

ZS20 SERIES

GENERAL PURPOSE VECTOR CONTROL INVERTER



INTRODUCTION

ZS20 is a general purpose vector control inverter with certified STO (Safe Torque OFF) function. It's oriented for OEM equipment markets, mainly covering the applications of water treatment, printing and packaging, winding equipment, paper machinery, shearing equipment, plastic machinery, food machinery, cable machinery, textile machinery, HVAC, etc.



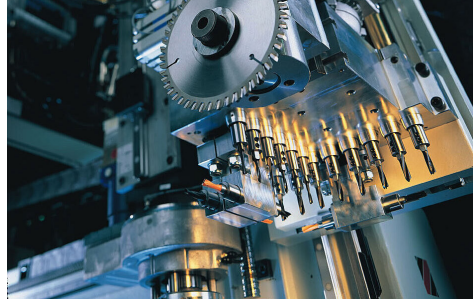
FEATURES

- V/F and Sensorless Vector Control
- External keypad for parameters copy
- Common DC bus solution (400V, $\geq 4\text{kW}$)
- Starting torque up to 0.5Hz/150%
- Built-in DC reactor for inverters $\geq 18.5\text{kW}$
- Built-in braking unit (standard $\leq 37\text{kW}$, optional $\geq 45\text{kW}$)
- Standard C3 filter ($\leq 4\text{kW}$), optional C3 filter ($\leq 2.2\text{kW}$) and C2 Filter
- UL certified

APPLICATIONS



PLASTICS INDUSTRY



WOOD INDUSTRY



PRINTING INDUSTRY



TEXTILE INDUSTRY



INTRALOGISTICS



**PASSENGER AND
MATERIAL TRANSPORT**

MULTI-FUNCTION AND EASY TO USE

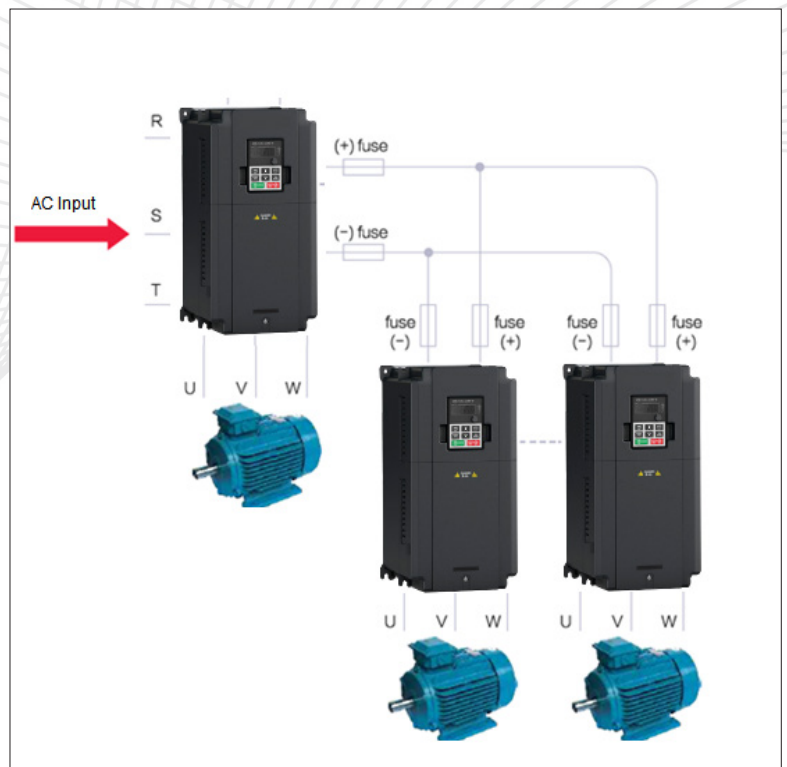
Built-in DC reactor for inverter $\geq 18.5\text{kW}$



The braking unit is built-in and standard for inverters $\leq 37\text{kW}$ but optional for inverter of 45–110kW.

Others	Embed for Standard			
	Embed for Standard		Optional	
ZS20	0.4kW	15kW	45kW	110kW

Inverter (400V; $\geq 4\text{kW}$) support the Common DC bus solution.



