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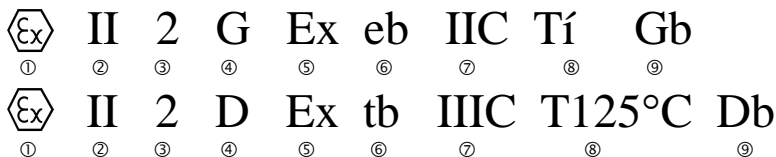
ISO 9001

SERVICE AND EXPLOITATION INSTRUCTION MANUAL

for three-phase squirrel - cage induction motors
explosion-proof,
comply with requirements for devices
group II, category 2G and 2D
according to requirements of
ATEX Directive 2014/34/EU

GENERAL INFORMATION

Marking of explosion-protected apparatus:



Marking equipment in accordance with Directive 2014/34/EU:

- ① specific marking of explosion protection
- ② equipment Group ATEX (for use in hazardous areas)
- ③ equipment Category ATEX (for use in Zone 1 and Zone 21 areas category)
- ④ for use in flammable Gas/Vapour (G) or Combustible Dust Substances (D)

Marking required by the standards used under ATEX and IECEx

- ⑤ the product corresponds to one or more of the types of protection according to EN 60079-0
- ⑥ type of protection used for explosive gas atmosphere /explosive dust atmosphere
- ⑦ equipment grouping
- ⑧ temperature class (explosive gas atmosphere)/maximum surface temperature (explosive dust atmosphere)
- ⑨ EPL ó equipment protection level

| Temperature class | Ignition temperature range of the mixture | Maximum surface temperature of the electrical equipment |
|-------------------|---|---|
| T1 | >450°C | 450°C |
| T2 | >300°C ... ≤ 450°C | 300°C |
| T3 | >200°C ... ≤ 300°C | 200°C |
| T4 | >135°C ... ≤ 200°C | 135°C |
| T5 | >100°C ... ≤ 135°C | 100°C |
| T6 | > 85°C ... ≤ 100°C | 85°C |

Summary of relations between Zones, Equipment groups and Equipment Protection Levels

| EN 60079-10-x | | Directive 2014/34/EU (ATEX) | | EN 60079-0 | |
|---------------|----|-----------------------------|-----------------|------------|-----|
| Zones | | Equipment Category | Equipment Group | Group | EPL |
| Gas | 0 | 1G | II | II | Ga |
| | 1 | 2G | | | Gb |
| | 2 | 3G | | | Gc |
| Dust | 20 | 1D | | III | Da |
| | 21 | 2D | | | Db |
| | 22 | 3D | | | Dc |

Products are in conformity with the requirements of the "Commission Regulation (EU) 2019/1781 of 1 October 2019 laying down ecodesign requirements for electric motors and variable speed drives pursuant to Directive 2009/125/EC of the European Parliament and of the Council ("ErP")" and subsequent amendments and comply with the requirements of **EN 60034-30-1:2014**

1. TECHNICAL DESCRIPTION

General description of the designation of BESEL SA electric motors:

$$\text{Ex (S, 2SIE, 3SIE) (K, L) h 80 ó 4 B 1 / xxxx}$$


(a)
(b)
(c)
(d) (e)
(f) (g) (h)
(i)

- (a) Explosion-proof motor
- (b) Type of motor
 - S ó three phase motor
 - 2SIE ó three-phase motor with IE2 efficiency class
 - 3SIE ó three-phase motor with IE3 efficiency class
- (c) Mounting type according to IEC
 - (no letter) ó foot
 - K ó flange
 - L ó foot + flange
- (d) Series frame size ó except 2SIE, 3SIE motors
- (e) Motor frame size according to IEC (56, 63, 71, 80)
- (f) Number of poles ó $2p=$ (2,4,6)
- (g) Frame length for frame sizes (relative to the rated power of the motor)
 - A
 - B
- (h) Size of flange (if key code (c) = K or L)
 - (no letter) ó flange IM B5 (big)
 - 1 ó flange IM B 14/1 (medium)
 - 2 ó flange IM B14/2 (small)
- (i) performance variant

The explosion-proof, increased safety squirrel-cage induction motors of frame size 56, 63, 71, 80 are low power enclosed motors.

The motors are manufactured in a way that there is increased safety in case of presence of excessive temperature, existence of arcs and sparks both inside the motor and on its surface during normal work.

Motors are intended to work in zones areas:

- 1 -  II 2 G
- 21 -  II 2 D

where dangerous explosive atmosphere is likely to occur, caused by gases, vapors, mists or dust-air mixture, but not in areas where methane occurs.

Ex eb explosion-proof motors meet one of the temperature classes, which should be selected according to the type of explosive atmosphere surrounding the motor:

T3 ó maximum temperature any part of motor the most unfavorable conditions, but the limit, does not exceed +200°C.

T4 ó maximum temperature any part of motor the most unfavorable conditions, but the limit, does not exceed +135°C.

Ex tb explosion-proof motors have a maximum surface temperature of 125°C.

Parts of motor housing are made of aluminum alloy EN AC-44300 (EN 1706:1998) with magnesium contents $\leq 7,5\%$ apart from the fan cover which is made of steel sheet.

In the terminal box there is a terminal board which is used for connecting the motor to the mains. The terminal box is equipped with a cable gland M20x1,5 (and M16x1,5 for PTC thermistors), with holder or without, through which the power lead should be inserted and sealed.

