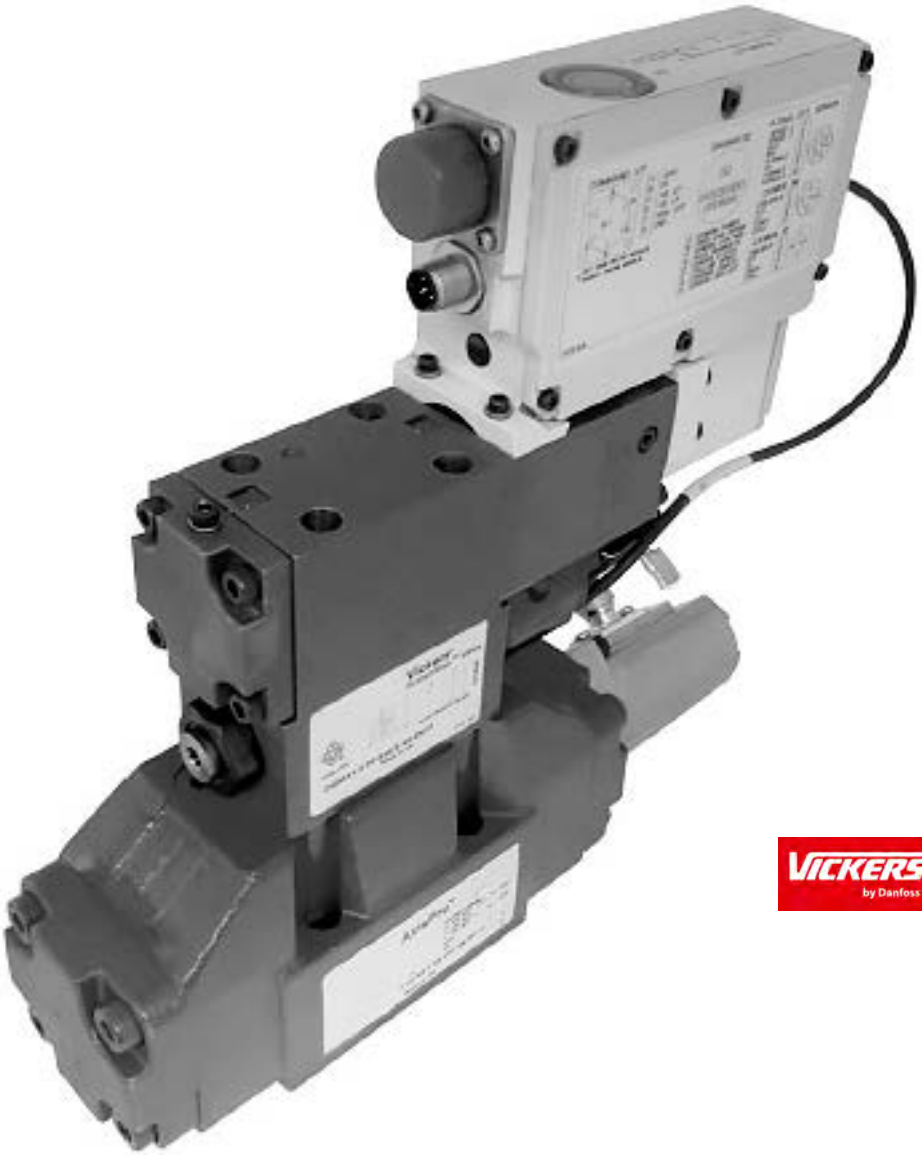
AxisPro®

Servo-Performance Proportional Directional Valve

KBH-05 11 Series



VICKERS by Danfoss

ENGINEERING TOMORROW

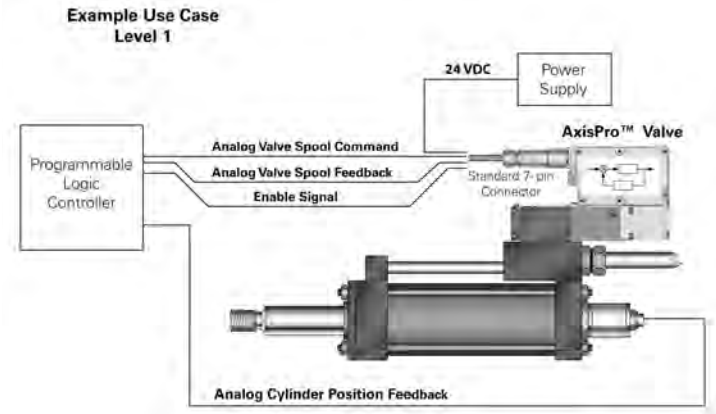
Danfoss

BC457502921218en-000201

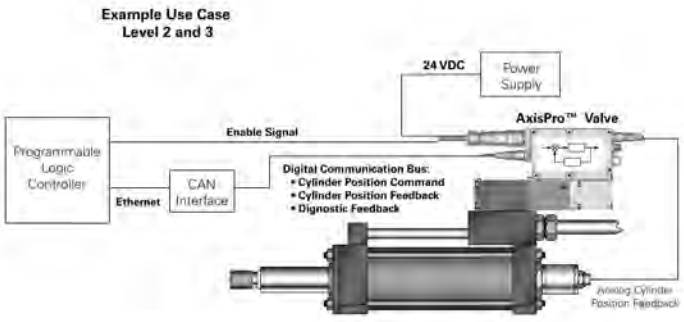
Contents

Introduction General Description Typical Section View	3
Model Code	4–5
Spool Sleeve Details	6
Spool Data	7
Pressure and Minimum Flow Rates	7
Performance Curve	8–9
Operating Data	10–12
Software Information	13
Electrical Information	14–17
Installation Dimensions	18–19
Mounting Surfaces	20
Application Data	21

AxisPro is a game changing machine control valve. Its embedded intelligence simplifies traditionally complex control practices. Plug and play design reduces machine build time, and its ability to predict potential maintenance issues increases machine reliability.



AxisPro level 1KBH valves, can be used to control machine motions in open loop or closed loop control applications. The valve receives its analog command input on the 7-pin, main, connector from an external axis control device.



AxisPro level 2 KBH valves, can be used to control machine motion in open or closed loop control applications. The valve can receive its analog command input on the 7-pin connec- tor from an external axis control device or, with the available on-board motion control feature activated (via Danfoss Pro-FX Configure), can close the external control loop around the actuator on the valve (taking feedback signal from cylinder or motor) – eliminating the separate motion controller. In this case the AxisPro valve receives a position, speed or force command and will create its own valve command needed to comply with the requested machine motion. In addition, digital communications over the CANopen bus is available for machine control or monitoring purposes.

Introduction

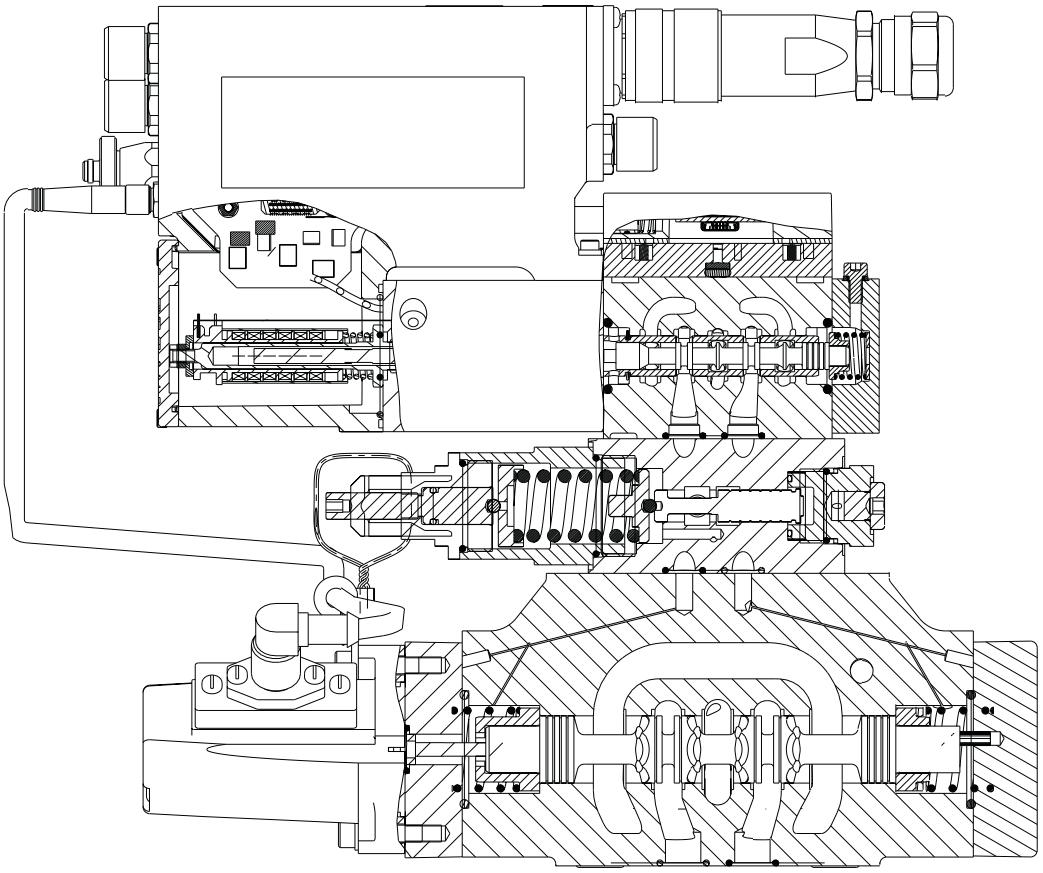
General Description

Built on the proven KBH servo Proportional Valve technology, the AxisPro Proportional Valve provides a range of control capabilities in a modular design. These solenoid operated proportional valves offer high dynamic performance which enables them to be used in closed-loop control applications.

