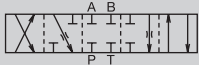
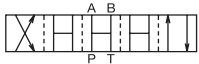
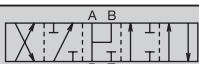
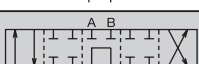
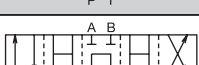
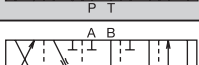
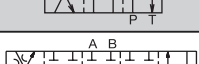


Directional Control Valves

D1V - Technical Information

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Standard Spool Reference Data				
Model	Spool Symbol	Maximum Flow, LPM (GPM) 350 Bar (5000 PSI) w/o Malfunction		
		High Watt DC	Low Watt AC	Low Watt DC
D1V*001		78 (20)	49 (13)	37 (10)
D1V*002		78 (20)	45 (12)	68 (18)
D1V*003		70 (18)	30 (8)	34 (9)
D1V*004		37 (10)	30 (8)	49 (13)
D1V*006		78 (20)	49 (13)	52 (14)
D1V*007		45 (12)	18 (5)	18 (5)
D1V*008		49 (13)	45 (12)	37 (10)
D1V*009		58 (15)	45 (12)	45 (12)
D1V*011		58 (16)	30 (8)	37 (10)
D1V*015		79 (21)	30 (8)	34 (9)
D1V*020		78 (20)	45 (12)	75 (20)
D1V*026		37 (10)	11 (3)	7 (2)
D1V*030		70 (18)	18 (5)	75 (20)
D1V*081		32 (9)	26 (7)	30 (8)
D1V*082		32 (9)	26 (7)	34 (9)
NOTE: Center or De-energized position is indicated by P, A, B & T notation				

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Directional Control Valves

D1V - Technical Information

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D1VA, D1VP, D1VC, D1VL Reference Data

Model	Spool Symbol	Maximum Flow, LPM (GPM) 350 Bar (5000 PSI) w/o Malfunction	Model	Spool Symbol	Maximum Flow, LPM (GPM) 350 Bar (5000 PSI) w/o Malfunction
D1V*001		83 (22)	D1V*020 #		53 (14)
D1V*002		83 (22)	D1V*026 #		11 (3)
D1V*004		45 (12)	D1V*030 #		19 (5)
D1V*008		45 (12)	D1V*081 #		30 (8)
D1V*009		57 (15)	D1V*082 #		30 (8)

*NOTE: Center or De-energized position is indicated by P, A, B & T notation
D1VP only*

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Manaplug – Electrical Mini Plug

EP336-30	3 Pin Plug
EP316-30	5 Pin Plug (Double Solenoid)
EP31A-30	5 Pin Plug (Single Solenoid)

Desina – 12 mm Connector

5004109

Electrical Cords – Mini Plug

EC	3 Conductor, 6 ft.
EC3	3 Conductor, 3 ft.
EC12	3 Conductor, 12 ft.
EC5	5 Conductor, 6 ft.
EC53	5 Conductor, 3 ft.
EC512	5 Conductor, 12 ft.

	Quantity Required		
	A,C,D	B,E,F	H,K,M
Hirschmann – Female Connector			
692915 Gray (Solenoid A)	1	-	1
692914 Black (Solenoid B)	1	1	-
Hirschmann – Female Connector-Rectified (48-240 VAC)			
1301053 Gray (Solenoid A)	1	-	1
1301054 Black (Solenoid B)	1	1	-
Hirschmann – Female Connector-Rectified w/Lights (100-240 VAC)			
1300712	2	1	1
Hirschmann – Female Connector w/Lights (Note Voltages)			
694935 6-48 VAC or VDC	2	1	1
694936 48-120 VDC, 100-240 VAC	2	1	1

Directional Control Valves

D1V - Technical Information

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Solenoid Ratings	
Insulation System	Class F
Allowable Deviation from rated voltage	-10% to +10% for DC and AC rectified coils -5% to +5% for AC Coils
Armature	Wet pin type
CSA File Number	LR60407
Environmental Capability	DC Solenoids meet NEMA 4 and IP67 when properly wired and installed. Contact HVS for AC coil applications.

Explosion Proof Solenoid Ratings*	
U.L. & CSA (EU)	Class I, Div 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the N.E.C.
ATEX (ED)	Complies with ATEX requirements for: Ex d IIB Gb; EN60079-0:2012, EN60079-1:2007
ATEX, IECEx & CSA/US (ER, ET) (Tri-rated)	Complies with IEC 60079-0:2011, IEC 60079-1:2007, IEC 60079-31:2013; Ex d IIC Gb; Ex tb IIIC Db IP66; IECEx BAS 14.0164X ATEX: EN60079-0, EN60079-1, EN60079-31; CE 1180 Ex II 2G BASEEFA08ATEX0041X CSA 22.2 No. 60079-0:07, 60079-1:07 and UL 60079-0:05, UL 60079-1:05; CSA listed to US and Canada Safety Standards. File 08-CSA-1932102 CSA Ex d IIC, AEx d IIC for Class I Zone 1; Class I Div 1 Grp. C & D; Class II Div 1 Grp. E, F & G
* Allowable Voltage Deviation +/-10%	

