YASKAWA

GA700
AC DRIVES
FOR INDUSTRIAL APPLICATIONS

YASKAWA

200 V CLASS: 0.55 - 110 kW
400 V CLASS: 0.55 - 630 kW

LIMITLESS
POSSIBILITIES

Incredibly Reliable, Easy to Use, and Powerful!

At Yaskawa, we know your time is valuable. That's why we've designed this variable speed drive to meet all your needs. Offering world class Yaskawa quality, along with intuitive interaction and high flexibility, our new GA700 is meant to easily handle nearly any application.

Discover the limitless possibilities of GA700!

SUSTAINABLE

FLEXIBLE

Connectivity
Advanced Motor Control
Customizable

Quick and Easy Setup
Easy Installation

Functional Safety
Global Certified
Environmental Protection

EASY

Designed to control traditional and emerging motor technologies through 630 kW, the GA700 handles applications ranging from simple fans and pumps to high performance test dynamometers requiring precise regulation. Whether you require hard-wired discrete, analog, or advanced network control, the GA700 provides extraordinary capability.

Equally impressive to its robust, powerful, and flexible design are the GA700's high resolution display, configuration wizards, and mobile device capability. Combine all this with modern safety features and a variety of environmental solutions, and you will need to look no further than GA700 for all your variable speed needs.

OUR COMMITMENT TO YOU

Loaded with convenient features, GA700 offers the best value proposition for industrial applications.

200 V CLASS: 0.55 - 110 kW
400 V CLASS: 0.55 - 630 kW

EFFORTLESS NETWORK INTEGRATION

- Supports all major networks with a new cost effective network integration feature
- Maintain network communications even during loss of main input power

ONE FOR ALL

- Precise and tuning-less motor control with one drive controlling any induction, permanent magnet or synchronous reluctance motor

QUICK & EASY SET-UP

- Reduce set-up time with an intuitive keypad, navigation and start-up wizards

POWERFUL CONFIGURATION TOOLS

- DriveWizard® and DriveWorksEZ® are PC tools for drive management and logic programming

SAFE, CONVENIENT SET-UP AND MONITORING

- Safe programming without main power connected
- Cloud-connected DriveWizard Mobile app for drive management on smartphones and tablets.

INTEGRATED FUNCTIONAL SAFETY

- Increased safety and reliability with STO SIL3 functional safety

MEETS GLOBAL STANDARDS

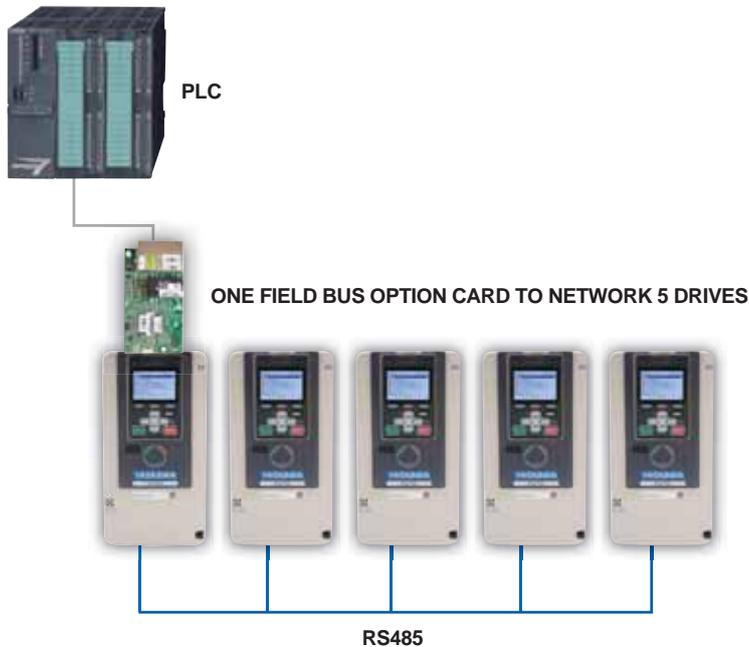- Local/global standards
- RoHS compliant

ENVIRONMENTAL PROTECTION WITH FLEXIBLE PACKAGE DESIGN

- Designed with flexibility to simplify installation and cabinet design

Effortless network integration

GA700 drives support all the major industrial communications and connection topologies (ring, star, line, etc.) to adapt to various factory automation networks. Reduce wiring when connecting to an upper level controller or PLC through available built-in protocols and/or dedicated communication options.

