Series 22 General Description
UL RECOGNIZED & CSA APPROVED
Winding Temperature Indicator &
Controller for Dry-Type Transformers

Cimco Electronics, Inc.
P. O. Box 248-104 Main St.
West Middlesex, PA 16159
(412) 528-9559

This control system uses electronic analog logic to select the highest winding temperature and control the fan power, alarm indication, audio alarm, trip indication, and trip and alarm switches. The system will also "remember" the maximum temperature that is experienced by the three transformer coils. Fan fuse and alarm are mounted on the face plate. All lights and switches are mounted behind a full panel overlay. This UV resistant overlay has black trim and lettering on "brushed aluminum" background.

OPERATION

As the temperature of the transformer coils change, the ambient compensated circuit provides accurate indication of the highest temperature which the three thermocouples sense. This highest temperature drives the control logic. The set points and the digital indicator are energized from the same circuit. The alarm and trip logic have five degree centigrade hysteresis to maintain alarm and trip information. Fan control logic has 20 degrees centigrade hysteresis to help extend the life of the fans and the fan contacts. The power light is green, the fans-on light is yellow, the alarm light is red, and the trip light is red. All status lights are LED's for longer life.

INSTALLATION GUIDELINES

1. Connect input power last.
2. Complete instructions are printed on the back side of the instrument next to the terminals.
3. All relays are included in the instrument.
4. Verify accuracy by reading ambient at start.
5. Set points adjustable by transformer supplier.
6. Verify set points with system test feature.
7. Verify fuse ratings.
8. Verify input power selections.

FAIL SAFE FEATURES

1. With loss of power--remote alarm turns on.
2. With loss of any thermocouple--
   fans & alarm turn on.
3. The trip circuit does not turn on under either of the above conditions.
4. If fan logic fails--trip logic turns fans on.

OPERATOR CONTROLS

Fan mode can be manual, automatic or **optional off**. In the manual position, fans will be turned on at all times. In automatic, fans turn on and off at the previously set fans on-and-off set-points, manual and automatic fan modes are de-energized.

Operators can **silence the local alarm** supplied with the instrument. The remote alarm continues until the alarm condition clears.

System test/signal generator will check all set-points and test all lights, local alarm, remote alarm, digital display, and fan relays. The trip relay is not tested during system test. The signal generator can also be used to change set-points.

Maximum temperature memory (MTM) is displayed by pressing the push to read control. MTM is erased by pressing the push to reset control. MTM is retained in the electronics for 30 days or more if power to the instrument is lost.

Three thermocouple selector logic operates automatically to select the hottest phase for control logic. Three LED's indicate which phase is the hottest and is being used in the control logic. Temperature of other phases is displayed by pressing the corresponding control button.

A **fuse** (30 amps max) helps protect the fans. The instrument **fuse** (0.25 amp only) helps protect the instrument against damage if 240 VAC is applied to the 120 VAC connection. The fan fuse may be used to de-energize the fan power.

The **optional fan exerciser** is automatically turned on every five to seven days for one to three minutes. The decimal point is displayed on the temperature read-out if fan exerciser is energized. The purpose of this feature is to help assure proper operation of the fans. **Caution--During fan maintenance and instrument bench tests, the fan fuse must be removed to help prevent accidental contact with fan voltage.**

