



SEQUENCE DRAFT CONTROL

— for automatic burners

DRAFT PROGRAM CONTROL TYPE 84D01

Introduction

For maximum efficiency of combustion, Fireeye draft control equipment should be specified and installed on oil and gas burning installations. Automatic draft controls are particularly important on installations with tall stacks, multiple boilers firing into a common breeching and where induced draft is employed. Fireeye combustion instruments have rugged die-cast cases designed for surface or flush mounting without change, covers are hinged and gasketed.

Fireeye Draft Program Control combines sequencing operations during the start up and shut down of the burner, together with draft control during operation, automatically positioning the uptake damper in response to changing draft in the combustion chamber. It drives the damper to full open position before ignition of burner, controls draft during firing and closes the damper at the end of firing cycle to reduce heat loss during shut down. Fireeye Draft Controls are standard with line fuses, "Power On" switch and indicator light, "Burner ON" switch and indicator light, "Open-Automatic" selector switch. Fireeye Draft

Controls are optional with low draft cut-off with time delay to avoid nuisance shut downs in the event of momentary draft failure; starting draft selector switch to preset starting at some intermediate draft setting other than full open damper position.

Electric actuator for operating stack damper is of linear design and is driven by capacitor type reversible motor, driving a telescoping screw. Responds to control signal from draft program control to position uptake damper accurately for maintaining constant combustion chamber draft. Complete with built in limit switches to prevent overtravel at the end of stroke and with auxiliary switch for connection to draft program control.

Draft indicator, single pointer type, gives accurate reading of draft in the combustion chamber. Convenient zero adjustment. Draft connection may be made at bottom or back of unit.

Flue gas temperature indicator provides constant temperature indication for flue gases leaving the boiler. Jeweled meter movement with automatic compensation for ambient temperature.

Specifications

Draft Program Control

- Range $-.5''$ to $0''$ of water column draft
- Control Point adjustable
- Model 84D01 — $.5''$ to $-.04''$
- Model 84D09 — $.5''$ to $-.05''$
- Model 84D41 — $.5''$ to $-.06''$

Electrical Rating

- 115 v. units
- Terminal 6— 660 VA normal
1600 VA inrush
- Terminals 13, 14, 17
- 7.4a. running— 44.4a. locked rotor

230 v. units

- Terminal 6— 660 VA normal
1600 VA inrush
- Terminals 13, 14, 17
- 3.7a. running— 22.2a. locked rotor

Draft Indicator

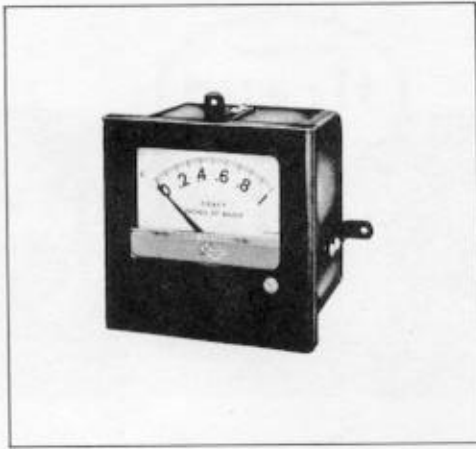
- Range $-.5''$ to $0''$ of water column draft

Flue Gas Temperature Indicator

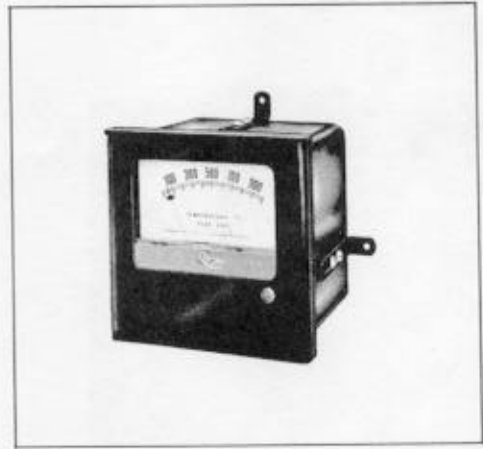
- Range $0-1,000^{\circ}$ F
- Standard thermocouple $36'$, also available in $50'$, $75'$ and $100'$ lengths

