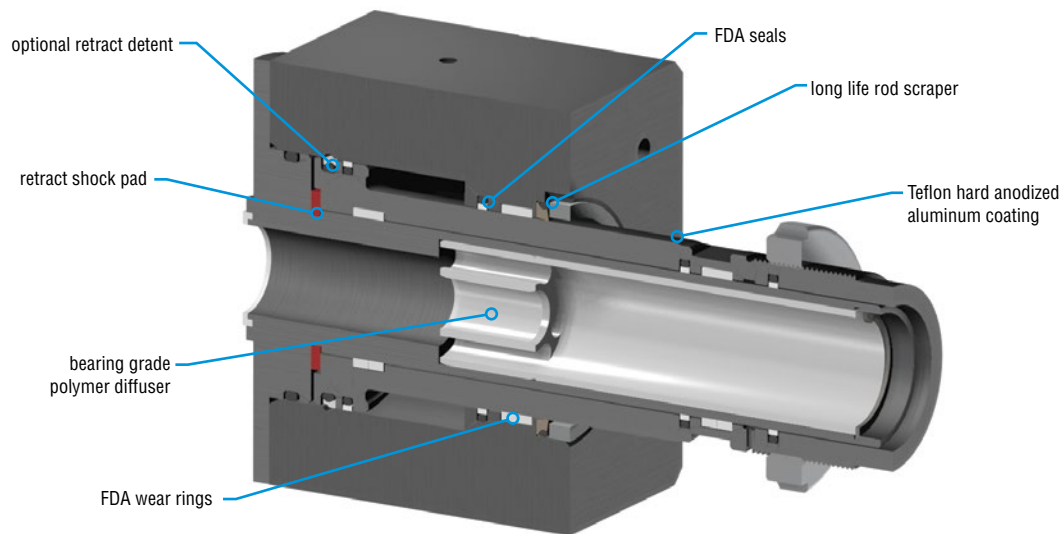


## NOZZLE CYLINDER

### Major Benefits

- Unit is designed to operate for 20 million cycles
- Components for OEM cylinder
- FDA materials used on all soft components inside unit
- Lube-free high pressure section
- Improved geometry over OEM to reduce component fatigue
- Optional internal detent to keep unit in the retract position with loss of air pressure and during service reducing chance of damaged transfer arms
- Composite, high wear resistant, rod scraper
- Tooling kit available for in field rebuild



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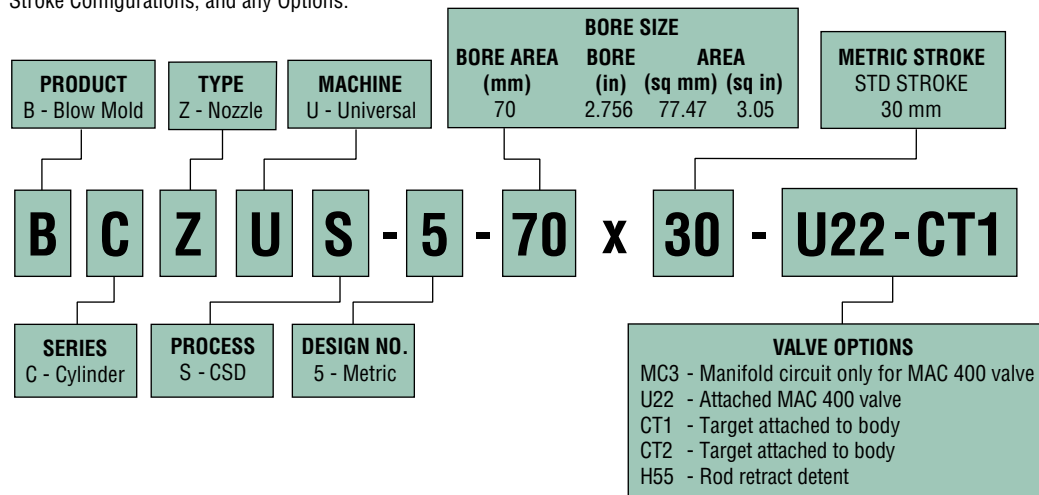
# ORDERING & ENGINEERING DATA: SERIES BCZUS

THE FOLLOWING IS A CROSS REFERENCE LISTING OF PHD TO 'S' STYLE UNITS:

PHD	'S' STYLE
BCZUS-5-7 X 30-U22-CT1	15.01124520804A
BCZUS-5-7 X 30-U22-CT2	15.01131571501
	15.01131444603
	15.01124638605A

## TO ORDER, SPECIFY:

Product, Series, Type, Machine No., Process, Design No., Bore Size, Stroke Configurations, and any Options.



CYLINDER SPECIFICATIONS	IMPERIAL	METRIC
TYPE	Pneumatic Cylinder	
SERIES	BCZU Two Step Nozzle Cylinder	
OPERATION	Double Acting	
BORE SIZE - ACTUATOR	2.756 in	70 mm
STROKE	1.181 in	30 mm
PISTON ROD DIAMETER	2.205 in	56 mm
BORE AREA EXTEND	3.680 in <sup>2</sup>	23.74 cm <sup>2</sup>
BORE AREA RETRACT	2.147 in <sup>2</sup>	13.85 cm <sup>2</sup>
OPERATING PRESSURE RANGE	30 - 145 psi	2.1 - 10 bar
BLOW PRESSURE	580 psi	40 bar
THEORETICAL EXTEND OUTPUT @ 87 PSI (6 BAR)	320.2 lbf	1424.4 N
THEORETICAL RETRACT OUTPUT @ 87 PSI (6 BAR)	186.7 lbf	830.5 N
AMBIENT AND FLUID TEMPERATURE	-20° to +180°F	-29° to +82°C
STROKE TIME - APPLIED POWER TO END OF STROKE	Extend 50 ms, Retract 110 ms	
STROKE TIME - START OF MOVEMENT TO END OF STROKE	Extend 32 ms, Retract 65 ms	
LUBRICATION	FDA Regulation 21CFR 178.3570	
PORT SIZE	N/A	
GLIDE RING	FDA Engineered Polymer	
PISTON & ROD SEALS	FDA Engineered Polymer	
BUMPER	FDA Polyurethane	
CAP	Teflon Hard Anodized Aluminum	
CYLINDER BODY	Teflon Hard Anodized Aluminum	
PISTON ROD	Teflon Hard Anodized Aluminum	
ROD BEARING	FDA Engineered Polymer	

VALVE SPECIFICATIONS	
SERIES	Mac 400 series
PRESSURE [MAX]	125 psi
FLOW [MAX]	1.0 Cv
FUNCTION	5/2
OPERATOR	Single
PILOT	Internal
SPOOL RETURN	4 way Pilot
SOLENOID	24 VDC (0.15 W)
ELECTRICAL CONNECTOR	Form "B"
MANUAL OPERATOR	Non-locking Recessed
PILOT EXHAUST	Muffled

## LIFE EXPECTANCY

Series BCZUS Cylinders have been designed for 20 million trouble-free cycles.

## CYCLE RATE

Series BCZUS Nozzle Cylinders meet or exceed cycle rate of competitor's unit when using optional manifold/valve combinations.

