COMPLETE DRIVE SYSTEMS FROM A SINGLE SOURCE
NORD DRIVESYSTEMS Group

Headquarters and technology centre in Bargteheide near Hamburg

Innovative drive solutions for more than 100 branches of industry

Mechanical products

Electrical products

Electronic products

Gear units

Motors

Frequency inverters and motor starters

7 production locations with cutting-edge technology produce gear units, motors, inverters etc. for complete drive systems from a single source.

Subsidiaries and sales partners in 98 countries on 5 continents provide local stocks, assembly centres, technical support and customer service.

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The map shown above is for information only and does not claim to be created for or applicable to any legal purpose. For this reason, we do not assume any liability for legality, correctness and completeness.

More than 4,000 employees throughout the world create customised solutions.

From page 10
From page 38
From page 54
An optimum and individual drive solution can be created using the modular NORD system consisting of the gear unit, motor and drive electronics. Each of the variants combine: the highest product quality, short planning and assembly times, high delivery availability, and a good price/performance ratio.

**RELIABLE**
- Reliable products
- Coordinated components
- Own development and production

**FLEXIBLE**
- Modular products
- Scalable functions
- Large range of drive units
- Complete drive solutions
- Integrated customer logistics

**INTERNATIONAL**
- Globally networked organisation
- Local advice, assembly and service
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GEAR UNITS

HELICAL, PARALLEL SHAFT, BEVEL
AND WORM GEAR UNITS
UNICASE HELICAL IN-LINE GEAR UNITS

The robust all-rounder

UNICASE helical gear units (Catalogue G1000)

- Foot or flange mounted versions
- Long life, low-maintenance
- Optimum sealing
- UNICASE housing

<table>
<thead>
<tr>
<th>Sizes</th>
<th>No.</th>
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<tbody>
<tr>
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<table>
<thead>
<tr>
<th>Power</th>
<th>Torque</th>
<th>Speed ratio</th>
</tr>
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<tbody>
<tr>
<td>0.12 – 160 kW</td>
<td>10 – 26,000 Nm</td>
<td>1.35 – 14,340.31:1</td>
</tr>
</tbody>
</table>

Special nomenclature:
- SK 33 = Standard series
- SK 33N = UNICASE series
NORDBLOC.1® HELICAL GEAR UNITS
The innovative performer

NORDBLOC.1® helical gear units (Catalogue G1000)
- Foot or flange mounted versions
- Die-cast aluminium alloy housing (cast iron housing for SK 772.1 and above)
- UNICASE housing
- Single-stage version available for high speed applications (SK x71.1)
- Long bearing life
- High permissible radial and axial forces
- Smooth-surface
- Compact design, even with IEC/NEMA adapter
- Natural corrosion protection, even without painting

Sizes 13
Power 0.12 – 37 kW
Torque 30 – 3,300 Nm
Speed ratio 1.07 – 456.77:1

NORDBLOC.1® single stage helical gear units
SK 5 7 1 .1
- No options (solid shaft, foot mounting)
- New design
- Gear stages
- NORDBLOC design
- Housing size

NORDBLOC.1® 2-, 3-stage helical gear units
SK 8 7 2 .1 F
- B5 flange
- New design
- Gear stages
- NORDBLOC design
- Housing size
STANDARD HELICAL GEAR UNITS
The proven classic

STANDARD helical gear units (Catalogue G2000)

- Foot or flange mounted versions
- Long life, low-maintenance
- Grey cast iron housing
- Reinforced output side (optional)

Sizes | 6
---|---
Power | 0.12 – 7.5 kW
Torque | 50 – 700 Nm
Speed ratio | 1.92 – 488.07:1

STANDARD helical gear units

SK 2 5 F

B5 flange
Housing size

Special nomenclature:
- The number of digits corresponds to the number of gear stages; exception SK 0: these gear units have two stages
- A “5” at the designation end (e.g. SK 225) indicates a reinforced output configuration (shaft and bearings)
UNICASE PARALLEL SHAFT GEAR UNITS
Slim and powerful

UNICASE parallel shaft gear units (Catalogue G1000)

- Foot, flange or face mounted
- Hollow or solid shaft
- Compact design
- UNICASE housing
- Long service life
- Low-maintenance
- Quiet running – e.g. for theatre applications
- NORDBLOC.1® aluminium parallel shaft gear units up to Size 4

<table>
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<th>Sizes</th>
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<tbody>
<tr>
<td>Power</td>
<td>0.12 – 200 kW</td>
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<tr>
<td>Torque</td>
<td>110 – 100,000 Nm</td>
</tr>
<tr>
<td>Speed ratio</td>
<td>4.03 – 15,685.03:1</td>
</tr>
</tbody>
</table>

UNICASE parallel shaft gear units

SK 9 3 82 AZ SH
- Shrink disc/cover
- Hollow shaft/B14 flange
- Gear stages
- Housing size

NORDBLOC.1® parallel shaft gear units

SK 1 2 82 .1 VX
- Solid shaft/foot mounting
- New design
- Parallel shaft gear units
- Gear stages
- Housing size

Special nomenclature (NORDBLOC.1®):
- For SK 0182.1 and SK 0282.1 the number of stages can be obtained from the nomenclature (a 2- and 3-stage version is available)
UNICASE BEVEL GEAR UNITS

Powerful and proven

UNICASE bevel gear units (Catalogue G1000)

- Foot, flange or face mounted
- Hollow or solid shaft
- UNICASE housing
- High efficiency
- Robust design
- Grey cast iron housing
- Various bearing concepts for high axial and radial load capacities
- Quiet running – e.g. for theatre applications

<table>
<thead>
<tr>
<th>Sizes</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>0.12 – 200 kW</td>
</tr>
<tr>
<td>Torque</td>
<td>180 – 50,000 Nm</td>
</tr>
<tr>
<td>Speed ratio</td>
<td>8.04 – 13,432.68:1</td>
</tr>
</tbody>
</table>

UNICASE bevel gear units

SK  90    4     2     .1   AZ

Hollow shaft/B14 flange
New design
Gear stages: 2 helical gear stages, 1 bevel gear stage
Housing size
Series 90

Special nomenclature:
- A 6 at the designation end indicates a reinforced version, 3-stage
- A 7 at the designation end indicates a reinforced version, 4-stage
  (including the bevel gear stage)
NORDBLOC.1® BEVEL GEAR UNITS

Power and design

NORDBLOC.1® 2-stage bevel gear units (Catalogue G1014)

- Foot, flange or face mounted
- Hollow or solid shaft
- UNICASE housing
- Aluminium housing
- nsd tupH treatment (optional)
- Wash-down design
- High power density

Sizes | 6
---|---
Power | 0.12 – 9.2 kW
Torque | 50 – 660 Nm
Speed ratio | 3.03 – 70:1

NORDBLOC.1® 2-stage bevel gear units

**SK 92**

- Solid shaft/B14 flange
- New design
- Gear stages: 1 helical gear stage, 1 bevel gear stage
- NORDBLOC design
- Series 92

**SK 93**

- Hollow shaft/B14 flange
- New design
- Gear stages: 1 helical gear stage, 1 bevel gear stage
- NORDBLOC design
- Series 93

SK 920072.1 / SK 930072.1 have the smallest available housing (Size 00)
UNICASE WORM GEAR UNITS
Quiet and powerful

UNICASE worm gear units (Catalogue G1000)

- Foot, flange or face mounted
- Hollow or solid shaft
- UNICASE housing
- Soft and quiet running
- High overload capacity
- High axial and radial loads
- Grey cast iron housing

<table>
<thead>
<tr>
<th>Sizes</th>
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</thead>
<tbody>
<tr>
<td>Power</td>
<td>0.12 – 15 kW</td>
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<tr>
<td>Torque</td>
<td>93 – 3,058 Nm</td>
</tr>
<tr>
<td>Speed ratio</td>
<td>4.40 – 7,095.12:1</td>
</tr>
</tbody>
</table>

