DAT
TECHNOLOGY

Goodrive300 Series

High Performance Vector Control Inverter

Management Service

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Brief introduction of Goodrive300 inverter

Goodrive300 series inverters are high performance open loop vector inverters for controlling asynchronous AC induction motors and permanent magnet synchronous motors. Applying the most advanced sensorless vector control technology which keeps pace with the leading international technology and DSP control system, the product enhances its reliability to meet the requirement of environment adaptability, customized and industrialized design with more optimized functions, more flexible application and more stable performance.

Advantages

Combined Drive

Multi function with simple operation

Reliable quality certificated by TÜV SÜD

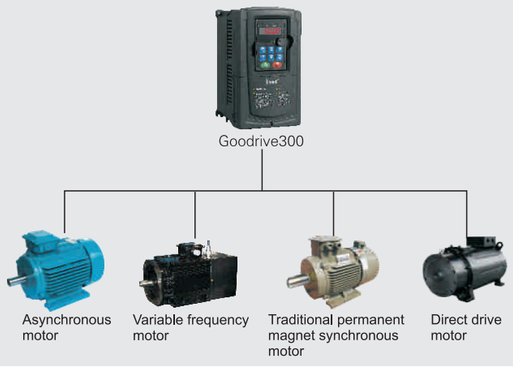
3 International Communication Protocols

Contents

Combined Drive

1.Compatible with multiple motors

Vector drive for asynchronous AC induction motors and permanent magnet synchronous motors. Reduce the inventory effectively without considering the motor compatibility.



Remarks:
1.The traditional permanent magnet synchronous motor includes SPM and IPM.
2.The variable frequency motor includes high speed spindle.

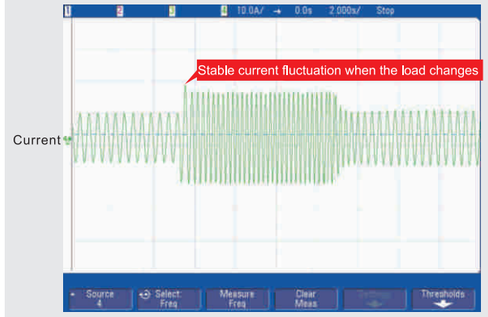
2.More Accurate Motor Autotuning

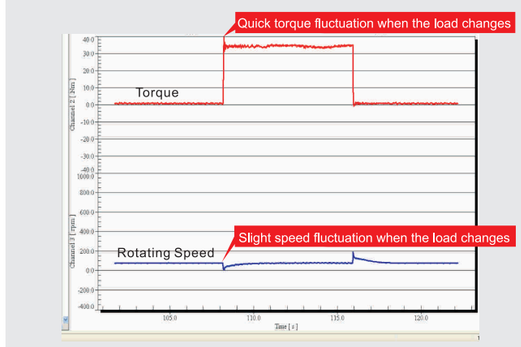
Correct rotating and static motor autotuning.
Convenient debugging,easy operation.

Rotating Autotuning	Static Autotuning
De-couple from the load Applied to the situation with high control accuracy	No need to de-couple from the load Applied when rotating autotuning is not available

3.Optimized V/F Control

The current, torque and rotating speed waveforms when sudden loading or unloading in asynchronous motor V/F control mode with 2Hz running frequency and full load.





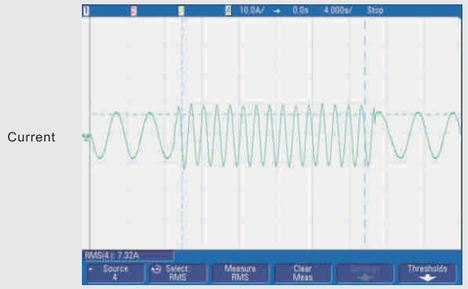
4. Advanced Open Loop Vector Control

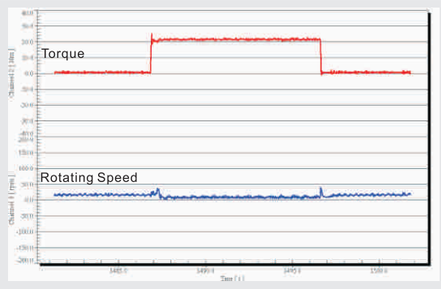
(1)Asynchronous Motor

Starting Torque	Dynamic Response	Speed Ratio	Steady Speed Accuracy
0.25Hz/150% of rated torque	<20ms	1：200	±0.2%

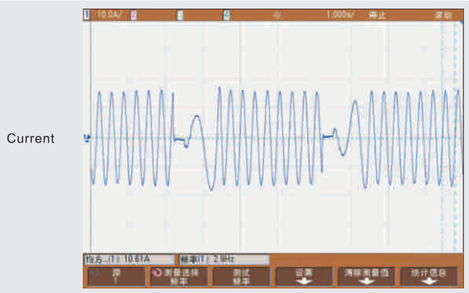
(2) Synchronous Motor

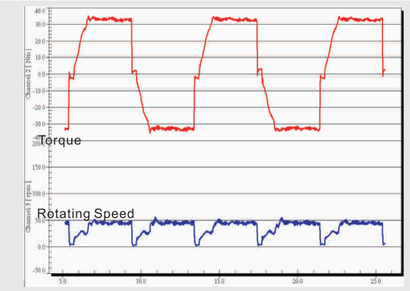
Starting Torque	Dynamic Response	Speed Ratio
2.5Hz/150%of rated torque	<40ms	1：20





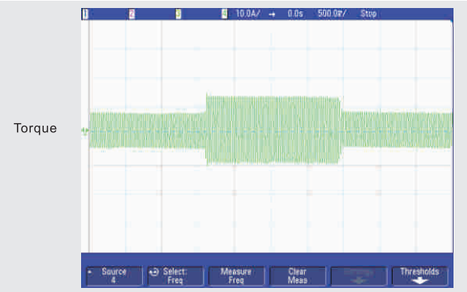
The current, torque and rotating speed waveforms when sudden loading or unloading in asynchronous motor open loop vector control mode with 0.25Hz running frequency and full load.

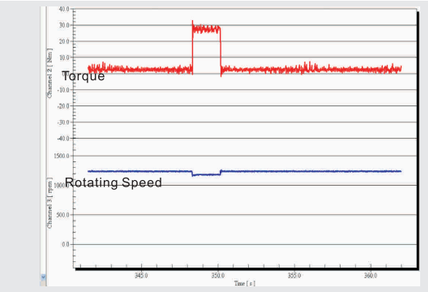




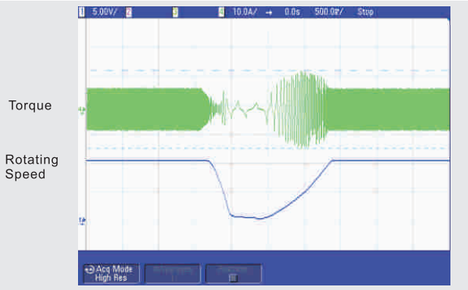
The current, torque and rotating speed waveforms when sudden loading or unloading in synchronous motor open loop vector control mode with 3Hz running frequency and full load.

