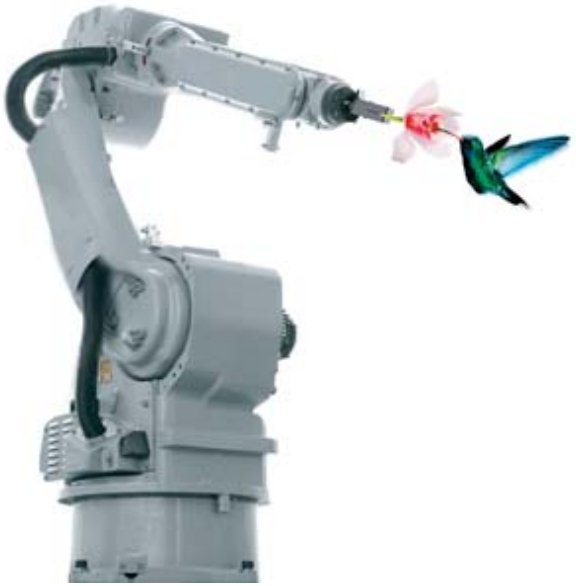
1000 Series Technical Training

Yaskawa Drives Department



Hardware Overview

Rev.: 05 (31.08.2010)

Overview and Contents

Table of contents

How to use this Presentation ?

This presentation shows all property and parameters that can be found in any of the J1000, V1000, A1000 drives. To distinguish whether the property or parameter is available in all of the drives or only in A1000 for example, please note the „ticks“ in the grey bar:

In the example above the function or the parameter would be available in V1000 and A1000 but NOT in J1000.

Default settings (i.e. the standard setting from the factory) are underlined.

Availability in different control modes:

All Modes

V/f | V/f w/PG | OLV | CLV
OLV/PM | AOLV/PM | CLV/PM

V/f | V/f w/PG | OLV | CLV
OLV/PM | AOLV/PM | CLV/PM

Hardware Specifications

Yaskawa J1000

Compact V/f Control Drive

Yaskawa V1000

Compact Vector Drive

Yaskawa A1000

High Performance

Vector Control Drive

Hardware Specifications

Power Input

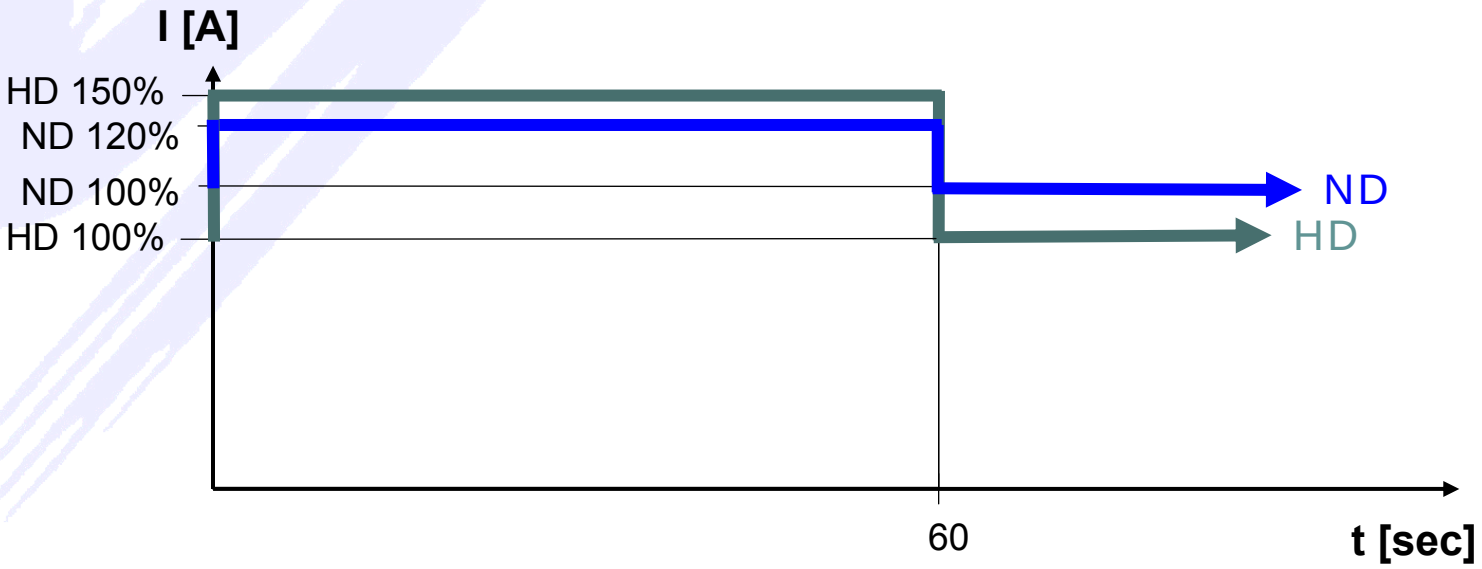
	J1000	V1000	A1000
Input voltage 1AC	200 ~ 240 V, -15%/+10%		
Input voltage 3AC	200 ~ 240 V, -15%/+10% 380 ~ 480 V, -15%/+10%		
Input frequency	50/60 Hz ± 5%		

Hardware Specifications

Power Output – Dual Rating
Normal Duty (ND) / Heavy Duty (HD)

- **Yaskawa inverter 1000 series inverters have dual rating feature**
  - **Normal Duty (ND): 120% overload capability for 60 sec**
  - **Heavy Duty (HD): 150% overload capability for 60 sec**

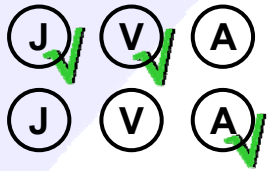
Heavy Duty is factory setting.
Parameter C6-01 (Drive Duty Selection) can be set to 0 (HD) or 1 (ND).



Hardware Specifications

Power Output – Dual Rating
Normal Duty (ND) / Heavy Duty (HD)

- Heavy Duty (factory default):
  - higher starting torque
  - constant torque applications
  - default carrier frequency [1]
    - 8/10 [2] kHz
    - 2 [3] kHz



- Normal Duty:
  - higher continuous output current than with HD setting

➔ Motor size one frame size bigger

- or alternatively -

➔ Inverter one frame size smaller

➔ **Cost saving**

  - variable torque applications
  - default carrier frequency [1]
    - 2 kHz swing PWM (low noise)

1) Different factory setting for ND and HD. If C6-01 (‘Drive Duty Selection‘ = HD or ND) is toggled, then the carrier frequency will be automatically updated to appropriate factory value.
2) Pre-set value for HD depends on inverter size
3) Higher frequency possible without derating, depending on drive rated power.

Hardware Specifications

Power Output

	J1000	V1000	A1000
Overload	HD[1]: 150% for 60 s / ND: 120% for 60 s		
Carrier frequency	Default setting: HD = 10 kHz for JCBA0001 ~ 0006, JC2A0001 ~ 0006 HD = 8 kHz for all other drives	Default setting[2]: HD = 10 kHz for VCBA0001 ~ 0006, VC2A0001 ~ 0006 HD = 8 kHz for all other drives	Default setting[2]: HD = 2 kHz
	ND = 2 kHz (Default setting: Swing PWM[2] [3])		
	Setting range ND / HD: Swing PWM and 2 ~ 15 kHz [5]		ND / HD: Swing PWM and 2 ~ 5/8/15 kHz[4] [5]

1) Factory setting of 'Drive Duty Selection'
2) Factory setting with PM motor is 5 kHz
3) Swing PWM is fixed on 2 kHz
4) Setting range depends on drive capacity
5) Derating might be applied if carrier frequency is set higher than default (See manual for details)

Hardware Specifications

Power Output – Units for Single Phase Mains Supply

	J1000	V1000	A1000
Power range (ND) 1AC	200 V: 0.1 ~ 2.2 kW	200 V: 0.2 ~ 4.0[1)] kW	
Current Range (ND)	200 V: 1 ~ 10 A	200 V: 1.2 ~ 19.6 A	

1) CIMR-VCBA0018 (4 kW), is only available with HD rating

Hardware Specifications

Power Output – Units for Three Phase Mains Supply

	J1000	V1000	A1000
Power range (ND) 3AC	200 V: 0.1 ~ 5.5 kW 400 V: 0.2 ~ 5.5 kW	200 V: 0.2 ~ 18.5 kW 400 V: 0.4 ~ 18.5 kW	200 V: 0.75 ~ 110 kW 400 V: 0.75 ~ 355 kW 500 and 710 kW[1)]
Current Range (ND)	200 V: 1 ~ 20 A 400 V: 1 ~ 11 A	200 V: 1.2 ~ 69 A 400 V: 1.2 ~ 38 A	200 V: 3.5 ~ 415 A 400 V: 2.1 ~ 675 A 930 and 1200 A[1)]

1) Release second half 2010

Hardware Specifications

Power Output

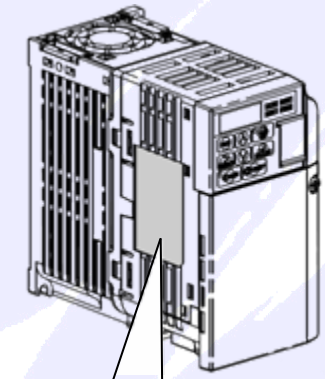
	J1000	V1000	A1000
Output frequency	0 ~ 400 Hz	0 ~ 400 Hz [1)]	0 ~ 400 Hz [2)]
Short Circuit Current Rating (UL)[3)]	30 kAIC RMS		100 kAIC RMS

1) Special software for 0 ~ 1000 Hz available
2) Special software for 0 ~ 1000 Hz
   a) Available: V/f and OLV with PM motor (VSA905111)
   b) In preparation: CLV and switch-over to V/f
   ➔ Same SW for machine with high precision axis and high-speed axis
3) UL 508 A specifies the short time Short Circuit Current Rating of conductors, terminals, cables, bus bars and so on. It must be greater than the tripping current of protective devices like fuses to ensure that a short circuit does not cause any damages or fire

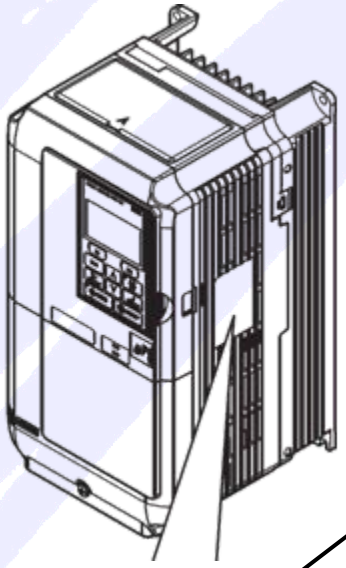
Technical Training - Hardware Specifications

Hardware Specifications

Nameplate – Position and Design



J1000, V1000



A1000

AC Drive Model (Sample from A1000)

Normal Duty Amps / Heavy Duty Amps

Design Revision

Software Version

Input Specification

Output Specification

Lot Number

Serial Number

Enclosure Type

MODEL : CIMR-AC2A0021FAA

MAX APPLI. MOTOR : 5.5kW / 3.7kW REV : A

INPUT : AC3PH 200-240V 50/60Hz 24A/18.9A

OUTPUT : AC3PH 0-240V 0-400Hz 21A/17.5A

MASS : 3.5 kg PRG : 1010

O / N :

S / N :

