



HUTCHINSON®

MAGNET RINGS

HEAVY DUTY APPLICATIONS



We make it *possible*





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INTRODUCTION

1 – HUTCHINSON GROUP

To meet the needs of its global customers on land, in the air and at sea, Hutchinson has been designing, developing and manufacturing high-performance solutions for over 160 years.

Our innovations cover a wide variety of demanding markets: automotive, aerospace, defence, energy, rail and industry in general.

Hutchinson is a global leader in anti-vibration systems, fluid management and sealing solutions, our group stands out for its multi-market and multi-expertise approach, a source of synergies and added value.

A wide spectrum of resources

A corporate Research & Innovation Centre brings together more than 200 engineers and technicians conducting fundamental and applied research. Innovative solutions are developed by combining our key technologies and skills:

- Chemistry and Materials Science
- Mechanical engineering
- Composite Materials
- Transformation processes
- Vibration and Acoustics
- Thermal insulation
- Mechatronics

Our teams in our technical centers around the world develop high added value solutions. They dedicate their resources in applied engineering to our customers.



PRECISION SEALING SYSTEMS



BODY SEALING SYSTEMS



FLUID MANAGEMENT SYSTEMS



MATERIALS AND STRUCTURES



VIBRATION CONTROL



BELT DRIVE SYSTEMS

Our ambition: participate in the mobility of the future that is safer, more comfortable, and more responsible.



> 44,000 employees



25 countries



100 sites



€211 million R&D



> €4,314 million turnover



2 - HUTCHINSON PRECISION SEALING SYSTEMS

Hutchinson Precision Sealing Systems designs and manufactures sealing solutions for dynamic applications and magnetic encoders measuring movement and position of rotating shafts and moving objects.

Our project team relies on constant experimentation and innovation, to develop solutions that are perfectly adapted to customer needs.

Our business unit has an international footprint with production and sales sites in Europe, NAFTA (Mexico and USA), Brazil and across Asia in China and Japan.

Services

- Worldwide production
- Continuous R&D product development
- Computer-aided design (CAD)
- One stock policy

Technology & Skills

- Molded elastoferrite rubber
- Metal insert bonding
- In-house adhesion scheme
- In-house rubber production

Certifications



*Designer and manufacturer
of your future magnetic
solutions.*

OUR MAGNET RINGS

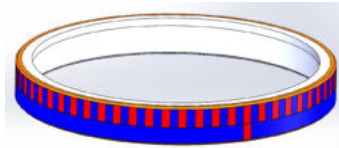
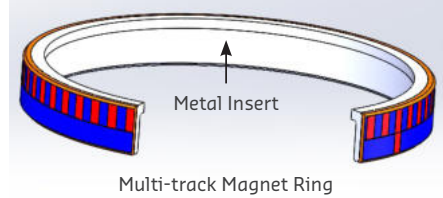
1 - DESCRIPTION

Our magnet rings are made of a metal insert bonded to a magnetic rubber compound. It responds efficiently to industrial applications, combining elastic properties and strong rubber/insert adhesion needed in extreme environments.

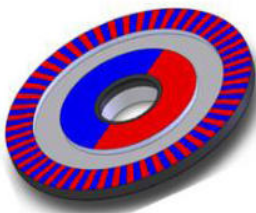
The magnet rings are compatible with different sensor technologies such as Hall Effect and magneto-resistive.

Our solutions allow high measurement accuracy. They are integrated in position and speed control systems such as encoders, motors, and actuators.

We develop and manufacture magnet rings with a customized magnetic pattern.



