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Document Title: **RMP60 functional description.**

Summary/Scope:
This document provides a functional description as required by FCC regulations.
This document applies to both RMP60 and RMP60M.

Reason for Issue/Nature of change:
This document has been updated to describe the RMP60 RMP60M using the Nordic nRF2401A radio modem. It will be supplied to the FCC as an exhibit for the type approval applications for KQG RMP60V2

Distribution:

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RMP60 functional description:

RMP60 is a point to point touch trigger probe radio transmission system for use on CNC (computer numerically controlled) machine tools.
RMP60M contains the same circuits as RMP60, the only difference between RMP60M and RMP60 is the mechanical housing.

Radio details:

RMP60 uses FHSS (frequency hopping spread spectrum) transmission in the frequency band from 2400 to 2483.5 MHz. There are $79 * 1$ MHz wide channels. 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. RMP uses 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 13MHz clock. The modem then modulates this carrier using the input serial data and then amplifies it for transmission to the antenna via a filter. When receiving the signal from the antenna is fed via the filter to a low noise amplifier and then to the built in heterodyne receiver. The receiver circuits generate intermediate frequencies of 350MHz and 3 MHz which are used to down mix the signal. Following the mixers the signal is demodulated and the resulting serial received data is output.

RMP

The RMP 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 a touch trigger probe similar to the Renishaw MP7 probe module.

The RMP is battery powered by 2* AA batteries, the total voltage of which must be between 2V and 7.5V.

The RMP contains the electronic circuitry needed to process the probe signals and convert them into radio transmissions.

The RMP is controlled by a microprocessor. The microprocessor encodes and decodes the radio messages that are sent or received via the FPGA to or 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 microprocessor runs continuously using the 32768Hz clock.