The maximum voltage is

- 440V 50Hz if the motor has built-in PTC thermistors.
- 690V 50Hz for motors without PTC thermistors

There are neutral terminals on the housing and in the terminal box which are used for neutral earthing or grounding of the motor.

Motors are intended to work in a horizontal position of the shaft.

They can work in perpendicular position with the shaft end downwards or upwards provided the axial load of the bearings is not too large and comes from the weight of a rotor, a pulley, a toothed wheel, relatively light clutch or the fan which is fixed on the motor shaft.

The motor should be used in ambient temperatures from $\geq 20^{\circ}\text{C}$ to $+ 40^{\circ}\text{C}$.

2. INSTALLATION INSTRUCTIONS

The motor housing protects the motor from being penetrated by a solid body or water in the range defined in EN 60034-5 Standard.

The terminal box corresponds to the explosion-proof construction type Ex e.

To ensure IP66 protection for gases and dust:

- **certified cable grommets should be used as intended and correctly installed.**
- **the fixing screws of the terminal box cover should be tightened with a torque between 1.1Nm and 1.4Nm**

The electrical connection of the permanently connected cable shall be made in a certified enclosure in type of protection flameproof enclosure $\text{d}\ddot{\text{o}}$ or increased safety $\text{e}\ddot{\text{o}}$.

The cable entry may be used only for fixed installations. The user shall ensure adequate clamping of the cable.

In areas with inflammable dust, the gland can be used only for threaded holes.

The cable entry is designed for use in normal industrial atmosphere.

The installation of the cable gland has to be done by properly qualified persons and only with the appropriate tools.

Unused apertures shall be closed with suitable blanking elements.

Motors intended for use in explosive gas atmospheres.

The motor shall be provided with a three-phase inverse-delay overload protective device that not only monitors the motor current but also disconnects the stalled motor within the above mentioned times t_E .

The motor shall only be used for continuous service, involving easy and infrequent starts which do not produce appreciable additional heating.

Motors intended for use in the presence of combustible dust.

The built-in winding PTC thermistors (DIN 44081 or 44082 ...°C) in combination with a protective device shall be installed in the motor circuits in such a way that operation of the PTC thermistors leads to switching-off of the motor.

The ...°C is the temperature of the PTC thermistor.

The maximum voltage is 440V 50Hz.

Each motor must be protected against overload and short-circuit.

There is a direct-on starting used in motors.

They can operate when voltage deviations do not exceed $\pm 5\%$ and frequency do not exceed $\pm 2\%$ of the motor rated values. All of the rated data refer to the rated voltage.

If voltage and frequency exceed of the rated values motors should not be started.

Each motor must be protected against electric shock in accordance with currently valid regulations.

Parts of a driven device coupled to the motor shaft directly should be balanced dynamically with the accuracy of $5\mu\text{m}$, not less.

2.1. ACTIVITIES BEFORE THE INSTALLATION OF A MOTOR

Before you mount the motor to a driven device:

- a) check if the rotor turns freely,
- b) check if parts of a device which is coupled to the motor shaft are balanced dynamically with the required accuracy,
- c) put on parts of a motored device sliding or pushing them lightly without exerting pressure on bearings. Otherwise you will cause damage. At the same time the motor **shaft should be supported on the non-drive end stiffly** so that the pressure should not cause either damage of bearings or damage of a spring washer which cancels axial play of the rotor,
- d) after fixing the motor to a device check whether there is the minimal distance (14 mm) between the fan cover and other parts and whether the holes in the cover are not stopped down, access of cooling air to the motor housing cannot be made difficult.
- e) check if supply cable is additionally protected against being pulled out

2.2. CONNECTING THE MOTOR TO THE MAINS

2.2.1. Three-phase motors:

a) **made for basic voltage 230/400V can be connected:**

- to the mains with line-to-line voltage: $3 \times 400V \pm 5\%$ $50Hz \pm 2\%$, when the motor winding is star connected,
- to the mains with line-to-line voltage: $3 \times 230V \pm 5\%$ $50Hz \pm 2\%$, when the motor winding is delta connected.

b) **Motors made for specific voltages can be connected to the mains of rated voltage U corresponding to the voltage marked on the rating plate of the motor U_N ,**

$$U = U_N \pm 5\% , f = f_N \pm 2\% .$$

The ways of winding connection and connecting them to the mains are presented on wiring diagrams in the annex No. 1 of this Manual.

The wiring diagram is on the inside of the lid of a terminal box.

2.2.2. Before you connect the motor check:

- a) if the rated voltage and frequency of the motor corresponds to the voltage of the mains - see item 2.2.1
- b) if winding connections on the terminal board are consistent with a wiring diagram,
- c) if neutral earthing (N) and protective grounding (PE) of the motor is correct and firm,
- d) **if the motor has the right overload protection whose time-current characteristic guarantees that the motor will be disconnected from supply voltage in a time shorter than the specified time t_E when the current is equal to starting current,**

t_E ó time in which alternating-current winding will heat up from the temperature of rated conditions and with maximal environment temperature to the limit temperature

- e) **if the motor has the right protection against short circuit (a fuse or an electromagnetic breaker),**
- f) if resistance of the motor insulation in the cool state is not lower than $50M\Omega$,
- g) if the direction of motor rotation is consistent with the direction of driven device rotation, in typical motors the direction is clockwise when you look from the shaft end,

Cautions:

1. In case of moistening (when the resistance of the motor insulation is lower than $50M\Omega$) dry in the temperature not higher than $80^{\circ}C$ ($353K$).
2. When the motor operates pay attention to how it works and disconnect the motor from the mains in following cases:
 - over-oscillation of the motor (excessive oscillation),
 - considerable decrease of rotational speed,
 - considerable heating of motor and bearings
3. In any case, in motors of all types the earth terminal should be stringently connected with earth conductor (wire).
4. The insulation should be removed from the earth wire 10-12mm in length, the wire end should be twisted and screwed to the earth terminal applying screwing torque that amounts to 2Nm.