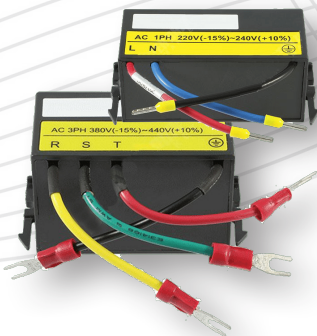
BUILT-IN SAFE TORQUE OFF FUNCTION

MODEL	Certification standard and level		
	IEC 61508	EN/ISO 13849-1	EN954-1
-1 : 0.4-2.2kW 2 : 0.4-0.75kW 4 : 0.75-2.2kW	SIL2	PLd	Category 3
2 : 1.5-7.5kW 4 : 4-110kW	SIL3	PLe	Category 3

C3 AND C2 FILTERS

C3 filters are built in inverters (3PH; 400V; ≥ 4 kW) and (3PH; 230V; ≥ 1.5 kW) by using J10 to determine the connection or disconnection. External C3 filters can be configured for inverters (1 PH; 230V; ≤ 2.2 kW), (3PH; 400V; ≤ 2.2 kW) and (3PH; 230V; ≤ 0.75 kW).

External C2 filters are optional for all ZS20 series inverters.



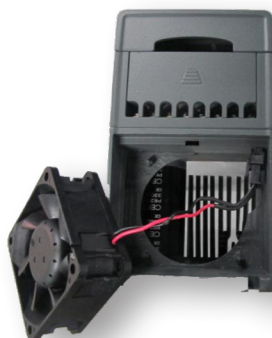
EXTERNAL KEYPAD

The membrane keypad are standard for inverters (3PH; 400V; ≤ 2.2 kW), which also support external LED keypads. The keypads for inverters (3PH; 400V; ≥ 4 kW) can be used as external keypads.

ZS20 series inverters can be configured with LED keypad which has the data copy function to upload or download the parameters.



