



## Motors Overview

Synchronous  
Stepper  
Electronics  
Gearboxes

**saia-burgess**  
Smart solutions for comfort and safety



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# Saia-Burgess Group

The human requirement for comfort and safety is central in driving technological progress.

Our activities are inspired by this:

Smart solutions for comfort and safety.



## Profile

### Who

We are a successful international group focusing on expanding segments of the automotive, industrial and building automation markets. As a supplier, our core competency is the development of innovative solutions which integrate electronic and electromechanical technologies.

### What

We want to be a leading supplier in our target market segments. Our global brand stands for innovation, reliability and value. Respecting ethical principles, we create sustained added value for all of our interest groups – employees, customers, shareholders.

### How

Together with our customers we develop solutions which increase comfort, safety and economy. We manufacture switches, sensors, motors, solenoids, electronic controllers and subsystems in Europe, America and Asia. Our products are supplied and supported through our extensive international sales and tech-centre organisation.

## Market led structure

### Automotive Division

Supplies mechanical and electromechanical components in large volumes worldwide (switches, motors, solenoids, sensors) together with subsystems as innovative solutions for clearly defined applications in the comfort and safety areas of automotive design.

### Industry Division

Supplies OEM customers worldwide with a broad product range comprising electromechanical and electronic components and subsystems. These cover increased demands for comfort and safety features, mainly in domestic appliances, heating, ventilation and air-conditioning applications, and in the general industrial sector.

### Controls Division

Supplies customers in Europe with control technology based on programmable logic controllers for use mainly in the areas of infrastructure automation processing control.

## Innovative Products

Our research and development is focused totally on market need and customer requirements. Substantial investment is made in the development not only of innovative, new products, but also of customised solutions. Our products are manufactured, according to type and technical requirements, on either highly automated, partially automated or manual production equipment.

# Saia-Burgess Industry Division

Solutions for comfort and safety



Heating/Ventilation/Air Conditioning



Kitchen Appliances



Domestic Appliances



Vending and Gaming Machines



Special Vehicles



Office Equipment

The Industry Division offers a broad range of standard and customised products: switches, motors, solenoids, door locking systems, sensors, electronic control devices and sub-systems. The Division has a worldwide presence with its own sales network and tech centre organisation.

## Combining the electromechanical with electronics

The fusion of electronic and electromechanical sub-assemblies has made new, innovative solutions possible for a variety of industrial applications.

## Highly flexible production

The Division is involved with design and engineering, tool manufacture, electronics, plastic and metal parts production, assembly employing its own extensive quality procedures and test equipment. The options of partially automated or manual production for medium to small volumes offer a high level of manufacturing flexibility.

## Domestic appliances are safer and more convenient

The use of control switches, microswitches, solenoids, sensors and sub-systems in coffee machines, extractor hoods, microwave ovens, washing machines, dishwashers, tumble dryers, mixers, etc. has brought greater safety and comfort to the user.

## Improved energy efficiency in heating, ventilation and air-conditioning

The level of energy efficiency in buildings has been increased by the use of solenoids, motors, microswitches, sensors and sub-systems in gas and water valves, and in air valves for heating, ventilation, air-conditioning and fuel-cell applications.

## More comfort and safety in very diverse applications

Comfort and safety have been improved by using microswitches, control switches, motors, solenoids and sub-systems in office machinery, postal sorting equipment and other very varied applications in vending machines, gaming machines, specialist vehicles, telecommunications and medical equipment.