3. PERIODICAL INSPECTIONS AND MAINTENANCE OF A MOTOR

Each operating motor should be inspected periodically:

- minor inspection ó every 12 months,
- main inspection ó after 36 months of operation or after 20 000 hours of operation.

In motors where drive end shields (DE shields) are in direct contact with an oil filling the driven device (for example a gear box) it is necessary to replace a seal (simmering).

The intervals of replacement of the seal are the following:

- If the oil that fills up the gear box reaches the temperature up to $60^{\circ}C$ the replacement should be carried out every 9 000 hours of the device operation;
- If the oil that fills up the gear box exceeds the temperature $60^{\circ}C$ the replacement should be carried out every 6 000 hours of the device operation;

3.1. MINOR INSPECTION

Minor inspection includes the following activities:

- a) visual inspection and cleaning of the motor and protecting apparatus without disassembly if visual inspection does not reveal such necessity,
- b) measurement of the resistance of motor winding insulation,
- c) measurement of the effectiveness of neutral earthing or the resistance of protective grounding,
- d) measurement of the resistance of feed installation insulation
- e) verification of setting of thermal protection.

3.2. MAIN INSPECTION

Main inspection includes the following activities:

- a) disassembly of the motor which consists in performing operations mentioned below in the following order:
 - unscrewing of the three bolts fixing the fan cover
 - removing of the fan from the shaft by means of a puller
 - unscrewing of the three bolts that fasten bearing shields
 - taking off bearings from the motor shaft by means of a bearing puller or by tapping a wooden hammer on riser heads that stick out of shields
 - removing of the rotor and bearings
 - taking off bearings from the motor shaft by means of a bearing puller only in case they must be replaced (**bearings must be absolutely replaced after 40000 hours of work**).

In motors two-sided closed ball bearings type 2Z are applied.

They do not need lubricating (bearings are prelubricated).

| Frame size | Type of bearing |
|------------|-----------------|
| 56 | 6201 2Z |
| 63 | 6202 2Z |
| 71 | 6203 2Z |
| 80 | 6204 2Z |

- in case of penetration of motor interior by the oil (operation of the motor with the gear box) - remove the oil and clean up the motor inside;
 - replace the simmering;
 - regenerate the shaft at the point of contacting with the simmering.
- b) checking the condition of the stator windings, which must be thoroughly cleaned and blown with compressed air; there must be no damaged areas on the winding face, and the face must be well braced,
 - c) checking of insulation resistance between particular phases of the windings and between windings and a motor housing,
 - d) **repair (re-winding) can be done only with the acceptance of BESEL SA when full information including execution, impregnation and methods of testing after the repair of windings is received,**
 - e) **it is unacceptable to replace any parts of motor and modification of motor without the acceptance of BESEL SA.**
 - f) **verification of setting of protected against overload,**
 - g) Motor reassembly is performed in reverse order than the disassembly.
All activities connected with disassembly, inspection and reassembly should be performed without damaging of windings, motor housing, endshields and other parts of the motor.

Caution:

The high-voltage test may only be carried out by a specialist with the required competence.

4. ACCEPTANCE TEST AFTER INSPECTION OR REPAIR

After inspection and remounting the motor should be subjected to the following examinations:

- a) to measure winding resistance,
- b) to control if the connections are correct,
- c) to measure insulation resistance in cool state,
- d) to carry out a 2 hours no-load running test of the motor and if it is possible to carry out a test of a rated loaded motor. The test must be long enough for the motor temperature to stop rising in a visible way.

The above researches must be conducted according to the EN 60034-1 standard.

Caution:

After repairing, tests shall be carried out in accordance with section 7.1 of standard EN 60079-7. Each motor shall be tested for electrical insulation strength in accordance with section 8 of standard EN 60034-1.

The inspection and acceptance testing of explosion-proof, increased safety motors should be carried out by experienced personnel which is trained in the various types of explosion protection, regulations and general rules for the classification of hazardous areas.

5. STORAGE

Motors should be stored in dry airy containers free from gases, liquids and caustic vapors which are harmful for the winding insulation and parts of the motor.

Motors must not be kept in rooms where fertilizers, chlorinated lime, acids and chemical agents etc. are gathered.

The temperature of the environment where motors are stored must not be lower than +5°C (278K) and relative humidity must not exceed 70%.

Motors stored after warranty period should be renovated which includes:

- a) outside cleaning of the motor,
- b) checking if bearings operate in a correct way and if not damaged bearings must be replaced,
- c) measurement of the winding insulation resistance (in cool state) and if it is lower than 50MΩ motors must be dried in a temperature not higher than +80°C (353K).

The shaft end must be protected against corrosion by the layer of corrosion preventing grease or an easily removed varnish.

6. TRANSPORT

Motors should be transported only in covered means of transport, in wooden boxes, metallic pallets or carton boxes to protect them against getting wet and moisture.

Motors packaging for transport should provide adequate protection against shock, dust and mechanical damage such as: damage to the shaft extension, terminal box, fan cover and lacquer coating.

