

# Need flexible VFDs to create more competitive systems?

## Highlights

- > Modular and configurable variable frequency drive (VFD)
- > STO and SS1-t SIL3 as standard
- > Functional safety by fieldbus: PROFIsafe
- > Scalable control platform
- > Powerful hardware-based security including end-to-end encrypted data transfer
- > Connectivity with multiple fieldbuses. Activate new fieldbus by license key
- > Industrial IoT-ready with secure OPC UA
- > High-torque machine performance
- > Superior motor control
- > Ultra compact

The iC7 series of intelligent drives delivers high torque performance in a compact footprint. Frequency converters in the iC7 series are optimized for wall-mounted, cabinet-mounted, or free-standing installation.

### Supply voltage and power range

3 x 380-500 V AC

0.37-710 kW



| Feature                                                                                                                                  | Benefit                                            |
|------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| Compact side-by-side mounting                                                                                                            | Save space and reduce installation costs           |
| Isolated cooling channel minimizes required installation space                                                                           | Reduce space requirement and air-conditioning load |
| Integrated options such as functional extensions, common-mode filters, fuses and disconnects mean no extra external devices are required | Save cost and time in installation                 |
| Installer-friendly design includes pluggable control terminals, pluggable power terminals <sup>1)</sup> , and replaceable fans           | Save cost and time in installation and service     |
| Robust by design, high uptime and quality                                                                                                | Reliable in heavy-duty service                     |
| Modular concept                                                                                                                          | Maximum design flexibility                         |
| Synchronization and positioning integrated into the Motion application                                                                   | Easy to enable using license key                   |
| OPC UA                                                                                                                                   | Easy integration in your cloud or HMI              |
| Easy to use logic blocks and states                                                                                                      | Unprecedented flexibility beyond parametrization   |

## Key specifications: Frequency converters

| Input                                                                            |                         |
|----------------------------------------------------------------------------------|-------------------------|
| Voltage rating                                                                   | 380-500 V AC, -15%/+10% |
| Supply frequency                                                                 | 50/60 Hz                |
| Switching on input                                                               | 1-2 times pr. minute    |
| Grid type                                                                        | TN, TT, IT, Delta       |
| Output                                                                           |                         |
| Output frequency                                                                 | 0-590 Hz <sup>1)</sup>  |
| Switching on output                                                              | Unlimited               |
| Overload capacity                                                                | 110% and 150/160%       |
| Protection ratings                                                               |                         |
| Frames FAx: IP20 – UL Open Type, FKxx: IP21 – UL Type 1, FBxx: IP54 – UL Type 12 |                         |

<sup>1)</sup> Higher output frequencies are possible. Contact Danfoss for advice.

## Key specifications: Frequency converters *(continued)*

| Environmental conditions                                         |                                                                                                                                                                                                                                  |
|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rated temperature                                                | -30 to 50 °C (-22 to 122 °F) <sup>1)</sup>                                                                                                                                                                                       |
| Nominal temperature 24 hours                                     | -30 to 45 °C (-22 to 113 °F) <sup>1)</sup>                                                                                                                                                                                       |
| Maximum temperature with derating                                | 60 °C (140 °F)                                                                                                                                                                                                                   |
| Rated altitude                                                   | 1000 m (3280 feet)                                                                                                                                                                                                               |
| Maximum altitude                                                 | 4400 m (14400 feet) with derating                                                                                                                                                                                                |
| Relative humidity                                                | 3K22, maximum 95% non-condensing                                                                                                                                                                                                 |
| Particles (IEC 60721-3-3:2019)                                   | Solid particles (nonconductive particles/dust) 3S6                                                                                                                                                                               |
| Chemically active substances (IEC 60721-3-3:2019, ISO 9223:2012) | – C3 (P1) – Medium corrosivity – Non coated (3C2) 12<br>– C4 (P2) – High corrosivity (3C3) <sup>2)</sup><br>– Coated in IP54/IP55/UL Type 12 enclosure or for IP20/Open Type and IP21/UL Type 1 following installation guidance. |
| Shock & vibration (IEC 60721-3-3:2019)                           | 3M12                                                                                                                                                                                                                             |
| Functional Safety I/O                                            |                                                                                                                                                                                                                                  |
| STO and SS1-t                                                    | Dual-channel, with galvanic isolation                                                                                                                                                                                            |
| STO and SS1-t feedback                                           | Single channel, with galvanic isolation                                                                                                                                                                                          |
| External supply                                                  |                                                                                                                                                                                                                                  |
| Rating                                                           | 24 V/2 A                                                                                                                                                                                                                         |