FILE NO : E131457 IP20

TYPE 1 ENCLOSURE

YASKAWA ELECTRIC CORPORATION MADE IN JAPAN

c UL us LISTED

IND.CONT.EQ. 7J48 B

CE

TÜV SÜD

PASS

RoHS

Hardware Specifications

Nameplate – Model Code

CIMR – J C 2 A 0001 B A A-□□□□

Drive

No.	Series
J	J1000
V	V1000
A	A1000

No.	Region Code
U	USA
A	Japan
C	Europe
B	China
T	Asia

No.	Voltage Class
B	1-phase, 200-240 Vac
2	3-phase, 200-240 Vac
4	3-phase, 380-480 Vac

No.	Customised Specifications
A	Standard Model
B	High frequency SW (1000Hz)

Normal **D**uty Output Amps (rounded)

No.	Enclosure Type
A	IP00
B	IP20
C	IP20 w. top-cover
F	NEMA Type 1
H	IP66 with Built-in EMC Filter (V1000)
J	Finless IP20
L	Finless IP00

No.	Environment Specification
A	Standard
?	Others, see next page

Design Revision Order

Special Version (see page after next)

Hardware Specifications

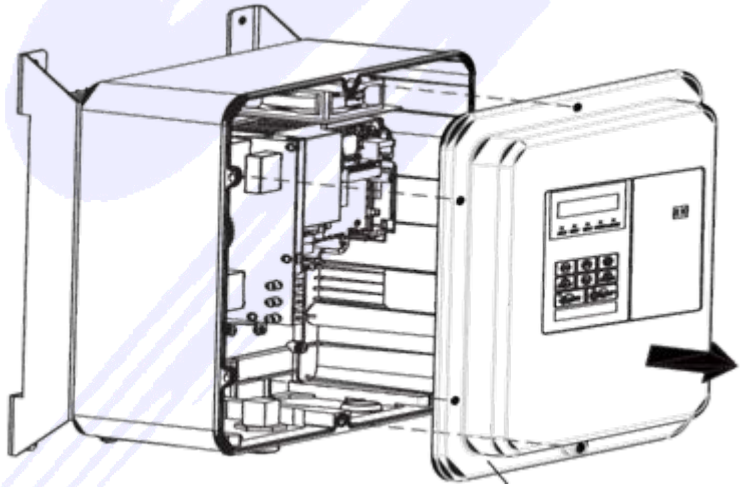
Nameplate – Environment Specification

No.	Environment Specification
A	Standard
M	Humidity / Dust Resistant
N	Oil Resistant
C	Salt Resistant
S	Vibration Resistant
K	Gas Resistant
P	Humidity / Dust / Vibration Resistant
B	Humidity / Dust Resistant
R	Gas / Vibration Resistant
T	Oil / Vibration Resistant

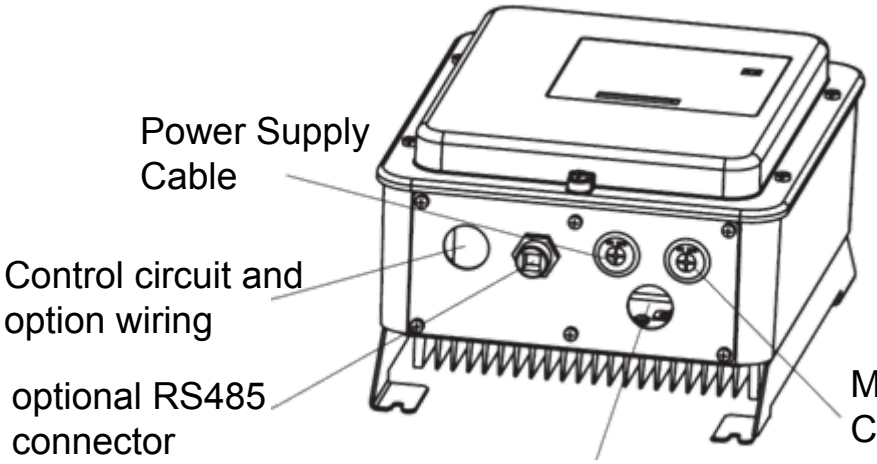
Hardware Specifications

Nameplate – Special Version Code for V1000

No.	Special Version
0080	IP66 with Digital Operator
0081	IP66 with remote connector RJ45



Front Cover



Cables for connection of main circuit options (DC Reactor, etc.).

Note: To use a through-hole, remove Rubber Bushing and fit Cable Gland

Technical Training - Hardware Specifications

Hardware Specifications

Designed for Long Lifetime

	J1000	V1000	A1000
Performance Life 1)	10 years (assumes: 30°C ambient temp., 80% load rate, 12 hours constant operation)	10 years (assumes: 40°C ambient temp., 80% load rate, 24 hours constant operation)	

1) Cooling Fan J1000: 2 ~ 3 years
Cooling Fan V1000/A1000: 10 years

Hardware Specifications

Design – 200 V Class

J √ V √ A √

Code □: Enclosure	J1000	V1000	A1000
A: IP00	-	VC2A0030□ ~ 0069□	AC2A0004□ ~ 0081□ ≥ AC2A0110□ √
B: IP20	JCBA0001□ ~ 0010□ √ JC2A0001□ ~ 0020□ √	VCBA0001□ ~ 0018□ √ VC2A0001□ ~ 0020□ √	-
C: IP20 w. top cover	-	-	-
F: IP20 / NEMA Type 1	JCBA0001□ ~ 0010□ JC2A0001□ ~ 0020□	VCBA0001□ ~ 0018□ VC2A0001□ ~ 0020□ VC2A0030□ ~ 0069□ √	AC2A0004□ ~ 0081□ √ ≥ AC2A0110□
H: IP66 with built-in EMC filter	-	VCBA0001□ ~ 0012□	-
J: Finless IP20	JCBA0001□ ~ 0010□ JC2A0001□ ~ 0020□	VCBA0001□ ~ 0018□ VC2A0001□ ~ 0020□ VC2A0030□ ~ 0069□	-
L: Finless IP00	-	-	-

Note: Standard is marked with √

Hardware Specifications

Design – 400 V Class

Code □: Enclosure	J1000	V1000	A1000
A: IP00	-	VC4A0018□ ~ 0038□	AC4A0002□ ~ 0044□ ≥ AC4A0058□ √
B: IP20	JC4A0001□ ~ 0011□ √	VC4A0001□ ~ 0011□ √	-
C: IP20 with top cover	-	-	-
F: IP20 / NEMA Type 1	JC4A0001□ ~ 0011□	VC4A0001□ ~ 0011□ VC4A0018□ ~ 0038□ √	AC4A0002□ ~ 0044□ √ ≥ AC4A0058□
H: IP66 with built-in EMC filter	-	VC4A0001□ ~ 0011□ VC4A0018□ ~ 0038□	-
J: Finless IP20	JC4A0001□ ~ 0011□	VC4A0001□ ~ 0011□ VC4A0018□ ~ 0038□	≥ AC4A0058□ 1)
L: Finless IP00	-	-	≥ AC4A0058□ 1)

1) To be developed

Note: Standard is marked with √

Hardware Specifications

Design

	J1000	V1000	A1000
Cooling method (kW in ND ratings)	Convection cooled: JCBA0001 ~ 0006, JC2A0001 ~ 0004, JC4A0001 ~ 0004 Fan cooled 1): JCBA0010, JC2A0006 ~ 0020, JC4A0005 ~ 0011	Convection cooled: VCBA0001 ~ 0006, VC2A0001 ~ 0004, VC4A0001 ~ 0004 Fan cooled 1): VCBA0010 ~ 0018, VC2A0006 ~ 0069, VC4A0005 ~ 0038	Convection cooled: AC2A0004 ~ 0012, AC4A0002 ~ 0005 Fan cooled 1): AC2A0021 and bigger, AC4A0007 and bigger
Cooling fan Power Supply	All fans supplied by DC-DC converter from DC bus		
Finless	Yaskawa Finless do not have any fan Yaskawa Finless = Fanless		

1) Cooling fan ON/OFF controlled by drive RUN command with OFF delay timer

Hardware Specifications

Design

	J1000	V1000	A1000
Installation	• Side-by-Side compact installation possible [1)] • Minimum clearance 2 mm instead of 30 mm		• Side-by-Side compact installation possible [1)] for units with IP20 enclosure (up to 22 kW ND rating) • Minimum clearance 2 mm instead of 30 mm

1) In case of 'NEMA Type 1' enclosure, top cover must be removed. Please note that unit is not NEMA compliant without top cover, but it is still IP20.

Technical Training - Hardware Specifications

Hardware Specifications

Enclosure Finless IP20

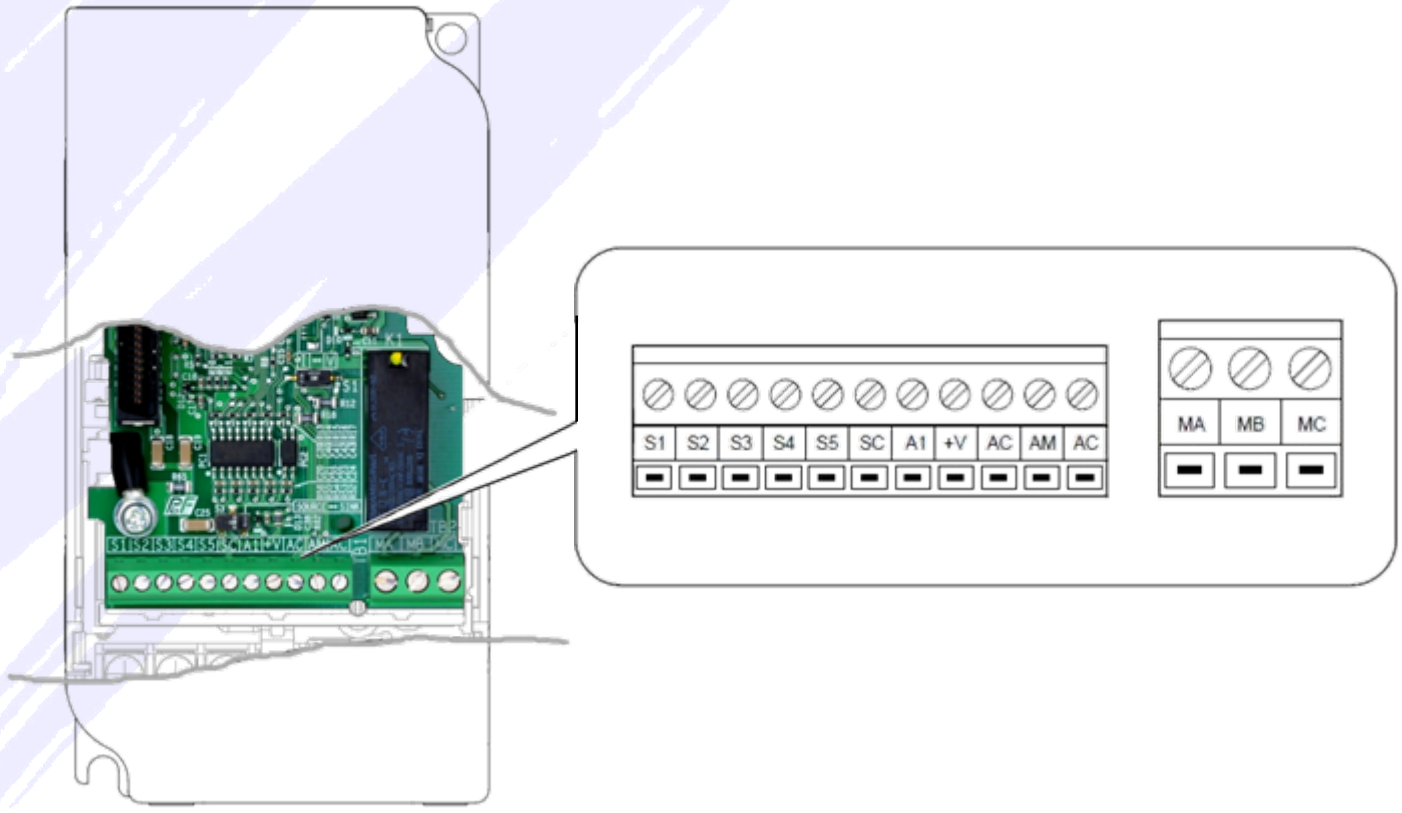
V1000 – Finless IP20

V1000 – IP20
(with regular heatsink)

