Product Bulletin
D104765X012
May 2024

Fisher™ FIELDVUE™ DVC7K-H

Digital Valve Controller

FISHER™

EMERSON™

The FIELDVUE DVC7K digital valve controller is reliable and intuitive, featuring diagnostics that enable you to optimize your plant's performance. It converts a 4 to 20 mA input signal into a pneumatic output signal that controls the actuator on the valve. Perform setup and configuration procedures, check the valve health and get Advice at the Device™ using the simple-to-use Local User Interface (LUI). The interface can be configured to support multiple languages with a few button pushes.

Figure 1. Linkage-Less Non-Contact Feedback System

Features

Reliability

- **Linkage-Less Non-Contact Position Feedback —** The high performance, linkage-less feedback system, shown in Figure 1, eliminates physical contact between the valve stem and the instrument. There is no wearing of parts so cycle life is maximized. Additionally, the elimination of levers and linkages reduces the number of mounting parts and mounting complexity. Instrument replacement and maintenance is simplified because the feedback parts stay connected to the actuator stem.
- **Built to Survive —** The DVC7K's field-proven conformal coated electronics resist the effects of vibration, temperature and corrosive atmospheres per the ISA.75.13 standard. A weather-tight housing construction protects the wiring terminal box and critical components from harsh environmental conditions.

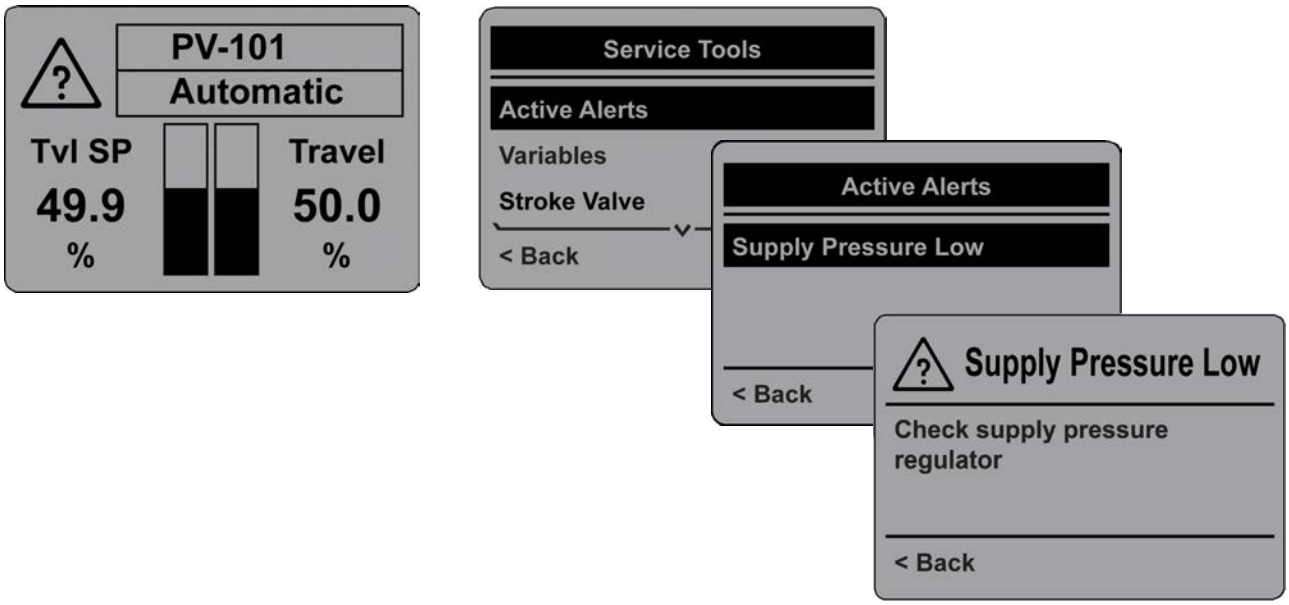
Performance

- **Accurate and Responsive —** The two-stage instrument design provides quick response to large step changes and precise control for small setpoint changes.
- **Ramped Cutoff provides smooth transition from throttling control to shutoff**

