

TA-Smart Fail-safe

– NPT threads/ANSI flanges



Smart valves

2-way control valve with uniquely shaped EQM characteristics with flow, temperature, power measurement capabilities and electronic fail-safe function

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The ultrasonic flow measurement technology combined with unique actuation algorithms capabilities provide best-in-class control performances. The TA-Smart Fail-safe controls can be set to flow or power, giving high on-site flexibility and providing highly effective comfort in heating and cooling applications. Its compact arrangement and simple set-up reduces installation and commissioning time.



Key features

- > **Fully configurable fail-safe**
Setting of position (extended, retracted) or intermediate position, flow or power. Possibility to set delay for entering/leaving failsafe mode for a reliable and optimal fail-safe function. Ability to perform quick health check of fail-safe function.
- > **Best-in-class control**
Accurate and fast control response even at very low flows in common part load conditions. Ensures full modulating control for the complete operating stroke leading to world class control and efficiencies.
- > **Optional cloud connection**
Easy remote access to data and configuration parameters allows to verify and adjust system performance.
- > **Optional ΔT and temperature return limitation**
Optimize the efficiency of your production units by ensuring optimal temperature regimes.
- > **Change-over functionality**
Possibility to switch between two operating conditions to manage seasonality or heating and cooling with the same valve in change-over applications.
- > **High measurement accuracy**
High flow and temperature measurement accuracies in all configurations (medium type, and temperature) for all flow regimes.
- > **Compactness and limited number of components**
Reduces installation time and space requirements facilitating retrofit installation.
- > **Convenient, reliable setup**
Fully customizable and commissionable using Bluetooth enabled smart device reducing commissioning and diagnostic time.
- > **Versatility in communication**
Digital (key Bus protocols and MQTT) and Analog (0(2)-10 VDC or 0(4)-20 mA).

Technical description

Application:

Heating (not steam) and cooling systems.

Functions:

Electronic fail-safe function
Control (flow, power, position)
Pre-setting (max./min. flow, max. power, max./min. position)
 ΔT and temperature return limitation
Reading (flow, power, energy, supply/return temperature, ΔT , position)
Change-over function
Manual override (via HyTune app)
Mode, status and position indication
Valve blockage protection
Valve clogging detection
Error safe position
Diagnostic
Logging
Delayed start-up

Fail-safe function:

Programmable actuator's stem extended, retracted or intermediate position, flow or thermal power on power supply failure.

Dimensions:

1/2" – 5"

Pressure class:

1/2" - 2": PN 25 (362 psi)
2 1/2" - 5": Class 150

Differential pressure (ΔpV):

Max. differential pressure (ΔpV_{max}): 58 psi
Closing pressure: 87 psi
 ΔpV_{max} = The maximum allowed pressure drop over the valve to fulfill all stated performances.

Flow range:

The flow ranges (q_{setmin} - q_{nom}) for different dimensions:

1/2": 0.70 - 5.28 gpm
3/4": 1.67 - 8.37 gpm
1": 2.38 - 11.89 gpm
1 1/4": 4.05 - 20.2 gpm
1 1/2": 6.86 - 34.3 gpm
2": 11.8 - 59.0 gpm
2 1/2": 25.5 - 128 gpm
3": 38.0 - 190 gpm
4": 62.5 - 312 gpm
5": 98.6 - 493 gpm

Minimum controllable flows ($q_{contr.min}$) size 1/2" 0.33% of q_{nom} , sizes 3/4" - 5" 0.5% of

q_{nom}

q_{setmin} = Minimum settable flow.

q_{nom} = Maximum settable flow.

Measurement accuracy:

Flow:

Water: From 2% accuracy at 100% of q_{nom} to 2.4% accuracy at 5% of q_{nom} (according MID-Class 2 EN1434).

Water+glycol: From 3% accuracy at 100% of q_{nom} to 4% accuracy at 5% of q_{nom} (according to MID-Class 3 EN1434).

