

KEY FEATURES:

- Color coded 3D isometric representation of the magnetic field;
- SENIS 3-axis integrated Hall probe with the spatial resolution of 0.1mm;
- Selectable measurement ranges;
- User defined scanning resolution, down to 10µm;
- Easy to use software on MS Windows platform.

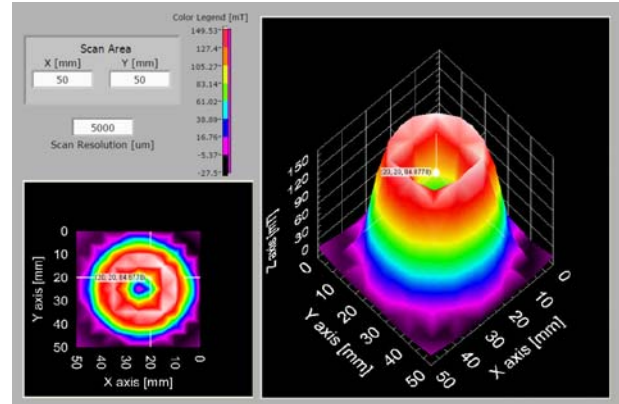


Figure 1: On-screen display of the magnetic field of a permanent magnet

DESCRIPTION:

Magnetic Field Mapping System allows a user to rapidly map the magnetic field around an electromagnet or permanent magnet. The map of the magnetic field may be given in the form of color coded 2D or 3D isometric visual display on PC screen, tables of the numerical values of the three components, and/or the total magnetic field, and so on. Due to the unique features of the applied integrated Hall probe, all three components of the magnetic field are measured simultaneously at virtually the same point. The system is controlled by an extremely easy-to-use-software built on MS Windows platform.

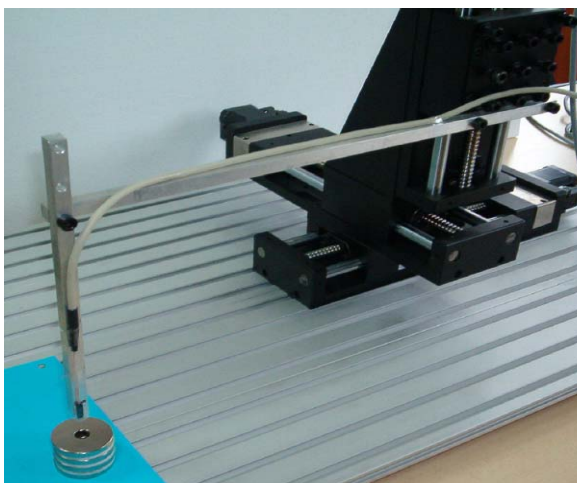


Figure 2: The moving part of the scanning system

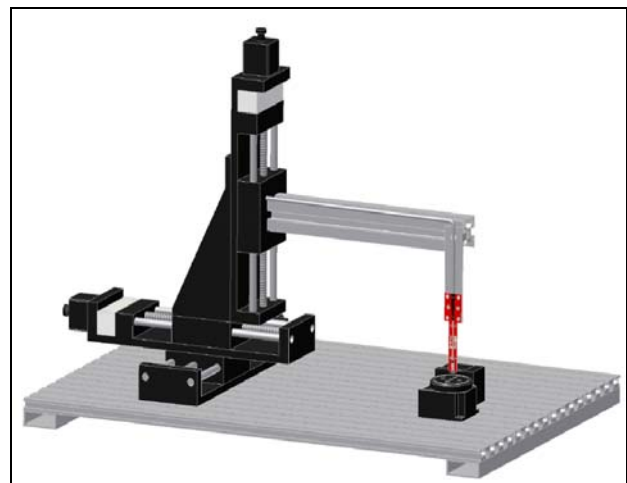


Figure 3: Scanning system with rotating fixture

The system consists of the following five modules:

- Senis magnetic field transducer x-H3A_E3D-2.5kHz-0.1%-xxT;
- Multifunction DAQ, NI 6009, which controls the driver, receives data from transducer and sends them to a computer. DAQ uses USB connection;
- Step motor driver, SSMD1, which controls the movement of the platform;
- Cartesian moving platform, CMP1, with a Hall probe attached to it;
- Personal computer.