PLC

ONE FIELD BUS OPTION CARD TO NETWORK 5 DRIVES

RS485

Network integration benefits/features:

SUPPORTS ALL MAJOR NETWORKS

- Network compliance tested
- Network up to 5 drives with a single communication card

COST SAVINGS WITH BUILT-IN PROTOCOLS

- RS-485 MEMOBUS/Modbus protocol
- 115.2 kbps communication speeds

MAINTAIN COMMUNICATION DURING MAIN POWERLOSS

- Embedded +24VDC input control power standard
- Programming and monitoring without main power

COST EFFECTIVE INTEGRATION

Up to five GA700 drives can be accessed through only one fieldbus option card, thus providing a cost effective solution with reduced wiring effort.

EMBEDDED +24VDC INPUT ACCESS

Network communication can be maintained during loss of main input power utilizing the +24VDC input. An external +24VDC source can be connected directly to the GA700 without an additional +24VDC power supply option.

DeviceNet   EtherNet/IP   EtherCAT   ETHERNET POWERLINK   CC-Link

CANopen   Modbus   MECHATROLINK   PROFINET   PROFI

One for all

The GA700 precisely controls induction, permanent magnet, and synchronous reluctance motors providing versatility to run a variety of applications with just one drive. The times of complex motor set-up are over. With the new EZ vector mode, the GA700 can run all of these motor types without comprehensive tuning.
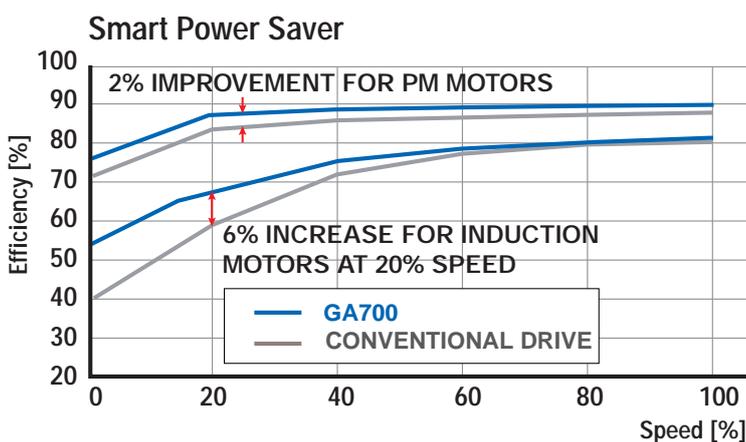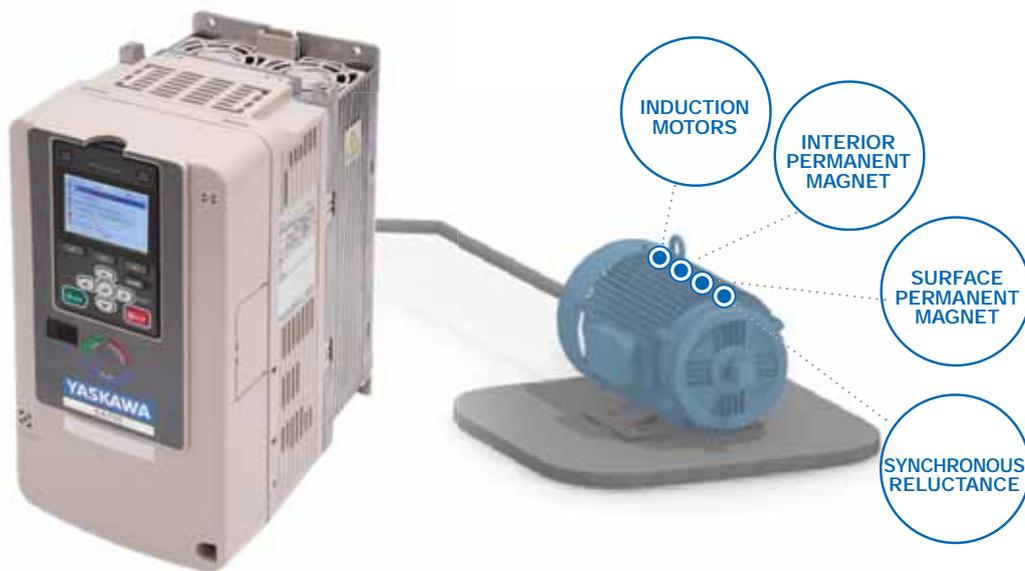
Motor control benefits/features:

FLEXIBLE MOTOR CONTROL

- Tuning-less with EZ vector
- Open/closed loop speed or torque control
- Induction/permanent magnet motors
- Synchronous reluctance (SynRM) motors
- 590 Hz output frequency
- Zero speed control

ENERGY SAVINGS

- High precision torque per amp capability
- Automatic energy efficiency optimizer with Smart Power Saver function

INDUCTION MOTORS

INTERIOR PERMANENT MAGNET

SURFACE PERMANENT MAGNET

SYNCHRONOUS RELUCTANCE

Smart Power Saver

2% IMPROVEMENT FOR PM MOTORS

6% INCREASE FOR INDUCTION MOTORS AT 20% SPEED

GA700
CONVENTIONAL DRIVE

Efficiency [%] vs Speed [%]

SMART POWER SAVER

Energy savings can be further increased and automatically optimized with the Smart Power Saver function. The Smart Power Saver can minimize energy consumption through varying load and speed ranges achieving power optimization for energy cost reduction.

Quick & easy set-up

The GA700 provides a user programming experience with an intuitively-designed keypad and tactile user interface. Self-guiding navigation menus and start-up wizards make the programming set-up faster and easier than ever. The keypad programming is complimented by easy-to-understand iconic symbols. Mobile device drive programming, monitoring and troubleshooting are possible with DriveWizard Mobile app.

MOBILE DEVICE CONNECTIVITY
Mobile device connectivity is achieved through using the built-in USB port or wireless communication with the Bluetooth® LCD keypad option.

1. Bluetooth keypad optional
2. Supports Android

COPY FUNCTION
Multiple sets of parameters can be stored and easily transferred (copied) to additional drives

HI-RESOLUTION DISPLAY
Contrast control offers clear and readable full-text descriptions

AUTOMATIC BACKUP FUNCTION
Saves the current parameter settings after a period of user inactivity. After an incident, settings can be retrieved from the keypad in a couple of seconds.

ADVANCED KEYPAD NAVIGATION
Faster scrolling and function keys offer faster navigation and short-cuts reducing programming time

MICRO SD STORAGE
Micro SD for data logging storage

REAL-TIME CLOCK
Real-time clock for time stamp of fault information (battery compartment in back)

OPTIONAL LCD KEYPAD WITH BLUETOOTH®
Wireless communication capability between the mobile device and drive

Keypad benefits/features:

REDUCE SET-UP TIME
- Start-up wizard
- Favorite parameter/monitor function
- Copy function integrated into the keypad
- Parameter set is backward compatible with previous generation drive products
- Fast navigation
- Help function

DRIVE PARAMETER MANAGEMENT
- Storage of up to 4 drive parameter sets
- Data logging with real-time stamped data and fault logging (up to 32 GB micro SD)
- Data trending e.g. for energy consumption analysis
- Multiple parameter storage
- Automatic parameter back-up

EASY TO USE
- LCD keypad with Bluetooth® option
- Display contrast control
- Real-time clock with time stamp
- Tactile feel buttons
- Remote mounting of keypad using standard RJ45 extension cable

START-UP WIZARD
Reduce basic set-up time to minutes using the start-up wizard without any drive parameter knowledge

Powerful configuration tools

DriveWizard® is an offline/online parameter and drive configuration tool. The easy and intuitive tool is used for set-up, maintenance and troubleshooting offering parameter editing, storing and file comparison as well as online trending using the highly functional oscilloscope feature.

EASY COMMISSIONING WITHOUT POWER
GA700 can be programmed without any power supply connected. Simply plug into a USB port of your PC, start programming and enjoy the ease of commissioning.

