Danfoss PVG 100 Electrical Actuating Module Installation Guide

Contents

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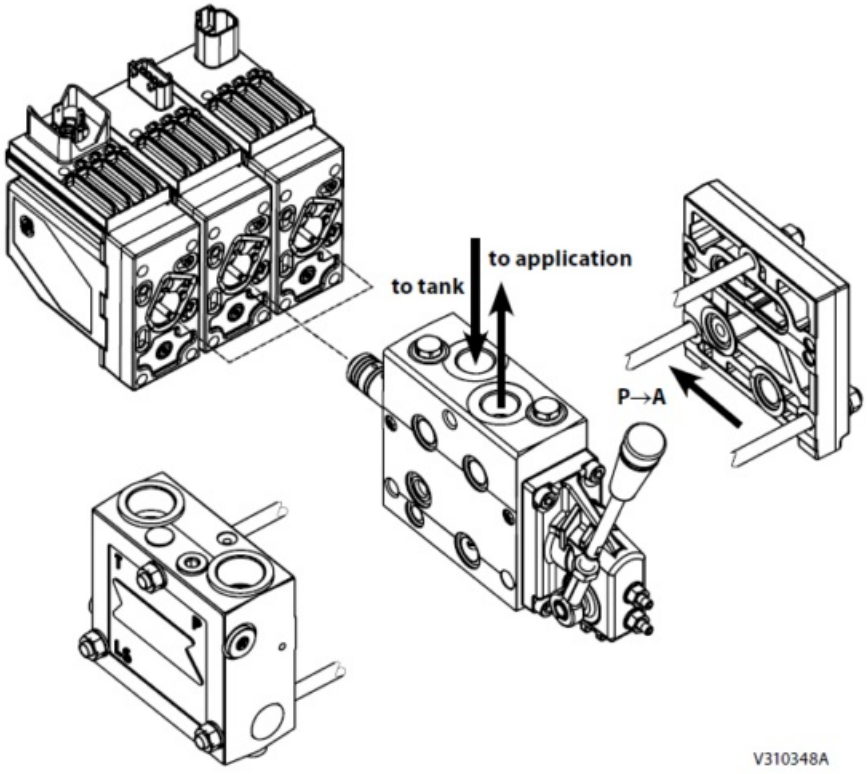
Installation Guide

Electrical Actuating Module

PVE series 4 for PVG 32 and PVG 100

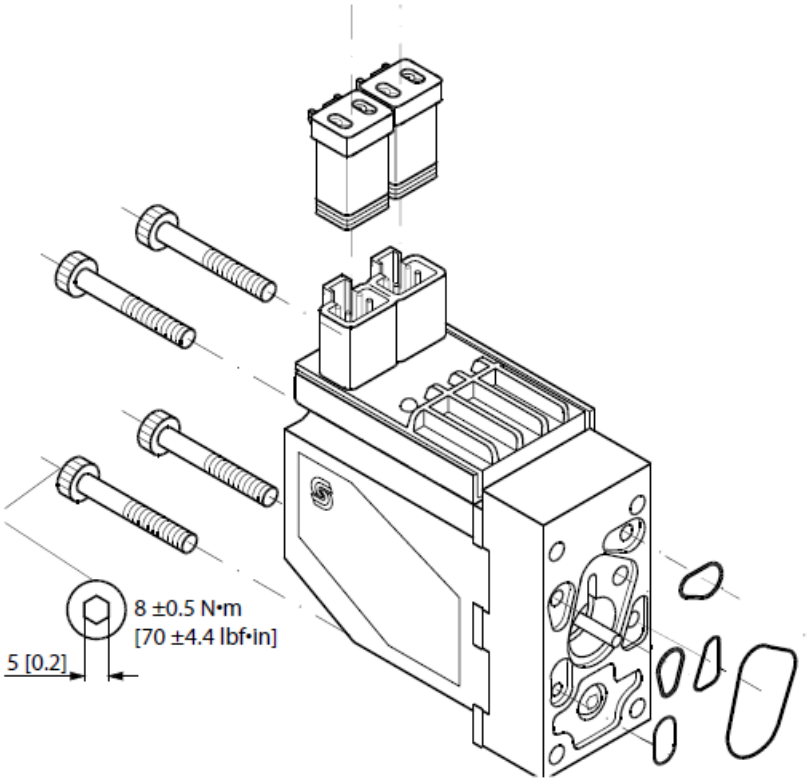
Oil flow direction for standard assembled group@



