

# 32.

# INVERTERS AND SOFTSTARTS

## PURPOSE

Inverters are electronic group of frequency converters are designed for smooth speed control of asynchronous three-phase motors.

## FA-1LX / FA-3HX



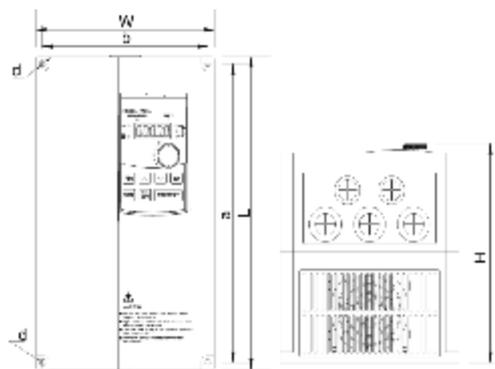
## KEY FUNCTIONS

- \* The design of the inverter is based on a powerful 32-bit DSP processor and ensures fast and effective implementation of advanced algorithms of asynchronous three-phase motor control.
- \* Ability to work in a speed control mode or torque control mode.
- \* Motor control based on vector control (both sensorless and speed-loop feedback) and control based on the freely programmable V/F characteristics.
- \* Automatic slip compensation and a large starting torque (up to 180% at a frequency of 0.25 Hz).
- \* Multi-function control panel connected to the inverter on a "hot-plug" basis with the ability of simultaneous storage of up to four sets of parameter settings and function to easily transfer settings from one inverter to another.
- \* PLC mode - the ability to program up to seven steps executed once or periodically by the inverter. For each of the steps, you can determine the speed, acceleration time, and duration.
- \* Great flexibility for programming the inputs and outputs of the inverter, both analog and digital.
- \* Built-in RS-485 communication module with Modbus RTU protocol support that allows you to plug the inverter into industrial grids and to remotely control, monitor and configure the inverter

