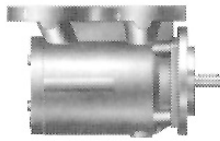
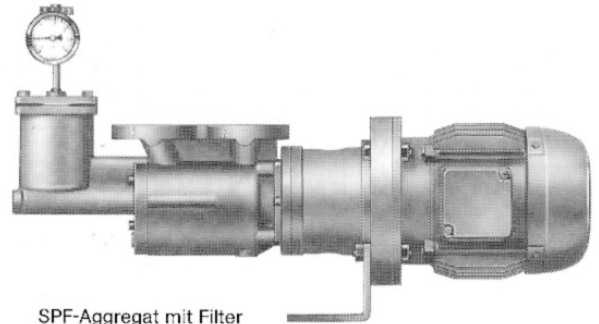


Screw Pumps Series SPF



SPF



SPF-Aggregat mit Filter

Application

For the delivery of fuel oils, lube oils, hydraulic oils or other lubricating liquids. The fluid media must not contain any abrasive particles nor attack the pump materials chemically.

Main fields of application

SPF pumps operate as transfer, booster and burner operation pumps in fuel oil engineering, as transfer and filling pumps in tank farms as well as lube-oil pumps in any industrial branches. They are moreover used for pressure generation in oil-hydraulic plants of all kinds.

Design

Self-priming three-screw type of pump with internal bearing. The hardened and ground screws run in an exchangeable casing insert.

The driving screw is hydraulically balanced. The axial thrust of the working screws is absorbed by the endside pump cover. Their drive is hydraulic. The thread flanks merely transmit the torque resulting from the liquid friction. Thus, the thread flanks are practically stress-free and not subject to any wear. All sliding parts are lubricated by the delivery medium being within the range of full liquid friction.

The radial and axial bearing of the driving screw with pump size 10 and 20 is by the balancing piston guided in the bearing ring, with pump size 40 by a groove ball bearing.

A maintenance-free mechanical seal is provided as the shaft sealing.

Sealing chamber and suction chamber are interconnected by way of a return gallery. Thus, independently of the delivery pressure at the shaft sealing, only the suction pressure becomes effective.

Complete units being supplied, the connection pump/driving motor is by a pump bracket with mounting foot.

Operation

Owing to a special profiling of the thread flanks, the three screws from sealed chambers the contents of which are axially and completely continuously shifted from the suction to the pump side of the pump as the screws turn. There will be no turbulence in spite of the screw rotation. The constant chamber volume excludes squeezing.

Noise/Pulsation

The structural design and operation of the screw pump ensure a very low noise level and an almost pulsation-free delivery.

Twin units

For all plants requiring stand-by pumps, twin units are supplied. See descriptive literature VM 533.

Shaft sealing

By means of a maintenance-free mechanical seal of the un-balanced type.

Material design:

Rotating seal ring	Tungsten carbide, Co-binder
Stationary seal ring	Tungsten carbide, Co-binder
Joint ring	FPM
Spring	CrNiMo steel
Metal parts	Cr steel

Performance data

Capacity	Q up to 112 l/min ①	resp.	6720 l/h ①
Temperature of the fluid pumped	t	up to	150 °C
Inlet pressure	p _z	up to	5 bar
Pump outlet pressure	p _d	up to	40 bar ②
Viscosity range	v	3 up to	750 mm ² /s
Delivery flange	DN _d	20 up to	25 mm

① With n = 2900 1/min and □ = 750 mm²/s

② With higher temperatures, please inquire.

③ For the attainable delivery pressure as a function of viscosity and speed, please refer to the individual characteristics. The pressure data only apply to nearly static pressure load. With dynamic pressure change load, please inquire.

Pressure relief valves

As an overload protection, installed in each pump is a pressure relief valve which, with all designs, is set at a response pressure approx. 10% above the operating pressure.

In case different response pressures are requested, same must be indicated in the order.

Flanges/Connections

Flanges	Suction side:	PN 16, DIN EN 1092-2
	Delivery side:	PN 40, DIN EN 1092-2

Connections	SPF without filter:	M1, M2 Pressure gauge
	SPF with filter:	B7 Draining filter casing E7 Venting filter casing M1, M2, M3 Pressure gauge

Materials

Denomination	Part No.	Material design		
		W 20	W 16	W 8
Pump casing	1	EN-GJL-250	EN-GJL-250	EN-GJS-400-15
Casing insert	2	AlMgSi1	EN-GJL-250	AlMgSi1
Pump cover				
driving side	3	EN-GJL-250	ENI-GJL-250	EN-GJS-400-15
end side	4	EN-GJL-250	ENI-GJL-250	EN-GJS-400-15
Casing cover	7 ①	EN-GJL-250	ENI-GJL-250	EN-GJS-400-15
Filter casing	9 ①	EN-GJL-250	ENI-GJL-250	EN-GJS-400-15
Bearing bush	10	AlMgSi1	ENI-GJL-250	AlMgSi1
Driving screw	12	16MnCrS 5	16MnCrS 5	16MnCrS 5
Idler screw	13	16MnCrS 5	16MnCrS 5	16MnCrS 5
Wire mesh at	481 ①	Steel	Steel	Stahl
radial screen filter		galvanized	galvanized	verzinkt

① for design with filter only

Installation

SPF pumps may be mounted in any position. For safety purposes, the arrangement with "motor downwards" is not admissible.

Drive/Coupling

By way of an intermediate bracket, electric motors of the most varied designs or other prime movers can be connected with the pumps. Normally, the following are provided:

Surface-cooled three-phase squirrel-cage motors, IM V1 type of construction, enclosure IP54 according to IEC Standards, class B insulation, performances and main dimensions according to DIN 42677.

