Pulse Cleaning System Components

Baghouse Pulse-Jet Cleaning System Schematic courtesy of Goyen Valve Corp.
Pulse Cleaning System Components (Horizontal Cartridge Collector)

Horizontal Cartridge Collector Cleaning System Graphic courtesy of Donaldson Filters
Diaphragm Valve Operation

Graphics courtesy of Goyen Valve Corp.
Dust Collector Pulse-Jet Valve Operating Sequence:
1. Differential pressure (DP) builds across the filter bags/cartridges as dust load increases in the collector.
2. Once DP reaches a pre-set point, the pulse-jet cleaning system is activated to go through a cleaning sequence/cycle, as programmed in the timer board or other controller.
3. The timer board (or other controller) then sends an electrical signal to the pilot solenoid valve(s), causing the coil to energize, thus pulling the valve plunger into the open position allowing the compressed air in the pneumatic line to bleed to atmosphere. (NOTE: The pilot solenoid valve can be **direct-mounted** (mounted directly on top of the diaphragm valve, or it can be **remote-mounted** (mounted in a solenoid enclosure separate from the diaphragm and connected with pneumatic tubing, as shown above.)
4. Bleeding the compressed air line to atmosphere causes an imbalance in air pressure within the diaphragm valve. In other words, the air pressure suddenly drops on the top-side of the diaphragm valve as the pneumatic line is bled to atmosphere.
5. The change in pressure difference within the diaphragm valve causes the compressed air manifold (compressed air tank) to force the diaphragm up from its seat, thus allowing compressed air to bypass the diaphragm and be expelled into the blow-tube. The “pulse” of compressed air then blows the dust off of the filter bags/cartridges.
6. The coil is quickly de-energized which causes the plunger to return to the closed position. Compressed air then bleeds through the diaphragm valve until the point where pressure is equalized on both sides of the diaphragm. Equalization of air pressure inside the diaphragm causes the diaphragm to reseat (return to closed position). The pulse cycle is then completed.
Steps for Diaphragm Valve Identification:
1. Valve Manufacturer (Goyen, Mecair, etc)
2. Bolt pattern of cover (number of bolts, configuration/shape)
3. Inlet/Outlet Pipe Sizes: Schedule 40 pipe diameters:
   
   \[ \frac{3}{4}'' = 1.05''; 1'' = 1.315''; 1.5'' = 1.90'' \]

4. Inlet/Outlet Connections: Threaded (T), Compression Coupling (DD), Manifold Mount (MM or MMR); Flanged (FS)
5. Remote (RCA) or Integral Solenoid Valve (CA)
6. Model Numbers (on older Goyen valves, four-digit part no.)
7. Diaphragm Materials and Cover (Buna versus Viton rubber, etc.)
8. Temperature at the valve
9. Single (3/4” to 1-1/2”) or Double Diaphragm (1-1/2” plus)
The original series valves, ¾” to 3” size, were designed with two different valve tops. One valve top, “CA” style, had an integral pilot solenoid on top. The solenoid could accept any of the standard coils. (See picture at centre.) The other valve style, “RCA” style, was “Remote Control Actuated” and was piped to a remoted-mounted pilot solenoid, usually the model RCA3D2 or RCA5D2.

**CA45T000 1-1/2” Double-Diaphragm with Integral Pilot**

Integral Piloted Valves can be fitted with these coils: QR (DIN plug), QT2, QD or QF

**RCA45DD 1-1/2” Double-Diaphragm with dresser-nut couplings.** The remote pilot solenoid is the RCA3D2, usually in an enclosure or multi-valve enclosure.
<table>
<thead>
<tr>
<th>Model</th>
<th>Size</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>K2034</td>
<td>2.75” x 2.75” with 4 bolt holes</td>
<td>20T4 ¾” 4-seriesRepair Kit</td>
</tr>
<tr>
<td>K2546</td>
<td>3.63” x 3.63” with 4 bolt holes</td>
<td>25T4 1” 4-seriesRepair Kit</td>
</tr>
<tr>
<td>K3500</td>
<td>4.25” Diameter</td>
<td>35T 1-1/2” Single</td>
</tr>
<tr>
<td>K4502</td>
<td>4.88” Dia. &amp; 2.5” Dia.</td>
<td>45T 1-1/2” DoubleRepair Kit</td>
</tr>
<tr>
<td>K5004</td>
<td>7.30” Dia. &amp; 2.5” Dia.</td>
<td>50T 2” DoubleRepair Kit</td>
</tr>
</tbody>
</table>

Threaded Diaphragm Valves (Current T & T4 Series), ¾ to 3 inch
Dresser-Nut Diaphragm Valves (DD & DD4 Series), Effective 2012

- **20DD4**
  - ¾” 4-Series
  - *K2034* Repair Kit
    - 2.75” x 2.75” with 4 bolt holes

- **25DD4**
  - 1” 4-Series
  - *K2546* Repair Kit
    - 3.63” x 3.63” with 4 bolt holes

- **45DD**
  - 1-1/2”
  - *K4502* Repair Kit
    - 4.88” dia & 2.5” dia
Flanged Diaphragm Valves (FS & FS4 Series), Effective 2012

20FS4 ¾”
K2034 Repair Kit (2.75” x 2.75” with 4 bolt holes)

25FS4 1”
K2546 Repair Kit (3.63” x 3.63” with 4 bolt holes)

45FS 1-1/2” Double
K4502 Repair Kit (4.88” dia. x 2.50” dia.)
Immersion Diaphragm Valves
(MM-Series & MMR-Series)

25MM
1” (Flat-Tank)

K2501
Repair Kit
(3.25” x 3.25”
with 4 bolt holes)

40MM
1-1/2” Flat-Tank

K4000
Repair Kit
(4.25” Dia. & 2.5” Dia.)

Immersion Diaphragm Valves Come in two arrangements:
MM-Series – Fit Flat Tanks
MMR-Series – Fit Round Tanks

MM-Series Sizes Include:
- MM-25 (1”)
- MM-40 (1-1/2”)
- MM76 (3”)

MMR-Series Sizes Include:
- 40MMR
- 62MR
- 76MR
There are many diaphragm valves that have been discontinued by Goyen years ago but are still commonly found on jet-pulse dust collectors from major OEM’s. These are just the most prevalent obsolete threaded valves and their readily available repair kits:

- **RCA20T (3/4”)** (Pentagon, 5-bolt)
  - RCA20DD (3/4”)
  - K2000 (Buna)
  - K2007 (Viton)

- **RCA25T (1”)**
  - RCA25DD (1”)
  - K2501 (Buna)
  - K2503 (Viton)

- **RCA32T (1-1/2”)**
  - (3.25” x 3.25”)
  - K2500 (Buna)
  - K2503 (Viton)

- **RCA40T (1-1/2”)**
  - (4.25” dia.)
  - K4000 (Buna)
  - K4007 (Viton)
The Millenium (3-Series) Diaphragm Valves were manufactured 2000-2012. The distinction from other valve series is that they had no “bolts” thru the valve top/cover. Kits are still available for this valve series.

**VALVE MODEL (SIZE)**
- 20T3, 20DD3, 20FS3 (3/4”)
- 25T3, 25DD3, 25FS3 (1”)

**Pilot Solenoid Options for the Millenium Diaphragms:**

**RCA3DS** is the integral (screw-on) solenoid valve. It is available with all the usual coil options and voltages. (See pic far left)

For remote piloting, the Millenium diaphragms can be connected to the RCA3D2 in any 1/8” port enclosure.
RCA3D2 (1/8-inch, 3mm) Pilot Solenoid Valve

RCA3D2 with QT2 Coil

RCA3D2 Repair Kits:
K0380 (Buna)
K0384 (Viton)

The RCA3D2 is the pilot solenoid used in the multi-valve NEMA4 rated solenoid enclosures:
3-5V (3 to 5 valves)
3-8V (4 to 8 valves)
3-12V (5 to 12 valves)
These multi-valve enclosures are UL and CSA listed and labeled.
RCA3D2 Pilot Solenoid Valve Coils

<table>
<thead>
<tr>
<th>RCA3D2 COIL TYPES:</th>
<th>RCA3D2 COIL VOLTAGE OPTIONS:</th>
<th>IP CLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>QT2 = Purple with screw spades (3D2)</td>
<td>120VAC, 200/240VAC, 24VAC; 12VDC, 24VDC</td>
<td>N/A</td>
</tr>
<tr>
<td>QF = Flying Lead</td>
<td>120VAC, 200/240VAC, 24VAC; 12VDC, 24VDC</td>
<td>IP64</td>
</tr>
<tr>
<td>QR = DIN Connector, NEMA4</td>
<td>120VAC, 200/240VAC, 24VAC; 12VDC, 24VDC</td>
<td>IP64</td>
</tr>
<tr>
<td>QD = QT Coil, NEMA1 cover, conduit entry</td>
<td>120VAC, 200/240VAC, 24VAC; 12VDC, 24VDC</td>
<td>IP31</td>
</tr>
</tbody>
</table>
Pilot Solenoid Valves
For 3-Series (Millenium) & Older Valves

RCA5D2:
¼"npt Solenoid Valve was used for many years, particularly on the 1-1/2" and larger diaphragm valves. It is available also in the 5-6V multi-valve enclosure. Parts include the K0580 repair kit and B2 (purple) coil.

TRICK: Here’s how to tell the RCA5D2 from the 3D2; on the 3D2 screw spades protrude.

RCA3DS:
1/8"npt solenoid valve is used strictly on the obsolete Millenium (3-series) diaphragm valves. It uses the Q-series coils and the K0380 repair kit (K0384 viton high-temp kit). The RCA3DS is basically an “RCA3D2 valve with a plastic shroud”.

RCA3DS
3-Series (QR coil)

TRICK: The RCA3DS and RDA3DM valves are almost identical. The only difference is the RCA3DM valve has a groove with an o-ring on the bottom; this is needed to seal the valve onto the 4-series vlv.
Pilot Solenoid Valves
(For New 4-Series Diaphragm Valves)

RCA3DM:
1/8"npt Solenoid Valve is specifically on the new 4-series diaphragm valves. The valve uses the standard Q-series coils (the picture above shows the QR coil), and K0380 repair kit. (The RCA3DM has an o-ring on the bottom to seal onto the 4-series diaphragm valve top.)

RCAC20T4 4-series threaded diaphragm with RCA3PV pilot valve (bottom right)

RCAC25DD4 compression-coupling diaphragm; RCA3DM pilot solenoid with QD coil. (bottom left)

RCA3PV:
This valve fits the new 4-series diaphragms only! This is a lower-cost, CE listed valve. It uses the new SB4 coil. NO repair kit is available.
GOYEN VALVE offers a number of multi-valve solenoid enclosures, three 1/8” valve enclosures with NEMA4 rating, one ¼” valve enclosure, and two NEMA7/9 dual-rated valve enclosures – one with CSA/UL certification and one with ATEX certification:

NEMA4 rated enclosures include:
- 3-5V
- 3-8V (with heater option)
- 3-12V
This enclosure uses RCA3D2 1/8” port solenoid valves.

¼” Solenoid Multi-Valve Enclosure, 5-6V
This enclosure uses RCA5D2 pilot valve and is only used for replacement on older equipment.

Explosion-Rated Multi-Valve Enclosure with CSA/UL or ATEX Certification, 3-6VFD;
Uses RCA3D2 pilot valve, K0383 repair kit, Q-series coils.
### Diaphragm Valve Repair Kit Table

#### Table Notes:
1) Valves in RED type are discontinued. Only repair kits are available for these valves.
2) Kits include diaphragm(s) and spring(s), where required.
3) Low temperature kits are only available for a few valves, as noted.