(see "Flow accuracy")

Temperature difference:

± 0.1 K @ $\Delta T = 6$ K (for cooling)

± 0.15 K @ $\Delta T = 10$ K (for heating)

± 0.2 K @ $\Delta T = 20$ K (for heating)

Flow control accuracy:

$\pm 5\%$ from 4% to 100% of q_{nom}

$\pm 10\%$ from 0.5% to 4% of q_{nom}

Temperature:

Max. working temperature: 230°F

Min. working temperature: 14°F

Operating environment: 32°F to 122°F (5-95%RH, non-condensing)

Storage environment: -4°F to 158°F (5-95%RH, non-condensing)

Media:

Water or neutral fluids, water-glycol mixtures (0-57%).

Leakage rate:

1/2" - 2": Leakage rate $< 0.01\%$ of q_{nom} with correct flow direction (Class IV according to EN 60534-4)

2 1/2" - 5": Tight sealing with correct flow direction (Class V according to EN 60534-4)

Characteristics:

Settable: Stepless between EQM 0.25 and inverted EQM 0.25.

Supply voltage:

24 VAC/VDC $\pm 15\%$.

Frequency 50/60 Hz ± 3 Hz.

NOTE: 24 VAC/VDC power supply must be provided only with safety isolating transformer according to EN 61558-2-6.

Power consumption:

1/2" - 2":

Peak: < 4.5 W (24 VDC); < 6.6 VA (24 VAC)

Operation: < 4.2 W (24 VDC); < 6 VA (24 VAC)

Standby: < 2.0 W (24 VDC); < 3.6 VA (24 VAC)

2 1/2" - 3":

Peak: < 10.5 W (24 VDC); < 18.4 VA (24 VAC)

Operation: < 6.1 W (24 VDC); < 11 VA (24 VAC)

Standby: < 2.1 W (24 VDC); < 4.1 VA (24 VAC)

4" - 5":

Peak: < 10.5 W (24 VDC); < 18.4 VA (24 VAC)

Operation: < 8 W (24 VDC); < 11.3 VA (24 VAC)

Standby: < 2.1 W (24 VDC); < 3.8 VA (24 VAC)

Peak consumption occurs for a short period after a power cut for recharging capacitors.

Input signal:

By BACnet/Modbus or Analog signal.

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

0(2)-10 VDC, R_i 47 k Ω .

Adjustable sensitivity 0.1-0.5 VDC.

0.33 Hz low pass filter.

0(4)-20 mA R_i 500 Ω .

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):

0-4.5 / 5.5-10 VDC.

2-5.5 / 6.5-10 VDC.

0-3.3 / 6.7-10 VDC.

2-4.7 / 7.3-10 VDC.

0-9 / 11-20 mA.

4-11 / 13-20 mA.

Default setting: Proportional 0-10 VDC.

Output signal:

BACnet/Modbus

0(2)-10 VDC, max. 8 mA, min. 1.25 k Ω .

Fail-safe delay:

Adjustable between 0 and 10 seconds.

Default setting: 2 s

Pre-charging time:

1/2" - 2": < 40 s

2 1/2" - 3" < 60 s

4" - 5" < 125 s

Wireless:

Bluetooth Low Energy (BLE)

Thread

Temperature sensor cable:

1/2" - 2": 9.8 ft halogen free

2 1/2" - 5": 16.4 ft halogen free

32.8 ft. halogen free cable on request.

Ingress protection:

IP54 (according to EN 60529)

Protection class:

(according to EN 61140)

III (SELV)

Material:

Sizes 1/2" - 2":

Valve body: AMETAL[®]

Valve insert: AMETAL[®]

Valve plug: AMETAL[®] and PTFE

Spindle: Stainless steel

Spindle seal: EPDM O-ring

Internal plastic parts: PPS

Springs: Stainless steel

O-rings: EPDM

Temperature housing: AMETAL[®].

Sizes 2 1/2" - 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 (1/2" - 5"):

Cover: PC/ABS, red.

Housing: PC/ABS, TPE.

Actuators:

Sizes 1/2" - 2":

Cover: PC/ABS GF8, white RAL 9016,

grey RAL 7047.

Housing: PA GF40.

Swivelling nut: Nickel-plated brass.

Sizes 2 1/2" - 5":

Cover: PBT, orange RAL 2011, grey

RAL 7043.

Bracket: Alu EN44200

Wires: Halogen free

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

Surface treatment:

1/2" - 2": Non treated

2 1/2" - 5": Electrophoretic painting

Pipe connection:

1/2" - 2": External thread according to

ISO 228. Connections (accessories) with internal NPT according to ANSI/ASME B1.20.1-1983, or for soldering according to ASME/ANSI B16.18.