Motors rated for 50 Hz may without any change also be operated from 60 Hz supply systems, speed and performance will change as follows:

Motor wound for 50 Hz ...V	Connection to 60 Hz ...V	Conversion factor for operation with 60 Hz	
		Speed	Performance
230 V	230 V	1,2	1,0
400 V	400 V	1,2	1,0
400 V	460 V	1,2	1,15
460 V	460 V	1,2	1,0

The power transmission is by a flexible coupling. Additional radial forces must not act upon the driving screw.

Filter

As a protection against contaminations, the pumps can be supplied with a filter casing with incorporated radial screen filter (extra price). Filter mesh size 0,4 mm.

A pressure vacuum gauge included in the scope of supply indicates the pressure behind the filter. Thus, the pressure loss in the filter can be determined and an inadmissible contamination realized

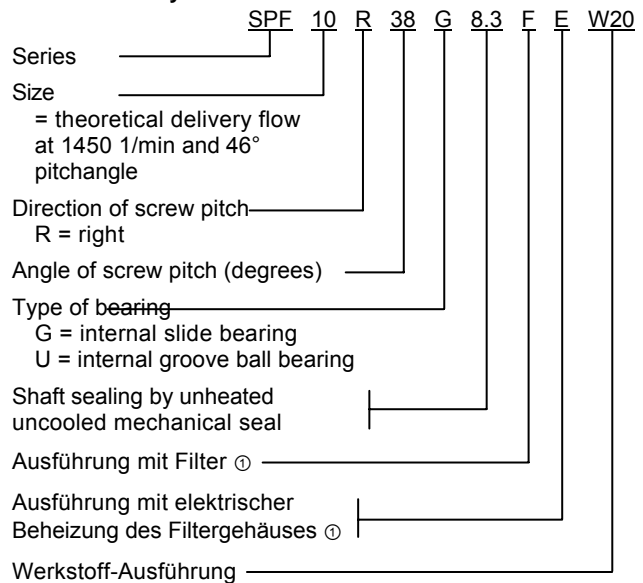
Electric heating

Designs with filters can be provided with heating shells for filter heating (extra price).

Pump size	Connection for	Heating capacity
SPF 10	230 V	165 W
SPF 20	230 V	205 W
SPF 40	230 V	265 W

The heating power is rated so that with an initial temperature of 20°C, a minimum heating-up time of 120 min. is required. In case of lower temperatures (below 0°C), an appropriately longer heating-up time must be expected. The heater is not suited for achieving, during operation, a marked temperature increase of the fluid to be pumped

Abbreviation system



① available at extra charge

NPSH erf. (m) – für Pumpe ohne Filter

The values as indicated apply to pumps without filter for air-free delivery media. A safety allowance is not required.

Pump size	Speed 1/min																								
	950/1140					1450/1750					2900					3400									
	Kinematic viscosity mm ² /s (E)																								
	3-40 (1,2-5)	75 (10)	150 (20)	380 (50)	750 (100)	3-40 (1,2-5)	75 (10)	150 (20)	380 (50)	750 (100)	3-40 (1,2-5)	75 (10)	150 (20)	380 (50)	750 (100)	3-40 (1,2-5)	75 (10)	150 (20)	380 (50)	750 (100)					
	NPSH req. m																								
10-28	2,5	2,8	2,8	2,9	3,0	2,5	2,8	2,9	3,0	3,1	2,5	2,8	2,9	3,1	3,2	2,5	2,8	3,1	3,3	3,5	2,5	2,8	3,0	3,2	3,4
10-38	2,5	2,8	2,8	3,0	3,1	2,5	2,8	2,9	3,1	3,2	2,5	2,8	3,1	3,3	3,5	2,5	2,8	3,1	3,3	3,5	2,5	2,8	3,0	3,2	3,4
10-46	2,5	2,8	2,9	3,0	3,1	2,5	2,8	3,0	3,2	3,4	2,6	3,0	3,3	3,5	3,8	2,7	3,2	3,4	3,7	4,0	2,7	3,2	3,4	3,7	4,0
10-56	2,5	2,8	2,9	3,1	3,3	2,5	2,9	3,1	3,4	3,6	2,8	3,4	3,7	4,0	4,4	3,0	3,7	4,0	4,4	4,8	3,0	3,7	4,0	4,4	4,8
20-38	2,5	2,8	2,9	3,0	3,2	2,5	2,8	2,9	3,1	3,3	2,5	3,0	3,2	3,5	3,8	2,6	3,1	3,4	3,7	4,0	2,6	3,1	3,4	3,7	4,0
20-46	2,5	2,8	2,9	3,1	3,3	2,5	2,9	3,1	3,3	3,5	2,7	3,2	3,5	3,9	4,2	2,9	3,4	3,8	4,4	4,5	2,9	3,4	3,8	4,4	4,5
20-56	2,5	2,9	3,0	3,3	3,5	2,5	3,1	3,3	3,0	3,9	3,2	3,8	4,1	4,5	4,9	3,5	4,1	4,5	5,0	5,5	3,5	4,1	4,5	5,0	5,5
40-38	2,5	2,8	2,9	3,1	3,3	2,5	2,9	3,1	3,3	3,5	2,7	3,2	3,5	3,8	4,1	2,8	3,4	3,7	4,0	4,4	2,8	3,4	3,7	4,0	4,4
40-46	2,5	2,8	3,0	3,2	3,4	2,6	3,0	3,3	3,5	3,8	3,0	3,6	4,0	4,3	4,7	3,3	4,1	4,3	4,7	5,2	3,3	4,1	4,3	4,7	5,2
40-54	2,5	3,0	3,2	3,4	3,6	2,7	3,3	3,6	3,9	4,2	3,6	4,3	4,7	5,1	5,5	4,1	4,8	5,1	5,5	6,4	4,1	4,8	5,1	5,5	6,4

