Sx2000


SET
RUN
FWD
REV
RUN
STOP
RESET
ESC
ENT
Sx2000
LARSEN & TOUBRO
WARNING

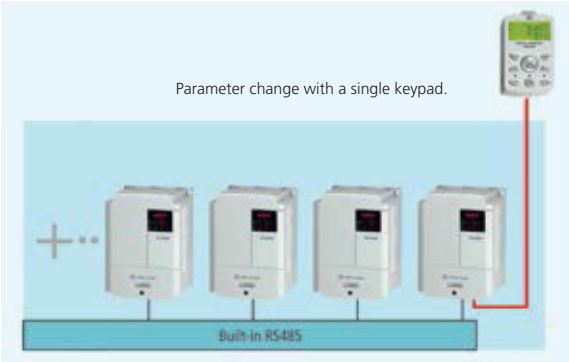
The Sx2000 adds a new dimension to L&T's AC drive solutions. Built to L&T's stringent quality standards, the Sx2000 is tested and certified to meet global benchmarks, giving you the assurance of total reliability. The Sx2000 is built to deliver powerful performance. It produces a starting torque of 200% at 0.5 Hz, which provides better control at low-speed. Its compact size enables panel-size reduction, hence helps in space-efficient design.

Main Features

- Range: 0.75kW to 90kW
- V/F, Sensorless Vector Control, Slip Compensation
- Starting Torque at 200% at 0.5Hz for Sensorless Control
- Component Life Monitor
- Peer to Peer Communication to share I/Os
- Built-in PLC Logic
- Built-in Brake Control
- Multi Keypad
- Stores last 5 faults
- Conformal Coating complying to IEC 60721-3-3 class 3C2
- Built-in RS485 Modbus RTU Communication

Applications

- OEM Machines
- Elevators
- Plastic & Textile Machines
- Conveyors
- Compressors
- Wire Drawing
- Extruders
- AHU Control
- Fan & Pump
- Crane Hoist
- Crane Control LT / CT
- Solar Pump



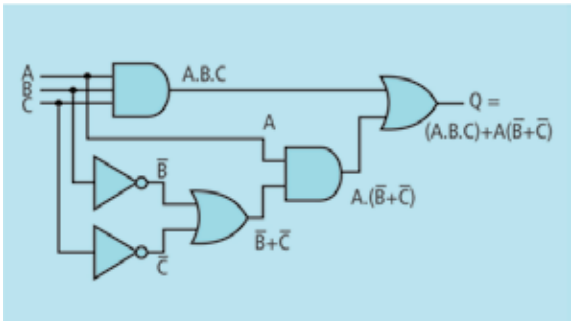
Multi-keypad function

Single LCD keypad can be used to set up the parameters of RS485 connected drives.

- LCD (LTOP-DOP-200) keypad (same as Fx2000 model) enables handy parameter set-up.
- Multi-language support available

User sequence function (PLC Logic)

- Simple PLC sequences can be operated with various function block combinations with direct access to Drive parameters.
- Function blocks: AND, NOR, ADD, SUB, XOR, MIN, MAX, COMPARE, TIMER, SWITCH, UP/DWN COUNT..etc
- No Software required to create logic

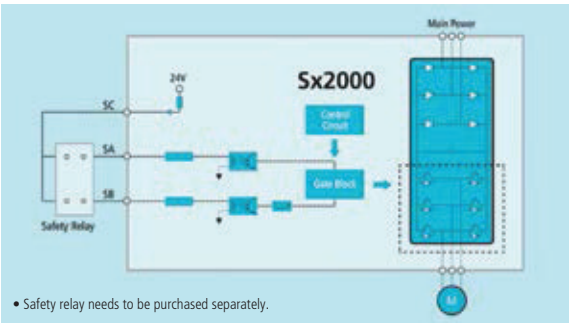


Peer-to-Peer function embedded

I/O can be shared among master and slave drives.
(RS485 wiring required).