SK 1 2 080

Worm gear size
(centre distance between gear and pinion 80 mm)

Gear stages: 1 helical gear stage, 1 worm gear stage

Housing size
(in combination with worm gear size)

- The nomenclature can also be used for SK 02040.1
UNIVERSAL SI worm gear units (Catalogue G1035)

- Modular
- Universal mounting
- Life-long lubrication
- IEC version
- Aluminium housing

Sizes  |   5   
Power  | 0.12 – 4.0 kW  
Torque | 21 – 427 Nm  
Speed ratio  | 5.00 – 3,000:1

UNIVERSAL SMI worm gear units (Catalogue G1035)

- Smooth-surfaces
- Life-long lubrication
- IEC version
- Aluminium housing
- nsd tupH (optional)

Sizes  |   5   
Power  | 0.12 – 4.0 kW  
Torque | 21 – 427 Nm  
Speed ratio  | 5.00 – 3,000:1

SK  1   SI   75 / H10
Helical gear pre-stage 10:1
Worm gear size (centre distance between gear and pinion 75 mm)

SK  1   SMI   31   AZ
Hollow shaft/B14 flange
Worm gear size (31 mm)
## GEAR UNIT OPTIONS

<table>
<thead>
<tr>
<th>Designation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Hollow shaft</td>
</tr>
<tr>
<td>AF</td>
<td>Hollow shaft, B5 flange</td>
</tr>
<tr>
<td>AX</td>
<td>Hollow shaft, foot mounting</td>
</tr>
<tr>
<td>AXF</td>
<td>Hollow shaft, foot mounting, B5 flange</td>
</tr>
<tr>
<td>AZ</td>
<td>Hollow shaft, B14 flange</td>
</tr>
<tr>
<td>AZD</td>
<td>Hollow shaft, B14 flange with torque arm</td>
</tr>
<tr>
<td>AZK</td>
<td>Hollow shaft, B14 flange with torque bracket</td>
</tr>
<tr>
<td>B</td>
<td>Fastening element for hollow shaft</td>
</tr>
<tr>
<td>D</td>
<td>Torque support</td>
</tr>
<tr>
<td>EA</td>
<td>Hollow shaft, splined, DIN 5480</td>
</tr>
<tr>
<td>G</td>
<td>Rubber buffer for torque arm</td>
</tr>
<tr>
<td>H</td>
<td>Cover as contact guard</td>
</tr>
<tr>
<td>IEC</td>
<td>Adapter for fitting IEC standard motors</td>
</tr>
<tr>
<td>LX</td>
<td>Solid shaft - both sides, foot mounting</td>
</tr>
<tr>
<td>MK</td>
<td>Motor bracket</td>
</tr>
<tr>
<td>R</td>
<td>Integrated backstop</td>
</tr>
<tr>
<td>RLS</td>
<td>Backstop in W adapter</td>
</tr>
<tr>
<td>S</td>
<td>Hollow shaft with shrink disc</td>
</tr>
<tr>
<td>SEK</td>
<td>Servo adapter with clamp coupling</td>
</tr>
<tr>
<td>SEP</td>
<td>Servo adapter with parallel key coupling</td>
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### Designation | Meaning |
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>V</td>
<td>Solid shaft</td>
</tr>
<tr>
<td>VF</td>
<td>Solid shaft, B5 flange</td>
</tr>
<tr>
<td>VL</td>
<td>Reinforced bearings</td>
</tr>
<tr>
<td>VL2</td>
<td>Agitator version</td>
</tr>
<tr>
<td>VL3</td>
<td>Agitator design with &quot;Drywell&quot;</td>
</tr>
<tr>
<td>VX</td>
<td>Solid shaft, foot mounting</td>
</tr>
<tr>
<td>VXF</td>
<td>Solid shaft, foot mounting, B5 flange</td>
</tr>
<tr>
<td>VXZ</td>
<td>Solid shaft, foot mounting, B14 flange</td>
</tr>
<tr>
<td>VZ</td>
<td>Solid shaft, B14 flange</td>
</tr>
<tr>
<td>W</td>
<td>Drive cylinder with free drive shaft</td>
</tr>
<tr>
<td>XF</td>
<td>Foot mounting, B5 flange</td>
</tr>
<tr>
<td>XZ</td>
<td>Foot mounting, B14 flange</td>
</tr>
</tbody>
</table>

- Not all options are available for all gear units
- Detailed descriptions and diagrams can be found in the relevant catalogues
- Further options in the cited catalogues or on request (e.g. belt drives)
- Multiple options are stated in succession, e.g.: SK 2282 S H G (hollow shaft with shrink disk, cover, rubber buffer)
INDUSTRIAL GEAR UNITS

MAXXDRIVE® HELICAL GEAR UNITS
MAXXDRIVE® BEVEL GEAR UNITS
MAXXDRIVE® XT BEVEL GEAR UNITS
MAXXDRIVE® INDUSTRIAL GEAR UNITS

MAXXDRIVE® industrial gear units (Catalogue G1050)
- UNICASE housing, no joints subject to torque
- All bearing points and sealing surfaces are machined in a single operation
- High precision axis alignment, quiet running
- Long life, low-maintenance
- Gear ratio range 5.54 to 400:1 with the same dimensions
- Helical and bevel gear units

MAXXDRIVE® helical gear units (Catalogue G1050)
- Universal gear units
- 2- and 3-stage
- Multiple mounting and cooling options
- Modified bearing options for high radial and axial load capacity
- Compact design
- All installation positions

MAXXDRIVE® helical bevel gear units (Catalogue G1050)
- Universal gear units
- 3- and 4-stage
- Multiple mounting and cooling options
- Modified bearing options for high radial and axial load capacity
- Compact design
- All installation positions

MAXXDRIVE® XT helical bevel gear units (T60-0011)
- 2-stage
- Thermally optimised gear units
- Integrated high power axial fan
- High powers with low speed ratios
- Optimised for horizontal installation orientation
- Ideal for applications such as belt or bucket conveyors

<table>
<thead>
<tr>
<th>Sizes</th>
<th>11</th>
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</thead>
<tbody>
<tr>
<td>Power</td>
<td>1.5 – 4,000 kW</td>
</tr>
<tr>
<td>Torque</td>
<td>15,000 – 260,000 Nm</td>
</tr>
<tr>
<td>Speed ratio</td>
<td>12.61 – 30,000:1</td>
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<table>
<thead>
<tr>
<th>Sizes</th>
<th>11</th>
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</thead>
<tbody>
<tr>
<td>Power</td>
<td>1.5 – 4,000 kW</td>
</tr>
<tr>
<td>Torque</td>
<td>15,000 – 282,000 Nm</td>
</tr>
<tr>
<td>Speed ratio</td>
<td>5.54 – 30,000:1</td>
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</table>

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Power</td>
<td>1.5 – 1,500 kW</td>
</tr>
<tr>
<td>Torque</td>
<td>15,000 – 75,000 Nm</td>
</tr>
<tr>
<td>Speed ratio</td>
<td>6.14 – 22.91:1</td>
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## MAXXDRIVE® INDUSTRIAL GEAR UNITS

### MAXXDRIVE® industrial gear units

<table>
<thead>
<tr>
<th>SK</th>
<th>11</th>
<th>2</th>
<th>17</th>
<th>AS</th>
<th>H</th>
<th>MS</th>
<th>FAN</th>
<th>355LP/4</th>
</tr>
</thead>
</table>

- **Motor designation**
- **Additional options (FAN, CC, ...)**
- **Motor adapters (IEC, NEMA, MS, ...)**
- **Additional options (D, H, B, ...)**
- **Shaft and mounting options (A, V, L, ...)**

