

# **OPERATION MANUAL**

CMCP548 Case Expansion Transmitter  
CMCP548A Case Expansion Monitor

REV. E

## **Model Description:**

The **CMCP548** is a 4-20mA Case Expansion Transmitter. It is typically used in conjunction with an LVDT and an external readout system to indicate relative case expansion.

The **CMCP548** can be also ordered as a stand alone Monitor by adding the suffix "A" to the basic model number, IE: **CMCP548A**. When ordered in this configuration, the unit includes an alarm module that provides independent set point alarms for both ALERT (A) and DANGER (D) levels in the up-scale direction. Each set point has a corresponding adjustment potentiometer and LED indicator on the alarm module front panel, and an output relay that can be jumper configured for either latching or non-latching operation. The alarm LED will turn "ON" and the corresponding relay will actuate whenever the expansion reading exceeds the corresponding set point for more than a preset (jumper selectable) delay time. The alarm module has a front panel accessible BNC connector and associated selector switch for reading the current position (CV) or alarm set points (A or D) with a standard digital volt-meter. Both monitors and transmitters mount on standard DIN rail.

## **Power:**

The CMCP548 requires externally supplied DC power. The power supply should have a nominal output of +24Vdc and be capable of supplying a minimum of 55mA for each CMCP548 in the system, or 90mA for each CMCP548A in the system. A linear-regulated, +24Vdc power-supply dedicated to the machine monitoring system is recommended.

It is recommended that the connection between the power-supply and transmitter be made using twisted-shielded instrument cable. The cable shield should float at the transmitter, and be connected to common at the power-supply / system-common end only. The CMCP548 regulates dc power internally to prevent a fault on the output of one channel from affecting other channels. When power is first applied to the transmitter after connecting the transducer, there will be a delay of approximately 30 seconds before the "OK" LED turns "ON".

## **Transducer:**

The CMCP548 is factory configured for use with an LVDT sensor. The specific sensitivity in mV/mil is identified by a dash number immediately following the basic P.N. on the side label. Example: -8.79 indicates the transmitter expects the LVDT to have a nominal output sensitivity of 8.79 mV/mil. The output signal from the LVDT is processed to determine the measured case expansion. The transmitter output is a standard 4-20mA current proportional to this position over a specified range such as 0 to 1 inch.

## **Transducer Cable:**

It is recommended that the transmitter be mounted as close as practical to the associated LVDT. This will help to minimize interference from external noise sources. A twisted- shielded, properly installed cable from the LVDT to the transmitter is needed for reliable operation. The cable shield should be open at the LVDT, and connected to common (xocr "-" terminal) at the monitor/transmitter input only. The cable should be routed as far away from other electrical circuits as possible, and routed through metal conduit where necessary to minimize noise pickup.

## **Full Scale Range:**

The CMCP548 is factory calibrated to the full-scale range specified at the time of order.

<b>Option:</b>	<b>Range:</b>
-01	500 mils
-02	1000 mils

The factory calibrated range is listed on the side label as a dash number. If a range other than shown above is indicated, the unit has been modified or adjusted for a special range.

## **4-20 mA Output:**

The output of the transmitter is 4-20 mA current which is proportional to the zero-to-full-scale range of the unit. IE: If the range is 0 – 1 inch, then 4mA corresponds to 0, 12mA corresponds to .5 inches, and 20mA corresponds to 1.0 inch. This output will drive a maximum resistive load of 500 Ohms with respect to system common. However, the recommended load is a precision 250 Ohm resistor. This will convert the 4-20mA current to 1-5Vdc at the control/monitor system input. A continuous short to ground (common) on the 4-20 output will not damage the output.

## **Buffered Output:**

The Buffered Out terminal and BNC connector on the front of the unit provide a 0 to 5Vdc output proportional to the zero to full-scale range.

## **Calibration / Setup:**

The CMCP548 is factory configured for the full-scale range indicated on the side label.

