



# Protectofier

**COMBUSTION SAFEGUARD**  
Form 6642 VLT

Multi-Burner Supervision, Manual Pushbutton Ignition,  
Plug-in SS100A FLAME-PAKS, Plug-in Control Relays,  
Plug-in U300M TIMOFIER for Purge (with or without Limited Ignition Trial Cycle),  
Built-in SSN TELEFIER for Flame Failure Position Indication.

Power on PROTECTOFIER terminals L1 and L2 provides power to electronic network.

Terminal L1 must be powered before terminal L2.

Power on PROTECTOFIER terminal L2 (thru permissive safety limits circuit).

1. "ACF" CHECK relay "C" is energized thru N.C. contacts of "ACF" FLAME relays "F", LOAD relay "L" and timer cam switch "CTP1" in starting position (N.C. in zero time position).
2. Cam timer motor "CTP" is energized thru cam switch "CTP3" in purge position thru N.C. "L" contact for purging cycle.
  - a. "TIMER" light is lighted to indicate timer motor is energized.
3. At approximately 6 seconds\*, cam switch contact "CTP2" closes to hold in CHECK relay coil "C" thru CHECK relay contact "C" thereby providing a holding circuit around the safe-start checking circuit in step 1.
4. At approximately 8 seconds\*, cam switch contact "CTP1" opens in safe-start circuit and CHECK relay "C" coil is held energized as noted in step 3.

\*Approximate times — dependent on total motor time.
5. At end of purge cycle, cam switch contact "CTP3" switches to the ignition trial position.
  - a. Cam timer motor "CTP" is de-energized to stop.
  - b. "TIMER" light goes out.
  - c. "PURGED" light, if used, will light. (If "PURGED" light is used, it must be a neon type).
6. Turn "BURNER/ALARM" selector switch to the "ON" position.

7. Press and hold "START" pilots pushbutton.
  - a. Internal wire jumper in plug-in TIMOFIER provides circuit to cam timer motor and to "TIMER" light.
  - b. "TIMER" light is lighted and cam timer motor is started for limited ignition trial cycle.
  - c. Pilot solenoid valve is energized to open.
  - d. Ignition transformer is energized to provide electric spark ignition for pilots.
8. With pilot flames established, respective "ACF" FLAME relays "F" are energized and series circuit of "F" contacts energizes "ACF" LOAD relay "L".
  - a. LOAD relay "L" contacts transfer.
    - 1) N.C. "L" contact in safe-start checking circuit opens.
    - 2) N.O. "L" contact in CHECK "C" and LOAD "L" relay holding coil circuit closes.
    - 3) N.C. "L" contact in cam switch "CTP3" purge position circuit opens.
    - 4) N.O. "L" contact in cam switch "CTP3" ignition position circuit closes. This contact, in series with CHECK relay "C" contact, provides power to PROTECTOFIER terminal 4 to energize pilot valve solenoid and any other circuits connected to this terminal.

(over)



**PROTECTION CONTROLS, INC.**

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Manufacturers Representative  
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INSTALLATION, OPERATION AND MAINTENANCE SHALL CONFORM WITH NATIONAL FIRE PROTECTION ASSOCIATION STANDARDS, NATIONAL AND LOCAL CODES, AND AUTHORITIES HAVING JURISDICTION. ANY MODIFICATION VOIDS APPROVALS.

## OPERATING SEQUENCE 42-VLT PAGE 2

- 5) N.O. "L" contact in series circuit with N.O. "C" contact between PROTECTOFIER terminals 9 and 8 closes to energize main gas valve. Flame-on indicator light to indicate all flame circuits established can also be connected in parallel with main valve between PROTECTOFIER terminal 8 and terminal L2.
- 6) Neon lamps on PROTECTOFIER chassis will glow to indicate pilot flames established. Neon lamp will glow as its respective FLAME relay "F" responds to flame signal upon establishment of flame. These indicator lights may be extended and brought to face of operating panel but they must be NE51H(B2A) neon type and the extended lamps and sockets must NOT have resistors.
9. "START" button can be released when all flame positions have been established. Timer will run to zero time position and stop. Cam contact "CTP2" opens and CHECK and LOAD relay coils are held energized thru series circuit of FLAME, CHECK and LOAD relay contacts.

Failure to establish pilot flames during limited ignition trial cycle de-energizes ignition transformer and pilot valve. Timer will continue to run for additional purge cycle before next ignition trial. Release "START" button.

PROTECTOFIER units not provided with limited ignition trial cycle do not have the internal wire jumper in the plug-in TIMOFIER. Therefore, when "START" button is depressed, the N.C. contact of the "START" button breaks

the circuit to the timer motor as well as to the "TIMER" light. Ignition will be sustained for as long as the "START" button is held depressed.

Flame failure during operation de-energizes fuel valves and PROTECTOFIER automatically goes into new purge cycle.