Technical Training - Hardware Specifications

Hardware Specifications

Control Circuit Terminal Block – J1000



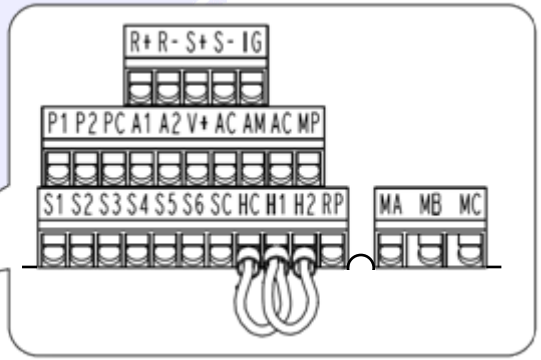
Note: Charge LED is visible after removal of Terminal Cover. It is located on the left side of the circuit board

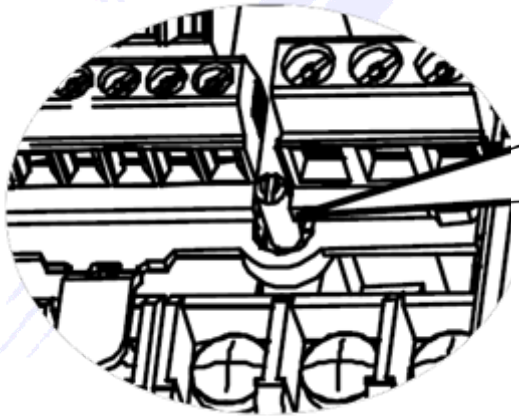
Hardware Specifications

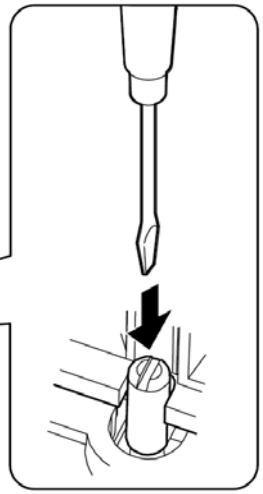
Detachable Control Circuit Terminal Block

J V A

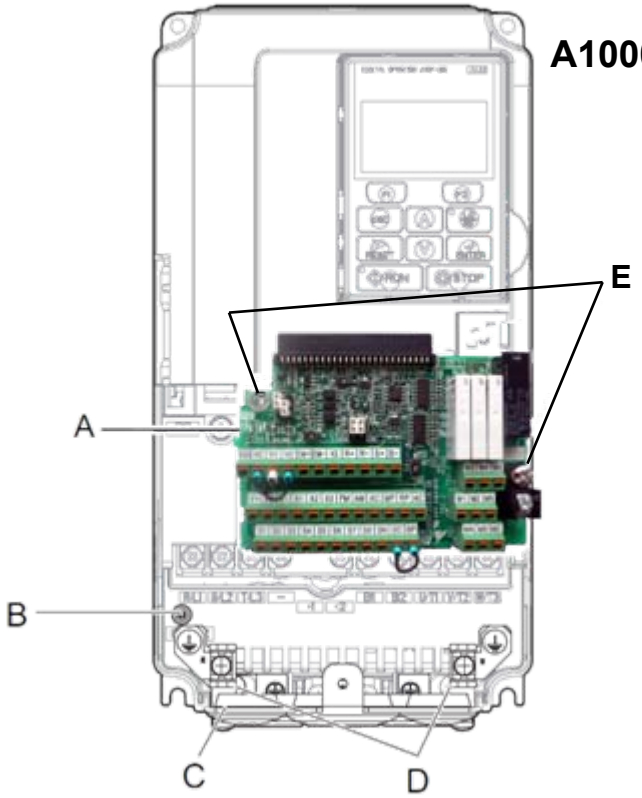
V1000







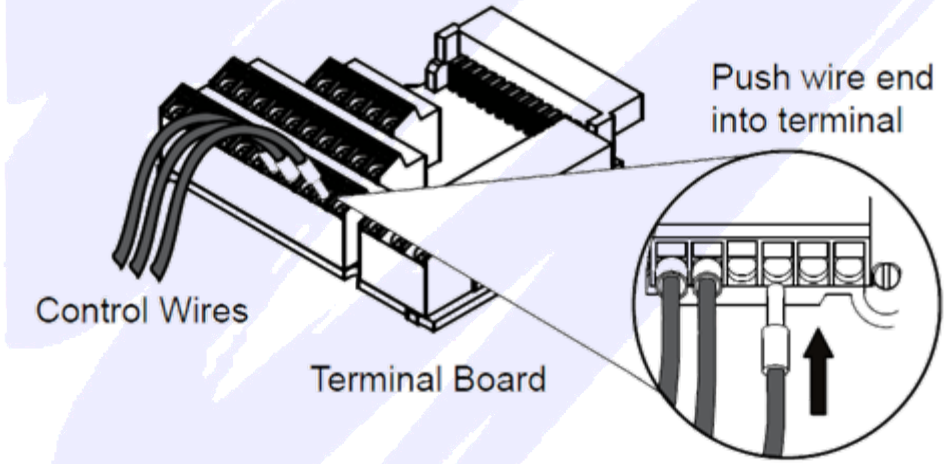
Push down the terminal board locking pin with a screwdriver

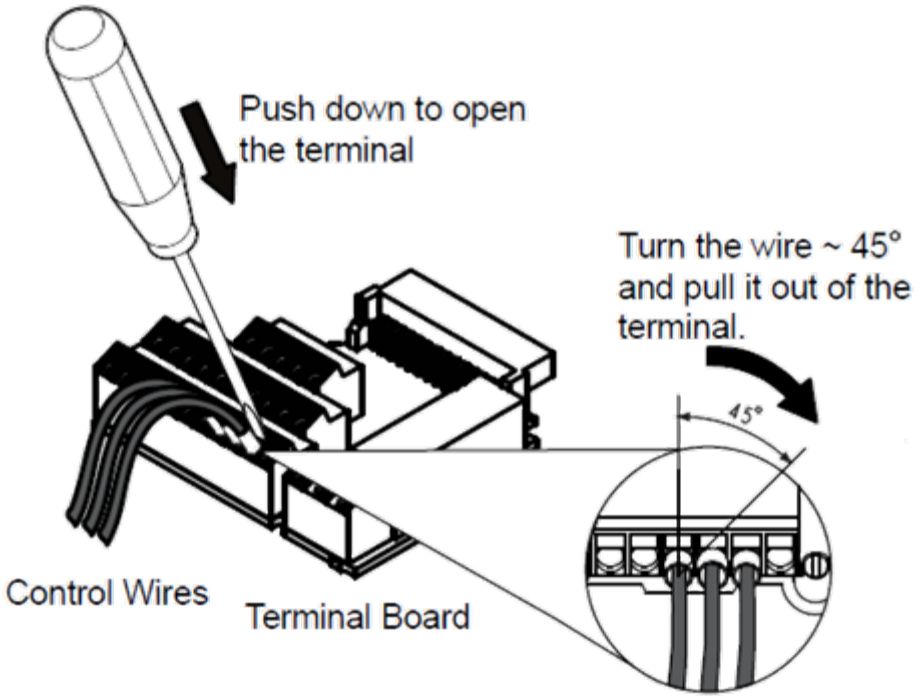


A1000

A - Detachable terminal board
B - Charge LED
C - Bottom cover
D - Bottom cover screws
E - Terminal board locking screws

Detachable Control Circuit Terminal Block





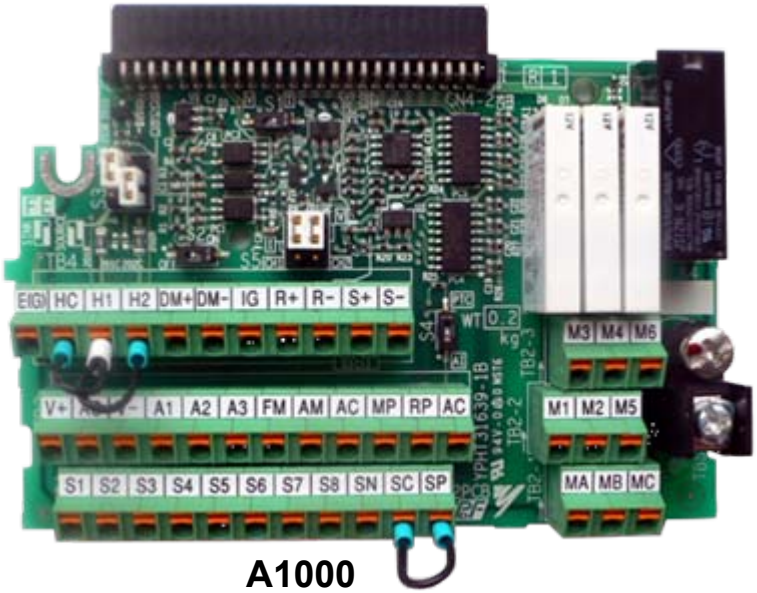
Hardware Specifications

Control Circuit Terminal Block – Features

	J1000	V1000	A1000
Data Backup		With parameter storage	
Pluggable		In case of maintenance control cables do not need to be re-wired	
Screwless		Cage clamps for wiring	

J1000
(Terminal Block is part of Control Board)

V1000

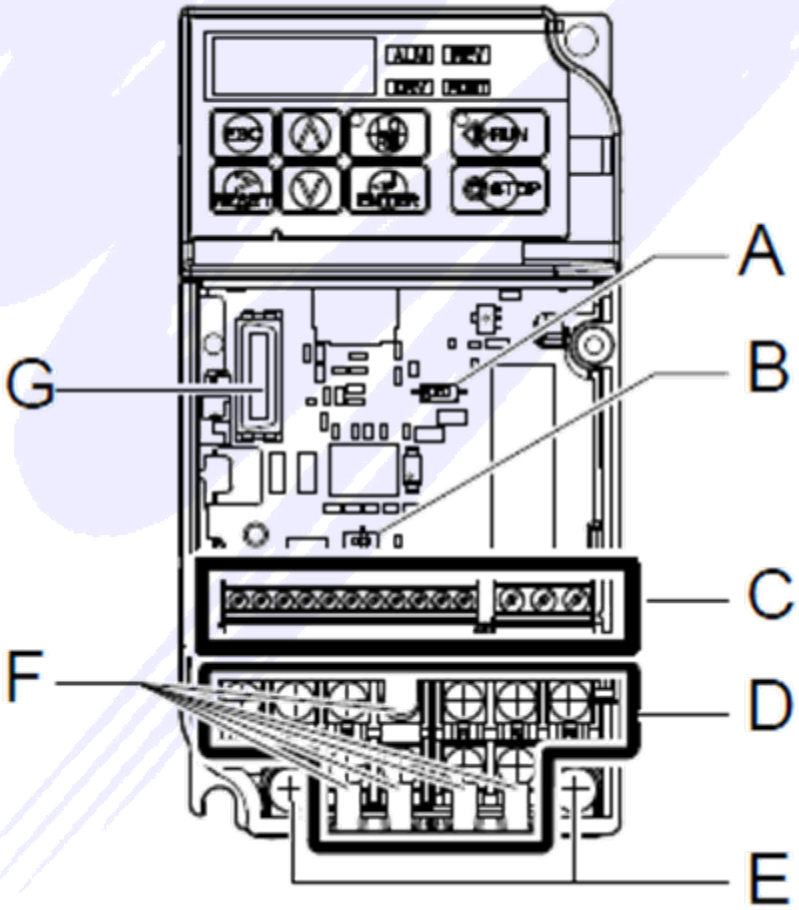


A1000

Technical Training - Hardware Specifications

Hardware Specifications

Jumpers and Switches on Control Board



A – DIP switch S1 (A1 - Frequency Reference: V/I sel.)

