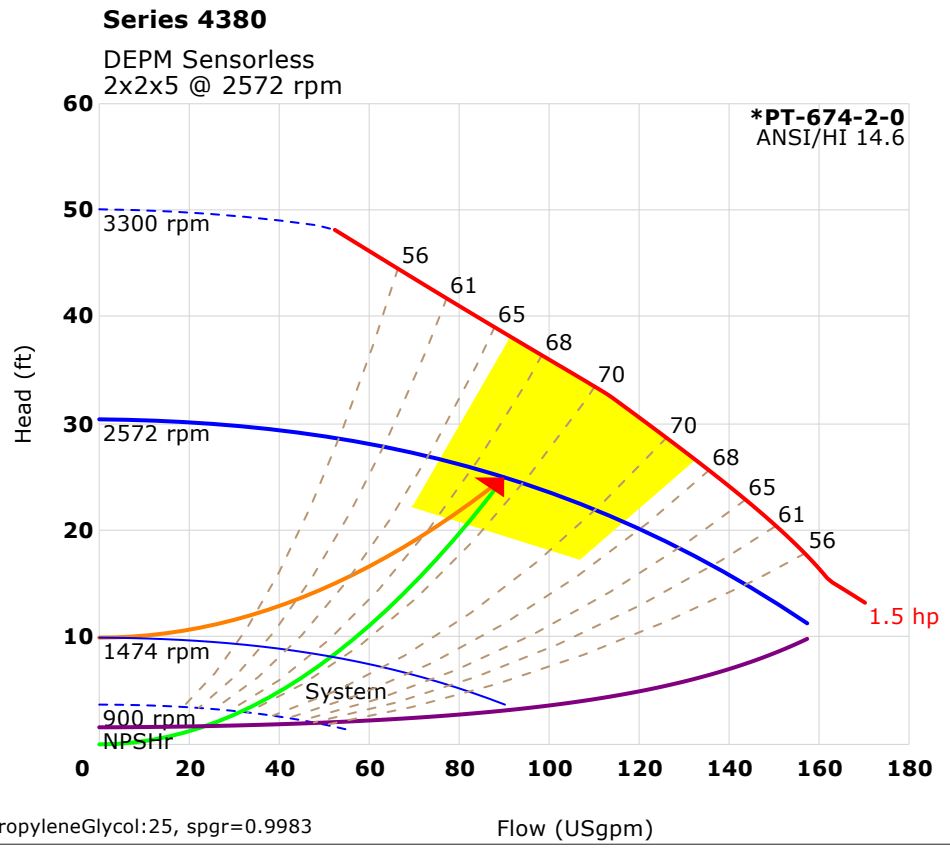
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid.

DEPM controller data

Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet MS/TP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current or voltage)
Fused disconnect switch:	Loose Supply	Digital inputs:	2 (programmable)
Control orientation:	L5	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Not Applicable
Absorbed Power/BHP at 50% load/flow and 55% of design head:	0.45 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	No	EMI/RFI control:	Integrated filter to meet EN61800-3

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 2144 rpm:
NPSHR: 3.18 ft
Intersection Pt: 90 usgpm @ 25 ft
bhp=0.82 hp, eff=68.92 %%,
%bepq=83 %%

2. Control (QPC) @ 2352 rpm:
NPSHR: 2.53 ft
Intersection Pt: 78.75 USgpm @ 21.48 ft
bhp=0.63 hp, eff=68.17%,
%bepq=78.89%

3. Control (QPC) @ 2133 rpm:
NPSHR: 1.94 ft
Intersection Pt: 66.6 USgpm @ 18.21 ft
bhp=0.46 hp, eff=66.76%,
%bepq=73.48%

4. Control (QPC) @ 1913 rpm:
NPSHR: 1.41 ft
Intersection Pt: 53.1 USgpm @ 15.22 ft
bhp=0.32 hp, eff=63.93%,
%bepq=65.22%

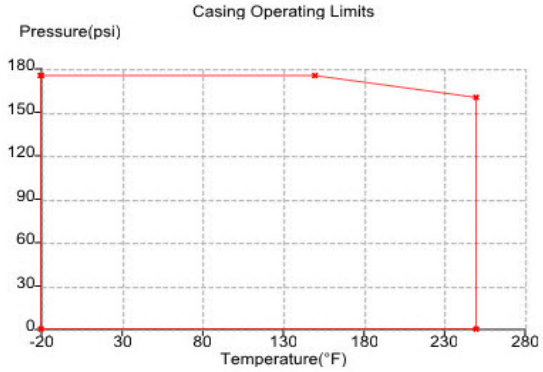
5. Control (QPC) @ 1694 rpm:
NPSHR: 0.95 ft
Intersection Pt: 36.9 USgpm @ 12.52 ft
bhp=0.2 hp, eff=57%,
%bepq=51.14%

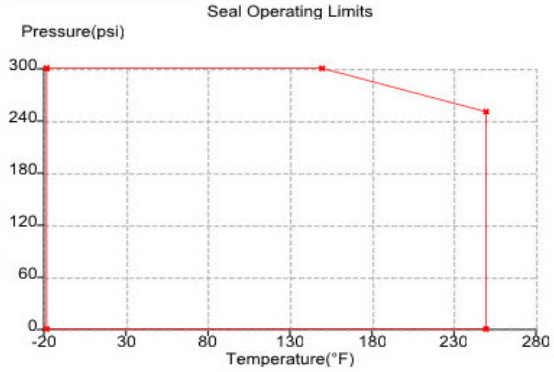
6. Hmin: 10 ft 1474 rpm:
NPSHR: 0.53 ft
Intersection Pt: 0 USgpm @ 10 ft
(Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	90 USgpm	38.54 ft	65.37%
Design point	90 USgpm	25 ft	68.92 %
50% average flow (with default load profile)	45 USgpm	13.75 ft	61.12 %
Motor Capability @ Rated Speed	1.15 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 250 F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless bundle:	Yes	DEPC Parallel sensorless:	No
Energy performance bundle:	No	Protection bundle:	No
Dual season setup:	No	Zone optimization bundle:	No

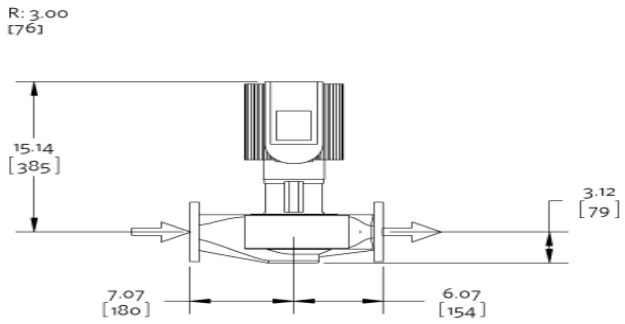
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1 min:	N/A	H2 min:	N/A
Maximum flow:	N/A	Minimum flow:	N/A

Optional Services

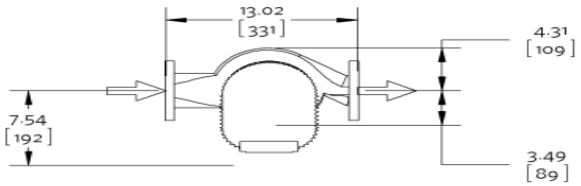
On-site pump commissioning:	Cost not Included	Extended warranty:	No
Pump manager:	Yes	Include spare parts qty:	0

Dimensional data (not for construction)

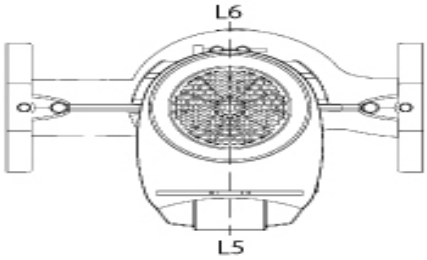
Side view



Top view



Weight: 62 lb [28.12 kg], Units of measure: inches [millimeters]
· Not to scale
· R = minimum lifting clearance required above motor
· Coupling guard and flush line (not shown) are supplied
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	2	ANSI-125	6.00	4	4.75	0.625
Outlet	2	ANSI-125	6.00	4	4.75	0.625

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Loose Supply
Space Heater: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Design Envelope pumps offer industry-leading efficiency and performance management capabilities for significantly reduced energy consumption. Armstrong has undertaken a multi-year project to transition our pump offering to an integrated design that use Design Envelope Permanent Magnet technology for even greater operating cost savings. In the sizes currently equipped with Design Envelope Permanent Magnet motors, the pumps are also more compact and lighter than our standard Design Envelope pumps.

Please note that depending on the pump sizes, your shipment may include a combination of:

- Design Envelope Permanent Magnet pumps
- Design Envelope Permanent Magnet pumps with IVS controls
- Design Envelope Pumps with Premium efficiency induction motors and IVS controls

DISCONNECT CONFIGURATION

Site electrical input voltage : _____

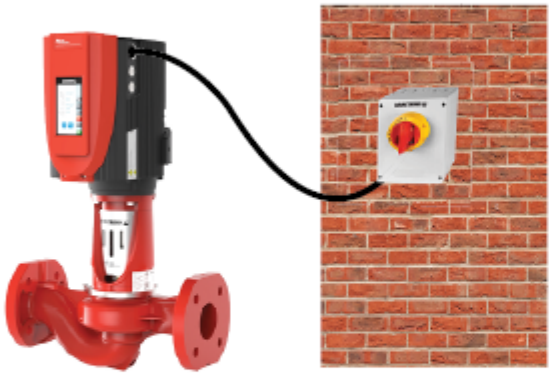
Number of 1PH 200-240V motors : ☐ 2hp & lower: _____

Number of 3PH 200-240V motors : ☐ 10hp & lower: _____

Number of 3PH 380-480V motors : ☐ 10hp & lower: _____

Number of 3PH 575-660V motors : ☐ 10hp & lower: _____

FUSED DISCONNECT FOR WALL MOUNTING



TECHNICAL DATA

Enclosure: UL/NEMA 4 X rated

Terminals

Number of poles: 3-poles, ground

Terminal size acceptability: Copper conductors only, 75°C, 14-8AWG

Electrical/Environmental

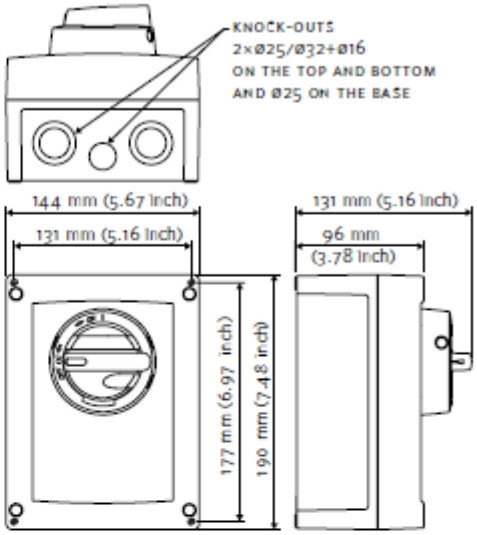
Up to 600V / Up to 60A, 50/60Hz

Minimum short circuit rating: 10kA

Ambient operating temperature: -10°C to +50°C (+14°F to +122°F)

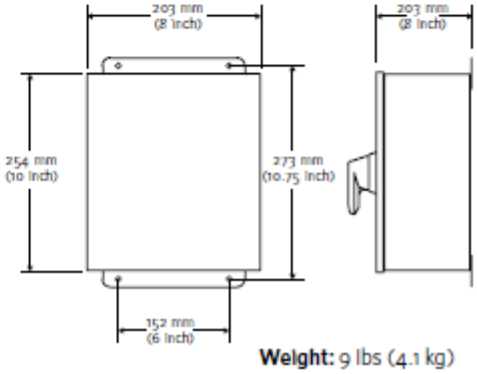
Ambient storage temperature: -30°C to +65°C (-22°F to +149°F)

30A DISCONNECT



Weight: 3.5 lbs (1.6 kg)

60A DISCONNECT



Weight: 9 lbs (4.1 kg)

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 1PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - FRAME 71

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
0.33	0.25	30A	6A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	2.0	1.6
0.5	0.37		6A		2.6	2.0
0.75	0.55		10A		3.3	2.9
1	0.75		10A		4.8	4.0
1.5	1.1		15A		7.1	5.8
2	1.5		20A		9.3	7.6

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
1	0.75	30A	10A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	3.1	2.7
1.5	1.1		10A		4.2	3.7
2	1.5		15A		6.0	4.8
3	2.2		20A		8.8	7.2
5	4		30A		15.7	14.0
7.5	5.5	60A	50A	J FAST-ACTING	20.7	18.5
10	7.5		60A	RK1 FAST-ACTING	28.1	25.1

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
3	2.2	30A	20A	CC FAST-ACTING	7.4	6.4
5.5	4		30A		14.2	12.6
7.5	5.5		30A		19.0	16.6
10	7.5		30A		26.2	23.0

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - FRAME 71

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
0.33	0.25	30A	5A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	1.3	0.8
0.5	0.37		5A		1.6	1.1
0.75	0.55		6A		1.9	1.5
1	0.75		6A		2.5	2.0
1.5	1.1		10A		4.1	3.5
2	1.5		10A		5.3	3.9
3	2.2		10A		6.5	5.8
4	3		15A		6.1	4.9
5	4		20A		9.2	7.1
7.5	5.5		25A		12.5	8.2
10	7.5		30A		18.5	14.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
1	0.75	30A	6A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	2.1	1.7
1.5	1.1		6A		2.8	2.3
2	1.5		10A		4.8	4.1
3	2.2		10A		6.5	5.8
4	3		15A		6.1	4.9
5	4		20A		9.2	7.1
7.5	5.5		25A		12.5	8.2
10	7.5		30A		18.5	14.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
3	2.2	30A	10A	CC FAST-ACTING	3.9	3.2
4	3		10A		5.4	4.2
5.5	4		15A		7.1	5.7
7.5	5.5		15A		9.5	7.6
10	7.5		25A		13.6	11.3
15	11		30A		18.8	15.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 575-600V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM MOTORS

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				575 VAC	600 VAC
1	0.75	30A	5A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	1.6	1.3
1.5	1.1		6A		2.2	1.8
2	1.5		8A		2.0	1.6
3	2.2		10A		3.4	2.8
5	4		20A		5.5	4.9
7.5	5.5		25A		7.2	6.0
10	7.5		30A		9.8	9.4

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 575-600V INPUT POWER FOI USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2 MOTORS

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				575 VAC	600 VAC
1	0.75	30A	5A	CC FAST-ACTING	1.6	1.5
1.5	1.1		6A		2.1	2.0
2	1.5		6A		2.6	2.6
3	2.2		6A		3.5	3.2
5	4		15A		5.7	5.3
7.5	5.5		15A		7.5	7.4
10	7.5		30A		10.8	10.1

All cabling and must comply with national and local regulations on cable cross-sections and ambient temperature

Submittal

Ref. #: SQFGQ002934_1

Suction guide

Model: SG-32

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
K-1,2 TH1,2, 3,4,5,6 -1,2	14	SG-32	3 in	2 in	90 USgpm	0.89 ft	Design Envelope Sensorless 4380 0205-001.5

*at design flow

Materials of construction

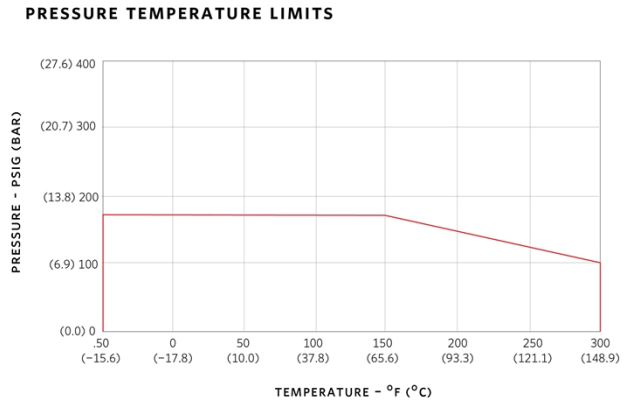
SG-32

Body:	Cast iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast iron	Strainer:	Stainless Steel,0.125"(3mm)Perf..
Cover plate:	Cast iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-32-Suction Guide-ANSI-125

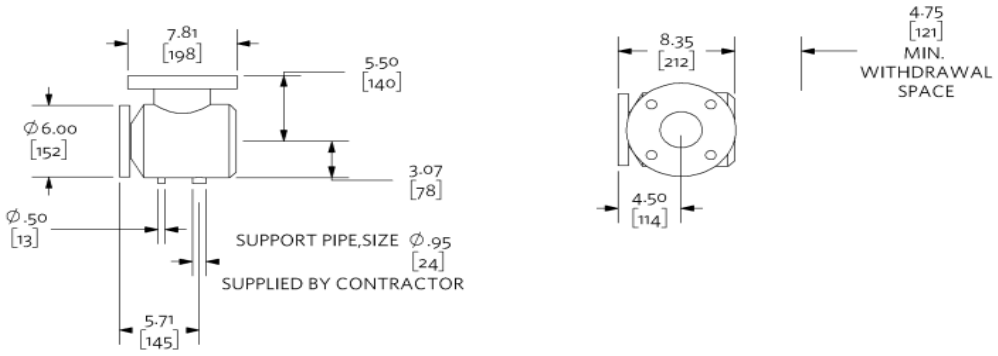


Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

Dimensional data (not for construction)

SG-32	Weight: 31 lb [14.06 kg]
Side view	Top view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-3FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
K-1,2 TH1, 2,3,4, 5,6-1,2	14	FTV-3FA	3 in	Angle	Flanged	90 USgpm	3 ft	Design Envelope Sensorless 4380 0205-001.5

*at design flow

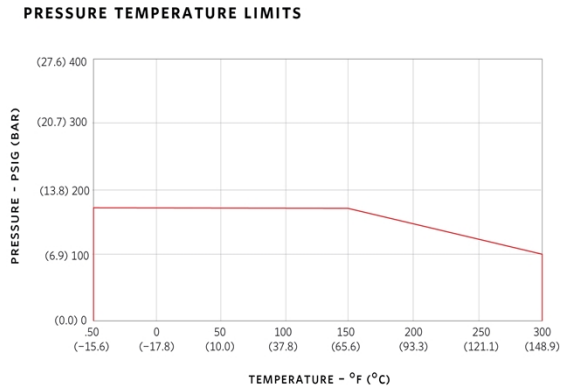
Materials of construction

FTV-3FA-Flo-Trex Valve-ANSI-125-Angle

Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

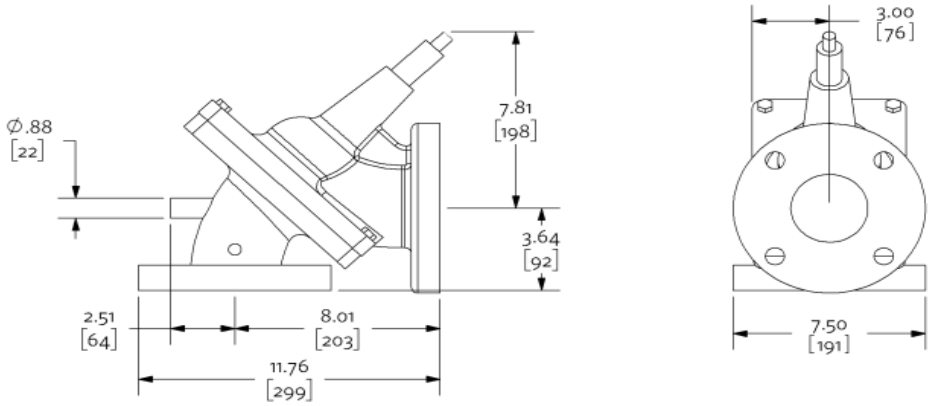
FTV-3FA-Flo-Trex Valve-ANSI-125-Angle



Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-3FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 39 lb [17.69 kg]
Side view	Front view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Spare Parts and Kits					
Design Envelope Seal Parts Kits					
Armstrong PN#	**Description**	**Includes**	**Item Size**	**Weights (lb\kg)**	**Image**
89975000-900K	Seal-kit 0.625 2A c-Ssc316epdL	Mech Seal, V- Clamp, O-ring, Capscrew & Washer	2A - 0.625"	2.8 lb [1.27 kg]	

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Close-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4380 0305-003.0 with Suction Guide, Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	TH2-1,2	Configuration:	Single
Service:	BLDG TAKEOFF	Suction pressure:	0 ft
Location:	BLDG TH2	Fluid:	Propylene Glycol: 25
Qty:	2	Operating temperature:	60 °F
Total system flow:	220 USgpm	Duty flow per pump:	220 USgpm
System head:	25 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	75.55 %	Safety factor % head:	0 %
NPSHR:	10 ft	Total Absorbed Power:	1.84 hp
Min. maintained system pressure*:	10 ft	Impeller diameter:	3.96 in
Standby qty:	0	Pump/motor run qty:	1
PEIvl:	0.45	ERvl:	55
Outlet velocity:	9.55 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Low Pressure Ductile Iron	Impeller:	316 Stainless Steel
Rating:	ANSI-125	Casing o-ring:	EPDM
Connections:	Inlet: 3in, Outlet: 3in	Flush line:	Braided Stainless Steel
Casing (volute):	Ductile Iron, E-coated	Stub shaft:	316 Stainless Steel