PLUGGABLE DESIGN FOR COOLING FANS, EASY MAINTENANCE



ABUNDANT SOFTWARE FUNCTIONS

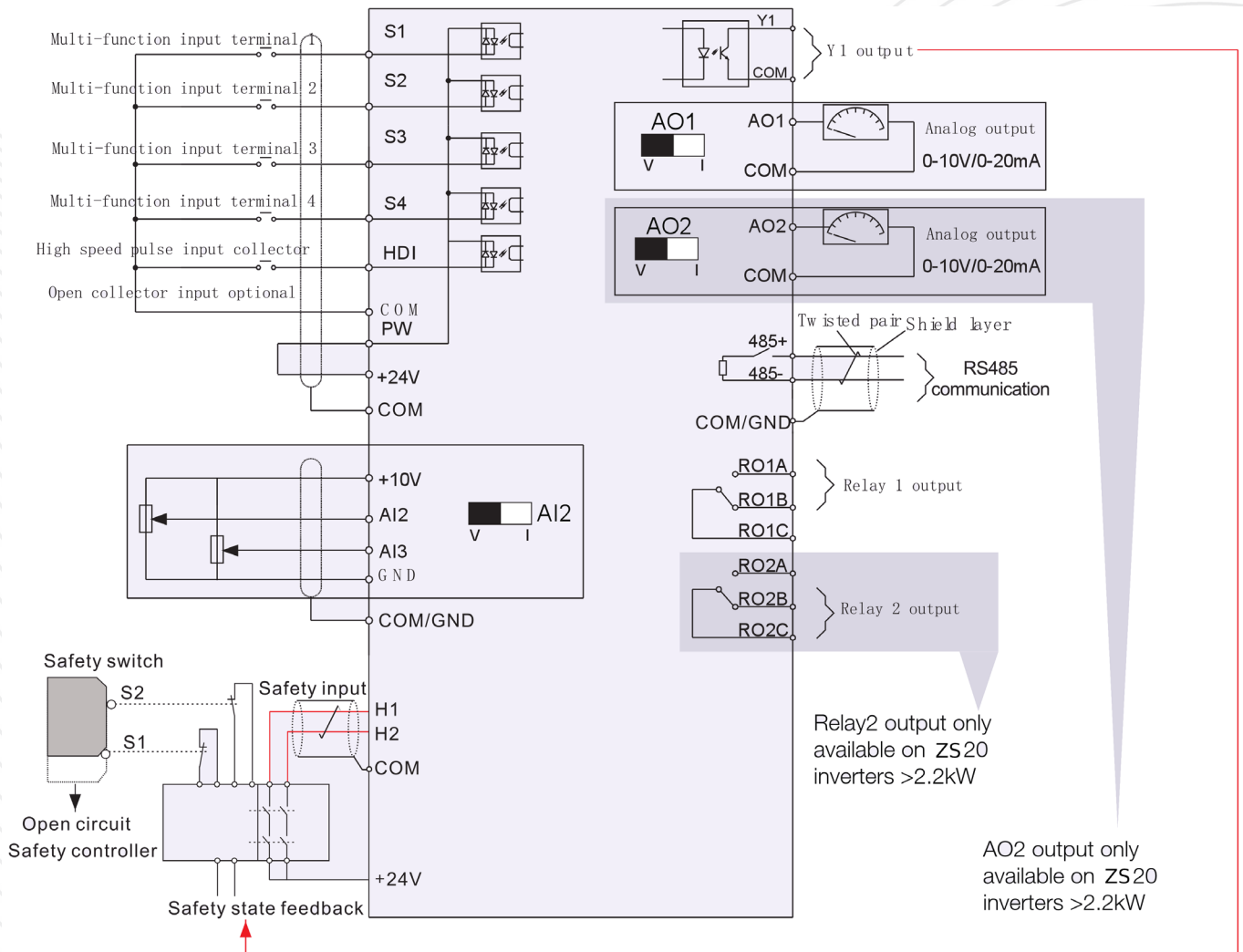
FUNCTION	USED TO	REMARKS
RS485 COMMUNICATION	Read and modify inverter parameters through connection to the upper computer so as to control inverter running status.	Configured with RS485 communication interface
PID	Carry out PID operation and feedback Signals to control inverter output frequency and improve target accuracy and stability. Applicable to pressure, flow and temperature process control.	Supports PID output polarity switching.
MOTOR PARAMETER AUTOTUNING	Carry out rotation or static autotuning, improving control accuracy and response speed.	Classified into rotation autotuning and static autotuning.
SIMPLE PLC FUNCTION	Change the running frequency and direction automatically according to the running time set by simple PLC to meet process requirements.	Supports multiple running modes.
MULTI-STEP SPEED CONTROL	Meet the speed control requirements in different periods of time.	A maximum of 16 steps can be divided for multi-step speed control.
MULTIPLE V/F CURVE SETTINGS	Meet the requirements of energy-saving operation for fans and water pumps and of various variable frequency power supplies; adapt to different load applications.	Linear, multi-dot, multi-power and V/F separation settings, implementing flexible setting of V/F curves.
VIRTUAL TERMINALS	Take external signals as local virtual I/O to reduce hardware configuration.	Corresponding virtual terminal functions must be enabled in communication mode.
DELAY OF SWITCHING ON AND OFF	Provide more programming and control modes	Max. switching on/off delay is 50s
UNINTERRUPTED RUNNING IN INSTANTANEOUS POWER OFF	Ensure uninterrupted running in instantaneous power off. Especially applicable to the Situations with high requirements on continuous operation.	At transient voltage drop, the inverter can keep running by feedback energy without stop in valid time.
VARIOUS PROTECTION FUNCTIONS	Provide overall fault protection functions.	Various measures provided to protect against faults such as overcurrent, overvoltage, undervoltage, overheating, and overload, whose information can be saved.
MULTIPLE BRAKING MODES AVAILABLE	Provide multiple braking modes, satisfying accurate and quick stop under different loads.	DC braking, flux braking, dynamic braking
BATTERY CAPACITY DISPLAY	Display the accumulative power consumption on the inverter without watt hour meter.	Inverter power consumption can be queried.

