

- REVIEWED
- REVIEWED AND MODIFIED
- REVISE AND RESUBMIT
- NOT REVIEWED

Submittal

Ref. #: RBW604497.1 rev1

The review by JRP Engineering is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean the detail design inherent in the shop drawings are approved, responsibility of which shall remain with the Contractor submitting same and review shall not relieve the Contractor of this responsibility for errors or omissions in the shop drawings or his responsibility for providing all requirements of the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of the work of all subtrades.

Model: Series 4030 4x5x10-15 hp Pump (Motor supplier: Armstrong choice)

Project name: Tomlinson Typos

Location:

Date submitted: 3/31/2017

Engineer:

Contractor:

Application design data

Tag number: P-1a/b

Service:

Location:

Quantity: 2

Duty flow per pump: 977 USgpm

Duty head: 75ft

Total dissolved solids: 0 ppm

Representative: Walmart Limited Nepean, Ontario

Phone number:

e-mail: renebueneman@walmart.net

Submitted by: Rene Bueneman

Pipe orientation:	Single
Suction pressure:	0 ft
Fluid:	Propylene Glycol:50
Operating temperature:	60 F
Viscosity:	49.45 SSU
Specific gravity:	1.0416

Materials of construction

Construction:	RF	Impeller:	Bronze (B584-844)
Connections:	DATE: May 10th, 2017	Pump shaft:	Carbon Steel
Casing (volute):	Cast Iron (HT-30)	Shaft sleeve:	304 SS
Bearings:	Anti-Friction Grease Lubricated	Flexible coupling:	Rotex
		Casing gasket:	Confined Non-Asbestos Fiber

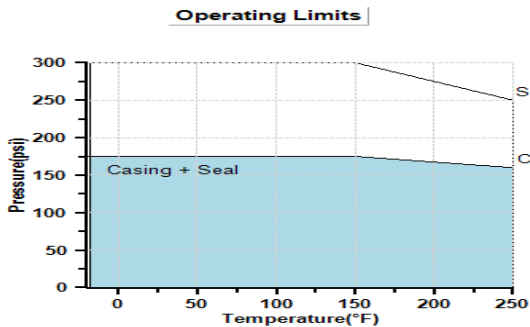
Mechanical seal data

Seal type:	Inside Single Spring	Rotating face:	Sintered Silicon Carbide
Manufacturer code:	SSCsc L EPSS 2A	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel		

Motor electrical data

Supplier:	Factory Choice	Insulation class:	Class F Insulation
Size:	15 hp	Inverter motor type:	Inverter Duty
Frame number:	254TC	Efficiency:	NEMA Prem (12.12)
Enclosure:	ODP	Speed:	1770 rpm
Motor Electrics:	575/3/60		

Operating limits (temperature - pressure)



Maximum pressure: 175 psi

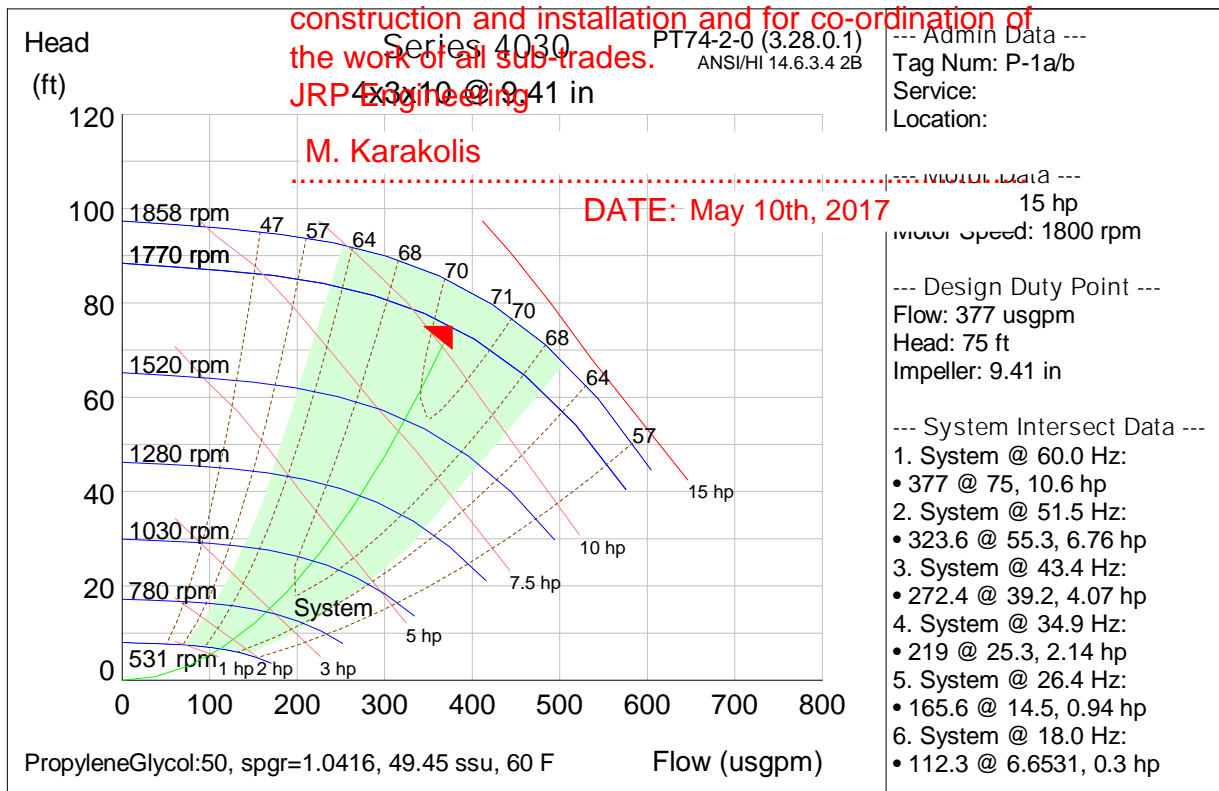
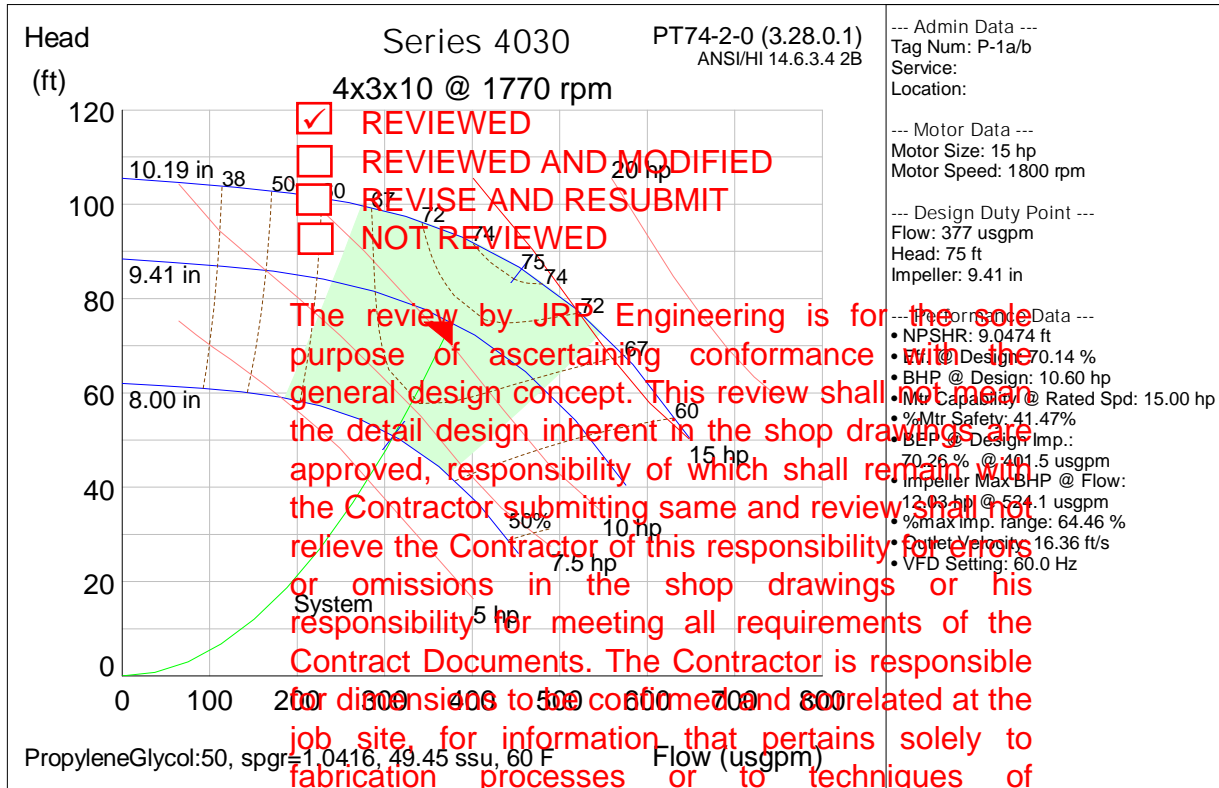
Maximum temperature: 250 F

Pump casings are hydrostatically tested to 1.5 times the maximum pump working pressure per TOMLINSON



- APPROVED
- REJECTED
- REVISE
- REVIEWED

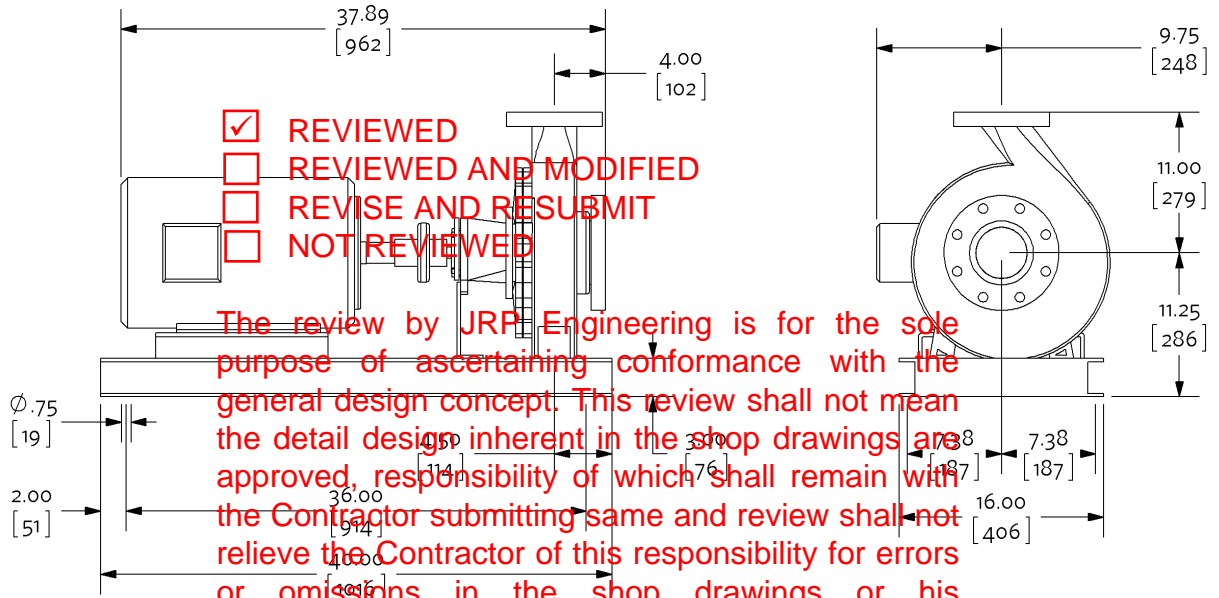
BY CARL MUIR DATE 4/12/2017



Dimensional data (not for construction)

Side view

Top view



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Weight: 446 lb

- 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
- Pump equipped with casing drain plug and 1/2 inch NPT suction and discharge gauge ports

Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	4	ANSI-125	9	8	7.5	0.625
Outlet	3				6	0.625

*Equally spaced straddling centreline

DATE: May 10th, 2017

Special instructions

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.

Selected options

Couplings-Rotex

Additional equipment

Flotrex: FTV-4FS (570200-378)
Suction Guide: SG-44 (516860-021)

Submittal

Ref. #: RBW604497.1 rev1

Design envelope horizontal base mounted end suction pump

Model: Series Design Envelope Sensorless 4200H 2506-015.0

Project name: Tomlinson Pumps

Location:

Date submitted: 3/31/2017

Engineer:

Contractor:

Representative: Walmart Limited Nepean, Ontario

Phone number:

e-mail: rene.buchanan@walmart.com

Submitted by: Rene Buchanan

Application design data

Tag number:	P271	Orientation:	Single
Service:		Suction pressure:	0 ft
Location:		Fluid:	Propylene Glycol:30
Quantity:	2	Operating temperature:	60 F
Duty flow per pump:	450 USgpm	Viscosity:	36.98 SSU
Duty head:	88 ft	Specific gravity:	1.0248
Environment:	Indoors	Safety factor % Head:	0 %
Total dissolved solids:	0 ppm		

Materials of construction

Construction:	BF	Impeller:	Brnze (B584-844)
Rating:	ANSI 125	Pump shaft:	SS ASTM A276 Type 416
Connections:	Inlet: 3 in, Outlet: 2.5 in	Flush line:	Braided Stainless Steel
Casing (volute):	Cast Iron (A48-30)	Casing gasket:	Confined Non-Asbestos Fiber

Mechanical seal data

Seal type:	Outside Balanced	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-S		ilicon Carbide
Springs:	Stainless Steel	Secondary seal:	Viton
Rotating hardware:	Stainless Steel		

