ENMET CANADA LTD.
ISA-6R/6RC
GAS MONITOR
OPERATIONS MANUAL

TABLE OF CONTENTS

1. THEORY OF OPERATION
2. DESCRIPTION
3. UNPACKING & INSPECTION
4. INSTALLATION
5. START-UP & CALIBRATION
6. GAS TEST & SETPOINT CALIBRATION
7. VISUAL ALARMS
8. ALARM CONTACTS
9. AUDIO ALARMS
10. FAULT ALARMS
11. PARTS & SUPPLIES
12. DRAWINGS

ISA-6R/6RC

THEORY OF OPERATION

1.0
The ISA-6R employs a metallic oxide semiconductor (MOS) sensing element in its detector head. In the presence of gas, an oxidation takes place resulting in a change in sensor resistance. This change is monitored by the instrument and an alarm is activated at a preset gas concentration/resistance level.

DESCRIPTION

2.0
The ISA-6R and ISA-6RC are single level gas detectors monitoring for one level of gas per sensor. The control module has an adjustable alarm setpoint and two top mounted LED's. The ISA-6R also includes a 1 amp. relay contact. Optional 10 amp. control relays and time delay relays are also available. See Sec. 9.0 for details.

Although this manual describes the set-up and calibration of a single channel system, the ISA-6R may be multiple channeled in one enclosure with remote sensors mounted up to 300 meters from the control panel. The multi-channel system uses the same sensors, control modules and calibration procedures as the single channel.

UNPACKING AND INSPECTION

3.0
Inspect all parts of the gas detector upon receipt for any damage that may have occurred during shipping and that all parts ordered were received. Contact Enmet Canada or your local Representative if there are any discrepancies or if damage is suspected.

INSTALLATION

4.0
This manual includes the necessary drawings to install and service your gas detector.
4.1
Instruments with integral sensors are factory calibrated and should be installed according to sec. 4.2. All instruments with remote sensors may have the control panel mounted in a central or convenient location with the remote sensors installed up to 300 meters away and mounted according to sec. 4.2. All remote sensors require a gas test after installation. See gas test and start-up sections. For TOXIC monitoring, see section 4.2.1. For COMBUSTIBLE monitoring, see section 4.2.2.
4.2.1
TOXIC MONITORING
Carbon Monoxide gas is a by-product of incomplete combustion. It is also slightly lighter than air in molecular weight and will disperse evenly throughout an area. Therefore the sensors should be mounted in the breathing zone; 4 to 6 feet above the floor.
4.2.2
COMBUSTIBLE MONITORING

Gases have different densities. For this reason, the sensor is installed according to the density of the gas it is primarily desired to detect.

Lighter than air - sensor mounted high
- Hydrogen
- Methane
- Natural Gas

Heavier than air - sensor mounted low
- Propane
- Gasoline
- Alcohol

4.3
An ISA-6R supplied with remote sensors must have them wired back to the control panel with a 4 strand 18 - 20 gauge shielded wire. DO NOT run with any other cables carrying more than 24 VDC. The wiring connections are colour coded for easy installation. The MAXIMUM distance between each sensor and the control panel is 300 meters.
4.4
If you have an unusual or difficult installation problem please contact Enmet Canada or your local Representative.

START-UP & CALIBRATION

5.0
In the event of a control module or sensor change, a complete re-calibration is required. Follow this procedure ONLY when necessary and after a 48 hour burn-in.

This equipment is designed to operate from 115 VAC 60 Hz. Other voltage supplies may seriously damage the circuit and will void the warranty.
5.1
After proper connection to the power supply (see subplate drawing), apply power to the instrument. All instruments with integral sensors have been factory pre-calibrated. Otherwise, the heater voltage must be set.
Measure the voltage with a digital voltmeter between the orange (+) (3) and brown (-) (4) wires at the sensor terminal block (see remote sensor drawing). Adjust Potentiometer "E" (control module drawing 92006100) so that the voltage is 5.0 VDC. The unit must now remain energized for 48 hours prior to proceeding with the gas test.
5.2
Adjust the heater voltage (see sec. 5.1) and then balance the sensor circuit by adjusting potentiometer "B" (control module drawing) so that the voltage across terminals 7 and 8 (control module drawing 92006100) is 6.0 volts or as close as possible. This adjustment must be made when the sensor is in CLEAN AIR. In contaminated areas it may be necessary to gas the sensor with clean air during this adjustment or wait until the ambient air is clean.