Mechanical seal data

Seal type:	Inside Single Spring	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-ssc L EPSS 2A	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS) ****:	2000 PPM

Electrical data

Supplier:	Armstrong	Insulation class:	Class F Insulation
Size:	3 hp	Motor type:	Permanent Magnet
Frame size:	IEC90	Efficiency:	IE5
Enclosure:	TEFC	Power supply:	208/3/60
Operating speed @ 100% flow:	2704 rpm	Operating speed @ 50% flow***:	1851 rpm

***Based on minimum pressure setting of 40% of design head

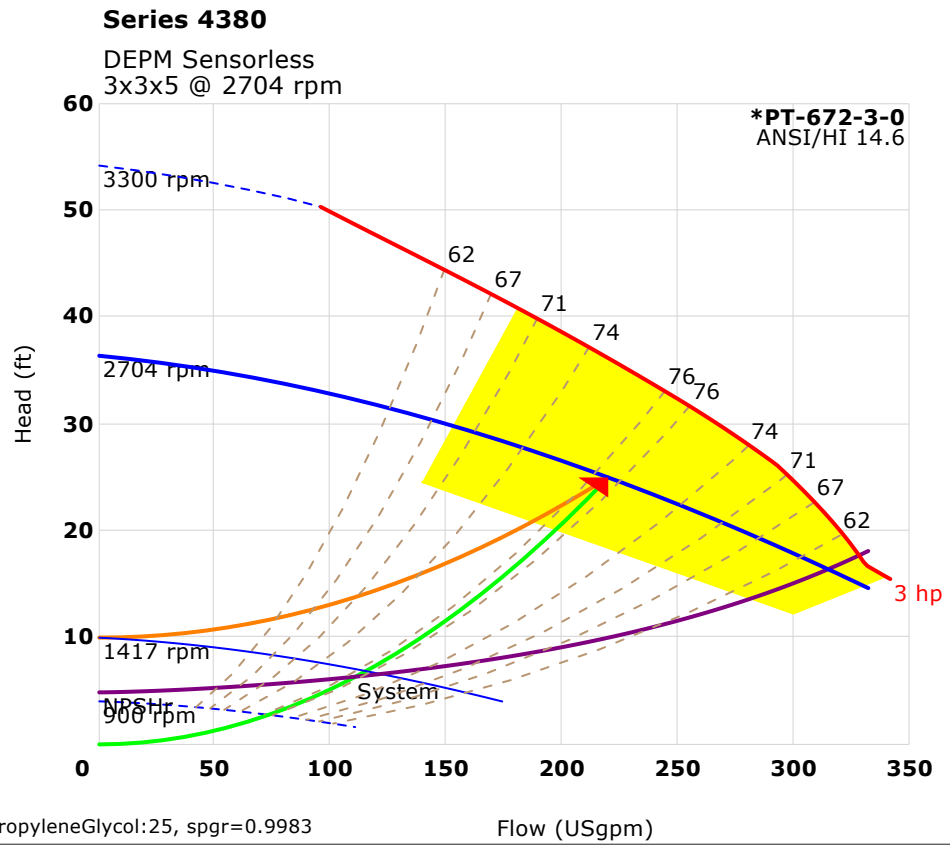
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid.

DEPM controller data

Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet MS/TP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current or voltage)
Fused disconnect switch:	Loose Supply	Digital inputs:	2 (programmable)
Control orientation:	L5	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Not Applicable
Absorbed Power/BHP at 50% load/flow and 55% of design head:	1.01 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	Yes	EMI/RFI control:	Integrated filter to meet EN61800-3

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 2254 rpm:
NPSHR: 10 ft
Intersection Pt: 220 usgpm @ 25 ft
bhp=1.84 hp, eff=75.55 %%,
%bepq=100 %%

2. Control (QPC) @ 2447 rpm:
NPSHR: 7.99 ft
Intersection Pt: 192.5 USgpm @ 21.48 ft
bhp=1.38 hp, eff=75.42%,
%bepq=96.01%

3. Control (QPC) @ 2189 rpm:
NPSHR: 6.13 ft
Intersection Pt: 162.8 USgpm @ 18.21 ft
bhp=1 hp, eff=74.79%,
%bepq=89.89%

4. Control (QPC) @ 1932 rpm:
NPSHR: 4.43 ft
Intersection Pt: 129.8 USgpm @ 15.22 ft
bhp=0.68 hp, eff=72.75%,
%bepq=80.55%

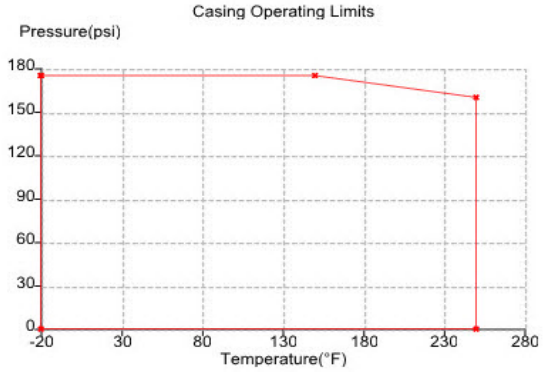
5. Control (QPC) @ 1675 rpm:
NPSHR: 2.91 ft
Intersection Pt: 90.2 USgpm @ 12.52 ft
bhp=0.43 hp, eff=66.01%,
%bepq=64.19%

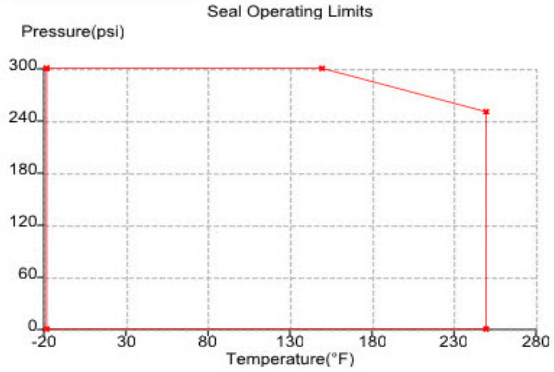
6. Hmin: 10 ft 1417 rpm:
NPSHR: 1.34 ft
Intersection Pt: 0 USgpm @ 10 ft
(Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	220 USgpm	36.18 ft	74.44%
Design point	220 USgpm	25 ft	75.55 %
50% average flow (with default load profile)	110 USgpm	13.75 ft	70.2 %
Motor Capability @ Rated Speed	2.44 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 250 F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless bundle:	Yes	DEPC Parallel sensorless:	No
Energy performance bundle:	No	Protection bundle:	No
Dual season setup:	No	Zone optimization bundle:	No

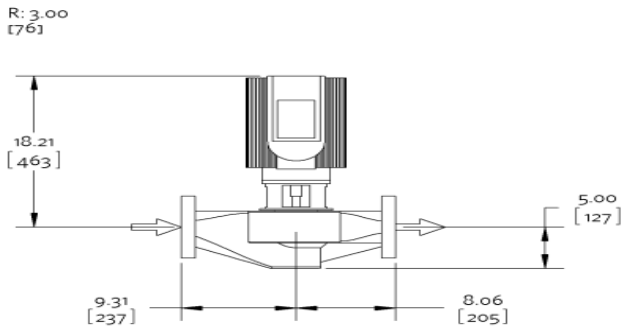
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1 min:	N/A	H2 min:	N/A
Maximum flow:	N/A	Minimum flow:	N/A

Optional Services

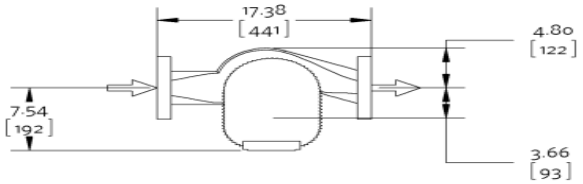
On-site pump commissioning:	Cost not Included	Extended warranty:	No
Pump manager:	Yes	Include spare parts qty:	0

Dimensional data (not for construction)

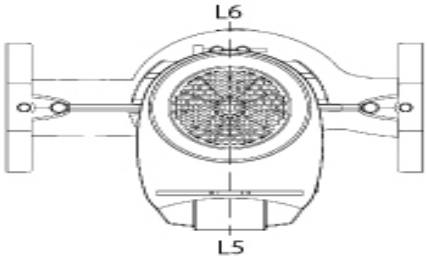
Side view



Top view



Weight: 89.32 lb [40.51 kg], Units of measure: inches [millimeters]
· Not to scale
· R = minimum lifting clearance required above motor
· Coupling guard and flush line (not shown) are supplied
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	3	ANSI-125	7.50	4	6.00	0.625
Outlet	3	ANSI-125	7.50	4	6.00	0.625

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Loose Supply
Space Heater: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Design Envelope pumps offer industry-leading efficiency and performance management capabilities for significantly reduced energy consumption. Armstrong has undertaken a multi-year project to transition our pump offering to an integrated design that use Design Envelope Permanent Magnet technology for even greater operating cost savings. In the sizes currently equipped with Design Envelope Permanent Magnet motors, the pumps are also more compact and lighter than our standard Design Envelope pumps.

Please note that depending on the pump sizes, your shipment may include a combination of:

- Design Envelope Permanent Magnet pumps
- Design Envelope Permanent Magnet pumps with IVS controls
- Design Envelope Pumps with Premium efficiency induction motors and IVS controls

DISCONNECT CONFIGURATION

Site electrical input voltage : _____

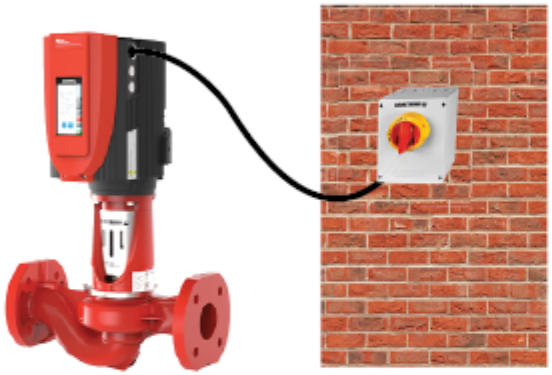
Number of 1PH 200-240V motors : ☐ 2hp & lower: _____

Number of 3PH 200-240V motors : ☐ 10hp & lower: _____

Number of 3PH 380-480V motors : ☐ 10hp & lower: _____

Number of 3PH 575-660V motors : ☐ 10hp & lower: _____

FUSED DISCONNECT FOR WALL MOUNTING



TECHNICAL DATA

Enclosure: UL/NEMA 4 X rated

Terminals

Number of poles: 3-poles, ground

Terminal size acceptability: Copper conductors only, 75°C, 14-8AWG

Electrical/Environmental

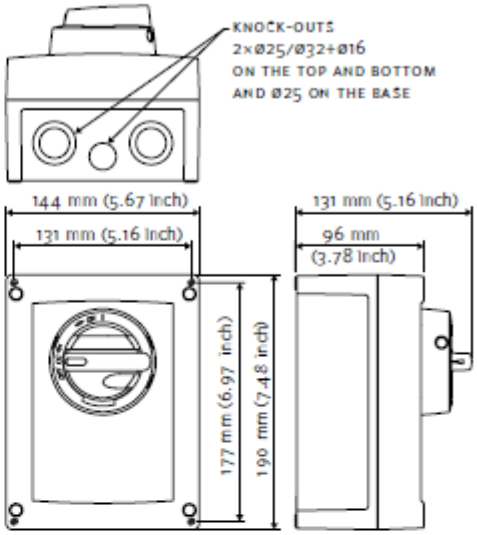
Up to 600V / Up to 60A, 50/60Hz

Minimum short circuit rating: 10kA

Ambient operating temperature: -10°C to +50°C (+14°F to +122°F)

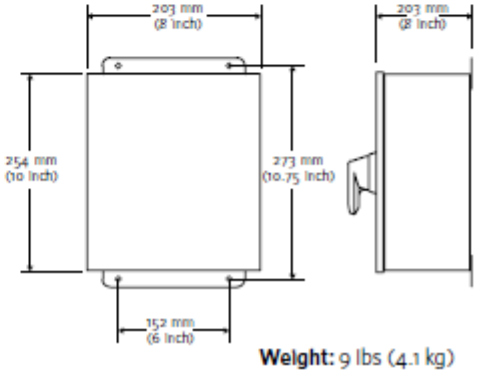
Ambient storage temperature: -30°C to +65°C (-22°F to +149°F)

30A DISCONNECT



Weight: 3.5 lbs (1.6 kg)

60A DISCONNECT



Weight: 9 lbs (4.1 kg)

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 1PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - FRAME 71

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
0.33	0.25	30A	6A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	2.0	1.6
0.5	0.37		6A		2.6	2.0
0.75	0.55		10A		3.3	2.9
1	0.75		10A		4.8	4.0
1.5	1.1		15A		7.1	5.8
2	1.5		20A		9.3	7.6

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
1	0.75	30A	10A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	3.1	2.7
1.5	1.1		10A		4.2	3.7
2	1.5		15A		6.0	4.8
3	2.2		20A		8.8	7.2
5	4		30A		15.7	14.0
7.5	5.5	60A	50A	J FAST-ACTING	20.7	18.5
10	7.5		60A	RK1 FAST-ACTING	28.1	25.1

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
3	2.2	30A	20A	CC FAST-ACTING	7.4	6.4
5.5	4		30A		14.2	12.6
7.5	5.5		30A		19.0	16.6
10	7.5		30A		26.2	23.0

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - FRAME 71

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
0.33	0.25	30A	5A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	1.3	0.8
0.5	0.37		5A		1.6	1.1
0.75	0.55		6A		1.9	1.5
1	0.75		6A		2.5	2.0
1.5	1.1		10A		4.1	3.5
2	1.5		10A		5.3	3.9
3	2.2		10A		6.5	5.8
4	3		15A		6.1	4.9
5	4		20A		9.2	7.1
7.5	5.5		25A		12.5	8.2
10	7.5		30A		18.5	14.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
1	0.75	30A	6A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	2.1	1.7
1.5	1.1		6A		2.8	2.3
2	1.5		10A		4.8	4.1
3	2.2		10A		6.5	5.8
4	3		15A		6.1	4.9
5	4		20A		9.2	7.1
7.5	5.5		25A		12.5	8.2
10	7.5		30A		18.5	14.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
3	2.2	30A	10A	CC FAST-ACTING	3.9	3.2
4	3		10A		5.4	4.2
5.5	4		15A		7.1	5.7
7.5	5.5		15A		9.5	7.6
10	7.5		25A		13.6	11.3
15	11		30A		18.8	15.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 575-600V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM MOTORS

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				575 VAC	600 VAC
1	0.75	30A	5A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	1.6	1.3
1.5	1.1		6A		2.2	1.8
2	1.5		8A		2.0	1.6
3	2.2		10A		3.4	2.8
5	4		20A		5.5	4.9
7.5	5.5		25A		7.2	6.0
10	7.5		30A		9.8	9.4

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 575-600V INPUT POWER FOI USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2 MOTORS

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				575 VAC	600 VAC
1	0.75	30A	5A	CC FAST-ACTING	1.6	1.5
1.5	1.1		6A		2.1	2.0
2	1.5		6A		2.6	2.6
3	2.2		6A		3.5	3.2
5	4		15A		5.7	5.3
7.5	5.5		15A		7.5	7.4
10	7.5		30A		10.8	10.1

All cabling and must comply with national and local regulations on cable cross-sections and ambient temperature

Submittal

Ref. #: SQFGQ002934_1

Suction guide

Model: SG-33

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
TH2-1,2	2	SG-33	3 in	3 in	220 USgpm	2.03 ft	Design Envelope Sensorless 4380 0305-003.0

*at design flow

Materials of construction

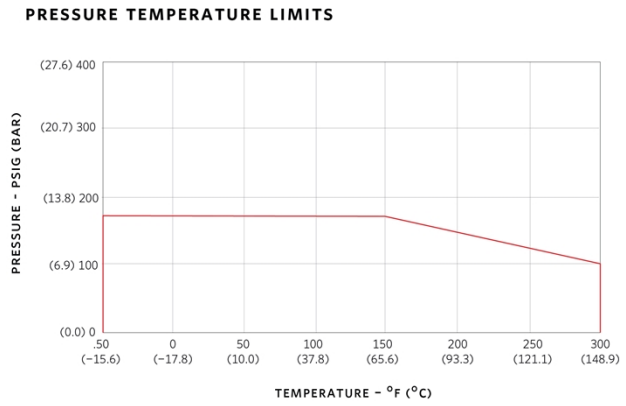
SG-33

Body:	Cast iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast iron	Strainer:	Stainless Steel,0.125"(3mm)Perf..
Cover plate:	Cast iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-33-Suction Guide-ANSI-125

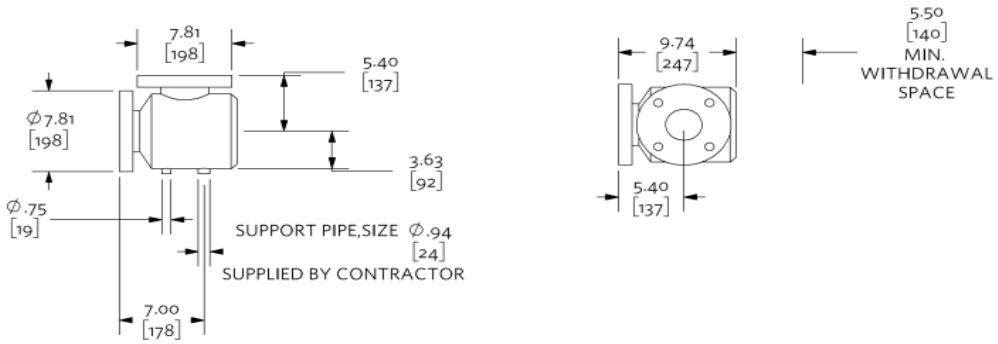


Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

Dimensional data (not for construction)

SG-33	Weight: 45 lb [20.41 kg]
Side view	Top view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-3FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
TH2-1,2	2	FTV-3FA	3 in	Angle	Flanged	220 USgpm	7.5 ft	Design Envelope Sensorless 4380 0305-003.0

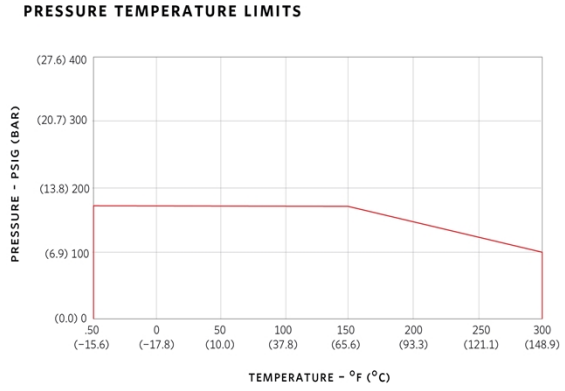
*at design flow

Materials of construction

FTV-3FA-Flo-Trex Valve-ANSI-125-Angle			
Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

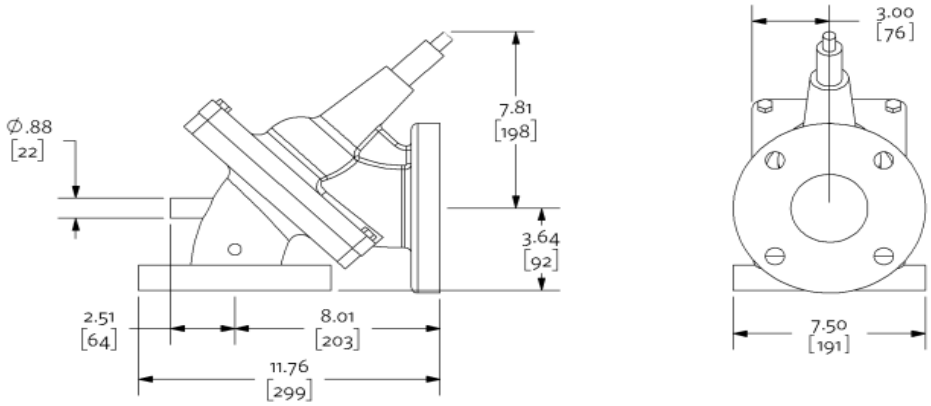
FTV-3FA-Flo-Trex Valve-ANSI-125-Angle



Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-3FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 39 lb [17.69 kg]
Side view	Front view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Spare Parts and Kits					
Design Envelope Seal Parts Kits					
Armstrong PN#	**Description**	**Includes**	**Item Size**	**Weights (lb\kg)**	**Image**
89975000-900K	Seal-kit 0.625 2A c-Ssc316epdL	Mech Seal, V- Clamp, O-ring, Capscrew & Washer	2A - 0.625"	2.8 lb [1.27 kg]	

