MZ CONTROLS

SERIES M9D

Split Body Ball Valves

Direct Mount
1/2" to 12"
Class 150
285 psi



DESIGN ADVANTAGES

- For general industrial and chemical applications.
- Split body design.
- ISO 5211 actuator mounting pad.
- Blow-out proof stem.
- Pyramidal stem packing.
- Available in stainless steel, carbon steel and alloys.
- Lockable manual handle.

END CONNECTIONS

- 150# Flange

STANDARDS

Design & Construction: • ASME B16.34 • API 6D • DIN 3202 F1/F4 • ASME B16.10 • ISO 5211

Connection Interfaces: • EN 1092-1 • ASME B16.5

Testing & Qualification: • API 598 • MSS SP-55

Performance & Env. Compliance: • NACE MR0175 / ISO 15156 • SIL 3 • TA-Luft • ATEX 2014/34/EU

Identification & Marking: • ISO 5209

Certification & Documentation: • EN 10204-3.1 • CE 0343 PED 2014/68/EU Cat. II Mod. D1 • EN 10204-3.1

SPECIFICATIONS

CONSTRUCTION: Split Body
BODY: Stainless Steel / Carbon Steel
SIZE: 1/2" to 12"
SEAT: TFM-1600 Standard, other options available.
BALL: Stainless Steel
STEM: Stainless Steel
CLASS: 150
PRESSURE RATING: 285 PSI

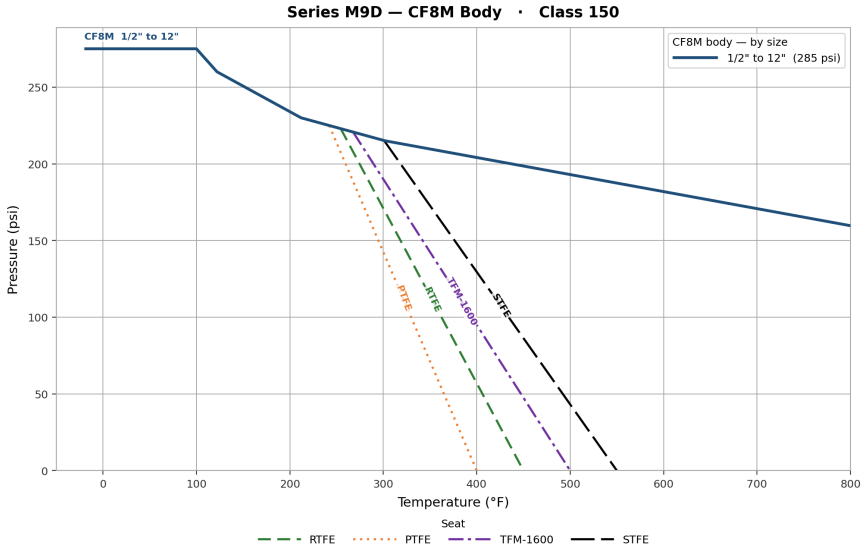
Distributed By:

PRESSURE VS. TEMPERATURE

SERIES M9D

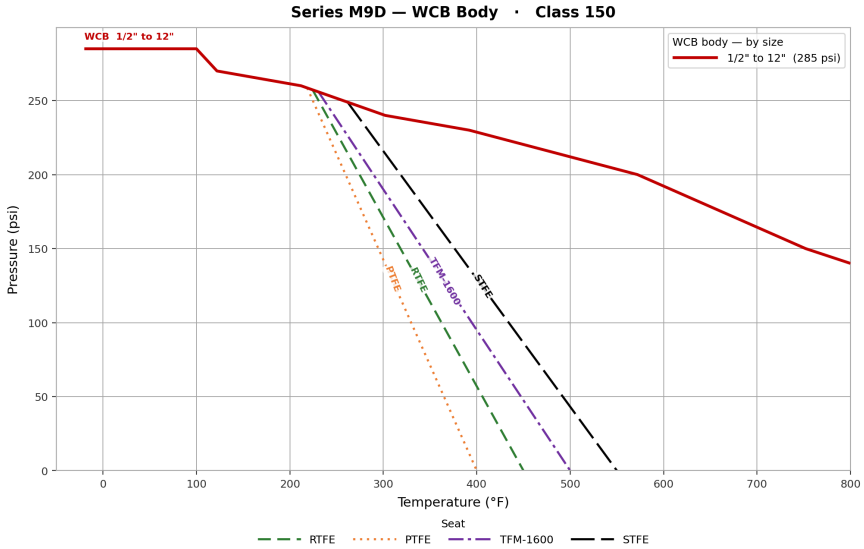
These charts compare pressure and temperature: a valve's allowable pressure decreases as its operating temperature rises. Each curve reflects a material's rating, and the table beside each chart lists the maximum temperature for those materials at the pressure the valve is operated at. Table values are the maximum allowable temperature (°F) at each pressure.

CLASS 150 · 1/2" TO 12"



CF8M — PT VALUES

PSI	RTFE	PTFE	TFM	STFE
275	100	100	100	100
250	152	152	152	152
200	275	260	289	318
150	318	295	342	376
100	362	330	395	434
50	406	365	447	492
0	450	400	500	550



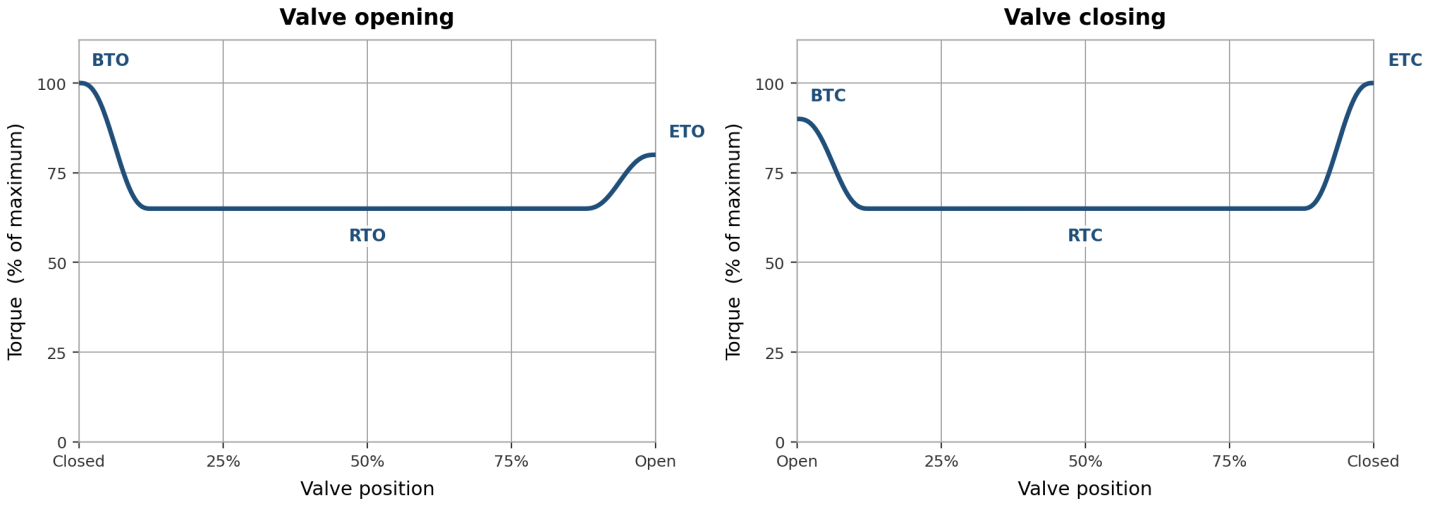
WCB — PT VALUES

PSI	RTFE	PTFE	TFM	STFE
285	100	100	100	100
250	231	225	237	257
200	275	260	289	318
150	318	295	342	376
100	362	330	395	434
50	406	365	447	492
0	450	400	500	550

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TORQUE CHARACTERISTICS

Representation of the valve torque required through the stroke — not to scale.
For a ball valve opening, torque is highest at the breakaway torque (BTO) as the ball unseats, is reduced while running (RTO), and rises again toward the open position (ETO).
For closing, torque starts high at the breakaway torque (BTC), is reduced while running (RTC), and reaches its highest as the ball seats in the closed position (ETC).