Ease of Use

- **Enhanced Safety —** The DVC7K is a HART® communicating device; information can be accessed anywhere along the loop. This flexibility can reduce exposure to hazardous environments and make it easier to evaluate valves in hard-to-reach locations.
- **Local User Interface (LUI) —** The full text display in the local interface is easy to navigate due to the six button LUI (Figure 2). Each unit can be configured to display Arabic, Chinese, Czech, English, French, German, Italian, Japanese, Korean, Polish, Portuguese, Russian or Spanish. View the Travel vs. Travel Setpoint, Instrument Mode and Valve Health instantly from the home screen.
- **Valve Health —** Identify the health status of the valve assembly at a distance with the NE 107 LED indicator. Quickly troubleshoot issues and identify recommended actions with Advice at the Device. Additionally, use the LUI to view primary variables like supply pressure and input current.
- **Faster Commissioning —** HART communications allow the user to quickly commission loops with a variety of tools from a remote location or locally at the valve assembly with the LUI.
- **Flexible Connectivity —** Emerson's secure Bluetooth® wireless technology implementation (future release) enables ability to see health across multiple valves.
- **Easy Maintenance —** The DVC7K is modular in design. Critical working components can be replaced without removing field wiring or pneumatic tubing.

Figure 2. Local User Interface



Value

- **Hardware Savings —** When installed in an integrated control system, significant hardware and installation cost savings can be achieved. Valve accessories such as limit switches and position transmitters can be eliminated due to the integrated position transmitter and switch option.
- **Increased Uptime —** The self-diagnostic capability of the DVC7K provides valve performance and health evaluation without shutting down the process or pulling the valve assembly from the line.
- **Improved Maintenance Decisions —** Digital communication provides easy access to the condition of the valve. Sound decisions can be made by analysis of valve information through any HART communicating asset management software.

Valve Diagnostics

With the DVC7K digital valve controller's enhanced memory, it is able to provide a comprehensive library of valve diagnostic alerts, as shown in Figure 3 These diagnostics and recommended actions are easily accessed with an Emerson handheld communicator or from the LUI. When installed as part of a HART communicating system, the DVC7K delivers prompt notification of current or potential equipment issues directly to the asset management system and supports NAMUR NE107 alert categorization.

Alerts assist in identification and notification of the following situations:

- Valve travel deviation due to excessive valve friction or galling
- High cycle due to dither or improper tuning
- Total travel movement accumulation beyond a specified point resulting in packing wear
- Valve travel deviating from the specified setpoint
- Various instrument mechanical and electrical issues

The instrument Event Log stores alerts in memory on board the DVC7K which can be accessed by the HART asset management software.

Figure 3. Remote Interface Examples [via DD (Device Description) and FDI (Field Device Integration) Package]

