

Eddy Current Rotaries

High Speed Testing of Wire, Rod & Bar

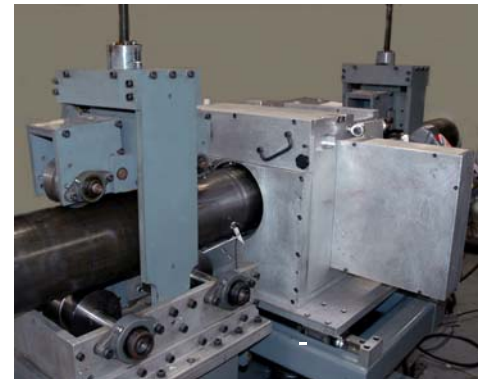
- ❑ Method of choice to detect seam type defects
- ❑ Test cold drawn wire
- ❑ Test cut length bar stock
- ❑ Use with MultiMac® eddy current electronics
- ❑ Systems with two or four probes, each with its own detector channel and distance compensation
- ❑ Test magnetic and nonmagnetic material from 1/8" (3 mm) up to 7-1/2" (190 mm) diameter



E-Rotary Mechanism



150 Rotary Mechanism



750 Rotary Mechanism

MAC's line of Eddy Current Rotary Mechanisms includes models for testing continuous product and cut lengths. Each Rotary Mechanism incorporates a headplate with test probes. A variety of headplates are available for surface or air ride configuration to accommodate varying surface conditions, sizes, and test specifications. A variable speed motor controller also provides dynamic braking to stop the test probe headplate rotation quickly. MAC Rotaries take advantage of the unique characteristics of eddy current rotary probe technology to detect long, continuous surface flaws which may not be detected by encircling coils.

PRINCIPLES OF OPERATION

Rotary probe technology requires relative motion between the test probe and the material under inspection. Rotary mechanisms rotate two or more probes around the test material inducing eddy currents in the material as it is fed through the tester. When the induced eddy currents are disrupted by the presence of a surface defect, such as a seam, the change is sensed by the probe. The resulting flaw signal is transmitted to the electronics for processing and final display on a screen.

The amplitude of the signal for any surface seam is highly proportional to the depth of the defect. When

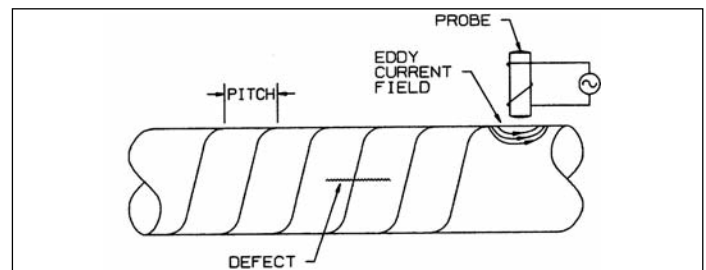


Figure 1

Eddy Current test probe passes over the material in a helical pattern. The helical pitch of inspection (HPI) is shortened as the rotational speed is increased, allowing detection of a shorter defect. A higher throughput speed, however, would lengthen the HPI.

flaw signals exceed preset threshold levels, assigned gate outputs activate alarms, downline marker systems and other devices. The minimum length of surface defect that can be consistently indicated is a function of the rotational speed of the probes and through put speed of the material. In general, either a higher rotational speed or a greater number of test probes, at a given throughput speed, permit detection of shorter defects. To be consistently detected, the defect length must be greater than the helical pitch of inspection. (see Figure 1).

MULTIMAC® ROTARY APPLICATIONS

MAC MultiMac® eddy current electronics are combined with appropriate Rotary Mechanisms designed for continuous product or cut lengths. The table below describes standard eddy current rotary models.

Rotary Mechanisms for Continuous Material Testing

Rotary Mechanisms can be installed in line with continuous wire operations such as drawing, parts forming, or straight and cut. Changes in speed, even stops, do not affect test results because the probes continually spin around the wire.

The test process can operate automatically as defects in the wire create flaw signals, activate alarms, paint markers or other devices. In parts forming, a piece made out of a defective wire length can be identified and rejected after cutting and forming operations.

Rotary Mechanism for Cut Length Testing

Rotary Mechanisms are also designed to handle cut lengths, often in-line with straighteners or installed in a separate test station. Installations can be completely automatic, including marking and sorting devices.

The Rotary is usually mounted in conjunction with MAC Elevating and Drive Mechanisms or on a Constant Center test bench to position the rotary housing and move the material accurately through the test head.

STANDARD EDDY CURRENT ROTARIES

ROTARY MODEL	MATERIAL DIAMETER	ROTARY SPEED	NUMBER OF PROBES	NOTES
9R-100	1/8" - 1" (3 mm - 25.4mm)	Up to 6000 RPM Continuously variable	Two	Surface or Air Ride probes. LH or RH feed available Heavy Duty Hub to prevent vibration of wire when installed in conjunction with a draw block. Inside hub & front plate bushing holder for better guidance for small diameters. Optional adjustable bushings
9R-150	1/8" - 1-1/2" (3 mm - 38.1mm)	Up to 6000 RPM Continuously variable	Two or Four	Surface or Air Ride probes. LH or RH feed available Inside hub & front plate bushing holder for better guidance for small diameters. Optional adjustable bushings
9R-350	1/2" - 3-1/2" (12.7mm - 88.9 mm)	Up to 3000 RPM Continuously variable	Two or Four	Surface or Air Ride probes. LH or RH feed available Optional adjustable bushing Optional Small Diameter package
9R-550	1/2" - 5-1/2" (12.7mm - 139.7mm)	Up to 1800 RPM Continuously variable	Two or Four	Surface or Air Ride probes. LH or RH feed available Optional Small Diameter package
9R-750	3/4" - 7-1/2" (19.05mm - 190.5mm)	Up to 1000 RPM Continuously variable	Two or Four	Surface or Air Ride probes. LH or RH feed available
9R-150E	3 mm - 38.1mm	Up to 6000 RPM Continuously variable	Two or Four	Uses Triple Roll Inlet & Outlet Guides. LH or RH feed available. Uses special design probes that provide extra sensitivity on hot rolled material to compensate for the greater distance between the material and the test probes.
9R-350E	12.7mm - 88.9 mm	Up to 3000 RPM Continuously variable	Two or Four	Uses Triple Roll Inlet & Outlet Guides. LH or RH feed available. Uses special design probes that provide extra sensitivity on hot rolled material to compensate for the greater distance between the material and the test probes. Optional Small Diameter package
9R-550E	12.7mm - 139.7mm	Up to 1800 RPM Continuously variable	Two or Four	Uses Triple Roll Inlet & Outlet Guides. LH or RH feed available. Uses special design probes that provide more sensitivity on hot rolled material to compensate for the greater distance between the material and the test probes.

*E rotaries: front bushing is added adjacent to triple roll guide for testing small diameter material.
For fine tuning for specific material diameters, different headplates can be used*



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