

➤ High on **savings**
big on reliability

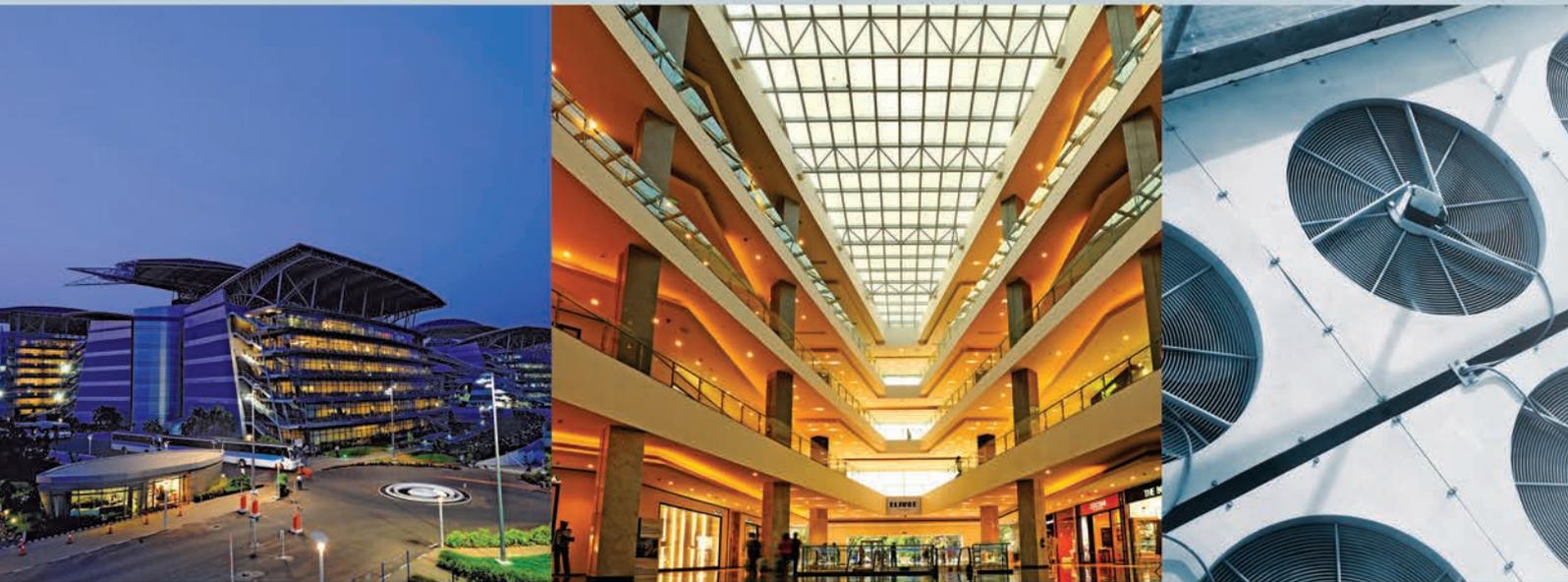


Hx2000 HVAC Drive

Three Phase 415V (0.75 ~ 90kW)

Two decades of application knowledge

For over two decades, various industry sectors have been reaping the benefits of L&T's cost-effective, performance-oriented AC Drive solutions. L&T's grasp of the specific needs of each industry enables it to offer application-specific solutions for various industries such as processing, textile, plastic, ceramic, pharmaceutical, elevator, oil & gas, power, cement and material-handling.



Hx2000 | HVAC Drive

› The new **reliability** edge

The Hx2000 adds a new dimension to L&T's AC drive solutions. It sets the standard for the industry by introducing an innovative energy reduction, environmental-friendly system that delivers outstanding energy savings for fan, pump and compressor applications in an HVAC system.



Built to L&T's stringent quality standards, the Hx2000 is tested and certified to meet global benchmarks, thus giving you the assurance of total reliability. It handles loads from 0.75kW to 90kW, and is engineered to keep your process 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 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, L&T'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 HVAC system functions at peak efficiency. From engineer to repair technician, our people have the knowledge and skill-sets to deliver total peace of mind.







➤ **Tested. Certified. Reliable.**

L&T 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 Hx2000 is ensured by international test certification – UL (Plenum Rated), CE, 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.

Rapid Response Service Team





➤ **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, 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 ensures total operational excellence, minimising downtime.

L&T's engineers and channel partners also upgrade their skills through seminars, workshops, training sessions and white papers on electrical practices.

➤ **Features** that ensure performance

- V/F, Slip Compensation
- Built-in RTC for Scheduling
- Password Protection
- Built-in EMC filter class C3
- Fire Mode
- Multi-Motor Control
- Built-in Payback Counter
- Lubrication Control
- Pump Clean Control
- Dry Pump Detection
- Built-in 3 PID
- Flow Compensation
- Built-in RS-485 Communication
- BACnet, Modbus-RTU,
Metasys N2
- Global Specifications Compliant-
CE, UL (Plenum Rated)



Hx2000

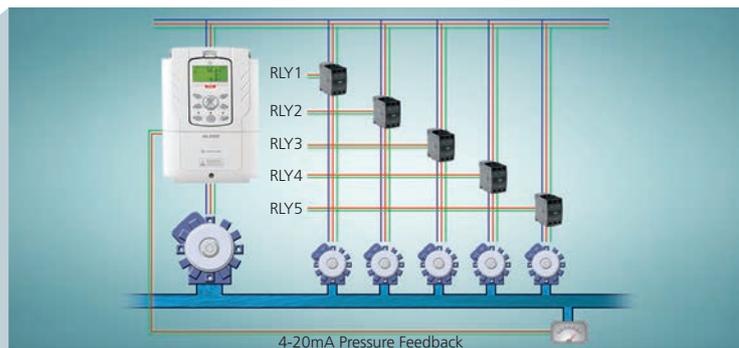
Provides Optimised Solutions for Global Systems



Multi Motor Control (MMC)

MMC is used when a single drive is used to control multiple motors in pump systems. It controls 1 main motor and 5 auxiliary motors.

The main motor is connected to the drive output and is controlled by the built-in PID controller. Auxiliary motors are connected with the supply power and are turned ON/OFF by a relay within the drive.