For Technical Information, see [Danfoss.com]

Mounting PVE

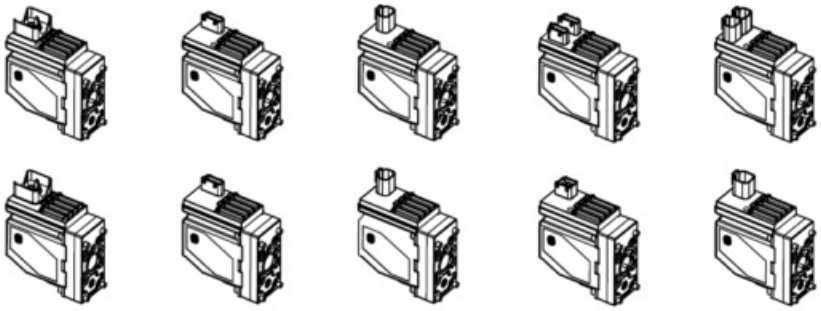
Instruction covers



- Protect LVDT-pin if present
- Ensure O-rings are in place
- Ensure gasket when using AMP and DIN/Hirschmann connector
- Do not over torque

warning
PVEA is not for use on PVG 100

All PVE variants. PVEO and PVEO-R are without LVDT



Version ON/OFF

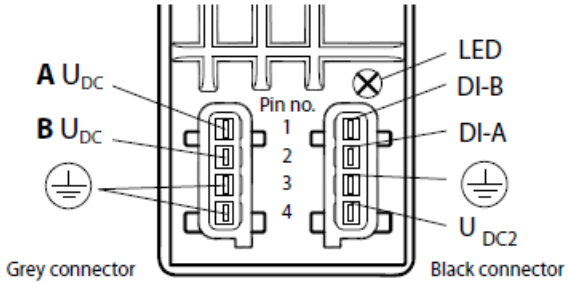
- Ground pins are internally connected.
- Pin 3 is not connected on
  Hirschmann/DIN version of PVEO.
- UDC2 supplies electronics for feedback signal on PVEO-DI.

Connection PVEO with direction indication (DI)

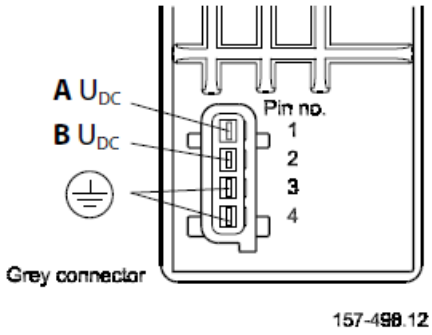
Connector 1	A U_{DC}	B U_{DC}	Gnd	Gnd
AMP (grey)	p 1	p 2	p 3	p 4