Motor electrical data

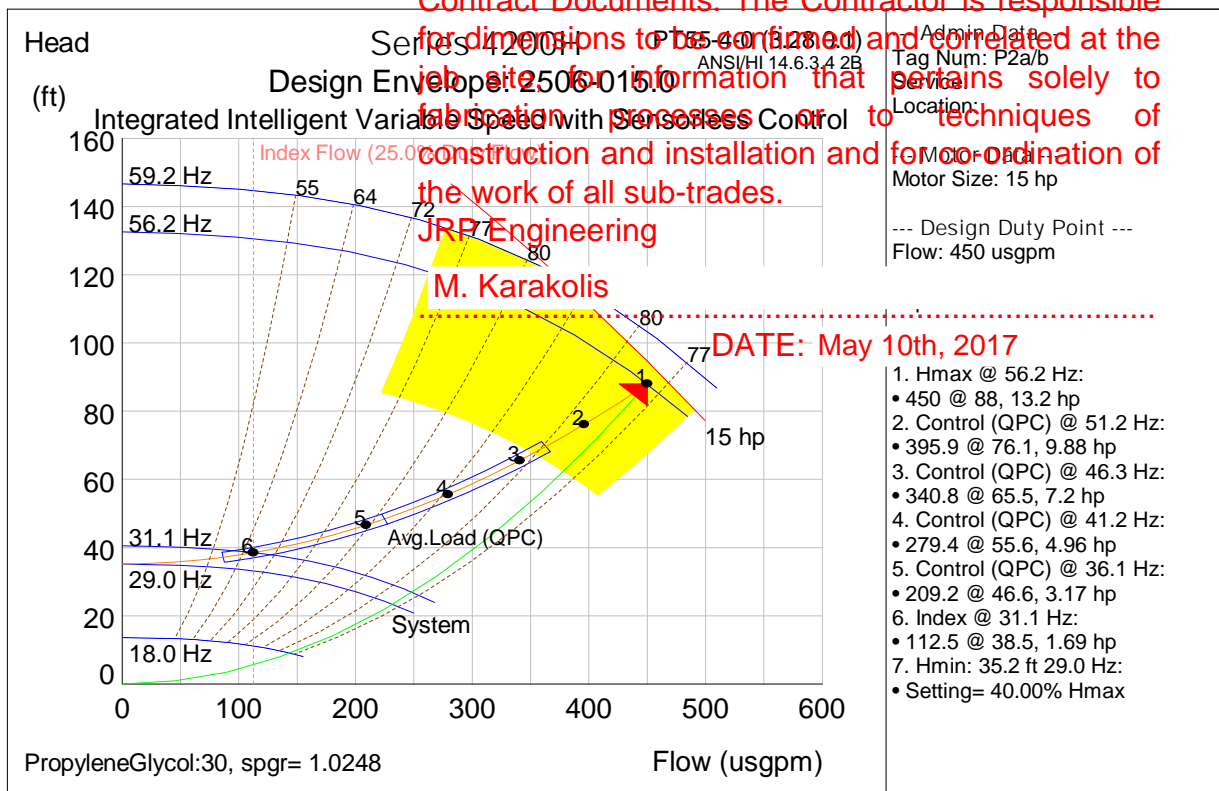
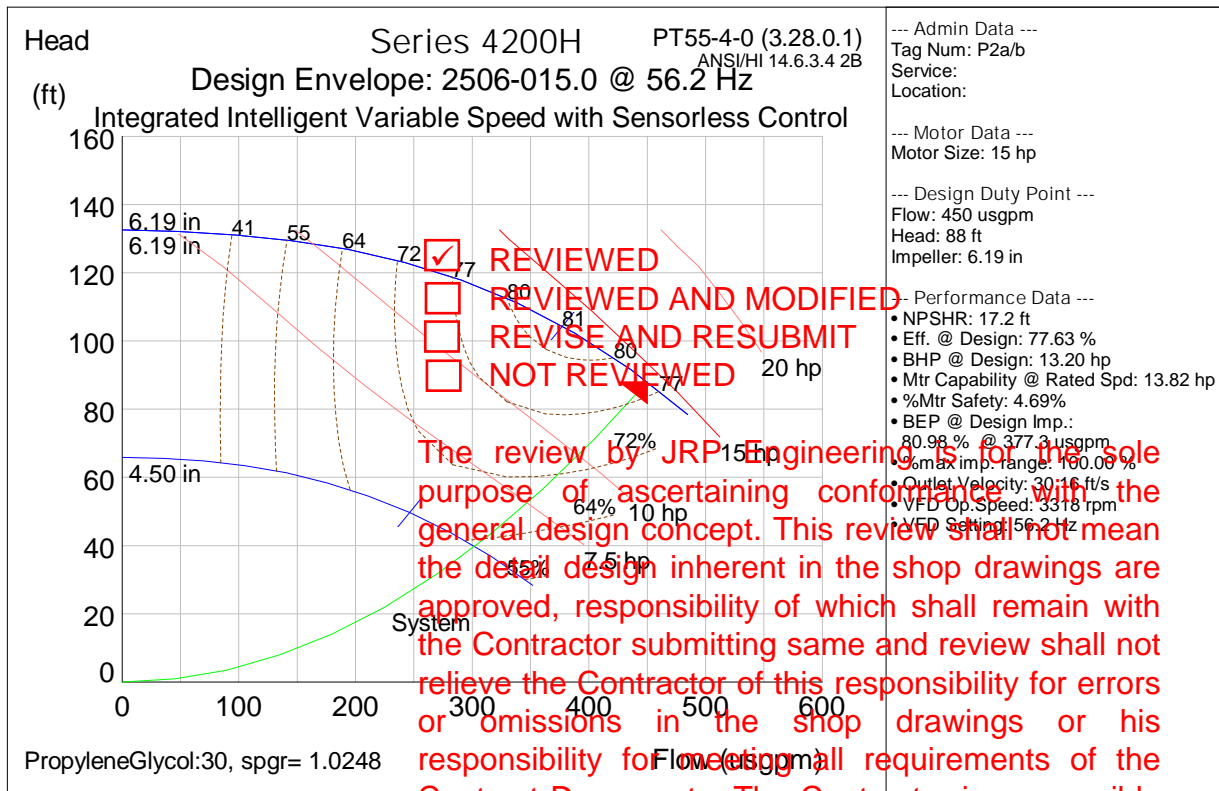
Supplier:	Factory Choice	Insulation class:	Class F Insulation
Size:	15 hp	Inverter motor type:	Inverter Duty
Frame number:	254TC	Efficiency:	NEMA Prem (12.12)
Enclosure:	TEFC	Operating speed @ 100% flow:	3318 rpm
Motor Electrics:	575/3/60	Operating speed @ 50% flow:	2194 rpm

IVS102 controller data

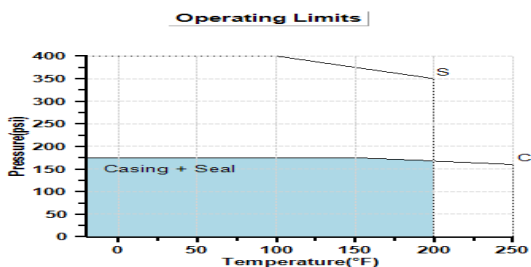
Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
BMS protocol:	BACnet Native	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12	Analog outputs:	1 (current)
Fused disconnect switch:	No	Digital inputs:	4 (programmable)
Control orientation:	STD	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Fan cooled through back channel
BHP at 50% load/flow and 55% of design head:	3.3 hp	Ambient temperature:	14F to 113F (up to 3280ft elevation)
Meets ASHRAE 90.1:	Yes	EMI/RFI control:	Integrated filter to meet EN61800-3
Min. maintained sys. pressure:	35.2 ft	Harmonic suppression:	Integrated DC link reactor**

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

** The IVS 102 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.



Operating limits (temperature - pressure)



Maximum pressure: 175 psi

Maximum temperature: 200 F

Pump casings are hydrostatically tested to 150% of maximum pump working pressure rating.

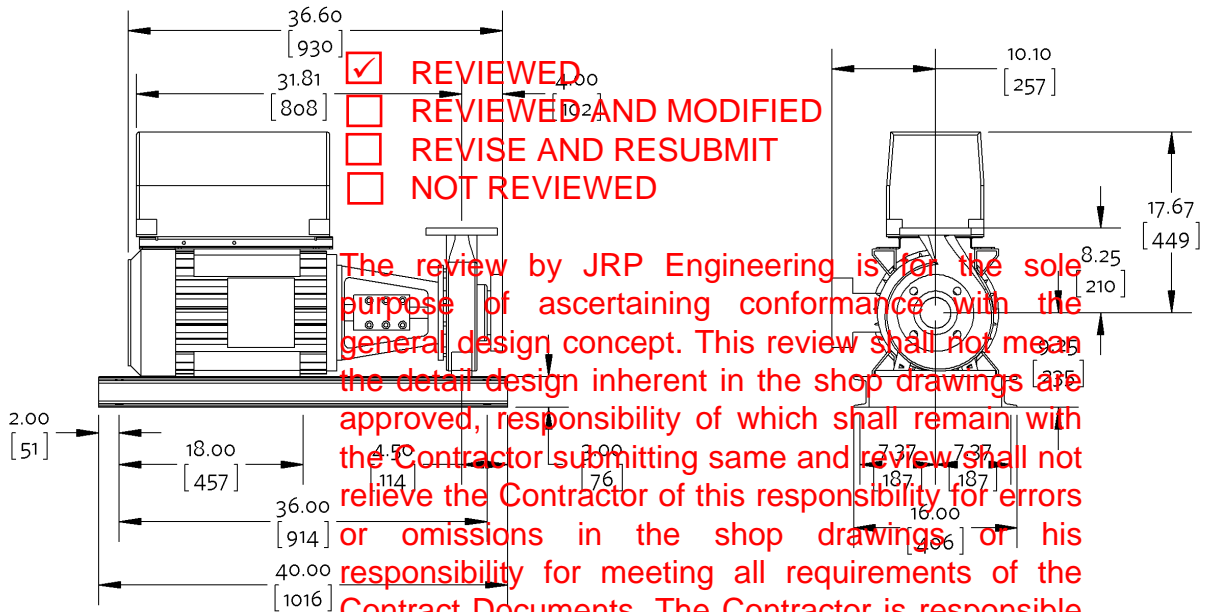
Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	450 USgpm	94.7 ft	78.53 %
Design point	450 USgpm	88 ft	77.63 %
50% average flow (with default load profile)	225 usgpm	48.5 ft	80.25 %

Dimensional data (not for construction)

Side view

Top view



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JRP Engineering
M. Karakolis

Weight: 501 lb

- Not to scale
- Units of measure : inches [millimeters]
- 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	Ball diameter	PCD	Bolt size
Inlet	3	ANSI-125	7.5	4	5.5	0.625
Outlet	2.5	ANSI-125	7	4	5.5	0.625

DATE: May 10th, 2017

*Equally spaced straddling centreline

Special instructions

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.

UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Environmental Application: Indoors

Additional equipment

Flotrex: FTV-4FA (570200-478)
 Suction Guide: SG-33 (516860-019)

Submittal

Ref. #: RBW604497.1 rev1

Design envelope horizontal base mounted end suction pump

Model: Series Design Envelope Sensorless 4200H 1506-007.5

Project name: Tomlinson Pump

Location:

Representative: Walmart Limited Nepean, Ontario

Date submitted: 3/31/2017

Phone number:

Engineer:

Email:

renebu@walmart.com

Contractor:

Submitted by:

Rene Buenerman

Application design data

Tag number:		Impeller orientation:	Single
Service:		Seal orientation:	Open
Location:		Fluid:	Non-Potable Fluid - Water
Quantity:	2	Operating temperature:	60 F
Duty flow per pump:	129 USGpm	Viscosity:	31 SSU
Duty head:	112 ft	Specific gravity:	1.0000
Environment:	Indoors	Safety factor % head:	0 %
Total dissolved solids:	0 ppm		

Materials of construction

Construction:	Cast Iron (A48-30)	Impeller:	Brass (B584-844)
Rating:	ANSI 125	Pump shaft:	SS ASTM A276 Type 416
Connections:	Inlet: 3 in. Outlet: 1.5 in.	Flush line:	Braided Stainless Steel
Casing (volute):	Cast Iron (A48-30)	Casing gasket:	Confined Non-Asbestos Fiber

Mechanical seal data

Seal type:	M. Karakolis		Bonded Carbon
Manufacturer code:	C-SSC AB2	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Seal:	in
Rotating hardware:	Stainless Steel		