BTO: BREAK TO OPEN · RTO: RUN TO OPEN · ETO: END TO OPEN · BTC: BREAK TO CLOSE · RTC: RUN TO CLOSE · ETC: END TO CLOSE

BREAKAWAY TORQUE

TFM-1600 seat, Class 150 (285 psi). Values in in·lb.

SIZE	Working psi	Torque (in·lb)
1/2"	285	45
3/4"	285	73
1"	285	91
1-1/2"	285	230
2"	285	297
2-1/2"	285	535
3"	285	768
4"	285	1250
6"	285	3000
8"	285	6500
10"	285	13000
12"	285	26000

FLOW COEFFICIENT (Cv)

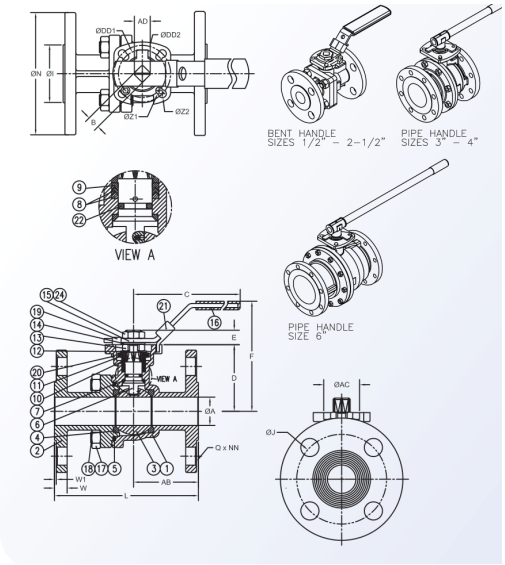
Full-port, 90° open.

SIZE	Cv
1/2"	15
3/4"	40
1"	70
1-1/2"	250
2"	430
2-1/2"	700
3"	1100
4"	2000
6"	5400
8"	9800
10"	16400
12"	23800

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MATERIALS LIST & DIMENSIONS

SERIES M9D



Item numbers & dimension letters refer to the drawing.

NO.	COMPONENT	STANDARD MATERIALS	OPT. MATERIALS	QTY
1	Body	ASTM A351 Gr CF8M, ASTM A216 Gr WCB	CN7M (Alloy 20)	1
2	Body End Cap (150# Flange)	ASTM A351 Gr CF8M, ASTM A216 Gr WCB	CN7M (Alloy 20)	1
3	Ball	ASTM A351 Gr CF8M	CN7M (Alloy 20), Hastelloy C-276	1
4	Seat	TFM™-1600	RTFE, PTFE, 50/50 STFE, CTFE, PEEK	2
5	Body Joint Gasket	TFM™-1600		1
6	Stem	ASTM A276 316SST	CN7M (Alloy 20), 17-4 PH	1
7	Stem Seal	TFM™-1600		1
8	Stem Packing Washer	PTFE		1
9	Stem Packing	25% Glass Fiber Filled PTFE		*
10	Stem Packing Gland	AISI 304		1
11	Stem Packing Belleville Washer	AISI 301		2
12	Stem Lock Handle	AISI 304		1
13	Stem Nut	AISI 304		2
14	Stem Washer	AISI 304		1
15	Handle	AISI 304		1
16	Handle Sleeve	TFM™-1600		1
17	Body Bolt Nut	AISI 304		*
18	Body Bolt	AISI 304		*
19	Handle Stop Bolt	AISI 304		1
20	Handle Stop Bolt Nut	AISI 304		1
21	Handle Lock	AISI 304		1
22	Stem O-Ring	FKM/Viton®		1
23	Anti-Static Device	ASTM A276 316SST		2
24	Handle Adaptor Bolt	AISI 304		2
25	Handle Adaptor	AISI 304		1
26	Handle Shaft	AISI 304		1

