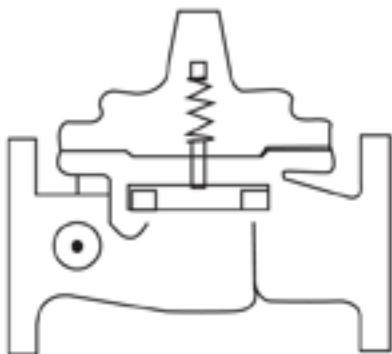


CLA-VAL

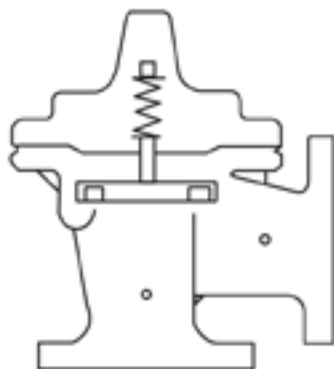
AUTOMATIC CONTROL VALVES

428-01/628-01

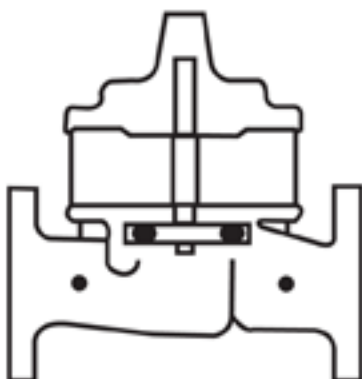
Place this manual with personnel responsible
for maintenance of this valve



INSTALLATION



OPERATION



MAINTENANCE




CLA-VAL CO.

NEWPORT BEACH, CALIFORNIA

CATALOG NO.

428-01/628-01

DRAWING NO.

23863

REV.

E

TYPE OF VALVE AND MAIN FEATURES

MODULATING FLOAT VALVE USING CFM-9 FLOAT CONTROL

DESIGN

DRAWN

TLC

2-22-93

CHK'D

I.C.

2-24-93

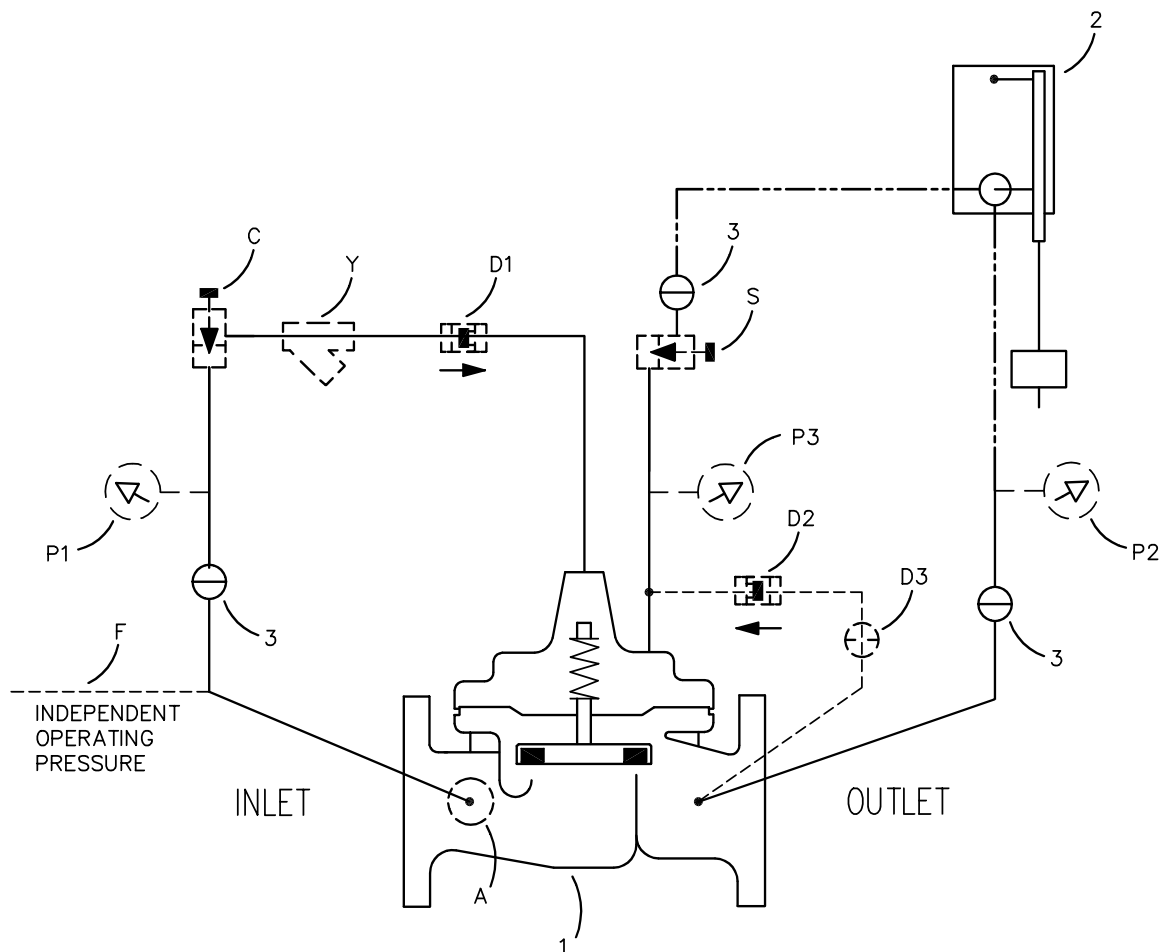
APVD

GJD

2-26-93

----- NOT FURNISHED BY CLA-VAL CO.

----- OPTIONAL FEATURES



* 1 1/4" - 6" = 428-01

** 3", 4", 6", AND 8" = 628-01

ITEM NO.	BASIC COMPONENTS	QTY
1	* 100-32 HYTROL (428-01) MAIN VALVE ** 100-33 HYTROL (628-01) MAIN VALVE	1
2	CFM-9 FLOAT CONTROL	1
3	CK2 COCK (ISOLATION VALVE)	3

OPTIONAL FEATURE SUFFIX

ADDED TO CATALOG NUMBER

A	X46A FLOW CLEAN STRAINER	1	Y	X43 "Y" STRAINER	1
C	CNA NEEDLE VALVE (CLOSING)	1			
D	CHECK VALVES WITH COCK	1			
F	INDEPENDENT OPERATING PRESSURE				
P	X141 PRESSURE GAUGE	3			
S	CNB NEEDLE VALVE (OPENING)	1			

E ADDED OPTIONAL FEATURE P (ECO 21821)

CAD REVISION RECORD - DO NOT REVISE MANUALLY

DESCRIPTION

DATE

BY

A-C SEE REVISION FILE

LTR

10-10-07

AK

D ADDED C & S OPTIONS AND REVISED (NED 61296)

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**CLA-VAL CO.**

NEWPORT BEACH, CALIFORNIA

CATALOG NO.

428-01/628-01

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REV.

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TYPE OF VALVE AND MAIN FEATURES

MODULATING FLOAT VALVE USING CFM-9 FLOAT CONTROL

DESIGN

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GJD

2-26-93

OPERATING DATA

I. FLOAT VALVE FEATURE:

FLOAT CONTROL (2) MUST BE INSTALLED AT THE DESIRED LIQUID LEVEL IN THE STORAGE TANK. A RISING LIQUID LEVEL CAUSES THE FLOAT TO RISE. THIS RESTRICTS FLOW THROUGH FLOAT CONTROL (2) AND INCREASES PRESSURE IN THE MAIN VALVE COVER WHICH TENDS TO CLOSE THE MAIN VALVE. WHEN THE LIQUID LEVEL (FLOAT) LOWERS, FLOW INCREASES THROUGH FLOAT CONTROL (2) AND REDUCES PRESSURE IN THE MAIN VALVE COVER AND TENDS TO OPEN THE MAIN VALVE. THIS MODULATING ACTION VARIES FLOW THROUGH THE MAIN VALVE INTO THE TANK IN DIRECT PROPORTION TO FLOW OUT OF THE TANK.

II. OPTIONAL FEATURE OPERATING DATA:

SUFFIX A (FLOW CLEAN STRAINER)

A SELF-CLEANING STRAINER IS INSTALLED IN THE MAIN VALVE INLET BODY BOSS WHICH PROTECTS THE PILOT SYSTEM FROM FOREIGN PARTICLES.

SUFFIX C (CLOSING SPEED CONTROL)

NEEDLE VALVE (C) CONTROLS THE CLOSING SPEED OF THE MAIN VALVE. TURN THE ADJUSTING STEM CLOCKWISE TO MAKE THE MAIN VALVE CLOSE SLOWER. DO NOT CLOSE VALVE (C) COMPLETELY OR MAIN VALVE WILL NOT CLOSE. SUGGESTED INITIAL SETTING 1/4 TURN OPEN.

SUFFIX D (CHECK VALVES WITH COCK):

WHEN OUTLET PRESSURE IS HIGHER THAN INLET PRESSURE, CHECK VALVE (D2) OPENS AND (D1) CLOSSES. THIS DIRECTS THE HIGHER OUTLET PRESSURE INTO THE MAIN VALVE COVER AND THE MAIN VALVE CLOSSES.

SUFFIX F (INDEPENDENT OPERATING PRESSURE)

PILOT SUPPLY PRESSURE IS OBTAINED FROM AN INDEPENDENT SOURCE. (PILOT SUPPLY PRESSURE IS OBTAINED FROM THE MAIN VALVE INLET IF SUFFIX (F) IS NOT SPECIFIED.) NOTE: INDEPENDENT OPERATING PRESSURE MUST BE EQUAL TO OR GREATER THAN PRESSURE AT THE MAIN VALVE INLET AT ALL TIMES.

SUFFIX P (PRESSURE GAUGE):

PRESSURE GAUGES (P) PROVIDE PRESSURE READING IN THE INLET, OUTLET AND COVER CONNECTIONS.

SUFFIX S (OPENING SPEED CONTROL)

NEEDLE VALVE (S) CONTROLS THE OPENING SPEED OF THE MAIN VALVE. TURN THE ADJUSTING STEM CLOCKWISE TO MAKE THE MAIN VALVE OPEN SLOWER. DO NOT CLOSE VALVE (S) COMPLETELY OR MAIN VALVE WILL NOT OPEN. SUGGESTED INITIAL SETTING 1/4 TURN OPEN.

SUFFIX Y (Y-STRAINER)

A Y-PATTERN STRAINER IS INSTALLED IN THE PILOT SUPPLY LINE TO PROTECT THE PILOT SYSTEM FROM FOREIGN PARTICLES. THE STRAINER SCREEN MUST BE CLEANED PERIODICALLY.

CAD REVISION RECORD - DO NOT REVISE MANUALLY

DESCRIPTION

DATE

BY

SEE SHEET 1

LTR

**CLA-VAL CO.**

NEWPORT BEACH, CALIFORNIA

CATALOG NO.

428-01/628-01

DRAWING NO.

23863

REV.

E

TYPE OF VALVE AND MAIN FEATURES

MODULATING FLOAT VALVE
USING CFM-9 FLOAT CONTROL

DESIGN

DRAWN

TLC

2-22-93

CHK'D

I.C.

2-24-93

APVD

GJD

2-26-93

OPERATING DATA

III. CHECK LIST FOR PROPER OPERATION:

- ☐ SYSTEM VALVES OPEN UPSTREAM AND DOWNSTREAM.
- ☐ AIR REMOVED FROM THE MAIN VALVE COVER AND PILOT SYSTEM AT ALL HIGH POINTS.
- ☐ PERIODIC CLEANING OF STRAINER (Y) IS RECOMMENDED (OPTIONAL FEATURE).
- ☐ CK2 COCKS (3) AND (D3) OPEN DURING NORMAL OPERATION.
- ☐ INDEPENDENT OPERATING PRESSURE CONNECTION PROPERLY CONNECTED.
- ☐ VAVES (C) & (S) OPEN ATLEAST 1/4 TURN (OPTIONAL FEATURE).

CAD REVISION RECORD - DO NOT REVISE MANUALLY

DESCRIPTION

DATE

BY

SEE SHEET 1

LTR



Technical Bulletin



428 Series Main Valve

Special Note: All I.O.M. manuals for 428 Series Modulating Float Valves do not contain service or maintenance information specific to the 100-32 or 100-33 Hytrol main valves. Refer to first page of schematic.

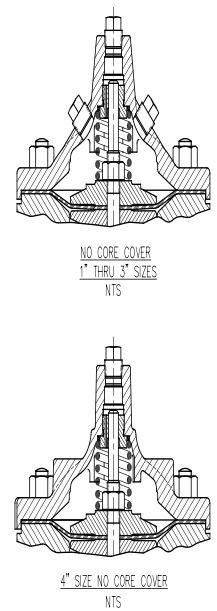
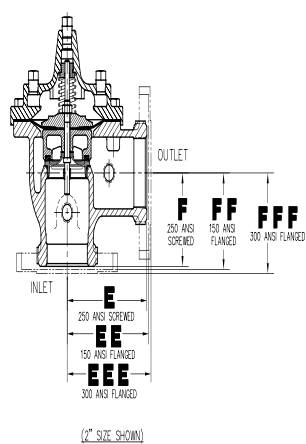
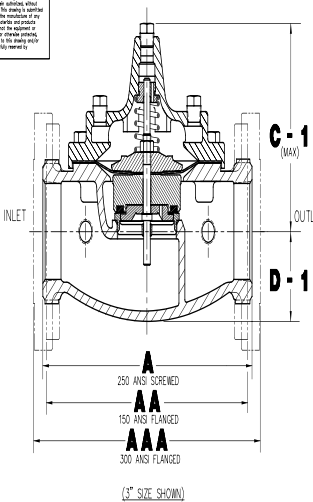
The Main Valve for all Cla-Val 428 Series Modulating Float Valves is a modified version of the standard 100-01 Hytrol main valve. All maintenance and service information for the 100-01 Hytrol main valve applies. This I.O.M. manual includes information for 100-01 Hytrol. When performing maintenance on the 428 Series main valves follow instructions for the 100-01 Hytrol valve. The 100-32 and 100-33 Hytrol use repair kits for 100-01 and 100-20 Hytrol.

