## High on compactness, Higher on functionality



## $N: 2000$ <br> $N: 2000^{+}$

Single Phase 230V (0.2-2.2kW)

## Two decades of application knowledge

For over three decades, various industry sectors have been reaping the benefits of L\&T Electrical \& Automation (E\&A)'s cost-effective, performance-oriented AC Drive solutions. E\&A's grasp of the specific needs of each industry enables it to offer application-specific solutions for various industries - such as Processing, HVAC, Water, Sugar, Plastic, Ceramic, Pharmaceutical, Elevator, Oil \& Gas, Power, Cement and


## Ň2000 Series AC Drive

## The new reliability edge

[^0]

Compact, lightweight, easy to install, operate and service - the Nx2000 Series is perfectly suited for conveyors, pumps, fans and textile machinery. It handles load up to 11 kW , and is engineered to keep your machine operating at optimum efficiency, even in the hot, humid and dusty conditions that characterise India's industrial environment.


## Backed by engineering knowledge across seven decades

A knowledge-based company, L\&T Electrical \& Automation (E\&A) brings you the benefits of over 75 years of engineering experience and expertise, and the richness of its collaborations with technology leaders across the globe.

For 50 years, E\&A's low-tension switchgear - India's widest range - has been the preferred option of top industrial houses countrywide.

## Meeting your needs, solving your problems

We believe in addressing your needs and not just selling a product. That's why a dedicated Solutions Team first focuses on understanding your application. Then helps you select the drive that best meets your needs. Our advice on installation, maintenance and replacement will ensure that your application function at peak productivity. From engineer to repair technician, our people have the knowledge and skill-sets to deliver total peace of mind.




## Tested. Certified. Reliable.

L\&T Electrical \& Automation (E\&A) is one of the few switchgear manufacturers in India with a dedicated, NABL-certified testing facility. Our products are tested for conformity to standards that exceed minimum requirements, giving you the assurance of high-quality performance. Our focus on continuous improvement ensures that our standards are on par with the best in the world. Repeat orders endorse the value that we deliver.

The reliability of the Nx2000 Series AC drive is ensured by international test certification - UL, CE and RoHS.

## After-sales service aimed at maximum uptime

A malfunction of the drive can bring an entire assembly line or process to a halt. To ensure maximum uptime for you, our Rapid Response service team is available to analyze the situation and help you set the problem right. We have set up strategic service centres across the country to provide temporary replacement drives or ready spares to ensure that your business keeps running smoothly.



## Training your people to enhance your operations

At our countrywide Switchgear Training Centres, we can train your operators, electricians and supervisors to increase their effectiveness in the operation and maintenance and trouble-shooting of your drives. We can also conduct in-plant training and workshops at your premises to improve both power management and equipment maintenance skills. This gives you total operational excellence, minimising downtime.

L\&T Electrical \& Automation (E\&A)'s engineers and channel partners also upgrade their skills through seminars, workshops, training sessions and white papers on electrical practices.

## General Purpose Drive



## N×2000 ${ }^{+}$(【G). C




## Great Performance

- Enhanced motor control - Sensorless \& V/F performance
- Peak torque at low speed
- Suitable for most applications


## Great Reliability

- Meets UL 61800-5-1
- Military (MIL 217Plus) design based methodology
- Enhanced materials and
manufacturing processes


## User Friendly

- Easy to install, use and maintain
- Simplified SLVC setup
- Various options


Great
Performance

The $\mathrm{N} \times 2000^{+}$has an advanced sensorless vector mode along with a highly adaptable V/F mode making it one of the most versatile drives in the market.

## Application Adaptability

Dual ratings enables use in most applications
V/F Accelerate and Decelerate Function
Applied ATB \& Flux braking function



Sensorless
Performance

- -0.5 Hz
$-0-1 \mathrm{~Hz}$
$\rightarrow 3 \mathrm{~Hz}$
$-5 \mathrm{~Hz}$
$\times 10 \mathrm{~Hz}$
$-20 \mathrm{~Hz}$
$-\sqrt{-}-30 \mathrm{~Hz}$
- 40 Hz
$-50 \mathrm{~Hz}$
$-55 \mathrm{~Hz}$
- -60 Hz


## KEB (Kinetic Energy Buffering)

Low speed/High torque
Speed regulation +/-1\% under load change $0.5 \mathrm{~Hz} 200 \%$ peak torque


KEB for controlled stop in case of power loss or failure, for different speeds. User has choice to start from zero speed or same speed

Select optimal flying start operation for different applications



## E

Great Reliability
$\mathrm{N} \times 2000^{+}$is designed to meet global standards through upgraded design, material and manufacturing improving its endurance for harsh environments.

## UL 61800-5-1 Design

Satisfied the new UL certification

## Robust Design

Construction of the air flow design minimizes exposure of critical components (IGBT, PCB, etc.) from outside contaminants.

## Built-in EMC Filter

Embeded EMC filter to meet IEC 61800-3 standards for noise reduction


Fan Lifecycle
Diagnosis
Displays fan replacement warning message with digital output or keypad


MIL 217Plus based Reliability design basis tool (PSA, Fr-FMEA, FTA, RBD, PBS)
Design
Improved circuit robustness through strict quality margins

\left.| Category | NX2000+ |
| :--- | :---: |
| Estimated Life Cycle | 240, 455 hrs (27 yrs) |
| (Accelerated life test result : 295, 951 hrs) |  |$\right]$ MTTF

Material Design Enhanced thermal resistance and intensity through upgraded materials Increased thickness to prevent damage


Modbus RTU


Modus TCP / Ethernet IP with dual port

$\mathrm{N} \times 2000^{+}$is convenient to install, control, perform maintenance and many other functions.