Motor electrical data

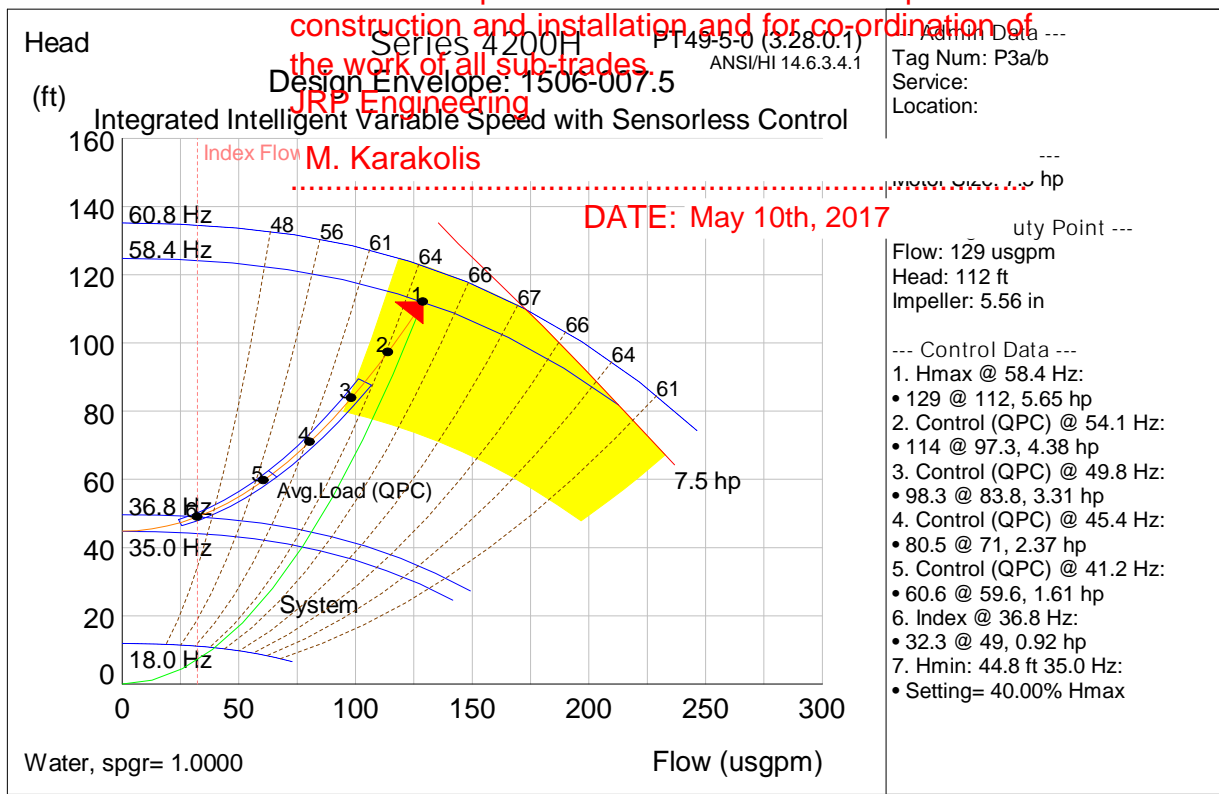
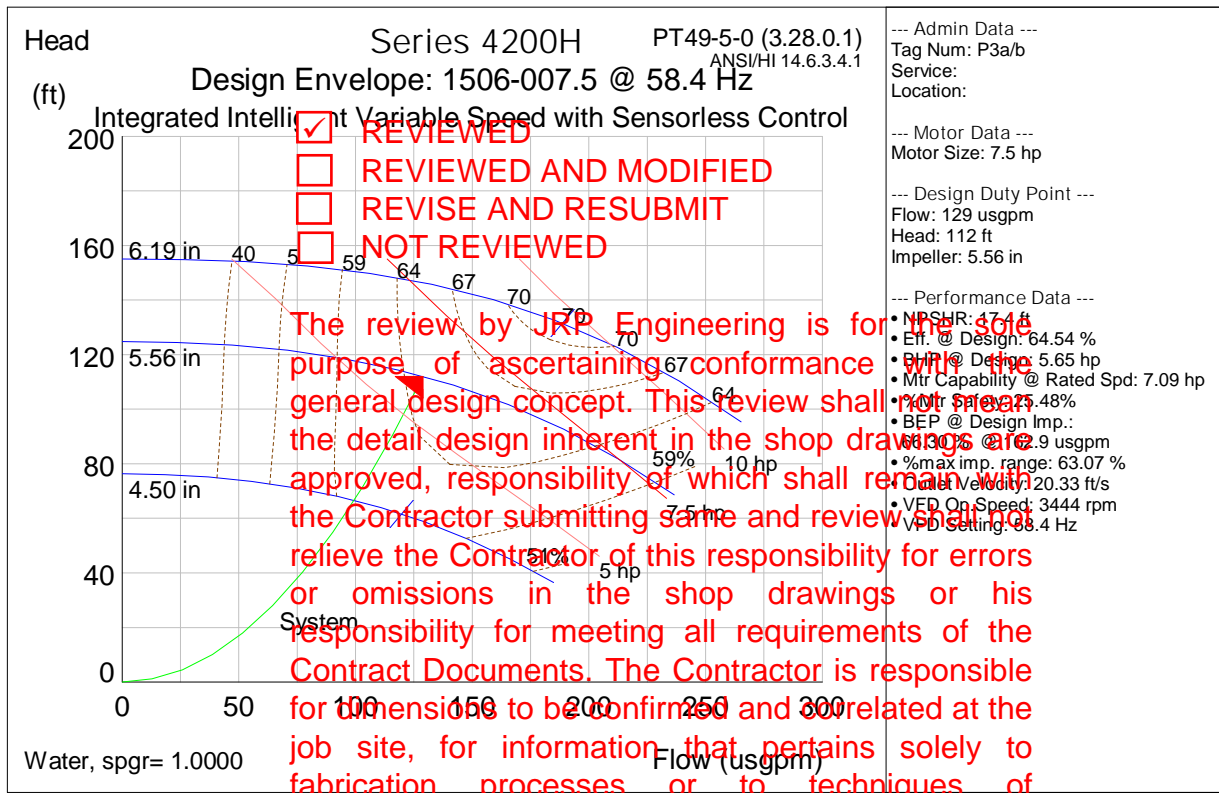
Supplier:	Factory Choice	Insulation class:	Class F Insulation
Size:	7.5 hp	Inverter motor type:	Inverter Duty
Frame number:	213TC	Efficiency:	NEMA Prem (12.12)
Enclosure:	TEFC	Operating speed @ 100% flow:	3444 rpm
Motor Electrics:	575/3/60	Operating speed @ 50% flow:	2476 rpm

IVS102 controller data

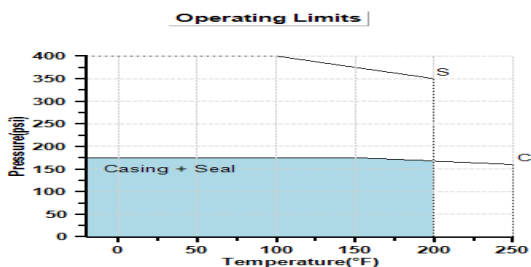
Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
BMS protocol:	BACnet Native	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12	Analog outputs:	1 (current)
Fused disconnect switch:	No	Digital inputs:	4 (programmable)
Control orientation:	STD	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Fan cooled through back channel
BHP at 50% load/flow and 55% of design head:	1.41 hp	Ambient temperature:	14F to 113F (up to 3280ft elevation)
Meets ASHRAE 90.1:	No	EMI/RFI control:	Integrated filter to meet EN61800-3
Min. maintained sys. pressure:	44.8 ft	Harmonic suppression:	Integrated DC link reactor**

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

** The IVS 102 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.



Operating limits (temperature - pressure)



Maximum pressure: 175 psi

Maximum temperature: 200 F

Pump casings are hydrostatically tested to 150% of maximum pump working pressure rating.

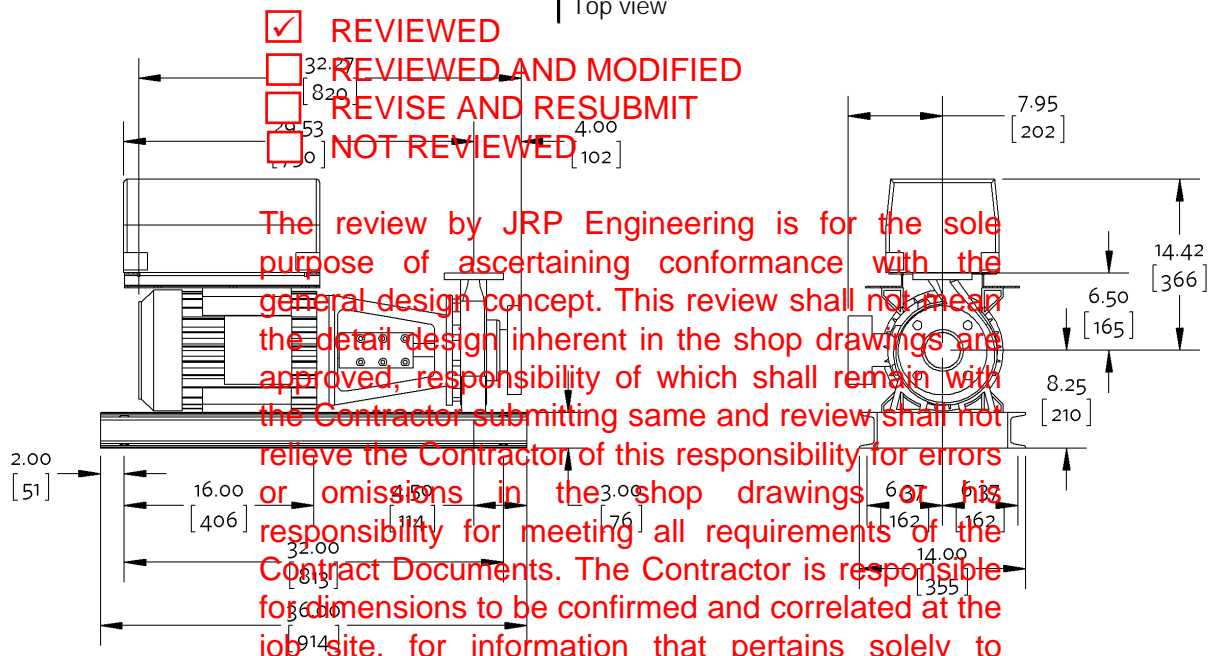
Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	129 USgpm	122.7 ft	63.97 %
Design point	129 USgpm	112 ft	64.54 %
50% average flow (with default load profile)	64.5 usgpm	61.7 ft	57.69 %

Dimensional data (not for construction)

Side view

Top view



Weight: 318 lb

- Not to scale
- Units of measure : inches [millimeters]
- 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

JRP Engineering
M. Karakolis

DATE: May 10th, 2017

Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	3	ANSI-125	7.5	4	6	0.625
Outlet	1.5	ANSI-125	5	4	3.88	0.5

*Equally spaced straddling centreline

Special instructions

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.

UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Environmental Application: Indoors

Additional equipment

Flotrex: FTV-3FA (570200-477)
Suction Guide: SG-33 (516860-019)

Submittal

Ref. #: RBW604497.1 rev1

Wet rotor circulator

Model: Series ASTRO 225BS 1/2" SWT

Part number: 110223-303

- REVIEWED
- REVIEWED AND MODIFIED
- REVISE AND RESUBMIT
- NOT REVIEWED

Project name: Tomlinson Pumps

Location:

Date submitted: 3/31/2017

Engineer:

Contractor:

Representative: Walmar Limited Nepean, Ontario

Phone number:

e-mail: renebueneman@walmar.net

Submitted by: Rene Bueneman

Application design data

Tag number:	P-6&7	Prop orientation:	Single
Service:		Suction pressure:	0 ft
Location:		Fluid:	Water
Quantity:	2	Operating temperature:	60 F
Duty flow per pump:	1.5 USgpm	Viscosity:	31 SSU
Duty head:	11 ft	Specific gravity:	1.0000
Total dissolved solids:	0 ppm		

Materials of construction

Construction:	AB	Impeller:	Cast Iron (PEI)
Connections:	Inlet: 0.6 in, Outlet: 0.6 in	Bearings:	Ceramic
Connection type:	NPSM union	Certified standard:	UL 778 & CSA C22.2 No. 108-01
Companion flange:	Not required	Listing:	ETL listed for US and Canada

Motor electrical data

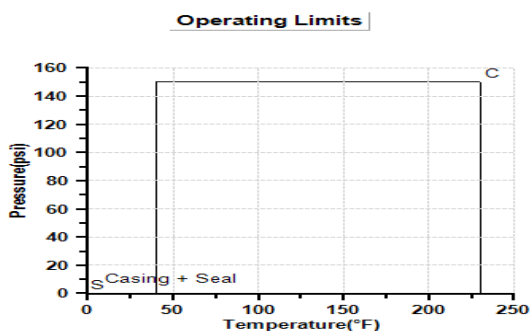
Supplier:	Factory Choice	Insulation class:	Not applicable
Size:	0.1 hp		
Frame number:	Not applicable	Efficiency:
Enclosure:	ODP	Speed:
Motor Electrics:	115/1/60		

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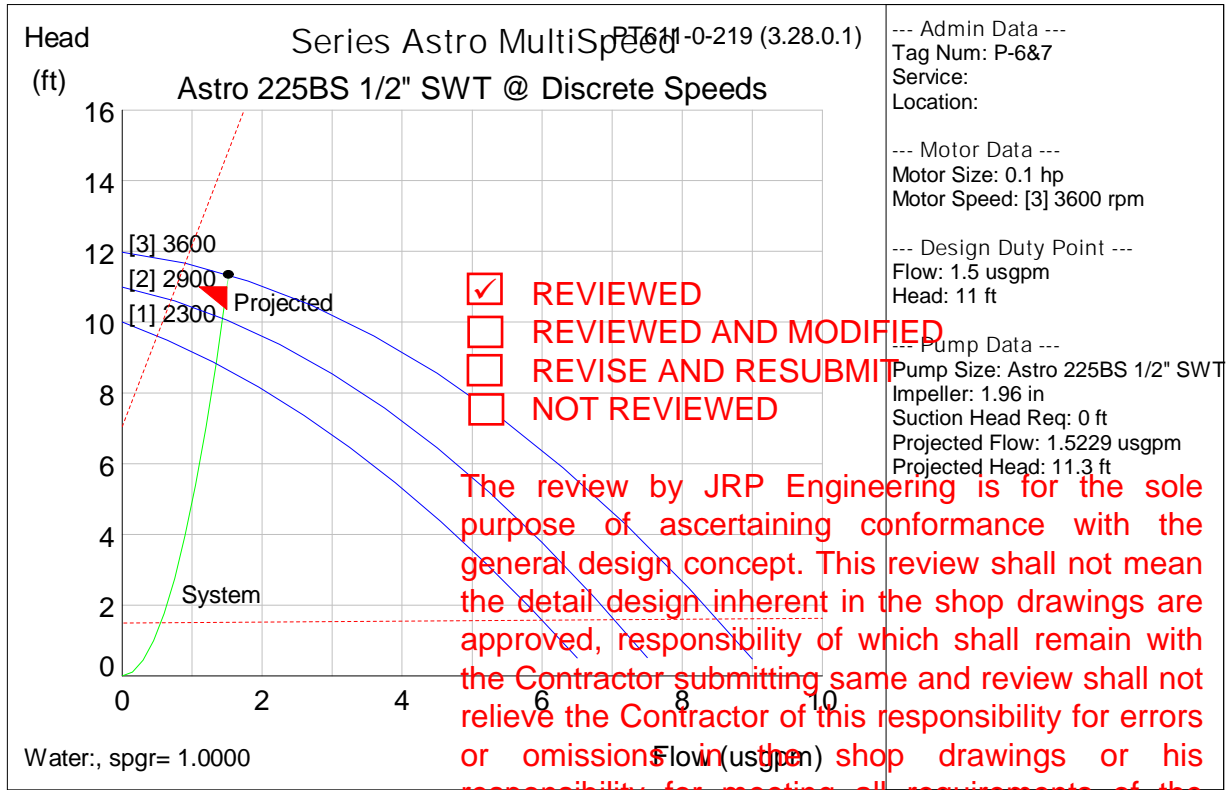
JRP Engineering
M. Karakolis

