

For selection and product demonstration, please contact any of our branch offices listed below:

REGISTERED OFFICE AND HEAD OFFICE

L&T House, Ballard Estate
P. O. Box 278
Mumbai 400 001
Telephone: 022-6752 5656
Fax: 022-67552 5858
Website: www.Larsentoubro.com

ELECTRICAL STANDARD PRODUCTS (ESP)

501, Sakar Complex
Opp. Gandhigram Rly. Station
Ashram Road
Ahmedabad 380 009
Tel: 079-55304007-11, 55304000/1
Fax: 079-26580491
e-mail: esp-ahm@Lntebg.com

38, Cubbon Road, Post Box 5098
Bangalore 560 001
Tel: 080-25020100 / 325
Fax: 080-25580525
e-mail: esp-blr@Lntebg.com

131/1, Zone II
Maharana Pratap Nagar
Bhopal 462 011
Tel: 0755-4233907/8/9
Fax: 0755-2769264
e-mail: esp-bho@Lntebg.com

Plot No. 559, Annapurna Complex
Lewis Road
Bhubaneswar 751 014
Tel: 0674-2537301, 2436696
Fax: 0674-2537309
e-mail: esp-bbi@Lntebg.com

SCO 32, Sector 26-D
Madhya Marg, P. O. Box 14
Chandigarh 160 026
Tel: 0172-2790750/151
Fax: 0172-2792764
e-mail: esp-chd@Lntebg.com

10, Club House Road
Chennai 600 002
Tel: 044-28462072 / 4
Fax: 044-28462102
e-mail: esp-maa@Lntebg.com

67, Appuswamy Road
Post Bag 7156
Opp. Nirmala College
Coimbatore 641 045
Tel: 0422-2588120, 2588123
Fax: 0422-2588148
e-mail: esp-cbe@Lntebg.com

L&T House
Group MIG - 5
Padmanabhpur
Durg 491 001
Tel: 0788-2200105, 2322809
Fax: 0788-2210161

A1/11, Astronauts Avenue
Bidhan Nagar
Durgapur 713 212
Tel: 0343-2536891/952
Fax: 0343-2536493
e-mail: esp-dgp@Lntebg.com

(Faridabad Switchgear Works)
12/4, Delhi-Mathura Road
Faridabad 121 003
Tel: 0129-2277543, 2275314
Fax: 0129-2275405
e-mail: esp-fbd@Lntebg.com

Milanpur Road, Bamuni Maidan
Guwahati 781 021
Tel: 0361-2550565
Fax: 0361-2551308
e-mail: esp-gau@Lntebg.com

5-10-173, Fateh Maidan Road
P. O. Box 12
Hyderabad 500 004
Tel: 040-23296468
Fax: 040-23242356
e-mail: esp-hyd@Lntebg.com

D-24, Prithvi Raj Road
C-Scheme
Jaipur 302 001
Tel: 0141-2341385/386
Fax: 0141-2373280
e-mail: esp-jai@Lntebg.com

Akashdeep Plaza, 2nd Floor
P. O. Golmuri
Jamshedpur 831 003
Jharkhand
Tel: 0657 - 2433673
Fax: 0657-2341250
e-mail: esp-jam@Lntebg.com

Skybright Bldg.
M.G. Road
Ravipuram Junction
Ernakulam
Kochi 682 016
Tel: 0484-2358513, 2358761
Fax: 0484-2358982
e-mail: esp-cok@Lntebg.com

3-B, Shakespeare Sarani
Kolkata 700 071
Tel: 033-44002301/2/3/4/5, 44002572
Fax: 033-22822589
e-mail: esp-ccu@Lntebg.com

A28, Indira Nagar
Faizabad Road
Lucknow 226 016
Uttar Pradesh
Tel: 0522-4040905/902/903
Fax: 0522-2311671
e-mail: esp-lko@Lntebg.com

Plot No. 518
4th Main Road
K.K. Nagar
Madurai 625 020
Tel: 0452-2537404/303
Fax: 0452-2537552
e-mail: esp-mdu@Lntebg.com

North Wing, Level II,
Gate 7, Powai
Mumbai 400 072
Tel: 022-67052287/2661/2737
Fax: 022-67051112
e-mail: esp-bom@Lntebg.com

8B, Farmland, Ramdaspath
Behind Hotel Radhika
Nagpur 440 010
Tel: 0712-2420641/24
Fax: 0712-2420619
e-mail: esp-ngp@Lntebg.com

32, Shivaji Marg, P.O. Box 6223
New Delhi 110 015
Tel: 011-41419500 / 1, 41419515
Fax: 011-41419600
e-mail: esp-del@Lntebg.com