Multi-track ring with singularity



Multi-track ring with dipole

Typical Applications

- Machine tool
- High speed spindles
- Health care
- Home Applications
- Elevators
- Aerospacew
- Off-road
- Robotics
- Railway
- ABS/ESP

Environments

- High temperature resistance
- Fluid resistance (Oil & Grease)
- Shock resistance
- Vibration Speed resistance
- Mechanical resistance
- Dynamic and static sealing

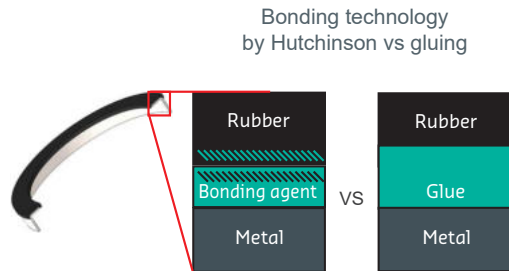


2 - MATERIAL

2.1 - Surface treatment & adhesion

Thanks to a special expertise in rubber adhesion, we can design the metal and the bonding agent system according to customer needs.

The adhesion strength is higher by the creation of chemical interphase of the bonding agent into the rubber layer. These bonding systems provide a higher resistance in severe environments than gluing.



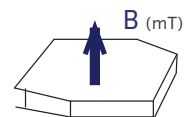
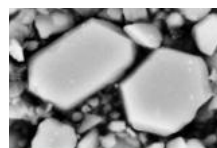
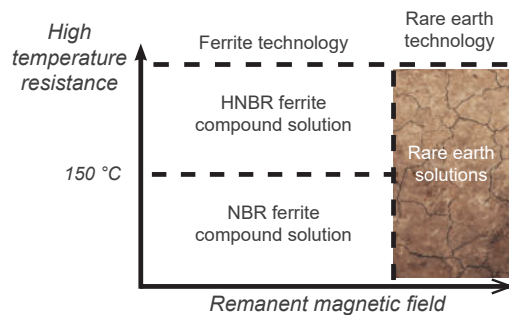
2.2 - Rubber

We design our magnetic rubber compounds with an expertise of more than 160 years. Our elastomer technology provides a good resistance to mechanical stress due to its elastic properties.

Our HNBR compounds offer solutions for high temperature.

They are based on anisotropic magnetic ferrite technology to get the best magnetic and mechanical performance. Their specificity lies in their level of filling ratio up to 50 shore D hardness.

We have designed processes which optimize the ferrite orientations in order to get the best magnetic performance.



Anisotropic ferrite particles lead to higher magnetic field than isotropic due to its specific orientation.

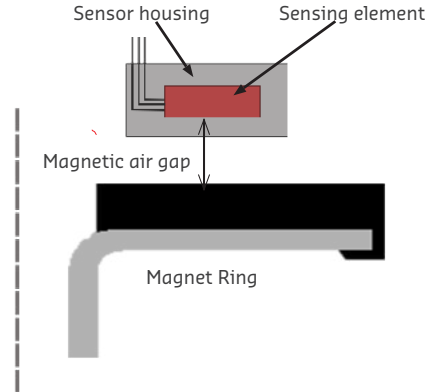
In-house manufacturing, stability and performance for our standard and tailor made solutions.

3-MAGNETIC PERFORMANCE

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Magnetic air gap

The distance between the surface of the **magnet ring** and the **sensing element** within the sensor housing is referred as the magnetic air gap.

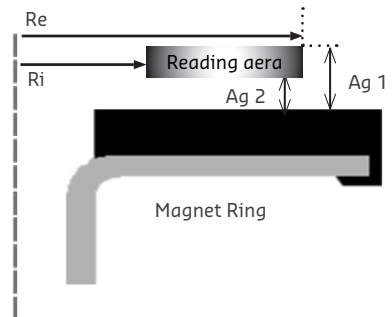


Reading diameter

The sensing element is located in the Reading Area.