Allowance to NPSH value (m) - for filter

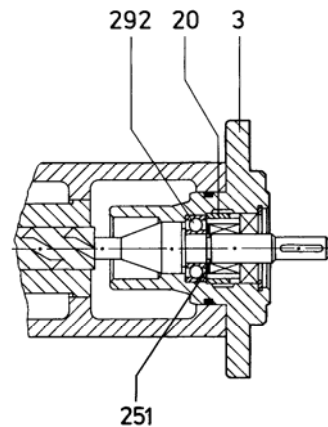
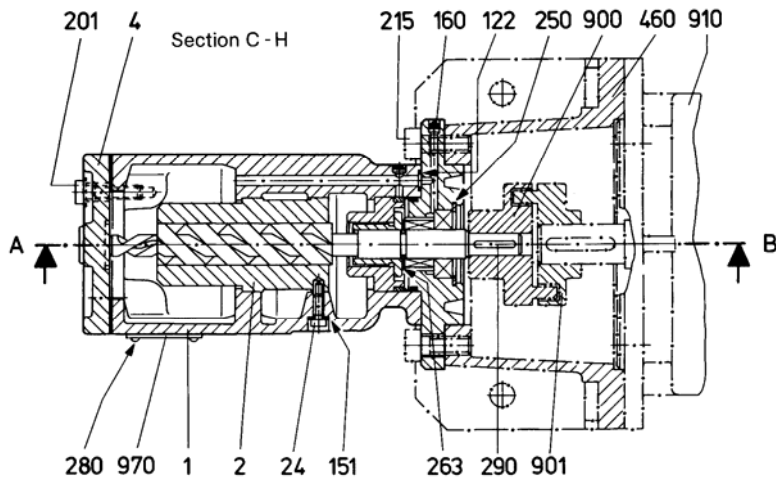
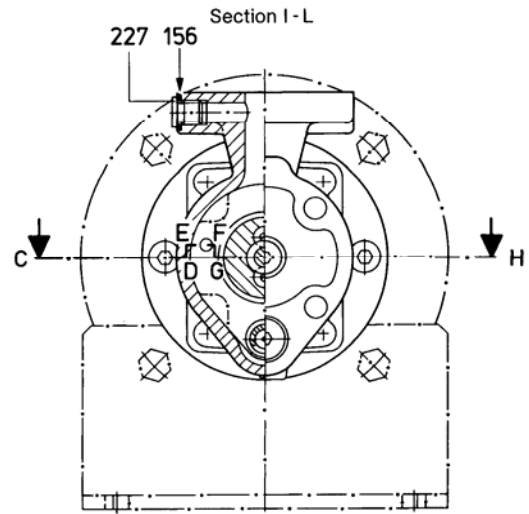
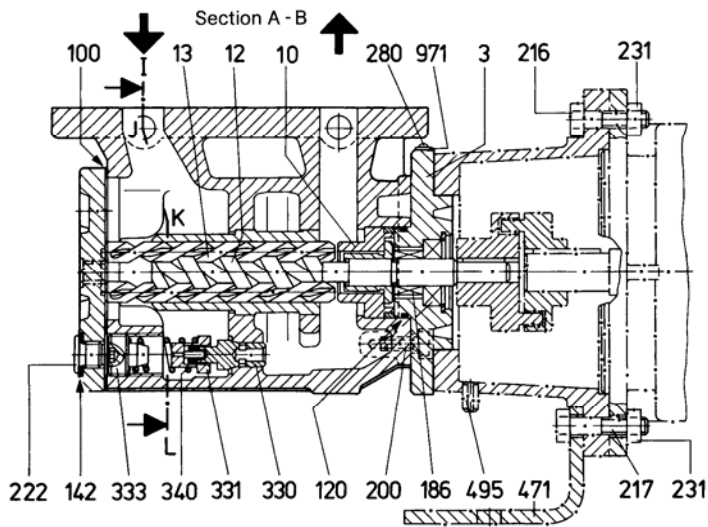
The values as indicated apply for air-free delivery media..

Pump size	Speed 1/min																			
	950/1140					1450/1750					2900					3400				
	Kinematic viscosity mm ² /s																			
	3-40	75	150	380	750	3-40	75	150	380	750	3-40	75	150	380	750	3-40	75	150	380	750
Allowance m																				
10-28	0,01	0,01	0,01	0,03	0,05	0,01	0,02	0,04	0,07	0,12	0,04	0,06	0,10	0,19	0,32	0,05	0,08	0,13	0,27	0,45
10-38	0,01	0,02	0,03	0,05	0,08	0,02	0,04	0,06	0,12	0,20	0,06	0,10	0,16	0,33	0,55	0,08	0,13	0,22	0,45	0,75
10-46	0,01	0,02	0,04	0,07	0,12	0,03	0,05	0,09	0,17	0,29	0,09	0,14	0,24	0,48	0,79	0,12	0,19	0,33	0,65	1,09
10-40	0,02	0,03	0,06	0,11	0,19	0,05	0,08	0,13	0,27	0,45	0,14	0,22	0,37	0,73	1,22	0,19	0,30	0,50	1,01	1,68
20-38	0,02	0,03	0,04	0,09	0,15	0,04	0,06	0,10	0,21	0,34	0,10	0,17	0,28	0,56	0,94	0,14	0,23	0,39	0,78	1,29
20-46	0,02	0,04	0,06	0,12	0,21	0,05	0,09	0,15	0,29	0,49	0,15	0,24	0,40	0,80	1,34	0,20	0,33	0,55	1,10	1,84
20-40	0,04	0,06	0,10	0,19	0,32	0,08	0,13	0,22	0,45	0,75	0,23	0,37	0,62	1,24	2,06	0,31	0,50	0,85	1,70	2,84
40-38	0,01	0,02	0,03	0,06	0,09	0,02	0,04	0,07	0,13	0,22	0,07	0,11	0,18	0,36	0,61	0,09	0,15	0,25	0,50	0,83
40-46	0,02	0,02	0,04	0,08	0,14	0,04	0,06	0,10	0,19	0,32	0,10	0,16	0,26	0,53	0,88	0,13	0,22	0,36	0,73	1,21
40-40	0,02	0,04	0,06	0,12	0,20	0,05	0,09	0,14	0,29	0,48	0,15	0,23	0,39	0,79	1,32	0,20	0,32	0,54	1,09	1,81

