



LM16

COMPACT DRIVE V/f
and SLV CONTROL





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INTRODUCTION

The LM16 inverter series is dedicated to the control of squirrel-cage three-phase asynchronous motors and is available both with single-phase (1ph) and three-phase (3ph) power supply.

It is equipped with V/f and SVL (voltage sensorless vector) motor control with advanced slip compensation functions. The LM16 has a compact and essential structure which makes it particularly suitable for an easy and intuitive use in low-dynamic applications and simple control architectures.

The on-board potentiometer allows for an easy speed adjustment of the motor, for a manual use of the inverter that can be obtained also through the integrated keyboard. The integrated Modbus communication interface allows the network use of the inverter not only during programming but also during motor control phase. Thanks to the integrated EMC filter in all power ratings, the LM16 inverter is compliant with category C2 according to EN 61800-3: 2004 +A1: 2012.

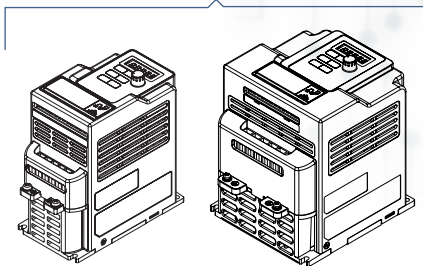


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INTRODUCTION

The different power ratings are distributed on three mechanical sizes in case of three-phase power supply that reduce to two in case of single-phase power supply.

SINGLE-PHASE 230V



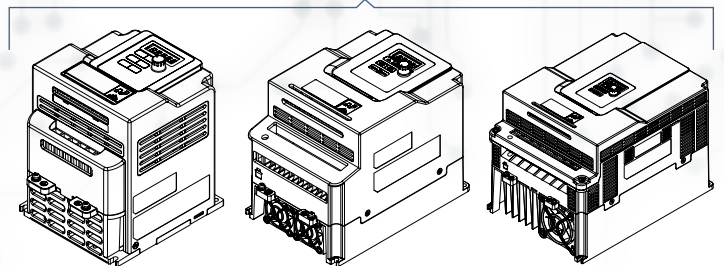
Size 1

0,18 kW
0,37 kW
0,75 kW

Size 2

1,5 kW
2,2 kW

THREE-PHASE 400V



Size 2

0,75 kW
1,5 kW
2,2 kW

Size 3

4,0 kW
5,5 kW

Size 4

7,5 kW
11 kW

Nominal power	0,18kW	0,37kW	0,75kW	1,5kW	2,2kW	4kW	5,5kW	7,5kW	11kW
LM16	Single-phase 230V								
				Three-phase 400V					

