MANNESMANN REXROTH

Variable Volume Vane Pump Model V4 (Series 2X, 3X, 4X) with Control Program

Sizes 20 to 125	...2320 PSI (160 bar)	...1.22 to 7.63 in^3/rev (20 to 125 cm^3/rev)

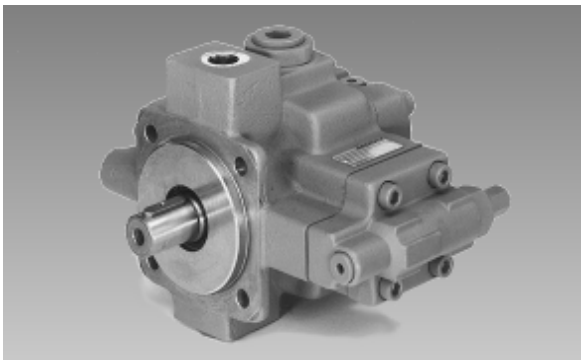
Extracted from RA 10 460/03.95

Replaces: 11.91

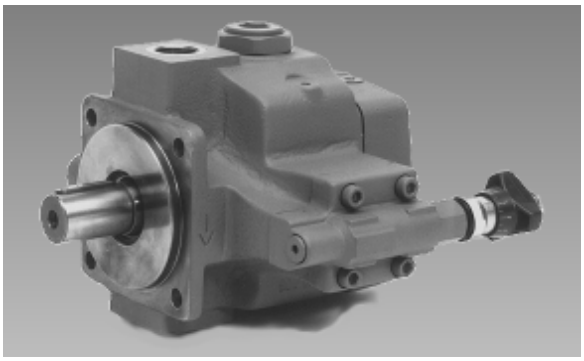
- variable displacement
- low noise level
- hydrodynamically lubricated sleeve bearings provide long life
- bronze-coated control plates provide favorable frictional characteristics
- single compensator fits all displacements and controllers (C, D W and E)
- optional control of pressure and flow, upon request
- low hysteresis
- short control times
- air bleed standard
- test point
- can also be supplied as combination pump

Phase Out in Progress
See Next 6 Pages

Please see RA 10 515
PV7... Vane Pump


K4752-7

Type V4/20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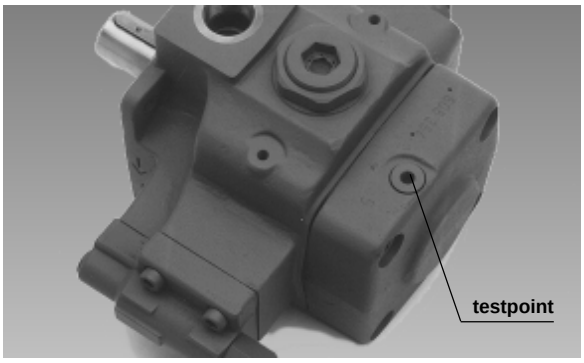
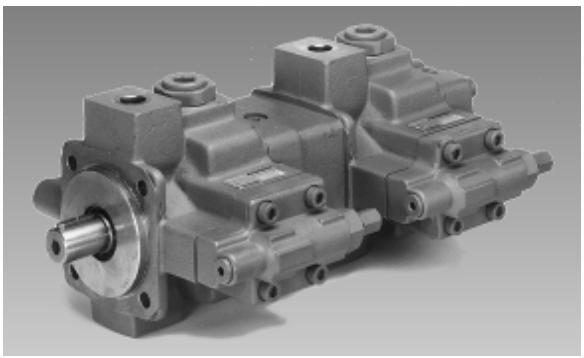
Type V4 with lockable compensator



F90005

Type V4/Testpoint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Type V4 + V4-Combination

Ordering code

Streamlining the Model Code Types of the 1PV2V4 variable Vane Pump

After consuming the parts in stock, the outlined versions are no longer available.
For replacements, please review corresponding footnotes.