Performance table data for 3400 1/min

Pump size	Delivery pressure	Kinematic viscosity mm ² /s (E)															
		3 (1.2)		6 (1.5)		12 (2)		40 (5)		75 (10)		150 (20)		380 (50)		750 (100)	
		Q	P	Q	P	Q	P	Q	P	Q	P	Q	P	Q	P	Q	P
SPF	bar	l/min	kW	l/min	kW	l/min	kW	l/min	kW	l/min	kW	l/min	kW	l/min	kW	l/min	kW

Sectional drawing
SPF without filter



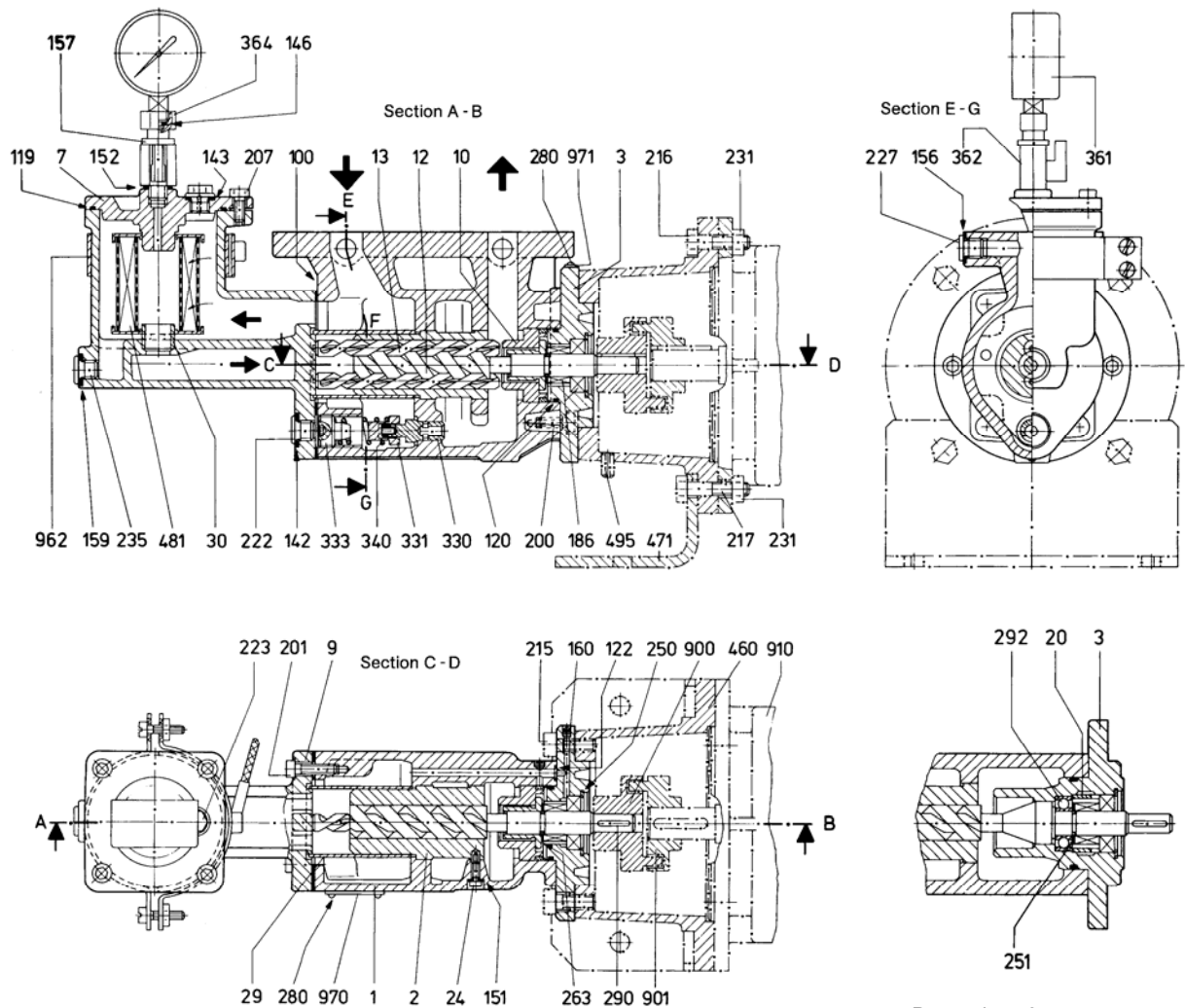
Pump size
10 and 20

Pump size 40

Denomination	Part No.	Denomination	Part No.
Pump casing	1 ②	Threaded plug	222
Casing insert	2 ②	Threaded plug	227
Pump cover driving side	3 ②	Hexagonal nut	231 ①
Pump cover end side	4 ②	Circlip	250 ②
Bearing bush	10 ②	Circlip	251 ②
Driving screw	12 ②	Support disk	263
Idler screw	13 ②	Blind rivet	280
Distance sleeve	20 ②	Key	290
Socket head cap screw	24	Groove ball bearing	292 ②
Gasket	100 ②	Valve cone	330 ②
O-ring	120 ②	Spring cup	331
O-ring	122 ②	Adjusting screw	333 ②
Joint washer	142 ②	Pressure spring	340 ②
Joint washer	151 ②	Bracket	460 ①
Joint washer	156 ②	Mounting foot	471 ①
Sealing plug	160	Clamping sleeve	495 ①
Mechanical seal	186 ②	Coupling half pump side	900 ①
Socket head cap screw	200	Coupling half driving side	901 ①
Socket head cap screw	201	Driving motor	910 ①
Socket head cap screw	215 ①	Rating plate	970
Hexagonal screw	216 ①	Information plate	971
Hexagonal screw	217 ①		

