

Fisher™ D3 Control Valve

The Fisher D3 control valve is a compact, rugged valve designed for on/off or throttling control, and utilizes FloPro technology, using either pneumatic or electric control. This valve is ideal for use as a dump valve on gas separators and scrubbers. It is also well suited for other high pressure applications in natural gas production, compression, and processing. NPS 1 and 2 D3 control valves are available with CL900 NPT end connections and CL600 raised face flanged end connections.

The D3 offers easy maintenance. The trim and packing can be maintained by removing the deep-bore hammer nut and lifting the actuator/bonnet assembly off the valve without disassembling the actuator.

Features

Electric and Pneumatic

- **Safer Bonnet / Valve Body Connection**-- The unique design provides additional protection if disassembly of bonnet/valve body connection is inadvertently started while there is still pressure in the valve body. Pins mounted in the valve bonnet help ensure the bonnet disengages from the valve body as the hammer nut is loosened, while the threads are still engaged. This allows internal pressure to be vented, while keeping the actuator retained to the valve body.
- **Field-Selectable Flow Rates**--The FloPro feature allows adjustment of the flow capacity without changing the trim. In this way, a single trim set can be used for more than one flow requirement, reducing inventory and maintenance costs. See figure 1.



W9797

FISHER D3 CONTROL VALVE WITH Gen 2 easy-Drive™ ELECTRIC ACTUATOR (NPS 2 NPT END CONNECTION)



W9249

FISHER D3 CONTROL VALVE (NPS 2 RF FLANGED END CONNECTION)

- **Two End Connection Styles**-- The D3 control valve is available in both CL900 screwed-end and CL600 RF flanged construction.

Features (continued)

Electric and Pneumatic

- **Two Modes of Actuation**-- Pneumatic or electric actuation is available.
- **Quad-O compliant Packing System** --Features Fisher ENVIRO-SEAL™ packing technology to provide reduced packing maintenance and meet Low E fugitive emission requirements for Leak Detection and Repair (LDAR) programs in compliance with the Code of Federal Regulations (CFR) 40, Part 60, Subpart OOOO.
- **Rugged Trim Design**--The pinned and guided plug/stem assembly is field-proven and easy to maintain.
- **Severe Service Capability with Tungsten Carbide Trim**--D3 valves are available with tungsten carbide trim for erosive service. Fisher tungsten carbide trim is designed specifically for severe service applications in the oil and gas industry. Durable tungsten carbide trim may benefit your application by wearing better and lasting longer.
- **Easy Maintenance**--The hammer nut bonnet/body joint allows repair or maintenance with a minimum of tools, without removing the valve body from the piping system. The seat ring can be removed with a standard hex socket.
- **Integral Bonnet Flange**-- The bonnet has an integral flange, retained by a hammer nut, making the bonnet-to-body connection. This eliminates use of snap rings, which can be subject to possible failure in sour service or in atmospheric corrosion.
- **Application Flexibility**--A selection of end connections, trim materials, and flow capacities allows the D3 to be used in a broad range of applications, including sour service.
- **NACE MR0175/ISO 15156 Service-Ready**--The standard D3 FloPro trim, valve body, and bonnet meet the metallurgical requirements of NACE MR0175/ISO 15156.

Electric

- **Low Power Consumption**-- The Fisher easy-Drive electric actuator operates from 9 to 30VDC and less than 0.1 watt hours per operation, using Modbus, 4-20 mA, or dry contact control signals.
- **Low Temperature**-- The easy-Drive electric actuator design allow use in ambient temperatures as low as -20°C (-4°F) without use of a heater.
- **Easy Installation**--The compact design allows installation where space is a premium. Fisher easy-Drive calibrates by simply opening and closing the valve.
- **Remote Monitoring and Configuration**-- Loss of signal position is programmable over Modbus.

Pneumatic

- **Low Temperature Materials**--Valve construction materials allow use in applications as low as -34°C (-30°F) for the pneumatic actuator.
- **Field-Reversible Actuator**--The D3 pneumatic actuator can be field-converted from spring-to-close to spring-to-open action.

Valve Specifications

Valve Body Sizes, End Connection Styles, and Port Diameters⁽¹⁾

VALVE SIZE, NPS	PORT DIAMETER, (INCHES)	THREADED	RAISED FACE (RF) FLANGED
		CL900	CL600
1	0.375, 0.75, 1	X	X
2	0.375, 0.75, 1	X	X

X = Available construction.