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FIELDS OF APPLICATION



PACKAGING MACHINES



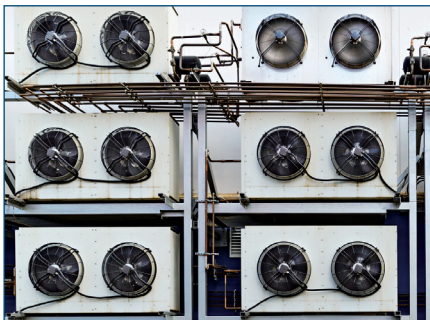
AUTOMATIC DOOR CONTROL



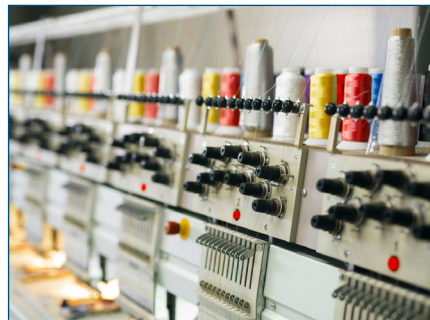
CONVEYOR BELTS



PUMPS



FANS



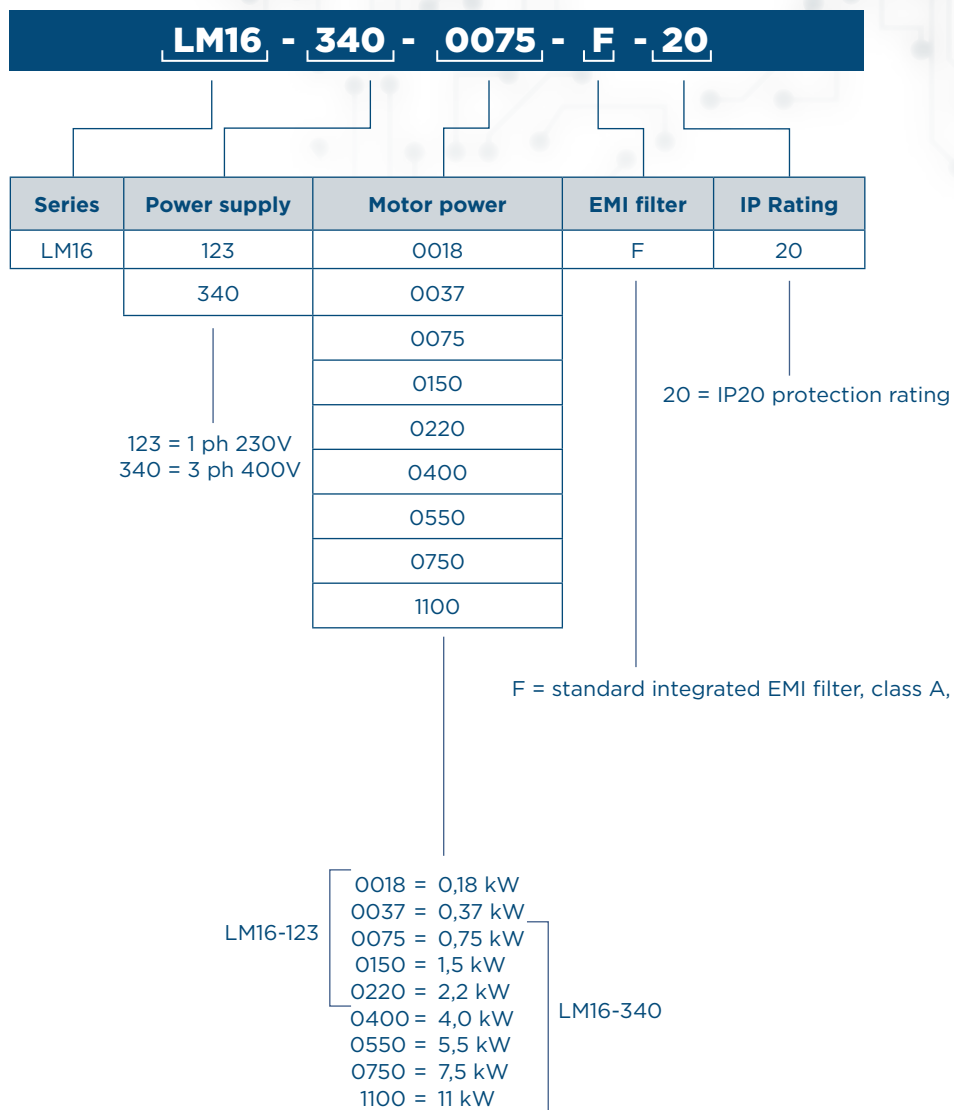
TEXTILE INDUSTRY MACHINES

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DESIGNATION

The designation string defines the inverter identification rules for a correct selection of its main structural features.

It consists of an ordered sequence of alpha-numerical values according to what listed in the diagram below:



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PRODUCT OFFER

Coherently with the previous designation structure, the LM16 series will be completely described in the following table which lists all possible product configurations:

Inverter	Power supply	Power (kW)	EMI filter	IP Rating
LM16-123-0018-F-20	1ph 230V	0,18	Integrated	20
LM16-123-0037-F-20		0,37		
LM16-123-0075-F-20		0,75		
LM16-123-0150-F-20		1,5		
LM16-123-0220-F-20		2,2		
LM16-340-0075-F-20	3ph 400V	0,75		
LM16-340-0150-F-20		1,5		
LM16-340-0220-F-20		2,2		
LM16-340-0400-F-20		4		
LM16-340-0550-F-20		5,5		
LM16-340-0750-F-20		7,5		
LM16-340-1100-F-20		11		

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MAIN FUNCTIONS

ENERGY SAVINGS

Generally speaking, a motor during its whole lifetime consumes a quantity of energy equal to a hundred times its purchase cost.

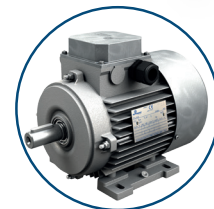
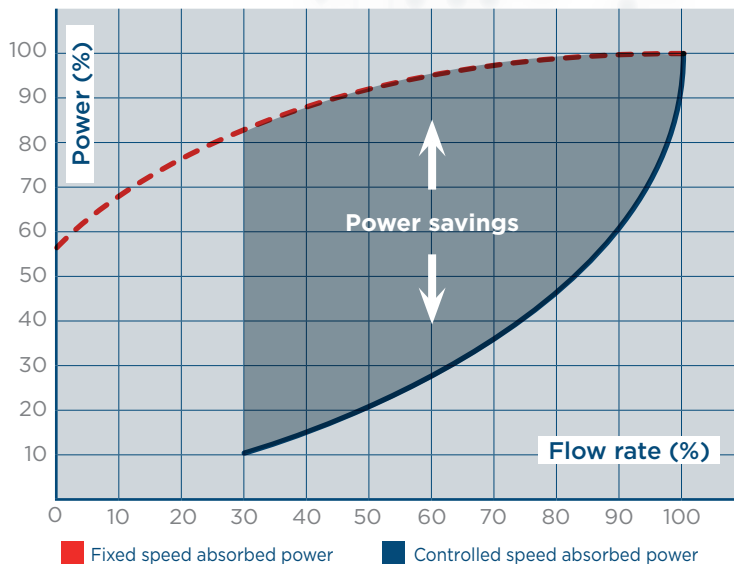
Energy savings thanks to speed reduction:

a speed reduction of 20% will save approx. 50% of energy.

Energy savings thanks to the PID and Sleep mode functions:

the process control and the slip compensation will save approx. 70% of energy.

