YASKAWA

HV600

The quality drive for commercial HVAC applications

yaskawa.eu

Uniquely designed for building automation

Yaskawa Variable Frequency Drives (VFDs) deliver high quality, top-tier solutions that maximize building energy efficiency performance, saving you money.

High performance that pushes expectations

Building owners. Facility managers. Mechanical contractors specifying drives. They all trust Yaskawa to deliver reliable performance in HVAC applications. Yaskawa offers:

- Industry experience
- Quick commissioning
- Easy-to-use interface
- Quick delivery
- Product quality

Yaskawa has delivered great HVAC solutions for these customers since 1988.

The HV600 family of drives pushes past industry requirements to establish a new benchmark for industry expectations.

In fact, the HV600 addresses all of the most pressing demands, including more flexibility and control, less downtime and more packaging options.

Exceeding your expectations

More than a quarter million installed Yaskawa VFDs reliably save energy and supply fresh air and water to the buildings we use every day.

Office buildings are probably the most common type of facility that benefit from using Variable Frequency Drives. But many other buildings can benefit from the energy savings and carbon footprint reduction provided by VFDs, including:

- Data centers
- Educational facilities
- Entertainment venues
- Government facilities
- Housing developments
- Medical facilities
- Parking structures
- Retail stores

A Yaskawa representative, or partner, can help you wherever usage can deliver the biggest return on your investment.

- Booster pumps
- Chiller compressors
- Chilled water pumps
- Condenser water pumps
- Condensing fans
- Cooling tower fans
- Fan arrays
- Supply and return fans

Variable frequency drives reduce energy use

A typical fan or pump running at 50% speed will use one-fifth as much energy compared to systems using mechanical control methods.

The primary reason VFDs reduce energy and improve system efficiency is due to the elimination of throttling, which has been the traditional method of mechanically adjusting air or water flow in a system. VFDs control the speed of fans, pumps and compressors.

Building owners can typically expect 20 - 70% energy savings when applying VFDs to fan and pump systems while creating a more comfortable work environment. VFDs are the perfect marriage between comfort and sustainability.

The HV600 family of VFDs also contributes toward LEED credits and help buidlings meet or exceed Energy Star Certification.

- Reduced mechanical and electrical stress on fan belts, compressors and pumps
- Reduction or elimination of demand charges
- Power factor improvement
- Control and monitoring via communication protocol

Capable. Efficient. Reliable. The new HVAC benchmark.

The Yaskawa Building Automation team is dedicated to listening to each of our different customer types to better understand each of their needs.

Building owners

Expect maximum customer comfort at minimal cost.

Facility managers

Expect simple maintenance, error free operation and specifications to be met.

Engineer's choice

Expect compliance to industry trends, customer acceptance, and quick and accurate commissioning.