L&T House, P.O. Box 119
191/1, Dhole Patil Road
Pune 411 001
Tel: 020-26135048, 26135611
Fax: 020-26129586, 26124910
e-mail: esp-pnq@Lntebg.com

3rd Floor, Vishwakarma Chambers
Majura Gate, Ring Road
Surat 395 002
Tel: 0261-2473726
Fax: 0261-2477078
e-mail: esp-sur@Lntebg.com

Radhadaya Complex
Old Padra Road
Near Charotar Society
Vadodara 390 015
Tel: 0265-6613610/11/12
Fax: 0265-2336184
e-mail: esp-bar@Lntebg.com

48-8-16, Dwarakanagar
Visakhapatnam 530 016
Tel: 0891-2755493, 2704928
Fax: 0891-2746075
e-mail: esp-viz@Lntebg.com

L&T SWITCHGEAR
SAFE & SURE



AC Inverter Drives

Product improvement is a continuous process. For the latest information and special applications, please contact any of our offices listed here.

L&T SWITCHGEAR
SAFE & SURE

Electrical Standard Products
Larsen & Toubro Limited
Powai Campus, Mumbai 400 072
Tel. No: 022-67050505
Fax: 022-67051324/1746
E-mail: esp@Lntebg.com
Website: www.LNTEBG.com

LARSEN & TOUBRO
It's all about Imagination

LARSEN & TOUBRO
It's all about Imagination

The New Generation of AC Drives

Larsen & Toubro's New Generation AC Drives incorporate the latest technological advancements in AC induction motor speed control.



Performance and Technology

L&T offers a range of performance choices and innovative technologies. Control methods include V/f, open loop vector and closed loop vector control for speed regulation choices.

Standards & Reliability

- MTBF: Exceeds 28 years
- Tested on fully-loaded motors
- Surface mount technology
- Protective PCB coating
- 0.6G or less (20 to 55Hz)
- UL, cUL and CE listed

Easy To Use

The New Generation Drives are factory-programmed and ready to run. J7, V7, V1000 & F7 drives have standard LED display. The keypad is intuitive and includes parameter-copying functions to copy parameters from one drive to another.

Commissioning Software: Drive Wizard

This support tool is a windows based PC program designed to make commissioning and troubleshooting of these drives as simple as possible. The user friendly Drive Wizard exchanges data with drive and data can be retrieved, reviewed, changed, stored and graphed.

J7, V7, V1000 & F7 AC Drives are manufactured by :
YASAKAWA Electric Corporation JAPAN

Salient Features of J7, V7, F7 & V1000 Drives

Performance Features

- Adjustable S-curves for acceleration and deceleration
- DC injection braking: at start or stop
- Power loss ride-through for protection against momentary power loss/under voltage
- Volts/Frequency ratio: fully adjustable
- Drive efficiency: 96 to 98%
- Displacement power factor: 0.98
- Output frequency: 1.0 to 400 Hz
- Torque boost: full range
- Critical frequency rejection settings
- Carrier frequency is selectable

Protective Features

- Torque limit
- Heat sink over-heat to give overload protection to inverter
- Current-limiting DC bus fuse to protect inverter
- Motor overload protection
- Phase-to-phase, ground fault and short circuit protection
- Over/under torque protection
- Short circuit withstanding rating: 65kA RMS
- Input/output single phasing protection
- Optically-isolated controls: to completely isolate control circuit from power circuit

User Friendly Features

- Digital keypad operator
- Copy keypad function
- 24 VDC control logic for sourcing sourcing outputs (both PNP or NPN transistors)
- RJ-45 style digital operator connector
- Multi speed settings plus jog speed
- Flash RAM software memory for update
- Split front cover for easy wiring
- Heat sink fan: Plug-in with on-off control



J7

Micro Size OEM Drive



The J7 drive is a general purpose AC drive; its sine wave PWM design provides low motor noise and high starting torque, with a current overload rating of 150% for 60 seconds. The J7 is feature-packed, compact yet economical and its V/f control makes the drive suitable for most of the general applications. The digital operator includes a 3-digit LED status display. An optional RS-485 Modbus RTU serial communication port is available. An ideal choice whenever economy and compactness are required.