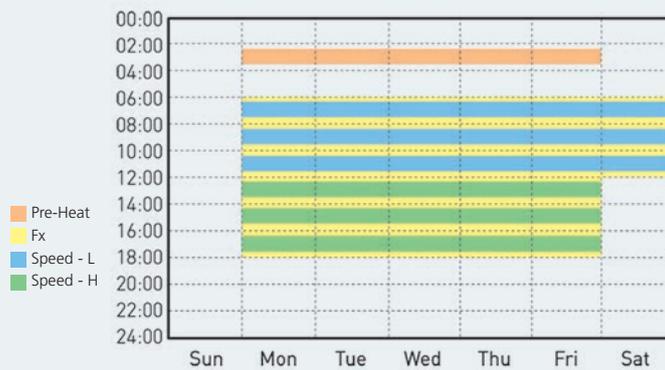


Time Event Scheduling: Real Time Clock (RTC)

RTC is used so that selected functions are operable during the set time. The user needs to configure the following:

- 4 Time Period Modules (Weekly)
- 8 Time Events
- 8 Exception Dates (Day)

(Possible to set 29 functions including FWD (Fx), REV (Rx), multiple acceleration/deceleration times, multiple frequencies, PID related functions and pre-heat)
Summer time available (Start/End date setting)



3 Process PID Control

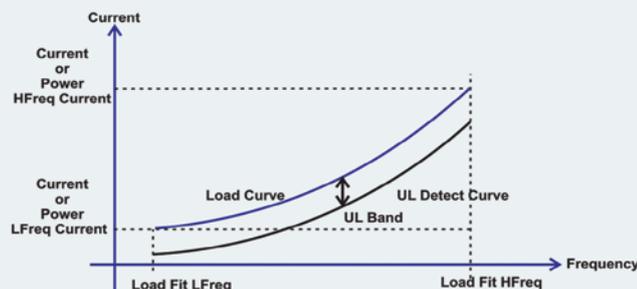
Main PID uses inputs from sensors to measure variables like pressure, temperature/humidity and flow, to change the motor speed by varying the output frequency to achieve the desired process output.

Two external PIDs control the external equipments of the HVAC system such as dampers, valves based on the feedback from CO₂, Rh, temperature, pressure & other sensors.



Dry Pump (Under Load Protection)

It prevents pump damage when there is insufficient water in the tank. If the actual load is below the Under Load (UL) Detect curve, the drive will trigger a warning or trip signal to protect the pump.



RARCAP2 N STP 0.0HZ
89 Cost per kWh 1.0 kWh
90 Saved kWh 612.8 kWh
91 Saved MWh 14 MWh

DIGITAL OPERATOR
HVAC



Hx 2000

LARSEN & TOUBRO

WARNING
Risk of Injury or Electric Shock.
Read the manual and follow the safety
instructions before install or use.
Before opening the cover, disconnect
all power and wait at least 10 minutes.

➤ Energy Saving

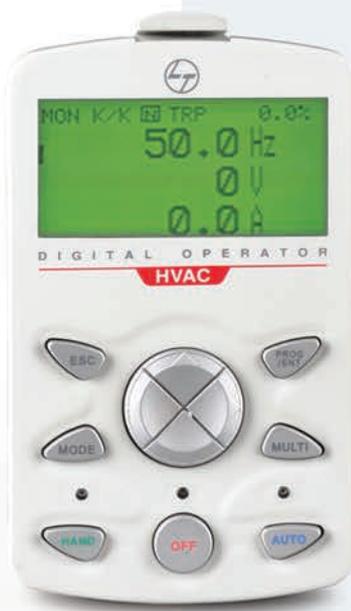
The energy saving information is displayed as kWh, saved energy cost and CO₂ emission level on the drive keypad.



➤ Keypad Exclusive for HVAC

Used to issue commands, configure drive parameters, and for monitoring drive status

- HAND Mode (Local Control Mode) or AUTO Mode (Remote Control Mode) can be selected
 - HAND Mode: Used when selecting frequency or run/stop commands
 - AUTO Mode: Drive operated using the keypad, multifunctional terminal block and communications
- Fault Status Monitoring



Cancel (ESC) Key

- While in the Edit state, previously saved data is used
- When pressed while switching codes within the group, it is switched to the very first mode of the group
- When pressed while switching modes, it reverts back to the monitor mode

Program (PROG/ENT) Key

- When pressed once, it is changed to the Parameter Edit state
- When pressed after changes, the changed data is saved

Left/Right Key

- It is used to switch between groups (Cursor is used in the Edit state)

Up/Down Key

- It is used to switch between codes and edit data values

Hand (HAND) Key

- It is used to select Keypad (HAND) operation
- Speed control (HAND key–UP/DOWN)

Auto (OFF) Key

- OFF mode or fault reset

Multifunction (MULTI) Key

- It is used to register user codes

Auto (AUTO) Key

- It is used to select AUTO mode operation

➤ Built-in EMC Filter

A built-in EMC filter meets the specifications for noise reduction

- 400V 0.75~90kW Built-in as default (Class C3)

➤ Built-in DC Reactor

A built-in DC Reactor effectively improves the power factor and reduces the THD

- Built-in as standard for 400V 37~90kW

➤ Global Specifications Compliant

UL (Plenum Rated)

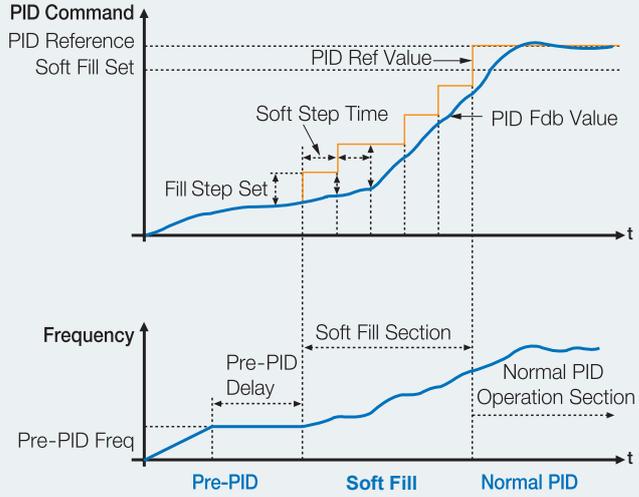
(American standards for conditioner fire safety)

- Suitable for installation in a compartment handling conditioned air



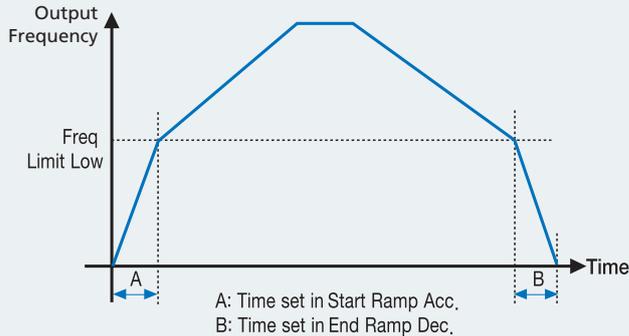
Soft Fill Operation

Prevents pump damage caused by excessive pressure building-up in the pipe system at the time of initial operation of pumps or inside the pumps.



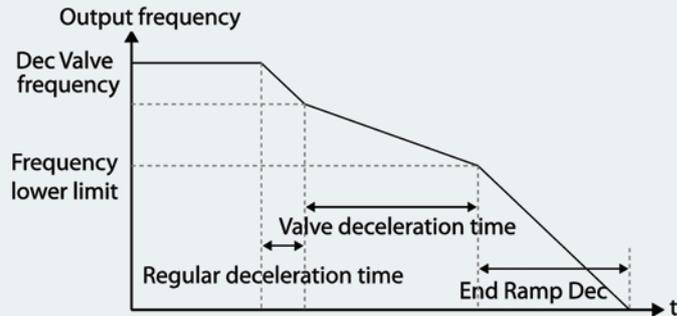
Start Ramp & End Ramp

Prevents pump damage by changing ramp using acceleration/deceleration time setting upon initial pump operation and stopping.