DIMENSIONS (IN)

Size	A	B	C	D	E	F	I	J	L	N	Q	NN	W	W1	AB	AC	AD	DD1	DD2	Z1	Z2	ISO 5211	LBS
1/2"	0.59	0.433	6.50	1.84	0.39	3.30	1.38	2.38	4.26	3.50	0.63	4	0.44	0.06	1.84	1.26	0.55	1.654	1.969	0.26	0.28	F04/F05	4.0
3/4"	0.79	0.433	6.50	2.02	0.39	3.45	1.69	2.74	4.62	3.88	0.63	4	0.44	0.06	2.18	1.26	0.55	1.654	1.969	0.26	0.28	F04/F05	5.0
1"	0.98	0.433	6.50	2.31	0.41	3.81	2.00	3.12	5.00	4.25	0.63	4	0.44	0.06	2.21	1.26	0.55	1.654	1.969	0.26	0.28	F04/F05	7.0
1-1/2"	1.50	0.669	10.32	3.51	0.75	5.60	2.88	3.88	6.50	5.00	0.63	4	0.56	0.06	2.83	2.09	0.94	2.756	4.016	0.39	0.47	F07/F10	14.5
2"	1.97	0.669	10.32	3.80	0.75	5.78	3.62	4.75	7.02	6.00	0.75	4	0.63	0.06	3.38	2.09	0.94	2.756	4.016	0.39	0.47	F07/F10	20.5
2-1/2"	2.56	0.669	10.32	4.57	0.75	6.75	4.12	5.50	7.48	7.00	0.75	4	0.69	0.06	3.06	2.09	0.94	2.756	4.016	0.39	0.47	F07/F10	31.0
3"	3.15	0.866	14.37	5.22	0.91	8.05	5.00	6.00	8.01	7.50	0.75	4	0.75	0.06	4.01	2.55	1.18	4.016	4.921	0.47	0.55	F10/F12	41.0
4"	3.94	0.866	14.37	6.18	0.91	9.00	6.19	7.50	9.00	9.00	0.75	8	0.94	0.06	4.07	2.55	1.18	4.016	4.921	0.47	0.55	F10/F12	67.5
6"	5.91	1.063	29.53	8.28	1.12	12.50	8.50	9.50	15.50	11.00	0.87	8	1.00	0.06	7.00	2.97	1.41	4.921	5.511	0.55	0.71	F12/F14	145.0

DIMENSION LEGEND

A - Port Dia
B - Stem Square
C - Stem Ctr–Max Width
D - Flow Ctr–Mount Pad
E - Mount Pad–Stem Top
F - Flow CL–Max Height
I - Flange Gasket Face Dia
J - Flange Bolt Circle Dia
L - Face–Face
N - Flange Dia
Q - Flange Hole Dia
NN - Flange Hole Count
W - Flange Thk w/ Face
W1 - Gasket Face Thk
AB - Stem CL–Face
AC - Stem Clearance Dia
AD - Stem Dia
DD1 - ISO Mount Dia 1
DD2 - ISO Mount Dia 2
Z1 - ISO Bolt Dia 1
Z2 - ISO Bolt Dia 2
ISO 5211 - ISO 5211 Desig.
LBS - Weight (lb)

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HOW TO ORDER MANUAL

SERIES M9D

Part-number format: {1}{2}-{3}-{4}-{5}{6}{7}{8}-{9}
Part-number Example: M9DS-F1-0050-TXXV-X
Description: Series M9D 1/2" Split Body Ball Valve with Stainless Steel Body, 150# Flange Connection, TFM-1600 Seats, Stainless Steel Ball, Stainless Steel Stem, FKM/VITON O-Ring(s), and Manual Handle.

