

ONRION

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Attention IVO DIMITROV

Argo International Corp

An ISO 9001:2008 Registered Company



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Customer reference	Quotation date	Expiry date	Payment	Delivery terms	Lead time working days
127080	7/21/2016	8/20/2016	PP	EXW	16

Ship Via (comments below)	Quotation#	Business account	Collect #	Packing
Best Way	Q-309430	BA-0038018		Included

Line No	Part Number/Description	Pos #	Lead time working days	Quantity	Unit price	Amount
1	GROUPGS ALLWEILER PUMP AFI40R46U8.3-W197 WITH ADAPTERS	1	16	1	4,078.00	4,078.00

NOTE THE SPF SERIES PUMPS HAVE BEEN
REPLACED WITH THE AFI ALLFUEL SERIES
PUMPS.

Total Amount	USD	4,078.00
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Argo International Corporation - Customer Focused, Quality Driven, Across the Globe

Argo is pleased to announce the opening of our new service and repair facility located at, 71 Veronica Ave, Unit 1, Somerset, NJ 08873-3466

COMMERCIAL AND SALES CONDITIONS

Prices quoted are in US Dollars (excluding all taxes).

Expiry date: 20.August.2016

Lead Time is 16 working days after receipt of order.

Delivery terms: EX Works

Delivery mode: Best Way

Freight responsibility: Prepaid & Add

Packing: domestic packaging included

Payment: Prepayment

Unless otherwise agreed, our Standard Terms & Conditions apply and are available upon request or at www.argointl.com.

Any purchase order placed, as a result of this quotation, will be subject to credit approval by Argo.

Quotation

Page 1 of 2

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Orders are non-cancellable and non-returnable. In case of order cancellation by customer, a restocking charge of no less than twenty-five percent 25%, and up to one hundred percent (100%) of the total purchase price may be applicable.

IMPORTANT NOTE: Any change in quantities/items quoted may result in change of prices and freight charges.

The contents of this quotation are private between the requestor and Argo International. Do not divulge to others.

EXPORT COMPLIANCE: In order to ensure full compliance with US export controls and sanctions laws and regulations, Buyer acknowledges and agrees that all products purchased from ARGO for export are subject to control under the U.S. Export Administration Regulations (15 CFR Part 730 et. seq.) administered by the U.S. Department of Commerce's Bureau of Industry and Security ("BIS") (www.bis.doc.gov) and other applicable U.S. export control laws and sanctions regulations, including those administered by the U.S. Treasury Department's Office of Foreign Assets Control ("OFAC") (www.treas.gov/ofac).

Buyer agrees that it will not export, re-export or transfer products purchased from ARGO via any means to any prohibited destination or for a prohibited end-use. The list of countries subject to United States economic sanctions may change from time to time, but currently includes Cuba, Iran, North Korea, Sudan, and Syria. Buyer also acknowledges and agrees that it will not export, re-export, or provide products purchased from ARGO to entities and persons that are ineligible under United States law to receive such items, including but not limited to, any person or entity on OFAC's List of Specially Designated Nationals or on BIS's Denied Persons List, Entity List or Unverified List. ARGO reserves the right to refuse and/or cancel any order if, at any time, ARGO believes that any U.S. export control or sanctions laws may be violated.

Unpaid invoices will accrue interest at the rate of eighteen (18%) percent per annum.

Late delivery penalties are not applicable to this supply.

Argo reserves the right to make partial shipments.

MINIMUM ORDER CHARGE: If your order does not reach 100.00 USD of material value, a 65.00 USD administration charge will be automatically added to our invoice.

PAYMENTS: The prices specified are in U.S. currency unless otherwise specified on invoice, payable in New York free of all expense to ARGO for collection charges including any credit card processing fees.

Screw pump Series ALLFUEL® AFI



AFI horizontal



AFI vertical

Utilization

For pumping heating oils, lubrication oils, hydraulic oils or other lubricating liquids. The pumped liquids may not contain any abrasive components nor chemically attack the pump material.

Main field of application

ALLFUEL Injection (AFI) pumps are employed as transfer, booster and burner operation pumps in oil-fired systems, as feeder and filling pumps in tank systems and as lube-oil pumps in virtually all areas of industry. They are also used to generate pressure in oil-hydraulic systems of all types.

Design

Single pump/motor assembly in compact design; vertical and horizontal configuration without integrated filter.