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Code		Voltage	In Rush Amps Amperage	In Rush VA	Holding Amps @ 3 mm	Watts	Resistance
Voltage Code	Power Code						
D	Omit	120 VDC	N/A	N/A	0.26 Amps	30 W	528.00 Ohms
E	F	24 VAC	4.8 Amps	120 VA	2.07 Amps	21 W	1.29 Ohms
J	L	24 VDC	N/A	N/A	0.44 Amps	10 W	51.89 Ohms
J	Omit	24 VDC	N/A	N/A	1.32 Amps	30 W	17.27 Ohms
K	L	12 VDC	N/A	N/A	0.88 Amps	10 W	12.97 Ohms
K	Omit	12 VDC	N/A	N/A	2.64 Amps	30 W	4.32 Ohms
Q	Omit	100 VAC / 60 Hz	2.05 Amps	170 VA	0.77 Amps	30 W	19.24 Ohms
QD	Omit	100 VAC / 60 Hz	2.05 Amps	170 VA	.77 Amps	30 W	19.24 Ohms
T	Omit	240/60 VAC	0.83 Amps	199 VA	0.30 Amps	30 W	120.40 Ohms
T	Omit	220/50 VAC	0.87 Amps	191 VA	0.34 Amps	30 W	120.40 Ohms
T	F	240/60 VAC, Low Watt	0.70 Amps	168 VA	0.22 Amps	21 W	145.00 Ohms
T	F	220/50 VAC, Low Watt	0.75 Amps	165 VA	0.26 Amps	23 W	145.00 Ohms
U	Omit	98 VDC	N/A	N/A	0.31 Amps	30W	288.00 Ohms
Y	Omit	120/60 VAC	1.7 Amps	204 VA	0.60 Amps	30 W	28.20 Ohms
Y	Omit	110/50 VAC	1.7 Amps	187 VA	0.68 Amps	30 W	28.20 Ohms
Y	F	120/60 VAC, Low Watt	1.40 Amps	168 VA	0.42 Amps	21 W	36.50 Ohms
Y	F	110/50 VAC, Low Watt	1.50 Amps	165 VA	0.50 Amps	23 W	36.50 Ohms
Explosion Proof Solenoids							
Y		120/60 VAC	1.60 Amps	192 VA	0.58 Amps	27 W	33.50 Ohms
J		24 VDC	N/A	N/A	1.38 Amps	33 W	17.33 Ohms
Explosion Proof Solenoids (German)							
J		24 VDC	N/A	N/A	1.0 Amps	24 W	24 Ohms
ER & ET Explosion Proof Solenoids							
J		24 VDC	N/A	N/A	0.54 Amps	13 W	44.30 Ohms
Y		120/60 VAC	N/A	N/A	0.16 Amps	17 W	667.00 Ohms

Industrial
Hydraulics Valves

MSG14-2500/US
Directional Control Valves

Directional Control Valves

D1V - Performance Curves

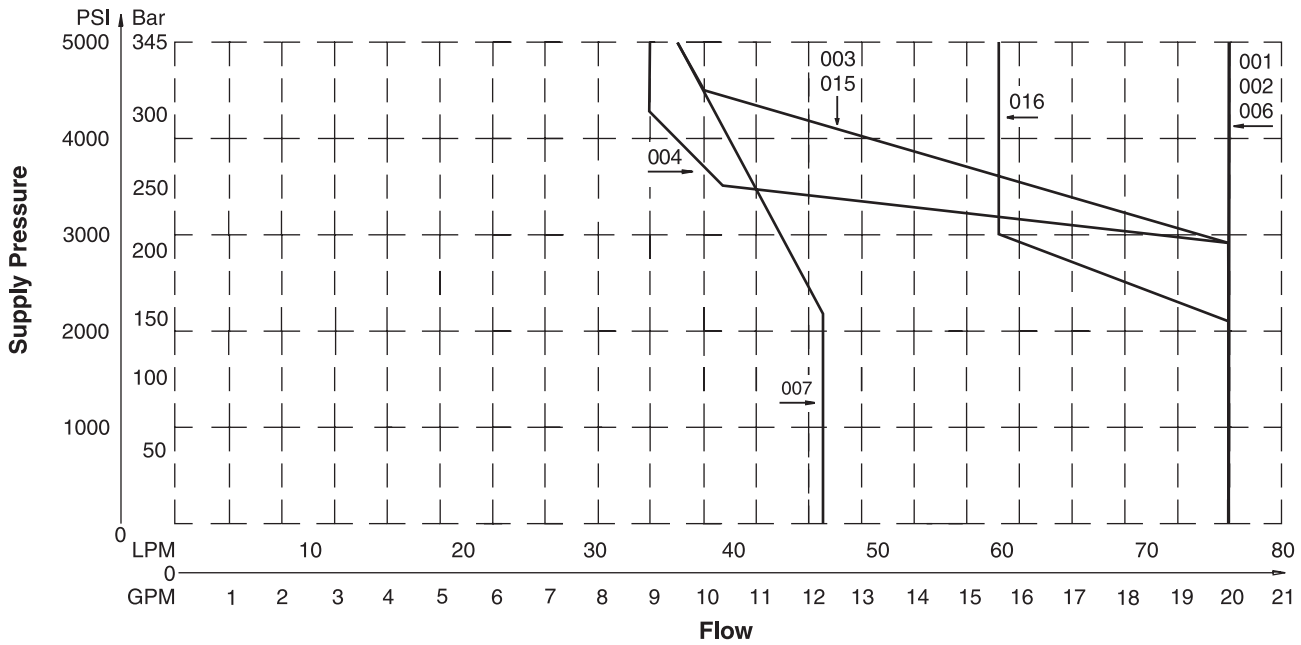
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D1V Shift Limits, DC & AC Rectified 30 Watt