## Fieldbus Options

Provides various communication options with simple mounting structure

- Dual Port Ethernet/IP, Modbus TCP, RAPIEnet
- Profibus-DP
- CANopen


## Built-in Potentiometer

Easy operation with built-in potentiometer

## Remote Keypad Option

Copy parameter (Read/Write) using remote keypads


## PC Tools (Drive Connect)

New version PC Tool

- Windows-based graphic user interface (GUI)
- Modbus RTU \& Modbus TCP
- Connecting multiple drives
- Integrated control console
- Offline editing function
- Data upload/download
- 8-channel oscilloscope
- Trigger function


## Built in 2No's Multi Function Relays

Cost efficient and easy to compose system with two embedded relays.


Simplified SLVC Setup
Tuning parameters reduced to 6 Nos

## Before

| Parameter | Name | Parameter Description |
| :---: | :---: | :---: |
| CON-09 | PreEx Time | Initial excitation time |
| CON-10 | Flux Force | Initial excitation amount |
| CON-20 | SI2 G View Sel | Sensorless gain display setting |
| CON-21 | ASR-SL P Gain 1 | Sensorless speed controller proportional gain 1 |
| CON-22 | ASR-SL I Gain 1 | Sensorless speed controller integral gain 1 |
| CON-23 | ASR-SL P Gain 2 | Sensorless speed controller proportional gain 2 |
| CON-24 | ASR-SL I Gain 2 | Sensorless speed controller integral gain 2 |
| CON-25 | ASR-SL I Gain 0 | Sensorless speed controller integral gain 0 |
| CON-26 | Flux P Gain | Flux estimator proportional gain |
| CON-27 | Flux I Gain | Flux estimator integral gain |
| CON-28 | S-Est P Gain 1 | Speed estimator proportional gain 1 |
| CON-29 | S-ESt I Gain 1 | Speed estimator integral gain 1 |
| CON-30 | S-Est I Gain 2 | Speed estimator integral gain 2 |
| CON-31 | ACR SL P Gain | Current controller P gain |
| CON-32 | ACR SL I Gain | Current controller I gain |
| CON-54 | FWD + Trq Limit | Positive-direction reverse torque limit |
| CON-55 | FWD - Trq Limit | Positive-direction regeneration torque limit |
| CON-56 | REV + Trq Limit | Negative-direction reverse torque limit |
| CON-57 | REV - Trq Limit | Negative-direction regeneration torque limit |
| CON-85 | Flux P Gain 1 | Flux estimator proportional gain 1 |
| CON-86 | Flux P Gain 2 | Flux estimator proportional gain 2 |
| CON-87 | Flux P Gain 3 | Flux estimator proportional gain 3 |
| CON-88 | Flux I Gain 1 | Flux estimator integral gain 1 |
| CON-89 | Flux I Gain 2 | Flux estimator integral gain 2 |
| CON-90 | Flux I Gain 3 | Flux estimator integral gain 3 |
| CON-91 | SL Volt Comp 1 | Sensorless voltage compensation 1 |
| CON-92 | SL Volt Comp 2 | Sensorless voltage compensation 2 |
| CON-93 | SL Volt Comp 3 | Sensorless voltage compensation 3 |
| CON-94 | SL FW Freq | Sensorless field weakening start frequency |
| CON-95 | SL FC Freq | Sensorless gain switching frequency |

## Easy Modbus Communication Connection

2 type of connection of Modbus communication

- RJ45 Port
- I/O (S+, S-)
- Communication Speed - upto 115kbps

DIN Rail Mount (upto 4kW)
Install using DIN rails (Side-by-Side)


## Fan Replacement

Simple cooling fan replacement procedure


## Operation Group

- Access commonly used parameters in the operation group
- Identical Parameter group structure for all $\times 2000$ series


## x2000 Series Parameter Group Configuration Applied

## After

| Parameter | Name | Parameter Description |
| :---: | :---: | :---: |
| CON-21 | Out Trq. Comp. Gain at Low Spd. | Output Torque Compensation Gain at Low speed |
| CON-22 | Out Trq. Comp. Gain | Output Torque Compensation Gain |
| CON-23 | Spd. Comp. Sub Gain | Speed Compensation Subsidiary Gain |
| CON-24 | Spd. Comp. Main Gain | Speed Compensation Main Gain |
| CON-29 | Spd. Comp. Gain at No-load | Speed Compensation Gain at No-load |
| CON-30 | Spd. Response Adjustment Gain | Speed Response Adjustment Gain |

Model \& Type

| Motor rating | Three - Phase 230V Normal duty | Three - Phase 415V Normal duty |
| :---: | :---: | :---: |
| 0.75 kW | LTVF-N203P1BAA | LTVF-N402P0BAA |
| 1.50 kW | LTVF-N206P0BAA | LTVF-N403P1BAA |
| 2.20 kW | LTVF-N209P6BAA | LTVF-N405P1BAA |
| 3.70 kW | LTVF-N212P0BAA | LTVF-N406P9BAA |
| 5.50 kW | LTVF-N218P0BAA | LTVF-N410P0BAA* |
| 7.50 kW | LTVF-N230POBAA | LTVF-N416POBAA* |
| 11 kW | LTVF-N240POBAA | LTVF-N423P0BAA* |