Unique benefits from AxisPro

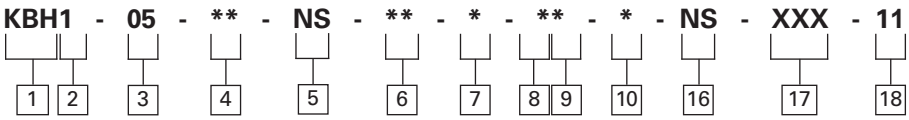
Reliable, extended uptime is enabled by valve and systems diagnostics capability. LED lens provides on-valve diagnostics information for level-1 valves. Access to systems and machine health data can be made available via CANopen networked valves and systems data collected from external sensors input to level-2 valves.

Leverage inventory of AxisPro valves by configuration through software. One valve SKU can serve multiple needs: Level-1 va lves can be configured via Danfoss's Pro-FX™ Configure software tool for optional command signal: Voltage or current, as well as activating the "enable"-pin. Level-2 valves can also have CAN bus activated and control modes selected and configured: VSC for valve-spool control, or for axis- control drive modes: DPC Cylinder position control, DSC Speed control, DFP Force/Pressure control, DPQ Pressure/ Flow control. User applications can be developed in Danfoss's Pro-FX Control software tool, which is based on the popular C ODESYS development environment. This feature is available o ption on level-2 valves allowing the use of pre-developed motion control blocks from Danfoss's Pro-FX Control library or custom developed solutions that can be loaded into a "white space" reserved in the on-board controller memory.



KBH*-05

Model Code



1 Valve Type

KBH – Two stage servo performance proportional valve with integral amplifier and electronic feedback

2 **1** – Level 1

3 Interface

05 – ISO 4401, Size 5

4 Spool/Sleeve

Size 5

01 – 2C95N - overlapped, P,A,B,T blocked
02 – 5C97N - zero lapped;
03 – 33C80N - P blocked, A & B to tank
04 – 2C90N60 - overlapped, P,A,B,T blocked, asymmetric
05 - 5C90N55 - zero lapped, asymmetric
06 – 33C80N50 - P blocked, A & B to tank, asymmetric
07 –PQ87F - Pressure flow control spoo
08 –2C70N45 - overlapped, P,A,B,T blocked, asymmetric

5 Valve Special Feature

NS – Not Selected

6 Pilot Supply

TS – Internal supply without pressure reducer
ES – External supply without pressure reducer
TX – Internal supply with pressure reducer
EX – External supply with pressure reducer

7 Pilot Drain

T – Internal Drain

D – External Drain

8 Command Signal

1 – +/- 10V voltage command signal
2 – +/- 4-20mA current command signal
3 – +/- 10mA current command signal
4 – +/- 15mA current command signal
5 – +/- 20mA current command signal

9 Monitor Output

1 – ±10V voltage feedback signal

2 – 4-20mA current feedback signal

10 Electrical Connection

C – 7 pin connector without plug
E – 7 pin connector with plug
H – As E but with pin "C" used for enable signal
R – As C but with pin "C" used for enable signal

16 Electronics Special Feature

NS – Not selected

17 Software Revision

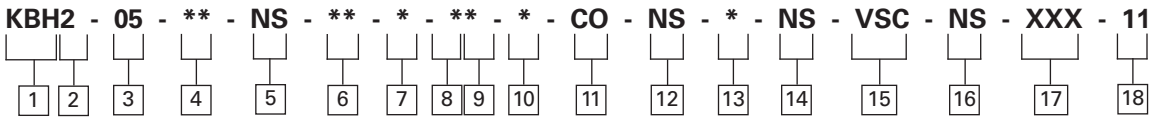
004 – Software revision

18 Design Number

11 series.

To find available product configurations go to www.danfoss.com

Model Code



2 **2** – Level 1 plus Network enabled control modes

8 **Command Signal**

1 – +/- 10V voltage command signal

Note: Command signal is shipped with 1 configuration. You may configure to other command signal options using Pro-FX: Configure software.

2 – 4-20mA current command signal

3 – +/- 10mA current command signal

4 – +/- 15mA current command signal

5 – +/- 20Ma current command signal

9 – Command over Fieldbus

9 **Monitor Output**

1 – ±10V voltage feedback signal

Note: Monitor Output is shipped with 1 setting. You may configure to other monitor signal options using Pro-FX: Configure software.

2 – 4-20mA current feedback signal

9 – Feedback over Fieldbus

11 **Digital Communication Interface**

CO – CANOpen
PN - ProfiNet
ET - Ethernet/IP
EC - EtherCAT

12 **Pilot Valve Sensors**

NS – Not Selected

PS – Pilot Pressure and Temperature Sensors

13 **External Sensor**

A – 4 4-20mA external sensor analog inputs and 2 discrete inputs

D – 1 SSI external digital sensor input

14 **Custom Application Programming Space**

NS – Not Selected

CW – Codesys White Space

15 **Control Mode**

VSC - Valve spool position control
Note: Control Mode is shipped in valve spool closed loop position control (VSC) configuration. You may reconfigure to other command signal options using Pro-FX: Configure software.

DPC - Drive Position Control Mode Enabled

DSC - Drive Speed Control Mode Enabled

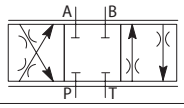
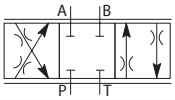
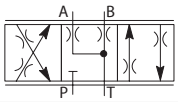
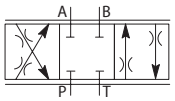
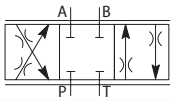
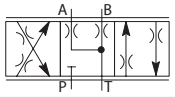
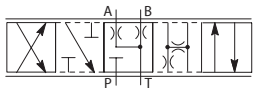
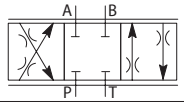
DFP - Drive Force/Pressure Control Mode Enabled

DPQ - Danfoss Custom Drive Pressure / Flow Control Mode Enabled

Refer to previous model code on page 4 for descriptions of other model code options

To find available product configurations go to www.danfoss.com

Spool Sleeve Details

Main-stage spool	Hydraulic symbol	Description	Flow ℓ/min@ Δ10 bar	Symmetric	Asymmetric	Notes
SIZE 5						
1		Overlapped, all ports block	95	√	-	Legacy 2C95N
2		Critically lapped	97	√	-	Legacy 5C97N
3		Overlapped, A,B,T connected	80	√	-	Legacy 33C80N
4		Overlapped, all ports block	90/60	- √		Legacy 2C90N60
5		Critically lapped	80/55	- √		Legacy 5C90N55
6		Overlapped, A,B,T connected	80/50	- √		Legacy 33C80N50
7		see flow curves	-	-	-	Legacy PQ87F
8		Overlapped, all ports block	70/45	- √		Legacy2C70N45

Spool Data

Spool Symbols

Application Notes

1. Main-Spool Options

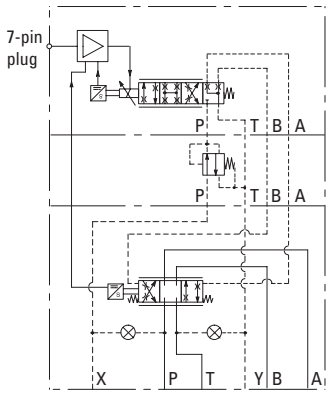
Spools shown are meter-in/meter-out types. Center-condition options are type 5C.

2. Internally Piloted Models

Differ from detailed symbols above by omission of plug A and the blocking of port X by the mating surface.

3. Internally Pilot Drain Models

Differ from detailed symbols above by omission of plug B and blocking of port Y by the mating surface.



Spool Types and Flow Ratings

Symmetric Spools

Base line pressure drop Δp 5 bar (72 psi) per metering flow path, e.g. B to T. For actual maximum flow refer to power capacity envelope curves.

Note: Valves with critically lapped spool are designed so that with the valve disabled the pressure in port B is at least twice that in port A (blocked ports).