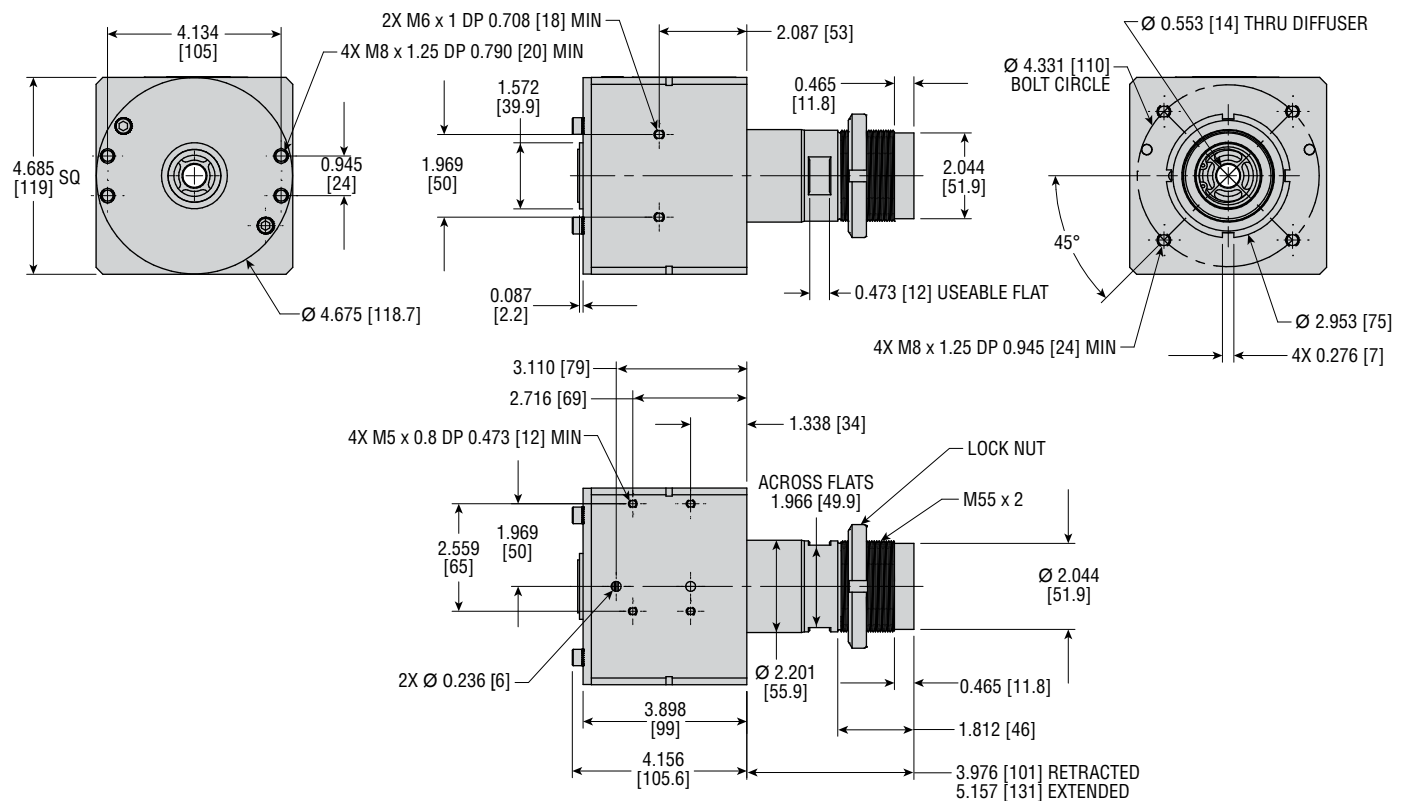
## MAINTENANCE

As with most PHD products, these cylinders are field repairable. Repair kits, tooling kits, and main structural components are available as needed for extended service. Rebuild service is available.

## LUBRICATION

Series BCZUS Nozzle Cylinders are designed and intended not to require lubrication. Static seals may be lubricated for assembly purposes using lubrication per FDA Regulation 21CFR 178.3570.

# DIMENSIONS: SERIES BCZUS UNIVERSAL® NOZZLE CYLINDER

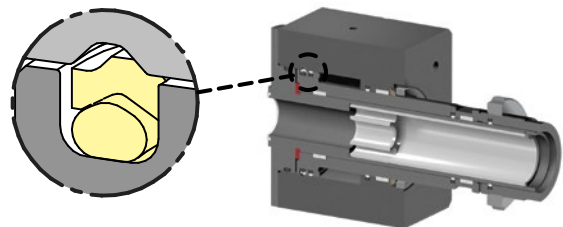


## OPTIONS: SERIES BCZU UNIVERSAL® NOZZLE CYLINDERS

**H55**

### ROD RETRACT DETENT

The H55 option provides additional retract position retention force. This additional retention force reduces the potential for nozzle dropping when the air pressure is removed.

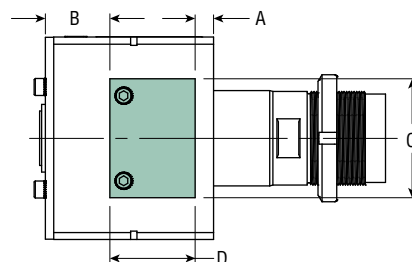
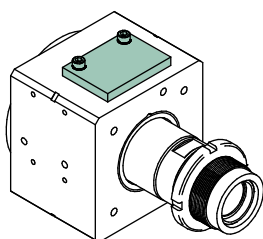


**CT1**

**CT2**

### TARGET ATTACHED TO BODY

The CT1 and CT2 target option is required for sensing of the cylinder on the machine.



UNIT SIZE	-CT1 OPTION LETTER DIMENSIONS			
	A	B	C	D
BCZUS-5-70-CT1	0.433 [11.0]	1.496 [38.0]	2.756 [70.0]	1.969 [50.0]

UNIT SIZE	-CT2 OPTION LETTER DIMENSIONS			
	A	B	C	D
BCZUS-5-70-CT2	0.826 [21.0]	1.103 [28.0]	2.756 [70.0]	1.969 [50.0]

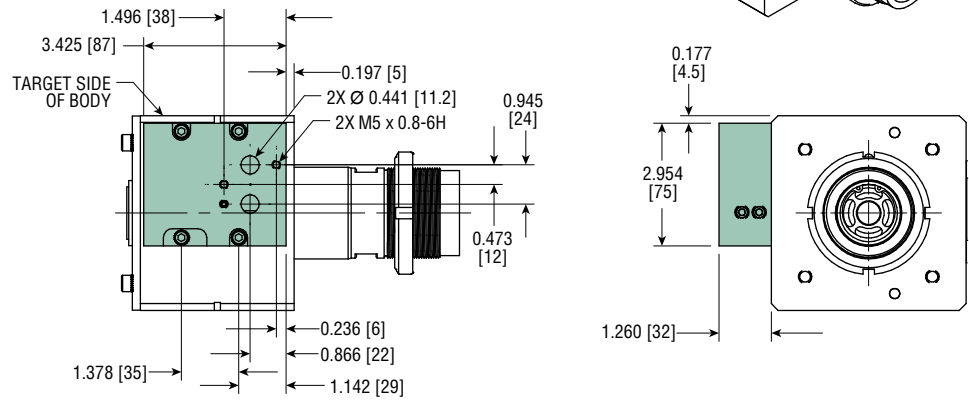
All dimensions are reference only unless specifically toleranced.

