The thermal joining process from EMAG enables the manufacture of high-precision powertrain components and is perfect for workpieces that are subject to high torque rates and dynamic loads. Customized solutions are always the focal point in the development of joining systems. Thermal joining technology ensures a significant reduction in component weight and very high functional density.
Joining by thermal, force-free processes

The SFC 600 is a highly productive joining machine designed for a variety applications such as joining small drive shafts or camshafts. A fast joining process is guaranteed by the completely NC-controlled high-speed joining axis.

When combined with the generators and heating systems developed by EMAG eldec, the SFC 600 delivers the complete technological process chain for heating and joining from a single source. The flexible design of the machine allows the SFC 600 to be used in a wide range of manufacturing scenarios – from manual loading to fully automatic line use.

Benefits of the SFC 600

+ Lower costs compared to conventional production processes
+ Increased flexibility in production (design of the process chain, shorter retooling times, etc.)
+ The component sequence can be freely selected
+ Angle and axial position can be freely selected
+ Joining precision parts without re-work (for example cams with negative radii) is possible
+ Joining components made of different materials is possible

**TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. workpiece diameter</td>
<td>mm</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>inch</td>
<td>1.5</td>
</tr>
<tr>
<td>Component diameter, max.</td>
<td>mm</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>inch</td>
<td>4</td>
</tr>
<tr>
<td>Workpiece length, max.</td>
<td>mm</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td>inch</td>
<td>23.5</td>
</tr>
<tr>
<td>Joining axis travel, X / Y / Z</td>
<td>mm</td>
<td>1,000 / 600 / 150</td>
</tr>
<tr>
<td></td>
<td>inch</td>
<td>39.5 / 23.5 / 5.9</td>
</tr>
</tbody>
</table>
A powerful eldec induction generator is used in the SFC 600 by EMAG. With its compact design and wide range of control features (optional Profinet interface), the eldec medium-frequency generators are perfect for integration into entire production systems.
Thermal, force-free joining of camshafts

Shaft assemblies and mechanical control assemblies are becoming increasingly important as an alternative to solid components in gearboxes and engines. The benefits of assembled components over conventional solid constructions are the significant reductions in weight. In addition, these components can have more compact dimensions, a design that better meets demands, increased flexibility in component design and production, as well as significantly higher efficiency in managing the range of versions.

The use of assembled camshafts opens up completely new perspectives in engine design. Assembled camshafts contribute significantly to developing fuel-efficient, environmentally-friendly combustion engines.

The patented EMAG process for joining without using thermal forces creates assembled camshafts with optimum precision while simultaneously minimizing the effort and expenditure for finishing processes.

Joining parts (cams, sensor wheels, other parts) are supplied on two interchangeable pallets based on position. While the workpieces from the first pallet are automatically removed via a loading portal, the second pallet is already being loaded up.

Workpiece recognition using dot patterns or Data Matrix Code (DMC) for workpiece identification and determining the correct workpiece position. The piece is then transferred to the induction heating station.
Joining electric motor shafts

The development in electric motor production has taken on a significantly higher role as a result of the increasing electrification of vehicles. Serial or parallel hybrids, range extenders and purely electric drive units make different demands on an electric motor and therefore also on the manufacturing process.

The SFC 600 joining machine provides the precision and productivity required for the manufacture of even high volumes. The joining machine scores particularly well as a result of its high positioning and repetition accuracy.

Joining process: The pump cam is in the cooling phase at this position. All workpieces are gripped with roll grabs. This ensures maximum thermal insulation, in order to minimize loss of heat energy.

Quality inspection of joining results: The probe tests the axial position of the workpiece after the joining process. The prescribed slump is automatically corrected in the case of deviations.
EMAG Salach GmbH
Salach
Austrasse 24
73084 Salach
Germany
Phone: +49 7162 17-0
Fax: +49 7162 17-4027
E-mail: info@salach.emag.com

Frankfurt
Martin-Behaim-Strasse 12
63263 Neu-Isenburg
Germany
Phone: +49 6102 88245-0
Fax: +49 6102 88245-412
E-mail: info@frankfurt.emag.com

Leipzig
Pitterstrasse 26
04159 Leipzig
Germany
Phone: +49 341 4666-0
Fax: +49 341 4666-114
E-mail: info@leipzig-emag.com

Munich
Zamdorferstrasse 100
81677 München
Germany
Phone: +49 89 99886-250
Fax: +49 89 99886-160
E-mail: info@muenchen.emag.com

Hungary
Gerenda 10
1163 Budapest
Hungary
Phone: +36 30 9362-416
E-mail: lbujak@emag.com

Austria
Zamorcherweg 1
5400 Hallein
Austria
Phone: +43 6245 76023-0
Fax: +43 6245 76023-20
E-mail: info@austria.emag.com

Czech Republic
Lotkova 766
103 00 Praha 10 – Kolovraty
Czech Republic
Phone: +420 731 476070
E-mail: mdeja@emag.com

Poland
ul. Krzycka 71 A / 6
53-620 Wrocław
Poland
Phone: +48 728 389 989
Fax: +48 601 371 353
E-mail: info@poland.emag.com

Turkey
Sanayi Cad. No.: 44
Nish Istanbul Sitesi D Blok
D: 155 Yenibosna – Istanbul
Turkey
Phone: +90 532 694 54 44
E-mail: ckoc@emag.com

Market Companies

EUROPE
ZETA EMAG Srl
Via dei Mille 31
20098 San Giuliano Milanese (Mi)
Italy
Phone: +39 02 905942-1
Fax: +39 02 905942-24
E-mail: zetaemag@emag.com

NODIER EMAG INDUSTRIE
2, Parc des Fontenelles
78870 Bailly
France
Phone: +33 130 8047-70
Fax: +33 130 8047-69
E-mail: info@nodier.emag.com

ZETA EMAG Srl
Sucursal en España
Pasaje Arrahona, nº 18
Polígono Industrial Santiga
08210 Barberá del Vallés (Barcelona)
Spain
Phone: +34 93 7195080
Fax: +34 93 7297107
E-mail: info@emh.emag.com

EMAG UK Ltd.
Cheshunt House,
Kingswood Business Park
Holyhead Road
Albrighton
Wolverhampton WV7 3AU
Great Britain
Phone: +44 1902 37609-0
Fax: +44 1902 37609-1
E-mail: info@uk.emag.com

EMAG OOO
ul. Akademika Chelomeya 3/2
117630 Moscow
Russia
Phone: +7 495 287 0960
Fax: +7 495 287 0962
E-mail: info@russia.emag.com

AMERICA
EMAG L.L.C. USA
38800 Grand River Avenue
Farmington Hills, MI 48335
USA
Phone: +1 248 477-7440
Fax: +1 248 477-7784
E-mail: info@busia.emag.com

EMAG MEXICO
Maquinaria EMAG México S de RL de CV
Av. Hercules 301 Nave 1
Polígono Empresarial Santa Rosa
76220 Santa Rosa Jauregui, Queretaro
Mexico
Phone: +52 442 291 1552
Fax: +52 442 291 1552
E-mail: info.mx@emag.com

EMAG DO BRASIL
Edificio Neo Corporate Offices,
CJ 1503
Rua Enxovia, 472
04711-030 São Paulo SP
Brazil
Phone: +55 11 38370145
Fax: +55 11 38370145
E-mail: info@brasil.emag.com

EMAG KOREA Ltd.
Rm204, Biz center, SKn Technopark,
124 Sagmokgil-ro, Sangdawon-dong,
Jungwon-gu, Seongnam City,
Gyeonggi-do, 462-721
South Korea
Phone: +82 31 776-4415
Fax: +82 31 776-4419
E-mail: info@korea.emag.com

ASIA
EMAG (China) Machinery Co., Ltd.
Building A & B Cangneng
Europe & America Technology Park
No. 8 Loujiang Rd. (N.)
215400 Taicang
Jiangsu, China
Phone: +86 512 5357-4098
Fax: +86 512 5357-5399
E-mail: info@emag-china.com

EMAG (Chongqing) Machinery Co., Ltd.
No. 10th Lailong Road
Yongchuan District
402160 Chongqing
China
Phone: +86 23 49783399
Fax: +86 23 49783388
E-mail: info@emag-china.com

TAKAMAZ EMAG Ltd.
1-8 Asahigaoka Hakusan-City
Ishikawa Japan, 924-0004
Japan
Phone: +81 76 274-1409
Fax: +81 76 274-8530
E-mail: info@takamaz.emag.com

EMAG INDIA Pvt. Ltd.
Technology Centre
No. 17/G/46-3, Industrial Suburb,
2nd Stage, Yeshwanthpur,
Bangaluru – 560 022.
India
Phone: +91 80 48652748
E-mail: info.india.emag.com