



IHI Hydraulic Industries

Technical Catalogue



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Introduction

(IHI) Hydraulic Industries is a specialized manufacturer of cartridge hydraulic vane pumps. These products are used in various industries, road construction machinery, drilling and mining machinery and marine vessels. **IHI** manufactures Hi-Tech automotive steering hydraulic pumps for cars and trucks under license of **Youngshin** company of South Korea.

This company undertook the production of hydraulic pumps in 1984 and was chosen as a **first-rate industrial unit in 2003 and 2004.**

■ **IHI products are widely used in:**

- Pipe and profile making, mill and steel mill industries.
- Petrochemical, oil, gas and related industries.
- Sugar and cane industries.
- Brick plants, ceramic and mosaic industries.
- Marine industries.
- Agricultural machinery.
- Municipality services, i.e. Garbage trucks.
- Plastic injection machines and shears.

■ **IHI pumps are used or can be substituted in:**

- Backhoe loaders
- Caterpillar machinery
- Alice Fiat
- Volvos 4400 and 4500.

■ **IHI steering pumps are/can be used in the following automobiles:**

- Peugeot
- Daewoo
- Hyundai
- Mercedes Benz truck 1921

Every hydraulic system depends on a reliable hydraulic pump. Rely on IHI'S!

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Single vane pumps

Operating characteristics of vane pumps at 1500 rpm with SAE 10 ^w hydraulic oil at 50°C and 24 cst viscosity.									
Model	Displacement	7 bar		70 bar		140 bar		175 bar	
	cm ³ /rev	L/min	KW	L/min	KW	L/min	KW	L/min	KW
20V 5	18	25	0.56	23	4	22	7	20	9
20V 8	27	39	0.75	36	5	35	10	33	12
20V 11	36	53	1.1	50	7	47	14	45	17
20V 12	39	56	1.2	54	8	52	15	-	-
20V 14	45	66	1.2	64	9	60	17	-	-
Operating characteristics of vane pumps at 1500 rpm with SAE 10 ^w hydraulic oil at 50°C and 24 cst viscosity.									
25V 8	25.8	38.7	1.2	36.7	5	35.3	10	32	11.5
25V 10	32.2	48.3	1.3	45.7	6	44	12	39.8	14.5
25V 12	38	57	1.4	54	7	52	15	47	17
25V 14	44	66	1.5	61	9	57	17	56	20
25V 17	53	80	1.7	75	10	71	21	68	24
25V 19	61.2	91.8	1.7	86	12	81.4	24	78	29
25V 21	66	99	1.8	94	13	90	26	88	32
Operating characteristics of vane pumps at 1500 rpm with SAE 10 ^w hydraulic oil at 50°C and 24 cst viscosity.									
35V 17	54.6	82	2.2	78	13	74	21.5	66	25.8
35V 25	78	124	2.6	118	17	112	32	100	36
35V 30	94	141	2.7	134	18	128	35	122	44
35V 35	110	165	3.0	158	21	150	42	145	52
35V 38	120	180	3.0	171	23	163	45	156	55
Operating characteristics of vane pumps at 1500 rpm with SAE 10 ^w hydraulic oil at 50°C and 24 cst viscosity.									
45V 42	138	198	2.8	187	25	177	51	166	62
45V 50	162	236	3.7	222	31	242	60	198	72
45V 57	184	269	4.3	255	34	245	67	231	77
45V 60	193	284	4.6	269	35	258	70	244	86

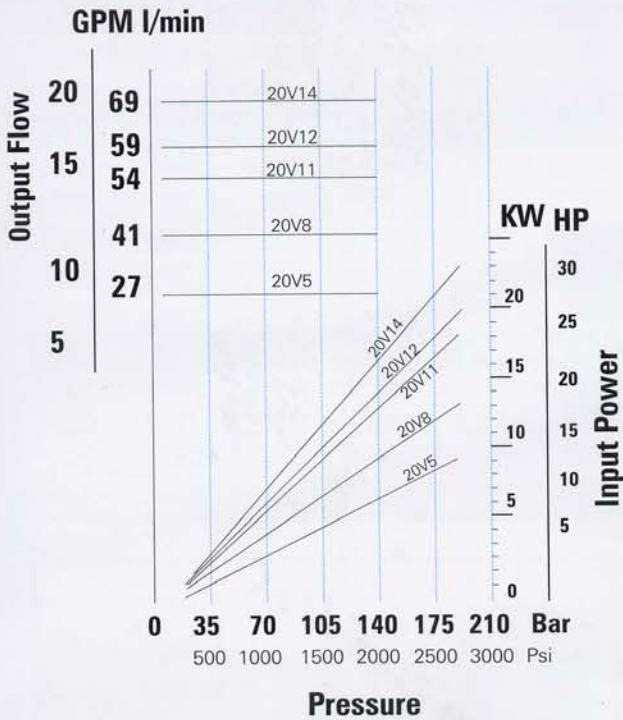


Model
20V

Specifications



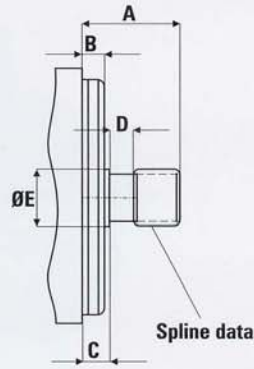
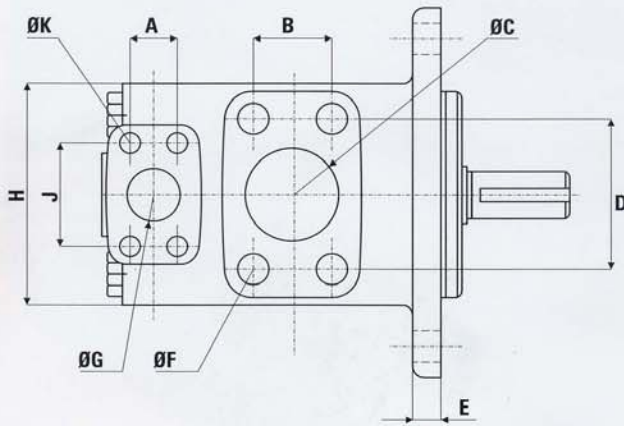
Typical pump characteristics 1500 rpm



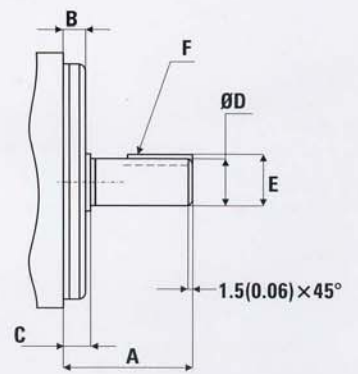
Operating characteristics of vane pumps at 1500 rpm with SAE 10^W hydraulic oil at 50°C and 24 cst viscosity.

Model	Displacement cm ³ /rev	7 bar		70 bar		140 bar		175 bar	
		L/min	KW	L/min	KW	L/min	KW	L/min	KW
20V 5	18	25	0.56	23	4	22	7	20	9
20V 8	27	39	0.75	36	5	35	10	33	12
20V 11	36	53	1.1	50	7	47	14	45	17
20V 12	39	56	1.2	54	8	52	15	-	-
20V 14	45	66	1.2	64	9	60	17	-	-

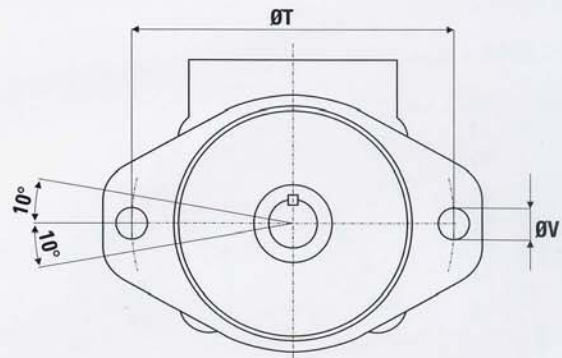
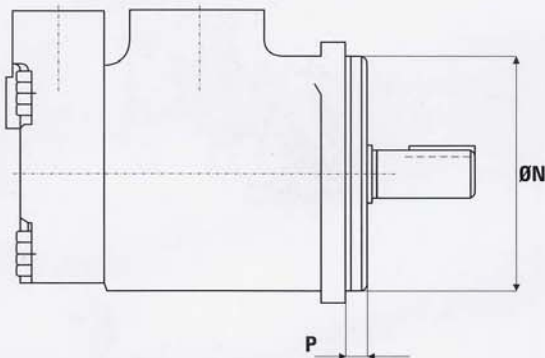
Installation



Splined Shaft



Straight Key Shaft



Model	A	B	ØC	D	E	ØG	H	J	ØN	P	ØT	ØV	ØF × full thread depth, 4 holes	ØK × full thread depth, 4 holes
20V	22.2	35.7	38.1	70	13	19	107	47.6	101.55, 101.6	9.5	146	14	M12 × 21 deep	M8 × 18 deep

Straight Key Shaft

Pump	Shaft Code	A	B	C	ØD	E	F key width × length
20V	I	58.8	9.5	11.8	22.22, 22.2	24.5, 24.4	6 × 26

Splined Shaft

Pump	Shaft Code	A	B	C	D	ØE	Spline data		
							No. of teeth	Major dia.	Minor dia.
20V	II	41.1	9.5	11.8	3.9	28	13	22.15	18.5

