Project Name: Cincinnati State HPB Boiler and Controls
Submittal: 44OP-398119_CSTCC_HPB_VAV_FR_VALVE_SUBMITTAL REV. 2

CMTA Project Code:	OSCB24	Reviewed by:	David Finke
Date Received:	5/9/2025	Date Returned:	05/09/2025

Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with requirements of the drawings and specifications. This check is only for review of general compliance with the information given in the contract documents. The contractor is responsible for confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades; and performing his work in a safe and satisfactory manner.

☒ **Reviewed** ☐ **Furnish as Corrected**

☐ **Rejected** ☐ **Revise and Resubmit**

COMMENTS:

1. ~~CV-207 serves FR-1-319.1, 319.2, 317, 315 per RFI. Pick up additional responses from control valve RFI.~~
2. Valves to be submitted at a later date:
   a. Provide control valve for CAH-1.
   b. provide new control valves for AHU-1.
3. ~~Specification calls for heating hot water to fail open. Provide fail open rather than the submitted fail in place.~~

1100 Sycamore Street, Ste. 400 | Cincinnati, OH 45202 | 513.429.4404 | cmta.com

The Geiler Company
6561 Glenway Avenue
P.O. Box 11324
Cincinnati, Ohio 45211-0324
Service (513) 574-0025
Contract (513) 574-1200 ext.267

GEILER
Mechanical Contractors

SUBMITTED FOR APPROVAL

PROJECT: Cinti State HPB

Engineer CMTA

Geiler Project Number- 25-015

SPEC. SECTION: 23 09 23

GEILER SUBMITTAL NO: 10 REVISED

ITEM: Valves for the VAV's, Fin Tube, Hydro Radiant and Unit Heaters

REVIEWED BY: Doug Weberding

DATE: 5/5/2025

SIEMENS

Siemens Industry, Inc.
Smart Infrastructure

Smart Infrastructure Transmittal Form

To: Geiler Company LLC P.O. Box 11324 6561 Glenway Ave. Cincinnati, Ohio	**Date:** 5/9/25	**Our Job No.** 44OP-398119
	Job Name CSTCC HPB Controls Upgrade	
	Your Order No.	

WE ARE SENDING YOU:

- ☐ HEREWITH
- ☐ UNDER SEPARATE COVER THE FOLLOWING ITEMS:
- ☒ SUBMITTALS FOR REVIEW/APPROVAL
- ☐ APPROVED SUBMITTALS
- ☐ SUBMITTALS FOR YOUR USE
- ☐ MARKED PLANS & SPECIFICATIONS
- ☐ CERTIFIED PAYROLL
- ☐ ENGINEERING COMMENTS
- ☐ ORIGINAL DRAWINGS
- ☐ SHOP DRAWINGS
- ☐ CHANGE ORDER(S)
- ☐

THESE ARE SUBMITTED:

- ☒ FOR APPROVAL
- ☐ FOR CORRECTION
- ☐ FOR COMMENTS
- ☐ FOR YOUR USE
- ☐ PLEASE RETURN _____ APPROVED COPY(S) FOR OUR USE

DESCRIPTION
(REVISED based on resubmit comments)) Siemens' floor level valve schedule (VAV Reheat, Fin-Tube, Hydro Radiant and Unit Heater valve)

IN ORDER TO PREPARE THE SUBMITTAL, WE NEED THE FOLLOWING INFORMATION AS CHECKED BELOW:

- ☐ ARCHITECTURAL PLANS
- ☐ MECHANICAL PLANS
- ☐ ELECTRICAL PLANS
- ☐ MECHANICAL SPECIFICATIONS
- ☐ ELECTRICAL SPECIFICATIONS
- ☐ BOILER WIRING
- ☐ ELECTRICAL HEATING COIL WIRING
- ☐ CHILLER WIRING
- ☐ TERMINAL UNIT CUT SHEETS
- ☐ HUMIDIFIER CUT SHEETS
- ☐ DX COIL WIRING
- ☐ COMPLETE SET(S) OF PLANS & SPECS.

PLEASE BE ADVISED THAT WE MUST HAVE THIS INFORMATION BEFORE WORK CAN BEGIN ON YOUR SUBMITTAL

REMARKS

PLEASE ADDRESS YOUR REMARKS TO: **Siemens Industry, Inc.**	ATTENTION: David Batdorf
	TELEPHONE NO: 513-212-8784

SIEMENS

FLOOR LEVEL VALVE SUBMITTAL:
REVISE & RESUMITT 5/8/2025

VAV REHEAT
FIN-TUBE VALVES
HYDRO RADIANT VALVES
UNIT HEATER VALVES

Siemens Industry
Smart Infrastructure

2000 Eastman Dr
Milford, OH 45150
USA

PHONE: 513-742-5590
FAX: 513-595-8844

05/08/25

FOR INFORMATION CONTACT
David Batdorf

Cincinnati State

ENGINEERING DATA FOR
CSTCC HPB HVAC Controls

3520 Central Parkway
Cincinnati, OH 45223
USA

44OP-398119

ARCHITECT

CMTA
ENGINEER

THE GEILER COMPANY LLC
CONTRACTOR

SIEMENS

Section 1: Schedules

Siemens Industry, Inc.

2000 Eastman Dr ● Milford, OH 45150 ● Tel: (513) 742-5590 ● Fax: (513) 595-8844

44OP-398119, CSTCC HPB Controls Upgrade
Siemens Industry, Smart Infrastructure
Terminal Box / Control Valve Schedule

SIEMENS Industry, Inc

5/8/2025

HVAC TERMINAL UNIT SCHEDLE																				
GENERAL					REHEAT, FIN-TUBE, UNIT HEATER, CONTROL VALVES:															
EQUIPMENT MARK	Room Number	Description	CV-SERVICE	Mech Dwg#	Vlv Tag	Valve#	Valve Size (in)	Medium	Manuf.	Config.	Body Style	Norm Pos	SR/NSR	Control	Design P. Drop (psi)	HW GPM (gpm)	Design Cv	Actual Cv	Actual P.D. (psi)	Close Off (psi)	COMMENTS:
VAV-001A	101	ENTRYWAY	VAV-RHV	M-200	VAV-001A	171K-10305	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	6.17	2.76	4.00	2.38	200	
VAV-001B	101	ENTRYWAY	VAV-RHV	M-200	VAV-001B	171K-10305	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	8.29	3.71	4.00	4.30	200	
VAV-001C	101	ENTRYWAY	VAV-RHV	M-200	VAV-001C	171G-10355	0.50	HW	SIEMENS	3-WAY	BALL	--	SR	0-10V	5.00	8.29	3.71	4.00	4.30	200	
VAV-002	002	AUDITORIUM	VAV-RHV	M-200	VAV-002	171K-10305	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	6.17	2.76	4.00	2.38	200	
VAV-003	003	MENS RR	VAV-RHV	M-200	VAV-003	171K-10304	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	4.73	2.12	2.50	3.58	200	
VAV-004	004	AUDITORIUM	VAV-RHV	M-200	VAV-004	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.96	1.32	1.60	3.42	200	
VAV-006	006	AUDITORIUM	VAV-RHV	M-200	VAV-006	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.96	1.32	1.60	3.42	200	
VAV-008	008	CLASSROOM	VAV-RHV	M-200	VAV-008	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.96	1.32	1.60	3.42	200	
VAV-010	010	CLASSROOM	VAV-RHV	M-200	VAV-010	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.96	1.32	1.60	3.42	200	
VAV-102	102	LAB	VAV-RHV	M-210	VAV-102	171K-10304	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	5.12	2.29	2.50	4.19	200	
VAV-104	104	LAB	VAV-RHV	M-210	VAV-104	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.96	1.32	1.60	3.42	200	Missing Rm Temp Sensor.
VAV-105	105	WOMENS RR	VAV-RHV	M-210	VAV-105	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.77	0.79	1.00	3.13	200	
VAV-106	106	CLASSROOM	VAV-RHV	M-210	VAV-106	171K-10304	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	4.02	1.80	2.50	2.59	200	
VAV-107	107	LABORATORY	VAV-RHV	M-210	VAV-107	171G-10354	0.50	HW	SIEMENS	3-WAY	BALL	--	SR	0-10V	5.00	5.12	2.29	2.50	4.19	200	
VAV-108	108	LABORATORY	VAV-RHV	M-210	VAV-108	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.96	1.32	1.60	3.42	200	
VAV-109	109	CLASSROOM	VAV-RHV	M-210	VAV-109	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.96	1.32	1.60	3.42	200	
VAV-110	110	CLASSROOM	VAV-RHV	M-210	VAV-110	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	3.26	1.46	1.60	4.15	200	
VAV-111	111	FACULTY	VAV-RHV	M-210	VAV-111	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.35	1.05	1.60	2.16	200	
VAV-112	112	CLASSROOM	VAV-RHV	M-210	VAV-112	171K-10304	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	4.09	1.83	2.50	2.68	200	
VAV-170	101	CORRIDOR	VAV-RHV	M-210	VAV-170	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.96	1.32	1.60	3.42	200	
VAV-200	200	OFFICE	VAV-RHV	M-220	VAV-200	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.96	1.32	1.60	3.42	200	
VAV-201	201	S.E. CORRIDOR	VAV-RHV	M-220	VAV-201	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.50	0.67	1.00	2.25	200	
VAV-202	202	STORAGE	VAV-RHV	M-220	VAV-202	171K-10305	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	6.17	2.76	4.00	2.38	200	
VAV-203	203	OFFICE	VAV-RHV	M-220	VAV-203	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.35	1.05	1.60	2.16	200	
VAV-204	204	CLASSROOM	VAV-RHV	M-220	VAV-204	171K-10305	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	6.17	2.76	4.00	2.38	200	
VAV-205	205	WOMENS RR	VAV-RHV	M-220	VAV-205	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.35	1.05	1.60	2.16	200	
VAV-206	206	CLASSROOM	VAV-RHV	M-220	VAV-206	171K-10304	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	5.12	2.29	2.50	4.19	200	
VAV-207	207	LAB	VAV-RHV	M-220	VAV-207	171G-10354	0.50	HW	SIEMENS	3-WAY	BALL	--	SR	0-10V	5.00	4.09	1.83	2.50	2.68	200	
VAV-207B	207B	LAB	VAV-RHV	M-220	VAV-207B	171K-10304	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	4.09	1.83	2.50	2.68	200	
VAV-208A	208A	CLASSROOM	VAV-RHV	M-220	VAV-208A	171K-10304	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	5.12	2.29	2.50	4.19	200	
VAV-209	209	CLASSROOM	VAV-RHV	M-220	VAV-209	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.96	1.32	1.60	3.42	200	
VAV-210	210	CLASSROOM	VAV-RHV	M-220	VAV-210	171K-10304	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	5.12	2.29	2.50	4.19	200	
VAV-212	212	CLASSROOM	VAV-RHV	M-220	VAV-212	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.96	1.32	1.60	3.42	200	
VAV-213	213	OFFICE	VAV-RHV	M-220	VAV-213	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.77	0.79	1.00	3.13	200	FTV on L1 VAV on L2
VAV-214	211	OFFICE	VAV-RHV	M-220	VAV-214	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.50	0.67	1.00	2.25	200	
VAV-218	218	OFFICE	VAV-RHV	M-220	VAV-218	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.50	0.67	1.00	2.25	200	FTV on L1 VAV on L2
VAV-220	220	OFFICE	VAV-RHV	M-220	VAV-220	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.50	0.67	1.00	2.25	200	FTV on L1 VAV on L2
VAV-300	300	OFFICE	VAV-RHV	M-230	VAV-300	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.65	1.19	1.60	2.74	200	FTV on L2 VAV on L3
VAV-301	301	CORRIDOR	VAV-RHV	M-230	VAV-301	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	3.04	1.36	1.60	3.61	200	
VAV-303	303	WORK RM	VAV-RHV	M-230	VAV-303	171K-10301	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.27	0.57	0.63	4.06	200	
VAV-304	304	OFFICE	VAV-RHV	M-230	VAV-304	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.77	0.79	1.00	3.13	200	FTV on L2 VAV on L3
VAV-305	305	CORRIDOR	VAV-RHV	M-230	VAV-305	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.46	0.65	1.00	2.13	200	Missing Rm Temp Sensor
VAV-308	308	CLASSROOM	VAV-RHV	M-230	VAV-308	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.77	0.79	1.00	3.13	200	
VAV-310	310	OFFICE	VAV-RHV	M-230	VAV-310	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.46	0.65	1.00	2.13	200	FTV on L2 VAV on L3
VAV-312	312	OFFICE	VAV-RHV	M-230	VAV-312	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.96	1.32	1.60	3.42	200	FTV on L2 VAV on L3
VAV-312.1	312.1	OFFICE	VAV-RHV	M-230	VAV-312.1	171K-10304	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	5.13	2.29	2.50	4.21	200	
VAV-313	311	OFFICE	VAV-RHV	M-230	VAV-313	171G-10353	0.50	HW	SIEMENS	3-WAY	BALL	--	SR	0-10V	5.00	3.04	1.36	1.60	3.61	200	FTV on L2 VAV on L3
VAV-314	314	OFFICE	VAV-RHV	M-230	VAV-314	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	3.04	1.36	1.60	3.61	200	FTV on L2 VAV on L3
VAV-316	316	OFFICE	VAV-RHV	M-230	VAV-316	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.77	0.79	1.00	3.13	200	FTV on L2 VAV on L3
VAV-318	318	OFFICE	VAV-RHV	M-230	VAV-318	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.77	0.79	1.00	3.13	200	FTV on L2 VAV on L3
VAV-319	319	OFFICE	VAV-RHV	M-230	VAV-319	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.35	1.05	1.60	2.16	200	FTV on L2 VAV on L3

44OP-398119, CSTCC HPB Controls Upgrade
Siemens Industry, Smart Infrastructure
Terminal Box / Control Valve Schedule

SIEMENS Industry, Inc
5/8/2025

HVAC TERMINAL UNIT SCHEDLE																				
GENERAL					REHEAT, FIN-TUBE, UNIT HEATER, CONTROL VALVES:															
EQUIPMENT MARK	Room Number	Description	CV-SERVICE	Mech Dwg#	Vlv Tag	Valve#	Valve Size (in)	Medium	Manuf.	Config.	Body Style	Norm Pos	SR/NSR	Control	Design P. Drop (psi)	HW GPM (gpm)	Design Cv	Actual Cv	Actual P.D. (psi)	Close Off (psi)	COMMENTS:
VAV-320	320	OFFICE	VAV-RHV	M-230	VAV-320	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.77	0.79	1.00	3.13	200	FTV on L2 VAV on L3
VAV-323	323	OFFICE	VAV-RHV	M-230	VAV-323	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	3.04	1.36	1.60	3.61	200	FTV on L2 VAV on L3
VAV-326	326	OFFICE	VAV-RHV	M-230	VAV-326	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.65	1.19	1.60	2.74	200	FTV on L2 VAV on L3
VAV-331	331	OFFICE	VAV-RHV	M-230	VAV-331	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	3.04	1.36	1.60	3.61	200	FTV on L2 VAV on L3
VAV-332	332	OFFICE	VAV-RHV	M-230	VAV-332	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.65	1.19	1.60	2.74	200	FTV on L2 VAV on L3
VAV-333	333	COMPUTER RM	VAV-RHV	M-230	VAV-333	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.77	0.79	1.00	3.13	200	
VAV-337	337	ELECTRIC RM	VAV-RHV	M-230	VAV-337	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.46	0.65	1.00	2.13	200	Missing Rm Temp Sensor
VAV-338	338	OFFICE	VAV-RHV	M-230	VAV-338	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.65	1.19	1.60	2.74	200	FTV on L2 VAV on L3
VAV-339	339	FACULTY	VAV-RHV	M-230	VAV-339	171K-10300	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	0.53	0.24	0.40	1.76	200	
VAV-341	341	LOUNGE	VAV-RHV	M-230	VAV-341	171K-10301	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	0.99	0.44	0.63	2.47	200	
VAV-343	343	STORAGE	VAV-RHV	M-230	VAV-343	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.77	0.79	1.00	3.13	200	
VAV-344	344	OFFICE	VAV-RHV	M-230	VAV-344	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.65	1.19	1.60	2.74	200	FTV on L2 VAV on L3
VAV-345	345	CONFERENCE	VAV-RHV	M-230	VAV-345	171K-10301	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.14	0.51	0.63	3.27	200	
VAV-347	347	WORK RM	VAV-RHV	M-230	VAV-347	171K-10300	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	0.77	0.34	0.40	3.71	200	
VAV-348	348	OFFICE	VAV-RHV	M-230	VAV-348	171K-10300	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	0.81	0.36	0.40	4.10	200	FTV on L2 VAV on L3
VAV-354	354	OFFICE	VAV-RHV	M-230	VAV-354	171K-10300	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	0.81	0.36	0.40	4.10	200	FTV on L2 VAV on L3
VAV-356	356	OFFICE	VAV-RHV	M-230	VAV-356	171K-10301	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.14	0.51	0.63	3.27	200	FTV on L2 VAV on L3
VAV-358	358	OFFICE	VAV-RHV	M-230	VAV-358	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.65	1.19	1.60	2.74	200	FTV on L2 VAV on L3
CV-000	001	ENTRY VESTIBULE	CUH-2.0	M-200	CV-000	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.50	1.12	1.60	2.44	200	
CV-001A	001A	ENTRYWAY	FR-2.1-2	M-200	CV-001A	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.90	0.85	1.00	3.61	200	
CV-001B	001B	ENTRYWAY	FR-2.4-7	M-200	CV-001B	171K-10304	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	4.00	1.79	2.50	2.56	200	
CV-004	004	SOFFIT SPACE	FR-3-004.1-2	M-200	CV-004	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.80	0.80	1.00	3.24	200	
CV-006	006	SOFFIT SPACE	FR-3-006.2-3,008.1-2	M-200	CV-006	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.50	1.12	1.60	2.44	200	
CV-007	007	ELEC ROOM	UH-1	M-200	CV-007	171K-10304	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	3.70	1.65	2.50	2.19	200	
CV-009	009	GENERATOR RM	UH-1	M-200	CV-009	171K-10304	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	3.70	1.65	2.50	2.19	200	
CV-010	010	SOFFIT SPACE	FR-3-010.1-4	M-200	CV-010	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.50	1.12	1.60	2.44	200	
CV-100	100	VESTIBULE	CUH-2.1	M-210	CV-100	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.50	1.12	1.60	2.44	200	
CV-101A	001	ATRIUM RAD HT PNL	HR-G02.3-5	M-210	CV-101A	171K-10303	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	3.40	1.52	1.60	4.52	200	
CV-101B	L2.SOF	SOFFIT BLW 2ND FLR	FR-3-100.1-6	M-210	CV-101B	171K-10304	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	5.40	2.41	2.50	4.67	200	
CV-102	001	ENTRYWAY	HR-G02.1-2	M-210	CV-102	171K-10301	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.30	0.58	0.63	4.26	200	
CV-111	213	OFFICE	FR-1-215.1-2	M-210	CV-111	171K-10304	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	3.80	1.70	2.50	2.31	200	FTV on L1 VAV on L2
CV-112A	218	OFFICE	FR-1-216,218.1-3	M-210	CV-112A	171K-10304	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	5.40	2.41	2.50	4.67	200	FTV on L1 VAV on L2
CV-112B	220	FR-1-220,222	FR-1-220,222	M-220	CV-112B	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.70	0.76	1.00	2.89	200	FTV on L2 VAV on L3
CV-200B	304	OFFICE	FR-1-303,306	M-220	CV-200B	171K-10301	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.10	0.49	0.63	3.05	200	FTV on L2 VAV on L3
CV-200C	300	OFFICE	FR1-300-302	M-220	CV-200C	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	2.00	0.89	1.00	4.00	200	FTV on L2 VAV on L3
CV-202A	202	STORAGE	FR-202.1-2	M-220	CV-202A	171K-10300	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	0.80	0.36	0.40	4.00	200	
CV-202B	310	OFFICE	FR-2-310.1-3	M-220	CV-202B	171K-10301	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.40	0.63	0.63	4.94	200	FTV on L2 VAV on L3
CV-202C	312	OFFICE	FR-2-312.1-4	M-220	CV-202C	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.50	0.67	1.00	2.25	200	FTV on L2 VAV on L3
CV-202D	202	STORAGE	FR-2-202.3-6	M-220	CV-202D	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.50	0.67	1.00	2.25	200	
CV-203	203	OFFICE	FR-2-203,204.2-3	M-220	CV-203	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.50	0.67	1.00	2.25	200	
CV-204A	314	OFFICE	FR-2-314.1-4	M-220	CV-204A	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.50	0.67	1.00	2.25	200	FTV on L2 VAV on L3
CV-204B	318	OFFICE	FR-2-318	M-220	CV-204B	171K-10300	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	0.61	0.27	0.40	2.33	200	FTV on L2 VAV on L3
CV-204C	204	CLASSROOM	FR-204.4-7	M-220	CV-204C	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.80	0.80	1.00	3.24	200	
CV-204D	316	OFFICE	FR-2-316	M-220	CV-204D	171K-10300	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	0.30	0.13	0.40	0.56	200	FTV on L2 VAV on L3
CV-206	320	OFFICE	FR-1-320,322	M-220	CV-206	171K-10301	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.40	0.63	0.63	4.94	200	FTV on L2 VAV on L3
CV-207	323	OFFICE	**FR-1-319.1-2,317,315**	M-220	CV-207	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.60	0.72	1.00	2.56	200	FTV on L2 VAV on L3
CV-207A	**311**	**OFFICE**	**FR-1-309,311,313**	**M-220**	**CV-207A**	**171K-10302**	**0.50**	**HW**	**SIEMENS**	**2-WAY**	**BALL**	**N.O.**	**SR**	**2-10V**	**5.00**	**1.80**	**0.80**	**1.00**	**3.24**	**200**	**FTV on L2 VAV on L3**
CV-208A	326	OFFICE	FR-1-328,326,324	M-220	CV-208A	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.62	0.72	1.00	2.62	200	FTV on L2 VAV on L3
CV-208B	332	OFFICE	FR-1-330,332,334	M-220	CV-208B	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.62	0.72	1.00	2.62	200	FTV on L2 VAV on L3
CV-209	331	OFFICE	FR-1-325,323,321	M-220	CV-209	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.60	0.72	1.00	2.56	200	FTV on L2 VAV on L3