## Specifications

| Model LTVF-N2 $\square \square \square \square$ BAA |  |  | 03P1 | 06P0 | 09P6 | 12P0 | 18P0 | 30P0 | 40P0 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Applied motor | Heavy load | HP | 0.5 | 1.0 | 2.0 | 3.0 | 5.0 | 7.5 | 10.0 |
|  |  | kW | 0.4 | 0.75 | 1.5 | 2.2 | 4.0 | 5.5 | 7.5 |
|  | Normal load | HP | 1.0 | 2.0 | 3.0 | 5.0 | 7.5 | 10.0 | 15.0 |
|  |  | kW | 0.75 | 1.5 | 2.2 | 3.7 | 5.5 | 7.5 | 11.0 |
| Rated output | Rated capacity (kVA) | Heavy load | 1.0 | 1.9 | 3.0 | 4.2 | 6.5 | 9.1 | 12.2 |
|  |  | Normal load | 1.2 | 2.3 | 3.8 | 4.6 | 6.9 | 11.4 | 15.2 |
|  | Rated current <br> [3-Phase input] (A) | Heavy load | 2.5 | 5.0 | 8.0 | 11.0 | 17.0 | 24.0 | 32.0 |
|  |  | Normal load | 3.1 | 6.0 | 9.6 | 12.0 | 18.0 | 30.0 | 40.0 |
|  | Rated current <br> [1-Phase input, 230V] (A) | Heavy load | 1.5 | 2.8 | 4.6 | 6.1 | 9.3 | 12.8 | 17.4 |
|  |  | Normal load | 2.0 | 3.6 | 5.9 | 6.7 | 9.8 | 16.3 | 22.0 |
|  | Output frequency |  | 0~400Hz (IM Sensorless: $0 \sim 120 \mathrm{~Hz}$ ) |  |  |  |  |  |  |
|  | Output voltage (V) |  | 3 -phase 200-240 V |  |  |  |  |  |  |
| Rated input | Working voltage (V) |  | 3-phase 200-240 VAC (-15\% to +10\%) |  |  |  |  |  |  |
|  | Input frequency |  | $50 \sim 60 \mathrm{~Hz}( \pm 5 \%)$ |  |  |  |  |  |  |
|  | Rated current <br> [3-Phase input] (A) | Heavy load | 2.2 | 4.9 | 8.4 | 11.8 | 18.5 | 25.8 | 34.9 |
|  |  | Normal load | 3.0 | 6.3 | 10.8 | 13.1 | 19.4 | 32.7 | 44.2 |
| Weight (kg) |  |  | 1.04 | 1.06 | 1.36 | 1.4 | 1.89 | 3.08 | 3.21 |


| Model LTVF-N4 $\square \square \square \square$ BAA |  |  | 02P0 | 03P1 | 05P1 | 06P9 | 10P0 | 16P0 | 23P0 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Applied motor | Heavy load | HP | 0.5 | 1.0 | 2.0 | 3.0 | 5.0 | 7.5 | 10.0 |
|  |  | kW | 0.4 | 0.75 | 1.5 | 2.2 | 4.0 | 5.5 | 7.5 |
|  | Normal load | HP | 1.0 | 2.0 | 3.0 | 5.4 | 7.5 | 10.0 | 15.0 |
|  |  | kW | 0.75 | 1.5 | 2.2 | 3.7 | 5.5 | 7.5 | 11.0 |
| Rated output | Rated capacity (kVA) | Heavy load | 1.0 | 1.9 | 3.0 | 4.2 | 6.5 | 9.1 | 12.2 |
|  |  | Normal load | 1.5 | 2.4 | 3.9 | 5.3 | 7.6 | 12.2 | 17.5 |
|  | Rated current [3-Phase input] (A) | Heavy load | 1.3 | 2.5 | 4.0 | 5.5 | 9.0 | 12.0 | 16.0 |
|  |  | Normal load | 2.0 | 3.1 | 5.1 | 6.9 | 10.0 | 16.0 | 23.0 |
|  | Rated current [Phase-Phase input, 415V] (A) | Heavy load | 0.7 | 1.4 | 2.1 | 2.8 | 4.9 | 6.4 | 8.7 |
|  |  | Normal load | 1.3 | 1.9 | 2.8 | 3.6 | 5.4 | 8.7 | 12.6 |
|  | Output frequency |  | $0 \sim 400 \mathrm{~Hz}$ (IM Sensorless: $0 \sim 120 \mathrm{~Hz}$ ) |  |  |  |  |  |  |
|  | Output voltage (V) |  | 3 -phase 380-480 V |  |  |  |  |  |  |
| Rated input | Working voltage (V) |  | 3 -phase 380-480 VAC (-15\% to +10\%) |  |  |  |  |  |  |
|  | Input frequency |  | $50 \sim 60 \mathrm{~Hz}( \pm 5 \%)$ |  |  |  |  |  |  |
|  | Rated current <br> [3-Phase input] (A) | Heavy load | 1.1 | 2.4 | 4.2 | 5.9 | 9.8 | 12.9 | 17.5 |
|  |  | Normal load | 2.0 | 3.3 | 5.5 | 7.5 | 10.8 | 17.5 | 25.4 |
| Weight (kg) |  |  | 1.04 | 1.08 | 1.44 | 1.46 | 1.98 | 3.24 | 3.28 |

