SG Transmission

ELECTROMAGNETIC CLUTCH AND BRAKE SOLUTIONS

Holding Electromagnets for Industrial Applications

Type 58 and Type 68

Experts in electromagnetic solutions

SG Transmission has designed, manufactured and developed electromagnetic clutches, brakes and holding magnets since 1972. With a commitment to innovation, we offer a customised design service to deliver the best solution to our global customer base.

Our experienced in-house design team work alongside our customers to develop solutions to meet specific holding forces, space requirements or develop new innovations. We provide a full project management service from design to manufacture and test.

We place a strong focus on process measurement and control using our quality management system. By creating a strong focus on continuous improvement, we exceed our customer's quality expectations in the most highly demanding market places. We hold internationally recognised certificates such as ISO 9001, OHSAS 18001 and ISO 14001.

We continue to invest in the latest CNC machinery, automation and testing facilities and we have a clear focus on continuous improvement in lean cellular manufacturing. Our purpose built factory enables us to cater for large and small volume orders from all over the world.

SG Transmission is part of the British Engines Group, which employs over 1,200 people within its eight engineering businesses. It has offices in 16 countries across the world including Australia, USA, India, South Africa, Singapore and Germany. We benefit from the core services and people orientated culture of our parent company, which includes taking on apprentices as part of the British Engines Apprenticeship Scheme, as well as graduates.

Direct current and alternating current industrial holding magnets

SG Transmission offers two ranges of industrial holding magnets, the electromagnetic holding magnet (type 58) and the electro-permanent holding magnet (type 68) for use in a wide variety of demanding industrial applications.

Electromagnetic holding magnets TYPE 58

Electromagnetic holding magnets consist of a steel housing and a DC-excited internal coil which when energised will securely hold ferromagnetic parts. If the coil is de-energised, the magnet will immediately release. The holding system works with a very low operating current and requires minimal maintenance.

- Size: ø 15 to 180 mm
- Axial force: 90 to 40,000 N
- High quality
- Cost effective
- Special voltages, forces and mountings available on request

Electro-permanent holding magnets TYPE 68

The electro-permanent magnet features an electromagnet, as well as a permanent magnet which allows hold to be maintained during power-off. As DC current is re-applied the electro-permanent magnet will release. Due to this principle, electro-permanent holding magnets are suited to applications which require long holding times with low power usage or where reliability is required in the event of power failure.

- Size: ø 20 to 90 mm
- Axial force: 40 to 1,200 N
- Fail-safe
- Special voltages, forces and mountings available on request

The maximum holding force can only be reached when a full coverage condition, or 0mm air gap is met. This is also dependent on the surface roughness and thickness of the material.

Nominal voltage	Duty cycle	Protection class
24 volt DC	Electromagnetic holding solenoids 100%	IP 51 with flying lead wires IP 62 with plug and socket connection and epoxy resin, required increase in length 'B'

Alternate voltages and modifications available at an additional cost. Please note, design is subject to change.

Electromagnetic Holding Magnet

TYPE 58

Our type 58 electromagnetic holding magnets are magnetised when current is applied, providing a reliable solution for applications where significant holding force and low power consumption is required.

Benefits

- Compact design
- Optimised power consumption and low rest magnetism
- Maximum holding force with low air gaps
- Armature keeper plates available
- Dual-fixing
- High quality, cost effective package

Features

- Available in a range of sizes Ø15 to Ø180mm
- Axial forces ranging from 40 to 40,000N
- Special voltages/forces/mountings available on request
- Made in the UK