Customizable

The GA700 further enhances the programming experience with DriveWorksEZ®. DriveWorksEZ® offers an icon-based, drag-n-drop graphical environment to add programmable functions that can tailor the drive to meet various machine and application requirements without the cost of external controllers, such as PLCs or additional controller hardware options.
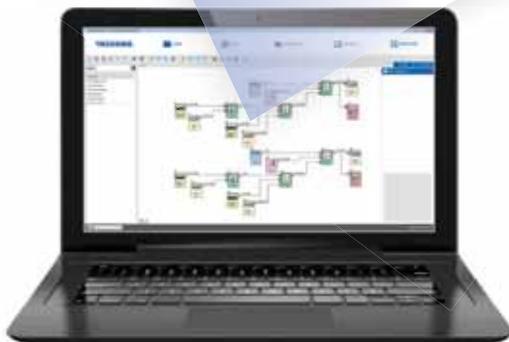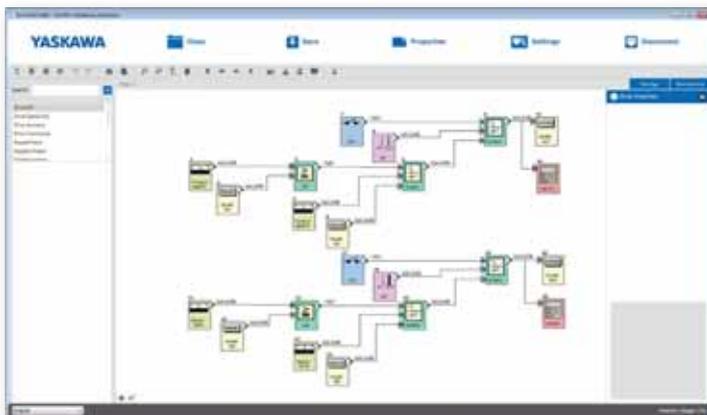
CUSTOMIZED PROGRAMMING
DriveWorksEZ® is a drag-n-drop graphical interface using pre-tested function blocks. Create your own custom control with the aide of an online debugger program. Example application programs created by DriveWorksEZ® include Winder, Laundry, etc.

DriveWizard® and DriveWorksEZ® are registered trademarks of Yaskawa

Application Toolbox benefits/features:

DRIVE MANAGEMENT WITH DRIVEWIZARD®

- Parameter management
- Online manual
- Report generation and export data
- 6 channel scope function
- Real-time monitoring
- Access through USB, EtherNet/IP, Modbus TCP/IP, or PROFINET
- Automatic parameter conversion from previous series drives

CUSTOMIZABLE WITH DRIVEWORKSEZ®

- Icon-based graphics
- Drag-n-drop graphical interface
- I/O, drive and network interface
- Select from 280+ function blocks
- Logic/math functions
- Timers/counters
- Subroutine creation
- Up to 200 connections

Safe, convenient set-up and monitoring

The GA700 offers programming access and control utilizing your PC or mobile device. PC and mobile drive programming, parameter access, and monitoring can provide a safe and convenient method for drive set-up. DriveWizard Mobile app brings the GA700 to your smartphone and tablet. Connected with the YASKAWA Drive Cloud, it combines quick and intuitive drive programming with complimentary drive data storage, providing anytime data access.

DRIVEWIZARD MOBILE APP

DriveWizard Mobile app turns your smartphone or tablet into a controller for GA700 drive. With DriveWizard Mobile app, all information for parameter setup and troubleshooting are in your pocket – anytime, anywhere.

Scanning the drive QR code can provide easy access to drive information and status with the DriveWizard Mobile application software.

YASKAWA DRIVE CLOUD SERVICE

With the YASKAWA Drive Cloud, we provide free drive registration access to latest product information and online storage for parameter backup data. Drive Cloud is the easy and safe way to keep a record of your drive data.

YASKAWA Drive Cloud

Product Information

Convenient setup and monitoring:

DRIVEWIZARD® MOBILE APP

- Quick and easy drive management apps for smart devices
- Easy USB OTG cable or Bluetooth® connection
- Drive registration via cloud by scanning QR code
- Paperless and easy access to latest online description of parameters and faults
- Single-click parameter and active troubleshooting tips
- Archive and retrieve parameter settings with comments on your smart device
- Worry-free data recovery: Parameter back-up/retrieval anytime via cloud service for registered drives

YASKAWA DRIVE CLOUD SERVICE

- Online manual
- Access to latest product updates
- Troubleshooting tips
- Registration of drives for retrieving product information, such as firmware history and updates
- Complimentary storage for parameter backup and organized record-keeping comments
- Convenient drive data storage accessible anywhere

Integrated functional safety

Built-in safety functions provide the right tools for risk reduction without the need for external devices such as motor relays. The GA700 is designed for SIL3 STO functional safety with 2-terminal-pin STO (Safe Torque Off) as standard.

Functional Safety benefits/features:

RISK REDUCTION MADE EASY

- STO with SIL3/PLe according to IEC 61800-5-2/IEC 61508/ISO 13849
- EDM monitor
- Lower number of parts reduces installation effort while increasing reliability

CONVENTIONAL DRIVE

YASKAWA

INCREASED SAFETY

POOR FAIR GOOD EXCELLENT

EMBEDDED FUNCTIONAL SAFETY
The built-in STO replaces mechanical emergency relays reducing parts. The electronic sequencing improves reliability and cost compared to mechanical components.

