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Document Title: RMP600 system description and functional block diagrams.		

Summary/Scope:

This document provides a description and block diagram as required by FCC regulations.

This document describes the RMP600, and has been developed from PD-4113-9058-02 which was a similar document for the RMP60 and RMP60M.

Reason for Issue/Nature of change:

New Issue. It will be supplied to the FCC as an exhibit for the type approval application for KQG RMP600.

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Summary of RMP600 system

RMP600 is a point to point touch trigger probe radio transmission system for use on CNC (computer numerically controlled) machine tools. It consists of two components, the RMP600 (Radio Module Probe) and RMI (Radio Machine Interface) which are the two radio stations.

Radio details

RMP600 uses FHSS (frequency hopping spread spectrum) transmission in the frequency band from 2400 to 2483.5 MHz. There are 79 * 1 channels, each 1 MHz apart. The maximum ERP (emitted radio power) is 1mW (0dBm) and the transmission range is up to 15m. The radio link is bi-directional with half duplex transmission. Both RMP and RMI use a nRF2401 Nordic radio modem. The nRF2401 is a transceiver circuit.

When transmitting, the modem uses a synthesiser to generate the desired carrier from the 16MHz clock. The modem then modulates this carrier using the input serial data and then amplifies it for transmission to the antenna via a filter. In receive mode, the signal from the antenna is fed via a filter to a low noise amplifier and then to the built in heterodyne receiver. The receiver circuits generate an intermediate frequency of 2 MHz which is used to down mix the signal. Following the mixing the signal is demodulated and the resulting serial received data is output.

RMP600 (see Fig 1)

The RMP600 is 62mm diameter, and 90mm long, and has a standard mounting face for fitment to a machine tool shank on one end and a M4 stylus mount on the other. The RMP contains the electronic circuitry needed to process the touch sensor signals and convert them into radio transmissions. The RMP is controlled by the base band processor. The base band processor works with the FPGA to encode and decode the radio messages that are sent to or received from the radio modem. The FPGA contains a correlator which is used to recognise messages addressed to the RMP. The FPGA contains the timing logic required for the radio modem. The microprocessor and the FPGA use the 4MHz clock. There is a radio standby mode of operation during which most of the circuitry is switched off and only the baseband processor runs using the 32768Hz clock. The RMP is battery powered by 2* AA batteries, the total voltage of which must be between 2V and 7.5V. The RMP contains a strain gauge touch trigger sensor similar to the Renishaw MP700 probe module. The signals from the touch sensor are processed by a dedicated ASIC and an associated PIC processor before being fed to the baseband processor. The accelerometer orientation sensor detects changes in orientation and this allows the ASIC to compensate for the effects these would have on the touch sensor.

Fig 1 RMP600 Functional Block Diagram

