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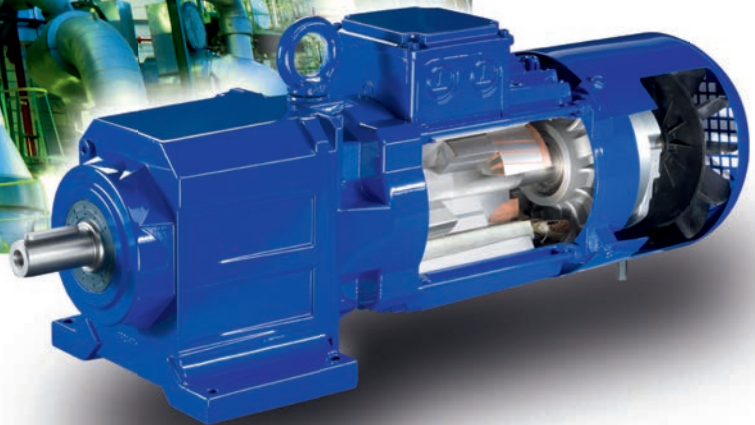
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**Super Premium
Efficiency
Gear Motors for
Explosion
Hazardous Areas**



IE4



 **Bauer**[®]
Gear Motor

An Altra Industrial Motion Company



Boosting energy efficiency with variable speed drives

EU Regulation 640/2009/EC exempts motors for use in explosion hazardous areas from the minimum efficiency requirements for placing new products on the market, because explosion protection takes precedence over the energy savings that can be achieved with motors. This does not mean that there is no potential for energy savings with the electric motors used in the chemical industry.

This is why the VIK pamphlet „VIK Recommendation 1: Three-Phase Induction Motors – Technical Requirements“ recommends the use of efficiency class IE2 (High Efficiency) for motors with explosion protection types Ex d and Ex nA and efficiency class IE1 (Standard Efficiency) for motors with explosion protection type Ex e.

For many years, only encapsulated motors (type Ex d) could be used for variable speed operation in explosion hazardous areas. With the launch of motors with explosion protection type Ex e for use next to the inverter, customers now have a economical alternative to encapsulated motors when procuring motors for use in explosion hazardous areas.

Variable speed drives create opportunities for major energy savings. For applications in explosion hazardous areas as well as other areas, retrofitting frequency inverters in existing plants and achieving higher energy savings by using highly efficient motors are both attractive options.

Most currently available variable-speed three-phase induction motors with explosion protection type Ex e are only available in standard efficiency class IE1. This means that potential energy savings are only partially utilised.

For the **first time ever**, the S series of permanent magnet synchronous motors (PMSM) from **Bauer Gear Motor GmbH** offers variable-speed motors in **efficiency class IE4** for use in explosion hazardous areas. This is the highest energy efficiency that can be achieved with the current state of motor technology.

Bauer Gear Motor GmbH helps the chemical industry fully exploit potential energy savings with high efficiency IE4 motors, even at the highest level.

PMSM S-series in IE4 for explosion hazardous areas


Design torque M_N :

5 Nm – 48 Nm

Rated power P_N :