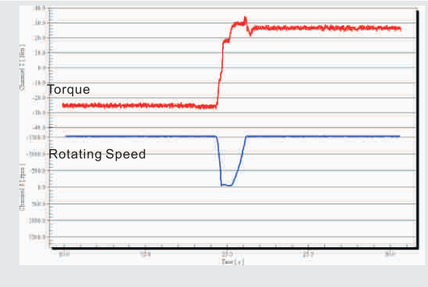
5.Torque Control Mode(open loop)





The current, torque and rotating speed waveforms when sudden loading or unloading in asynchronous motor torque control mode with full load.



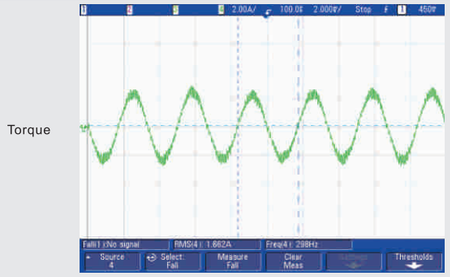


The FWD/REV current, torque and rotating speed waveforms in synchronous motor torque control mode with 100Hz running frequency and full load.

6. More smoother and more quietter running by applying advanced 3–phase modulation

【 Common Inverter 】 【 Goodrive300 】

7. Excellent performance on specific motors such as High speed spindle, Direct–control motor



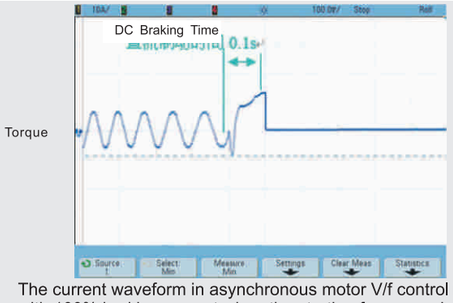
The current waveforms in synchronous motor open loop vector control mode with 300Hz running frequency and full load.

8. Perfect voltage and current control, reducing the fault protection times

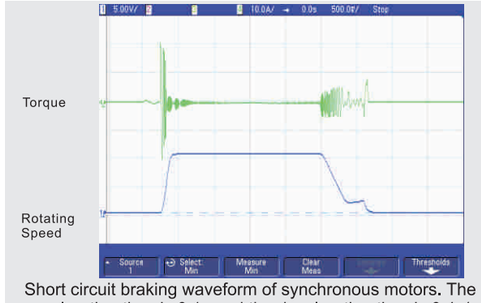
OV Fault	OC Fault
Adjust the output frequency to avoid overvoltage of the DC bus during deceleration	Adjust the output frequency to avoid overcurrent of the inverter during acceleration

9. Multiple braking modes and instant stopping

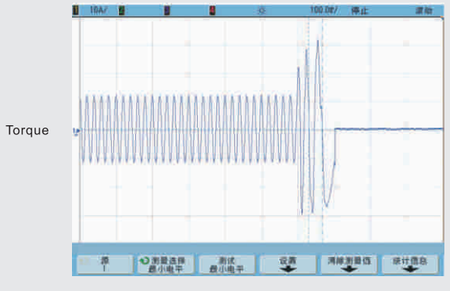
Dynamic Braking	DC Braking	Flux Braking	Short Braking
Configure braking units and resistors	No need to configure braking units and resistors	No need to configure braking units and resistors	No need to configure braking units and resistors: quick braking
Available on the situation of big inertia load and frequent braking	Available on the situation when start the running motor after braking and the situation when keep the moment output after braking to zero speed	Available on the instant stopping situation with big inertia load and no frequent braking	Only available on quick braking of PM motor
Big braking torque and quick braking	Not available on the situation of big inertia load or instant stopping braking in high speed running	Not available on the situation of big inertia load and frequent and braking(the energy consumed on the stator and its cooling is better than DC braking)	The energy consumed on the stator and its cooling is better than DC braking



The current waveform in asynchronous motor V/f control mode with 100% braking current when the starting frequency is 10Hz and the braking time is 0.1s.



Short circuit braking waveform of synchronous motors. The acceleration time is 0.1s and the deceleration time is 0.4s(rated frequency:100Hz,braking frequency:20Hz,braking time:0.5s)



Flux braking current waveform when the running frequency is 50Hz, deceleration time is 0.1s with full load in asynchronous motor V/f control mode

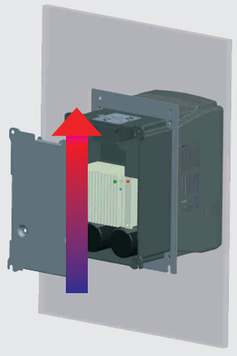
10.Continuous running in instantaneous power off

The inverter can keep running if the grid voltage drops and used in the situation with high requirement such as fiberic and textile production line.

Multi–function with simple operation

1. Separate Air–duct

The separate air duct prevents the contaminants into the electronic parts/components and greatly improves the protective effect of the inverter, as well as its reliability and service life, to adapt various complicated site environments. It can also facilitate the heat-releasing in control cabinets and the heat–releasing design of the customer.

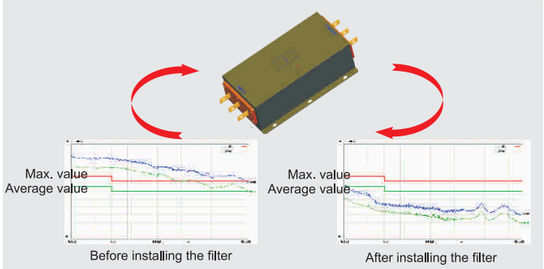


2. Multiple Installation Modes

1.5~20KW:wall and flange mounting
220~315KW:wall and floor mounting
350～500KW：floor mounting

3. C3 input filter (standard configuration) and C2 filter (optional)

C3 input filter is embedded in the factory to meet different application requirements, save installation space and avoid the electromagnetic interference caused by incorrect selection and site installation.



Conductive interference test of the power supply terminals

Remarks:
(1)C2 filter: EMC performance of the inverter achieves the limited usage requirement in civil environment.
(2)C3 filter: EMC performance of the inverter achieves the limited usage requirement in industrial environment.

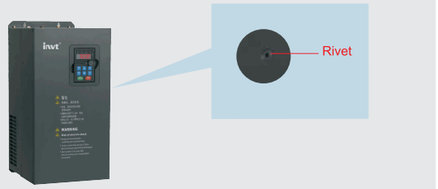
4. Book Structure

Parallel installation
Little installation space with less cost and beautiful appearance.