The built-in SSN TELEFIER will indicate the flame position initially causing shut-down by the flame signal neon light of the faulty position remaining lighted at reduced brilliance with one element glowing. All other neon lights will go out.

Power interruption to PROTECTOFIER terminal 12 de-energizes relays and valves. Resumption of power will cause timer motor "CTP" to run to the completion of its cycle plus another safe-start check and complete purge.

Failure of CHECK relay "C" to prove safe-start check will cause the timer motor to continuously recycle and prevent any ignition.

PROTECTOFIER models without purge timing but with ignition trial cycle have a built-in delay or off-time which requires a waiting period (usually of timing equal to the ignition trial cycle) before another ignition relight attempt can be made.

One of the SSN TELEFIER neon indicator lamps on the PROTECTOFIER chassis will glow when PROTECTOFIER terminal 3 is energized. Connect one N.C. contact of "START" pilots pushbutton between PROTECTOFIER terminals L1 and 3. When "START" button is depressed during light-off period, terminal 3 will be de-energized and neon light will gradually be extinguished. Neon lights on chassis will then glow in response to respective flame signal.

### **POWER EQUIPMENT CO.**

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**PROTECTOFIER**

**MANUAL OPERATION**

- .S100A FLAME PAK
- ACF { L-LOAD RELAY
- C-CHECK RELAY
- F-FLAME RELAY

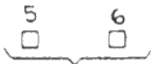
**CTP-U300M MANUAL TIMOFIER**

TWO BURNER PROTECTOFIER (FORM 6642 VLT GROUP M4102.)

NOTE: TIMER CAMS (CTP) SHOWN IN ZERO TIME POSITION. CTP2 CLOSES BEFORE CTP1 OPENS.

- INTERNAL WIRING.
- - - EXTERNAL WIRING.

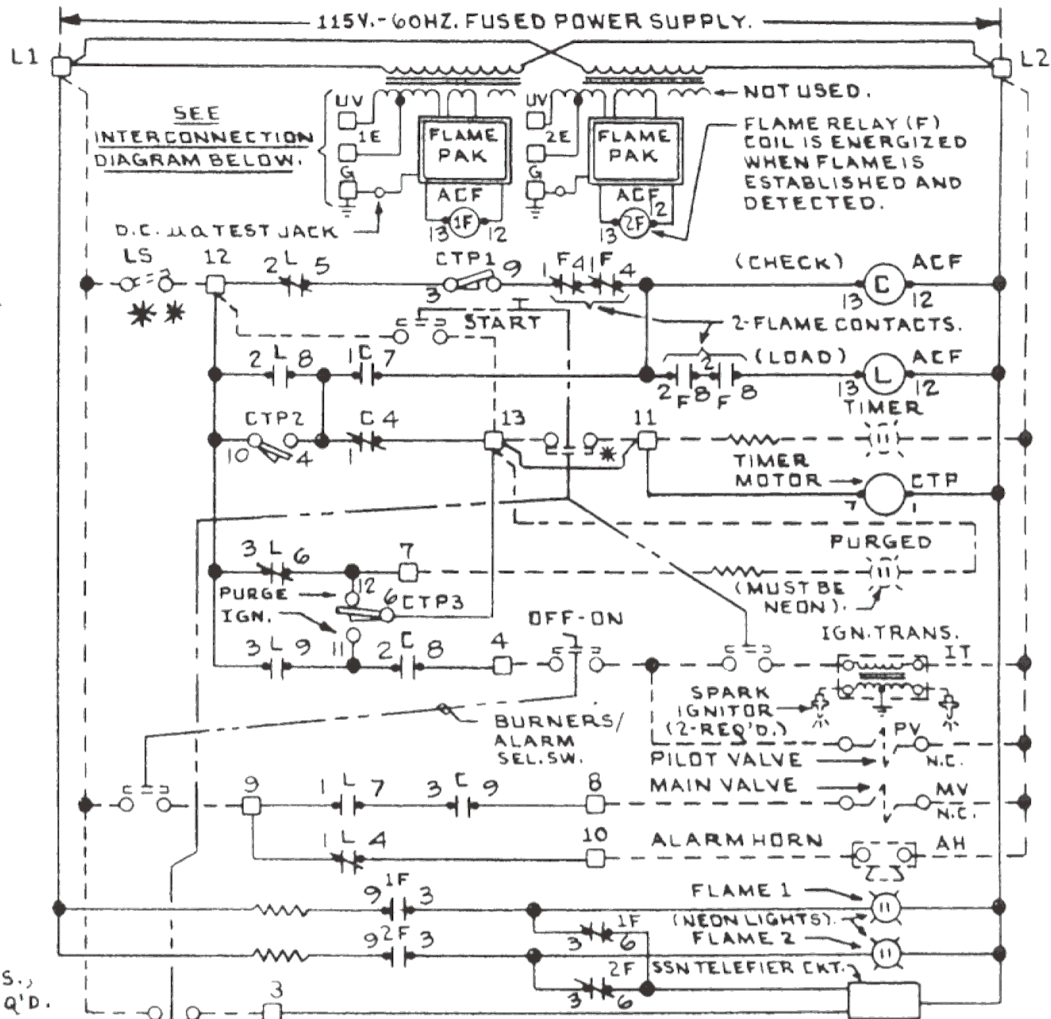
\* - JUMPER IN U300M MANUAL TIMOFIER FOR IGNITION TRIAL UNITS ONLY.



