

Harmony



Pressure Independent
Balancing and Control Valve

Engineering
GREAT Solutions

HARMONY

The Harmony delivers a complete hydronic balancing and control solution that optimizes the performance of cooling and heating systems. Engineered to provide more precise control at minimal energy consumption, Harmony advances PICV technology with first-in-the-industry innovations for enhanced measuring and diagnostics, easier system maintenance and faster commissioning.



Key Features

> More Precise Control

No lift limitations with the full stroke of the valve while maintaining the ability to set maximum flow rates prevents overflow at all terminal units.

> Minimal Energy Consumption

Harmony's startup pressure at 2 psi is the lowest in the industry.

> Trouble-Free Set Up in the Field

Easy-to-use dial lets users set the exact GPM, without time-consuming calibrations.

> Built-in Flushing Feature

The first-of-its kind feature in the HVAC industry, Harmony's integral bypass valve allows for flushing after installation.

> True Isolation and Increased Serviceability

Harmony's unique breakaway isolation valve saves time and money installing one separately in the field.

> Easy Installation

One of the smallest and lightest PICVs in the industry, Harmony can be installed in any orientation.

> High Reliability

DZR brass and stainless steel guarantees high corrosion resistance and reduces the risk of leakage.

Technical Description

Application:

HVAC, Chilled and Hot Water Hydronic Systems

Functions:

Control, Balancing, Pre-Setting, Differential Pressure Control, Measuring, Shut-off and Maintenance

Sizes:

1/2" - 3"

Pressure class:

400 psig

Differential pressure (Δp_V):

1/2" - 1"	2-80 psi
1-1/4" - 2"	3-60 psi
2-1/2"	3.5-60 psi
3"	4-60 psi

Flow range:

1/2"	Min 0.2	Max 2.0 gpm
3/4"	Min 0.5	Max 5.0 gpm
1"	Min 2.0	Max 11 gpm
1-1/4"	Min 4.0	Max 20 gpm
1-1/2"	Min 10	Max 50 gpm
2"	Min 10	Max 50 gpm
2-1/2"	Min 20	Max 100 gpm
3"	Min 32	Max 160 gpm

Temperature:

1/2" - 1-1/4"	Max. working temp.: 250° F
	Min. working temp.: -20° F
1-1/2" - 3"	Max. working temp.: 250° F
	Min. working temp.: -4° F

Stroke:

1/2"	4 mm	1-1/2"	16 mm
3/4"	6 mm	2"	16 mm
1"	9 mm	2-1/2"	20 mm
1-1/4"	12 mm	3"	20 mm

Leakage rate:

<0.01% of Maximum Cv

Marking:

400 wwp, flow direction arrow, size

End Connections:

1/2" - 2"	Inlet - FPT / Outlet - FPT
2-1/2" - 3"	Flanges according to ANSI B16.5 Class 150

Connection to actuator:

1/2" - 1"	M30 x 1.5 Thread
1-1/2" - 2"	M30 x 1.5 Thread
2-1/2" - 3"	2 x M8 Thread

Technical Description (Continued)

Material: 1/2" - 1-1/4"

Valve body: DZR Brass
 Valve plug: EPDM
 Presetting parts: PPS composite
 Spindle: Stainless Steel
 Spindle seat: EPDM
 Δp insert: Brass for containing pressure, PPS composite internals
 Membrane: EPDM
 Springs: Stainless Steel
 O-rings: EPDM

Material: 1-1/2" - 2"

