Hart Engineering Corporation

SUBMITTAL:
11961-15

PROJECT: 9950. - Veolia/Taunton WWTP Improvements Phase 2 **DATE: 10/19/2022**

SUBMITTAL: 11961-15 - Plug, Check, Butterfly Valves O&M Manual
REVISION: 0
STATUS: Eng
SPEC #: 11961

TO:
James Dyment
Beta Group Inc.
701 George Washington HW
Lincoln, RI 02865
jdyment@beta-inc.com

FROM:
Nick George
Hart Engineering Corporation
800 Scenic View Drive
Cumberland, RI 02864
ngeorge@hartcompanies.com

Item	Revision	Description	Status	Date Sent	Date Returned
11961-15	0	Plug, Check, Butterfly Valves O&M Manual	Eng	10/19/2022	
Notes:					

Additional Notes:

Status Codes
1-APP – No Exceptions Taken
2-ANR – Make Corrections Noted
3-R&R – Revise and Resubmit
4-REJ – Rejected
5-IPO – For Information Purposes Only
6-NRR – Not Required for Review
ENG – Submitted to Engineer

Sincerely,
Hart Engineering Corporation

_____ DATE: 10/19/2022

October 18, 2022

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

PROJECT NAME
TAUTON, MA-WWTF IMPROVEMENTS PH II

PURCHASE ORDER
9950.121

VALVE TYPE
AWWA Eccentric Plug Valve
Swing Check Valves
RESILIENT SEATED BUTTERFLY VALVE

CONTRACTOR:	HART ENGINEERING CORPORATION 800 SCENIC VIEW DRIVE CUMBERLAND, RI 02864
LOCAL SUPPLIER:	ATLANTIC FLUID TECHNOLOGY INC PO BOX 404 WEST BOYLSTON, MA 01583 508-755-0440
MANUFACTURER:	DeZURIK 250 RIVERSIDE AVE NORTH SARTELL, MN 56377 (320) 259-2000
Factory Work Order	156286
Factory Sales Order	627659

DeZURIK
250 Riverside Avenue North
Sartell, MN 56377 USA
Ph: 320-259-2000

October 18, 2022

HART ENGINEERING CORPORATION
800 SCENIC VIEW DRIVE
CUMBERLAND, RI 02864

Subject: American Iron and Steel Step Certification for Project **"TAUTON, MA-WWTF IMPROVEMENTS PH II"**

Work Order # "156286"

I, Rachael Nieland, certify that the (melting, bending, galvanizing, cutting, etc.) processes for (manufacturing or fabricating) the following products and/or materials shipped or provided for the subject project is in full compliance with AIS requirement as mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A – Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference.

Item, Products and/or materials:
Model CVS, Swing Check Valves
Model PEC, Eccentric Plug Valves
Manufacturing processes of the above products take place at the following location:

DeZURIK - Sartell Plant
250 Riverside Ave North
Sartell, Minnesota 56377
320-259-2000

I also certify that the following products and/or materials shipped or provided for the subject project are ***not*** subject to AIS requirements, as they are not of "primarily iron or steel" construction with their material costs being less than 50% iron or steel.
Model BOS-US Resilient Seated Butterfly Valves with Bronze Disc

This certification is to be submitted upon request to interested parties (e.g. municipalities, consulting engineers, general contractors, etc.)

If any of the above compliance statements change while providing materials to this project, please immediately notify the person(s) who is requesting to use your product(s).

Rachael Nieland

Rachael Nieland
Project Management &
Order Administration Manager
320-259- 2137Office
Rachael.nieland@dezurik.com

250 Riverside Avenue North
Sartell, MN 56377 USA
www.dezurik.com

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A Data Sheet is included for each line item on the purchase order.
Document numbers are listed at the bottom of the Data Sheet.
Any one drawing may apply to more than one item number.
All documents are assembled in alpha/numeric order within each section.

DeZURIK

Submittal Data Sheet
Date: 10/18/22

HART ENGINEERING CORPORATION

800 SCENIC VIEW DRIVE

CUMBERLAND, RI
02864

P.O. 9950.121
FACTORY ORDER NO 156286
FACTORY SALES ORDER NO 627659
REV 0

PROJ. NAME TAUTON, MA-WWTF
IMPROVEMENTS PH II

Fact. ITEM	Cust. ITEM	QTY	DESCRIPTION	PART NO. **9713086**
1		16	PEC,6,F1,CI,NBR,CR,AIS-L41LS1*NT	

Style	PEC	DeZURIK Eccentric Plug Valve, Rectangular Port (AWWA C517)
Size	6	6 Inch (150mm); (Standard Port), Stainless Steel Bearings, Welded-In Nickel Seat (Except Rubber Lined or Stainless Steel Bodies)
End Connection	F1	Flanged, Drilled to ASME Class 125/150
Body Material	CI	Cast Iron, ASTM A126, Class B; (.5"-12" Pressure Rating 175 psi (1210 kPa); (14"& larger Pressure Rating 150 psi (1030 kPa)
Packing	NBR	.5" - 3" Acrylonitrile-Butadiene Reinforced filler in a PTFE U-ring, -20 to 180° F. (-29 to 83° C.); 4" & Larger Acrylonitrile-Butadiene Reinforced V-type , -20 to 250° F. (-29 to 121° C.)
Plug Facing	CR	Chloroprene; -20 to 180°F (-29 to 83°C)
Temp. Rating		180 degrees F.
Pressure Rating		175 psig
Option	AIS	USA Iron & Steel
Coating	L41LS1	12 mils minimum (non-stainless steel parts) of Blue Fusion Bonded Epoxy (Valve); on Interior with SP5 surface prep and 12 Mils of Blue Fusion Bonded Epoxy (Valve), and Minimum 4 Mils Epoxy (Actuator) Blue on Exterior with SP5 surface prep
Act Type	NT	2 Inch Square Nut

RELATED DOCUMENTS

A50941	DWG INST PEC F GR1 NT 4-8"
A20730	DWG VALVE ASSY PEC F 3.5-20"
A22557	DWG ACT NT 4-8"
D10021	IM VALVE PEC 4-20"
D10061	IM ACT 2" NUT/LEVER (NT/LV/LVF

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HART ENGINEERING CORPORATION

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PROJ. NAME TAUTON, MA-WWTF
IMPROVEMENTS PH II

Fact. ITEM	Cust. ITEM	QTY	DESCRIPTION	PART NO. **9070083**
2		16	ACC*LV-6	

Style	ACC	DeZURIK ACCESSORIES
Acc Cde	LV	Lever; For Use on 4-8" PEC
Additional Data	6	6 Inch (150mm)

RELATED DOCUMENTS

A22563	DWG INST ACC LV 4-8"

FEATURES

SHIP WITH ITEM 1

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Fact. ITEM	Cust. ITEM	QTY	DESCRIPTION	PART NO. **9718721**
3		8	PEC,8,F1,CI,NBR,CR,AIS-L41LS1*GS-6-HD8	

Style	PEC	DeZURIK Eccentric Plug Valve, Rectangular Port (AWWA C517)
Size	8	8 Inch (200mm); (Standard Port), Stainless Steel Bearings, Welded-In Nickel Seat (Except Rubber Lined or Stainless Steel Bodies)
End Connection	F1	Flanged, Drilled to ASME Class 125/150
Body Material	CI	Cast Iron, ASTM A126, Class B; (.5"-12" Pressure Rating 175 psi (1210 kPa); (14"& larger Pressure Rating 150 psi (1030 kPa)
Packing	NBR	.5" - 3" Acrylonitrile-Butadiene Reinforced filler in a PTFE U-ring, -20 to 180° F. (-29 to 83° C.); 4" & Larger Acrylonitrile-Butadiene Reinforced V-type , -20 to 250° F. (-29 to 121° C.)
Plug Facing	CR	Chloroprene; -20 to 180°F (-29 to 83°C)
Temp. Rating		180 degrees F.
Pressure Rating		175 psig
Option	AIS	USA Iron & Steel
Coating	L41LS1	12 mils minimum (non-stainless steel parts) of Blue Fusion Bonded Epoxy (Valve); on Interior with SP5 surface prep and 12 Mils of Blue Fusion Bonded Epoxy (Valve), and Minimum 4 Mils Epoxy (Actuator) Blue on Exterior with SP5 surface prep
Act Type	GS-6-HD8	G-Series Gear with Handwheel Operator

RELATED DOCUMENTS

A46423	DWG INST PEC F GR1 GS-6-HD 4-1
A20730	DWG VALVE ASSY PEC F 3.5-20"
A22553	DWG ACT GS-6-HD/CW/N & GS-12-H
D10021	IM VALVE PEC 4-20"
D10063	IM ACT G-SERIES MANUAL ECCENTR

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PROJ. NAME TAUTON, MA-WWTF
IMPROVEMENTS PH II

Fact. ITEM	Cust. ITEM	QTY	DESCRIPTION	PART NO. **9725085**
4		8	PEC,8,F1,CI,NBR,CR,AIS-L41LS1*GS-6-CW8	

Style	PEC	DeZURIK Eccentric Plug Valve, Rectangular Port (AWWA C517)
Size	8	8 Inch (200mm); (Standard Port), Stainless Steel Bearings, Welded-In Nickel Seat (Except Rubber Lined or Stainless Steel Bodies)
End Connection	F1	Flanged, Drilled to ASME Class 125/150
Body Material	CI	Cast Iron, ASTM A126, Class B; (.5"-12" Pressure Rating 175 psi (1210 kPa); (14"& larger Pressure Rating 150 psi (1030 kPa)
Packing	NBR	.5" - 3" Acrylonitrile-Butadiene Reinforced filler in a PTFE U-ring, -20 to 180° F. (-29 to 83° C.); 4" & Larger Acrylonitrile-Butadiene Reinforced V-type , -20 to 250° F. (-29 to 121° C.)
Plug Facing	CR	Chloroprene; -20 to 180°F (-29 to 83°C)
Temp. Rating		180 degrees F.
Pressure Rating		175 psig
Option	AIS	USA Iron & Steel
Coating	L41LS1	12 mils minimum (non-stainless steel parts) of Blue Fusion Bonded Epoxy (Valve); on Interior with SP5 surface prep and 12 Mils of Blue Fusion Bonded Epoxy (Valve), and Minimum 4 Mils Epoxy (Actuator) Blue on Exterior with SP5 surface prep
Act Type	GS-6-CW8	G-Series Gear with Chainwheel Operator

RELATED DOCUMENTS

A53708	DWG INST PEC F GR1 GS-6-CW 4-1
A20730	DWG VALVE ASSY PEC F 3.5-20"
A22553	DWG ACT GS-6-HD/CW/N & GS-12-H
D10021	IM VALVE PEC 4-20"
D10063	IM ACT G-SERIES MANUAL ECCENTR

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HART ENGINEERING CORPORATION

800 SCENIC VIEW DRIVE

CUMBERLAND, RI
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FACTORY ORDER NO 156286
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REV 0

PROJ. NAME TAUTON, MA-WWTF
IMPROVEMENTS PH II

Fact. ITEM	Cust. ITEM	QTY	DESCRIPTION	PART NO. **9725086**
5		9	PEC,12,F1,CI,NBR,CR,AIS-L41LS1*GS-12-HD16	

Style	PEC	DeZURIK Eccentric Plug Valve, Rectangular Port (AWWA C517)
Size	12	12 Inch (300mm); (Standard Port), Stainless Steel Bearings, Welded-In Nickel Seat (Except Rubber Lined or Stainless Steel Bodies)
End Connection	F1	Flanged, Drilled to ASME Class 125/150
Body Material	CI	Cast Iron, ASTM A126, Class B; (.5"-12" Pressure Rating 175 psi (1210 kPa); (14"& larger Pressure Rating 150 psi (1030 kPa)
Packing	NBR	.5" - 3" Acrylonitrile-Butadiene Reinforced filler in a PTFE U-ring, -20 to 180° F. (-29 to 83° C.); 4" & Larger Acrylonitrile-Butadiene Reinforced V-type , -20 to 250° F. (-29 to 121° C.)
Plug Facing	CR	Chloroprene; -20 to 180°F (-29 to 83°C)
Temp. Rating		180 degrees F.
Pressure Rating		175 psig
Option	AIS	USA Iron & Steel
Coating	L41LS1	12 mils minimum (non-stainless steel parts) of Blue Fusion Bonded Epoxy (Valve); on Interior with SP5 surface prep and 12 Mils of Blue Fusion Bonded Epoxy (Valve), and Minimum 4 Mils Epoxy (Actuator) Blue on Exterior with SP5 surface prep
Act Type	GS-12-HD16	G-Series Gear with Handwheel Operator

RELATED DOCUMENTS

A46453	DWG INST PEC F GR1 GS-12-HD 8-
A20730	DWG VALVE ASSY PEC F 3.5-20"
A22553	DWG ACT GS-6-HD/CW/N & GS-12-H
D10021	IM VALVE PEC 4-20"
D10063	IM ACT G-SERIES MANUAL ECCENTR

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REV 0

PROJ. NAME TAUTON, MA-WWTF
IMPROVEMENTS PH II

Fact. ITEM	Cust. ITEM	QTY	DESCRIPTION	PART NO. **9725087**
6		3	PEC,14,F1,CI,NBR,CR,AIS-L41LS1*GS-12-HD20	

Style	PEC	DeZURIK Eccentric Plug Valve, Rectangular Port (AWWA C517)
Size	14	14 Inch (350mm); (Standard Port), Stainless Steel Bearings, Welded-In Nickel Seat (Except Rubber Lined or Stainless Steel Bodies)
End Connection	F1	Flanged, Drilled to ASME Class 125/150
Body Material	CI	Cast Iron, ASTM A126, Class B; (.5"-12" Pressure Rating 175 psi (1210 kPa); (14"& larger Pressure Rating 150 psi (1030 kPa)
Packing	NBR	.5" - 3" Acrylonitrile-Butadiene Reinforced filler in a PTFE U-ring, -20 to 180° F. (-29 to 83° C.); 4" & Larger Acrylonitrile-Butadiene Reinforced V-type , -20 to 250° F. (-29 to 121° C.)
Plug Facing	CR	Chloroprene; -20 to 180°F (-29 to 83°C)
Temp. Rating		180 degrees F.
Pressure Rating		150 psig
Option	AIS	USA Iron & Steel
Coating	L41LS1	12 mils minimum (non-stainless steel parts) of Blue Fusion Bonded Epoxy (Valve); on Interior with SP5 surface prep and 12 Mils of Blue Fusion Bonded Epoxy (Valve), and Minimum 4 Mils Epoxy (Actuator) Blue on Exterior with SP5 surface prep
Act Type	GS-12-HD20	G-Series Gear with Handwheel Operator

RELATED DOCUMENTS

A46453	DWG INST PEC F GR1 GS-12-HD 8-
A20730	DWG VALVE ASSY PEC F 3.5-20"
A22553	DWG ACT GS-6-HD/CW/N & GS-12-H
D10021	IM VALVE PEC 4-20"
D10063	IM ACT G-SERIES MANUAL ECCENTR

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PROJ. NAME TAUTON, MA-WWTF
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Fact. ITEM	Cust. ITEM	QTY	DESCRIPTION	PART NO. **9725088**
7		8	PEC,16,F1,CI,NBR,CR,AIS-L41LS1*GS-12-HD24	

Style	PEC	DeZURIK Eccentric Plug Valve, Rectangular Port (AWWA C517)
Size	16	16 Inch(400mm); (Standard Port), Stainless Steel Bearings, Welded-In Nickel Seat (Except Rubber Lined or Stainless Steel Bodies)
End Connection	F1	Flanged, Drilled to ASME Class 125/150
Body Material	CI	Cast Iron, ASTM A126, Class B; (.5"-12" Pressure Rating 175 psi (1210 kPa); (14"& larger Pressure Rating 150 psi (1030 kPa)
Packing	NBR	.5" - 3" Acrylonitrile-Butadiene Reinforced filler in a PTFE U-ring, -20 to 180° F. (-29 to 83° C.); 4" & Larger Acrylonitrile-Butadiene Reinforced V-type , -20 to 250° F. (-29 to 121° C.)
Plug Facing	CR	Chloroprene; -20 to 180°F (-29 to 83°C)
Temp. Rating		180 degrees F.
Pressure Rating		150 psig
Option	AIS	USA Iron & Steel
Coating	L41LS1	12 mils minimum (non-stainless steel parts) of Blue Fusion Bonded Epoxy (Valve); on Interior with SP5 surface prep and 12 Mils of Blue Fusion Bonded Epoxy (Valve), and Minimum 4 Mils Epoxy (Actuator) Blue on Exterior with SP5 surface prep
Act Type	GS-12-HD24	G-Series Gear with Handwheel Operator

RELATED DOCUMENTS

A46453	DWG INST PEC F GR1 GS-12-HD 8-
A20730	DWG VALVE ASSY PEC F 3.5-20"
A22553	DWG ACT GS-6-HD/CW/N & GS-12-H
D10021	IM VALVE PEC 4-20"
D10063	IM ACT G-SERIES MANUAL ECCENTR

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800 SCENIC VIEW DRIVE

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PROJ. NAME TAUTON, MA-WWTF
IMPROVEMENTS PH II

Fact. ITEM	Cust. ITEM	QTY	DESCRIPTION	PART NO. **9688884**
8		6	CVS,6,250A,F1,DI,DI-S11-S2-NBR,AIS*LW	

Style	CVS	APCO Swing Check Valves
Size	6	6 Inch (150mm)
Body Style	250A	Series 250 Swing Check Valve
End Connection	F1	Flanged; ASME 125/150
Body Material	DI	Ductile Iron
Disc Material	DI	Ductile Iron
Shaft Material	S11	303 Stainless Steel
Body Seat Material	S2	316 Stainless Steel
Disc Seat Material	NBR	Acrylonitrile-Butadiene (NBR)
Option	AIS	USA Iron & Steel
Coating		12 mils minimum (non-stainless steel parts) of Blue DeZURIK Epoxy (NSF Std. 61) on Interior and Exterior with Standard (SP10) surface prep
Act Type	LW	Lever & Weight

RELATED DOCUMENTS

A70021	DWG INST CVS F1 LW 2-36" 250/2
A70161	DWG VALVE ASSY CVS 2-20" 250/2
A70064	DWG ASSY 250/250A LW CLOSURE C
D12003	IM VALVE CVS SWING CHECK (250/

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HART ENGINEERING CORPORATION

800 SCENIC VIEW DRIVE

CUMBERLAND, RI
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FACTORY ORDER NO 156286
FACTORY SALES ORDER NO 627659
REV 0

PROJ. NAME TAUTON, MA-WWTF
IMPROVEMENTS PH II

Fact. ITEM	Cust. ITEM	QTY	DESCRIPTION	PART NO. **9689088**
9		3	CVS,12,250A,F1,DI,DI-S11-S2-NBR,AIS*LW	

Style	CVS	APCO Swing Check Valves
Size	12	12 Inch (300mm)
Body Style	250A	Series 250 Swing Check Valve
End Connection	F1	Flanged; ASME 125/150
Body Material	DI	Ductile Iron
Disc Material	DI	Ductile Iron
Shaft Material	S11	303 Stainless Steel
Body Seat Material	S2	316 Stainless Steel
Disc Seat Material	NBR	Acrylonitrile-Butadiene (NBR)
Option	AIS	USA Iron & Steel
Coating		12 mils minimum (non-stainless steel parts) of Blue DeZURIK Epoxy (NSF Std. 61) on Interior and Exterior with Standard (SP10) surface prep
Act Type	LW	Lever & Weight

RELATED DOCUMENTS

A70021	DWG INST CVS F1 LW 2-36" 250/2
A70161	DWG VALVE ASSY CVS 2-20" 250/2
A70064	DWG ASSY 250/250A LW CLOSURE C
D12003	IM VALVE CVS SWING CHECK (250/

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IMPROVEMENTS PH II

Fact. ITEM	Cust. ITEM	QTY	DESCRIPTION	PART NO. **9694096**
10		3	CVS,14,250A,F1,DI,DI-S11-S2-NBR,AIS*LW	

Style	CVS	APCO Swing Check Valves
Size	14	14 Inch (350mm)
Body Style	250A	Series 250 Swing Check Valve
End Connection	F1	Flanged; ASME 125/150
Body Material	DI	Ductile Iron
Disc Material	DI	Ductile Iron
Shaft Material	S11	303 Stainless Steel
Body Seat Material	S2	316 Stainless Steel
Disc Seat Material	NBR	Acrylonitrile-Butadiene (NBR)
Option	AIS	USA Iron & Steel
Coating		12 mils minimum (non-stainless steel parts) of Blue DeZURIK Epoxy (NSF Std. 61) on Interior and Exterior with Standard (SP10) surface prep
Act Type	LW	Lever & Weight

RELATED DOCUMENTS

A70021	DWG INST CVS F1 LW 2-36" 250/2
A70161	DWG VALVE ASSY CVS 2-20" 250/2
A70064	DWG ASSY 250/250A LW CLOSURE C
D12003	IM VALVE CVS SWING CHECK (250/

DeZURIK

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Fact. ITEM	Cust. ITEM	QTY	DESCRIPTION	PART NO. **9725089**
11		4	BOS,14,US,W1,DI,EPDM,EPDM,ALB-S8,SC0*MG-1216-CW20,SEH90	

Style	BOS	DEZURIK RESILIENT SEATED BUTTERFLY VALVE
Size	14	14 Inch (350mm)
Body Style	US	Un-interrupted Seat
End Connection	W1	Wafer Drilling; ASME Class 125/150
Body Material	DI	Ductile Iron
Seat Type	EPDM	Terpolymer of Ethylene Propylene & A Diene; Temperature -20° to 250° F. (-29° to 121C.) for CL Body Style; Temperature -30° to 250° F. (-35° to 121° C.) for US Body Style
Shaft Seal	EPDM	Terpolymer of Ethylene Propylene & A Diene; Temperature -20° to 250° F. (-29° to 121C.) for CL Body Style; Temperature -30° to 250° F. (-35° to 121° C.) for US Body Style
Disc	ALB	Aluminum Bronze
Shaft	S8	410 Stainless Steel
Coating	SC0	8 mils minimum (non-stainless steel parts) of Blue DeZURIK Epoxy (NSF Std. 61) on Exterior with Standard (SP10) surface prep
Act Type	MG-1216-CW20	Manual Gear Chainwheel; 20 In Dia
Accessory	SEH90	(2) Stonel Switches; Mechanical; SPDT; 2 Conduit Conn; Type 1,3,4,4X,5,6,7,9,12 and 13

RELATED DOCUMENTS

A60644	DWG INST BOS US W MG-1216-CW 1
A56941	DWG VALVE ASSY BOS US W 2-20"
A57199	DWG ACT MG-_-HD/CW
A53803	DWG INST ACC SEH MG-7/1012/121
A56330	DWG ACC SW CONTACT STONEL
D10459	IM VALVE BOS-US 2-20"
D10408	IM ACT MANUAL GEAR
D10350	IM SWITCH/POSITION TRANSMITTER

FEATURES

SWITCH ACTION: SWITCHES TO INDICATE VALVE OPEN & CLOSED
*SEE NOTE 2 BELOW FOR DEVIATION FROM SPECIFICATION.

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Fact. ITEM	Cust. ITEM	QTY	DESCRIPTION	PART NO. **9725090**
12		2	BOS,24,US,W1,DI,EPDM,T,BZ-S4,SC0*GS-12-HD16	

Style	BOS	DEZURIK RESILIENT SEATED BUTTERFLY VALVE
Size	24	24 Inch (600mm)
Body Style	US	Un-interrupted Seat
End Connection	W1	Wafer Drilling; ASME Class 125/150
Body Material	DI	Ductile Iron
Seat Type	EPDM	Terpolymer of Ethylene Propylene & A Diene; Temperature -20° to 250° F. (-29° to 121C.) for CL Body Style; Temperature -30° to 250° F. (-35° to 121° C.) for US Body Style
Shaft Seal	T	PTFE; Temperature to 500° F. (260° C.)
Disc	BZ	Bronze
Shaft	S4	416 Stainless Steel
Coating	SC0	8 mils minimum (non-stainless steel parts) of Blue DeZURIK Epoxy (NSF Std. 61) on Exterior with Standard (SP10) surface prep
Act Type	GS-12-HD16	G-Series Manual Gear: Handwheel 16 In Dia

RELATED DOCUMENTS

A46583	DWG INST BOS US W GS-12-HD 24-
A46575	DWG VALVE ASSY BOS US W 24-36"
A30325	DWG ACT GS-12-HD/N 14-36" BTFL
D10348	IM VALVE BOS-US 24-36"
D10083	IM ACT G-SERIES MANUAL (HD/CW)

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IMPROVEMENTS PH II

Fact. ITEM	Cust. ITEM	QTY	DESCRIPTION	PART NO. **9725091**
13		2	BOS,4,US,W1,DI,EPDM,EPDM,ALB-S8,SC0*X*A33695	

Style	BOS	DEZURIK RESILIENT SEATED BUTTERFLY VALVE
Size	4	4 Inch (100mm)
Body Style	US	Un-interrupted Seat
End Connection	W1	Wafer Drilling; ASME Class 125/150
Body Material	DI	Ductile Iron
Seat Type	EPDM	Terpolymer of Ethylene Propylene & A Diene; Temperature -20° to 250° F. (-29° to 121C.) for CL Body Style; Temperature -30° to 250° F. (-35° to 121° C.) for US Body Style
Shaft Seal	EPDM	Terpolymer of Ethylene Propylene & A Diene; Temperature -20° to 250° F. (-29° to 121C.) for CL Body Style; Temperature -30° to 250° F. (-35° to 121° C.) for US Body Style
Disc	ALB	Aluminum Bronze
Shaft	S8	410 Stainless Steel
Coating	SC0	8 mils minimum (non-stainless steel parts) of Blue DeZURIK Epoxy (NSF Std. 61) on Exterior with Standard (SP10) surface prep
Act Type	X	Specified in Modifier Below
Modifier	A33695	AUMA SQR05.2/AC01.2 P/N 1456160

RELATED DOCUMENTS

J45217	DWG INST BOS W1 AUMATIC SQ_05.
A56941	DWG VALVE ASSY BOS US W 2-20"
J44001	DWG CONN PARTS BOS/MTR
D10459	IM VALVE BOS-US 2-20"
DP00563	IM ACT AUMA MTR SQ(R)05.2-SQ(R

DeZURIK

Submittal Data Sheet
Date: 10/18/22

HART ENGINEERING CORPORATION

800 SCENIC VIEW DRIVE

CUMBERLAND, RI
02864

P.O. 9950.121
FACTORY ORDER NO 156286
FACTORY SALES ORDER NO 627659
REV 0

PROJ. NAME TAUTON, MA-WWTF
IMPROVEMENTS PH II

Fact. ITEM	Cust. ITEM	QTY	DESCRIPTION	PART NO. **9725092**
14		2	BOS,6,US,W1,DI,EPDM,EPDM,ALB-S8,SC0*X*A33696	

Style	BOS	DEZURIK RESILIENT SEATED BUTTERFLY VALVE
Size	6	6 Inch (150mm)
Body Style	US	Un-interrupted Seat
End Connection	W1	Wafer Drilling; ASME Class 125/150
Body Material	DI	Ductile Iron
Seat Type	EPDM	Terpolymer of Ethylene Propylene & A Diene; Temperature -20° to 250° F. (-29° to 121C.) for CL Body Style; Temperature -30° to 250° F. (-35° to 121° C.) for US Body Style
Shaft Seal	EPDM	Terpolymer of Ethylene Propylene & A Diene; Temperature -20° to 250° F. (-29° to 121C.) for CL Body Style; Temperature -30° to 250° F. (-35° to 121° C.) for US Body Style
Disc	ALB	Aluminum Bronze
Shaft	S8	410 Stainless Steel
Coating	SC0	8 mils minimum (non-stainless steel parts) of Blue DeZURIK Epoxy (NSF Std. 61) on Exterior with Standard (SP10) surface prep
Act Type	X	Specified in Modifier Below
Modifier	A33696	AUMA SQR05.2/AC01.2 P/N 1456161

RELATED DOCUMENTS

J45869	DWG INST BOS W1 AUMATIC SQ_05/
A56941	DWG VALVE ASSY BOS US W 2-20"
J44001	DWG CONN PARTS BOS/MTR
D10459	IM VALVE BOS-US 2-20"
DP00563	IM ACT AUMA MTR SQ(R)05.2-SQ(R

DeZURIK

Submittal Data Sheet
Date: 10/18/22

HART ENGINEERING CORPORATION

800 SCENIC VIEW DRIVE

CUMBERLAND, RI
02864

P.O. 9950.121
FACTORY ORDER NO 156286
FACTORY SALES ORDER NO 627659
REV 0

PROJ. NAME TAUTON, MA-WWTF
IMPROVEMENTS PH II

Fact. ITEM	Cust. ITEM	QTY	DESCRIPTION	PART NO. **9725093**
15		2	BOS,8,US,W1,DI,EPDM,EPDM,ALB-S8,SC0*X*A33697	

Style	BOS	DEZURIK RESILIENT SEATED BUTTERFLY VALVE
Size	8	8 Inch (200mm)
Body Style	US	Un-interrupted Seat
End Connection	W1	Wafer Drilling; ASME Class 125/150
Body Material	DI	Ductile Iron
Seat Type	EPDM	Terpolymer of Ethylene Propylene & A Diene; Temperature -20° to 250° F. (-29° to 121C.) for CL Body Style; Temperature -30° to 250° F. (-35° to 121° C.) for US Body Style
Shaft Seal	EPDM	Terpolymer of Ethylene Propylene & A Diene; Temperature -20° to 250° F. (-29° to 121C.) for CL Body Style; Temperature -30° to 250° F. (-35° to 121° C.) for US Body Style
Disc	ALB	Aluminum Bronze
Shaft	S8	410 Stainless Steel
Coating	SC0	8 mils minimum (non-stainless steel parts) of Blue DeZURIK Epoxy (NSF Std. 61) on Exterior with Standard (SP10) surface prep
Act Type	X	Specified in Modifier Below
Modifier	A33697	AUMA SQR07.2/AC01.2 P/N 1456162

RELATED DOCUMENTS

J45867	DWG INST BOS W1 AUMATIC SQ_05.
A56941	DWG VALVE ASSY BOS US W 2-20"
J44001	DWG CONN PARTS BOS/MTR
D10459	IM VALVE BOS-US 2-20"
DP00563	IM ACT AUMA MTR SQ(R)05.2-SQ(R

DeZURIK

Submittal Data Sheet
Date: 10/18/22

HART ENGINEERING CORPORATION

800 SCENIC VIEW DRIVE

CUMBERLAND, RI
02864

P.O. 9950.121
FACTORY ORDER NO 156286
FACTORY SALES ORDER NO 627659
REV 0

PROJ. NAME TAUTON, MA-WWTF
IMPROVEMENTS PH II

Fact. ITEM	Cust. ITEM	QTY	DESCRIPTION	PART NO. **9725094**
16		2	BOS,10,US,W1,DI,EPDM,EPDM,ALB-S8,SC0*X*A33698	

Style	BOS	DEZURIK RESILIENT SEATED BUTTERFLY VALVE
Size	10	10 Inch (250mm)
Body Style	US	Un-interrupted Seat
End Connection	W1	Wafer Drilling; ASME Class 125/150
Body Material	DI	Ductile Iron
Seat Type	EPDM	Terpolymer of Ethylene Propylene & A Diene; Temperature -20° to 250° F. (-29° to 121C.) for CL Body Style; Temperature -30° to 250° F. (-35° to 121° C.) for US Body Style
Shaft Seal	EPDM	Terpolymer of Ethylene Propylene & A Diene; Temperature -20° to 250° F. (-29° to 121C.) for CL Body Style; Temperature -30° to 250° F. (-35° to 121° C.) for US Body Style
Disc	ALB	Aluminum Bronze
Shaft	S8	410 Stainless Steel
Coating	SC0	8 mils minimum (non-stainless steel parts) of Blue DeZURIK Epoxy (NSF Std. 61) on Exterior with Standard (SP10) surface prep
Act Type	X	Specified in Modifier Below
Modifier	A33698	AUMA SQR12.2/AC01.2 P/N 1456163

RELATED DOCUMENTS

J45868	DWG INST BOS W1 AUMATIC SQ12.2
A56941	DWG VALVE ASSY BOS US W 2-20"
J44001	DWG CONN PARTS BOS/MTR
D10459	IM VALVE BOS-US 2-20"
DP00563	IM ACT AUMA MTR SQ(R)05.2-SQ(R

DeZURIK

Submittal Data Sheet
Date: 10/18/22

HART ENGINEERING CORPORATION

800 SCENIC VIEW DRIVE

CUMBERLAND, RI
02864

P.O. 9950.121
FACTORY ORDER NO 156286
FACTORY SALES ORDER NO 627659
REV 0

PROJ. NAME TAUTON, MA-WWTF
IMPROVEMENTS PH II

Fact. ITEM	Cust. ITEM	QTY	DESCRIPTION	PART NO. **9725095**
17		2	BOS,12,US,W1,DI,EPDM,EPDM,ALB-S8,SC0*X*A33699	

Style	BOS	DEZURIK RESILIENT SEATED BUTTERFLY VALVE
Size	12	12 Inch (300mm)
Body Style	US	Un-interrupted Seat
End Connection	W1	Wafer Drilling; ASME Class 125/150
Body Material	DI	Ductile Iron
Seat Type	EPDM	Terpolymer of Ethylene Propylene & A Diene; Temperature -20° to 250° F. (-29° to 121C.) for CL Body Style; Temperature -30° to 250° F. (-35° to 121° C.) for US Body Style
Shaft Seal	EPDM	Terpolymer of Ethylene Propylene & A Diene; Temperature -20° to 250° F. (-29° to 121C.) for CL Body Style; Temperature -30° to 250° F. (-35° to 121° C.) for US Body Style
Disc	ALB	Aluminum Bronze
Shaft	S8	410 Stainless Steel
Coating	SC0	8 mils minimum (non-stainless steel parts) of Blue DeZURIK Epoxy (NSF Std. 61) on Exterior with Standard (SP10) surface prep
Act Type	X	Specified in Modifier Below
Modifier	A33699	AUMA SQR14.2/AC01.2 P/N 1456164

RELATED DOCUMENTS

J45871	DWG INST BOS W1 12&14 AUMA SQ1
A56941	DWG VALVE ASSY BOS US W 2-20"
J44001	DWG CONN PARTS BOS/MTR
D10459	IM VALVE BOS-US 2-20"
DP00563	IM ACT AUMA MTR SQ(R)05.2-SQ(R

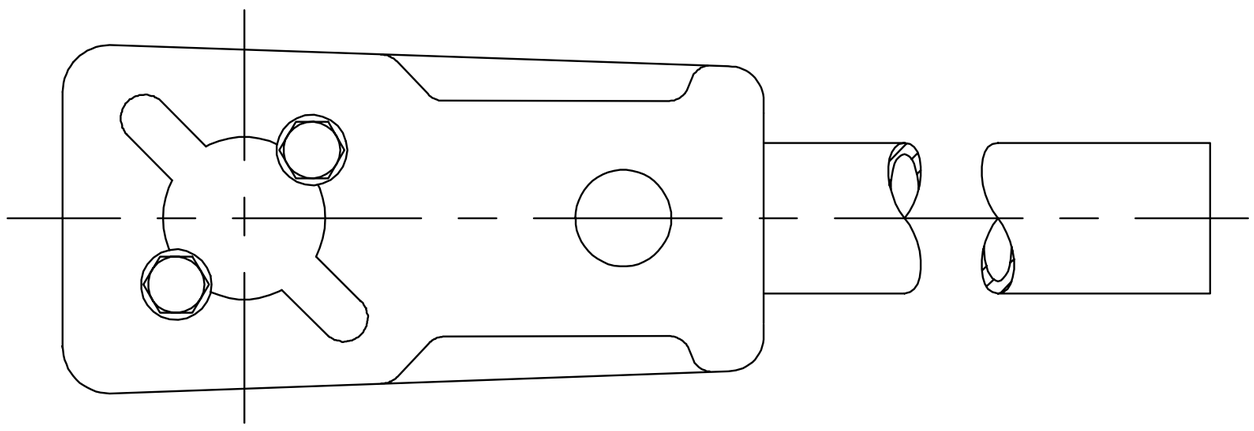
VALVE SIZE	MAX SHUT–OFF PRESSURE DROP (PSI)	DIM A *
3.5 4	125	14.75 375
4.5 5 6	25	22.50 571
	75	29.50 749
	100	32.75 832
6.5 8	25	29.50 749
	75	32.75 832
	100	43.25 1099

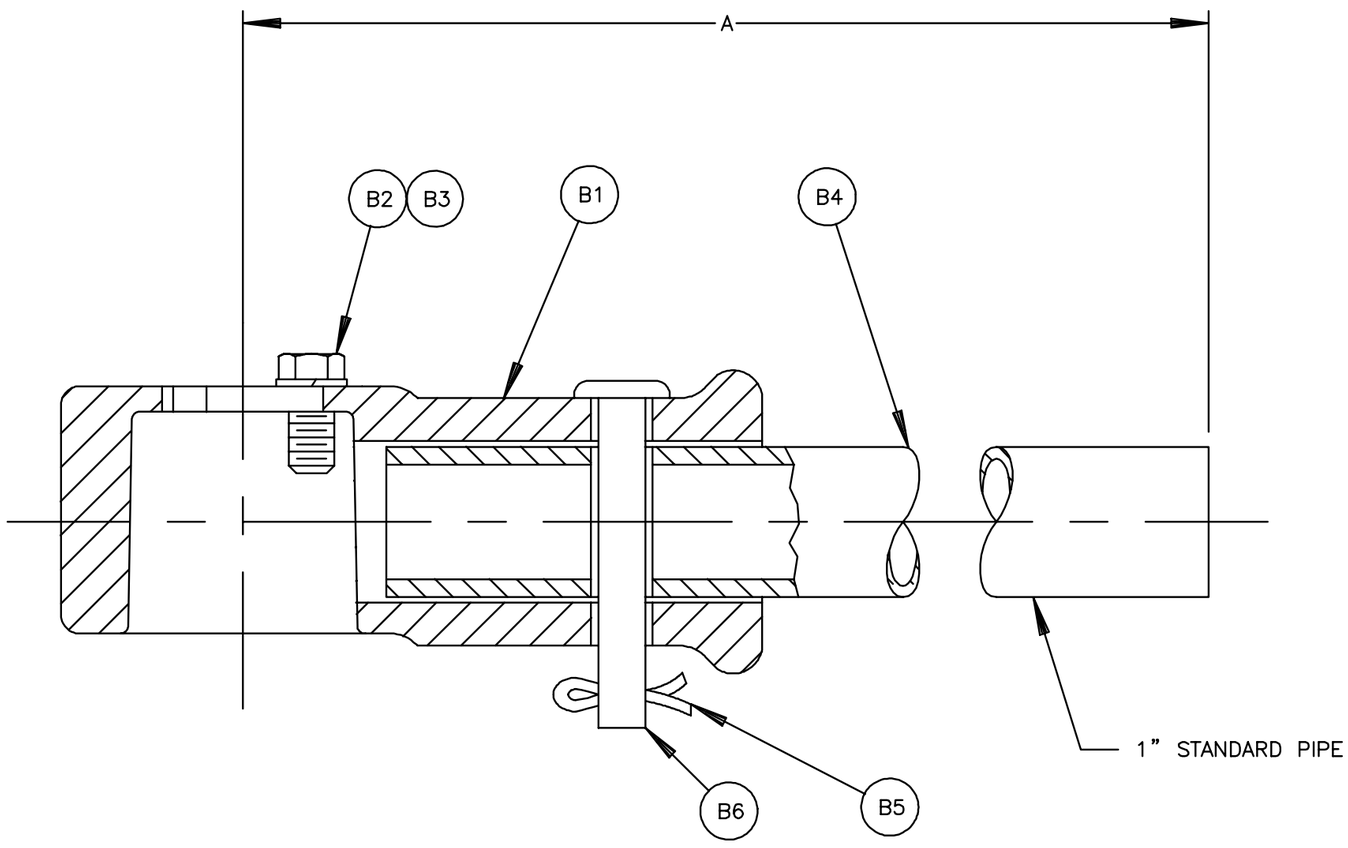
*THE LONGEST LENGTH OF LEVER PER VALVE IS FURNISHED STANDARD UNLESS OTHERWISE SPECIFIED.

NO	PART NAME	QTY
B1	WRENCH	1
B2	SCREW	2
B3	LOCKWASHER	2
B4	HANDLE	1
B5	COTTER PIN	1
B6	CLEVIS PIN	1

NOTE:

1. WHEN ORDERING PARTS, SPECIFY VALVE SIZE AND MODEL NUMBER FROM DATA PLATE, GIVE DRAWING NUMBER WITH PART NAME, ITEM NUMBER AND QUANTITY.
2. DIMENSIONS SHOWN IN $\frac{\text{INCHES}}{\text{MILLIMETERS}}$ UNLESS OTHERWISE INDICATED.





G	F	E	D	C	B	A
	05/04/11	04/28/99	10/12/94	03/04/91	12/12/86	11/20/81
	62105	54620	50312	51112	17010	15278

DeZURIK
Sartell, MN USA 56377
www.dezurik.com

LV WRENCH FOR USE WITH 3.5 – 8 ECCENTRIC VALVES

DOCT. CODE	DRAWN	APPROVED	A22563
C1	CHECKED RJP	DATE 10–30–81	

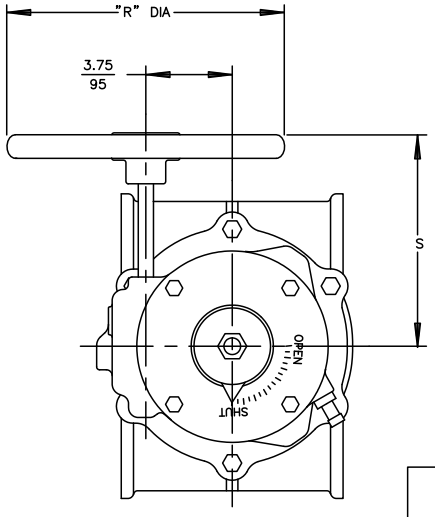
VALVE SIZE		DIMENSIONS INCHES / MILLIMETERS										
INCH	MM	A	B	C	D	E	F	G	H	J	K	L
4	100	.69 / 18	9.00 / 229	5.38 / 137	7.50 / 191	NONE	NONE	NONE	.75 / 19	8	9.62 / 244	13.27 / 337
5	125	.75 / 19	10.50 / 267	6.50 / 165	8.50 / 216	3/4–10UNC	4	1.00 / 25	.88 / 22	4	11.81 / 300	15.46 / 393
6	150	.75 / 19	10.50 / 267	6.50 / 165	9.50 / 241	NONE	NONE	NONE	.88 / 22	8	11.81 / 300	15.46 / 393
8	200	.81 / 21	11.50 / 292	8.25 / 210	11.75 / 298	3/4–10UNC	4	.81 / 21	.88 / 22	4	13.63 / 346	17.28 / 439
10	250	.88 / 22	13.00 / 330	10.28 / 261	14.25 / 362	7/8–9UNC	4	.88 / 22	1.00 / 25	8	15.12 / 384	18.77 / 477
12	300	.94 / 24	14.00 / 356	11.69 / 297	17.00 / 432	7/8–9UNC	4	.94 / 24	1.00 / 25	8	16.75 / 425	20.40 / 518

VALVE SIZE	ACTUATOR NUMBER	DIMENSIONS IN / MM	
		R	S
4	GS–6–HD8	8.00 / 203	6.88 / 175
5 & 6	GS–6–HD8	8.00 / 203	8.75 / 222
5 & 6	GS–6–HD12	12.00 / 305	8.75 / 222
5 & 6	GS–6–HD16	16.00 / 406	9.12 / 232
5 & 6	GS–6–HD20	20.00 / 508	9.38 / 238
8	GS–6–HD8	8.00 / 203	8.75 / 222
8	GS–6–HD12	12.00 / 305	9.38 / 238
8	GS–6–HD16	16.00 / 406	9.75 / 248
8	GS–6–HD20	20.00 / 508	9.38 / 238
10	GS–6–HD8	8.00 / 203	11.12 / 282
10	GS–6–HD12	12.00 / 305	11.62 / 295
10	GS–6–HD16	16.00 / 406	12.00 / 305
10	GS–6–HD20	20.00 / 508	11.62 / 295
12	GS–6–HD8	8.00 / 203	11.88 / 302
12	GS–6–HD12	12.00 / 305	12.88 / 327
12	GS–6–HD16	16.00 / 406	13.25 / 337
12	GS–6–HD20	20.00 / 508	12.88 / 327

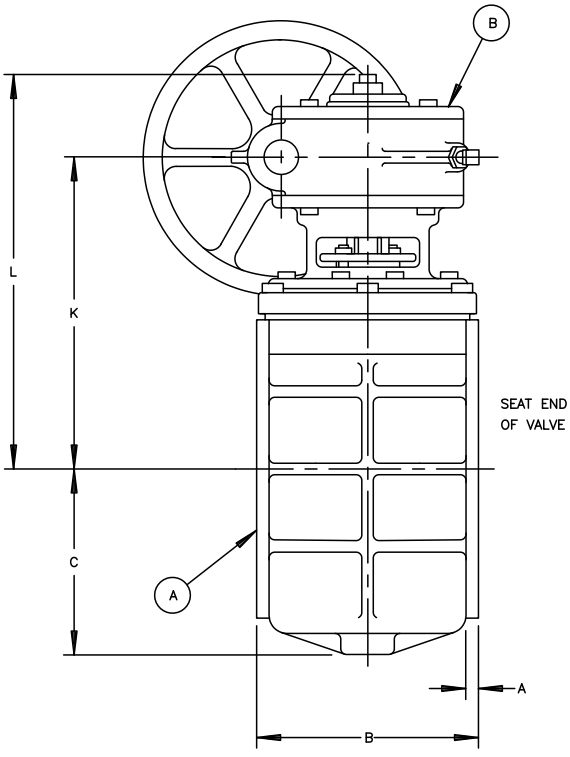
A	VALVE
B	ACTUATOR

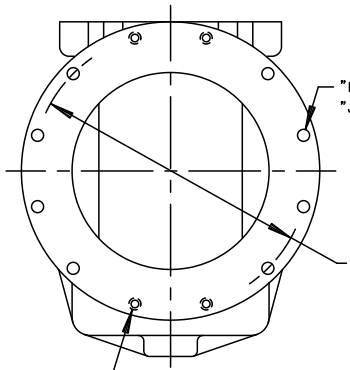
NOTE:

1. FLANGES ARE FLAT FACED WITH DIAMETER AND DRILLING TO CLASS 125 ANSI STANDARD B16.1, EXCEPT FOR TAPPED HOLES AS INDICATED. SEE A–16368 FOR NON–ANSI FLANGE DATA.
2. 13 TURNS OF HANDWHEEL ARE REQUIRED TO OPEN VALVE.
3. INSTALLATION NOTE:
   - FOR LIQUIDS & GASES: INSTALL VALVE WITH HIGHER PRESSURE AGAINST END OPPOSITE SEAT.
   - FOR SUSPENDED SOLIDS, SLURRIES, ETC: INSTALL VALVE WITH HIGHER PRESSURE AGAINST SEAT END. IN HORIZONTAL PIPELINES, VALVE SHOULD BE INSTALLED ON IT'S SIDE SO PLUG ROTATES TO THE TOP OF THE PIPELINE WHEN OPEN. (SEE DIAGRAM BELOW).
4. ACTUATORS WITH 16" AND 20" HANDWHEEL MAY BE MOUNTED IN THE STANDARD AND 180° POSITIONS ONLY.

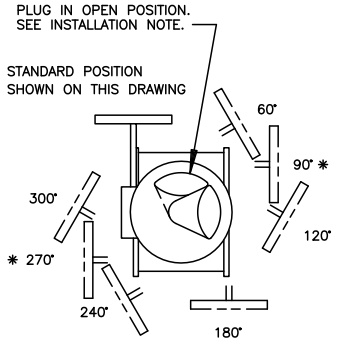


NOTICE
THIS DRAWING DOES NOT SHOW ACTUATOR ACCESSORIES. IF ACCESSORIES ARE REQUIRED, REFER TO THE APPROPRIATE ACCESSORY INSTALLATION DRAWING FOR DIMENSIONS AND OTHER RELATED INFORMATION.





"E" SIZE OF TAPPED HOLES
"F" QTY OF TAPPED HOLES
PER FLANGE
"G" DEPTH OF TAPPED HOLES



ACTUATOR MOUNTING POSITIONS AS VIEWED FROM TOP OF VALVE. DOTTED LINES SHOW OPTIONAL MOUNTING POSITIONS.

* THE 90° AND 270° POSITIONS REQUIRE DIFFERENT INTERNAL GEARING. THESE POSITIONS MUST BE NOTED ON THE PURCHASE ORDER.

G	F	E	D	C	B	A 71163 01/04/22

DeZURIK
Sartell, MN USA 56377
www.dezurik.com

PEC ECCENTRIC VALVES SIZE 4–12 FLANGED MATERIAL GROUP 1
GS–6–HD_ HANDWHEEL ACT'D

DOCT. CODE	DRAWN	APPROVED
C1	BMP	TPK
	CHECKED	DATE
	TPK	02/08/99

A46423

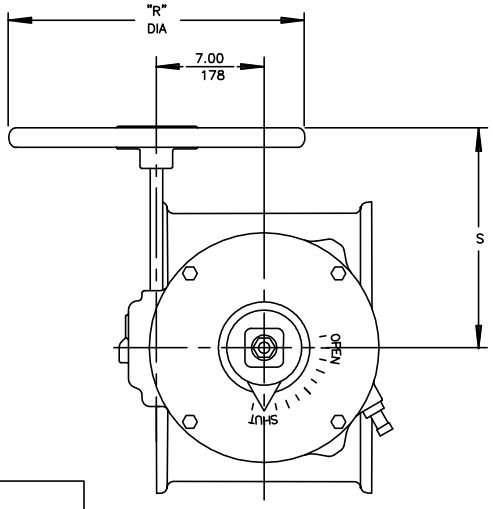
VALVE SIZE		DIMENSIONS INCHES / MILLIMETERS										
INCH	MM	A	B	C	D	E	F	G	H	J	K	L
8	200	.81 / 21	11.50 / 292	8.25 / 210	11.75 / 298	3/4–10UNC	4	.81 / 21	.88 / 22	4	14.25 / 362	20.63 / 524
10	250	.88 / 22	13.00 / 330	10.28 / 261	14.25 / 362	7/8 – 9 UNC	4	.88 / 22	1.00 / 25	8	15.74 / 400	22.12 / 562
12	300	.94 / 24	14.00 / 356	11.69 / 297	17.00 / 432	7/8 – 9 UNC	4	.94 / 24	1.00 / 25	8	17.75 / 451	24.13 / 613
14	350	1.00 / 25	17.00 / 432	12.94 / 329	18.75 / 476	1 – 8 UNC	4	1.00 / 25	1.12 / 28	8	18.74 / 476	25.12 / 638
16	400	1.06 / 27	17.75 / 451	14.31 / 363	21.25 / 540	1 – 8 UNC	4	1.06 / 27	1.12 / 28	12	20.24 / 514	26.62 / 676
18	450	1.12 / 28	21.50 / 546	15.69 / 399	22.75 / 578	1 1/8–7 UNC	4	1.12 / 28	1.25 / 32	12	21.12 / 536	27.50 / 699
20	500	1.19 / 30	23.50 / 597	17.19 / 437	25.00 / 635	1 1/8–7 UNC	8	1.25 / 32	1.25 / 32	12	23.00 / 584	29.38 / 746

VALVE SIZE	ACTUATOR NUMBER	DIMENSIONS IN / MM	
		R	S
8 – 20	GS–12–HD12	12.00 / 305	17.88 / 454
8 – 20	GS–12–HD16	16.00 / 406	18.25 / 464
10 – 20	GS–12–HD20	20.00 / 508	18.25 / 464
10 – 20	GS–12–HD24	24.00 / 610	22.25 / 565

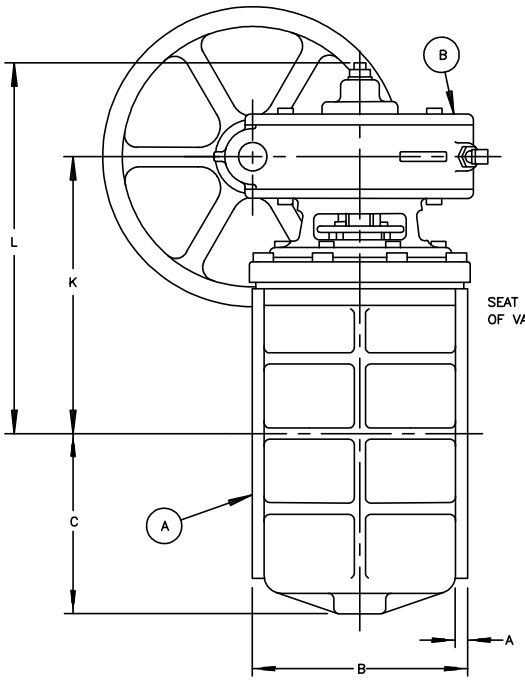
A	VALVE
B	ACTUATOR

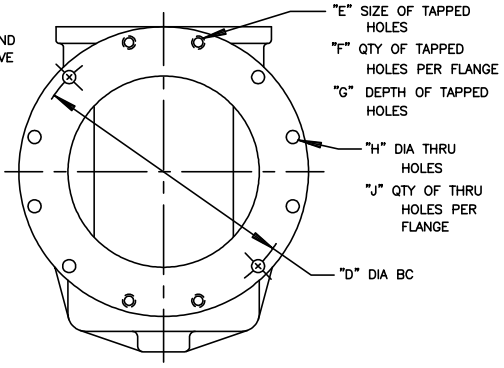
NOTE:

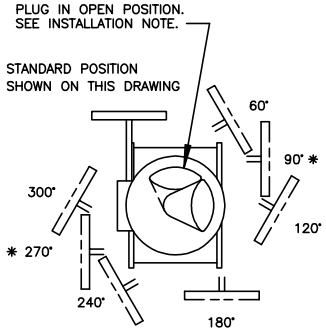
1. FLANGES ARE FLAT FACED WITH DIAMETER AND DRILLING TO CLASS 125 ANSI STANDARD B16.1, EXCEPT FOR TAPPED HOLES AS INDICATED. SEE A–16368 FOR NON–ANSI FLANGE DATA.
2. 19 TURNS OF HANDWHEEL ARE REQUIRED TO OPEN VALVE.
3. 90°, 120°, 270° & 300° POSITIONS NOT AVAILABLE ON 14", 16" & 18" VALVES WITH 24" HANDWHEEL.
4. INSTALLATION NOTE:
   - FOR LIQUIDS & GASES: INSTALL VALVE WITH HIGHER PRESSURE AGAINST END OPPOSITE SEAT.
   - FOR SUSPENDED SOLIDS, SLURRIES, ETC: INSTALL VALVE WITH HIGHER PRESSURE AGAINST SEAT END. IN HORIZONTAL PIPELINES, VALVE SHOULD BE INSTALLED ON IT'S SIDE SO PLUG ROTATES TO THE TOP OF THE PIPELINE WHEN OPEN. (SEE DIAGRAM BELOW).



NOTICE
THIS DRAWING DOES NOT SHOW ACTUATOR ACCESSORIES. IF ACCESSORIES ARE REQUIRED, REFER TO THE APPROPRIATE ACCESSORY INSTALLATION DRAWING FOR DIMENSIONS AND OTHER RELATED INFORMATION.







ACTUATOR MOUNTING POSITIONS AS VIEWED FROM TOP OF VALVE. DOTTED LINES SHOW OPTIONAL MOUNTING POSITIONS.

* THE 90° AND 270° POSITIONS REQUIRE DIFFERENT INTERNAL GEARING. THESE POSITIONS MUST BE NOTED ON THE PURCHASE ORDER.

G							
F							
E							
D							
C							
B	62702	07/01/14					
A	54653	03/30/99					

DeZURIK
Sartell, MN USA 56377
www.dezurik.com

PEC ECCENTRIC VALVES SIZE 8–20 FLANGED MATERIAL GROUP 1
GS–12–HD_ HANDWHEEL ACT'D

DOCT. CODE	DRAWN	APPROVED	
C1	BMP	TPK	A46453
	CHECKED TPK	DATE 02/08/99	

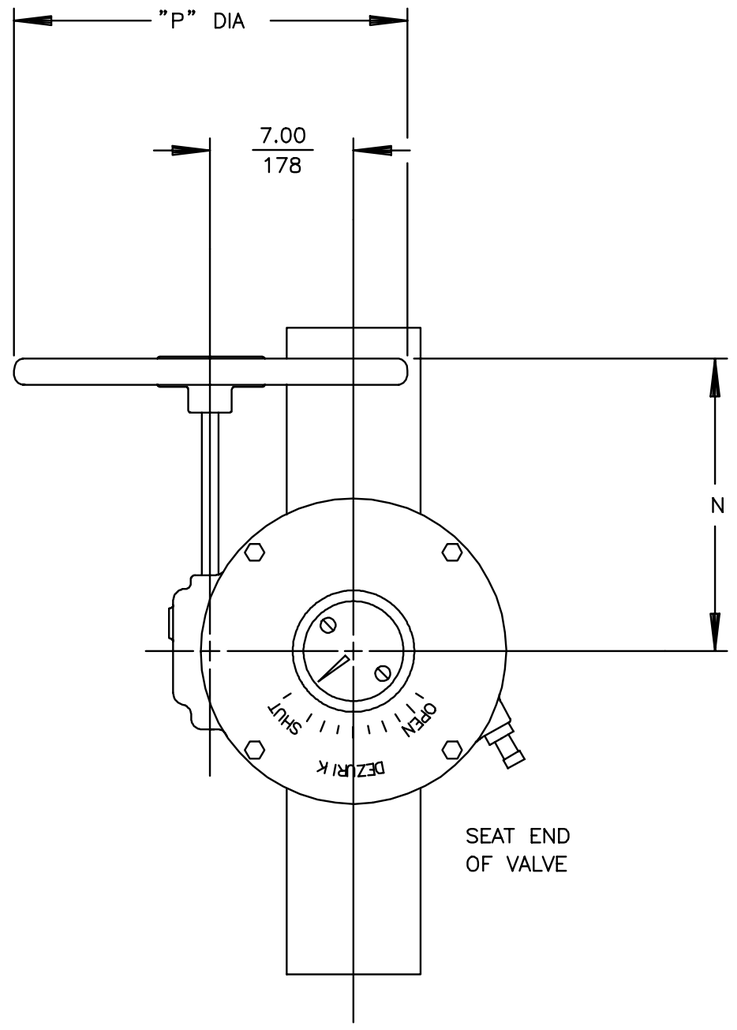
VALVE SIZE		DIMENSIONS INCHES / MILLIMETERS										
IN	MM	A	B	C	D	E	F	G	H		J	K
24	600	6.25 / 159	26.50 / 673	17.62 / 448	20.00 / 508		1–1/4 – 7UNC	29.50 / 749	4	1.50 / 38		18.00 / 457
30	750	7.38 / 187	33.00 / 838	20.38 / 518	21.88 / 556		1–1/4 – 7UNC	36.00 / 914	4	1.50 / 38		19.88 / 505
36	900	9.00 / 229	39.50 / 1003	24.12 / 613	26.25 / 667		1–1/2 – 6UNC	42.75 / 1086	4	1.75 / 44		24.25 / 616

ACTUATOR NUMBER	DIM INCHES / MILLIMETERS	
	N	P
GS–12–HD12	13.50 / 343	12.00 / 305
GS–12–HD16	13.50 / 343	16.00 / 406
GS–12–HD20	13.50 / 343	20.00 / 508
GS–12–HD24	17.50 / 445	24.00 / 610
GS–12–HD30	17.50 / 445	30.00 / 762

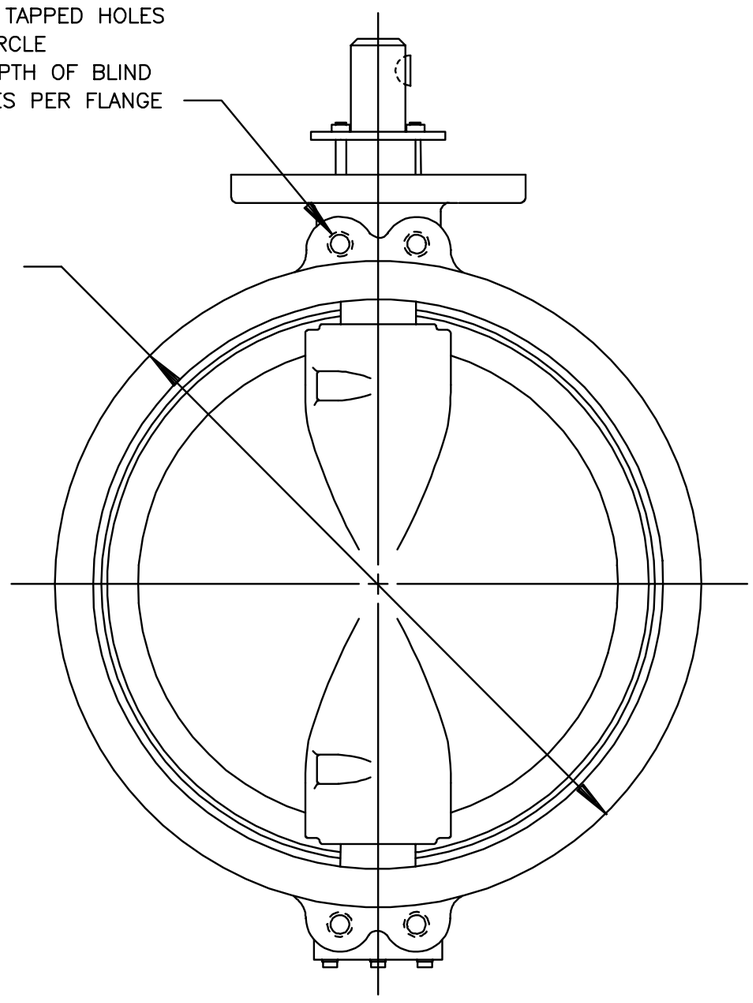
A	VALVE
B	ACTUATOR

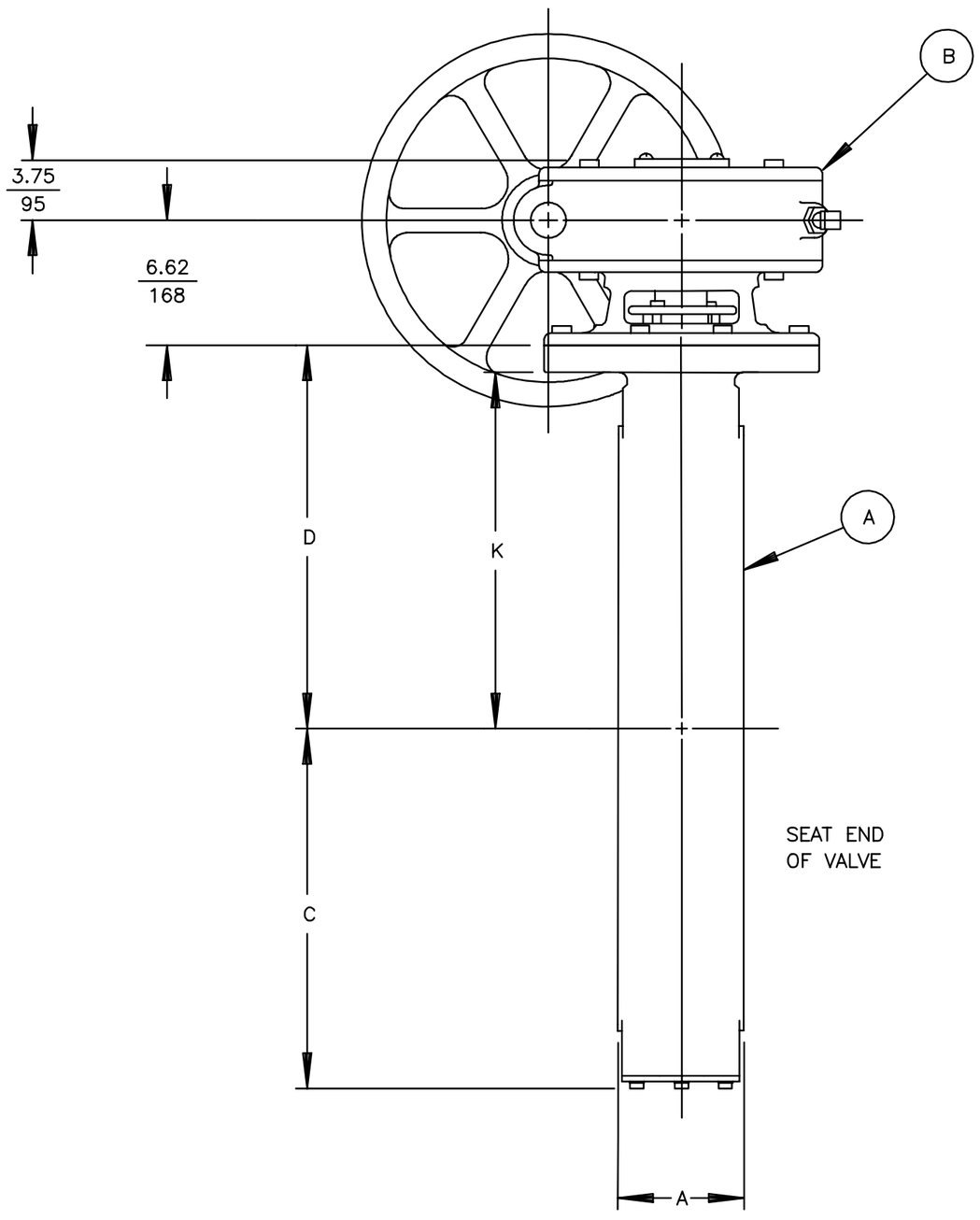
NOTES:

1. MATING PIPE FLANGES MUST MEET ANSI STANDARD CLASS 125 OR 150 FOR THE 24 VALVE, AND CLASS 125 FOR THE 30 AND 36 VALVES. SEE A–17173 FOR NON–ANSI FLANGE DATA.
2. FOR SLIP–ON FLANGES, PIPES WITH WALL THICKNESS UP TO SCHEDULE 30 MAY BE USED FLUSH WITH FLANGE FACE. PIPES WITH GREATER WALL THICKNESS MUST BE RECESSED FROM THE FLANGE FACE BY TWICE THE AMOUNT WHICH THE WALL THICKNESS EXCEEDS SCHEDULE 30.
3. FOR WELD NECK FLANGES, RECOMMENDED FLANGE I.D. IS $\frac{.75}{19}$ LESS THAN NOMINAL VALVE SIZE; MINIMUM FLANGE I.D. IS $\frac{1.25}{32}$ LESS THAN NOMINAL VALVE SIZE.
4. FLOW MAY BE IN EITHER DIRECTION.
5. 19 TURNS OF HANDWHEEL ARE REQUIRED TO OPEN VALVE.
6. ACTUATOR WITH 24 OR 30 HANDWHEEL (GS–12–HD24 OR GS–12–HD30) IS AVAILABLE ONLY IN STD. AND 180° POSITION.

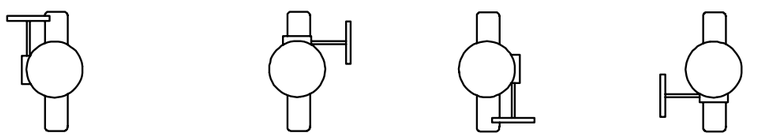


"F" SIZE OF ALL TAPPED HOLES
"G" DIA. BOLT CIRCLE
"H" QTY. AND DEPTH OF BLIND TAPPED HOLES PER FLANGE





ACTUATOR MOUNTING POSITIONS
(SEE NOTE 6)



STANDARD POSITION SHOWN ON THIS DRAWING | 90° POSITION | 180° POSITION | 270° POSITION

G	F	E	D	C	B	A 61878	08/16/10

DeZURIK
Sartell, MN USA 56377
www.dezurik.com

24 – 36 WAFER RESILIENT BUTTERFLY VALVES
GS–12–HD_ HANDWHEEL ACTUATED

DOCT. CODE	DRAWN	APPROVED	
C1	KDM	JDB	A46583
	CHECKED JDB	DATE 10/11/95	

VALVE SIZE		DIMENSIONS INCHES / MILLIMETERS									
INCH	MM	A	B	C	D	E	F	G	H	J	K
4	100	.69 / 18	9.00 / 229	5.38 / 137	7.50 / 191	NONE	NONE	NONE	.75 / 19	8	10.19 / 259
5	125	.75 / 19	10.50 / 267	6.50 / 165	8.50 / 216	3/4–10UNC	4	1.00 / 25	.88 / 22	4	13.81 / 351
6	150	.75 / 19	10.50 / 267	6.50 / 165	9.50 / 241	NONE	NONE	NONE	.88 / 22	8	13.81 / 351
8	200	.81 / 21	11.50 / 292	8.25 / 210	11.75 / 298	3/4–10UNC	4	.81 / 21	.88 / 22	4	15.38 / 391

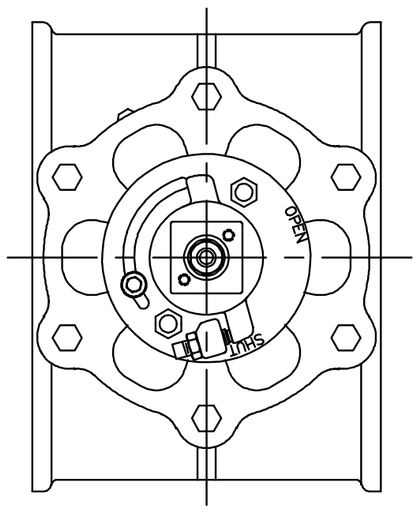
A	VALVE
B	ACTUATOR

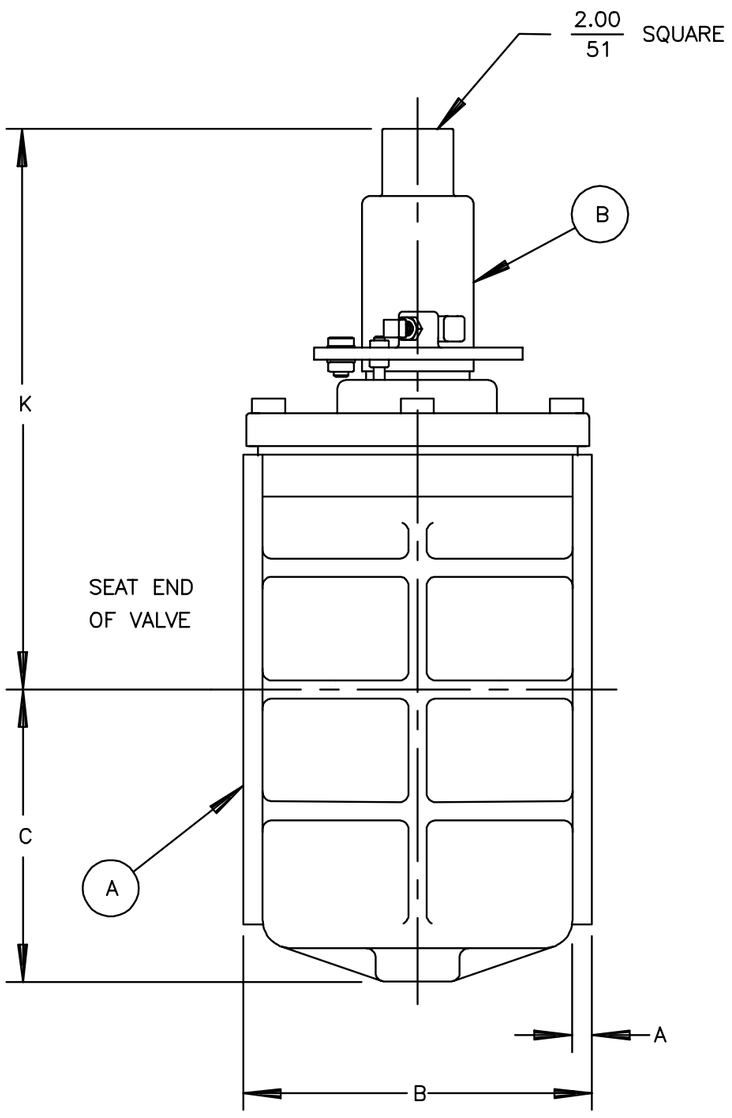
NOTES:

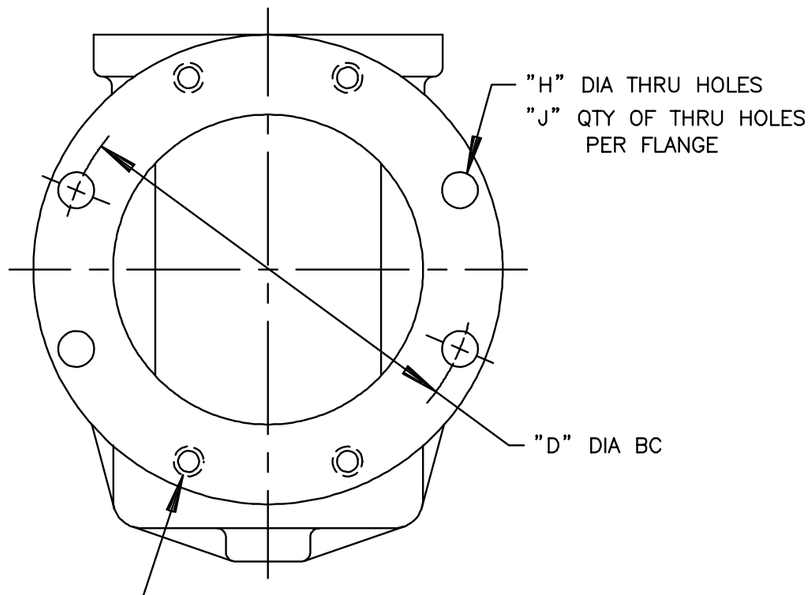
1. FLANGES ARE FLAT FACED WITH DIAMETER AND DRILLING TO CLASS 125 ANSI STANDARD B16.1, EXCEPT FOR TAPPED HOLES AS INDICATED. SEE A–16368 FOR NON–ANSI FLANGE DATA.

NOTICE

THIS DRAWING DOES NOT SHOW ACTUATOR ACCESSORIES. IF ACCESSORIES ARE REQUIRED, REFER TO THE APPROPRIATE ACCESSORY INSTALLATION DRAWING FOR DIMENSIONS AND OTHER RELATED INFORMATION.







G F E D C B A

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www.dezurik.com

PEC ECCENTRIC VALVES SIZE 4 – 8 FLANGED MATERIAL GROUP 1
NT NUT ACTUATED

DOCT. CODE	DRAWN	APPROVED	
C1	BMP	TPK	A50941
	CHECKED TPK	DATE 02/08/99	

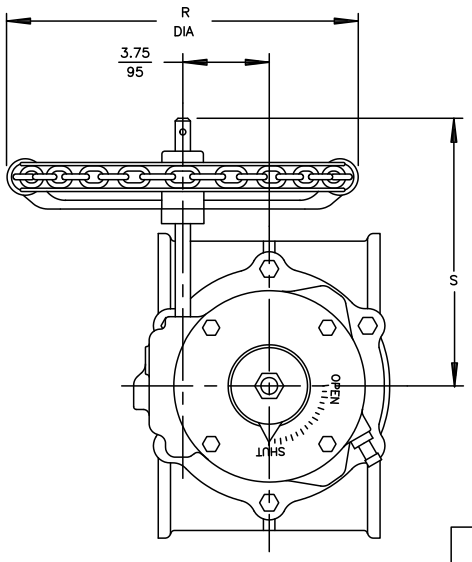
VALVE SIZE		DIMENSIONS INCHES / MILLIMETERS										
INCH	MM	A	B	C	D	E	F	G	H	J	K	L
4	100	.69 / 18	9.00 / 229	5.38 / 137	7.50 / 191	NONE	NONE	NONE	.75 / 19	8	9.62 / 244	13.27 / 337
5	125	.75 / 19	10.50 / 267	6.50 / 165	8.50 / 216	3/4–10UNC	4	1.00 / 25	.88 / 22	4	11.81 / 300	15.46 / 393
6	150	.75 / 19	10.50 / 267	6.50 / 165	9.50 / 241	NONE	NONE	NONE	.88 / 22	8	11.81 / 300	15.46 / 393
8	200	.81 / 21	11.50 / 292	8.25 / 210	11.75 / 298	3/4–10UNC	4	.81 / 21	.88 / 22	4	13.63 / 346	17.28 / 439
10	250	.88 / 22	13.00 / 330	10.28 / 261	14.25 / 362	7/8–9UNC	4	.88 / 22	1.00 / 25	8	15.12 / 384	18.77 / 477
12	300	.94 / 24	14.00 / 356	11.69 / 297	17.00 / 432	7/8–9UNC	4	.94 / 24	1.00 / 25	8	16.75 / 425	20.40 / 518

VALVE SIZE	ACTUATOR NUMBER	DIMENSIONS IN / MM	
		R	S
4	GS–6–CW8	10.06 / 256	8.81 / 224
5 & 6	GS–6–CW8	10.06 / 256	9.62 / 244
5 & 6	GS–6–CW12	13.94 / 354	9.62 / 244
5 & 6	GS–6–CW20	21.62 / 549	9.62 / 244
8	GS–6–CW8	10.06 / 256	9.62 / 244
8	GS–6–CW12	13.94 / 354	9.62 / 244
8	GS–6–CW20	21.62 / 549	9.62 / 244
10	GS–6–CW8	10.06 / 256	11.88 / 302
10	GS–6–CW12	13.94 / 354	11.88 / 302
10	GS–6–CW20	21.62 / 549	11.88 / 302
12	GS–6–CW8	10.06 / 256	11.88 / 302
12	GS–6–CW12	13.94 / 354	11.88 / 302
12	GS–6–CW20	21.62 / 549	11.88 / 302

A	VALVE
B	ACTUATOR

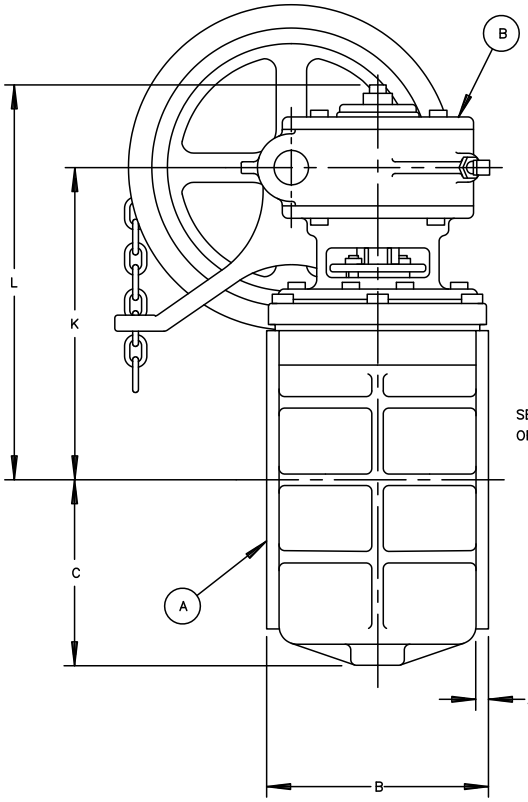
NOTE:

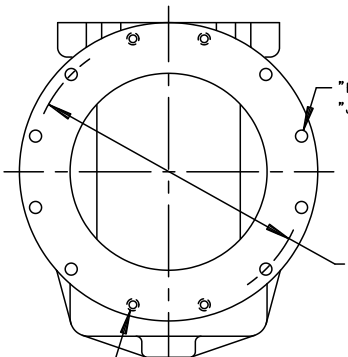
1. FLANGES ARE FLAT FACED WITH DIAMETER AND DRILLING TO CLASS 125 ANSI STANDARD B16.1, EXCEPT FOR TAPPED HOLES AS INDICATED. SEE A–16368 FOR NON–ANSI FLANGE DATA.
2. 13 TURNS OF CHAINWHEEL ARE REQUIRED TO OPEN VALVE.
3. INSTALLATION NOTE:
   - FOR LIQUIDS & GASES: INSTALL VALVE WITH HIGHER PRESSURE AGAINST END OPPOSITE SEAT.
   - FOR SUSPENDED SOLIDS, SLURRIES, ETC: INSTALL VALVE WITH HIGHER PRESSURE AGAINST SEAT END. IN HORIZONTAL PIPELINES, VALVE SHOULD BE INSTALLED ON IT'S SIDE SO PLUG ROTATES TO THE TOP OF THE PIPELINE WHEN OPEN. (SEE DIAGRAM BELOW).
4. ACTUATORS WITH 20" CHAINWHEEL MAY BE MOUNTED IN THE STANDARD AND 180° POSITIONS ONLY.



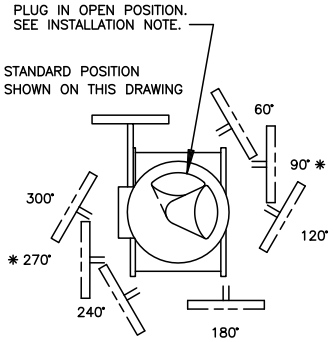
NOTICE

THIS DRAWING DOES NOT SHOW ACTUATOR ACCESSORIES. IF ACCESSORIES ARE REQUIRED, REFER TO THE APPROPRIATE ACCESSORY INSTALLATION DRAWING FOR DIMENSIONS AND OTHER RELATED INFORMATION.





"E" SIZE OF TAPPED HOLES
"F" QTY OF TAPPED HOLES
PER FLANGE
"G" DEPTH OF TAPPED HOLES



ACTUATOR MOUNTING POSITIONS AS VIEWED FROM TOP OF VALVE. DOTTED LINES SHOW OPTIONAL MOUNTING POSITIONS.

* THE 90° AND 270° POSITIONS REQUIRE DIFFERENT INTERNAL GEARING. THESE POSITIONS MUST BE NOTED ON THE PURCHASE ORDER.

G	F	E	D	C	B	A	71163	2/22/22

DeZURIK
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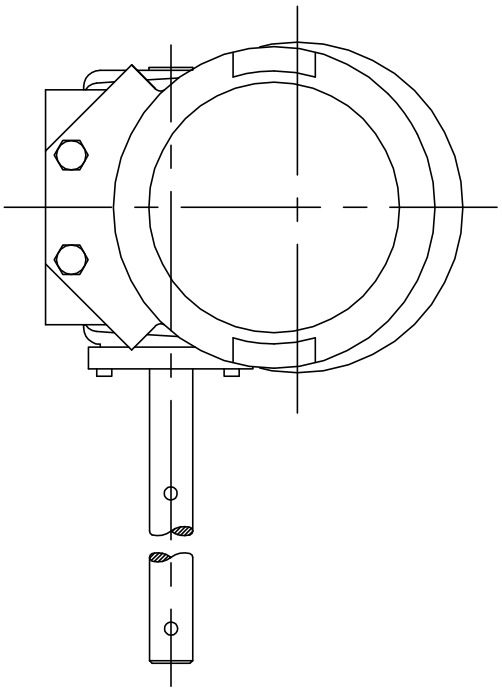
PEC ECCENTRIC VALVES SIZE 4–12 FLANGED MATERIAL GROUP 1
GS–6–CW_CHAINWHEEL ACT'D

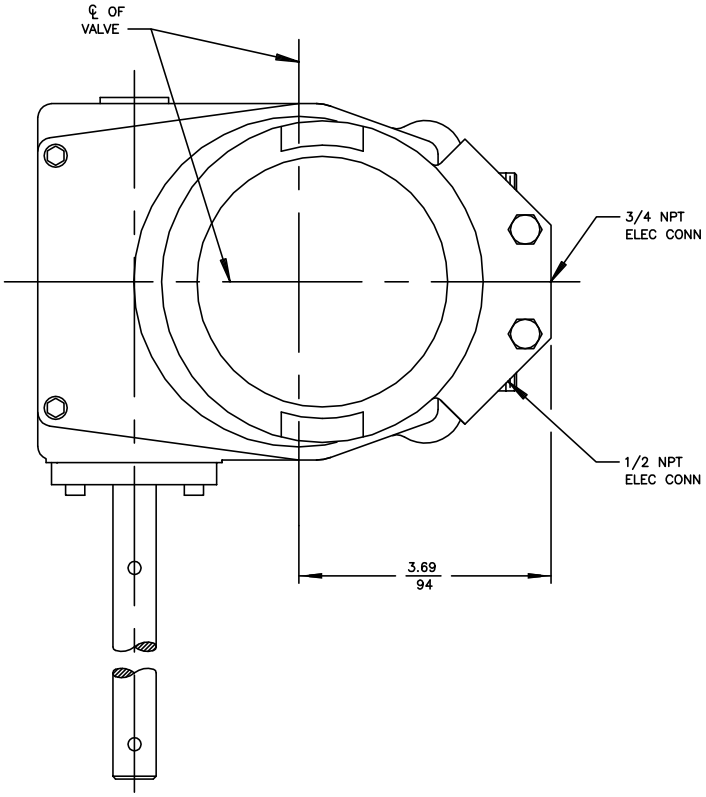
DOCT. CODE	DRAWN	APPROVED	
C1	JSM	TPK	A53708
	CHECKED TPK	DATE 08/02/01	

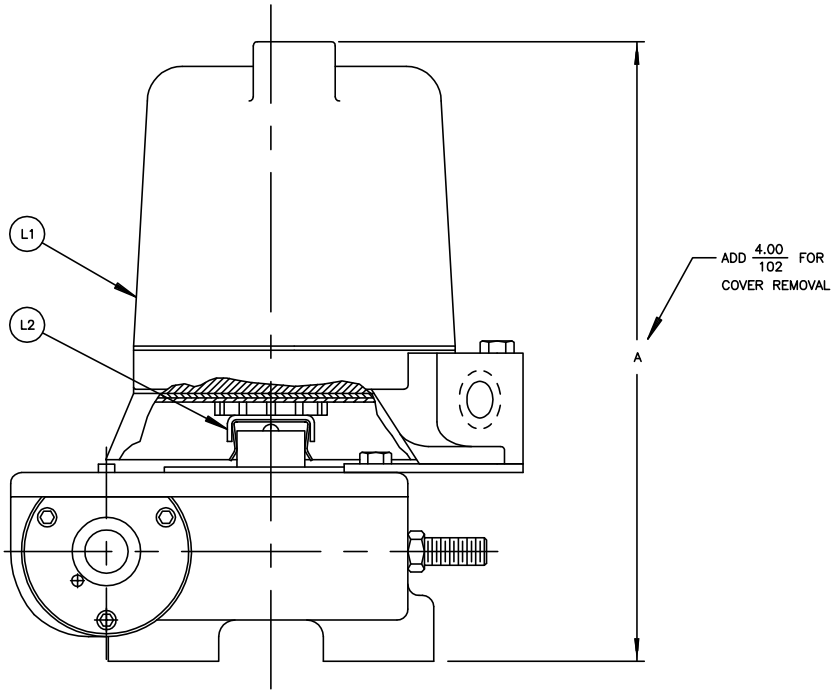
ACTUATOR NUMBER	DIM A
MG–7	8.69 / 221
MG–1012	9.06 / 230
MG–1216	10.25 / 260
MG–1250	10.25 / 260
MG–16	10.25 / 260

NO	PART NAME	QTY
L1	SWITCH AND/OR POSITION TRANSMITTER	1
L2	MOUNTING KIT	1



VIEW SHOWING SWITCH ORIENTATION ON MG–7 ACTUATOR





VIEW SHOWING SWITCH ORIENTATION ON MG–1012, MG–1216 AND MG–16 ACTUATORS

G							
F							
E							
D							
C							
B	50312	05/01/19					
A	60578	09/06/01					

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SE_ SWITCH AND/OR POSITION TRANSMITTER
FOR USE WITH MG–_ DEZURIK MANUAL ACTUATOR

DOCT. CODE	DRAWN	APPROVED	A53803
C1	SN	SN	
	CHECKED SN	DATE 06/12/01	

VALVE SIZE		DIMENSIONS IN [MM]						
IN	MM	A	B	C	D	E	F	G
12	300	3.06 [78]	15.25 [387]	9.06 [230]	13.35 [339]	.98 [25]	1.00 [25]	17.00 [432]
14	350	3.06 [78]	17.32 [440]	10.14 [258]	14.5 [368]	.98 [25]	1.12 [28]	18.75 [476]
16	400	4.00 [102]	18.97 [482]	11.81 [300]	15.83 [402]	1.06 [27]	1.12 [28]	21.25 [540]

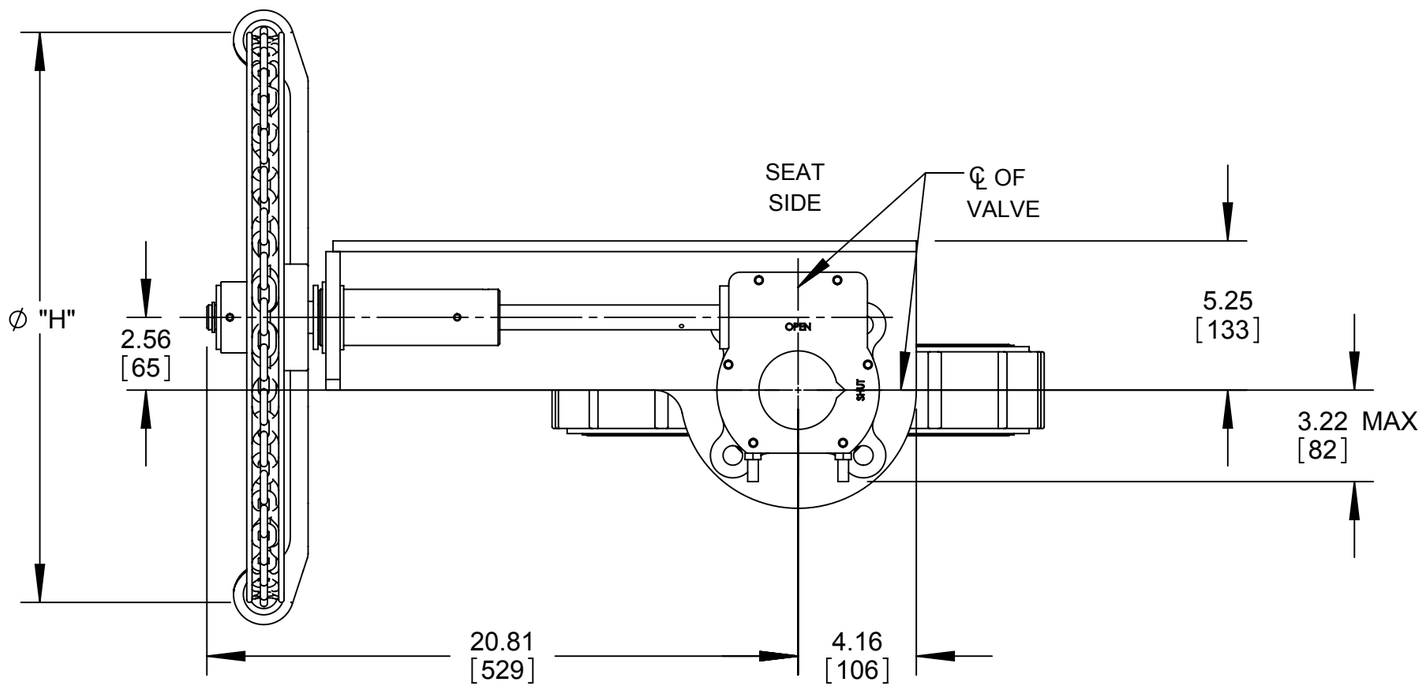
VALVE SIZE	ACTUATOR NUMBER	DIM IN [MM] H
12	MG-1216-CW12	12.75 [324]
14 & 16	MG-1216-CW20	20.06 [510]

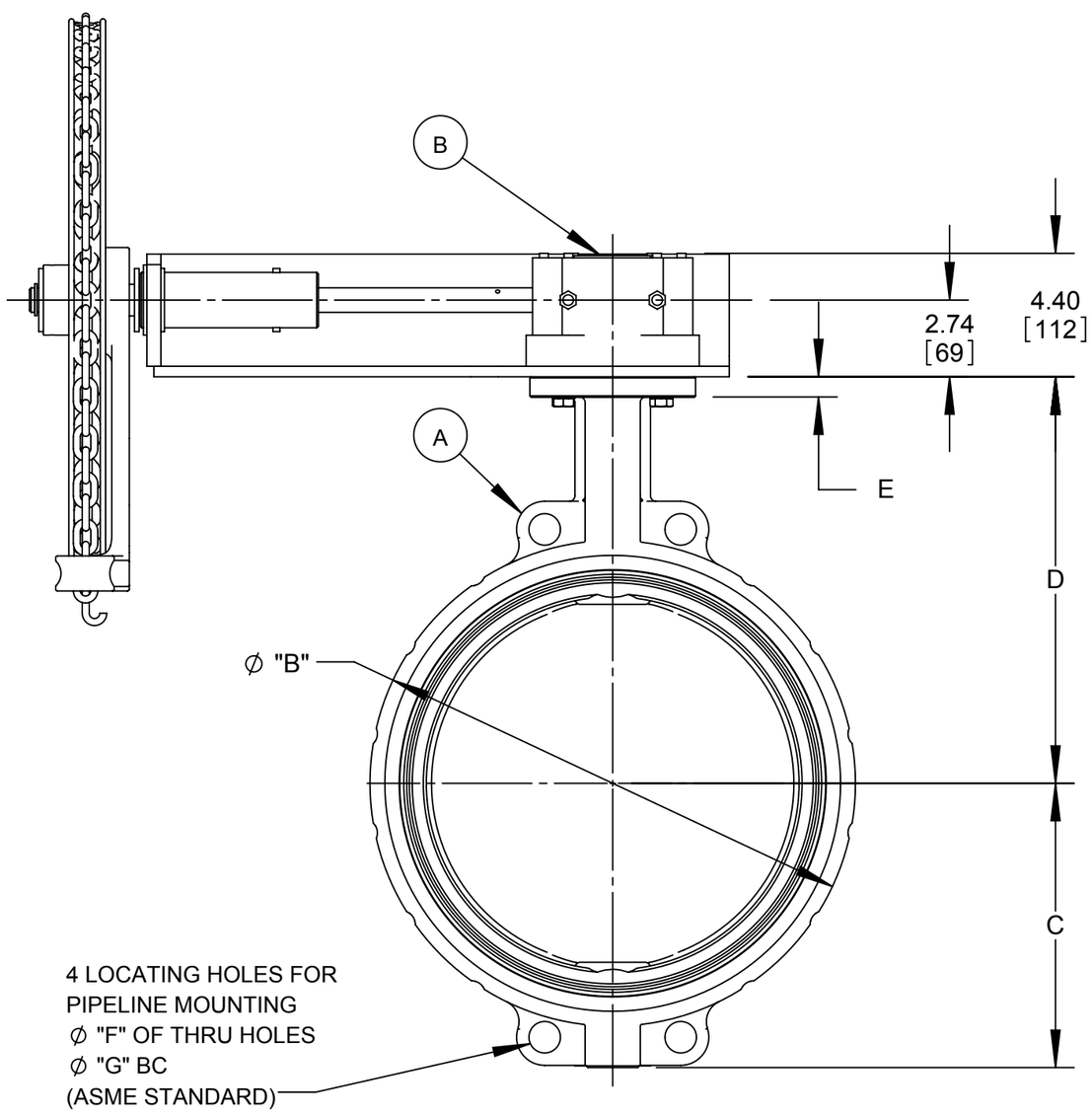
A	VALVE
B	ACTUATOR

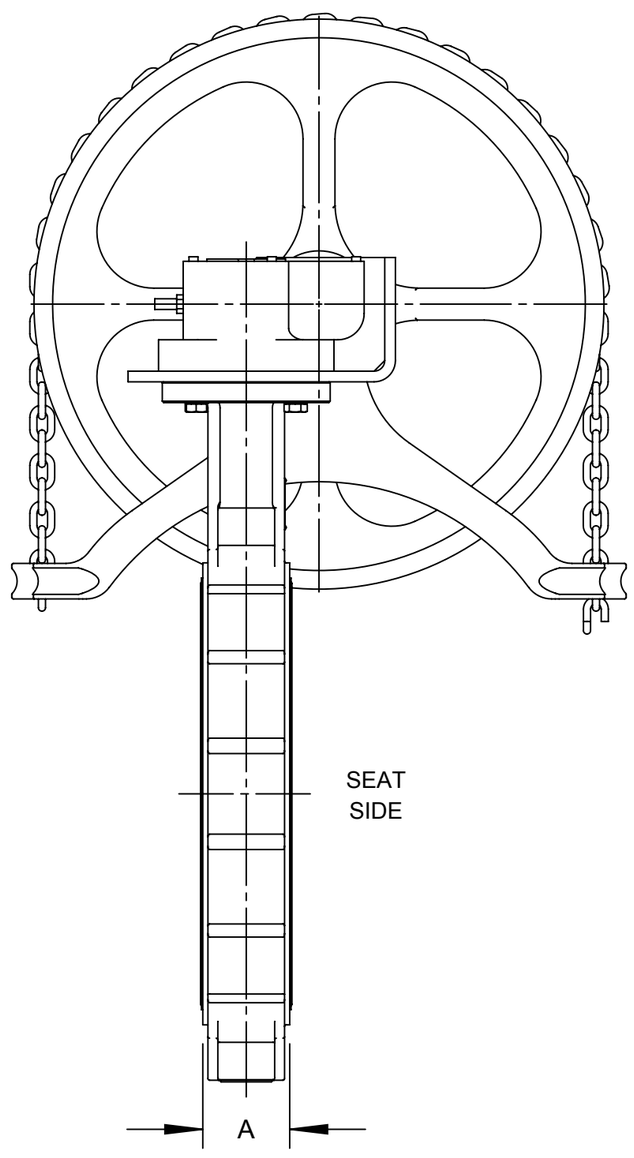
NOTE:

1. DRAWING SHOWS MOUNTING HOLES FOR ASME CLASS 125/150 FLANGES.
2. FOR FLANGES OTHER THAN ASME STANDARD SEE D10478 FOR DIMENSIONS.
3. DO NOT USE GASKETS BETWEEN VALVE AND MATING FLANGES.
4. RECOMMENDED FLOW DIRECTION IS WITH THE HIGHER PRESSURE AGAINST THE SEAT SIDE OF VALVE (FLAT SIDE OF DISC).
5. 10 TURNS OF CHAINWHEEL ARE REQUIRED TO OPEN VALVE.

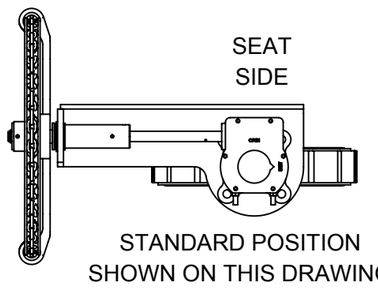
NOTICE
THIS DRAWING DOES NOT SHOW ACTUATOR ACCESSORIES. IF ACCESSORIES ARE REQUIRED, REFER TO THE APPROPRIATE ACCESSORY INSTALLATION DRAWING FOR DIMENSIONS AND OTHER RELATED INFORMATION.