44OP-398119, CSTCC HPB Controls Upgrade
Siemens Industry, Smart Infrastructure
Terminal Box / Control Valve Schedule

HVAC TERMINAL UNIT SCHEDLE																				
GENERAL					REHEAT, FIN-TUBE, UNIT HEATER, CONTROL VALVES:															
EQUIPMENT MARK	Room Number	Description	CV-SERVICE	Mech Dwg#	Vlv Tag	Valve#	Valve Size (in)	Medium	Manuf.	Config.	Body Style	Norm Pos	SR/NSR	Control	Design P. Drop (psi)	HW GPM (gpm)	Design Cv	Actual Cv	Actual P.D. (psi)	Close Off (psi)	COMMENTS:
CV-210	338	OFFICE	FR-1-340,338,336	M-220	CV-210	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.62	0.72	1.00	2.62	200	FTV on L2 VAV on L3
CV-212A	344	OFFICE	FR-1-340,342,344	M-220	CV-212A	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.62	0.72	1.00	2.62	200	FTV on L2 VAV on L3
CV-212B	348	OFFICE	FR-1-346,348	M-220	CV-212B	171K-10301	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.10	0.49	0.63	3.05	200	FTV on L2 VAV on L3
CV-212C	354	OFFICE	FR-1-354-352	M-220	CV-212C	171K-10301	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.10	0.49	0.63	3.05	200	FTV on L2 VAV on L3
CV-213	331	OFFICE	FR-1-331,329,327	M-220	CV-213	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.60	0.72	1.00	2.56	200	FTV on L2 VAV on L3
CV-218	356	OFFICE	FR-1-356.1	M-220	CV-218	171K-10301	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.10	0.49	0.63	3.05	200	FTV on L2 VAV on L3
CV-220	358	OFFICE	FR-1-358	M-220	CV-220	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.60	0.72	1.00	2.56	200	FTV on L2 VAV on L3
CV-301	301	LOBBY	HD-301.1-2	M-230	CV-301	171K-10302	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	1.60	0.72	1.00	2.56	200	
CV-200A	201	LOBBY	HD-218.2	M-220	CV-200A	171K-10301	0.50	HW	SIEMENS	2-WAY	BALL	N.O.	SR	2-10V	5.00	0.90	0.40	0.63	2.04	200	
UH-011	011	MECH RM	UH-011	M-200	**UH-011**	**171K-10304**	**0.50**	**HW**	**SIEMENS**	**2-WAY**	**BALL**	**N.O.**	**SR**	**2-10V**	**5.00**	**3.70**	**1.65**	**2.50**	**2.19**	**200**	**Matched HW Flow w/UH-1**
UH-1.4	RTU	RTU DOG HSE	UH-1.4	M-240	**UH-1.4**	**171K-10304**	**0.50**	**HW**	**SIEMENS**	**2-WAY**	**BALL**	**N.O.**	**SR**	**2-10V**	**5.00**	**3.70**	**1.65**	**2.50**	**2.19**	**200**	**Matched HW Flow w/UH-1**

Notes: All control valves and wells shall be installed by the mechanical contractor
Flow units are in GPM (Water) lbs/hr (Steam)
Failsafe Notation: NSR = Non-Spring Return, SR = Spring Return, FS = Failsafe, F.I.P = Fail in Place
N.O. = Normally Open, N.C. = Normally Closed

SIEMENS

Section 7: Technical Literature

Siemens Industry, Inc.
2000 Eastman Dr.. ● Milford OH, 45150 ●Tel: (513) 742-5590 ● Fax: (513) 595-8844

SIEMENS

Submittal Sheet
Document No. 154-038
January 4, 2023

599 Series 2-Way Ball Valves

Description

The 599 Series 2-Way Ball Valves are coupled with OpenAir® actuators to provide equal percentage flow control. The Ball Valves are 1/4-turn rotary control valves.

Product Numbers

Use the product numbers in Table 1 through Table 11 to order a valve and actuator assembly. The product number consists of a 4-character actuator prefix code, a hyphen, and a 5-digit valve body suffix code. Stainless steel product numbers have an “S” suffix in Table 6 through Table 11.

Features

- 200 psi close-off with ANSI Class IV leakage for all line sizes and actuators.
- Available with chrome-plated brass ball and brass stem or 316 stainless steel ball and stem.
- Blow-out proof stem withstands high pressure.
- Universal mounting plate.
- Actuator and plate can be rotated (90-degree increments).
- Standoffs provide a thermal barrier between the actuator and the mounting plate.
- Operating handle for manual operation.
- All ball valve actuators include integral conduit adapters.

Table 1. Fail-In-Place Assemblies: Chrome-Plated Ball with Brass Stem (1/2-Inch and 3/4-Inch)

Valve Body Product Number *	Valve Size Inches (mm)	Flow Rate Cv (Kvs)	Close-Off ΔP in psi (kPa)	Fail-in-Place	
					
				Floating	0 to 10 Vdc
				GDE 131.1P	GDE 161.1P
				Actuator Prefix Code	
				171A	171C
599-10300	1/2 (15)	0.4 (0.34)	200 (1379)	171A-10300	171C-10300
599-10301		0.63 (0.54)		171A-10301	171C-10301
599-10302		1.0 (0.9)		171A-10302	171C-10302
599-10303		1.6 (1.4)		171A-10303	171C-10303
599-10304		2.5 (2.2)		171A-10304	171C-10304
599-10305		4.0 (3.4)		171A-10305	171C-10305
599-10306		6.3 (5.4)		171A-10306	171C-10306
599-10307*		10 (8.6)		171A-10307*	171C-10307*
599-10308	3/4 (20)	6.3 (5.4)		171A-10308	171C-10308
599-10309		10 (8.6)		171A-10309	171C-10309
599-10310		16 (14)		171A-10310	171C-10310
599-10311*		25 (22)		171A-10311*	171C-10311*

*Denotes a full-port valve without flow characterizers insert.

Table 2. Fail-In-Place Assemblies: Chrome-Plated Ball with Brass Stem (1-Inch to 2-Inch)

Valve Body Product Number *	Valve Size Inches (mm)	Flow Rate Cv (Kvs)	Close-Off ΔP in psi (kPa)	Fail-in-Place			
							
				Floating		0 to 10 Vdc	
				GDE 131.1P	GLB 131.1P	GDE 161.1P	GLB 161.1P
				Actuator Prefix Code			
				171A	171B	171C	171D
599-10312	1 (25)	10 (9.0)	200 (1379)	171A-10312		171C-10312	
599-10313		16 (14)		171A-10313		171C-10313	
599-10314		25 (22)		171A-10314		171C-10314	
599-10315		40 (34)		171A-10315		171C-10315	
599-10316*		63 (54)		171A-10316*		171C-10316*	
599-10317	1 1/4 (32)	16 (14)		171A-10317		171C-10317	
599-10318		25 (22)		171A-10318		171C-10318	
599-10319		40 (34)		171A-10319		171C-10319	
599-10320		63 (54)		171A-10320		171C-10320	
599-10321*		100 (90)		171A-10321*		171C-10321*	
599-10322	1 1/2 (40)	25 (22)		171B-10322		171D-10322	
599-10323		40 (34)		171B-10323		171D-10323	
599-10324*		63 (54)		171B-10324*		171D-10324*	
599-10325		100 (90)		171B-10325		171D-10325	
599-10326*		160 (140)		171B-10326*		171D-10326*	
599-10327	2 (50)	40 (34)		171B-10327		171D-10327	
599-10328		63 (54)		171B-10328		171D-10328	
599-10329*		100 (90)		171B-10329*		171D-10329*	
599-10330		160 (140)		171B-10330		171D-10330	

***Denotes a full-port valve without flow characterizers insert.**

Table 3. Fail-Safe Assemblies: Chrome-Plated Ball with Brass Stem (1/2-Inch and 3/4-Inch).

Valve Body Product Number*	Valve Size Inches (mm)	Flow Rate Cv (Kvs)	Close-off ΔP in psi (kPa)	Fail-Safe					
									
				2-Position		Floating		2 to 10 Vdc	
				GQD121.1P		GQD131.1P		GQD151.1P	
				N.O.	N.C.	N.O.	N.C.	N.O.	N.C.
				Actuator Prefix Code					
				171H	172H	171J	172J	171K	172K
599-10300	1/2 (15)	0.4 (0.34)	200 (1379)	171H-10300	172H-10300	171J-10300	172J-10300	171K-10300	172K-10300
599-10301		0.63 (0.54)		171H-10301	172H-10301	171J-10301	172J-10301	171K-10301	172K-10301
599-10302		1.0 (0.9)		171H-10302	172H-10302	171J-10302	172J-10302	171K-10302	172K-10302
599-10303		1.6 (1.4)		171H-10303	172H-10303	171J-10303	172J-10303	171K-10303	172K-10303
599-10304		2.5 (2.2)		171H-10304	172H-10304	171J-10304	172J-10304	171K-10304	172K-10304
599-10305		4.0 (3.4)		171H-10305	172H-10305	171J-10305	172J-10305	171K-10305	172K-10305
599-10306		6.3 (5.4)		171H-10306	172H-10306	171J-10306	172J-10306	171K-10306	172K-10306
599-10307*		10 (8.6)		171H-10307*	172H-10307*	171J-10307*	172J-10307*	171K-10307*	172K-10307*
599-10308	3/4 (20)	6.3 (5.4)		171H-10308	172H-10308	171J-10308	172J-10308	171K-10308	172K-10308
599-10309		10 (8.6)		171H-10309	172H-10309	171J-10309	172J-10309	171K-10309	172K-10309
599-10310		16 (14)		171H-10310	172H-10310	171J-10310	172J-10310	171K-10310	172K-10310
599-10311*		25 (22)		171H-10311*	172H-10311*	171J-10311*	172J-10311*	171K-10311*	172K-10311*

*Denotes a full-port valve without flow characterizer insert.

Table 4. Fail-Safe Assemblies: Chrome-Plated Ball and Brass Stem (1-Inch to 2-Inch).

Valve Body Product Number *	Valve Size Inches (mm)	Flow Rate Cv (Kvs)	Close-ff ΔP in psi (kPa)	Fail-Safe					
									
				2-Position		Floating		0 to 10 Vdc	
				GMA121.1P		GMA131.1P		GMA161.1P	
				N.O.	N.C.	N.O.	N.C.	N.O.	N.C.
				Actuator Prefix Code					
				171E	172E	171F	172F	171G	172G
599-10312	1 (25)	10 (9.0)	200 (1379)	171E-10312	172E-10312	171F-10312	172F-10312	171G-10312	172G-10312
599-10313		16 (14)		171E-10313	172E-10313	171F-10313	172F-10313	171G-10313	172G-10313
599-10314		25 (22)		171E-10314	172E-10314	171F-10314	172F-10314	171G-10314	172G-10314
599-10315		40 (34)		171E-10315	172E-10315	171F-10315	172F-10315	171G-10315	172G-10315
599-10316*		63 (54)		171E-10316*	172E-10316*	171F-10316*	172F-10316*	171G-10316*	172G-10316*
599-10317	1 1/4 (32)	16 (14)		171E-10317	172E-10317	171F-10317	172F-10317	171G-10317	172G-10317
599-10318		25 (22)		171E-10318	172E-10318	171F-10318	172F-10318	171G-10318	172G-10318
599-10319		40 (34)		171E-10319	172E-10319	171F-10319	172F-10319	171G-10319	172G-10319
599-10320		63 (54)		171E-10320	172E-10320	171F-10320	172F-10320	171G-10320	172G-10320
599-10321*		100 (90)		171E-10321*	172E-10321*	171F-10321*	172F-10321*	171G-10321*	172G-10321*
599-10322	1 1/2 (40)	25 (22)		171E-10322	172E-10322	171F-10322	172F-10322	171G-10322	172G-10322
599-10323		40 (34)		171E-10323	172E-10323	171F-10323	172F-10323	171G-10323	172G-10323
599-10324*		63 (54)		171E-10324*	172E-10324*	171F-10324*	172F-10324*	171G-10324*	172G-10324*
599-10325		100 (90)		171E-10325	172E-10325	171F-10325	172F-10325	171G-10325	172G-10325
599-10326*		160 (140)		171E-10326*	172E-10326*	171F-10326*	172F-10326*	171G-10326*	172G-10326*
599-10327	2 (50)	40 (34)		171E-10327	172E-10327	171F-10327	172F-10327	171G-10327	172G-10327
599-10328		63 (54)		171E-10328	172E-10328	171F-10328	172F-10328	171G-10328	172G-10328
599-10329*		100 (90)		171E-10329*	172E-10329*	171F-10329*	172F-10329*	171G-10329*	172G-10329*
599-10330		160 (140)		171E-10330	172E-10330	171F-10330	172F-10330	171G-10330	172G-10330

* Denotes a full-port valve without flow characterizer insert.

Table 5. Fail-Safe Assemblies: Full-Port, Chrome-Plated Ball and Brass Stem, 120V.

Valve Body Product Number*	Valve Size Inches (mm)	Flow Rate Cv (Kvs)	Close-off ΔP in psi (kPa)	Fail-Safe, 120V			
							
				2-Position			
				GQD221.1U		GMA221.1U	
				N.O.	N.C.	N.O.	N.C.
				Actuator Prefix Code			
				171L	172L	171M	172M
599-10307*	1/2 (15)	10 (9)	200 (1379)	171L-10307*	172L-10307*	—	—
599-10311*	3/4 (20)	25 (22)		171L-10311*	172L-10311*	—	—
599-10316*	1 (25)	63 (54)		—	—	171M-10316*	172M-10316*
599-10321*	1-/14 (32)	100 (90)		—	—	171M-10321*	172M-10321*
599-10326*	1-1/2 (40)	160 (140)		—	—	171M-10326*	172M-10326*
599-10330	2 (50)			—	—	171M-10330	172M-10330

* Denotes a full-port valve without flow characterizers insert.

Table 6. Fail-In-Place Assemblies: Stainless Steel Ball and Stem (1/2-Inch and 3/4-Inch).

Valve Body Product Number *	Valve Size Inches (mm)	Flow Rate Cv (Kvs)	Close-Off ΔP in psi (kPa)	Fail-in-Place	
					
				Floating	0 to 10 Vdc
				GDE 131.1P	GDE 161.1P
				Actuator Prefix Code	
				171A	171C
599-10300S	1/2 (15)	0.4 (0.34)	200 (1379)	171A-10300S	171C-10300S
599-10301S		0.63 (0.54)		171A-10301S	171C-10301S
599-10302S		1.0 (0.9)		171A-10302S	171C-10302S
599-10303S		1.6 (1.4)		171A-10303S	171C-10303S
599-10304S		2.5 (2.2)		171A-10304S	171C-10304S
599-10305S		4.0 (3.4)		171A-10305S	171C-10305S
599-10306S		6.3 (5.4)		171A-10306S	171C-10306S
599-10307S*		10 (8.6)		171A-10307S*	171C-10307S*
599-10308S	3/4 (20)	6.3 (5.4)		171A-10308S	171C-10308S
599-10309S		10 (8.6)		171A-10309S	171C-10309S
599-10310S		16 (14)		171A-10310S	171C-10310S
599-10311S*		25 (22)		171A-10311S*	171C-10311S*

*Denotes a full-port valve without flow characterizer insert.

Table 7. Fail-In-Place Assemblies: Stainless Steel Ball and Stem (1-Inch to 2-Inch).