TECHNICAL SPECIFICATION

FUNCTION	USED TO	SPECIFICATION
POWER INPUT	Input Voltage (V)	1PH 220V (-15%)-240V(+ 10%) 3PH 220V(-15%)-240V(+10%) 3PH 380V (-15%)-440V(+ 10%)
	Input Current (A)	Refer to the rated value
	Input Frequency (Hz)	50Hz or 60Hz, allowed range: 47-63Hz
POWER OUTPUT	Output Motor Capacity (kW)	Refer to the rated value
	Output Current (A)	Refer to the rated value
	Output Voltage (V)	0-input voltage, error≤5%
	Output Frequency (Hz)	0-400Hz
TECHNICAL CONTROL FEATURE	Control Mode	SVPWM, SVC
	Adjustable-speed Ratio	1:100
	Speed Control Accuracy	± 0.2% (SVC)
	Speed Fluctuation	± 0.3% (SVC)
	Torque Response	≤20ms (SVC)
	Torque Control Accuracy	10%
	Starting Torque	0. 5Hz/150% (SVC)
	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 Method	Digital setting, analog setting, pulse frequency setting, multi-step speed running setting, simple PLC setting, PID setting, MODBUS communication setting Shift between the set combination and set channel.
	Auto-adjustment of the Voltage	Keep a stable voltage automatically when the grid voltage transients
	Fault Protection	Provide comprehensive fault protection functions: over-current, over-voltage, under-voltage, over-heating, phase loss and overload, etc.
PERIPHERAL INTERFACE	Analog Input	1 (AI2) 0-1 OV/0-20mA and 1 (AI3) -10-1 OV
	Analog Output	2 (AO1, AO2) 0-10V/0-20mA (Only 1 AO for inverters ≤ 2.2kW)
	Digital Input	4 common inputs, the Max. frequency: 1 kHz: 1 high speed input, the Max. frequency: 50kHz
	Digital Output	1 Y1 terminal output:
	Relay Output	2 programmable relay outputs(Only 1 Relay output for Inverters ≤2.2kW) R01A NO, R01 B NC, R01 C common terminal R02A NO, R02B NC, R02C common terminal Contactor capacity: 3A/AC250V
OTHERS	Mountable Method	Wall and rail mountable
	Braking Unit	≤37kW Standard built-in. 45- 110kW Optional built-in (model "-B")
	EMI Filter	Optional filter: meet the degree requirement of IEC61800-3 C2, IEC61800-3 C3
	Temperature of the Running	-10-50°C Above 40°C, derate 1 % for every additional 1 °C.
	Altitude	≤1000m Above 1000m, derate 1 % for every additional 100m.
	Protective Degree	IP20
	Safety	Meet the requirement of CE
	Cooling	Fan cooling

STANDARD WIRING

WIRING DIAGRAM OF CONTROL CIRCUIT



LOGIC TABLE FOR STO FUNCTION

Input states and corresponding faults of STO function:

STO INPUT STATE	CORRESPONDING STO FAULT
H1, H2 opens simultaneously	Trigger STO function,the drive can't operate normally
H1, H2 closes simultaneously	Don't trigger STO function,the drive can operate normally
Either H 1 or H2 opens or closes	Trigger STL 1 /STL2/STL3 fault,fault code: 38: Safety circuit of channel 1 is abnormal (STL 1) 39: Safety circuit of channel 2 is abnormal (STL2) 40: Internal circuit is abnormal (STL3)

Control terminal diagram

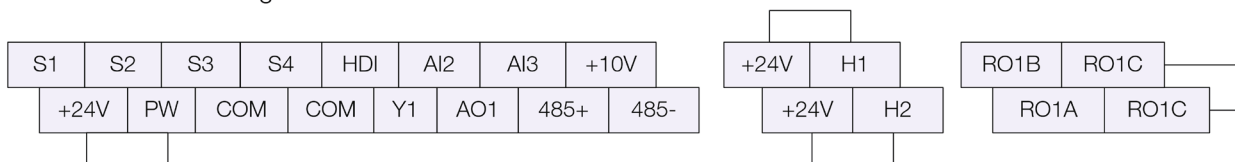


Fig 1 Connection terminal diagram for inverters $\leq 2.2\text{kW}$

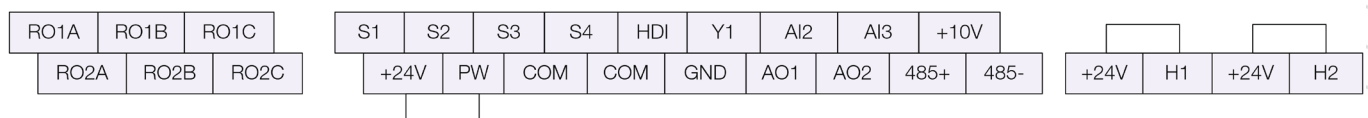


Fig2 Connection terminal diagram for inverters $\geq 4\text{kW}$

MODEL SELECTION

**¹
ZS20** - **²
055CL** - **³
4** - **⁴
B**

SIGN	DESCRIPTION	CONTENTS
1	Product series	ZS20: Multi VFD Frequency Inverter, Vector Control, IP20, UL certified
2	Power range+ load type (refer to table Power Ratings)	e.g. 055 CL : 55kW @ constand torque load xxx CL : constant torque load
3	Voltage level	1: 1PH 220V-240V Rated Voltage: 230V 2: 3PH 220V-240V Rated Voltage: 230V 4: 3PH 380V-440V Rated Voltage: 400V
4	Additional information	B: Built-In Braking unit, For inverter ≥ 45kW