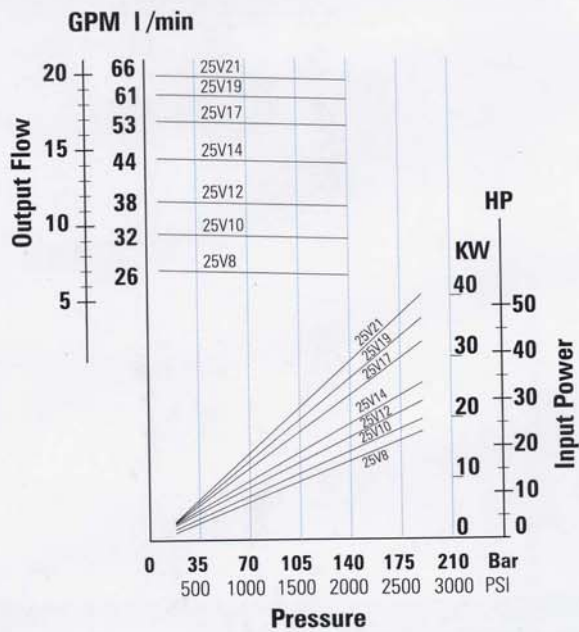
Model 25V

IHI Hydraulic Industries

Specifications



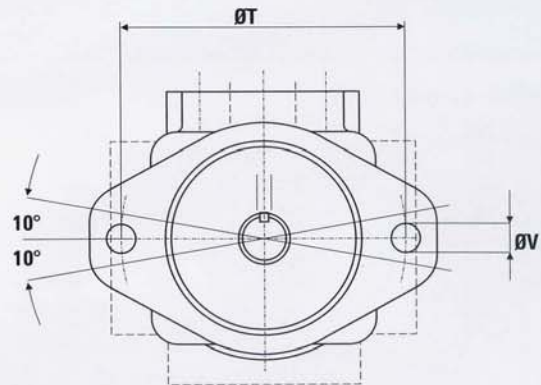
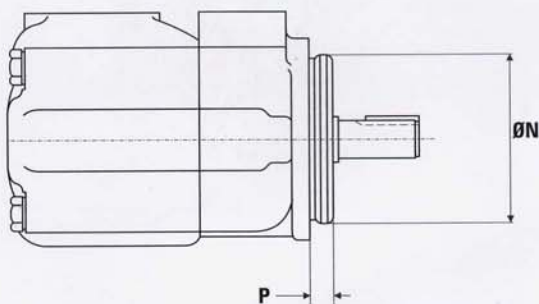
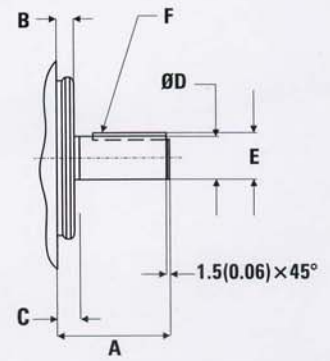
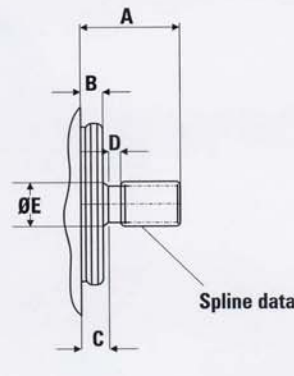
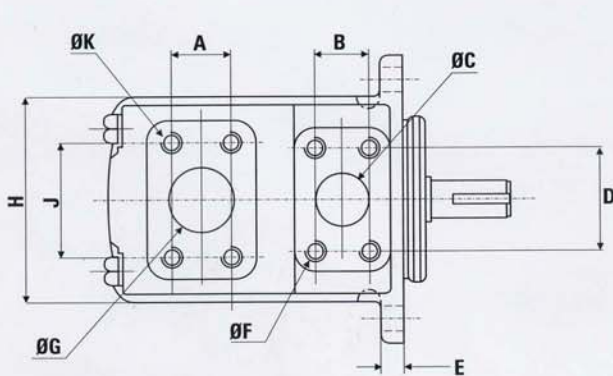
Typical pump characteristics 1500 rpm



Operating characteristics of vane pumps at 1500 rpm with SAE 10^W hydraulic oil at 50°C and 24 cst viscosity.

Model	Displacement cm ³ /rev	7 bar		70 bar		140 bar		175 bar	
		L/min	KW	L/min	KW	L/min	KW	L/min	KW
25V 8	25.8	38.7	1.2	36.7	5	35.3	10	32	11.5
25V 10	32.2	48.3	1.3	45.7	6	44	12	39.8	14.5
25V 12	38	57	1.4	54	7	52	15	47	17
25V 14	44	66	1.5	61	9	57	17	56	20
25V 17	53	80	1.7	75	10	71	21	68	24
25V 19	61.2	91.8	1.7	86	12	81.4	24	78	29
25V 21	66	99	1.8	94	13	90	26	88	32

Installation



Model	A	B	ØC	D	E	ØG	H	J	ØN	P	ØT	ØV	ØF × full thread depth, 4 holes	ØK × full thread depth, 4 holes
25V	35.71 (1.406)	26.19 (1.031)	25.4 (1.00)	52.37 (2.062)	12.7 (0.50)	38.1 (1.50)	118 (4.62)	69.85 (2.75)	101.60(4.000) 101.55(3.998)	9.7 (0.38)	146 (5.750)	14.2 (0.56)	M10 × 17.0(0.67) deep	M12 × 19(0.75) deep

Straight Key Shaft

Pump	Shaft Code	A	B	C	ØD	E	F key width × length
25V	I	59(2.32)	9.7(0.375)	11.05(0.435)	22.23(0.875) 22.20(0.874)	24.5(0.966) 24.4(0.961)	6(0.236) × 32(2.6)

Splined Shaft

Pump	Shaft Code	A	B	C	D	ØE	Spline data		
							No. of teeth	Major dia.	Minor dia.
25V	II	44.5(1.75)	9.7(0.375)	11.1(0.437)	3.9(0.156)	28	13	21.78	18.1

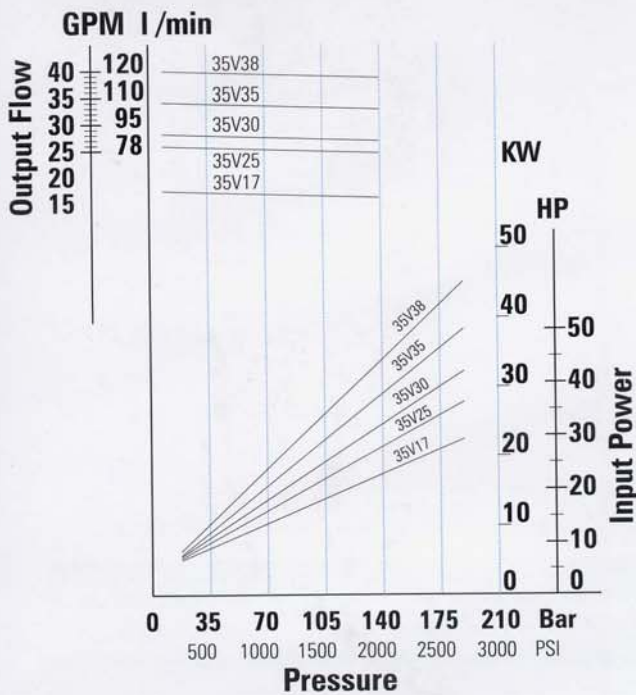
Model 35V

IHI Hydraulic Industries

Specifications



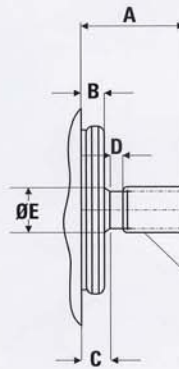
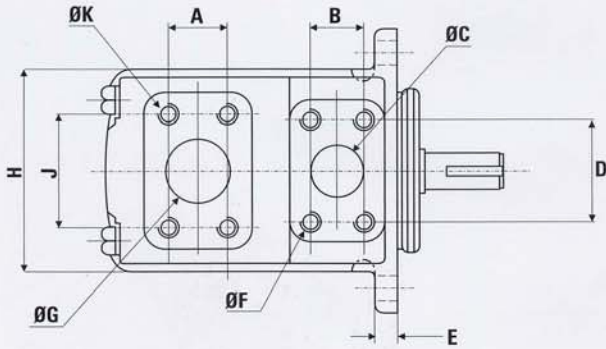
Typical pump characteristics 1500 rpm



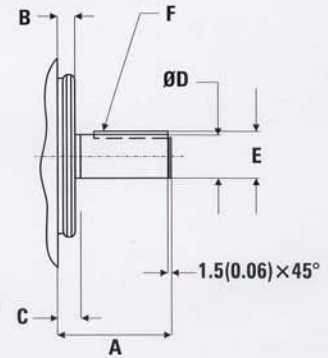
Operating characteristics of vane pumps at 1500 rpm with SAE 10^W hydraulic oil at 50°C and 24 cst viscosity.

Model	Displacement cm ³ /rev	7 bar		70 bar		140 bar		175 bar	
		L/min	KW	L/min	KW	L/min	KW	L/min	KW
35V 17	54.6	82	2.2	78	13	74	21.5	66	25.8
35V 25	78	124	2.6	118	17	112	32	100	36
35V 30	94	141	2.7	134	18	128	35	122	44
35V 35	110	165	3.0	158	21	150	42	145	52
35V 38	120	180	3.0	171	23	163	45	156	55

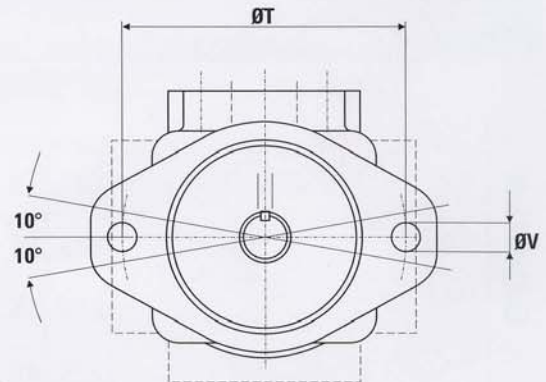
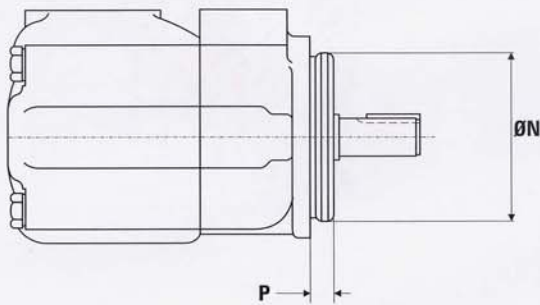
Installation



Splined Shaft



Straight Key Shaft



Model	A	B	ØC	D	E	ØG	H	J	ØN	P	ØT	ØV	ØF×full thread depth, 4 holes	ØK×full thread depth, 4 holes
35V	42.88 (1.688)	30.18 (1.188)	31.8 (1.25)	58.72 (2.312)	16 (0.63)	50.8 (2.00)	140 (5.50)	77.77 (3.062)	127.00(5.000) 126.95(4.998)	9.7 (0.38)	181 (7.125)	17.5 (0.688)	M12×19(0.88) deep	M12×19(0.88) deep

Straight Key Shaft

Pump	Shaft Code	A	B	C	ØD	E	F key width×length
35V	I	73.2(2.88)	9.7(0.375)	11.05(0.435)	31.75(1.250) 31.70(1.248)	35.877(1.412) 35.623(1.402)	8.00(0.315)×37(1.50)