- 150% of the torque at 3Hz

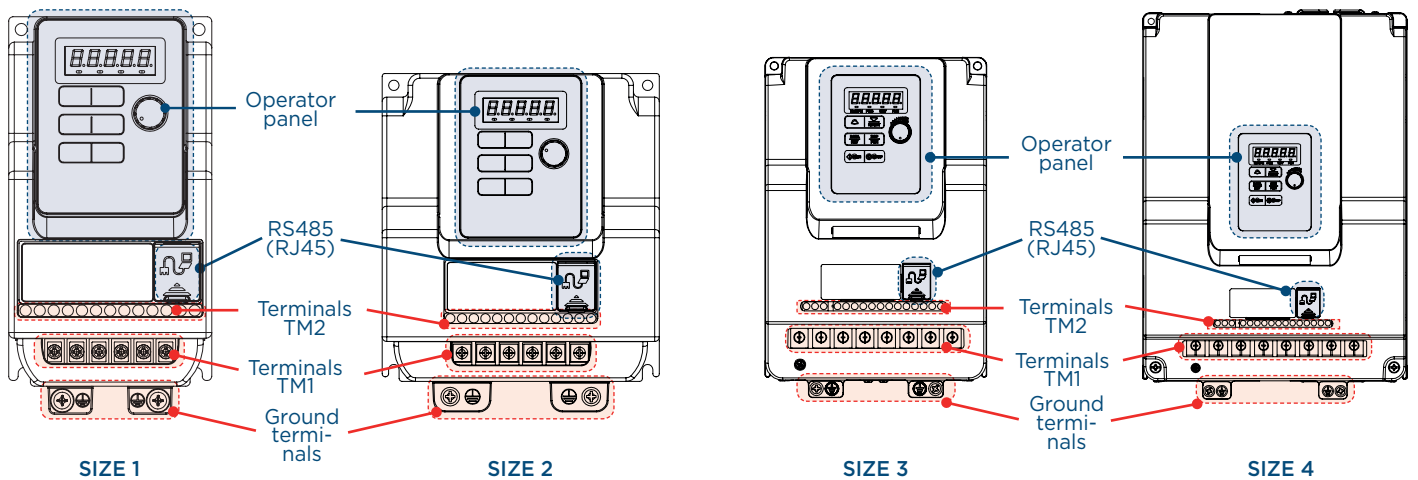


- Braking torque 20% without resistance
- RTU Modbus RS485 interface through RJ45
- Integrated PID control
- Motor phase loss control
- Removable integrated EMI filter
- Integrated braking transistor in 3ph 400V models
- 3 types of V/f control with soft PWM
- Parameter block with password
- 2/3 wire wiring
- Programmable cyclic speed sequences
- 8 programmable fixed speeds
- Electromechanical brake control logic
- S-Ramps
- Auto-tuning of the modulation frequency according to the temperature

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STRUCTURE

The whole LM16 series, regardless of the size, is characterised by a neat and simple front panel where each interface provides an easy access for the user.



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STRUCTURE

The product offers a wide range of optional devices dedicated to fieldbus network connections and connections with local data exchange units.