Valve Body Product Number *	Valve Size Inches (mm)	Flow Rate Cv (Kvs)	Close-Off ΔP in psi (kPa)	Fail-in-Place			
							
				Floating		0 to 10 Vdc	
				GDE 131.1P	GLB 131.1P	GDE 161.1P	GLB 161.1P
				Actuator Prefix Code			
				171A	171B	171C	171D
599-10312S	1 (25)	10 (9.0)	200 (1379)	171A-10312S		171C-10312S	
599-10313S		16 (14)		171A-10313S		171C-10313S	
599-10314S		25 (22)		171A-10314S		171C-10314S	
599-10315S		40 (34)		171A-10315S		171C-10315S	
599-10316S*		63 (54)		171A-10316S*		171C-10316S*	
599-10317S	1-1/4 (32)	16 (14)		171A-10317S		171C-10317S	
599-10318S		25 (22)		171A-10318S		171C-10318S	
599-10319S		40 (34)		171A-10319S		171C-10319S	
599-10320S		63 (54)		171A-10320S		171C-10320S	
599-10321S*		100 (90)		171A-10321S*		171C-10321S*	
599-10322S	1-1/2 (40)	25 (22)			171B-10322S		171D-10322S
599-10323S		40 (34)			171B-10323S		171D-10323S
599-10324S*		63 (54)			171B-10324S*		171D-10324S*
599-10325S		100 (90)			171B-10325S		171D-10325S
599-10326S*		160 (140)			171B-10326S*		171D-10326S*
599-10327S	2 (50)	40 (34)			171B-10327S		171D-10327S
599-10328S		63 (54)			171B-10328S		171D-10328S
599-10329S*		100 (90)			171B-10329S*		171D-10329S*
599-10330S		160 (140)			171B-10330S		171D-10330S

*Denotes a full-port valve without flow characterizer insert.

Table 8. Fail-Safe Assemblies: Stainless Steel Ball and Stem (1/2-Inch and 3/4-Inch).

Valve Body Product Number*	Valve Size Inches (mm)	Flow Rate Cv (Kvs)	Close-off ΔP in psi (kPa)	Fail-Safe					
									
				2-Position		Floating		2 to 10 Vdc	
				GQD121.1P		GQD131.1P		GQD151.1P	
				N.O.	N.C.	N.O.	N.C.	N.O.	N.C.
				Actuator Prefix Code					
				171H	172H	171J	172J	171K	172K
599-10300S	1/2 (15)	0.4 (0.34)	200 (1379)	171H-10300S	172H-10300S	171J-10300S	172J-10300S	171K-10300S	172K-10300S
599-10301S		0.63 (0.54)		171H-10301S	172H-10301S	171J-10301S	172J-10301S	171K-10301S	172K-10301S
599-10302S		1.0 (0.9)		171H-10302S	172H-10302S	171J-10302S	172J-10302S	171K-10302S	172K-10302S
599-10303S		1.6 (1.4)		171H-10303S	172H-10303S	171J-10303S	172J-10303S	171K-10303S	172K-10303S
599-10304S		2.5 (2.2)		171H-10304S	172H-10304S	171J-10304S	172J-10304S	171K-10304S	172K-10304S
599-10305S		4.0 (3.4)		171H-10305S	172H-10305S	171J-10305S	172J-10305S	171K-10305S	172K-10305S
599-10306S		6.3 (5.4)		171H-10306S	172H-10306S	171J-10306S	172J-10306S	171K-10306S	172K-10306S
599-10307S*		10 (8.6)		171H-10307S*	172H-10307S*	171J-10307S*	172J-10307S*	171K-10307S*	172K-10307S*
599-10308S	3/4 (20)	6.3 (5.4)		171H-10308S	172H-10308S	171J-10308S	172J-10308S	171K-10308S	172K-10308S
599-10309S		10 (8.6)		171H-10309S	172H-10309S	171J-10309S	172J-10309S	171K-10309S	172K-10309S
599-10310S		16 (14)		171H-10310S	172H-10310S	171J-10310S	172J-10310S	171K-10310S	172K-10310S
599-10311S*		25 (22)		171H-10311S*	172H-10311S*	171J-10311S*	172J-10311S*	171K-10311S*	172K-10311S*

*Denotes a full-port valve without flow characterizer insert.

Table 9. Fail-Safe Assemblies: Stainless Steel Ball and Stem (1-Inch to 2-Inch).

Valve Body Product Number *	Valve Size Inches (mm)	Flow Rate Cv (Kvs)	Close-off ΔPin psi (kPa)	Fail-Safe					
									
				2-Position		Floating		0 to 10 Vdc	
				GMA121.1P		GMA131.1P		GMA161.1P	
				N.O.	N.C.	N.O.	N.C.	N.O.	N.C.
				Actuator Prefix Code					
				171E	172E	171F	172F	171G	172G
599-10312S	1 (25)	10 (9.0)	200 (1379)	171E-10312S	172E-10312S	171F-10312S	172F-10312S	171G-10312S	172G-10312S
599-10313S		16 (14)		171E-10313S	172E-10313S	171F-10313S	172F-10313S	171G-10313S	172G-10313S
599-10314S		25 (22)		171E-10314S	172E-10314S	171F-10314S	172F-10314S	171G--0314S	172G-10314S
599-10315S		40 (34)		171E-10315S	172E-10315S	171F-10315S	172F-10315S	171G-10315S	172G-10315S
599-10316S*		63 (54)		171E-10316S*	172E-10316S*	171F-10316S*	172F-10316S*	171G-10316S*	172G-10316S*
599-10317S	1-1/4 (32)	16 (14)		171E-10317S	172E-10317S	171F-10317S	172F-10317S	171G-10317S	172G-10317S
599-10318S		25 (22)		171E-10318S	172E-10318S	171F-10318S	172F-10318S	171G-10318S	172G-10318S
599-10319S		40 (34)		171E-10319S	172E-10319S	171F-10319S	172F-10319S	171G-10319S	172G-10319S
599-10320S		63 (54)		171E-10320S	172E-10320S	171F-10320S	172F-10320S	171G-10320S	172G-10320S
599-10321S*		100 (90)		171E-10321S*	172E-10321S*	171F-10321S*	172F-10321S*	171G-10321S*	172G-10321S*
599-10322S	1-1/2 (40)	25 (22)		171E-10322S	172E-10322S	171F-10322S	172F-10322S	171G-10322S	172G-10322S
599-10323S		40 (34)		171E-10323S	172E-10323S	171F-10323S	172F-10323S	171G-10323S	172G-10323S
599-10324S*		63 (54)		171E-10324S*	172E-10324S*	171F-10324S*	172F-10324S*	171G-10324S*	172G-10324S*
599-10325S		100 (90)		171E-10325S	172E-10325S	171F-10325S	172F-10325S	171G-10325S	172G-10325S
599-10326S*		160 (140)		171E-10326S*	172E-10326S*	171F-10326S*	172F-10326S*	171G-10326S*	172G-10326S*
599-10327S	2 (50)	40 (34)		171E-10327S	172E-10327S	171F-10327S	172F-10327S	171G-10327S	172G-10327S
599-10328S		63 (54)		171E-10328S	172E-10328S	171F-10328S	172F-10328S	171G-10328S	172G-10328S
599-10329S*		100 (90)		171E-10329S*	172E-10329S*	171F-10329S*	172F-10329S*	171G-10329S*	172G-10329S*
599-10330S		160 (140)		171E-10330S	172E-10330S	171F-10330S	172F-10330S	171G-10330S	172G-10330S

* Denotes a full-port valve without flow characterizer insert.

Table 10. Fail-Safe Assemblies: Full-Port, Stainless Steel Ball and Stem, 120V.

Valve Body Product Number*	Valve Size Inches (mm)	Flow Rate Cv (Kvs)	Close-off ΔP in psi (kPa)	Fail-Safe, 120V			
							
				2-Position			
				GQD221.1U		GMA221.1U	
				N.O.	N.C.	N.O.	N.C.
				Actuator Prefix Code			
				171L	172L	171M	172M
599-10307S*	1/2 (15)	10 (9)	200 (1379)	171L-10307S*	172L-10307S*	—	—
599-10311S*	3/4 (20)	25 (22)		171L-10311S*	172L-10311S*	—	—
599-10316S*	1 (25)	63 (54)		—	—	171M-10316S*	172M-10316S*
599-10321S*	1-/14 (32)	100 (90)		—	—	171M-10321S*	172M-10321S*
599-10326S*	1-1/2 (40)	160 (140)		—	—	171M-10326S*	172M-10326S*
599-10330S	2 (50)			—	—	171M-10330S	172M-10330S

* Denotes a full-port valve without flow characterizer insert.

Table 11. Fail-Safe Assemblies: Full-Port, Stainless Steel Ball and Stem, 24V with Dual Auxiliary Switches.

Valve Body Product Number*	Valve Size Inches (mm)	Flow Rate Cv (Kvs)	Close-off ΔP in psi (kPa)	Fail-Safe, 24V			
							
				2-Position			
				GQD126.1P		GMA126.1P	
				N.O.	N.C.	N.O.	N.C.
				Actuator Prefix Code			
				171N	172N	171P	172P
599-10307S*	1/2 (15)	10 (9)	200 (1379)	171N-10307S*	172N-10307S*	—	—
599-10311S*	3/4 (20)	25 (22)		171N-10311S*	172N-10311S*	—	—
599-10316S*	1 (25)	63 (54)		—	—	171P-10316S*	172P-10316S*
599-10321S*	1-/14 (32)	100 (90)		—	—	171P-10321S*	172P-10321S*
599-10326S*	1-1/2 (40)	160 (140)		—	—	171P-10326S*	172P-10326S*
599-10330S	2 (50)			—	—	171P-10330S	172P-10330S

* Denotes a full-port valve without flow characterizer insert.

Typical Specifications

Ball valves shall have female NPT type fittings and shall be 1/2-inch to 2-inch (15 mm to 50 mm) line and ball sizes. The valves shall have a forged brass body; chrome-plated brass ball with brass stem or 316 stainless steel ball and stem; and EPDM O-ring seals. Valves shall contain glass-filled PTFE ball valve seals or integral seals and flow characterizers to provide an equal percentage control characteristic where required. Ball valves shall utilize a 90-degree rotation for control. They shall provide automated flow control of hot or chilled water and up to 50% water-glycol solution for HVAC control applications.

Technical Data

Pressure Rating	600 WOG/ANSI 250	**Ball Seals**	Glass-filled PTFE with EPDM O-rings
Media Temperature	0°F to 250°F (-18°C to 121°C)	**End Connections**	Female NPT
Controlled Medium	Water, 50% water-glycol solution	**Stem**	Brass or 316 stainless steel
Body	Brass: ASTM B283, C37700	**Stem Seals**	EPDM O-rings
Ball	Chrome-plated brass or 316 stainless steel	**Angle of Rotation**	0° to 90°
Flow Characterizer	Glass-filled PTFE		

Table 12. Full-Port (No Flow Characterizer) Ball Valve Product Numbers and Flow Coefficients.

Valve Product Number	Valve Line Size in Inches (mm)	Effective (Installed) Cv (Kvs)										
		Supply Line Size in Inches (mm)										
		1/2 (13)	3/4 (20)	1 (25)	1-1/4 (32)	1-1/2 (38)	2 (51)	2-1/2 (63)	3 (76)	4 (102)	5 (127)	6 (152)
599-10307 or 599-10307S	1/2 (15)	**10.00 (8.62)**	**6.94 (5.93)**	**6.19 (5.29)**	—	—	—	—	—	—	—	—
599-10311 or 599-10311S	3/4 (20)	—	**25.00 (21.55)**	**18.66 (15.95)**	**15.35 (13.12)**	—	—	—	—	—	—	—
599-10316 or 599-10316S	1 (25)	—	—	**63.00 (54.31)**	**39.78 (34.00)**	**33.56 (28.69)**	—	—	—	—	—	—
599-10321 or 599-10321S	1-1/4 (32)	—	—	—	**100.00 (86.21)**	**69.19 (59.13)**	**51.45 (43.98)**	—	—	—	—	—
599-10324 or 599-10324S	1-1/2 (40)	—	—	—	—	**63.00 (54.31)**	**55.34 (47.30)**	**51.00 (43.59)**	—	—	—	—
599-10326 or 599-10326S		—	—	—	—	**160.00 (137.93)**	**93.80 (80.17)**	**76.34 (65.25)**	—	—	—	—
599-10329 or 599-10329S	2 (50)	—	—	—	—	—	**100.00 (86.21)**	**94.30 (80.60)**	**86.12 (73.61)**	—	—	—

= Valve may be oversized. = Optimal valve size. = Valve may be undersized

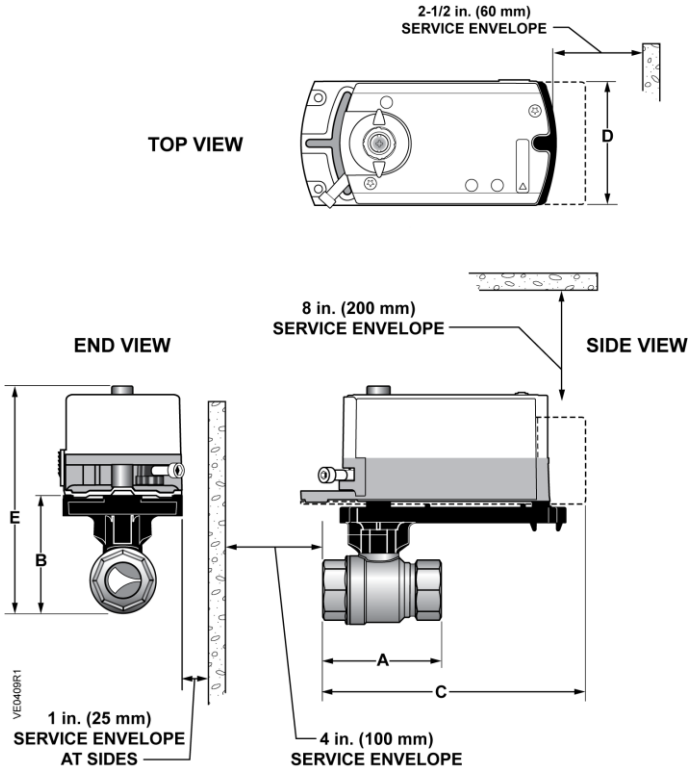


Figure 1. Two-Way Ball Valve and Low Profile Bracket with Actuator Dimensions in Inches (Millimeters).

Line Size Inches (mm)	Cv Range	A Length	B Height	C Length Actuator Codes		D Width	E Height	Valve and Bracket Weight lbs (kg)
				GDE	GQD			
				171A-D	171H, J, K, L, N			
1/2 (15)	0.4 to 10	2-7/16 (61)	2-1/4 (57)	5-1/4 (133)	5-1/4 (133)	2-3/4 (70)	4-13/16 (123)	1 (0.45)
3/4 (20)	6.3 to 25	2-3/4 (70)	2-5/8 67)	5-3/8 (136)	5-3/8 (136)		5-1/4 (133)	1.3 (0.60)

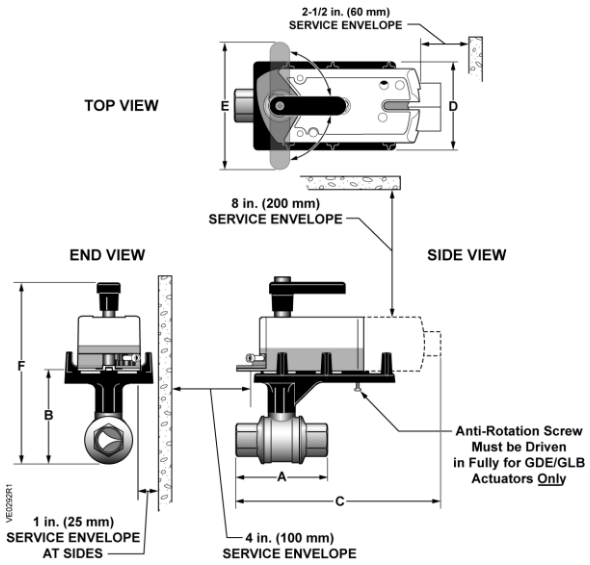


Figure 2. 2-Way Ball Valves.

- All dimensions are in inches (mm).
- Dimension “D”, Depth, is 3.7 inches (94.5) “E”, Handle, is 5.3 inches (135.9).
- Dimension weights are in pounds (kg).

Table 13. Two-Way Ball Valve and Bracket with Actuator Dimensions in Inches (Millimeters).

Line Size Inch (mm)	Cv Range	A Length	C Length * Actuator Codes 171A-D, GDE/GLB	C Length * Actuator Codes 171H,J,K GQD	C Length* Actuator Codes 171E,F 172E,F Fail Safe GMA	F Height	Valve and Bracket Weight lbs (kg)
1 (25)	10	3 (77)	6-11/16 (170)	—	8 (203)	8 (203)	1.6 (0.73)
	16, 40, 63	3-1/4 (82)		—	8-3/8 (213)	8-5/16 (212)	1.8 (0.82)
	25	3-7/8 (98)	7 (178)	—	8-11/16 (221)	8-13/16 (223)	
1-1/4 (32)	16	3-3/8(86)	6-11/16 (170)	—	8-7/16 (214)	8-3/8 (213)	2.0 (0.91)
	25 to 100	3-11/16 (94)	6-15/16 (176)	—	8-11/16 (221)	8-13/16 (223)	2.5 (1.1)
1-1/2 (40)	25, 63	3-5/8 (92)		—	8-7/16 (214)	8-13/16 (223)	1.8 (0.82)
	40, 100, 160	3-15/16 (100)	7-1/16 (180)	—	8-3/4 (223)	9-1/4 (235)	3.3 (1.50)
2 (50)	40, 100	4 (102)		—		9-3/8 (238)	3.1 (1.41)
	63	4-5/8 (118)	7-1/2 (190)	—	9-1/8 (223)	10-1/16 (255)	5.25 (2.38)
	160			—			5.3 (2.40)

*Dimension C is the maximum length, measured from actuator, end fitting, or mounting plate, whichever extends the furthest.

SIEMENS

Submittal Sheet
Document No. 154-045
January 9, 2023

599 Series 3-Way Ball Valves

Description

The 599 Series three-way Ball Valves are coupled with OpenAir® actuators to provide equal percentage flow control in either mixing or diverting applications. The Ball Valves are 1/4-turn rotary control valves and are available in 1/2-inch to 2-inch line sizes.

Product Numbers

Use the product numbers in Table 1 or Table 2 to order the valve and the actuator assembled together. The product number consists of a 4-digit prefix code, a hyphen, and a 5- or 6-digit suffix code. The prefix specifies an actuator. The suffix specifies the valve body.

Features

- ANSI 250 valve body rating.
- Available in either chrome-plated brass ball/brass stem or 316 stainless steel ball and stem
- May be used as either mixing or diverting valves
- Shutoff up to 200 psi
- Universal mounting plate
- Blow-out proof stem withstands high pressure
- Actuator and plate can be rotated
- Standoffs provide a thermal barrier between the actuator and the mounting plate
- Operating handle can manually operate valve.
- All ball valve actuators include integral conduit adapters.

Table 1. Product Numbers for Fail-In- Place Assemblies.