POWER RATINGS

VOLTAGE	MODEL	RATED OUTPUT POWER (KW)	RATED OUTPUT CURRENT (A)	RATED INPUT CURRENT (A)	DIMENSION W*H*D (MM)	NET WEIGHT (KG)
1PH 200-240V	ZS20-0004CL-01	0.4	2.5	6.5	80*160*123.5	0.9
	ZS20-0007CL-01	0.75	4.2	9.3	80*160*123.5	0.9
	ZS20-0015CL-01	1.5	7.5	15.7	80*185*140.5	1.2
	ZS20-0022CL-01	2.2	10	24	80*185*140.5	1.2
3PH 200-240V	ZS20-0004CL-02	0.4	2.5	3.7	80*185*140.5	1
	ZS20-0007CL-02	0.75	4.2	5	80*185*140.5	1
	ZS20-0015CL-02	1.5	7.5	7.7	146*256*167.0	3.1
	ZS20-0022CL-02	2.2	10	11	146*256*167.0	3.1
	ZS20-0040CL-02	4	16	17	146*256*167.0	3.1
	ZS20-0055CL-02	5.5	20	21	170*320*196.3	5.58
	ZS20-0075CL-02	7.5	30	31	170*320*196.3	5.83

POWER RATINGS

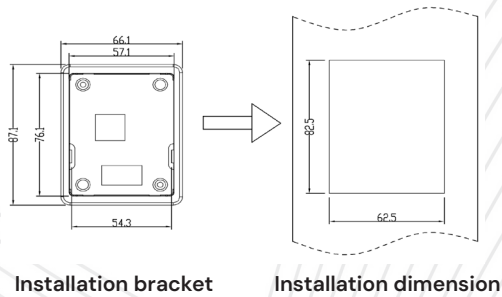
VOLTAGE	MODEL	RATED OUTPUT POWER (KW)	RATED OUTPUT CURRENT (A)	RATED INPUT CURRENT (A)	DIMENSION W*H*D (MM)	NET WEIGHT (KG)
3PH 380-440V	ZS20-0007CL-04	0.75	2.5	3.4	80*185*140.5	1
	ZS20-0015CL-04	1.5	4.2	5.0	80*185*140.5	1
	ZS20-0022CL-04	2.2	5.5	5.8	80*185*140.5	1
	ZS20-0040CL-04	4	9.5	13.5	146*256*167.0	3.1
	ZS20-0055CL-04	5.5	14	19.5	146*256*167.0	3.1
	ZS20-0075CL-04	7.5	18.5	25	170*320*196.3	5.58
	ZS20-0110CL-04	11	25	32	170*320*196.3	5.58
	ZS20-0150CL-04	15	32	40	170*320*196.3	5.83
	ZS20-0185CL-04	18.5	38	47	200*340.6*184.3	9
	ZS20-0220CL-04	22	45	51	200*340.6*184.3	9
	ZS20-0300CL-04	30	60	70	250*400*202.0	15.5
	ZS20-0370CL-04	37	75	80	250*400*202.0	15.5
	ZS20-0450CL-04	45	92	98	282*560*238.0	25
	ZS20-0450CL-04-B	45	92	98	282*560*238.0	25
	ZS20-0550CL-04	55	115	128	282*560*238.0	25
	ZS20-0550CL-04-B	55	115	128	282*560*238.0	25
	ZS20-0750CL-04	75	150	139	282*560*238.0	25
	ZS20-0750CL-04-B	75	150	139	282*560*238.0	25
	ZS20-0900CL-04	90	180	168	338*554*329.2	45
	ZS20-0900CL-04-B	90	180	168	338*554*329.2	45
	ZS20-1100CL-04	110	215	201	338*554*329.2	45
	ZS20-1100CL-04-B	110	215	201	338*554*329.2	45