Deceleration Valve Ramp

Prevents pump and pipe damage caused by sudden pressure changes when pumps are stopped or a pump valve is closed, based on specific requirements, deceleration time can be set.



➤ Easy-to-Change Cooling Fan

It is easy to change a cooling fan without opening the cover of the drive.



➤ Flange-Type Mounting

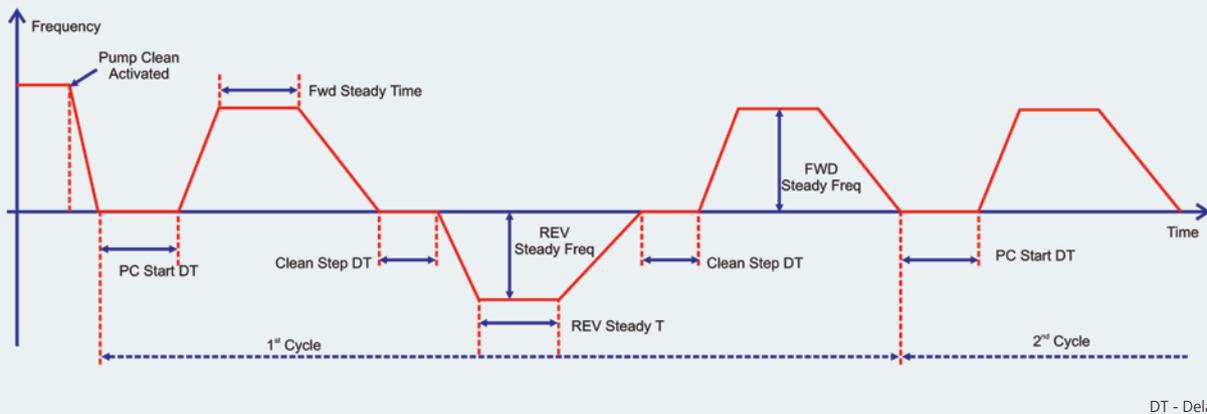
If the space is too small, a heat sink can be installed outside the panel. This helps reduce heat losses inside the panel.



➤ Side-by-Side Installation

The size of the control board is significantly reduced when multiple drives are installed by minimising the distance between them.
(Side-by-side installation is unavailable for 37~90kW)





➤ Pump Clean Operation

Scraps and deposits that get built up in impellers inside pumps, decrease the efficiency of a motor's performance. Through consecutive FWD/REV or ACC/DEC operations, the scraps get eliminated. This results in extension of the pump's lifespan, prevents pre-mature pump failure and ensures energy savings. The Pump Clean mode is initiated by a remote signal, current profile or power profile.

➤ Payback Counter (Energy Saving Display)

It displays energy saving information by comparing the average energy efficiency for operation with and without the drive. The energy saving information is displayed as kWh, saved energy cost and CO₂ emission level.

➤ Load Tuning

Establishes load (current and power) curves based on the drive frequency, so as to make the load characteristics curve required for 'Under Load' and 'Pump Clean' modes.

➤ Fire Mode

When an emergency such as a fire occurs at the suction/exhaust fans, without any hardware failure or a critical defect, the drive continuously operates to protect other systems under the set frequency and direction.

➤ Detection of Broken Pipe

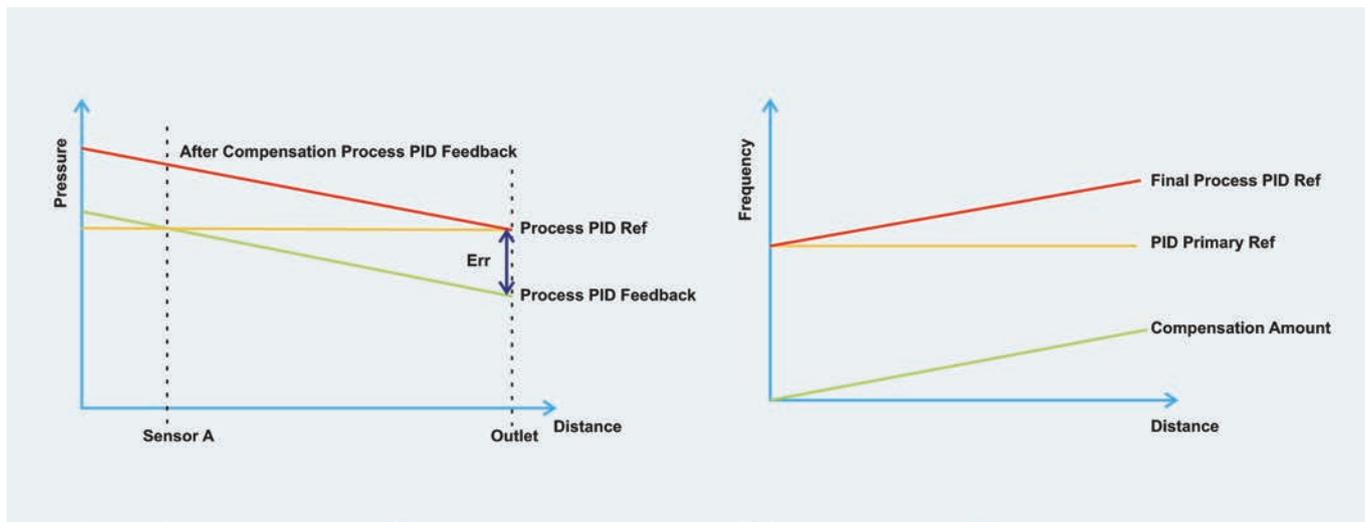
This function detects pipe breaks when the PID operation is ON. The fault trip or a warning signal will occur if the feedback does not reach the level set by the user during the operation with the maximum output (PID maximum output or the maximum speed set).

➤ Aux Motor PID Compensation

In-pipe flow increases and conduit pressure decreases as the number of auxiliary motors increases. To counter this, Aux Motor PID Compensation is used to compensate for the pressure loss.

➤ Power-on Resume

When the drive restarts after it was stopped due to power interruption, the drive memorises the status command, frequency reference and ACC/DEC time settings upon loss of communication control. As soon as power is resumed, 'Power-on Resume' is used to follow the previous control command.



➤ Flow Compensation

In a system with longer pipes and a higher flow rate, a drop in pressure is often experienced. This feature helps to compensate for the pressure drop by increasing the PID reference.

➤ Lubrication Control

During a lubrication operation, the drive outputs the lubrication signal through one of the output relays when the drive receives a RUN command. The drive does not start operating until the time set at 'Lubrication OP Time' has elapsed and the Lubrication signal is turned OFF.

➤ Level Detection

When the drive is operated above or below the user defined values i.e., beyond the set frequency and source (voltage, current) values the drive generates a trip or activates a relay for protective operation.