Splined Shaft

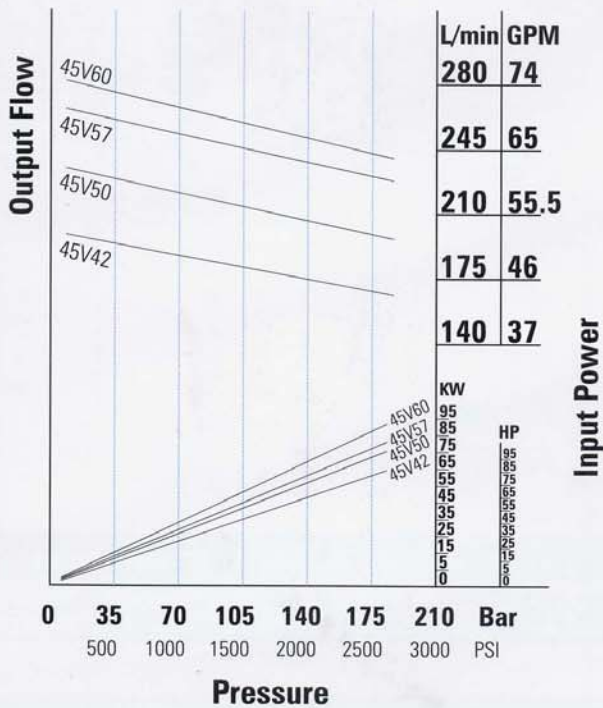
Pump	Shaft Code	A	B	C	D	ØE	Spline data		
							No .of teeth	Major dia.	Minor dia.
35V	II	58.7(2.31)	9.7(0.375)	11.1(0.437)	6.35(0.25)	36.5(1.38)	14	31.22	26.85

Model 45V

Specifications



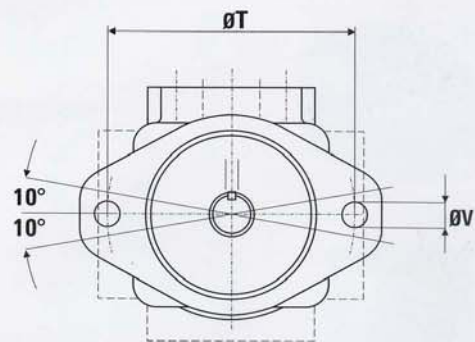
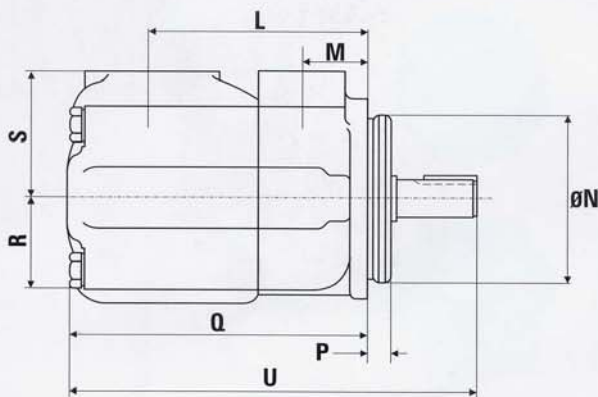
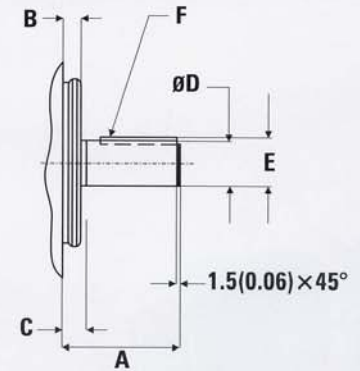
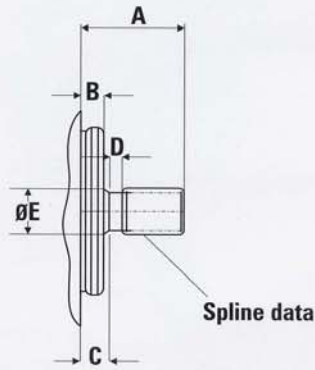
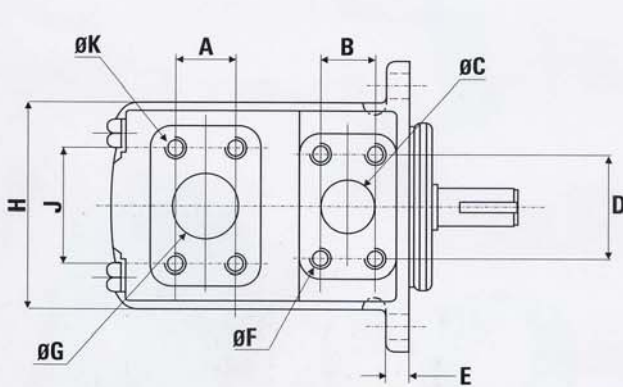
Typical pump characteristics 1500 rpm



Operating characteristics of vane pumps at 1500 rpm with SAE 10^W hydraulic oil at 50°C and 24 cst viscosity.

Model	Displacement	7 bar		70 bar		140 bar		175 bar	
	cm ³ /rev	L/min	KW	L/min	KW	L/min	KW	L/min	KW
45V 42	138	198	2.8	187	25	177	51	166	62
45V 50	162	236	3.7	222	31	242	60	198	72
45V 57	184	269	4.3	255	34	245	67	231	77
45V 60	193	284	4.6	269	35	258	70	244	86

Installation



Shaft Code	U
I	277.5
II	278.9

Model	A	B	ØC	D	E	ØG	H	J	ØN	P	ØT	ØV	L	M	Q	R	S	ØF × full thread depth, 4 holes	ØK × full thread depth, 4 holes
45V	61.8	35.7	38.18	69.8	16	76.2	160	106.4	127.00, 126.95	12.7	181	17.5	123	43	217	83	97	M12 × 21.7 deep	M16 × 22 deep

Straight Key Shaft							
Pump	Shaft Code	A	B	C	ØD	E	F key width × length
45V	I	60.5	12.7	14.7	31.75, 31.70	35.36, 35.10	8.00 × 28.5

Splined Shaft							Spline data		
Pump	Shaft Code	A	B	C	D	ØE	No. of teeth	Major dia.	Minor dia.
45V	II	61.9	12.7	14.3	9.7	41.3	14	31.16, 31.2	26.7, 26.65

Spare Parts

All parts listed on this page are uniformly used in pumps and cartridges of 20v, 25v, 35v and 45v ranges.
To order, please specify part name and range.

Model 20V



..... Straight / Key Cover

Model [25,35,45]V



..... Splined Cover

Model [25,35,45]V



..... Cover

Model 20V



..... Cover



..... Wear Plate



..... Cartridge Kit



..... Ring



..... Pressure Plate

Model 20V



..... Body

Model [25,35,45]V



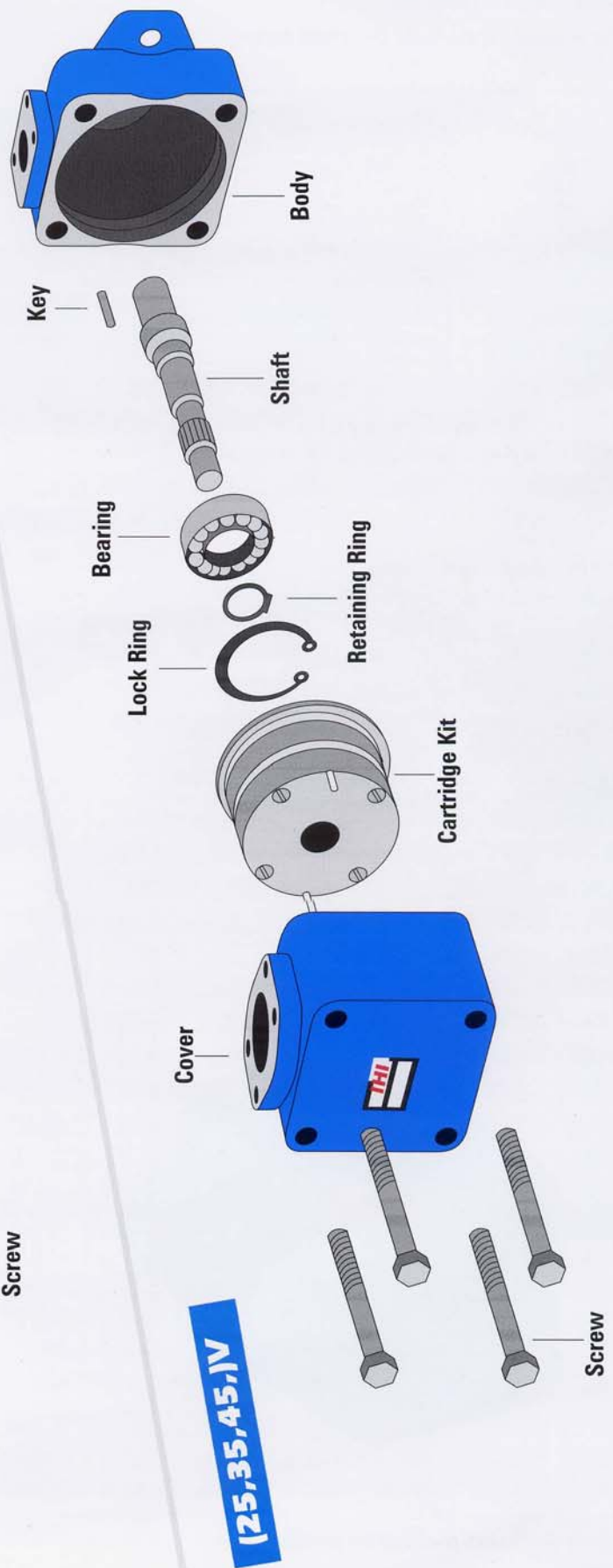
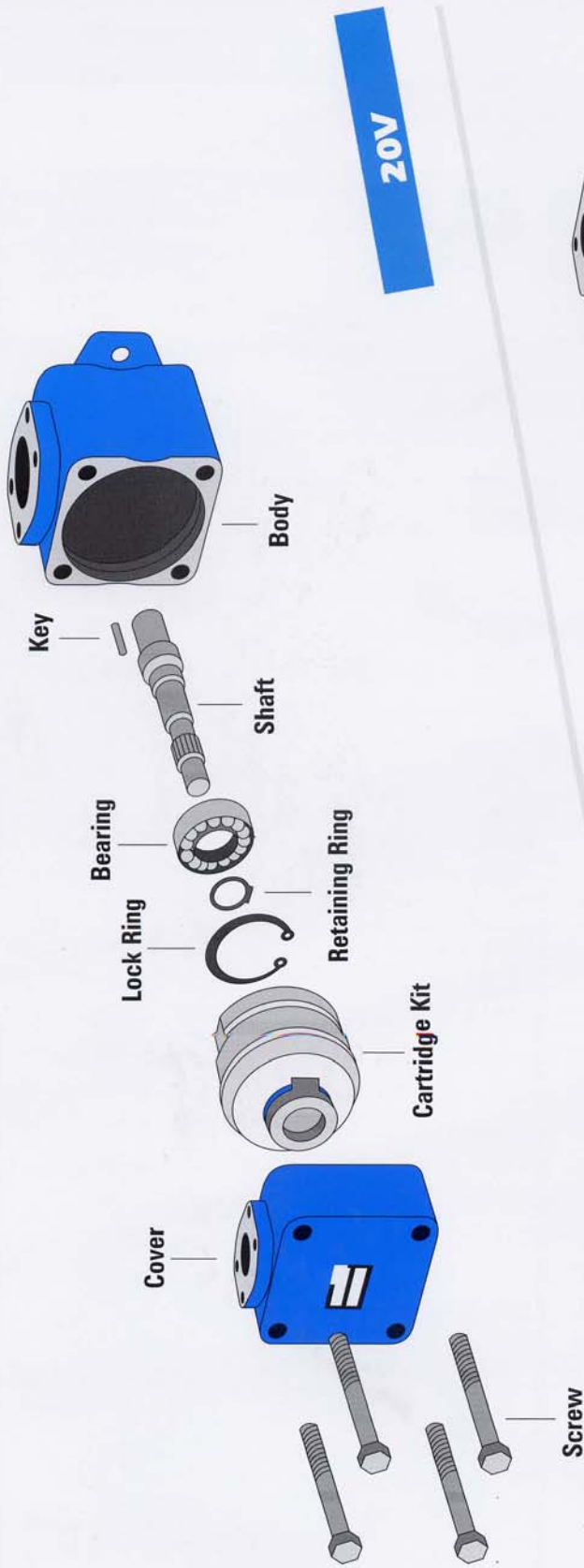
..... Body