Profibus DP
JN5-CM-PDP



DeviceNet
JN5-CM-DNET



CANbus
JN5-CM-CAN



Ethernet TCP/IP
JN5-CM-TCPIP



RTU/ASCII Modbus
integrated protocol

PC Software
M16 Drive Link



USB/RJ45 cable
JN5-CM-USB



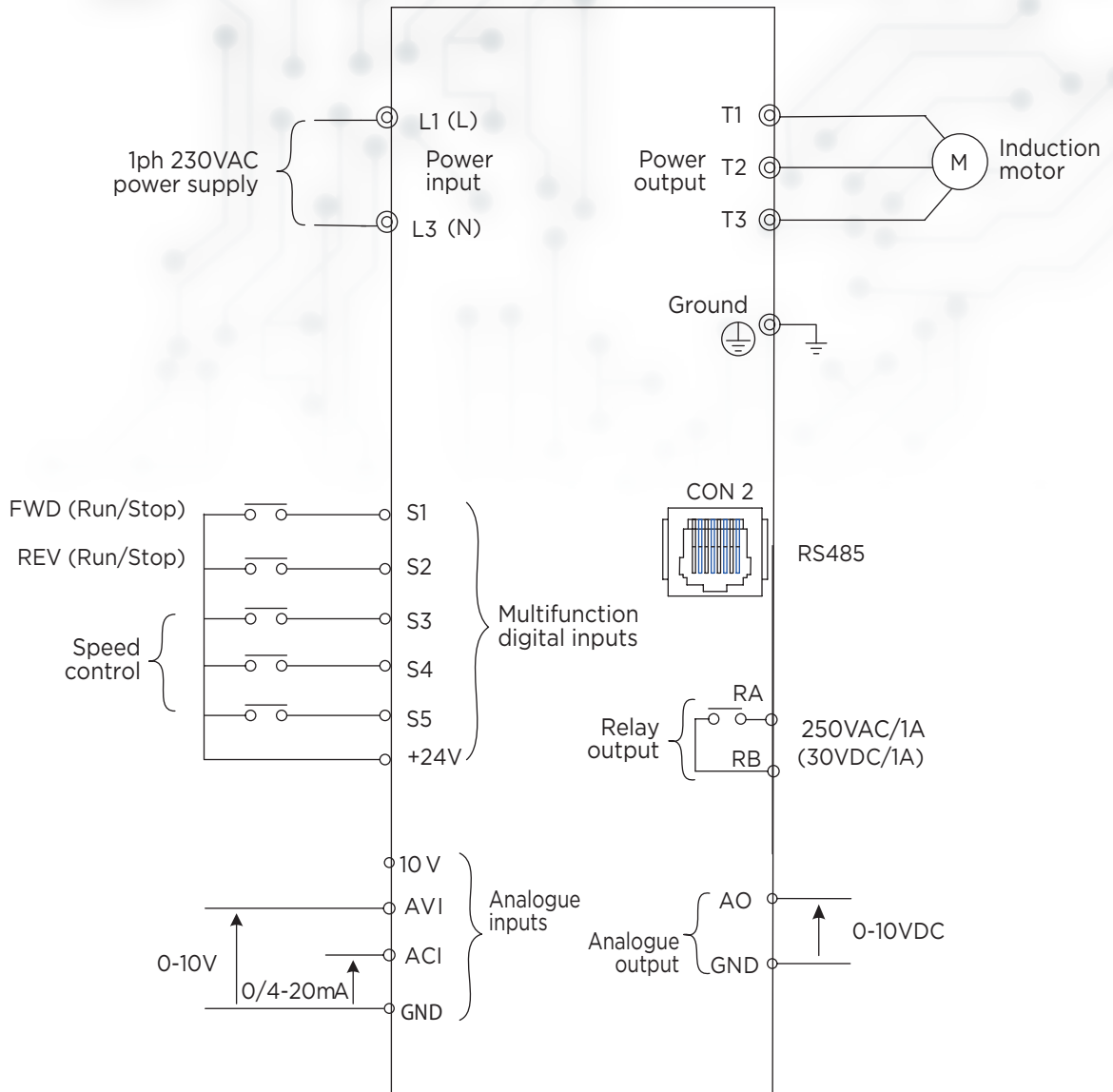
Parameter Copy Unit
JN5-CU

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CONNECTIONS

The LM16 series offers different connection modes according to the power supply and nominal power versions.

1PH 230V VERSION



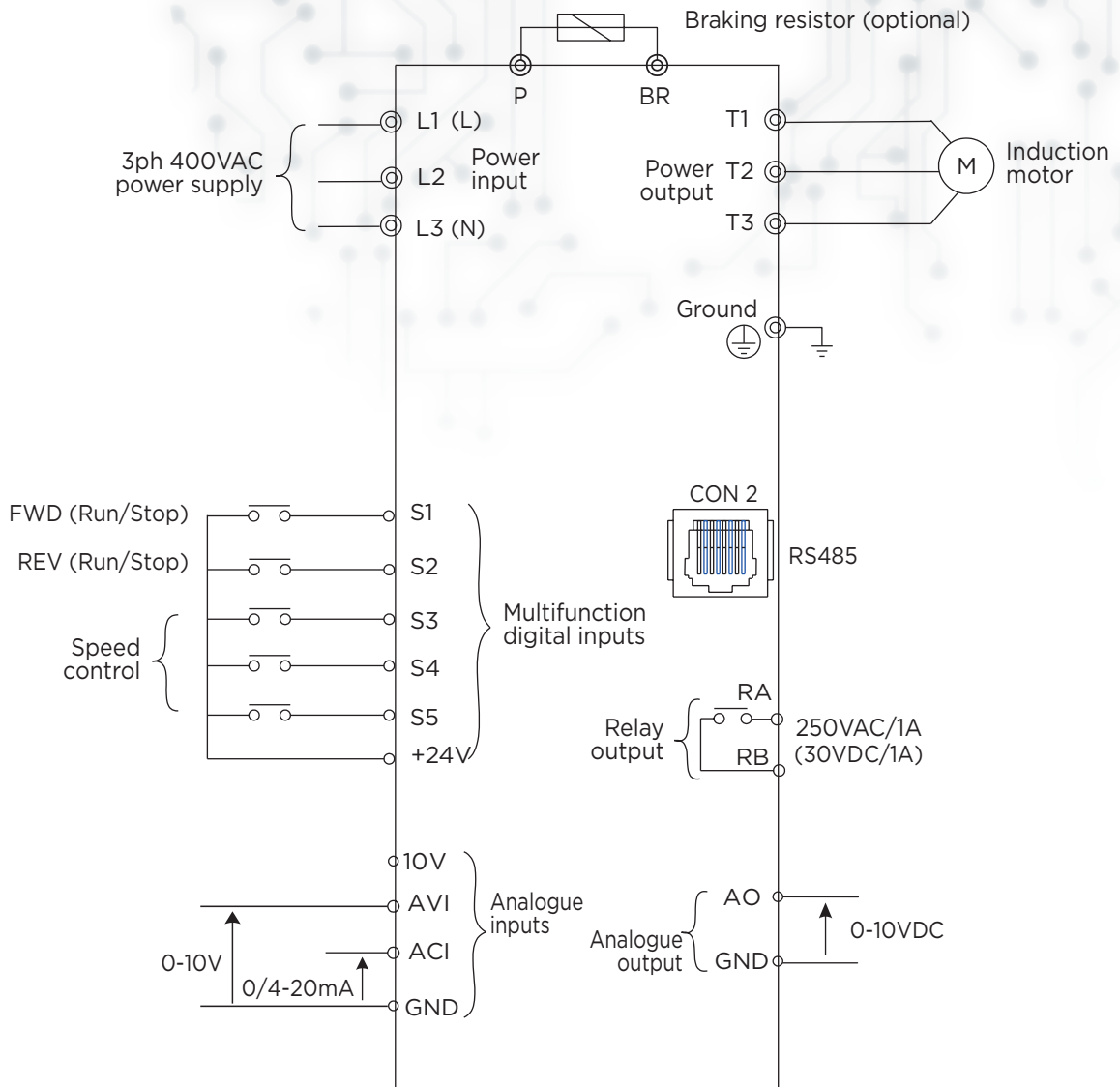
The following models fall within this category:

Inverter
LM16-123-0018-F-20
LM16-123-0037-F-20
LM16-123-0075-F-20
LM16-123-0150-F-20
LM16-123-0220-F-20

