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An Investigation of PWM Controlled Calibrated Three Phase Induction Motor Drive

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Abstract: A sensor is a system that produces an output by detecting changes in quantities or measurements. Sensors, in general, generate an electrical or optical output signal in response to changes in the inputs. Analog and digital sensors are two types of sensors that are basically secret. However, only a few types of sensors, such as temperature sensors, infrared sensors, pressure sensors, proximity sensors, and touch sensors, are commonly used in virtually all electronic applications. A multimeter can be used to measure resistance before adding power to the sensing district. Light, radiation, pressure, flow rate, and acceleration are all factors to consider.In this respect, sensors frequently form the hub constituent in their products and solutions and have a key control on the worth, economic good organization and shelter of the application by jealous key practice parameters.

Keywords: *Touch sensor, Temperature sensor, PIR sensor, Pressure sensor.*

1. Introduction

Via green-house gases (GHGs) and the procurement Sensors are rapidly overtaking computers and communication devices as the most important and fastest-growing markets. Sensors can be used in smart phones, cars, security systems, and even popular household items such as coffee makers! These are also used in the internet of things, medical, nuclear, defence, aviation, robotics and artificial intelligence, agriculture, environmental monitoring, and deep-sea applications, in addition to consumer electronics.

A sensor is a system that senses and reacts to a variety of inputs from the real world. Light, fire, motion, moisture, friction, or any of a huge number of other environmental phenomena may be the unambiguous input. The output is usually a signal that is either re-dispensed to a human-readable monitor at the sensor site or sent electronically over a network for reading or auxiliary dispensation. Motion sensors are used in a variety of systems, including home security lights, automatic doors, and bathroom fixtures, to transmit various types of energy, such as microwaves, ultrasonic waves, or light beams, and detect when the flow of energy is disrupted by something inflowing its path.

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Fig. 1 Sensor Technology

Sensors collect data on vibration, temperature, strain, and voltage, among other things, and make it available for real-time analysis. They can also contribute to the detection of defective parts in goods weeks before they fail. When sensors were first developed, they were intended for big, steep industrial platforms like electrical group systems and jet engines. Sensors linked to analytical platforms can be built into virtually every product in no time. This is because there is a growing expectation that technology can improve the reliability of machinery and systems.Sensors and analytics will alert users and trader to problems sooner than they become visible, which will abolish many continuation checks so companies can save moment and wealth.

Sensors will also help companies to understand how consumers use their goods, which will assist in the production of new products. Sensor data analytics enables businesses to examine trends in raw sensor data and how they relate to daily actions and events. Raw tremor data from an accelerometer is often used as a starting point, as accelerometers have advanced power-saving algorithms that make them suitable for ultra-low power applications. Many sensor manufacturers are concentrating their efforts on developing new sensor technology. Free scale has presently now stubborn on sensor fusion, which is a string by which data from many different sensors are “multipart” to compute a little more than could be determined by any one sensor alone.

This makes it possible to enhance the efficiency of the application or device. According to Steve Whalley, Chief Strategy Officer at MIG, "it's all about putting the relevant data together from different sensors to provide a bigger picture of what's going on in a system." Advanced MP Technology is a well-known electronic product distributor in the world. Honeywell, Omron, Freescale, NXP, and STM are just some of the sensor manufacturers we supply and support.

II. TYPE OF SENSORS

TOUCH SENSOR FLEXIFORCE™ A502 SENSOR

They have a 0-222 N (0-50 lb) energy range and are fitted with Tekscan electronics. The model measures loads up to 44,482 N and is linear from a much lower collection of 0-22N (0-5 lb) (10,000 lb). By changing the force voltage and the resistance of the feedback resistor, the bouncy range of this tiny force sensor can be customized.

