



Danfoss KBFRG4-05 Proportional Directional Valve Installation Guide

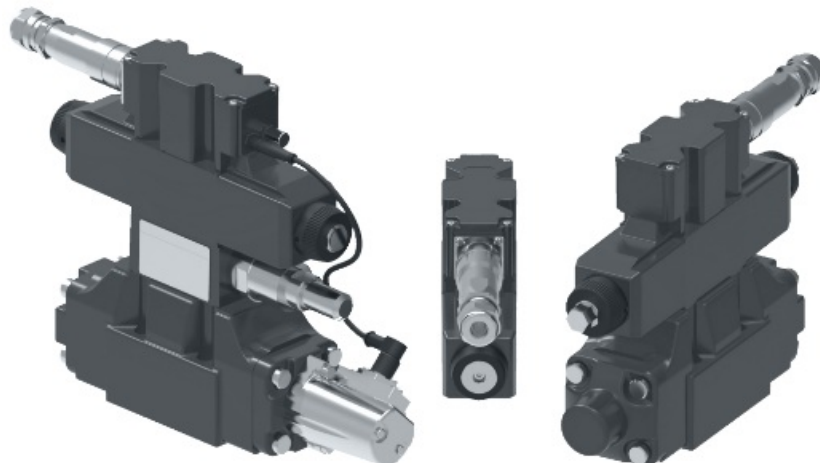
[Home](#) » [Danfoss](#) » Danfoss KBFRG4-05 Proportional Directional Valve Installation Guide 

Contents

- [1 Danfoss KBFRG4-05 Proportional Directional Valve](#)
- [2 Specifications](#)
- [3 Product Usage Instructions](#)
- [4 FAQ](#)
- [5 Valve installation for new application](#)
- [6 Electrical Connections](#)
- [7 Connections and Screening](#)
- [8 Wiring instructions and connector pinning for CAN bus](#)
- [9 Documents / Resources](#)
 - [9.1 References](#)



Danfoss KBFRG4-05 Proportional Directional Valve



Specifications

- **Product:** Proportional Directional Valve KBFRG4-05
- **Recommended Cable:** ALPHA type 1299/10C 10 conductors, 22 AWG foil shielded cable with drain wire
- **Maximum Cable Length:** 30 meters
- **Minimum Power Supply Voltage:** Refer to the provided graph
- **Bolt Recommendations:**
 - **Valve Minimum Bolt Length:** 40 mm (1.625 in)
 - **Bolts/Studs for Mounting Surface:** 4X M6 (11-15 Nm / 100-130 in-lbs torque)
- **Electrical Connections:** 7-pin plug with specific pin assignments

Product Usage Instructions

- The valve can be mounted in any attitude, ensuring that it is kept full of fluid, especially port T.
- Do not remove the protection pad until installation. Mount on a clean, burr-free surface.
- Use the recommended cable ALPHA type 1299/10C.
- Pair wires for power supply and protective earth ground connections.
- The maximum cable length is 30 meters.
- Use a minimum bolt length of 40 mm for mounting the valve.
- Follow torque specifications for mounting surface bolts/studs.
- Make electrical connections via the 7-pin plug. Ensure power is switched off before connecting cables.
- Use a cable with at least 6 cores and pairs of conductors individually screened with an overall braided screen.

FAQ

- **Q:** What is the recommended cable for this product?
- **A:** The recommended cable is ALPHA type 1299/10C, a 10 conductor, 22 AWG foil shielded cable with drain wire.
- **Q:** How should I install the valve to ensure proper functioning?
- **A:** The valve can be mounted in any attitude, but ensure it is kept full of fluid at all times, especially port T. Do not remove the protection pad until immediately before installation.