① Parts not included with pump when being supplied without bracket, coupling and driving motor
② Spare parts

Sectional drawing SPF with filter



Pump size
10 and 20

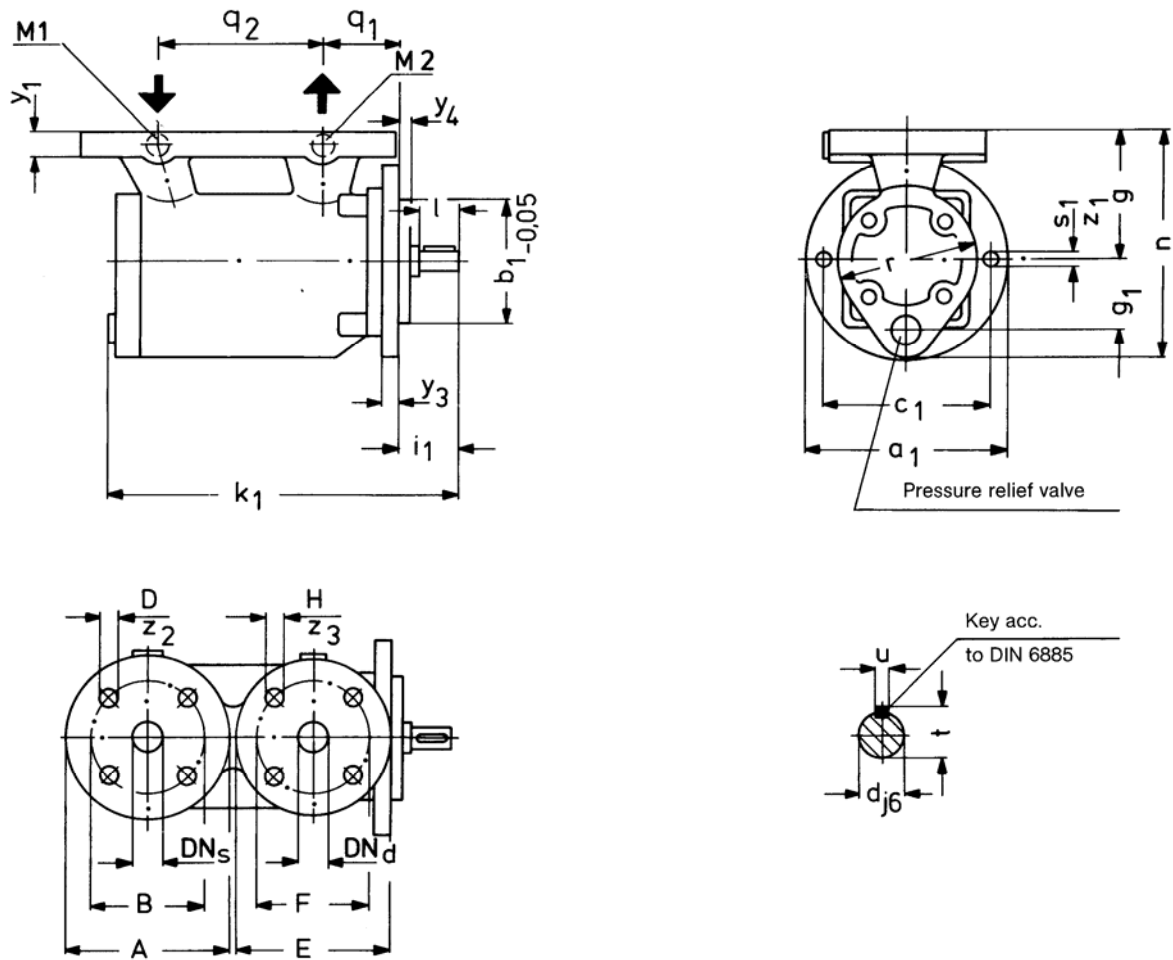
Pump size 40

Denomination	Part No.
Pump casing	1 ③
Casing insert	2 ③
Pump cover	
driving side	3 ③
Casing cover	7 ③
Filter casing	9 ③
Bearing bush	10 ③
Driving screw	12 ③
Idler screw	13 ③
Distance sleeve	20 ③
Socket head cap screw	24
Pipe	29
Pipe	30
Gasket	100 ③
O-ring	119 ③
O-ring	120 ③
O-ring	122 ③
Joint washer	142 ③
Joint washer	143 ③
Gasket	146 ③
Joint washer	151 ③
Joint washer	152 ③
Joint washer	156 ③
Gasket	157 ③
Joint washer	159 ③
Sealing plug	160
Mechanical seal	186 ③
Socket head cap screw	200
Socket head cap screw	201
Hexagonal screw	207
Socket head cap screw	215 ①
Hexagonal screw	216 ①

Denomination	Part No.
Hexagonal screw	217 ①
Threaded plug	222
Vent plug	223
Threaded plug	227
Hexagonal nut	231 ①
Screw plug	235
Circlip	250 ③
Circlip	251 ③
Support disk	263
Blind rivet	280
Key	290
Groove ball bearing	292 ③
Valve cone	330 ③
Spring cup	331
Adjusting screw	333 ③
Pressure spring	340 ③
Pressure gauge	361 ③
Ball valve	362
Connector	364
Bracket	460 ①
Mounting foot	471 ①
Radial-screen filter	481 ③
Clamping sleeve	495 ①
Coupling half	
pump side	900 ①
Coupling half	
driving side	901 ①
Driving motor	910 ①
Heating shell	962 ②③
Rating plate	970
Information plate	971

- ① Parts not included with pump when being supplied without bracket, coupling and driving motor
- ② Heating shell supplied on request only (at an extra charge).
- ③ Spare parts

