



INVERTER DRIVES PRODUCT RANGE

EN

DE
ES
FR
IT



INVERTER DRIVES
INVERTER DRIVES
INVERTER DRIVES
INVERTER DRIVES

About YASKAWA



Contents

- ▶ **Page 2**
About YASKAWA
What we do
- ▶ **Page 3**
What makes us a leader
- ▶ **Page 4/5**
Specifications
- ▶ **Page 6/7**
1000 Series
- ▶ **Page 8/9**
Special Application
Inverter Series
- ▶ **Page 10**
Special Purpose
Inverter Series
- ▶ **Page 11**
YASKAWA Inverter
Software Tools

For more than 90 years YASKAWA has been supplying mechatronic products and is one of the leading companies for motion control products worldwide. YASKAWA develops and manufactures Inverter Drives, Servo Drives and Motion Controllers and has introduced many

ground-breaking innovations over the past decades. YASKAWA products are used in all fields of machine building and industrial automation and have a high reputation for their outstanding quality and durability.

What we do

Electronic drive technology, motion control, system engineering – three essentials for efficient and resource-saving production systems.

YASKAWA offers dedicated mechatronic solutions for industries such as packaging, lifting & handling, semiconductors, cranes & hoists, textiles, HVAC/fans & pumps, lifts & escalators, machine tools/woodworking, food & beverages and the automotive industry.

Since it was founded about 100 years ago YASKAWA has shaped technological innovation and the industrial development of our times. Today YASKAWA is one of the worldwide leading manufacturers of motors and drives, factory automation products and robots. Standard products as well as customised solutions from YASKAWA gain broad acceptance and recognition in global markets.

Since 1963 YASKAWA has continuously developed its European business and expanded its market share. In 1998, the company completed its global production network for localised market supply by establishing a European factory in Cumbernauld, Scotland. For the past couple of years YASKAWA has been among the top manufacturers of inverter drives in Europe.

Well known for outstanding quality standards, YASKAWA serves and supports customers all over the world as a competent and qualified partner. Together with subsidiaries and partners, YASKAWA provides international distribution networks including offices and production facilities in 25 countries to react instantly within 24 hours to customer demands.

YASKAWA key competences:

- ▶ Leading edge technologies in the fields of electric motors and drives, factory automation control products, mechatronics and robots
- ▶ Business network includes offices in 24 countries & production facilities in 6 countries
- ▶ Technology research & development to pursue innovation in mechatronics and automation technology as well as information technologies and environmental/human automation



About YASKAWA Inverters

What makes us a leader

In 2007 YASKAWA announced the production of its 10 millionth inverter in the new inverter plant in Yukuhashi, Japan. With this YASKAWA is probably the biggest inverter manufacturer in the world. The 10 millionth inverter was a V1000, the newest inverter developed by YASKAWA, which was released in Spring 2007. With the release of the V1000 YASKAWA has again set standards in the market. The V1000 was awarded by IEN magazine as being the 'most innovative product' at Hanover Fair Industry 2007. Extensive research and development has allowed YASKAWA to remain at the

forefront of motion control and automation technology. This technological leadership has helped to modernise industries such as mining, steel, cement, pulp and paper, chemical, automotive, packaging, machine tool and semiconductor. The company always shows its dedication by supplying high quality products and services. YASKAWA inverter drives prove it with highest level of reliability and exceptionally low failure rates. Since its foundation in 1915, YASKAWA, through its numerous inventions, has proved to be a true pioneer and inventor in electronic drives technology and factory automation.

1974

First general purpose transistor Inverter in serial production

1979

First Vector Control for Inverter Drives

1985

First Digital Control for Inverter Drives

1988

First IGBT Low Noise Inverter Drive

1995

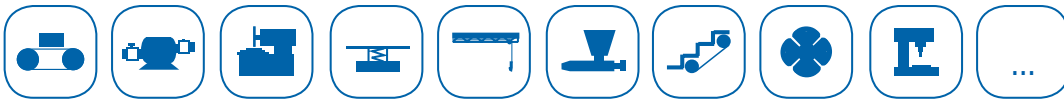
First Vector Control for General-Purpose Inverter Drives