Electric Actuator

- Stroke $6''$
- Thrust 100#
- Timing $6''$ in 60 seconds



DRAFT GAUGE TYPE 85PO1



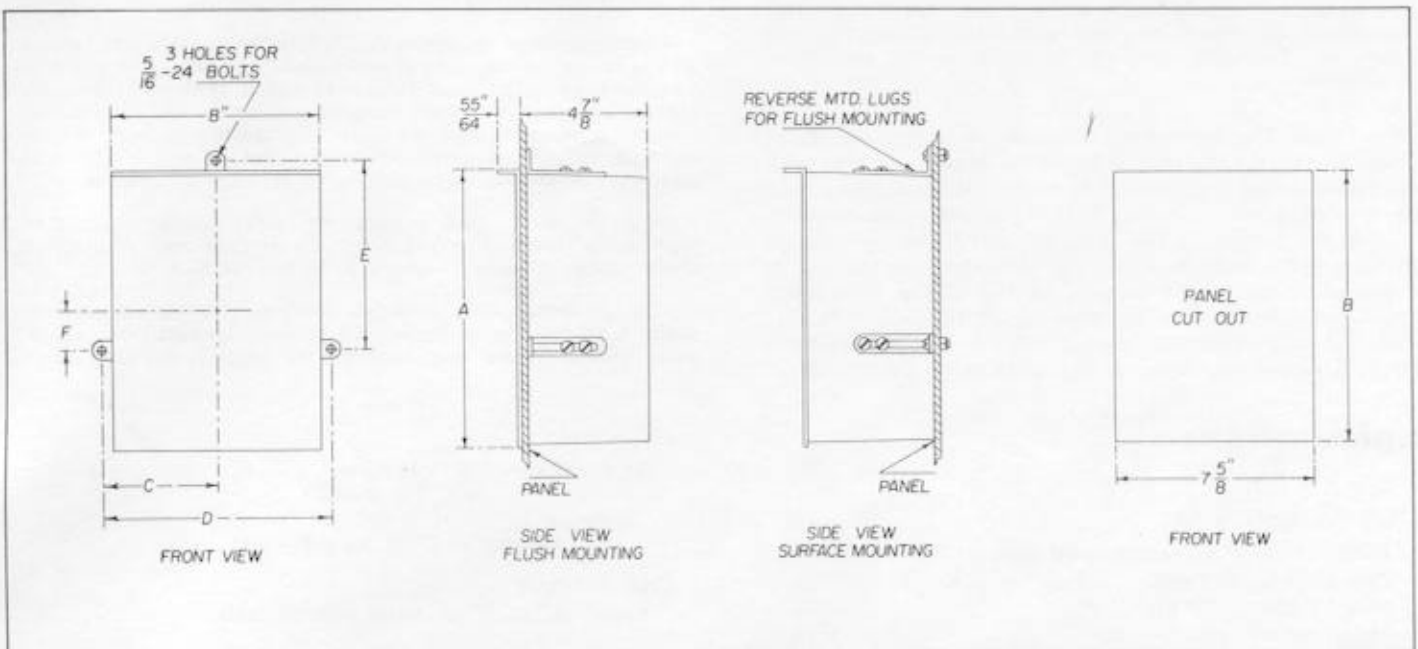
STACK TEMPERATURE INDICATOR TYPE 85T14

TABULATION OF SYSTEMS

Description	Type	Description	Type
Sequence Control		Stack temperature indicator with thermocouple	85T14
Standard	84DO1*	Thermocouples: 36' long	85C36
With time delay low draft switch	84DO9*	50' long	85C50
With time delay low draft switch and adjustable starting draft.	84D41*	75' long	85C75
Damper Actuator	84AO3*	100' long	85C100
Draft Gauge	85PO1		

*Suffix number -1 indicates 115v., -2 indicates 230 v.

Dimensions



Letter Dimensions

	LETTER DIMENSIONS					
	A	B	C	D	E	F
DRAFT CONTROL	10 ³ / ₄	10 ¹ / ₁₆	4 ¹³ / ₃₂	8 ¹³ / ₁₆	7 ¹ / ₂	1 ¹ / ₂
DRAFT GAGE	8	7 ¹ / ₁₆	4 ¹ / ₁₆	8 ²⁵ / ₃₂	5 ³ / ₄	1 ⁵ / ₁₆

FLUE GAS TEMPERATURE IND. DIMENSIONS SAME AS DRAFT GAGE.