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Close-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4380 0205-001.5 with Suction Guide, Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	TH3-1,2,3-1,2	Configuration:	Single
Service:	BLDG TAKEOFF	Suction pressure:	0 ft
Location:	BLDG TH3	Fluid:	Propylene Glycol: 25
Qty:	6	Operating temperature:	60 °F
Total system flow:	90 USgpm	Duty flow per pump:	90 USgpm
System head:	25 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	68.92 %	Safety factor % head:	0 %
NPSHR:	3.18 ft	Total Absorbed Power:	0.82 hp
Min. maintained system pressure*:	10 ft	Impeller diameter:	3.94 in
Standby qty:	0	Pump/motor run qty:	1
PEIvl:	0.43	ERvl:	57
Outlet velocity:	8.6 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Low Pressure Ductile Iron	Impeller:	316 Stainless Steel
Rating:	ANSI-125	Casing o-ring:	EPDM
Connections:	Inlet: 2in, Outlet: 2in	Flush line:	Braided Stainless Steel
Casing (volute):	Ductile Iron, E-coated	Stub shaft:	316 Stainless Steel

Mechanical seal data

Seal type:	Inside Single Spring	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-ssc L EPSS 2A	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS) ****:	2000 PPM

Electrical data

Supplier:	Armstrong	Insulation class:	Class F Insulation
Size:	1.5 hp	Motor type:	Permanent Magnet
Frame size:	IEC90S	Efficiency:	IE5
Enclosure:	TEFC	Power supply:	208/3/60
Operating speed @ 100% flow:	2572 rpm	Operating speed @ 50% flow***:	1809 rpm

***Based on minimum pressure setting of 40% of design head

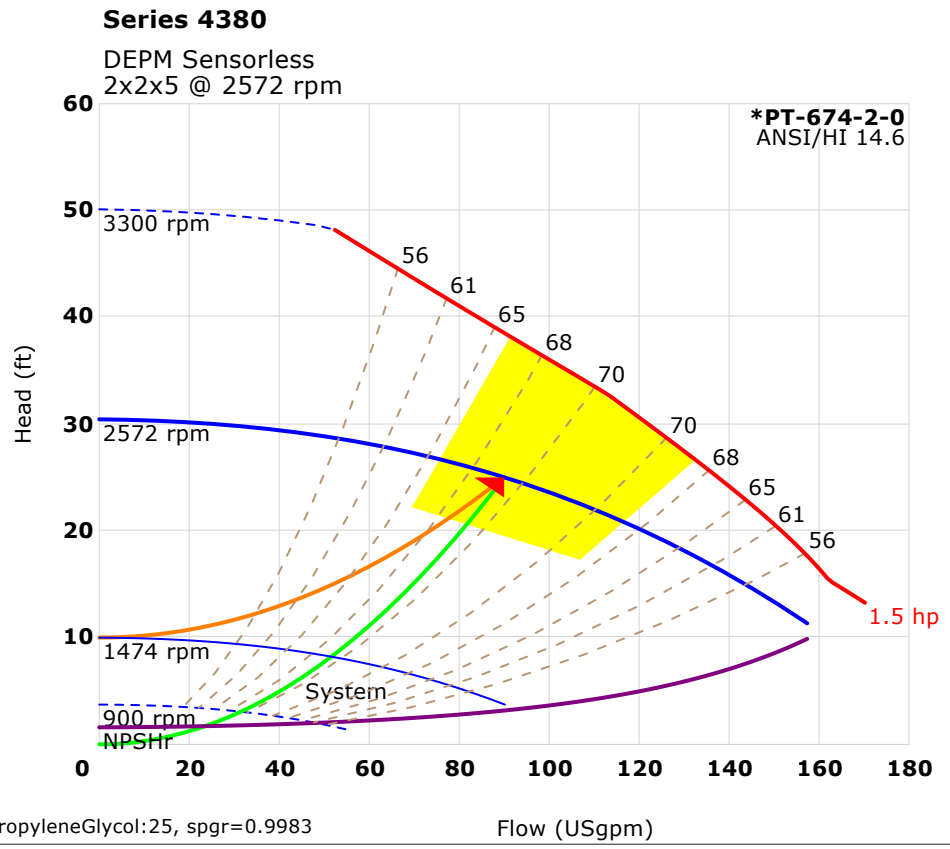
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid.

DEPM controller data

Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet MS/TP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current or voltage)
Fused disconnect switch:	Loose Supply	Digital inputs:	2 (programmable)
Control orientation:	L5	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Not Applicable
Absorbed Power/BHP at 50% load/flow and 55% of design head:	0.45 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	No	EMI/RFI control:	Integrated filter to meet EN61800-3

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 2144 rpm:
NPSHR: 3.18 ft
Intersection Pt: 90 usgpm @ 25 ft
bhp=0.82 hp, eff=68.92 %%,
%bepq=83 %%

2. Control (QPC) @ 2352 rpm:
NPSHR: 2.53 ft
Intersection Pt: 78.75 USgpm @ 21.48 ft
bhp=0.63 hp, eff=68.17%,
%bepq=78.89%

3. Control (QPC) @ 2133 rpm:
NPSHR: 1.94 ft
Intersection Pt: 66.6 USgpm @ 18.21 ft
bhp=0.46 hp, eff=66.76%,
%bepq=73.48%

4. Control (QPC) @ 1913 rpm:
NPSHR: 1.41 ft
Intersection Pt: 53.1 USgpm @ 15.22 ft
bhp=0.32 hp, eff=63.93%,
%bepq=65.22%

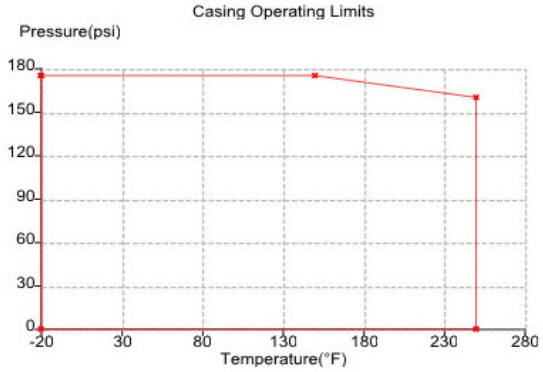
5. Control (QPC) @ 1694 rpm:
NPSHR: 0.95 ft
Intersection Pt: 36.9 USgpm @ 12.52 ft
bhp=0.2 hp, eff=57%,
%bepq=51.14%

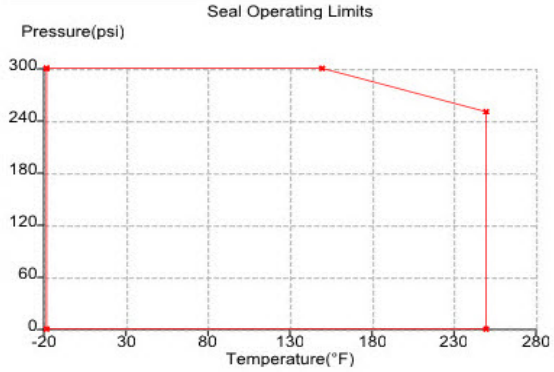
6. Hmin: 10 ft 1474 rpm:
NPSHR: 0.53 ft
Intersection Pt: 0 USgpm @ 10 ft
(Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	90 USgpm	38.54 ft	65.37%
Design point	90 USgpm	25 ft	68.92 %
50% average flow (with default load profile)	45 USgpm	13.75 ft	61.12 %
Motor Capability @ Rated Speed	1.15 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 250 F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless bundle:	Yes	DEPC Parallel sensorless:	No
Energy performance bundle:	No	Protection bundle:	No
Dual season setup:	No	Zone optimization bundle:	No

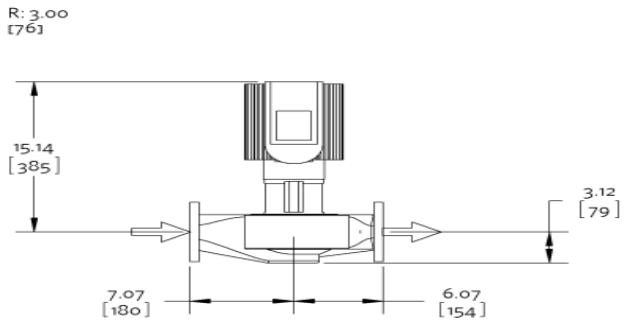
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1 min:	N/A	H2 min:	N/A
Maximum flow:	N/A	Minimum flow:	N/A

Optional Services

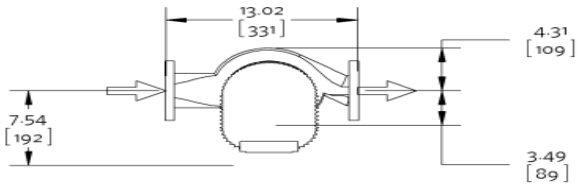
On-site pump commissioning:	Cost not Included	Extended warranty:	No
Pump manager:	Yes	Include spare parts qty:	0

Dimensional data (not for construction)

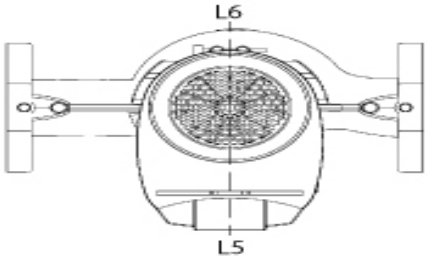
Side view



Top view



Weight: 62 lb [28.12 kg], Units of measure: inches [millimeters]
· Not to scale
· R = minimum lifting clearance required above motor
· Coupling guard and flush line (not shown) are supplied
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	2	ANSI-125	6.00	4	4.75	0.625
Outlet	2	ANSI-125	6.00	4	4.75	0.625

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Loose Supply
Space Heater: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Design Envelope pumps offer industry-leading efficiency and performance management capabilities for significantly reduced energy consumption. Armstrong has undertaken a multi-year project to transition our pump offering to an integrated design that use Design Envelope Permanent Magnet technology for even greater operating cost savings. In the sizes currently equipped with Design Envelope Permanent Magnet motors, the pumps are also more compact and lighter than our standard Design Envelope pumps.

Please note that depending on the pump sizes, your shipment may include a combination of:

- Design Envelope Permanent Magnet pumps
- Design Envelope Permanent Magnet pumps with IVS controls
- Design Envelope Pumps with Premium efficiency induction motors and IVS controls

DISCONNECT CONFIGURATION

Site electrical input voltage : _____

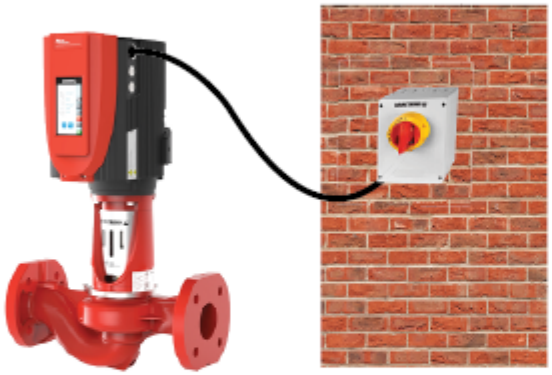
Number of 1PH 200-240V motors : ☐ 2hp & lower: _____

Number of 3PH 200-240V motors : ☐ 10hp & lower: _____

Number of 3PH 380-480V motors : ☐ 10hp & lower: _____

Number of 3PH 575-660V motors : ☐ 10hp & lower: _____

FUSED DISCONNECT FOR WALL MOUNTING



TECHNICAL DATA

Enclosure: UL/NEMA 4 X rated

Terminals

Number of poles: 3-poles, ground

Terminal size acceptability: Copper conductors only, 75°C, 14-8AWG

Electrical/Environmental

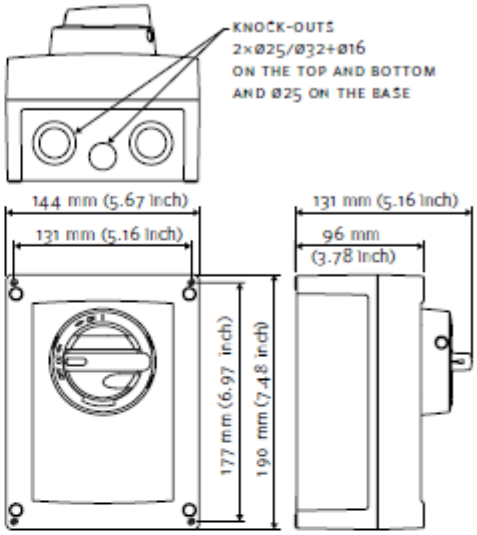
Up to 600V / Up to 60A, 50/60Hz

Minimum short circuit rating: 10kA

Ambient operating temperature: -10°C to +50°C (+14°F to +122°F)

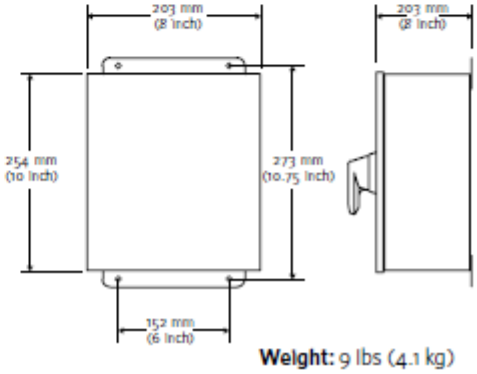
Ambient storage temperature: -30°C to +65°C (-22°F to +149°F)

30A DISCONNECT



Weight: 3.5 lbs (1.6 kg)

60A DISCONNECT



Weight: 9 lbs (4.1 kg)

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 1PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - FRAME 71

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
0.33	0.25	30A	6A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	2.0	1.6
0.5	0.37		6A		2.6	2.0
0.75	0.55		10A		3.3	2.9
1	0.75		10A		4.8	4.0
1.5	1.1		15A		7.1	5.8
2	1.5		20A		9.3	7.6

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
1	0.75	30A	10A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	3.1	2.7
1.5	1.1		10A		4.2	3.7
2	1.5		15A		6.0	4.8
3	2.2		20A		8.8	7.2
5	4		30A		15.7	14.0
7.5	5.5	60A	50A	J FAST-ACTING	20.7	18.5
10	7.5		60A	RK1 FAST-ACTING	28.1	25.1

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
3	2.2	30A	20A	CC FAST-ACTING	7.4	6.4
5.5	4		30A		14.2	12.6
7.5	5.5		30A		19.0	16.6
10	7.5		30A		26.2	23.0

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - FRAME 71

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
0.33	0.25	30A	5A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	1.3	0.8
0.5	0.37		5A		1.6	1.1
0.75	0.55		6A		1.9	1.5
1	0.75		6A		2.5	2.0
1.5	1.1		10A		4.1	3.5
2	1.5		10A		5.3	3.9
3	2.2		10A		6.5	5.8
4	3		15A		6.1	4.9
5	4		20A		9.2	7.1
7.5	5.5		25A		12.5	8.2
10	7.5		30A		18.5	14.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
1	0.75	30A	6A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	2.1	1.7
1.5	1.1		6A		2.8	2.3
2	1.5		10A		4.8	4.1
3	2.2		10A		6.5	5.8
4	3		15A		6.1	4.9
5	4		20A		9.2	7.1
7.5	5.5		25A		12.5	8.2
10	7.5		30A		18.5	14.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
3	2.2	30A	10A	CC FAST-ACTING	3.9	3.2
4	3		10A		5.4	4.2
5.5	4		15A		7.1	5.7
7.5	5.5		15A		9.5	7.6
10	7.5		25A		13.6	11.3
15	11		30A		18.8	15.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 575-600V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM MOTORS

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				575 VAC	600 VAC
1	0.75	30A	5A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	1.6	1.3
1.5	1.1		6A		2.2	1.8
2	1.5		8A		2.0	1.6
3	2.2		10A		3.4	2.8
5	4		20A		5.5	4.9
7.5	5.5		25A		7.2	6.0
10	7.5		30A		9.8	9.4

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 575-600V INPUT POWER FOI USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2 MOTORS

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				575 VAC	600 VAC
1	0.75	30A	5A	CC FAST-ACTING	1.6	1.5
1.5	1.1		6A		2.1	2.0
2	1.5		6A		2.6	2.6
3	2.2		6A		3.5	3.2
5	4		15A		5.7	5.3
7.5	5.5		15A		7.5	7.4
10	7.5		30A		10.8	10.1

All cabling and must comply with national and local regulations on cable cross-sections and ambient temperature

Submittal

Ref. #: SQFGQ002934_1

Suction guide

Model: SG-32

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
TH3-1,2,3-1,2	6	SG-32	3 in	2 in	90 USgpm	0.89 ft	Design Envelope Sensorless 4380 0205-001.5

*at design flow

Materials of construction

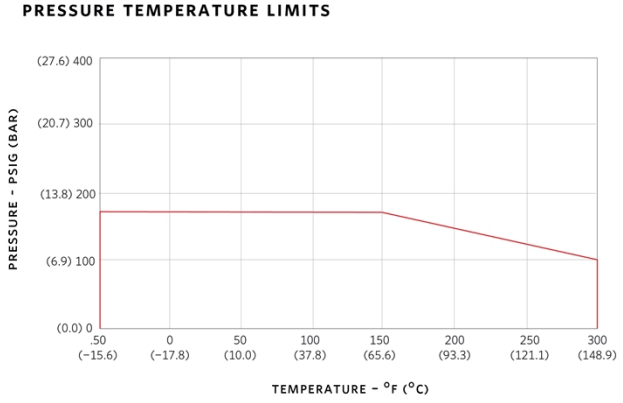
SG-32

Body:	Cast iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast iron	Strainer:	Stainless Steel,0.125"(3mm)Perf..
Cover plate:	Cast iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-32-Suction Guide-ANSI-125

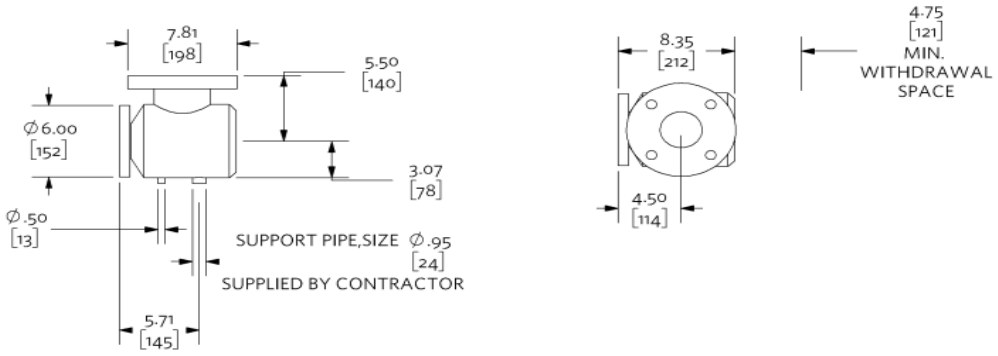


Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

Dimensional data (not for construction)

SG-32	Weight: 31 lb [14.06 kg]
Side view	Top view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-3FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
TH3-1,2,3-1,2	6	FTV-3FA	3 in	Angle	Flanged	90 USgpm	3 ft	Design Envelope Sensorless 4380 0205-001.5

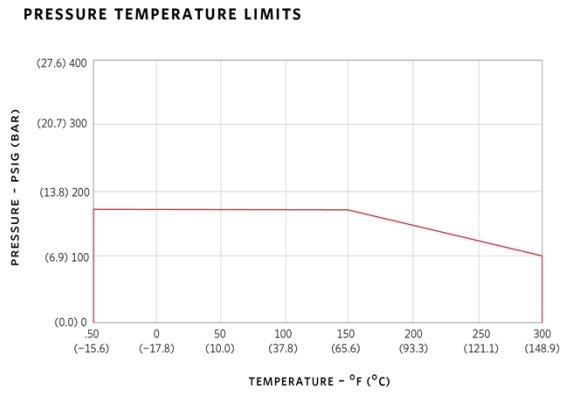
*at design flow

Materials of construction

FTV-3FA-Flo-Trex Valve-ANSI-125-Angle			
Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

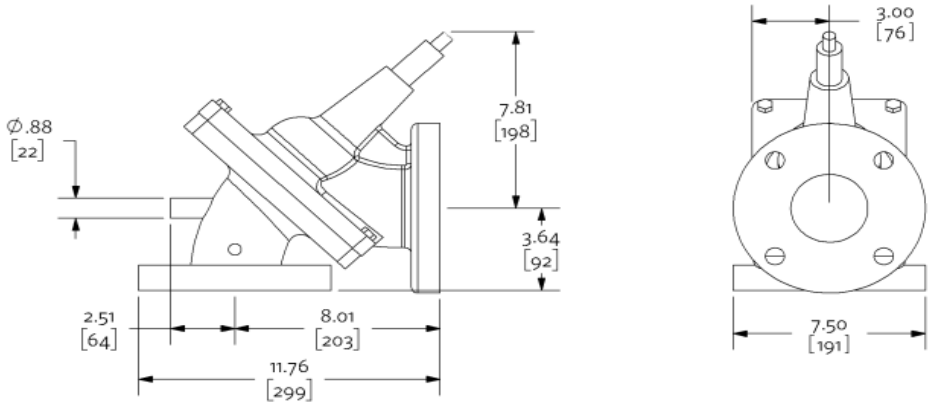
FTV-3FA-Flo-Trex Valve-ANSI-125-Angle



Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-3FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 39 lb [17.69 kg]
Side view	Front view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Spare Parts and Kits					
Design Envelope Seal Parts Kits					
Armstrong PN#	**Description**	**Includes**	**Item Size**	**Weights (lb\kg)**	**Image**
89975000-900K	Seal-kit 0.625 2A c-Ssc316epdL	Mech Seal, V- Clamp, O-ring, Capscrew & Washer	2A - 0.625"	2.8 lb [1.27 kg]	