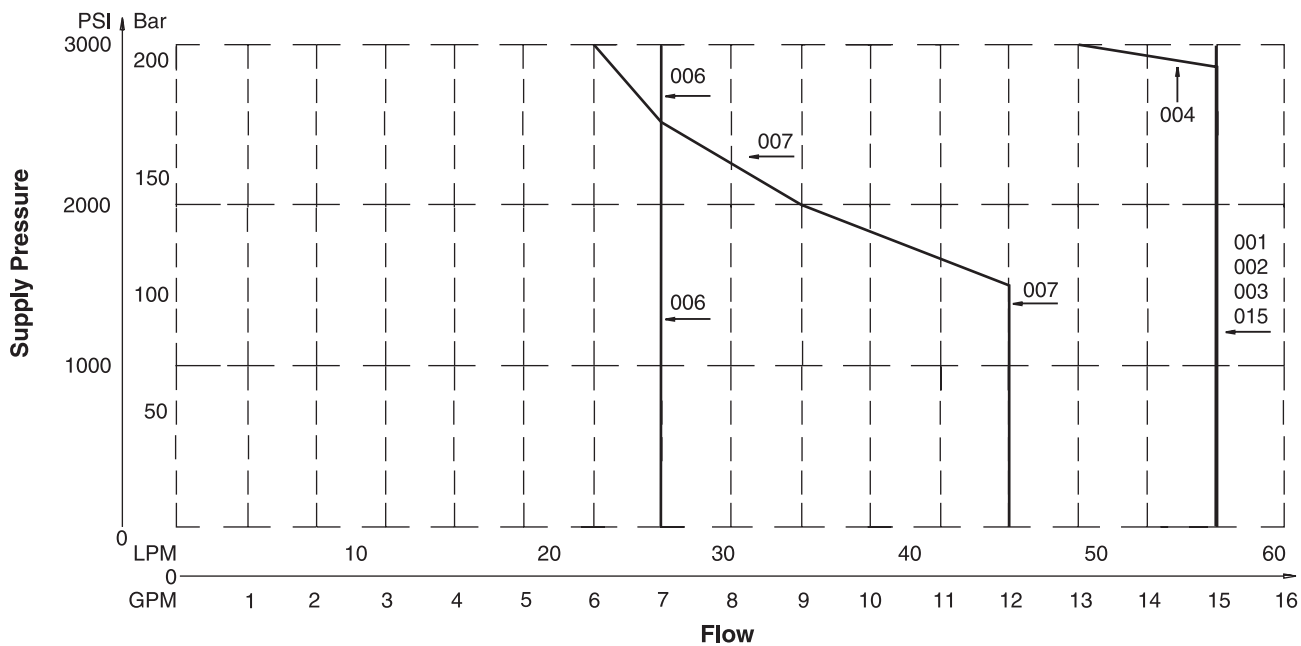
Example:

Determine the maximum allowable flow of a Series D1V valve (#004 spool) at 138 Bar (2000 PSI) supply pressure. Locate the curve marked "004". At 138 Bar (2000 PSI) supply pressure, the maximum flow is 57 LPM (15 GPM). At 207 Bar (3000 PSI), the flow is 49 LPM (13 GPM).

Important Notes for Switching Limit Charts

1. For F & M style valves, reduce flow to 70% of that shown.
2. Shift limits charted for equal flow A and B ports. Unequal A and B port flows may reduce shift limits.
3. These charts do not show explosion proof performance. Consult factory for explosion proof duty.
4. Blocking A or B ports will reduce flow by 70%.

D1W*****L Shift Limits



Directional Control Valves

D1V - Performance Curves

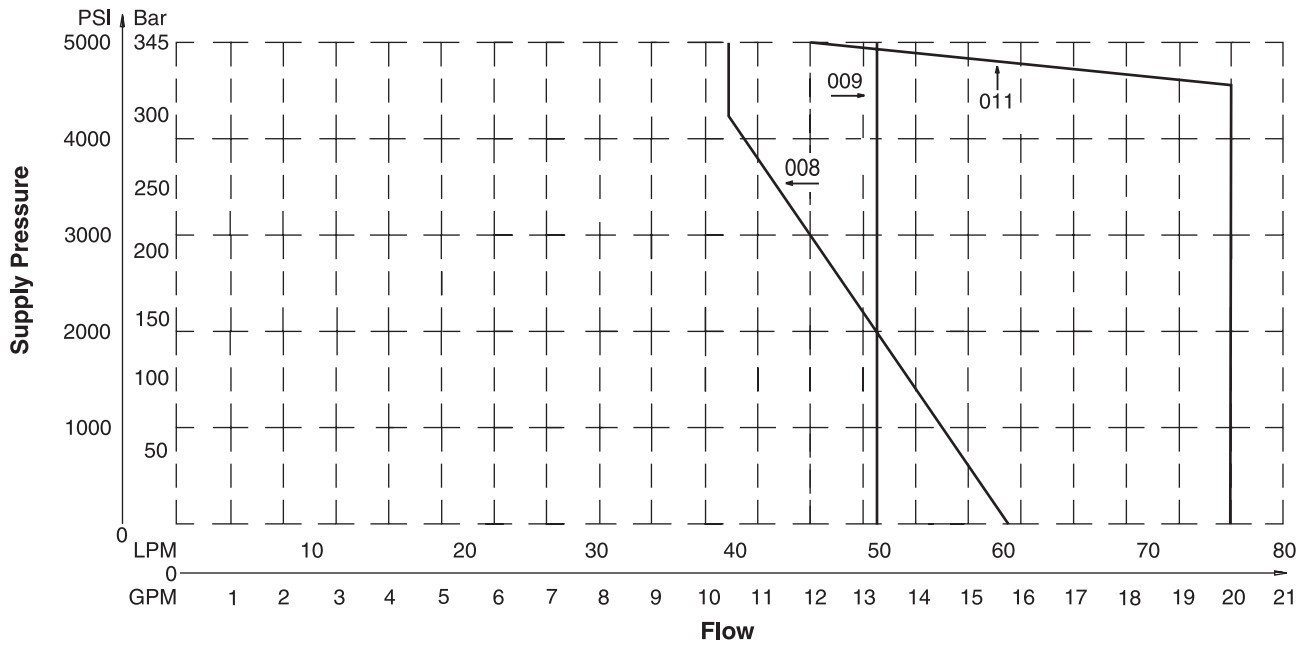
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D1V Shift Limits, DC & AC Rectified 30 Watt