# Motors

## Synchronous Motors

### Rotational



Type	URT	UAT	UCM/UCR	UBR1/UBR2	UDR
Dimensions (mm)	∅ 13 x 11	∅ 20 x 17	∅ 28 x 24	∅ 36 x 21	∅ 48 x 24
Characteristics	<ul style="list-style-type: none"> <li>smallest motor</li> <li>optional planetary gearbox with diameter 13mm</li> <li>pin connection or flex print</li> </ul>	<ul style="list-style-type: none"> <li>long life</li> <li>precision bearing</li> <li>standard 24VAC motor</li> </ul>	<ul style="list-style-type: none"> <li>standard modules</li> <li>customer specific interfaces</li> </ul>	<ul style="list-style-type: none"> <li>wide range of customised versions available</li> <li>up to 230 VAC supply voltage</li> </ul>	<ul style="list-style-type: none"> <li>compact reversible synchronous motor</li> </ul>
Voltage (V)	3–24	12–48	12–48	12–230	12–230
Speed 50 Hz (rpm)	600	600	250/500	250/500	500
60 Hz (rpm)	720	720	300/600	300/600	600
Pole number	10	10	24/12	24/12	12
Running torque (cNm)					
50 Hz	0,1	0,31	0,9–1,2	0,75–0,9	1,5
60 Hz	0,1	0,3	0,85–1,2	0,72–0,9	1,4
Power output (W)					
50 Hz	0,06	0,19	0,32–0,47	0,24–0,39	0,77
60 Hz	0,07	0,23	0,37–0,53	0,28–0,45	0,87
Gear combination	–	–	–	A, D, M, B, F, V, J	A, D, M, B, F, V, J
Weight (g)	7	25	54	60	132

## Synchronous Motors

### Rotational



Type	UDS	SM5021/SM5022	UFM/UFR	UHM	SM6443/SM6444
Dimensions (mm)	∅ 48 x 18,5	∅ 50 x 21	∅ 52 x 28 (56)	∅ 59 x 35 (70)	∅ 64 x 43
Characteristics	<ul style="list-style-type: none"> <li>simple to connect, only two wires</li> <li>no capacitor</li> <li>uni-directional with integrated anti-return mechanism</li> </ul>	<ul style="list-style-type: none"> <li>three speeds versions</li> <li>wide range of torque capacities</li> </ul>	<ul style="list-style-type: none"> <li>three-phase AC operation possible</li> <li>for high power 2, 3 or 4 coils</li> </ul>	<ul style="list-style-type: none"> <li>powerful motor</li> <li>synchronous version of the stepper motor UHD</li> </ul>	<ul style="list-style-type: none"> <li>most powerful package with STG/V gearboxes</li> </ul>
Voltage (V)	6–230	6–230	12–230	12–230	12–230
Speed 50 Hz (rpm)	500	250/375/500	250/500	250	250/375
60 Hz (rpm)	600	300/450/600	300/600	300	300/450
Pole number	12	24/16/12	24/12	24	24/16
Running torque (cNm)					
50 Hz	0,95	2,0–7,5	2,8–5,3	8,5–15	10,5–35
60 Hz	0,8	1,8–7	2,6–4,7	6,6–9,5	8,5–30
Power output (W)					
50 Hz	0,5	0,65–2,75	1–2,8	2,2–3,9	3,5–13,8
60 Hz	0,5	0,78–3,0	1,1–3	2,1–3	3,9–14,2
Gear combination	A, D, M, B, F, V, J	VK4, STG60/61/200, V250	A, D, M, B, F, V, J	J	STG60/61/200
Weight (g)	102	195	195–370	300–580	500

## Synchronous Motors

### Rotational, Torque Limited



Type **SM3532RG**

Type **SM5032RG**

Type **SM6469RG**

Dimensions (mm)	∅ 35 x 32	∅ 50 x 32	∅ 64 x 69
Characteristics	<ul style="list-style-type: none"> <li>■ torque limiting feature</li> <li>■ abrasion-free, integrated low noise magnetic hysteresis clutch</li> </ul>		
Voltage (V)	24–230	24–230	24–230
Speed 50 Hz (rpm)	375	375	375
60 Hz (rpm)	450	450	450
Pole number	16	16	16
Rotational, Torque Limited (cNm)			
50 Hz	0,6	2	7
60 Hz	0,6	2	7
Power output (W)			
50 Hz	0,25	0,8	2,75
60 Hz	0,3	0,95	3
Gear combination	STG60/61/200, V250	STG60/61/200, V250	STG61/200, V250
Weight (g)	100	190	600

### Linear



Type **UCC/UCK**

Dimensions (mm)	∅ 28 x 31
Characteristics	<ul style="list-style-type: none"> <li>■ new linear motor using modules of the UC range</li> <li>■ integrated non-rotational thread spindle</li> </ul>
Travel (mm)	10/13
Voltage (V)	12–48
Thread pitch (mm)	1,0
Speed (mm/s)	
50 Hz	4,16/8,33
60 Hz	5/10
Pole number	24/12
Max Force (N)*	35
Weight (g)	67