DATE: May 10th, 2017

Operating limits (temperature - pressure)



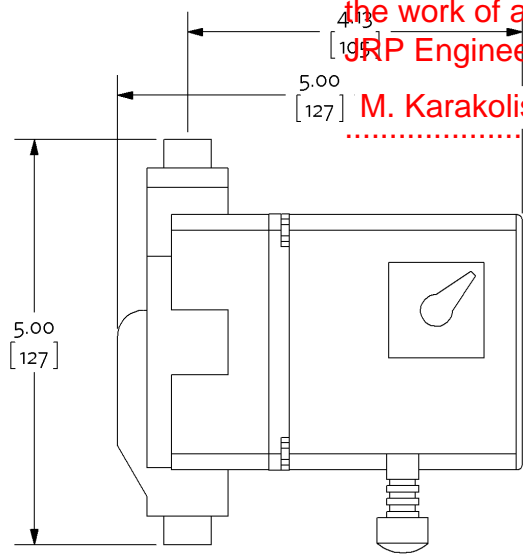
Maximum pressure: 150 psi
Maximum temperature: 230 F



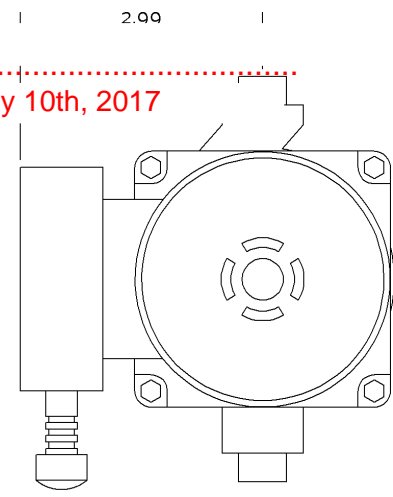
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Dimensional data (not for construction)

Side view



Top view



JRP Engineering
M. Karakolis

DATE: May 10th, 2017

- Weight: 7 lb
- 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

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JRP Engineering

M. Karakolis

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DATE: May 10th, 2017

Submittal

Ref. #: RBW604497.1 rev1

Design envelope close coupled vertical in-line pump

Model: Series Design Envelope Sensorless 4380 0310-005 0

Project name: Tomlinson Pump

Location:

Representative: Walmar Limited Nepean, Ontario

Date submitted: 3/31/2017

Phone number:

Engineer:

Email: rerebueneman@walmar.net

Contractor:

Submitted by: Rene Bueneman

Application design data

Tag number:	1	Pipe orientation:	Single
Service:	194 USGpm	Serial number:	011
Location:	52 ft	Fluid:	Propylene Glycol:50
Quantity:	1	Operating temperature:	60 F
Duty flow per pump:	194 USGpm	Viscosity:	50.45 SSU
Duty head:	52 ft	Specific gravity:	1.0416
Environment:	Indoors	Safety factor % head:	0 %
Total dissolved solids:	0 ppm		

Materials of construction

Construction:	Br	Impeller:	Br (BS1400 Grade LG1)
Rating:	ANSI 125	Shaft sleeve:	316 SS
Connections:	Inlet: 3 in. Outlet: 3 in.	Casing gasket:	Confined Non-Asbestos Fiber
Casing (volute):	Cast Iron (BS1452 GR220)	Flush line:	Braided Stainless Steel

Mechanical seal data

Seal type:	M. Karakolis	Stationary seat:	Sintered Silicon Carbide
Manufacturer code:	SSC556 L'EPSS 2A	Seal:	DM
Springs:	Stainless Steel		
Rotating hardware:	Stainless Steel		

Motor electrical data

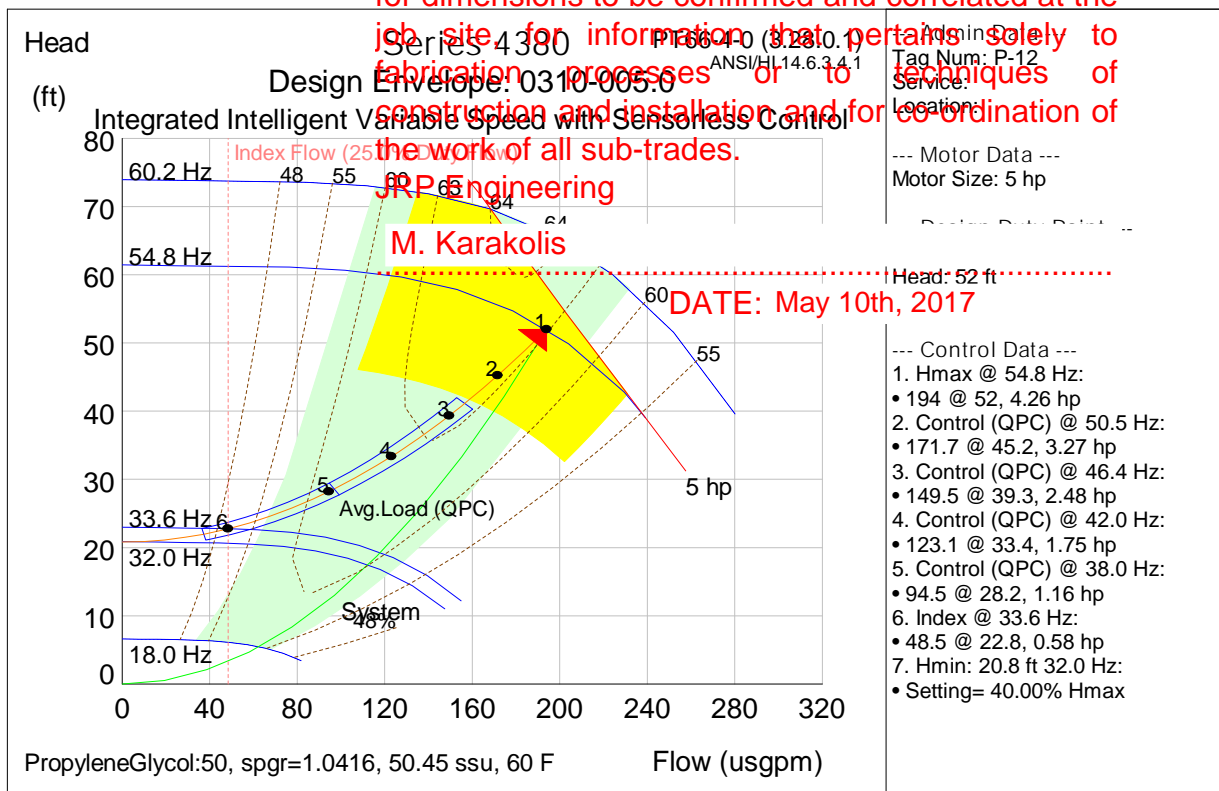
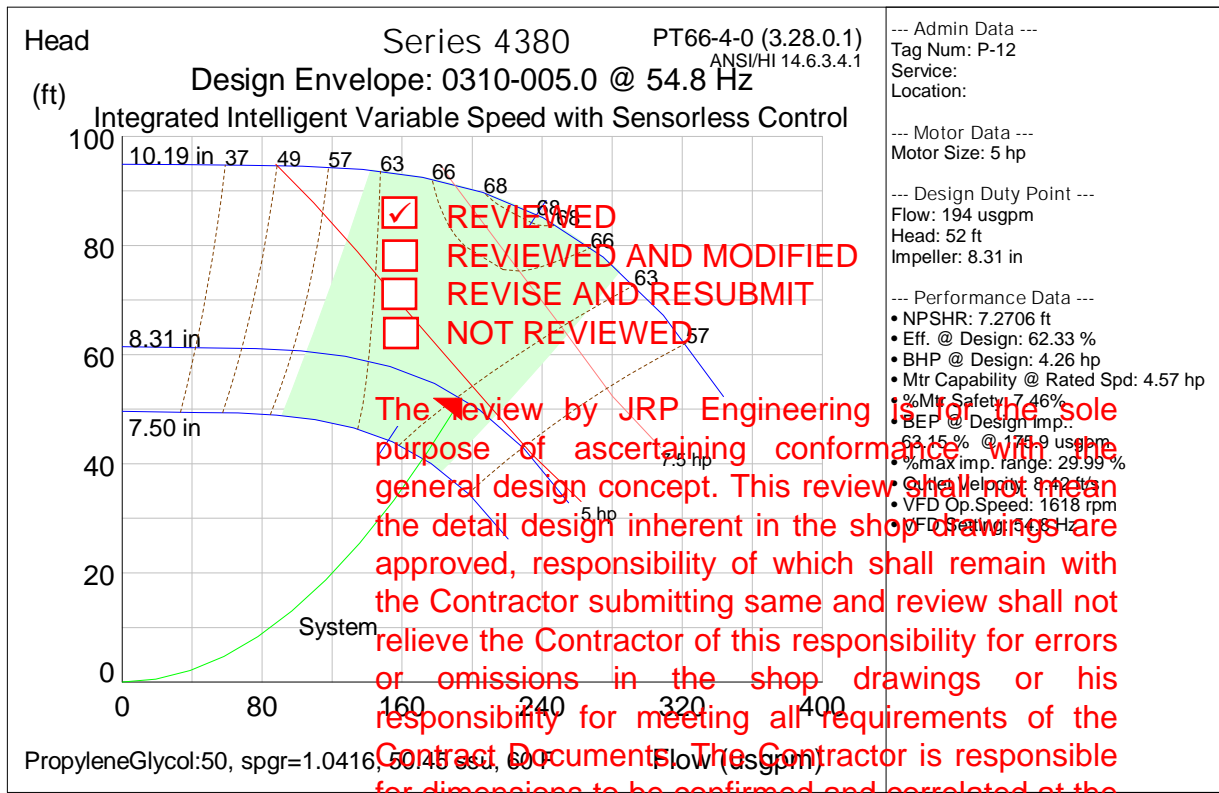
Supplier:	Factory Choice	Insulation class:	Class F Insulation
Size:	5 hp	Inverter motor type:	Inverter Duty
Frame number:	184JM	Efficiency:	NEMA Prem (12.12)
Enclosure:	TEFC	Operating speed @ 100% flow:	1618 rpm
Motor Electrics:	575/3/60	Operating speed @ 50% flow:	1130 rpm

IVS102 controller data

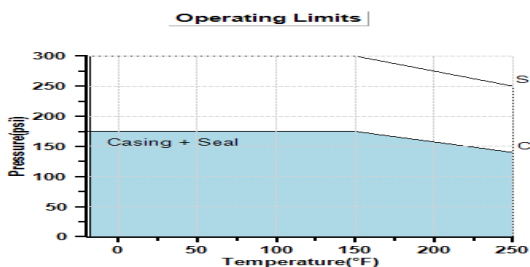
Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
BMS protocol:	BACnet Native	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12	Analog outputs:	1 (current)
Fused disconnect switch:	No	Digital inputs:	4 (programmable)
Control orientation:	L1	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Fan cooled through back channel
BHP at 50% load/flow and 55% of design head:	1.06 hp	Ambient temperature:	14F to 113F (up to 3280ft elevation)
Meets ASHRAE 90.1:	Yes	EMI/RFI control:	Integrated filter to meet EN61800-3
Min. maintained sys. pressure:	20.8 ft	Harmonic suppression:	Integrated DC link reactor**

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

** The IVS 102 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.



Operating limits (temperature - pressure)



Maximum pressure: 175 psi

Maximum temperature: 250 F

Pump casings are hydrostatically tested to 150% of maximum pump working pressure rating.

Design envelope pumping unit capability

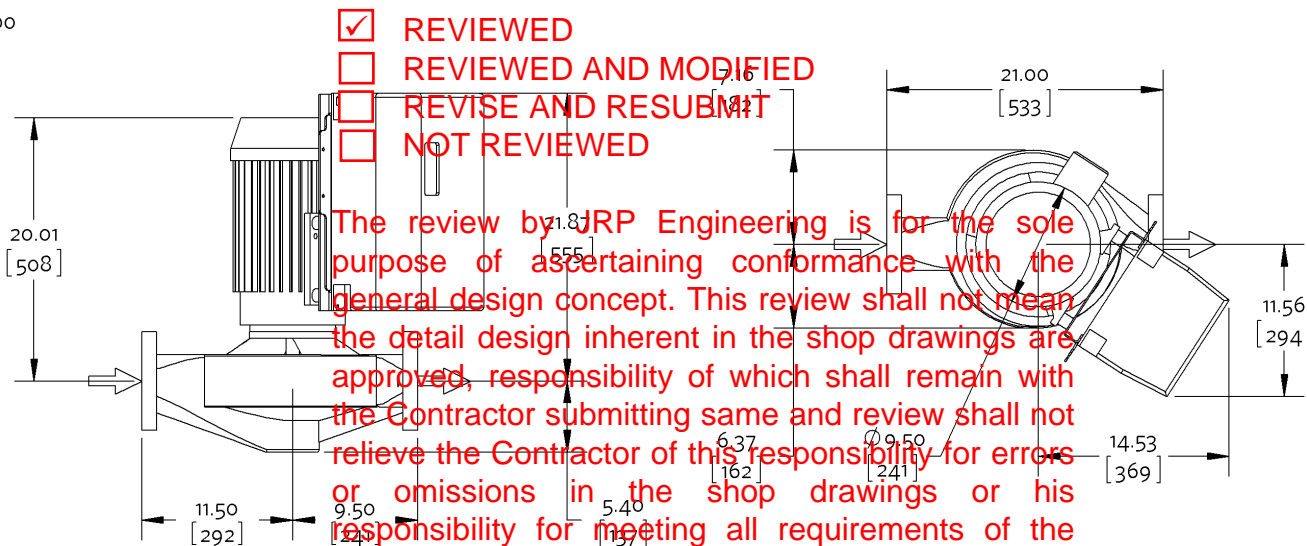
Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	194 USgpm	58.4 ft	63.09 %
Design point	194 USgpm	52 ft	62.33 %
50% average flow (with default load profile)	97 usgpm	28.6 ft	60.55 %

Dimensional data (not for construction)

Side view

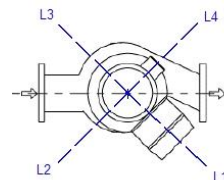
Top view

R: 4.00
[102]



Weight: 379 lb

- Not to scale
- R = minimum lifting clearance required above motor
- Units of measure : inches [millimeters]
- Coupling guard and flush line (not shown) to be used
- 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 1/4 inch NPT suction and discharge gauge ports



Connection details

DATE: May 10th, 2017

Connection	Size	Rating	OD	Bolt quantity	DD	Bolt size
Inlet	3	ANSI-125	7.5	4	6	0.625
Outlet	3	ANSI-125	7.5	4	6	0.625

*Equally spaced straddling centreline

Special instructions

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.