## Control

| Control Method | V/F, Slip Compensation, Sensorless Vector |
| :--- | :--- |
| Frequency Setting Resolution | Digital command : 0.01 Hz <br> Analog command : 0.05 Hz |
| Frequency Accuracy | $1 \%$ of the maximum output frequency |
| V/F Pattern | Linear, squared, user V/F |
| Overload Capacity | $\mathrm{HD}: 150 \%$ for 1 minute, ND: $120 \%$ for 1 minute |
| Torque Boost | Manual/Automatic torque boost |

## Operation

| Operation Mode |  | Select keypad, terminal strip, or communication operation |  |
| :---: | :---: | :---: | :---: |
| Frequency Setting |  | Analog: -10~10[V], 0~10[V], 4~20[mA] Digital : Keypad |  |
| Operation Function |  | PID control, 3-wire operation, Frequency limit, Second function, Anti-forward and reverse direction rotation, Commercial transition, Speed search, Power braking, Leakage reduction, Frequency up/down operation, DC braking, Frequency jump, Slip compensation, Automatic restart, Automatic tuning, Energy buffering, Flux braking, Fire mode |  |
| Input |  | NPN (Sink) / PNP (Source) Selectable |  |
|  | Multi-Function Terminal (5 Points) | Function: Forward run, Reverse run, Reset, External trip, Emergency stop, Jog operation, Multi-step frequency-high, middle, low, Multi-step acceleration/deceleration-high, middle, low, DC braking at stop, 2nd motor select, Frequency up/down, 3-wire operation, change into normal operation during PID operation, Analog command frequency fixing, Acceleration/deceleration stop etc. selectable |  |
|  | Analog Input | V1:-10~10V, 12: 4~20mA |  |
| Output | Multi-funaction Relay Terminal | Fault output and drive operation status output | (N.O., N.C.) less than AC 250 V 1A, less than DC 30V 1A |
|  | Analog Output | 0~12Vdc: Frequency, Output current, Output voltage, DC link voltage etc. selectable |  |

## Protective Function

|  | Over current trip, external signal trip, ARM short current fault trip, Over heat trip, input phase loss trip, <br> ground trip, motor over heat trip, //O board link trip, no motor trip, parameter writing trip, emergency stop |
| :--- | :--- |
| trip, command loss trip, external memory error, CPU watchdog trip, motor light load trip |  |
| Over voltage trip, temperature sensor trip, inverter over heat, option trip, output image trip, inverter overload |  |
| trip, fan trip, pre-PID operation failure external brake trip, low voltage trip during operation, low voltage trip, |  |
| analog input error, motor overload trip, over torque trip, under torque trip |  |, | Command loss trip warning, overload warning, light load warning, inverter overload warning, |
| :--- |
| fan operation warning, braking resistance braking rate warning, rotor time constant tuning error, |
| inverter pre-overheat warning, over torque warning, under torque warning |,

## Environment

| Cooling Type | Forced fan cooling structure |
| :--- | :--- |
| Enclosure Type | IP20/UL Open (Default), UL Enclosed type 1 (Option) |
| Conformal Coating | Complies to IEC 60721-3-3 class 3C3 (Avg) |
| Ambient Temperature | Ambient temperature under the condition of no ice or frost. <br> $\mathrm{HD}:-10 \sim 50^{\circ} \mathrm{C}\left(14 \sim 122^{\circ} \mathrm{F}\right) / \mathrm{ND}:-10 \sim 40^{\circ} \mathrm{C}\left(14 \sim 104^{\circ} \mathrm{F}\right)$ <br> [ However, recommended to use load upto $80 \%$ when using Normal Duty rating at $\left.50^{\circ} \mathrm{C}\right]$ |
| Humidity | Relative humidity upto $95 \% \mathrm{RH}$ (no dew formation) |
| Storage Temperature | $-20 \sim 65^{\circ} \mathrm{C}\left(-4 \sim 149^{\circ} \mathrm{F}\right)$ |
| Location | No corrosive gas, flammable gas, oil mist and dust etc. indoor (Pollution degree 2 environment) |
| Altitude, Vibration | Below $1,000 \mathrm{~m}$ (From 1000 to 4000m, the rated input voltage and rated output current <br> of the drive must be derated by $1 \%$ for every 100 m.$)$, below 9.8m/sec ${ }^{2}(1 \mathrm{G})$ |
| Pressure | $70 \sim 106 \mathrm{kPa}$ |



## Power Terminals

## 0.4/0.75kW


1.54/2.2kW

4.0kW


## 5.5/7.5kW



| Terminal Labels | Name | Description |
| :--- | :---: | :---: |
| $\left(\frac{}{\theta}\right.$ | Ground terminal | Connect earth grounding |
| $R(L 1) / S(L 2) / T(L 3)$ | AC power input terminal | Mains supply AC power connections |
| $B 1 / B 2$ | Brake resistor terminals | Brake resistor wiring connection |
| UNN | Motor output terminals | 3-phase induction motor wiring connections |


| Capacity (kW) |  | Terminal Screw Size | Rated Screw Torque (Kgf.cm/Nm) |
| :---: | :---: | :---: | :---: |
| 3-Phase <br> 230V Class | 0.4 | R/S/T, UNM : M3 | R/S/T, UNM : 5.1/0.5 |
|  | 0.75 |  |  |
|  | 1.5 | R/S/T, UNN : M4 | R/S/T, UNNW : 12.1/1.2 |
|  | 2.2 |  |  |
|  | 4 | R/S/T, UNN : M4 | R/S/T, UNNW : 18.4/1.8 |
|  | 5.5 | R/S/T, UNNW : M4 | R/S/T : 24.0/2.4 UN/N : 15.0/1.5 |
|  | 7.5 |  |  |
| 3-Phase 415V Class | 0.4 | R/S/T, UN/W : M3.5 | R/S/T, UN/W : 10.3/1.0 |
|  | 0.75 |  |  |
|  | 1.5 |  |  |
|  | 2.2 |  |  |
|  | 4 | R/S/T, UNN : M4 | R/S/T, UN/W : 18.4/1.8 |
|  | 5.5 | R/S/T, UNN : M4 | R/S/T : 14.3 / 1.4 U/VNW: 18.4/1.8 |
|  | 7.5 |  |  |