2000

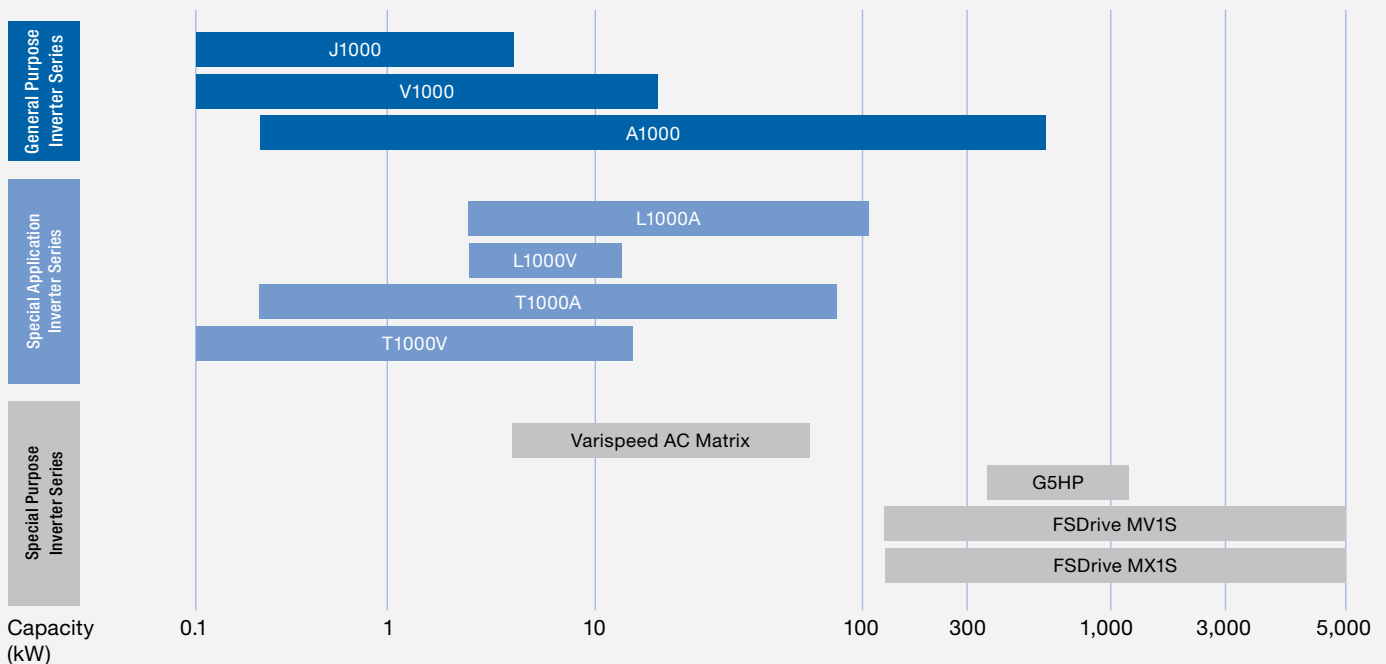
First three-level Control Inverter Drive for 400V class