### Stages

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<thead>
<tr>
<th></th>
<th>07</th>
<th>17</th>
<th>07</th>
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<tbody>
<tr>
<td>Helical gear units</td>
<td>Helical bevel gear units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAXXDRIVE®</td>
<td>MAXXDRIVE® XT</td>
<td>MAXXDRIVE®</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>2-stage</th>
<th>3-stage</th>
<th>4-stage</th>
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<tbody>
<tr>
<td>07</td>
<td>2</td>
<td>3</td>
<td>–</td>
</tr>
<tr>
<td>17</td>
<td>2</td>
<td>–</td>
<td>4</td>
</tr>
<tr>
<td>07</td>
<td>–</td>
<td>–</td>
<td>5</td>
</tr>
</tbody>
</table>

### Sizes (5 – 15)

**MAXXDRIVE® drive systems** (Catalogue G1050)

- Complete drive systems consisting of the gear unit, motor and drive electronics
- Wide selection of other components, e.g. couplings, brakes, etc.
- Standardised solutions for rockers and base frames e.g. for belt conveyors, bucket elevators, etc.
- Systems tailored to applications, e.g. agitators, extruders, etc.
- Individually adaptable
### INDUSTRIAL GEAR UNIT OPTIONS

<table>
<thead>
<tr>
<th>Designation</th>
<th>Meaning</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>Hollow output shaft</td>
</tr>
<tr>
<td>AS</td>
<td>Hollow output shaft for shrink disc</td>
</tr>
<tr>
<td>B</td>
<td>Fastening element for hollow shaft</td>
</tr>
<tr>
<td>CC</td>
<td>Internal water cooling system</td>
</tr>
<tr>
<td>CS1</td>
<td>External oil cooling system</td>
</tr>
<tr>
<td>CS2</td>
<td>External oil-air cooling system</td>
</tr>
<tr>
<td>D</td>
<td>Torque support</td>
</tr>
<tr>
<td>DRY</td>
<td>“Drywell” agitator version with standard bearings</td>
</tr>
<tr>
<td>EA</td>
<td>Splined hollow DIN 5480 output shaft</td>
</tr>
<tr>
<td>ED</td>
<td>Elastic torque arm</td>
</tr>
<tr>
<td>EV</td>
<td>Splined solid 5480 output shaft</td>
</tr>
<tr>
<td>F</td>
<td>Flat output flange (B14 with threaded holes)</td>
</tr>
<tr>
<td>FAN</td>
<td>Fan</td>
</tr>
<tr>
<td>FK</td>
<td>High output flange (B5 with through holes)</td>
</tr>
<tr>
<td>F1</td>
<td>Drive flange (SK..207 / SK..307)</td>
</tr>
<tr>
<td>H/H66</td>
<td>Cover (contact guard) / IP66 cover</td>
</tr>
<tr>
<td>IEC</td>
<td>Adapter for B5 mounting, IEC standard motors</td>
</tr>
<tr>
<td>L</td>
<td>Double solid drive shaft</td>
</tr>
<tr>
<td>LC</td>
<td>Pressurised oil lubrication (bearings)</td>
</tr>
<tr>
<td>LCX</td>
<td>Pressurised oil lubrication (bearings and gears)</td>
</tr>
<tr>
<td>MC</td>
<td>Motor bracket</td>
</tr>
<tr>
<td>MF</td>
<td>Motor base frame</td>
</tr>
<tr>
<td>MFB</td>
<td>Motor base frame with brake</td>
</tr>
<tr>
<td>MS</td>
<td>Motor swing base</td>
</tr>
<tr>
<td>MSB</td>
<td>Motor swing base with brake</td>
</tr>
<tr>
<td>MFK</td>
<td>Motor base frame with elastic coupling</td>
</tr>
<tr>
<td>MFT</td>
<td>Motor base frame with turbo coupling</td>
</tr>
<tr>
<td>MSK</td>
<td>Motor rocker with elastic coupling</td>
</tr>
<tr>
<td>MST</td>
<td>Motor rocker with turbo coupling</td>
</tr>
<tr>
<td>MFKB</td>
<td>Motor base frame with elastic coupling and brake</td>
</tr>
<tr>
<td>MFTB</td>
<td>Motor base frame with turbo coupling and brake</td>
</tr>
<tr>
<td>MSKB</td>
<td>Motor rocker with elastic coupling and brake</td>
</tr>
<tr>
<td>MSTB</td>
<td>Motor rocker with turbo coupling and brake</td>
</tr>
<tr>
<td>NEMA</td>
<td>Adapter for fitting B5 NEMA C flange and standard motors</td>
</tr>
<tr>
<td>OT</td>
<td>Oil expansion tank</td>
</tr>
<tr>
<td>OH</td>
<td>Oil heater</td>
</tr>
<tr>
<td>R</td>
<td>Backstop</td>
</tr>
<tr>
<td>TAC</td>
<td>Taconite sealing system</td>
</tr>
<tr>
<td>V</td>
<td>Solid output shaft</td>
</tr>
<tr>
<td>VL2/KL2</td>
<td>Agitator version</td>
</tr>
<tr>
<td>VL3/KL3</td>
<td>Agitator version with “Drywell”</td>
</tr>
<tr>
<td>VL4/KL4</td>
<td>Agitator version with “True Drywell”</td>
</tr>
<tr>
<td>VL5</td>
<td>Extruder flange</td>
</tr>
<tr>
<td>VL6/KL6</td>
<td>Agitator version with “Drywell”, without flange</td>
</tr>
<tr>
<td>WG</td>
<td>First stage gear unit</td>
</tr>
<tr>
<td>WX</td>
<td>Auxiliary drive unit</td>
</tr>
</tbody>
</table>

- Not all options/combinations are available for all gear units
- Detailed descriptions and diagrams can be found in the relevant catalogues
- Further options can be found in the cited catalogues or on request
- Multiple options are stated consecutively, e.g. SK 11217 AS H ED (hollow output shaft with shrink disc, cover and elastic torque arm)
**ASYNCHRONOUS MOTORS**

Robust motors for all applications

### Standard motors (Catalogue M7000)
- Comply with international regulations and directives
- Extensive options possible
- ISO F used according to B (ISO H as option)
- Suited for inverter operation
- High overload reserves

<table>
<thead>
<tr>
<th>Sizes</th>
<th>Power</th>
<th>Number of poles</th>
<th>Protection class</th>
<th>Efficiency class</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 – 225</td>
<td>0.12 – 55 kW</td>
<td>2, 4, 6, 8</td>
<td>IP55, optional IP66</td>
<td>IE1, IE2, IE3</td>
</tr>
</tbody>
</table>

### Switchable pole motors (Catalogue M7000)
- ISO F used according to B

<table>
<thead>
<tr>
<th>Sizes</th>
<th>Power</th>
<th>Number of poles</th>
<th>Protection class</th>
<th>Efficiency class</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 – 160</td>
<td>0.10 – 17 kW</td>
<td>4-2, 8-2, 8-4</td>
<td>IP55, optional IP66</td>
<td>IE1</td>
</tr>
</tbody>
</table>

### Single-phase motors (Catalogue M7000)
- ISO F used according to B
- With operating and starting capacitor and as single-phase motors with Steinmetz circuit

<table>
<thead>
<tr>
<th>Sizes</th>
<th>Power</th>
<th>Number of poles</th>
<th>Protection class</th>
<th>Efficiency class</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 – 90</td>
<td>0.12 – 1.5 kW</td>
<td>4</td>
<td>IP55, optional IP66</td>
<td>IE1</td>
</tr>
</tbody>
</table>
ASYNCHRONOUS MOTORS
Robust motors for all applications

