

# Victaulic® Smart, Pressure-Independent Balancing and Modulating Control Valve

## TA Series 7SM



08.74



### 1.0 PRODUCT DESCRIPTION

#### Available Sizes

- ¾" – 5"

#### Maximum Working Pressure

- ¾" – 2"/DN20 – DN50: 363 psi/2503 kPa/25 bar
- 2½" – 5": 270 psi/1862 kPa/19 bar

#### Differential Pressure

- Maximum differential pressure ( $\Delta p_{Vmax}$ ): 58 psi/400 kPa/4 bar
- Maximum closing pressure: 87 psi/600 kPa/6 bar

#### NOTE

- $\Delta p_{Vmax}$  = The maximum allowed pressure drop over the valve to fulfill all stated performances.

#### Flow Range

- Nominal flow rates ( $q_{nom}$ ):
  - ¾" / DN20: 8.2 GPM
  - 1" / DN25: 11.7 GPM
  - 1¼" / DN32: 19.9 GPM
  - 1½" / DN40: 33.8 GPM
  - 2" / DN50: 58 GPM
  - 2½": 125.5 GPM
  - 3" / DN80: 187 GPM
  - 4" / DN100: 307 GPM
  - 5": 485 GPM
- Minimum controllable flows: 0.5%  $q_{nom}$

#### Operating Temperature Range

- +14°F to +230°F/-10°C to +110°C
- Operating environment: +32°F to +122°F/0°C to +50°C (5-95% RH, non-condensing)
- Storage environment: -4°F to +158°F/-20°C to +70°C (5-95% RH, non-condensing)

#### Application

- Heating (hot water) and cooling systems

ALWAYS REFER TO ANY NOTIFICATIONS AT THE END OF THIS DOCUMENT REGARDING PRODUCT INSTALLATION, MAINTENANCE OR SUPPORT.



## 1.0 PRODUCT DESCRIPTION (CONTINUED)

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### Function

- Control (Flow, power, position)
  - Pre-Setting (Max/min flow; Max power; Max/min position)
  - Reading (Flow, power, time, temperature, position)
  - Manual override mode (via IMI TA HyTune app)
  - Valve blockage protection
  - Valve clogging detection
  - Fail-safe position
  - Diagnostic
  - Logging
  - Delayed start-up
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## 2.0 CERTIFICATION/LISTINGS

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Product manufactured by Victaulic and/or certified suppliers in accordance with ISO-9001.

### 3.0 SPECIFICATIONS – MATERIAL

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#### TA Series 7SM Control Valve

**Sizes** ¾" – 2"/DN20 – DN50

**Valve Body:** AMETAL®

**Valve Insert:** AMETAL®

**Valve Plug:** AMETAL® and PTFE

**Spindle:** Stainless steel

**Spindle Seal:** EPDM O-ring

**Internal Plastic Parts:** Polyphenylene sulfide (PPS)

**Springs:** Stainless steel

**O-Rings:** EPDM

**Temperature Housing:** AMETAL®

**Sizes** 2 ½" – 5"

**Valve Body:** Ductile iron EN-GJS-400-15

**Valve Insert:** Ductile iron EN-GJS-400-15 and brass

**Valve Plug:** Stainless steel and EPDM O-ring

**Valve Seat:** Stainless steel

**Spindle:** Stainless steel

**Spindle Seal:** EPDM

**Springs:** Stainless steel

**O-Rings:** EPDM

#### SmartBox

**Cover:** Polycarbonate (PC)/ABS

**Housing:** PC/ABS, TPE

#### Actuators

**Sizes** ¾" – 2"/DN20 – DN50

**Cover:** Polybutylene terephthalate (PBT)

**Housing:** PA GF40

**Swiveling Nut Threaded and Sweat:** Nickel-plated brass

**Swiveling Nut Grooved:** 316 stainless steel

**Sizes** 2 ½" – 5"

**Cover:** Polybutylene terephthalate (PBT)

**Bracket:** Aluminum

**Cables:** Halogen-free

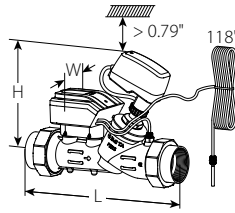
#### NOTE

- AMETAL® is the dezincification resistant alloy of IMI Hydronic Engineering.