Valve installation for new application

- The valve can be mounted in any attitude but the piping must be arranged to ensure that the valve is kept full of fluid at all times. This applies particularly to port T.
- Do not remove the protection pad on the bottom face of the valve until immediately before installation.
- Take care not to lose the seals from the valve ports. Ensure that the surface on which the valve is to be mounted is clean and free from burrs and damage. This applies also to any intermediate “stacking/sandwich” valves that may be used.
- Install the valve on the mounting surface and secure them with bolts to class 12.9-ISO 898 (Alloy Steel, Rc 38-43, grade 8). The supplied shipping bolts meet this requirement. Torque bolts according to the following recommendations. Bolt thread tolerance class must match the mating internal thread tolerance class (ex: use -g6 bolts with -H7 threads; use UNC-3A bolts with UNC-3B threads)

Bolt Recommendations

Valve	Minimum Bolt Length* mm (in)	Bolts/Studs for Mounting Surface: ISO 4401 (torque)**	ANSI/B93.7M (torque)**
KBFRG4-05- *	40 (1.625)	4X M6 (11-15 Nm)	4x 1/4" -20 UNC (100-130 in-lbs)

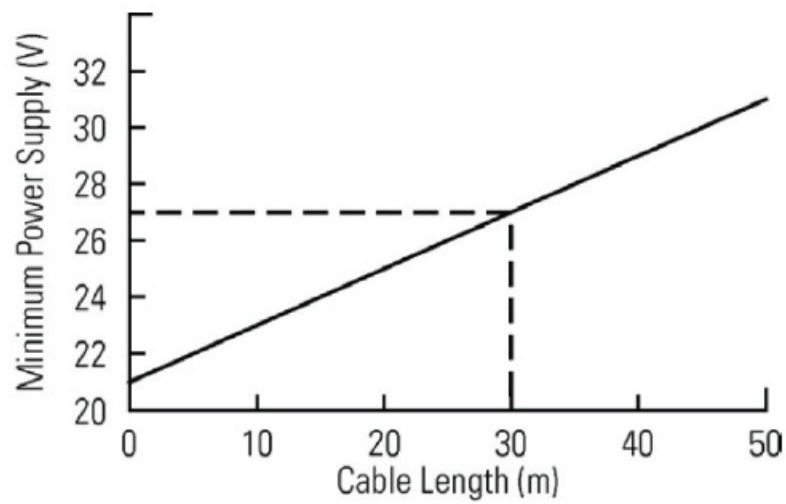
- The minimum bolt length is the sum of the valve body clamping height plus the minimum thread engagement in ferrous materials.
- Reduce torque by 20% for lubricated threads.

Fluid Cleanliness Point

- The following recommendations are based on ISO cleanliness levels at 2 µm, 5 µm, and 15 µm. The recommended level is:
- Customer requested for 18/15/12. The team to come back with an evaluation.

Electrical Connections

- Before starting to connect cables ensure that all power is switched off.
- Electrical connections must be made via the 7-pin plug mounted on the amplifier.
- The recommended cable should have at least 6 cores with pairs of conductors individually screened and an overall braided screen.
- A suitable cost-effective cable is ALPHA type 1299/10C 10 conductor, 22 AWG foil shielded cable with drain wire.
- To achieve the recommended wire gages for the power supply and protective earth ground connections, pairs of wires are used.
- The maximum recommended cable length is 30 meters.
- The minimum power supply voltage under full load conditions should be as shown in the following graph.
- This will ensure that the minimum valve voltage of 21V is maintained at all times.



Recommended cable: Alpha# 58643, 16AWG 3 Pairs, Alpha# 2243C 18AWG 3 Pairs, Alpha# 58633, 18AWG 3 Pairs.

Command Signals and Outputs, V11

7-pin plug Pin D	Pin E	Flow direction
Positive	OV	P to A
OV	Negative	P to A
$U_D - U_E = \text{Positive}$		
Negative	OV	P to B
OV	Positive	P to B
$U_D - U_E = \text{Negative}$		