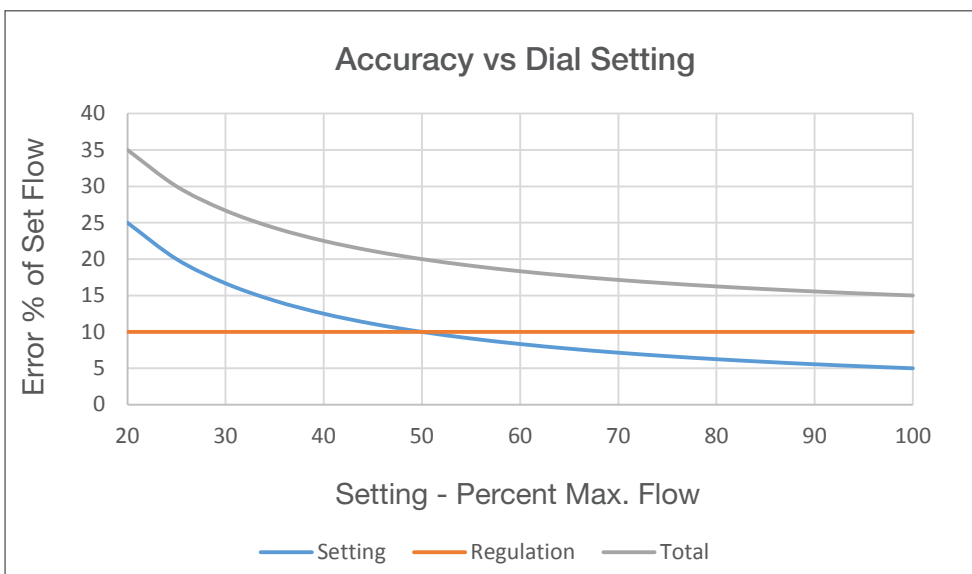
Valve body: AMETAL
 Valve insert: Brass
 Valve plug: Brass
 Spindle: Stainless Steel
 Spindle seat: EPDM O-ring
 Dp insert: PPS
 Membrane: EPDM
 Spring: Stainless Steel
 O-rings: EPDM

Material: 2-1/2" - 3"

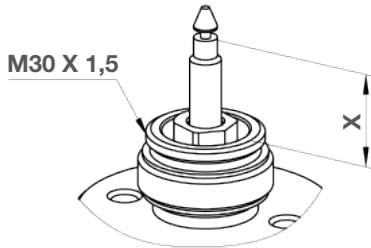
Valve body: Ductile iron EN-GJS-400
 Valve insert: Ductile iron EN-GJS-400 and brass
 Valve plug: Brass
 Spindle: Stainless Steel
 Spindle seat: EPDM O-ring
 Dp insert: PPS
 Membrane: EPDM
 Springs: Stainless Steel
 O-rings: EPDM

Measuring Accuracy

Maximum flow deviation at different settings



Actuator Connection



Valve Size	X-Closed, min
1/2"	0.41" (10.5 mm)
3/4"	0.40" (10.1 mm)
1"	0.47" (12 mm)
1-1/4"	0.32" (8.2 mm)
1-1/2"	0.24" (9 mm)
2"	0.24" (9 mm)
2-1/2"	0.72" (6 mm)
3"	0.72" (6 mm)

Starting Pressure

Model	Size	Flow						
		0.2	0.5	1	2	3	4	5
HM050	1/2"	2.0 psi	2.0 psi	2.0 psi	2.2 psi	-	-	-
HM075	3/4"	-	2.0 psi	2.0 psi	2.0 psi	2.0 psi	2.2 psi	2.5 psi

Model	Size	Flow							
		2	4	6	8	10	11	15	20
HM100	1"	2.0 psi	2.0 psi	2.3 psi	2.8 psi	3.3 psi	3.6 psi	-	-
HM125	1-1/4"	-	2.4 psi	2.4 psi	2.4 psi	2.4 psi	2.4 psi	3.5 psi	4.8 psi

Model	Size	Flow								
		10	15	20	25	30	35	40	45	50
HM150	1-1/2"	2.8 psi	2.8 psi	2.8 psi	2.8 psi	2.8 psi	3.2 psi	3.5 psi	3.8 psi	4.0 psi

Model	Size	Flow								
		10	15	20	25	30	35	40	45	50
HM200	2"	2.8 psi	2.8 psi	2.8 psi	2.8 psi	2.8 psi	3.2 psi	3.5 psi	3.8 psi	4.0 psi