..... Splined Shaft

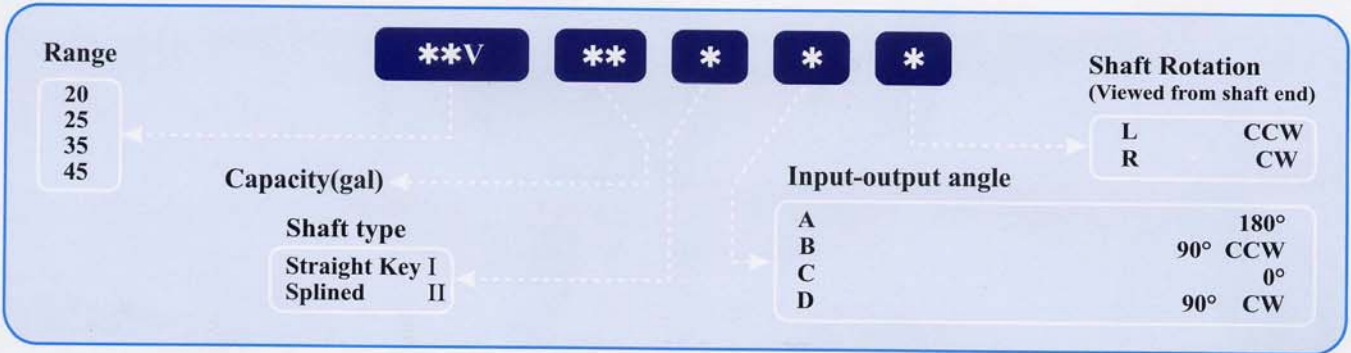


..... Straight / Key Shaft



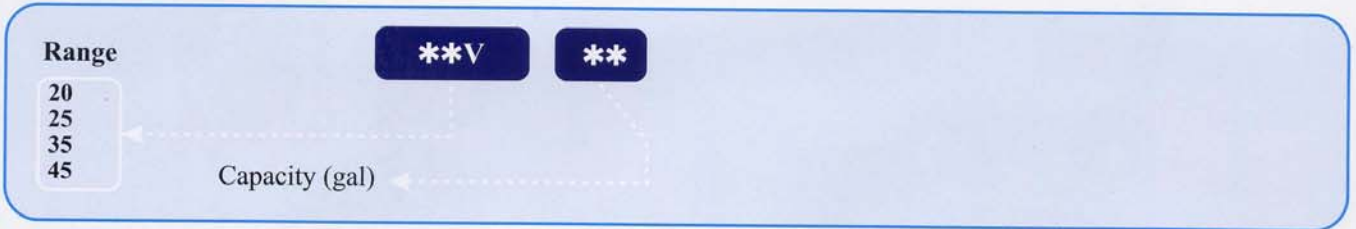
Ordering codes

For pumps please note the chart below:

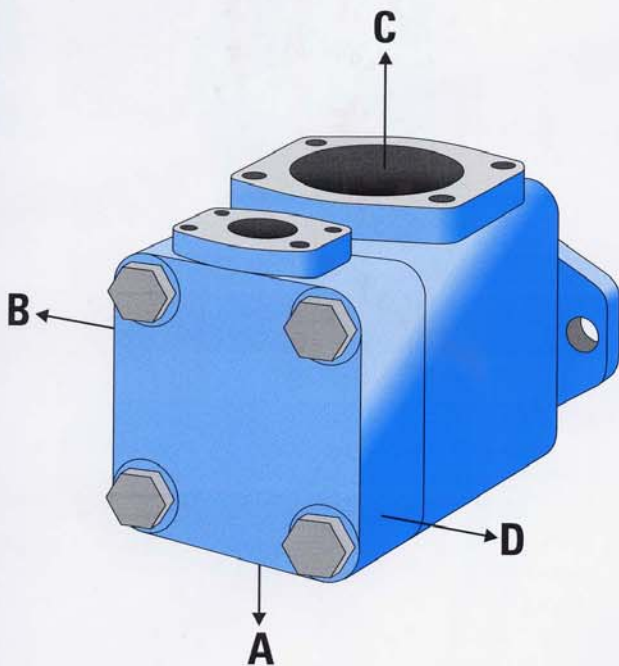


ie. 25v21 IBL would be a pump in 25v range with a capacity of 21 gals. With straight key shaft, input-output angle of 90° CCW. With CCW rotation.

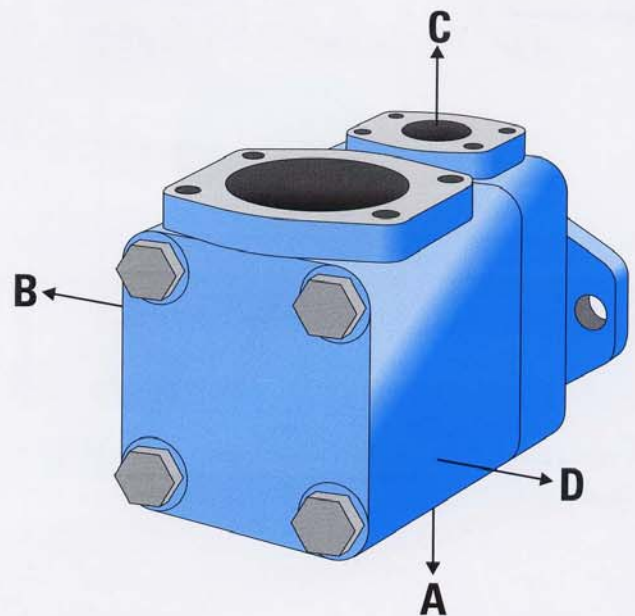
For cartridges and rings:



ie.45v42 cartridge would be a cartridge of 45v range and 42 gals capacity.



Directional angles of 20v



directional angles of (25v,35v,45v)



Double vane pumps

2520 V

3525 V

4535 V

Operating characteristics of vane pumps at 1500 rpm with SAE 10^w hydraulic oil at 50°C and 24 cst viscosity.

Model	Displacement cm ³ /rev	7 bar		70 bar		140 bar		175 bar	
		L/min	KW	L/min	KW	L/min	KW	L/min	KW
20V 5	18	25	0.56	23	4	22	7	20	9
20V 8	27	39	0.75	36	5	35	10	33	12
20V 11	36	53	1.1	50	7	47	14	45	17
20V 12	39	56	1.2	54	8	52	15	-	-
20V 14	45	66	1.2	64	9	60	17	-	-
25V 8	25.8	38.7	1.2	36.7	5	35.3	10	32	11.5
25V 10	32.2	48.3	1.3	45.7	6	44	12	39.8	14.5
25V 12	38	57	1.4	54	7	52	15	47	17
25V 14	44	66	1.5	61	9	57	17	56	20
25V 17	53	80	1.7	75	10	71	21	68	24
25V 19	61.2	91.8	1.7	86	12	81.4	24	78	29
25V 21	66	99	1.8	94	13	90	26	88	32

Operating characteristics of vane pumps at 1500 rpm with SAE 10^w hydraulic oil at 50°C and 24 cst viscosity.

25V 8	25.8	38.7	1.2	36.7	5	35.3	10	32	11.5
25V 10	32.2	48.3	1.3	45.7	6	44	12	39.8	14.5
25V 12	38	57	1.4	54	7	52	15	47	17
25V 14	44	66	1.5	61	9	57	17	56	20
25V 17	53	80	1.7	75	10	71	21	68	24
25V 19	61.2	91.8	1.7	86	12	81.4	24	78	29
25V 21	66	99	1.8	94	13	90	26	88	32
35V 17	54.6	82	2.2	78	13	74	21.5	66	25.8
35V 25	78	124	2.6	118	17	112	32	100	36
35V 30	94	141	2.7	134	18	128	35	122	44
35V 35	110	165	3.0	158	21	150	42	145	52
35V 38	120	180	3.0	171	23	163	45	156	55

Operating characteristics of vane pumps at 1500 rpm with SAE 10^w hydraulic oil at 50°C and 24 cst viscosity.