Connector 2	DI-B	DI-A	Gnd	UDC 2
AMP (black)	p 1	p 2	p 3	p 4

AMP version of PVEO–DI



AMP version of PVEO/PVEO–R



Connection PVEO standard

Connector	A	B
AMP/Hirschmann/DIN	pin 1	pin 2
Deutsch	pin 1	pin 4

Function	A (pin 1)	B (pin 2)
Neutral	0	0
Q: P ® A	UDC	0
Q: P ® B	0	UDC

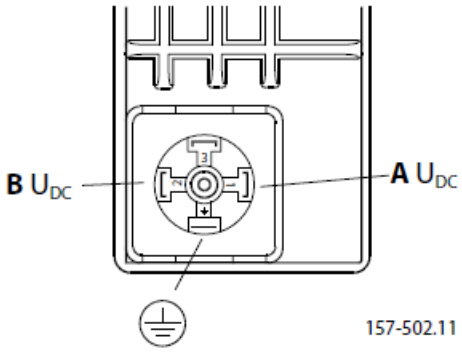
Control all PVEO

Connector	A	B
AMP Hirschmann/DIN	pin 1	pin 2
Deutsch	pin 1	pin 4

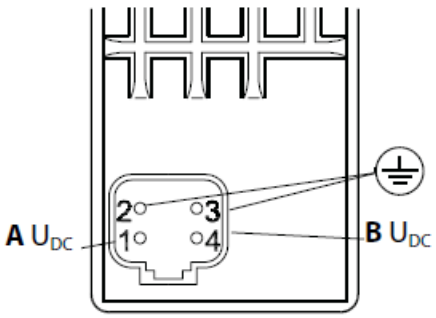
DI general not

- On DI versions two UDC connections (UDC and UDC2) are necessary.
  UDC will supply the electronics and
- UDC2 will supply the solenoid valves two ground pins are internally connected.
  With advantages two separate power supplies can be used, see also Technical information for PVE series 4.

Hirschmann/DIN version of PVEO / PVEO–R



Deutsch version of PVEO /PVEO-R



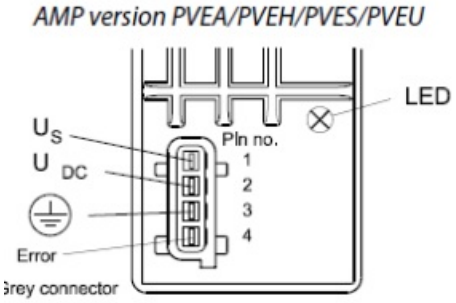
Proportional Version

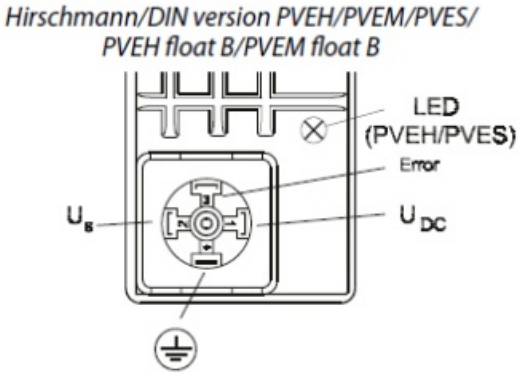
Standard PVE
Connection PVEA/PVEH/PVEM/PVES/PVEU – also with oat B four pin

Connector	U_S	UDC	Gnd	Error
AMP	pin 1	pin 2	pin 3	pin 4
Hirschmann/ DIN	pin 2	pin 1	gnd	pin 3
Deutsch	pin 1	pin 4	pin 3	pin 2

- On PVEM the error pin is not used and not connected (pin 3 Hirschmann/DIN).

- Ground pins are internally connected.

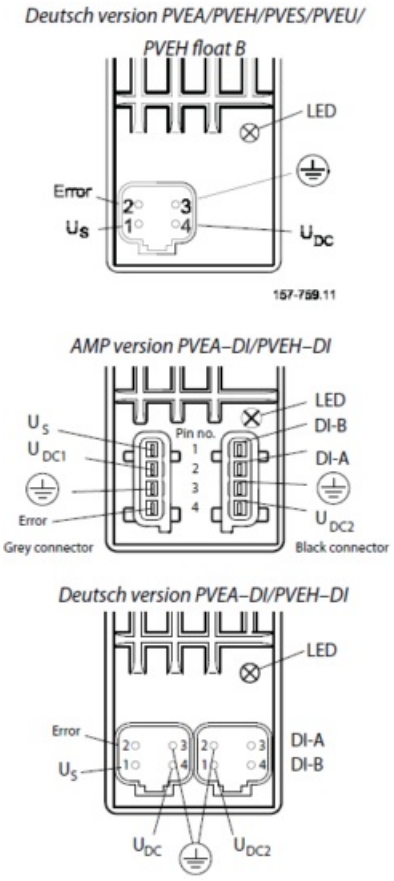




Control (US) for standard mounted PVEA/ PVEH/ PVEM/ PVES

Function	Voltage relative	PWM
Neutral	0,5 • U_{DC}	50%
Q: P ® A	0,5 ® 0,25 • U_{DC}	50% ® 25%
Q: P ® B	0,5 ® 0,75 • U_{DC}	50% ® 75%