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Close-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4380 1503-001.0 with Suction Guide, Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	B1.1,2,3,4,5,6,7-1,2	Configuration:	Single
Service:	BLDG TAKEOFF	Suction pressure:	0 ft
Location:	BLDG B1.1,2,3,4,5,6,7	Fluid:	Propylene Glycol: 25
Qty:	14	Operating temperature:	60 °F
Total system flow:	40 USgpm	Duty flow per pump:	40 USgpm
System head:	25 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	67.52 %	Safety factor % head:	0 %
NPSHR:	3.83 ft	Total Absorbed Power:	0.37 hp
Min. maintained system pressure*:	10 ft	Impeller diameter:	3.05 in
Standby qty:	0	Pump/motor run qty:	1
PEIvl:	0.45	ERvl:	57
Outlet velocity:	6.3 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Low Pressure Ductile Iron	Impeller:	316 Stainless Steel
Rating:	ANSI-125	Casing o-ring:	EPDM
Connections:	Inlet: 1.5in, Outlet: 1.5in	Flush line:	Braided Stainless Steel
Casing (volute):	Ductile Iron, E-coated	Stub shaft:	316 Stainless Steel

Mechanical seal data

Seal type:	Inside Single Spring	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-ssc L EPSS 2A	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS) ****:	2000 PPM

Electrical data

Supplier:	Armstrong	Insulation class:	Class F Insulation
Size:	1 hp	Motor type:	Permanent Magnet
Frame size:	IEC90S	Efficiency:	IE5
Enclosure:	TEFC	Power supply:	208/3/60
Operating speed @ 100% flow:	3027 rpm	Operating speed @ 50% flow***:	2166 rpm

***Based on minimum pressure setting of 40% of design head

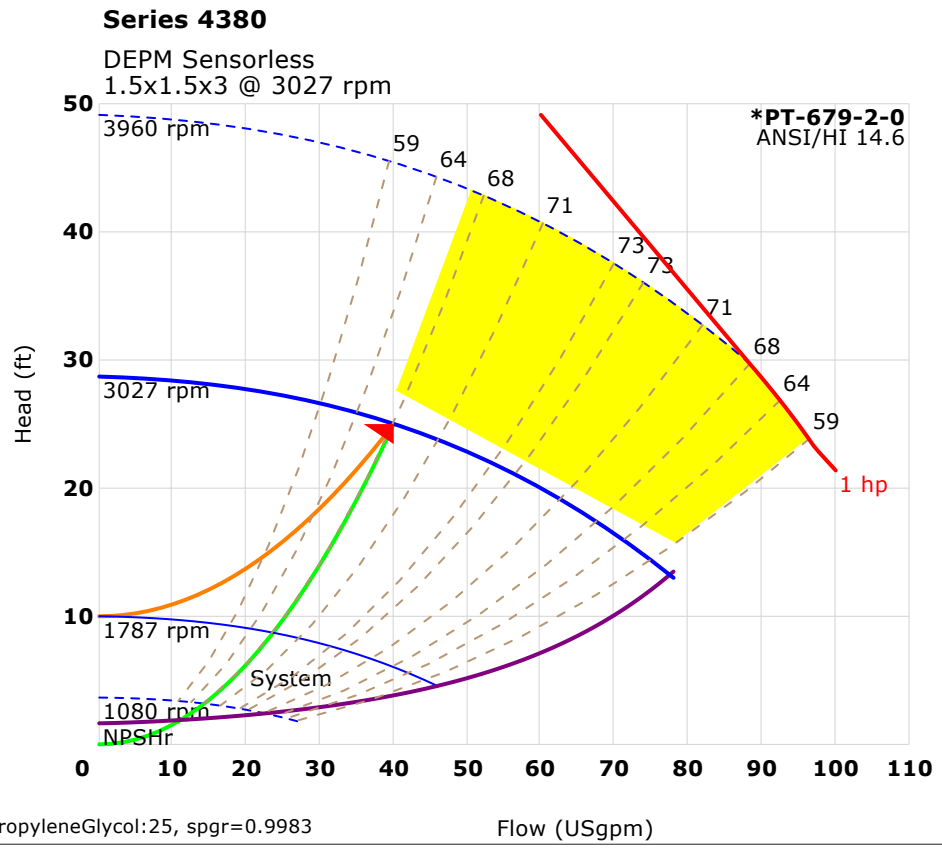
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid.

DEPM controller data

Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet MS/TP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current or voltage)
Fused disconnect switch:	Loose Supply	Digital inputs:	2 (programmable)
Control orientation:	L5	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Not Applicable
Absorbed Power/BHP at 50% load/flow and 55% of design head:	0.21 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	No	EMI/RFI control:	Integrated filter to meet EN61800-3

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 3027 rpm:
NPSHR: 3.83 ft
Intersection Pt: 40 usgpm @ 25 ft
bhp=0.37 hp, eff=67.52 %%, %bepq=73 %%

2. Control (QPC) @ 2779 rpm:
NPSHR: 3.07 ft
Intersection Pt: 35 USgpm @ 21.48 ft
bhp=0.29 hp, eff=66.17%, %bepq=68.97%

3. Control (QPC) @ 2531 rpm:
NPSHR: 2.36 ft
Intersection Pt: 29.6 USgpm @ 18.21 ft
bhp=0.21 hp, eff=63.98%, %bepq=63.91%

4. Control (QPC) @ 2283 rpm:
NPSHR: 1.73 ft
Intersection Pt: 23.6 USgpm @ 15.22 ft
bhp=0.15 hp, eff=60.06%, %bepq=56.39%

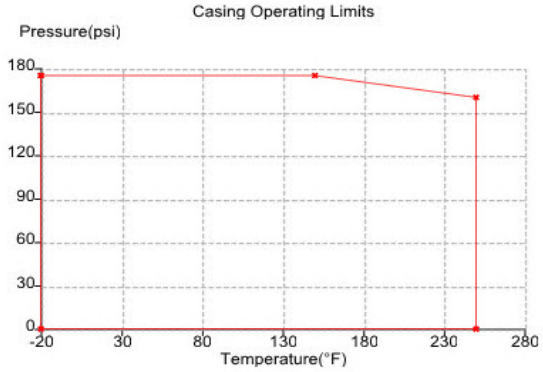
5. Control (QPC) @ 2035 rpm:
NPSHR: 1.16 ft
Intersection Pt: 16.4 USgpm @ 12.52 ft
bhp=0.1 hp, eff=51.8%, %bepq=43.89%

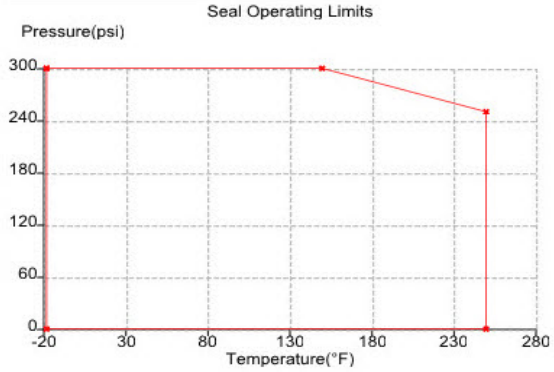
6. Hmin: 10 ft 1787 rpm:
NPSHR: 0.57 ft
Intersection Pt: 0 USgpm @ 10 ft (Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	40 USgpm	45.43 ft	59.59%
Design point	40 USgpm	25 ft	67.52 %
50% average flow (with default load profile)	20 USgpm	13.75 ft	56.57 %
Motor Capability @ Rated Speed	0.83 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 250 F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless bundle:	Yes	DEPC Parallel sensorless:	No
Energy performance bundle:	No	Protection bundle:	No
Dual season setup:	No	Zone optimization bundle:	No

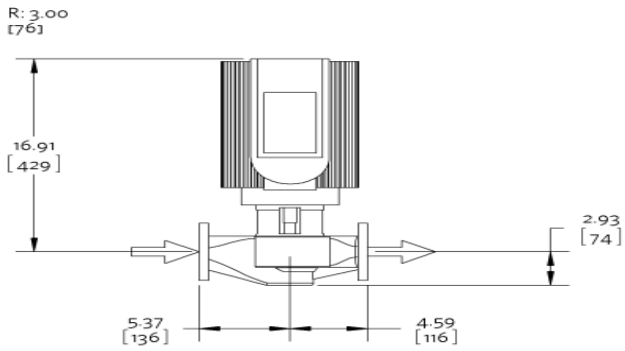
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1 min:	N/A	H2 min:	N/A
Maximum flow:	N/A	Minimum flow:	N/A

Optional Services

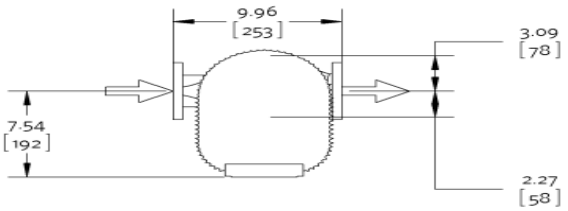
On-site pump commissioning:	Cost not Included	Extended warranty:	No
Pump manager:	Yes	Include spare parts qty:	0

Dimensional data (not for construction)

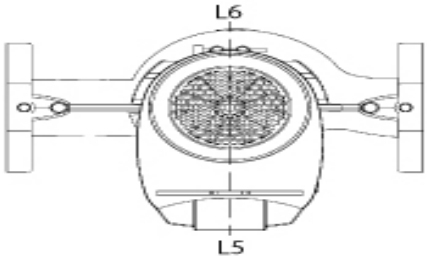
Side view



Top view



Weight: 45 lb [20.41 kg], Units of measure: inches [millimeters]
· Not to scale
· R = minimum lifting clearance required above motor
· Coupling guard and flush line (not shown) are supplied
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	1.5	ANSI-125	5.00	4	3.88	0.5
Outlet	1.5	ANSI-125	5.00	4	3.88	0.5

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Loose Supply
Space Heater: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Design Envelope pumps offer industry-leading efficiency and performance management capabilities for significantly reduced energy consumption. Armstrong has undertaken a multi-year project to transition our pump offering to an integrated design that use Design Envelope Permanent Magnet technology for even greater operating cost savings. In the sizes currently equipped with Design Envelope Permanent Magnet motors, the pumps are also more compact and lighter than our standard Design Envelope pumps.

Please note that depending on the pump sizes, your shipment may include a combination of:

- Design Envelope Permanent Magnet pumps
- Design Envelope Permanent Magnet pumps with IVS controls
- Design Envelope Pumps with Premium efficiency induction motors and IVS controls

DISCONNECT CONFIGURATION

Site electrical input voltage : _____

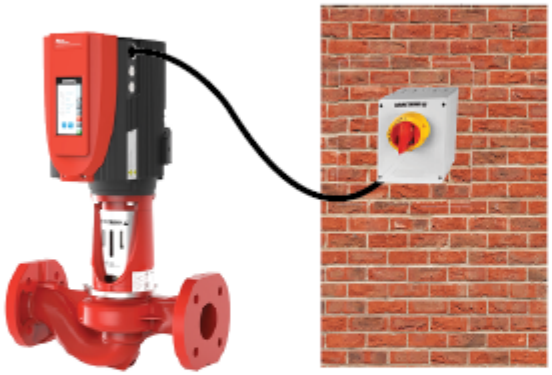
Number of 1PH 200-240V motors : ☐ 2hp & lower: _____

Number of 3PH 200-240V motors : ☐ 10hp & lower: _____

Number of 3PH 380-480V motors : ☐ 10hp & lower: _____

Number of 3PH 575-660V motors : ☐ 10hp & lower: _____

FUSED DISCONNECT FOR WALL MOUNTING



TECHNICAL DATA

Enclosure: UL/NEMA 4 X rated

Terminals

Number of poles: 3-poles, ground

Terminal size acceptability: Copper conductors only, 75°C, 14-8AWG

Electrical/Environmental

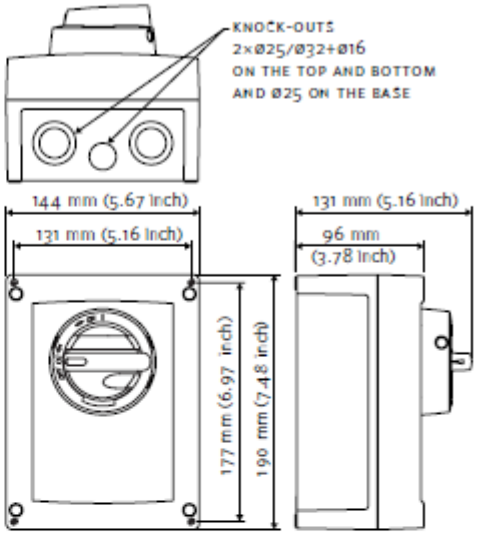
Up to 600V / Up to 60A, 50/60Hz

Minimum short circuit rating: 10kA

Ambient operating temperature: -10°C to +50°C (+14°F to +122°F)

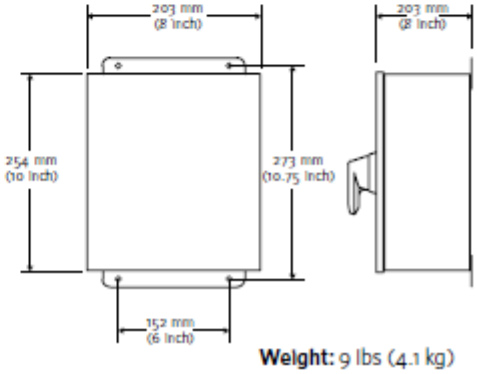
Ambient storage temperature: -30°C to +65°C (-22°F to +149°F)

30A DISCONNECT



Weight: 3.5 lbs (1.6 kg)

60A DISCONNECT



Weight: 9 lbs (4.1 kg)

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 1PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - FRAME 71

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
0.33	0.25	30A	6A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	2.0	1.6
0.5	0.37		6A		2.6	2.0
0.75	0.55		10A		3.3	2.9
1	0.75		10A		4.8	4.0
1.5	1.1		15A		7.1	5.8
2	1.5		20A		9.3	7.6

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
1	0.75	30A	10A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	3.1	2.7
1.5	1.1		10A		4.2	3.7
2	1.5		15A		6.0	4.8
3	2.2		20A		8.8	7.2
5	4		30A		15.7	14.0
7.5	5.5	60A	50A	J FAST-ACTING	20.7	18.5
10	7.5		60A	RK1 FAST-ACTING	28.1	25.1

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
3	2.2	30A	20A	CC FAST-ACTING	7.4	6.4
5.5	4		30A		14.2	12.6
7.5	5.5		30A		19.0	16.6
10	7.5		30A		26.2	23.0

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - FRAME 71

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
0.33	0.25	30A	5A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	1.3	0.8
0.5	0.37		5A		1.6	1.1
0.75	0.55		6A		1.9	1.5
1	0.75		6A		2.5	2.0
1.5	1.1		10A		4.1	3.5
2	1.5		10A		5.3	3.9
3	2.2		10A		6.5	5.8
4	3		15A		6.1	4.9
5	4		20A		9.2	7.1
7.5	5.5		25A		12.5	8.2
10	7.5		30A		18.5	14.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
1	0.75	30A	6A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	2.1	1.7
1.5	1.1		6A		2.8	2.3
2	1.5		10A		4.8	4.1
3	2.2		10A		6.5	5.8
4	3		15A		6.1	4.9
5	4		20A		9.2	7.1
7.5	5.5		25A		12.5	8.2
10	7.5		30A		18.5	14.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
3	2.2	30A	10A	CC FAST-ACTING	3.9	3.2
4	3		10A		5.4	4.2
5.5	4		15A		7.1	5.7
7.5	5.5		15A		9.5	7.6
10	7.5		25A		13.6	11.3
15	11		30A		18.8	15.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 575-600V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM MOTORS

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				575 VAC	600 VAC
1	0.75	30A	5A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	1.6	1.3
1.5	1.1		6A		2.2	1.8
2	1.5		8A		2.0	1.6
3	2.2		10A		3.4	2.8
5	4		20A		5.5	4.9
7.5	5.5		25A		7.2	6.0
10	7.5		30A		9.8	9.4

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 575-600V INPUT POWER FOI USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2 MOTORS

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				575 VAC	600 VAC
1	0.75	30A	5A	CC FAST-ACTING	1.6	1.5
1.5	1.1		6A		2.1	2.0
2	1.5		6A		2.6	2.6
3	2.2		6A		3.5	3.2
5	4		15A		5.7	5.3
7.5	5.5		15A		7.5	7.4
10	7.5		30A		10.8	10.1

All cabling and must comply with national and local regulations on cable cross-sections and ambient temperature

Submittal

Ref. #: SQFGQ002934_1

Suction guide

Model: SG-2515

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
B1.1,2, 3,4,5,6 ,7-1,2	14	SG-2515	2.5 in	1.5 in	40 USgpm	0.17 ft	Design Envelope Sensorless 4380 1503-001.0

*at design flow

Materials of construction

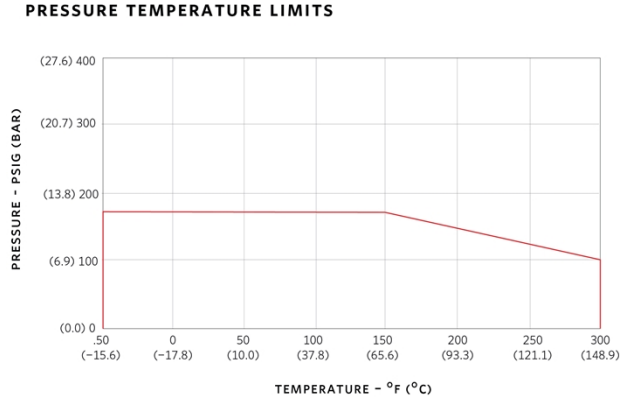
SG-2515

Body:	Cast Iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast Iron	Strainer:	Stainless Steel,0.188"(5mm)Perf..
Cover plate:	Cast Iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-2515-Suction Guide-ANSI-125

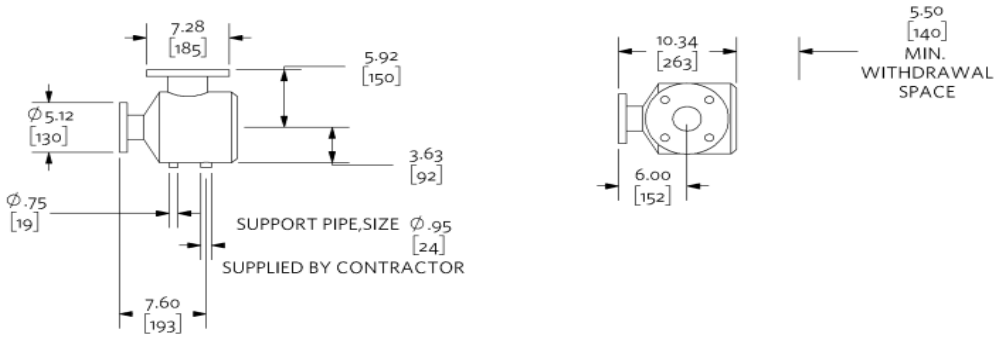


Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

Dimensional data (not for construction)

SG-2515	Weight: 26.31 lb [11.93 kg]
Side view	Top view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-2.5FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
B1.1, 2,3,4, 5,6,7-1,2	14	FTV-2.5FA	2.5 in	Angle	Flanged	40 USgpm	3.2 ft	Design Envelope Sensorless 4380 1503-001.0

*at design flow

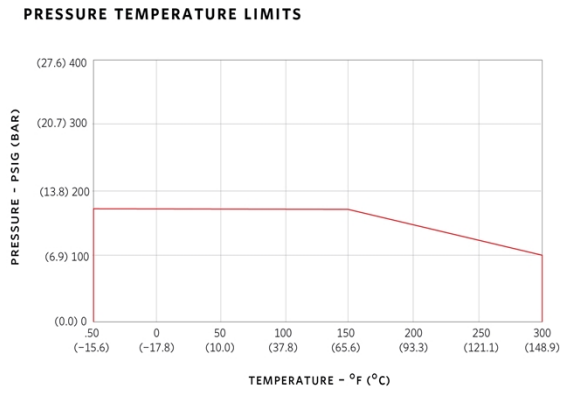
Materials of construction

FTV-2.5FA-Flo-Trex Valve-ANSI-125-Angle

Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

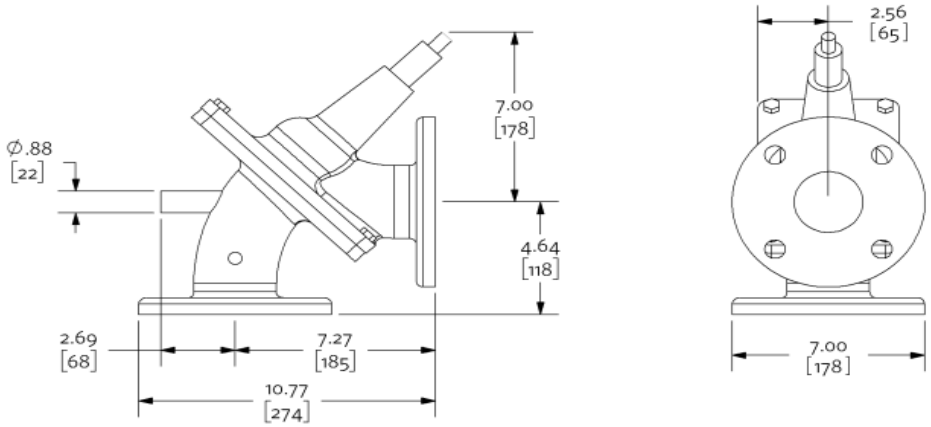
FTV-2.5FA-Flo-Trex Valve-ANSI-125-Angle



Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-2.5FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 33 lb [14.97 kg]
Side view	Front view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Spare Parts and Kits					
Design Envelope Seal Parts Kits					
Armstrong PN#	**Description**	**Includes**	**Item Size**	**Weights (lb\kg)**	**Image**
89975000-900K	Seal-kit 0.625 2A c-Ssc316epdL	Mech Seal, V- Clamp, O-ring, Capscrew & Washer	2A - 0.625"	2.8 lb [1.27 kg]	

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Close-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4380 0103-000.5 with Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	B.2-1,2,3 B3.-1,2	Configuration:	Single
Service:	BLDG TAKEOFF	Suction pressure:	0 ft
Location:	BLDG B2,B3	Fluid:	Propylene Glycol: 25
Qty:	12	Operating temperature:	60 °F
Total system flow:	30 USgpm	Duty flow per pump:	30 USgpm
System head:	25 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	49.29 %	Safety factor % head:	0 %
NPSHR:	19.28 ft	Total Absorbed Power:	0.38 hp
Min. maintained system pressure*:	10 ft	Impeller diameter:	3.05 in
Standby qty:	0	Pump/motor run qty:	1
PEIvl:	Not applicable	ERvl:	Not applicable
Outlet velocity:	11.13 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 60% of design head.

