

Phone (724) 528-9559
Fax (724) 528-1108
cimco@cimcoelectronics.com

Cimco Electronics, Inc.
26 Main St.; P. O. Box 248
West Middlesex, PA 16159

Oct., 2002

IMPORTANT NOTICE

Dear Customer,

We would like to make you aware of a few hardware modifications that have been made to our existing Model A21 instrument. These changes are

1. different fuse holders and
2. the use of a 120/240 volt selector switch.

These hardware modifications do not alter the performance of our instrument; however, to avoid any possible confusion we have decided to create a new model number for the instruments with this new hardware. This instrument that you have received is now considered a C21. Please use this new model number when placing orders for this instrument.

Thank you for your patience, and if you have any questions please feel free to contact our office through phone, fax, or email.

Oct., 2002

INCOMING TEST INSTRUCTIONS MODEL C21 SERIES 21 with Microprocessor

Before conducting tests, read STANDARD INSTALLATION INSTRUCTIONS, IL 10-29-02.

The following procedure is part of our complete certification test. You will receive a certified test report with each instrument. Your incoming inspection should include all steps.

1. **CONNECT INSTRUMENT TO POWER AND SHORT THE SENSORS INPUTS.**
 - a. Functional tests can begin immediately.
 - b. Instrument must have a warm-up period of 15 minutes before accuracy tests are conducted.

2. **CHECK STATUS MODE OF ALL RELAYS WITH INSTRUMENT ENERGIZED**

The status must agree with the notations on the back-plate.

3. **TEST TOTAL SYSTEM CONTROL**
 - a. **PRESS AND HOLD** bottom left button.
Ambient temperature will be displayed and all LEDs will illuminate.
 - b. **PRESS AND RELEASE** bottom right button to advance test mode.
 - c. **TEST MODE SEQUENCE** is described on face-plate.
Local alarm can be silenced if desire.
Trip relay will not turn on.
Trip relay turns on only with input signal.
 - d. **RELEASE** bottom left button when test is complete.

4. **TEST MAXIMUM TEMPERATURE MEMORY**
 - a. Connect thermocouple to one input, leaving others shorted.
 - b. Press **READ** and note temperature indication.
 - c. Press **RESET**.
 - d. Apply heat to the thermocouple tip.
 - e. Temperature will increase.
 - f. Press **READ**. Memory will indicate maximum temperature indicated in step four.
 - g. Press **RESET**.

5. **CHECK ALL FRONT PANEL SWITCHES AND LIGHTS:** Turn the instrument power off for a few seconds and turn the power on again, repeat as desired. Each of the switch controls will click as it is pressed. The following sequence will test all operator controls and status lights on the front panel.
 - a. Test set-up and fan mode control: Short all temperature sensor inputs with a short piece of copper wire. Press the manila mode control and note the fans-on and manual mode indicator light. Press the automatic mode, note the automatic mode indicator light and retain this mode during the remainder of the following tests.
 - b. For optional fan exerciser, the fan exerciser begins in the fans-on cycle. The decimal point located on the bottom right of the temperature indicates that the fan exerciser is energized. This decimal point, the fans on relay and fans on status LED will remain energized for one to two minutes. Continue the test after the fan exerciser has completed the fans on cycle.
 - c. Follow system test instructions to check all remaining lights and relays (except trip relay).
 - d. Follow Read Other Phases to verify phase lights.
Each control will energize the appropriate LED next to the control switch.

After the above checks are completed, all switches and status lights have been checked.

MODEL C21 SERIES 21 with Microprocessor

STANDARD INSTRUCTIONS FACE-PLATE

OPERATING STATUS

Power on light is green.
Fans on light is amber (yellow). (Fail-Safe)
Alarm on light is red. (Fail-Safe)
Trip on light is red.

DISPLAY CONTROLS

MAXIMUM TEMPERATURE MEMORY (MTM)

PRESS READ to display MTM since last reset.
PRESS RESET to erase MTM.
MTM is retained indefinitely 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 bottom left button.
PRESS AND RELEASE bottom right button to advance test mode.
TEST MODE SEQUENCE is described on face-plate.
Local alarm can be silenced if desired.
Trip relay will not turn on.
Trip relay turns on only with input signal.
RELEASE bottom left button when test is complete.