Pump dimensions SPF without filter



Dimensions in mm
Subject to alterations

$z_1/z_2/z_3$ = No. of holes

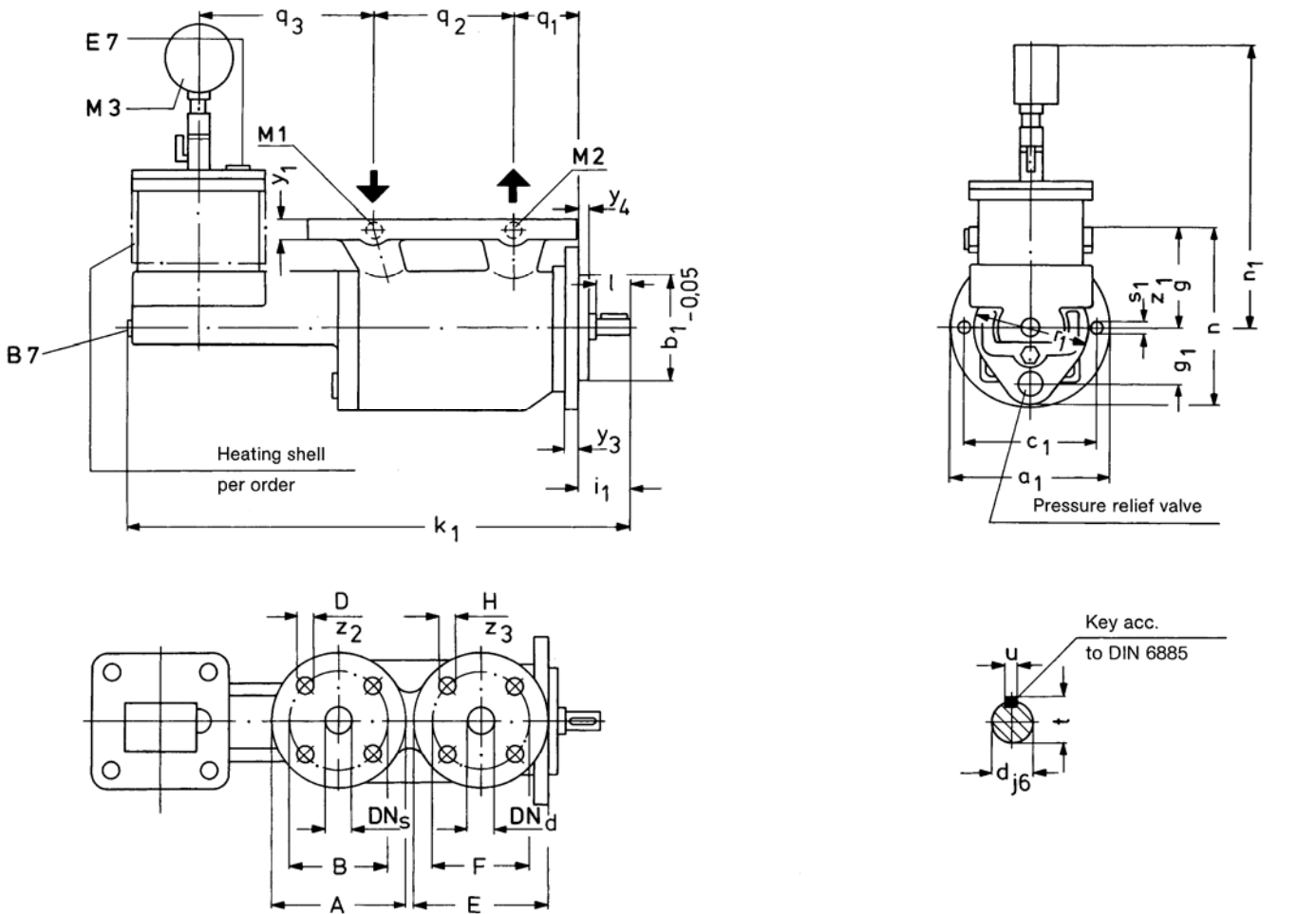
Sense of rotation: clockwise as seen
from the driving side

Pump size SPF	Pump dimensions														Shaft end				
	a_1	b_1	c_1	g	g_1	i_1	k_1	n	q_1	q_2	r	s_1	y_3	y_4	z_1	d	l	t	u
10	130	82,55	106	90	45	42	232	155	54	110	95	11	12	9	2	14	30	16	5
20	175	101,6	146	95	56	53	280	177	77	125	110	14	15	10	2	19	40	21,5	6
40	175	101,6	146	110	60	53	330	198	77	135	146	14	15	10	2	19	40	21,5	6

Pump size SPF	Connecting dimensions											Pressure gauge M1/M2	
	Suction side ①					Delivery side ②							
	DN_s	A	B	D	y_1	z_2	DN_d	E	F	H	y_1	z_3	
10	20	105	75	14	18	4	20	105	75	14	18	4	G 1/4
20	25	120	85	14	18	4	25	120	85	14	18	4	G 1/4
40	32	140	100	18	18	4	25	120	85	14	18	4	G 1/4