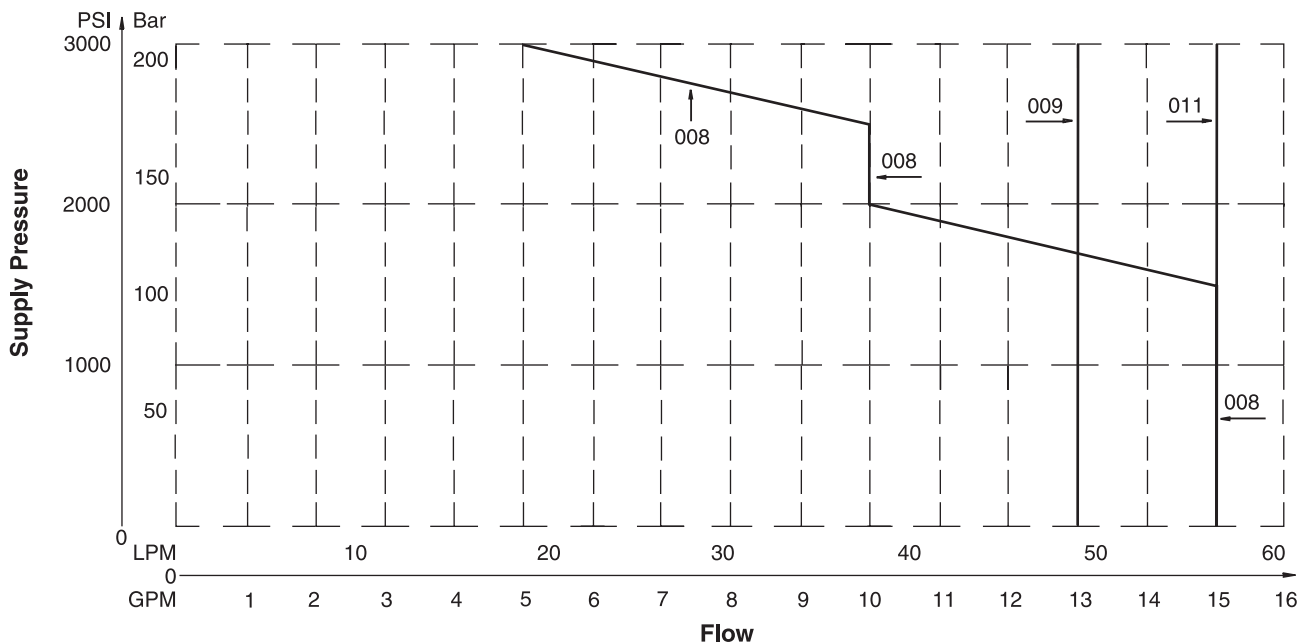
Example:

Determine the maximum allowable flow of a Series D1V valve (#008 spool) at 83 Bar (1200 PSI) supply pressure. Locate the curve marked "008". At 83 Bar (1200 PSI) supply pressure, the maximum flow is 57 LPM (15 GPM). At 207 Bar (3000 PSI), the flow is 19 LPM (5 GPM).

Important Notes for Switching Limit Charts

1. For F & M style valves, reduce flow to 70% of that shown.
2. Shift limits charted for equal flow A and B ports. Unequal A and B port flows may reduce shift limits.
3. These charts do not show explosion proof performance. Consult factory for explosion proof duty.
4. Blocking A or B ports will reduce flow by 70%.

