



# 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. Running the engines all the time is a large waste of fuel. So mechanical devices were added to the engines which dump the water when the water temperature reaches a certain level. But when 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.

## PRODUCTS USED: TMPRT001, 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 goes below (example 15 F), the internal relay closes sending a signal to auto turn on the engine circuit before the water freezes. The engine would then automatically turn off at a desired value above the setpoint temperature by programming in a hysteresis value. In this case, only relay 1 terminals are used.

With the ability of the engineer to change the setpoint value higher than 15\*, it would not be possible for the shut off engine to occur at the same safe temperature. To resolve this, the IAMS second relay / setpoint can be used. The start/stop engine circuit is wired in series through both output IAMS terminals. The second setpoint is then set to a guaranteed shut off engine temperature (example 20 F). Both setpoint conditions have to be met to start the engine (example: below SP2: 20 and below SP1: 15\*) but only one (example: SP2: 20 or SP1: 15\* + 5 hysteresis) has to be met for the engine to shut off again. (\*Value adjustable by the operator.)

## 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  
15.0 : R1.SETP  
DECR : ACT.DIR  
5.0 : R1.HYST  
NONE : ERR.ACT  
0 : ON.DEL (Time on delay)  
0 : OFF.DEL

R2.FUNC : SETP  
N.O. : R2.CONT  
20.0 : 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)

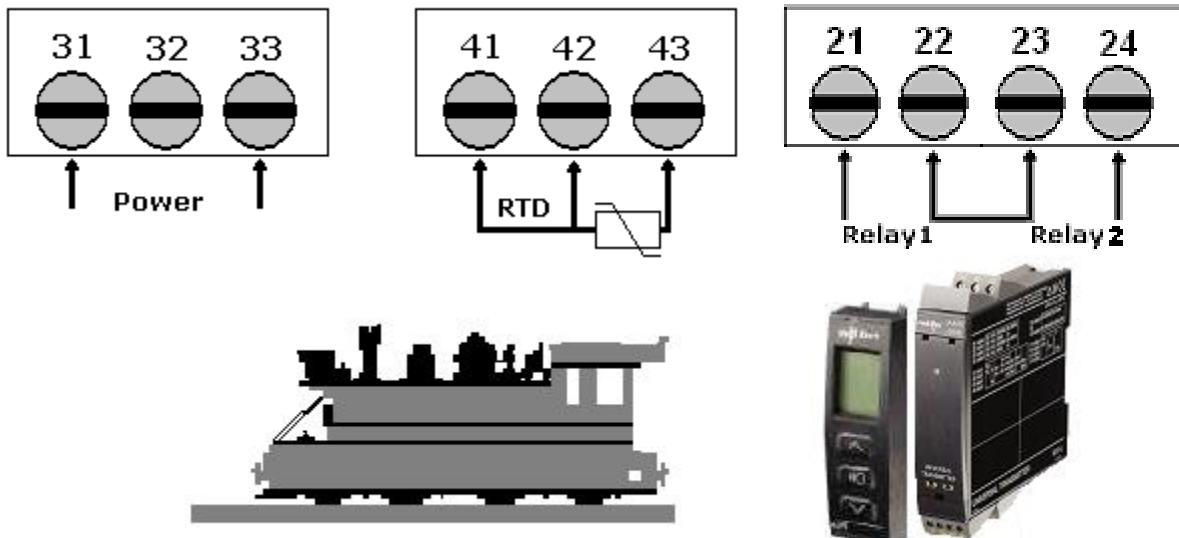
9.ADV : SETUP  
PASS : ADV.SET (To lock out programming)  
YES : EN.PASS  
0001 : NEW.PAS  
YES : EN.FAST (Enable setpoint changes.)  
MEM : ADV.SET  
SAVE : MEMORY (From IAMS to display module.)

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. For specific assistance, you may contact your local Red Lion products supplier or Red Lion Controls Technical Support at 717-767-6511.