Common Applications

- Conveyors
- Grinders
- Centrifuges
- Pumps
- Fans
- Blowers
- Mixers
- Commercial Laundry
- Automotive Assembly
- Packaging Equipment
- Material Handling

Features

- ➔ Full range automatic torque boost function can deliver outstanding starting torque
- ➔ High speed current limiting function for tripless operation
- ➔ Slip compensation function for excellent speed regulation
- ➔ Speed search function for automatic restart after power loss
- ➔ Compact space saving design with uniform height of 128mm on all models

STANDARD SPECIFICATIONS

VOLTAGE CLASS		200 V single-phase				400 V three-phase							
MODEL CIMR-J7AA		B0P20	B0P40	B0P70	B1P50	40P20	40P40	40P70	41P50	42P20	43P00	43P70	
Max. Applicable motor output *		kW	0.2	0.4	0.75	1.5	0.2	0.4	0.75	1.5	2.2	3	3.7
		HP	0.25	0.5	1	2	0.25	0.5	1	2	3	4	5
Output Characteristics	Inverter rated kVA	0.6	1.1	1.9	3	0.9	1.4	2.6	3.7	4.2	5.5	7	
	Rated output current (A)	1.6	3	5	8	1.2	1.8	3.4	4.8	5.5	7.2	8.6	
	Max. Output voltage (V)	200 to 240 V (proportional to input voltage)				380 to 460 V (proportional to input voltage)							
	Max. Output frequency (Hz)	400 Hz											
Power Supply	Rated input voltage and frequency	1-phase: 200 to 240 V, 50/60 Hz				3-phase, 380 to 460 V, 50/60 Hz							
	Allowable voltage fluctuation	-15% to + 10%											
	Allowable fluctuation	± 5%											
Control Characteristics	Control method	Sine wave PWM (V/f control)											
	Speed control range	1: 20											
	Speed Control Accuracy	± 1%											
	Carrier frequency	1kHz to 15kHz											
	Overload capacity	150% rated output current for one minute											
	Output frequency resolution	0.01 Hz											
	Frequency reference signal	0 to 10 V, 4 to 20 mA, 0 to 20 mA or upfront speed control potentiometer											
	Frequency accuracy (temperature change)	Digital reference: ± 0.01% -10 to +50°C and Analog reference: ± 0.5% 25 ±10°C											
	Accel / Decel Time	0.1 Sec. to 999 Secs											
	Protections	Motor overload, Power loss ride through, Fin overheat, Under voltage, Over voltage, Stall prevention, etc.											
	Standard functions	Up to 79 parameters including 3-wire sequence, frequency jump, over torque detection, speed search, 9-step multi speed, S-curves, dual acc/dec rates, automatic restart after fault detection, momentary power loss (0.5sec), slip compensation, DC injection braking, LOCAL/REMOTE selection, UP/DOWN, etc.											
	Digital/Analog I/O ports	1 analog input, 1 analog output, 5 digital inputs (three programable), 1 digital output											
Communication	MEMOBUS / MODBUS Communication (RS-485/422 max. 19.2 kbps) (Optional)												
Environment	Working ambient temperature	-10°C to 50°C											
	Humidity	90% RH or less (non-condensing)											
	Location	Indoors (free from corrosive gases or dust) and within 1000 m MSL elevation											

*Based on a standard 4-pole motor.

V7

Multi Functional Industrial Drive



V7 is a high performance AC drive for induction motor. Its PWM design provides low motor noise and high starting torque. It provides best speed regulation by two control methods, V/f and open loop vector control which provides high torque at low speed. The V7 is intended for constant torque application, with current overload rating of 150% for 60 sec. The digital operator provides 4-digit LED status display with a built-in analog speed potentiometer and more than 200 programming parameters.

Common Applications

- Conveyors
- Grinders
- Centrifuges
- Pumps
- Fans
- Blowers
- Machine Tools
- Packaging
- Food Processing
- Commercial Laundry

Features

- ➔ Vector control without feedback provides excellent starting torque and performance
- ➔ High speed current limit function to eliminate nuisance trip
- ➔ Copy keypad function for convenient parameter uploading and downloading
- ➔ Digital operator interface for easy and quick configuration
- ➔ Speed search function for starting a coasting motor to desired frequency
- ➔ Dynamic Braking Transistor is standard for low cost braking with optional resistor