➤ Damper Control

If a fan and a damper are used together in a system, the drive may be configured to operate according to the damper's operation status. During damper operation, one of the relay outputs (Relay 1–5) may be set to 'Damper Control' to output a signal based on the damper's operation status. One of the multi-function terminal inputs may also be set 'Damper Open' to receive the damper status input. The drive starts operating when both the RUN command and the 'Damper Open' signal are turned ON.

➤ Macro Setting

The Macro selection function is used to put various application functions together in a group. For applications with the Hx2000 drive, 7 Macro configurations are available i.e. Basic, Compressor, Supply Fan, Exhaust Fan, Cooling Tower, Circulation Pump, Vacuum Pump and Constant Torque.

➤ Pre-Heat Function

Pre-heats motors by outputting direct current when the motors or pumps are not in operation, in order to prevent condensation of the motors or pumps.

➤ PID Sleep and Wake-up function

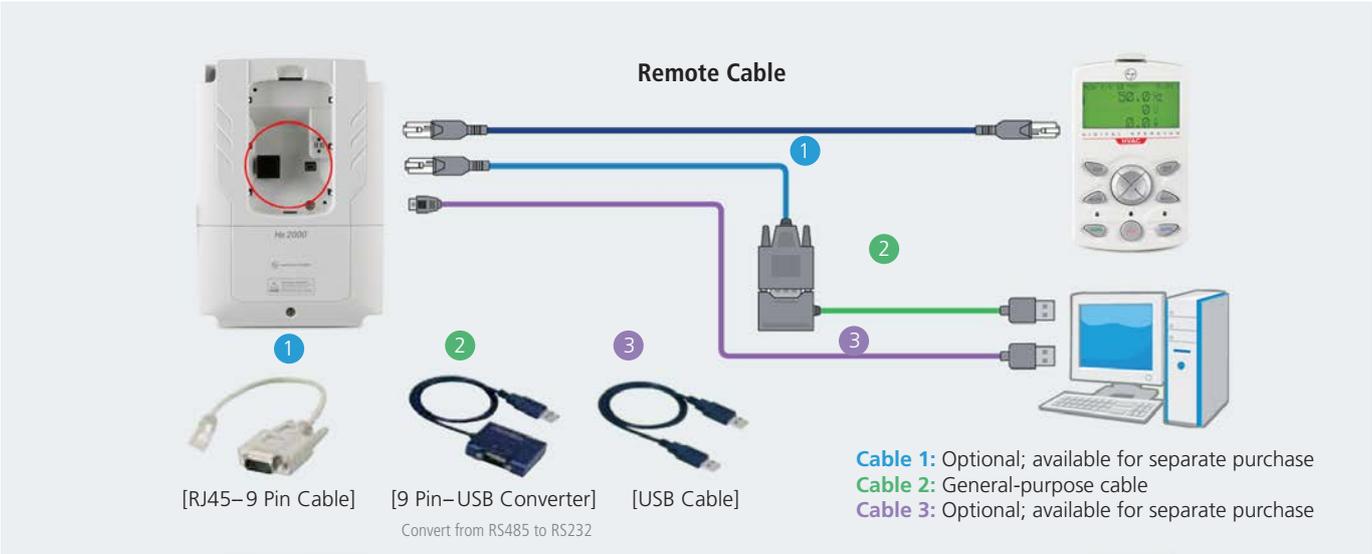
It is used to put the drive on standby and restart it using PID as per the load requirements in order to reduce motor losses as much as possible.

➤ **Communication Module**

Built-in RS485 communication: • **BACnet** • **Modbus-RTU** • **Metasys N2**
Optional: **LonWorks**

➤ **Software Exclusive for L&T Drives**

DriveConnect can be connected using USB Port or RJ45 terminal.



➤ **Optional I/O Expansion Card**



| Motor Rating (Normal Duty) | Three-Phase 415V | ND Current (A) |
|----------------------------|------------------|----------------|
| 0.75kW | LTVF-H40002BAA | 2 |
| 1.5kW | LTVF-H40004BAA | 4 |
| 2.2kW | LTVF-H40006BAA | 6 |
| 3.7kW | LTVF-H40008BAA | 8 |
| 5.5kW | LTVF-H40012BAA | 12 |
| 7.5kW | LTVF-H40016BAA | 16 |
| 11kW | LTVF-H40024BAA | 24 |
| 15kW | LTVF-H40030BAA | 30 |
| 18.5kW | LTVF-H40038BAA | 38 |
| 22kW | LTVF-H40045BAA | 45 |
| 30kW | LTVF-H40061BAA | 61 |
| 37kW | LTVF-H40075BAA | 75 |
| 45kW | LTVF-H40091BAA | 91 |
| 55kW | LTVF-H40107BAA | 107 |
| 75kW | LTVF-H40142BAA | 142 |
| 90kW | LTVF-H40169BAA | 169 |

| | | | | | | |
|------------------------------|---------------|--|--------------------------------------|------------------|---------------|----------|
| LTVF | H | 4 | 0006 | B | A | A |
| L&T Variable Frequency Drive | Series Hx2000 | Input Voltage 4 Three-Phase 380~480[V] | Drive Current Rating Normal Duty Amp | Enclosure B IP20 | Keypad A With | Reserved |

➤ Input and Output Specifications: **Input Voltage Three-Phase 415V (0.75 to 90kW - ND)**

| LTVF-H4□□□□BAA | | 0002 | 0004 | 0006 | 0008 | 0012 | 0016 | 0024 | 0030 | 0038 | 0045 | 0061 | 0075 | 0091 | 0107 | 0142 | 0169 | |
|--------------------|-----------------------|------|------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| Applied Motor (kW) | kW | 0.75 | 1.5 | 2.2 | 3.7 | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 | 30 | 37 | 45 | 55 | 75 | 90 | |
| | HP | 1.5 | 2.2 | 3.7 | 5.5 | 7.5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 | 100 | 120 | |
| Output Ratings | Rated Current [A] | ND | 2 | 4 | 6 | 8 | 12 | 16 | 24 | 30 | 38 | 45 | 61 | 75 | 91 | 107 | 142 | 169 |
| | Rated Capacity [kVA] | | 1.9 | 3 | 4.5 | 6.1 | 9.1 | 12.2 | 18.3 | 23 | 29 | 34.3 | 46.5 | 57.1 | 69.4 | 82 | 108.2 | 128.8 |
| | Output Frequency | | 0 ~ 400 [Hz] | | | | | | | | | | | | | | | |
| | Output Voltage [V] | | 3-phase 380 ~ 480V | | | | | | | | | | | | | | | |
| Input Ratings | Available Voltage [V] | | 3-phase 380 ~ 480 VAC (-15%, +10%) | | | | | | | | | | | | | | | |
| | Input Frequency | | 50 ~ 60 [Hz] (±5%) | | | | | | | | | | | | | | | |
| | Rated Current [A] | ND | 2.2 | 3.6 | 5.5 | 7.5 | 12.2 | 17.5 | 26.5 | 33.4 | 42.5 | 50.7 | 69.1 | 69.3 | 84.6 | 100.1 | 133.6 | 160 |