- Only use the specified torque on the screw heads otherwise damage could occur. Loose screws can cause overheating and damage.
- Use copper wires with $600 \mathrm{~V}, 75^{\circ} \mathrm{C}$ specification.


| Terminals | Terminal Screw Size | Screw Torque (Kgf.cm/Nm) |
| :---: | :---: | :---: |
| P1~P5/CM/NR/N1/I2/AO/24/S+/S- | M2 | $2.2 \sim 2.5 / 0.22 \sim 0.25$ |
| $\mathrm{~A} 1 / \mathrm{B} 1 / \mathrm{C} 1, \mathrm{~A} 2 / \mathrm{C} 2$ | M 2.6 | $4.0 / 0.4$ |

- Only use the specified torque on the screw heads otherwise damage could occur. Loose screws can cause overheating and damage.

| Category | Terminal Labels | Name | Description |
| :---: | :---: | :---: | :---: |
| Multi-function <br> Terminal Configuration | P1~P5 | Multi-function Input 1-5 | Configurable for multi-function input terminal. Factory default terminal ad setup are as follows. <br> - P1:Fx <br> - P2:Rx <br> - P3:Bx <br> - P4:RST <br> - P5:Speed-L |
|  | 24 | External 24V power source | Maximum current output: 100 mA |
|  | CM | Sequence common terminal | Common terminal for digital \& analog terminal inputs and outputs. |
| Analog Input | VR | Potentiometer frequency reference input | Used to setup or modify a frequency reference via analog voltage or current input. <br> - Maximum voltage output:12V <br> - Maximum current output:100mA <br> - Potentiometer: $1 / 5 \mathrm{k} \Omega$ |
|  | V1 | Voltage input for frequency reference input | Used to setup or modify a frequency reference via analog voltage input terminal. <br> - Unipolar: 0-10V (12V Max.) <br> - Bipolar: -10-10V ( $\pm 12 \mathrm{~V}$ Max.) |
|  | 12 | Current input for frequency reference input terminal | Used to setup or modify a frequency reference via current input terminal. <br> - Input current: 4-20 mA <br> - Maximum Input current:24mA <br> - Input resistance: $249 \Omega$ |
| Analog Output | AO | Voltage Output terminal | Used to send inverter output information to external devices: Output frequency, output current, output voltage, or a DC voltage. <br> - Output voltage: 0-10V <br> - Maximum output voltage/Current: 12V, 10mA <br> - Factory default output: Frequency |
| Digital Output | A1/C 1/B1 | Fault signal output 1 | Sends out alarm signals when the inverter's safety features are activated $\text { (AC } 250 \mathrm{~V} \text { 1A, DC } 30 \mathrm{~V} \text { 1A) }$ <br> - Fault condition:A1 and C1 contacts are connected (B1 and C1 open connection) <br> - Normal operation : B1 and C1 contacts are connected (A1 and C1 open connection) |
|  | A2/C2 | Fault signal output 2 | Sends out alarm signals when the inverter's safety features are activated (AC 250 V 1A, DC 30 V 1A) <br> - Fault condition: A2 and C2 contacts are connected <br> - Normal operation: A2 and C2 contacts are open condition |
| RS-485 <br> Communication | S+/S- | RS-485 signal line | Used to send or receive RS-485 signals. |



| No. | Name | Function |
| :---: | :---: | :---: |
| (1) | 7-Segment Display | Displays Current Operational status and Parameter information. |
| (2) | SET Indicator | LED flashes during parameter configuration. |
| (3) | RUN Indicator | LED turns on (Steady) during an operation, and flashes during acceleration or deceleration. |
| (4) | FWD Indicator | LED turns on (Steady) during forward operation. |
| (5) | REV Indicator | LED turns on (Steady) during reverse operation |
| Key | Name | Function |
| RUN | [RUN] Key | Used to run the inverter (Inputs a RUN command). |
| $\begin{array}{ll} \text { STOP } \\ \hline \text { RESET } \\ \hline \end{array}$ | [STOP/RESET] Key | STOP: Stops the inverter <br> RESET: Resets the inverter if a fault or failure occurs. |
| $\sim \sim$ | [ $\mathbf{\triangle}]$ Key, [ $\mathbf{\nabla}]$ Key | Switches between codes, or increases or decreases parameter values. |
| $\begin{aligned} & \text { MODE } \\ & \hline \text { SHIFT } \\ & \hline \end{aligned}$ | [MODE/SHIFT] Key | Moves between groups or moves to the digit on the left when setting the parameter. Press the MODE/SHIFT key once again on the maximum number of digits to move to the minimum number of digits. |
| ENT | [ENTER] Key | Switches from the selected state of parameter to the input state. Edits parameter and apply change. <br> Accesses the operation information screen during failure. |
| ( $+\mathbf{V}$ + MODE SHIFT MODE SHIFT $\mathbf{V}$ | - | Escape to the initial display. |
|  | Potentiometer or Rotating Knob | Used to set the operation frequency. |