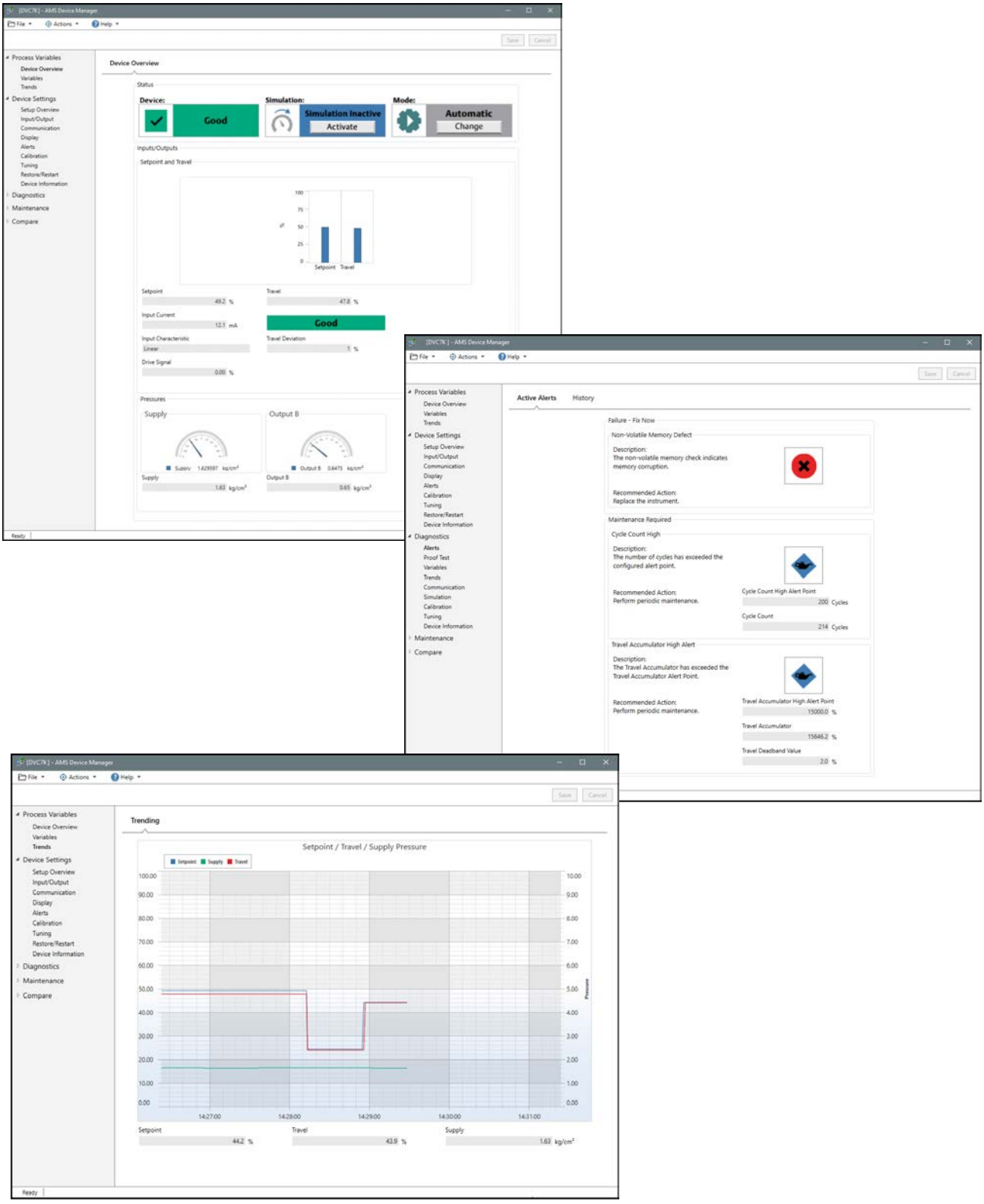


Table 1. Specifications

Available Mounting

- Direct actuator mounting to Fisher 657i/667i or GX actuators
- Integral mounting to Fisher sliding-stem and rotary actuators
- Quarter-turn rotary actuators

DVC7K digital valve controllers can also be mounted on other actuators that comply with IEC 60534-6-1, IEC 60534-6-2, VDI/VDE 3845 and NAMUR mounting standards

Communication Protocol

HART 7

Input Signal

Point-to-Point

Analog Input Signal: 4 to 20 mA DC, nominal; split-ranging available

Minimum voltage available at instrument terminals must be 10.2 V DC for analog control, 10.7 V DC for HART communication

Minimum Control Current: 4.0 mA
Minimum Current without Microprocessor Restart: 3.8 mA
Maximum Voltage: 30 V DC
Overcurrent protected
Reverse Polarity protected

24 V DC

Instrument Power: 11 to 30 V DC at 10 mA
Reverse Polarity protected

Supply Pressure[1]

Minimum Recommended: 0.3 bar / 5 psig higher than maximum actuator requirements

Maximum: 10.0 bar / 145 psig or maximum pressure rating of the actuator, whichever is lower

Supply medium must be clean, dry and noncorrosive

Per ISA Standard 7.0.01
A maximum 40 micrometer particle size in the air system is acceptable. Further filtration down to 5 micrometer particle size is recommended. Lubricant content is not to exceed 1 ppm weight (w/w) or volume (v/v) basis. Condensation in the air supply should be minimized.
Pressure dew point: At least 10 °C less than the lowest ambient temperature expected

Per ISO 8573-1
Maximum particle density size: Class 7
Oil content: Class 3
Pressure dew point: Class 3

Output Signal

Pneumatic signal, up to full supply pressure
Maximum Span: 9.5 bar / 140 psig
Action: ■Double ■Single Direct or ■Reverse

Steady-State Air Consumption[2][3]

At 1.4 bar / 20 psig supply pressure:
Less than 0.38 normal m^3/hr / 14 scfh

At 5.5 bar / 80 psig supply pressure:
Less than 1.3 normal m^3/hr / 49 scfh

Maximum Output Capacity[2][3]

At 1.4 bar / 20 psig supply pressure:
10.0 normal m^3/hr / 375 scfh

At 5.5 bar / 80 psig supply pressure:
29.5 normal m^3/hr / 1100 scfh

Operating Ambient Temperature Limits[1][4]