# OPTIONS: SERIES BCZUS UNIVERSAL® NOZZLE CYLINDER

**MC3**

## MANIFOLD CIRCUIT ONLY FOR MAC 400 SERIES VALVE

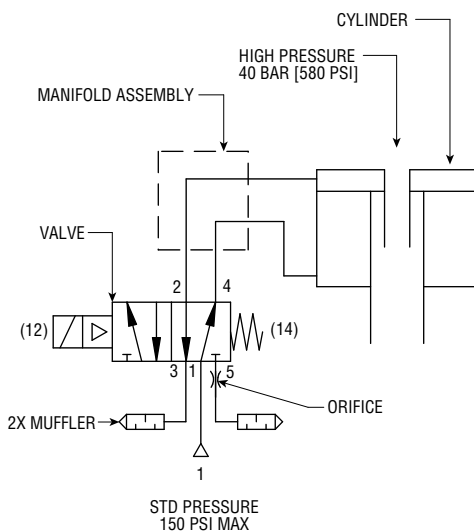
The MC3 option provides a manifold circuit only for use with MAC 400 Series valves. All hardware relating to mounting the manifold such as fasteners and seals will be provided in kit form.



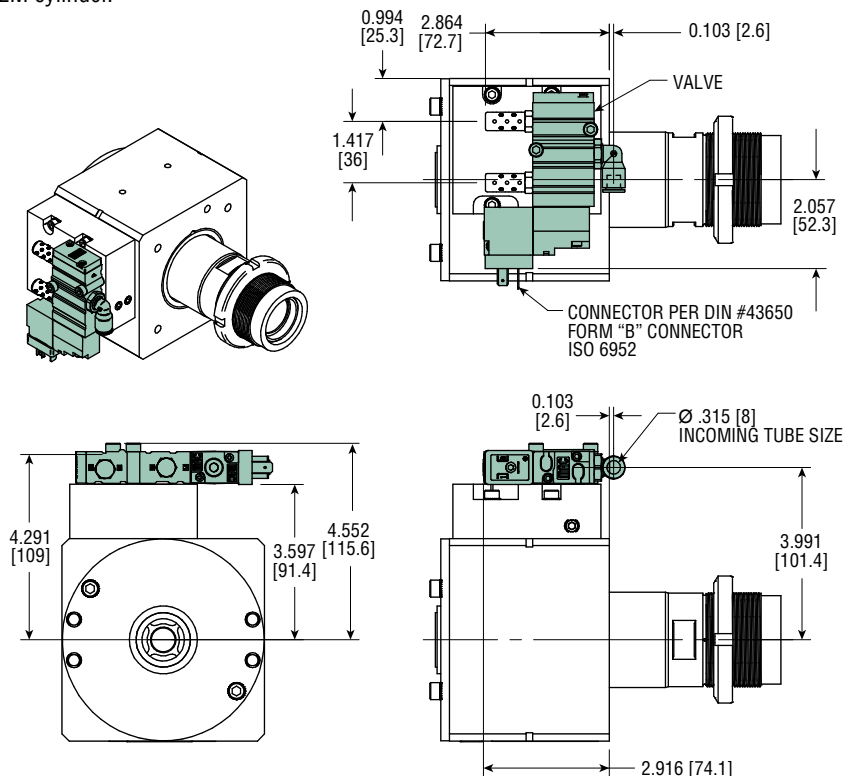
**U22**

## ATTACHED MAC 400 SERIES VALVE

The U22 option provides a manifold mounted valve combination that uses a MAC 400 Series valve. An exhaust orifice is installed in the valve so that the cylinder will achieve cycle rates of an OEM cylinder.

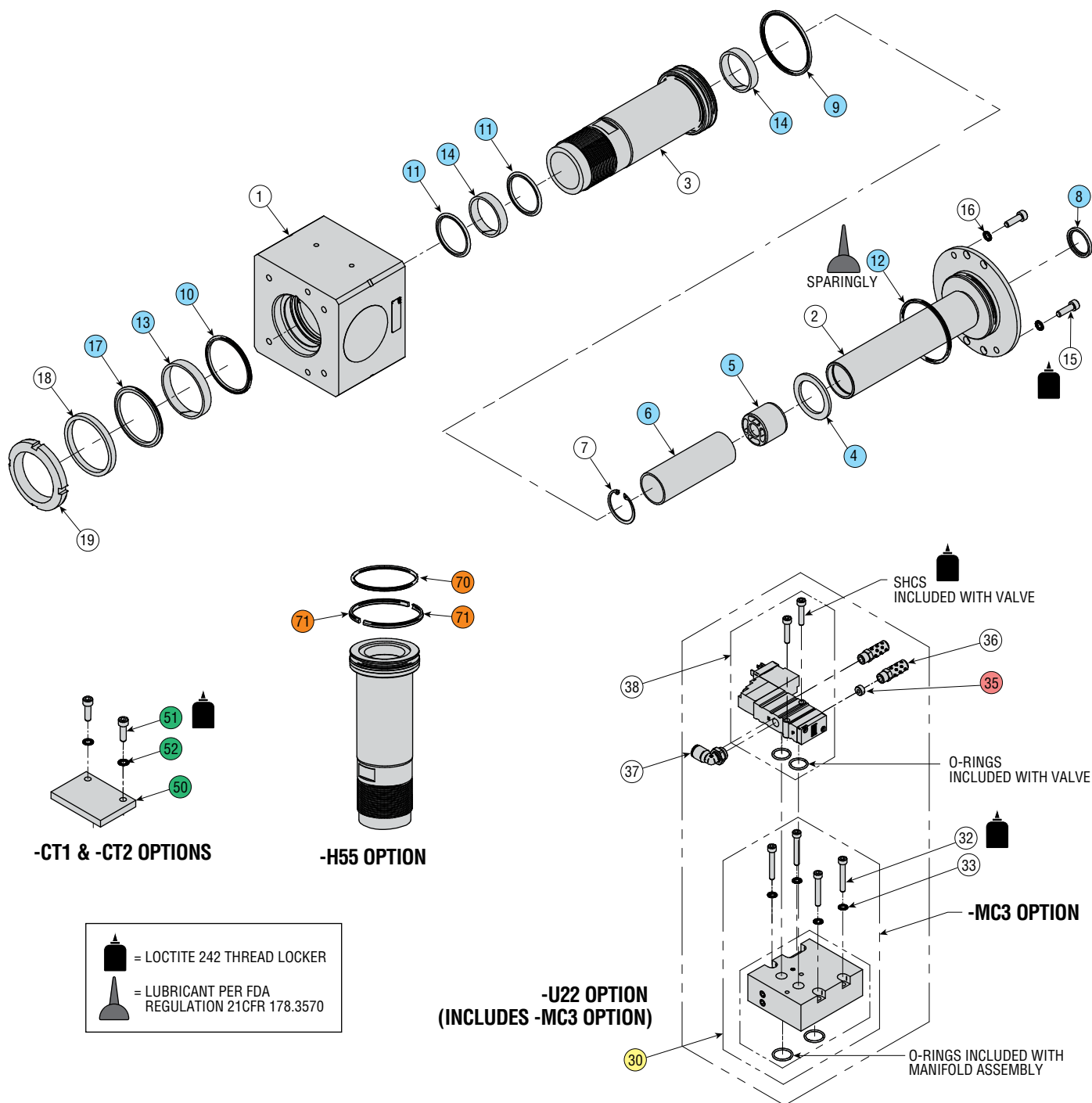


**PLUMBING SCHEMATIC**



All dimensions are reference only unless specifically toleranced.

