# V86 Series Ball Valves, High Pressure 2-way & 3-way Ball Valves
# VC86 Series CNG Ball Valves, 2-way Ball Valves

Catalog No. V86-7
March 2009

## Features

- High pressure up to 10 000 psi (689 bar).
- Blowout proof design with internally loaded stem.
- Handle indicates the flow direction.
- Positive stop with robust stop pin.
- High flow rate with maximum orifice.
- Various end ports including Dk-Lok tube port.
- Various flow control with a side or bottom inlet port on 3-way valves.

Optional Oval Handle

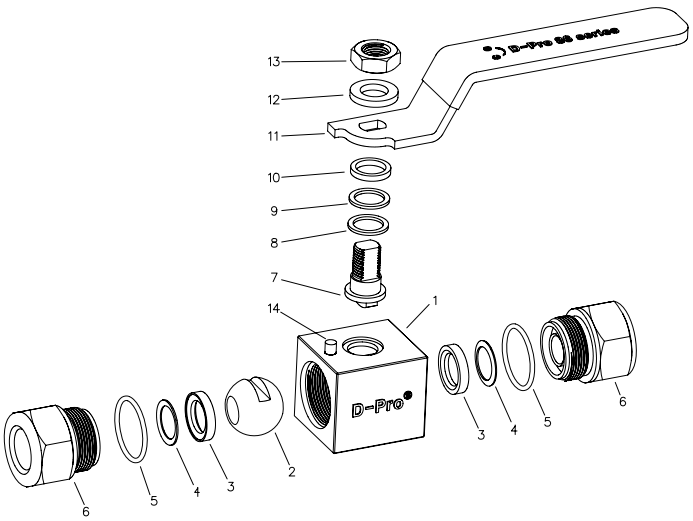



Table 1. Materials of Construction

| Component | | Valve Body Materials |
|---|---|---|
| 1 | Body | SS316/ASTM A276 or A479 or ASTM A479 |
| 2 | Ball | |
| 3 | Seat (2) | PVDF, standard for V86 series<br>PEEK, standard for VC86 series |
| 4 | Disc Spring (2) | TYPE 631<br>Disc spring, standard for VC86 series<br>CNG valve only. |
| 5 | End Seal (2) | ● FKM Oring for V86 series<br>● HNBR O-ring for VC86 series |
| 6 | End Connector (2) | SS316/ ASTM A276 or ASTM A479 |
| 7 | Stem | |
| 8 | Bearing | PTFE, standard for V86 series<br>PEEK, standard for VC86 series |
| 9 | Packing | Carbon PTFE |
| 10 | Gland | SS316/ ASTM A276 or ASTM A479 |
| 11 | Lever Handle | SS304 handle with vinyl sleeve |
| | Optional Oval Handle | |
| 12 | Washer | SS304 |
| 13 | Stem Nut | SS304 |
| 14 | Stop Pin | SS304 |

- Wetted parts and lubricants listed in blue.
- Fluorinated-based lubricant

## ECE R110 Manual Valves

- Classification: Class 0
- Service Pressure: 200 bar (2900 psig)
- Working Pressure: 260 bar (3770 psig)
- Temperature: - 40 to 105˚C (-40 to 221˚F)


## VC86 series CNG ball valves

VC86 valve with live loaded compensation disc spring reacts on ball movement for sealing at low and high CNG pressure. VC86 series standard PEEK and PCTFE seats are compatible with CNG.

End Connections:

- Dk-Lok tube port 12 to 16 mm OD (1/2 to 3/4 in. OD)
- Pipe Thread 1/2 to 1 in.

## Operation

- 2-way positive shut off and 3-way directional control of fluids in process, power and instrument application.
- Valves are designed to control fluids in full open or full closed position.
- Valves that have not been actuated for a period of time may have a higher initial actuation torque.
- Valves must be in open position during system test not to damage the valve seat.
- Sour Gas Service NACE MR0175 available.