OPERATION CONTROLS

FAN MADE CONTROL LED's indicate auto or manual control of fan power.

START-UP condition is AUTO.

PRESS MANUAL ON to energize fans for continuous running.

PRESS AUTO to return to automatic mode.

FAN EXERCISER (PROGRAMMABLE) will energize fans once per week.

FAIL-SAFE START-UP DEFINITION

- 1 At start-up, alarm and fan contacts are in the "on-state".
- 2 Alarm and fan contacts change to "off-state" when power is applied or,
- 3 Alarm and fan relays revert to "on-state" if thermocouple is open or,
- 4 Alarm and fan contacts revert to "on-state" if power lost.

STANDARD INSTALLATION BACK-PLATE

INPUT POWER

CONNECT LAST TO T-11 & T-12

1. Determine input power voltage.
2. Make proper switch selection 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 OUTPUTS TOTAL

- 1 Fan power relays are Fail-Safe.
- 2 Fans one output power is T-1 and T-2.
- 3 Fans two output power is T-3 and T-4.
- 4 Each circuit rating if used alone is
15 amps, 1 HP at 120 VAC, 2 HP at 240 VAC
- 5 Total rating for both circuits together is
15 amps, 2 HP at 120 VAC, 4 HP at 240 VAC
- 6 Instrument is supplied with 20 amp fuse.
Maximum fuse rating is 30 amps.

TEMPERATURE SENSORS-CONNECT 2ND

- 1 Non-magnetic Type E thermocouple is 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.

SYSTEM GROUND

- 1 Instrument ground is isolated from system ground.
- 2 Connect system ground to T-10.

TRIP AND ALARM RELAYS

- 1 Form C relays.
- 2 Connects are dry.
- 3 Alarm relay is Fail-Safe.

Obtain permission from the transformer manufacturer before changing any programmable features.

Contact Cimco for programming instructions.

Visit Cimco's website at:

www.cimcoelectronics.com

FAIL-SAFE FEATURES
 REFERENCE DRAWING
 10-21-96-A
 10-21-96-B
 10-21-96-C

FAIL-SAFE DETAILS

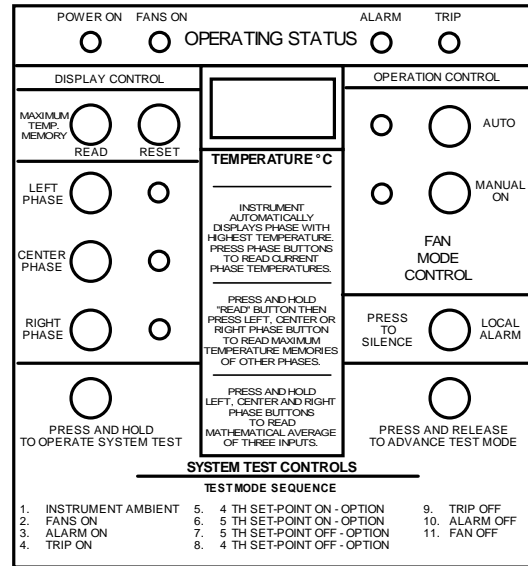
1. Loss of power to instrument
 1. Alarm relay turns on.
 2. Fan relays turn on.
 3. Optional 5th set-point relay turns on.
2. Power supply brown-out
 1. Power supply supervisor
 2. Automatic re-start
3. Open temperature sensor
 1. Alarm relay turns on.
 2. Local alarm turns on.
 3. Alarm-on status LED turns on.
 4. Fan relays turn on.
 5. Fan-on status LED turns on.
 6. Digital display blinks.
 7. Phase LED associated with open sensor blinks.
 8. Press phase selector with blinking LED and digital display will indicate three zeroes.
 9. Functional sensors continue with normal operation. (Trip relay can be turned on from operating sensors.)
4. Micro-controller failure
 1. Alarm relay turns on.
 2. Fan relays turn on.
 3. Power-on LED stays on.
 4. On set-points are limited to
 1. Minimum set-point on is 50 C and
 2. Maximum set-point on is 230 C.
5. EE Prom failure
 1. EE Prom remembers user selected set-points.
 2. If EE Prom fails, operating software will use:
 1. 160 Degrees C for Fans-On
 2. 180 Degrees C for Alarm-On
 3. 210 Degrees C for Trip-On
 4. 210 Degrees C for 4th Set-Point On (Option)
 5. 160 Degrees C for 5th Set-Point On (Option)

SPECIAL NOTE

7. Trip relay with open temperature sensor:
 1. Open temp. sensor does not energize trip relay.
 2. Trip relay will turn-on if one or both of the other phase sensors indicate temperatures above the trip set-point.