**IEC-motors**

<table>
<thead>
<tr>
<th>SK 100</th>
<th>L</th>
<th>H / 4</th>
<th>SH</th>
</tr>
</thead>
</table>

- Anti-condensation heating
- Number of poles
- Efficiency class
- Power class
- Size (frame size)

- X or W in the nomenclature designates a smaller size
- Example: SK 250WP is a 55 kW Motor in a size 225 housing

**NEMA C-FACE-motors**

<table>
<thead>
<tr>
<th>SK 90</th>
<th>L</th>
<th>H / 4</th>
<th>145</th>
<th>TC</th>
<th>TW</th>
</tr>
</thead>
</table>

- Motor option (TW = thermostat)
- C-flange
- Housing size
- Efficiency class
- Power class
- Size (frame size)

**Switchable pole motors**

<table>
<thead>
<tr>
<th>SK 132</th>
<th>M</th>
<th>8 / 2</th>
<th>WU</th>
</tr>
</thead>
</table>

- Silumin rotor
- Number of poles – high speed
- Number of poles – low speed
- Power class
- Size (frame size)

**Single-phase motors**

<table>
<thead>
<tr>
<th>SK 90</th>
<th>LB / 4</th>
<th>EHB1</th>
</tr>
</thead>
</table>

- EHB1 – with capacitor
- EAR1 – with operating and starting capacitor
- EST – with Steinmetz circuit
- ECR – with operating and starting capacitor, CUS approved
- Number of poles
- Power class
- Size (frame size)
ASYNCHRONOUS MOTORS
Robust motors for all applications

Smooth motors (Catalogue M7010)

- ISO F
- Suited for inverter operation
- Wash-down design
- nsd tupH (optional)
- Smooth-surfaces, especially suitable for food industry applications

<table>
<thead>
<tr>
<th>Sizes</th>
<th>71 – 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>0.12 – 2.2 kW</td>
</tr>
<tr>
<td>Number of poles</td>
<td>4</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP66, optional IP69K in combination with the gear unit</td>
</tr>
<tr>
<td>Efficiency class</td>
<td>IE3</td>
</tr>
</tbody>
</table>

For non-ventilated smooth motors, the efficiency code letter is H or P for Premium Efficiency (IE3)
# SYNCHRONOUS MOTORS
High performance for your application

## Standard motors (TI60-0001 and TI60-0004)
- ISO B
- Only for inverter operation
- Open or closed loop operation with NORD frequency inverters
- High overload reserves

<table>
<thead>
<tr>
<th>Sizes</th>
<th>80 – 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>1.1 – 5.5 kW</td>
</tr>
<tr>
<td>Number of poles</td>
<td>4</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP55, optional IP66</td>
</tr>
<tr>
<td>Efficiency class</td>
<td>IE4</td>
</tr>
</tbody>
</table>

## Smooth motors (DS1007)
- ISO B
- Only for inverter operation
- Open or closed loop operation with NORD frequency inverters
- Wash-down design
- nsd tupH (optional)

<table>
<thead>
<tr>
<th>Sizes</th>
<th>80 – 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>0.75 – 2.2 kW</td>
</tr>
<tr>
<td>Number of poles</td>
<td>4</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP66, optional IP69K in combination with the gear unit</td>
</tr>
<tr>
<td>Efficiency class</td>
<td>IE4</td>
</tr>
</tbody>
</table>
**IE5+ SYNCHRONOUS MOTORS**

Efficient, hygienic and compact

---

### IE5+ Synchronous motors (Special flyer 9012)

- Ultimate operational efficiency with IE5 technology
- Reduced TCO and fast ROI
- Reduced number of versions through constant torque over a wide speed range
- Motor can be operated worldwide
- Flexible motor mounting: direct mounting, NEMA, IEC
- Especially easy to clean and corrosion-proof due to smooth and fanless motor design – Wash-down
- Optional motor-integrated encoder
- Optional integrated mechanical brake

<table>
<thead>
<tr>
<th>Sizes</th>
<th>71</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>0.35 – 1.1 kW</td>
</tr>
<tr>
<td>Number of poles</td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Protection class</th>
<th>IP55, optional IP66, IP69K is possible in combination with a gear unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency class</td>
<td>In many instances, IE5 is clearly exceeded</td>
</tr>
</tbody>
</table>
EXPLOSION-PROTECTED MOTORS
Optimally secured

Dust explosion-protected motors (Catalogue G2122)
- Zone 21, device category 2D, Ex tb 125°C
- Zone 22, device category 3D, Ex tb 125°C
- Direct and IEC mounting

Sizes: 63 – 180
Power: 0.12 – 22 kW
Number of poles: 4
Protection class: IP55, optional IP66
Efficiency class: IE2 (80SH and higher)

Gas explosion-protected motors (Catalogue G2122)
- Zone 1, device category 2G, Exe T3
- Zone 2, device category 3G, Exn T3
- Direct and IEC mounting

Sizes: 63 – 180
Power: 0.12 – 22 kW
Number of poles: 4
Protection class: IP55, optional IP66
Efficiency class: IE2 (80SH and higher)

 Motors compliant with NEC explosion protection HazLoc and IECEx are also available
Further information about European explosion protection is given in Manual Part No. 6091602

NORD UNIVERSAL MOTOR
Can be used in the main global markets

Universal motor (DS1005)
- International certification
  - CE
  - UL standard 1004
  - CSA
  - CCC
  - EAC
  - ISI
- International energy standards
  - IEC 60034-30
  - EISA 2007
  - EER 2010
  - CEL/GB 18613
  - MEPS AS/NZ 1359.5
- Dual-Mode: 50 Hz and 60 Hz
- Four different operating points

Sizes: 63 – 225
Power: 0.12 – 45 kW
Number of poles: 4
Protection class: IP55, optional IP66
Efficiency class: IE3/Premium

Motors compliant with NEC explosion protection HazLoc and IECEx are also available
Further information about European explosion protection is given in Manual Part No. 6091602
### MOTOR OPTIONS

<table>
<thead>
<tr>
<th>Designation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRE +</td>
<td>Brake / brake torque + sub-options</td>
</tr>
<tr>
<td>DBR +</td>
<td>Double brake + sub-options</td>
</tr>
<tr>
<td>RG *</td>
<td>Rust protected version</td>
</tr>
<tr>
<td>SR *</td>
<td>Dust and rust protected version</td>
</tr>
<tr>
<td>IR *</td>
<td>Current relay</td>
</tr>
<tr>
<td>FHL *</td>
<td>Lockable manual release</td>
</tr>
<tr>
<td>HL</td>
<td>Manual release</td>
</tr>
<tr>
<td>MIK</td>
<td>Microswitch</td>
</tr>
<tr>
<td>AS55 *</td>
<td>Outdoor installation</td>
</tr>
<tr>
<td>BRB</td>
<td>Anti-condensation heater / Brake</td>
</tr>
<tr>
<td>NRB1/2</td>
<td>Noise-reduced brake</td>
</tr>
<tr>
<td>ERD</td>
<td>External earthing terminal</td>
</tr>
<tr>
<td>TF</td>
<td>Thermistor, PTC resistor</td>
</tr>
<tr>
<td>TW</td>
<td>Temperature sensor, bi-metal</td>
</tr>
<tr>
<td>SH</td>
<td>Anti-condensation heating</td>
</tr>
<tr>
<td>WU</td>
<td>Silumin rotor</td>
</tr>
<tr>
<td>Z</td>
<td>Additional flywheel, cast iron fan</td>
</tr>
<tr>
<td>WE +</td>
<td>Second shaft end</td>
</tr>
<tr>
<td>HR</td>
<td>Hand wheel</td>
</tr>
<tr>
<td>RD</td>
<td>Protective shield</td>
</tr>
<tr>
<td>RDT</td>
<td>Protective shield, textile fan cowl</td>
</tr>
<tr>
<td>RDD</td>
<td>Double fan cowl</td>
</tr>
<tr>
<td>AS66</td>
<td>Outdoor installation</td>
</tr>
<tr>
<td>OL</td>
<td>Without fan</td>
</tr>
<tr>
<td>OL/H</td>
<td>Without fan, without fan cowl</td>
</tr>
<tr>
<td>KB</td>
<td>Closed condensation drain hole</td>
</tr>
<tr>
<td>MS</td>
<td>Motor plug connection</td>
</tr>
<tr>
<td>EKK</td>
<td>One-piece terminal box</td>
</tr>
<tr>
<td>KKV</td>
<td>Encapsulated terminal box</td>
</tr>
<tr>
<td>FEU</td>
<td>Humidity protection insulation</td>
</tr>
<tr>
<td>TRO</td>
<td>Tropical protection insulation</td>
</tr>
<tr>
<td>MOL</td>
<td>Dairy version</td>
</tr>
<tr>
<td>VIK</td>
<td>Regulation – Vereinigung Industrieller Kraftwirtschaft (Association of the Industrial Power Industry)</td>
</tr>
<tr>
<td>F</td>
<td>External fan</td>
</tr>
<tr>
<td>RLS</td>
<td>Backstop</td>
</tr>
<tr>
<td>MG</td>
<td>Magnetic incremental encoder</td>
</tr>
<tr>
<td>SL</td>
<td>Sensor bearings</td>
</tr>
<tr>
<td>IG</td>
<td>Incremental encoder</td>
</tr>
<tr>
<td>IG.P</td>
<td>Incremental encoder with plug connector</td>
</tr>
<tr>
<td>IG.K</td>
<td>Incremental encoder with terminal box</td>
</tr>
<tr>
<td>AG</td>
<td>Absolute encoder</td>
</tr>
</tbody>
</table>