① PN 16, DIN EN 1092-2; ② PN 40, DIN EN 1092-2

Pump dimensions SPF with filter



Dimensions in mm
Subject to alterations

$z_1/z_2/z_3$ = No. of holes

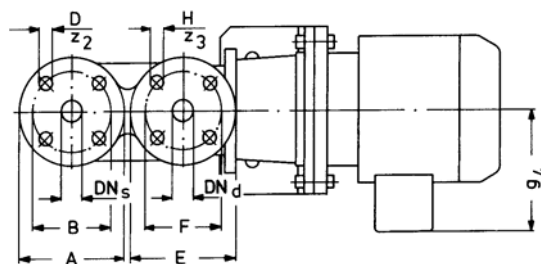
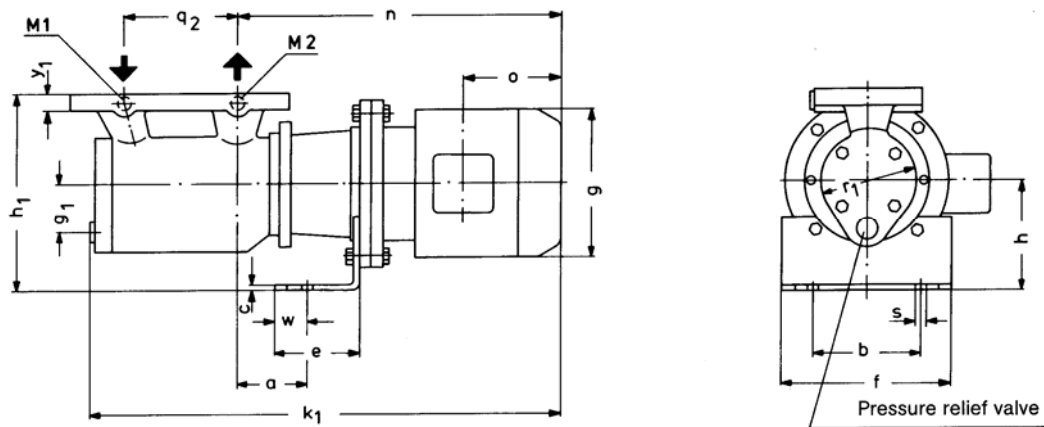
Sense of rotation: clockwise as seen
from the driving side

Pump size	Pump dimensions																	Shaft end			
	a ₁	b ₁	c ₁	g	g ₁	i ₁	k ₁	n	n ₁	q ₁	q ₂	q ₃	r	s ₁	y ₃	y ₄	z ₁	d	l	t	u
10	130	82,55	106	90	45	42	381	155	252	54	110	119	95	11	12	9	2	14	30	16	5
20	175	101,6	146	95	56	53	468	177	262	77	125	144	110	14	15	10	2	19	40	21,5	6
40	175	101,6	146	110	60	53	510	198	320	77	135	175	146	14	15	10	2	19	40	21,5	6

Pump size	Connecting dimensions											Draining B 7	Venting E 7	Pressure gauge M1/M2	
	Suction side ①						Delivery side ②								
SPF	DN _s	A	B	D	y ₁	z ₂	DN _d	E	F	H	y ₁	z ₃			
10	20	105	75	14	18	4	20	105	75	14	18	4	G 3/8	G 1/4	G 1/4
20	25	120	85	14	18	4	25	120	85	14	18	4	G 1/2	G 1/4	G 1/4
40	32	140	100	18	18	4	25	120	85	14	18	4	G 1/2	G 1/4	G 1/4

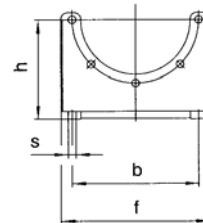
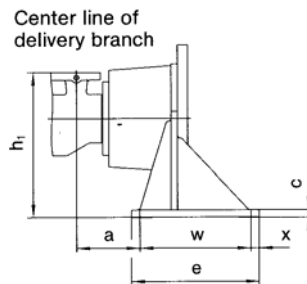
①PN 16, DIN EN 1092-2; ②PN 40, DIN EN 1092-2

Unit dimensions SPF without filter



For mounting of coupling refer to drawing No. VM.626.5005-1, ident No. 550 044

Foot mounting with size 40 for motor size 160 M
Arrangement of other unit dimensions as above