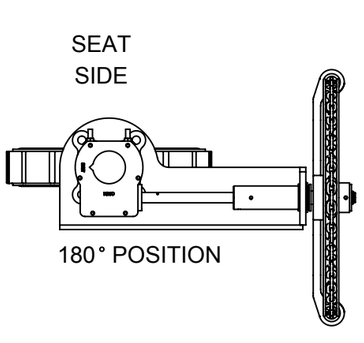




ACTUATOR MOUNTING POSITIONS



STANDARD POSITION
SHOWN ON THIS DRAWING



180° POSITION

G							
F							
E							
D							
C							
B	70362	12/19/18					
A	RLP	3/16/15					

DeZURIK
Sartell, MN USA 56377
www.dezurik.com

BOS US BUTTERFLY VALVES SIZE 12 - 16 WAFER
MG-1216-CW_ CHAINWHEEL ACTUATOR

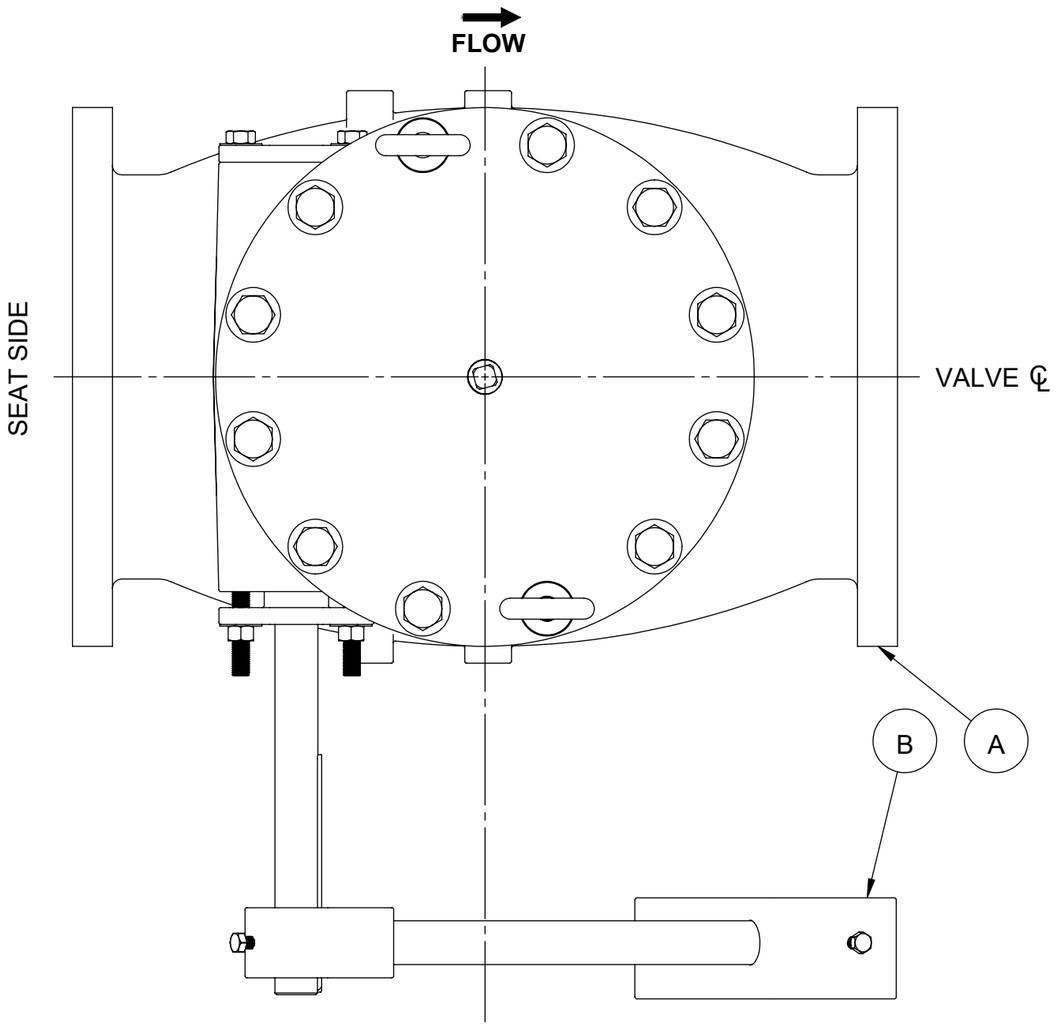
DOCT. CODE	DRAWN	APPROVED	
C1	SN	SN	A60644
	CHECKED	DATE	
	SN	3/16/15	

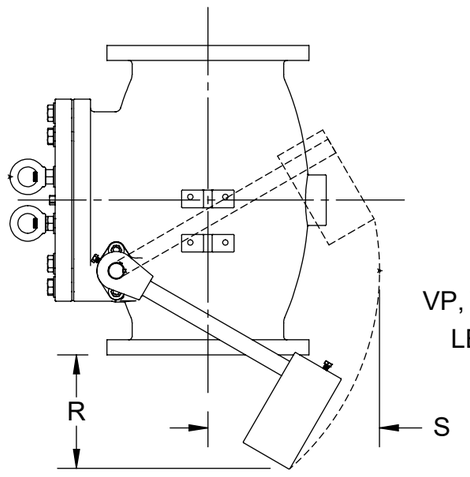
DIMENSIONS (INCHES / MM)

VALVE SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S
2	8.00 203.2	10.00 254.0	3.50 88.9	10.92 277.4	4.12 104.6	6.00 152.4	4.75 120.7	0.63 16.0	-	-	4	5/8-11	0.62 15.7	7.00 177.8	10.00 254.0	6.00 152.4	9.38 238.1
2.5	8.50 215.9	9.72 246.8	3.50 88.9	10.92 277.4	4.12 104.6	7.00 177.8	5.50 139.7	0.88 22.4	-	-	4	5/8-11	0.88 22.4	6.50 165.1	9.88 250.8	6.13 155.6	9.38 238.1
3	9.50 241.3	10.00 254.0	4.50 114.3	11.00 279.4	4.00 101.6	7.50 190.5	6.00 152.4	0.75 19.1	-	-	4	5/8-11	0.75 19.1	5.88 149.2	10.13 257.2	5.50 139.7	9.25 235.0
4	11.50 292.1	10.75 273.1	5.00 127.0	11.75 298.5	5.00 127.0	9.00 228.6	7.50 190.5	0.94 23.8	0.75 19.7	6	2	5/8-11	0.94 23.8	4.88 123.8	10.75 273.1	4.88 123.8	8.75 222.3
6	14.00 355.6	11.75 298.5	5.75 146.1	13.50 342.9	6.50 165.1	11.00 279.4	9.50 241.3	1.00 25.4	0.88 22.2	6	2	3/4-10	1.00 25.4	2.13 54.0	11.63 295.3	4.63 117.5	7.88 200.0
8	19.50 495.3	13.75 349.3	7.25 184.2	17.00 431.8	7.50 190.5	13.50 342.9	11.75 298.5	1.13 28.6	0.88 22.2	8	-	-	-	2.00 50.8	15.50 393.7	5.88 149.2	10.38 263.5
10	24.50 622.3	15.00 381.0	9.38 238.1	16.25 412.8	9.00 228.6	16.00 406.4	14.25 362.0	1.19 30.2	1.00 25.4	12	-	-	-	3.00 76.2	18.38 466.7	9.00 228.6	13.63 346.1
12	27.50 698.5	19.00 482.6	11.00 279.4	18.25 463.6	11.00 279.4	19.00 482.6	17.00 431.8	1.25 31.8	1.00 25.4	12	-	-	-	3.25 82.6	21.13 536.6	9.00 228.6	14.25 362.0
14	31.00 787.4	22.50 571.5	13.50 342.9	26.00 660.4	14.00 355.6	21.00 533.4	18.75 476.3	1.38 34.9	1.13 28.6	12	-	-	-	6.63 168.3	25.88 657.2	11.75 298.5	18.75 476.3
16	36.00 914.4	24.50 622.3	14.25 362.0	29.50 749.3	15.00 381.0	23.50 596.9	21.25 539.8	1.44 36.5	1.13 28.6	16	-	-	-	2.00 50.8	32.00 812.8	7.25 184.2	15.88 403.2
18	40.00 1016.0	26.50 673.1	17.38 441.3	31.00 787.4	18.63 473.1	25.00 635.0	22.75 577.9	1.56 39.7	1.25 31.8	16	-	-	-	7.00 177.8	36.00 914.4	9.25 235.0	21.25 539.8
20	40.00 1016.0	28.75 730.3	17.63 447.7	32.38 822.3	18.63 473.1	27.50 698.5	25.00 635.0	1.69 42.9	1.25 31.8	20	-	-	-	6.00 152.4	41.00 1041.4		
24	48.00 1219.2	32.50 825.5	20.13 511.2	34.00 863.6	21.00 533.4	32.00 812.8	29.50 749.3	1.88 47.6	1.38 34.9	20	-	-	-	0	38.00 965.2	8.75 222.3	19.25 489.0
30	56.00 1422.4	37.20 945.0	21.85 555.0	39.00 990.6	24.00 609.6	38.75 984.3	36.00 914.4	2.13 54.0	1.38 34.9	28	-	-	-	14.13 358.8	53.13 1349.4	15.50 393.7	24.00 609.6
36	63.00 1600.2	42.91 1090.0	26.38 670.0	42.00 1066.8	27.00 685.8	46.00 1168.4	42.75 1085.9	2.38 60.3	1.63 41.3	32	-	-	-	14.63 371.5	57.50 1460.5	15.00 381.0	21.00 533.4
42	70.00 1778.0	56.30 1430.0	32.28 820.0	39.29 998	33.27 845	53.00 1346.2	49.50 1257.3	2.63 66.7	1.63 41.3	36	-	-	-	19.69 500.0	53.54 1360.0	22.83 580.0	14.17 360.0

ITEM NO.	DESCRIPTION
A	VALVE
B	LEVER & WEIGHT CLOSURE CONTROL

NOTE:
1. VALVE SIZES 2" THRU 14" ARE 250A BODY STYLE.
2. LEVER ARM IS ANGLED 30° BELOW THE HORIZONTAL WHEN VALVE IS CLOSED. LEVER ARM HAS A MAXIMUM OF 60° OF TRAVEL.
3. FACE TO FACE DIMENSIONS ARE IN COMPLIANCE WITH AWWA C508.





VP, VERTICAL FLOW UP
LEVER ARM SWING

NOTICE
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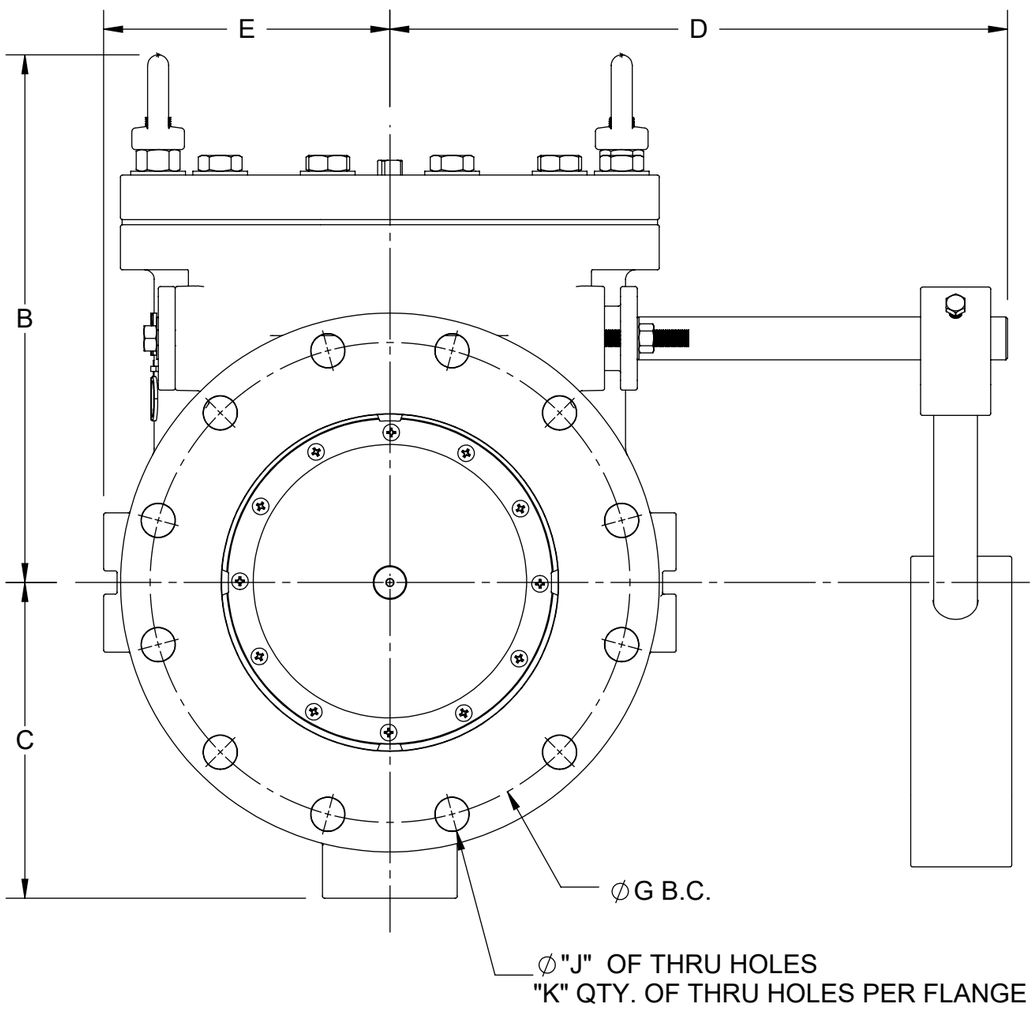
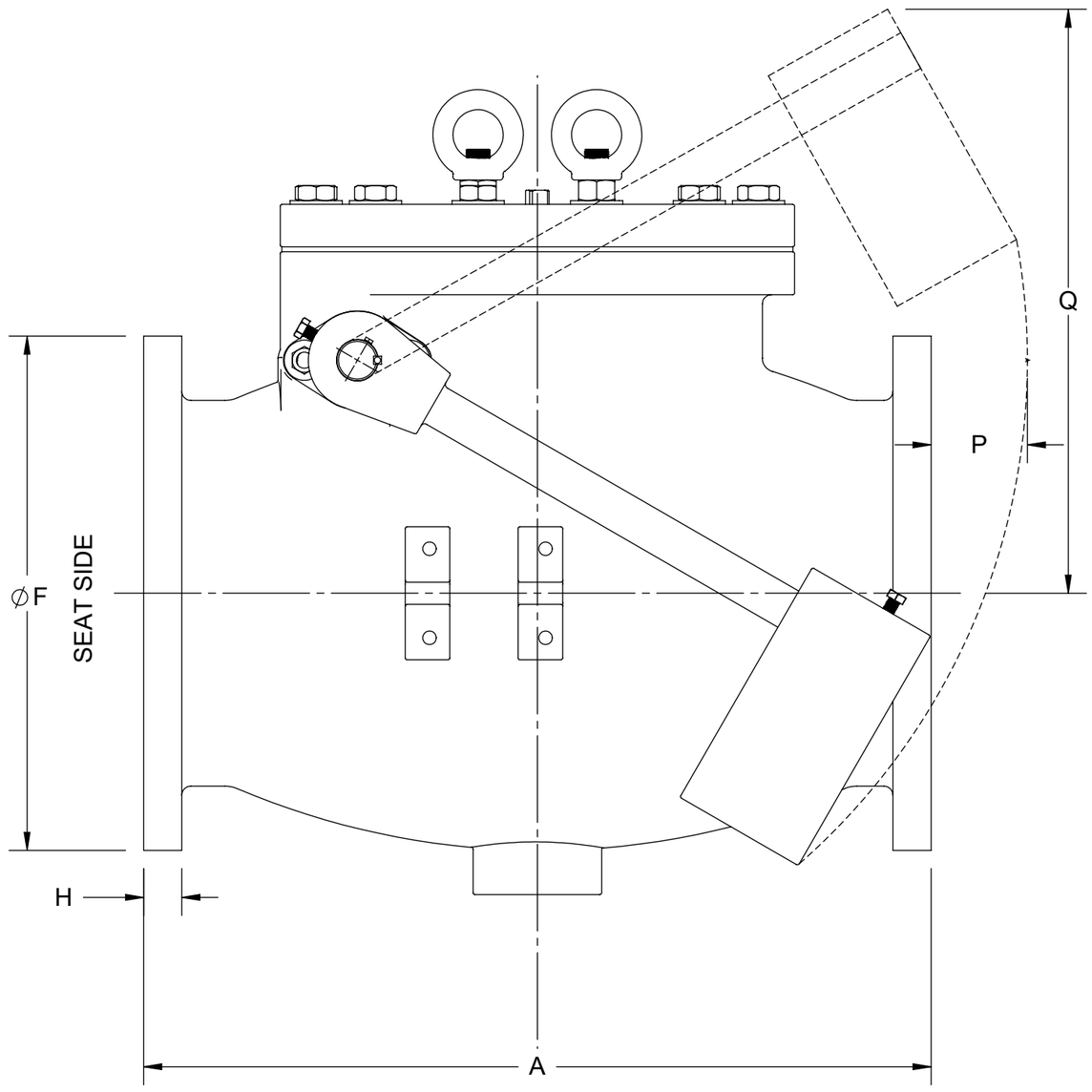
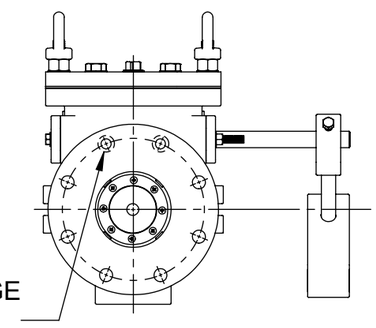
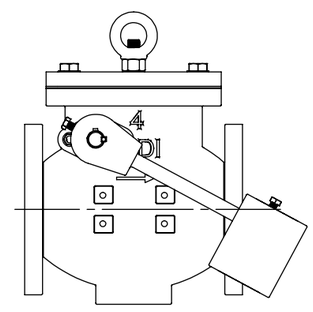


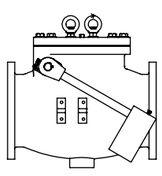




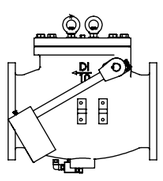
"L" QTY. OF TAP HOLES PER FLANGE
"M" TAP HOLE SIZE
"N" DEPTH OF TAP HOLE



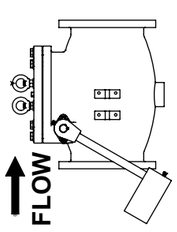
SIZES 2" THRU 6" VALVE BODY CONFIGURATION



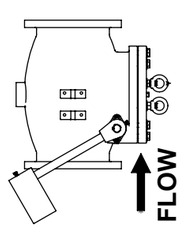
FLOW
STANDARD
(SHOWN)



FLOW
LEFT HAND



VP, STANDARD



VP, LEFT HAND

G	F	E	D	C	B	A
					50312 7/11/17	

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APCO CVS SWING CHECK VALVE, SIZES 2" THRU 36"
250 SERIES, LEVER & WEIGHT CLOSURE CONTROL

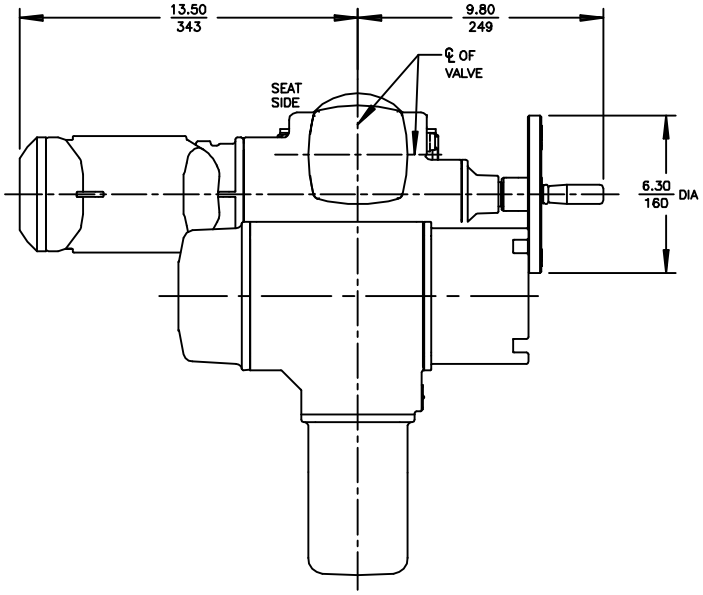
DOCT. CODE	DRAWN	APPROVED	A70021
C1	JPD	TMO	
	CHECKED DWZ	DATE 10/23/2013	

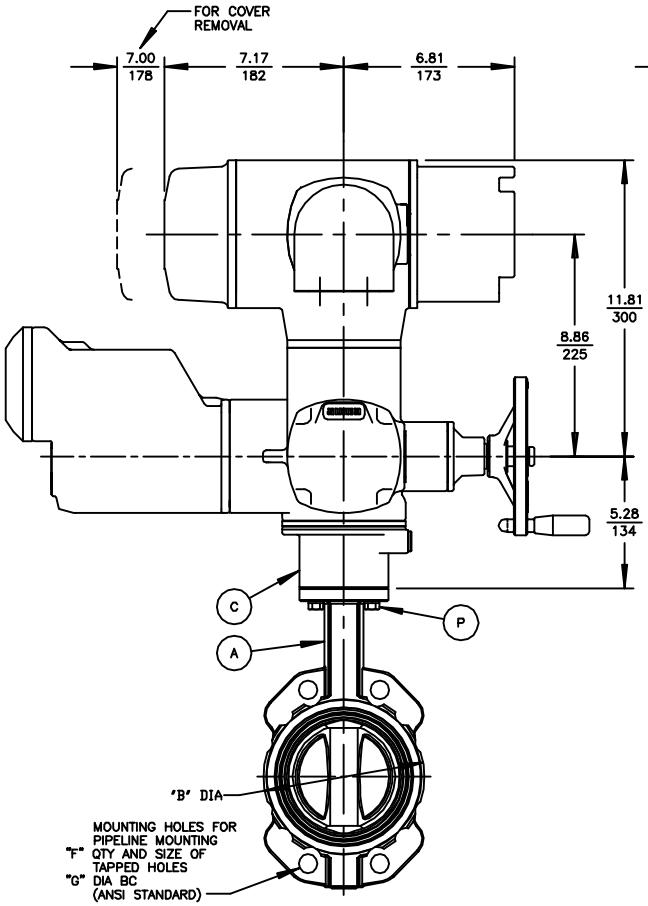
VALVE SIZE		DIMENSIONS (INCHES / MILLIMETERS)						
INCH	MM	A	B	C	D	E	F	G
2	50	1.69 / 43	3.90 / 99	3.31 / 84	5.79 / 147	.51 / 13	.75 / 19	4.75 / 121
2.5	50	1.81 / 46	4.41 / 112	3.31 / 84	6.10 / 155	.51 / 13	.75 / 19	5.50 / 140
3	80	1.81 / 46	5.10 / 130	3.54 / 90	6.50 / 165	.51 / 13	.75 / 19	6.00 / 152
4	100	2.06 / 52	6.42 / 163	4.47 / 114	7.52 / 191	.63 / 16	.75 / 19	7.50 / 191
5	125	2.19 / 56	7.58 / 193	4.82 / 122	8.11 / 206	.63 / 16	.88 / 22	8.50 / 216
6	150	2.19 / 56	8.74 / 222	5.51 / 140	8.62 / 219	.63 / 16	.88 / 22	9.50 / 241

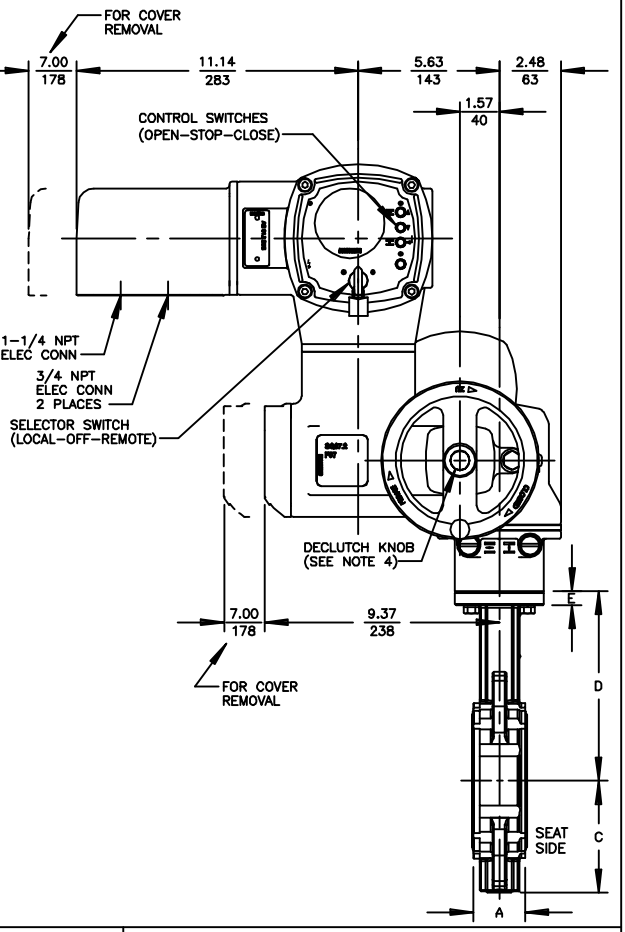
A	VALVE
C	MOTOR
P	CONNECTING PARTS

NOTE:

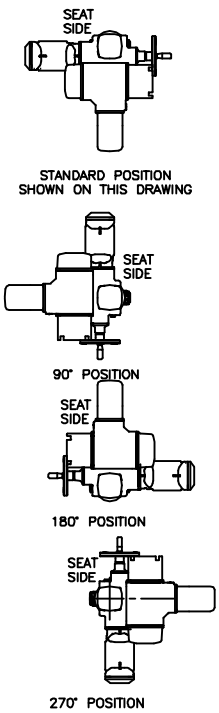
1. DRAWING SHOWS MOUNTING HOLES FOR ANSI CLASS 125/150 FLANGES.
2. FOR FLANGES OTHER THAN ANSI STANDARD SEE D10478 FOR DIMENSIONS.
3. RECOMMENDED FLOW DIRECTION IS WITH THE HIGHER PRESSURE AGAINST THE SEAT SIDE OF VALVE (FLAT SIDE OF DISC).
4. PULL OUT KNOB TO ENGAGE FOR MANUAL OPERATION. UNIT REMAINS IN HAND OPERATION UNTIL MOTOR IS ENERGIZED.







ACTUATOR MOUNTING POSITIONS



REV	DESCRIPTION	DATE
A		09/27/16

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BOS BUTTERFLY VALVES SIZE 2–6 WAFER
AUMA SQ_05.2/07.2 (1 PHASE) AUMATIC MOTOR ACTUATOR

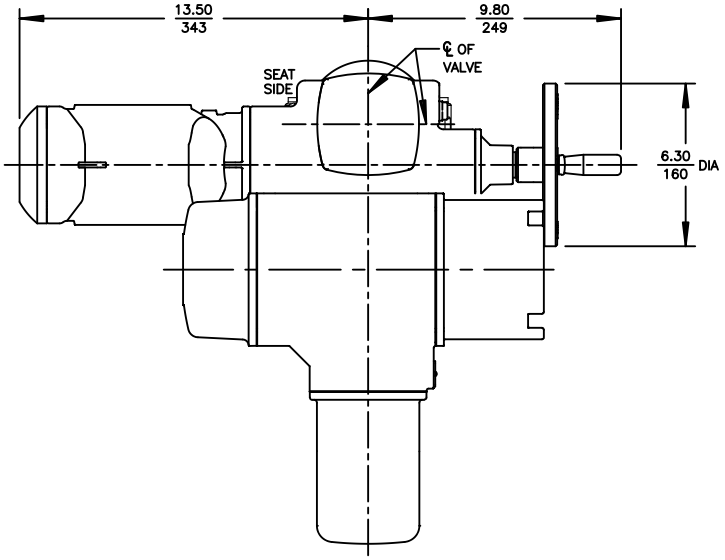
DOCT. CODE	DRAWN	APPROVED	
C1	BMP	TH	J45217
	CHECKED TH	DATE 09/27/16	

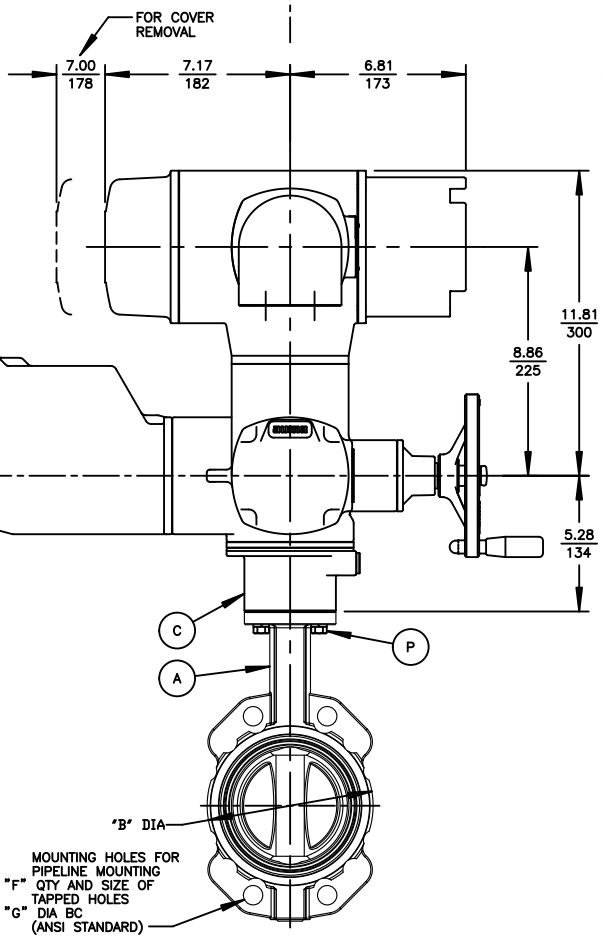
VALVE SIZE		DIMENSIONS INCHES / MILLIMETERS						
INCH	MM	A	B	C	D	E	F	G
2	50	1.69 / 43	3.90 / 99	3.31 / 84	5.79 / 147	.51 / 13	.75 / 19	4.75 / 121
2.5	50	1.81 / 46	4.41 / 112	3.31 / 84	6.10 / 155	.51 / 13	.75 / 19	5.50 / 140
3	80	1.81 / 46	5.10 / 130	3.54 / 90	6.50 / 165	.51 / 13	.75 / 19	6.00 / 152
4	100	2.06 / 52	6.42 / 163	4.47 / 114	7.52 / 191	.63 / 16	.75 / 19	7.50 / 191
5	125	2.19 / 56	7.58 / 193	4.82 / 122	8.11 / 206	.63 / 16	.88 / 22	8.50 / 216
6	150	2.19 / 56	8.74 / 222	5.51 / 140	8.62 / 219	.63 / 16	.88 / 22	9.50 / 241
8	200	2.38 / 60	10.86 / 276	6.75 / 171	10.24 / 260	.71 / 18	.88 / 22	11.75 / 298

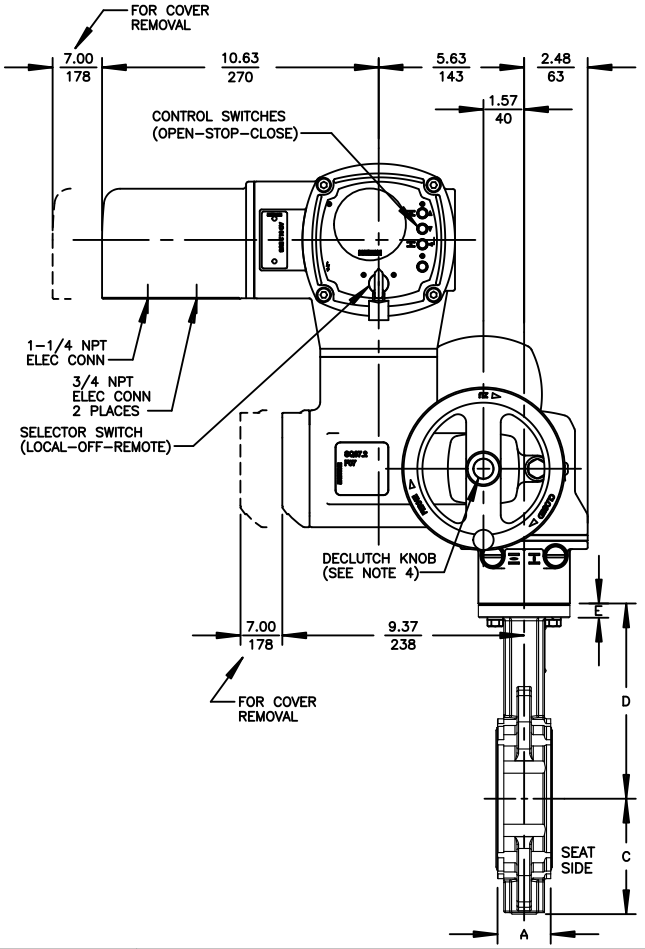
A	VALVE
C	MOTOR
P	CONNECTING PARTS

NOTE:

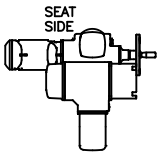
1. DRAWING SHOWS MOUNTING HOLES FOR ANSI CLASS 125/150 FLANGES.
2. FOR FLANGES OTHER THAN ANSI STANDARD SEE D10478 FOR DIMENSIONS.
3. RECOMMENDED FLOW DIRECTION IS WITH THE HIGHER PRESSURE AGAINST THE SEAT SIDE OF VALVE (FLAT SIDE OF DISC).
4. PULL OUT KNOB TO ENGAGE FOR MANUAL OPERATION. UNIT REMAINS IN HAND OPERATION UNTIL MOTOR IS ENERGIZED.



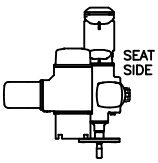




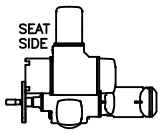
ACTUATOR MOUNTING POSITIONS



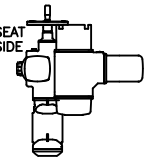
STANDARD POSITION
SHOWN ON THIS DRAWING



90° POSITION



180° POSITION



270° POSITION

G	F	E	D	C	B	A	RLP	08/19/22

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BOS BUTTERFLY VALVES SIZE 2–8 WAFER
AUMA SQ_05.2/07.2 (1 PHASE) AUMATIC MOTOR ACTUATOR
WITH LOW COVER

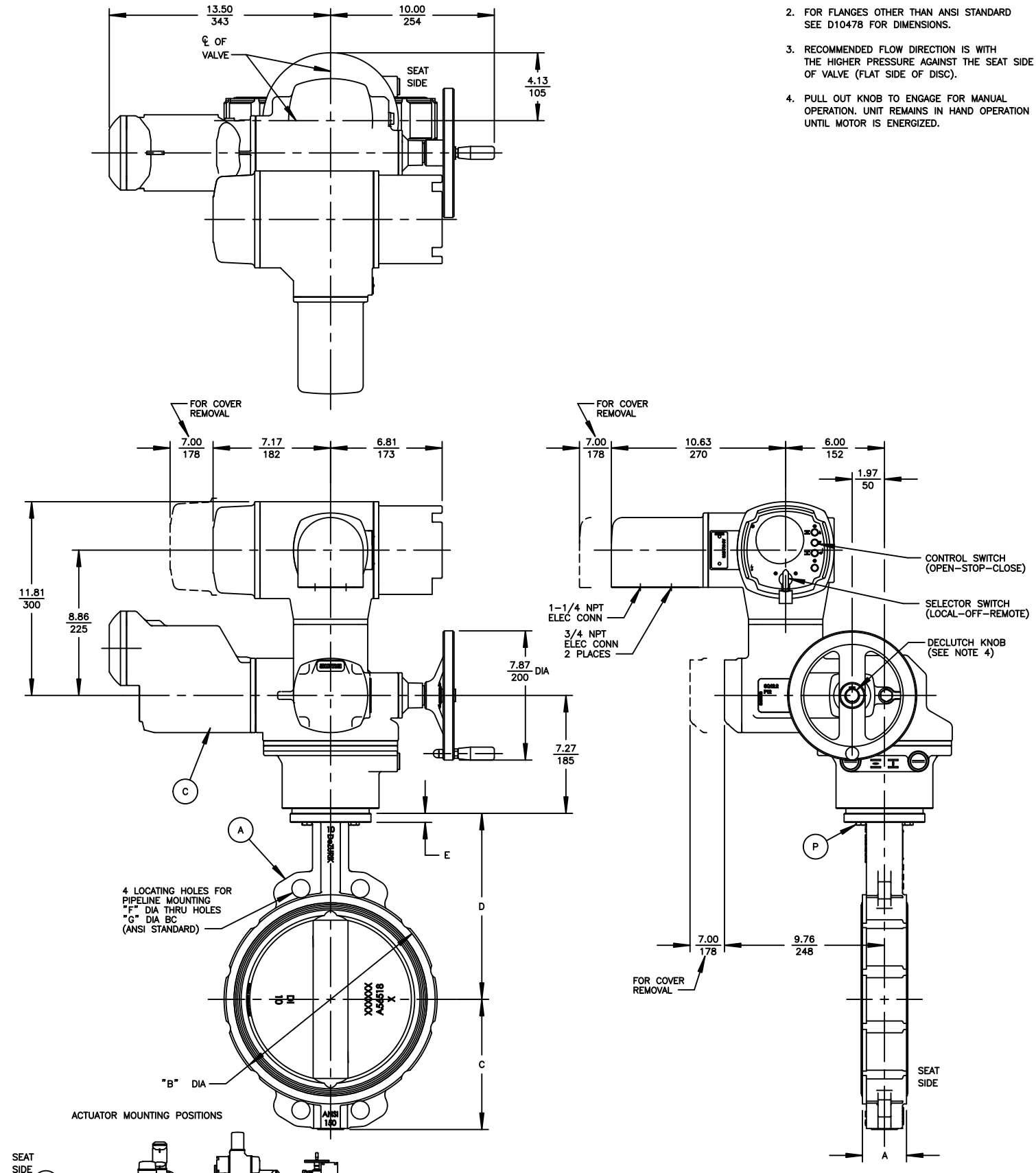
DOCT. CODE	DRAWN	APPROVED	
C1	CTP	SO	J45867
	CHECKED	DATE	
	SO	08/19/22	

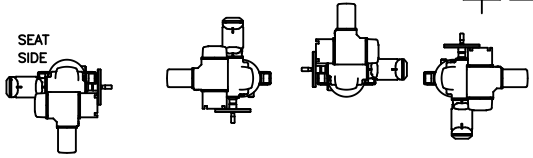
VALVE SIZE		DIMENSIONS INCHES / MILLIMETERS						
INCH	MM	A	B	C	D	E	F	G
8	200	2.38 / 60	10.86 / 276	6.75 / 171	10.24 / 260	.71 / 18	.88 / 22	11.75 / 298
10	250	2.69 / 68	12.84 / 326	7.93 / 201	11.50 / 292	.71 / 18	1.00 / 25	14.25 / 362

A	VALVE
C	MOTOR
P	CONNECTING PARTS

NOTE:

1. DRAWING SHOWS MOUNTING HOLES FOR ANSI CLASS 125/150 FLANGES.
2. FOR FLANGES OTHER THAN ANSI STANDARD SEE D10478 FOR DIMENSIONS.
3. RECOMMENDED FLOW DIRECTION IS WITH THE HIGHER PRESSURE AGAINST THE SEAT SIDE OF VALVE (FLAT SIDE OF DISC).
4. PULL OUT KNOB TO ENGAGE FOR MANUAL OPERATION. UNIT REMAINS IN HAND OPERATION UNTIL MOTOR IS ENERGIZED.





STANDARD POSITION SHOWN ON THIS DRAWING | 90° POSITION | 180° POSITION | 270° POSITION

G	F	E	D	C	B	A	RLP	08/18/22

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BOS BUTTERFLY VALVES 8 & 10 WAFER
AUMA SQ(R)12.2 AUMATIC (1 PHASE) MOTOR ACTUATOR
WITH LOW COVER

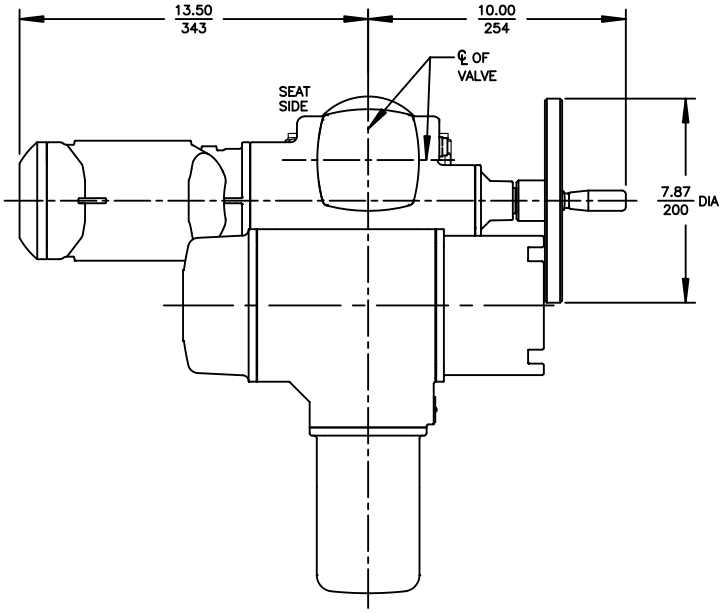
DOCT. CODE	DRAWN	APPROVED	
	CTP	SO	J45868
C1	CHECKED SO	DATE 08/18/22	

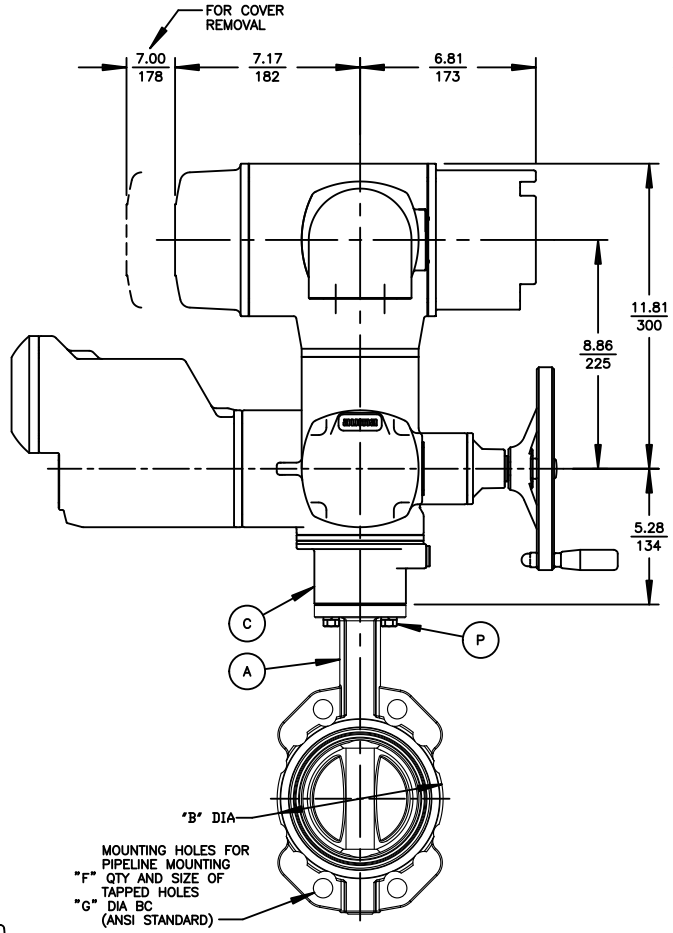
VALVE SIZE		DIMENSIONS INCHES / MILLIMETERS						
INCH	MM	A	B	C	D	E	F	G
2	50	1.69 / 43	3.90 / 99	3.31 / 84	5.79 / 147	.51 / 13	.75 / 19	4.75 / 121
2.5	50	1.81 / 46	4.41 / 112	3.31 / 84	6.10 / 155	.51 / 13	.75 / 19	5.50 / 140
3	80	1.81 / 46	5.10 / 130	3.54 / 90	6.50 / 165	.51 / 13	.75 / 19	6.00 / 152
4	100	2.06 / 52	6.42 / 163	4.47 / 114	7.52 / 191	.63 / 16	.75 / 19	7.50 / 191
5	125	2.19 / 56	7.58 / 193	4.82 / 122	8.11 / 206	.63 / 16	.88 / 22	8.50 / 216
6	150	2.19 / 56	8.74 / 222	5.51 / 140	8.62 / 219	.63 / 16	.88 / 22	9.50 / 241

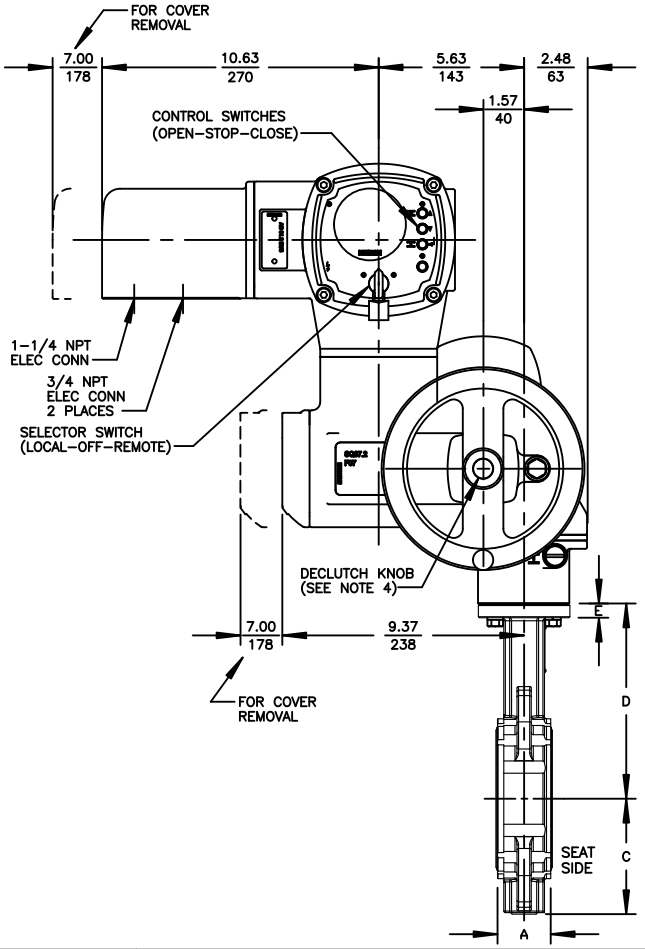
A	VALVE
C	MOTOR
P	CONNECTING PARTS

NOTE:

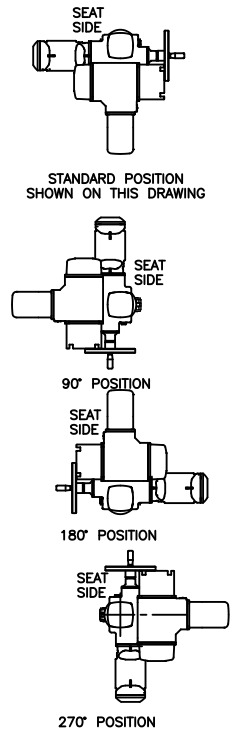
1. DRAWING SHOWS MOUNTING HOLES FOR ANSI CLASS 125/150 FLANGES.
2. FOR FLANGES OTHER THAN ANSI STANDARD SEE D10478 FOR DIMENSIONS.
3. RECOMMENDED FLOW DIRECTION IS WITH THE HIGHER PRESSURE AGAINST THE SEAT SIDE OF VALVE (FLAT SIDE OF DISC).
4. PULL OUT KNOB TO ENGAGE FOR MANUAL OPERATION. UNIT REMAINS IN HAND OPERATION UNTIL MOTOR IS ENERGIZED.







ACTUATOR MOUNTING POSITIONS



G	F	E	D	C	B	A	RLP	08/19/22

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BOS BUTTERFLY VALVES SIZE 2–6 WAFER
AUMA SQ_05.2/07.2 (1 PHASE) AUMATIC MOTOR ACTUATOR
WITH LOW COVER

DOCT. CODE	DRAWN	APPROVED	
C1	CTP	SO	J45869
	CHECKED	DATE	
	SO	08/19/22	

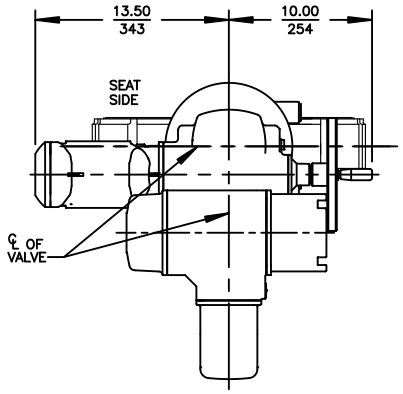
VALVE SIZE		DIMENSIONS INCHES / MILLIMETERS						
INCH	MM	A	B	C	D	E	F	G
12	300	3.06 / 78	15.25 / 387	9.06 / 230	13.35 / 339	.98 / 25	1.00 / 25	17.00 / 432
14	350	3.06 / 78	17.32 / 440	10.14 / 258	14.50 / 368	.98 / 25	1.12 / 28	18.75 / 476

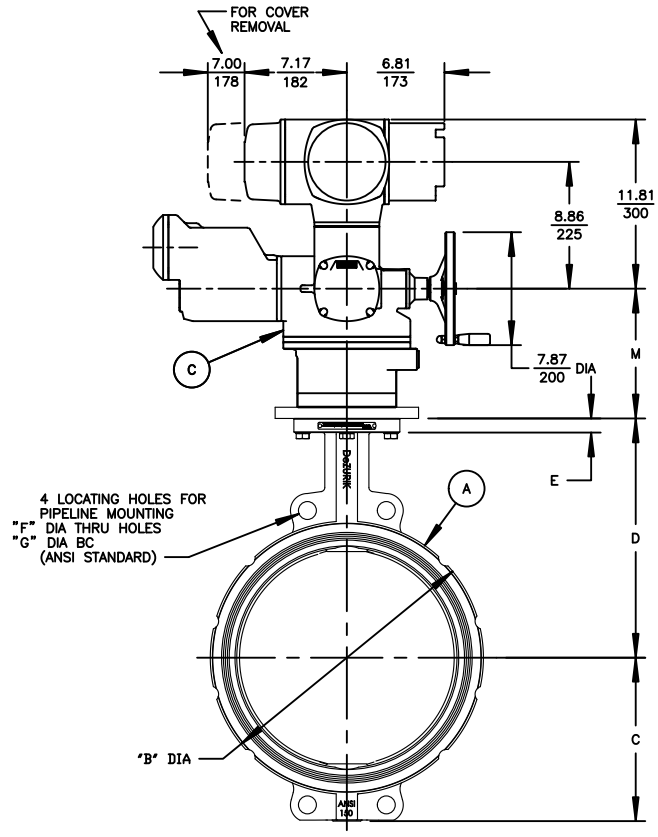
ACTUATOR NUMBER	DIMENSIONS	
	M	N
SQ12.2	7.77 / 197	4.12 / 105
SQ14.2	8.78 / 223	4.45 / 113

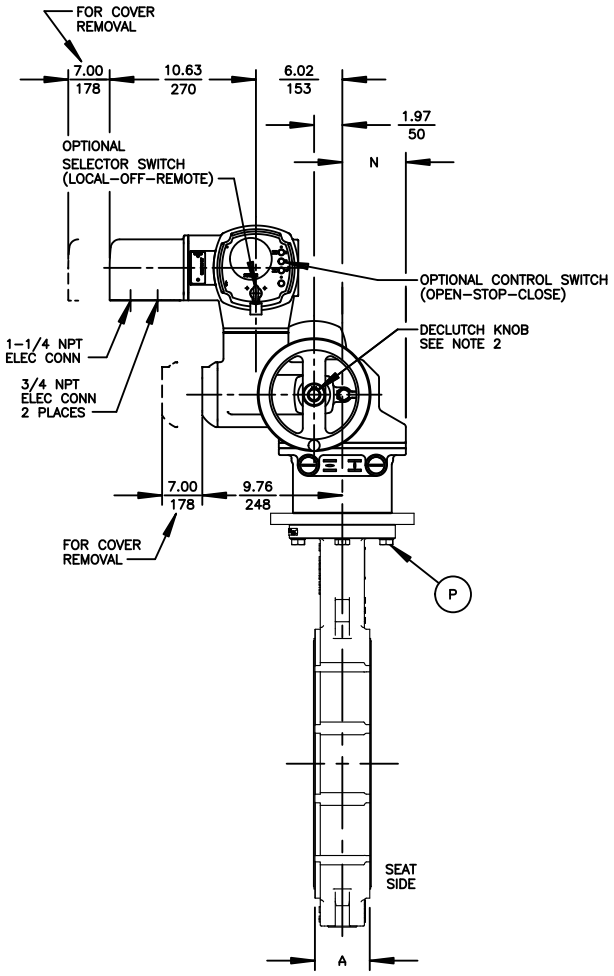
A	VALVE
C	GEAR UNIT AND MOTOR
P	CONNECTING PARTS

NOTE:

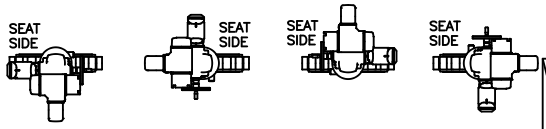
1. DRAWING SHOWS MOUNTING HOLES FOR ANSI CLASS 125/150 FLANGES.
2. FOR FLANGES OTHER THAN ANSI STANDARD SEE D10478 FOR DIMENSIONS.
3. RECOMMENDED FLOW DIRECTION IS WITH THE HIGHER PRESSURE AGAINST THE SEAT SIDE OF VALVE (FLAT SIDE OF DISC).
4. PULL OUT KNOB TO ENGAGE FOR MANUAL OPERATION. UNIT REMAINS IN HAND OPERATION UNTIL MOTOR IS ENERGIZED.







ACTUATOR MOUNTING POSITIONS



STANDARD POSITION SHOWN ON THIS DRAWING | 90° POSITION | 180° POSITION | 270° POSITION

G	F	E	D	C	B	A	RLP	08/25/22

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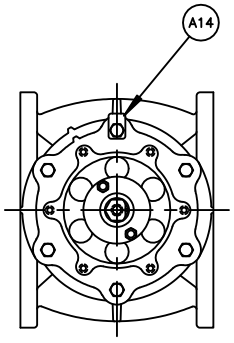
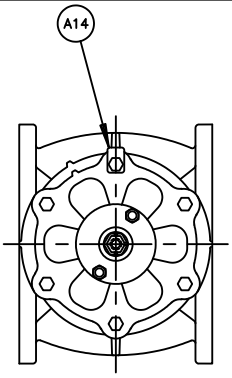
BOS BUTTERFLY VALVES SIZE 12 & 14 WAFFER
AUMA SQ.2.2 & 14.2 AUMATIC (1PHASE) MOTOR ACUATOR

DOCT. CODE	DRAWN	APPROVED
C1	BTK	CE
	CHECKED	DATE
	CE	08/25/22

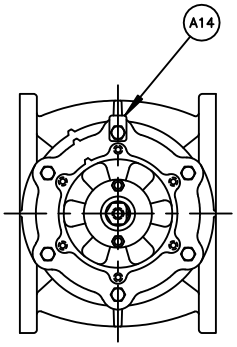
J45871



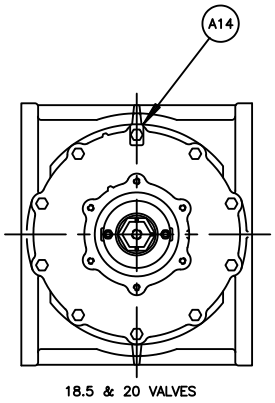
6.5 & 8 VALVES



8.5 – 10 VALVES
(SEE NOTE 4)



10.5 – 18 VALVES

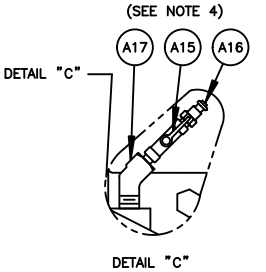


18.5 & 20 VALVES

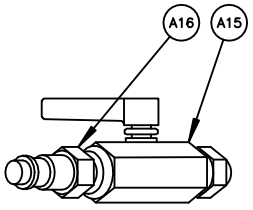
NOTE:

1. REPLACEABLE WEAR PARTS ARE ITEMS NUMBER A3, PLUG(IF RUBBER FACED), A4, A5 AND A9.
2. WHEN ORDERING PARTS, INCLUDE VALVE SIZE AND PART NUMBER FROM DATA PLATE. ALSO INCLUDE THIS DRAWING NUMBER WITH PART NAME, NUMBER AND QUANTITY.
3. CLOCKWISE ROTATION OF PLUG STEM CLOSES VALVE.
4. ON THE SIZE 3.5, 4, 4.5, 5, 6, 8.5, & 10 VALVES BONNET SCREWS ARE USED FOR MOUNTING ACTUATOR.
5. VALVE MAY BE FURNISHED WITH EITHER THE UPPER JOURNAL GREASE FITTING, THE LOWER JOURNAL GREASE FITTING OR BOTH.

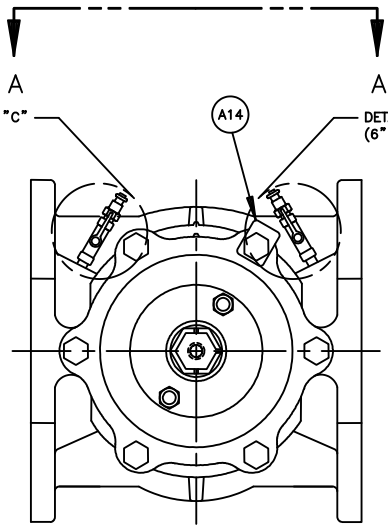
NO	PART NAME	QTY
A1	BODY	1
A2	BEARING (3.5 – 8 VALVES)	1
A2	BEARING (8.5 – 18 VALVES)	2
A2	BEARING (18.5 & 20 VALVES)	1
A3	PLUG	1
A4	GRIT EXCLUDER	1
A5	GASKET (BODY)	1
A6	BONNET	1
A7	BEARING	1
A8	SCREW (3.5 – 18 VALVES)	6
A8	SCREW (18.5 & 20 VALVES)	10
A9	PACKING	–
A10	CONE, 3.5 – 8 NT (EXCEPT LOW FRICTION CAT. CHAR. NBRL & SQ. PACKING)	1
A11	GLAND	1
A12	STUD (3.5 – 20 GS-_-HD_ & GS-_-CW_)	2
A12	STUD (3.5 – 20 GS-_-_C-_)	2
A12	STUD (8.5 – 12 MNA)	NOT REQ'D
A12	STUD (8.5 – 12 LV)	NOT REQ'D
A12	STUD (3.5 – 20 GS-_-ML_)	2
A12	STUD (3.5 – 8 NT)	2
A13	NUT (3.5 – 20 GS-_-HD_ & GS-_-CW_)	2
A13	NUT (3.5 – 20 GS-_-_C_)	2
A13	NUT (8.5 – 12 MNA)	NOT REQ'D
A13	NUT (8.5 – 12 LV)	NOT REQ'D
A13	NUT (3.5 – 12 GS-_-ML_)	2
A13	NUT (3.5 – 8 NT)	4
A14	CAUTION TAG	1
A15	PIPE PLUG (PU, PD OR PDU)	–
A15	TIRE FITTING (BV1)	2
A15	MANUAL VALVE (BV2)	2
A16	ADAPTOR (BV2)	2
A17	STREET ELBOW 45 DEG (4.5 & 8 VALVE) (BV2)	2
A18	GRIT EXCLUDER	–
A20	GREASE FITTING (OPTION GR ONLY)	1
A21	GREASE FITTING (OPTION GR ONLY)	1
A22	NIPPLE (EXCEPT LV & NT) (OPTION GR ONLY)	1
A36	WASHER (FUSION COATING)(3.5–18 VALVES)	6
A36	WASHER (FUSION COATING)(18.5–20 VALVES)	10



DETAIL "C"
4, 5 & 8" VALVE

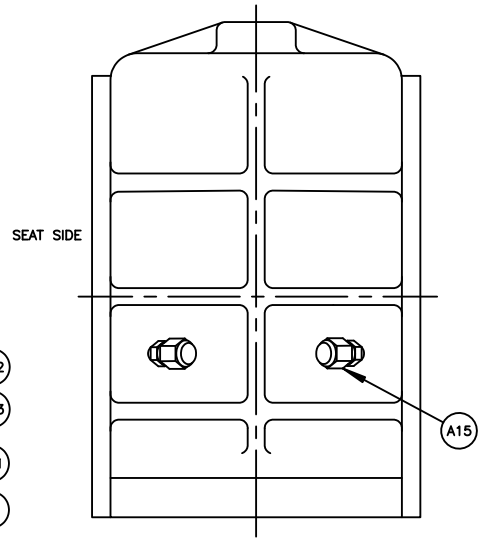


ENLARGED VIEW
DETAIL "B"

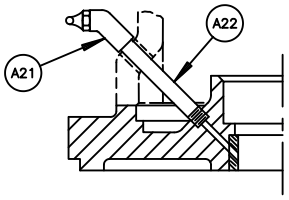


3.5 – 6 VALVES
(SEE NOTE 4)

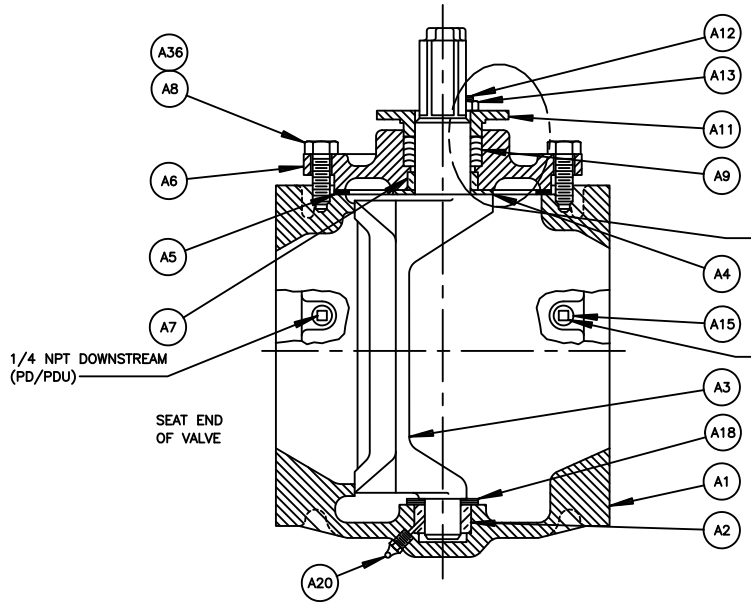
PETCOCKS AND
QUICK DISCONNECTS

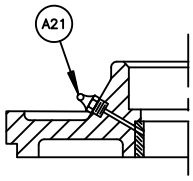


VIEW A–A
TIRE FITTING

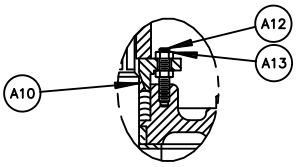


GREASE FITTING IN BONNET,
ALL ACTUATORS EXCEPT LV & NT





GREASE FITTING IN BONNET,
LV & NT ACTUATORS



DETAIL "A"
3.5 – 8 NT CONSTRUCTION

V	U	T	S	R	Q	P	N	M	L	K	J	H	G	F	E	D	C	B	A
71280	70443	70336	63480	62259	62047	61845	61612	61602	61371	60266	54653	54620	53766	50512	50512	51112	16517	16276	14970
09/28/22	02/06/20	11/20/18	08/04/17	04/30/12	07/28/11	11/19/09	06/10/08	04/02/08	11/22/05	10/19/00	03/30/99	02/11/99	09/03/98	03/22/93	03/03/93	03/05/91	4/2/85	11/22/82	08/28/81

PEC ECCENTRIC VALVE ASSEMBLY
3.5 – 20, FLANGED, EXCEPT BODY MATERIAL CIS, DIS & CIH

DOCT. CODE	DRAWN	APPROVED
C1	DENNY	RJP
	CHECKED TNB	DATE 10–13–83

A20730

MATERIALS OF CONSTRUCTION

DRAWING(S): A20730

WORK ORDER: 156286 **PART NO:** 9713086

DESCRIPTION: PEC,6,F1,CI,NBR,CR,AIS-L41LS1*NT

ITEM	MATERIAL
A01	IRON, ASTM A126, CLASS B, USA FOUNDRY
A02	STAINLESS STEEL, TYPE 316L, SINTERED
A03	CHLOROPRENE (CR)
A03	IRON, ASTM A126, CLASS B, USA FOUNDRY
A04	PTFE, TYPE II, ASTM D3294 OR D3308, GRADE 1
A05	GASKET, NON-ASBESTOS COMPRESSED SHEET GASKET MATERIAL
A06	IRON, ASTM A126, CLASS B, USA FOUNDRY
A07	STAINLESS STEEL, TYPE 316L, SINTERED
A08	CARBON STEEL, ZINC PLATED
A09	ACRYLONITRILE-BUTADIENE (NBR)
A10	RYTON, MINERAL FILLED, INJECTION MOLDING PELLETS
A11	IRON, ASTM A126, CLASS B
A12	CARBON STEEL, ZINC PLATED
A13	CARBON STEEL, ZINC PLATED
A14	STAINLESS STEEL, SERIES 300
A18	PTFE, TYPE II, ASTM D3294 OR D3308, GRADE 1
A36	STAINLESS STEEL, TYPE 316

MATERIALS OF CONSTRUCTION

DRAWING(S): A20730

WORK ORDER: 156286 **PART NO:** 9718721

DESCRIPTION: PEC,8,F1,CI,NBR,CR,AIS-L41LS1*GS-6-HD8

ITEM	MATERIAL
A01	IRON, ASTM A126, CLASS B, USA FOUNDRY
A02	STAINLESS STEEL, TYPE 316L, SINTERED
A03	CHLOROPRENE (CR)
A03	IRON, ASTM A126, CLASS B, USA FOUNDRY
A04	PTFE, TYPE II, ASTM D3294 OR D3308, GRADE 1
A05	GASKET, NON-ASBESTOS COMPRESSED SHEET GASKET MATERIAL
A06	IRON, ASTM A126, CLASS B, USA FOUNDRY
A07	STAINLESS STEEL, TYPE 316L, SINTERED
A08	CARBON STEEL, ZINC PLATED
A09	ACRYLONITRILE-BUTADIENE (NBR)
A11	IRON, ASTM A126, CLASS B
A12	CARBON STEEL, ZINC PLATED
A13	CARBON STEEL, ZINC PLATED
A14	STAINLESS STEEL, SERIES 300
A18	PTFE, TYPE II, ASTM D3294 OR D3308, GRADE 1
A36	STAINLESS STEEL, TYPE 316

MATERIALS OF CONSTRUCTION

DRAWING(S): A20730

WORK ORDER: 156286 **PART NO:** 9725085

DESCRIPTION: PEC,8,F1,CI,NBR,CR,AIS-L41LS1*GS-6-CW8

ITEM	MATERIAL
A01	IRON, ASTM A126, CLASS B, USA FOUNDRY
A02	STAINLESS STEEL, TYPE 316L, SINTERED
A03	CHLOROPRENE (CR)
A03	IRON, ASTM A126, CLASS B, USA FOUNDRY
A04	PTFE, TYPE II, ASTM D3294 OR D3308, GRADE 1
A05	GASKET, NON-ASBESTOS COMPRESSED SHEET GASKET MATERIAL
A06	IRON, ASTM A126, CLASS B, USA FOUNDRY
A07	STAINLESS STEEL, TYPE 316L, SINTERED
A08	CARBON STEEL, ZINC PLATED
A09	ACRYLONITRILE-BUTADIENE (NBR)
A11	IRON, ASTM A126, CLASS B
A12	CARBON STEEL, ZINC PLATED
A13	CARBON STEEL, ZINC PLATED
A14	STAINLESS STEEL, SERIES 300
A18	PTFE, TYPE II, ASTM D3294 OR D3308, GRADE 1
A36	STAINLESS STEEL, TYPE 316

MATERIALS OF CONSTRUCTION

DRAWING(S): A20730

WORK ORDER: 156286 **PART NO:** 9725086

DESCRIPTION: PEC,12,F1,CI,NBR,CR,AIS-L41LS1*GS-12-HD16

ITEM	MATERIAL
A01	IRON, ASTM A126, CLASS B, USA FOUNDRY
A02	STAINLESS STEEL, TYPE 316L, SINTERED
A03	CHLOROPRENE (CR)
A03	IRON, ASTM A126, CLASS B, USA FOUNDRY
A04	PTFE, TYPE II, ASTM D3294 OR D3308, GRADE 1
A05	GASKET, NON-ASBESTOS COMPRESSED SHEET GASKET MATERIAL
A06	IRON, ASTM A126, CLASS B, USA FOUNDRY
A07	STAINLESS STEEL, TYPE 316L, SINTERED
A08	CARBON STEEL, ZINC PLATED
A09	ACRYLONITRILE-BUTADIENE (NBR)
A11	IRON, ASTM A126, CLASS B
A12	CARBON STEEL, ZINC PLATED
A13	CARBON STEEL, ZINC PLATED
A14	STAINLESS STEEL, SERIES 300
A18	PTFE, TYPE II, ASTM D3294 OR D3308, GRADE 1
A36	STAINLESS STEEL, TYPE 316

MATERIALS OF CONSTRUCTION

DRAWING(S): A20730

WORK ORDER: 156286 **PART NO:** 9725087

DESCRIPTION: PEC,14,F1,CI,NBR,CR,AIS-L41LS1*GS-12-HD20

ITEM	MATERIAL
A01	IRON, ASTM A126, CLASS B, USA FOUNDRY
A02	STAINLESS STEEL, TYPE 316L, SINTERED
A03	CHLOROPRENE (CR)
A03	IRON, ASTM A126, CLASS B, USA FOUNDRY
A04	PTFE, TYPE II, ASTM D3294 OR D3308, GRADE 1
A05	GASKET, NON-ASBESTOS COMPRESSED SHEET GASKET MATERIAL
A06	IRON, ASTM A126, CLASS B, USA FOUNDRY
A07	STAINLESS STEEL, TYPE CF-8M, ASTM A743
A08	CARBON STEEL, ZINC PLATED
A09	ACRYLONITRILE-BUTADIENE (NBR)
A11	IRON, ASTM A126, CLASS B
A12	CARBON STEEL, ZINC PLATED
A13	CARBON STEEL, ZINC PLATED
A14	STAINLESS STEEL, SERIES 300
A18	PTFE, TYPE II, ASTM D3294 OR D3308, GRADE 1
A36	STAINLESS STEEL, TYPE 316

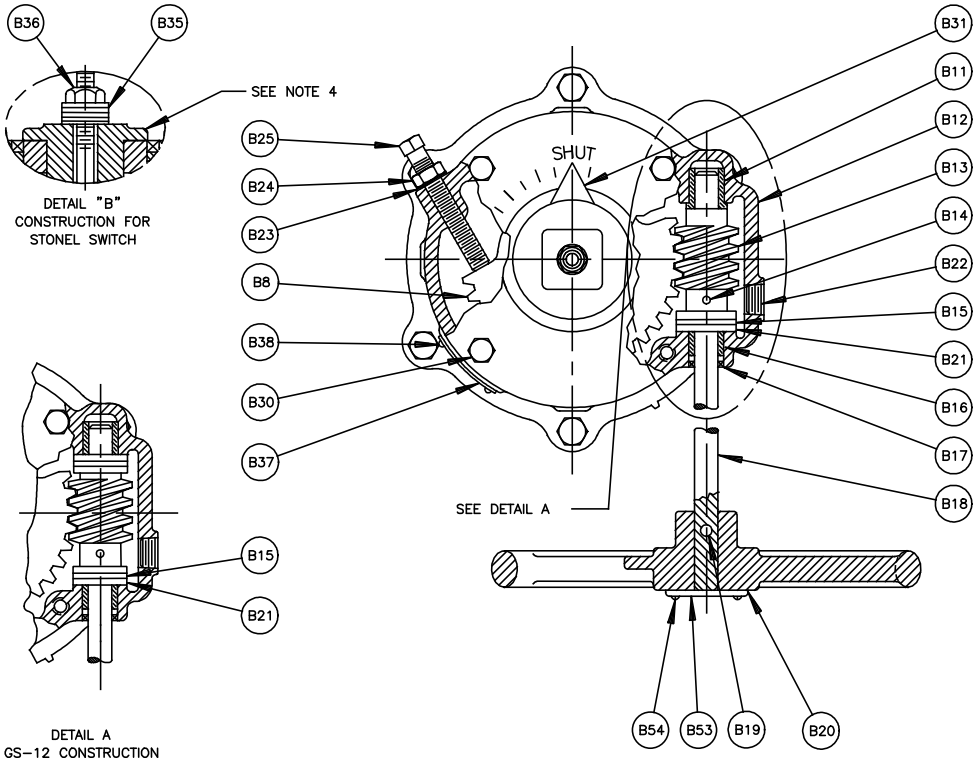
MATERIALS OF CONSTRUCTION

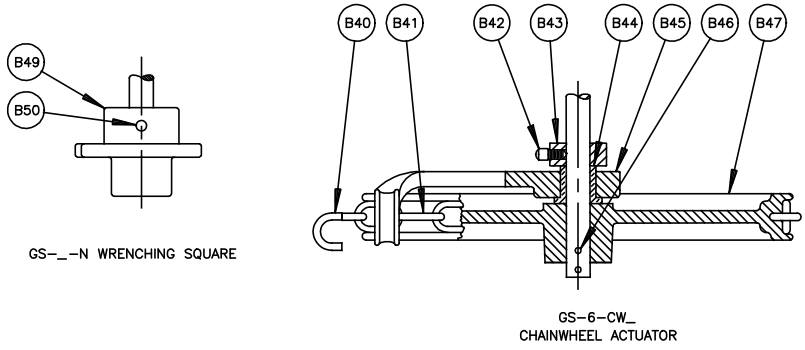
DRAWING(S): A20730

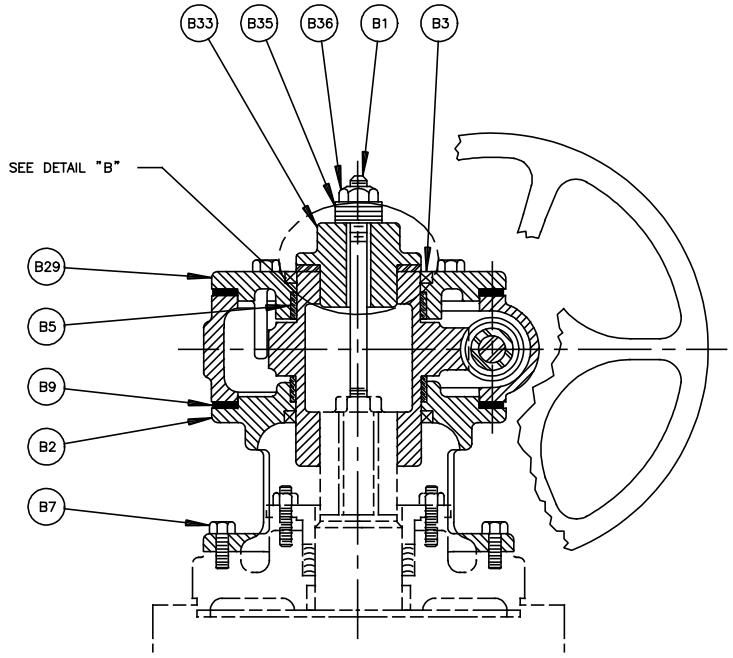
WORK ORDER: 156286 **PART NO:** 9725088

DESCRIPTION: PEC,16,F1,CI,NBR,CR,AIS-L41LS1*GS-12-HD24

ITEM	MATERIAL
A01	IRON, ASTM A126, CLASS B, USA FOUNDRY
A02	STAINLESS STEEL, TYPE 316L, SINTERED
A03	CHLOROPRENE (CR)
A03	IRON, ASTM A126, CLASS B, USA FOUNDRY
A04	PTFE, TYPE II, ASTM D3294 OR D3308, GRADE 1
A05	GASKET, NON-ASBESTOS COMPRESSED SHEET GASKET MATERIAL
A06	IRON, ASTM A126, CLASS B, USA FOUNDRY
A07	STAINLESS STEEL, TYPE CF-8M, ASTM A743
A08	CARBON STEEL, ZINC PLATED
A09	ACRYLONITRILE-BUTADIENE (NBR)
A11	IRON, ASTM A126, CLASS B
A12	CARBON STEEL, ZINC PLATED
A13	CARBON STEEL, ZINC PLATED
A14	STAINLESS STEEL, SERIES 300
A18	PTFE, TYPE II, ASTM D3294 OR D3308, GRADE 1
A36	STAINLESS STEEL, TYPE 316







NO	PART NAME	QTY
B1	STUD	1
B2	ADAPTOR	1
B3	SEAL (GEAR SECTOR)	2
B4		
B5	BEARING	2
B6		
B7	SCREW (3.5, 4, 4.5, 5, 6, 8.5 & 10 VALVES SEE NOTE 3)	NOT REQD
B7	SCREW (6.5, 8, 10.5, 12, 12.5, 14, 14.5, 16, 16.5, 18, 18.5 & 20 VALVES)	6
B8	GEAR SECTOR	1
B9	GASKET (HOUSING)	2
B10		
B11	BEARING	1
B12	HOUSING	1
B13	WORM	1
B14	PIN	1
B15	THRUST BEARING (GS–6)	1
B15	THRUST BEARING (GS–12)	2
B16	BEARING	1
B17	SEAL (HOUSING	1
B18	DRIVE SHAFT	1
B19	PIN	1
B20	HANDWHEEL	1
B21	BEARING RACE (GS–6)	2
B21	BEARING RACE (GS–12)	4
B22	PIPE PLUG	1
B23	SEAL (HOUSING)	
B24	JAM NUT	1
B25	SET SCREW	1
B26		
B27		
B28		
B29	COVER	1
B30	SCREW	8
B31	POINTER	1
B32		
B33	WRENCHING SQUARE (SEE NOTE 4)	1
B34		
B35	SPRING WASHER	5
B36	LOCK NUT	1
B37	DATA PLATE	1
B38	DRIVE SCREW	2
B39		
B40	CLOSING LINK	1
B41	CHAIN	–
B42	SET SCREW (SB16 OPTION ONLY)	1
B43	COLLAR & SET SCREW (CHAINWHEEL)	1
B44	BEARING	1
B45	CHAIN GUIDE	1
B46	PIN	2
B47	CHAINWHEEL (GS–6)	1
B48		
B49	WRENCHING SQUARE	1
B50	PIN	1
B51		
B52		
B53	OPEN TAG (24" HANDWHEELS ONLY)	1
B54	DRIVE SCREW (24" HANDWHEELS ONLY)	2

NOTE:

1. RECOMMENDED SPARE PARTS ARE ITEMS NUMBER B3, B9 & B17.
2. WHEN ORDERING PARTS, SPECIFY VALVE SIZE AND MODEL NUMBER FROM DATA PLATE, ALSO GIVE DRAWING NUMBER WITH PART NAME ITEM NUMBER AND QUANTITY.
3. ITEM NUMBER B7 IS NOT REQUIRED ON THE 3.5, 4, 4.5, 5, 6, 8.5 & 10 VALVES USE BONNET SCREWS ON BODY ASSEMBLY TO MOUNT ACTUATOR TO VALVE.
4. WHEN STONEL SWITCH IS USED, ITEM B33, WRENCHING SQUARE IS REPLACED BY A STUD SUPPORT.

M	L	K	J	H	G	F	E	D	C	B	A	
71050	61658	61398	80075	54620	54230	53449	53132	52851	52699	51744	51112	
06/01/21	10/13/08	03/24/06	02/22/01	04/28/99	04/09/98	12/23/96	06/23/95	12/01/94	02/25/94	06/15/92	03/04/91	

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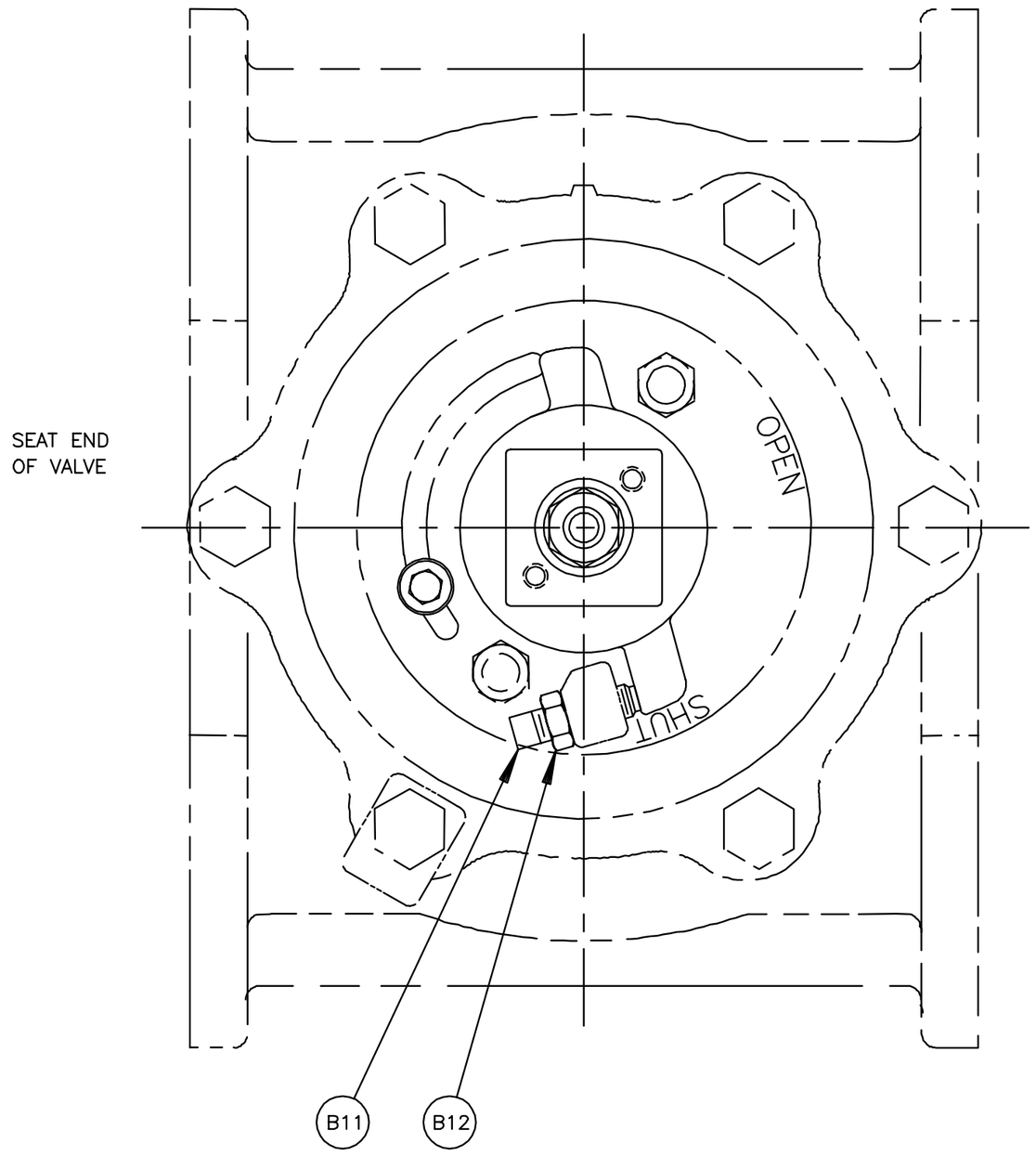
GS–6 WITH HANDWHEEL, CHAINWHEEL AND NUT ACTUATORS OR GS–12 WITH HANDWHEEL AND NUT FOR USE WITH ECCENTRIC VALVES

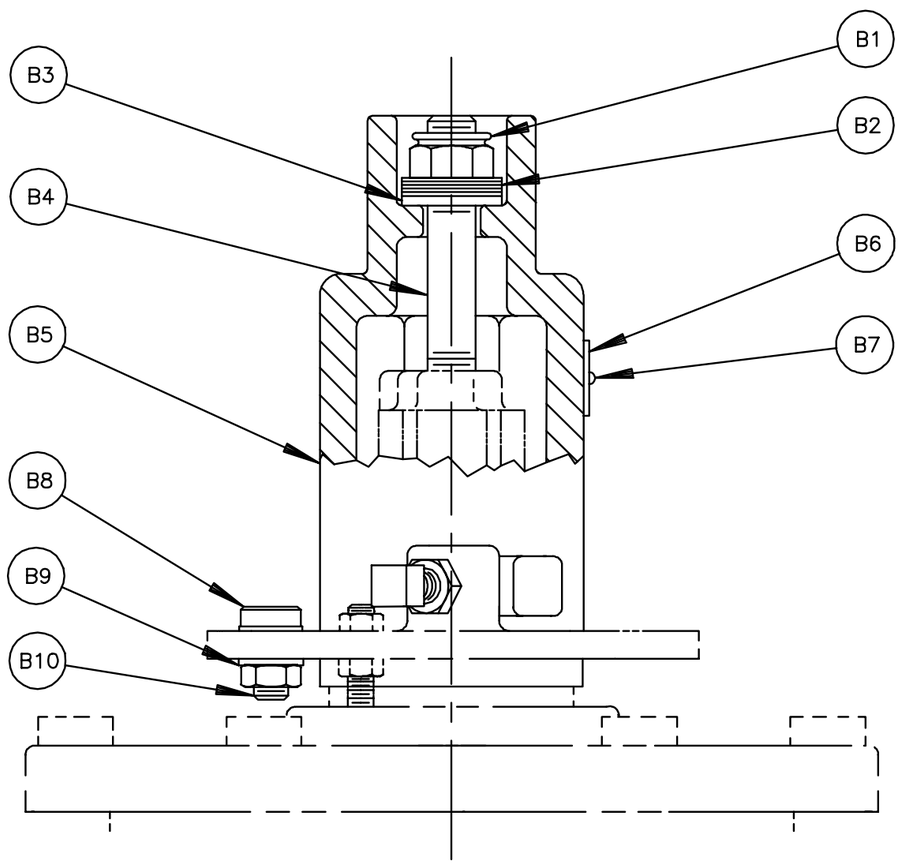
DOCT. CODE	DRAWN	APPROVED	
C1	RBA	BOOS	A22553
	CHECKED RJP	DATE 10–30–81	

NO	PART NAME	QTY
B1	LOCK NUT	1
B2	SPRING WASHER	5
B3	WASHER	1
B4	STUD	1
B5	ADAPTER	1
B6	DATA PLATE	1
B7	DRIVE SCREW	2
B8	SCREW	1
B9	WASHER (EXCEPT 3.5 & 4)	2
B9	WASHER (3.5 & 4)	3
B10	JAM NUT	1
B11	SET SCREW	1
B12	JAM NUT	1

NOTE:

1. WHEN ORDERING PARTS, SPECIFY VALVE SIZE AND MODEL NUMBER FROM DATA PLATE, ALSO GIVE DRAWING NUMBER WITH PART NAME, ITEM NUMBER AND QUANTITY.





G	F	E	D 02/16/99	C 11/12/91	B 03/04/91	A 02/28/91
			54620	51714	51112	51488

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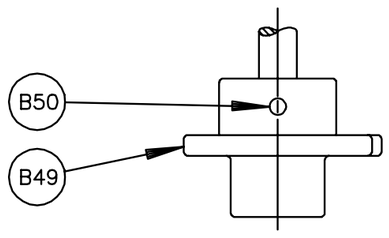
NT NUT ACTUATOR FOR USE ON 3.5–8 PEC ECCENTRIC VALVES

DOCT. CODE	DRAWN	APPROVED	A22557
C1	CHECKED RJP	DATE 10–30–81	

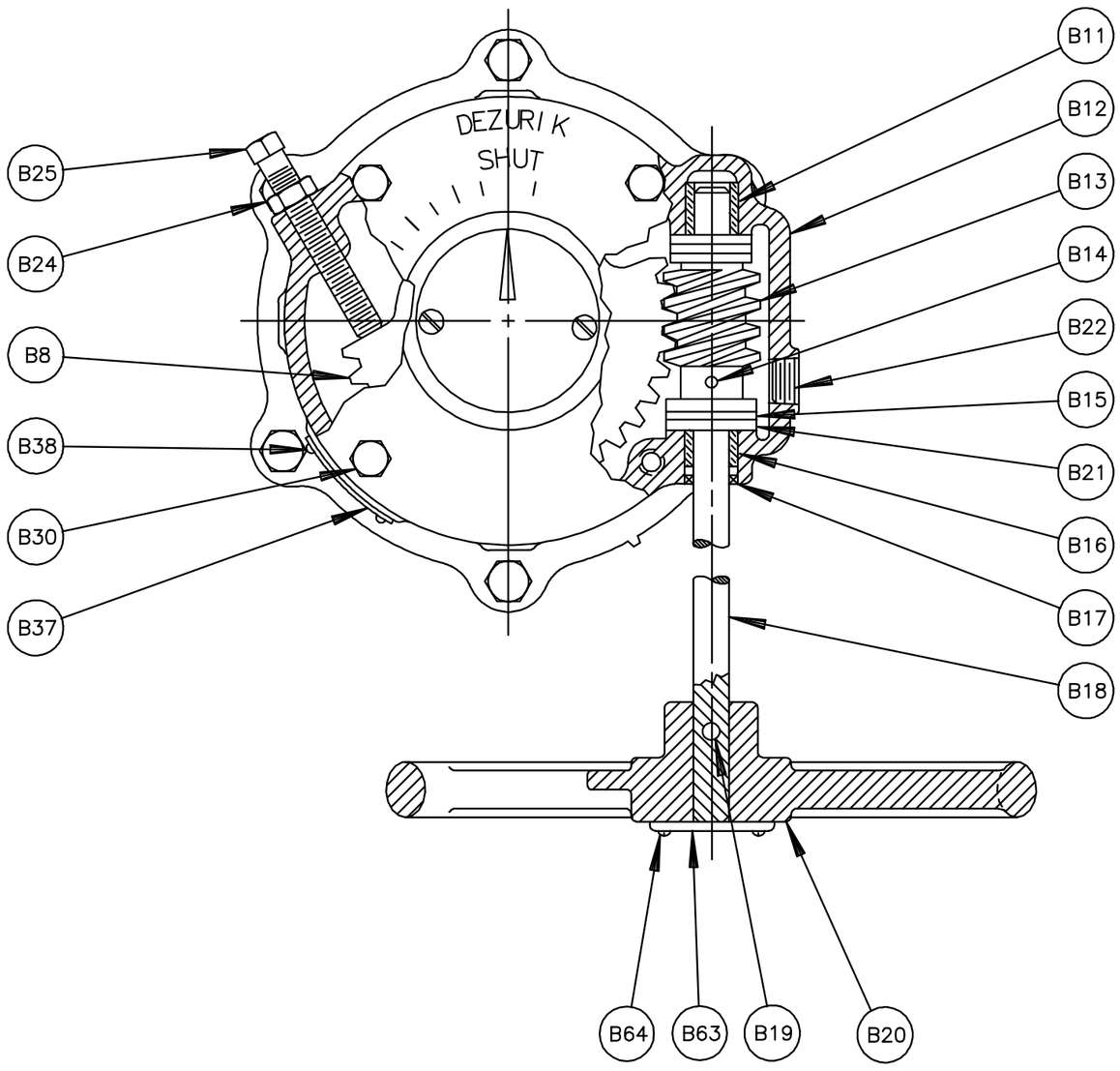
NOTE:

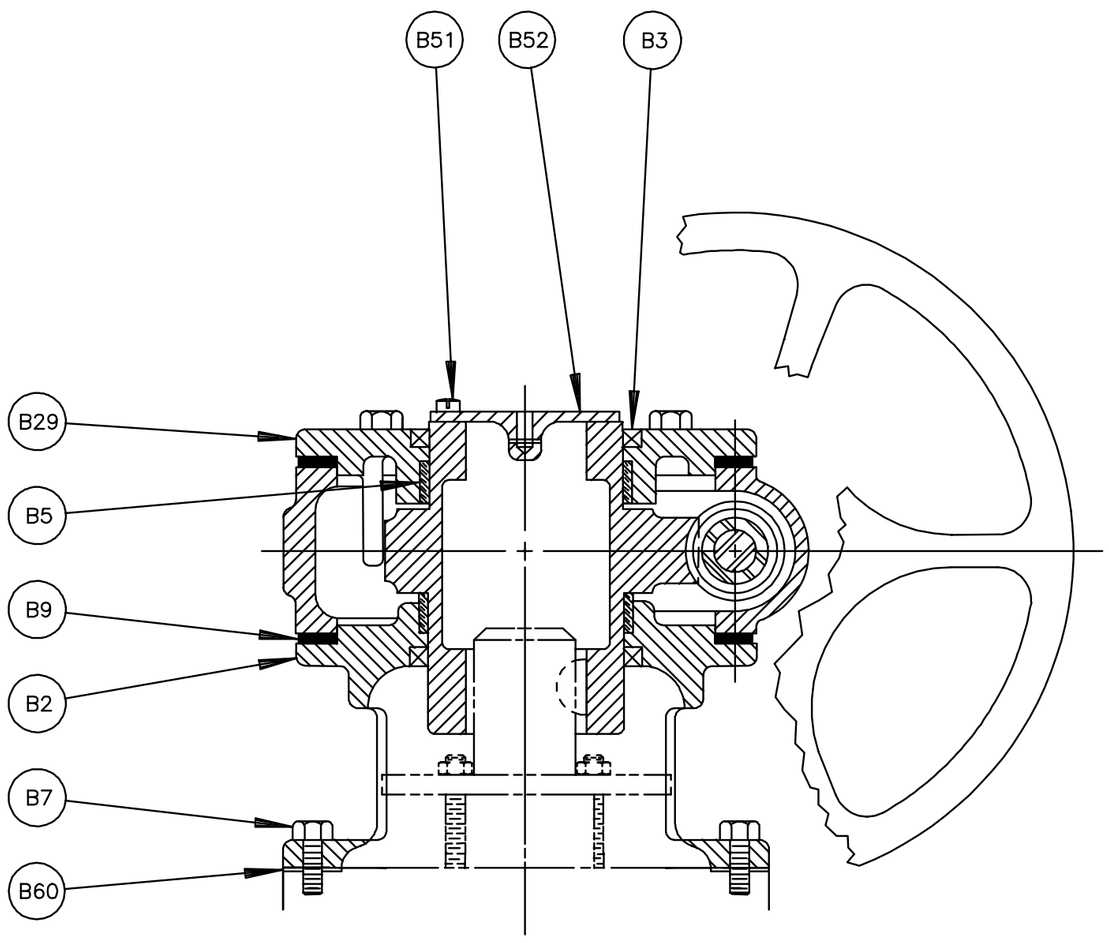
1. RECOMMENDED SPARE PARTS ARE ITEMS NUMBER B3, B9, B17 & B60.

2. WHEN ORDERING PARTS, SPECIFY VALVE SIZE AND MODEL NUMBER FROM DATA PLATE, ALSO GIVE DRAWING NUMBER WITH PART NAME ITEM NUMBER AND QUANTITY.

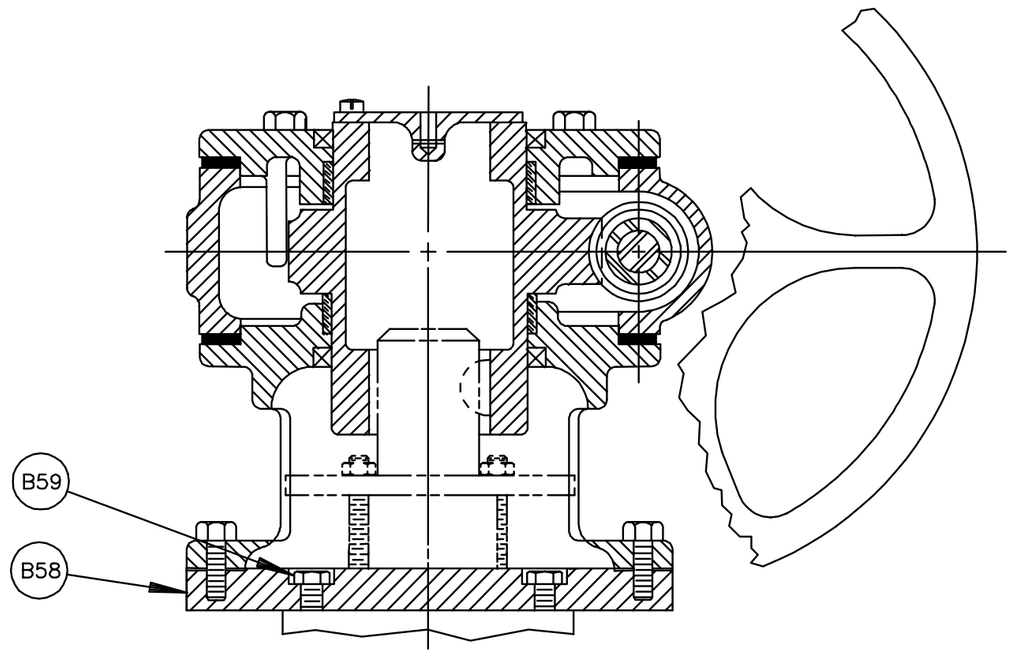


NT WRENCHING SQUARE





GS–12–HD_
HANDWHEEL ACTUATOR



ALTERNATE CONSTRUCTION

NO	PART NAME	QTY
B2	ADAPTOR	1
B3	SEAL (GEAR SECTOR)	2
B5	BEARING	2
B7	SCREW	6
B8	GEAR SECTOR	1
B9	GASKET (HOUSING)	2
B11	BEARING	1
B12	HOUSING	1
B13	WORM	1
B14	PIN	1
B15	THRUST BEARING	2
B16	BEARING	1
B17	SEAL (HOUSING)	1
B18	DRIVE SHAFT	1
B19	PIN	1
B20	HANDWHEEL	1
B21	BEARING RACE	4
B22	PIPE PLUG	1
B24	JAM NUT	1
B25	SET SCREW	1
B29	COVER	1
B30	SCREW	8
B37	DATA PLATE	1
B38	DRIVE SCREW	2
B49	WRENCHING SQUARE	1
B50	PIN	1
B51	SCREW	2
B52	POINTER	1
B58	ADAPTOR PLATE (14" CL300 BHP)	1
B59	SCREW (14" CL300 BHP)	4
B60	GASKET (BHP W/S2 SEAT STYLE)	1
B63	OPEN TAG (24" HANDWHEEL ONLY)	1
B64	DRIVE SCREW (24" HANDWHEEL ONLY)	2

G	61878	08/20/10
F	60075	02/23/01
E	53449	01/06/97
D	52864	06/15/95
C	52951	11/29/94
B	51744	03/13/93
A	17192	10/27/86

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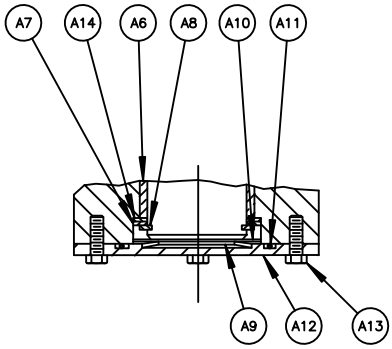
GS–12 GEAR UNIT USED WITH
14–36 BHP BFLY VALVES AND 24–36 RESILIENT BFLY VALVES
WITH HANDWHEEL & NUT ACTUATORS

DOCT. CODE	DRAWN	APPROVED	
C1	GENE	RJP	A30325
	CHECKED TNB	DATE 6–4–86	

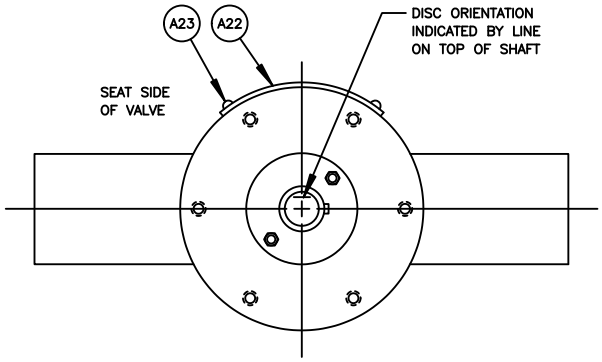


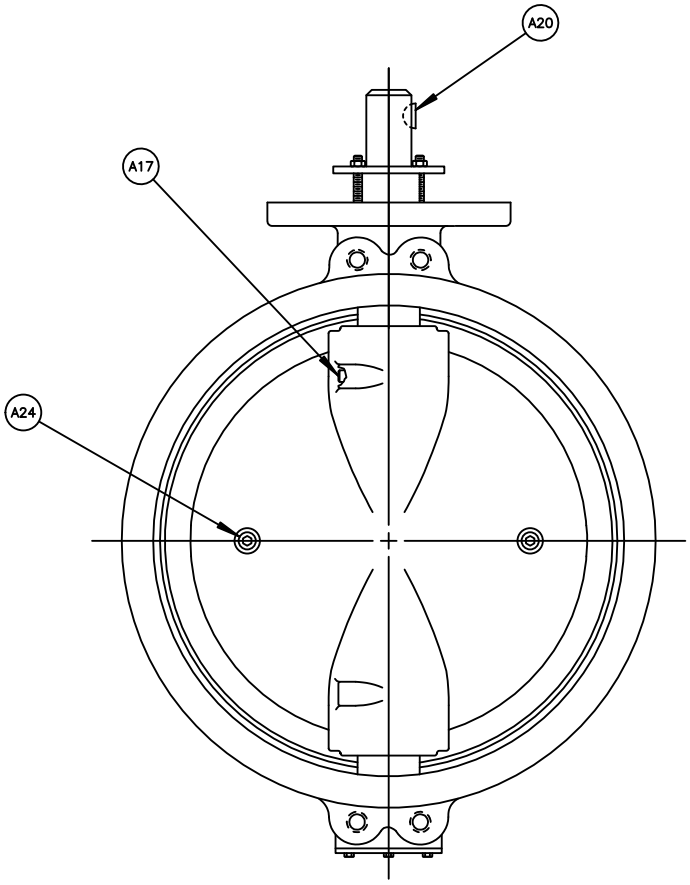
DETAIL "A"
ENLARGED

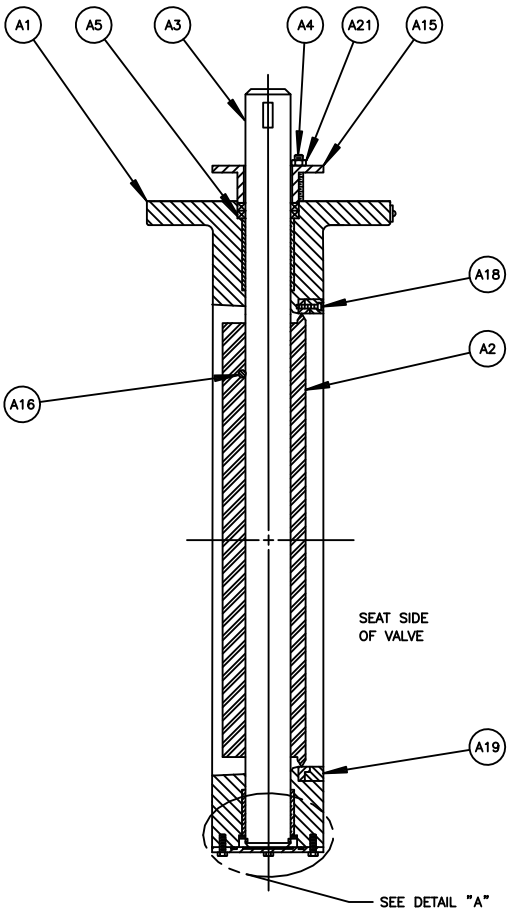
NO.	PART NAME	QTY.
A1	BODY	1
A2	DISC	1
A3	SHAFT	1
A4	STUD	2
A5	PACKING	–
A6	BEARING	3
A7	THRUST BEARING	1
A8	RETAINING RING	1
A9	SPRING (24 & 30 VALVE)	1
A9	SPRING (36 VALVE)	2
A10	THRUST BEARING	1
A11	O–RING	1
A12	COVER	1
A13	SCREW	4
A14	THRUST BEARING	1
A15	GLAND	1
A16	PIN	2
A17	SET SCREW	2
A18	SCREW (24" VALVE)	20
A18	SCREW (30" VALVE)	28
A18	SCREW (36" VALVE)	32
A19	SEAT RING	1
A20	KEY	1
A21	LOCK NUT	2
A22	NAME PLATE	1
A23	DRIVE SCREW	2
A24	PLUG (DI PAINTED DISC ONLY)	2

NOTE:

1. WHEN ORDERING PARTS, SPECIFY VALVE SIZE AND MODEL NUMBER FROM DATA PLATE, ALSO GIVE DRAWING NUMBER WITH PART NAME, ITEM NUMBER AND QUANTITY.
2. REPLACEABLE WEAR PARTS ARE ITEMS NUMBER A5, A6 & A11.