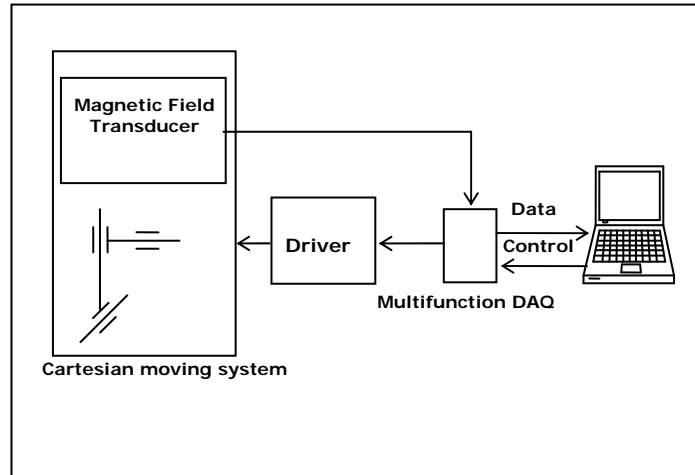


Figure 4: Block diagram of the Magnetic field mapping system

SOFTWARE:

The software, based on LabVIEW on MS Windows platform, offers the following options:

- Automatic color coding of magnetic field with appropriate legend;
- User defined scanning area and resolution;
- Zoom and rotate 3D image;
- Movable cursor which displays X and Y coordinate and magnetic flux density value;
- Probe returns to the start measuring point after the full scan is performed.

TYPICAL APPLICATIONS:

- Quality control of permanent magnets;
- Quality assessment tool in production, for assemblies such as loudspeakers, multi-pole magnets, photocopier rollers and magnetic film;
- Development of magnet systems;
- AC magnetic field mapping;
- Application in laboratories and in production lines, etc.

SPECIFICATIONS:

Parameter	Values	Remarks
Technical specifications:		
Full system dimensions	700mm x 500mm x 600mm	
Maximum scan area	100mm x 100mm	
Minimum scan area (note 1)	0.7mm x 0.3mm	Depending on probe type (note 2)
Distance of FSV (Field Sensitive Volume) from the magnet	Minimum 0.2mm or 1.1mm Maximum 100mm	Depending on probe type (note 2)
User defined scanning interval resolution (STEP)	Minimum 10µm	Distance between two measurement points
Accuracy of the magnetic field measurement	0.1%	
Measurement range	±100mT, ±500mT or ±2T	
Mechanical specifications:		
Repeat position accuracy		5µm
Absolute positioning accuracy		8µm
Straightness		6µm
Pitching		50"
Yawing		25"
Total scanning time:		
Equation (note 3):		Equation factors:
$t[s] \approx \frac{Y[mm]}{2.5} \cdot \left(\frac{X[mm]}{STEP[mm]} + 2 \right) + \frac{1}{5} \cdot \frac{X[mm]}{STEP[mm]} \cdot \frac{Y[mm]}{STEP[mm]}$		X,Y- dimensions of scan area STEP- distance between two measurement points

- Note 1: Minimum dimension of the hole in the magnet that probe can access;
- Note 2: T-probe is not encapsulated, it has very small dimensions (640 µm x 280 µm) and it's Field Sensitive Volume (FSV) is at the probe's surface; whereas C-probe is encapsulated and it's FSV is 1mm away from the probe's surface;
- Note 3: Total scanning time depends on dimensions of scanning area and resolution of scanning.

RECOMMENDED ACCESSORIES:

- Rotating fixture for the magnet under test;
- Power supply S12-5 [DC output: ± 12 V, +5V]; [AC input: $\sim 110/220$ V, 50/60 Hz];
(http://www.senis.ch/images/power%20supply%20S12-5%20version%20C_datasheet.pdf)
- Zero Gauss Chamber: ZG12
(<http://www.senis.ch/images/Zero%20Gauss%20chamber%20ZG12.pdf>).