2006

First Matrix Inverter Drive for mass production



INVERTER SERIES



Specifications



Product		J1000	V1000	A1000	L1000A	L1000V
Max. Motor Output (kW)		1~230 VAC, 0.1 – 2.2 3~200 VAC, 0.1 – 5.5 3~400 VAC, 0.2 – 5.5	1~230 VAC, 0.1 – 4.0 3~200 VAC, 0.1 – 18.5 3~400 VAC, 0.2 – 18.5	- 3~200 VAC, 0.4 – 110 3~400 VAC, 0.4 – 630	- 3~200 VAC, 4.0 – 45 3~400 VAC, 4.0 – 110	- 3~200 VAC, 5.5 – 15 3~400 VAC, 4.0 – 15
Applicable Motor	Induction Motor (IM)	■	■	■	■	■
	Synchronous Motor (PM)	-	■	■	■	-
Control	V/f Control	■	■	■	■	■
	Open Loop Vector (OLV)	-	■	■	■	■
	Closed Loop Vector (CLV)	-	-	■	■	-
	Open Loop Vector (OLV) for PM	-	■	■	-	-
	Adv. Open Loop Vector (OLV) for PM	-	-	■	-	-
	Closed Loop Vector (CLV) for PM	-	-	■	■	-
	V/f and V/F with PG	1:40	1:40	1:40	1:40	1:40
Speed control range	OLV	-	1:100	1:200	1:200	1:100
	CLV	-	-	1:1500	1:1500	-
	CLV and OLV for PM	-	1:10*2	1:1500*3	1:1500	-
Torque Control		-	-	■	-	-
Max. Output Frequency	400 Hz	■	■	■	120 Hz	120 Hz
	1,000 Hz	-	▲	▲	-	-
Fieldbus Interfaces	RS-232C	▲	■	■	■	■
	RS-422/485 (Memobus/Modbus)	▲	■	■	■	-
	MECHATROLINK-I	-	▲	▲	-	-
	MECHATROLINK-II	-	▲	▲	-	-
	Ethernet/IP	-	▲	▲	-	-
	EtherCAT	-	▲	▲	-	-
	CC-Link	-	▲	▲	-	-
	DeviceNet	-	▲	▲	-	-
	PROFIBUS-DP	-	▲	▲	-	-
CANopen	-	▲	▲	▲	-	
Standards	CE	■	■	■	■	■
	UL/cUL	■	■	■	■	■
	ROHS	■	■	■	■	■
	UL508C	■	■	■	■	■
	EN ISO 13849-1PLd	-	■	■	■	■
	IEC/EN61508 SIL2	-	■	■	■	■
Enclosure		IP20 Finless Types	IP20, NEMA1, IP66 Finless Types	IP00, IP20, NEMA1	IP20, NEMA1	IP20, NEMA1
Funktionen	Speed/Torque Control Switching	-	-	■	-	-
	Energy Saving Function	■	■	■	-	-
	Double Rating (ND/HD)	■	■	■	-	-
	Speed Search	■	■	■	-	-
	Slip Compensation	■	■	■	■	■
	Torque Compensation	-	■	■	■	■
	PID Control (with sleep function)	-	■	■	-	-
	DriveWorks EZ (PLC SW)	-	■	■	-	-
	Momentary Power Loss Ride-Thru	■	■	■	-	-
	Application Parameter Presets	■	■	■	-	-
	Preventive Maintenance Functions	-	■	■	■	■
	RS-232C Interface	▲	■	■	■	■
	USB Interface	-	-	■	■	-
	Coated PCB	-	-	-	-	-
	Battery Rescue Operation	-	-	-	■	■

*1 Varies according to motor slip *2 Only Open Loop Vector Control *3 Open-Loop: 1:1000 ■ Standard ▲ Optional



	T1000A	T1000V	Varispeed AC Matrix	G5HP	FSDrive MV1S	FSDrive MX1S
	- 3~200 VAC, 0.4 – 55 3~400 VAC, 0.4 – 90	1~230 VAC, 0.1 – 4.0 3~200 VAC, 0.1 – 18.5 3~400 VAC, 0.2 – 18.5	- 3~200 VAC, 5.5 – 45 3~400 VAC, 5.5 – 75	- 3~400 VAC, 400 – 1,100	- 3~3300 VAC, 132 – 2,500 3~6600 VAC, 250 – 5,000	- 3~3300 VAC, 132 – 2,500 3~6600 VAC, 250 – 5,000
	■	■	■	■	■	■
	■	■	-	-	-	-
	■	■	■	■	■	■
	■	■	■	■	■	■
	■	-	■	■	▲	▲
	■	■	-	-	-	-
	■	-	-	-	-	-
	■	-	-	-	-	-
	1:40	1:40	1:40	1:20	-	-
	1:200	1:100	1:20	1:100	1:100	1:100
	1:1500	-	1:1000	1:1000	1:1000	1:1000
	1:1500	1:10	-	-	-	-
	■	-	-	■	-	-
	■	■	120 Hz	150 Hz	120 Hz	120 Hz
	-	-	-	-	-	-
	■	■	■	■	■	■
	■	■	■	■	■	■
	▲	▲	-	-	-	-
	▲	▲	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	▲	▲	▲	-	-	-
	▲	▲	▲	▲	▲	▲
	▲	▲	▲	▲	▲	▲
	▲	▲	▲	▲	-	-
	■	■	■	■	on request	on request
	■	■	■	-	-	-
	■	■	-	-	-	-
	■	■	-	-	-	-
	■	■	-	-	-	-
	■	■	-	-	-	-
	IP00, IP20, NEMA1 Finless Types	IP20, NEMA1 Finless Types	IP00	IP20	Vertical self-stand type	Vertical self-stand type
	■	-	■	■	-	-
	■	■	■	■	■	■
	■	■	■	■	-	-
	■	■	■	■	■	■
	■	■	■	■	■	■
	■	■	■	■	■	■
	■	■	■	No sleep function	▲	▲
	-	-	■	-	PLC built in	PLC built in
	■	■	■	■	■	■
	-	-	-	-	▲	▲
	■	■	-	-	■	■
	■	■	■	■	■	■
	■	-	-	-	-	-
	■	■	-	-	-	-
	-	-	-	-	-	-