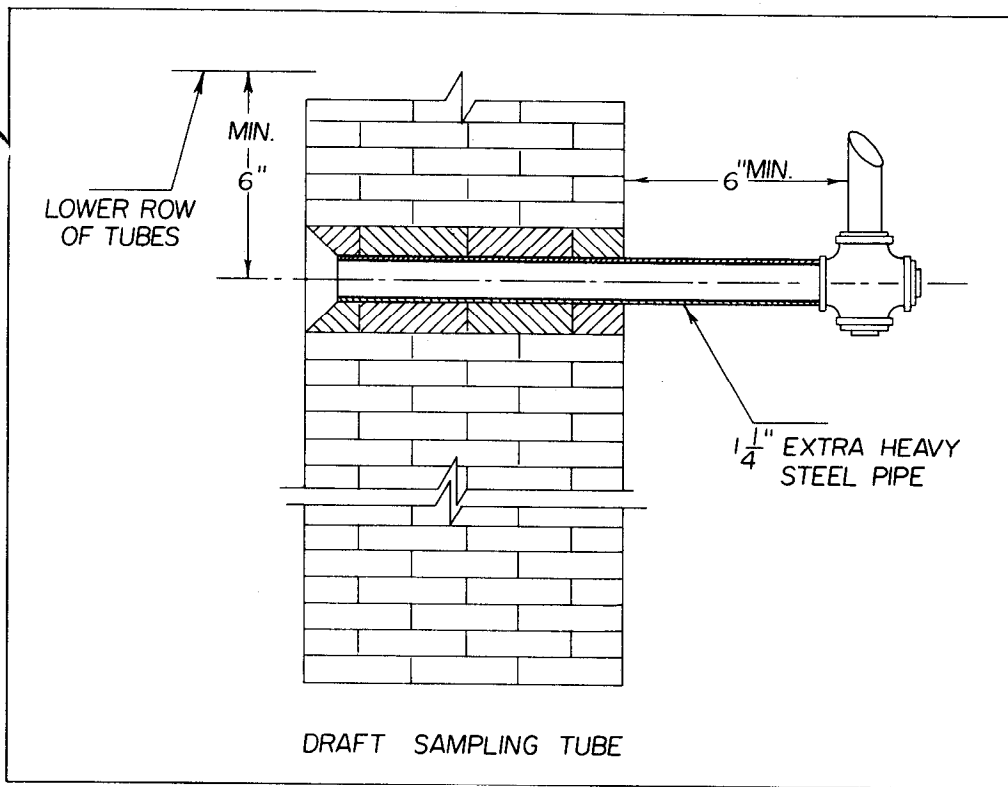


FIGURE 1

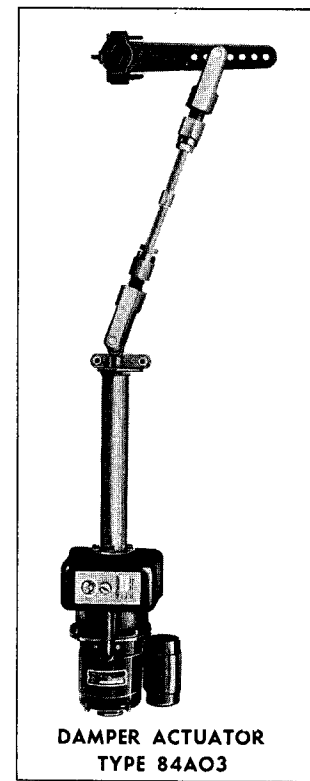


FIGURE 2

Draft Connections

Install a 1/4" extra heavy pipe as a firebox draft take-off connection as shown in Figure 1. The remainder of the run to the instrument should be sized in accordance with the following table, and at each point the piping makes a turn, a cross should be installed to facilitate cleaning of this line.

Length of Run	Minimum Size	
	Tubing	Pipe
0-18'	3/8"	1/4"
18'-75'	1/2"	3/8"
75'-Up	5/8"	1/2"

Thermocouple Mounting and Wiring

- At the point selected in the breeching between the boiler exit and damper, drill a 1 1/8" hole to admit the thermocouple and secure mounting flange on center of this hole.
- Insert the thermocouple tip to the center of the breeching. If the breeching is too wide, insert the tip 21".
- Run the thermocouple cable in rigid conduit or greenfield for protection. Coil up excess at instrument.
- Make sure + lead is connected to + terminal of the instrument.

Wiring Controls

All wiring should be done in accordance with the wiring diagrams in this bulletin. All wiring should be enclosed in rigid conduit and must comply with UL, NEMA, and local codes.