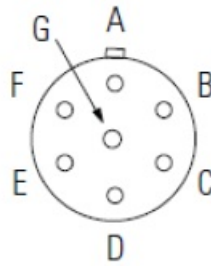
Command Signals and Outputs, V21

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

KBFRG4-05 Proportional Directional Valve

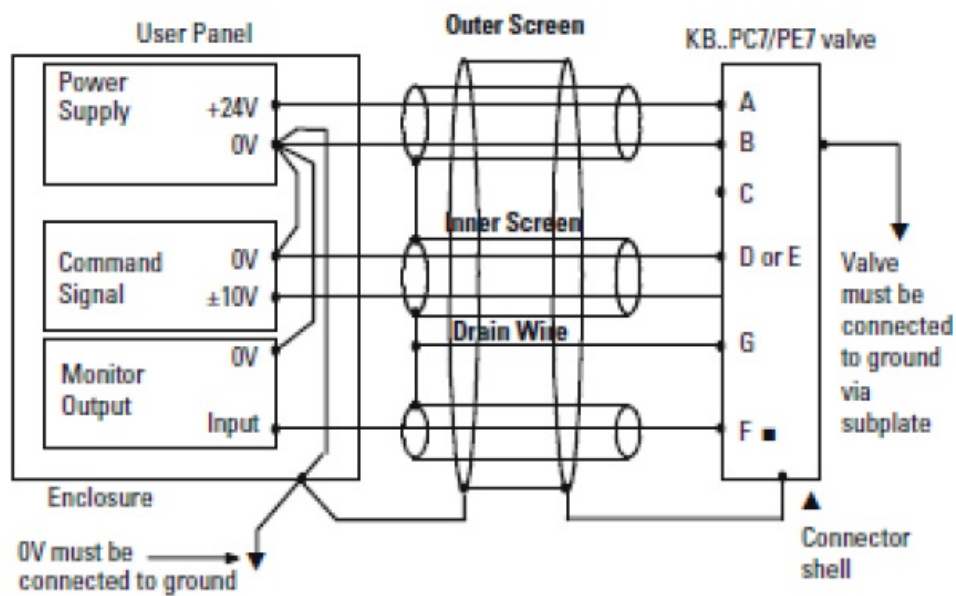
- **Pin A** Power Supply
- **Pin B** Power 0V
- **Pin C** Enable
- **Pin D** Command signal (See table above)
- **Pin E** Command signal (See table above)