Mechanical or electrical contractors

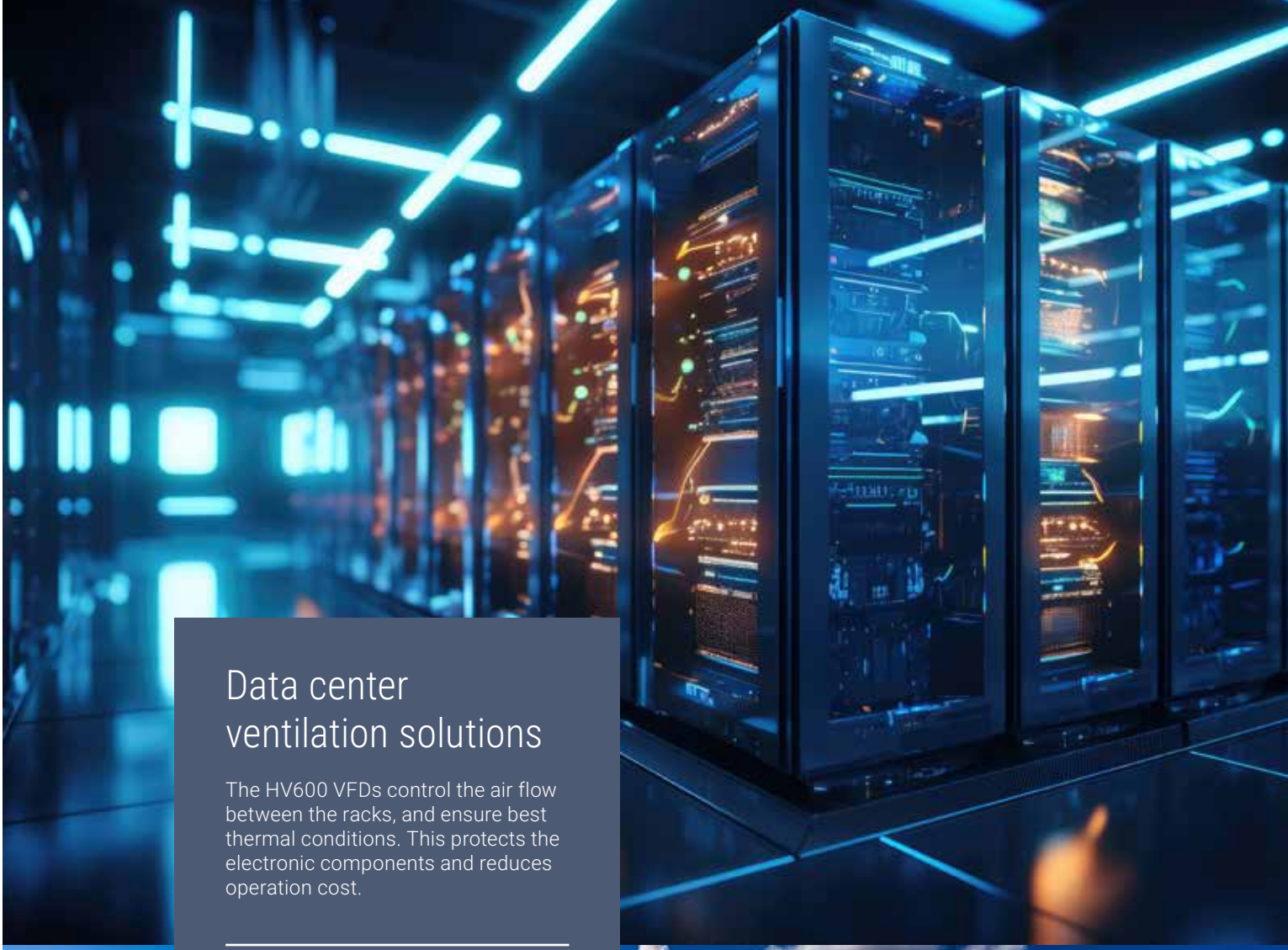
Expect easy installation and programming and quick response to any questions.

HVAC control contractors

Expect integrated control, stable software, and compatibility across various platforms.

Maintenance & service contractors

Expect to easily identify and quickly resolve problems by replacement or field maintenance.



Data center ventilation solutions

The HV600 VFDs control the air flow between the racks, and ensure best thermal conditions. This protects the electronic components and reduces operation cost.

Chillers and condensing fan units

Use the HV600 for chillers (air-cooled and water-cooled), condensing units or pumps to maintain perfect thermal conditions.

Advanced HVAC features

Simple operation

- Real-time clock for scheduled functions
- Hand-Off-Auto keypad with LCD display and tactile buttons
- Timer controls for starting, stopping, and speed changes

Designed for building automation

- Built-in building automation protocols
- Compliance with global certifications and standards
- Built-in line impedance for harmonic reduction
- On-board EMC/RFI filter (C2 level)
- Conformal coating for circuit board protection

Network multiplexing

The HV600 has a special network multiplexing function that enables four drives to work in a closed-loop lead-lag configuration.

You can program the drive using pump terminology for fast and easy set up. Pump protection features ensure maximum drive and pump life.

Emergency override

This function enables the drive to operate regardless of faults ensuring smoke clearance, preventing smoke infiltration, and providing fresh air in emergency situations to safeguard human safety.

Enhanced pump control

The HV600 includes intelligent pump control capable of single reliable booster pump control. It also has built-in deadhead protection, loss of prime detection, and many other pump system protection features. The HV600 protects your building.

Quick and easy set-up

- Simple steps for efficient commissioning
- DriveWizard® support tool for PCs
- DriveWizard® Mobile app for VFD management on smart mobile devices
- Safe programming without main three-phase power
- Side-by-side mounting for multiple drives to be installed in a minimal mounting space
- All models are plenum rated for building automation applications

Utility start delay timer

- Prevent a peak power surge when more than one drive powers up and accelerates at the same time
- Ensures that the power system is not stressed when utility power is restored and the pump system is restarted automatically

Sequence run timers

- Programmable run timers for Real Time Clock (RTC).
- Automatic start/stop of the drive at certain times without host control system
- Run timers daily, on weekdays, on weekends, or only on certain days of the week.

Low and high pressure feedback detection

The HV600 drive continuously monitors the system feedback to report a warning alarm or fault based on the programmed level.