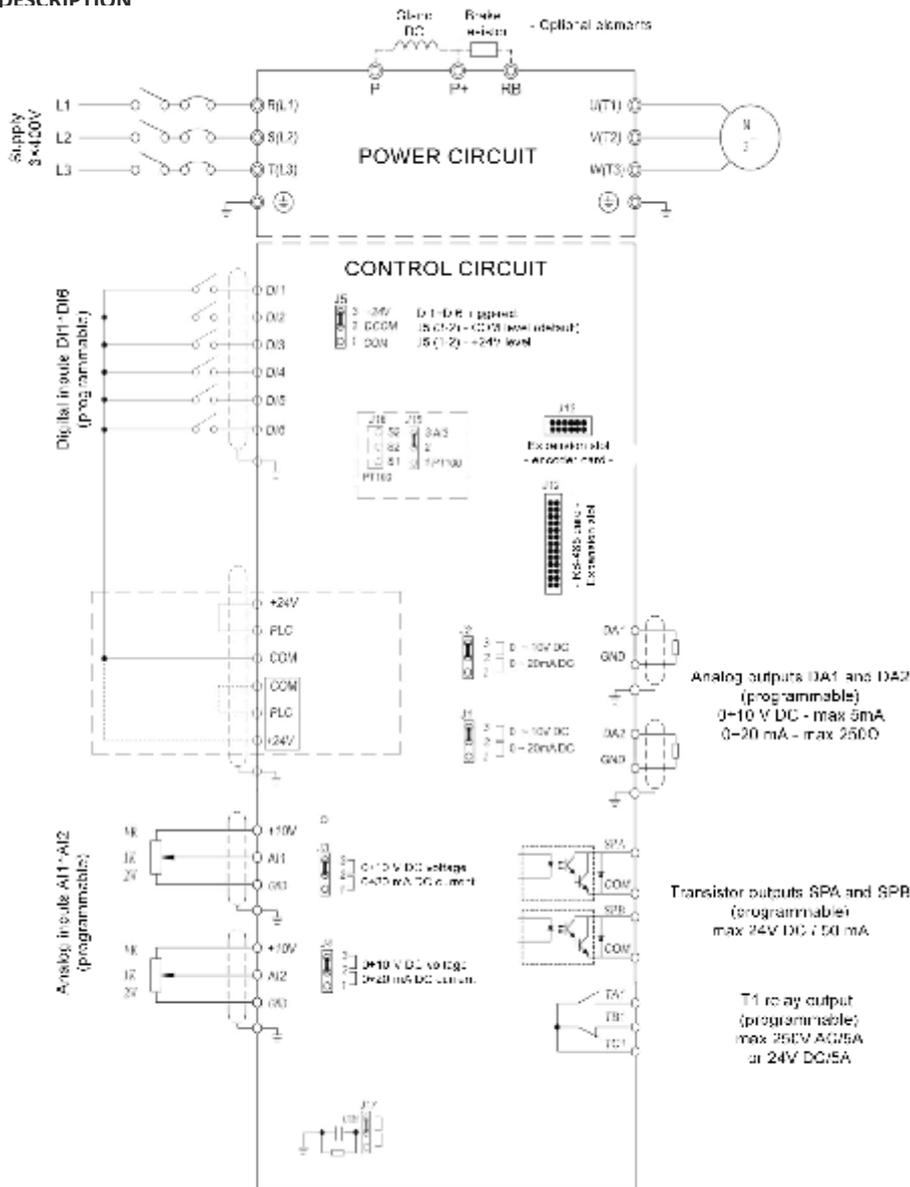


## TYPES

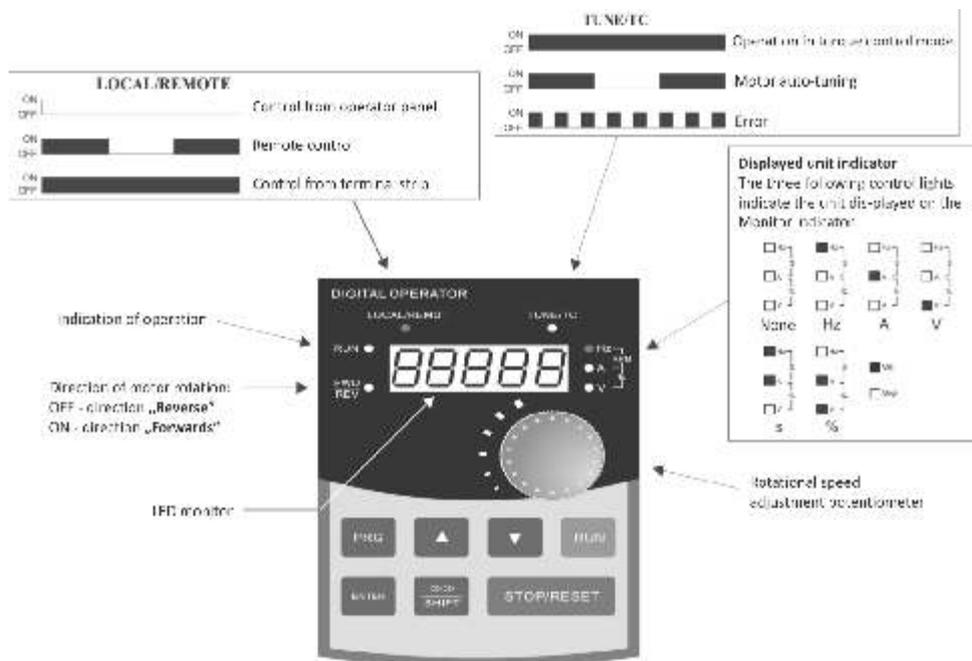
Inverter type	Input voltage V	Input current A	Output voltage V	Output current A	Motor power max kW	Length L mm	Width W mm	Height H mm
FA-1LX007	1×230	8.2	3×230	4	0.75	185	120	165
FA-1LX015	1×230	14.0	3×230	7	1.5	185	120	165
FA-1LX022	1×230	23.0	3×230	10	2.2	220	150	182
FA-1LX040	1×230	35.0	3×230	16	4.0	285	180	200
FA-3HX007	3×400	4.3	3×400	2.5	0.75	185	120	165
FA-3HX015	3×400	5.0	3×400	3.8	1.5	185	120	165
FA-3HX022	3×400	5.8	3×400	5.1	2.2	185	120	165
FA-3HX040	3×400	10.5	3×400	9.0	4.0	220	150	182
FA-3HX055	3×400	14.6	3×400	13	5.5	220	150	185
FA-3HX075	3×400	20.5	3×400	17	7.5	285	180	200