Standard Specifications

| | |
|----------------------|--|
| Rated Input Voltage | 3-phase 380 ~ 480 VAC (-15%, +10%) |
| Rated Frequency | 50 ~ 60 [Hz] (±5%) |
| Max Output Voltage | Proportional to Input Voltage |
| Max Output Frequency | 0 to 400Hz |
| Keypad | LCD Detachable |
| DC Reactor | Built-in from 37kW to 90kW |
| EMC Filter | Built-in as default (C3) |
| Features | Multi Motor Control, Built-in RTC, USB Port, HVAC Macros, Built-in PID, Lubrication Control, Motor Pre Heat, KEB, Auto Restart, Sleep & Wake-up Function, Damper Control, Belt Broken Detection, Pump Clean Mode, Flow Compensation Mode, Dry Pump Detection, Password Protection, Payback Counter (Energy Saving on Display), Fire Mode |

Control

| | |
|------------------------------|--|
| Control Method | V/F control, slip compensation |
| Frequency Setting Resolution | Digital command: 0.01 Hz Analog command: 0.06 Hz (60 Hz standard) |
| Frequency Settings | Analog type: -10~10 V, 0~10 V, 0~20 mA Digital type: key pad, pulse train input |
| V/F Pattern | Liner, squared overload reduction and user V/F |
| Overload Capacity | Rated current for 120% for 1 minute |
| Torque Boost | Manual torque boost, automatic torque boost 1, automatic torque boost 2 |
| Output Frequency Resolution | 0.01Hz |
| Accel/Decel Time | 0.0 to 600.0 (sec) |
| Frequency Accuracy | 1% of maximum output frequency |

Operation

| | | | |
|----------------------|--|--|--|
| Operating Method | Selectable among keypad/terminal block/communication operation | | |
| Operating Functions | PID control, 3-wire operation, Frequency limit, Second function, Anti-forward and reverse, direction rotation, Commercial transition, Speed search, Power braking, Leakage reduction, Up-down operation, DC braking, Frequency jump, Slip compensation, Automatic restart, Automatic tuning, Energy buffering, Flux braking, Energy Saving | | |
| Input | Multi-function terminal P1-P7 | 7No. Programmable NPN (Sink) / PNP (Source) Function: Forward direction operation, Reset, Emergency stop, Multi step speed, frequency-high/med/low, Reverse direction operation, External trip, Jog operation, Multi step acc/dec, Second motor selection, DC braking during stop, Frequency increase, 3-wire, Select acc/dec/stop, MMC Interlock, Frequency reduction, Fix analog command frequency, Transition from PID to general operation Pre Heat, Pump Cleaning, RTC (Time Event) | |
| | Analog input | 2 No., -10 ~ 10 Vdc : 1 No. 0 ~ 20 mA / -10 ~ 10Vdc : 1 No. | |
| | Pulse Train input | 0 to 32 kHz | |
| Output | Multi-function open collector terminal | 1 No., Less than DC 26 V, 50 mA | |
| | Fault Signal relay | Fault output and drive operation status output | 1 No. N.O.: Less than AC 250 V 2A, DC 30 V, 3A N.C.: Less than AC 250 V 1A, DC 30 V 1A |
| | Multi-function relay | | 4 No., Less than AC 250 V, 5 A Less than DC 30 V, 5 A |
| | Analog output | 2 No., 0 ~ 10 Vdc / 0 ~ 20 mA : 1 No. -10 ~ 10 Vdc : 1 No. | |
| | Pulse Train output | 0 to 32 kHz | |
| RS-485 Communication | Built-in BACnet, Modbus-RTU, Metasys N2 as standard | | |