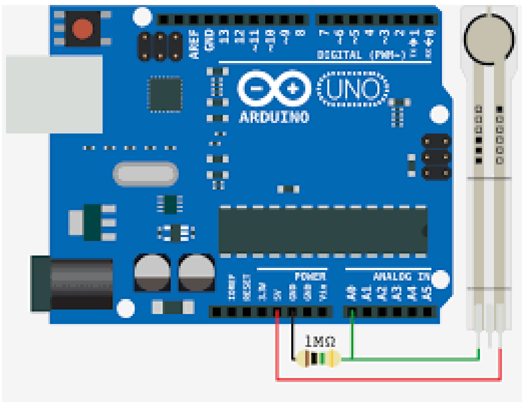

Fig. 2 Flexi Force A502 Sensor Image

HOW TO ADJUST THE FORCE RANGE:

In order to measure higher forces, apply a lower drive voltage (-0.5 V, -0.25 V, etc.) and reduce the resistance of the feedback resistor (1kΩ min.) To measure lower forces, apply a higher drive voltage and increase the resistance of the feedback resistor.

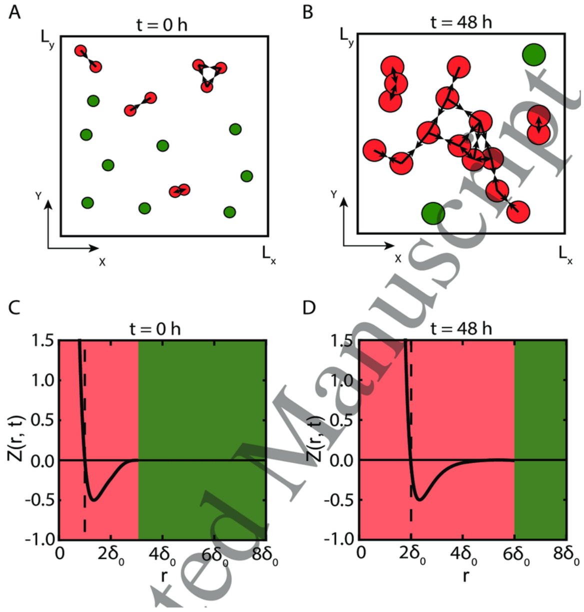

Fig. 4 Force Range

A101 TOUCH SENSOR

The smallest sensor, which is suitable for embedding into merchandise and is designed for high volume industrial use. The 2-pin gauge sensors are now our smallest gauge sensor. Shifting the drive voltage and adjusting the resistance of the feedback resistor will customise the mini sensor's wide range.

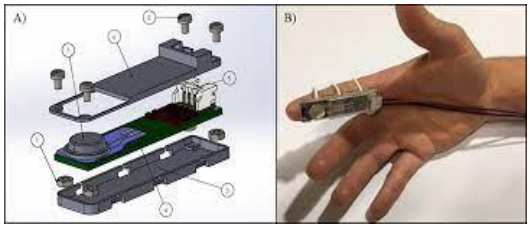

Fig. 5 A101 Touch Sensor

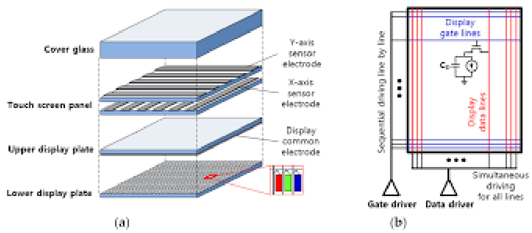

Fig. 6 Typical Performance

Heat sensing feature with a significant resistive change in response to temperature. This thermo resistive system is made from a solid piece of doped material with very few molecular slippages and/or dislocations, resulting in a highly stable device. A signal resolvable to 0.001° F is possible when used as guided. R1 and R2 are passive components with no impact on linearization and can be used to provide an offset or bridge balance at any temperature within the operating range. Because of the differences in thermal expansion between silicon and the material to which it is bonded, the temperature sensing element can be bonded with epoxy to materials that can form the data. The temperature sensing element's group is thin, and it responds to a 180°F change in water temperature in less than two milliseconds.

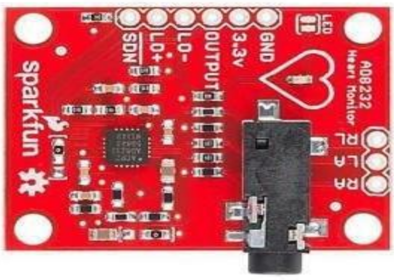

Fig. 7 Temperature Sensor

PRESSURE SENSOR DESCRIPTION

The PT303 pressure transmitter from Dynisco was created for gas turbine pressure applications in hazardous environments. They deliver trouble-free operation and versatility thanks to their heavy-duty construction and large pressure ranges.

