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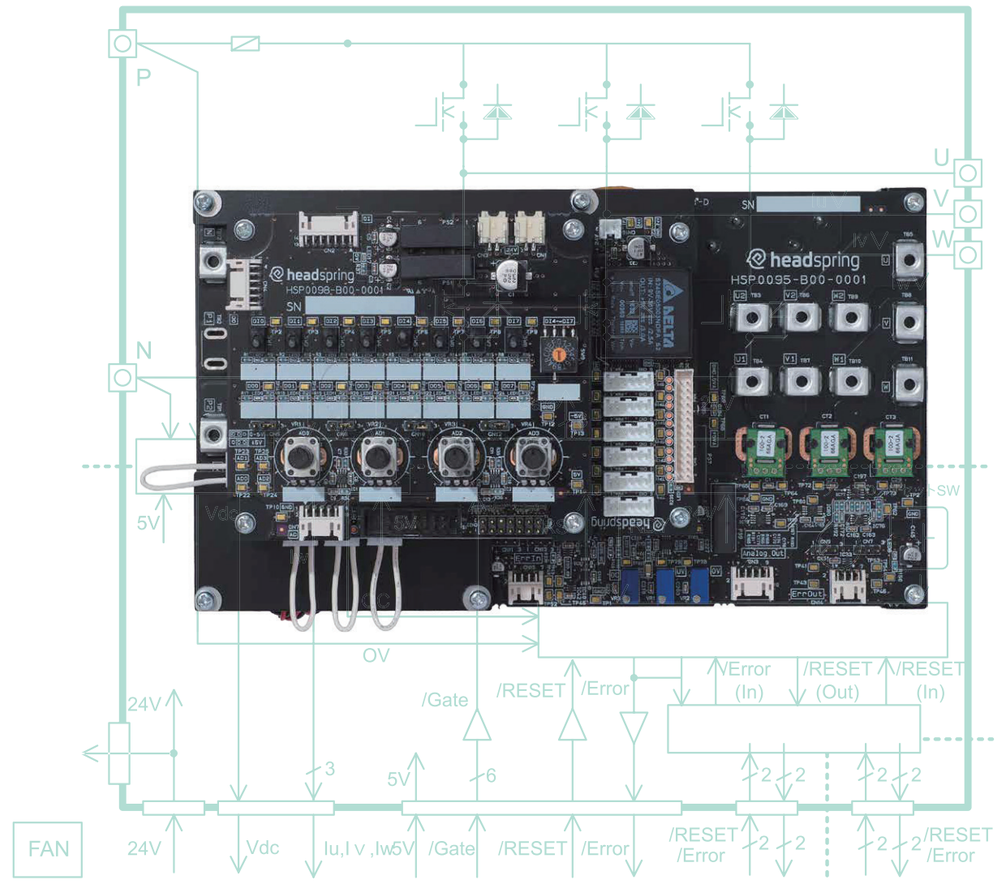
biRAPID

Rapid Prototyping Tool For Power Electronics



Easy and Rapid Prototype
even for Next-Generation Power Semiconductors
“SiC/GaN”

※Specification subject to change without notice

2024.6

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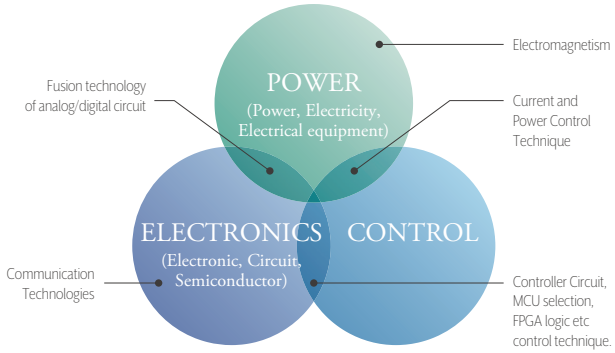
“Speedup” (Rapid)
Power Electronics development

Divides Power Electronics systems into parts, creating a modular unit.
Enables a fast yet a simple method reducing multiple steps.

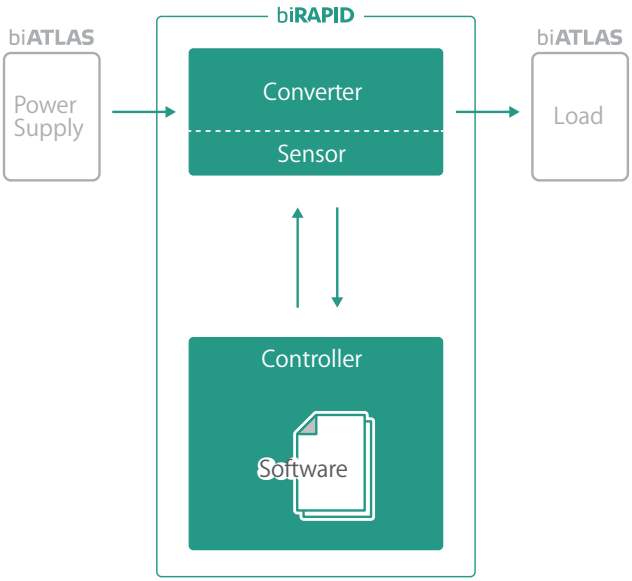
Power Electronics Technologies

Power Electronics Technologies is a technology for all applied systems centered on power conversion and control using power semiconductor devices. By using a power semiconductor device as a switch and switching its on / off at high speed, it is possible to change the DC voltage (boost, buck) and convert DC to AC (inverter).The technologies has been used in a wide range of electric power fields such as power generation and power transmission, industrial fields such as motors and pumps, power supply equipments such as communication systems and factories, electric railway fields such as train drive and substation, and automobiles and household appliances. There are many fields where energy saving can be achieved by applying power electronics technology, and expectations for power electronics technology are increasing in response to the recent demands for energy saving and decarbonization.



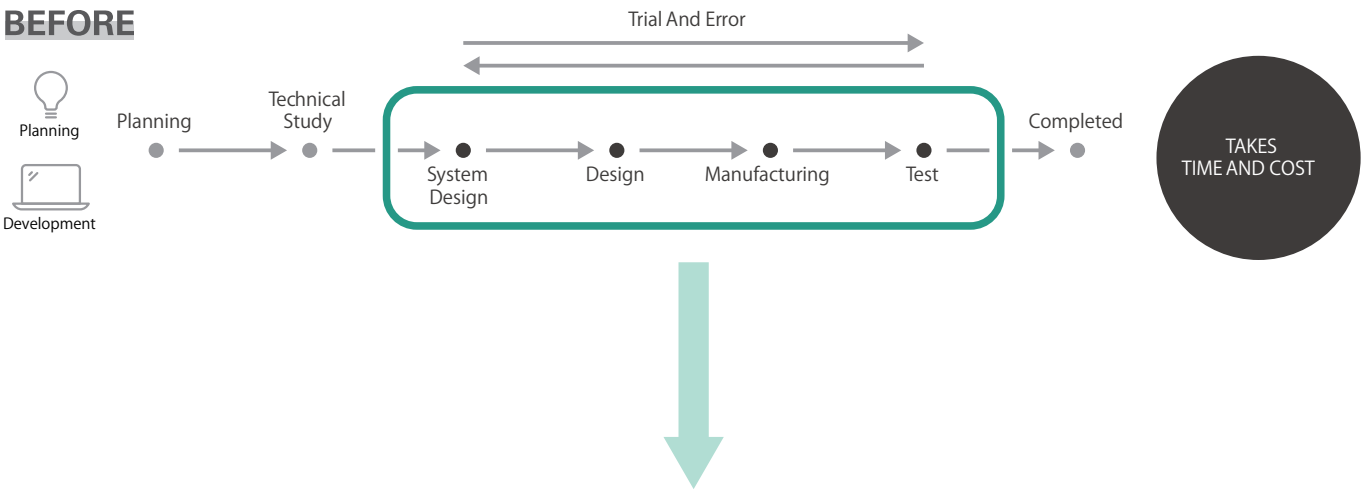
Power Electronics breakdown into parts as modules

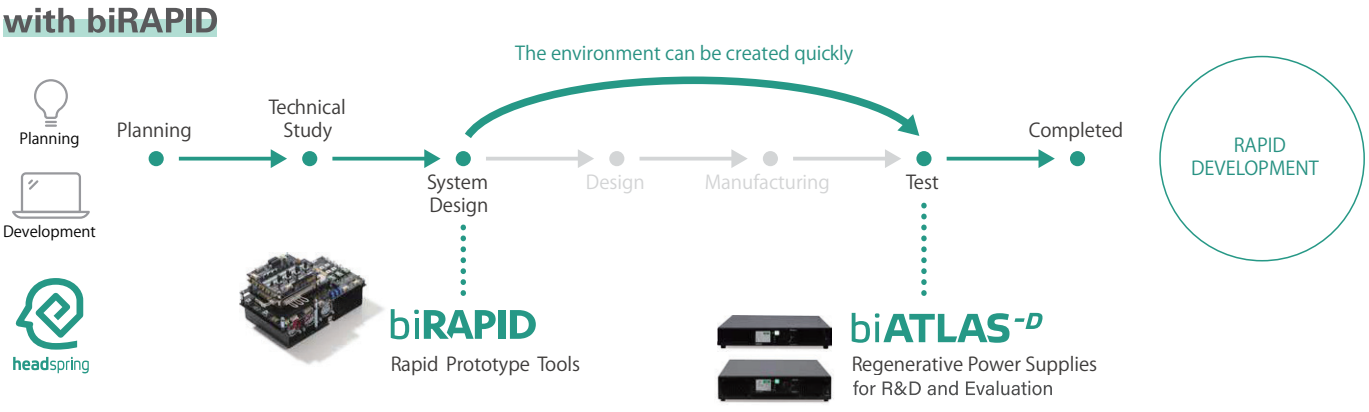
Power Electronics products and systems are constructed by converters, controller, sensors and other parts. biRAPID is the breakdown of such parts. By The "biRAPID" system aims to accelerate research and product development by replacing parts of your existing system with its components, reducing the need for prototyping. This can lead to shorter development times and cost savings, potentially speeding up market entry. The specific features and applicability of "biRAPID" vary depending on its specifications and the targeted application, offering flexible customization through its modular design.