B – DIP switch S3 (Digital Input: Sink/Source selection)

C – Control circuit terminal

D – Main circuit terminal

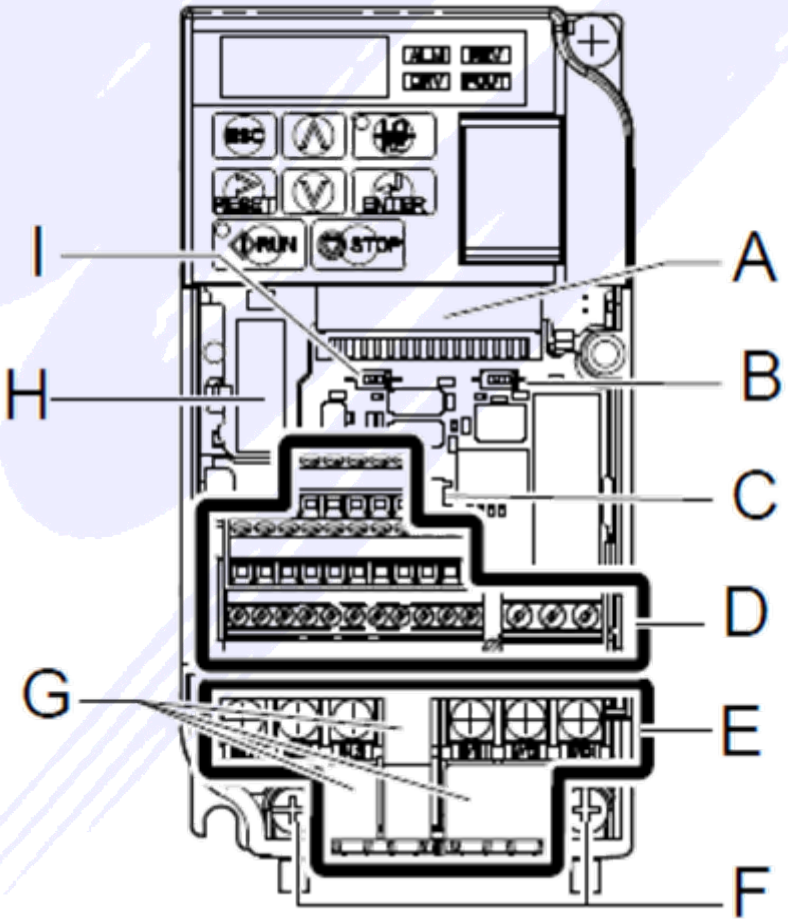
E – Ground terminal

F – Terminal cover

G – Option card connector

Hardware Specifications

Jumpers and Switches on Terminal Board

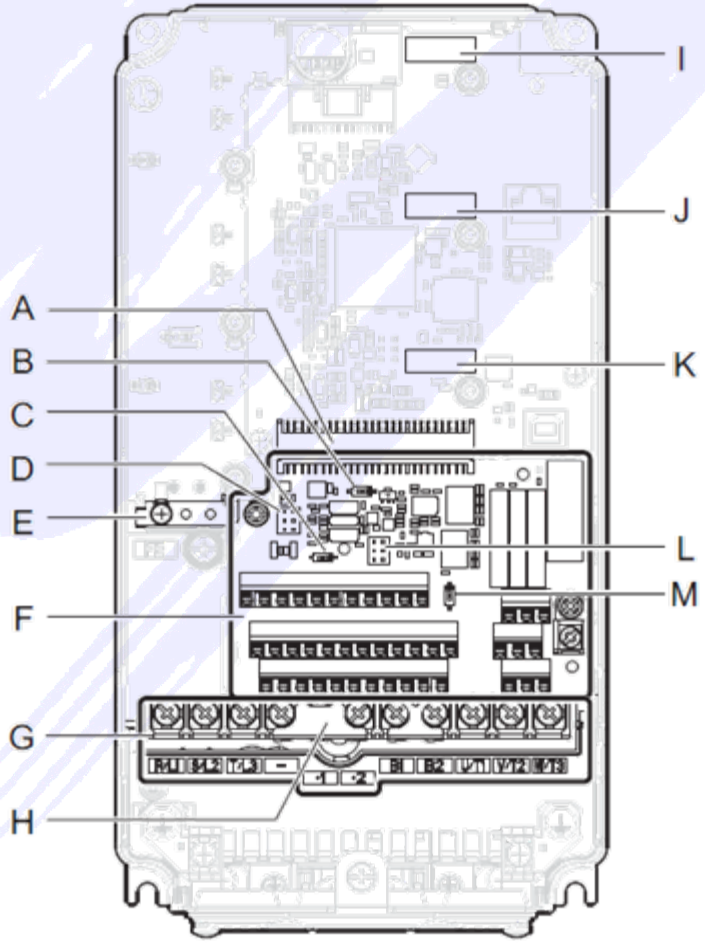


- A – Terminal board connector
- B – DIP switch S1 (A2: Input signal sel. V/I)
- C – DIP switch S3 (Digital Input: Sink/Source sel.)
- D – Control circuit terminal
- E – Main circuit terminal
- F – Ground terminal
- G – Terminal cover
- H – Option card connector
- I – DIP switch S2 (Termination Resistor Memobus)

Hardware Specifications

Jumpers and Switches on Terminal Board

CIMR-A□2A0012F

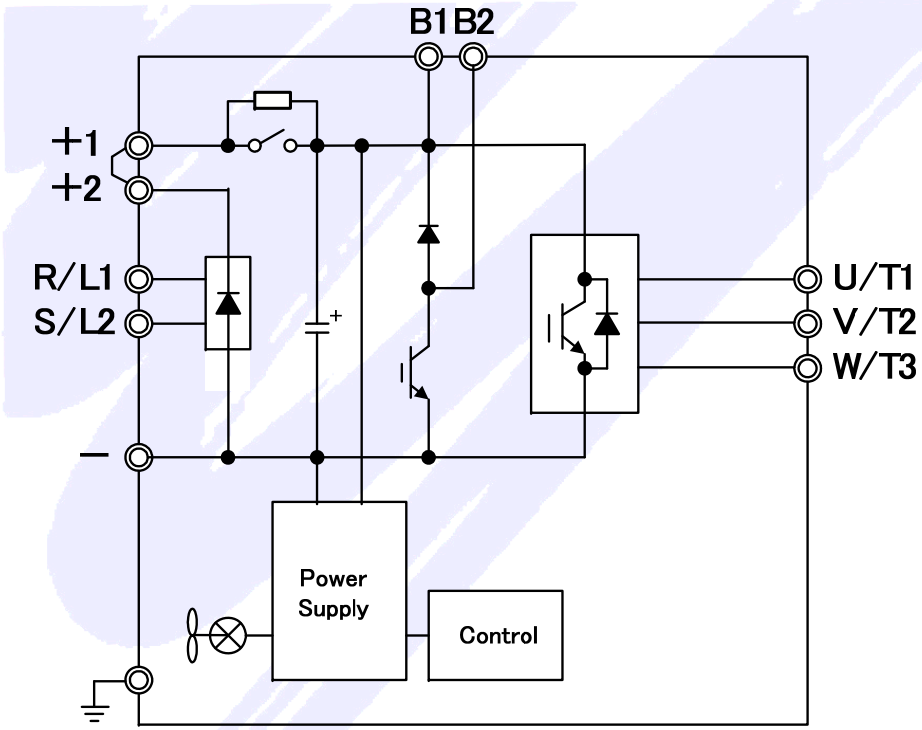


- **A – Terminal board connector**
- **B – DIP switch S1 (A2: Input signal sel. V/I)**
- **C – DIP switch S2 (Termination Resistor)**
- **D – Jumper S3 (Safe Disable: Sink/Source)**
- **E – Ground terminal**
- **F – Terminal board**
- **G – Main circuit terminal**
- **H – Protecting cover to prevent miswiring**
- **I – Option card connector CN5-C**
- **J – Option card connector CN5-B**
- **K – Option card connector CN5-A**
- **L – Jumper S5 (AM/FM: Sets analogue output to operate as voltage source or as current source)**
- **M – DIP switch S4 (A3: Analogue/ PTC selection)**

Technical Training - Hardware Specifications

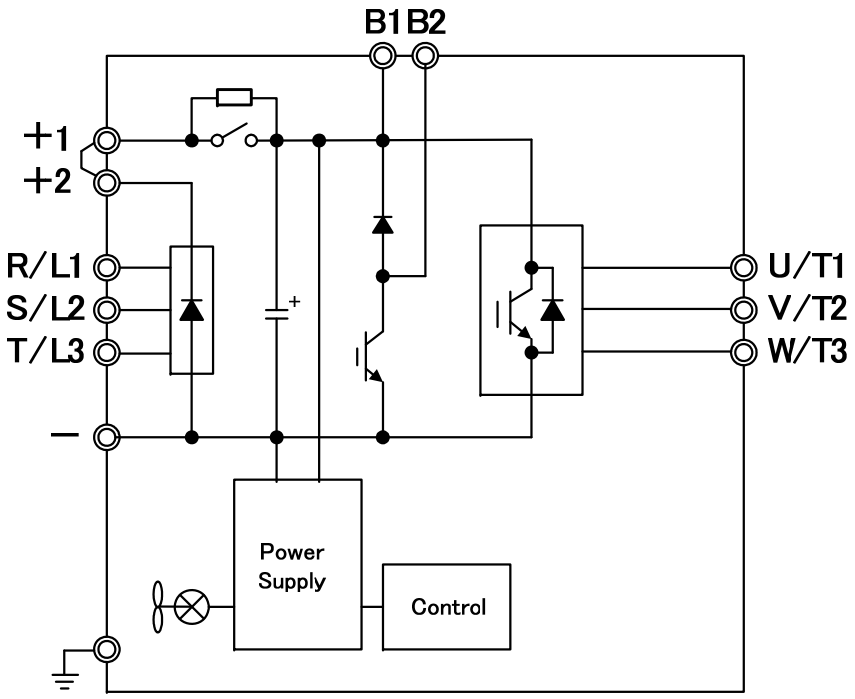
Hardware Specifications

Main Circuit Overview – J1000, V1000, A1000



Cooling fan is fitted on 200V class CIMR-J□BA0010, CIMR-V□BA0010 and bigger V1000