IL 5-20-94-C
MAY 1994

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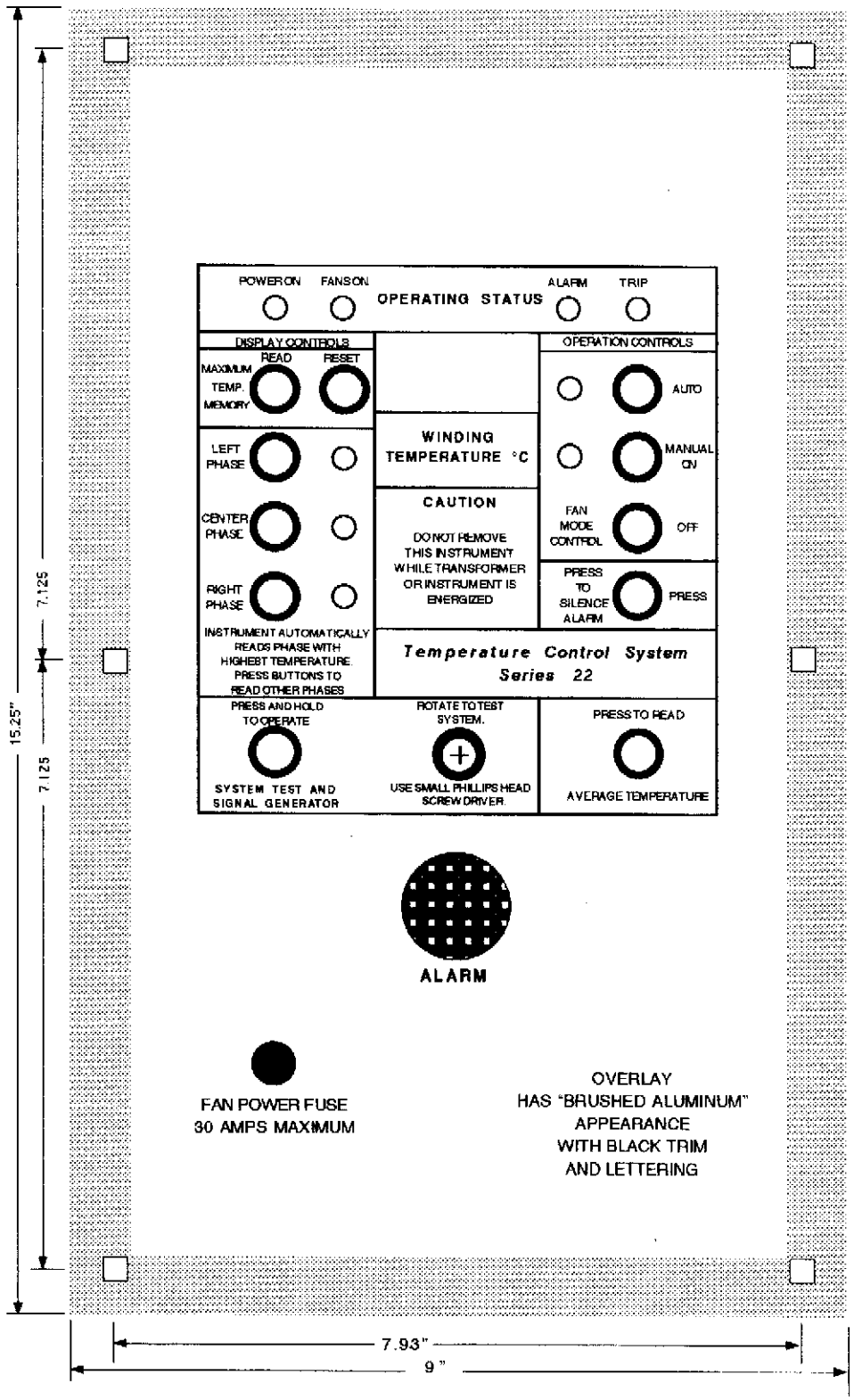
GENERAL SPECIFICATIONS

FEATURE	STANDARD	OPTIONAL
FRONT PANEL OVERLAY	UV RESISTANT	
SCALE RANGE	0 TO 250 DEGREES C	
SCALE TYPE	LED DIGITAL	
ACCURACY	1.5% FULL SCALE	
SENSORS	TYPE "E"	CONTACT CIMCO
CURRENT LOOP		0-20, 4-20, 0-1 MILLIAMP
COMMUNICATION LINKS		RS-232C OR RS-485
SYSTEM TEST & SIGNAL GENERATOR	FULL TEST EXCEPT TRIP RELAY	
SET POINT RANGE	FULL SCALE	
DEAD BAND		
FANS	17.5 DEGREES C	10 TO 50 DEGREES C
ALARM AND TRIP	5 DEGREES C	5 TO 20 DEGREES C
FAN MODE CONTROL	AUTO-MAN	OFF CONTROL
FAN EXERCISER		ON 2 MIN; OFF 6 DAYS
