Rotating Wire Scanner

Type DS 040

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ROTATING WIRE SCANNER

Type DS 040

Application:

Measurement of beam intensity profiles versus transverse coordinates.

Principle:

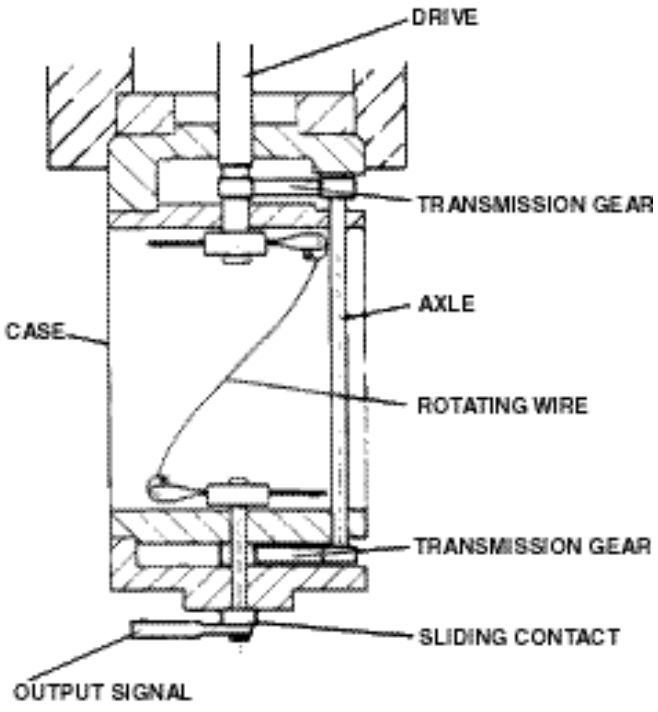
The intensity profile is measured by a wire which rotates inside the vacuum of a beam transport line. The wire detects particles directly or by measurement of the charge released by secondary electrons. The scan system itself is mounted to a CF-150 flange and can be attached directly to a standard diagnostic chamber The scanning wire is moved into a position which will not disturb the beam if scanner is not activated. The wire is driven from both ends to avoid deformation due to the heating of the wire by impinging particles.

Fig. 1

Photograph of scanner head.

Fig. 2

Principle of scanner head.



Cover Photograph: *Rotating wire scanner mounted to a 8" (CF-150) flange. Top left: Motor with tachogenerator. Bolts are provided for adjustment to the beam axis.*

Technical Specifications:

Mechanical parts		
Inside vacuum	:	Stainless steel
Outside vacuum	:	Carbon steel (nickel-plated)
Scanning wire	:	Tantalum
Supporting flange	:	8" O.D. (CF-l50)
Adjustment	:	Supporting plate with bolts
Accuracy of position for wire cross with respect to beam axis	:	0.01 inches
Drive (rotation)	:	12 V d.c. motor
Revolution frequency	:	Less than 750 rpm
Clutch	:	Magnetic discs
Scan velocity @ 750 rpm	:	1.344 mm/ms
Measurement - angular position	:	Rotary potentiometer
Accuracy-angular determination	:	Approx. 0.2°
Current transfer from wire	:	Sliding contact
Current feedthroughs	:	Mini conflat with 6-pin connector.
.**Sealing**	:	Membrane bellow, conflat system.
Maximum leak rate	:	10^{-9} Torrs x liters/second
Orientation of unit	:	Optional: recommended 45° (vertical axis).
Maximum power loss in wire	:	1 - 2 Watts/mm
Maximum beam diameter (linear position signal)	:	30 - 40 mm

NOTE: In the event that scanner head has to be moved completely out of beam path when not in use, it is suggested that the DS 01 version will be installed. This scanner provides measurement of pulsed beams as described herein; further details are available upon request.

Control Electronics

Complete package of control electronics is available for scanner described.

Electronics includes:

- Relays or FET-multiplexer for connection of up to 8 scanners to one (1) signal processing electronics unit.

- Complete motor control, including control of revolution frequency and automatic search for zero position for free passage of beam.

Control Electronics (continued):

- Signal processing electronics with ranges of:
  1 V / 5 nA
  1 V / 10 nA
  1 V / 50nA
  1 V / 100 nA
  1 V / 500 nA
  1 V / 1 µA
  1 V / 10 µA

- Analog outputs with position markers for observation of profiles on oscilloscope.

- Digital signal outputs, including CAMAC interface, to the computer.

On Request: Microcontrols, including RAM for data storage and computer interface to larger host computer.

Fig. 3
Rotating wire scanner combined
with linear actuator