Model No. DFC

Support 877-351-4702

DIGITAL ENHANCED GAS FIRED MODULATING CONTROL

This manual covers the following product(s):

DFC Direct Fired Control

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Ph. (877) 351-4702
Fax (919) 845-8102
www.RTC-Solutions.com
Email: info@RTC-Solutions.com
4370 Oakes Road, Suite 700
Davie, FL 33314

Overview

The Direct Fired Control (DFC) is a digital gas fired heating control. The control has a simple five button interface with a four digit LED display. All programmable parameters can be accessed through the user menu with the five button interface. The DFC's setpoint temperature sensing operation ranges from 40°F (4°C) to 250°F (121°C). There is a temperature sensor input that connects to provide a discharge temperature. The setpoint may be adjusted by the controls internal menu settings or by an external remote, such as the DFTD and RDU. There is a combination of two modulating outputs that will power both 0-24V DC and 0-10V DC valve. User parameters are stored in non-volatile memory, and are retained even during a power outage. Also, the DFC is powered by 24V AC.

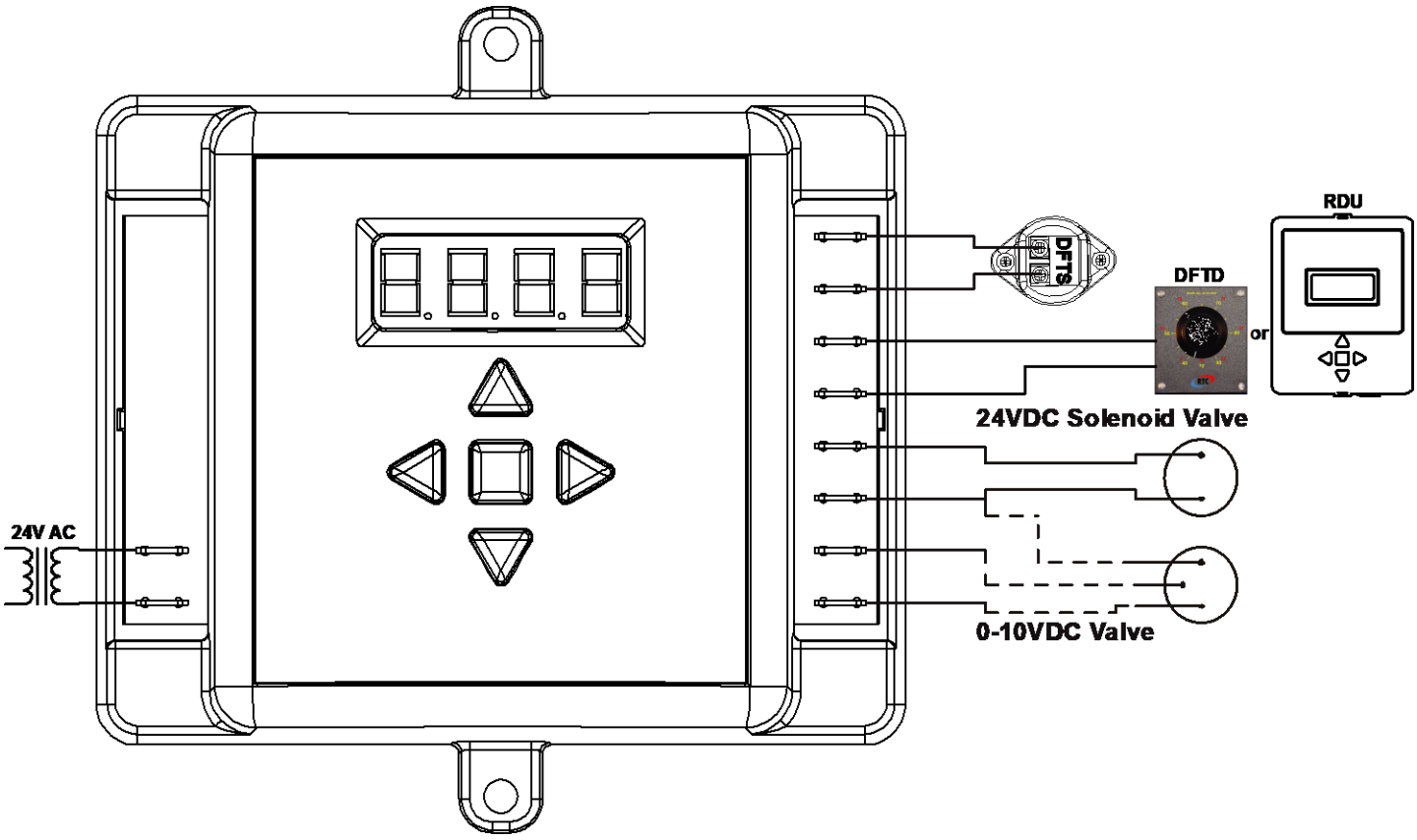

Figure 1: DFC Schematic Layout

Normal Operation

The DFC will always display the current discharge air temperature. Press the UP▲ or DN▼ key to change the discharge setpoint temperature. Once the key is pressed, the LED will display the text for the current setpoint temperature. Use the UP▲ or DN▼ key in order to set a new discharge temperature. Then press the ENT key to save the changes made. If a key is not pressed for 10 seconds, the DFC will exit without saving. When adjusting the setpoint range, the setpoint cannot surpass the set Low and High values. For instance, if Low ("SPLo") is set to 80°F and High ("SPhi") is set to 150°F, the setpoint is adjustable between 80°F to 150°F.

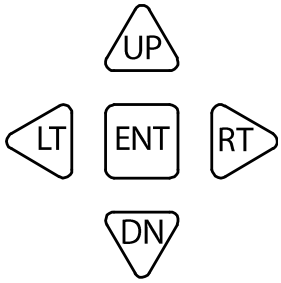

Figure 2: DFC Keys

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Programming