## **ALARM MODULE:**

### **Alert and Danger Alarm Set-Point Adjustment:**

The Alert and Danger alarm set-points can be independently set in the field by turning the front panel selector switch to the associated position (A or D) and adjusting the associated front-panel potentiometer until the correct DC voltage is measured at the BNC connector located directly above the selector switch. Adjusting the set-point requires the use of a digital volt-meter, knowledge of the full scale range of the monitor, and the desired set-point as a percentage of the full scale range. The voltage measured at the BNC will vary between 0 Vdc and 5 Vdc, corresponding to 0 to Full-scale. IE: 2.5 Vdc represents 50% of full scale, 3.75 Vdc represents 75% of full scale. To calculate the set-point voltage, use the equation,  $5(.xx)$  where .xx is the desired percentage expressed as a decimal fraction of the full scale range. IE.  $5(.60) = 3.00$  Vdc for a set-point of 60% of the full scale range. Turning the potentiometer clockwise increases the set point voltage.

### **Alert and Danger Alarm Delay Adjustment:**

The Alert and Danger alarm delays can be independently set by internal jumper selection to .1, 1, 3, 6, or 10 seconds. The purpose of the delay is to reduce nuisance alarms caused by external electrical noise and/or transient vibration events. Both the Alert and Danger delay are factory set to the 3 second position.. To change the delay, open the unit and move the delay jumpers to the proper position (See: CMCP500 SERIES ALARM MODULE JUMPER LOCATIONS, at the back of this manual).

### **Latching/Non-Latching Alarms:**

The Alert and Danger alarms are factory set for NON-LATCHING operation. This means that whenever the vibration level drops below the associated set-point for more than about 1 second, the associated relay will de-energize and the alarm LED will turn off. The alarms can also be set for LATCHING operation by installing shunts on jumpers E11 and E12 respectively on the Alarm module circuit board (See: CMCP500 SERIES ALARM MODULE JUMPER LOCATIONS, at the back of this manual). Latched alarms may be reset by closing the RESET (RST) and COMMON (COM) contacts at the top of the unit. This may be done with an external switch, dry contact relay, or by shorting the terminals together by hand. **DO NOT APPLY VOLTAGE TO EITHER THE ARST@ or "COM" TERMINALS.** If several monitors are mounted together, the "RST" terminals may be daisy-chained together and switched to "COM" (system common) as a group.

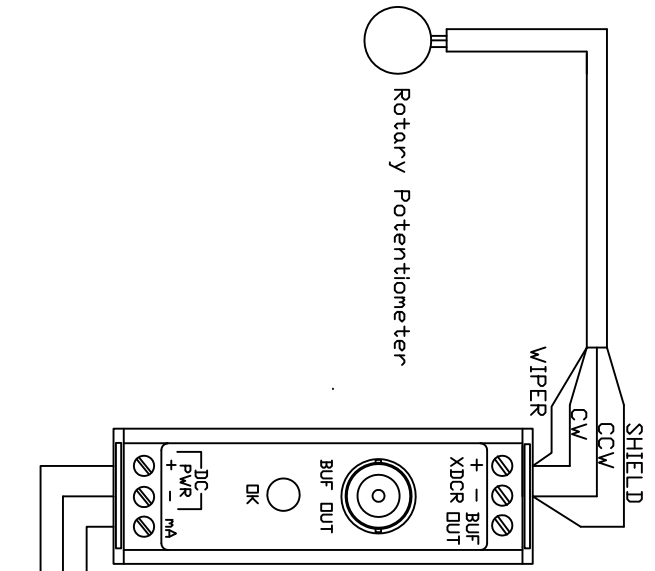
## Alarm Relays:

The Alert Danger and OK relays are independent, single-pole-double throw relays. NO, ARM, and NC contacts are available via plug-able screw-connector at the bottom of the monitor. Ok relay contacts are available on fixed screw terminals at the bottom front of the alarm module (See drawing: CMCP500 Series Relays And External Connections). Relay contacts are rated 5 Amps at 30 Vdc or 125 Vac, resistive load. This rating includes any inrush current that the load draws. For loads that are not purely resistive the contact switching capability will need to be considered carefully in terms of this inrush current. The entire subject of relay application is too large to address here, so the user is cautioned to use care in the application of the relays. The factory intended purpose of providing relay contacts is to operate relatively low power alarm enunciators, act as a dry or low dc voltage contact closure input to other systems, or act to actuate an appropriately sized slave relay for larger loads.