Maximum Inlet Pressures and Temperatures⁽¹⁾

VALVE BODY SIZE	MAXIMUM INLET PRESSURE	TEMPERATURE RANGE
	bar (psig)	°C (°F)
NPS 1 and NPS 2 NPT CL900	155 (2250)	-46 to 93 (-50 to 200)
	150 (2185)	93 to 149 (200 to 300)
NPS 1 and NPS 2 RF CL600	103 (1500)	-46 to 93 (-50 to 200)
	100 (1455)	93 to 149 (200 to 300)

Maximum Shutoff Pressure Drops⁽¹⁾

See table 3

Shutoff Classification per ANSI/FCI 70-2 and IEC 60534-4

Class IV

Flow Characteristic/Valve Plug Style

Equal percentage/Micro-Form Valve Plug

Flow Coefficients

See Fisher Catalog 12

Maximum Travel

15 mm (0.6 inch)

Material Temperature Capabilities⁽¹⁾

Valve Body Assembly:
Standard Bonnet O-Ring: -40 to 135°C (-40 to 275°F)

Construction Materials

See table 1

Flow Direction

Flow Up or Flow Down

1. The pressure or temperature limits in the referenced tables and any applicable ASME code limitations should not be exceeded.

Table 1. Fisher D3 Materials of Construction

Part	D3 Material with Pneumatic Actuator	D3 Material with easy-Drive Electric Actuator
Actuator Casing	Painted Steel	Painted Aluminum
Actuator Diaphragm	CR (chloroprene/polyester)	NA
Actuator Springs	Painted Steel	NA
Stem Bushing	PPS (polyphenylene sulfide)	Bronze - Oil Impregnated
Valve Body and Bonnet	ASME SA 352 LCC	
Valve Plug and Seat	Standard/Sour: S17400 (NACE MR0175/ISO 15156) Severe Service: Tungsten Carbide/S17400 (NACE MR0175/ISO 15156)	
Pin	S17400	
Valve Stem	S20910	
O-rings	HNBR (Hydrogenated Nitrile)	
Packing	PTFE/Carbon PTFE	
Packing Springs	N07718	
Packing Retainer	S17400	

Actuator Specifications

ELECTRIC ACTUATOR

Material Temperature Capabilities⁽¹⁾

Electric Actuator Assembly:
-20 to 70°C (-4 to 158°F) ambient

Available Electric Actuator Configurations

Gen 2 easy-Drive Electric On/Off (snap acting)
Gen 2 easy-Drive Electric Positioning (flow or pressure control)

Power Requirements

9 to 30VDC, minimum 4 amp power supply required (fuse to 5 amps), less than 5% ripple, 15 mA quiescent at 24VDC, 25 mA quiescent at 12VDC (40 mA quiescent for Gen 1)

Maximum Current Draw

4 amps

Nominal Stroke Speed⁽²⁾

3.9 mms (0.15 inch/s) at 24VDC
2.2 mm/s (0.09 inch/s) at 12VDC

Control Signals

On/Off: Dry contact, Modbus RTU
Positioning: 4-20 mA, 4-20 mA level, Modbus RTU
Auxillary Digital Input (Gen 2 only): Dry contact
Auxillary Digital Output (Gen 2 only): 10VDC, 25 mA maximum

Hazardous Area Approvals

CSA (C/US): Explosion-Proof Class I, Division 1, Groups C and D, T6, Ex d IIA T6, Class I, Zone 1, AEx d IIA T6
ATEX Flameproof - Gas:
Ⓔ II 2 G, Ex db IIA T6
IECEx Flameproof - Gas: Ex db IIA T6

Enclosure Rating

Type 4X and IP66

Electromagnetic Compatibility

Meets EN 61326-1 (2013)
Immunity: Industrial locations per table 2 of EN 61326-1 Standard. Performance is shown in table 2
Emmissions: Class A
ISM Equipment Rating: Group 1, Class A

Conduit Connections

Two 3/4 NPT connections

PNEUMATIC ACTUATOR

Material Temperature Capabilities⁽¹⁾

Pneumatic Actuator Assembly:
-34 to 82°C (-30 to 180°F) ambient

Available Pneumatic Actuator Configurations

Spring-to-Open
Spring-to-Close

Maximum Actuator Casing Pressure⁽¹⁾

3.4 bar (50 psig)

Actuator Diaphragm Effective Area

329 cm² (51 square inches)

Actuator Pressure Connections

1/4 NPT internal

1. The pressure or temperature limits in the referenced tables and any applicable ASME code limitations should not be exceeded.
2. 10% variation can be expected, based on temperature and pressure of application.