Abbreviation

	AFI	10	R	38	G	19US	W195	E
Series (Injection)	AFI							
Size ①		10						
Spindel pitch direction (R = right)			R					
Spindel pitch angle (degrees)				38				
Bearing type ②					G			
Shaft seal ③						19US		
Material code							W195	
Heating ④								E

① Theoretical capacity Q [l/min] at 1.450 1/min and 46-degree pitch angle

② G = internal plain bearing; U = antifriction bearing

③ Unheated, uncooled mechanical shaft seal

④ Version with electric heating of mechanical seal available at additional charge

Structural design

Internal-bearing, three-screw, self-priming screw pump. Hardened and polished spindles run in an exchangeable casing insert. The drive spindle is hydraulically balanced. A special starting screw absorbs the axial thrust of the idler screws. It is hydraulically driven. Only the torque resulting from liquid friction is transferred to the thread flanks. The thread flanks are therefore virtually free of loads and are not subject to wear. The pumped liquid lubricates all sliding parts and can be categorized as full fluid friction. In sizes 10 and 20 a balancing piston running in the bearing ring provides radial and axial bearing of the drive spindle; in size 40 a groove ball bearing fulfils this role. A maintenance-free mechanical seal seals the shaft. A return bore connects the seal chamber and the suction area to each other. As a result, only suction pressure acts on the shaft seal, regardless of discharge pressure. When a complete pump/motor assembly is delivered, a pump bracket connects the pump to the drive motor.

Functionality

Specially-shaped thread flanks cause the three spindles to form sealed chambers; rotation of the spindles then causes the contents of the chambers to move continuously in the axial direction from the pump's suction side to its pressure side. Despite rotation of the spindles, no turbulence results. The uniform chamber volumes eliminate crushing forces.

Performance data

Capacity ①	Q	up to	112 l/min
Suction pressure	p_s	up to	6 bar
Discharge pressure ②	p_d	up to	40 bar
Liquid temperature ③	t	up to	150 °C
Viscosity range	ν	1 up to	750 mm ² /s

① At $n = 2900$ 1/min and $\nu = 750$ mm²/s

② Refer to the individual reference curves for the achievable pump pressure in relation to viscosity and rotational speed. Pressure specifications are applicable only to nearly static pressure loads. Please inquire about dynamically alternating pressure loads.

③ Consultation required if temperatures higher

Filter and twin units

A separate system filter is essential when pumping oil with these no-filter AFI pumps. However, these pumps are also available with an integrated radial screen filter (AFI-F version) for protection against contamination. Filter mesh size 0,4 mm. Refer to document number 488 082 for more information. Twin units (version AFI-T) are provided when a reserve pump is required. Refer to document number 488 082 for more information.

Heating

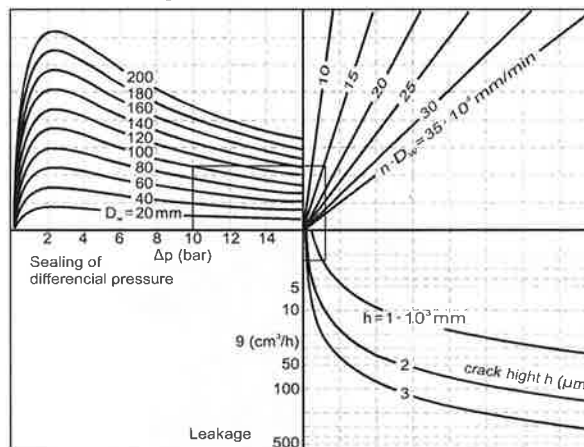
If heating is required, these pumps can be delivered with electric heating cartridges for the mechanical seal chamber (subject to additional cost).

Pump size	Connection for	Heating cartridge output (Pressure side)
10	230 V	200 W
20	230 V	200 W
40	230 V	300 W

Heating capacity is dimensioned so that when outlet temperature is 20 °C heating time of 60 minutes will be adequate for highly viscous liquids. When temperatures are lower, a corresponding longer heat-up time will be required. Heating is not designed to achieve noticeable higher liquid temperatures during operation. To avoid potential damage to the bearing, do not exceed the permitted temperature of the pumped liquid.