Meets global standards

Globally certified to meet a wide range of application standards and compliance levels. Global standard such as UL, CE to application specific certifications.

Environmental protection with flexible package design

Flexible product design that is adaptable for various environmental conditions. The enclosure is designed with flexibility for simple cabinet installation to outdoor exposure.

CONVENTIONAL DRIVE

* Figure depicts 45 kW unit

COATED BOARD PROTECTION
Coated PCBs as standard protect the electronics from dust or humidity and ensure reliable operation even in a harsh environment (IEC 60723-3-3, 3C2, 3S2).

MINIMUM FOOTPRINT
The small foot print of the GA700 provides best usage of available panel space. Optimized heat management results in an up to 50% smaller foot print compared to previous drives.

Enhanced Product benefits/features:

INSTALLATION EASE – PANEL/ENCLOSURE

- IP20 standard
- NEMA 1 kit optional
- Type 12/IP55 protected heatsink
- IEC 60721-3-3, class 3C2/3S2 conformal coated boards
- Side-by-side mounting
- Built-in braking transistor (up to 75 kW)

REDUCE HARMONICS/ EMISSIONS

- Built-in C3/C2 filters as factory option
- Built-in DC reactor (above 18.5 kW)

| CONVENTIONAL DRIVE | CONVENTIONAL DRIVE | CONVENTIONAL DRIVE | CONVENTIONAL DRIVE |

REDUCED CABINET SIZE

SIDE-BY-SIDE MOUNTING
The GA700 can be mounted side-by-side with bottom entry wiring to reduce cabinet size.

Inside of enclosure

Outside of enclosure

Mounting for External Heatsink

HORIZONTAL MOUNTING
The GA700 can be horizontally mounted up to 75 kW.

EASY EXTERNAL BACK HEATSINK MOUNTING
The GA700 with a integrated flange design offers easy installation when mounting the heatsink outside the cabinet to reduce cabinet size and cooling equipment. In addition, the factory optional Type 12/IP55 heatsink design can provide greater protection from dust particles while reducing cooling requirements resulting in smaller cabinets.
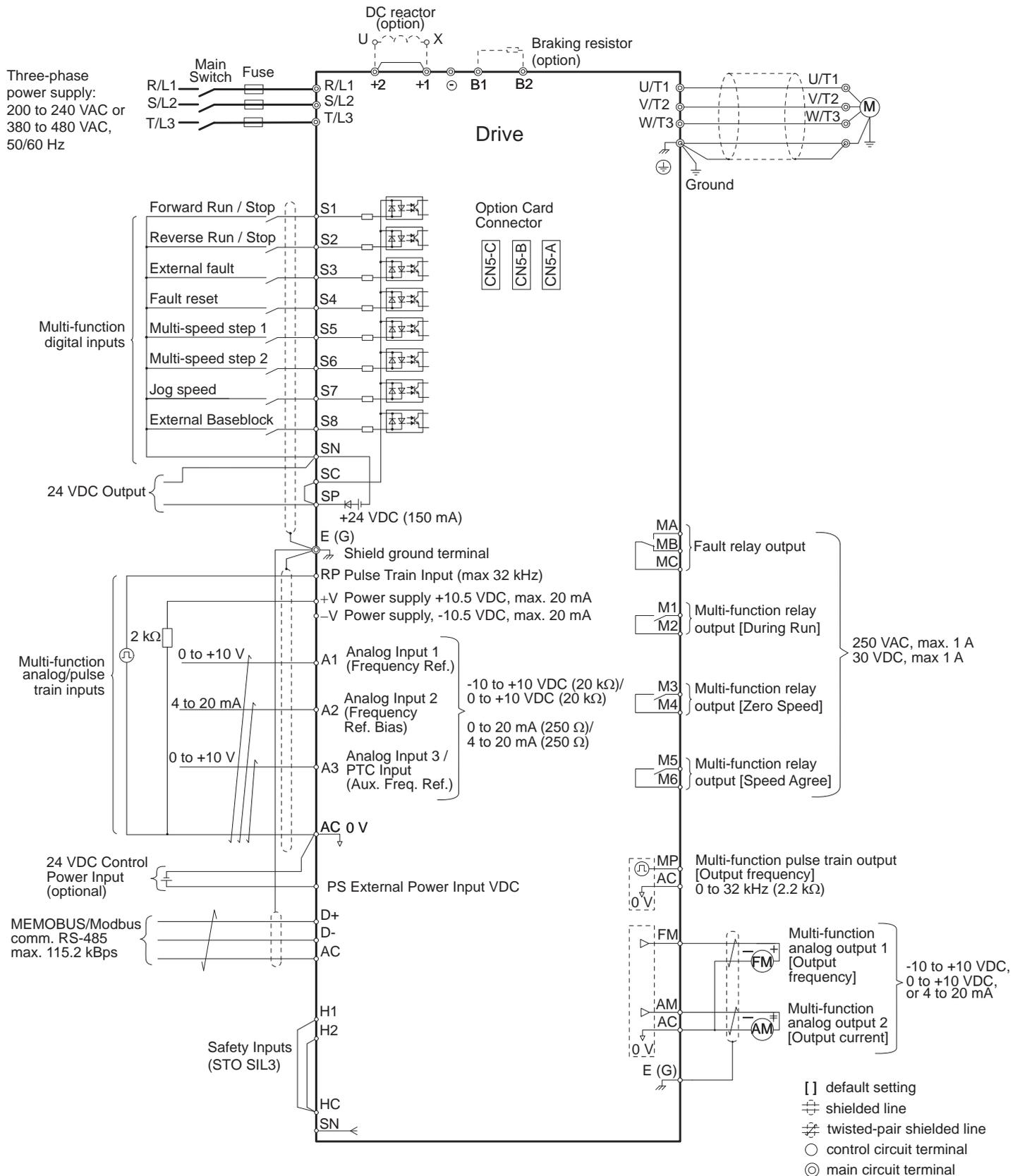
SPECIFICATION OVERVIEW