1 PV 2 V4	–	/	R						–				/5*

Series

Series 20 to 29	**= 2X**
Size 20 and Size 50 (20 to 29, externally interchangeable)	
Series 30 to 39	**= 3X**
Size 32 and Size 80 (30 to 39, externally interchangeable)	
Series 40 to 49	**= 4X**
Size 125 (40 to 49, externally interchangeable)	

Size / Displacement

	V_{eff}	
Size 20	20.7 cm^3	**= 20**
Size 32	34.5 cm^3	**= 32**
Size 50	55.2 cm^3	**= 50**
Size 80	82.8 cm^3	**= 80**
Size 125	127.6 cm^3	**= 125**

Direction of rotation

Clockwise (viewed on shaft end)	**= R**

Shaft end

front shaft keyed metric	**= A**
front shaft end keyed metric - rear shaft end splined	**= E**
front shaft splined - rear shaft end splined	**= F**
front shaft splined	**= G**
front shaft keyed SAE	**= W**

Connections

Standard model		
Size 20, 32, 50: suction and pressure ports: SAE threaded		**= 12**
Size 80: suction port: SAE flange pressure port: SAE thread;		**= 16**
Size 125: suction and pressure ports: SAE flanges		**= 15**
Model with mounting for servo orifice on pressure port		
Size 20, 32, 50: suction port: BSP thread	4)	**= 27**
Size 80: suction port: SAE flange	5)	**= 36**
Size 125: suction port: SAE flange	5A)	**= 07**

Seals

M =		NBR-seals, suitable for use with mineral oils (HLP) to DIN 51524 part 3 mineral oils (HLP)
V =	12)	FPM-seals, suitable for use with phosphate-ester (HFD-R)
K =		NBR-seals and FPM shaft seal

Controls*

C =		pressure control-mechanic adjustable
D =		pressure control-remote hydraulic adjustable
E =	10)	pressure control-remote electric adjustable
W =		pressure control 2 stage electric switchable
N=		flow control-mechanical flow setting

Control settings

1 =	8)	setting screw
3 =		lockable rotaryhand knob with scale
5 =	9)	setting screw and K-plate for minimum start pressure
7 =		lockable rotary hand knob with scale and K-plate

Stall pressure range

16 =	up to 2320 PSI (160 bar) optimum range 580 to 2320 PSI (40 to 160 bar) Other stall pressure settings Details in clear text

Displacement control

N =		without setting screw
A =	7)	with setting screw

automatic bleed valve

1 =	6)	without valve

further details in clear text

Footnotes: Streamlined 1PV2V4... Vane Pump

[1] The single end shaft type “A”, metric, will be substituted with thru-drive shaft, metric, “E”

[2] The middle/rear pump shaft type “G” will be substituted with thru-drive shaft, spline, “F”

[3] The American keyed shaft “W” will be standard with thru-drive splined rear, (see illustration 1). If envelope dimensions do not permit this solution. Please contact us for specific applications.

[4, 5, 5a] The “Servo blend” orifice mounts are not available; however for replacement requirements, please contact us for specific solutions i.e.: mill pressure port pad, or provide an adapter from pressure port to “Servo Blend” control.

[6] The airbleed designation “1” will remain in the model code; however no airbleed will be provided.

[7] The displacement control “A”, with set screw is only option. Special versions, i.e.: Dr. Boy can still be provided.

[3, 9] Standard compensator with set screw adjustment “K” plate with set screw adjustment only.

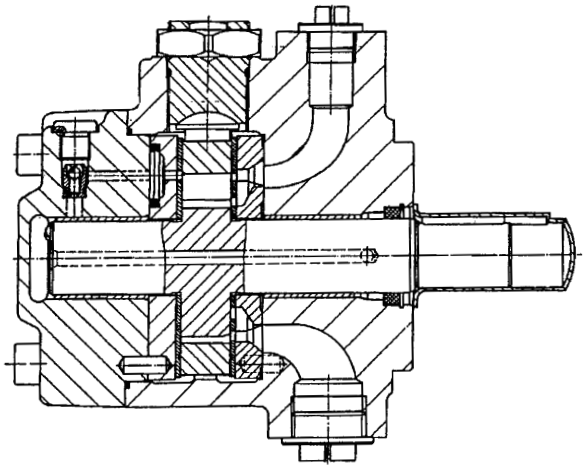
[10, 11] Controls “E” and “W” are not specifically available; however can be duplicated by removing access plate from new “D” control, part #543378.

[12] “V” seals not available, “K” (FPM shaft seal), only for temperature, not for HFD fluid.

*** Controllers type:** “J’, “T”, “R”, “V”, “U”, and “F” are no longer available. For replacement requirements, please contact us for specific solutions. The specials, “A93”, and “A86” will remain available in the near future.