5. The rivet design ensures reliable integration connection

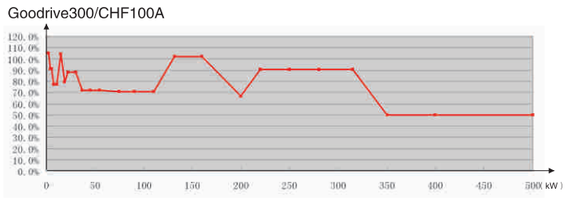
Greener
Stronger corrosion-resistance

Proper grounding
Excellent EMC performance

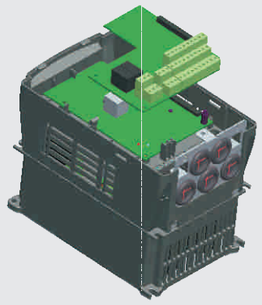


6. Smaller Size

Due to the thermal simulation and advanced modularized design, the size of our product is reduced greatly. The width ratio between Goodrive300 and CHF100A is shown in the figure below (the Max. percentage is 50%)



7. Various external interfaces and swappable terminal board convenient for replacement and maintenance



Terminals	Quantity	Features
ON–OFF input	8 channels	1KHz NPN and PNP
High speed pulse input	1 channel	50KHz NPN and PNP
Analog input	3 channels	0~10V, 0~20mA,–10V~+10V
ON–OFF output	1 channel	Max. output frequentcy:1KHz
High speed puls output	1 channel	Max. output frequentcy:50KHz
Analog output	2 channels	0~10V, 0~20MA
Relay output	2 channels	3A/250DAC, 1A/30VDC, NO+NC

8. High Performance Keypad

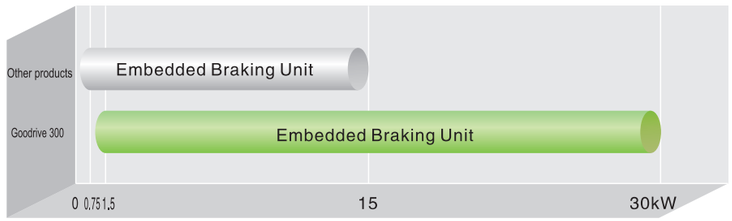
The standard LED keypad supports parameters loading and unloading with Max. length of 200m and digital potentiometer. The optional external LCD keypad supports parameters loading and unloading with displaying 10 lines and 10 rows of Chinese characters and several languages

Standard LED Keypad

Optional LCD Keypad

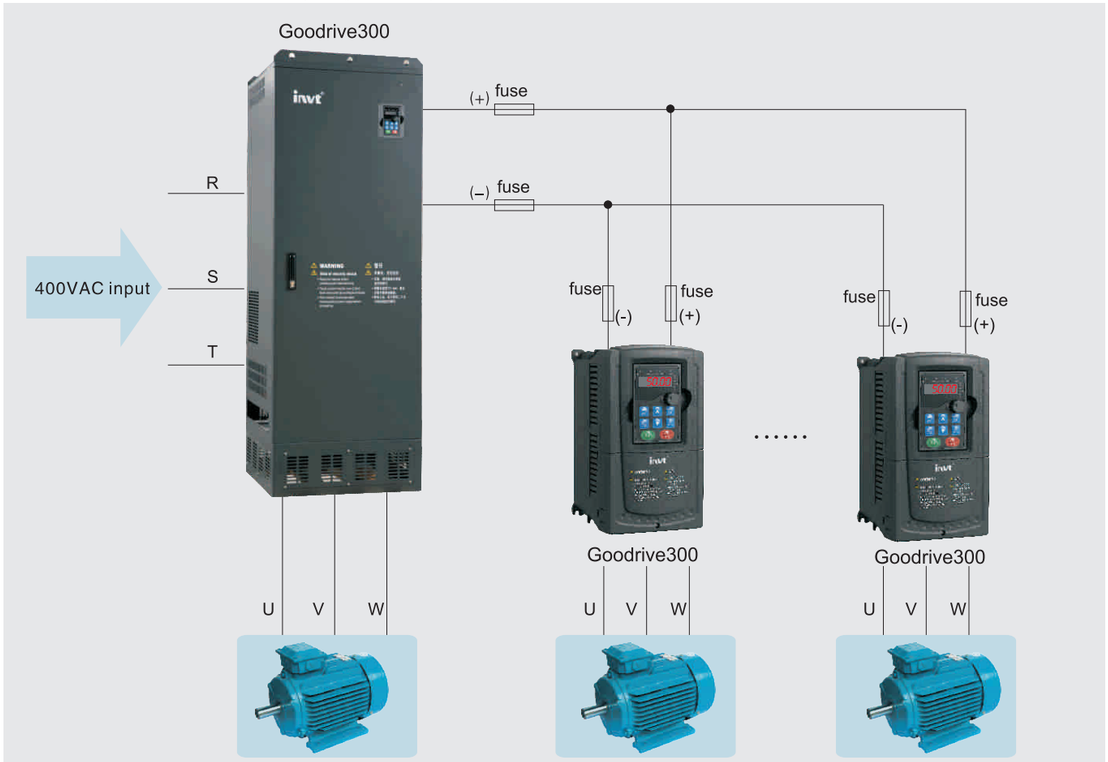
9. Embedded braking units of 1.5–30kw inverters

Reduce the occupied space and decrease the cost



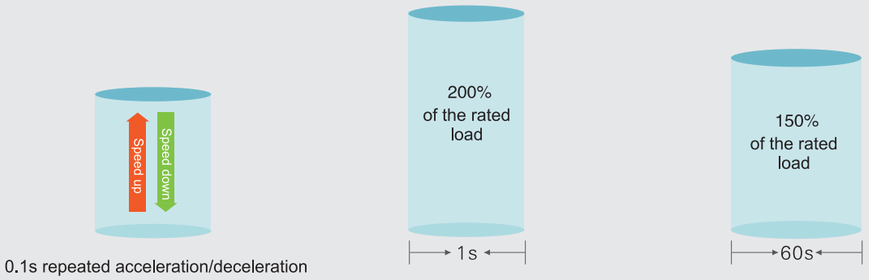
10. Supporting common DC bus

Reduce the power lost on DBR
Note the impact current and the capacity of the input AC system



11. Available on DC power supply

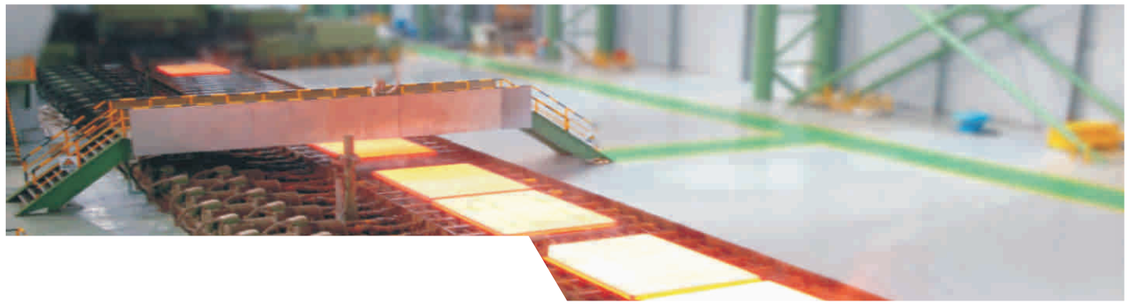
12. Heavy–load Design



13. Various Application Function

Function	Effect
V·f separation setting	Meet the requirement of different power supplied and realize flexible setting to V/F curves
Two sets of motor parameters	Different motors can use the same inverter, reducing the cost, shifting between two motors making electrical control more convenient
Virtual terminal function	Make the middle variables as the local virtual I/O quantity, save the hardware configuration
Speed Tracking	Available on asynchronous motor and permanent magnet synchronous motor and the situation of big inertia load, reversal rotating during starting and continuous frequent shifting
Delay ON/OFF signal, high speed pulse and relay	Provide more programmable and control modes
Energy Displaying	Display the total consumed energy. No need to use the power meter
Stopping Delay	Ensure the motor is under control and stops safely