Valve Body Product Number *	Valve Size Inches (mm)	Close-Off ΔP in psi (kPa)	Flow Rate Cv (Kvs)	Fail-in-Place			
							
				Control & Actuator Prefix Code			
				3-Position		0 to 10 Vdc	
				GDE131.1P 171A	GLB131.1P 171B	GDE161.1P 171C	GLB161.1P 171D
599-10350(S)	1/2 (15)	200 (1379)	0.4 (0.34)	171A-10350(S)		171C-10350(S)	
599-10351(S)			0.63 (0.54)	171A-10351(S)		171C-10351(S)	
599-10352(S)			1.0 (0.86)	171A-10352(S)		171C-10352(S)	
599-10353(S)			1.6 (1.4)	171A-10353(S)		171C-10353(S)	
599-10354(S)			2.5 (2.2)	171A-10354(S)		171C-10354(S)	
599-10355(S)			4 (3.5)	171A-10355(S)		171C-10355(S)	
599-10356(S)			6.3 (5.5)	171A-10356(S)		171C-10356(S)	
599-10357(S)*			10 (8.6)	171A-10357(S)*		171C-10357(S)*	
599-10358(S)	3/4 (20)	200 (1379)	6.3 (5.5)	171A-10358(S)		171C-10358(S)	
599-10359(S)			10 (8.6)	171A-10359(S)		171C-10359(S)	
599-10360(S)*			16 (14)	171A-10360(S)*		171C-10360(S)*	
599-10361(S)	1 (25)	200 (1379)	10 (8.6)	171A-10361(S)		171C-10361(S)	
599-10362(S)			16 (14)	171A-10362(S)		171C-10362(S)	
599-10363(S)*			25 (22)	171A-10363(S)*		171C-10363(S)*	
599-10364(S)	1-1/4 (32)	200 (1379)	16 (14)	171A-10364(S)		171C-10364(S)	
599-10365(S)			25 (22)	171A-10365(S)		171C-10365(S)	
599-10366(S) *			40 (35)	171A-10366(S)*		171C-10366(S)*	
599-10367(S)	1-1/2 (40)	200 (1379)	25 (22)	171B-10367(S)		171D-10367(S)	
599-10368(S)			40 (35)	171B-10368(S)		171D-10368(S)	
599-10369(S) *			63 (54)	171B-10369(S)*		171D-10369(S)*	
599-10370(S)	2 (50)	200 (1379)	40 (35)	171B-10370(S)		171D-10370(S)	
599-10371(S)			63 (54)	171B-10371(S)		171D-10371(S)	
599-10372(S) *			100 (86)	171B-10372(S)*		171D-10372(S)*	

*Denotes a full-port valve without flow optimizer insert.
S – Suffix denotes stainless steel ball and stem
NOTE: Maximum operating differential pressure = 60 psi for 1/2" to 1-1/2"; 35 psi for 2".

Typical Specifications

Ball valves shall have female NPT type fittings and shall be 1/2 to 2-inch (15 to 50-mm) line and ball sizes. The valves shall have a forged brass body, chrome-plated brass or 316 stainless steel ball, and EPDM O-ring seals. Valves may contain a glass-filled polymer flow optimizer to provide an equal percentage control characteristic. This flow optimizer should be an integral part of the ball assembly. Ball valves shall utilize a 90-degree rotation for control. They shall provide automated flow control of hot or chilled water and up to 50% glycol solution for HVAC control applications.

Technical Data

Valve Body Rating	ANSI 250/600 WOG
Static Pressure	360 psi (2482 kPa)
Maximum Operating Differential Pressure	60 psi (414 kPa) for 1/2" to 1-1/2" valves 35 psi (345 kPa) for 2" valves
Controlled Media	Water, glycol solutions to 50%
Media Temperature	
1/2-inch to 1-1/4 inch	0°F to 250°F (-18°C to 121°C)
1-1/2 inch and 2-inch	0°F to 230°F (-18°C to 110°C)
Body	Forged Brass ASTM B283
Flow Optimizer	Glass-filled polymer
Ball	Chrome-plated brass or 316 stainless steel
Stem	Brass or 316 stainless steel
Ball Seals	Reinforced PTFE seals with EPDM O-rings
Stem Seals	EPDM O-rings
Angle of Rotation	0 to 90°

Table 2. Product Numbers for Fail-Safe Assemblies.

Valve Body Product Number *	Valve Size Inches (mm)	Close-Off ΔP in psi (kPa)	Flow Rate Cv (Kvs)	Fail-Safe		
						
				Control & Actuator Prefix Code		
				2-Position, GMA121.1P 171E	3-Position, GMA131.1P 171F	0 to 10 Vdc, GMA161.1P 171G
599-10350(S)	1/2 (15)	200 (1379)	0.4 (0.34)	171E-10350(S)	171F-10350(S)	171G-10350(S)
599-10351(S)			0.63 (0.54)	171E-10351(S)	171F-10351(S)	171G-10351(S)
599-10352(S)			1.0 (0.86)	171E-10352(S)	171F-10352(S)	171G-10352(S)
599-10353(S)			1.6 (1.4)	171E-10353(S)	171F-10353(S)	171G-10353(S)
599-10354(S)			2.5 (2.2)	171E-10354(S)	171F-10354(S)	171G-10354(S)
599-10355(S)			4 (3.5)	171E-10355(S)	171F-10355(S)	171G-10355(S)
599-10356(S)			6.3 (5.5)	171E-10356(S)	171F-10356(S)	171G-10356(S)
599-10357(S)*			10 (8.6)	171E-10357(S)*	171F-10357(S)*	171G-10357(S)*
599-10358(S)	3/4 (20)	200 (1379)	6.3 (5.5)	171E-10358(S)	171F-10358(S)	171G-10358(S)
599-10359(S)			10 (8.6)	171E-10359(S)	171F-10359(S)	171G-10359(S)
599-10360(S)*			16 (14)	171E-10360(S)*	171F-10360(S)*	171G-10360(S)*
599-10361(S)	1 (25)	200 (1379)	10 (8.6)	171E-10361(S)	171F-10361(S)	171G-10361(S)
599-10362(S)			16 (14)	171E-10362(S)	171F-10362(S)	171G-10362(S)
599-10363(S)*			25 (22)	171E-10363(S)*	171F-10363(S)*	171G-10363(S)*
599-10364(S)	1-1/4 (32)	200 (1379)	16 (14)	171E-10364(S)	171F-10364(S)	171G-10364(S)
599-10365(S)			25 (22)	171E-10365(S)	171F-10365(S)	171G-10365S)
599-10366(S)*			40 (35)	171E-10366(S)*	171F-10366(S)*	171G-10366(S)*
599-10367(S)	1-1/2 (40)	200 (1379)	25 (22)	171E-10367(S)	171F-10367(S)	171G-10367(S)
599-10368(S)			40 (35)	171E-10368(S)	171F-10368(S)	171G-10368(S)
599-10369(S)*			63 (54)	171E-10369(S)*	171F-10369(S)*	171G-10369(S)*
599-10370(S)	2 (50)	200 (1379)	40 (35)	171E-10370(S)	171F-10370(S)	171G-10370(S)
599-10371(S)			63 (54)	171E-10371(S)	171F-10371(S)	171G-10371(S)
599-10372(S)*			100 (86)	171E-10372(S)*	171F-10372(S)*	171G-10372(S)*

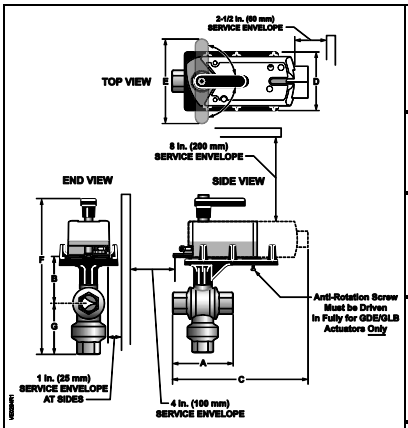
* Denotes a full-port valve without flow optimizer insert.
S – Suffix denotes stainless steel ball and stem
NOTE: Maximum operating differential pressure = 60 psi for 1/2" to 1-1/2"; 35 psi for 2".

Table 2. 3-Way, Full-Port (Without Flow Optimizer) Ball Valve Product Numbers and Flow Coefficients.

Valve Size in Inches (mm)	Valve Body Product Number	Effective (Installed) Cv (Kvs)										
		Supply Line Size in Inches (mm)										
		1/2 (13)	3/4 (20)	1 (25)	1-1/4 (32)	1-1/2 (38)	2 (51)	2-1/2 (63)	3 (76)	4 (102)	5 (127)	6 (152)
1/2 (15)	599-10357(S)	**10.00 (8.62)**	**6.94 (5.93**	**6.19 (5.29)**	--	--	--	--	--	--	--	--
3/4 (20)	599-10360(S)	--	**16.00 (13.79)**	**13.9 (11.98)**	**12.4 (10.69)**	--	--	--	--	--	--	--
1 (25)	599-10363(S)	--	--	**25.00 (21.55)**	**22.5 (19.40)**	**21.2 (18.27)**	--	--	--	--	--	--
1-1/4 (32)	599-10366(S)	--	--	--	**40.00 (34.48)**	**36.9 (31.81)**	**33.3 (28.70)**	--	--	--	--	--
1-1/2 (40)	599-10369(S)	--	--	--	--	**63.00 (54.31)**	**55.3 (47.67)**	**51.00 43.96)**	--	--	--	--
2 (50)	599-10372(S)	--	--	--	--	--	**100 (86.21)**	**94.3 (81.29)**	**86.1 (74.23)**	--	--	--

= Valve may be oversized. = Optimal valve size. = Valve may be undersized.

Table 3. Dimensions in Inches (Millimeters).



- All dimensions are in inches (mm) and weights are in pounds (kg).
- Stamping on valve body indicates the ball size, not necessarily the line size.
- Dimension “C” is maximum length, measured from the actuator, end fitting, or mounting plate, whichever extends the furthest.
- Dimension “D”, Depth, is 3 inches (76 mm).
- Dimension “E”, Handle, is 4 inches (102 mm).

Line Size Inches (mm)	Product Number	A Length	C Length * for Actuator Codes 171A-D	C Length * for Actuator Codes 171E-G	B Height	G Height	F Height	Weight
1/2 (15)	599-10350(S) through 599-10357(S)	2-9/16 (65)	6-11/16 (170)	7-3/4 (197)	3-1/4 (83)	1-3/8 (35)	8-5/8 (219)	1.50 (0.68)
3/4 (20)	599-10358(S) 599-10359(S)	2-3/4 (70)	6-11/16 (170)	8 (203)	3-1/4 (83)	1-3/8 (35)	8-5/8 (219)	1.60 (0.73)
	599-10360(S)	3-1/8 (79)				1-11/16 (43)		2.20 (1.00)
1 (25)	599-10361(S)	3-1/8 (79)	6-11/16 (170)	8 (203)	3-3/4 (95)	1-11/16 (43)	9-1/8 (232)	2.37 (1.08)
	599-10362(S) 599-10363(S)	3-13/16 (97)	6-15/16 (176)	8-1/2 (216)	4 (102)	2 (51)	9-5/8 (244)	2.74 (1.24)
1-1/4 (32)	599-10364(S) 599-10365(S)	3-5/8 (92)	6-7/8 (174)	8-1/2 (216)	4 (102)	2-1/8 (54)	9-3/4 (248)	3.50 (1.59)
	599-10366(S)	3-15/16 (100)	7 (178)			2-5/16 (59)	10-1/4 (260)	4.30 (1.95))
1-1/2 (40)	599-10367(S) 599-10368(S)	3-15/16 (100)	7 (178)	8-1/2 (216)	4 (102)	2-5/16 (59)	10-1/4 (260)	3.90 (1.76)
	599-10369(S)	4-5/8 (117)	7-1/4 (184)	8-3/4 (222)	4-1/2 (114)	2-13/16 (71)	11 (279)	7.83 (3.55)
2 (50)	599-10370(S)	4-5/8 (117)	7-1/4 (184)	8-3/4 (222)	4-1/2 (114)	2-7/8 (73)	10-3/8 (264)	6.70 (3.04)
	599-10371(S) 599-10372(S)				5-3/4 (146)		11-3/16 (284)	

Siemens Industry, Inc.
Smart Infrastructure
1000 Deerfield Parkway
Buffalo Grove, IL 60089
USA
+ 1 847-215-1000

Your feedback is important to us. If you have comments about this document, please send them to sbt_technical.editor.us.sbt@siemens.com

SIEMENS

Technical Instructions

Document No. 155-760
EA GQD
June 5, 2019

OpenAir® GQD Series

Spring Return, 20 lb-in (2 Nm), Rotary Electronic Damper Actuators

Description

The OpenAir GQD Series direct-coupled spring return electronic actuator is designed for modulating, two-position, and floating control of building HVAC dampers.

Features

- Bi-directional spring return (fail-safe)
- Pre-cabled
- Plenum-rated models available
- Optional built-in auxiliary switches with fixed switch points at 5° and 85° rotation
- Auxiliary switch units shipped with separate conduit box
- Fast run time
- Available in 20 lb-in (2 Nm) torque
- Signal inversion capability on modulating types (2 to 10 Vdc or 10 to 2 Vdc)
- UL and cUL listed, CE certified
- Compact footprint
- Low voltage models are 24 Vac/dc compatible
- All models without auxiliary switches are equipped with a conduit adapter.
- 120 Vac model with 1/2" NPT conduit connection

Application

Used in constant or variable air volume installations for the control of return air, mixed air, exhaust, and face and bypass, and residential zone dampers requiring up to 20 lb-in (2 Nm) torque.

Designed for applications that require the damper to return to a fail-safe position when there is a power failure.

Product Numbers

Table 1.

Product Number*	Torque	Voltage		Control Signals			Plenum Cabling	Appliance Cable	Auxiliary Switch
	20 lb-in	24 Vac/dc	120 Vac	2-Position	Floating	Modulating 2 to 10 Vdc/ 10 to 2 Vdc			
GQD121.1P	●	●	—	●	—	—	●	—	—
GQD126.1P	●	●	—	●	—	—	●	—	●
GQD131.1P	●	●	—	—	●	—	●	—	—
GQD136.1P	●	●	—	—	●	—	●	—	●
GQD151.1P	●	●	—	—	—	●	●	—	—
GQD156.1P	●	●	—	—	—	●	●	—	●
GQD221.1U	●	—	●	●	—	—	—	●	—
GQD226.1U	●	—	●	●	—	—	—	●	●

NOTE: Add /B to part numbers to order bulk packs of 10.

Warning/Caution Notations

WARNING:		Personal injury or loss of life may occur if you do not perform a procedure as specified.
CAUTION:		Equipment damage may occur if you do not perform a procedure as specified.

Actuator Components

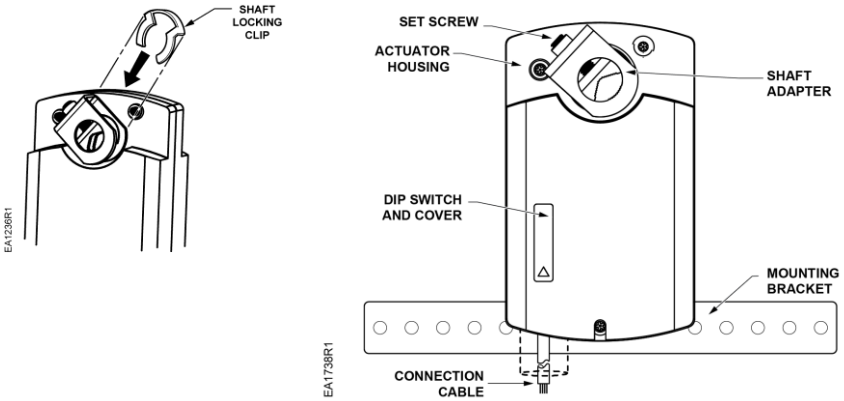


Figure 1. Components of the GQD Spring Return Actuator.

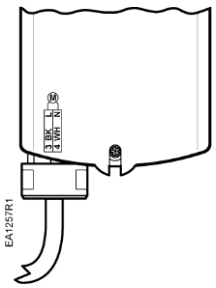


Figure 2. GQDxx1.1x with Conduit Adapter.

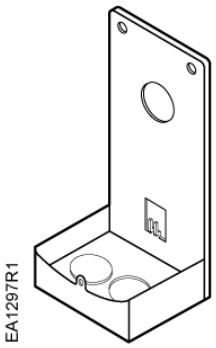


Figure 3. Conduit Box Shipped Only with GQDxx6.1x Actuators.

Specifications

Power Supply	Operating voltage	24 Vac ±20%; 24 Vdc ±15% 120 Vac ± 15%
	Frequency	50/60 Hz
	Power consumption	**Running** **Holding**
	24 Vac ±20%/ 24 Vdc ±15%	
	GQD12x.1P	6.5 VA (4.5W) 4 VA (2.5W)
	GQD13x.1P	4 VA (2.5W) 3 VA (1.5W)
	GQD15x.1P	4.5 VA (3W) 3.5 VA (2W)
	120 Vac ±15%	
	GQD22x.1U	10 VA 7 VA
Equipment Rating	24 Vac	Class 2, in accordance with UL/CSA Class III per IEC 60536
	120 Vac	Double insulation
Auxiliary Switch Rating	Fixed dual end switches AC rating	24 Vac to 250 Vac/24 Vdc 6A resistive/2 FLA/12 LRA

Specifications, Continued

Control Signal	Input signal (wires 8–2)	
	voltage input signal GQD151.1P	2 to 10 Vdc (max. 35 Vdc)
	input resistance	>100K ohms
Feedback Signal	Position output signal (wires 9–2)	
	voltage output signal GQD151.1P	2 to 10 Vdc
	maximum output current	+1 mA, -0.5 mA
Function	Running/spring return torque	20 lb-in (2 Nm)
	Maximum torque	53 lb-in (6 Nm)
	Runtime for 90°	
	operating with motor	30 seconds
	closing (on power loss) with spring return	15 seconds typical
Mounting	Nominal angle of rotation	90°
	Maximum angular rotation	95°
	Shaft size	3/8 to 1/2-inch (8 to 13 mm) dia. 1/4 to 7/16-inch (6 to 11 mm) square
	Minimum shaft length	3/4-inch (20 mm)
Housing	Enclosure	NEMA 1 IP40
	Material	Plenum-rated rugged plastic
	Gear lubrication	Silicone-free
Ambient Conditions	Ambient temperature	
	operation	–25°F to 130°F (–32°C to 55°C)
	storage and transport	–40°F to 158°F (–40°C to 70°C)
	Ambient humidity (non-condensing)	95% rh
Agency Certification		UL listed per UL873
	24 Vac	cUL to CSA C22.2 No. 24-93 C-Tick conformity per AS/NZS3548
	NOTE: These devices were approved for installation in plenum areas by Underwriters Laboratories, Inc. (UL) per UL 1995.	
CE Conformity	120 Vac	EMC and Low Voltage Directives
Miscellaneous	Pre-cabled connection	18 AWG (0.75 mm^2)
	Cable length	3 feet (0.9 m) length
	Life cycle	Designed for minimum of 60,000 full stroke cycles and a minimum of 1.5 million repositions at rated torque and temperature
	Dimensions	
	GQDxx6.1x	4-23/32" H × 2-22/32" W × 2-15/32" D (120 mm H × 69 mm W × 63 mm D)
	GQDxx1.1x	5-1/2" H × 2-22/32" W × 2-15/32" D (138.5 mm H × 69 mm W × 63 mm D)
	GQDxx6.1x w/conduit box	6-3/16" H × 2-22/32" W × 2-15/32" D (156.7 mm H × 69 mm W × 63 mm D
	Weight	1.06 lbs (0.48 kg)

Accessories

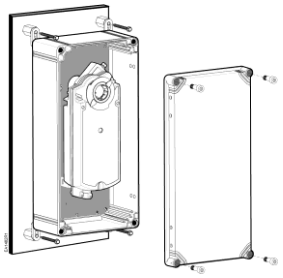


Figure 4. NEMA Type 4X Weather Shield.