OPERATING ENVIRONMENT	
Ambient Temperature	-10 to +50 °C (IP00), -10 to +40 °C (NEMA Type 1), up to +60 °C with derating
Storage Temperature	-40 to +70 °C (short-term temperature during transportation)
Humidity	95% RH or less (non-condensing)
Altitude	Up to 1000 m without derating, up to 4000 m with derating.
Vibration/Shock	10 to 20 Hz: 9.8 m/s^2 20 to 55 Hz: 5.9 m/s^2 (2004 to 2211; 4002 to 4168) 2 m/s^2 (2257 to 2415; 4208 to 4568), according to EN60068-2-6
Protection Design	IP20 STANDARD, NEMA 1 kit optional, IP55/Type 12 external heatsink (factory option)
Mounting	Side-by-side up to 18.5/22 kW, horizontal up to 55/75 kW
Conformal Coating (PCB's)	IEC 60721-3-3, Class 3CS (chemical gases), Class 3S2 (solid particles)
Standards	CE, UL, cUL, RCM, TUV, EAC, RoHS
Functional Safety	Safe Torque Off (STO) according to IEC 61800-5-2, tested according to IEC/EN61508 (SIL3) and ISO/EN13849-1 (Pl e, Cat. 3)

POWER RATINGS	
Overload Capacity	150%/1 min. (Heavy Duty) or 110%/1 min. (Normal Duty)
Rated Voltage	200 to 240VAC, -15 to +10%
	380 to 480VAC, -15 to +10%
Capacity Range (ND)	200 V Class: 0.55 to 110 kW
	400 V Class: 0.55 to 630 kW
Input Frequency	50/60 Hz +/-5%
Output Frequency	0 to 590 Hz
Motor Control	Induction Motor (IM), Permanent Magnet Motor (IPM/SPM), Synchronous Reluctance Motor (SynRM)

OPTIONS		MODEL CODE
Communications	CANopen	SI-S3
	CC-Link	SI-C3
	DeviceNet	SI-N3
	EtherCAT	SI-ES3
	Ethernet/IP	SI-EN3
	Ethernet/IP dual port	SI-EN3/D
	MECHATROLINK-II	SI-T3
	MECHATROLINK-III	SI-ET3
	Modbus/TCP	SI-EM3
	Modbus/TCP dual port	SI-EM3/D
	POWERLINK	SI-EL3
	PROFIBUS-DP	SI-P3
	PROFINET	SI-EP3
Motor Feedback	Incremental Encoder (Line Driver)	PG-X3
	Complimentary Encoder (Open Collector)	PG-B3
	Resolver Interface for TS2640N321E64	PG-RT3
Input/Output	Analog Input: 3-channel, Voltage -/+10 V, 13-bit signed, Current (0) 4 to 20 mA, 12-bit	AI-A3
	Analog Output: 2-channel, Voltage -/+ 10 V, 11-bit signed	AO-A3
	Digital Input: 16 Digital Inputs, +24 V @ 8 mA each, sink or source, multi-function or frequency reference (16 bit binary or BCD)	DI-A3
	Digital Output: 8-channel, 6 photocoupler (48 V, 50 mA or less), 2 relay contacts (250 VAC/30 VDC, 1 A max.)	DO-A3
Other Options	Bluetooth Keypad	
	Attachment for External Heatsink	
	External EMC Filter	