Pressure and Minimum Flow Rates

Maximum Pressures, Bar (PSI) Valves With Pressure Reducer

Model	Pilot pressure source †	Pilot drain connection	P Port	A&B Ports	T Port	X Port ♦	Y Port
KBH*-05	External	External	315 (4500)	315 (4500)	210 (3000)	315 (4500)	50 (700)
		Internal*	315 (4500)	315 (4500)	50 (700)	315 (4500)	50 (700)
	Internal	External	315 (4500)	315 (4500)	210 (3000)	315 (4500)	50 (700)
		Internal*	315 (4500)	315 (4500)	50 (700)	315 (4500)	50 (700)

† Minimum recommended pilot operating pressure = 50 bar (700 psi)

* Internal drain is a non-preferred option

♦ For pilot pressures ≤ 210 bar (3000 psi) a pilot pressure reducer is optional For pilot pressures > 210 bar (3000 psi) a pilot pressure reducer must be used Unused pilot port: Maximum pressure as shown

Maximum Pressures, Bar (PSI) Valves Without Pressure Reducer

Model	Pilot pressure source †	Pilot drain connection	P Port	A&B Ports	T Port	X Port ♦	Y Port
KBH*-05	External	External	315 (4500)	315 (4500)	210 (3000)	210 (3000)	50 (700)
		Internal*	315 (4500)	315 (4500)	50 (700)	210 (3000)	50 (700)
	Internal	External	210 (3000)	315 (4500)	210 (3000)	210 (3000)	50 (700)
		Internal*	210 (3000)	315 (4500)	50 (700)	210 (3000)	50 (700)

† Minimum recommended pilot operating pressure = 50 bar (700 psi)

* Internal drain is a non-preferred option

♦ For pilot pressures ≤ 210 bar (3000 psi) a pilot pressure reducer is optional For pilot pressures > 210 bar (3000 psi) a pilot pressure reducer must be used Unused pilot port: Maximum pressure as shown

Minimum Recommended Flow Rates

Valve Size/Spool Code	Min. Flow Rate L/min	in^3/min
KBH*-05	0,5	30

Performance Curves

Flow again

At Øp = 5 bar (72 psi) per metering (e.g.P-A), with flow through P-A-B-T or P-B-A-T Percentage command signals applicable for positive and negative values of command signal.

At other Øp values, flow rates approximate to: $Q_X = Q_D \sqrt{\frac{Øp_X}{Øp_D}}$ where Q = Datum flow rate

Øp = Pressure drop at datum flow rate

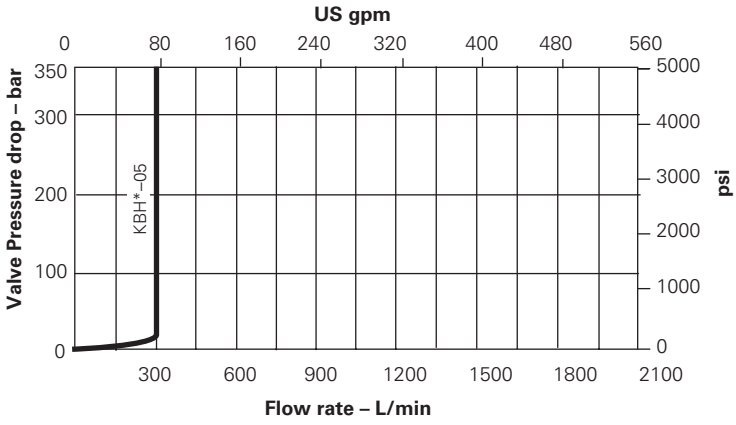
Øp = Required p

Limited by valve power capacity.

Refer to curves on page 9

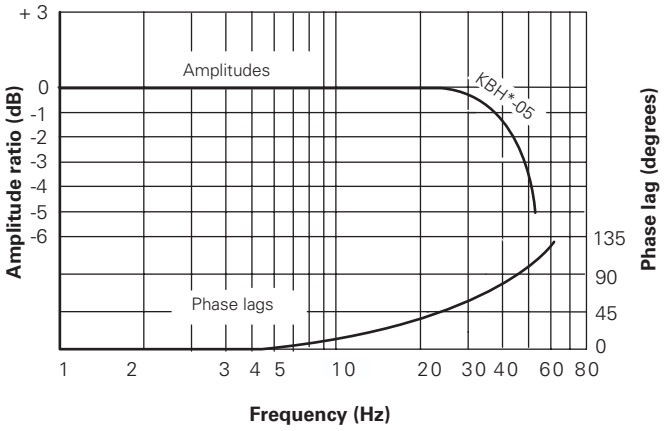
POWER CAPACITY ENVELOPE

Flow through P-A-B-T or P-B-A-T

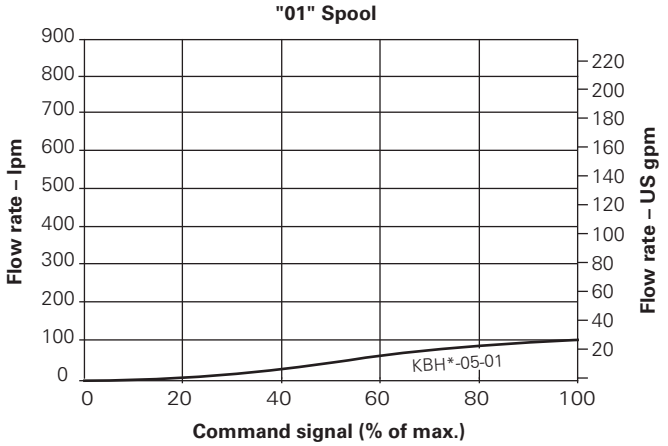


FREQUENCY RESPONSE, TYPICAL

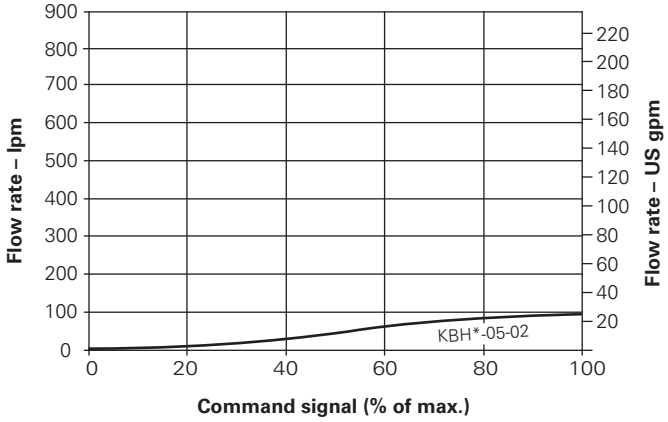
For an amplitude of 50 ± 25% of rated flow (ISO 10770-1)
01 spool measured at ν= 36 cSt (168 SUS),
t = 50˚C (122˚F) and pilot pressure = 40 bar (with-reducer model)