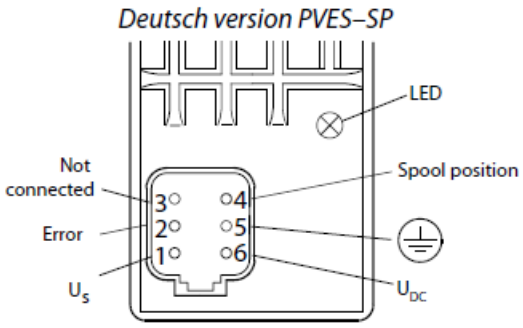
Function	Voltage relative	PWM
Neutral	0,5 • U_{DC}	50%
Q: P ® A	0,5 ® 0,34 • U_{DC}	50% ® 34%
Q: P ® B	0,5 ® 0,65 • U_{DC}	50% ® 65%
Float	0,75 • U_{DC}	75%



Standard PVE with DI
Connection PVE with direction indication (DI)

Connector 1	**U_S**	**UDC 1**	**Gnd**	**Error**
AMP (grey)	p 1	p 2	p 3	p 4
Deutsch	p 1	p 4	p 3	p 2

Connector 2	**DI-B**	**DI-A**	**Gnd**	**UDC 2**
AMP (black)	p 1	p 2	p 3	p 4
Deutsch	p 4	p 3	p 2	p 1



Control (US) for standard mounted PVEA–DI/ PVEH–DI

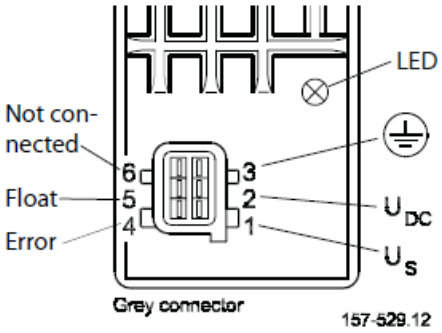
Function	U_S	PWM
Neutral	0,5 • U_{DC}	50%
Q: P ® A	0,5 ® 0,25 • U_{DC}	50% ® 25%
Q: P ® B	0,5 ® 0,75 • U_{DC}	50% ® 75%

- Ground pins are internally connected.
- UDC2 only supplies electronics for feedback signal and error pin on PVEA-DI / PVEH-DI. Two separate power sources can be used.

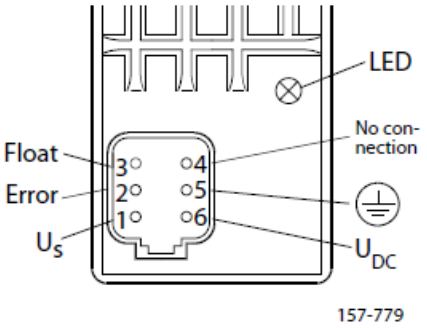
Standard PVE with SP
Connection PVE with Spool Position (SP)

Connector	U_S	Error	SP	Gnd	UDC
Deutsch	p 1	p 2	p 4	p 5	p 6

AMP with separate float pin



Deutsch version with separate float pin



Control (US) for standard mounted PVES-SP

Function	U_S	PWM
Neutral	0,5 • U_{DC}	50%
Q: P ® A	0,5 ® 0,25 • U_{DC}	50% ® 25%
Q: P ® B	0,5 ® 0,75 • U_{DC}	50% ® 75%