TABLE 3

FIGURE 1



FAIL-SAFE LISTING & REFERENCES
 Details on TABLE 3

Fail-Safe Feature	Drawing and Item
1. Initial start-up	10-21-96-A 1
2. Future start-ups	10-21-96-A 2
3. Reset software	10-21-96-A 3
4. Fan mode	10-21-96-A 8.1
5. Silence alarm	10-21-96-B 1
6. Access code	10-21-96-B Table 2.4
7. Dead-band limits	10-21-96-B Table 2.5
8. Fan exerciser limits	10-21-96-C Item 2
9. Monitor fans-on time	10-21-96-C Item 3
10. Monitor alarm-on time	10-21-96-C Item 4
11. Monitor trip-on time	10-21-96-D Table 3.1
12. Loss of power	10-21-96-D Table 3.2
13. Brown-out	10-21-96-D Table 3.3
14. Open temp. sensor	10-21-96-D Table 3.4
15. Micro-processor	10-21-96-D Table 3.5
16. Limits on set-points	10-21-96-D Table 3.6
17. EE Prom failure	10-21-96-D Table 3.7
18. Trip relay	

TABLE 4

OPERATING INSTRUCTIONS for MONITORING FEATURES

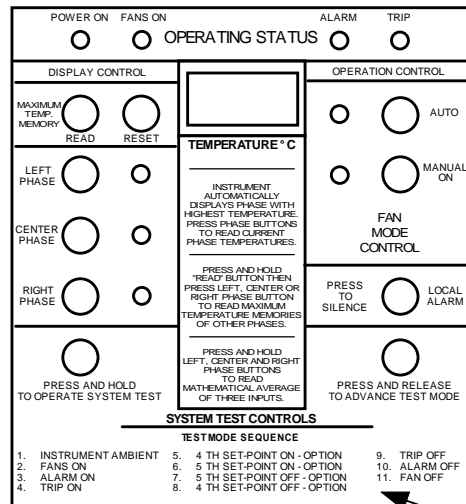
1. First time (as shipped) start-up status
 1. Fan mode is automatic.
 2. Fan exerciser is off.
2. Future "start-up's" use customer's choice of programmed operations.
 1. Reference Drawing 10-21-96-B.
 2. Access code is required for all programmable features.
3. Reset or restart software (if instrument does not respond to commands)
 1. Press and hold buttons 1, 6, & 9 in 1-6-9 simultaneously.
 2. All lights except for "POWER ON" will turn off.
 3. Release the three buttons.
 4. Instrument software will reset to normal start-up mode.
 5. Check instrument fuse if Power On status light is "OFF".
4. Display maximum temperature memory.
 1. Press button 1.
 2. Display will indicate highest temperature in memory.
 3. Phase LED's will indicate which phase temperature is displayed.
5. Display maximum temperature memory (MTM) of other phases
 1. Press and hold button 1. Then press
 2. Button 3 to display MTM of left phase or
 3. Button 4 to display MTM of center phase or
 4. Button 5 to display MTM of right phase.
 5. Buttons 4 and 5 to display MTM of optional 4th input.
 6. Release button 1.
6. Erase maximum temperature memories.
 1. Press button 2 to reset all MTM's to zero.
 2. Maximum temperature memories include
 1. All three phases and
 2. Optional fourth temperature sensor.
7. Display current operating temperatures
 1. Press button 3 or 4 or 5 to display current phase temperatures.
 2. Press buttons 4 & 5 to display optional 4th input temperature.
 3. Press and hold buttons 3, 4, & 5 to display mathematical average of the three phase temperatures.
8. Operation controls
 1. Fan mode
 1. Start-up is always in automatic mode.
 2. Press button 7 for manual-on mode.
 3. Press button 6 for automatic mode.
 2. Alarm control
 1. Press button 9 to silence local alarm.
 2. Remote alarm relay remains "on" until alarm condition clears.
9. SYSTEM TEST (general description)

(for start-up test or check set-points and relays)