Motors cannot move within the packaging, the packaging of the engine must be prevented from slipping and falling over.

Information on Disposal for Users of Waste Electrical and Electronic Equipment

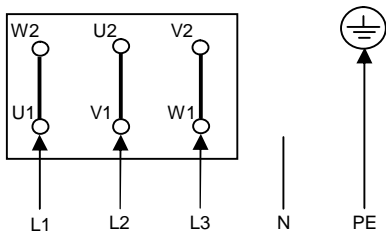
This product is marked according to the European Directive on Waste Electrical and Electronic Equipment (2012/19/UE) and further amendments.



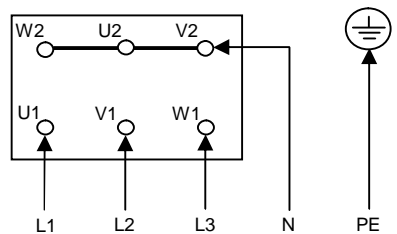
By ensuring this product is disposed of correctly, you will help to prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product.

The symbol on the product, or the documents accompanying the product, indicates that this appliance may not be treated as household waste. It shall be handed over to the applicable collection point for used up electrical and electronic equipment for recycling purpose. For more information about recycling of this product, please contact your local authorities, your household waste disposal service or the shop where you purchased the product.

Annex No.1

Delta connected Δ 

Star connected Y

**Marking**- Manufacturer Address

BESEL SA
ul. Elektryczna 8
49-300 Brzeg
POLAND

- CE 1461

CE ó CE mark indicates compliance with all applicable CE directives
1461 ó identification number of the Notified Body responsible for the surveillance of the
Quality management system of the production site

Number of the certificate

OBAC ó name of Notified Body
14 ó Year of Issuance
0048 ó EC Type Examination Certificate with sequence number i.e. 0048
X ó Certificate number Suffix (points to the special conditions of use)

- rated parameters

EC-Type Examination Certificate OBAC 14 ATEX 0048X

| Marking | II 2 G Ex eb IIC T... Gb | | | | | | | |
|--------------------------------------|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Motor type | ExSh56-2A | | ExSh56-2B | | ExSh56-4A | | ExSh56-4B | |
| Rated output (kW) | 0,09 | | 0,12 | | 0,06 | | 0,09 | |
| Rated voltage (V±5%) | 230/400 | 265/460 | 230/400 | 265/460 | 230/400 | 265/460 | 230/400 | 265/460 |
| Rated frequency (Hz) | 50 | 60 | 50 | 60 | 50 | 60 | 50 | 60 |
| Rated current (A) | 0,70/0,40 | 0,65/0,38 | 0,70/0,40 | 0,70/0,40 | 0,54/0,31 | 0,52/0,30 | 0,64/0,37 | 0,64/0,37 |
| Power factor | 0,60 | 0,55 | 0,70 | 0,64 | 0,57 | 0,50 | 0,59 | 0,53 |
| Efficiency (%) | 54,0 | 55,0 | 62,0 | 64,0 | 48,0 | 51,0 | 60,0 | 60,0 |
| Rated speed (obr/min) | 2760 | 3440 | 2750 | 3390 | 1380 | 1700 | 1370 | 1690 |
| Insulation class | F | | F | | F | | F | |
| I _A /I _N | 3,1 | 3,9 | 3,6 | 3,8 | 2,7 | 3,0 | 2,8 | 3,0 |
| t _E for T3 (s) | 45,0 | | 40,0 | | 64,0 | | 64,0 | |
| t _E for T4 (s) | 18,0 | | 17,0 | | 24,0 | | 27,0 | |
| Temp. limiting switches (on request) | 140°C | | 140°C | | 140°C | | 140°C | |

EC-Type Examination Certificate OBAC 14 ATEX 0047X

| Marking | II 2 G Ex eb IIC T... Gb | | | | | | | |
|--------------------------------------|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Motor type | ExSh63-2A | | ExSh63-2B | | ExSh63-4A | | ExSh63-4B | |
| Rated output (kW) | 0,18 | | 0,25 | | 0,12 | | 0,18 | |
| Rated voltage (V±5%) | 230/400 | 265/460 | 230/400 | 265/460 | 230/400 | 265/460 | 230/400 | 265/460 |
| Rated frequency (Hz) | 50 | 60 | 50 | 60 | 50 | 60 | 50 | 60 |
| Rated current (A) | 1,05/0,60 | 0,95/0,55 | 1,55/0,90 | 1,40/0,80 | 1,15/0,65 | 1,05/0,60 | 1,20/0,70 | 1,15/0,65 |
| Power factor | 0,70 | 0,67 | 0,60 | 0,60 | 0,47 | 0,44 | 0,57 | 0,53 |
| Efficiency (%) | 63,0 | 63,0 | 68,0 | 68,0 | 57,0 | 57,0 | 65,0 | 65,0 |
| Rated speed (obr/min) | 2820 | 3440 | 2870 | 3480 | 1415 | 1725 | 1390 | 1700 |
| Insulation class | F | | F | | F | | F | |
| I _A /I _N | 4,8 | 5,6 | 5,9 | 7,0 | 3,5 | 4,1 | 3,75 | 4,25 |
| t _E for T3 (s) | 26,0 | | 17,0 | | 55,0 | | 45,0 | |
| t _E for T4 (s) | 12,0 | | 8,0 | | 22,0 | | 20,0 | |
| Temp. limiting switches (on request) | 140°C | | 140°C | | 140°C | | 140°C | |

