Danfoss iC7-HVACR:
Intelligent drives (VFDs) for every HVACR application

Highlights

> Small footprint: Lightweight IP55 enclosures and compact IP20 modules for flexible installation
> Cybersecurity: Advanced, hardware-based cybersecurity. Avoid compromising the security of your property
> HVACR intelligence: Enhanced intelligence with more sensors, analytics, and future-proof connectivity for optimized HVACR system performance
> EMC compliance: Built-in EMC filter protects against electrical interference (Categories C1, C2, and C3)
> Integrated fieldbuses: Eliminate hardware options with integrated fieldbuses for seamless communication
> Ultra low-harmonic: iC7-HVACR ULH variant delivers supreme THDi (<3%) to protect equipment from overheating and malfunctioning

The Danfoss iC7-HVACR intelligent variable frequency drives (VFDs) deliver world-class performance, built on 35 years of HVACR expertise and a proven track record of 5 million installed drives in HVACR applications. These VFDs provide the highest efficiency and optimal total cost of ownership (TCO) for your HVACR systems.

Learn more about iC7-HVACR

Advanced ultra low-harmonic drive

The ultra low-harmonic variant iC7-HVACR ULH features an integrated active rectifier, delivering exceptional THDi (<3%) and minimal losses. This results in unmatched efficiency, compactness, low weight, simplified integration. Ideal for applications requiring superior power quality.

Uncompromised cybersecurity

Protect your HVACR investment with market-leading, hardware-based cybersecurity. A built-in crypto chip on the control unit provides robust protection against unauthorized access.

End-to-end encrypted data transfer during datalogging and software downloads ensures data integrity. Malicious firmware prevention guarantees that only genuine firmware is executed. Encrypted software safeguards locally stored data.

Supply voltage and power range

- 3 x 380-480 V AC…1.1-710 kW
- Available in IP20 (UL Open Type), and IP54/IP55 (UL Type 12) protection ratings to match different installation locations
- Mains switch and fuses available

Intelligence for comfort and high indoor air quality

The iC7-HVACR drive is equipped with integrated sensors and supports new add-on sensor types. Sensor calibration ensures optimal comfort and maximizes energy savings. A wide range of intelligent features optimizes comfort and energy efficiency in Air Handling Units (AHUs), Rooftop Units (RTUs), chillers, and cooling tower fans. The drive can become the controller, reducing cost and complexity. Effectively controls dampers and valve actuators for precise environmental control.

Seamless connectivity through MQTT communication

Unlock the power of drive data and analytical insights with simple and effective connectivity. The iC7-HVACR natively supports connectivity in any form required. MQTT offers low-bandwidth communication for the specific data you need, based on your subscription. For all fieldbus protocols, the iC7-HVACR provides the flexibility to tailor data and communication to your exact requirements.

Prevent problems and improve uptime with condition-based monitoring (CBM)

Integrated condition-based monitoring (CBM) functionality leverages built-in and connected sensors to deliver real-time data analytics, self-monitoring, and lifetime assessment. This enables proactive maintenance, minimizing downtime and maximizing the lifespan of your equipment, using

- Motor stator winding monitoring
- Vibration monitoring
- Load envelope monitoring
- Cavitation detection

Using edge computing, these functions are performed within the drive, with no need to take the information to the cloud for analysis.
This protects the drive better from unauthorized access.

Functional safety compliance with integrated SIL3/PL e

Integrated Safe Torque Off (STO) meets SIL3/PL e safety levels. Integrated diagnostics eliminate the need for external safety relays, simplifying system design and reducing costs.

SIL3/PL e is superior to a contactor-driven safety system, which can only achieve SIL2/ PL d. It has no mechanical moving parts, so has a longer, safer lifespan.

Ultimate user-friendliness with intuitive UI and digital tools

Keypad-based guided commissioning is streamlined with the set-up assistant, which directly navigates you to the relevant pump-specific settings.
A unified user interface ensures a consistent experience across all control panel variants. Furthermore, the iC7 drives leverage the advanced MyDrive® digital tools for PC, offering comprehensive support for engineering, guided commissioning, and monitoring.

Discover MyDrive®Suite digital tools

World's most efficient cooling

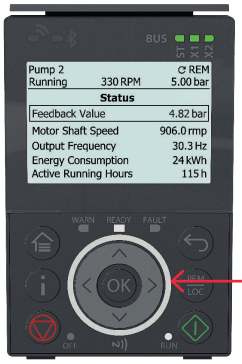
Unique back-channel cooling removes up to 90% of heat losses from the electrical room, for maximum efficiency and space optimization.
Extend the service life of electronic equipment and reduce energy costs significantly with dramatically less air conditioning load.