CONNECTION DIAGRAM

DC reactor (option)

Braking resistor (option)

Three-phase power supply:
200 to 240 VAC or
380 to 480 VAC,
50/60 Hz

Main Switch Fuse

R/L1
S/L2
T/L3

R/L1 +2 +1 ⊖ B1 B2

Drive

U/T1
V/T2
W/T3

U/T1
V/T2
W/T3

M

Ground

Forward Run / Stop — S1

Reverse Run / Stop — S2

External fault — S3

Fault reset — S4

Multi-speed step 1 — S5

Multi-speed step 2 — S6

Jog speed — S7

External Baseblock — S8

Multi-function digital inputs

Option Card Connector

CN5-C CN5-B CN5-A

SN
SC
SP

24 VDC Output

+24 VDC (150 mA)

E (G) Shield ground terminal

RP Pulse Train Input (max 32 kHz)

+V Power supply +10.5 VDC, max. 20 mA
−V Power supply, -10.5 VDC, max. 20 mA

2 kΩ

Multi-function analog/pulse train inputs

0 to +10 V

4 to 20 mA

0 to +10 V

A1 Analog Input 1 (Frequency Ref.)

A2 Analog Input 2 (Frequency Ref. Bias)

A3 Analog Input 3 / PTC Input (Aux. Freq. Ref.)

-10 to +10 VDC (20 kΩ)/
0 to +10 VDC (20 kΩ)

0 to 20 mA (250 Ω)/
4 to 20 mA (250 Ω)

AC 0 V

24 VDC Control Power Input (optional)

PS External Power Input VDC

MEMOBUS/Modbus comm. RS-485 max. 115.2 kBps

D+
D-
AC

H1
H2

Safety Inputs (STO SIL3)

HC
SN

MA
MB Fault relay output
MC

M1 Multi-function relay
M2 output [During Run]

M3 Multi-function relay
M4 output [Zero Speed]

M5 Multi-function relay
M6 output [Speed Agree]

250 VAC, max. 1 A
30 VDC, max 1 A

MP Multi-function pulse train output
AC [Output frequency]
0 V 0 to 32 kHz (2.2 kΩ)

FM
FM Multi-function analog output 1 [Output frequency]

AM
AC Multi-function analog output 2 [Output current]
AM

0 V

E (G)

-10 to +10 VDC,
0 to +10 VDC,
or 4 to 20 mA

[ ] default setting
⊕ shielded line
⌇ twisted-pair shielded line
○ control circuit terminal
◎ main circuit terminal

RATINGS & SPECIFICATIONS

Catalog Number Designation

GA70 C 4 004 B B A

Product Series
GA700 Series

Region code*
C: Europe

Voltage Class
2: 200 V 3-phase
4: 400 V 3-phase

Environmental Spec
A: Standard

Enclosure
B: IP20

EMC filter option
A: No built-in filter
B: C3 built-in
C: C2 built-in

Rated output current
See Ratings Table
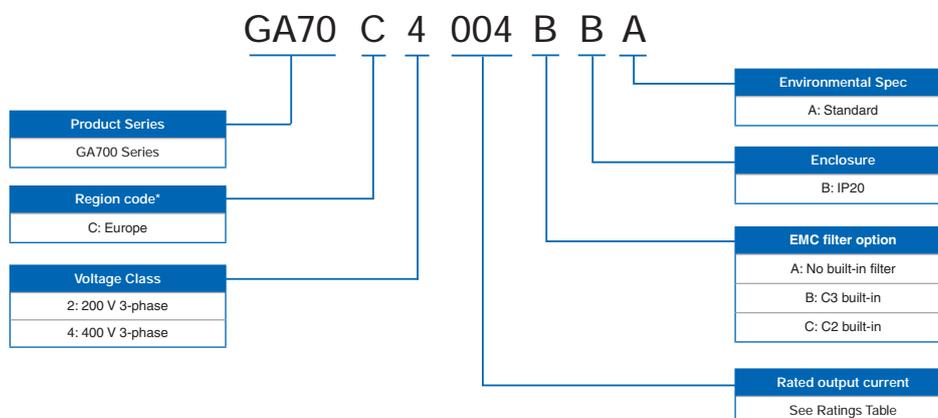
200 - 240 VAC