*not for DBR

- Not all options are available for all motors
- Detailed descriptions and drawings of the options can be found in M7000
- Further options (e.g. motor plug connection, 2xTF etc.) on request
DRIVE ELECTRONICS

FREQUENCY INVERTERS
AND MOTOR STARTERS
NORDAC PRO SK 500P
Frequency inverters – for versatile use

Universal drive in various basic versions, can be modularly extended

Precise current vector control with high overload reserves for operating asynchronous and synchronous motors

HTL encoder interface for closed-loop servo mode and POSICON positioning function even in the basic SK 500P device

Universal interface for real-time Ethernet PROFINET, ETHERCAT, ETHERNET IP and POWERLINK

CANopen as series equipment

Drive profile DS402 for CANopen, ETHERCAT and POWERLINK

Integrated PLC for drive-related functions, even in the basic device

TTL encoder interface and optional universal encoder interface

Optional: Safe Stop with "Safe Torque Off" (STO) and "Safe Stop 1" (SS1) according to EN 61800-5-2

MicroSD Card

USB interface for connection to NORDCON, may also be used without a power supply

Compact slim design, can be mounted directly adjacent to other components

in Size 1 and 2 all terminals are implemented as plug connections, including the power connections for the mains and the motor

<table>
<thead>
<tr>
<th>Sizes</th>
<th>3</th>
</tr>
</thead>
</table>
| Voltage | 1~ 200 – 240 V  
3~ 380 – 480 V |
| Power | 0.25 – 5.5 kW |
**NORDAC PRO SK 500E**
Frequency inverters – for versatile use

**NORDAC PRO SK 500E (Catalogue E3000)**

- Maximum functionality
- Sensorless current vector control (ISD control)
- Multi-encoder interface
- PLC functionality for drive-integrated functions, SK 520E and higher
- Optional: POSICON positioning SK 530E and higher
- Optional: Safe stop with “Safe Torque Off” (STO) and “Safe Stop 1” (SS1) as per EN 61800-5-2 (for SK 510E and SK 530E)
- ASM and PMSM motor operation
- Energy-saving function
- High overload reserves (200 %) for all power ratings up to 160 kW
- Many field bus- and Industrial Ethernet-based bus systems
- Optional: CANopen integrated in SK 511E and higher
- Integrated Class C1 line filter
- Alternative cooling systems, e.g. “Cold Plate”
- IP20 control cabinet installation

**Sizes**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11</td>
</tr>
</tbody>
</table>

**Voltage**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1~ 110 – 120 V</td>
<td>1~ 200 – 240 V</td>
</tr>
<tr>
<td>3~ 200 – 240 V</td>
<td>3~ 380 – 480 V</td>
</tr>
</tbody>
</table>

**Power**

0.25 – 160 kW
**NORDAC LINK SK 250E**
Frequency inverters – easy to install

### NORDAC LINK SK 250E (Catalogue E3000)

- Protection class IP65 (<2.2 kW), IP55 (all devices with fan or option FANO)
- Simple commissioning and installation in the field
- All I/O, bus interface and power connections in plug-in version for easy commissioning and maintenance
- Extensive options e.g. key operated maintenance switch, push buttons, potentiometers
- PLC functionality for drive-integrated functions
- Functions compatible with modular NORDAC FLEX
- AS-Interface
- Safe stop with “Safe Torque Off” (STO) and “Safe Stop 1” (SS1) as per EN 61800-5-2
- Many field bus- and Industrial Ethernet-based bus systems
- ASM and PMSM motor operation
- Local or remote control

<table>
<thead>
<tr>
<th>Sizes</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>3~ 380 – 500 V</td>
</tr>
<tr>
<td>Power</td>
<td>0.37 – 7.5 kW</td>
</tr>
</tbody>
</table>

**NORDAC LINK SK 250E**

<table>
<thead>
<tr>
<th>SK 250E</th>
<th>FDS</th>
<th>301</th>
<th>340</th>
<th>A</th>
</tr>
</thead>
</table>

- EMC line filters:
  - A = Class A1 (C2)
- Mains voltage:
  - x40 = 400 V
- Number of mains phases:
  - 3xx = 3-phase
- Digits before decimal point for power:
  - 0 = 0.xx; 1 = 0.x0
- Rated power (xx):
  - 301 = 3 kW

**NORDAC LINK FDS**
Frequency inverter type: SK 250E ... SK 280E

**FDS = Field Distribution System**
NORDAC FLEX SK 200E
Frequency inverters – for flexible use

**NORDAC FLEX SK 200E**

- Sensorless current vector control (ISD control)
- PLC functionality for drive-integrated functions
- Integrated POSICON positioning control
- Safe stop with “Safe Torque Off” (STO) and “Safe Stop 1” (SS1) as per EN 61800-5-2
- ASM and PMSM motor operation
- Energy-saving function
- Motor or wall mounting
- IP55 (optional IP66)
- AS-Interface integrated in SK 22xE and SK 23xE
- Many field bus- and Industrial Ethernet-based bus systems
- Extensive selection of plug connectors for control and power cable connections
- ATEX Zone 22, Category 3D (Sizes 1 – 3)
- POSICON with absolute encoder

**Sizes**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>1~ 110 – 120 V</td>
<td>0.25 – 22 kW</td>
</tr>
<tr>
<td>1~ 200 – 240 V</td>
<td></td>
</tr>
<tr>
<td>3~ 200 – 240 V</td>
<td></td>
</tr>
<tr>
<td>3~ 380 – 500 V</td>
<td></td>
</tr>
</tbody>
</table>

**NORDAC FLEX SK 200E**

- SK 200E 550 340 A (-C)
- Protection class: without = IP55 (standard)
  - C = IP66
- EMC line filters:
  - A = Class A1 (C2)
- Mains voltage:
  - x12 = 115 V; x23 = 230 V;
  - x40 = 400 V
- Number of mains phases:
  - 1xx = 1-phase; 3xx = 3-phase
- Digits before decimal point for power:
  - 0 = 0.xx; 1 = 0x.x0; 2 = 0xx.0
- Rated power (xx):
  - 550 = 0.55 kW ... 222 = 22 kW etc.
- Frequency inverter type: SK 200E ... SK 230E and SK 205E ... SK 235E
**NORDAC BASE SK 180E**