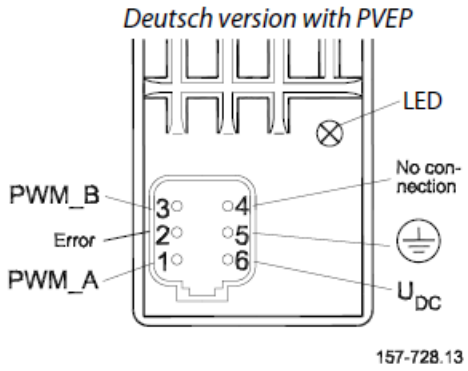
PVE with separate
Float pin Connection PVEH with float A six pin

Connector	U_S (control)	U_{DC} (power)	Float	Ground	Error
AMP	pin 1	pin 2	pin 5	pin 3	pin 4
Deutsch	pin 1	pin 6	pin 3	pin 5	pin 2

PWM controlled PVE – PVEP Connection PVEP

Connector	PWM A	Error	PWM B	Gnd	UDC
Deutsch	p 1	p 2	p 3	p 5	p 6

Function	PWM A	PWM B
Neutral	< 10%	< 10%
Q: P ® A	10% ® 80%	< 10%
Q: P ® B	< 10%	10% ® 80%



Safety and Monitoring

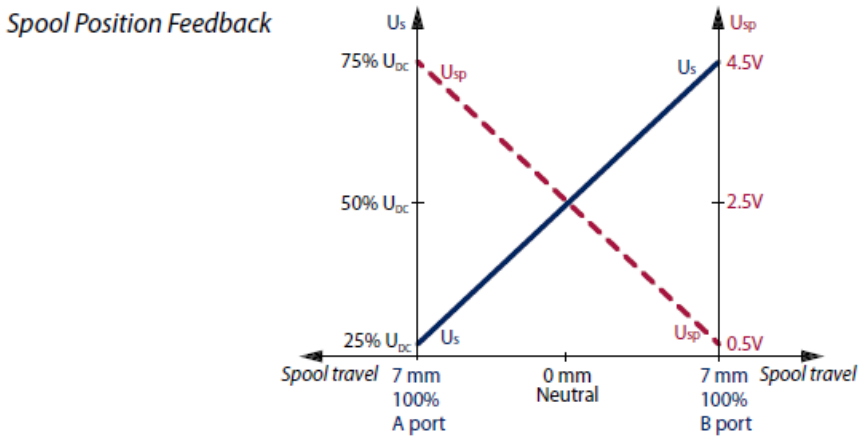
Fault monitoring overview

Type	Fault monitoring	Delay before error out	Error mode	Error output status	Fault output on PVE [1)]	LED light	Memory (reset needed)
PVEO PVEM	No fault monitoring	–	–	–	–	–	–
PVEA PVEH PVEP PVES PVEU	Active	500 ms (PVEA: 750 ms)	No fault	Low	< 2 V	Green	–
			Input signal faults	High	~U_{DC}	Flashing red	Yes
			Transducer (LVDT)			Constant red	
			Close loop fault				
	Passive	250 ms (PVEA: 750 ms)	No fault	Low	< 2 V	Green	–
			Input signal faults	High	~U_{DC}	Flashing red	No
			Transducer (LVDT)			Constant red	
			Close loop fault				
PVE Float six pin	Active	500 ms	Float not active	High	~U_{DC}	Constant red	Yes
		750 ms	Float still active				

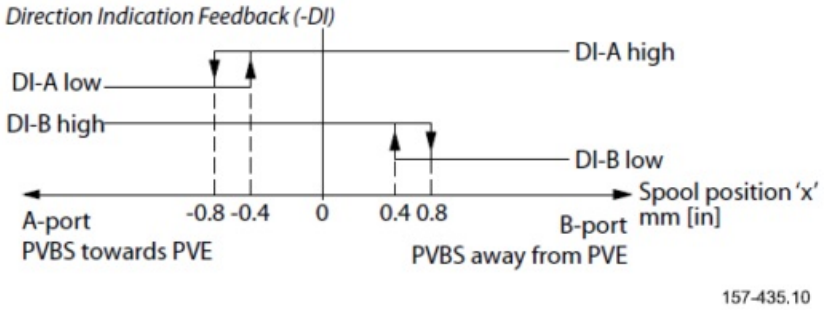
1. Measured between fault output pin and ground.