\* Depends on winding, frequency and lifetime required. Drive against end stops only permissible after clarification of operational conditions

## Synchronous Motors

### Linear



Type **UBK**

Type **LA3520SM**

Type **SP3520SM**

Type **LA5021SM**

Type **SP5021/5022SM**

Dimensions (mm)	∅ 36 x 36	∅ 36 x 41	∅ 36 x 25	∅ 50 x 76	∅ 50 x 27
Characteristics	<ul style="list-style-type: none"> <li>■ standard linear motor</li> <li>■ for extended travel the spindle has to be retained externally</li> </ul>	<ul style="list-style-type: none"> <li>■ linear actuator with 3 speeds</li> <li>■ 20 mm travel</li> <li>■ integrated non-rotational threaded spindle</li> </ul>	<ul style="list-style-type: none"> <li>■ spindle type</li> <li>■ threaded spindle has to be retained externally</li> <li>■ for extended travel</li> </ul>	<ul style="list-style-type: none"> <li>■ linear actuator with 3 speeds</li> <li>■ 50 mm travel</li> <li>■ integrated non-rotational threaded spindle</li> </ul>	<ul style="list-style-type: none"> <li>■ spindle type</li> <li>■ threaded spindle has to be retained externally</li> <li>■ for extended travel</li> </ul>
Travel (mm)	8/13/56	20	24–134	45–50	68–130
Voltage (V)	12–230	24–230	24–230	12–230	12–230
Thread pitch (mm)	1,0	0,75/0,75/0,75	0,75/0,75/0,75	1,5/1,5/1,5	1,5/1,5/1,5
Speed (mm/s)					
50 Hz	6,67/8,33	3,125/4,69/6,25	3,125/4,69/6,25	6,25/9,37/12,5	6,25/9,37/12,5
60 Hz	8/10	3,75/5,62/7,5	3,75/5,62/7,5	7,5/11,25/15	7,5/11,25/15
Pole number	12	24/16/12	24/16/12	24/16/12	24/16/12
Max Force (N)*	35	20	20	45–50	45–70
Weight (g)	90	100	100	220	220

\* Depends on winding, frequency and lifetime required. Drive against end stops only permissible after clarification of operating conditions

## Stepper Motor

### Rotational



Type	URG	UAG	UCD/UCB	UBD/UBB	UDB
Dimensions (mm)	∅ 13 x 11	∅ 20 x 17	∅ 28 x 24	∅ 36 x 21	∅ 48 x 24
Characteristics	<ul style="list-style-type: none"> <li>high dynamic performance</li> <li>optional planetary gearbox with motor diameter</li> <li>pin connection or flex print</li> </ul>	<ul style="list-style-type: none"> <li>precision bearing standard motor</li> </ul>	<ul style="list-style-type: none"> <li>standard modulators</li> <li>customer specific interfaces</li> </ul>	<ul style="list-style-type: none"> <li>wide range of customised versions available</li> </ul>	<ul style="list-style-type: none"> <li>compact reversible 15° stepper motor</li> </ul>
Step angle(°)	18	18	7,5/15	7,5/15	15
Holding torque (cNm)	0,25	0,7/0,5	1,6–3,1	1,0–1,9	2,2–2,7
Detent torque (cNm)	0,04	0,14	0,2	0,22–0,36	0,35
Winding	bipolar	bipolar/unipolar	bipolar/unipolar	bipolar/unipolar	bipolar/unipolar
Gear combination	–	–	–	A, D, M, B, F, V	A, D, M, B, F, V, J
Weight (g)	7	25	54	60	132

## Stepper Motor

### Rotational



Type	ST5021/ST5022	UFD/UFB	UHD	ST6443/ST6444
Dimensions (mm)	∅ 50 x 21	∅ 52 x 28 (56)	∅ 59 x 35 (70)	∅ 64 x 43
Characteristics	<ul style="list-style-type: none"> <li>three step angle motor</li> <li>wide range of torque capabilities</li> </ul>	<ul style="list-style-type: none"> <li>two step angle motor</li> </ul>	<ul style="list-style-type: none"> <li>powerful standard motor</li> <li>7,5° stepper motor</li> </ul>	<ul style="list-style-type: none"> <li>most powerful package with STG/V gearboxes</li> </ul>
Step angle(°)	7,5/11,25	7,5/15	7,5	7,5/11,25
Holding torque (cNm)	3,7–7,5	4,3–10,4	13–45,5	30–45
Detent torque (cNm)	0,25–1	0,45–0,8	1,3–5,3	2–7
Winding	bipolar	bipolar/unipolar	bipolar/unipolar	bipolar
Gear combination	VK4, STG60/61/200 V250	A, D, M, B, F, V, J	J	STG60/61/200, V250
Weight (g)	195	180–350	300–580	500