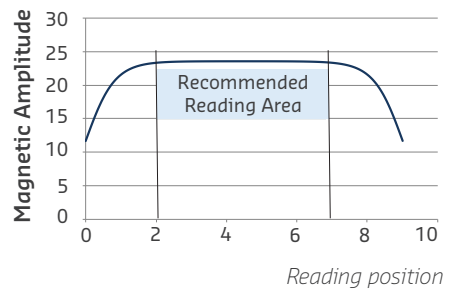
Ri/Re: Reading Radius min/max

Ag1/Ag2 : Air Gap min/max



Magnetic profile

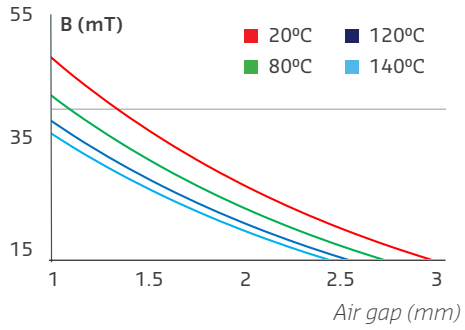
The outline of the magnetic profile is important as it allows us to **define** the recommended reading area in order to **improve** the magnetic performance.





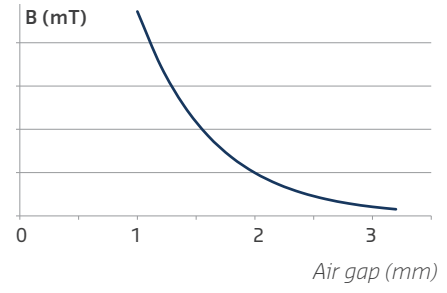
Temperature effect

The operating temperature affects the magnet. For each degree Celsius increase, the ferrite remanence decreases by 0.19%. This effect is reversible as it returns to ambient temperature.



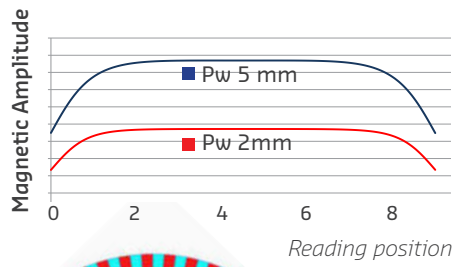
Signal strength

The magnetic signal is **stronger** when the air gap is smaller.



Pole width

The pole width affects the magnetic flux amplitude. It is important to know the air gap to calculate the recommended reading area and get the desired **magnetic strength**.



PARTS SELECTION

1-TECHNICAL SUPPORT

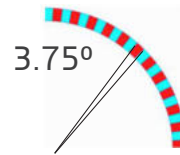
All our parts can be pre-designed with a magnetic simulation.

We offer on request numerical simulations that support accurately your designs and test their performance.

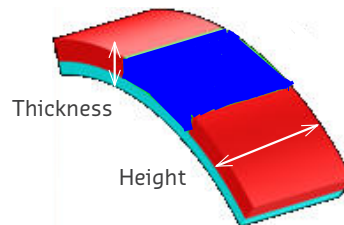
Feasibility studies or mockup parts can be realized upon request to fit customer needs.

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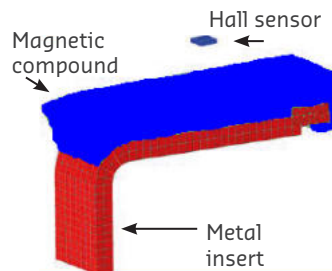
Our experts can advice you about the reading position to fit the magnetic profile of your part.



A parametric study takes every parameter into account to possibly optimize the part including the rubber volume.



Other factors that the numerical simulation covers is the magnetic compound, the HR-sensor and the metal insert. Customized solution can be made.