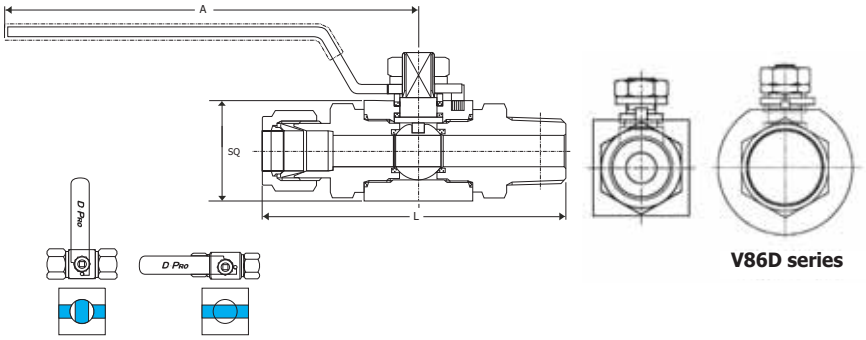
## Factory Test

Every valve is tested with nitrogen gas @1000 psig (68 bar) for leakage at the seat to a maximum allowable leak rate of 0.1 SCCM. The stem packing is tested with nitrogen gas @1000 psig for no detectable leakage.

## Cleaning and Packaging

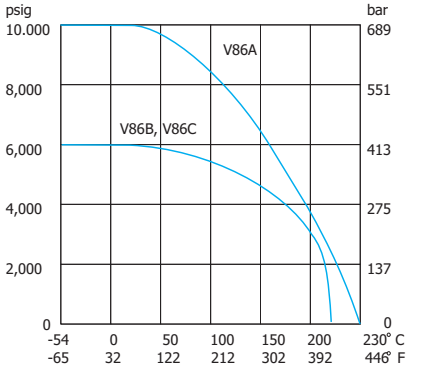
Valves are cleaned and packaged in accordance with Dk Tech DC-01 cleaning standard. Special cleaning for oxygen service is available on request.