Current version, V4

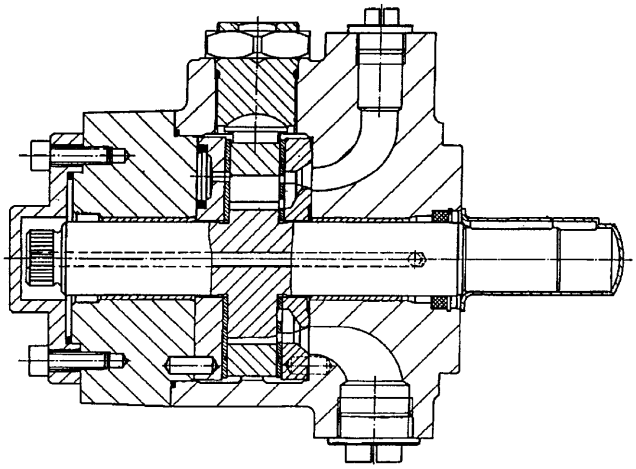
Example: V4/20



Future supply, V4

Example: V4/20

- **No airbleed**
- **Shaft with Thru-Drive Standard (~1" overall length increase)**



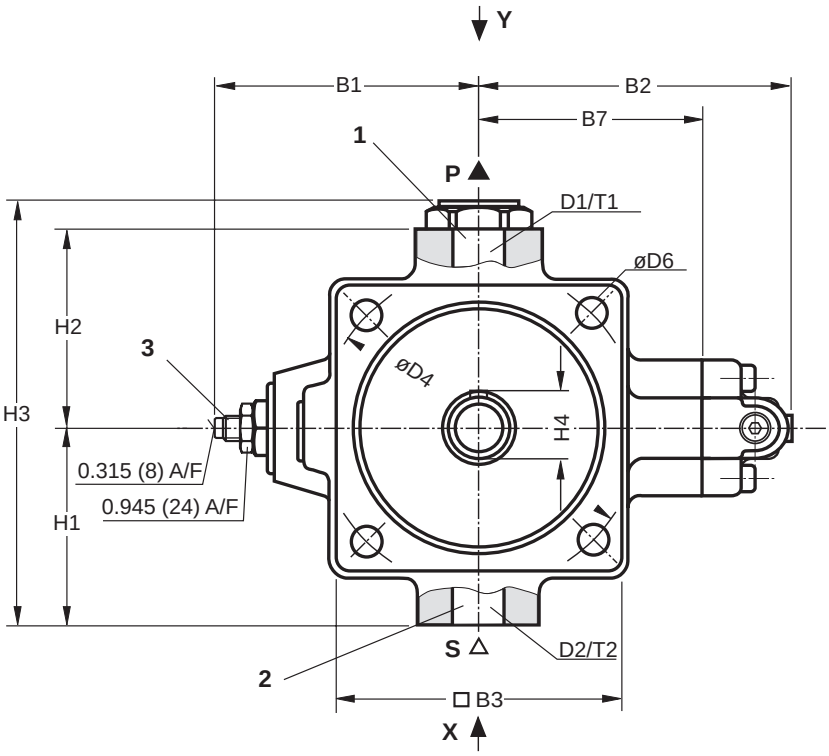
Technical data (for operation outside these parameters, please consult us!)