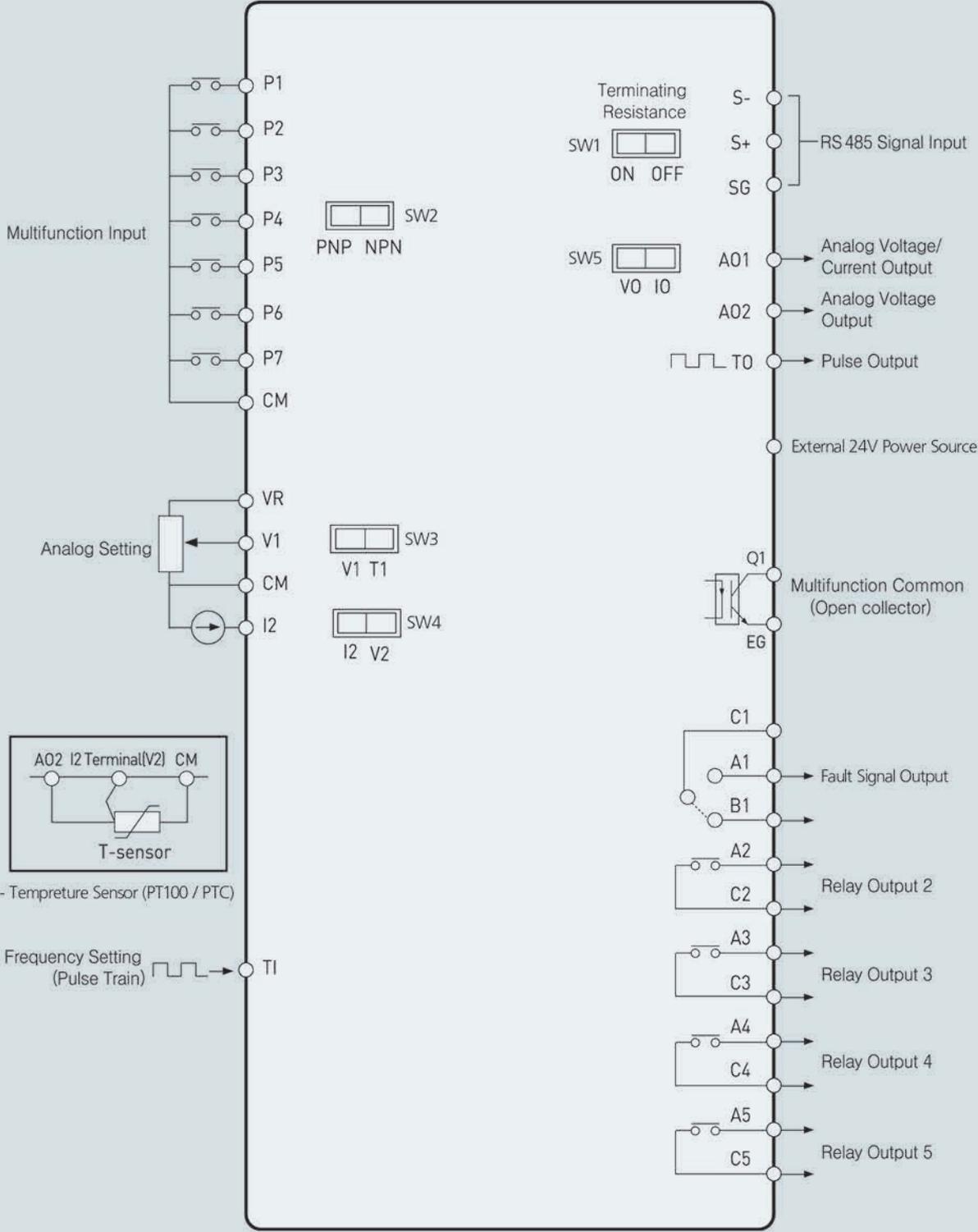
Protective Functions

| | |
|-----------------------------------|---|
| Trip | Over-current trip, Trip caused by external signals, ARM short-circuit current trip, Overheat trip, Pipe broken trip, Input open-phase trip, Ground trip, Motor overheat trip, IO board connection trip, No motor trip, Parameter write trip, Emergency stop trip, Command loss trip, External memory error, CPU watchdog trip, Motor under-load trip, Overvoltage trip, Temperature sensor trip, Drive overheat, Option trip, Output open-phase trip, Drive overload trip, Fan trip, Low voltage trip during operation, Low voltage trip, Analog input error, Motor overload trip, Keypad command loss trip, Damper trip, Level detect trip, All auxiliary motor failure trip, Pump clean failure (fault) |
| Alarm | Command loss trip alarm, overload alarm, normal load alarm, drive overload alarm, fan operation alarm, resistance braking rate alarm, Capacitor life alarm, Pump Clean alarm, Fire Mode Alarm, LDT Alarm. |
| Momentary Power Loss Ride through | Less than 8 ms: Continue Operation (must be within the rated input voltage and rated output range) More than 8 ms: Auto restart operation |

Structure & Environment

| | |
|----------------------|---|
| Area of Use | Indoors. Prevent contact with corrosive gases, inflammable gases, oil stains, dust, and other pollutants (Pollution Degree 2 Environment) |
| Type of Cooling | Forced fan cooling structure |
| Enclosure Type | IP20 / UL Open(default), UL Enclosed Type 1(option) |
| Ambient Temperature | -10°C to 40°C |
| Storage Temperature | -20C ~ 65°C |
| Application Humidity | Below 90% RH of relative humidity (with no dew formation) |
| PCB Protection | Conformal Coating complying to IEC 60721-3-3 class 3C2 |
| Altitude | 1,000m or below |
| Vibration | 9.8m/sec ² (1.0G) or below |
| Global Compliance | CE, RoHS, UL (Plenum Rated) |

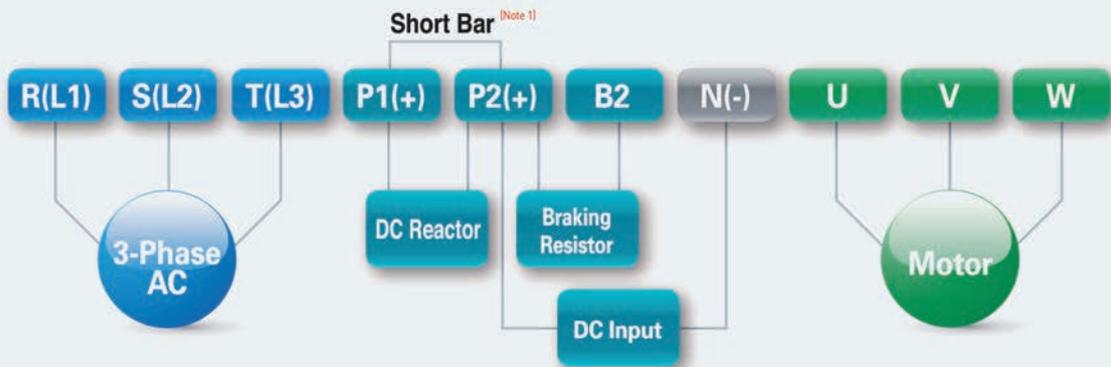
0.75 to 90kW



| | Classification | Symbol | Name | Description |
|---------------------------------------|-----------------------------|----------------------------|--|--|
| Input Terminal Details | Selection of contact points | P1~P7 | Multifunctional Input 1~7 Terminal | It can be used by setting multifunctional input. Default values from the factory are as follows: <ul style="list-style-type: none"> • P1: Fx • P2: Rx • P3: BX • P4: RST • P5: Speed-L • P6: Speed-M • P7: Speed-H |
| | | CM | Sequence Common Terminal | Common terminal of contact point input and analog I/O terminal |
| | Analog Input | VR | Power Terminal for Frequency Setting | Power for analog frequency setting: <ul style="list-style-type: none"> • Max. output voltage: 12V • Max. output current: 12mA • Volume resistivity: 1~10kΩ |
| | | V1 | Frequency Setting(Voltage) Terminal | Frequency is set depending on the voltage supplied to V1 terminal. <ul style="list-style-type: none"> • Unipolar: 0~10V(Max. 12V) • Bipolar: -10~10V(Max. ±12V) |
| | | I2 | Frequency Setting (Current/Voltage) Terminal | Frequency is set depending on the current capacity supplied to I2 terminal. V2 can be used by selecting analog voltage/current input terminal setting switch (SW4). <ul style="list-style-type: none"> • Input current: 0~20mA • Max. input current: 24mA • Input resistance 249Ω • Input voltage: 0~10V |
| Pulse Train | TI | Frequency Setting Terminal | Frequency is set as 0~32kHz. Low Level : 0~0.8V, High Level : 3.5~12V | |
| Output/Communication Terminal Details | Selection of contact points | Q1 | Multifunctional (Open Collector) Output/ Pulse Output Terminal | As a multifunctional output signal or pulse output, one of the following is chosen: Output frequency, output current, output voltage and DC voltage. DC 26V, 50mA or below Pulse output terminal <ul style="list-style-type: none"> • Output frequency: 0~32kHz • Output voltage: 0~12V |
| | | EG | Common Terminal | <ul style="list-style-type: none"> • Common ground terminal for external power of open collector |
| | | 24 | 24V Power Terminal * | <ul style="list-style-type: none"> • Max. output current: 100mA • Do not use external 24V except for PNP-mode terminal block |
| | | A1/C1/B1 | Abnormal Signal Output/Multifunctional Output Terminal | When power is cut-off to protect the product, signals or multifunctional signals are output. (N.O. : AC250V 2A or below, DC 30V 3A or below N.C. : AC250V 1A or below and DC 30V 1A or below) <ul style="list-style-type: none"> • At abnormal state: A1-C1 connected (B1-C1 disconnected) • At normal state: B1-C1 connected (A1-C1 disconnected) • Factory default value: Frequency |
| | | A2/C2 ~ A5/C5 | Multifunctional Relay Output A Contact Point | Multifunctional output terminal such as signals at operation is defined and used.(AC 250V 5A or below and DC 30V 5A or below) |
| | Analog Output | A01 | Voltage/Current Output Terminal | One of the following is chosen and output: Output frequency, output current, output voltage and DC voltage. The following voltage/current output can be chosen by selecting analog voltage/current output terminal setting switch (SW5). <ul style="list-style-type: none"> • Output voltage: 0~10V • Max. output voltage/current: 12V, 10mA • Output current: 0~20mA • Max. output current: 20mA • Factory default value: Frequency |
| | | A02 | Voltage Output Terminal | -10 ~ 10 Vdc |
| | Pulse Train | T0 | Frequency Setting Terminal | Frequency is set as 0~32kHz. Low Level : 0~0.8V, High Level : 3.5~12V |
| | Communication Terminal | S+/S-/SG | RS485 Signal Input Terminal | RS485 signal line |