35V 17	54.6	82	2.2	78	13	74	21.5	66	25.8
35V 25	78	124	2.6	118	17	112	32	100	36
35V 30	94	141	2.7	134	18	128	35	122	44
35V 35	110	165	3.0	158	21	150	42	145	52
35V 38	120	180	3.0	171	23	163	45	156	55
45V 42	138	198	2.8	187	25	177	51	166	62
45V 50	162	236	3.7	222	31	242	60	198	72
45V 57	184	269	4.3	255	34	245	67	231	77
45V 60	193	284	4.6	269	35	258	70	244	86

Model 2520V

IHI Hydraulic Industries

Specifications



To calculate the power and delivery of double vane pumps, using the table below, for a given pressure each cartridge has the delivery shown and the power would be the sum of the two powers given. ie. A 2520v 17-11 pump at 175 bars would have deliveries of 68 and 45 lit/min, successively, of the 2 cartridges and a power of 17+24=41kw

Model	Displacement Cm ³ /rev	7 bar		70 bar		140 bar		175 bar	
		L/min	KW	L/min	KW	L/min	KW	L/min	KW
20V 11	36	53	1.1	50	7	47	14	45	17
25V 17	53	80	1.7	75	10	71	21	68	24

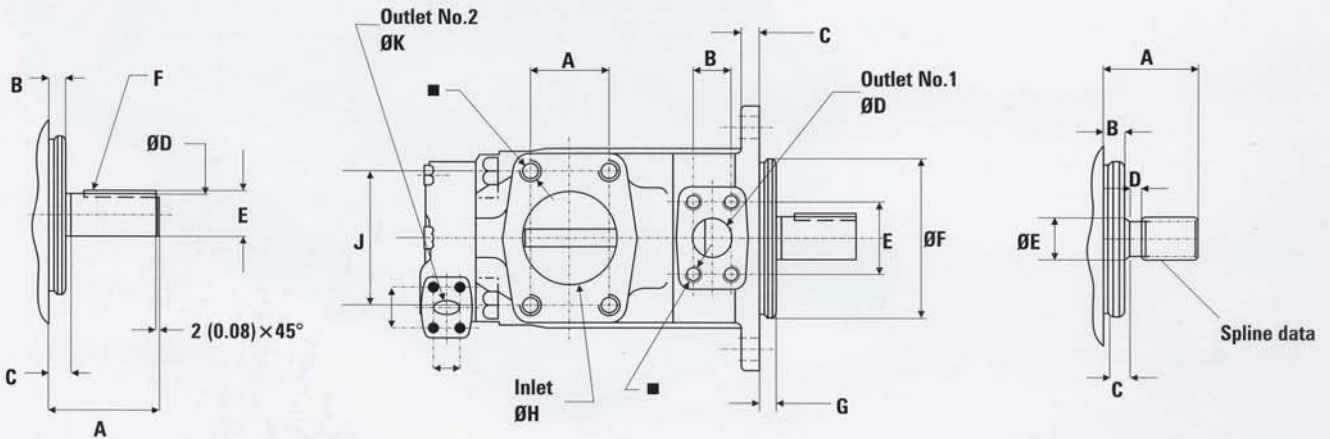
Operating characteristics of vane pumps at 1500 rpm with SAE 10^W hydraulic oil at 50°C and 24 cst viscosity.

Model	Displacement cm ³ /rev	7 bar		70 bar		140 bar		175 bar	
		L/min	KW	L/min	KW	L/min	KW	L/min	KW
20V 5	18	25	0.56	23	4	22	7	20	9
20V 8	27	39	0.75	36	5	35	10	33	12
20V 11	36	53	1.1	50	7	47	14	45	17
20V 12	39	56	1.2	54	8	52	15	-	-
20V 14	45	66	1.2	64	9	60	17	-	-
25V 8	25.8	38.7	1.2	36.7	5	35.3	10	32	11.5
25V 10	32.2	48.3	1.3	45.7	6	44	12	39.8	14.5
25V 12	38	57	1.4	54	7	52	15	47	17
25V 14	44	66	1.5	61	9	57	17	56	20
25V 17	53	80	1.7	75	10	71	21	68	24
25V 19	61.2	91.8	1.7	86	12	81.4	24	78	29
25V 21	66	99	1.8	94	13	90	26	88	32

Model 2520V

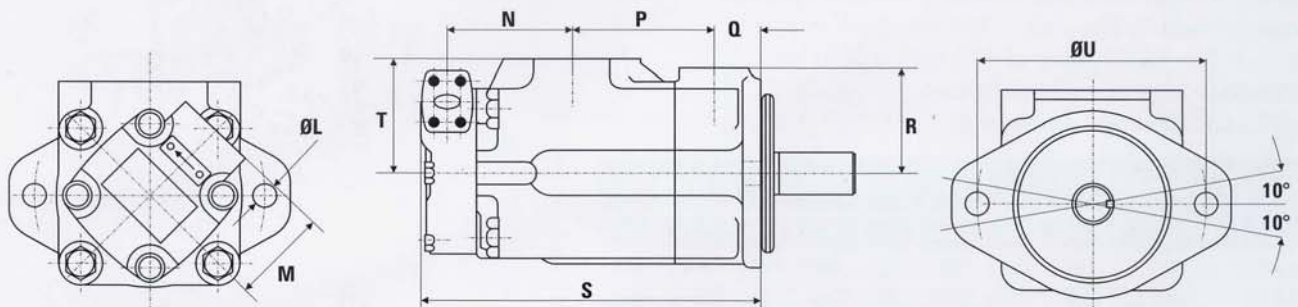


Installation



Straight Key Shaft

Splined Shaft



Model	A	B	C	ØD	E	ØF	G	ØH	J
2520V	50.8	26.19	12.2	25	52.37	101.55, 101.6	9.7	63.5	89

Model	ØK	ØL	M	N	P	Q	R	S	T	ØU
2520V	19	14.3	77.1	88.9	102.3	38.1	76.2	253.65	84	146

Straight Key Shaft

Pump	Shaft Code	A	B	C	ØD	E	F key width x length
2520V	I	58	9.7	10.5	22.22, 22.2	24.4, 24.5	6 x 26

Splined Shaft

Pump		Splined Shaft									
Pump	Shaft Code	Spline data	A	B	C	D	ØE	Type	No. of teeth	Major dia.	Minor dia.
2520V	III	A	58	9.7	10.5	9.8	28	A	13	21.78	18.1
2520V	II	B	77.5	9.7	10.5	20.5	28	B	14	31.22	26.85

Model

3525V

IHI Hydraulic Industries

Specifications



To calculate the power and delivery of double vane pumps, using the table below, for a given pressure each cartridge has the delivery shown and the power would be the sum of the two powers given. ie. A 3525v 38-21 pump at 175 bars would have deliveries of 156 and 88 lit/min, successively, of the 2 cartridges and a power of 32+55=87 kw

Model	Displacement Cm ³ /rev	7 bar		70 bar		140 bar		175 bar	
		L/min	KW	L/min	KW	L/min	KW	L/min	KW
25V 21	66	99	1.8	94	13	90	26	88	32
35V 38	120	180	3.0	171	23	163	45	156	55

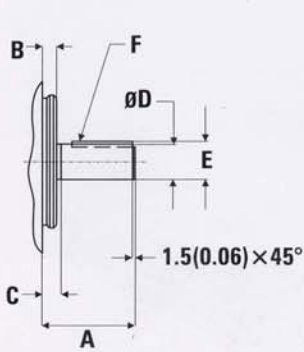
Operating characteristics of vane pumps at 1500 rpm with SAE 10^w hydraulic oil at 50°C and 24 cst viscosity.

Model	Displacement cm ³ /rev	7 bar		70 bar		140 bar		175 bar	
		L/min	KW	L/min	KW	L/min	KW	L/min	KW
25V 8	25.8	38.7	1.2	36.7	5	35.3	10	32	11.5
25V 10	32.2	48.3	1.3	45.7	6	44	12	39.8	14.5
25V 12	38	57	1.4	54	7	52	15	47	17
25V 14	44	66	1.5	61	9	57	17	56	20
25V 17	53	80	1.7	75	10	71	21	68	24
25V 19	61.2	91.8	1.7	86	12	81.4	24	78	29
25V 21	66	99	1.8	94	13	90	26	88	32
35V 17	54.6	82	2.2	78	13	74	21.5	66	25.8
35V 25	78	124	2.6	118	17	112	32	100	36
35V 30	94	141	2.7	134	18	128	35	122	44
35V 35	110	165	3.0	158	21	150	42	145	52
35V 38	120	180	3.0	171	23	163	45	156	55

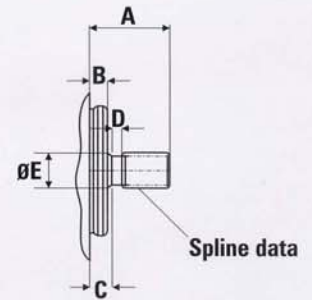
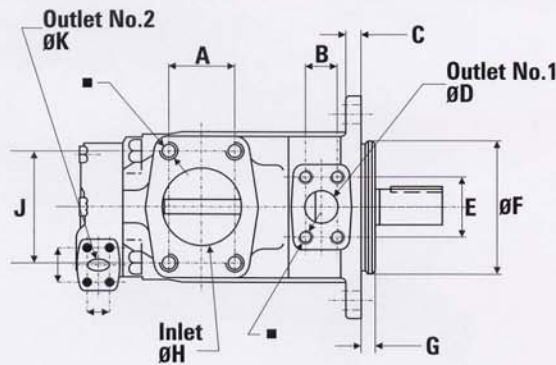
Model 3525V



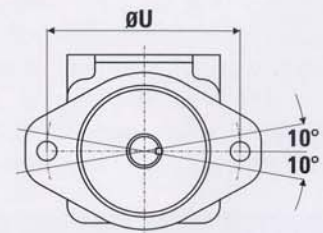
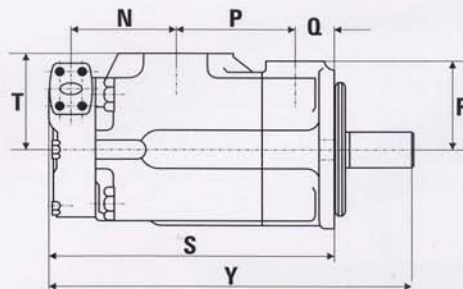
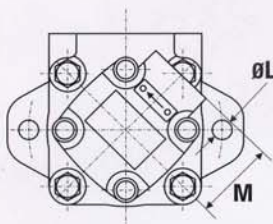
Installation



Straight Key Shaft



Splined Shaft



Model	A	B	C	ØD	E	ØF	G	ØH	J
3525V	62(2.437)	30.1(1.187)	15.9(0.62)	31.7(1.25)	58.7(2.312)	127.00(5.000), 126.95(4.998)	9.7(0.375)	76.2(3.00)	106.3(4.187)

Model	ØK	ØL	M	N	P	Q	R	S	T	ØU
3525V	25.4(1.00)	17.5(0.688)	74.7(2.94)	109.5(4.312)	114.3(4.50)	38.1(1.50)	82.6(3.25)	287.3(9.81)	88.9(3.50)	181(7.125)