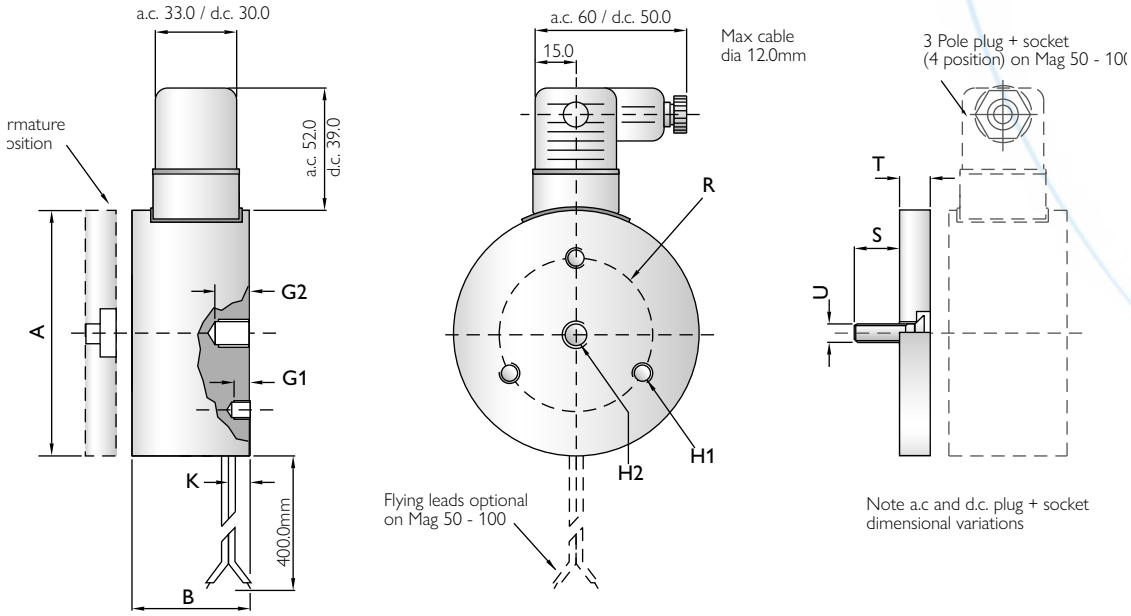
Key applications

- Automation, transportation and handling
- Door locking/holding mechanisms for access control and security
- Fixture construction
- Medical applications
- Wind turbines in the renewable energy sector

Technical specification

Voltage	230v AC *
Duty cycle	100% ED *
Ambient temp.	-5 to 65°C
Protection	Standard IP51 (IP56 available on request)
Standard finish	Bright zinc
Insulation	Class B

* Other voltages and sizes available upon request



Technical data

Size	Axial force (N)	P20 (W)	Magnet weight (Kg)	Armature weight (Kg)	A	B	G1	G2	H1	H2	K	R	S	T	U	Part number	
																Magnet	Magnet and arm
15	12	1.5	0.02	0.01	15	12	-	6	-	M3	-	-	-	2	-	0115	0315
20	90	3.0	0.05	0.01	20	15.0	-	4	-	M4	5	-	7	3	M3	0120	0320
25	140	3.7	0.07	0.01	25	20.5	4	10	M3	M5	6.5	15	7	3	M3	0125	0325
30	230	3.8	0.20	0.04	30	24.0	5	5	M3	M5	7	18	8	5	M4	0130	0330
40	500	4.6	0.23	0.05	40	27.5	5	10	M4	M6	9	26	8	5	M4	0140	0340
50	750	5.4	0.40	0.10	50	30.5	5	10	M4	M6	8.5	34	10	6	M4	0150	0350
65	1400	9.0	0.75	0.20	65	35.5	6	12	M5	M8	8.5	40	12	8	M5	0165	0365
80	2200	14.2	1.25	0.40	80	38.5	5	15	M6	M8	10.5	50	14	10	M6	0180	0380
100	3500	20.0	2.20	0.75	100	43.5	5	18	M6	M10	12.5	75	20	12	M8	0110	0310
150	9,000	37	6	-	150	56	-	24	-	M16	-	-	-	17	-	-	-
180	15,000	49	10	-	180	63	-	36	-	M24	-	-	-	21	-	-	-