Table 2. EMC Summary Results - Immunity

PORT	PHENOMENON	BASIC STANDARD	TEST LEVEL	PERFORMANCE CRITERIA ⁽¹⁾
Enclosure	Electrostatic discharge (ESD)	IEC 61000-4-2	4kV Contact 8kV Air	A
	Radiated EM field	IEC 61000-4-3	80 to 1000 MHz @ 10V/m 1kHz AM at 80% 1400 to 2000 MHz @ 3V/m 1kHz AM at 80% 2000 to 2700 MHz @ 1V/m 1kHz AM at 80%	A
	Rated power frequency magnetic field	IEC 61000-4-8	30 A/m @ 50 and 60 Hz	A
I/O signal/ control	Burst	IEC 61000-4-4	1kV	B
	Surge	IEC 61000-4-5	1kV cable shield, and line to ground	B
	Conducted RF	IEC 61000-4-6	3V 150 kHz to 80 MHz at 3 Vrms	A

Performance criteria is +/- 5% stem position
1. A= No degradation during testing. B = Temporary degradation during testing, but is self recovering.

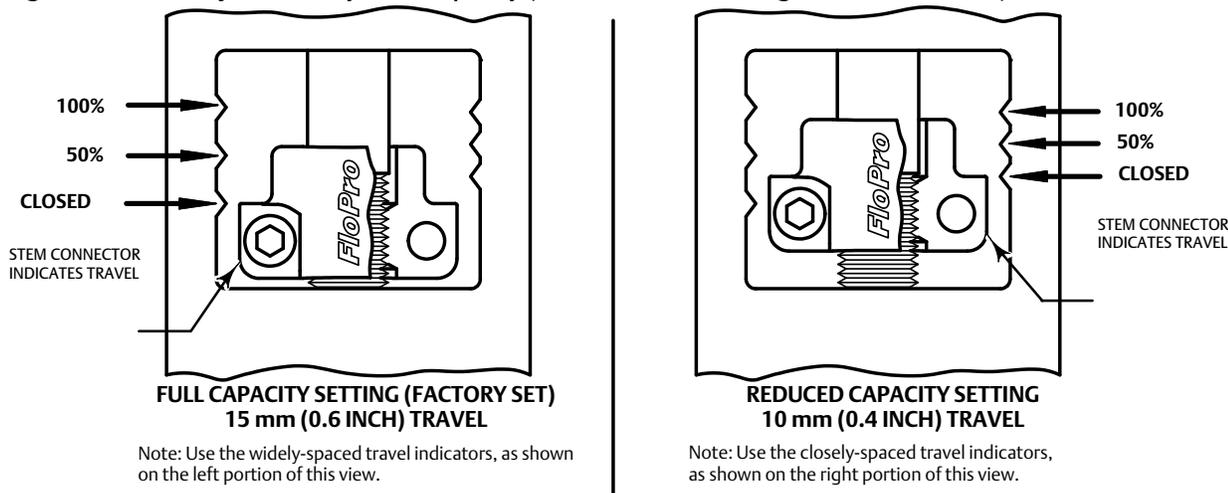
Table 3. Fisher D3 Maximum Shutoff Pressure Drops (Pneumatic)

ACTUATOR DESIGN	FLOW DIRECTION	ACTUATOR ACTION	INPUT SIGNAL	NUMBER OF SPRINGS	MAXIMUM ΔP (PSI) PER PORT SIZE (INCH)		
			psi		0.375	0.75	1.00
Pneumatic	Up	Spring-to-Close	0-20	3	2250	544	341
			0-35	6	2250	1504	999
		Spring-to-Open	0-20	2	2250	935	608
			0-35	2	2250	2250	2094
	Down	Spring-to-Close	0-20	2	1558	1800	950
			0-35	3	2250	2250	2250
		Spring-to-Open	0-20	2	2250	1700	939
			0-35	3	2250	2250	1575

