



Instruction Bulletin

Series 90 Intrinsically Safe Control Installation, Maintenance

Intended Use

This line of Intrinsically Safe Pressure Control Pilots receives a low current input signal from a variety of machine controllers and converts the current signal into a proportional differential pressure signal suitable to control larger hydraulic equipment in hazardous locations. The Intrinsically Safe Controls can be added to a Series 90 pump as a standard option or purchased separately.

Danfoss offers five different models of Intrinsically Safe Pressure Control Pilots to accommodate a variety of standard industrial process controllers. Various combinations of hydraulic nozzle sizes and coil resistances yields a relationship between electrical current (input) and hydraulic differential pressure (output).

Refer to the *Unit Specifications* tables on pages three and four for proper selection.

Installation

Mechanical installation

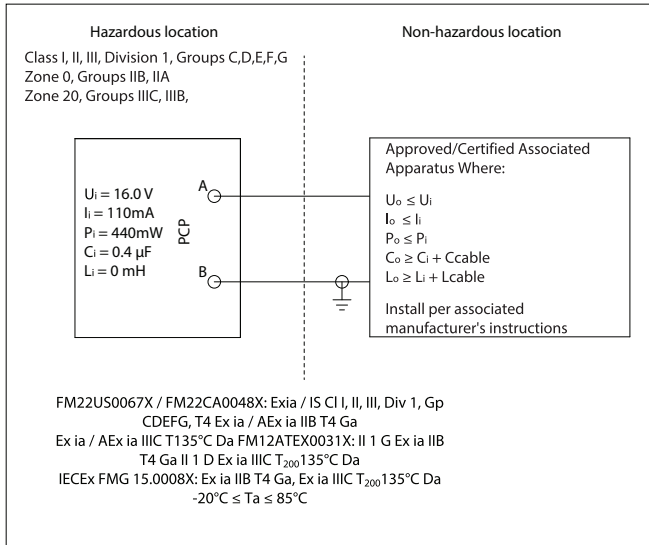
Ensure that the four supplied O-rings are in place on the bottom of the unit. These pressure control pilots are fastened to the second stage of the control with four M5 x 0.8 x 16 mm socket head screws. Torque to 5 Nm (44 in-lb).

Electrical Installation

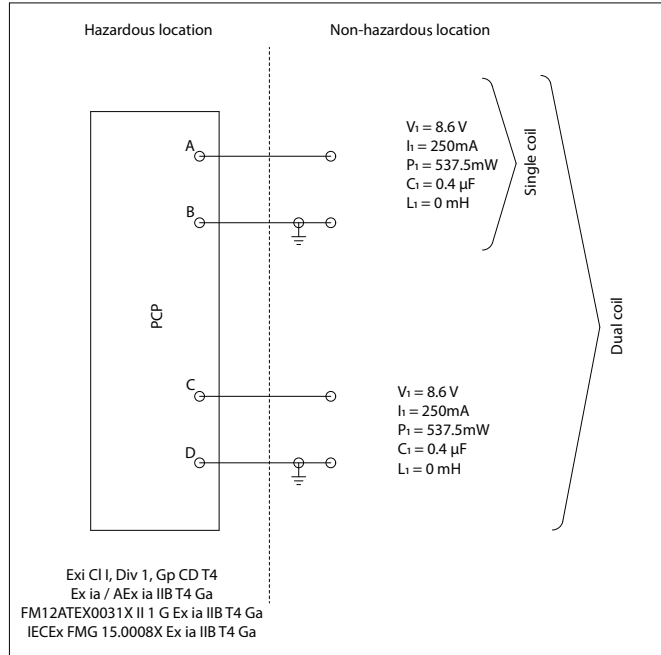
A Mil-Spec Connector (MS3102C-14S-2P) provides the means for electronic signal input to the device. Proper selection of the mating connector to ensure safe operation in a hazardous environment is required (Recommended MS3108E-14S-S, Danfoss Kit number K08106). A suppression circuit is incorporated in the PCP torque motor cover but by itself does not insure intrinsic safety. An additional safety barrier used to connect intrinsically safe circuits with non-intrinsically safe circuits must be connected in series between the PCP and controller. The safety barrier and electrical controller must be isolated from the hazardous area either through use of a purge enclosure or mounted in a safe area. The intrinsically safe device enclosure grounding terminal must be connected to a robust chassis ground. The connection must be in accordance with applicable standards where required.

Refer to the following wiring diagrams for proper connections.

Wiring diagram for 11101116



Wiring diagram for 11101126, 11101118, 11101115, 11101106



Adjustment

No adjustment is possible.

Do not attempt to disassemble or adjust the control.