G							
F							
E	71260	09/21/22					
D	62881	07/24/15					
C	62503	02/16/15					
B	62734	05/12/14					
A	61679	07/12/10					

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24–36 WAFER VALVE ASSEMBLY
RESILIENT BUTTERFLY VALVES

DOCT. CODE	DRAWN	APPROVED
C1	KDM	JDB
	CHECKED	DATE
	JDB	10/11/95

A46575

MATERIALS OF CONSTRUCTION

DRAWING(S): A46575

WORK ORDER: 156286 **PART NO:** 9725090

DESCRIPTION: BOS,24,US,W1,DI,EPDM,T,BZ-S4,SC0*GS-12-HD16

ITEM	MATERIAL
A01	DUCTILE IRON, ASTM A536, GRADE 65-45-12
A02	BRASS, ASTM B584/B763, C84400
A03	STAINLESS STEEL, TYPE 416, ASTM A582, CONDITION A
A04	STAINLESS STEEL, TYPE 316
A05	PACKING, V-FLEX, VIRGIN TEFLON
A06	SELF-LUBRICATING BEARING, WOVEN POLYTETRAFLUOROETHYLENE OR PTFE (FIBERGLIDE)
A07	TETRAFLUOROETHYLENE (TEFLON), SELF LUBRICATING, WITH 304 STAINLESS STEEL BACKING
A08	STAINLESS STEEL, TYPE 302
A09	STAINLESS STEEL, TYPE 302
A10	TETRAFLUOROETHYLENE (TEFLON), SELF LUBRICATING, WITH 304 STAINLESS STEEL BACKING
A11	ETHYLENE, PROPYLENE & DIENE TERPOLYMER (EPDM)
A12	STEEL, ASTM A36
A13	CARBON STEEL, ZINC PLATED
A14	STAINLESS STEEL, TYPE 304
A15	IRON, ASTM A126, CLASS B
A16	STAINLESS STEEL, TYPE 304, ASTM A276, CONDITION A
A17	STAINLESS STEEL, TYPE 316
A18	STAINLESS STEEL, TYPE 18-8
A19	BRASS, ASTM B584/B763, C84400
A20	STEEL ALLOY, SAE J502, HEAT TREATED
A21	STAINLESS STEEL, TYPE 18-8
A22	STAINLESS STEEL
A23	STAINLESS STEEL, TYPE 18-8

NOTE:
THE POSITION TRANSMITTER IS FACTORY SET TO 4mA AT THE CLOSED POSITION AND 20 mA AT THE OPEN POSITION.

POSITION TRANSMITTER

TRANSMITTER		SPARES			
+	−	1	2	3	4

700 OHMS AT 24 VDC MAX

AMMETER 20 mA RANGE

+ −
24 VDC SUPPLY
(10 − 40 VDC MAX RANGE)
50 mA MINIMUM

SEHPT POSITION TRANSMITTER WIRING TO TERMINAL STRIP

TOP SWITCH BOTTOM SWITCH

SPARES			TOP SWITCH			BTM SWITCH			SPARES		
1	2	3	NC 4	NO 5	C 6	C 7	NO 8	NC 9	10	11	12

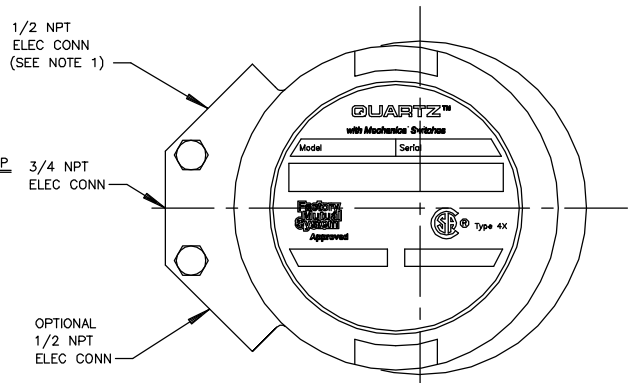
TWO SPDT PROXIMITY SWITCHES

SEH92 PROXIMITY SWITCH WIRING TO TERMINAL STRIP

NOTE:
THE TOP SWITCH IS FACTORY SET TO TRIP C TO NO AT THE CLOSED OR CLOCKWISE VALVE POSITION. THE BOTTOM SWITCH IS FACTORY SET TO TRIP C TO NO AT THE OPEN OR COUNTER−CLOCKWISE VALVE POSITION.

NOTE:

1. ONE 1/2 NPT PIPE PLUG IS PROVIDED WITH EACH SWITCH. IF THE 1/2 NPT ELECTRICAL CONNECTION IS NOT USED, INSTALL THE PIPE PLUG TIGHTLY IN THE CONNECTION. DO NOT USE THREAD SEALANT.



NOTE:
THE TOP SWITCH IS FACTORY SET TO TRIP C TO NO AT THE CLOSED OR CLOCKWISE VALVE POSITION. THE BOTTOM SWITCH IS FACTORY SET TO TRIP C TO NO AT THE OPEN OR COUNTER−CLOCKWISE VALVE POSITION.

TOP SWITCH BOTTOM SWITCH

SPARES			TOP SWITCH			BTM SWITCH			SPARES		
1	2	3	NC 4	NO 5	C 6	C 7	NO 8	NC 9	10	11	12

SEH90 TWO SPDT MECHANICAL SWITCHES

NOTE:
THE POSITION TRANSMITTER IS FACTORY SET TO 4mA AT THE CLOSED POSITION AND 20 mA AT THE OPEN POSITION.

NOTE:
THE TOP SWITCH IS FACTORY SET TO TRIP C TO NO AT THE CLOSED OR CLOCKWISE VALVE POSITION. THE BOTTOM SWITCH IS FACTORY SET TO TRIP C TO NO AT THE OPEN OR COUNTER−CLOCKWISE VALVE POSITION.

TOP SWITCH BOTTOM SWITCH

TRANSMITTER		TOP SWITCH			BTM SWITCH			SPARES			
+	−	NC	NO	C	C	NO	NC	1	2	3	4

700 OHMS AT 24 VDC MAX

AMMETER 20 mA RANGE

+ −
24 VDC SUPPLY
(10 − 40 VDC MAX RANGE)
50 mA MINIMUM

TWO SPDT SWITCHES
(PROXIMITY OR MECHANICAL)

SEH90−PT OR SEH92−PT
POSITION TRANSMITTER AND SWITCH
WIRING TO TERMINAL STRIP

NOTE:
THE TOP SWITCH IS FACTORY SET TO TRIP C TO NO AT THE CLOSED OR CLOCKWISE VALVE POSITION. THE BOTTOM SWITCH IS FACTORY SET TO TRIP C TO NO AT THE OPEN OR COUNTER−CLOCKWISE VALVE POSITION. WHEN FOUR SPDT SWITCHES ARE ORDERED, THE SECOND AND THIRD SWITCHES ARE NOT FACTORY SET.

TOP SWITCH BOTTOM SWITCH

1ST SWITCH TOP			2ND SWITCH			SPARES					SPARES				4TH SWITCH BTM			3RD SWITCH		
NC 1	NO 2	C 3	C 4	NO 5	NC 6	7	8	9	10	11	12	13	14	15	16	NC 17	NO 18	C 19	C 20	NO 21	NC 22

FOUR SPDT MECHANICAL SWITCHES

SEH91 MECHANICAL SWITCH WIRING TO TERMINAL STRIP

G					B	82718	05/01/14
F					A	50312	03/04/10
E							
D							
C							

DeZURIK
Sartell, MN USA 56377
www.dezurik.com

WIRING INFORMATION AND SCHEMATIC FOR SEH_ STONEL AND/OR POSITION TRANSMITTER

DOCT. CODE	DRAWN	APPROVED
C1	BMP	TPK
	CHECKED TPK	DATE 03/02/06

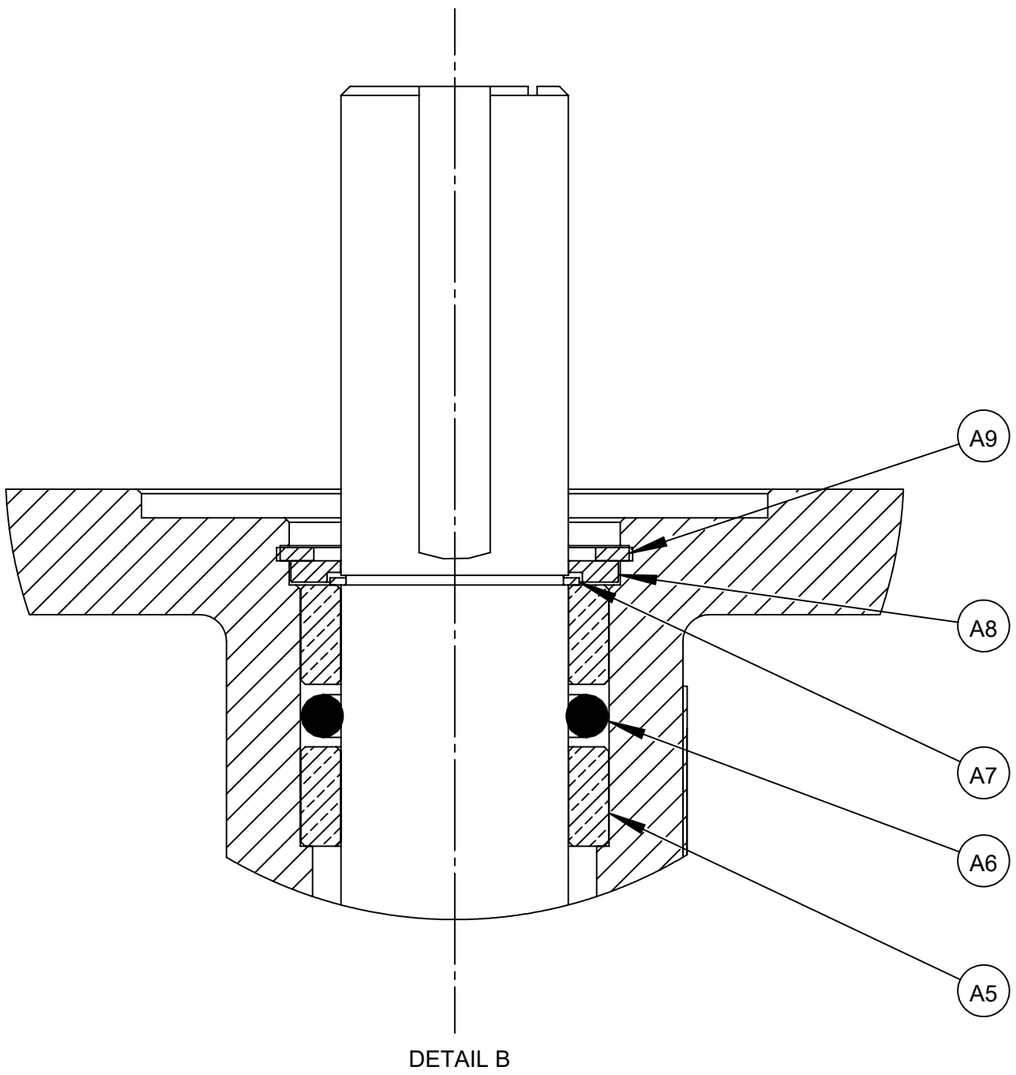
A56330

NO	DESCRIPTION	QTY
A1	BODY	1
A2	DISC	1
A3	SHAFT	1
A4	BEARING, MIDDLE	1
A5	BEARING, UPPER	2
A6	O-RING	1
A7	RETAINING RING	1
A8	WASHER	1
A9	RETAINING RING	1
A10	KEY	1
A11	PIPE PLUG	1
A12	BEARING, LOWER	1
A13	NAMEPLATE	1
A14	DRIVE SCREW	2
A15	MARKING PLATE (WHEN REQUIRED)	1
A16	DRIVE SCREW (WHEN REQUIRED)	2

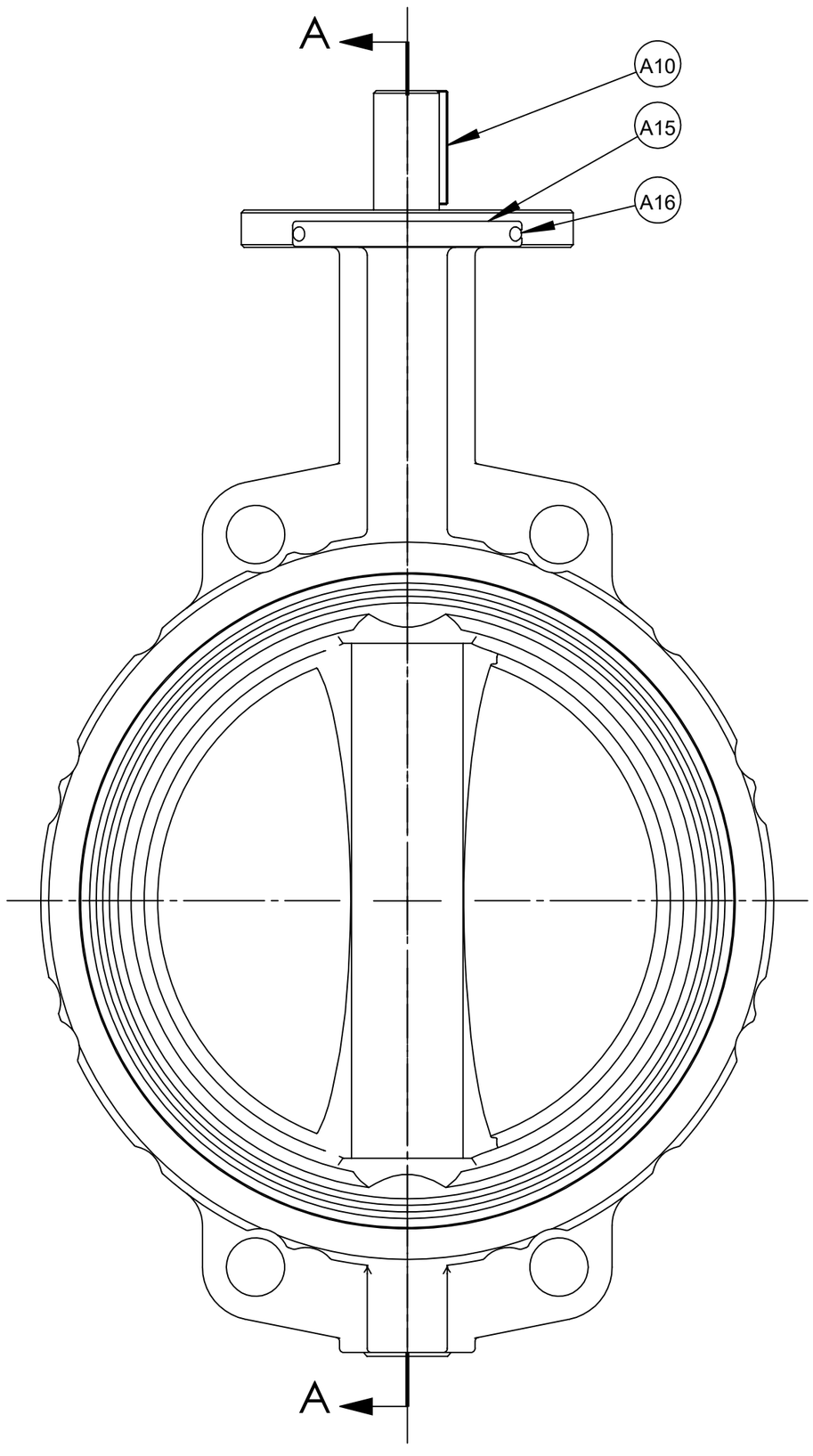
NOTE:

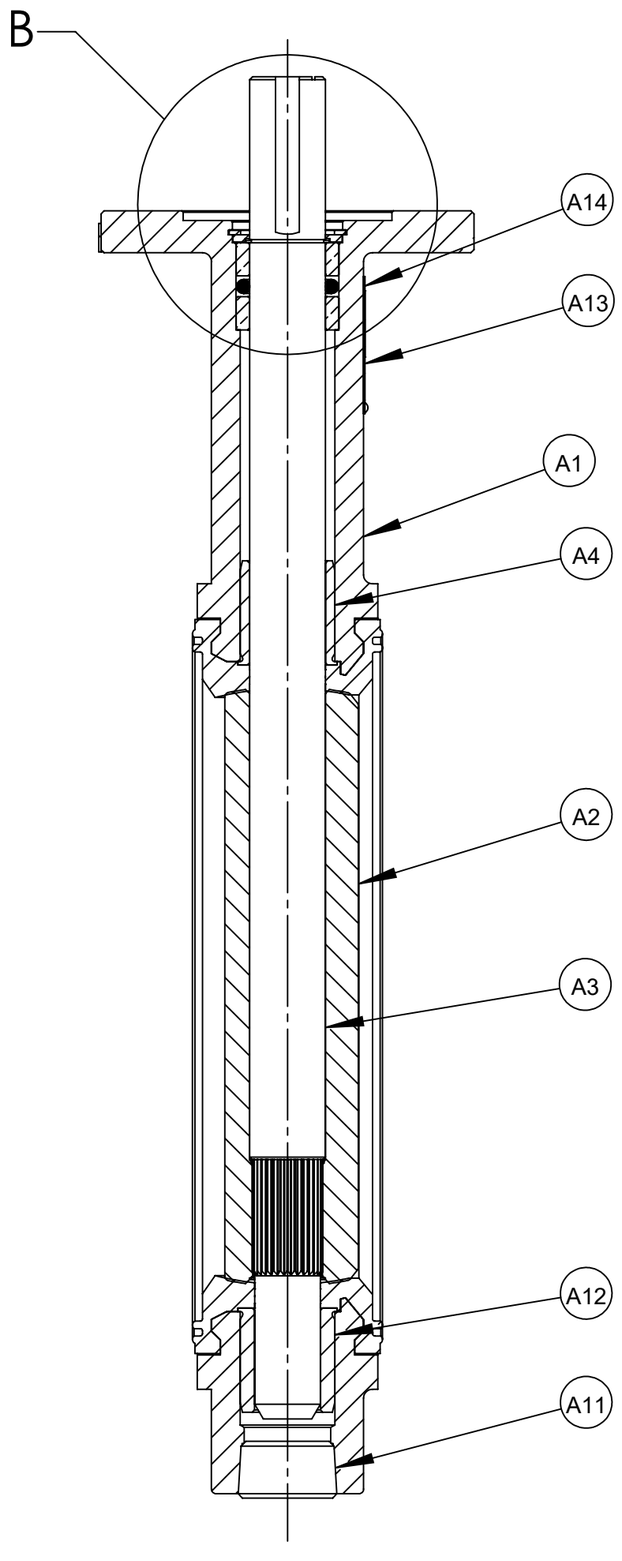
1. WHEN ORDERING PARTS, INCLUDE VALVE SIZE AND PART NUMBER FROM DATA PLATE. ALSO INCLUDE THIS DRAWING NUMBER WITH PART NAME, NUMBER AND QUANTITY.

2. REPLACEABLE WEAR PARTS ARE ITEMS NO A5 AND A6.



DETAIL B





SECTION A-A

G	F	E	D 09/21/22	C 2/24/21	B 3/11/15	A 2/16/09
			71280	70975	62888	61716

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BOS BUTTERFLY VALVES SIZE 2" - 20"
WAFER VALVE ASSEMBLY

DOCT. CODE	DRAWN	APPROVED	A56941
C1	TC	CEG	
	CHECKED CEG	DATE 4/10/07	

MATERIALS OF CONSTRUCTION

DRAWING(S): A56941

WORK ORDER: 156286 **PART NO:** 9725089

DESCRIPTION: BOS,14,US,W1,DI,EPDM,EPDM,ALB-S8,SC0*MG-1216-CW20,SEH90

ITEM	MATERIAL
A01	DUCTILE IRON, ASTM A536, GRADE 65-45-12
A02	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A03	STAINLESS STEEL, TYPE 410, ASTM A276
A04	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A05	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A06	ETHYLENE, PROPYLENE & DIENE TERPOLYMER (EPDM)
A07	STAINLESS STEEL, TYPE 302
A08	STAINLESS STEEL, TYPE 416, ASTM A582, CONDITION A
A09	CARBON STEEL
A10	STEEL, ASTM A36, AISI 1020
A11	IRON, MALLEABLE, ZINC PLATED
A12	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A13	STAINLESS STEEL, TYPE 304
A14	STAINLESS STEEL, TYPE 18-8
A15	STAINLESS STEEL, TYPE 316
A16	STAINLESS STEEL, TYPE 18-8

MATERIALS OF CONSTRUCTION

DRAWING(S): A56941

WORK ORDER: 156286 **PART NO:** 9725091

DESCRIPTION: BOS,4,US,W1,DI,EPDM,EPDM,ALB-S8,SC0*X*A33695

ITEM	MATERIAL
A01	DUCTILE IRON, ASTM A536, GRADE 65-45-12
A02	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A03	STAINLESS STEEL, TYPE 410, ASTM A276
A04	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A05	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A06	ETHYLENE, PROPYLENE & DIENE TERPOLYMER (EPDM)
A07	STAINLESS STEEL, TYPE 302
A08	STAINLESS STEEL, TYPE 416, ASTM A582, CONDITION A
A09	CARBON STEEL
A10	STEEL, ASTM A36, AISI 1020
A11	IRON, MALLEABLE, ZINC PLATED
A12	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A13	STAINLESS STEEL, TYPE 304
A14	STAINLESS STEEL, TYPE 18-8
A15	STAINLESS STEEL, TYPE 316
A16	STAINLESS STEEL, TYPE 18-8

MATERIALS OF CONSTRUCTION

DRAWING(S): A56941

WORK ORDER: 156286 **PART NO:** 9725092

DESCRIPTION: BOS,6,US,W1,DI,EPDM,EPDM,ALB-S8,SC0*X*A33696

ITEM	MATERIAL
A01	DUCTILE IRON, ASTM A536, GRADE 65-45-12
A02	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A03	STAINLESS STEEL, TYPE 410, ASTM A276
A04	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A05	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A06	ETHYLENE, PROPYLENE & DIENE TERPOLYMER (EPDM)
A07	STAINLESS STEEL, TYPE 302
A08	STAINLESS STEEL, TYPE 416, ASTM A582, CONDITION A
A09	CARBON STEEL
A10	STEEL, ASTM A36, AISI 1020
A11	IRON, MALLEABLE, ZINC PLATED
A12	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A13	STAINLESS STEEL, TYPE 304
A14	STAINLESS STEEL, TYPE 18-8
A15	STAINLESS STEEL, TYPE 316
A16	STAINLESS STEEL, TYPE 18-8

MATERIALS OF CONSTRUCTION

DRAWING(S): A56941

WORK ORDER: 156286 **PART NO:** 9725093

DESCRIPTION: BOS,8,US,W1,DI,EPDM,EPDM,ALB-S8,SC0*X*A33697

ITEM	MATERIAL
A01	DUCTILE IRON, ASTM A536, GRADE 65-45-12
A02	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A03	STAINLESS STEEL, TYPE 410, ASTM A276
A04	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A05	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A06	ETHYLENE, PROPYLENE & DIENE TERPOLYMER (EPDM)
A07	STAINLESS STEEL, TYPE 302
A08	STAINLESS STEEL, TYPE 416, ASTM A582, CONDITION A
A09	CARBON STEEL
A10	STEEL, ASTM A36, AISI 1020
A11	IRON, MALLEABLE, ZINC PLATED
A12	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A13	STAINLESS STEEL, TYPE 304
A14	STAINLESS STEEL, TYPE 18-8
A15	STAINLESS STEEL, TYPE 316
A16	STAINLESS STEEL, TYPE 18-8

MATERIALS OF CONSTRUCTION

DRAWING(S): A56941

WORK ORDER: 156286 **PART NO:** 9725094

DESCRIPTION: BOS,10,US,W1,DI,EPDM,EPDM,ALB-S8,SC0*X*A33698

ITEM	MATERIAL
A01	DUCTILE IRON, ASTM A536, GRADE 65-45-12
A02	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A03	STAINLESS STEEL, TYPE 410, ASTM A276
A04	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A05	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A06	ETHYLENE, PROPYLENE & DIENE TERPOLYMER (EPDM)
A07	STAINLESS STEEL, TYPE 302
A08	STAINLESS STEEL, TYPE 416, ASTM A582, CONDITION A
A09	CARBON STEEL
A10	STEEL, ASTM A36, AISI 1020
A11	IRON, MALLEABLE, ZINC PLATED
A12	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A13	STAINLESS STEEL, TYPE 304
A14	STAINLESS STEEL, TYPE 18-8
A15	STAINLESS STEEL, TYPE 316
A16	STAINLESS STEEL, TYPE 18-8

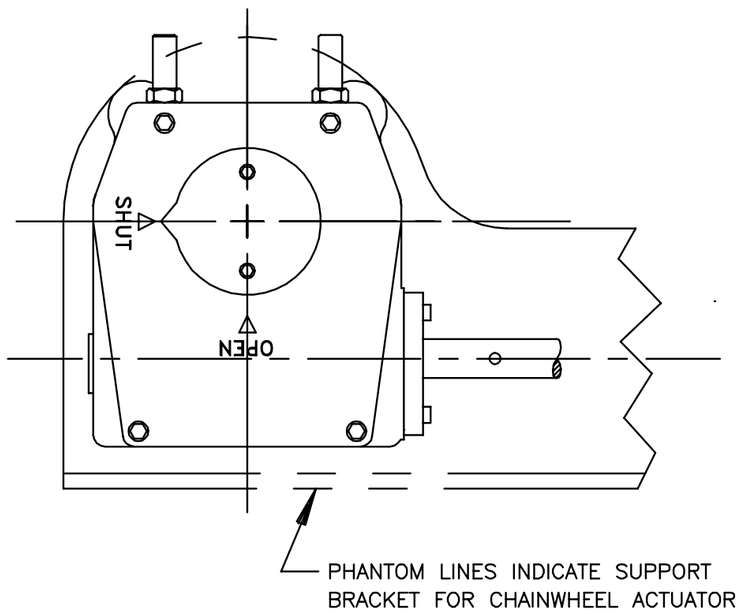
MATERIALS OF CONSTRUCTION

DRAWING(S): A56941

WORK ORDER: 156286 **PART NO:** 9725095

DESCRIPTION: BOS,12,US,W1,DI,EPDM,EPDM,ALB-S8,SC0*X*A33699

ITEM	MATERIAL
A01	DUCTILE IRON, ASTM A536, GRADE 65-45-12
A02	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A03	STAINLESS STEEL, TYPE 410, ASTM A276
A04	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A05	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A06	ETHYLENE, PROPYLENE & DIENE TERPOLYMER (EPDM)
A07	STAINLESS STEEL, TYPE 302
A08	STAINLESS STEEL, TYPE 416, ASTM A582, CONDITION A
A09	CARBON STEEL
A10	STEEL, ASTM A36, AISI 1020
A11	IRON, MALLEABLE, ZINC PLATED
A12	ALUMINUM BRONZE, ASTM B148/B271/B505, ALLOY C95400
A13	STAINLESS STEEL, TYPE 304
A14	STAINLESS STEEL, TYPE 18-8
A15	STAINLESS STEEL, TYPE 316
A16	STAINLESS STEEL, TYPE 18-8



PHANTOM LINES INDICATE SUPPORT
BRACKET FOR CHAINWHEEL ACTUATOR

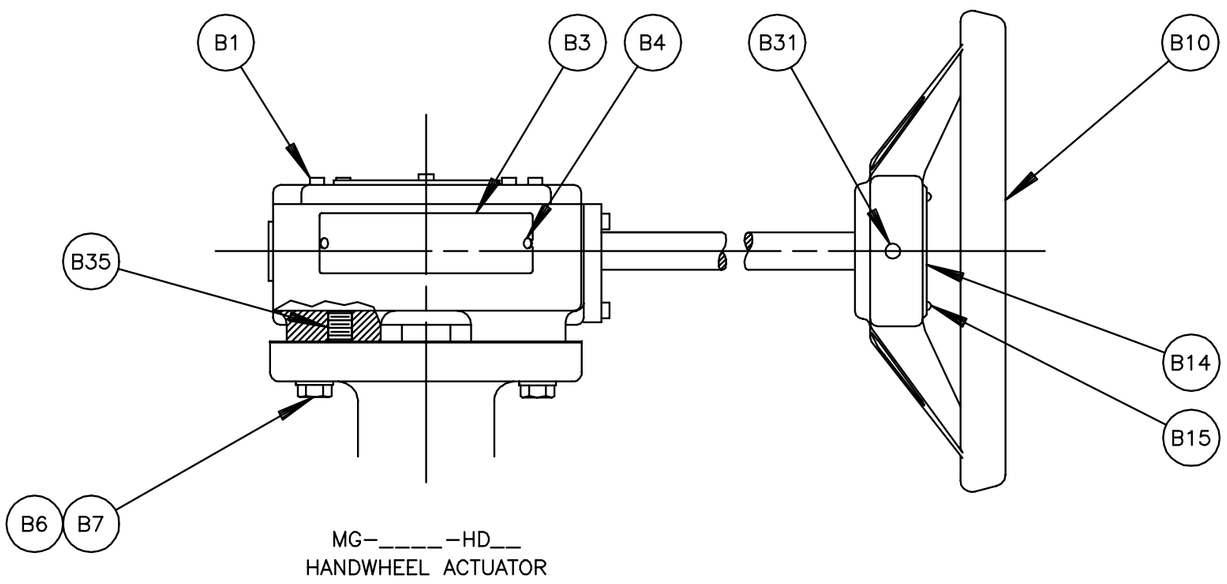
NO	PART NAME	QTY
B1	ACTUATOR	1
B2		
B3	DATA PLATE (SEE NOTE 3)	1
B4	DRIVE SCREW (SEE NOTE 3)	2
B5		
B6	SCREW	4
B7	LOCKWASHER	4
B8		
B9		
B10	HANDWHEEL	1
B11		
B12		
B13		
B14	OPEN TAG (24", 30" & 36" HANDWHEEL)	1
B15	DRIVE SCREW (24", 30" & 36" HANDWHEEL)	2
B16	CHAIN GUIDE	1
B17		
B18	SET SCREW	1
B19	CHAINWHEEL	1
B20		
B21	CHAIN	–
B22	CLOSING LINK	1
B23	SHAFT EXTENSION (CHAINWHEEL ONLY)	1
B24	PIN (CHAINWHEEL ONLY)	1
B25	BEARING	1
B26	WASHER	2
B27	RETAINING RING	1
B28	GASKET (CHAINWHEEL ONLY)	1
B29	SUPPORT	1
B30	BEARING	1
B31	PIN	1
B32		
B33		
B34		
B35	SET SCREW (WHEN REQUIRED)	4

NOTE:

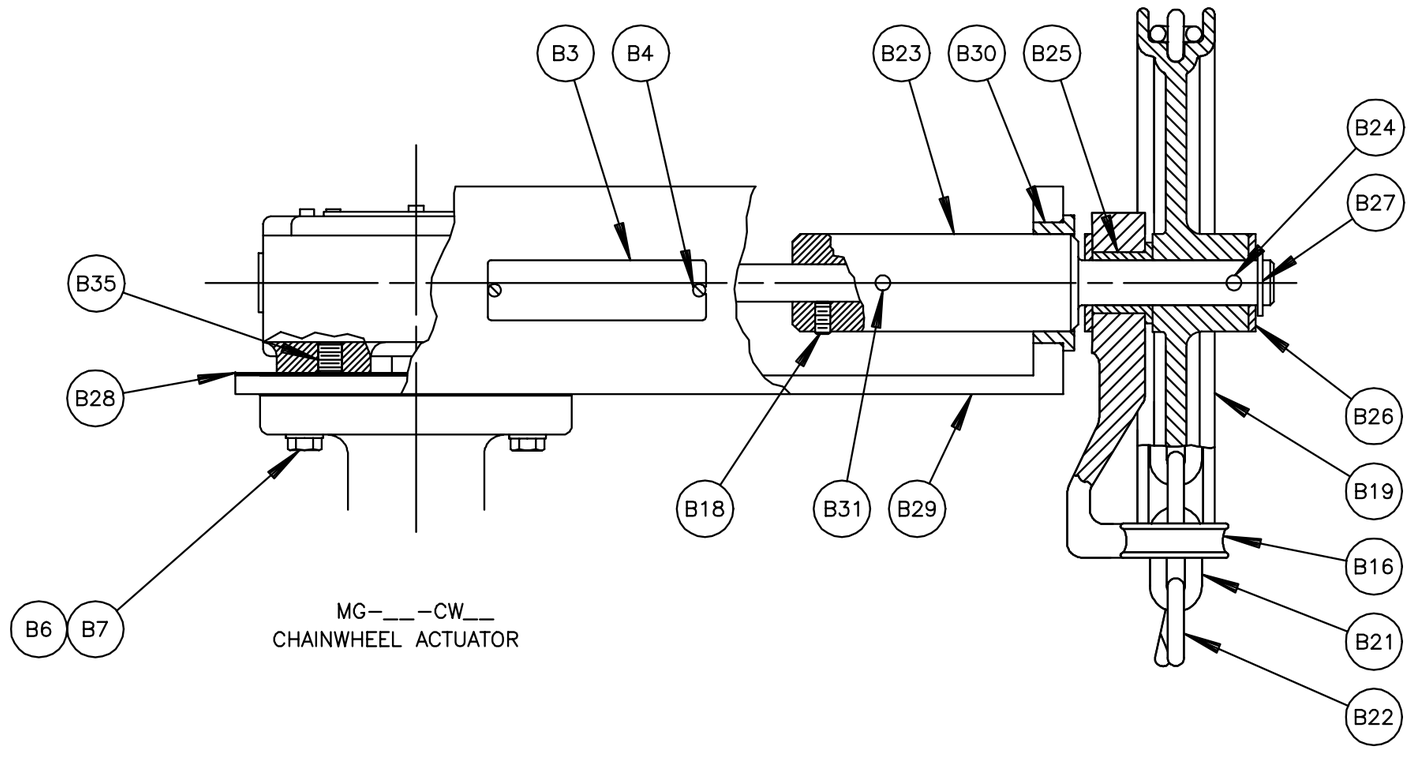
1. WHEN ORDERING PARTS, INCLUDE VALVE SIZE AND PART NUMBER FROM DATA PLATE. ALSO INCLUDE THIS DRAWING NUMBER WITH PART NAME, NUMBER AND QUANTITY.

2. RECOMMENDED SPARE PARTS ARE ITEMS B24, B25, B30 AND B31.

3. DATA PLATE WILL BE FASTENED DIRECTLY TO ACTUATOR WHEN HANDWHEEL IS ORDERED OR TO SUPPORT BRACKET WHEN CHAINWHEEL IS ORDERED.



MG–_____–HD__
HANDWHEEL ACTUATOR



MG–___–CW__
CHAINWHEEL ACTUATOR

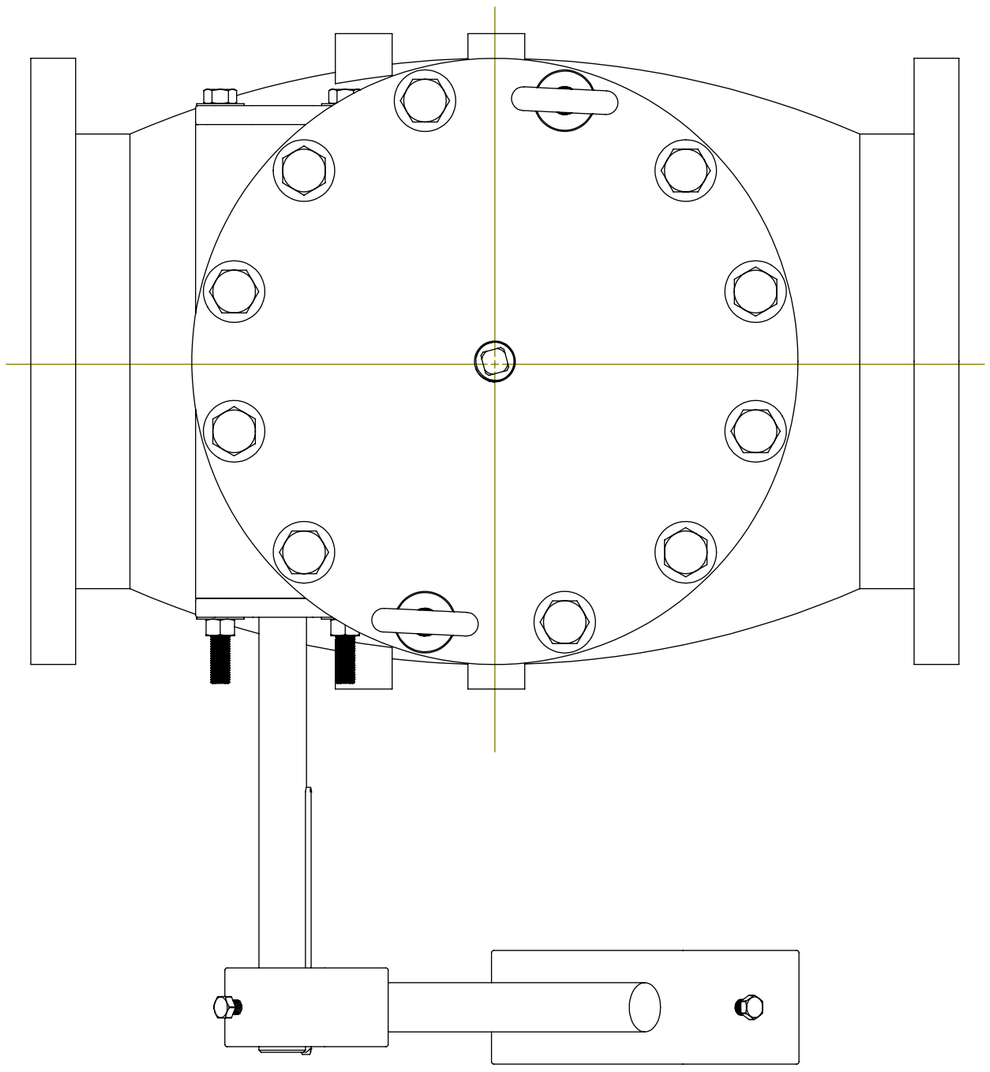
G	F	E	D	C	B	A 62369 10/08/12

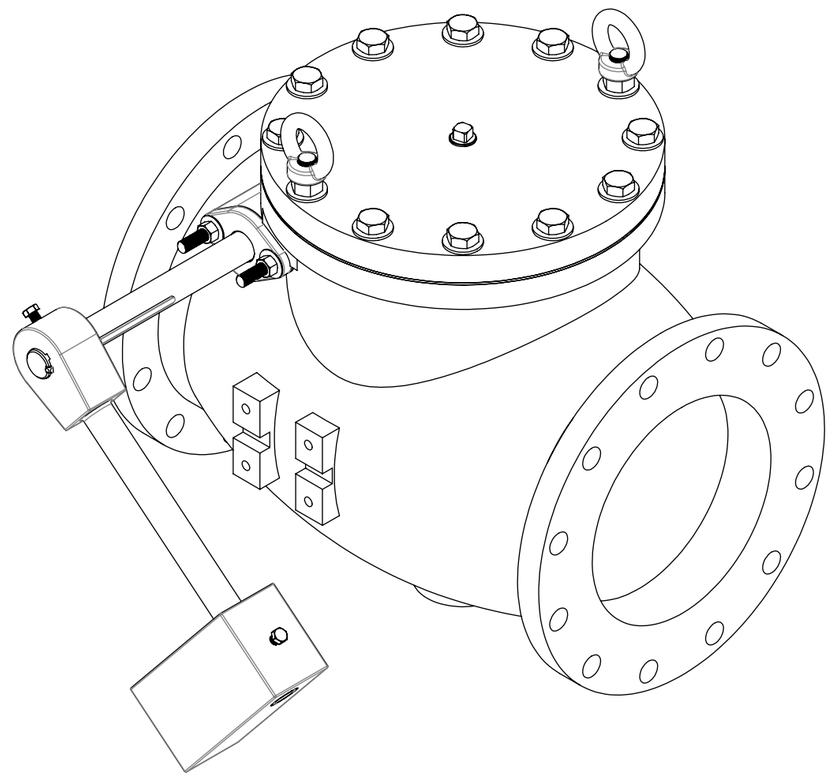
DeZURIK
Sartell, MN USA 56377
www.dezurik.com

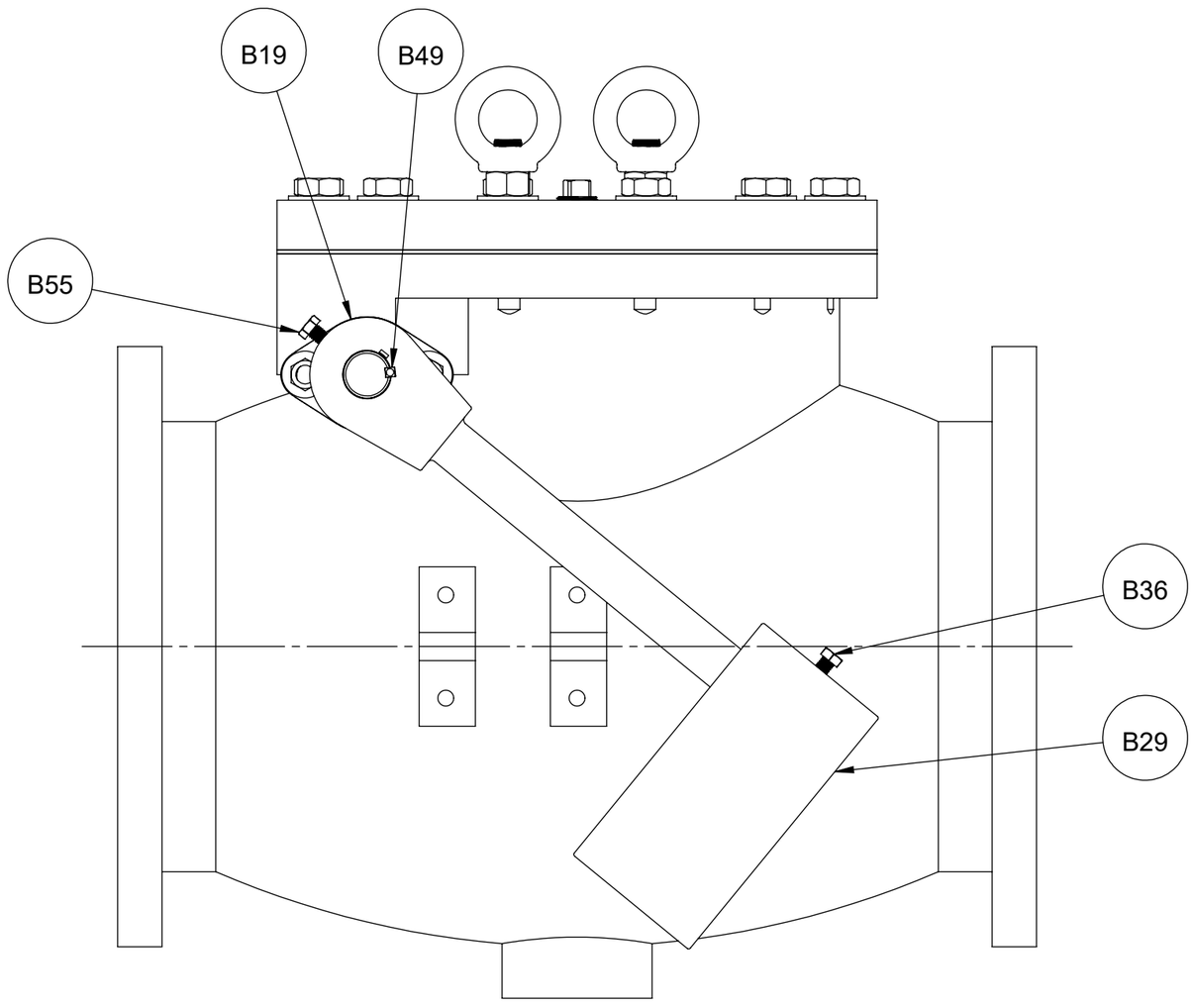
CHAINWHEEL AND HANDWHEEL OPERATOR
FOR USE WITH MG–_–CW_ AND MG–_–HD_ MANUAL ACTUATORS

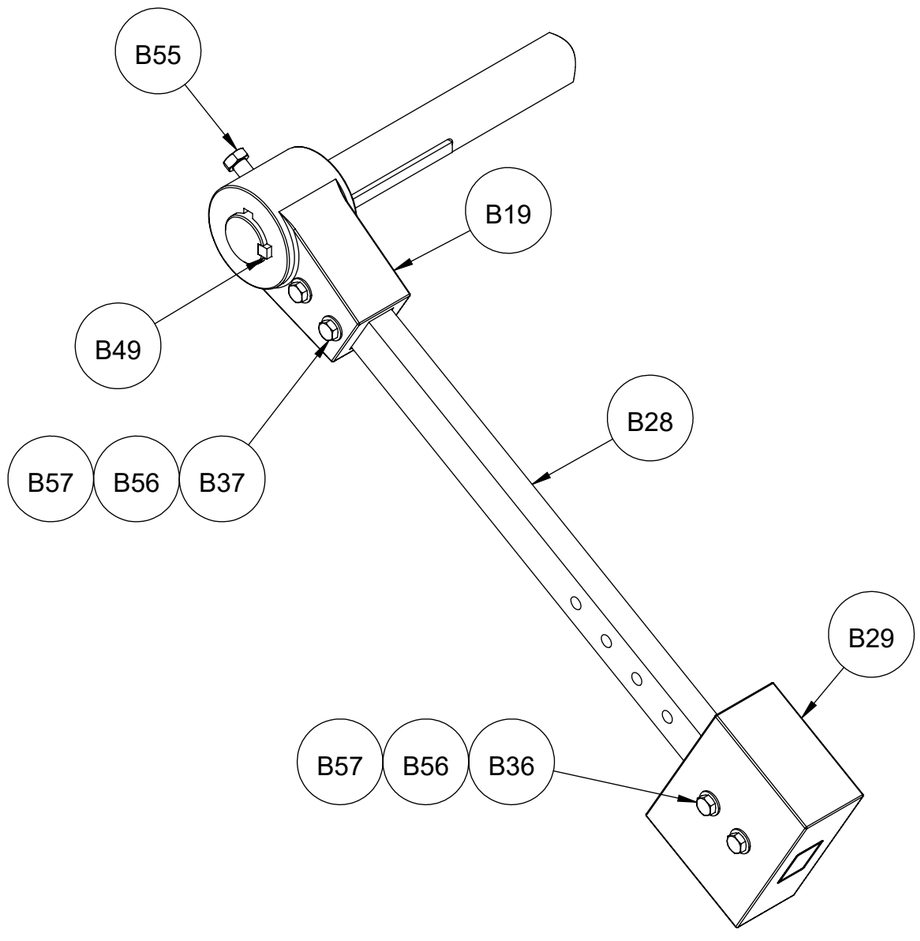
DOCT. CODE	DRAWN	APPROVED	A57199
C1	TC	CEG	
	CHECKED CEG	DATE 04/10/07	

ITEM NO.	DESCRIPTION	QTY
B19	COUNTERWEIGHT LEVER	1
B28	COUNTERWEIGHT ARM (16" & UP)	1
B29	COUNTERWEIGHT	1
B36	COUNTERWEIGHT ARM SET SCREW (2"-14")	1
	COUNTERWEIGHT ARM SCREW (16" & UP)	2
B37	LEVER ARM SCREW (16" & UP)	2
B49	LEVER ARM KEY	1
B55	LEVER ARM RETAINING SCREW	1
B56	LEVER ARM NUT (16" & UP)	4
B57	LEVER ARM WASHER (16" & UP)	8









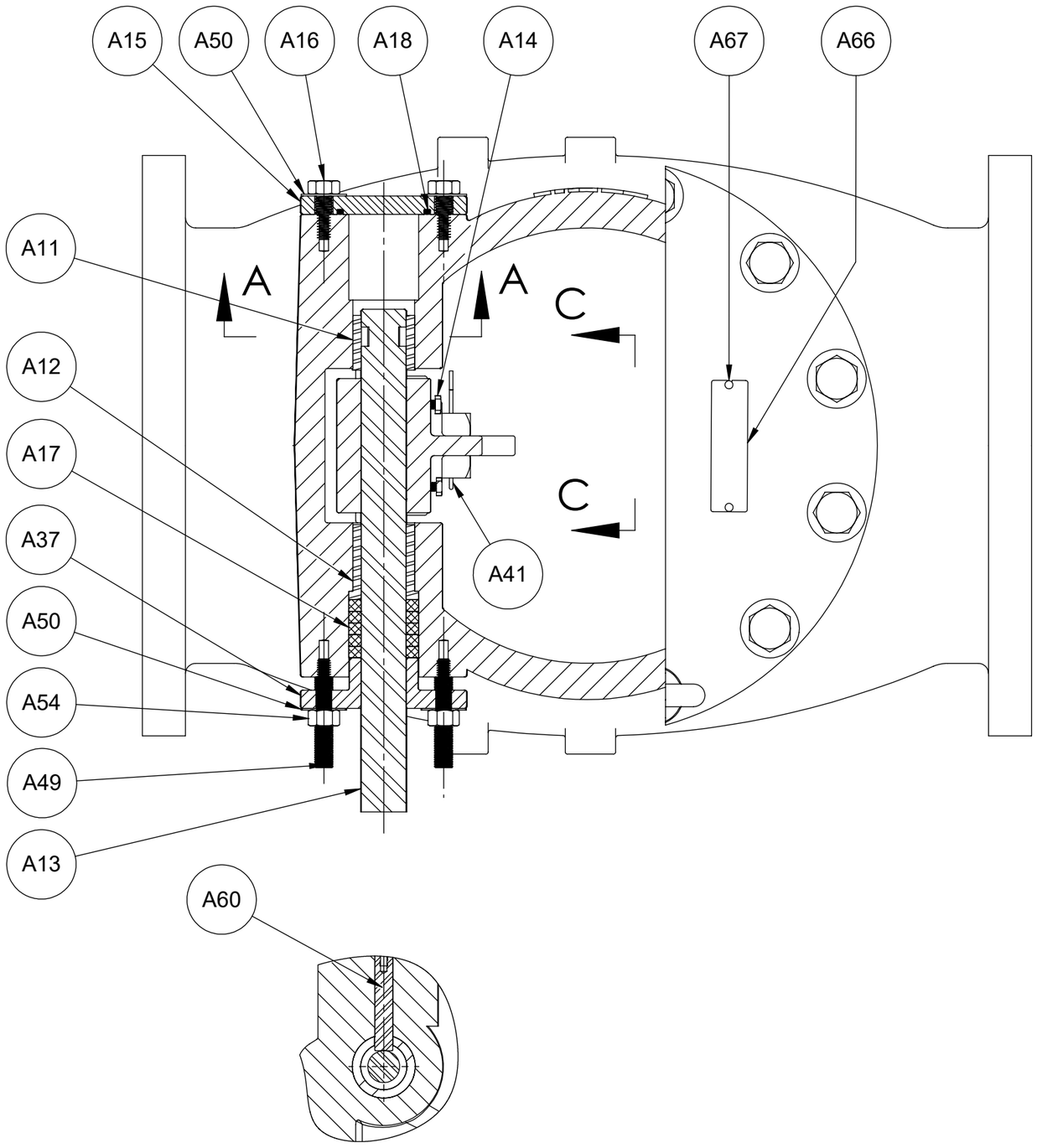
VALVE SIZES 16" & UP

G						
F						
E						
D						
C						
B	50312	7/1/21				
A	70283	8/21/19				

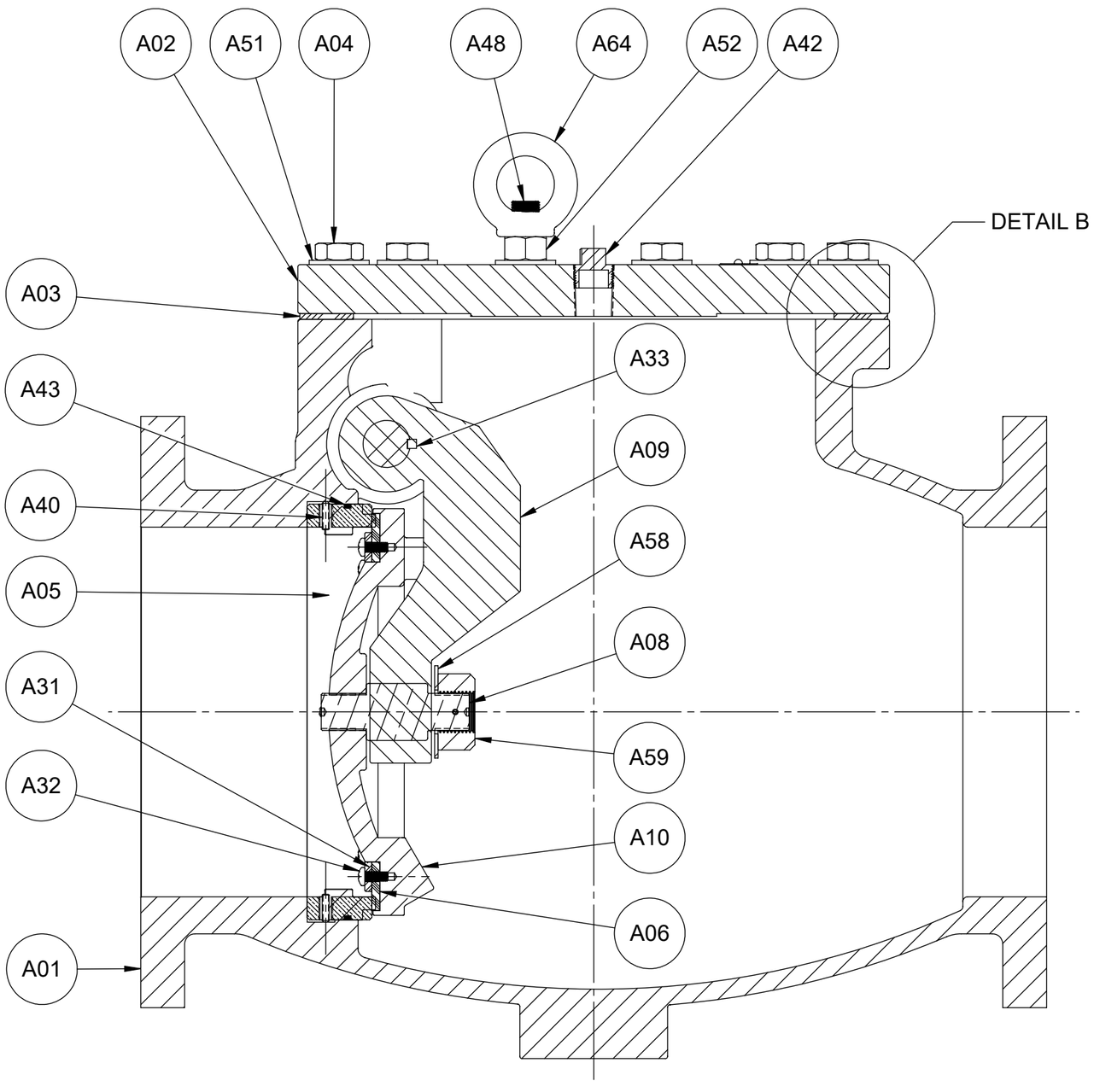
DeZURIK
APCO | HILTON

APCO CVS - SWING CHECK VALVE, 250 SERIES
LW - LEVER & WEIGHT CLOSURE CONTROL ASSEMBLY

DOCT. CODE	DRAWN	APPROVED	
C1	JPD	DWZ	A70064
	CHECKED DWZ	DATE 10/28/2013	



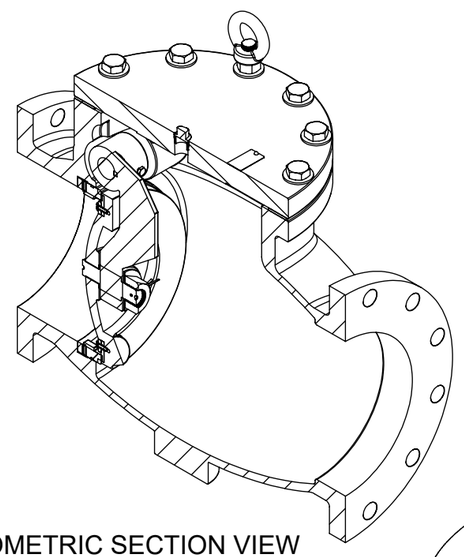
SECTION A-A



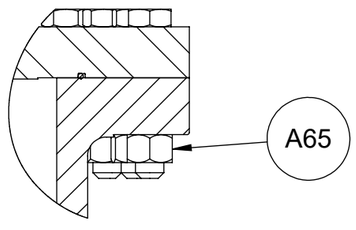
ITEM NO.	DESCRIPTION	QTY
A01	BODY	1
A02	COVER	1
A03	COVER SEAL[3]	1
A04	COVER BOLT	-
A05	BODY SEAT RING	1
A06	DISC SEAT[3]	1
A08	DISC STEM / PIN	1
A09	DISC ARM	1
A10	DISC	1
A11	PIVOT SHAFT STRAIGHT BUSHING[1]	1
A12	PIVOT SHAFT FLANGED BUSHING[1]	1
A13	PIVOT SHAFT	1
A14	DISC ARM RETAINING SCREW	-
A15	PIVOT SHAFT COVER	1
A16	PIVOT SHAFT COVER BOLT	-
A17	PACKING[4]	1
A18	PIVOT SHAFT COVER SEAL[3]	1
A31	SEAT RETAINING RING[3]	1
A32	SEAT RETAINING SCREW[3]	-
A33	DISC ARM KEY (4" & UP)	1
A37	PACKING GLAND	1
A40	BODY SEAT RETAINING SCREW	4
A41	DISC PIN RETAINER	1
A42	COVER PIPE PLUG	1
A43	BODY SEAT SEAL	1
A48	COVER STUD[2]	2
A49	PACKING GLAND STUD	2
A50	WASHER	4
A51	COVER BOLT WASHER	-
A52	COVER NUT	2
A54	PACKING GLAND NUT	-
A58	DISC ARM WASHER[2]	1
A59	DISC STEM NUT[2]	1
A60	SHAFT RETAINING PIN	1
A64	COVER EYE NUT[2]	2
A65	COVER NUT (30 & 36")	-
A66	DATA PLATE	1
A67	DRIVE SCREWS	2

NOTES:

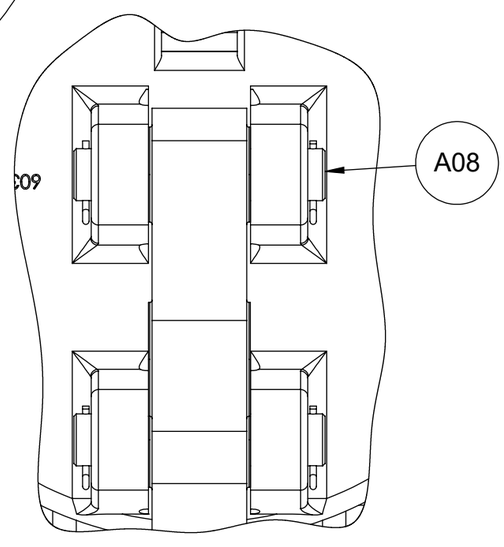
1. ITEMS A11 & A12 ARE NOT USED ON VALVE SIZES 2", 2.5", OR 3".
2. ITEMS A48, A58, A59, A64 ARE NOT INCLUDED ON VALVE SIZES 30" & 36".
3. REPLACEABLE WEAR PARTS: A03, A06, A17, A18, A31, A32.



ISOMETRIC SECTION VIEW



DETAIL B
30" & 36" COVER CONNECTION



VIEW C-C
30" & 36" DOUBLE CLEVIS CONNECTION

G	F	E	D	C	B	71280	09/27/22	
					A	50312	03/02/2020	

DeZURIK
APCO | HILTON

APCO CVS - SWING CHECK VALVE, 250 SERIES,
2" THRU 36" BASIC VALVE ASSEMBLY W/ SLIP IN SEAT

DOCT. CODE	DRAWN	APPROVED	
C1	DWZ	DWZ	A70161
	CHECKED MJS	DATE 12/18/15	

MATERIALS OF CONSTRUCTION

DRAWING(S): A70161

WORK ORDER: 156286 **PART NO:** 9688884

DESCRIPTION: CVS,6,250A,F1,DI,DI-S11-S2-NBR,AIS*LW

ITEM	MATERIAL
A01	DUCTILE IRON, ASTM A536, GRADE 65-45-12, USA FOUNDRY
A02	DUCTILE IRON, ASTM A536, GRADE 65-45-12, USA FOUNDRY
A03	GASKET MATERIAL, GARLOCK MULTI-SWELL STYLE 3760-U, NON-ASBESTOS
A04	STAINLESS STEEL, TYPE 316
A05	STAINLESS STEEL, TYPE CF-8M, ASTM A743, USA FOUNDRY
A06	ACRYLONITRILE-BUTADIENE (NBR), 60 DUROMETER
A08	STAINLESS STEEL, TYPE 303, ASTM A582, CONDITION A
A09	DUCTILE IRON, ASTM A536, GRADE 65-45-12, USA FOUNDRY
A10	DUCTILE IRON, ASTM A536, GRADE 65-45-12, USA FOUNDRY
A11	STAINLESS STEEL, TYPE 304
A12	STAINLESS STEEL, TYPE 304
A13	STAINLESS STEEL, WROUGHT, TYPE 303, ASTM 582, USA MILL
A14	STAINLESS STEEL, TYPE 304
A15	DUCTILE IRON, ASTM A536, GRADE 65-45-12
A16	STAINLESS STEEL, TYPE 304
A17	VIRGIN PTFE
A18	ACRYLONITRILE-BUTADIENE (NBR), 70 DUROMETER
A31	STAINLESS STEEL, TYPE 304, ASTM A276, CONDITION A
A32	STAINLESS STEEL, TYPE 316
A33	STAINLESS STEEL, TYPE 18-8
A37	DUCTILE IRON, ASTM A536, GRADE 65-45-12
A40	STAINLESS STEEL, TYPE 316
A41	STAINLESS STEEL
A42	STAINLESS STEEL, TYPE 304
A43	ACRYLONITRILE-BUTADIENE (NBR)
A48	STAINLESS STEEL, TYPE 316
A49	STAINLESS STEEL, TYPE 304
A50	STAINLESS STEEL, TYPE 18-8
A51	STAINLESS STEEL, TYPE 316
A52	STAINLESS STEEL, TYPE 316
A54	STAINLESS STEEL, TYPE 304
A58	STAINLESS STEEL, TYPE 18-8
A59	STAINLESS STEEL, TYPE 304
A60	STAINLESS STEEL, TYPE 304, ASTM A276, CONDITION A
A64	CARBON STEEL, ZINC PLATED
A66	STAINLESS STEEL, TYPE 316
A67	STAINLESS STEEL, TYPE 18-8

MATERIALS OF CONSTRUCTION

DRAWING(S): A70161

WORK ORDER: 156286 **PART NO:** 9689088

DESCRIPTION: CVS,12,250A,F1,DI,DI-S11-S2-NBR,AIS*LW

ITEM	MATERIAL
A01	DUCTILE IRON, ASTM A536, GRADE 65-45-12, USA FOUNDRY
A02	STEEL, WROUGHT, ASTM A36, AISI 1020, USA MILL
A03	ACRYLONITRILE-BUTADIENE (NBR), 70 DUROMETER
A04	STAINLESS STEEL, TYPE 316
A05	STAINLESS STEEL, TYPE CF-8M, ASTM A743, USA FOUNDRY
A06	ACRYLONITRILE-BUTADIENE (NBR), 70 DUROMETER
A08	STAINLESS STEEL, TYPE 303, ASTM A582, CONDITION A
A09	DUCTILE IRON, ASTM A536, GRADE 65-45-12, USA FOUNDRY
A10	DUCTILE IRON, ASTM A536, GRADE 65-45-12, USA FOUNDRY
A11	STAINLESS STEEL, TYPE 304
A12	STAINLESS STEEL, TYPE 304
A13	STAINLESS STEEL, WROUGHT, TYPE 303, ASTM 582, USA MILL
A14	STAINLESS STEEL, TYPE 316
A15	DUCTILE IRON, ASTM A536, GRADE 65-45-12
A16	STAINLESS STEEL, TYPE 316
A17	VIRGIN PTFE
A18	ACRYLONITRILE-BUTADIENE (NBR), 70 DUROMETER
A31	STAINLESS STEEL, TYPE 304, ASTM A276, CONDITION A
A32	STAINLESS STEEL, TYPE 304
A33	STAINLESS STEEL, TYPE 18-8
A37	DUCTILE IRON, ASTM A536, GRADE 65-45-12
A40	STAINLESS STEEL, TYPE 316
A41	STAINLESS STEEL
A42	STAINLESS STEEL, TYPE 304
A43	ACRYLONITRILE-BUTADIENE (NBR), 70 DUROMETER
A48	STAINLESS STEEL, TYPE 316
A49	STAINLESS STEEL, TYPE 304
A50	STAINLESS STEEL, TYPE 18-8
A51	STAINLESS STEEL, TYPE 316
A52	STAINLESS STEEL, TYPE 316
A54	STAINLESS STEEL, TYPE 304
A58	STAINLESS STEEL, TYPE 18-8
A59	STAINLESS STEEL, TYPE 316
A60	STAINLESS STEEL, TYPE 304, ASTM A276, CONDITION A
A64	CARBON STEEL, ZINC PLATED
A66	STAINLESS STEEL, TYPE 316
A67	STAINLESS STEEL, TYPE 18-8

MATERIALS OF CONSTRUCTION

DRAWING(S): A70161

WORK ORDER: 156286 **PART NO:** 9694096

DESCRIPTION: CVS,14,250A,F1,DI,DI-S11-S2-NBR,AIS*LW

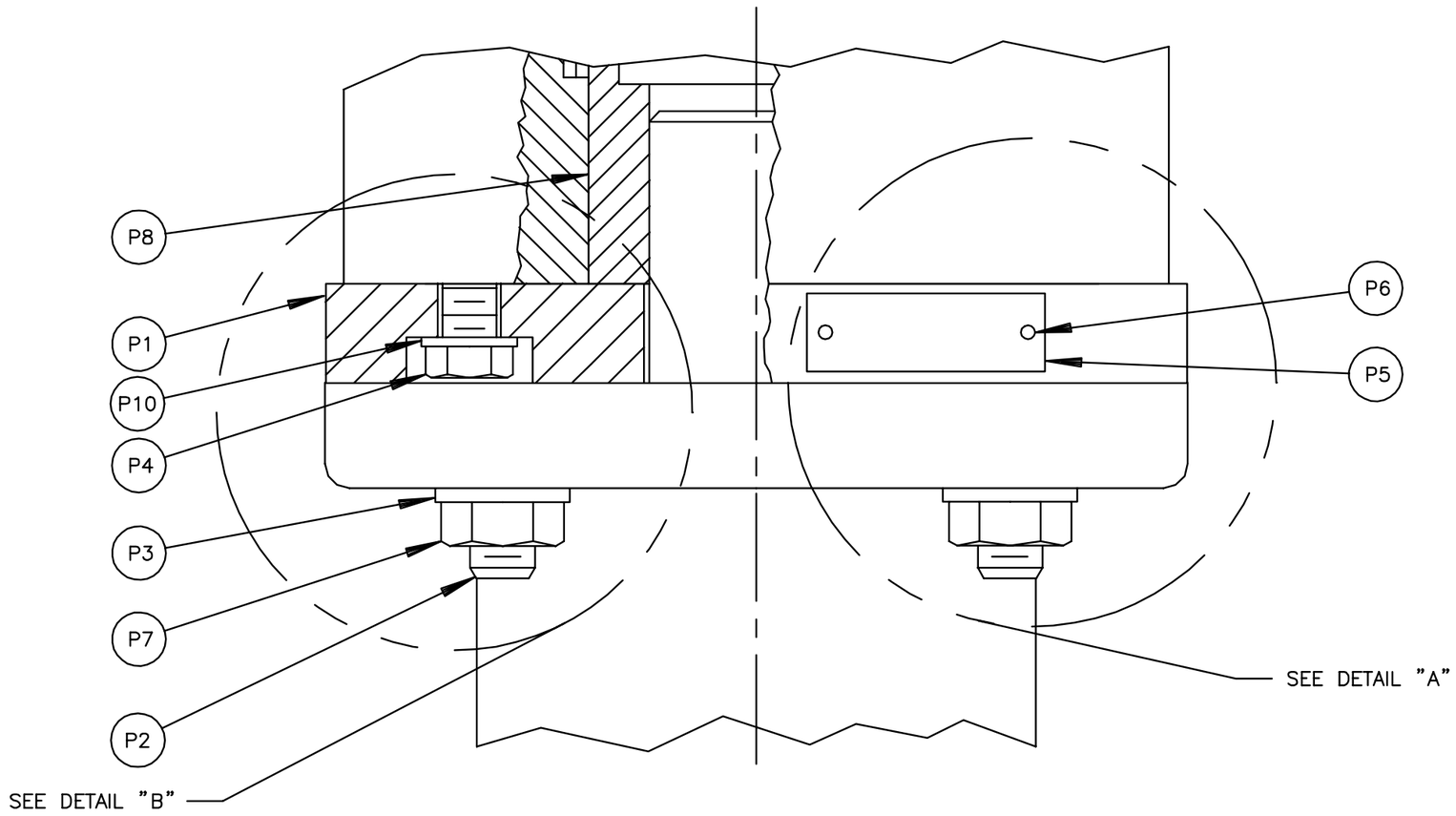
ITEM	MATERIAL
A01	DUCTILE IRON, ASTM A536, GRADE 65-45-12, USA FOUNDRY
A02	STEEL, WROUGHT, ASTM A36, AISI 1020, USA MILL
A03	ACRYLONITRILE-BUTADIENE (NBR), 70 DUROMETER
A04	STAINLESS STEEL, TYPE 316
A05	STAINLESS STEEL, TYPE CF-8M, ASTM A743, USA FOUNDRY
A06	ACRYLONITRILE-BUTADIENE (NBR), 70 DUROMETER
A08	STAINLESS STEEL, TYPE 303, ASTM A582, CONDITION A
A09	DUCTILE IRON, ASTM A536, GRADE 65-45-12, USA FOUNDRY
A10	DUCTILE IRON, ASTM A536, GRADE 65-45-12, USA FOUNDRY
A11	STAINLESS STEEL, TYPE 304
A12	STAINLESS STEEL, TYPE 304
A13	STAINLESS STEEL, WROUGHT, TYPE 303, ASTM 582, USA MILL
A14	STAINLESS STEEL, TYPE 304
A15	DUCTILE IRON, ASTM A536, GRADE 65-45-12
A16	STAINLESS STEEL, TYPE 304
A17	VIRGIN PTFE
A18	ACRYLONITRILE-BUTADIENE (NBR), 70 DUROMETER
A31	STAINLESS STEEL, TYPE 304, ASTM A276, CONDITION A
A32	STAINLESS STEEL, TYPE 18-8
A33	STAINLESS STEEL, TYPE 18-8
A37	DUCTILE IRON, ASTM A536, GRADE 65-45-12
A40	STAINLESS STEEL, TYPE 316
A41	STAINLESS STEEL
A42	STAINLESS STEEL, TYPE 304
A43	ACRYLONITRILE-BUTADIENE (NBR)
A48	STAINLESS STEEL, TYPE 316
A49	STAINLESS STEEL, TYPE 304
A50	STAINLESS STEEL, TYPE 18-8
A51	STAINLESS STEEL, TYPE 316
A52	STAINLESS STEEL, TYPE 316
A54	STAINLESS STEEL, TYPE 304
A58	STAINLESS STEEL, TYPE 18-8
A59	STAINLESS STEEL, TYPE 304
A60	STAINLESS STEEL, TYPE 304, ASTM A276, CONDITION A
A64	CARBON STEEL, ZINC PLATED
A66	STAINLESS STEEL, TYPE 316
A67	STAINLESS STEEL, TYPE 18-8

NO	PART NAME	QTY
P1	ADAPTOR PLATE (IF REQUIRED)	1
P2	STUD OR SCREW (W/ADAPTOR PLATE)	4
P3	LOCK WASHER	4
P4	SCREW (W/ADAPTOR PLATE)	4
P5	DATA PLATE	1
P6	DRIVE SCREW	2
P7	NUT (W/ADAPTOR PLATE)	4
P8	SLEEVE (IF REQUIRED)	1
P9	SCREW (W/O ADAPTOR PLATE)	4
P10	LOCKWASHER (IF REQUIRED)	4

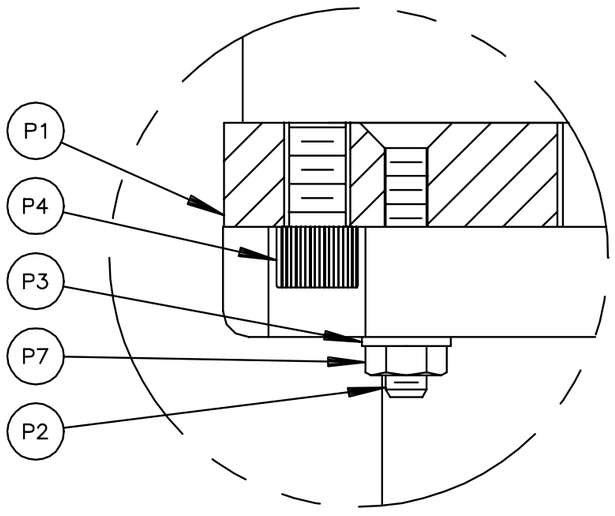
NOTE:

1. WHEN ORDERING PARTS, SPECIFY VALVE SIZE AND MODEL NUMBER FROM DATA PLATE, ALSO GIVE DRAWING NUMBER WITH PART NAME, ITEM NUMBER AND QUANTITY.

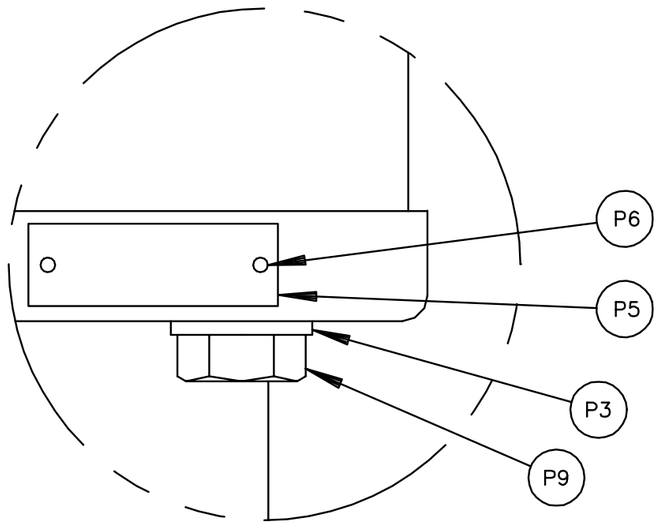
MOTOR



VALVE



DETAIL "B"
ALTERNATE VIEW
SHOWING VALVE
WITH ADAPTOR PLATE



DETAIL "A"
VALVE WITHOUT
ADAPTOR PLATE

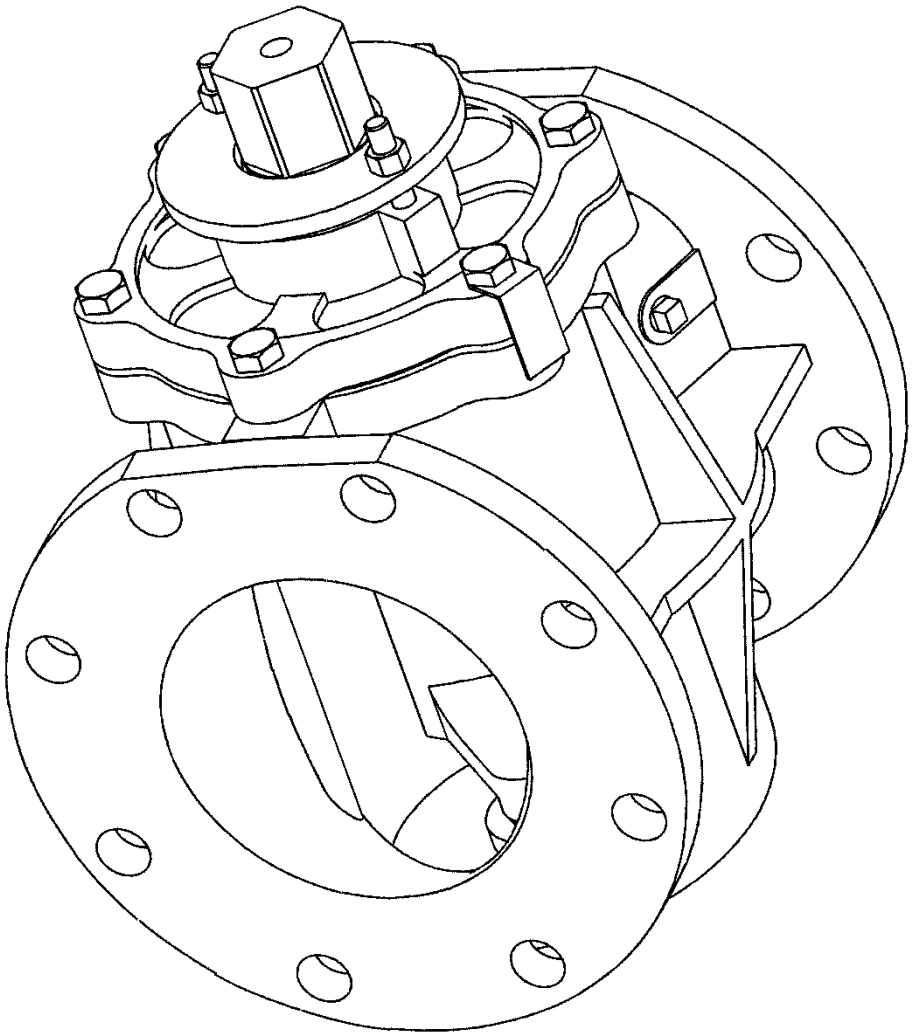
G	F	E	D	C 50312 11/12/07	B 50312 08/01/07	A 50312 07/17/07	

DeZURIK
Sartell, MN USA 56377
www.dezurik.com

CONNECTING PARTS
FOR USE WITH MOTOR ACTUATOR ON BOS VALVES

DOCT. CODE	DRAWN	APPROVED	
C1	BMP	BV	J44001
	CHECKED BV	DATE 04/13/07	

DeZURIK 4-20” PEC ECCENTRIC VALVES



Instruction **D10021**
June 2021

DeZURIK, Inc. Sartell, Minnesota USA | Phone: 320-259-2000 | www.dezurik.com | info@dezurik.com

Instructions

These instructions are for use by personnel who are responsible for the installation, operation and maintenance of DeZURIK valves, actuators or accessories.

Safety Messages

All safety messages in the instructions are identified by a general warning sign and the signal word CAUTION, WARNING or DANGER. These messages indicate procedures to avoid injury or death.

Safety label(s) on the product indicate hazards that can cause injury or death. If a safety label becomes difficult to see or read, or if a label has been removed, please contact DeZURIK for replacement label(s).

⚠WARNING

Personnel involved in the installation or maintenance of valves should be constantly alert to potential emission of pipeline material and take appropriate safety precautions. Always wear suitable protection when dealing with hazardous pipeline materials. Handle valves which have been removed from service with suitable protection for any potential pipeline material in the valve.

Inspection

Your DeZURIK product has been packaged to provide protection during shipment; however, items can be damaged in transport. Carefully inspect the unit for damage upon arrival and file a claim with the carrier if damage is apparent.

Parts

Replaceable wear parts are listed on the assembly drawing. These parts can be stocked to minimize downtime. Order parts from your local DeZURIK sales representative or directly from DeZURIK. When ordering parts please provide the following information:

If the valve has a data plate: please include the 7-digit part number with either 4-digit revision number (example: 9999999R000) or 8-digit serial number (example: S1900001) whichever is applicable. The data plate will be attached to the valve assembly. Also, include the part name, the assembly drawing number, the balloon number and the quantity stated on the assembly drawing.

If there isn't any data plate visible on the valve: please include valve model number, part name, and item number from the assembly drawing. You may contact your local DeZURIK Representative to help you identify your valve.

DeZURIK Service

DeZURIK service personnel are available to maintain and repair all DeZURIK products. DeZURIK also offers customized training programs and consultation services. For more information, contact your local DeZURIK sales representative or visit our website at DeZURIK.com.

Table of Contents

Description

The 4 – 20” PEC Eccentric Valves have welded nickel seats that provide excellent resistance to corrosion and damage, and prolong the life of the resilient plug facing. The valve rotates 90 degrees from full open to full closed. Clockwise rotation of the valve stem closes the valve. If an actuator other than a DeZURIK is to be mounted, the actuator must be capable of maintaining the valve plug position with flow in the pipeline.

WARNING!

Personnel involved in the installation or maintenance of valves should be constantly alert to potential emission of pipeline material and take appropriate safety precautions. Always wear suitable protection when dealing with hazardous pipeline materials. Handle valves, which have been removed from service with suitable protection for any potential pipeline material in the valve.

Handling

Lifting the valve improperly may damage it. Do not fasten lifting devices to the actuator, plug or through the seat opening in the body. Lift the valve with slings, chains or cables fastened around the valve body, or fastened to bolts or rods through bolt holes in the flanges.

Required Tools

This valve is assembled using only SAE fasteners. To service this valve, you should have a full set of combination wrenches, Allen wrenches, a large flat tipped screwdriver, a flat pry bar, a pin punch and a dead blow hammer.

Note: You may want to machine a shaft to aid you in removing the lower bearing from the body. See *"Disassembly"* section.

Installation

The type of materials carried in the pipeline and the location of the valve determine the correct installation procedure. Proper installation of PEC Eccentric Valves with rubber lining and rubber faced flanges is without gaskets. The rubber facing on the valve flanges is an integral flange seal.

Rust Veto may be removed with the use of Houghton Kleensol #4 or petroleum solvent.

Liquids and Gases

1. Before installation, remove foreign material such as weld spatter, oil, grease, and dirt from the valve and pipeline.

Install the valve as shown in Figure

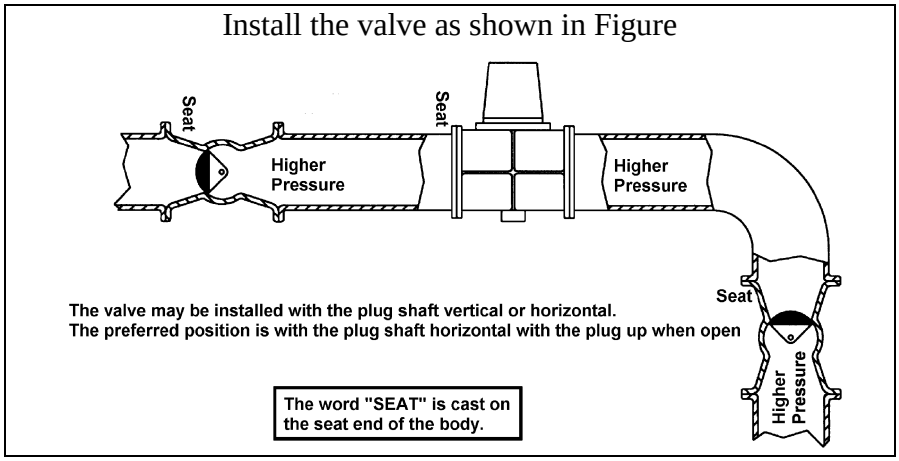


Figure 1—Liquids and Gases

Installation *(continued)*

2. Ensure the valve and flanges are concentric to ensure proper flange sealing.
3. Tighten the flange bolts or studs in a crisscross pattern.

Suspended Solids

If the pipeline carries suspended solids such as paper stock of 2 percent or higher consistency, mining slurry, or raw sewage:

1. Before installation, remove foreign material such as weld spatter, oil, grease, and dirt from the valve and pipeline.
2. Install the valve as shown in Figure 2.
    a. In HORIZONTAL pipelines, install the valve so that the plug is horizontal and rotates upward as the valve opens.
    b. For VERTICAL pipelines, install the valve with the end marked "SEAT" at top of valve.

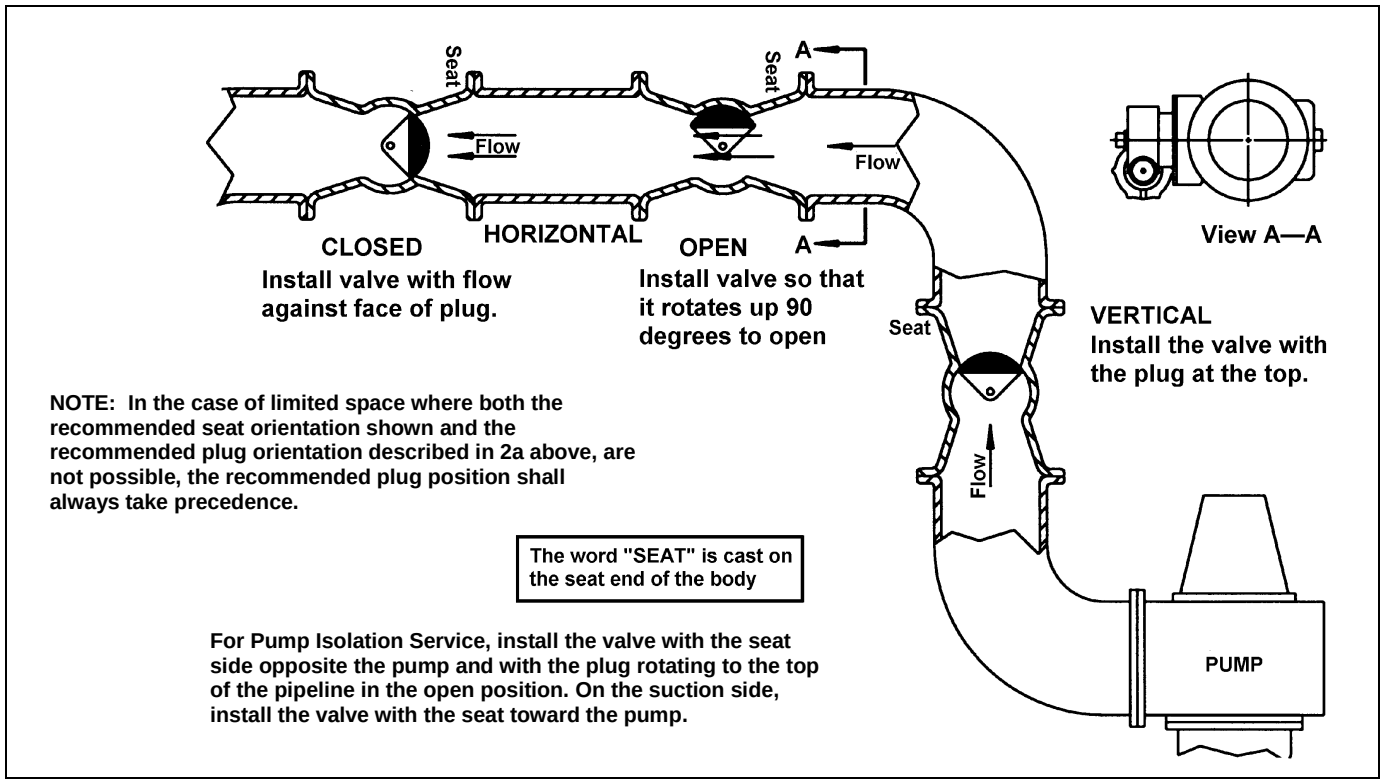


Figure 2 — Liquids with Suspended Solids

3. Tighten the flange bolts or studs in a crisscross pattern.
4. Ensure the valve and flanges are concentric to ensure proper flange sealing.

Fusion/Powder Coated Valves

CAUTION!

Valves with fusion/powder coated exterior paint require flat washers to be installed under the flange nuts when installing the valve to the pipeline flange to prevent the paint from cracking or chipping.

Closed Position

Because of the eccentric action of this valve, the closed position of the valve is dependent upon the pressure drop expected when the valve is closed.

To adjust the valve closed position, follow these steps:

WARNING!

This valve is a pressure vessel. The bonnet will blow off the actuator if the bonnet bolts are removed with pressure in the valve. Completely release pressure before disassembling the valve.

1. Relieve pipeline pressure.

WARNING!

Moving parts from accidental operation of power actuator can cause personal injury or equipment damage. Disconnect and lock out power to actuator before servicing.

2. If the actuator is powered, disconnect and lock out the pneumatic, hydraulic, or electrical power to prevent accidental operation of the actuator.
3. Back off the actuator closed position stop as described in the Actuator Instructions.
4. Close the valve with the torque specified in the Actuator Instructions.

   Note: This torque is the amount required to seat the plug for a given pressure drop across the valve. To avoid excessive plug and seat wear caused by over torquing, use the actual pressure drop across the valve when determining correct closing torque.
5. After the valve has been closed using the correct amount of torque, set the actuator closed position stop to limit actuator travel at this position.

Lubrication

This valve does not require routine maintenance lubrication. If the valve is disassembled, lubricate the packing and the plug journals as follows:

Lubrication *(continued)*

Packing

Packing lubrication requirements are dependent upon the packing material.

- **PTFE PACKING:**

  Requires no lubrication.

- **ALL PACKING OTHER THAN PTFE:**

  Apply a light coat to the inside and outside diameters of the packing rings using one of these lubricants.

  - Lubriplate Clearplex-2 (**recommended**)
  - Amoco FG (alternate)
  - Mobilgrease FM 101 (alternate)
  - Petro-Canada Purity FG 2 (alternate)
  - Phillips Philube PF (alternate)

  Note: Ensure lubricant is compatible with flow media.

Plug Journals and Lubrication

Plug journal lubrication is dependent upon the materials used in construction of the valve.

- CAST IRON, DUCTILE IRON, NI-RESIST, BRONZE AND ACID BRONZE VALVES: Lubricate the journals on the plug using one of these lubricants.
  - Lubriplate Clearplex-2 (**recommended**)
  - Amoco FG (alternate)
  - Mobilgrease FM 101 (alternate)
  - Petro-Canada Purity FG 2 (alternate)
  - Phillips Philube PF (alternate)
- ALL VALVES EXCEPT CAST IRON, DUCTILE IRON, NI-RESIST, BRONZE, & ACID BRONZE: Coat the journals on the plug with a light coat using one of these lubricants.
  - Molykote G Rapid paste (**recommended**)
  - Shell Retinax AM (alternate)
  - Shell Lithall MDS (alternate)

  Then lubricate with a mixture of powdered graphite and one of these lubricants.
  - Standard Oil #140 Gear Lube (**recommended**)
  - Mobil Mobilgear 634 (alternate)
  - Shell Omala 460 (alternate)
  - Texaco Meropa 460 (alternate)
  - Amoco MP (alternate)
- HARD RUBBER LINED VALVES: Lubricate the journals on the plug using one of these lubricants.
  - Molykote #44 (**recommended**)
  - Magnalube G (alternate)
  - Texaco Molytex E.P. Grade 2 (alternate)

Lubrication *(continued)*

Grit Excluders/ Thrust Washer

Apply a light coat to all surfaces of grit excluders and thrust washer using one of these lubricants.

- Lubriplate Clearplex-2 (**recommended**)
- Amoco FG (alternate)
- Mobilgrease FM 101 (alternate)
- Petro-Canada Purity FG 2 (alternate)
- Phillips Philube PF (alternate)

Note: **Ensure lubricant is compatible with flow media**

Packing Adjustment

The stem seal tightening procedure is dependent upon the type of actuator on the valve. If a packing leak should occur, tighten the packing as follows:

4 – 8" Lever and Nut Operated Valves

1. Loosen the nuts under the packing gland
2. While actuating the valve with a torque wrench, tighten the nuts on top of the packing gland until the torque required to actuate the valve matches the torque shown in Table A.

Table A: Actuating Torque

Valve Size		Actuating Torque			
		Standard Packing		Low Friction Packing	
in	mm	ft lbs	Nm	ft lbs	Nm
4	100	28	37	14	18
5-6	125-150	60	81	30	40
8	200	104	141	52	70

3. Once the torque is matched, tighten the nuts under the packing gland.

Note: If the packing leaks following this adjustment, replace the packing.

All Other Actuators

Tighten the gland nuts evenly only until the leak stops.

Note: Do not continue tightening after leak stops. If packing leak cannot be stopped by tightening the gland nuts, the packing must be replaced.

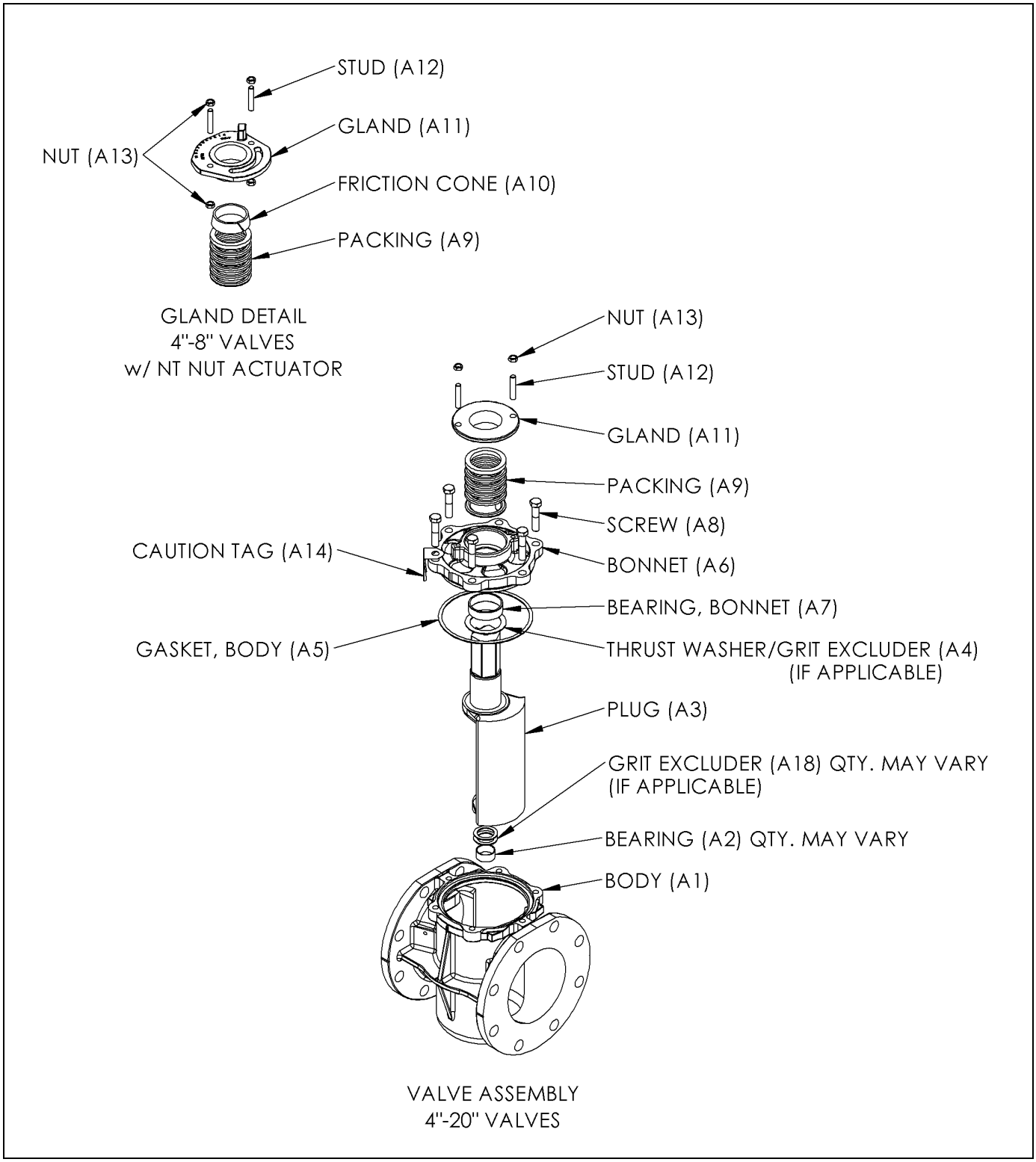


Figure 3 – Parts Identification

Packing Replacement

Replacing Packing with Actuator Removed

To replace the packing without removing actuator, see *"Replacing Packing Without Removing Actuator"* section.