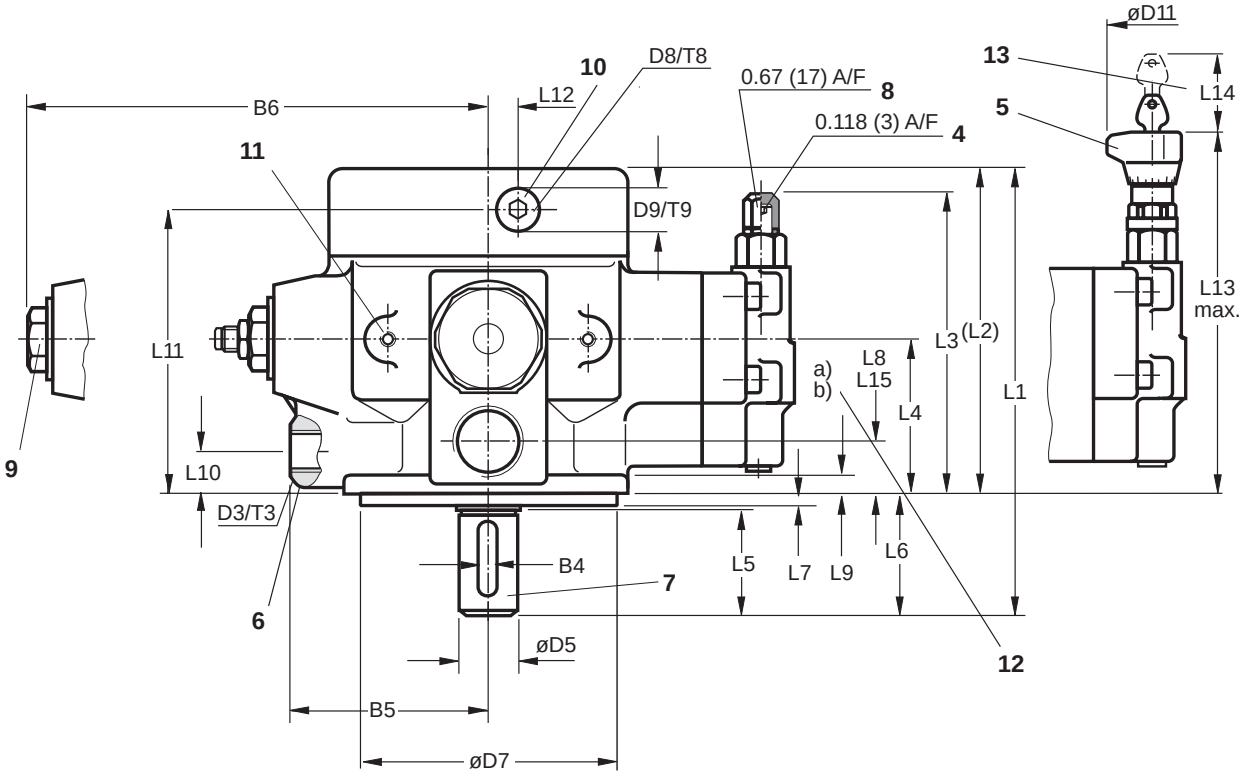
General						
Construction		Variable vane pump				
Type		V4				
Mounting		Flange mounting				
Connections		Threaded or flanged, dependent on size of unit and model designation				
Installation position		Optional, preferrably horizontal (see page 8)				
Shaft loading		Radial and axial forces **cannot** be accepted				
Direction of rotation		Clockwise (viewed on shaft end)				
Speed range	n_{min} bis n_{max} rpm	900 to 1800				
Size		**20**	**32**	**50**	**80**	**125**
Drive power (n = 1750 rpm)	P_{eff} HP	13.8	23.5	37.34	51.8	71.7
	(kW)	(10.3)	(17.5)	(27.8)	(38.6)	(64)
Torque	T_{max} lb-ft	166.69	216.84	376.16	376.16	723.52
	(Nm)	(228)	(294)	(510)	(510)	(1330)
Weight (with pressure control C1)	m lbs.	51.79	68.32	94.33	123.42	211.58
	(kg)	(23.5)	(31)	(42.8)	(56)	(98)
Hydraulic						
Size		20	32	50	80	125
Displacement	V_{eff} in^3	1.26	2.11	3.37	5.05	7.79
	(cm^3)	(20.7)	(34.5)	(55.2)	(82.8)	(127.6)
Max. flow	Q GPM	9.25	16.9	24.3	38	57.7
at n = 1750 min^{-1}; p = 145 PSI (10 bar)	(L/min)	(35)	(64)	(92)	(144)	(218)
Nominal pressure	p_N PSI (bar)	2320 PSI (160 bar)				
Operating pressure (absolute)						
Inlet	p PSIA (bar)	12 PSIA to 36 PSIA (0.8 to 2.5 bar)				
Outlet	p PSI (bar)	2320 PSI (up to 160 bar)				
optimum adjustable Compensator pressure range	p_{NH} PSI (bar)	580 to 2320 PSI (40 to 160)[1]				
Leakage outlet, max	p PSI (bar)	29 (2)				
Fluid		HLP-mineral oils petroleum; phosphate-ester (HFD-R **Please observe the specifications in data sheet RA 07 075!**				
Fluid temperature range	°F (°C)	14 to 158 °F (–10 to +70 °C) (note permissible viscosity range)				
Viscosity range	ν SUS (mm^2/s)	75 to 740 SUS (16 to 160 mm^2/s) at operating temperature and deadhead pressure below 915 PSI (63 bar) 120 to 740 SUS (25 to 160 mm^2/s) at operating temperature and deadhead pressure above 915 PSI (63 bar) max. 3720 SUS (800 mm^2/s) when starting up when the pump is delivering max. 930 SUS (200 mm^2/s) when starting up deadheaded				
Maximum degree of fluid contamination		Class 18/15 according to ISO 4406 Therrefore, we recommend a filter with a retention rate of $ß_{20} \geq 75$. To ensure longer pump life, we recommend class 17/14 according to ISO 4406.Therefore, we recommend a filter with a retention rate of $ß_{10} \geq 100$.				