ONE HOUR "ON" TIME AVAIL.		INDICATOR ON
FAN RELAY RATINGS	1 HP AT 120 VAC	2 HP ON N. O.
FANS 1 (SPST)	2 HP AT 240 VAC	FOURTH SET POINT
	1 HP AT 120 VAC	ADDITIONAL
FANS 2 (SPST)	2 HP AT 240 VAC	FAN FUSE
FANS ON SIGNAL		FORM C CONTACTS
FAN CIRCUIT PROTECTION	FUSED TO FAN LOAD 30 AMPS MAX.	SINGLE POLE BREAKER
TRIP SIGNAL	OPTIONAL	6 VDC
FOURTH SET POINT	OPTIONAL	NO 30 AMPS-NC 20 AMPS
FANS ON SIGNAL	OPTIONAL	NO 30 AMPS-NC 20 AMPS
REMOTE ALARM AND TRIP RELAY RATINGS ALL FORM C	10 AMPS AT 120 VAC 8 AMPS AT 240 VAC AT PF = 1.0 1.5 AMPS AT 120 VDC 0.7 AMPS AT 240 VDC	
SONIC ALARM	90 DB AT 2 FEET INTERMITTENT SIREN	100 DB @ 2FT; 105 DB @ 10 FT
HI-POT TEST	1500 VAC; 60 HZ; 60 SEC	

