

# APPLICATION SOLUTION IAMS # 01

## TRAIN COOLING PROTECTION APPLICATION

Water inside the cooling system of a locomotive can freeze causing expensive damage to the train. Anti-freeze chemicals cannot be used. So mechanical devices were added to the engines which dump the water when the outside temperature reaches a certain level. But when false dumps occur, it takes 4 hours to refill, after a tanker car arrives. They need something that better monitors what is really happening with the water temperature.

## PRODUCTS USED: TMPT001, IAMS0010, PGMMOD00

The following Red Lion Controls models can do the job: TMPT001 Surface Mount RTD Sensor, IAMS0010 Intelligent Universal Signal Conditioning Module, PGMMOD00 Display / Programming Module for IAMS0010.

## HOW IT WORKS

The surface mount RTD Sensor can be placed on the cooling system. The IAMS is programmed with a setpoint value that if it gets to a programmed value (example 25 F), the internal relay closes sending a signal to drain the system just before the water freezes. A hysteresis value would automatically open the drain relay at a desired temperature (example 25) from the setpoint value. A delay on time could be programmed to prevent short drops in temperature from falsely activating the drain.

With the ability of the engineer to change the drain setpoint value higher than 25 and the hysteresis value staying at a fixed value (example 15) in the program, it will not be possible for the drain circuit to always automatically open again at the same temperature (example 40). To resolve this, the second relay / setpoint can be used. The drain circuit is wired in series through both output relays. The second setpoint is set to the desired automatic open temperature (example 40 F). Both setpoint conditions have to be met for the drain circuit to engage (example: below 40 and below 25 or “entered value”) but only one (example: SP2: 40 + 0.1 hysteresis or example SP1: “entered value” + 15 hysteresis) has to be met for the drain circuit to open. Setpoint 2 could also serve as a warning alarm or signal when it is safe to begin a start-up sequence again.

## DESIGN ADVANTAGES

The IAMS is a small package product that can easily fit in the cab of the engine. It has a wide range of AC or DC power requirements. The setpoint can be easily changed or be locked out from the operators. The program can be locked with a password. Also a tag description can be programmed on the display.

## ADDITIONAL CAPABILITIES

With the Display / Programming Module, the program can be stored in the removable module for backup or be used to download to additional conditioners. This module can also be used for better monitoring the cooling system temperature.

## PROGRAMMING

1.INP : SETUP  
TEMP : IN TYPE  
SENSOR : PT  
TYPE: PT100  
3W : CONN  
UNIT : F

6.SPT : SETUP  
R1.FUNC : SETP  
N.O. : R1.CONT  
25.0 : R1.SETP  
DECR : ACT.DIR  
15.0 : R1.HYST  
NONE : ERR.ACT  
0 : ON.DEL (Time on delay)  
0 : OFF.DEL

R2.FUNC : SETP  
N.O. : R2.CONT  
40.0 : R2.SETP  
DECR : ACT.DIR  
0.1 R2.HYST  
NONE : ERR.ACT  
0 : ON.DEL  
0 : OFF.DEL

NO : SETUP (Exit and save before going to 9.ADV)

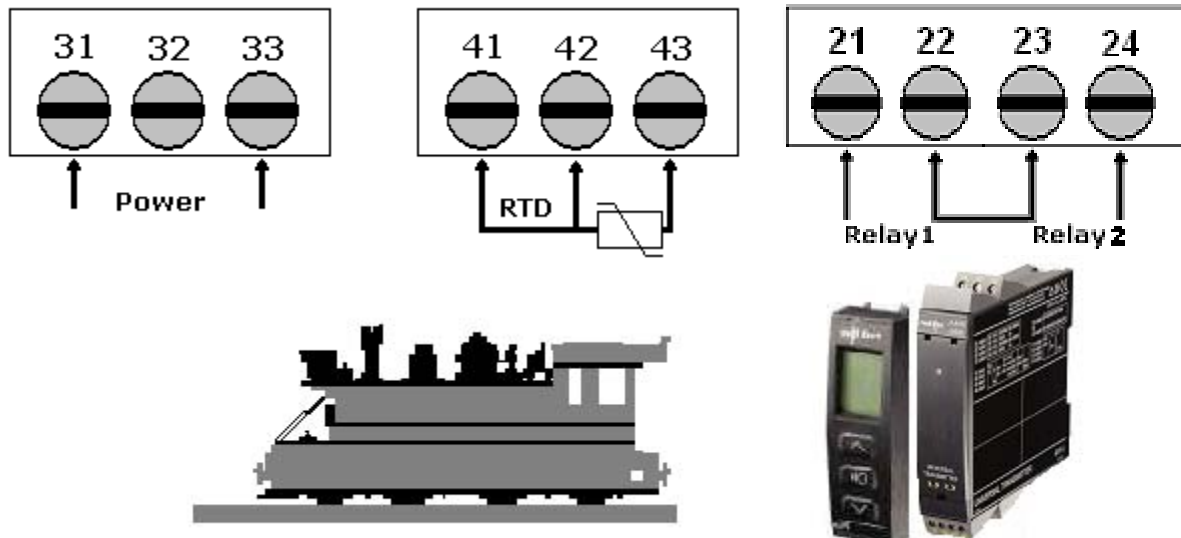
9.ADV : SETUP  
PASS : ADV.SET  
YES : EN.PASS (To lock out programming)  
0001 : NEW.PAS  
YES : EN.FAST (Enable setpoint changes.)  
MEM : ADV.SET  
SAVE : MEMORY (From IAMS to display module.)

Enter the program from a preprogrammed display module:

9.ADV : SETUP  
MEM : ADV.SET  
LOAD : MEMORY (From display module to IAMS)

## WIRING DIAGRAM

All wiring must be according to the installation guidelines listed in the product's specifications. For the setpoint outputs to function an external isolated voltage source (not shown below) must be connected in series.



This application note is intended to be an example. Your specific application may require changes in products, programming and/or wiring.