OSHDP Seismic Certification OSP-0422-10
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Environmental Application: Indoors

Additional equipment

Flotrex: FTV-3FA (570200-477)
Suction Guide: SG-33 (516860-019)

Submittal

Ref. #: RBW604497.1 rev1

Design envelope close coupled vertical in-line pump

Model: Series Design Envelope Sensorless 4380 0310-005.0

Project name: Tomlinson Pumps	<input checked="" type="checkbox"/> REVIEWED
Location:	<input type="checkbox"/> REVIEWED AND MODIFIED
Date submitted: 3/31/2017	<input type="checkbox"/> REVISE AND RESUBMIT
Engineer:	<input type="checkbox"/> NOT REVIEWED
Contractor:	

REVIEWED
 REVIEWED AND MODIFIED
 REVISE AND RESUBMIT
 NOT REVIEWED

Application design data

Tag number:	Alt. P-9	Pipe orientation:	Single
Service:		Suction pressure:	0 ft
Location:		Fluid:	Propylene Glycol:50
Quantity:	1	Operating temperature:	60 F
Duty flow per pump:	167 USgpm	Viscosity:	50.45 SSU
Duty head:	47 ft	Specific gravity:	1.04
Environment:	Indoors	Pressure:	101
Total dissolved solids:	0 ppm		

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Materials of construction

Construction:	BF	Impeller:	Bronze (BS1400 Grade LG1)
Rating:	ANSI-125	Shaft sleeve:	316 SS
Connections:	Inlet: 3 in, Outlet: 3 in	Casing gasket:	Confined Non-Asbestos Fiber
Casing (volute):	Cast Iron (BS1452 GR20)	Flush line:	Braided Stainless Steel

Mechanical seal data

Seal type:	Inside Single Spring	Rolling face:	Sintered Silicon Carbide
Manufacturer code:	SSCssc L DPS W	Anti-leak seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel		

M. Karakolis

Motor electrical data

Supplier:	Factory Choice	Insulation class:	1
Size:	5 hp	Inverter motor type:	Inverter Duty
Frame number:	184JM	Efficiency:	NEMA Prem (12.12)
Enclosure:	TEFC	Operating speed @ 100% flow:	1504 rpm
Motor Electrics:	575/3/60	Operating speed @ 50% flow:	1068 rpm

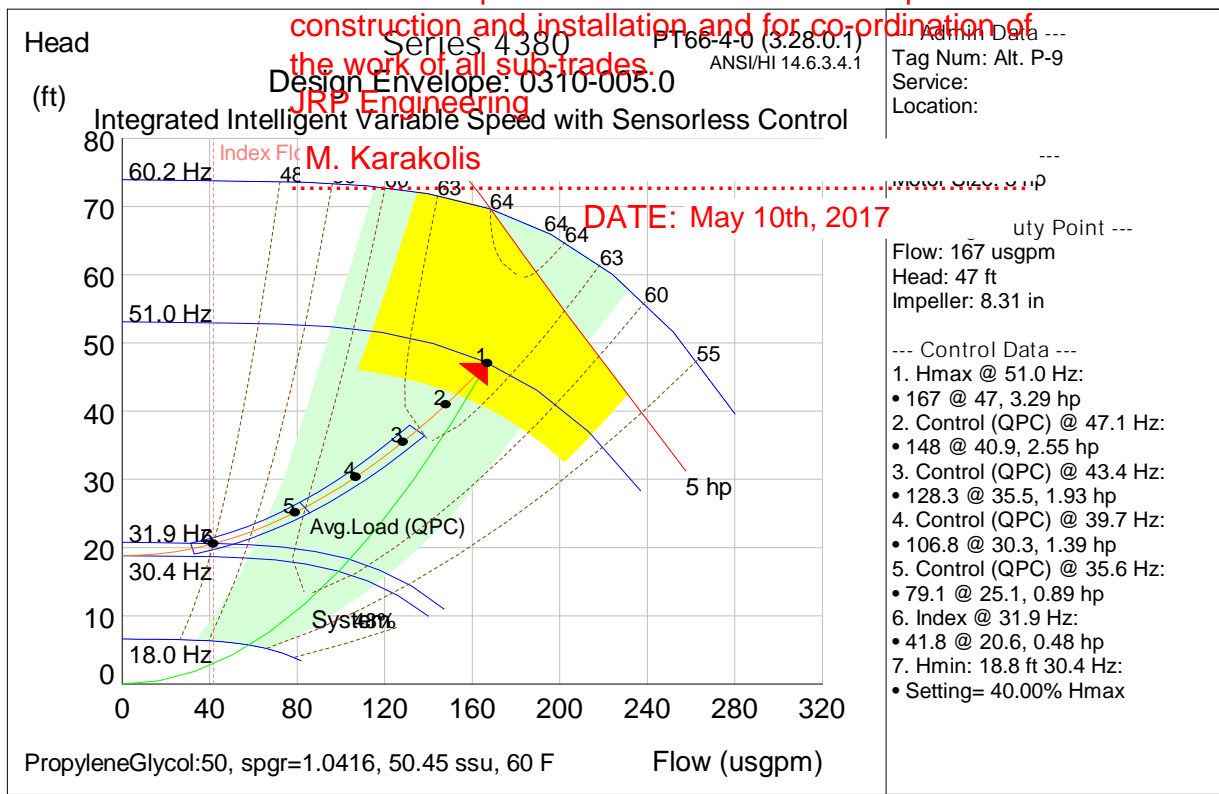
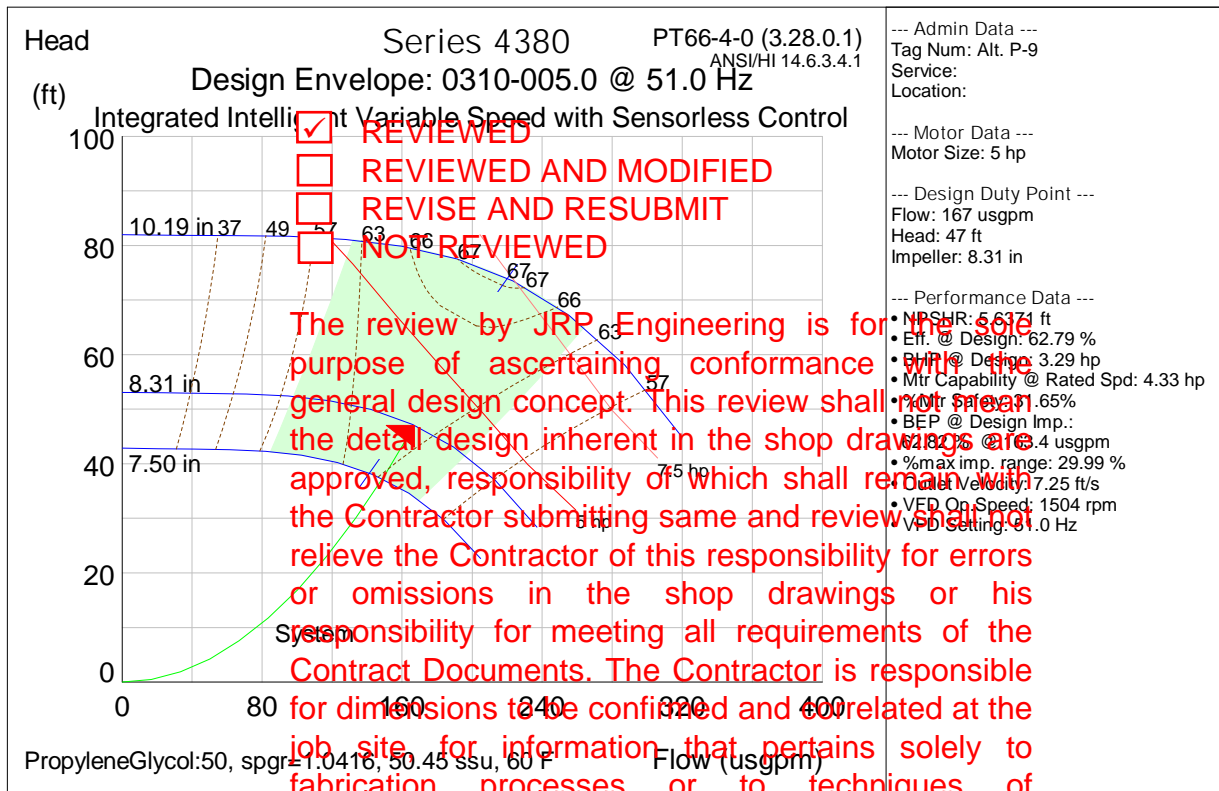
DATE: May 10th, 2017

IVS102 controller data

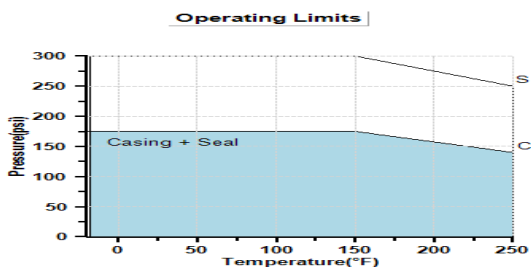
Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
BMS protocol:	BACnet Native	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12	Analog outputs:	1 (current)
Fused disconnect switch:	No	Digital inputs:	4 (programmable)
Control orientation:	L1	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Fan cooled through back channel
BHP at 50% load/flow and 55% of design head:	0.82 hp	Ambient temperature:	14F to 113F (up to 3280ft elevation)
Meets ASHRAE 90.1:	Yes	EMI/RFI control:	Integrated filter to meet EN61800-3
Min. maintained sys. pressure:	18.8 ft	Harmonic suppression:	Integrated DC link reactor**

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

** The IVS 102 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.



Operating limits (temperature - pressure)



Maximum pressure: 175 psi

Maximum temperature: 250 F

Pump casings are hydrostatically tested to 150% of maximum pump working pressure rating.

Design envelope pumping unit capability

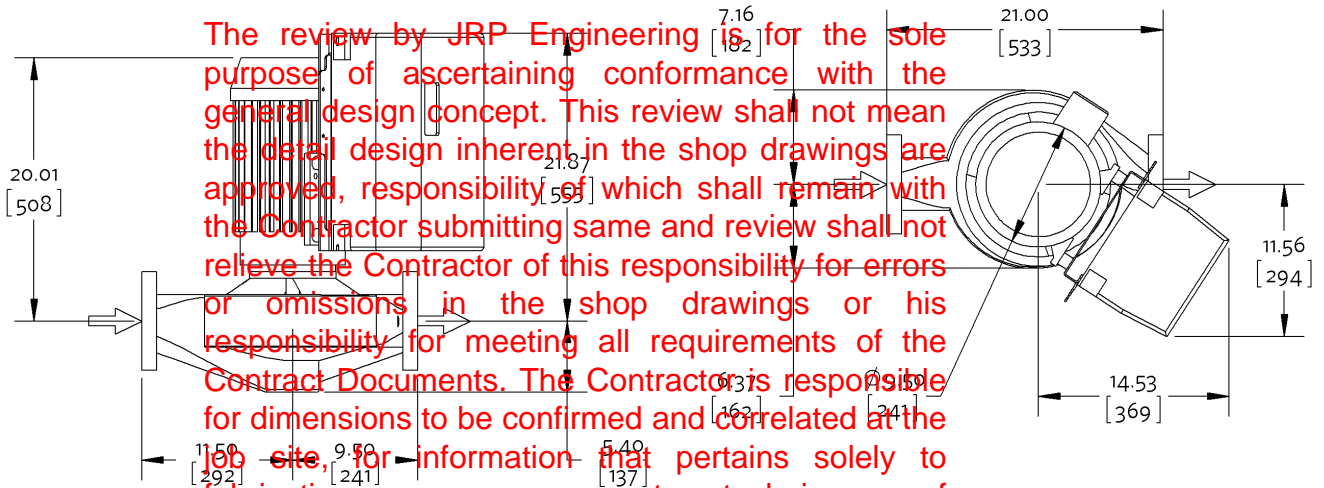
Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	167 USgpm	69.7 ft	63.27 %
Design point	167 USgpm	47 ft	62.79 %
50% average flow (with default load profile)	83.5 usgpm	25.9 ft	59.27 %

Dimensional data (not for construction)

Side view

R: 4.00
[102]

- REVIEWED
- REVIEWED AND MODIFIED
- REVISE AND RESUBMIT
- NOT REVIEWED



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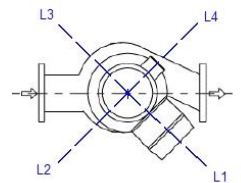
JRP Engineering

Weight: 379 lb

- Not to scale
- R = minimum lifting clearance
- Units of measure : inches [mil]
- 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

M. Karakolis

DATE: May 10th, 2017



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	3	ANSI-125	7.5	4	6	0.625
Outlet	3	ANSI-125	7.5	4	6	0.625

*Equally spaced straddling centreline

Special instructions

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

Environmental Application: Indoors

Additional equipment

Flotrex: FTV-3FA (570200-477)
Suction Guide: SG-33 (516860-019)

Submittal

Ref. #: RBW604497.1 rev1

Design envelope close coupled vertical in-line pump

Model: Series Design Envelope Sensorless 4380 0208-003.0

Project name: Tomlinson Pumps

Location:

Date submitted: 3/31/2017

Engineer:

Contractor:

REVIEWED
 REVIEWED AND MODIFIED
 REVISE AND RESUBMIT
 NOT REVIEWED

Representative: Walmart Limited Nepean, Ontario

Phone number:

e-mail: rene.buchanan@walmart.com

Submitted by: Rene Buchanan

Application design data

Tag number:	All Pumps	Orientation:	Single
Service:		Suction pressure:	0 ft
Location:		Fluid:	Propylene Glycol:50
Quantity:	1	Operating temperature:	60 F
Duty flow per pump:	140 USgpm	Viscosity:	50.45 SSU
Duty head:	34 ft	Specific gravity:	1.0416
Environment:	Indoors	Safety factor % Head:	0 %
Total dissolved solids:	0 ppm		

Materials of construction

Construction:	BF	Motor:	Brnze (BS1400 Grade LG1)
Rating:	ANSI 125	Shaft sleeve:	316 SS
Connections:	Inlet: 2 in, Outlet: 2 in	Casing gasket:	Confined Non-Asbestos Fiber
Casing (volute):	Cast Iron (BS1452 GR220)	Flush line:	Braided Stainless Steel

Mechanical seal data

Seal type:	Inside Single Spring	Rotating face:	Sintered Silicon Carbide
Manufacturer code:	SS		ilicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel		

Motor electrical data

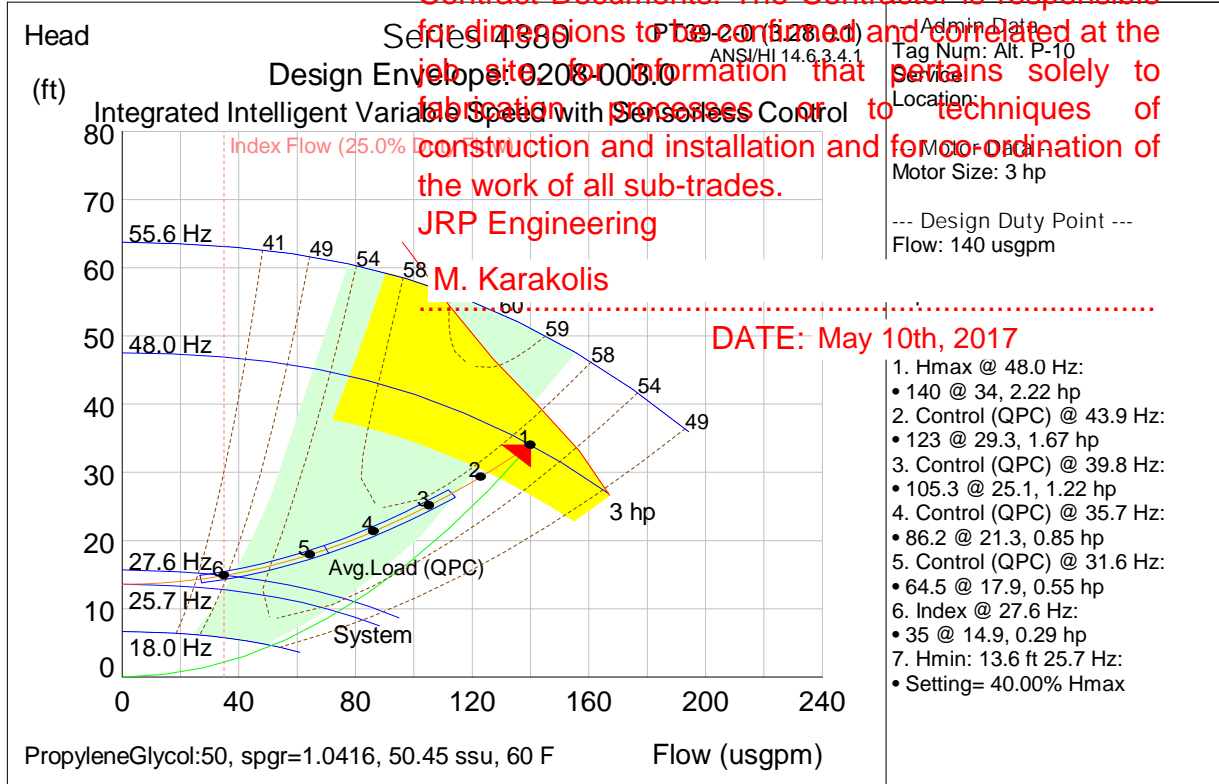
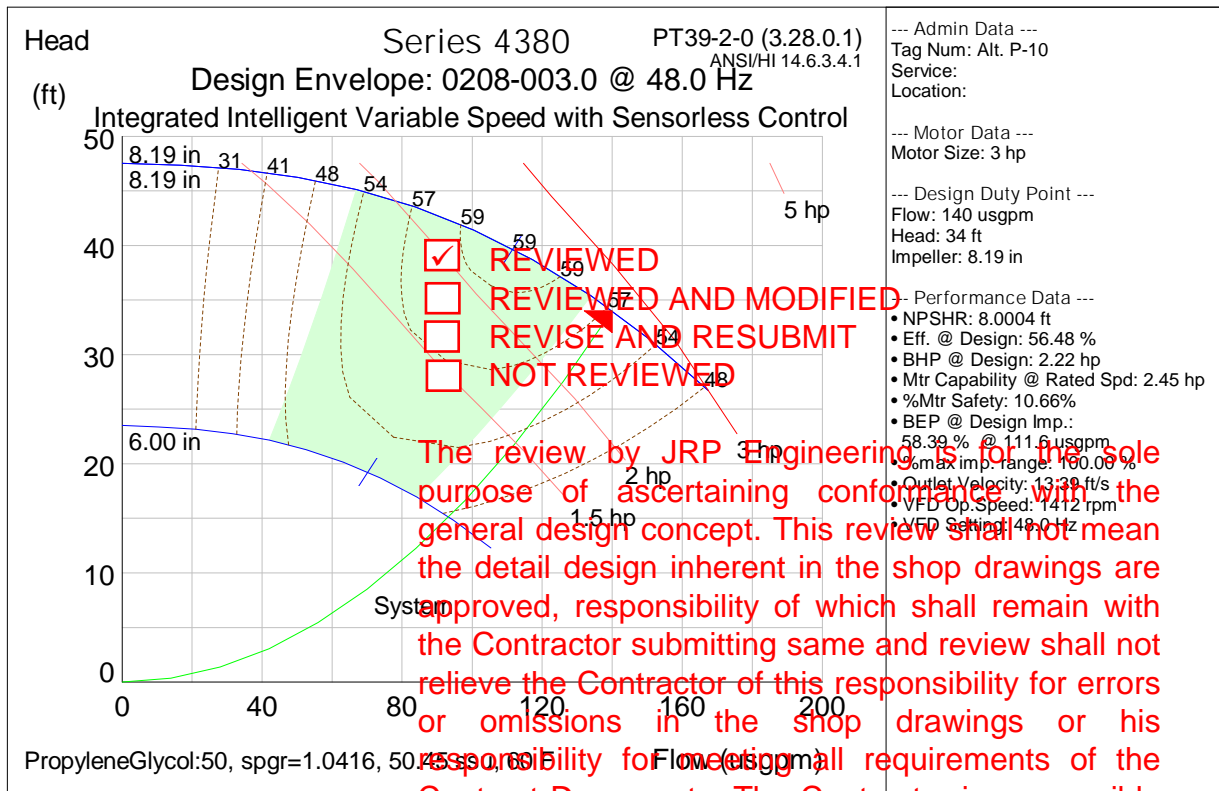
Supplier:	Factory Choice	Insulation class:	Class F Insulation
Size:	3 hp	Inverter motor type:	Inverter Duty
Frame number:	182JM	Efficiency:	NEMA Prem (12.12)
Enclosure:	TEFC	Operating speed @ 100% flow:	1412 rpm
Motor Electrics:	575/3/60	Operating speed @ 50% flow:	959 rpm

IVS102 controller data

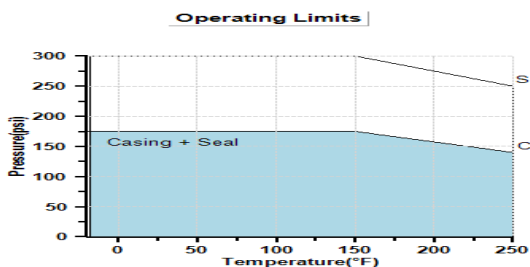
Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
BMS protocol:	BACnet Native	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12	Analog outputs:	1 (current)
Fused disconnect switch:	No	Digital inputs:	4 (programmable)
Control orientation:	L1	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Fan cooled through back channel
BHP at 50% load/flow and 55% of design head:	0.55 hp	Ambient temperature:	14F to 113F (up to 3280ft elevation)
Meets ASHRAE 90.1:	Yes	EMI/RFI control:	Integrated filter to meet EN61800-3
Min. maintained sys. pressure:	13.6 ft	Harmonic suppression:	Integrated DC link reactor**

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

** The IVS 102 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.



Operating limits (temperature - pressure)



Maximum pressure: 175 psi

Maximum temperature: 250 F

Pump casings are hydrostatically tested to 150% of maximum pump working pressure rating.

Design envelope pumping unit capability

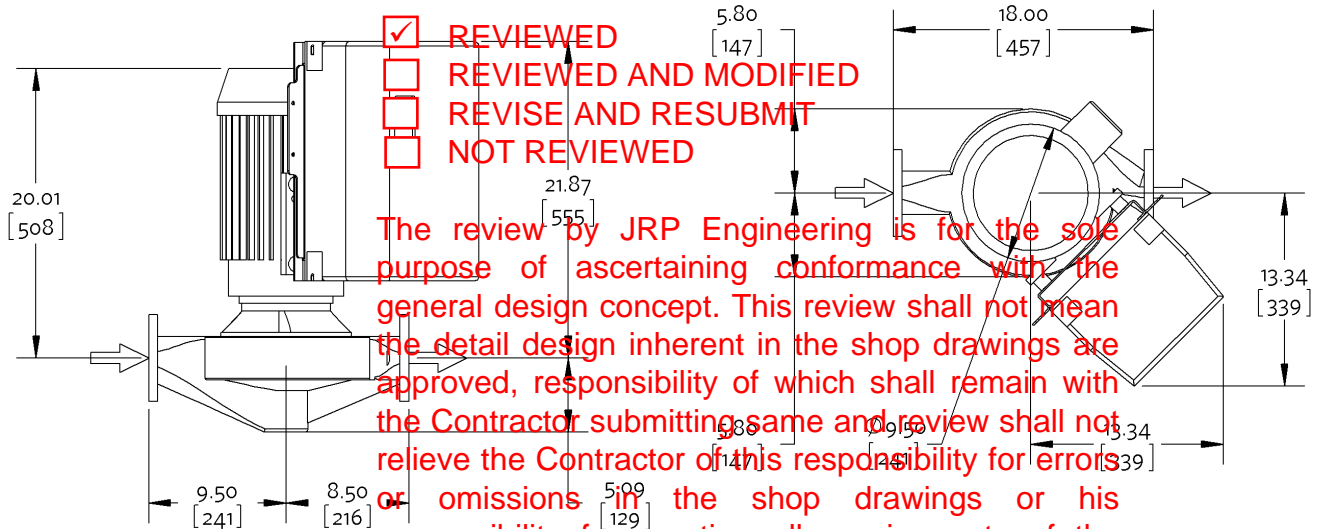
Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	140 USgpm	40.9 ft	57.94 %
Design point	140 USgpm	34 ft	56.48 %
50% average flow (with default load profile)	70 usgpm	18.7 ft	56.15 %

Dimensional data (not for construction)

Side view

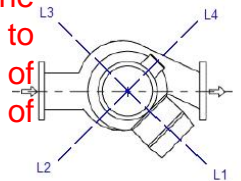
Top view

R: 4.00
[102]



Weight: 292 lb

- Not to scale
- R = minimum lifting clearance required above motor
- Units of measure : inches [millimeters]
- 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 $\frac{1}{4}$ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Ball diameter	PCD	Bolt size
Inlet	2	ANSI-125	6	4	4.75	0.625
Outlet	2	ANSI-125	6	4	4.75	0.625

*Equally spaced straddling centreline

Special instructions

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

Environmental Application: Indoors

Additional equipment

Flotrex: FTV-3FA (570200-477)
Suction Guide: SG-32 (516860-016)

Submittal

Ref. #: RBW604497.1 rev1

- REVIEWED
- REVIEWED AND MODIFIED
- REVISE AND RESUBMIT
- NOT REVIEWED

Flo-trex valve

Model: FTV-F (to 10 hp)

Project name: Tomlinson Pumps

Location:

Date submitted: 3/31/2017

Engineer:

Contractor:

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Representative: Walmart Limited Nepean, Ontario
 Phone number:
 e-mail: renebueneman@walmart.net
 Submitted by: Rene Bueneman

Application design data

Tag	Qty	Model	Size	Config	Flange rating	Design flowrate	Pressure Drop*	Associated pump
Alt. P-9	1	FTV-3FA	3 in	Angle Flanged	ANSI-125	167.0 USgpm	1.9 psi	Alt. P-9 Design Envelope Sensorless 4380 0310-005.0
Alt. P-10	1	FTV-3FA	3 in	Angle Flanged	ANSI-125	140.0 USgpm	1.9 psi	Alt. P-10 Design Envelope Sensorless 4380 0208-003.0
P-1a/b	2	FTV-4FS	4 in	Straight Flanged	ANSI-125	377.0 USgpm	2.2 psi	P-1a/b 4030-4x3x10-15 hp Pump (Factory Choice Motor)
P2a/b	2	FTV-4FA	4 in	Angle Flanged	ANSI-125	450.0 USgpm	2.8 psi	P2a/b Design Envelope Sensorless 4200H 2506-015.0
P3a/b	2	FTV-3FA	3 in	Angle Flanged	ANSI-125	127.0 USgpm	1.3 psi	P3a/b Design Envelope Sensorless 4200H 1506-007.5
P-9	1	FTV-3FA	3 in	Angle Flanged	ANSI-125	167.0 USgpm	1.9 psi	P-9 Design Envelope Sensorless 4380 0308-005.0
P-10	1	FTV-3FA	3 in	Angle Flanged	ANSI-125	140.0 USgpm	1.9 psi	P-10 Design Envelope Sensorless 4380 0308-003.0
P-11	1	FTV-2TS	2 in	Straight Threaded	None	160.0 USgpm	1.1 psi	P-11 Design Envelope Sensorless 4380 1508-001.0
P-12	1	FTV-3FA	3 in	Angle Flanged	ANSI-125	194.0 USgpm	2.5 psi	P-12 Design Envelope Sensorless 4380 0310-005.0

relieve the Contractor of this responsibility for errors or omissions in the shop drawings or his responsibility for meeting all requirements of the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of the work of all sub-trades.