IL 5-20-94-D
MAY 1994

DURING HI-POT TEST: DO NOT INCLUDE THERMOCOUPLE TERMINALS IN THE TEST.
DURING IMPULSE TEST: (1) DO NOT CONNECT THERMOCOUPLE TERMINALS TO GROUND.
(2) INSTRUMENT (WITH TYPE E T/C) CAN BE FULLY OPERATIONAL DURING IMPULSE TEST.



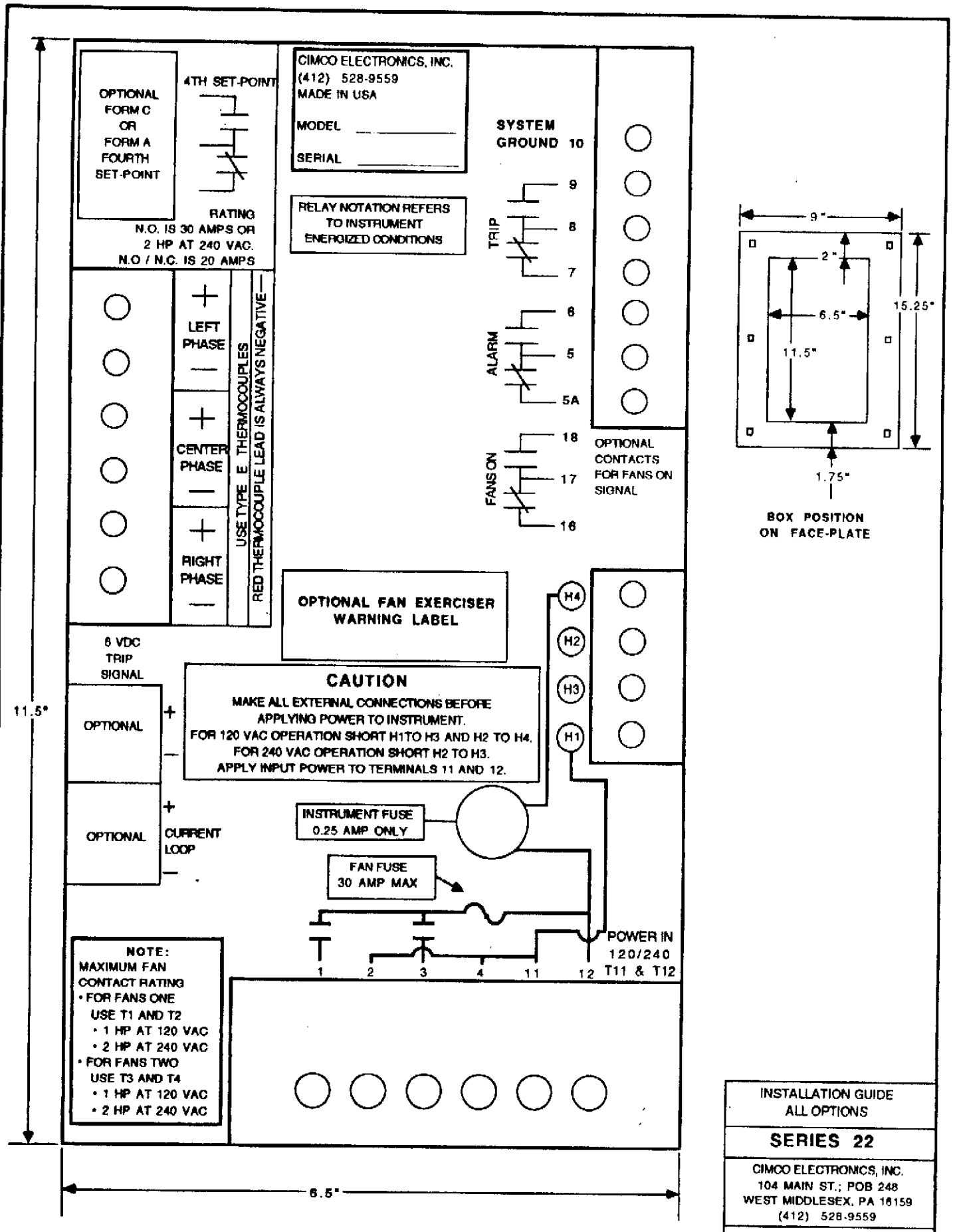
NOTES

UL RECOGNIZED
AND
CSA CERTIFIED

1. 3Ø TEMPERATURE MONITOR AND CONTROL SYSTEM
2. OPTIONS AVAILABLE
   - 1Ø TEMPERATURE MONITOR AND CONTROL
   - DC INPUT POWER FOR INSTRUMENT
   - FAN OFF (FAN MODE CONTROL)
   - FAN EXERCISER
   - FANS-ON SIGNAL/FORM C OR FORM A
   - UP TO EIGHT HORSE POWER FOR FANS
   - FAN MOTOR OVERLOAD ALARM
   - ALARMS UP TO 105 DB AT 10 FEET
   - 6 VDC TRIP SIGNAL
   - FOURTH SET-POINT/FORM C OR FORM A
   - CURRENT LOOP
   - COMMUNICATIONS LINK (RS-232C OR RS-485) INCLUDES SOFTWARE
   - FULL LENGTH HINGE
   - GASKET
   - READ AVERAGE TEMPERATURE
   - YOUR LOGO
3. "FLAT PANEL" WITH UV RESISTANT OVERLAY
4. FACE PLATE IS 0.060" ALUMINUM
5. FAN FUSE (MAXIMUM = 30 AMPS) IS MOUNTED ON FRONT OF INSTRUMENT.
6. INSTRUMENT FUSE IS ONE-FOURTH AMP AND IS MOUNTED ON BACK OF INSTRUMENT.
7. ACTUAL LETTERING IS SLIGHTLY DIFFERENT THAN SHOWN.
8. ALL LIGHTS AND OPERATOR CONTROL SWITCHES ARE LOCATED BEHIND OVERLAY.
9. SIX MOUNTING HOLES; 0.281" SQUARE
10. ALARM IS ON FRONT PANEL
11. SIGNAL GENERATOR FOR CHANGING SET-POINTS LOCATED ON FRONT PANEL