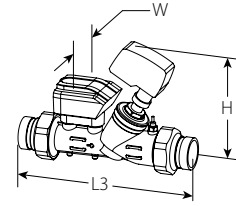
## 4.0 DIMENSIONS

### TA Series 7SM Control Valve

Including Temperature Housing



Female NPT Union Ends



Grooved Ends

Size		Dimensions				Weight <sup>1</sup>
Nominal inches DN	Actual Outside Diameter inches mm	L inches mm	L3 inches mm	H inches mm	W inches mm	Approx. (Each) lb kg
3/4 DN20	1.050 26.9	8.91 226	-	6.85 174	3.82 97	3.5 1.6
1 DN25	1.315 33.7	9.48 241	10.92 277	6.85 174	3.82 97	4.0 1.8
1 1/4 DN32	1.660 42.4	10.31 262	11.19 284	7.83 199	3.82 97	4.6 2.1
1 1/2 DN40	1.900 48.3	11.10 282	12.16 309	7.79 198	3.82 97	6.6 3.0
2 DN50	2.375 60.3	11.93 303	13.23 336	7.79 198	3.82 97	8.6 3.9

<sup>1</sup> Weights are for valves only.

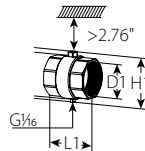
**NOTE**

- → = Flow direction

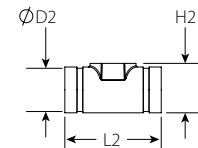
## 4.1 DIMENSIONS

### Temperature Housing with Temperature Pocket

Included with TA Series 7SM Control Valve



Female NPT Ends



Grooved Ends

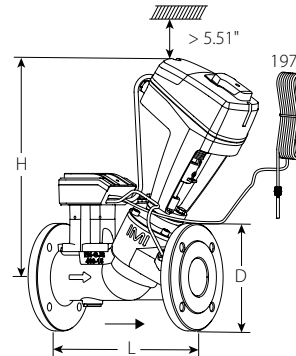
Size		Dimensions			ØD1 Thread Size	Dimensions		ØD2 Groove Size OGS
Nominal inches DN	Actual Outside Diameter inches mm	L1 inches mm	H1 inches mm	L2 inches mm		H2 inches mm		
3/4 DN20	1.050 26.9	2.17 55	2.20 56	3/4 NPT	-	-	-	
1 DN25	1.315 33.7	2.52 64	2.40 61	1 NPT	-	-	-	
1 1/4 DN32	1.660 42.4	2.60 66	2.76 70	1 1/4 NPT	-	-	-	
1 1/2 DN40	1.900 48.3	2.64 67	2.99 76	1 1/2 NPT	-	-	-	
2 DN50	2.375 60.3	2.68 68	3.50 89	2 NPT	5.00 127	2.56 65	2"	

## 4.2 DIMENSIONS

### TA Series 7SM Control Valve

Including Thermowell (Free space > 2.75"/70 mm is required above the temperature pocket)

Flanges According to ASME/ANSI B16.42 Class 150



Size		Number of Bolt Holes	Dimensions			Weight
Nominal inches DN	Actual Outside Diameter inches mm		D inches mm	L inches mm	H inches mm	Approximate (Each) lb kg
2½	2.875 73.0	4	7.09 180	11.42 290	14.84 377	36.3 16.5
3 DN80	3.500 88.9	4	7.48 190	12.20 310	14.96 380	40.9 18.6
4 DN100	4.500 114.3	8	9.06 230	13.78 350	17.24 438	63.9 29.0
5	5.563 141.3	8	10.04 255	15.75 400	17.48 444	77.2 35.0

**NOTE**

- → = Flow direction

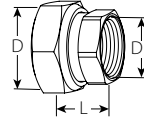
### 4.3 DIMENSIONS

#### Connections

#### With Female Thread NPT

Threads According to ANSI/ASME B1.20.1-1983

Swiveling Nut: Brass/AMETAL®



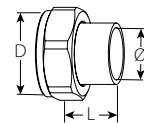
Size		Dimensions		Thread Size
Nominal inches DN	Actual Outside Diameter inches mm	L <sup>1</sup> inches mm		
¾ DN20	1.050 26.9	0.71 18		½ NPT
¾ DN20	1.050 26.9	0.91 23		¾ NPT
1 DN25	1.315 33.7	1.06 27		¾ NPT
1 DN25	1.315 33.7	1.06 27		1 NPT
1 ¼ DN32	1.660 42.4	1.06 27		1 NPT
1 ¼ DN32	1.660 42.4	1.22 31		1 ¼ NPT
1 ½ DN40	1.900 48.3	1.18 30		1 NPT
1 ½ DN40	1.900 48.3	1.26 32		1 ½ NPT
2 DN50	2.375 60.3	1.26 32		1 ½ NPT
2 DN50	2.375 60.3	1.26 32		2 NPT