Note: * Available only when used in PNP mode

0.75~30kW(3-Phase)



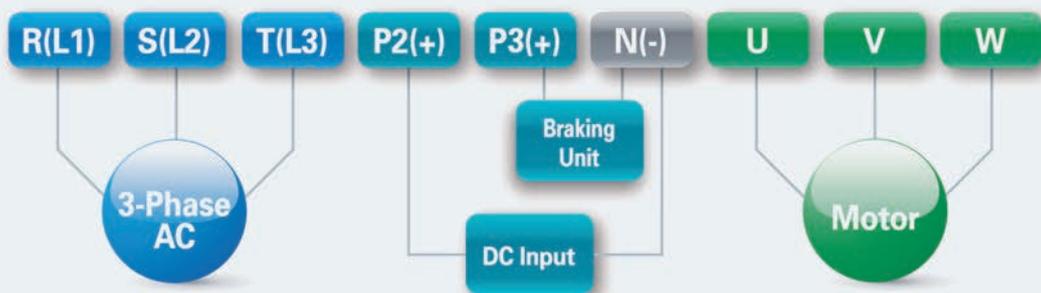
| Terminal Mark | Name | Description |
|-------------------|--|---|
| R(L1)/S(L2)/T(L3) | AC Power Input Terminal | It connects to commercial AC power |
| P1+ | +DC Link Terminal | + DC voltage terminal: This terminal is used to connect an exterior DC reactor |
| P2+ | +DC Input Terminal | DC(+) is connected when DC is input via drive power |
| N- | -DC Link Terminal | DC voltage terminal: DC(-) is connected when DC is input via drive power |
| B2 | Damping resistance connection terminal | It connects to damping resistance ^{Note 2} |
| U/V/W | Motor output terminal | It connects to 3-phase induction motor |

If you want to run the drive using DC input, connect DC input to P2(+) and N(-) terminal

Note 1: Short Bar should be removed when wiring DC Reactor

Note 2: In case of using with an external DC reactor, only P2(+) terminal connection is allowed
In case of not using with an external DC reactor, P1(+) or P2(+) terminal connection is allowed

37~90kW(3-Phase)



| Terminal Mark | Name | Description |
|-------------------|-------------------------|---|
| R(L1)/S(L2)/T(L3) | AC Power Input Terminal | It connects to commercial AC power |
| P2+ | +DC Link Terminal | + DC voltage terminal: DC(+) is connected when DC is input via drive power |
| P3+ | +DC Input Terminal | +DC voltage terminal This terminal is used to connect DBU |
| N- | -DC Link Terminal | DC voltage terminal: DC(-) is connected when DC is input via drive power |
| U/V/W | Motor output terminal | It connects to 3-phase induction motor |

If you wish to start the drive using DC input, connect it to the P2(+), N(-) terminal

➤ Incomer (MPCB / MCCB) & Magnetic Contactor (MC)

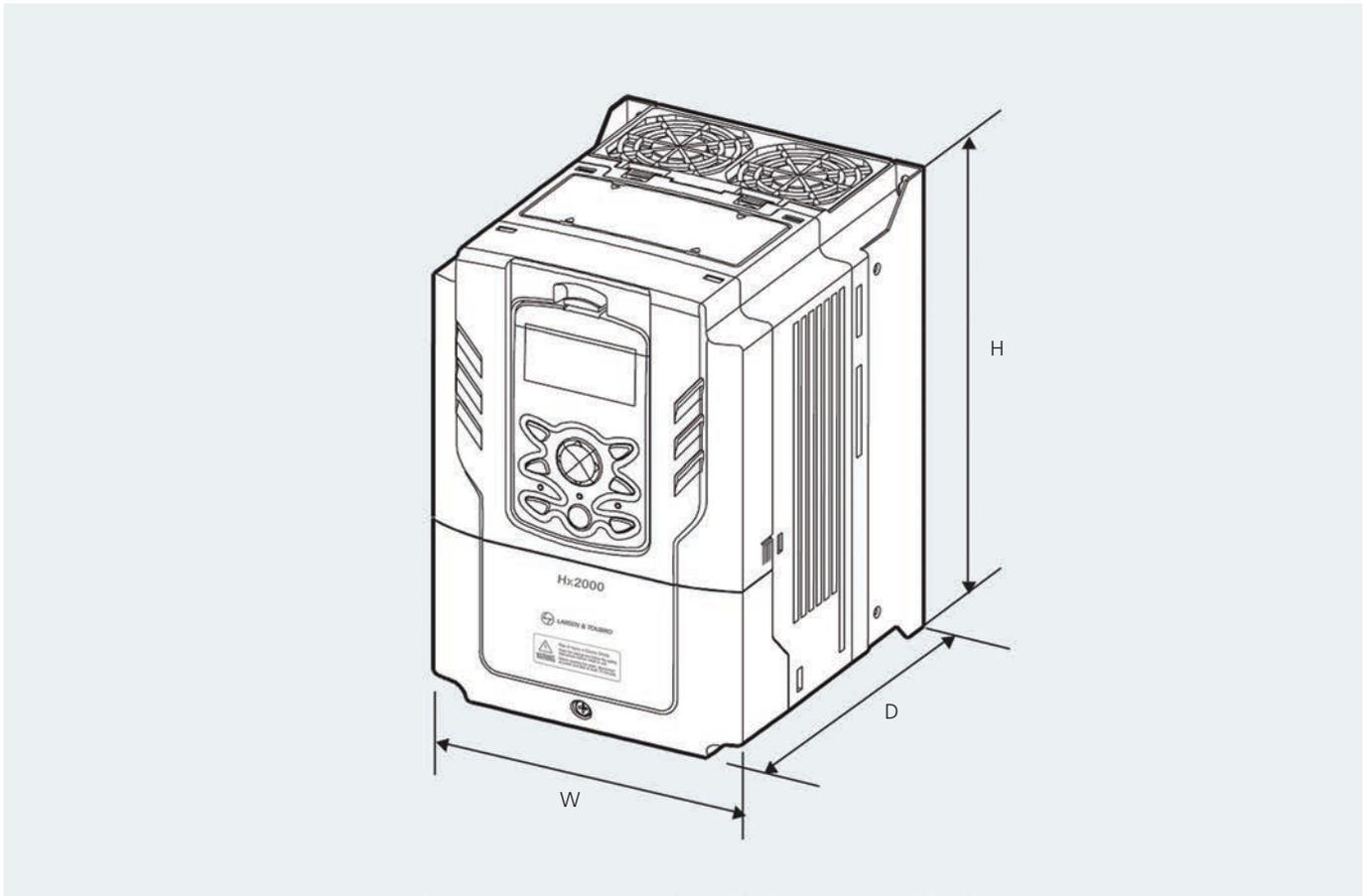
| Motor (ND) kW | CAT Nos. | AC Drive Current | Specification of Breaker (MPCB / MCCB) | | Magnetic Contactor (MC) | |
|------------------|----------------|------------------|--|-------------|-------------------------|-----|
| | | | Type | A | Type | A |
| 0.75 | LTVF-H40002BAA | 2 | MOG-S1/MOG-H1 | 4 - 6.3 | MNX | 9 |
| 1.5 | LTVF-H40004BAA | 4 | MOG-S1/MOG-H1 | 6.3 - 10 | MNX | 9 |
| 2.2 | LTVF-H40006BAA | 6 | MOG-S1/MOG-H1 | 6.3 - 10 | MNX | 9 |
| 3.7 | LTVF-H40008BAA | 8 | MOG-H1 | 11.0 - 16.0 | MNX | 18 |
| 5.5 | LTVF-H40012BAA | 12 | MOG-H1 | 14 - 20 | MNX | 18 |
| 7.5 | LTVF-H40016BAA | 16 | MOG-H1 | 24 - 32 | MNX | 25 |
| 11 | LTVF-H40024BAA | 24 | MOG-H2 | 28 - 40 | MNX | 40 |
| 15 | LTVF-H40030BAA | 30 | MOG-H2 | 35 - 50 | MNX | 45 |
| 18.5 | LTVF-H40038BAA | 38 | MOG-H2 | 45 - 63 | MNX | 50 |
| 22 | LTVF-H40045BAA | 45 | DN0 - 100M | 80 | MNX | 70 |
| 30 | LTVF-H40061BAA | 61 | DN0 - 100M | 100 | MNX | 80 |
| 37 | LTVF-H40075BAA | 75 | DN1 - 160M | 125 | MNX | 110 |
| 45 | LTVF-H40091BAA | 91 | DN1 - 160M | 160 | MNX | 140 |
| 55 | LTVF-H40107BAA | 107 | DN2 - 250M | 200 | MNX | 185 |
| 75 | LTVF-H40142BAA | 142 | DN2 - 250M | 250 | MNX | 225 |
| 90 | LTVF-H40169BAA | 169 | DN3 - 400M | 320 | MNX | 265 |