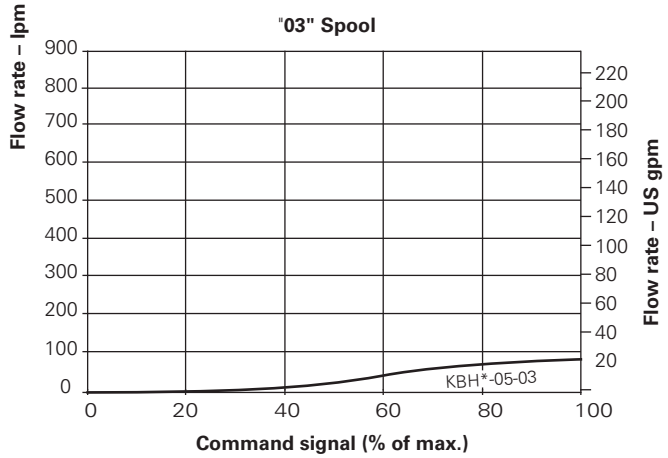
"01" Spool



"02" Spool

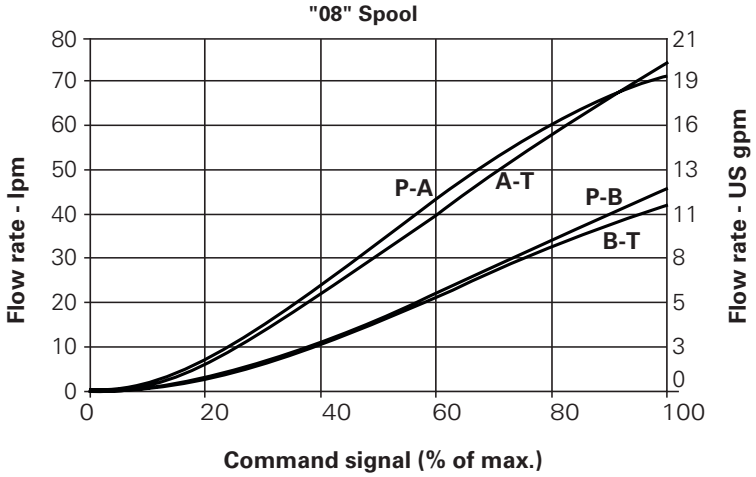


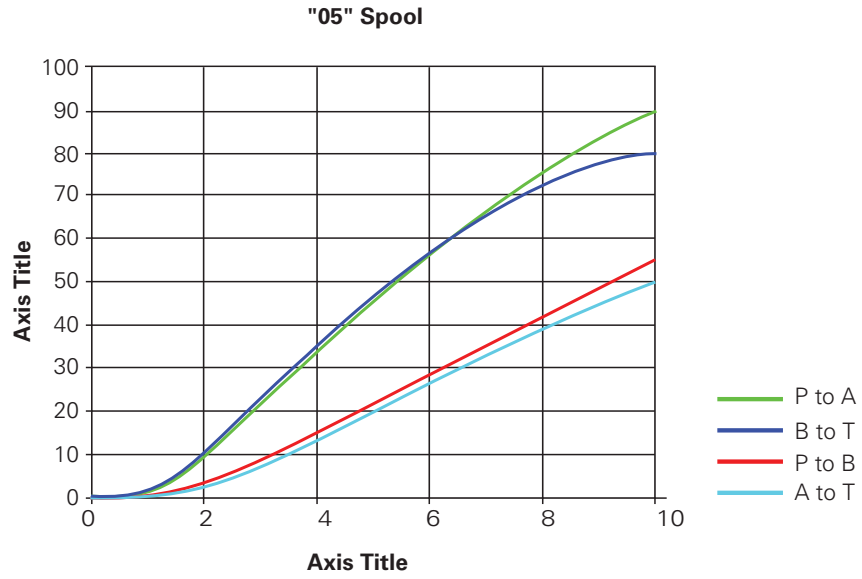
"03" Spool

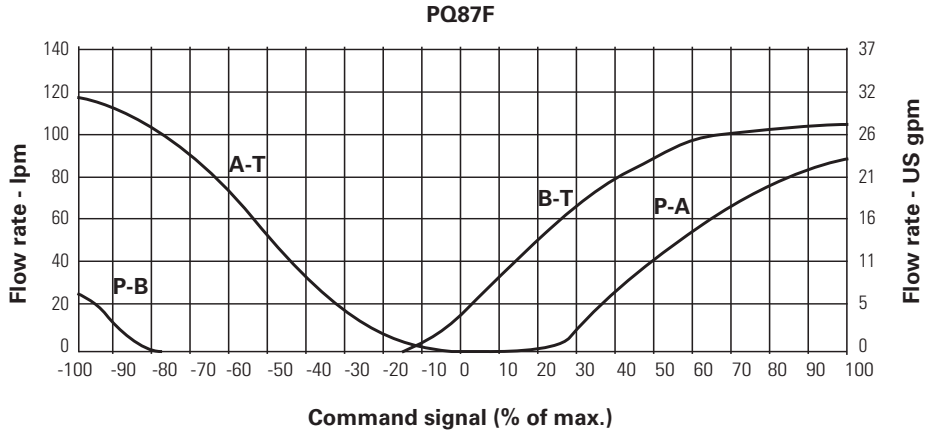


Performance Curves

KBH*-05



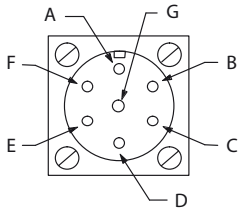




Operating Data

Connector Details

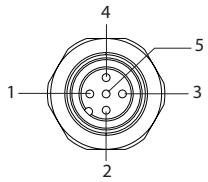
7-pin plug connector



Pin	Description
A	Power supply positive (+)
B	Power supply 0V and current command return
C	Not connected (Field 8 = C,E)
C	Valve enable (Field 8 = H,R)
D	Command signal (+V or current in)
E	Command signal (-V or current GND)
F	Output monitor
G	Protective earth

Note:
Present at location 1 of the electronics enclosure (see figure 1 below).
To ensure EMI protection use only metal shielded mating connectors. Mating 7-pin (connector) is Danfoss part number 934939

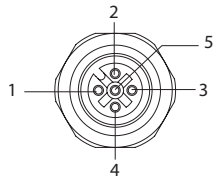
M12 5-pin CAN Connector (Male)



Pin	Description
1	CAN shield Not
2	Connected Power
3	supply 0V CAN
4	High
5	CAN Low

Note:
Present at location 2 and 4 of the electronics enclosure (see figure 1 below). Selection based on model code field number 9, present when CO option enabled.
To ensure EMI protection use only metal shielded mating connectors
Use only shielded twisted pair (STP) cables for mating connection.

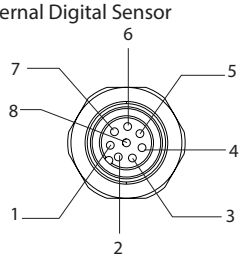
M12 5-pin CAN Connector (Female)



Pin	Description
1	CAN shield
2	Not Connected
3	Power supply 0V
4	CAN High
5	CAN Low

Note:
Present at location 5 of the electronics enclosure (see figure 1 below). Selection based on model code field number 9, present when CO option enabled.
To ensure EMI protection use only metal shielded mating connectors
Use only shielded twisted pair (STP) cables for mating connection.

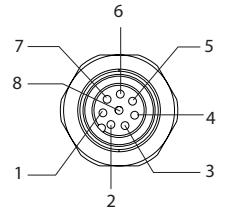
M12 8-pin External Digital Sensor



Pin	Description
1	Power supply 0V
2	+24V Supply
3	CLK-
4	DATA-
5	DATA+
6	Not Connected
7	CLK+
8	Not Connected

Note:
Present at location 3 of the electronics enclosure (see figure 1 below). Selection based on model code field number 10, present when D option enabled.
To ensure EMI protection use only metal shielded mating connectors
24V to Power supply 0V (pin 2, 1) short circuit protected (max current 1.5A)
Use only shielded twisted pair (STP) cables for mating connection.

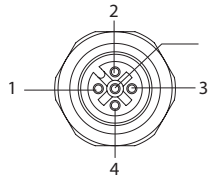
M12 8-pin External Analog Sensor Port



Pin	Description
1	Speed Sensor Input1
2	Speed Sensor Input2
3	4-20mA External Sensor Signal1
4	+15V Supply
5	4-20mA External Sensor Signal2
6	Power supply 0V
7	4-20mA External Sensor Signal3
8	4-20mA External Sensor Signal4

Note:
Present at location 3 of the electronics enclosure (see figure 1 below). Selection based on model code field number 10, present when A option enabled.
To ensure EMI protection use only metal shielded mating connectors
15V to Power supply 0V (pin 4, 6) short circuit protected (max current 500 mA).

M12 4-pin Ethernet Connector (Female)



Pin	Description
1	TxD+
2	RxD+
3	TxD-
4	RxD-

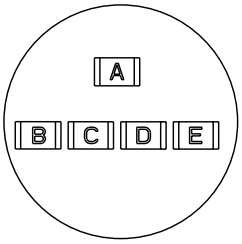
Note:
Present at location 4 and 5 of the electronics enclosure (see figure 1 below). Selection based on model code field number 9, present when PN, ET or EC option enabled.
Location 4 is Ethernet Channel 0 Location 5 is Ethernet Channel 1
M12 connector is D-Coded

To ensure EMI protection use only pre made CAT5 or CAT 6 cable

Operating Data

Data is typical, with fluid at 32 cST (150 SUS) and 40°C (104°F)

Diagnostic



Color	Description CO	PN	ET	EC
A [Green]	Power	Power	Power	Power
B [Red]	CAN Error	PN Diagnostic (SF)	ET Module Status	EC Error
C [Green]	CAN Run	Valve Diagnostic	Valve Diagnostic	EC Run
D [Red]	Diagnostic	PN Network Status (BF)	ET Network Status	Valve Diagnostic
E [Green]	Status	Valve Status	Valve Status	Valve Status

Note:
1. Figure to the left references the clear plastic window on the top of the valve.

Electromagnetic compatibility (EMC):	IEC61326-1
Monitor Points Signal: Voltage mode Current mode Output impedance	 ±10V DC 4 to 20 mA 10 kΩ
Power stage PWM frequency	20 kHz nominal
Reproducibility, valve-to-valve (at factory settings): Flow gain at 100% command signal	 ≤5%
Protection: Electrical	 Reverse polarity protected between pin A and B of the 7 pin plug connector
Ambient air temperature range for full performance Oil temperature range for full performance	-0°C to +70°C (+32°F to +158°F) NOTE: Ethernet version: 0°C +60°C -0°C to +70°C (+32°F to +158°F) NOTE: Ethernet version: 0°C +60°C
Minimum temperature at which valves will work at reduced performance	 –20°C (–4°F)
Storage temperature range	–25°C to +85°C (–13°F to +185°F)
Power supply	24V DC (18V to 36V including 10% peak-to-peak max ripple) max current 3,7A
Command Signal: Voltage mode Input impedance Voltage between Pin D and B Voltage between Pin E and B Current mode Max differential voltage to pin E to pin B	 –10V to +10V DC 13 bit resolution, ± 1% Field 8 = 1: 47kΩ, Field 6 = 2,3,4,5: 100Ω Field 8 = 1:18v (max) Field 8 = 1:18v (max) Field 8 = 2,3,4,5: 13 bit resolution based on ±20mA , ±1%Field 8 = 2,3,4,5: 100 mV
Valve enable signal for model code H & R Enable Disable Input impedance	 Disable <6.5V; Enable Signal >8.5V (max 36V) 10 kΩ
Sensor Resolution: Ext. Sensor Port	 4-20 mA: 0-20mA 12 bit resolution ± 1%, 3mA cable break detect, 22mA overcurrent detect. Speed, independent frequency mode: 10Hz to 100 kHz. Speed, incremental count and direction + frequency mode: signed 32bit count, 0 to 100 kHz. Speed, quadrature phase A&B + frequency mode: signed 32 bit count, 0 to 100 kHz. SSI: binary or gray code, 32bits max, adjustable resolution and zero offset.
Integrated Pilot Pressure and Temperature Sensors	 Integrated PCB temperature sensor accuracy: ± 2°C For valves with "PS" Pressure Sensor option" Integrated pressure sensors on all ports Pressure sensor rated to 400bar Integrated pressure sensor accuracy: ± 0.5% of full scale Bandwidth: >100 Hz Integrated temperature sensor on tank port Accuracy: ± 5°C Bandwidth: ~1 Hz
Amplifier Temperature Sensing	1°C (1.8°F) resolution, -25°C (-13°F) undertemp detect, 125°C (257°F) overtemp detect
Power Supply Detect	18-36Vdc, 0.01 V resolution ± 1%, 19V under voltage detect, 36V overvoltage