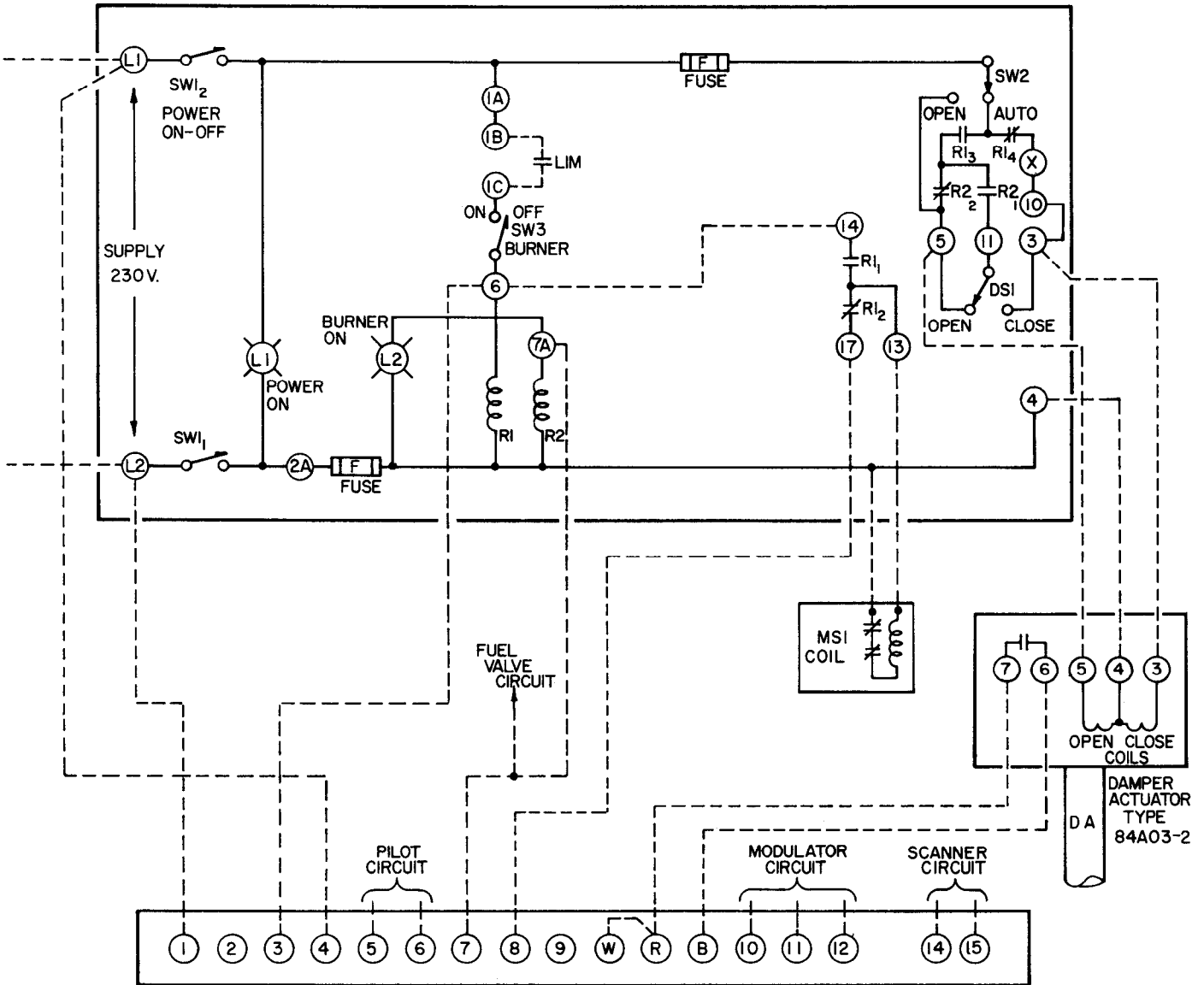
Damper Actuator

Select a reasonably clean and dry location where the actuator will not be exposed to extreme vibration and where the ambient temperature does not exceed 125° F. The actuator should be mounted on a smooth surface by means of its mounting bracket and hinge bracket. If separate mounting plate must be provided, it should be 1/4" steel plate suitably braced to make it rigid and free of vibration.

The linkage should be assembled as shown in Figure 2.

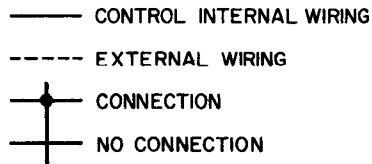
- Apply power to terminals 3 and 4 of the actuator to completely extend its ram.
- Close the damper manually.
- Adjust the linkage and crank arm so that the crank arm will move an equal distance on either side of the plane which is at right angles to the linkage assembly and then tighten the crank arm on the damper shaft.
- Apply power to terminals 4 and 5 to completely retract the actuator ram. The damper should now be in the open position.
- Now adjust the travel by moving the linkage inward on the damper arm for more travel and outward for less.