<table>
<thead>
<tr>
<th>SIZE</th>
<th>DIAPHRAGM VALVE MODEL(S):</th>
<th>GOYEN DIAPHRAGM VALVE REPAIR KITS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>STANDARD TEMP. RANGE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-40C to 82C)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LOW TEMP.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-60C to 82C)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HIGH TEMP. RANGE (VITON)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-29C to 232C)</td>
</tr>
<tr>
<td>3/8” Ø</td>
<td>SINGLE-DIAPHRAGM: RCA10T; RCA6T</td>
<td>K1001</td>
</tr>
<tr>
<td>3/4” Ø</td>
<td>4-SERIES: RCAC20T4; RCAC20DD4; RCAC20FS4; RCAC20ST4</td>
<td>K2034</td>
</tr>
<tr>
<td></td>
<td>MILLENIUM: RCAC20T3; RCAC20DD3; RCAC20FS3</td>
<td>K2016</td>
</tr>
<tr>
<td></td>
<td>5-BOLT: (R)CA20T; (R)CA20DD;</td>
<td>K2000 (M1204B)</td>
</tr>
<tr>
<td></td>
<td>5-BOLT: (R)CA20M</td>
<td>K2003</td>
</tr>
<tr>
<td>1” Ø</td>
<td>4-SERIES: RCAC25T4; RCAC25DD4; RCAC25FS4</td>
<td>K2546</td>
</tr>
<tr>
<td></td>
<td>IMMERSION VALVE: RCA25MM</td>
<td>K2501 (M1183B)</td>
</tr>
<tr>
<td></td>
<td>MILLENIUM: RCAC25T3; RCAC25DD3; RCAC25FS3</td>
<td>K2529</td>
</tr>
<tr>
<td></td>
<td>4-BOLT: (R)CA25T; (R)CA25DD; (R)CA25FS</td>
<td>K2501 (M1183B)</td>
</tr>
<tr>
<td>1-1/2” Ø</td>
<td>DOUBLE-DIAPHRAGM: (R)CA45T; (R)CA45DD; (R)CA45FS;</td>
<td>K4502 (M2162)</td>
</tr>
<tr>
<td></td>
<td>SINGLE-DIAPHRAGM: (R)CA35T</td>
<td>K3500 (M1581)</td>
</tr>
<tr>
<td></td>
<td>SINGLE-DIAPHRAGM, 4-BOLT: (R)CA32T</td>
<td>K2500 (M1183)</td>
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<td></td>
<td>DOUBLE-DIAPHRAGM, 6-BOLT: (R)CA40T</td>
<td>K4000 (M1182)</td>
</tr>
<tr>
<td>2” Ø</td>
<td>DOUBLE-DIAPHRAGM: (R)CA50T</td>
<td>K5004 (M765A)</td>
</tr>
<tr>
<td>2-1/2” Ø</td>
<td>DOUBLE-DIAPHRAGM: (R)CA62T</td>
<td>K5005</td>
</tr>
<tr>
<td>3” Ø</td>
<td>DOUBLE-DIAPHRAGM: (R)CA76T</td>
<td>K7600</td>
</tr>
<tr>
<td>Goyen Solenoid Valve Model(s):</td>
<td>Solenoid Valve Repair Kits</td>
<td>Standard Temp. (-40C to 82C)</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>RCA3DM (4-Series Solenoid Valve)</td>
<td>K0380 (M1131B)</td>
<td>K0384 (M1167B)</td>
</tr>
<tr>
<td>RCA3PV (4-Series Solenoid Valve)</td>
<td>NONE</td>
<td>NONE</td>
</tr>
<tr>
<td>3D2 (RCA3D2), 1/8&quot; Pilot Solenoid (direct mount or remote mount)</td>
<td>K0380 (M1131B)</td>
<td>K0384 (M1167B)</td>
</tr>
<tr>
<td>RCA5D2, 1/4&quot; Pilot Solenoid (5-6V Encl.) CA40T1 (single diaphragm)</td>
<td>K0580 (AC) (M1141B) M1160 (DC)</td>
<td>M1168</td>
</tr>
<tr>
<td>3-6VFP, 3-6VDP (Expl. Proof Encl.)</td>
<td>K0383</td>
<td></td>
</tr>
<tr>
<td>RCA3DS (Millennium Series Solenoid)</td>
<td>K0380 (M1131B)</td>
<td>K0384 (M1167B)</td>
</tr>
<tr>
<td>CA-32 (SH)</td>
<td>K0389 (M1197)</td>
<td>N/A</td>
</tr>
<tr>
<td>CA-40-TH2</td>
<td>K0386</td>
<td>N/A</td>
</tr>
<tr>
<td>CA-TB</td>
<td>M1150</td>
<td>N/A</td>
</tr>
<tr>
<td>RCA5V3 - RCA5V5 (Old Style Explosion Enclosure)</td>
<td>M735 (AC) M769 (DC)</td>
<td>N/A</td>
</tr>
<tr>
<td>CAC-45 Conversion Kit</td>
<td>K0381</td>
<td>N/A</td>
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<tr>
<td>CAC45 Converted</td>
<td>K0390</td>
<td>N/A</td>
</tr>
<tr>
<td>CATK (CA40TK)</td>
<td>M1177</td>
<td>N/A</td>
</tr>
<tr>
<td>RCA25/32TAO</td>
<td>M1637</td>
<td>N/A</td>
</tr>
</tbody>
</table>