0,75 kW – 15 kW

Protection type: Increased Safety – Zone 1

 II 2 G Ex e IIC T1 - T3 Gb

S.XE.08MA4
S.XE.08LA4
S.XE.09SA4
S.XE.09XA4
S.XE.11SA6
S.XE.11MA6
S.XE.11LA6

Dust explosion protection – Zone 21

 II 2 D Ex tb IIIC T 160°C ... 120° Db

S.XC.08MA4
S.XC.08LA4
S.XC.09SA4
S.XC.09XA4
S.XC.11SA6
S.XC.11MA6
S.XC.11LA6





Motor Data

| Type | Design | | | | | | | |
|-----------------|------------|-------|--------|---------|------------|-------|--------|---------|
| | 1500 1/min | | | | 3000 1/min | | | |
| | Speed | Power | Torque | Current | Speed | Power | Torque | Current |
| | 1/min | kW | Nm | A | 1/min | kW | Nm | A |
| S..08MA4 | 150 | 0,08 | 5 | 1,9 | 150 | 0,08 | 5 | 3,7 |
| | 500 | 0,29 | 5,6 | 2,1 | 500 | 0,29 | 5,6 | 4,1 |
| | 1000 | 0,68 | 6,5 | 2,3 | 1000 | 0,7 | 6,5 | 4,7 |
| | 1500 | 1 | 6,5 | 2,3 | 3000 | 2 | 6,5 | 4,7 |
| | 1800 | 1,2 | 6,5 | 2,3 | 3600 | 2,5 | 6,5 | 4,7 |
| S..08LA4 | 150 | 0,1 | 6,5 | 2,5 | 150 | 0,1 | 6,5 | 5,2 |
| | 500 | 0,42 | 8,0 | 3,0 | 500 | 0,42 | 8,0 | 5,9 |
| | 1000 | 1 | 9,55 | 3,5 | 1000 | 1 | 9,55 | 7,0 |
| | 1500 | 1,5 | 9,55 | 3,5 | 3000 | 3 | 9,55 | 7,0 |
| | 1800 | 1,8 | 9,55 | 3,5 | 3600 | 3,6 | 9,55 | 7,0 |
| S..09SA4 | 150 | 0,13 | 8 | 2,5 | 150 | 0,13 | 8 | 5,2 |
| | 500 | 0,53 | 10 | 3,2 | 500 | 0,53 | 10 | 6,4 |
| | 1000 | 1,36 | 13 | 4,0 | 1000 | 1,36 | 13 | 8,25 |
| | 1500 | 2 | 13 | 4,0 | 3000 | 4 | 13 | 8,25 |
| | 1800 | 2,2 | 11,5 | 4,0 | 3600 | 4,15 | 11 | 7,3 |
| S..09XA4 | 150 | 0,2 | 13 | 4,0 | 150 | 0,196 | 12,5 | 8,0 |
| | 500 | 0,84 | 16 | 5,0 | 500 | 0,84 | 15,7 | 9,9 |
| | 1000 | 2,1 | 20 | 6,3 | 1000 | 2,1 | 20 | 12,5 |
| | 1500 | 3,1 | 20 | 6,3 | 3000 | 6,3 | 20 | 12,5 |
| | 1800 | 3,6 | 19 | 6,3 | 3600 | 5,5 | 14,5 | 9,2 |
| S..11SA6 | 150 | 0,28 | 18 | 5,6 | 150 | 0,28 | 18 | 12 |
| | 500 | 1 | 20 | 6,2 | 500 | 1 | 20 | 13,3 |
| | 1000 | 2,4 | 22,5 | 7,0 | 1000 | 2,4 | 22,5 | 15 |
| | 1500 | 3,5 | 22,5 | 7,0 | 3000 | 7,1 | 22,5 | 15 |
| | 1800 | 6,1 | 22,5 | 7,0 | 3600 | 8,5 | 22,5 | 15 |
| S..11MA6 | 150 | 0,42 | 26,5 | 8,5 | 150 | 0,42 | 26,5 | 17 |
| | 500 | 1,6 | 30 | 9,5 | 500 | 1,6 | 30 | 19,3 |
| | 1000 | 3,7 | 35 | 11 | 1000 | 3,7 | 35 | 22,5 |
| | 1500 | 5,5 | 35 | 11 | 3000 | 11 | 35 | 22,5 |
| | 1800 | 6,5 | 35 | 11 | 3600 | 12,9 | 34,3 | 22,5 |
| S..11LA6 | 150 | 0,51 | 32,5 | 9,8 | 150 | 0,5 | 32,5 | 20 |
| | 500 | 2 | 39,4 | 12 | 500 | 2,1 | 39,4 | 24 |
| | 1000 | 5 | 48 | 14,7 | 1000 | 5 | 48 | 30 |
| | 1500 | 7,5 | 48 | 14,7 | 3000 | 15 | 48 | 30 |
| | 1800 | 9 | 47,5 | 14,7 | 3600 | 15 | 40 | 25,8 |