INSTALLATION DIMENSION

EXTERNAL KEYPAD DIMENSION

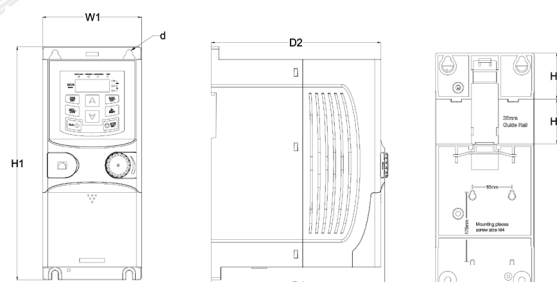


Note: The external keypad can be 20 meters away from the Inverter at most.



INVERTER DIMENSIONS

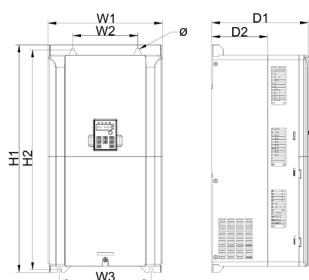
VOLTAGE	MODEL	RATED POWER [kW]	DIMENSION (mm)									WEIGHT (kg)
			W1	W2	H1	H2	H3	H4	D1	D2	d	
1PH 200-240V	ZS20-0004CL-01	0.4	80.0	60.0	160.0	150.0	35.4	36.6	123.5	120.3	5	0.9
	ZS20-0007CL-01	0.75	80.0	60.0	160.0	150.0	35.4	36.6	123.5	120.3	5	0.9
	ZS20-0015CL-01	1.5	80.0	60.0	185.0	175.0	35.4	36.6	140.5	137.3	5	1.2
	ZS20-0022CL-01	2.2	80.0	60.0	185.0	175.0	35.4	36.6	140.5	137.3	5	1.2
3PH 220-240V	ZS20-0004CL-02	0.4	80.0	60.0	185.0	175.0	35.4	36.6	140.5	137.3	5	1
	ZS20-0007CL-02	0.75	80.0	60.0	185.0	175.0	35.4	36.6	140.5	137.3	5	1
3PH 380-440V	ZS20-0007CL-04	0.75	80.0	60.0	185.0	175.0	35.4	36.6	140.5	137.3	5	1
	ZS20-0015CL-04	1.5	80.0	60.0	185.0	175.0	35.4	36.6	140.5	137.3	5	1
	ZS20-0022CL-04	2.2	80.0	60.0	185.0	175.0	35.4	36.6	140.5	137.3	5	1



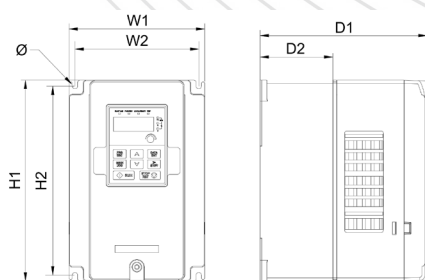
Rail mounting of inverters of 1PH 230V/3PH 400V ($\leq 2.2\text{kW}$) and 3PH 230V ($\leq 0.75\text{kW}$)