Materials of construction

Construction:	Low Pressure Ductile Iron	Impeller:	316 Stainless Steel
Rating:	ANSI-125	Casing o-ring:	EPDM
Connections:	Inlet: 1.5 MNPT, Outlet: 1.5 MNPT	Flush line:	NA
Casing (volute):	Ductile Iron, E-coated	Stub shaft:	316 Stainless Steel

Mechanical seal data

Seal type:	Inside Single Spring	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-ssc L EPSS 2A	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS) ****:	2000 PPM

Electrical data

Supplier:	Armstrong	Insulation class:	Class F Insulation
Size:	1 hp	Motor type:	Permanent Magnet
Frame size:	IEC90S	Efficiency:	IE5
Enclosure:	TEFC	Power supply:	208/3/60
Operating speed @ 100% flow:	3262 rpm	Operating speed @ 50% flow***:	2216 rpm

***Based on minimum pressure setting of 60% of design head

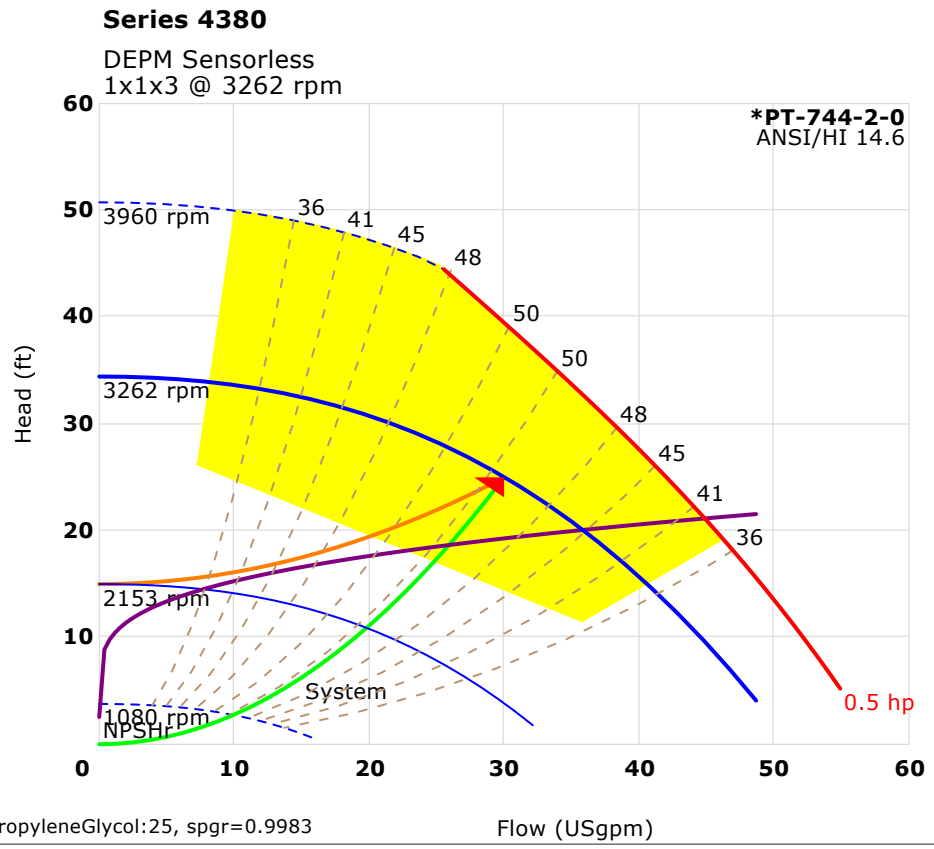
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid.

DEPM controller data

Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet MS/TP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current or voltage)
Fused disconnect switch:	Loose Supply	Digital inputs:	2 (programmable)
Control orientation:	L5	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Not Applicable
Absorbed Power/BHP at 50% load/flow and 55% of design head:	0.21 hp	Ambient temperature:	14°F to 113°F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	Yes	EMI/RFI control:	Integrated filter to meet EN61800-3

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 3262 rpm:
NPSHR: 19.28 ft
Intersection Pt: 30 usgpm @ 25 ft
bhp=0.38 hp, eff=49.29 %%,
%bepq=109 %%

2. Control (QPC) @ 2961 rpm:
NPSHR: 15.87 ft
Intersection Pt: 26.25 USgpm @ 21.48 ft
bhp=0.29 hp, eff=49.58%,
%bepq=104.99%

3. Control (QPC) @ 2660 rpm:
NPSHR: 12.68 ft
Intersection Pt: 22.2 USgpm @ 18.21 ft
bhp=0.21 hp, eff=49.67%,
%bepq=98.65%

4. Control (QPC) @ 2359 rpm:
NPSHR: 9.77 ft
Intersection Pt: 17.7 USgpm @ 15.22 ft
bhp=0.14 hp, eff=49.17%,
%bepq=88.55%

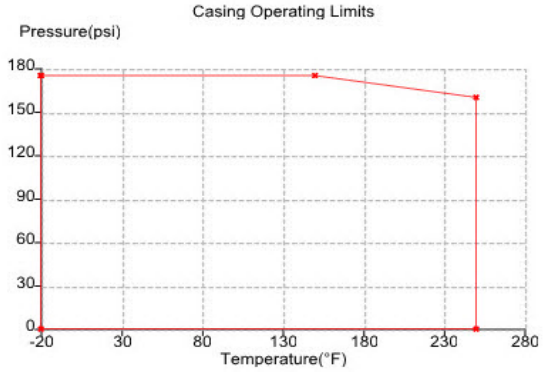
5. Control (QPC) @ 2059 rpm:
NPSHR: 7.06 ft
Intersection Pt: 12.3 USgpm @ 12.52 ft
bhp=0.08 hp, eff=46.02%,
%bepq=70.59%

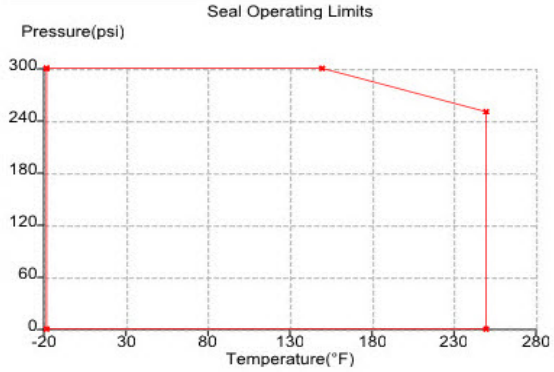
6. Hmin: 10 ft 1758 rpm:
NPSHR: 0.78 ft
Intersection Pt: 0 USgpm @ 10 ft
(Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	30 USgpm	39.48 ft	49.03%
Design point	30 USgpm	25 ft	49.29 %
50% average flow (with default load profile)	15 USgpm	13.75 ft	48.09 %
Motor Capability @ Rated Speed	0.55 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 250 F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless bundle:	Yes	DEPC Parallel sensorless:	No
Energy performance bundle:	No	Protection bundle:	No
Dual season setup:	No	Zone optimization bundle:	No

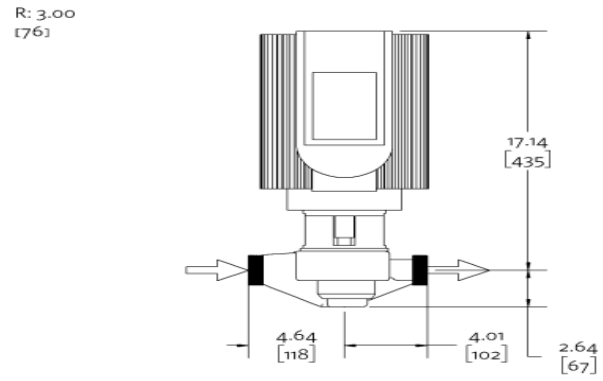
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1 min:	N/A	H2 min:	N/A
Maximum flow:	N/A	Minimum flow:	N/A

Optional Services

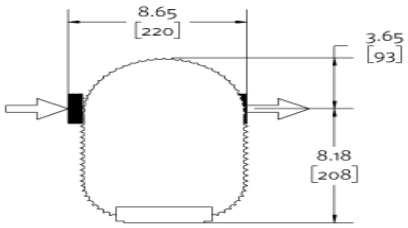
On-site pump commissioning:	Cost not Included	Extended warranty:	No
Pump manager:	Yes	Include spare parts qty:	0

Dimensional data (not for construction)

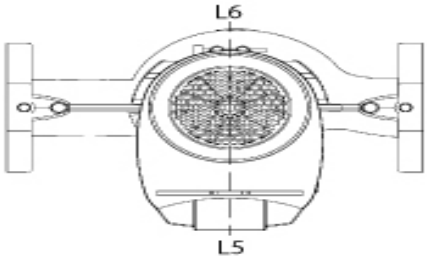
Side view



Top view



Weight: 30 lb [13.61 kg], Units of measure: inches [millimeters]
· Not to scale
· R = minimum lifting clearance required above motor
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	1.5 MNPT	N/A	N/A	N/A	N/A	N/A
Outlet	1.5 MNPT	N/A	N/A	N/A	N/A	N/A

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Loose Supply
Space Heater: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Design Envelope pumps offer industry-leading efficiency and performance management capabilities for significantly reduced energy consumption. Armstrong has undertaken a multi-year project to transition our pump offering to an integrated design that use Design Envelope Permanent Magnet technology for even greater operating cost savings. In the sizes currently equipped with Design Envelope Permanent Magnet motors, the pumps are also more compact and lighter than our standard Design Envelope pumps.

Please note that depending on the pump sizes, your shipment may include a combination of:

- Design Envelope Permanent Magnet pumps
- Design Envelope Permanent Magnet pumps with IVS controls
- Design Envelope Pumps with Premium efficiency induction motors and IVS controls

DISCONNECT CONFIGURATION

Site electrical input voltage : _____

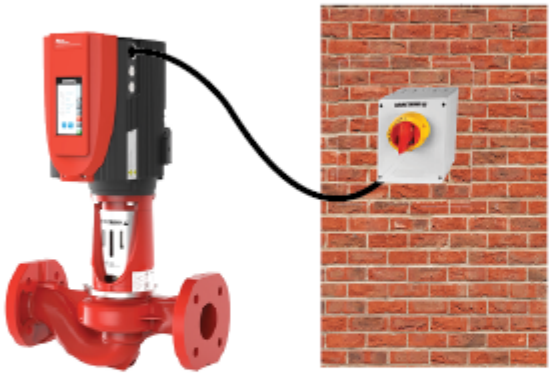
Number of 1PH 200-240V motors : ☐ 2hp & lower: _____

Number of 3PH 200-240V motors : ☐ 10hp & lower: _____

Number of 3PH 380-480V motors : ☐ 10hp & lower: _____

Number of 3PH 575-660V motors : ☐ 10hp & lower: _____

FUSED DISCONNECT FOR WALL MOUNTING



TECHNICAL DATA

Enclosure: UL/NEMA 4 X rated

Terminals

Number of poles: 3-poles, ground

Terminal size acceptability: Copper conductors only, 75°C, 14-8AWG

Electrical/Environmental

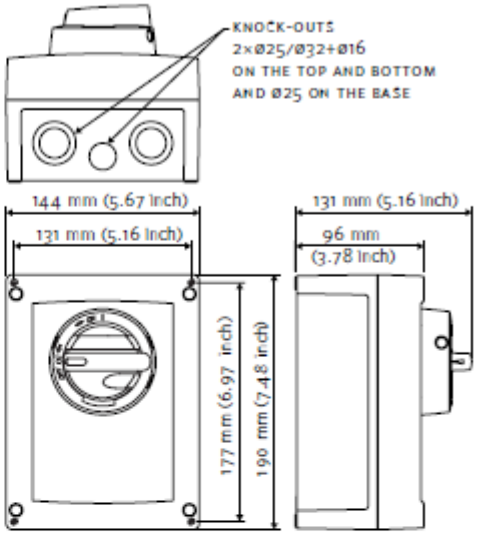
Up to 600V / Up to 60A, 50/60Hz

Minimum short circuit rating: 10kA

Ambient operating temperature: -10°C to +50°C (+14°F to +122°F)

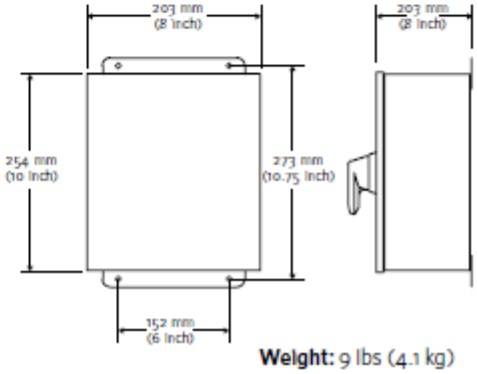
Ambient storage temperature: -30°C to +65°C (-22°F to +149°F)

30A DISCONNECT



Weight: 3.5 lbs (1.6 kg)

60A DISCONNECT



Weight: 9 lbs (4.1 kg)

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 1PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - FRAME 71

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
0.33	0.25	30A	6A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	2.0	1.6
0.5	0.37		6A		2.6	2.0
0.75	0.55		10A		3.3	2.9
1	0.75		10A		4.8	4.0
1.5	1.1		15A		7.1	5.8
2	1.5		20A		9.3	7.6

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
1	0.75	30A	10A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	3.1	2.7
1.5	1.1		10A		4.2	3.7
2	1.5		15A		6.0	4.8
3	2.2		20A		8.8	7.2
5	4		30A		15.7	14.0
7.5	5.5	60A	50A	J FAST-ACTING	20.7	18.5
10	7.5		60A	RK1 FAST-ACTING	28.1	25.1

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 200-240V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				200 VAC	240 VAC
3	2.2	30A	20A	CC FAST-ACTING	7.4	6.4
5.5	4		30A		14.2	12.6
7.5	5.5		30A		19.0	16.6
10	7.5		30A		26.2	23.0

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - FRAME 71

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
0.33	0.25	30A	5A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	1.3	0.8
0.5	0.37		5A		1.6	1.1
0.75	0.55		6A		1.9	1.5
1	0.75		6A		2.5	2.0
1.5	1.1		10A		4.1	3.5
2	1.5		10A		5.3	3.9
3	2.2		10A		6.5	5.8
4	3		15A		6.1	4.9
5	4		20A		9.2	7.1
7.5	5.5		25A		12.5	8.2
10	7.5		30A		18.5	14.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
1	0.75	30A	6A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	2.1	1.7
1.5	1.1		6A		2.8	2.3
2	1.5		10A		4.8	4.1
3	2.2		10A		6.5	5.8
4	3		15A		6.1	4.9
5	4		20A		9.2	7.1
7.5	5.5		25A		12.5	8.2
10	7.5		30A		18.5	14.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 380V-480V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				380 VAC	480 VAC
3	2.2	30A	10A	CC FAST-ACTING	3.9	3.2
4	3		10A		5.4	4.2
5.5	4		15A		7.1	5.7
7.5	5.5		15A		9.5	7.6
10	7.5		25A		13.6	11.3
15	11		30A		18.8	15.5

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 575-600V INPUT POWER FOR USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM MOTORS

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				575 VAC	600 VAC
1	0.75	30A	5A	CC FAST-ACTING J FAST-ACTING RK1 FAST-ACTING	1.6	1.3
1.5	1.1		6A		2.2	1.8
2	1.5		8A		2.0	1.6
3	2.2		10A		3.4	2.8
5	4		20A		5.5	4.9
7.5	5.5		25A		7.2	6.0
10	7.5		30A		9.8	9.4

ARMSTRONG DISCONNECT SWITCH AND FUSE RATING - 3PH 575-600V INPUT POWER FOI USE WITH DESIGN ENVELOPE PERMANENT MAGNET MOTORS - DEPM2 MOTORS

RATED POWER		DISCONNECT SWITCH RATING	FUSE RATING	FUSE CLASS TYPES	MAXIMUM DRIVER INPUT CURRENT (A)	
HP	KW				575 VAC	600 VAC
1	0.75	30A	5A	CC FAST-ACTING	1.6	1.5
1.5	1.1		6A		2.1	2.0
2	1.5		6A		2.6	2.6
3	2.2		6A		3.5	3.2
5	4		15A		5.7	5.3
7.5	5.5		15A		7.5	7.4
10	7.5		30A		10.8	10.1

All cabling and must comply with national and local regulations on cable cross-sections and ambient temperature

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-2.5FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
B.2-1,2,3 B3.-1,2	12	FTV-2.5FA	2.5 in	Angle	Flanged	30 USgpm	3.2 ft	Design Envelope Sensorless 4380 0103-000.5

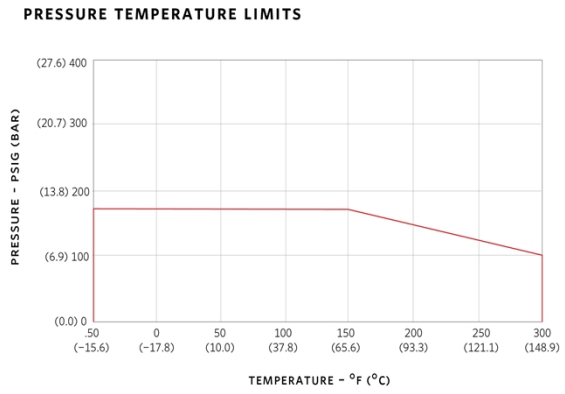
*at design flow

Materials of construction

FTV-2.5FA-Flo-Trex Valve-ANSI-125-Angle			
Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