The 100-32 (100 Series) and 100-33 (600 Series) Hytrol main valves have different stem and cover bearing from that of the standard Hytrol parts. The stem has a special groove in the top bearing area and the cover bearing does not have the small bypass hole. When replacing the stem or the cover bearing only, you **MUST** specify that these parts are for 100-32 or 100-33 Hytrol.

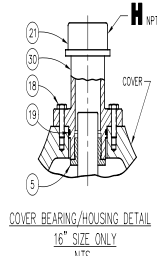
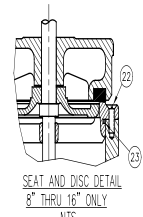
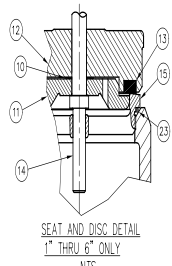
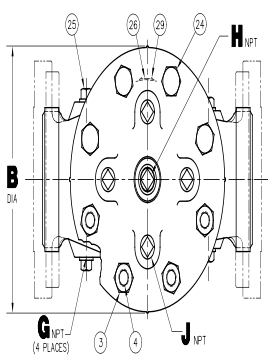
	Hytrol	USE Service Steps for	Repair Kit
428 Series (100)	100-32	100-01	100-01
628 Series (600)	100-33	100-01	100-20

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REVISIONS		
REV.	DESCRIPTION	DATE
A-1	SEE REVISION FILE	
E	REVISED AS PERMANENT ON CAD ADDED DIM. 4.00 & 4.25 ON VALVE SIZE 1-1/2" (ECC 16899)	03-19-05
F	ADDED 1" SIZE SCREWED CONFIGURATION TO THE DIM. (ECC 20844)	02-18-10

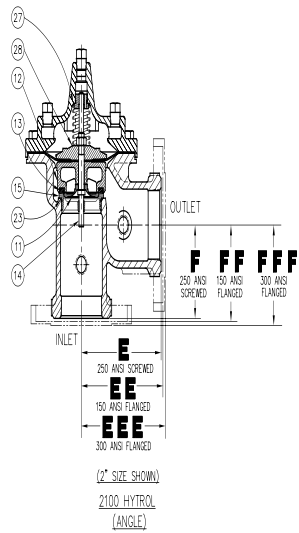
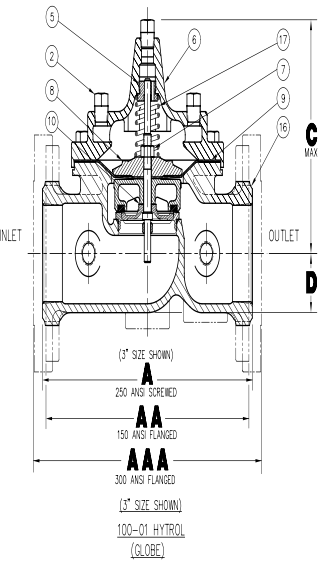


OLD STYLE BODY CONFIGURATIONS



DIMENSION TABLE														
VALVE SIZES	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"	8"	10"	12"	14"	16"	
A	7.25	7.25	9.38	11.00	12.50	-	-	-	-	-	-	-	-	
AA	-	-	8.50	9.38	11.00	12.00	15.00	20.00	26.38	29.75	34.00	39.00	41.38	
AAA	-	-	9.00	10.00	11.62	13.25	15.62	21.00	26.38	31.12	35.50	40.50	43.50	
B DIA	5.62	5.62	5.62	6.62	8.00	9.12	11.50	15.75	20.00	23.62	28.00	32.75	35.50	
C MAX	5.50	5.50	5.50	6.50	7.56	8.19	10.62	13.38	16.00	-	-	-	-	
C-1 MAX	-	4.75	4.75	5.75	6.88	7.25	9.31	12.12	14.62	17.12	20.88	24.19	25.00	
D	1.12	1.12	1.12	1.50	1.69	2.06	3.19	4.31	5.31	-	-	-	-	
D-1	-	2.00	2.00	2.50	2.88	3.12	4.25	6.00	7.56	9.25	10.75	12.62	15.50	
E	3.25	3.25	3.25	4.75	5.50	6.25	-	-	-	-	-	-	-	
EE	-	-	4.00	4.75	5.50	6.00	7.50	10.00	12.69	14.88	17.00	19.50	20.88	
EEE	-	-	4.25	5.00	5.88	6.38	7.88	10.50	13.25	15.56	17.75	20.25	21.62	
F	1.88	1.88	1.88	3.25	4.00	4.50	-	-	-	-	-	-	-	
FF	-	-	4.00	3.25	4.00	4.00	5.00	6.00	8.00	8.62	13.75	14.88	15.69	
FFF	-	-	4.25	3.50	4.31	4.38	5.31	6.50	8.50	9.31	14.50	15.62	16.50	
G NPT	3/8"	3/8"	3/8"	3/8"	1/2"	1/2"	3/4"	3/4"	1"	1"	1"	1"	1"	
H NPT	1/4"	1/4"	1/4"	1/2"	1/2"	1/2"	3/4"	3/4"	1"	1"	1-1/4"	1-1/2"	2"	
J NPT	1/4"	1/4"	1/4"	3/8"	1/2"	1/2"	3/4"	3/4"	1"	1"	1"	1"	1"	

* 3/8" NPT FOR NO CORE COVER



RECOMMENDED SPARE PARTS		
ITEM NO.	DESCRIPTION	QTY
30	HOUSING, COVER BEARING (16" ONLY)	1
29	SCREW, DRIVE	2
28	WASHER, SPRING, LOWER (1000K ONLY)	1
27	WASHER, SPRING, UPPER (1000K ONLY)	1
26	NAMEPLATE	1
25	PLUG, PIPE, BODY	A/R
24	BOLT, HEX HD. (1" THRU 4" ONLY)	A/R
23	O-RING, SEAT	1
22	SCREW, FLAT HD. (8" THRU 16" ONLY)	A/R
21	CAP, PIPE (16" ONLY)	1
20		
19	O-RING (16" ONLY)	1
18	BOLT, HEX HD. (16" ONLY)	8
17	SPRING	1
16	BODY	1
15	SEAT	1
14	STEM	1
13	DISC	1
12	RETAINER, DISC	1
11	GUIDE, DISC	1
10	WASHER, SPACER	2
9	DIAPHRAGM	1
8	WASHER, DIAPHRAGM	1
7	NUT, STEM	1
6	COVER	1
5	BEARING, COVER	1
4	STUD (8" THRU 16")	A/R
3	NUT, HEX (6" THRU 16" ONLY)	A/R
2	PLUG, PIPE, COVER	A/R
1	PLUG, PIPE, CENTER COVER	1

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES. TOLERANCES ARE: FRACTIONS DECIMALS MILLIMETERS 1/32 .015 1/16 .010 1/8 .008 1/4 .005 3/8 .003 1/2 .002 3/4 .001 1 .000 1 1/2 .000 2 .000 2 1/2 .000 3 .000 3 1/2 .000 4 .000 4 1/2 .000 5 .000 5 1/2 .000 6 .000 6 1/2 .000 7 .000 7 1/2 .000 8 .000 8 1/2 .000 9 .000 9 1/2 .000 10 .000 10 1/2 .000 11 .000 11 1/2 .000 12 .000 12 1/2 .000 13 .000 13 1/2 .000 14 .000 14 1/2 .000 15 .000 15 1/2 .000 16 .000 16 1/2 .000 17 .000 17 1/2 .000 18 .000 18 1/2 .000 19 .000 19 1/2 .000 20 .000 20 1/2 .000 21 .000 21 1/2 .000 22 .000 22 1/2 .000 23 .000 23 1/2 .000 24 .000 24 1/2 .000 25 .000 25 1/2 .000 26 .000 26 1/2 .000 27 .000 27 1/2 .000 28 .000 28 1/2 .000 29 .000 29 1/2 .000 30 .000 30 1/2 .000 31 .000 31 1/2 .000 32 .000 32 1/2 .000 33 .000 33 1/2 .000 34 .000 34 1/2 .000 35 .000 35 1/2 .000 36 .000 36 1/2 .000 37 .000 37 1/2 .000 38 .000 38 1/2 .000 39 .000 39 1/2 .000 40 .000 40 1/2 .000 41 .000 41 1/2 .000 42 .000 42 1/2 .000 43 .000 43 1/2 .000 44 .000 44 1/2 .000 45 .000 45 1/2 .000 46 .000 46 1/2 .000 47 .000 47 1/2 .000 48 .000 48 1/2 .000 49 .000 49 1/2 .000 50 .000 50 1/2 .000 51 .000 51 1/2 .000 52 .000 52 1/2 .000 53 .000 53 1/2 .000 54 .000 54 1/2 .000 55 .000 55 1/2 .000 56 .000 56 1/2 .000 57 .000 57 1/2 .000 58 .000 58 1/2 .000 59 .000 59 1/2 .000 60 .000 60 1/2 .000 61 .000 61 1/2 .000 62 .000 62 1/2 .000 63 .000 63 1/2 .000 64 .000 64 1/2 .000 65 .000 65 1/2 .000 66 .000 66 1/2 .000 67 .000 67 1/2 .000 68 .000 68 1/2 .000 69 .000 69 1/2 .000 70 .000 70 1/2 .000 71 .000 71 1/2 .000 72 .000 72 1/2 .000 73 .000 73 1/2 .000 74 .000 74 1/2 .000 75 .000 75 1/2 .000 76 .000 76 1/2 .000 77 .000 77 1/2 .000 78 .000 78 1/2 .000 79 .000 79 1/2 .000 80 .000 80 1/2 .000 81 .000 81 1/2 .000 82 .000 82 1/2 .000 83 .000 83 1/2 .000 84 .000 84 1/2 .000 85 .000 85 1/2 .000 86 .000 86 1/2 .000 87 .000 87 1/2 .000 88 .000 88 1/2 .000 89 .000 89 1/2 .000 90 .000 90 1/2 .000 91 .000 91 1/2 .000 92 .000 92 1/2 .000 93 .000 93 1/2 .000 94 .000 94 1/2 .000 95 .000 95 1/2 .000 96 .000 96 1/2 .000 97 .000 97 1/2 .000 98 .000 98 1/2 .000 99 .000 99 1/2 .000 100 .000 100 1/2 .000 101 .000 101 1/2 .000 102 .000 102 1/2 .000 103 .000 103 1/2 .000 104 .000 104 1/2 .000 105 .000 105 1/2 .000 106 .000 106 1/2 .000 107 .000 107 1/2 .000 108 .000 108 1/2 .000 109 .000 109 1/2 .000 110 .000 110 1/2 .000 111 .000 111 1/2 .000 112 .000 112 1/2 .000 113 .000 113 1/2 .000 114 .000 114 1/2 .000 115 .000 115 1/2 .000 116 .000 116 1/2 .000 117 .000 117 1/2 .000 118 .000 118 1/2 .000 119 .000 119 1/2 .000 120 .000 120 1/2 .000 121 .000 121 1/2 .000 122 .000 122 1/2 .000 123 .000 123 1/2 .000 124 .000 124 1/2 .000 125 .000 125 1/2 .000 126 .000 126 1/2 .000 127 .000 127 1/2 .000 128 .000 128 1/2 .000 129 .000 129 1/2 .000 130 .000 130 1/2 .000 131 .000 131 1/2 .000 132 .000 132 1/2 .000 133 .000 133 1/2 .000 134 .000 134 1/2 .000 135 .000 135 1/2 .000 136 .000 136 1/2 .000 137 .000 137 1/2 .000 138 .000 138 1/2 .000 139 .000 139 1/2 .000 140 .000 140 1/2 .000 141 .000 141 1/2 .000 142 .000 142 1/2 .000 143 .000 143 1/2 .000 144 .000 144 1/2 .000 145 .000 145 1/2 .000 146 .000 146 1/2 .000 147 .000 147 1/2 .000 148 .000 148 1/2 .000 149 .000 149 1/2 .000 150 .000 150 1/2 .000 151 .000 151 1/2 .000 152 .000 152 1/2 .000 153 .000 153 1/2 .000 154 .000 154 1/2 .000 155 .000 155 1/2 .000 156 .000 156 1/2 .000 157 .000 157 1/2 .000 158 .000 158 1/2 .000 159 .000 159 1/2 .000 160 .000 160 1/2 .000 161 .000 161 1/2 .000 162 .000 162 1/2 .000 163 .000 163 1/2 .000 164 .000 164 1/2 .000 165 .000 165 1/2 .000 166 .000 166 1/2 .000 167 .000 167 1/2 .000 168 .000 168 1/2 .000 169 .000 169 1/2 .000 170 .000 170 1/2 .000 171 .000 171 1/2 .000 172 .000 172 1/2 .000 173 .000 173 1/2 .000 174 .000 174 1/2 .000 175 .000 175 1/2 .000 176 .000 176 1/2 .000 177 .000 177 1/2 .000 178 .000 178 1/2 .000 179 .000 179 1/2 .000 180 .000 180 1/2 .000 181 .000 181 1/2 .000 182 .000 182 1/2 .000 183 .000 183 1/2 .000 184 .000 184 1/2 .000 185 .000 185 1/2 .000 186 .000 186 1/2 .000 187 .000 187 1/2 .000 188 .000 188 1/2 .000 189 .000 189 1/2 .000 190 .000 190 1/2 .000 191 .000 191 1/2 .000 192 .000 192 1/2 .000 193 .000 193 1/2 .000 194 .000 194 1/2 .000 195 .000 195 1/2 .000 196 .000 196 1/2 .000 197 .000 197 1/2 .000 198 .000 198 1/2 .000 199 .000 199 1/2 .000 200 .000 200 1/2 .000 201 .000 201 1/2 .000 202 .000 202 1/2 .000 203 .000 203 1/2 .000 204 .000 204 1/2 .000 205 .000 205 1/2 .000 206 .000 206 1/2 .000 207 .000 207 1/2 .000 208 .000 208 1/2 .000 209 .000 209 1/2 .000 210 .000 210 1/2 .000 211 .000 211 1/2 .000 212 .000 212 1/2 .000 213 .000 213 1/2 .000 214 .000 214 1/2 .000 215 .000 215 1/2 .000 216 .000 216 1/2 .000 217 .000 217 1/2 .000 218 .000 218 1/2 .000 219 .000 219 1/2 .000 220 .000 220 1/2 .000 221 .000 221 1/2 .000 222 .000 222 1/2 .000 223 .000 223 1/2 .000 224 .000 224 1/2 .000 225 .000 225 1/2 .000 226 .000 226 1/2 .000 227 .000 227 1/2 .000 228 .000 228 1/2 .000 229 .000 229 1/2 .000 230 .000 230 1/2 .000 231 .000 231 1/2 .000 232 .000 232 1/2 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.000 278 1/2 .000 279 .000 279 1/2 .000 280 .000 280 1/2 .000 281 .000 281 1/2 .000 282 .000 282 1/2 .000 283 .000 283 1/2 .000 284 .000 284 1/2 .000 285 .000 285 1/2 .000 286 .000 286 1/2 .000 287 .000 287 1/2 .000 288 .000 288 1/2 .000 289 .000 289 1/2 .000 290 .000 290 1/2 .000 291 .000 291 1/2 .000 292 .000 292 1/2 .000 293 .000 293 1/2 .000 294 .000 294 1/2 .000 295 .000 295 1/2 .000 296 .000 296 1/2 .000 297 .000 297 1/2 .000 298 .000 298 1/2 .000 299 .000 299 1/2 .000 300 .000 300 1/2 .000 301 .000 301 1/2 .000 302 .000 302 1/2 .000 303 .000 303 1/2 .000 304 .000 304 1/2 .000 305 .000 305 1/2 .000 306 .000 306 1/2 .000 307 .000 307 1/2 .000 308 .000 308 1/2 .000 309 .000 309 1/2 .000 310 .000 310 1/2 .000 311 .000 311 1/2 .000 312 .000 312 1/2 .000 313 .000 313 1/2 .000 314 .000 314 1/2 .000 315 .000 315 1/2 .000 316 .000 316 1/2 .000 317 .000 317 1/2 .000 318 .000 318 1/2 .000 319 .000 319 1/2 .000 320 .000 320 1/2 .000 321 .000 321 1/2 .000 322 .000 322 1/2 .000 323 .000 323 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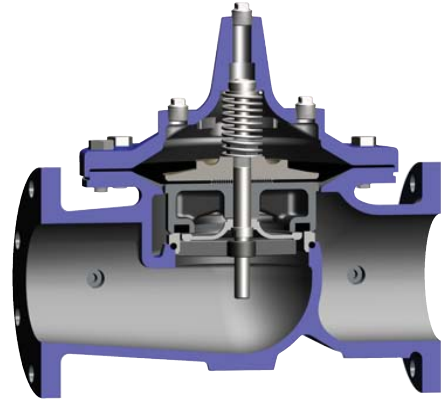