Please refer to the "DFC Menu Map" on Page 4 for programming in program mode. To enter program mode, hold the ENT key down for 3 seconds until "SPLo" is displayed. Use the UP and DN keys to navigate to the desired menu parameter as shown in column 1. To edit a menu parameter, press the RT key once on the desired parameter. Displayed will be the current value of that parameter as shown in column 2. Use the UP and DN keys again to edit the parameters for column 2. Press the ENT key to save the changes made or the LT key to cancel without saving and return to column 1. If a key is not pressed for 10 seconds or the ENT key is held for 3 seconds while in program mode, the control will return to normal mode.

Features

Alarms:

Error messages on the DFC will be scrolled across the display with a detailed message. This will allow users to realize the issue in order to resolve the error faster. Below are the list of errors and their meanings.

1. "dFtS oPEn" – There is no Discharge Temperature Sensor connected to the DFC. Therefore, no discharge temperature reading can be made.
2. "dFtd oPEn" – The user has the Remote ("rEtd") parameter on the DFC enabled, but no external control is found to take a reading.
3. "dFts ShortEd" – There is a short in the connection of the Discharge Temperature Sensor.
4. "dFtd ShortEd" – The user has the Remote ("rEtd") parameter on the DFC enabled and there is a short in the connection.

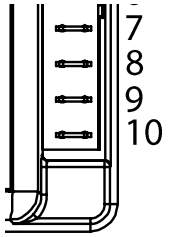
To resolve an issue check the wiring connections. Please refer to "Installation" on page 5 for proper terminal connections.

Password:

When trying to access program mode, if the DFC is password protected the display will show "PASS". Otherwise the display will show "SPLo", which is the start of program mode. If password protected no menu settings may be altered until the correct password is entered. In order to enter the password press the ENT key while "PASS" is displayed and use the UP and DN keys to set the DFC to the factory set password (21). Once on the number 21, press the ENT key again to access program mode. If the wrong password is entered then the DFC will return to normal mode.

