

Efficiently Control your Compact Machines

Applications

- **Electrical torque wrenches**
 - Measures the current and allows the control of the torque
- **Electrical drilling machines**
 - Ensures equipment protection

Features

- Bipolar AC & DC current measurement from 3 to 50 Arms nominal
- Unipolar 0 to + 5 Volts, or + 12 to + 15 Volts or Bipolar +/- 12 to 15 Volts power supply
- Expected to be used with a μ controller (Possibility to have access to the internal voltage reference, or to bring it from external : LTSR model)
- Voltage output signal
- Galvanic Isolation up to 3kVrms/50Hz/1 min
- 2 different Compact Sizes for PCB mountings
- EN 50178 Compliance
- CE Marking
- 5 years warranty

When there is no more space available on the PCB inside your machine and when current measurement is necessary to ensure the control and protection of the device then small, compact transducers are required.

In some existing applications such as the electrical torque wrenches or the drilling machines, electrical protection is a function that is more and more frequently incorporated into the product. To incorporate electrical protection, some type of control system is necessary along with the measurement of the devices current. This can be accomplished in these machines where little space is available for the electronics by using compact transducers. The LTSR, LTS and HX models are really very compact size transducers for PCB mounting.

The HX series has a version designed to be powered by +/- 12 to 15 Volts. Other members of the HX family the SP2 models operate on a unipolar power supply of +12 to +15 Volts. With the LTS & LTSR models, the use of a + 5 Volts power supply allows better synergies with the

μ controllers used in today's intelligent machines. The LTSR series offers an interesting feature: It is possible, with an additional external pin to have access to the reference voltage signal used inside the transducer. This reference signal can then be supplied to an A/D converter frequently used with μ processors to eliminate the error due to reference differences. This extra pin can also receive the voltage reference used by a DSP or A/D converter (from 1.9 to 2.7 Volts) allowing the cancellation of the reference temperature drift, leading to a better total transducer accuracy and a better control of the system.

These 3 transducers series cover most of the current measurements needs in size critical applications from 3 to 50 Arms nominal.

COMPACT AC/DC CURRENT TRANSDUCERS : **LTSR**, **LTS** and **HX**



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Application Note

Industrial Electrical Torque Wrench



& Drilling machines

A Low Pass Filter (LPF)(generally around 100 Hz) is used at the transducer output in order to avoid the harmonics to be able to distort the RMS current value, the 50/60 Hz signal being the only one looked for.

The μ processor realises the Analog to Digital signal conversion to feed a Digital Signal Processor (DSP). The DSP is controlling the AC RMS drained current value versus the preset value corresponding to the maximum authorized torque and switches the SSR (Solid State Relay or over-run limiter) when the threshold is reached. The SSR can then either limit the current supplied to the motor and then the torque or cut the supply to the motor.

Indeed, the protection in an electrical torque wrench is the possibility to control the torque applied to tighten the screws. If an overtorque is applied to a fastener it can weaken or even rupture the fastener. If that bolt is used in the metallic construction of a high rise building or steel bridge where safety must be assured 100%, the maximum torque in an electric torque wrench must be controlled. Protection in drilling machines can be the capacity to stop the machine when the bit is jammed.

In the case of the drilling machine, it is the same principle : When the bit is jammed, an overcurrent is required and can be detected to stop the machine.

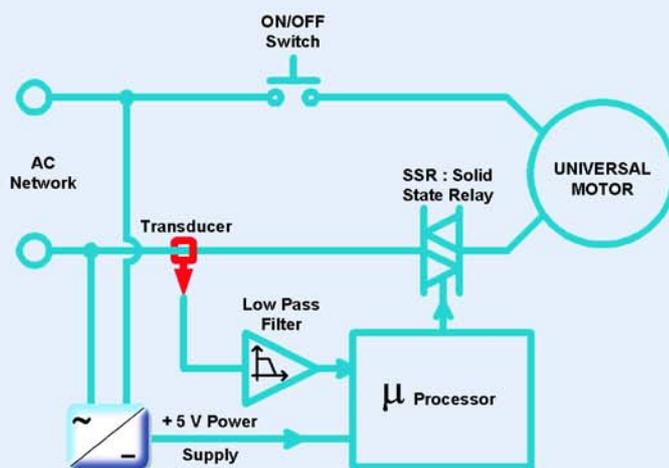
The measurement of the AC current consumed by the universal motor (low power such as in home appliances) used in the application ensures this protection.

The LTSR, LTS or HX models bring quicker response times than simple Current Transformers. These Current Transformers by reacting slowly to the starting currents allow higher torques than expected and then cause some screw ruptures. It is also

In the electrical torque wrench, the motor is regulated by a motor controller.

This controller acts through an output driver that is preselected for a certain maximum torque corresponding to an AC RMS current value drained from the AC network, as the voltage supplied is stable.

The transducer measures the AC RMS current supplied from the line and provides it to the μ processor based controller as feedback.



interesting to note the power supply sharing (+ 5 Volts) between the LTS or LTSR and the μ processor.

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