

Submittal

Design Envelope Split-Coupled Vertical In-Line Tango Pump

Model: Series Design Envelope Sensorless 4332 0406C-020.0 with Suction Guide , Services

Project name:
Location:
Date submitted:
Engineer:
Representative:
Phone number:
e-mail:
Submitted by:

Application design data

Tag number:		Piping configuration:	Single
Service:		Suction pressure:	0 ft
Equipment Location:		Fluid:	Propylene Glycol: 50
Qty:	1	Operating temperature:	60 °F
Total system flow:	720 USgpm	Duty flow per pump:	720 USgpm
System head:	50 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	1.0000
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	66.83 %	Safety factor % head:	0 %
NPSHR:	24.48 ft	Total Absorbed Power:	13.6 hp
Min. maintained pressure*:	20 ft	Impeller diameter:	6.19 in
PEIv:	0.45	ERv:	55
Standby qty:	0	Pump/motor run qty:	1
Outlet velocity:	18.14 ft/s	Load Profile Location:	NA
Climate Zone Type:	NA	Building Type:	NA
Time Period:	8760 (1 Year)		
Redundancy %:	N/A		

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

Materials of construction

Construction:	Stainless Steel Fitted	Impeller:	316 Stainless Steel
Rating:	ANSI-125	Pump shaft:	316 Stainless Steel
Connections:	ANSI-125 Flanges Inlet: 4in, Outlet: 4in	Flush line:	Braided Stainless Steel
Casing (volute):	Cast iron, e-coated	Casing o-ring:	Confined Non-Asbestos Fiber
		Stub Shaft:	N/A

Mechanical seal data

Seal type:	Outside Balanced	Rotating face:	Carbon
Manufacturer code:	C-SSC G30	Stationary seat:	Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	Viton
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS)****:	2000 PPM

Electrical data

Supplier:	Armstrong	Insulation class:	Class F Insulation
Size:	20 hp	Motor type:	Permanent Magnet
Frame size:	132	Efficiency:	IE5
Enclosure:	TEFC	Power supply:	208/3/60
Operating speed @ 100% flow:	2644 rpm	Operating speed @ 50% flow***:	1693 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