Second PID controller

The drive's second PI controller option allows for automatic use of a secondary backup PID controller in the event of a primary PID controller failure. A text message on the keypad indicates which feedback PID controller is in use.

* See manual for specific VFD ratings.

Overload capacity

- 110% for 60 s
- 140% for 2 s

Output frequency

- 0 ... 400 Hz

Control methods

- V/f control
- PM open loop vector control
- EZ vector control

Available I/O

- 7× MFDI, 2× MFAI
- 1× fault relay output, 3× MF relay output, 2× MFAO
- 2× safe disable input
- 1× 24 VDC control power input

Embedded network communication

BACnet, METASYS, APOGEE ANYWHERE, Modbus

Optional network communication

PROFINET®, PROFIBUS®, EtherNet/IP™, Modbus TCP/IP

IP rating

- IP20 up to 302 A (160 kW)
- IP55 up to 156 A (75 kW)
- Built-in C2 filter

Application presets

- Fan
- Fan with PI Control
- Return Fan with PI Control
- Cooling Tower Fan
- Cooling Tower Fan with PI Control
- Pump
- Pump with PI Control

Reduce HVAC
energy costs up to

70%

with variable
frequency drives.

Air handling systems
account for

25%

of electricity used
in a typical office building.

Yaskawa
commits

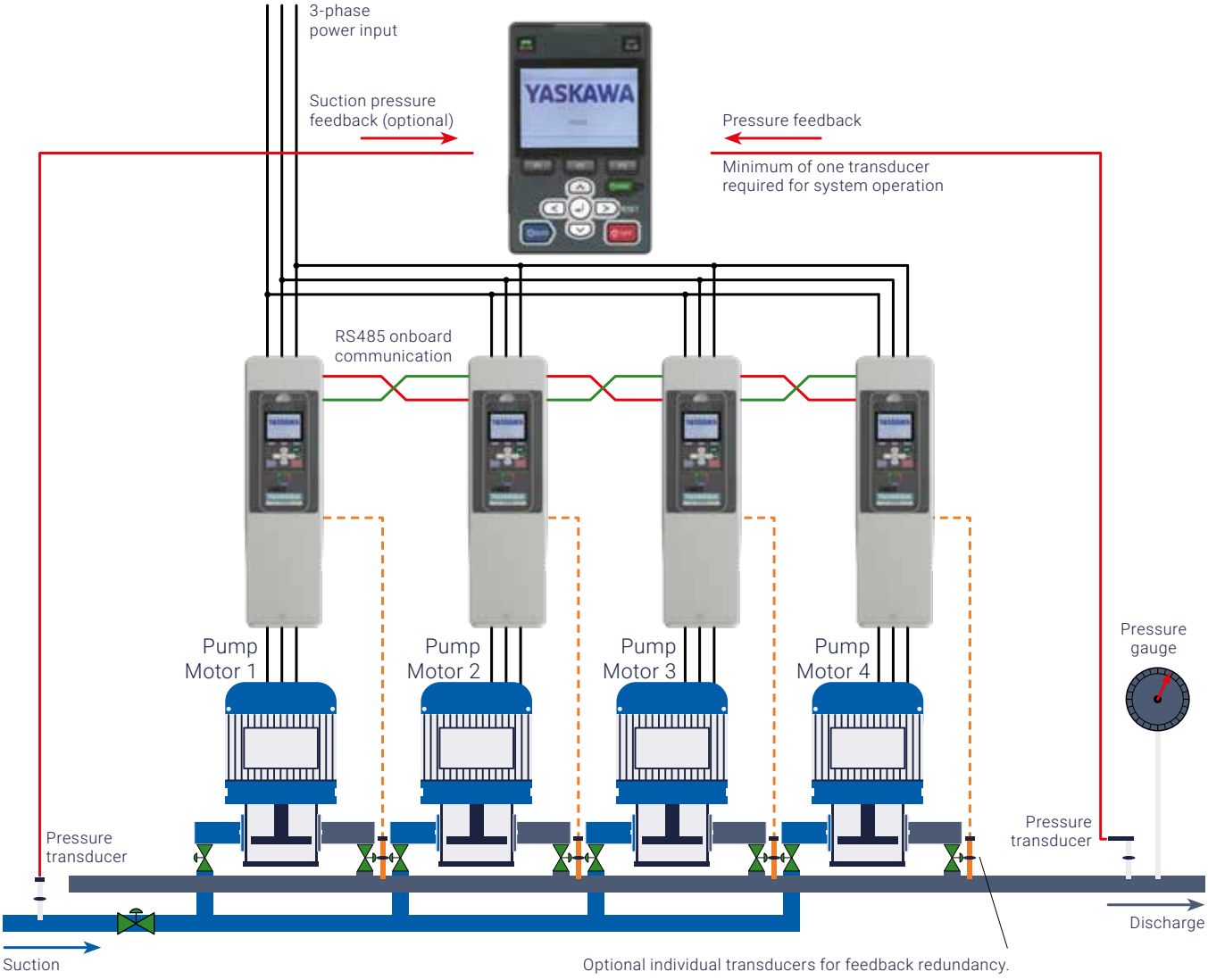
100%

to provide the best quality
and service possible.