| Group | Keypad Display | Description |
| :---: | :---: | :---: |
| Operation | - | Configures basic parameters for inverter operation. |
| Drive |  | Configures parameters for basic operation. <br> These include jog operation, motor capacity evaluation, torque boost, and other keypad related Parameters |
| Basic | 1681 18 | Configures basic operation parameters <br> These parameters include motor parameters and multi-step frequency parameters. |
| Advanced |  | Configures acceleration or deceleration patterns, frequency limits, etc. |
| Control | 6 601 | Configures sensorless vector-related features. |
| Input Terminal |  | Configures input terminal-related features, including digital multi-functional inputs and analog inputs. |
| Output Terminal |  7 1 1 <br> 1 1 1 1 | Configures output terminal-related features such as relays and analog outputs. |
| Communication | 1 0  <br> 1 1 1 | Configures communication features for RS -485 or other communication options. |
| Application |  | Configures functions related to PID control. |
| Protection | $180$ | Configures motor and inverter protection features |
| Motor 2 <br> (Secondary Motor) | $110^{2}$ | Configures secondary motor related features. <br> The secondary motor (M2) group appears on the keypad only when one of the multi-function Input terminals (In.65-In.69) has been set to 26 (secondary motor). |

## Peripheral Devices

Braking Resistor Specification

| Product (kW) HD |  | Resistance ( $\Omega$ ) | Rated Capacity (W) |
| :---: | :---: | :---: | :---: |
| 3-Phase 230V | 0.4 | 300 | 100 |
|  | 0.75 | 150 | 150 |
|  | 1.5 | 60 | 300 |
|  | 2.2 | 50 | 400 |
|  | 3.7 | 33 | 600 |
|  | 4.0 | 33 | 600 |
|  | 5.5 | 20 | 800 |
|  | 7.5 | 15 | 1,200 |
| 3-Phase 415V | 0.4 | 1,200 | 100 |
|  | 0.75 | 600 | 150 |
|  | 1.5 | 300 | 300 |
|  | 2.2 | 200 | 400 |
|  | 3.7 | 130 | 600 |
|  | 4.0 | 130 | 600 |
|  | 5.5 | 85 | 1,000 |
|  | 7.5 | 60 | 1,200 |

* The standard for braking torque is $150 \%$ and the working rate (\%ED) is $5 \%$. If the working rate is $10 \%$ the rated capacity for braking resistance must be calculated at twice the standard.

Compatible Circuit Breaker \& Magnetic Contactor Models of L\&T Electrical \& Automation

| Inverter <br> Capacity <br> (kW) HD |  | Specification of Breaker (MPCB / MCCB) |  |  |  | Magnetic Contactor |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Heavy Duty |  | Normal Duty |  | Heavy Duty |  | Normal Duty |  |
|  |  | Type | A | Type | A | Type | A | Type | A |
| 3-Phase 230V | 0.4 | MOG-S1/MOG-H1 | 2.5-4.0 | MOG-S1/MOG-H1 | 4.0-6.3 | MNX | 9 | MNX | 9 |
|  | 0.75 | MOG-S1/MOG-H1 | 4.0-6.3 | MOG-S1/MOG-H1 | 9.0-13.0 | MNX | 9 | MNX | 9 |
|  | 1.5 | MOG-S1/MOG-H1 | 9.0-13.0 | MOG-S1/MOG-H1 | 14.0-20.0 | MNX | 9 | MNX | 12 |
|  | 2.2 | MOG-S1/MOG-H1 | 14.0-20.0 | MOG-S1/MOG-H1 | 14.0-20.0 | MNX | 12 | MNX | 12 |
|  | 4.0 | MOG-S1/MOG-H1 | 24.0-32.0 | MOG-S1/MOG-H1 | 24.0-32.0 | MNX | 18 | MNX | 18 |
|  | 5.5 | MOG-S1/MOG-H1 | 28.0-40.0 | MOG-H2 | 35.0-50.0 | MNX | 25 | MNX | 32 |
|  | 7.5 | MOG-H2 | 35.0-50.0 | MOG-H2 | 45.0-63.0 | MNX | 32 | MNX | 40 |
| 3-Phase$415 \mathrm{~V}$ | 0.4 | MOG-S1/MOG-H1 | 1.6-2.5 | MOG-S1/MOG-H1 | 4.0-6.3 | MNX | 9 | MNX | 9 |
|  | 0.75 | MOG-S1/MOG-H1 | 2.5-4.0 | MOG-S1/MOG-H1 | 4.0-6.3 | MNX | 9 | MNX | 9 |
|  | 1.5 | MOG-S1/MOG-H1 | 4.0-6.3 | MOG-S1/MOG-H1 | 6.3-10.0 | MNX | 9 | MNX | 9 |
|  | 2.2 | MOG-S1/MOG-H1 | 6.3-10 | MOG-H1 | 6.3-10.0 | MNX | 9 | MNX | 9 |
|  | 4.0 | MOG-H1 | 11.0-16.0 | MOG-H1 | 11.0-16.0 | MNX | 9 | MNX | 18 |
|  | 5.5 | MOG-H1 | 11.0-16.0 | MOG-H1 | 14.0-20.0 | MNX | 18 | MNX | 18 |
|  | 7.5 | MOG-H1 | 14.0-20.0 | MOG-H1 | 24.0-32.0 | MNX | 18 | MNX | 25 |