- **Pin F** Monitor output
- **Pin G** Protective ground

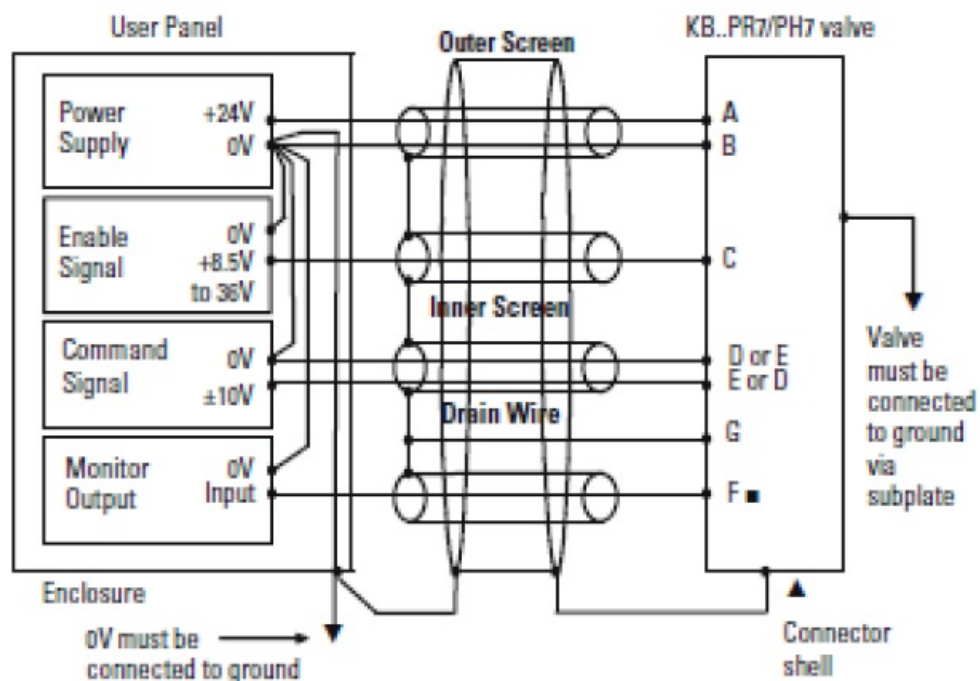


Connections and Screening

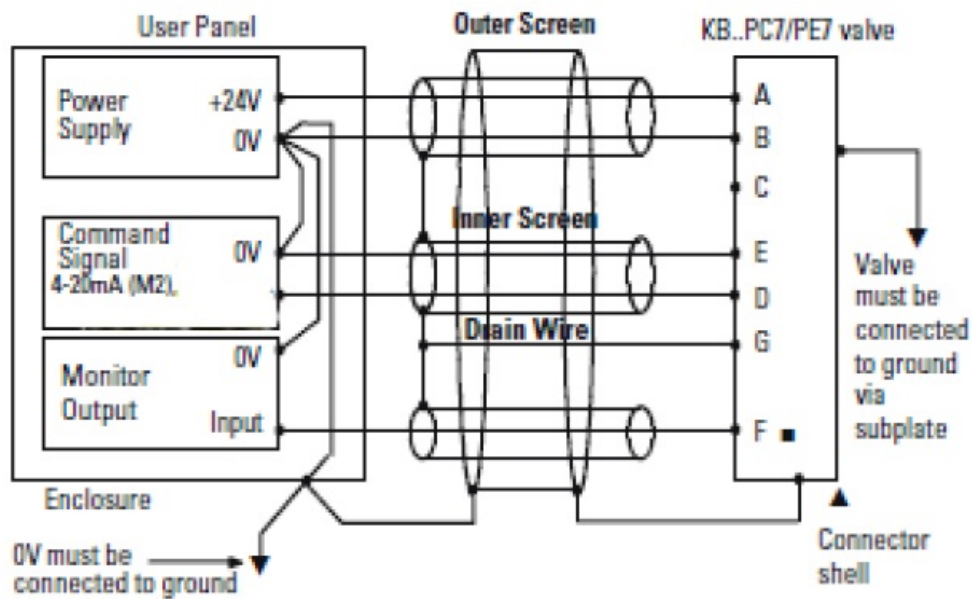
- Connections and Screening must be used with specification



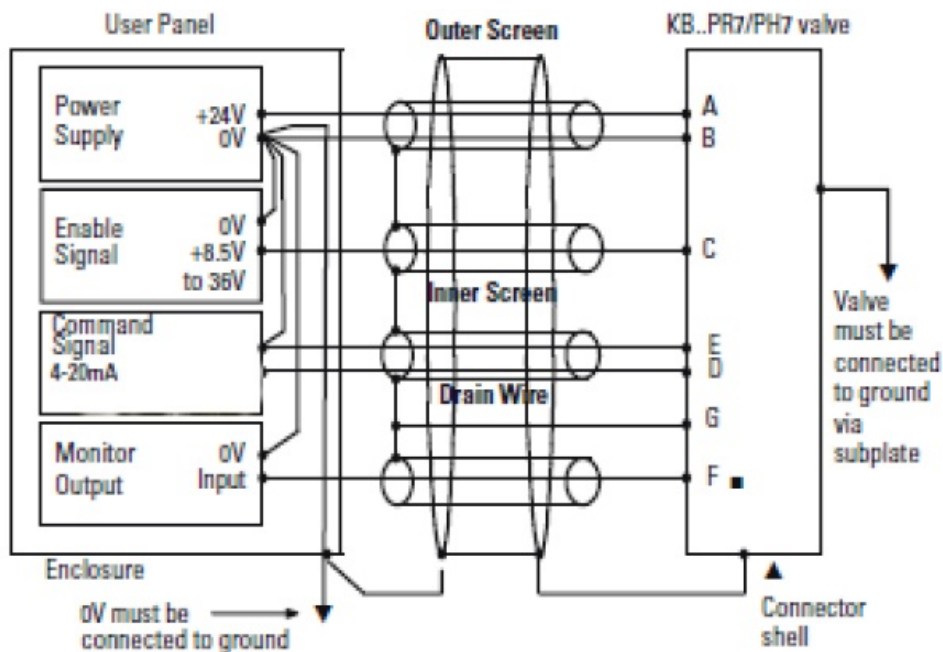
V11 Wiring



V11 Wiring with enable feature



V21 Wiring



V21 Wiring with enable feature

Monitor output [pin f] will be referenced to the KBF valve power 0V [pin B]

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's ground. Proper earth grounding practices must be observed in this case, as any differences in command source and valve ground potential will result in a screen (shield) ground loop.