Network multiplexing

The multiplexing function controls multiple pumps in parallel via a dedicated HV600 drive.

Thanks to the integrated master function, the HV600 automatically selects the leading pump drive, while the other drives act as slave drives and ensure optimum performance of the pump system when needed. The drive switching function of the HV600 ensures constant pump utilization over time and instantly switches the master/lead drive in the event of sensor, communication, or drive failures. This redundancy ensures optimum operation of your system.



Control for a wide variety of motor types, along with mobile device programming and clear status indication make the HV600 the efficient and reliable choice for smart building control.

- Booster pumps
- Chiller compressors
- Chilled water pumps
- Condenser water pumps
- Condensing fans
- Cooling tower fans
- Fan arrays
- Supply and return fans

HVAC made easy

The HV600 keypad has all the features you need intuitively at your fingertips, its simplicity is what makes it easy and simple to commission.

Choice of protection ratings

The HV600 comes standard from the factory with a choice of IP20 and IP55 chassis with ambient temperature ratings up to 50 °C. Ratings up to 60 °C can be achieved with current derating.

Side-by-side

Most HV600 models can be mounted side-by-side with bottom entry wiring to maximize cabinet space.

Panel mounting

When mounted in a separate enclosure, heat management can be accomplished by removing detachable top and bottom covers on the VFD or by “back side” mounting the standard VFD with the heatsink external to the enclosure.

Digital and analog I/O

All the features expected for efficient building operation come standard with the HV600. Customer-supplied 24 VDC input control power ensures network communications are maintained even during loss of main input power. A full complement of analog and digital inputs are built in and are customizable for user requirements.

Enhanced pump control

The HV600 includes intelligent pump control capable of single failure-proof booster pump control. It also has built-in deadhead protection, loss of prime detection, and many other pump system protection features. The HV600 protects your building.

Flexible motor control

- Induction and permanent magnet motors
- Synchronous reluctance (SynRM) motors
- 400 Hz output frequency

Made for
easy
&
simple
commissioning

Bluetooth option

Use the DriveWizard Mobile Application to manage HV600 VFDs and packages with optional Bluetooth keypad connectivity.

Copy function

Multiple sets of parameters can be stored and easily copied to additional VFDs.

High-contrast display

Contrast control offers clear and readable full-text descriptions.

Automatic backup function

Saves the current parameter settings after a user-defined period of inactivity. After an incident, settings can be easily retrieved from the keypad.

Micro SD slot

Micro SD storage for data logging.

Real-time clock

Real-time clock for time and date stamp of fault information.

Advanced keypad navigation

Shortcuts, scrolling and function keys offer faster navigation.

Conformance to industry standards

HV600 VFDs conform to a variety of industry standards from various governing bodies:

TÜV SÜD

RoHS COMPLIANT

CE

UL

LEARN MORE AT energystar.gov

CO_2

Energy Efficiency with Reduction of Carbon Footprint

U.S. GREEN BUILDING COUNCIL LEED USGBC

Leadership in Energy and Environmental Design

Network compatibility

HV600 VFDs are compatible with the most popular HVAC and industrial protocols:

ASHRAE BACnet®

METASYS

APOGEE® ANYWHERE

Modbus

PROFIBUS® *

PROFINET® *

EtherNet/IP™ *

* Optional

The Yaskawa advantage

The latest offering for the HVAC industry from Yaskawa, the HV600, is sustainable, flexible, and easy.

Exceptional design

Specifically designed for building automation applications, the HV600 helps minimize energy costs and maximize occupant comfort.

Available in IP20 and IP55 versions, the HV600 can be mounted without the need for an expensive additional enclosure. With a high contrast display HOA keypad, a high visibility status ring, and enhanced pump control functionality, the HV600 is perfectly suited to building automation application needs.