Standard: -40 to 80°C / -40 to 176°F includes nitrile elastomers
Extreme Temperature Option: -45 to 80°C / -49 to 176°F includes fluorosilicone elastomers
High Temperature Option: -40 to 80°C / -40 to 176°F includes fluorosilicone elastomers

Note: LUI may not be readable below -20°C / -4°F

Independent Linearity[5]

Typical Value: ±0.5% of output span

Electromagnetic Compatibility

Meets EN IEC 61326-1:2021
Immunity—Industrial locations per Table 2 of the EN 61326-1 standard.
Emissions—Class A
ISM equipment rating: Group 1, Class A

General Electrical Safety - Environmental Conditions

Use: Indoor and Outdoor

Altitude: Up to 2000 m

Temperature: See operating ambient temperature limits

Humidity Testing Method: Tested per IEC61514-2

Supply Voltage Fluctuations: N/A, not connected to Mains

Transient Overvoltage: Category I

Pollution Degree: 2

Wet Locations: Yes

Vibration Testing Method

Tested per ANSI/ISA-S75.13.01 Section 5.3.5.

- continued -

Table 1. Specifications (continued)

Input Impedance	Actuator Compatibility
An equivalent impedance of 550 ohms may be used. This value corresponds to 11 V at 20 mA.	Stem Travel (Sliding-Stem Linear): Linear actuators with rated travel between 6.35 mm / 0.25 in. and 606 mm / 23.375 in. Shaft Rotation (Quarter-Turn Rotary): Rotary actuators with rated travel between 45° and 180° (6)
Hazardous Area Approvals (PENDING)	**Weight**
cCSAus - Intrinsically Safe, Explosion-proof, Dust-Ignition-proof, Increased Safety, Class/Div/Zone (Canada and/or United States, see Selection Matrix) ATEX - Intrinsically Safe, Flameproof, Dust-Ignition-proof, Increased Safety IECEx - Intrinsically Safe, Flameproof, Dust-Ignition-proof, Increased Safety NEPSI - Intrinsically Safe, Flameproof, Dust-Ignition-proof, Increased Safety Not all certifications apply to all constructions. Contact your Emerson sales office or refer to the DVC7K product page at Fisher.com for approval specific information.	Aluminum: 3.9 kg / 8.9 lbs
	Construction Materials
	Housing and Front Cover: EN AC-43400/EN AC-AlSi10Mg(Fe) copper free die cast aluminum (standard) LUI Cover: Polycarbonate Elastomers: Silicone Environmental / Nitrile Internal (standard temperature), Silicone Environmental / Fluorosilicone Internal (extreme temperature)
Electrical Housing (PENDING)	**Control Tier**
cCSAus - Type 4X, IP66 ATEX - Type 4X, IP66 IECEx - Type 4X, IP66	Throttling Control (TC): Supports Throttling and On/Off Application Modes Discrete Control (DC): Supports On/Off Application Mode only
Connections	**Options**
Supply Pressure: 1/4 NPT internal or G1/4 and integral pad for mounting 67CFR regulator Output Pressure: 1/4 NPT internal or G1/4 Tubing: 3/8-in. recommended Vent: 1/2 NPT internal Electrical: 1/2 NPT internal or M20	■ Integral mounted filter regulator ■ Low-Bleed Relay(7) ■ Extreme Temperature ■ High Temperature ■ Integral 4 to 20 mA Position Transmitter(8)(9) ■ Integral Switches(10)(11) ■ Pipe-away Vent Connection

NOTE: Specialized instrument terms are defined in ANSI/ISA Standard 51.1 - Process Instrument Terminology.