GAS TEST & SETPOINT CALIBRATION

6.0
To properly test the instrument, a standard calibration kit consisting of the following is required: 1 canister of calibration gas, a calibration adapter and carrying case. See spare parts list for details.

This calibration kit as well as replacement gas cylinders and parts are available from Enmet Canada or your local Representative. Please specify gas concentration when ordering replacement cylinders.

6.1

The ISA-6R should be checked for proper calibration on a regular basis. Always ensure that the gas detector has been turned on for at least 48 hours prior to the gas test and that the air in the sensor area is clean and free of contaminants. Follow these procedures closely and always allow 15 minutes clearing time between tests on the same sensor.

6.1.1

Connect the calibration adapter to the canister of calibration gas. Fill the humidifier bowl with clean water to 1/2" above the bottom of the bubbler tube.

6.1.2

Open the gas valve slowly and adjust the flow so that the flow indicator is at 1.0 SCFH. DO NOT OPEN THE VALVE FULLY or you will force water onto the sensor.

6.1.3

Firmly place the calibration cup over the sensor, allowing the gas to pass over the sensor for a period of 3 minutes. If the gas detector is out of calibration, it may alarm prior to or just after the correct time has elapsed. A few seconds either way will make little difference. If the unit does not alarm correctly, adjust potentiometer "A" (see control module drawing 92006100) until the red LED is illuminated (see sec. 6.1.4). This indicates that the alarm level has been reached. Allow 15 minutes clearing time before gassing the sensor again.

6.1.4

Due to the deadband action of the gas detector, there are approximately three full turns between tripping in and out of alarm. To turn the alarm off, turn "A" clockwise, then while applying calibration gas, turn the pot counterclockwise until the detector trips back into alarm. Adjusting for instantaneous alarm when the gas is first applied, or using excessively high flow rates will result in improper calibration and extremely high sensitivity.

VISUAL ALARMS

7.0

The ISA-6R has two LED alarm lights visible through a window in the control panel door on the control.

7.1 **GREEN**

Gas concentration is below this setpoint. Control relays are de-energized.

7.2 **RED**

Gas concentration is at or above the setpoint and the control relays are energized. This relay is non-latching and will drop out when the gas concentration drops below the setpoint.

7.3

If the green LED is out and the unit is NOT in alarm check the heater voltage (5.1) and the sensor voltage (7.1), also the sensor and sensor wiring. This indicates a wire break or sensor failure.

ALARM CONTACTS

8.0

The ISA-6R includes one 1 amp. control relay (see control module drawing). Optional 5 amp time delay relays and 10 amp control relays are available.

8.1

TIME DELAY RELAY: This optional relay may be mounted on the subplate and will delay the relay action in seconds, minutes or hours so as to eliminate momentary alarms or to lock in fans for an adjustable period of time. The time delay may be delay "ON" or delay "OFF" and is specified when ordering.

A time delay relay set for "DELAY ON" cannot be used for "DELAY OFF", nor can a "DELAY OFF" be used for "DELAY ON" without rewiring the relay. Should this be necessary please contact Enmet Canada for details.

If a time delay is supplied (see time delay drawing) it may not be set to the range and scale required. Using a small screwdriver adjust the scale to the one required. i.e.: minutes, hours, seconds and adjust the range to 0-10, 0-1 etc.

AUDIO ALARMS

9.0

Enmet Canada offers two types of audio alarms as options on the ISA-6R and ISA-6RC. They are a door mounted buzzer and a door or top mounted horn. When this optional equipment is provided an audio/off switch is included.

FAULT ALARMS

10.0

Should a sensor wire fail, the corresponding green control module light will go out. (see 8.3).