D1W*****L Shift Limits



Directional Control Valves

D1V - Performance Curves

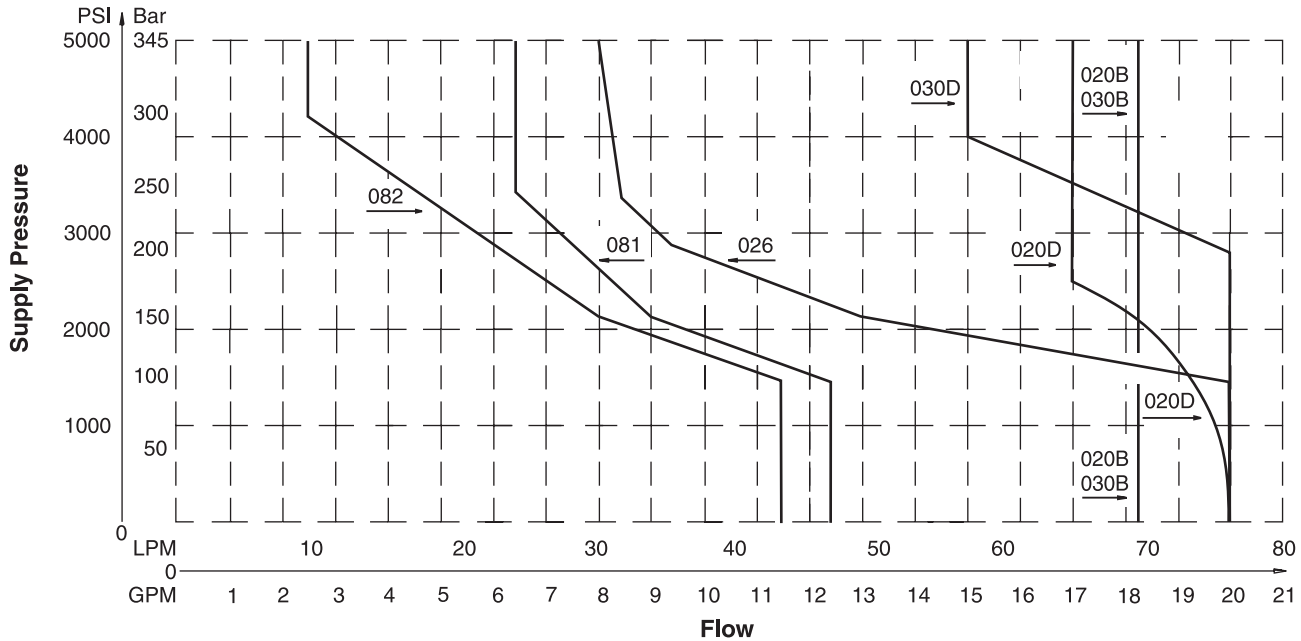
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D1V Shift Limits, DC & AC Rectified 30 Watt



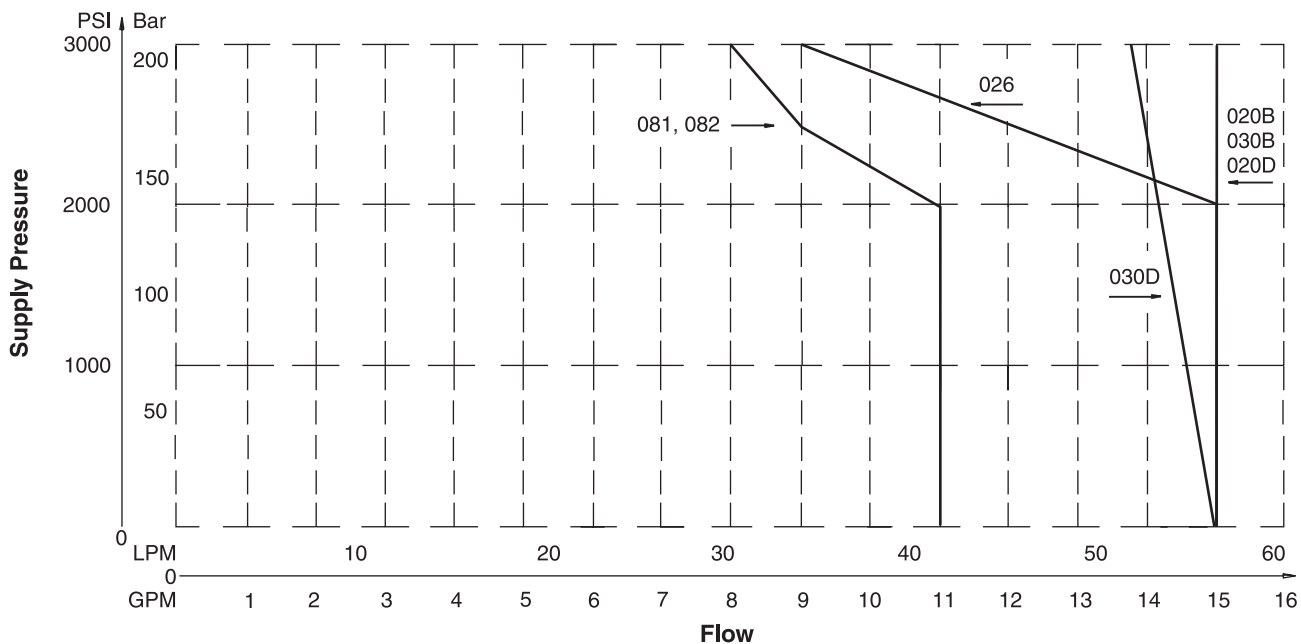
Example:

Determine the maximum allowable flow of a Series D1V valve (#081 spool) at 83 Bar (1200 PSI) supply pressure. Locate the curve marked "081". At 83 Bar (1200 PSI) supply pressure, the maximum flow is 42 LPM (11 GPM). At 138 Bar (2000 PSI), the flow is 42 LPM (11 GPM).

Important Notes for Switching Limit Charts

1. For F & M style valves, reduce flow to 70% of that shown.
2. Shift limits charted for equal flow A and B ports. Unequal A and B port flows may reduce shift limits.
3. These charts do not show explosion proof performance. Consult factory for explosion proof duty.
4. Blocking A or B ports will reduce flow by 70%.