# EXPLODED VIEW: SERIES BCZUS UNIVERSAL® NOZZLE CYLINDER



KIT DESCRIPTION	KIT NO.	COLOR CODE
Repair Kit	Full unit description required followed by -H9010	
Detent Kit	85082	
Manifold Kit	86255	
Orifice Kit	86256	
-CT1 Target Kit	86291	
-CT2 Target Kit	86292	
Repair Tooling (not shown)	86257	

# PARTS LIST: SERIES BCZUS UNIVERSAL® NOZZLE CYLINDER

## CYLINDER ONLY PARTS LIST

KEY	PART DESCRIPTION	PART NO.
1	Body	86225
2	Cap	86226
3	Piston	86227
4	Shock Pad	86228
5	Diffuser	86229
6	Spacer Tube	86230
7	Retaining Ring	Full unit description required followed by -H7101
8	Compression Seal	Sold as part of Repair Kit (-H9010*)
9	70 mm Piston Seal	Sold as part of Repair Kit (-H9010*)
10	56 mm Rod Seal	Sold as part of Repair Kit (-H9010*)
11	40 mm Rod Seal	Sold as part of Repair Kit (-H9010*)
12	O-Ring Seal	Sold as part of Repair Kit (-H9010*)
13	56 mm Wear Ring	Sold as part of Repair Kit (-H9010*)
14	40 mm Wear Ring	Sold as part of Repair Kit (-H9010*)
15	Fastener	61054-118
16	Serrated Safety Washer	84141-008-02
17	56 mm Rod Scraper	Sold as part of Repair Kit (-H9010*)
18	Rod Scraper Retainer	86237
19	Locking Nut	Full unit description required followed by -H3600

NOTE: \* Full unit description required (followed by -Hxxxx)

## -MC3 OPTION PARTS LIST

KEY	PART DESCRIPTION	PART NO.
30	Manifold Assembly	86240
32	Fastener	61054-106
33	Serrated Safety Washer	84141-007-02
35	Orifice Plug	86242
36	Muffler	86957
37	Elbow Fitting	61734-053

## -U22 OPTION PARTS LIST

KEY	PART DESCRIPTION	PART NO.
30	Manifold Assembly	86240
32	Fastener	61054-106
33	Serrated Safety Washer	84141-007-02
35	Orifice Plug	86242
36	Muffler	86957
37	Elbow Fitting	61734-053
38	400 Series Mac Valve	86243

## -CT1 OPTION PARTS LIST

KEY	PART DESCRIPTION	PART NO.
50	Target	86239
51	Fastener	61054-118
52	Serrated Safety Washer	84141-008-02

## -CT2 OPTION PARTS LIST

KEY	PART DESCRIPTION	PART NO.
50	Target	86259
51	Fastener	61054-118
52	Serrated Safety Washer	84141-008-02

## -H55 OPTION PARTS LIST

KEY	PART DESCRIPTION	PART NO.
70	O-Ring Seal	1950-143-14
71	Detent Ring	87095

NOTE: \* Full unit description required (followed by -Hxxxx)



# BCZUD

'S' Style Universal® Components

## 3 POSITION HR NOZZLE CYLINDER

### Major Benefits

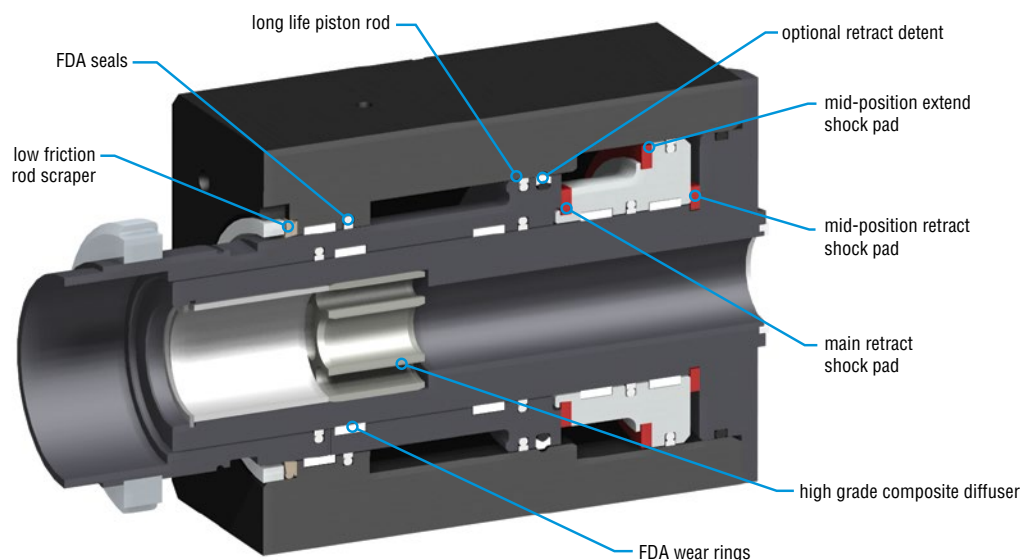
- Unit is designed to operate for 20 million cycles
- Components for 'S' style Universal® OEM Nozzle Cylinder on heat set machines
- FDA materials used on all internal components
- Completely non-lubed unit
- Improved geometry over OEM to reduce component fatigue
- Optional internal detent to keep unit in the retract position with loss of air pressure
- Composite, high wear resistant, rod scraper
- Tooling kit available for in field rebuild
- Factory rebuild available



MAC 52 Series Valves  
PHD Option -U44



MAC 400 Series Valves  
PHD Option -U22



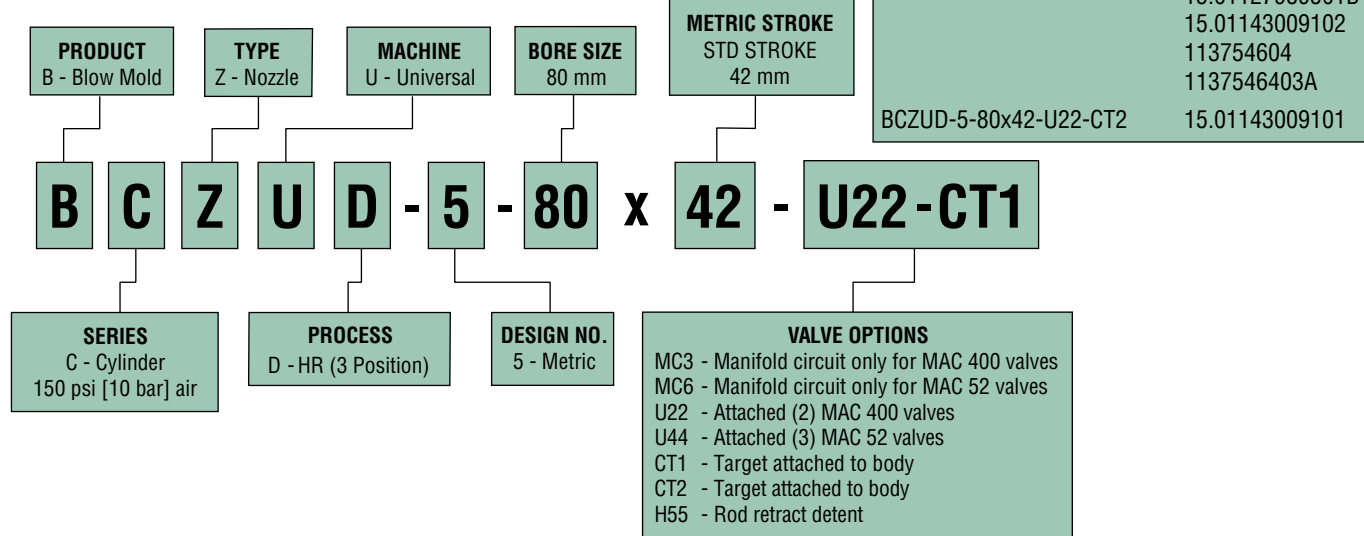
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# ORDERING & ENGINEERING DATA: SERIES BCZUD

THE FOLLOWING IS A CROSS REFERENCE LISTING OF PHD TO 'S' STYLE UNITS:

## TO ORDER, SPECIFY:

Product, Series, Type, Machine No., Process, Design No., Bore Size, Stroke Configurations, and any desired Options.