—MODEL— **100-01**
Hytrol Valve

Description

The Cla-Val Model 100-01 Hytrol Valve is a main valve for Cla-Val Automatic Control Valves. It is a hydraulically operated, diaphragm-actuated, globe or angle pattern valve.

This valve consists of three major components; body, diaphragm assembly, and cover. The diaphragm assembly is the only moving part. The diaphragm assembly uses a diaphragm of nylon fabric bonded with synthetic rubber. A synthetic rubber disc, contained on three and one half sides by a disc retainer and disc guide, forms a seal with the valve seat when pressure is applied above the diaphragm. The diaphragm assembly forms a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure.



Installation

1. Before valve is installed, pipe lines should be flushed of all chips, scale and foreign matter.
2. It is recommended that either gate or block valves be installed on both ends of the 100-01 Hytrol Valve to facilitate isolating the valve for preventive maintenance and repairs.
3. Place the valve in the line with flow through the valve in the direction indicated on the inlet nameplate. (See "Flow Direction" Section)
4. Allow sufficient room around valve to make adjustments and for disassembly.
5. Cla-Val 100-01 Hytrol Valves operate with maximum efficiency when mounted in horizontal piping with the cover UP, however, other positions are acceptable. Due to size and weight of the cover and internal components of 8 inch and larger valves,

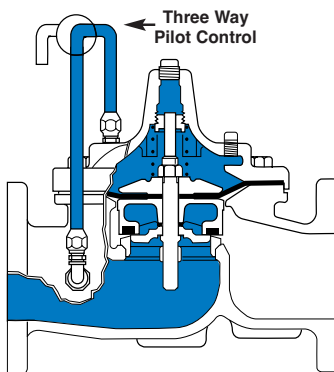
installation with the cover UP is advisable. This makes internal parts readily accessible for periodic inspection.

6. Caution must be taken in the installation of this valve to insure that galvanic and/or electrolytic action does not take place. The proper use of dielectric fittings and gaskets are required in all systems using dissimilar metals.

7. If a pilot control system is installed on the 100-01 Hytrol Valve, use care to prevent damage. If it is necessary to remove fittings or components, be sure they are kept clean and replaced exactly as they were.

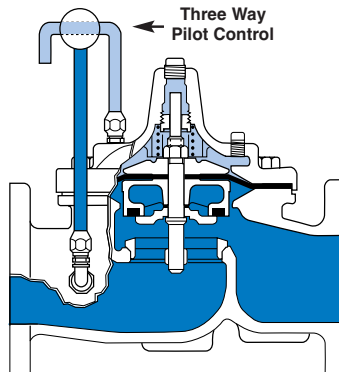
8. After the valve is installed and the system is first pressurized, vent air from the cover chamber and pilot system tubing by loosening fittings at all high points.

Principles of Operation



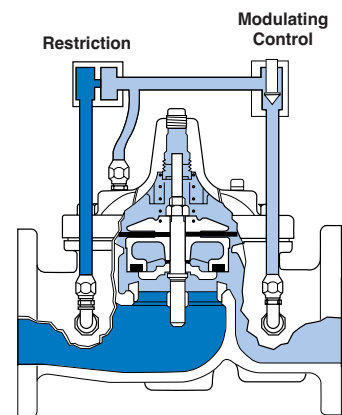
Tight Closing Operation

When pressure from the valve inlet (or an equivalent independent operating pressure) is applied to the diaphragm chamber the valve closes drip-tight.



Full Open Operation

When pressure in diaphragm chamber is relieved to a zone of lower pressure (usually atmosphere) the line pressure (5 psi Min.) at the valve inlet opens the valve.



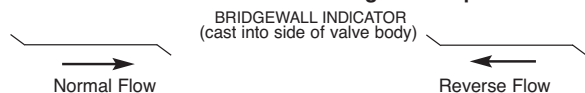
Modulating Action

Valve modulates when diaphragm pressure is held at an intermediate point between inlet and discharge pressure. With the use of a Cla-Val. "modulating control," which reacts to line pressure changes, the pressure above the diaphragm is varied, allowing the valve to throttle and compensate for the change.

Flow Direction

The flow through the 100-01 Hytrol Valve can be in one of two directions. When flow is “up-and-over the seat,” it is in “normal” flow and the valve will fail in the open position. When flow is “over-the seat-and down,” it is in “reverse” flow and the valve will fail in the closed position. There are no permanent flow arrow markings.

The valve must be installed according to nameplate data.



Recommended Tools

1. Three pressure gauges with ranges suitable to the installation to be put at Hytrol inlet, outlet and cover connections.
2. Cla-Val Model X101 Valve Position Indicator. This provides visual indication of valve position without disassembly of valve.
3. Other items are: suitable hand tools such as screwdrivers, wrenches, etc. soft jawed (brass or aluminum) vise, 400 grit wet or dry sandpaper and water for cleaning.

Troubleshooting

The following troubleshooting information deals strictly with the Model 100-01 Hytrol Valve. This assumes that all other components of the pilot control system have been checked out and are in proper working condition. (See appropriate sections in Technical Manual for complete valve).

All trouble shooting is possible without removing the valve from the line or removing the cover. It is highly recommended to permanently install a Model X101 Valve Position Indicator and three gauges in unused Hytrol inlet, outlet and cover connections.

SYMPTOM	PROBABLE CAUSE	REMEDY
Fails to Close	Closed isolation valves in control system, or in main line.	Open Isolation valves.
	Lack of cover chamber pressure.	Check upstream pressure, pilot system, strainer, tubing, valves, or needle valves for obstruction.
	Diaphragm damaged. (See Diaphragm Check.)	Replace diaphragm.
	Diaphragm assembly inoperative. Corrosion or excessive scale build up on valve stem. (See Freedom of Movement Check)	Clean and polish stem. Inspect and replace any damaged or badly eroded part.
	Mechanical obstruction. Object lodged in valve. (See Freedom of Movement Check)	Remove obstruction.
	Worn disc. (See Tight Sealing Check)	Replace disc.
	Badly scored seat. (See Tight Sealing Check)	Replace seat.
Fails to Open	Closed upstream and/or downstream isolation valves in main line.	Open isolation valves.
	Insufficient line pressure.	Check upstream pressure. (Minimum 5 psi flowing line pressure differential.)
	Diaphragm assembly inoperative. Corrosion or excessive buildup on valve stem. (See Freedom of Movement Check)	Clean and polish stem. Inspect and replace any damaged or badly eroded part.
	Diaphragm damaged. (For valves in "reverse flow" only)	Replace diaphragm.

After checking out probable causes and remedies, the following three checks can be used to diagnose the nature of the problem before maintenance is started. They must be done in the order shown.

Three Checks

The 100-01 Hytrol Valve has only one moving part (the diaphragm and disc assembly). So, there are only three major types of problems to be considered.

First: Valve is stuck - that is, the diaphragm assembly is not free to move through a full stroke either from open to close or vice versa.

Second: Valve is free to move and can't close because of a worn out diaphragm.

Third: Valve leaks even though it is free to move and the diaphragm isn't leaking.

CAUTION:

*Care should be taken when doing the troubleshooting checks on the 100-01 Hytrol Valve. These checks do require the valve to open fully. This will either allow a high flow rate through the valve, or the downstream pressure will quickly increase to the inlet pressure. In some cases, this can be very harmful. Where this is the case, and there are no block valves in the system to protect the downstream piping, it should be realized that **the valve cannot be serviced under pressure**. Steps should be taken to remedy this situation before proceeding any further.*

Diaphragm Check (#1)

1. Shut off pressure to the Hytrol Valve by slowly closing upstream and downstream isolation valves. **SEE CAUTION.**
2. Disconnect or close all pilot control lines to the valve cover and leave only one fitting in highest point of cover open to atmosphere.
3. With the cover vented to atmosphere, slowly open upstream isolation valve to allow some pressure into the Hytrol Valve body. Observe the open cover tapping for signs of continuous flow. It is not necessary to fully open isolating valve. Volume in cover chamber capacity chart will be displaced as valve moves to open position. Allow sufficient time for diaphragm assembly to shift positions. If there is no continuous flow, you can be quite certain the diaphragm is sound and the diaphragm assembly is tight. If the fluid appears to flow continuously this is a good reason to believe the diaphragm is either damaged or it is loose on the stem. In either case, this is sufficient cause to remove the valve cover and investigate the leakage. (See "Maintenance" Section for procedure.)

COVER CHAMBER CAPACITY (Liquid Volume displaced when valve opens)

Valve size (inches)	Displacement	
	Gallons	Liters
1 1/4	.020	.07
1 1/2	.020	.07
2	.032	.12
2 1/2	.043	.16
3	.080	.30
4	.169	.64
6	.531	2.0
8	1.26	4.8
10	2.51	9.5
12	4.00	15.1
14	6.50	24.6
16	9.57	36.2
20	12.00	45.4
24	29.00	109.8
30	42.00	197.0
36	90.00	340.0

Freedom of Movement Check (#2)

4. Determining the Hytrol Valve's freedom of movement can be done by one of two methods.
5. For most valves it can be done after completing Diaphragm Check (Steps 1, 2, and 3). **SEE CAUTION.** At the end of step 3 the valve should be fully open.
6. If the valve has a Cla-Val X101 Position Indicator, observe the indicator to see that the valve opens wide. Mark the point of maximum opening.
7. Re-connect enough of the control system to permit the application of inlet pressure to the cover. Open pilot system cock so pressure flows from the inlet into the cover.
8. While pressure is building up in the cover, the valve should close smoothly. There is a hesitation in every Hytrol Valve closure, which can be mistaken for a mechanical bind. The stem will appear to stop moving very briefly before going to the closed position. This slight pause is caused by the diaphragm flexing at a particular point in the valve's travel and is not caused by a mechanical bind.
9. When closed, a mark should be made on the X101 Valve position indicator corresponding to the "closed" position. The distance between the two marks should be approximately the stem travel shown in chart.

STEM TRAVEL

(Fully Open to Fully Closed)

Valve Size (inches)		Travel (inches)	
Inches	MM	Inches	MM
1 1/4	32	0.4	10
1 1/2	40	0.4	10
2	50	0.6	15
2 1/2	65	0.7	18
3	80	0.8	20
4	100	1.1	28
6	150	1.7	43
8	200	2.3	58
10	250	2.8	71
12	300	3.4	86
14	350	4.0	100
16	400	4.5	114
20	500	5.6	143
24	600	6.7	165
30	800	7.5	190
36	900	8.5	216

10. If the stroke is different than that shown in stem travel chart this is a good reason to believe something is mechanically restricting the stroke of the valve at one end of its travel. If the flow does not stop through the valve when in the indicated "closed" position, the obstruction probably is between the disc and the seat. If the flow does stop, then the obstruction is more likely in the cover. In either case, the cover must be removed, and the obstruction located and removed. The stem should also be checked for scale build-up. (See "Maintenance, section for procedure.)