[1] For compensator values <40 bar please consult us

Unit dimensions*, pump - all sizes: dimensions in inches (millimeters)

Note: Descriptions of number identities are found on page 13.



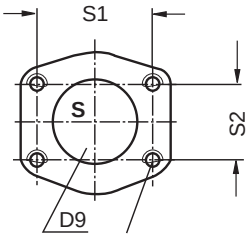


* shown pump: 1 PV 2 V4-3X/80 RW 16 ... $C\frac{1}{3}$ –16$\frac{A}{N}$1

A/F = Across Flats

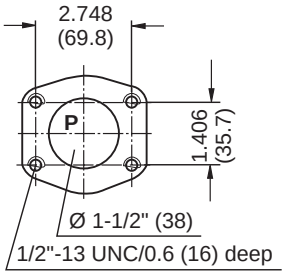
Unit dimensions, pump - all sizes: dimensions in inches (millimeters)

View X
Only sizes 80, 125



1/2"-13 UNC
Size 80; 1.1 (27) deep
Size 125; 0.6 (16) deep

View Y
Only size 125
(SAE 1-1/2")



1 Pressure port
2 Suction port
3 Maximum displacement setting via adjustment screw
Type code ..**A**..
Clockwise rotation:
reduces replacement
Counter-clockwise rotation:
increases displacement
4 Deadhead pressure setting via allen head adjustment screw 0.118 (3) A/F
Ordering code see controllers
Clockwise rotation:
increases pressure
Counter-clockwise rotation:
reduces pressure
5 Deadhead pressure setting via lockable adjustment device
Ordering code see controller
(key: ordering no. RR00 008158)
6 Drain port
7 Drive shaft
(clockwise rotation)
8 Acorn nut
9 **without** setting screw for adjusting displacement
10 Gauge port (remove plug)
11 Thread for lifting lugs
Size 50: M8; 0.511 (13) deep
Size 80: M8; 0.511 (13) deep
Size 125: M10; 0.708 (18) deep
12 [a] Pressure line
[b] Suction line
(180° opposite)
13 Space required for removal of key

For mounting brackets see RA 45 525

Note:
Unit dimensions for version 1 PV 2 V4–.X/..RW..MC_{3}^{1}–16_{A}^{N}1
A/F = Across Flats

Size	B1	B2	B3	B4	B5	B6	B7	ØD1	T1	ØD2	T2	ØD3	T3	ØD4 (±0.2)
V4-1X/**20**	5.9 (150)	5.94 (151)	4.7 (120)	$0.189_{-0.001}$ ($4.788_{-0.025}$)	3.94 (100)	5.08 (129)	3.89 (99)	SAE-8 3/4–16	0.551 (14)	SAE-16 1-5/16–12	0.709 (18)	SAE-6 9/16–18	0.47 (12)	$5.000_{\pm 0.008}$ (127.0)
V4-2X/**32**	6.2 (157)	6.37 (162)	6.0 (152)	$0.251_{-0.001}$ ($6.375_{-0.025}$)	3.27 (83)	5.35 (136)	4.33 (110)	SAE-12 1-1/16–12	0.630 (16)	SAE-20 1-5/8–12	0.787 (20)	SAE-6 9/16–18	0.47 (12)	$6.374_{\pm 0.008}$ (161.9)
V4-2X/**50**	6.4 (163)	6.92 (176)	5.9 (150)	$0.376_{-0.001}$ ($9.550_{-0.025}$)	3.94 (100)	5.59 (142)	4.88 (124)	SAE-16 1-5/16–12	0.709 (18)	SAE-24 1-7/8–12	0.866 (22)	SAE-8 3/4–16	0.47 (12)	$6.374_{\pm 0.008}$ (161.9)
V4-3X/**80**	6.9 (176)	7.16 (182)	7.9 (200)	$0.376_{-0.001}$ ($9.550_{-0.025}$)	4.25 (108)	6.10 (155)	5.11 (130)	SAE-20 1-5/8–12	0.787 (20)	SAE 2"	—	SAE-12 1-1/16–12	0.63 (16)	$8.996_{\pm 0.008}$ (228.5)
V4-3X/**125**	8.4 (214)	10.43 (265)	8.8 (224)	$0.376_{-0.001}$ ($9.550_{-0.025}$)	6.14 (156)	7.60 (193)	6.49 (165)	SAE 1-1/2"	—	SAE 2-1/2"	—	SAE-16 1-5/16–12	0.71 (18)	$9.843_{\pm 0.008}$ (250.0)