DRAFT PROGRAM CONTROL
TYPE — 84D01-2



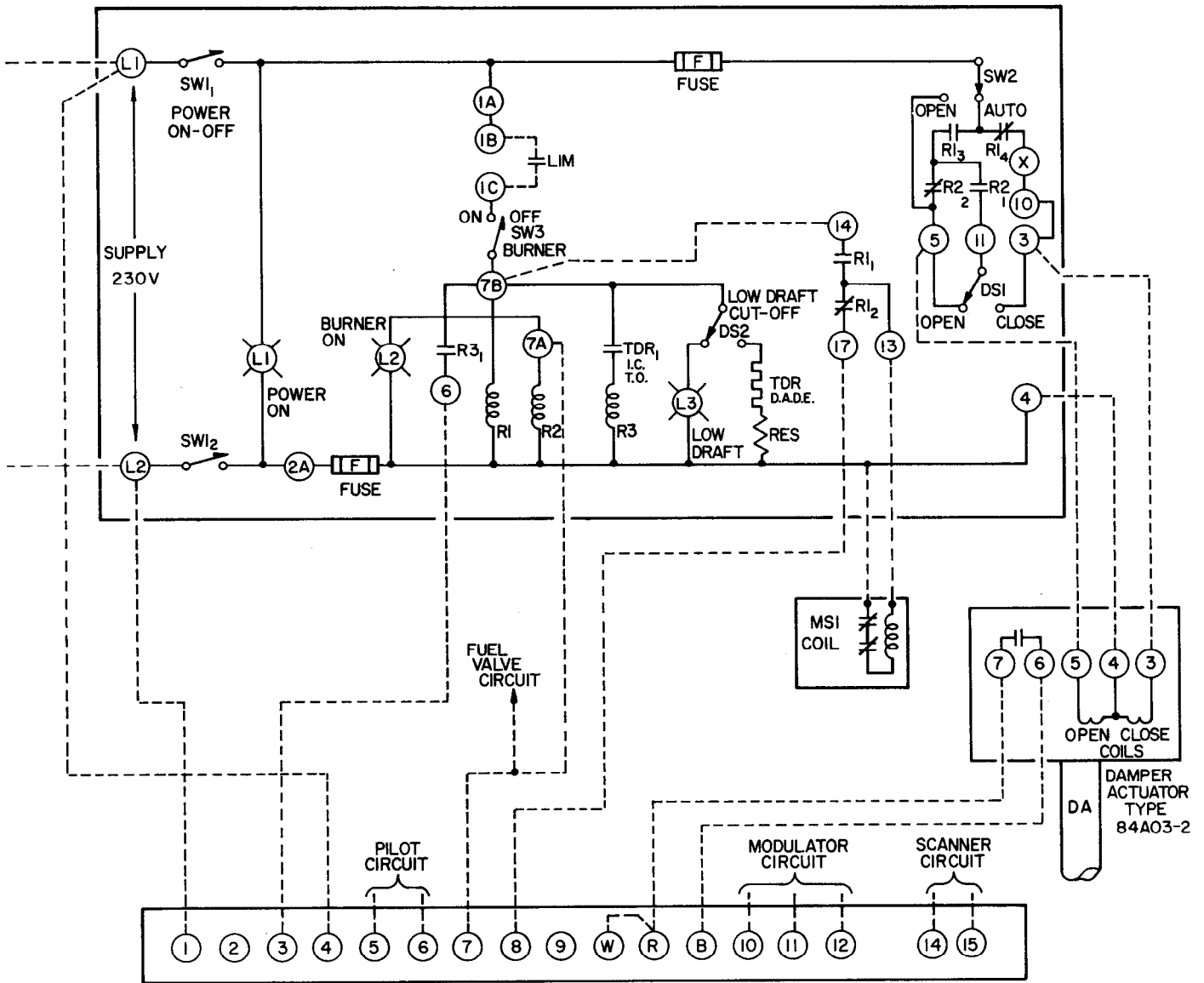
FIREYE PROGRAMMING CONTROL
TYPE — 26RJ8 MOD-1008

LEGEND	
SW1	POWER SWITCH
SW2	MANUAL-AUTOMATIC DAMPER SWITCH
SW3	BURNER SWITCH
LIM	LIMIT CONTROLS
L1	POWER ON LIGHT — GREEN
L2	BURNER ON — LIGHT — AMBER
R1	RELAY NO. 1
R2	RELAY NO. 2
DSI	OPERATING DRAFT SWITCH
MSI	INDUCED DRAFT FAN MOTOR STARTER
DA	DAMPER ACTUATOR
F	FUSES — 3.0 AMP. (115 V. — 5.0 AMP)