INVERTER DIMENSIONS

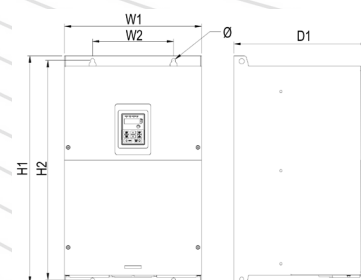
VOLTAGE	MODEL	RATED POWER [kW]	DIMENSION (mm)								WEIGHT (kg)
			W1	W2	W3	H1	H2	D1	D2	d	
3PH 220-240V	ZS20-0007CL-01	1.5	146.0	131.0	-	256.0	243.5	167.0	84.5	6	3.1
	ZS20-0007CL-01	2.2	146.0	131.0	-	256.0	243.5	167.0	84.5	6	3.1
	ZS20-0015CL-01	4	146.0	131.0	-	256.0	243.5	167.0	84.5	6	3.1
	ZS20-0007CL-01	5.5	170.0	151.0	-	320.0	303.5	196.3	113.0	6	5.58
	ZS20-0022CL-01	7.5	170.0	151.0	-	320.0	303.5	196.3	113.0	6	5.83
3PH 380-440V	ZS20-0040CL-04	4	146.0	131.0	-	256.0	243.5	167.0	84.5	6	3.1
	ZS20-0055CL-04	5.5	146.0	131.0	-	256.0	243.5	167.0	84.5	6	3.1
	ZS20-0075CL-04	7.5	170.0	151.0	-	320.0	303.5	196.3	113.0	6	5.58
	ZS20-0110CL-04	11	170.0	151.0	-	320.0	303.5	196.3	113.0	6	5.58
	ZS20-0150CL-04	15	170.0	151.0	-	320.0	303.5	196.3	113.0	6	5.83
	ZS20-0185CL-04	18.5	200.0	185.0	-	340.6	328.6	184.3	104.5	6	9
	ZS20-0220CL-04	22	200.0	185.0	-	340.6	328.6	184.3	104.5	6	9
	ZS20-0300CL-04	30	250.0	230.0	-	400.0	380.0	202.0	123.5	6	15.5
	ZS20-0370CL-04	37	250.0	230.0	-	400.0	380.0	202.0	123.5	6	15.5
	ZS20-0450CL-04	45	282.0	160.0	226.0	560.0	542.0	238.0	138.0	9	25
	ZS20-0550CL-04	55	282.0	160.0	226.0	560.0	542.0	238.0	138.0	9	25
	ZS20-0750CL-04	75	282.0	160.0	226.0	560.0	542.0	238.0	138.0	9	25
	ZS20-0900CL-04	90	338.0	200.0	-	554.0	535.0	329.2	-	9.5	45
	ZS20-1100CL-04	110	338.0	200.0	-	554.0	535.0	329.2	-	9.5	45



Wall mounting of 3PH 400V 4-37kW
and 3PH 230V 1.5-7.5kW inverters



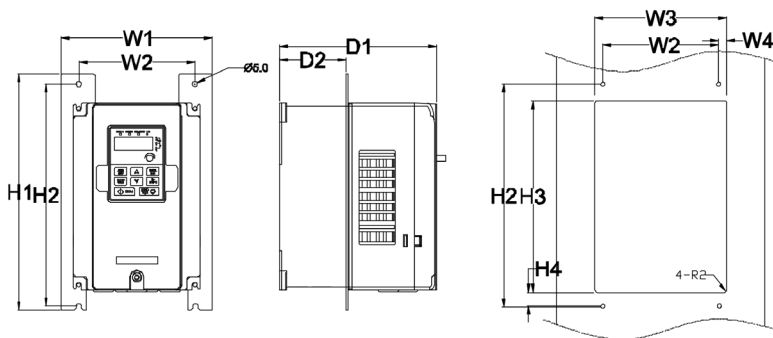
Wall mounting of 3PH 400V
45-75kW inverters



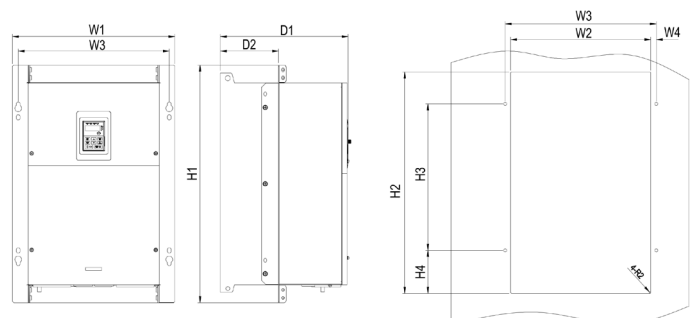
Wall mounting of 3PH 400V
90-110kW inverters