STANDARD SPECIFICATIONS

Voltage Class		400 three phase						
MODEL CIMR-V7AA		40P4	40P7	41P5	42P2	43P0	43P7	45P5
Max. applicable KW		0.4	0.75	1.5	2.2	3.0	3.7	5.5
Motor output HP*		0.54	1.0	2	3	4.1	5	7.5
Control Characteristics	Inverter rated kVA	1.4	1.6	3.7	4.2	5.5	6.6	11
	Rated output current (A)	1.8	3.4	4.8	5.5	7.2	8.6	14.8
	Max. output voltage (V)	380 to 460 V (proportional to input voltage)						
	Rated input volt and frequency	3-phase,380 to 460 V, 50/60Hz						
	Max. output frequency	400Hz						
Power Supply	Rated input voltage and frequency	3-phase, 380 to 460 V, 50/60Hz						
	Allowable frequency fluctuation	+/-5%						
	Allowable voltage fluctuation	15% to +10%						
Output Characteristics	Speed control range	1:20 (V/f), 1:40 (OLV)						
	Control Method	V/f and Open Loop Control						
	Overload capacity	150% rated output current for 60 sec						
	Accel / Decel time	0.01 to 6000 sec						
	Carrier frequency	10 kHz						
	Output frequency resolution	0.01 Hz						
	Frequency reference signal	0 to 10 V,4 to 20mA, 0 to 20mA, pulse train input (max 30kHz),upfront speed control potentiometer or MEMOBUS comm						
	Braking torque	Braking transistor built-in,braking torque in excess of 100% achievable						
	Frequency accuracy (temp. change)	Digital reference: +/-0.01% (-10 to +50°C) Analog reference: +/-0.5% (25 +/- to 10°C)						
	Protection	Motor overload, power loss ride through, fin overheat, over/under voltage, stall prevention, shot ckt, current limiting, ground fault,over/under torque						
	Programmable I/O	7 discrete input, 3 discrete output, 1 analog output, 1analog input , 1 pulse train input & 1 pulse train output						
	Main control functions	Up to179parameters including vector control, RS485/422 19.2KB MEMOBUS comms, constants copy, PID control, every savings, speed search 16-step multi-speed, S-curves, dual acce/decelerates, dc injection braking, momentary powerloss (0.5sec), slip commensation (even during regen), UP/DOWN						
Environment	Working ambient temperature	-10°C to 50°C						
	Humidity	90% RH or less (non-condensing)						
	Location	Indoor (free from corrosive gases or dust) and with in 1000m MSL elevation						

* Based on a standard 4-pole motor for max. applicable motor output

V1000

Compact Current
Control Vector Drive
Normal & Heavy Duty



The V1000 drive is incredibly compact, technologically advanced, environmentally responsible package capable of driving induction as well as synchronous motor. With its preset application function and dual rating it can handle wide variety of application ranging from Fan, Pump Compressor, Elevator, Crane Conveyor and many more. V1000 employs dual CPU concept that is 4 times faster than other drives, which improves motor control performance especially in vector control applications. Custom software, network communications, plugin I/O cards, packaging options as among the many choices. V1000 with its highly advanced features stands out in its class and a perfect solutions for most of your applications.

Common Applications

- Pump
- Fan
- HVAC (AHU)
- Conveyor
- Air Compressor
- Crane Hoist
- Crane (Travel)
- Elevator
- Packaging machines
- Extruders
- Centrifuge

Features

- ➔ 10 years performance life design
- ➔ Normal Duty and Heavy Duty selection depending on the application
- ➔ Single drive for both Induction & permanent magnet motors
- ➔ Drive customization / PLC functionality
- ➔ Dual microprocessor for faster control
- ➔ Rotation & Static Auto-tuning
- ➔ On-line Auto-tuning
- ➔ 200% starting torque
- ➔ Allows side by side mounting- reduces panel space
- ➔ High flux braking for faster stopping without use of braking resistors
- ➔ Intelligent detachable terminal block
- ➔ Stores last 10 faults
- ➔ High speed serial communication at 115kbps
- ➔ Optional LCD operator