Quick and easy set-up

- Simple steps for efficient commissioning
- DriveWizard® support tool for PCs
- DriveWizard Mobile app for VFD management on smart mobile devices
- Safe programming without main three-phase power

Ease of installation

- Side-by-side mounting*
- IP20, IP55
- -10°C to +60°C ambient*

Simple operation

- Real-time clock for scheduled functions
- Hand-Off-Auto keypad with LCD display and tactile buttons
- Timer controls for starting, stopping, and speed changes

Designed for building automation

- Built-in building automation protocols
- Emergency Override for occupant safety in fire events
- Compliance with global certifications and standards

Building-specific design

- Built-in line impedance for harmonic reduction
- On board EMC/RFI filter
- Conformal coating for circuit board protection

Application presets

- Fan
- Fan with PI Control
- Return Fan with PI Control
- Cooling Tower Fan
- Cooling Tower Fan with PI Control
- Pump
- Pump with PI Control

* See manual for specific VFD ratings.

Extensive programming solutions

The HV600 can be programmed with its resident keypad, a mobile device or personal computer. Whatever you choose, enjoy easy navigation and guided wizards for configuration, monitoring and troubleshooting.

Mobile device connectivity

Use the free Yaskawa DriveWizard Mobile Application for iPhone®, iPad®, or Android™ to manage your VFD. Connect with Bluetooth or to the built-in USB port using a USB On-The-Go (OTG) enabled Android device.

DriveWizard Mobile

The DriveWizard Mobile app turns your smartphone or tablet into an interface for your HV600 VFD. All information for parameter setup and troubleshooting are in your pocket, anytime, anywhere. Save HV600 settings to your smart device or to the free and secure Yaskawa Drive Cloud™ service.

DriveWizard Mobile also provides:

- Intuitive parameter editing with help and search function
- Custom parameter and monitor lists
- Compare setting differences between the VFD and backup files
- Simple support activities, such as the ability to email VFD settings
- Parameter backup/verify with or without main power applied to the VFD
- Backup and restore VFD settings to the free and secure Yaskawa Drive Cloud service
- Parameter file compatibility with DriveWizard HVAC

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Download on the App Store

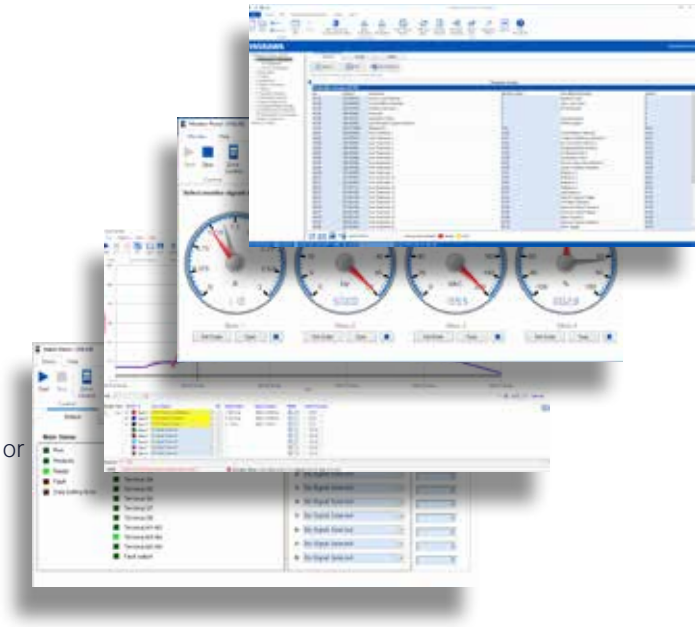
Convenient programming without main power

The HV600 can be programmed without any power supply connected, even if the drive is still in its packaging. Just connect it to one of the USB ports on your PC or to a USB On-the-Go device (Android smartphone or tablet), start programming and enjoy the ease of commissioning.

DriveWizard® 10

DriveWizard® 10 enables easy configuration of Yaskawa VFDs. Its comprehensive monitoring functions and integrated oscilloscope allow easy process optimization and fast troubleshooting.

- Connect to the VFD via USB – even without mains power!
- Configure the VFD online or offline.
- Log your process with up to six channels of recorded data.
- Create reports to export and send via email.
- Simplify operation and save valuable time during setup, maintenance, or troubleshooting.
- Import and export data with DriveWizard mobile.
- Connect to multiple drives though ProfiNet, EtherNet/IP or Modbus TCP.



DriveWorksEZ® 10

DriveWorksEZ® is an icon-based, drag-and-drop graphical environment for adding programmable functions allowing the VFD to be tailored for a variety of machine and application requirements without the cost of external controllers, such as PLCs or additional controller hardware options.