INPUTS/OUTPUTS DESCRIPTION



CONTROL PANEL



## SPECIFICATIONS

Function		Technical data
Power supply	<b>FA-1LX</b>	1-phase
	Voltage and frequency	1× 230 V (±10%), 50/60 Hz (±5%)
	Output voltage	3× 230 V (for 230 V supply)
	<b>FA-3HX</b>	3-phases
	Voltage and frequency	3× 400 V (±10%), 50/60Hz (±5%)
	Output voltage	3× 400 V (for 400 V supply)
	Output frequency	0.00÷3200 Hz (U/f control) 0.00÷300.0 Hz (vector control)
	V/F Control characteristics	1) Constant torque characteristics 2) Characteristics of the reduced torque 3) Characteristics of the torque set by the user 4) Vector control (sensor and sensorless)
	Starting torque	18.0% for 0.50 Hz
	The dynamics of speed control	1: 100
	The stability of the output speed	±0.5%
	Torque boost	In this mode V/F control - automatic or user defined
	Acceleration / deceleration	Linear or by programmed curve S Maximum acceleration and braking - 6500 sec
	Accuracy frequency reference	Digital frequency reference: 0,01 Hz (f≤100Hz), 0,1 Hz (>100 Hz); Analog frequency reference: 1% of maximum frequency
	Overload	1) 150% rated current for 1 minute 2) 200% rated current for 0.1 sec
	Motor slip compensation	In this mode V/F control can automatically compensate for the slip
Security	Security of inverter	1) Before too high or too low supply voltage 2) Prior to exceeding the maximum current 3) Before the load is too high 4) Before losing speed and stall 5) Within the current to ground 6) Prior to excessive overheating inverter 7) In addition, the inverter is protected against communication errors or incorrect feedback signal
	Safety switch	Can be programmed as input or button on the safety switch causing immediate image voltage of the inverter output
	Security settings	Possibility to secure the set the inverter to use a PIN
	Error deleting	You can set both automatic and manual reset errors
Braking	DC braking and using an external braking resistor	
IO	6 digital inputs	1) Trigger inputs for both low level (COM) and high (+24V) 2) A large freedom of programming functions. Among other things, running back and forth, trying to run back and forth, safety switch, reset, multi-speed control, motor potentiometer, change of acceleration and deceleration, pulse input and more.
	2 analog inputs	1) They can workboth as input voltage (0÷10 V) and input current 0÷20mA (software, you can set the range of 4÷20 mA) 2) The analog inputs can be used to ask frequency and time, and to cooperate with PID controller
	2 analog outputs	1) They can workboth as a voltage output (0÷10 V) and output current 0÷20mA 2) Analog outputs can be programmed to indicate: a. Set point and actual frequency b. Voltage output current c. DC voltage on the track d. Temperatures IGBT power amplifier e. Power output f. Engine speed g. Drive torque
	2 transistor outputs	1) Fast pulse outputs (max. frequency 100 kHz) Possible signalling: a. Desired frequency b. Actual frequency c. The current values d. Output voltages e. DC voltage on the track f. Temperatures power amplifier g. Output power h. Engine speed i. Output torque 2) Overload of transistor - max. 20 mA / 27 V

IO	2 transistor outputs	<p>1) Fast pulse outputs (max. frequency 100 kHz) Possible signalling:</p> <ul style="list-style-type: none"> <li>a. Desired frequency</li> <li>b. Actual frequency</li> <li>c. The current values</li> <li>d. Output voltages</li> <li>e. DC voltage on the track</li> <li>f. Temperatures power amplifier</li> <li>g. Output power</li> <li>h. Engine speed</li> <li>i. Output torque</li> </ul> <p>2) Overload of transistor - max 20 mA / 27 V</p>
	1 relay output	<p>1) Overload of contacts 5 A/250 V AC or 5A/ 30 V DC</p> <p>2) Extensive programming output function (signalling 34 different states of the inverter)</p>
Speed control	<p>1) Wide range speed reference, including taking into account different combinations of digital inputs, analog inputs, potentiometer and buttons on the control panel, pulse inputs and motor potentiometer</p> <p>2) Multi-speed - the possibility of 16 different speed and eight times the acceleration/deceleration</p> <p>3) PLC mode - can define a sequence of eight steps that will be performed by the inverter. For each step, you can determine the motor speed, acceleration/deceleration and duration step. You can also specify whether the sequence is executed only once or will be repeated in a loop.</p>	
PID	<p>Built-in PID increases the ability of the drive to match process requirements. Both the reference and the feedback signal may be placed in one of the following sources:</p> <ul style="list-style-type: none"> <li>1) Control panel (buttons or potentiometer)</li> <li>2) Analog inputs</li> <li>3) Digital inputs</li> <li>4) Input pulse</li> </ul>	
Environmental conditions	Working temperature	-10°C ÷ 40°C. If the temperature exceeds 40°C, the maximum output current is reduced by 1% with each additional °C
	Storage	-20÷65°C
	Humidity	Below 90%, without humidity condensation
	Height	0÷1000 m
	Assembly	Installation in a vertical position inside the cabinet with good ventilation to the mounting plate made of non-combustible material. Mounting must also protect the inverter from direct sunlight, dust moisture and corrosive or explosive gases.
	Ventilation	Cooling by natural and forced air flow