CIMR-J□BA0001 up to BA0010
CIMR-V□BA0001 up to BA0018

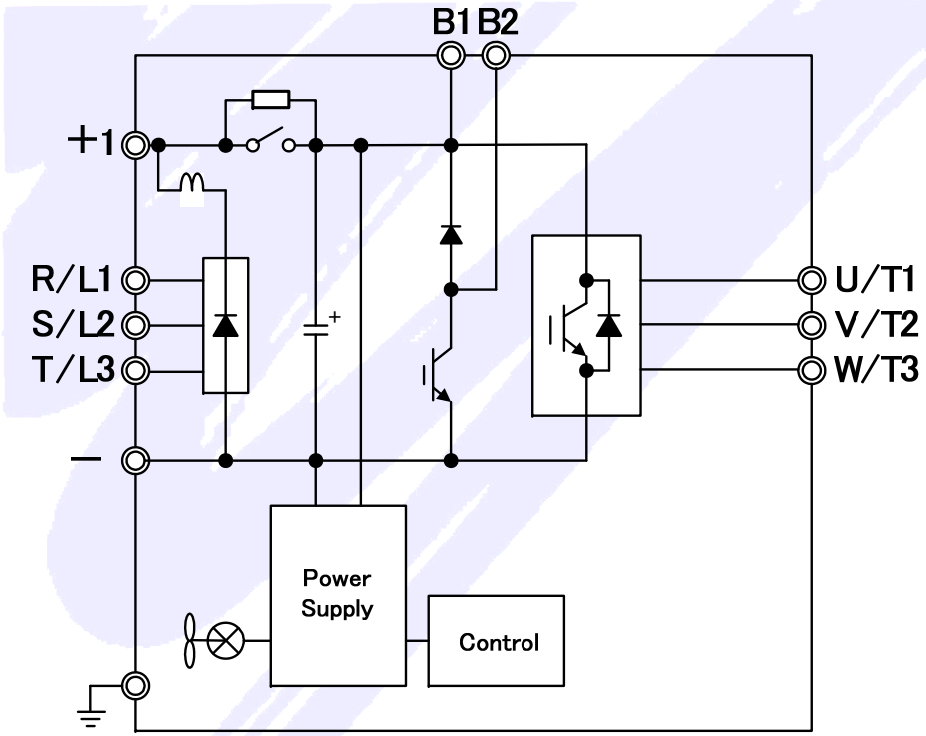


Cooling fan is fitted on
200V class CIMR-J□2A0006, CIMR-V□2A0006, CIMR-A□2A0021 and above,
400V class CIMR-J□4A0005, CIMR-V□4A0005, CIMR-A□4A0007 and above.

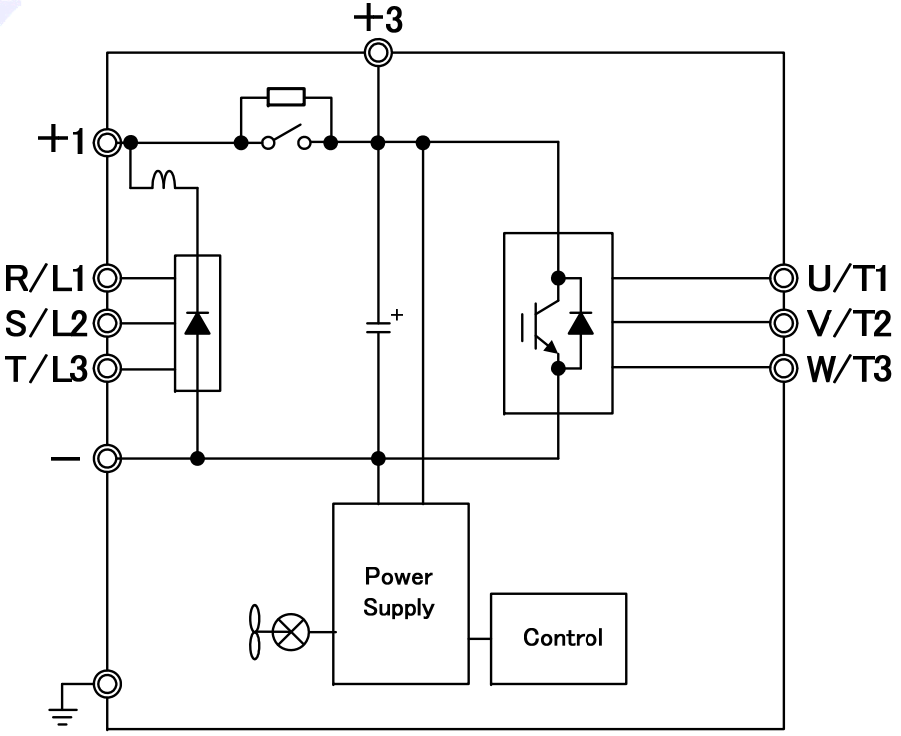
CIMR-J□2A0001 up to 2A0020
CIMR-V□2A0001 up to 2A0069
CIMR-A□2A0004 up to 2A0081
CIMR-J□4A0001 up to 4A0011
CIMR-V□4A0001 up to 4A0038
CIMR-A□4A0002 up to 4A0044

Hardware Specifications

Main Circuit Overview – A1000



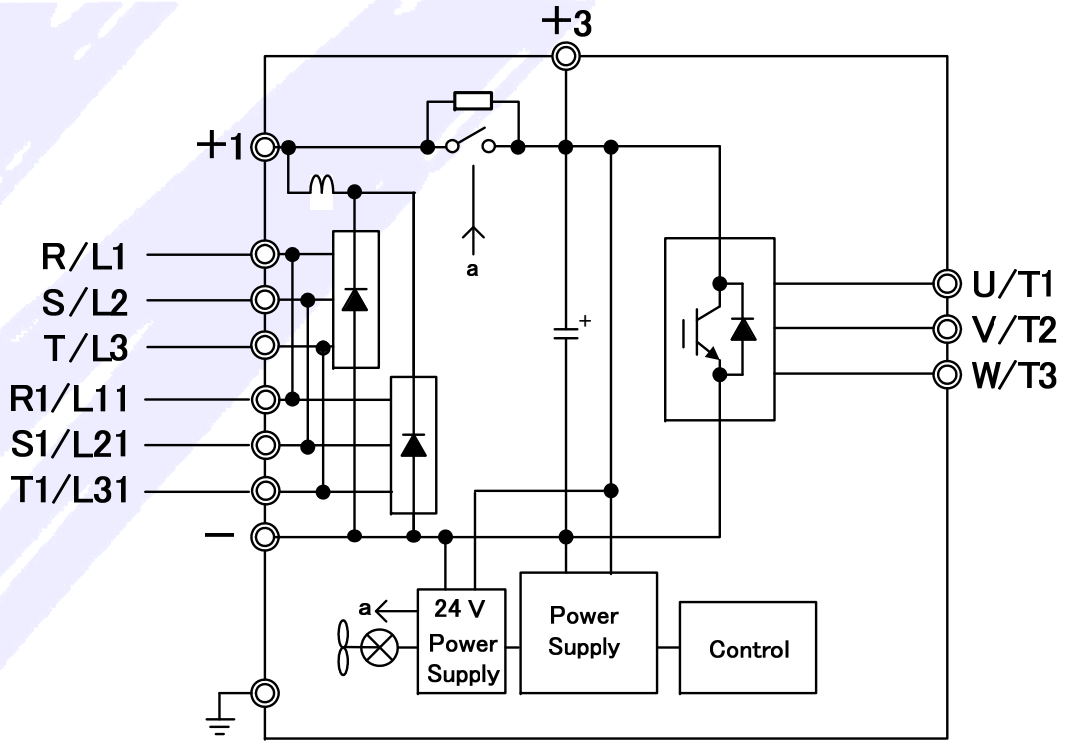
CIMR-A□2A0110 up to 2A0138
CIMR-A□4A0058 up to 4A0072



CIMR-A□2A0169 up to 2A0415
CIMR-A□4A0088 up to 4A0675

Hardware Specifications

Main Circuit Overview – A1000



CIMR-A□4A0930 up to 4A1200

Note: The inverter comes with 3 jumpers on power input for 6 pulse mains power supply. Remove these if 12 pulse mains power supply shall be connected!

Technical Training - Hardware Specifications

Hardware Specifications

Environment

	J1000	V1000	A1000
Ambient temperature[1)]	-10° ~ 50°C	-10° ~ 50°C (IP20/NEMA Type 1, IP20, Finless IP00/IP20)	-10° ~ 40°C up to 22 kW ND (NEMA Type 1) -10° ~ 50°C [2)] bigger than 22 kW ND (IP00)
Humidity	up to 95% non-condensing		
Altitude	up to 3000 m > 1000 m derating		
Storage temperature	-20° ~ 60°C		

1) No extra derating for NEMA Type 1
   Derating for ambient temperature > 30°C
   For finless enclosure: Derating for ambient temperature > 35°C
   (See manuals for characteristic of derating curve)
2) Derating for ambient temperature up to 60°C under consideration

Hardware Specifications

Environment

	J1000	V1000	A1000
Vibration	10 ~ 20 Hz: 9.8 m/s² 20 ~ 55 Hz: 5.9 m/s²		10 ~ 20 Hz: 9.8 m/s² 20 ~ 55 Hz: 5.9 m/s² for up to 200 V, 55 kW ND 400 V, 90 kW ND 2 m/s² for up to 200 V, 110 kW ND 400 V, 355 kW ND and bigger

Technical Training - Hardware Specifications

Hardware Specifications

Energy Saving, Cost Saving, Maintenance Monitor

	J1000	V1000	A1000
Energy saving function	• Induction motors	• Induction motors • PM motors	
Two Motor settings		Cost saving: One inverter can drive two different motors alternatively	
Multiple motors	Multiple motors can be connected parallel (V/f)		
Lifetime monitors		• Cooling fan (U4-04) • Capacitors (U4-05) • Inrush relays (U4-06) • IGBT (U4-07)	

Technical Training - Hardware Specifications

Hardware Specifications

Functional Safety

J V A

	J1000	V1000	A1000
Functional safety		2 Channel Safe Torque Off [1)]	
External Device Monitor (EDM)			Status for Safe Torque Off function: Photo coupler, 48 Vdc, 50mA

1) A1000: Can be used alternatively with internal or external DC 24 V
V1000: Must use internal DC 24 V. Do not use external DC 24 V. It may cause damage to the inverter!