11. For valves 6" and smaller, the Hytrol Valve's freedom of movement check can also be done after all pressure is removed from the valve. **SEE CAUTION.** After closing inlet and outlet isolation valves and bleeding pressure from the valve, check that the cover chamber and the body are temporarily vented to atmosphere. Insert fabricated tool into threaded hole in top of valve stem, and lift the diaphragm assembly manually. Note any roughness. The diaphragm assembly should move smoothly throughout entire valve stroke. The tool is fabricated from rod that is threaded on one end to fit valve stem and has a "T" bar handle of some kind on the other end for easy gripping. (See chart in Step 4 of "Disassembly" Section.)

12. Place marks on this diaphragm assembly lifting tool when the valve is closed and when manually positioned open. The distance between the two marks should be approximately the stem travel shown in stem travel chart. If the stroke is different than that shown, there is a good reason to believe something is mechanically restricting the stroke of the valve. The cover must be removed, and the obstruction located and removed. The stem should also be checked for scale build-up. (See "Maintenance" Section for procedure.)

Tight Sealing Check (#3)

13. Test for seat leakage after completing checks #1 & #2 (Steps 1 to 12). **SEE CAUTION.** Close the isolation valve downstream of the Hytrol Valve. Apply inlet pressure to the cover of the valve, wait until it closes. Install a pressure gauge between the two closed valves using one of the two ports in the outlet side of the Hytrol. Watch the pressure gauge. If the pressure begins to climb, then either the downstream isolation valve is permitting pressure to creep back, or the Hytrol is allowing pressure to go through it. Usually the pressure at the Hytrol inlet will be higher than on the isolation valve discharge, so if the pressure goes up to the inlet pressure, you can be sure the Hytrol is leaking. Install another gauge downstream of isolating valve. If the pressure between the valves only goes up to the pressure on the isolation valve discharge, the Hytrol Valve is holding tight, and it was just the isolation valve leaking.

Maintenance

Preventative Maintenance

The Cla-Val Co. Model 100-01 Hytrol Valve requires no lubrication or packing and a minimum of maintenance. However, a periodic inspection schedule should be established to determine how the operating conditions of the system are affecting the valve. The effect of these actions must be determined by inspection.

Disassembly

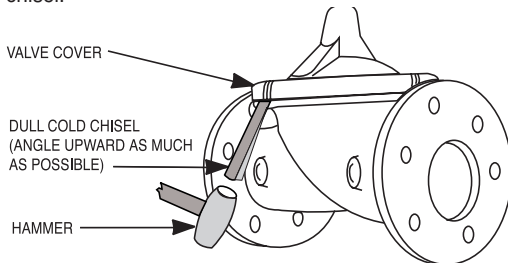
Inspection or maintenance can be accomplished without removing the valve from the line. Repair kits with new diaphragm and disc are recommended to be on hand before work begins.

WARNING: Maintenance personnel can be injured and equipment damaged if disassembly is attempted with pressure in the valve. **SEE CAUTION.**

1. Close upstream and downstream isolation valves **and independent operating pressure when used** to shut off all pressure to the valve.

2. Loosen tube fittings in the pilot system to remove pressure from valve body and cover chamber. After pressure has been released from the valve, use care to remove the controls and tubing. Note and sketch position of tubing and controls for re-assembly. The schematic in front of the Technical Manual can be used as a guide when reassembling pilot system.

3. Remove cover nuts and remove cover. If the valve has been in service for any length of time, chances are the cover will have to be loosened by driving upward along the edge of the cover with a **dull cold chisel**.



On 6" and smaller valves block and tackle or a power hoist can be used to lift valve cover by inserting proper size eye bolt in place of the center cover plug. on 8" and larger valves there are 4 holes (5/8" — 11 size) where jacking screws and/or eye bolts may be inserted for lifting purposes. **Pull cover straight up** to keep from damaging the integral seat bearing and stem.

COVER CENTER PLUG SIZE

Valve Size	Thread Size (NPT)
1 1/4" — 1 1/2"	1/4"
2" — 3"	1/2"
4" — 6"	3/4"
8" — 10"	1"
12"	1 1/4"
14"	1 1/2"
16"	2"
20" & 24"	2"
30" & 36"	2"

4. Remove the diaphragm and disc assembly from the valve body. With smaller valves this can be accomplished by hand by **pulling straight up on the stem so as not to damage the seat bearing**. On large valves, an eye bolt of proper size can be installed in the stem and the diaphragm assembly can be then lifted with a block and tackle or power hoist. Take care not to damage the stem or bearings. The valve won't work if these are damaged.

VALVE STEM THREAD SIZE

Valve Size	Thread Size (UNF Internal)
1 1/4" — 2 1/2"	10—32
3" — 4"	1/4—28
6" — 14"	3/8—24
16"	1/2—20
20	3/4—16
24"	3/4—16
30"	3/4—16
36"	3/4—16

5. The next item to remove is the stem nut. Examine the stem threads above the nut for signs of mineral deposits or corrosion. If the threads are not clean, use a wire brush to remove as much of the residue as possible. Attach a good fitting wrench to the nut and give it a sharp "rap" rather than a steady pull. Usually several blows are sufficient to loosen the nut for further removal. On the smaller valves, the entire diaphragm assembly can be held by the stem in a vise **equipped with soft brass jaws** before removing the stem nut.

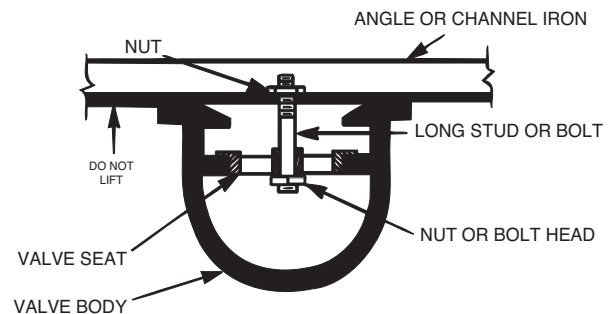
The use of a pipe wrench or a vise without soft brass jaws scars the fine finish on the stem. No amount of careful dressing can restore the stem to its original condition. Damage to the finish of the stem can cause the stem to bind in the bearings and the valve will not open or close.

6. After the stem nut has been removed, the diaphragm assembly breaks down into its component parts. Removal of the disc from the disc retainer can be a problem if the valve has been in service for a long time. Using two screwdrivers inserted along the outside edge of the disc usually will accomplish its removal. Care should be taken to preserve the spacer washers in water, particularly if no new ones are available for re-assembly.

7. The only part left in the valve body is the seat which ordinarily does not require removal. Careful cleaning and polishing of inside and outside surfaces with 400 wet/dry sandpaper will usually restore the seat's sharp edge. If, however, it is badly worn and replacement is necessary, it can be easily removed.

Seats in valve sizes 1 1/4" through 6" are threaded into the valve body. They can be removed with accessory X109 Seat Removing Tool available from the factory. On 8" and larger valves, the seat is held in place by flat head machine screws. Use a tight-fitting, long shank screwdriver to prevent damage to seat screws. If upon removal of the screws the seat cannot be lifted out, it will be necessary to use a piece of angle or channel iron with a hole drilled in the center. Place it across the body so a long stud can be inserted through the center hole in the seat and the hole in the angle iron. By tightening the nut a uniform upward force is exerted on the seat for removal.

NOTE: Do not lift up on the end of the angle iron as this may force the integral bearing out of alignment, causing the stem to bind.



Lime Deposits

One of the easiest ways to remove lime deposits from the valve stem or other metal parts is to dip them in a 5-percent muriatic acid solution just long enough for the deposit to dissolve. This will remove most of the common types of deposits. **CAUTION: USE EXTREME CARE WHEN HANDLING ACID.** Rinse parts in water before handling. If the deposit is not removed by acid, then a fine grit (400) wet or dry sandpaper can be used with water.

Inspection of Parts

After the valve has been disassembled, each part should be examined carefully for signs of wear, corrosion, or any other abnormal condition. Usually, it is a good idea to replace the rubber parts (diaphragm and disc) unless they are free of signs of wear. These are available in a repair kit. Any other parts which appear doubtful should be replaced. **WHEN ORDERING PARTS, BE SURE TO GIVE COMPLETE NAMEPLATE DATA, ITEM NUMBER AND DESCRIPTION.**

NOTE: If a new disc isn't available, the existing disc can be turned over, exposing the unused surface for contact with the seat. The disc should be replaced as soon as practical.

Reassembly

1. Reassembly is the reverse of the disassembly procedure. If a new disc has been installed, it may require a different number of spacer washers to obtain the right amount of "grip" on the disc. When the diaphragm assembly has been tightened to a point where the diaphragm cannot be twisted, the disc should be compressed very slightly by the disc guide. Excessive compression should be avoided. Use just enough spacer washers to hold the disc firmly without noticeable compression.

2. MAKE SURE THE STEM NUT IS VERY TIGHT. Attach a good fitting wrench to the nut and give it a sharp "rap" rather than a steady pull. Usually several blows are sufficient to tighten the stem nut for final tightening. Failure to do so could allow the diaphragm to pull loose and tear when subjected to pressure.

3. Carefully install the diaphragm assembly by lowering the stem through the seat bearing. Take care not to damage the stem or bearing. Line up the diaphragm holes with the stud or bolt holes on the body. On larger valves with studs, it may be necessary to hold the diaphragm assembly up part way while putting the diaphragm over the studs.

4. Put spring in place and replace cover. Make sure diaphragm is lying smooth under the cover.

5. Tighten cover nuts firmly using a cross-over pattern until all nuts are tight.

6. Test Hytrol Valve before re-installing pilot valve system.

Test Procedure After Valve Assembly

There are a few simple tests which can be made in the field to make sure the Hytrol Valve has been assembled properly. Do these before installing pilot system and returning valve to service. These are similar to the three troubleshooting tests.

1. Check the diaphragm assembly for freedom of movement after all pressure is removed from the valve. **SEE CAUTION.** Insert fabricated tool into threaded hole in top of valve stem, and lift the diaphragm assembly manually. Note any roughness, sticking or grabbing. The diaphragm assembly should move smoothly throughout entire valve stroke. The tool is fabricated from rod that is threaded on one end to fit valve stem (See chart in Step 4 of "Disassembly" section.) and has a "T" Bar handle of some kind on the other end for easy gripping.

Place marks on this diaphragm assembly lifting tool when the valve is closed and when manually positioned open. The distance between the two marks should be approximately the stem travel shown in stem travel chart. (See "Freedom of Movement Check" section.) If the stroke is different than that shown, there is a good reason to believe something is mechanically restricting the stroke of the valve. The cover must be removed, the obstruction located and removed. (See "Maintenance" Section for procedure.)

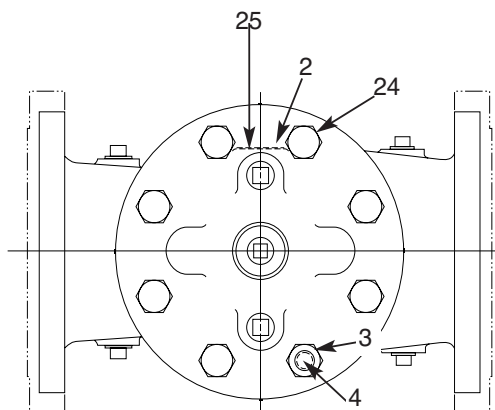
Due to the weight of the diaphragm assembly this procedure is not possible on valves 8" and larger. On these valves, the same determination can be made by carefully introducing a low pressure-less than five psi) into the valve body with the cover vented. **SEE CAUTION.** Looking in cover center hole see the diaphragm assembly lift easily without hesitation, and then settle back easily when the pressure is removed.

2. To check the valve for drip-tight closure, a line should be connected from the inlet to the cover, and pressure applied at the inlet of the valve. If properly assembled, the valve should hold tight with as low as ten PSI at the inlet. See "Tight Sealing Check" section.)

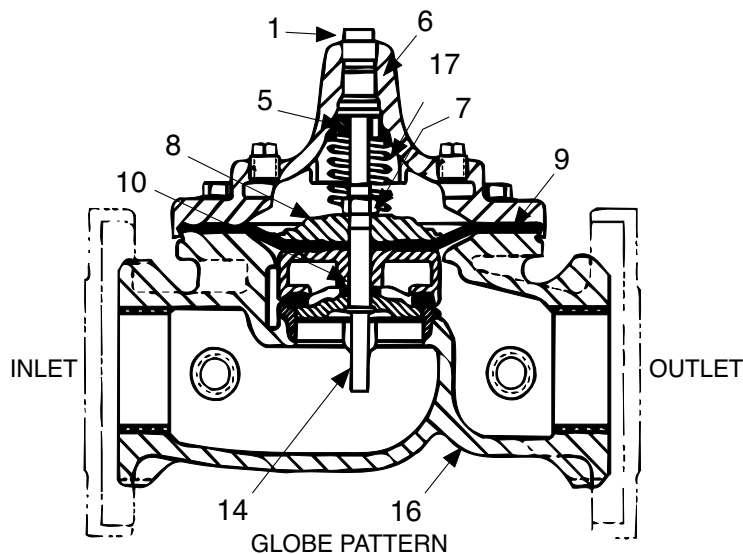
3. With the line connected from the inlet to the cover, apply full working pressure to the inlet. Check all around the cover for any leaks. Re-tighten cover nuts if necessary to stop leaks past the diaphragm.