STANDARD SPECIFICATIONS

200 V Class (Three-phase/Single-phase)

Model	Three-Phase	CIMR-VT2A	0001	0002	0004	0006	0008	0010	0012	0018	0020	0030	0040	0056	0069
	Single-Phase ¹	CIMR-VTBA	0001	0002	0003	0006	-	0010	0012	-	0018	-	-	-	-
Input	Max. Applicable Motor Capacity ² kW		Normal Duty	0.2	0.4	0.75	1.1	1.5	2.2	3.0	3.7	5.5	7.5	11.0	18.5
			Heavy Duty	0.1	0.2	0.4	0.75	1.1	1.5	2.2	3.0	3.7	5.5	7.5	11.0
	Rated Input Current A	Three-Phase	Normal Duty	1.1	1.9	3.9	7.3	8.8	10.8	13.9	18.5	24.0	34.7	50.9	85.6
		Single-Phase	Normal Duty	2.0	3.6	7.3	13.8	-	20.2	24.0	-	-	-	-	-
Output	Rated Output Capacity kVA	Three-Phase	Heavy Duty	0.7	1.5	2.9	5.8	7.0	7.5	11.0	15.6	18.9	26.0	35.4	70.8
		Single-Phase	Heavy Duty	1.4	2.8	5.5	11.0	-	14.1	20.6	-	35.0	-	-	-
	Rated Output Current A		Normal Duty	0.5	0.7	1.3	2.3	3.0	3.7	4.6	6.7	7.5	11.4	15.2	26.3
			Heavy Duty	0.3	0.6	1.1	1.9	2.6	3.0	4.2	5.3	6.7	9.5	12.6	22.9
Power	Rated Output Current A		Normal Duty	1.2	1.9	3.5(3.3)	6.0	8.0	9.6	12.0	17.5	19.6	30.0	40.0	69.0
			Heavy Duty	0.8	1.6	3.0	5.0	6.9	8.0	11.0	14.0	17.5	25.0	33.0	60.0
	Overload Tolerance		Normal Duty Rating: 120% of rated output current for 60 sec Heavy Duty Rating: 150% of rated output current for 60 sec												
	Carrier Frequency		2 kHz (user-set, up to 15 kHz possible)												
Power	Max. Output Voltage		Three-Phase Power Supply: Three-Phase 200 to 240 V (relative to input voltage) Single-Phase Power Supply: Three-Phase 200 to 240 V (relative to input voltage)												
	Max. Output Frequency 400 Hz		400 Hz												
	Rated Voltage/Rated Frequency		Three-Phase Power Supply: Three-Phase 200 to 240 V 50/60 Hz Single-Phase Power Supply: Single-Phase 200 to 240 V 50/60 Hz												
	Allowable Voltage Fluctuation		-15 to 10%												
Power	Allowable Frequency Fluctuation		±5%												
	Power Supply kVA	Three-Phase	Normal Duty	0.5	0.9	1.8	3.3	4.0	4.9	6.4	8.5	11.0	17.0	24.0	37.0
		Three-Phase	Heavy Duty	0.3	0.7	1.3	2.7	3.2	3.4	5.0	7.1	8.6	11.0	17.0	24.0
		Single-Phase	Normal Duty	0.5	1.0	1.9	3.6	-	5.3	6.3	-	-	-	-	-
		Single-Phase	Heavy Duty	0.4	0.7	1.5	2.9	-	3.7	5.4	-	9.2	-	-	-

*1: Drives with a single-phase power supply input have Three-phase output and cannot be used for single phase motors.

*2: Based on a standard 4-pole motor for max. applicable motor output.

Note: Value inside parenthesis is for a single-phase drive.

400 V Class (Three-phase)

Model			CIMR-VT4A		0001	0002	0004	0005	0007	0009	0011	0018	0023	0031	0038
Max. Applicable Motor Capacity ¹			kW	Normal Duty	0.4	0.75	1.5	2.2	3.0	3.7	5.5	7.5	11.0	15.0	18.5
				Heavy Duty	0.2	0.4	0.75	1.5	2.2	3.0	3.7	5.5	7.5	11.0	15.0
Input	Rated Input Current	A	Normal Duty	1.2	2.1	4.3	5.9	8.1	9.4	14.0	20.0	24.0	38.0	44.0	
			Heavy Duty	1.2	1.8	3.2	4.4	6.0	8.2	10.4	15.0	20.0	29.0	39.0	
Output	Rated Output Capacity	kVA	Normal Duty	0.9	1.6	3.1	4.1	5.3	6.7	8.5	13.3	17.5	23.6	29.0	
			Heavy Duty	0.9	1.4	2.6	3.7	4.2	5.5	7.0	11.3	13.7	18.3	23.6	
	Rated Output Current	A	Normal Duty	1.2	2.1	4.1	5.4	6.9	8.8	11.1	17.5	23.0	31.0	38.0	
			Heavy Duty	1.2	1.8	3.4	4.8	5.5	7.2	9.2	14.8	18.0	24.0	31.0	
	Overload Tolerance			Normal Duty Rating: 120% of rated output current for 60 sec Heavy Duty Rating: 150% of rated output current for 60 sec											
	Carrier Frequency			2 kHz (user-set, up to 15 kHz possible)											
	Max. Output Voltage			Three-Phase 380 to 480 V (relative to input voltage)											
	Power	Max. Output Frequency			400 Hz (user-set)										
Rated Voltage/Rated Frequency			Three-Phase 380 to 480 V 50/60 Hz												
Allowable Voltage Fluctuation			-15 to 10%												
Allowable Frequency Fluctuation			±5%												
Power Supply		kVA	Normal Duty	1.1	1.9	3.9	5.4	7.4	8.6	13.0	18.0	22.0	35.0	40.0	
			Heavy Duty	1.1	1.6	2.9	4.0	5.5	7.5	9.5	14.0	18.0	27.0	36.0	

*1: Based on a standard 4-pole motor for max. applicable motor output.