SERIES 22
FACE-PLATE
MARCH 18, 1994
DRAWING 3-18-94-A
SCALE 1 = 2

CIMCO ELECTRONICS, INC.
104 MAIN ST. -- P. O. BOX 248
WEST MIDDLESEX, PA 16159
PHONE 412-528-9559
FAX 412-528-1108



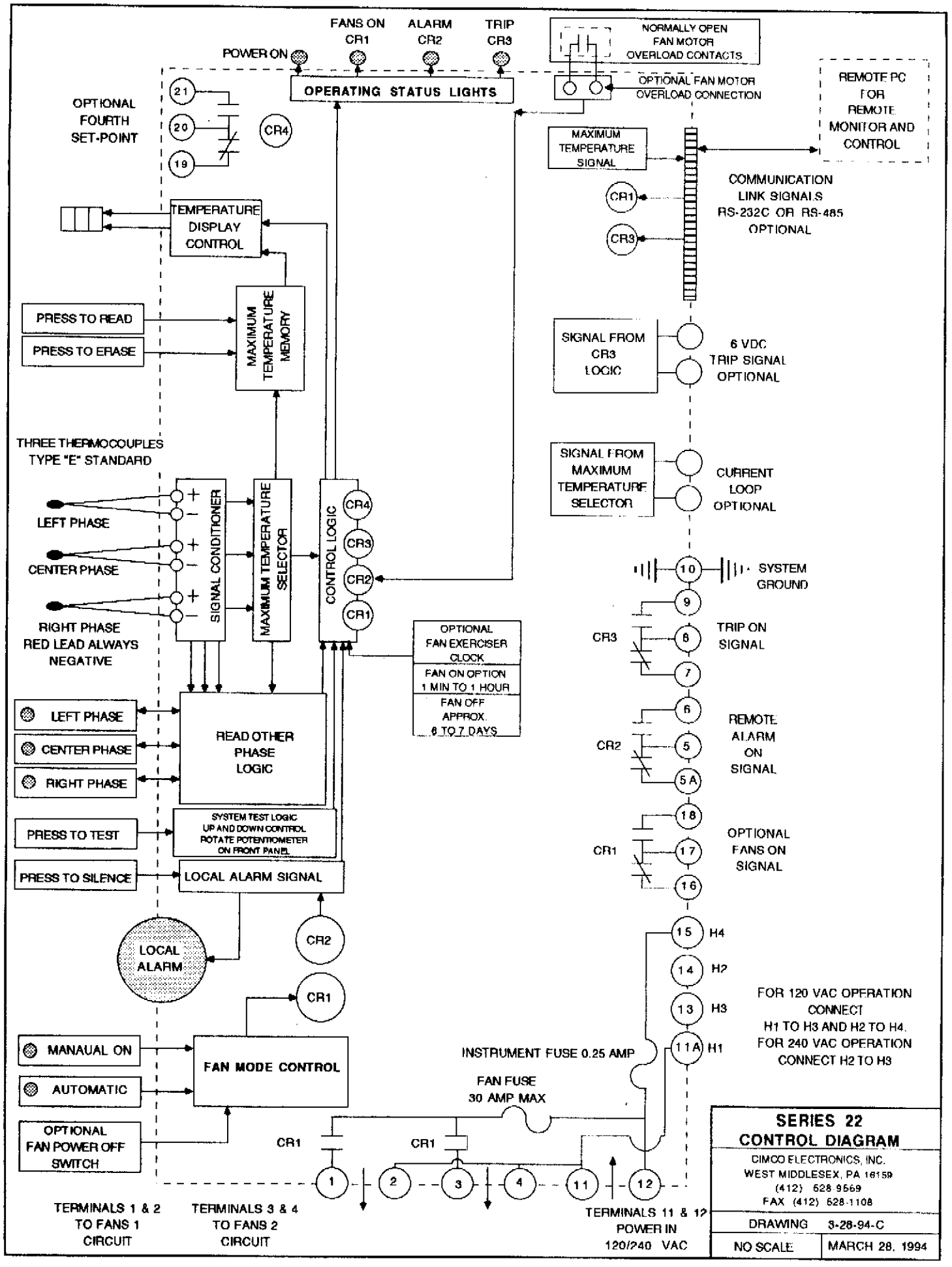
INSTALLATION GUIDE
ALL OPTIONS

SERIES 22

CIMCO ELECTRONICS, INC.
104 MAIN ST.; POB 248
WEST MIDDLESEX, PA 16159
(412) 528-9559

DRAWING 3-18-94-B

SUB: 1: 4TH SET POINT: 8-8-94 | SCALE 3/4 =1" MARCH 18, 1994



SERIES 22
CONTROL DIAGRAM

CIMCO ELECTRONICS, INC.
WEST MIDDLESEX, PA 16159
(412) 528-9569
FAX (412) 528-1108

DRAWING 3-28-94-C

NO SCALE | MARCH 28, 1994

SERIES 21 & SERIES 22
Instructions for changing set-points in the field

Cimco Electronics, Inc.
West Middlesex, PA 16159
(412) 528-9559

These instructions are for customers of Cimco Electronics, Inc. These customers may have reason to change one or more set-points of Cimco Series 21 or Series 22 instruments. Most instruments manufactured by Cimco after Sept. 1994 will include signal generators for changing all set-points.

Do not change any set-point without permission of the transformer manufacturer since the set-points are established to protect the insulation of the transformer and to coordinate with external protection.

The set-point is defined as the light-on temperature. Dead-band is defined as the difference between the light-on and light off temperature range.

OPERATION OF SIGNAL GENERATOR ON SERIES 21

1. Signal generator on the Series 21 is an optional feature.
2. Controls are on the back of the instrument just below the alarm.
3. Push the slide switch to the left to energize the signal generator.
4. Use a small phillips head screwdriver to change the signal level.
5. Clock-wise rotation increases while counter clock-wise decreases the signal.
6. Follow instructions in the column to the right of this column to change set-points.

