DPFC

DIFFERENTIAL PRESSURE FLOW COMPUTER

Features

- Compensates Steam, Gases and Liquids for Temperature and Pressure to Yield Corrected Volume, Mass and Heat Flow.

- Two Line by 20 Character Super Twist Back-Lit LCD Display

- Accepts Single or Dual Differential Pressure (DP) Inputs

- Square Root Extraction of DP Inputs

- 16 Point Linearization

- Displays Compensated Rate and Total Flow

- Takes a Direct 100 Ω Platinum RTD (4 wire)

- Flow Rate, Temperature and Pressure Alarm

- 4-20 mA and Pulse Outputs Based on Compensated Flow

- 24 Volt Excitation Provided

- Front Panel NEMA 4X/IP 65 Rated

Description

The KEP DPFC is a microprocessor based instrument designed to measure compensated flow in an industrial environment. Four analog inputs for temperature, pressure and dual differential pressure are provided to measure the parameters needed to calculate the actual compensated volume, mass or heat flow.

Special signal conditioning circuitry is included to allow direct connection of platinum resistance temperature detectors (RTD'S). Voltage inputs or current loops can be used for the above.

All instrument interface is with a 32 point screw terminal strip on the rear of the instrument.

DP Flow Computer Application

§ Pressure transducer sends 0-5V or 4-20 mA signal to Flow Computer.

§ 100Ω, 4 wire, RTD direct hookup to Flow Computer.

§ DP transmitters send signals to Flow Computer.

§ Flow Computer calculates flow and generates output signals.

§ 5 V pulse out to remote totalizer in supervisory area.

§ 4-20 mA out to strip chart recorder tracks trends.

§ RS232 out to printer for data logging.

§ Alarm relays activate bell and/or light as needed.

Flow Instruments
FLOW COMPUTERS

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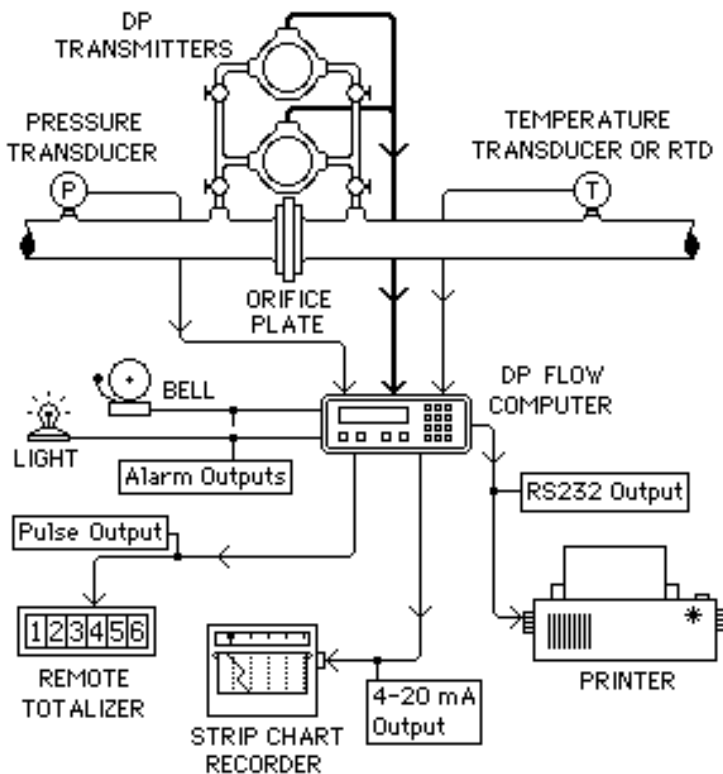
General Specifications
OVERALL ACCURACY: .25%
ENVIRONMENTAL:
Operating Temperature: 32 to 122 F (0 to 50 C)
Storage Temperature: -10 to 160 F (-23 to 71 C)
Humidity: 0 to 90% Noncondensing
Front Bezel: NEMA 4X/IP 65
Case: ABS Plastic
Listing: CE Compliant
POWER: (Internally Fused)
115 / 230 VAC ±15% (Switch Selectable)
or 24VDC ±20% or 12 VDC +20%/-10%
Frequency: 50/60Hz.
Power Consumption: 10 Watts max
Input Specifications:
The following applies to all inputs. Inputs are referenced to signal ground. All ground terminals are connected internally.
NOTE: All inputs are single-ended with one leg grounded. The exception is the RTD input which is differential but is referenced to ground.
CURRENT INPUTS:
Input Impedance: 100Ω
Range: 0-20mA, 4-20mA
Maximum sustained input voltage:
5 VDC (Fault Condition)
Resolution: .0244% FS
VOLTAGE INPUTS:
Input Impedance: 115 kΩ
Range: 0-5V, 0-10V
Resolution: .0244% FS
TEMPERATURE INPUTS:
Compatible RTD type: 100Ω Platinum
(α = .00385; DIN 43-760 Calibration)
Lead Wire Compensation: 4 Wire
Configuration: 2, 3 or 4 wire (4 wire cable required)
Excitation Current: 2mA typical
Max Fault Current: 15mA
Max Volt on sense inputs: 50 VDC
Rejection of 50 or 60Hz signal: 40dB minimum (Automatically based on line frequency)
Raw Accuracy: ± .5°C
Output Specifications:
ANALOG OUTPUTS:
Range: 4-20mA DC, sink only.
Compliance Voltage Range: 3 - 24 VDC
Load Type: Non Inductive
Accuracy: ± .5% FS
Update Rate: 1Hz
PULSE OUTPUT:
This output is intended to drive a counter with a minimum input impedance of 1000Ω. It is compatible with TTL and 5V CMOS logic inputs.
Output High Voltage
    No load: 4.5 Volts min
    4.0 mA source: 4.0 Volts min
Output Low Voltage
    No Load: 0.2 Volts max
    4.0 mA sink: 1.0 Volts max
Output waveform: Symmetric square wave above 1Hz 100msec pulse below 1Hz
Frequency Range: 0 to 50kHz
Max Slew Rate: 27 Volts/μsec
Sustained Fault Voltage for no permanent damage: 7 Volts
RELAY OUTPUTS:
One relay is a flow alarm output and a second is for other alarm conditions. Each has the following electrical specifications:
Type: Dry Contact, Form C
Contact Rating: 10A @ 115/230VAC/28VDC