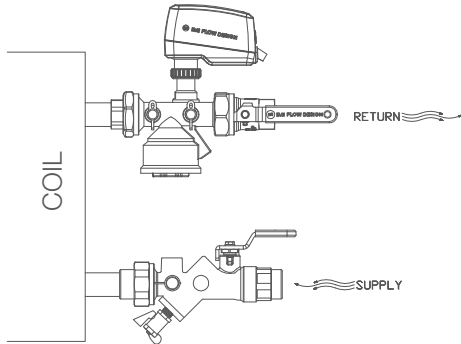
Model	Size	Flow								
		20	30	40	50	60	70	80	90	100
HM250	2-1/2"	3.5 psi	3.5 psi	3.5 psi	3.6 psi	3.6 psi	3.6 psi	3.7 psi	3.8 psi	3.9 psi

Model	Size	Flow								
		32	48	64	80	96	112	128	144	160
HM300	3"	3.9 psi	3.9 psi	3.9 psi	4.0 psi	4.1 psi	4.3 psi	4.4 psi	4.5 psi	4.6 psi

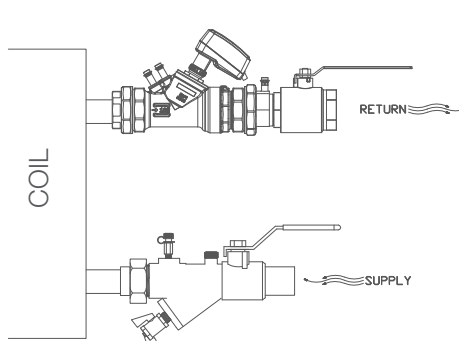
Installation

Application Example

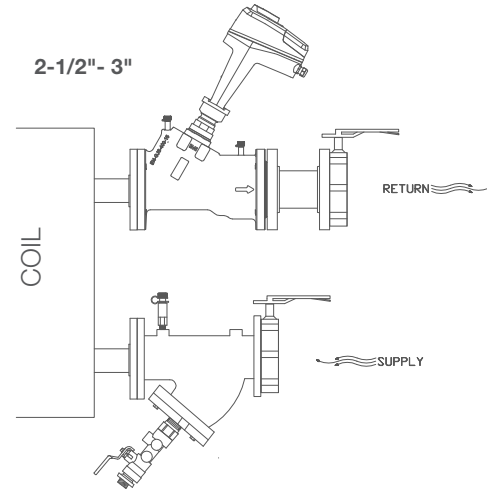
1/2" - 3/4"



1" - 2"



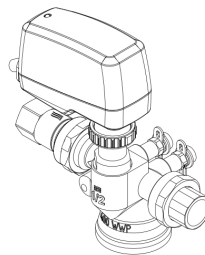
2-1/2" - 3"



Installation of Actuator

Approx. 1" in of free space is required above the actuator. Place the actuator onto the valve and tighten the threaded nut.

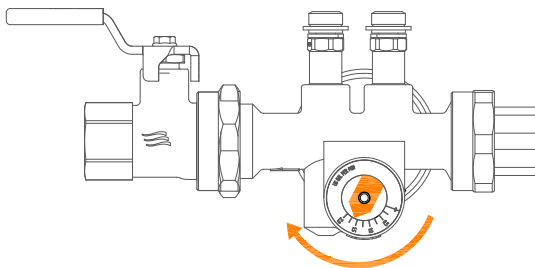
Harmony + Actuator



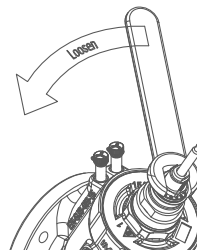
Operation

Setting

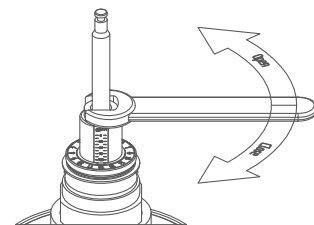
1/2" - 2"



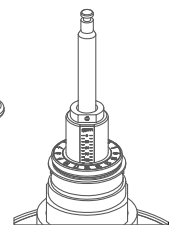
2-1/2" - 3"