# Peripheral Devices \& Watt Loss 

## Fuse \& Reactor Specification

| Inverter capacity (kW) HD |  | AC Input Fuse |  |  | AC Reactor |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 3-Phase 230V |  | Model | Current [A] | Voltage [V] | Inductance (mH) | Current (A) |
|  | $0.4 / 0.75$ | DFJ-10 | 10 | 600 | 1.2 | 10 |
|  | 1.5 | DFJ-15 | 15 |  | 0.88 | 14 |
|  | 2.2 | DFJ-20 | 20 |  | 0.56 | 20 |
|  | 4.0 | DFJ-30 | 30 |  | 0.39 | 30 |
|  | 5.5 | DFJ-50 | 50 |  | 0.3 | 34 |
|  | 7.5 | DFJ-60 | 60 |  | 0.22 | 45 |
| 3-Phase 415V | $0.4 / 0.75$ | DFJ-10 | 10 | 600 | 4.81 | 4.8 |
|  | 1.5 | DFJ-10 | 10 |  | 3.23 | 7.5 |
|  | 2.2 | DFJ-15 | 15 |  | 2.34 | 10 |
|  | 4.0 | DFJ-20 | 20 |  | 1.22 | 15 |
|  | 5.5 | DFJ-30 | 30 |  | 1.12 | 19 |
|  | 7.5 | DFJ-35 | 35 |  | 0.78 | 27 |

Drive Watt Loss Data

| Voltage | Model Number | Rated <br> Power <br> (kW) | HD |  |  |  | ND |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Rated Output Current (A) | Total Losses (W) | Internal Losses (W) | Heat <br> Losses <br> (Kacl) | Rated <br> Output <br> Current <br> (A) | Total <br> Losses <br> (W) | Internal Losses (W) | Heat <br> Losses <br> (Kacl) |
| 220 | LTVF-N203P1BAA | 0.4 | 2.5 | 19 | 16.8 | 2 | 3.1 | 24 | 16.8 | 7 |
| 220 | LTVF-N206P0BAA | 0.75 | 5.0 | 34 | 16.8 | 14 | 6.0 | 37 | 16.8 | 17 |
| 220 | LTVF-N209P6BAA | 1.5 | 8.0 | 50 | 17.4 | 28 | 9.6 | 59 | 17.4 | 35 |
| 220 | LTVF-N212P0BAA | 2.2 | 11.0 | 80 | 17.4 | 54 | 12.0 | 89 | 17.4 | 62 |
| 220 | LTVF-N218POBAA | 4.0 | 17.0 | 127 | 17.7 | 94 | 18.0 | 160 | 17.7 | 122 |
| 220 | LTVF-N230P0BAA | 5.5 | 24.0 | 173 | 18.7 | 132 | 30.0 | 267 | 18.7 | 214 |
| 220 | LTVF-N240POBAA | 7.5 | 32.0 | 247 | 18.7 | 197 | 40.0 | 398 | 18.7 | 326 |
| 440 | LTVF-N402P0BAA | 0.4 | 1.3 | 21 | 17.4 | 3 | 2.0 | 22 | 17.4 | 4 |
| 440 | LTVF-N403P1BAA | 0.75 | 2.5 | 25 | 17.4 | 7 | 3.1 | 31 | 17.4 | 12 |
| 440 | LTVF-N405P1BAA | 1.5 | 4.0 | 40 | 17.7 | 19 | 5.1 | 47 | 17.7 | 25 |
| 440 | LTVF-N406P9BAA | 2.2 | 5.5 | 54 | 17.7 | 31 | 6.9 | 57 | 17.7 | 33 |
| 440 | LTVF-N410P0BAA | 4.0 | 9.0 | 93 | 18.7 | 64 | 10.0 | 125 | 18.7 | 91 |
| 440 | LTVF-N416P0BAA | 5.5 | 12.0 | 170 | 19.7 | 129 | 16.0 | 153 | 19.7 | 115 |
| 440 | LTVF-N423P0BAA | 7.5 | 16.0 | 194 | 19.7 | 149 | 23.0 | 225 | 19.7 | 177 |

Note: Total Losses $(W)=$ Internal Losses $(W)+$ Heat Loss (W)
$1 \mathrm{wh}=3,600 \mathrm{~J}, 1 \mathrm{kcal}=4,186 \mathrm{~J}$
0.4~0.75kW (LTVF- N203P1BAA, LTVF-N206POBAA, LTVF-N402POBAA, LTVF-N403P1BAA)

1.5~2.2kW (LTVF-N209P6BAA, LTVF-N212POBAA, LTVF-N405P1BAA, LTVF-N406P9BAA)

4.0kW (LTVF-N2 18POBAA, LTVF-N410POBAA)

5.5~7.5kW (LTVF-N230POBAA, LTVF-N240POBAA, LTVFN416POBAA, LTVF-N423POBAA)


Units: mm (inches)


## Model \& Specifications

## $N \times 2000$

## The best way to save money \& time

$>$ Built-in EMC Filter
$>$ New UL61800-5-1 Design
> Built-in DB Unit : $\geqslant 1.5 \mathrm{~kW}$
$>$ Built-in Modbus Communication
> User - Friendly Design

- DIN - rail mountable
- Side-by-side installation
- Easy connection with Rj45 port
- Modbus / Smart Copier / Remote keypad / DriveConnect


