



# Sensor Interface

## Smart Sensor

*Author: Ravi Pailoor  
Chip Technologies  
Bangalore Karnataka, India  
Email: pailoor@hotmail.com*

### OVERVIEW

This is used to monitor the voltage, current and the bearing temperature of a motor. In the event of any deviation from the limits, the relay switches the motor off if programmed to do so. Any number of such **SMART SENSORS** can be used to monitor motors in remote areas.

### APPLICATION OPERATION

#### Hardware

PIC12C67X

- The chip configuration is Internal RC oscillator and Internal reset.
- The MCLR is used for clocking the data in and out.
- The CKIN line is for bidirectional data transfer.
- GP4 is used for relay control.
- GP0, GP1 and GP2 are used as analog input.
- The +5 V power supply is generated using a zener.
- The clock input and bidirectional data lines are pulled up.
- The method of data transfer is clocked serial.
- The relay output is connected to a transistor for relay driving.
- The AN0 input is connected to the current sensor.
- The AN1 input is connected to the voltage sensor.
- The AN2 is connected to a thermistor.

#### Software

On power up, the chip will switch the relay off. It will then wait for initialization and limit inputs from the master controller. On receiving clocked serial data, it will switch on the relay and wait for the programmed delay before monitoring the sensors and any deviation from the set limits will result in relay tripping if it were programmed to do so. The delay is required to let the motors starting current to come back to normal limits.

The master controller keeps polling these smart sensors for the current values of the 3 sensors for data logging purpose. For this operation the CKIN line is used as output. The tripping operation is done locally to remove the burden from the master controller.

The programmable parameters from master controller to SMART SENSOR are

1. Voltage trip limit and delay time before tripping
2. Current trip limit and delay time before tripping
3. Bearing temperature and delay time before tripping
4. Auto trip relay for – Voltage – YES / NO  
– Current – YES / NO  
– Temperature – YES / NO
5. Switch on delay in seconds.

Microchip Tools Used

#### HARDWARE

ICEPIC with PIC16C71 POD - interface module developed in-house for PIC12C671.

#### Assembler/Compiler version:

MPLAB 3.22 and MPASM 1.5

Microchip Technology Incorporated, has been granted a nonexclusive, worldwide license to reproduce, publish and distribute all submitted materials, in either original or edited form. The author has affirmed that this work is an original, unpublished work and that he/she owns all rights to such work. All property rights, such as patents, copyrights and trademarks remain with author.

# Sensor Interface