1. Discontinue pipeline flow and relieve pipeline pressure.
2. Scribe the actuator and valve bonnet for alignment when reassembling.

WARNING!

Moving parts from accidental operation of power actuator can cause personal injury or equipment damage. Disconnect and lock out power to actuator before servicing.

3. If the actuator is powered, disconnect and lock out the pneumatic, hydraulic, or electrical power to prevent accidental operation of the actuator.

WARNING!

When an eccentric valve is mounted in a vertical pipeline— or mounted in a horizontal pipeline with the plug stem horizontal—gravity can cause the plug to swing to a lower position in the valve body when the actuator is removed. Place the plug in the lowest position before removing the actuator.

4. Remove the actuator from the valve. See Actuator Instructions.
5. Remove the actuator adaptor (when used) from the valve.
6. Remove the packing gland nuts (A13), then slide the packing gland (A11) off the plug shaft (A3).
7. Pull the packing (A9) out of the bonnet (A6).
8. For valves with low friction packing, lubricate the new packing (A9), then install it one ring at a time in the sequence shown in Figure 4.

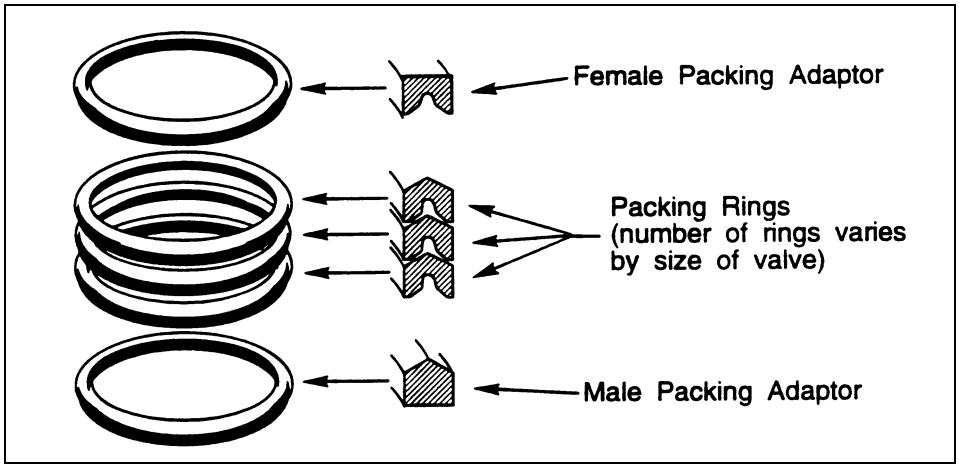


Figure 4 — Correct Packing Installation Sequence

Packing Replacement *(continued)*

Note: 4 - 8" lever and nut operated valves without low-friction packing have a friction cone (A10) and standard packing (A9). Before installing the gland (A11), set the cone on top of the packing. Do not lubricate the outside of the cone or the inside of the gland. See Figure 5.

9. Slide the packing gland (A11) down the plug shaft (A3) and over the studs (A12). If the valve has a friction cone (A10), bring the gland nuts (A13) under the gland (A11) up finger tight.

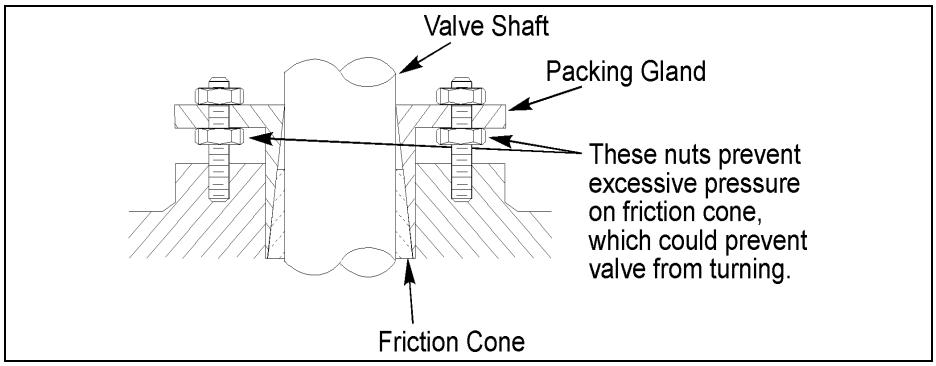


Figure 5 — Friction Cone Adjustment

10. Adjust gland nuts (A13).
    a. 4 - 8" LEVER AND NUT OPERATED VALVES ONLY:
    Turn packing gland nuts (A13) onto the studs (A12) until they touch the gland (A11).
    b. ALL REMAINING VALVES EXCEPT 10" AND 12" LEVER OPERATED:
    Turn the packing gland nuts (A13) onto the studs until they touch the packing gland (A11), then one more turn.

    Note: This is a preliminary adjustment, it will be necessary to adjust the packing gland nuts (A13) after the valve is pressurized. See "Packing Adjustment" section.
11. Fasten the adaptor (when used) to the valve, lining up the scribe marks made during disassembly.
12. Install the actuator as described in the Actuator Instructions.
13. If the actuator is a powered actuator, reconnect power to the actuator.

Packing Replacement *(continued)*

Replacing Packing Without Removing Actuator

Note: Lever and nut operated valves require that the actuator be removed before packing can be replaced. See *"Replacing Packing with Actuator Removed"* section to replace the packing in these valves.

1. This process can be done with or without pressure in the pipeline.

WARNING!

Caustic, toxic, or hot material in the pipeline can cause personal injury or death if leakage occurs. Confirm that the material is not harmful.

2. Ensure that the material in the pipeline will not cause injury if leakage occurs.
3. Remove the packing gland nuts (A13) from the studs (A12), and slide the packing gland (A11) up the stem of the plug (A3).
4. Remove the studs (A12) from the bonnet (A6).
5. Cut and completely remove all of the old packing (A9) from the packing chamber in the bonnet (A6).
6. Cut each new packing ring (A9) radially in one place with a razor-sharp knife.
7. Place each new packing ring (A9)—one at a time with the joints staggered—around the plug stem (A3) and into position in the packing chamber.
8. Replace the studs (A12) in the bonnet (A6).
9. Push the packing rings (A9) down into position with the packing gland (A11), and replace the packing gland nuts (A13) on the studs (A12).
10. Turn the packing gland nuts (A13) onto the studs (A12) until they touch the packing gland (A11), then one more turn.
11. Restore the pipeline pressure if it was relieved, and check for packing leakage. If leakage occurs, tighten each packing nut just enough to stop the leakage. Excessive tightening will cause reduced packing life and higher valve operating torque.

Disassembly

WARNING!

This valve is a pressure vessel. The bonnet will blow off the actuator if the bonnet bolts are removed with pressure in the valve. Pressure must be completely released before disassembly.

Follow these steps to disassemble valve:

1. Relieve pipeline pressure and close the valve.

   WARNING!

   Moving parts from accidental operation of power actuator can cause personal injury or equipment damage. Disconnect and lock out power to actuator before servicing.

2. If the actuator is powered, disconnect and lock out the pneumatic, hydraulic, or electrical power to prevent accidental operation of the actuator.
3. Close the valve.
4. Remove the valve from the pipeline (if desired).

   Note: The valve can be disassembled while still in the pipeline.

   WARNING!

   When an eccentric valve is mounted in a vertical pipeline—or mounted in a horizontal pipeline with the plug stem horizontal—gravity can cause the plug to swing to a lower position in the valve body when the actuator is removed. Place the plug in the lowest position before removing the actuator.

5. Remove actuator from valve—see Actuator Instructions.
6. Scribe a line on the body (A1), bonnet (A6) and plug stem (A3) to help align these parts during re-assembly.
7. Remove the screws (A8) that hold the bonnet (A6) in place, then pry the bonnet loose from the valve body (A1).

   Note: Note the location of the **WARNING TAG** (A14) on bonnet (A6) and do not misplace tag. This tag must be attached to the valve at reassembly.

8. Remove the plug (A3) from the valve body (A1). Remove the grit excluder (A18) (If applicable).
9. Remove the gland nuts (A13) and gland (A11) from the bonnet (A6).
10. Remove the packing (A9) from the bonnet (A6).
11. Reaching through the packing chamber in the bonnet (A6), drive the upper bearing (A7) out of the bonnet using a hammer and pin punch.
12. Remove the lower bearing (A2) from the valve body (A1).

    Note: The bearing can be chiseled out; or, it can be hydraulically forced out. See Figure 6.

Disassembly *(continued)*

To hydraulically force the bearing (A2) out:

1. Fill the interior diameter of the bearing (A2) with water.
2. Pound a shaft with the same outside diameter as the lower journal of the valve plug into the bearing (A2).

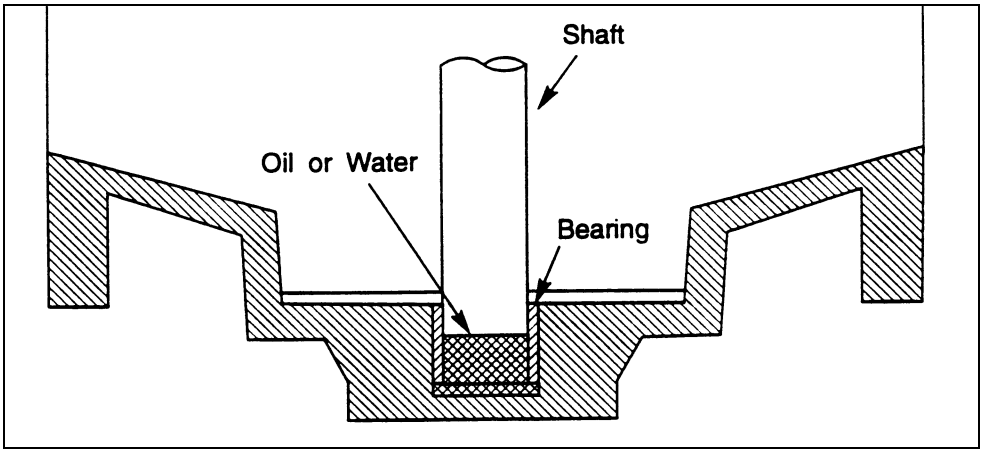


Figure 6 — Hydraulically Removing the Lower Bearing

Reassembly

1. Push a new lower bearing (A2) into the valve body (A1), then lubricate the bearing as described in the *"Lubrication"* section.
2. Place the grit excluder (A18) (If applicable) on the bottom shoulder of the plug shaft (A3) and place the thrust washer (A4) on the top shoulder of the plug shaft (A3). Lubricate grit excluder and thrust washer as described in the "*Lubrication"* section.
3. Place the plug (A3) into the valve body (A1) so the lower journal slides into the bearing (A2). Turn the plug so it is almost closed.
4. Set a new gasket (A5) in the body (A1).
5. Push a new bearing (A7) into the bonnet (A6), then lubricate the bearing. See "Lubrication" section.
6. Place bonnet (A6) on body (A1), align scribe marks, then fasten bonnet in place with screws (A8).
7. Turn the plug (A3) to the closed position. See "Closed Position" section.
8. For valves with low friction packing, lubricate the new packing (A9), then install it one ring at a time. See Figure 4.

   Note: 4 - 8" valves use a friction cone (A10) with a wrenching nut or hand lever actuator, and standard packing. Before installing the gland (A11), set the cone on top of the packing (A9). Do not lubricate the outside of the cone or the inside of the gland. (See Figure 5)
9. Slide the packing gland (A11) down the plug shaft (A3) and over the studs (A12). If the valve has a friction cone (A10), bring the gland nuts (A13) under the gland up finger tight.

Reassembly *(continued)*

10. Adjust gland nuts (A13).
    a. 4 – 8" LEVER AND NUT OPERATED VALVES ONLY: Turn packing gland nuts (A13) onto the studs (A12) until they contact the gland (A11). It will be necessary to adjust the packing gland nuts after the valve is pressurized; see the *"Packing Adjustment"* section.
    b. ALL VALVES EXCEPT 10" AND 12" LEVER OPERATED: Turn the packing gland nuts (A13) onto the studs (A12) until they contact the packing gland (A11), then one additional turn.

    Note: This is a preliminary adjustment, it will be necessary to adjust the packing gland nuts after the valve is pressurized. See *"Packing Adjustment"* section.
11. Install the actuator—see Actuator Instructions.
12. After pipeline flow is restored, check the packing for leakage.

    Note: If packing leaks, tighten the packing gland nuts (A13) only enough to stop the leak. Over tightening the packing will cause premature packing failure and higher valve operating torque.
13. If the actuator is a powered actuator, reconnect power to the actuator.

Removing Valve from Pipeline

To remove the entire valve assembly from the pipeline, follow these steps.

WARNING!

This valve is a pressure vessel. The bonnet will blow off the actuator if the bonnet bolts are removed with pressure in the valve. Pressure must be completely released before disassembly.

1. Relieve pipeline pressure and drain portion of system where valve is located.
2. Close the valve.

WARNING!

Moving parts from accidental operation of power actuator can cause personal injury or equipment damage. Disconnect and lock out power to actuator before servicing.

3. If the actuator is powered, disconnect and lock out the pneumatic, hydraulic, or electrical power to prevent accidental operation of the actuator.
4. Support the valve assembly, then remove the flange bolts.
5. Remove the valve from the pipeline.

Field Test

Stroke the valve between the fully open and fully closed positions to verify that the valve and actuator are functioning properly.

Emergency Operation

Operate the valve as under normal conditions, taking care to bring the plug to the position required by the particular emergency condition.

Predicted Wear of Parts

Length of service for parts subject to wear is dependent on service conditions.

Troubleshooting

Symptom	Possible Cause	Corrective Action
Packing Leaks.	Packing is loose.	Adjust Packing. (See *"Packing Adjustment"* section)
	Packing is worn.	Replace Packing. (See *"Packing Replacement"* section)
Valve does not close.	Object is wedged between plug and seat.	Open the valve completely to flush object. If this doesn't work, remove valve from the pipeline. (See *"Removing Valve from Pipeline"* section)
	Actuator closed position is out of adjustment.	Adjust the closed position stop as described in the Actuator instructions.
Valve leaks when closed.	Plug is worn or damaged.	Replace plug. (See *"Disassembly"* section)
	Rubber on plug is torn.	

Limited Warranty

DeZURIK, Inc. (“Seller”) manufactured products, auxiliaries and parts for a period of twenty-four (24) months from date of shipment from Seller’s factory, are warranted to the original purchaser only against defective workmanship and material, but only if properly stored, installed, operated, and serviced in accordance with Seller’s recommendations and instructions.

For items proven to be defective within the warranty period, your exclusive remedy under this limited warranty is repair or replacement of the defective item, at Seller’s option, FCA Incoterms 2020 Seller’s facility with removal, transportation, and installation at your cost.

Products or parts manufactured by others but furnished by Seller are not covered by this limited warranty. Seller will provide repair or replacement for other’s products or parts only to the extent provided in and honored by the original manufacturer’s warranty to Seller, in each case subject to the limitations contained in the original manufacturer’s warranty.

No claim for transportation, labor, or special or consequential damages or any other loss, cost or damage is being provided in this limited warranty. You shall be solely responsible for determining suitability for use and in no event shall Seller be liable in this respect.

This limited warranty does not warrant that any Seller product or part is resistant to corrosion, erosion, abrasion or other sources of failure, nor does Seller warrant a minimum length of service.

Your failure to give written notice to us of any alleged defect under this warranty within twenty (20) days of its discovery, or attempts by someone other than Seller or its authorized representatives to remedy the alleged defects therein, or failure to return product or parts for repair or replacement as herein provided, or failure to store, install, or operate said products and parts according to the recommendations and instructions furnished by Seller shall be a waiver by you of all rights under this limited warranty.

This limited warranty is voided by any misuse, modification, abuse or alteration of Seller’s product, accident, fire, flood or other Act of God, or your failure to pay entire contract price when due.
The foregoing limited warranty shall be null and void if, after shipment from our factory, the item is modified in any way or a component of another manufacturer, such as but not limited to, an actuator is attached to the item by anyone other than a Seller factory authorized service personnel.

All orders accepted shall be deemed accepted subject to this limited warranty, which shall be exclusive of any other or previous Warranty, and this shall be the only effective guarantee or warranty binding on Seller, despite anything to the contrary contained in the purchase order or represented by any agent or employee of Seller in writing or otherwise, notwithstanding, including but not limited to implied warranties.

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Sales and Service

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October 2021 Printed in U.S.A.

DEZURIK NT NUT AND LEVER ACTUATOR

USED ON 4” - 8” PEC & 3” - 8” PEF ECCENTRIC VALVES

Instruction D10061

June 2014

DeZURIK, Inc. Sartell, Minnesota USA | Phone: 320-259-2000 | www.dezurik.com | info@dezurik.com

Instructions

These instructions are for use by personnel who are responsible for the installation, operation and maintenance of DeZURIK valves, actuators or accessories.

Safety Messages

All safety messages in the instructions are identified by a general warning sign and the signal word CAUTION, WARNING or DANGER. These messages indicate procedures to avoid injury or death.

Safety label(s) on the product indicate hazards that can cause injury or death. If a safety label becomes difficult to see or read, or if a label has been removed, please contact DeZURIK for replacement label(s).

⚠WARNING

Personnel involved in the installation or maintenance of valves should be constantly alert to potential emission of pipeline material and take appropriate safety precautions. Always wear suitable protection when dealing with hazardous pipeline materials. Handle valves which have been removed from service with suitable protection for any potential pipeline material in the valve.

Inspection

Your DeZURIK product has been packaged to provide protection during shipment; however, items can be damaged in transport. Carefully inspect the unit for damage upon arrival and file a claim with the carrier if damage is apparent.

Parts

Replaceable wear parts are listed on the assembly drawing. These parts can be stocked to minimize downtime. Order parts from your local DeZURIK sales representative or directly from DeZURIK. When ordering parts please provide the following information:

If the valve has a data plate: please include the 7-digit part number with either 4-digit revision number (example: 9999999R000) or 8-digit serial number (example: S1900001) whichever is applicable. The data plate will be attached to the valve assembly. Also, include the part name, the assembly drawing number, the balloon number and the quantity stated on the assembly drawing.

If there isn't any data plate visible on the valve: please include valve model number, part name, and item number from the assembly drawing. You may contact your local DeZURIK Representative to help you identify your valve.

DeZURIK Service

DeZURIK service personnel are available to maintain and repair all DeZURIK products. DeZURIK also offers customized training programs and consultation services. For more information, contact your local DeZURIK sales representative or visit our website at DeZURIK.com.

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Description

The 4" - 6" PEC & 3” - 6” PEF Eccentric valves can be actuated with the LV or LVF lever operators or with other levers that fit the 2" NT wrenching nut. Recommended lengths for levers are dependent upon valve size and maximum pressure drop expected across the valve as shown in Table A.

Table A: *Lever Length*

Valve Size	Lever Length			
	Pressure Drop			
	25 psi 170 kPa	**50 & 75 psi 345 & 515 kPa**	**100 psi 690 kPa**	**125 psi 860 kPa**
3 & 4 in 80 & 100 mm	15 in 381mm	15 in 381mm	15 in 381mm	15 in 381mm
5 & 6 in 125 & 150 mm	23 in 584 mm	30 in 762 mm	-	-
8 in 200 mm	30 in 762 mm	33 in 838 mm	43 in 1092 mm	-

Pressure Ratings

Direct shutoff pressure differentials for nut or lever actuated valves must not exceed the limits shown in Table B.

Note: Reverse shutoff differentials must not exceed 25 psi (170 kPa).

If valves must seal higher pressures, use handwheel actuators.

Table B: *Maximum Shutoff Pressure Differentials*

Valve Size	Nitrile-Butadiene (Buna V) NBR Packing (with Friction Cone)	Low Friction Nitrile-Butadiene (Buna V) NBRL Packing (without Friction Cone)
3 & 4 in 80 & 100 mm	125 psi 860 kPa	40 psi 275 kPa
5 - 8 in 125 - 200 mm	100 psi 690 kPa	25 psi 170 kPa

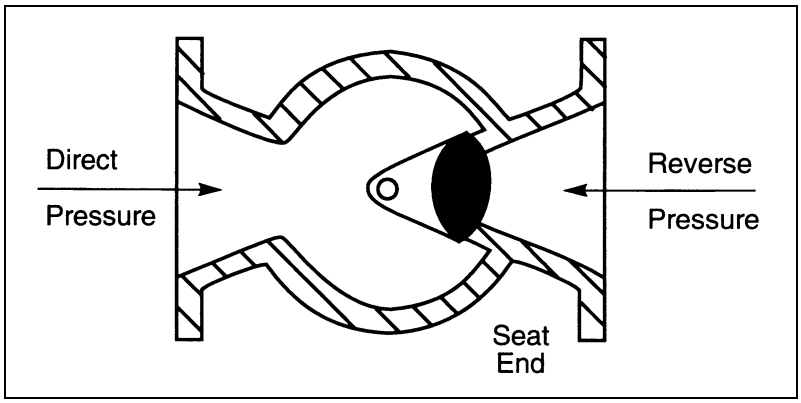

Figure 1 - Direct and Reverse Pressure Detail

Operation

Slowly rotate the lever clockwise around the valve stem to close the valve.

CAUTION!

Close the valve slowly. Rapid closure of the valve can cause pipeline pressure surges that will damage pipeline equipment.

Stop Adjustments

This actuator features open and closed position stops. These stops can be adjusted to stop valve stroke at the fully open and fully closed valve positions, or at any other valve position as desired to allow full control of your flow system.

Open Position Stop

The open position stop is a socket head cap screw and nut located in the slot in the gland. To change the stop setting, loosen the nut, slide the screw to the desired stop location, then tighten the nut. Check the stop setting by operating the valve until the lug contacts the stop; readjust the stop if necessary.

Closed Position Stop

The closed position setting for PEC Eccentric valves is determined by torquing the valve plug into the seat. To set the closed position stop, turn the closed position stop screw counterclockwise several turns, torque the plug into the seat to the torque specified in Table C, then turn the closed position stop screw clockwise until it contacts the adaptor.

Table C: *Valve Seating Torque*

Valve Size	Valve Seating Torque
3 & 4 in 80 & 100 mm	150 ft lbs 200 N-M
5 & 6 in 125 mm & 150 mm	180 ft lbs 245 N-M
8 in 200 mm	300 ft lbs 400 N-M

Removing Actuator

1. Stop pipeline flow.

WARNING!

Flow in the pipeline with the actuator removed can allow the valve to slam closed and cause personal injury and/or damage to the flow system. Shut down the flow in the pipeline before removing the actuator.

2. Scribe a line on the wrenching nut, packing gland and the valve bonnet for alignment during assembly.
3. Remove the nut recessed in the top of the wrenching nut.
4. Lift the wrenching nut off the plug stem.

   Note: Do not lose the washers that are in the recessed hole.

Installing Actuator

1. Line up the scribe marks on the wrenching nut and packing gland, then set the wrenching nut on the plug stem.
2. Slide the flat washer (PEC Valves only) down the plug stem stud, then install the spring washers as shown in Figure 2.
3. Screw the lock nut down the plug stud until it is tight and the spring washers are completely compressed, then back the nut off one full turn.

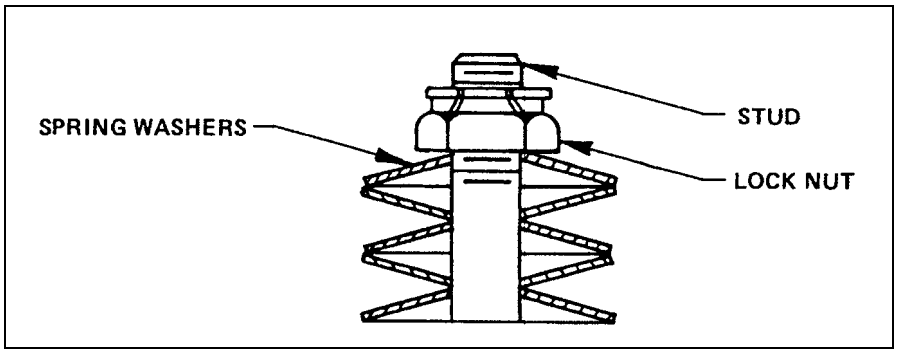

Figure 2 – Spring Washer Stackup

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No claim for transportation, labor, or special or consequential damages or any other loss, cost or damage is being provided in this limited warranty. You shall be solely responsible for determining suitability for use and in no event shall Seller be liable in this respect.

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This limited warranty is voided by any misuse, modification, abuse or alteration of Seller’s product, accident, fire, flood or other Act of God, or your failure to pay entire contract price when due.
The foregoing limited warranty shall be null and void if, after shipment from our factory, the item is modified in any way or a component of another manufacturer, such as but not limited to, an actuator is attached to the item by anyone other than a Seller factory authorized service personnel.

All orders accepted shall be deemed accepted subject to this limited warranty, which shall be exclusive of any other or previous Warranty, and this shall be the only effective guarantee or warranty binding on Seller, despite anything to the contrary contained in the purchase order or represented by any agent or employee of Seller in writing or otherwise, notwithstanding, including but not limited to implied warranties.

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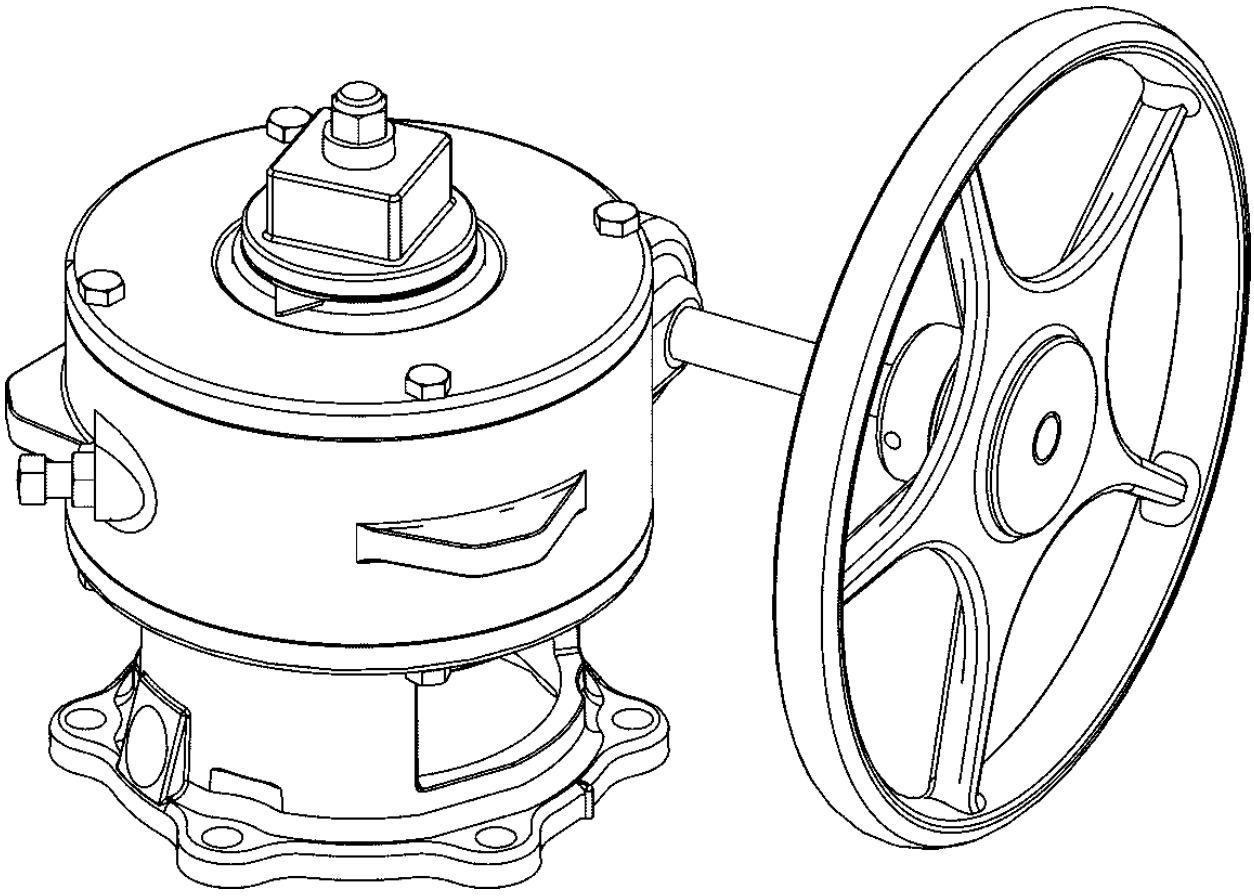
October 2021 Printed in U.S.A.

DEZURIK MANUAL G-SERIES ACTUATORS

USED ON PEC ECCENTRIC VALVES



Instruction D10063
August 2012

DeZURIK, Inc. Sartell, Minnesota USA | Phone: 320-259-2000 | www.dezurik.com | info@dezurik.com

Instructions

These instructions are for use by personnel who are responsible for the installation, operation and maintenance of DeZURIK valves, actuators or accessories.

Safety Messages

All safety messages in the instructions are identified by a general warning sign and the signal word CAUTION, WARNING or DANGER. These messages indicate procedures to avoid injury or death.

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⚠WARNING

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Inspection

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Parts

Replaceable wear parts are listed on the assembly drawing. These parts can be stocked to minimize downtime. Order parts from your local DeZURIK sales representative or directly from DeZURIK. When ordering parts please provide the following information:

If the valve has a data plate: please include the 7-digit part number with either 4-digit revision number (example: 9999999R000) or 8-digit serial number (example: S1900001) whichever is applicable. The data plate will be attached to the valve assembly. Also, include the part name, the assembly drawing number, the balloon number and the quantity stated on the assembly drawing.

If there isn't any data plate visible on the valve: please include valve model number, part name, and item number from the assembly drawing. You may contact your local DeZURIK Representative to help you identify your valve.

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Description

The manual operated G-Series actuator is designed to operate a PEC Eccentric valve. Integral stops limit actuator stroke for both the open and closed valve positions. This actuator is available in three sizes: Size 6, Size 12 and Size 16. See Figure 1 to identify which unit you have.

CAUTION!

This actuator can be furnished with either cast iron or ductile iron gears.

The ductile iron gear is necessary for submerged or buried service valves or when a 2" operating nut is installed on the input shaft. Breakage of the gear teeth will occur if cast iron gears are torqued above 200 ft-lb's.

Cast Iron & Ductile Iron are similar in appearance: To determine if the gear material is ductile iron, remove the cover as described in the ACTUATOR DISASSEMBLY Section. Size 6 gears have "M199" cast in raised letters on the round surface opposite the teeth. Size 12 & Size 16 gears have "M199" cast in raised letters on either the top or under side of the web between the hub and the teeth, removal of the gear is necessary to see the marking. If there is no "M199" on the gear, the material is cast iron.

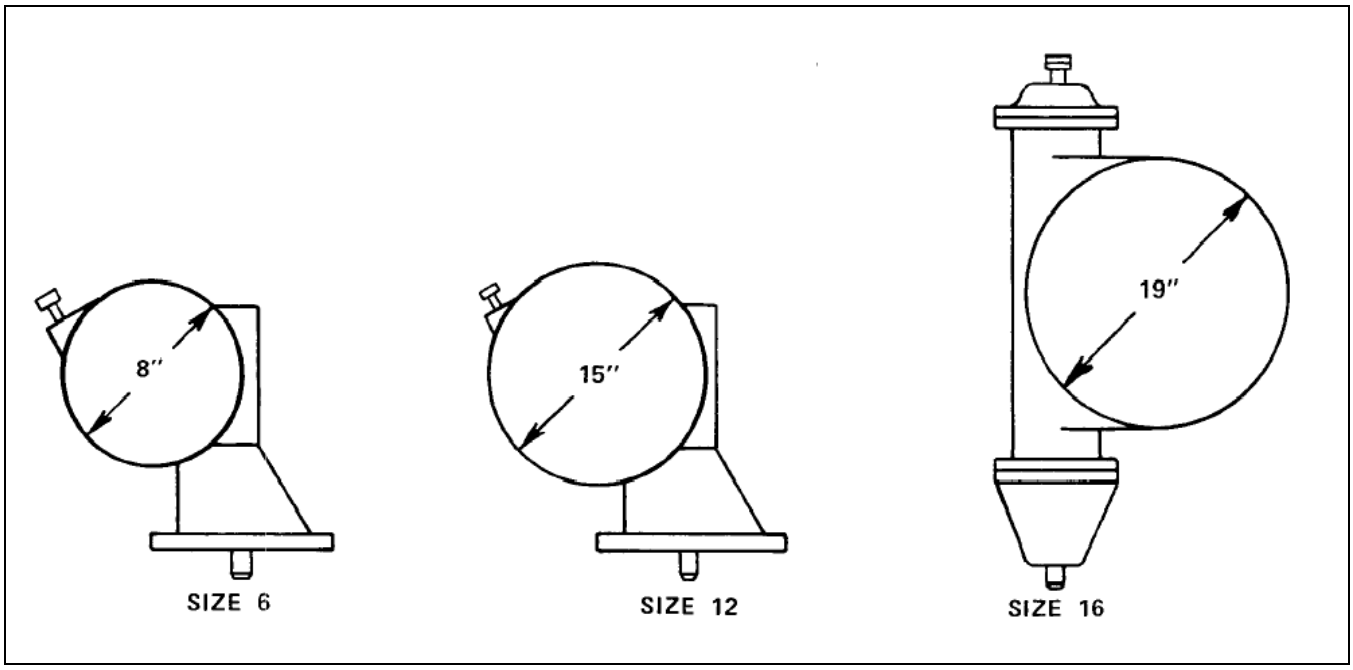


Figure 1— G-Series Actuator Identification

Operation

Rotating the operator (handwheel or chainwheel) clockwise closes the valve. To actuate the valve from full open to full closed (or vice-versa), the Size 6 requires 13 revolutions, the Size 12 requires 19 revolutions and the Size 16 requires 33 revolutions of the operator.

Required Tools

This actuator is assembled using only SAE fasteners. To service this unit, you should have a full set of combination wrenches, Allen wrenches, a flat tipped screwdriver, a pin punch and a dead blow hammer.

Lubrication

The G-Series actuator has been lubricated at the factory and requires no routine maintenance lubrication. If the actuator is disassembled, apply a liberal amount of lubricant to the gear sector, bearings and worm gear (size 6 and Size 12) or the rack (Size 16) using one of these lubricants:

- Keystone Zeniplex-1 (**recommended**)
- Amoco Amolith Grease #1-EP (alternate)
- Amsoil GHD (alternate)
- Mobil Mobilux EP 1 (alternate)
- Petro-Canada Vultrex MPG EP 1 (alternate)
- Shell Alvania EP 1 (alternate)
- Texaco Multifak EP 1 (alternate)

Stop Adjustments

This actuator has a stop to limit valve stroke at each end of the cycle. The open position stop is an integral, non-adjustable stop in the actuator cover; the closed position stop is an adjustable stop screw located in the side of the actuator housing (Size 6 and Size 12) or in the end of the extension cap (Size 16). To adjust the closed position stop, follow these steps:

1. Relieve pipeline pressure.
2. Loosen the jam nut on the closed position stop screw, then turn the closed position stop screw counterclockwise about 1 ½".
3. Close the valve with the torque specified in Table A.
4. While maintaining the torque from Table A, turn the closed position stop adjusting screw in just until resistance is felt as it contacts the gear.
5. Lock the stop in this position by tightening the jam nut against the actuator.

Table A: Valve Closing Torques

Valve Size	Actuator Size	Seating Torque (ft lbs)									
		Direct Pressure Drop (psi)	Reverse Pressure Drop								
			25	50	75	100	125	150	175	200	230
4	G6	4	4	4	5	5	5	5	5	5	5
5	G6	8	8	9	10	11	11	11	11	11	11
6	G6	8	8	9	10	11	11	11	11	11	11
8	G6	15	15	17	19	20	21	21	21	21	21
10	G6	22	22	25	29	33	36	N/A	N/A	N/A	N/A
10	G12	11	11	18	18	18	18	18	18	18	18
12	G6	29	29	29	29	N/A	N/A	N/A	N/A	N/A	N/A
12	G12	15	15	15	15	15	15	15	15	15	15
14	G12	18	18	24	29	34	34	34	34	34	34
16	G12	22	22	29	37	45	45	45	45	N/A	N/A
16	G16	19	19	26	26	26	26	26	26	26	26
18	G12	26	26	35	45	55	55	N/A	N/A	N/A	N/A
18	G16	21	21	29	29	29	29	29	29	29	29
20	G12	29	29	44	55	55	N/A	N/A	N/A	N/A	N/A
20	G16	22	22	32	32	32	32	32	32	32	32
24.00	G16	24	24	29	34	39	N/A	N/A	N/A	N/A	N/A
24.50 & 30.00	G16	26	26	35	42	49	N/A	N/A	N/A	N/A	N/A
30.50 & 36.00	G16	57	57	72	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note: The "N/A" designation in Table A indicates that the Valve/Actuator combination cannot be used for that particular reverse pressure.

Stop Adjustments *(continued)*

Direct Pressure - When the higher pressure is at the end opposite the seat. See Figure 2.

Reverse Pressure - When the higher pressure is at the seat end of the valve. See Figure 2.

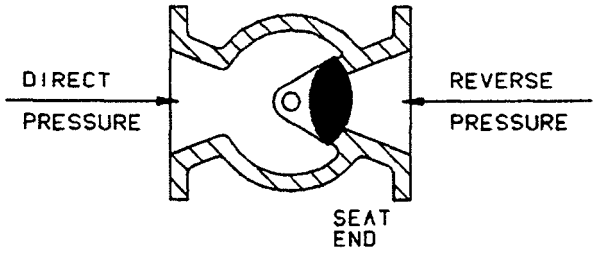


Figure 2 – Pressure Direction

Actuator Removal

The actuator removal procedure is dependent upon whether or not the actuator is built for submerged service. Follow the correct section to properly and safely remove the actuator.

WARNING!

When Eccentric valves are mounted in a vertical pipeline, or mounted in a horizontal pipeline with the plug stem horizontal, there is a chance that gravity will cause the plug to swing to a lower position in the valve body when the actuator is removed. To avoid this hazard, place the plug in the lowest position before removing the actuator.

Submerged Service Actuators

1. Discontinue flow and relieve pipeline pressure.

WARNING!

The valve is a pressure vessel. Pressure must be completely released before removing the bonnet bolts on the 4”, 5”, 6” and 10” valves.

2. Scribe corresponding lines on the valve and actuator to be used for alignment during actuator installation.

Actuator Removal *(Continued)*

3. Scribe corresponding lines on the actuator housing and top cover so the cover can be reinstalled in the correct position.
4. Remove the screws attaching the top cover on the actuator and lift the cover from the housing.
5. If the valve is a size 4" thru 20", remove the lock nut, spring washers and flat washers from the plug stud and go to Step 9. If the valve is a size 24" thru 36", do not remove anything, go to the next step.
6. Loosen lockscrew #1 about 6 to 8 turns. Loosen lockscrews #2 about 3 turns. See Figure 3.

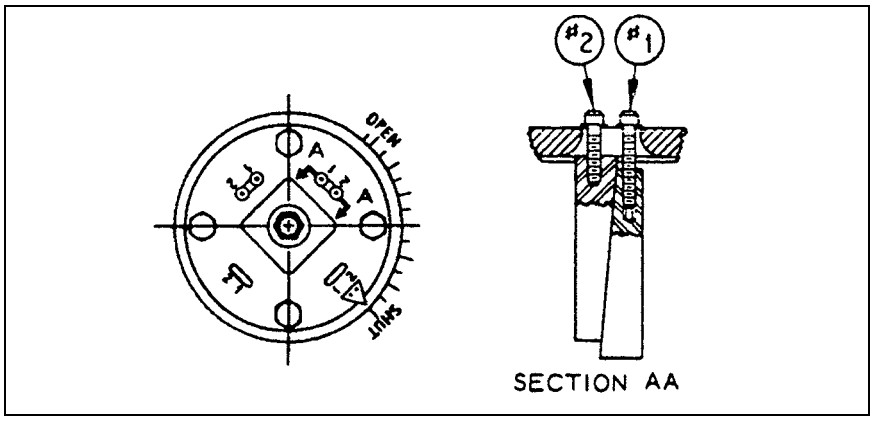


Figure 3 – 24" thru 36" Key and Lockscrew Arrangement

7. Using a soft hammer, tap the heads of the #1 lockscrews to loosen the keys.
8. Remove the four screws holding the washer to the gear sector, then remove the stud, locknut, spring washers and the washer with the keys attached.
9. Remove the 6 screws fastening the adaptor to the valve. On the 4", 5", 6" and 10" valves, these screws also hold the bonnet to the valve body.
10. Lift the actuator and adaptor off the valve.
11. Scrape the old gasket material from the valve bonnet and the bottom of the adaptor.
12. Scrape the gasket material from the actuator cover and housing.

Non-Submerged Service Actuators

1. Discontinue flow and relieve pipeline pressure.

> **WARNING!**
>
> **The valve is a pressure vessel. Pressure must be completely released before removing the bonnet bolts on the 4", 5", 6" and 10" valves.**

2. Scribe corresponding lines on the valve and actuator to be used for alignment during actuator installation.
3. If the valve is a size 4" thru 20", remove the lock nut, spring washers, wrenching nut and pointer from the plug stud, then go to Step 7. If the valve is a size 24" thru 36", do not remove anything and go to the next step.

Actuator Removal *(Continued)*

4. Loosen lockscrew #1 about 6 to 8 turns. Loosen lockscrews #2 about 3 turns. See Figure 3.
5. Using a soft hammer, tap the heads of the #1 lockscrews to loosen the keys.
6. Remove the four screws holding the wrenching nut to the gear sector, then remove the stud, locknut, spring washers and the wrenching nut with the keys attached.
7. Remove the 6 screws fastening the adaptor to the valve. On the 4”, 5”, 6” and 10” valves, these screws also hold the bonnet to the valve body.
8. Lift the actuator and adaptor off the valve.

Actuator Installation

The actuator installation procedure is dependent upon whether or not the actuator is built for submerged service. Follow the correct section to properly install the actuator.

Submerged Service Actuators

1. Place the valve in the position it was in when the actuator was removed. Normally this will be so the plug is in the lowest position in the valve body.
2. Place a new gasket on the valve bonnet, lining up the holes in the bonnet and gasket.
3. Line up the scribe marks on the valve and actuator made during actuator removal, then set the actuator on the valve so the valve shaft slides into the actuator gear sector.
4. Fasten the actuator adaptor to the valve with six screws.
5. Slide the flat washer down the plug stud so it rests on top of the gear sector. If the valve is a size 24” thru 36”, hold the keys in position when you slide the washer over the plug stud and guide the keys into the gear sector and stem slots. Then install the four screws fastening the washer to the gear sector.
6. Place the spring washers on the plug stud as shown in Figure 4.

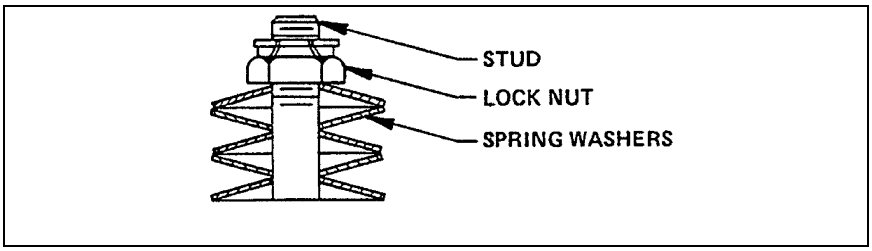


Figure 4—Spring Washer Stackup

7. Screw the lock nut down the plug stud until it is tight and the spring washers are completely compressed, then back the nut off one full turn.
8. If the valve is a size 24” thru 36”, tighten the #2 lockscrews and then the #1 lockscrews to hold the keys in place. Skip this step if the valve is a size 4” thru 20”.
9. Line up the scribe marks on the cover and housing, then set the cover on the actuator. Fasten the cover in place.
10. Check the closed position stop setting and readjust if necessary.
11. Pipeline flow may now be restored.

Actuator Installation (*Continued)*

Non-Submerged Service Actuators

1. Place the valve in the position it was in when the actuator was removed. Normally this will be so the plug is in the lowest position in the valve body.
2. Line up the scribe marks on the valve and actuator made during actuator removal, then set the actuator on the valve so the valve shaft slides into the actuator gear sector.
3. Fasten the actuator adaptor to the valve with six screws.
4. Slide the pointer and wrenching nut down the plug stud so it rests on top of the gear sector; the pointer should point to indicate the correct valve position. If the valve is a size 24” thru 36”, hold the keys in position when you slide the wrenching nut over the plug stud and guide the keys into the gear sector and stem slots. Then install the four screws fastening the wrenching nut to the gear sector.
5. Place the spring washers on the plug stud as shown in Figure 4.
6. Screw the lock nut down the plug stud until the spring washers are completely compressed, then back the nut off until the washers return to their normal unstressed shape.
7. If the valve is a size 24” thru 36”, tighten the #2 lockscrews and then the #1 lockscrews to hold the keys in place. Skip this step if the valve is a size 4” thru 20”.
8. Pipeline flow may now be restored.

Recommended Spare Parts Replacement

Follow these steps to replace the recommended spare parts in this actuator. This procedure is dependent upon the actuator size (see Figure 1); make sure you are using the correct section for your actuator.

WARNING!

When Eccentric valves are mounted in a vertical pipeline, or mounted in a horizontal pipeline with the plug stem horizontal, there is a chance that gravity will cause the plug to swing to a lower position in the valve body when the actuator is removed. To avoid this hazard, place the plug in the lowest position before removing the actuator.

Size 6 and Size 12 Actuators

1. Remove the actuator from the valve as described in the ACTUATOR REMOVAL Section of this Instruction.
2. Scribe corresponding lines on the actuator cover and housing, then remove the cover screws and cover from the top of the actuator (non-submerged units).
3. Note the position of the gear sector in the housing, then lift the gear sector out.
4. Remove the pipe plug in the side of the housing.
5. Reaching in thru the hole where the pipe plug was, drive out the pin connecting the worm gear to the actuator drive shaft. Take the pin out of the housing.

Recommended Spare Parts Replacement *(Continued)*

6. Slide the drive shaft (complete with operator) out of the actuator.
7. Reach into the housing and remove the worm gear, thrust bearing(s) and bearing races. The Size 6 actuator has one thrust bearing and two bearing races; the Size 12 has two bearings and four bearing races.
8. Remove the gear sector seals from the top cover and adaptor.
9. Remove the drive shaft seal from the housing.
10. Scrape the gasket material from the top cover and actuator housing.
11. Grease the new seals and press them into the top cover and adaptor.
12. Push a new drive shaft seal into the housing.
13. **Size 6 Actuators** - Slide the drive shaft into the housing and thru these components in the following order: bearing race, bearing, bearing race, worm gear, and then into the bearing in the housing.

    Size 12 Actuators - Slide the drive shaft into the housing and thru these components in the following order: bearing race, bearing, bearing race, worm gear, bearing race, bearing, bearing race, and then into the bearing in the housing.
14. Turn the drive shaft and worm gear until the holes in them line up with the pipe plug hole in the housing.
15. Reaching in thru the pipe plug hole, insert the pin to connect the drive shaft and worm gear.
16. Screw the pipe plug into the hole in the housing.
17. Place the gear sector on the valve shaft in the same position noted before it was removed.
18. Apply a liberal amount of grease to the gear sector, bearings and worm gear.
19. Set a new cover gasket on the housing, then install and fasten the top cover on the housing; make sure the scribe marks line up (non-submerged units only).
20. Install the actuator on the valve as described in the ACTUATOR INSTALLATION Section of this Instruction.

Size 16 Actuators

1. Remove the actuator from the valve as described in the ACTUATOR REMOVAL Section of this Instruction.
2. Scribe corresponding lines on the actuator cover and housing, then remove the cover screws and cover from the top of the actuator (non-submerged units).
3. Note the position of the gear sector in the housing, then lift the gear sector out.
4. Mark one tooth on the rack with a center punch, then mark two adjacent teeth on the gear so the rack and gear can be re-installed in the correct position.
5. Remove the four screws that hold the drive shaft housing assembly to the actuator housing.
6. Turn the operator clockwise to remove the drive shaft housing assembly from the actuator housing.
7. Lift the gear sector and rack from the housing.
8. Drive the pin out that holds the rack guide in place, then remove the rack guide and pin from the housing.

Recommended Spare Parts Replacement *(Continued)*

9. Remove the gear sector seals from the top cover and adaptor.
10. Scrape the gasket material from the top cover, actuator housing and drive shaft housing.
11. Rebuild the drive shaft housing assembly as follows:
    a. Remove the set screw inside the housing and turn the threaded collar out. The bearing and two bearing faces will also come out.
    b. Remove the pin securing the operator to the drive shaft and slide the operator off the shaft.
    c. Push the housing off the operator end of the drive shaft. The remaining bearing and two races will come out at this time.
    d. Pull the seal out of the drive shaft housing.
    e. Lightly grease the new seal and slide it into the drive shaft housing.
    f. Sandwich the bearing between the two races and slide them down the operator end of the drive shaft until they sit on the sleeve.
    g. Apply a liberal amount of grease to the bearing and races.
    h. Carefully push the operator end of the drive shaft thru the seal from inside the housing.
    i. Slide the operator onto the shaft, line up the holes in the operator and shaft, then install the pin.
    j. Sandwich the bearing between the two races and slide them against the sleeve inside the housing.
    k. Apply a liberal amount of grease to the bearings.
    l. Screw the threaded collar into place and secure with the set screw.
12. Grease the new seals and press them into the top cover and adaptor.
13. Pin the rack guide in position in the housing.
14. Place the gear sector and rack in the housing, carefully aligning the teeth marked during disassembly.
15. Place a new gasket on the drive shaft housing, then push the drive shaft housing assembly into the actuator housing.
16. Turn the operator counterclockwise to screw the drive shaft into the rack until the drive shaft housing is tight against the actuator housing.
17. Fasten the drive shaft housing to the actuator housing with four screws.
18. Apply a liberal amount of grease to the gear sector and rack.
19. Set a new cover gasket on the housing, then install and fasten the top cover on the housing; make sure the scribe marks line up (non-submerged units only).
20. Install the actuator on the valve as described in the ACTUATOR INSTALLATION Section of this Instruction.

Changing Actuator Mounting Position

On **4–20" (100–500mm)** valves, the actuator can be mounted in 60° increments around the valve shaft. 90° or 270° position changes require changing the gear sector on Size 6 & Size 12 actuators or the timing between the gear sector and the rack on Size 16 actuators; 60° position changes do not require changing the gear sector or timing.

On **24–36" (600–900mm**) valves, handwheel/chainwheel sizes will limit actuator mounting positions. However, the actuator can be mounted in 45° increments around the valve shaft. 45° position changes require changing the timing between the gear sector and the rack; 90° position changes do not require changing the timing.

Mounting Actuator in 60° Increments on 4–20" (100–500mm) Valves and 90° Increments on 24–36" (600–900mm) Valves

1. Remove the actuator from the valve. See "*Removing Actuator*" section.

WARNING!

This valve is a pressure vessel. On 4, 5, 6 and 10" (100, 125, 150 and 250mm) valves, the same bolts hold both the actuator and the bonnet.

Removing the bolts on 4, 5, 6 and 10" (100, 125, 150 and 250mm) valves before relieving pipeline pressure can result in personal injury or equipment damage.

Always relieve pipeline pressure before removing the actuator.

2. Rotate the actuator into position.
3. Install the actuator on the valve. See "*Installing Actuator*".

Changing Actuator to 90°/270° Positions on 4–20" (100–500mm) Valves with Size 6 & Size 12 Actuators Only (Requires a different gear sector)

When eccentric valves are mounted in a vertical pipeline, or mounted in a horizontal pipeline with the plug stem horizontal, gravity can cause the plug to swing to a lower position in the valve body when the gear sector is removed. To avoid this problem, place the plug in the lowest position before removing the gear sector.

1. Discontinue flow and relieve pipeline pressure.
2. If possible, put the valve in the closed position just so the plug is touching the valve seat.
3. Remove the lock nut, spring washers, wrenching nut and pointer from the plug stud.
4. Scribe corresponding lines on the actuator cover and housing, then remove the cover screws and cover from the top of the actuator.
5. Note that one edge of the gear is either against or close to the stop screw in the side of the gear housing, this is where the other gear should be after the actuator has been rotated 90° and the new gear installed. Now lift the gear sector out of the actuator.
6. Remove the 4 screws fastening the gear housing to the adaptor.
7. Pry the gear housing loose from the valve adaptor and turn it 90°clockwise or counterclockwise to suit your need. Line up the bolt holes and install and tighten the 4 screws.

Changing Mounting Positions *(Continued)*

8. Make sure the plug is still touching the valve seat, then using the new gear, liberally grease the teeth and journals then drop the gear in over the plug hex making sure the edge of the gear is close to or will touch the stop screw.

   NOTE: The gear has two different length journals. The longer journal must engage the plug and the shorter journal must stick up thru the actuator cover.

9. Set a new cover gasket on the housing, then install and fasten the top cover on the housing; make sure the scribe marks line up.
10. Test actuate the valve by turning the handwheel to open the valve. The valve plug must go 90° from the seat and stop as the gear sector hits the stop lug that is cast in the cover. Now turn the handwheel to close the valve, the plug should contact the seat before the gear hits the stop screw. If the valve does not operate as described, remove the cover from the gear housing and make sure the edge of the gear is touching or very close to the stop screw when the plug is in the closed position.
11. When you are satisfied that the valve is operating properly, put the valve in the closed position. With the cover bolted in place, slide the pointer and wrenching nut down the plug stud so it rests on top of the gear sector; the pointer should point to indicate the correct valve position.
12. Place the spring washers on the plug stud as shown in Figure 5.
13. Screw the lock nut down the plug stud until it is tight and the spring washers are completely compressed, then back the nut off one full turn.
14. Adjust the position stops. See "*Position Stops*" section.

Changing Actuator to 90°/270° Positions on 12"–20" (300–500mm) Valves with Size 16 Actuator Only

When eccentric valves are mounted in a vertical pipeline, or mounted in a horizontal pipeline with the plug stem horizontal, gravity can cause the plug to swing to a lower position in the valve body when the gear sector is removed. To avoid this problem, place the plug in the lowest position before removing the gear sector.

1. Discontinue flow and relieve pipeline pressure.
2. Remove the lock nut, spring washers, wrenching nut and pointer from the plug stud.
3. Scribe corresponding lines on the actuator cover and housing, then remove the cover screws and cover from the top of the actuator.
4. Mark which teeth of the rack and gear are engaged and lift the gear sector out of the actuator.
5. Remove the screws fastening the adapter to the valve.
6. Take out the screws fastening the actuator housing to the adapter.
7. Rotate the adapter on the valve, and the actuator on the adapter until the holes line up and the actuator is in the desired position. Replace all of the screws.
8. Find the tooth that was marked on the gear sector and count over clockwise five teeth. This is the tooth that will engage with the marked tooth on the rack. Install the gear sector using the new tooth engagement, and be sure the gear sector fits on the plug stem properly.

Changing Mounting Positions *(Continued)*

9. Set a new cover gasket on the housing, then install and fasten the top cover on the housing; make sure the scribe marks line up.
10. Slide the pointer and wrenching nut down the plug stud so it rests on top of the gear sector; the pointer should point to indicate the correct valve position.
11. Place the spring washers on the plug stud as shown in Figure 5.
12. Screw the lock nut down the plug stud until it is tight and the spring washers are completely compressed, then back the nut off one full turn.
13. Adjust the position stops. See "*Position Stops*" section.

Mounting Actuator in 45° Increments on 24–36" (600–900mm) Valves Only

When eccentric valves are mounted in a vertical pipeline, or mounted in a horizontal pipeline with the plug stem horizontal, gravity can cause the plug to swing to a lower position in the valve body when the gear sector is removed. To avoid this problem, place the plug in the lowest position before removing the gear sector.

1. Discontinue flow and relieve pipeline pressure.

WARNING!

When Eccentric valves are mounted in a vertical pipeline, or mounted in a horizontal pipeline with the plug stem horizontal, there is a chance that gravity will cause the plug to swing to a lower position in the valve body when the gear sector is removed. To avoid this hazard, place the plug in the lowest position before removing the gear sector.

2. Loosen lockscrews #1 about 6 to 8 turns. Loosen lockscrews #2 about 3 turns. See Figure 4.
3. Using a soft hammer, tap the heads of the #1 lockscrews to loosen the keys.
4. Remove the four screws that hold the wrenching nut to the gear sector, then remove the stud locknut, spring washers and the wrenching nut with the keys.
5. Scribe corresponding lines on the actuator cover and housing, then remove the cover screws and cover from the top of the actuator.
6. Mark which teeth of the rack and gear are engaged, and lift the gear sector out of the actuator.
7. Remove the screws fastening the adapter to the valve.
8. Remove the screws fastening the actuator housing to the adapter.
9. Rotate the adapter on the valve and the actuator on the adapter until the holes line up and the actuator is in the desired position. Replace all of the screws.
10. Note the tooth that was marked on the gear sector and count clockwise five teeth on the size 16 actuator. This is the tooth that will engage with the marked tooth on the rack. Install the gear sector using the new tooth engagement, and be sure the keyways in the gear sector match the keyways in the plug stem.
11. Set a new cover gasket on the housing, then install the top cover on the housing, making sure the scribe marks line up.

Changing Mounting Positions *(Continued)*

12. Hold the keys in position and slide the wrenching nut over the plug stud, then guide the keys into the gear sector and stem slots.
13. Install the four screws fastening the wrenching nut to the gear sector.
14. Place the spring washers on the plug stud as shown in Figure 5.
15. Screw the lock nut down the plug stud until it is tight and the spring washers are completely compressed, then back the nut off one full turn.
16. Tighten the #2 lockscrews, and then the #1 lockscrews to hold the keys in place.
17. Adjust the position stops—see "*Position Stops*" section.

Limited Warranty

DeZURIK, Inc. (“Seller”) manufactured products, auxiliaries and parts for a period of twenty-four (24) months from date of shipment from Seller’s factory, are warranted to the original purchaser only against defective workmanship and material, but only if properly stored, installed, operated, and serviced in accordance with Seller’s recommendations and instructions.

For items proven to be defective within the warranty period, your exclusive remedy under this limited warranty is repair or replacement of the defective item, at Seller’s option, FCA Incoterms 2020 Seller’s facility with removal, transportation, and installation at your cost.

Products or parts manufactured by others but furnished by Seller are not covered by this limited warranty. Seller will provide repair or replacement for other’s products or parts only to the extent provided in and honored by the original manufacturer’s warranty to Seller, in each case subject to the limitations contained in the original manufacturer’s warranty.

No claim for transportation, labor, or special or consequential damages or any other loss, cost or damage is being provided in this limited warranty. You shall be solely responsible for determining suitability for use and in no event shall Seller be liable in this respect.

This limited warranty does not warrant that any Seller product or part is resistant to corrosion, erosion, abrasion or other sources of failure, nor does Seller warrant a minimum length of service.

Your failure to give written notice to us of any alleged defect under this warranty within twenty (20) days of its discovery, or attempts by someone other than Seller or its authorized representatives to remedy the alleged defects therein, or failure to return product or parts for repair or replacement as herein provided, or failure to store, install, or operate said products and parts according to the recommendations and instructions furnished by Seller shall be a waiver by you of all rights under this limited warranty.

This limited warranty is voided by any misuse, modification, abuse or alteration of Seller’s product, accident, fire, flood or other Act of God, or your failure to pay entire contract price when due.
The foregoing limited warranty shall be null and void if, after shipment from our factory, the item is modified in any way or a component of another manufacturer, such as but not limited to, an actuator is attached to the item by anyone other than a Seller factory authorized service personnel.

All orders accepted shall be deemed accepted subject to this limited warranty, which shall be exclusive of any other or previous Warranty, and this shall be the only effective guarantee or warranty binding on Seller, despite anything to the contrary contained in the purchase order or represented by any agent or employee of Seller in writing or otherwise, notwithstanding, including but not limited to implied warranties.

THE FOREGOING REPAIR AND REPLACEMENT LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, OBLIGATIONS AND LIABILITIES, INCLUDING ALL WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR OF MERCHANTABILITY OR OTHERWISE, EXPRESSED OR IMPLIED IN FACT OR BY LAW, AND STATE SELLER’S ENTIRE AND EXCLUSIVE LIABILITY AND YOUR EXCLUSIVE REMEDY FOR ANY CLAIM IN CONNECTION WITH THE SALE AND FURNISHING OF SERVICES, GOODS OR PARTS, THEIR DESIGN, SUITABILITY FOR USE, INSTALLATION OR OPERATIONS.

Disclaimer

Metric fasteners should not be used with ASME Class 150/300 bolt holes and flange bolt patterns. If you use metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns, it may lead to product failure, injury, and loss of life. DeZURIK Inc. disclaims all liability associated with the use of metric fasteners with ASME Class 150/300 bolt holes and flange patterns, including but not limited to personal injury, loss of life, loss of product, production time, equipment, property damage, lost profits, consequential damages of any kind and environment damage and/or cleanup. Use of metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns is a misuse that voids all warranties and contractual assurances. If you use metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns, you do so at your sole risk and any liability associated with such use shall not be the responsibility of DeZURIK, Inc. In addition to the foregoing, DeZURIK’s Manufacturer’s Conditions apply.

Limitation of Liability

IN NO EVENT SHALL SELLER BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES WHATSOEVER, AND SELLER’S LIABILITY, UNDER NO CIRCUMSTANCES, WILL EXCEED THE CONTRACT PRICE FOR THE GOODS AND/OR SERVICES FOR WHICH LIABILITY IS CLAIMED. ANY ACTION FOR BREACH OF CONTRACT BY YOU, OTHER THAN RIGHTS RESPECTING OUR LIMITED WARRANTY DESCRIBED ABOVE, MUST BE COMMENCED WITHIN 12 MONTHS AFTER THE DATE OF SALE.

Sales and Service

For information about our worldwide locations, approvals, certifications and local representative:

Web site: www.dezurik.com E-Mail: info@dezurik.com

250 Riverside Ave. N., Sartell, MN 56377 ● Phone: 320-259-2000 ● Fax: 320-259-2227

October 2021 Printed in U.S.A.

DEZURIK G-SERIES HANDWHEEL AND CHAINWHEEL ACTUATORS

Instruction D10083
August 2012

DeZURIK, Inc. Sartell, Minnesota USA | Phone: 320-259-2000 | www.dezurik.com | info@dezurik.com

Instructions

These instructions are for use by personnel who are responsible for the installation, operation and maintenance of DeZURIK valves, actuators or accessories.

Safety Messages

All safety messages in the instructions are identified by a general warning sign and the signal word CAUTION, WARNING or DANGER. These messages indicate procedures to avoid injury or death.

Safety label(s) on the product indicate hazards that can cause injury or death. If a safety label becomes difficult to see or read, or if a label has been removed, please contact DeZURIK for replacement label(s).

⚠WARNING

Personnel involved in the installation or maintenance of valves should be constantly alert to potential emission of pipeline material and take appropriate safety precautions. Always wear suitable protection when dealing with hazardous pipeline materials. Handle valves which have been removed from service with suitable protection for any potential pipeline material in the valve.

Inspection

Your DeZURIK product has been packaged to provide protection during shipment; however, items can be damaged in transport. Carefully inspect the unit for damage upon arrival and file a claim with the carrier if damage is apparent.

Parts

Replaceable wear parts are listed on the assembly drawing. These parts can be stocked to minimize downtime. Order parts from your local DeZURIK sales representative or directly from DeZURIK. When ordering parts please provide the following information:

If the valve has a data plate: please include the 7-digit part number with either 4-digit revision number (example: 9999999R000) or 8-digit serial number (example: S1900001) whichever is applicable. The data plate will be attached to the valve assembly. Also, include the part name, the assembly drawing number, the balloon number and the quantity stated on the assembly drawing.

If there isn't any data plate visible on the valve: please include valve model number, part name, and item number from the assembly drawing. You may contact your local DeZURIK Representative to help you identify your valve.

DeZURIK Service

DeZURIK service personnel are available to maintain and repair all DeZURIK products. DeZURIK also offers customized training programs and consultation services. For more information, contact your local DeZURIK sales representative or visit our website at DeZURIK.com.

Table of Contents

Description

These instructions cover adjustments and maintenance for a DeZURIK G-Series handwheel or chainwheel actuator. Two sizes, G12 and G16, are available. See Figure 1 to identify which unit you have.

CAUTION!

This actuator can be furnished with either cast iron or ductile iron gears.

The ductile iron gear is necessary for submerged or buried service valves or when a 2" operating nut is installed on the input shaft. Breakage of the gear teeth will occur if cast iron gears are torqued above 200 ft-lb's.

Cast Iron & Ductile Iron are similar in appearance: To determine if the gear material is ductile iron, remove the cover as described in the ACTUATOR DISASSEMBLY Section. G12 & G16 gears have "M199" cast in raised letters on either the top or under side of the web between the hub and the teeth, removal of the gear is necessary to see the marking. If there is no "M199" on the gear, the material is cast iron.

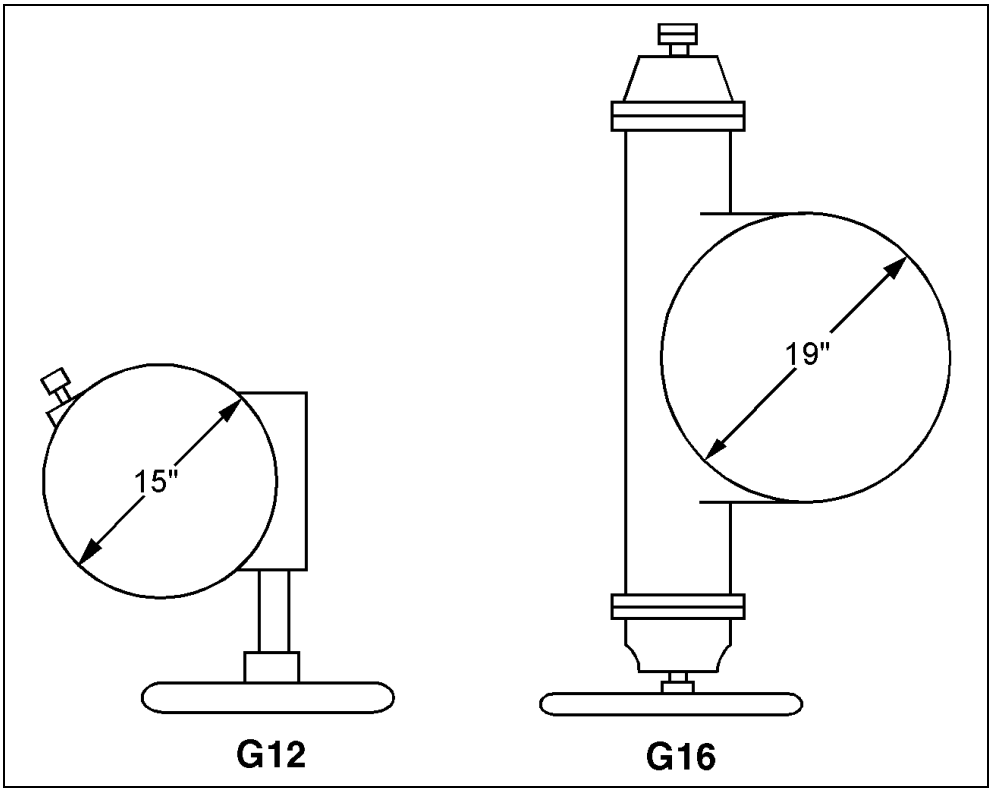


Figure 1- Actuator Identification

Lubrication

The G-Series Actuator has been lubricated at the factory and requires no routine lubrication. If the actuator is disassembled, lubricate the worm gear and bearings and pack the gear sector teeth using one of these lubricants:

- Keystone Zeniplex-1 (**recommended**)
- Amoco Amolith Grease #1-EP (alternate)
- Amsoil GHD (alternate)
- Mobil Mobilux EP 1 (alternate)
- Petro-Canada Vultrex MPG EP 1 (alternate)
- Shell Alvania EP 1 (alternate)
- Texaco Multifak EP 1 (alternate)

Adjustments

The closed position stop is a set screw located in the side of the actuator housing on the G12 unit, and is located in the end of the extension cap on the G16 unit.

Adjust the set screw to position the valve in the closed position when the gear or rack contacts the set screw. (Read the instruction sheet for the valve. Additional information on the proper closed position may be included.)

Changing the Actuator Position

The possible actuator mounting positions are shown on the customer drawing. To change the mounting position:

1. Shut off line pressure and close the valve.
2. Remove the actuator cover screws and the cover.
3. Remove the screws that fasten the actuator to the adaptor.

   Note: These screws are located on the underside of the actuator.
4. Remove the actuator from the valve.
5. Remove the gear sector.

   Note: Rotate it in the same direction and for the same number of degrees as the actuator will be rotated, and reinstall the gear sector in the actuator. Be sure the key and keyway are engaged.
6. Place the actuator on the valve in the desired position, and install the screws that fasten the actuator to the adaptor.

Disassembling the Actuator

G12 UNITS

1. Shut off line pressure if the actuator is mounted on an installed valve.
2. Remove the actuator cover screws and the actuator cover.
3. Note the position of the gear sector—it must be installed in the same position during reassembly.
4. Remove the gear sector.
5. Remove the pipe plug in the housing, and drive out the pin that connects the worm gear to the handwheel drive shaft.
6. Remove the drive shaft, handwheel, and bearing race.

G16 UNITS

1. Shut off pipeline pressure if the actuator is mounted on an installed valve.
2. Remove the actuator cover screws, the actuator cover, the screws and the pointer.
3. Mark the teeth on the gear and rack that are engaged.
4. Remove the four screws that fasten the drive shaft seal housing to the actuator housing.
5. Turn the handwheel to remove the drive shaft seal assembly complete with handwheel and drive shaft.
6. To disassemble the drive shaft seal housing assembly:
    a. To remove the collar and the set screw, and turn the threaded collar out.

       Note: Because this collar retains the lower bearing, the bearing will also be removed.

    b. To remove the seal housing, remove the handwheel pin and handwheel. Then lift the seal housing off the shaft.

       Note: This will allow access to the top bearing.

    c. To remove the sleeve, remove the pin that connects it to the shaft.
7. Remove the gear sector, the rack, the pin and the rack guide.

Reassembling the Actuator

G12 UNITS

1. Assemble the drive shaft and handwheel, worm gear, thrust bearing, and bearing race.
2. Install the pin that connects the handwheel drive shaft and the worm gear.
3. Install the pipe plug in the housing.
4. Lubricate the worm gear and the gear sector with Keystone Zeniplex-1, and place the gear sector on the plug stem in the same position as it was when disassembled.
5. Fasten the actuator cover to the actuator housing.

G16 UNITS

1. Assemble the drive shaft seal housing assembly:
    a. Pin the sleeve to the shaft.
    b. Install the top bearing, seal housing, and handwheel.
    c. Pin the handwheel.
    d. Install the lower bearing and threaded collar.
    e. Install the set screw in the collar.
2. Lubricate the rack guide, rack and gear sector with Keystone Zeniplex-1.
3. Pin the rack guide in place.

    Note: Position the pin so it does not protrude into the housing.
4. Install the gear sector and rack with the proper teeth engaged.
5. Install the drive shaft seal housing.
6. Continue turning the handwheel until the drive shaft seal housing is in place against the actuator housing flange (marked P), and install the screws.
7. Fasten the actuator cover to the actuator housing.
8. Install the pointer.

Limited Warranty

DeZURIK, Inc. (“Seller”) manufactured products, auxiliaries and parts for a period of twenty-four (24) months from date of shipment from Seller’s factory, are warranted to the original purchaser only against defective workmanship and material, but only if properly stored, installed, operated, and serviced in accordance with Seller’s recommendations and instructions.

For items proven to be defective within the warranty period, your exclusive remedy under this limited warranty is repair or replacement of the defective item, at Seller’s option, FCA Incoterms 2020 Seller’s facility with removal, transportation, and installation at your cost.

Products or parts manufactured by others but furnished by Seller are not covered by this limited warranty. Seller will provide repair or replacement for other’s products or parts only to the extent provided in and honored by the original manufacturer’s warranty to Seller, in each case subject to the limitations contained in the original manufacturer’s warranty.

No claim for transportation, labor, or special or consequential damages or any other loss, cost or damage is being provided in this limited warranty. You shall be solely responsible for determining suitability for use and in no event shall Seller be liable in this respect.

This limited warranty does not warrant that any Seller product or part is resistant to corrosion, erosion, abrasion or other sources of failure, nor does Seller warrant a minimum length of service.

Your failure to give written notice to us of any alleged defect under this warranty within twenty (20) days of its discovery, or attempts by someone other than Seller or its authorized representatives to remedy the alleged defects therein, or failure to return product or parts for repair or replacement as herein provided, or failure to store, install, or operate said products and parts according to the recommendations and instructions furnished by Seller shall be a waiver by you of all rights under this limited warranty.

This limited warranty is voided by any misuse, modification, abuse or alteration of Seller’s product, accident, fire, flood or other Act of God, or your failure to pay entire contract price when due.
The foregoing limited warranty shall be null and void if, after shipment from our factory, the item is modified in any way or a component of another manufacturer, such as but not limited to, an actuator is attached to the item by anyone other than a Seller factory authorized service personnel.

All orders accepted shall be deemed accepted subject to this limited warranty, which shall be exclusive of any other or previous Warranty, and this shall be the only effective guarantee or warranty binding on Seller, despite anything to the contrary contained in the purchase order or represented by any agent or employee of Seller in writing or otherwise, notwithstanding, including but not limited to implied warranties.

THE FOREGOING REPAIR AND REPLACEMENT LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, OBLIGATIONS AND LIABILITIES, INCLUDING ALL WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR OF MERCHANTABILITY OR OTHERWISE, EXPRESSED OR IMPLIED IN FACT OR BY LAW, AND STATE SELLER’S ENTIRE AND EXCLUSIVE LIABILITY AND YOUR EXCLUSIVE REMEDY FOR ANY CLAIM IN CONNECTION WITH THE SALE AND FURNISHING OF SERVICES, GOODS OR PARTS, THEIR DESIGN, SUITABILITY FOR USE, INSTALLATION OR OPERATIONS.

Disclaimer

Metric fasteners should not be used with ASME Class 150/300 bolt holes and flange bolt patterns. If you use metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns, it may lead to product failure, injury, and loss of life. DeZURIK Inc. disclaims all liability associated with the use of metric fasteners with ASME Class 150/300 bolt holes and flange patterns, including but not limited to personal injury, loss of life, loss of product, production time, equipment, property damage, lost profits, consequential damages of any kind and environment damage and/or cleanup. Use of metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns is a misuse that voids all warranties and contractual assurances. If you use metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns, you do so at your sole risk and any liability associated with such use shall not be the responsibility of DeZURIK, Inc. In addition to the foregoing, DeZURIK’s Manufacturer’s Conditions apply.

Limitation of Liability

IN NO EVENT SHALL SELLER BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES WHATSOEVER, AND SELLER’S LIABILITY, UNDER NO CIRCUMSTANCES, WILL EXCEED THE CONTRACT PRICE FOR THE GOODS AND/OR SERVICES FOR WHICH LIABILITY IS CLAIMED. ANY ACTION FOR BREACH OF CONTRACT BY YOU, OTHER THAN RIGHTS RESPECTING OUR LIMITED WARRANTY DESCRIBED ABOVE, MUST BE COMMENCED WITHIN 12 MONTHS AFTER THE DATE OF SALE.

Sales and Service

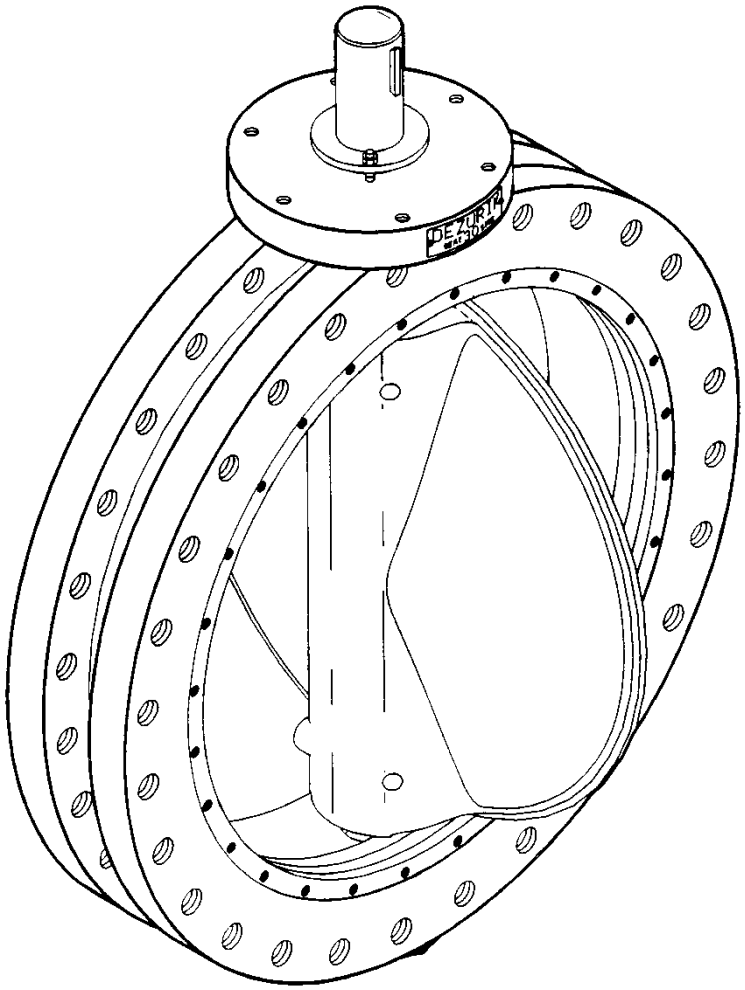
For information about our worldwide locations, approvals, certifications and local representative:

Web site: www.dezurik.com E-Mail: info@dezurik.com

250 Riverside Ave. N., Sartell, MN 56377 ● Phone: 320-259-2000 ● Fax: 320-259-2227

October 2021 Printed in U.S.A.

DEZURIK 24” THRU 36”
RESILIENT BUTTERFLY VALVES



Instruction D10348

April 2015

DeZURIK, Inc. Sartell, Minnesota USA | Phone: 320-259-2000 | www.dezurik.com | info@dezurik.com

Instructions

These instructions are for use by personnel who are responsible for the installation, operation and maintenance of DeZURIK valves, actuators or accessories.

Safety Messages

All safety messages in the instructions are identified by a general warning sign and the signal word CAUTION, WARNING or DANGER. These messages indicate procedures to avoid injury or death.

Safety label(s) on the product indicate hazards that can cause injury or death. If a safety label becomes difficult to see or read, or if a label has been removed, please contact DeZURIK for replacement label(s).

⚠WARNING

Personnel involved in the installation or maintenance of valves should be constantly alert to potential emission of pipeline material and take appropriate safety precautions. Always wear suitable protection when dealing with hazardous pipeline materials. Handle valves which have been removed from service with suitable protection for any potential pipeline material in the valve.

Inspection

Your DeZURIK product has been packaged to provide protection during shipment; however, items can be damaged in transport. Carefully inspect the unit for damage upon arrival and file a claim with the carrier if damage is apparent.

Parts

Replaceable wear parts are listed on the assembly drawing. These parts can be stocked to minimize downtime. Order parts from your local DeZURIK sales representative or directly from DeZURIK. When ordering parts please provide the following information:

If the valve has a data plate: please include the 7-digit part number with either 4-digit revision number (example: 9999999R000) or 8-digit serial number (example: S1900001) whichever is applicable. The data plate will be attached to the valve assembly. Also, include the part name, the assembly drawing number, the balloon number and the quantity stated on the assembly drawing.

If there isn't any data plate visible on the valve: please include valve model number, part name, and item number from the assembly drawing. You may contact your local DeZURIK Representative to help you identify your valve.

DeZURIK Service

DeZURIK service personnel are available to maintain and repair all DeZURIK products. DeZURIK also offers customized training programs and consultation services. For more information, contact your local DeZURIK sales representative or visit our website at DeZURIK.com.

Table of Contents

Description

The DeZURIK 24" thru 36" Resilient Butterfly Valve is a resilient-seated bi-directional valve for general industrial applications. Lugged or wafer end connections are offered, with a choice of disc and seat materials. Pressure and temperature ratings are shown on the valve data plate.

Handling

Lifting the valve improperly may damage it. Do not fasten lifting devices to the actuator, disc or through the seat opening in the body. Lift the valve with slings, chains or cables fastened around the valve body, or fastened to bolts or rods through bolt holes in the flanges.

Fusion/Powder Coated Valves

CAUTION!

Valves with fusion/powder coated exterior paint require flat washers to be installed under the flange nuts when installing the valve to the pipeline flange to prevent the paint from cracking or chipping.

Installation

Installation requirements are shown below. Refer to the Installation Drawing for dimensional information.

- Lift the valve with slings, chains, or cables fastened around the valve body, or fastened to bolts or rods through bolt holes in the flanges. Do not fasten lifting devices to the actuator or disc, or through the seat opening in the body. Failure to lift the valve properly may cause damage during handling and installation.
- Mount the actuator on the valve if the valve has been ordered without an actuator. For a DeZURIK actuator, refer to the Actuator Instructions. For an actuator other than DeZURIK, the dimensional requirements for the actuator interface are shown on the Installation Drawing for the valve.
- Before installation, remove all foreign material such as weld spatter, oil, grease, and dirt from the valve, flanges, and pipeline. Open the valve, and clean the seat and the sealing edge of the disc. Apply a light coating of silicone lubricant to the seat, and close the valve.
- To minimize the possibility of excessive dynamic torque in the valve, select a pipeline location which is at least 8 pipe diameters downstream from the nearest pump or elbow. The valve is bi-directional, and may be installed in any position; if possible, however, install the valve with the shaft horizontal to provide a self cleaning action on the seat.
- Use mating flanges that comply with ASME/ANSI B16.1 Class 125 or ASME/ANSI B16.5 Class 150. Flange gaskets are required.
- Place the valve in the pipeline with the valve closed. Ensure that the valve, the pipeline, and the mating connections are concentric before tightening the pipeline bolts. Tighten the bolts evenly, in a crisscross pattern.
- Due to varying conditions during shipment, storage, handling, and installation, valve testing is recommended while the valve is fully accessible in the pipeline.

Operation

Clockwise rotation of the valve shaft closes the disc in the seat. The valve is fully closed when the flat side of the disc is parallel with the flange sealing surface on the body; the valve is fully open when the disc is 90 degrees counterclockwise from the closed position. A line located on the top of the valve shaft may be used to determine the approximate position of the disc when the disc is not visible.

The valve actuator is connected to the valve shaft, and positions the disc at the open, closed, or intermediate positions. The adjustable open and closed position stops in the valve actuator are set to match the open and closed positions of the valve. Refer to the Actuator Instructions for actuator stop adjustment information.

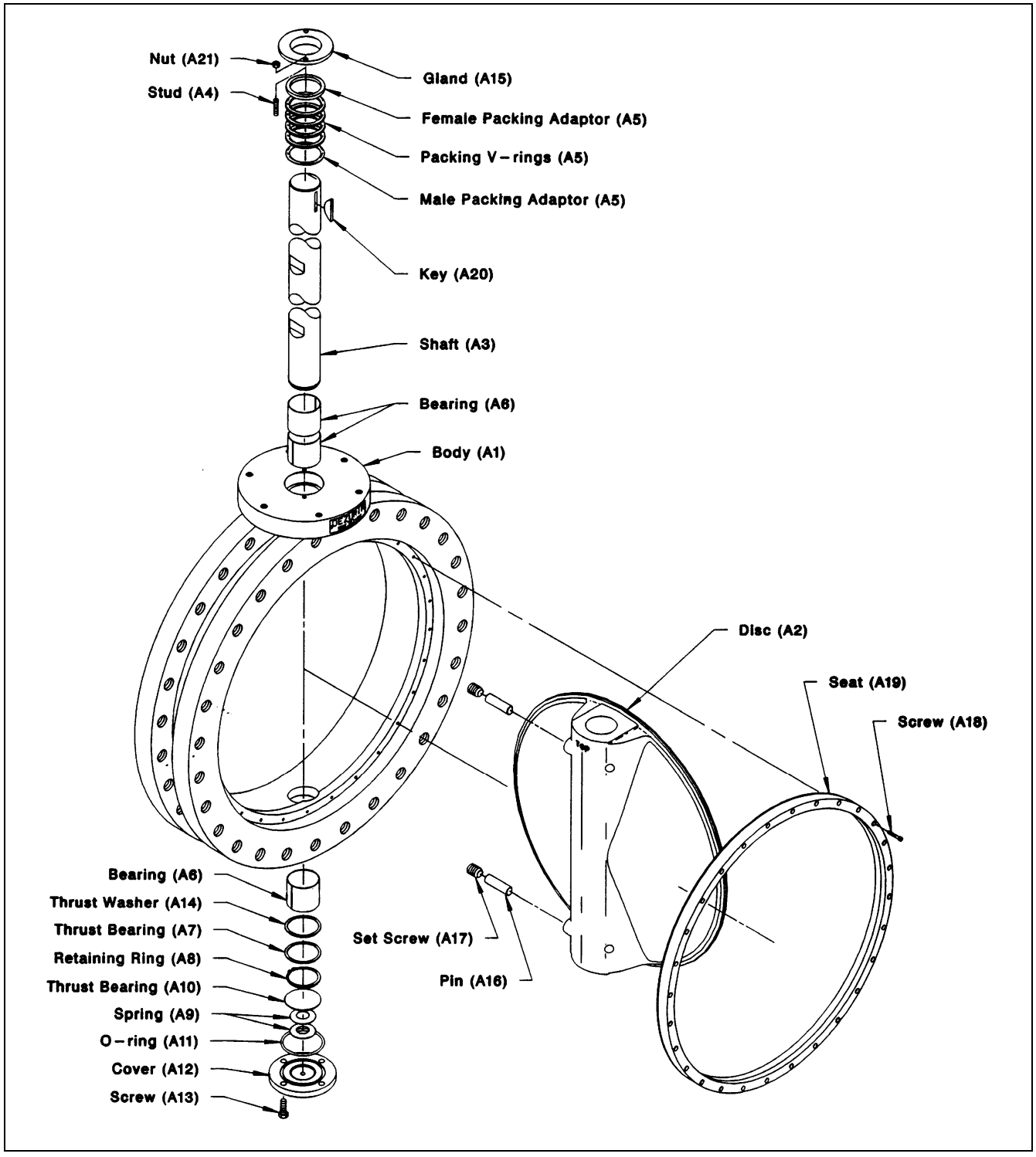


Figure 1 - Component Identification - Disassembled

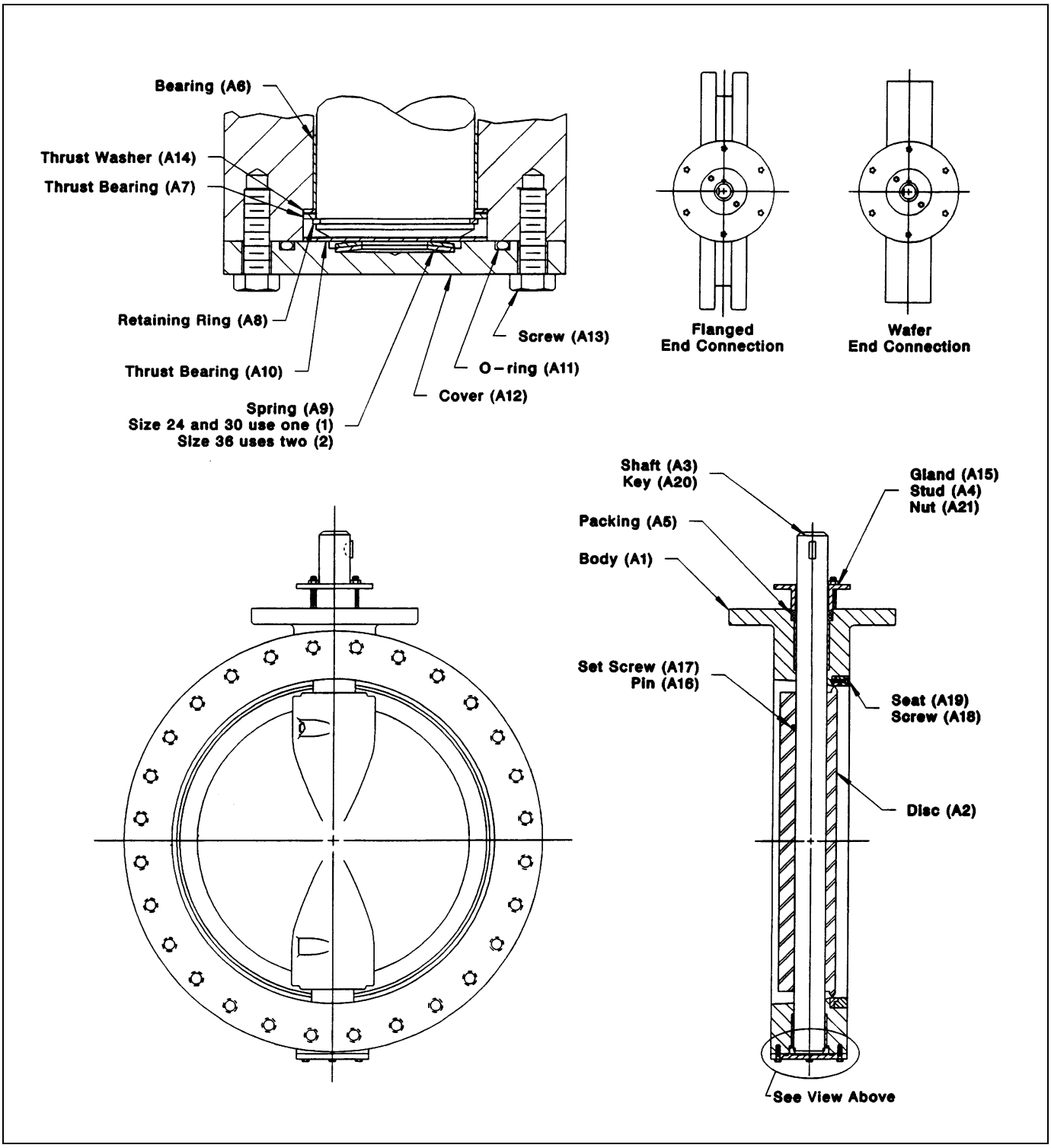


Figure 2 - Component Identification - Assembled

Lubrication

When the valve is installed, apply a light coating of silicone lubricant to the seat using one of these lubricants:

- Dow Corning Molykote No. 44 (recommended)
- Shell Retinax AM (alternate)
- Shell Lithall MDS (alternate)

Other lubrication requirements are described in the *Packing Replacement* and *Seat Replacement* sections

Packing Adjustment

The packing is contained and compressed by the packing gland (A15). If packing leakage occurs, tighten the two adjustment nuts (A21) on the packing gland. Tighten the nuts evenly and gently—just enough to stop the leakage. Over-tightening will cause excessive operating torque, and will decrease the life of the packing. If leakage persists, replace the packing as described in the *Packing Replacement* section.

Removing Valve from Pipeline

Follow the steps below to remove the entire valve assembly from the pipeline.

1. Relieve the pressure in the pipeline, and drain the sections of the pipeline on both sides of the valve.

WARNING!

Loosening the flange bolts on a pressurized valve can allow the valve to suddenly shift position and release uncontrolled pipeline fluid. To avoid personal injury or pipeline damage, relieve the pressure in the pipeline before loosening the pipeline flange bolts.

2. Close the valve.
3. If the valve has a powered actuator, turn off and disconnect the air pressure and/or electricity to the valve.

WARNING!

Moving parts from accidental operation of a powered actuator can cause personal injury or equipment damage. Disconnect and lock out power to actuator before servicing.

4. While supporting the valve, remove the bolts from the pipeline flanges.
5. Remove the valve from the pipeline. Refer to the lifting requirements in the *Installation* section.

Packing Replacement

Refer to Figures 1 and 2 for component identification.

1. Relieve the pressure in the pipeline, and close the valve.

WARNING!

Relieve the pipeline pressure before removing the actuator. Pipeline pressure can propel the loose actuator and/or the packing, and can cause personal injury or equipment damage.

2. If the actuator is powered, disconnect and lock out the pneumatic, hydraulic, or electrical power to prevent accidental operation of the actuator.

WARNING!

Moving parts from accidental operation of a powered actuator can cause personal injury or equipment damage. Disconnect and lock out power to actuator before servicing.

3. Remove the actuator from the valve as described in the Actuator Instructions.
4. Remove the two nuts (A21) and the gland (A15).
5. Use a hooked tool to remove all of the packing rings (A5) from the packing chamber. Remove all residue and debris so that the sealing surfaces are clean.
6. If the new packing ring material is rubber, apply a light film of silicone grease such as Dow Corning 44 to the inside and outside diameters of each of the packing rings. **Do not lubricate PTFE packing rings.** Slide the rings, one ring at a time, over the valve shaft and into the packing chamber as shown in Figure 2. Push the rings firmly in place. Do not use a sharp or pointed tool.
7. Replace the gland (A15) and the two nuts (A21). Tighten the nuts evenly and finger tight, plus ½ turn.
8. Replace the actuator as described in the Actuator Instructions.
9. Pressurize the valve and check for packing leakage. If leakage occurs, tighten the two nuts (A21) on the gland (A15). Tighten the nuts evenly and gently —just enough to stop the leakage. Over-tightening will cause excessive operating torque, and will decrease the life of the packing.

Seat Replacement

The resilient seat may be replaced by following the steps below. Refer to Figures 1, 2 and 3 for parts identification.

1. Remove the valve from the pipeline as described in the *Removing Valve From Pipeline* section.
2. Support the valve in a horizontal position with the seat side up. Open the valve.
3. Remove all of the seat screws (A18) with a 3/16" hex driver.
4. Note that several of the screw holes in the seat (A19) are threaded with 5/16-24 UNF threads. Screw eyebolts into three or four of the threaded holes, approximately equally spaced, and fasten a lifting device to each of the eyebolts. Lift the seat slowly and evenly from the body. As an alternative to the eyebolts, hex head screws may be used. Then remove the seat slowly and evenly with a pry bar or claw hammer on each of the screws.
5. Use a trichlorethane solvent such as Chlorothene to clean surfaces E and D on the body, and surfaces B and C on the new seat as shown in Figure 3.
6. Apply a light film of silicone lubricant such as Dow Corning 44 to seat surface C. **Do not get lubricant on seat surface B**.
7. Apply one thin, even, paint-like coat of Permatex Hi-Tack 99MA to seat surface B.
8. Align the holes in the seat (A19) with the holes in the body, place the seat in the body, and fasten the seat with seat screws (A18). Tighten the seat screws in a crisscross pattern to 30 ± 2 inch pounds. Tighten each screw three times, or until the torque stabilizes at 30 ± 2 inch pounds.

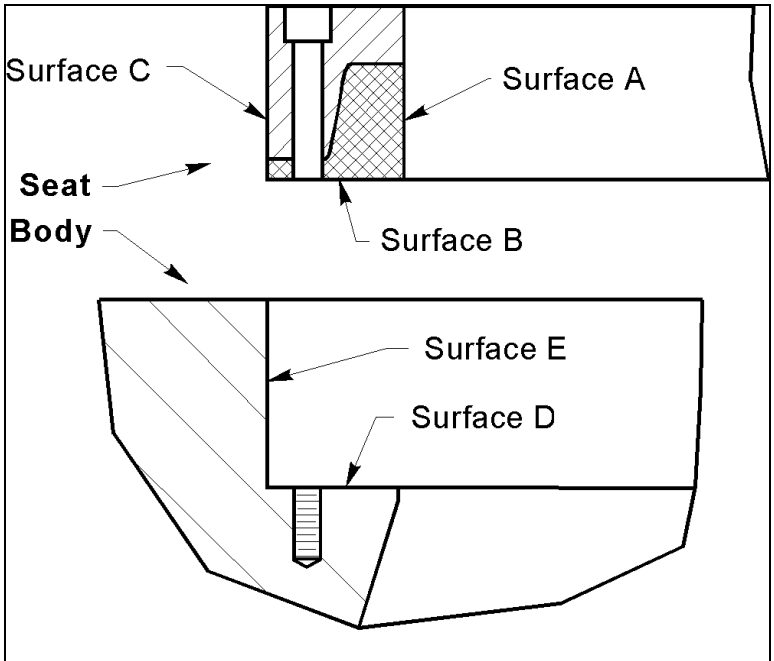


Figure 3
Seat and Body Surface Identification

Seat Replacement *(continued)*

9. Use a trychlorethane solvent such as Chlorothane to clean seat surface A.
10. Wipe seat surface A with a silicone fluid such as Slipmore 71751, manufactured by Pulmore, applied to a clean wiping cloth. **Do not spray directly on the seat.**
11. Replace the valve in the pipeline as described in the *Installation* section.

Valve Disassembly

The valve is disassembled and reassembled by following the steps in the next two sections. Inspect all parts for wear, and replace worn parts. Refer to Figures 1 and 2 for parts identification.

1. Remove the valve from the pipeline as described in the *Removing Valve From Pipeline* section.
2. Remove the actuator from the valve as described in the Actuator Instructions.
3. Remove the seat from the valve as described in steps 2 thru 4 in the *Seat Replacement* section.
4. Turn the valve over so that the seat side of the valve is down.
5. Remove the two disc set screws (A17) with a large slotted screw driver. Remove the two disc pins (A16) by driving each pin on the end opposite the set screw.
6. Remove the four bottom cover screws (A13), the bottom cover (A12), the spring washer(s) (A9), the thrust bearing (A10), and the O-ring (A11).
7. To protect the machined edge of the disc (A2), place a small wooden block or several thick cloths between the disc and the body at the 12 o'clock and 6 o'clock positions of the opened disc.
8. Remove the two gland nuts (A21) and the gland (A15). Remove all of the packing rings (A5) with a hooked tool.
9. Support the disc (A2) securely with wooden blocks so that the disc does not drop and become damaged during the next step.
10. Push on the top end of the shaft (A3), and slide the shaft out of the bottom of the body. The shaft may instead be removed from the top of the body by first pushing the shaft down far enough to remove the parts in step 11.
11. Remove the retaining ring (A8), the thrust washer (A14), and the thrust bearing (A7) from the shaft.
12. Remove the three bearings (A6) from the body.