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CONNECTIONS

3PH 400V VERSION - 0,75KW / 1,5KW / 2,2KW



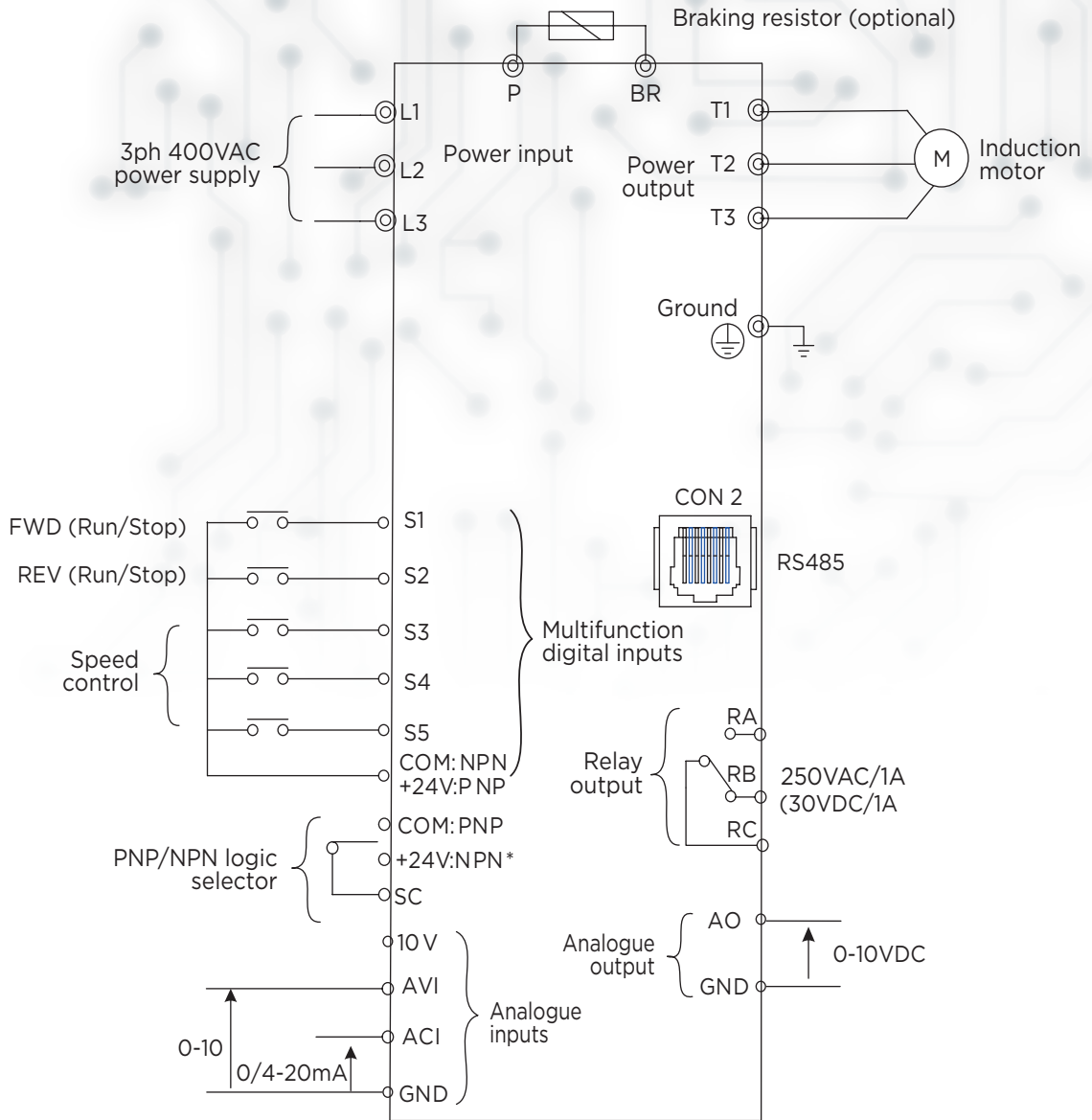
The following models fall within this category:

Inverter
LM16-340-0075-F-20
LM16-340-0150-F-20
LM16-340-0220-F-20

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CONNECTIONS

3PH 400V VERSION - 4,0KW / 5,5KW / 7,5KW / 11KW



The following models fall within this category:

Inverter
LM16-340-0400-F-20
LM16-340-0550-F-20
LM16-340-0750-F-20
LM16-340-1100-F-20

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GENERAL SPECIFICATIONS

Motor control	V/f (scalar) and SVL (voltage sensorless vector)
Current overload	150% for 60s
Starting torque	V/f mode: 100% of nominal torque starting from 3Hz
	SLV mode: 150% of nominal torque starting from 3Hz
Frequency range	0,00-599,00Hz
Speed precision	V/f mode: 3% (100% torque)
	SLV mode: 1% (100% torque)
Adjustment frequency resolution	Up/Down digital inputs: 0,01Hz
	Analogue input: 0,015Hz
Frequency reference sources	Keyboard: adjustment through buttons ▲▼
	On-board potentiometer
	0/2-10V analogue input
	0/4-20mA analogue input
	Multifunction digital inputs in Up/Down mode
	Field bus/serial communication channels
Start/stop sources	Keyboard through RUN and STOP buttons
	Multifunction digital inputs in 2 or 3 wire mode
	Jog mode through digital inputs
	Field bus/serial communication channels
Predefined V/f curves	6 predefined curves and 1 curve defined by the user
Carrier frequency	1-16kHz (default 5kHz)
Control in acceleration/deceleration	2 linear independent acceleration ramps and 2 independent deceleration ramps
	2 independent acceleration S-ramps and 2 independent deceleration S-ramps
Multifunction digital inputs	5 PNP inputs
	19 different functions for each input
	PNP/NPN logic selection through jumper, only for 3ph400V ≥ 4kW
Analogue inputs	1 0-10V input (multifunction: ref. frequency / PTC probe / PID)
	1 0-20mA input
Multifunction digital output	1 single-contact relay output
	16 different functions
Multifunction analogue output	1 0-10V output
	5 different functions
LED display	Display: parameter number/ parameter value/ frequency/ speed/ DC voltage/ output AC voltage/ output current/ PID feedback value/ inputs and outputs status/ heat sink temperature/ alarm in progress/ firmware version
Status LEDs	Run/stop/forward/reverse signalling