Leaks

Formation of a lubricating film between the sliding surfaces is the most important factor in the functionality of a mechanical seal. This film is formed by the liquid being sealed. Due to elevated pressure inside the suction chamber, a small amount of liquid/lubricant will be continuously pushed out through the sliding surfaces. This "standard leak" of a few ml/h is essential for maintaining lubrication of the sliding surfaces. Absence or inadequate formation of a lubricating film is a common cause of damage.



Theoretical average leak rate depending on mechanical oscillations, fluid properties, condition of the sliding surfaces, etc. (Source: Burgmann ABC der Gleitringdichtungen)

When pumping liquids with low volatility, such as HFO, the user must therefore expect increasing deposits on the atmosphere side as time passes. As a result, it is physically not possible to achieve a 100% seal with a mechanical seal. If this is not acceptable, the magnetically-coupled version of ALLFUEL will be the right choice.

Flanges and connections

Feed and pressure ports as counter flange based on SAE (SAE J518C, hole pattern 3000 PSI).

Connections at present: E7 Venting of pump
H7 Heating cartridge
M1, M2, pressure gauge

Shaft seal

The shaft is sealed with a maintenance-free, unbalanced mechanical seal.

Part name	Material design
Rotating ring	silicon carbide
Counter ring	silicon carbide
Seal ring	FPM (Viton)
Spring	CrNiMo steel
Metal parts	CrNiMo steel

Noise level and pulsation

The design and operation of the screw pump enable a very low noise level and virtually pulsation-free pumping.

Overload protection

A pressure-relief valve is integrated into each pump as a means of overload protection. Its standard trigger pressure is set to approximately 10% above the working pressure. Please make sure your order specifies if a different trigger pressure is desired.

Installation

To avoid air bubbles inside the pump, the pump may not be installed with the flanges pointing down.

When installed vertically, a "motor down" arrangement is not permitted for safety reasons. In addition, the vent screw (160) may not point down.

Drive

A motor bracket facilitates connection of a wide variety of electric motors or other drive units.

The following motor versions are normally provided with delivery of complete pump/motor assemblies:

Surface-cooled three-phase squirrel-cage motors, IMV 1 design type, IP 55 protection class according to IEC standard, insulation class F utilized according to B, output and main dimensions according to DIN 42 677. Motors configured for 50 Hz may also be operated in 60 Hz networks.

- Voltage/connection:

Frequency [Hz]	Voltage [V]	Areas of usage
50	220-240/380-420	Europe
50	380-420/660-720	Europe
50	500	Europe
60	254-277/440-480	USA
60	440-480	USA
60	318-346/550-600	Canada
60	220-240/380-420	Asia, S.-Am.

Power is transferred over an elastic coupling. Additional radial forces may not act on the drive spindle.

Explosion protection

 The pump fulfills the requirements according to EU explosion-protection directive 94/9/EC (ATEX 100a) for devices in device class II, category 2 G. Classification into temperature classes according to EN 13463-1 depends on the temperature of the pumped liquid. Refer to the proposal or order documentation for the maximum permissible liquid temperature for the respective temperature classes.

Note: When operating the pump in category 2, suitable measures must be provided to prevent impermissible warming of the pump surfaces in the event of disturbance.

Materials

Denomination	Material design				
	W195	W196	W197	W198	W199 ②
Pump casing	EN-GJL-250	EN-GJS-400-15	EN-GJL-250	EN-GJS-400-15	EN-GJS-400-15
Casing insert	AlMgSi1	AlMgSi1	EN-GJL-250 tenifer.	EN-GJL-250 tenifer.	EN-GJL-250 tenifer.
Pump cover, drive side	EN-GJL-250	EN-GJS-400-15	EN-GJL-250	EN-GJS-400-15	EN-GJS-400-15
Bush	AlMgSi1	AlMgSi1	EN-GJL-250 tenifer.	EN-GJL-250	Hybrid bearing
Drive screw	16MnCrS5	16MnCrS5	16MnCrS5	16MnCrS5 tenifer.	16MnCrS5 PVD
Idler screw					
Reversing valve housing ①	EN-GJL-250	EN-GJS-400-15	EN-GJL-250	EN-GJS-400-15	EN-GJS-400-15
Valve casing					

① Recommended material for critical liquids (e.g. HFO, MGO)