Loosen Lock Nut



Adjust Max. Flow



Read Max. Flow
(128+12=140)

1. Remove actuator by rotating coupling ring counter-clockwise.
2. Turn pointer to the desired flow (label is in GPM).
 - a. If there is no pressure in the system, the pointer can be turned by hand.
 - b. If there is pressure, a wrench might be needed.
3. Re-Install actuator

1. Loosen lock nut
2. Turn setting to reach desired flow
3. To read setting, find the last mark that is visible on the vertical scale and add the number on the ring scale pointed to by the red mark on the setting screw
4. Tighten lock nut

Operating Instructions

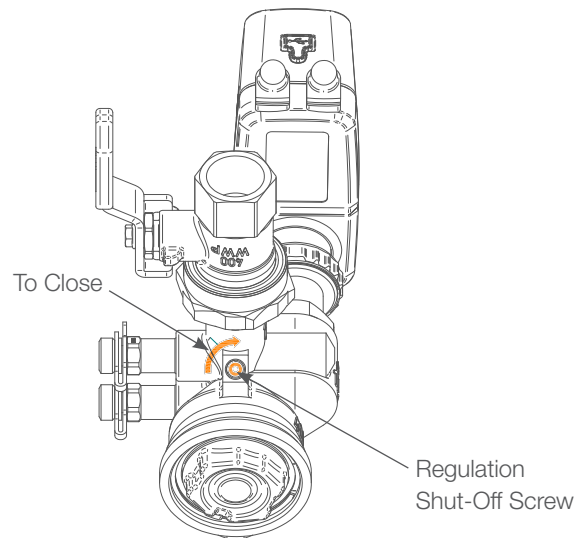
Measuring ΔH

The two P/T ports allow measurement of the total pressure drop across the valve. If it is more than the required minimum pressure at the desired flow, then the pump head in the system could be reduced by the difference without affecting the terminal where the measured unit is attached. Find the terminal with the least excess pressure, and reduce the pump pressure by the difference at that terminal.

Flushing System - 1/2" - 1 1/4"

When flushing system:

- Step 1.** Stop flow to the terminal and then tighten the screw shown in the illustration (right) using either a 2mm or 5/64 allen wrench
- Step 2.** This will disable regulating function, allowing higher flow through the valve
- Step 3.** Reopen the isolation valve



After flushing the system, be sure to loosen the screw on every Harmony valve in order to re-enable regulation. There is no need to stop flow while re-opening the screw. The screw should stop when it reaches an internal safety clip, but if not do not unscrew beyond the surface of the body.

Flushing System - 1 1/2" - 2"

When flushing system:

- Step 1.** Close pressure passage by tightening upstream P/T port with 5mm allen wrench as shown in [Figure 1](#)
- Step 2.** Bleed pressure from regulator as shown in [Figure 2](#) (Do not loosen bleed screw more than one turn) This also uses the 5mm allen wrench
- Step 3.** Tighten bleed screw
- Step 4.** Flush system
- Step 5.** Open pressure passage by loosening upstream P/T port until it reaches the safety clip Open pressure passage by loosening upstream P/T port until it reaches the safety clip

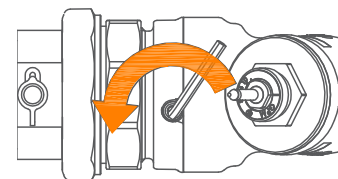
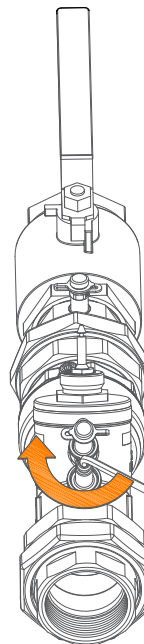


Figure 2

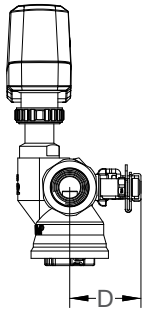
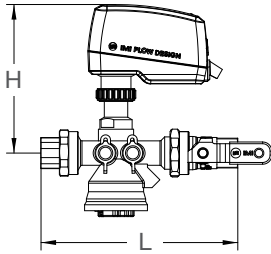
Turn as shown to bleed
(1/4 turn or so)