Spool Position Feedback (-SP

The –SP functionality is a 0,5V to 4,5V inverted feedback with 2,5V as neutral value.



Direction Indication Feedback (-DI)



As shown in the figure, both “DI-A” and “DI-B” signals are “High” when the spool is in neutral position. When the spool is moving in the A direction, the “DI-A” signal goes “Low” and the “DI-B” signal stays “High”. The reverse is true when the spool is moved in the B direction.
Direction Indication Feedback (-DI)

Both direction indication signals go low when the error indicator goes high.

Values for both Direction Indicators, pin A and pin B

Transition to low from high	0.8 ± 0.1 mm [0.031 in]
Transition to high from low	0.4 ± 0.1 mm [0.015 in]
Transition to low both pins	error pin goes high
Maximum load of “DI-A” , “DI-B”	50 mA
Voltage U_{DC} high by load 20 mA	> U_{DC} –1.5 V
Voltage U_{DC} high by load 50 mA	> U_{DC} –2.0 V
Voltage low	< 0.2 V

Technical data

The following technical data are from typical test results. For the hydraulic system a mineral based hydraulic oil with a viscosity of 21 mm2/s [102 SUS] and a temperature of 50°C [122°F] were used.

Supply voltage U_{DC}	rated	12 V DC	24 V DC
	range	11 V to 15 V	22 V to 30 V
	max. ripple	5%	
Current consumption at rated voltage		0.65 A @ 12 V	0.33 A @ 24 V
Signal voltage (PVEM)	neutral	0.5 x UDC	
	A-port « B-port	0.25 • UDC to 0.75 • UDC	
Signal current at rated voltage (PVEM)		0.25 mA	0.50 mA
Input impedance in relation to 0.5 • U DC		12 KW	
Power consumption		8 W	

PVEA, PVEH, PVEP, PVES, PVEU

Supply voltage U_{DC}	rated / range	11 V to 32 V	
	max. ripple	5%	
Current consumption at rated voltage PVEH/PVEP/PVES/PVEU (PVEA)		0.57 (0.28) A @ 12 V	0.3 (0.15) A @ 24 V
Signal voltage	PVEA/PVEH/PVES – neutral	0.5 x UDC	
	PVEA/PVEH/PVES – A-port « B-port	0.25 • U_{DC} to 0.75 • U_{DC}	
	PVEU – neutral	5V	
	PVEU – A-port « B-port	2.5V to 7.5V	
	PVEP – neutral	A< 10%, B < 10%	
	PVEP – A-port	10%<A<80%, B< 10%	
	PVEP – B-port	A< 10%, 10%<B<80%	
Signal currentat rated voltage		0.25 mA to 0.70 mA	
Input impedance in relation to 0.5 • U_{DC}		12 KW	
Input capacitor		100 hF	
Power consumption PVEH/PVEP/PVES/PVEU (PVEA)		7 (3.5) W	

Oil viscosity

Oil viscosity	range	12 – 75 mm2/s [65 – 347 SUS]
	min.	4 mm2/s [39 SUS]
	max.	460 mm2/s [2128 SUS]

Note: Max. start up viscosity 2500 mm2/s

Oil temperature

Oil temperature	range	30 – 60°C [86 – 140°F]
	min.	-30°C [-22°F]
	max.	90°C [194°F]

Operating temperature

Ambient	-30 – 60°C [-22 – 140°F]
Stock	-40 – 90°C [-40 – 194°F]
Recommended long time storage in packaging	10 – 30°C [50 – 86°F]