Frequency inverters – economical in use

**NORDAC BASE SK 180E (Catalogue E3000)**

- Sensorless current vector control (ISD control)
- PLC functionality for drive-integrated functions
- Operation on standard RCD possible, leakage current <16 mA
- AS-Interface integrated in SK 190E
- Energy-saving function
- Motor or wall mounting
- IP55 (optional IP66 or IP69K)
- nsd tupH treatment (optional)
- Integrated line filter
- 2 analogue inputs, 3 digital inputs, 2 digital outputs
- Temperature sensor input (TF+/TF-)
- RS485 (System bus/RS232 interface)
- ATEX Zone 22, Category 3D

**Sizes**

<table>
<thead>
<tr>
<th></th>
<th>2</th>
</tr>
</thead>
</table>

**Voltage**

<table>
<thead>
<tr>
<th></th>
<th>1~ 110 – 120 V</th>
<th>1~ 200 – 240 V</th>
<th>3~ 200 – 240 V</th>
<th>3~ 380 – 500 V</th>
</tr>
</thead>
</table>

**Power**

<table>
<thead>
<tr>
<th></th>
<th>0.25 – 2.2 kW</th>
</tr>
</thead>
</table>

**NORDAC BASE SK 180E**

- SK 180E 750 340 B (-C) XXX
- NSD (nsd tupH) without = Standard
- BRI (internal braking resistor)
- Protection class: without = IP55 (standard)
- C = IP66
- EMC line filters:
  - Class C1, B = Class C1
- Mains voltage:
  - x12 = 115 V; x23 = 230 V; x40 = 400 V
- Number of mains phases:
  - 1xx = 1-phase; 3xx = 3-phase
- Digits before decimal point for power:
  - 0 = 0.xx; 1 = 0.x0
- Rated power (xx):
  - 250 = 0.25 kW ... 221 = 2.2 kW etc.
- Frequency inverter type: SK 180E or SK 190E

**GEAR UNITS**

- **MOTORS**
- **INVERTERS**
- **INFORMATION**

**DRIVE ELECTRONICS**
NORDAC **LINK SK 155E**
Motor starters – for economical operation

### NORDAC LINK SK 155E / 175E (Catalogue E3000)

- All I/O, bus interface and power connections in plug-in version for easy commissioning and maintenance
- Extensive options e.g. key switch maintenance switch
- PLC functionality for drive-integrated functions
- Wear-free fully electronic starting with reversing function
- Functions compatible with modular NORDAC START
- Protection class IP65
- Simple commissioning
- AS-Interface or PROFIBUS can be used
- Field installation
- Can be parameterised on-site

<table>
<thead>
<tr>
<th>Sizes</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>3~ 380 – 500 V</td>
</tr>
<tr>
<td>Power</td>
<td>0.12 – 3 kW</td>
</tr>
</tbody>
</table>

### NORDAC LINK SK 155E / 175E

- **SK 175E**
  - **FDS**
  - **301 340 A**

  - **EMC line filters:**
    - A = Class A1 (C2)
  - **Mains voltage:**
    - x40 = 400 V
  - **Number of mains phases:**
    - 3xx = 3-phase
  - **Digits before decimal point for power:**
    - 1 = 0x.x0
  - **Rated power (xx):**
    - 301 = 3 kW
  - **NORDAC LINK FDS**
  - **Frequency inverter type:**
    - SK 155E (unidirectional), SK 175E (bidirectional)

- **FDS = Field Distribution System**
**NORDAC START SK 135E**
Motor starters – for economical operation

**NORDAC START SK 135E**
(Catalogue E3000)

- Motor starter with soft start and reversing function
- Integrated brake rectifier to control a brake (BRE)
- PROFIBUS or AS-Interface integrated
- Wall or motor mounting
- IP55 (optional IP66 and IP69K)
- nsd tupH treatment (optional)
- Integrated line filter
- 2 digital inputs, 2 digital outputs
- Temperature sensor input (TF+/TF-)
- RS232 interface
- ATEX Zone 22, Category 3D
- Electronic starter switches without wear
- Reduced mechanical wear due to reduced start-up torque

<table>
<thead>
<tr>
<th>Sizes</th>
<th>2</th>
</tr>
</thead>
</table>
| Voltage | 3~ 200 – 240 V  
3~ 380 – 500 V |
| Power | 0.12 – 3 kW or up to 7.5 kW |

**NORDAC START SK 135E**

- Protection class:
  - Standard = IP55
  - C = IP66
- Communication:
  - ASI = AS-Interface
  - PBR = PROFIBUS-Interface
- EMC line filters: Class B = Class C1
- Mains voltage: x23 = 230 V; x40 = 400 V
- Number of mains phases: 3xx = 3-phase
- Rated power (xx):
  - 301 = 3.0 kW or 751 = 7.5 kW
- Frequency inverter type: SK 135E or SK 175E

---

Motor starters – for economical operation
**NORDAC ACCESS BT / NORDCON APP**

**NORDAC ACCESS BT**
- Stand-alone parameter memory
- Bluetooth interface for inverter and NORDCON APP
- Data transfer to PC via USB
- Can be plugged in or disconnected during operation

**NORDCON APP**
- Dashboard based visualisation for drive monitoring and fault diagnosis
- Parameterisation with Help function and rapid access to parameters
- Individually configurable oscilloscope function for drive analysis
- Backup and recovery function for simple handling of drive parameters

**PROFIsafe – SK TU4-PNS**

- Safe Motion PROFIsafe via PROFINET with module SK TU4-PNS

Safety functions for drives according to IEC 61800-5-2

- Safety Limited Speed (SLS)
- Safe Speed Range (SSR)
- Safe Operation Stop (SOS)
- Safe Speed Measurement (SSM)

- PLc (Performance Level) Cat. 4 according to ISO 13849-1
- SIL 3 (Safety Integrity Level) as per IEC 62061

- Simple implementation of safe responses for NORDAC FLEX decentralised inverters
- Comprehensive safety for reliable operation of plant and machinery
- Functional safety with a single network cable
- Minimum wiring effort
- Global availability of fail-safe machine data
SPECIAL OPTIONS FOR DECENTRALISED INVERTERS

Plug connections

All connections designed for simple handling, so that drives can be very conveniently configured and installed.
- Simple Plug-and-Play with all common connection plugs
- Mains and motor output plugs
- M12 plugs for sensors and encoders
- Pre-assembled cables

Local control

Switches and keys are located directly on the drives and enable direct starting and stopping as well as mode switching.
- Mains switch
- Selector switch for local or remote control
- Start/Stop and Forward/Reverse switch

BUS SYSTEMS AND INDUSTRIAL ETHERNET

Bus systems/Industrial Ethernet

- EtherNet/IP
- POWERLINK
- PROFINET
- CANopen
- DeviceNet

Plug connections

All connections designed for simple handling, so that drives can be very conveniently configured and installed.

- Simple Plug-and-Play with all common connection plugs
- Mains and motor output plugs
- M12 plugs for sensors and encoders
- Pre-assembled cables

Local control

Switches and keys are located directly on the drives and enable direct starting and stopping as well as mode switching.

- Mains switch
- Selector switch for local or remote control
- Start/Stop and Forward/Reverse switch
NORD DRIVESYSTEMS supplies an extensive range of connection and control cables.

- Depending on the version, connecting cables include power connection cables (mains and motor) and if necessary cables for thermistors as well as 24 V DC control voltage.
- Control cables are exclusively used for transmitting control signals (encoder, bus, I/O signals).