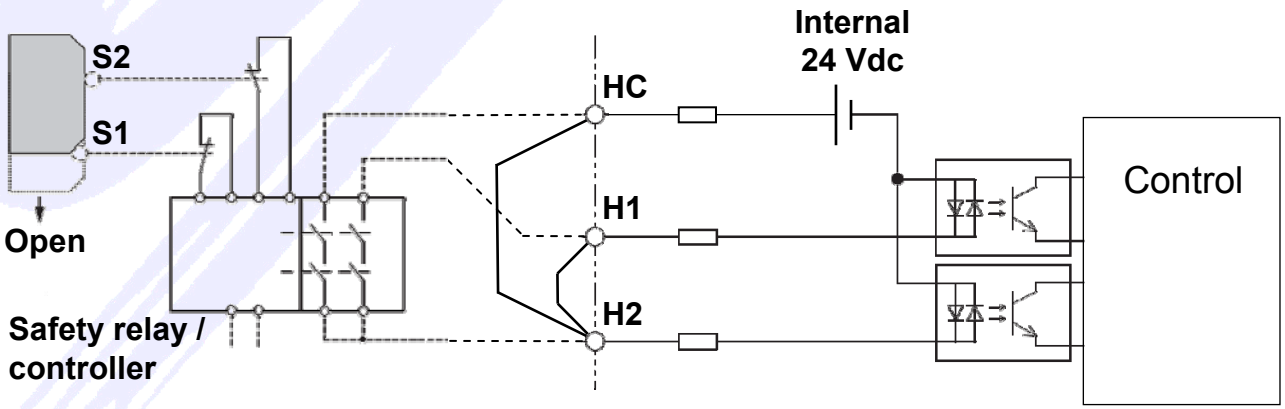
Hardware Specifications

Functional Safety

J V A

Note for V1000 only:
Internal 24 Vdc must be used for Functional Safety Circuit.

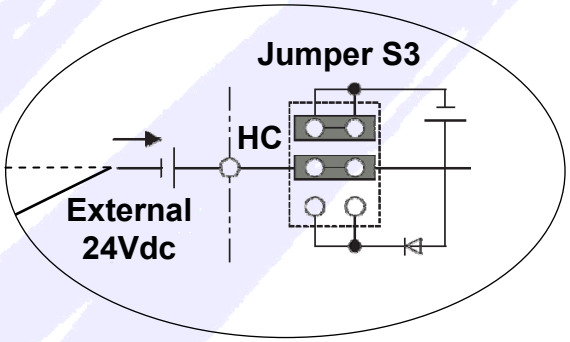
Warning!
Do not use External 24 Vdc with V1000. It will destroy onboard component.



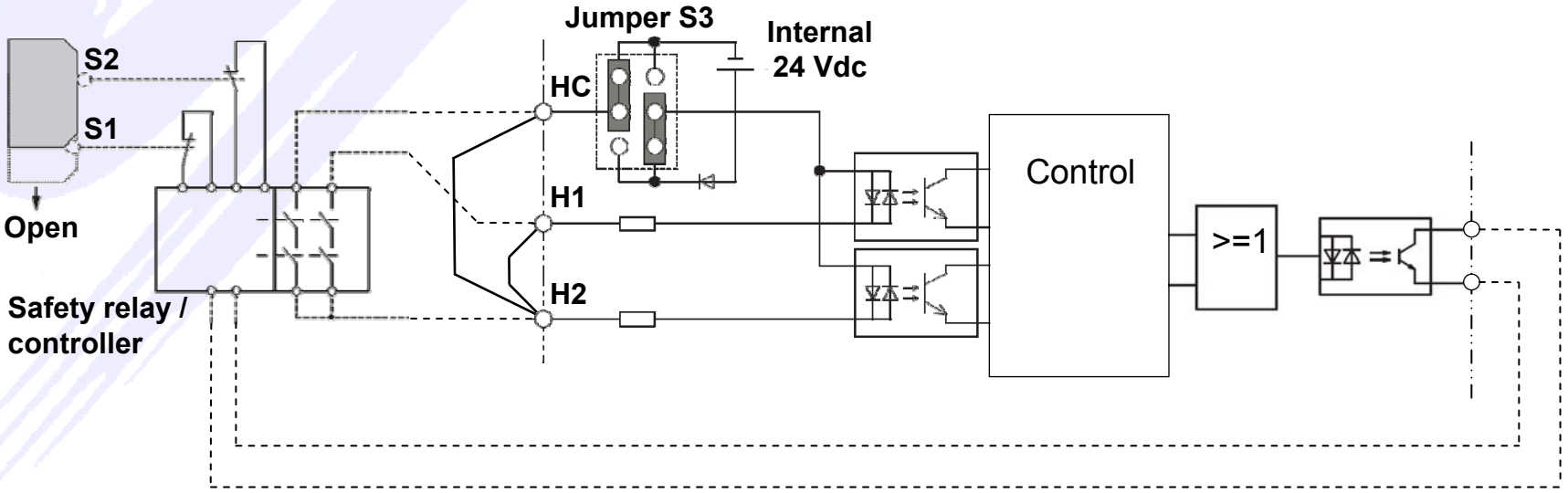
Hardware Specifications

Functional Safety

Note for A1000 only:
Jumper S3 must be properly set for use of Internal 24 Vdc or External 24 Vdc, before Voltage is applied.



Warning!
Wrong setting of Jumper S3 may cause damage to onboard components.



Technical Training - Hardware Specifications

Hardware Specifications

Norms and Standards - Safety

	J1000	V1000	A1000
EN954-1: 1996 Safety Category 3		Yes	
EN61508-1 to 4:2000 Safety Integrated Level (SIL) 2		Yes	Yes
EN60204-1: 2007 Stop cat. 0: Safe Torque Off (STO)		Yes	Yes
EN ISO 13849-1: 2009 Performance Level d		Yes	Yes

Hardware Specifications

Norms and Standards - CE Directive 2006/95/EC
Norms and Standards - EMC Directive 2004/108/EC

	J1000	V1000	A1000
CE			
EN61800-5-1	Yes	Yes	Yes
EN50178:1997	Yes	Yes	Yes
EMC with opt. EMC Filter			
EN61800-3:2004	Yes	Yes	Yes
EN61000-3-2:2006 (Harmonics) w. Reactor/Filter	Yes	Yes	Yes

Hardware Specifications

Norms and Standards – Optional EMC Filter for EN61800-3

	J1000	V1000	A1000
FS series	• Class 1 (20 m) • Functional Safety: Yes • Footprint mounting[1)]	• Class 1 (20 m) • Functional Safety: Yes • Footprint mounting[1)]	• Class 2 (10 m) • Functional Safety: Yes • Side mounting[1)]
FB series			• Class 1 (25 m)[2)] Class 2 (50 m) • Functional Safety: No • Footprint or Stand-alone Filter[1)]

1) Footprint Filters can alternatively be mounted on the side. Footprint and Side-mount Filters do have fixed cables. Stand-alone Filters for CIMR-AC4A0044 and bigger do have a terminal block.
2) C1 and C2 up to CIMR-AC4A0038. Bigger inverter C2.
3) V1000 IP66 comply to C1, 10m motor cable length

Hardware Specifications

Norms and Standards - Others

	J1000	V1000	A1000
CE	Yes	Yes	Yes
Germanischer Lloyd [1)]			Planned
UL 508C (Report No. E131457)	Yes	Yes	Yes
RoHS	Compliant	Compliant	Compliant
REACH	Compliant	Compliant	Compliant
cUL [2)]	Compliant	Compliant	Compliant
CCC (China Compulsory Certification)	Not related to inverters		

1) GL at the moment only for E7 / F7
2) Equivalent to CSA. For details contact Yaskawa.

Technical Training - Hardware Specifications

Hardware Specifications

Basic Serial Communication Interfaces

	J1000	V1000	A1000
MEMOBUS/ Modbus (RS-422, RS-485)	Option board SI-485/J	Standard • up to 115.2 kBaud • Termination resistor (120 Ω) switchable	
RS-232C	Option board SI-232/J	Standard	
USB			Standard

Technical Training - Hardware Specifications

Hardware Specifications

Digital Operator

	J1000	V1000	A1000
Digital Operator	<u>Standard (LED)</u> • Built-in • Fix mounted on Front-Cover • Optional JVOP-182 (LED) for remote operation 1)2) • V1000 supports JVOP-180 (LCD) 1)		<u>Standard JVOP-180 (LCD)</u> • Plug-in to Front-Cover – or – Remote operation 1) • Can be mounted in the door of a cabinet with optional Installation Support Kits, e.g. IP54 Operator frame (EUOP-V11001) • Optional JVOP-182 (LED)

1) Optional Remote Operator can be connected via Patch Cable

   Please note:
   Patch cables are the standard cables for computer networks (RJ-45 plugs, 1:1 connected).
   Do not use cross-over cable!

2) J1000: Option board SI-232/J required

Technical Training - Hardware Specifications

Hardware Specifications

Digital Inputs
Digital Outputs

<table>
<tr><th></th><th>J1000</th><th>V1000</th><th>A1000</th></tr>
<tr><td rowspan="2">Multi-Function Digital Inputs</td><td>5 inputs</td><td>6 inputs</td><td>8 inputs</td></tr>
<tr><td colspan="3">• Sinking/Sourcing mode selectable
• HIGH/LOW threshold: Typical 11.85 Vdc
• External power supply usable (24 Vdc, 8 mA)</td></tr>
<tr><td rowspan="2">Multi-Function Digital Outputs</td><td rowspan="2">Fault Output Relay can be re-assigned as Multi-Function Digital Output to other function</td><td>2 Photo coupler Outputs</td><td>3 Relay Outputs</td></tr>
<tr><td>• 48 Vdc,
2 mA ~ 50 mA</td><td>• N.O. or N.C., programmable
• 30 Vdc, 10 mA ~ 1A
• 250 Vac, 10 mA ~ 1A
• Minimum load 5 Vdc, 10 mA</td></tr>
<tr><td>Fault Output</td><td colspan="3">• 1 Relay Output, two-way contact N.O./N.C.
• 30 Vdc, 10 mA ~ 1A
• 250 Vac, 10 mA ~ 1A
• Minimum load 5 Vdc, 10 mA</td></tr>
</table>