EC-Type Examination Certificate OBAC 14 ATEX 0047X

| Marking | II 2 G Ex eb IIC T... Gb | |
|--------------------------------------|--------------------------|-----------|
| Motor type | ExSh63-6B | |
| Rated output (kW) | 0,06 | |
| Rated voltage (V±5%) | 230/400 | 265/460 |
| Rated frequency (Hz) | 50 | 60 |
| Rated current (A) | 0,95/0,55 | 0,95/0,55 |
| Power factor | 0,39 | 0,34 |
| Efficiency (%) | 40,0 | 40,0 |
| Rated speed (obr/min) | 940 | 1140 |
| Insulation class | F | |
| I _A /I _N | 2,4 | 2,5 |
| t _E for T3 (s) | 110,0 | |
| t _E for T4 (s) | 40,0 | |
| Temp. limiting switches (on request) | 140°C | |

EC-Type Examination Certificate OBAC 15 ATEX 0114X

| Marking | II 2 G Ex eb IIC T... Gb | | | | | | | |
|--------------------------------------|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Motor type | ExSh71-2A | | ExSh71-2B | | ExSh71-4A | | ExSh71-4B | |
| Rated output (kW) | 0,37 | | 0,55 | | 0,25 | | 0,37 | |
| Rated voltage (V±5%) | 230/400 | 265/460 | 230/400 | 265/460 | 230/400 | 265/460 | 230/400 | 265/460 |
| Rated frequency (Hz) | 50 | 60 | 50 | 60 | 50 | 60 | 50 | 60 |
| Rated current (A) | 1,75/1,00 | 1,55/0,90 | 2,60/1,50 | 2,25/1,30 | 1,50/0,85 | 1,30/0,75 | 2,00/1,15 | 1,75/1,00 |
| Power factor | 0,83 | 0,80 | 0,75 | 0,73 | 0,65 | 0,55 | 0,70 | 0,65 |
| Efficiency (%) | 68,0 | 69,0 | 72,0 | 73,0 | 65,0 | 68,0 | 67,0 | 70,0 |
| Rated speed (obr/min) | 2780 | 3410 | 2800 | 3430 | 1370 | 1690 | 1350 | 1680 |
| Insulation class | F | | F | | F | | F | |
| I _A /I _N | 4,75 | 5,6 | 5,3 | 6,4 | 3,9 | 4,7 | 3,6 | 4,5 |
| t _E for T3 (s) | 24,0 | | 14,0 | | 43,0 | | 25,0 | |
| t _E for T4 (s) | 9,0 | | - | | 15,0 | | - | |
| Temp. limiting switches (on request) | 140°C | | 140°C | | 140°C | | 140°C | |

EC-Type Examination Certificate OBAC 15 ATEX 0114X

| Marking | II 2 G Ex eb IIC T... Gb | | | |
|--------------------------------------|--------------------------|-----------|-----------|-----------|
| Motor type | ExSh71-6A | | ExSh71-6B | |
| Rated output (kW) | 0,18 | | 0,25 | |
| Rated voltage (V±5%) | 230/400 | 265/460 | 230/400 | 265/460 |
| Rated frequency (Hz) | 50 | 60 | 50 | 60 |
| Rated current (A) | 1,20/0,70 | 1,15/0,65 | 1,50/0,85 | 1,35/0,80 |
| Power factor | 0,70 | 0,60 | 0,67 | 0,62 |
| Efficiency (%) | 55,0 | 57,5 | 64,0 | 66,0 |
| Rated speed (obr/min) | 880 | 1110 | 900 | 1120 |
| Insulation class | F | | F | |
| I _A /I _N | 2,9 | 3,35 | 3,0 | 4,0 |
| t _E for T3 (s) | 40,0 | | 60,0 | |
| t _E for T4 (s) | - | | 23,0 | |
| Temp. limiting switches (on request) | 140°C | | 140°C | |

EC-Type Examination Certificate OBAC 16 ATEX 0118X

| Marking | II 2 G Ex eb IIC T... Gb | | | | | | | |
|--------------------------------------|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Motor type | ExSh80-2A | | ExSh80-2A | | ExSh80-2B | | ExSh80-2B | |
| Rated output (kW) | 0,75 | | 0,55 | | 1,10 | | 0,75 | |
| Rated voltage (V±5%) | 230/400 | 265/460 | 230/400 | 265/460 | 230/400 | 265/460 | 230/400 | 265/460 |
| Rated frequency (Hz) | 50 | 60 | 50 | 60 | 50 | 60 | 50 | 60 |
| Rated current (A) | 3,10/1,80 | 2,60/1,50 | 2,45/1,40 | 2,20/1,25 | 4,20/2,40 | 3,65/2,10 | 3,10/1,80 | 2,80/1,60 |
| Power factor | 0,86 | 0,85 | 0,79 | 0,78 | 0,88 | 0,85 | 0,80 | 0,78 |
| Efficiency (%) | 72,0 | 75,0 | 74,0 | 73,0 | 75,0 | 78,0 | 78,0 | 78,0 |
| Rated speed (obr/min) | 2710 | 3370 | 2830 | 3450 | 2730 | 3380 | 2850 | 3470 |
| Insulation class | F | | F | | F | | F | |
| I _A /I _N | 4,85 | 6,1 | 6,2 | 7,35 | 5,25 | 6,3 | 7,0 | 8,25 |
| t _E for T3 (s) | 14,0 | | - | | 8,0 | | - | |
| t _E for T4 (s) | - | | 10,0 | | - | | 8,0 | |
| Temp. limiting switches (on request) | 140°C | | 140°C | | 140°C | | 140°C | |