Operating Data

KBS*-05 Valves (all valves)	
Relative duty factor	Continuous rating (ED = 100%)
Hysteresis	<0.4%
Mass: kg (lb) approx. Valves with pressure reducer Valves without pressure reducer	 10 kg (23 lb) approx 9 kg (20 lb) approx
Environmental	IP65 and IP67 rated when using a similarly rated connector Location 2, 3, 4 and 5 connectors have IP65 and IP67 rated shipping covers
Step response:	**KBS*-05**
Step, % Flow	ms
0% to 100%, 100% to 0%	24
10% to 90%, 90% to 10%	16
10% to -10%, -10% to 10%	14
25% to 75%, 75% to 25%	15
Parts Information:	
Interface Seal Kits	02-350686
Mating Electrical 7-pin Connector	934939

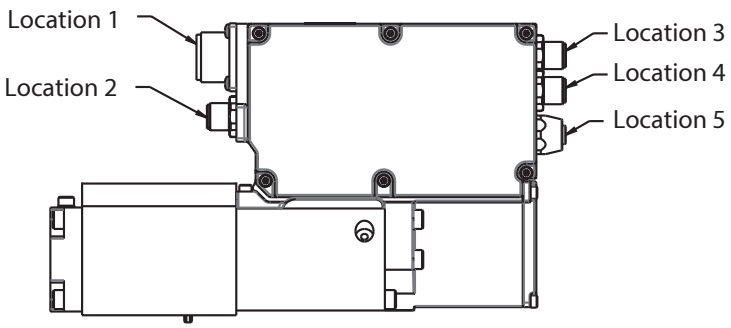


Figure 1

Note: See above for connector plugs specifications.

Software Information

KBH1

- Analog commanded spool control.
- Analog command source configuration options.
- Monitor output signal configuration options.
- Enable input signal enable/disable option.

KBH2/KBH3

- KBF 1capability.
- Sensor port configuration options. Configurable position, Speed, Pressure, Force and SSI Sensors.
- CANopen control modes (device options vary per available hardware options).
  - valve spool position control (VPOC/VSC).
  - drive speed control (DSC).
  - drive force/pressure control (DFPC/DFP).
  - drive position control (DPC).
  - drive pressure/flow control (Danfoss DPQ).
- CANopen DSP306 compliant electronic data sheet (EDS).
- Diagnostic configuration options.

All levels and models are compatible with the Danfoss Pro-FX:
For the latest revision, please visit www.danfoss.com

EtherCAT Version:
-EtherCAT Slave Device
-PDO communication 100us ring time
2ms refresh rate
-100/10Mbit data rate
-SDO communication (COE)
-PDO dynamic mapping support (8 parameters)
-ESI file available
-TCP port:80 webserver, 300 (Profx tool) planned via EOE
-Profx tool access via CANopen
-training material available for TwinCAT connectivity

Ethernet/IP Version:
-Ethernet/IP Adapter Device
-Assembly package for Process Data 2ms refresh rate
-100/10Mbit data rate
- two ports supported with daisy chaining, DLR support
- Class 3 explicit message support
-EDS file available
-TCP ports: 80 (webserver) 300 (Profx tool)
-Muticast support

Profinet Version:
-Protocol IO-Device
-Cyclic 5ms data exchange
-Conformance Class 2
-PROFINET IO specification: V 2.4
-100/10 Mbit RT compatible
-Acyclic data exchange via Read Write Data
-Records
-Two ports both can be used as access, build in Switch
-GDML file for Level1 and Level2
-TCP ports: 80 (webserver) 300 (Profx tool)

Download Pro-FX, Technical Information and Support Materials from Danfoss's Website: www.danfoss.com

Install the Danfoss Pro-FX Configure PC application tool. Installation is supported on a wide range of Windows based operating systems including Windows 10/11 32 bit and 64 bit.

The Pro-FX configure installation provides several options for PC USB peripheral CANbus adapters supported by the software. During installation the user can choose to install drivers for an available CANbus adapter.

The adapters supported by Pro-FX Configure are:

- PCAN-USB* PEAK-System Technik GmbH (http://www.peak-system.com)
- ValueCAN Intrepid Control Systems, Inc. (http://www.intrepidcs.com)
- Leaf-Light Kvaser AB (http://www.kvaser.com)

* The PCAN-USB adapter is recommended for compatibility with Danfoss Pro-FX: Control development environment used with KBS4DGV-xxx and other DanfossPro-FX products it is also included in the TEQ-470-A-10 test box.

Electrical Information

Block Diagram Voltage Input (Field 8 = 1)

Wiring connections must be made via the 7-pin plug mounted on the amplifier. See page 18 of this leaflet and Danfoss's Installation Wiring Practices for Vickers Electronic Products, leaflet 2468. Recommended cable sizes are:

Power cables:
For 24V supply
0.75 mm_2 (18 AWG) up to 20m (65 ft)
1.00 mm_2 (16 AWG) up to 40m (130 ft)

Signal cables:

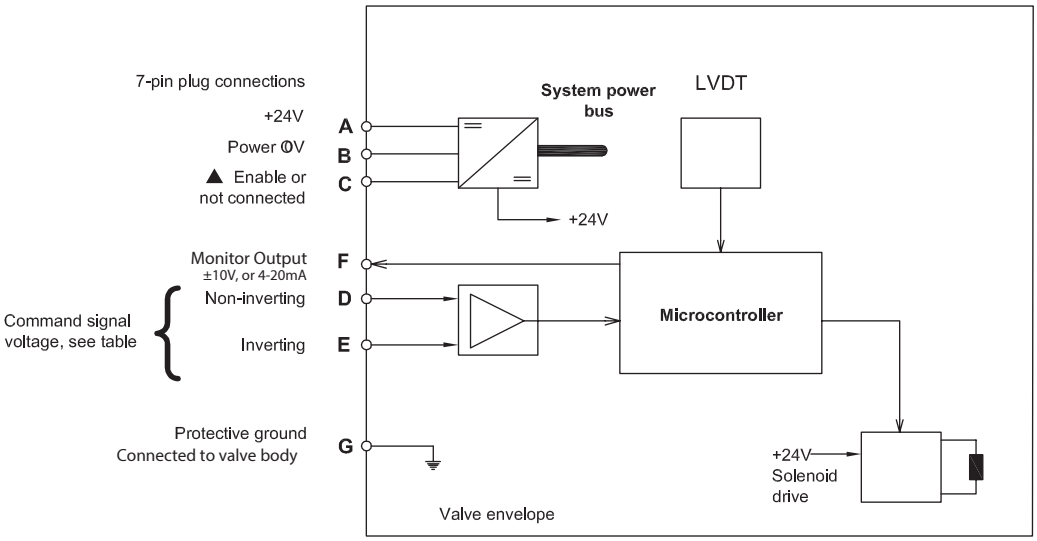
0.50 mm2 (20 AWG)

Screen (shield):

A suitable cable would have 7 cores, a separate screen for the signal wires and an overall screen.

Cable outside diameter 8.0 - 10.5 mm (0.31 - 0.41inches)

See connection diagram on page 16.



▲ Pin C is used for a valve enable signal with electrical connections Field 8 = H or R.