- Select from 400+ function blocks
- Logic/math functions
- Timers/counters
- Up to 100 connections
- Offline simulation mode for testing without the risk of application malfunctions
- Protection of intellectual property with project lock
- Online monitor for visual debugging
- Fast cycle time of 2 ms, independent of program size

DriveWorksEZ Application Library

The DWEZ Application Library provides pre-configured applications than can be used instantly or can be modified and expanded to fit the need of your appliciation or machine.

- These are just a few of the applications available:
- Flexible timer
- Torque limits
- Master-Slave via serial communication without PLC

HV600

Catalog code 400 V class

HV60 C 4 005 C F A

(1) (2) (3) (4) (5) (6) (7)

1	Drive series
HV60	HV600 series

2	Region code
C	Europe

3	Drive rating
2	200 V, 3-phase
4	400 V, 3-phase

4	50% ED rated output current
...	See Ratings table

5	EMC filter option
C	Built-in EMC filter for C2

6	Enclosure
F	IP20
V	IP55

7	Environmental spec
A	Standard

Use the Yaskawa Drive Finder to find all technical information, energy efficiency information, and more details.

Ratings - 400 V models

Model Code	Max Appl. Motor Power [kW]	Rated Output Current [A]	Dimensions [mm]			Weight [kg]
			W	H	D	
HV60C4xxxCFA, IP20 models						
005	1.5	4.8	124	357	218	7.0
006	2.2	6				7.5
008	3	7.6				7.5
011	4	11				7.0
014	5.5	14				7.0
021	7.5	21	124	447	233	9.0
027	11	27				10
034	15	34				11
040	18.5	40	200	538	237	16
052	22	52				18
065	30	65				20
077	37	77	255	590	263	28
096	45	96				30
124	55	124				33
156	75	156	312	830	400	78
180	90	180	312	731	420	79
240	110	240				98
302	160	302	440	831	472	125
HV60C4xxxCVA, IP55 models						
005	1.5	4.8	124	357	228	7.0
006	2.2	6				7.0
008	3	7.6				7.0
011	4	11				7.0
014	5.5	14				7.0
021	7.5	21	124	447	243	9.0
027	11	27				10
034	15	34				11
040	18.5	40	200	538	247	16
052	22	52				18
065	30	65				20
077	37	77	255	590	273	28
096	45	96				30
124	55	124				33
156	75	156	362	867	410	83

HV600

Catalog code 200 V class

HV60 C 2 005 C F A

(1) (2) (3) (4) (5) (6) (7)