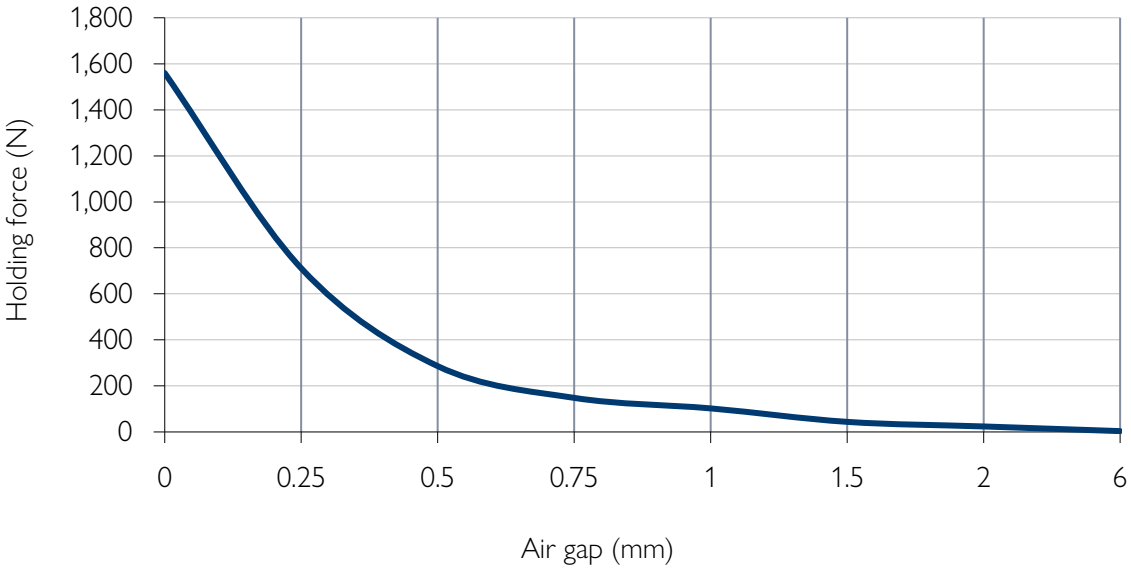
General information

1. All magnets can be supplied with mounting flanges to suit any particular mounting requirements.
2. Pole faces can be supplied electro-plated, however this will result in approx 10% reduction in axial force.
3. All magnets can be supplied with flying leads, and the size 50 and above can be fitted with a 3-pole plug and free socket.

SIZE PART NUMBER D.C. VOLTAGE SUPPLY

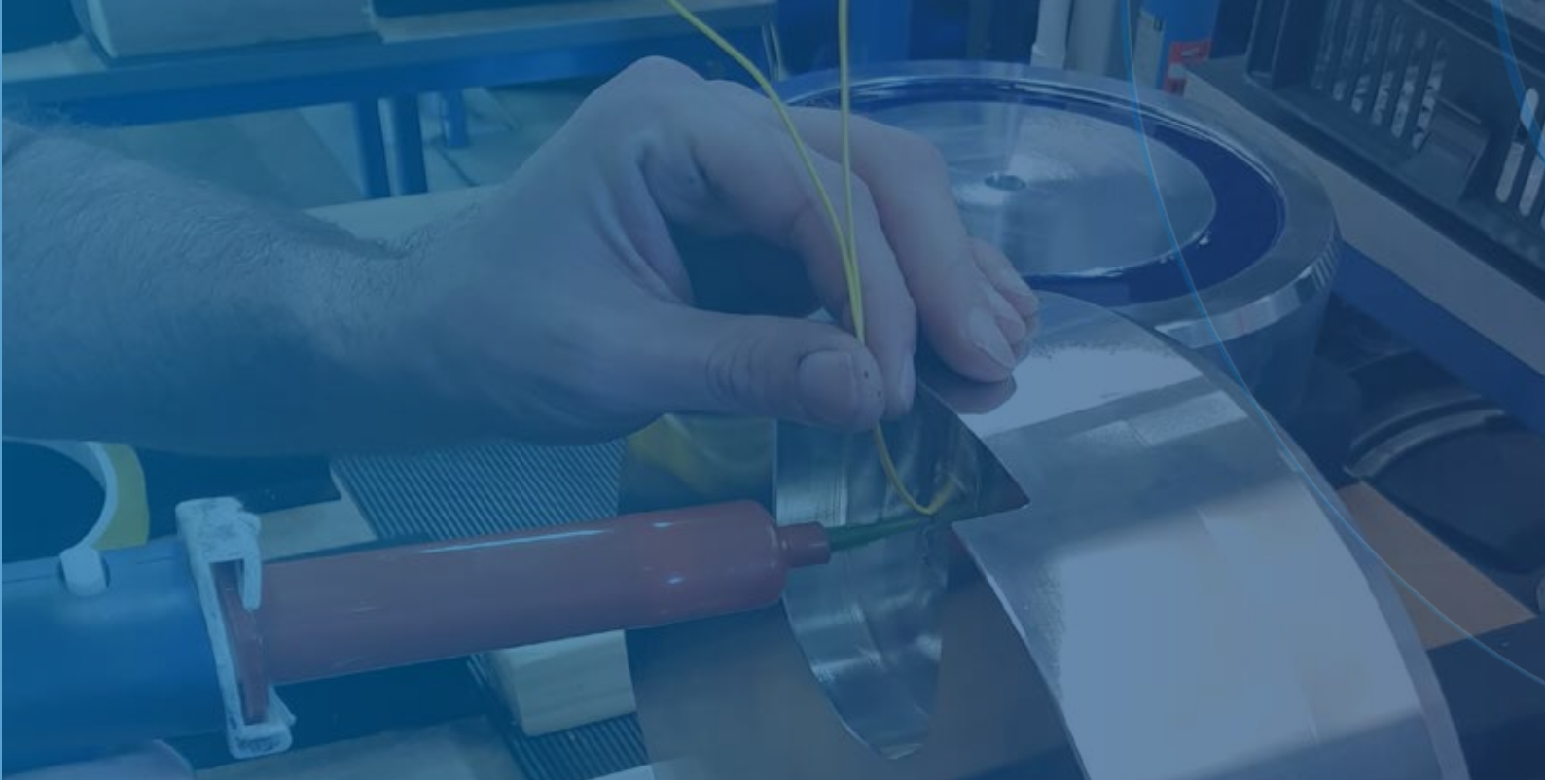
58 - 50 - ELECTROMAGNET - 0350 - 24 - D.C.