1000 Series

J1000

Compact Inverter Drive



The J1000 meets all automation requirements for compact applications with variable speed operation and energy saving characteristics. A wide range of useful functions upgrade your machine and offer great potentials.

Features

- ▶ Stall Prevention Functions for stable operation during changes of load or power supply
- ▶ Over-Excitation Braking for quick deceleration without external braking resistor

V1000

Compact Vector Control Inverter Drive



YASKAWA V1000 is a general purpose inverter drive covering the demands of a wide field of applications including Open-Loop-Vector functionality and the usage of PM motor without feedback.

Features

- ▶ High flux braking for 50% reduction of braking time
- ▶ Quick response on load and speed changes to improve machine performance
- ▶ Online Auto-Tuning to optimise for improved motor performance at low speed
- ▶ Open Loop Vector Control for PM motor operation
- ▶ Safe Disable Inputs for Safe Torque OFF

A1000

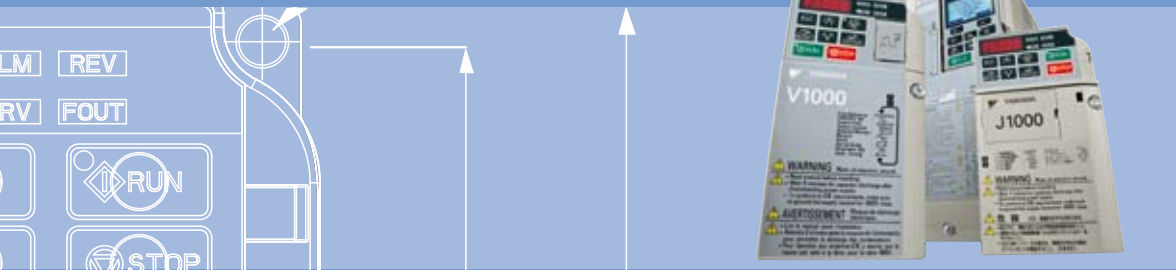
High Performance Vector Control Drive



The A1000 is the premium inverter from YASKAWA. It provides great operation reliability, environmental benefits and energy savings as well as many other user oriented operational features that make it a first class choice.

Features

- ▶ Encoder less operation of PM motors with full torque at zero speed
- ▶ Advanced Auto-Tuning functions to adjust automatically motor settings and analyse continuously changes during motor operation to achieve highest machine performance
- ▶ Advanced energy-saving control technology which improves efficiency and machine productivity in combination with induction and synchronous motor operation.