CYLINDER SPECIFICATIONS	IMPERIAL	METRIC
TYPE	Pneumatic	
SERIES	BCZU Three Step HR Nozzle Cylinder	
OPERATION	Double Acting	
MAIN BORE SIZE - ACTUATOR	3.150 in	80 mm
INTERMEDIATE BORE SIZE - ACTUATOR	3.543 in	90 mm
TOTAL STROKE	1.654 in	42 mm
INTERMEDIATE STROKE	0.787 in	20 mm
PISTON ROD DIAMETER	2.598 in	66 mm
BORE AREA EXTEND	4.240 in <sup>2</sup>	27.35 cm <sup>2</sup>
BORE AREA RETRACT (UNIT RETRACTED)	3.730 in <sup>2</sup>	24.06 cm <sup>2</sup>
BORE AREA INTERMEDIATE (UNIT RETRACTED)	0.730 in <sup>2</sup>	4.71 cm <sup>2</sup>
OPERATING PRESSURE RANGE	35 - 145 psi	2.4 - 10 bar
HIGH PRESSURE	580 psi max	40 bar max
AMBIENT AND FLUID TEMPERATURE	-20° to +180°F	-29° to +82°C
GLIDE RING	FDA Engineered Polymer	
PISTON & ROD SEALS	FDA Engineered Polymer	
BUMPER	FDA Polyurethane	
CAP, CYLINDER BODY, MAIN PISTON ROD	Teflon Hard Anodized Aluminum	
INTERMEDIATE PISTON ROD	Anodized Aluminum	

## LIFE EXPECTANCY

Series BCZUD Cylinders have been designed for 20 million trouble-free cycles.

## CYCLE RATE

Series BCZUD Nozzle Cylinders meet or exceed cycle rate of competitor's unit when using optional manifold/valve combinations.

## MAINTENANCE

As with most PHD products, these cylinders are field repairable. Repair kits, tooling kits, and all components are available as needed for extended service. Rebuild service is available.

## LUBRICATION

Series BCZUD Nozzle Cylinders are designed and intended not to require lubrication. Static seals may be lubricated for assembly purposes using lubrication per FDA Regulation 21CFR 178.3570.

## MAC 400 SERIES

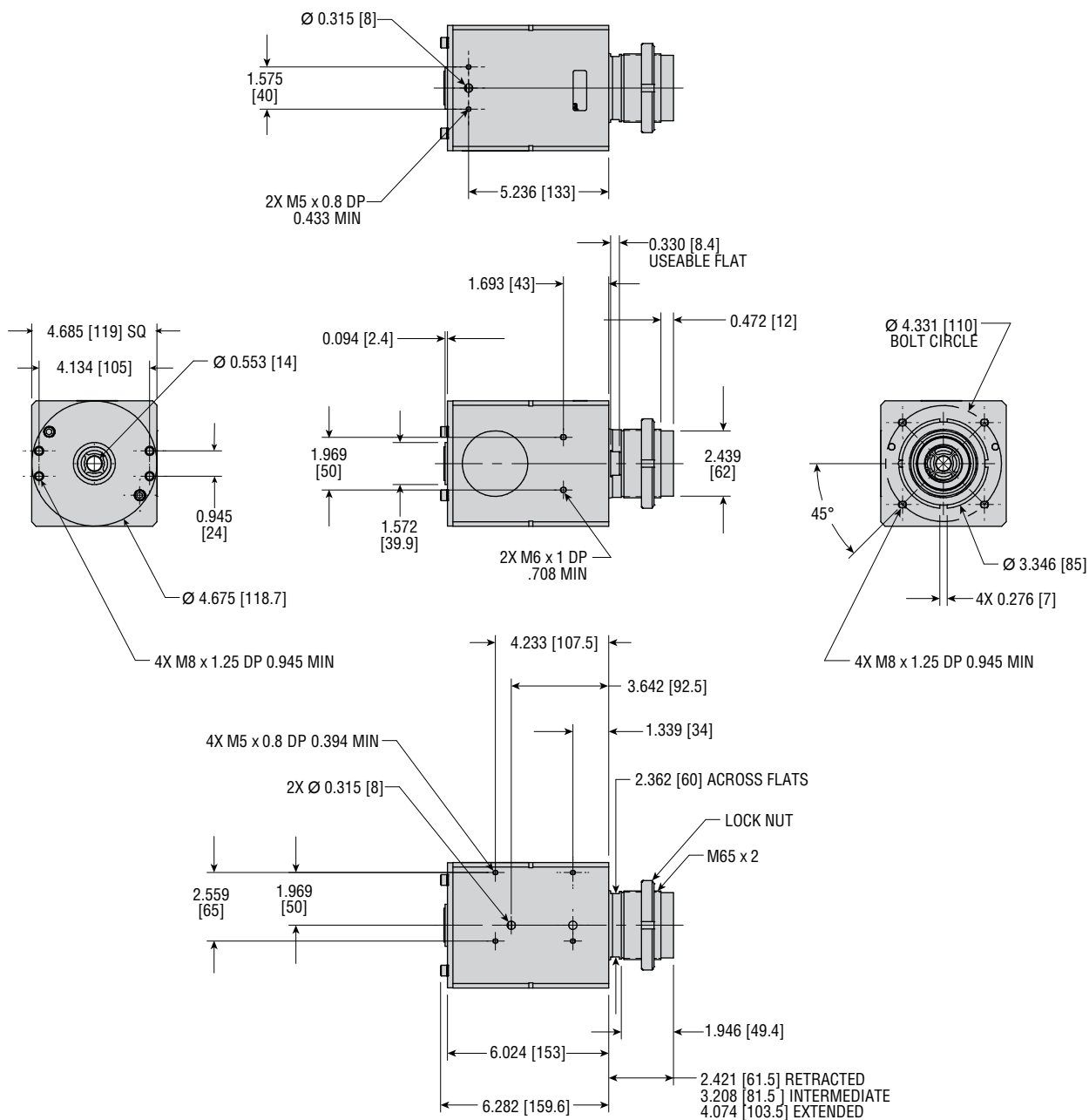
VALVE SPECIFICATIONS	EXTEND/RETRACT	INTERMEDIATE
MAXIMUM PRESSURE	120 psi	
MAXIMUM FLOW	1.0 Cv	
FUNCTION	5/2	
OPERATOR	Single	
PILOT	Internal	
SPOOL RETURN	4 way Pilot	
SOLENOID	24VDC, 5.4W	
ELECTRICAL CONNECTOR	Form "B" Style ISO 6952	Form "B" Industry Standard
MANUAL OPERATOR	Non-locking Recessed	
PILOT EXHAUST	Muffled	