EC-Type Examination Certificate OBAC 16 ATEX 0118X

| Marking | II 2 G Ex eb IIC T... Gb | | | | | | | |
|--------------------------------------|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Motor type | ExSh80-4A | | ExSh80-4A | | ExSh80-4B | | ExSh80-4B | |
| Rated output (kW) | 0,55 | | 0,37 | | 0,75 | | 0,55 | |
| Rated voltage (V±5%) | 230/400 | 265/460 | 230/400 | 265/460 | 230/400 | 265/460 | 230/400 | 265/460 |
| Rated frequency (Hz) | 50 | 60 | 50 | 60 | 50 | 60 | 50 | 60 |
| Rated current (A) | 2,60/1,50 | 2,25/1,30 | 2,00/1,15 | 1,75/1,00 | 3,30/1,90 | 2,85/1,65 | 2,60/1,50 | 2,25/1,30 |
| Power factor | 0,75 | 0,72 | 0,64 | 0,61 | 0,76 | 0,74 | 0,69 | 0,67 |
| Efficiency (%) | 72,0 | 76,0 | 74,0 | 76,0 | 75,0 | 79,0 | 78,0 | 79,0 |
| Rated speed (obr/min) | 1360 | 1700 | 1420 | 1730 | 1360 | 1690 | 1410 | 1720 |
| Insulation class | F | | F | | F | | F | |
| I _A /I _N | 3,90 | 4,75 | 5,1 | 6,2 | 4,2 | 5,1 | 5,3 | 6,5 |
| t _E for T3 (s) | 35,0 | | - | | 29,0 | | - | |
| t _E for T4 (s) | - | | 21,0 | | - | | 11,0 | |
| Temp. limiting switches (on request) | 140°C | | 140°C | | 140°C | | 140°C | |

EC-Type Examination Certificate OBAC 16 ATEX 0118X

| Marking | II 2 G Ex eb IIC T... Gb | | | | | |
|--------------------------------------|--------------------------|-----------|-----------|-----------|-----------|-----------|
| Motor type | ExSh80-6A | | ExSh80-6B | | ExSh80-6B | |
| Rated output (kW) | 0,37 | | 0,55 | | 0,37 | |
| Rated voltage (V±5%) | 230/400 | 265/460 | 230/400 | 265/460 | 230/400 | 265/460 |
| Rated frequency (Hz) | 50 | 60 | 50 | 60 | 50 | 60 |
| Rated current (A) | 2,25/1,30 | 2,10/1,20 | 2,70/1,55 | 2,35/1,35 | 2,20/1,25 | 2,00/1,15 |
| Power factor | 0,66 | 0,60 | 0,75 | 0,69 | 0,60 | 0,55 |
| Efficiency (%) | 64,0 | 67,0 | 69,0 | 75,0 | 72,0 | 74,0 |
| Rated speed (obr/min) | 920 | 1140 | 890 | 1120 | 940 | 1150 |
| Insulation class | F | | F | | F | |
| I _A /I _N | 3,35 | 3,9 | 3,5 | 4,1 | 4,35 | 4,85 |
| t _E for T3 (s) | 30,0 | | 36,0 | | - | |
| t _E for T4 (s) | - | | - | | 20,0 | |
| Temp. limiting switches (on request) | 140°C | | 140°C | | 140°C | |

| EC-Type Examination Certificate OBAC 14 ATEX 0048X | | | | | | | | |
|---|-----------------------------|-----------|-------------|-----------|-----------|-----------|-----------|-----------|
| Marking | II 2 D Ex tb IIIC T125°C Db | | | | | | | |
| Motor type | ExSh56-2A | | Ex2SIE56-2B | | ExSh56-4A | | ExSh56-4B | |
| Rated output (kW) | 0,09 | | 0,12 | | 0,06 | | 0,09 | |
| Rated voltage (V±5%) | 230/400 | 265/460 | 230/400 | 265/460 | 230/400 | 265/460 | 230/400 | 265/460 |
| Rated frequency (Hz) | 50 | 60 | 50 | 60 | 50 | 60 | 50 | 60 |
| Rated current (A) | 0,70/0,40 | 0,65/0,38 | 0,70/0,40 | 0,70/0,40 | 0,54/0,31 | 0,52/0,30 | 0,64/0,37 | 0,64/0,37 |
| Power factor | 0,60 | 0,55 | 0,70 | 0,64 | 0,57 | 0,50 | 0,59 | 0,53 |
| Efficiency (%) | 54,0 | 55,0 | 62,0 | 64,0 | 48,0 | 51,0 | 60,0 | 60,0 |
| Rated speed (obr/min) | 2760 | 3440 | 2750 | 3390 | 1380 | 1700 | 1370 | 1690 |
| Insulation class | F | | F | | F | | F | |
| I _A /I _N | 3,1 | 3,9 | 3,3 | 3,6 | 2,7 | 3,0 | 2,8 | 3,0 |
| Temp. limiting switches | 120°C | | 120°C | | 120°C | | 120°C | |