Built-in Brake Control

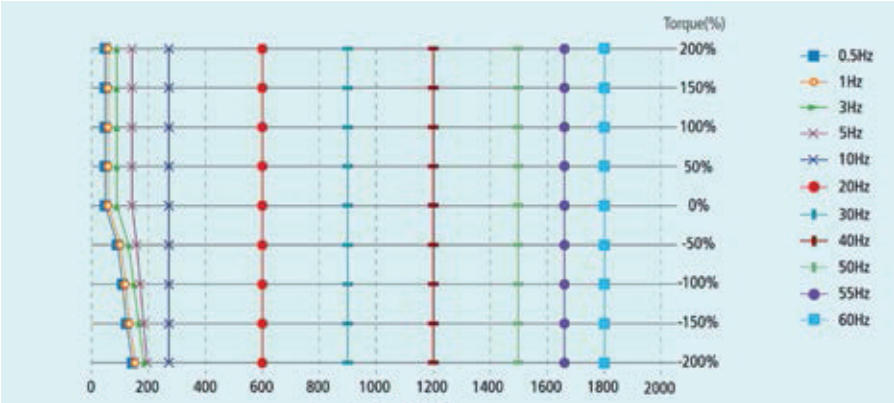
- Brake opening command by drive under the following conditions:
  - Inverter Output Frequency > Brake Release Frequency
  - Inverter Output Current > Brake Release Current
- Brake release with delay
- Ensures Slip prevention
- Brake Close frequency different settings possible for Hoisting & Lowering Motion



Safety Function

Sx2000 has in-built safety functions conforming to modern safety standards.

The safety input function meets EN ISO 13849-1 PLd and EN 61508 SIL2 (EN60204-1, stop category 0).
This feature is standard and enables compliance with current safety standards.

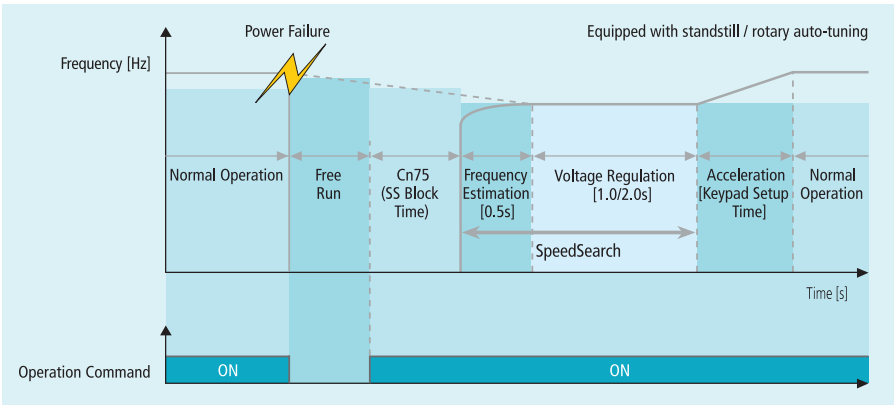


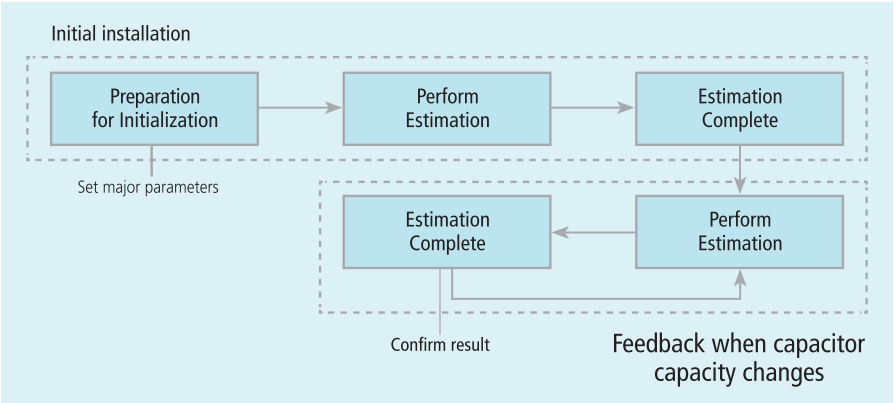
Powerful sensorless control

Starting torque of 200%/0.5Hz is produced and provides robust power in the low speed region. The motor auto-tuning function is optimised to maximise motor performance.

Flying-start function

Drive capable of reliable and smooth re-starts even for bi-directional rotating loads.