Warning

Electromagnetic Compatibility (EMC) It is necessary to ensure that the unit is wired up as above. For effective protection of the user's electrical cabinet, the valve subplate or manifold and the cable screen should be connected to efficient ground points.

The metal 7-pin connector part number 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 source of electromagnetic radiation such as cable

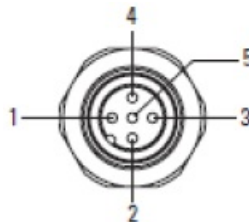
carrying heavy current, relays, and certain kinds of portable radio transmitters, etc.

- Difficult environments could mean that extra screening may be necessary to avoid interference.
- It is important to correct the OV lines as shown above. The multi-core cable should have at least two screens to separate the command 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.

Wiring instructions and connector pinning for CAN bus

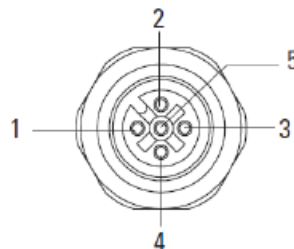
5-pin CAN Connector (Male)

- **Pin 1:** GND
- **Pin 2:** Not connected
- **Pin 3:** Not connected
- **Pin 4:** CAN High
- **Pin 5:** CAN Low



5-pin CAN Connector (Female)

- **Pin 1:** GND
- **Pin 2:** Not connected
- **Pin 3:** Not connected
- **Pin 4:** CAN High
- **Pin 5:** CAN Low



1. To ensure EMI protection use only metal shielding mating connectors.
2. Use only shielded twisted pair (STP) cables for mating connection.
3. The CANbus termination resistor is not installed in the valve. Use a 120-ohm termination resistor on both ends of the cable to realize a capable impedance of 60 ohms.

Power and Signal Levels

#	Mode	Command Signal	Feedback Signal
1	V11	+/-10V voltage command signal	+/-10V voltage feedback signal
2	V21	4-20mA current command signal	+/-10V voltage feedback signal

Start-up

Valve model KBFRG4-05 can be checked for correct electrical functioning without any hydraulic supply:

1. Switch the power on and check that the voltage is within the above specification.
2. The valve will respond to a command signal and can be monitored via the connection from the plug pin F.
3. If the monitor signal does not follow the command signal, check the command signal connections to the amplifier.
4. When the valve is working and is fitted correctly, the hydraulic power to the system can be turned on under the system designer's instructions.

Replacing an existing valve

The following are advisory and may not apply to specific systems or applications. The user may need to establish procedures to suit the application.

Warning

Before removing an existing valve:

- Turn off all electrical power.
- Relieve hydraulic pressure. Accumulators must either be isolated from the system by suitable valves or the hydraulic fluid discharged to the reservoir.
- Overhead or positive head reservoirs must be isolated from the system by suitable valves.
- Lower all vertical cylinders.
- Block any cylinders whose movement could generate pressure.

Disconnect the electrical plug from the valve.

- Before removing the valve make provisions to prevent any hazard arising from the fluid that will drain from exposed mounting surfaces.
- Unscrew the valve mounting bolts, removing these and the valve. Keep the valve mounting surface clear of any contamination whilst draining all fluid from it. If returning the valve to Danfoss for repair, fit the protection plate from the new valve after ensuring that all fluid has been drained.
- Install the new valve using the existing bolts and electrical plugs if in good condition. If not, replace the part appropriately.

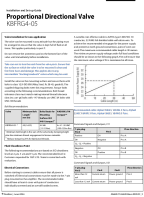
Re-start-up

1. Restore the application to its state immediately prior.
2. Proceed as a new valve.

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Documents / Resources

	Danfoss KBFRG4-05 Proportional Directional Valve [pdf] Installation Guide KBFRG4-05, KBFRG4-05 Proportional Directional Valve, Proportional Directional Valve, Directional Valve, Valve
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References

- [User Manual](#)

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