4. Remove pressure, then re-install the pilot system and tubing exactly as it was prior to removal. **Bleed air from all high points.**

5. Follow steps under "Start-Up and Adjustment" Section in Technical Manual for returning complete valve back to service.



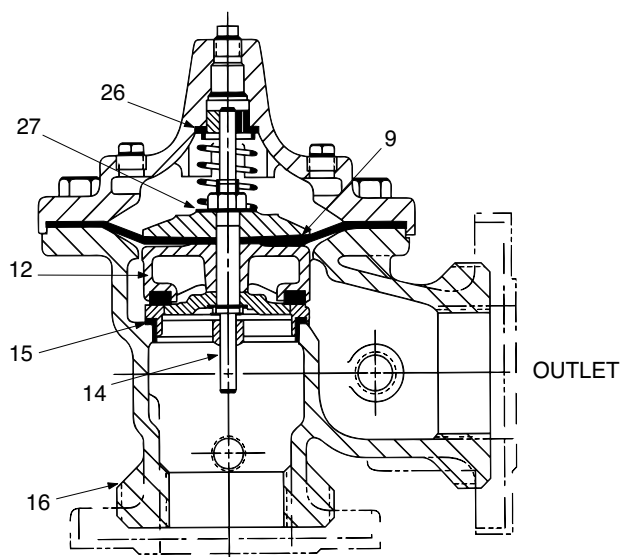
TOP VIEW



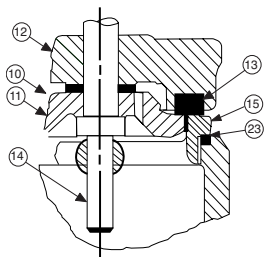
GLOBE PATTERN

PARTS LIST

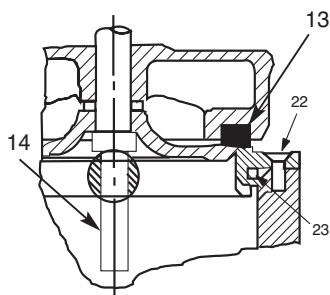
Item	Description
1.	Pipe Plug
2.	Drive Screws (for nameplate)
3.	Hex Nut (8" and larger)
4.	Stud (8" and larger)
5.	Cover Bearing
6.	Cover
7.	Stem Nut
8.	Diaphragm Washer
9.	Diaphragm
10.	Spacer Washers
11.	Disc Guide
12.	Disc Retainer
13.	Disc
14.	Stem
15.	Seat
16.	Body
17.	Spring
22.	Flat Head Screws (8" and larger)
23.	Seat O-Ring
24.	Hex head Bolt (1 1/4" thru 4")
25.	Nameplate
26.	Upper Spring Washer (Epoxy coated valves only)
27.	Lower Spring Washer (Epoxy coated valves only)
28.	Cover Bearing Housing (16" only)
29.	Cover O-Ring (16" only)
30.	Hex Bolt (16" only)
31.	Pipe Cap (16" only)



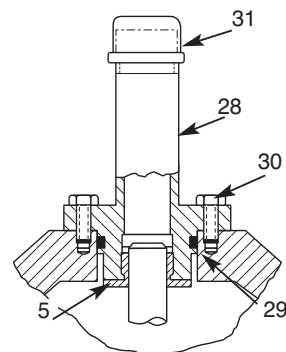
INLET
ANGLE PATTERN



1 1/4" - 6" SEAT DETAIL



8" - 24" SEAT DETAIL



16" COVER DETAIL



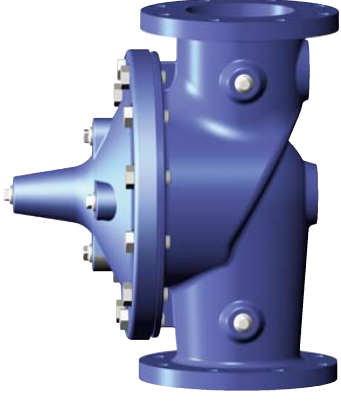
— MODEL — 100-01

Hytrol Valve Service Data

Description 100-01 Hytrol Valve

The Cla-Val Model 100-01 Hytrol Valve is a main valve for Cla-Val Automatic Control Valves. It is a hydraulically operated, diaphragm-actuated, globe or angle pattern valve.

This valve consists of three major components; body, diaphragm assembly, and cover. The diaphragm assembly is the only moving part. The diaphragm assembly uses a diaphragm of nylon fabric bonded with synthetic rubber. A synthetic rubber disc, contained on three and one half sides by a disc retainer and disc guide, forms a seal with the valve seat when pressure is applied above the diaphragm. The diaphragm assembly forms a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure.



Description 100-20 600 Series Hytrol Valve

The Cla-Val Model 100-20 Hytrol Valve (600 Series main valve) have only one part -the body- that is different from standard 100 Series Cla-Val main valve parts. The remaining parts of the 600 series main valve are standard Cla-Val main valve parts. All service and maintenance information for the standard 100 Series main valves also apply to the 600 series main valves.

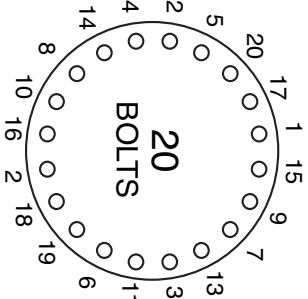
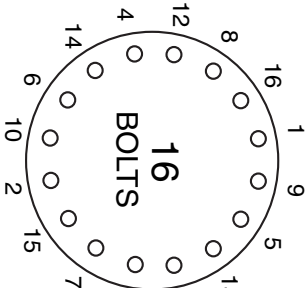
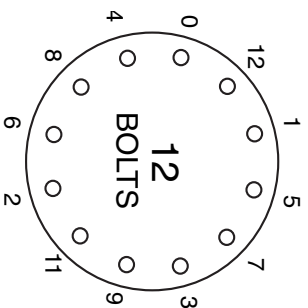
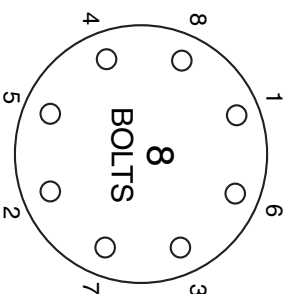
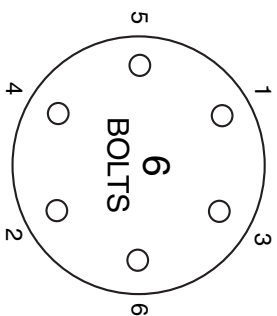
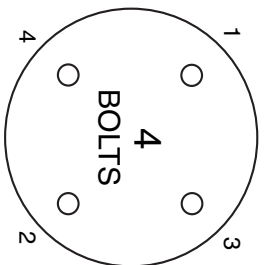
The most important thing to remember when ordering main valve repair kits and replacement parts, except for the body, all other parts are going to be for a smaller size main valve. Cla-Val identifies main valve parts with the flange size of the standard 100 Series main valve. Refer to the "Main Valve Sizes" chart below.

HYTROL Service Data

HYTROL SIZE				Stem Travel		Cover Capacity Displacement		Valve Stem Thread	Cover Center Plug	Cover Nut or Bolt			Cover Lifting Holes	Cover Plug		Cover Torque		Stem Nut**		Stem Nut Torque	
100-01	inches	mm	inches	mm	inches	Gallons	Liters	UNF-Internal	NPT	Thread (Bolt)	Socket	Qty	UNC	Thread	Socket	ft. Lbs.	in. Lbs.	Thread	Socket (Long)	Lubed	DRY
1"	25				0.3	8			1/4"	1/4" - 20 (B)	7/16"	8				4	48	3/8" - 24		4	6
1 1/4"	32				0.4	10	0.020	10 - 32	1/4"	5/16" - 18 (B)	1/2"	8				8	96	7/16" - 20		6	10
1 1/2"	40				0.4	10	0.020	10 - 32	1/4"	5/16" - 18 (B)	1/2"	8				8	96	7/16" - 20		6	10
2"	50				0.6	15	0.032	10 - 32	1/2"	3/8" - 16 (B)	9/16"	8		3/8"	7/16"	12		1/2" - 20	3/4"	10	15
2 1/2"	65				0.7	18	0.043	10 - 32	1/2"	7/16" - 14 (B)	5/8"	8		1/2"	9/16"	20		5/8" - 18	15/16"	21	30
3"	80	4"		100	0.8	20	0.080	1/4 - 28	1/2"	1/2" - 13 (B)	3/4"	8		1/2"	9/16"	30		5/8" - 18	15/16"	21	30
4"	100	6"		150	1.1	23	0.169	1/4 - 28	3/4"	3/4" - 10 (B)	1 1/8"	8		3/4"	5/8"	110		3/4" - 16	1 1/16"	40	60
6"	150	8"		200	1.7	43	0.531	3/8 - 24	3/4"	3/4" - 10 (B)	1 1/8"	12		3/4"	5/8"	110		7/8" - 14	1 5/16"	85	125
8"	200	10"		250	2.3	58	1.26	3/8 - 24	1"	3/4" - 10	1 1/4"	16	5/8" - 11	1"	13/16"	110		1 1/8" - 12	1 13/16"	125	185
10"	250	12"		300	2.8	71	2.51	3/8 - 24	1"	7/8" - 9	1 7/16"	20	3/4" - 10	1"	13/16"	160		1 1/2" - 12	1 7/8"	252	375
12"	300	16"		400	3.4	86	4.0	3/8 - 24	1 1/4"	1 1/8" - 7	1 13/16"	20	3/4" - 10	1"	13/16"	390		1 1/2" - 12	2 1/2"	270	400
14"	350				3.9	99	6.5	3/8 - 24	1 1/2"	1 1/4" - 7	2"	20	1" - 8	1"	13/16"	545		1 1/2" - 12	2 1/2"	280	420
16"	400	20", 24"		600	4.5	114	9.6	1/2 - 20	2"	1 1/4" - 7	2"	20	1" - 8	1"	13/16"	545		2" - 16	3"	500	750
20"	500				5.63	143	12	3/4 - 16	1 1/2"	1 3/8" - 6	2 1/8"	24	1" - 8	1"	13/16"	670		2 1/4" - 16	3 1/2"	930	N/R
24"	600	30"			6.75	165	29.0	3/4 - 16*	3/4"	1 1/2" - 12	2 3/8"	24	1 1/8" - 7	1"	13/16"	800		3" - 12	Special	1350	N/R
* Adapter p/n 2594101E inside 1/4" - 28"										Grade 5 Bolts "Heavy" Grade Nuts Tighten cover nuts in a "star" cross-over pattern										** Must Use ONLY Cla-Val Supplied part	

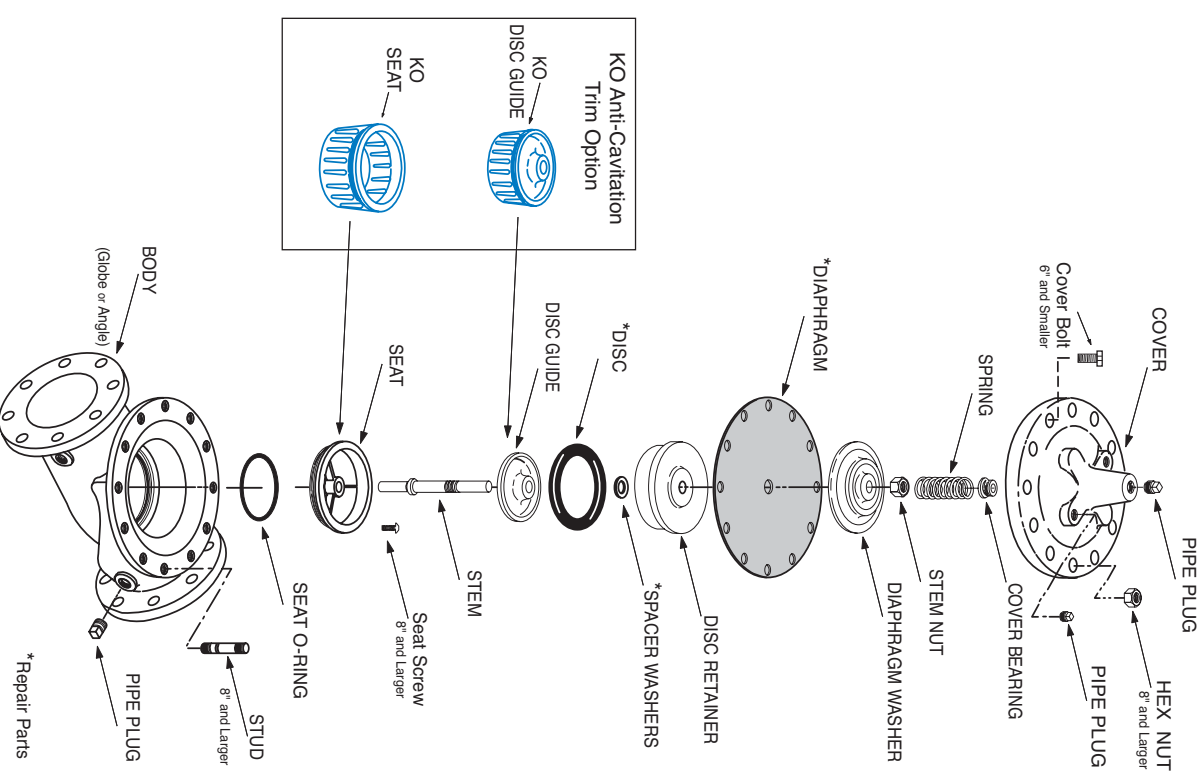
BOLT/NUT TORQUING PROCEDURES ON VALVE COVERS

100-01 Hytrol Main Valve Assembly



Follow this procedure when reassembling MAIN Valve:

1. Tightens bolts/nuts in a "Star" or "Cross-Over" pattern following the numbers shown above to insure that cover seats evenly on the diaphragm material and body.
2. Torque the bolt/nuts in three stages with a "Star" or "Cross-Over" pattern for each stage:
 - A. To approximately 10% of final torque.
 - B. To approximately 75% of final torque.
 - C. To final required torque.
3. Valves that are to be tested to 375 PSI or higher should be retorqued after 24 hours.