Speedup (RAPID) the commercialization of products by adopting biRAPID in R&D

Prototyping and manufacturing power electronics equipment requires a lot of know-how, labor, time, and cost. In recent years, semiconductors operated at high speed, such as SiC and GaN, are often utilized, and in this case, the design difficulty becomes significantly higher. Even spending a hard time designing and prototyping, if noise related malfunctions occurred, redesign and prototyping is needed all over again, which will take more time. In the development of power electronics, we have prepared "biRAPID" series that realizes rapid prototyping, which is a development method for quickly prototyping a product. biRAPID can help to speed up the feedback cycle of planning, design, and prototyping.





Easy and Rapid Prototype even for Next-Generation Power Semiconductors "SiC/GaN"

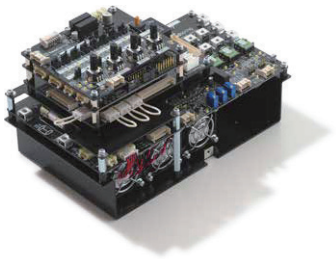
Lineup

Inverter/Converter Set

P5–8

3 Phase Inverter Development Set

- SiC Inverter Development Set（HEK-INV-A ）
- GaN Inverter Development Set （HEK-INV-C ）



Inverter/Converter circuit

P9–16

3 Phase Inverter

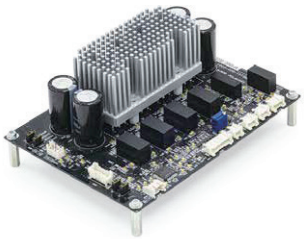
- SiC 3 Phase Inverter Circuit Block （HGCB-6A-401300 ）
- GaN 3 Phase Inverter Circuit Block （HGCB-6B-401120 ）

Half-Bridge Circuit Block

- GaN Half-Bridge Circuit Block （HGCB-2B-401150 ）

SiC Inverter Circuit Block

- SiC Inverter (H-Bridge) Circuit Block （HGCB-4A-401200 ）



Sensor board

P17–18

- Voltage Sensor Board （HVSB-3A-4014R0 ）

- Current Sensor Board （HCSB-3A-1504R5 ）

Signal converter

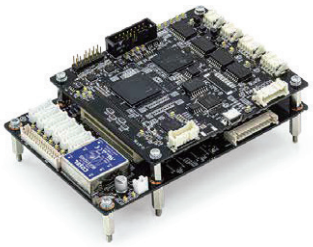
P19–20

- Electro-Optic Conversion Board （HOEB-2A ）
- Optic- Electro Conversion Board （HEOB-2A ）

Controller

P21–22

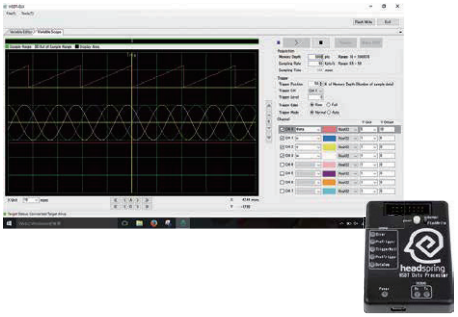
- Controller for Software Development （HECS-B/A ）



Software Development

P23–24

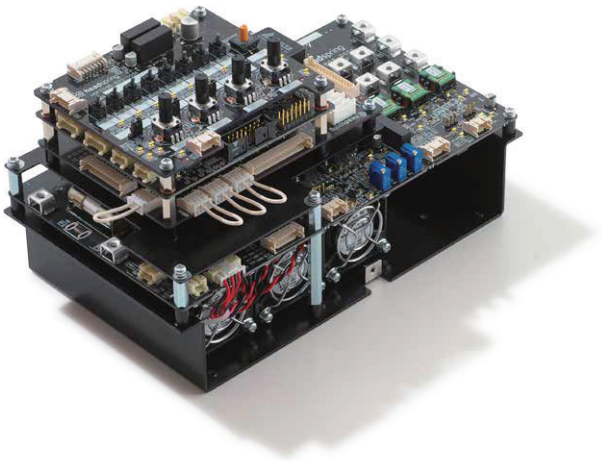
- Software Development Kit（HSDT-KIT-B ）



HEK-INV-A　SiC Inverter Development Set

Overview

A combination of SiC Three-Phase inverter with a controller, sample software, etc., so that it can be operated as a Three-Phase inverter simply by turning on AC100V for control. 6 units of SiC-MOSFET (manufactured by ROHM) are used to form a Three-Phase full-bridge inverter with max. rated power at 10 kVA. 24V control power supply and sample software are included.



Features

SiC inverter set with minimal setup for immediate testing

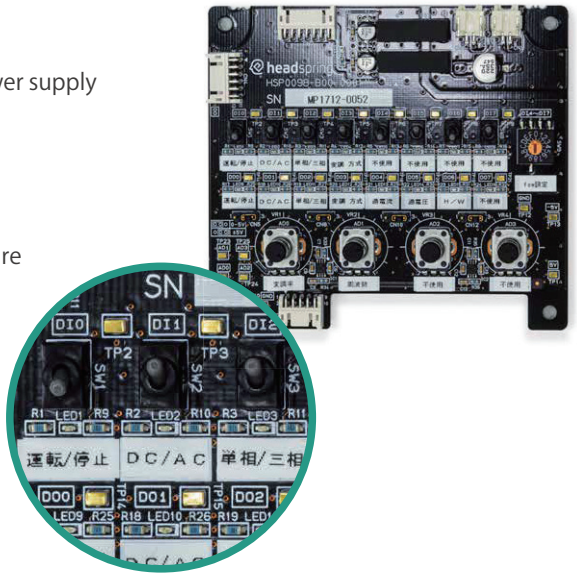
Experiments can be performed immediately only with wiring to the power supply and the load.

Various circuit configurations and conditions

Switchable between chopper and inverter operation with sample software
Adjusting switching frequency, dead time through operation board.

Software Development

Software development is possible with HSDT-KIT-B
(Power Elec. Development Kits)



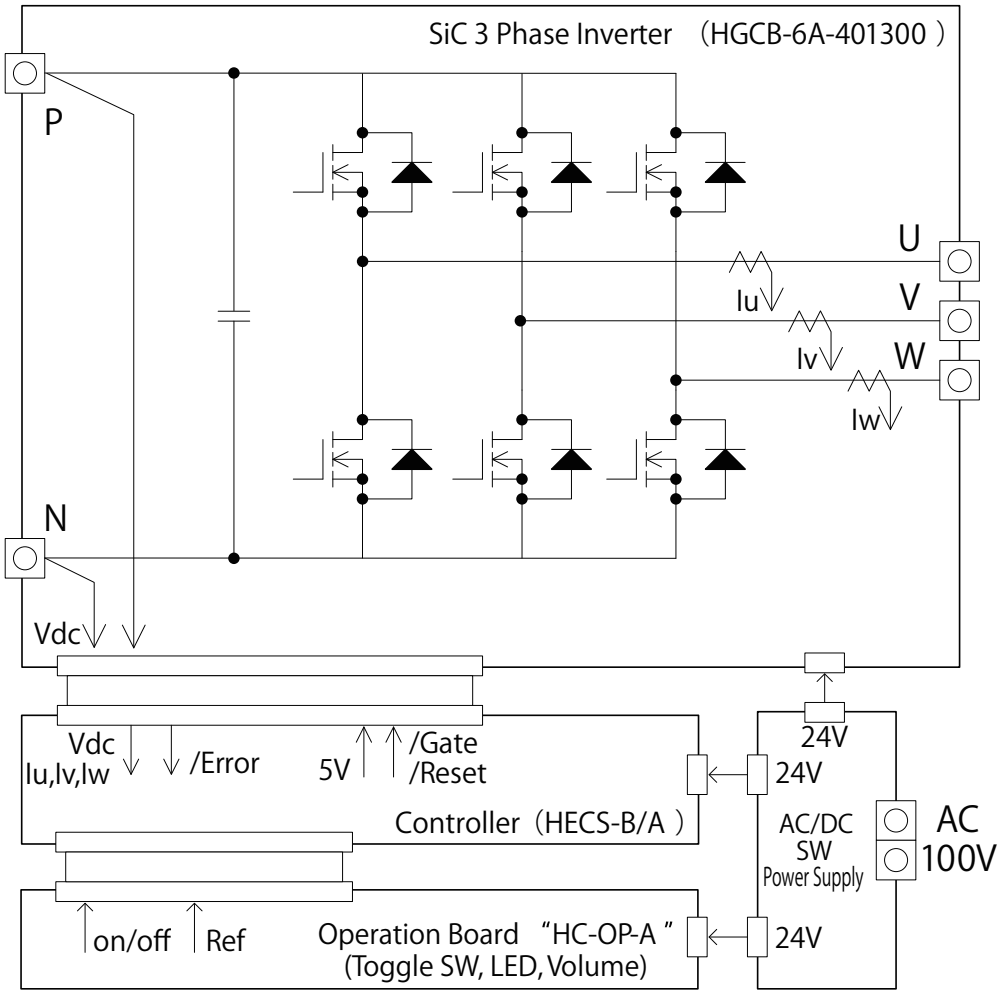
Specification (Model: HEK-INV-A)

DC Voltage Range	0 V - 400 V	P-N Port
Maximum AC Current	30 Arms	U, V, W Port
Maximum Switching Frequency	200 kHz	Modified w/ Rotary Switch
Minimum Dead-time	200 ns	Modified w/ Rotary Switch
Operational Switch	Toggle SW: 8 ch / Rotary SW: 1 ch	
Display LED	Yellow ：8 ch / Red ：4 ch / Green ：5 ch	
Operation Mode	Chopper 1-phase Inverterr 3-phase Inverter	Selected by Switch
Protection	AC OC / DC OV	Threshold limit can be adjusted with Variable Resistor on the circuite board
Power Supply	AC100 V	
Equipment Size	W: 215mm / D: 125mm / H: 130mm	All the component connected

Operational Parameter

Start/Stop	Gate Signal Output Control	
Topologies	Chopper / Inverter 1-phase /3-phase	U port for Chopper U, V Port for 1-phase Output
Modulation	Unipolar Modulation /Bipolar Modulation Triangle-Comparison/ Space Vector	For 1-phase Output For 3-phase Output
Switching Frequency	10 kHz -200 kHz	Changeable by Rotary Switching
Dead-time	200 ns - 600 ns	Changeable by Rotary Switching
Modulation Ratio	0～1	
Inverter Output AC Frequency	50 Hz - 500 Hz	

Block Diagram



HEK-INV-C GaN Inverter Development Set

Overview

A combination of GaNThree-Phase inverter with a controller, sample software, etc., so that it can be operated as a Three-Phase inverter simply by turning on AC100V for control. 6 units of GaN E-HEMT (manufactured by GaNSystems) are used to form aThree-Phase full-bridge inverter with max. 5MHz switching frequency. 24V control power supply and sample software are included.

Features

GaN Inverter Set for MHz class high frequency switching experiments

Experiments can be performed immediately only with wiring to the power supply and the load

Various circuit configurations and conditions

Switchable between chopper and inverter operation with sample software
Adjusting switching frequency, dead time through operation board.

Software Development

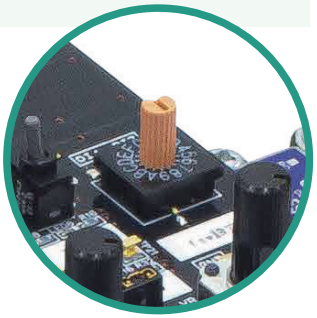
Software development is possible with HSDT-KIT-B (Power Elec. Development Kits)

Specification (Model: HEK-INV-C)

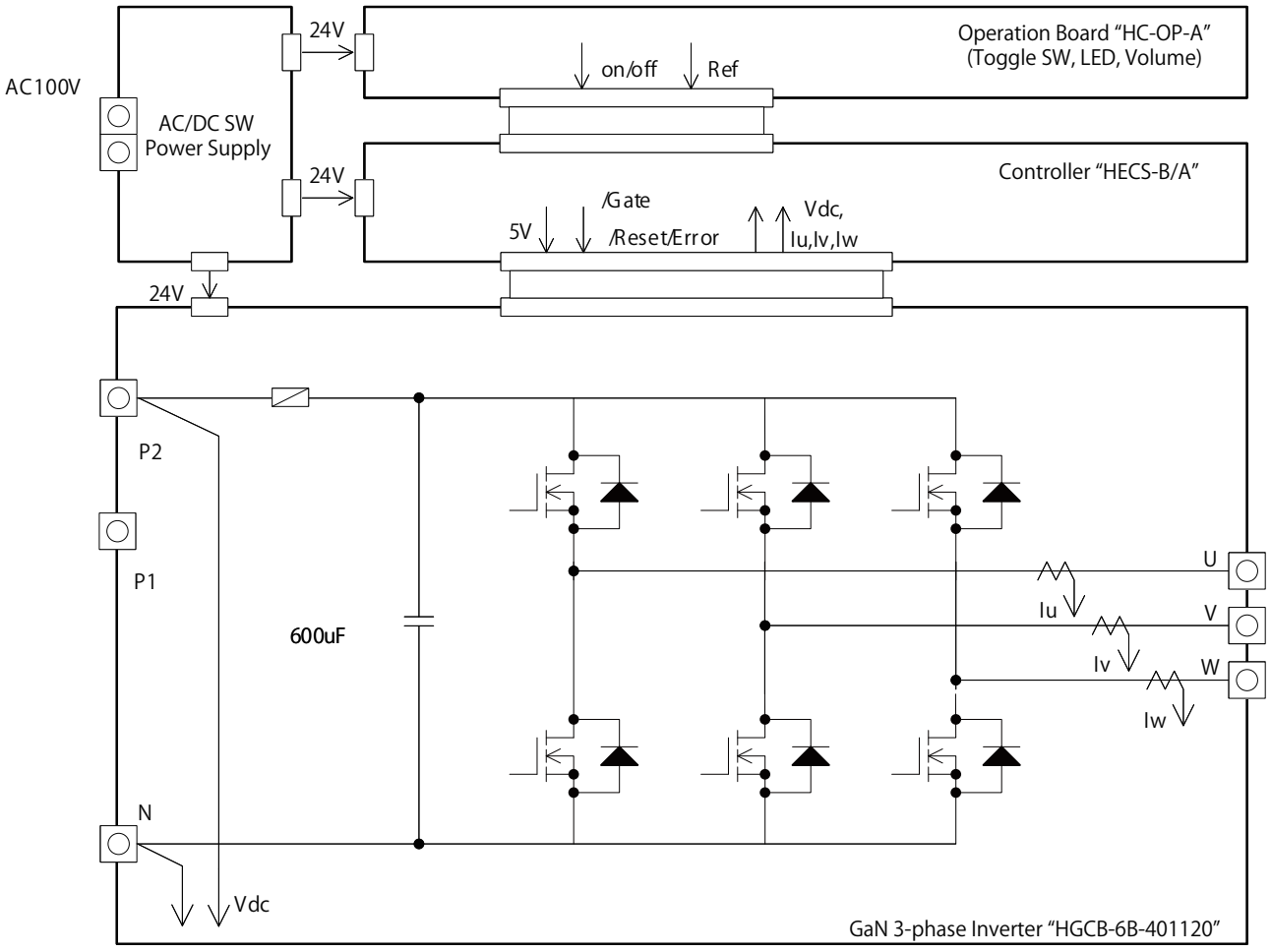
DC Voltage Range	0 V - 400 V	P-N Port
Maximum AC Current	12 Arms	U, V, W Port
Maximum Switching Frequency	1.5 MHz (5MHz)	Can choose up to 1.5MHz w/ Rotary Switch. Along with HSDT-KIT-B, can drive until 5MHz
Minimum Dead-time	30 ns	Can be chosen through Rotary Switch
Operational Switch	Toggle SW: 8 ch / Rotary SW: 1 ch	
Display LED	Yellow ：8 ch / Red ：4 ch / Green ：5 ch	
Operation Mode	Chopper 1-phase Inverter 3-phase Inverter	Selected by Switch
Protection	AC OC / DC OV	Threshold to be modified with variable Resister
Power Supply	AC100 V	
Equipment Size	W: 209mm / D: 130mm / H: 186mm	Combining 3-phase inverter and controller board
Weight	2.35 kg	

Operational Parameter

Start/Stop	Gate Signal Output Control	
Topologies	Chopper / Inverter	U port for Chopper
	1-phase / 3-phase	U, V Port for 1-phase Output
Modulation	Unipolar Modulation / Bipolar Modulation	For 1-phase output
	Triangle-Comparison / Space Vector	For 3-phase Output
Switching Frequency	20 kHz – 1.5 MHz	Changeable by Rotary Switching
Dead-time	30 ns ~ 100ns	Changeable by Rotary Switching
Modulation Ratio	0 - 1	
Inverter Output AC Frequency	50Hz - 500Hz	



Block Diagram



HGCB-6A-401300　SiC 3 Phase Inverter Circuit Block

Overview

SiC-MOSFET (manufactured by ROHM) integrated 3-phase Full Bridge Inverter capable of operating at rated power of 10kVA within the compact A5 size.
Embedded with sensors enabling the Voltage/Current feedback.
Can be operated even as Chopper circuit or Single Phase inverter.

Features

☑ Compact SiC 3 Phase Inverter with High Capacity

Can be used just by preparing 24V/5V power source, cabling and a set of controller.
Can be used as a Motor Inverter.
Can be used as Chopper, Single Phase Inverter by changing the connection setting.

☑ Open Concept Design

Suitable for a various testing.
Circuit diagram is provided as a design reference.

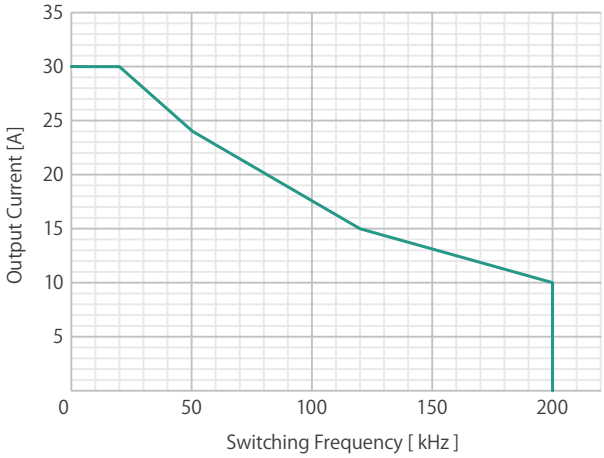
Specification (Model: HGCB-6A-401300)

Equipment Size	W:213mm / D:123mm / H:67mm	Protruding parts not included
Weight	950 g	
DC Voltage Range	0 V - 400 V	P-N terminal voltage
AC Side Max. Current	30 Arms	Derating depending on the switching frequency
AC Side Rated Power	10 kVA	
Switching Frequency	≤ 200 kHz	
Dead-time	≥ 200 ns	
Voltage Sensor Circuit	400 V / 4 V	P-N terminal voltage Circuit Protection against over / under voltage Protection threshold is adjustable with volume
Current Sensor Circuit	±100 A / ±4 V	Three-phase current Circuit Protection against over / under current Protection threshold is adjustable with volume
Control Power Enter 5 V	≤ 0.15 A	
Control Power Enter 24 V	≤ 0.75 A	

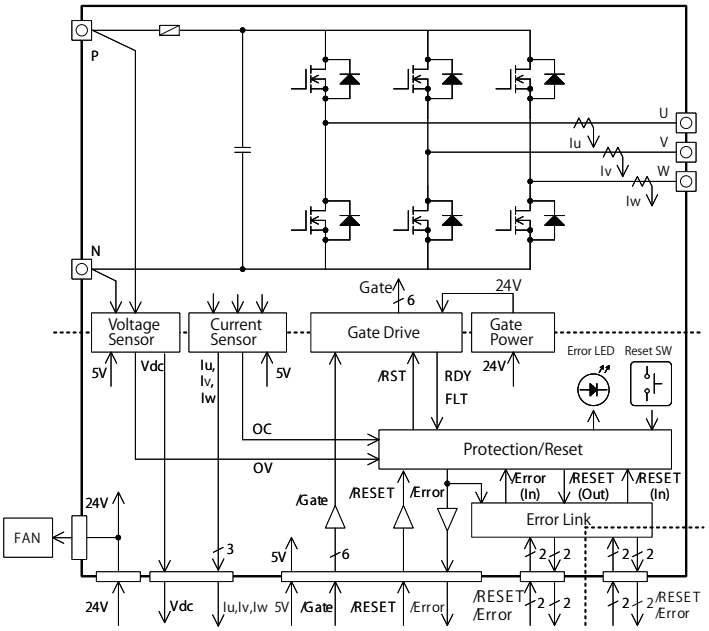
External Interface

Gating Signal	Input	5 VTTL / Negative logic / Pulled up of 4.7 kΩ at input side
Error Reset Signal	Input	5 VTTL / Negative logic (low at reset) / Pulled up of 4.7 kΩ at input side
Error Signal	Output	5 VTTL / Negative logic (low in error) / Protection detection output
Analogue Signal	Output	DC voltage sensor 1 point / AC current sensors 3 points
Error Signal (Error Link Function)	Input / Output	5 VTTL / Positive logic / Share error information
Reset Signal (Error Link Function)	Input / Output	5 VTTL / Positive logic / Share reset information

Derating



Block Diagram



HGCB-6B-401120 GaN 3 Phase Inverter Circuit Block

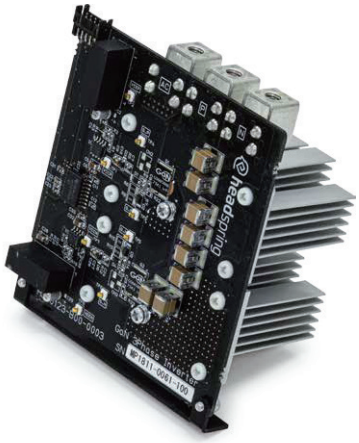
Overview

6 units of GaN E-HEMT (manufactured by GaN Systems) are used to form aThree-Phase full-bridge inverter. An A5 size that capable of max. 5MHz switching frequency operation. Embedded with sensors that allow the Voltage/Current feedback. Can be operated even as Chopper circuit or Single Phase inverter.

Features

GaN Inverter for MHz class high frequency switching

Operational up to 5MHz
Can be used just by preparing 24V/5V power source, cabling and a set of controller.



Open Concept Design

Suitable for a various testing.
Circuit diagram is provided as a design reference.

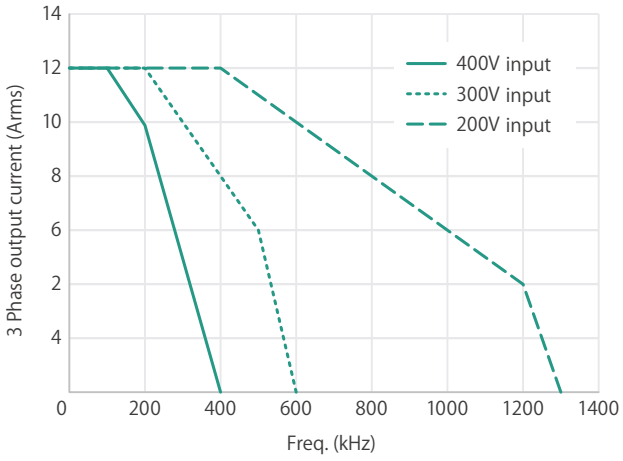
Specification (Model: HGCB-6B-401120)

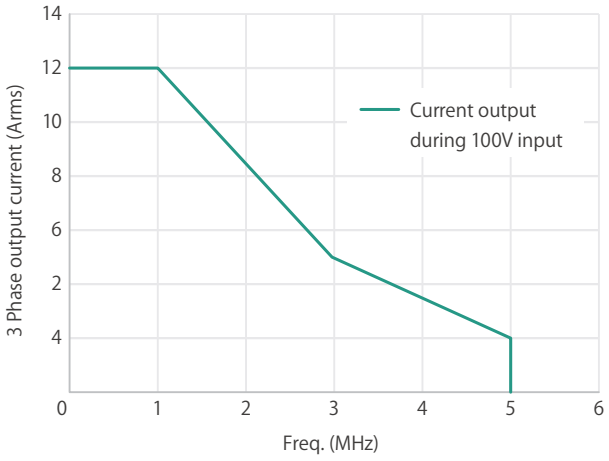
Equipment Size	W:209mm / D:134mm / H:120mm	Protruding parts not included
Weight	1.9 kg	
DC voltage range	0V - 400V	P-N terminal voltage
AC side Max. current	≤ 12 Arms	Derating depending on the switching frequency
AC side rated power	4 kVA	
Switching frequency	≤ 5 MHz	
Dead-time	≥ 30 ns	Dead time generation function is not mounted. Arm short-circuit prevention function is mounted.
Voltage sensor circuit	400V / 4V	P-N terminal voltage Gate block when OV or UV is applied Protection threshold is adjustable with volume
Current sensor circuit	±50 A / ±4V	Three-phase current Gate block on OC (peak) Protection threshold is adjustable with volume
Control power enter 5V	0.6 A max	
Control Power Enter 24V	0.8 A max	

External interface

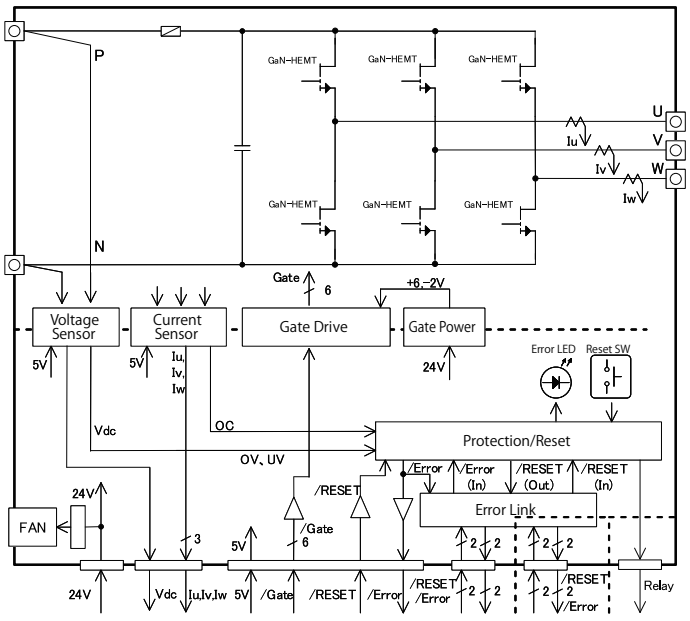
Gating signal	Input	5 VTTL / Negative logic / Pulled up of 4.7 kΩ at input side
Error reset Signal	Input	5 VTTL / Negative logic (low at reset) / Pulled up of 4.7 kΩ at input side
Error signal	Output	5 VTTL / Negative logic (low in error) / Protection detection output
Analog signal	Output	DC voltage sensor 1 point / AC current sensors 3 points
Error signal (Error link function)	Input/Output	5 VTTL / Positive logic / Share error information
Reset-signal (Error link function)	Input/Output	5 VTTL / Positive logic / Share reset information

Derating





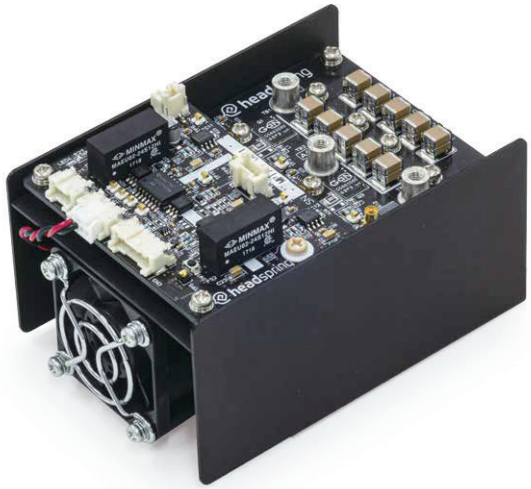
Block Diagram



HGCB-2B-401150 GaN Half-Bridge Circuit Block

Overview

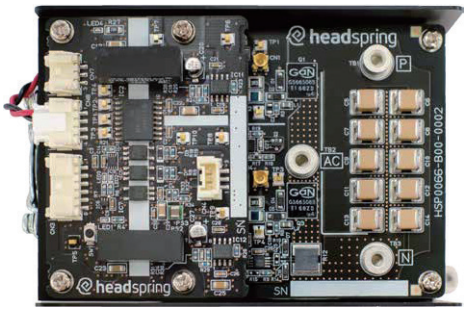
Two pieces of GaN E-HEMT (manufactured by GaNSystems) are built in the half-bridge circuit.This is a compact circuit block having a footprint about the size of a pass holder.
Since this block has a gate drive circuit, it can be operated at a maximum switching frequency of 5 MHz by inputting a gate signal.
By connecting multiple units, it can be used as an inverter.



Features

☑ GaN E-HEMT Half-Bridge Circuit Block

By preparing a gate power source and inputting a gate signal, this device can be used as a chopper circuit.
By preparing a low-current circuit, it can be used as a GaN device.



☑ Simple and Open Concept Design

Simplified component arrangement and sufficient test pins for various testing.
Circuit diagram is provided as a design reference.

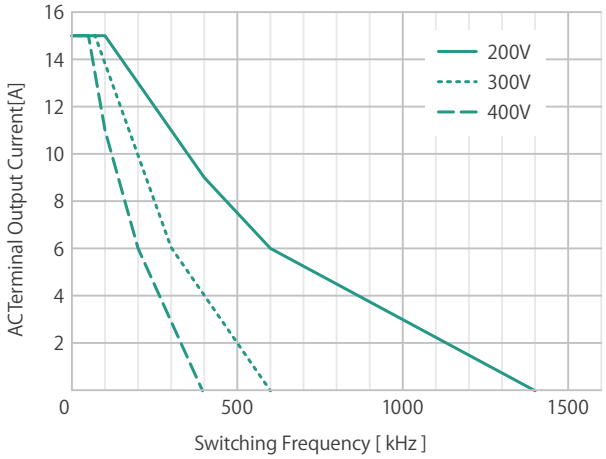
Specification (Model: HGCB-2B-401150)

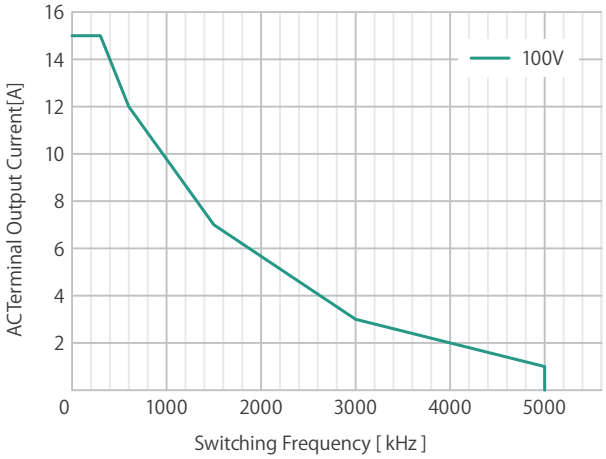
Equipment Size	W: 106mm / D: 75mm / H: 55mm	Protruding parts not included
Weight	370 g	
High Side Voltage Range	0 V - 400 V	P-N terminal voltage
Low Side Voltage Range	0 V - 380 V	N-AC and AC-N terminal voltage. To be lower than that of the high pressure side.
Low Side Current Range	±15 A	A current input to or output from the AC terminal Derating depending on the switching frequency or voltage.
Switching Frequency	≤ 5 MHz less	
DeadTime	≥ 30 ns	Arm short-circuit prevention function is mounted.

External Interface

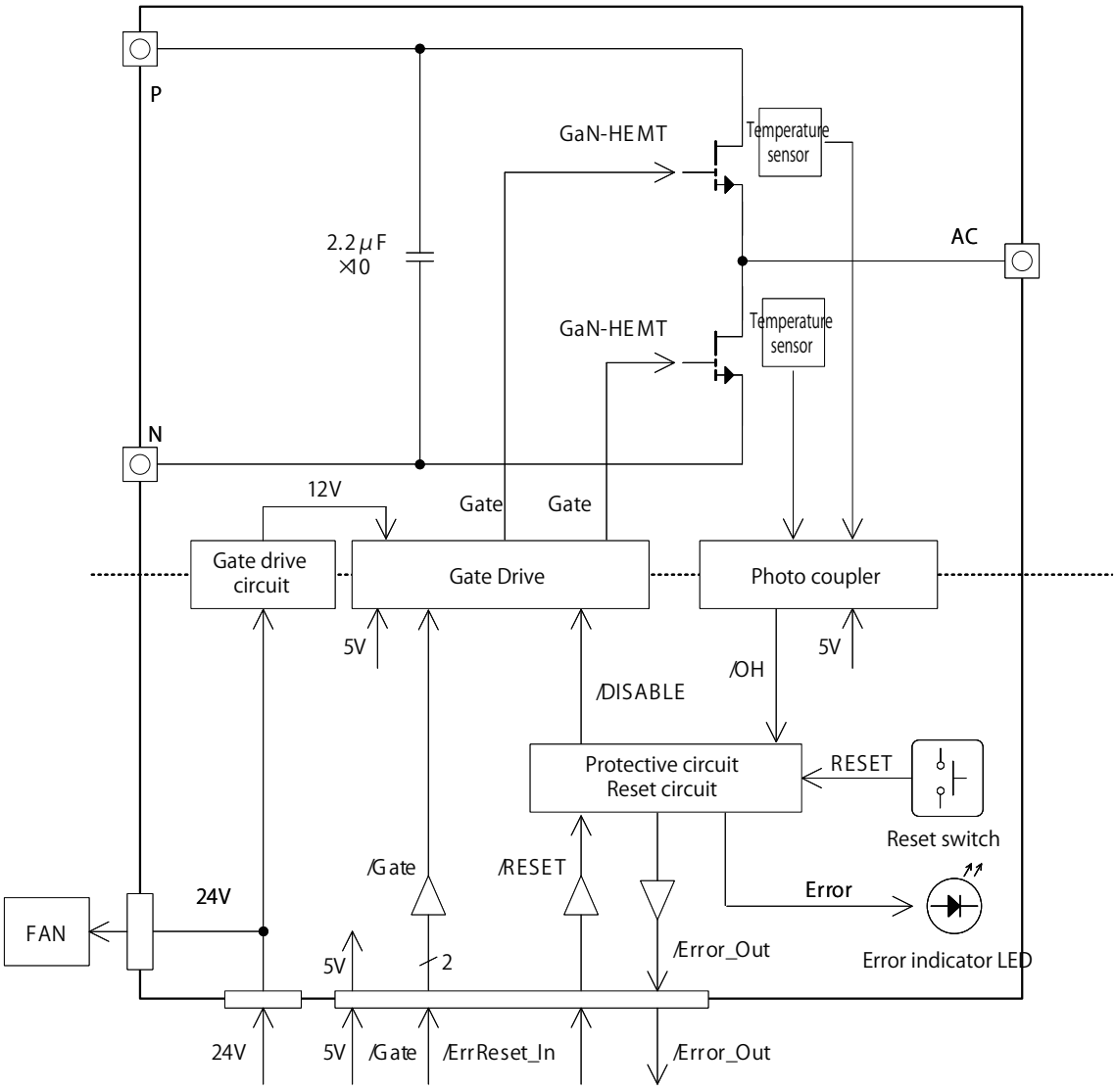
Gate Signal	Input	5 VTTL / Negative logic / Input section is pulled up by 4.7 kΩ
Error Reset Signal	Input	5 VTTL / Negative logic (Low during Reset) / Input section is pulled up by 4.7 kΩ
Error Signal	Output	5 VTTL / Negative logic (Low during Error) / Error signal is output when overheat protection is detected.

Derating





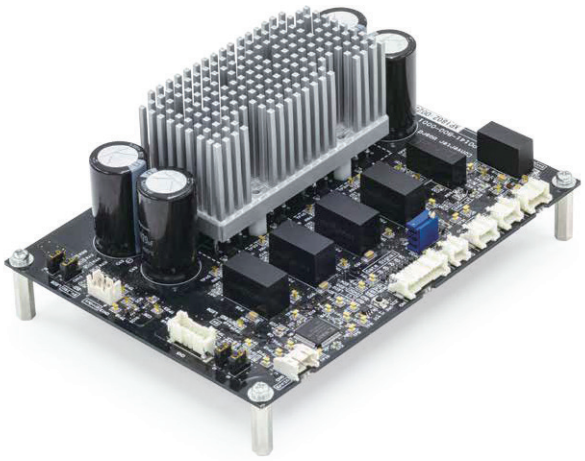
Block Diagram



HGCB-4A-401200 SiC Inverter (H-Bridge) Circuit Block

Overview

The H-bridge contains of 4 units SiC-MOSFET (manufactured by ROHM) circuit to form a compact inverter circuit block with a footprint about the size of a postcard.
Since this unit has a gate drive circuit, it can be operated as a single-phase inverter at the maximum rated power (4 kVA) by just inputting a gate signal.
A set of four circuit blocks installed in the chasis with cooling mechanism is also available.This block comes with a voltage sensor circuit.



Features

☑ SiC H-Bridge Inverter

It can be operated by preparing a gate power source and inputting a gate signal.
By changing the connection setting, it can be used as the single inverter or chopper circuit.

☑ A voltage sensor circuit is built in

Signal detected from the sensor can be feed back to the control circuit.

Set Unit HGCB-4x4A-401200

A set of four pieces of SiC H-bridge boards mounted in chasis with cooling mechanism which is convenient to be used as Modular Multilevel Converter (MMC).

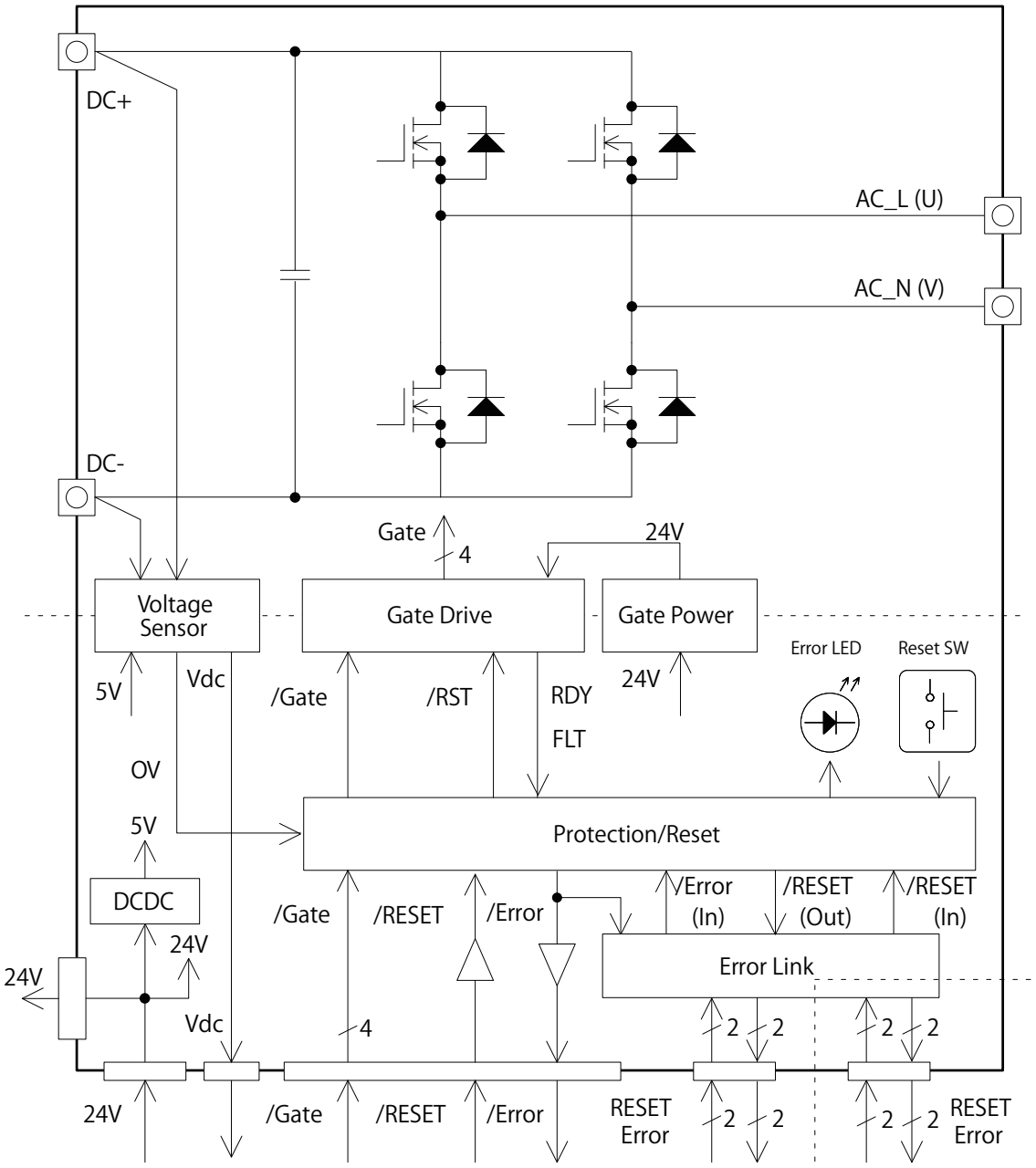
Specification (Model: HGCB-4A-401200)

Equipment Size	W: 150mm / D: 110mm / H: 54mm W: 162mm / D: 170mm / H: 246mm	HGCB-4A-401200 HGCB-4x4A-401200
DC Voltage Range	0 V - 400 V	[DC+] - [DC-] terminal voltage
AC Maximum Current	20 Arms	L-N terminal current
AC Rated Power	4 kVA	In case of 200 V AC and 10 A.
Switching Frequency	200 kHz	
DeadTime	≥ 200 ns	
Power Supply	DC24 V	
Voltage Sensor	400 V / 4 V	

External Interface

Gate Signal	Input	5 VTTL (negative) with 10 kΩ pull-down
Error Reset Signal	Input	5 VTTL (negative) with 10 kΩ pull-down
Error Signal	Output	5 VTTL (negative) with 10 kΩ pull-down
Error Signal (Error Link Function)	Input / Output	Error Sharing among multiple blocks to enable a synchronous stop (gate block)

Block Diagram



HVSB-3A-4014R0 Voltage Sensor Board

Features

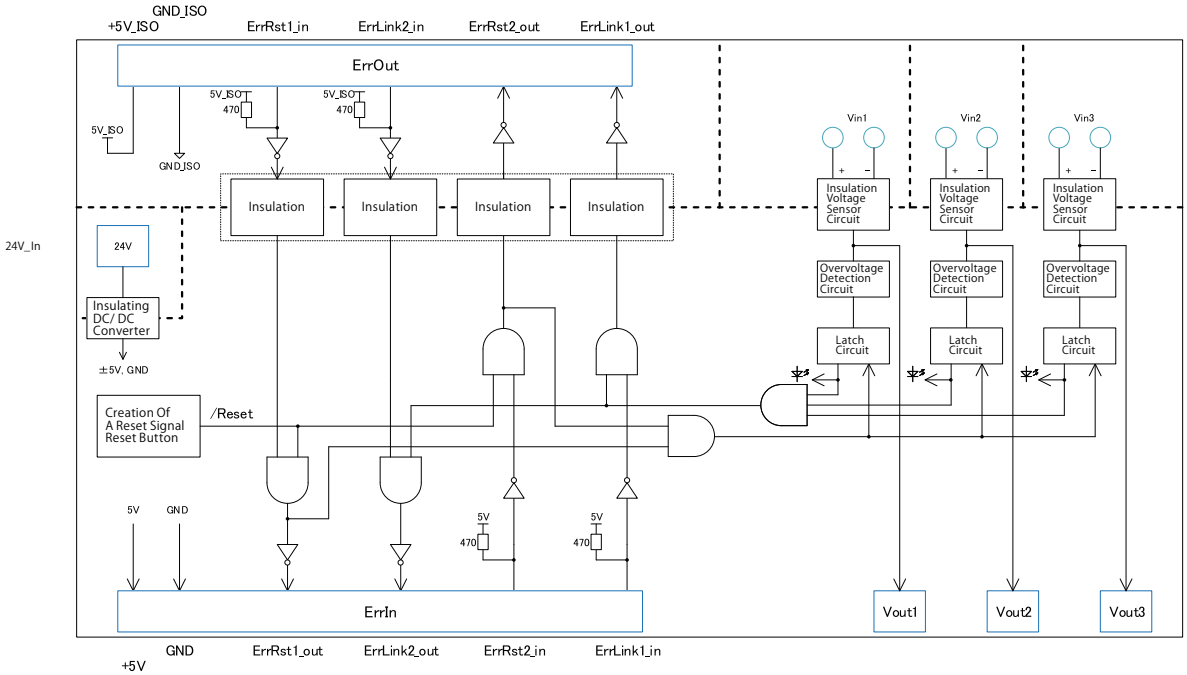
☑ Voltage sensor board with wide detection range for three phases

± 400 V converted into ± 4 V analog signal through insulation.
An error can be detected according to an arbitrarily threshold set per channel.

Specification (Model: HVSB-3A-4014R0)

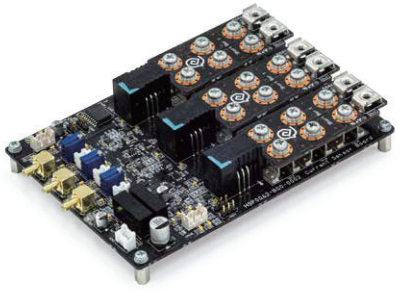
Input Voltage Range (Vin)	± 400 V	
Output Voltage Range (Vout)	± 4 V	
Division Ratio (Vout/Vin)	1:100	
Cutoff Frequency	100 kHz	
Linearity	≤ 0.3%	For full scale
No. Of Channels	3 ch	
Error Link Function ErrIn Connector	1 ch	V_{IL_max} = 1.35 V/V_{IH_min} = 3.15V/I_{I_max} = 10 mA (per channel)
Error Link Function ErrOut Connector	1 ch	V_{OL_max} = 0.55V/V_{OH_min} = 3.8 V/I_{O_max} = 10 mA (per channel)
Power Supply 5 V	≤ 40 mA	Range of voltage tolerance: ± 5 %
Power Supply 24 V	≤ 100 mA	Range of voltage tolerance: ± 10 %
Equipment Size	W: 140mm / D: 100mm	
Withstand Voltage (Input-Output)	3,000 V AC	1 minute
Insulation Resistance (Input-Output)	≥ 10 MΩ	500 V DC

Block Diagram



HCSB-3A-1514R5 Current Sensor Board

Features



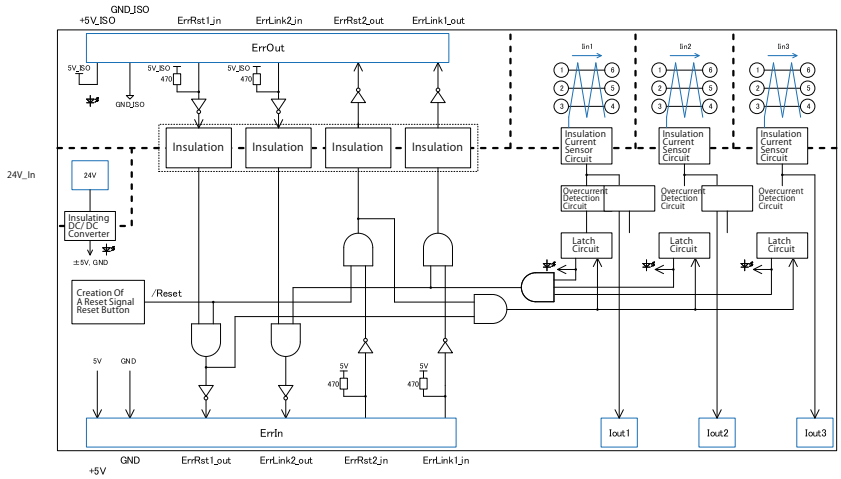
Current sensor board for three phases with three switchable measurement ranges

Input current ranges 50Arms, 25Arms, 16.7Arms switchable by the short-bar provided.
± 4.5V analog signals are output.
An error detection threshold can be set arbitrarily per channel.

Specification (Model: HCSB-3A-1514R5)

Input Current Range (Iin)	short bar1:50.0 Arms short bar2:25.0 Arms short bar3:16.7 Arms	short bar1:±150 Apk short bar2:±75 Apk short bar3:±50 Apk
Output Voltage Range (Iout)	±4.5 V	
Division Ratio (Iout/Iin)	short bar1 :0.03 V/A short bar2 :0.06 V/A short bar3 :0.09 V/A	
Cutoff Frequency	100 kHz	
Linearity	0.2 %	The ratio to the maximum effective value of an input current
Number of Sensors	3 ch	
Error Link Function ErrIn Connecter	1 ch	V_{IL_max} = 1.35 V/V_{IH_min} = 3.15 V / I_{I_max} = 10 mA (per signal)
Error Link Function ErrOut Connecter	1 ch	V_{OL_max} = 0.55 V/V_{OH_min} = 3.8 V/I_{O_max} = 10 mA (per signal)
Controlled Source Input 5 V	≤ 40 mA	Range of voltage tolerance: ± 5 %
Controlled Source Input 24 V	≤ 160 mA	Range of voltage tolerance ± 10 %
Equipment Size	W: 140mm / D: 100mm	
Withstand Voltage (Input-Output)	3,000 V AC	1 minute
Insulation Resistance (Input-Output)	≥ 10 MΩ	500 V DC

Block Diagram



HEOB-2A Electro-Optic Conversion Board
HOEB-2A Optic- Electro Conversion Board

Overview

Gate signals conversion boards to enable the transmission through an optical cable.
Suitable in case of expanding the distance between a controller and power circuit, or connecting with a device having optical I/O terminals.

Features

☑ A gate signal is converted from the electric signal to the optical from the optical signal to the electrical.

By using an optical cable, the distance between the controller and the power inverter can be extended.
Possible to divert the existing system configured with the optical cables.

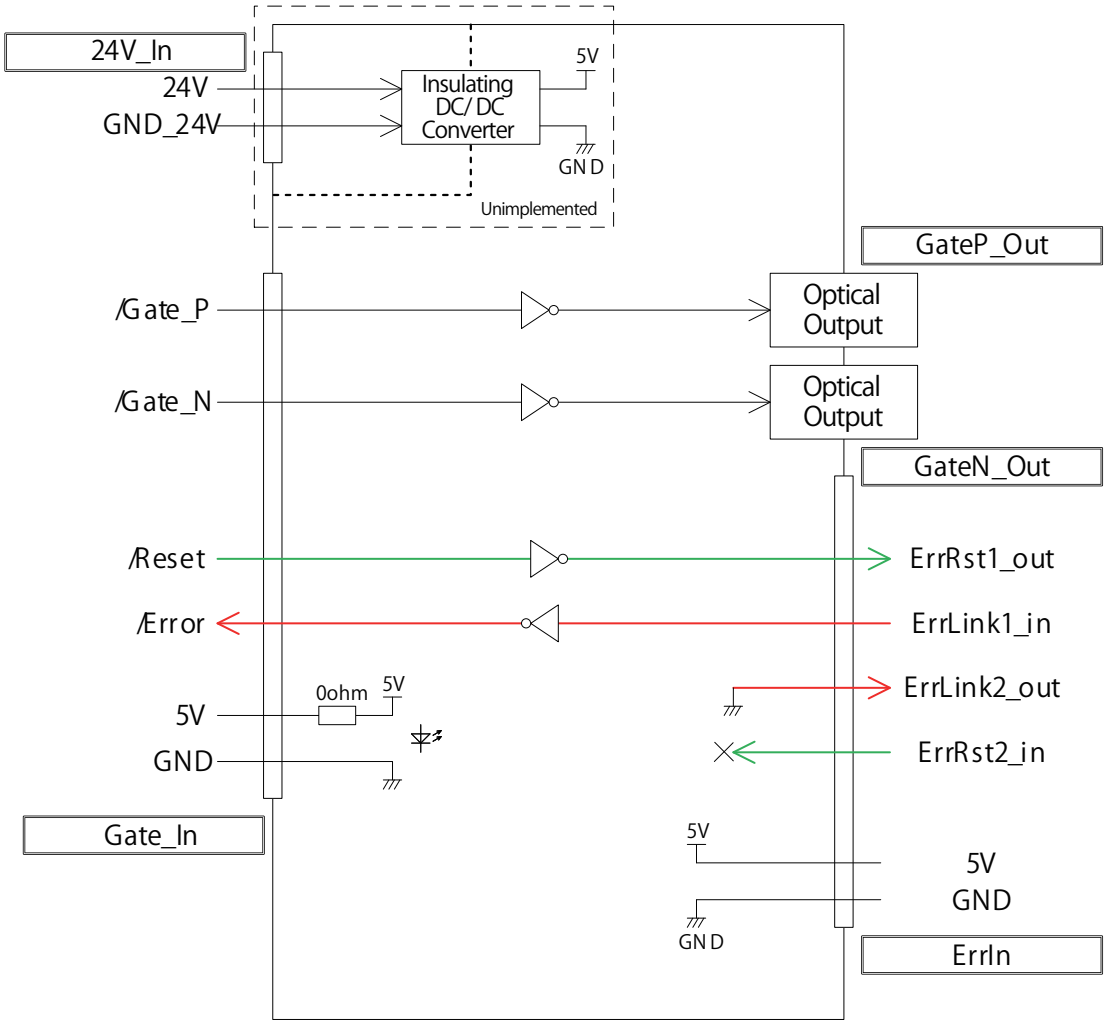
Specification (Model: HEOB-2A)

Equipment Size	W:60mm /D:60mm	
Optical Signal Output	2 ch	
Optical Signal Output DelayTime	30 nsec	
Minimum Pulse Width of Optical Signal Output	10 nsec	
Error Link Function ErrIn Connector	1 ch	V_{IL_max} = 1.35 V V_{IH_min} = 3.15 V I_{I_max} = 10 mA (per signal)
Error Link Function ErrOut Connector	1 ch	V_{OL_max} = 0.55 V V_{OH_min} = 3.8 V I_{O_max} = 10 mA (per signal)
Controlled Source Input 5V	≤ 170 mA	Range of Voltage Tolerance ±5 %

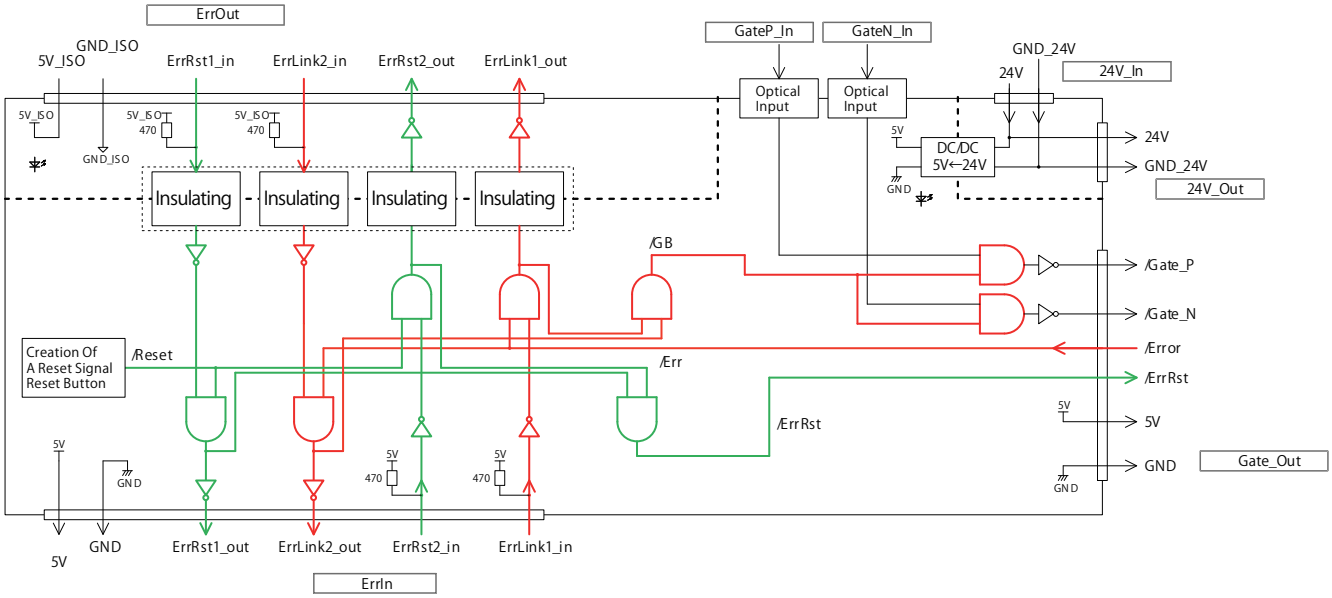
Specification (Model: HOEB-2A)

Equipment Size	W:100mm /D:50mm	
Optical Signal Output	2 ch	
Optical Signal Output DelayTime	30 nsec	
Minimum Pulse Width of Optical Signal Output	10 nsec	
Error Link Function ErrIn Connector	1 ch	V_{IL_max} = 1.35 V V_{IH_min} = 3.15 V I_{I_max} = 10 mA (per signal)
Error Link Function ErrOut Connector	1 ch	V_{OL_max} = 0.55 V V_{OH_min} = 3.8 V I_{O_max} = 10 mA (per signal)
Controlled Source Input 5V	≤ 40 mA	Range of Voltage Tolerance ±5 %
Controlled Source Input 24V	≤ 30 mA	Range of Voltage Tolerance ±10 %

Block Diagram (Model: HEOB-2A)



Block Diagram (Model: HOEB-2A)



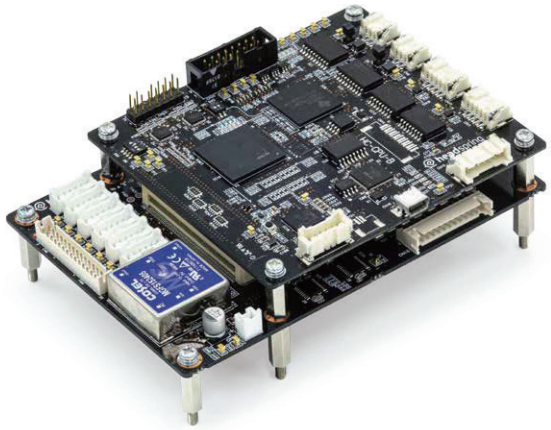
HECS-B/A Controller for Main Circuit Control

Overview

12-signals gate output unit equipped with High-ended Micro processor and FPGA that allow various of pulse pattern genera tion, and capable of driving 2 units of three-phase inverter par allelly.

Compact A6 size design suitable for system integration.

12 bits AD conversion, and embedded with CAN communica tion system.



Features

Compact Size with various functions embedded

High performance Microprocessor integrated with FPGA embedded in a compact size.
Capable of PWM output, AD conversion, and other communication functions embedded.

Suitable for software development and debug

Can be connected to a PC USB port by using HSDT-KIT-B.
Along with our HSDT-KIT-B, a SW Development and Debug can be setup.

Various I/O

Compact board with a variety of I/O : 12 Gate Signals output, 16 ch AD input, 16ch DI, 16 Ch DO

Specification (Model: HEC-B/A)

Micro Processor	TITMS320F28377S (Texas Instruments)	200 MHz Clock Frequency
FPGA	XC6SLX45 (Xillinx)	Spartan-6
Gate Signal output	12 port	5 VTTL
Error-Link I/F	4 ch	5 VTTL
AD Input	16 ch	+/- 5V, 100kHz
Digital Input	16 ch	5 V
Digital Output	16 ch	OC Output DC5 - 30 V / 50 mA
Equipment Size	W:90mm / D:130mm / H:130mm	
Operational Temperature	0 - 50 ℃	No Condensing
Power Supply	DC 10.8 - 26.4 V	
Power Consumption	≤ 18 W	

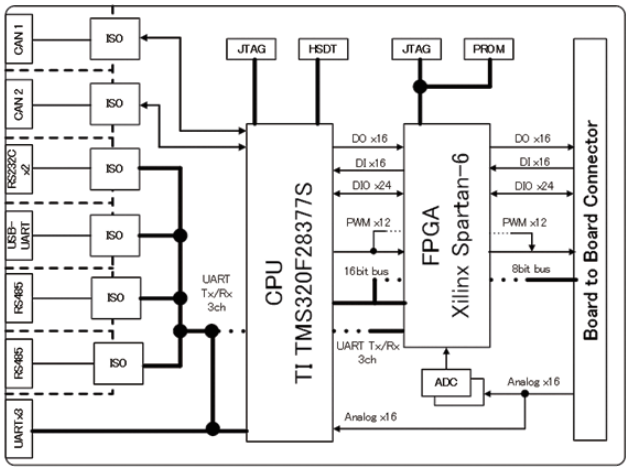
Related Function with our other products

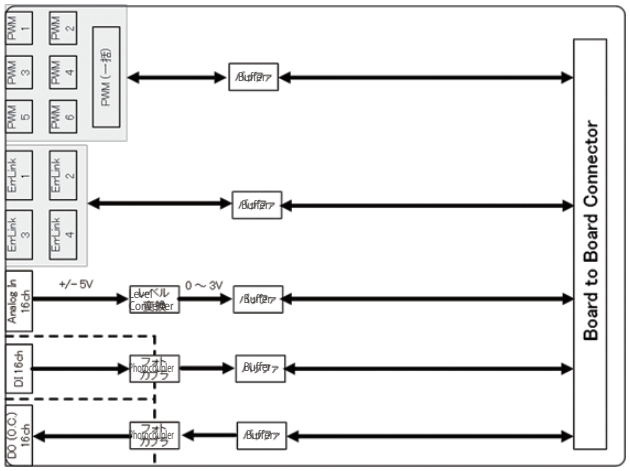
Inverter/Converter I/F (Main Circuit)	6 ch	Interface directly to Circuit Block Maximum 6 Circuit blocks.
Error Link I/F	4 ch	Interface for Error Link Function with other platform products. Maximum 4 links.
Our HSDT I/F	1 ch	Interface to HSDT-Data Processor.

Main Function

PWM Generator	12 port	Complement PWM Generator with Dead-time. Carrier wave can be selected from sine-wave, sawtooth-wave and reverse sawtooth-wave.
Digital In/Out	16 ch each	Isolated Universal Digital Input / Output.
AD Conversion	16 ch	12bit AD Conversion Function. Embedded microprocessor and FPGA can be used independently.
Comparator	8 ch	Comparing input voltage with upper and lower threshold and activate Gate Block function in case exceeded to them.
Universal LED	Yellow x 4 Red x 4	Controlled by embedded program.
Universal Dip Switch	4 ch	Read by embedded program.
Asynchronous Serial Com Port	3 ch	RS485, RS232C are usable.
CAN Com Port	2 ch	CAN port isolated from the circuit board
EEPROM	512 kBit	Embedded program to access EEPROM through I2C connection

Block Diagram





HSDT-KIT-B　Software Development Kit

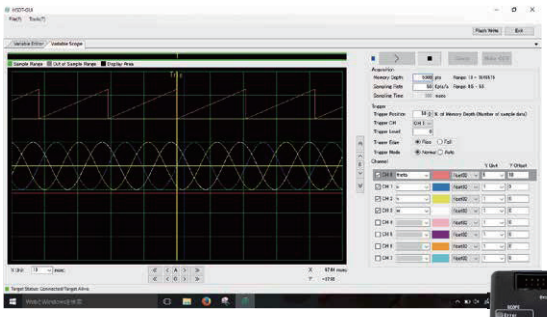
Overview

Function Library, data processors, and real time Debugging as a set is convenient for Current/Power Conversion control Software development.

It was originally purposed for our in-house engineer usage in order to increase the efficiency of R&D.

This is not simply for "How to Operate the Micro processor," but is for how to perform right "System Control."

This is the toolset enabling for various engineers to create con - trolling software.



▲HSDT-GUI

▲HSDT-DP

Features

☑ Function Library HSLiB for development

A set of functions often used for power control
Capable to call for selling of hardware etc from micro processor etc.

☑ Setup an Intuitive debugging environment, HSDT-GUI

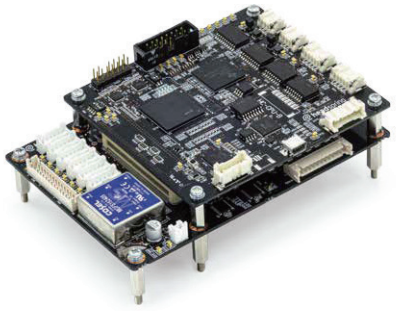
Debugging on real-time without stopping the program.

☑ Data Processor "HSDT-DP" to connect to PC

Connecting the controller and PC with USB port.

Associated Product

▶HECS-B/A　(P21)



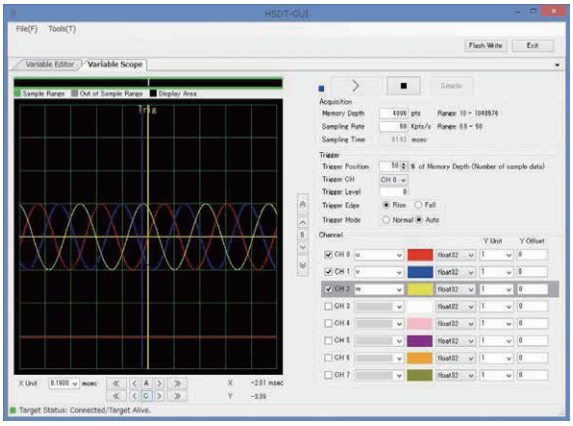
Specification (Model: HSDT-KIT-B)

Debug	Serial connection	Through Variable Editor Function and Flash Write Function in HSDT-GUI
Waveform Data Transmission	–	Waveform Data transmitted via Variable Scope function in HSDT-GUI
WatchdogTimer	CPU Embedded	Reset Signal Detection is determined by the function
PeriodicTimer	2 ch / 200MHz	32-bit timer function for generating periodic interrupts
Asynchronous Serial Connection	3 ch	Through SCI function
CAN Port	2 ch	125kbps~1Mbps speed with total of 32 Send/Receive message Box
Periodic Measurement	6 ch	Detecting the Edge of Waveform and measure the time.
Multiplex interrupt	–	Parallelly manage of multiple interruptions through Flagging towards Peripheral, PIE. etc.
External interrupt	5 ch	Interrupt Function using External Input Signal to GPIO
Arithmetic	–	Trigonometric , Coordination Changes, Limit etc are available in Library
Digital In/Out	Fixed port	Digital Input and Output can be handled.
EEPROM	Fixed port	Read/Write Function of Each Platform Circuit Board

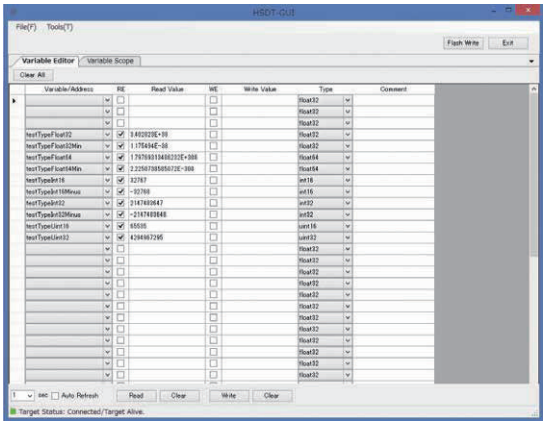
HSDT-DP Function

PC Connection	USB (mini B)
Controller Connection	Specific Cable (Provided as accessory)
LED Indicator	Shows status of Debugging, Waveform indication tools

HSDT-GUI Function



Waveform Display of Parameter in Control Program. Oscilloscope-like function such as Range Setting and Trigger Function Available



RealTime Writing Function without Pausing the Program

How to Connect to PC