Straight Key Shaft

Pump	Shaft Code	A	B	C	ØD	E	F key width x length
3525V	I	73.2(2.88)	9.7(0.375)	11.05(0.435)	31.75(1.250), 31.70(1.248)	35.877(1.412), 35.623(1.402)	8.00(0.315) x 37(1.38)

Splined Shaft

Pump	Shaft Code	A	B	C	D	ØE	Spline data		
							No. of teeth	Major dia.	Minor dia.
3525V	II	58.7(2.31)	9.7(0.375)	11.1(0.437)	6.35(0.25)	36.3(1.38)	14	31.22	26.85

Model
4535V

Specifications



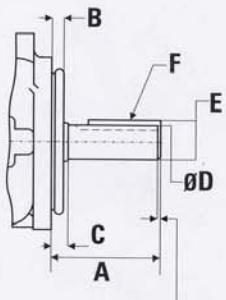
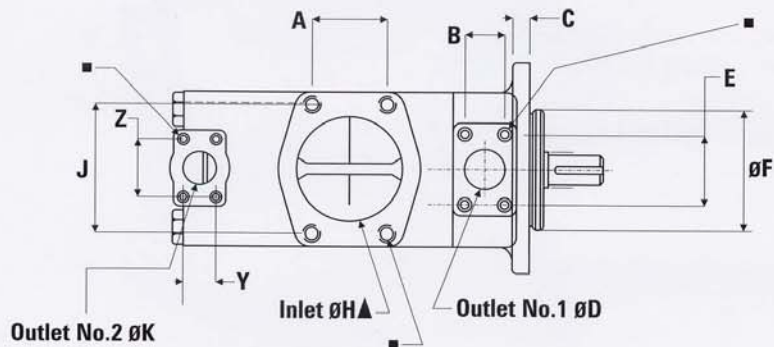
To calculate the power and delivery of double vane pumps, using the table below, for a given pressure each cartridge has the delivery shown and the power would be the sum of the two powers given. ie. A 4535v 57-30 pump at 175 bars would have deliveries of 231 and 122 lit/min, successively, of the 2 cartridges and a power of 44+77=121 kw

Model	Displacement Cm ³ /rev	7 bar		70 bar		140 bar		175 bar	
		L/min	KW	L/min	KW	L/min	KW	L/min	KW
35V 30	94	141	2.7	134	18	128	35	122	44
45V 57	164	269	4.3	255	34	245	67	231	77

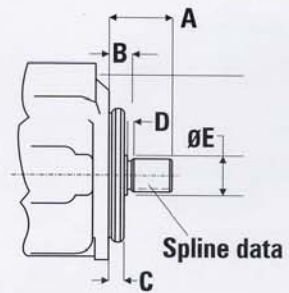
Operating characteristics of vane pumps at 1500 rpm with SAE 10 ^w hydraulic oil at 50°C and 24 cst viscosity.									
Model	Displacement cm ³ /rev	7 bar		70 bar		140 bar		175 bar	
		L/min	KW	L/min	KW	L/min	KW	L/min	KW
35V 17	54.6	82	2.2	78	13	74	21.5	66	25.8
35V 25	78	124	2.6	118	17	112	32	100	36
35V 30	94	141	2.7	134	18	128	35	122	44
35V 35	110	165	3.0	158	21	150	42	145	52
35V 38	120	180	3.0	171	23	163	45	156	55
45V 42	138	198	2.8	187	25	177	51	166	62
45V 50	162	236	3.7	222	31	242	60	198	72
45V 57	184	269	4.3	255	34	245	67	231	77
45V 60	193	284	4.6	269	35	258	70	244	86

Model 4535V

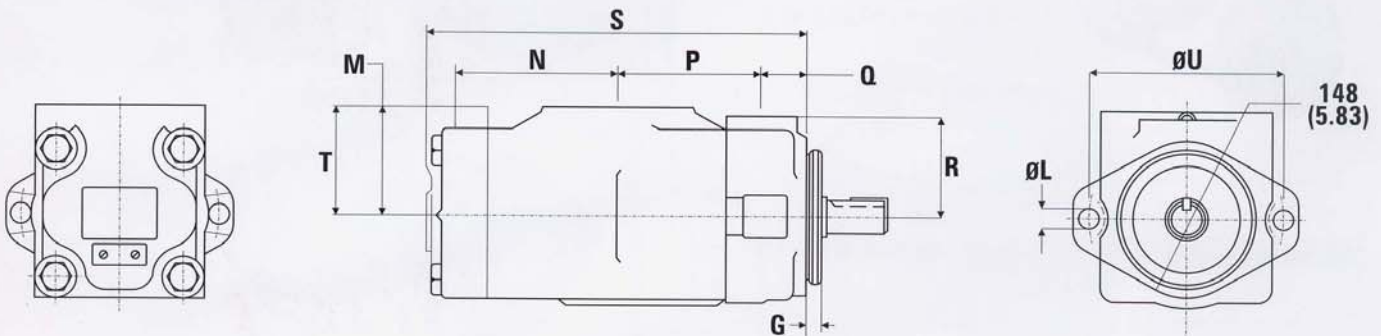
Installation



1.5(0.06) × 45°
Straight Key Shaft



Splined Shaft



Model	A	B	C	ØD	E	ØF	G	ØH	J	ØK
4535V	77.8(3.062)	35.7(1.41)	16(0.62)	38.18(1.50)	69.85(2.75)	127.00(5.00) , 126.95(4.99)	12.7(0.5)	101.6(4.00)	130.2(2.31)	31.7(1.25)

Model	ØL	M	N	P	Q	R	S	T	ØU	Y	Z
4535V	17.5(0.668)	101.6(4.00)	148(5.83)	132.3(5.21)	43(1.69)	93.85(3.69)	354(13.94)	102.4(4.03)	181(7.125)	30.2(1.19)	58.7(2.31)

Straight Key Shaft

Pump	Shaft Code	A	B	C	ØD	E	F key width × length
4535V	I	60.5 (2.38)	12.7(0.50)	14.7(0.58)	31.75(1.25) , 31.7(1.248)	35.36(1.392) , 35.1(1.382)	8(0.315) , 28.5(1.12)

Splined Shaft

Pump	Shaft Code	A	B	C	D	ØE	Spline data		
							No .of teeth	Major dia.	Minor dia.
4535V	II	61.9(2.44)	12.7(0.5)	14.3(0.565)	14.7(0.38)	41.3(1.56)	14	31.16 , 31.2	26.7 , 26.65

Spare Parts

All parts listed on this page are uniformly used in pumps and cartridges of 2520v, 3525v, 4535v ranges.

To order, please specify part name and range.



