MULTI-MODE

UHP Air-Operated Flow Control Valve

Pressures to 40,000 PSI (2750 Bar)

GARDNER DENVER WATER JETTING SYSTEMS, INC.

Quality ♦ Performance ♦ Safety

Air Operated Multi-Mode Flow Control Valve

Model #3177230
Multi-Mode, Multi-Gun, Pressurized Dump

Model #3177235
Single Gun, Low Pressure Dump

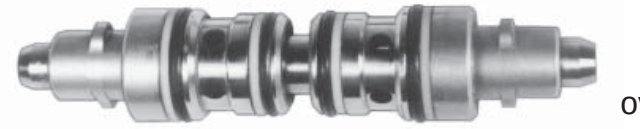
Model #3177240
Dry Shut Operation

AIR SIDE

MULTI-MODE TUMBLE BOX OPTIONS:

1. Dry Shut Operation
2. Single Dump - One Gun Operation
3. Multi-Gun Operation: Each gun requires a Multi-Mode Tumble Box

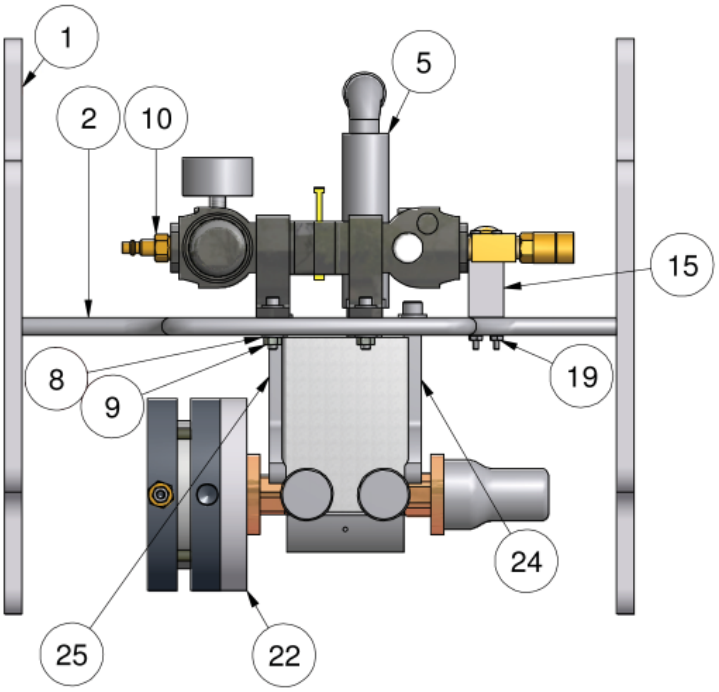

WATER SIDE

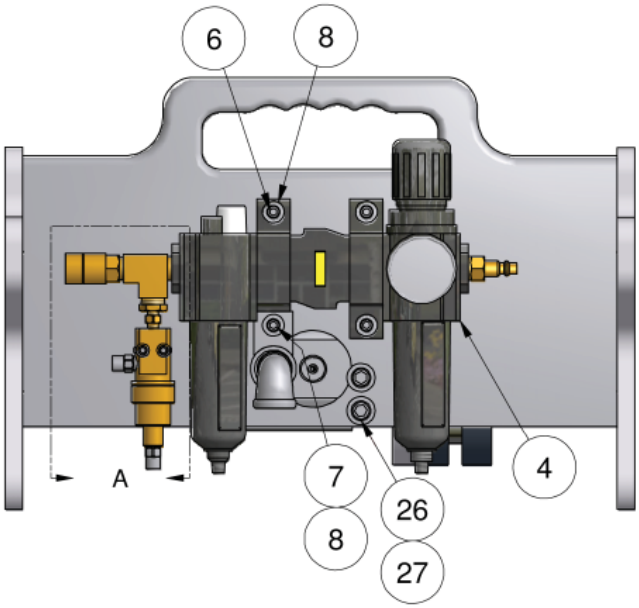


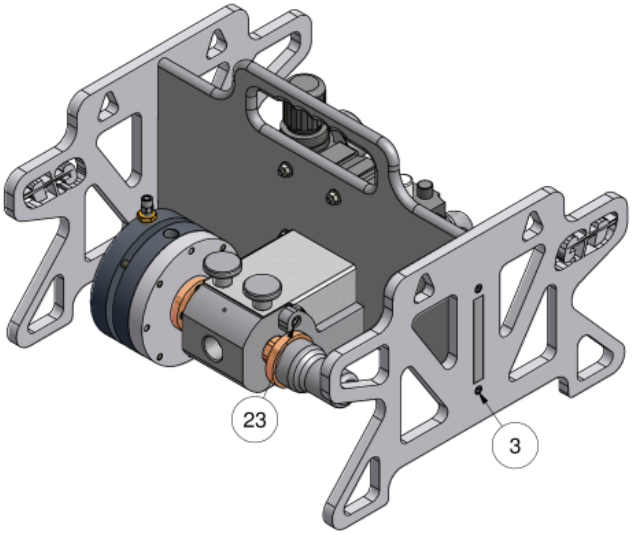
Multi-Mode Cartridge #408803

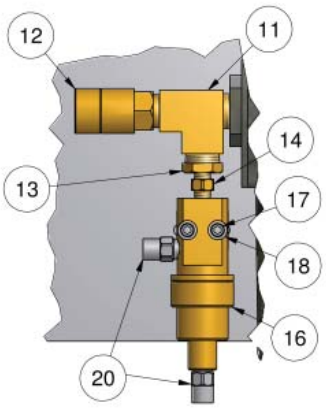
The Multi-Mode Tumble Box features fast cartridge overhaul so your waterblasting operations stay on-line!

DUMP VALVES









DETAIL A
SCALE 0.40 : 1

40K AIR-CONTROLLED TUMBLE BOX - #3177230

ITEM	QTY.	DESCRIPTION	PART NO.
1	2	Side Plate, Tumble Box Frame	77408713
2	1	Base Plate, 40K Tumble Box	77408714003
3	4	Screw, SHCS, 1/4"-20 x 3/4", SS	1615148
4	1	Air Filter/Lubricator/Shut-Off Assy.	77408674