Valve Reassembly

Clean and inspect all parts, and replace worn parts before reassembly. Refer to Figures 1 and 2 for parts identification.

1. Support the valve body (A1) in a horizontal position with the seat side down.
2. Place two bearings (A6) in the upper body area with the joints opposed —towards the 3 o'clock and 9 o'clock positions of the body. Place one bearing (A6) in the lower body area with the joint aligned with the joint in either of the upper bearings. **Do not lubricate the bearings.**
3. If the packing (A5) material is rubber, apply a light film of light grease such as Dow Corning 44 to the inside and outside diameters of each of the packing rings. Do not lubricate PTFE packing rings. Slide the rings one ring at a time into position in the body (A1) as shown in Figure 2.
4. Note the word “top” cast in the disc (A2). With “top” towards the top (or neck) of the body, place and hold the disc in position in the body. **Handle the disc carefully so that the edge of the disc does not get scratched or damaged.**
5. Slide the top end of the shaft (A3) thru the lower body bearing (A6), thru the disc (A2), and partially thru the upper body bearings. The bottom end of the shaft must extend an inch or two out the bottom of the body so that the groove near the lower end of the shaft is accessible for the next step.
6. Place the thrust washer (A14) and upper thrust bearing (A7) on the bottom of the shaft (A3) with the burr side of the thrust washer towards the body, and the fiber side of the upper thrust bearing towards the thrust washer. Place the retaining ring (A8) in the groove in the shaft, and push the bottom end of the shaft into position in the body so that the retaining ring is bottomed out against the upper thrust bearing, the thrust washer, and the body.
7. Place the fiber side of the lower thrust bearing (A10) against the bottom of the shaft (A3), and place the (A9) spring washer(s)—the 24" and 30" valve have **one** spring washer, and the 36" valve has **two**—against the lower thrust bearing. The spring washer(s) may be adhered in position with a small amount of light grease such as Dow Corning 44. **Do not get grease on the thrust bearings**.
8. Apply a light film of light grease such as Dow Corning 44 to the O-ring (A11), and place the O-ring in the groove of the bottom cover (A12). Mount the cover to the body (A1) with the four screws (A13). Tighten the screws to 40 ± 3 foot pounds.
9. Place the two disc pins (A16) in the disc (A2) and rotate the disc so that the flats on the pins are against the flats on the shaft. **Do not drive the pins until step 11.**
10. Open the disc (A2) and slide the disc on the shaft (A3) so that the disc is approximately centered in the body. Measure the disc-to-body clearance with a feeler gauge at both the 12 o'clock and 6 o'clock positions of the body. Slide the disc on the shaft so that the two measured clearances are equal within .002", and lock the disc in position with two feeler gauges.
11. With the feeler gauges in place, tap the two disc pins (A16) lightly, and secure the pins with the set screws (A17). Tighten the set screws to 100 ± 5 foot pounds, and remove the feeler gauges.
12. Replace the gland (A15) and the two nuts (A21). Tighten the nuts evenly and finger tight, plus ½ turn.
13. Turn the valve over so that the seat side of the valve is up.
14. Install the seat as described in steps 5 thru 10 of the *Seat Replacement* section.
15. Replace the actuator as described in the Actuator Instructions.

Valve Reassembly *(continued)*

16. Install the valve in the pipeline as described in the *Installation* section. Re-connect any pneumatic and electrical lines to the valve actuator and accessories.
17. The pipeline may now be pressurized. If packing leakage occurs, tighten the two nuts (A21) on the gland (A15). Tighten the nuts evenly and gently—just enough to stop the leakage. Over-tightening will cause excessive operating torque, and will decrease the life of the packing.

Troubleshooting

Condition	Possible Cause	Corrective Action
Packing leaks.	Packing is loose.	Adjust packing. See *Packing Adjustment* section.
	Packing is worn.	Replace packing. See *Packing Replacement* section.
Valve does not close.	Object is wedged between disc and seat.	Open valve and allow flushing action to remove object.
	Closed position stop is not adjusted correctly.	Adjust stop. See Actuator Instructions.
Valve leaks when closed.	Seat is worn or damaged.	Replace seat. See *Seat Replacement* section.
	Disc is worn or damaged.	Replace disc. See *Valve Disassembly* and *Valve Reassembly* sections.
	Closed position stop is not adjusted correctly.	Adjust stop. See Actuator Instructions.

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For items proven to be defective within the warranty period, your exclusive remedy under this limited warranty is repair or replacement of the defective item, at Seller’s option, FCA Incoterms 2020 Seller’s facility with removal, transportation, and installation at your cost.

Products or parts manufactured by others but furnished by Seller are not covered by this limited warranty. Seller will provide repair or replacement for other’s products or parts only to the extent provided in and honored by the original manufacturer’s warranty to Seller, in each case subject to the limitations contained in the original manufacturer’s warranty.

No claim for transportation, labor, or special or consequential damages or any other loss, cost or damage is being provided in this limited warranty. You shall be solely responsible for determining suitability for use and in no event shall Seller be liable in this respect.

This limited warranty does not warrant that any Seller product or part is resistant to corrosion, erosion, abrasion or other sources of failure, nor does Seller warrant a minimum length of service.

Your failure to give written notice to us of any alleged defect under this warranty within twenty (20) days of its discovery, or attempts by someone other than Seller or its authorized representatives to remedy the alleged defects therein, or failure to return product or parts for repair or replacement as herein provided, or failure to store, install, or operate said products and parts according to the recommendations and instructions furnished by Seller shall be a waiver by you of all rights under this limited warranty.

This limited warranty is voided by any misuse, modification, abuse or alteration of Seller’s product, accident, fire, flood or other Act of God, or your failure to pay entire contract price when due.
The foregoing limited warranty shall be null and void if, after shipment from our factory, the item is modified in any way or a component of another manufacturer, such as but not limited to, an actuator is attached to the item by anyone other than a Seller factory authorized service personnel.

All orders accepted shall be deemed accepted subject to this limited warranty, which shall be exclusive of any other or previous Warranty, and this shall be the only effective guarantee or warranty binding on Seller, despite anything to the contrary contained in the purchase order or represented by any agent or employee of Seller in writing or otherwise, notwithstanding, including but not limited to implied warranties.

THE FOREGOING REPAIR AND REPLACEMENT LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, OBLIGATIONS AND LIABILITIES, INCLUDING ALL WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR OF MERCHANTABILITY OR OTHERWISE, EXPRESSED OR IMPLIED IN FACT OR BY LAW, AND STATE SELLER’S ENTIRE AND EXCLUSIVE LIABILITY AND YOUR EXCLUSIVE REMEDY FOR ANY CLAIM IN CONNECTION WITH THE SALE AND FURNISHING OF SERVICES, GOODS OR PARTS, THEIR DESIGN, SUITABILITY FOR USE, INSTALLATION OR OPERATIONS.

Disclaimer

Metric fasteners should not be used with ASME Class 150/300 bolt holes and flange bolt patterns. If you use metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns, it may lead to product failure, injury, and loss of life. DeZURIK Inc. disclaims all liability associated with the use of metric fasteners with ASME Class 150/300 bolt holes and flange patterns, including but not limited to personal injury, loss of life, loss of product, production time, equipment, property damage, lost profits, consequential damages of any kind and environment damage and/or cleanup. Use of metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns is a misuse that voids all warranties and contractual assurances. If you use metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns, you do so at your sole risk and any liability associated with such use shall not be the responsibility of DeZURIK, Inc. In addition to the foregoing, DeZURIK’s Manufacturer’s Conditions apply.

Limitation of Liability

IN NO EVENT SHALL SELLER BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES WHATSOEVER, AND SELLER’S LIABILITY, UNDER NO CIRCUMSTANCES, WILL EXCEED THE CONTRACT PRICE FOR THE GOODS AND/OR SERVICES FOR WHICH LIABILITY IS CLAIMED. ANY ACTION FOR BREACH OF CONTRACT BY YOU, OTHER THAN RIGHTS RESPECTING OUR LIMITED WARRANTY DESCRIBED ABOVE, MUST BE COMMENCED WITHIN 12 MONTHS AFTER THE DATE OF SALE.

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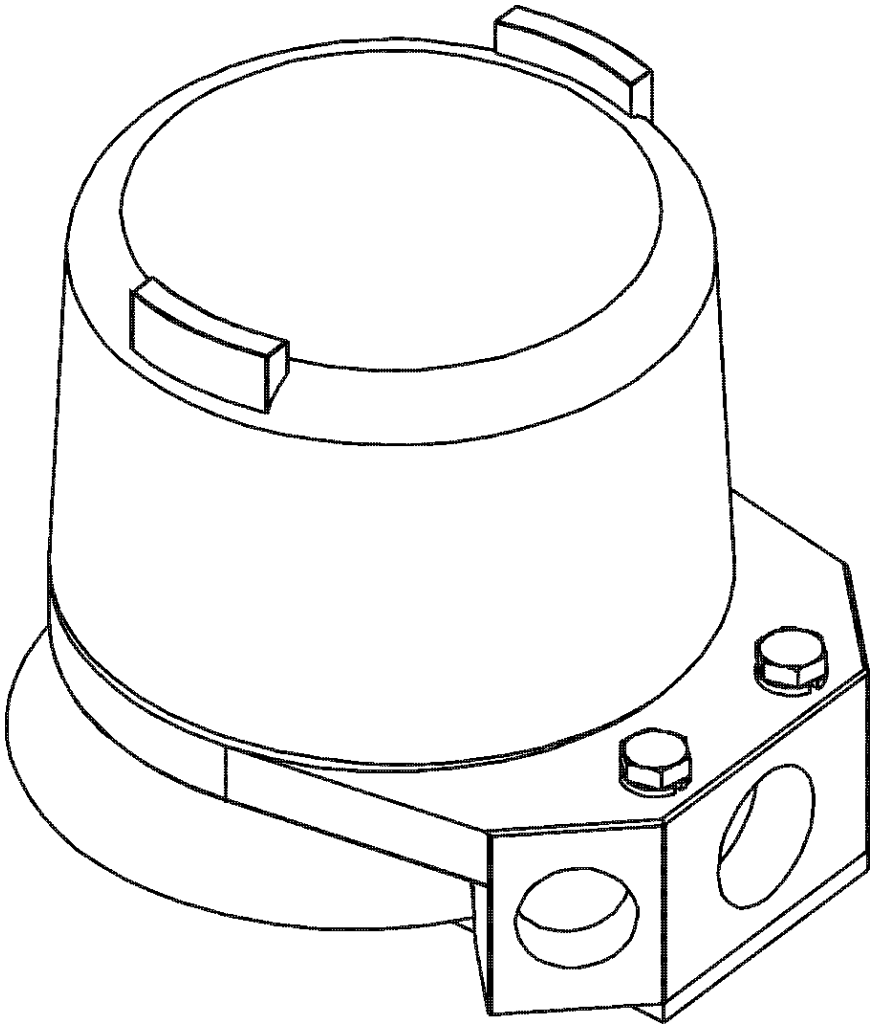
Web site: www.dezurik.com E-Mail: info@dezurik.com

250 Riverside Ave. N., Sartell, MN 56377 ● Phone: 320-259-2000 ● Fax: 320-259-2227

October 2021 Printed in U.S.A.

DEZURIK SWITCH AND POSITIONER TRANSMITTER



Instruction D10350
May 2014

DeZURIK, Inc. Sartell, Minnesota USA | Phone: 320-259-2000 | www.dezurik.com | info@dezurik.com

Instructions

These instructions are for use by personnel who are responsible for the installation, operation and maintenance of DeZURIK valves, actuators or accessories.

Safety Messages

All safety messages in the instructions are identified by a general warning sign and the signal word CAUTION, WARNING or DANGER. These messages indicate procedures to avoid injury or death.

Safety label(s) on the product indicate hazards that can cause injury or death. If a safety label becomes difficult to see or read, or if a label has been removed, please contact DeZURIK for replacement label(s).

⚠WARNING

Personnel involved in the installation or maintenance of valves should be constantly alert to potential emission of pipeline material and take appropriate safety precautions. Always wear suitable protection when dealing with hazardous pipeline materials. Handle valves which have been removed from service with suitable protection for any potential pipeline material in the valve.

Inspection

Your DeZURIK product has been packaged to provide protection during shipment; however, items can be damaged in transport. Carefully inspect the unit for damage upon arrival and file a claim with the carrier if damage is apparent.

Parts

Replaceable wear parts are listed on the assembly drawing. These parts can be stocked to minimize downtime. Order parts from your local DeZURIK sales representative or directly from DeZURIK. When ordering parts please provide the following information:

If the valve has a data plate: please include the 7-digit part number with either 4-digit revision number (example: 9999999R000) or 8-digit serial number (example: S1900001) whichever is applicable. The data plate will be attached to the valve assembly. Also, include the part name, the assembly drawing number, the balloon number and the quantity stated on the assembly drawing.

If there isn't any data plate visible on the valve: please include valve model number, part name, and item number from the assembly drawing. You may contact your local DeZURIK Representative to help you identify your valve.

DeZURIK Service

DeZURIK service personnel are available to maintain and repair all DeZURIK products. DeZURIK also offers customized training programs and consultation services. For more information, contact your local DeZURIK sales representative or visit our website at DeZURIK.com.

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Description

This valve accessory provides electrical functions in response to the open, closed, and intermediate positions of a 2-way valve or a 2-position 3-way valve. Electrical switching and variable current functions are provided in selected combinations. The adjustable sensing devices are mechanically linked to a valve, a valve actuator, or a positioner.

Components are located in a sealed and accessible aluminum enclosure, constructed to comply with NEMA types 4, 4X, 7 and 9. The position of the valve is visibly displayed in two windows at 180° viewing angles. Three basic options consisting of mechanical switches, proximity switches, and a position transmitter are provided individually or in selected combinations. The three options are described below.

Electrical Connections

Field wiring enters through ¾" and ½" NPT electrical connections to a prewired and labeled terminal strip as described in the following sections. One ½" pipe plug is provided with the unit. If the ½" connection is not used, install the pipe plug tightly in the connection. Do not use thread sealant.

Mechanical Switches

The two SPDT or four SPDT mechanical snap-acting switches each have a rating of:

- Silver Contacts -10 Amps at 125/250 VAC, or 0.5 Amp at 125 VDC.
- Gold Contacts - 1 Amp at 125 VAC, or 0.5 Amp at 30 VDC

With two SPDT switches, the top switch is factory set to trip as the valve reaches the closed or clockwise position, and the bottom switch is factory set to trip as the valve reaches the open or counter-clockwise position. The internal wiring from the switches to the terminal strip is shown in Figure 1.

With four SPDT switches, the top (first) switch is factory set to trip as the valve reaches the closed or clockwise position, and the bottom (fourth) switch is factory set to trip as the valve reaches the open or counterclockwise position. The second and third switches are not factory set, but may be set in the field. The internal wiring from the switches to the terminal strip is shown in Figure 2.

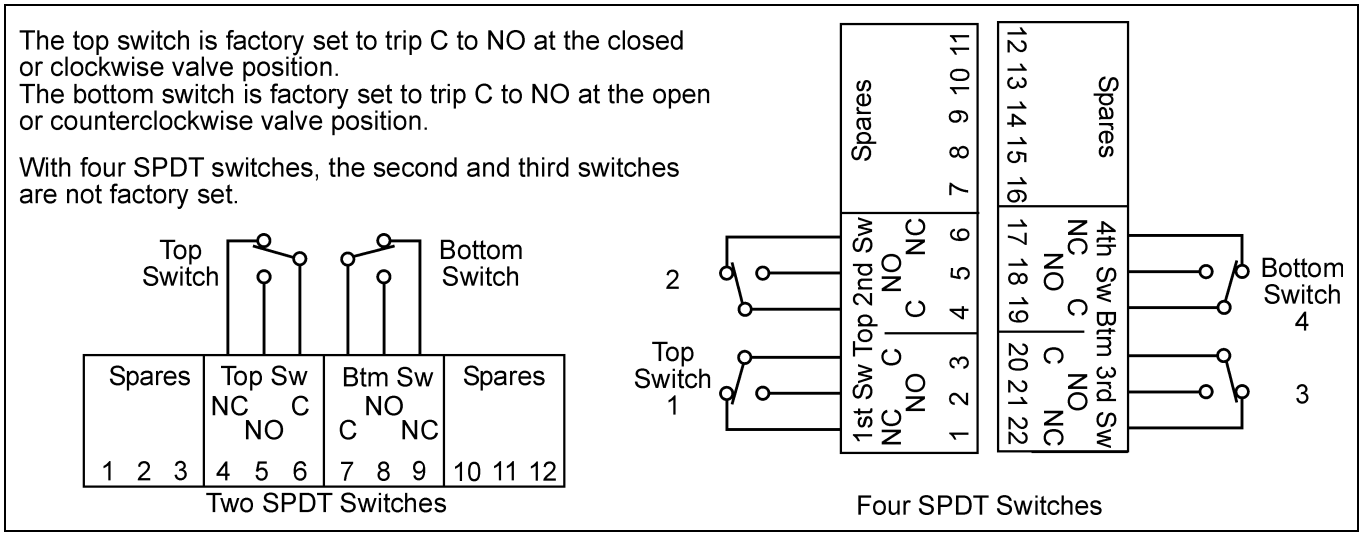

Figure 1— Mechanical Switches

Mechanical Switches *(Continued)*

Each switch is actuated by a rotating cam. To adjust a top switch, push the top cam down, rotate it to the desired position, and release the cam so it engages into the new position on the spline. To adjust a bottom switch, repeat the process with the bottom cam, but lift the cam upwards to rotate it to the desired position. Each cam may be further fine-tuned between spline positions by turning the set screw on the cam with a 1/16" hex driver. The set screw is limited to adjustment of no more than one full turn.

Proximity Switches

The two SPDT proximity switches each has a rating of 0.3 amp at 120 VAC, or 0.2 amp at 30 VDC. The switch contacts are sealed for low-energy switching of solid-state signal circuits.

The top switch is factory set to trip as the valve reaches the closed or clockwise position, and the bottom switch is factory set to trip as the valve reaches the open or counterclockwise position. The internal wiring from the switches to the terminal strip is shown in Figure 2.

Each switch is actuated as the white stripe on its rotating cam aligns with the white stripe on the switch. To adjust the top switch, push the top cam down, rotate it to the desired position, and release the cam so it slides into the new position on the spline. To adjust the bottom switch, repeat the process with the bottom cam, but lift the cam upwards to rotate it to the desired position.

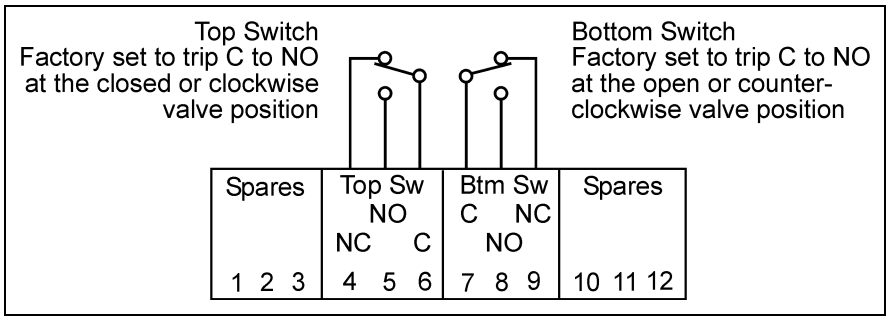

Figure 2—Proximity Switches

Position Transmitter

The position transmitter provides a 4 to 20 mA output signal with the plus and minus terminals connected in series with an external 24 VDC power supply. Voltage variations from 10 VDC to 40 VDC do not affect the current signal. The maximum load is 700 ohms at 24 VDC. The unit is calibrated as shown in the following steps. Refer to Figure 3 for component identification.

1. Plug the 3-pin potentiometer connector into the appropriate 3 pins on the 5-pin block as described in Figure 3. The 5-pin block is located next to the span adjustment.
2. Place the valve in the position desired for 4 mA output. Do not connect power until step 4. If the valve is in the closed or clockwise position, connect an ohmmeter to terminals 2 and 3 of the potentiometer; if the valve is in the open or counterclockwise position, connect an ohmmeter to terminals 1 and 2 of the potentiometer.
3. Loosen the coupling that drives the potentiometer shaft, and rotate the potentiometer so that the ohmmeter reads 500 ± 100 ohms. Then tighten the coupling, and disconnect the ohmmeter from the potentiometer.
4. Connect a 20 mA ammeter and a 24 VDC power supply to terminals + and – as shown in Figure 3.
5. Adjust the zero trimpot so that the ammeter reads 4 ± 0.1 mA.
6. Place the valve in the position desired for 20 mA output. Adjust the span trimpot so that the ammeter reads 20 ± 0.1 mA. The zero and span adjustments are not interactive.

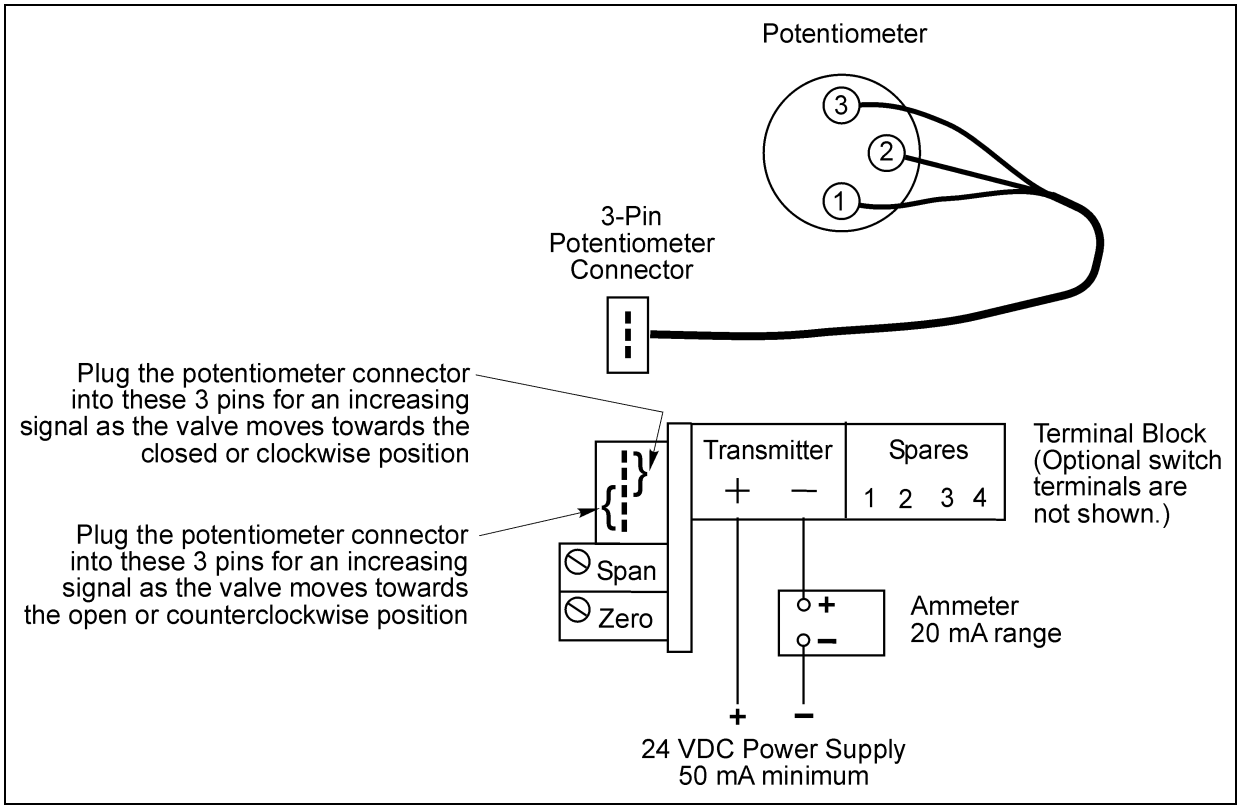

Figure 3—Position Transmitter

Indicator Adjustment

The open-closed indicator on all units, shown in Figure 4 as indicator drum (A4), may be re-indexed on the input shaft as follows:

1. Remove the two mounting screws and washers near the conduit connection, and lift the unit from position so that the bottom of the unit is accessible.
2. Loosen the screw (A5) about 3 turns.
3. Pull out the spacer (A6) and shaft adaptor (A1) so that the spacer pins are disengaged from the timing holes in the indicator drum (A4). (The shaft adaptor may be a different size and/or shape than shown in Figure 3.)
4. Rotate the indicator drum (A4) to the desired position, and push the shaft adaptor (A1) and spacer (A6) towards the indicator drum (A4) to engage the spacer pins with the nearest timing holes in the indicator drum. Tighten the screw (A5) to 8 ± 2 inch pounds.
5. Replace the unit in the same mounting position with the two screws and washers, and tighten the screws to 80 ± 5 inch pounds.
6. To fine-tune the position of the indicator cover (A3), loosen the set screw (A2), and rotate the indicator cover to the desired position. Tighten the set screw.

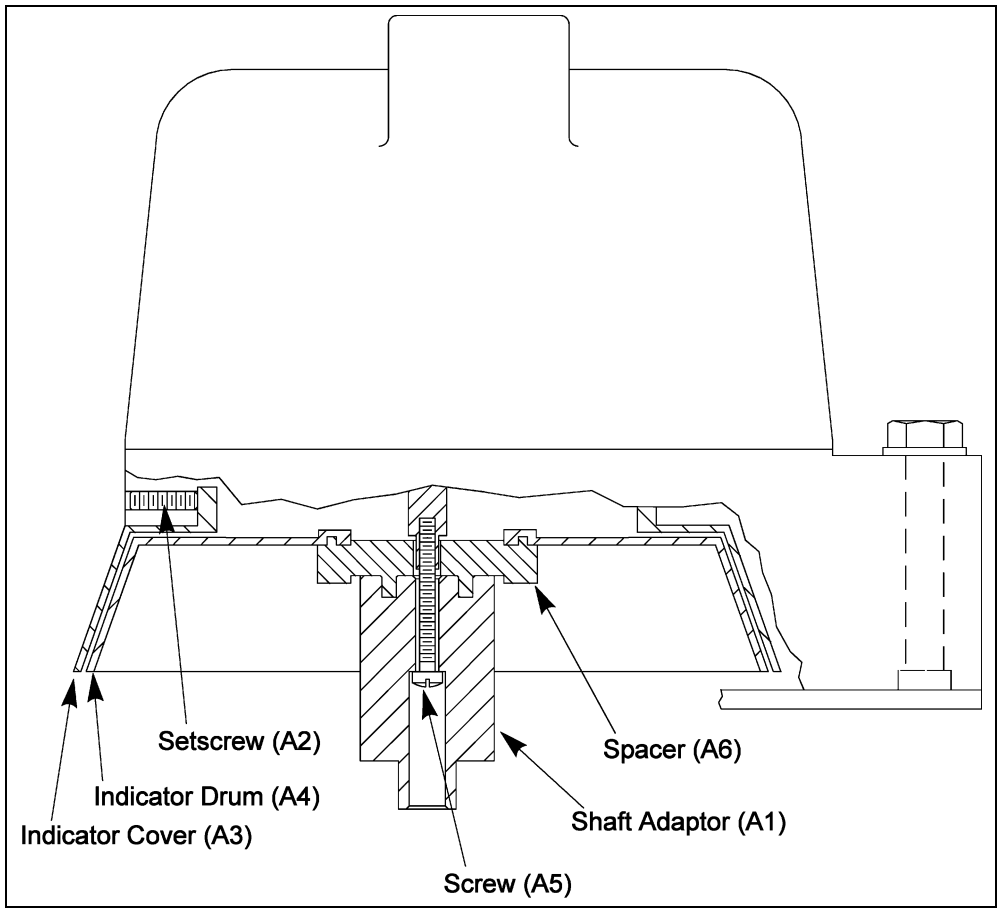

Figure 4 - Indicator Adjustment Components

Switch Mounting Kit used on PMV Positioner

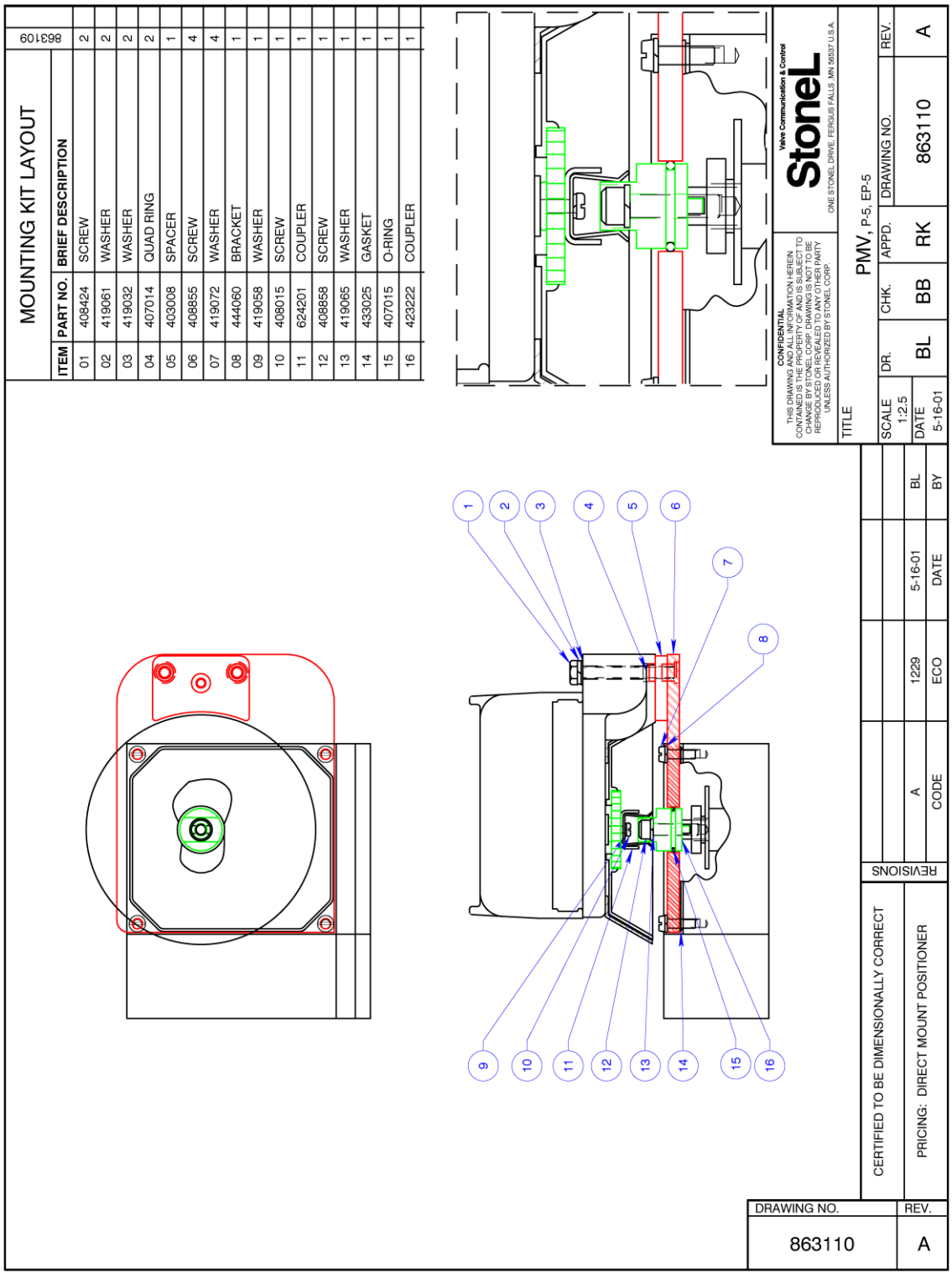

Figure 5 – Switch Mounting Kit used on PMV Positioner

Limited Warranty

DeZURIK, Inc. (“Seller”) manufactured products, auxiliaries and parts for a period of twenty-four (24) months from date of shipment from Seller’s factory, are warranted to the original purchaser only against defective workmanship and material, but only if properly stored, installed, operated, and serviced in accordance with Seller’s recommendations and instructions.

For items proven to be defective within the warranty period, your exclusive remedy under this limited warranty is repair or replacement of the defective item, at Seller’s option, FCA Incoterms 2020 Seller’s facility with removal, transportation, and installation at your cost.

Products or parts manufactured by others but furnished by Seller are not covered by this limited warranty. Seller will provide repair or replacement for other’s products or parts only to the extent provided in and honored by the original manufacturer’s warranty to Seller, in each case subject to the limitations contained in the original manufacturer’s warranty.

No claim for transportation, labor, or special or consequential damages or any other loss, cost or damage is being provided in this limited warranty. You shall be solely responsible for determining suitability for use and in no event shall Seller be liable in this respect.

This limited warranty does not warrant that any Seller product or part is resistant to corrosion, erosion, abrasion or other sources of failure, nor does Seller warrant a minimum length of service.

Your failure to give written notice to us of any alleged defect under this warranty within twenty (20) days of its discovery, or attempts by someone other than Seller or its authorized representatives to remedy the alleged defects therein, or failure to return product or parts for repair or replacement as herein provided, or failure to store, install, or operate said products and parts according to the recommendations and instructions furnished by Seller shall be a waiver by you of all rights under this limited warranty.

This limited warranty is voided by any misuse, modification, abuse or alteration of Seller’s product, accident, fire, flood or other Act of God, or your failure to pay entire contract price when due.
The foregoing limited warranty shall be null and void if, after shipment from our factory, the item is modified in any way or a component of another manufacturer, such as but not limited to, an actuator is attached to the item by anyone other than a Seller factory authorized service personnel.

All orders accepted shall be deemed accepted subject to this limited warranty, which shall be exclusive of any other or previous Warranty, and this shall be the only effective guarantee or warranty binding on Seller, despite anything to the contrary contained in the purchase order or represented by any agent or employee of Seller in writing or otherwise, notwithstanding, including but not limited to implied warranties.

THE FOREGOING REPAIR AND REPLACEMENT LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, OBLIGATIONS AND LIABILITIES, INCLUDING ALL WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR OF MERCHANTABILITY OR OTHERWISE, EXPRESSED OR IMPLIED IN FACT OR BY LAW, AND STATE SELLER’S ENTIRE AND EXCLUSIVE LIABILITY AND YOUR EXCLUSIVE REMEDY FOR ANY CLAIM IN CONNECTION WITH THE SALE AND FURNISHING OF SERVICES, GOODS OR PARTS, THEIR DESIGN, SUITABILITY FOR USE, INSTALLATION OR OPERATIONS.

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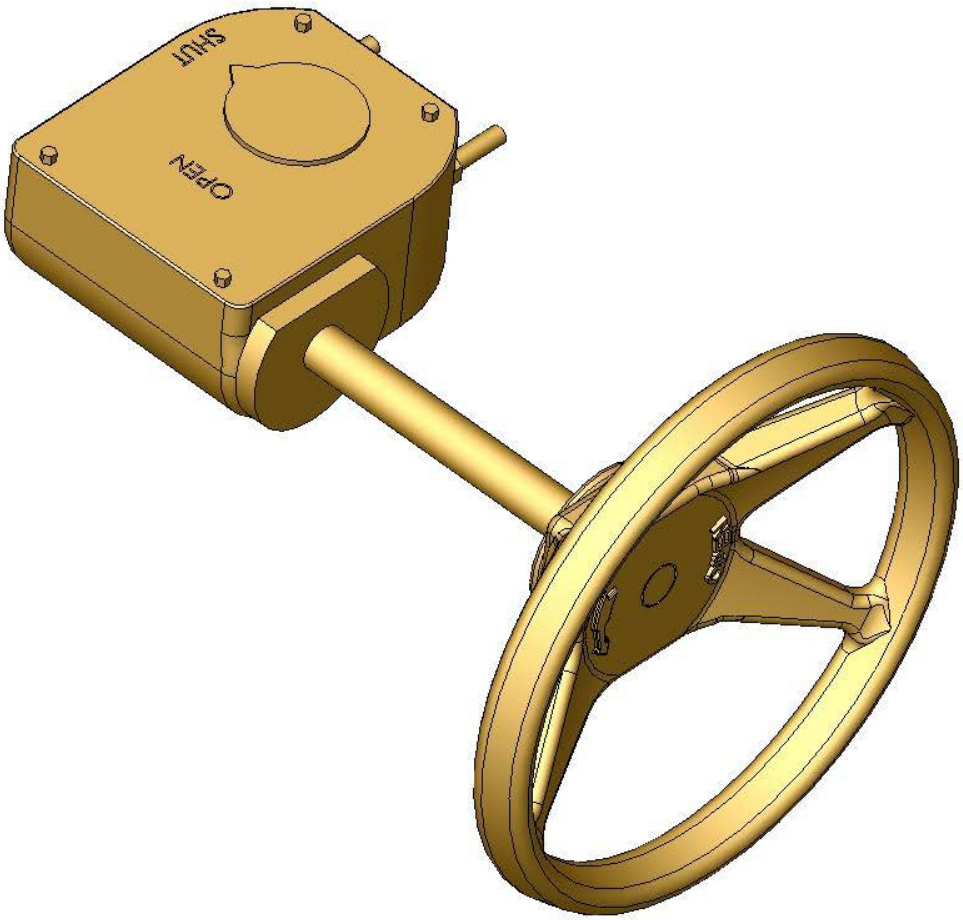
250 Riverside Ave. N., Sartell, MN 56377 ● Phone: 320-259-2000 ● Fax: 320-259-2227

October 2021 Printed in U.S.A.

DEZURIK MANUAL GEAR ACTUATOR



Instruction D10408
August 2012

DeZURIK, Inc. Sartell, Minnesota USA | Phone: 320-259-2000 | www.dezurik.com | info@dezurik.com

Instructions

These instructions are for use by personnel who are responsible for the installation, operation and maintenance of DeZURIK valves, actuators or accessories.

Safety Messages

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Description

The Manual Gear Actuator is a quarter-turn gear actuator. The actuator is available with a handwheel, chainwheel or 2" (50mm) square nut operator. Each actuator has adjustable open and closed position stops and may be mounted on the valve in four positions.

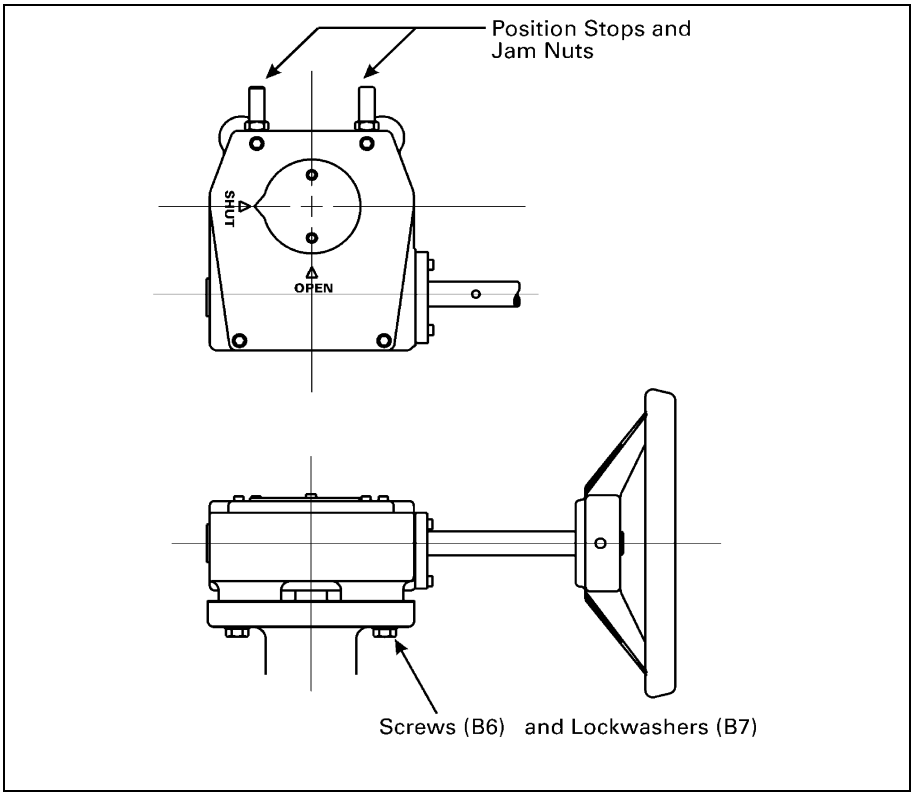


Figure 1— Component Identification

Operation

Clockwise rotation of the operator closes the valve; counterclockwise rotation opens the valve.

Lubrication

The actuator is lubricated at the factory, and does not require further lubrication.

Position Stops

The open and closed position stops prevent the actuator from rotating beyond the open and closed positions of the valve. Each stop is adjustable. If the actuator is factory-mounted, the stops do not require adjustment. If the actuator is not factory mounted, or if the actuator has been removed, adjust the stops as described below. See Figure 1 for component identification.

Adjusting the Closed Position Stop

1. Loosen the jam nut on the closed position stop screw and loosen the stop screw about two turns.
2. Turn the handwheel so that the valve is in the closed position.
3. Turn the closed position stop screw clockwise until resistance is felt from the screw coming into contact with the gear inside of the actuator.
4. Hold the stop screw to prevent it from turning and tighten the jam nut to the torque shown in Table A.

Adjusting the Open Position Stop

1. Loosen the jam nut on the open position stop screw and loosen the stop screw about two turns.
2. Turn the handwheel so that the valve is in the open position.
3. Turn the open position stop screw clockwise until resistance is felt from the stop screw contacting the gear inside of the actuator.
4. Hold the stop screw to prevent it from turning and tighten the jam nut to the torque shown in Table A.

Table A : Jam Nut Torque

	Actuator			
	MG-7	**MG-1012**	**MG-1216**	**MG-16**
Torque, ft lbs **Jam Nut Nm**	6±2 8±3	21±5 28±7	21±5 28±7	45±5 61±7

Removing Actuator

Refer to Figure 1 for component identification.

WARNING!

Flow in the pipeline with the actuator removed can slam the valve closed causing personal injury and damaging the flow system. Shut down the flow in the pipeline before removing the actuator from the valve.

1. Close the valve.
2. Remove the four mounting screws (B6) and lockwashers (B7).
3. Remove the actuator from the valve.

Adaptor Mounting Screws

The MG-1012 and MG-1216 Manual Gear Actuators have two sets of mounting holes.

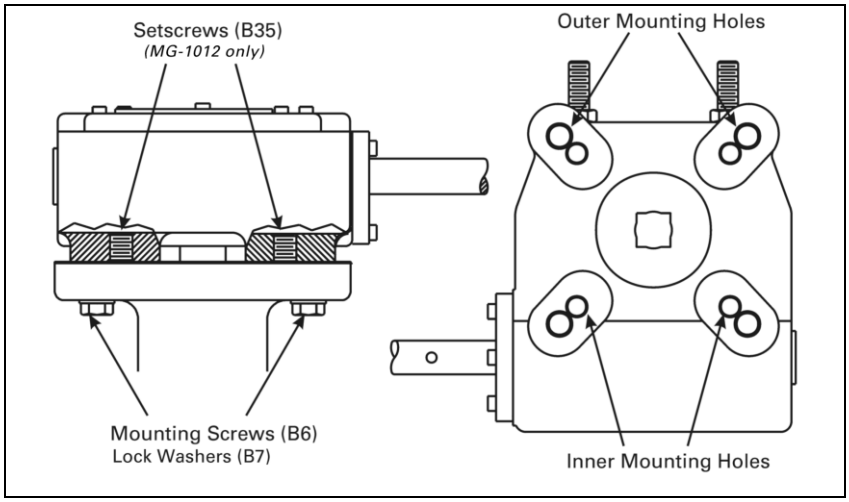


Figure 2 — Mounting Screw Locations

MG-1012

When using the outer mounting holes on the MG-1012 actuator, you must first remove the setscrews from the two mounting holes that are inline with the input shaft. When using the outer mounting holes, plug all interior holes with setscrews.

Note: Tighten the setscrews only until they are flush with the edge of the body. Make sure the setscrews are not protruding into the gears.

Table B: Mounting Bolt Torque ft. lb./Nm

Mounting Bolts	Actuator			
	MG-1012		MG-1216	
Torque, ft lbs	47±6	83±10	83±10	435±60
Carbon Steel Nm	64±8	113±14	113±14	592±81
Torque, ft lbs	33±4	58±8	58±8	300±40
Stainless Steel Nm	45±5	79±11	79±11	407±54

Mounting Actuator

Refer to Figure 1 for component identification.

1. Place both the actuator and the valve in the closed position.
2. Select the desired actuator mounting position from the optional positions shown on the installation drawing. Place the gasket in position (see note below), engage the actuator with the valve shaft, and slide the actuator into position on the top of the valve.

   Note: All chainwheel actuators use a 1/32" (0.8 mm) thick gasket (B28) between the actuator and the chainwheel support (B29). High-temperature valves use a 1/16" (1.6 mm) thick insulating gasket (P5) on both handwheel and chainwheel operators. The insulating gasket is used only when the gasket is included with the valve.
3. Mount the actuator and gasket (see note above) to the valve with the four mounting screws (B6) and lockwashers (B7). Tighten the screws as shown in Table C or Table B.

Table C: Mounting Bolt Torque ft. lb./Nm

Mounting Bolts	Actuator			
	MG-7	MG-1012	MG-1216	MG-16
Torque, ft lbs	23±3	See	See	435±60
Carbon Steel Nm	31±4	Table B	Table B	592±81
Torque, ft lbs	16±2	See	See	300±40
Stainless Steel Nm	22±3	Table B	Table B	407±54

4. Adjust the open and closed position stops as shown in the Adjustments section.

Changing the Mounting Position

No additional components are needed to change the mounting position of the Manual Gear Actuator.

Before changing the actuator mounting position, check to assure that dimensional clearance is available for the proposed actuator location. The actuator may be mounted in any one of two or four positions as indicated on the installation drawing for the valve. To change the position, follow the steps in the *"REMOVING ACTUATOR"* and *"MOUNTING ACTUATOR"* sections.

Replacing a Handwheel with a Chainwheel

On sizes MG-7 through MG-16, the handwheel can be replaced with a chainwheel. Refer to Figure 1 for component identification.

1. Remove the actuator from the valve as described in the *"REMOVING ACTUATOR"* section.
2. Support the actuator shaft on a solid surface, drive out the handwheel pin (B31), and remove the handwheel (B10).

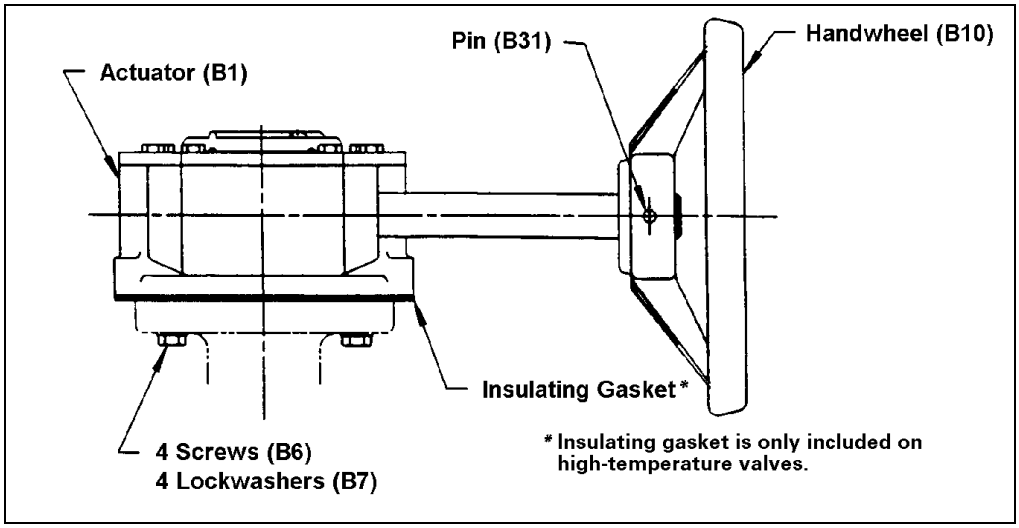


Figure 3—Handwheel

3. Place the shaft extension (B23) on the actuator shaft, and align the pin holes. Support the shaft extension on a solid surface, and drive the pin (B31) into position.

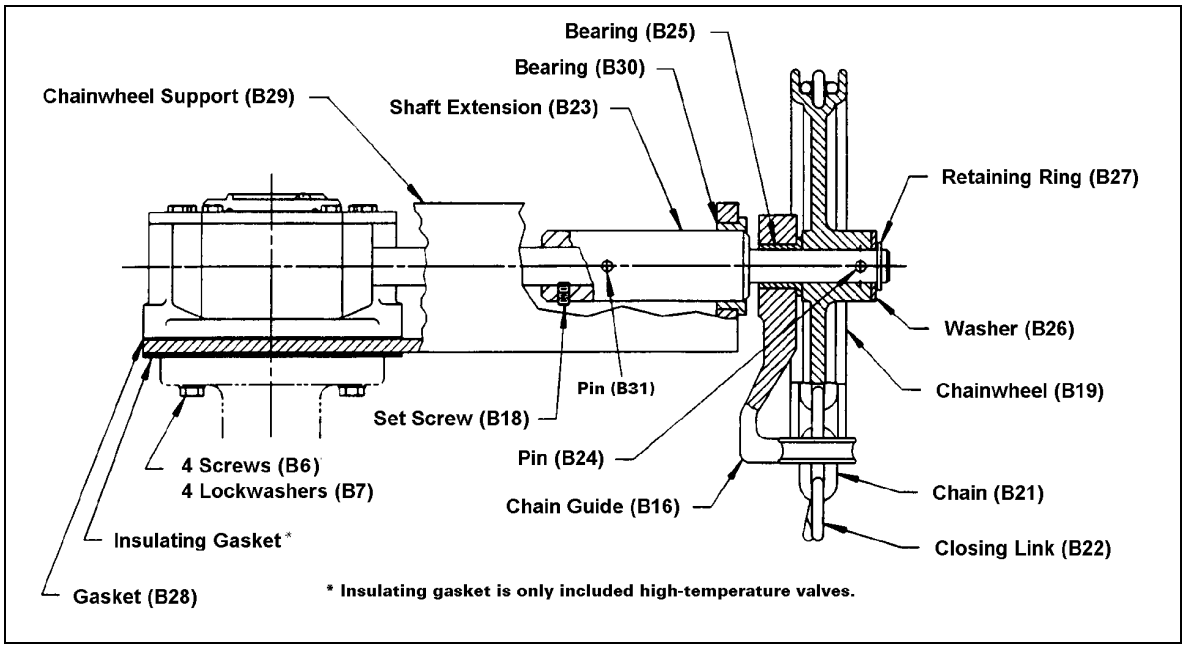


Figure 4—Chainwheel Assembly

4. Turn the set screw (B18) into the threaded hole in the shaft extension, and tighten the set screw to 7 ± 1 foot pounds (9 ± 1 Nm).

Replacing a Handwheel with a Chainwheel *(Continued)*

5. Place the gasket (B28) on the chainwheel support (B29) and align the holes in the gasket with the mounting holes.
6. Insert the shaft extension (B23) through the bearing (B30) in the chainwheel support (B29).
7. Place the chain guide (B16) and the chainwheel (B19) onto the shaft extension, and align the pin holes in the shaft and the chainwheel.
8. Place the hub of the chainwheel on a solid surface, and drive the pin (B24) into position.
9. Place the washer (B26) on the end of the shaft extension, and then place the retaining ring (B27) in the groove on the end of the shaft extension.

Replacing a Chainwheel with a Handwheel

1. Remove the actuator from the valve as described in the *"REMOVING ACTUATOR"* section.
2. Loosen the set screw (B18), and drive out the pin (B31). Remove the support (B29) and the shaft extension (B23)—including the chain guide (B16) and the chainwheel (B19)—from the actuator.
3. Place the handwheel (B10) on the actuator shaft. Align the pin holes, support the actuator shaft on a solid surface, and drive the pin (B31) into position.
4. Replace the actuator on the valve as described in the *"MOUNTING ACTUATOR"* section.

Lockout

Operation

The handwheel actuator is available with an optional lockout that allows the handwheel to be locked with a padlock at any 1/8-turn increment. Lockouts may be ordered with a valve or ordered separately as a kit. A padlock is not included with the lockout accessory.

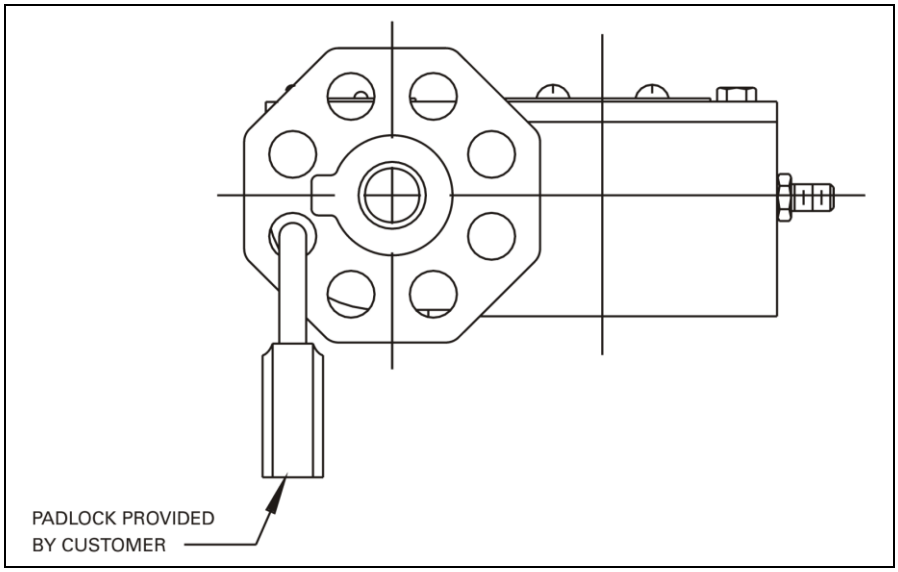


Figure 5—Lockout

Adding a Lockout to Actuator

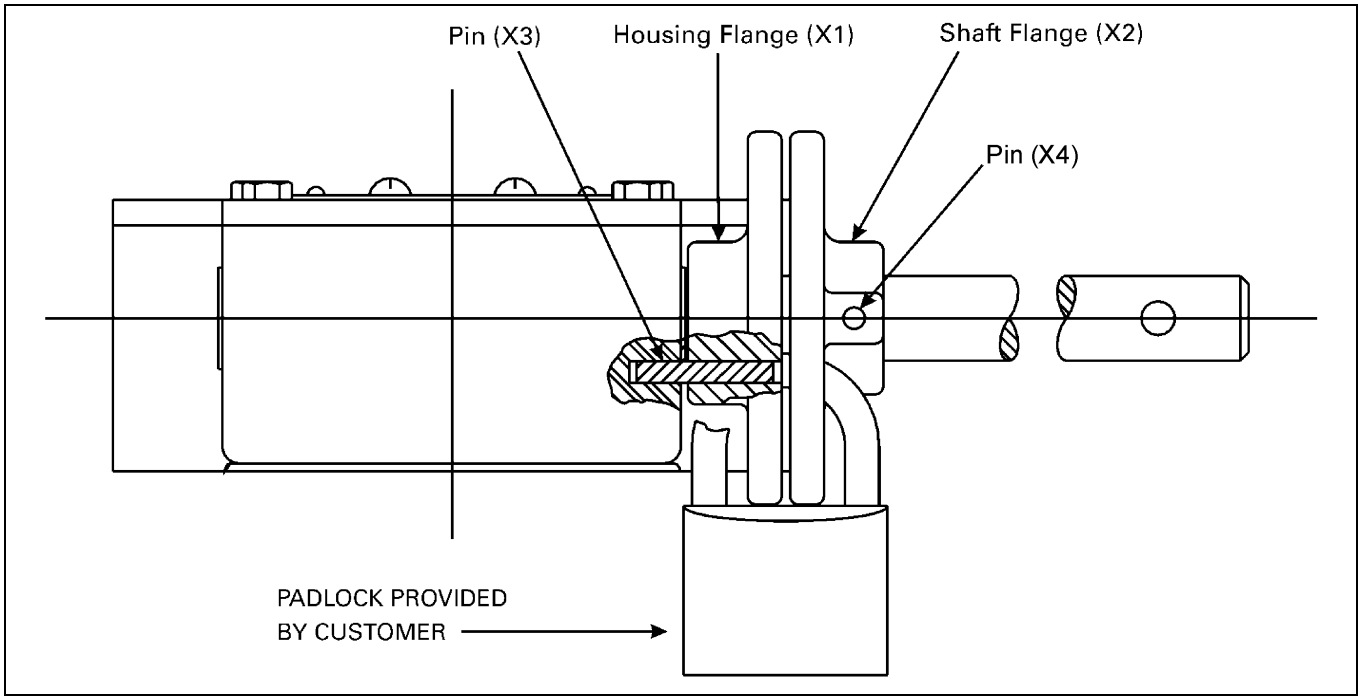


Figure 6—Lockout Parts

1. Remove the handwheel pin (B31), and remove the handwheel (B10) from the handwheel shaft.
2. Note the drilled hole in the side of the actuator next to the shaft. Insert the pin (X3) into the hole so that the pin is bottomed out in the hole.
3. With the hub side of the housing flange (X1) facing the actuator, slide the flange onto the shaft so that the hole in the flange is aligned with the pin (X3) in the actuator. Carefully drive the flange onto the pin until the flange hub is against the side of the actuator.
4. With the flat side of the shaft flange (X2) facing the actuator, slide the flange onto the shaft. Align the hole in the flange hub (X2) with the hole in the actuator shaft. Drive the shaft pin (X4) through the hole in the flange hub and into the hole in the shaft so that the pin is approximately flush with the flange hub.
5. Place the handwheel (B10) in the original position on the handwheel shaft, and secure the handwheel with the pin (B31).

Adjustable Memory Stop

MG-7 & MG-1012

The Manual Gear Actuator (MG-7 & MG-1012) has an optional adjustable memory stop. The memory stop adjusts by rotating it around the pins. One side of the stop adjusts to 0, 30 and 60°; the other side adjusts to 15, 45, 75 and 90°.

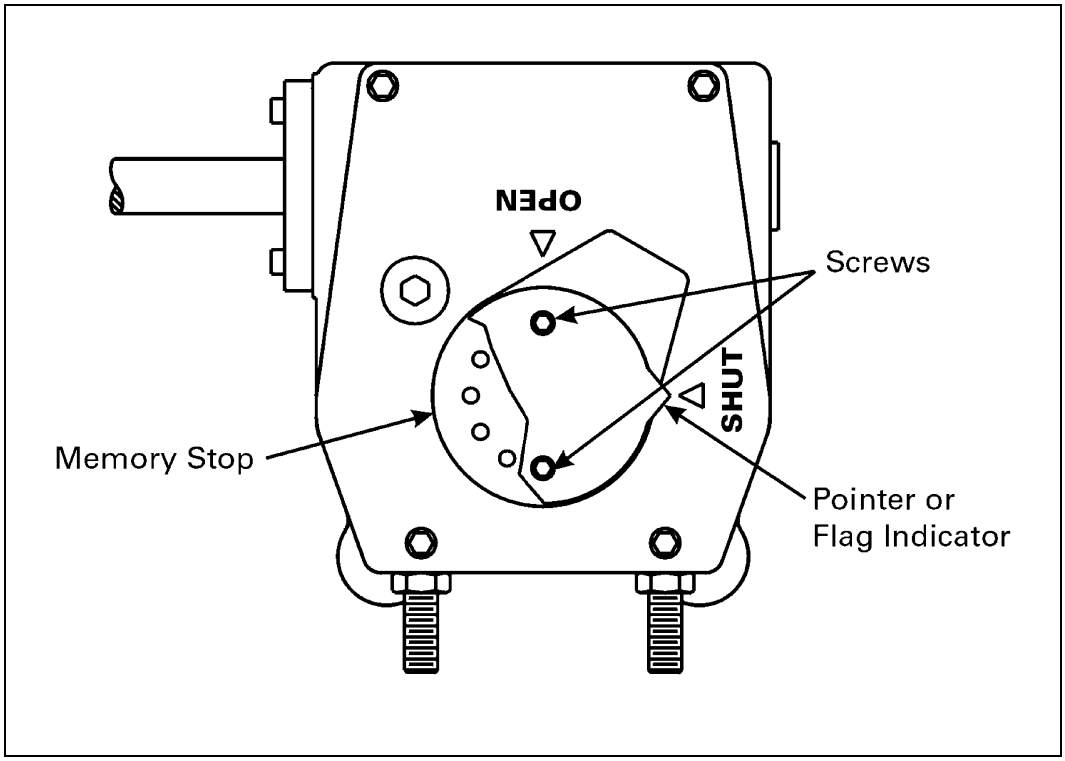


Figure 7—Memory Stop (MG-7 and MG1012)

To adjust the memory stop:

1. Remove the two screws, the pointer or flag indicator and the memory stop.
2. Position the actuator where you want it to stop.
3. Place the memory stop in position on the pins located on the gear.

   Note: If needed, flip the stop over to adjust to the correct position.
4. Replace the pointer or flag indicator and tighten the screws to secure the stop. Ensure the pointer or flag indicator is aligned with the valve position.

Adjustable Memory Stop *(Continued)*

MG-1216 & MG-16

The Manual Gear Actuator (MG-1216 & MG-16) has an optional field mountable adjustable memory stop. The memory stop adjusts by rotating the traveling stop screw (T2) around the actuator shaft. For every rotation of the actuator shaft, there are 6 positions for stop adjustment.

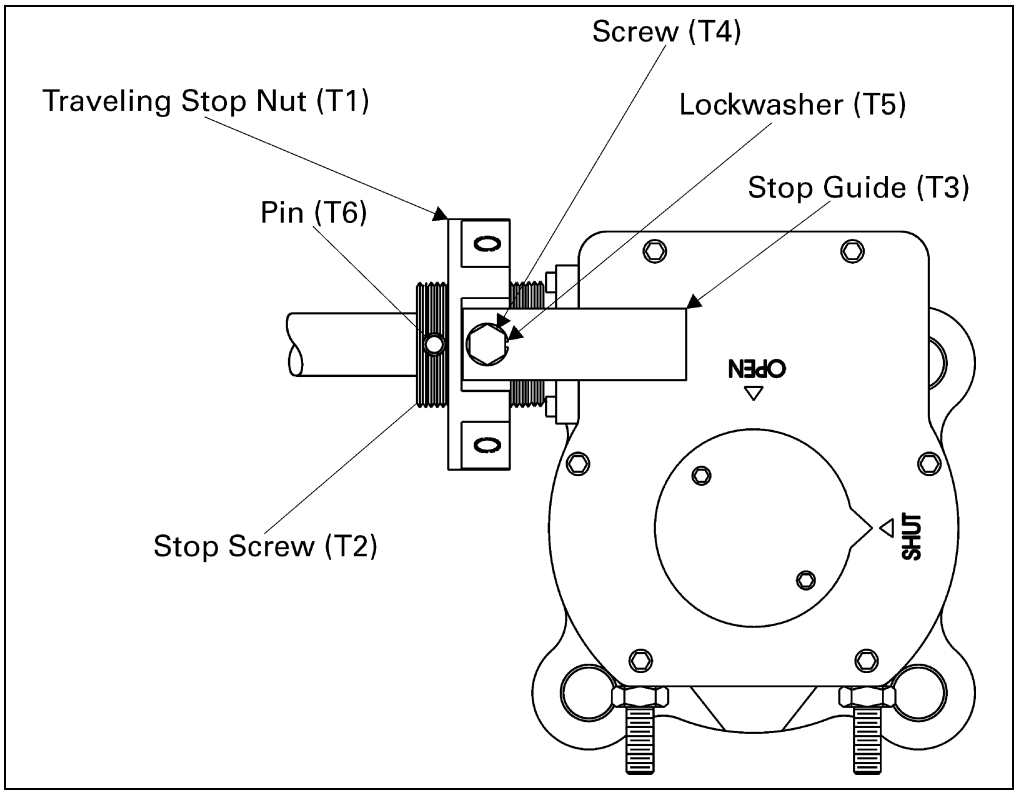


Figure 8—Memory Stop (MG-1216 & MG-16)

To adjust the memory stop:

1. Remove the handwheel, chainwheel or nut from the actuator shaft.
2. Slide the stop screw (T2) on to the actuator shaft.
3. Align the pin hole in the stop screw (T2) with the hole in the actuator shaft nearest the actuator housing.
4. Insert the pin (T6) into the pin hole in the stop screw (T2) and through the actuator shaft.

   Note: Ensure the pin (T6) is recessed below the threads on both ends of the stop screw (T2).
5. Install the handwheel, chainwheel or nut on the actuator shaft. Position the actuator to the desired stop location.
6. Rotate the traveling stop nut (T1) until it makes contact with the actuator housing.
7. Attach the stop guide (T3) to the traveling stop nut (T1) so it is extended over the actuator housing with the screw (T4) and lockwasher (T5).

Replacing Pointer with Flag Indicator

1. Remove the screws holding the pointer and remove the pointer.

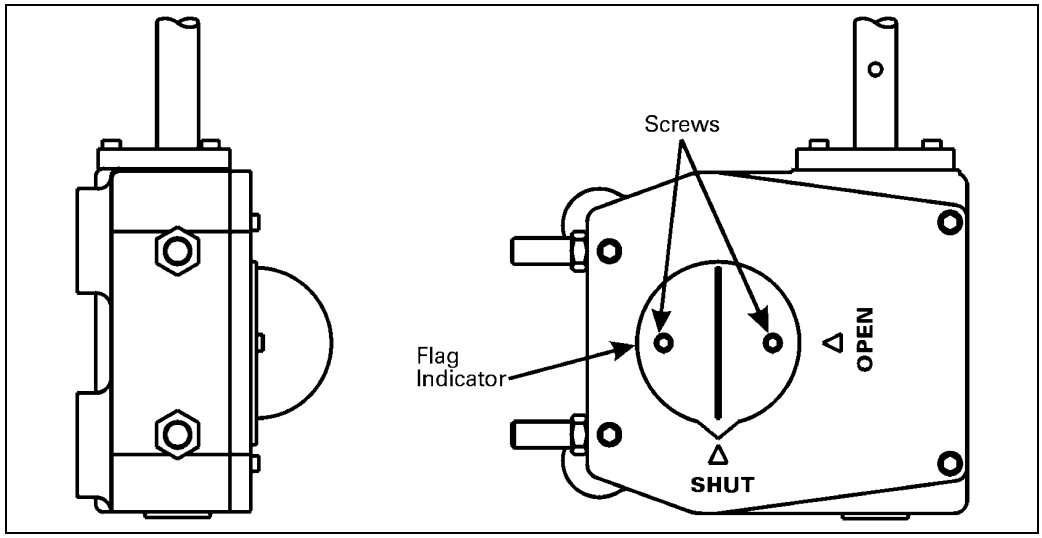


Figure 9—Flag Indicator

2. Using the same screws, attach the flag indicator to the actuator.

   Note: Make sure the arrow is aligned with the valve position.

Troubleshooting

Condition	Possible Cause	Corrective Action
Actuator closes to wrong position.	Closed position stop is set incorrectly.	Adjust closed position stop.
Actuator opens to wrong position.	Open position stop is set incorrectly.	Adjust open position stop.
Actuator will not fully operate valve.	Internal pipeline obstruction is preventing closure.	Remove obstruction.
Actuator will not operate or will move only in one direction. *	Setscrews are interfering with gear operation.	Make sure the setscrews are flush with body.

* Models MG-1012 and MG-1216

Limited Warranty

DeZURIK, Inc. (“Seller”) manufactured products, auxiliaries and parts for a period of twenty-four (24) months from date of shipment from Seller’s factory, are warranted to the original purchaser only against defective workmanship and material, but only if properly stored, installed, operated, and serviced in accordance with Seller’s recommendations and instructions.

For items proven to be defective within the warranty period, your exclusive remedy under this limited warranty is repair or replacement of the defective item, at Seller’s option, FCA Incoterms 2020 Seller’s facility with removal, transportation, and installation at your cost.

Products or parts manufactured by others but furnished by Seller are not covered by this limited warranty. Seller will provide repair or replacement for other’s products or parts only to the extent provided in and honored by the original manufacturer’s warranty to Seller, in each case subject to the limitations contained in the original manufacturer’s warranty.

No claim for transportation, labor, or special or consequential damages or any other loss, cost or damage is being provided in this limited warranty. You shall be solely responsible for determining suitability for use and in no event shall Seller be liable in this respect.

This limited warranty does not warrant that any Seller product or part is resistant to corrosion, erosion, abrasion or other sources of failure, nor does Seller warrant a minimum length of service.

Your failure to give written notice to us of any alleged defect under this warranty within twenty (20) days of its discovery, or attempts by someone other than Seller or its authorized representatives to remedy the alleged defects therein, or failure to return product or parts for repair or replacement as herein provided, or failure to store, install, or operate said products and parts according to the recommendations and instructions furnished by Seller shall be a waiver by you of all rights under this limited warranty.

This limited warranty is voided by any misuse, modification, abuse or alteration of Seller’s product, accident, fire, flood or other Act of God, or your failure to pay entire contract price when due.
The foregoing limited warranty shall be null and void if, after shipment from our factory, the item is modified in any way or a component of another manufacturer, such as but not limited to, an actuator is attached to the item by anyone other than a Seller factory authorized service personnel.

All orders accepted shall be deemed accepted subject to this limited warranty, which shall be exclusive of any other or previous Warranty, and this shall be the only effective guarantee or warranty binding on Seller, despite anything to the contrary contained in the purchase order or represented by any agent or employee of Seller in writing or otherwise, notwithstanding, including but not limited to implied warranties.

THE FOREGOING REPAIR AND REPLACEMENT LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, OBLIGATIONS AND LIABILITIES, INCLUDING ALL WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR OF MERCHANTABILITY OR OTHERWISE, EXPRESSED OR IMPLIED IN FACT OR BY LAW, AND STATE SELLER’S ENTIRE AND EXCLUSIVE LIABILITY AND YOUR EXCLUSIVE REMEDY FOR ANY CLAIM IN CONNECTION WITH THE SALE AND FURNISHING OF SERVICES, GOODS OR PARTS, THEIR DESIGN, SUITABILITY FOR USE, INSTALLATION OR OPERATIONS.

Disclaimer

Metric fasteners should not be used with ASME Class 150/300 bolt holes and flange bolt patterns. If you use metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns, it may lead to product failure, injury, and loss of life. DeZURIK Inc. disclaims all liability associated with the use of metric fasteners with ASME Class 150/300 bolt holes and flange patterns, including but not limited to personal injury, loss of life, loss of product, production time, equipment, property damage, lost profits, consequential damages of any kind and environment damage and/or cleanup. Use of metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns is a misuse that voids all warranties and contractual assurances. If you use metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns, you do so at your sole risk and any liability associated with such use shall not be the responsibility of DeZURIK, Inc. In addition to the foregoing, DeZURIK’s Manufacturer’s Conditions apply.

Limitation of Liability

IN NO EVENT SHALL SELLER BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES WHATSOEVER, AND SELLER’S LIABILITY, UNDER NO CIRCUMSTANCES, WILL EXCEED THE CONTRACT PRICE FOR THE GOODS AND/OR SERVICES FOR WHICH LIABILITY IS CLAIMED. ANY ACTION FOR BREACH OF CONTRACT BY YOU, OTHER THAN RIGHTS RESPECTING OUR LIMITED WARRANTY DESCRIBED ABOVE, MUST BE COMMENCED WITHIN 12 MONTHS AFTER THE DATE OF SALE.

Sales and Service

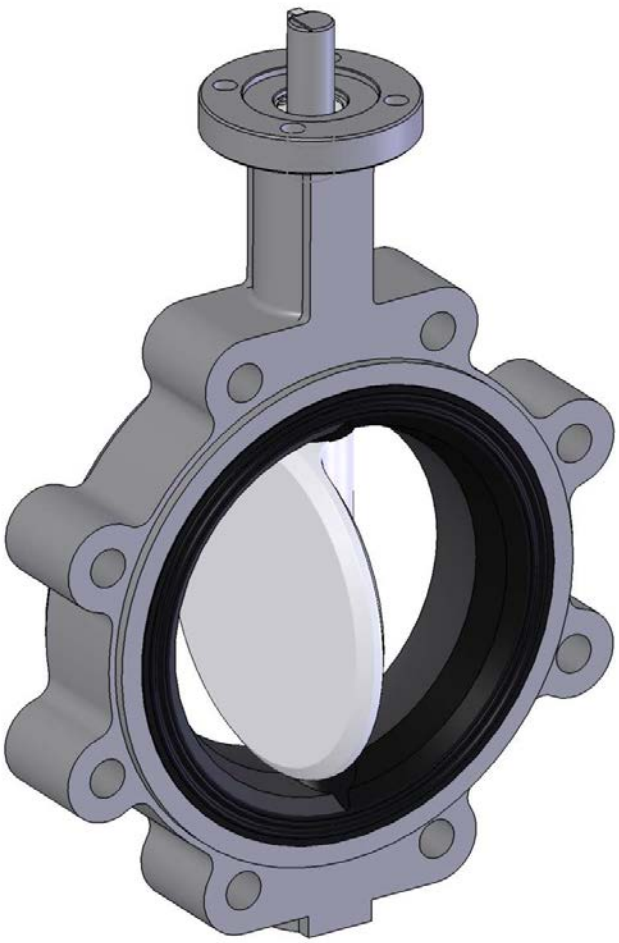
For information about our worldwide locations, approvals, certifications and local representative:

Web site: www.dezurik.com E-Mail: info@dezurik.com

250 Riverside Ave. N., Sartell, MN 56377 ● Phone: 320-259-2000 ● Fax: 320-259-2227

October 2021 Printed in U.S.A.

DEZURIK 2-20” BOS BUTTERFLY VALVES



Instruction D10459
February 2018

DeZURIK, Inc. Sartell, Minnesota USA | Phone: 320-259-2000 | www.dezurik.com | info@dezurik.com

Instructions

These instructions are for use by personnel who are responsible for the installation, operation and maintenance of DeZURIK valves, actuators or accessories.

Safety Messages

All safety messages in the instructions are identified by a general warning sign and the signal word CAUTION, WARNING or DANGER. These messages indicate procedures to avoid injury or death.

Safety label(s) on the product indicate hazards that can cause injury or death. If a safety label becomes difficult to see or read, or if a label has been removed, please contact DeZURIK for replacement label(s).

⚠WARNING

Personnel involved in the installation or maintenance of valves should be constantly alert to potential emission of pipeline material and take appropriate safety precautions. Always wear suitable protection when dealing with hazardous pipeline materials. Handle valves which have been removed from service with suitable protection for any potential pipeline material in the valve.

Inspection

Your DeZURIK product has been packaged to provide protection during shipment; however, items can be damaged in transport. Carefully inspect the unit for damage upon arrival and file a claim with the carrier if damage is apparent.

Parts

Replaceable wear parts are listed on the assembly drawing. These parts can be stocked to minimize downtime. Order parts from your local DeZURIK sales representative or directly from DeZURIK. When ordering parts please provide the following information:

If the valve has a data plate: please include the 7-digit part number with either 4-digit revision number (example: 9999999R000) or 8-digit serial number (example: S1900001) whichever is applicable. The data plate will be attached to the valve assembly. Also, include the part name, the assembly drawing number, the balloon number and the quantity stated on the assembly drawing.

If there isn't any data plate visible on the valve: please include valve model number, part name, and item number from the assembly drawing. You may contact your local DeZURIK Representative to help you identify your valve.

DeZURIK Service

DeZURIK service personnel are available to maintain and repair all DeZURIK products. DeZURIK also offers customized training programs and consultation services. For more information, contact your local DeZURIK sales representative or visit our website at DeZURIK.com.

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This Drinking Water System Component is tested and certified by WQA against NSF/ANSI Standard 61 and NSF/ANSI Standard 372.

Description

The BOS Butterfly Valve is a resilient-seated valve for general industrial applications. Lugged or wafer end connections are offered, with a choice of disc, seat, and shaft materials. Pressure and temperature ratings are shown on the valve data plate.

Handling

Lifting the valve improperly may damage it. Do not fasten lifting devices to the actuator, disc or through the seat opening in the body. Lift the valve with slings, chains or cables fastened around the valve body, or fastened to bolts or rods through bolt holes in the flanges

Installation

Refer to the valve installation drawing for dimensional information.

- Installing the valve in the wrong location may cause excessive dynamic torque and damage the valve. Install the valve at least 8 pipe diameters downstream from the nearest pump or elbow.
- Pipeline flow may be in either direction through the valve. For optimum performance, install the valve with the higher pressure on the seat side of the valve (flat side of disc). If possible, install the valve with the shaft horizontal to provide a self-cleaning action on the seat.
- Use pipeline flanges that conform to ASME/ANSI B16.1 Class 125 or ASME/ANSI B16.5 Class 150.
- Mount wafer body valves to the pipeline flanges with either bolts or studs that extend through both flanges:
- Mount lugged body valves to the pipeline flanges with bolts only. Studs are not recommended.

CAUTION!

Lifting a larger size valve incorrectly can damage it. Do not fasten lifting devices to the actuator or disc, or through the seat opening in the body. Lift the valve with slings fastened around the valve body, or attach them to bolts or rods run through holes for the pipeline flanges.

1. If the valve has been ordered without an actuator, mount the actuator on the valve.
   - For a DeZURIK actuator, refer to the Actuator Instructions.
   - For an actuator other than DeZURIK, the dimensional requirements for the actuator interface are shown on the Installation Drawing for the valve.
2. Before installation, remove all foreign material such as weld spatter, oil, grease, and dirt from the valve, flanges, and pipeline.
3. Open the valve, and clean the seat and the sealing edge of the disc.
4. Place the valve in the pipeline with the valve closed. Handle the valve carefully so that the integral flange sealing surfaces are not scratched or damaged. Do not use gaskets between valve and mating flanges.
5. Ensure that the valve, the pipeline and the mating connections are aligned and centered before tightening the pipeline bolts.
6. Open the valve slowly to ensure that there is adequate clearance between the open disc and the pipeline.
7. Tighten the bolts evenly, in a crisscross pattern.

Operation

Clockwise rotation of the valve shaft closes the disc into the seat. The valve is fully closed when the flat side of the disc is parallel with the flange sealing surface on the body. The valve is fully open when the disc is 90° counterclockwise from the closed position. A machined flat on the top of the valve shaft corresponds to the flat side of the disc. The machined flat may be used to determine the approximate position of the disc when the disc is not visible.

The valve actuator is connected to the valve shaft, and positions the disc at the open, closed, or intermediate positions. The adjustable open and closed position stops in the valve actuator are set to match the open and closed positions of the valve. Refer to the Actuator Instructions for actuator stop adjustment information.

Lubrication

The valve is lubricated at the factory, and does not require routine lubrication. Refer to the actuator instructions for actuator lubrication requirements.

If the valve is disassembled, apply a paint-like coating of the below lubricant to the following surfaces (see Figure 1 for each area listed below):

A. The two shaft holes and lip seals in the seat.

B. The area of the seat adjacent to the two shaft holes.

C. The upper shaft seal (A6).

D. The inside diameters of the four shaft bearings (A4, A5 & A12).

E. The chamfer on the bottom end of the shaft (A3).

F. The spline of the shaft (A3).

G. The spline of the disc (A2).

H. The area of shaft just above the spline.

- For oxygen service valves, use Hooker Fluorolube GR-362 (no substitutes are allowed).
- For other valves with EPDM, NBR or FKM seat material, use Dow Corning 111 (no substitutes are allowed).

Lubrication *(Continued)*

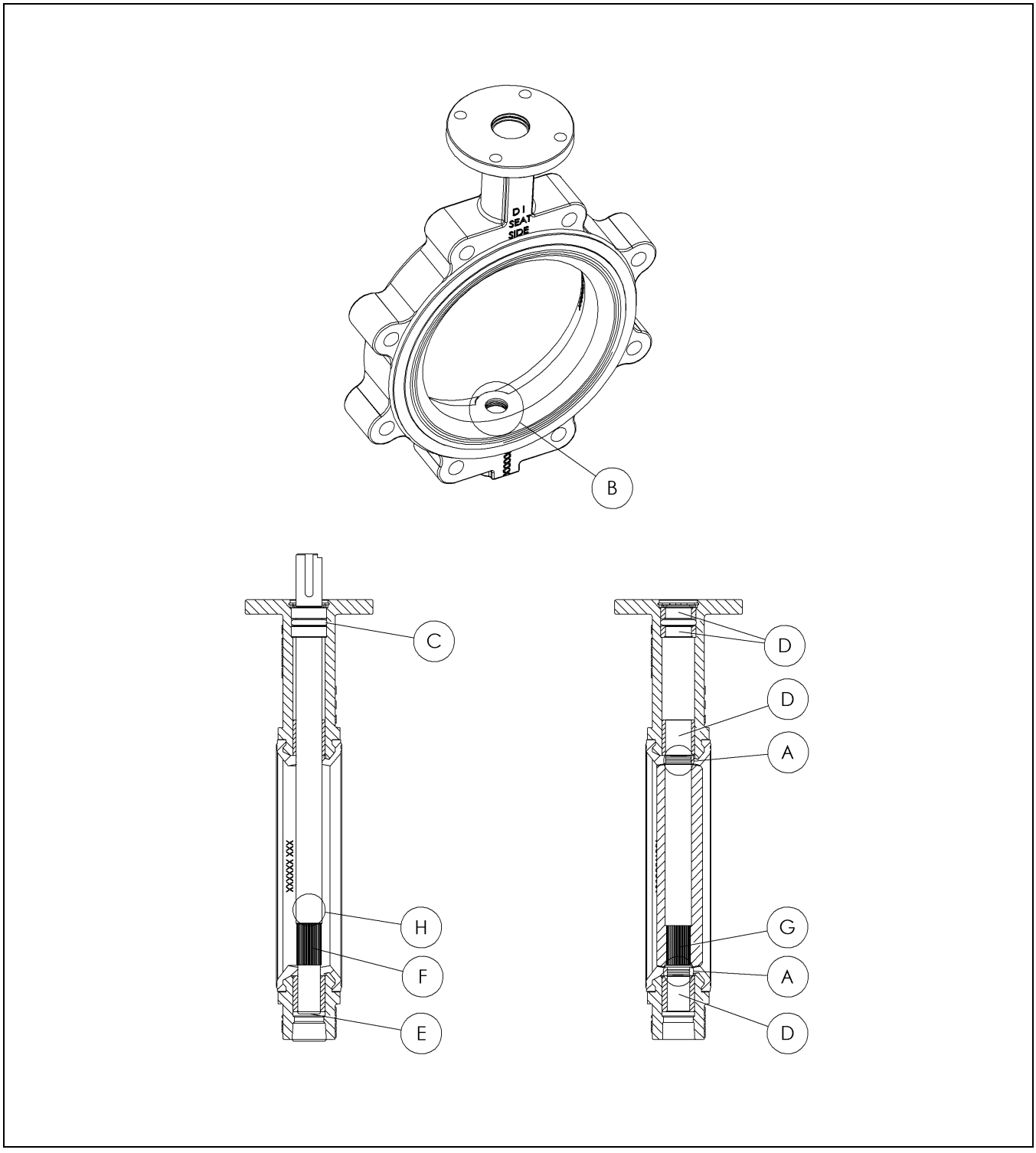

Figure 1—Areas to Lubricate

Parts Identification

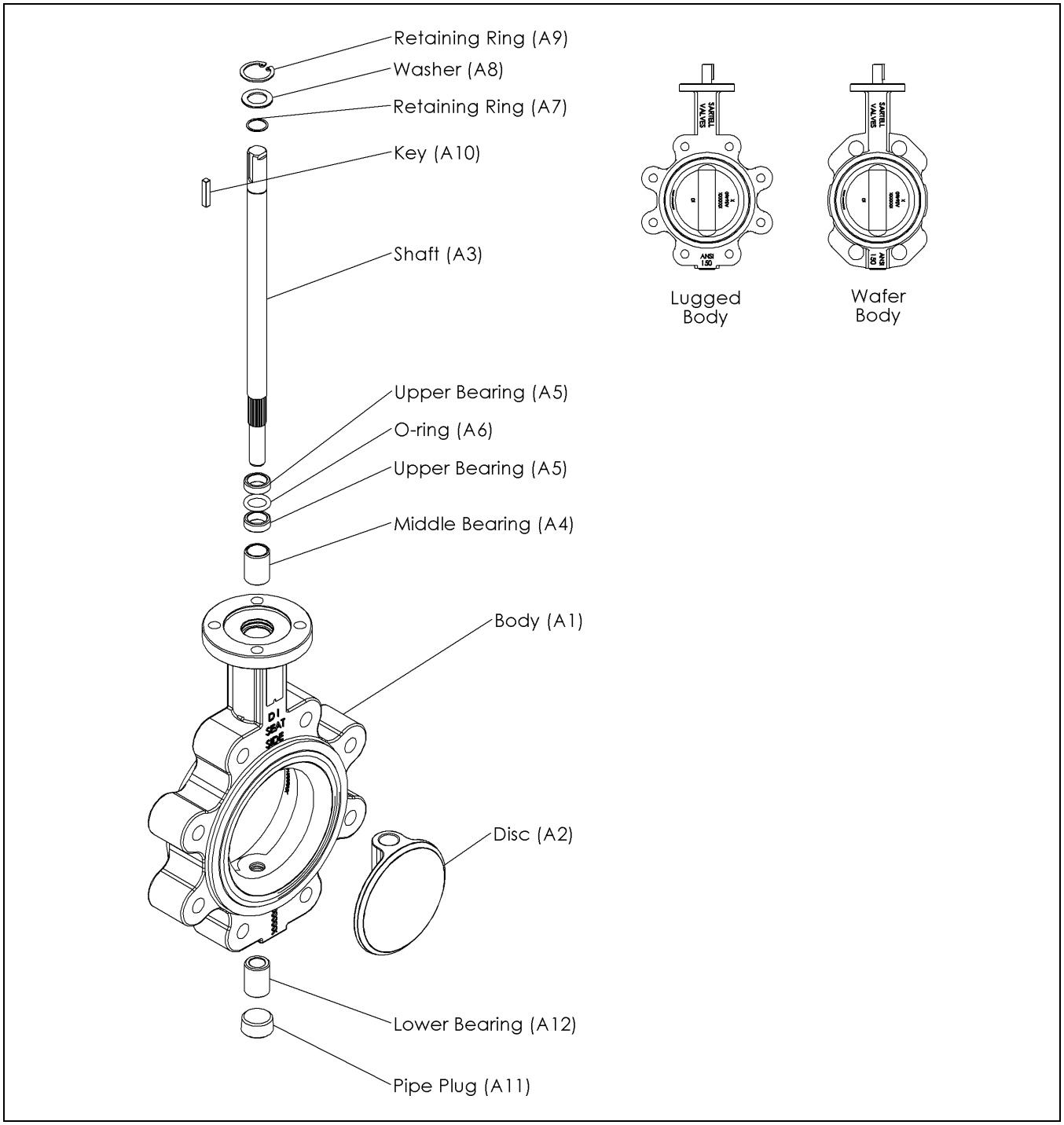

Figure 2—Parts Identification

Removing Valve from Pipeline

Follow the steps below to remove the valve from the pipeline.

WARNING!

Loosening the flange bolts on a pressurized valve can allow the valve to suddenly shift position and release uncontrolled pipeline fluid. To avoid personal injury or pipeline damage, relieve the pressure in the pipeline before loosening the pipeline flange bolts.

1. Relieve pressure in the pipeline, and drain the pipeline.
2. Close the valve.

WARNING!

Moving parts from accidental operation of a powered actuator can cause personal injury or equipment damage. Disconnect and lock out power to actuator before servicing.

3. If the actuator is powered, disconnect and lock out the pneumatic, hydraulic, or electrical power to prevent accidental operation.
4. Support the valve, remove the flange bolting, and remove the valve from the pipeline. Refer to the lifting requirements in the *"Installation"* section.

Disassembling the Valve

Refer to Figure 2 for parts identification.

1. Remove the valve from the pipeline as described in the *"Removing Valve From Pipeline"* section.
2. Remove the actuator as described in the Actuator Instructions.
3. Remove the pipe plug (A11) from threaded lower end of body (A1).
4. Remove the retaining ring (A9) from the groove in the upper end of body (A1).
5. Remove the washer (A8).
6. To remove the shaft (A3) from the disc (A2), tap the lower end of the shaft (A3) towards the upper end of the body (A1) and remove the shaft from the body.
7. Remove the disc (A2) from the body (A1).
8. Remove the two upper bearings (A5) and o-ring (A6) from the upper body shaft bore.

Reassembling the Valve

Clean and inspect all parts, and replace worn parts. Refer to Figure 2 for parts identification. Lubricate the valve as noted in the "*Lubrication*" section.

1. Place the two upper bearings (A5) and o-ring (A6) seal in the upper body shaft bore.
2. Assemble the disc (A2) in the body (A1) with the spline towards the bottom of the body aligning the disc shaft bore with the body shaft bores.
3. Assemble the shaft (A3) into the body (A1) and disc (A2) shaft bores until the spline in the shaft just contacts the disc spline (slight resistance will be felt between shaft and disc).

   Note: If the retaining ring (A7) in the shaft (A3) is damaged, replace the retaining ring. Verify that the new retaining ring is completely seated in the shaft groove before installing the shaft.
4. Position the flat on shaft (A3) so that it is parallel to and on the same side of the flat on the disc (A2). See Figure 3 for disc/shaft alignment. Then slide and fully engage the shaft spline with the disc spline (shaft will bottom out in disc bore when fully engaged).

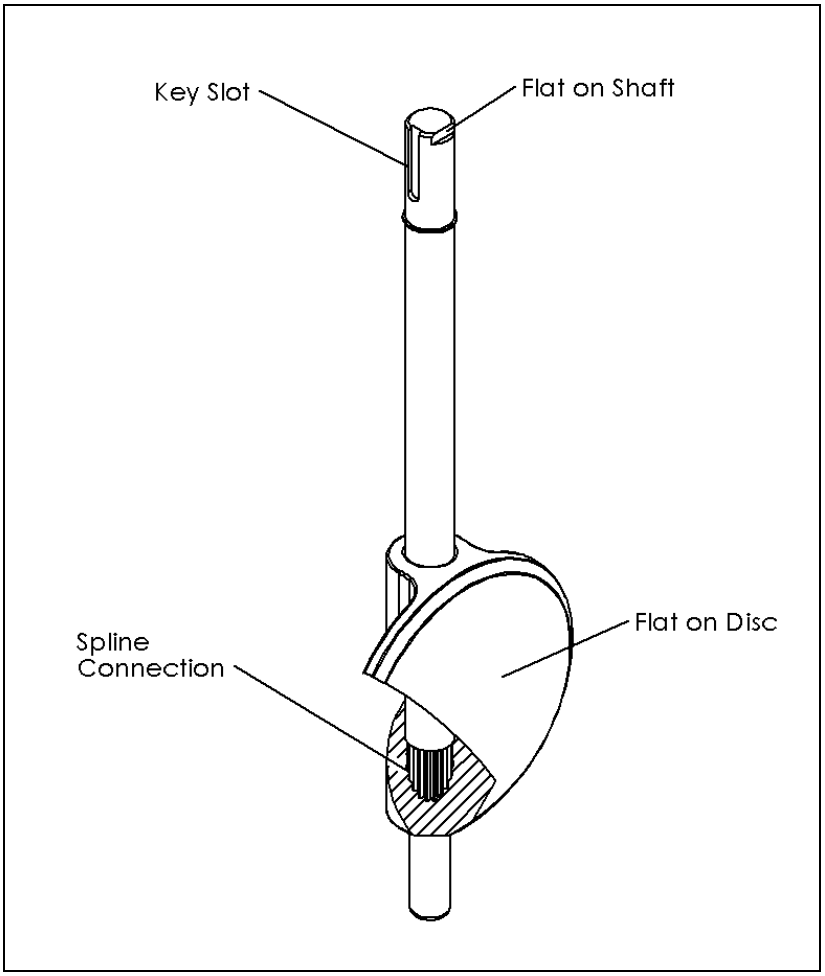

Figure 3—Disc/Shaft Alignment

Reassembling the Valve *(Continued)*

5. Assemble the thrust washer (A8) into the upper body shaft bore and against the snap ring (A7) in the shaft (A3).
6. Assemble the retaining ring (A9) into the retaining ring groove located in the upper body bore.

   Note: Verify that the retaining ring is completely seated in the retaining ring body groove.
7. Assemble the pipe plug (A11) into the threaded lower body.
8. Mount the actuator on the valve as described in the "*Actuator*" instructions.
9. Install the valve as described in the "*Installation*" section. If the actuator is a powered actuator, re-connect the power and other connections.

Troubleshooting

Condition	Possible Cause	Corrective Action
Valve does not fully close.	Object is wedged between disc and seat	Open valve, and allow flow to remove object
	Closed position stop is not adjusted correctly.	Adjust closed stop.
	Disc-to-shaft connection has failed.	Replace shaft and/or disc.
Valve leaks when closed.	Closed position stop is not adjusted correctly.	Adjust closed stop.
	Seat is worn or damaged.	Replace valve or valve body.
	Sealing edge of disc is worn or damaged.	Replace valve or valve body.
Valve does not fully open.	Open position stop is not adjusted correctly.	Adjust open stop.
	Disc-to-shaft connection has failed.	Replace shaft and/or disc.
Opening or closing torque is excessive.	Bearings, shaft, disc or seat are dirty or worn	Clean or replace dirty or worn components.
	Shaft is bent.	Replace shaft.
Valve leaks between body and pipeline flanges.	Valve flange seal is damaged.	Replace valve or valve body.
	Flange bolts are tightened incorrectly.	Tighten the flange bolts evenly, in a crisscross pattern.
	Flange gaskets were used between valve and pipeline flanges.	Remove flange gaskets.
Media leaks between actuator and top of valve	O-ring (A6) leaking at top of shaft.	Inspect and replace O-ring (A6).

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This limited warranty does not warrant that any Seller product or part is resistant to corrosion, erosion, abrasion or other sources of failure, nor does Seller warrant a minimum length of service.

Your failure to give written notice to us of any alleged defect under this warranty within twenty (20) days of its discovery, or attempts by someone other than Seller or its authorized representatives to remedy the alleged defects therein, or failure to return product or parts for repair or replacement as herein provided, or failure to store, install, or operate said products and parts according to the recommendations and instructions furnished by Seller shall be a waiver by you of all rights under this limited warranty.

This limited warranty is voided by any misuse, modification, abuse or alteration of Seller’s product, accident, fire, flood or other Act of God, or your failure to pay entire contract price when due.
The foregoing limited warranty shall be null and void if, after shipment from our factory, the item is modified in any way or a component of another manufacturer, such as but not limited to, an actuator is attached to the item by anyone other than a Seller factory authorized service personnel.

All orders accepted shall be deemed accepted subject to this limited warranty, which shall be exclusive of any other or previous Warranty, and this shall be the only effective guarantee or warranty binding on Seller, despite anything to the contrary contained in the purchase order or represented by any agent or employee of Seller in writing or otherwise, notwithstanding, including but not limited to implied warranties.

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250 Riverside Ave. N., Sartell, MN 56377 ● Phone: 320-259-2000 ● Fax: 320-259-2227

October 2021 Printed in U.S.A.

APCO CVS-250/250A SWING CHECK VALVES

Instruction D12003
October 2018

DeZURIK, Inc. Sartell, Minnesota USA | Phone: 320-259-2000 | www.dezurik.com | info@dezurik.com

Instructions

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Description

A swing check valve consists of a valve body, a cover, and a disc that is connected to a hinge. The disc swings away from the valve-seat to allow flow in the forward direction, and returns to valve-seat when upstream flow is stopped, to prevent backflow. The valve is equipped with either a lever & weight, an air cushion with lever & weight, or a lever & spring to assist with closing the valve.

Handling and Storage

Lifting the valve improperly may damage it. Do not fasten lifting devices to the lever arm actuator or through the seat opening in the body. Lift the valve with slings, chains or cables fastened around the valve body, or fastened to bolts or rods through bolt holes in the flanges.

If installation will be delayed, place valve indoors in secure, weather tight storage. If temporary outside storage is unavoidable, make sure a vermin proof rain cover (water shedding tarp, etc.) is secured around/over the equipment to keep off rain and mud. Skid and set the assembly on a flat, solid, and well drained surface for protection from ground moisture, runoff and pooled rain water.

Installation

- The APCO CVS 250/250A Swing Check Valve may be installed in a horizontal or vertical position (with the flow upward). In either case, the Counterweight Arm (B19) should be set in horizontal position. Unless otherwise specified, the valves are shipped for horizontal installation.
    - To change the counterweight arm position, loosen the Lever Arm Bolt Set Screw (B55), slide the counterweight arm assembly off the Pivot Shaft (A13), rotate the counterweight arm assembly and slide it back onto the Pivot Shaft (A13) using the appropriate keyway shown in Figure 1. See Figure 2 for component identification.

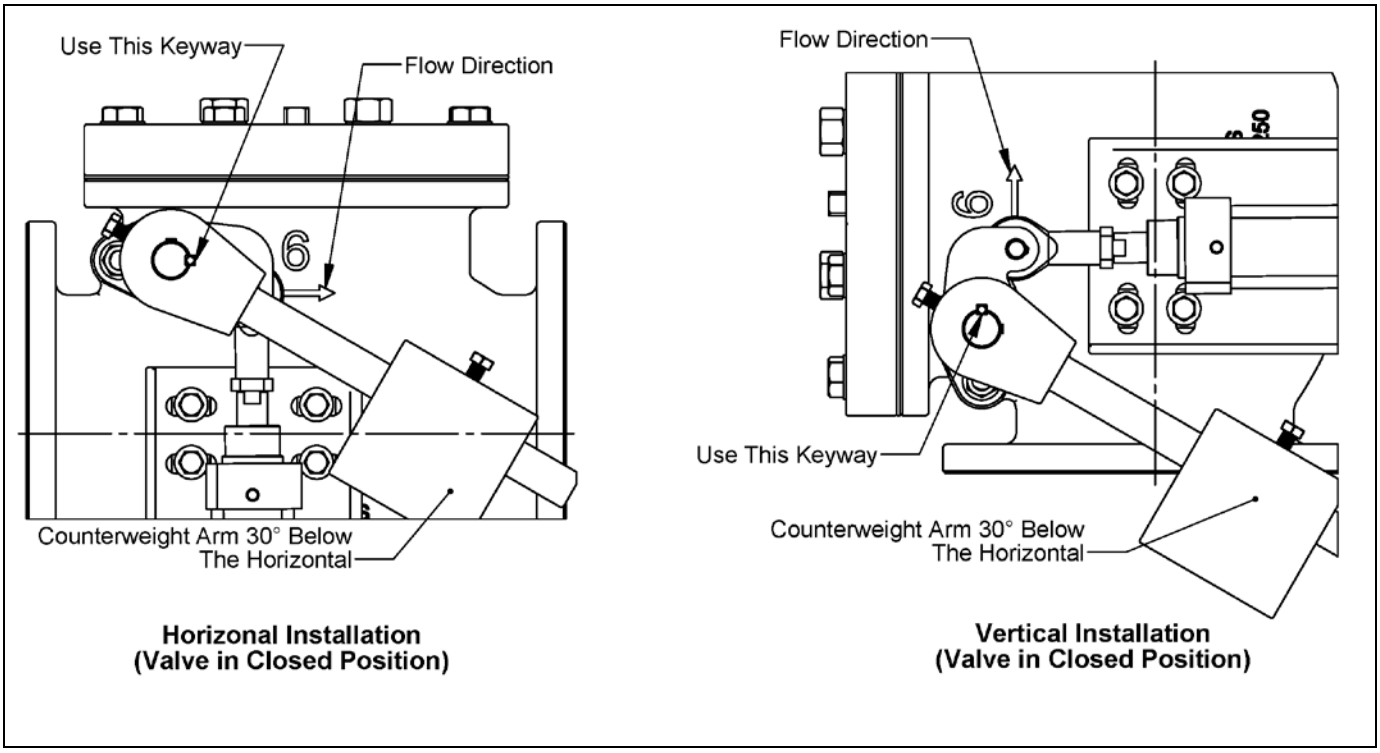

Figure 1 – Counterweight Arm Position

Installation *(Continued)*

- Before installation, remove foreign material such as weld spatter, oil, grease, and dirt from the pipeline.
- Prepare pipe ends and install valves in accordance with the pipe manufacture's instructions for the joint used.