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GENERAL SPECIFICATIONS

Main features	Overload management, 8 predefined speeds, auto-run, ramp selection via digital input, reference and run selection via digital input, PID control, torque boost, alarm reset
Integrated protections	Motor and inverter overload (150% for 60sec), overvoltage, undervoltage, output short-circuit, short-circuit to the ground, stall prevention in transient mode and in standard operation, short power supply interruption compensation
Other integrated protections	Heat sink overtemperature, carrier frequency automatic adjustment according to the temperature, fault at output, rotation inversion not permitted, alarm self-reset, parameter block, motor overtemperature through PTC
Certifications	CE/UL/cUL/RCM
Communication interfaces	On-board RS485 (Modbus RTU)
	On-board BacNet
	Profibus DP, DeviceNet, CANbus, Ethernet TCP/IP through optional gateways
Dynamic braking	Standard integrated braking unit in the 3ph 400V versions (external optional resistance)
Operating temperature	-10-50°C (Sizes 3 and 4), -10-40°C (Sizes 1 and 2)
Storage temperature	-20-60°C
Humidity	Lower than 95% RH (non-condensing)
Vibration resistance	2G (19,6m/s ²) for 57-150Hz
	0,3mm for 10-57Hz in compliance with IEC 60068-2-6
EMC Conformity	EN61800-3, first environment
	Category C1 using the grounding kit
LVD Conformity	EN 61800-5-1
UL electric safety	UL508C
Protection rating	IP20

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TECHNICAL DATA

1PH 230V VERSION

	LM16-123-	0018	0037	0075	0150	0220
Motor side output	Recommended motor power (kW)	0,18	0,37	0,55	1,5	2,2
	Output nominal power (kVA)	0,68	1,00	1,65	2,90	4,00
	Output nominal current (A)	1,8	2,6	4,3	7,5	10,5
	Overload current 60s (A)	2,7	3,9	6,4	11,2	15,7
	Output voltage (V)	3x (0-V mains)				
	Output frequency (Hz)	0...599				
Mains side input	Mains nominal voltage (V)	1 x (170...265)				
	Mains nominal frequency (Hz)	50...60				
	Input nominal current (A)	4,9	7,2	11	15,5	21
	Power supply temporary interruption (s)	1,0	1,0	1,0	2,0	2,0
General	Weight (kg)	0,95			1,45	
	Dimensions (Width x Height x Depth)	72x141x141			118x144x150	
	Size	1			2	
	Protection rating	IP20				
Options and accessories	Braking module	NO				
	Braking resistor	NO				
	Line inductance	Optional				
	Motor inductance	Optional				
	EMI filter	Integrated				
	Control keyboard	Integrated				
	Communication interfaces	Integrated RTU Modbus - optional Profibus DP DeviceNet CANbus Ethernet TCP/IP				

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TECHNICAL DATA

3PH 400V VERSION - 0,75÷2,2KW

	LM16-340-	0075	0150	0220
Motor side output	Recommended motor power (kW)	0,75	1,5	2,2
	Output nominal power (kVA)	1,7	2,9	4,0
	Output nominal current (A)	2,3	3,8	5,2
	Overload current 60s (A)	3,4	5,7	7,8
	Output voltage (V)	3x (0-V mains)		
	Output frequency (Hz)	0...599		
Mains side input	Mains nominal voltage (V)	1 x (323...528)		
	Mains nominal frequency (Hz)	50...60		
	Input nominal current (A)	4,2	5,6	7,3
	Power supply temporary interruption (s)	2	2	2
General	Weight (kg)	1,45		
	Dimensions (Width x Height x Depth)	118x144x150		
	Size	2		
	Protection rating	IP20		
Options and accessories	Braking module	Integrated		
	Braking resistor	Optional		
	Line inductance	Optional		
	Motor inductance	Optional		
	EMI filter	Integrated		
	Control keyboard	Integrated		
	Communication interfaces	Integrated RTU Modbus - optional Profibus DP DeviceNet CANbus Ethernet TCP/IP		