| EC-Type Examination Certificate OBAC 14 ATEX 0047X | | | | | | | | |
|---|-----------------------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|
| Marking | II 2 D Ex tb IIIC T125°C Db | | | | | | | |
| Motor type | Ex2SIE63-2A | | Ex2SIE63-2B | | Ex2SIE63-4A | | Ex2SIE63-4B | |
| Rated output (kW) | 0,18 | | 0,25 | | 0,12 | | 0,18 | |
| Rated voltage (V±5%) | 230/400 | 265/460 | 230/400 | 265/460 | 230/400 | 265/460 | 230/400 | 265/460 |
| Rated frequency (Hz) | 50 | 60 | 50 | 60 | 50 | 60 | 50 | 60 |
| Rated current (A) | 1,05/0,60 | 0,95/0,55 | 1,55/0,90 | 1,40/0,80 | 0,70/0,40 | 0,70/0,40 | 0,95/0,55 | 0,90/0,50 |
| Power factor | 0,70 | 0,67 | 0,60 | 0,60 | 0,65 | 0,65 | 0,70 | 0,65 |
| Efficiency (%) | 64,0 | 64,0 | 68,0 | 68,0 | 66,0 | 64,0 | 69,0 | 71,0 |
| Rated speed (obr/min) | 2820 | 3440 | 2870 | 3480 | 1400 | 1710 | 1380 | 1700 |
| Insulation class | F | | F | | F | | F | |
| I _A /I _N | 4,8 | 5,6 | 5,9 | 7,0 | 4,3 | 4,6 | 3,8 | 4,5 |
| Temp. limiting switches | 120°C | | 120°C | | 120°C | | 120°C | |

| EC-Type Examination Certificate OBAC 14 ATEX 0047X | | |
|---|-----------------------------|-----------|
| Marking | II 2 D Ex tb IIIC T125°C Db | |
| Motor type | ExSh63-6B | |
| Rated output (kW) | 0,06 | |
| Rated voltage (V±5%) | 230/400 | 265/460 |
| Rated frequency (Hz) | 50 | 60 |
| Rated current (A) | 0,95/0,55 | 0,95/0,55 |
| Power factor | 0,39 | 0,34 |
| Efficiency (%) | 40,0 | 40,0 |
| Rated speed (obr/min) | 940 | 1140 |
| Insulation class | F | |
| I _A /I _N | 2,4 | 2,5 |
| Temp. limiting switches | 120°C | |

| EC-Type Examination Certificate OBAC 15 ATEX 0114X | | | | | | | | |
|--|-----------------------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|
| Marking | II 2 D Ex tb IIIC T125°C Db | | | | | | | |
| Motor type | Ex2SIE71-2A | | Ex2SIE71-2B | | Ex2SIE71-4A | | Ex2SIE71-4B | |
| Rated output (kW) | 0,37 | | 0,55 | | 0,25 | | 0,37 | |
| Rated voltage (V±5%) | 230/400 | 265/460 | 230/400 | 265/460 | 230/400 | 265/460 | 230/400 | 265/460 |
| Rated frequency (Hz) | 50 | 60 | 50 | 60 | 50 | 60 | 50 | 60 |
| Rated current (A) | 1,65/0,95 | 1,55/0,90 | 2,25/1,30 | 2,00/1,15 | 1,45/0,85 | 1,30/0,75 | 2,00/1,15 | 1,80/1,05 |
| Power factor | 0,75 | 0,75 | 0,80 | 0,80 | 0,62 | 0,60 | 0,63 | 0,59 |
| Efficiency (%) | 75,0 | 72,5 | 77,0 | 76,5 | 70,0 | 72,0 | 73,5 | 76,0 |
| Rated speed (obr/min) | 2880 | 3490 | 2840 | 3460 | 1410 | 1720 | 1410 | 1720 |
| Insulation class | F | | F | | F | | F | |
| I _A /I _N | 5,2 | 6,0 | 5,1 | 6,5 | 3,7 | 4,7 | 4,1 | 4,9 |
| Temp. limiting switches | 120°C | | 120°C | | 120°C | | 120°C | |

| EC-Type Examination Certificate OBAC 15 ATEX 0114X | | | | |
|--|-----------------------------|-----------|-------------|-----------|
| Marking | II 2 D Ex tb IIIC T125°C Db | | | |
| Motor type | Ex2SIE71-6A | | Ex2SIE71-6B | |
| Rated output (kW) | 0,18 | | 0,25 | |
| Rated voltage (V±5%) | 230/400 | 265/460 | 230/400 | 265/460 |
| Rated frequency (Hz) | 50 | 60 | 50 | 60 |
| Rated current (A) | 1,15/0,65 | 1,05/0,60 | 1,55/0,90 | 1,40/0,80 |
| Power factor | 0,64 | 0,58 | 0,65 | 0,59 |
| Efficiency (%) | 63,5 | 65,0 | 64,0 | 67,0 |
| Rated speed (obr/min) | 910 | 1130 | 910 | 1130 |
| Insulation class | F | | F | |
| I _A /I _N | 3,1 | 3,6 | 2,9 | 3,7 |
| Temp. limiting switches | 120°C | | 120°C | |