<sup>1</sup> Fitting length (From the gasket surface to the end of the connection)

#### Soldering Connection

According to ANSI/ASME B16.18

Swiveling Nut: Brass



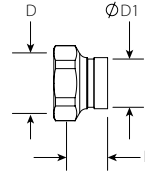
Size		Dimensions	
Nominal inches DN	Actual Outside Diameter inches mm	Pipe Ø inches mm	L <sup>1</sup> inches mm
¾ DN20	1.050 26.9	0.88 22	0.87 22
1 DN25	1.315 33.7	1.13 29	1.02 26
1 ¼ DN32	1.660 42.4	1.38 35	1.10 28
1 ½ DN40	1.900 48.3	1.63 41	1.22 31
2 DN50	2.375 60.3	2.13 54	1.50 38

<sup>1</sup> Fitting length (From the gasket surface to the end of the connection)

### 4.3 DIMENSIONS

#### OGS Grooved End Connection

Swiveling Nut: 316 Stainless Steel



Size		Dimensions		Ø D1 Groove Size
Nominal inches DN	Actual Outside Diameter inches mm	L <sup>1</sup> inches mm		
1 DN25	1.315 33.7	1.78 45		1
1 ¼ DN32	1.660 42.4	1.66 42		1 ¼
1 ½ DN40	1.900 48.3	1.79 45		1 ½
2 DN50	2.375 60.3	1.91 49		2

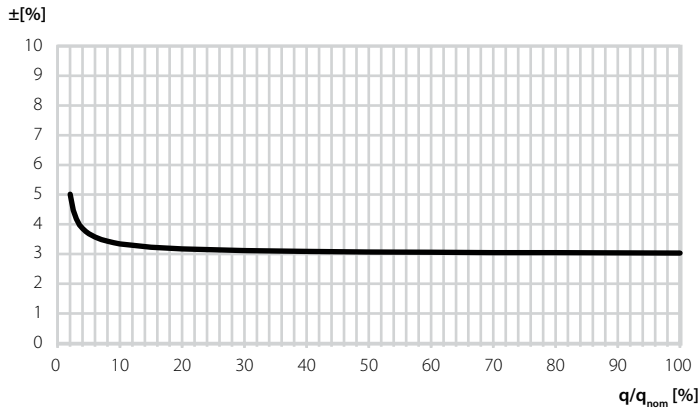
<sup>1</sup> Fitting length (From the gasket surface to the end of the connection)

## 5.0 PERFORMANCE

### 7SM Female Union

Size		Flow Characteristics
Nominal inches DN	Actual Outside Diameter inches mm	Full Open $C_v$ $K_v$
3/4 DN20	1.050 26.9	3.64 3.15
1 DN25	1.315 33.7	5.03 4.35
1 1/4 DN32	1.660 42.4	8.44 7.30
1 1/2 DN40	1.900 48.3	14.30 12.37
2 DN50	2.375 60.3	24.50 21.19

### Flow Accuracy



## 5.1 PERFORMANCE

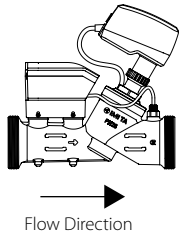
### 7SM Flange

Size		Flow Characteristics
Nominal inches DN	Actual Outside Diameter inches mm	Full Open $C_v$ $K_v$
2½	2.875 73.0	56.60 48.96
3 DN80	3.500 88.9	84.40 73.01
4 DN100	4.500 114.3	139.00 120.24
5	5.563 141.3	220.00 190.30