Putting into service

For instructions on putting a pump with the Intrinsically Safe Control in service, refer to *Initial Startup Procedure* in the *Series 90 Pumps Service Manual*, **AX152886483063**.

Prior to installation, inspect packaging and unit for any damage. Do not continue installation if unit has visible signs of damage.

Danfoss is not responsible for the design of the control input circuit outside of the installed Mil-Spec connector. Proper design on the entire system as noted in the applicable standards is required for safe usage in hazardous environments.

The condition of use

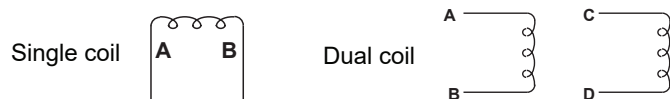
The EDC is designed to be controlled from a DC current source or voltage source. Pulse width modulation (PWM) is not required. But, if a PMW signal is used, use a carrier frequency between 200 Hz and 4000 Hz. Do not use a pulse current of more than 120% of that required for full output(refer to unit specifications below).

Unit specification tables

Pulse Width Modulation

(PWM) The PCP is designed to be controlled from a dc current source or voltage source. If a PWM signal is used, do not use a pulse current of more than 120% of that required.

Coil resistance



P108 686E

Electrical Characteristics

	Model Number				
	11101126	11101118	11101116	11101115	11101106
Single Coil Coil Resistance	A-B 23 Ω at 70° F, A-B 29 Ω at 200° F	A-B 23 Ω at 70° F, A-B 29 Ω at 200° F	A-B 106 Ω at 70° F, A-B 130 Ω at 200° F		
Dual Coil Coil Resistance				A-B 20 Ω at 70° F, A-B 25 Ω at 200° F C-D 16 Ω at 70° F, C-D 20 Ω at 200° F	A-B 20 Ω at 70° F, A-B 25 Ω at 200° F C-D 16 Ω at 70° F, C-D 20 Ω at 200° F
Phasing	Positive voltage to pin A produces a pressure rise at output port C1 Positive voltage to pin B produces a pressure rise at output port C2	Positive voltage to pin A produces a pressure rise at output port C1 Positive voltage to pin B produces a pressure rise at output port C2	Positive voltage to pin A produces a pressure rise at output port C1 Positive voltage to pin B produces a pressure rise at output port C2	Positive voltage to pin A or C produces a pressure rise at output port C1 Positive voltage to pin B or D produces a pressure rise at output port C2	Positive voltage to pin A or C produces a pressure rise at output port C1 Positive voltage to pin B or D produces a pressure rise at output port C2
Current/Voltage Range	up to 145 mA at 3.90 Vdc (linear range)	up to 190 mA at 4.75 Vdc (linear range)	4 mA at 0.50 Vdc to 20 mA at 2.2 Vdc (linear range)	up to 205 mA at 4.50 Vdc (linear range)	up to 170 mA at 4.50 Vdc (linear range)
Scale Factor	0.165 \pm 0.013 Bar/mA 2.4 \pm 0.2 psid/mA	0.079 \pm 0.007 Bar/mA 1.15 \pm 0.1 psid / mA	0.379 \pm 0.034 Bar/mA 5.5 \pm 0.5 psid / mA	0.101 \pm 0.010 Bar/mA 1.47 \pm 0.15 psid / mA	0.054 \pm 0.006 Bar/mA 0.78 \pm 0.08 psid / mA

Unit specification tables

Hydraulic Fluid

Oil Viscosity must be in the 40 – 6000 SSU [cSt] range.

Oil Cleanliness of ISO 4406 class 22/18/13 (SAE J1165) or better, under normal operating conditions.

For detailed information on lubricants and cleanliness refer to *Hydraulic Fluids and Lubricants* **BC1528864845240463**, and *Design Guidelines for Hydraulic Fluid Cleanliness* **BC152886482150**.

Hydraulic Characteristics

	Model Number				
	11101126	11101118	11101116	11101115	11101106
Maximum supply pressure:	69 bar 1000 psid	69 bar 1000 psid	69 bar 1000 psid	69 bar 1000 psid	69 bar 1000 psid
Recommended range:	27.6 - 41.4 bar 400 - 600 psid	20.7 - 34.5 bar 300 - 500 psid	20.7 - 34.5 bar 300 - 500 psid	34.5 - 41.4 bar 500 - 600 psid	20.7 - 34.5 bar 300 - 500 psid
Maximum return pressure:	13.8 bar 200 psid	13.8 bar 200 psid	13.8 bar 200 psid	13.8 bar 200 psid	13.8 bar 200 psid
Maximum internal leakage: at 500 psid supply	3.41 lpm 0.90 gpm	2.46 lpm 0.65 gpm	2.46 lpm 0.65 gpm	2.46 lpm 0.65 gpm	2.46 lpm 0.65 gpm
Maximum linear psid output pressure:	24.1 bar at 34.5 bar supply 350 psid at 500 psid supply	15.2 bar at 20.7 bar supply 220 psid at 300 psid supply	15.2 bar at 20.7 bar supply 220 psid at 300 psid supply	21.4 bar at 34.5 bar supply 350 psid at 500 psid supply	13.8 bar at 20.7 bar supply 220 psid at 300 psid supply
Load flow: the output differential flow across a 100 psid load pressure drop at maximum current:	>0.738 l/m > 45 cim	>0.0492 l/m > 30 cim	>0.0492 l/m > 30 cim	>0.738 l/m > 45 cim	>0.0492 l/m > 30 cim