Key specifications

Input	
Supply voltage	380-480 V AC, -15%/+10%
Supply frequency	45-65 Hz
Output	
Power range	1.1-710 kW (1.5-950 hp)
Output current	3.0-1260 A
Overload ratings	110% (fans, pumps and compressors), 150% (compressors with high starting torque)
Output frequency	0-590 Hz
Environmental conditions	
Protection ratings and cooling versions	
– Frames Fx02-Fx08 1.1-90 kW (400 V supply)	IP20 (UL Open Type), IP21 (UL Type 1), IP55 (UL Type 12)
– Frames Fx09-Fx12 110-710 kW (400 V supply)	IP20 (UL Open Type), IP21 (UL Type 1), IP54 (UL Type 12), back-channel cooling
Ambient operating temperature [1]	-30 to 60 °C (-22 to 140 °F) *Refer to design guide for derating*
Maximum altitude	4400 m (14400 feet)
Relative humidity	3K22, maximum 95% non-condensing
Chemically active substances (IEC 60721-3-3:2019)	– C3 (P1) – Medium corrosivity – Non coated – C4 (P2) – High corrosivity – Coated
Shock & vibration (IEC 60721-3-3:2019)	3M12
Harmonic mitigation and THDi	
iC7-HVACR	THDi <40% at full load as per IEC61000-3-12
iC7-HVACR ULH	THDi <3% at full load and <5% at part load

EMC protection (EN/IEC 61800-3 compliance class) [2]	**Cable length [3]**
C1	Up to 50 m
C2	Up to 150 m
C3	Up to 300 m
Compliance	
Efficiency class	IE2 as per IEC 61800-9-2. See EcoDesign Directive for a full list of losses at your desired operating point. MyDrive® Energy tool also provides part-load efficiency data.
Approvals	UL 61800-5-1 ed 3. CE IEC61800-5-1. For other approvals, contact Danfoss
Functional safety I/O	
STO	SIL3, PL e
Control I/O – standard	
Analog inputs (AI)	2
– Voltage mode	0-10 V, scalable
– Current mode	0/4-20 mA
– Temperature sensor support	Pt1000, Ni1000, KTY81, KTY82, KTY84
Analog outputs (AO)	1 (0/4-20 mA)
Digital inputs (DI)	4+2 (0/24V, selectable PNP or NPN)
Digital outputs (DO)	2 (0/24 V) Digital outputs are reconfigured from digital inputs
Relay outputs (RO)	2 (NO/NC), 250 V AC/2 A, 24 V DC/2A
Auxiliary voltages	10 V output (10 mA), 24 V output (150 mA)
External supply	24 V external supply input (2 A)

[1] Rated operating temperature varies between products
[2] Compliance classes:
C1: Intended for residential, commercial and light industrial installations, and critical installations such as airports, hospitals and data centers
C2: For commercial installations, only when installed by professionals
C3: For industrial installations
[3] Cable length varies with product size



Halo indicator
Normal operation = white
Warning = orange
Fault = red

Key specifications (continued)

Power options	
Mains input variants	Mains switch, AC fuses
Output filters (integrated)	Common-mode filter
Output filters (external)	dU/dt filters, sine-wave filters, common-mode filters
Functional extension options	
General Purpose I/O OC7C0	General purpose I/O extension board (3xDI, 2xDO, 2xAI, 1xAO, temperature measurement)
Relay Option OC7R0	Relay I/O extension board, with 3 relays (2 NO/NC , 1 NO up to 250 V AC/2 A)
Temperature Measurement OC7T0	Temperature measurement extension board with 5 sensor inputs, Pt100, Pt1000, Ni1000, and KTY81
Temperature and Analog I/O OC7T2	Temperature measurement and analog I/O option board (3 x AI, 3 x AO, 3 sensor inputs)
Fieldbus options (embedded)	
Ethernet control board	Modbus TCP, BACnet IP, EtherNet/IP, PROFINET RT
Serial control board	Modbus RTU, BACnet MSTP
Other protocols	MQTT
Ease-of-use	
Control panel	
– Display	2.8" graphical, 9 line, greyscale, high resolution
– Buttons	"Undo", "on-board manual", rem/loc (HOA) etc. Tactile feedback buttons for operation, local/remote control (HOA) and easy navigation
Commissioning	Guided setup and setup assistant
Parameter backup and restore	
Event log	Clear fault and warning messages
Commissioning tools	MyDrive® Insight*
Engineering tools	MyDrive® Harmonics, MyDrive® Select, MyDrive® Energy
Easy cable installation	Terminal sliders for 30-90 kW (40-125 hp) units. Pluggable terminals for IP20 units up to 22 kW (30 hp).

Dedicated HVAC features	
Fire mode protection	Basic and standard fire mode protection
Cooling tower optimization	Algorithm built-in
Enthalpy	Wet bulb temp and dew point conversion
Reference (set-point)	Feedback, range
PID loops	x 3 (internal, dampers, valve actuators)
Condition-based monitoring	Stator windings, load envelope, vibration monitoring
Energy	kWh counter, RunHours, kW