Table 4. Fisher D3 easy-Drive Maximum Shutoff Pressure Drops (Electric)

ACTUATOR DESIGN	FLOW DIRECTION	MAXIMUM ΔP (PSI) PER PORT SIZE (INCH)		
		0.375	0.75	1.00
Electric	Up	2250	1714	1114
	Down	2250	2250	1948

Figure 1. FloPro Adjusts to Vary Flow Capacity (Shown with Valve Plug in Seated Position)



Note: See Fisher Catalog 12 for flow coefficients. Full capacity coefficients are shown as 100 percent valve opening. Reduced capacity coefficients are shown as 60 percent valve opening.

Table 5. Fisher D3 Control Valve with easy-Drive Electric Actuator Dimensions (also see figure 2)

VALVE SIZE	DIMENSION								WEIGHT	
	A		B		C		D		kg	lb
	mm	Inch	mm	Inch	mm	Inch	mm	Inch		
NPS 1 NPT CL900	159	6.25	51	2.00	352	13.86	275	10.83	14	31
NPS 2 NPT CL900	191	7.50	46	1.80	363	14.29	275	10.83	15	34
NPS 1 CL600 RF	210	8.25	56	1.42	364	14.33	275	10.83	18	39
NPS 2 CL600 RF	286	11.25	44	1.74	363	14.29	275	10.83	24	53

Figure 2. Fisher D3 Control Valve with easy-Drive Electric Actuator (also see table 5)

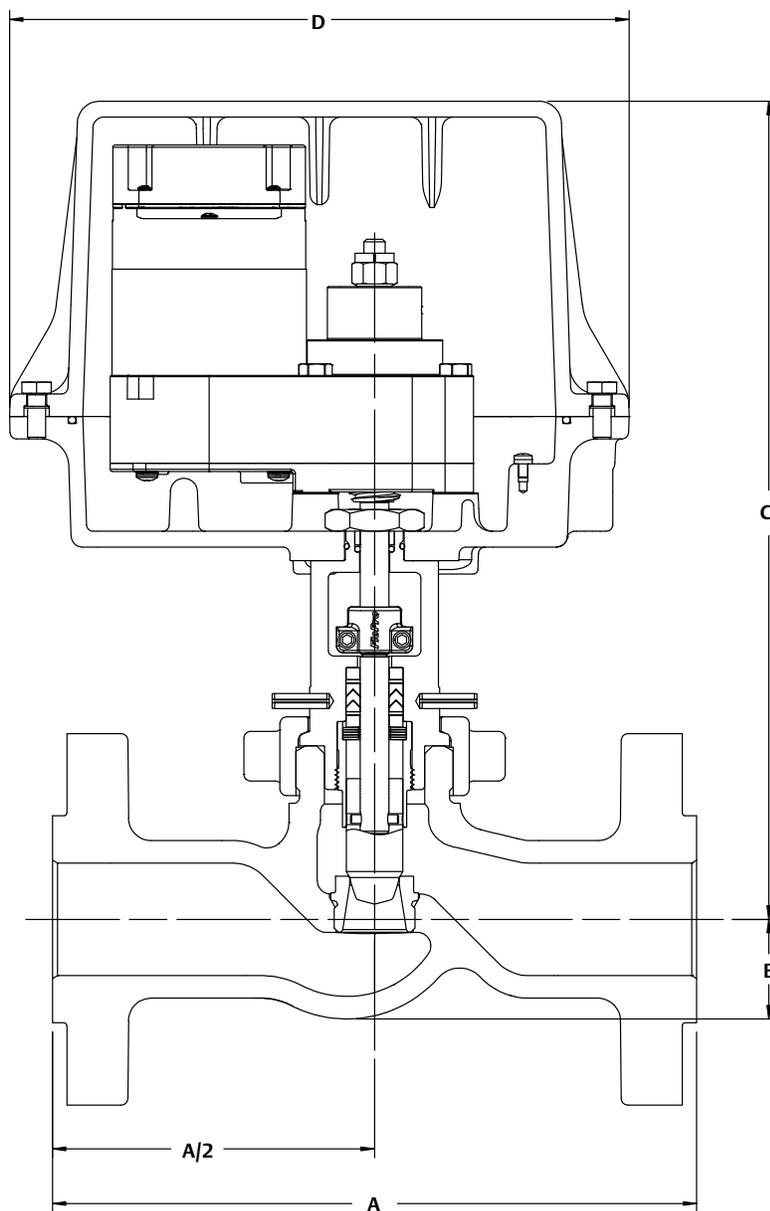


Table 6. Fisher D3 Control Valve with Pneumatic Actuator Dimensions⁽¹⁾ (also see figure 3)