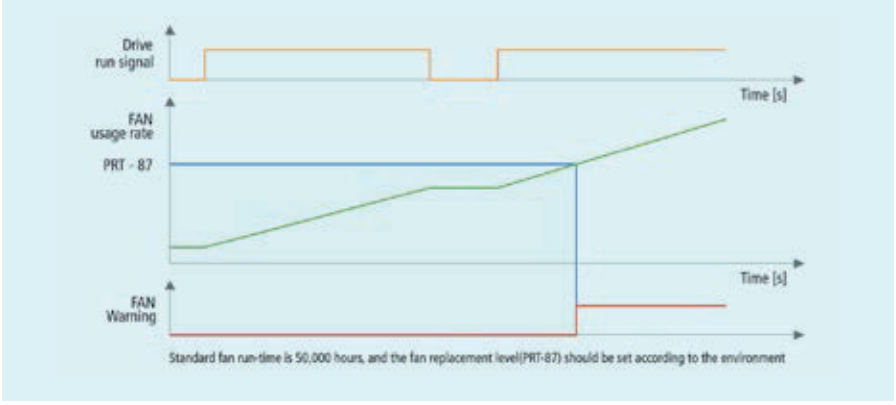


Main capacitor lifecycle estimation

Estimated through monitoring the change in the capacitance value.

Fan lifecycle estimation

Warning signal is displayed when fan is operated over a certain amount of hours.



Optional Accessories - easy to install & use

*Optional fieldbus networks:
① **Profibus-DP** (LTCI-PDP-S.)
② **Modbus TCP / Ethernet IP** (LTCI-ETH-S.)
③ **CANopen** (LTCI-CAN-S)

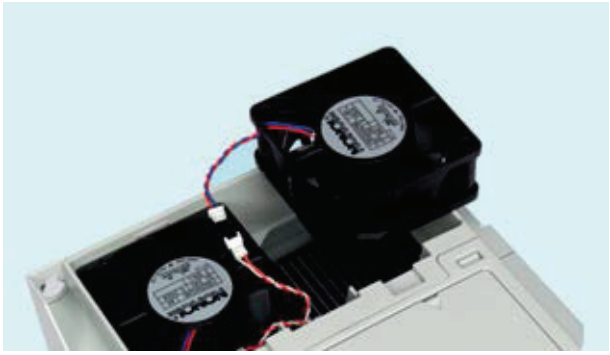
***I/O Expansion Card** (LTIO-EXP-S.):

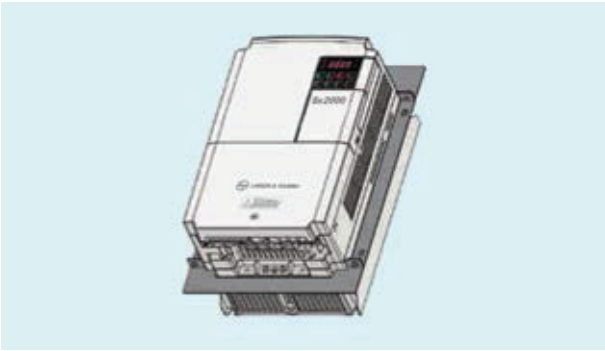
- Digital input - 3 (PNP / NPN)
- Digital output - 2 (R) AC 250V - 1A / DC 30V - 1A
- Analog input - 2, 1 Voltage (-10 to +10V)
  1 Current (0 to 20mA) / 1 Voltage (0 to +10V)
- Analog output - 1, 1 Voltage (0 to +10V) / 1 Current (0 to 20mA)

*Only one option card can be used at a time.

Simple cooling fan replacement

Tool-less replacement of cooling fan without dismantling the drive





Flange type

To reduce heat losses inside the panel
The heat sink can be mounted outside of the panel in case the space is limited.