| EC-Type Examination Certificate OBAC 16 ATEX 0118X | | | | | | | | |
|--|-----------------------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|
| Marking | II 2 D Ex tb IIIC T125°C Db | | | | | | | |
| Motor type | Ex3SIE80-2A | | Ex3SIE80-2B | | Ex2SIE80-4A | | Ex3SIE80-4B | |
| Rated output (kW) | 0,75 | | 1,10 | | 0,55 | | 0,75 | |
| Rated voltage (V±5%) | 230/400 | 265/460 | 230/400 | 265/460 | 230/400 | 265/460 | 230/400 | 265/460 |
| Rated frequency (Hz) | 50 | 60 | 50 | 60 | 50 | 60 | 50 | 60 |
| Rated current (A) | 3,10/1,80 | 2,75/1,60 | 4,35/2,50 | 3,80/2,20 | 2,50/1,45 | 2,25/1,30 | 3,60/2,10 | 3,30/1,90 |
| Power factor | 0,76 | 0,76 | 0,78 | 0,77 | 0,70 | 0,68 | 0,65 | 0,71 |
| Efficiency (%) | 80,7 | 78,0 | 83,0 | 84,0 | 79,0 | 80,5 | 82,5 | 83,5 |
| Rated speed (obr/min) | 2890 | 3500 | 2900 | 3510 | 1420 | 1730 | 1430 | 1740 |
| Insulation class | F | | F | | F | | F | |
| I _A /I _N | 7,3 | 9,1 | 8,3 | 9,8 | 5,4 | 6,5 | 5,7 | 6,6 |
| Temp. limiting switches | 120°C | | 120°C | | 120°C | | 120°C | |

| EC-Type Examination Certificate WE OBAC 16 ATEX 0118X | | | | |
|--|-----------------------------|-----------|-------------|-----------|
| Marking | II 2 D Ex tb IIIC T125°C Db | | | |
| Motor type | Ex2SIE80-6A | | Ex2SIE80-6B | |
| Rated output (kW) | 0,37 | | 0,55 | |
| Rated voltage (V±5%) | 230/400 | 265/460 | 230/400 | 265/460 |
| Rated frequency (Hz) | 50 | 60 | 50 | 60 |
| Rated current (A) | 1,75/1,00 | 1,55/0,90 | 3,30/1,90 | 3,00/1,75 |
| Power factor | 0,76 | 0,71 | 0,57 | 0,53 |
| Efficiency (%) | 72,0 | 75,5 | 73,5 | 76,0 |
| Rated speed (r.p.m.) | 920 | 1130 | 950 | 1160 |
| Insulation class | F | | F | |
| I _A /I _N | 3,5 | 4,2 | 4,3 | 4,9 |
| Temp. limiting switches | 120°C | | 120°C | |




EU DECLARATION OF CONFORMITY

The Manufacturer: **Fabryka Silników Elektrycznych BESEL SA**
ul. Elektryczna 8, 49-300 BRZEG, POLAND

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Product:

3-phase induction motors explosion-proof, series:
 ExS(K,L)h56- ..., Ex2SIE(K,L)56-f , ExS(K,L)h63- ..., Ex2SIE(K,L)63-f , ExS(K,L)h71- ..., Ex2SIE(K,L)71-f ,
 Ex(K,L)h80- ..., Ex2SIE(K,L)80-f , Ex3SIE(K,L)80-f

 II 2 G Ex eb IIC Tx Gb

 II 2 D Ex tb IIIC T125°C Db

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

Directive 2014/34/EU (ATEX Directive) of 26 February 2014

and are in conformity with provisions of the harmonized standards:

| | |
|----------------------------|---|
| EN IEC 60079-0:2018 | Explosive atmospheres ó Part 0: Equipment ó General requirements. |
| EN 60079-7:2015 | Explosive atmospheres ó Part 7: Equipment protection by increased safety "e". |
| EN 60079-31:2014 | Explosive atmospheres ó Part 31: Equipment dust ignition protection by enclosure "t". |

Directive 2014/35/EU (Low Voltage Directive) of 26 February 2014

and are in conformity with provisions of the harmonized standard **EN 60034-1:2010** §Rotating electrical machines - Part 1: Rating and performanceó which thus comply with Principal Elements of the Safety Objectives for Electrical Equipment stated in Annex I of said directive.

Directive 2014/30/EU (EMC) of 26 February 2014

The squirrel-cage induction motors do not fall under the directives of 2014/30/UE, and thus no CE identification for the EMC is required.

Directive 2009/125/EC of 21 October 2009

Products are in conformity with the requirements of the óCommission Regulation (EU) 2019/1781 of 1 October 2019 laying down ecodesign requirements for electric motors and variable speed drives pursuant to Directive 2009/125/EC of the European Parliament and of the Council (í)" and subsequent amendments and comply with the requirements of **EN 60034-30-1:2014**

Quality Production Assurance of equipment intended for use in potentially explosive atmospheres:

Certification Notified Body No 1461:

Institute for Research, Attestation and Certification OBAC Ltd.,/ ab dżka 21 Street, 44-121 Gliwice, Poland,
 Phone. +48 32 237 84 40, Fax +48 32 237 84 42, <http://obac-cert.co.uk/contact>

EC-Type Examination Certificate Number:

| | |
|-------------------|--------------------|
| for frame size 56 | OBAC 14 ATEX 0048X |
| for frame size 63 | OBAC 14 ATEX 0047X |
| for frame size 71 | OBAC 15 ATEX 0114X |
| for frame size 80 | OBAC 16 ATEX 0118X |

Production Quality Assurance Notification

OBAC 21 ATEXQ 006

Manufacturer's statement:

When the motor is fitted into a machinery, the conformity of the end product with Directive 2006/42/EC has to be established by the commissioning party.

Place and date of the declaration issue: Brzeg, 1st February 2022

Signed by: Andrzej Wiczorek

Title: Head of Design Office

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