— CONNECTION DIAGRAM —
FIREYE DRAFT PROGRAM CONTROL
TYPE — 84D01-2
FIREYE PROGRAMMING CONTROL
TYPE — 26RJ8 — MOD-1008

DRAFT PROGRAM CONTROL
TYPE-84D09-2



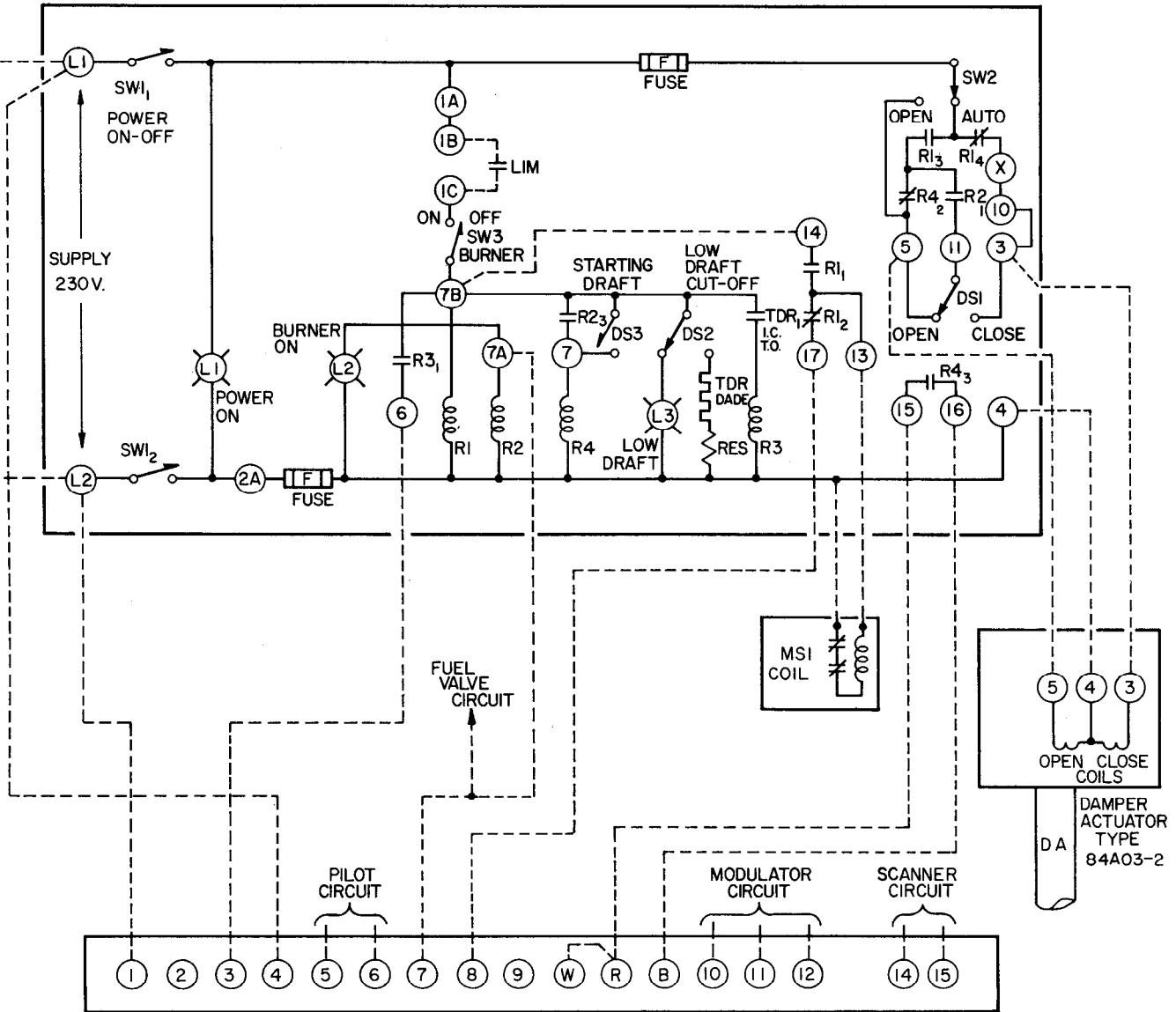
FIREYE PROGRAMMING CONTROL
TYPE-26RJ8 MOD.-1008