Command Signals and Outputs, Field 6 = 1

7-pin plug		Flow direction
Pin D	**Pin E**	
Positive OV U_D - U_E = Positive	OV Negative	P to A
Negative OV U_D - U_E = Negative	OV Positive	P to B

Block Diagram Current Input (Field 8 = 2,3,4,5)

Wiring connections must be made via the 7-pin plug mou nted on the amplifier. See page 19 of this leaflet and Danfoss's Installation Wiring Practices for Vickers Electronic Products, leaflet 2468. Recommended cable sizes are:

Power cables:

For 24V supply

0.75 mm_2 (18 AWG) up to 20m (65 ft)

1.00 mm_2 (16 AWG) up to 40m (130 ft)

Signal cables:

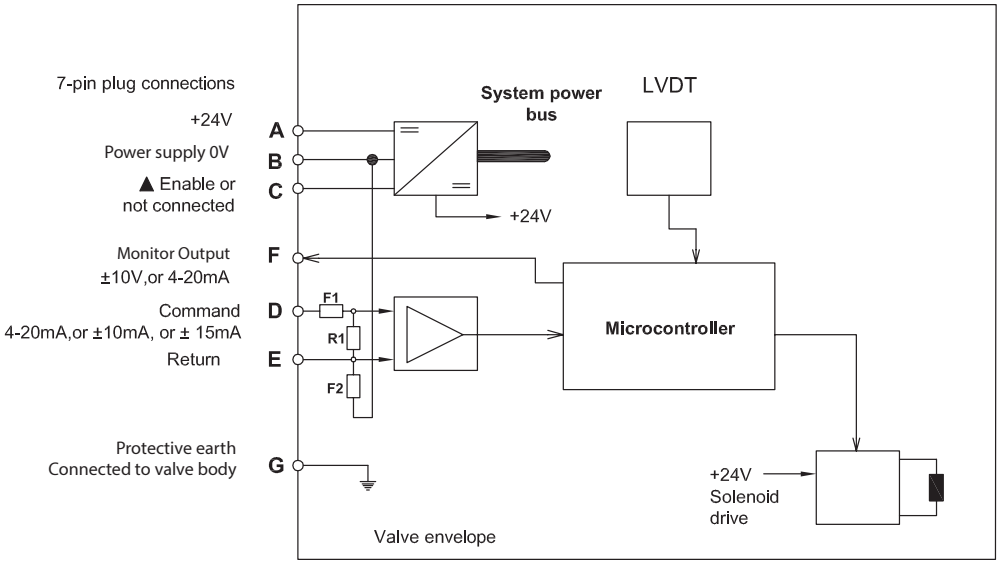
0.50 mm_2 (20 AWG)

Screen (shield):

A suitable cable would have 7 cores, a separate screen for the signal wires and an overall screen.

Cable outside diameter 8.0 - 10.5 mm (0.31 - 0.41 inches)

See connection diagram on page 17.



▲ Pin C is used for a valve enable signal with electrical connections Field = H or R

R1 shunt resistor 100R
F1, F2 resettable fuse

Command Signals and Outputs, Field 6 = 2

7-pin plug

Pin D	Pin E	Pin B	Flow direction
More than 12 mA	Current return	Power ground	P to A
Less than 12 mA	Current return	Power ground	P to B

Command Signals and Outputs, Field 6 = 3,4,5

7-pin plug

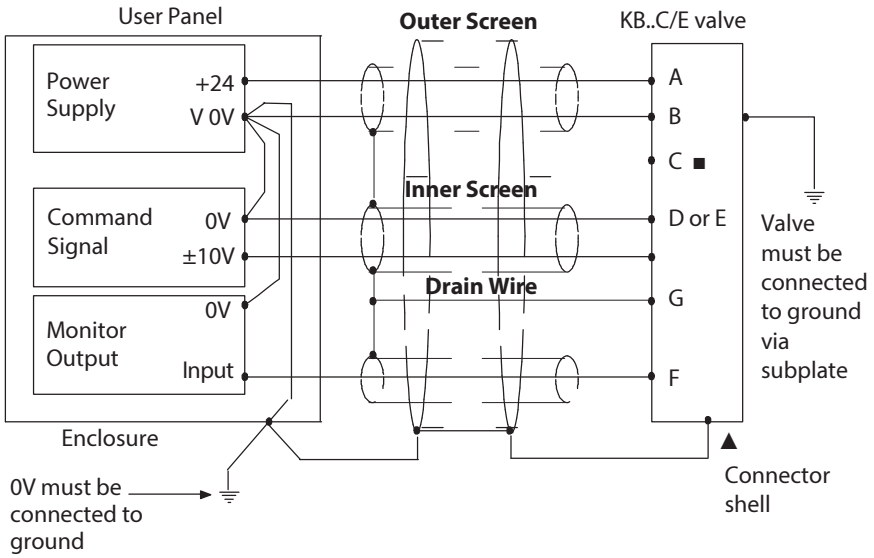
Pin D	Pin E	Pin B	Flow direction
More than 0 mA	Current return	Power ground	P to A
Less than 0 mA	Current return	Power ground	P to B

Warning

All power must be switched off before connecting/disconnecting any plugs.

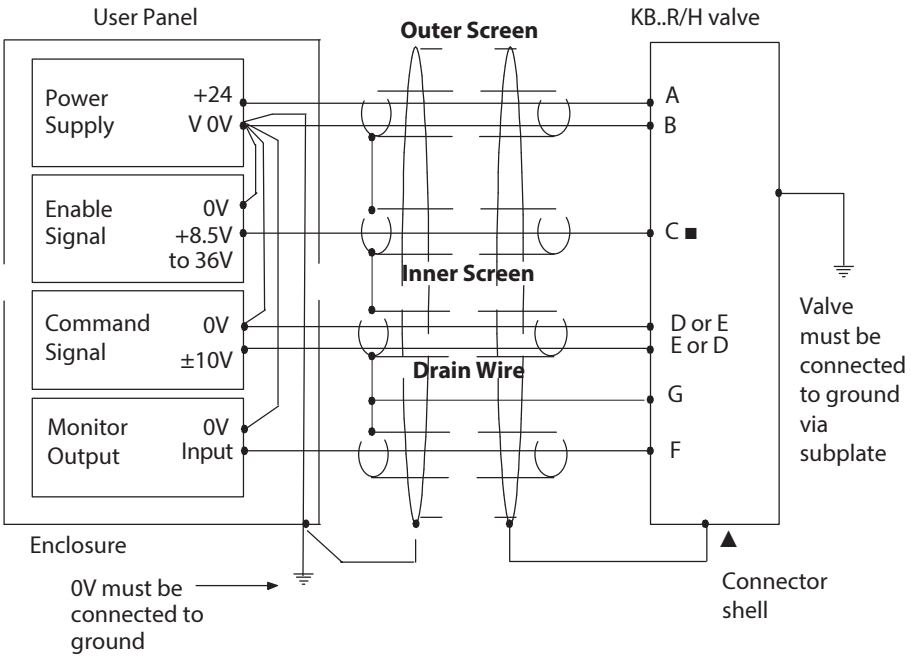
Wiring Connections Voltage Output (Field 9 = 1)

■ Spool position monitor voltage (pin F) will be referenced to the KB valve local ground (pin B).



Wiring Connections for Voltage mode (Field 10 = R/H) Valves with Enable Feature

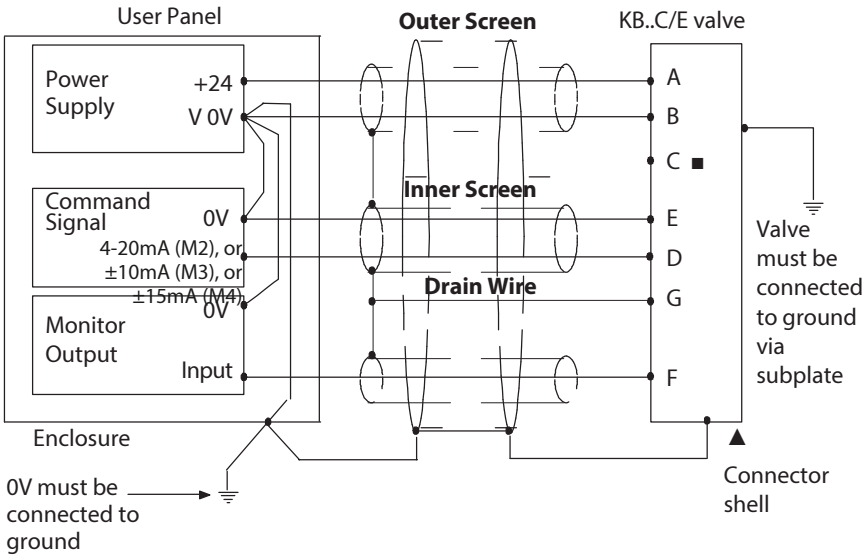
▲ Note: In applications where the valve must con-form to European RFI/EMC regulations, the outer screen (shield) must be connected to the outer shell of the 7 pin connector, and the valve body must be fastened to the earth ground. Proper earth grounding practices must be observed in this case, as any differences in command source and valve ground po-tentials will result in a screen (shield) ground loop.