Pilot pressure

Pilot pressure (relative to T pressure)	nom.	13.5 bar [196 psi]
	min.	10 bar [145 psi]
	max.	15 bar [217 psi]

*Grade of enclosure**

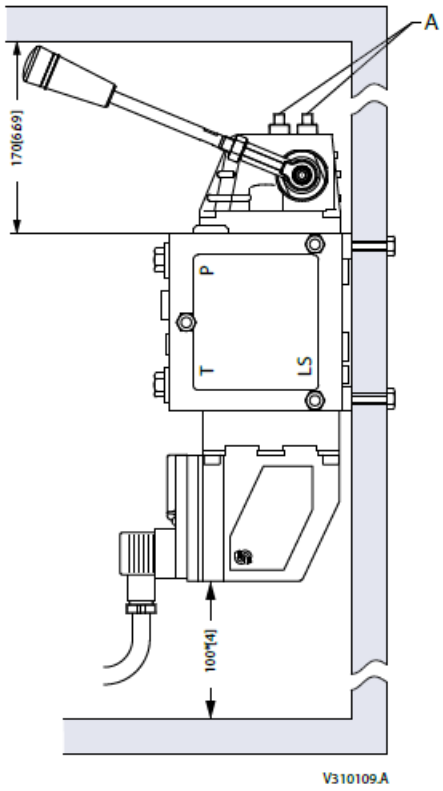
Connector version	
AMP JPT	IP 66
Hirschmann	IP 65
Deutsch	IP 67

* According to the international standard IEC 529.

NB: In particularly exposed applications, protection by screen is recommended.

Bleeding

If the group is installed vertically, it is recommended to bleed it at the adjusting screws (Pos.A)
Note: Because of the hydraulic build-up of PVEA, it may be necessary to bleed the PVEK.



Protection

All PVE modules comply with protection class IP65 in accordance with IEC 529. However, in particularly exposed applications protection in the form of screening is recommended.

Warning

All marks and brands of valves – inclusive proportional valves – can fail and cause serious damage. It is therefore important to analyse all aspects of the application.
Because the proportional valves are used in many different operation conditions and applications, the manufacturer of the application is alone responsible for making the final selection of the products – and assuring that all performance, safety and warning requirements of the application are met.
The process of choosing the control system – and safety level – could e.g. be governed by EN 954-1 (Safety related parts of control system). See also Technical information for PVE series 4.

Accessories

Connector code numbers

Part number	**Name**	
157B4992	AMP CONNECTING KIT (GREY)	4 pin with housing, contact and wire sealing
157B4993	AMP CONNECTING KIT (BLAC K)	4 pin with housing, contact and wire sealing
984L3165	EL-PLUG, ON-OFF black	Hirschmann DIN connector set*

Set of seals code numbers

Part number	**Name**	**Actuator**
157B4997	Set of seals	PVE for PVG 32/ PVG 100
155G8519	Set of seals	PVE for PVG 120
11061235	Set of seals	PVHC for PVG 32/ PVG 100

Cables code numbers

Feature		Wire colors						Length	Code number
Connector		pin 1	pin 2	pin 3	pin 4	pin 5	pin 6		
Deutsch	4 pin	white	blue	yellow	red	—	—	4 m	11007498
	6 pin	white	blue	yellow	red	black	green	4 m	11007513
AMP	4 pin	white	blue	yellow	red	—	—	4 m	157B4994
	6 pin	white	red	black	yellow	green	blue	5 m	157B4974
AMP/black coding	4 pin	white	blue	yellow	red	—	—	4 m	157B4995

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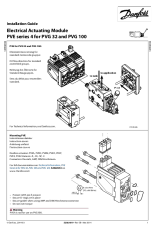
Documents / Resources

	Danfoss PVG 100 Electrical Actuating Module [pdf] Installation Guide PVE Series 4 for PVG 32, PVG 100, PVG 100 Electrical Actuating Module, PVG 100, Electrical Actuating Module, Actuating Module, Module

References

- User Manual