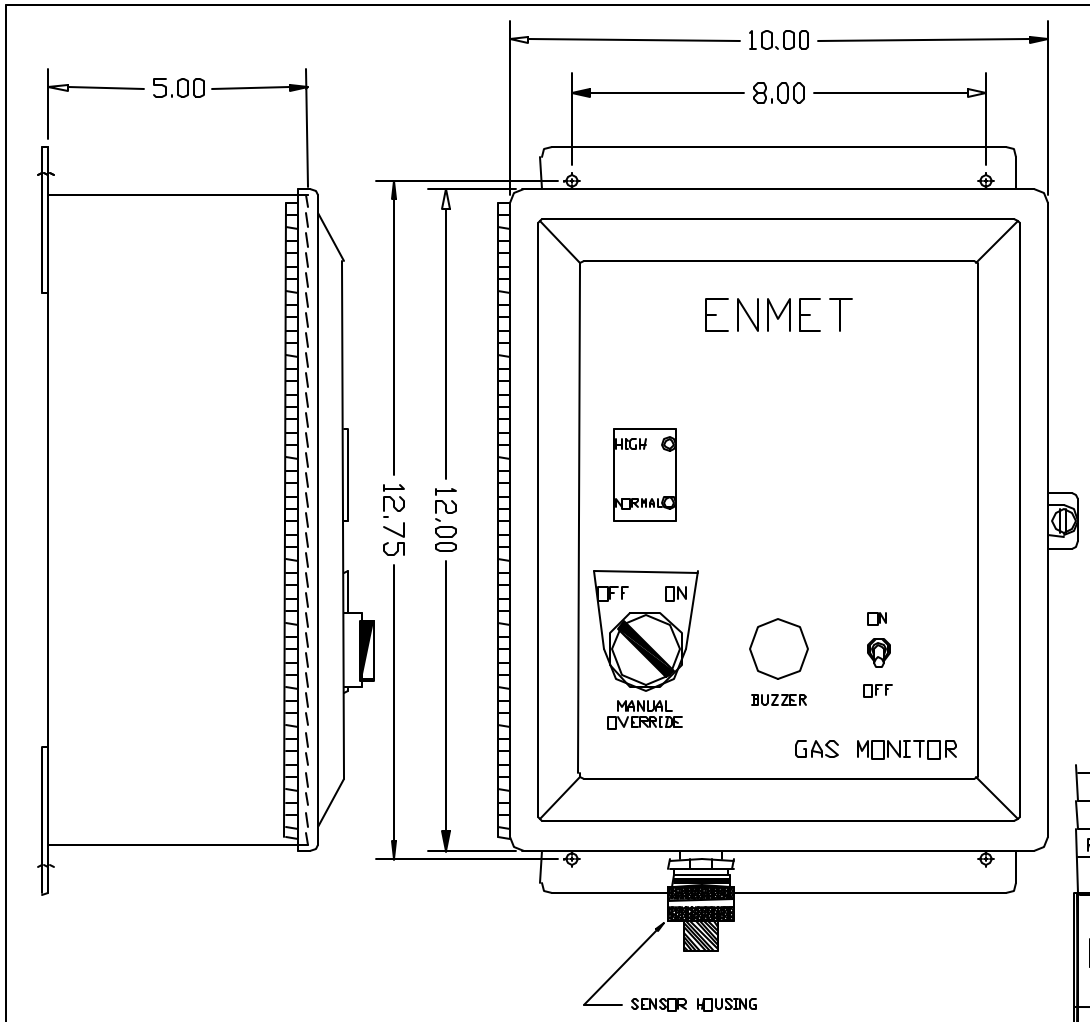
10.1

An optional fault alarm module is available. This module will monitor up to five sensors and should a wire break occur, it will activate a yellow LED and a 1 amp. relay. The sensor control module will indicate which sensor has a problem as its green LED will go out as well.

SPARE PARTS

11.0

PART	**PART NO.**
Replacement Toxic Sensor	E90035
Replacement Combustible Sensor	E90036
Replacement module	E90016
Calibration Kits (Includes cal adapter & case)	E90020



NOTE:
THE FOLLOWING ITEMS ARE OPTIONAL
1) THE MANUAL OVERRIDE
2) THE BUZZER AND ITS ON, OFF SWITCH
3) THE SENSOR CAN BE INTEGRAL OR REMOTE