Modulating Valve Outputs:

The DFC has the ability to power either a 24V DC or a 10V DC modulating valve. Only one valve at a time may be connected.



7	PWM For Solenoid Valve
8	24VDC Valve Output
9	0-10VDC Valve Output
10	Valve Ground

Connection for 0-24V DC use terminals 7 and 8

Connection for 0-10V DC use terminals 8, 9, and 10

Figure 3: DFC Modulating Output Terminals

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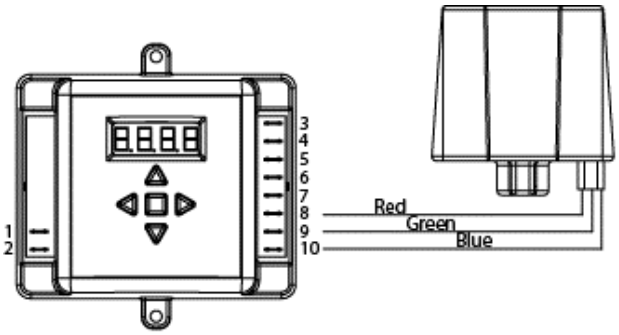
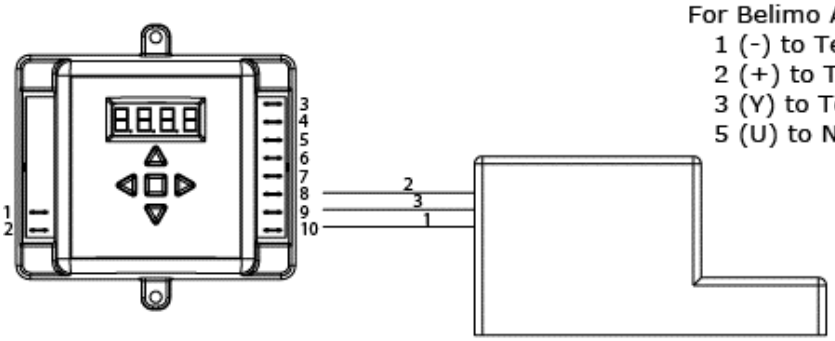
Valve Connections

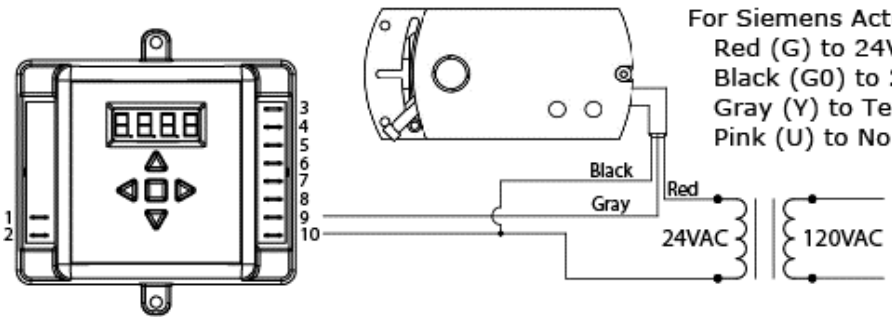
DFC	Solenoid	ACT-4.0	Belimo	Siemens
Term 7: PWM	PWM			
Term 8: 24VDC	24VDC	Red: 24VDC	2: 24VDC	Red: 24VAC
Term 9: 0-10V Output		Green: 0-10V Input	3: 2-10V Input	Gray: 0-10V Input
Term 10: Ground		Blue: Ground	1: Ground	Black: Ground



For Enolgas Actuator
Red to Terminal 8 (24VDC)
Blue to Terminal 10 (Ground)
Green to Terminal 9 (0-10VDC Input)
Pink to No Connect (0-10VDC Output)



For Belimo Actuator
1 (-) to Terminal 10 (Ground)
2 (+) to Terminal 8 (24VDC)
3 (Y) to Terminal 9 (2-10VDC Input)
5 (U) to No Connect (2-10VDC Output)