 1. Reference Table 1 for test mode sequence
 2. Press and hold button 10 then

(NOTE: User must hold button 10 until desired steps in TABLE 1 are complete.)
 3. Press and release button 11 to advance TEST MODE one step.
10. SYSTEM TEST sequential actions of test mode are:
 1. instrument ambient temperature is displayed and all other LED's turn on.
 2. Fans-on set-point temperature is displayed.
 1. Fans-on LED is turned on.
 2. Fans relays are turned on.
 3. Alarm-on set-point temperature is displayed.
 1. Alarm-on LED is turned on.
 2. Alarm relay is turned on.
 3. Local alarm is turned on.
 4. Local alarm can be silenced if desired.
 4. Trip-on set-point temperature is displayed.
 1. Trip-on LED is turned on.
 2. Trip relay will not turn on.
 3. Trip relay turns on only with input signal.

FIGURE 1



STEP	MODE
1.	INSTRUMENT AMBIENT
2.	FANS ON
3.	ALARM ON
4.	TRIP ON
5.	4TH SET-POINT ON - OPTIONAL
6.	5TH SET-POINT ON - OPTIONAL
7.	5TH SET-POINT OFF - OPTIONAL
8.	4TH SET-POINT OFF - OPTIONAL
9.	TRIP OFF
10.	ALARM OFF
11.	FAN OFF

TABLE 1

10. SYSTEM TEST CONTINUED
 5. Fourth set-point on-temperature is displayed.

(Display will indicate 180 if set-point is not activated.)

 1. 100's decimal point is turned on.
 2. Fourth set-point relay is turned on.
 6. Fifth set-point on-temperature is displayed.

(Display will indicate 180 if set-point is not activated.)

 1. 10's decimal point is turned on.
 2. Fifth set-point relay is turned on.
 7. Fifth set-point off temperature is displayed.

(Display will indicate 166 if set-point is not activated.)

 1. 10's decimal point will blink.
 2. Fifth set-point relay will turn off.
 8. Fourth set-point off temperature is displayed.

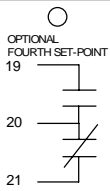
(Display will indicate 175 if set-point is not activated.)

 1. 100's decimal point will blink.
 2. Fourth set-point relay will turn off.
 9. Trip-off set-point temperature is displayed and trip-on LED will blink.
 10. Alarm-off set-point temperature is displayed.
 1. Alarm-on LED will blink.
 2. Alarm relay will turn off or
 3. Local alarm will turn off if not previously silenced.
 11. Fans-off set-point temperature is displayed.
 1. Fans-on LED will blink.
 2. Fan relays will turn off.

MODEL C21
CONTROL PANEL
OCT. 29, 2002
SCALE 1:2
DRAWING 10-29-02-D

CIMCO ELECTRONICS, INC.
26 MAIN ST.; P. O. BOX 248
WEST MIDDLESEX, PA 16150
PHONE 724-528-9559
FAX 724-528-1108
cimco@cimcoelectronics.com

SUB 2: 5-5-97; REMOVE FAN OFF
SUB 1: 11-15-96; ART WORK

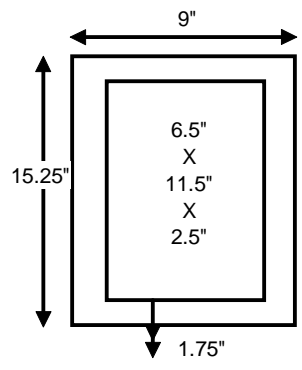
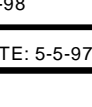
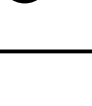
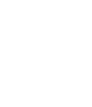
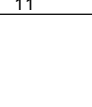
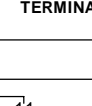
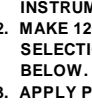
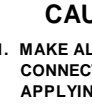
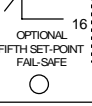
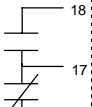
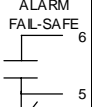
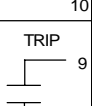


CIMCO ELECTRONICS, INC.
 PHONE (724) 528-9559 MADE IN U.S.A.
 FAX (724) 528-1108
 www.cimcoelectronics.com
 MODEL NO. _____



SERIAL NO. _____
 RELAY NOTATION REFERS TO INSTRUMENT ENERGIZED CONDITIONS. FAN POWER AND ALARM AND FIFTH SET-POINT RELAYS ARE FAIL-SAFE. READ INSTRUCTION MANUALS.