OPERATION OF SIGNAL GENERATOR ON SERIES 22

1. Signal generator on the Series 22 is a standard feature.
2. Controls are on the front panel and also used for system test.
3. Press and hold the System Test and signal generator control to energize the signal generator.
4. Use a small phillips head screwdriver to change the signal level.
5. Clock-wise rotation increases while counter clock-wise decreases the signal.
6. Follow instructions in the column to the right of this column to change set-points.

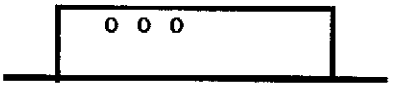
GENERAL INFORMATION

1. Energize the instrument for a minimum of 15 minutes to all temperatures to stabilize inside the instrument. This short warm up period will assure maximum accuracy for the adjustments.
2. With the instrument upright and supported on a flat surface facing you, locate the set-point adjustment holes on the top of the sheet metal back box. The may be covered with a "WARRANTY VOID" STICKER.
3. Figure "A" locates the three adjustment holes.
4. Remove the "WARRANTY VOID" seal if it is present over these three holes.
5. Do Not remove the "WARRANTY VOID" sticker over the holes on the right as viewed from the front and the top. Adjustment of these three controls will void the warranty on the instrument.
6. **NOTE**: Clockwise rotation of the adjustments will increase or raise the set-point. The dead band is fixed by Cimco during manufacturing.
7. **NOTE**: Counter-clockwise rotation of the adjustments will decrease or lower the "ON" temperature of the set-point.

SET-POINT CHANGE INSTRUCTIONS

8. If all set-points are changed, start with the "ALARM" set-point. Next change the "TRIP" and "FANS" on set-points.
9. Use a very small non-metallic flat tip screw driver.
10. After the correct adjustment has been located, connect the thermocouple simulator, milli-volt source, or use the build in signal generator.
11. Adjust the display to the desired temperature and adjust the set-points as instructed above.

LEFT HOLE IS FOR FANS ON ADJUSTMENT
CENTER HOLE IS FOR TRIP ON ADJUSTMENT
RIGHT HOLE IS FOR ALARM ON ADJUSTMENT



TOP VIEW -- FIGURE A

Series 22-Instructions
OPERATING AND INSTALLATION
Winding Temperature Indicator &
Controller for Dry-Type Transformers

Cimco Electronics, Inc.
P. O. Box 248-104 Main St.
West Middlesex, PA 16159
(412) 528-9559

STANDARD FEATURES
FACE PLATE

OPERATING STATUS
Power on light is green. Fans on light is amber (yellow). Alarm and trip lights are red.

DISPLAY CONTROLS
Maximum Temperature Memory (MTM)
PRESS READ to display MTM since last reset
PRESS RESET to erase MTM.
MTM is retained 30 days with loss of power.

READ OTHER PHASES
Instrument displays highest temperature input.
Green LED indicates hottest phase.
PRESS other buttons to read other phases.
Control logic automatically shifts to indication.

SYSTEM TEST
PRESS AND HOLD left button to energize.
ROTATE control in middle of panel.
OBSERVE operating status of LED's as temperature increases and decreases.
Dead band for fans is normally 20 C.
Maximum dead band is normally 50 C.
Minimum dead band is normally 5 C.
Dead band alarm and trip is 5 C.

SIGNAL GENERATOR to change set-points.
PRESS AND HOLD left button to energize.
ADJUST control in middle of panel to desired "on" set-point.
FOLLOW INSTRUCTIONS for changing set-points. (Cimco IL 3-15-94-A) Always contact transformer manufacturer for approval before changing set-points.

OPERATION CONTROLS
FAN MODE CONTROL LED's indicate auto or manual control of fan power.
START-UP condition is AUTO.
PRESS MANUAL ON to energize fans for continuous forced air cooling.
PRESS AUTO to return to automatic mode.
PRESS FAN OFF (OPTIONAL) to de-energize automatic mode and manual on mode. No fan mode lights are on during fans off mode.
PRESS MANUAL ON to exit **FAN OFF** mode.

STANDARD INSTALLATION
BACK PLATE

INPUT POWER—Connect Last to T-11 & T-12
1 Determine input power voltage.
2 Connect H1, H2, H3, and H4 while following instructions on the back plate.
3 The 0.25 amp fuse is to protect the instrument if 240 VAC is applied while the instrument is connected for 120 VAC power.

