### **Tech Note**



## Electrical activation unit type PVEK and PVEK-DI for proportional valves PVG 32

	DKMH.PN.500.B1.02 is new	
Introduction	<ul> <li>Danfoss is introducing a new electrical activation unit type PVEK.</li> <li>PVEK is one of a new series of electrical activation units - the PVE series 3 - for PVG 32.</li> <li>The features of PVEK are:</li> <li>Newly-developed electronics based on hybrid technology.</li> <li>Two solenoid valves plus two orifices instead of four solenoid valves.</li> <li>Standard AMP connector (IP66).</li> <li>No fault monitoring.</li> <li>Integrated direction indication as an option.</li> </ul>	PVEK has been developed for systems where low hysteresis has a higher priority than reac- tion time. Because of its design with only two NC solenoid valves, PVEK has hydraulic charac- teristics that differ from than those familiar in the PVE series 2, see technical description.

## Versions and code numbers

Version	Desciption	Code r 12 Volt	number 24 Volt
	PVEK (Without direction indication)	157B4911	157B4912
	PVEK-DI (With direction indication)	157B4913	157B4914

#### Function principles PVEK



PVEK is built up of both new and familiar components:

- Newly-developed electronics based on hybrid technology.
- Same inductive LVDT transducer as PVE series 2.
- Same hydraulic bridge as PVE series 2, but two of the solenoid valves have been replaced with two orifices(0.6 mm).

The use of two solenoid valves and two orifices results in properties that deviate from those of PVM series 2 in the following respects:

- Low hysteresis
- Greater pilot oil flow.
   Pilot oil supply still able to sustain supply to a minimum of five activated PVEK units at the same time.
- Activation of PVM while voltage is being applied to the PVE (manual override) easier than with a PVEM.

To begin activation requires a force of 40 N (measured at the middle of the knob on a standard PVM). To obtain full activation requires a force of 55 N.

- Greater oil flow creates flow forces that may limit the travel of the main spool. Example: In systems with pressure control spools ( > D dimension), depending on the flow forces (QA/QB > 1.25), PVEK limits the velocity of a negative load when no pressure regulating valve is used.
- PVEK, is more sensitive to contamination than PVE series 2. In systems with strict safety requirements, it is recommended that PVEK-DI be used with direction indication connected to a safety system.



#### Function principles PVEK-DI



As PVEK but with integrated direction indication (DI).

For direction indication, signals A and B on the DI output are "high" in neutral.

If activated in direction A (oil out of port A), signal A falls from "high" to "low" while signal B remains "high" and vice versa:



#### **PVEK-DI** connections



#### **Technical data**

# Mineral-based oil with a viscosity of 21 mm²/s at a temperature of $50^{\circ}$ C must be used.

Reaction times and hysteresis

Function	Voltage	Min.	Nominal	Max.
Reaction time from neutral position to max. spool travel	V <sub>bat</sub> OFF (Neutr. switch)	250 ms	320 ms	500 ms
Reaction time from max. spool travel to neutral position	V <sub>bat</sub> OFF (Neutr. switch)	300 ms	400 ms	550 ms
Reaction time from neutral position to max. spool travel	V <sub>bat</sub> ON (Constant)	250 ms	320 ms	500 ms
Reaction time from max. spool travel to neutral position	V <sub>bat</sub> ON (Constant)	150 ms	200 ms	250 ms
Hysteresis (frequency = 0,02 Hz)			2%	4%

#### Comparison of hysteresis, PVEM and PVEK



#### Pilot oil consumption

Function	Voltage	Oil flow
Pilot oil flow per PVEK	Off	0 l/min
Pilot oil flow per PVEK in locked position	On	0,5 l/min
Pilot oil flow per PVEK for one full activation	On	0,75 l/min

#### Electrical specification

Function	12	24	
Nominal voltage	12 V <sub>DC</sub>	24 V <sub>DC</sub>	
Supply voltage (U <sub>DC</sub> ) range	11 - 15 V	22 - 30 V	
Supply voltage (U <sub>DC</sub> ) max. ripple	5%		
Supply voltage (U <sub>DC</sub> ) overvoltage (max. 5 min)	18 V	36 V	
Current consumption (on activation)	350 mA	210 mA	
Signal voltage in neutral	0,5 x U <sub>DC</sub>		
Signal voltage in regulation range	0,25 x U <sub>DC</sub> t	o 0,75 x U <sub>DC</sub>	
Signal current	0,25 mA	0,5 mA	
Max. current load in V <sub>bat+</sub> (PVEK-DI)	35 mA	55 mA	
Input impedance at 0,5 x U <sub>DC</sub>	12 kΩ		
Power concumption	5 W		

#### Enclosure and socket

Function	
IEC 529 degree of protection	IP 66
Socket PVEK	4-pole AMP
Socket PVEK-DI	2 x 4-pole AMP

AMP JPT-socket