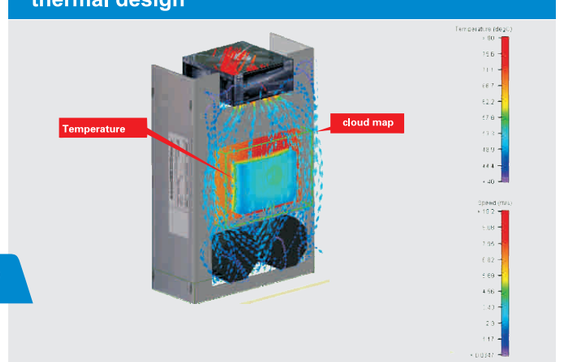
Reliable quality certificated by TÜV SÜD



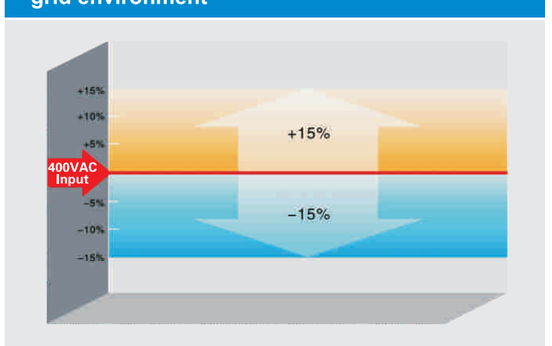
1.The product design follows IEC national standards and passes the CE test of international authority TÜV SÜD, INVT is the unique manufacturer having TÜV-MARK marks in Chinese industrial control field

Remarks: 1.Each Goodrive300 inverter has past the test certification
2.Visit http://www.tuev-sued.de/industry_and_consumer_products/certificates for the TUV certifications

2. Advanced thermal technology makes exact thermal design



3. Wide voltage range meets the requirement of grid environment



4. Perfect and reliable test system ensure products adapt complicated site environments and INVT is the only manufacturer achieved ACT certificate of TÜV SÜD

Experiment Type	Experiment Name	Classification
Mechanical Reliability Experiments	Packaging Experiments	Package compression experiments
		Package Resonance imaging and storage test
		Package random vibration test
		Package dropping test
		Package rolling test
		Package dumping test
		Package inclined impact test
	Impact Test	Half–sine shock test(working and non–working state)
		Trapezoidal wave impulse test(non–working state)
	Vibration Test	Sinusoidal vibration test(working state)
		Random vibration test(working and non–working state)
Climatic Environmental Reliability Test	Temperature Experiment	Low temperature storage test
		High temperature storage test
		Low temperature experiments
		High temperature experiments
		Temperature gradient experiments
		Temperature impact test
	Thermal Test	Constant thermal test
		Alternation thermal test
	Salt Spray Test	Constant salt spray test
		Alternation salt spray test
	Low Air Pressure Test	Low temperature and low pressure test
		High temperature and low pressure test

Remarks :
The full name of ACT is Acceptance of Client's Testing, which means the German TÜV SÜD admit the technology level of the lab and accept their separate testing data and test reports officially.

Electric Vibration System

Low Pressure Test Chamber
Constant temperature and humidity test chamber

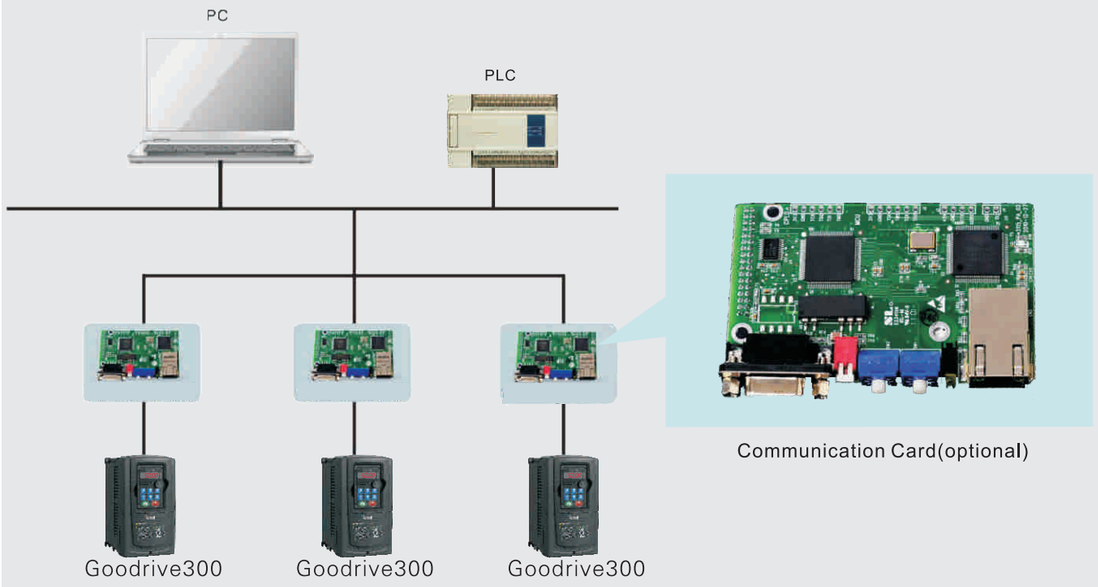
Natural Convection Test Chamber
Thermal Shock Test Chamber

3 International Communication Protocals

1. Multiple communication modes : Standard-configured MODBUS communication Optional communication card with PROFIBUS and Ethernet

The optional communication card can connect the inverter to Ethernet or the Profibus,and there are several functions

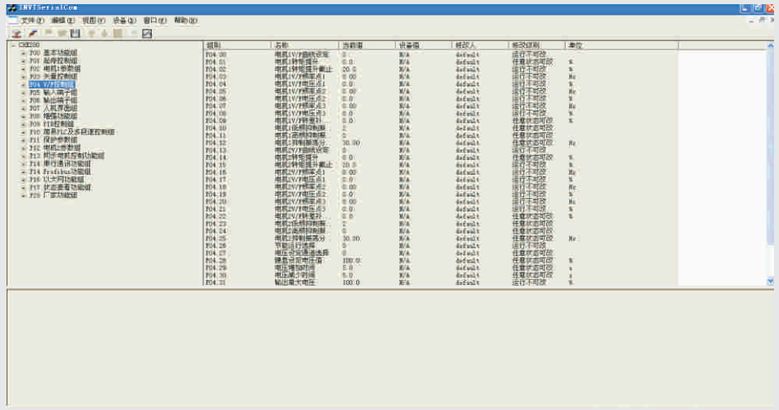
- Send control commands(starting, stopping and fault reset) to the inverter
- Send speed or torque reference signal to the inverter
- Read the state and actual value from the inverter
- Modify the parameters of the inverter

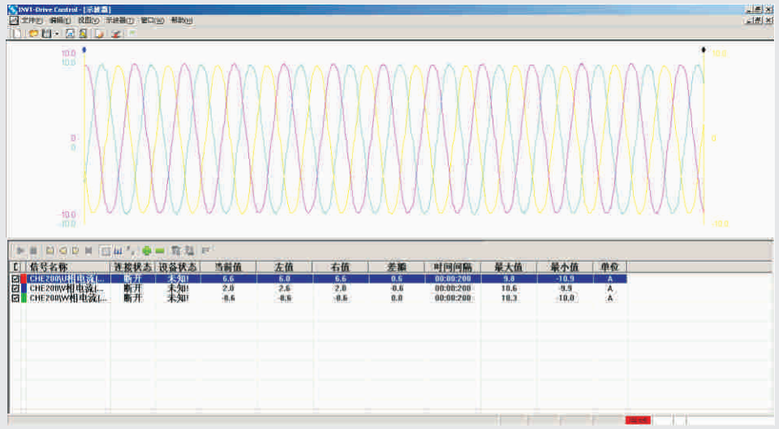


Communication Card(optional)

2. PC Software

The software carries out tracking and fault location with the function of oscilloscope, making more convenient debugging and programming and facilltaion the current monitoring, back analysis and engineering management.