Built-in DC reactor

Effective in improving power factor and decreasing THD.
• 3-phase 400V 37~90kW (ND)

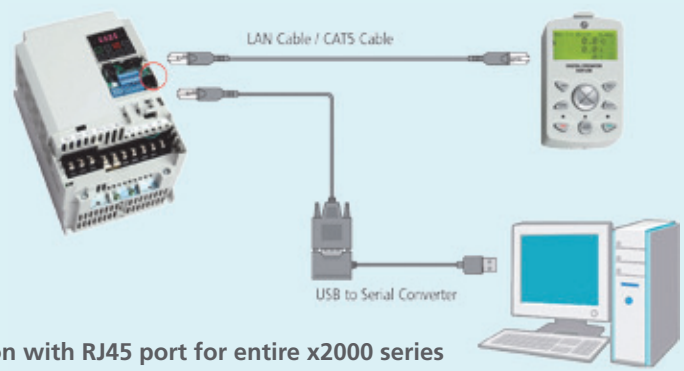
Dual rating operation

Designed to be used for heavy and normal duty applications.

Overload capacity:
– Heavy duty operation **150%** of ratedcurrent, 60 seconds
– Normal duty operation **120%** of rated current, 60 seconds

DriveConnect software allows drive/system monitoring on a PC and easy maintenance of drive and motor parameters

- Windows-based graphic user interface (GUI)
- Modbus-RTU
- Connecting up to 31 drives
- Integrated control console
- Offline editing function
- Data upload/download
- 4-channel oscilloscope
- Trigger function



DriveConnect software connection with RJ45 port for entire x2000 series

Input and output specification: Input Voltage Single-Phase 230V (0.75 to 3.7kW - ND)

LTVF-S1 □□□□ BAA			0003	0006	0010	0012
Applicable Motor	Heavy Duty [HD]	HP	0.5	1.0	2.0	3.0
		kW	0.4	0.75	1.5	2.2
	Normal Duty [ND]	HP	1.0	2.0	3.0	5.0
		kW	0.75	1.5	2.2	3.7
Output Rating	Capacity [kVA]	Heavy Duty [HD]	1.0	1.9	3.0	4.2
		Normal Duty [ND]	1.2	2.3	3.8	4.6
	Rated Current [A]	Heavy Duty [HD]	2.5	5.0	8.0	11.0
		Normal Duty [ND]	3.1	6.0	9.6	12.0
	Frequency [Hz]		0~400Hz (IM Sensorless : 0~120[Hz])			
	Voltage [V]		3-phase 200~240V			
Input Rating	Voltage [V]		1-phase 200~240VAC (-15% ~ +10%)			
	Frequency [Hz]		50~60Hz (±5%)			
	Rated Current [A]	Heavy Duty [HD]	4.8	9.3	15.6	21.7
		Normal Duty [ND]	5.8	11.7	19.7	24.0
Display			LED [LCD optional]			
Braking Unit			Built-in			

Input and output specification: Input Voltage Three-Phase 230V (0.75 to 18.5kW - ND)

LTVF-S2 □□□□ BAA			0003	0006	0010	0012	0018	0030	0040	0056	0069
Applicable Motor	Heavy Duty [HD]	HP	0.5	1.0	2.0	3.0	5.4	7.5	10.0	15.0	20.0
		kW	0.4	0.75	1.5	2.2	4.0	5.5	7.5	11.0	15.0
	Normal Duty [ND]	HP	1.0	2.0	3.0	5.0	7.5	10.0	15.0	20.0	25.0
		kW	0.75	1.5	2.2	3.7	5.5	7.5	11.0	15.0	18.5
Output Rating	Capacity [kVA]	Heavy Duty [HD]	1.0	1.9	3.0	4.2	6.5	9.1	12.2	17.5	22.9
		Normal Duty [ND]	1.2	2.3	3.8	4.6	6.9	11.4	15.2	21.3	26.3
	Rated Current [A]	Heavy Duty [HD]	2.5	5.0	8.0	11.0	17.0	24.0	32.0	46.0	60.0
		Normal Duty [ND]	3.1	6.0	9.6	12.0	18.0	30.0	40.0	56.0	69.0
	Frequency [Hz]		0~400Hz (IM Sensorless : 0~120[Hz])								
	Voltage [V]		3-phase 200~240V								
Input Rating	Voltage [V]		3-phase 200~240VAC (-15% ~ +10%)								
	Frequency [Hz]		50~60Hz (±5%)								
	Rated Current [A]	Heavy Duty [HD]	2.2	4.9	8.4	11.8	18.5	25.8	34.9	50.8	66.7
		Normal Duty [ND]	3.0	6.3	10.8	13.1	19.4	32.7	44.2	62.3	77.2
Display			LED [LCD optional]								
Braking Unit			Built-in								