Electrical Information

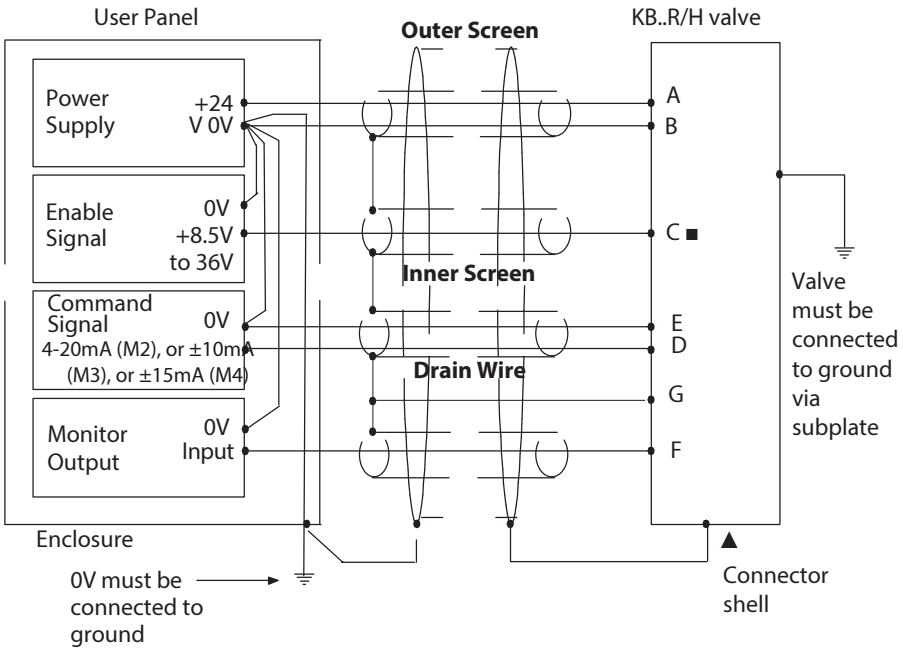
Wiring Connections Current Output (Field 9 = 2)

■ Spool position monitor voltage (pin F) will be referenced to the KB valve local ground (pin B).



Wiring Connections for Current mode (Field 10 = R/H) Valves with Enable Feature

▲ Note: In applications where the valve must conform to European RFI/EMC regulations, the outer screen (shield) must be connected to the outer shell of the 7 pin connector, and the valve body must be fastened to the earth ground. Proper earth grounding practices must be observed in this case, as any differences in command source and valve ground potentials will result in a screen (shield) ground loop.



Warning

Electromagnetic Compatibility (EMC) It is necessary to ensure that the valve is wired up as above. For effective protection of the user electrical cabinet, the valve subplate or manifold and the cable screens should be connected to efficient ground points. The metal 7 pin connector part no. 934939 should be used for the integral amplifier.

In all cases both valve and cable should be kept as far away as possible from any sources of electromagnetic radiation such as cables carrying heavy current, relays and certain kinds of portable radio transmitters, etc.

Difficult environments could mean that extra screening may be necessary to avoid the interference. It is important to connect the 0V lines as shown above. The multi-core cable should have at least two screens to separate the demand signal and monitor output from the power lines.

The enable line to pin C should be outside the screen which contains the demand signal cables.

To ensure EMI protection use only metal shielded mating connectors.

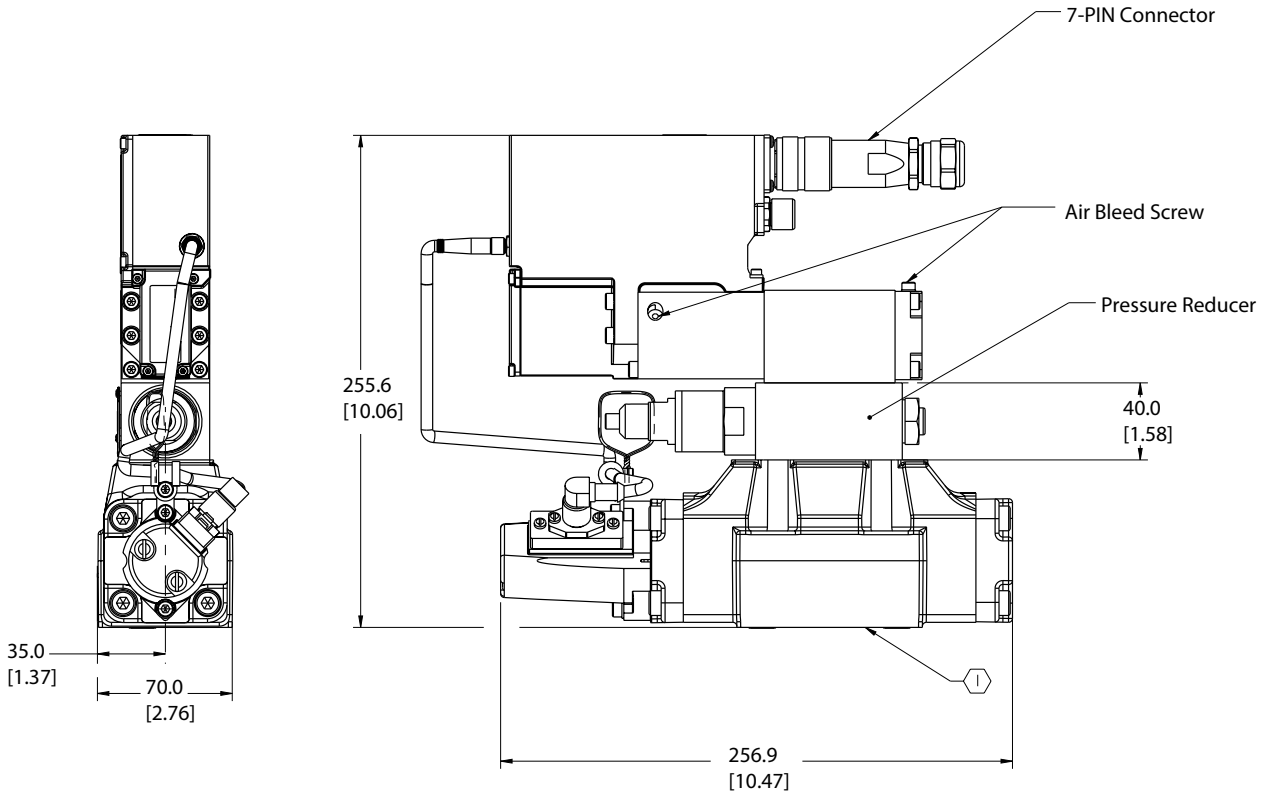
Warning

All power must be switched off before connecting/ disconnecting any plugs.

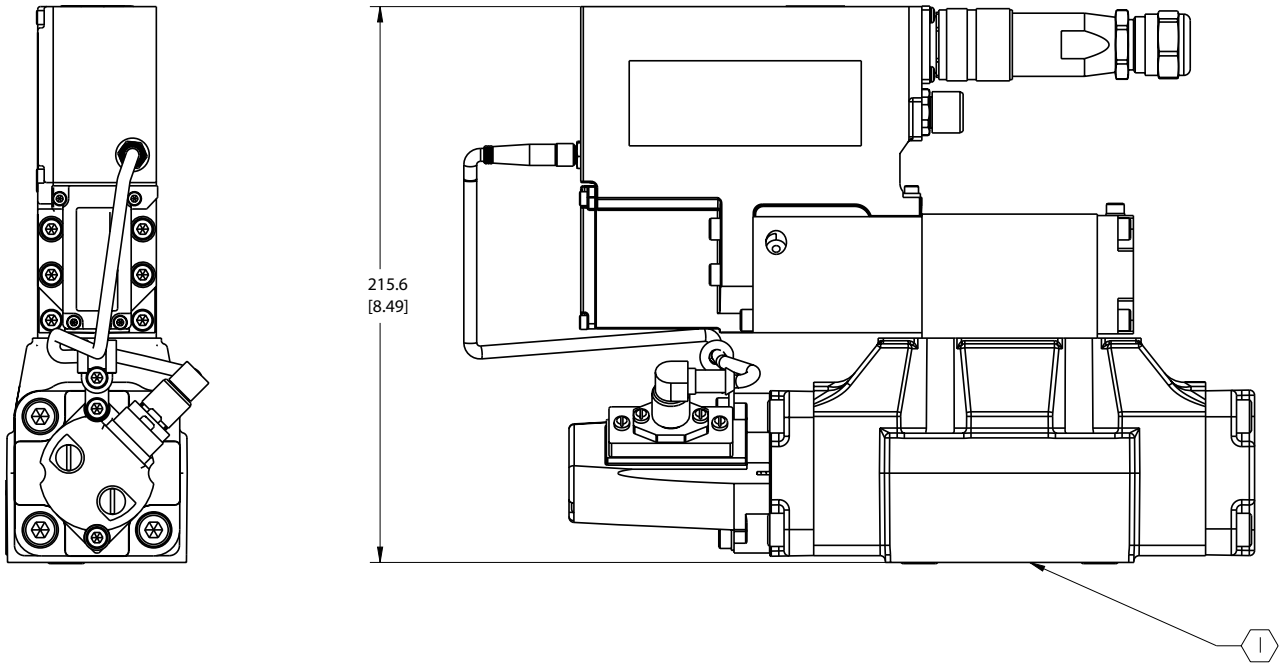
Installation Dimensions

mm (inch)