## 2-Way On-Off Valves




V86D series

**Pressure/Temperature Ratings**
V86 2-way valve with PEEK seat




## Valve Ordering Information and Dimensions

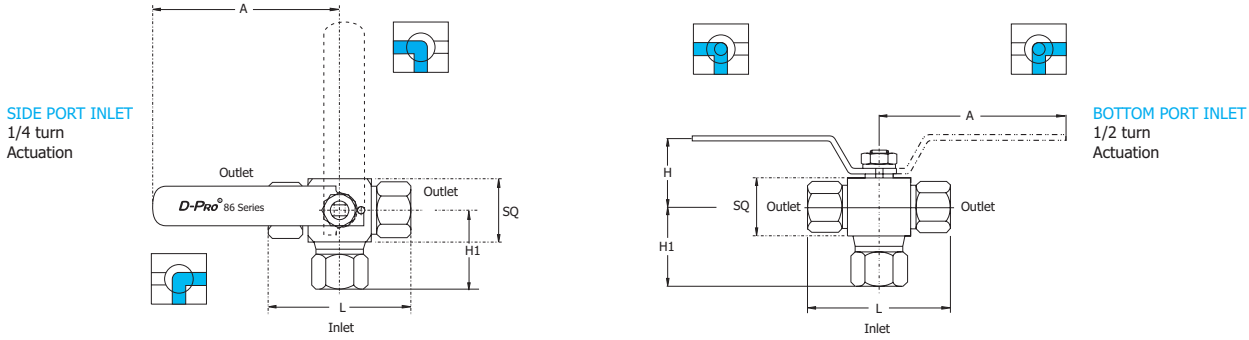
| Basic Ordering Number | | End Connections Inlet & Outlet | Orifice mm (in.) | Cv | Dimensions mm (in.) A | H | L | SQ |
|---|---|---|---|---|---|---|---|---|
| V86A- | D-4T | 1/4 in. Dk-Lok | 4.8 (0.19) | 1.2 | 108.3 (4.26) | 38.4 (1.52) | 96.00 (3.78) | 32.0 (1.26) |
| | D-6T | 3/8 in. Dk-Lok | 7.1 (0.28) | 3.7 | | | 102.50 (4.04) | |
| | D-8T | 1/2 in. Dk-Lok | 10.0 (0.39) | 7.5 | | | 107.60 (4.24) | |
| | F-4N | 1/4 in. Female NPT | | | | | 74.00 (2.91) | |
| | F-6N | 3/8 in. Female NPT | | | | | 77.00 (3.03) | |
| | F-8N | 1/2 in. Female NPT | | | | | 85.00 (3.35) | |
| | M-4N | 1/4 in. Male NPT | 7.1 (0.28) | 3.7 | | | 95.40 (3.76) | |
| | M-6N | 3/8 in. Male NPT | 10.0 (0.39) | 7.2 | | | 95.40 (3.76) | |
| | M-8N | 1/2 in. Male NPT | | 7.5 | | | 100.20 (3.94) | |
| V86B- VC86B- | F-8N | 1/2 in. Female NPT | 12.7 (0.50) | 10.1 | 149.0 (5.86) | 51.0 (2.00) | 89.00 (3.50) | 40.0 (1.57) |
| | F-12N | 3/4 in. Female NPT | | | | | 90.00 (3.54) | |
| | D-12M | 12mm Dk-Lok | 10.0 (0.39) | | | | 110.00 (4.33) | |
| | D-16M | 16mm Dk-Lok | 12.7 (0.50) | | | | 116.00 (4.56) | |
| | D-8T | 1/2 in. Dk-Lok | 10.4 (0.41) | | | | 110.00 (4.33) | |
| | D-10T | 5/8 in. Dk-Lok | 12.7 (0.50) | | | | 116.00 (4.56) | |
| | D-12T | 3/4 in. Dk-Lok | | | | | 115.00 (4.52) | |
| V86C- VC86C- | F-12N | 3/4 in. Female NPT | 19.0 (0.75) | 30.0 | 149.0 (5.86) | 56.0 (2.20) | 108.00 (4.25) | 50.0 (1.97) |
| | F-16N | 1 in. Female NPT | | | | | 127.00 (5.00) | |
| | D-12T | 3/4 in. Dk-Lok | 15.7 (0.62) | 19.0 | | | 125.00 (4.92) | |
| | D-16T | 1 in. Dk-Lok | 19.0 (0.75) | 30.0 | | | 134.00 (5.27) | |
| | M-12N | 3/4 in. Male NPT | 15.7 (0.62) | 19.0 | | | 119.00 (4.68) | |
| | M-16N | 1 in. Male NPT | 19.0 (0.75) | 30.0 | | | 129.00 (5.07) | |
| V86D- VC86D- | F -16N | 1 in. Female NPT | 25.0 (0.98) | Full Bore | 132.00 (5.20) | 84.10 (3.31) | 112.90 (4.44) | 80.0*(3.15) |

* V86D body is round bar construction.
**CNG valve ordering number** : The basic ordering number listed in blue represents VC86 as well as V86 series ball valve.

Table 2. 2-Way Valve Actuation Torque

| Valve Series | System Pressures, bar (psig) 0 (0) | 344 (5000) | 413 (6000) |
|---|---|---|---|
| | Torque Unit: Nm (lbs-ft) | | |
| V86A | 3.92 (2.89) | - | 6.37 (4.69) |
| V86B | 7.35 (5.42) | 10.30 (7.59) | - |
| V86C | 12.26 (9.04) | 19.61 (14.62) | - |

## 3-way Diverter Valves




V86 3-way ball valve is designed to switch media through the inlet port and direct it to out of two outlet ports.