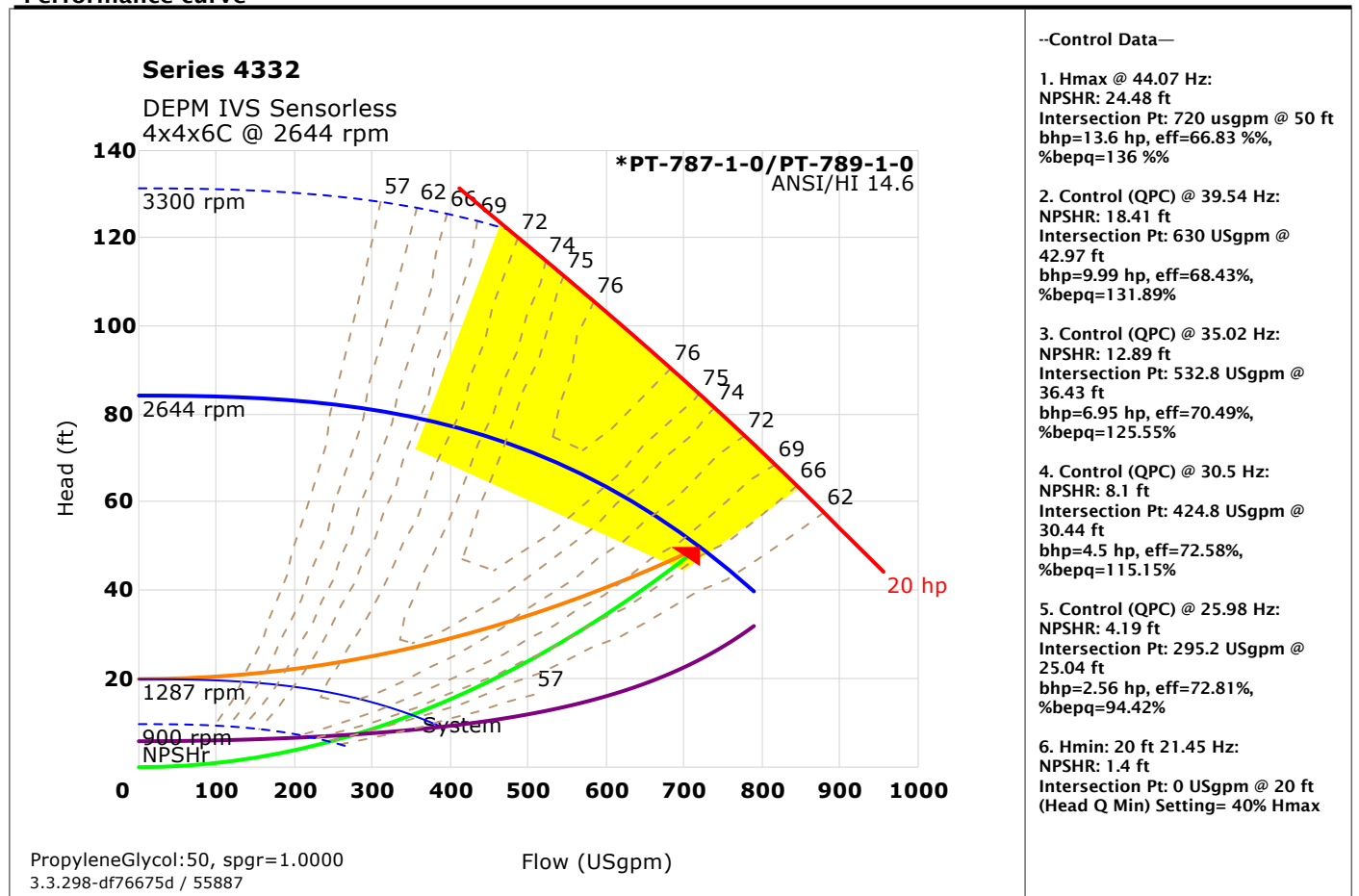
DEPM controller data

Sensorless control:	Yes - Quadratic press control	Communication port:	RS 485
Communication protocol (*):	Default Field Reconfigurable	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current or voltage)
Fused disconnect switch:	None	Digital inputs:	2 (programmable)
Control orientation:	STD	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:	7.48 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



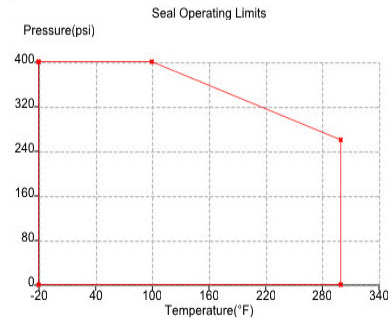
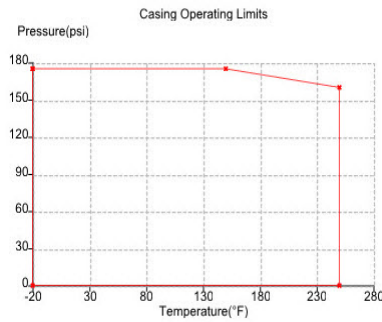
Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	720 USgpm	87.05 ft	76.91%
Design point	720 USgpm	50 ft	66.83 %
50% average flow (with default load profile)	360 USgpm	27.5 ft	73.33 %

Motor Capability @ Rated Speed

18.14 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:	Yes*
Energy Performance Bundle:	No	Protection Bundle:	No
Dual Season Setup:	No	Zone Optimization Bundle:	No

*This feature is embedded into the controls of up to 4 pumps.

Cooling

Q1:	N/A
H1:	N/A
H1 min:	N/A
Maximum Flow:	N/A

Heating

Q2:	N/A
H2:	N/A
H2 min:	N/A
Minimum Flow:	N/A

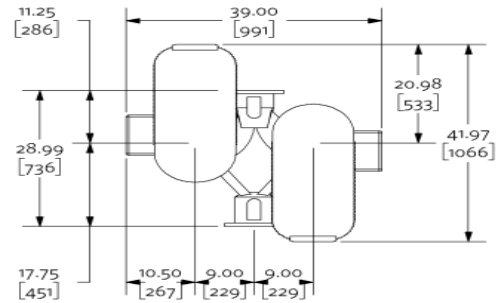
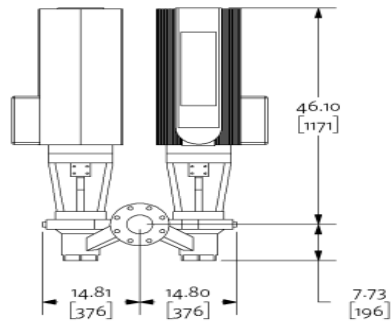
Optional Services