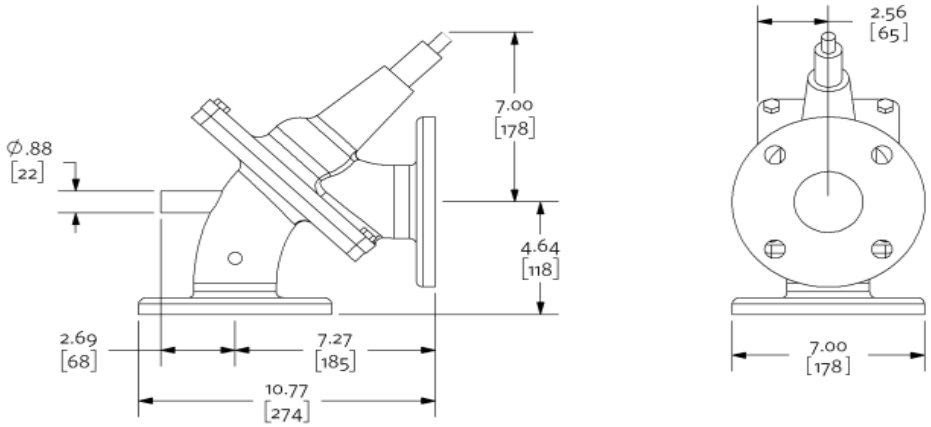
FTV-2.5FA-Flo-Trex Valve-ANSI-125-Angle



Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-2.5FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 33 lb [14.97 kg]
Side view	Front view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Spare Parts and Kits					
Design Envelope Seal Parts Kits					
Armstrong PN#	**Description**	**Includes**	**Item Size**	**Weights (lb\kg)**	**Image**
89975000-900K	Seal-kit 0.625 2A c-Ssc316epdL	Mech Seal, V- Clamp, O-ring, Capscrew & Washer	2A - 0.625"	2.8 lb [1.27 kg]	

Submittal

Ref. #: SQFGQ002934_1

Design Envelope Split-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4300 0608-010.0 with Suction Guide, Flo-Trex Valve and Spare Parts and Kits

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Glenn Wheeler
Location:	Far Rockaways	**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag number:	DRY COOLER	Configuration:	Single
Service:	DC TAKEOFF + CIRCULATION	Suction pressure:	0 ft
Location:	BLDG C	Fluid:	Propylene Glycol: 25
Qty:	4	Operating temperature:	60 °F
Total system flow:	750 USgpm	Duty flow per pump:	750 USgpm
System head:	25 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	0.9983
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	77.06 %	Safety factor % head:	0 %
NPSHR:	8.85 ft	Total Absorbed Power:	6.13 hp
Min. maintained system pressure*:	10 ft	Impeller diameter:	7.02 in
PElvl:	0.468152665	ERvl:	53.18473354
Standby qty:	0	Pump/motor run qty:	1
Outlet velocity:	8.33 ft/s		
Redundancy %:	N/A		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Bronze Fitted	Impeller:	Bronze
Rating:	ANSI-125	Pump shaft:	416 Stainless Steel
Connections:	Inlet: 6in, Outlet: 6in	Flush line:	Braided Stainless Steel
Casing (volute):	Cast Iron, E-coated	Casing gasket:	Confined Non-Asbestos Fiber

Mechanical seal data

Seal type:	Outside Balanced	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-SSC AB2	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	Viton
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS)****:	2000 PPM

Electrical data

Supplier:		Insulation class:	Class F Insulation
Size:	10 hp	Motor type:	Inverter Duty
Frame size:	215TC	Efficiency:	NEMA Premium 12.12
Enclosure:	ODP	Power supply:	208/3/60
Operating speed @ 100% flow:	1547 rpm	Operating speed @ 50% flow***:	1047 rpm

***Based on minimum pressure setting of 40% of design head.

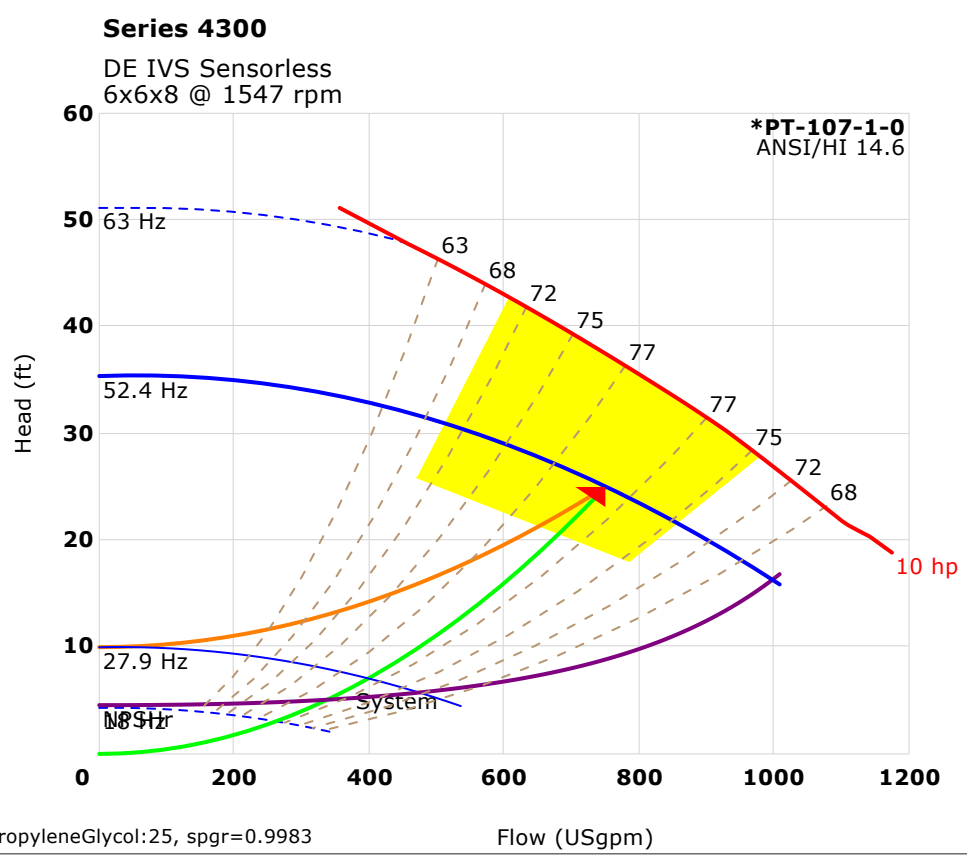
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid

IVS controller data

Sensorless control:	Yes - Quadratic press control	Communication port:	RS 485
Communication protocol (*):	BACnet TCP/IP	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current)
Fused disconnect switch:	Integrated Fused Disconnect	Digital inputs:	4 (programmable)
Control orientation:	L1	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Fan cooled through back channel
Absorbed Power/BHP at 50% load/flow and 55% of design head:	3.37 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	Yes	EMI/RFI control:	Integrated filter to meet EN61800-3
		Harmonic suppression:	Integrated DC link reactor**

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field.
** The IVS control is a low harmonic control with a built-in DC link reactor equivalent in performance to a 5% AC line reactor. This does not guarantee performance to any system wide harmonic specification or the costs to meet a system wide specification. If supplied with the system electrical details, Armstrong will run a computer simulation of the system wide harmonics. If system harmonic levels are exceeded, Armstrong can also recommend additional harmonic mitigation and the cost for such mitigation.

Performance curve



PropyleneGlycol:25, spgr=0.9983

--Control Data—

1. Hmax @ 52.44 Hz:
NPSHR: 8.85 ft
Intersection Pt: 750 usgpm @ 25 ft
bhp=6.13 hp, eff=77.06 %%,
%bepq=104 %%

2. Control (QPC) @ 47.53 Hz:
NPSHR: 7.49 ft
Intersection Pt: 656.25 USgpm @ 21.48 ft
bhp=4.61 hp, eff=77.08%,
%bepq=99.64%

3. Control (QPC) @ 42.62 Hz:
NPSHR: 6.12 ft
Intersection Pt: 555 USgpm @ 18.21 ft
bhp=3.33 hp, eff=76.63%,
%bepq=93.63%

4. Control (QPC) @ 37.7 Hz:
NPSHR: 4.76 ft
Intersection Pt: 442.5 USgpm @ 15.22 ft
bhp=2.27 hp, eff=74.79%,
%bepq=84.28%

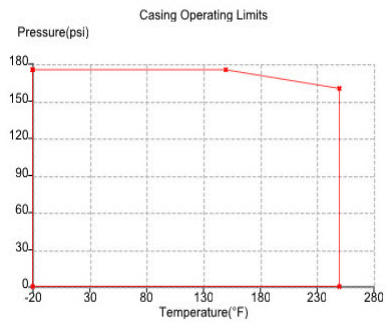
5. Control (QPC) @ 32.79 Hz:
NPSHR: 3.43 ft
Intersection Pt: 307.5 USgpm @ 12.52 ft
bhp=1.42 hp, eff=68.2%,
%bepq=67.38%

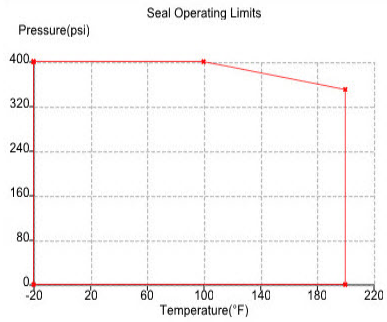
6. Hmin: 10 ft 27.88 Hz:
NPSHR: 2.2 ft
Intersection Pt: 0 USgpm @ 10 ft
(Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	750 USgpm	38.74 ft	75.87%
Design point	750 USgpm	25 ft	77.06 %
50% average flow (with default load profile)	375 USgpm	13.75 ft	72.38 %
Motor Capability @ Rated Speed	8.46 hp		

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 200 ˚F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless Bundle:	Yes	DEPC Parallel Sensorless:	No
Energy Performance Bundle:	No	Protection Bundle:	No
Dual Season Setup:	No	Zone Optimization Bundle:	No

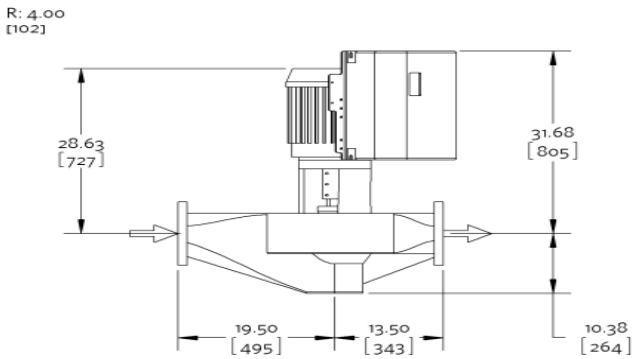
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1min:	N/A	H2min:	N/A
Maximum Flow:	N/A	Minimum Flow:	N/A

Optional Services

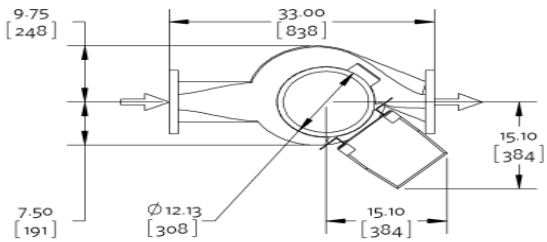
On-Site Pump Commissioning:	Cost not Included	Extended Warranty:	No
Pump Manager:	Yes	Include Spare Parts Qty:	0

Dimensional data (not for construction)

Side view

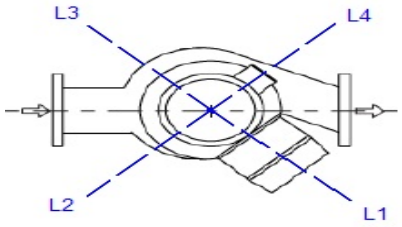


Top view



Inverter motor type: Inverter duty

Weight: 620 lb [281.23 kg], Units of measure: inches [millimeters]
· R = minimum lifting clearance required above motor
· Coupling guard and flush line (not shown) are supplied
· Tolerance of ± 0.125 inch (± 3 mm) should be used
· For certified dimensions, please contact your Armstrong representative
· Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	6	ANSI-125	11.00	8	9.50	0.75
Outlet	6	ANSI-125	11.00	8	9.50	0.75

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

Special instructions

Reference Motor Specification AES 05007.
The program has defaulted to a NEMA Premium Efficiency motor supplied with NEMA MG-1 Part 31.4.4.2 insulation standards for inverter-fed polyphase motors.
OSHPD Seismic Certification OSP-0422-10
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: Certified Test Curves (Flow & Head) (cth)
Seal Environment Accessories: None
Fused Disconnect: Integrated Fused Disconnect
Pre-Wired Control Bridge: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Submittal

Ref. #: SQFGQ002934_1

Suction guide

Model: SG-66

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
DRY COOLER	4	SG-66	6 in	6 in	750 USgpm	1.68 ft	Design Envelope Sensorless 4300 0608-010.0

*at design flow

Materials of construction

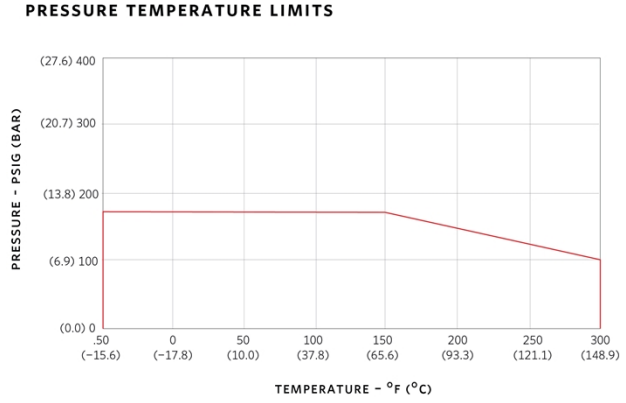
SG-66

Body:	Cast iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast iron	Strainer:	Stainless Steel,0.125"(3mm)Perf..
Cover plate:	Cast iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-66-Suction Guide-ANSI-125

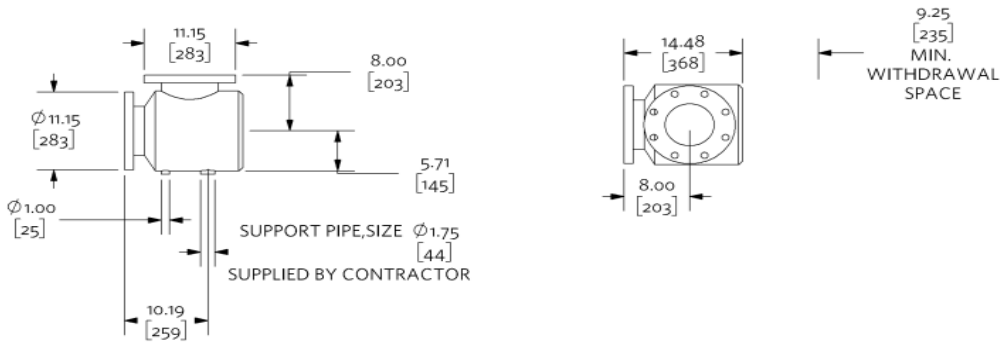


Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

Dimensional data (not for construction)

SG-66	Weight: 141 lb [63.96 kg]
Side view	Top view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFGQ002934_1

Flo-trex valve

Model: FTV-6FA-Flo-Trex Valve-ANSI-125-Angle

Project name:	Arvern East-Far Rockaways ZBF Geo 2.25.23	**Representative:**	Tyler Deluca
Location:		**Phone number:**	
Date submitted:	2/25/2023 12:38 PM	**e-mail:**	Tdeluca@Srs-Enterprises.com
Engineer:		**Submitted by:**	Deluca, Tyler

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
DRY COOLER	4	FTV-6FA	6 in	Angle	Flanged	750 USgpm	3.48 ft	Design Envelope Sensorless 4300 0608-010.0

*at design flow

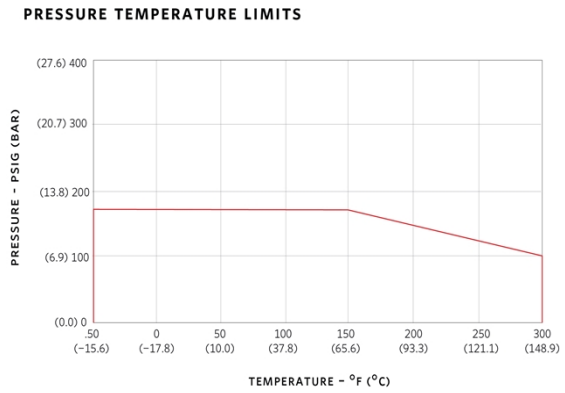
Materials of construction

FTV-6FA-Flo-Trex Valve-ANSI-125-Angle

Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

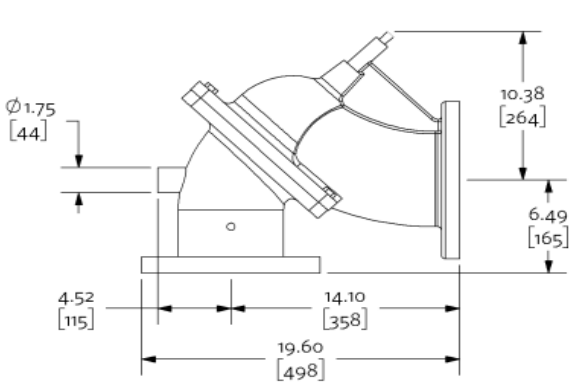
FTV-6FA-Flo-Trex Valve-ANSI-125-Angle

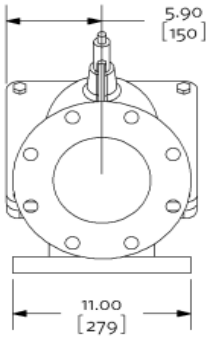


Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-6FA-Flo-Trex Valve-ANSI-125-Angle	Weight: 167 lb [75.75 kg]
Side view	Front view





Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Comprehensive Extended Warranty (CEW) Contract

Armstrong Comprehensive Extended Warranty contract provides a seamless extension of the Service factory warranty. This contract applies only when an Armstrong equipment has been started up based on Armstrong guidelines and remain connected for the entire warranty period to Pump Manager cloud-analytics for active performance management.

By selecting this contract, you are expanding the warranty on the connected equipment to include site/off-site labor to resolve specific equipment problem. All CEW contracts are governed under Terms & Conditions - Service Agreement and the general Armstrong Terms and Conditions of Sale & Installation. Warranty starts from day of shipment of the Design Envelope product.

1.0 Features & Benefits

Features	Benefits
• Up to a total of 3yr or 5yr on products failure coverage*	Provides peace of mind and complete factory warranty protection, including labor for the duration of the warranty. Please see "Details of Service" section of this document for more details.
• 24x7 Customer Service Support with Toll Free Call-in Telephone Number	Customers are provided with a toll-free number. Calls are handled within a 24hours period, 7 days a week.
• Factory authorized repair or replacement	All repair work is carried out by certified and authorized Armstrong technicians for expedited return to services while ensuring long-term product integrity.
• Only genuine Armstrong parts	All repairs or replacement will use only genuine Armstrong parts that have been designed & engineered specifically for the product under warranty.
• Product Updates included	At the time of repair Armstrong authorized technician may update firmware and make recommendations to update/upgrade other parts of the asset

* By registering the Design Envelope pump, adding SMART Start-up and including 2 year CEW, total warranty adds up to 5 years coverage for Parts & Labor

* By registering the Design Envelope pump and including 1 year CEW, total warranty adds up to 3 years coverage for Parts & Labor

* By registering the Design Envelope pump and including 3 year CEW, total warranty adds up to 5 years coverage for Parts & Labor

2.0 Details of Service

2.1 The specific activities of the Comprehensive Extended Warranty service are listed below. For each item, Armstrong Service team will perform the work described.

Warranty Coverage	
Activities	**Description**
Issue a Comprehensive Extended Warranty (CEW) Reference Number	Armstrong Service team will assist the customer with the set-up and registration process. Once a CEW has been purchased, Armstrong Service team will generate and provide the customer with a CEW Service order via e-mail. The order has a specific reference number. This reference number should be referred when contacting Armstrong Service team to redeem a claim.
Provide Customer Telephone Support	*Armstrong Service team will provide 24 X 7 Customer telephone support.
Provide Comprehensive Extended Warranty Redemption	*Should warranty redemption be necessary, Armstrong Service team will provide, at their discretion, a replacement unit, or new part(s) and the required site/off-site labor to resolve the problem. Armstrong service team will ship out the replacement product and provide a prepaid return shipping label for the used unit or part.

*Armstrong will provide a connectivity kit and data transmission. For Extended Warranty claim to be valid, the customer is responsible for ensuring that the pump is connected at all times. If the pump gets disconnected, Armstrong will contact you through phone and text messages, and provide reasonable support to bring the pump back online. In case there is a technical issue with the router, Armstrong will ship a new router to the customer and take the defective one back. **Note**: If the connection is down for more than a month, despite all reasonable attempts from Armstrong and the customer, warranty could be voided. In certain cases if connectivity can't be maintained at no fault of the customer, a reasonable prorated reimbursement may be issued by Armstrong for the remaining warranty period. Armstrong will communicate critical notifications and recommended actions generated by the connected pump. The expectation is that the customer will take reasonable actions to mitigate irrevocable damage. Armstrong technical team will be available for remote support during this time. It is also required that the annual Armstrong recommended maintenance schedule be performed and submitted by an Armstrong trained technician. These annual maintenance records will be required to approve and process warranty claims.