CAUTION!

Do not deflect the pipe-valve joint. Minimize bending stresses in the valve end connection with pipe loading.

If excessive seat leakage occurs during start-up, recheck the installation and eliminate any distortion to the valve body.

- Ensure the valve and pipeline flanges are concentric to ensure proper flange sealing and seat leakage control.
- Tighten the flange bolts or studs in a crisscross pattern and minimum of four stages.

Fusion/Powder Coated Valves

CAUTION!

Valves with fusion/powder coated exterior paint require flat washers to be installed under the flange nuts when installing the valve to the pipeline flange to prevent the paint from cracking or chipping.

Maintenance

It is suggested that these valves, which do not require routine scheduled maintenance, be included as part of the normal facility equipment inspections for any malfunction while under normal usage conditions.

Shaft Packing Adjustment

Packing adjustment may be needed to optimize packing life on initial start-up.

WARNING!

These valves may open or close, swinging the counterweight/spring lever arm without warning due to flow changes from pumps starting and stopping. Servicing or working around these valves while the pipeline is under pressure can cause personal injury or equipment damage.

Workers must be cautious when working around these valves. Relieve pipeline pressure and lockout the pumps before servicing the valve.

Tighten the gland nuts (A54) evenly only until the packing leak stops.

Caution: Do not over-tighten Packing Gland. Valve can remain open during operation if packing is too tight. After packing adjustments are made and pipeline is pressurized, visually inspect valve stroke to ensure proper operation.

Note: Do not continue tightening after leak stops. If packing leak cannot be stopped by tightening the gland nuts, the packing must be replaced.

Maintenance *(Continued)*

Shaft Packing Replacement

Removal of the valve from the line for shaft packing replacement is not required as long as the shaft is accessible.

WARNING!

These valves may open or close, swinging the counterweight/spring loaded arm without warning due to flow changes from pumps starting and stopping. Servicing or working around these valves while the pipeline is under pressure can cause personal injury or equipment damage.

Workers must be cautious when working around these valves. Relieve pipeline pressure and lockout the pumps before servicing the valve.

1. Relieve the pressure in the pipeline and close the valve.
2. If needed, remove Counter Weight Arm Assembly (B19), Cushion Lever (B27). Then, remove the Packing Gland Nuts (A54), Washers (A50), and Packing Gland (A37) from Pivot Shaft (A13).
3. Remove the packing (A17) with a flexible packing hook or similar tool. Clean the packing area, being careful not to damage it.
4. Obtain the proper size packing from the parts list. Cut the packing rings to fit around the shaft. Install one ring at a time. Make sure it is clean and has not picked up any dirt in handling before installing it. Lubricate I.D. of each packing ring. Joints of successive rings should be staggered at least 90 degrees apart. Each ring should be firmly seated with a tamping tool. Do not depend on the packing gland entirely to seat the set of rings properly. This practice will jam the last rings installed but leave the first ones loose in the box.
5. See “Shaft Packing Adjustment” section to adjust packing after replacing.

Disc Seat Replacement

WARNING!

These valves may open or close, swinging the counterweight/spring loaded arm without warning due to flow changes from pumps starting and stopping. Servicing the valve while the pipeline is under pressure can cause personal injury or equipment damage.

Workers must be cautious when working around these valves. Relieve pipeline pressure and lockout the pumps before servicing the valve.

1. Relieve the pressure in the pipeline and close the valve. Lockout the pumps.
2. Remove Seat Retaining Ring (A31) from Disc (A10).
3. Remove old Disc Seat (A06) and replace with new Disc Seat.
4. Re-install Seat Retaining Ring (A31).

Maintenance *(Continued)*

Changing Counterweight or Spring Assembly to Opposite Side of Valve

WARNING!

These valves may open or close, swinging the counterweight/spring loaded arm without warning due to flow changes from pumps starting and stopping. Servicing or working around these valves while the pipeline is under pressure can cause personal injury or equipment damage.

Workers must be cautious when working around these valves. Relieve pipeline pressure and lockout the pumps before servicing the valve.

1. Relieve the pressure in the pipeline and close the valve. Lockout the pumps.
2. Loosen the Screw (B55) and remove the Counter Weight Arm (B19) and Weight (B29) assembly or Spring (B59) with Spring Bracket (B60). (Note that a special spring bracket may be required to change lever & spring assembly to opposite side of valve.)
3. If the valve is equipped with an Air Cylinder (B20):
    a. Remove the Retaining Rings (B60) and Clevis Pin (B59) from the cylinder rod eye.
    b. Remove the Cushion Cylinder (B20) and Bracket (B24) assembly from the Body (A01).
    c. Remove the Cushion Lever (B27) from the Pivot Shaft (A13).
4. Remove the Packing Gland (A37), Packing (A17) and Studs (A49) from the Body (A01).
5. Remove the Screws (A16) and Pivot Shaft Cover (A15) from the Body (A01)
6. Remove the Eye Nuts (A64), Nuts (A52), Screws (A04), Washers (A51) and Cover (A02) from the Body (A01).
7. Loosen the Screws (A14) in the Disc Arm (A09).
8. Insert a threaded bolt (1/4-20) into the Pivot Shaft Retaining Pin (A60) and remove the pin from the pin hole in the top of the Body (A01).
9. Remove the Pivot Shaft (A13) from the Body (A01). The Packing (A17), Flanged Bushing (A12, on 4” and larger valves) and the Pivot Shaft Disc Key (A33) will be removed along with the shaft.
10. Remove the Straight Bushing (A11), on 4” and larger valves from the Body (A01) and install it on the opposite side of the body aligning it with the pin hole in the top of the body.
11. Align the Disc Arm (A09) with the holes in the Body (A01) for the Pivot Shaft (A13); insert the pivot shaft with the Pivot Shaft Disc Key (A33) with the groove and shorter keyway end first into the opposite side of the body, through the disc arm and align the pivot shaft retaining groove with the pin hole in the body.
12. Insert the Pivot Shaft Retaining Pin (A60) thru the hole in the top of the Body (A01) so the pin goes thru the Straight Bushing (A11), on 4” and larger valves in into the groove in the Pivot Shaft (A13). The pin should be flush with the top of the body.
13. Center the Disc (A10) assembly and the Body Seat (A05).
14. Tighten the Screws (A14) in the Disc Arm (A09).

Maintenance *(Continued)*

15. Slide the Flanged Bushing (A12), on 4" and larger valves over the Pivot Shaft (A13) and into the Body (A01).
16. Install one Packing Ring (A17) at a time. Make sure it is clean and has not picked up any dirt in handling before installing it. Lubricate I.D. of each packing ring. Joints of successive rings should be staggered at least 90 degrees apart. Each ring should be firmly seated with a tamping tool.
17. Install the Studs (A49), Packing Gland (A37), Washers (A50), Nuts (A54) and adjust packing.
18. Install the Pivot Shaft Cover (A15) with Screws (A16) and Washers (A50).
19. Install the Cover (A02) to the Body (A01) with Eye Nuts (A64), Nuts (A52), Screws (A04) and Washers (A51).
20. If the valve is equipped with an Air Cylinder (B20):
    a. Install the Cushion Lever (B27) and Key (B34) on the Pivot Shaft (A13). Secure to Pivot Shaft by tightening Cushion Lever Screw.
    b. Install the Cushion Cylinder (B20) and Bracket (B24) assembly to the Body (A01) using Hex Bolts (B21) and Washers (B22).
    c. Install the Retaining Rings (B60) and Clevis Pin (B59) to secure the Cushion Arm to the cylinder rod eye.
21. Install Counter Weight Arm (B19) and Weight (B29) or Spring (B59) to the Pivot Shaft (A13). If equipped with lever & spring, install Spring Bracket (B60) assembly to Body (A01) using Spring Bracket Bolts (B62); then hook end of spring thru Eye Bolt (B61).

Adding Air Cushion Assembly to Valve

WARNING!

These valves may open or close, swinging the counterweight/spring loaded arm without warning due to flow changes from pumps starting and stopping. Servicing or working around these valves while the pipeline is under pressure can cause personal injury or equipment damage.

Workers must be cautious when working around these valves. Relieve pipeline pressure and lockout the pumps before servicing the valve.

1. Relieve the pressure in the pipeline and close the valve. Lockout the pumps.
2. Loosen the Screw (B55) and remove the Counter Weight Arm (B19) and Weight (B29) assembly or Spring (B59) with Spring Bracket (B60). (Note that a special spring bracket is required to add an air cylinder to a lever & spring valve.)
3. If Clevis Pin (B59) is installed in cylinder rod eye, uninstall retaining rings (B60) and Clevis Pin
4. Install the Cushion Lever (B27) and Key (B34) on the Pivot Shaft (A13). Secure to Pivot Shaft by tightening Cushion Lever Screw.
5. Install the Cushion Cylinder (B20) and Bracket (B24) assembly to the Body (A01) using Hex Bolts (B21) and Washers (B22). If equipped with lever & spring, install Spring Bracket (B60) as shown on special assembly drawing provided.

Maintenance *(Continued)*

6. Install the Retaining Rings (B60) and Clevis Pin (B59) to secure the Cushion Arm to the cylinder rod eye.
7. Install Counter Weight Arm (B19) and Weight (B29) or Spring (B59) to the Pivot Shaft (A13). If equipped with lever & spring, then hook end of spring thru Eye Bolt (B61).

Operation

WARNING!

These valves may open or close, swinging the counterweight/spring loaded arm without warning due to flow changes from pumps starting and stopping. Servicing or working around these valves while the pipeline is under pressure can cause personal injury or equipment damage.

Workers must be cautious when working around these valves. Relieve pipeline pressure and lockout the pumps before servicing the valve.

The flow from the pump opens the Disc (A10) and raises the Counterweight Arm (B19). If the valve is equipped with an Air Cushion, the cylinder piston is pulled upward, drawing air freely into the cylinder through the small flow control valve. If the valve is equipped with a lever & spring, the spring (B59) is extended by the Lever Arm (B19) raising up.

When the pump is shut off, the decreased flow allows gravity to close the Disc (A10) towards the Body Seat Ring (A05). For valves equipped with a lever & weight, the weight causes the disc close faster or slower depending on its position along the lever. For valves equipped with an air cushion, the closure speed can be dampened by the air cylinder (B20). As the Disc (A10) closes, the cylinder piston is pushed downwards and the compressed air can only escape through the flow control valve on the bottom of the cylinder. The exhausting air can be adjusted with the flow control valve to suit the best performance for the installation. For valves equipped with a lever & spring, the stored energy in the extended spring (B59) causes the disc to close in addition to weight of the disc (A10).

System static pressure (downstream of the check valve) keeps the disc (A10) and disc seat (A06) closed and seated against the body seat (A05).

Closure Speed Control Adjustment (Valves with Lever & Weight)

- Faster Disc closing - Move Counterweight away from the pivot shaft.
- Slower Disc closing – Move Counterweight towards pivot shaft.

Closure Speed Control Adjustment (Valves with Air Cushion)

- Increase cushioning - Turn adjusting screw of Flow Control Valve clockwise.
- Decrease cushioning - Turn adjusting screw of Flow Control Valve counterclockwise
- Faster Disc closing - Move Counterweight away from the pivot shaft.
- Slower Disc closing – Move Counterweight towards pivot shaft.

Operation *(Continued)*

Start-up Procedure

1. Ensure the Counterweight Arm (B19) is angled 30° below the horizontal.
2. Throttle down mainline isolation valve (furnished by others) on discharge side of Swing Check Valve to approximately 1/3 open to prevent severe slamming during initial pump shutdown testing.
3. Position Counterweight (B29) midway on the lever and lock in place.
4. If valve has an Air Cushion: Turn adjusting screw of flow control valve two (2) turns counterclockwise from fully closed position.
5. Start and stop pump and observe rate of closing.

Adjustment (Valves with Air Cushion with Lever & Weight)

Condition	Adjustment
Check valve slams	Turn adjusting screw of Flow Control Valve one-half (1/2) turn clockwise. Repeat start and stop. If slam persists, continue turning adjusting screw in ½ turn increments. Be careful not to fully close Flow Control Valve.
Slam persists	Move weight towards end of lever a couple of inches. Repeat start and stop.
Slam still persists	Continue repeating above steps until satisfactory closing is achieved. Then increase opening discharge isolation valve to ½ open. Repeat start and stop pump sequence and above steps until isolation valve is full open.

Adjustment (Valves with Lever & Weight)

Condition	Adjustment
Check valve slams	Move weight towards end of lever a couple of inches. Repeat start and stop.
Slam persist	Repeat above step.

Notes:

1. Testing must conducted carefully and adjustments made in small increments to arrive at the optimum where the swing check valve shuts off just prior to or at zero reverse flow.
2. The APCO CVS-250/250A Swing Check Valve is not a silent closing check valve.

Drawings

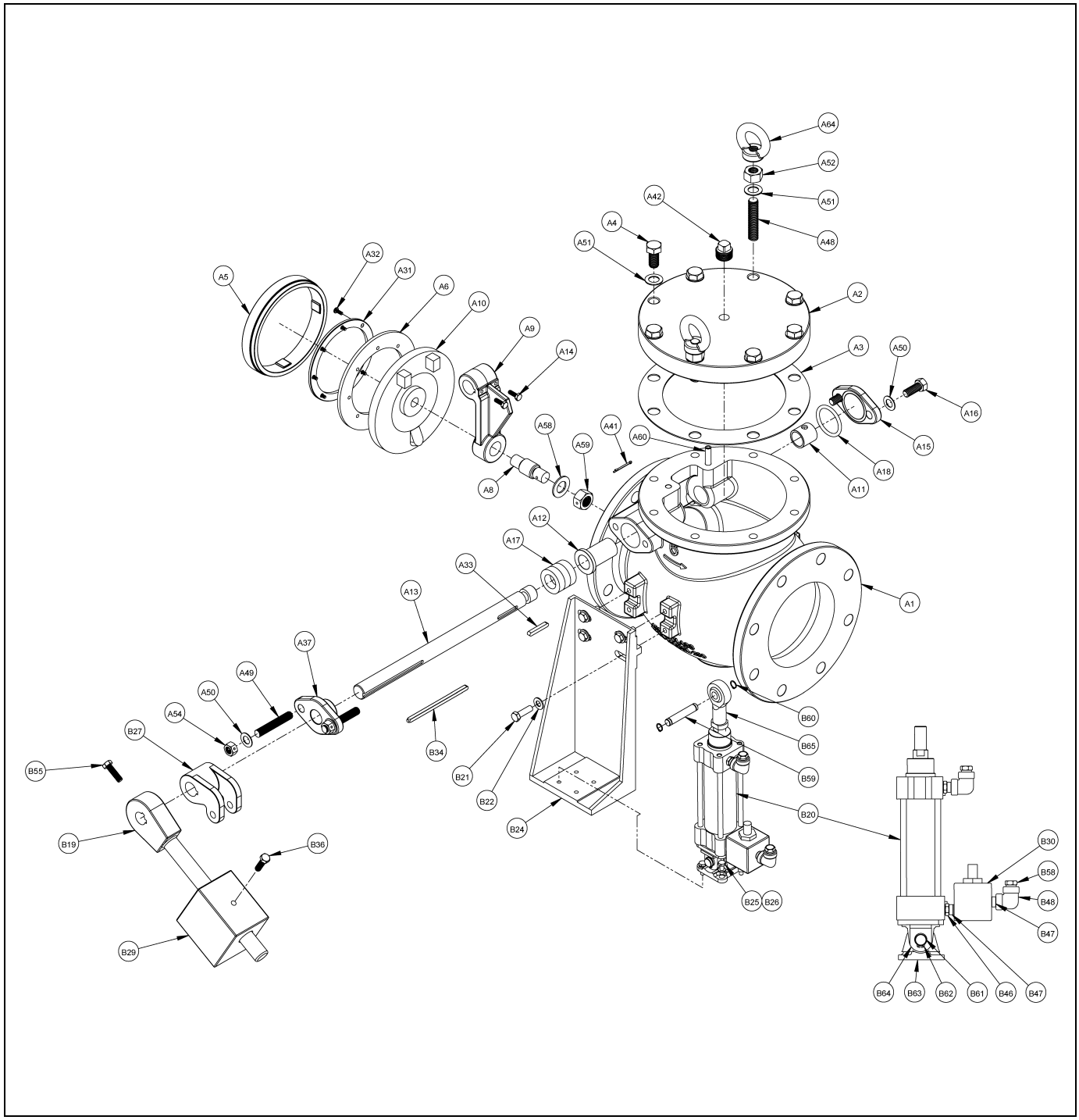

Figure 2 – APCO CVS-250/250A Swing Check Valve (with Air Cushion)

Drawings *(Continued)*

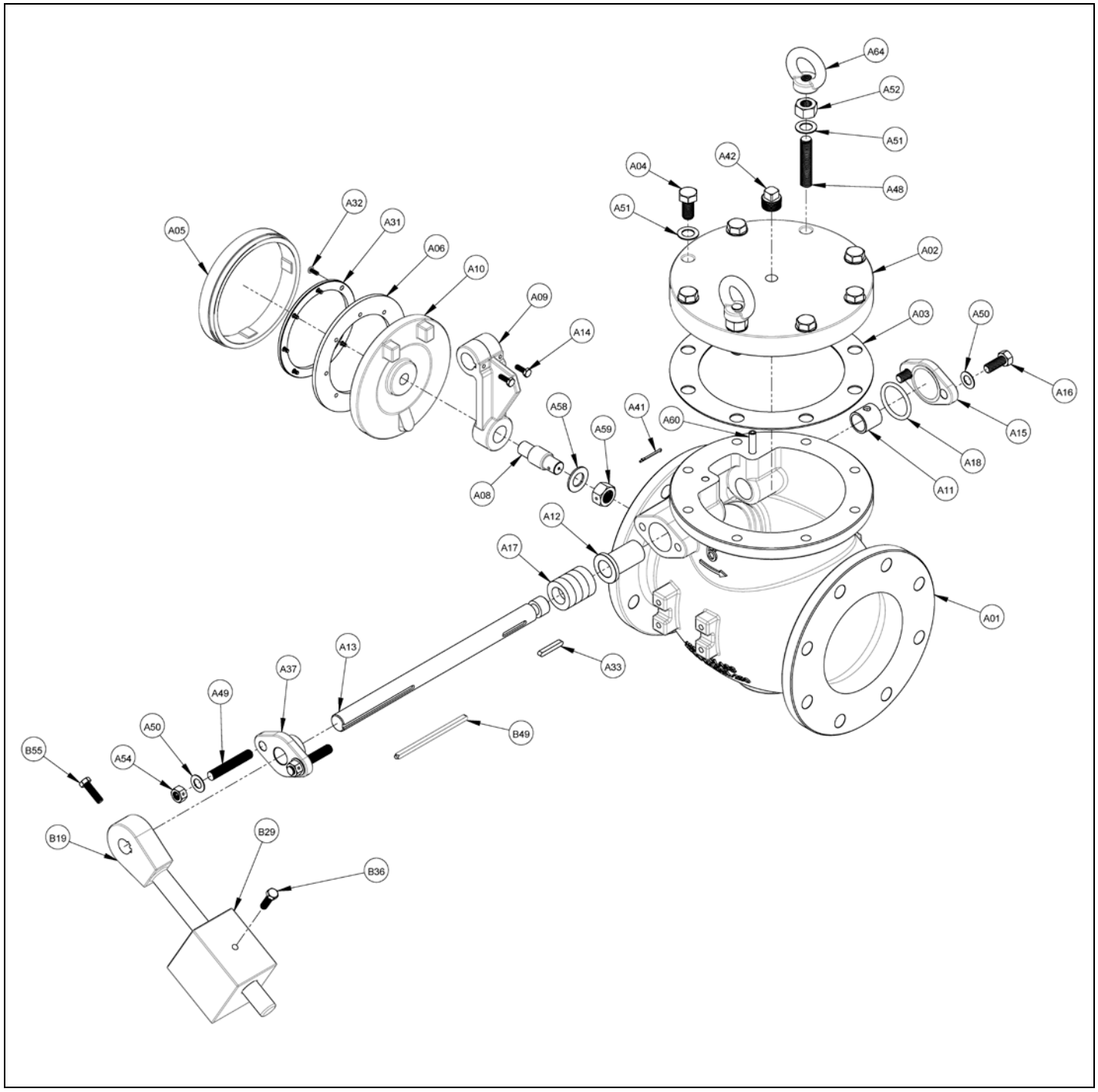

Figure 3 - CVS-250/250A Swing Check Valve (Lever & Weight)

Drawings *(Continued)*

Table 1 - CVS-250/250A Swing Check Valve Parts

Item Number	Description
A01	Body
A02	Cover
A03	Cover Gasket
A04	Hex Bolt
A05	Body Seat Ring
A06	Disc Seat
A08	Disc Stem
A09	Disc Arm
A10	Disc
A11	Straight Bushing
A12	Flanged Bushing
A13	Pivot Shaft
A14	Hex Bolt
A15	Pivot Shaft Cover
A16	Hex Bolt
A17	Packing
A18	Shaft Cover Seal
A31	Seat Retaining Ring
A32	Machine Screw
A33	Pivot Shaft Disc Key
A37	Packing Gland
A41	Cotter Pin
A42	Pipe Plug
A48	Stud
A49	Stud
A50	Washer
A51	Washer
A52	Hex Eye Nut
A54	Hex Nut
A58	Washer
A59	Hex Nut with Drilled Hole
A59	Spring
A60	Pivot Shaft Retaining Pin
A64	Eye Nut
A65	Cover Nut (30” & 36” only)

Note: Items A11 and A12 are not included in the 2” and 3” valve sizes.

Lever & Weight and Cylinder Parts

Item Number	Description
B19	Counter Weight Arm Assembly
B20	Cylinder Assembly (Air Cushion only)
B21	Hex Bolt (Air Cushion only)
B22	Washer (Air Cushion only)
B24	Cylinder Bracket (Air Cushion only)
B25	Hex Bolt
B26	Split Washer
B27	Cushion Lever (Air Cushion only)
B29	Counter Weight
B30	Flow Control Valve
B34	Pivot Shaft Key (Air Cushion only)
B36	Counterweight Arm Retaining Screw
B46	Reducer Bushing (8"-42")
B47	Pipe Nipple
B48	Pipe Elbow
B55	Lever Arm Bolt (Weighted Lever only)
B58	Air Breather
B59	Cushion Lever Clevis Pin (Air Cushion only)
B60	Retaining Ring (Air Cushion only)
B61	Clevis Pin (Air Cushion only)
B62	Retaining Ring (Air Cushion only)
B63	Male Clevis Bracket (Air Cushion only)
B64	Female Clevis Bracket (Air Cushion only)
B65	Yoke (Air Cushion only)

Note: Items B30, B46, B47, B48, B58, B61, B62, B63 & B64 are included with B20 Cylinder Assembly.

Drawings *(Continued)*

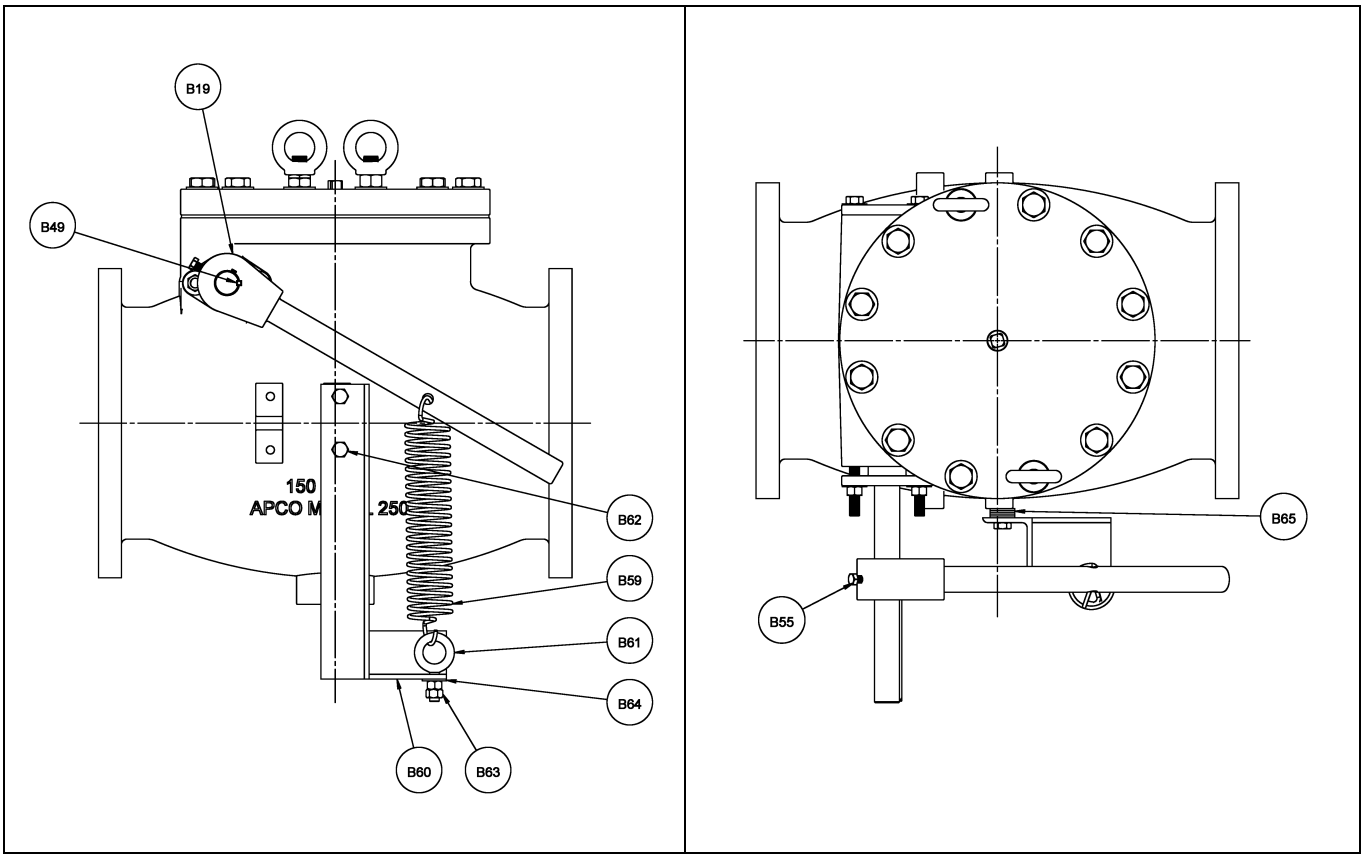

Figure 4 - CVS-250/250A Swing Check Valve (Lever & Spring)

Table 2 –Lever & Spring Parts

Item Number	Description
B19	Lever Arm (Spring Only)
B49	Spring Lever Arm Key (Spring Only)
B55	Spring Lever Arm Retainer Screw (Spring Only)
B59	Spring (Spring Only)
B60	Spring Bracket (Spring Only)
B61	Eye Bolt (Spring Only)
B62	Spring Bracket Bolt (Spring Only)
B63	Eye Bolt Retaining Nut (Spring Only)
B64	Spring Bracket Washer (Spring Only)
B65	Washer (Spring Only)

Troubleshooting

Condition	Possible Cause	Corrective Action
Shaft seal leaks.	Packing is worn. Packing is not tight.	Replace Packing. Adjust packing.
Valve leaks excessively from one side of the disc to the other.	Foreign matter caught between disc and seat.	Fully open valve to remove object.
	Disc seat is worn or damaged.	Repair disc seat or replace valve.
Valve leaks at flange joint.	Loose flange bolting.	Tighten flange bolting.
	Blown flange gasket.	Replace flange gasket.
	Misalignment or damage to field piping and supports.	Adjust misalignment or repair piping or supports.
	Damaged flange face/s or improper flange connections.	Repair flange, replace valve body or adjust flange connections.
Valve does not fully close.	Object is wedged between seat and disc.	Fully open valve to remove object.
	Packing Gland is too tight	Loosen packing gland fasteners. Packing may need to be replaced if leakage occurs.

Limited Warranty

DeZURIK, Inc. (“Seller”) manufactured products, auxiliaries and parts for a period of twenty-four (24) months from date of shipment from Seller’s factory, are warranted to the original purchaser only against defective workmanship and material, but only if properly stored, installed, operated, and serviced in accordance with Seller’s recommendations and instructions.

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Products or parts manufactured by others but furnished by Seller are not covered by this limited warranty. Seller will provide repair or replacement for other’s products or parts only to the extent provided in and honored by the original manufacturer’s warranty to Seller, in each case subject to the limitations contained in the original manufacturer’s warranty.

No claim for transportation, labor, or special or consequential damages or any other loss, cost or damage is being provided in this limited warranty. You shall be solely responsible for determining suitability for use and in no event shall Seller be liable in this respect.

This limited warranty does not warrant that any Seller product or part is resistant to corrosion, erosion, abrasion or other sources of failure, nor does Seller warrant a minimum length of service.

Your failure to give written notice to us of any alleged defect under this warranty within twenty (20) days of its discovery, or attempts by someone other than Seller or its authorized representatives to remedy the alleged defects therein, or failure to return product or parts for repair or replacement as herein provided, or failure to store, install, or operate said products and parts according to the recommendations and instructions furnished by Seller shall be a waiver by you of all rights under this limited warranty.

This limited warranty is voided by any misuse, modification, abuse or alteration of Seller’s product, accident, fire, flood or other Act of God, or your failure to pay entire contract price when due.
The foregoing limited warranty shall be null and void if, after shipment from our factory, the item is modified in any way or a component of another manufacturer, such as but not limited to, an actuator is attached to the item by anyone other than a Seller factory authorized service personnel.

All orders accepted shall be deemed accepted subject to this limited warranty, which shall be exclusive of any other or previous Warranty, and this shall be the only effective guarantee or warranty binding on Seller, despite anything to the contrary contained in the purchase order or represented by any agent or employee of Seller in writing or otherwise, notwithstanding, including but not limited to implied warranties.

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Sales and Service

For information about our worldwide locations, approvals, certifications and local representative:

Web site: www.dezurik.com E-Mail: info@dezurik.com

250 Riverside Ave. N., Sartell, MN 56377 ● Phone: 320-259-2000 ● Fax: 320-259-2227

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DeZURIK VENDOR INSTRUCTIONS

IM ACT AUMA MTR SC(R)05.2-SQ(R)14.2 AUMATIC AC01.2 PAR NON-INT

Instruction **DP00563**
April 2022

DeZURIK, Inc. Sartell, Minnesota USA | Phone: 320-259-2000 | www.dezurik.com | info@dezurik.com

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Solutions for a world in motion

Part-turn actuators
SQ 05.2 – SQ 14.2
SQR 05.2 – SQR 14.2
Control unit: electronic (MWG)
with actuator controls
AC 01.2 Non-Intrusive

Control

→ Parallel

Profibus DP

Profinet

Modbus RTU

Modbus TCP/IP

Foundation Fieldbus

HART

Operation instructions

Assembly, operation, commissioning

Read operation instructions first.

- Observe safety instructions.
- These operation instructions are part of the product.
- Retain operation instructions during product life.
- Pass on instructions to any subsequent user or owner of the product.

Purpose of the document:

This document contains information for installation, commissioning, operation and maintenance staff. It is intended to support device installation and commissioning.

Reference documents:

- Manual (Operation and setting) of actuator controls AC 01.2 Parallel

Reference documents can be downloaded from the Internet (www.auma.com) or ordered directly from AUMA (refer to <Addresses>).

Table of contents

1. Safety instructions

1.1. Basic information on safety

Standards/directives

Our products are designed and manufactured in compliance with recognised standards and directives. This is certified in a Declaration of Incorporation and an EU Declaration of Conformity.

The end user or the contractor must ensure that all legal requirements, directives, guidelines, national regulations and recommendations with respect to assembly, electrical connection, commissioning and operation are met at the place of installation.

Safety instructions/warnings

All personnel working with this device must be familiar with the safety and warning instructions in this manual and observe the instructions given. Safety instructions and warning signs on the device must be observed to avoid personal injury or property damage.

Qualification of staff

Assembly, electrical connection, commissioning, operation, and maintenance must be carried out by suitably qualified personnel authorised by the end user or contractor of the plant only.

Prior to working on this product, the staff must have thoroughly read and understood these instructions and, furthermore, know and observe officially recognised rules regarding occupational health and safety.

Commissioning

Prior to commissioning, it is important to check that all settings meet the requirements of the application. Incorrect settings might present a danger to the application, e.g. cause damage to the valve or the installation. The manufacturer will not be held liable for any consequential damage. Such risk lies entirely with the user.

Operation

Prerequisites for safe and smooth operation:

- Correct transport, proper storage, mounting and installation, as well as careful commissioning.
- Only operate the device if it is in perfect condition while observing these instructions.
- Immediately report any faults and damage and allow for corrective measures.
- Observe recognised rules for occupational health and safety.
- Observe national regulations.
- During operation, the housing warms up and surface temperatures > 60 °C may occur. To prevent possible burns, we recommend checking the surface temperature using an appropriate thermometer and wearing protective gloves, if required, prior to working on the device.

Protective measures

The end user or the contractor are responsible for implementing required protective measures on site, such as enclosures, barriers, or personal protective equipment for the staff.

Maintenance

To ensure safe device operation, the maintenance instructions included in this manual must be observed.

Any device modification requires prior written consent of the manufacturer.

1.2. Range of application

AUMA part-turn actuators are designed for the operation of industrial valves, e.g. butterfly valves and ball valves.

Other applications require explicit (written) confirmation by the manufacturer.

The following applications are not permitted, e.g.:

- Industrial trucks according to EN ISO 3691
- Lifting appliances according to EN 14502
- Passenger lifts according to DIN 15306 and 15309
- Service lifts according to EN 81-1/A1

- Escalators
- Continuous duty
- Buried service
- Continuous submersion (observe enclosure protection)
- Potentially explosive areas, with the exception of zone 22
- Radiation exposed areas in nuclear power plants

No liability can be assumed for inappropriate or unintended use.

Observance of these operation instructions is considered as part of the device's designated use.

Information These operation instructions are only valid for the "clockwise closing" standard version, i.e. driven shaft turns clockwise to close the valve.

1.3. Applications in Ex zone 22 (option)

Actuators of the indicated series basically meet the requirements for applications in dust hazardous locations of ZONE 22 in compliance with the ATEX directive 2014/34/EU.

To comply with all requirements of the ATEX directive, observe the following points:

- Actuators are marked with the explosion protection designation II3D... for use in ZONE 22.
- Maximum surface temperature of actuators
  - T150 °C for ambient temperatures up to +60 °C or
  - T190 °C for ambient temperatures up to +80 °C.

  Increased dust deposit on the equipment was not considered for the determination of the maximum surface temperature.
- The following conditions must be fulfilled to respect the maximum permissible surface temperatures at the actuator:
  - Respecting types of duty and technical manufacturer data
  - Correct connection of thermal motor protection (thermoswitches or PTC thermistor)

Table 1:

Ambient temperature	Tripping temperature Thermal motor protection	Maximum surface temperature
up to +60 °C	140 °C	T150 °C
up to +80 °C	155 °C	T190 °C

- The connector may only be connected or disconnected when not live.
- The cable glands and cable entries used have to meet the requirements of category II3D and must at least comply with enclosure protection IP67.
- The actuators must be connected by means of an external earth connection (accessory part) to the equipotential earth bonding or integrated into an earthed piping system.
- As a general rule, the requirements of IEC 60079 Parts 14 and 17 must be respected in dust hazardous locations. During commissioning, service, and maintenance, special care as well as qualified and trained personnel are required for safe actuator operation.

1.4. Warnings and notes

The following warnings draw special attention to safety-relevant procedures in these operation instructions, each marked by the appropriate signal word (DANGER, WARNING, CAUTION, NOTICE).

⚠ DANGER **Indicates an imminently hazardous situation with a high level of risk. Failure to observe this warning could result in death or serious injury.**

⚠ WARNING	**Indicates a potentially hazardous situation with a medium level of risk. Failure to observe this warning could result in death or serious injury.**
⚠ CAUTION	**Indicates a potentially hazardous situation with a low level of risk. Failure to observe this warning may result in minor or moderate injury. May also be used with property damage.**
NOTICE	**Potentially hazardous situation. Failure to observe this warning may result in property damage. Is not used for personal injury.**

Arrangement and typographic structure of the warnings

⚠ DANGER

Type of hazard and respective source!

Potential consequence(s) in case of non-observance (option)

→ Measures to avoid the danger

→ Further measure(s)

Safety alert symbol ⚠ warns of a potential personal injury hazard.

The signal word (here: DANGER) indicates the level of hazard.

1.5. References and symbols

The following references and symbols are used in these instructions:

Information The term **Information** preceding the text indicates important notes and information.

Symbol for CLOSED (valve closed)

Symbol for OPEN (valve open)

✓ Important information before the next step. This symbol indicates what is required for the next step or what has to be prepared or observed.

M ▷ **Via the menu to parameter**

Describes the path within the menu to the parameter. By using the push buttons of the local controls you may quickly find the desired parameter in the display.

< > **Reference to other sections**

Terms in brackets shown above refer to other sections of the document which provide further information on this topic. These terms are either listed in the index, a heading or in the table of contents and may easily be located.

2. Identification

2.1. Name plate

Each device component (actuator, actuator controls, motor) is equipped with a name plate.

Figure 1: Arrangement of name plates

[1] Actuator name plate
[2] Actuator controls name plate
[3] Motor name plate
[4] Additional plate, e.g. KKS plate (Power Plant Classification System)

Actuator name plate

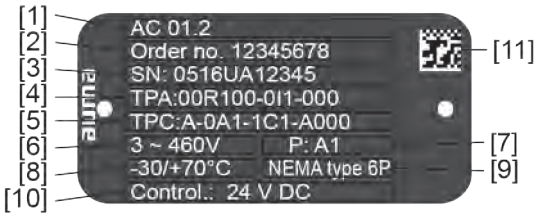
Figure 2: Actuator name plate (example)

auma (= manufacturer logo)

[1] Name of manufacturer
[2] Address of manufacturer
[3] **Type designation**
[4] **Order number**
[5] **Actuator serial number**
[6] Operating time in [s] for a part-turn movement of 90°
[7] Torque range in direction CLOSE
[8] Torque range in direction OPEN
[9] Type of lubricant
[10] Permissible ambient temperature
[11] Can be assigned as an option upon customer request
[12] Enclosure protection
[13] **Data Matrix code**

Actuator controls name plate

Figure 3: Name plate for actuator controls (example)

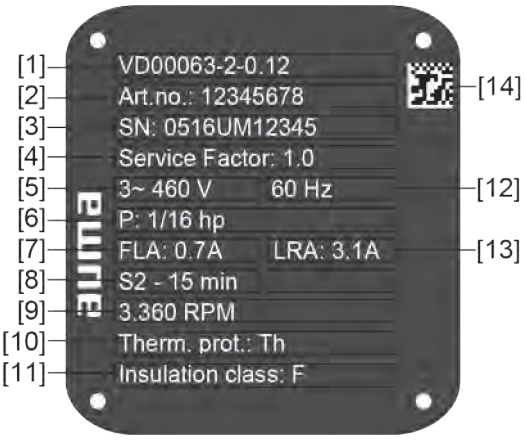


auma (= manufacturer logo)

[1] **Type designation**
[2] **Order number**
[3] **Serial number**
[4] **Actuator terminal plan**
[5] Actuator controls terminal plan
[6] Mains voltage
[7] **AUMA power class for switchgear**
[8] Permissible ambient temperature
[9] Enclosure protection
[10] **Control**
[11] Data Matrix code

Motor name plate

Figure 4: Motor name plate (example)



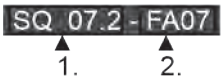
auma (= manufacturer logo);

[1] Motor type
[2] Motor article number
[3] Serial number
[4] Service factor
[5] Phase, mains voltage
[6] Horse power
[7] Full load current (corresponds to approx. 35% of maximum torque)
[8] Type of duty
[9] Speed
[10] Motor protection (temperature protection)
[11] Insulation class
[12] Mains frequency
[13] Locked rotor current (Starting current)
[14] Data Matrix code

Descriptions referring to name plate indications

Type designation

Figure 5: Type designation (example)



1. Type and size of actuator
2. Flange size

Type and size

These instructions apply to the following devices types and sizes:

- Type SQ = Part-turn actuators for open-close duty
  Sizes and generation: 05.2, 07.2, 10.2, 12.2, 14.2
- Type SQ**R** = Part-turn actuators for modulating duty
  Sizes and generation: 05.2, 07.2, 10.2, 12.2, 14.2
- Type AC = AUMATIC actuator controls
  Size and generation: 01.2

Order number

The product can be identified using this number and the technical data as well as order-related data pertaining to the device can be requested.

Please always state this number for any product inquiries.

On the Internet at **http://www.auma.com** > Service & Support > myAUMA, we offer a service allowing authorised users to download order-related documents such as wiring diagrams and technical data (both in German and English), inspection certificate and the operation instructions when entering the order number.

Actuator serial number

Table 2:

Description of the serial number (with example 0516US12345)			
05	16	US12345	
05	Positions 1+2: Assembly in week = week 05		
	16	Positions 3+4: Year of manufacture = 2016	
		US12345	Internal number for unambiguous product identification

Actuator terminal plan

Position 9 after **TPA**: Position transmitter version

I, Q = MWG (Magnetic limit and torque transmitter)

AUMA power class for switchgear

The switchgear used in the actuator controls (reversing contactors/thyristors) are classified according to AUMA power classes (e.g. A1, B1, ...). The power class defines the max. permissible rated power (of the motor) the switchgear has been designed for. The rated power (nominal power) of the actuator motor is indicated in kW on the motor name plate. For the assignment of the AUMA power classes to the nominal power of the motor types, refer to the separate electrical data sheets.

For switchgear without assignment to any power classes, the actuator controls name plate does not indicate the power class but the max. rated power in kW.

Control

Table 3:

Control examples (indications on actuator controls name plate)	
Input signal	Description
24 V DC	Control voltage 24 V DC for OPEN - CLOSE control via digital inputs (OPEN, STOP, CLOSE)
48 V DC	Control voltage 48 V DC OPEN - CLOSE control via digital inputs (OPEN, STOP, CLOSE)
60 V DC	Control voltage 60 V DC OPEN - CLOSE control via digital inputs (OPEN, STOP, CLOSE)
115 V AC	Control voltage 115 V AC for OPEN - CLOSE control via digital inputs (OPEN, STOP, CLOSE)
0/4 – 20 mA	Input current for setpoint control via analog input

Data Matrix code

When registered as authorised user, you may use our **AUMA Assistant App** to scan the Data Matrix code and directly access the order-related product documents without having to enter order number or serial number.

Figure 6: Link to AUMA Assistant App:

For further Service & Support, software/apps/... refer to www.auma.com.

2.2. Short description

Part-turn actuator

Definition in compliance with EN 15714-2/EN ISO 5211:

A part-turn actuator is an actuator which transmits a torque to the valve for less than one full revolution. It need not be capable of withstanding thrust.

AUMA part-turn actuators SQ 05.2 – SQ 14.2/SQR 05.2 – SQR 14.2 are driven by an electric motor. For manual operation, a handwheel is provided. Switching off in end positions may be either by limit or torque seating. Actuator controls are required to operate or process the actuator signals.

Actuator controls

AC 01.2 actuator controls are used to operate AUMA actuators and are supplied ready for use. The actuator controls may be mounted directly to the actuator or separately on a wall bracket.

The functions of AC 01.2 actuator controls include standard valve control in OPEN-CLOSE duty, positioning, process control, logging of operating data right through to diagnostic functions.

Local controls/ AUMA software

Operation, setting, and display can be performed directly at actuator controls or alternatively from Remote via binary input signals.

The following options are available at the actuator controls in local operation:

- The actuator can be operated via the push buttons of the local controls or settings can be made in the actuator controls menu. The display shows information on the actuator as well as menu settings (contents of these instructions).
- Using the AUMA CDT software for Windows-based notebooks or the AUMA Assistant App for Android-based devices, data can be uploaded and read whereas settings can be modified and stored. The connection between computer and actuator controls is wireless via Bluetooth interface (not included in these instructions). AUMA CDT software can be downloaded free of charge from our website www.auma.com.

Intrusive - Non-Intrusive

- Intrusive version (control unit: electromechanical):
  Limit and torque setting is performed via switches in the actuator.

- Non-Intrusive version (control unit: electronic):
  Limit and torque setting is performed via the controls, without removal of actuator or actuator controls covers. For this purpose, the actuator is equipped with an MWG (magnetic limit and torque transmitter), also capable to supply analogue torque feedback signals/torque indication and analog position feedback signals/ position indication at the actuator controls output.

3. Transport, storage and packaging

3.1. Transport

For transport to place of installation, use sturdy packaging.

DANGER

Hovering load!

Risk of death or serious injury.

→ Do NOT stand below hovering load.

→ Attach ropes or hooks for the purpose of lifting by hoist only to housing and NOT to handwheel.

→ Actuators mounted on valves: Attach ropes or hooks for the purpose of lifting by hoist to valve and NOT to actuator.

→ Actuators mounted to gearboxes: Attach ropes or hooks for the purpose of lifting by hoist only to the gearbox using eyebolts and NOT to the actuator.

→ Actuators mounted to controls: Attach ropes or hooks for the purpose of lifting by hoist only to the actuator and NOT to the controls.

→ Respect total weight of combination (actuator, actuator controls, gearbox, valve)

→ Secure load against falling down, sliding or tilting.

→ Perform lift trial at low height to eliminate any potential danger e.g. by tilting.

Figure 7: Example: Lifting the actuator

Table 4:

Weight for AC 01.2 actuator controls	
with electrical connection type:	Weight approx. lbs [kg]
AUMA plug/socket connector with screw-type connection	15 [7]

Table 5:

Dimensions Part-turn actuators SQ 05.2 – SQ 14.2 / SQR 05.2 – SQR 14.2 with 3-phase AC motors		
Type designation Actuator	Weight[1)]	Weight with base and lever[2)]
	approx. lbs [kg]	approx. lbs [kg]
SQ 05.2/ SQR 05.2	46 [21]	60 [27]
SQ 07.2/ SQR 07.2	46 [21]	60 [27]
SQ 10.2/ SQR 10.2	57 [26]	68 [31]
SQ 12.2/ SQR 12.2	77 [35]	95 [43]
SQ 14.2/ SQR 14.2	97 [44]	121 [55]

1) Indicated weight includes AUMA NORM part-turn actuator with 3-phase AC motor, electrical connection in standard version, unbored coupling and handwheel. For other output drive types, heed additional weights.
2) Indicated weight includes AUMA NORM part-turn actuator with 3-phase AC motor, electrical connection in standard version, and handwheel, including base and lever. For other output drive types, heed additional weights.

Table 6:

Dimensions Part-turn actuators SQ 05.2 – SQ 14.2 / SQR 05.2 – SQR 14.2 with 1-phase AC motors		
Type designation Actuator	Weight [1)]	Weight with base and lever[2)]
	approx. lbs [kg]	approx. lbs [kg]
SQ 05.2/ SQR 05.2	50 [23]	63 [29]
SQ 07.2/ SQR 07.2	50 [23]	63 [29]
SQ 10.2/ SQR 10.2	61 [28]	70 [32]
SQ 12.2/ SQR 12.2	81 [37]	99 [45]
SQ 14.2/ SQR 14.2	101 [46]	125 [57]

1) Indicated weight includes AUMA NORM part-turn actuator with 1-phase AC motor, electrical connection in standard version, unbored coupling and handwheel. For other output drive types, heed additional weights.
2) Indicated weight includes AUMA NORM part-turn actuator with 1-phase AC motor, electrical connection in standard version, and handwheel, including base and lever. For other output drive types, heed additional weights.

3.2. Storage

NOTICE

Danger of corrosion due to inappropriate storage!

→ Store in a well-ventilated, dry room.
→ Protect against floor dampness by storage on a shelf or on a wooden pallet.
→ Cover to protect against dust and dirt.
→ Apply suitable corrosion protection agent to uncoated surfaces.

NOTICE

Damage on display caused by temperatures below permissible level!

→ AC actuator controls MUST NOT be stored below –30 °C.

Long-term storage

For long-term storage (more than 6 months), observe the following points:

1. Prior to storage:
   Protect uncoated surfaces, in particular the output drive parts and mounting surface, with long-term corrosion protection agent.
2. At an interval of approx. 6 months:
   Check for corrosion. If first signs of corrosion show, apply new corrosion protection.

3.3. Packaging

Our products are protected by special packaging for transport when leaving the factory. The packaging consists of environmentally friendly materials which can easily be separated and recycled. We use the following packaging materials: wood, cardboard, paper, and PE foil. For the disposal of the packaging material, we recommend recycling and collection centers.

4. Assembly

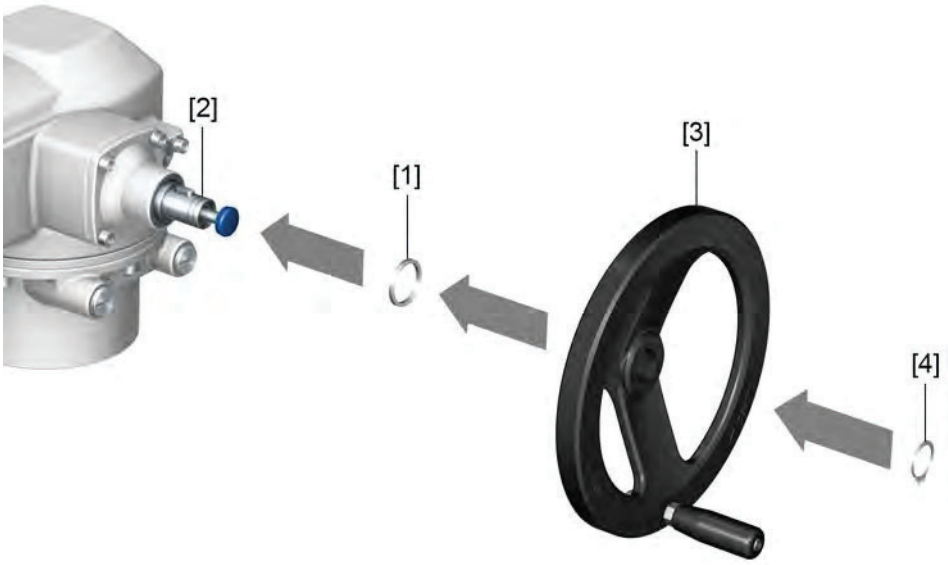
4.1. Mounting position

The product described in this document can be operated in any mounting position.

Restriction: When using oil instead of grease within the actuator gear housing, the hollow shaft mounting position must be perpendicular, with the flange pointing downward. The type of lubricant used is indicated on the actuator name plate (short designation **F**...= grease; **O**...= oil).

4.2. Handwheel fitting

Figure 8: Handwheel



[1] Spacer
[2] Input shaft
[3] Handwheel
[4] Retaining ring

1. If required, fit spacer [1] onto input shaft [2].
2. Slip handwheel [3] onto input shaft.
3. Secure handwheel [3] using the retaining ring [4] supplied.

Information The retaining ring [4] (together with these operation instructions) is stored in a weatherproof bag, which is attached to the device prior to delivery.

4.3. Part-turn actuator to valve: mount

NOTICE

Danger of corrosion due to damage to paint finish and condensation!

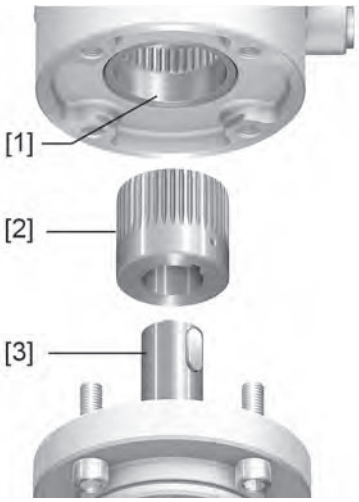
- Touch up damage to paint finish after work on the device.
- After mounting, connect the device immediately to electrical mains to ensure that heater minimises condensation.

The part-turn actuator is mounted to the valve using a coupling (standard) or via lever. Separate instructions are available for actuator mounting to the valve when equipped with base and lever.

4.3.1. Output drive for coupling

Design

Figure 9: Valve attachment via coupling



[1] Actuator worm wheel with internal splines
[2] Splined plug-in coupling
[3] Valve shaft (example with key)

Application

- For valve attachments according to MSS SP-101
- For rotating, non-rising valve stem

4.3.1.1. Part-turn actuator (with coupling): mount to valve

Unbored couplings or couplings with pilot bore must be machined to match the valve shaft prior to mounting the part-turn actuator to the valve (e.g. with bore and keyway, two-flat or square bore).

Information

Assemble valve and part-turn actuator in the same end position. As standard, the part-turn actuator is supplied in end position CLOSED.

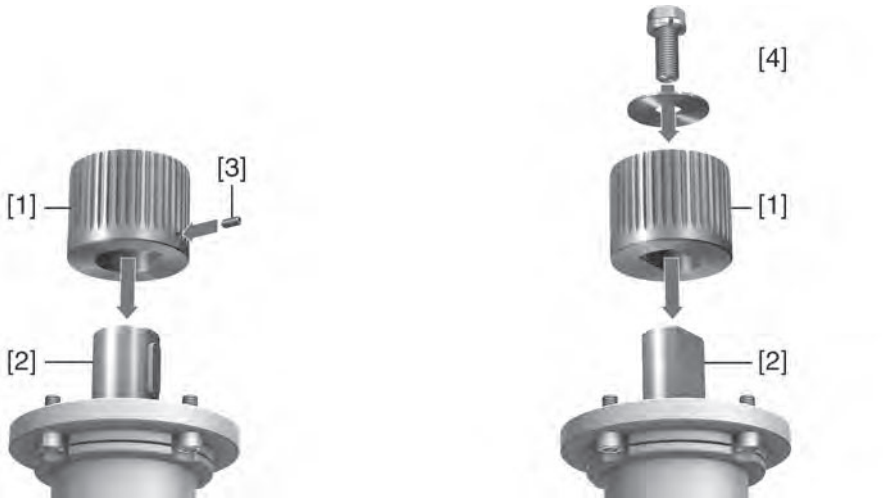
- Recommended mounting position for **butterfly valves**: End position CLOSED.
- Recommended mounting position for **ball valves**: End position OPEN.

Assembly steps

1. If required, move part-turn actuator in same end position as valve using the handwheel.
2. Clean mounting faces, thoroughly degrease uncoated mounting surfaces.
3. Apply a small quantity of grease to the valve shaft [2].

4. Place coupling [1] onto valve shaft [2] and secure against axial slipping by using a grub screw [3] or a clamping washer and a screw with curved spring lock washer [4]. Thereby, ensure that dimensions X, Y or L are observed (refer to figure and table <Mounting positions for coupling>).

Figure 10: Examples: Fit coupling



[1] Coupling
[2] Valve shaft
[3] Grub screw
[4] Clamping washer and screw with curved spring lock washer

Figure 11: Mounting positions for coupling

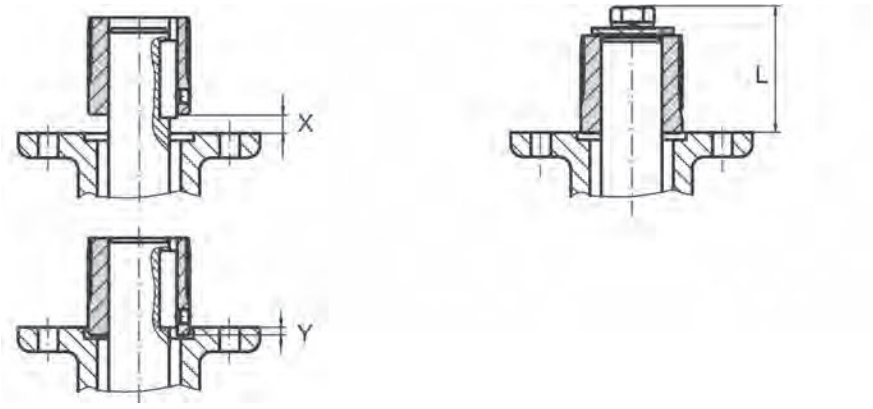


Table 7:

Mounting position of the coupling within fitting dimensions according to AUMA definition											
Dimensions [mm]	SQ 05.2		SQ 07.2			SQ 10.2		SQ 12.2		SQ 14.2	
EN ISO 5211	FA05	FA07	FA05	FA07	FA10	FA10	FA12	FA12	FA14	FA14	FA16
X max.	3	3	3	3	3	4	4	5	5	8	8
Y max.	2	2	2	2	2	5	5	10	10	10	10
L max.	40	40	40	40	66	50	82	61	101	75	125

5. Apply non-acidic grease at splines of coupling (e.g. Gleitmo by Fuchs).

6. Fit part-turn actuator. If required, slightly turn part-turn actuator until splines of coupling engage.
   Figure 12:

Information Ensure that the spigot (if provided) fits uniformly in the recess and that the flanges are in complete contact.

7. If flange bores do not match thread:
   7.1 Slightly rotate handwheel until bores line up.
   7.2 If required, shift part-turn actuator by one tooth on the coupling.
8. Fasten part-turn actuator with screws.
   Information: We recommend applying liquid thread sealing material to the screws to avoid contact corrosion.
9. Fasten screws crosswise to a torque according to table.

Table 8:

Tightening torques for screws	
Threads	Tightening torque [ft-lb]
	Strength class A2-80/A4–80
1/4" [M6]	7 [10]
5/16" [M8]	18 [24]
3/8" [M10]	35 [48]
1/2" [M12]	60 [82]
5/8" [M16]	148 [200]
3/4" [M20]	289 [392]

4.4. Mounting positions of local controls

Figure 13: Mounting positions

The mounting position of the local controls is implemented according to the order. If, after mounting the actuator to the valve or the gearbox on site, the local controls are in an unfavourable position, the mounting position can be changed at a later date. Four mounting positions shifted by respectively 90° are possible (by maximum 180° into one direction).

4.4.1. Mounting positions: modify

DANGER

Hazardous voltage!

Risk of electric shock.

→ Disconnect device from the mains before opening.

NOTICE

Electrostatic discharge ESD!

Risk of damage to electronic components.

→ Earth both operators and devices.

1. Loosen screws and remove the local controls.
2. Check whether O-ring is in good condition, correctly insert O-ring.
3. Turn local controls into new position and re-place.

NOTICE

Cable damage due to twisting or pinching!

Risk of functional failures.

→ Turn local controls by a maximum of 180°.

→ Carefully assemble local controls to avoid pinching the cables.

4. Fasten screws evenly crosswise.

5. Electrical connection

5.1. Basic information

⚠ WARNING

Danger due to incorrect electrical connection

Failure to observe this warning can result in death, serious injury, or property damage.

→ The electrical connection must be carried out exclusively by suitably qualified personnel.

→ Prior to connection, observe basic information contained in this chapter.

→ After connection but prior to applying the voltage, observe the <Commissioning> and <Test run> chapters.

Wiring diagram/terminal plan

The pertaining wiring diagram/terminal plan (in German or English) is attached to the device in a weather-proof bag, together with these operation instructions. It can also be requested from AUMA (state order number, refer to name plate) or downloaded directly from the Internet (http://www.auma.com).

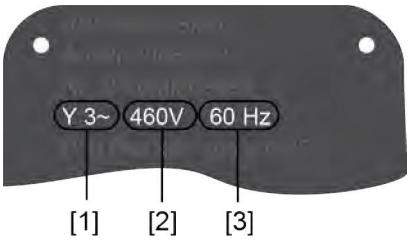
Permissible networks (supply networks)

Actuator controls (actuators) are suitable for use in TN and TT networks with directly earthed star point for mains voltage up to maximum 690 V AC. Use in IT networks for nominal voltages up to maximum 600 V AC are permissible. For IT network, a suitable, approved insulation monitor measuring the pulse code is required.

Current type, mains voltage, mains frequency

Type of current, mains voltage and mains frequency must match the data on the actuator controls and motor name plates. Also refer to chapter <Identification>/<Name plate>.

Figure 14: Motor name plate (example)



[1] Type of current

[2] Mains voltage

[3] Mains frequency (for 3-phase and 1-phase AC motors)

External supply of the electronics

For external electronics supply with 24 V DC and simultaneous use of DC motors (24 V DC, 48 V DC, 60 V DC, 110 V DC, 220 V DC), the 24 V DC controls' voltage supply should be ensured via the XK25/26 terminals, separately from the power supply (U1, V1). In case of common supply using a single cable (links from U1, V1 with XK25/26, for 24 V DC only !!!), short-term excess or falling below the permissible voltage limits can be the consequence during switching (24 V DC +10 %/–10 %). Any possibly incoming operation commands are not executed outside the admissible limit values. The actuator controls briefly signal a fault condition.

Protection and sizing on site

For short-circuit protection and for disconnecting the actuator from the mains, fuses and disconnect switches have to be provided by the customer.

The current values for sizing the protection can be derived from the current consumption of the motor (refer to motor name plate) plus the current consumption of actuator controls.

We recommend adapting the switchgear sizing to the max. current (RTA/I_{max}) and selecting and setting the overcurrent protection device in compliance with the indications in the electrical data sheet.

Table 9:

Current consumption of actuator controls		
Mains voltage	Max. current consumption	
Permissible variation of the mains voltage	±10 %	±30 %
100 to 120 V AC	750 mA	1,000 mA
208 to 240 V AC	400 mA	750 mA
380 to 500 V AC	250 mA	400 mA
515 to 690 V AC	200 mA	400 mA

Table 10:

Maximum permissible protection		
Switchgear (switchgear with power class)[1)]	Rated power	max. protection
Reversing contactor A1	up to 1.5 kW	16 A (gL/gG)
Thyristor B1	up to 1.5 kW	16 A (g/R) I^2t<1,500A^2s

1) The AUMA power class (A1, B1, ...) is indicated on the actuator controls name plate

Consider the motor starting current (LRA/I_a) (refer to electrical data sheet) when selecting the circuit breaker.We recommend tripping characteristics D or K for circuit breakers in accordance with IEC 60947-2. For controls with thyristors, we recommend safety fuses instead of circuit breakers.

We recommend refraining from using residual current devices (RCD). However, if an RCD is used within the mains, the residual current device must be of type B.

For actuator controls equipped with a heating system and external electronics power supply, the fuses for the heating system have to be provided by the customer (refer to wiring diagram F4 ext.)

Table 11:

Fuse for heating system Designation in wiring diagram = F4 ext.		
External power supply	115 V AC	230 V AC
Fuse	2 A T	1 A T

If actuator controls are mounted separately from actuator (actuator controls on wall bracket): Consider length and cross section of connecting cable when defining the protection required.

Potential of customer connections

All input signals (control inputs) must be supplied with the same potential.

All output signals (status signals) must be supplied with the same potential.

Safety standards

Safety measures and safety equipment must comply with the respectively valid national on site specifications. All externally connected devices shall comply with the relevant safety standards for the place of installation.

Connecting cables

- We recommend using connecting cables and connecting terminals according to rated current (FLA/I_n) (refer to motor name plate or electrical data sheet).
- For device insulation, appropriate (voltage-proof) cables must be used. Specify cables for the highest occurring rated voltage.
- Use connecting cable with appropriate minimum rated temperature.
- For connecting cables exposed to UV radiation (outdoor installation), use UV resistant cables.
- For the connection of position transmitters, screened cables must be used.

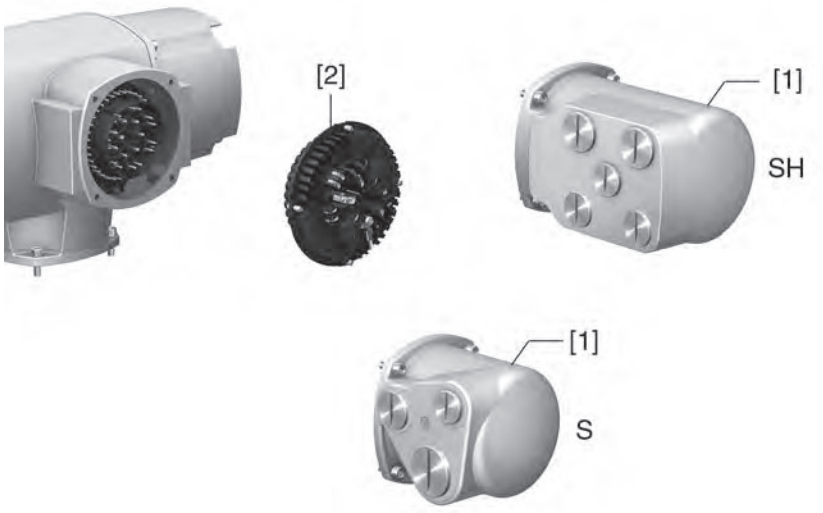
Cable installation in accordance with EMC

Signal and fieldbus cables are susceptible to interference. Motor cables are interference sources.

- Lay cables being susceptible to interference or sources of interference at the highest possible distance from each other.
- The interference immunity of signal and fieldbus cables increases if the cables are laid close to the earth potential.
- If possible, avoid laying long cables and make sure that they are installed in areas being subject to low interference.
- Avoid parallel paths with little cable distance of cables being either susceptible to interference or interference sources.

5.2. S/SH electrical connection (AUMA plug/socket connector)

Figure 15: S and SH electrical connection



[1] Cover
[2] Socket carrier with screw-type terminals

Short description

Plug-in electrical connection with screw-type terminals for power and control contacts. Control contacts also available as crimp-type connection as an option.

S version (standard) with three cable entries. SH version (enlarged) with additional cable entries. For cable connection, remove the AUMA plug/socket connector and the socket carrier from cover.

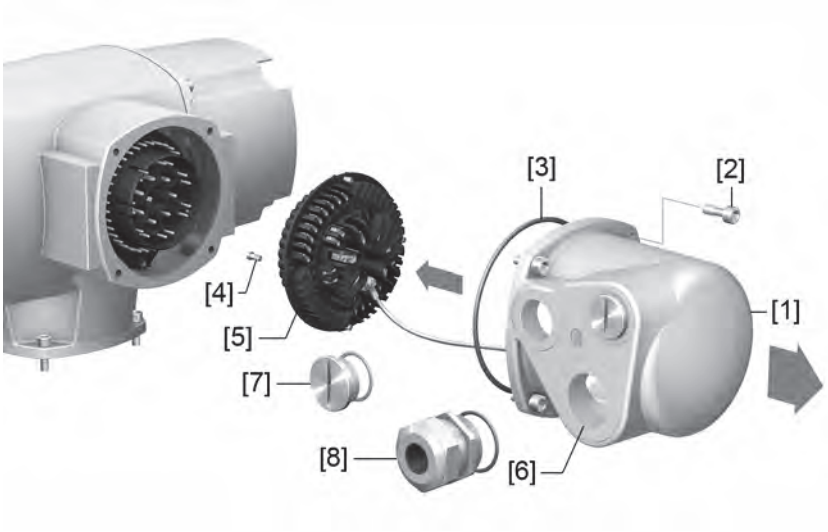
Technical data

Table 12:

Electrical connection via AUMA plug/socket connector		
	Power contacts	Control contacts
No. of contacts max.	6 (3 equipped) + protective earth conductor (PE)	50 pins/sockets
Designation	U1, V1, W1, U2, V2, W2, PE	1 to 50
Connection voltage max.	750 V	250 V
Rated current max.	25 A	16 A
Type of customer connection	Screw connection	Screw connection, crimp-type (option)
Connection diameter max.	AWG 10 [6 mm^2] (flexible) AWG 8 [10 mm^2] (solid)	AWG 14 [2.5 mm^2] (flexible or solid)

5.2.1. Terminal compartment : open

Figure 16: Open terminal compartment



[1] Cover (figure shows S version)
[2] Screws for cover
[3] O-ring
[4] Screws for socket carrier
[5] Socket carrier
[6] Cable entry
[7] Blanking plugs
[8] Cable gland (not included in delivery)

DANGER

Hazardous voltage!

Risk of electric shock.

→ Disconnect device from the mains before opening.

1. Loosen screws [2] and remove cover [1].
2. Loosen screws [4] and remove socket carrier [5] from cover [1].
3. Insert cable glands [8] suitable for connecting cables.

➥ The enclosure protection IP… stated on the name plate is only ensured if suitable cable glands are used.

Figure 17: Example: Name plate for enclosure protection IP68

4. Seal unused cable entries [6] with suitable blanking plugs [7].

5.2.2. Cable connection

Table 13:

Terminal cross sections and terminal tightening torques		
Designation	Terminal cross sections	Tightening torques
Power contacts (U1, V1, W1, U2, V2, W2)	1.0 – 6 mm^2 (flexible) 1.5 – 10 mm^2 (solid)	0.9 – 1.1 ft-lb [1.2 – 1.5 Nm]
Protective earth connection ⏚ (PE)	1.0 – 6 mm^2 (flexible) with ring lugs 1.5 – 10 mm^2 (solid) with loops	0.9 – 1.6 ft-lb [1.2 – 2.2 Nm]
Control contacts (1 to 50)	0.25 – 2.5 mm^2 (flexible) 0.34 – 2.5 mm^2 (solid)	0.9 – 0.5 ft-lb [0.5 – 0.7 Nm]

1. Remove cable sheathing.
2. Insert the wires into the cable glands.
3. Fasten cable glands with the specified torque to ensure required enclosure protection.
4. Strip wires.
   → Controls approx. 6 mm, motor approx. 10 mm
5. For flexible cables: Use wire end sleeves.
6. Connect cables according to order-related wiring diagram.

⚠ WARNING

In case of a fault: Hazardous voltage while protective earth conductor is NOT connected!

Risk of electric shock.

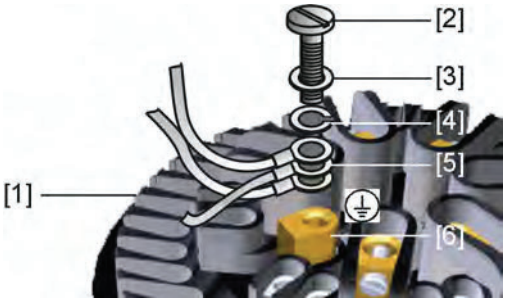
→ Connect all protective earth conductors.

→ Connect PE connection to external protective earth conductor of connecting cables.

→ Start running the device only after having connected the protective earth conductor.

7. Tighten PE conductors firmly to PE connection using ring lugs (flexible cables) or loops (solid cables).

   Figure 18: Protective earthing

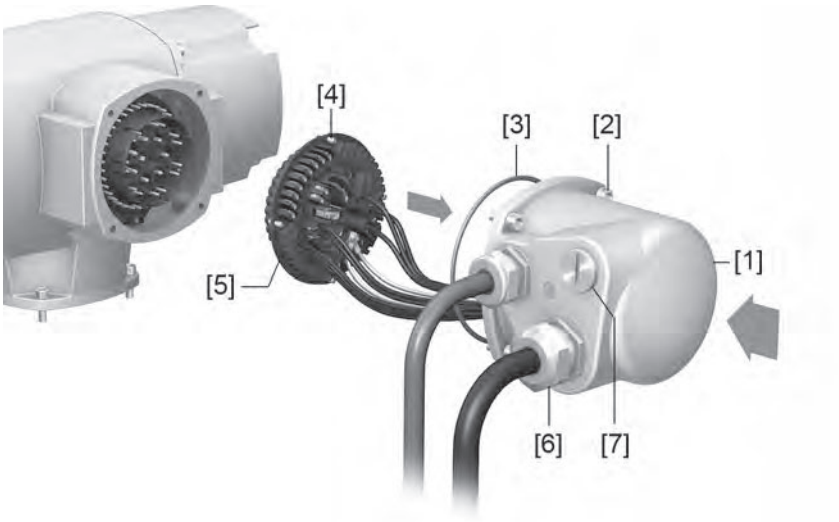


[1] Socket carrier
[2] Screw
[3] Washer
[4] Lock washer
[5] Protective earth with ring lugs/loops
[6] Protective earthing, symbol: ⏚

8. For shielded cables: Link the cable shield end via the cable gland to the housing (earthing).

5.2.3. Terminal compartment : close

Figure 19: Close terminal compartment



[1] Cover (figure shows S version)
[2] Screws for cover
[3] O-ring
[4] Screws for socket carrier
[5] Socket carrier
[6] Cable gland (not included in delivery)
[7] Blanking plug

⚠ WARNING

Short-circuit due to pinching of cables!

Risk of electric shock and functional failures.

→ Carefully fit socket carrier to avoid pinching the cables.

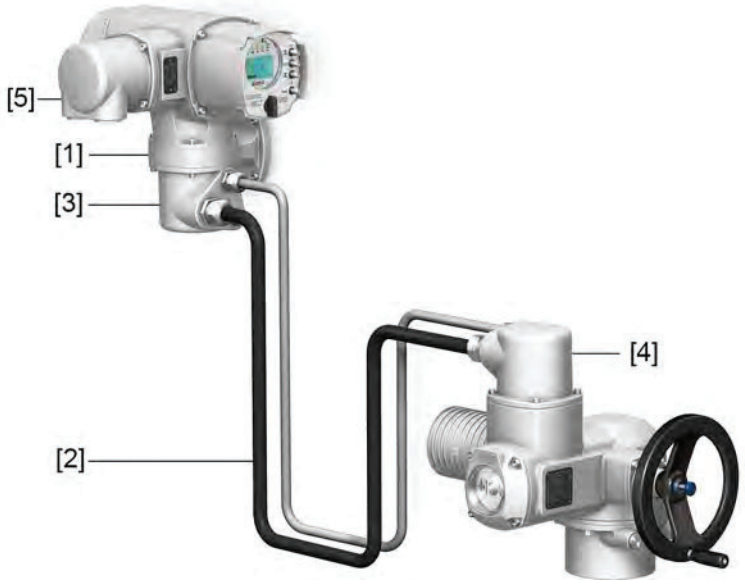
1. Insert the socket carrier [5] into the cover [1] and fasten with screws [4].
2. Clean sealing faces of cover [1] and housing.
3. Check whether O-ring [3] is in good condition, replace if damaged.
4. Apply a thin film of non-acidic grease (e.g. petroleum jelly) to the O-ring and insert it correctly.
5. Fit cover [1] and fasten screws [2] evenly crosswise.
6. Fasten cable glands and blanking plugs applying the specified torque to ensure the required enclosure protection.

5.3. Accessories for electrical connection

5.3.1. Actuator controls on wall bracket

Design

Figure 20: Design principle with wall bracket



[1] Wall bracket
[2] Connecting cables
[3] Electrical connection of wall bracket (XM)
[4] Electrical connection of actuator (XA)
[5] Electrical connection of actuator controls (XK) - customer plug

Application

The wall bracket allows separate mounting of actuator controls and actuator.

- If the actuator cannot be accessed safely.
- If the actuator is subjected to high temperatures.
- In case of heavy vibration of the valve.

Observe prior to connection

- Permissible length of connecting cables: max. 100 m.
- We recommend: AUMA cable set LSW20.
- If the AUMA cable set is not used:
  - Use suitable flexible and screened connecting cables.
  - Use separate, CAN bus data cable for MWG of 120 Ohm character impedance (e.g. UNITRONIC BUS-FD P CAN UL/CSA - 2 x 2 x 0.5 mm², manufacturer: Lapp).
  - Data cable connection: XM2-XA2 = CAN L, XM3-XA3 = CAN H.
  - Voltage supply MWG: XM6-XA6 = GND, XM7-XA7 = + 24 V DC (refer to wiring diagram).
  - For the electrical connection at wall bracket [3], the terminals are made as crimp connections.
  - Use a suitable four indent crimp tool for crimping.
  - Cross sections for flexible wires:
    - Control cables: max. 0.75 to 1.5 mm²
    - Mains connection: max. 2.5 to 4 mm²
- When using connecting cables, e.g. of the heater, requiring direct wiring from the actuator to the XK customer connector (XA-XM-XK, refer to wiring diagram), these connecting cables must be subject to an insulation test in compliance with EN 50178. Connecting cables for MWG do not belong to this group. They may **not** be subjected to an insulation test.

5.3.2. Parking frame

Figure 21: Parking frame, example with plug/socket connector and cover

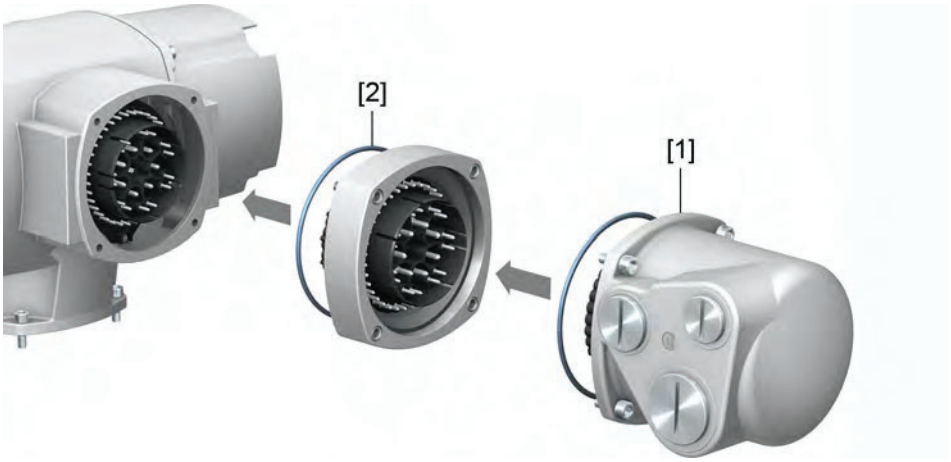
Application

Parking frame for safe storage of a disconnected plug or cover.

For protection against touching the bare contacts and against environmental influences.

5.3.3. DS intermediate frame for double sealing

Figure 22: Electrical connection with DS intermediate frame



[1] Electrical connection

[2] DS intermediate frame

Application

When removing the electrical connection or due to leaky cable glands, there is a potential risk of ingress of dust and water into the housing. This is prevented effectively by inserting the double sealed intermediate frame [2] between the plug/socket connector [1] and the housing of the device. The enclosure protection of the device (NEMA type 6P) will not be affected, even if the electrical connection [1] is removed.

5.3.4. External earth connection

Figure 23: Earth connection for part-turn actuator

Application

External earth connection (U-bracket) for connection to equipotential compensation.

Table 14:

Terminal cross sections and earth connection tightening torques		
Conductor type	Terminal cross sections	Tightening torques
Solid wire and stranded	AWG 14 [6 mm^2] to AWG 10 [2,5 mm^2]	2 - 3 ft-lb [3-4 Nm]
Fine stranded	AWG 12 [1,5 mm^2] to AWG 16 [4 mm^2]	2 - 3 ft-lb [3-4 Nm]
For fine stranded (flexible) wires, connection is made via cable lugs/ring terminals. When connecting two individual wires with a U-bracket, cross sections have to be identical.		

6. Operation

6.1. Manual operation

For purposes of setting and commissioning, in case of motor or power failure, the actuator may be operated manually. Manual operation is engaged by an internal change-over mechanism.

6.1.1. Manual operation: engage

NOTICE

Damage at the motor coupling due to faulty operation!

→ Engage manual operation only during motor standstill.

1. Press push button.

2. Turn handwheel in desired direction.
   → To close the valve, turn handwheel clockwise:
   ↳ Drive shaft (valve) turns clockwise in direction CLOSE.

6.1.2. Manual operation: disengage

Manual operation is automatically disengaged when motor is started again. The handwheel does not rotate during motor operation.

6.2. Motor operation

Perform all commissioning settings and the test run prior to motor operation.

NOTICE

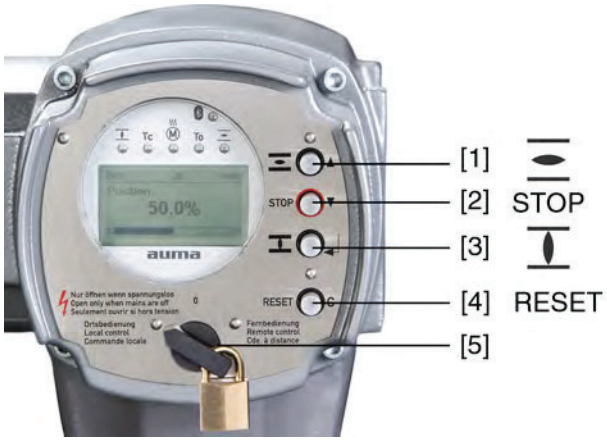
Valve damage due to incorrect basic setting!

→ Prior to electrical operation of the actuator, the basic settings i.e. type of seating, torque and limit switching have to be completed.

6.2.1. Local actuator operation

Local actuator operation is performed using the local controls push buttons of actuator controls.

Figure 24: Local controls



[1] Push button for operation command in direction OPEN
[2] Push button STOP
[3] Push button for operation command in direction CLOSE
[4] Push button RESET
[5] Selector switch

CAUTION

Hot surfaces, e.g. possibly caused by high ambient temperatures or strong direct sunlight!

Danger of burns

→ Verify surface temperature and wear protective gloves.

→ Set selector switch [5] to position **Local control** (LOCAL).

➥ The actuator can now be operated using the push buttons [1 – 3]:

- Run actuator in direction OPEN: Press push button [1].
- Stop actuator: Press push button STOP [2].
- Run actuator in direction CLOSE: Press push button [3].

Information

OPEN and CLOSE operation commands can be given either in push-to-run or in self-retaining operation mode. In self-retaining mode, the actuator runs to the defined end position after pressing the button, unless another command has been received beforehand. For further information, please refer to Manual (Operation and setting).

6.2.2. Actuator operation from remote

CAUTION

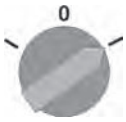
Risk of immediate actuator operation when switching on!

Risk of personal injuries or damage to the valve

→ If the actuator starts unexpectedly: Immediately turn selector switch to position **0** (OFF).

→ Check input signals and functions.

→ Set selector switch to position **Remote control** (REMOTE).



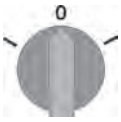
↪ Now, it is possible to operate the actuator via remote control, via operation commands (OPEN, STOP, CLOSE) or analogue setpoints (e.g. 0 – 20 mA).

Information For actuators equipped with a positioner, it is possible to change over between **OPEN - CLOSE control** (Remote OPEN-CLOSE) and **setpoint control** (Remote SET-POINT). Selection is made via MODE input, e.g. based on a 24 V DC signal (refer to wiring diagram).

6.3. Menu navigation via push buttons (for settings and indications)

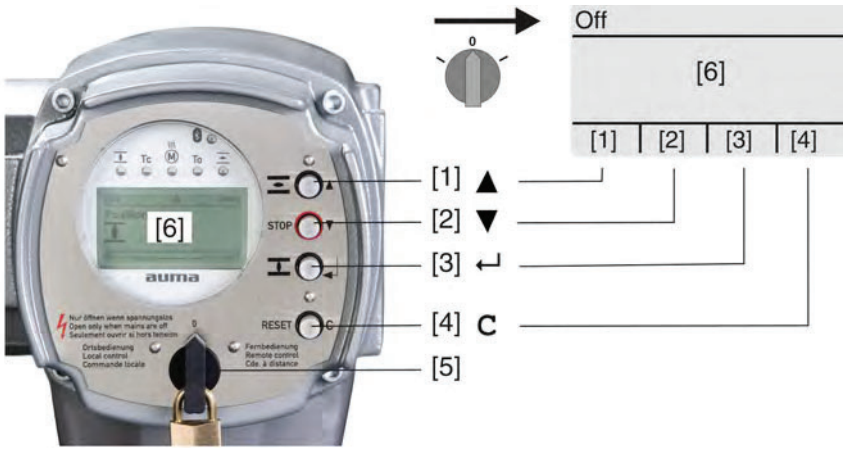
Menu navigation for display and setting is made via the push buttons [1 – 4] of the local controls.

Set the selector switch [5] to position **0** (OFF) when navigating through the menu.



The bottom row of the display [6] serves as navigation support and explains which push buttons [1 – 4] are used for menu navigation.

Figure 25:



[1–4] Push buttons or navigation support
[5] Selector switch
[6] Display

Table 15: Important push button functions for menu navigation

Push buttons	Navigation support on display	Functions
[1] ▲	Up ▲	Change screen/selection
		Change values
		Enter figures from 0 to 9
[2] ▼	Down ▼	Change screen/selection
		Change values
		Enter figures from 0 to 9
[3] ↵	Ok	Confirm selection
	Save	Save
	Edit	Enter <Edit> menu
	Details	Display more details

Push buttons	Navigation support on display	Functions
[4] **C**	Setup	Enter Main menu
	Esc	Cancel process
		Return to previous display

Backlight

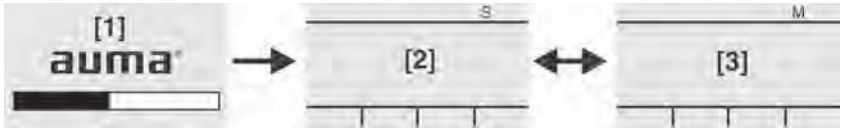
- The display is illuminated in white during normal operation. It is illuminated in red in case of a fault.
- The screen illumination is brighter when operating a push button. If no push button is operated for 60 seconds, the display will become dim again.

6.3.1. Menu layout and navigation

Groups

The indications on the display are divided into 3 groups:

Figure 26: Groups



[1] Startup menu
[2] Status menu
[3] Main menu

ID

Status menu and main menu are marked with an ID.

Figure 27: Marking with ID

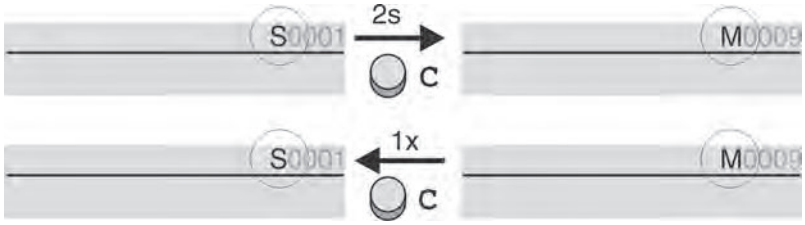
S ID starts with S = status menu
M ID starts with M = main menu

Group selection

It is possible to select between status menu S and main menu M:

For this, set selector switch to **0** (OFF), hold down push button **C** for approx. 2 seconds until a screen containing the ID M... appears.

Figure 28: Select menu groups



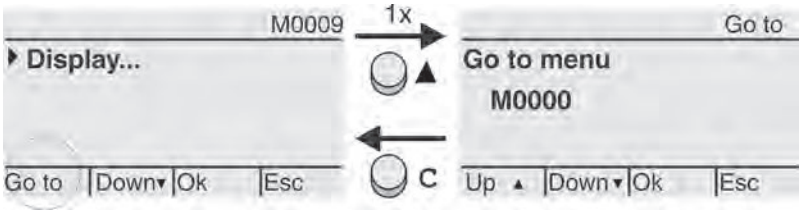
You return to the status menu if:

- the push buttons on the local controls have not been operated within 10 minutes
- or by briefly pressing **C**

Direct display via ID

When entering the ID within the main menu, screens can be displayed directly (without clicking through).

Figure 29: Direct display (example)



Display indicates in the bottom row: Go to

1. Press push button ▲ Go to.
   Display indicates: Go to menu M0000
2. Use push buttons ▲▼ Up ▲ Down ▼ to select figures 0 to 9.
3. Press push button ↵ Ok to confirm first digit.
4. Repeat steps 2 and 3 for all further digits.
5. To cancel the process: Press **C** Esc.

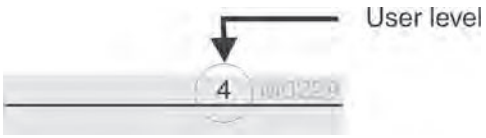
6.4. User level, password

User level

The user level defines which menu items or parameters can be displayed or modified by the active user.

There are 6 different user levels. The user level is indicated in the top row:

Figure 30: User level display (example)



Password

A password must be entered to allow parameter modification. The display indicates: Password 0***

A specific password is assigned to each user level and permits different actions.

Table 16:

User levels and authorisations	
Designation (user level)	Authorisation/password
Observer (1)	Verify settings No password required
Operator (2)	Change settings Default factory password: 0000
Maintenance (3)	Reserved for future extensions
Specialist (4)	Change device configuration e.g. type of seating, assignment of output contacts Default factory password: 0000
Service (5)	Service staff Change configuration settings
AUMA (6)	AUMA administrator

6.4.1. Password entry

1. Select desired menu and hold down push button ↵ for approx. 3 seconds.

↪ Display indicates the set user level, e.g Observer (1)

2. Select higher user level via ▲ Up ▲ and confirm with ↵ Ok.

↪ Display indicates: Password 0***

3. Use push buttons ▲▼ Up ▲ Down ▼ to select figures 0 to 9.
4. Confirm first digit of password via push button ↵ Ok.

5. Repeat steps 1 and 2 for all further digits.

↪ Having confirmed the last digit with ↵ Ok, access to all parameters within one user level is possible if the password entry is correct.

6.4.2. Password change

Only the passwords of same or lower access level may be changed.

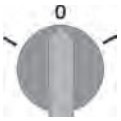
Example: If the user is signed in as Specialist (4), he/she can change passwords as for password levels (1) through (4).

M ▷ Device configuration M0053
Service functions M0222
Change passwords M0229

Menu item Service functions M0222 is only visible, if user level Specialist (4) or higher is selected.

Select main menu

1. Set selector switch to position **0** (OFF).



2. Press push button **C** Setup and hold it down for approx. 3 seconds.

↪ Display goes to main menu and indicates: ▸ Display...

Change passwords

3. Select parameter Change passwords either:
   → click via the menu M ▷ to parameter, or
   → via direct display: press ▲ and enter ID M0229

- Display indicates: ▸ Change passwords
- The user level is indicated in the top row (1 – 6), e.g.:

- For user level 1 (view only), passwords cannot be changed. To change passwords, you must change to a higher user level. For this, enter a password via a parameter.

4. For a user level between 2 and 6: Press push button ↵ Ok.

↪ The display indicates the highest user level, e.g.: For user 4

5. Select user level via push buttons ▲▼ Up ▲ Down ▼ and confirm with ↵ Ok.

↪ Display indicates: ▸ Change passwords Password 0***

6. Enter current password (→ enter password).

↪ Display indicates: ▸ Change passwords Password (new) 0***

7. Enter new password (→ enter password).

↪ Display indicates: ▸ Change passwords For user 4 (example)

8. Select next user level via push buttons ▲▼ Up ▲ Down ▼ or cancel the process via Esc.

6.5. Language in the display

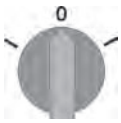
The AUMATIC actuator controls display is multilingual.

6.5.1. Language change

M ▷ Display... M0009
Language M0049

Select main menu

1. Set selector switch to position **0** (OFF).



2. Press push button **C** Setup and hold it down for approx. 3 seconds.

↪ Display goes to main menu and indicates: ▸ Display...

Change language

3. Press ↵ Ok.

↪ Display indicates: ▸ Language

4. Press ↵ Ok.

↪ Display indicates the selected language, e.g.: ▸ Deutsch

5. The bottom row of the display indicates:
   - → Save → continue with step 10
   - → Edit → continue with step 6

6. Press ↵ Edit.

↪ Display indicates: ▸ Observer (1)

7. Select user level via ▲▼ Up ▲ Down ▼ resulting in the following significations:
   - → black triangle: ▸ = current setting
   - → white triangle: ▹ = selection (not saved yet)

8. Press ↵ Ok.

↪ Display indicates: Password 0***

9. Enter password (→ enter password).

↪ Display indicates: ▸ Language and Save (bottom row)

Language selection

10. Select new language via ▲▼ Up ▲ Down ▼ resulting in the following significations:
    - → black triangle: ▸ = current setting
    - → white triangle: ▹ = selection (not saved yet)

11. Confirm selection via ↵ Save.

↪ The display changes to the new language. The new language selection is saved.

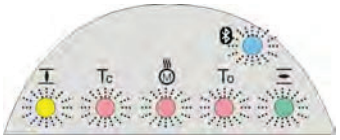
7. Indications

7.1. Indications during commissioning

LED test

When switching on the power supply, all LEDs on the local controls illuminate for approx. 1 second. This optical feedback indicates that the voltage supply is connected to the controls and all LEDs are operable.

Figure 31: LED test



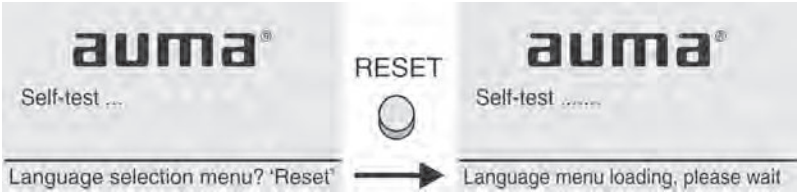
Language selection

During the self-test, the language selection can be activated so that the selected language is immediately indicated in the display. For this, set selector switch to position **0** (OFF).

Activate language selection:

1. Display indicates in the bottom row: Language selection menu? 'Reset'
2. Press push button **RESET** and hold it down until the following text is displayed in the bottom line: Language menu loading, please wait.

Figure 32: Self-test



The language selection menu follows the startup menu.

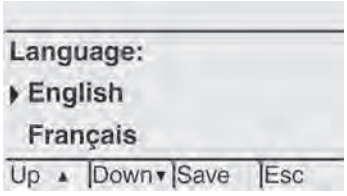
Startup menu

The current firmware version is displayed during the startup procedure:

Figure 33: Startup menu with firmware version: 04.00.00–xxxx

If the language selection feature has been activated during the self-test, the menu for selecting the display language will now be indicated. For further information on language setting, please refer to chapter <Language in the display>.

Figure 34: Language selection



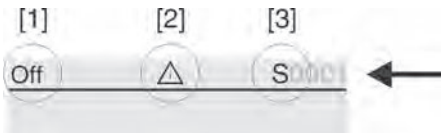
If no entry is made over a longer period of time (approx. 1 minute), the display automatically returns to the first status indication.

7.2. Indications in the display

Status bar

The status bar (first row in the display) indicates the operation mode [1], the presence of an error [2] and the ID number [3] of the current display indication.

Figure 35: Information in the status bar (top)

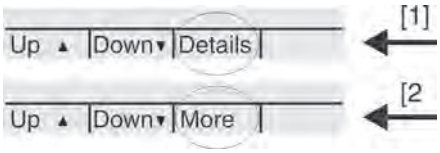


[1] Operation mode
[2] Error symbol (only for faults and warnings)
[3] ID number: S = Status page

Navigation support

If further details or information are available with reference to the display, the following indications Details or More appear in the navigation support (bottom display row). Then, further information can be displayed via the ↵ push button.

Figure 36: Navigation support (bottom)



[1] shows list with detailed indications
[2] shows further available information

The navigation support (bottom row) is faded out after approx. 3 seconds. Press any push button (selector switch in position **0** (OFF)) to fade in the navigation support.

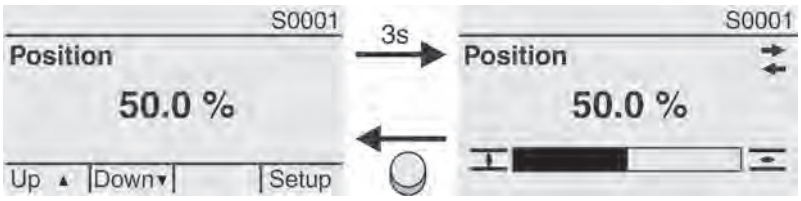
7.2.1. Feedback indications from actuator and valve

Display indications depend on the actuator version.

Valve position (S0001)

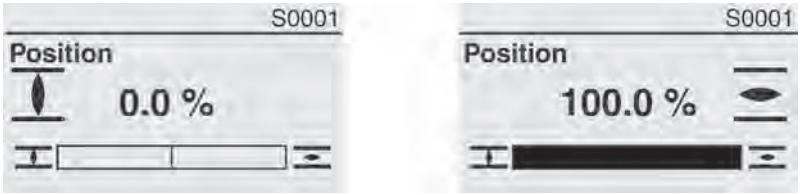
- S0001 on the display indicates the valve position in % of the travel.
- The bar graph display appears after approx. 3 seconds.
- When issuing an operation command, an arrow indicates the direction (OPEN/CLOSE).

Figure 37: Valve position and direction of operation



Reaching the preset end positions is additionally indicated via ⊥ (CLOSED) and ⊤ (OPEN) symbols.

Figure 38: End position CLOSED/OPEN reached

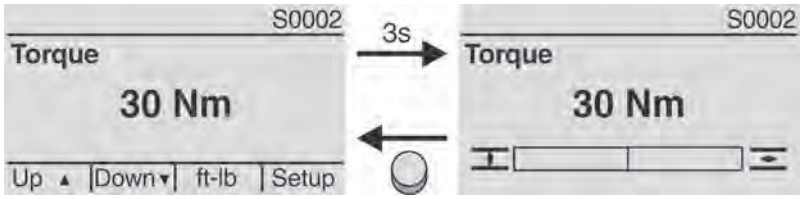


0% Actuator is in end position CLOSED
100% Actuator is in end position OPEN

Torque (S0002)

- S0002 on the display indicates the torque applied at the actuator output.
- The bar graph display appears after approx. 3 seconds.

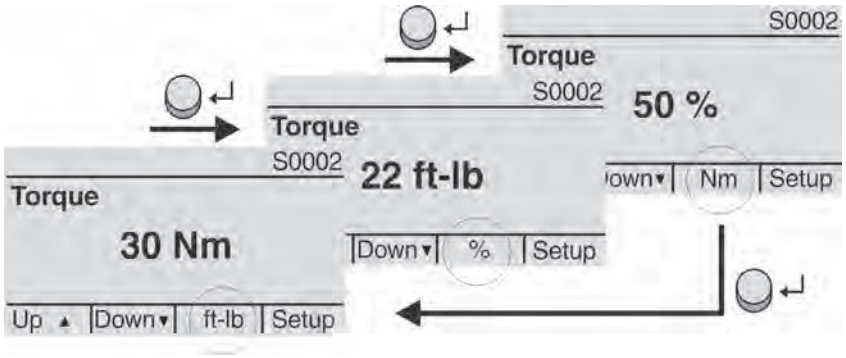
Figure 39: Torque



Select unit

The push button ↵ allows to select the unit displayed (percent %, Newton metre Nm or "foot-pound" ft-lb

Figure 40: Units of torque



Display in percent

100 % indication equals the max. torque indicated on the name plate of the actuator.

Example: SA 07.6 with 20 – 60 Nm.

- 100 % corresponds to 60 Nm of nominal torque.
- 50 % corresponds to 30 Nm of nominal torque.

Operation commands (S0003)

The display S0003 indicates:

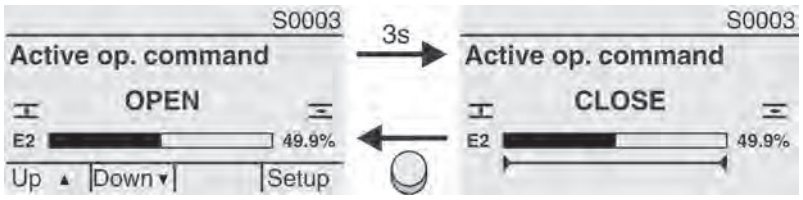
- active operation commands, like e.g.: Operation in direction CLOSE or in direction OPEN
- the actual value E2 as bar graph indication and as value between 0 and 100 %.
- for setpoint control (positioner): setpoint E1
- for stepping mode or for intermediate positions with operation profile: pivot points and operation behaviour of pivot points

The navigation support (bottom row) is faded out after approx. 3 seconds and the axis/axes for pivot point display are shown.