DIMENSIONS

VOLTAGE	MODEL	RATED POWER [kW]	DIMENSION (mm)												WEIGHT (kg)
			W1	W2	W3	W4	H1	H2	H3	H4	D1	D2	d	SCREW	
1PH 200-240V	ZS20-0015CL-02	1.5	170.2	131.0	150.0	9.5	292.0	276.0	260.0	6.0	167.0	84.5	6	M5	3.1
	ZS20-0022CL-02	2.2	170.2	131.0	150.0	9.5	292.0	276.0	260.0	6.0	167.0	84.5	6	M5	3.1
	ZS20-0040CL-02	4	170.2	131.0	150.0	9.5	292.0	276.0	260.0	6.0	167.0	84.5	6	M5	3.1
	ZS20-0055CL-02	5.5	191.2	151.0	174.0	11.5	370.0	351.0	324.0	12.0	196.3	113.0	6	M5	5.58
	ZS20-0075CL-02	7.5	191.2	151.0	174.0	11.5	370.0	351.0	324.0	12.0	196.3	113.0	6	M5	5.83
3PH 380-440V	ZS20-0040CL-04	4	170.2	131.0	150.0	9.5	292.0	276.0	260.0	6.0	167.0	84.5	6	M5	3.1
	ZS20-0055CL-04	5.5	170.2	131.0	150.0	9.5	292.0	276.0	260.0	6.0	167.0	84.5	6	M5	3.1
	ZS20-0075CL-04	7.5	191.2	151.0	174.0	11.5	370.0	351.0	324.0	12.0	196.3	113.0	6	M5	5.58
	ZS20-0110CL-04	11	191.2	151.0	174.0	11.5	370.0	351.0	324.0	12.0	196.3	113.0	6	M5	5.58
	ZS20-0150CL-04	15	191.2	151.0	174.0	11.5	370.0	351.0	324.0	12.0	196.3	113.0	6	M5	5.83
	ZS20-0185CL-04	18.5	266.0	250.0	224.0	13.0	371.0	250.0	350.6	20.3	184.6	104.0	6	M5	9
	ZS20-0220CL-04	22	266.0	250.0	224.0	13.0	371.0	250.0	350.6	20.3	184.6	104.0	6	M5	9
	ZS20-0300CL-04	30	316.0	300.0	274.0	13.0	430.0	300.0	410.0	55.0	202.0	118.3	6	M5	15.5
	ZS20-0370CL-04	37	316.0	300.0	274.0	13.0	430.0	300.0	410.0	55.0	202.0	118.3	6	M5	15.5
	ZS20-0450CL-04	45	352.0	332.0	306.0	13.0	580.0	400.0	570.0	80.0	238.0	133.8	9	M8	25
	ZS20-0550CL-04	55	352.0	332.0	306.0	13.0	580.0	400.0	570.0	80.0	238.0	133.8	9	M8	25
	ZS20-0750CL-04	75	352.0	332.0	306.0	13.0	580.0	400.0	570.0	80.0	238.0	133.8	9	M8	25
	ZS20-0900CL-04	90	418.5	361.0	389.5	14.2	600.0	559.0	370.0	108.5	329.5	149.5	9.5	M8	45
	ZS20-1100CL-04	110	418.5	361.0	389.5	14.2	600.0	559.0	370.0	108.5	329.5	149.5	9.5	M8	45



Flange mounting of 3PH 400V 4-75kW and 3PH 230V 1.5-7.5kW inverters



Flange mounting of 3PH 400V 4-75kW 90-110kW inverters

OPTIONAL PARTS

EXTERNAL LED KEYPAD

Including the external keypads with or without the parameter copying function.



REACTOR

Input reactor: Improve the power factor of the input side of the inverter and control the higher harmonic current.

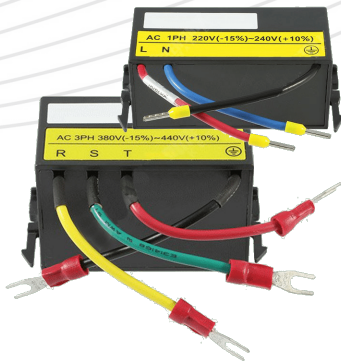
Output reactor: Prolong the effective transmitting distance of the inverter and control the sudden high voltage when switching on/off the IGBT of the inverter.



FILTER

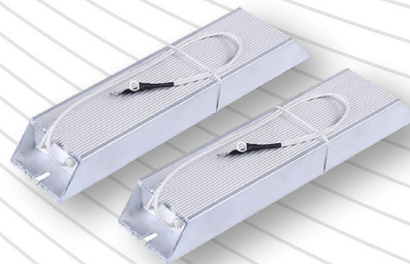
Input filter: Control the electromagnetic interference generated from the inverter, please install close to the input terminal side of the inverter.

Output filter: Control the interference from the output side of the inverter, please install close to the output terminals of the inverter.



BRAKING RESISTOR

Auxiliary equipment for braking system, shorten the deceleration time.

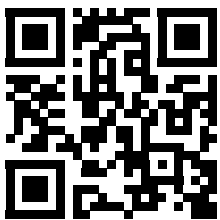


KEYPAD BRACKET

Use it to install the keypad on the front of cabinet



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