TRIP, ALARM, FOURTH SET-POINT, AND FIFTH SET-POINT MAXIMUM RELAY CONTACT RATINGS ARE: N.O. CONTACTS ARE 20 AMPS OR 2 HP AT 240 VAC. N.C. CONTACTS ARE 10 AMPS AT 240 VAC. ALARM AND FIFTH SET-POINT RELAYS AND FAN POWER RELAYS ARE FAIL-SAFE. READ INSTRUCTION MANUALS CAREFULLY.



BOX POSITION ON FACE-PLATE
 BOX IS 2.5" DEEP
 WEIGHT APPROX. 5.0 LBS

- CAUTION**
1. MODEL C21 INSTRUMENTS USE MICRO-CONTROLLERS FOR SIGNAL PROCESSING AND LOGIC CONTROL.
 2. MODEL C21 INSTRUMENTS THEREFORE MUST BE SHIELDED FROM MAGNETIC FIELDS GENERATED BY TRANSFORMERS.
 3. MODEL C21 INSTRUMENTS ARE SHIPPED FROM CIMCO INSTALLED IN A CARBON STEEL ENCLOSURE WHICH IS ADEQUATE SHIELDING IN "STANDARD" POWER CENTER AND SUBSTATION INSTALLATIONS.
 4. CALL CIMCO FOR ADVICE ON NON-STANDARD INSTALLATIONS WITH ABNORMAL MAGNETIC OR ELECTRIC FIELDS.
 6. ALWAYS CONNECT SYSTEM GROUND TO TERMINAL 10.

RTD'S AND THERMISTORS ARE OPTIONAL TEMPERATURE SENSORS

BACK-BOX SIZE
 6.5" X 11.5" X 3"



23 + LEFT PHASE
 24 -
 26 + CENTER PHASE
 27 -
 29 + RIGHT PHASE
 30 -

THIS INSTRUMENT USES:
 TYPE E THERMOCOUPLES

ALWAYS CONNECT RED THERMOCOUPLE LEADS TO NEGATIVE TERMINALS.

OPTIONAL 100 OHM RTD's. USE TWO LEADS AND CONNECT TO + AND -- TERMINALS.

FAN EXERCISER CAUTION
 THIS INSTRUMENT CONTAINS A USER SELECTABLE FAN EXERCISER. FAN POWER MAY BE TURNED ON AUTOMATICALLY EVERY 7 DAYS. FOLLOW OPERATING INSTRUCTIONS TO TURN THE EXERCISER ON OR OFF.

TO PREVENT ACCIDENTAL CONTACT WITH FAN POWER VOLTAGE ON TERMINALS 1 & 3, REMOVE THE FAN FUSE ON THIS PANEL DURING ALL BENCH INSTRUMENT TESTS AND FAN MAINTENANCE.

NOTE: FAN RELAYS ARE FAIL-SAFE.
 FANS-ONE USES T1 AND T2. MAXIMUM HORSEPOWER IS
 1 HP AT 120 VAC OR
 2 HP AT 240 VAC.
 FANS-TWO USES T3 AND T4. MAXIMUM HORSEPOWER IS
 1 HP AT 120 VAC OR
 2 HP AT 240 VAC.

EACH FAN RELAY CONTACT RATING IS 30 AMPS RESISTIVE.

- CAUTION**
1. MAKE ALL EXTERNAL CONNECTIONS BEFORE APPLYING POWER TO INSTRUMENT.
 2. MAKE 120/240 VOLTAGE SELECTION ON SWITCH BELOW.
 3. APPLY POWER TO TERMINALS 11 AND 12.

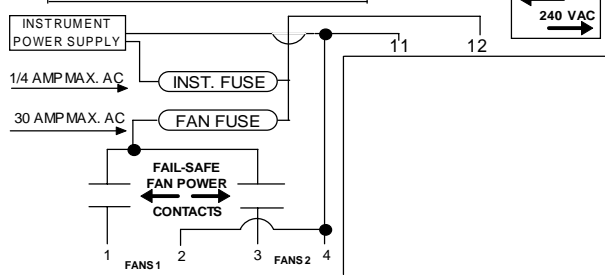
CAUTION DO NOT INCLUDE TERMINALS 23 TO 39 IN HI-POT TESTS

CONTACT CIMCO FOR INSTRUCTIONS ON ALL OPTIONAL FEATURES.