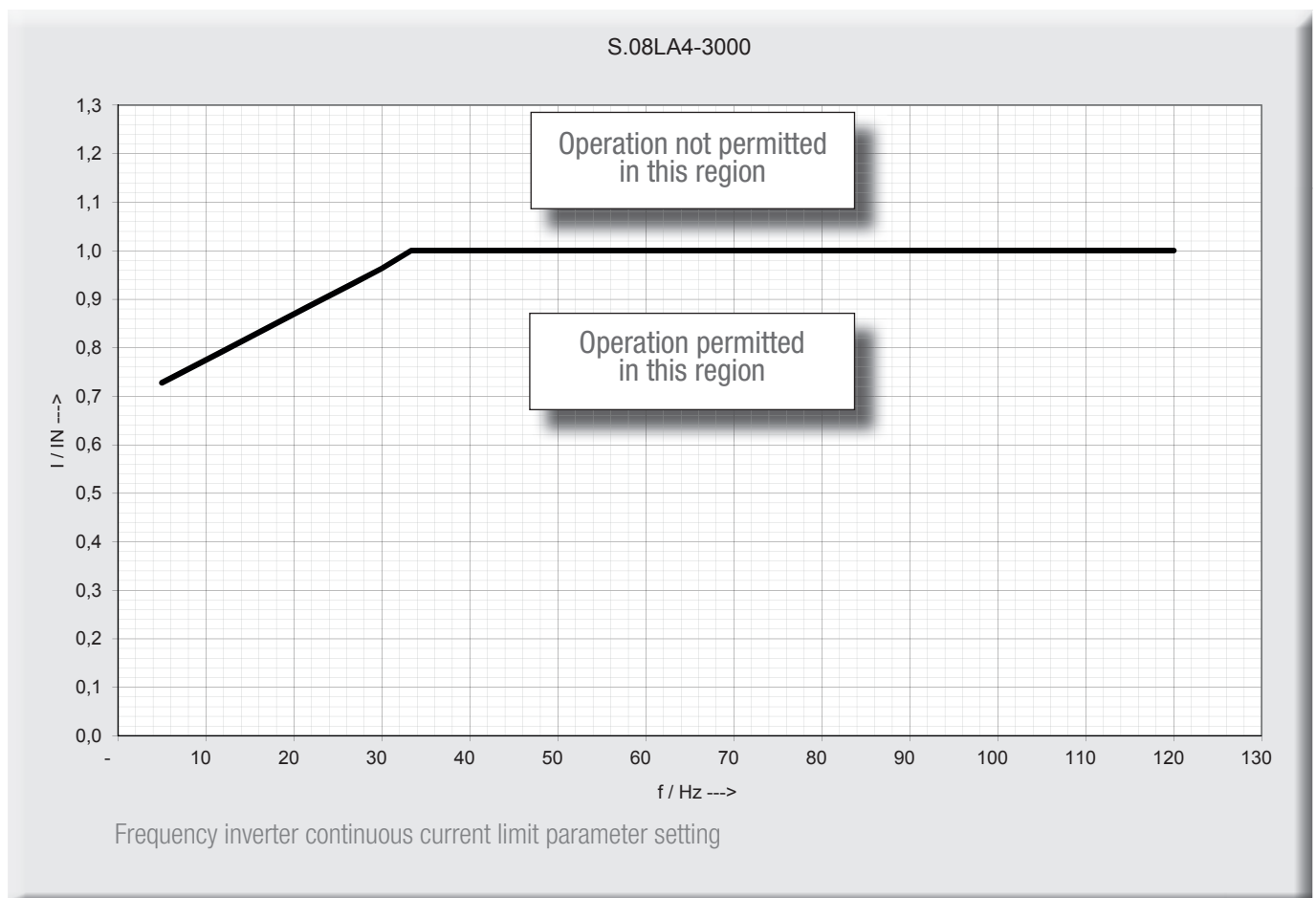
Inverter Settings

| | |
|--|---|
| Minimum clock frequency: | 3 kHz |
| Short-term current limit: | 160% x I_N |
| Maximum overload time: | 60 s |
| Minimum frequency: | 5 Hz |
| Maximum frequency: | Up to 180 Hz, depending on motor design |
| Permissible operating time below f_{min} : | 60 s (in open loop mode) |

All other settings must be selected according to the requirements of the drive. The maximum overload time and the permissible operating time below f_{min} are based on an interval of 10 minutes. Non-standard operating conditions are available on request.

Frequency-dependent current limit

The continuous current limit of the frequency inverter must be set in accordance with the current versus frequency diagram (the example diagram below is for motor type S..08LA4-3000 rpm).





Investment security for the future

Electrically driven machinery accounts for around 70% of overall energy demand for industrial consumption. Energy savings of 135 billion kilowatt-hours per year would be possible within Europe with the use of modern drive systems.

Bauer Gear Motor GmbH pursues its goals with minimum consumption of raw materials and energy, the lowest possible environmental impact, and efficient utilisation of resources. This philosophy is reflected in our product strategy, and we want to share it with our customers in

WHAT WE OFFER

- Over 85 years of experience in drive technology
- Advice from gear motor specialists
- A high level of engineering expertise for custom drive solutions
- A high level of application expertise
- Global availability
- Exceptional flexibility
- A broad product spectrum
 - Pioneering technologies for energy-efficient drives
 - Standard Efficiency (IE1) and Premium Efficiency (IE3) with standard induction motor technology
 - Super Premium Efficiency (IE4) – the highest efficiency class technologically possible – with permanent magnet synchronous motors (PMSMs)
- Sector-specific solutions as standard