FAN POWER—CONNECT THIS FIRST
TWO OUT-PUTS TOTAL
1 Fans one output power is T-1 and T-2.
2 Fans two output power is T-3 and T-4.
3 Each circuit rating if used alone is 30 amps, 1 HP at 120 VAC, 2 HP at 240 VAC
4 Total rating for both circuits together is 30 amps, 2 HP at 120 VAC, 4 HP at 240 VAC
5 Instrument is supplied with 20 amp fuse. Maximum fuse rating is 30 amps.
6 Additional fan power available on optional fourth set-point and fans on signal relays

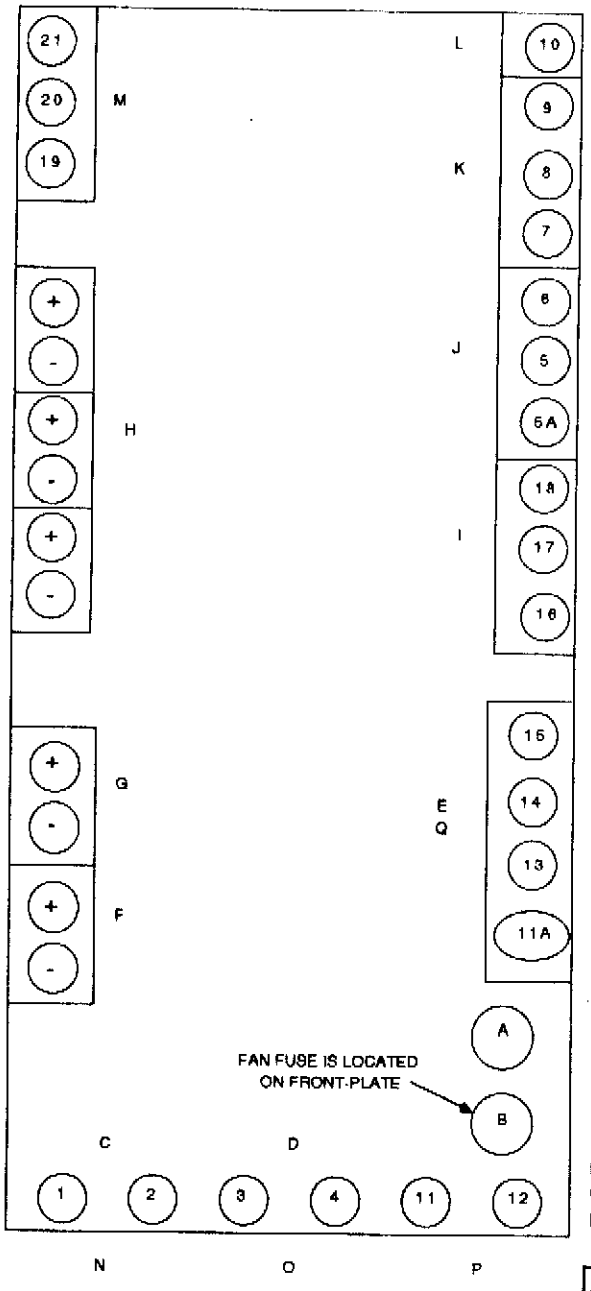
THERMOCOUPLE INPUT-CONNECT SECOND
1 Non-magnetic Type E thermocouple standard
2 Red lead is always negative.
3 Cut thermocouples to length.
4 Strip insulation from metal leads.
5 Use clamp on terminal block to connect thermocouple to instrument.
6 Do not use crimp lugs.
7 Clamp leads firmly in place.
8 Do not wrap leads on terminal stud.

SYSTEM GROUND-CONNECT THIRD
1 Instrument ground is isolated from system ground. Connect system ground to T-10.

TRIP & ALARM RELAYS-CONNECT FOURTH
1 Form C relays.
2 Contacts are dry.
3 Alarm relay is fail-safe.

OPTIONS--CONNECT FIFTH
Each option has dedicated instructions.
Contact Cimco if not supplied with instrument.

IL 5-20-94-F **JUNE 1994**



BACK SIDE OF INSTRUMENT

INSTALLATION INSTRUCTIONS

GENERAL

- CONNECT INPUT POWER LAST.
- EXCEPT FOR INPUT POWER AND FAN CONNECTIONS, CONNECT TERMINALS AT THE BOTTOM OF THE INSTRUMENT FIRST AND WORK TO THE TOP USING THE FOLLOWING SEQUENCE
- DETAILED INSTRUCTIONS ARE PRINTED ON THE BACK SIDE OF THE INSTRUMENT

DETAIL

A. VERIFY INSTRUMENT FUSE - 0.25 AMP FUSE SUPPLIED
REPLACE FUSE WITH DUPLICATE RATING.
- CAUTION: THE INSTRUMENT TRANSFORMER WILL FAIL IF 240 VAC IS APPLIED TO T-11 AND T-12 WHILE STEP E HAS SELECTED 120 VAC.