NO CONNECTIONS.

**WIRING DIAGRAM**

\*\* - SAFETY INTLK. SERIES CIRCUIT. FUEL AND AIR PRESS., SWS, VENT, FANS ETC. AS REQ'D.



**TWO BURNER PROTECTOFIER (FORM 6642 VLT GROUP M4102.)**

115V.-60HZ. FUSED POWER SUPPLY.

NOTES:  
 FLAME WIRE TO BE NO. 14 TYPE TW. 600V. INSULATED WIRE OR EQUAL. FLAME WIRE MUST NOT BE IN SAME CONDUITS WITH POWER WIRING.  
 IGNITION CABLE MUST BE RUN IN SEPARATE CONDUIT TO SPARK ELECTRODE. (DO NOT MIX WITH 115V. WIRING.)  
 START P.B.

WIRING AND INSTALLATION TO CONFORM WITH NATIONAL AND LOCAL ELECTRICAL CODES. ALL WIRING AND EQUIPMENT EXTERNAL TO PROTECTOFIER TO BE FURNISHED BY OTHERS UNLESS OTHERWISE SPECIFIED.

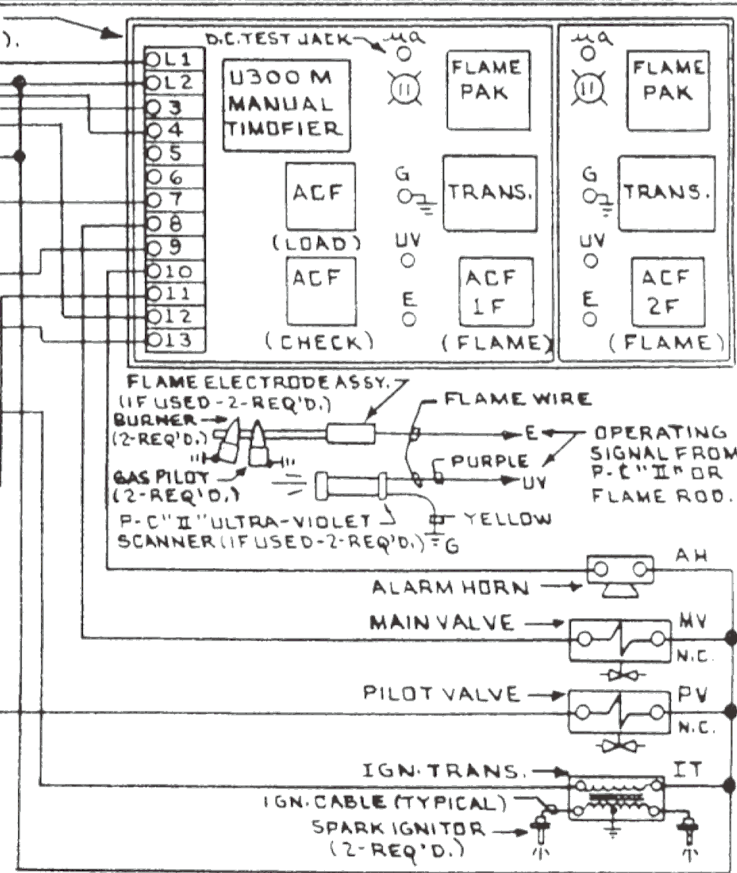
**U300M MANUAL TIMOFIER TIMING**

RANGE	PURGE (MIN.)	IGN. (SEC.)
M-	MIN.	SEC.

NOTE: INSTALLATION, OPERATION AND MAINTENANCE SHALL CONFORM WITH NATIONAL FIRE PROTECTION ASSOCIATION STANDARDS, NATIONAL AND LOCAL CODES, AND AUTHORITIES HAVING JURISDICTION

**PROTECTION CONTROLS, INC.**  
 SKOKIE, ILLINOIS  
 WIRING DIAGRAM FOR:  
**PROTECTOFIER FORM 6642 VLT GROUP M4102**

JOB NO.	DRWN. BY	DATE	DRAWING NO.
	H.R.V.	6-2-79	X-243



**INTERCONNECTION DIAGRAM**

REVISED AND REDRAWN. 10-1-81