34 OPTIONAL OUTPUT FOR REMOTE COMMUNICATIONS
 35

36 OPTIONAL OUTPUT FOR REMOTE COMMUNICATIONS
 37

38 OPTIONAL OUTPUT FOR REMOTE COMMUNICATIONS
 39



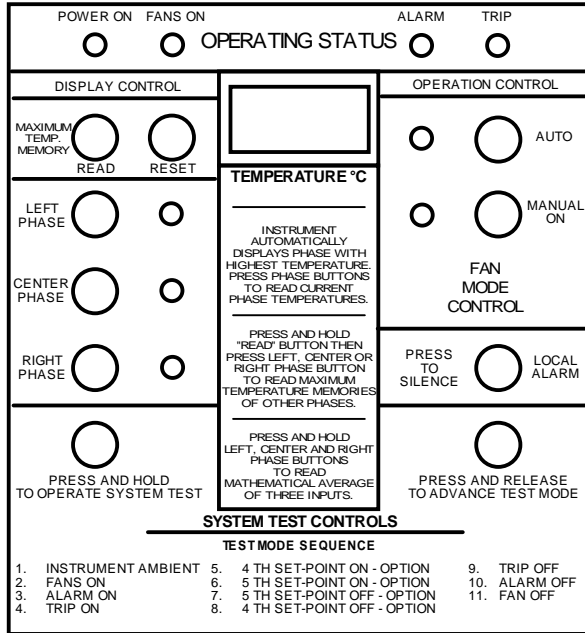
SUB 2. Area Code 5-21-98

SUB 1. T-12 & USA-NOTE: 5-5-97

CONNECTIONS
 MODEL C21
 OCT. 29, 2002
 NOT TO SCALE
 DRAWING 10-29-02-F

CIMCO ELECTRONICS, INC.
 26 MAIN ST.; P. O. BOX 248
 WEST MIDDLESEX, PA 16159
 PHONE 724-528-9559
 FAX 724-528-1108
 cimco@cimcoelectronics.com

SERIES 21



THIS DRAWING IS SHOWN WITH BLACK LINES ON WHITE FOR COPY AND FAX CONVENIENCE. ACTUAL INSTRUMENT CONTROL PANEL IS BLACK WITH WHITE LETTERS AND LINES.

**OSHA
WARNING LABEL**

REFERENCE NOTES

~~1. UL RECOGNIZED AND CROSS LISTED BY UL FOR CANADA (CSA)~~

2. OPERATING INSTRUCTIONS USE DRAWINGS
10-21-96
10-21-96-A
10-21-96-B
10-21-96-C
10-21-96-D

3. INSTALLATION AND CONNECTION INSTRUCTIONS ARE INCLUDED WITH EACH INSTRUMENT. USE DRAWING 2-26-97-A.

4. CONTACT CIMCO FOR COMPLETE LITERATURE AND DETAILED DRAWINGS.

5. FACE-PLATE IS BLACK WITH WHITE LETTERS AND LINES. THIS DRAWING IS SHOWN WITH BLACK LINES ON WHITE FOR COPY CONVENIENCE.

6. OSHA LABEL IS INCLUDED IN THE OVERLAY AND IS OSHA STANDARD RED, BLACK AND WHITE.

7. REFERENCE DRAWING 2-26-97-A FOR MAGNETIC FIELD SHIELDING INSTRUCTIONS.

PANEL SIZE = 9" X 15.25"
MOUNTING HOLES ON 8" X 14.15" CENTERS
OVERLAY IS BLACK LEXAN WITH WHITE LETTERS AND TRIP LINES.
PANEL IS STEEL; PRIMES, BLACK 0.04" THICK

SUB 1: Area Code 5-21-98

MODEL C21
FACE-PLATE
OCT. 29, 2002
SCALE 1:2
DRAWING 10-29-02-E

CIMCO ELECTRONICS, INC.
26 MAIN ST.; P. O. BOX 248
WEST MIDDLESEX, PA 16159
PHONE 724-528-9559
FAX 724-528-1108
cimco@cimcoelectronics.com