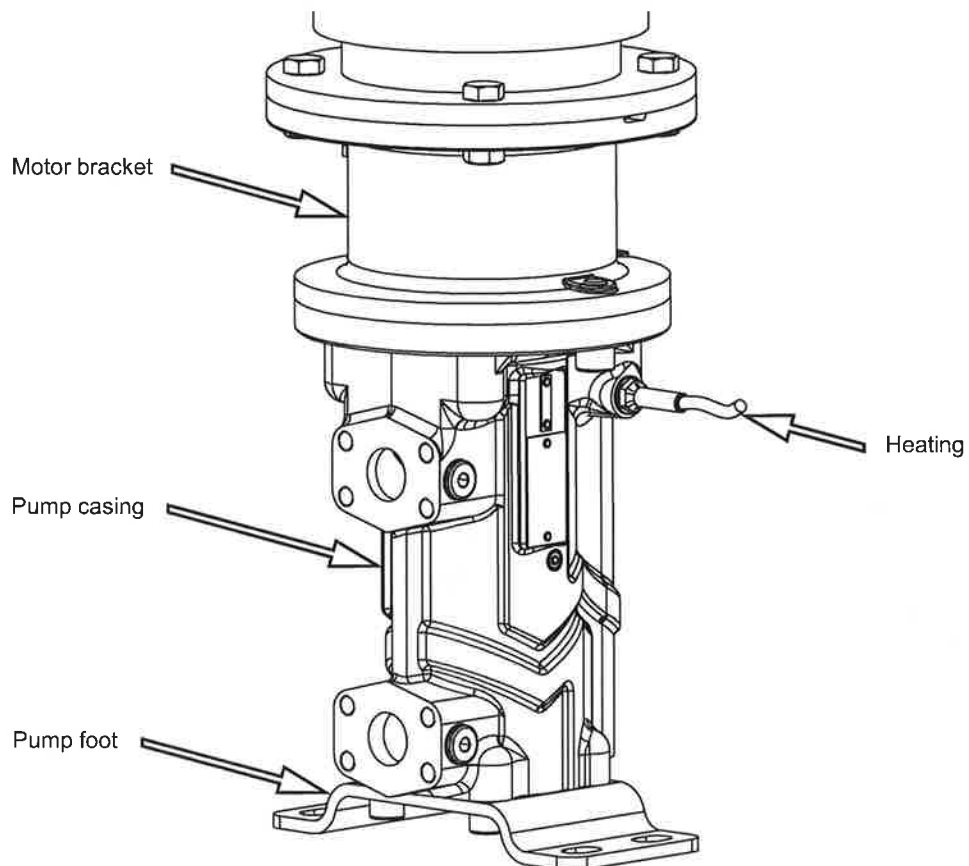
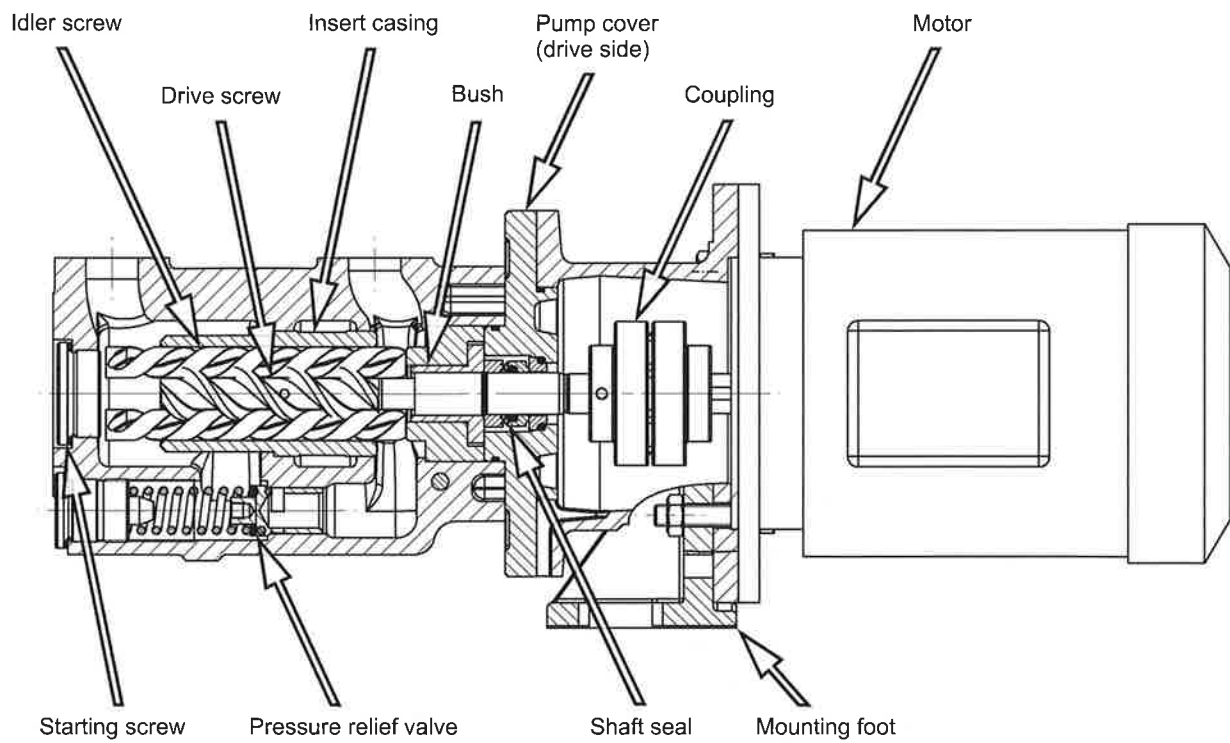
② Recommended material for low sulphur with pump size 40