5	1	Diffuser Cover	77408857
6	3	Screw, SHCS, 1/4"-20 x 1-1/4", SS	77408698
7	1	Screw, SHCS, 1/4"-20 x 1-1/2", SS	77408635
8	8	Flat Washer, 1/4", SS	1615251
9	4	Hex Nut, 1/4"-20", SS	1900322001
10	1	Fitting, 3/8" NPT x 1/4" Mqd, Brass	77408565
11	1	Tee, 3/8" (FxFxMB), Brass	77408567
12	1	Fitting, 3/8" NPT x 1/4" Fqd, Brass	77408568
13	1	Bushing, 3/8" NPTM x 1/8" NPTF, Brass	1900335
14	1	Hex Nipple, 1/8" NPT Brass	1900322001
15	1	Adapter Block for Versa Air Pilot Valve	77408837
16	1	Air Pilot Valve, for 3-Way Tumble Box	77408835
17	2	Hose, 1/4" Push-Lock on Reel	77408844
18	2	Tee, 1/2" NPT SS	77408845
19	2	Street Elbow, 1/2" NPT SS	77408846
20	2	Nipple, 1/2" NPT B/E SS	77408661
21	24	Mount, Dump Valve, Pilot Op.	77408650
22	1	Dump Valve, 25K Hi Flow, Pilot Op.	77408856
23	4	Tubing, 1/4" MP, Air Act. Dump Valve	77408716
24	1	Air Pilot Valve, for Dump Valve	3177231
25	1	Clamp, Actuator, Air	3177232
26	4	Hex Head Bolt, 1/4"-20 x 5-1/2"	77408666
27	4	Self Lock Hex Nut, 1/4"-20	77408652
28	1	GD Logo I.D.	2886000

Tumble Box Dimensions

PART #	LENGTH	WIDTH	HEIGHT	WEIGHT
3177230	18" / 457 mm	16.5" / 419 mm	12.375" / 314 mm	57 Lbs. / 25.9 Kg

