



# TEMPERATURE MONITORING & ALARM SYSTEMS

**M**ARINE ELECTRIC SYSTEMS Temperature Monitoring and Alarm System was designed to monitor the performance of diesel engines on naval ships and vessels. The system consists of measuring the temperatures with thermocouple type temperature sensors directly embedded into each cylinder of a diesel engine.

The optimum temperature of a cylinder in normal operation is around 750 Degree F. The system must constantly monitor this temperature and record its operation. Any deviation of the cylinder temperature is an indication of malfunction. Temperature increase can be caused by improper cooling or high friction due to insufficient oil intake. Temperature drop can indicate loss of control, ignition or fuel delivery problem. So either case must be monitored, reported and alarmed immediately.

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## PERFORMANCE SPECIFICATION:

1. Measurement type: Temperature measurement of embedded cylinders using standard "J" or "K" type thermocouples
2. Measurement range: 0-1200 Degree Fahrenheit  
optionally converted to Celsius Scale
3. Measurement accuracy: 1% over the entire scale for the measuring apparatus;  
3% accuracy for the system, including the sensor
4. Number of channels: 12 channels proposed (expandable to 36)
5. Measurement frequency: At least one reading per second on each channel

## DISPLAYS AND INDICATORS:

6. Temperature indicator: 3 digit red LED type 7 segment display  
For each channel
7. Alarm indicator: T1 type red LED for high alarm  
T1 type orange LED for low alarm  
LEDs blink until alarm condition clears
8. Engineering unit indicator: T1 type LED to show "F" or "C" scale
9. Remote: LED indication for remote control



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## CONTROLS:

10. Alarm setting pushbuttons
11. Channel selector buttons
12. Simulate mode buttons
13. Data dump button

## DATA STORAGE AND PROCESSING:

14. Temperature data is stored in internal memory in digital form for each channel
15. Data is time/date stamped
16. Data is stored in FIFO type memory
17. Data is sampled and stored once a minute for 24 hours  
[Sample rate/resolution adjustable – (factory set)]

## ENCLOSURE REQUIREMENTS:

18. NEMA-4 type water and dust proof enclosure
19. Approx. size is 16" high, 12.5" wide standard military enclosure
20. Front panel controls and indicators
21. Rear panel cable access for power, sensors and input-output controls
22. Grade A requirement for shock and vibration for first article testing

## OUTPUTS:

- |                                 |                                                                    |
|---------------------------------|--------------------------------------------------------------------|
| 23. Remote signal output        | Isolated 4-20 mA (per channel)<br>Host supplied excitation voltage |
| 24. Summary on-off Alarm output | 0-10VDC (to optional remote Bell)                                  |
| 25. Strip chart recorder output | 0-1 mA DC (per channel)                                            |
| 26. Dry Contacts                | 2 DPDT 1A relays (per channel)                                     |
| 27. Communication Port          | RS-232 or RS-485 (optional)                                        |

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## SPECIFICATIONS: "DIGITAL PYROMETER" FOR USE WITH "J" AND "K" TYPE THERMOCOUPLES

1. Power Requirement	115 VAC/50-60 Hz/1Ø
2. Enclosure Dimensions	per MIL spec. drawing
3. Enclosure Type	Water/dust proof
4. First Article Requirements	Grade "A" shock, VIB. & EMI
5. Number of Channels	12 per panel
6. Display (digital)	3-1/2 digit per channel
7. Linearized Display Range	0-1200 degree F
8. Alarm level settings	2 user adjustable (low and high)
9. Alarm level LED indicators	2 – Amber (low), Red (high)
10. User "simulate control"	adjustable over full range
11. FIFO data logging	24 hours per channel (optional)
12. Outputs:	
12.1.	Remote signal output Isolated 4-20 mA (per channel)
12.2.	Summary on-off Alarm output 0-10VDC (to optional remote Bell)
12.3.	Strip chart recorder output 0-1 mA DC (per channel)
12.4.	2 DPDT relay contacts (per channel)
12.5.	Communication Port RS-232 or RS-485 (optional)



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