NPSH [m]

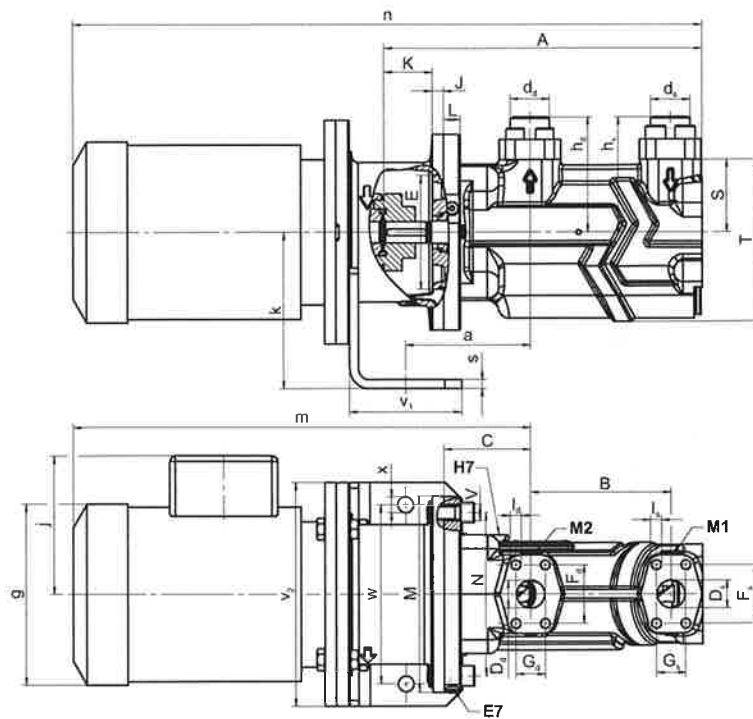
NPSH req. for the pump without filter

AFI	Speed 1/min											
	950 / 1.140			1.450 / 1.750			2.900			3.500		
	Kinematic viscosity mm²/s											
	3-40	150	750	3-40	150	750	3-40	150	750	3-40	150	750
10-28	2,5	2,8	3,2	2,5	2,9	3,6	2,5	2,9	4,2	2,6	3,1	4,3
10-38	2,5	2,8	3,6	2,5	2,9	3,9	2,5	3,1	4,6	2,6	3,3	5,1
10-46	2,5	2,9	3,9	2,5	3,0	4,2	2,6	3,3	5,1	2,8	3,5	6,6
10-56	2,5	2,9	4,3	2,5	3,1	4,5	2,8	3,7	7,3	3,1	4,1	7,0
20-38	2,5	2,9	3,9	2,5	2,9	4,1	2,5	3,2	5,0	2,7	3,5	5,6
20-46	2,5	2,9	4,2	2,5	3,1	4,4	2,7	3,5	6,2	3,0	3,9	7,0
20-56	2,5	3,0	4,5	2,5	3,3	5,1	3,2	4,1	7,2	3,6	4,6	9,1
40-38	2,5	2,9	3,8	2,5	3,1	4,3	2,7	3,5	5,6	2,9	3,8	6,3
40-46	2,5	3,0	4,2	2,6	3,3	4,8	3,0	4,0	6,8	3,4	4,4	7,8
40-54	2,5	3,2	4,8	2,7	3,6	5,4	3,6	4,7	8,2	4,2	5,5	9,7