Typical holding force curve example (58-0365)



General information

1. Force is measured with an armature in EN1A (BS230 M07) material with a finish of 0.38µm max. and minimum thickness 'T'



SG Transmission supplies European distributor with largest electromagnets yet

SG Transmission has supplied a European distributor with their largest electromagnets designed and manufactured in their 47 years history. The design brief was to create an electromagnet with a holding force greater than 40,000 Newtons, which are used to mount, align and level the client's large modular machine process weighing 40 tonnes.

Paul Short, Research and Development Manager said, "Once the customer approved the outline drawing we verified the design with our Electromagnetic FEA package and created an initial physical prototype. An independent third party facility tested the axial force of the magnet with a calibrated Tensile Test machine.

"When tested, we found that the actual holding force of the Ø280mm magnet was very close to the prediction being 50% greater than products of a comparable size. We were extremely pleased with the outcome and look forward to continued work with this client and others who require more force."

Product	Large electromagnet
Application	Industrial (handling)
Diameter	280mm
Height	85mm
Holding force	40,000N (4,000kg)
Power	97W
Voltage	240V
Weight	40kg
Reference	ATD 7319

Electro-permanent Holding Magnet

TYPE 68

Our type 68 electro-permanent holding magnets remain 'on', or energised, when no current is applied. This provides an energy efficient solution for applications where long holding times are required.

Features

- Available in a range of sizes Ø20-Ø90mm
- Axial force: 40 to 1,200 N
- Energy saving through power-off holding
- Fail safe in the event of power failure
- High holding force
- Special voltages/forces/mountings available on request
- Made in the UK

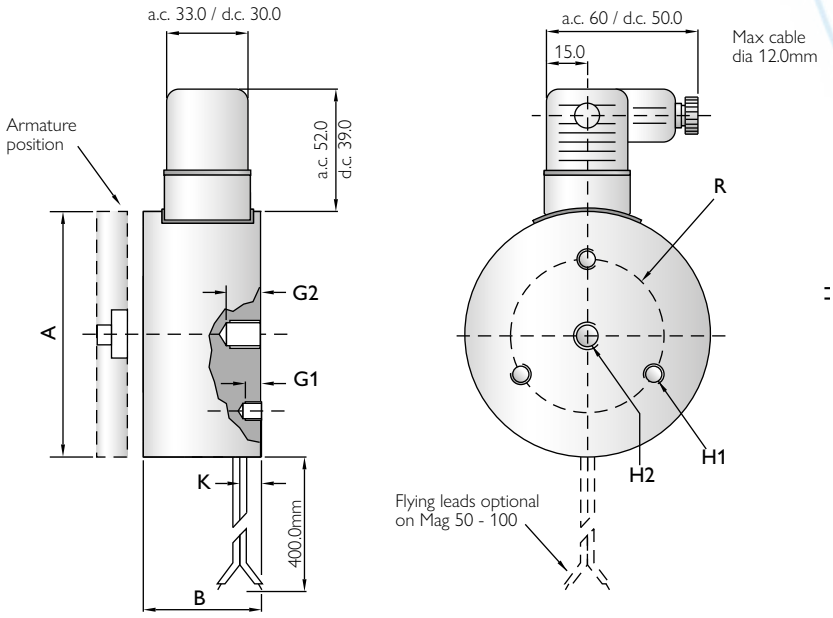
Key applications

- Locking solutions
- X-ray tables and medical applications
- Magnetic grippers
- Packaging machines
- Power switches