ALL DIMENSIONS ARE IN INCHES
ENCLOSURE MODEL NUMBER
4500 121005
EEMAC/NEMA 12

REV	DATE	DESCRIPTION	CHK'D	APP'D

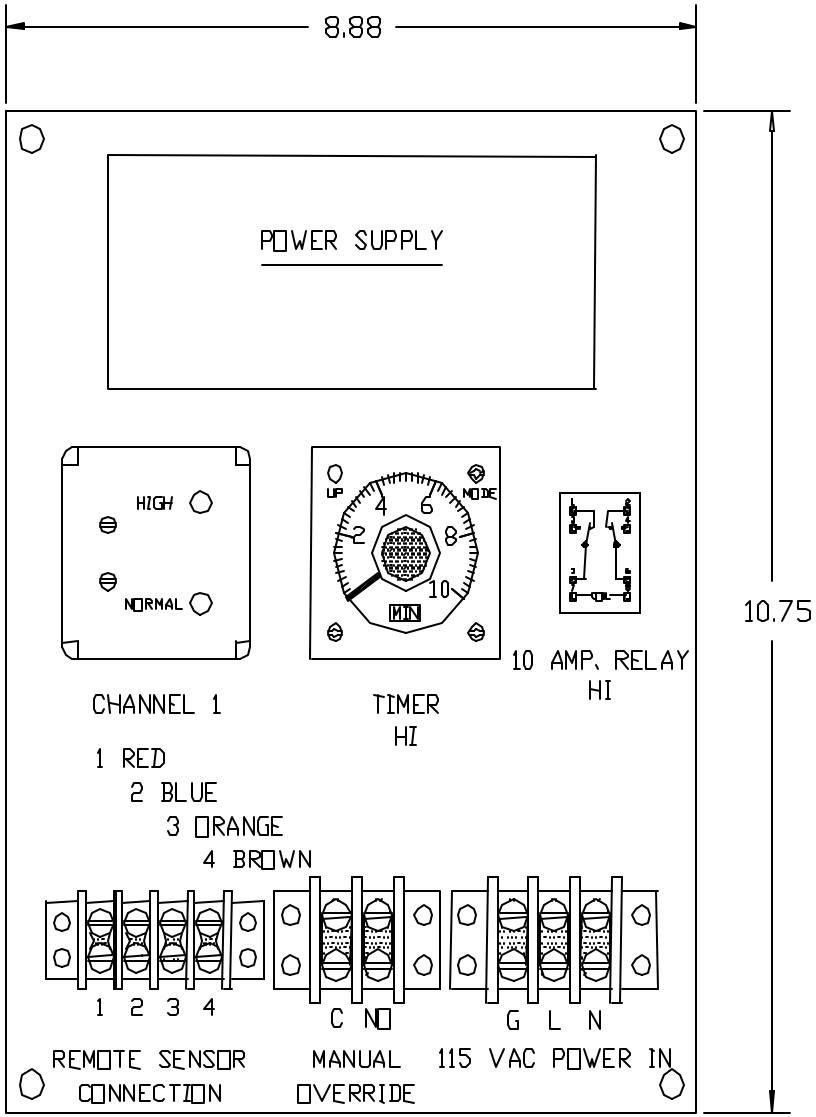
REVISIONS

ENMET CANADA LTD.

DWG. STATUS	BY	DATE D	M	Y
DRAWN	C.P.	26	11	92
CHECKED				
APPROVED				

TITLE: ENCLOSURE FOR ISA6R OR 6RC GAS DETECTION SYSTEM

SCALE	REF. DWGS.	DWG. NO.	SHT.	REV.
N.T.S.		92005900	1	0



NOTE:
THE FOLLOWING ITEMS ARE OPTIONAL
1) TIMER
2) RELAY
3) REMOTE SENSOR CONNECTION
4) OVERRIDE SWITCH CONNECTION

ALL DIMENSIONS ARE IN INCHES

REV	DATE	DESCRIPTION	CHK'D	APP'D

REVISIONS

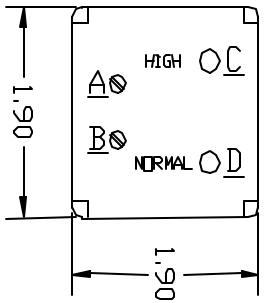
ENMET CANADA LTD.