COMMON SPECIFICATION

ITEM		SPECIFICATIONS
Control Characteristics	Control Method	Open Loop Vector Control (Current Vector), V/f Control, PM Open Loop Vector Control (for SPM and IPM motors)
	Frequency Control Range	0.01 to 400 Hz
	Frequency Accuracy	Digital Input : within $\pm 0.01\%$ of the max. output frequency (-10° to $+50^{\circ}\text{C}$)
	(Temperature Fluctuation)	(Analog Input : within $\pm 0.1\%$ of the max. output frequency ($25^{\circ}\text{C} \pm 10^{\circ}\text{C}$))
	Frequency Setting	Digital Input : 0.01 Hz
	Resolution	Analog Input : 1/1000 of max. frequency
	Output Frequency Resolution	$1/2^{20}$ of maximum output frequency (parameter E1 - 04 setting)
	Frequency Setting	Main frequency reference : 0 to +10Vdc ($20\text{k}\Omega$) 4 to 20mA (250 Ω), 0 to 20mA (250 Ω) Pulse Train Input max. 32 kHz
	Starting Torque	200%/0.5 Hz 50%/6 Hz
	Speed Control Range	1:100 (Open Loop Vector Control), 1:20 to 40 (V/f Control), 1:10 (PM Open Loop Vector Control)
	Speed Control Accuracy	$\pm 0.2\%$ in Open Loop Vector Control ($25^{\circ}\text{C} \pm 10^{\circ}\text{C}$)
	Speed Response	5 Hz in Open Loop Vector ($25^{\circ}\text{C} \pm 10^{\circ}\text{C}$)
	Torque Limit	Open Loop Vector Control allows separate settings in four quadrants
	Accel/Decel Time	0.0 to 6000.0 sec (4 selectable combinations)
	Braking Torque	Continuous regen. torque : approx. 20% (approx. 125% with dynamic braking resistor option : 10% ED, 10s, internal braking transistor)
Operating Environment	V/f Characteristics	User-selected programs, V/f preset patterns possible
	Main Control Functions	Momentary power loss ride-thru, Speed search, Over torque detection, Torque limit, 17-step speed (max), Accel/Decel time switch, S-Curve accel/decel, 3-wire sequence, Auto-Tuning (Rotational, Stationary tuning for resistance between lines), Cooling fan on/off switch, Slip compensation, Torque compensation, Frequency jump, Upper/Lower limits for frequency reference, DC Injection braking at start and stop, High slip braking, PID control (With sleep function), Energy saving Control, Memobus comm. (RS-485/422 max 115.2 kbps), Fault restart, Application presets, Removable terminal block with parameter backup function
	Protection	Motor overheat protection based on output current, Momentary over-current protection, Overload protection, Over-voltage protection, Undervoltage protection, Momentary power loss ride-thru, Heatsink oveheat, Braking resistance overheat protection, Stall prevention, Ground fault protection
	Area of Use	Indoors
	Ambient Temperature	-10° to $+50^{\circ}\text{C}$
	Humidity	95 RH% or less (no condensation)
	Storage Temperature	-20° to $+60^{\circ}\text{C}$ (short-term temperature during transportation)
	Altitude	Upto 1000 meters
	Shock	10 to less than 20 Hz (9.8m/s ²) max., 20 to 50 Hz (5.9 m/s ²) max
	Safety Standard	UL 508 C, EN954 - 1Cat. 3, IEC/EN61508 SIL2
	Protection Design	IP20 open-chassis, NEMA1 enclosure

Rotational Auto-Tuning must be performed to achieve the performance described with Open Loop Vector Control.