Connection and control cables are supplied pre-assembled. They are available in various lengths and can be optionally provided with open ends or plug connectors. Connection cables are certified for global use according to the relevant IEC and UL standards.

### Cables for motor and frequency inverter connection
- Mains connection and Daisy chain cables
- Signal and brake resistor cables

#### Labelling for various combinations
- **SK CE HQ8-K MA H10E-M1B 3 OM**
  - **3_OM** = Length 3 m
  - **S5UL** = Special solution 3 m and UL certification, note: only permissible for plug connectors

#### Cable end side 2: version and material labelling
- **H10E** = HAN 10E plug connector
- **M1B** = One metal lock
- Otherwise identical to **M2B** = Two metal locks
- **Note**: material labelling is only permissible for plug connectors

#### Cable category
- **LE** = Line connection
- **LA** = Daisy chain mains connection
- **MA** = Motor connection
- **BRE** = Brake resistor
- **BRW5** = Brake resistor
- **SYSM** = System bus
- **AG** = Absolute encoder
- **IG** = Encoder without zero track
- **... C** = Combination encoder (AG / IG)
- **IG0** = Encoder with zero track

#### Cable end side 1: version and material labelling
- **HQ8** = HAN Q8/0 plug connector
- **HQ4** = HAN Q4 plug connector (w/o = without)
- **HQ42** = HAN Q4/2 plug connector (24 V DC)
- **OE** = Open ends
- **A5F** = M12 A-coded 5-pin female
- **B4M** = M12 B-coded 4-pin male
- **K** = Plug connector with plastic housing
- **M** = Plug connector with metal housing
  - Note: material labelling is only permissible for plug connectors

#### Cable extension
CONDITION MONITORING FOR PREDICTIVE MAINTENANCE

For CONDITION MONITORING, drive and status data are recorded periodically or continuously in order to optimise the operational safety and efficiency of machines and plants. CONDITION MONITORING can provide major information for PREDICTIVE MAINTENANCE. The objective is to maintain machines and plants proactively, to reduce downtimes and to increase the efficiency of the entire plant.

The INDUSTRIAL INTERNET of THINGS (IIoT) focuses on internet usage in industrial processes and procedures. IIoT aims at increasing the operational efficiency, reducing costs and speeding up processes. Sensors and sensor data play a central role to provide the basis for CONDITION MONITORING and PREDICTIVE MAINTENANCE.

- CONDITION MONITORING solutions for PREDICTIVE MAINTENANCE systems integrated into the frequency inverter
- System is IIoT/Industry 4.0 READY!
- Available for decentralised and control cabinet solutions

Further information in special flyer S9091

Temperature curve of the oil in the gear unit

Temperature curve of the oil in the gear unit

Sensors
- Virtual sensors – the PLC can calculate information such as the optimal oil change time
- Interface for digital/analogue sensors

Communication interfaces
- Threshold values or general status information can be communicated externally (via normal Industrial Ethernet dialects)

Integrated PLC
- Local pre-processing of data with the integrated PLC
- Pre-processing of threshold values
TECHNICAL INFORMATION

nsd tupH surface protection
Energy saving directives for motors
Nominal operating modes
International Protection Codes
Installation orientations
Enquiry process
NORD geared motors and electronics (SK 1xxE) with nsd tupH are ideal for use in extreme ambient conditions:

- Easy to clean surfaces
- Resistant to acids and alkalis (wide pH range)
- No blistering, even if damaged
- Cannot flake
- Corrosion resistant – prevents contact corrosion
- Alternative to stainless steel
- Complies with FDA Title 21 CFR 175.300
- Free from chromates

The complete solution for extreme conditions:

- Surface treated housing components
- DIN and standard components made from stainless steel
- Wash-down housing (gear unit and motor)
- Stainless steel shafts
- Special shaft sealing rings
- Food compatible oil

nsd tupH for extreme conditions:

- Food and beverage industry
- Dairies
- Pharmaceutical industry
- Water and waste water plants
- Car wash equipment
- Offshore and coastal areas
- Chemical cleaning (Wash-down, wide pH range)

Tests performed on surface treated aluminium housing components:

- ASTM D714 Blister formation
- ASTM D610-08 Corrosion
- ASTM D1654-08 Scratching
- ASTM B117-09 Salt spray test
- ASTM D3170 Gravelometer test
- DIN EN ISO 9227 Salt spray mist test
- DIN EN ISO 2409 Cross-cut test

<table>
<thead>
<tr>
<th>Overview of advantages</th>
<th>Paint</th>
<th>Stainless steel</th>
<th>nsd tupH</th>
</tr>
</thead>
<tbody>
<tr>
<td>No flaking possible</td>
<td>–</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Corrosion resistant</td>
<td>+</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Costs</td>
<td>+</td>
<td>–</td>
<td>O</td>
</tr>
<tr>
<td>Weight</td>
<td>++</td>
<td>–</td>
<td>++</td>
</tr>
<tr>
<td>Available products</td>
<td>+</td>
<td>–</td>
<td>+</td>
</tr>
<tr>
<td>Thermal conductivity</td>
<td>+</td>
<td>–</td>
<td>+</td>
</tr>
</tbody>
</table>

+ advantageous, ++ very advantageous, O neutral, – disadvantageous, —— very disadvantageous

Products available with nsd tupH:

- Helical gear units
- Bevel gear units
- Worm gear units
- Smooth motors
- NORDAC START and NORDAC BASE electronics
### Overview of Energy Saving Directives for Motors

<table>
<thead>
<tr>
<th>Country</th>
<th>Voltage / frequency</th>
<th>Power range</th>
<th>Number of poles</th>
<th>Regulations / Directives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe, Switzerland and Turkey</td>
<td>50 – 1000 V 50 / 60 Hz</td>
<td>0.75 – 375 kW</td>
<td>2 – 6</td>
<td>EG 640/2009 / EG 4/2014 2009/125/EG Ecodesign Directive</td>
</tr>
<tr>
<td>USA</td>
<td>&lt; 600 V 60 Hz</td>
<td>1 – 500 HP (0.75 – 375 kW)</td>
<td>2 – 8</td>
<td>EISA 2007 / EISA 2014 NEMA Premium (IE3) Extension to sizes NEMA 42-48-56</td>
</tr>
<tr>
<td>Canada</td>
<td>&lt; 600 V 50 / 60 Hz</td>
<td>1 – 500 HP (0.75 – 375 kW)</td>
<td>2 – 8</td>
<td>EER 2017 NEMA Premium (IE3) No update planned</td>
</tr>
<tr>
<td>China</td>
<td>&lt; 1000 V 50 Hz</td>
<td>0.75 – 375 kW</td>
<td>2 – 6</td>
<td>GB 18613-2012 GB 25958-2010 Grade 3 (IE2) IE3 introduction has been postponed</td>
</tr>
<tr>
<td>Brazil</td>
<td>&lt; 1000 V 50 / 60 Hz</td>
<td>0.75 – 185 kW</td>
<td>2 – 8</td>
<td>NOM-016-ENER-2010 NEMA Premium (IE3) No update planned</td>
</tr>
<tr>
<td>Mexico</td>
<td>&lt; 600 V 60 Hz</td>
<td>1 – 500 HP (0.75 – 375 kW)</td>
<td>2 – 8</td>
<td>Resolution no. 1012:2015 IE2 IE3 &gt; 7.5 kW from August 2020</td>
</tr>
<tr>
<td>Columbia</td>
<td>&lt; 600 V 60 Hz</td>
<td>0.18 – 373 kW</td>
<td>2 – 8</td>
<td>NCh 3086 of 2008 IE2 No update planned</td>
</tr>
<tr>
<td>Chile</td>
<td>&lt; 690 V 50 Hz</td>
<td>0.75 – 7.5 kW</td>
<td>2 – 6</td>
<td>Resolucion No. 17 524:2017 IE2 No update planned</td>
</tr>
<tr>
<td>Ecuador</td>
<td>&lt; 1000 V 60 Hz</td>
<td>0.746 – 373 kW</td>
<td>2 – 8</td>
<td>AS/NZS 1359.5 : 2004 MEPS 2 “E2” IE2 requirements according to AS / NZS 1359.5 are to some extent more stringent than the IE2 regulations according to IEC!</td>
</tr>
<tr>
<td>Australia New Zealand</td>
<td>&lt; 1100 V 50 Hz</td>
<td>0.73 – 185 kW</td>
<td>2 – 8</td>
<td>Gazette of India No. 3144/2018 IE2 No update planned</td>
</tr>
<tr>
<td>India</td>
<td>&lt; 1000 V 50 Hz</td>
<td>0.12 – 375 kW</td>
<td>2 – 8</td>
<td>MKE-2015-28 IE3 No update planned</td>
</tr>
<tr>
<td>South Korea</td>
<td>&lt; 600 V 60 Hz</td>
<td>0.75 – 375 kW</td>
<td>2 – 8</td>
<td>Energy Conservation Act (ECA) 2013 IE3 No update planned</td>
</tr>
<tr>
<td>Singapore</td>
<td>&lt; 1000 V 50 Hz</td>
<td>0.75 – 375 kW</td>
<td>2 – 6</td>
<td>CNS 14400 (MEPS) IE3 No update planned</td>
</tr>
<tr>
<td>Taiwan</td>
<td>&lt; 600 V 60 Hz</td>
<td>0.75 – 200 kW</td>
<td>2 – 8</td>
<td>Jis C 4213 (2014) IE3 No update planned</td>
</tr>
<tr>
<td>Japan</td>
<td>&lt; 1000 V 50 / 60 Hz</td>
<td>0.75 – 375 kW</td>
<td>2 – 6</td>
<td>SASO 2893:2018 IE3 No update planned</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>50 – 1000 V 60 Hz</td>
<td>0.75 – 375 kW</td>
<td>2 – 8</td>
<td></td>
</tr>
</tbody>
</table>