## Stepper Motor

### Linear



Type	UCE/UCL	UBL	LA3520ST	SP3520ST	LA5021ST
Dimensions (mm)	∅ 28 x 31	∅ 36 x 36	∅ 36 x 41	∅ 36 x 25	∅ 50 x 76
Characteristics	<ul style="list-style-type: none"> <li>new linear motor using modules of the UC range</li> <li>integrated non-rotational threaded spindle</li> </ul>	<ul style="list-style-type: none"> <li>general purpose linear motor</li> <li>for long travel version the spindle has to be retained externally</li> </ul>	<ul style="list-style-type: none"> <li>linear actuator with 3 step widths and 20 mm travel</li> <li>integrated threaded spindle is prevented from rotating</li> </ul>	<ul style="list-style-type: none"> <li>spindle type</li> <li>threaded spindle has to be retained externally for extended travel</li> </ul>	<ul style="list-style-type: none"> <li>linear actuator with 3 step widths and 50 mm travel</li> <li>integrated non-rotating threaded spindle</li> </ul>
Travel (mm)	10/13	8/13/56	20	24-134	45-50
Travel per step (mm)	0.021/0.041	0.033/0.041	0.016/0.023/0.031	0.016/0.023/0.031	0.031/0.047/0.063
Thread pitch (mm)	1.0	1.0	0.75/0.75/0.75	0.75/0.75/0.75	1.5/1.5/1.5
Speed (mm/s) at 200 Hz	4.16/8.33	6.67/8.33	3.125/4.69/6.25	3.125/4.69/6.25	6.25/9.37/12.5
Step angle (°)	7.5/15	15	7.5/11.25/15	7.5/11.25/15	7.5/11.25/15
Max. Force (N)*	35	35	20	20	45-50
Weight (g)	67	90	100	100	220

\* Depends on winding, frequency and lifetime required.  
Drive against end stops only permissible after clarification of operational conditions

## Stepper Motor

### Linear



Type	SP5022ST	UKE
Dimensions (mm)	∅ 50 x 27	∅ 57 x 45
Characteristics	<ul style="list-style-type: none"> <li>spindle type</li> <li>threaded spindle has to be retained externally for extended travel</li> </ul>	<ul style="list-style-type: none"> <li>the most powerful 7.5 ° linear stepper motor</li> <li>integrated non-rotating threaded spindle</li> </ul>
Travel (mm)	68-130	13/30
Travel per step (mm)	0.031/0.047/0.063	0.031
Thread pitch (mm)	1.5/1.5/1.5	1.5
Speed (mm/s) at 200 Hz	6.25/9.37/12.5	6.25
Step angle (°)	7.5/11.25/15	7.5
Max. Force (N)*	50-70	50-100
Weight (g)	220	325

\* Depends on winding, frequency and lifetime required.  
Drive against end stops only permissible after clarification of operating conditions