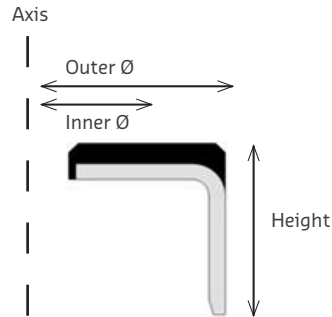




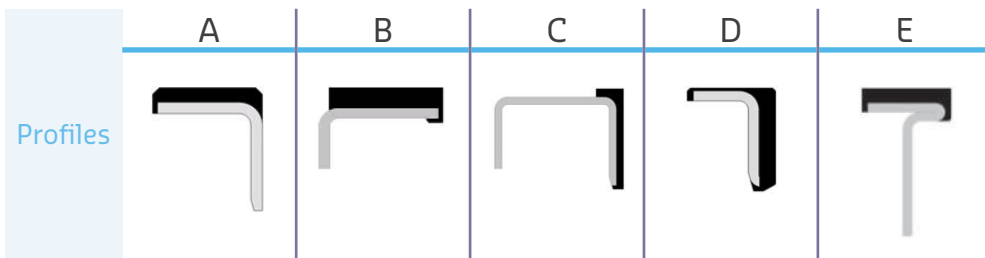
2-DESIGN

2.1 – Part profiles

The axis is always consider to be at the left of the profile.



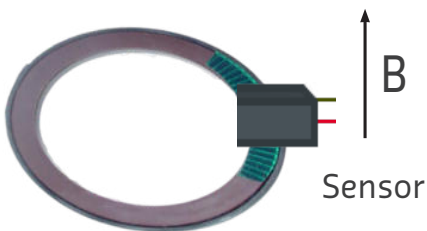
We design several profiles to fit different applications.



2.2 – Axial or Radial

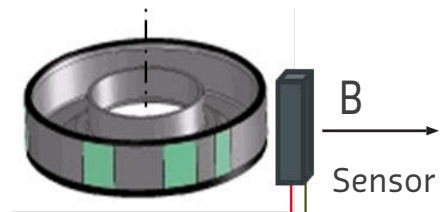
Axial

The magnetic field (B) is along the rotational axis.



Radial

The magnetic field (B) is orthogonal to the rotational axis.



3 – SIZE CHARTS

3.1 – Axial references

Profile	Dimensions			Reference
	Outer Ø (mm)	Inner Ø (mm)	Height (mm)	
A	34	18	1	CSA34
B	36	24	5	CLA36
A	44	12	17	CSA44
B	44	35	13	CLA44
A	45	25	1	CSA45
E	52	39	11	CTA52
A	54	44	11	CSA54
E	59	47	10	CTA59
B	62	50	4	CLA62
B	63	53	6	CLA63
B	63	52	4	CLA63
A	63	51	4	CSA63
E	66	55	11	CTA66
B	67	57	5	CLA67
A	68	57	10	CSA68
B	71	57	4	CLA71
A	71	59	7	CSA71
B	72	61	5	CLA72
A	72	61	5	CSA72
A	74	60	3	CSA74
B	75	60	4	CLA75
B	75	58	7	CLA75
B	76	58	6	CLA76
A	76	61	3	CSA76
A	77	60	4	CSA77
B	77	61	5	CLA77
B	78	66	4	CLA78
E	79	66	7	CTA79
A	80	67	8	CSA80
B	80	64	4	CLA80
B	81	65	7	CLA81
A	81	67	3	CSA81
B	83	68	5	CLA83
A	83	69	4	CSA83
B	87	71	4	CLA87



3.2 – Radial references

Profile	Dimensions			Reference
	Outer Ø (mm)	Inner Ø (mm)	Height (mm)	
C	48	36	7	CUR48
C	49	22	11	CUR49
D	49	41	10	CLR49
C	55	16	7	CUR55
D	64	57	10	CLR64
C	67	47	11	CUR67
C	67	36	11	CUR67
C	67	41	17	CUR67
C	71	38	8	CUR71
D	71	60	8	CLR71
D	72	64	9	CLR72
D	76	69	7	CLR76
C	79	44	10	CUR79
C	79	38	11	CUR79
D	80	69	8	CLR80
D	80	70	7	CLR80
B	82	72	8	CLR82
C	82	68	11	CUR82
C	83	60	7	CUR83
D	88	76	7	CLR88
C	93	75	9	CUR93
C	101	85	9	CUR101
D	104	58	10	CLR104
D	110	43	10	CLR114
D	114	42	9	CLR114
C	115	94	10	CUR115
C	118	92	10	CUR118
D	126	40	12	CLR126
D	128	45	16	CLR128
D	205	201	10	CLR205

We make it **possible**



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