## Ordering Information and Dimensions

| Basic Ordering Number | | End Connections | Orifice mm (in.) | Dimensions mm (in.) A | H | H1 | L | SQ |
|---|---|---|---|---|---|---|---|---|
| V86A- | 3*- D-4T- | 1/4 in. Dk-Lok | 4.8 ( 0.19) | 108.3 ( 4.26 ) | 38.4 ( 1.52 ) | 50.9 (2.00) | 96.0 (3.78) | 32.0 (1.26) |
| | 3*- D-6T- | 3/8 in. Dk-Lok | 7.1 ( 0.28) | | | 53.0 (2.09) | 102.5 (4.04) | |
| | 3*- D-8T- | 1/2 in. Dk-Lok | 10.0 (0.39) | | | 55.8 (2.20) | 107.6 (4.24) | |
| | 3*- F-4N - | 1/4 in. Female NPT | | | | 40.0 (1.57) | 74.0 (2.91) | |
| | 3*- F-6N- | 3/8 in. Female NPT | | | | 41.5 (1.64) | 77.0 (3.03) | |
| | 3*- F-8N- | 1/2 in. Female NPT | | | | 45.5 (1.79) | 85.0 (3.35) | |
| V86B- | 3*- F-8N- | 1/2 in. Female NPT | 12.7 (0.50) | 149.0 ( 5.86 ) | 51.0 ( 2.00 ) | 55.0 (2.17) | 89.0 ( 3.5 ) | 40.0 (1.57) |
| | 3*- F-12N- | 3/4 in. Female NPT | | | | 55.0 (2.17) | 90.0 (3.54) | |
| | 3*- D-10T- | 5/8 in. Dk-Lok | | | | 67.2 (2.66) | 114.4 ( 4.5 ) | |
| | 3*- D-12T- | 3/4 in. Dk-Lok | | | | 67.7 (2.66) | 115.0 (4.52) | |
| V86C- | 3*- D-12T- | 3/4 in. Dk-Lok | 15.7 (0.62) | 149.0 ( 5.86 ) | 56.0 ( 2.20 ) | 75.3 (2.96) | 125.0 (4.92) | 50.0 (1.97) |
| | 3*- D-16T- | 1 in. Dk-Lok | 19.0 (0.75) | | | 80.0 (3.15) | 134.0 (5.27) | |
| | 3*- F-12N- | 3/4 in. Female NPT | | | | 59.5 (2.34) | 96.0 (3.78) | |
| | 3*- F-16N- | 1 in. Female NPT | | | | 67.0 (2.64) | 111.0 (4.37) | |

All dimensions shown are for reference only and are subject to change.

**Side and Bottom Port Valve Ordering Information**

To order side port entry valve, replace * with **S**, to order bottom port entry valve, replace * with B. Examples: V86A-3**S**-D-4T-S, V86A-3**B**-D-4T-S.

Table 3. 3-way Valve Actuation Torque

| Valve Series | System Pressures, bar (psig) 0 (0) | 206 (3000) | 275 (4000) |
|---|---|---|---|
| | | **Torque** | Unit: Nm (lbs-ft) |
| V86A | 3.92 (2.89) | - | 4.90 (4.69) |
| V86B | 7.35 (5.42) | 7.85 (5.78) | - |

Table 4. 2-way Valve Pressure and Temperature Rating

| Valve Series | Seat | Allowable Working Pressure at ambient temperature psig(bar) | Temperature Rating ℃(℉) |
|---|---|---|---|
| V86A | PVDF | 6,000 (413) | -30 to 130 (-22 to 266 ) |
| | PCTFE | | -30 to 180 (-22 to 356 ) |
| | PEEK | 10,000 (689) | -40 to 230 (-40 to 446 ) |
| V86B V86C | PVDF | 5,000 (344) | -30 to 110 (-22 to 230 ) |
| | PCTFE | | -30 to 160 (-22 to 320 ) |
| | PEEK | 6,000 (413) | -40 to 210 (-40 to 410 ) |
| V86D | PCTFE | 5,000 (344) | -30 to 160 (-22 to 320 ) |

Table 5. 3-way Valve Pressure and Temperature Rating

| Valve Series | Seat | Allowable Working Pressure at ambient temperature psig(bar) | Temperature Rating ℃(℉) |
|---|---|---|---|
| V86A | PVDF | 4,000 (275) | -30 to 130 (-22 to 266 ) |
| | PCTFE | | -30 to 180 (-22 to 356 ) |
| | PEEK | 6,000 (413) | -40 to 230 (-40 to 446 ) |
| V86B V86C | PVDF | 3,000 (206) | -30 to 110 (-22 to 230 ) |
| | PCTFE | | -30 to 160 (-22 to 320 ) |
| | PEEK | 4,000 (275) | -40 to 210 (-40 to 410 ) |