Figure 1

Turn as shown until tight

Note: Flushing feature not available for sizes 2-1/2" - 3"

Articles



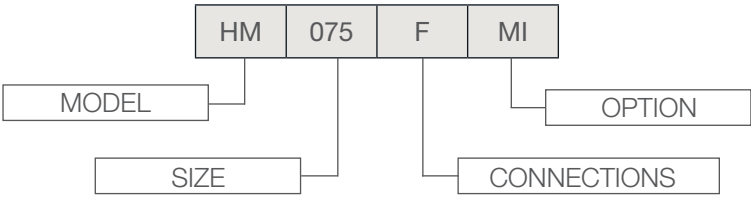
Nominal Dimensions / Weights

Size	L [in]	H [in]	D [in]	Weight w/Actuator lb	Weight w/o Actuator lb
1/2"	6.6	5.0	2.0	3.1	2.6
3/4"	7.2	5.0	2.2	4.4	3.8
1"	10.1	6.0	2.2	4.9	4.4
1-1/4"	12.1	6.3	2.4	9.8	9.3
1-1/2"	15.3	5.9	3.4	19.6	19.2
2"	16.8	5.9	3.8	23.8	23.4
2-1/2"	11.4	17.2	7.0	43.4	40.0
3"	12.2	17.2	7.5	49.1	45.6

Connections

Model	Size in./mm	Outlet Connection in./mm	Inlet Connection in./mm
HM050	1/2" (15)	1/2" (15) F	1/2" (15) F
		3/4" (20) F	3/4" (20) F
HM075	3/4" (20)	3/4" (20) F	1/2" (15) F
			3/4" (20) F
			1" (25) F
HM100	1" (25)	1" (25) F	1" (25) F
HM125	1 1/4" (32)	1 1/4" (32) F	1 1/4" (32) F
HM150	1 1/2" (40)	1 1/2" (40) F	1 1/2" (40) F
HM200	2" (50)	2" (50) F	2" (50) F
HM250	2 1/2" (65)	2 1/2" (65) Flange	2 1/2" (65) Flange
HM300	3" (80)	3" (80) Flange	3" (80) Flange

Model Order Designation



F = female NPT S = sweat

Options Available

- DX** Ext. P/T Ports
- MI** Metal ID Tag
- EH** Extended Handle

Harmony Actuator

The Harmony 160/500 Actuator requires the lowest power consumption and the least programming time in the industry. Fully programmable without power, the Harmony's wide range of set-up options and adjustable maximum stroke of the valve bring unprecedented opportunities for advanced hydronic balancing and control of your HVAC systems.



Key Features

> Convenient, Reliable Set-up

Fully customizable by smart phone via Bluetooth, app, and Actuator Control Unit, users can program multiple Harmony actuators with just a few clicks.

> Time-Saving Copy of Settings

Identical settings can be copied from Actuator Control Unit to multiple Harmony actuators, for 50% faster commissioning than conventional actuators.

> Extensive Setup Flexibility

More than 200 setup options allow for the configuration of input and output signals, binary input, relay, characteristics and many other on-site parameters.

> Easy Diagnostic

The only actuator range with memory of the previous 10 errors allows users to find possible system faults quickly.

> Digital Setup Comfort

Unique digital configuration provides on-site adaptability to real system conditions, even in buildings without BUS communication.