— MODEL — **100-20**
(Reduced Internal Port)

600 Series Hytrol Valve

SERVICE AND MAINTENANCE OF 600 SERIES VALVES

The 600 series main valves have only one part -the body- that is different from standard 100 Series Cla-Val main valve parts. The remaining parts of the 600 series main valve are standard Cla-Val main valve parts. All service and maintenance information for the standard 100 Series main valves in this manual also apply to the 600 series main valves.

The most important thing to remember when ordering main valve repair kits and replacement parts, except for the body, all other parts are going to be for a smaller size main valve. Cla-Val identifies main valve parts with the flange size of the standard 100 Series main valve. Refer to the "Main Valve Sizes Comparison" chart. For example, if you are servicing a 6" 100-20 Hytrol and needed a repair kit, you would order a repair kit for a 4" 100-01 Hytrol. This kit is also suitable for a 6" 100-20 Hytrol. Complete Technical Manuals include a repair kit data sheet N-RK that shows this relationship.

When you order repair parts, it is a good idea to include valve nameplate data (size, catalog number, and part number) and description of the parts desired. Do this to be sure parts will fit the valve you are working on and not be too big for it. Pilot controls and repair kits maintenance information remain the same for 100 or 600 Series valves.

UNDERSTANDING THE 600 SERIES VALVES

In 1987, Cla-Val introduced the Model 100-20 Hytrol as the basic main valve for the 600 Series of automatic control valves. To identify all new valves using the 100-20 Hytrol, an existing catalog number is modified. Making a 600 Series catalog number is simply done by using a "6" in front of the two digit catalog numbers or replacing the "2" with a "6" in three digit catalog numbers. Current schematics reflect both catalog numbers together separated by a slash (i.e. - 90-01/690-01, 58-02/658-02, 210-01/610-01, etc). Since these two valves 'share' the same catalog number and schematic, they provide the same function in a system. The only difference between the two valves is the relative capacity of the two main valve series.

The 100-01 Hytrol is the basic main valve for Cla-Val automatic control valves. This valve is the current version of the Clayton Hytrol valve design originated in 1936. The 100-01 Hytrol is designed as a full flow area valve. This means that the inlet, seat and outlet openings are the same size. Thus, the pressure drop is kept to a minimum for this globe style design.

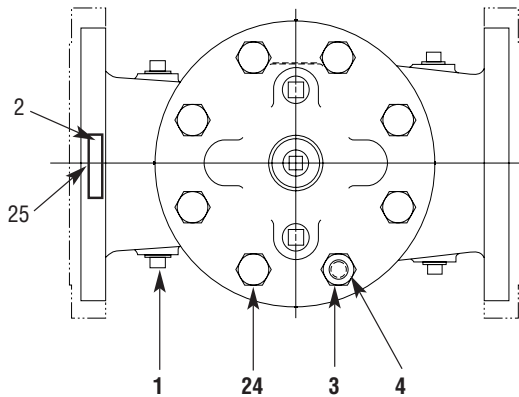
The 100-20 Hytrol valve has all of the basic features and advantages of the original 100-01 Hytrol. Only one part has been changed - the body. It is designed with different size inlet, seat and outlet openings. The 100-20 Hytrol has inlet and outlet flanges one valve size larger than the seat opening size. This results in what is sometimes called a 'reduced port' main valve. For example, a 4" 100-20 valve has a 3" seat. Note: valve size is always determined by the flange size. The following chart compares the 100-01 and the 100-20 main valves.

Basic Main Valve Size Comparison		
Globe Pattern Valves		
Flange Size (inch)	Seat Size	
	100-01 (100 Series)	100-20 (600 Series)
3	3	2
4	4	3
6	6	4
8	8	6
10	10	8
12	12	10
14	14	----
16	16	12
18	----	16
20	20	16
24	24	16
30	30	24
36	36	30
42	----	36
48	----	36
Angle Pattern Valves		
Flange Size (inch)	Seat Size	
	100-01 (100 Series)	100-20 (600 Series)
4	4	3
6	6	4
8	8	6

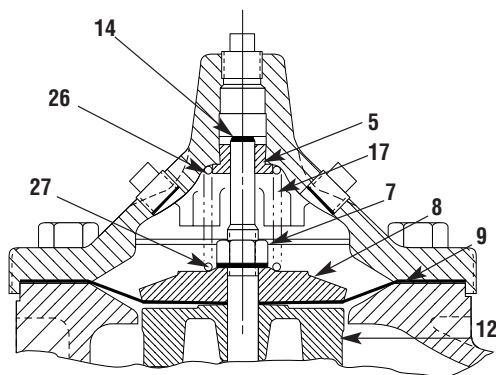
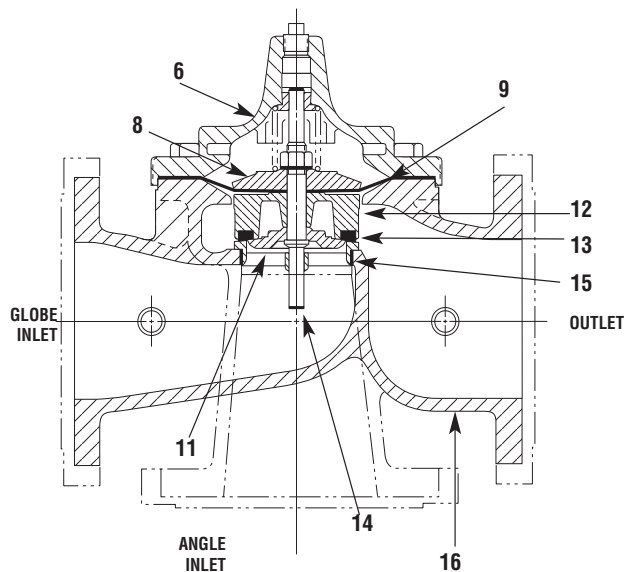
The 100-20 Hytrol is available only in ductile iron, 150 and 300 pressure class, and Bronze trim standard. Available extra cost main valve options include stainless steel trim, epoxy coating, Dura-Kleen stem, Delrin sleeved stem, and high temperature rubber parts. All four basic main valves have a 600 Series version available with all of the same benefits and size relationships. The following chart shows the relationship of Cla-Val main valve catalog numbers.

Cla-Val Main Valves

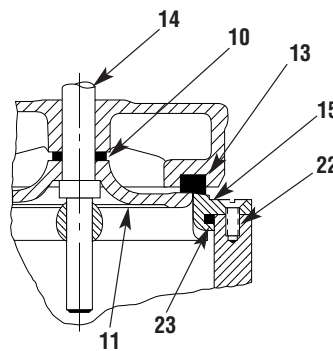
Catalog Name	Catalog Number		
	Circa 1936	100-Series	600 Series
Hytrol	100 (Angle =2100)	100-01	100-20
Powertrol	100P & 100PA	100-02	100-21
Powercheck	100PC & 100PCA	100-03	100-22
Hycheck	181	100-04	100-23



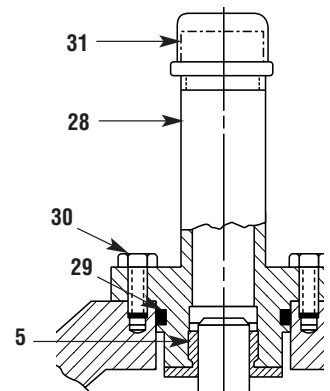
TOP VIEW



3" — 6" COVER DETAIL



10" — 24" SEAT DETAIL



20" — 24" COVER DETAIL

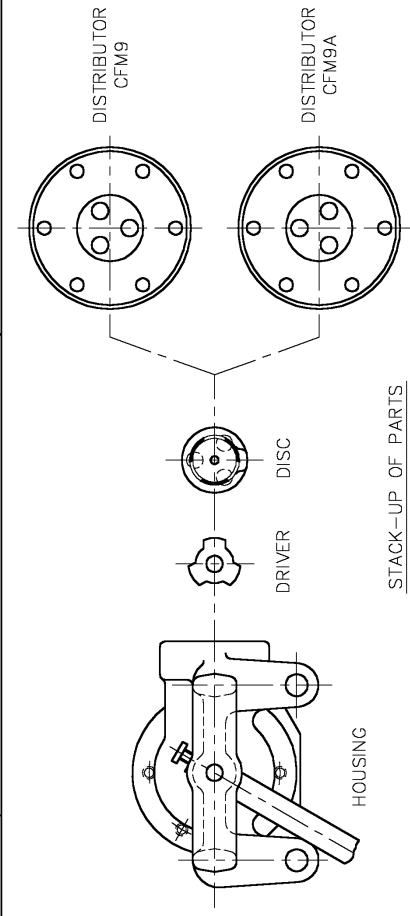
PARTS LIST

NO. DESCRIPTION

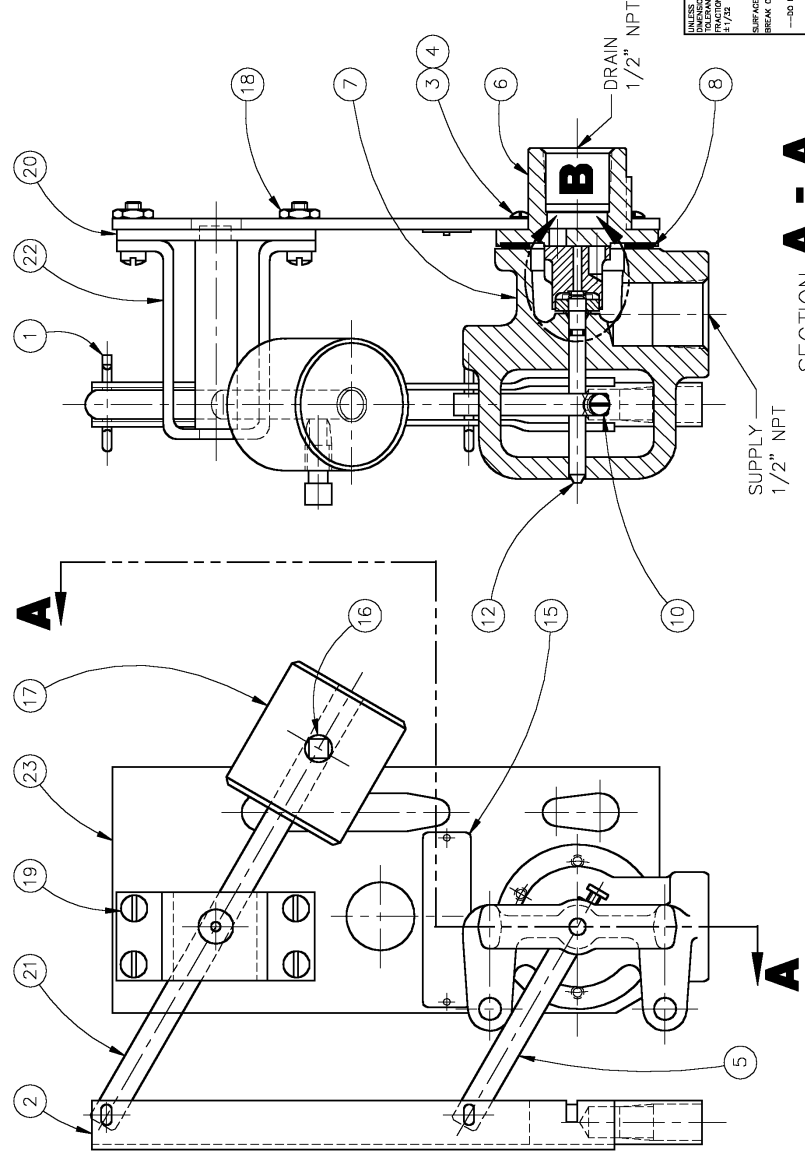
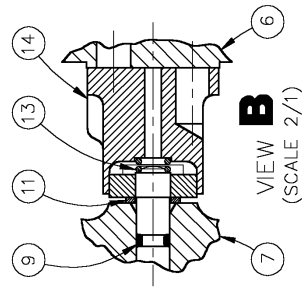
- | | |
|----|--|
| 1 | Pipe Plug |
| 2 | Drive Screws (for nameplate) |
| 3 | Hex Nut (8" and larger) |
| 4 | Stud (8" and larger) |
| 5 | Cover Bearing |
| 6 | Cover |
| 7 | Stem Nut |
| 8 | Diaphragm Washer |
| 9 | Diaphragm |
| 10 | Spacer Washers |
| 11 | Disc Guide |
| 12 | Disc Retainer |
| 13 | Disc |
| 14 | Stem |
| 15 | Seat |
| 16 | Body |
| 17 | Spring |
| 22 | Flat Head Screws (10" and larger) |
| 23 | Seat O-Ring |
| 24 | Hex Bolt (3 " Thru 6") |
| 25 | Nameplate (Mounted on inlet flange) |
| 26 | Upper Spring Washer (Epoxy coated valves only) |
| 27 | Lower Spring Washer (Epoxy coated valves only) |
| 28 | Cover Bearing Housing (20" & 24" & 30") |
| 29 | Cover Bearing Housing O-Ring (20" & 24" & 30") |
| 30 | Hex Bolt (20" & 24") |
| 31 | Pipe Cap (20" & 24" & 30") |

WHEN ORDERING PARTS, BE SURE TO GIVE COMPLETE NAMEPLATE DATA, ITEM NUMBER AND DESCRIPTION.