2 1/2" - 5": Flanges according to ASME 7 ANSI B16.42 Class 150.

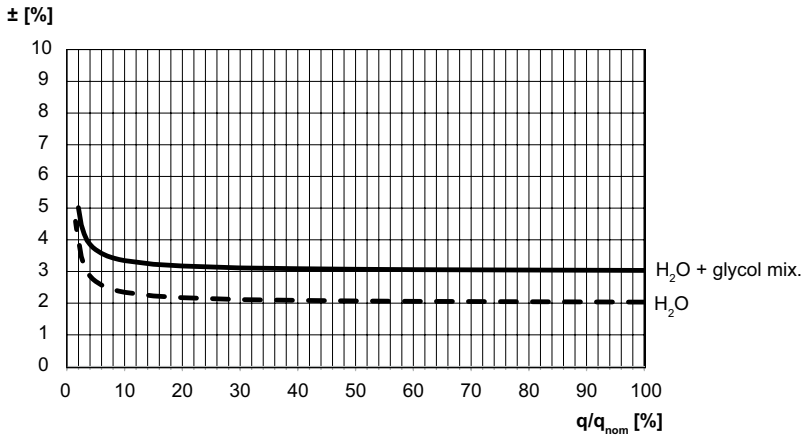
Certifications and directives:

EMC-D. 2014/30/EU: EN 60730-1, -2-14.

Product standards EN 60730-x.

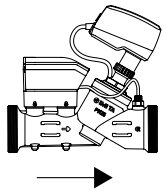
PED: 2014/68/EU

Flow accuracy

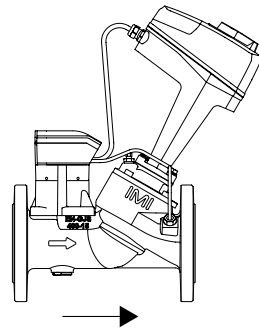


Installation

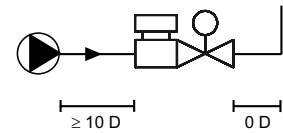
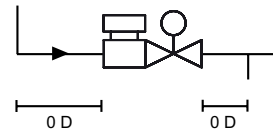
1/2" - 2"



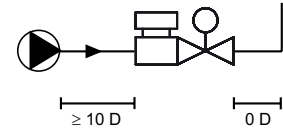
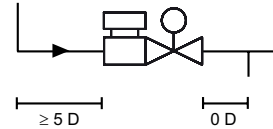
2 1/2" - 5"



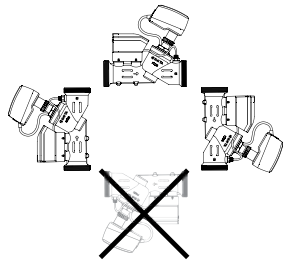
1/2" - 2"



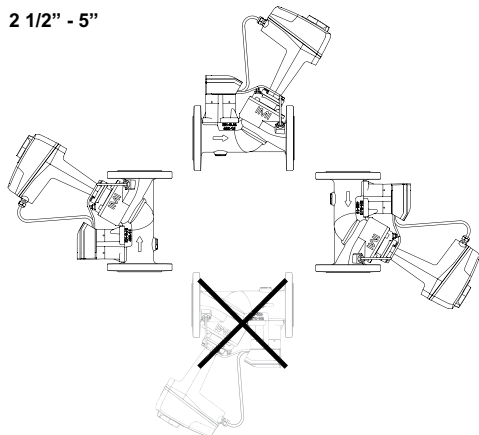
2 1/2" - 5"



1/2" - 2"

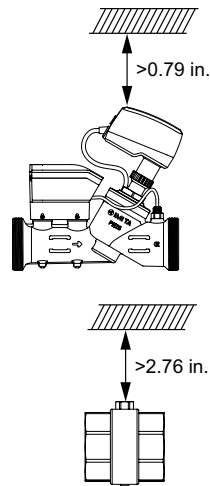


2 1/2" - 5"

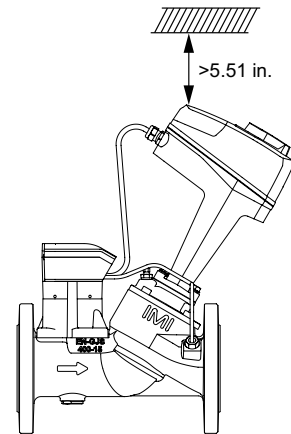


Note: Free space is required above the actuator/temperature sensor pocket for easy mounting/dismounting.