D1W*****L Shift Limits



Directional Control Valves

D1V - Performance Curves

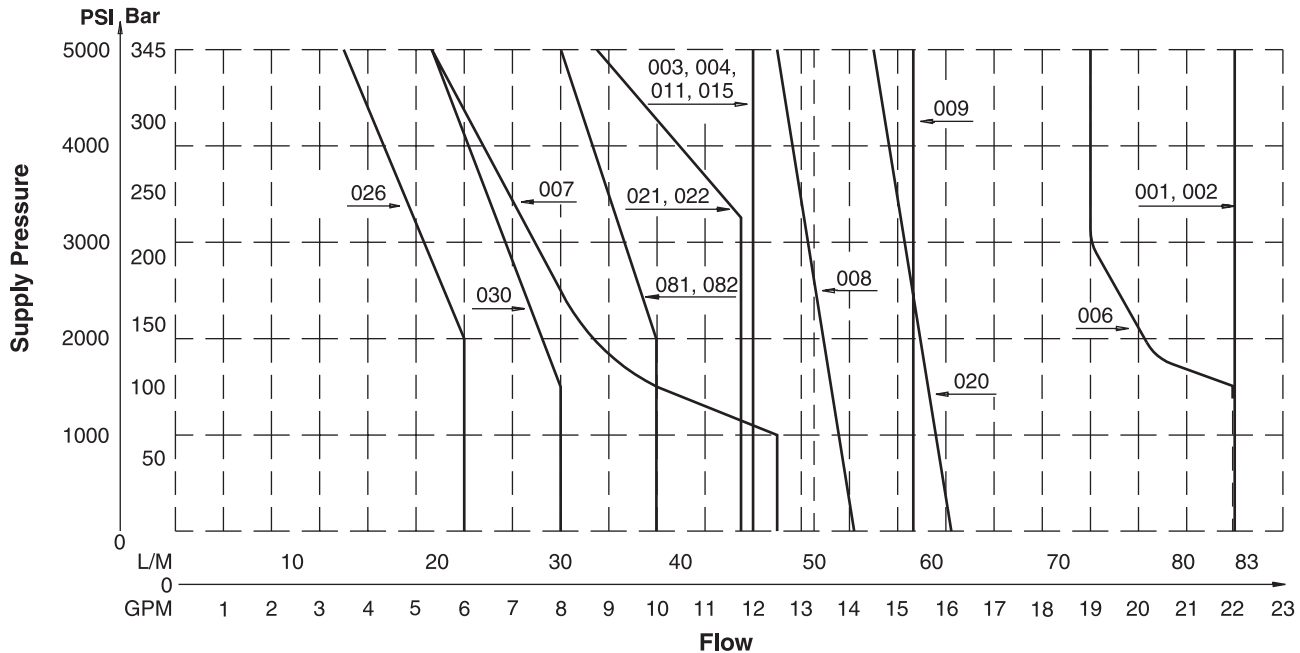
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D1V Shift Limits, AC 30 Watt



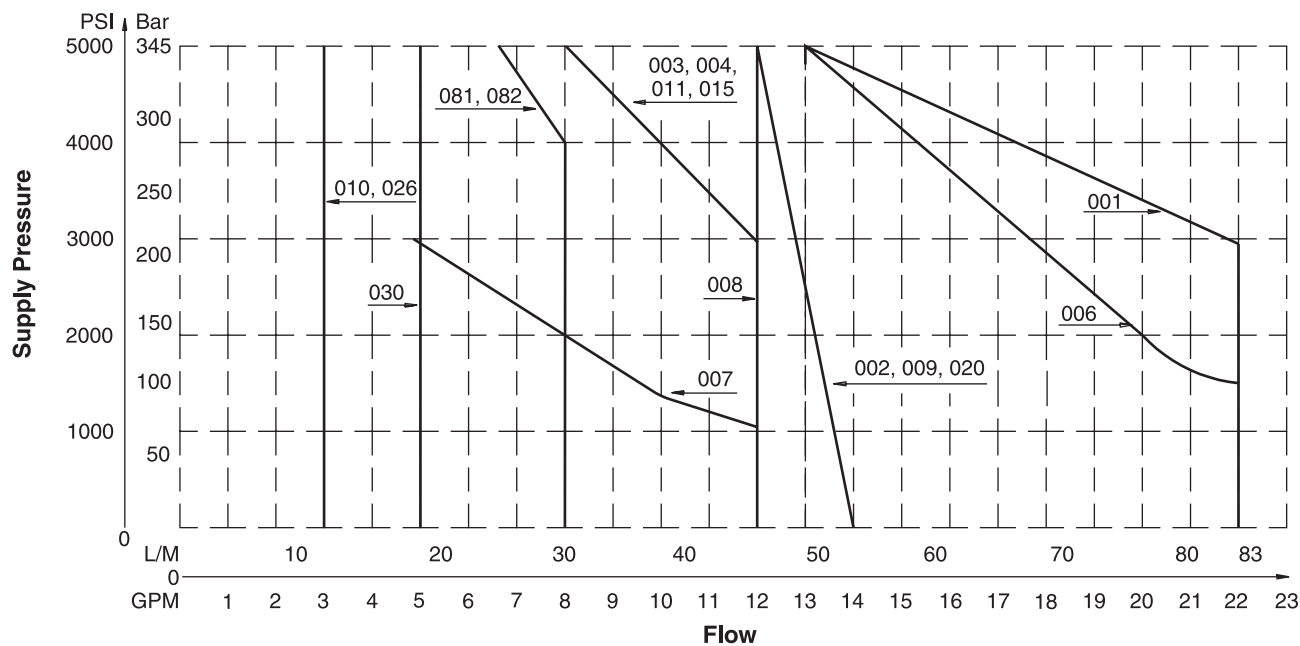
Example:

Determine the maximum allowable flow of a Series D1V valve (#009 spool) at 83 Bar (1200 PSI) supply pressure. Locate the curve marked "009". At 83 Bar (1200 PSI) supply pressure, the maximum flow is 75 LPM (20 GPM). At 207 Bar (3000 PSI), the flow is 68 LPM (18 GPM).

Important Notes for Switching Limit Charts

1. For F & M style valves, reduce flow to 70% of that shown.
2. Shift limits charted for equal flow A and B ports. Unequal A and B port flows may reduce shift limits.
3. These charts do not show explosion proof performance. Consult factory for explosion proof duty.
4. Blocking A or B ports will reduce flow by 70%.

D1W*****F Shift Limits, AC



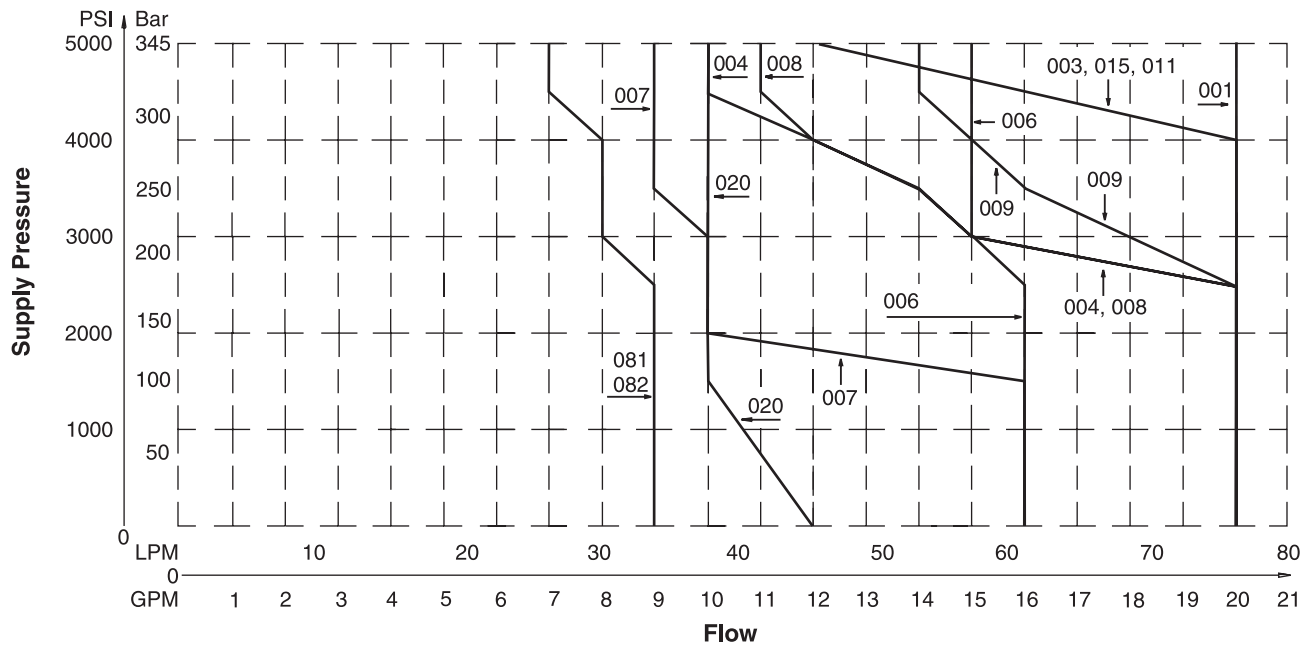
Directional Control Valves

D1V - Performance Curves

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Soft Shift Limit Curves

DC Power Supply



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Pressure Drop vs. Flow, High Watt

The table to the right provides the flow vs. pressure drop curve reference for standard and high performance D1V Series valves by spool type.