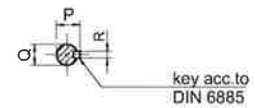
Assembly AFI



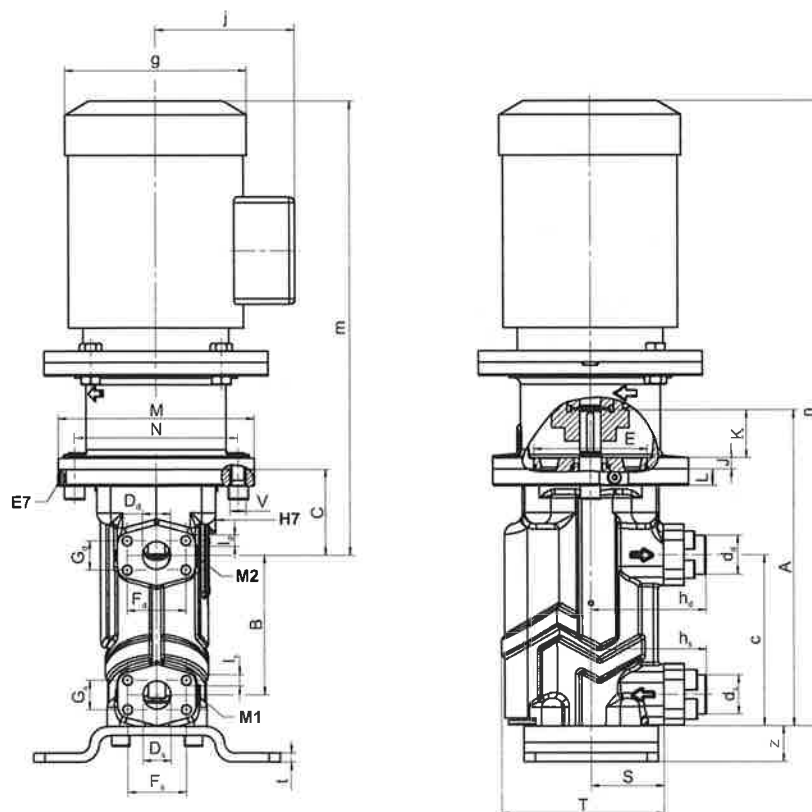
Main dimensions AFI
AFI horizontal configuration



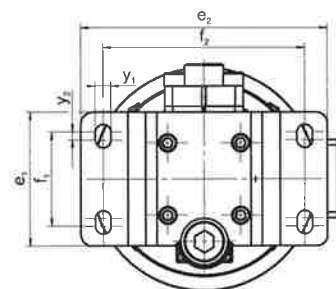
Shaft end



AFI vertical configuration



Pump foot



Main dimensions AFI

AFI size	Pump dimensions														
	A	B	C	E	J	K	L	M	N	P	Q	R	S	T	V
10	237	110	55	82,55 _{-0,05}	9	33	13	130	106	16	14 _{j6}	5	60	132	11
20	283	125	77	101,6 _{-0,05}	10	43	15	175	146	21,5	19 _{j6}	6	65	145	14
40	332	135											80	164	

AFI size	Motor size	Unit dimensions									
		a	c	e ₁	e ₂	f ₁	f ₂	g ②	j ②	k	m ②
10	80	88	141	120	200		160	162	209	140	451
	90S	88						181	218	140	464
	90L	88						181	218	140	488
	100L	110						202	223	160	545
20	90S	151	153		220	84	180	181	218	140	526
	90L	151						181	218	140	550
	100L	129						202	223	160	563
	112M	129						227	238	160	570
	132S	141			266			278	170	682	
40	90L	151	135		240		200	181	218	140	550
	100L	129						202	223	160	563
	112M	129						227	238	160	570
	132S	141						266	278	170	682
	132M	141			266			278	170	682	
	160M	150/ 415 ③			320			314	235	861	

AFI size	Motor size	Unit dimensions									
		n ②	s	t	v ₁	v ₂	w	x	y ₁	y ₂	z
10	80	592	8	8	100	200	160	14	14	7	32
	90S	605				200	160				
	90L	629				200	160				
	100L	686				250	200				
20	90S	679	8		100	200	160	14			
	90L	703			100	200	160				
	100L	716			100	250	200				
	112M	723			100	250	200				
	132S	835			120	300	250	14,5			
40	90L	685	8		100	200	160	14			
	100L	698			100	250	200				
	112M	705			100	250	200				
	132S	817			120	300	250				
	132M	817			120	300	250	14,5			
	160M	996	18		305	350	300	18 ③			