Size	ØD5	ØD6	ØD7	ØD8	D9	T9	D10	D11	H1	H2	H3	H4	L1	L2
V4-1X/**20**	$0.998^{+0.0006}_{+0.0001}$ ($25.37^{+0.015}_{+0.002}$)	0.56 (14.4)	$4.000_{-0.002}$ ($101.6_{-0.05}$)	G 1/4"	0.787 (20)	0.098 (2.5)	—	2.36 (60)	3.11 (79)	3.90 (99)	7.2 (184)	1.087 (27.6)	8.46 (215)	6.42 (163)
V4-2X/**32**	$1.25^{+0.0007}_{+0.0001}$ ($31.75^{+0.018}_{+0.002}$)	0.56 (14.4)	$5.000_{-0.002}$ ($127.0_{-0.05}$)	G 3/8"	0.905 (23)	0.492 (12.5)	—	2.36 (60)	3.66 (93)	4.25 (108)	8.1 (206)	1.362 (34.6)	9.33 (237)	6.65 (169)
V4-2X/**50**	$1.50^{+0.0007}_{+0.0001}$ ($38.1^{+0.018}_{+0.002}$)	0.56 (14.4)	$5.000_{-0.002}$ ($127.0_{-0.05}$)	G 3/8"	0.905 (23)	0.157 (4)	—	2.36 (60)	3.62 (92)	4.53 (115)	8.7 (220)	1.665 (42.3)	11.14 (283)	8.46 (215)
V4-3X/**80**	$1.50^{+0.0007}_{+0.0001}$ ($38.1^{+0.018}_{+0.002}$)	0.81 (20.7)	$6.000_{-0.002}$ ($152.4_{-0.05}$)	G 3/8"	0.905 (23)	0.314 (8)	1.889 (48)	2.36 (60)	4.29 (109)	4.84 (123)	9.6 (243)	1.665 (42.3)	11.34 (288)	8.70 (221)
V4-3X/**125**	$1.75^{+0.0007}_{+0.0001}$ ($44.45^{+0.018}_{+0.002}$)	0.87 (22.0)	$7.874_{-0.003}$ ($200.0_{-0.072}$)	G 3/8"	0.905 (23)	0.275 (7)	2.480 (63)	2.36 (60)	4.65 (118)	5.12 (130)	11.5 (291)	1.921 (48.8)	14.76 (375)	11.14 (283)

Size	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	S1	S2	
V4-1X/**20**	6.594 (167.5)	3.228 (82)	1.654 (42)	2.047 (52)	0.354 (9)	1.102 (28)	0.433 (11)	0.669 (17)	5.472 (139)	0.629 (16)	8.543 (217)	1.771 (45)	1.102 (28)	—	—	
V4-2X/**32**	6.751 (171.5)	3.385 (86)	2.283 (58)	2.696 (68.5)	0.393 (10)	1.259 (32)	0.472 (12)	0.826 (21)	5.905 (150)	0.590 (15)	8.661 (220)	1.771 (45)	1.259 (32)	—	—	
V4-2X/**50**	7.618 (193.5)	4.251 (108)	2.283 (58)	2.677 (68)	0.354 (9)	1.437 (36.5)	0.492 (12.5)	0.905 (23)	7.401 (188)	0.708 (18)	9.566 (243)	1.771 (45)	1.437 (36.5)	—	—	
V4-3X/**80**	7.854 (199.5)	4.488 (114)	2.276 (57.8)	2.677 (68)	0.354 (9)	1.673 (42.5)	0.629 (16)	1.259 (32)	7.992 (203)	0.708 (18)	9.803 (249)	1.771 (45)	2.047 (52)	3.063 (77.8)	1.689 (42.9)	SAE 2"
V4-3X/**125**	8.720 (221.5)	5.669 (144)	3.228 (82)	3.641 (92.5)	0.354 (9)	2.244 (57)	0.984 (25)	1.535 (39)	9.409 (239)	1.181 (30)	10.66 (271)	1.771 (45)	2.244 (57)	3.500 (88.9)	2.004 (59.9)	SAE 2-1/2"

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