## Opening the Case:

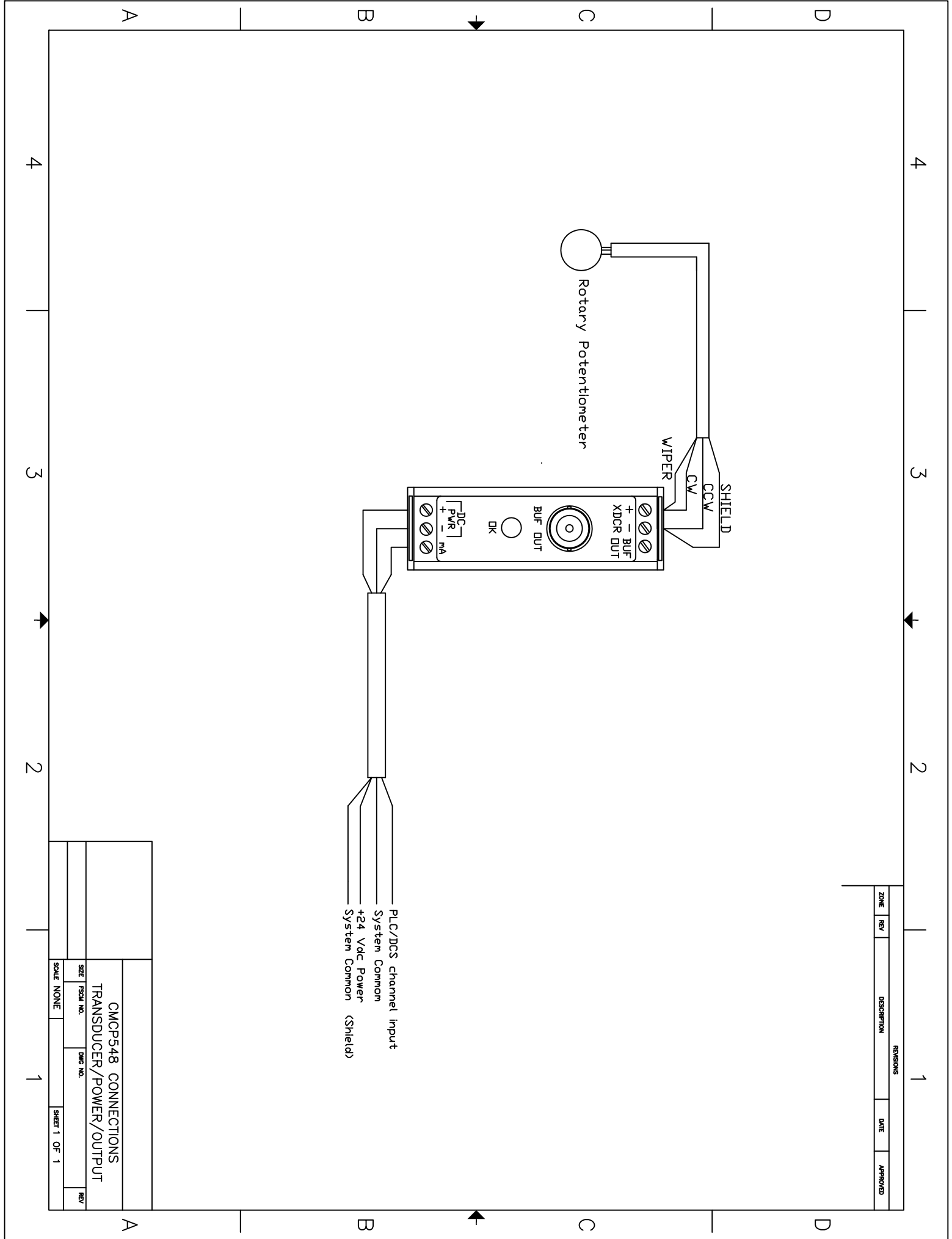
Opening the case is best done with a small flat-blade screwdriver. On transmitters (1" wide units) insert the tip of the screwdriver between the right-side cover (as viewed from the front of the unit) and the DIN rail mounting foot at the back of the unit and gently leverage the blade to begin separating the cover from the rest of the unit. Carefully work your way around to the front of the unit to complete removal of the cover, exposing the circuit board components. On Monitors (1.6" wide units), you must first CAREFULLY separate the two halves of the unit at the center. The sides do not need to be removed. This is done by working the screwdriver around the middle of the unit in the same general manner described above. As the two halves start to become separated, you will see that they are still attached by a short ribbon cable inside. This cable can be carefully removed by pulling it away from the left hand side of the unit. The cable stays with the right hand side permanently. **CAUTION:** When re-installing this cable, make sure it is properly connected to the mating connector, and that the bend in the cable goes towards the front panel side of the unit. **IF THE UNIT IS CLOSED WITH THE BEND TOWARDS THE BACK, THE RIBBON CABLE CAN BE DAMAGED.**