DWG STATUS	BY	DATE D	M	Y
DRAWN	C.P.	21	10	91
CHECKED				
APPROVED				

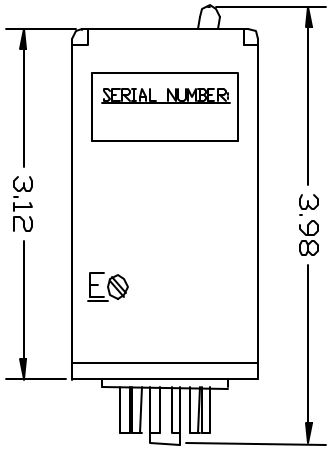
TITLE: SUBPLATE FOR ISA6R OR 6RC GAS DETECTION SYSTEM

SCALE N.T.S. | REF DWGS | DWG NO 92006000 | SHT 1 | REV. 0

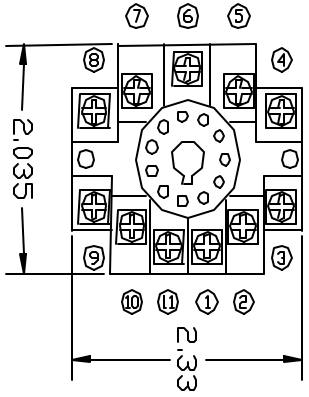
TOP



SIDE



BASE



STANDARD:

A HI ALARM ADJUST
B SENSOR VOLTAGE ADJUST
C LED HI ALARM INDICATOR (RED)
D LED "ON" INDICATOR (GREEN)
E HEATER VOLTAGE ADJUST

FACTORY WIRING:

8 +12 VDC
7 SENSOR
6 HEATER
5 GROUND
4 FAULT

CUSTOMER CONTACTS:

1 AMP. DRY CONTACTS

9 COMMON
10 NORMALLY CLOSED
11 NORMALLY OPEN

ALL DIMENSIONS ARE IN INCHES

REV	DATE	DESCRIPTION	CHK'D	APP'D

REVISIONS

ENMET CANADA LTD.

PROJECT:

DWG STATUS	BY	DATE D	M	Y
DRAWN	C.P.	27	11	92
CHECKED				
APPROVED				

TITLE: 6R OR 6RC CONTROL MODULE

SCALE: N T S

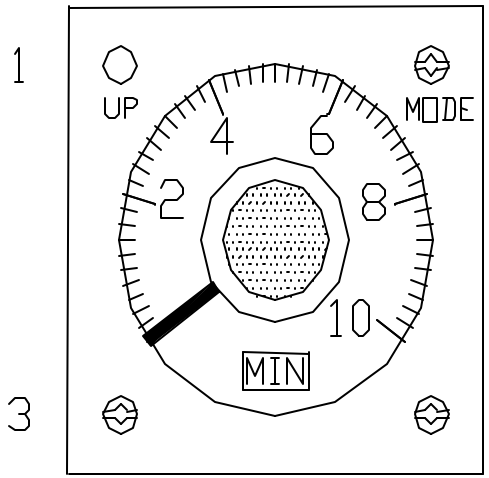
REF. NOS

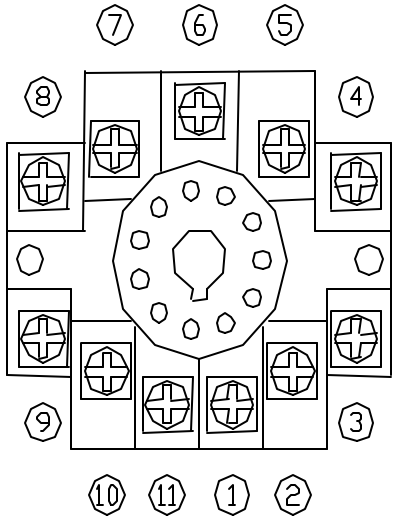
DWG. NO: 92006100

SHT: 1

REV: 0

RELAY TOP





RELAY BASE

1 "ON" LIGHT

2 MODE ADJUST
D = DELAY "OFF"
A = DELAY "ON"

3 RANGE ADJUST I>0 - 10
II>0 - 5.0
III>0 - 1.0
IV>0 - 0.5

4 SCALE ADJUST
SECONDS - MINUTES - HOURS

SOURCE - 115 VAC

WIRING CONTACTS-5 AMP 250 VAC

1 COMMON	8 N.C.
3 N.O.	9 N.O.
4 N.C.	11 COMMON

REV	DATE	DESCRIPTION	CHK'D	APP'D

REVISIONS

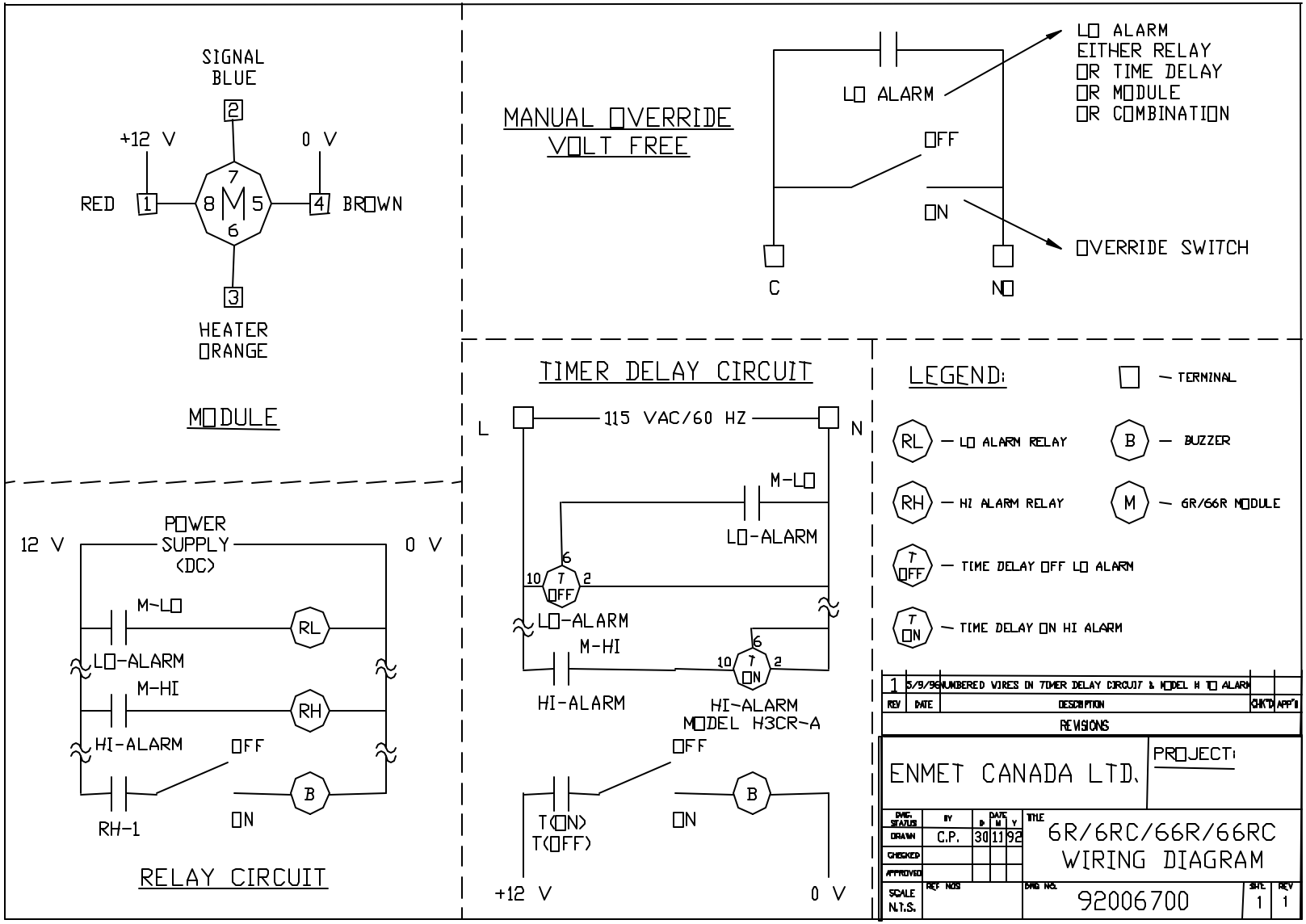
ENMET CANADA LTD.