1	Drive series
HV60	HV600 series

2	Region code
C	Europe

3	Drive rating
2	200 V, 3-phase
4	400 V, 3-phase

4	50% ED rated output current
...	See Ratings table

5	EMC filter option
C	Built-in EMC filter for C2

6	Enclosure
F	IP20
V	IP55

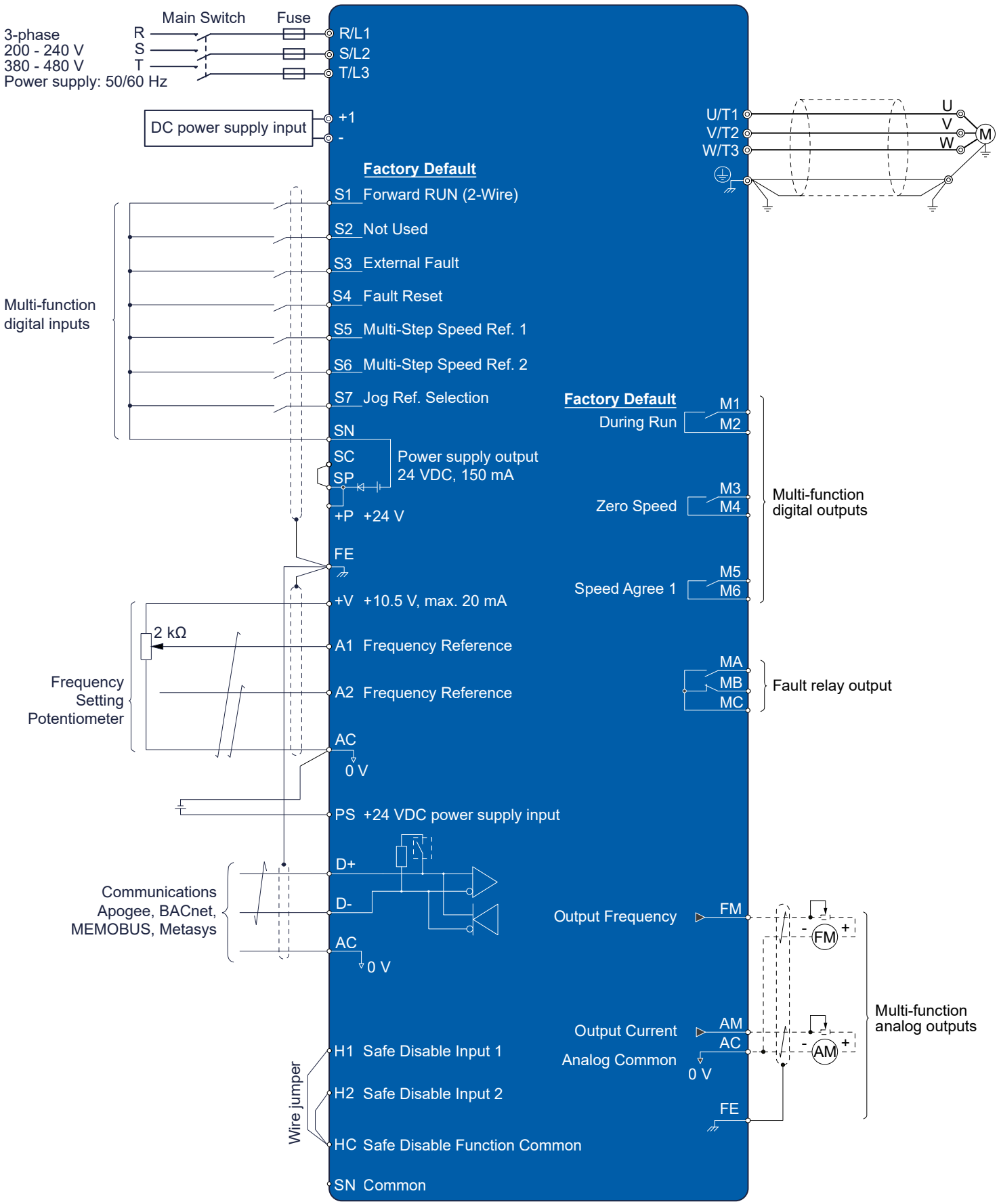
7	Environmental spec
A	Standard

Use the Yaskawa Drive Finder to find all technical information, energy efficiency information, and more details.

Ratings - 200 V models

Model Code	Max Appl. Motor Power [kW]	Rated Output Current [A]	Dimensions [mm]			Weight [kg]
			W	H	D	
HV60C2xxxCFA, IP20 models						
011	2.2	10.6	124	357	218	6.5
017	4	16.7				6.5
024	5.5	24.2	124	447	233	8.5
031	7.5	30.8				9.0
046	11	46.2	200	538	237	15
059	15	59.4				16
075	18.5	74.8	255	590	263	25
088	22	88				25
114	30	114				28
143	37	143	312	830	400	74
169	45	169				76
211	55	211	312	731	420	78
273	75	273				82
HV60C2xxxCVA, IP55 models						
011	2.2	10.6	124	357	228	6.5
017	4	16.7				6.5
024	5.5	24.2	124	447	243	8.5
031	7.5	30.8				9.0
046	11	46.2	200	538	247	15
059	15	59.4				16
075	18.5	74.8	255	590	273	25
088	22	88				25
114	30	114				28

Connection diagram



Specification

Item	Specification
Input Voltage	Three-phase 200 to 240 VAC, +10%/-15%, 50/60 Hz +/-5% 380 to 480 VAC, +10%/-15%, 50/60 Hz +/-5%
Ambient Operating Temperature	-10°C to +50°C* (14°F to 122°F), up to 60°C (140°F) with derating
Ambient Storage Temperature	-20°C to +70°C (-4°F to 158°F)
Overload Capacity	110% for 60 seconds, 140% for 2 seconds, 175% instantaneous
Output Frequency	0 to 400 Hz
Environmental	1,000 meters altitude, up to 4,000 meters with derating
	Class 3C2 and 3S2 operation for IP20, Class 3C2 and 3S3 for IP55
	95% humidity, non-condensing
EMC and Harmonics	EMC filter built in; complies with IEC 61800-3 restricted distribution for first environment
	5% split choke built in both positive and negative DC bus leg as standard
Control Methods	V/f Control, PM Open Loop Vector, EZ Vector Control
Motor Types	Induction
	Permanent Magnet
	Synchronous Reluctance
Protective Design Types	IP20
	IP55
Interface	LCD keypad with Hand-Off-Auto and Status Ring, Bluetooth keypad optional
Global Certifications	UL, cUL, CE, RoHS 2, WEEE, TÜV SÜD
Seismic Certification	CBC, IBC, ASCe7, ICC-ES 156
	HCAI (Special Seismic Cerification Pre-approval OSP-0687)
Functional Safety	Safe Torque Off, SIL3 according to IEC 62061, PLe according to ISO 1384
Standard I/O	(7) programmable multi-function digital inputs (24 VDC)
	(2) programmable multi-function analog inputs (0 to +10 VDC, 0-20 mA, 4-20 mA)
	(2) functional Safety inputs
	(1) fault relay output (Form C)
	(3) programmable multi-function relay outputs (Form A)
	(2) programmable multi-function analog output (0 to +10 VDC, 0-20 mA, 4-20 mA)
24 VDC power	External supply input to maintain communications without main power
	150 mA output for customer use
Network Communications	Built in: BACnet MSTP, Siemens APOGEE® FLN P1, Johnson Controls Metasys® N2, and Modbus® RTU
	Optional: PROFINET®, PROFIBUS®, EtherNet/IP™ and Modbus® TCP/IP
Software Support Tools	DriveWizard® Mobile
	DriveWizard®
	DriveWorksEZ®