# Electronics for Stepper Motors

## Driver Boards



Type **SAMOTRONIC101**    **SAMOTRONIC102**    **Evaluation Kit 2**

Dimensions (mm)	55 x 40	84 x 54	metal case 160 x 100 x 30 (Euro-PCB)
Characteristics	<ul style="list-style-type: none"> <li>■ small unipolar driver board</li> </ul>	<ul style="list-style-type: none"> <li>■ small bipolar driver board</li> <li>■ flash controller</li> <li>■ optional customised software</li> </ul>	<ul style="list-style-type: none"> <li>■ tool for development, test and optimisation of stepper drive systems</li> <li>■ windows-based software</li> <li>■ quick parameter setup</li> <li>■ visualisation of speed and position</li> <li>■ positioning sequences capability</li> </ul>
Driver	■ for unipolar motors	■ for bipolar motors	■ for unipolar and bipolar motors
Supply voltage (V)	10–24 (DC)	standard version 10–24 (DC) enhanced version 10–42 (DC)	3–55 (DC) 24 (AC)
Motor current	constant voltage drive	constant current drive (chopper controlled) adjustable via potentiometer	constant voltage drive and constant current drive (chopper controlled)
Step mode	full/half step	full/half step	full/half/micro step
Clock source	internal or external	internal or external	internal, programmable
Control inputs to	<ul style="list-style-type: none"> <li>■ inhibit internal clock</li> <li>■ inhibit motor current</li> <li>■ change direction of rotation</li> </ul>	<ul style="list-style-type: none"> <li>■ inhibit internal clock</li> <li>■ inhibit motor current</li> <li>■ change direction of rotation</li> </ul>	<ul style="list-style-type: none"> <li>■ 3 digital inputs</li> <li>■ 4 signal outputs</li> <li>■ 1 analog input 0...10 VDC</li> <li>■ 1 relay contact</li> </ul>
Configuration	via DIP-switch, potentiometer	via DIP-switch potentiometer	RS 232, USB


## Gearboxes



Type	VK2	UGA/UGD	VK4	UGM	UGB/UGF
Dimensions (mm)	∅ 40	55 x 62/65,6	∅ 52	51 x 65,2	58 x 81
Characteristics	<ul style="list-style-type: none"> <li>compact</li> <li>cylindrical shape</li> </ul>	<ul style="list-style-type: none"> <li>established plastic gears</li> <li>wide range of ratios</li> <li>gears rotate on hardened steel shafts</li> <li>optional integrated slipping clutches</li> </ul>	<ul style="list-style-type: none"> <li>cylindrical 52 mm diameter design</li> </ul>	<ul style="list-style-type: none"> <li>volume metal and plastic spur gears</li> <li>hardened steel shafts included in plastic housing and metal plate</li> </ul>	<ul style="list-style-type: none"> <li>robust metal spur gears, plastic primary gears</li> <li>die-cast aluminium housing</li> </ul>
Height	19	12/13	20	15	17
Max. torque (cNm) <sup>1)</sup>	20	32	40	100	250/500
Ratios	6 <sup>1</sup> / <sub>4</sub> ...2250	A: 4 <sup>1</sup> / <sub>6</sub> ...360.000 D: 4 <sup>1</sup> / <sub>6</sub> ...6.048.000	6 <sup>1</sup> / <sub>4</sub> ...1875	12 <sup>1</sup> / <sub>2</sub> ...4800	B: 4 <sup>1</sup> / <sub>3</sub> ...345.600 F: 4 <sup>1</sup> / <sub>6</sub> ...5000
Internal slipping clutch	–	optional	–	–	optional (UGB)
Standard shaft (mm)	∅ 3 x 10	∅ 4 x 10	∅ 3 x 10	∅ 4 x 10	∅ 8 x 12
Weight (g)	depends on ratio	55/35	depends on ratio	45	130

<sup>1)</sup> max. value, for higher ratios

## Gearboxes



Type	UGV	STG60/STG61	UGJ	STG200	V250
Dimensions (mm)	70 x 70	∅ 65/68 x 68	65 x 107	70 x 130	70 x 100
Characteristics	<ul style="list-style-type: none"> <li>solid metal spur gears</li> <li>die-cast aluminium housing</li> </ul>	<ul style="list-style-type: none"> <li>high performance hardened steel spur gears</li> <li>low teeth profile</li> <li>optional interface plates for DC motors</li> <li>option additional housing for IP 65</li> </ul>	<ul style="list-style-type: none"> <li>the most extensive gear ratio range</li> <li>medium torque two plate gear type with metal spur gears</li> </ul>	<ul style="list-style-type: none"> <li>high performance metal gear type</li> <li>robust aluminium twin plate design</li> <li>can be used with DC motors</li> </ul>	<ul style="list-style-type: none"> <li>high torque spur gears type</li> </ul>
Height	17	30–38 <sup>2)</sup>	28	38	36
Max. torque (cNm) <sup>1)</sup>	500	600	1500	2000	2500
Ratios	8 <sup>1</sup> / <sub>3</sub> ...2.000	6 <sup>1</sup> / <sub>4</sub> ...5400	4 <sup>1</sup> / <sub>6</sub> ...36 Mill. ≥ 2500 with UGD	6 <sup>1</sup> / <sub>4</sub> ...375	125...1500
Internal slipping clutch	–	–	–	–	–
Standard shaft (mm)	∅ 8 x 12	∅ 8 x 22	∅ 12 x 20	∅ 12 x 35	∅ 12 x 35
Weight (g)	130	230–330	480	depends on ratio	depends on ratio