General Features and Functions

Cost Saving

- ▶ Reduced mounting space because of small design and Side-by-Side Mounting
- ▶ Performance Life Monitor informs about parts wear and tear (IGBT, cooling fan, capacitors)
- ▶ Dual Rating – One frame size smaller drive can run an application with low overload characteristics
- ▶ PM motor control
- ▶ Rotational and stationary Autotuning for induction & synchronous motor
- ▶ International Standards (CE, UL/cUL, ROHS, UL508C, Safe Torque Off, EN ISO 13849-1 PLd, IEC/EN61508 SIL2)

Reliable Operation

- ▶ Long life design for 10 years of maintenance-free operation (10 years, 24 hrs per day, 80% nominal load)*
- ▶ High torque performance (A1000 200% at 0.3 Hz, V1000 200% at 0,5 Hz, J1000 150% at 3,0 Hz)
- ▶ Power-Loss-Ride-Through and Fault Restart Functions ensure continuous running of the motor.

Easy Handling

- ▶ Same Parameter structure for all YASKAWA Inverter drives „If you know one you know them all!“
- ▶ Application Parameter Presets automatically adjusts parameter for major applications
- ▶ Screwless Multifunction Terminal Board with parameter storage function*
- ▶ Online Auto-Tuning
- ▶ USB Copy Unit
- ▶ LED/LCD Operator

*only A1000 and V1000

Special Application Inverter Series

L1000A

Lift Drive for Modernisation and New Construction



The YASKAWA L1000A is the new special purpose lift inverter drive designed for 3 Million starts at 165% output current. It provides advanced control functions to run induction and PM motor applications in geared or gearless elevator systems.

Features

- ▶ New sensor-less torque compensation function including anti-rollback function, preventing shock and ensures a smooth start
- ▶ New torque ripple suppression function for smooth start/stop and comfortable acceleration and deceleration characteristics
- ▶ Overshoot and anti-vibration control including feed forward function, accel/decel compensation and 5 independent S-curve settings which ensure a perfectly smooth ride.
- ▶ UPS and light-load direction search function provide reliable rescue operation
- ▶ New stationary Auto-Tuning with closed brake
- ▶ One motor contactor solution in compliance with EN81-1

L1000V

For Open-loop Lift Applications

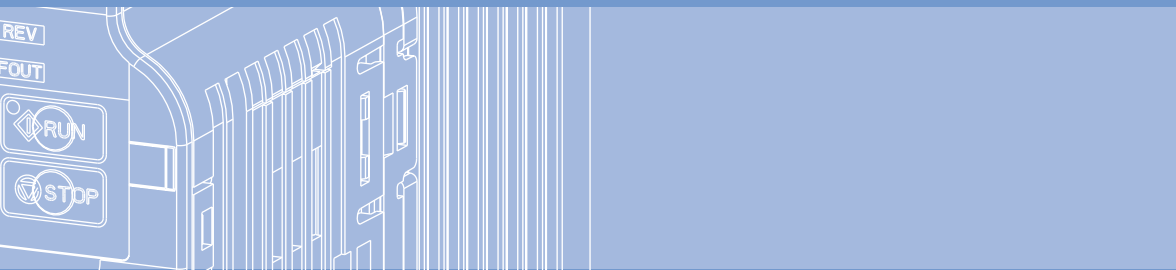


The compact lift inverter drive L1000V was designed for low speed operation (up to 1 m/sec) of geared motors. Optimised standard functions simplify set-up, operation and maintenance, while ensuring smooth and comfortable rides. It upgrades lift systems in terms of reduced costs and enhanced comfort.

Features

- ▶ One motor contactor solution (in compliance with EN81-1)
- ▶ Two relay outputs for fault and brake control reduce installation effort and costs.
- ▶ Simple and efficient brake sequences enable smooth operation.
- ▶ Five independent settings of S-Curves to prevent jerks
- ▶ Pulse input feedback with PG and load detection during run to increase levelling accuracy





For High Performance Textile Applications

T1000A

The T1000A is the high performance vector control AC Drive specially developed for textile applications. Special hardware and software features make this inverter drive specifically adapted to the needs of the textile industries.

Features

- ▶ Standard traverse functions to optimise the winding of the yarn around the drum
- ▶ Pulse output for traverse functions, synchronized accel/decel line speed, pulse train speed reference, pulse output, etc. ideal for textile machinery
- ▶ Available as finless type for heat sink or water cooler mounting
- ▶ Option cards available for all major serial networks: PROFIBUS-DP, DeviceNet, CC-Link, CANopen, MECHATROLINK, etc.
- ▶ Included power failure detection, reliable power loss ride through control



AC Drive for Textile Machinery

T1000V

The T1000 is the compact size Inverter for textile application. It includes many useful features and functions which correspond to the needs of textile machinery.