Catalog Code GA70C	Max Applicable Motor Power	Rated Output Current	Dimensions [mm]			Weight [kg]
	HD / ND [kW]	HD / ND [A]	H	W	D	
2004	0.55 / 0.75	3.2 / 3.5	260	140	176	3.5
2006	0.75 / 1.1	5 / 6				
2008	1.1 / 1.5	6.9 / 8				
2010	1.5 / 2.2	8 / 9.6				
2012	2.2 / 3	11 / 12.2				
2018	3 / 3.7	14 / 17.5			211	3.9
2021	3.7 / 5.5	17.5 / 21				
2030	5.5 / 7.5	25 / 30				4.2
2042	7.5 / 11	33 / 42				
2056	11 / 15	47 / 56	300	180	202	6.0
2070	15 / 18.5	60 / 70	350	220	227	8.5
2082	18.5 / 22	75 / 82				9.0
2110	22 / 30	88 / 110	400	240	280	20
2138	30 / 37	115 / 138	450	255		35
2169	37 / 45	145 / 169	543	264	335	40
2211	45 / 55	180 / 211				
2257	55 / 75	215 / 257	700	312	420	80
2313	75 / 90	283 / 313				
2360	90 / 110	346 / 360	800	440	472	120
2415	110 / -	415 / -				

RATINGS & SPECIFICATIONS

380 - 480 VAC

Catalog Code GA70C	≤ 380 to 460 VAC		> 460 VAC		Dimensions [mm]			Weight [kg]
	Max Applicable Motor	Rated Output Current	Max Applicable Motor	Rated Output Current	H	W	D	
	HD / ND [kW]	HD / ND [A]	HD / ND [kW]	HD / ND [A]				
4002	0.55 / 0.75	1.8 / 2.1	0.55 / 0.75	1.6 / 2.1	260	140	176	3.5
4004	0.75 / 1.5	3.4 / 4.1	0.75 / 1.5	2.1 / 3			176	3.5
4005	1.5 / 2.2	4.8 / 5.4	1.5 / 2.2	3.4 / 4.8				
4007	2.2 / 3.0	5,5 / 7.1	2.2 / 3.0	4.8 / 6.9			211	3.9
4009	3.0 / 4.0	7.2 / 8.9	3.0 / 4.0	6.9 / 7.6				3.9
4012	3.7 / 5.5	9.2 / 11.9	3.7 / 5.5	7.6 / 11				
4018	5.5 / 7.5	14.8 / 17.5	5.5 / 7.5	11 / 14				4.2
4023	7.5 / 11	18 / 23.4	7.5 / 11	14 / 21				4.2
4031	11 / 15	24 / 31	11 / 15	21 / 27	300	180	202	6.0
4038	15 / 18.5	31 / 38	15 / 18.5	27 / 34				6.0
4044	18.5 / 22	39 / 44	18.5 / 22	34 / 40	350	220	227	7.5
4060	22 / 30	45 / 59.6	22 / 30	40 / 52			246	13
4075	30 / 37	60 / 74.9	30 / 37	52 / 65	400	240	280	16
4089	37 / 45	75 / 89.2	37 / 45	65 / 77	450	255	280	35
4103	45 / 55	91 / 103	45 / 55	77 / 96				35
4140	55 / 75	112 / 140	55 / 75	96 / 124	543	264	335	40
4168	75 / 90	150 / 168	75 / 90	124 / 156				40
4208	90 / 110	180 / 208	90 / 110	156 / 180	700	312	420	80
4250	110 / 132	216 / 250	110 / 150	180 / 240				80
4296	132 / 160	260 / 296	150 / 185	240 / 302				
4371	160 / 200	304 / 371	185 / 220	302 / 361	800	440	472	120
4389	200 / 220	371 / 389	220 / 260	361 / 414				120
4453	220 / 250	414 / 453	260 / 300	414 / 477	1140	510	480	175
4568	250 / 315	453 / 568	300 / 335	477 / 515				175
4675	315 / 355	605 / 675	370 / 450	590 / 720				

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