Technical specification

Voltage	240v AC *
Duty cycle	100% ED *
Ambient temp.	-5 to 65°C
Protection	Standard IP51 (IP56 available on request)
Standard finish	Bright zinc
Insulation	Class E

* Other voltages and sizes available upon request



Technical data

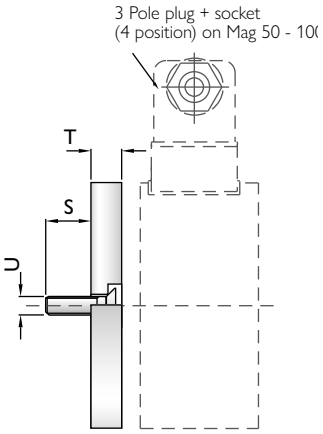
Size	Axial force (N)	P20 (W)	Magnet weight (Kg)	A	B	G1	G2	H1	H2	K	R
20	40	3.6	0.04	20	22	-	4.5	-	M4	400	10
30	160	4.6	0.15	35	28	-	5	-	M4	400	15
50	420	8.9	0.50	55	36	-	5	-	M5	400	23
70	720	13.3	0.90	70	45	-	5	-	M8	400	30
90	1,200	21.7	1.50	90	48	-	7.5	-	M8	400	39

General information

1. All magnets can be supplied with mounting flanges to suit any particular mounting requirements.
2. Pole faces can be supplied electro-plated, however this will result in approx 10% reduction in axial force.
3. All magnets can be supplied with flying leads, and the size 50 and above can be fitted with a 3-pole plug and free socket.

Accessories

Armature



Note a.c and d.c. plug + socket
dimensional variations

Size	Armature weight (Kg)	S	T	U
15	0.01	-	2	-
20	0.01	7	3	M3
25	0.01	7	3	M3
30	0.04	8	5	M4
40	0.05	8	5	M4
50	0.10	10	6	M4
65	0.20	12	8	M5
80	0.40	14	10	M6
100	0.75	20	12	M8
150	-	-	17	-
180	-	-	21	-

For more information, or to speak to our expert engineering team, call us at +44 (0)1388 770 360 or send an email to enquiries@sgtransmission.com.

Technical explanations

Holding force F_H

The perpendicular force required to pull a work piece from the holding surface of the electromagnet (no peeling or shear effect).

Air gap

The medium distance between the face of the holding magnet and the work piece surface. The air gap size can be determined by profile shape, roughness and non-magnetic substances such as dust and paint.

Remanence

The remaining holding force left after magnetisation is removed between a holding solenoid and a work piece. Depending on the work piece, pole faces can be supplied electro-plated, however this will result in approx 10% reduction in axial force.

Insulation class

The maximum temperature used during manufacture, insulation classes are defined according to IEC 60085.

Class	Maximum permitted limit temperature
Y	95°C
A	105°C
E	120°C
B	130°C
F	155°C
H	180°C

Reversion of polarity

The removal of the remaining magnetism between holding surface and work piece with time or intensity dependent pulses of reversed polarity.

Demagnetisation

The decreasing of remnant magnetic field, often through polarity reversal with decreasing amplitude.

Relative duty cycle ED

The value achieved by calculating the time and total cycle duration as a percentage (% ED). Typically electromagnetic holding magnets are designed for a 100% ED duty cycle.

Protection class

Designates the kind of shielding of the device against outer influences.

Code no. 1	Protection level
0	No protection
1	Protection against large foreign substances
2	Protection against medium sized foreign substances
3	Protection against small foreign substances
4	Protection against grain-shaped foreign substances
5	Protection against dust deposit
6	Protection against dust penetration

Code no. 2	Protection level
0	No protection
1	Protection against vertical dripping water
2	Protection against dripping water at an angle
3	Protection against spray water
4	Protection against splashing water
5	Protection against hose water
6	Protection against flooding
7	Protection against immersion
8	Protection against submersion

SG Transmission

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