For Siemens Actuator
Red (G) to 24VAC Transformer (24VAC)
Black (G0) to 24VAC Transformer & Terminal 10 (Ground)
Gray (Y) to Terminal 9 (0-10VDC Input)
Pink (U) to No Connect (0-10VDC Output)

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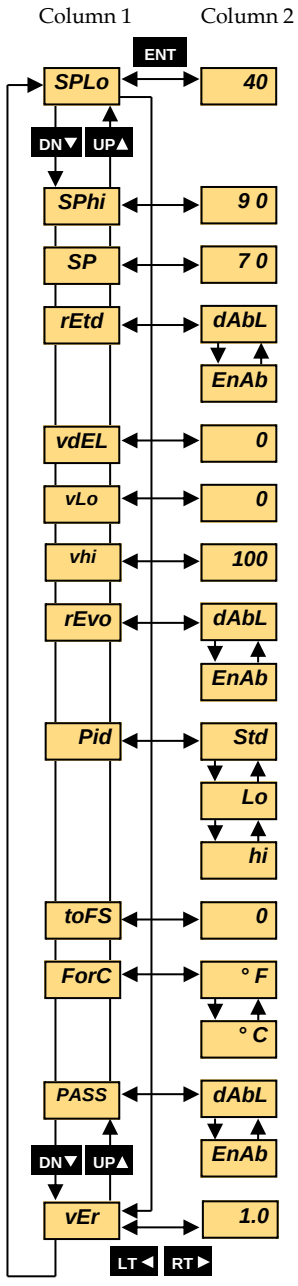
Menu Map

DFC Menu Map

What you want to do	What you see	What it means



Set the lowest the user can adjust the temperature to in normal mode for setpoint.

Set the highest the user can adjust the temperature to in normal mode for setpoint.

Adjust the discharge setpoint.

Enables or Disables the use of an external remote control for adjusting the setpoint.

Set the Valve Startup Delay from 0 to 30 seconds.

Set the Valve Minimum Output percentage.

Set the Valve Maximum Output percentage.

Valve Reverse Output.

Select the desired aggression/speed of the PID curve for the valve (Standard, Low, or High).

Set a temperature offset. For examples, to correct for duct losses or sensor calibration errors.

Set the control to convert the temperature to display either °F or °C.

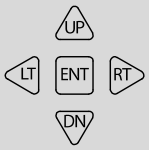
The password may either be enabled or disabled.

View the software version number.

Column 1 shows the menu parameters

Column 2 shows the factory set defaults for each parameter. Temperature defaults are shown in °F.

Arrow Keys:



Up and Down: to navigate or adjust a menu parameter
Right: to access column 2 for editing a parameter
Left: to return to column 1 without saving a parameter
Enter: to return to column 1 with saving a parameter

Low (SPLo) can be set from 40°F - 240 °F and must be at least 10°F less than the High. High (SPhi) can set be from 50°F - 250°F and must be at least 10°F greater than the Low. These will limit how far the user can change the temperature outside of programming mode.

Setpoint (SP) may be adjusted within the menu map or on the main screen with the up and down arrows, then pressing enter to save the selected setpoint.

When adjusting the discharge setpoint temperature above the outside air it will result in turning the burner on and modulate the system at that specified setpoint.

Remote (rEtd) allows the user to use the DFC's built-in interface when disabled (dAbL) or an external remote control when enabled (EnAb) in order to adjust the setpoint.