1) Series	**M9D**				
2) Body	**S** - Stainless Steel	**C** - Carbon Steel	**A** - Alloy 20		
3) Connection	**F1** - 150# Flange				
4) Size	**0050** - 1/2"	**0075** - 3/4"	**0100** - 1"	**0150** - 1-1/2"	**0200** - 2"
	0250 - 2-1/2"	**0300** - 3"	**0400** - 4"	**0600** - 6"	**0800** - 8"
	1000 - 10"	**1200** - 12"			
5) Seat	**T** - TFM-1600	**R** - RTFE	**P** - PTFE	**S** - 50/50 STFE	**C** - CTFE
	Z - PEEK				
6) Ball	**A** - Alloy 20	**T** - Hastelloy C-276	**V** - SST Vented	**X** - Stainless Steel	
7) Stem	**A** - Alloy 20	**B** - 17-4 PH	**X** - Stainless Steel		
8) O-Ring	**V** - FKM/VITON				
9) Operator	**X** - Manual Handle	**B** - Bare Stem	**G** - Gear Operator		
	L - Stem Extension	**S** - Spring Return Handle	**O** - Oval Handle		

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HOW TO ORDER AUTOMATED

Automated part number: take categories 1–8 from How to Order Manual, drop category 9 (Operator), add a "/", then continue with categories 9–15 below.

Format: {1}{2}-{3}-{4}-{5}{6}{7}{8} / {9}{10}{11}{12}{13}-{14}{15}

PNEUMATIC

9) Actuator Series	**ZPD** - Aluminum Hard Anodized Body **ZPN** - Aluminum Electroless Nickel Plated Body
10) Model	**1** - 035 **2** - 050 **3** - 063 **4** - 066 **5** - 075 **6** - 088 **7** - 100 **8** - 115 **9** - 125 **A** - 145 **B** - 160 **C** - 180 **D** - 200 **E** - 210 **F** - 211 **G** - 212
11) Acting Type	**DA** - Double Acting **S4** - Spring Return (4 Springs*) 60 psi standard **S6** - Spring Return (6 Springs*) **R4** - Reverse Acting Spring Return (4 Springs*) **R6** - Reverse Acting Spring Return (6 Springs*) **S3** - Spring Return (3 Springs*) **S5** - Spring Return (5 Springs*) 80 psi standard **R3** - Reverse Acting Spring Return (3 Springs*) **R5** - Reverse Acting Spring Return (5 Springs*)
12) O-Ring	**B** - Buna O-Ring **V** - Viton O-Ring **S** - Silicone O-Ring
13) Speed	**X** - 1/4" NPT **A** - 1/8" NPT
14) Control	**X** - No Control **B** - Type 4 Solenoid 24VDC (ZSV-X411-4N-D24) **D** - Type 7 Solenoid 24VDC (ZESV-X411-7C-D24) **J** - Pneumatic Positioner (ZPP) **L** - Smart Positioner (ZSP-5) **U** - Electro-Pneumatic Positioner (ZEP-UN2SN4NTR) **A** - Type 4 Solenoid 120VDC (ZSV-X411-4N-A120) **C** - Type 7 Solenoid 120VAC (ZESV-X411-7C-A120) **I** - Intrinsically Safe Solenoid (ZSV-X411-IC-D24) **K** - Electro-Pneumatic Positioner (ZEP-DN2SN4NTN) **M** - Smart Positioner (ZSP-7)
15) Instrumentation	**X** - No Instrumentation **B** - Type 4 Limit Switch (Option) (ZLS-310N) **I** - Intrinsically Safe Limit Switch (ZLS-218N) **A** - Type 4 Limit Switch (ZLS-210N) **C** - Type 7 Limit Switch (ZLS-510N)