## MAC 52 SERIES

VALVE SPECIFICATIONS	EXTEND	RETRACT	INTERMEDIATE
MAXIMUM PRESSURE	120 psi		
MAXIMUM FLOW	1.5 Cv		
FUNCTION	3/2		
OPERATOR	Single / N.C. Main	Single / N.O. Main	Single / N.C. Main
PILOT	Internal		
SPOOL RETURN	3 way Pilot		
SOLENOID	24VDC, 5.4W		
ELECTRICAL CONNECTOR	Form "B" Style ISO 6952	Form "B" Style ISO 6952	Form "B" Industry Standard
MANUAL OPERATOR	Non-locking Recessed		
PILOT EXHAUST	Muffled		



# DIMENSIONS: SERIES BCZUD UNIVERSAL® NOZZLE CYLINDER

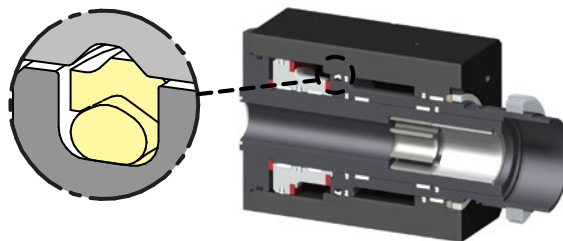


# OPTIONS: SERIES BCZUD UNIVERSAL® NOZZLE CYLINDER

**H55**

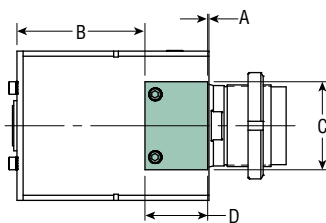
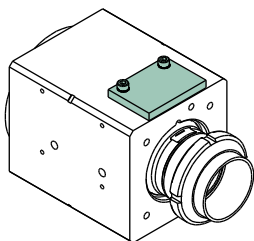
## ROD RETRACT DETENT

The H55 option provides additional retract position retention force. This additional retention force reduces the potential for nozzle dropping when the air pressure is removed.

**CT1****CT2**

## TARGET ATTACHED TO BODY

The CT1 and CT2 target option is required for sensing of the cylinder on the machine.



UNIT SIZE	-CT1 OPTION LETTER DIMENSIONS			
	A	B	C	D
BCZUD-5-80-CT1	0.039 [1.0]	4.016 [102.0]	2.756 [70.0]	1.969 [50.0]

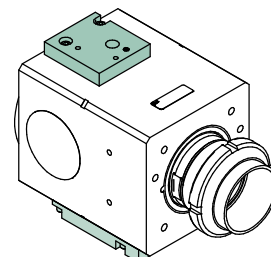
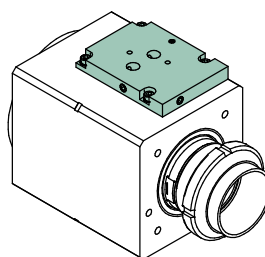
  

UNIT SIZE	-CT2 OPTION LETTER DIMENSIONS			
	A	B	C	D
BCZUD-5-80-CT2	0.432 [11.0]	3.622 [92.0]	2.756 [70.0]	1.969 [50.0]

**MC3**

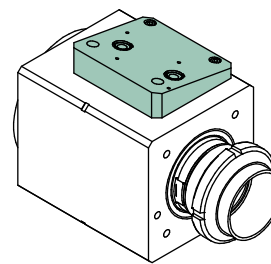
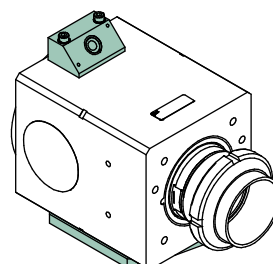
## MANIFOLD CIRCUIT ONLY FOR MAC 400 SERIES VALVE

The MC3 option provides a manifold circuit only for use with MAC 400 Series valves. All hardware relating to mounting the valve such as mufflers and seals will be provided in kit form. An exhaust orifice (Item #35 on page 56) is supplied with the kit so that the cylinder will achieve cycle rates of an OEM cylinder. Removing this orifice will change actuation time.

**MC6**

## MANIFOLD CIRCUIT ONLY FOR MAC 52 SERIES VALVE

The MC6 option provides a manifold circuit only for use with MAC 52 Series valves. All hardware relating to mounting the valve such as seals will be provided in kit form. An exhaust orifice (Item #96 on page 56) is supplied with the kit so that the cylinder will achieve cycle rates of an OEM cylinder. Removing this orifice will change actuation time.