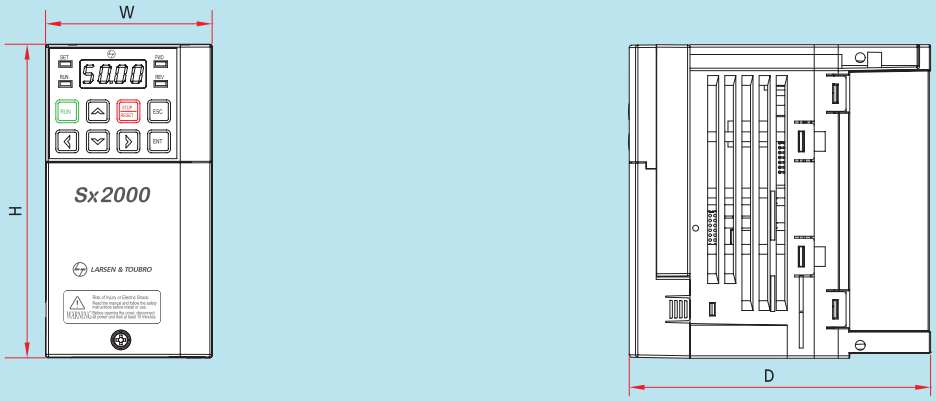
Input and output specification: Input Voltage Three-Phase 415V (0.75 to 30kW - ND)

LTVF-S4 □□□□ BAA			0002	0003	0005	0007	0010	0016	0023	0030	0038	0044	0058
Applicable Motor	Heavy Duty [HD]	HP	0.5	1.0	2.0	3.0	5.4	7.5	10.0	15.0	20.0	25.0	30.0
		kW	0.4	0.75	1.5	2.2	4.0	5.5	7.5	11.0	15.0	18.5	22.0
	Normal Duty [ND]	HP	1.0	2.0	3.0	5.0	7.5	10.0	15.0	20.0	25.0	30.0	40.0
		kW	0.75	1.5	2.2	3.7	5.5	7.5	11.0	15.0	18.5	22.0	30.0
Output Rating	Capacity [kVA]	Heavy Duty [HD]	1.0	1.9	3.0	4.2	6.5	9.1	12.2	18.3	22.9	29.7	34.3
		Normal Duty [ND]	1.5	2.4	3.9	5.3	7.6	12.2	17.5	22,9	29.0	33.5	44.2
	Rated Current [A]	Heavy Duty [HD]	1.3	2.5	4.0	5.5	9.0	12.0	16.0	24.0	30.0	39.0	45.0
		Normal Duty [ND]	2.0	3.1	5.1	6.9	10.0	16.0	23.0	30.0	38.0	44.0	58.0
	Frequency [Hz]		0~400Hz (IM Sensorless : 0~120[Hz])										
	Voltage [V]		3-phase 380~480V										
Input Rating	Voltage [V]		3-phase 380~480VAC (-15% ~ +10%)										
	Frequency [Hz]		50~60Hz (±5%)										
	Rated Current [A]	Heavy Duty [HD]	1.1	2.4	4.2	5.9	9.8	12.9	17.5	26.5	33.4	43.6	50.7
		Normal Duty [ND]	2.0	3.3	5.5	7.5	10.8	17.5	25.4	33.4	42.5	49.5	65.7
DC Reactor			External [option]										
Display			LED [LCD optional]										
Braking Unit			Built-in										

Input and output specification: Input Voltage Three-Phase 415V (37 to 90kW - ND)