Applications

Goodrive300 Applications

Permanent Magnet Synchronous Motor
Screw oil pumps, water pumps, compressors, hoisting, chemical fabric devices, plastic machinery, wood processing machinery and machine tools and so on

Mine
Belt conveyor, hoisting machines air compressors, crushers, ball mills, centrifugal dewaterers and so on

Machines Tools
Lathes, wood processing machinery, drilling machines, grinding machines, milling machines and air compressors and so on

Textiles
Carding machines, roving machines, winders, warping machines knitting machines, warp knitting machines and so on

Oil
Oil pumps, water injection pumps, compressors and so on

Other Machineries
Hoisting, chemical, industrial, metal processing, EPS and constructive machines and so on

Technical Specifications

Function		Specification
Input	Input Voltage(V)	AC 3PH 400V ± 15%
	Input Frequency(Hz)	47~63Hz
Output	Output Voltage(V)	0~input voltage
	Output Frequency(Hz)	0~400Hz
Technical Control Feature	Control Mode	V/F, sensorless vector control
	Motor Type	Asynchronous motor and permanent magnet synchronous motor
	Speed–adjusting Ratio	Asynchronous motor 1:200(SVC) synchronous motor 1:20(SVC)
	Speed Control Accuracy	± 0.2%(sensorless vector control)
	Speed Fluctuation	± 0.3%(sensorless vector control)
	Torque Response	<20ms(sensorless vector control)
	Torque Control Accuracy	10%(sensorless vector control)
	Starting Torque	Asynchronous motor: 0.25Hz/150%(sensorless vector control) Synchronous motor: 2.5Hz/151%(sensorless vector control)
	Overload Capability	150% of rated current:1 minute 180% of rated current:10 seconds 200% of rated current:1 second
Running Control Feature	Frequency Setting	Digital setting, analog setting, pulse frequency setting, multi–step speed running setting, simple PLC setting, PID setting, MODBUS communication setting, PROFIBUS communication setting
	Auto–adjustment of the voltage	Keep a stable voltage automatically when the grid voltage fluctuates
	Fault Protection	Provide over 30 fault protection functions, overcurrent, overvoltage, undervoltage ,overheating, phase loss and overload, etc
	Speed Tracking Function	The rotating motor can be started smoothly

Technical Specifications

Function		Specification
Peripheral Interface	Analog Input Resolution	<10mV
	On–off input Resolution	<2mS
	Analog Input	2 channels(AI1,AI2)0~10V/0~20V and 1 channel (AI3)–10~10V
	Analog Output	2 channels (A01,A02)0~10V/0~20mA
	Digital Input	8 channels common input ,the Maximum frequency: 1kHz 1 channel high speed input ,the Maximum frequency: 50kHz
	Digital Output	1channel high speed pulse output ,the Maximum frequency: 50kHz 1channel Y terminal open collector output
	Relay Output	RO1A NO,RO1B NC,RO1C common terminal RO2A NO,RO2B NC,RO2C common terminal Contactor capability: 3A/AC250V,1A/DC30V
Others	Mountable Method	Wall flange and floor mountable
	Temperature of the running environment	–10~50℃.Derate above 40℃
	Protection Class	IP20
	Cooling	Air–cooling
	Brake Unit	Built in braking unit for below 30kW including 30kW
		External braking unit for others
	EMC filter	Built–in C3 filter,meet the degree requirement of IEC61800–3C3 External filter: meet the degree requirement of IEC61800–3C2

Power Ratings

Model NO.	Rated Output Power(kW)	Input Current (A)	Rated Output Current (A)
GD300–1R5G–4	1.5	5.0	3.7
GD300–2R2G–4	2.2	5.8	5
GD300–004G–4	4	13.5	9.5
GD300–5R5G–4	5.5	19.5	14
GD300–7R5G–4	7.5	25	18.5
GD300–011G–4	11	32	25
GD300–015G–4	15	40	32
GD300–018G–4	18.5	47	38
GD300–022G–4	22	56	45
GD300–030G–4	30	70	60
GD300–037G–4	37	80	75
GD300–045G–4	45	94	92
GD300–055G–4	55	128	115
GD300–075G–4	75	160	150
GD300–090G–4	90	190	180
GD300–110G–4	110	225	215
GD300–132G–4	132	265	260
GD300–160G–4	160	310	305
GD300–200G–4	200	385	380
GD300–220G–4	220	430	425
GD300–250G–4	250	485	480
GD300–280G–4	280	545	530
GD300–315G–4	315	610	600
GD300–350G–4	350	625	650
GD300–400G–4	400	715	720
GD300–500G–4	500	890	860

Remarks:
(1)The input current of the inverter 1.5-315KW is tested when the input voltage is 380V and there is no DC reactor and output/input reactor.
(2)The output current of the inverter 350-500KW is tested when the input voltage is 380V and there is input reactor
(3)Rated output current is defined when the rated output voltage is 380V

Dimensions (unit: mm)

Installation dimension when wall mounting

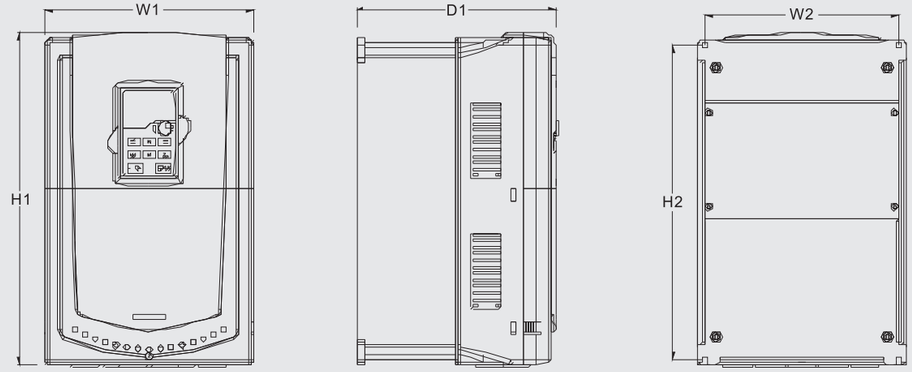
Model	W1	W2	H1	H2	D1	Installation Hole
1.5kW~2.2kW	126	115	193	175	174.5	5
4kW~5.5kW	146	131	263	243.5	181	6
7.5kW~11kW	170	151	331.5	303.5	216	6
15kW~18.5kW	230	210	342	311	216	6
22kW~30kW	255	237	407	384	245	7
37kW~55kW	270	130	555	540	325	7
75kW~110kW	325	200	680	661	365	9.5
132kW~200kW	500	180	870	850	360	11
220kW~315kW	680	230	960	926	379.5	13