Orifice Inserts Available

ITEM	PART NO.	DESCRIPTION
1	77408191-006	Jewel Assy., Viper (.006)
2	77408191-007	Jewel Assy., Viper (.007)
3	408191-008	Jewel Assy., Viper (.008)
4	77408191-009	Jewel Assy., Viper (.009)
5	77408191-010	Jewel Assy., Viper (.010)
6	77408191-011	Jewel Assy., Viper (.011)
7	77408191-012	Jewel Assy., Viper (.012)
8	77408191-013	Jewel Assy., Viper (.013)
9	77408191-014	Jewel Assy., Viper (.014)
10	77408191-015	Jewel Assy., Viper (.015)
11	77408191-016	Jewel Assy., Viper (.016)
12	77408191-017	Jewel Assy., Viper (.017)
13	77408191-018	Jewel Assy., Viper (.018)
14	77408191-019	Jewel Assy., Viper (.019)
15	77408191-020	Jewel Assy., Viper (.020)
16	77408191-021	Jewel Assy., Viper (.021)
17	77408191-022	Jewel Assy., Viper (.022)

ITEM	PART NO.	DESCRIPTION
18	77408191-023	Jewel Assy., Viper (.023)
19	77408191-024	Jewel Assy., Viper (.024)
20	77408191-025	Jewel Assy., Viper (.025)
21	77408191-026	Jewel Assy., Viper (.026)
22	77408191-027	Jewel Assy., Viper (.027)
23	77408191-028	Jewel Assy., Viper (.028)
24	77408191-029	Jewel Assy., Viper (.029)
25	77408191-030	Jewel Assy., Viper (.030)
26	77408191-031	Jewel Assy., Viper (.031)
27	77408191-032	Jewel Assy., Viper (.032)
28	77408191-033	Jewel Assy., Viper (.033)
29	77408191-034	Jewel Assy., Viper (.034)
30	77408191-035	Jewel Assy., Viper (.035)
31	77408191-036	Jewel Assy., Viper (.036)
32	77408191-036	Jewel Assy., Viper (PLUG)
4	77408199	Screw, Viper Nozzle Jewel

Nozzle Sizing Chart

NOZZLE SIZE (In.)	PRESSURE (PSI) 35,000	PRESSURE (PSI) 40,000	NOZZLE SIZE (In.)	PRESSURE (PSI) 35,000	PRESSURE (PSI) 40,000
.005	0.098	0.104	.023	2.064	2.207
.006	0.140	0.150	.024	2.248	2.403
.007	0.191	0.204	.025	2.439	2.607
.008	0.250	0.267	.026	2.638	2.820
.009	0.316	0.338	.027	2.845	3.041
.010	0.390	0.417	.028	3.060	3.271
.011	0.472	0.505	.029	3.282	3.509
.012	0.562	0.601	.030	3.512	3.755
.013	0.660	0.705	.031	3.750	4.009
.014	0.765	0.818	.032	3.996	4.272
.015	0.878	0.939	.033	4.250	4.543
.016	0.999	1.068	.034	4.511	4.823
.017	1.128	1.206	.035	4.781	5.111
.018	1.264	1.352	.036	5.058	5.407
.019	1.409	1.506	.037	5.343	5.711
.020	1.561	1.669	.038	5.635	6.024
.021	1.721	1.840	.039	5.936	6.346
.022	1.889	2.019	.040	6.244	6.675

Nozzle Sizing Formula

F = GPM

psi = Pressure

d_n^2 = Nozzle Diameter (in)