<sup>1)</sup> max. value, for higher ratios

<sup>2)</sup> depends on ratio

# Addresses

## Sales Companies

### Europe

#### Austria

Saia-Burgess Österreich GmbH  
Linzer Bundesstrasse 101  
A-5025 Salzburg  
T +43 662 88 4910  
F +43 662 88 4910 11  
office@saia-burgess.at

#### Belgium

Saia-Burgess Benelux  
Mechelsesteenweg 277  
B-1800 Vilvoorde  
T +32 24 56 0620  
F +32 24 60 5044  
office@saia-burgess.be

#### France

Saia-Burgess Paris Sarl  
10 Bld. Louise Michel  
F-92250 Gennevilliers  
T +33 1 46 88 07 70  
F +33 1 46 88 07 99  
claudine.giraud@saia-burgess.com

#### Germany

Saia-Burgess Halver GmbH & Co. KG  
Weissenpferd 9  
D-58555 Halver  
T +49 2353 911 0  
F +49 2353 911 250  
sales-d@saia-burgess.com

#### Hungary

Saia-Burgess Controls Kft  
Liget u. 1  
H-2040 Budaörs  
T +36 23 50 1170  
F +36 23 50 1180  
office@saia-burgess.hu

#### Italy

Saia-Burgess Milano Srl  
Via Cadamosto 3  
I-20094 Corsico, Milano  
T +39 02 4869 21  
F +39 02 4860 0692  
saia-burgess.it@saia-burgess.com

#### Netherlands

Saia-Burgess Benelux B.V.  
Hanzeweg 12c  
NL-2803 MC Gouda  
T +31 1825 43 154  
F +31 1825 43 151  
office@saia-burgess.nl

#### Switzerland

Saia-Burgess Murten AG  
Bahnhofstrasse 18  
CH-3280 Murten  
T +41 26 672 71 11  
F +41 26 670 19 85  
vch@saia-burgess.com

#### United Kingdom

Saia-Burgess Gateshead Ltd.  
Dukesway  
Team Valley Trading Estate  
Gateshead  
Tyne & Wear NE11 0UB  
United Kingdom  
T +44 191 401 61 00  
F +44 191 401 63 24  
uk.sales@saia-burgess.com

### North America

#### Canada

Saia-Burgess Canada Co. Inc.  
70 Ironside Crescent  
Unit 7  
Scarborough  
Ontario M1X 1G4  
Canada  
T +1 416 299 08 52  
F +1 416 299 67 56  
saiaburg@pathcom.com

#### USA

Saia-Burgess USA Inc.  
616 Atrium Drive, Suite 100  
Vernon Hills  
Illinois 60061  
USA  
T +1 847 549 9650  
F +1 847 549 9625  
sales@saia-burgess-usa.com

#### Saia-Burgess Inc.

Ledex® and Dormeyer® Products  
801 Scholz Drive  
P.O. Box 427  
Vandalia  
Ohio 45377  
USA  
T +1 937 454 2345  
F +1 937 898 8624  
sales@ledex.com

### Asia

#### Hong Kong

Saia-Burgess (HK) Ltd.  
Rooms 2503-4,  
Cheung Tat Centre  
18 Cheung Lee Street  
Chaiwan  
Hong Kong  
T +852 2556 3772  
F +852 2976 0871  
sbehk@saia-burgess.com.hk

#### China

Saia-Burgess GuangZhou Ltd.  
4th Floor, Dongjiang River Avenue  
West 9, GETDD  
Guangzhou 510730, P.R.CHINA  
T +8620-82223537, 82223586  
F +8620-82087207  
sales.gz@saia-burgess.com.cn

### All other countries

### Distributed by

#### International

Saia-Burgess Murten Ltd.  
Bahnhofstrasse 18  
CH-3280 Murten  
T +41 26 672 71 11  
F +41 26 672 76 06  
office@saia-burgess.com