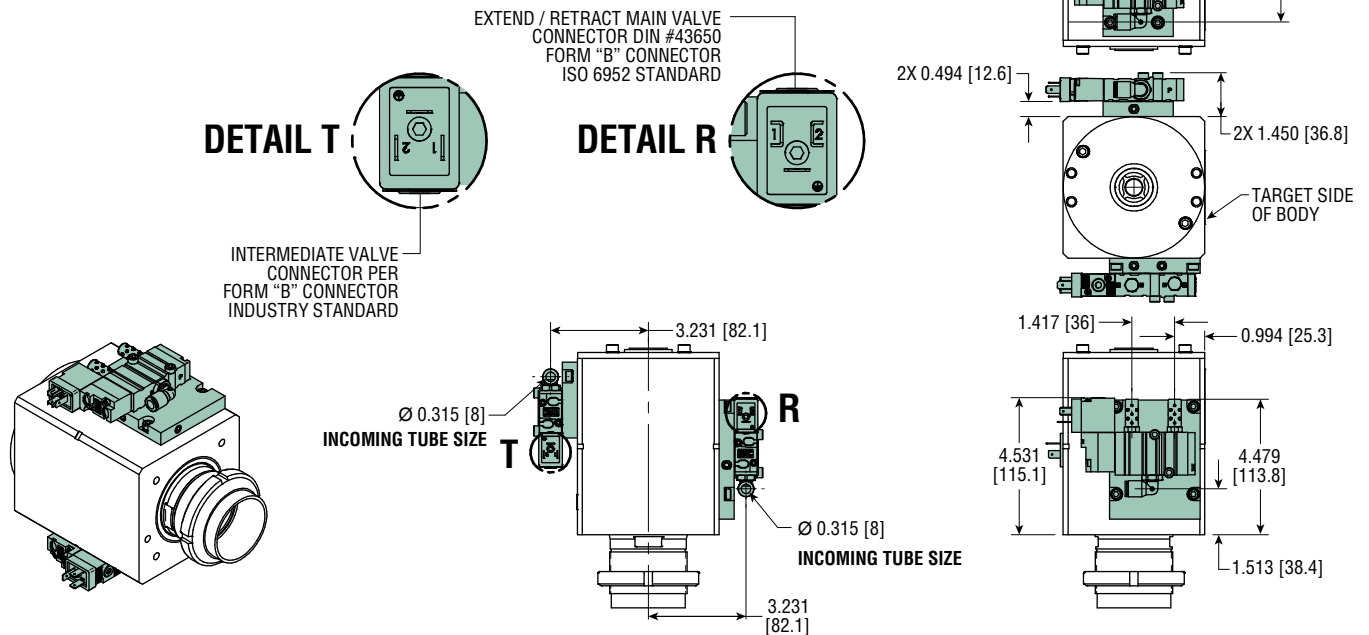


# OPTIONS: SERIES BCZUD UNIVERSAL® NOZZLE CYLINDER

## U22

### ATTACHED MAC 400 SERIES VALVES

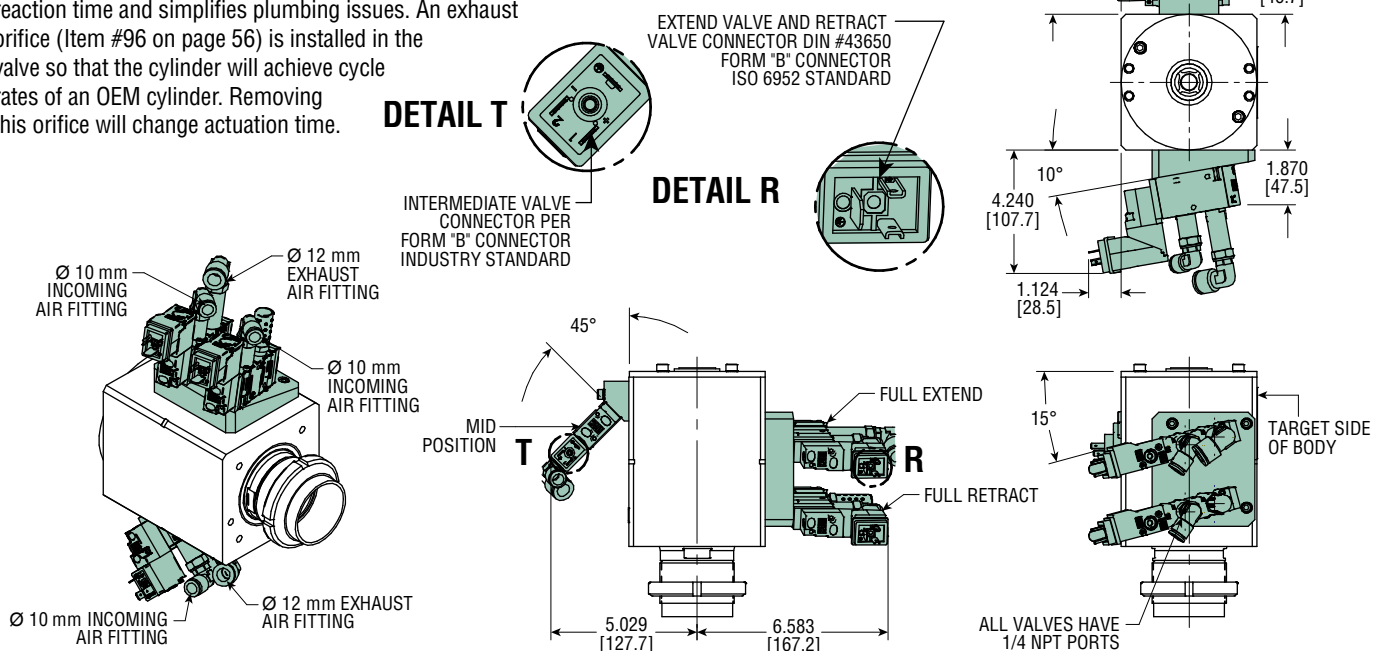
The U22 option provides a manifold-mounted valve combination that uses two MAC 400 Series valves. An exhaust orifice (Item #35 on page 56) is installed in the valve so that the cylinder will achieve cycle rates of an OEM cylinder. Removing this orifice will change actuation time.



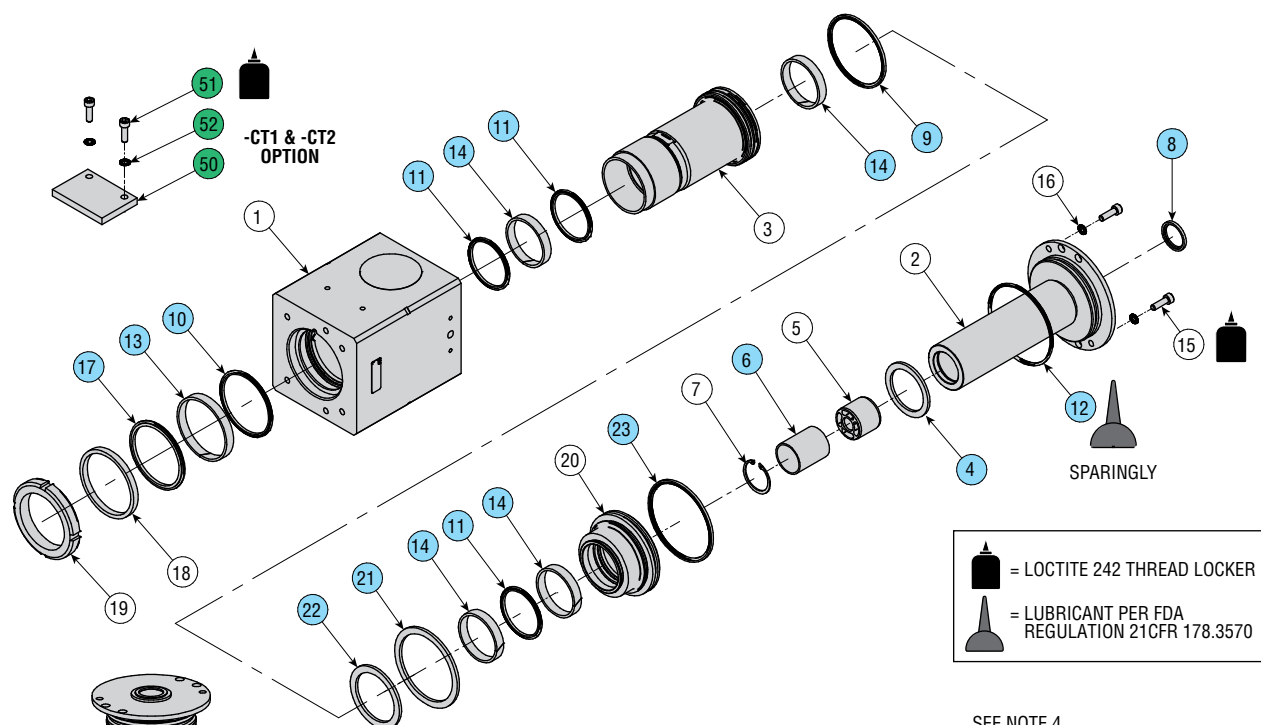
## U44

### ATTACHED MAC 52 SERIES VALVES

The U44 option provides a manifold mounted valve combination that uses three MAC 52 Series valves. This option improves reaction time and simplifies plumbing issues. An exhaust orifice (Item #96 on page 56) is installed in the valve so that the cylinder will achieve cycle rates of an OEM cylinder. Removing this orifice will change actuation time.