Features

- ▶ All models also as finless version
- ▶ Kinetic Energy Buffering Function for synchronous decel/accel in case of temporary power loss.
- ▶ Standard traverse functions to optimise the winding of the yarn around the bobbin
- ▶ Synchronous operation of multiple drives ensuring constant speed ratio between motors



Special Purpose Inverter Series

Varispeed AC

Environmental friendly Matrix Converter



The Varispeed AC is an example for YASKAWA innovative spirit. It is the world's first series produced matrix converter. Direct conversion of AC input voltage to AC output voltage is a real technical advancement in times of limited resources and improved energy efficiency. The Varispeed AC not only improves energy efficiency, but also solves many problems typically associated with conventional inverters drives.

Features

- ▶ Sine-wave PWM control with 9 bi-directional switches
- ▶ Direct conversion of 3-phase AC power to AC power required to control voltage and frequency output
- ▶ Simple drive design due to missing sine-wave converter, DC link circuit and electrolytic capacitors, devices to prevent harmonics, or braking units
- ▶ Energy regeneration functions without special devices.
- ▶ Less wiring to simplify installation and maintenance.

G5HP

Extra Value at Maximum Cost Performance



The Varispeed-656G5HP is the best solution for systems in the high power segment. It achieves optimum control over a wide range of applications for variable torque such as fans and pumps and constant torque applications such as extruders and printing machines.

Features

- ▶ Variable speed range of 1:1000 torque limit (in flux vector mode)
- ▶ High starting torque: 150% at 1Hz (open loop); 150% at 0 Hz (closed loop)

FSDrive-MV1S / FSDrive-MX1S



YASKAWA has developed Japan's first commercially produced PWM controlled, medium-voltage inverter with multi-output connection. Based on these innovative technologies, the FSDrive-MV1S inverter represents the company's attitude to develop an easy to use inverter with great operability and improved monitoring functions. The FSDrive-MX1S enables unbelievable energy savings due to its power regeneration function and optimum control of all medium-voltage motors due to sinusoidal waveforms of the power supply and output signals.

FSDrive-MV1S Features

- ▶ Enhanced trace function and LAN compatibility for easy monitoring the operation status for protective maintenance.
- ▶ Constant operation during momentary power loss of several cycles (Holding time depends on the load forms or operation status). Instant re-acceleration to the referenced speed to ensure smooth restart
- ▶ V/f Control additionally enabling parallel operation of multiple motors with one inverter to reduce needed drive equipment

FSDrive-MX1S Features

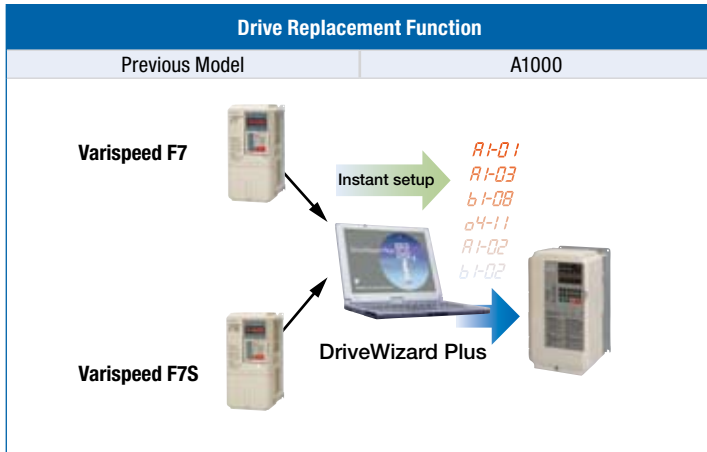
- ▶ Dynamic operation at variable speeds for quick respond sudden speed changes.
- ▶ Design for applications requiring low-speed operation and quick deceleration
- ▶ Optional PLC card enables the use of ladder program for individual software
- ▶ Enhanced trace function and LAN compatibility for easy monitoring operation status, protective maintenance and quick intervention.

```

-MONITR- DRU Rdy
Freq Ref (d1-01)
-----
U1-01=050.00Hz
(0.00~60.00)
"0.00Hz"
    
```

YASKAWA Inverter Software Tools

Engineering Tool DriveWizard Plus



Note: To obtain a copy of DriveWizard Plus, contact a YASKAWA representative.