PROJECT:

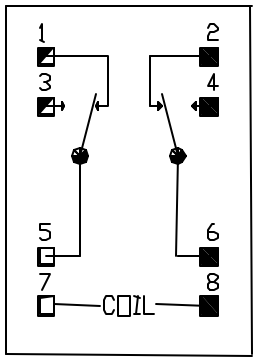
DWG STATUS	BY	DATE D	M	Y
DRAWN	C.P.	5	11	91
CHECKED				
APPROVED				

TITLE: TIME DELAY RELAY

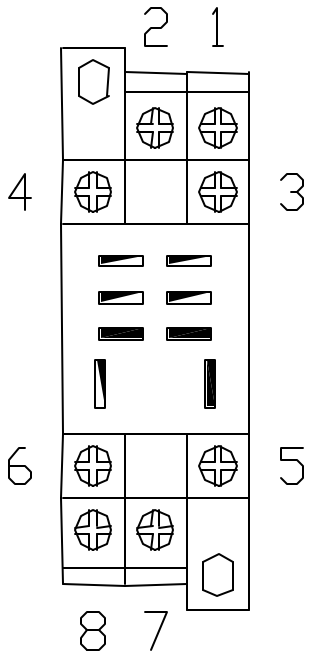
SCALE	REF. DWGS.	DWG. NO.	SHT.	REV.
N.T.S.		92000002	1	0


SIGNAL
BLUE
2
+12 V
0 V
7
RED
1
8
M
5
4
BROWN
6
3
HEATER
ORANGE
MODULE
MANUAL OVERRIDE
VOLT FREE
LO ALARM
OFF
ON
C
NO
LO ALARM
EITHER RELAY
OR TIME DELAY
OR MODULE
OR COMBINATION
OVERRIDE SWITCH
TIMER DELAY CIRCUIT
L
115 VAC/60 HZ
N
M-LO
LO-ALARM
6
10
T
OFF
2
LO-ALARM
M-HI
HI-ALARM
6
10
T
ON
2
HI-ALARM
MODEL H3CR-A
OFF
T(ON)
T(OFF)
B
ON
+12 V
0 V
POWER
SUPPLY
(DC)
12 V
0 V
M-LO
RL
LO-ALARM
M-HI
RH
HI-ALARM
OFF
B
RH-1
ON
RELAY CIRCUIT
LEGEND:
TERMINAL
RL
LO ALARM RELAY
B
BUZZER
RH
HI ALARM RELAY
M
6R/66R MODULE
T
OFF
TIME DELAY OFF LO ALARM
T
ON
TIME DELAY ON HI ALARM
1
5/9/96
NUMBERED WIRES IN TIMER DELAY CIRCUIT & MODEL H TO ALARM
REV
DATE
DESCRIPTION
CHK'D
APP'D
REVISIONS
ENMET CANADA LTD.
PROJECT:
ENG. STATUS
BY
DATE
D
M
Y
DRAWN
C.P.
30
11
92
CHECKED
APPROVED
TITLE
6R/6RC/66R/66RC
WIRING DIAGRAM
SCALE
N.T.S.
REF NOS
DWG NO.
92006700
SHT.
1
REV
1

RELAY



BASE



RELAY WIRING CONTACTS:

5 COMMON	6 COMMON
3 NO	4 NO
1 NC	2 NC

7 & 8 COIL

VOLTS	TYPE
12 VDC	LY2 12 VDC
24 VDC	LY2 24 VDC
120 VAC	LY2 120 VAC

REV	DATE	DESCRIPTION	CHK'D	APP'D

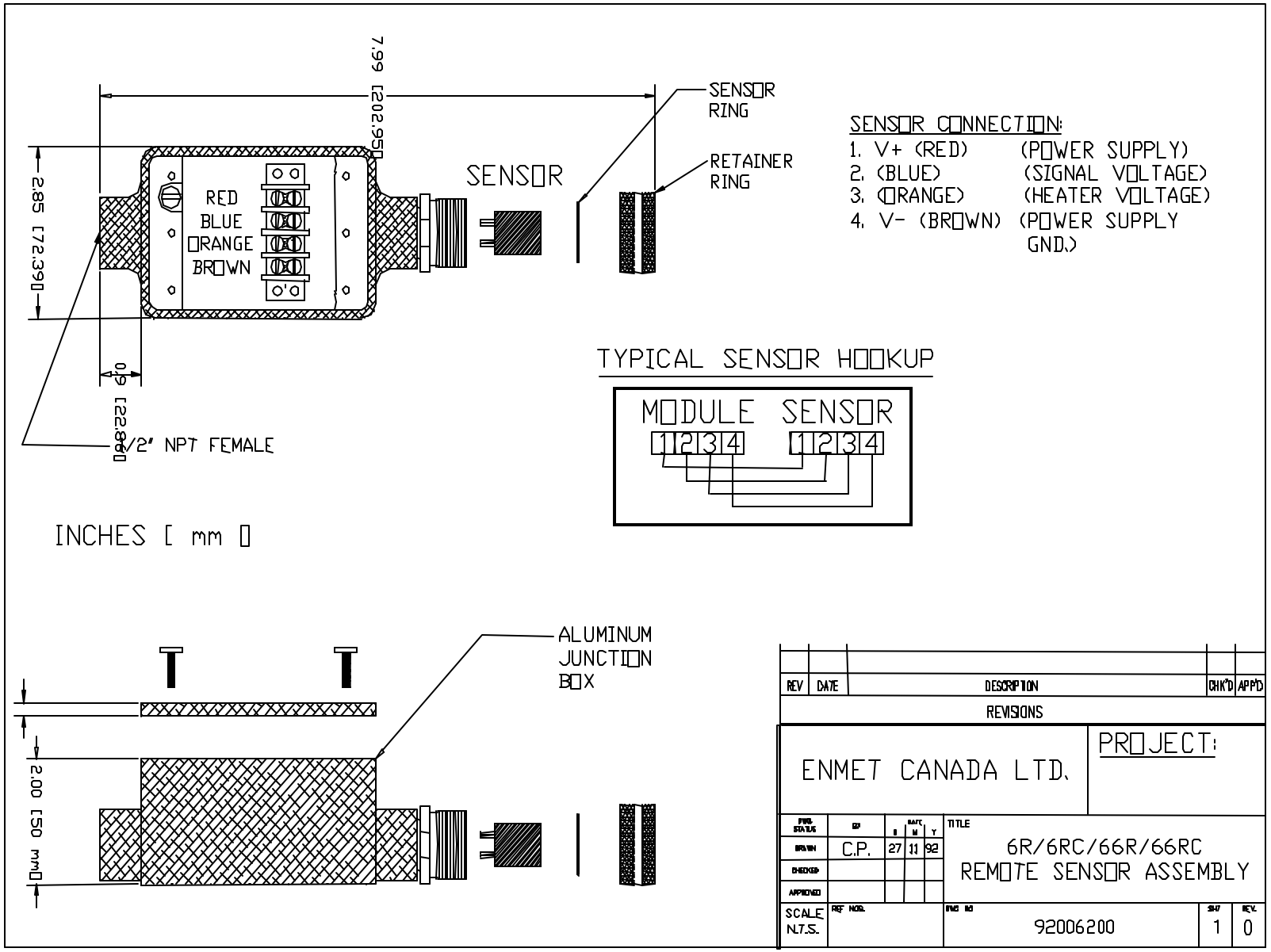
REVISIONS

ENMET CANADA LTD.

DWG STATUS	BY	DATE D	M	Y
DRAWN	C.P.	21	10	91
CHECKED				
APPROVED				

TITLE: WIRING DETAILS FOR 10 AMP. RELAY, 220 VAC

SCALE N.T.S. | REF. DWGS | DWG NO 92000803 | SHT 1 | REV 0


7.99 [202.95]
2.85 [72.39]
0.9 [22.8]
RED
BLUE
ORANGE
BROWN
SENSOR
SENSOR RING
RETAINER RING
1/2" NPT FEMALE
SENSOR CONNECTION:
1. V+ (RED) (POWER SUPPLY)
2. (BLUE) (SIGNAL VOLTAGE)
3. (ORANGE) (HEATER VOLTAGE)
4. V- (BROWN) (POWER SUPPLY GND.)
TYPICAL SENSOR HOOKUP
MODULE SENSOR
1 2 3 4
1 2 3 4
INCHES [mm]
ALUMINUM JUNCTION BOX
0.197 [5 mm]
2.00 [50 mm]
REV DATE DESCRIPTION CHK'D APP'D
REVISIONS
ENMET CANADA LTD.
PROJECT:
DWN. STATUS
BY
DATE D M Y
TITLE
BROWN
C.P.
27 11 92
6R/6RC/66R/66RC
REMOTE SENSOR ASSEMBLY
CHECKED
APPROVED
SCALE N.T.S.
REF. NOS.
DWG. NO.
92006200
SHT 1
REV. 0