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TECHNICAL DATA

3PH 400V VERSION - 4,0÷11KW

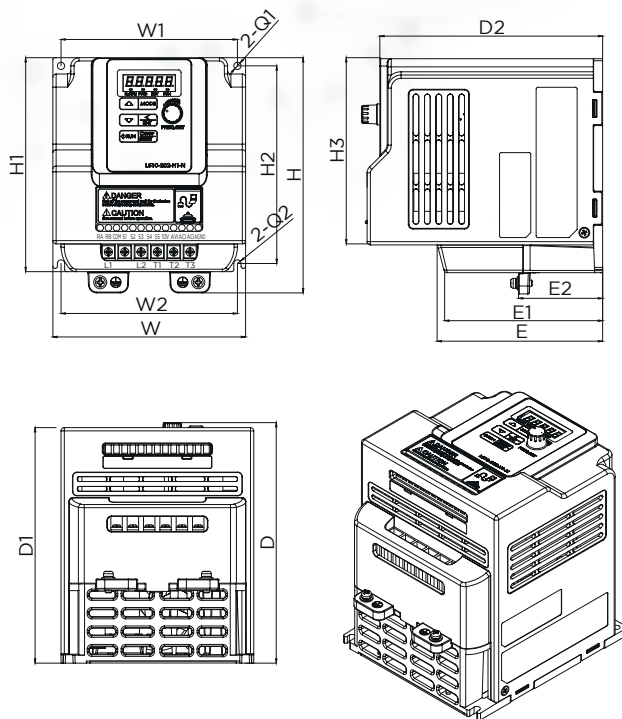
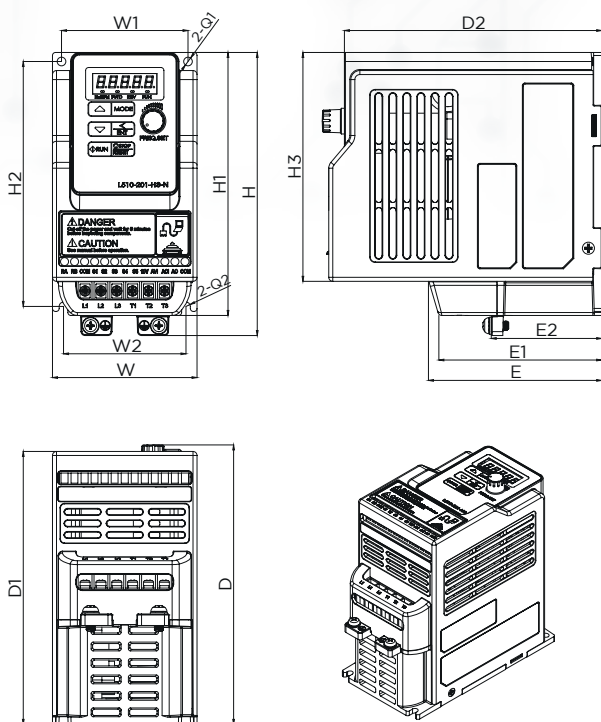
	LM16-340-	0400	0550	0750	1100
Motor side output	Recommended motor power (kW)	4,0	5,5	7,5	11
	Output nominal power (kVA)	7,0	9,9	13,3	18,3
	Output nominal current (A)	9,2	13	17,5	24
	Overload current 60s (A)	13,8	19,5	26,2	36
	Output voltage (V)	3x (0-V mains)			
	Output frequency (Hz)	0...599			
Mains side input	Mains nominal voltage (V)	1 x (323...528)			
	Mains nominal frequency (Hz)	50...60			
	Input nominal current (A)	10,1	14,3	19,3	26,4
	Power supply temporary interruption (s)	2	2	2	2
General	Weight (kg)	2,7		6,3	
	Dimensions (Width x Height x Depth)	129x197,5x148		187x273x190	
	Size	3		4	
	Protection rating	IP20			
Options and accessories	Braking module	Integrated			
	Braking resistor	Optional			
	Line inductance	Optional			
	Motor inductance	NO			
	EMI filter	Integrated			
	Control keyboard	Integrated			
	Communication interfaces	Integrated RTU Modbus - optional Profibus DP DeviceNet CANbus Ethernet TCP/IP			

10 DIMENSIONS

Inverter size	mm															
	W	W1	W2	H	H1	H2	H3	D	D1	D2	E	E1	E2	Q	Q1	Q2
1	72	63	61	141	131	122	114	141	136	128,2	86,3	81,1	55	-	4,4	2,2
2	118	108	108	144	131	121	114	150	144,2	136,4	101,32	96,73	51,5	-	4,3	2,2

SIZE 1

SIZE 2

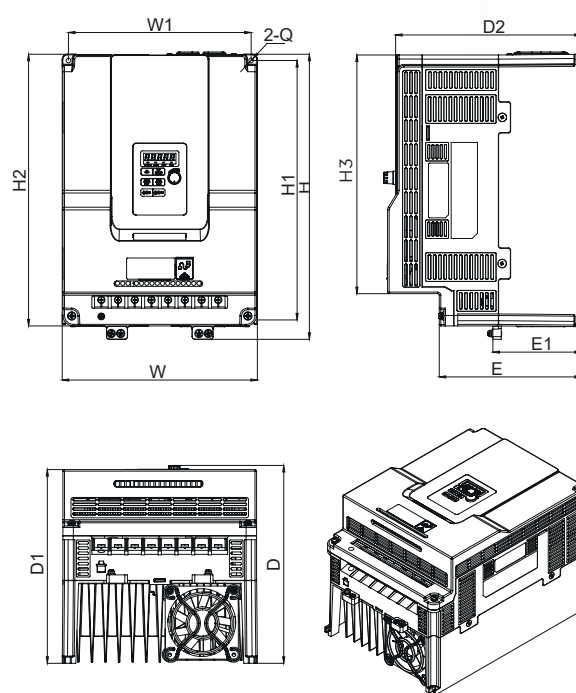
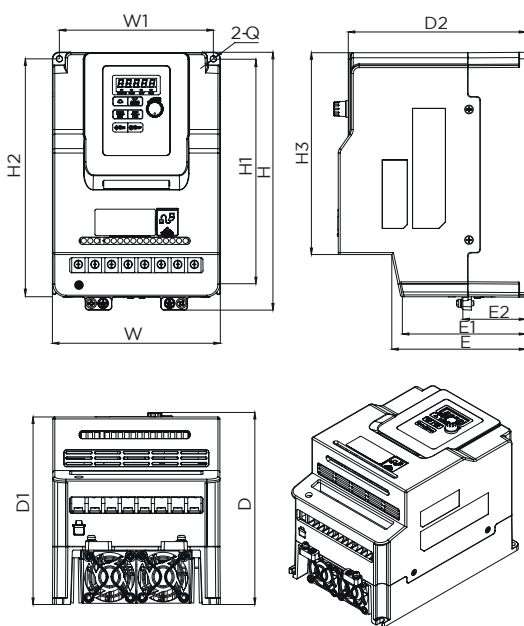