Note:

- 1) MC (Magnetic Contactor) current is 1.3 ~ 1.5 times of drives rated current
- 2) MCCB should be used to protect against overload and damage of drive installation from the fault current
- 3) From 22kW to 90kW MCCB dsine with frame size DN0 to DN3 with thermal-magnetic release

➤ Selection Chart for Input and Output Choke

| Motor (ND) kW | CAT Nos. | AC Drive Current | Chokes | | | | | |
|------------------|----------------|------------------|-----------------|-------------|-----------------|-------------|-----------------|-------------|
| | | | I/P AC Reactor | | DC Reactor | | O/P Reactor | |
| | | | Inductance (mH) | Current (A) | Inductance (mH) | Current (A) | Inductance (mH) | Current (A) |
| 0.75 | LTVF-H40002BAA | 2 | 4.8 | 4.8 | 16 | 4.27 | 8.1 | 3 |
| 1.5 | LTVF-H40004BAA | 4 | 4.8 | 4.8 | 16 | 4.27 | 6.54 | 5 |
| 2.2 | LTVF-H40006BAA | 6 | 3.23 | 7.5 | 12 | 6.41 | 3.71 | 7 |
| 3.7 | LTVF-H40008BAA | 8 | 2.34 | 10 | 8 | 8.9 | 2.45 | 9 |
| 5.5 | LTVF-H40012BAA | 12 | 1.22 | 15 | 5.34 | 14 | 1.9 | 12 |
| 7.5 | LTVF-H40016BAA | 16 | 1.22 | 18 | 3.2 | 17 | 1.1 | 18 |
| 11 | LTVF-H40024BAA | 24 | 0.78 | 27 | 2.5 | 25 | 0.81 | 25 |
| 15 | LTVF-H40030BAA | 30 | 0.59 | 35 | 1.9 | 32 | 0.54 | 35 |
| 18.5 | LTVF-H40038BAA | 38 | 0.46 | 44 | 1.4 | 41 | 0.45 | 40 |
| 22 | LTVF-H40045BAA | 45 | 0.4 | 52 | 1.0 | 49 | 0.36 | 46 |
| 30 | LTVF-H40061BAA | 61 | 0.3 | 68 | 0.7 | 64 | 0.29 | 62 |
| 37 | LTVF-H40075BAA | 75 | 0.23 | 98 | Built-in | | 0.23 | 78 |
| 45 | LTVF-H40091BAA | 91 | 0.195 | 118 | | | 0.2 | 95 |
| 55 | LTVF-H40107BAA | 107 | 0.157 | 142 | | | 0.16 | 115 |
| 75 | LTVF-H40142BAA | 142 | 0.122 | 196 | | | 0.12 | 160 |
| 90 | LTVF-H40169BAA | 169 | 0.096 | 237 | | | 0.12 | 190 |



| Input Voltage | Drive Model | W (mm) | H (mm) | D (mm) | Weight (kg) |
|-------------------|----------------|--------|--------|--------|-------------|
| Three-Phase 415 V | LTVF-H40002BAA | 160 | 232 | 181 | 3.3 |
| | LTVF-H40004BAA | 160 | 232 | 181 | 3.3 |
| | LTVF-H40006BAA | 160 | 232 | 181 | 3.3 |
| | LTVF-H40008BAA | 160 | 232 | 181 | 3.3 |
| | LTVF-H40012BAA | 160 | 232 | 181 | 3.3 |
| | LTVF-H40016BAA | 160 | 232 | 181 | 3.3 |
| | LTVF-H40024BAA | 160 | 232 | 181 | 3.4 |
| | LTVF-H40030BAA | 180 | 290 | 205.3 | 4.6 |
| | LTVF-H40038BAA | 180 | 290 | 205.3 | 4.8 |
| | LTVF-H40045BAA | 220 | 350 | 223.2 | 7.5 |
| | LTVF-H40061BAA | 220 | 350 | 223.2 | 7.5 |
| | LTVF-H40075BAA | 275 | 450 | 284 | 26 |
| | LTVF-H40091BAA | 325 | 510 | 284 | 35 |
| | LTVF-H40107BAA | 325 | 510 | 284 | 35 |
| | LTVF-H40142BAA | 325 | 550 | 309 | 43 |
| | LTVF-H40169BAA | 325 | 550 | 309 | 43 |

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

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