Dimensions in mm
Subject to alterations

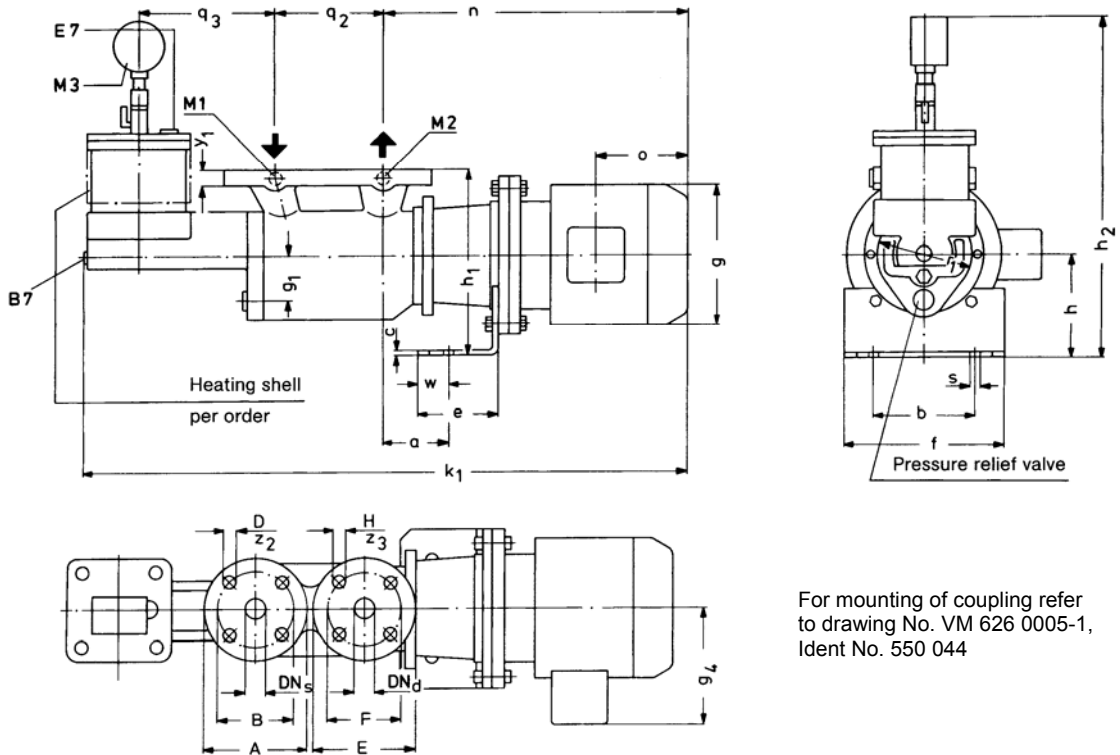
$z_1/z_2/z_3$ = No. of holes

Sense of rotation: clockwise as seen from the driving side

Pump size	Motor size acc. to IEC	Unit dimensions																	Connecting dimensions							Pressure gauge						
		a	b	c	e	f	g	g ₁	g ₂	h	h ₁	k ₁	n	o	q ₂	r ₁	s	w	x	y ₁	Suction side ①				Delivery side ②							
SPF						③		③				③	③								DN _s	A	B	D	z ₂	DN _d	E	F	H	z ₃	M1/M2	
10	80	88	160			200	162	124	140	230	524	388	134																			G ¼
	90 S	88	160			200	181	130	140	230	572	436	163																			
	90 L	88	160	8	100	200	181	45	130	140	230	572	436	163	110	95	14	50	-	18	20	105	75	14	4	20	105	75	14	4		
	100 L	110	200			250	203		158	160	250	626	490	179																		
20	90 S	151	160		100	200	181		130	140	235	649	499	163				50														G ¼
	90 L	151	160		100	200	181		130	140	235	649	499	163				50														
	100 L	129	200	8	100	250	203	56	158	160	255	659	509	179	125	110	14	50	-	18	25	120	85	14	4	25	120	85	14	4		
	112 M	129	200		100	250	228		171	160	255	682	532	195				50														
	132 S	141	250		120	300	266		196	170	265	784	634	214			14,5	60														
40	90 L	151	160	8	100	200	181		130	140	250	699	499	163				50	-													G ¼
	100 L	129	200	8	100	250	203		158	160	270	709	509	179			14	50	-													
	112 M	129	200	8	100	250	228		171	160	270	732	532	195			50	-														
	132 S	141	250	8	120	300	266	60	196	170	280	834	634	214	135	146		60	-	18	32	140	100	18	4	25	120	85	14	4		
	132 M	141	250	8	120	300	266		196	170	280	834	634	214			14,5	60	-													
	160 M	150	300	18	305	350	320		234	235	345	943	743	265			18	265	20													

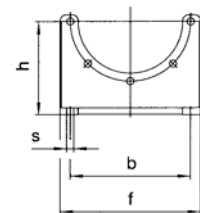
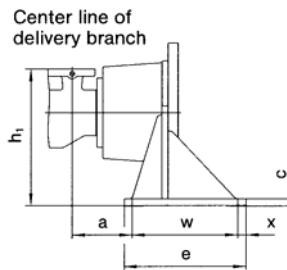
① PN 16, DIN EN 1092-2; ② PN 40, DIN EN 1092-2; ③ Approximate dimensions, can vary according to motor make.

Unit dimensions SPF with filter



For mounting of coupling refer to drawing No. VM 626 0005-1, Ident No. 550 044

Foot mounting with size 40 for motor size 160 M
Arrangement of other unit dimensions as above



Dimensions in mm
Subject to alterations

$z_1/z_2/z_3 = \text{No. of holes}$

Sense of rotation: clockwise as seen from the driving side

Pump size SPF	Motor size acc. to IEC	Unit dimensions																					
		a	b	c	e	f	g	g ₁	g ₄	h	h ₁	h ₂	k ₁	n	o	q ₂	q ₃	r ₁	s	W	x	y ₁	
10	80	88	160			200	162		124	140	230	392	673	388	134								
	90S	88	160			200	181		130	140	230	392	721	436	163								
	90 L	88	160	8	100	200	181	45	130	140	230	392	721	436	163	110	119	95	14	50	-	18	
	100 L	110	200			250	203		158	160	250	412	775	490	179								
20	90S	151	160		100	200	181		130	140	235	402	835	499	163								
	90 L	151	160		100	200	181		130	140	235	402	835	499	163								
	100 L	129	200	8	100	250	203	56	158	160	255	422	845	509	179	125	144	110	14	50	-	18	
	112 M	129	200		100	250	228		171	160	255	422	868	532	195					50			
	132 S	141	250		120	300	266		196	170	265	432	970	634	214				14,5	60			
40	90 L	151	160	8	100	200	181		130	140	250	458	878	499	163								
	100 L	129	200	8	100	250	203		158	160	270	478	888	509	179								
	112 M	129	200	8	100	250	228		171	160	270	478	911	532	195								
	132 S	141	250	8	120	300	266	60	196	170	280	488	1013	634	214	135	175	146	14	50	-	18	
	132 M	141	250	8	120	300	266		196	170	280	488	1013	634	214								
	160 M	150	300	18	305	350	320		234	235	345	553	1122	743	265				18	265	20		

Pump size SPF	Connecting dimensions										Draining B 7	Venting E 7	Pressure gauge M1/M2/M3
	Suction side ①					Delivery side ②							
	DN _s	A	B	D	z ₂	DN _d	E	F	H	z ₃			
10	20	105	75	14	4	20	105	75	14	4	G 3/8	G 1/4	G 1/4
20	25	120	85	14	4	25	120	85	14	4	G 1/2	G 1/4	G 1/4
40	32	140	100	18	4	25	120	85	14	4	G 1/2	G 1/4	G 1/4

① PN 16, DIN EN 1092-2; ② PN 40, DIN EN 1092-2; ③ Approximate dimensions, can vary according to motor make.

Subject to technical alterations.



The mentioned performance data are to be considered as a product and performance abstract only. The particular operating limits can be taken from the quotation or order acknowledgement.

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VM 523 GB / 10.00 – Ident NO. 795 535