Technical Description

Functions:

Proportional control
Manual override
Self-stroking
Mode, status and position indication
Stroke limitation setting
Valve blockage protection
Valve clogging detection
Error safe position
Diagnostic/Logging

Supply Voltage:

24 VAC/VDC $\pm 15\%$
Frequency 50/60 Hz ± 3 Hz.

Power Consumption: (HA-Harmony Actuator)

HA160 Operation: < 1 VA (VAC); < 0.6 W (VDC)
Standby: < 0.5 VA (VAC); < 0.25 W (VDC)
HA500 Operation: < 3.2 VA (VAC); < 1.6 W (VDC)
Standby: < 1.3 VA (VAC); < 0.6 W (VDC)
HA750 Operation: < 8 VA (VAC); < 4.5 W (VDC)
Standby: < 1 VA (VAC); < 0.5 W (VDC)
100-240 VAC:
Operation: < 9.7 VA (VAC)
Standby: < 1.8 VA (VAC)

Input Signal:

0(2)-10 VDC, Ri 47 k Ω .
Adjustable sensitivity 0.1-0.5 VDC.
0.33 Hz low pass filter.
Proportional:
0-10, 10-0, 2-10, 10-2 VDC
0-20, 20-0, 4-20, 20-4 mA (750 only)

Proportional split-range:

0-5, 5-0, 5-10, 10-5 VDC
0-4.5, 4.5-0, 5.5-10, 10-5.5 VDC
2-6, 6-2, 6-10, 10-6 VDC
0-10, 10-0, 10-20, 20-10 mA (750 only)
4-12, 12-4, 12-20, 20-12 mA (750 only)
Proportional dual range (for changeover): (750 only)
0-3.3 / 6.7-10VDC
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:

Ranges: See "Input signal".

Characteristics:

Linear, EQM 0.25 and inverted EQM 0.25

Control Speed:

254 s/in

Adjusting Force: (HA-Harmony Actuator)

HA160 36 lbf Push (no pull)
HA500 110 lbf Push 70 lbf Pull
HA750 170 lbf

Temperature:

Operating environment: 32°F – +122°F
(5-95%RH, non-condensing)
Storage environment: -4°F – +158°F
(5-95%RH, non-condensing)

Ingress Protection:

IP54
(all directions) **HA160 / HA500**
(according to EN 60529)
HA750 Specified directions

Stroke:

HA160 0.25 in. / **HA500** 0.7 in. / **HA750** 0.87 in.
Automatic detection of the valve lift (self-stroking).

Noise Level:

Max. 30 dBA

Weight:

HA160 0.44 lb
HA500 0.44 lb
HA750 3.5 lb

Connection to Valve:

HA160/500 Retainer nut M30x1.5.
HA750 2x M8 Bolt

Material:

Cover: PC/ABS GF8
Housing: PA GF40.
Swivelling nut: Nickel-plated brass.

Marking:

Label: IMI Flow Design, CE, product name and technical specification.

Certification:

LV-D. 2014/35/EU: EN 60730-1, -2-14.

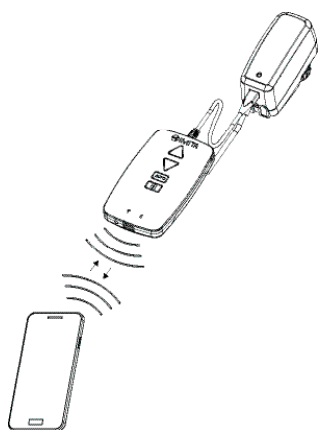
Function

Setting

The actuator can be set by the HyTune app (iOS version 8 or later on iPhone 4S or later, Android version 4.3 or later) + the Actuator Control Unit, with or without the actuator power supplied.

The setting configuration can be stored in the Actuator Control Unit for setting of one or several actuators. Press the configuration button on the Actuator Control Unit, after connecting to the actuator.

HyTune can be downloaded from the Apple App Store or Google Play.



Manual Override

By using the Actuator Control Unit device. No power supply needed.

LED indication

Status	Red (heating) Blue (cooling)	
Fully retracted (actuator stem)	Long pulse Short pulse	(— · — · — ·)
Fully retracted (actuator stem)	Short pulse Long pulse	(· — · — · —)
Intermediate position	Long pulse	(— — —)
Moving	Short pulse	(· · ·)
Calibrating	2 Short pulse	(· · · · ·)
Manual mode or no power supply	Off	

Error code	Violet	
Power supply too low	1 pulse	(· · ·)
Line broken (2-10 V or 4-20 mA)	2 pulse	(· · · · ·)
Valve clogging or foreign object	3 pulse	(· · · · · · · · ·)
Stroke detection failure	4 pulse	(· · · · · · · · · ·)

If an error is detected, violet pulses are displayed as the red or blue status lights flash alternately.