Installation dimension when flange mounting

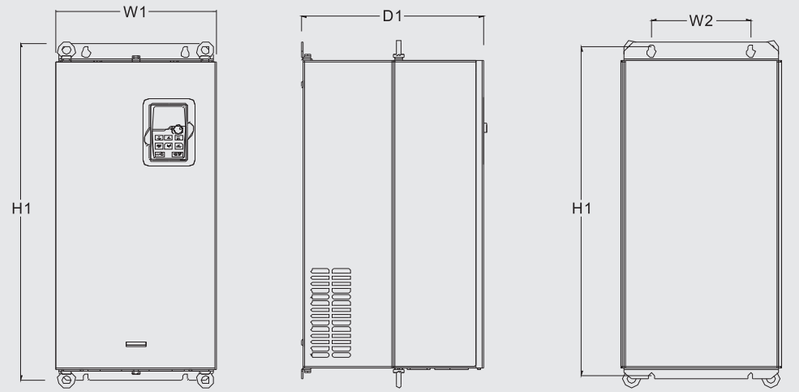
Model	W1	W2	W3	W4	H1	H2	H3	H4	D1	D2	Installation Hole
1.5kW~2.2kW	150	115	130	7.5	234	220	190	16.5	174.5	65.5	5
4kW~5.5kW	170	131	150	9.5	292	276	260	10	181	79.5	6
7.5kW~11kW	191	151	174	11.5	370	351	324	15	216	113	6
15kW~18.5kW	250	210	234	12	375	356	334	10	216	108	6
22kW~30kW	275	237	259	11	445	426	404	10	245	119	7
37kW~55kW	270	130	261	65.5	555	540	516	17	325	167	7
75kW~110kW	325	200	317	58.5	680	661	626	23	363	182	9.5
132kW~200kW	500	180	480	60	870	850	796	37	358	178.5	11

Model	W1	W2	W3	W4	H1	H2	D1	D2	Installation Hole
220kW~315kW	750	230	714	680	1410	1390	380	150	13\12
350kW~500kW	620	230	553	–	1700	1678	560	240	22\12