Maintenance, Overhaul, and Repair

11101126, 11101118, 11101115, 11101106

WARNING: Part of the enclosure is constructed from plastic. To prevent the risk of electrostatic sparking the plastic surfaces should only be cleaned with a damp cloth.

WARNING: The enclosure incorporates exposed aluminum alloy. Install equipment such that it is protected against spark ignition resulting from impact and friction.

11101116

WARNING: Part of the enclosure is constructed from plastic. To prevent the risk of electrostatic sparking the plastic surfaces should only be cleaned with a damp cloth.

WARNING: Risk of electrostatic sparking in dust atmospheres. Equipment shall not be applied in an explosive dust atmosphere where high electrostatic charging process are present that could result in propagating brush discharges. See IEC TS60079-32-1 for additional guidance.




WARNING: The enclosure incorporates exposed aluminum alloy. Install equipment such that it is protected against spark ignition resulting from impact and friction.

No other maintenance is required.




For overhaul or repair return to: Danfoss
Power Solutions
2800 East 13th Street
Ames IA, 50010

Labels

11101126, 11101118, 11101115, 11101106

 	Intrinsically Safe / Sécurité intrinsèque Exi, CI I, Div 1, Gp CD T4 Ex ia / AEx ia IIB T4 Ga FM12ATEX0031X II 1 G Ex ia IIB T4 Ga IECEx FMG 15.0008X Ex ia IIB T4 Ga Install per control drawing: DWG00019588 Input: 8.6 VDC; 250mA	 2809 IP66
	MODEL NO. _____ XXXXXXXXXXXX S/N: A123456789	Made in USA
DANFOSS POWER SOLUTIONS (US) COMPANY, 2800 E. 13th St. Ames, IA 50010		

11101116

 	Intrinsically Safe / Sécurité intrinsèque FM22US0067X / FM22CA0048X FM12ATEX0031X IECEx FMG 15.0008X Install per control drawing: DWG00019589 Input: 16 VDC; 110mA	 2809 IP66
	MODEL NO. _____ XXXXXXXXXXXX S/N: AYYWWXXXXX	Made in USA MANUFD 2022
DANFOSS POWER SOLUTIONS (US) COMPANY, 2800 E. 13th St. Ames, IA 50010		



Danfoss A/S

DK-6430 Nordborg
Denmark
CVR nr.: 20 16 57 15

Telephone: +45 7488 2222
Fax: +45 7449 0949

EU DECLARATION OF CONFORMITY

Danfoss A/S Danfoss Power Solutions

declares under our sole responsibility that the

Product: Pressure Controlled Pilot Valve
Models: 11101106, 11101115, 11101118, 11101126, and 11101116
Description: Receives a low current input signal from a variety of machine controllers and converts the current signal into a proportional differential pressure signal suitable to control larger hydraulic equipment



covered by this declaration is in conformity with the following directive(s), standard(s) or other normative document(s), provided that the product is used in accordance with our instructions.

<u>Directive</u>	<u>Title</u>
2014/34/EU	Equipment for Potentially Explosive Atmospheres (ATEX)
<u>Reference Number</u>	<u>Title</u>
EN IEC 60079-0:2018	Explosive Atmospheres – Part 0: Equipment – General requirements
EN 60079-11:2012	Explosive Atmospheres – Part 11: Equipment protection by safety “i”
EN 60529:1991 + A1:2000+A2:2013	Degrees of Protection Provided by Enclosures (IP Code)

Notes:

The pressure controlled pilot valve must be used in accordance with its specifications, especially (but not limited to) electrical, pressure, temperature, shock, and vibration limits.

FM Approvals, Ltd. Notified Body no.: 2809

Date 10/26/2021	Issued by Signature Name Title FABRIZIO FLAMINIO DIRECTOR OF QUALITY	Date	Approved by Signature Name Title
--------------------	---	------	---

Danfoss only vouches for the correctness of the English version of this declaration. In the event of the declaration being translated into any other language, the translator concerned shall be liable for the correctness of the translation