1. The pressure/temperature limits in this document and any other applicable code or standard should not be exceeded.
2. Normal m^3/hr - Normal cubic meters per hour at 0 °C and 1.01325 bar, absolute. Scfh - Standard cubic feet per hour at 60 °F and 14.7 psia.
3. Values at 1.4 bar / 20 psig based on a single-acting direct relay; values at 5.5 bar / 80 psig based on double-acting relay.
4. Temperature limits vary based on hazardous area approval.
5. Not applicable for travels less than 19 mm / 0.75 in. or for shaft rotation less than 60°. Also not applicable for digital valve controllers in long-stroke applications.
6. Rotary actuators with 180° rated travel require a special mounting kit; contact your Emerson sales office for kit availability.
7. The Quad O steady-state consumption requirement of 6 scfh can be met by a DVC7K with low bleed relay A option, when used with up to 4.8 bar / 70 psi supply of Natural Gas at 16 °C / 60 °F. The 6 scfh requirement can be met by low bleed relay B and C when used with up to 5.2 bar / 75 psi supply of Natural Gas at 16 °C / 60 °F.
8. 4 to 20 mA output, isolated; Supply Voltage: 11 to 30 V DC; Reference Accuracy: 1% of travel span.
9. Position transmitter meets the requirements of NAMUR NE43; selectable to show failure low (< 3.6 mA) or failure high (> 22.5 mA). Fail high available only when the instrument is powered.
10. Two isolated switches, configurable throughout the calibrated travel range or actuated from a device alert; Off State: 0 mA (nominal); On State: up to 1 A; Supply Voltage: 30 V DC maximum; Reference Accuracy: 2% of travel span.
11. Switch 1 is a normally open circuit and Switch 2 is a normally closed circuit.

Table 2. DVC7K Product Selection Matrix

Base Instrument Model	
DVC7K	Electro-Pneumatic Digital Valve Controller
1. Communication Protocol	
1H	HART 7 Communication
2. Hazardous Area Approval Agency/Location/Protection Method	
2A	None - EMC Compliance to CE, IEC 61010 and IEC 61000-4
2B	cCSAus - Intrinsically Safe, Explosion-proof, Dust-Ignition-proof, Increased Safety, Class/Div/Zone (Canada and United States)
2C	IECEx - Intrinsically Safe, Flameproof, Dust-Ignition-proof, Increased Safety (Includes Certified Blanking Element)
2D	ATEX - Intrinsically Safe, Flameproof, Dust-Ignition-proof, Increased Safety (Includes Certified Blanking Element)
2E	NEPSI (China) - Intrinsically Safe, Flameproof, Dust-Ignition-proof, Increased Safety
2F	cCSA - Intrinsically Safe, Explosion-proof, Dust-Ignition-proof, Increased Safety, Class/Div (Canada)
2G	CSAus - Intrinsically Safe, Explosion-proof, Dust-Ignition-proof, Increased Safety, Class/Div/Zone (United States)
2H	ATEX/IECEx - Intrinsically Safe, Flameproof, Dust-Ignition-proof, Increased Safety (includes Certified Blanking Element)
3. Housing Material	
3A	VOC Free Powder Coated Copper-Free Aluminum
4. Temperature Range	
4A	Standard -40 to +80 °C (see specific Ex markings for deratings); Clock Battery Backup included
4B	Extreme Temperature -45 to +80 °C (see specific Ex markings for deratings); Clock Battery Backup not supported
4C	High Temperature -40 to +80 °C (see specific Ex markings for deratings); Clock Battery Backup included
5. Electrical/Pneumatic Connections	
5A	Imperial - 1/2 NPT Electrical / 1/4 NPT Pneumatic
5B	Metric - M20 Electrical / G1/4 Pneumatic
5C	Metric/Imperial - M20 Electrical / 1/4 NPT Pneumatic

- continued -

Table 2. DVC7K Product Selection Matrix (continued)

6. I/O Functions	
6A	None (I/O Electronics not included)
6B	I/O Options: (Qty 1) 4 to 20 mA Position Transmitter, (Qty 2) Solid State Dry Contact Switches
7. Local User Interface	
7B	Local User Interface (LED, LCD, Buttons)
8. Pneumatic Action	
8A	DOUBLE-Acting Operation (Relay A)
8B	Single-Acting REVERSE Operation (Relay B)
8C	Single-Acting DIRECT Operation (Relay C)
8D	Single-Acting DIRECT Operation (Relay A)
8E	DOUBLE-Acting Low Bleed Operation (Relay A Low Bleed)
8F	Single-Acting REVERSE Low Bleed Operation (Relay B Low Bleed)
8G	Single-Acting DIRECT Low Bleed Operation (Relay C Low Bleed)
8H	Single-Acting DIRECT Low Bleed Operation (Relay A Low Bleed)
9. Pneumatic Block (Imperial or Metric Pneumatic Connections per Housing Construction)	
9A	None
9B	Gauge Block with Pipe Plugs
9C	Gauge Block with Tire Valve Connections
9D	Gauge Block with Supply and Output Gauges, dual scaled 0 to 60 psig, 0 to 4 bar
9E	Gauge Block with Supply and Output Gauges, dual scaled 0 to 60 psig, 0 to 0.4 MPa
9F	Gauge Block with Supply and Output Gauges, dual scaled 0 to 60 psig, 0 to 4 kg/cm^2
9G	Gauge Block with Supply and Output Gauges, dual scaled 0 to 160 psig, 0 to 11 bar
9H	Gauge Block with Supply and Output Gauges, dual scaled 0 to 160 psig, 0 to 1.1 MPa
9I	Gauge Block with Supply and Output Gauges, dual scaled 0 to 160 psig, 0 to 11 kg/cm^2
10. Wireless Interface Tier	
BLR	Bluetooth ready (future firmware update required to field enable - no additional purchase required)
BLD	Bluetooth disabled PERMANENTLY from the factory