AUXILIARY POWER OUTPUT: (AC Powered units only)
Voltage: 24VDC regulated and filtered
Isolation: 230VAC max
The 24VDC Output is supplied with a self resetting fuse.
Current: 0 to 100mA
Protection: Short Circuit Proof
RS232 COMMUNICATIONS:
Connector: 25 Pin Sub-D
Input Impedance: 3000Ω to 7000Ω
Compliance Voltage:
Output: -25 to -5 (Mark);
          5 to 25 (Space); Volts
Input: -25 to -3 (Mark);
          3 to 25 (Space); Volts
Protection: Short circuit proof.
Protocol: 8 bits, 1 Stop bit
Parity: None (Not monitored)
Available Baud Rates: 300, 1200, or 9600
DATA DISPLAY AND KEYPAD:
Internal 2 line by 20 character dot matrix LCD display. Sealed, 16 key panel featuring numeric keys
0- 9, plus the following keys:
A   Advance through menus
B   Back up through menus
C   Cancel current menu selection
D   Decimal point key
ENT .... General purpose enter or recall data key
CLR .... Data clear key

OPERATION:
Through the 16 button, NEMA 4X/IP 65, front keypad, the operator enters all parameters necessary to configure the DPFC. No additional input cards or dip switch settings are needed.
The operator selects the type of compensation desired for the medium (steam, ideal gas or liquid). For steam flow and heat measurement the 1967 ASME steam tables for saturated and superheated steam are stored in memory. For gases and liquids, the necessary factors are entered in by the operator.
Additionally, the following hardware parameters must be entered to configure the DPFC input signal types (from the temperature, pressure and differential pressure transmitters) along with their corresponding ranges or factors and alarm set points. Also the 4-20mA output, pulse output and optional serial port can be set up. If desired, the operator can lockout the unit from changes by entering a five digit lockout code.
The optional RS232 serial communications allows for timely printouts of flow results and/or parameters as well as parameter down load and up load for easy computer programming.

SOFTWARE ACCESSORIES:

K1 Diskette:
 A diskette program is available to assist in the computation of the K1 term. The K1 factor is used in Orifice/Pitot/Annubar calculations. The K1 factor is the calibration factor for the meter run. It is part of the Variables menu for flow input values (analog).

MASSCON Diskette:
The MASSCON diskette program facilitates the configuration and calibration of the flow computer. The program runs on PC compatibles and communicates through the RS232 port.