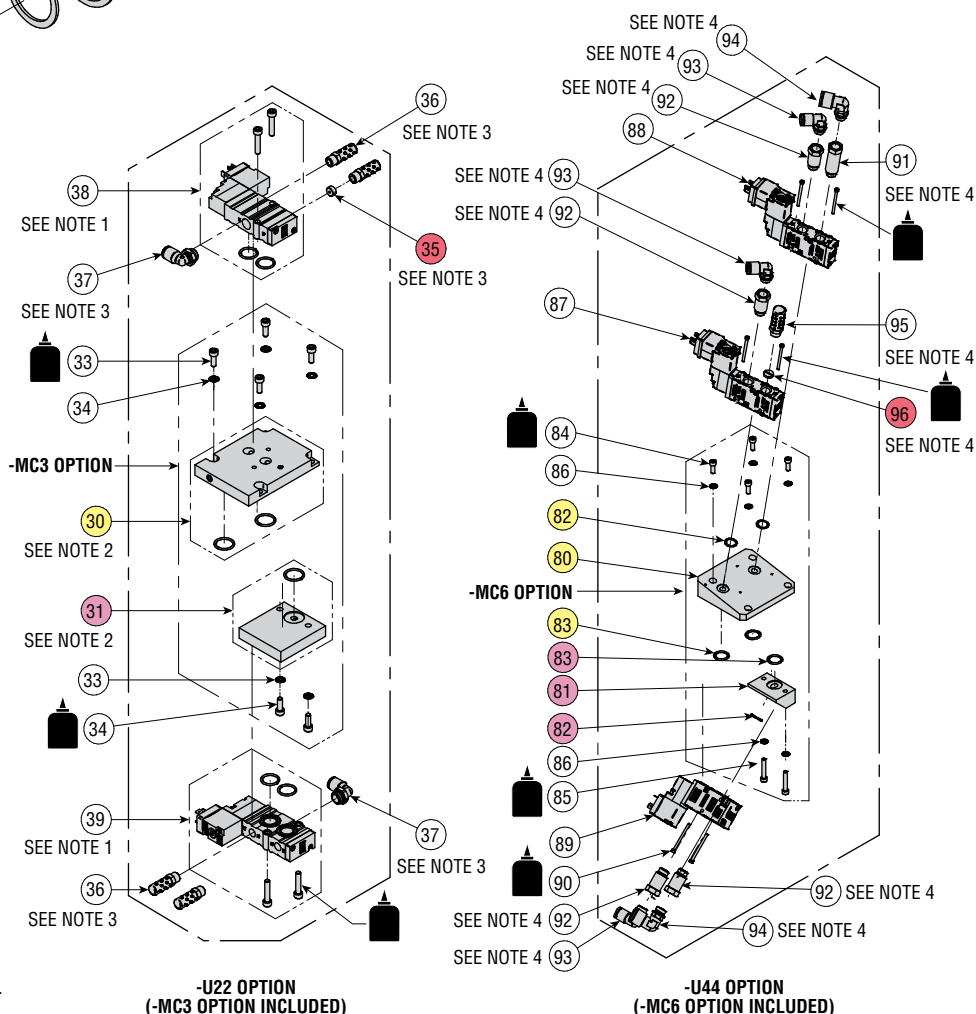
# EXPLODED VIEW: SERIES BCZUD UNIVERSAL® NOZZLE CYLINDER



KIT DESCRIPTION	KIT NO.	COLOR CODE
Repair Kit	Full unit description required followed by -H9010	
Detent Kit	88028	
Main Manifold Kit (400 Series)	88030	
Mid Manifold Kit (400 Series)	88031	
Orifice Kit (400 Series)	88032	
-CT1 Target Kit	88034	
-CT2 Target Kit	88035	
Main Manifold Kit (52 Series)	88912	
Mid Manifold Kit (52 Series)	88913	
Orifice Kit (52 Series)	88037	
Repair Tooling	88033	

## NOTES:

- 1) FASTENERS AND O-RINGS INCLUDED WITH VALVES.
- 2) O-RINGS INCLUDED IN MANIFOLD ASSEMBLIES.
- 3) INCLUDED IN -MC3 OPTION
- 4) INCLUDED IN -MC6 OPTION



# PARTS LIST: SERIES BCZUD UNIVERSAL® NOZZLE CYLINDER

## CYLINDER ONLY

KEY	PART DESCRIPTION	PART NUMBER
1	Body	87174
2	Cap	87175
3	Piston	87176
4	Shock Pad	86263
5	Diffuser	86229
6	Spacer Tube	87186
7	Retaining Ring	Full unit description required followed by -H1200
8	Compression Seal	Sold as part of Repair Kit (-H9010*)
9	80 mm Piston Seal	Sold as part of Repair Kit (-H9010*)
10	66 mm Rod Seal	Sold as part of Repair Kit (-H9010*)
11	50 mm Rod Seal	Sold as part of Repair Kit (-H9010*)
12	O-Ring Seal	Sold as part of Repair Kit (-H9010*)
13	66 mm Wear Ring	Sold as part of Repair Kit (-H9010*)
14	50 mm Wear Ring	Sold as part of Repair Kit (-H9010*)
15	Fastener	61054-118
16	Serrated Safety Washer	84141-008-02
17	66 mm Rod Scraper	Sold as part of Repair Kit (-H9010*)
18	Rod Scraper Retainer	87196
19	Locking Nut	Full unit description required followed by -H2001
20	Intermediate Piston	87177
21	Shock Pad	87178
22	Shock Pad	87179
23	90 mm Piston Seal	Sold as part of Repair Kit (-H9010*)

NOTE: \*Full unit description required (followed by -Hxxxx)

## -MC3 OPTION

KEY	PART DESCRIPTION	PART NUMBER
30	Main Manifold Assembly	87187
31	Intermediate Manifold Assembly	87190
32	Fastener	61054-100
33	Serrated Safety Washer	84141-007-02
35	Orifice Plug	87189
36	Muffler	86957
37	Elbow Fitting	61734-053

## -MC6 OPTION

KEY	PART DESCRIPTION	PART NUMBER
80	Main Manifold Plate	88907
81	Intermediate Manifold Plate	88908
82	O-Ring Seal	3642-117-1
83	O-Ring Seal	3642-015-1
84	Fastener	61054-100
85	Fastener	61054-105
86	Serrated Safety Washer	84141-007-02
91	Long Extension	74345-231
92	Short Extension	74345-230
93	Ø 10 mm Tube Elbow Fitting	74345-072
94	Ø 12 mm Tube Elbow Fitting	74345-071
95	Bantum Muffler	74854
96	Orifice Plug	88038

## -CT1 OPTION

KEY	PART DESCRIPTION	PART NUMBER
50	Target	86239
51	Fastener	61054-118
52	Serrated Safety Washer	84141-008-02

## -CT2 OPTION

KEY	PART DESCRIPTION	PART NUMBER
50	Target	86259
51	Fastener	61054-118
52	Serrated Safety Washer	84141-008-02

## -H55 OPTION

KEY	PART DESCRIPTION	PART NUMBER
70	O-Ring Seal	1950-149-14
71	Detent Ring	86334

NOTE: \*Full unit description required (followed by -Hxxxx)

## -U22 OPTION

KEY	PART DESCRIPTION	PART NUMBER
30	Main Manifold Assembly	87187
31	Intermediate Manifold Assembly	87190
32	Fastener	61054-100
33	Serrated Safety Washer	84141-007-02
35	Orifice Plug	87189
36	Muffler	86957
37	Elbow Fitting	61734-053
38	400 Series Mac Valve	86243
39	400 Series Mac Valve	87192

## -U44 OPTION

KEY	PART DESCRIPTION	PART NUMBER
80	Main Manifold Plate	88907
81	Intermediate Manifold Plate	88908
82	O-Ring Seal	3642-117-1
83	O-Ring Seal	3642-015-1
84	Fastener	61054-100
85	Fastener	61054-105
86	Serrated Safety Washer	84141-007-02
87	52 Series Mac Valve	88909
88	52 Series Mac Valve	88910
89	52 Series Mac Valve	88911
90	Manifold to Body Fastener	61054-084
91	Long Extension	74345-231
92	Short Extension	74345-230
93	Ø 10 mm Tube Elbow Fitting	74345-072
94	Ø 12 mm Tube Elbow Fitting	74345-071
95	Bantum Muffler	74854
96	Orifice Plug	88038