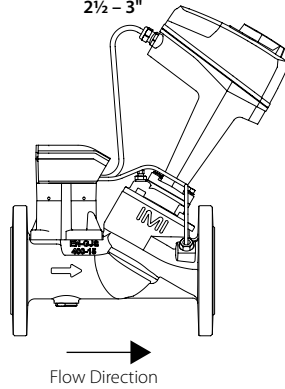
### Installation

#### Flow Direction

1¼ - 2"/DN32 - DN50

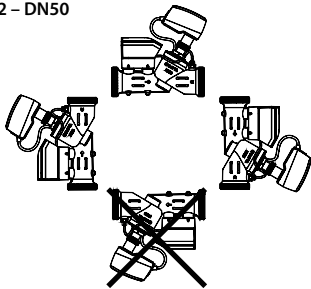


2½ - 3"

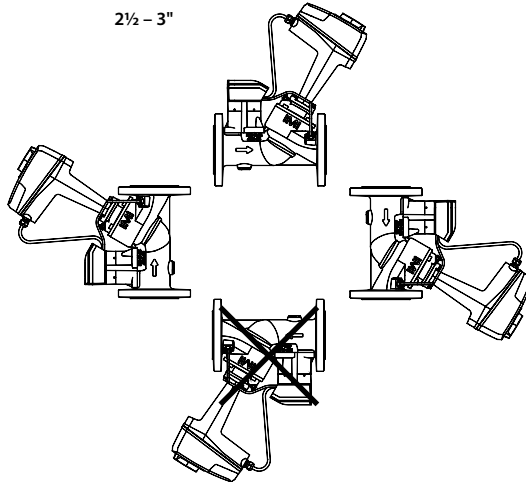


#### Orientation

1¼ - 2"/DN32 - DN50



2½ - 3"



## 5.1 PERFORMANCE (CONTINUED)

### Installation

#### Component Spacing

1¼ - 2"/DN32 - DN50

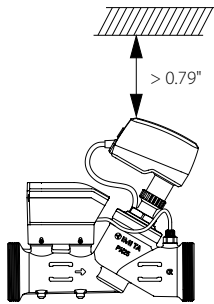


2½ - 3"

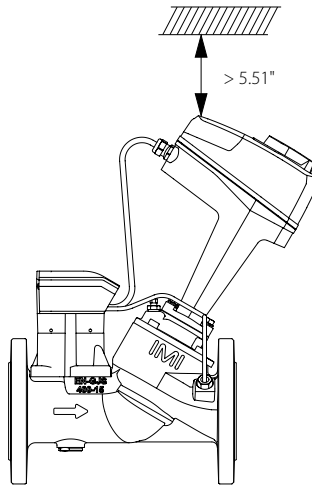


#### Actuator Service Clearance

1¼ - 2"/DN32 - DN50



2½ - 3"



## 5.2 PERFORMANCE

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### Actuator Signal Requirements

#### Input Signal

By BACnet/Modbus or Analog signal.

Analog in VDC or mA, selectable by jumper in the SmartBox;

0(2)-10 VDC, Ri 47 k $\Omega$ .

Adjustable sensitivity 0.1-0.5 VDC.

0.33 Hz low pass filter.

0(4)-20 mA Ri 500  $\Omega$ .

Proportional:

0-10, 10-0, 2-10 or 10-2 VDC.

0-20, 20-0, 4-20 or 20-4 mA.

Proportional split-range:

0-5, 5-0, 5-10 or 10-5 VDC.

0-4.5, 4.5-0, 5.5-10 or 10-5.5 VDC.

2-6, 6-2, 6-10 or 10-6 VDC.

0-10, 10-0, 10-20 or 20-10 mA.

4-12, 12-4, 12-20 or 20-12 mA.

Proportional dual-range (for change-over):

0-3.3 / 6.7-10 VDC,

10-6.7 / 3.3-0 VDC,

2-4.7 / 7.3-10 VDC or

10-7.3 / 4.7-2 VDC.

Default setting: Proportional 0-10 VDC.

#### Output Signal

BACnet/Modbus

0(2)-10 VDC, max. 8 mA, min. 1.25 k $\Omega$ .

**Enclosure Class:** IP54 (According to EN 60529)

**Protection Class:** (According to EN 61140) III (SELV)

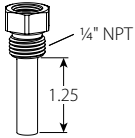
### 5.3 PERFORMANCE

#### Accessories

##### Thermowell

Included in TA Series 7SM, sizes 2 ½ – 3"

For mounting directly on pipe. Free space > 2.76"/70 mm is required above the thermowell.