Hardware Specifications

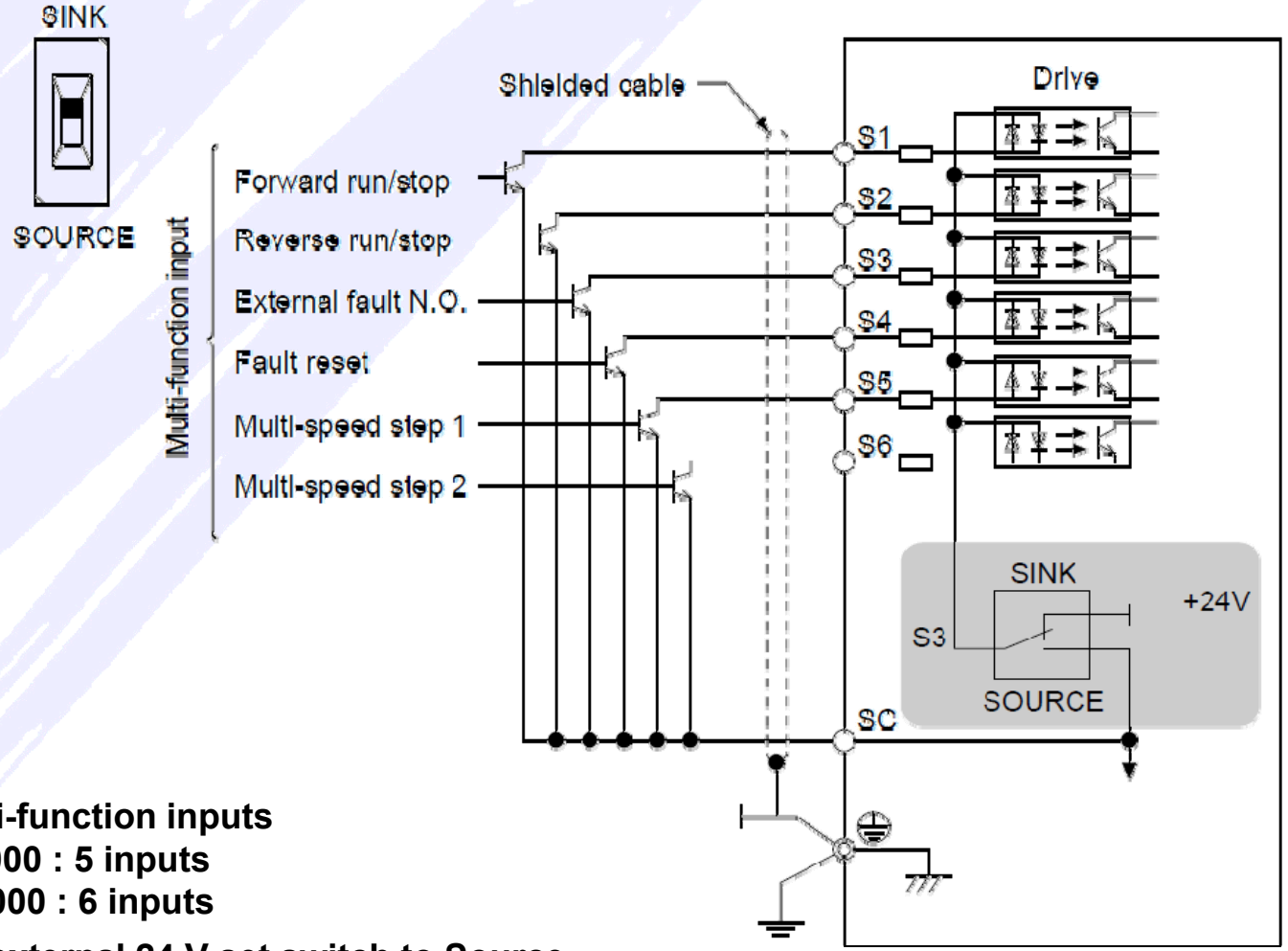
Pulse Train

J V A

	J1000	V1000	A1000
Pulse Train Input [1)]		• up to 32kHz • HIGH/LOW threshold: typical 12 Vdc • Maximum signal level 24 Vdc, + 10% • Input impedance: 3 kΩ • Signal duty cycle: 30% ~ 70% • Easy synchronizing with output frequency	
Multi-Function Pulse Train Output		• up to 32kHz • Easy synchronizing with output frequency • Output impedance: 2.2 kΩ • Alternatively use of internal or external power supply 12 Vdc ~ 15 Vdc, ± 10%	

Hardware Specifications

Digital Inputs – Sinking/Sourcing Mode Selection



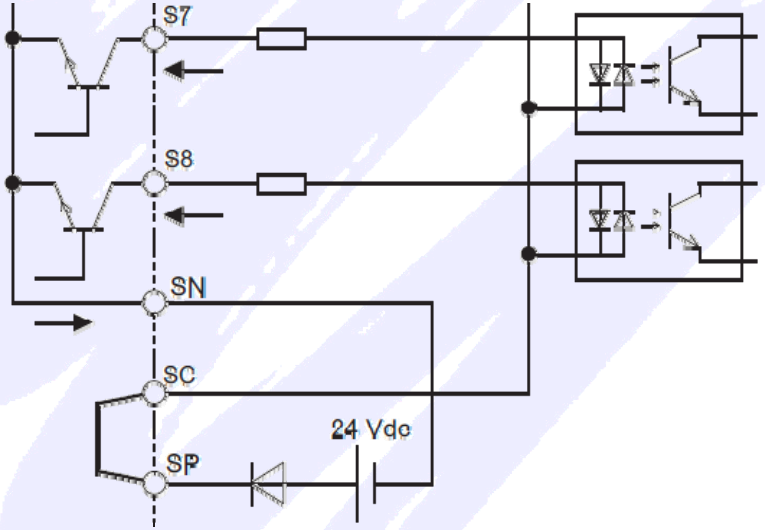
Note: Multi-function inputs
- J1000 : 5 inputs
- V1000 : 6 inputs

For external 24 V set switch to Source

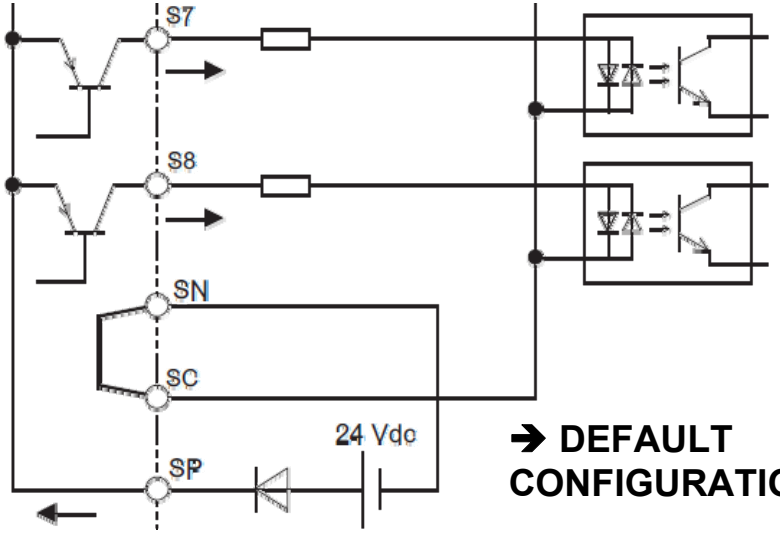
Hardware Specifications

Digital Inputs – Sinking/Sourcing Mode Selection

J V A

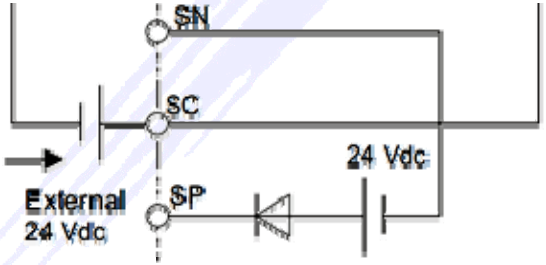


Sinking mode (NPN)
with external 24 Vdc Power Supply

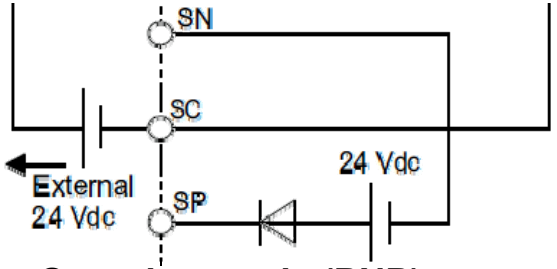


➔ DEFAULT CONFIGURATION

Sourcing mode (PNP)
with drive internal power supply



Sinking mode (NPN)
with drive internal power supply



Sourcing mode (PNP)
with external 24 Vdc Power Supply

Hardware Specifications

Multi-Function Analogue Inputs
Analogue Input Power Supply

Range	J1000	V1000	A1000
Inputs			
Resolution	1 input / 10 Bit	2 inputs / 10 Bit	3 inputs / 12 Bit (incl. sign)
0 ~ 10 Vdc (20 k Ω)	A1	A1, A2	A1, A2, A3
-10 V ~ +10 Vdc (20 k Ω)		A1, A2 [1)]	A1, A2, A3
0 mA ~ 20 mA (250 Ω)	A1	A2	A2
4 mA ~ 20 mA (250 Ω)	A1	A2	A2
PTC input		A2 [2)]	A3
Power Supply			
10.5 Vdc, 20 mA	V+		V+, V-
0 Vdc	AC		

1) Special unit available in 2010
2) Additional external branch resistor required

Hardware Specifications

Analogue Outputs

Range	J1000	V1000	A1000
Outputs			
Resolution	1 output / 8 Bit	1 output / 10 Bit	2 outputs / 11 Bi (incl. sign)
0 ~ 10 Vdc, ≤ 2 mA	AM	AM	AM, FM
-10 V ~ +10 Vdc, ≤ 2 mA			AM, FM
4 mA ~ 20 mA			AM, FM
0 Vdc	AC		

Note: AM is preset for output of Motor Current with A1000, but Motor Frequency with J1000/V1000.
FM is preset for output of Motor Frequency.

Hardware Specifications

Analogue Outputs

	J1000	V1000	A1000
Multi-Function Analogue Outputs [1)]	1 output (8 Bit)	1 output (10 Bit)	2 outputs (10 Bit plus sign)
	• AM 0 ~ 10 Vdc, 2 mA or less		• FM: (Default is Output Frequency) -10/0 ~ +10 V (2 mA) or 4 ~ 20 mA selectable • AM: (Default is Output Current) -10/0 ~ +10 V (2 mA) or 4 ~ 20 mA selectable

1) Voltage Output signal low-pass filtered

Technical Training - Hardware Specifications

Hardware Specifications

Braking Capability

	J1000	V1000	A1000
Brake transistor	• Built-in		≤ AC2A0138 (ND), ≤ AC4A0072 (ND): • Built-in

1) Appropriate value of resistance is determined by the rating of the inverter. Do not connect a brake resistor that has a resistance below the minimum resistance specified for the inverter!

Hardware Specifications

Braking Capability

	J1000	V1000	A1000
Optional ext. CDBR unit [1)]	• Can be used with all inverters, even though it is designed for use with inverters that do not have a built-in Brake Transistor • Multiple CDBR supported (Master/slave configuration) • Each CDBR requires a separate Brake resistor		

1) CDBR unit can also be used in conjunction with a common DC-Link for multiple inverters.

Technical Training - Hardware Specifications

Hardware Specifications

Reactors

<table>
<tr><th></th><th colspan="2">J1000</th><th>V1000</th><th>A1000</th></tr>
<tr><td rowspan="2">DC Link Reactor</td><td colspan="3">• Suppresses harmonic current
• Improves the power factor on the supply side
• Less voltage drop than with line reactor</td></tr>
<tr><td colspan="2">• External option [1)]</td><td>< 30 kW (ND):
• External option [1)]
• Ext. reactor may cause radiated noise

≥ 30 kW (ND) [2)]:
• Built-in</td></tr>
</table>

1) Please note that external wiring increases radiated noise. Keep wires short and use shielded cables!
2) CIMR-AC2A0110, CIMR-AC4A0058

Technical Training - Hardware Specifications

Hardware Specifications

Mechanical Options

	J1000	V1000	A1000
Heatsink External Mounting Attachment	Yes		
DIN Rail Attachment	Yes		
NEMA Type 1 Kit	Yes		
Installation Support for Remote Operator			
Set A (100-039-992)	Mounting with screws through holes in the panel		
Set B (100-039-993)	Mounting with threaded studs that have to be fixed inside the panel		
Set IP65 (EUOP-V11001)	Mounting with screws through holes in the panel - Release end of 2010		

Technical Training - Hardware Specifications

Hardware Specifications

Accuracy of frequency
Multi-Speed

	J1000	V1000	A1000
Accuracy of frequency setting	± 0.01% of max. frequency with digital reference ± 0.5% of max. frequency with analogue reference		± 0.01% of max. freq. with digital reference ± 0.1% of max. freq. with analogue reference

Hardware Specifications

Controlled Speed Range
Speed Accuracy with Asynchronous Motors (ASM)

	J1000	V1000	A1000
• V/f	1:40 Speed accuracy typical ± 3% (dependent on motor slip)		
• V/f with PG feedback		1:40 Speed accuracy ± 0.03%	
• OLV (Open Loop Vector control)		1:100 Speed accuracy ± 0.2%	1:200 Speed accuracy ± 0.2%
• CLV (Closed Loop Vector Control)			1:1500 Speed accuracy ± 0.02%
• OLV for PM motors		1:10 Speed accuracy ± 0.2%	1:20 Speed accuracy ± 0.2%
• Adv. OLV for PM motors			1:100 Speed accuracy ± 0.2%
• CLV for PM motors			1:1500 Speed accuracy ± 0.02%

Technical Training - Hardware Specifications

Hardware Specifications

PC Software Tools

	J1000	V1000	A1000
DriveWizardPlus [1)]	Yes	Yes	Yes
DriveWorksEZ (Pro) [2)]		Yes	Yes

1) Can be downloaded from: ftp.yaskawa.de/Public
or from Yaskawa Web Site: http://www.yaskawa.eu.com
(Navigate to 'Products & Services => Downloads => Inverter Software')

2) Available on CD. Training curse mandatory for the 'Pro' version, which has extended functionality and can use more memory.