Built-in EMC Filter


Side-by-Side Installation ( 2 mm between drives)


DIN-rail Mountable

## Model and Type



Specification


## Control

| Control Method | V/F, Slip Compensation |
| :--- | :--- |
| Frequency Setting <br> Resolution | Digital command $: 0.01 \mathrm{~Hz}$ <br> Analog command :0.05 Hz |
| Frequency Accuracy | $1 \%$ of maximum output frequency |
| V/F Pattern | Linear, Square reduction, User V/F |
| Overload Capacity | $150 \%$ for 1 min |
| Torque Boost | Manual / Automatic torque boost |

## Specifications

## Operation

| Operation Mode |  | Select keypad, Terminal strip or Communication operation |  |
| :---: | :---: | :---: | :---: |
| Frequency Setting |  | Analog: 0~10 [V], 4~20 [mA], 0~20 [mA] Digital : Keypad |  |
| Operation Function |  | Anti-forward and reverse direction rotation, Frequency jump, Frequency limit, DC braking, Jog operation, Up-down operation, 3-wire operation, Dwell operation, Slip compensation, PID control, Energy saving operation, Speed search, Automatic restart |  |
| Input |  | NPN (Sink) / PNP (Source) selectable |  |
|  | Multi-Function Terminal | Function: Forward run, Reverse run, Reset, Emergency stop, Multi-step speed frequency-high/med/low, DC braking during stop, Frequency increase, 3-wire, Select acc/dec/stop, Reverse direction operation, External trip, Jog operation, Multi-step acc/dec-high/med/low, Second motor selection, Frequency reduction, Fix analog command frequency, Transition from PID to general operation |  |
|  | Analog Input | V1: 0~10V, $12: 4 \sim 20 \mathrm{~mA}$ or 0~20mA |  |
| Output | Multi-function relay terminal | Fault output and inverter operation status output | (N.O., N.C.) less than AC 250 V 1 A , less than DC 30V 1A |
|  | Analog output | 0-10 Vdc: Frequency, Output current, Output voltage, DC terminal voltage etc. selectable |  |

Environment

| Ambient Temperature | $-10 \sim 50^{\circ} \mathrm{C}\left(14 \sim 122^{\circ} \mathrm{F}\right)$, Ambient temperature under the condition of no ice or frost |
| :--- | :--- |
| Ambient Humidity | Relative humidity less than $95 \% \mathrm{RH}$ (No condensation forming) |
| Storage Temperature | $-20 \sim 65^{\circ} \mathrm{C}\left(-4 \sim 149^{\circ} \mathrm{F}\right)$ |
| Surrounding Environment | Prevent contact with corrosive gases, inflammable gases,oil stains, dust <br> and other pollutants (Pollution degree 2 environment) |
| Altitude / Oscillation | Below $1,000 \mathrm{~m}$, below $9.8 \mathrm{~m} / \sec ^{2}(1 \mathrm{G})$ |
| Pressure | $70 \sim 106 \mathrm{kPa}$ |

## I/O Configuration



## Braking Resistor Specification

| Product (kW) HD | Resistance $(\Omega)$ | Rated Capacity (W) |
| :---: | :---: | :---: |
| 1.5 | 60 | 300 |
| 2.2 | 50 | 400 |

* The standard for braking torque is $150 \%$ and the working rate (\%ED) is 5\%. If the working rate is $10 \%$, the rated capacity for braking resistance must be calculated at twice the standard

Compatible MCB \& Magnetic Contactor of L\&T Electrical \& Automation

| Inverter Capacity (kW) HD |  | Circuit Breaker |  | Magnetic Contactor |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Model | Rating [A] | Model | Rating [A] |
| Single phase 200V | 0.2kW | AU | 6 | MNX | 9 |
|  | 0.4 kW | AU | 6 | MNX | 9 |
|  | 0.8 kW | AU | 10 | MNX | 9 |
|  | 1.5 kW | AU | 20 | MNX | 18 |
|  | 2.2 kW | AU | 25 | MNX | 22 |

## Fuse and Reactor Specifications

| Inverter capacity (KW) HD |  | AC Input Fuse |  | AC Reactor |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Current [A] | Voltage[V] | Inductance[mH] | Current [A] |
| Single phase 200V | 0.2 kW | 5 | 600 | 4.2 | 3.5 |
|  | 0.4/0.8kW | 10 |  | 1.2 | 10 |
|  | 1.5 kW | 15 |  | 0.88 | 14 |
|  | 2.2 kW | 20 |  | 0.56 | 20 |

## Dimensions



| CAT No. | W1 | H | D1 |
| :---: | :---: | :---: | :---: |
| LTVF-N101P4BAA |  | $135(5.31)$ | $100(3.94)$ |
| LTVF-N102P4BAA | $85(3.34)$ | $153(6.02)$ | $123(4.84)$ |
| LTVF-N104P2BAA |  | $180(7.08)$ | $140(5.51)$ |
| LTVF-N107P5BAA |  |  |  |
| LTVF-N110P0BAA | $100(3.94)$ |  |  |

Notes:

Notes:

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Product improvement is a continuous process. For the latest information and special application, please contact any of our offices listed here. Product photographs shown for representative purpose only.

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[^0]:    The Nx2000 series adds a new dimension to L\&T Electrical \& Automation E\&A's AC drive solutions. Built to E\&A's stringent quality standards, the $N \times 2000$ Series AC drive is tested and certified to meet global benchmarks, thus giving you the assurance of total reliability.