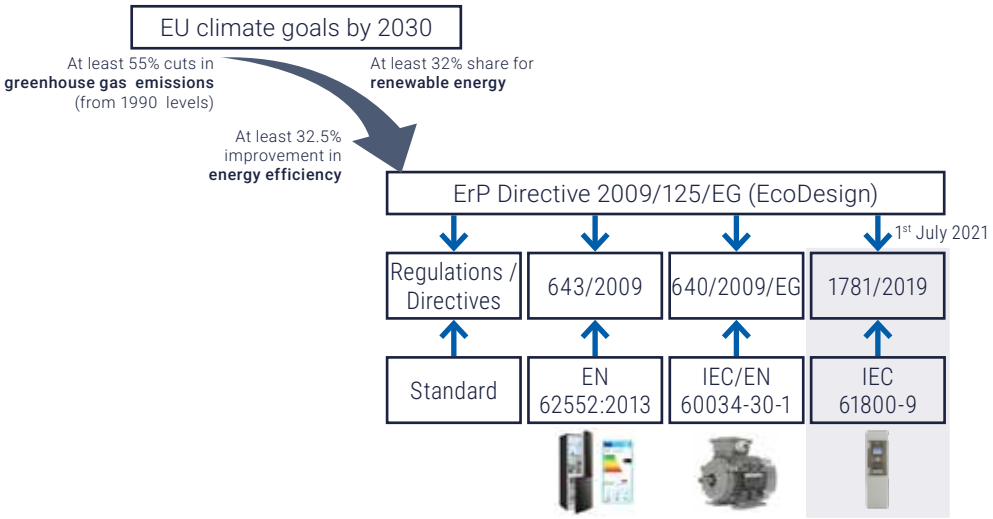
Lifting everyone to a sustainable tomorrow

Achieving the European climate goals

To achieve European “Green Deal” climate targets, the ErP (Energy-related Products) Directive was created, which is often referred to as the Ecodesign Directive. It provides a framework but does not contain product-specific requirements, as these are so diverse that they cannot possibly be covered by just one directive. Consequently, implementation regulations have been defined, based on the ErP Directive, which regulate the requirements for the energy efficiency of products.

Similar regulations and labels exist for industrial applications such as compressors, fans, pumps, etc., and electric motors, which are estimated to consume half of the electrical energy produced in the EU, have not been spared.

However, it was recognized that much more energy could be saved by controlling the speed of electric motors and so Regulation (EU) 2019/1781 was published, which now regulates the efficiency of the variable speed drive that work alongside the motors.

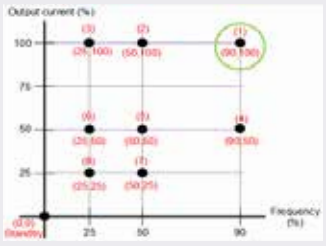


Efficiency at a glance

To determine the efficiency of a VFD (Variable Frequency Drive), the loss values are measured at eight defined load points and in standby according to the IEC 61800-9-2 standard. The loss value at the load point (90, 100) (90% speed, 100% load) is compared with a defined reference value. If it is below 75 % of the reference value, the device corresponds to the highest efficiency class IE2.

Watt loss according to IEC 61800-9-2 and efficiency class according to (EU) 2019/1781

CDM data (complete drive module)



IE classes

IE2 Loss < Ref* 75%

IE1 Reference Loss

IE0 Loss > Ref* 125%

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Shaping
the future.
Sustainably.
Together.

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YEU_INV_HV600 | EN | v2 09/2025