TERMINAL BLOCK DESIGNATIONS:

PIN	RTD	VOLTAGE IN	CURRENT IN	FUNCTION
1	**RTD EXCITATION +**	----------------	----------------	
2	**RTD SENSE +**	----------------	----------------	**CHANNEL 1**
3	**RTD SENSE -**	----------------	----------------	
4	**RTD EXCITATION -**	----------------	**I IN +**	**TEMPERATURE**
5	**COMMON (SHIELD)**	**V IN - (COM)**	**I IN - (COM)**	
6	----------------	**V IN +**	----------------	
7	**RTD EXCITATION +**	----------------	----------------	
8	**RTD SENSE +**	----------------	----------------	**CHANNEL 2**
9	**RTD SENSE -**	----------------	----------------	**PRESSURE or**
10	**RTD EXCITATION -**	----------------	**I IN +**	**AUX. TEMP.**
11	**COMMON (SHIELD)**	**V IN - (COM)**	**I IN - (COM)**	
12	----------------	**V IN +**	----------------	
13	----------------	----------------	**I IN +**	**CHANNEL 3**
14	**COMMON (SHIELD)**	**V IN - (GND)**	**I IN - (GND)**	**FLOW (LOW)**
15	----------------	**V IN +**	----------------	**DP**
16	----------------	----------------	**I IN +**	**CHANNEL 4**
17	----------------	**V IN +**	----------------	**FLOW (HIGH)**
18	**COMMON (SHIELD)**	**V IN - (COM)**	**I IN - (COM)**	**DP2**
19	**ANALOG OUTPUT (SINK)**			**ANALOG OUT**
20	**PULSE OUTPUT**			**5V SCALED**
21	**COMMON (SHIELD)**			**PULSE OUT**
22	**N.O.**			**ALARM**
23	**N.C.**			**RELAY**
24	**COMMON**			
25	**N.O.**			**FLOW**
26	**N.C.**			**ALARM**
27	**COMMON**			**RELAY**
28	**115/230 VAC 50/60Hz**			**POWER (AC)**
29	**115/230 VAC 50/60Hz**			
30	**+24 VOLTS**	**24VDC OUT**	**+ VDC IN**	**POWER (DC)**
31	**24 VOLTS RETURN**	**(AC POWERED**	**-DC (GND)**	**(DC POWERED**
		UNITS ONLY)		**UNITS ONLY)**
32	**CHASSIS COMMON**			

Flow Instruments
FLOW COMPUTERS

TYPICAL HOOKUP:

Ordering Information

Example: DPFC   A   1

Series:
DPFC

Operating Voltage:
A: 115 VAC ± 15% at 50/60Hz
B: 230 VAC ± 15% at 50/60Hz
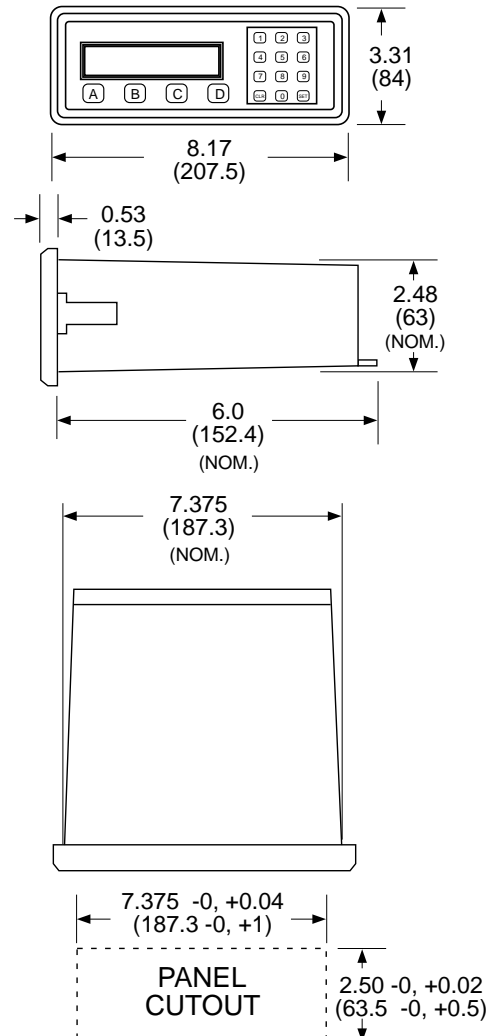C: 24   VDC ± 20%
D: 12 VDC -10, +20%

Options:
1: RS-232 Serial Interface

Accessories:
FLEXCOVER #36120
NEMA 4X wall mount enclosure available, see NEMATROL
Explosion Proof housing available, see XTROL7/4
Serial printer available, see P1000, P295
Ethernet Port Server available, see IEPS
Remote metering and data collection software available, see TROLlink

Dimensions:

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