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED



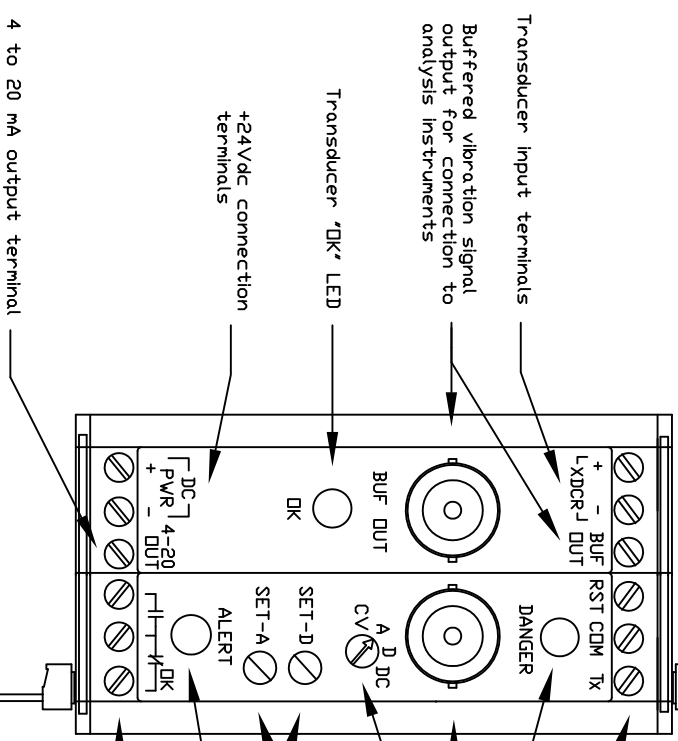
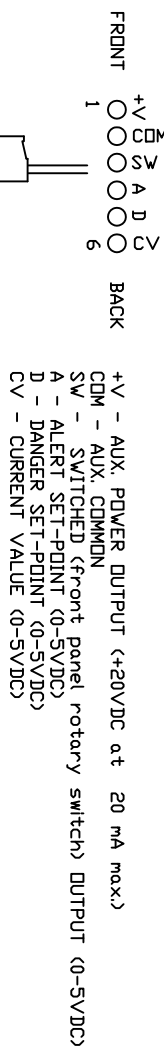
PLC/DCS channel Input  
 System Common  
 +24 Vdc Power  
 System Common (Shield)

CMCP548 CONNECTIONS			
TRANSDUCER/POWER/OUTPUT			
SIZE	FSM NO.	DWG NO.	REV
SCALE NONE			SHEET 1 OF 1

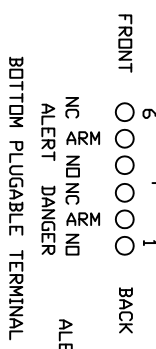


REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

TOP PLUGGABLE TERMINAL (for external meter connections)