OPEN - CLOSE control

Active operation commands (OPEN, CLOSE, ...) are shown above the bar graph display. The figure below shows the operation command in direction CLOSE.

Figure 41: Display for OPEN - CLOSE control



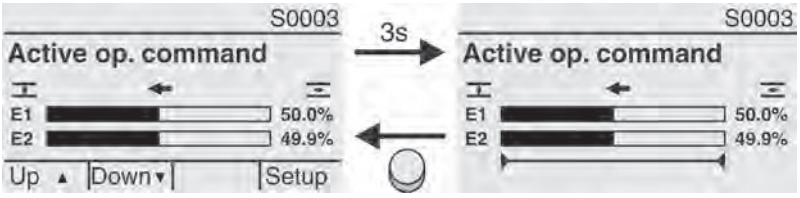
E2 Actual position value

Setpoint control

If the positioner is enabled and activated, the bar graph indication for E1 (position setpoint) is displayed.

The direction of the operation command is displayed by an arrow above the bar graph indication. The figure below shows the operation command in direction CLOSE.

Figure 42: Indication for setpoint control (positioner)



E1 Position setpoint
E2 Actual position value

Pivot point axis

The pivot points and their operation behaviour (operation profile) are shown on the pivot point axis by means of symbols.

The symbols are only displayed if at least one of the following functions is activated:

Operation profile M0294

Timer CLOSE M0156

Timer OPEN M0206

Figure 43: Examples: on the left pivot points (intermediate positions); on the right stepping mode

Table 17: Symbols along the pivot point axis

Symbol	Pivot point (intermediate position) with operation profile	Stepping mode
|	Pivot point without reaction	End of stepping mode
◀	Stop during operation in direction CLOSE	Start of stepping mode in direction CLOSE
▶	Stop during operation in direction OPEN	Start of stepping mode in direction OPEN
◆	Stop during operation in directions OPEN and CLOSE	–
◁	Pause for operation in direction CLOSE	–
▷	Pause for operation in direction OPEN	–
◇	Pause for operation in directions OPEN and CLOSE	–

7.2.2. Status indications according to AUMA classification

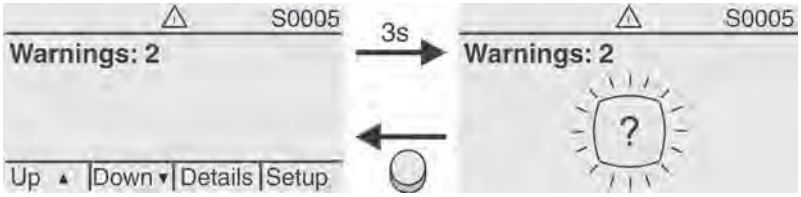
These indications are available if the parameter Diagnostic classific. M0539 is set to AUMA.

Warnings (S0005)

If a warning has occurred, the display shows S0005:

- the number of warnings occurred
- a blinking question mark after approx. 3 seconds

Figure 44: Warnings



For further information, please also refer to <Corrective action>.

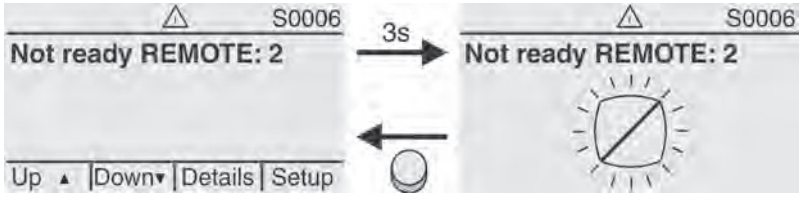
Not ready REMOTE (S0006)

The S0006 display shows indications of the Not ready REMOTE group.

If such an indication has occurred, the display shows S0006:

- the number of indications occurred
- a blinking crossbar after approx. 3 seconds

Figure 45: Not ready REMOTE indications



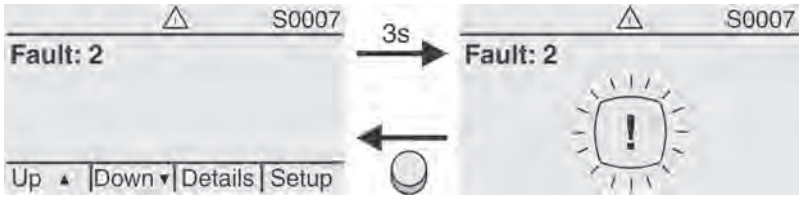
For further information, please also refer to <Corrective action>.

Fault (S0007)

If a fault has occurred, the display shows S0007:

- the number of faults occurred
- a blinking exclamation mark after approx. 3 seconds

Figure 46: Fault



For further information, please also refer to <Corrective action>.

7.2.3. Status indications according to NAMUR recommendation

These indications are available, if the parameter Diagnostic classific. M0539 is set to NAMUR.

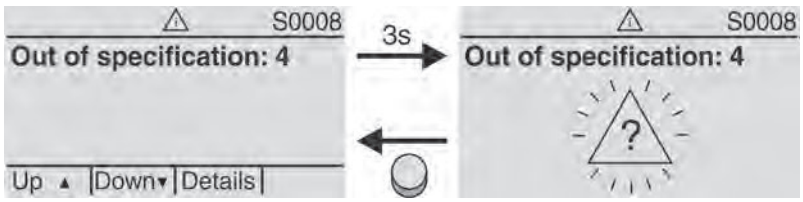
Out of Specification (S0008)

The S0008 indication shows out of specification indications according to NAMUR recommendation NE 107.

If such an indication has occurred, the display shows S0008:

- the number of indications occurred
- a blinking triangle with question mark after approx. 3 seconds

Figure 47: Out of specification



For further information, please also refer to <Corrective action>.

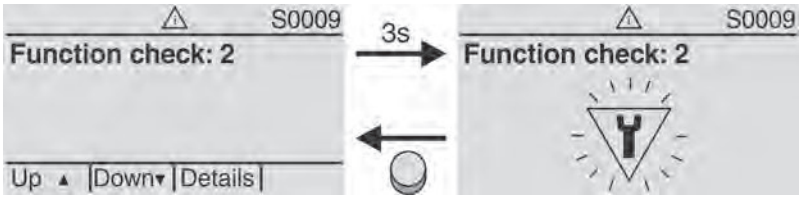
Function check (S0009)

The S0009 indication shows function check indications according to NAMUR recommendation NE 107.

If an indication has occurred via the function check, the display shows S0009:

- the number of indications occurred
- a blinking triangle with a spanner after approx. 3 seconds

Figure 48: Function check



For further information, please also refer to <Corrective action>.

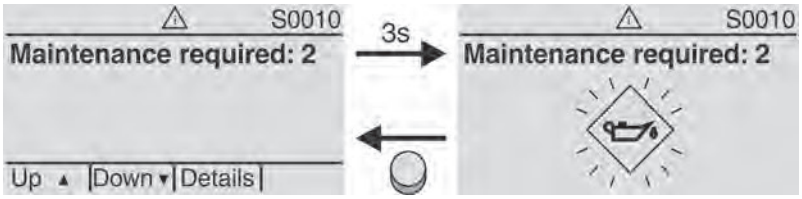
Maintenance required (S0010)

The S0010 indication shows maintenance indications according to NAMUR recommendation NE 107.

If such an indication has occurred, the display shows S0010:

- the number of indications occurred
- a blinking square with an oilcan after approx. 3 seconds

Figure 49: Maintenance required



For further information, please also refer to <Corrective action>.

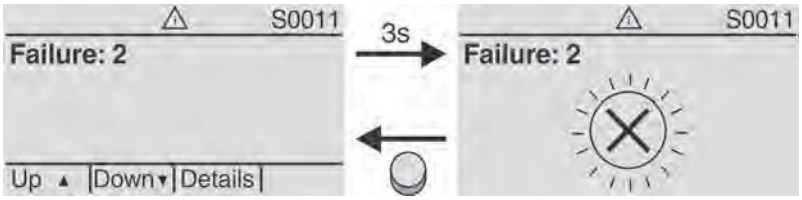
Failure (S0011)

The S0011 indication shows the causes of the failure indication according to NAMUR recommendation NE 107.

If such an indication has occurred, the display shows S0011:

- the number of indications occurred
- a blinking circle with a cross after approx. 3 seconds

Figure 50: Failure



For further information, please also refer to <Corrective action>.

7.3. Indication lights of local controls

Figure 51: Arrangement and signification of indication lights

[1] Marking with figures 1 – 6 (standard)
[2] Marking with symbols (option)
1 End position CLOSED reached (blinking: operation in direction CLOSE)
2 Tc Torque fault CLOSE
3 Motor protection tripped
4 To Torque fault OPEN
5 End position OPEN reached (blinking: operation in direction OPEN)
6 Bluetooth connection

Modify indication light assignment (indications)

Different indications can be assigned to LEDs 1 – 5.

M ▷ Device configuration M0053
Local controls M0159
Indication light 1 (left) M0093
Indication light 2 M0094
Indication light 3 M0095
Indication light 4 M0096
Indicat. light 5 (right) M0097
Signal interm. pos. M0167

Defaut values (Europe):
Indication light 1 (left) = End p. CLOSED, blink
Indication light 2 = Torque fault CLOSE
Indication light 3 = Thermal fault
Indication light 4 = Torque fault OPEN
Indicat. light 5 (right) = End p. OPEN, blink
Signal interm. pos. = OPEN/CLOSED = On

Further setting values:

Refer to Manual (Operation and setting).

7.4. Mechanical position indication (self-adjusting)

Figure 52: Mechanical position indicator

[1] End position OPEN reached
[2] End position CLOSED reached

Characteristics

- Independent of power supply
- Used as running indication: Indicator disc (with arrow ⇨) rotates during actuator operation and continuously indicates the valve position
  (For “clockwise closing version”, the arrow rotates in clockwise direction for operation in direction CLOSE)
- Indicates that end positions (OPEN/CLOSED) have been reached
  Arrow ⇨ points to symbol ⏤ (OPEN) or ⊥ (CLOSED)
- Self-adjusting when increasing the swing angle

7.5. Mechanical position indication via indicator mark

Figure 53: Mechanical position indicator

[1] End position OPEN reached
[2] End position CLOSED reached
[3] Indicator mark at cover

Characteristics

- Independent of power supply
- Used as running indication: Indicator disc rotates during actuator operation and continuously indicates the valve position
  (For “clockwise closing version”, the symbols ⏤/⊥ rotate in counterclockwise direction for operation in direction CLOSE)
- Indicates that end positions (OPEN/CLOSED) have been reached
  (Symbols ⏤ (OPEN)/ ⊥ (CLOSED) point to the indicator mark ▲ at cover)

8. Signals (output signals)

8.1. Status signals via output contacts (digital outputs)

Characteristics

Output contacts are used to send status signals (e.g. reaching the end positions, selector switch position, faults...) as binary signals to the control room.

Status signals only have two states: active or inactive. Active means that the conditions for the signal are fulfilled.

8.1.1. Assignment of outputs

The output contacts (outputs DOUT 1 – 12) can be assigned to various signals.

Required user level: Specialist (4) or higher.

M ▷ Device configuration M0053
I/O interface M0139
Digital outputs M0110
Signal DOUT 1 M0109

Table 18: Default values

Output	Default value:	Output	Default value:
Signal DOUT 1	Fault	Signal DOUT 7	Thermal fault
Signal DOUT 2	End position CLOSED	Signal DOUT 8	OPEN
Signal DOUT 3	End position OPEN	Signal DOUT 9	Limit switch CLOSED
Signal DOUT 4	Selector sw. REMOTE	Signal DOUT 10	Limit switch OPEN
Signal DOUT 5	Torque fault CLOSE	Signal DOUT 11	Torque sw. CLOSED
Signal DOUT 6	Torque fault OPEN	Signal DOUT 12	Torque sw. OPEN

8.1.2. Coding the outputs

The output signals Coding DOUT 1 – Coding DOUT 12 can be set either to high active or low active.

- High active = output contact closed = signal active
- Low active = output contact open = signal active

Signal active means that the conditions for the signal are fulfilled.

Required user level: Specialist (4) or higher.

M ▷ Device configuration M0053
I/O interface M0139
Digital outputs M0110
Coding DOUT 1 M0102

Default values:

Coding DOUT 1 = Low active
Coding DOUT 2 – Coding DOUT 12 = High active

8.2. Analogue signals (analogue outputs)

Valve position

Signal: E2 = 0/4 – 20 mA (galvanically isolated)

Designation in the wiring diagram: AOUT1 (position)

Torque feedback

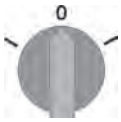
Signal: E6 = 0/4 – 20 mA (galvanically isolated)

Designation in the wiring diagram: AOUT2 (torque)

For further information on this topic, please refer to Manual (Operation and setting).

9. Commissioning (basic settings)

1. Set selector switch to position **0** (OFF).



Information: The selector switch is not a mains switch. When positioned to **0** (OFF), the actuator cannot be operated. The controls' power supply is maintained.

2. Switch on the power supply.
   Information: Observe heat-up time for ambient temperatures below –30 °C.
3. Perform basic settings.

9.1. End stops in part-turn actuator

The internal end stops limit the swing angle. They protect the valve in case of limit switching failure during motor operation and serve the purpose as limitation for manual operation via handwheel. They may not be used for torque tripping in end positions during standard operation.

End stop setting is generally performed by the valve manufacturer **prior** to installing the valve into the pipework.

⚠ CAUTION

Exposed, rotating parts (discs/balls) at the valve!

Pinching and damage by valve or actuator.

→ End stops should be set by suitably qualified personnel only.

→ Never completely remove the setting screws [2] and [4] to avoid grease leakage.

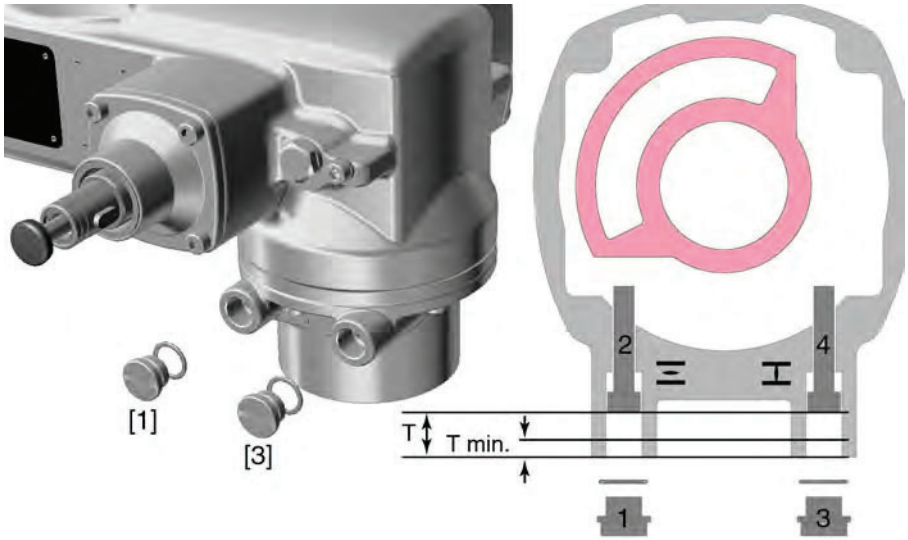
→ Observe dimension $T_{min.}$

Information

- The swing angle set in the factory is indicated on the name plate:
  Figure 54: Example: Name plate Swing angle

- The setting sequence depends on the valve:
  - Recommendation for **butterfly valves**: Set end stop CLOSED first.
  - Recommendation for **ball valves**: Set end stop OPEN first.

Figure 55: End stop



[1] Screw plug for end stop OPEN
[2] Setting screw for end stop OPEN
[3] Screw plug for end stop CLOSED
[4] Setting screw for end stop CLOSED

Dimensions/sizes	05.2	07.2	10.2	12.2	14.2
T (for 90°)	17	17	20	23	23
$T_{min.}$	11	11	12	13	12

9.1.1. End stop CLOSED: set

1. Remove screw plug [3].
2. Move valve to end position CLOSED with handwheel.
3. If the valve end position is not reached:
   → Slightly turn setting screw [4] counterclockwise until valve end position CLOSED can be safely set.
   ↳ Turning the setting screw [4] clockwise results in a smaller swing angle.
   ↳ Turning the setting screw [4] counterclockwise results in a larger swing angle.

4. Turn setting screw [4] clockwise to the stop.

↳ This completes the setting of end stop CLOSED.

5. Check O-ring in screw plug and replace if damaged.
6. Fasten and tighten screw plug [3].

Having completed this procedure, the end position detection CLOSED can be set immediately.

9.1.2. End stop OPEN: set

Information In general, the end stop OPEN does not have to be set.

1. Remove screw plug [1].
2. Move valve to end position OPEN with handwheel.

3. If the valve end position is not reached:
   → Slightly turn setting screw [2] counterclockwise until valve end position OPEN can be safely set.
   ↳ Turning the setting screw [2] clockwise results in a smaller swing angle.
   ↳ Turning the setting screw [2] counterclockwise results in a larger swing angle.

4. Turn setting screw [2] clockwise to the stop.
↳ This completes the setting of end stop OPEN.
5. Check O-ring in screw plug and replace if damaged.
6. Fasten and tighten screw plug [1].

Having completed this procedure, the end position detection OPEN can be set immediately.

9.2. Type of seating: set

NOTICE

Valve damage due to incorrect setting!
→ The type of seating must suit the valve.
→ Only change the setting with the consent of the valve manufacturer.

M ▷ Customer settings M0041
Type of seating M0012
End position CLOSED M0086
End position OPEN M0087

Default value: Limit

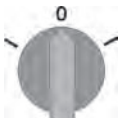
Setting values:

Limit — Seating in end positions via limit switching.

Torque — Seating in end positions via torque switching.

Select main menu

1. Set selector switch to position **0** (OFF).



2. Press push button **C** Setup and hold it down for approx. 3 seconds.
↳ Display goes to main menu and indicates: ▸ Display...

Select parameter

3. Select parameter either:
   → click via the menu M ▷ to parameter, or
   → via direct display: Press ▲ and enter ID M0086 or M0087
↳ Display indicates: End position CLOSED

CLOSE or OPEN

4. Use ▲▼ Up ▲ Down ▼ to select:
   → ▸ End position CLOSED
   → ▸ End position OPEN
↳ The black triangle ▸ indicates the current selection.

5. Press ↵ Ok.
↳ Display indicates the current setting: Limit or Torque
↳ The bottom row of the display indicates either:
- Edit → continue with step 6
- Save → continue with step 10
6. Press ↵ Edit.
↳ Display indicates: ▸ Specialist (4)

User login

7. Use ▲ ▼ Up ▲ Down ▼ to select user:
Information: Required user level: Specialist (4) or higher
↳ The symbols have the following meaning:
- black triangle: ▸ = current setting
- white triangle: ▹ = selection (not saved yet)
8. Press ↵ Ok.
↳ Display indicates: Password 0***
9. Enter password (→ enter password).
↳ The screen indicates the pre-set type of seating (▸Limit or ▸Torque) by means of a black triangle ▸.

Change settings

10. Use ▲ ▼ Up ▲ Down ▼ to select new setting.
↳ The symbols have the following meaning:
- black triangle: ▸ = current setting
- white triangle: ▹ = selection (not saved yet)
11. Confirm selection via ↵ Save.
↳ The setting for the type of seating is complete.
12. Back to step 4 (CLOSED or OPEN): Press ↵ Esc .

9.3. Torque switching: set

Once the set torque is reached, the torque switches will be tripped (overload protection of the valve).

Information

The torque switches may also trip during manual operation.

NOTICE

Valve damage due to excessive tripping torque limit setting!
→ The tripping torque must suit the valve.
→ Only change the setting with the consent of the valve manufacturer.

M ▷

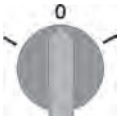
Customer settings M0041
Torque switching M0013
Trip torque CLOSE M0088
Trip torque OPEN M0089

Default value: According to order data

Setting range: Torque range according to actuator name plate

Select main menu

1. Set selector switch to position **0** (OFF).



2. Press push button **C** Setup and hold it down for approx. 3 seconds.
↳ Display goes to main menu and indicates: ▸ Display...

Select parameter

3. Select parameter either:
   → click via the menu M ▷ to parameter, or
   → via direct display: press ▲ and enter ID M0088.

↳ Display indicates: Trip torque CLOSE

CLOSE or OPEN

4. Use ▲▼ Up ▲ Down ▼ to select:
   → ▸ Trip torque CLOSE
   → ▸ Trip torque OPEN

↳ The black triangle ▸ indicates the current selection.

5. Press ↵ Ok.

↳ Display shows the set value.

↳ The bottom row indicates: Edit Esc

6. Press ↵ Edit.

↳ Display indicates:

- Specialist (4) → continue with step 7
- in bottom row Up ▲ Down ▼ Esc → continue with step 11

User login

7. Use ▲▼ Up ▲ Down ▼ to select user:
   Information: Required user level: Specialist (4) or higher.

↳ The symbols have the following meanings:

- black triangle: ▸ = current setting
- white triangle: ▹ = selection (not saved yet)

8. Press ↵ Ok.

↳ Display indicates: Password 0***

9. Enter password (→ enter password).

↳ Display shows the set value.

↳ The bottom row indicates: Edit Esc

10. Press ↵ Edit.

Change value

11. Enter new value for tripping torque via ▲▼ Up ▲ Down ▼.
    Information: The adjustable torque range is shown in round brackets.

12. Save new value via ↵ Save.

↳ The tripping torque is set.

13. Back to step 4 (CLOSED or OPEN): Press ↵ Esc.

Information

The following fault signals are issued if the torque setting performed has been reached **in mid-travel**:

- In the display of the local controls: Status indication S0007 Fault = Torque fault OPEN or Torque fault CLOSE

The fault has to be acknowledged before the operation can be resumed. The acknowledgement is made:

1. either by an operation command in the opposite direction.
   - For Torque fault OPEN: Operation command in direction CLOSE
   - For Torque fault CLOSE: Operation command in direction OPEN
2. or, in case the torque applied is lower than the preset tripping torque:
   - in selector switch position **Local control** (LOCAL) via push button **RESET**.
   - in selector switch position **Remote control** (REMOTE):
     - via a digital (I/O interface) with the Reset command if a digital input is configured for RESET signal.

9.4. Limit switching: set

NOTICE

Valve damage at valve/gearbox due to incorrect setting!

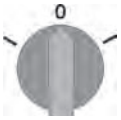
→ When setting with motor operation: Stop actuator **prior** reaching end of travel (press STOP push button).

→ Allow for overrun when selecting limit seating.

M ▷ Customer settings M0041
Limit switching M0010
Set end pos.CLOSED? M0084
Set end pos. OPEN? M0085

Select main menu

1. Set selector switch to position **0** (OFF).



2. Press push button **C** and hold it down for approx. 3 seconds.

↳ Display goes to main menu and indicates: ▸ Display...

Select parameter

3. Select parameter either:
   → click via the menu M ▷ to parameter, or
   → via direct display: press ▲ and enter ID M0084.

↳ Display indicates: Set end pos.CLOSED?

CLOSED or OPEN

4. Select via ▲ ▼ Up ▲ Down ▼:
   → ▸ Set end pos.CLOSED? M0084
   → ▸ Set end pos. OPEN? M0085

↳ The black triangle ▸ indicates the current selection.

5. Press ↵ Ok.

↳ The display indicates either:

- Set end pos.CLOSED? CMD0009 → continue with step 9
- Set end pos. OPEN? CMD0010 → continue with step 12
- Specialist (4) → continue with step 6

User login

6. Use ▲ ▼ Up ▲ Down ▼ to select user:
   Information: Required user level: Specialist (4) or higher

↳ The symbols have the following meaning:

- black triangle: ▸ = current setting
- white triangle: ▹ = selection (not saved yet)

7. Press Ok to confirm selected user.

↳ Display indicates: Password 0***

8. Enter password (→ enter password).

↳ The display indicates either:

- Set end pos.CLOSED? CMD0009 → continue with step 9
- Set end pos. OPEN? CMD0010 → continue with step 12

Set end position CLOSED CMD0009

9. Set end position CLOSED again :

9.1 For large strokes: Set selector switch in position **Local control** (LOCAL) and operate actuator in motor operation via push button (CLOSE) in direction of the end position.
Information: Stop actuator **before** reaching end of travel (press **STOP** push button to avoid damage.

9.2 Engage manual operation.

9.3 Turn handwheel until valve is closed.

9.4 Set selector switch to position **0** (OFF).

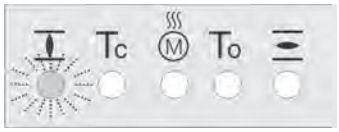
↪ Display indicates: Set end pos.CLOSED? Yes No

Confirm new end position

10. Press ↵ Yes to confirm new end position.

↪ Display indicates: End pos. CLOSED set!

↪ The left LED is illuminated (standard version) and thus indicates that the end position CLOSED setting is complete.



11. Make selection:

→ Edit → back to step 9: Set end position CLOSED "once again"

→ Esc → back to step 4; either set end position OPEN or exit the menu.

Set end position OPEN CMD0010

12. Re-set end position OPEN:

12.1 For large strokes: Set selector switch in position **Local control** (LOCAL) and operate actuator in motor operation via push button (OPEN) in direction of the end position.
Information: Stop actuator **before** reaching end of travel (press **STOP** push button to avoid damage.

12.2 Engage manual operation.

12.3 Turn handwheel until valve is open.

12.4 Set selector switch to position **0** (OFF).

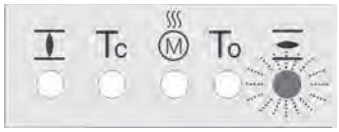
↪ Display indicates: Set end pos. OPEN? Yes No

Confirm new end position

13. Press ↵ Yes to confirm new end position.

↪ Display indicates: End pos. OPEN set!

↪ The right LED is illuminated (standard version) and thus indicates that the end position OPEN setting is complete.



14. Make selection:

→ Edit → back to step 12: Set end position OPEN "once again"

→ Esc → back to step 4; either set end position CLOSED or exit the menu.

Information

If an end position cannot be set: Check the type of control unit in actuator.

9.5. Test run

Only perform test run only once all settings previously described have been performed.

9.5.1. Direction of rotation at mechanical position indicator: check

NOTICE

Valve damage due to incorrect direction of rotation!

→ If the direction of rotation is wrong, switch off immediately (press STOP).
→ Eliminate cause, i.e. correct phase sequence for cable set wall bracket.
→ Repeat test run.

Information Switch off before reaching the end position.

1. Move actuator manually to intermediate position or to sufficient distance from end position.
2. Switch on actuator in direction CLOSE and observe the direction of rotation on the mechanical position indication:

   → **For self-adjusting mechanical position indication:**

   ➥ The direction of rotation is correct if the actuator operates in direction **CLOSE** and arrow ⇨ turns **clockwise** in direction CLOSE (symbol ⊥).

   Figure 56: Direction of rotation ⇨ (for “clockwise closing” version”)

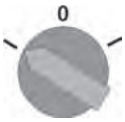
   → **For mechanical position indication via indicator mark:** (not self-adjusting)

   ➥ The direction of rotation is correct if the actuator operation in direction **CLOSE** and the symbols (⌒/⊥) turn **counterclockwise**:

   Figure 57: Direction of rotation ⌒/⊥ (for “clockwise closing version”)

9.5.2. Limit switching: check

1. Set selector switch to position **Local control** (LOCAL).



2. Operate actuator using push buttons OPEN, STOP, CLOSE.

↪ The limit switching is set correctly if (default indication):

- the yellow indication light/LED1 is illuminated in end position CLOSED
- the green indication light/LED5 is illuminated in end position OPEN
- the indication lights go out after travelling into opposite direction.

↪ The limit switching is set incorrectly if:

- the actuator comes to a standstill before reaching the end position
- one of the red indication lights/LEDs is illuminated (torque fault)
- the status indication S0007 in the display signals a fault.

3. If the end position setting is incorrect: Reset limit switching.

10. Commissioning (settings in the actuator)

Figure 58: Mechanical position indicator (self-adjusting)

The actuator is supplied with the swing angle set in the factory in compliance with the order. The mechanical position indication is set to this swing angle.

If the factory swing angle is changed at a later date, the position indicator must be adapted to the new swing angle:

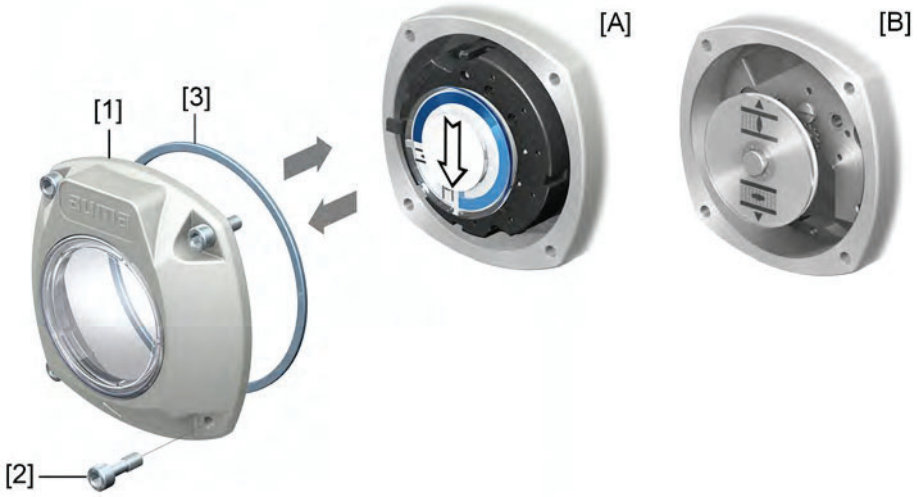
- Increasing the swing angle: The mechanical position indication automatically adjusts with the subsequent operation.
- Decreasing the swing angle: The mechanical position indication must be newly set (refer to the subsequent chapters).

Figure 59: Mechanical position indication via indicator mark (not self-adjusting)

In case the mechanical position indication integrated within the actuator is NOT self-adjusting, the switch compartment must be opened for mechanical position indication adjustment when commissioning.

10.1. Switch compartment: open/close

Figure 60: Open/close switch compartment



[A] Mechanical position indication (self-adjusting)
[B] Mechanical position indication via indicator mark

Open
Close

1. Open Loosen screws [2] and remove cover [1] from the switch compartment.
2. Clean sealing faces of housing and cover.
3. Check whether O-ring [3] is in good condition, replace if damaged.
4. Apply a thin film of non-acidic grease (e.g. petroleum jelly) to the O-ring and insert it correctly.
5. Place cover [1] on switch compartment.
6. Fasten screws [2] evenly crosswise.

10.2. Mechanical position indicator (self-adjusting)

Figure 61: Mechanical position indicator (self-adjusting)

The self-adjusting mechanical position indicator shows the valve position by means of an arrow ⇨. When correctly set, the arrow points to symbol ⎺ (OPEN) or ⎽ (CLOSED) in the end positions.

Information

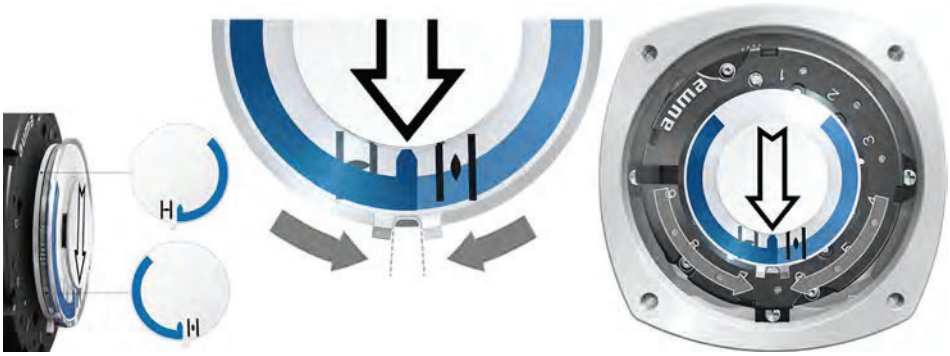
The position indications is housed in the actuator switch compartment. Opening the switch compartment for manual setting is only necessary if the gear stage setting must be modified of if the factory settings of predefined end position CLOSED (or OPEN) must be adapted when commissioning.

10.2.1. Mechanical position indicator: set

1. Move valve to end position CLOSED.

2. Push both lower discs with the symbols (OPEN) and (CLOSED) towards each other. The disc with the arrow is thereby is driven:

Figure 62: Setting position in CLOSED



3. Move actuator to end position OPEN.

↳ The arrow rotates in direction OPEN driving the indicator disc with symbol (OPEN) until the actuator stops in position OPEN.

Figure 63: Operation in direction OPEN (left) and position OPEN (right)

4. Check settings:

↳ The setting of the mechanical position indicator is correct, if the angle between the symbols (OPEN) and (CLOSED) ranges between approx. 120° and 280°.

↳ If all three discs are turned at the same time, the indicator can be shifted in steps of 15°. Individual shifts of 5° are possible.

↳ If the indicator is rotated too far (more than 280°) or if the angle is too small (below 120°), adapt the gear stage setting to the actuator swing angle. Refer to <Gear stage of the reduction gearing: test/set>.

10.2.2. Gear stage of the reduction gearing: test/set

The test/setting is only required if the mechanical position indicator cannot be correctly set or if another swing angle range is ordered subsequently, for example, 120° ±15° instead of 90° ±15° (replacement by the AUMA Service only).

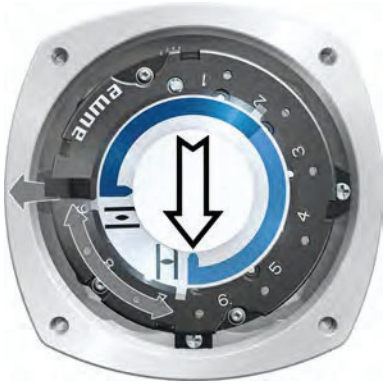
1. Refer to table and check if swing angle corresponds to the setting of the reduction gearing (stages 1– 9).

Table 19:

Actuator swing angle and suitable reduction gearing setting				
	SQ 05.2 / SQ 07.2	SQ 10.2	SQ 12.2	SQ 14.2
30° +/–15°	2	2	3	4
60° +/–15°	3	3	4	5
90° +/–15°	3	3	4	6
120° +/–15°	3	4	5	6
150° +/–15°	4	4	5	6
180° +/–15°	4	4	5	7
210° +/–15°	4	5	6	7
290° +/–70°	5	5	6	7

2. To modify settings, lift the lever at the reduction gearing and engage at the selected stage.

Figure 64: Set reduction gearing



10.3. Mechanical position indication via indicator mark (not self-adjusting)

Figure 65: Mechanical position indication via indicator mark

The mechanical position indicator shows the valve position via two indicator discs with symbols ⌓ (OPEN) and ⌶ (CLOSED). When correctly set, the symbols OPEN/CLOSED point to the indicator mark ▲ at the cover in the end positions.

Setting elements The position indications is housed in the actuator switch compartment. The switch compartment must be opened to perform any settings. Refer to <Switch compartment: open/close>.

10.3.1. Mechanical position indicator: set

✓ If options (e.g. potentiometer, position transmitter) are available: Only set mechanical position indication once all optional equipment have been successfully set.

1. Move valve to end position CLOSED.

2. Turn lower indicator disc until symbol ⊥ (CLOSED) is in alignment with the ▲ mark on the cover.

3. Move actuator to end position OPEN.
4. Hold lower indicator disc in position and turn upper disc with symbol ⊤ (OPEN) until it is in alignment with the ▲ mark on the cover.

5. Move valve to end position CLOSED again.
6. Check settings:

   If the symbol ⊥ (CLOSED) is no longer in alignment with ▲ mark on the cover:
   → Repeat setting procedure.

10.3.2. Gear stage of the reduction gearing: test/set

This test/setting is only required if a different swing angle range was integrated subsequently into the actuator.

Information The adjustable swing angle range is available in the order-related technical data sheet (e.g. "90° +/–15°").

1. Pull off indicator disc using a spanner as lever if required.

2. Refer to table and check if swing angle of the actuator corresponds to the setting of the reduction gearing (stages 1– 9).

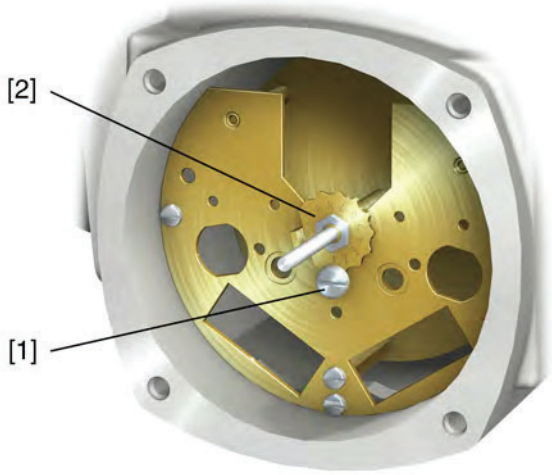
   If the setting is **not correct**: continue with step 4.
   If the setting is correct: continue with step 7.

Table 20:

Actuator swing angle and suitable reduction gearing setting				
	SQ 05.2/SQ 07.2	SQ 10.2	SQ 12.2	SQ 14.2
30° +/–15°	2	2	3	4
60° +/–15°	3	3	4	5
90° +/–15°	3	3	4	6
120° +/–15°	3	4	5	6
150° +/–15°	4	4	5	6
180° +/–15°	4	4	5	7
210° +/–15°	4	5	6	7
290° +/–70°	5	5	6	7

3. Loosen screw [1].
4. Set crown wheel [2] to desired level according to table.
5. Tighten screw [1].
6. Place indicator disc on shaft.
7. Set mechanical position indicator.

Figure 66: Control unit with reduction gearing



[1] Screw
[2] Crown wheel

11. Corrective action

11.1. Faults during commissioning

Table 21:

Faults during operation/commissioning		
Fault	Description/cause	Remedy
Mechanical position indicator cannot be set.	Reduction gearing is not suitable for actuator swing angle.	Set gear stage of the reduction gearing. The control unit might have to be exchanged.
In spite of correct setting of mechanical limit switching, actuator operates into the valve or actuator end position.	The overrun was not considered when setting the limit switching. The overrun is generated by the inertia of both the actuator and the valve and the delay time of the actuator controls.	• Determine overrun: Overrun = travel covered from switching off until complete standstill. • Set limit switching again considering the overrun. (Turn handwheel back by the amount of the overrun)

11.2. Fault indications and warning indications

Faults interrupt or prevent the electrical actuator operation. In the event of a fault, the display backlight is red.

Warnings have no influence on the electrical actuator operation. They only serve for information purposes. The display remains white.

Collective signals include further indications. They can be displayed via the ↵ Details push button. The display remains white.

Table 22:

Faults and warnings via status indications in the display		
Indication on display	Description/cause	Remedy
S0001	Instead of the valve position, a status text is displayed.	For a description of the status texts, refer to Manual (Operation and setting).
S0005 Warnings	Collective signal 02: Indicates the number of active warnings.	For indicated value > 0: Press push button ↵ Details. For details, refer to <Warnings and Out of specification> table.
S0006 Not ready REMOTE	Collective signal 04: Indicates the number of active signals.	For indicated value > 0: Press push button ↵ Details. For details, refer to <Not ready REMOTE and Function check> table.
S0007 Fault	Collective signal 03: Indicates the number of active faults. The actuator cannot be operated.	For indicated value > 0: Press push button ↵ Details to display a list of detailed indications. For details, refer to <Faults and Failure> table.
S0008 Out of specification	Collective signal 07: Indication according to NAMUR recommendation NE 107 Actuator is operated outside the normal operation conditions.	For indicated value > 0: Press push button ↵ Details. For details, refer to <Warnings and Out of specification> table.
S0009 Function check	Collective signal 08: Indication according to NAMUR recommendation NE 107 The actuator is being worked on; output signals are temporarily invalid.	For indicated value > 0: Press push button ↵ Details. For details, refer to <Not ready REMOTE and Function check> table.
S0010 Maintenance required	Collective signal 09: Indication according to NAMUR recommendation NE 107 Recommendation to perform maintenance.	For indicated value > 0: Press push button ↵ Details to display a list of detailed indications.
S0011 Failure	Collective signal 10: Indication according to NAMUR recommendation NE 107 Actuator function failure, output signals are invalid	For indicated value > 0: Press push button ↵ Details to display a list of detailed indications. For details, refer to <Faults and Failure> table.

Table 23:

Warnings and Out of specification		
Indication on display	Description/cause	Remedy
Config. warning	Collective signal 06: Possible cause: Configuration setting is incorrect. The device can still be operated with restrictions.	Press push button ↵ Details to display a list of individual indications. For a description of the individual signals, refer to Manual (Operation and setting).
Internal warning	Collective signal 15: Device warnings The device can still be operated with restrictions.	Press push button ↵ Details to display a list of individual indications. For a description of the individual signals, refer to Manual (Operation and setting).
24 V DC external	The external 24 V DC voltage supply of the controls has exceeded the power supply limits.	Check 24 V DC voltage supply.
Wrn op.mode run time	Warning on time max. running time/h exceeded	• Check modulating behaviour of actuator. • Check parameter Perm. run time M0356, re-set if required.
Wrn op.mode starts	Warning on time max. number of motor starts (starts) exceeded	• Check modulating behaviour of actuator. • Check parameter Permissible starts M0357, re-set if required.
Failure behav. active	The failure behaviour is active since all required setpoints and actual values are incorrect.	Verify signals: • Setpoint E1 • Actual value E2 • Actual process value E4
Wrn input AIN 1	Warning: Loss of signal analogue input 1	Check wiring.
Wrn input AIN 2	Warning: Loss of signal analogue input 2	Check wiring.
Wrn setpoint position	Warning: Loss of signal setpoint position Possible causes: For an adjusted setpoint range of e.g. 4 – 20 mA, the input signal is 0 (signal loss). For a setpoint range of 0 – 20 mA , monitoring is not possible.	Check setpoint signal.
Op. time warning	The set time (parameter Perm.op. time, manual M0570) has been exceeded. The preset operating time is exceeded for a complete travel from end position OPEN to end position CLOSED.	The warning indications are automatically cleared once a new operation command is executed. • Check valve. • Check parameter Perm.op. time, manual M0570.
Wrn controls temp.	Temperature within controls housing too high.	Measure/reduce ambient temperature.
Time not set	Real time clock has not yet been set.	Set time.
RTC voltage	Voltage of the RTC button cell is too low.	Replace button cell.
PVST fault	Partial Valve Stroke Test (PVST) could not be successfully completed.	Check actuator (PVST settings).
PVST abort	Partial Valve Stroke Test (PVST) was aborted or could not be started.	Perform RESET or restart PVST.
Wrn no reaction	No actuator reaction to operation commands within the set reaction time.	• Check movement at actuator. • Check parameter Reaction time M0634.
Torque wrn OPEN	Limit value for torque warning in direction OPEN exceeded.	Check parameter Wrn torque OPEN M0768, re-set if required.
Torque wrn CLOSE	Limit value for torque warning in direction CLOSE exceeded.	Check parameter Wrn torque CLOSE M0769, re-set if required.
SIL fault[1)]	SIL sub-assembly fault has occurred.	Refer to separate Manual Functional Safety.
PVST required	Execution of PVST (Partial Valve Stroke Tests) is required.	
Maintenance required	Maintenance is required.	
FQM fail safe fault[2)]	FQM fault	Checking and fault remedy are required. Refer to FQM operation instructions.

1) For actuators controls in SIL version
2) For actuators with fail safe unit

Table 24:

Faults and Failure		
Indication on display	Description/cause	Remedy
Configuration error	Collective signal 11: Configuration error has occurred.	Press push button ↵ Details to display a list of individual indications. For a description of the individual signals, refer to Manual (Operation and setting).
Config. error REMOTE	Collective signal 22: Configuration error has occurred.	Press push button ↵ Details to display a list of individual indications. For a description of the individual signals, refer to Manual (Operation and setting).
Internal error	Collective signal 14: Internal error has occurred.	AUMA service Press push button ↵ Details to display a list of individual indications. For a description of the individual signals, refer to Manual (Operation and setting).
Torque fault CLOSE	Torque fault in direction CLOSE	Perform one of the following measures: • Issue operation command in direction OPEN. • Set selector switch to position **Local control** (LOCAL) and reset fault indication via push button **RESET**.
Torque fault OPEN	Torque fault in direction OPEN	Perform one of the following measures: • Issue operation command in direction CLOSE. • Set selector switch to position **Local control** (LOCAL) and reset fault indication via push button **RESET**.
Phase fault	• When connecting to a 3-ph AC system and with internal 24 V DC supply of the electronics: Phase 2 is missing. • When connecting to a 3-ph or 1-ph AC system and with external 24 V DC supply of the electronics: One of the phases L1, L2 or L3 is missing.	Test/connect phases.
Incorrect phase seq	The phase conductors L1, L2 and L3 are connected in the wrong sequence. Only applicable if connected to a 3-ph AC system.	Correct the sequence of the phase conductors L1, L2 and L3 by exchanging two phases.
Mains quality	Due to insufficient mains quality, the controls cannot detect the phase sequence (sequence of phase conductors L1, L2 and L3) within the pre-set time frame provided for monitoring.	• Check mains voltage. For 3-phase/1-phase AC current, the permissible variation of the mains voltage is ±10 % (option ±30 %). The permissible variation of the mains voltage is ±5 % • Check parameter Tripping time M0172, extend time frame if required.
Thermal fault	Motor protection tripped	• Cool down, wait. • If the fault indication display persists after cooling down: - Set selector switch to position **Local control** (LOCAL) and reset fault indication via push button **RESET**. • Check fuses.
Fault no reaction	No actuator reaction to operation commands within the set reaction time.	Check movement at actuator.
Poti Out of Range	Potentiometer is outside the permissible range.	Check device configuration: Parameter Low limit Uspan M0832 must be less than parameter Volt.level diff. potent. M0833.
LPV not ready[1)]	LPV: Lift Plug Valve function The master actuator signals a fault	
Wrn input AIN 1	Loss of signal analogue input 1	Check wiring.

Faults and Failure		
Indication on display	Description/cause	Remedy
Wrn input AIN 2	Loss of signal analogue input 2	Check wiring.
Incorrect rotary direct.	Contrary to the configured direction of rotation and the active operation command, the motor turns into the wrong direction.	Check operation command control. For 3-phase AC current mains, activate phase monitoring (parameter Adapt rotary dir. M0171). Check device configuration setting (parameter Closing rotation M0176). To delete the fault indication: Disconnect actuator controls from the mains and perform reboot.
FQM collective fault[2)]	Collective signal 25:	Press push button ↵ Details to display a list of individual indications. For a description of the individual signals, refer to Manual (Operation and setting).

1) For lift plug valve product variant
2) For actuators equipped with fail safe-unit

Table 25:

Not ready REMOTE and Function check (collective signal 04)		
Indication on display	Description/cause	Remedy
Wrong oper. cmd	Collective signal 13: Possible causes: • Several operation commands (e.g. OPEN and CLOSE simultaneously, or OPEN and SETPOINT operation simultaneously) • A setpoint is present and the positioner is not active	• Check operation commands (reset/clear all operation commands and send one operation command only). • Set parameter Positioner to Function active. • Check setpoint. Press push button ↵ Details to display a list of individual indications. For a description of the individual signals, refer to Manual (Operation and setting).
Sel. sw. not REMOTE	Selector switch is not in position REMOTE.	Set selector switch to position REMOTE.
Service active	Operation via service interface (Bluetooth) and AUMA CDT service software.	Exit service software.
Disabled	Actuator is in operation mode Disabled.	Check setting and status of function <Local controls enable>.
EMCY stop active	The EMERGENCY stop switch has been operated. The motor control power supply (contactors or thyristors) is disconnected.	• Enable EMERGENCY stop switch. • Reset EMERGENCY stop state by means of Reset command.
EMCY behav. active	Operation mode EMERGENCY is active (EMERGENCY signal was sent). 0 V are applied at the EMERGENCY input.	• Detect cause for EMERGENCY signal. • Verify failure source. • Apply +24 V DC at EMERGENCY input.
I/O interface	The actuator is controlled via the I/O interface (parallel).	Check I/O interface.
Handwheel active	Manual operation is activated.	Start motor operation.
Interlock	An interlock is active.	Check interlock signal.
Interlock by-pass	By-pass function is interlocked.	Check states of main and by-pass valve.
PVST active	Partial Valve Stroke Test (PVST) is active.	Wait until PVST function is complete.
SIL function active[1)]	SIL function is active	

1) For actuators controls in SIL version

11.3. Fuses

11.3.1. Fuses within the actuator controls

F1/F2

Table 26:

Primary fuses F1/F2 (for power supply unit)		
G fuse	F1/F2	AUMA art. no.
Size	6.3 x 32 mm	
Reversing contactors Power supply ≤ 500 V	1 A T; 500 V	K002.277
Reversing contactors Power supply > 500 V	2 A FF; 690 V	K002.665
Thyristor units for motor power up to 1.5 kW	1 A T; 500 V	K002.277
Thyristor units for motor power up to 3.0 kW		
Thyristor units for motor power up to 5.5 kW		

F3 Internal 24 V DC supply

Table 27:

Secondary fuses F3 (internal 24 V DC supply)		
G fuse according to IEC 60127-2/III	F3	AUMA art. no.
Size	5 x 20 mm	
Voltage output (power supply unit) = 24 V	2.0 A T; 250 V	K006.106
Voltage output (power supply unit) = 115 V	2.0 A T; 250 V	K006.106

F4

Table 28:

Secondary fuse F4 (internal AC supply)[1)]		
G-fuse according to IEC 60127-2/III	F4	AUMA art. no.
Size	5 x 20 mm	
Voltage output (power supply unit) = 24 V	1.25 A T; 250 V	K001.184
Voltage output (power supply unit) = 115 V	—	—

1) Fuse for: Switch compartment heater, reversing contactor control, PTC tripping device (at 24 V AC only), at 115 V AC also control inputs OPEN, STOP, CLOSE

F5 Automatic reset fuse as short-circuit protection for external 24 V DC supply for customer (see wiring diagram)

11.3.2. Fuse replacement

11.3.2.1. Replace fuses F1/F2.

DANGER

Hazardous voltage!

Risk of electric shock.

→ Disconnect device from the mains before opening.

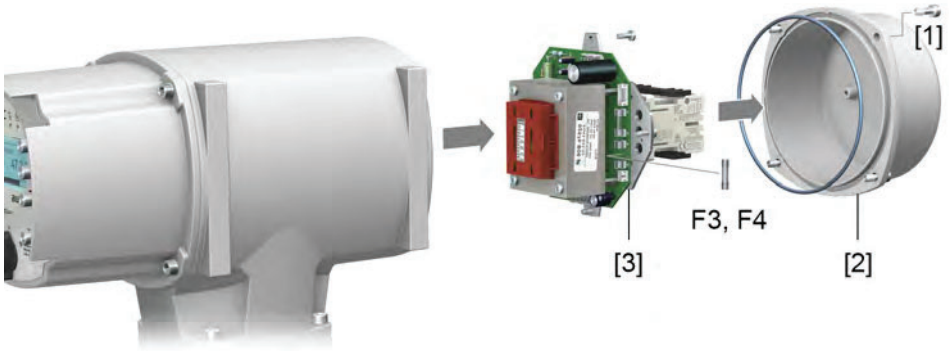
1. Remove electrical connection from actuator controls.
   → Refer to <Disconnection from the mains> chapter.

Figure 67:

2. Pull fuse holder out of pin carrier, open fuse cover and replace old fuses by new ones.

11.3.2.2. Test/replace fuses F3/F4

1. Loosen screws [1] and remove cover [2] on the rear of the actuator controls.
   Figure 68:



Check fuses.

2. The power supply unit has measurement points (solder pins) allowing to perform a resistance (continuity) measurement:

Table 29:

Checking	Measuring points
F3	MTP5 – MTP6
F4	MTP7 – MTP8

3. To replace defective fuses: Carefully loosen power supply unit [3] and pull out. (The fuses are on the equipped part of the power supply board.)

NOTICE

Cable damage due to pinching!

Risk of functional failures.

→ Carefully assemble power supply unit to avoid pinching the cables.

11.3.3. Motor protection (thermal monitoring)

In order to protect against overheating and impermissibly high surface temperatures at the actuator, PTC thermistors or thermoswitches are embedded in the motor winding. Motor protection trips as soon as the max. permissible winding temperature has been reached.

The actuator is switched off and the following signals are given:

- LED 3 (motor protection trippped) on the local controls is illuminated.
- The status indication S0007 or S0011 Failuredisplays a fault..
  The fault Details is displayed when selecting Thermal fault.

The motor has to cool down before operation can be resumed.

Depending on the parameter setting (motor protection behaviour), the fault signal is either automatically reset or the the fault signal has to be reset using **RESET** push button with selector switch position **Local operation** (LOCAL).

12. Servicing and maintenance

⚠ CAUTION

Damage caused by inappropriate maintenance!

→ Servicing and maintenance must be carried out exclusively by suitably qualified personnel having been authorised by the end user or the contractor of the plant. Therefore, we recommend contacting our service.

→ Only perform servicing and maintenance tasks when the device is switched off.

AUMA Service & Support

AUMA offers extensive service such as servicing and maintenance as well as customer product training. For the relevant contact addresses, please refer to <Addresses> in this document or to the Internet (www.auma.com)

12.1. Preventive measures for servicing and safe operation

The following actions are required to ensure safe device operation:

6 months after commissioning and then once a year

- Carry out visual inspection:
  Check cable entries, cable glands, blanking plugs, etc. for correct tightness and sealing.
  Consider torques according to manufacturer's details.
- Check fastening screws between actuator and gearbox/valve for tightness. If required, fasten screws while applying the tightening torques as indicated in chapter <Assembly>.
- When rarely operated: Perform test run.

For enclosure protection NEMA type 6P

After submersion:

- Check actuator.
- In case of ingress of water, locate leaks and repair. Dry device correctly and check for proper function.

12.2. Maintenance

Lubrication

- In the factory, the gear housing is filled with grease.
- Grease change is performed during maintenance
  - Generally after 4 to 6 years for modulating duty.
  - Generally after 6 to 8 years if operated frequently (open-close duty).
  - Generally after 10 to 12 years if operated rarely (open-close duty).
- We recommend exchanging the seals when changing the grease.
- No additional lubrication of the gear housing is required during operation.

12.3. Disposal and recycling

Our devices have a long lifetime. However, they have to be replaced at one point in time. The devices have a modular design and may, therefore, easily be separated and sorted according to materials used, i.e.:

- electronic scrap
- various metals
- plastics
- greases and oils

The following generally applies:

- Greases and oils are hazardous to water and must not be released into the environment.
- Arrange for controlled waste disposal of the disassembled material or for separate recycling according to materials.

- Observe the national regulations for waste disposal.

13. Technical data

Information The following tables include standard and optional features. For detailed information on the customer-specific version, refer to the order-related data sheet. The technical data sheet can be downloaded from the Internet in both German and English at **http://www.auma.com** (please state the order number).

13.1. Technical data Part-turn actuator

Features and functions		
Type of duty (Part-turn actuators for open-close duty)	with 3-phase AC motor: Short-time duty S2 - 15 min, classes A and B according to EN 15714-2 with 1-phase AC motor: Short-time duty S2 - 10 min, classes A and B according to EN 15714-2	
	For nominal voltage, +40 °C ambient temperature and at load with 35 % of the max. torque	
Type of duty (Part-turn actuators for modulating duty)	Standard:	with 3-phase AC motor: Intermittent duty S4 - 25 %, class C according to EN 15714-2 with 1-phase AC motor: Intermittent duty S4 - 20%, class C according to EN 15714-2
	Option:	With 3-phase AC motor: Intermittent duty S4 - 50 %, class C according to EN 15714-2
	For nominal voltage, +40 °C ambient temperature and at modulating torque load.	
Motors	Standard:	3-phase AC asynchronous motor, type IM B9 according to IEC 60034-7, IC410 cooling procedure according to IEC 60034-6
	Option:	1-phase AC motor with integral permanent split capacitor (PSC), type IM B9 according to IEC 60034-7, IC410 cooling procedure according to IEC 60034-6
Mains voltage, mains frequency	Refer to motor name plate Permissible variation of mains voltage: ±10 % Permissible variation of mains frequency: ±5 %	
Overvoltage category	Category III according to IEC 60364-4-443	
Insulation class	Standard:	F, tropicalized
	Option:	H, tropicalized
Motor protection	Standard:	Thermoswitches (NC)
	Option:	PTC thermistors (according to DIN 44082)
Motor heater (option)	Voltages:	110 – 120 V AC, 220 – 240 V AC or 380 – 480 V AC for 3-phase AC motors
	Power:	12.5 W
Swing angle	Standard:	Adjustable between 75° and < 105°
	Option:	15° to < 45°, 45° to < 75°, 105° to < 135°, 135° to < 165°, 165° to < 195°, 195° to < 225°,
Self-locking	Yes (Part-turn actuators are self-locking if the valve position cannot be changed from standstill while torque acts upon the output drive.)	
Manual operation	Manual drive for setting and emergency operation, handwheel does not rotate during electrical operation.	
	Option:	Handwheel lockable Handwheel stem extension Power tool for emergency operation with square 30 mm or 50 mm
Indication for manual operation (option)	Indication whether manual operation is active/not active via single switch (1 change-over contact)	
Splined coupling for connection to the valve shaft	Standard:	Coupling without bore
	Options:	Machined coupling with bore and keyway, square bore or bore with two-flats according to ANSI B17.1
Valve attachment	Dimensions according to MSS SP-101 without spigot	

With base and lever (option)		
Swing lever	Made of spheroidal cast iron with two or three bores for fixing a lever arrangement. Considering the installation conditions, the lever may be mounted to the output shaft in any desired position.	
Ball joints (option)	Two ball joints matching the lever, including lock nuts and two welding nuts, suitable for pipe according to dimension sheet	
Fixing	Base with four holes for fastening screws	

Electronic control unit (option, only in combination with actuator controls: AC)		
Non-Intrusive setting	Magnetic limit and torque transmitter (MWG) Turns per stroke: 1 to 500 (standard) or 10 to 5,000 (option)	
Position feedback signal	Via actuator controls	
Torque feedback signal	Via actuator controls	
Mechanical position indicator	Continuous self-adjusting indication with symbols OPEN and CLOSED	
Running indication	Blinking signal via actuator controls	
Heater in switch compartment	Resistance type heater with 5 W, 24 V AC	

Service conditions		
Use	Indoor and outdoor use permissible	
Mounting position	Any position	
Installation altitude	≤ 2,000 m above sea level > 2,000 m above sea level on request	
Ambient temperature	Refer to actuator name plate	
Humidity	Up to 100 % relative humidity across the entire permissible temperature range	
Enclosure protection according to EN 60529	Standard:	NEMA type 6P with AUMA 3-phase AC motor/1-phase AC motor For special motors differing enclosure protection available (refer to motor name plate)
	Option:	Terminal compartment additionally sealed against interior of actuator (double sealed)
	According to AUMA definition, enclosure protection NEMA type 6P meets the following requirements: • Depth of water: maximum 26 feet head of water • Duration of continuous immersion in water: Max. 96 hours • Up to 10 operations during continuous immersion • Modulating duty is not possible during continuous immersion	
	For exact version, refer to actuator controls name plate.	
Pollution degree according to IEC 60664-1	Pollution degree 4 (when closed), pollution degree 2 (internal)	
Vibration resistance according to IEC 60068-2-6	2 g, 10 to 200 Hz (AUMA NORM), 1 g, 10 to 200 Hz (for actuators with AM or AC integral controls) Resistant to vibration during start-up or for failures of the plant. However, a fatigue strength may not be derived from this. Valid for part-turn actuators in version AUMA NORM and in version with integral actuator controls, each with AUMA plug/socket connector. Not valid in combination with gearboxes.	
Corrosion protection	Standard:	KS: Suitable for use in areas with high salinity, almost permanent condensation, and high pollution.
	Option:	KX: Suitable for use in areas with extremely high salinity, permanent condensation, and high pollution.
		KX-G: Same as KX, however aluminium-free version (outer parts)
Coating	Double layer powder coating Two-component iron-mica combination	
Colour	Standard:	AUMA silver-grey (similar to RAL 7037)
	Option:	Available colours on request
Lifetime	AUMA part-turn actuators meet or even exceed the lifetime requirements of EN 15714-2. Detailed information can be provided on request.	

Further information	
EU Directives	Electromagnetic Compatibility (EMC): (2014/30/EU) Low Voltage Directive: (2014/35/EU) Machinery Directive: (2006/42/EC)

Technical data for handwheel activation switches	
Mechanical lifetime	10^6 starts
Silver plated contacts:	
U min.	12 V DC
U max.	250 V AC
I max. AC current	3 A at 250 V (inductive load, cos phi = 0.8)
I max. DC current	3 A at 12 V (resistive load)

13.2. Technical data Actuator controls

Features and functions		
Power supply	Refer to name plate Permissible variation of mains voltage: ±10 % Permissible variation of mains voltage: ±30 % (optional) Permissible variation of mains frequency: ±5 %	
External supply of the electronics (option)	24 V DC +20 %/–15 % Current consumption: Basic version approx. 250 mA, with options up to 500 mA External power supply must have reinforced insulation against mains voltage in accordance with IEC 61010-1 and may only be supplied by a circuit limited to 150 VA in accordance with IEC 61010-1.	
Current consumption	Current consumption of the actuator controls depending on mains voltage: For permissible variation of mains voltage of ±10 %: • 100 to 120 V AC = max. 740 mA • 208 to 240 V AC = max. 400 mA • 380 to 500 V AC = max. 250 mA • 515 to 690 V AC = max. 200 mA For permissible variation of mains voltage of ±30 %: • 100 to 120 V AC = max. 1,200 mA • 208 to 240 V AC = max. 750 mA • 380 to 500 V AC = max. 400 mA • 515 to 690 V AC = max. 400 mA	
Overvoltage category	Category III according to IEC 60364-4-443	
Rated power	The actuator controls are designed for the nominal motor power, refer to motor name plate	
Switchgear	Standard:	Reversing contactors (mechanically and electrically interlocked) for AUMA power classes A1/A2
	Options:	Reversing contactors (mechanically and electrically interlocked) for AUMA power class A3
		Thyristor unit for mains voltage up to 500 V AC (recommended for modulating actuators) for AUMA power classes B1, B2 and B3
	The reversing contactors are designed for a lifetime of 2 million starts. For applications requiring a high number of starts, we recommend the use of thyristor units. For the assignment of AUMA power classes, please refer to Electrical data on actuator	
Control inputs	6 digital inputs: OPEN, STOP, CLOSE, EMERGENCY (via opto-isolator, thereof OPEN, STOP, CLOSE with one common and EMERGENCY without common, respect minimum pulse duration for modulating actuators).	
Control voltage/current consumption for control inputs	Standard:	100 – 120 V AC, current consumption : approx. 15 mA per input
	Options:	48 V DC, current consumption: approx. 7 mA per input 60 V DC, current consumption: approx. 9 mA per input 100 – 125 V DC, current consumption : approx. 15 mA per input 24 V DC, current consumption: approx. 10 mA per input
	All input signals must be supplied with the same potential.	

Features and functions		
Status signals (output signals)	Standard:	• 6 programmable output contacts: - 5 change-over contacts with one common, max. 250 V AC, 1 A (resistive load), 1 potential-free change-over contact, max. 250 V AC, 5 A (resistive load)
	Options:	• 6 programmable output contacts: - 5 potential-free NO contacts with one common, max. 250 V AC, 1 A (resistive load) Default configuration: End position CLOSED, end position OPEN, selector switch REMOTE, SIL function active, SIL fault, torque fault CLOSE, torque fault OPEN - 1 potential-free change-over contact, max. 250 V AC, 5 A (resistive load) Default configuration: Collective fault signal (torque fault, phase failure, motor protection tripped) • Analogue output signal for position feedback - Galvanically isolated position feedback 0/4 – 20 mA (load max. 500 Ω) • 12 programmable output contacts: - 10 potential-free NO contacts, 5 with one common each, max. 250 V AC, 1 A (resistive load), 2 potential-free change-over contacts, max. 250 V AC, 5 A (resistive load) • 6 programmable output contacts: - 6 potential-free change-over contacts without one common, per contact max. 250 V AC, 5 A (resistive load) • 10 programmable output contacts: - 10 potential-free change-over contacts without one common, per contact max. 250 V AC, 5 A (resistive load) • 6 programmable output contacts: - 4 mains failure proof potential-free NO contacts with one common, max. 250 V AC, 1 A (resistive load), 1 potential-free NO contact, max. 250 V AC, 1 A (resistive load), 1 potential-free change-over contact, max. 250 V AC, 5 A (resistive load) • 6 programmable output contacts: - 4 mains failure proof potential-free NO contacts, max. 250 V AC, 5 A (resistive load), 2 potential-free change-over contacts, max. 250 V AC, 5 A (resistive load), • 12 programmable output contacts: - 8 mains failure proof potential-free NO contacts, max. 250 V AC, 1 A (resistive load), 2 potential-free NO contacts, max. 250 V AC, 1 A (resistive load), 2 potential-free change-over contacts, max. 250 V AC, 5 A (resistive load) • 12 programmable output contacts: - 8 mains failure proof potential-free NO contacts, max. 250 V AC, 5 A (resistive load), 4 potential-free change-over contacts, max. 250 V AC, 5 A (resistive load), All output signals must be supplied with the same potential.
Voltage output	Standard:	Auxiliary voltage 115 V AC: max. 30 mA for supply of control inputs, galvanically isolated from internal voltage supply (Not possible in combination with PTC tripping device)
	Option:	Auxiliary voltage 24 V DC: max. 100 mA for supply of control inputs, galvanically isolated from internal voltage supply.
Analogue output (option)	2 Analog outputs: With position transmitter option: Output of travel and torque as continuous values between 0/4 and 20 mA	
Analogue input (option)	2 Analog inputs: With positioner/process controller option: Input of actual position value/actual process value as continuous values between 0/4 and 20 mA	

Features and functions		
Local controls	Standard:	• Selector switch: LOCAL - OFF - REMOTE (lockable in all three positions) • Push buttons OPEN, STOP, CLOSE, RESET - Local STOP The actuator can be stopped via push button STOP of local controls if the selector switch is in position REMOTE. (Not activated when leaving the factory.) • Special colours for the indication lights: - End position CLOSED (green), torque fault CLOSE (blue), torque fault OPEN (yellow), motor protection tripped (violet), end position OPEN (red) • Graphic LC display: illuminated
	Option:	• 6 indication lights: - End position and running indication CLOSED (yellow), torque fault CLOSE (red), motor protection tripped (red), torque fault OPEN (red), end position and running indication OPEN (green), Bluetooth (blue)
Bluetooth Communication interface	Bluetooth class II chip, version 2.1: With a range up to 10 m in industrial environments, supports the SPP Bluetooth profile (Serial Port Profile). Required accessories: • AUMA CDT (Commissioning and Diagnostic Tool for Windows-based PC) • AUMA Assistant App (Commissioning and Diagnostic Tool for Android devices)	
Application functions	Standard:	• Selectable type of seating, limit or torque seating for end position OPEN and end position CLOSED • Torque by-pass: Adjustable duration (with adjustable peak torque during start-up time) • Start and end of stepping mode as well as ON and OFF times can be set individually for directions OPEN and CLOSE, 1 to 1,800 seconds • Any 8 intermediate positions: can be set between 0 and 100 %, reaction and signal behaviour programmable • Running indication blinking: can be set
	Options:	• Positioner - Position setpoint via analog input 0/4 input 0/4 – 20 mA - Programmable behavior on loss of signal - Automatic adaptation of dead band (adaptive behaviour selectable) - Split range operation - MODE input for selecting between OPEN-CLOSE and setpoint control • PID process controller: with adaptive positioner, via 0/4 – 20 mA analogue inputs for process setpoint and actual process value • Automatic deblocking: Up to 5 operation trials, travel time in opposite direction can be set • Static and dynamic torque recording for both rotation directions with torque measurement flange as additional accessory
Safety functions	Standard:	• EMERGENCY operation (programmable behaviour) - Digital input: Low active - Reaction can be selected: Stop, run to end position CLOSED, run to end position OPEN, run to intermediate position - Torque monitoring can be by-passed during EMERGENCY operation - Thermal protection can be by-passed during EMERGENCY operation (only in combination with thermoswitch within actuator, not with PTC thermistor).
	Options:	• Enabling local controls via digital input Enable LOCAL. Thus, actuator operation can be enabled or disabled via push buttons on the local controls. • Interlock for main/by-pass valve: Enabling the operation commands OPEN or CLOSE via two digital inputs • EMERGENCY Stop push button (latching): interrupts electrical operation, irrespective of the selector switch positions. • PVST (Partial Valve Stroke Test): programmable to check the function of both actuator and actuator controls: Direction, stroke, operation time, reversing time
Monitoring functions	• Valve overload protection: adjustable, results in switching off and generates fault signal • Motor temperature monitoring (thermal monitoring): results in switching off and generates fault indication • Monitoring the heater within actuator: generates warning signal • Monitoring of permissible on-time and number of starts: adjustable, generates warning signal • Operation time monitoring: adjustable, generates warning signal • Phase failure monitoring: results in switching off and generates fault signal • Automatic correction of rotation direction upon wrong phase sequence (3-ph AC current)	

Features and functions		
Diagnostic functions	• Electronic device ID with order and product data • Logging of operating data: A resettable counter and a lifetime counter each for:: - Motor running time, number of starts, torque switch trippings in end position CLOSED, limit switch trippings in end position CLOSED, torque switch trippings in end position OPEN, limit switch trippings in end position OPEN, torque faults CLOSE, torque faults OPEN, motor protection trippings • Time-stamped event report with history for setting, operation and faults • Status signals according to NAMUR recommendation NE 107: "Failure", "Function check", "Out of specification", "Maintenance required" • Torque characteristics (for version with MWG in actuator): - 3 torque characteristics (torque-travel characteristic) for opening and closing directions can be saved separately. - Torque characteristics stored can be shown on the display.	
Motor protection evaluation	Standard:	Monitoring the motor temperature in combination with thermoswitches within actuator motor
	Options:	• Thermal overload relay in controls combined with thermal switches within actuator • PTC tripping device in combination with PTC thermistors within actuator motor
ACV 01.2 heating system (option)	Temperature versions below –30 °C incl. heating system for connection to external power supply 230 V AC or 115 V AC or internal version 400 V AC	
Electrical connection	Standard:	AUMA plug/socket connector with screw-type connection
	Option:	Gold-plated control plug (sockets and plugs)
Threads for cable entries	Standard:	Metric threads
	Options:	• NPT threads, Pg threads, G-threads • Terminals or crimp-type connection
Wiring diagram	Refer to name plate	

Further options for Non-intrusive version with MWG in the actuator	
Setting of limit and torque switching via local controls	
Torque feedback signal	Galvanically isolated analog output 0/4 output 0/4 – 20 mA (load max. 500 Ω).

Service conditions		
Use	Indoor and outdoor use permissible	
Mounting position	Any position	
Installation altitude	≤ 2 000 m above sea level > 2,000 m above sea level, on request	
Ambient temperature	Refer to name plate of actuator controls	
Humidity	Up to 100 % relative humidity across the entire permissible temperature range	
Enclosure protection according to EN 60529	Standard:	NEMA type 6P
	Option:	Terminal compartment additionally sealed against interior of actuator controls (double sealed)
	According to AUMA definition, enclosure protection IP68 meets the following requirements: • Depth of water: Maximum 8 m head of water • Duration of continuous immersion in water: Maximum 96 hours • Up to 10 operations during continuous immersion • Modulating duty is not possible during continuous immersion. For exact version, refer to actuator controls name plate.	
Pollution degree according to IEC 60664-1	Pollution degree 4 (when closed), pollution degree 2 (internal)	
Corrosion protection	Standard:	KS: Suitable for use in areas with high salinity, almost permanent condensation, and high pollution.
	Option:	KX: Suitable for use in areas with extremely high salinity, permanent condensation, and high pollution.

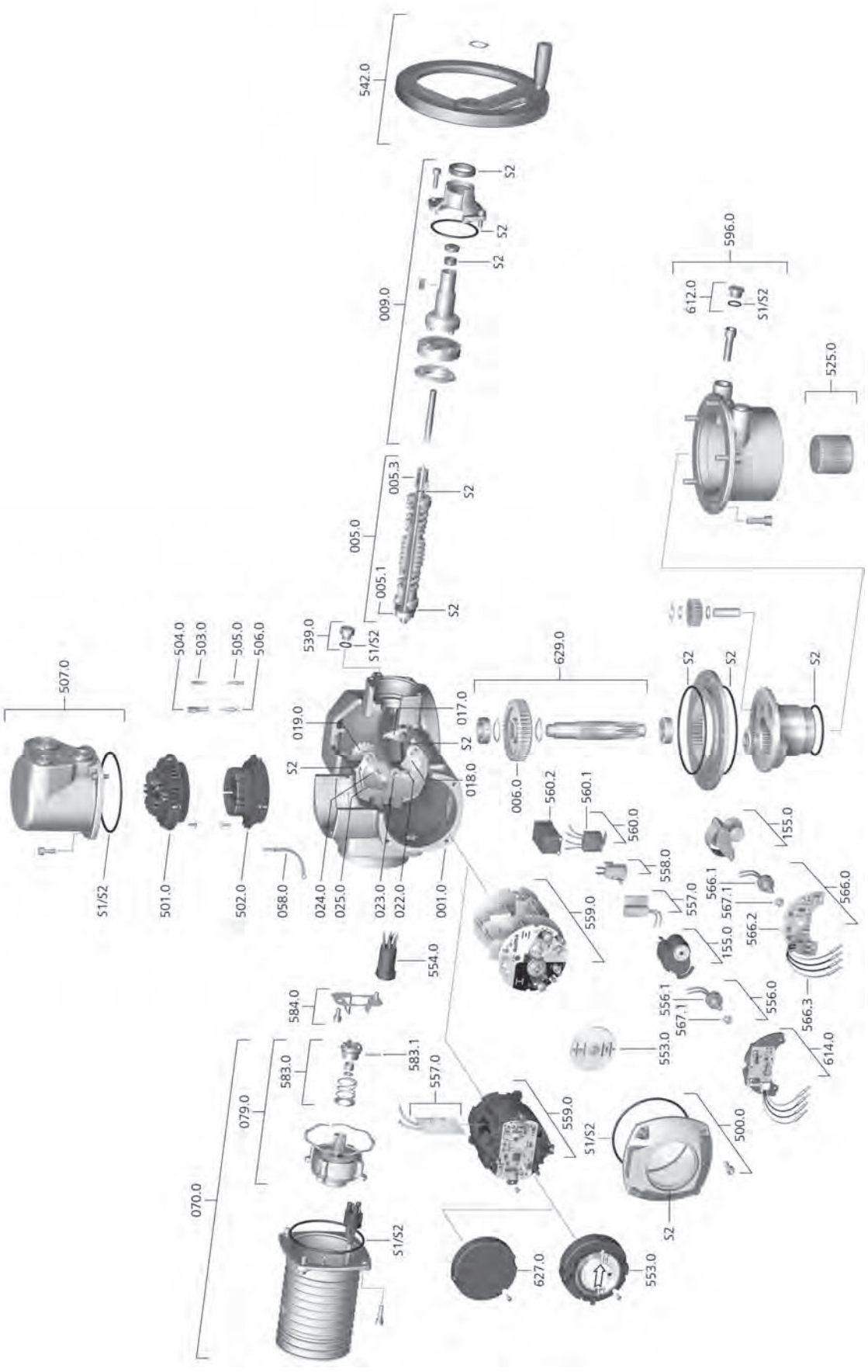
Service conditions		
Coating	Double layer powder coating Two-component iron-mica combination	
Colour	Standard:	AUMA silver-grey (similar to RAL 7037)
	Option:	Available color on request

Accessories	
Wall bracket	For actuator controls mounted separately from the actuator, including plug/socket connector. Connecting cable on request. Recommended for high ambient temperatures, difficult access, or in case of heavy vibration during service. Cable length between actuator and actuator controls is max. 100 m (Not suitable for version with potentiometer in the actuator). Instead of the potentiometer, the actuator has to be equipped with an electronic position transmitter. (MWG requires a separate data cable.)
Programming software	AUMA CDT (Commissioning and Diagnostic Tool for Windows-based PC) AUMA Assistant App (Commissioning and Diagnostic Tool for Android devices)
Torque measurement flange DMF	Accessory for torque measurement for SA/SAR 07.2 – SA/SAR 16.2

Further information	
Weight	Approx. 7 kg (with AUMA plug/socket connector)
EU Directives	Electromagnetic Compatibility (EMC): (2014/30/EU) Low Voltage Directive: (2014/35/EU) Machinery Directive: (2006/42/EC)

14. Spare parts

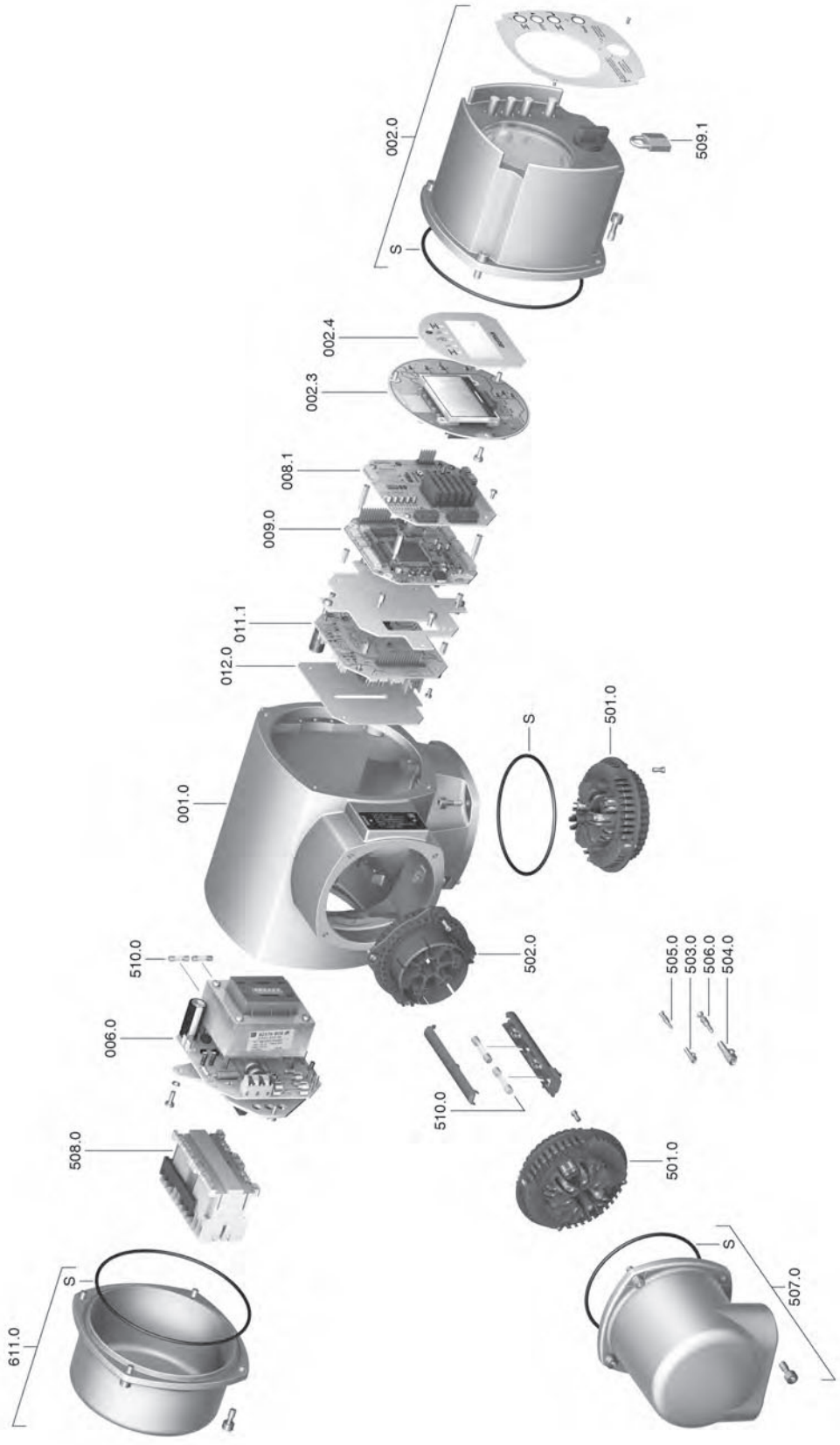
14.1. Part-turn actuators SQ 05.2 – SQ 14.2/SQR 05.2 – SQR 14.2



Please state device type and our order number (see name plate) when ordering spare parts. Only original AUMA spare parts should be used. Failure to use original spare parts voids the warranty and exempts AUMA from any liability. Representation of spare parts may slightly vary from actual delivery.

Ref. no.	Designation	Type	Ref. no.	Designation	Type
001.0	Housing	Sub-assembly	553.0	Mechanical position indicator	Sub-assembly
005.0	Drive shaft	Sub-assembly	554.0	Socket carrier for motor plug/socket connector with cable harness	Sub-assembly
005.1	Motor coupling	Sub-assembly	556.0	Potentiometer as position transmitter	Sub-assembly
005.3	Manual drive coupling		556.1	Potentiometer without slip clutch	Sub-assembly
006.0	Worm wheel	Sub-assembly	557.0	Heater	Sub-assembly
009.0	Manual gearing	Sub-assembly	558.0	Blinker transmitter including pins at wires (without impulse disc and insulation plate)	Sub-assembly
017.0	Torque lever		559.0–1	Electromechanical control unit with switches, including torque switching heads	Sub-assembly
018.0	Gear segment	Sub-assembly	559.0–2	Electronic control unit with magnetic limit and torque transmitter (MWG)	Sub-assembly
019.0	Crown wheel		560.0–1	Switch stack for direction OPEN	Sub-assembly
022.0	Drive pinion II for torque switching	Sub-assembly	560.0–2	Switch stack for direction CLOSE	Sub-assembly
023.0	Output drive wheel for limit switching	Sub-assembly	560.1	Switch for limit/torque	Sub-assembly
024.0	Drive wheel for limit switching	Sub-assembly	560.2–1	Switch case for direction OPEN	
025.0	Locking plate	Sub-assembly	560.2–2	Switch case for direction CLOSE	
058.0	Cable for protective earth	Sub-assembly	566.0	RWG position transmitter	Sub-assembly
070.0	Motor (incl. ref. no. 079.0)	Sub-assembly	566.1	Potentiometer for RWG without slip clutch	Sub-assembly
079.0	Planetary gearing for motor drive	Sub-assembly	566.2	Position transmitter board for RWG	Sub-assembly
155.0	Reduction gearing	Sub-assembly	566.3	Cable set for RWG	Sub-assembly
500.0	Cover	Sub-assembly	567.1	Slip clutch for potentiometer	Sub-assembly
501.0	Socket carrier (complete with sockets)	Sub-assembly	583.0	Motor coupling on motor shaft	Sub-assembly
502.0	Pin carrier without pins	Sub-assembly	583.1	Pin for motor coupling	Sub-assembly
503.0	Socket for controls	Sub-assembly	584.0	Retaining spring for motor coupling	
504.0	Socket for motor		596.0	Output drive flange with end stop	Sub-assembly
505.0	Pin for controls	Sub-assembly	612.0	Screw plug for end stop	Sub-assembly
506.0	Pin for motor	Sub-assembly	614.0	EWG position transmitter	Sub-assembly
507.0	Cover for electrical connection	Sub-assembly	627.0	MWG 05.03 cover	
525.0	Coupling	Sub-assembly	629.0	Pinion shaft	Sub-assembly
539.0	Screw plug	Sub-assembly	S1	Seal kit, small	Set
542.0	Handwheel with ball handle		S2	Seal kit, large	Set

14.2. AC 01.2 actuator controls with S electrical connection



Please state device type and our order number (see name plate) when ordering spare parts. Only original AUMA spare parts should be used. Failure to use original spare parts voids the warranty and exempts AUMA from any liability. Representation of spare parts may slightly vary from actual delivery.

Ref. no.	Designation	Type
001.0	Housing	Sub-assembly
002.0	Local controls	Sub-assembly
002.3	Local controls board	Sub-assembly
002.4	Face plate for display	
006.0	Power supply unit	Sub-assembly
008.1	Fieldbus board	
009.0	Logic board	Sub-assembly
011.1	Relay board	Sub-assembly
012.0	Option board	
050.1	Fieldbus connection board	Sub-assembly
500.0	Cover	Sub-assembly
501.0	Socket carrier (complete with sockets)	Sub-assembly
502.0	Pin carrier without pins	Sub-assembly
503.0	Socket for controls	Sub-assembly
504.0	Socket for motor	Sub-assembly
505.0	Pin for controls	Sub-assembly
506.0	Pin for motor	Sub-assembly
507.0	Electrical connection for fieldbus without connection board (050.1)	Sub-assembly
507.1	Frame for electrical connection	Sub-assembly
508.0	Switchgear	Sub-assembly
509.1	Padlock	Sub-assembly
510.0	Fuse kit	Kit
611.0	Cover	Sub-assembly
S	Seal kit	Set

15. Certificates

Information Certificates are valid as from the indicated date of issue. Subject to changes without notice. The latest versions are attached to the device upon delivery and also available for download at http://www.auma.com.

15.1. Declaration of Incorporation and EU Declaration of Conformity

AUMA Riester GmbH & Co. KG
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auma®
Solutions for a world in motion

EU Declaration of Conformity / Declaration of Incorporation in compliance with Machinery Directive

for electric actuators of the following type designations:

SA 07.2, SA 07.6, SA 10.2, SA 14.2, SA 14.6, SA 16.2,
SAR 07.2, SAR 07.6, SAR 10.2, SAR 14.2, SAR 14.6, SAR 16.2
SQ 05.2, SQ 07.2, SQ 10.2, SQ 12.2, SQ 14.2
SQR 05.2, SQR 07.2, SQR 10.2, SQR 12.2, SQR 14.2

in versions:

AUMA NORM
AUMA SEMIPACT SEM 01.1, SEM 02.1
AUMA MATIC AM 01.1, AM 02.1
AUMATIC AC 01.2

AUMA Riester GmbH & Co. KG as manufacturer declare herewith, that the above mentioned actuators meet the basic requirements of the following Directives:

2014/30/EU (EMC Directive)
2006/42/EC (Machinery Directive)

The following harmonised standards in terms of the specified directives have been applied:

Directive 2014/30/EU

EN 61000-6-4:2007 / A1:2011
EN 61000-6-2:2005 / AC:2005

Directive 2006/42/EC

EN ISO 12100:2010
EN ISO 5210:1996

AUMA actuators are designed for the operation of industrial valves. Putting into service is prohibited until the final machinery has been declared in conformity with the provisions of Directive 2006/42/EC.

The following basic requirements in compliance with Annex I of the Directive are respected:

Appendix I, articles 1.1.2, 1.1.3, 1.1.5, 1.2.1, 1.2.6, 1.3.1, 1.3.7, 1.5.1, 1.6.3, 1.7.1, 1.7.3, 1.7.4

The manufacturer shall be obligated to electronically submit the documents for the partly completed machinery to national authorities on request. The relevant technical documentation pertaining to the machinery described in Annex VII, part B has been prepared.

Authorised person for documentation: Peter Malus, Aumastrasse 1, 79379 Muellheim, Germany

Furthermore, the essential health and safety requirements in compliance with Directive 2014/35/EU (Low Voltage Directive) are fulfilled by applying the following harmonised standards, as far as applicable for the products:

EN 60204-1:2006 / A1:2009 / AC:2010
EN 60034-1:2010 / AC:2010
EN 50178:1997

Muellheim, 2016-04-01
H. Newerla, Managing Director

This declaration does not contain any guarantees. The safety instructions in product documentation supplied with the devices must be observed. Non-concerted modification of the devices voids this declaration.