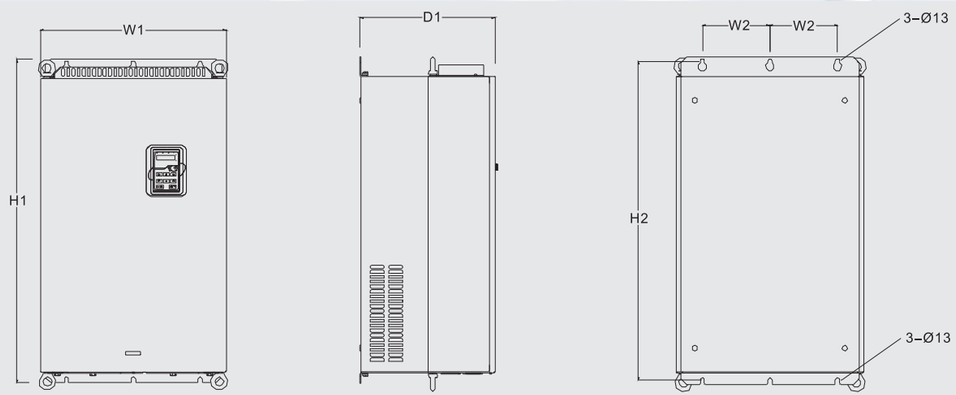
Wall mounting for 1.5-30kW inverters



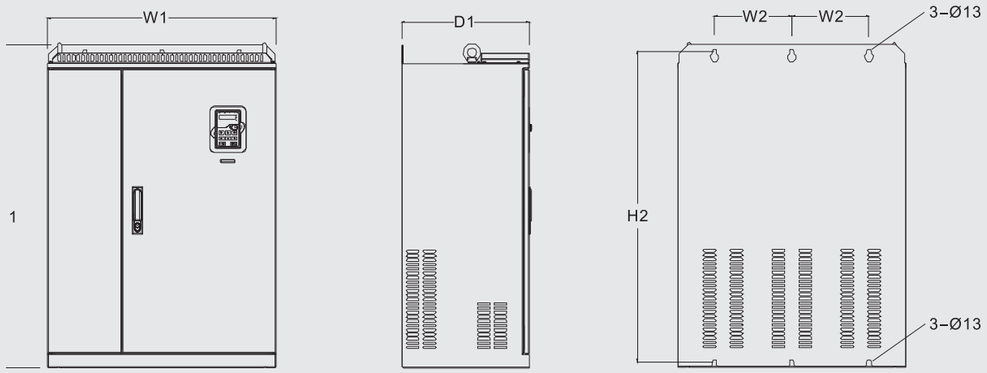
Wall mounting for 37-110kW inverters



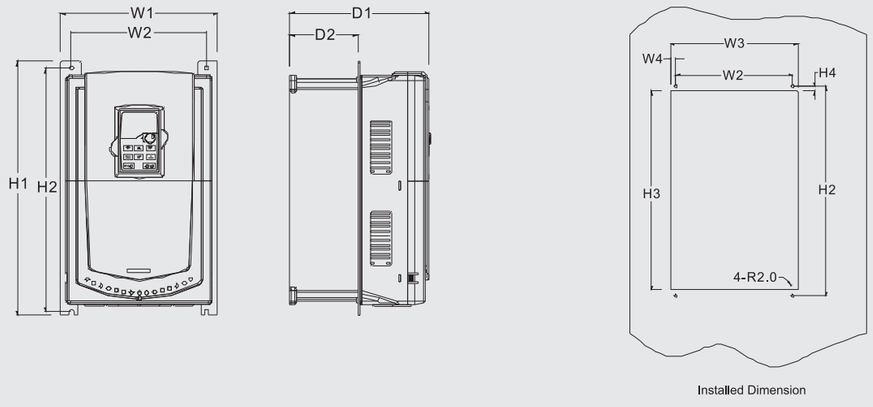
Wall mounting for 132-200kW inverters



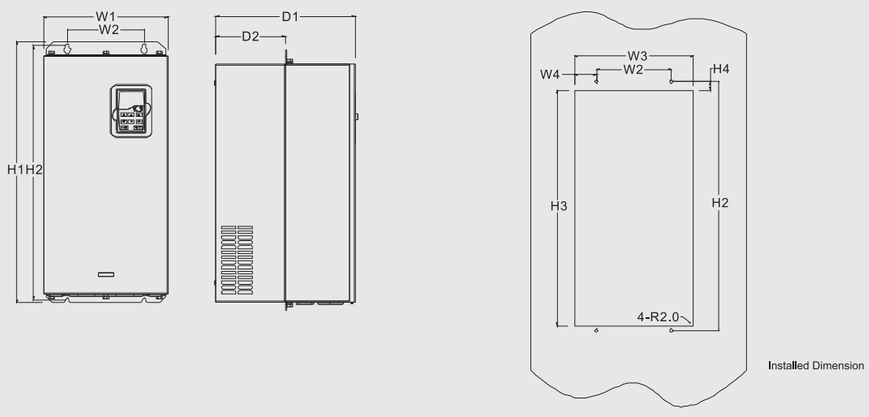
l mounting for 220-315kW inverters



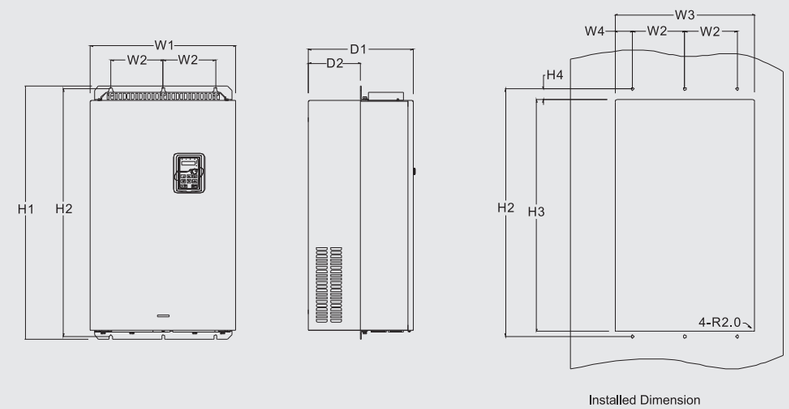
ange mounting for 1.5-30kW inverters



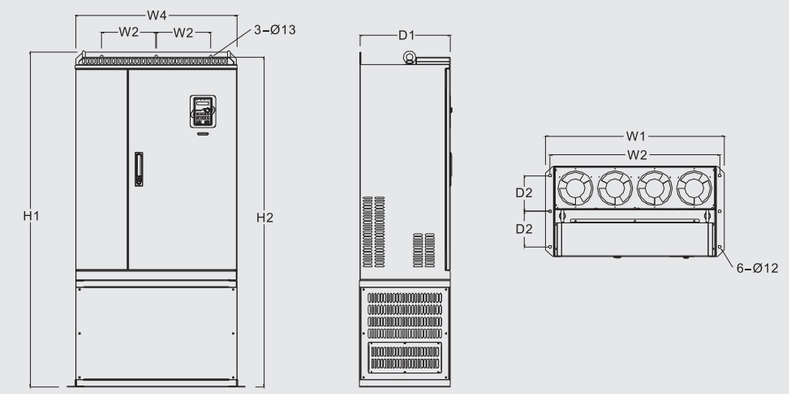
ange mounting for 37-110kW inverters



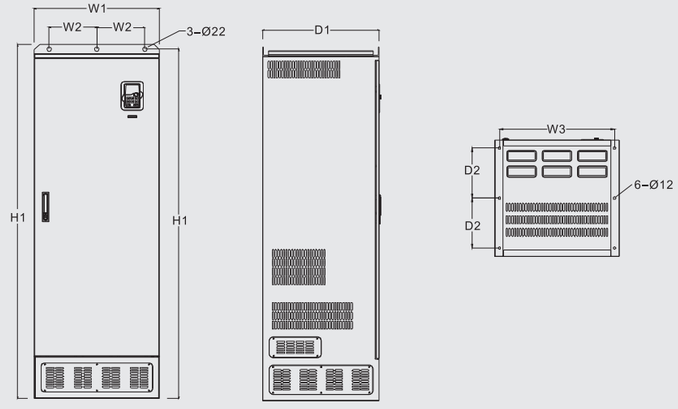
Flange mounting for 132-200kW inverters



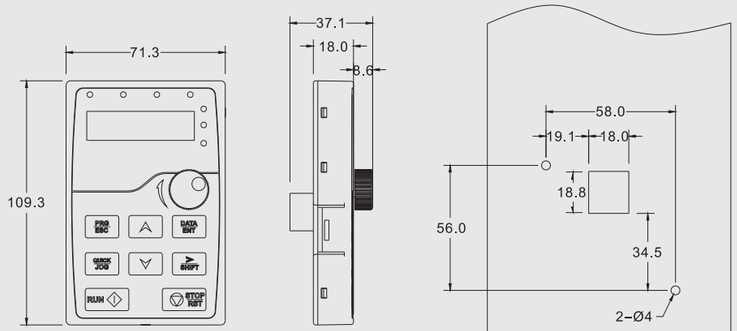
Flange mounting for 220-315kW inverters



Floor mounting for 350-500kW inverters



Keypad Demension



Keypad Installed Dimension

Optional Parts

1. Flange Mounting Panel

Needed in 1.5–30kW inverters
Not needed in 37–200kW

2. Installation Base

Only optional in 220–315kW inverters .Its bases rector and an output AC rector can be built–in an input AC (or DC)

3. Installation bracket for the keypad

Installation bracket or M3 screw can be used in the installation of extertal keywad.
The bracket of 37–500kW inverters is standard
The bracket of 1.5–30kW inverters is optional

4. Heat–relaeasing Hole

Inverter needs to derate when selecting a cover Consult with the INVT technicians for the detailed information.

5. LCD keypad

10 rows of DH displaying
Compatible with the LED keypad

6. Communication Card

Compatiable with profibus and Ethernet communication

7. Assistant Power (AC single phase 220V)

Provide for a safer and more convenient inverter debugging when the main power supply is power off(note as non–standard assistant power supply)

8. Reactor

The inverters of 37KW and above can be connected with external DC reactor.The reactor can improve the power factor and avoid damage to the recitifier bridge caused by overcurrent and damage to the rectifier circuit by harmonic

Model NO.	Input Rector	DC Reactor	Output Reactor
GD300–1R5G–4	ACL2–1R5–4	—	OCL2–1R5–4
GD300–2R2G–4	ACL2–2R2–4	—	OCL2–2R2–4
GD300–004G–4	ACL2–004–4	—	OCL2–004–4
GD300–5R5G–4	ACL2–5R5–4	—	OCL2–5R5–4
GD300–7R5G–4	ACL2–7R5–4	—	OCL2–7R5–4
GD300–011G–4	ACL2–011–4	—	OCL2–011–4

Model NO.	Input Reactor	DC Reactor	Output Reactor
GD300–015G–4	ACL2–015–4	—	OCL2–015–4
GD300–018G–4	ACL2–018–4	—	OCL2–018–4
GD300–022G–4	ACL2–022–4	—	OCL2–022–4
GD300–030G–4	ACL2–030–4	—	OCL2–030–4
GD300–037G–4	ACL2–037–4	DCL2–037–4	OCL2–037–4
GD300–045G–4	ACL2–045–4	DCL2–045–4	OCL2–045–4
GD300–055G–4	ACL2–055–4	DCL2–055–4	OCL2–055–4
GD300–075G–4	ACL2–075–4	DCL2–075–4	OCL2–075–4
GD300–090G–4	ACL2–090–4	DCL2–090–4	OCL2–090–4
GD300–110G–4	ACL2–110–4	DCL2–110–4	OCL2–110–4
GD300–132G–4	ACL2–132–4	DCL2–132–4	OCL2–132–4
GD300–160G–4	ACL2–160–4	DCL2–160–4	OCL2–160–4
GD300–200G–4	ACL2–200–4	DCL2–200–4	OCL2–200–4
GD300–220G–4	ACL2–220–4	DCL2–220–4	OCL2–220–4
GD300–250G–4	ACL2–250–4	DCL2–250–4	OCL2–250–4
GD300–280G–4	ACL2–280–4	DCL2–280–4	OCL2–280–4
GD300–315G–4	ACL2–315–4	DCL2–315–4	OCL2–315–4
GD300–350G–4	Standard	DCL2–350–4	OCL2–350–4
GD300–400G–4	Standard	DCL2–400–4	OCL2–400–4
GD300–500G–4	Standard	DCL2–500–4	OCL2–500–4