LTVF-S4 □□□□ BAA			0075	0091	0107	0142	0169
Applicable Motor	Heavy Duty [HD]	HP	40.0	50.0	60.0	75.0	100.0
		kW	30.0	37.0	45.0	55.0	75.0
	Normal Duty [ND]	HP	50.0	60.0	75.0	100.0	120.0
		kW	37.0	45.0	55.0	75.0	90.0
Output Rating	Capacity [kVA]	Heavy Duty [HD]	46.5	57.2	69.4	83.8	115.8
		Normal Duty [ND]	57.2	69.4	81.5	108.2	128.8
	Rated Current [A]	Heavy Duty [HD]	61.0	75.0	91.0	110.0	152.0
		Normal Duty [ND]	75.0	91.0	107.0	142.0	169.0
	Frequency [Hz]		0~400Hz (IM Sensorless : 0~120[Hz])				
	Voltage [V]		3-phase 380~480V				
Input Rating	Voltage [V]		3-phase 380~480VAC (-15% ~ +10%)				
	Frequency [Hz]		50~60Hz (±5%)				
	Rated Current [A]	Heavy Duty [HD]	56.0	69.0	85.0	103.0	143.0
		Normal Duty [ND]	69.0	85.0	100.0	134.0	160.0
DC Reactor			Built-in				
Display			LCD				
Braking Unit			External [option]				

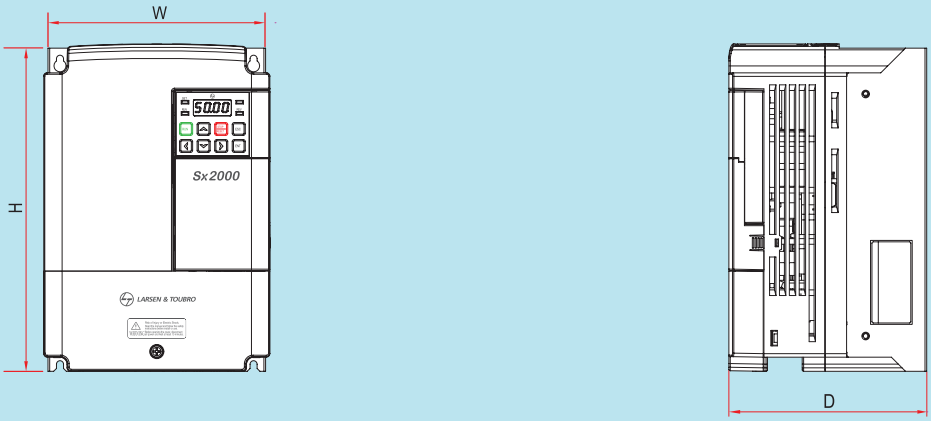
	Range	Single-Phase 230V	Three-Phase 230V	Three-Phase 415V
		0.75 to 3.7kW (ND)	0.75 to 18.5kW (ND)	0.75 to 90kW (ND)
Standard Specifications	Enclosure Type	IP20		
	Overload Capacity	HD: 150% for 1min; ND: 120% for 1min		
	Max Output Voltage	Proportional to Input Voltage		
	Max Output Frequency	0 to 400Hz (Sensorless: 0 to 120Hz)		
	Rated Voltage	380 to 480V Three-phase (-15%/+10%)		
	Rated Frequency	50/60Hz (-5/+5%)		
	Keypad	Built-in LED till 30kW (ND) & Above 30kW standard Detachable LCD		
	Braking Chopper	Built-in up to 30kW (ND)		
	DC Reactor	Built-in from 37kW to 90kW		
Control Details	Control Method	V/F, Sensorless Vector Control, Slip Compensation		
	Starting Torque	200% at 0.5Hz for Sensorless Control & 150% at 3Hz for V/F		
	Frequency Control Range	0.01 to 400Hz for V/F , 0 to 120Hz for Sensorless Vector Control		
	Frequency Precision Setting	Digital command: 0.01Hz Analog command: 0.03Hz (Max. frequency: 60Hz)		
	Frequency Setting	Analog type: - 10 to 10V, +0 to 10[V], 4 to 20[mA], Digital type: Keypad, panel potentiometer, pulse train input		
	Output Frequency Resolution	0.01Hz		
	V/F pattern	Linear, squared, user V/F		
	Accel/Decel Time	0.0 to 6000 Sec		
	Braking Torque	Continuous Regeneration Torque 20% (150% with DBR)		
	Features	Multi keypad, peer-to-peer communication to share I/Os, user sequence, inbuilt PID, component life monitor, no motor detection, auto tuning, KEB, DI/DO ON-OFF delay, torque control, torque boost, DC braking, fire mode, flux braking, 2nd motor, frequency jump, slip compensation		
Protection	Faults	Under load trip, low voltage trip, phase loss trip, no motor trip, exterior brake trip, safety input error, IO board trip inverter overload warning, lost command warning, overheat Trip, encoder trip, DBR %ED warning		
	Alarm	Command Loss trip, overload, inverter overload, fan operation, resistance braking, nos of corrections on rotor auto tuning		
	Momentary Power Loss Ride Through	Continuous Operation: Heavy Loads less then 15msec, normal load less then 8msec, Auto Restart Operation: Heavy Loads more then 15msec, normal load more then 8msec		
Interface	DI	7 (Programmable NPN/PNP)		
	DO	1 (Programmable NO/NC) + 1 TR till 30kW, 2 (Programmable NO/NC) + 1 TR above 30kW		
	AI	2 (4-20mA / - 10 to + 10Vdc)		
	AO	1 (4-20mA / 0 to 10Vdc) till 30kW, 1 (4-20mA) + 1 (0 to 10Vdc) above 30kW		
	Pulse Train	1 I/P & 1 O/P (0 to 32Khz)		
	Communication	Built-in RS485 Modbus RTU		
	Safety I/P	2, complying with EN ISO 13849-1 Pld and EN61508SIL2 [EN60204-1, stop category 0]		
Environment	Area of Use	Indoors. There shall not be corrosive air, combustible gas, oil mist, dust and other pollutants		
	Ambient Temperature	-10°C to 50°C for HD, -10°C to 40°C for ND		
	Storage Temperature	-20°C to 65°C		
	PCB Protection	Conformal Coating complying to IEC 60721-3-3 class 3C2		
	Application Humidity	Below relative humidity 90% RH (no condensation)		
	Altitude	Below 1000m		
	Vibration	9.8m/sec^2 (1G)		
	Global Compliance	CE, UL, RoHS		