On-Site Pump Commissioning:	Cost not Included	Extended Warranty:	No
Pump Manager:	Yes, Standard (1 Year Pump Manager Professional)	Include Spare Parts Qty:	0

Dimensional data (not for construction)

Side view

Top view



Weight: 919.32 lb [417 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 $\frac{1}{4}$ 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 $\pm 5\%$ accuracy.

Special instructions

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

Selected options

Testing: No Test Certification Required
Seal Environment Accessories: None
Pre-Wired Control Bridge: Parallel
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout
Parallel Sensorless : Yes

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

Submittal

Suction guide

Model: SG-64

Project name:

Representative:

Location:

Phone number:

Date submitted:

e-mail:

Engineer:

Submitted by:

Application design data

Tag	Qty	Model	Pipe Conn.size	Pump Conn.size	Design flowrate	Pressure Drop*	Associated pump
	1	SG-64	6 in	4 in	720 USgpm	6.87 ft	Design Envelope Sensorless 4332 0406C-020.0

*at design flow

Materials of construction

SG-64

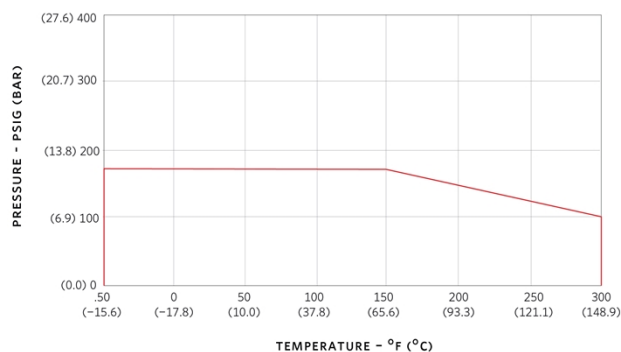
Body:	Cast iron	Cover gasket:	Synthetic fiber
Guide vanes:	Cast iron	Strainer:	Stainless Steel, 0.125"(3mm)Perf..
Cover plate:	Cast iron	Start-up strainer*:	Fine Mesh Galvanized Steel

*Remove start up strainer after 24 hours of pump operation

Operating limits (temperature - pressure)

SG-64-Suction Guide-ANSI-125

PRESSURE TEMPERATURE LIMITS



Maximum pressure: 175 psi
Maximum temperature: 300 F

Units are hydrostatically tested to 150% of maximum working pressure

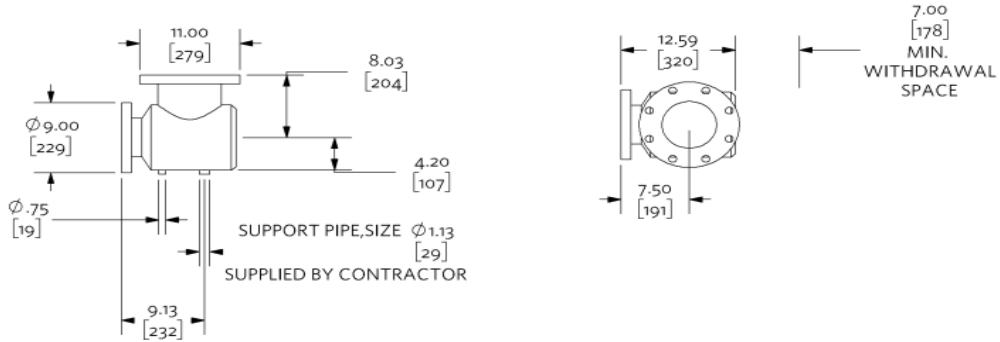
Dimensional data (not for construction)

SG-64

Weight: 87 lb [39.46 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

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
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	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
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