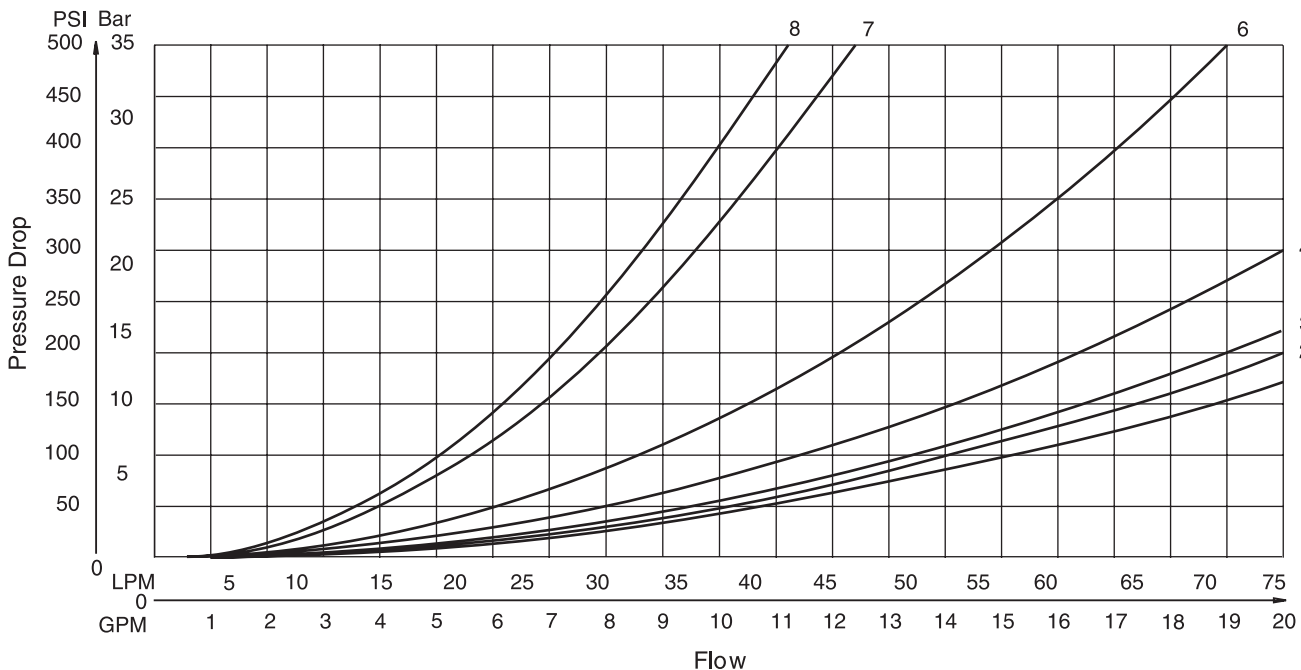
The chart below demonstrates graphically the pressure drop characteristics of the standard D1V*****F and the high performance D1V. The low watt coil and other design features of the standard D1V*****F accommodate a maximum flow of 50 LPM (13 GPM) at 345 Bar (5000 PSI).

D1VW Pressure Drop Reference Chart – 30 Watt Coil											
Spool No.	Curve Number										
	Shifted				Center Condition						
	P-A	P-B	B-T	A-T	(P-T)	(B-A)	(A-B)	(P-A)	(P-B)	(A-T)	(B-T)
001	3	3	2	2	–	–	–	–	–	–	–
002	2	2	1	1	2	1	1	1	1	1	1
003	2	2	1	1	–	–	–	–	–	1	–
004	2	2	1	1	–	–	–	–	–	2	2
006	2	2	1	1	–	6	6	6	6	–	–
007	2	3	1	1	4	–	1	–	–	–	–
008	5	5	5	5	5	–	–	–	–	–	–
009	4	4	4	4	4	–	–	–	–	–	–
011	3	3	1	1	–	–	–	–	–	8	8
015	2	2	1	1	–	–	–	–	–	–	1
020	4	4	2	2	–	–	–	–	–	–	–
026	4	4	–	–	–	–	–	–	–	–	–
030	2	2	1	1	–	–	–	–	–	–	–
081	7	7	8	8	–	–	–	–	–	–	–
082	7	7	8	8	–	–	–	–	–	–	–

Viscosity Correction Factor

Viscosity (SSU)	75	150	200	250	300	350	400	Curves were generated using 100 SSU hydraulic oil. For any other viscosity, pressure drop will change per chart.
% of ΔP (Approx.)	93	111	119	126	132	137	141	

Performance Curves – 30 Watt Coil



Directional Control Valves

D1V - Technical Information

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Pressure Drop vs. Flow, High Watt

The table to the right provides the flow vs. pressure drop curve reference for standard and high performance D1V Series valves by spool type.

The chart below demonstrates graphically the pressure drop characteristics of the standard D1V*****F and the high performance D1V. The low watt coil and other design features of the standard D1V*****F accommodate a maximum flow of 50 LPM (13 GPM) at 345 Bar (5000 PSI).

D1VW Pressure Drop Reference Chart – 30 Watt Coil											
Spool No.	Curve Number										
	Shifted				Center Condition						
	P-A	P-B	B-T	A-T	(P-T)	(B-A)	(A-B)	(P-A)	(P-B)	(A-T)	(B-T)
001	3	3	2	2	–	–	–	–	–	–	–
002	2	2	1	1	2	2	2	2	2	1	1
003	3	3	2	1	–	–	–	–	–	4	–
004	3	3	1	1	–	–	–	–	–	6	6
006	3	3	1	1	–	8	8	7	7	–	–
007	3	3	1	1	5	–	4	–	–	–	–
008	5	5	6	6	7	–	–	–	–	–	–
009	6	6	6	6	5	–	–	–	–	–	–
011	3	3	1	1	–	–	–	–	–	11	11
015	3	3	1	2	–	–	–	–	–	–	4
020	7	7	4	4	–	–	–	–	–	–	–
026	6	6	–	–	–	–	–	–	–	–	–
030	2	2	1	1	–	–	–	–	–	–	–
081	9	9	10	10	–	–	–	–	–	–	–
082	10	10	10	10	–	–	–	–	–	–	–

Viscosity Correction Factor

Viscosity (SSU)	75	150	200	250	300	350	400	Curves were generated using 100 SSU hydraulic oil. For any other viscosity, pressure drop will change per chart.
% of ΔP (Approx.)	93	111	119	126	132	137	141	

Performance Curves – 10 Watt Coil