3.0 Assumptions

The successful performance of the services defined is based on the following key assumptions:

- That Design Envelope pumps purchased are registered.
- The customer has purchased an Armstrong Comprehensive Extended Warranty for an Armstrong Fluid Technology product
- That Pump Manager or SMART Start-up is also included in the purchase
- Some aspects of the service definition presented in this document may vary by location. In the case of a conflict between the service definitions contained on this Statement of Work and the local service definitions the local service definitions will prevail. For more information, please refer to your Armstrong Fluid Technology sales representative
- Valid for:

HP/kW
0.33-7.5 HP (0.25-5.5 kW)
10-15 HP (7.5-11 kW)
20-40 HP (15-30 kW)
50-75 HP (37-55 kW)
100-150 HP (75-110 kW)

Please contact your Armstrong Fluid Technology sales representative for more details. The following items are outside the scope of this warranty:

- Non-Armstrong Fluid Technology products
- All items exempted from the terms of sales and warranty document (file 9.101C)
  - Link to Terms of sale and warranty
- Any work performed without prior authorization or approval from Armstrong

4.0 Scope of Responsibility

The following items are responsibilities to and from both Armstrong Fluid Technology and customer.

4.1 ARMSTRONG FLUID TECHNOLOGY SERVICE RESPONSIBILITIES

- Provide Armstrong Fluid Technology Service order number with reference number
- Provide remote customer support.
- Provide parts replacement at no extra charge to the customer
  - **Warranty exclusion:** Consumables that wear and tear: Mechanical seals, gaskets, batteries, flush line filters AND Parts damaged due to absence of maintenance, mishandling or unfavorable site conditions.
- Provide labor support to resolve issues related to Armstrong product at no extra charge to the customer.

4.2 CUSTOMER RESPONSIBILITIES

- Provide the product model and serial number and registration information
- Contact Armstrong Fluid Technology customer service support in case of occurrence of issue
- Provide a point of contact during time of service
- Provide a point of contact for receipt of units and components

5.0 Terms and Conditions

Armstrong Fluid Technology Standard Terms and Conditions apply. The information provided in this Scope of Work cannot be used or duplicated, in full or in part. Other uses for this document are prohibited without written consent by Armstrong Fluid Technology. All documentation, photographs, imaging or other information provided by the customer, or gathered at the customer site, or through Pump Manager cloud analytics, will be for internal use only and used solely for the purpose of report generation, analysis and recommendations. All services' conditions included in this document apply (i) only between Armstrong Fluid Technology and that organization that bought the Services Solutions; and (ii) only to those products and services ordered by the Customer at the time that the Armstrong Fluid Technology Services information is current. Armstrong Fluid Technology may change the Armstrong Fluid Technology Services Information at any time. The Customer will be notified of any change in the Armstrong Fluid Technology Services Information in the manner stated in the then current product ordering and/or services solutions related agreement between Armstrong Fluid Technology and the Customer, but any such change shall not apply to products or service ordered by the Customer prior to the date of such change. Armstrong Fluid Technology will have no obligations to provide Services Solutions with respect to equipment and assets that are outside the Service

Area. “Armstrong Fluid Technology Service Area” means a location that is within (i) Thirty one (31) miles or Fifty (50) kilometers radius of a Armstrong Fluid Technology service location; and (ii) the country in which the Installation site is located, unless otherwise defined in the governing agreement with Armstrong Fluid Technology, in which case the definition in the governing agreement prevails. If for any reason, Armstrong Fluid Technology determines that is it is unable to repair the covered unit, Armstrong Fluid Technology will offer a pro-rated refund of the service contract. Please refer to Armstrong Fluid Technology standard terms and conditions. Products or services obtained from any Armstrong Fluid Technology partner or reseller are governed solely by the agreement between the purchaser and the reseller. That agreement may provide terms that are the same as the Armstrong Fluid Technology Services Solutions on this document. Please contact the reseller or the local Armstrong Fluid Technology sales representative for additional information on Armstrong Fluid Technology Services Solutions on Products obtained from a reseller.

Submittal

Pump Manager

Pump Manager is a cloud-based Active Performance Management service for Armstrong's latest Design Envelope pumps. This service:

- helps manage the energy performance of the equipment and provides system level insights as a baseline for future commissioning
- comes with built-in asset management capabilities to enable complete asset life cycle management from day 1
- identifies and connects issues with experts who have the right skills and the right parts to ensure maximum asset availability

Pump Manager (Professional)

Cloud Notifications

Alerts:	Pump in Hand Deadhead Broken Coupling Time Mismatch	Pump Comms. Loss Excessive Vibration Cavitation	Warnings:	VSD/Motor Overheating VSD Overcurrent Ext VSD Voltage Int VSD Voltage out of range Int VSD Error VSD Parameter VSD/Motor Startup VSD Warning VSD Comms. VSD Speed	VSD Wiring Sys. Over. Temp. Low Battery Voltage BMS Comms. Loss Invalid VSD Parameter VSD Initial. VSD Speed VSD Start Set Failure Sensorless Err. Hand Mode Timeout
Alarms:	VSD/Motor Overheating VSD Overcurrent Ext VSD Volt. Int. VSD Volt. out range Int VSD Error VSD Parameter	VSD/Motor Startup VSD Alarm VSD Comms. VSD Speed VSD Initial. Cavitation			

Online Trends

The average flow profile over time	3dimensional pump vibration
The average energy consumption profile over time	Historical Alarms, Performance and Energy consumption tracking, Alerts, Warnings
Flow and head relationships	Current operation conditions relative to design conditions

Performance Reporting

Monthly report that summarizes the performance of the equipment highlighting flow & head output, energy consumption behavior, and relative performance of each unit in the pumping station, relative to the other units in the station.	Annual report that summarizes the performance of the equipment highlighting flow & head output, energy consumption behavior, and relative performance of each unit in the pumping station, relative to the other units in the station.

Asset Management

Comes with built-in asset management capabilities to enable complete life cycle management of the equipment to improve speed of response & expedite return to service.	**Easy access to:** ▪ Asset Specifications ▪ Configuration files ▪ Change Management Capability ▪ Services, Start-up & Commissioning Reports ▪ *Activated Advanced Control Features ▪ I/O manuals, Submittals, Firmware downloads ▪ Notification History

Value-Chain Integration

Identifies issues, connects issues with experts with the right skills and the right parts to ensure maximum uptime	▪ Finding and *buying parts specific to the asset ▪ Access to live digital support ▪ Ability to find and engage the right resources to solve a problem

Submittal

Connectivity Kit

4G LTE router / cellular modem	SIM card and data plan included	Accessibility	Multi-platform (web/mobile)
Installation	By a certified Armstrong tech	Security	Secure connection to IBM Watson analytics engine

*Connectivity package includes one Prepaid cellular data plan with nation-wide coverage. Router installation and connection to pumps by certified Armstrong service tech. **Maximum 8 pumps per router. Each router requires an annual subscription. Router coverage range is 30m (100') to a maximum 100m (300') radius unobstructed. Pumps serving a system are within the router coverage perimeter.

Submittal

SMART Start-up

Start-up is defined by ASHRAE as "a set of procedures to be followed in the systematic initial sequencing or energizing of components, devices, equipment, and systems".

SMART Start-up is performed by an Armstrong Design Envelope certified technician. It builds on start-up by connecting the pump-to-Pump Manager for Active Performance Management™. This:

1) helps manage the energy performance of the pump and provides system level insights as a baseline for future commissioning

2) comes with built-in asset management capabilities to enable complete asset life cycle management from day 1

3) identifies and connects issues with experts who have the right skills and the right parts to ensure maximum asset availability

This OEM-certified single site-visit includes:

- ****Comprehensive Extended Warranty - parts and labor warranty for 1-year**
- Setup and activation of Performance Management Service with 1-year Pump Manager Professional subscription and **connectivity Kit with data plan to get real-time insights and alerts on:**
    - Excessive vibrations, unloaded pump, Pump in hand, Dead head, Cavitation,
    - Bearing failure, Impeller balance, shaft misalignment, mechanical seal failure
    - Performance reports on average flow and load profile, energy consumption over time, operation conditions relative to design conditions, flow, and head relationships and 3-dimension pump vibration
- **Setup and activation of built-in performance optimization software controls (as required**)
    - Setting duty point and control signals, as required
    - Control strategy (i.e., Parallel Sensorless, analog or digital I/O)
    - Feature bundle (Dual Season, Protection bundle) set up as per requirements.
    - Establishing local (BACNET, Modbus) integration with the existing Building Automation System, if available
- **Multi-point pump check:**
    - starts up and runs in correct working conditions.
    - alignment, pump rotation, suction, and discharge pressure
    - bleed air from the pump
    - condition of the seal, strainer, drive and impeller
    - vibration metering is within specification.
    - motor or bearing are greased and are within specification.
    - for abnormal noises
    - flash line filters (if applicable) is within specification
    - for voltage and amperage are within specification
    - leaks, abnormal noise, abnormal vibration, and alarms
    - verify that the data trends (Power, Flow, Head, and vibration) are within specification.
- Firmware upgrade or update as specified.
- Comprehensive SMART Start-up report provided upon completion.

Benefits of SMART Start-up:

- This OEM start-up of the equipment ensures that it has been started up correctly. Reduce the risk of equipment failure due to improper installation and operation.
- **1-year backed OEM extended warranty on the equipment includes expert support to facilitate faster return of equipment to service. This mitigates operation risk and maximizes equipment and system uptime
- All benefits of Pump Manager to the End User apply including and not limited to peace of mind, knowing that the equipment is actively being managed
- Get visibility into asset performance and records – identify, troubleshoot, and resolve issues faster before they become catastrophic
- The Comprehensive start-up service report including complete asset information can all be accessed digitally from one place. This information integrates seamlessly with existing Building Automation System, Computerized Maintenance Management Systems, Energy Management Systems. Easy access to this information facilitates faster equipment return to service
- Activating the Design Envelope Performance capabilities such as Parallel Sensorless Pump Control (PSPC), Flow Protection, Dual season set-up, Energy Performance ensure operation and energy optimization from day 1
- Save up to 20% energy savings up to 30% maintenance savings

**Valid for:

HP/kW
0.33-7.5 HP (0.25-5.5 kW)
10-15 HP (7.5-11 kW)
20-40 HP (15-30 kW)
50-75 HP (37-55 kW)
100-150 HP (75-110 kW)

Closed Circuit Cooler Technical Data Sheet

Ben McLaughlin
P.O. Box 87

Amesbury, Massachusetts 01913
781-941-0030
ben@fesone.com

(1) EAW-VD15S5PK750K4-425AXSP02

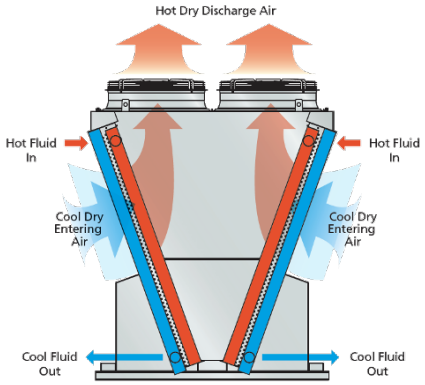
Project Details

Project Name : Arvern East
Location: TBD UNK

Date: 2/24/2023
Customer:
Contact:
Contact Email:

Product Description

The eco-Air Series V-configuration Industrial Cooler is a 100% dry induced draft cooler, minimizing maintenance associated with evaporative systems. The V coil configuration offers the maximum surface area per plan area. Every eco-Air Series unit comes with **EVAPCO's exclusive 100% thermal performance guarantee**, ensuring peace of mind in selecting the ideal cooling solution for your needs.



Selection Criteria

	Total	Each Unit
Flow:	625.0 GPM 25%	625.0 GPM 25%
Fluid:	Propylene Glycol	Propylene Glycol
Entering Fluid Temp:	100.0 F	100.0 F
Leaving Fluid Temp:	90.0 F	90.0 F
Entering Wet Bulb:	65.0 F	65.0 F
Relative Humidity:	58.9%	58.9%
Entering Dry Bulb:	75.0 F	75.0 F

Required Capacity

3,005.90 MBH
200.39 Tons

Altitude: 0 ft

Unit Selected

One(1) EVAPCO EAW-VD15S5PK750K4-425AXSP02 at 103% capacity (206.39 Tons)

Product line is CTI certified for water, propylene glycol or ethylene glycol as process fluid. Selection is rated in accordance with CTI Standard 201 RS.

Physical Data Per Unit

Overall Dimensions (WxLxH):	7'-2 1/2" x 33'-1" x 7'-11 7/8"
Operating Weight:	13,200 lbs
Shipping Weight:	11,840 lbs
*weights and dimensions could vary depending on options selected	
Fin Spacing:	10 fins per inch
Fin Thickness:	0.01 inches
Surface Area:	35,796.2 sq ft

IBC Design Capability

IBC Standard Structural Design
1.0 Importance Factor Specified

Seismic(Sds):	up to 1.6 g, z/h = 0
Wind Load(P):	up to 59.5 psf

Fan Motor Data Per Unit

Number of Fans:	5
# of Fan Motors:	5
Nameplate Power (460/3/60):	10 HP Per Motor
Total Connected Nameplate Power:	50.00 HP
Motor Type:	NEMA

Additional Details Per Unit

Air Flow:	225,190 CFM
Coil Volume:	168.3 gal per unit
Coil Design Pressure:	250 psi

Hydraulic Data

Pressure Drop Through Coil:	7.1 psi

Layout Criteria

From FACE B/D to wall:	-ft
From FACE A/C to wall:	-ft
Between FACE B/D ends:	-ft
Between FACE A/C sides:	-ft

Sound Data(dB(A) @ 5'/50')

Face A (Opp Mtr. Side):	93/80	Face C (Motor Side):	93/80
Face B (End):	84/75	Face D (Opp End):	84/75
Top:	94/81		

Notes: Sound Pressure Levels are according to CTI Standard ATC-128 and verified by an independent CTI-licensed sound test agency. The use of frequency inverters (Variable Frequency Drives) can increase sound levels. Sound Options: None

Accessories

(1) IBC Standard Structural Design

(1) Plain End (PE) Coil Connections

(5) Individual Motor Disconnect Switche(s)

(2) Return Bend Cover Plate

(1) 1.0 Importance Factor Specified

(1) Nitrogen Charged Coil(s)

(1) EVAPCO PLC/VFD Control Panel; BACnet MS/TP; Field

(1) 304L Stainless Steel Structure and Casing

(1) 304L Stainless Steel Coil with Al Fins

(5) Fan Motor: NEMA Inverter Capable, Premium Efficient

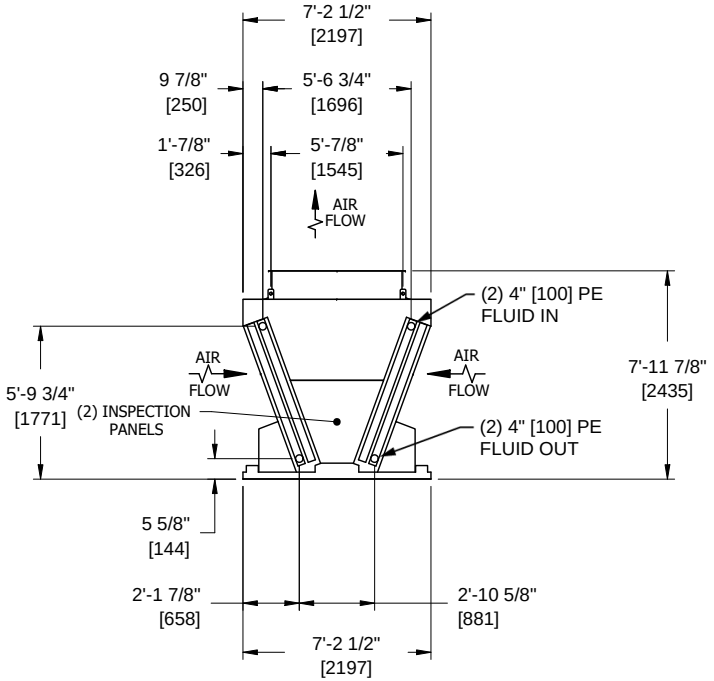
(1) Temperature Sensor

UNIT	CLOSED CIRCUIT COOLER	EVAPCO, INC.	DWG. # EV15S5PML-DRG-ST	REV. -
MODEL # EAW-VD15S5PK750K4-425AXSP02	SCALE NTS		SERIAL #	DATE 2/24/2023

NOTES:

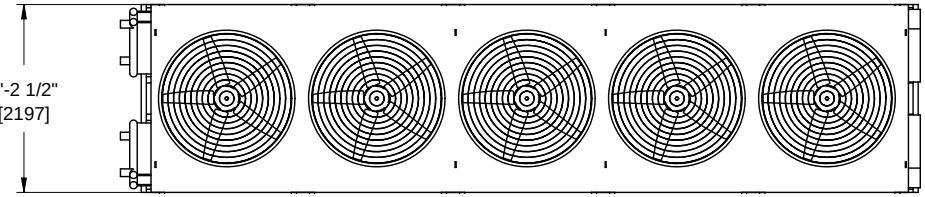
1. DIMENSIONS LISTED AS FOLLOWS:
   ENGLISH FT-IN
   [METRIC] [mm]
2. DO NOT SCALE DRAWING. CONNECTION LOCATIONS ARE APPROXIMATE; DO NOT USE FOR FABRICATION OF PIPING.
3. * LIFTER LOCATIONS
4. MPT DENOTES MALE PIPE THREAD
   FPT DENOTES FEMALE PIPE THREAD
   BFW DENOTES BEVELED FOR WELDING
   GVD DENOTES GROOVED
   FLG DENOTES FLANGE
   PE DENOTES PLAIN END
5. +UNIT WEIGHT DOES NOT INCLUDE ACCESSORIES (SEE ACCESSORY AND ELECTRICAL DRAWINGS)
6. 3/4" [19MM] DIA. MOUNTING HOLES. REFER TO RECOMMENDED STEEL SUPPORT DRAWING
7. CONTROL PANEL MAY ADD LENGTH TO UNIT, REFER TO CONTROL DRAWING FOR DIMENSIONS.
8. ACTUAL SHIPPING DIMENSION OF THE INLET AND OUTLET COIL CONNECTIONS IS 3" LONGER THAN SHOWN ON THE CERTIFIED PRINT. COILS ARE SHIPPED NITROGEN CHARGED WITH STEEL PLUGS WELDED INTO THE INLET AND OUTLET COIL CONNECTIONS FOR PLAIN END (PE), BEVELED (BFW) AND GROOVED (GVD) CONNECTIONS. FIELD CUTTING MAY BE REQUIRED.
9. COIL OUTLETS LOCATED IN CLOSE PROXIMITY TO UNIT BASE. CUSTOMER TO VERIFY CLEARANCES FOR UNIT PIPING, VALVES, AND INSULATION AS NECESSARY.
10. COILS DO NOT COMPLETELY GRAVITY DRAIN. TO DRAIN COILS, OPEN THE AIR VENT AND DRAIN CONNECTION(S) AND APPLY POSITIVE PRESSURE TO EVACUATE THE COIL.