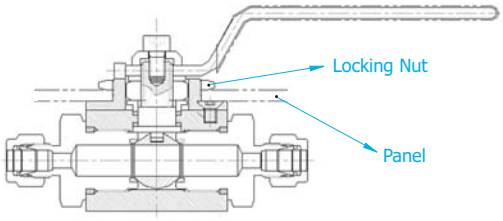
## Options

### Locking Nut Panel Mounting

Ordering designator : **P1**
Addition locking nut below handle makes the valve panel mountable.
Disassemble the handle prior to panel mounting.

mm (in.)

| Valve Series | Panel Hole Drill | Panel Thickness |
|---|---|---|
| V86A | 30.0 (1.18) | Max. 4.0 (0.157) |
| V86B | 38.0 (1.50) | |
| V86C | 38.0 (1.50) | |

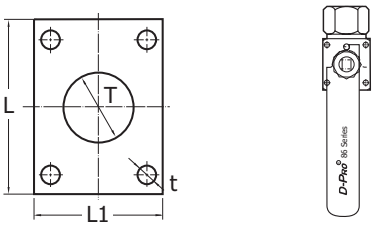



### Screw Hole Panel Mounting

Ordering designator : **P2**
Additional four (4) screw holes on the top of valve makes the valve panel mountable.
Disassemble the handle prior to panel mounting.

mm (in.)

| Valve Series | L | L1 | t | T |
|---|---|---|---|---|
| V86A | 34.0 (1.33) | 26.0 (1.02) | 4.0 (0.15) | 30.0 (1.18) |
| V86B | 36.0 (1.42) | 29.0 (1.14) | 5.0 (0.20) | 38.0 (1.50) |
| V86C | 40.0 (1.57) | 35.0 (1.37) | 6.0 (0.23) | 38.0 (1.50) |

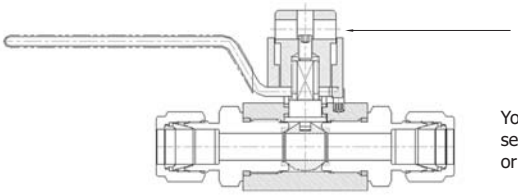



### "Lift-Turn" Locking Device

Ordering designator : **LD**

Dk Tech patented "Lift-Turn" safety locking device allows you to lock the valve manually either in open or close position. The locking device consists of study upper and lower locking detents made out of stainless steel.

Note: This option is applicable to 2-way valves.



**Pad-Lock applicable 7.2 mm (0.28 in) hole constructed on upper locking detent.**

You may apply a pad-lock to secure the valve in the open or close position.

## Ordering Information

Select the desired basic ordering number, and options from designators listed below.

**V86A-D-4T -PC -OH -S**
**V86B-F-12N -LD -S**
**VC86B-D-12M -S**

| Seat | Panel Mounting | Locking Device | Handle | Valve Material |
|---|---|---|---|---|
| ● Nil: PEEK, standard for VC86B, VC86C series<br>● Nil: PCTFE, standard for VC86D series<br>● Nil: PVDF, standard for V86 series<br>● PC: PCTFE<br>● PK: PEEK<br>● PD: PVDF | ● P1:<br>Locking nut panel mounting<br>● P2:<br>Screw hole panel mounting | ● LD: Locking Device | ● Nil:<br>Standard Lever Handle<br>● OH: Oval Handle<br><br>OH option is applicable to 2-way V86A series valves. | ● S316 |

### Safe Valve Selection

The selection of a valve for any application or system design must be considered to ensure safe performance.Valve function, valve rating, material compatibility, proper installation, operation and maintenance remain the sole responsibillty of the system designer and the user. Dk Tech accepts no liability for any improper selection, installation, operation or maintenance.

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