LEGEND	
SW1	POWER SWITCH
SW2	MANUAL-AUTOMATIC DAMPER SWITCH
SW3	BURNER SWITCH
LIM	LIMIT CONTROLS
L1	POWER ON LIGHT-GREEN
L2	BURNER ON LIGHT-AMBER
L3	LOW DRAFT LIGHT-RED
R1	RELAY NO.1
R2	RELAY NO.2
R3	RELAY NO.3
DS1	OPERATING DRAFT SWITCH
DS2	LOW DRAFT SWITCH
TDR	TIMER LOW DRAFT-DADE HEATER
RES	DROPPING RESISTOR
MSI	INDUCED DRAFT FAN MOTOR STARTER
DA	DAMPER ACTUATOR
F	FUSES-3.0 AMP. (115 V.-5.0 AMP)

- CONTROL INTERNAL WIRING
- EXTERNAL WIRING
- D.A.D.E.—DELAY AFTER DE-ENERGIZATION
- ⊕ CONNECTION
- ⊖ NO CONNECTION

———— CONNECTION DIAGRAM ————
FIREYE DRAFT PROGRAM CONTROL
TYPE-84D09-2
FIREYE PROGRAMMING CONTROL
TYPE-26RJ8-MOD-1008

DRAFT PROGRAM CONTROL
TYPE — 84D41-2



FIREYE PROGRAMMING CONTROL
TYPE-26RJ8 MOD.1008

LEGEND	
SW1	POWER SWITCH
SW2	MANUAL-AUTOMATIC DAMPER SWITCH
SW3	BURNER SWITCH
LIM	LIMIT CONTROLS
L1	POWER ON LIGHT—GREEN
L2	BURNER ON — LIGHT—AMBER
L3	LOW DRAFT LIGHT—RED
R1	RELAY NO.1
R2	RELAY NO.2
R3	RELAY NO.3
R4	RELAY NO.4
DS1	OPERATING DRAFT SWITCH
DS2	LOW DRAFT SWITCH
DS3	START DRAFT SWITCH
TDR	TIMER LOW DRAFT—D.A.D.E. HEATER
RES	DROPPING RESISTOR
MSI	INDUCED DRAFT FAN MOTOR STARTER
DA	DAMPER ACTUATOR
F	FUSES—3.0AMP. (115 V. — 5.0 AMP.)

- CONTROL INTERNAL WIRING
- - - EXTERNAL WIRING
- D.A.D.E.—DELAY AFTER DE-ENERGIZATION
- CONNECTION
- NO CONNECTION

— CONNECTION DIAGRAM —
FIREYE DRAFT PROGRAM CONTROL
TYPE — 84D41-2
FIREYE PROGRAMMING CONTROL
TYPE — 26RJ8 - MOD. - 1008

Sequence of Operation

Type 84DO1

1. With power switch SW1 "On" the manual automatic switch in the "Automatic" position and the burner switch SW3 in the "On" position, the control is ready to operate. The green "Power On" light will be illuminated.

2. When the limit controls call for the burner to operate, relay R1 will be energized, its contacts R1-1 will close starting the induced draft fan, R1-3 will close and R1-4 will open. This applies power to terminal No. 5 of the damper actuator causing it to drive toward the open position. Terminal No. 3 of the 26RJ8 control is energized.

3. As soon as the damper actuator has reached the wide open position, the limit switch in the actuator, across terminals Nos. 7 and 6, will close. This in turn closes the starting circuit, R and B, of the 26RJ8 control which starts to program. The burner motor is energized.

4. When the 26RJ8 control has programmed to the point of energizing the main fuel valve, its terminal No. 7 is powered, and through external wiring terminal 7A of the draft control is energized. Relay R2 is now energized. Its contacts R2-1 close and R2-2 opens. The damper actuator is now under the control of the operating draft switch.

5. When the limit controls are satisfied, all relays are de-energized. The 26RJ8 control is de-energized and all fuel valves close, all lights are extinguished except for the green "Power On" light. Relay contact R1-2 closes causing the induced draft fan to operate until the post purge period of the 26RJ8 control is completed. R1-3 opens, R1-4 closes, applying power to terminal No. 3 of the damper operator, thus causing it to drive closed.

6. In the event of flame failure, terminal No. 7 of the 26RJ8 is de-energized, relay R2 is de-energized and R1-4 and R2-1 open causing the damper to drive to the open position.

7. Placing the manual automatic switch SW2 in the open position causes the damper actuator to drive open while the burner switch SW3 shuts the burner down and drives the damper to the closed position.

Type 84DO9

1. With power switch SW1 "On" the manual automatic switch in the "Automatic" position and the burner switch SW3 in the "On" position, the control is ready to operate. The green "Power On" light will be illuminated.