1/2" - 2"



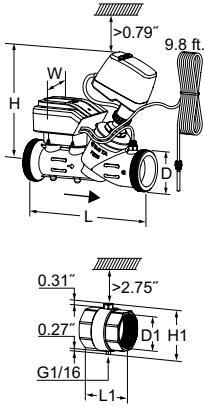
2 1/2" - 5"



Articles

TA-Smart sizes 1/2" - 2"

Including temperature housing and 9.8 ft. temperature sensor cable.
 (32.8 ft. cable on request, please contact IMI Hydronic Engineering)
 External threads according to ISO 228.
 NPT threads - see "Connections".



Size	D	L [in]	H [in]	W [in]	Cvs	lb.	Article No
1/2"	G3/4	6.57	6.81	3.82	2.20	3.09	322233-00115
3/4"	G1	7.09	6.85	3.82	3.64	3.53	322233-00120
1"	G1 1/4	7.36	6.85	3.82	5.03	3.97	322233-00125
1 1/4"	G1 1/2	7.87	7.83	3.82	8.44	4.63	322233-00132
1 1/2"	G2	8.58	7.79	3.82	14.3	6.61	322233-00140
2"	G2 1/2	9.41	7.79	3.82	24.5	8.60	322233-00150

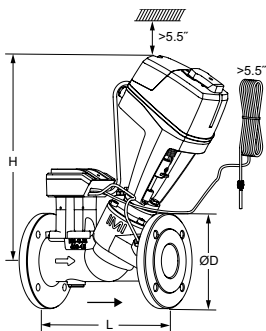
Temperature housing incl. temperature sensor pocket

Included in TA-Smart sizes 1/2" - 2".
 Internal thread NPT according to ANSI/ASME B1.20.1-1983.

Size	D1	L1 [in]	H1 [in]
1/2"	1/2 NPT	2.05	2.17
3/4"	3/4 NPT	2.17	2.20
1"	1 NPT	2.52	2.40
1 1/4"	1 1/4 NPT	2.60	2.79
1 1/2"	1 1/2 NPT	2.64	3.03
2"	2 NPT	2.68	3.50

TA-Smart sizes 2 1/2" - 5"

Including temperature sensor pocket and 16.4 ft. temperature sensor cable.
 (32.8 ft. cable on request, please contact IMI Hydronic Engineering)
 Free space >2.76 in. is required above the temperature pocket.
 Flanges according to ASME 7 ANSI B16.42 Class 150.

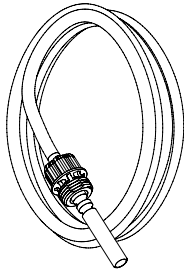


Size	Number of bolt holes	D [in]	L [in]	H [in]	Cvs	lb.	Article No
Class 150							
2 1/2"	4	7.09	11.42	14.84	56.6	36.4	322233-01465
3"	4	7.48	12.20	14.96	84.4	41.0	322233-01480
4"	8	9.06	13.78	17.24	139	63.9	322233-01490
5"	8	10.04	15.75	17.48	220	77.2	322233-01491

→ = Flow direction

Cvs = gpm at a pressure drop of 1 psi and fully open valve.

Accessories



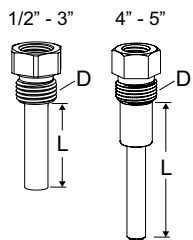
Temperature sensor

Included in TA-Smart.

(32.8 ft. cable on request, please contact IMI Hydronic Engineering)

Tool for exchanging temperature sensor is included.

For size	Length [ft]	Article No
1/2" - 1"	9.8	322230-01106
1 1/4" - 2"	9.8	322230-01100
2 1/2" - 5"	16.4	322230-01101

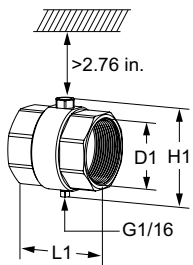


Temperature sensor pocket

Included in TA-Smart sizes 2 1/2" - 5".