ASK75.7U: GQD Actuators are UL listed to meet NEMA Type 4X requirements (a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, hose-directed water, corrosion, and damage from external ice formation) when installed with an ASK75.7U Weather Shield and outdoor-rated conduit fittings. This weather shield may be mounted in any orientation.

For dimensions, see Figure 13.

Service Parts

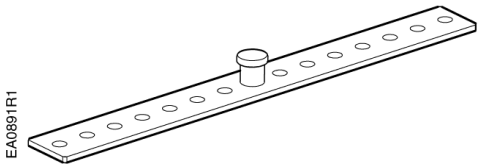


Figure 5. 985-055P24
Anti-rotation Bracket (Mounting).

Figure 6. 985-124
499-ohm Resistor Assembly Kit for 4 to 20 mA Applications.

Operation

GQD151
Apply a continuous 2 to 10 Vdc control signal between wire 8 (Y) and wire 2 (G0) to operate the damper actuator. The angle of rotation is proportional to the control signal.

A 2 to 10 Vdc position feedback output signal is available between wire 9 (U) and wire 2 (G0) to monitor the position of the damper motor.

In the event of a power failure or when the operating voltage is shut off, the actuator returns to the **0** position.

GQD121/GQD221.1U
When power is applied, the actuator coupling moves toward the open position "90°". In the event of a power failure or when the operating voltage is shut off, the actuator returns to the **0** position.

GQD131
A floating control signal controls the damper actuator. The actuator's angle of rotation is proportional to the length of time the signal is applied. A 24 Vac/dc control signal to wire 6 (Y1) causes the actuator coupling to rotate clockwise. A 24 Vac/dc control signal to wire 7 (Y2) causes the actuator coupling to rotate counterclockwise.

With no control voltage, the damper actuator holds its position. In the event of a power failure, the actuator will return to the **0** position.

Overload Protection

In the event of a blockage in the damper, the actuator is overload protected over the full range to prevent damage to the actuator.

Life Expectancy

An improperly tuned loop will cause excessive repositioning that will shorten the life of the actuator.

Sizing

The type of actuator required depends on several factors:

1. Obtain damper torque ratings (lb-in/ft^2 or Nm/m^2) from the damper manufacturer
2. Determine the area of the damper.
3. Calculate the total torque required to move the damper:

$$\text{Total Torque} = \frac{\text{Torque Rating} \times \text{Damper Area}}{\text{SF}^{1}}$$

4. Select a spring return actuator using Table 1.

[1] Safety Factor: When calculating the total torque required, a safety factor should be included for unaccountable variables such as slight misalignments, aging of the damper, etc. A suggested safety factor is 0.80.

Table 2. Sizing.

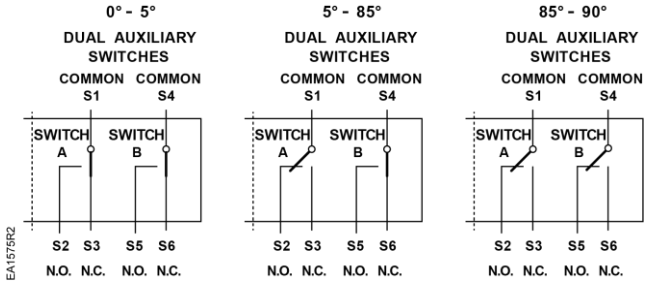
Total Torque	Actuator
≤20 lb-in (2Nm)	GQD
>35 lb-in ≤ 62 lb-in (>4 Nm ≤ 7 Nm)	GMA
>62 lb-in ≤ 160 lb-in (7 Nm ≤ 18 Nm)	GCA
>160 lb-in ≤ 320 lb-in (>18 Nm ≤ 36 Nm)	Tandem GCA **ASK73.2U***: Tandem mounting bracket with any combination of GCA16x. **ASK73.1U*:** Tandem mounting bracket for all other GCAx actuators.

***NOTE:** Mechanically coupled actuators must be of the exact same type. Use the correct mounting bracket.

Mounting and Installation

- The shaft adapter can be mounted on either side of the actuator. The actuator mounting orientation and shaft length determine how they will be mounted on the actuator.
- The minimum damper drive shaft length is 3/4-inch (20 mm).
- See *Specifications* for the minimum and maximum damper shaft dimensions.
- A mounting bracket is included with the actuator.
- See the detailed installation instructions included with each actuator.

Auxiliary Switches



Actuator Position	Switch A Common S1 Connected to	Switch B Common S4 Connected to
0° to 5°	S3	S6
5° to 85°	S2	S6
85° to 90°	S2	S5

CAUTION:
Mixed switch operation to the switching outputs of both dual end switches (5° and 85°) is not permitted.

Either AC line voltage from the same phase must be applied to all six outputs of the fixed dual end switches, or UL-Class 2 voltage must be applied to all six outputs.

DIP Switch Functionality GQD 151.1P

NOTE: The black position indicates the active switch setting.

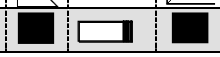
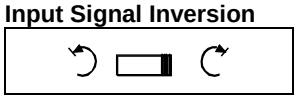
Description	Label	Description	Function
Inverse Acting		Direct-Acting	Input Signal Inversion
Inverse-Acting Feedback		Direct-Acting feedback	Feedback Signal inversion
			**Not In Use**

Figure 7. DIP Switches.

Input Signal Inversion



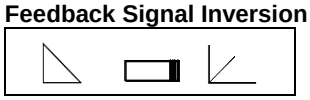
Allows inverting the control input signal

The arrow direction indicates opening or closing (closing or opening) when operating an actuator with a given control signal.

= Direct acting (Factory setting)
Input signal 2 Vdc ► fail-safe position

= Inverse acting
Input signal 10 Vdc ► fail-safe position

Feedback Signal Inversion



Allows inverting the position feedback output signal

= Direct acting feedback (Factory setting)
Fail-safe position ► Output signal 2 Vdc

= Inverse acting feedback,
Fail-safe position ► Output signal 10 Vdc

Wiring

All wiring must conform to NEC and local codes and regulations.

Use earth ground isolating step-down Class 2 transformers. Do not use autotransformers.

The maximum rating for a Class 2 step-down transformer is 100 VA. Determine the supply transformer rating by summing the VA ratings of all actuators and all other components used. It is recommended that one transformer power no more than 10 actuators (or 80% of its VA).

WARNING:
Installations requiring CE Conformance:

- All wiring for 24 Vac/dc actuators must only be safety extra-low voltage (SELV) or protective extra-low voltage (PELV) per HD384.
- Use safety transformers per EN61558 with double isolation, designed for 100% duty-cycle for supplying SELV or PELV circuits.
- Over-current protection for supply lines is maximum 10A.

Wire Designations Each wire has the standard symbol printed on it. See Table 3.

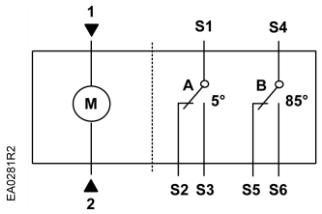
Table 3. Wire Designations.

Applicable Actuator	Standard Symbol	Function	Terminal Designations	Color
24 Vac/dc	1	Supply (SP)	G	Red
	2	Neutral (SN)	G0	Black
	6	Control signal clockwise (CW)	Y1	Violet
	7	Control signal counterclockwise (CCW)	Y2	Orange
	8	Input signal: 2 to 10 Vdc or 10 to 2 Vdc	Y	Gray
	9	Position output: 2 to 10 Vdc	U	Pink
120 Vac	3	Supply	L	Black
	4	Neutral	N	White
Auxiliary Switches	S1	Switch A – Common	S1	Gray/red
	S2	Switch A – N.O.	S2	Gray/blue
	S3	Switch A – N.C.	S3	Gray/pink
	S4	Switch B – Common	S4	Black/red
	S5	Switch B – N.O.	S5	Black/blue
	S6	Switch B – N.C.	S6	Black/pink

Wiring Diagrams

GQD12x.1P

24 Vac/dc
2-Position Control

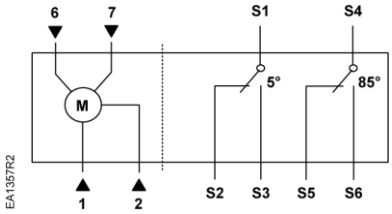


Class III

Figure 8.

GQD13x.1P

24 Vac/dc
Floating Control



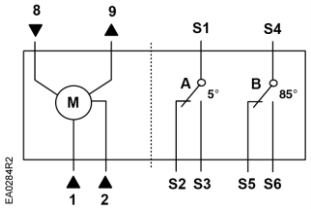
Class III

Figure 9.

Wiring Diagrams, Continued

GQD15x.1P

24 Vac/dc
Modulating Control



Class III

Figure 10.

GQD22x.1U

120 Vac

2-Position Control

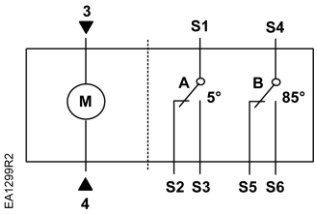


Figure 11.

Special Applications

GQD15x.1P

4 to 20 mA

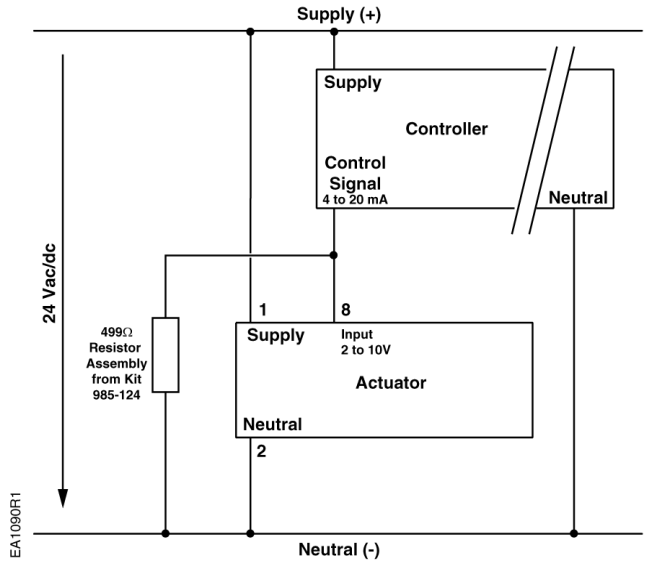


Figure 12. GQD15x.1P 4 to 20 mA Applications.

Start-Up/ Commissioning

GQD15x.1P

Spring Return Modulating Control 24 Vac/dc

1. Check Operation:
   a. Connect wires 1 (red) and 2 (black) to the 24 Vac/dc power supply.

      NOTE: With no input signal present, the GQD151 actuator with input signal inversion switch set to Inverse Acting, will start driving towards 90°.

   b. Use a Digital Multimeter (DDM) and set the dial to Vdc for the actuator input signal.
   c. Connect wires 2 (black) and 8 (gray) to the DMM.
   d. Apply to input signal wire 8 (gray):
      Y = 10 Vdc (GQD151 with input signal inversion switch set to Direct Acting).
      Y = 2 Vdc (GQD151 with input signal inversion switch set to Inverse Acting).

   Allow the actuator shaft coupling to rotate from 0° to 90°.

   e. Apply to input signal wire 8 (gray):
      Y = 2 Vdc (GQD151 with input signal inversion switch set to Direct Acting).
      Y = 10 Vdc (GQD151 with input signal inversion switch set to Inverse Acting).

   The shaft coupling returns to the **0** position.
2. Check Spring Return:
   a. Set the DMM dial to Vdc.
   b. Connect wires 2 (black) and 8 (gray) to the DMM.
   c. Apply to input signal wire 8 (gray):
      Y = 6 Vdc (GQD151).

   Allow the actuator shaft coupling to rotate halfway.

   d. Disconnect wire 1 (red).

   The spring returns the actuator shaft coupling to the fail-safe **0** position.

   e. Connect wire 1 (red) and the actuator moves.
3. Check Feedback:
   a. Set the DMM dial to Vdc.
   b. Attach wires 2 (black) and 9 (pink) to the DMM.
   c. Apply the input signal as in *Step 1d,* to wire 8 (gray).
      - The reading at the DMM should increase (decrease for GQD151 with output signal inversion switch set to Inverse Acting Feedback).
      - The reading at the DMM should decrease (increase for GQD 151 with output signal inversion switch set to Inverse Acting Feedback) and the actuator shaft coupling returns to the fail-safe **0** position.

GQD12x.1P

Spring Return 2-Position 24 Vac/dc

1. Check Operation:
   a. Connect wires 1 (red) and 2 (black) to 24 Vac/dc power supply.

   Allow the actuator shaft coupling to rotate from 0° to 90°.

   b. Disconnect wire 1 (red) and the actuator shaft coupling returns to the "0" position.
2. Check Spring Return:
   a. Connect wire 1 (red).

   Allow the actuator shaft coupling to rotate halfway.

   b. Disconnect wire 1 (red).

   The spring returns the actuator shaft coupling to the fail-safe **0** position.

GQD13x.1P
Spring Return
Floating
24 Vac/dc

1. Check Operation:
   a. Connect wires 1 (red) and 2 (black) to a 24 Vac/dc power supply.
   b. Apply a control signal (24 Vac/dc) to wire 6 (violet).
   Allow the actuator shaft coupling to rotate from 0 to 90°.
   c. Stop the control signal to wire 6 (violet).
   d. Apply a control signal (24 Vac/dc) to wire 7 (orange).
   Allow the actuator shaft coupling to rotate from 90° to 0°.
2. Check Spring Return:
   a. Apply a control signal (24 Vac/dc) to wire 6 (violet).
   Allow the actuator shaft coupling to rotate half way.
   b. Disconnect wire 1 (red).
   The spring returns the actuator shaft coupling to the fail-safe **0** position.
   c. Connect wire 1 (red).
   The actuator shaft coupling begins to move.

GQD22x.1U
Two-Position
120 Vac

1. Check Operation:
   a. Switch on 120 Vac power.
   b. Allow the actuator shaft coupling to rotate from 0 to 90°.
2. Switch off power.
   The actuator shaft coupling will return to the **0** position.
3. Check Spring Return:
   a. Switch on 120 Vac power.
   b. Allow the actuator shaft coupling to rotate halfway.
   c. Switch off 120 Vac power.
   The spring returns the actuator shaft coupling to the fail **0** position.

Service

WARNING:
Do not open the actuator.
If the actuator is inoperative, replace the unit.

Troubleshooting

WARNING:

To avoid injury or loss of life, pay attention to any hazardous voltage (For example, 120 Vac) when performing checks.

- Check that the wires are connected correctly.
- Check that DIP switch is set correctly, if used.
- Use a Digital Multimeter (DMM) to verify that the operating voltage is within range.
- If the actuator is not working, check the damper for blockage.
- If blocked, remove the obstacle and cycle the actuator power off and on. The actuator should resume normal operating mode.

Dimensions

In Inches (Millimeters)

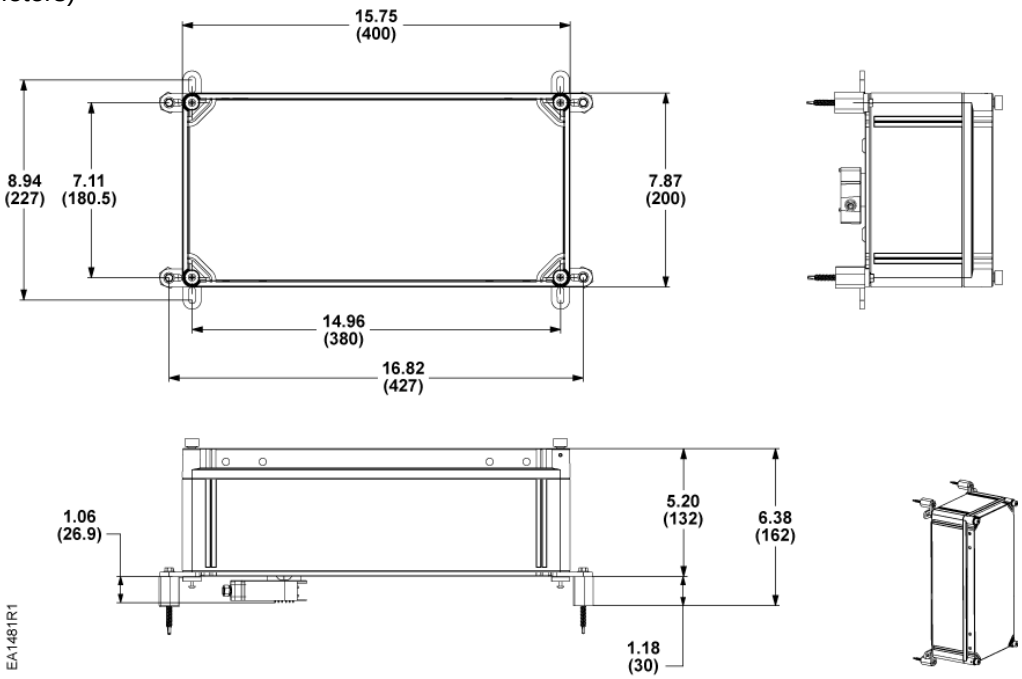


Figure 13. Dimensions of the ASK75.7U Weather Shield in Inches (Millimeters).