Input Voltage	Drive Cat. No.	W (mm)	H (mm)	D (mm)	Weight (kg)
Single-Phase 230 V	LTVF-S10003BAA	68	128	128	0.88
Three-Phase 230 V	LTVF-S20003BAA	68	128	123	0.86
	LTVF-S10006BAA	68	128	128	0.86
Three-Phase 415 V	LTVF-S40002BAA	68	128	123	0.86
	LTVF-S40003BAA	68	128	128	0.88

Input Voltage	Drive Cat. No.	W (mm)	H (mm)	D (mm)	Weight (kg)
Single-Phase 230 V	LTVF-S10006BAA	100	128	130	1.3
	LTVF-S10010BAA	100	128	145	1.5
	LTVF-S10012BAA	140	128	145	2.2
Three-Phase 230 V	LTVF-S20010BAA	100	128	130	1.5
	LTVF-S20012BAA	100	128	145	1.5
	LTVF-S20018BAA	140	128	145	2.3
Three-Phase 415 V	LTVF-S40005BAA	100	128	130	1.5
	LTVF-S40007BAA	100	128	145	1.5
	LTVF-S40010BAA	140	128	145	2.7

Note: The above drawings are solely for reference purposes. Please refer to the technical manual.



Input Voltage	Drive Cat. No.	W (mm)	H (mm)	D (mm)	Weight (kg)
Three-Phase 230 V	LTVF-S20030BAA	160	232	140	3.3
	LTVF-S20040BAA	160	232	140	3.3
	LTVF-S20056BAA	180	290	163	4.6
	LTVF-S20069BAA	220	350	187	4.6
Three-Phase 415 V	LTVF-S40016BAA	160	232	140	3.3
	LTVF-S40023BAA	160	232	140	3.4
	LTVF-S40030BAA	180	290	163	4.6
	LTVF-S40038BAA	180	290	163	4.8
	LTVF-S40044BAA	220	350	187	7.5
	LTVF-S40058BAA	220	350	187	7.5

Input Voltage	Drive Cat. No.	W (mm)	H (mm)	D (mm)	Weight (kg)
Three-Phase 415 V	LTVF-S40075BAA	275	450	284	26
	LTVF-S40091BAA	325	510	284	35
	LTVF-S40107BAA	325	510	284	35
	LTVF-S40142BAA	325	550	309	43
	LTVF-S40169BAA	325	550	309	43

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