Valve Minimum Output (vLo), controls the percentage the valve will operate when in the closed position

Valve Maximum Output (vhi), controls the percentage the valve will operate when in the open position

Valve Reverse Output (rEvo), causes the valve voltage output to be inverted. For example, if the discharge temperature increases then the valve voltage output will decrease

Figure 4: Menu Map

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Installation

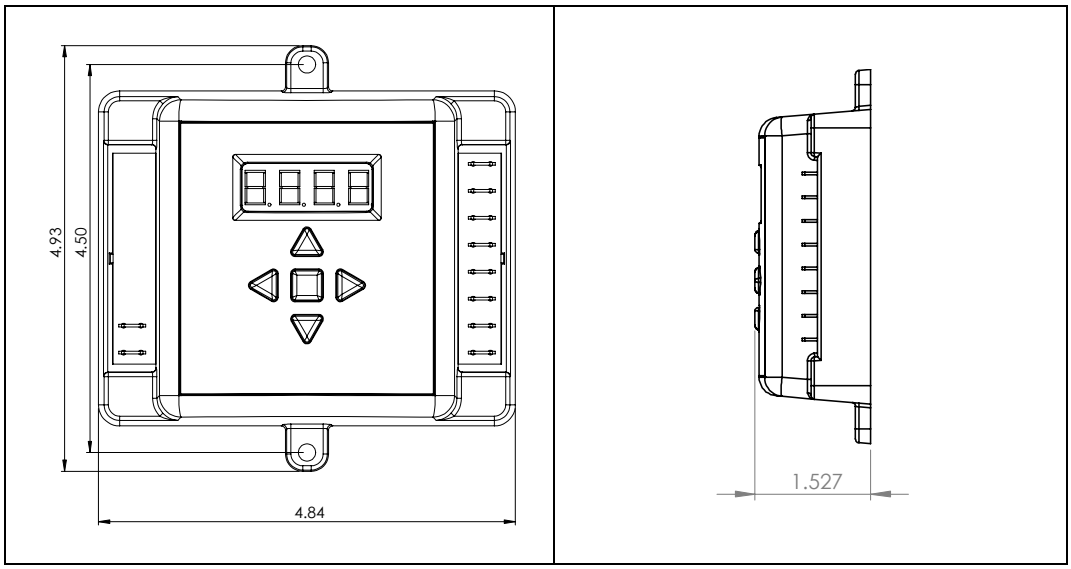

Figure 5: DFC Front Panel **Figure 6: DFC Side view**

***All dimensions are in inches ***

Wiring for the DFC is convenient for the user with easy access to all terminal connections.

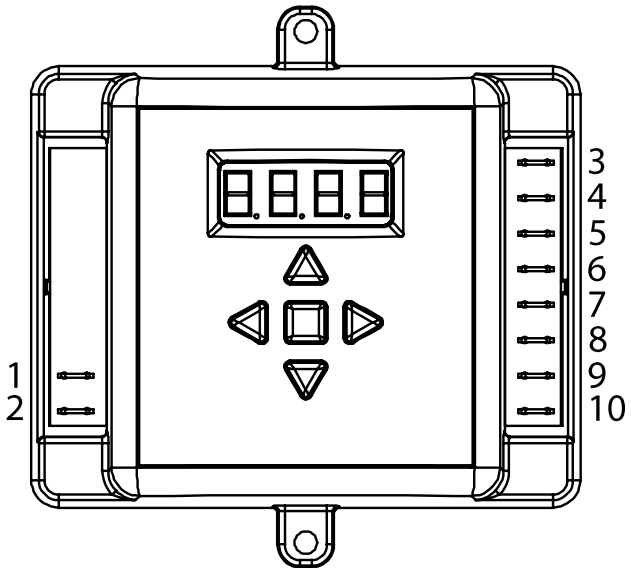

Figure 7: DFC Terminal Number Layout

1	24VAC
2	24VAC
3	DFTS
4	DFTS
5	DFTD or RDU
6	DFTD or RDU
7	PWM For Solenoid Valve
8	24VDC Valve Output
9	0-10VDC Valve Output
10	Valve Ground

Specifications

Power Requirements	24V AC Nominal (18VAC/DC – 26VAC/DC)
Current Rating 24V Output	1A
DFC Ambient Temperature Limits Operating	-40-149°F (-40-65°C)
Accuracy	+/-3°F (1°C)

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