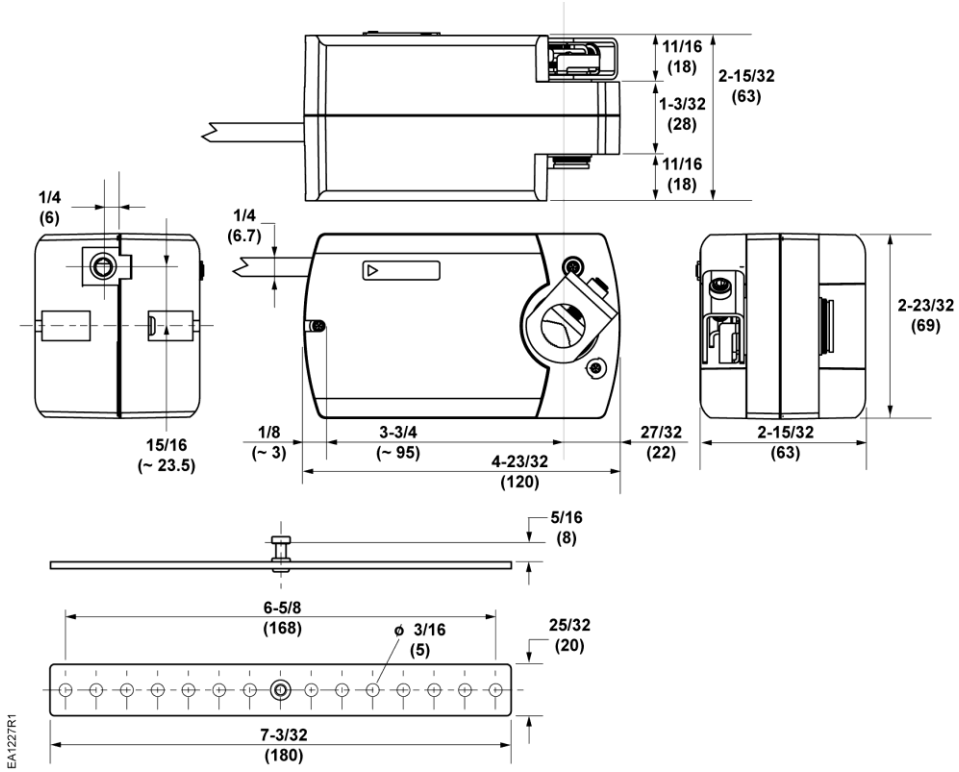


Figure 14. GQDxx6.1x Actuator and Mounting Bracket.

Dimensions, Continued

In Inches (Millimeters)

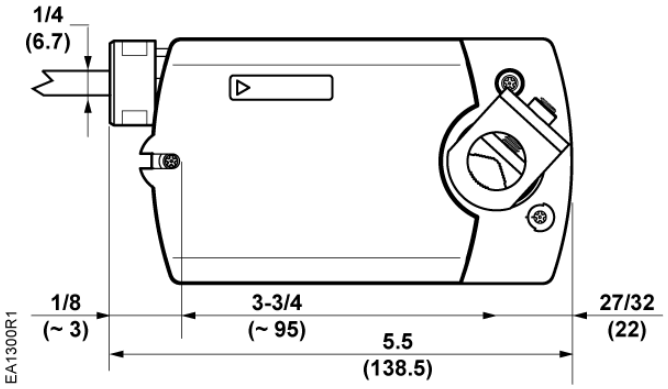


Figure 15. GQDxx1.1x Actuators Only.

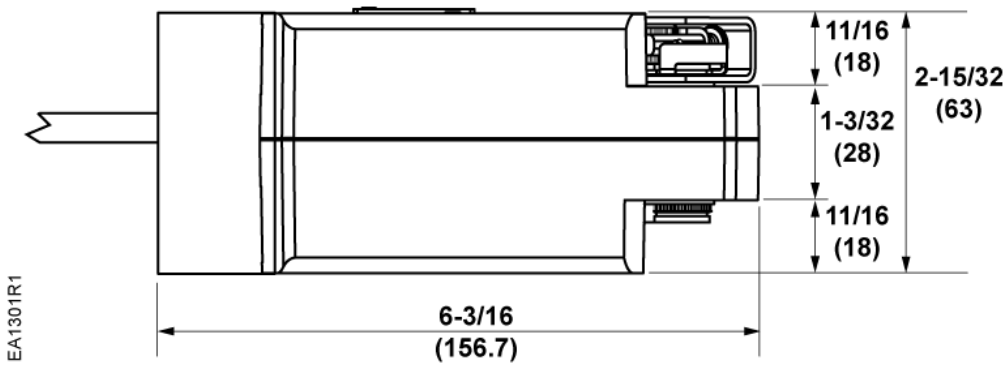


Figure 16. GQDxx6.1x with Conduit Box.

SIEMENS

Technical Instructions

Document No. 155-315P25
EA GMA
April 19, 2022

OpenAir™

GMA Series, Spring Return, 62 lb-in, Rotary, Electronic Damper Actuators

Description	The OpenAir direct-coupled spring return electronic actuator is designed for modulating, two-position, and floating control of building HVAC dampers.
Features	• Brushless DC motor technology with stall protection • Bi-directional fail-safe spring return • Models available with dual, independently adjustable auxiliary switches • Unique self-centering shaft coupling • Manual override • Available in 62 lb-in torque • 5° preload as shipped from factory • Mechanical range adjustment capabilities • UL and cUL listed, CE certified • 24 Vac/dc compatible
Application	Used in constant or variable air volume installations for the control of return air, mixed air, exhaust, and face and bypass dampers requiring up to 62 lb-in (7 Nm) torque. Designed for applications that require the damper to return to a fail-safe position when there is a power failure.

Warning/Caution Notations

WARNING:		Personal injury or loss of life may occur if you do not perform a procedure as specified.
CAUTION:		Equipment damage may occur if you do not perform a procedure as specified.

Product Numbers

Table 1.

Product Number	Operating Voltage		Control				Cables		Built-In Control Options				
	24 Vac ±20% 24 Vdc ±15%	120 Vac ±10%	Modulating 0 to 10 Vdc	Modulating 2 to 10 Vdc	Floating	2-position	Standard	Plenum	Position Feedback	Dual Auxiliary Switches	Offset 0 to 5 Vdc Span 2 to 30 Vdc	Input Signal Inversion (Direct or Inverse Acting)	Feedback Signal Inversion
GMA121.1U	●					●	●						
GMA121.1P	●					●		●					
GMA121.1P/B	●					●		●					
GMA126.1U	●					●	●			●			
GMA126.1P	●					●		●		●			
GMA221.1U		●				●	●						
GMA226.1U		●				●	●			●			
GMA131.1U	●				●		●						
GMA131.1P	●				●			●					
GMA132.1U	●				●		●		●				
GMA136.1U	●				●		●			●			
GMA151.1U	●			●			●		●			●	●
GMA151.1P	●			●				●	●			●	●
GMA156.1U	●			●			●		●	●		●	●
GMA156.1P	●			●				●	●	●		●	●
GMA161.1U	●		●				●		●				
GMA161.1P	●		●					●	●				
GMA163.1U	●		●				●		●		●		
GMA163.1P	●		●					●	●		●		
GMA164.1U	●		●				●		●	●	●		
GMA166.1U	●		●				●		●	●			
GMA166.1P	●		●					●	●	●			

Specifications

Power Supply	Operating voltage	24 Vac ±20%; 24 Vdc ±15%
	Frequency	50/60 Hz
24 Vac/24 Vdc	Power consumption	
	running (GMA 12x, 13x, 15x, 16x)	5 VA/3.5W
	holding (GMA 12x, 13x, 15x, 16x)	4 VA/3W
	Equipment rating	Class 2, in accordance with UL/CSA Class III per EN 60730
Power Supply	Operating voltage	120 Vac ±10%
	Frequency	50/60 Hz
120 Vac	Power consumption	
	running and holding (GMA 22x)	7 VA/5W

Control Signal	Input signal (wires 8–2)	
	voltage input signal GMA16x	0 to 10 Vdc (max. 35 Vdc)
	voltage input signal GMA15x	2 to 10 Vdc (max. 35 Vdc)
	input resistance	>100K ohms
Feedback Signal	Position output signal (wires 9–2)	
	voltage output signal GMA16x	0 to 10 Vdc
	voltage output signal GMA15x	2 to 10 Vdc
	maximum output current	+1 mA, -0.5 mA
Function	Running/spring return torque	62 lb-in (7 Nm)
	Maximum torque	186 lb-in (21 Nm)
	Runtime for 90°	
	operating with motor	90 seconds
	closing (on power loss) with spring return	15 seconds typical
		(60 seconds max. at -25°F [-32°C])
Mounting	Nominal angle of rotation	90°
	Maximum angular rotation	95°
	Shaft size	1/4 to 3/4-inch (6.4 to 20.5 mm) dia.
		1/4 to 1/2-inch (6.4 to 13 mm) square
	Minimum shaft length	3/4-inch (20 mm)
Housing	Enclosure	NEMA 1 IP54 according to EN 60 529 (limited positions; see *OpenAir™ GMA Series Installation Instructions* (129-307)
	Material	Die-cast aluminum alloy
	Gear lubrication	Silicone-free
Ambient Conditions	Ambient temperature	
	operation	-25°F to 130°F (-32°C to 55°C)
	storage and transport	-40°F to 158°F (-40°C to 70°C)
	Ambient humidity (non-condensing)	95% rh
Agency Certification		UL listed to UL60730 (to replace UL873) cUL certified to Canadian Standard C22.2 No. 24-93 Australian Electromagnetic Compatibility (EMC) per AS/NZS 4251.1/2:1999 (C-tick)
CE Conformity	Low voltage directive (LVD)	2006/95/EC EN 60 730-2-14 (Type 1)
	Electromagnetic compatibility (EMC)	2004/108/EC
	Immunity for all models, except GMA132.xx	EN61000-6-2
	Immunity for GMA132.xx	EN61000-6-1
	Emissions for all models	EN61000-6-3

Auxiliary Features

Control signal adjustment	
Offset (start point)	Between 0 to 5 Vdc
Span	Between 2 to 30 Vdc
Dual auxiliary switches	
AC rating (standard cable)	24 to 250 Vac
	AC 6A resistive
	AC 2A general purpose
AC rating (Plenum cable)	24 Vac
	AC 4A resistive
	AC 2A general purpose
DC rating (Standard/Plenum cable)	12 to 30 Vdc
	DC 2A
Switch Range	
Switch A	0° to 90° with 5° intervals
Recommended range usage	0° to 45°
Factory setting	5°
Switch B	0° to 90° with 5° intervals
Recommended range usage	45° to 90°
Factory setting	85°
Switching hysteresis	2°

WARNING:
Apply only AC-line voltage from the same phase or only UL-Class 2 voltage (SELV for CE conformance) to the switching outputs of both auxiliary switches A and B. Mixed operation is not permissible.

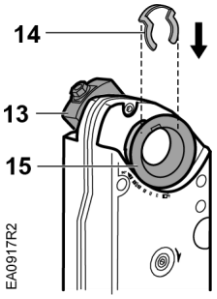
NOTE: With plenum cables, only UL-Class 2 voltage (SELV for CE) is permitted.

Feedback potentiometer (GMA 132.1U)	
Sliding contact (P2)	0 to 1000 ohm <10 mA
Load	<1W
Voltage	UL-Class 2 (SELV/PELV for CE) <24 Vac/dc

Miscellaneous

Pre-cabled connection	18 AWG (0.75 mm^2)
Cable length	3 feet (0.9 m) length
Noise level	40 dBA
Life cycle	Designed for over 60,000 full stroke cycles and a minimum of 1.5 million repositions at rated torque and temperature
Dimensions	8-3/8-in. H × 3-1/4-in. W × 2-2/3-in. D (212 mm H × 83 mm W × 68 mm D)
Weight	2.9 lbs (1.3 kg)
Country of Origin	USA

Actuator Components



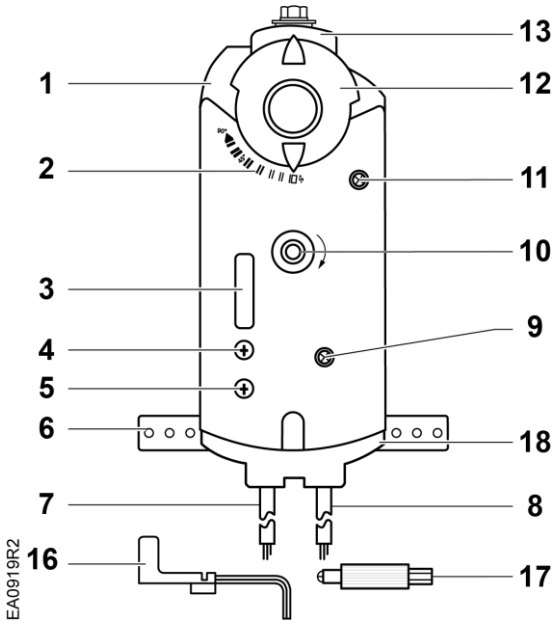


Figure 1. Components of the GMA Spring Return Actuator.

Legend

1. Actuator housing
2. Positioning scale for angle of rotation
3. DIP switches and cover
4. Span adjustment
5. Offset (start point) adjustment
6. Mounting bracket
7. Connection cable for power and control signals
8. Connection cable for auxiliary switches or feedback potentiometer
9. Gear train lock pin
10. Manual override wrench opening and direction of rotation arrow
11. Auxiliary switches A and B
12. Position indicator
13. Self-centering shaft adapter
14. Shaft adapter locking clip
15. Position indicator adapter
16. Key for manual adjustment
17. Adjustment tool for: auxiliary switches (11), offset/span (4 and 5), and lock pin (9)
18. 1/2-inch NSPT conduit connections

Accessories

NOTE: The auxiliary switches, control signal adjustment, and feedback potentiometer cannot be added in the field. Order the product number that includes the option(s).

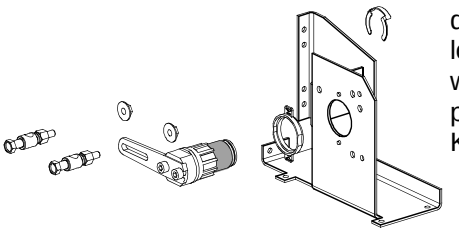


Figure 2. Floor/Frame Mount Kit.

ASK71.11: For in-the-air stream applications; anywhere a foot-mounted actuator can be mounted. Can also be directly mounted to a damper frame with louvers and vents and in applications where use of the floor mount is not possible.

Kit contains:

- Crank arm to change the angular rotation into a linear stroke.
- Support bearing ring to minimize side loading on the actuator's output bearing.
- Mounting bracket, and required mounting fasteners.

Accessories, Continued

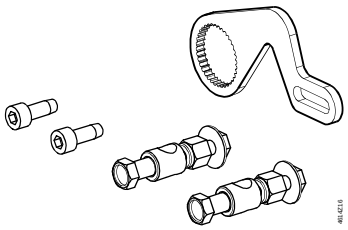


Figure 3. Rotary to Linear Crank Arm Kit.

ASK71.13: Allows a direct-coupled actuator to provide an auxiliary linear drive. Can be used to simultaneously drive a set of opposing or adjacent dampers with a single actuator. Kit contains:

- Crank arm to attach to the splined hub of the shaft adapter.
- Mounting fasteners.

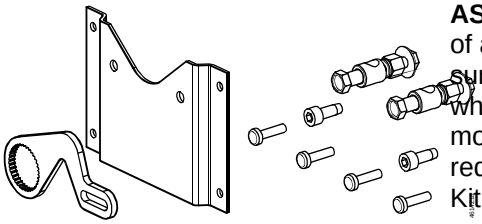


Figure 4. Rotary to Linear Crank Arm Kit with Mounting Bracket.

ASK71.14: Allows economical mounting of an OpenAir actuator to a variety of surfaces. Should be used in applications where the actuator can be rigid-surface mounted and a linear stroke output is required.
Kit contains:

- Crank arm to attach to the splined hub of the shaft adapter.
- Mounting bracket, and other required mounting fasteners.

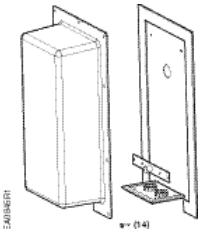


Figure 5. NEMA 3R Weather Shield.

ASK75.3U: GMA actuators are UL listed to meet NEMA 3R requirements (a degree of protection against rain, sleet, snow, and damage from external ice formation) when installed with ASK75.3U Weather Shield and outdoor-rated conduit fittings in the vertical position. See Figure 20 for dimensions.

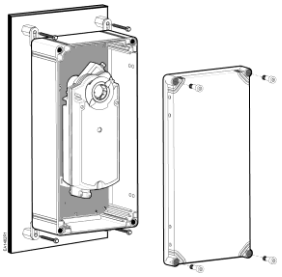


Figure 6. NEMA Type 4X Weather Shield.

ASK75.7U: GMA Actuators are UL listed to meet NEMA Type 4X requirements (a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, hose-directed water, corrosion, and damage from external ice formation) when installed with an ASK75.7U Weather Shield and outdoor-rated conduit fittings. This weather shield may be mounted in any orientation.

For dimensions, see Figure 21.

Accessories, Continued

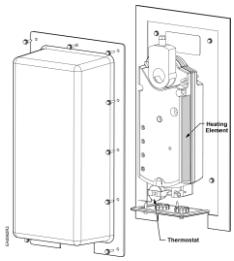
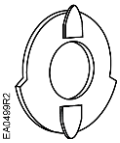


Figure 7. Heater/Weather Shield Assembly.

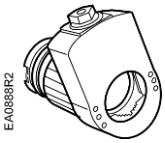
985-107: Provides protection for 24 Vac/dc OpenAir GMA1xx actuators down to temperatures of -58°F (-50°C).
Assembly includes:

- Weather Shield (ASK75.3U)
- Heater Kit (985-108)

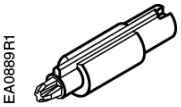
Service Parts



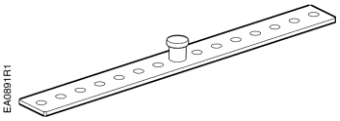
985-094P10
Position indicators (10/pkg.)



985-093
Standard shaft adapter.



985-098P10
Adjustment Tool.



985-092
Anti-rotation (mounting) bracket.

985-124
499-ohm resistor assembly kit for 4 to 20 mA applications.

Figure 8. GMA Series Service Parts.

Operation

GMA16x, GMA15x

Apply a continuous 0 to 10 Vdc, or 2 to 10 Vdc control signal between wire 8 (Y) and wire 2 (G0) to operate the damper actuator. The angle of rotation is proportional to the control signal.

A 0 to 10 Vdc or 2 to 10 Vdc position feedback output signal is available between wire 9 (U) and wire 2 (G0) to monitor the position of the damper motor.

In the event of a power failure or when the operating voltage is shut off, the actuator returns to the **0** position.

GMA12x and GMA 22x
When power is applied, the actuator coupling moves toward the open position "90°". In the event of a power failure or when the operating voltage is shut off, the actuator returns to the **0** position.

GMA13x
A floating control signal controls the damper actuator. The actuator's angle of rotation is proportional to the length of time the signal is applied. A 24 Vac/dc control signal to wire 6 (Y1) causes the actuator coupling to rotate clockwise. A 24 Vac/dc control signal to wire 7 (Y2) causes the actuator coupling to rotate counterclockwise.

With no control voltage, the damper actuator holds its position. In the event of a power failure, the actuator spring returns to the **0** position.

Overload Protection

In the event of a blockage in the damper, the actuator is overload protected over the full range to prevent damage to the actuator.

Life Expectancy

An improperly tuned loop will cause excessive repositioning that will shorten the life of the actuator.

Sizing

The type of actuator required depends on several factors:

1. Obtain damper torque ratings (lb-in/ft^2 or Nm/m^2) from the damper manufacturer.
2. Determine the area of the damper.
3. Calculate the total torque required to move the damper:

$$\text{Total Torque} = \frac{\text{Torque Rating} \times \text{Damper Area}}{SF^{1}}$$

4. Select a spring return actuator using Table 2.

[1]Safety Factor: When calculating the total torque required, a safety factor should be included for unaccountable variables such as slight misalignments, aging of the damper, etc. A suggested safety factor is 0.80.