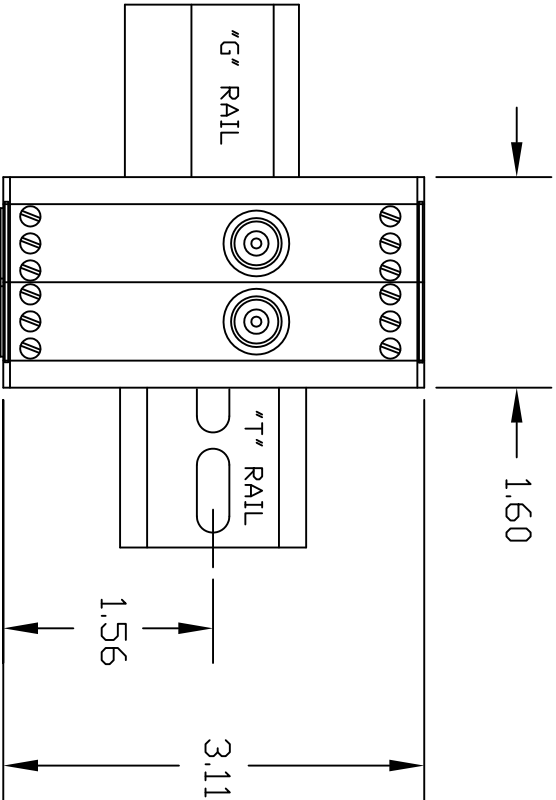
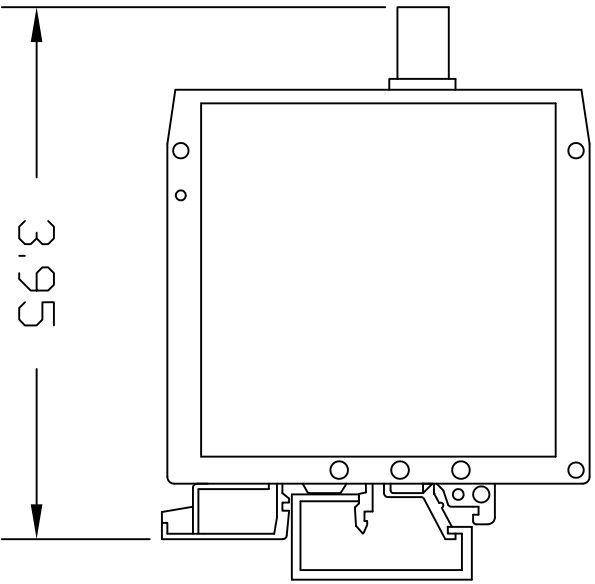


- Alarm reset ('RST'), and trip multiply ('Tx') terminals. External contact closure to the adjacent 'CDM' terminal, or to instrument common activates
- 'DANGER' LED - Turns on when Danger setpoint is exceeded
- BNC connector - Read switch selected values, using digital volt meter
- Rotary switch - selects output to BNC connector above
- Potentiometers for adjusting 'ALERT' and 'DANGER' setpoints. (Based on 0 to 5Vdc proportional to zero to full scale range of unit)
- 'ALERT' LED - Turns on when Danger setpoint is exceeded
- 'DK RELAY' - Normally energized. Contacts shown in 'DK' condition.