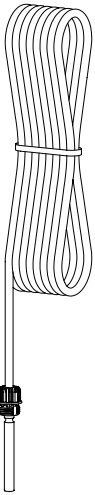


Size	Part Code
1/4" NPT	P0007SMTEM

##### Temperature Sensor

Included in TA Series 7SM

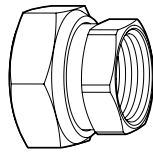
9.84 ft/3 m with sizes 1 ¼ – 2"/DN32 – DN50; 16.40 ft/5 m with sizes 2 ½ – 3"



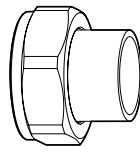
Length ft m	Part Code
9.8 3	P0007SMS3M
16.4 5	P0007SMS5M

5.3 PERFORMANCE (CONTINUED)

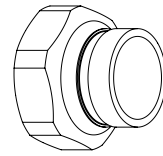
Tailpieces



Female NPT



Sweat



Grooved

Size	Female NPT	Sweat	Grooved
3/4"	P0067CPF06	P0067CPS06	-
3/4" Gasket	P0067CPGSK	P0067CPGSK	-
1"	P0107CPF10	P0107CPS10	P0107MP112
1" Gasket	P0107CPGSK	P0107CPGSK	P0107MPGK1
1 1/4"	P0127CPF12	P0127CPS12	P0127MP114
Reducer 1 1/4" as 1"	P0127CPF10	Not Available	-
1 1/4" Gasket	P0127CPGSK	P0127CPGSK	P0127MPGK1
1 1/2"	P0147MPF14	P0147MPS14	P0147MP120
1 1/2" Gasket	P0147MPGSK	P0147MPGSK	P0147MPGK1
2"	P0207MPF20	P0207MPS20	P0207MP124
Reducer 2" as 1 1/2"	P0207MPF14	Not Available	-
2" Gasket	P0207MPGSK	P0207MPGSK	P0207MPGK1

## 6.0 NOTIFICATIONS

### WARNING



- Read and understand all instructions before attempting to install any Victaulic products.
- Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.
- Confirm that any equipment, branch lines, or sections of piping that may have been isolated for/during testing or due to valve closures/positioning are identified, depressurized, and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.
- Wear safety glasses, hardhat, foot protection, and hearing protection.

Failure to follow these instructions could result in death or serious personal injury and property damage.

## 7.0 REFERENCE MATERIALS

[08.16: Victaulic Balancing Valves - TA Series 786H/787H/788/789 and Series 78KH](#)

[08.29: Victaulic Differential Pressure Controller - TA Series 793/794](#)

[08.30: Victaulic KOIL-KIT™ Coil Pack](#)

[08.34: Victaulic Automatic Balancing Valves - Series 76T, 76B, 76K, 76V & 76G](#)

[08.37: Victaulic Compact Pressure Independent Balancing and Control Valve \(Compact P\) - TA Series 7CP](#)

[08.38: Victaulic TBV Terminal Balancing and Control Valves - Series TC & Series TCM](#)

[08.46: Victaulic Differential pressure Controller - TA Series 7PR](#)

[08.47: Victaulic Compact Differential Pressure Control TA Series 7DA](#)

[08.50: Victaulic Balancing Valve TA Series 78BL](#)

[08.55: Victaulic Pressure Independent Balancing and Modulating Control Valve - TA Series 7MP](#)

[08.57: Victaulic Differential Pressure Relief Valve TA Series 782](#)

### User Responsibility for Product Selection and Suitability

Each user bears final responsibility for determining the suitability of Victaulic products for their end-use application, in accordance with industry standards, project specifications, and Victaulic's published performance, maintenance, and safety data, as well as all warnings and installation instructions. Nothing in this or any other document, nor any verbal recommendation, advice, or opinion from any Victaulic employee, shall be deemed to alter, vary, supersede, or waive any provision of Victaulic Company's standard conditions of sale, warranty, installation instructions, or this disclaimer.

### Installation

Always refer to and follow the [Victaulic Installation Handbook](#) or installation instructions for the product you are installing. Handbooks are included with each shipment of Victaulic products, providing complete installation and assembly data, and are available in PDF format on our website at [victaulic.com](#).

### Warranty

Refer to the Warranty section of the current Price List or contact Victaulic for details.

### Intellectual Property Rights

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