2. When the limit controls call for the burner to operate, relay R1 will be energized, its contacts R1-1 will close starting the induced draft fan. R1-3 will close and R1-4 open. This applies power to terminal No. 5 of the damper actuator causing it to drive toward the open position. When the draft increases to the point that low draft cut-off switch DS2 is satisfied, time

delay relay TDR is energized, the low draft light is extinguished and contact TDR-1 is closed, energizing relay R3. Relay contact R3-1 closes and terminal No. 3 of the 26RJ8 is energized.

3. As soon as the damper actuator has reached the wide open position, the limit switch in the actuator, across terminals Nos. 7 and 6, will close. This in turn closes the starting circuit, R and B, of the 26RJ8 control which starts to program. The burner motor is energized.

4. When the 26RJ8 control has programmed to the point of energizing the main fuel valve, its terminal No. 7 is powered, and through external wiring terminal 7A of the draft control is energized. Relay R2 is now energized. Its contacts R2-1 close and R2-2 opens. The damper actuator is now under the control of the operating draft switch.

5. When the limit controls are satisfied, all relays are de-energized. The 26RJ8 control is de-energized and all fuel valves close, all lights are extinguished except for the green "Power On" light. Relay contact R1-2 closes causing the induced draft fan to operate until the post purge period of the 26RJ8 control is completed. R1-3 opens, R1-4 closes, applying power to terminal No. 3 of the damper operator, thus causing it to drive closed.

6. In the event of flame failure, terminal No. 7 of the 26RJ8 is de-energized, relay R2 is de-energized and R1-4 and R2-1 open causing the damper to drive to the open position.

7. Placing the manual automatic switch SW2 in the open position causes the damper actuator to drive open while the burner switch SW3 shuts the burner down and drives the damper to the closed position.

Type 84D41

1. With power switch SW1 "On" with Manual-Automatic Damper Switch in the automatic position and the Burner Switch in the "On" position, the control is ready to operate. The green "Power On" light will be illuminated.

2. When the limit controls call for the burner to operate, relay R1 will be energized, its contacts R1-1 will close starting the induced draft fan. R1-3 will close and R1-4 open. This applies power to terminal No. 5 of the damper actuator causing it to drive toward the open position. When the draft increases to the point that low draft cut-off switch DS2 is satisfied, time delay relay TDR is energized, the low draft light is extinguished and contact TDR-1 is closed, energizing relay R3. Relay contact R3-1 closes and terminal No. 3 of the 26RJ8 is energized.

3. When the draft increases further to satisfy the adjustable starting draft switch, relay R4 is energized. Its contact R4-2 opens. This removes power from terminal No. 5 of the damper operator causing it to remain at the position it has now assumed. Contact R4-3 closes, closing the R-B low voltage circuit of the 26RJ8, causing it to start programming.

4. When the 26RJ8 control has programmed to the point of energizing the main fuel valve, its terminal No. 7 is powered, and through external wiring terminal No. 7A of the draft control is energized. Relay R2 is now energized. Its contacts R2-3 close shunting the starting draft switch. Contacts R2-1 close energizing terminal No. 11 of the control. The damper actuator is now under the control of the operating draft switch.

5. When the limit control is satisfied, all relays are de-energized. The 26RJ8 control is de-energized and all fuel valves close. All lights are extinguished except for the green "Power On" light. Relay contact R1-2 closes causing the induced draft fan to operate until the post purge period of the 26RJ8 control is completed. R1-3 opens, R1-4 closes applying power to

terminal No. 3 of the damper operator thus causing it to drive closed.

6. In the event of flame failure, terminal No. 7 of the 26RJ8 control is de-energized, relay R2 is de-energized. Its contacts R2-3 open removing the shunt from the starting draft switch thus de-energizing relay R-4. Relay contacts R1-3 and R4-2 are closed and contacts R1-4 and R2-1 are open causing the damper to drive toward the open position. The induced draft fan runs until the post purge of the 26RJ8 control is completed.

7. Placing the manual automatic switch SW2 in the open position causes the damper actuator to drive open while the burner switch SW3 shuts the burner down and drives the damper to the closed position.

Guarantee

We guarantee to replace or, at our option, repair any products or parts thereof (except electronic tubes, and cells) which are found defective in material or workmanship within one year from date of shipment. Our obligation with respect to such products or parts shall be limited to replacement or repair f.o.b. Cambridge, Mass., and in no event shall we be liable for consequential or

special damages, or for transportation, installation, adjustment, or other expenses which may arise in connection with such products or parts. Note: Guarantee is void unless guarantee card (supplied with equipment) is filled out completely and mailed within 10 days of installation.



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