10 DIMENSIONS

Inverter size	mm															
	W	W1	W2	H	H1	H2	H3	D	D1	D2	E	E1	E2	Q	Q1	Q2
3	129	118	-	197	177,6	188	157,7	148	143,7	136	102,6	96	48,2	4,5	-	-
4	187	176	-	273	249,8	261	228,6	190	185,6	177,9	136	84,7	-	4,5	-	-

SIZE 3

SIZE 4



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OPTIONS AND ACCESSORIES

The LM16 inverter can be equipped with a range of accessories listed in the table below:

CABLES

Type	Description
JN5-CM-USB	RJ45-USB cable for programming via PC 1,8m
JN5-CM-USB-3	RJ45-USB cable for programming via PC 3m

KEYPADS

Type	Description
JN5-CU	Parameter Copy Device with JN5-CB-02M cable

INSTALLATION KIT

Type	Description
JN5-DIN-L01	Installation kit on DIN rail for Size_1 and Size_2
JN5-GK-L01	Grounding kit for Size_1
JN5-GK-L02	Grounding kit for Size_2

COMMUNICATION MODULES

Type	Description
JN5-CM-PDP	Profibus DP gateway
JN5-CM-TCPIP	Ethernet TCP/IP Gateway
JN5-CM-DNET	DeviceNet Gateway
JN5-CM-CAN	CANbus Gateway

BRAKING RESISTORS

Inverter type	Inverter power (kW)	Resistor type	Description
LM16-340-0075-F-20	0,75 (3ph400V)	JTTLKEB-150W750	750 Ω / 150W / IP20
LM16-340-0150-F-20	1,5 (3ph400V)	JTTLKEB-150W400	400 Ω / 150W / IP20
LM16-340-0220-F-20	2,2 (3ph400V)	JTTLKEB-300W250	250 Ω / 300W / IP20
LM16-340-0400-F-20	4,0 (3ph400V)	JTTLKEB-400W150	150 Ω / 400W / IP20
LM16-340-0550-F-20	5,5 (3ph400V)	JTTLKEB-600W130	130 Ω / 600W / IP20
LM16-340-0750-F-20	7,5 (3ph400V)	JTTLKEB-800W100	100 Ω / 800W / IP20
LM16-340-1100-F-20	11 (3ph400V)	JTTLKEB-1600W50	50 Ω / 1600W / IP20

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OPTIONS AND ACCESSORIES

LINE INDUCTANCE

Inverter type	Inverter power (kW)	Inductance type (mains)	Description
LM16-123-0018-F-20	0,18 (1ph230V)	CNW-901/6	7,0 mH/5A/4%
LM16-123-0037-F-20	0,37 (1ph230V)	CNW-901/8	4,2 mH/8,5A/4%
LM16-123-0075-F-20	0,75 (1ph230V)	CNW-901/16	2,1 mH/12A/4%
LM16-123-0150-F-20	1,5 (1ph230V)	CNW-901/16	1,1 mH/19A/4%
LM16-123-0220-F-20	2,2 (1ph230V)	CNW-901/25	0,71 mH/25A/4%
LM16-340-0075-F-20	0,75 (3ph400V)	CNW-905/6	15,22 mH/4,5A/4%
LM16-340-0150-F-20	1,5 (3ph400V)	CNW-905/6	9,21 mH/6A/4%
LM16-340-0220-F-20	2,2 (3ph400V)	CNW-905/8	6,73 mH/7,5A/4%
LM16-340-0400-F-20	4,0 (3ph400V)	CNW-905/12	2,2 mH/12A/4%
LM16-340-0550-F-20	5,5 (3ph400V)	CNW-905/25	1,42 mH/17A/4%
LM16-340-0750-F-20	7,5 (3ph400V)	CNW-905/25	1,06 mH/23A/4%
LM16-340-1100-F-20	11 (3ph400V)	CNW-905/36	0,7 mH/31A/4%

MOTOR INDUCTANCE

Inverter type	Inverter power (kW)	Inductance type (motor)	Description
LM16-123-0018-F-20	0,18 (1ph230V)	CNW-854/8	-
LM16-123-0037-F-20	0,37 (1ph230V)	CNW-854/8	-
LM16-123-0075-F-20	0,75 (1ph230V)	CNW-854/8	-
LM16-123-0150-F-20	1,5 (1ph230V)	CNW-854/8	-
LM16-123-0220-F-20	2,2 (1ph230V)	CNW-854/12	-
LM16-340-0075-F-20	0,75 (3ph400V)	CNW-854/8	-
LM16-340-0150-F-20	1,5 (3ph400V)	CNW-854/8	-
LM16-340-0220-F-20	2,2 (3ph400V)	CNW-854/8	-
LM16-340-0400-F-20	4,0 (3ph400V)	-	-
LM16-340-0550-F-20	5,5 (3ph400V)	-	-
LM16-340-0750-F-20	7,5 (3ph400V)	-	-
LM16-340-1100-F-20	11 (3ph400V)	-	-



NOTES



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