ELECTRIC

9) Actuator Series	**ZE** - Weatherproof | NEMA 4,4X,6 | IP66,67 **ZX** - Ex tb IIIC T135°C | NEMA 4,4X,6 | IP66,67
10) Model	**1** - 350 in-lbs **2** - 510 in-lbs **3** - 710 in-lbs **4** - 1320 in-lbs **5** - 1770 in-lbs **6** - 2700 in-lbs **7** - 4450 in-lbs **8** - 5300 in-lbs **9** - 7000 in-lbs **A** - 10600 in-lbs **B** - 17700 in-lbs **C** - 26500 in-lbs
11) Supply Voltage	**X** - 110 VAC 1Ø **E** - 220 VAC 1Ø **F** - 220 VAC 3Ø **G** - 380 VAC 3Ø **K** - 440 VAC 3Ø **H** - 480 VAC 3Ø **B** - 12 VDC **C** - 24 VDC **A** - 24V AC/DC **M** - Multi-Voltage (24 VDC / 110 VAC)
12) Speed	**X** - Standard **A** - High Speed | 2 Start Gear **B** - High Speed | 3 Start Gear
13) Temperature	**X** - Standard -20°C to +70°C **L** - Low Temperature -40°C to +60°C
14) Control	**X** - ON/OFF **A** - ON/OFF | MODBUS **B** - ON/OFF | PROFIBUS **C** - ON/OFF | 4-20mA Transmitter **D** - ON/OFF | Potentiometer Feedback **M** - Modulating Control **R** - Proportional Control | MODBUS **P** - Proportional Control | PROFIBUS **S** - Modulating Slide Wire
15) Local Control Unit	**X** - No LCU **B** - LCU-B LED Lights **D** - LC-D: Local/Remote **Z** - LCU: LED Indication **A** - LCU: Super Capacitor **C** - LCU-C Digital Display **R** - LCU: Rechargeable Battery Pack, LED Indication

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AUTOMATED ASSEMBLIES

Standard automated-assembly part numbers by valve size (base valve: 150# flange, TFM-1600 seat, SST. Larger sizes: consult factory).

ELECTRIC

On/Off | Stainless Steel

SIZE	Part Number
1/2"	M9DS-F1-0050-TXXV/ZE2XXX-XX
3/4"	M9DS-F1-0075-TXXV/ZE2XXX-XX
1"	M9DS-F1-0100-TXXV/ZE2XXX-XX
1-1/2"	M9DS-F1-0150-TXXV/ZE3XXX-XX
2"	M9DS-F1-0200-TXXV/ZE3XXX-XX
2-1/2"	M9DS-F1-0250-TXXV/ZE3XXX-XX
3"	M9DS-F1-0300-TXXV/ZE6XXX-XX
4"	M9DS-F1-0400-TXXV/ZE6XXX-XX
6"	M9DS-F1-0600-TXXV/ZE7XXX-XX
8"	M9DS-F1-0800-TXXV/ZE9XXX-XX
10"	M9DS-F1-1000-TXXV/ZEBXXX-XX
12"	M9DS-F1-1200-TXXV/ZECXXX-XX

Modulating | Stainless Steel

SIZE	Part Number
1/2"	M9DS-F1-0050-TXXV/ZE2XXX-MX
3/4"	M9DS-F1-0075-TXXV/ZE2XXX-MX
1"	M9DS-F1-0100-TXXV/ZE2XXX-MX
1-1/2"	M9DS-F1-0150-TXXV/ZE3XXX-MX
2"	M9DS-F1-0200-TXXV/ZE3XXX-MX
2-1/2"	M9DS-F1-0250-TXXV/ZE3XXX-MX
3"	M9DS-F1-0300-TXXV/ZE6XXX-MX
4"	M9DS-F1-0400-TXXV/ZE6XXX-MX
6"	M9DS-F1-0600-TXXV/ZE7XXX-MX
8"	M9DS-F1-0800-TXXV/ZE9XXX-MX
10"	M9DS-F1-1000-TXXV/ZEBXXX-MX
12"	M9DS-F1-1200-TXXV/ZECXXX-MX