B. VERIFY FAN FUSE RATING - 20 AMP FUSE SUPPLIED
MAXIMUM RATING IS 30 AMPS. LOCATED ON FRONT-PLATE!

C. CONTACT FOR FAN CIRCUIT ONE (TERMINALS 1 AND 2)
RATING: 1 HP AT 120 VAC OR 2.0 HP AT 240 VAC
VOLTAGE IS SAME AS ON TERMINALS 11 AND 12

D. CONTACT FOR FAN CIRCUIT ON TWO (TERMINALS 3 AND 4)
RATING: 1 HP AT 120 VAC OR 2.0 HP AT 240 VAC
VOLTAGE IS SAME AS ON TERMINALS 11 AND 12

E. (MIDDLE RIGHT) SELECT FOR 120 OR 240 VAC INPUT POWER TO THE INSTRUMENT (TERMINALS 11A, 13, 14, 15)

F. LOWER LEFT-OPTIONAL CURRENT LOOP

G. LOWER LEFT-OPTIONAL 6 VDC TRIP SIGNAL

H. TERMINALS FOR THERMOCOUPLE CONNECTION (MIDDLE LEFT)
- RED THERMOCOUPLE LEAD IS NEGATIVE
- TYPE "E" IS STANDARD
- TYPE "K" IS BY SPECIAL ORDER AND REQUIRES MAGNETIC SHIELDING

I. MIDDLE RIGHT
OPTIONAL FORM C CONTACTS FOR "FANS ON" SIGNAL

J. UPPER RIGHT-ALARM FORM C CONTACTS

K. UPPER RIGHT-TRIP FORM C CONTACTS

L. TOP RIGHT-GROUND TERMINAL

M. TOP LEFT- FOURTH SET POINT-OPTIONAL
CONTACT FOR FAN CIRCUIT ONE (TERMINALS 21 AND 20)
RATING: 1 HP AT 120 VAC OR 2.0 HP AT 240 VAC

N. BOTTOM LEFT-FAN CIRCUIT ONE TERMINALS (1 & 2)

O. BOTTOM CENTER-FAN CIRCUIT TWO TERMINALS (3 & 4)

P. BOTTOM RIGHT-INPUT POWER FOR FANS AND INSTRUMENT (TERMINALS 11 & 12)

Q. CHECK CONNECTIONS FOR TERMINALS H1, H2, H3 AND H4 VERY CAREFULLY BEFORE APPLYING POWER.

VERIFICATION TESTS AFTER ALL CONNECTIONS ARE COMPLETE

1. TURN ON POWER TO INSTRUMENT.
2. THE INSTRUMENT WILL READ AMBIENT TEMPERATURE
3. ERASE TEMPERATURE IN MAXIMUM TEMPERATURE MEMORY
4. READ MAXIMUM MEMORY. THE METER SHOULD READ AMBIENT TEMPERATURE.
5. CHECK FAN MODE. PRESS MANUAL BUTTON; THE FANS WILL OPERATE. PRESS AUTOMATIC; THE FANS WILL STOP.
6. PRESS AND HOLD SYSTEM TEST BUTTON. SIGNAL GENERATOR IS IN THE MIDDLE OF THE FACE-PLATE. USE VERY SMALL PHILLIPS HEAD (ZERO) SCREW DRIVER TO CHANGE DISPLAY. ROTATE CLOCK-WISE TO INCREASE DISPLAY. ROTATE COUNTER-CLOCK-WISE TO DECREASE TEMP. DISPLAY. OBSERVE STATUS LIGHTS AS DISPLAY GOES UP AND DOWN. CONTACT TRANSFORMER MANUFACTURER BEFORE CHANGING SET-POINTS.
7. READ TEMPERATURES OF OTHER PHASES. (THEY WILL BE SLIGHTLY LOWER)

SERIES 22	
CIMCO ELECTRONICS, INC WEST MIDDLESEX, PA 16159 (412) 528-9559	
DRAWING 3-26 94-A	
NO SCALE	MARCH 28, 1994

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