KBH1-05 with Pressure Reducer



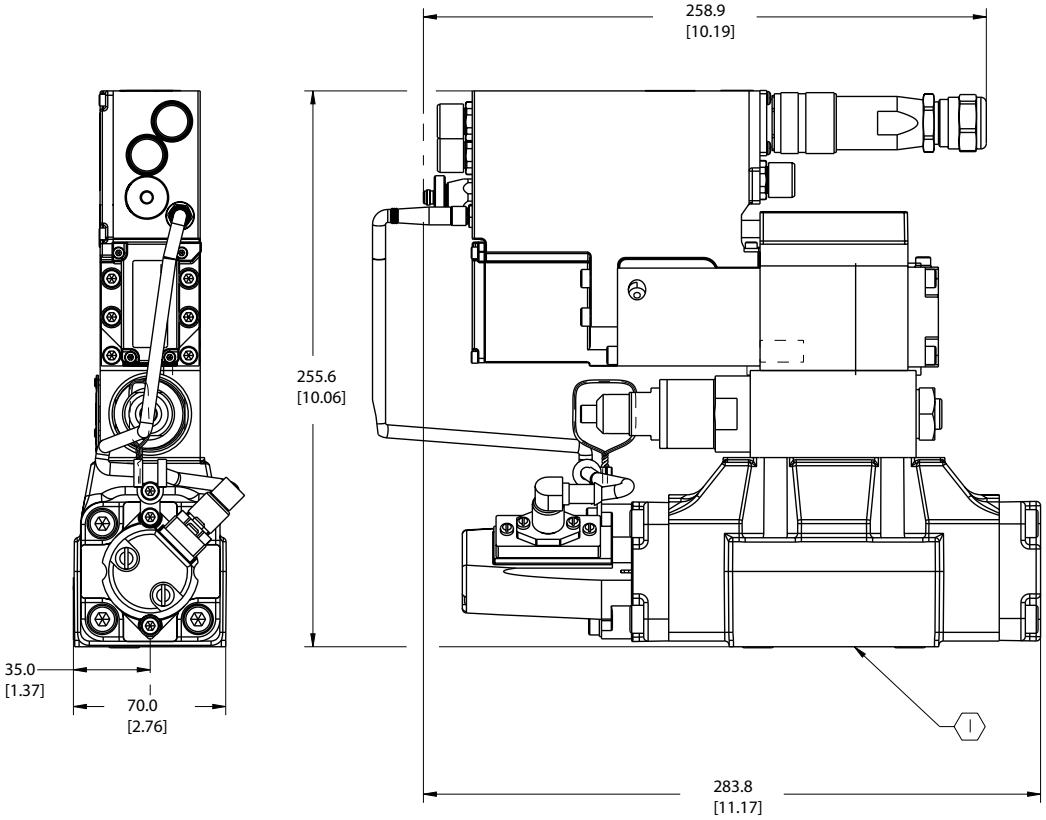
KBH1-05 without Pressure Reducer



Installation Dimensions

mm (inch)

KBH2-05 with Reducer and Pilot Sensors



Mounting Surfaces

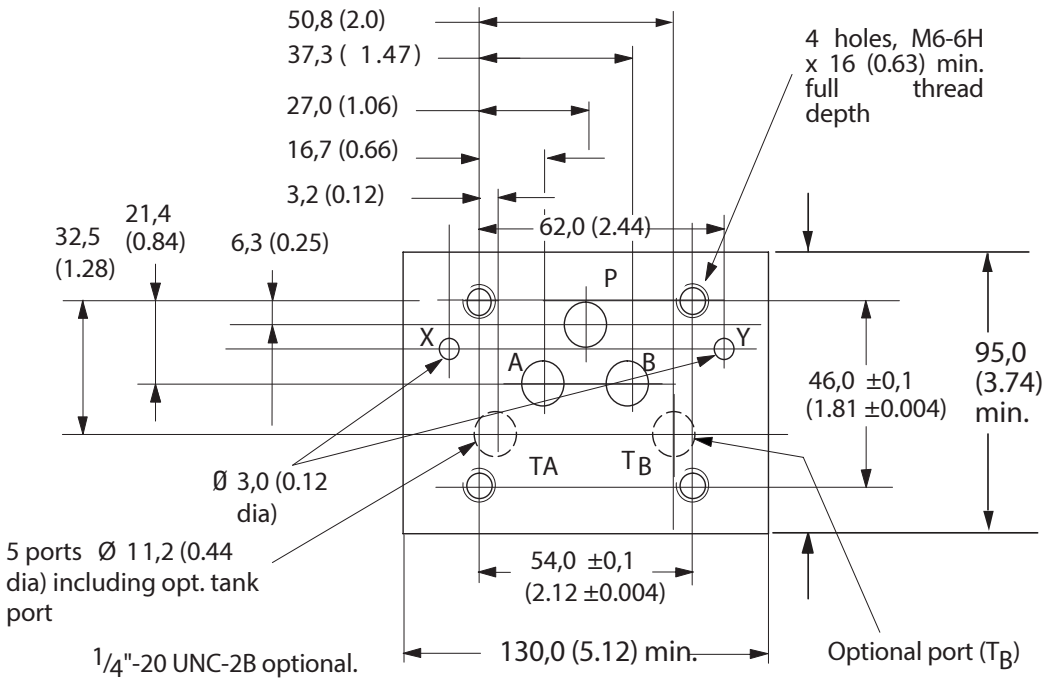
Mounting Surface Interface to ISO 4401 (Size 05)

This interface conforms to: ISO 4401-05-05-0-05

ANSI/B93.7M (and NFPA) size 05

CETOP R35H4.2-05

DIN 24340 Form A10



Application Data

Fluid Cleanliness

Proper fluid condition is essential for long and satisfactory life of hydraulic components and systems. Hydraulic fluid must have the correct balance of cleanliness, materials and addi-tives for protection against wear of components, elevated viscosity and inclusion of air.

The following recommendations are based on ISO cleanliness levels at 2 µm, 5 µm and 15 µm. For products in this catalog the recommended levels are:

17/15/12

Danfoss products, as any components, will operate with apparent satisfaction in fluids with higher cleanliness codes th an those described. Other manufacturers will often recomme nd levels above those specified.

Experience has shown, however, that life of any hydraulic components is shortened in fluids with higher cleanliness codes than those listed above. These codes have been prov-en to provide a long trouble-free service life for the products shown, regardless of the manufacturer.

Hydraulic Fluids

Materials and seals used in these valves are compatible with antiwear hydraulic oils, and aryl phosphate esters. The extreme operating viscosity range is 500 to 13 cSt (2270 to 70 SUS) but the recommended running range is 54 to 13 cSt (245 to 70 SUS).

Installation

The proportional valves in this catalog can be mounted in any attitude, but it may be necessary in certain demanding appli-cations, to ensure that the solenoids are kept full of hydraulic fluid. Good installation practice dictates that the tank port and any drain port are piped so as to keep the valves full of fluid once the system start-up has been completed.

Service Information

The products from this range are preset at the factory for optimum performance; disassembling critical items would de- stroy these settings. It is therefore recommended that should any mechanical or electronic repair be necessary they should be returned to the nearest Danfoss repair center.

The products will be refurbished as necessary and retested to specification before return. Field repair is restricted to the replacement of the seals.

ENGINEERING TOMORROW

Products we offer:

- Cartridge valves
- DCV directional control valves
- Electric converters
- Electric machines
- Electric motors
- Fluid Conveyance
- Gear motors
- Gear pumps
- Hydraulic integrated circuits (HICs)
- Hydrostatic motors
- Hydrostatic pumps
- Industrial hydraulics
- Orbital motors
- PLUS+1® controllers
- PLUS+1® displays
- PLUS+1® joysticks and pedals
- PLUS+1® operator interfaces
- PLUS+1® sensors
- PLUS+1® software
- PLUS+1® software services, support and training
- Position controls and sensors
- PVG proportional valves
- Steering components and systems
- Telematics

Danfoss Power Solutions is a global manufacturer and supplier of high-quality hydraulic and electric components. We specialize in providing state-of-the-art technology and solutions that excel in the harsh operating conditions of the mobile off-highway and industrial markets as well as the marine sector. Building on our extensive applications expertise, we work closely with you to ensure exceptional performance for a broad range of applications. We help you and other customers around the world speed up system development, reduce costs and bring vehicles and vessels to market faster.

Danfoss Power Solutions – your strongest partner in hydraulics and mobile electrification.

Go to www.danfoss.com for further product information.

We offer you expert worldwide support for ensuring the best possible solutions for outstanding performance. And with an extensive network of Global Service Partners, we also provide you with comprehensive global service for all of our components.

Local address:

Hydro-Gear
www.hydro-gear.com

Daikin-Sauer-Danfoss
www.daikin-sauer-danfoss.com

Danfoss
Power Solutions (US) Company
2800 East 13th Street
Ames, IA 50010, USA
Phone: +1 515 239 6000

Danfoss
Power Solutions GmbH & Co. OHG
Krokamp 35
D-24539 Neumünster, Germany
Phone: +49 4321 871 0

Danfoss
Power Solutions ApS
Nordborgvej 81
DK-6430 Nordborg, Denmark
Phone: +45 7488 2222

Danfoss
Power Solutions Trading (Shanghai) Co., Ltd.
Building #22, No. 1000 Jin Hai Rd
Jin Qiao, Pudong New District
Shanghai, China 201206
Phone: +86 21 2080 6201

Danfoss can accept no responsibility for possible errors in catalogues, brochures and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alterations can be made without subsequent changes being necessary in specifications already agreed.
All trademarks in this material are property of the respective companies. Danfoss and the Danfoss logotype are trademarks of Danfoss A/S. All rights reserved.