MODEL SELECTION BY MOTOR CAPACITY

MODEL	Heavy Duty			Normal Duty		
	kW	Amps	KVA	kW	Amps	KVA
1 PH 220V INPUT						
CIMR-VTBA0001BAA	0.1	0.8	0.3	0.2	1.2	0.5
CIMR-VTBA0002BAA	0.2	1.6	0.6	0.4	1.9	0.6
CIMR-VTBA0003BAA	0.4	3.0	1.1	0.75	3.3	1.3
CIMR-VTBA0006BAA	0.75	5.0	1.9	1.1	6.0	2.3
CIMR-VTBA0010BAA	1.5	8.0	3.0	2.2	9.6	3.7
CIMR-VTBA0012BAA	2.2	11.0	4.2	3.0	12.0	4.6
CIMR-VTBA0018BAA	3.7	17.5	6.7	--	--	--
3 PH 220V INPUT						
CIMR-VT2A0001BAA	0.1	0.8	0.3	0.2	1.2	0.5
CIMR-VT2A0002BAA	0.2	1.6	0.6	0.4	1.9	0.7
CIMR-VT2A0004BAA	0.4	3.0	1.1	0.75	3.3	1.3
CIMR-VT2A0006BAA	0.75	5.0	1.9	1.1	6.0	2.3
CIMR-VT2A0008BAA	1.1	6.9	2.6	1.5	8.0	3.0
CIMR-VT2A0010BAA	1.5	8.0	3.0	2.2	9.6	3.7
CIMR-VT2A0012BAA	2.2	11.0	4.2	3.0	12.0	4.6
CIMR-VT2A0018BAA	3.0	14.0	5.3	3.7	17.5	6.7
CIMR-VT2A0020BAA	3.7	17.5	6.7	5.5	19.6	7.5
CIMR-VT2A0030FAA	5.5	25.0	9.5	7.5	30.0	11.4
CIMR-VT2A0040FAA	7.5	33.0	12.6	11.0	40.0	15.2
CIMR-VT2A0056FAA	11.0	47.0	17.9	15.0	56.0	21.3
CIMR-VT2A0069FAA	15.0	60.0	22.9	18.5	69.0	26.3
3PH 415V INPUT						
CIMR-VT4A0001BAA	0.2	1.2	0.9	0.4	1.2	0.9
CIMR-VT4A0002BAA	0.4	1.8	1.4	0.75	2.1	1.6
CIMR-VT4A0004BAA	0.75	3.4	2.6	1.5	4.1	3.1
CIMR-VT4A0005BAA	1.5	4.8	3.7	2.2	5.4	4.1
CIMR-VT4A0007BAA	2.2	5.5	4.2	3.0	6.9	5.3
CIMR-VT4A0009BAA	3.0	7.2	5.5	3.7	8.8	6.7
CIMR-VT4A0011BAA	3.7	9.2	7.0	5.5	11.1	8.5
CIMR-VT4A0018FAA	5.5	14.8	11.3	7.5	17.5	13.3
CIMR-VT4A0023FAA	7.5	18.0	13.7	11.0	23.0	17.5
CIMR-VT4A0031FAA	11.0	24.0	18.3	15.0	31.0	23.6
CIMR-VT4A0038FAA	15.0	31.0	23.6	18.5	38.0	29.0

Normal Duty Application
Heavy Duty Application

120% Overload for 1 min on inverter rated output current fans, pumps, variable torque load and application which do not require high overload
150% overload for 1 min on inverter rated output current
Constant torque or impact load, like elevator, crane, compressor, Centrifuges and mixers with high viscosity material

F7

Industrial Workhorse
Normal And Heavy Duty



The F7 drive is the Industrial Workhorse of adjustable frequency drives. It is intended to handle every conventional drive application found in the typical industrial manufacturing plant from simple variable torque pumping to sophisticated networked material handling. With excellent performance and a wide array of configurations and options, the F7 drive can be the single drive platform for an entire facility. Network communications, plug-in I/O cards, custom software, and power /packaging options are among the many choices. For new installations or retrofits, F7 drive is truly the Industrial Workhorse, perfect for every conventional application and even some unconventional ones.

Common Applications

- Conveyors
- Mixers
- Machine tools
- Cut-to-length
- Centrifugal Pumps
- Centrifuges
- Extruders
- Packaging Machines

Features

- ➔ Constant or variable torque operation for the flexibility to handle all industrial applications
- ➔ Rotational and static Auto-tuning for ease of motor configuration
- ➔ Closed or open loop vector can deliver outstanding starting torque and performance
- ➔ High speed current limiting to prevent nuisance trips
- ➔ High Slip Braking reduces installation cost and eliminates the need for additional braking
- ➔ Communication options that support all major industrial networks
- ➔ LCD operator (optional)