DOUBLE ACTING

60 PSI | Stainless Steel

SIZE	Part Number
1/2"	M9DS-F1-0050-TXXV/ZPD2DABA-XX
3/4"	M9DS-F1-0075-TXXV/ZPD2DABA-XX
1"	M9DS-F1-0100-TXXV/ZPD2DABA-XX
1-1/2"	M9DS-F1-0150-TXXV/ZPD5DABA-XX
2"	M9DS-F1-0200-TXXV/ZPD5DABA-XX
2-1/2"	M9DS-F1-0250-TXXV/ZPD6DABA-XX
3"	M9DS-F1-0300-TXXV/ZPD8DABX-XX
4"	M9DS-F1-0400-TXXV/ZPD8DABX-XX
6"	M9DS-F1-0600-TXXV/ZPDADABX-XX
8"	M9DS-F1-0800-TXXV/ZPDDDABX-XX
10"	M9DS-F1-1000-TXXV/ZPDGDABX-XX

80 PSI | Stainless Steel

SIZE	Part Number
1/2"	M9DS-F1-0050-TXXV/ZPD2DABA-XX
3/4"	M9DS-F1-0075-TXXV/ZPD2DABA-XX
1"	M9DS-F1-0100-TXXV/ZPD2DABA-XX
1-1/2"	M9DS-F1-0150-TXXV/ZPD5DABA-XX
2"	M9DS-F1-0200-TXXV/ZPD5DABA-XX
2-1/2"	M9DS-F1-0250-TXXV/ZPD5DABA-XX
3"	M9DS-F1-0300-TXXV/ZPD8DABX-XX
4"	M9DS-F1-0400-TXXV/ZPD8DABX-XX
6"	M9DS-F1-0600-TXXV/ZPDADABX-XX
8"	M9DS-F1-0800-TXXV/ZPDCDABX-XX
10"	M9DS-F1-1000-TXXV/ZPDGDABX-XX

SPRING RETURN

60 PSI (8 springs) | Stainless Steel

SIZE	Part Number
1/2"	M9DS-F1-0050-TXXV/ZPD2S4BA-XX
3/4"	M9DS-F1-0075-TXXV/ZPD3S4BA-XX
1"	M9DS-F1-0100-TXXV/ZPD4S4BA-XX
1-1/2"	M9DS-F1-0150-TXXV/ZPD6S4BA-XX
2"	M9DS-F1-0200-TXXV/ZPD7S4BX-XX
2-1/2"	M9DS-F1-0250-TXXV/ZPD8S4BX-XX
3"	M9DS-F1-0300-TXXV/ZPDAS4BX-XX
4"	M9DS-F1-0400-TXXV/ZPDBS4BX-XX
6"	M9DS-F1-0600-TXXV/ZPDDS4BX-XX

80 PSI (10 springs) | Stainless Steel

SIZE	Part Number
1/2"	M9DS-F1-0050-TXXV/ZPD2S5BA-XX
3/4"	M9DS-F1-0075-TXXV/ZPD3S5BA-XX
1"	M9DS-F1-0100-TXXV/ZPD3S5BA-XX
1-1/2"	M9DS-F1-0150-TXXV/ZPD6S5BA-XX
2"	M9DS-F1-0200-TXXV/ZPD6S5BA-XX
2-1/2"	M9DS-F1-0250-TXXV/ZPD8S5BX-XX
3"	M9DS-F1-0300-TXXV/ZPD9S5BX-XX
4"	M9DS-F1-0400-TXXV/ZPDAS5BX-XX
6"	M9DS-F1-0600-TXXV/ZPDDS5BX-XX

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