NOTE: Mechanically coupled actuators must be of the exact same type except for the dual auxiliary switches and feedback potentiometer options. Use the correct mounting bracket. See Table 2.

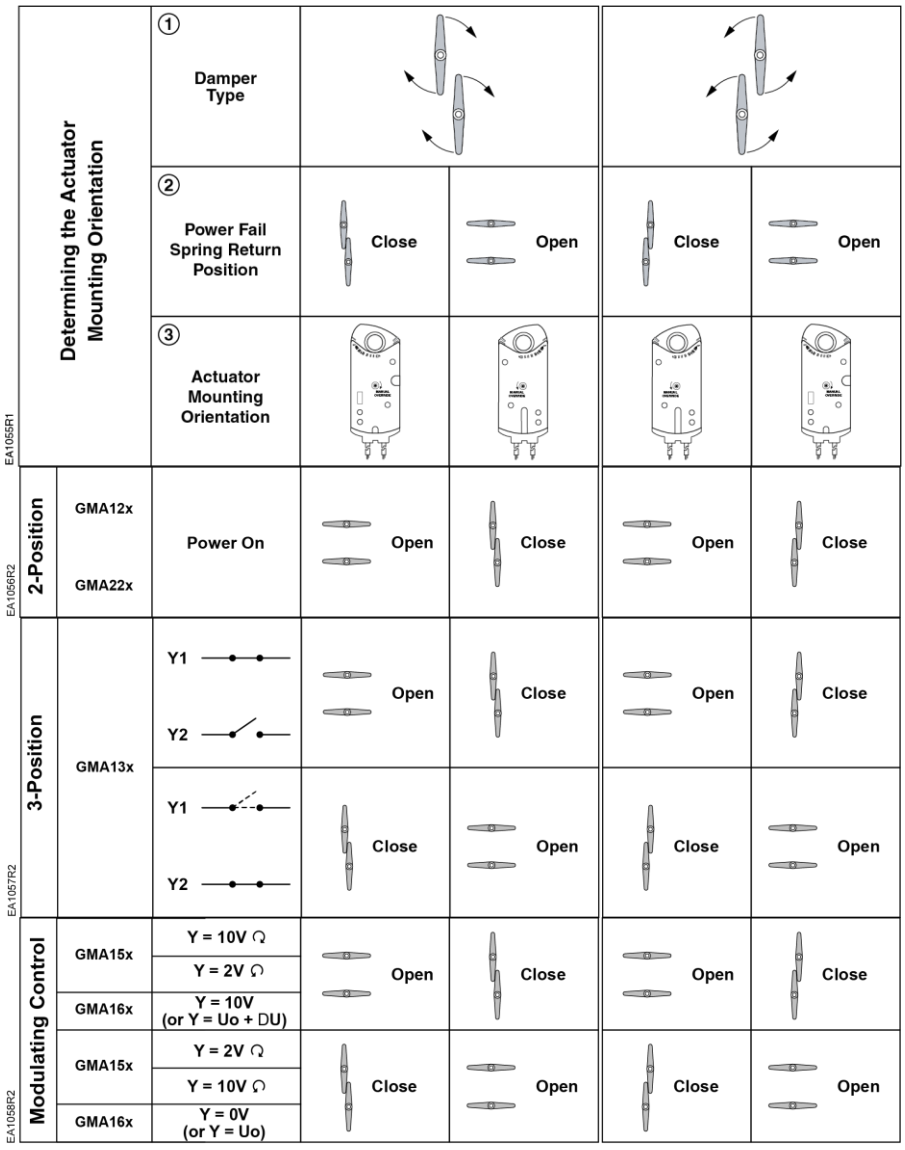
Table 2.

DC Power (24 Vdc)		AC Power (24 Vac, 120 Vac)	
Total Torque	**Actuator**	**Total Torque**	**Actuator**
<62 lb-in (7 Nm)	GMA1xx	<62 lb-in (7 Nm)	GMA
>62 lb-in <160 lb-in (>7 Nm <18 Nm)	GCA12x, GCA13x, GCA15x*	>62 lb-in <160 lb-in (>7 Nm <18 Nm)	GCA
>160 lb-in <320 lb-in (>18 Nm <36 Nm)	Use tandem mounting bracket ASK73.1 with any combination of: • GCA12x actuators • GCA13x actuators Use tandem mounting bracket ASK73.2U with any combination of GCA151 and GCA156 actuators.*	>160 lb-in <320 lb-in (>18 Nm <36 Nm)	Use tandem mounting bracket ASK73.1 with any combination of: • GCA12x actuators • GCA22x actuators • GCA13x actuators • Use tandem mounting bracket ASK73.2U with any combination of: • GCA151 and GCA156 actuators* • GCA161 and GCA166 actuators

Mounting and Installation

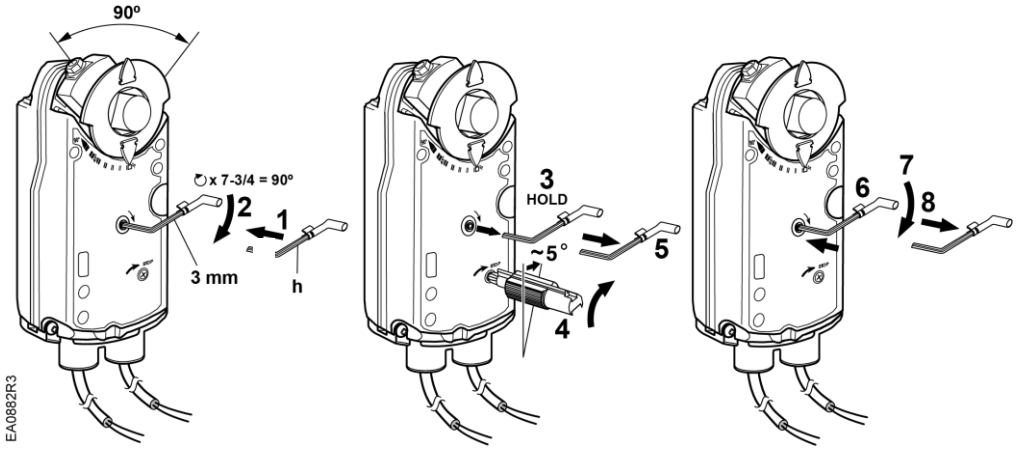
Flip the actuator to select either clockwise or counterclockwise fail-safe rotation of the damper shaft. Follow steps 1, 2, and 3 of Table 3 to determine the correct actuator mounting orientation.

Table 3. Actuator Mounting Orientation and Damper Control.



- The shaft adapter and the position indicator can be mounted on either side of the actuator. The actuator mounting orientation and shaft length determine how they will be mounted on the actuator.
- The minimum damper drive shaft length is 3/4-inch (20 mm).
- See *Specifications* for the minimum and maximum damper shaft dimensions.
- The actuator is shipped from the factory with a 5° preload enabling tight close off of the damper in power-fail-close applications.
- A mounting bracket is included with the actuator.
- The shaft adapter and mounting parts are shipped in a separate container with the actuator.
- See the detailed mounting instructions included with each actuator.

Manual Override



Rotating | Locking in place | Releasing when power is absent

Figure 9. Manual Override.

NOTE: Always turn the key in the direction of the arrow.

CAUTION:
When engaging the gear train lock pin, carefully turn only about 5 degrees until you meet slight resistance. Turning too far will strip the lock pin.

To Release Manual Override

Do one of the following:

- Restore power and send a control signal.
- When power is absent, do the following:
  1. Insert the 3 mm hex key in the override opening.
  2. Turn the key in the direction of the arrow.
  3. Remove the key.

Mechanical Range Adjustment

The angular rotation is adjustable between 0° and 90° at 5-degree intervals.

To limit the range of shaft movement:

1. Remove the locking clip and self-adjusting shaft adapter.
2. Rotate the damper blade shaft to its failed position.
3. Rotate the shaft coupling to the desired position.
4. Insert the shaft adapter into the actuator and fasten it with the locking clip. See Figure 10.

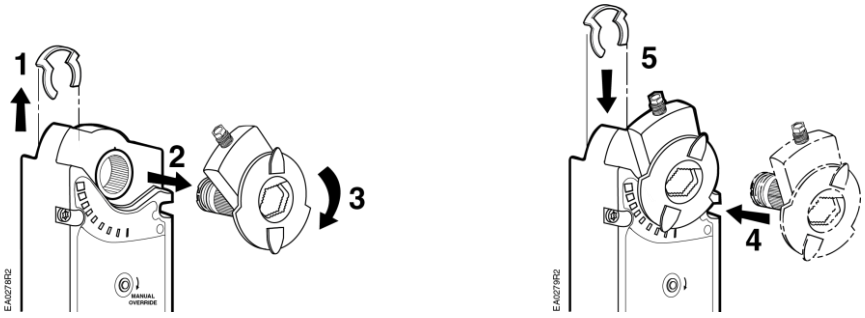
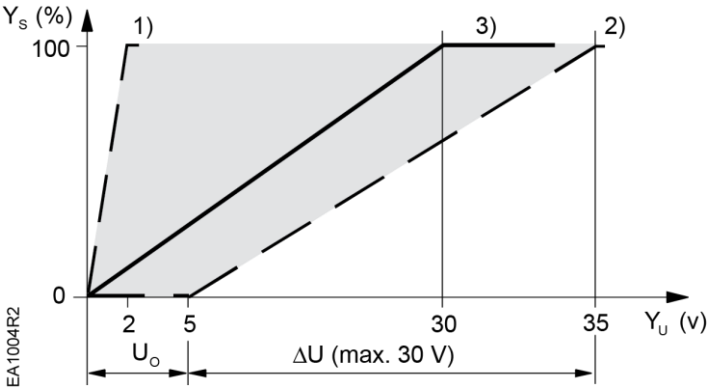


Figure 10. Mechanical Range Adjustment.

Control Signal Adjustment

(Offset and Span)
GMA163
GMA164

The offset (start point) and span of the control signal can be adjusted. The offset, Uo, can be adjusted between 0 to 5 Vdc. The span, ΔU, can be adjusted between 2 to 30 Vdc.



Factory Setting
of 30V span
0 offset

Ys Mechanical positioning range (100% = angle of rotation 90°)
Yu Control signal
Uo Offset (start point)
ΔU Span

1. Uo = 0V, ΔU = 2V The minimum working range for Ys = 100%
2. Uo = 5V, ΔU = 30V The maximum working range for Ys = 100%
3. Uo = 0V, ΔU ≈ 30V Factory setting

Figure 11. The Minimum and Maximum Control Signal Adjustment.

Example:

Open the actuator from 0 to 50% (45°) using a control signal of:

Umin = 2V to Umax = 10V

Calculating the value of ΔU:

$$\Delta U = \frac{100\,[\%]\,(U\ max - U\ min)}{\text{Working angle of rotation in \%}} = \frac{100 \text{ x } (10-2)}{50} = 16V$$

Settings

Uo = 2V; ΔU = 16V

Umin = minimum control signal
Umax = maximum control signal

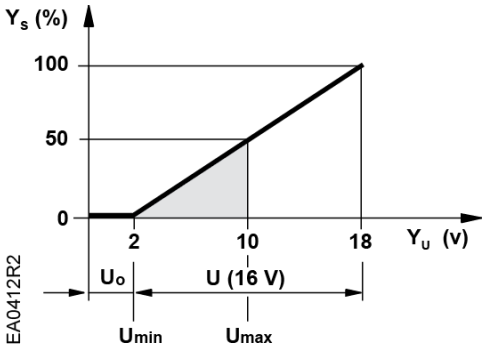
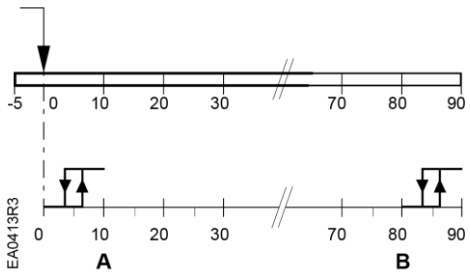


Figure 12. Example.

Dual Auxiliary Switch

GMA126
GMA226
GMA136
GMA156
GMA164
GMA166



Actuator rotary range with the shaft adapter mounted at position **0**.

Setting range for switches A and B
Setting interval: 5°
Switching hysteresis: 2°

To change the settings of A and B:

- Make sure the actuator is in the **0**, fail-safe position. The scale is valid only in the **0** position.
- Use the adjustment tool provided with the actuator to turn the switch adjustment dials to the desired setting at which a signal is to be given.

Factory setting:

Switch A = 5°

Switch B = 85°

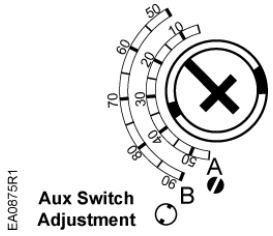


Figure 13. Adjustable Switching Values for the Dual Auxiliary Switches.

NOTE: Use the long arm of the "†" to point to the position of switch A. Use the narrower tab on the red ring to point to the position of switch B.

DIP Switch Functionality GMA 151 GMA 156

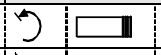
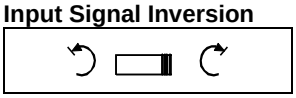
Description	Label	Description	Function
Inverse Acting		Direct-Acting	Input Signal Inversion
Inverse-Acting Feedback		Direct-Acting feedback	Feedback Signal inversion
			**Not In Use**

Figure 14. DIP Switches.

Input Signal Inversion



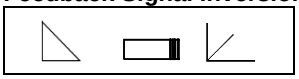
Allows inverting the control input signal

The arrow direction indicates opening or closing (closing or opening) when operating an actuator with a given control signal.

= Direct acting (Factory setting)
Input signal 2 Vdc ► fail-safe position

= Inverse acting
Input signal 10 Vdc ► fail-safe position

Feedback Signal Inversion



Allows inverting the position feedback output signal

= Direct acting feedback (Factory setting)
Fail-safe position ► Output signal 2 Vdc

= Inverse acting feedback,
Fail-safe position ► Output signal 10 Vdc

Wiring

All wiring must conform to NEC and local codes and regulations.

Use earth ground isolating step-down Class 2 transformers. Do not use autotransformers.

The maximum rating for a Class 2 step-down transformer is 100 VA. Determine the supply transformer rating by summing the VA ratings of all actuators and all other components used. It is recommended that one transformer power no more than 10 actuators (or 80% of its VA).

WARNING:

Mixed switch operation is not permitted to the switching outputs of both auxiliary switches (A and B).

Either AC line voltage from the same phase must be applied to all six outputs of the dual auxiliary switches, or UL-Class 2 voltage (SELV for CE conformance) must be applied to all six outputs.

NOTE: With Plenum cables only UL-Class 2 voltage (SELV for CE conformance) is permitted.

WARNING:

Installations requiring CE Conformance:

- Except for the auxiliary switches (See *Warning* above) all wiring for 24 Vac/dc actuators must only be safety extra-low voltage (SELV) or protective extra-low voltage (PELV) per HD384.
- Use safety transformers per EN61558 with double isolation, designed for 100% duty-cycle for supplying SELV or PELV circuits.
- Over-current protection for supply lines is maximum 10A.

Wire Designations

Each wire has the standard symbol printed on it. See Table 4.

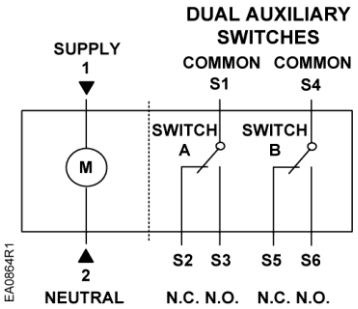
Table 4. Wire Designations.

Applicable Actuator	Standard Symbol	Function	Terminal Designations	Color
24 Vac/dc	1	Supply (SP)	G	Red
	2	Neutral (SN)	G0	Black
	6	Control signal clockwise	Y1	Violet
	7	Control signal counterclockwise	Y2	Orange
	8	Input signal: 0 to 10 Vdc (GMA16x) or 2 to 10 Vdc (GMA15x)	Y	Gray
	9	Position output: 0 to 10 Vdc (GMA16x) or 2 to 10 Vdc (GMA15x)	U	Pink
120 Vac	3	Line	L	Black
	4	Neutral	N	White
Auxiliary Switches	S1	Switch A – Common	Q11	Gray/red
	S2	Switch A – N.C.	Q12	Gray/blue
	S3	Switch A – N.O.	Q14	Gray/pink
	S4	Switch B – Common	Q21	Black/red
	S5	Switch B – N.C.	Q22	Black/blue
	S6	Switch B – N.O.	Q24	Black/pink
Position Feedback	P1	Feedback Potentiometer 0 to 100% P1 - P2	a	White/red
	P2	Feedback Potentiometer Common	b	White/blue
	P3	Feedback Potentiometer 100 to 0% P3 – P2	c	White/pink

Wiring Diagrams

GMA12x

24 Vac/dc
2-Position Control



Class 2

Figure 15.

GMA22x

120 Vac
2-Position Control

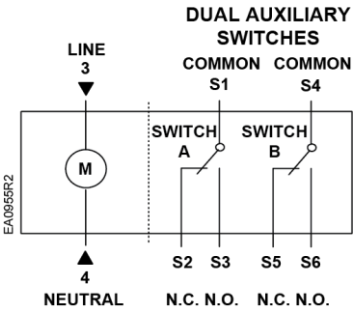
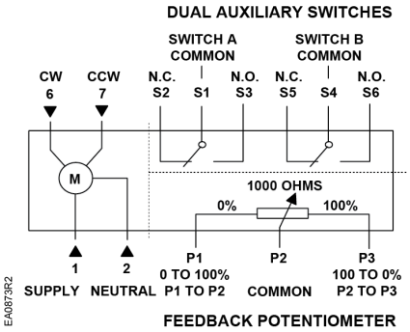


Figure 16.

GMA13x

24 Vac/dc
Floating Control

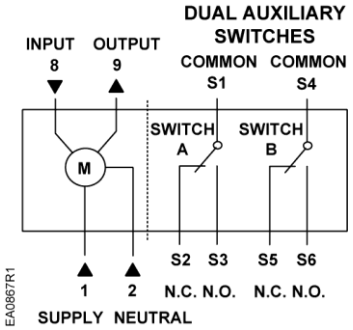


Class 2

Figure 17.

GMA15x
GMA16x

24 Vac/dc
Modulating control



Class 2

Figure 18.