..... Cartridge kit



..... All Cartridge parts



..... Splined Shaft



..... Straight / Key Shaft

Model [2520,3525]V

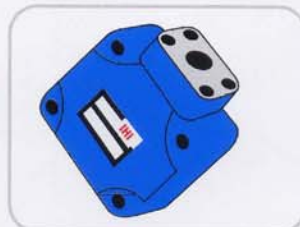


..... Splined Cover

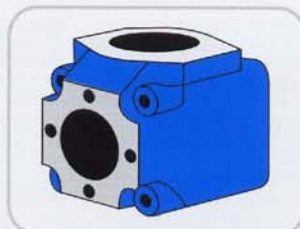
Model [4535]V



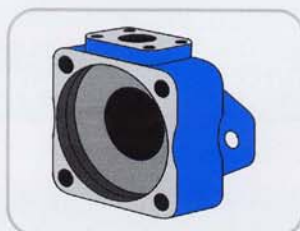
..... Straight Key Cover



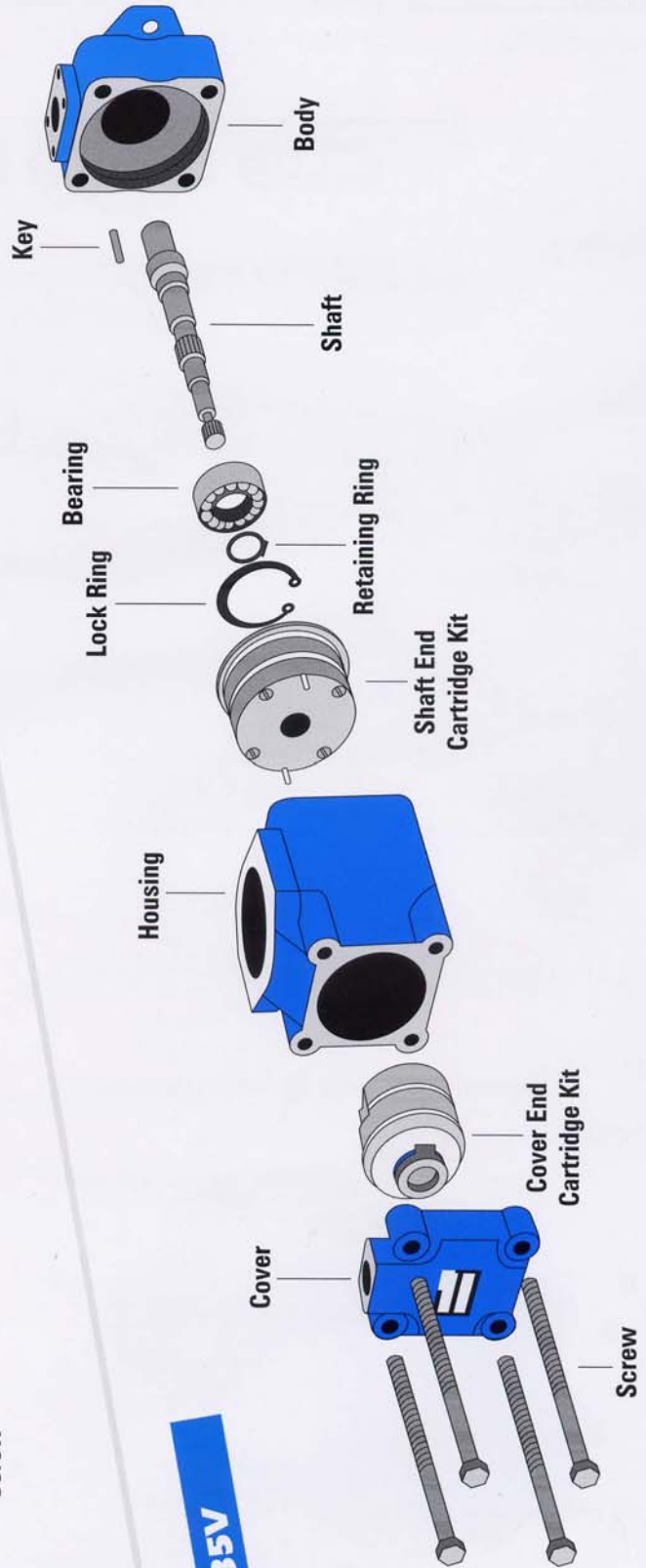
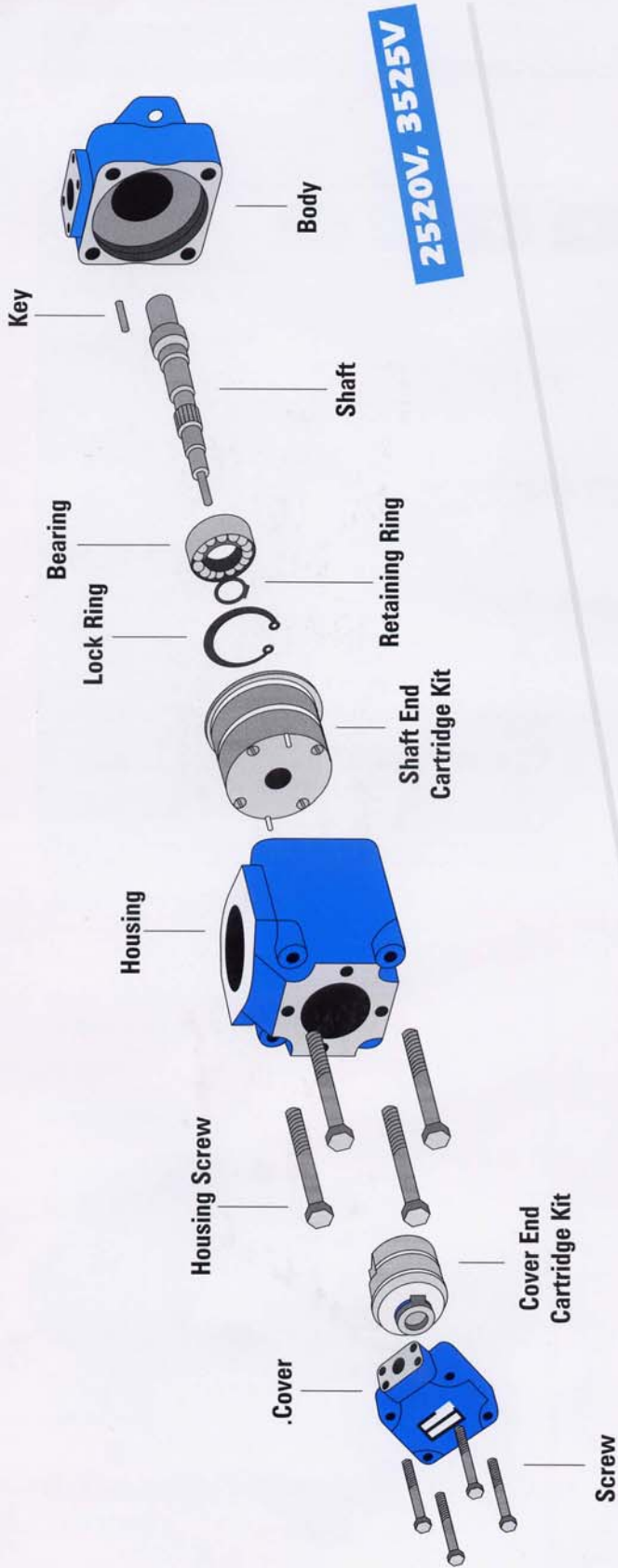
..... Cover



..... Housing



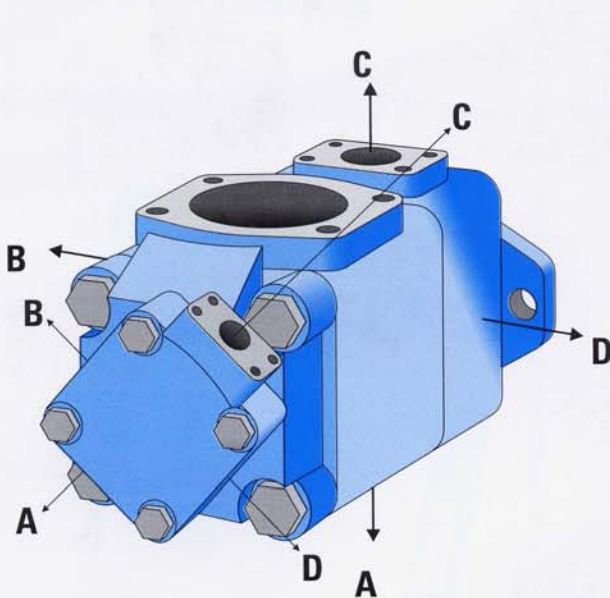
..... Body



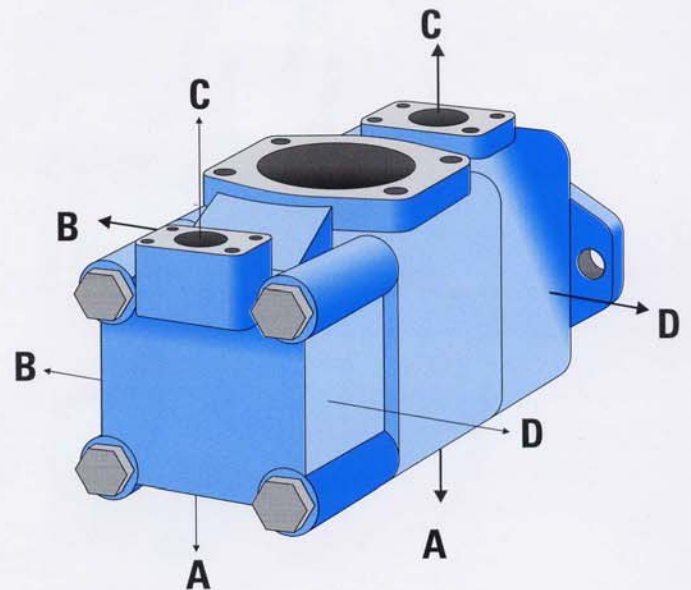
Ordering codes

For pumps please note the chart below:

Range 2520V 3520V 3525V	****V	*	*	*	*	*	*	Shaft Rotation (Viewed from shaft end) L CCW R CW
Capacity (gal)								Angle of cover output relative to pump's input
								A 135° CCW B 45° CCW C 45° CW D 135° CW
								For 4535V: A 180° B 90° CCW C 0° D 90° CW
Capacity (gal)								Angle of body output relative to pump's input
Shaft type Straight Key I Splined II								A 180° B 90° CCW C 0° D 90° CW



Directional angles of
2520V, 3520V, 3525V, 4520V, 4525V



Directional angles of 4535V

Practical calculation for measuring gear and vane pumps capacity

A: Gear Pump

$$G = 27.2 W (2D - L)(L - D)$$

B: Vane Pump

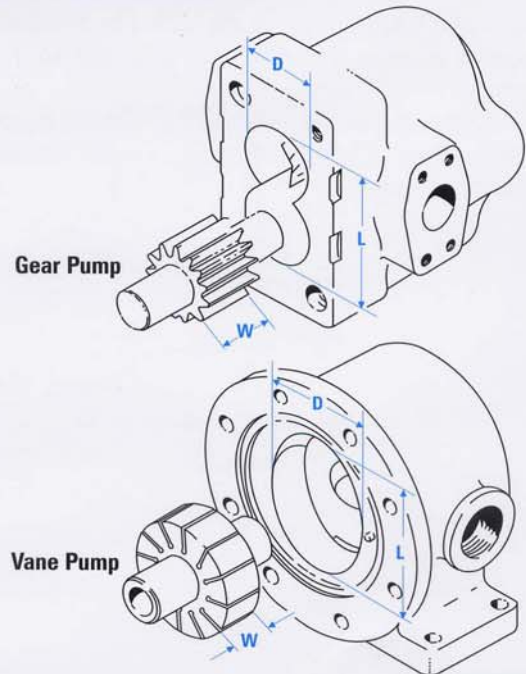
$$G = 54.4 W (L + D)(L - D)$$

G = Galon at 1000 RPM

W per inch

D per inch

L per inch



Some practical hydraulic formulas

Practical hydraulic formula
Geometric flow rate (L/min)
(pumps and motors)

$$= \frac{\text{Geometric displacement (cm}^3/\text{r)} \times \text{shaft speed (r/min)}}{100}$$

Theoretical shaft torque (Nm)
(pumps and motors)

$$= \frac{\text{Geometric displacement (cm}^3/\text{r)} \times \text{pressure (bar)}}{20}$$

Shaft power (kw)

$$= \frac{\text{Torque at shaft (Nm)} \times \text{shaft speed (r/min)}}{9550}$$

Hydraulic power (kw)

$$= \frac{\text{Flow rate (L/min)} \times \text{pressure (bar)}}{600} \Rightarrow \frac{PKQ}{600}$$

Heat equivalent of
hydraulic power (kJ/min)

$$= \frac{\text{Flow rate (L/min)} \times \text{pressure (bar)}}{10} \Rightarrow \frac{PKQ}{10}$$

Geometric flow rate (L/min)
(cylinders)

$$= \frac{\text{Effective area (cm}^2) \times \text{piston speed (m/min)}}{10}$$

Theoretical force (N)
(cylinders)

$$= \text{Effective area (cm}^2) \times \text{piston (bar)} \cdot 10$$

Velocity of fluid
in pipe (m/s)

$$= \frac{\text{Flow rate (L/min)} \times 21.22}{D^2}$$

Where D = inside diameter of pipe in millimeters.

Winch pumps

A clutch and a coupling are added to 20v and 25v pumps to make the winch pumps, used in marine vessels.

These pumps are mainly used in fishing boats and ice crushers. They are durable, easily maintained and economical.