FACE B
PLAN VIEW



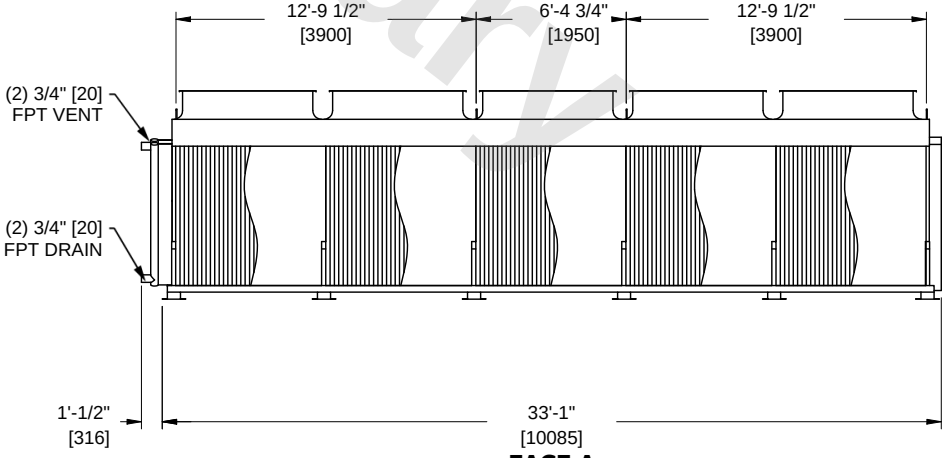
FACE B

FACE C



FACE D

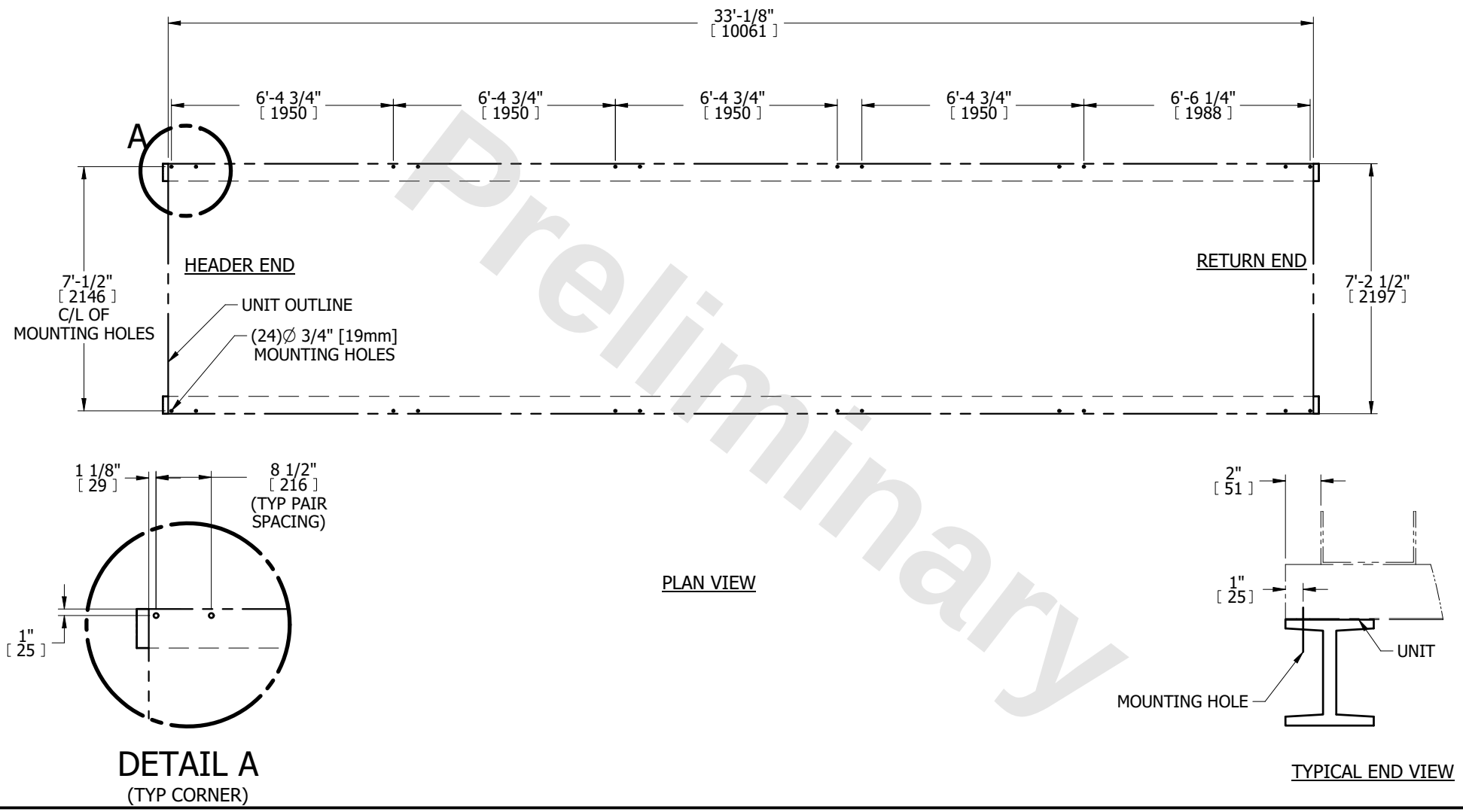
FACE A



FACE A

SHIPPING WEIGHT	11840 lbs+ [5375] kg+	OPERATING WEIGHT	13200 lbs+ [5990] kg+	DRAWN BY: RAW

UNIT	EAW-VD15S5PK750K4-425AXSP02	EVAPCO, INC.	DWG. #	SLVPK05-DA
TITLE	STEEL SUPPORT CONFIGURATION		SCALE N.T.S.	DRAWN BY SLR



DETAIL A
(TYP CORNER)

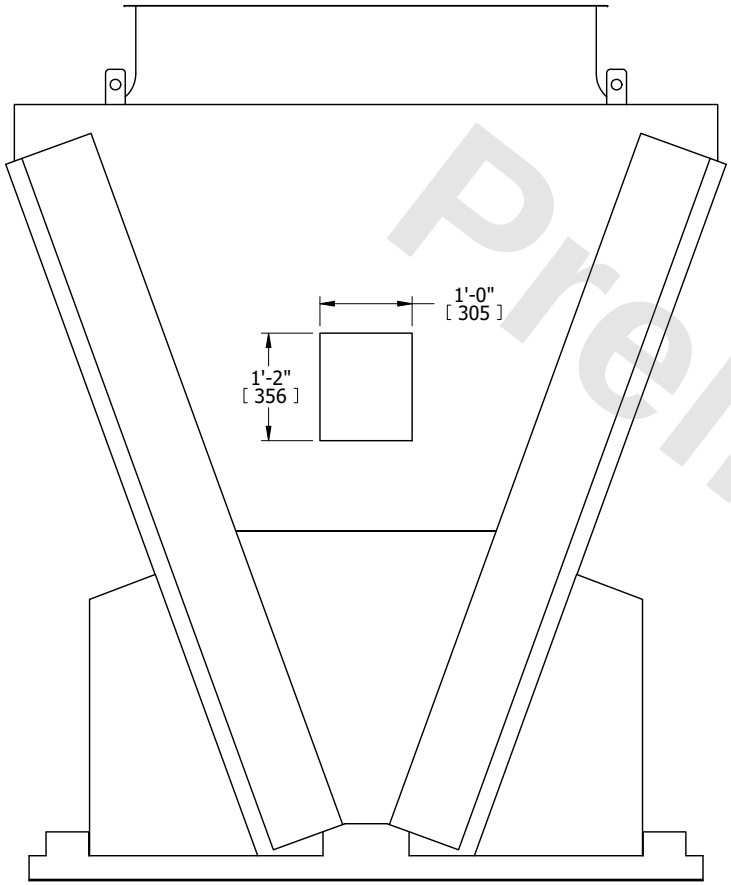
TYPICAL END VIEW

NOTES:

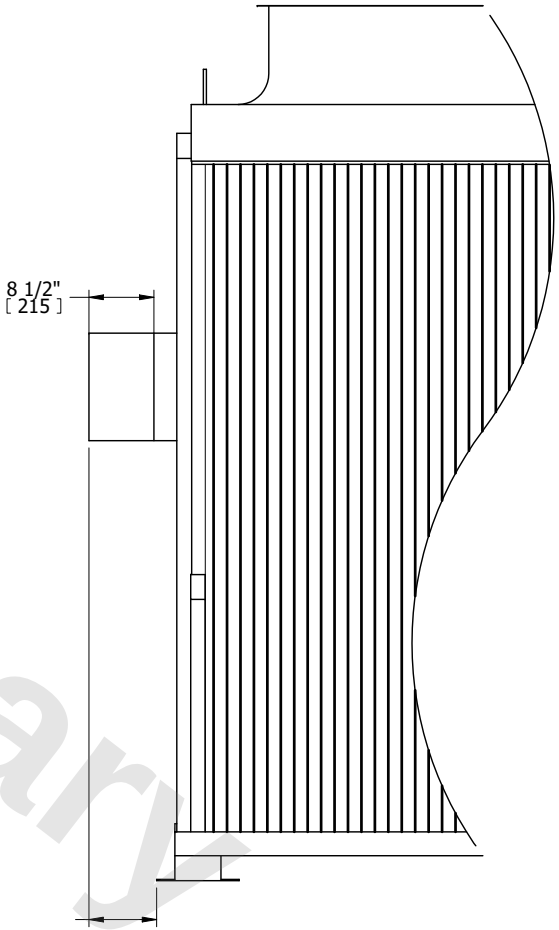
1. BEAMS SHOULD BE SIZED IN ACCORDANCE WITH ACCEPTED STRUCTURAL PRACTICES. MAXIMUM DEFLECTION OF BEAM UNDER UNIT TO BE 1/360 OF UNIT LENGTH NOT TO EXCEED 1/2" [13mm].
2. DEFLECTION MAY BE CALCULATED BY USING 50% OF THE OPERATING WEIGHT AS A UNIFORM LOAD ON EACH BEAM. SEE CERTIFIED PRINT FOR OPERATING WEIGHT.
3. SUPPORT BEAMS AND ANCHOR HARDWARE ARE TO BE FURNISHED BY OTHERS. ANCHOR HARDWARE TO BE ASTM A325 5/8" [16mm] BOLT OR EQUIVALENT.
4. BEAMS MUST BE LOCATED UNDER THE FULL LENGTH OF THE UNIT.
5. SUPPORTING BEAM SURFACE MUST BE LEVEL. DO NOT LEVEL THE UNIT BY PLACING SHIMS BETWEEN THE UNIT MOUNTING FLANGE AND THE SUPPORTING BEAM.
6. THE FACTORY RECOMMENDED STEEL SUPPORT CONFIGURATION IS SHOWN. CONSULT THE FACTORY FOR ALTERNATE SUPPORT CONFIGURATIONS.
7. UNIT SHOULD BE POSITIONED ON STEEL SUCH THAT THE ANCHORING HARDWARE FULLY PENETRATES THE BEAM'S FLANGE AND CLEARS THE BEAM'S WEB.
8. WHEN VIBRATION ISOLATION IS REQUIRED, THE VIBRATION ISOLATORS (BY OTHERS) MUST BE LOCATED UNDER THE SUPPORTING BEAMS AND NOT BETWEEN THE SUPPORTING STEEL BEAMS AND THE UNIT.
9. DIMENSIONS LISTED AS FOLLOWS: ENGLISH FT-IN
   [METRIC] [mm]

UNIT		DWG. #	EPAVMW15AV06-DRB-CT
TITLE	TERMINAL BOX	SCALE	N.T.S.
		DRAWN BY	SLR

EVAPCO, INC.



FACE D



FACE C

NOTES:
1. DIMENSIONS LISTED AS FOLLOWS: ENGLISH FT-IN
   METRIC [mm]
2. * INDICATES LENGTH ADDED TO UNIT.
3. TERMINAL BOX LOCATED ON END OF UNIT, OPPOSITE THE COIL CONNECTIONS.
4. ALL CUSTOMER ELECTRICAL CONNECTIONS TO GO INTO BOTTOM OF TERMINAL BOX.
5. APPROXIMATE WEIGHT OF ELECTRICAL COMPONENTS IS .

Full Speed Complete Sound Data

Ben McLaughlin
P.O. Box 87

Amesbury, Massachusetts 01913
781-941-0030
ben@fesone.com

Sound Pressure Levels (SPL) in dB RE 0.0002 Microbar
Sound Power Levels (PWL) in dB RE 10-12 Watt

Model	EAW-VD15S5PK750K4-425AXSP02
Motor	10 HP
# Motors	5
Speed	Full Speed

Single Unit Data

	Sound Pressure Level (dB)										
	End		Motor Side		Opp End		Opp Mtr. Side		Top		Sound
	5.0 ft	50.0 ft	5.0 ft	50.0 ft	5.0 ft	50.0 ft	5.0 ft	50.0 ft	5.0 ft	50.0 ft	Power
Band	(1.5m)	(15.2m)	(1.5m)	(15.2m)	(1.5m)	(15.2m)	(1.5m)	(15.2m)	(1.5m)	(15.2m)	Level (db)
63	79	71	88	76	79	71	88	76	90	77	109
125	81	72	90	78	81	72	90	78	92	79	111
250	82	73	91	79	82	73	91	79	93	80	112
500	81	72	90	77	81	72	90	77	91	78	110
1000	80	71	89	76	80	71	89	76	90	77	109
2000	75	66	83	71	75	66	83	71	85	72	104
4000	71	62	79	67	71	62	79	67	81	68	100
8000	66	57	75	62	66	57	75	62	77	64	96
Calc dBA	84	75	93	80	84	75	93	80	94	81	113

Sound option(s) selected: None

Remarks:

1. Sound Pressure Levels are according to CTI Standard ATC-128 and verified by an independent CTI-licensed sound test agency
2. Sound Power Levels are calculated according to the Small Units Section 8
3. Sound from free-field conditions over a reflecting plane with -1/+2 db(A) tolerance
4. Noise levels can increase with variable frequency drives depending on the drive manufacturer and the drive configuration
5. Complete unit sound data with all fans operating

CERTIFICATE OF COMPLIANCE

Independent Sound Validation

All EVAPCO Cooling Towers, Closed Circuit Coolers and Condensers have been tested in accordance with CTI ATC-128, Test Code for Measurement of Sound from Water-Cooling Towers, by a CTI-licensed independent test agency

As outlined in CTI ATC-128, sound testing was conducted on various EVAPCO cooling towers, closed circuit coolers and condenser models by an independent CTI-licensed sound test agency. Sound pressure levels were recorded in the acoustic near-field and far-field locations. Using certified and calibrated precision sound test instruments per test standards, the sound test agency conducted and verified the analysis.

Applicable Codes:
CTI ATC 128

Glycol Feed Systems

Purpose

Neptune Glycol Feeders are designed for the addition of glycol solution to closed loop chilled or hot water systems. The system automatically maintains pressure in the loop by adding glycol solution to make up for losses which occur due to leakage.

Glycol addition is controlled by a pressure switch with adjustable low and high set points.

Standard Pressure Switch:
Cut-In Range: 10-45 PSI Cut-Out Range: 20-60 PSI
Adjustable Differential: 10-30 PSI
Other pressure switches available.

When the pressure in the loop reaches the low set point, the pump begins to feed glycol into the system until the high pressure set point is achieved and stops the pump.

Features

- 50 gallon polyethylene tank mounted in a steel frame
- Bronze rotary gear pump (1.5 gpm @ 100 psi)
- Float switch for low level pump shutoff and alarm
- NEMA 4X control panel

Panel includes:

- Hand-off-auto selector switch for pump motor
- Pump "on" indicator light
- "Low" tank level indicator light
- Dry contact for remote low level indication
- Power cord with plug, 115V 60C

Optional audible alarm and push button silence available.
(Audible alarm is not watertight.)

Neptune
A DOVER COMPANY

MODEL
G-50-1

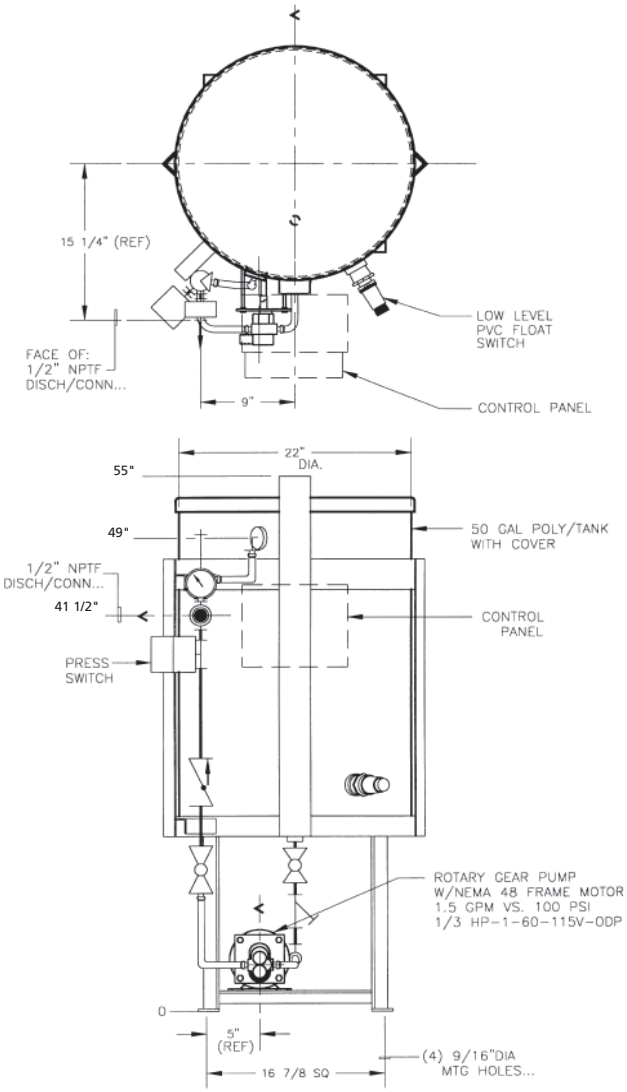
Each Neptune Glycol Feeder is fully piped and wired with the following components:

Suction assembly includes:

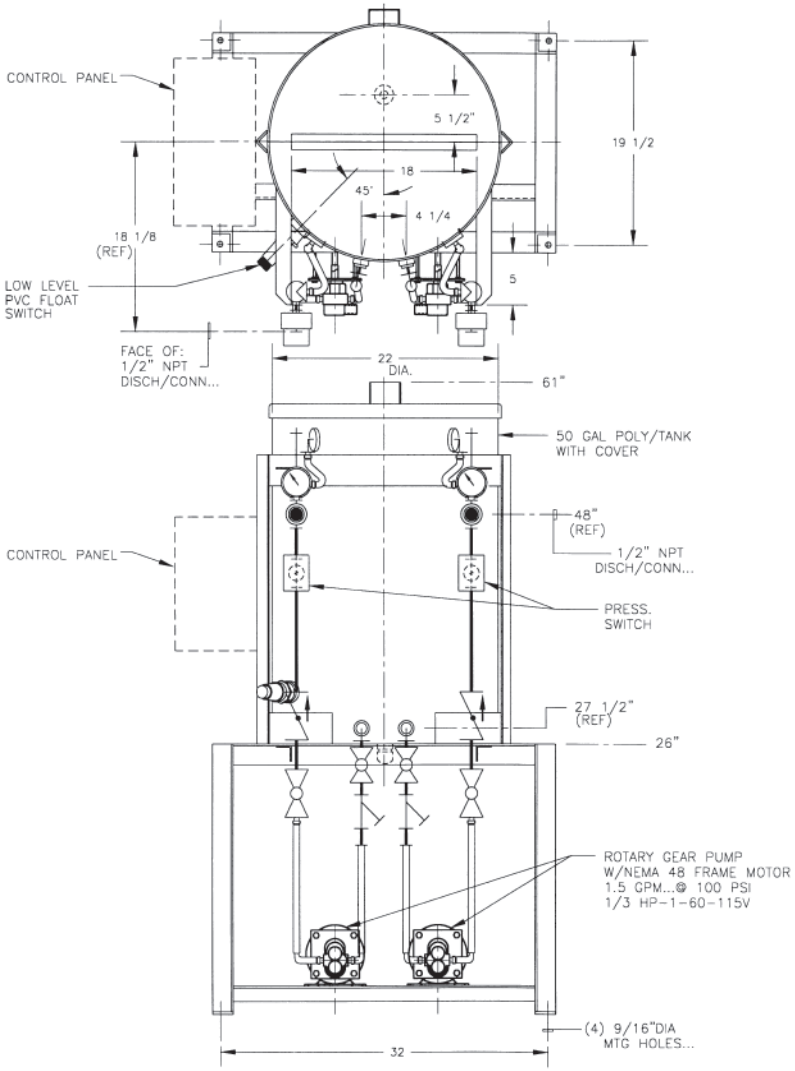
- PVC tubing and fittings
- PVC ball valve
- Cast iron "Y" strainer

Discharge assembly includes:

- Schedule 40 brass pipe and fittings
- PVC ball valve • Brass check valve • Pressure gauge
- Brass relief valve with return to tank tubing



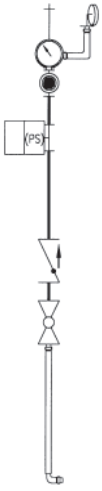
MODEL G-50-1 & G-50-1A



MODEL G-50-2A

SELECTION CHART

MODEL	DESCRIPTION
G-50-1	Complete system including 1.5 gpm (@ 100 psi) pump and low level light.
G-50-1A	Complete system including 1.5 gpm (@ 100 psi) pump, low level light and audible alarm.
G-50-2A	Complete system including two 1.5 gpm (@ 100 psi) pumps, low level light and audible alarm. Separate discharges and pressure switches allow feeding two separate closed loop systems independently from a single tank.
LP	Option to furnish larger pump rated 3.75 gpm (@ 100 psi). Add "LP" to Model Number to specify larger pump; Example G-50-1-LP.



EACH DISCHARGE ASSEMBLY CONTAINS:

- ½" S40/BRASS/PIPE w/NPT FITTINGS
- ½" BALL VALVE/PVC
- ½" CHECK VALVE/BRASS
- ½" RELIEF VALVE/BRASS (SET @ 100 PSI) w/PVC RETURN LINE
- PRESSURE GAUGE (0–100 PSI)
- PRESSURE SWITCH

EACH SUCTION ASSEMBLY CONTAINS:

- ½" S80/PVC/PIPE w/NPT FITTINGS & PVC TUBING
- ½" BALL VALVE/PVC
- ½" Y-STRAINER/CAST IRON

Neptune
A DOVER COMPANY

SOLD BY:

NEPTUNE
MEMBER OF
PSG
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A DOVER COMPANY

P.O. Box 247 • Lansdale, PA 19446-0247
Tel: 215-699-8700 • Fax: 215-699-0370
Toll-Free Tel: 1-888-3NEPTUNE (1-888-363-7886)
Toll-Free Fax: 1-800-255-4017
Web Site: http://www.neptune1.com
E-mail: pump@neptune1.com

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