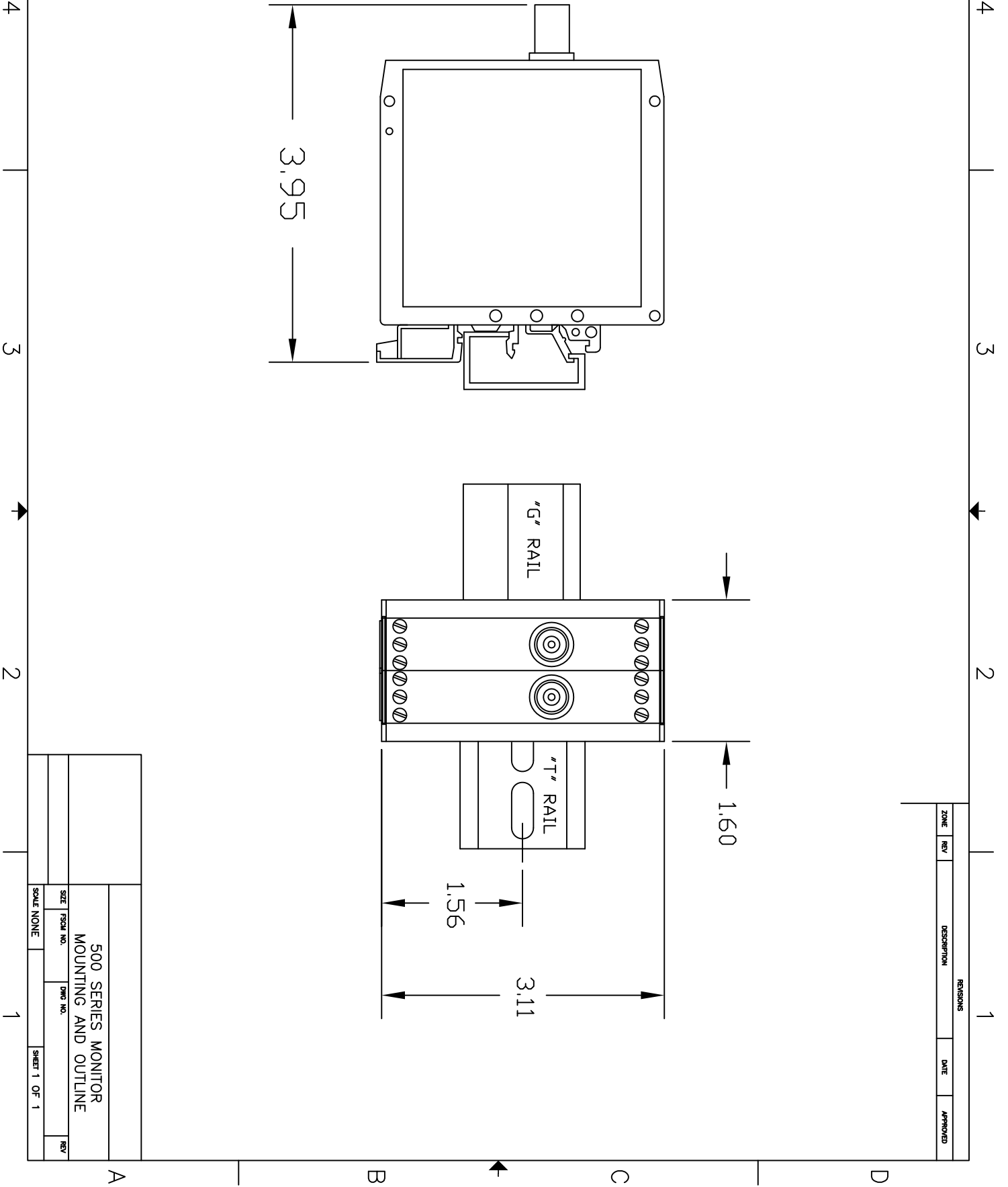
500 SERIES CONNECTIONS

SIZE	FSQD NO.	DWG NO.	REV
SCALE	NONE	SHEET 1 OF 1	



500 SERIES MONITOR MOUNTING AND OUTLINE		SIZE	FSOIA NO.	DWG NO.	REV
SCALE NONE		SHEET 1 OF 1			

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED





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ZONE	REV	DESCRIPTION	DATE	APPROVED

ALERT DELAY:

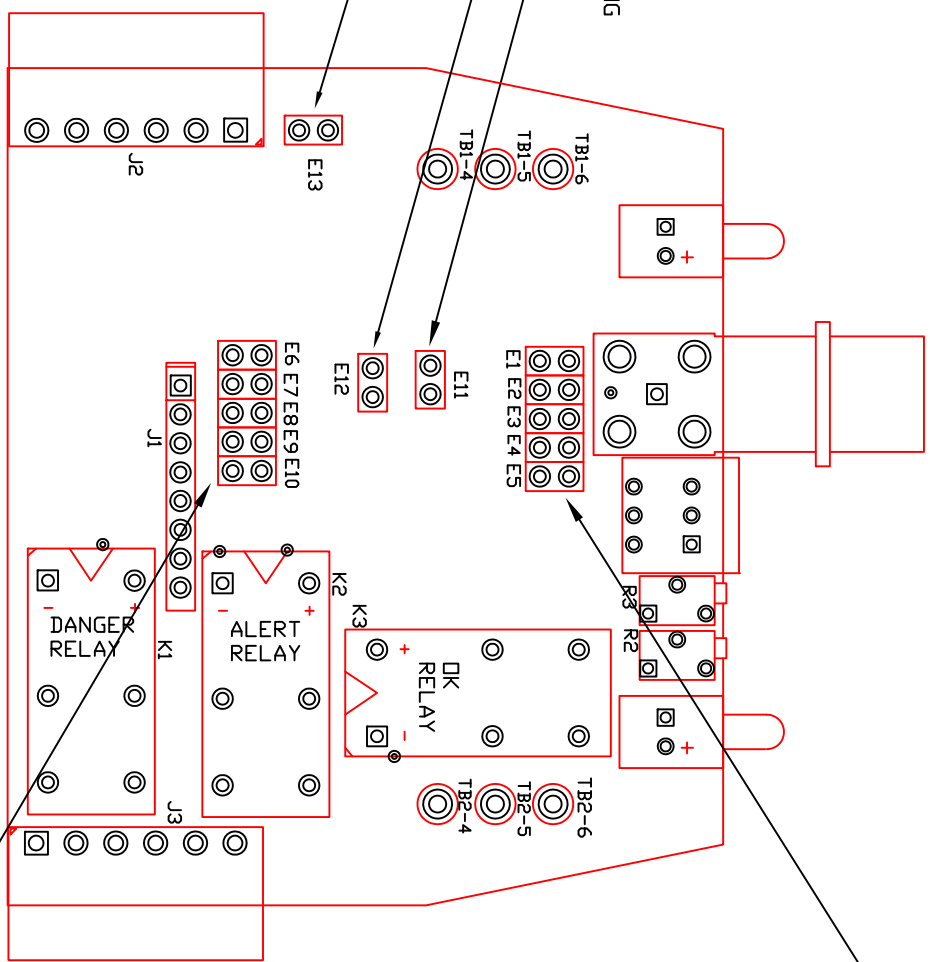
- E1 - 1 SEC
- E2 - 1 SEC
- E3 - 3 SEC
- E4 - 6 SEC
- E5 - 10 SEC

JUMPER INSTALLED - LATCHING  
 JUMPER REMOVED - NON-LATCHING

ALERT LATCH

DANGER LATCH

TRIP MULTIPLY  
 OPEN - 2X  
 JUMP - 3X



DANGER DELAY:

- E6 - 1 SEC
- E7 - 1 SEC
- E8 - 3 SEC
- E9 - 6 SEC
- E10 - 10 SEC

500 SERIES ALARM MODULE  
 JUMPER LOCATIONS

SIZE	FSICAL NO.	DRWG NO.	REV
C			
SCALE	NONE	SHEET	1 OF 1

A

B

C

D

4

3

2

1

A

B

C

D

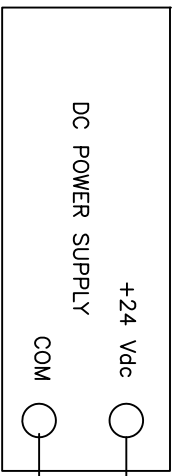
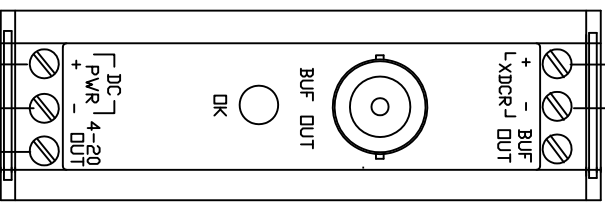
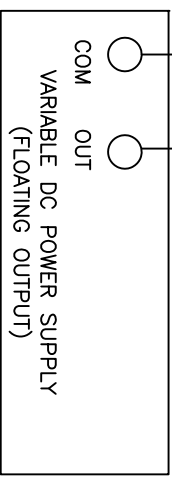
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3

2

1

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED



A

B

C

D

4

3

2

1

CMCP548 TEST/CALIBRATION			
SIZE	FORM NO.	DWG NO.	REV
SCALE NONE	SHEET 1 OF 1		

A

B

C

D