Parts

■ Sliding table

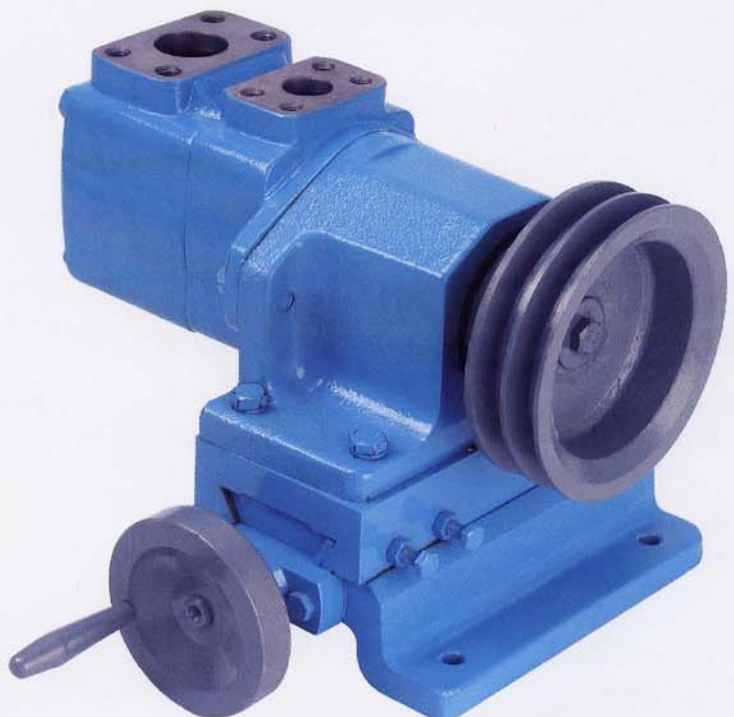


■ Coupling

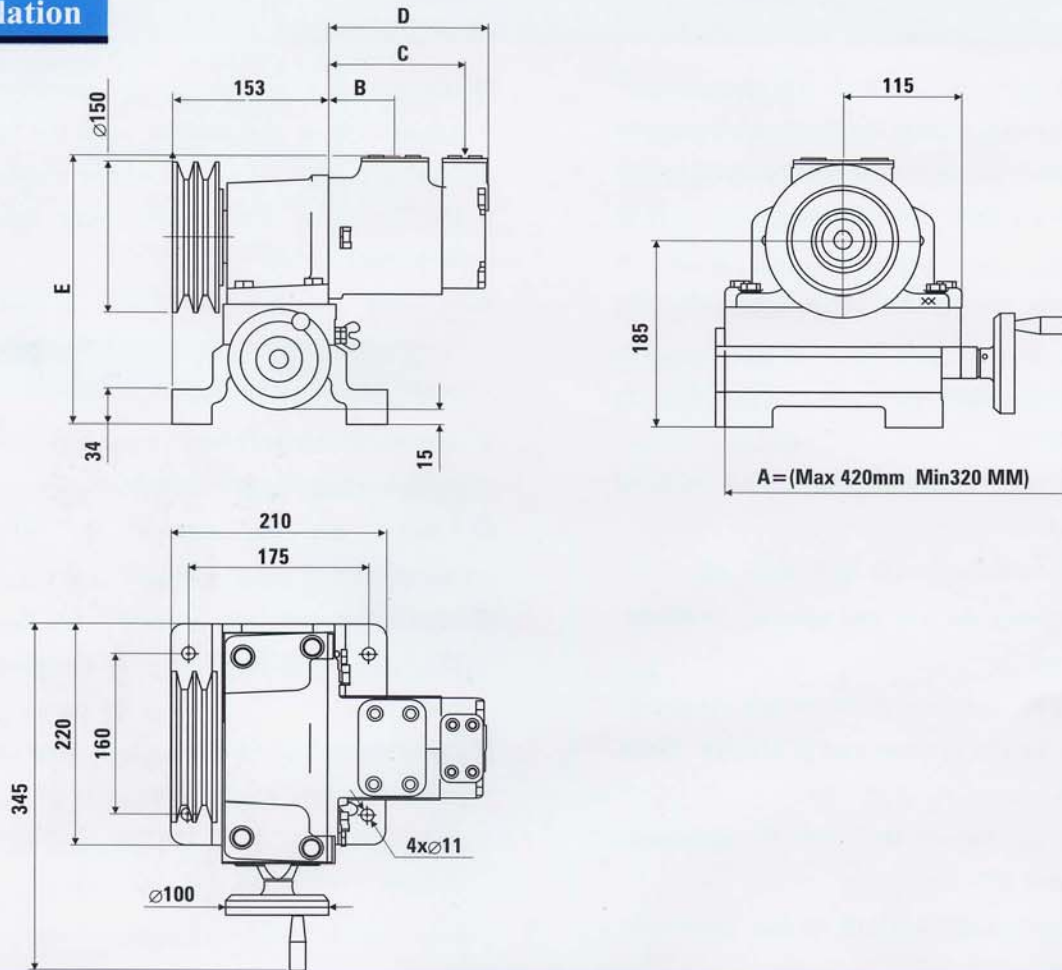


Ordering procedure

Same as 20v and 25v pumps.
Coupling can be ordered separately.



Installation



Straight Key Shaft

Models	Pump Type	B	C	D	E
MP5, MP8, MP11, MP12, Mp14	20V	76.5	132.5	152	262
MP8, MP10, MP12, MP14, MP19, MP21	25V	121	38	176	261

Operating characteristics of vane pumps at 1500 rpm with SAE 10^w hydraulic oil at 50°C and 24 cst viscosity.

Model	Displacement cm ³ /rev	7 Bar		140 Bar		175 Bar	
		L/min	KW	L/min	KW	L/min	KW
20V MP 5	18	25	0.56	22	7	20	9
20V MP 8	27	39	0.75	35	10	33	12
20V MP 11	36	53	1.1	47	14	45	17
20V MP 12	39	56	1.2	52	15	---	---
20V MP 14	45	66	1.2	60	17	---	---
25V MP 8	25.8	38.7	1.2	35.3	10	32	11.5
25V MP 10	32.2	48.3	1.3	44	12	39.8	14.5
25V MP 12	38	57	1.4	52	15	47	17
25V MP 14	44	66	1.5	57	17	56	24
25V MP 17	53	80	1.7	71	21	68	24
25V MP 19	61.2	91.8	1.7	81.4	24	78	29
25V MP 21	66	99	1.8	90	26	88	32

Instructions for installation, operation and maintenance of cartridge and hydraulic pump.

The optimal performance and life time of the pump and cartridge directly depend on proper installation and maintenance of the products; therefore, kindly note the following:

- Oil reservoir should be thoroughly cleaned before use.
- Use suitable hydraulic oil: SAE10w of 24cst viscosity.
- Keep the oil reservoir free of all sorts of contamination.
- Never mix motor oil with hydraulic oil.
- In cold regions, do not use solvent to dilute hydraulic oil.
- Make sure the internal filter of the reservoir is suitable for the system and is always clean and intact.
- The valves put before and after the pump must be intact and efficient.
- There must be sufficient oil in the reservoir at all times.
- Shaker plates must be placed inside the reservoir to protect the filter from contamination.
- Before placing the cartridge into the cover, the pump cover must be washed with oil or gas oil, then the cartridge should be installed, fixing the 2 pins in their proper places.
- After placing the cartridge, fill up the pump cover with hydraulic oil, preventing any sort of contamination from entering the pump.
- Check the inlet flange o-ring for air leaks.
- The pump and elector-motor shafts must be aligned. Their being out of alignment causes noise and damage.
- Check the direction of rotation of the cartridge in regard to that of the elector-motor.
- If you have to change the position of the pump's input and output, note the following:
 - The cartridge pins must not be displaced.
 - The o-ring of the pump cover must be in its proper place.
 - In cold weather conditions, before the oil reaches 30 °C, let the system work for 30 min. With no load.
 - The ideal temperature range for the system is 45-55 degrees centigrade.
 - Always use the same oil to fill up the reservoir. Do not re-use oil.
 - Maximum constant pressure for the pump is 175 bars, with a max instant pressure of 210 bars.
 - Before starting up the system, minimize the pressure and speed of the valves put after the pump, in order to lower the shock-especially in cold weather.

Note:

Complying with the above mentioned instructions would ensure longer life and smooth operation of the product.

Pressure loss in hydraulic systems

Causes:

- Internal leakage of the pump, jacks, valves or hydro motor.
- Malfunction of flow control or depressurizing valves.
- Insufficient flow delivery.
- Low oil viscosity.
- Unsuitable hydraulic valves regarding pressure and delivery of the pump.
- Clogging of oil path.

Important note

High pump flow delivery relative to the power of elector-motor and flow of other hydraulic parts would cause excessive noise and higher electricity consumption.

Noise in hydraulic systems

Causes:

- Incompatible oil filter and pump suction power.
- Presence of air bubbles in oil and foam on its surface.
- Unsealed valves and reservoir connections leading to the pump.
- Incompatible diameters of hose (from reservoir to pump) and pump inlet.
- High pump capacity in relation to jacks and other parts of hydraulic system.
- Misalignment of the pump and motor shafts.
- Cold or thick hydraulic oil.
- Pump vibration due to improper installation.
- Damaged packing seal of the pump.

Insufficient flow delivery in hydraulic systems

Causes:

- Unsuitable, soiled or clogged filter.
- Clogging of the inlet pipe.
- Pipe of wrong diameter or bent pipe leading to the pump inlet.
- Presence of air prior to pump suction.
- Presence of air in oil filter or reservoir.
- Snapping of the shaft or coupling.
- Too low or too high rotation speeds (acceptable range: 600-800rpm).
- Unsuitable hydraulic oil (of high viscosity).
- Malfunction of the pump due to wear and tear.

High temperatures in hydraulic systems

Causes:

- Out of range max. Pressure.
- Pump continuously under pressure.
- Internal leakage.
- Low oil volume in the reservoir, regarding the systems need.
- Insufficiency of the cooling system.
- High ratio of pump delivery to required system capacity.

General problems in hydraulic systems

Problem	Solution
Presence of air in system	<ul style="list-style-type: none"> ■ Bleeding the system ■ Closing all the pores
Obstruction (clogging) Of oil path in valves	<ul style="list-style-type: none"> ■ Keeping valves, inlets, outlets and other hydraulic parts free of contamination.
Obstruction (clogging) Of oil path in cylinders	<ul style="list-style-type: none"> ■ Controlling the cylinders regularly. ■ Operating the jacks and cylinders property.
Pressure change in accumulator	<ul style="list-style-type: none"> ■ Increasing the capacity of the accumulator. ■ Fixing the system leakages. ■ Checking the gas volume of the accumulator regularly.

Research shows that over 90 % of damage done to hydraulic systems is due to:

- Presence of suspended particles and metal chips of bigger than 5μ in the system.
- Air penetration into the system.
- Water or moisture penetration into the system.
- Over used hydraulic oil.

To prevent contamination

- While in storage, keep spare parts and hydraulic oil in clean and sealed packing.
- Use suitable filter to fill up the oil tank.
- When replacing hydraulic components (oil filter, pump, valves, ...), make sure they are clean.
- Note that all connections are correctly installed and sealed.
- Never use hydraulic oil for over a year; empty the system (tank, jacks, pipes,...) Thoroughly, before refilling.



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