- ▶ Engineering Tool DriveWizard Plus
- ▶ Manage the unique settings for all your drives right on your PC.
- ▶ An indispensable tool for drive setup and maintenance. Edit parameters, access all monitors, create customized operation sequences, and observe drive performance with the oscilloscope function.
- ▶ The Drive Replacement feature in DriveWizard Plus saves valuable time during equipment replacement and application upgrades by converting previous YASKAWA product parameter values to the new parameters automatically.

“DriveWorksEZ” a simple design environment for easy installation and reliable operation

Application-specific Functional Add-on

Using DriveWorksEZ, machine builders and users are able to configure default application-specific functions, and to adapt customized functionalities for YASKAWA Inverter Series. Control tasks are executed directly in the inverter, eliminating an entire PLC module. Fieldbus overhead is reduced and the drive will react to application requirements with shorter cycle times.

Software Features

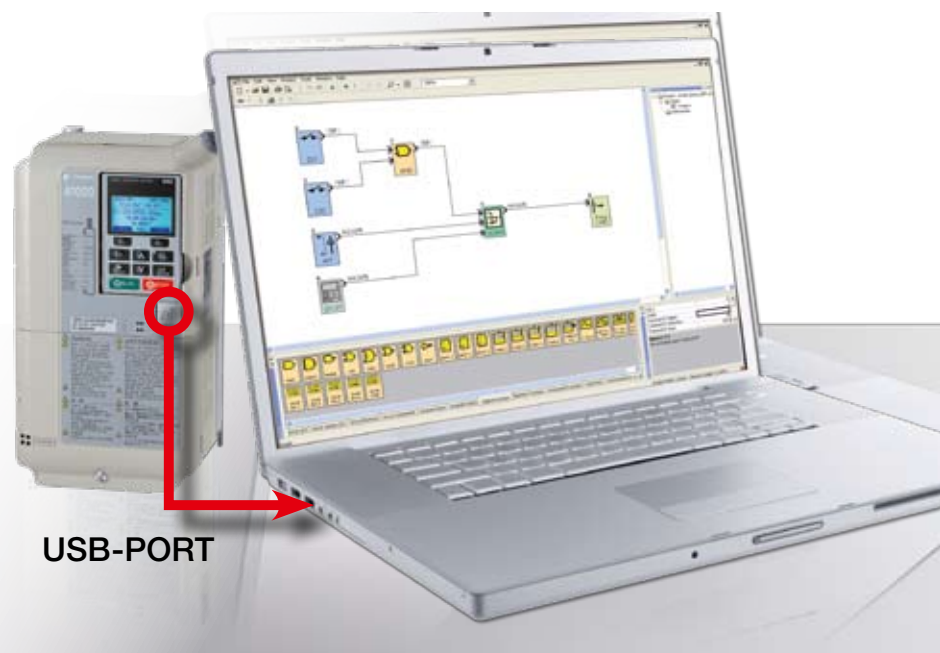
The software offers simple operation, a block diagram with 204 function modules, a cycle time (scan time) of 1 ms (for A1000 e.g.), and application examples such as cascade control, positioning tasks etc.

Rapid Project Implementation

Thanks to user-friendly “drag-and-drop” functionalities, PLC functions can be quickly programmed, and may be activated directly in the frequency inverter. Project implementation is fast and easy; the load on central machine control resources is relieved and fieldbus saturation is reduced.

Protection of Intellectual Property

Software that was created using “DriveWorksEZ” is protected against readout and copying by third parties. All rights remain with the software originator so that the author’s intellectual property is protected.



USB-PORT



YASKAWA Europe GmbH

Drives & Motion Division
Hauptstr. 185
65760 Eschborn
Germany

+49 6196 569-300
info@yaskawa.eu.com
www.yaskawa.eu.com