For mounting directly on pipe. Free space >2.76 in. is required above the temperature sensor pocket.

For size	D	L [in]	Article No
1/2" - 1"	1/4 NPT	0.55	322230-00501
1 1/4" - 3"	1/4 NPT	1.18	322230-00500
4" - 5"	3/8 NPT	2.28	322230-00502



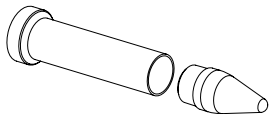
Temperature housing incl. temperature sensor pocket

Included in TA-Smart sizes 1/2" - 2".

To be ordered separately if the pipe size does not match the valve size.

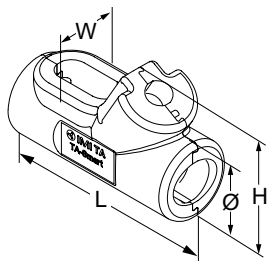
Internal thread NPT according to ANSI/ASME B1.20.1-1983.

Size	D1	L1 [in]	H1 [in]	Article No
1/2"	1/2 NPT	2.05	2.17	322230-00315
3/4"	3/4 NPT	2.17	2.20	322230-00320
1"	1 NPT	2.52	2.40	322230-00325
1 1/4"	1 1/4 NPT	2.60	2.79	322230-00332
1 1/2"	1 1/2 NPT	2.64	3.03	322230-00340
2"	2 NPT	2.68	3.50	322230-00350



Service tool

	Article No
For exchange of temperature sensor	322033-00000
For exchange of TA-Slider cable	322033-00001



Insulation

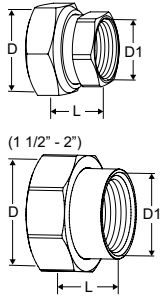
For heating and non-condensing cooling applications.

Material: EPP.

Fire class: E (EN 13501-1), B2 (DIN 4102).

For size	L [in]	H [in]	W [in]	Ø [in]	Article No
1/2"	-	-	-	-	-
3/4"	8.46	4.41	2.99	2.72	322230-00620
1"	8.86	4.68	3.39	3.23	322230-00625
1 1/4"	9.37	6.02	3.62	3.78	322230-00632
1 1/2"	10.1	6.61	4.33	4.49	322230-00640
2"	11.2	7.20	5.28	5.63	322230-00650

Connections

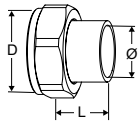


With internal thread NPT

Threads according to ANSI/ASME B1.20.1-1983.

Swivelling nut
Brass/AMETAL®

For size	D	D1	L [in] *	Article No
1/2"	G3/4	1/2 NPT	0.98	52 163-215
3/4"	G1	1/2 NPT	0.71	52 163-320
3/4"	G1	3/4 NPT	0.91	52 163-220
1"	G1 1/4	3/4 NPT	1.06	52 163-325
1"	G1 1/4	1 NPT	1.06	52 163-225
1 1/4"	G1 1/2	1 NPT	1.06	52 163-332
1 1/4"	G1 1/2	1 1/4 NPT	1.22	52 163-232
1 1/2"	G2	1 NPT	1.18	52 163-340
1 1/2"	G2	1 1/2 NPT	1.26	52 163-240
2"	G2 1/2	1 1/2 NPT	1.26	52 163-350
2"	G2 1/2	2 NPT	1.26	52 163-250



Soldering connection

According to ASME/ANSI B16.18

Swivelling nut
Brass/gunmetal CC491K (EN 1982)

For size	D	Pipe Ø [in]	L [in] *	Article No
1/2"	G3/4	0.629	0.63	52 009-715
3/4"	G1	0.879	0.87	52 009-720
1"	G1 1/4	1.130	1.02	52 009-725
1 1/4"	G1 1/2	1.380	1.10	52 009-732
1 1/2"	G2	1.630	1.22	52 009-740
2"	G2 1/2	2.130	1.50	52 009-750

*) Fitting length (from the gasket surface to the end of the connection).

Other type of connections (ISO), see international version of TA-Smart.