| Basic I/O             |                             |
|-----------------------|-----------------------------|
| Digital inputs        | 4+2 <sup>3)</sup>           |
| – Logic               | NPN/PNP selectable – 0/24 V |
| – Pulse/Encoder input | 0-110 kHz                   |
| Digital outputs       | 2 <sup>3)</sup>             |
| – Logic               | NPN/PNP selectable – 0/24 V |
| – Pulse output        | 0-100 kHz                   |
| Analog inputs         | 2                           |
| – Voltage mode        | 0-10 V or ±10 V, scalable   |
| – Current mode        | 0/4-20 mA                   |
| Analog output         | 0/4-20 mA                   |
| Relay output          | 2                           |
| – Function            | NO/NC                       |
| – Rating              | 250 V AC 2 A, 24 VDC 2 A    |
| Analog output         | 0/4-20 mA                   |

<sup>1)</sup> Frames Fx09-Fx12: For low overload conditions, the maximum permissible ambient air temperatures without derating are 40° C (104° F) average over 24 hours duration; and 45° C (113° F) for 1 hour duration, respectively.

<sup>2)</sup> The environments used as reference for the design criteria are described in standard IEC 60721-3-3:2019, unless otherwise specified. For references based on IEC/EN 61800-2, see the value in brackets or refer to the Design Guide, section 8.3.8.4

Example

“C3 (P1) – Medium corrosivity – Non coated” refers to IEC 60721-3-3:2019

“3C2” refers to the older IEC 60721-3-3:2019

<sup>3)</sup> 2 of the inputs can be reconfigured to outputs

| EMC category<br>(model code)   | Frame     | EN/IEC 61800-3 compliance class |     |     |                   |     |     |
|--------------------------------|-----------|---------------------------------|-----|-----|-------------------|-----|-----|
|                                |           | Conducted emission              |     |     | Radiated emission |     |     |
|                                |           | C1                              | C2  | C3  | C1                | C2  | C3  |
|                                |           | Cable length [m]                |     |     |                   |     |     |
| F1 – Combined C1 and C2 filter | Fx02–Fx08 | 50                              | 150 | 150 | No                | Yes | Yes |
| F2 – C2 filter                 | Fx02–Fx08 | –                               | 150 | 150 | No                | Yes | Yes |
|                                | Fx09-Fx12 | –                               | 150 | 150 | No                | Yes | Yes |
| F3 – C3 filter                 | Fx02–Fx05 | –                               | –   | 250 | No                | No  | Yes |
|                                | Fx06–Fx08 | –                               | –   | 300 | No                | No  | Yes |
|                                | Fx09–Fx12 | –                               | –   | 150 | No                | No  | Yes |

## Dimensions and weight

| Frame       | FA02a | FA03a | FA04a | FA05a | FA06 | FK06 | FA07 | FK07 | FA08 | FK08 |
|-------------|-------|-------|-------|-------|------|------|------|------|------|------|
| [mm] Width  | 90    | 114   | 130   | 165   | 200  | 210  | 230  | 240  | 255  | 270  |
| Height      | 270   | 270   | 399   | 399   | 555  | 670  | 600  | 770  | 746  | 980  |
| Depth       | 221   | 221   | 262   | 269   | 294  | 297  | 308  | 327  | 368  | 365  |
| [kg] Weight | 4.7   | 5.7   | 11.6  | 14.1  | 26   | 28   | 35   | 38   | 55   | 60   |

Frames FA02b to FA05b: Add 26 mm (1 in) to depth. Outer dimensions include mounting flange, without EMC shield plates. Weight is maximum weight.

| Frame       | FA09 | FK09/<br>FB09a | FK09c/<br>FB09c | FA10 | FK10a/<br>FB10a | FK10c/<br>FB10c | FA11 | FK11/FB11 | FA12 | FK12/FB12 |
|-------------|------|----------------|-----------------|------|-----------------|-----------------|------|-----------|------|-----------|
| [mm] Width  | 250  | 325            | 325             | 350  | 420             | 420             | 508  | 602       | 604  | 698       |
| Height      | 909  | 1001           | 1421            | 1122 | 1232            | 1779            | 1578 | 2043      | 1578 | 2043      |
| Depth       | 370  | 378            | 381             | 370  | 378             | 381             | 482  | 513       | 482  | 513       |
| [kg] Weight | 81   | 84             | 107             | 127  | 137             | 174             | 225  | 272       | 298  | 320       |

Weight is maximum weight.