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REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
—	RELEASED FOR PRODUCTION (NED 38195)	12-21-92	TLC
A	ADDED MODEL CFM9A; REVISED AND REDRAWN ON CAD (NED 40718)	2-26-96	CN
B	CORRECTED "STACK-UP OF PARTS" VIEW. (ECO 16445)	1-23-97	J.BROWN



ITEM NO.	DESCRIPTION	QTY	RECD
23	BASE PLATE	1	
22	COUNTERBALANCE BRACKET	1	
21	COUNTERBALANCE SHAFT ASSEMBLY	1	
20	BEARING PLATE	1	
19	SCREW, 10-32 X .62 FIL HD	4	
18	NUT, HEX 10-32	4	
17	COUNTERWEIGHT	1	
16	SET SCREW, 1/4-20 X .75 SQ HD	1	
15	NAMEPLATE	1	
14	DISC ASSEMBLY	1	
13	SPRING	1	
12	STEM ASSEMBLY	1	
11	THRUST WASHER	1	
10	LOCK PIN	1	
9	O-RING	1	
8	GASKET	1	
7	HOUSING	1	
6	DISTRIBUTOR	1	
5	ARM, LEVER	1	
4	SCREW 6-32 X .62 FIL HD	4	
3	SCREW 6-32 X .44 FIL HD	2	
2	CONNECTING LINK ASSEMBLY	1	
1	COTTER PIN	2	

CONTRACT NO. _____		DATE _____	
DRAWN _____		CHECKED _____	
APPROVED _____		ENGR _____	
TITLE ASSEMBLY AND STACK-UP FLOAT CONTROL MODEL CFM9 & CFM9A		CAGE CODE 86184	
DWG NO. 23773		REV. B	
SCALE 1/1		SHEET 1 OF 1	

CIA-VAL CO.
NEWPORT BEACH, CALIFORNIA

07-10-08 08-14-08 10-1-2008	AK	AK	PC	BB ADDED PN'S 67783-62B (NED 62200) BC ADDED PN'S 67783-63K (NED 62218) BD ADDED PN 67783-64H (NED 62446)	<div style="display: flex; align-items: center;"> <div> CLA-VAL CO. NEWPORT BEACH, CALIFORNIA </div> </div>	CATALOG NO.	DRAWING NO. 67783	REV BD									
	TYPE OF VALVE AND MAIN FEATURES					CK2 COCK/BALL VALVE		DESIGN									
			DRAWN			MGR	4-02-80										
			CHK'D			KD	4-03-80										
				APV'D	CH	4-07-80											
SCALE: NONE																	
<div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;"> "NPT" SIZE </div> <div style="text-align: center;"> "NPT" SIZE </div> <div style="text-align: center;"> FOR PN 67783-01K </div> </div>																	
CLA-VAL PART NO. AND MATERIAL																	
BRONZE WITH HANDLE		STEEL WITH HANDLE		IRON WITH HANDLE		316 SST WITH HANDLE		316 SST W/ LOCKING HANDLE		BRONZE WITH HANDLE		MONEL WITH HANDLE		MONEL W/ LOCKING HANDLE		SIZE "NPT"	
67783-01K*		-09C		-17F		-25J SUPSD BY-26G				-41F SUPSD BY-01K						1/8"	
-02H		-10A		-18D		-26G		-51E SUPSD BY-26G -52C		-42D SUPSD BY-02H		-55F				1/4"	
-03F * -59H***		-11J		-19B		-27E		-46E SUPSD BY-27E -53A		-45G -57B * *		-48A SUPSD BY-49J		-63K		3/8"	
-04D -60F ***		-12G		-20K		-28C		-54J		-43B SUPSD BY-04D		-49J		-62B		1/2"	
-05A -61D ***		-13E		-21H		-29A		-64H		-44K SUPSD BY-05A		-56D				3/4"	
-06J		-14C		-22F		-30J						-58K				1"	
-07G		-15K		-23D		-31G										1 1/4"	
-08E		-16H		-24B		-32E										1 1/2"	
-50G						-47C										2"	
<p>* SEE ENGINEERING APPROVED VENDORS TABLE (SHEET 2 OF 2).</p> <p>** HAMMOND VALVE 8501 ONLY.</p> <p>*** WILKINS CK2 (SEE SHEET 2 OF 2)</p>																	

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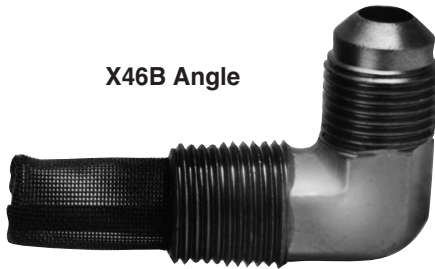
— MODEL — **X46**

Flow Clean Strainer



X46A Straight

X46B Angle

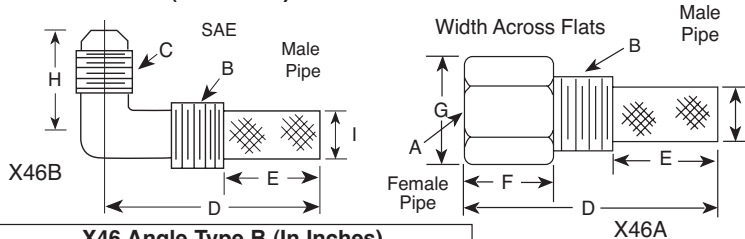


- Self Scrubbing Cleaning Action
- Straight Type or Angle Type

The Cla-Val Model X46 Strainer is designed to prevent passage of foreign particles larger than .015". It is especially effective against such contaminant as algae, mud, scale, wood pulp, moss, and root fibers. There is a model for every Cla-Val. valve.

The X46 Flow Clean strainer operates on a velocity principle utilizing the circular "air foil" section to make it self cleaning. Impingement of particles is on the "leading edge" only. The low pressure area on the downstream side of the screen prevents foreign particles from clogging the screen. There is also a scouring action, due to eddy currents, which keeps most of the screen area clean.

Dimensions (In Inches)



X46 Angle Type B (In Inches)

B(NPT)	C(SAE)	D	E	H	I
1/8	1/4	1-3/8	5/8	7/8	1/4
1/4	1/4	1-3/4	3/4	1	3/8
3/8	1/4	2	7/8	1	1/2
3/8	3/8	1-7/8	7/8	1	1/2
1/2	3/8	2-3/8	1	1-1/4	5/8

When Ordering, Please Specify:

- Catalog Number X46
- Straight Type or Angle Type
- Size Inserted Into and Size Connection
- Materials

X46A Straight Type A (In Inches)

A (NPT)	B (NPT)	D	E	F	G	I
1/8	1/8	1-3/4	3/4	1/2	1/2	1/4
1/4	1/4	2-1/4	1	3/4	3/4	3/8
3/8	3/8	2-1/2	1	7/8	7/8	1/2
3/8	1/2	2-1/2	1-1/4	1/2	7/8	3/4
1/2	1/2	3	1-1/4	1	1-1/8	3/4
3/8	3/4	3-3/8	2	1/2	1	7/8
3/4	3/4	4	2	1	1-1/2	7/8
3/8	1	4-1/4	2-3/4	1/2	1-3/8	7/8
1	1	4-1/2	2-3/4	1-1/4	1-3/4	7/8
1/2	1	4-1/4	2-3/4	1/2	1-3/8	7/8

INSTALLATION

The strainer is designed for use in conjunction with a Cla-Val Main Valve, but can be installed in any piping system where there is a moving fluid stream to keep it clean. When it is used with the Cla-Val Valve, it is threaded into the upstream body port provided for it on the side of the valve. It projects through the side of the Main Valve into the flow stream. All liquid shunted to the pilot control system and to the cover chamber of the Main Valve passes through the X46 Flow Clean Strainer.

INSPECTION

Inspect internal and external threads for damage or evidence of cross-threading. Check inner and outer screens for clogging, embedded foreign particles, breaks, cracks, corrosion, fatigue, and other signs of damage.

DISASSEMBLY

Do not attempt to remove the screens from the strainer housing.

CLEANING

After inspection, cleaning of the X46 can begin. Water service usually will produce mineral or lime deposits on metal parts in contact with water. These deposits can be cleaned by dipping X46 in a 5-percent muriatic acid solution just long enough for deposit to dissolve. This will remove most of the common types of deposits.

Caution: use extreme care when handling acid. If the deposit is not removed by acid, then a fine grit (400) wet or dry sandpaper can be used with water. Rinse parts in water before handling. An appropriate solvent can clean parts used in fueling service. Dry with compressed air or a clean, lint-free cloth. Protect from damage and dust until reassembled.

REPLACEMENT

If there is any sign of damage, or if there is the slightest doubt that the Model X46 Flow Clean Strainer may not afford completely satisfactory operation, replace it. Use Inspection steps as a guide. Neither inner screen, outer screen, nor housing is furnished as a replacement part. Replace Model X46 Flow Clean Strainer as a complete unit.

When ordering replacement Flow-Clean Strainers, it is important to determine pipe size of the tapped hole into which the strainer will be inserted (refer to column A or F), and the size of the external connection (refer to column B or G).



X43

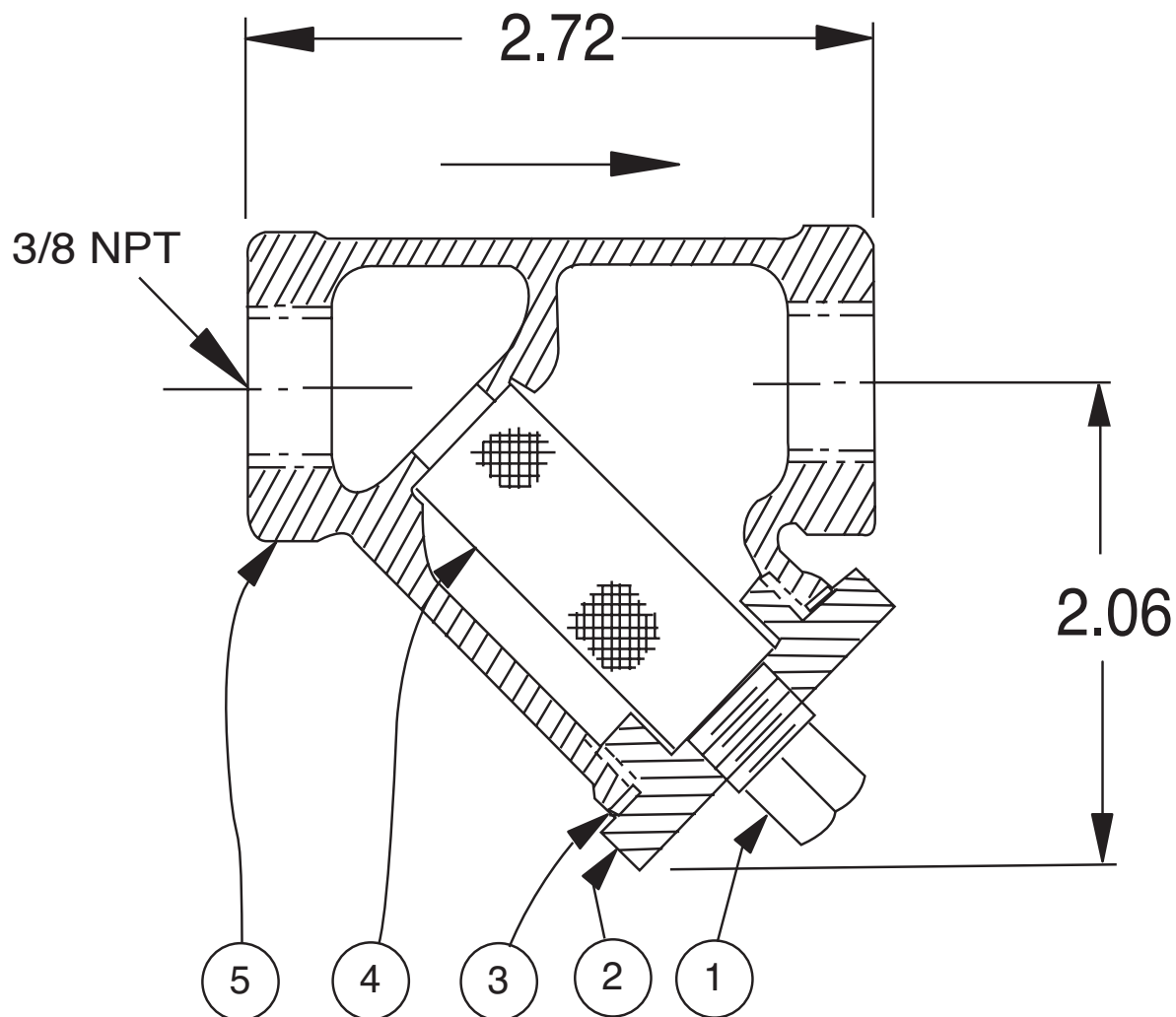
Strainer

ITEM	DESCRIPTION	MATERIAL
1	Pipe Plug	Steel
2	Strainer Plug	Brass
3	Gasket	Copper
4	Screen	SST
5	Body	Brass

No parts available. Replacement assembly only.

Standard 60 mesh pilot system strainer for fluid service.

SIZE	STOCK NUMBER
3/8 x 3/8	33450J

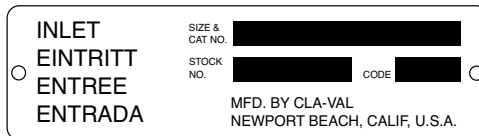


Proper Identification

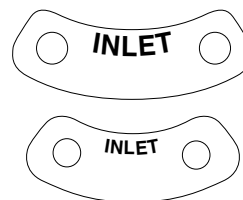
For ordering repair kits, replacement parts, or for inquiries concerning valve operation, it is important to properly identify Cla-Val products already in service by including all nameplate data with your inquiry. Pertinent product data includes valve function, size, material, pressure rating, end details, type of pilot controls used and control adjustment ranges.