Connections			
AFI size	Venting	Heating cartridge	Pressure gauge
	E7	H7	M1/M2
10	M8x1	M12x1	G 1/8
20 and 40			G 1/4

Dimensions in mm,
Direction of rotation:
Clockwise as seen from the
drive side

AFI size	Connection dimensions													
	SAE suction flange ①							SAE pressure flange ①						
	Inch.	D _s	F _s	G _s	I _s	d _s	h _s	Inch.	D _d	F _d	G _d	I _d	d _d	h _d
10	¾	22	47,63	22,23	4 x M10	28	96	¾	22	47,63	22,23	4 x M10	28	96
20	1	25	52,37	26,19		35	103	1	25	52,37	26,19		35	103
40	1 ¼	32	58,72	30,18	4 x M12	43	121	1	25	52,37	26,19		35	118

- ① SAE J518C, hole pattern
3.000 PSI
② Dimensions are reference
only and may deviate depen-
ding on motor manufacturer
③ Foot-mounted design on
pump size 40 for motor size
160M with 4 screws, see
ALL2CAD for dimensions

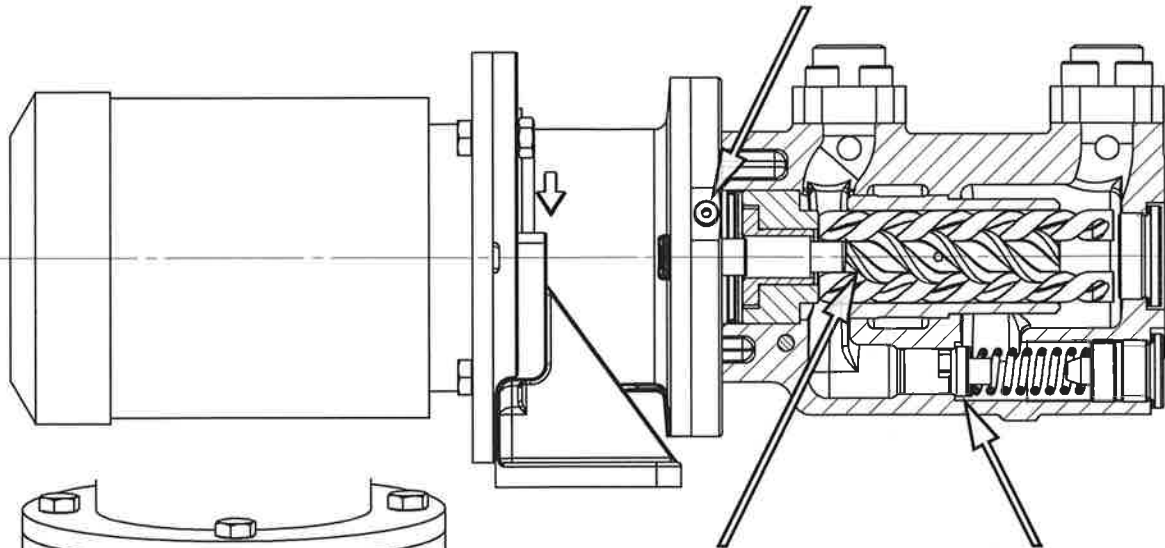
Benefits

► **Economical use of space**

The installed pump requires little space.

► **Flawless start-up**

The vent screw ensures the best possible venting of the mechanical seal chamber each time the pump is started, even when installed vertically.



► **Reliable process stability**

Specially-shaped thread flanks produce virtually pulsation-free, low-noise pumping action.

► **Outstanding reliability**

The conical valve provides permanent protection against impermissibly high pressures.

► **Impressive service life**

Hydrodynamic axial thrust compensation minimizes loads on the screws and extends service life.

► **Flawless pump starting**

Optional heating of the casing ensure that the pump starts without issue even when the ambient temperature is low.

► **Extraordinary flexibility**

A wide range of available materials makes it possible to adapt to special operating conditions and various liquids.

► **Versatile and adaptable**

The ability to install the pump horizontally or vertically lets the operator adapt to even small spaces.

Subject to alterations.

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