$F = 20.8 \sqrt{\text{Pressure}} \times [d_n^2]$

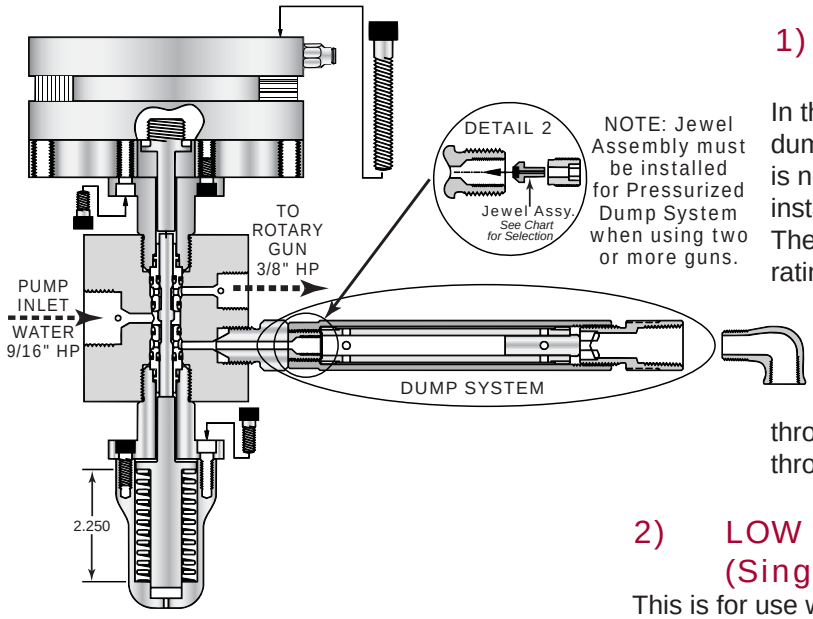
EXAMPLE

What is flow rate from a .038 nozzle at 40,000 psi?

$F = 20.8 \sqrt{40{,}000} = .038^2$ in.

F = 6.0 GPM

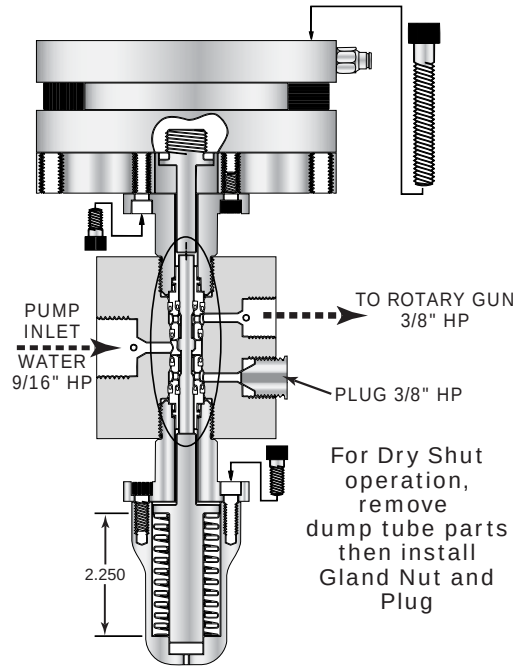
Multi-Mode Options Illustrated



1) PRESSURIZED DUMP MODE (Multi Gun Operation)

In this arrangement the Multi-Mode Control Valve dumps the unused flow from the pump, when the gun is not being operated, through a single orifice nozzle installed in the inlet to the Energy Diffuser Assembly. The single orifice is chosen to have the same flow rating as the combined orifices on the gun or lance.

The jet from the single orifice nozzle discharges into the Energy Absorber Guide Tube and strikes the Jet Impact Slug, which destroys most of the energy of the jet. The flow leaves the Guide Tube through a series of holes and exits to atmosphere through the Energy Absorber Cap and Street Elbow.



2) LOW PRESSURE DUMP MODE (Single Gun Operation)

This is for use with a plunger pump, when only one lance or gun wil be used at any time. The single dump orifice and Energy Diffuser Assembly are omitted so that whenever the Multi-Mode Control Valve shifts to the dump mode, the pressure in the entire system will fall to zero. Actuating the trigger on the gun or lance closes the dump and restores pressure throughout the system.

3) DRY SHUT-OFF MODE

This is primarily intended for use with an intensifier pump and assumes that the pressurized system has a flow compensation device, which will discharge or control theexcess flow when a gun or lance is shut off. To operate the Multi-Mode Control Valve in this mode, an orifice plug is substituted for the orifice in the nozzle holder. Actuating the trigger on the gun signals the Multi-Mode Control Valve to initiate the high-pressure flow to the gun. Releasing the trigger allows the Multi-Mode Control Valve to stop the flow, which MUST be compensated for elsewhere in the system.

GARDNER DENVER WATER JETTING SYSTEMS, INC.
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Your local distributor/representative is: