

Goodrive600 Series

High-Performance Multi-drive VFD



CONTENTS



Company introduction.....	2
Product introduction	3
Multi-drive and high performance.....	4
Safe and reliable	6
Seamlessly integrated automatic control system	9
Technical specification.....	11
Type selection	12
Product overview	12
Module structure— —rectifier unit.....	13
Rectifier unit selection	13
Module structure— —inverter unit.....	13
Converter unit selection.....	14
Expansion card selection	14
Structure parts selection	15
Optional parts selection— —main circuit.....	15
Buffer unit model selection	16
Installation dimension.....	17
Parallel combination.....	20
Wiring diagram	21
Installation instruction— —expansion card	23
Installation instruction— —external terminal of bus.....	24

ABOUT US



Company Introduction

INVT (Shenzhen INVT Electric Co., Ltd) has been concentrating on industry automation and energy power since its foundation in 2002 and is committed to "Providing the best product and service to allow customers more competitiveness". INVT goes public in 2010 and is the first A-share listed company (002334) in Shenzhen Stock Exchange in the industry. At present, INVT owns 15 subsidiaries and more than 4500 employees, over 40 branches, forming a sales network covering more than 100 overseas countries and regions.

INVT has been awarded as the Key High-tech Enterprise of National Torch Plan based on mastering of key technologies in power electronics, auto control and IT. With business covering industry automation, electric vehicle, network power and rail transit, INVT has established 10 R&D centers nationwide, boasts more than 1400 patents and owns the first lab in the industry awarded ACT qualification from TÜV SÜD, UL-WTDP and CNAS National Lab. The industrial parks in Shenzhen and Suzhou aim to provide customers with advanced integrated product development design management, comprehensive product R&D test and auto informational production. The worldwide INVT branches and warranty service centers are ready to offer customers all-around back-ups including professional solutions, technical trainings and service support.

In the next decade, INVT will continue to take "Sincere Virtuous, Professional Aspiring" as our business philosophy, enhance core business sectors including industrial automation, electric vehicle, network power and rail transit based on the three major technologies in industry automation and energy power fields, and strive to become a leading, responsible and harmonic international professional group armed with proper product structure, leading technologies, efficient management, robust profitability and superior competitiveness.



Product introduction

Goodrive600 Series High-Performance Multi-Drive VFD is a common DC bus multi-drive system, which adopts the book-type unit structure and integrated bus control. It features high power density, flexible communication networking, and strong extensibility, manifesting its incomparable advantages.

- Integrating the STO function
- Compatible with the mainstream fieldbus 1MB~100MB
- Integrating torque control, speed control, and position control
- Implementing the driving control over asynchronous induction motors, permanent-magnet synchronous motors and servo motors
- Outstanding dynamic responding and control precision

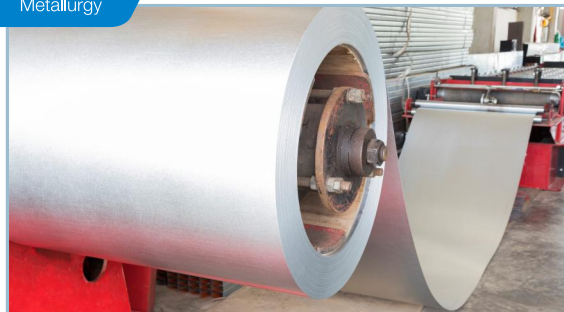
GD600 can be widely used in continuous production lines composed of multiple motor drives such as metal processing, printing and packaging, textile machinery, tissue machinery, and small-sized paper making.



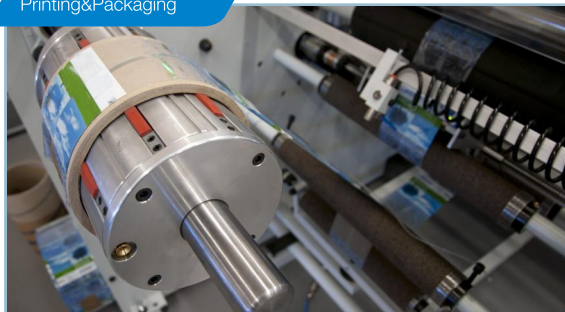
Metal processing



Metallurgy



Printing&Packaging



Textile



Papermaking

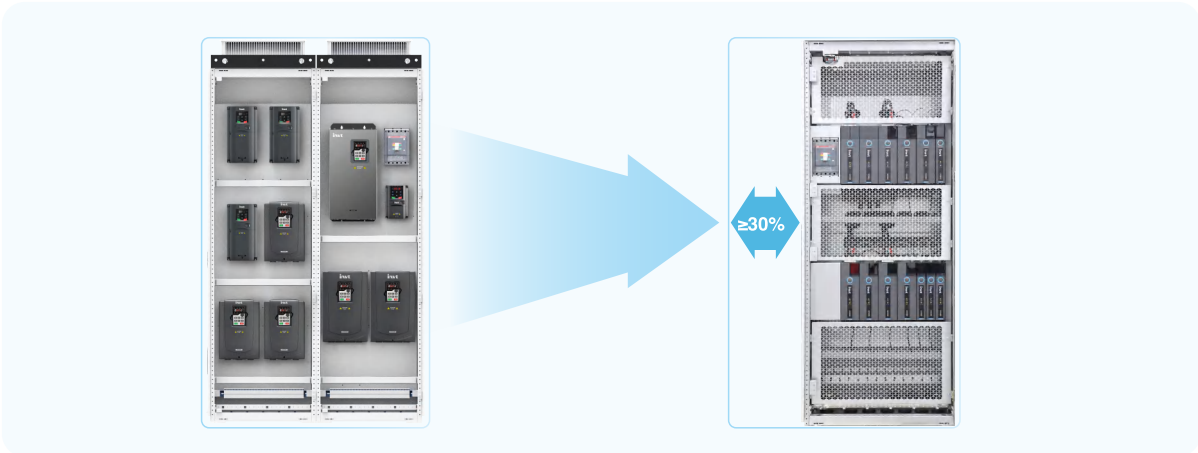


Automatic production line

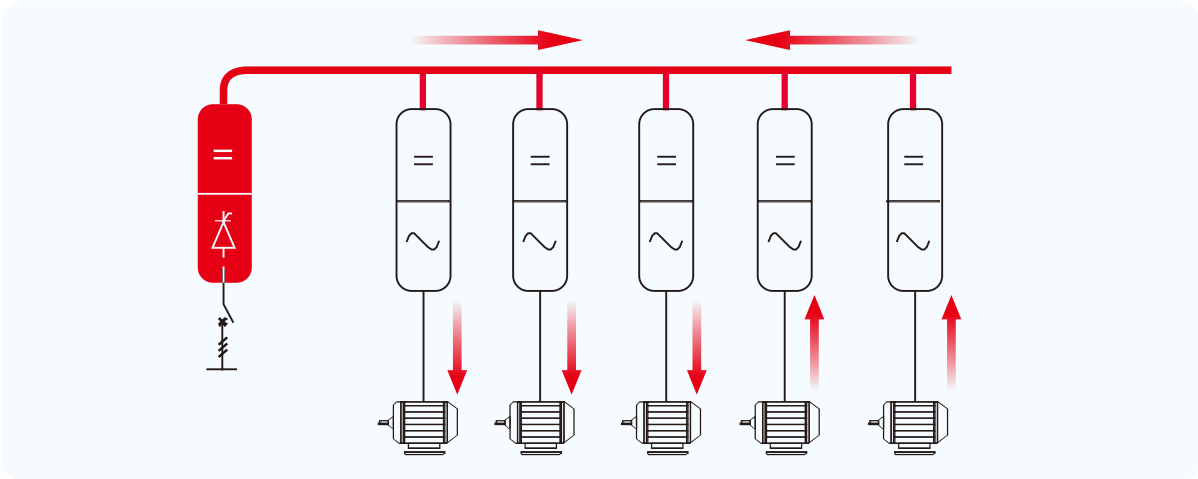


Multi-drive & high performance

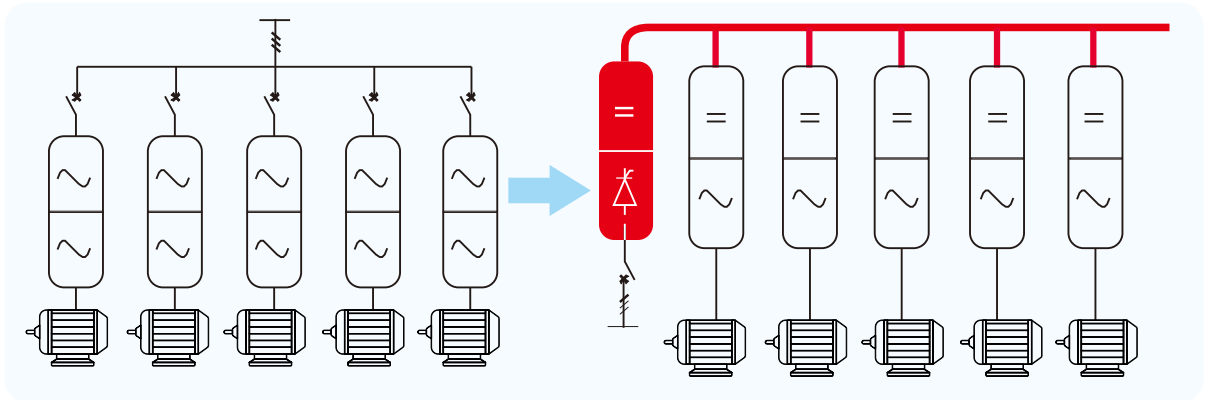
- Equal-height and equal-depth book module design, totally **saves 30% space or more**.



- Common dc bus realizes internal flow of energy, improves the electrical energy efficiency. It can **realize 30% of energy saving**.



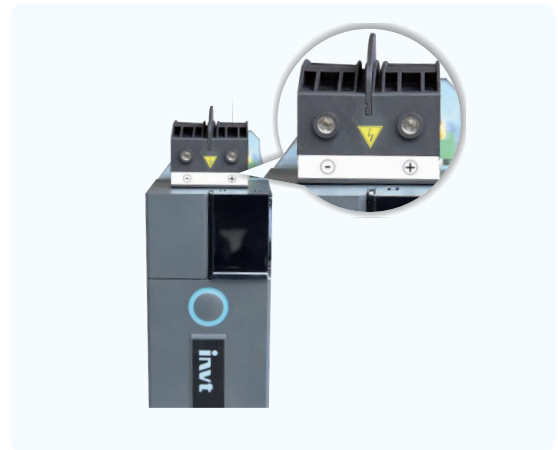
- Common dc bus effectively reduces the major circuit switch elements and redundant power cable of brake unit and system by unified power supply through rectifier units, to save system cost.



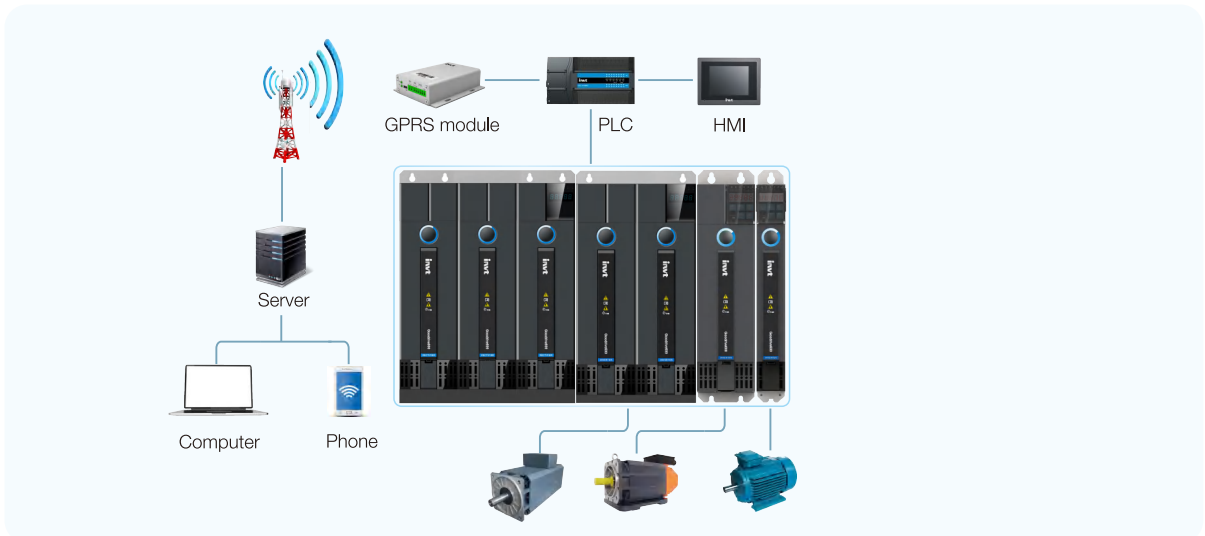
- Fast installation

External DC terminals can be used to facilitate the layered installation and maximize the utilization of the space in the cabinet.

The design allows quick lapping to DC buses and enables easy parallel operation, reducing the wiring time and costs.

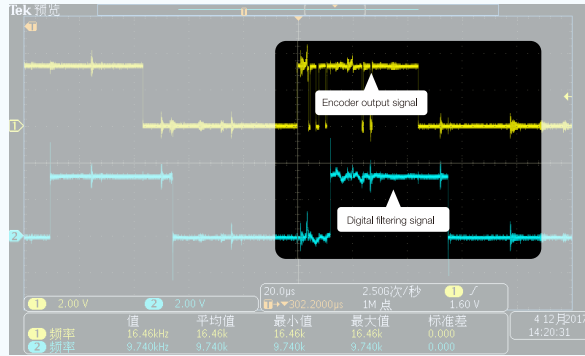


- It combines asynchronous, synchronous and servo motor, making update easy.

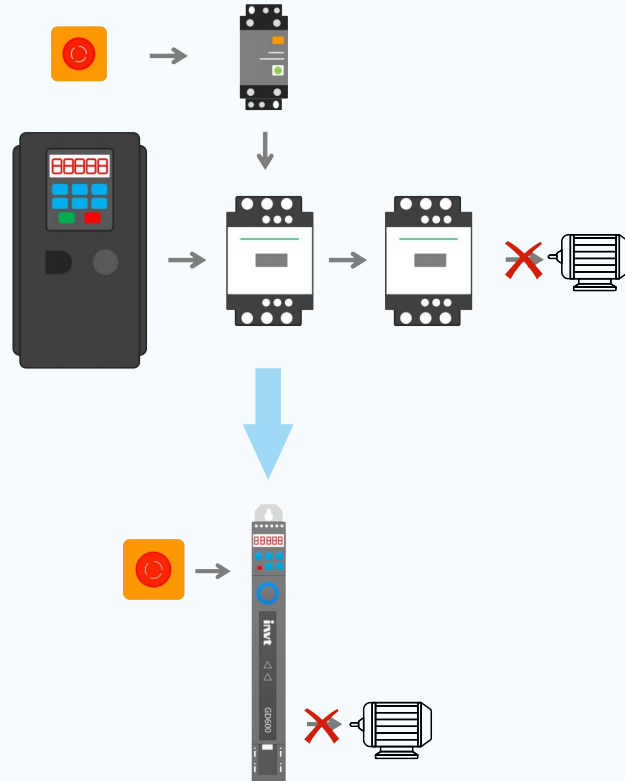


Safe and reliable

- PG card with digital filter technology improve anti-interference ability by more than one time, which insures the stable reception of encoder signal even over long distance.



- Standard STO function — cut off torque output when motor stops, to avoid accidental activation and keep safe and reliable.



Note: Meet SIL2 class

- Perfect protection

The converter unit has a built-in DC fuse, preventing unit failure from spreading to the system, to improve system stability.



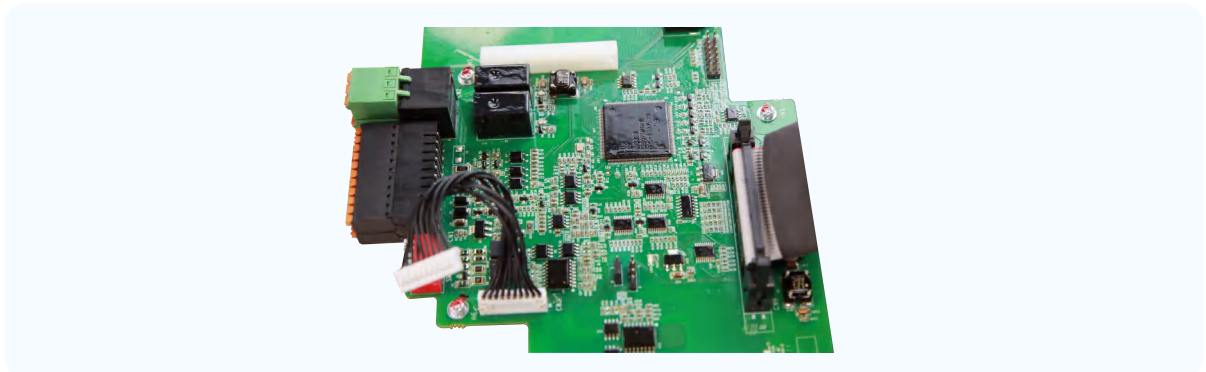
- Independent air duct

Independent air duct design, effectively prevent dust, particles and other pollutants into the VFD internal cause ignition and short circuit, improve product reliability, extend the service life.



- Superior environmental adaptability

Automatic three-proofing spray technology, covered with more uniform coating coverage, comprehensively improve the protection ability of board.



- Perfect reliability test system insures the product suitable for the most complex application environment.

Test category	Test name	Segment types
Mechanical reliability test	Packaging test	Compression test of package
		Resonant scanning and resident experiment of package
		Random vibration test of package
		Drop test of package
		Rolling test of package
		Tilt drop test of package
	Impact test	Italic impact test of package
		Half-sine wave impact tes
	Vibration test	Trapezoidal wave impact test
		Sine wave vibration test
Climatic environment reliability test	Temperature test	Random vibration experiment
		Cryogenic storage experiment
		High temperature storage experiment
		Low temperature work experiment
		High temperature work experiment
		Temperature gradient experiment
	Moist test	Temperature impact experiment
		Constant moist experiment
	Salt spray test	Mutational moist experiment
		Continuous salt spray experiment
	Low-pressure test	Mutational salt spray experiment
		Comprehensive experiment of low temperature and low pressure

Note:

INVT is first domestic factory to achieve the ACT qualification issued by TÜV SÜD. ACT is the short of Acceptance of Client's Testing. It tells that TÜV SÜD of Germany officially recognizes the technical level of a company's laboratory, officially recognizes the test data issued by this laboratory, and receives the test report issued by this laboratory.



Electric vibration experiment



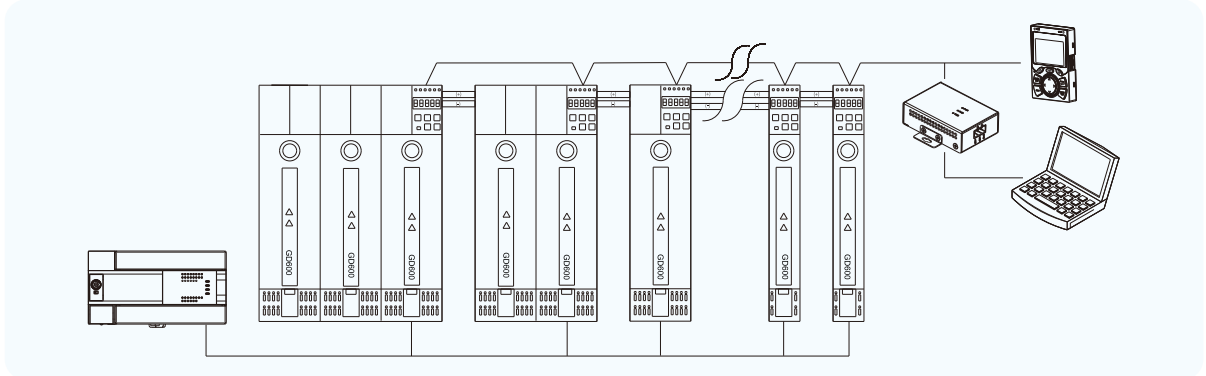
Low pressure test box (left)
Constant temperature and humidity test box (right)



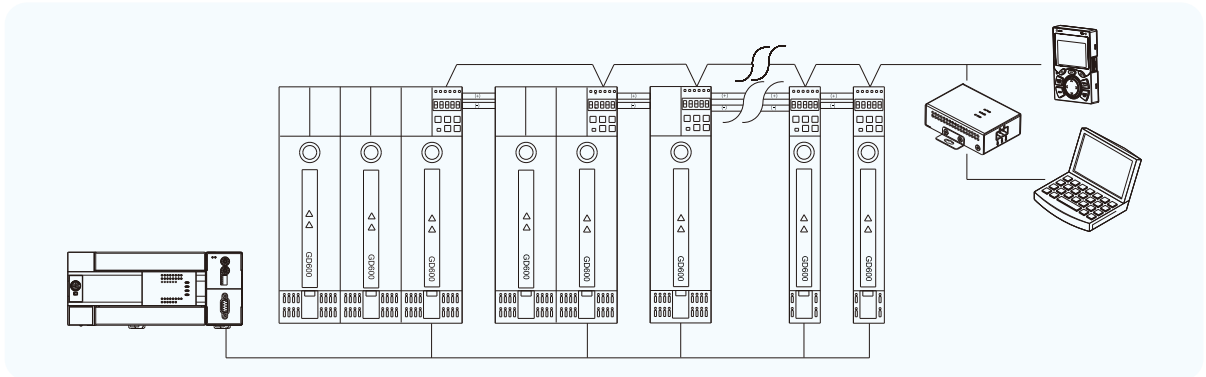
Natural convection test box (left)
Cold and hot shock test box (right)

Seamlessly integrated automatic control system

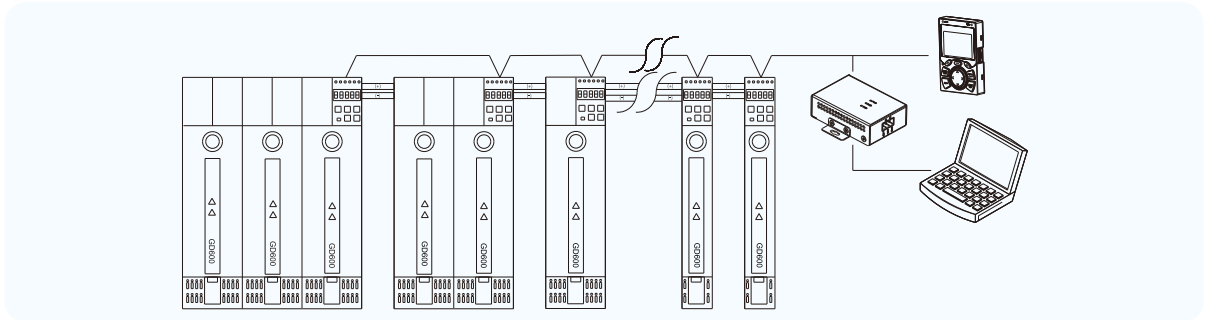
PLC+Standard Modbus



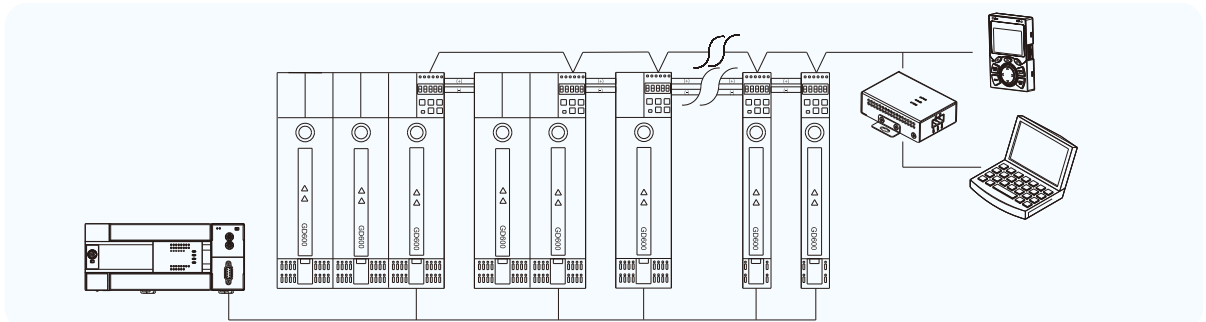
PLC+Standard CANopen



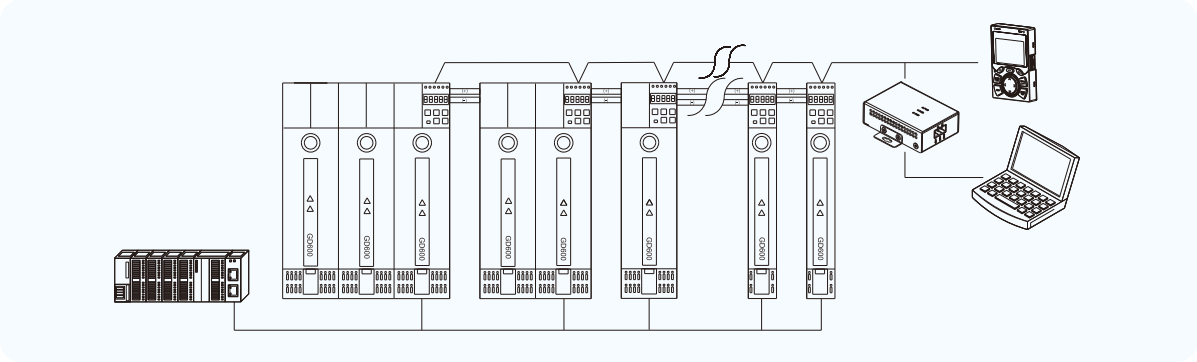
Optional PLC Card+Standard CANopen



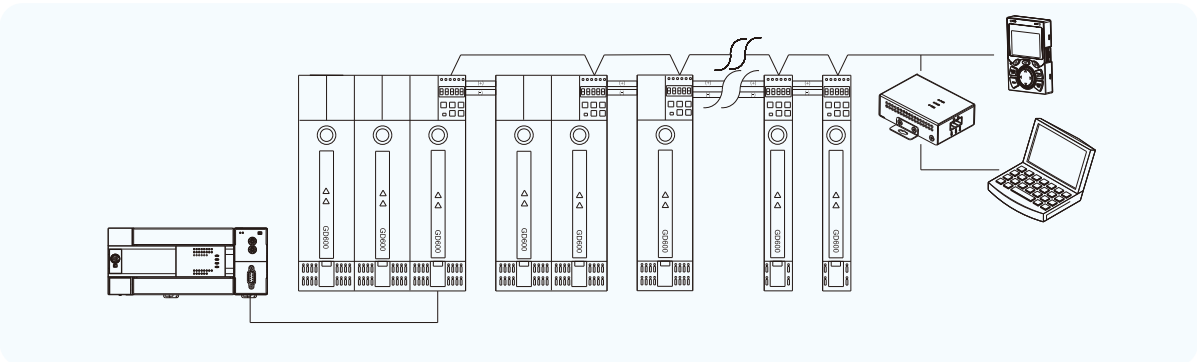
PLC+Optional PROFIBUS-DP



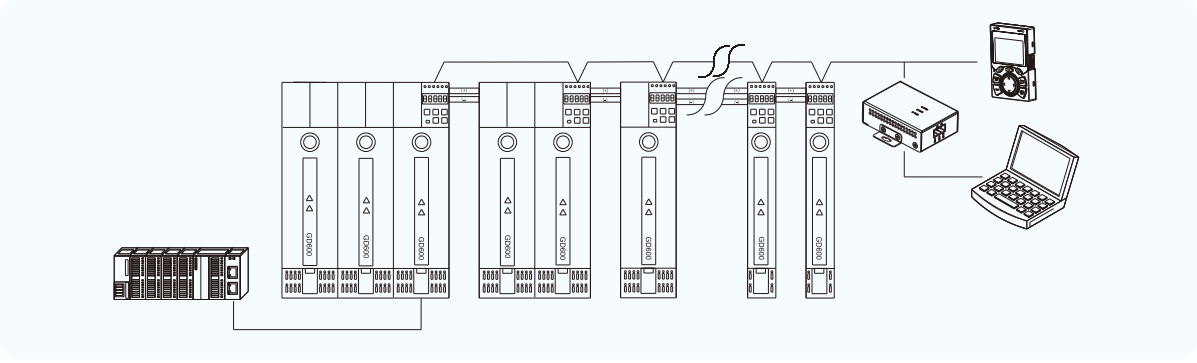
PLC+Optional PROFINET/ Optional EtherCAT



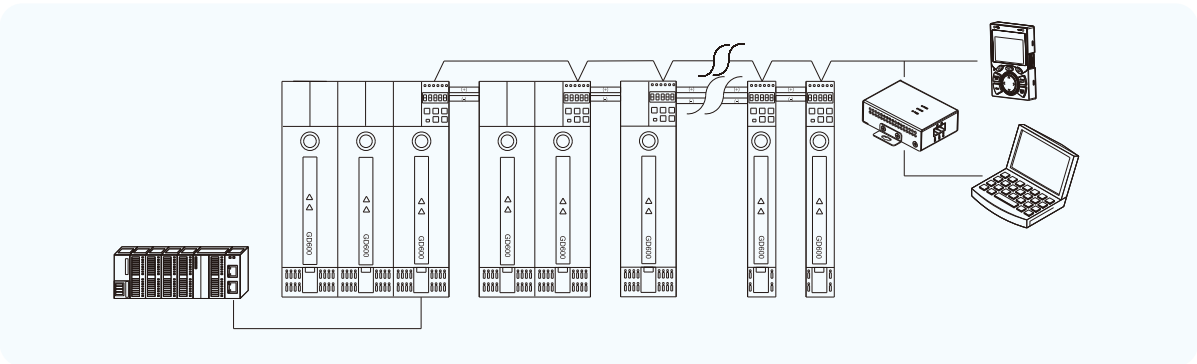
PLC+Optional PROFIBUS-DP/CANopen bridge network



PLC+Optional PROFINET/CANopen bridge network



PLC+Optional EtherCAT/CANopen bridge network



Technical specification

Function description		Specifications indicators
Technical control performance	Output frequency(Hz)	0~400Hz
	Carrier frequency(Hz)	1.0~15kHz
	Control mode	SVPWM control, SVC, VC
	Motor type	Asynchronous motor, permanent-magnet synchronous motor
	Speed regulation ratio	Asynchronous motor 1:200(SVC); Synchronous motor 1:20(SVC); Asynchronous motor 1:1000(VC)
	Speed control precision	±0.2%(SVC), ±0.02%(VC)
	Speed fluctuation	±0.3%(SVC), ±0.02%(VC)
	Torque response	<20ms(SVC); <10ms(VC)
	Torque control precision	±10%(SVC); ±5%(VC)
	Starting torque	Asynchronous motor: 0.25Hz/150% (SVC) Synchronous motor: 2.5 Hz/150% (SVC) Asynchronous motor: 0Hz/200% (VC)
	Overload capacity	150%: 1min; 180%: 10s; 200%: 1s;
Running control performance	Frequency setup mode	Digital, analog, pulse frequency, multi-step speed running, simple PLC, PID, MODBUS, PROFIBUS, PROFINET, ETHERCAT, etc. Realize switch-over between the set combination and the set channel
	Automatic voltage regulation function	Keep the output voltage constant when grid voltage changes
	Speed tracking restart function	Realize impact-free starting of the motor in rotating
External interface	Analog input	2, AI1: 0~10V/0~20mA, AI2: -10~10V Resolution: no more than 20mA
	Analog output	1, AO1: 0~10V/0~20mA
	Digital input	4 outputs, max. frequency: 1kHz, Internal impedance: 3.3kΩ Resolution: no more than 2ms
	Digital output	1 Y terminal open collector output
	Relay output	2 programmable relay outputs RO1A NO, RO1B NC, RO1C common port RO2A NO, RO2B NC, RO2C common port Contact capacity: 3A/AC250V, 1A/DC30V
	Communication interface	1 RS485 interface, supporting Modbus; 1 CAN interface for synchronous control
	External interface	2 extension interface: SLOT1, SLOT2; Expandable PG card, programmable extension card, communication card, I/O card, etc.
Protection function	Rectifier unit	Input out-phase, input overvoltage, input unbalanced 3PH voltage, overcurrent protection of brake circuit, short-circuit protection of brake resistance, direction protection of brake pipe protection, overvoltage, undervoltage, over-temperature
	Converter unit	Provide more than 30 fault protection functions: earthing short circuit, phase short circuit, overcurrent, overvoltage, undervoltage, overheating, phase loss, overload, overheating, communication fault, stall, encoder fault, etc.
Others	Installation mode	Wall-mounting, flange-mounting
	Temperature of running environment	-10~50°C, derating is required if the ambient temperature exceeds 40°C
	Protection level	IP20
	Pollution level	Level 2
	Cooling mode	Forced air cooling

Type selection

GD600-71-045-4-B

①
②
③
④
⑤

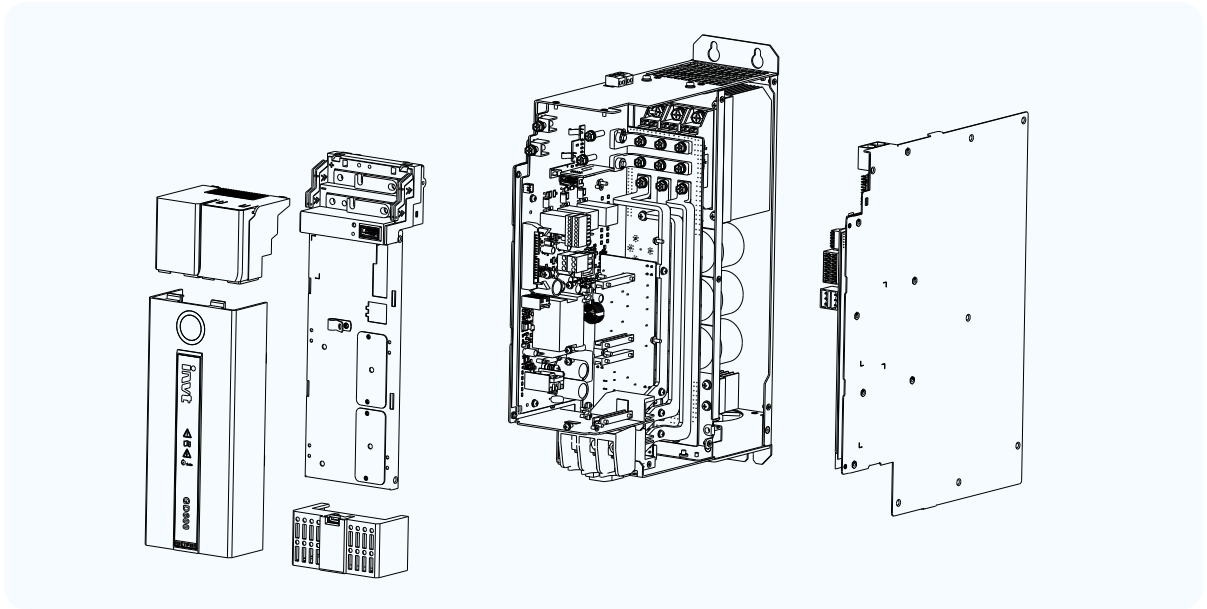
Field	Identification	Description
Product series	①	GD600: Goodrive600 high-performance multi-function VFD
Product type	②	51: Inverter unit 71: Main control rectifier unit
Power code	③	045: 45kW
Voltage class	④	4: 400V
Management of no.	⑤	None: default B: Built-in brake unit

Note: A built-in input current detection module can be selected for the 160kW and 355kW rectifier units for data analysis, which is a customized function.

Product overview

Appearance						
	Rectifier unit			Converter unit		
Power (kW)	45	160	355	1.5~7.5	11~37	45~75
Dimension (W*H*D)	100*400*350	300*400*350	180*805*423	50*400*350	100*400*350	200*400*350
Optional part						
Type	PLC card		Communication card		PG card	I/O card

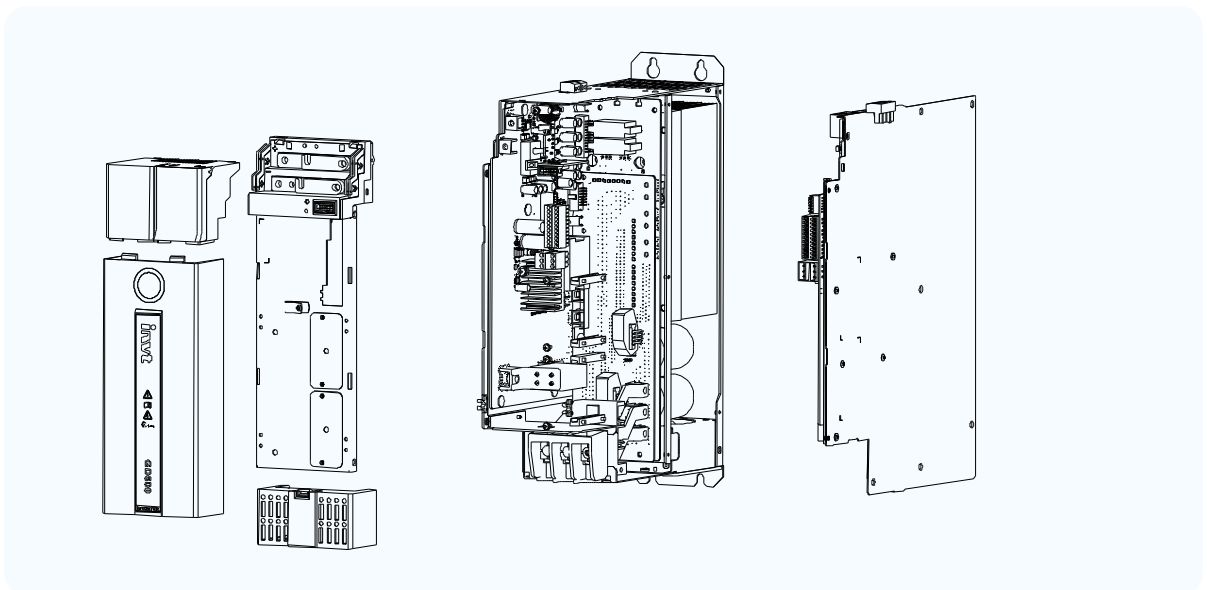
Module structure——rectifier unit



Rectifier unit selection

Input voltage: AC 3PH 380V(-15%)~440V(+10%), Output voltage: 457Vdc~684Vdc							
Product model	Rated power (kW)	Power capacity (kVA)	Input current AC(A)	Output current DC(A)	Built-in bus current-carrying capacity (A)	Recommended brake unit	Recommended braking resistor (OHM)
GD600-71-045-4-B	45	76	110	135	200	Built-in	≥6.4
GD600-71-160-4	160	215	320	380	200	DBU100H- 320-4	≥2.2
GD600-71-355-4	355	433	625	766	-	DBU100H-320-4×2	≥2.2*2


Module structure——converter unit







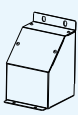

Converter unit selection

Input voltage: 457Vdc~684Vdc (working range: 350Vdc~800Vdc), Output voltage: 0~480Vdc						
Product model	Rated power (kW)	Input current DC(A)	Output current DC(A)	Built-in bus current-carrying capacity(A)	Motor	
					(kW)	(HP)
GD600-51-1R5-4	1.5	3.6	3.7	100	1.5	2
GD600-51-2R2-4	2.2	5.5	5.5	100	2.2	3
GD600-51-004-4	4	9.6	9.5	100	3.7	5
GD600-51-5R5-4	5.5	14.2	14	100	5.5	7.5
GD600-51-7R5-4	7.5	19	18.5	100	7.5	10
GD600-51-011-4	11	26	25	200	11	15
GD600-51-015-4	15	33	32	200	15	20
GD600-51-018-4	18.5	40	38	200	18.5	25
GD600-51-022-4	22	47	45	200	22	30
GD600-51-030-4	30	62	60	200	30	40
GD600-51-037-4	37	79	75	200	37	50
GD600-51-045-4	45	97	92	200	45	60
GD600-51-055-4	55	121	115	200	55	75
GD600-51-075-4	75	158	150	200	75	100

Expansion card selection

Type	Model	Category	Specification
 PG card	EC-PG705-12B	Multi-function incremental PG card	Supporting differential,push-pull, and open collector ABZ signals of 5V or 12 V incremental encoders; Maximum 200kHz; Supporting the giving of pulse + direction; Supporting 5V differential output with frequency multiplied by 1~255
	EC-PG704-00	Resolver transformer PG card	Resolver transformer encoder; Supporting pulse/direction differential input; Maximum 200kHz; Supporting 5V differential output with frequency multiplied by 2^(1~255)
	EC-PG707-24	24V incremental PG card	Supporting differential,push-pull, and opencollector ABZ signals of 24V incremental encoders; Maximum 200kHz;
	EC-PG708-24	Absolute encoder SSI communication PG card	Supporting differential,push-pull, and opencollector ABZ signals of 24V incremental encoders; Maximum 400kHz; Supporting SSI signal, 5V isolation differential input, interrupted clock signal synchronization, communication rate up to 700kHz; Supporting output of frequency divided by 1-255)
 Communication card	EC-TX703	PROFIBUS-DP	Supporting the POFIBUS protocol, 9.6kbps~12Mbps
	EC-TX709	PROFINET	Supporting the PROFINET protocol; Supporting 100Mbps full-duplex operation
	EC-TX704	Upper computer card	Supporting the INVT Ethernet protocol; Used for INVT Workshop upper computer monitoring
	EC-TX708	EtherCAT card	Supporting the EtherCAT protocol to function as an EtherCAT slave station;Providing 2 real-time industrial communication Ethernet interfaces;Supporting 100Mbps/s full duplex operation.
 PLC card	EC-PC701-02	PLC card	4DI 2RO; 16K steps of user data storage; 8K words of data storage space; Supporting IL, LD,and SFC
 I/O card	EC-IO702	I/O card	Support 2 digital inputs, 1 analog input, 1 relay output, 4 types (KTY84-130/PT100/PT1000/NTC) of temperature detection

Structure parts selection

Name	Picture	Model/Order number	Specification	Adaptable model
LCD keypad		SOP-600-01	LCD keypad	All
		19005-00149	External keypad bracket	All
		37005-00022	3m outer cable	All
Outer terminal		GD600-CON1	100A outer terminal	Inverter unit ($\leq 7.5\text{kW}$)
		GD600-CON2	200A outer terminal	Inverter unit ($> 11\text{kW}$) 45kW/60kW rectifier unit
shielding shelf		GD600-SH1	50mm shielding shelf	Inverter unit (1.5-7.5kW)
		GD600-SH2	100mm shielding shelf	Inverter unit (11-37kW)
Flange-mounted shelf		GD600-FLAN1	50mm mounting bracket	Inverter unit (1.5-7.5kW)
		GD600-FLAN2	100mm mounting bracket	Inverter unit (11-37kW) ; Rectifier unit (45kW)
		GD600-FLAN3	200mm mounting bracket	Inverter unit (45-75kW)
		GD600-FLAN4	300mm mounting bracket	Rectifier unit (160kW)
Air deflector		GD600-AD1	50mm lead wind board	Inverter unit (1.5-7.5kW)
		GD600-AD2	100mm lead wind board	Inverter unit (11-37kW) ; Rectifier unit (45kW)
		GD600-AD3	200mm lead wind board	Inverter unit (45-75kW)
		GD600-AD4	300mm lead wind board	Rectifier unit (160kW)
USB-485		EC-TM485-USB	Adaptor	All

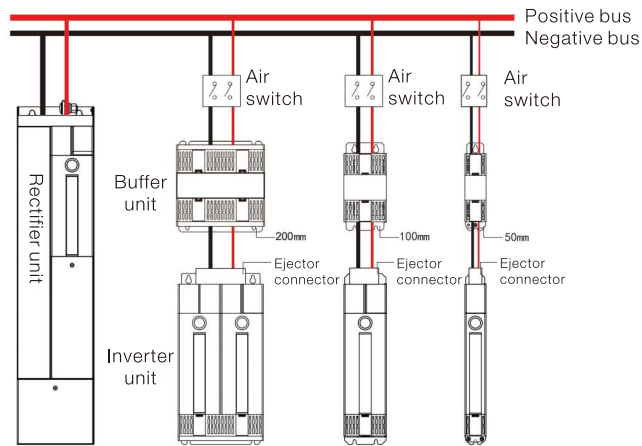
Optional parts selection main circuit

Type	Model	Rated power (kW)	Reactor	Filter
Rectifier part	GD600-71-045-4-B	45	GDL-ACL0110-4AL	FLT-P04100L-B
	GD600-71-160-4	160	GDL-ACL0330-4AL	FLT-P04400L-B
	GD600-71-355-4	355	GDL-ACL0660-4AL	FLT-P04800L-B
Converter part	GD600-51-1R5-4	1.5	GDL-OCL0005-4CU	FLT-L04006L-B
	GD600-51-2R2-4	2.2	GDL-OCL0006-4CU	
	GD600-51-004-4	4	GDL-OCL0010-4CU	FLT-L04016L-B
	GD600-51-5R5-4	5.5	GDL-OCL0014-4CU	
	GD600-51-7R5-4	7.5	GDL-OCL0020-4CU	FLT-L04032L-B
	GD600-51-011-4	11	GDL-OCL0025-4CU	
	GD600-51-015-4	15	GDL-OCL0035-4AL	FLT-L04045L-B
	GD600-51-018-4	18.5	GDL-OCL0040-4AL	
	GD600-51-022-4	22	GDL-OCL0050-4AL	FLT-L04065L-B
	GD600-51-030-4	30	GDL-OCL0060-4AL	
	GD600-51-037-4	37	GDL-OCL0075-4AL	FLT-L04100L-B
	GD600-51-045-4	45	GDL-OCL0092-4AL	
	GD600-51-055-4	55	GDL-OCL0115-4AL	FLT-L04150L-B
	GD600-51-075-4	75	GDL-OCL0150-4AL	

Buffer unit model selection



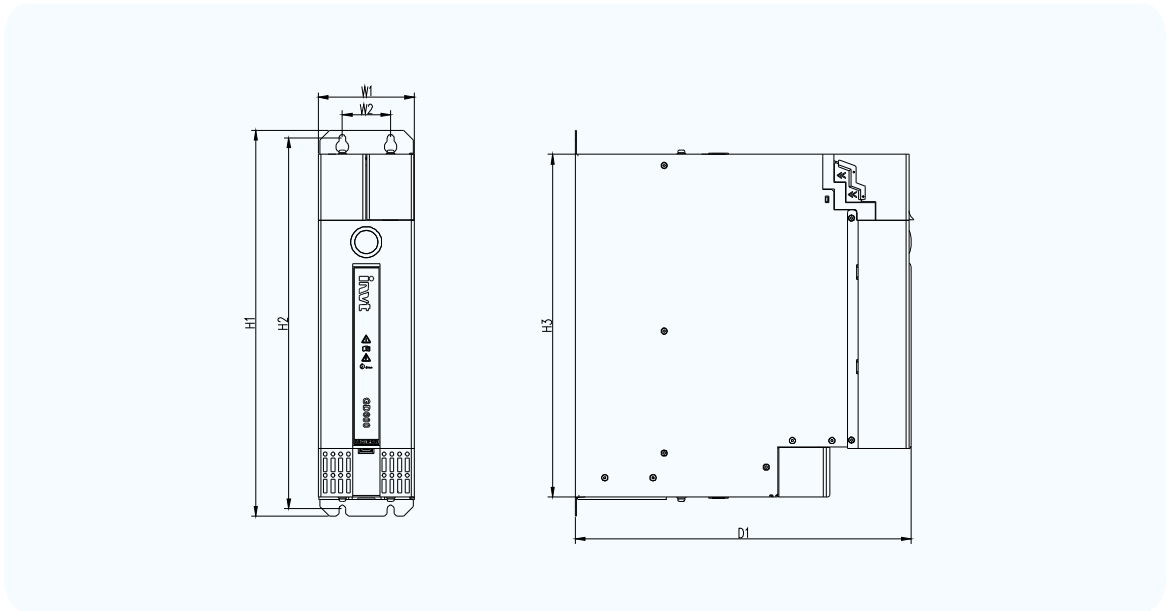
BUB600 series buffer unit is applicable to the DC power-up buffer device used in GD600 series inverter unit. It works with the "air switch" and "bus external terminal" to achieve independent power up and down operations on the inverter unit, facilitating the inverter unit replacement without power cut during rectification.



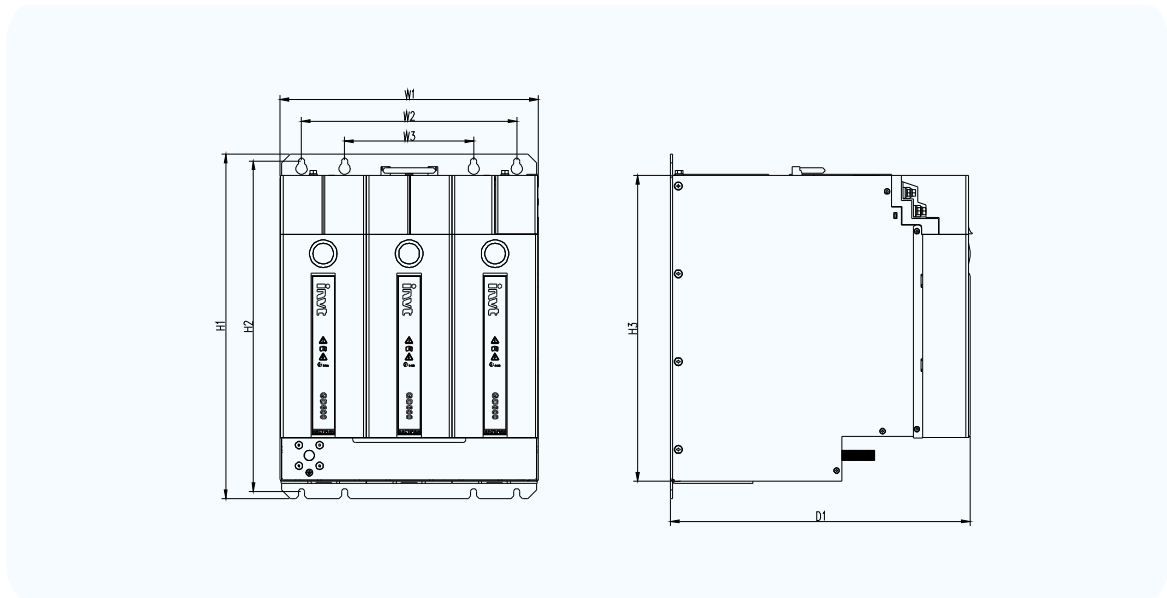
System schematic diagram

Inverter unit	Applicable BUB model	Rated current of recommended air switch (A)
GD600-51-1R5-4	BUB600-7R5-4	40
GD600-51-2R2-4	BUB600-7R5-4	40
GD600-51-004-4	BUB600-7R5-4	40
GD600-51-5R5-4	BUB600-7R5-4	40
GD600-51-7R5-4	BUB600-7R5-4	40
GD600-51-011-4	BUB600-037-4	80
GD600-51-015-4	BUB600-037-4	80
GD600-51-018-4	BUB600-037-4	80
GD600-51-022-4	BUB600-037-4	80
GD600-51-030-4	BUB600-037-4	125
GD600-51-037-4	BUB600-037-4	125
GD600-51-045-4	BUB600-075-4	200
GD600-51-055-4	BUB600-075-4	200
GD600-51-075-4	BUB600-075-4	315

Installation dimension

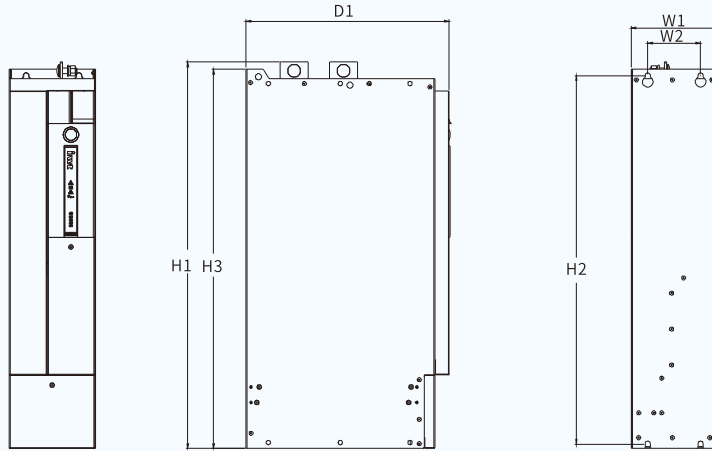


Model	Overall dimensions(mm)			Installation hole location(mm)			Installation hole size (mm)	Weight (kg)
	W1	H1	D1	W2	H2	H3		
GD600-71-045-4-B	100	400	350	50	384	355	Φ7	9

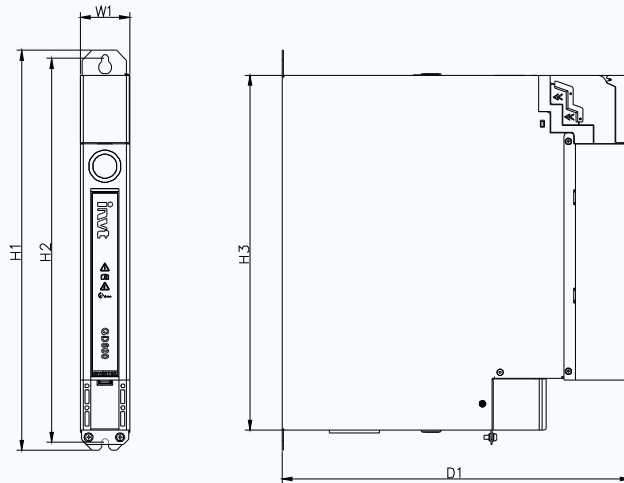


Model	Overall dimensions(mm)			Installation hole location(mm)				Installation hole size (mm)	Weight (kg)
	W1	H1	D1	W2	W3	H2	H3		
GD600-71-160-4	300	400	350	250	150	384	355	Φ7	28

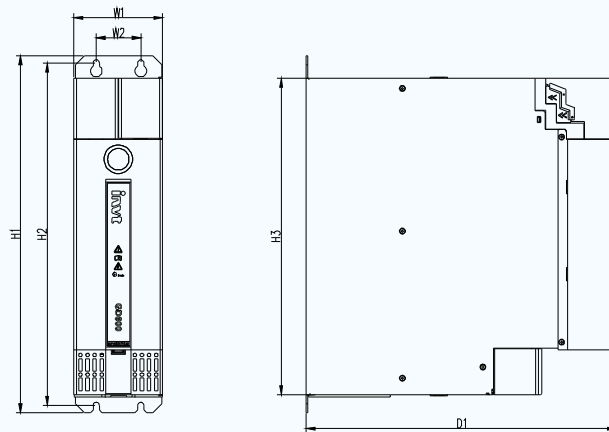
Installation dimension



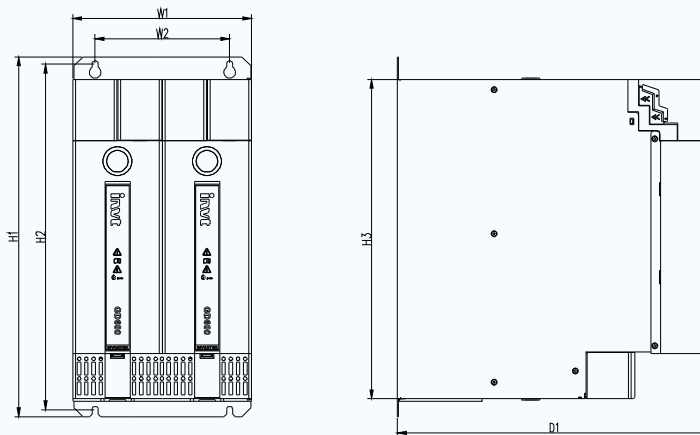
Model	Overall dimensions(mm)			Installation hole location(mm)			Installation hole size (mm)	Weight (kg)
	W1	H1	D1	W2	H2	H3		
GD600-71-355-4	180	805	423	110	767.5	790	Φ11	42.6



Model	Overall dimensions(mm)			Installation hole location(mm)			Installation hole size (mm)	Weight (kg)
	W1	H1	D1	W2	H2	H3		
GD600-51-1R5-4	50	400	350	-	384	355	Φ7	4
GD600-51-2R2-4	50	400	350	-	384	355	Φ7	4
GD600-51-004-4	50	400	350	-	384	355	Φ7	4
GD600-51-5R5-4	50	400	350	-	384	355	Φ7	4
GD600-51-7R5-4	50	400	350	-	384	355	Φ7	4



Model	Overall dimensions(mm)			Installation hole location(mm)			Installation hole size (mm)	Weight (kg)
	W1	H1	D1	W2	H2	H3		
GD600-51-011-4	100	400	350	50	384	355	Φ7	9
GD600-51-015-4	100	400	350	50	384	355	Φ7	9
GD600-51-018-4	100	400	350	50	384	355	Φ7	9
GD600-51-022-4	100	400	350	50	384	355	Φ7	9
GD600-51-030-4	100	400	350	50	384	355	Φ7	9
GD600-51-037-4	100	400	350	50	384	355	Φ7	9

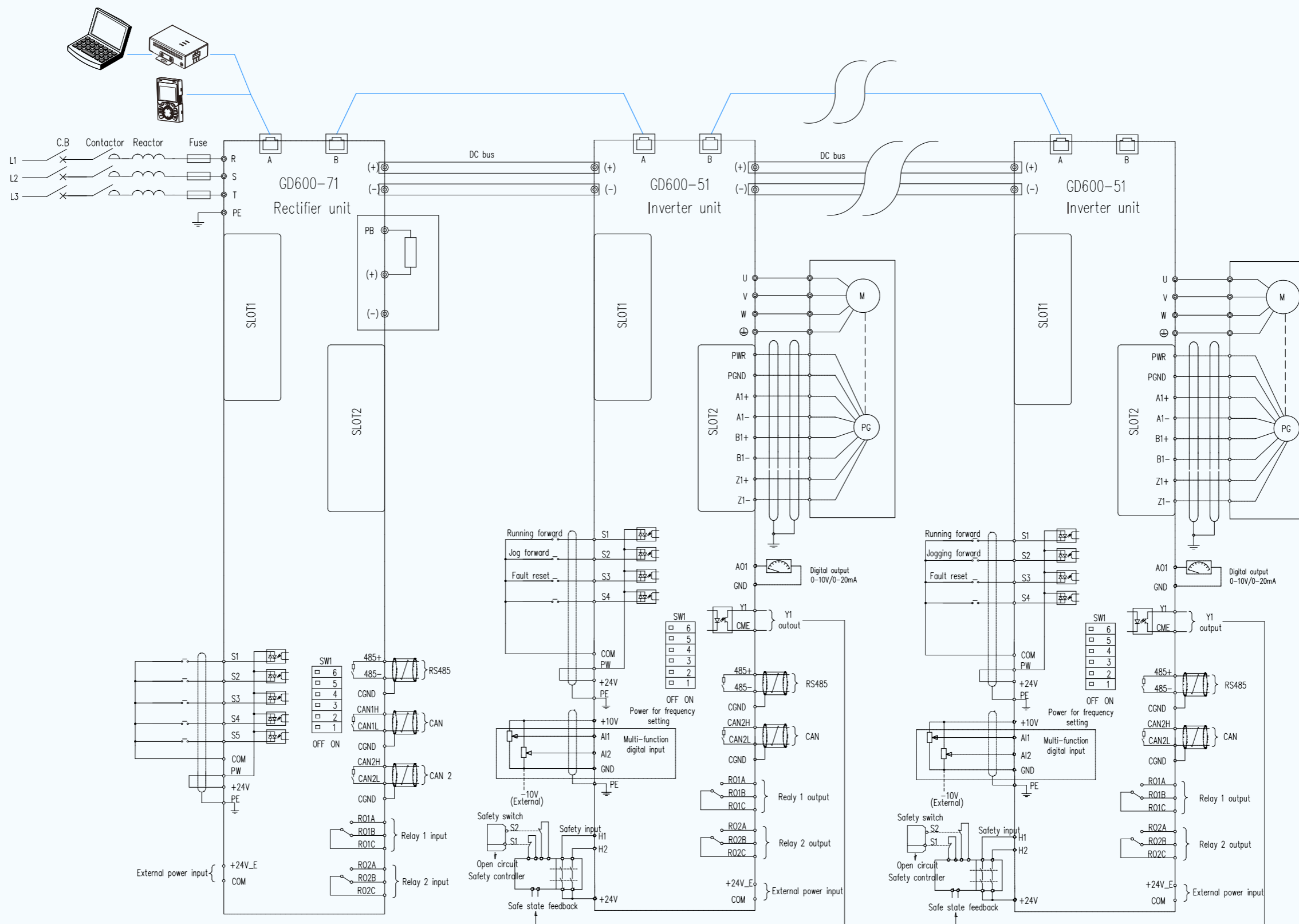


Model	Overall dimensions(mm)			Installation hole location(mm)			Installation hole size (mm)	Weight (kg)
	W1	H1	D1	W2	H2	H3		
GD600-51-045-4	200	400	350	150	384	355	Φ7	18
GD600-51-055-4	200	400	350	150	384	355	Φ7	18
GD600-51-075-4	200	400	350	150	384	355	Φ7	18

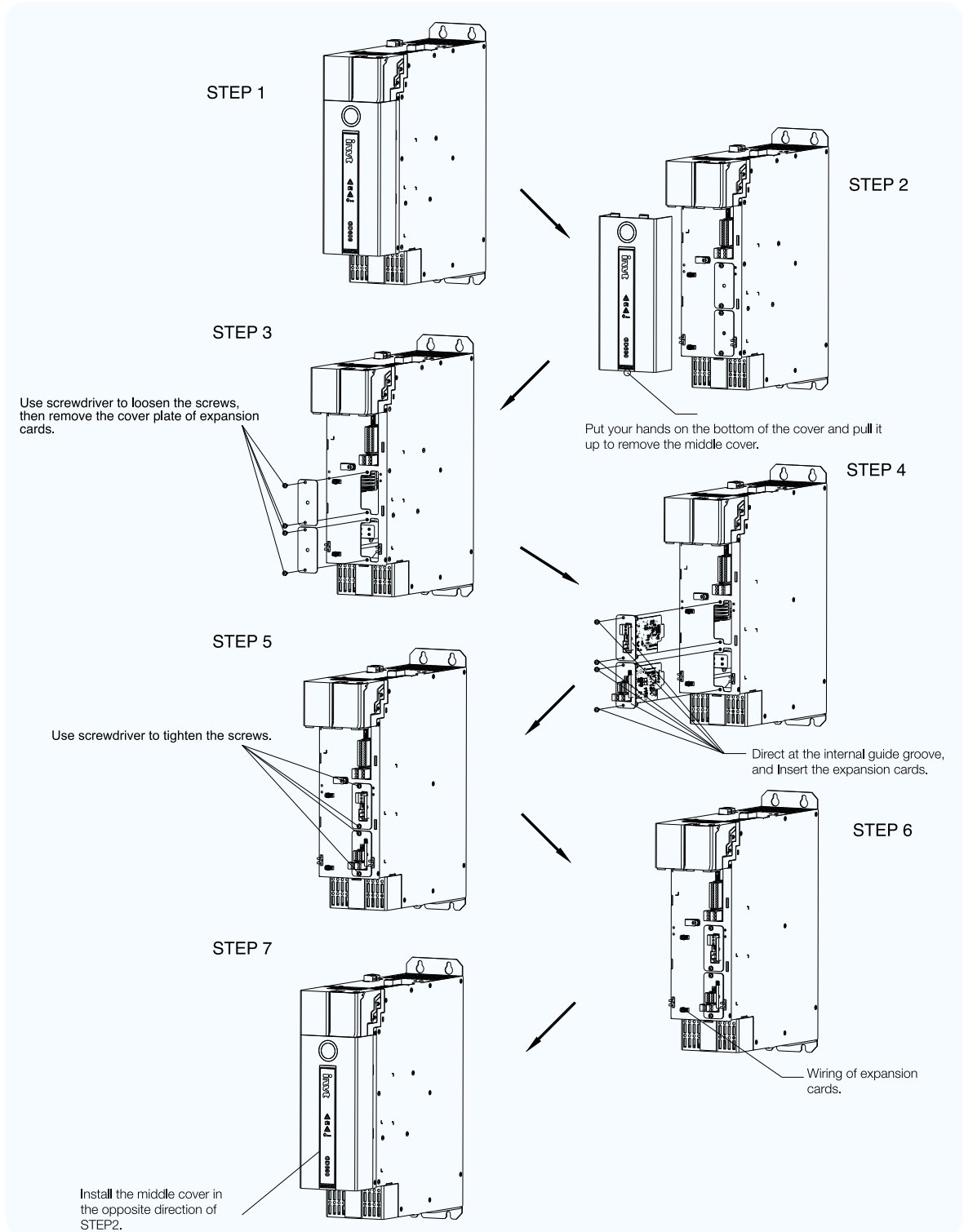
Parallel combination

Combination mode	Parallel figure	Satisfied condition
Single row distribution (Rectifier on the left)		$I \geq 0.8 * (I_1 + I_2 + I_3 + I_4 + I_5 + I_6 + \dots)$ $I_1 + I_2 + I_3 + I_4 + I_5 + I_6 + \dots \leq 200A$ $I_4 + I_5 + I_6 + \dots \leq 100A$
Single row distribution (Rectifier in the middle)		$I \geq 0.8 * (I_1 + I_2 + I_3 + I_4 + I_5 + I_6 + I_7 + \dots)$ $I_1 + I_2 + I_3 + \dots \leq 200A$ $I_4 + I_5 + I_6 + I_7 + \dots \leq 200A$ $I_5 + I_6 + I_7 + \dots \leq 100A$ $I_3 + \dots \leq 100A$
Single row distribution (External bus)		$I \geq 0.8 * (I_1 + I_2 + I_3 + I_4 + I_5 + I_6 + \dots)$ $I_1 + I_2 \leq 200A$ $I_3 + I_4 + I_5 + I_6 + \dots \leq 200A$ $I_4 + I_5 + I_6 + \dots \leq 100A$
Double row distribution (single rectifier)		$I \geq 0.8 * (I_1 + I_2 + I_3 + I_4 + I_5 + I_6 + I_7 + \dots)$ $I_1 + I_2 + I_3 + \dots \leq 200A$ $I_4 + I_5 + I_6 + I_7 + \dots \leq 200A$ $I_5 + I_6 + I_7 + \dots \leq 100A$ $I_3 + \dots \leq 100A$
Multiple row distribution (Multiple rectifiers installed in parallel)		$I + II \geq 0.8 * (I_1 + I_2 + I_3 + I_4 + I_5 + I_6 + I_7 + \dots)$ $I / II \approx (I_1 + I_2 + I_3 + \dots) / (I_4 + I_5 + I_6 + I_7 + \dots)$ $I_1 + I_2 + I_3 + \dots \leq 200A$ $I_4 + I_5 + I_6 + I_7 + \dots \leq 200A$ $I_5 + I_6 + I_7 + \dots \leq 100A$ $I_3 + \dots \leq 100A$ <p>Note: Parallel installation is not supported among rectifier units of different power</p>

Wiring diagram



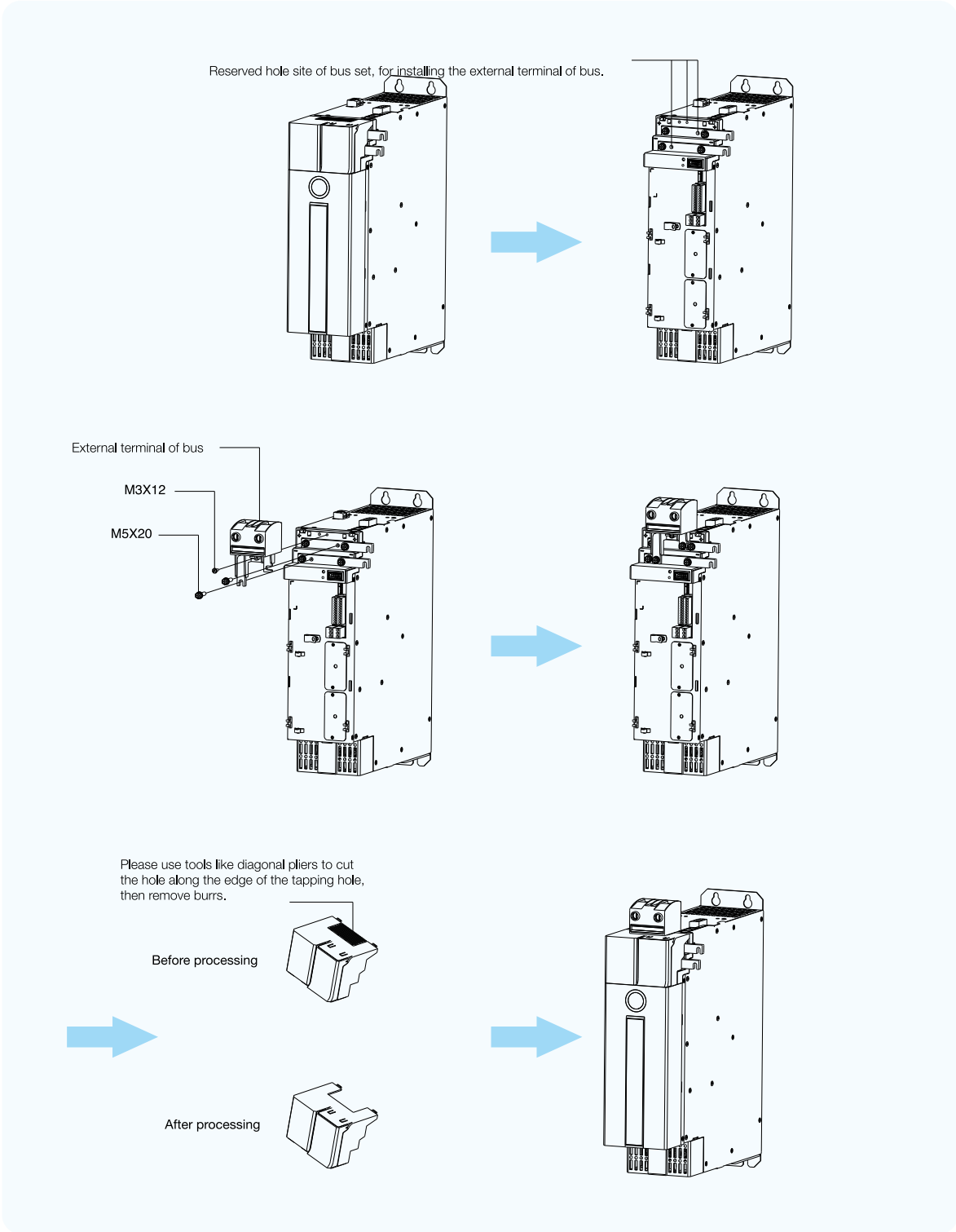
Installation instruction—expansion card



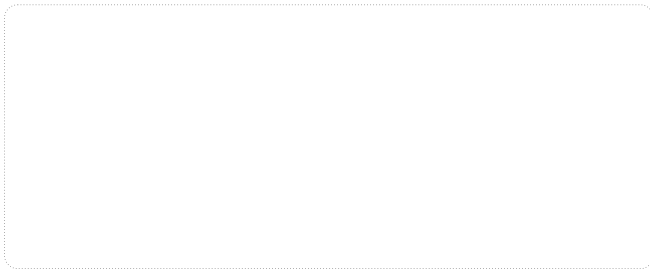
Note:

1. Please install the expansion cards when the power is turned off.
2. Expansion cards can be inserted in any card slot of SLOT1 and SLOT2.
3. If the external wiring interference occurs after the installation of the expansion card, please adjust the installation slot of each expansion card flexibly to the most convenient wiring state. For example, the DP card connector is large, so it is recommended to install the SLOT2 card slot.

Installation instruction——external terminal of bus



Your Trusted Industry Automation Solution Provider



E-mail: overseas@invt.com.cn

Website: www.invt.com

SHENZHEN INVT ELECTRIC CO.,LTD. INVT Guangming Technology Building, Songbai Road, Matian, Guangming District, Shenzhen, China

- Industrial Automation:
- HMI
 - PLC
 - VFD
 - Servo System
 - Elevator Intelligent Control System
 - Rail Transit Traction System
- Electric Power:
- UPS
 - DCIM
 - Solar Inverter
 - New Energy Vehicle Powertrain System
 - New Energy Vehicle Charging System
 - New Energy Vehicle Motor

INVT Copyright.
Information may be subject to change without notice during product improving.

66003-00198

202407(V4.0)