### Regulations / Directives

<table>
<thead>
<tr>
<th>Regulation for min. energy efficiency</th>
<th>Planning / remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG 640/2009</td>
<td>New Ecodesign Directive for the EU as of 2021 or 2023, see page 85</td>
</tr>
<tr>
<td>EISA 2007 / EISA 2014</td>
<td>Extension to sizes NEMA 42-48-56</td>
</tr>
<tr>
<td>EER 2017</td>
<td>No update planned</td>
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<tr>
<td>GB 18613-2012 GB 25958-2010</td>
<td>Grade 3 (IE2) IE3 introduction has been postponed</td>
</tr>
<tr>
<td>Lei No 10.295 Decret No 4.508 Portaria Interministerial Nº 1, DE 29 DE JUNHO DE 2017</td>
<td>Alto Redimento Plus (IE3) No update planned</td>
</tr>
<tr>
<td>NOM-016-ENER-2010</td>
<td>NEMA Premium (IE3) No update planned</td>
</tr>
<tr>
<td>Resolution no. 1012:2015</td>
<td>IE3 &gt; 7.5 kW from August 2020</td>
</tr>
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<td>NCh 3086 of 2008</td>
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</tr>
<tr>
<td>SASO 2893:2018</td>
<td>IE3 No update planned</td>
</tr>
</tbody>
</table>
- In case of S2 the operating time in minutes must be stated as follows: “S2 15 minutes”
- In case of S3, S4, S5 and S6 the operating time in minutes must be stated as follows: „S3 40 %“, i.e.: 40 % operating time on the basis of 10 minutes
**INTERNATIONAL PROTECTION CODES**
"IP PROTECTION CLASS" (IEC 60529)

<table>
<thead>
<tr>
<th>Digit 1</th>
<th>Protection against foreign bodies</th>
<th>Digit 2</th>
<th>Protection against water (humidity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No protection</td>
<td>0</td>
<td>No protection</td>
</tr>
<tr>
<td>1</td>
<td>Protected against solid foreign bodies with diameter above 50 mm</td>
<td>1</td>
<td>Protection against dripping water</td>
</tr>
<tr>
<td>2</td>
<td>Protected against solid foreign bodies with diameter above 12.5 mm</td>
<td>2</td>
<td>Protection against dripping water if the housing is inclined by up to 15°</td>
</tr>
<tr>
<td>3</td>
<td>Protected against solid foreign bodies with diameter above 2.5 mm</td>
<td>3</td>
<td>Protected against falling sprayed water up to 60° from vertical</td>
</tr>
<tr>
<td>4</td>
<td>Protected against solid foreign bodies with diameter above 1.0 mm</td>
<td>4</td>
<td>Protected against splashed water from all sides</td>
</tr>
<tr>
<td>5</td>
<td>Protected against damaging amounts of dust</td>
<td>5</td>
<td>Protection against water jets (nozzle) from any angle</td>
</tr>
<tr>
<td>6</td>
<td>Dust-proof</td>
<td>6</td>
<td>Protection against strong water jets</td>
</tr>
<tr>
<td>7</td>
<td>Protection against temporary immersion</td>
<td>7</td>
<td>Protection against permanent immersion</td>
</tr>
<tr>
<td>8</td>
<td>Protection against permanent immersion</td>
<td>8</td>
<td>Protection against water for high pressure water jet and steam cleaning, specifically for road vehicles</td>
</tr>
<tr>
<td>9K</td>
<td>Protection against water for high pressure water jet and steam cleaning, specifically for road vehicles</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If one of the numbers is not stated, this is indicated with an “X”, e.g.: IP4X (protection against foreign bodies > 1.0 mm no details of protection against moisture)

For IPX7 the immersion depth and the immersion time must also be stated

Up to IPX6 the lower protection classes are included

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**NEW EUROPEAN ECODESIGN DIRECTIVE**

The European Union has continued to develop the existing Ecodesign Directive 2009/125/EG. In future, the present exceptions will be greatly restricted and motors for special ambient conditions, e.g. explosion protection areas will also have to comply with these new energy efficiency classes. Establishment of these increased requirements will take place in several stages:

**JULY 2021**
- IE3 for 0.75 – 1,000 kW and IE2 for 0.12 – <0.75 kW including for brake motors, inverter operated motors and Ex motors (Ex eb is exempted)
- IE2 for frequency inverters from 0.12 – 1,000 kW

**JULY 2023**
- IE4 for 75 – 200 kW
- IE2 for Ex eb motors
- IE2 for single-phase motors

Further information can be found in S4700, S4750 and S4755.
INSTALLATION ORIENTATIONS
MAXXDRIVE® BEVEL GEAR UNITS
INSTALLATION ORIENTATIONS
MAXXDRIVE® PARALLEL SHAFT GEAR UNITS

2-stage gear unit installation orientations

3-stage gear unit installation orientations
INSTALLATION ORIENTATIONS FOR MOTORS AND TERMINAL BOXES

The nomenclature is also available as a poster (Part No. 6091985)

ENQUIRY PROCESS

myNORD
The online product configurator in the myNORD (www.mynord.com) customer portal enables convenient selection of the drive unit. Ex drives including options can also be selected for

- Precise configuration,
- Direct generation of CAD-data (3D models, dimensioned drawings, outline drawings),
- Creation of offers online.

It must be emphasised that the configurator indicates whether or not a selected drive unit is Ex compliant. Price information as well as an enquiry/order form are also included.

If configuration with myNORD is not possible, an enquiry form is available (www.nord.com > Forms > General Enquiry Form) Selection of the drive unit and checking of conformity will then be carried out by your technical contact partner.

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