THE BENEFITS FOR YOU

- A partner on your side:
 - that speaks your language
 - that understands you
 - that gives top priority to customer satisfaction
- More added value by using:
 - The Bauer brand, with
 - a good reputation worldwide
 - sturdy and durable drives
 - a high enclosure protection rating of IP65 as standard lying above the market standard
 - extremely high quality awareness
 - Products that are tailored to your applications and give you the benefit of:
 - our expertise as drive manufacturers for over 85 years
 - our knowledge of the industry
 - Higher flexibility
 - adaptation of standard drives to your needs
 - fast time to market for product launch with custom drive solutions (SSD)
- Expert advice for fully exploiting potential energy savings
- Acquiring technology leadership by using IE4 motors
- Achieving investment security by complying with statutory provisions for energy efficiency extending beyond 2017

Couplings**Ameridrives Couplings***Mill Spindles, Ameriflex, Ameridisc*Erie, PA - USA
1-814-480-5000*Gear Couplings*San Marcos, TX - USA
1-800-458-0887**Bibby Turboflex***Disc, Gear, Grid Couplings,
Overload Clutches*Dewsbury, England
+44 (0) 1924 460801Boksburg, South Africa
+27 11 918 4270**TB Wood's***Elastomeric Couplings*Chambersburg, PA - USA
1-888-829-6637 – Press #5*For application assistance:
1-888-829-6637 – Press #7**General Purpose / Disc Couplings*San Marcos, TX - USA
1-888-449-9439**Ameridrives Power Transmission***Universal Joints, Drive Shafts,
Mill Gear Couplings*Green Bay, WI - USA
1-920-593-2444**Huco Dynatork***Precision Couplings
and Air Motors*Hertford, England
+44 (0) 1992 501900Chambersburg, PA - USA
1-800-829-6637**Lamiflex Couplings***Flexible Couplings, Bearing Isolators,
and Coupling Guards*São Paulo, SP - Brasil
(11) 5679-6533**Linear Products****Warner Linear***Linear Actuators*Belvidere, IL - USA
1-800-825-6544*For application assistance:
1-800-825-9050*St Barthelemy d'Anjou, France
+33 (0) 2 41 21 24 24**Electromagnetic
Clutches and Brakes****Warner Electric***Electromagnetic Clutches
and Brakes*New Hartford, CT - USA
1-800-825-6544*For application assistance:
1-800-825-9050*St Barthelemy d'Anjou, France
+33 (0) 2 41 21 24 24*Precision Electric Coils and
Electromagnetic Clutches and
Brakes*Columbia City, IN - USA
1-260-244-6183**Matrix International***Electromagnetic Clutches
and Brakes, Pressure Operated
Clutches and Brakes*Brechtin, Scotland
+44 (0) 1356 602000New Hartford, CT - USA
1-800-825-6544**Inertia Dynamics***Spring Set Brakes; Power On and
Wrap Spring Clutch/Brakes*New Hartford, CT - USA
1-800-800-6445**Overrunning Clutches****Formsprag Clutch***Overrunning Clutches
and Holdbacks*Warren, MI - USA
1-800-348-0881 – Press #1*For application assistance:
1-800-348-0881 – Press #2***Marland Clutch***Roller Ramp and Sprag Type
Overrunning Clutches
and Backstops*South Beloit, IL - USA
1-800-216-3515**Stieber Clutch***Overrunning Clutches
and Holdbacks*Heidelberg, Germany
+49 (0) 6221 30 47 0**Heavy Duty
Clutches and Brakes****Wichita Clutch***Pneumatic Clutches and Brakes*Wichita Falls, TX - USA
1-800-964-3262Bedford, England
+44 (0) 1234 350311**Twiflex Limited***Caliper Brakes and Thrusters*Twickenham, England
+44 (0) 20 8894 1161**Industrial Clutch***Pneumatic and Oil Immersed
Clutches and Brakes*Waukesha, WI - USA
1-262-547-3357**Gearing****Boston Gear***Enclosed and Open Gearing,
Electrical and Mechanical
P.T. Components*Charlotte, NC - USA
1-800-825-6544*For application assistance:
1-800-816-5608***Bauer Gear Motor***Gearred Motors*Esslingen, Germany
+49 (711) 3518-0**Nuttall Gear and
Delroyd Worm Gear***Worm Gear and
Helical Speed Reducers*Niagara Falls, NY - USA
1-716-298-4100**Belted Drives and Sheaves****TB Wood's***Belted Drives*Chambersburg, PA - USA
1-888-829-6637 – Press #5*For application assistance:
1-888-829-6637 – Press #7***Engineered
Bearing Assemblies****Kilian Manufacturing***Engineered Bearing Assemblies*Syracuse, NY - USA
1-315-432-0700**Bauer Gear Motor****Bauer Gear Motor GmbH**Eberhard-Bauer-Strasse 36-60
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