VALVE SIZE	DIMENSION														WEIGHT	
	A		B		C		D		E		AR ⁽²⁾ Spring-to-Close		AR ⁽²⁾ Spring-to-Open			
	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	kg	lb
NPS 1 NPT CL900	159	6.25	51	2.00	148	5.83	289	11.38	127	5.00	57	2.25	76	3.00	16	35
NPS 2 NPT CL900	191	7.50	46	1.80	159	6.28	289	11.38	127	5.00	57	2.25	76	3.00	17	38
NPS 1 CL600 RF	210	8.25	36	1.42	160	6.32	289	11.38	127	5.00	57	2.25	76	3.00	19	42
NPS 2 CL600 RF	286	11.25	44	1.74	159	6.28	289	11.38	127	5.00	57	2.25	76	3.00	25	56

1. All dimensions except AR are identical for both spring-to-close and spring-to-open.
2. Actuator removal clearance.

Figure 3. Fisher D3 Control Valve with Pneumatic Actuator Dimensions (also see table 6)

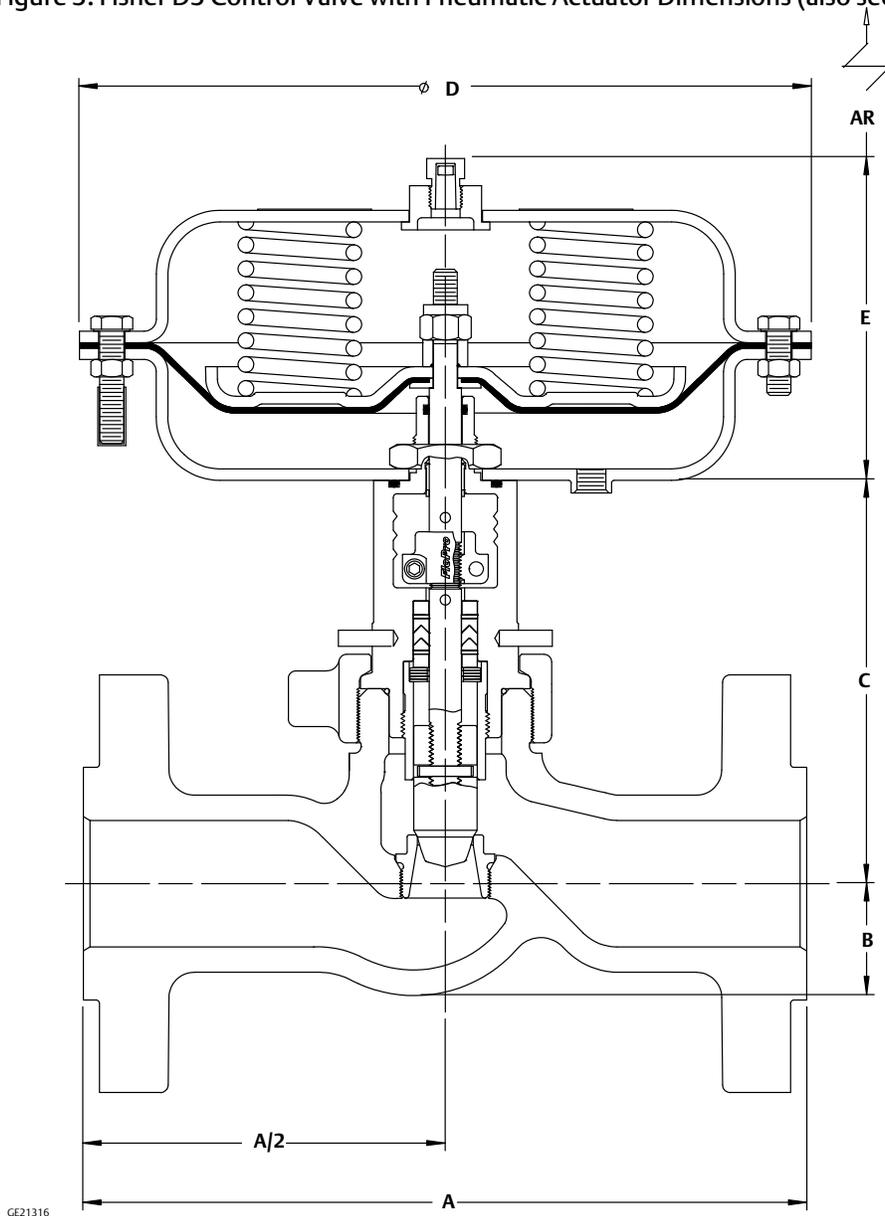
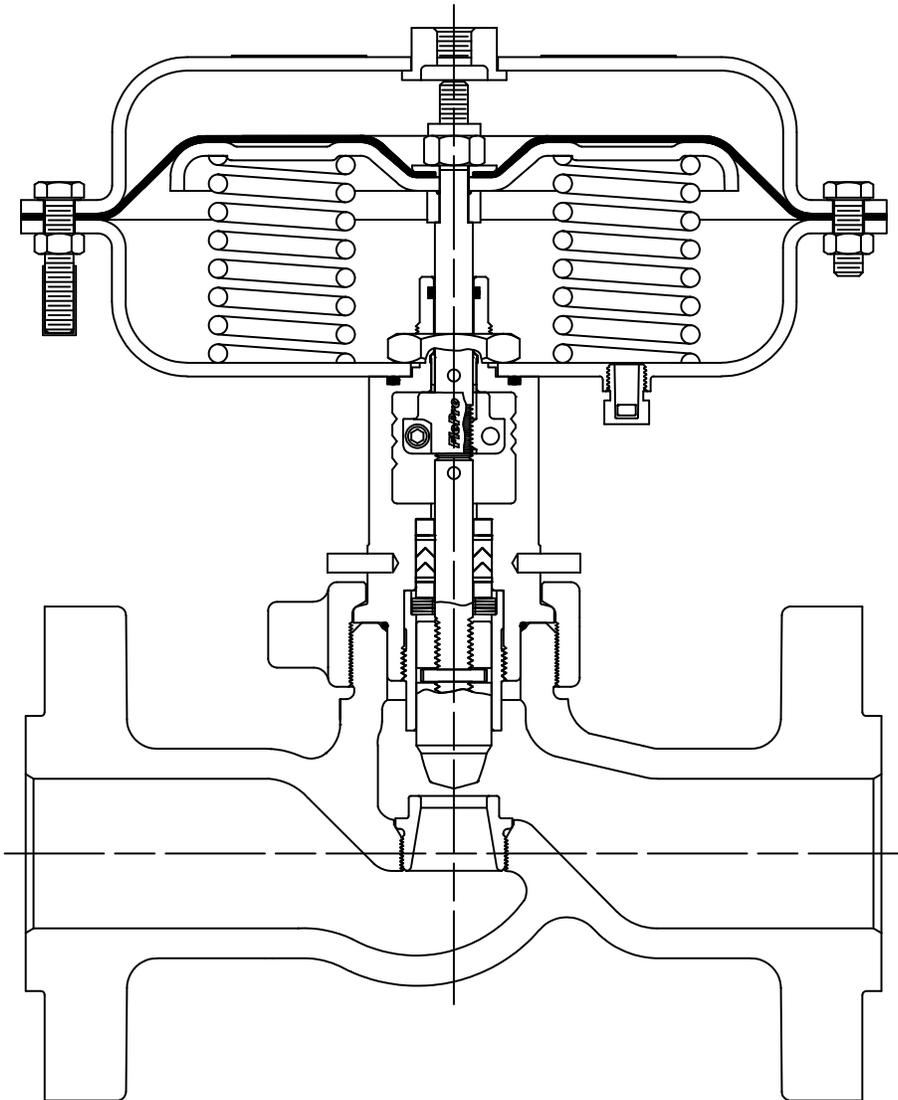


Figure 4. Fisher D3 Control Valve with Size 30 Actuator and NPS 2 Flanged Valve Body (Spring-to-Open Configuration)



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