- continued -

Table 2. DVC7K Product Selection Matrix (continued)

11. Control Tier	
TC	Throttling Control (Field configurable to Throttling or End Point Open/Close with Application Mode)
DC	On/Off Control (End Point Open/Close Only)
12. Instrument Tier	
XX	None
13. Power Source(1)	
CS	4 to 20 mA
VS	24 V DC
14. Local User Interface Language(1)	
AR	Arabic
CH	Chinese
CZ	Czech
EN	English
FR	French
DE	German
IT	Italian
JA	Japanese
KO	Korean
PO	Polish
PT	Portuguese
RU	Russian
ES	Spanish
15. Electrical Conduit Connection 1 (Left Side)	
XX	None
SBE	Standard Blanking Element
CBE	Certified Blanking Element(2)
CG1	Cable Gland: Intrinsically Safe, blue plastic
CG2	Cable Gland: Flameproof, ENC Brass
TPP	Protective Plastic Pipe Plugs for electrical conduit opening

- continued -

Table 2. DVC7K Product Selection Matrix (continued)

16. Electrical Conduit Connection 2 (Left Bottom)	
XX	None[3]
SBE	Standard Blanking Element
CBE	Certified Blanking Element
CG1	Cable Gland: Intrinsically Safe, blue plastic
CG2	Cable Gland: Flameproof, ENC Brass
TPP	Protective Plastic Pipe Plugs for electrical conduit opening
17. Electrical Conduit Connection 3 (Right Bottom)	
XX	None
SBE	Standard Blanking Element
CBE	Certified Blanking Element[2]
CG1	Cable Gland: Intrinsically Safe, blue plastic
CG2	Cable Gland: Flameproof, ENC Brass
TPP	Protective Plastic Pipe Plugs for electrical conduit opening
18. Additional Options[4]	
XX	None
PP	Protective plastic pipe plugs for pneumatic or conduit openings
PI	Pipeaway vent connection for 1/2 in. pipe
VD	Configured for Direct Mount (adaptor included) to Pneumatic Module per VDI/VDE 3847-1 and VDI/VDE 3847-2, Single-Acting Direct without Rebreather and Double-Acting
VDR	Configured for Direct Mount (adaptor included) to Pneumatic Module per VDI/VDE 3847-1 and VDI/VDE 3847-2, Single-Acting Direct with Rebreather[5]
HF	HART Filter (DIN rail-mounted to support HART communications with HART incompatible hosts)
LC	LC340 Line Conditioner[6]
CC	Custom configuration - detail requirements separately

1. Option is field configurable.
2. Standard for ATEX and IECEx approved devices on Electrical Conduit Connection 1 and 3.
3. Default for all orders.
4. Select more than one option, if required.
5. European Sourcing Only.
6. Use 24 V DC, Multi-Drop for HART communications.

Typical model number:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
DVC7K	1H	2G	3A	4A	5A	6A	7B	8C	9A	BLR	TC	XX	CS	EN	SBE	XX	SBE	XX

Enter your choices to start the selection process:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
DVC7K	1H		3A				7B					XX						

LinkedIn.com/groups/3941826
Facebook.com/FisherValves
Fisher.com
Twitter.com/FisherValves

Neither Emerson, nor any of its affiliated entities assume responsibility for the selection, use or maintenance of any product. Responsibility for proper selection, use, and maintenance of any product remains solely with the purchaser and end user.

Emerson
Marshalltown, Iowa 50158 USA
Sorocaba, 18087 Brazil
Cernay, 68700 France
Dubai, United Arab Emirates
Singapore 128461 Singapore

www.Fisher.com

FISHER™

EMERSON™