JRP Engineering
 M. Karakolis

DATE: May 10th, 2017

*at design flow

Materials of construction

FTV-4FS-Flo-Trex Valve-ANSI-125-Straight Flanged		FTV-Flanged-2.5-12	
Body:	Cast Iron ASTM A48 Class 30	Spring:	Stainless Steel ASTM A313 Type 302
Disc:	Bronze ASTM B584-C84400	O rings:	BUNA (STEM) Elastomers & EPDM
Seat:	EPDM	2 metering ports:	Brass Body with EPDM Check and Gasketed Cap
Stem:	Stainless Steel ASTM A582 Type 416	2 drain tappings:	¼" NPT with Brass Plug

FTV-4FA-Flo-Trex Valve-ANSI-125-Angle Flanged		FTV-Flanged-2.5-12	
Body:	Cast Iron ASTM A48 Class 30	Spring:	Stainless Steel ASTM A313 Type 302
Disc:	Bronze ASTM B584-C84400	O rings:	BUNA (STEM) Elastomers & EPDM
Seat:	EPDM	2 metering ports:	Brass Body with EPDM Check and Gasketed Cap
Stem:	Stainless Steel ASTM A582 Type 416	2 drain tappings:	¼" NPT with Brass Plug

FTV-3FA-Flo-Trex Valve-ANSI-125-Angle Flanged		FTV-Flanged-2.5-12	
Body:	Cast Iron ASTM A48 Class 30	Spring:	Stainless Steel ASTM A313 Type 302
Disc:	Bronze ASTM B584-C84400	O rings:	BUNA (STEM) Elastomers & EPDM
Seat:	EPDM	2 metering ports:	Brass Body with EPDM Check and Gasketed Cap
Stem:	Stainless Steel ASTM A582 Type 416	2 drain tappings:	¼" NPT with Brass Plug

REVIEWED
 REVIEWED AND MODIFIED
 REVISE AND RESUBMIT
 NOT REVIEWED

FTV-3FA-Flo-Trex Valve-ANSI-125-Angle Flanged		FTV-Flanged-2.5-12	
Body:	Cast Iron ASTM A48 Class 30	Spring:	Stainless Steel ASTM A313 Type 302
Disc:	Bronze ASTM B584-C84400	O rings:	BUNA (STEM) Elastomers & EPDM
Seat:	EPDM	2 metering ports:	Brass Body with EPDM Check and Gasketed Cap
Stem:	Stainless Steel ASTM A582 Type 416	2 drain tappings:	¼" NPT with Brass Plug

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JRP Engineering

M. Karakolis

FTV-3FA-Flo-Trex Valve-ANSI-125-Angle Flanged		FTV-Flanged-2.5-12	
Body:	Cast Iron ASTM A48 Class 30	Spring:	Stainless Steel ASTM A313 Type 302
Disc:	Bronze ASTM B584-C84400	O rings:	BUNA (STEM) Elastomers & EPDM
Seat:	EPDM	2 metering ports:	Brass Body with EPDM Check and Gasketed Cap
Stem:	Stainless Steel ASTM A582 Type 416	2 drain tappings:	¼" NPT with Brass Plug

FTV-2TS-Flo-Trex Valve-Straight Threaded		FTV1.25-2	
Body:	SS 304 A304	Spring:	SS ASTM A-313 TYPE 302-(18-8)
Disc:	Brass C46500	O rings:	EPDM
Seat:	Brass C46500	2 metering ports:	Brass Body with EPDM Check and Gasketed Cap
		2 drain tappings:	¼" NPT with SS 304 Plug

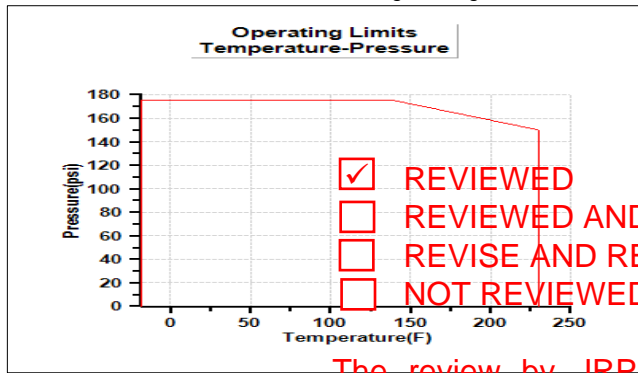
DATE: May 10th, 2017

FTV-3FA-Flo-Trex Valve-ANSI-125-Angle Flanged		FTV-Flanged-2.5-12	
Body:	Cast Iron ASTM A48 Class 30	Spring:	Stainless Steel ASTM A313 Type 302
Disc:	Bronze ASTM B584-C84400	O rings:	BUNA (STEM) Elastomers & EPDM
Seat:	EPDM	2 metering ports:	Brass Body with EPDM Check and Gasketed Cap
Stem:	Stainless Steel ASTM A582 Type 416	2 drain tappings:	¼" NPT with Brass Plug

FTV-3FA-Flo-Trex Valve-ANSI-125-Angle Flanged		FTV-Flanged-2.5-12	
Body:	Cast Iron ASTM A48 Class 30	Spring:	Stainless Steel ASTM A313 Type 302
Disc:	Bronze ASTM B584-C84400	O rings:	BUNA (STEM) Elastomers & EPDM
Seat:	EPDM	2 metering ports:	Brass Body with EPDM Check and Gasketed Cap
Stem:	Stainless Steel ASTM A582 Type 416	2 drain tappings:	¼" NPT with Brass Plug

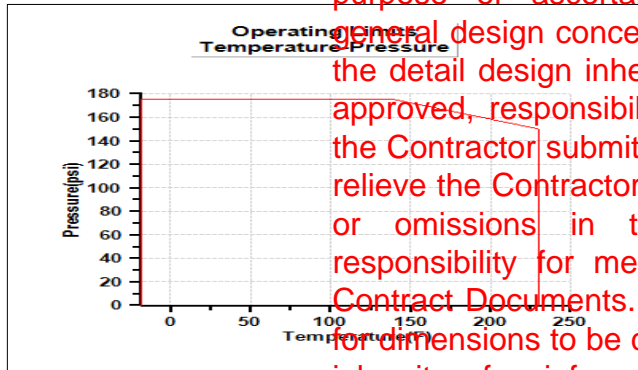
FTV-3FA-Flo-Trex Valve-ANSI-125-Angle Flanged		FTV-Flanged-2.5-12	
Body:	Cast Iron ASTM A48 Class 30	Spring:	Stainless Steel ASTM A313 Type 302
Disc:	Bronze ASTM B584-C84400	O rings:	BUNA (STEM) Elastomers & EPDM
Seat:	EPDM	2 metering ports:	Brass Body with EPDM Check and Gasketed Cap
Stem:	Stainless Steel ASTM A582 Type 416	2 drain tappings:	¼" NPT with Brass Plug

Operating limits (temperature - pressure)



Maximum pressure: 175 psi
 Maximum temperature: 230 F

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Maximum pressure: 175 psi
 Maximum temperature: 230 F

Dimensional data (not for construction)

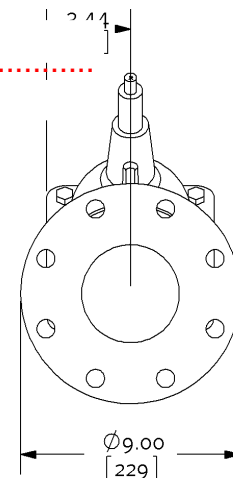
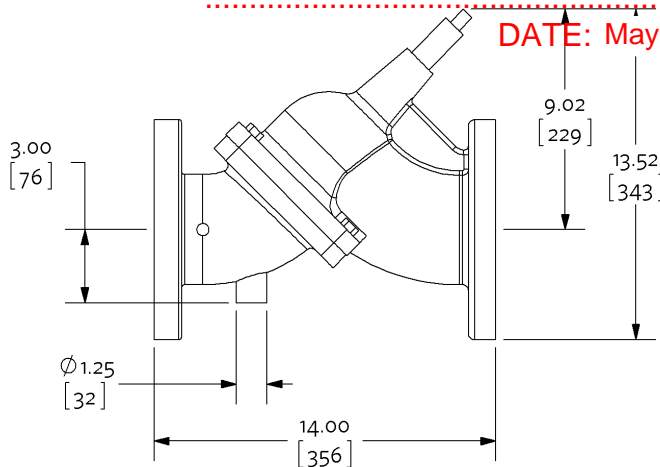
Model: FTV-4FS-Flo-Trex Valve-ANSI-125-Straight Flanged
 Side view

Weight: 26.8 kg

Front view

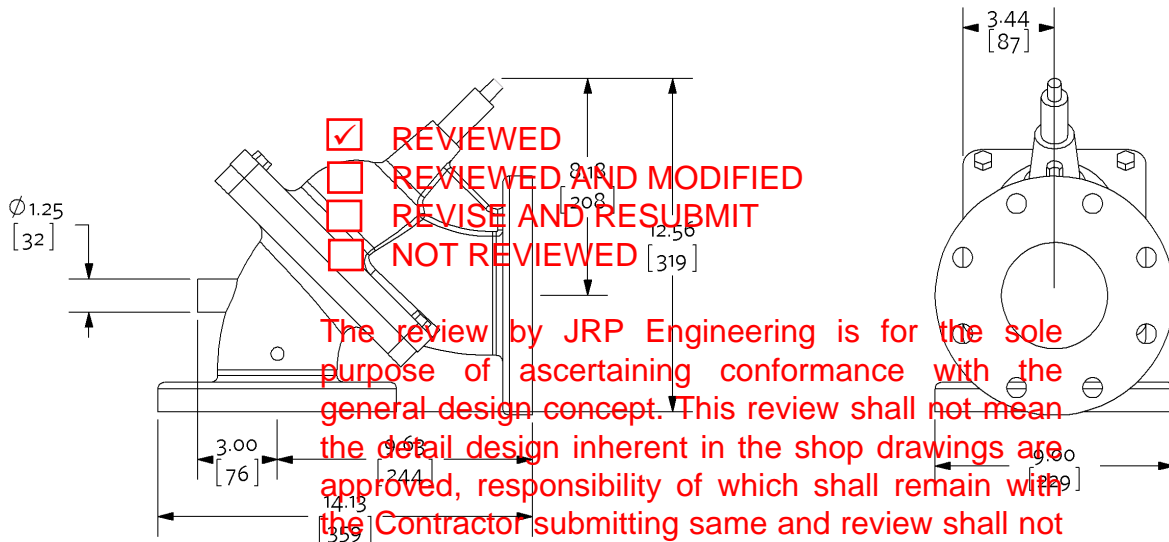
JRP Engineering
 M. Karakolis

DATE: May 10th, 2017



Side view

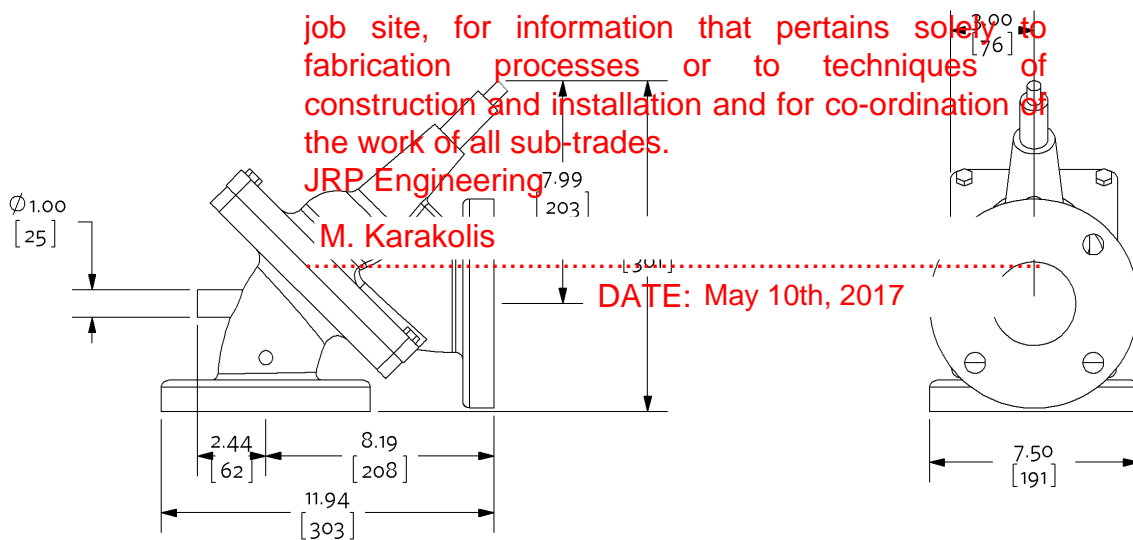
Front view



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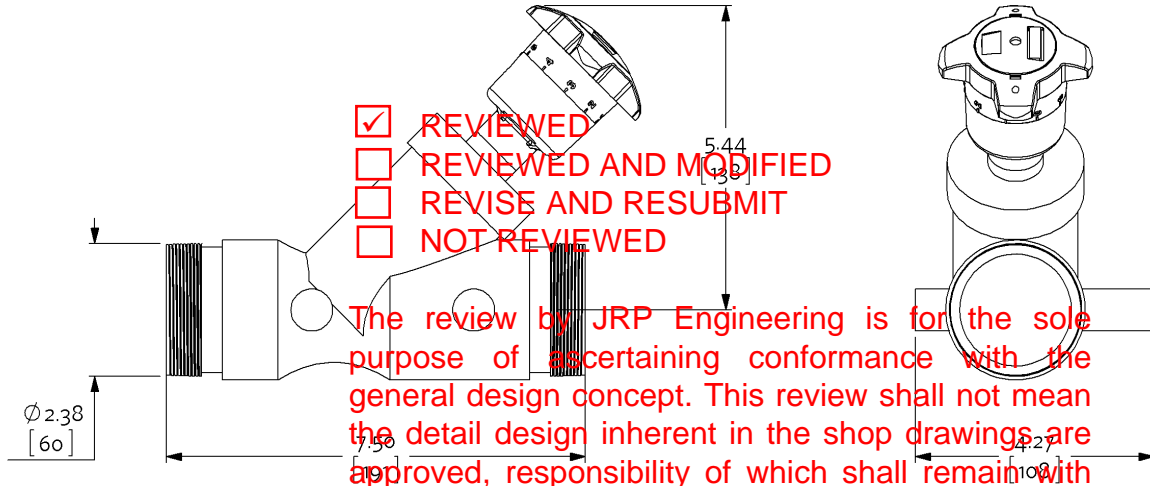
Side view