Y006.332/003/en/1.16

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AUMA Datasheet

08-11-2022 08:56:15
AUMA Order: A000223508
Datasheet: 1
Com-No.: A223508-001

AUMA Actuators, Inc. USA
www.auma-usa.com
Phone: (724) 743-2862
Fax: (724) 743-4711

Customer: **DeZurik**
PO No: **15628**
Customer Item: **1**
Qty: **2**
Valve/Gate Size & Type: **4" BOS-US**

Certified by: **Ed Ondovcik**
Certified date: **08/10/22**
Revision: **0**
AUMA Line: **2**
Project: **City of Taunton WWTF Improvements**

Line Number(s): **2**
Qty: **2**

Tags:
(Qty: 2) Part No: **1456160**

DEVICE CHARACTERISTICS

AUMA product:	**Quarter-turn electric actuator**
Rated output torque [lbs.ft.]:	**110**
Rated output torque [inch.lbs.]:	**1,320**
Rated output torque [Nm]:	**149**
Approximate weight (lbs.):	**67**

SERVICE CONDITIONS

Version:	**Weather-proof**
Operating mode:	**Modulating duty**
Enclosure protection:	**NEMA type 6P**
Color:	**AUMA silver-grey (similar to RAL 7037)**
Ambient temperature:	**-30 °C to +70 °C (-22 °F to +158 °F)**
Nameplates:	**English - aluminum (US-AL)**
Sealing elements:	**NBR - Nitrile Butadiene Rubber**
Corrosion protection:	**KS**

ELECTRICAL DATA

Mains voltage:	**120 Volts AC**
Phase:	**1-Ph**
Frequency:	**60 Hz**
Type of duty:	**S4 - 20% intermittent duty**
Motor protection:	**(W-1T-O140) 1Ph-1 thermal switch 140°C N.C., class F insulation, tropicalized winding**

AUMA Datasheet

08-11-2022 08:56:15
AUMA Order: A000223508
Datasheet: 1
Com-No.: A223508-001

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Phone: (724) 743-2862
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MOTOR DATA

Motor designation :	**VW0R063-4-0,02**
Nominal power (HP) :	**1/16**
Nominal power (kW) :	**0.02**
Nominal speed (RPM) :	**1,680**
Nominal current (FLA) :	**1.7**
Current approx. Imax. (RTA) :	**1.8**
Starting current (LRA) :	**4.9**
COS :	**0.84**
Capacitor uF :	**35**

ACTUATOR FEATURES

SQ model:	**SQR 05.2**
Valve coupling:	**Unbored valve shaft coupling**
Swing angle:	**Setting range 75 - 105 degrees**
Set to degrees:	**92**
Operation time:	**17 seconds for 90°**
Valve attachment:	**FA07, US flange with female pilot**
Coupling type:	**steel**
Mechanical position indicator:	**(11.2) self-adjusting continuous indication, with symbols OPEN and CLOSED**
Torque switches:	**(0-M) torque sensing via MWG**
Limit switches:	**(0-M) limit sensing via MWG**
Position transm.:	**(30.5) MWG absolute encoder for AC 01.2**
Heater:	**(22.5) 24 V in combination with controls: 5 W**
Motor heater:	**(0) without**
Torque switching:	**Setting range 55-110 lbs.ft.**
Set to close lbs.ft.:	**105**
Set to open lbs.ft.:	**105**
Handwheel:	**6.3" (160mm)**
Close direction:	**RH - clockwise**
Limit switching:	**(240) SQ with MWG**
Lubricant:	**F15 Shell ALVANIA 1029**
Electrical connection:	**(S0-000) actuator plug for mounting AM/SEM/AC**

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ACTUATOR CONTROLS

AUMATIC version:	**AC 01.2**
Feedback E2:	**MWG magnetic limit/ torque sensor (non-intrusive setting)**
Max. motor power:	**(B00.01) Contactors for power class A1**
Motor protection:	**(C00.01) thermal switch, automatic reset**
Interface:	**(D00.01) Parallel I/O Interface**
Positioner:	**(F10.01) Positioner**
Input signals:	**(R00.02) MODE, CLOSE, OPEN, STOP, EMERGENCY •**
Control voltage:	**(E00.01) 24 V DC**
Electronics supply:	**(A10.01) 24 V DC internal •**
Output aux. voltage:	**(A30.01) 24 V DC - 100mA (internally powered)**
Output contacts:	**(H00.03) 6 output contacts: 6 NO/NC without common 250V AC/5A •**
Output signals:	**(S00.01) default setting: K1=Fault, K2=End pos. CLOSED, K3=End pos. OPEN, K4=Selector sw. REMOTE, K5=Torque fault CLOSE, K6=Torque fault OPEN**
Local controls:	**(L00.01) selector switch LOCAL-OFF-REMOTE with padlock; push buttons OPEN-STOP-CLOSE-RESET; large graphical LCD with a resolution of 200 x 100 pixels**
Activ. Bluetooth:	**(L90.01) Switched on**
Indication lights:	**(L10.02) 1 CLOSED:green, 2 TRQ-CL:blue, 3 TH:yellow, 4 TRQ-OP:violet, 5 OPEN:red, BLUETOOTH:blue (with numbers) •**
Face plate:	**(EN-ES-FR) English-Spanish-French •**
Tolerance mains voltage:	**(A40.01) +/- 10%**
Electrical connection:	**(SB-080) plug/socket 100mm, 2 x ¾" NPT; 1 x 1 ¼" NPT •**
Heater:	**(Q00.01) heater 24 V, internal supply •**
Analog input 1:	**(P20.02) setpoint: 4-20mA**
Analog output 1:	**(P00.02) Position feedback: 4-20mA**
Analog output 2:	**(P10.02) Torque feedback: 4-20mA**
Blinker version:	**(N00.02) lights illuminated in mid travel (electronic)**
Display language:	**English**
Switch off in CLOSE:	**(042.01) Limit**
Switch off in OPEN:	**(043.01) Limit**
Self retaining LOCAL:	**(033.03) In direction OPEN and CLOSE**
Self retaining REMOTE:	**(052.00) OFF**
Safety mode:	**(153.01) OFF**
Emergency function:	**(140.01) OFF**
Torque by-pass:	**Function not active**
Mounting position:	**Position A**
Mounting pos. local controls:	**Position A-1, selector switch at 6 o'clock in relation to base of controls (standard for SA/SQ)**
Electrical connection mounting position:	**Position A**

OPTIONAL EXTRAS

Inspection reports reqd.:	**Yes**

AUMA Actuators, Inc. USA
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Drawings:

ACTUATOR DIMENSIONAL DWG
(click here) DDS000004A3AAQ331 REV-000
OUTPUT DRIVE/MOUNTING FLANGE DWG
(click here) SK099594 REV-008
POINT-TO-POINT WIRING DWG
(click here) TPCA-1B2-1C1-A000TPA01R100-0I1-000 REV-001

Operation Manuals:

SQ 05.2 - SQ 14.2/SQR 05.2 - SQR 14.2, Control unit: electronic (MWG), with actuator controls AUMATIC AC 01.2 Non-Intrusi
(click here) BA_SQR2_05_14_AC2_NONIN_PARALLEL_US.PDF
Actuator controls AUMATIC AC 01.2/ACExC 01.2 Parallel
(click here) HB_AC2_PARALLEL_EN.PDF
Legend for AUMATIC AC 01.2/ACExC 01.2
(click here) SP_AC2_LEG_US.PDF

AUMA Datasheet

08-11-2022 08:56:27
AUMA Order: A000223508
Datasheet: 2
Com-No.: A223508-002

AUMA Actuators, Inc. USA
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Customer: **DeZurik**
PO No: **15628**
Customer Item: **2**
Qty: **2**
Valve/Gate Size & Type: **6" BOS-US**

Certified by: **Ed Ondovcik**
Certified date: **08/10/22**
Revision: **0**
AUMA Line: **3**
Project: **City of Taunton WWTF Improvements**

Line Number(s): **3**
Qty: **2**

Tags:
(Qty: 2) Part No: **1456161**

DEVICE CHARACTERISTICS

AUMA product:	**Quarter-turn electric actuator**
Rated output torque [lbs.ft.]:	**110**
Rated output torque [inch.lbs.]:	**1,320**
Rated output torque [Nm]:	**149**
Approximate weight (lbs.):	**67**

SERVICE CONDITIONS

Version:	**Weather-proof**
Operating mode:	**Modulating duty**
Enclosure protection:	**NEMA type 6P**
Color:	**AUMA silver-grey (similar to RAL 7037)**
Ambient temperature:	**-30 °C to +70 °C (-22 °F to +158 °F)**
Nameplates:	**English - aluminum (US-AL)**
Sealing elements:	**NBR - Nitrile Butadiene Rubber**
Corrosion protection:	**KS**

ELECTRICAL DATA

Mains voltage:	**120 Volts AC**
Phase:	**1-Ph**
Frequency:	**60 Hz**
Type of duty:	**S4 - 20% intermittent duty**
Motor protection:	**(W-1T-O140) 1Ph-1 thermal switch 140°C N.C., class F insulation, tropicalized winding**

AUMA Datasheet

08-11-2022 08:56:27
AUMA Order: A000223508
Datasheet: 2
Com-No.: A223508-002

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MOTOR DATA

Motor designation :	**SW0R063-4-0,01**
Nominal power (HP) :	**1/16**
Nominal power (kW) :	**0.01**
Nominal speed (RPM) :	**1,680**
Nominal current (FLA) :	**1.6**
Current approx. Imax. (RTA) :	**1.7**
Starting current (LRA) :	**4.9**
COS :	**0.82**
Capacitor uF :	**35**

ACTUATOR FEATURES

SQ model:	**SQR 05.2**
Valve coupling:	**Unbored valve shaft coupling**
Swing angle:	**Setting range 75 - 105 degrees**
Set to degrees:	**92**
Operation time:	**25 seconds for 90°**
Valve attachment:	**FA07, US flange with female pilot**
Coupling type:	**steel**
Mechanical position indicator:	**(11.2) self-adjusting continuous indication, with symbols OPEN and CLOSED**
Torque switches:	**(0-M) torque sensing via MWG**
Limit switches:	**(0-M) limit sensing via MWG**
Position transm.:	**(30.5) MWG absolute encoder for AC 01.2**
Heater:	**(22.5) 24 V in combination with controls: 5 W**
Motor heater:	**(0) without**
Torque switching:	**Setting range 55-110 lbs.ft.**
Set to close lbs.ft.:	**88**
Set to open lbs.ft.:	**88**
Handwheel:	**7.9" (200mm)**
Close direction:	**RH - clockwise**
Limit switching:	**(240) SQ with MWG**
Lubricant:	**F15 Shell ALVANIA 1029**
Electrical connection:	**(S0-000) actuator plug for mounting AM/SEM/AC**

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ACTUATOR CONTROLS

AUMATIC version:	**AC 01.2**
Feedback E2:	**MWG magnetic limit/ torque sensor (non-intrusive setting)**
Max. motor power:	**(B00.01) Contactors for power class A1**
Motor protection:	**(C00.01) thermal switch, automatic reset**
Interface:	**(D00.01) Parallel I/O Interface**
Positioner:	**(F10.01) Positioner**
Input signals:	**(R00.02) MODE, CLOSE, OPEN, STOP, EMERGENCY •**
Control voltage:	**(E00.01) 24 V DC**
Electronics supply:	**(A10.01) 24 V DC internal •**
Output aux. voltage:	**(A30.01) 24 V DC - 100mA (internally powered)**
Output contacts:	**(H00.03) 6 output contacts: 6 NO/NC without common 250V AC/5A •**
Output signals:	**(S00.01) default setting: K1=Fault, K2=End pos. CLOSED, K3=End pos. OPEN, K4=Selector sw. REMOTE, K5=Torque fault CLOSE, K6=Torque fault OPEN**
Local controls:	**(L00.01) selector switch LOCAL-OFF-REMOTE with padlock; push buttons OPEN-STOP-CLOSE-RESET; large graphical LCD with a resolution of 200 x 100 pixels**
Activ. Bluetooth:	**(L90.01) Switched on**
Indication lights:	**(L10.02) 1 CLOSED:green, 2 TRQ-CL:blue, 3 TH:yellow, 4 TRQ-OP:violet, 5 OPEN:red, BLUETOOTH:blue (with numbers) •**
Face plate:	**(EN-ES-FR) English-Spanish-French •**
Tolerance mains voltage:	**(A40.01) +/- 10%**
Electrical connection:	**(SB-080) plug/socket 100mm, 2 x ¾" NPT; 1 x 1 ¼" NPT •**
Heater:	**(Q00.01) heater 24 V, internal supply •**
Analog input 1:	**(P20.02) setpoint: 4-20mA**
Analog output 1:	**(P00.02) Position feedback: 4-20mA**
Analog output 2:	**(P10.02) Torque feedback: 4-20mA**
Blinker version:	**(N00.02) lights illuminated in mid travel (electronic)**
Display language:	**English**
Switch off in CLOSE:	**(042.01) Limit**
Switch off in OPEN:	**(043.01) Limit**
Self retaining LOCAL:	**(033.03) In direction OPEN and CLOSE**
Self retaining REMOTE:	**(052.00) OFF**
Safety mode:	**(153.01) OFF**
Emergency function:	**(140.01) OFF**
Torque by-pass:	**Function not active**
Mounting position:	**Position A**
Mounting pos. local controls:	**Position A-1, selector switch at 6 o'clock in relation to base of controls (standard for SA/SQ)**
Electrical connection mounting position:	**Position A**

OPTIONAL EXTRAS

Inspection reports reqd.:	**Yes**

AUMA Actuators, Inc. USA
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Fax: (724) 743-4711

Drawings:

ACTUATOR DIMENSIONAL DWG
(click here) DDS000004A3ADQ331 REV-000
OUTPUT DRIVE/MOUNTING FLANGE DWG
(click here) SK099594 REV-008
POINT-TO-POINT WIRING DWG
(click here) TPCA-1B2-1C1-A000TPA01R100-0I1-000 REV-001

Operation Manuals:

Actuator controls AUMATIC AC 01.2/ACExC 01.2 Parallel
(click here) HB_AC2_PARALLEL_EN.PDF
Legend for AUMATIC AC 01.2/ACExC 01.2
(click here) SP_AC2_LEG_US.PDF
SQ 05.2 - SQ 14.2/SQR 05.2 - SQR 14.2, Control unit: electronic (MWG), with actuator controls AUMATIC AC 01.2 Non-Intrusi
(click here) BA_SQR2_05_14_AC2_NONIN_PARALLEL_US.PDF

AUMA Datasheet

08-11-2022 08:56:33
AUMA Order: A000223508
Datasheet: 3
Com-No.: A223508-003

AUMA Actuators, Inc. USA
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Phone: (724) 743-2862
Fax: (724) 743-4711

Customer: **DeZurik**
PO No: **15628**
Customer Item: **3**
Qty: **2**
Valve/Gate Size & Type: **8" BOS-US**

Certified by: **Ed Ondovcik**
Certified date: **08/10/22**
Revision: **0**
AUMA Line: **4**
Project: **City of Taunton WWTF Improvements**

Line Number(s): **4**
Qty: **2**

Tags:
(Qty: 2) Part No: **1456162**

DEVICE CHARACTERISTICS

AUMA product:	**Quarter-turn electric actuator**
Rated output torque [lbs.ft.]:	**225**
Rated output torque [inch.lbs.]:	**2,700**
Rated output torque [Nm]:	**305**
Approximate weight (lbs.):	**67**

SERVICE CONDITIONS

Version:	**Weather-proof**
Operating mode:	**Modulating duty**
Enclosure protection:	**NEMA type 6P**
Color:	**AUMA silver-grey (similar to RAL 7037)**
Ambient temperature:	**-30 °C to +70 °C (-22 °F to +158 °F)**
Nameplates:	**English - aluminum (US-AL)**
Sealing elements:	**NBR - Nitrile Butadiene Rubber**
Corrosion protection:	**KS**

ELECTRICAL DATA

Mains voltage:	**120 Volts AC**
Phase:	**1-Ph**
Frequency:	**60 Hz**
Type of duty:	**S4 - 20% intermittent duty**
Motor protection:	**(W-1T-O140) 1Ph-1 thermal switch 140°C N.C., class F insulation, tropicalized winding**

AUMA Datasheet

08-11-2022 08:56:33
AUMA Order: A000223508
Datasheet: 3
Com-No.: A223508-003

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MANUFACTURED IN USA SINCE 1976

MOTOR DATA

Motor designation :	**SW0R063-4-0,01**
Nominal power (HP) :	**1/16**
Nominal power (kW) :	**0.01**
Nominal speed (RPM) :	**1,680**
Nominal current (FLA) :	**1.6**
Current approx. Imax. (RTA) :	**1.9**
Starting current (LRA) :	**4.9**
COS :	**0.82**
Capacitor uF :	**35**

ACTUATOR FEATURES

SQ model:	**SQR 07.2**
Valve coupling:	**Unbored valve shaft coupling**
Swing angle:	**Setting range 75 - 105 degrees**
Set to degrees:	**92**
Operation time:	**25 seconds for 90°**
Valve attachment:	**FA07, US flange with female pilot**
Coupling type:	**steel**
Mechanical position indicator:	**(11.2) self-adjusting continuous indication, with symbols OPEN and CLOSED**
Torque switches:	**(0-M) torque sensing via MWG**
Limit switches:	**(0-M) limit sensing via MWG**
Position transm.:	**(30.5) MWG absolute encoder for AC 01.2**
Heater:	**(22.5) 24 V in combination with controls: 5 W**
Motor heater:	**(0) without**
Torque switching:	**Setting range 110-225 lbs.ft.**
Set to close lbs.ft.:	**207**
Set to open lbs.ft.:	**207**
Handwheel:	**6.3" (160mm)**
Close direction:	**RH - clockwise**
Limit switching:	**(240) SQ with MWG**
Lubricant:	**F15 Shell ALVANIA 1029**
Electrical connection:	**(S0-000) actuator plug for mounting AM/SEM/AC**

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MANUFACTURED IN USA SINCE 1976

ACTUATOR CONTROLS

AUMATIC version:	**AC 01.2**
Feedback E2:	**MWG magnetic limit/ torque sensor (non-intrusive setting)**
Max. motor power:	**(B00.01) Contactors for power class A1**
Motor protection:	**(C00.01) thermal switch, automatic reset**
Interface:	**(D00.01) Parallel I/O Interface**
Positioner:	**(F10.01) Positioner**
Input signals:	**(R00.02) MODE, CLOSE, OPEN, STOP, EMERGENCY •**
Control voltage:	**(E00.01) 24 V DC**
Electronics supply:	**(A10.01) 24 V DC internal •**
Output aux. voltage:	**(A30.01) 24 V DC - 100mA (internally powered)**
Output contacts:	**(H00.03) 6 output contacts: 6 NO/NC without common 250V AC/5A •**
Output signals:	**(S00.01) default setting: K1=Fault, K2=End pos. CLOSED, K3=End pos. OPEN, K4=Selector sw. REMOTE, K5=Torque fault CLOSE, K6=Torque fault OPEN**
Local controls:	**(L00.01) selector switch LOCAL-OFF-REMOTE with padlock; push buttons OPEN-STOP-CLOSE-RESET; large graphical LCD with a resolution of 200 x 100 pixels**
Activ. Bluetooth:	**(L90.01) Switched on**
Indication lights:	**(L10.02) 1 CLOSED:green, 2 TRQ-CL:blue, 3 TH:yellow, 4 TRQ-OP:violet, 5 OPEN:red, BLUETOOTH:blue (with numbers) •**
Face plate:	**(EN-ES-FR) English-Spanish-French •**
Tolerance mains voltage:	**(A40.01) +/- 10%**
Electrical connection:	**(SB-080) plug/socket 100mm, 2 x ¾" NPT; 1 x 1 ¼" NPT •**
Heater:	**(Q00.01) heater 24 V, internal supply •**
Analog input 1:	**(P20.02) setpoint: 4-20mA**
Analog output 1:	**(P00.02) Position feedback: 4-20mA**
Analog output 2:	**(P10.02) Torque feedback: 4-20mA**
Blinker version:	**(N00.02) lights illuminated in mid travel (electronic)**
Display language:	**English**
Switch off in CLOSE:	**(042.01) Limit**
Switch off in OPEN:	**(043.01) Limit**
Self retaining LOCAL:	**(033.03) In direction OPEN and CLOSE**
Self retaining REMOTE:	**(052.00) OFF**
Safety mode:	**(153.01) OFF**
Emergency function:	**(140.01) OFF**
Torque by-pass:	**Function not active**
Mounting position:	**Position A**
Mounting pos. local controls:	**Position A-1, selector switch at 6 o'clock in relation to base of controls (standard for SA/SQ)**
Electrical connection mounting position:	**Position A**

OPTIONAL EXTRAS

Inspection reports reqd.:	**Yes**

AUMA Actuators, Inc. USA
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Phone: (724) 743-2862
Fax: (724) 743-4711

Drawings:

ACTUATOR DIMENSIONAL DWG
(click here) DDS000004A3AAQ331 REV-000
OUTPUT DRIVE/MOUNTING FLANGE DWG
(click here) SK099594 REV-008
POINT-TO-POINT WIRING DWG
(click here) TPCA-1B2-1C1-A000TPA01R100-0I1-000 REV-001

Operation Manuals:

SQ 05.2 - SQ 14.2/SQR 05.2 - SQR 14.2, Control unit: electronic (MWG), with actuator controls AUMATIC AC 01.2 Non-Intrusi
(click here) BA_SQR2_05_14_AC2_NONIN_PARALLEL_US.PDF
Actuator controls AUMATIC AC 01.2/ACExC 01.2 Parallel
(click here) HB_AC2_PARALLEL_EN.PDF
Legend for AUMATIC AC 01.2/ACExC 01.2
(click here) SP_AC2_LEG_US.PDF

AUMA Datasheet

08-11-2022 08:56:09
AUMA Order: A000223508
Datasheet: 4
Com-No.: A223508-004

AUMA Actuators, Inc. USA
www.auma-usa.com
Phone: (724) 743-2862
Fax: (724) 743-4711

Customer: **DeZurik**
PO No: **15628**
Customer Item: **4**
Qty: **2**
Valve/Gate Size & Type: **10" BOS-US**

Certified by: **Ed Ondovcik**
Certified date: **08/10/22**
Revision: **0**
AUMA Line: **5**
Project: **City of Taunton WWTF Improvements**

Line Number(s): **5**
Qty: **2**

Tags:
(Qty: 2) Part No: **1456163**

DEVICE CHARACTERISTICS

AUMA product:	**Quarter-turn electric actuator**
Rated output torque [lbs.ft.]:	**900**
Rated output torque [inch.lbs.]:	**10,800**
Rated output torque [Nm]:	**1,220**
Approximate weight (lbs.):	**97**

SERVICE CONDITIONS

Version:	**Weather-proof**
Operating mode:	**Modulating duty**
Enclosure protection:	**NEMA type 6P**
Color:	**AUMA silver-grey (similar to RAL 7037)**
Ambient temperature:	**-30 °C to +70 °C (-22 °F to +158 °F)**
Nameplates:	**English - aluminum (US-AL)**
Sealing elements:	**NBR - Nitrile Butadiene Rubber**
Corrosion protection:	**KS**

ELECTRICAL DATA

Mains voltage:	**120 Volts AC**
Phase:	**1-Ph**
Frequency:	**60 Hz**
Type of duty:	**S4 - 20% intermittent duty**
Motor protection:	**(W-1T-O140) 1Ph-1 thermal switch 140°C N.C., class F insulation, tropicalized winding**

AUMA Datasheet

08-11-2022 08:56:09
AUMA Order: A000223508
Datasheet: 4
Com-No.: A223508-004

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MANUFACTURED IN USA SINCE 1976

MOTOR DATA

Motor designation :	**SW0R063-4-0,04**
Nominal power (HP) :	**1/16**
Nominal power (kW) :	**0.04**
Nominal speed (RPM) :	**1,680**
Nominal current (FLA) :	**2.7**
Current approx. Imax. (RTA) :	**3.2**
Starting current (LRA) :	**5.4**
COS :	**0.98**
Capacitor uF :	**50**

ACTUATOR FEATURES

SQ model:	**SQR 12.2**
Valve coupling:	**Unbored valve shaft coupling**
Swing angle:	**Setting range 75 - 105 degrees**
Set to degrees:	**92**
Operation time:	**70 seconds for 90°**
Valve attachment:	**FA12, US flange with female pilot**
Coupling type:	**steel**
Mechanical position indicator:	**(11.2) self-adjusting continuous indication, with symbols OPEN and CLOSED**
Torque switches:	**(0-M) torque sensing via MWG**
Limit switches:	**(0-M) limit sensing via MWG**
Position transm.:	**(30.5) MWG absolute encoder for AC 01.2**
Heater:	**(22.5) 24 V in combination with controls: 5 W**
Motor heater:	**(0) without**
Torque switching:	**Setting range 450-900 lbs.ft.**
Set to close lbs.ft.:	**450**
Set to open lbs.ft.:	**450**
Handwheel:	**7.9" (200mm)**
Close direction:	**RH - clockwise**
Limit switching:	**(240) SQ with MWG**
Lubricant:	**F15 Shell ALVANIA 1029**
Electrical connection:	**(S0-000) actuator plug for mounting AM/SEM/AC**

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ACTUATOR CONTROLS

AUMATIC version:	**AC 01.2**
Feedback E2:	**MWG magnetic limit/ torque sensor (non-intrusive setting)**
Max. motor power:	**(B00.01) Contactors for power class A1**
Motor protection:	**(C00.01) thermal switch, automatic reset**
Interface:	**(D00.01) Parallel I/O Interface**
Positioner:	**(F10.01) Positioner**
Input signals:	**(R00.02) MODE, CLOSE, OPEN, STOP, EMERGENCY •**
Control voltage:	**(E00.01) 24 V DC**
Electronics supply:	**(A10.01) 24 V DC internal •**
Output aux. voltage:	**(A30.01) 24 V DC - 100mA (internally powered)**
Output contacts:	**(H00.03) 6 output contacts: 6 NO/NC without common 250V AC/5A •**
Output signals:	**(S00.01) default setting: K1=Fault, K2=End pos. CLOSED, K3=End pos. OPEN, K4=Selector sw. REMOTE, K5=Torque fault CLOSE, K6=Torque fault OPEN**
Local controls:	**(L00.01) selector switch LOCAL-OFF-REMOTE with padlock; push buttons OPEN-STOP-CLOSE-RESET; large graphical LCD with a resolution of 200 x 100 pixels**
Activ. Bluetooth:	**(L90.01) Switched on**
Indication lights:	**(L10.02) 1 CLOSED:green, 2 TRQ-CL:blue, 3 TH:yellow, 4 TRQ-OP:violet, 5 OPEN:red, BLUETOOTH:blue (with numbers) •**
Face plate:	**(EN-ES-FR) English-Spanish-French •**
Tolerance mains voltage:	**(A40.01) +/- 10%**
Electrical connection:	**(SB-080) plug/socket 100mm, 2 x ¾" NPT; 1 x 1 ¼" NPT •**
Heater:	**(Q00.01) heater 24 V, internal supply •**
Analog input 1:	**(P20.02) setpoint: 4-20mA**
Analog output 1:	**(P00.02) Position feedback: 4-20mA**
Analog output 2:	**(P10.02) Torque feedback: 4-20mA**
Blinker version:	**(N00.02) lights illuminated in mid travel (electronic)**
Display language:	**English**
Switch off in CLOSE:	**(042.01) Limit**
Switch off in OPEN:	**(043.01) Limit**
Self retaining LOCAL:	**(033.03) In direction OPEN and CLOSE**
Self retaining REMOTE:	**(052.00) OFF**
Safety mode:	**(153.01) OFF**
Emergency function:	**(140.01) OFF**
Torque by-pass:	**Function not active**
Mounting position:	**Position A**
Mounting pos. local controls:	**Position A-1, selector switch at 6 o'clock in relation to base of controls (standard for SA/SQ)**
Electrical connection mounting position:	**Position A**

OPTIONAL EXTRAS

Inspection reports reqd.:	**Yes**

AUMA Actuators, Inc. USA
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Fax: (724) 743-4711

Drawings:

ACTUATOR DIMENSIONAL DWG
(click here) DDS000004C3ADQ331 REV-000
OUTPUT DRIVE/MOUNTING FLANGE DWG
(click here) SK099594 REV-008
POINT-TO-POINT WIRING DWG
(click here) TPCA-1B2-1C1-A000TPA01R100-0I1-000 REV-001

Operation Manuals:

SQ 05.2 - SQ 14.2/SQR 05.2 - SQR 14.2, Control unit: electronic (MWG), with actuator controls AUMATIC AC 01.2 Non-Intrusi
(click here) BA_SQR2_05_14_AC2_NONIN_PARALLEL_US.PDF
Actuator controls AUMATIC AC 01.2/ACExC 01.2 Parallel
(click here) HB_AC2_PARALLEL_EN.PDF
Legend for AUMATIC AC 01.2/ACExC 01.2
(click here) SP_AC2_LEG_US.PDF

AUMA Datasheet

08-11-2022 08:56:21
AUMA Order: A000223508
Datasheet: 5
Com-No.: A223508-005

AUMA Actuators, Inc. USA
www.auma-usa.com
Phone: (724) 743-2862
Fax: (724) 743-4711

Customer: **DeZurik**
PO No: **15628**
Customer Item: **5**
Qty: **2**
Valve/Gate Size & Type: **12" BOS-US**

Certified by: **Ed Ondovcik**
Certified date: **08/10/22**
Revision: **0**
AUMA Line: **6**
Project: **City of Taunton WWTF Improvements**

Line Number(s): **6**
Qty: **2**

Tags:
(Qty: 2) Part No: **1456164**

DEVICE CHARACTERISTICS

AUMA product:	**Quarter-turn electric actuator**
Rated output torque [lbs.ft.]:	**1,800**
Rated output torque [inch.lbs.]:	**21,600**
Rated output torque [Nm]:	**2,440**
Approximate weight (lbs.):	**117**

SERVICE CONDITIONS

Version:	**Weather-proof**
Operating mode:	**Modulating duty**
Enclosure protection:	**NEMA type 6P**
Color:	**AUMA silver-grey (similar to RAL 7037)**
Ambient temperature:	**-30 °C to +70 °C (-22 °F to +158 °F)**
Nameplates:	**English - aluminum (US-AL)**
Sealing elements:	**NBR - Nitrile Butadiene Rubber**
Corrosion protection:	**KS**

ELECTRICAL DATA

Mains voltage:	**120 Volts AC**
Phase:	**1-Ph**
Frequency:	**60 Hz**
Type of duty:	**S4 - 20% intermittent duty**
Motor protection:	**(W-1T-O140) 1Ph-1 thermal switch 140°C N.C., class F insulation, tropicalized winding**

AUMA Datasheet

08-11-2022 08:56:21
AUMA Order: A000223508
Datasheet: 5
Com-No.: A223508-005

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MOTOR DATA

Motor designation :	**SW0R063-4-0,06**
Nominal power (HP) :	**1/12**
Nominal power (kW) :	**0.06**
Nominal speed (RPM) :	**1,680**
Nominal current (FLA) :	**2.9**
Current approx. Imax. (RTA) :	**3.9**
Starting current (LRA) :	**7.7**
COS :	**0.96**
Capacitor uF :	**60**

ACTUATOR FEATURES

SQ model:	**SQR 14.2**
Valve coupling:	**Unbored short spline valve shaft coupling for SQ 14.2**
Swing angle:	**Setting range 75 - 105 degrees**
Set to degrees:	**92**
Operation time:	**60 seconds for 90°**
Valve attachment:	**FA14, US flange with female pilot**
Coupling type:	**steel**
Mechanical position indicator:	**(11.2) self-adjusting continuous indication, with symbols OPEN and CLOSED**
Torque switches:	**(0-M) torque sensing via MWG**
Limit switches:	**(0-M) limit sensing via MWG**
Position transm.:	**(30.5) MWG absolute encoder for AC 01.2**
Heater:	**(22.5) 24 V in combination with controls: 5 W**
Motor heater:	**(0) without**
Torque switching:	**Setting range 900-1800 lbs.ft.**
Set to close lbs.ft.:	**900**
Set to open lbs.ft.:	**900**
Handwheel:	**7.9" (200mm)**
Close direction:	**RH - clockwise**
Limit switching:	**(240) SQ with MWG**
Lubricant:	**F15 Shell ALVANIA 1029**
Electrical connection:	**(S0-000) actuator plug for mounting AM/SEM/AC**

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ACTUATOR CONTROLS

AUMATIC version:	**AC 01.2**
Feedback E2:	**MWG magnetic limit/ torque sensor (non-intrusive setting)**
Max. motor power:	**(B00.01) Contactors for power class A1**
Motor protection:	**(C00.01) thermal switch, automatic reset**
Interface:	**(D00.01) Parallel I/O Interface**
Positioner:	**(F10.01) Positioner**
Input signals:	**(R00.02) MODE, CLOSE, OPEN, STOP, EMERGENCY •**
Control voltage:	**(E00.01) 24 V DC**
Electronics supply:	**(A10.01) 24 V DC internal •**
Output aux. voltage:	**(A30.01) 24 V DC - 100mA (internally powered)**
Output contacts:	**(H00.03) 6 output contacts: 6 NO/NC without common 250V AC/5A •**
Output signals:	**(S00.01) default setting: K1=Fault, K2=End pos. CLOSED, K3=End pos. OPEN, K4=Selector sw. REMOTE, K5=Torque fault CLOSE, K6=Torque fault OPEN**
Local controls:	**(L00.01) selector switch LOCAL-OFF-REMOTE with padlock; push buttons OPEN-STOP-CLOSE-RESET; large graphical LCD with a resolution of 200 x 100 pixels**
Activ. Bluetooth:	**(L90.01) Switched on**
Indication lights:	**(L10.02) 1 CLOSED:green, 2 TRQ-CL:blue, 3 TH:yellow, 4 TRQ-OP:violet, 5 OPEN:red, BLUETOOTH:blue (with numbers) •**
Face plate:	**(EN-ES-FR) English-Spanish-French •**
Tolerance mains voltage:	**(A40.01) +/- 10%**
Electrical connection:	**(SB-080) plug/socket 100mm, 2 x ¾" NPT; 1 x 1 ¼" NPT •**
Heater:	**(Q00.01) heater 24 V, internal supply •**
Analog input 1:	**(P20.02) setpoint: 4-20mA**
Analog output 1:	**(P00.02) Position feedback: 4-20mA**
Analog output 2:	**(P10.02) Torque feedback: 4-20mA**
Blinker version:	**(N00.02) lights illuminated in mid travel (electronic)**
Display language:	**English**
Switch off in CLOSE:	**(042.01) Limit**
Switch off in OPEN:	**(043.01) Limit**
Self retaining LOCAL:	**(033.03) In direction OPEN and CLOSE**
Self retaining REMOTE:	**(052.00) OFF**
Safety mode:	**(153.01) OFF**
Emergency function:	**(140.01) OFF**
Torque by-pass:	**Function not active**
Mounting position:	**Position A**
Mounting pos. local controls:	**Position A-1, selector switch at 6 o'clock in relation to base of controls (standard for SA/SQ)**
Electrical connection mounting position:	**Position A**

OPTIONAL EXTRAS

Inspection reports reqd.:	**Yes**

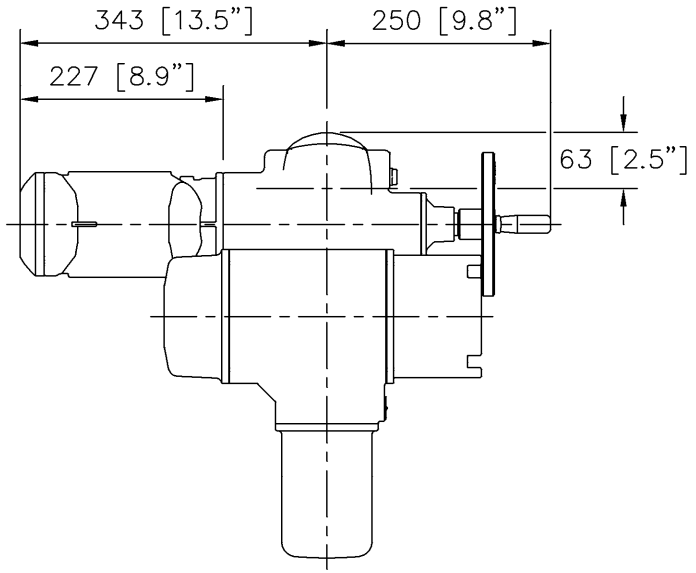
AUMA Actuators, Inc. USA
www.auma-usa.com
Phone: (724) 743-2862
Fax: (724) 743-4711

Drawings:

ACTUATOR DIMENSIONAL DWG
(click here) DDS000004D3ADQ331 REV-000
OUTPUT DRIVE/MOUNTING FLANGE DWG
(click here) SK099594 REV-008
POINT-TO-POINT WIRING DWG
(click here) TPCA-1B2-1C1-A000TPA01R100-0I1-000 REV-001

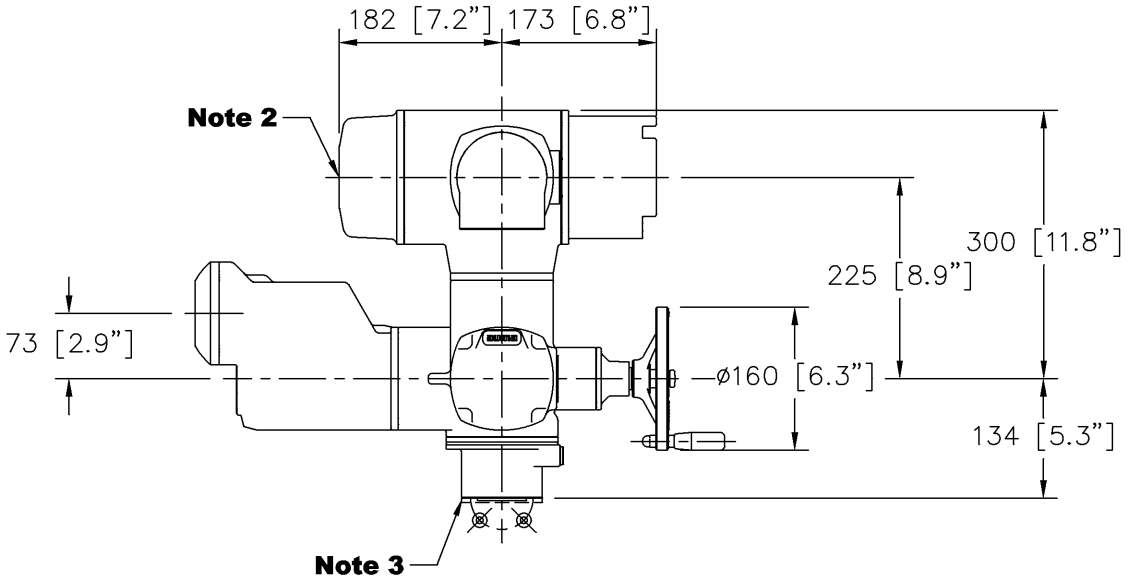
Operation Manuals:

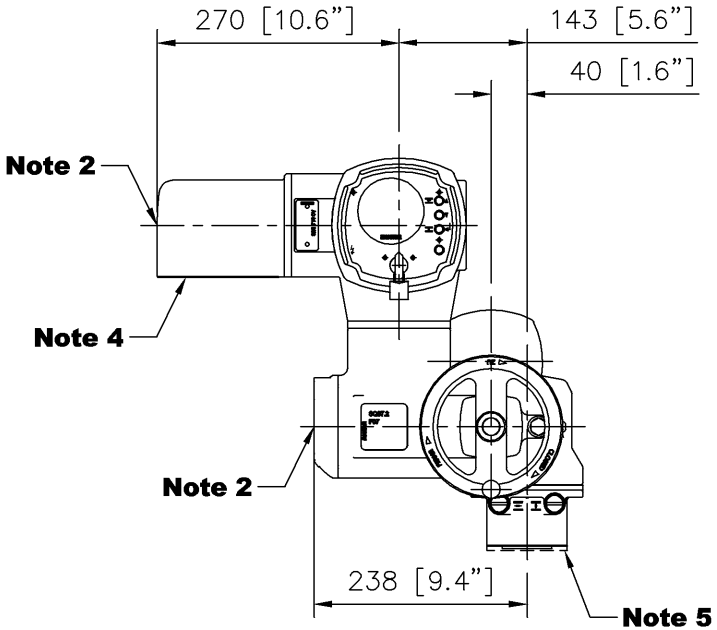
SQ 05.2 - SQ 14.2/SQR 05.2 - SQR 14.2, Control unit: electronic (MWG), with actuator controls AUMATIC AC 01.2 Non-Intrusi
(click here) BA_SQR2_05_14_AC2_NONIN_PARALLEL_US.PDF
Actuator controls AUMATIC AC 01.2/ACExC 01.2 Parallel
(click here) HB_AC2_PARALLEL_EN.PDF
Legend for AUMATIC AC 01.2/ACExC 01.2
(click here) SP_AC2_LEG_US.PDF



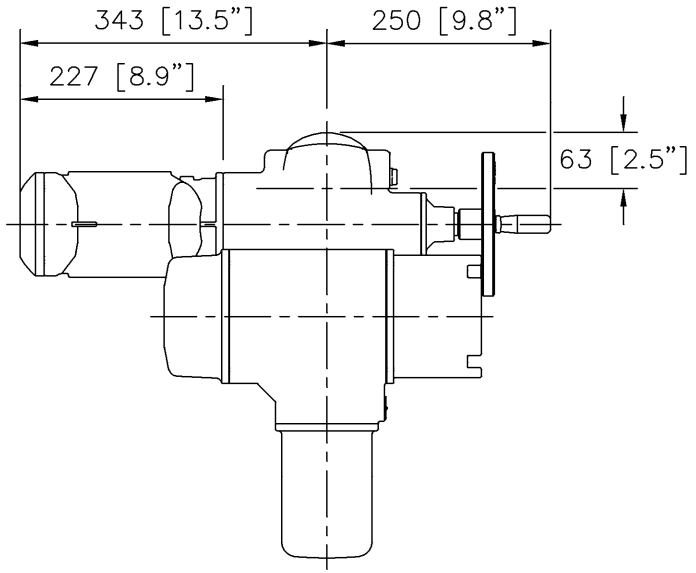
Notes:

1. **Metric tolerance per ISO 2768-m. Dimensions in brackets [] are in inches and rounded to one decimal place.**
2. **Seven inch minimum clearance recommended for removal of access cover and equipment adjustment.**
3. **See appropriate mounting flange drawing for detail.**
4. **See data sheets for conduit entries.**
5. **Optional SG replacement ring.**



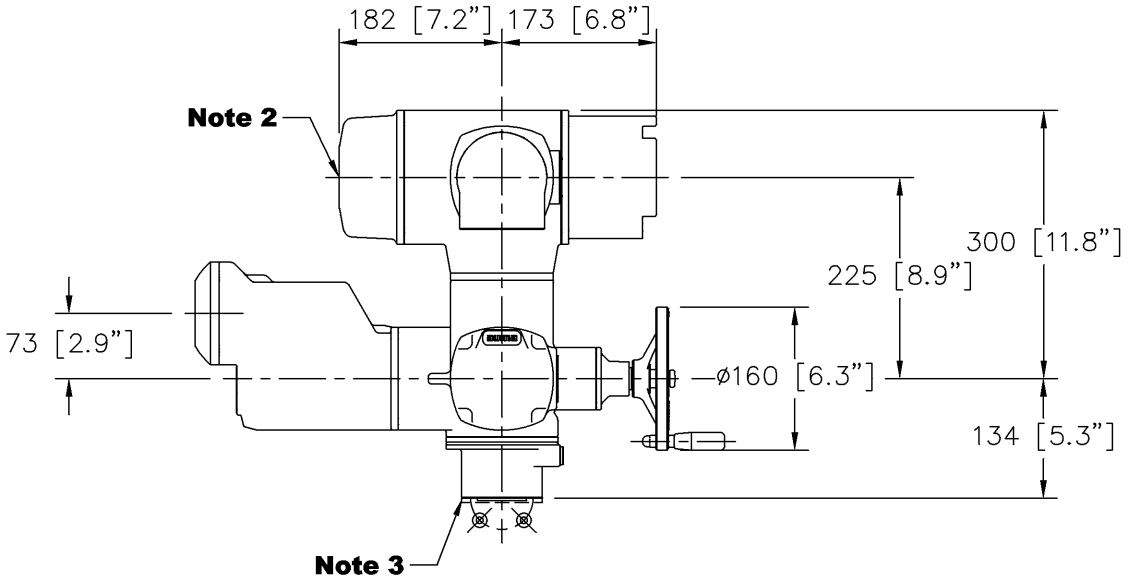


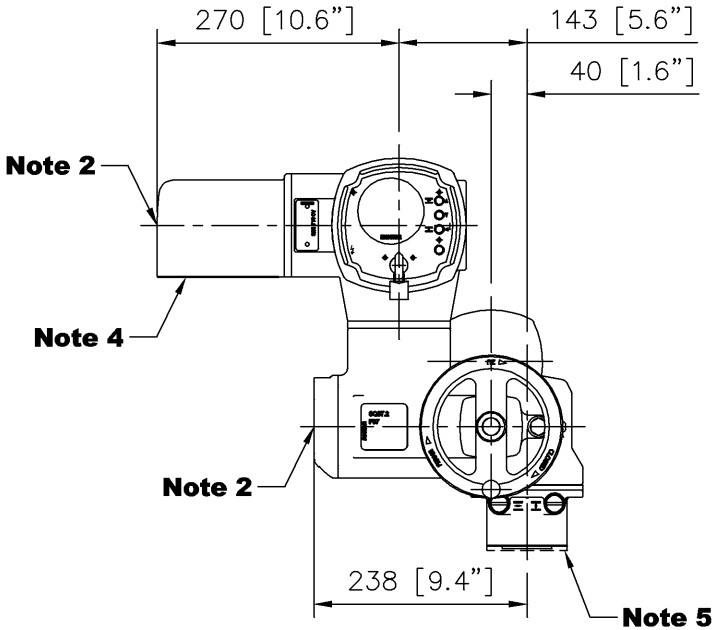
auma® AUMA ACTUATORS, INC.	**Torque only** **No gearbox**	**SQ(R) 05.2 / 07.2** **Motor 1 phase** **Handwheel - 6.3"**	**AC01.2 - Low Cover** **P&S - SB - 100mm** **Matic Pos. - A / P&S Pos. - A**	FIRST ISSUE DESCRIPTION	MK 03/07/2018 / GF 03/07/2018 BY / DATE / APP / DATE **DDS000004A3AAQ331**	0 REV



Notes:

1. **Metric tolerance per ISO 2768-m. Dimensions in brackets [] are in inches and rounded to one decimal place.**
2. **Seven inch minimum clearance recommended for removal of access cover and equipment adjustment.**
3. **See appropriate mounting flange drawing for detail.**
4. **See data sheets for conduit entries.**
5. **Optional SG replacement ring.**

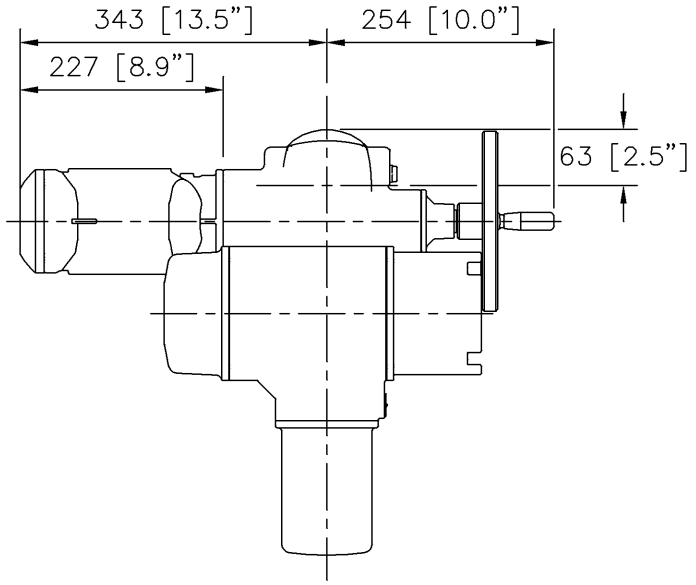


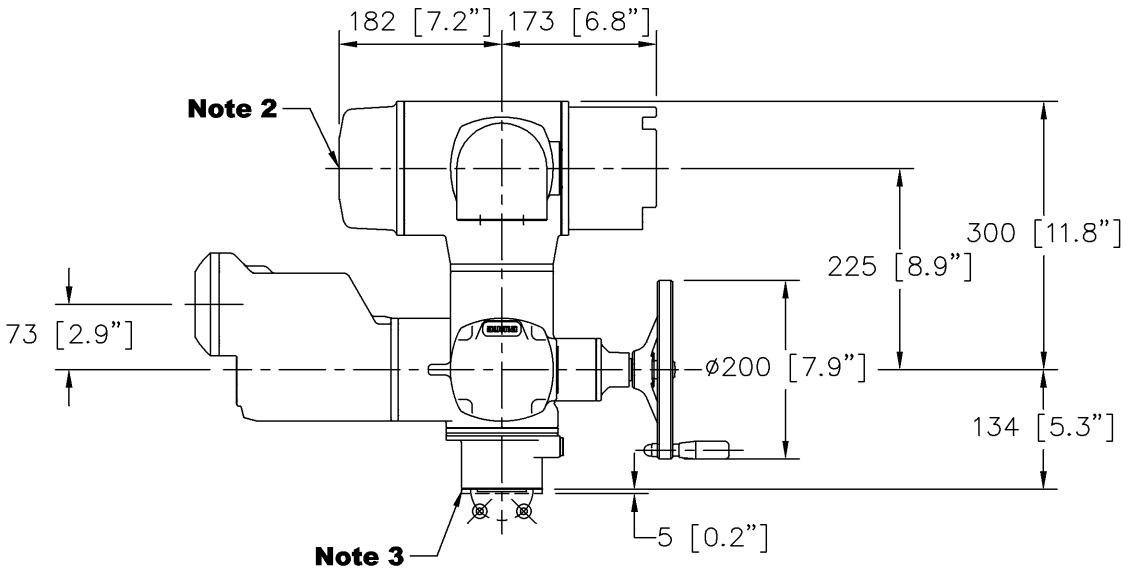


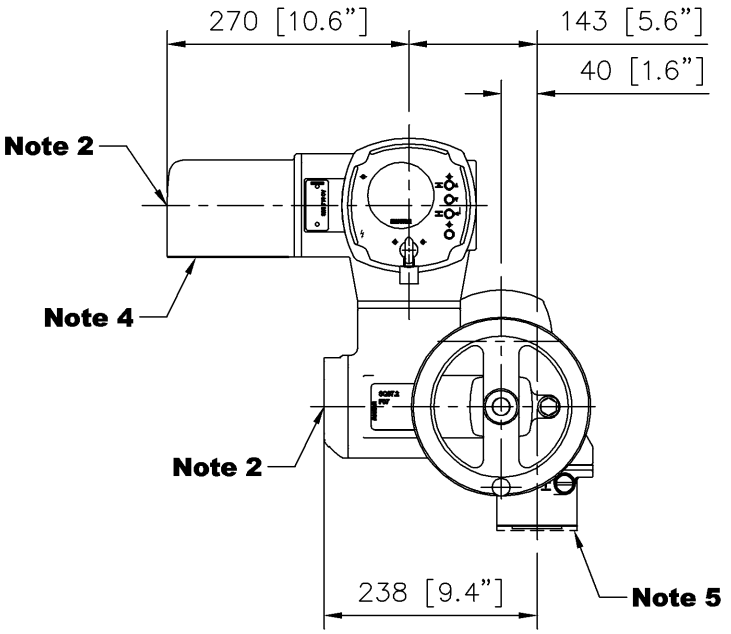
auma® AUMA ACTUATORS, INC.	**Torque only** **No gearbox**	**SQ(R) 05.2 / 07.2** **Motor 1 phase** **Handwheel - 6.3"**	**AC01.2 - Low Cover** **P&S - SB - 100mm** **Matic Pos. - A / P&S Pos. - A**	FIRST ISSUE DESCRIPTION	MK 03/07/2018 / GF 03/07/2018 BY / DATE / APP / DATE **DDS000004A3AAQ331**	0 REV

Notes:

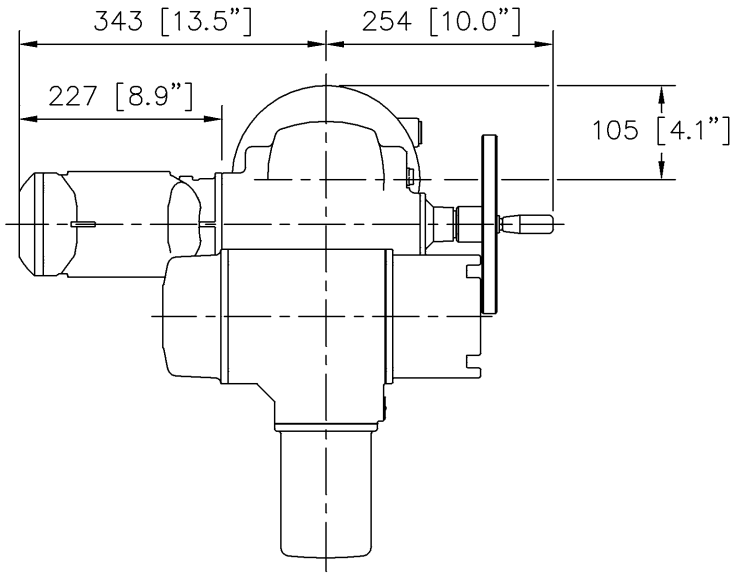
1. **Metric tolerance per ISO 2768-m. Dimensions in brackets [] are in inches and rounded to one decimal place.**
2. **Seven inch minimum clearance recommended for removal of access cover and equipment adjustment.**
3. **See appropriate mounting flange drawing for detail.**
4. **See data sheets for conduit entries.**
5. **Optional SG replacement ring.**





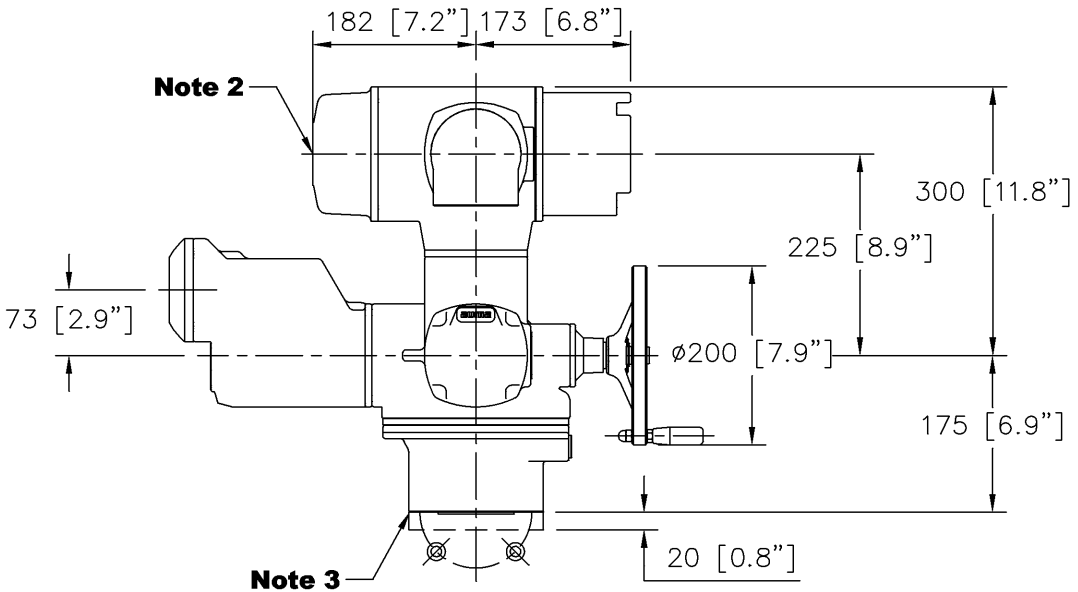


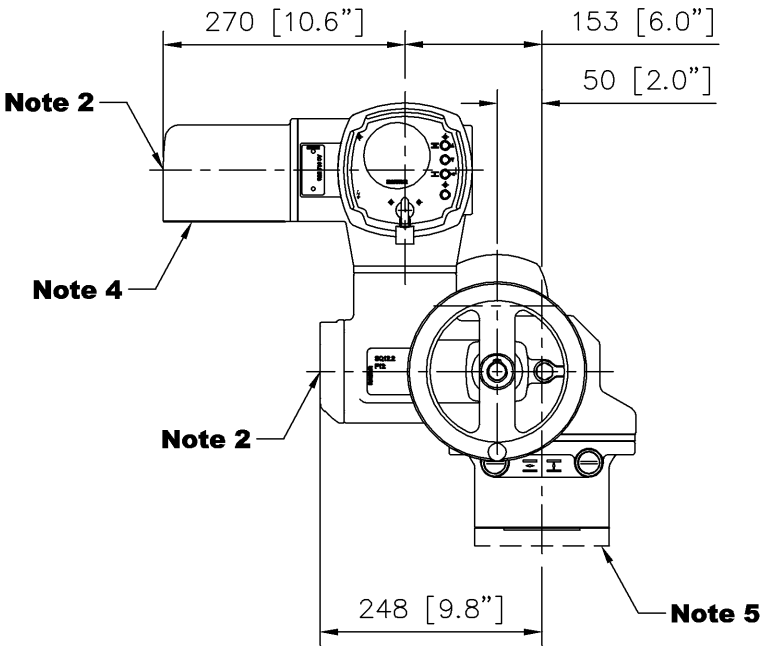
auma AUMA ACTUATORS, INC.	**Torque only** **No gearbox**	**SQ(R) 05.2 / 07.2** **Motor 1 phase** **Handwheel - 7.9"**	**AC01.2 - Low Cover** **P&S - SB - 100mm** **Matic Pos. - A / P&S Pos. - A**	FIRST ISSUE DESCRIPTION	TH 08/11/2022 BY / DATE	MG 08/11/2022 APP / DATE **DDS000004A3ADQ331**	0 REV



Notes:

1. **Metric tolerance per ISO 2768-m. Dimensions in brackets [] are in inches and rounded to one decimal place.**
2. **Seven inch minimum clearance recommended for removal of access cover and equipment adjustment.**
3. **See appropriate mounting flange drawing for detail.**
4. **See data sheets for conduit entries.**
5. **Optional SG replacement ring.**

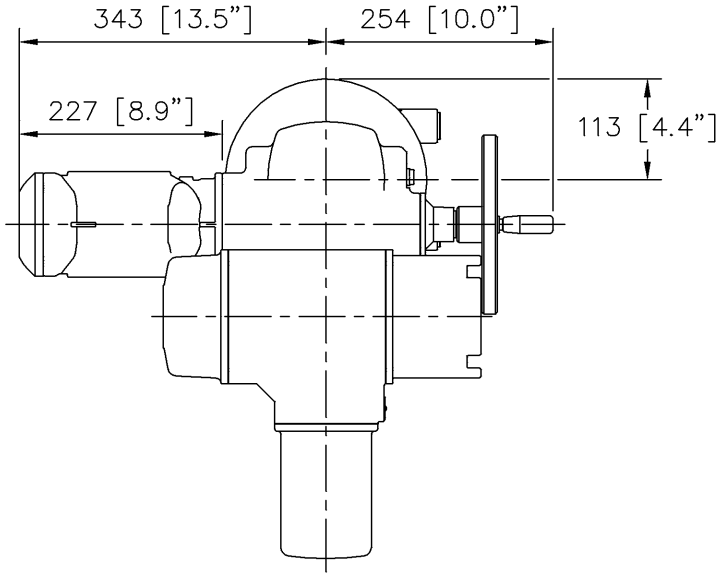


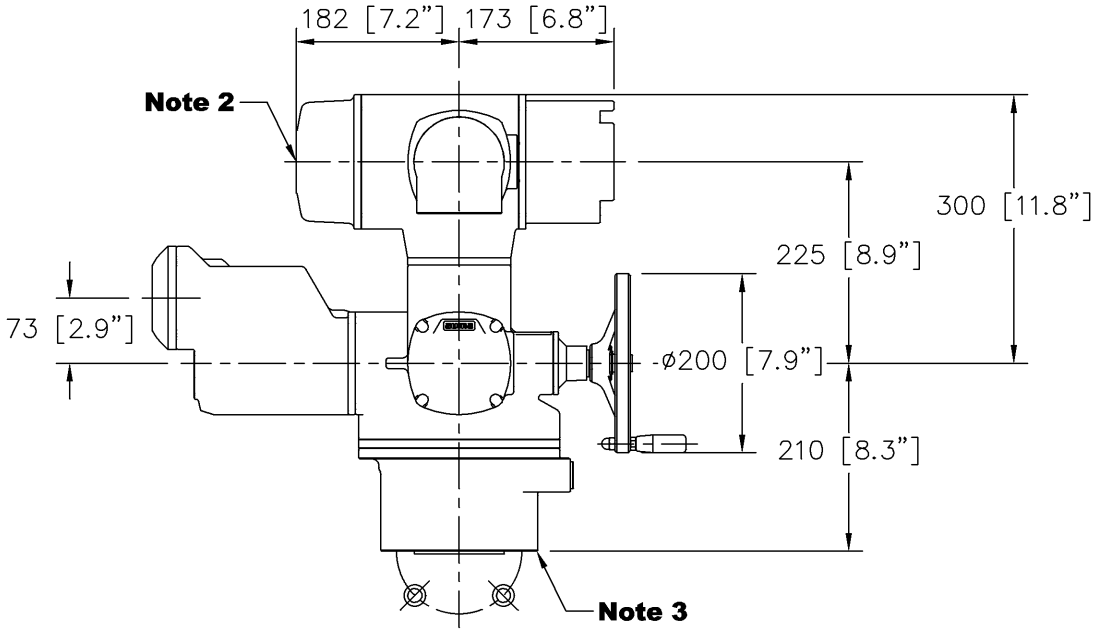


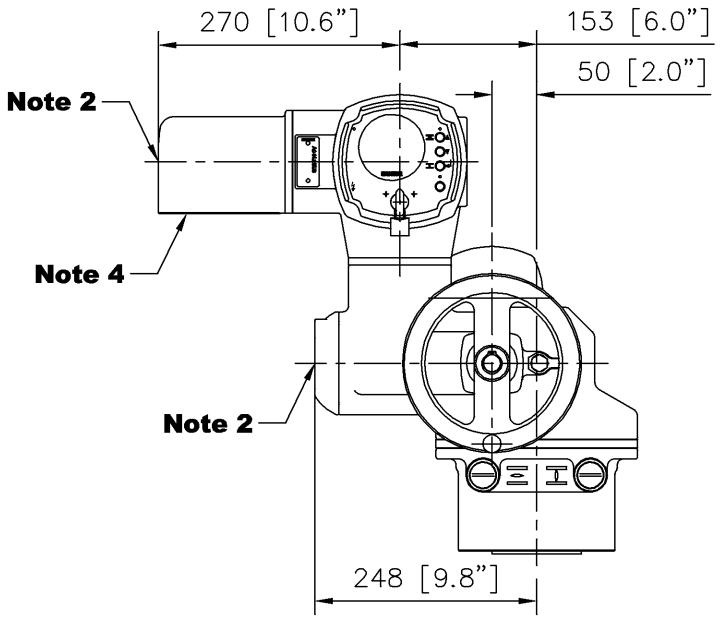
auma® AUMA ACTUATORS, INC.	**Torque only** **No gearbox**	**SQ(R) 12.2** **Motor 1 phase** **Handwheel - 7.9"**	**AC 01.2 - Low Cover** **P&S - SB - 100mm** **Matic Pos. - A / P&S Pos. - A**	FIRST ISSUE DESCRIPTION	MC 04/03/2018 BY / DATE	GF 04/03/2018 APP / DATE **DDS000004C3ADQ331**	0 REV

Notes:

1. **Metric tolerance per ISO 2768-m. Dimensions in brackets [] are in inches and rounded to one decimal place.**
2. **Seven inch minimum clearance recommended for removal of access cover and equipment adjustment.**
3. **See appropriate mounting flange drawing for detail.**
4. **See data sheets for conduit entries.**



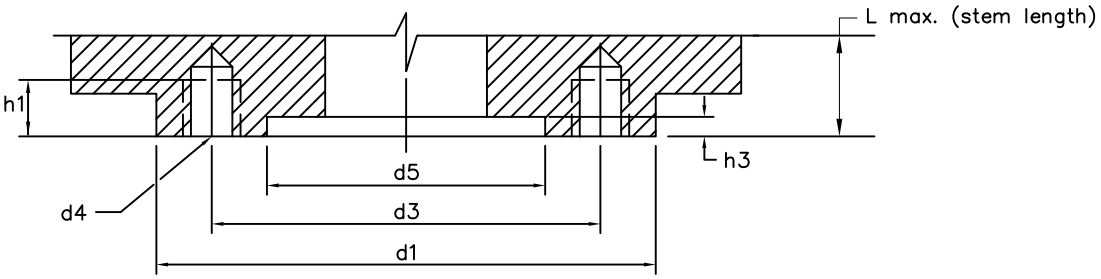


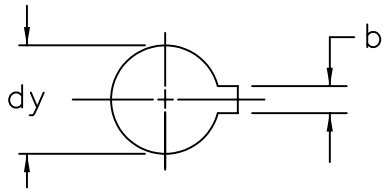


auma AUMA ACTUATORS, INC.	**Torque only** **No gearbox**	**SQ(R) 14.2** **Motor 1 phase** **Handwheel - 7.9"**	**AC 01.2 - Low Cover** **P&S - SB - 100mm** **Matic Pos. - A / P&S Pos. - A**	FIRST ISSUE DESCRIPTION	MC 04/10/2018 / BY / DATE **DDS000004D3ADQ331**	GF 04/10/2018 / APP / DATE 0 / REV

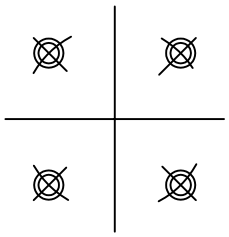
AUMA ACTUATORS, INC.

FA05 – FA16

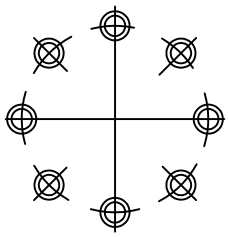




DIMENSIONS 'b' BASED
ON ANSI B17.1
AT MAX. BORE 'dy'



4 HOLE PATTERN
(FA05 – FA10)



8 HOLE PATTERN
(FA10 – FA16)

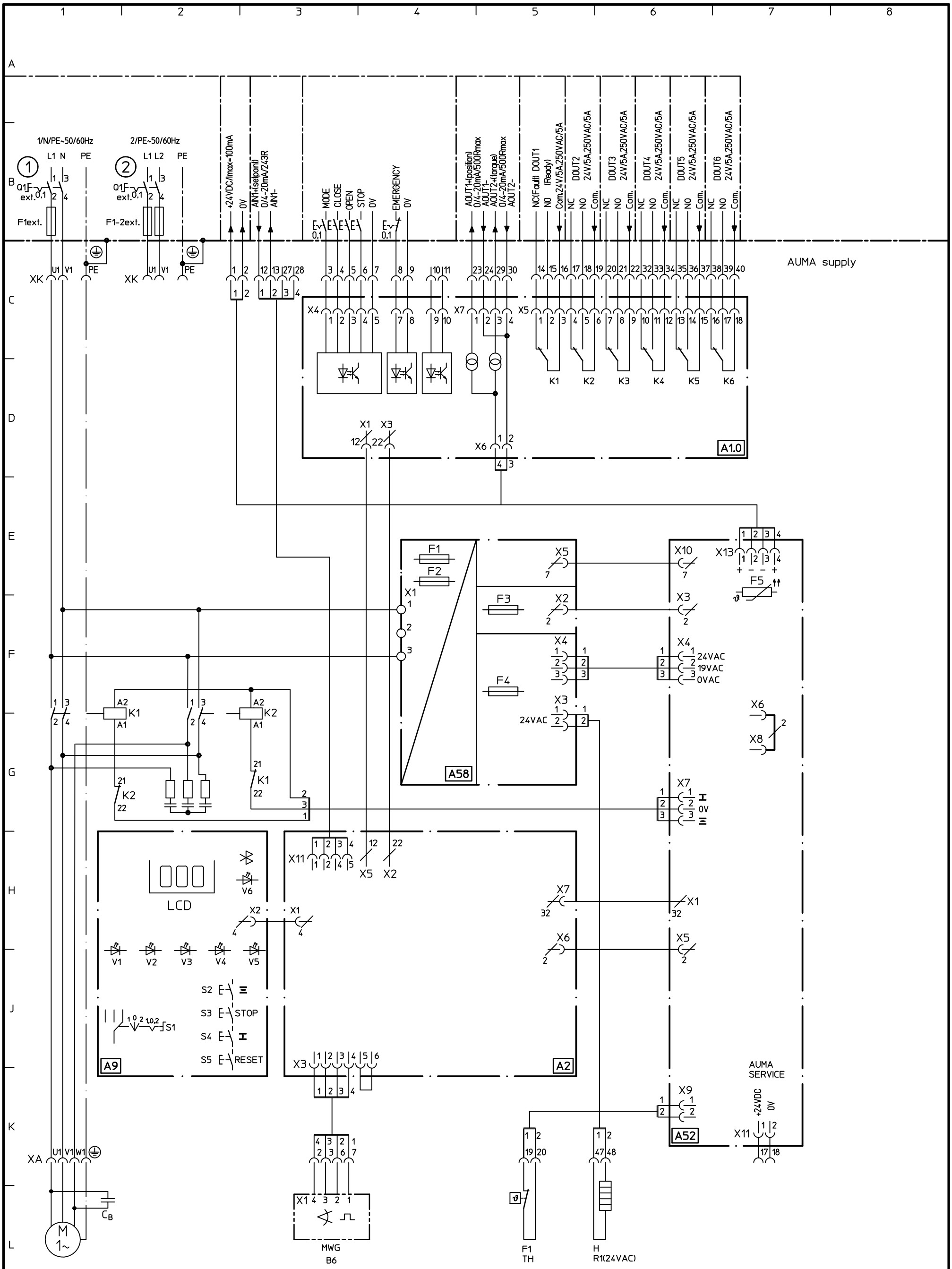
ACTUATOR MODEL	FLANGE TYPE	d1	d3 ± 0.01	(qty.) d4	d5	h1	h3	L max.	SQ. KEY		RECT. KEY	
									b	dy max.	b	dy max.
SQ05.2	FA05	3.54	2.00	(4) 1/4 – 20	-	0.47	-	1.575	1/4	1.0	1/4 x 3/16	1.063
	FA07	3.54	2.75	(4) 5/16 – 18	-	0.59	-	1.575				
	FA10	4.92	4.00	(4) 3/8 – 16	3.346	0.63	0.157	2.598				
SQ07.2	FA05	3.54	2.00	(4) 1/4 – 20	-	0.47	-	1.575	1/4	1.0	1/4 x 3/16	1.063
	FA07	3.54	2.75	(4) 5/16 – 18	-	0.59	-	1.575				
	FA10	4.92	4.00	(4) 3/8 – 16	3.346	0.63	0.157	2.598				
SQ10.2	FA10	4.92	4.00	(8) 3/8 – 16	3.346	0.71	0.157	1.969	3/8	1.438	3/8 x 1/4	1.5
	FA12	5.91	4.95	(8) 1/2 – 13	4.134	0.75	0.157	3.228				
SQ12.2	FA12	5.91	4.95	(8) 1/2 – 13	4.134	0.87	0.157	2.402	1/2	1.875	1/2 x 3/8	2.0
	FA14	6.89	5.50	(8) 5/8 – 11	4.528	0.98	0.197	3.976				
	FA16	8.27	6.50	(8) 3/4 – 10	5.512	1.26	0.197	4.370				
SQ14.2	FA14	6.89	5.50	(8) 5/8 – 11	4.528	1.14	0.197	2.953	5/8	2.375	5/8 x 7/16	2.5
	FA16	8.27	6.50	(8) 3/4 – 10	5.512	1.26	0.197	4.921				

Notes:

1. All dimensions are in inches.
2. Contact AUMA Engineering for tolerances
3. FA Flange per MSS STANDARD SP-101

FA MOUNTING FLANGE DIMENSIONS

SQ05.2- SQ14.2	BY/DATE MC 02/03/20	APP/DATE PM 02/03/20	DWG. NO. SK099594	REV 8



For explosion-proof actuators terminals / cage clamps are used instead of plug / socket connector !

				Datum	2017-07-27
				Bearb.	Roemer
01	2017-091	2017-07-27	Roe	Gepr.	Meyer
Zust.	Änderung	Datum	Name	Norm	Meyer

auma®
AUMA Riester GmbH & Co. KG

TPCA-1B2-1C1-A000 TPA01R100-011-000

Legende	Auftragsnummer	Bestellnummer
Y007.523/065	A000223508-001	

Projekt

Mains voltage:
120 V 60 Hz 1-ph AC

Voltage tolerance:
+/- 10%

Electronics supply:
24 V DC internal

Control voltage:
24 V DC

Output aux. voltage:
24 V DC

Input DIN1:
MODE

Input DIN2:
CLOSE

Input DIN3:
OPEN

Input DIN4:
STOP

Input DIN5:
EMERGENCY

Analog input 1:
setpoint: 4-20mA

Analog output 1:
position feedback: 4-20mA

Analog output 2:
torque feedback: 4-20mA

Output contacts:
contacts: 6 NO/NC 5A

Output DOUT1:
fault

Output DOUT2:
end position CLOSED

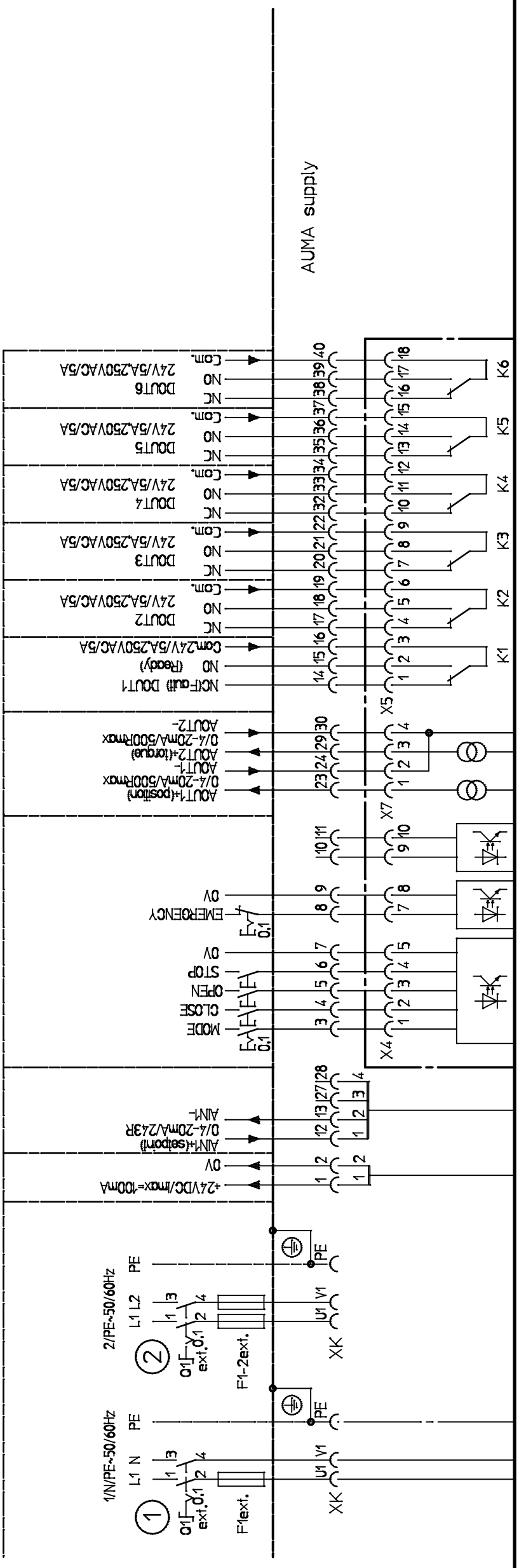
Output DOUT3:
end position OPEN

Output DOUT4:
selector switch REMOTE

Output DOUT5:
torque fault CLOSE

Output DOUT6:
torque fault OPEN

Heater:
heater 24V, internal supply



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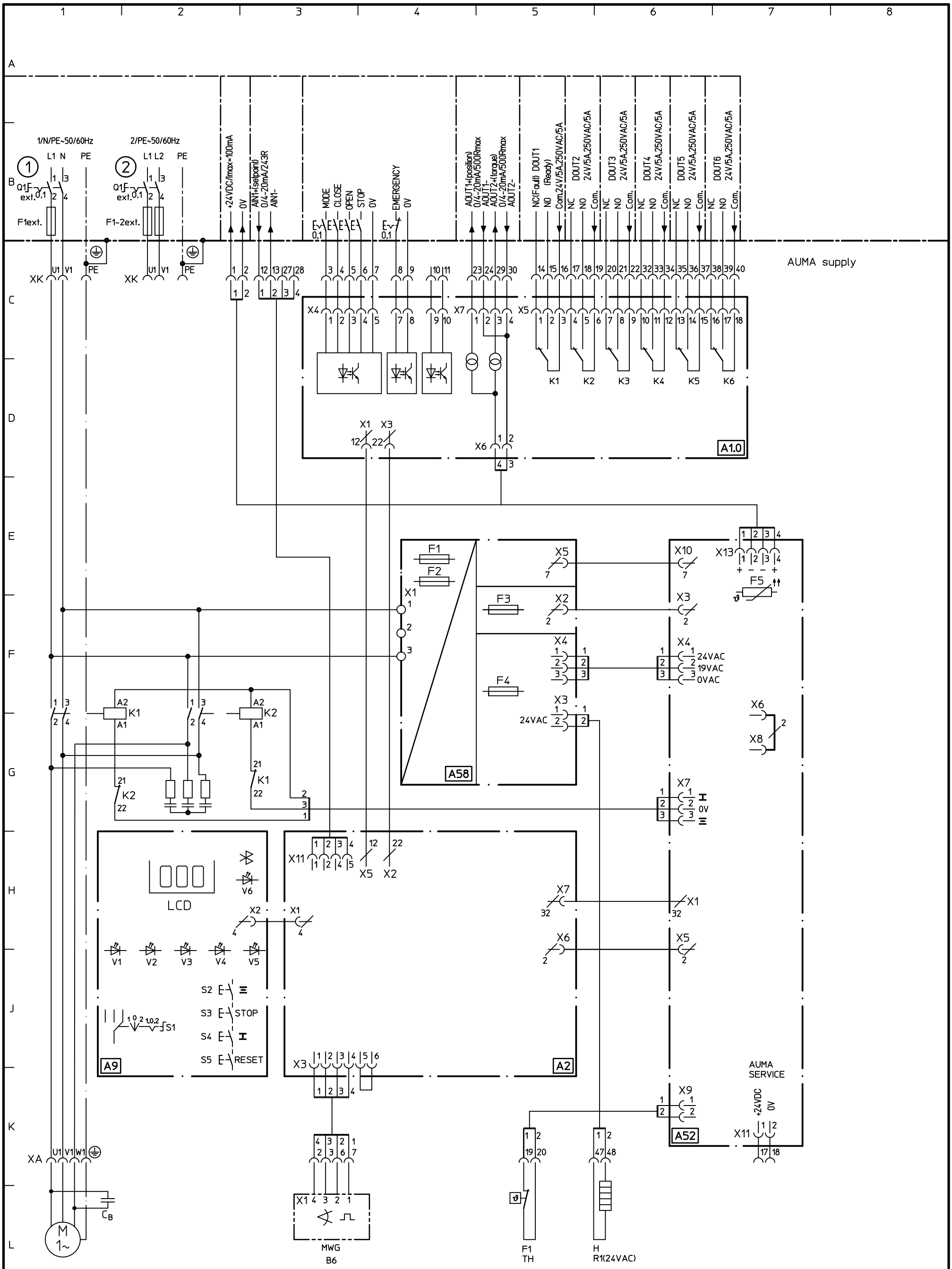
01	2017-091	2017-07-27	Roe	Gepr.	Meyer
Zust.	Änderung	Datum	Name	Norm	Meyer

AUMA Riester GmbH & Co. KG

TPCA-1B2-1C1-A000 TPA01R100-011-000

Legende	Auftragsnummer	Bestellnummer
Y007.523/065	A000223508-001	

Projekt



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Zust.	Änderung	Datum	Name	Norm	Meyer

auma®
AUMA Riester GmbH & Co. KG

TPCA-1B2-1C1-A000 TPA01R100-011-000

Legende	Auftragsnummer	Bestellnummer
Y007.523/065	A000223508-002	

Projekt

Mains voltage:
120 V 60 Hz 1-ph AC

Voltage tolerance:
+/- 10%

Electronics supply:
24 V DC internal

Control voltage:
24 V DC

Output aux. voltage:
24 V DC

Input DIN1:
MODE

Input DIN2:
CLOSE

Input DIN3:
OPEN

Input DIN4:
STOP

Input DIN5:
EMERGENCY

Analog input 1:
setpoint: 4-20mA

Analog output 1:
position feedback: 4-20mA

Analog output 2:
torque feedback: 4-20mA

Output contacts:
contacts: 6 NO/NC 5A

Output DOUT1:
fault

Output DOUT2:
end position CLOSED

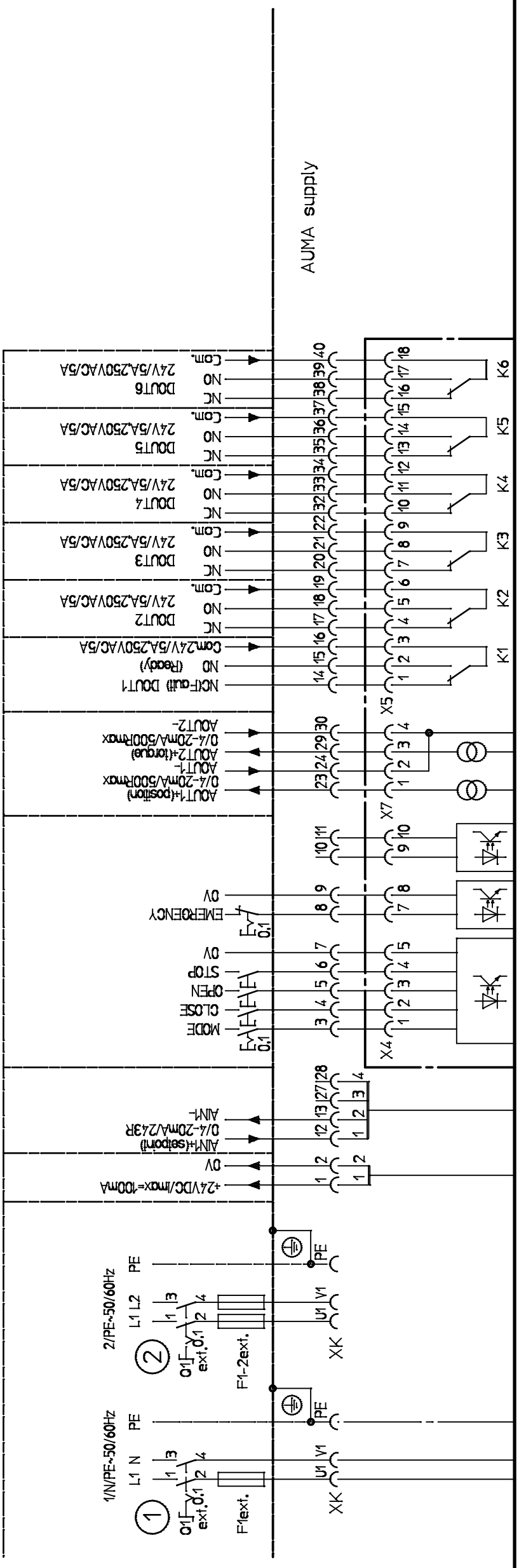
Output DOUT3:
end position OPEN

Output DOUT4:
selector switch REMOTE

Output DOUT5:
torque fault CLOSE

Output DOUT6:
torque fault OPEN

Heater:
heater 24V, internal supply



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AUMA Riester GmbH & Co. KG

TPCA-1B2-1C1-A000 TPA01R100-011-000

Legende	Auftragsnummer	Bestellnummer
Y007.523/065	A000223508-002	

Projekt

1/N/PE~50/60Hz
L1 N PE
2/PE~50/60Hz
L1 L2 PE
Q1F ext.
F1ext.
F1-2ext.
XK U1 V1 PE
XA U1 V1 W1
M 1~
C_B
+24VDC/max=100mA
0V
AIN1+(setpoint) 0/4-20mA/243R
AIN1-
MODE
CLOSE
OPEN
STOP
0V
EMERGENCY
0V
AOUT1+(position) 0/4-20mA/500Rmax
AOUT1-
AOUT2+(torque) 0/4-20mA/500Rmax
AOUT2-
NC(Fault) DOUT1
NO (Ready)
Com.24V/5A,250VAC/5A
DOUT2 24V/5A,250VAC/5A
DOUT3 24V/5A,250VAC/5A
DOUT4 24V/5A,250VAC/5A
DOUT5 24V/5A,250VAC/5A
DOUT6 24V/5A,250VAC/5A
AUMA supply
X4 X7 X5
K1 K2 K3 K4 K5 K6
X1 X3
X6
A1.0
F1 F2 F3 F4
A58
K1 K2
LCD
V1 V2 V3 V4 V5 V6
S1 S2 S3 STOP S4 S5 RESET
A9
X11 X5 X2
X7 X1
X6 X5
X3
A2
X10 X13 F5
X4 24VAC 19VAC 0VAC
X6 X8
X7 H 0V
X9
A52
AUMA SERVICE +24VDC 0V
X11
MWG B6
F1 TH
H R1(24VAC)

For explosion-proof actuators terminals / cage clamps are used instead of plug / socket connector !

				Datum	2017-07-27
				Bearb.	Roemer
01	2017-091	2017-07-27	Roe	Gepr.	Meyer
Zust.	Änderung	Datum	Name	Norm	Meyer

auma®
AUMA Riester GmbH & Co. KG

TPCA-1B2-1C1-A000 TPA01R100-011-000

Legende	Auftragsnummer	Bestellnummer
Y007.523/065	A000223508-003	

Projekt

Mains voltage:
120 V 60 Hz 1-ph AC

Voltage tolerance:
+/- 10%

Electronics supply:
24 V DC internal

Control voltage:
24 V DC

Output aux. voltage:
24 V DC

Input DIN1:
MODE

Input DIN2:
CLOSE

Input DIN3:
OPEN

Input DIN4:
STOP

Input DIN5:
EMERGENCY

Analog input 1:
setpoint: 4-20mA

Analog output 1:
position feedback: 4-20mA

Analog output 2:
torque feedback: 4-20mA

Output contacts:
contacts: 6 NO/NC 5A

Output DOUT1:
fault

Output DOUT2:
end position CLOSED

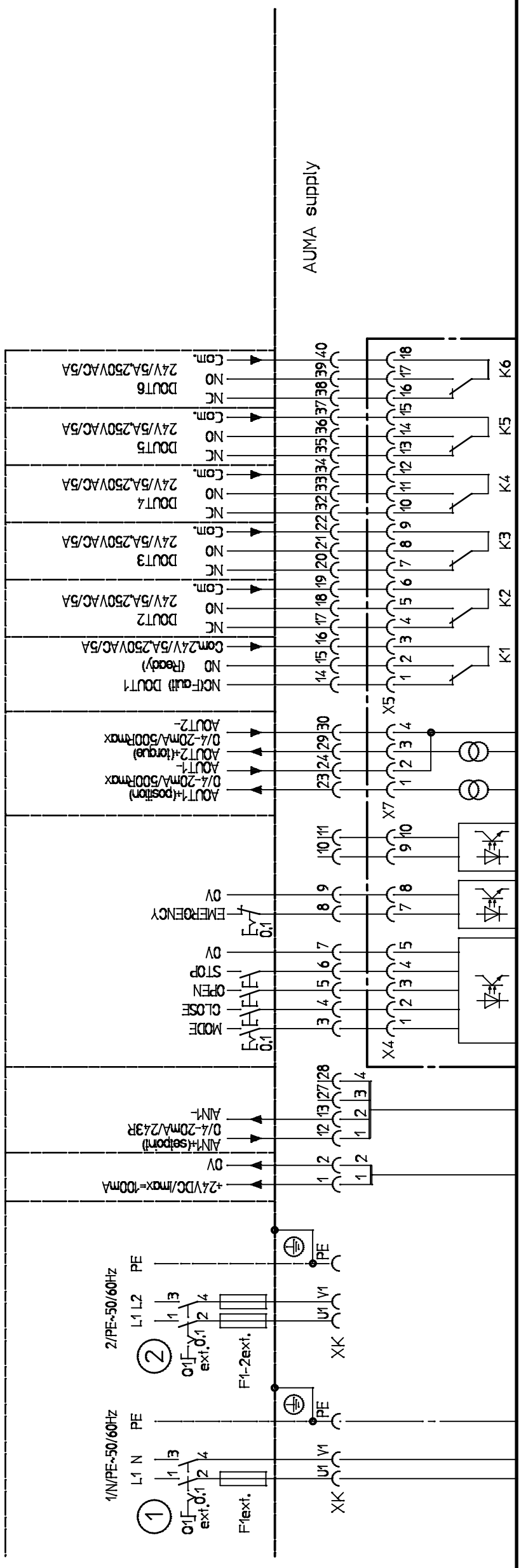
Output DOUT3:
end position OPEN

Output DOUT4:
selector switch REMOTE

Output DOUT5:
torque fault CLOSE

Output DOUT6:
torque fault OPEN

Heater:
heater 24V, internal supply



				Datum	2017-07-27
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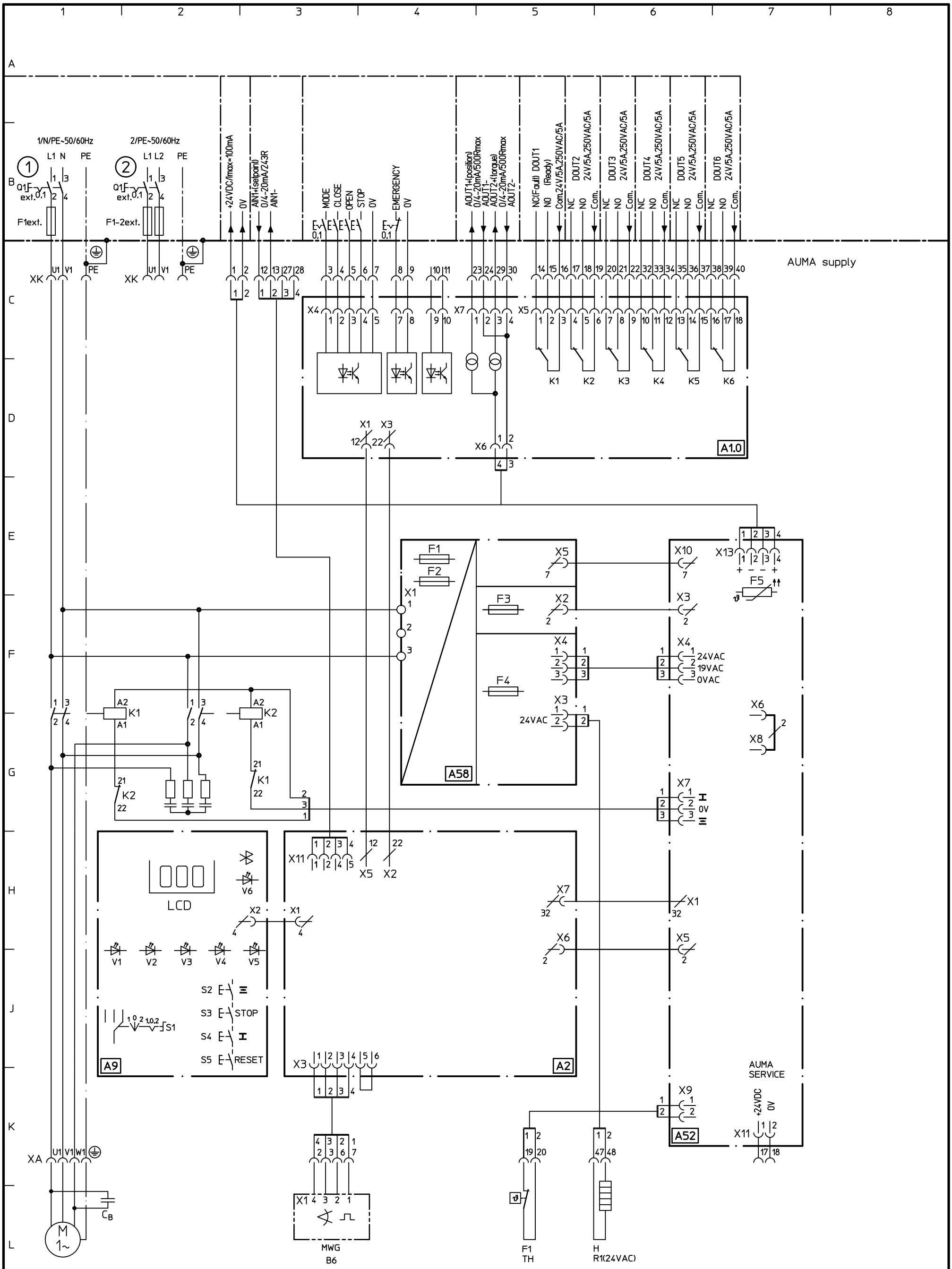
01	2017-091	2017-07-27	Roe	Gepr.	Meyer
Zust.	Änderung	Datum	Name	Norm	Meyer

AUMA Riester GmbH & Co. KG

TPCA-1B2-1C1-A000 TPA01R100-011-000

Legende	Auftragsnummer	Bestellnummer
Y007.523/065	A000223508-003	

Projekt



For explosion-proof actuators terminals / cage clamps are used instead of plug / socket connector !

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01	2017-091	2017-07-27	Roe	Gepr.	Meyer
Zust.	Änderung	Datum	Name	Norm	Meyer

auma®
AUMA Riester GmbH & Co. KG

TPCA-1B2-1C1-A000 TPA01R100-011-000

Legende	Auftragsnummer	Bestellnummer
Y007.523/065	A000223508-004	

Projekt

Mains voltage:
120 V 60 Hz 1-ph AC

Voltage tolerance:
+/- 10%

Electronics supply:
24 V DC internal

Control voltage:
24 V DC

Output aux. voltage:
24 V DC

Input DIN1:
MODE

Input DIN2:
CLOSE

Input DIN3:
OPEN

Input DIN4:
STOP

Input DIN5:
EMERGENCY

Analog input 1:
setpoint: 4-20mA

Analog output 1:
position feedback: 4-20mA

Analog output 2:
torque feedback: 4-20mA

Output contacts:
contacts: 6 NO/NC 5A

Output DOUT1:
fault

Output DOUT2:
end position CLOSED

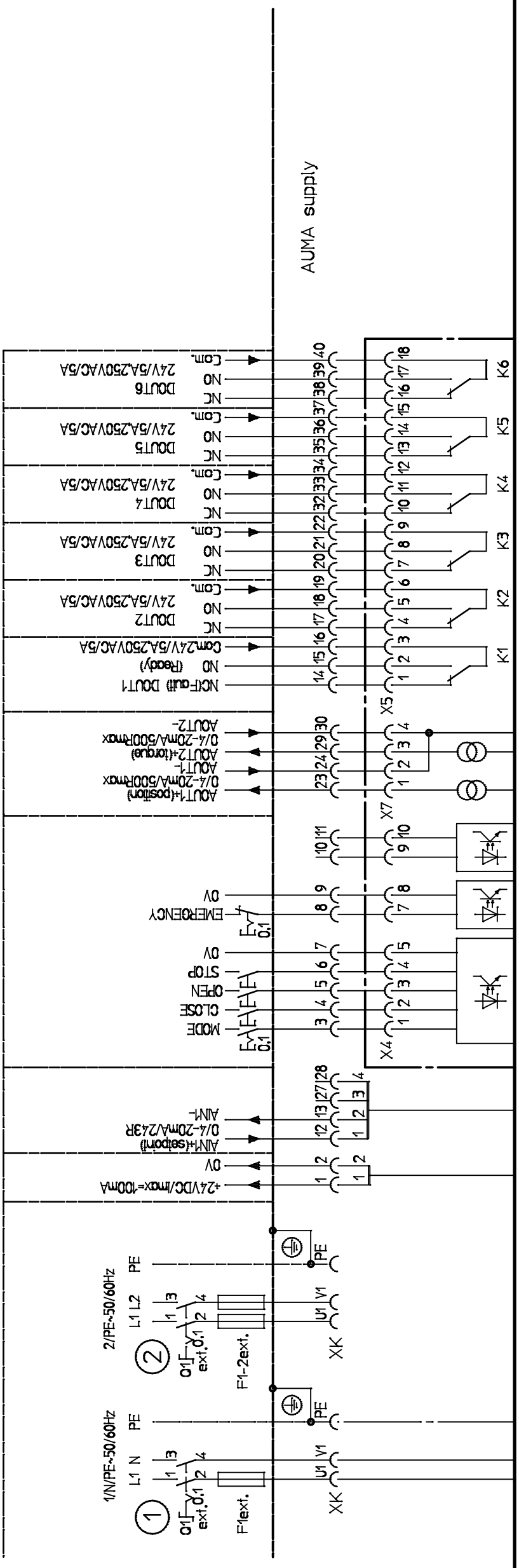
Output DOUT3:
end position OPEN

Output DOUT4:
selector switch REMOTE

Output DOUT5:
torque fault CLOSE

Output DOUT6:
torque fault OPEN

Heater:
heater 24V, internal supply



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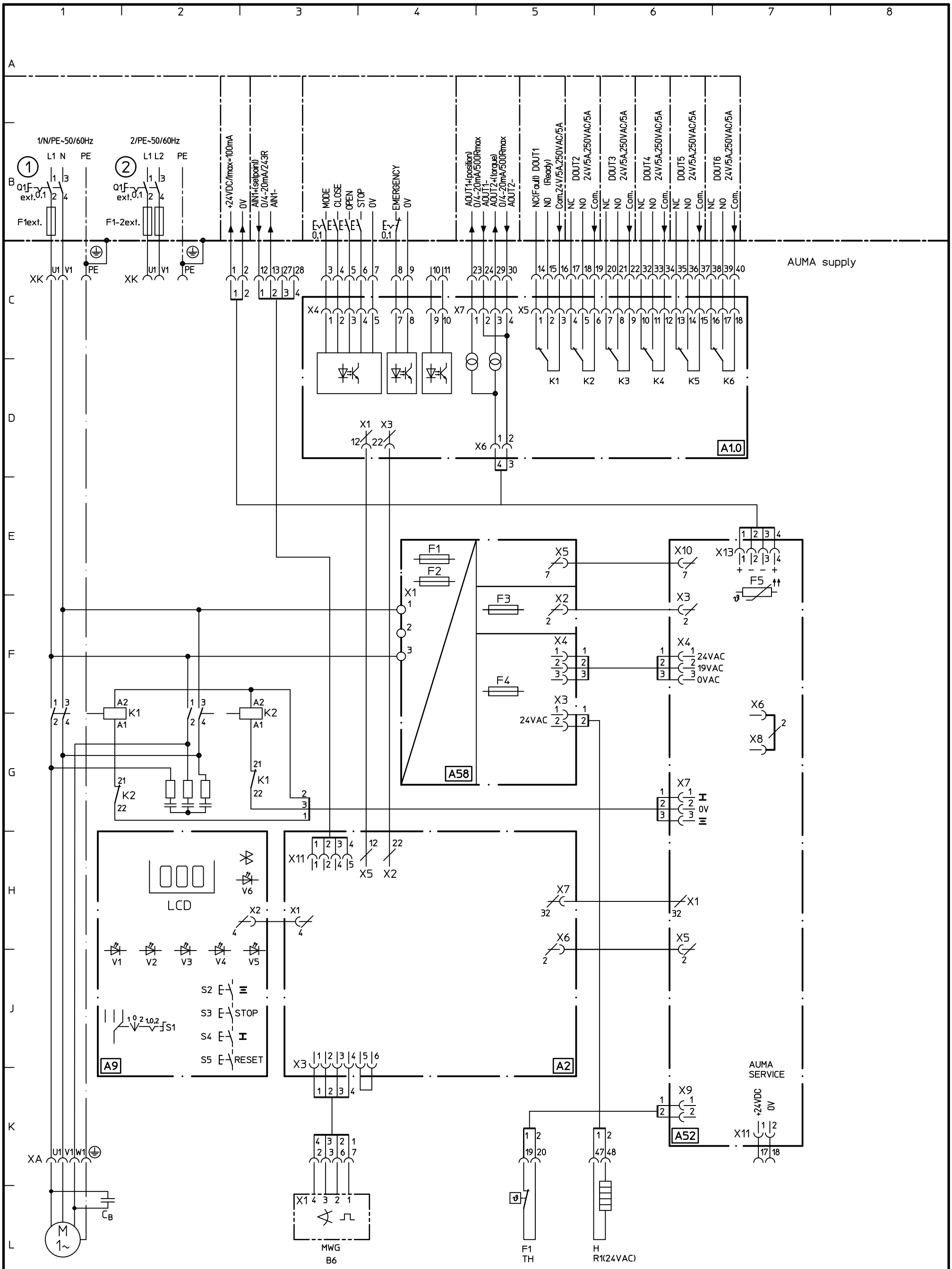
AUMA Riester GmbH & Co. KG

TPCA-1B2-1C1-A000 TPA01R100-011-000

Legende	Auftragsnummer	Bestellnummer
Y007.523/065	A000223508-004	

Projekt



For explosion-proof actuators terminals / cage clamps are used instead of plug / socket connector !

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AUMA Riester GmbH & Co. KG

TPCA-1B2-1C1-A000 TPA01R100-011-000

Legende	Auftragsnummer	Bestellnummer
Y007.523/065	A000223508-005	

Projekt

Mains voltage:
120 V 60 Hz 1-ph AC

Voltage tolerance:
+/- 10%

Electronics supply:
24 V DC internal

Control voltage:
24 V DC

Output aux. voltage:
24 V DC

Input DIN1:
MODE

Input DIN2:
CLOSE

Input DIN3:
OPEN

Input DIN4:
STOP

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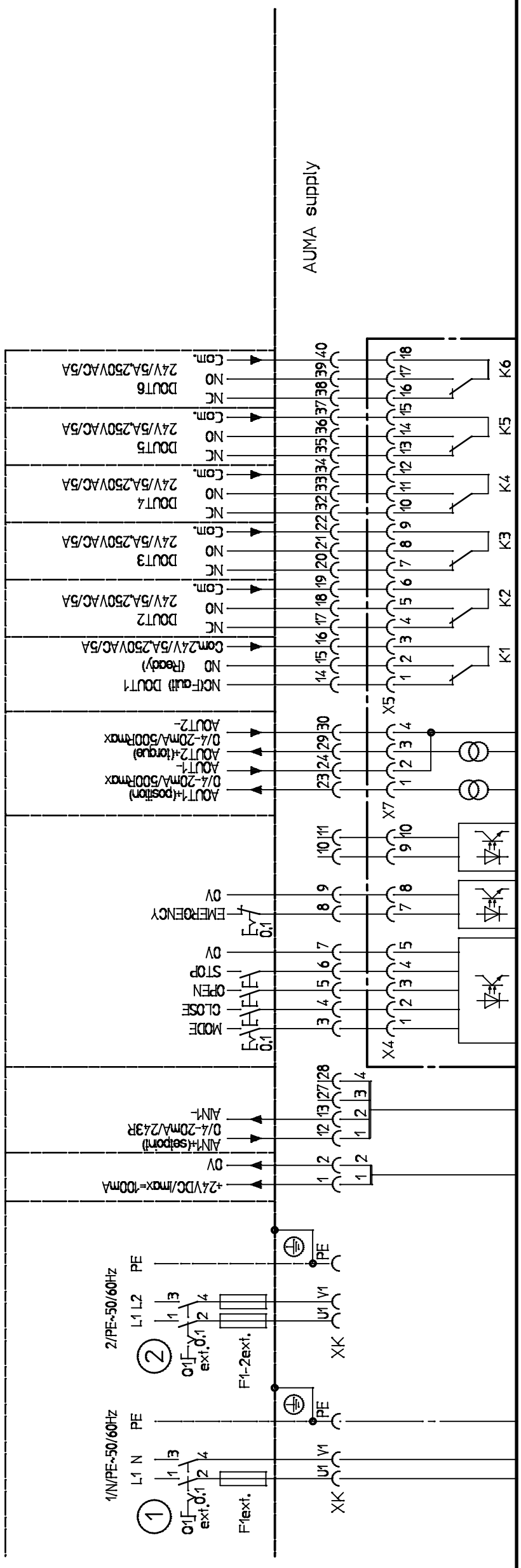
end position OPEN

Output DOUT4:
selector switch REMOTE

Output DOUT5:
torque fault CLOSE

Output DOUT6:
torque fault OPEN

Heater:
heater 24V, internal supply



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Zust.	Änderung	Datum	Name	Norm	Meyer

AUMA Riester GmbH & Co. KG

TPCA-1B2-1C1-A000 TPA01R100-011-000

Legende	Auftragsnummer	Bestellnummer
Y007.523/065	A000223508-005	

Projekt

Legend AUMATIC

Drawing component		Description
A1.0		Interface board
	K1 - 6	Output relays
A1.1		Interface board
	K7 - K12	Programmable output relays
A1.8		Fieldbus board
A13		Fieldbus connection board
A2		Logic board
A32		Overvoltage protection board
A4/A5		Solid state thyristor motor control
A52		Control board
	F5	Fuse for external supply 24 V DC
A52.1		Option board
A58		Power supply
	F1, F2	Primary fuses
	F3, F4	Secondary fuses
A88		Heater system board
A88.1		Motor heater fuse board
A9		Local control board
	S1	Selector switch LOCAL, OFF, REMOTE
	S2	Push button OPEN
	S3	Push button STOP
	S4	Push button CLOSE
	S5	Push button RESET
	V1 - V5	Programmable indication LEDs
	V6	Bluetooth
	LCD	Graphic display
A90		WirelessHART adaptor
B2/B4	EWG/RWG	Electronic position transmitter board
B6	MWG	Magnetic limit and torque transmitter
C_B		Motor capacitor
F1	TH	Thermal switch embedded in motor
F1-F3 ext		External fuses supplied by others
F6		Transformer fuse
F7		Thermal overload relay
K1, K2		Revering contactors
KO		Contactor for disconnection of thyristor
LCD		Liquid crystal display
M		Motor
PE		Ground (earth) connection
Q1		Internal disconnect switch
Q2 ext		External disconnect switch supplied by others
Q2		Motor protection switch

Legend AUMATIC

Drawing component		Description
R1	H	Switch compartment heater
R2	f1	Potentiometer
R2/2	f2	Potentiometer in tandem arrangement with R2
R3	PTC1	PTC thermistor
R4	H	Motor heater
R5	H	AUMATIC heater
S0		Latching EMERGENCY stop button
T1		Control transformer
XA		Actuator connection
XK		Customer connection

Drawing symbol	Description
	Form C relay or contactor contact
	Grounded transformer
	NO contact
	NC contact
	Fuse
	Resettable fuse
	Plug & socket electrical connection
	Galvanic isolator
	NO push button
	NC push button
	Thermal contact
	Heater
	LED

Legend AUMATIC

	3-position switch
	Optical isolator
	Contactor/relay coil

Limit switch development chart for intrusive actuators

Switch	Contact	0% CLOSE intermediate 100% OPEN
S1 DSR/TSC	NC NO	
S2 DOEL/TSC	NC NO	
S3 WSR/LSC	NC NO	
S3/2 WSR1/LSC1	NC NO	
S4 WOEL/LSO	NC NO	
S4/2 WOEL1/LSO1	NC NO	
S6 WDR/LSA	NC NO	
S6 WDR/LSA S6/2 WDR1/LSA1	NC NO	
S7 WDL/LSB	NC NO	
S7/2 WDL1/LSB1	NC NO	

Terminal plan shows the actuator in intermediate position, switches are not actuated.

——— = Contact closed

– – – = Contact open

Legend AUMATIC

S1	DSR/TSC	Torque switch, closing, clockwise rotation
S1/2	DSR1/TSC1	Torque switch, closing, in tandem operation with DSR/TSC (not shown above)
S2	DOEL/TSO	Torque switch, opening, counter-clockwise rotation
S2/2	DOEL1/TSO1	Torque switch, opening, in tandem operation with DOEL/TSO (not shown above)
S3	WSR/LSC	Limit switch, closing, clockwise rotation
S3/2	WSR1/LSC1	Limit switch, closing, in tandem operation with WSR/LSC
S3/3	WSR2/LSC2	Limit switch, closing, in triple operation with WSR/LSC (not shown above)
S4	WOEL/LSO	Limit switch, opening, counter-clockwise rotation
S4/2	WOEL1/LSO1	Limit switch, opening, in tandem operation with WOEL/LSO
S4/3	WOEL2/LSO2	Limit switch, opening, in triple operation with WOEL/LSO (not shown above)
S6	WDR/LSA	Limit switches DUO, closing, for 2 intermediate positions, can be adjusted to any position
S6/2	WDR1/LSA1	Limit switches DUO, closing, for 2 intermediate positions in tandem operation with WDR/LSA
S7	WDL/LSB	Limit switches DUO, opening, for 2 intermediate positions, can be adjusted to any position
S7/2	WDL1/LSB1	Limit switches DUO, opening, for 2 intermediate positions in tandem operation with WDL/LSB

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RECOMMENDED LONG & SHORT TERM STORAGE PROCEDURES

LONG TERM STORAGE (6 MONTHS +)

1. All valves shall be stored in the position in which they were shipped.

2. Valves shall be stored fully enclosed in a crate or on a skid. It is acceptable to store the valves uncrated but protected from any dirt, debris or UV exposure as long as the environmental conditions as described in item 3 are met. Any desiccant packages received with the original shipment should be replaced before putting valves into long term storage. Please follow your desiccant manufacturer's recommended usage of any desiccant based on the volume of the enclosed area.

3. Valves shall be stored in a well ventilated, clean, dry indoor facility on skids or raised racks with temperatures ranging from 35°F to 95°F (2°C to 35°C) with humidity levels not exceeding 50%.

4. If the above conditions cannot be met, valves shall be separately packaged inside sealed heavy duty plastic sheeting and a weather resistant enclosure, or a standard crate lined with moisture proof paper, to protect the valves from dirt, debris and UV exposure. Desiccant packages shall be used to control moisture both inside the enclosure and the sealed heavy duty plastic covering. Please follow your desiccant manufacturer's recommended usage of any desiccant based on the volume of the enclosed area.

5. Do not store valves next to operating electric motors or equipment which may emit ozone, which can cause deterioration of valve elastomers. Store in an environment with less than 0.1 ppm concentration, at least 25 feet from ozone emitting devices, with ventilation.

6. Valves with cylinder actuators and control valves which are stored for extended periods may be subject to cylinder blow-by caused by permanent distortion of any of the seals. Valves should be operated prior to installation and damaged seals replaced. If possible, it is recommended that cylinders be cycled every 4-6 months to maintain seals.

7. Valves with electric motor operators shall be stored in accordance with the individual motor manufacturer's recommended long term storage procedures.

8. All electrical components shall be visually inspected prior to valve installation.

SHORT TERM STORAGE (LESS THAN 6 MONTHS)

1. All valves shall be stored in the position in which they were shipped.

2. Valves shall be protected from dirt, debris, excessive moisture and UV exposure. Store at temperatures ranging from 35°F to 95°F (2°C to 35°C) with humidity levels not exceeding 50%.

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