Special Applications

4 to 20 mA
GMA15x

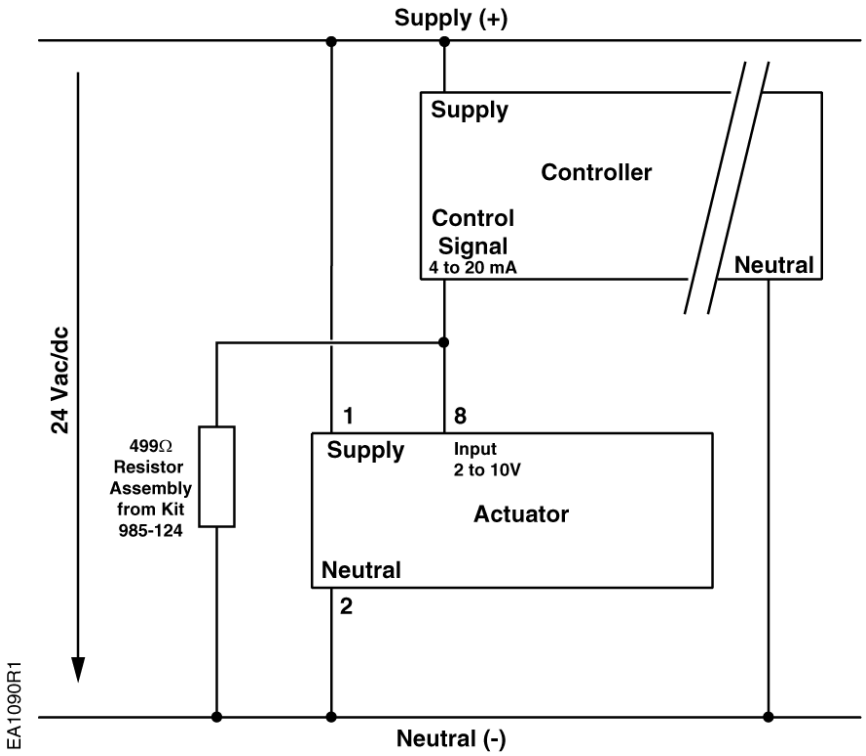


Figure 19. GMA 151 and GMA156, 4 to 20 mA Applications.

Start-Up/ Commissioning

GMA16x, GMA15x

Spring Return Modulating Control 24 Vac/dc

1. Check Operation:

   a. Connect wires 1 (red) and 2 (black) to the 24 Vac/dc power supply.

   NOTE: With no input signal present, the GMA15x actuator with input signal inversion switch set to Inverse Acting will start driving towards 90°.

   b. Use a Digital Multimeter (DDM) and set the dial to Vdc for the actuator input signal.

   c. Connect wires 2 (black) and 8 (gray) to the DMM.

   d. Apply to input signal wire 8 (gray):
   Y = 10 Vdc or Y = Uo + ∆U (GMA16x)
   Y = 10 Vdc (GMA15x with input signal inversion switch set to Direct Acting)
   Y = 2 Vdc (GMA15x with input signal inversion switch set to Inverse Acting)

   Allow the actuator shaft coupling to rotate from 0° to 90°.

   e. Apply to input signal wire 8 (gray):
   Y = 0 Vdc or Y = Uo (GMA16x)
   Y = 2 Vdc (GMA15x with input signal inversion switch set to Direct Acting)
   Y = 10 Vdc (GMA15x with input signal inversion switch set to Inverse Acting)

   The shaft coupling returns to the **0** position.

2. Check Spring Return:

   a. Set the DMM dial to Vdc.

   b. Connect wires 2 (black) and 8 (gray) to the DMM.

   c. Apply to input signal wire 8 (gray):
   Y = 5 Vdc or Y = Uo + 1/2 ∆U (GMA16x)
   Y = 6 Vdc (GMA15x)

   Allow the actuator shaft coupling to rotate halfway.

   d. Disconnect wire 1 (red).

   The spring returns the actuator shaft coupling to the fail **0** position.

   e. Connect wire 1 (red) and the actuator moves.

3. Check Feedback:

   a. Set the DMM dial to Vdc.

   b. Attach wires 2 (black) and 9 (pink) to the DMM.

   c. Apply the input signal as in *Step 1d,* to wire 8 (gray).

   The reading at the DMM should increase (decrease for GMA15x with output signal inversion switch set to Inverse Acting Feedback).

   d. Apply the input signal as in *Step 1f,* to wire 8 (gray).

   The reading at the DMM should decrease (increase for GMA 15x with output signal inversion switch set to Inverse Acting Feedback) and the actuator shaft coupling returns to the fail **0** position.

4. Check the Auxiliary Switch A:

   a. Set the DMM dial to ohms (resistance) or continuity check.

   b. Connect wires S1 and S3 to the DMM. The DMM should indicate open circuit or no resistance.

   c. Apply the input signal as in *Step 1d,* to wire 8 (gray).

   The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of switch A.

   d. Connect wires S1 and S2 to the DMM. The DMM should indicate open circuit or no resistance.

   e. Apply the input signal as in *Step* 1*f,* to wire 8 (gray).

   The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of switch A.

Start-Up/ Commissioning, Continued

5. Check the Auxiliary Switch B:
   a. Set the DMM dial to ohms (resistance) or continuity check.
   b. Connect wires S4 and S6 to the DMM. The DMM should indicate open circuit or no resistance.
   c. Apply the input signal as in *Step 1d,* to wire 8 (gray).

   The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of switch B.
   d. Connect wires S4 and S5 to the DMM. The DMM should indicate open circuit or no resistance.
   e. Apply the input signal as in *Step 1f,* to wire 8 (gray).

   The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of switch B.

GMA12x

Spring Return 2-Position 24 Vac/dc

1. Check Operation:
   a. Connect wires 1 (red) and 2 (black) to 24 Vac/dc power supply.

   Allow the actuator shaft coupling to rotate from 0° to 90°.
   b. Disconnect wire 1 (red) and the actuator shaft coupling returns to the **0** position.

2. Check Spring Return:
   a. Connect wire 1 (red).

   Allow the actuator shaft coupling to rotate halfway.
   b. Disconnect wire 1 (red).

      The spring returns the actuator shaft coupling to the fail **0** position.

3. Check the Auxiliary Switch A:
   a. Set the DMM dial to ohms (resistance) or continuity check.
   b. Connect wires S1 and S3 to the DMM.

      The DMM should indicate open circuit or no resistance.
   c. Connect wire 1 (red).

      The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of switch A.
   d. Connect wires S1 and S2 to the DMM.

      The DMM should indicate open circuit or no resistance.
   e. Disconnect wire 1 (red).

      The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of switch A.

4. Check the Auxiliary Switch B:
   a. Set the DMM dial to ohms (resistance) or continuity check.
   b. Connect wires S4 and S6 to the DMM.

      The DMM should indicate open circuit or no resistance.
   c. Connect wire 1 (red).

      The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of switch B.
   d. Connect wires S4 and S5 to the DMM.

      The DMM should indicate open circuit or no resistance.
   e. Disconnect wire 1 (red).

      The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of switch B.

Start-Up/ Commissioning, Continued

GMA22x

Spring Return
2-Position
120 Vac

WARNING: Switch off 120 Vac power before connecting wires 3 (black) and 4 (white).

1. Check Operation:
   a. Switch on 120 Vac power.
      Allow the actuator shaft coupling to rotate from 0 to 90°.
   b. Switch off 120 Vac power
      The actuator shaft coupling will return to the fail **0** position.
2. Check Spring Return:
   a. Switch on 120 Vac power.
      Allow the actuator shaft coupling to rotate halfway.
   b. Switch off 120 Vac power.
      The spring returns the actuator shaft coupling to the fail **0** position.
3. Check the Auxiliary Switch A:
   a. Set the DMM dial to ohms (resistance) or continuity check.
   b. Connect wires S1 and S3 to the DMM.
      The DMM should indicate an open circuit or no resistance.
   c. Switch on 120 Vac power.
      The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of switch A.
   d. Connect wires S1 and S2 to the DMM.
      The DMM should indicate open circuit or no resistance.
   e. Switch off 120 Vac power.
      The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of switch A.
4. Check the Auxiliary Switch B:
   a. Set the DMM dial to ohms (resistance) or continuity check.
   b. Connect wires S4 and S6 to the DMM.
      The DMM should indicate open circuit or no resistance.
   c. Switch on 120 Vac power.
      The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of switch B.
   d. Connect wires S4 and S5 to the DMM.
      The DMM should indicate open circuit or no resistance.
   e. Switch off 120 Vac power.
      The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of switch B.

GMA13x

Spring Return
Floating
24 Vac/dc

1. Check Operation:
   a. Connect wires 1 (red) and 2 (black) to a 24 Vac/dc power supply.
   b. Apply a control signal (24 Vac/dc) to wire 6 (violet).
      Allow the actuator shaft coupling to rotate from 0 to 90°.
   c. Stop the control signal to wire 6 (violet).
   d. Apply a control signal (24 Vac/dc) to wire 7 (orange).
      Allow the actuator shaft coupling to rotate from 90° to 0°.

Start-Up/ Commissioning, Continued

GMA13x

Spring Return
Floating
24 Vac/dc

2. Check Spring Return:
   a. Apply a control signal (24 Vac/dc) to wire 6 (violet).
      Allow the actuator shaft coupling to rotate half-way.
   b. Disconnect wire 1 (red).
      The spring returns the actuator shaft coupling to the fail **0** position.
   c. Connect wire 1 (red).
      The actuator shaft coupling begins to move.

3. Check Feedback:
   a. Set the DMM dial to ohms.
   b. Connect wires P1 and P2 to the DMM.
      The DMM should indicate a resistive value.
   c. Apply a control signal (24 Vac/dc) to wire 6 (violet).
      The reading of the DMM should increase.
   d. Stop the control signal to wire 6 (violet).
   e. Connect wires P2 and P3 to the DMM.
      The DMM should indicate a resistive value.
   f. Apply a control signal (24 Vac/dc) to wire 7 (orange).
      The reading of the DMM should increase.

4. Check the Auxiliary Switch A:
   a. Set the DMM dial to ohms (resistance) or continuity check.
   b. Connect wires S1 and S3 to the DMM.
      The DMM should indicate an open circuit or no resistance.
   c. Apply a control signal (24 Vac/dc) to wire 6 (violet).
      The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of switch A.
   d. Stop the control signal to wire 6 (violet).
   e. Connect wires S1 and S2 to the DMM.
      The DMM should indicate an open circuit or no resistance.
   f. Apply a control signal (24 Vac/dc) to wire 7 (orange).
      The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of switch A.

5. Check the Auxiliary Switch B:
   a. Set the DMM dial to ohms (resistance) or continuity check.
   b. Connect wires S4 and S6 to the DMM.
      The DMM should indicate an open circuit or no resistance.
   c. Apply a control signal (24 Vac/dc) to wire 6 (violet).
      The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of switch B.
   d. Stop the control signal to wire 6 (violet).
   e. Connect wires S4 and S5 to the DMM.
      The DMM should indicate an open circuit or no resistance.
   f. Apply a control signal (24 Vac/dc) to wire 7 (orange).
      The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of switch B.

Service

WARNING:
Do not open the actuator.
If the actuator is inoperative, replace the unit.

Troubleshooting

WARNING:

To avoid injury or loss of life, pay attention to any hazardous voltage (For example, 120 Vac) when performing checks.

- Check that the wires are connected correctly.
- Check that span/offset (start point) and Dip switches are set correctly, if used.
- Use a Digital Multimeter (DMM) to verify that the operating voltage is within range.
- If the actuator is not working, check the damper for blockage. If blocked, remove the obstacle and cycle the actuator power off and on. The actuator should resume normal operating mode.

Dimensions

Inches (mm)

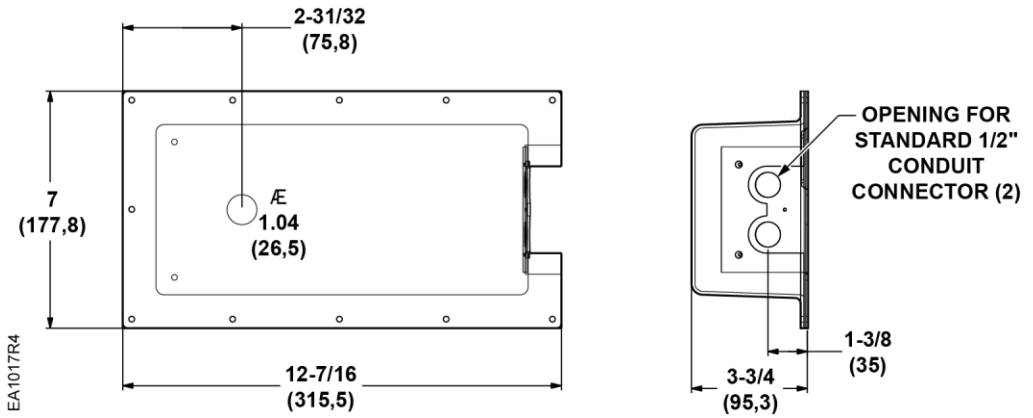


Figure 20. ASK75.3U Weather Shield Dimensions.

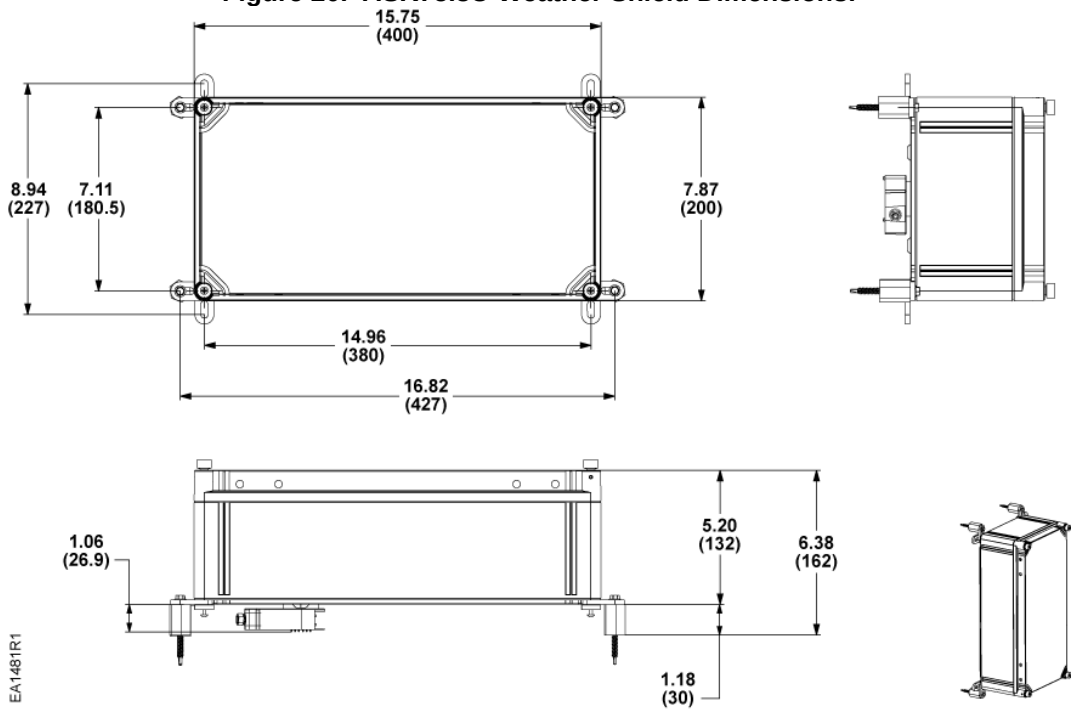


Figure 21. Dimensions of the ASK75.7U Weather Shield in Inches (Millimeters).

Dimensions, Continued

Inches (mm)

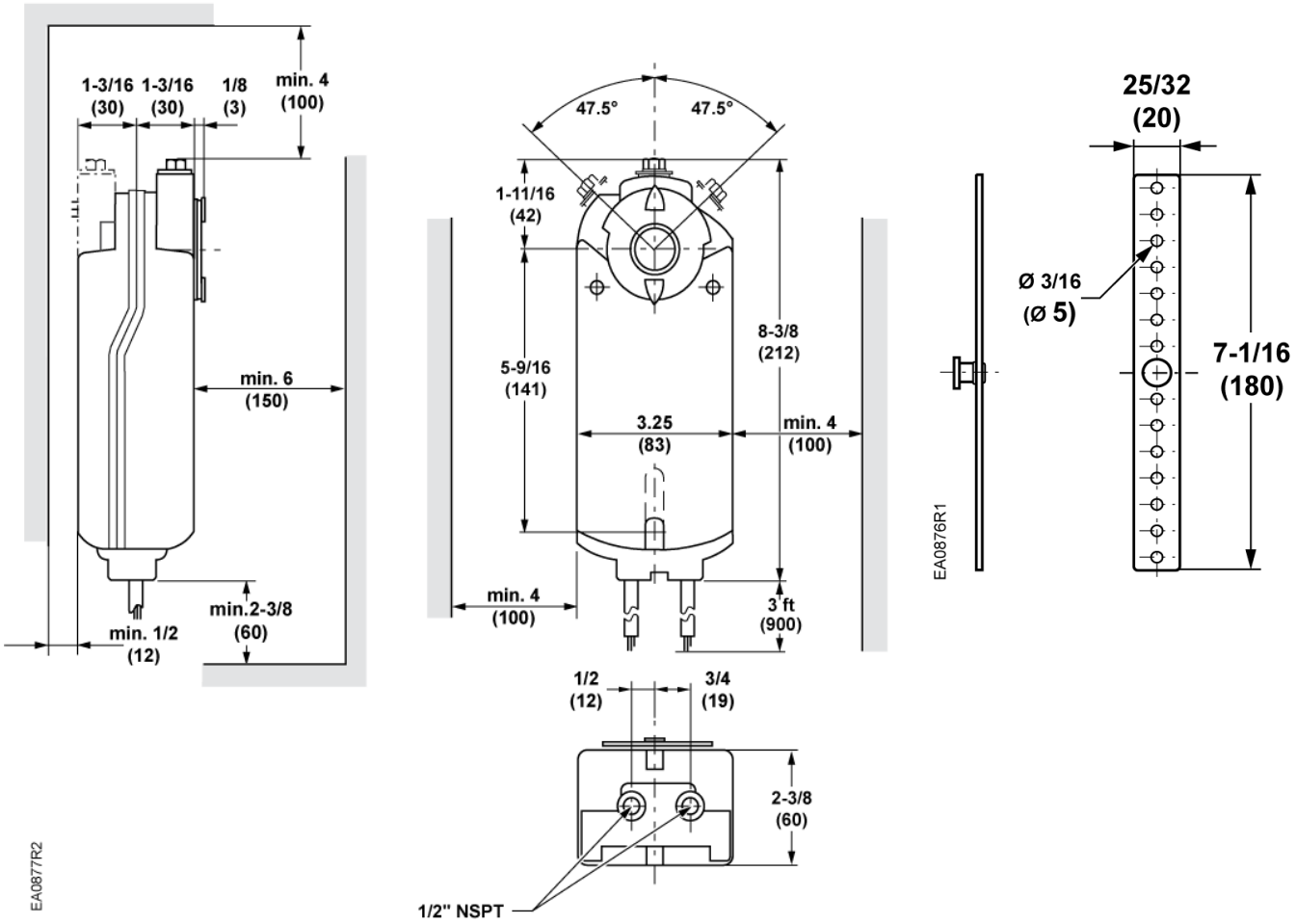


Figure 22. GMA Actuator and Mounting Bracket Dimensions.