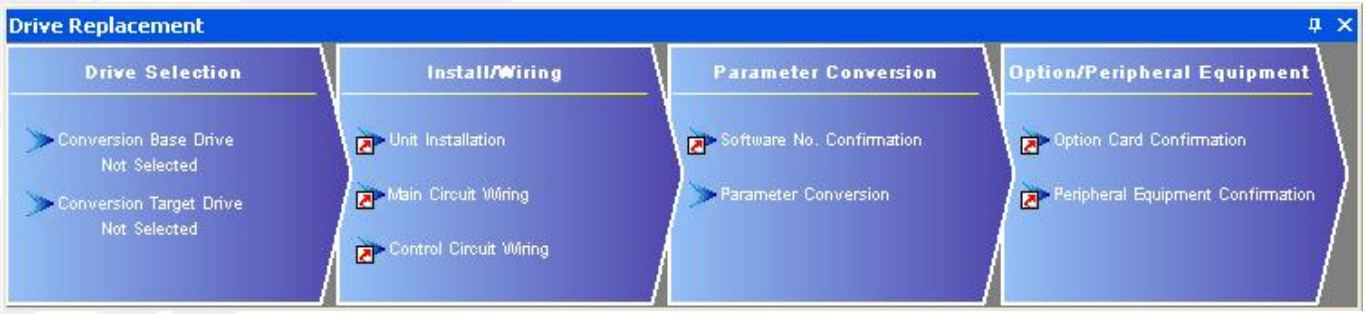
PC Software Tools – DriveWizardPlus

- Drive Wizard Plus makes it possible to operate the drive and perform maintenance on a PC:
  - Edit parameters
  - Access all monitors
  - Create customized operation sequences
  - Observe drive performance with the oscilloscope function
  - Save parameter

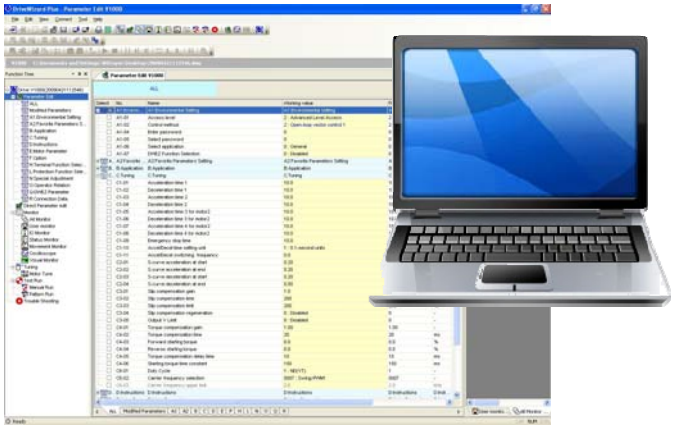
Hardware Specifications

PC Software Tools – DriveWizardPlus

- **Drive Wizard Plus Drive Replacement Function**
  - ➔ **Automatic parameter conversion from V7 to V1000**



VS 606 V7

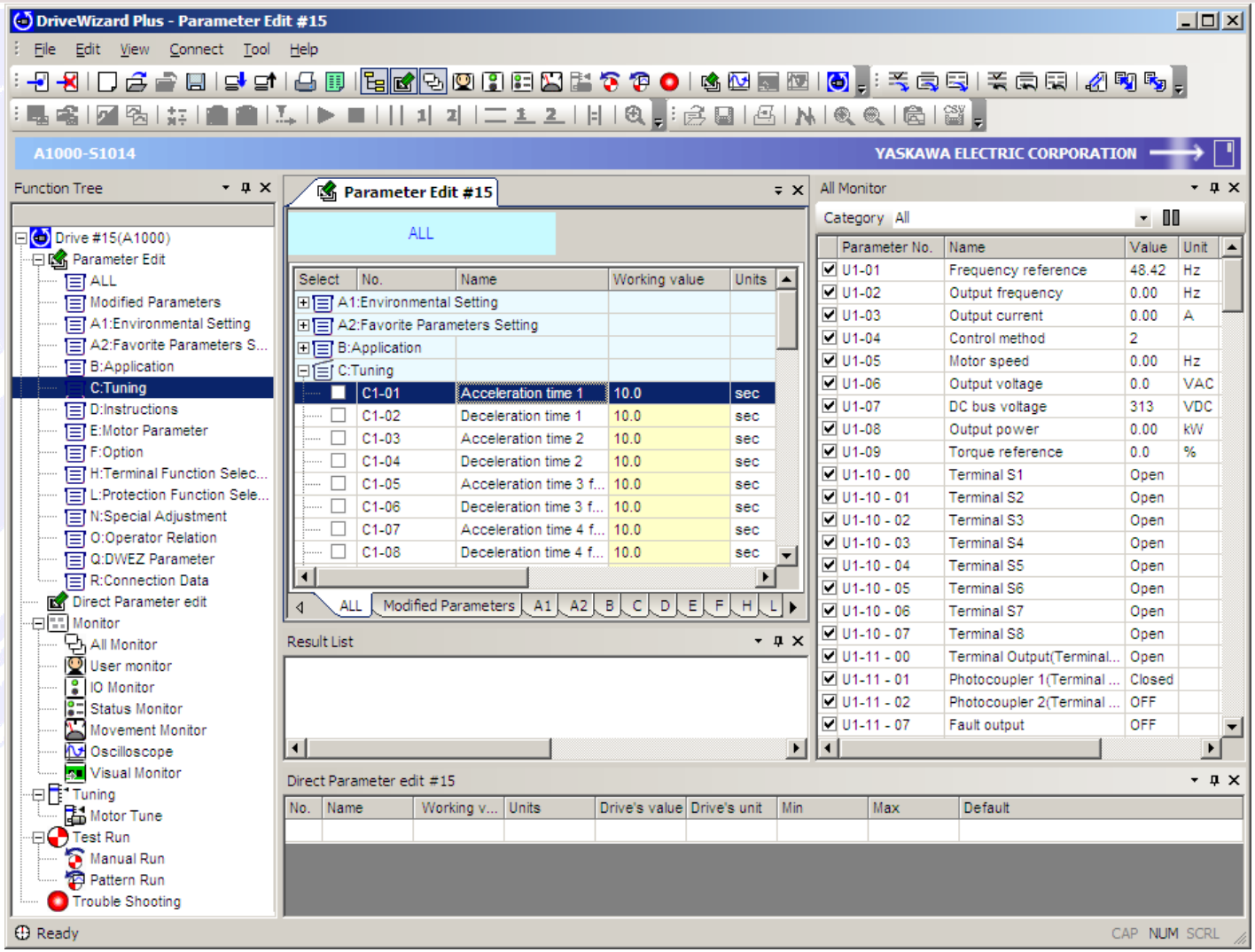


Drive Wizard Plus

V1000

Hardware Specifications

PC Software Tools – DriveWizardPlus
Parameter Edit and Monitoring



Hardware Specifications

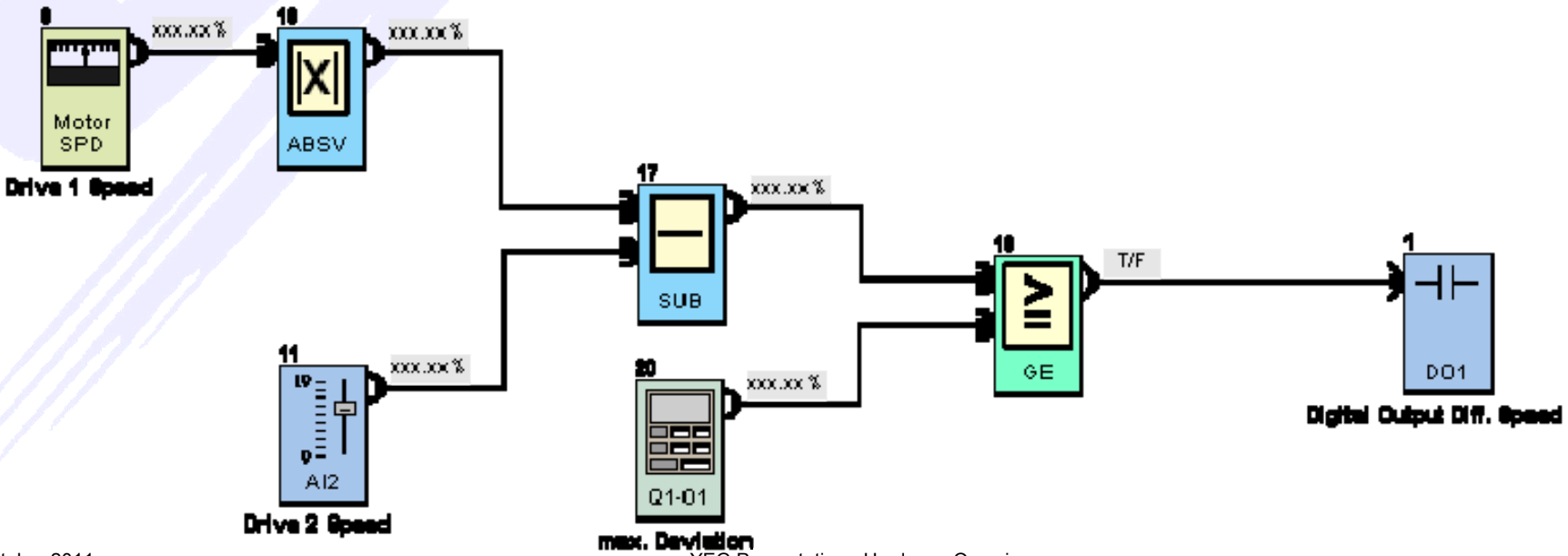
PC Software Tools – DriveWorksEZ (Pro)

- Icon-based programming of customized inverter
  - Modified I/O functions
  - Timer sequence
  - Logic functions
  - Project protection
  - Basic and Pro Version available

Hardware Specifications

PC Software Tools – DriveWorksEZ (Pro)

- Implementation of simple PLC functionality into the V1000 and A1000
  - ➔ In some cases no SPS needed.
- Drag-and-Drop programming
  - ➔ Easy programming. No high-level programming language knowledge necessary.
- Customer know-how protection
  - ➔ Projects can be only modified and copied to inverter by creator DriveWorksEZ license



Technical Training - Hardware Specifications