Fig. 8 PT303 Pressure Sensor

The Model IP from Honeywell is a new platform of intrinsically safe pressure sensors that are designed to provide repeatable, reliable, and accurate pressure readings over time. These pressure sensors are pre-configured with the most frequently requested choices and are made of stainless steel. They can be used in a range of stressful and harsh settings, as well as with a variety of media. Present measurement configurations are entirely temperature compensated and calibrated.

Pumps, compressors, generators, fracturing trucks, wellheads, pipelines, manifolds, and oil/water/gas separators are all possible applications. Via accurate measurement of media (gas, fluid) under extreme environmental conditions, Honeywell IP IS Series pressure sensors help keep equipment safe and reduce maintenance. Pressure input on the inlet and/or discharge may be used for both control and monitoring purposes, such as fault monitoring to shut down or control equipment to prevent damage or malfunction of other field equipment, or to trigger safety concerns. Production/process equipment, end-of-line testers, and product/material test machines are all potential applications.

PASSIVE INFRARED SENSOR (PIR)

A passive infrared sensor (PIR sensor) is a type of electronic sensor that detects infrared (IR) light emitted by objects in its analysis region. They're most commonly found in motion detectors with a PIR sensor. A PIR sensor detects differences in the amount of infrared radiation impinging on it, which varies depending on the temperature and surface characteristics of the objects in front of it. When an entity, such as a person, moves in front of a backdrop, such as a wall, the temperature in the sensor's field of view rises from room temperature to body temperature and then falls.

The sensor transforms the change in incoming infrared radiation into a change in output voltage, which enables the detection. Objects with similar temperatures but different surface characteristics can emit infrared light in different patterns, triggering the detector when moved in relation to the background. The ultraviolet and perceptible portions of the spectrum are used by ocular radiations; audio waves use an ultrasonic fraction of the frequency scale; and radio waves are micro and millimetre waves. The portion of the electromagnetic spectrum with wavelengths smaller than microwaves but longer than visible light is known as infrared radiation. The image below shows a typical pin configuration of a PIR sensor, which is very easy to understand the pinouts; and, with the aid of the following points, one can easily organise them into a working circuit: Pin 1 refers to the device's drain terminal, which should be attached to a 5V DC positive supply. Pin 2 corresponds to the device's source terminal, which should be connected to the ground terminal through a resistor of 100K or 47K. We studied the pin outs of a PIR sensor in the previous section; now let's look at a simple application of the PIR sensor.In the being there of a being IR energy or radiation, the infrared sensor detects the energy and immediately convert it into minuscule electrical pulses, enough to set off the transistor BC547 into transfer and to make its collector go low.

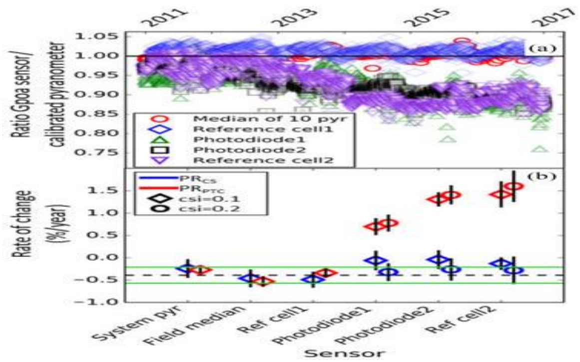

Fig. 10 PIR Sensor

The IC741 is used as a comparator, and it has eight pins, with pin 3 serving as the situation input and Pin 2 serving as the sensing input. As the transistor's collector terminal goes low, the IC's potential pin2 becomes lower than the potential pin3. It immediately raises the IC's output, activating the relay driver, which is made up of another transistor and a relay. The alarm system, which is attached to the circuit, is triggered and switched on by the relay. The 100uF/25V capacitor ensures that the relay continues to operate even after the passive infrared sensor has been switched off, presumably due to the radiation source's exit.

III. CONCLUSION

Sensors can be fitted into almost any system, including consumer electronics, robots, cars, and even human bodies. In addition to counter-terrorism, cargo tracking, and biometrics, intelligent sensors are increasingly being used in other applications. In cars, cutting-edge sensors are used to detect an imminent collision and assess the type of airbags that will be deployed, as well as the force and speed at which they will deploy.

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