Identification Plates

For product identification, cast-in body markings are supplemented by identification plates as illustrated on this page. The plates, depending on type and size of product, are mounted in the most practical position. **It is extremely important that these identification plates are not painted over, removed, or in any other way rendered illegible.**



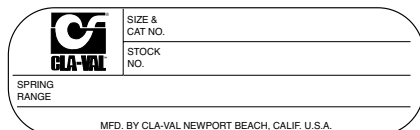
This brass plate appears on valves sized 2 1/2" and is located on the top of the inlet flange.



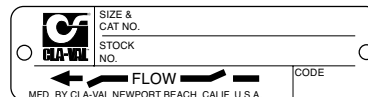
These two brass plates appear on 3/8", 1/2", and 3/4" size valves and are located on the valve cover.



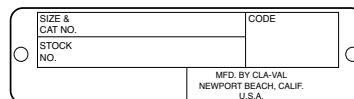
This brass plate appears on altitude valves only and is found on top of the outlet flange.



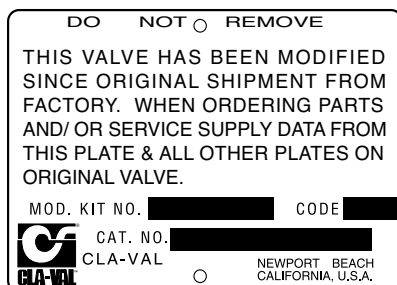
This tag is affixed to the cover of the pilot control valve. The adjustment range appears in the spring range section.



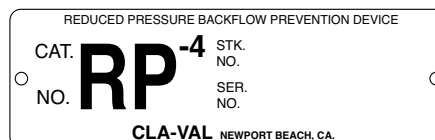
These two brass plates appear on threaded valves 1" through 3" size or flanged valves 1" through 2". It is located on only one side of the valve body.



This brass plate is used to identify pilot control valves. The adjustment range is stamped into the plate.



This aluminum plate is included in pilot system modification kits and is to be wired to the new pilot control system after installation.



This brass plate is used on our backflow prevention assemblies. It is located on the side of the Number Two check (2" through 10"). The serial number of the assembly is also stamped on the top of the inlet flange of the Number One check.

HOW TO ORDER

Because of the vast number of possible configurations and combinations available, many valves and controls are not shown in published product and price lists. For ordering information, price and availability on product that are not listed, please contact your local Cla-Val office or our factory office located at:

P. O. Box 1325
Newport Beach, California 92659-0325
(949) 722-4800
FAX (949) 548-5441

SPECIFY WHEN ORDERING

- Model Number
- Globe or Angle Pattern
- Adjustment Range (As Applicable)
- Valve Size
- Threaded or Flanged
- Body and Trim Materials
- Optional Features
- Pressure Class

UNLESS OTHERWISE SPECIFIED

- Globe or angle pattern are the same price
- Ductile iron body and bronze trim are standard
- X46 Flow Clean Strainer or X43 "Y" Strainer are included
- CK2 Isolation Valves are included in price on 4" and larger valve sizes (6" and larger on 600 Series)

LIMITED WARRANTY

Automatic valves and controls as manufactured by Cla-Val are warranted for three years from date of shipment against manufacturing defects in material and workmanship that develop in the service for which they are designed, provided the products are installed and used in accordance with all applicable instructions and limitations issued by Cla-Val. Electronic components manufactured by Cla-Val are warranted for one year from the date of shipment.

We will repair or replace defective material, free of charge, that is returned to our factory, transportation charges prepaid, if upon inspection, the material is found to have been defective at time of original shipment. This warranty is expressly conditioned on the purchaser's providing written notification to Cla-Val immediate upon discovery of the defect.

Components used by Cla-Val but manufactured by others, are warranted only to the extent of that manufacturer's guarantee.

This warranty shall not apply if the product has been altered or repaired by others, Cla-Val shall make no allowance or credit for such repairs or alterations unless authorized in writing by Cla-Val.

DISCLAIMER OF WARRANTIES AND LIMITATIONS OF LIABILITY

The foregoing warranty is exclusive and in lieu of all other warranties and representations, whether expressed, implied, oral or written, including but not limited to any implied warranties or merchantability or fitness for a particular purpose. All such other warranties and representations are hereby cancelled.

Cla-Val shall not be liable for any incidental or consequential loss, damage or expense arising directly or indirectly from the use of the product. Cla-Val shall not be liable for any damages or charges for labor or expense in making repairs or adjustments to the product. Cla-Val shall not be liable for any damages or charges sustained in the adaptation or use of its engineering data and services. No representative of Cla-Val may change any of the foregoing or assume any additional liability or responsibility in connection with the product. The liability of Cla-Val is limited to material replacements F.O.B. Newport Beach, California.

TERMS OF SALE

ACCEPTANCE OF ORDERS

All orders are subject to acceptance by our main office at Newport Beach, California.

CREDIT TERMS

Credit terms are net thirty (30) days from date of invoice.

PURCHASE ORDER FORMS

Orders submitted on customer's own purchase order forms will be accepted only with the express understanding that no statements, clauses, or conditions contained in said order form will be binding on the Seller if they in any way modify the Seller's own terms and conditions of sales.

PRODUCT CHANGES

The right is reserved to make changes in pattern, design or materials when deemed necessary, without prior notice.

PRICES

All prices are F.O.B. Newport Beach, California unless expressly stated otherwise on our acknowledgement of the order. Prices are subject to change without notice. The prices at which any order is accepted are subject to adjustment to the Seller's price in effect at the time of shipment. Prices do not include sales, excise, municipal, state or any other Government taxes. Minimum order charge \$100.00.

RESPONSIBILITY

We will not be responsible for delays resulting from strikes, accidents, negligence of carriers, or other causes beyond our control. Also, we will not be liable for any unauthorized product alterations or charges accruing there from.

RISK

All goods are shipped at the risk of the purchaser after they have been delivered by us to the carrier. Claims for error, shortages, etc., must be made upon receipt of goods.

EXPORT SHIPMENTS

Export shipments are subject to an additional charge for export packing.

RETURNED GOODS

1. Customers must obtain written approval from Cla-Val prior to returning any material.
2. Cla-Val reserves the right to refuse the return of any products.
3. Products more than six (6) months old cannot be returned for credit.
4. Specially produced, non-standard models cannot be returned for credit.
5. Rubber goods such as diaphragms, discs, o-rings, etc., cannot be returned for credit, unless as part of an unopened vacuum sealed repair kit which is less than six months old.
6. Goods authorized for return are subject to a 35% (\$100 minimum) restocking charge and a service charge for inspection, reconditioning, replacement of rubber parts, retesting, repainting and repackaging as required.
7. Authorized returned goods must be packaged and shipped prepaid to Cla-Val, 1701 Placentia Avenue, Costa Mesa, California 92627.



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Lausanne, Switzerland
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Fax: 41-21-643-15-50

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www.cla-val.com

Represented By:



— MODEL — REPAIR KITS

Complete Replacement Diaphragm Assemblies for 100-01 and 100-20 Hytrol Main Valves
For: Hytrol Main Valves with Ductile Iron, Bronze Trim Materials—**125/150 Pressure Class Only.**
FACTORY ASSEMBLED

Includes: Stem, Disc Guide, Disc, Disc Retainer, Spacer Washers, Diaphragm, Diaphragm Washer and Stem Nut.

Valve Size	Diaphragm Assembly Stock Number		Valve Size	Diaphragm Assembly Stock Number	
	100-01	100-20		100-01	100-20
3/8" (Also 81-01)	49097K	N/A	6"	40456G	33273E
1/2" - 3/4" (Also 81-01)	C2518D	N/A	8"	45276D	40456G
1"	C2520K	N/A	10"	81752J	45276D
1 1/4"-1 1/2"	C2522 F	N/A	12"	85533J	81752J
2"	C2524B	N/A	14"	89067D	N/A
2 1/2"	C2523D	N/A	16"	89068B	85533J
3"	C2525J	C2524B	20"	N/A	89068B
4"	33273E	C2525J	24"	N/A	89068B

Repair Kits for 100-01/100-20 Hytrol Valves

For: Hytrol Main Valves—**125/150 Pressure Class Only.**

Includes: Diaphragm, Disc (or Disc Assembly) and spare Spacer Washers.

Buna-N® Standard Material				Viton (For KB Valves)			
Valve Size	Repair Kit Stock Number		Valve Size	Repair Kit Stock Number		Valve Size	Repair Kit Stock Number
	100-01	100-20		100-01	100-20		
3/8" (Also 81-01)	9169801K	N/A	3/8" (Also 81-01)	9169806J	N/A	3/8" (Also 81-01)	9169806J
1/2" - 3/4" (Also 81-01)	9169802H	N/A	1/2" - 3/4" (Also 81-01)	9169807G	N/A	1/2" - 3/4" (Also 81-01)	9169807G
1"	9169803F	N/A	1"	9169808E	N/A	1"	9169808E
1 1/4" - 1 1/2"	9169804D	N/A	1 1/4" - 1 1/2"	9169809C	N/A	1 1/4" - 1 1/2"	9169809C
2"	9169805A	N/A	2"	9169810A	N/A	2"	9169810A
2 1/2"	9169811J	N/A	2 1/2"	9169817F	N/A	2 1/2"	9169817F
3"	9169812G	9169805A	3"	9169818D	9169810A	3"	9169818D
4"	9169813E	9169812G	4"	9169819B	9169818D	4"	9169819B
6"	9169815K	9169813E	6"	9169820K	9169819B	6"	9169820K
8"	9817901D	9169815K	8"	9169834A	9169820K	8"	9169834A
10"	9817902B	9817901D					
12"	9817903K	9817902B					
14"	9817904H	N/A					
16"	9817905E	9817903K					
20"	N/A	9817905E					
24"	9817906C	9817905E					

When ordering, please give complete nameplate data of the valve and/or control being repaired.
MINIMUM ORDER CHARGE APPLIES.

Repair Kits for 100-02/100-21 Powertrol and 100-03/100-22 Powercheck Main Valves**For:** Powertrol and Powercheck Main Valves—**125/150 Pressure Class Only**

Includes: Diaphragm, Disc (or Disc Assembly) and O-rings and full set of spare Spacer Washers.

Valve Size	Kit Stock Number 100-02	Valve Size	Kit Stock Number	
			100-02 & 100-03	100-21 & 100-22
3/8"	9169901H	2 1/2"	9169910J	N/A
1/2" & 3/4"	9169902F	3"	9169911G	9169905J
1"	9169903D	4"	9169912E	9169911G
1 1/4" & 1 1/2"	9169904B	6"	9169913C	9169912E
2"	9169905J	8"	99116G	9169913C
		10"	9169939H	99116G
		12"	9169937B	9169939H

Repair Kits for 100-04/100-23 Hy-Check Main Valves

Larger Sizes: Consult Factory.

For: Hy-Check Main Valves—**125/150 Pressure Class Only**

Includes: Diaphragm, Disc and O-Rings and full set of spare Spacer Washers.

Valve Size	Kit Stock Number		Valve Size	Kit Stock Number	
	100-04	100-23		100-04	100-23
4"	20210901B	N/A	12"	20210905H	20210904J
6"	20210902A	20210901B	14"	20210906G	N/A
8"	20210903K	20210902A	16"	20210907F	20210905H
10"	20210904J	20210903K	20"	N/A	20210907F
			24"	N/A	20210907F

Repair Kits for Pilot Control Valves (In Standard Materials Only)

Larger Sizes: Consult Factory.

Includes: Diaphragm, Disc (or Disc Assembly), O-Rings, Gaskets or spare Screws as appropriate.

BUNA-N® (Standard Material)				VITON (For KB Controls)	
Pilot Control	Kit Stock Number	Pilot Control	Kit Stock Number	Pilot Control	Kit Stock Number
CDB	9170006C	CFM-7	1263901K	CDB-KB	9170012A
CDB-30	9170023H	CFM-7A	1263901K	CRA-KB	N/A
CDB-31	9170024F	CFM-9	12223E	CRD-KB (w/bucking spring)	9170008J
CDB-7	9170017K	CRA (w/bucking spring)	9170001D	CRL-KB	9170013J
CDH-2	18225D	CRD (w/bucking spring)	9170002B	CDHS-2BKB	9170010E
CDHS-2	44607A	CRD (no bucking spring)	9170003K	CDHS-2FKB	9170011C
CDHS-2B	9170004H	CRD-18	20275401K	CDHS-18KB (no bucking spring)	9170009G
CDHS-2F	9170005E	CRD-22	98923G	102C-KB	1726202D
CDHS-3C-A2	24657K	CRL (55F, 55L)	9170007A		
CDHS-8A	2666901A	CRL-4A	43413E		
CDHS-18	9170003K	CRL-5 (55B)	65755B		
CDS-4	9170014G	CRL-5A (55G)	20666E		
CDS-5	14200A	CRL-18	20309801C		
CDS-6	20119301A	CV	9170019F		
CDS-6A	20349401C	X105L (O-ring)	00951E	Buna-N®	
CFCM-M1	1222301C	102B-1	1502201F	CRD Disc Ret. (Solid)	C5256H
CFM-2	12223E	102C-2	1726201F	CRD Disc Ret. (Spring)	C5255K
		102C-3	1726201F		

Repair Assemblies (In Standard Materials Only)

Control	Description	Stock Number
CF1-C1	Pilot Assembly Only	89541H
CF1-CI	Complete Float Control less Ball and Rod	89016A
CFC2-C1	Disc, Distributor and Seals	2674701E
CSM 11-A2-2	Mechanical Parts Assembly	97544B
CSM 11-A2-2	Pilot Assembly Only	18053K
33A 1"	Complete Internal Assembly and Seal	2036030B
33A 2"	Complete Internal Assembly and Seal	2040830J

When ordering, please give complete nameplate data of the valve and/or control being repaired. MINIMUM ORDER CHARGE APPLIES