Front view



Side view

Front view



- REVIEWED
- REVIEWED AND MODIFIED
- REVISE AND RESUBMIT
- NOT REVIEWED

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JRP Engineering

M. Karakolis

DATE: May 10th, 2017

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. #: RBW604497.1 rev1

Suction guide

Model: SG (2 to 12 inches), SG-TF

Project name: Tomlinson Pumps

Location:

Date submitted: 3/31/2017

Engineer:

Contractor:

REVIEWED
 REVIEWED AND MODIFIED
 REVISE AND RESUBMIT
 NOT REVIEWED

Representative: Walmar Limited Nepean, Ontario
Phone number:
e-mail: renebueneman@walmar.net

Submitted by: Rene Bueneman

Application design data

Tag	Qty	Model	System	Pump Design Pressure	Flow	Associated pump
P2a/b	2	SG-33	3 in	420.0 USgpm	0.3 psi	P2a/b Design Envelope Sensorless 4200H 2506-015.0
P3a/b	2	SG-33	3 in	128.0 USgpm	0.3 psi	P3a/b Design Envelope Sensorless 4200H 1506-007.5
P-9	1	SG-33	3 in	167.0 USgpm	0.5 psi	P-9 Design Envelope Sensorless 4380 0308-005.0
P-10	1	SG-33	3 in	140.0 USgpm	0.4 psi	P-10 Design Envelope Sensorless 4380 0308-003.0
P-11	1	SG-215TF	2 in	16.0 USgpm	0.0 psi	P-11 Design Envelope Sensorless 4380 1508-001.0
P-12	1	SG-33	3 in	194.0 USgpm	0.7 psi	P-12 Design Envelope Sensorless 4380 0310-005.0
Alt. P-9	1	SG-33	3 in	167.0 USgpm	0.5 psi	Alt. P-9 Design Envelope Sensorless 4380 0310-005.0
Alt. P-10	1	SG-32	3 in	140.0 USgpm	1.0 psi	Alt. P-10 Design Envelope Sensorless 4380 0208-003.0
P-1a/b	2	SG-44	4 in	370.0 USgpm	0.8 psi	P-1a/b 4030-4320-15hp Pump (Factory Choice Motor)

*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		Galvanized Steel

SG-215TF			
Body:	Ductile Iron	Cover gasket:	Synthetic fiber
Guide vanes:	Ductile Iron	Strainer:	Stainless Steel,0.125"(3mm)Perf.
Cover plate:	Ductile Iron	Start-up strainer*:	Fine Mesh Galvanized Steel

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

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

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

The review by JRP Engineering is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean the detail design inherent in the shop drawings are approved, responsibility of which shall remain with the Contractor submitting same and review shall not relieve the Contractor of this responsibility for errors or omissions in the shop drawings or his responsibility for meeting all requirements of the Contract Documents. The Contractor is responsible for dimensions to be confirmed and corrected at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of the work of all sub-trades.

JRP Engineering
 M. Karakolis

DATE: May 10th, 2017

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

- REVIEWED
- REVIEWED AND MODIFIED
- REVISE AND RESUBMIT
- NOT REVIEWED

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

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

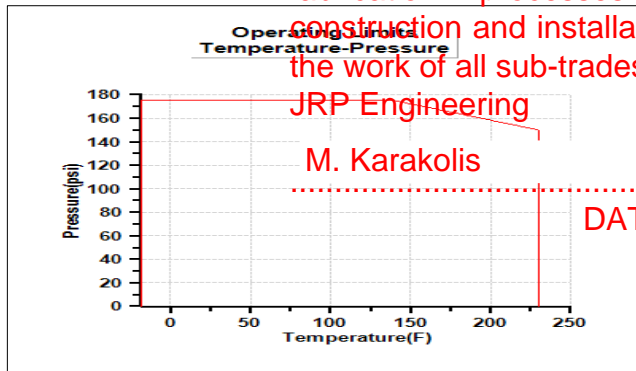
SG-33	Body: Cast Iron	Cover gasket: Synthetic fiber
	Guide vanes: Cast Iron	Strainer: Stainless Steel,0.125"(3mm)Perf.
	Cover plate: Cast Iron	Start-up strainer*: Fine Mesh Galvanized Steel

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*Remove start up strainer after 24 hours

Operating limits (temperature - pressure)

SG-33-Suction Guide-ANSI-125

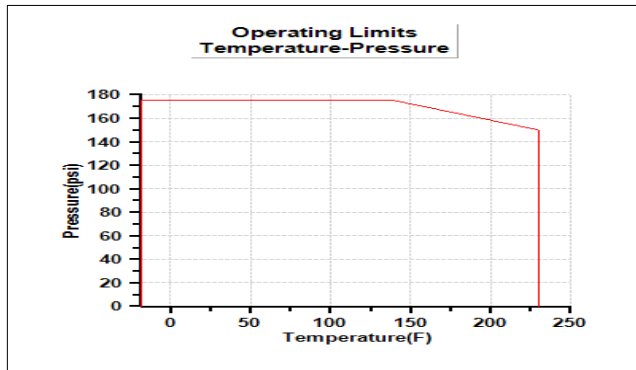


Maximum pressure: 175 psi
 Maximum temperature: 230 F

Units are hydrostatically tested to 150% of maximum working pressure

DATE: May 10th, 2017

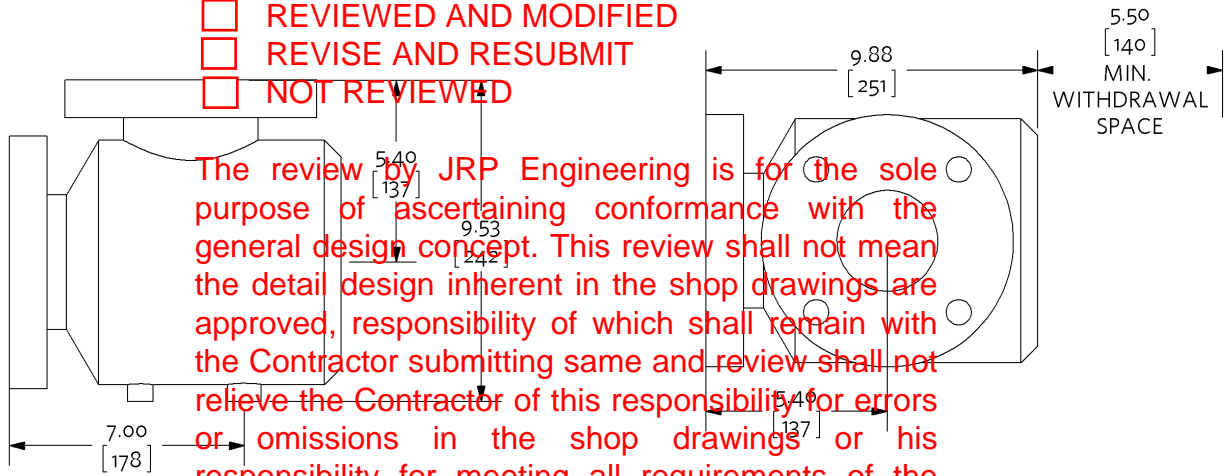
SG-215TF-Suction Guide-ANSI-125



Maximum pressure: 175 psi
 Maximum temperature: 230 F

Units are hydrostatically tested to 150% of maximum working pressure

- REVIEWED
- REVIEWED AND MODIFIED
- REVISE AND RESUBMIT
- NOT REVIEWED

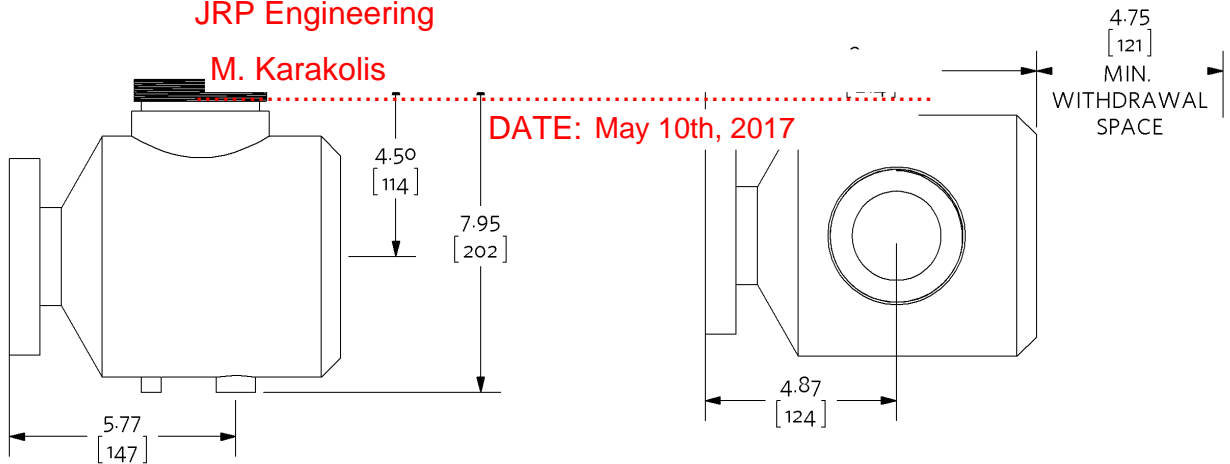


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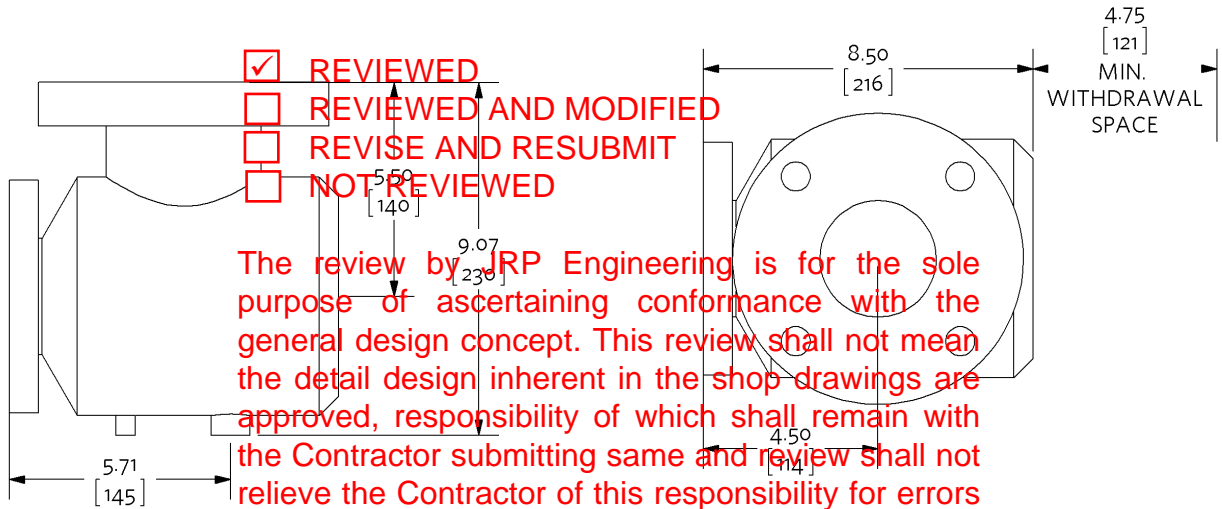
M. Karakolis

DATE: May 10th, 2017



Side view

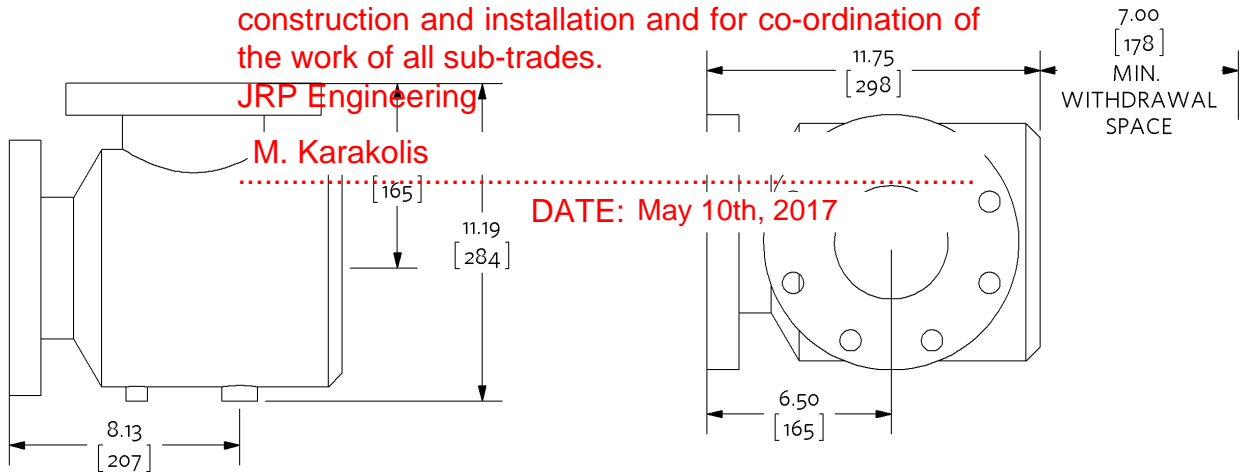
Top view



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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