More detailed information, please see the HyTune app + Actuator Control Unit.

Calibration/self-stroking

According to selected settings in the table.

Type of calibration	At power on	After manual override
Both end positions (full)	√*	√
Fully extended position (fast)	√	√*
None	√	

* Default

Note: A calibration refresh can be automatically repeated monthly or weekly.
Default setting: Off.

Self-adjusting force

Automatic valve type detection, the force is set to 36 lbf or 45 lbf for IMI Flow Design valves.
Default setting: On.

Stroke limitation setting

The stroke can be set to a percentage (20-100%) of detected valve lift.
For some IMI Flow Design valves it can also be set to a Cvmax/qmax.
Default setting: No stroke limitation (100%).

Valve blockage protection

If no actuation is performed for one week or one month, the actuator will perform one full stroke cycle.
Default setting: Off.

Valve clogging detection

If actuation stops before the desired value is reached, the actuator moves back ready to make a new attempt. The actuator will move to the configured error safe position after three attempts.
Default setting: On.

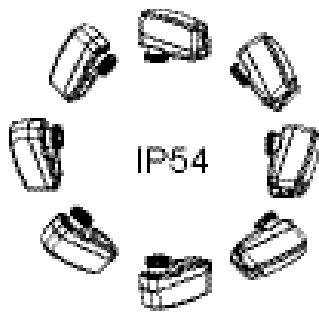
Error safe position

Fully extended or retracted position when following errors occur; low power, line break, valve clogging or stroke detection failure.
Default setting: Fully retracted position.

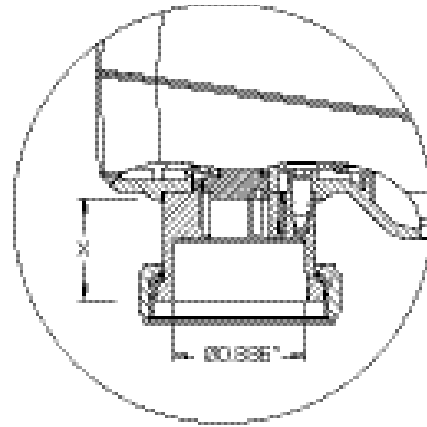
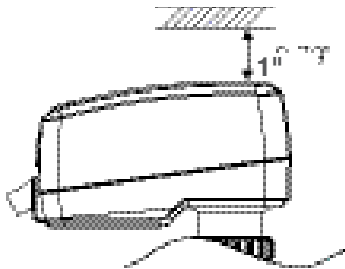
Diagnostics/logging

The last 10 errors (low power, line break, valve clogging, stroke detection failure) with time-stamps are readable by the HyTune app + Actuator Control Unit device. Time-stamps of past errors will be cleared if the power is disconnected.

Installation



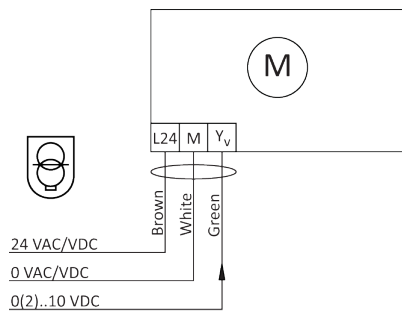
Note:



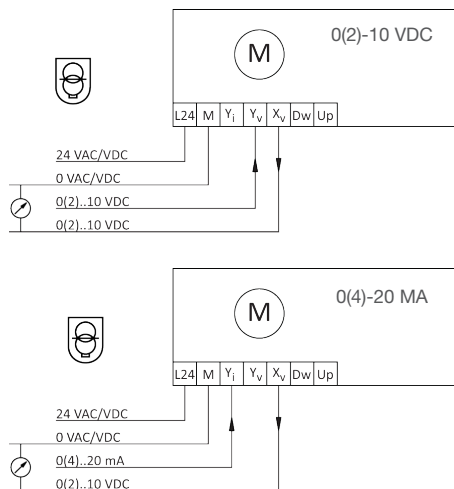
$$X = 0.394" - 0.665"$$

Connection Diagram

Actuator 160/500



Actuator 750



Harmony Actuator 160/500

Terminal	Wire Color	Description
L24	Brown	Power supply 24 VAC/VDC
M	White	Neutral for power supply 24 VAC/VDC and signals
Yv	Green	Input signal for proportional control 0(2)-10 VDC, 47 kΩ

Harmony Actuator 750

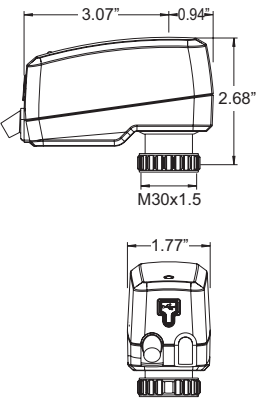
Terminal	Description
L24	Power supply 24 VAC/VDC
M*	Neutral for power supply 24 VAC/VDC and signals
L	Power supply 100-240 VAC
N	Neutral for power supply 100-240 VAC
Yi	Input signal for proportional control 0(4)-20 mA, 500 Ω
Yv	Input signal for proportional control 0(2)-10 VDC, 47 kΩ
Xi	Output signal 0(4)-20 mA, max. resistance 700 Ω
Xv	Output signal 0(2)-10 VDC, max. 8 mA or min. load resistance 1.25 kΩ
Dw	3-point control signal for extending actuator spindle (24 VAC/VDC or 100-240 VAC)
Up	3-point control signal for retracting actuator spindle (24 VAC/VDC or 100-240 VAC)
B	Connection for potential free contact (e.g. open window detection), max. 100 Ω, max. 10 m cable or shielded
COM1, COM2	Common relay contacts, max. 250 VAC, max. 5A @ 250 VAC on resistive load, max. 5A @ 30 VDC on resistive load
NC1, NC2	Normally closed contacts for relays 1 and 2
NO1, NO2	Normally open contacts for relays 1 and 2

Notes: 24 VAC/DC operating only with safety transformer according EN 61558-2-6

* All M terminals are internally connected.

Actuator Selection

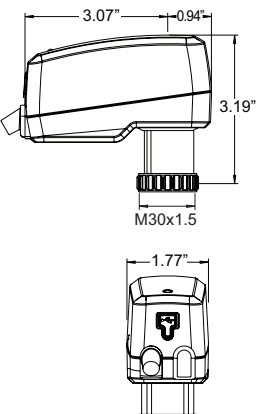
HA160 Actuator



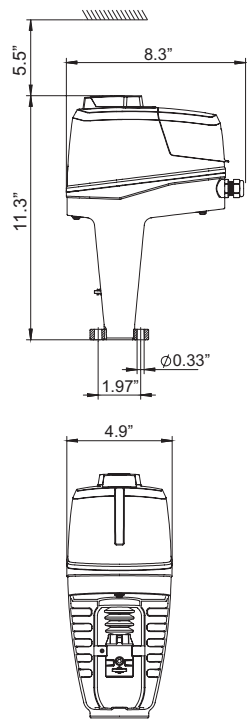
Harmony 160/500 Actuator

Actuator Selection	
Harmony	Actuator
HM050	HA160
HM075	HA160
HM100	HA500
HM125	HA500
HM150	HA500
HM200	HA500
HM250	HA750
HM300	HA750

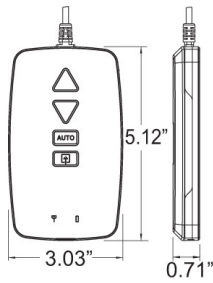
HA500 Actuator



HA750 Actuator



Function



Actuator Control Unit

For Bluetooth communication with the app HyTune, transfer configuration settings and manual override