9. Filter

Model NO.	Input Filter	Output Filter
GD300–1R5G–4	FLT–P04006L–B	FLT–L04006L–B
GD300–2R2G–4		
GD300–004G–4	FLT–P04016L–B	FLT–L04016L–B
GD300–5R5G–4	FLT–P04032L–B	FLT–L04032L–B
GD300–7R5G–4		
GD300–011G–4		
GD300–015G–4	FLT–P04045L–B	FLT–L04045L–B
GD300–018G–4	FLT–P04065L–B	FLT–L04065L–B
GD300–022G–4		
GD300–030G–4	FLT–P04150L–B	FLT–L04150L–B
GD300–037G–4		
GD300–055G–4		
GD300–045G–4	FLT–P04240L–B	FLT–L04240L–B
GD300–075G–4		
GD300–090G–4		

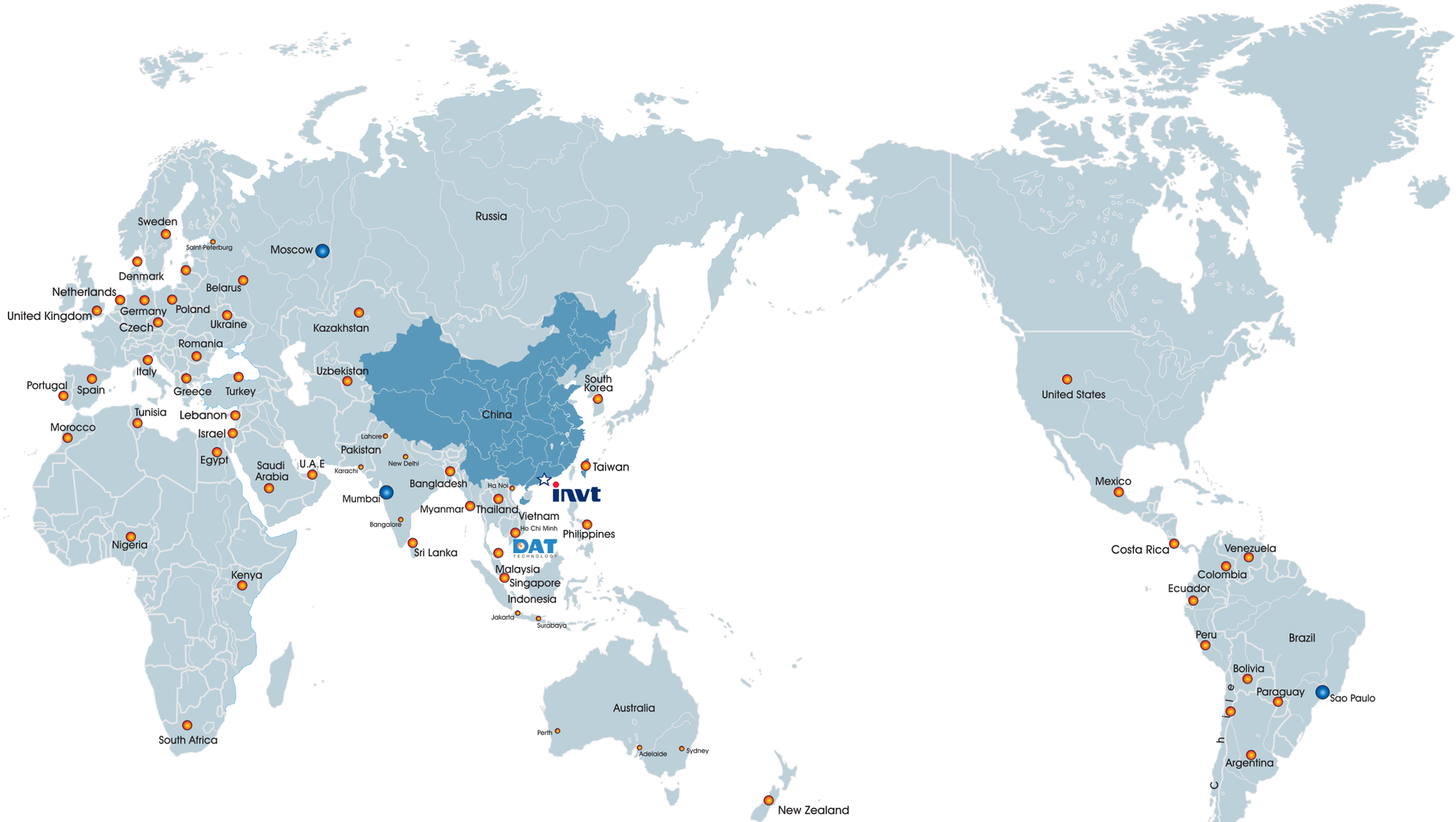
Remarks:
(1)C2 standard can be achieved of select above external filters
(2)The inverter of 132kW or above select filters referring to the non-standard mode,please consult with INVT technicians for detailed information.

10.Braking System

The inverters of 30kW and below are embedded internal braking units and the inverters of 37kW and above need external braking units ,please select the braking units according to actual use (the requirement of braking torque and braking usage ratio)
The braking resistor will increase the braking torque,the following table is the resistor power designed to different situations and user needs to select according to actual situation.

Model NO.	DBU Model	DBR Value 100% Braking (Ω)	DBR Power 10% Braking(kW)	DBR Power 50% Braking(kW)	DBR Power 80% Braking(kW)	Minimum DBR Value (Ω)
GD300–1R5G–4	Embedded Braking Unit	326	0.23	1.1	1.8	170
GD300–2R2G–4		222	0.33	1.7	2.6	130
GD300–004G–4		122	0.6	3.0	4.8	80
GD300–5R5G–4		89	0.75	4.1	6.6	60
GD300–7R5G–4	Embedded braking unit	65	1.1	5.6	9.0	47
GD300–011G–4		44	1.7	8.3	13.2	31
GD300–015G–4		32	2	11	18	23
GD300–018G–4		27	3	14	22	19
GD300–022G–4		22	3	17	26	16
GD300–030G–4		16	5	23	36	9
GD300–037G–4	DBU100H–060–4	13	6	28	44	11.7
GD300–045G–4	DBU100H–110–4	10	7	34	54	6.4
GD300–055G–4		8	8	41	66	
GD300–075G–4		6.5	11	56	90	
GD300–090G–4	DBU100H–160–4	5.4	14	68	108	4.4
GD300–110G–4		4.5	17	83	132	
GD300–132G–4	DBU100H–220–4	3.7	20	99	158	3.2
GD300–160G–4	DBU100H–320–4	3.1	24	120	192	2.2
GD300–200G–4		2.5	30	150	240	
GD300–220G–4	DBU100H–400–4	2.2	33	165	264	1.8
GD300–250G–4		2.0	38	188	300	
GD300–280G–4	Two DBU100H–320–4	3.6×2	21×2	105×2	168×2	2.2×2
GD300–315G–4		3.2×2	24×2	118×2	189×2	
GD300–350G–4		2.8×2	27×2	132×2	210×2	
GD300–400G–4		2.4×2	30×2	150×2	240×2	
GD300–500G–4	Two DBU100H–400–4	2×2	38×2	186×2	300×2	1.8×2

Sales Network



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