STANDARD SPECIFICATIONS

400 V Class	Model CIMR-F7A			40P41	40P71	41P51	42P21	43P71	45P51	47P51	40111	40151	40180	40220	40300	40370	40450	40550	40750	40900	41100	41320	41600	41850	42200	43000			
	Max. applicable kW Motor output ¹ HP			0.4 0.5	0.75 1.0	1.5 2.0	2.2 3.0	3.7 5.0	5.5 7.5	7.5 10.0	11 15	15 20	18.5 25	22 30	30 40	37 50	45 60	55 75	75 100	90 120	110 150	132 180	160 215	185 250	220 300	300 400			
	Inverter capacity kVA torque			1.4	1.6	2.8	4.0	5.8	9.8	13	18	24	30	34	46	57	69	85	110	140	160	200	230	280	390	510			
	Output Characteristics	Continuous current ¹¹²			2.0	2.3	4.0	5.8	8.3	13.6	18.5	26.2	33.8	42.5	49.1	65.4	81.8	99.2	122.1	163.5	196.2	235.4	283.4	331.4	403.3	551.5	735.8		
		Variable torque current ¹¹			1.9	2.2	3.9	5.5	7.9	13.1	17.7	25.1	32.4	40.7	47.0	62.6	78.3	95.0	116.9	156.6	187.9	225.5	271.4	317.4	386.3	528.3	704.7		
		Constant torque current ¹¹			1.8	2.1	3.7	5.3	7.6	12.5	17.0	24.0	31.0	39.0	45.0	60.0	75.0	91.0	112.0	150.0	180.0	216.0	260.0	304.0	370.0	404.8	540.0		
	Max. voltage			3-phase, 380/400/415/440/460/480 V (Proportional to input voltage)																									
	Max. frequency			CT mode : 150Hz, VT mode : 400Hz (selectable)																									
	Power supply	Rated input voltage and frequency			3-phase, 380/400/415/440/460/480V, 50/60Hz																								
		Allowable voltage fluctuation			-15% to +10%																								
Allowable frequency fluctuation			±5%																										
Control Characteristics	Harmonic Wave Prevention	DC Reactor	Option												Provided														
		12- Pulse input	Not available												Available (3-winding transformer required at 12-pulse input)														
	Control method			Sine wave PWM [Open loop vector, V/f, V/f with PG control (selectable)] , Closed loop vector control																									
	Starting torque			150% at 0.5 Hz (Open vector control, CT mode), 120% at 0.5 Hz (Open loop vector control, VT mode)																									
	Speed control range			1: 100 (Open loop vector control) 1: 1000 (flux control mode, encoder reqd.)																									
	Speed control accuracy			± 0.2% (Open loop vector control at 25°C ± 10°C) ± 0.02 (flux control)																									
	Speed response			5 Hz (Open loop vector control)																									
	Torque limit			Can be set by parameter : 4 steps available (in open loop vector control)																									
	Carrier frequency			1kHz to 15kHz																									
	Frequency control range			CT mode : 0.01 to 150 Hz, VT mode : 0.01 to 400 Hz																									
	Frequency accuracy			Digital reference : ± 0.01 % , -10 to 40° C, Analog reference : ± 0.1 % , 25 ± 10° C																									
	Frequency setting resolution			Digital reference : ± 0.01 Hz, Analog reference : 0.03 Hz/60 Hz (10-bit, no code)																									
	Output freq. resolution			0.001 Hz																									
	Overload capacity			CT mode : 150% rated output current for 1 minute (not available when using 220 to 300kW inverters), VT mode : 110% rated output current for 1 minute																									
	Frequency setting signal			+10 to -10 V, 4 to 20 mA, Pulse train																									
	Accel / Decel time			0.01 to 6000 secs. (Accel/Decel time setting independently, 4 steps available)																									
	Braking torque			Approx. 20 % (Approx. 125 % when using braking resistor)																									
	Main control functions			Momentary power loss restart, Speed search, Overtorque detection, Torque limit, 16-step operation (max), Accel/Decel time changeover, S-curve accel/decel, 3-wire sequence, Auto-Tuning (dynamic, Static), DWELL, Cooling fan ON/OFF, Slip compensation, Jump frequency, Frequency upper/ lower limit settings, DC injection braking at start/stop, High slip braking, PID control (with sleep function), Energy-saving control, Fault retry, Constant copy, etc.																									
	Digital/analog I/O ports			Three Analog input (two programable) Two Analog output, Eight Digital input (six Programable), three digital output																									
	Pulse I/O			One pulse Input and Output each (32 kHz max.)																									
Communication			MEMOBUS / MODBUS communication (RS-485/422 max. 19.2 kbps)																										
Protective functions			Motor overload protection, Inverter overload, Fuse Protection, Instantaneous overcurrent, Open phase, Undervoltage, Overvoltage, Ground fault, Fin overheat, Stall prevention, etc.																										
Environment	Protective functions			Enclosed wall-mounted type (NEMA 1) : 18.5 kW or less, Open chassis type (IP00): 22 kW or more																									
	Working ambient temperature			-10°C to 60 °C																									
	Humidity			90% RH or less (non-condensing)																									
	Location			Indoors (free from corrosive gases or dust) and within 1000 m MSL elevation																									

- Notes :** 1. Standard 4-pole motors are used for max. applicable motor output. Choose the inverter whose rated current is within the motor rated current range.
2. Drive Ratings are for ambient temperature of 45°C. For use beyond 45°C, derate by 1.33% per degree rise in temperature.

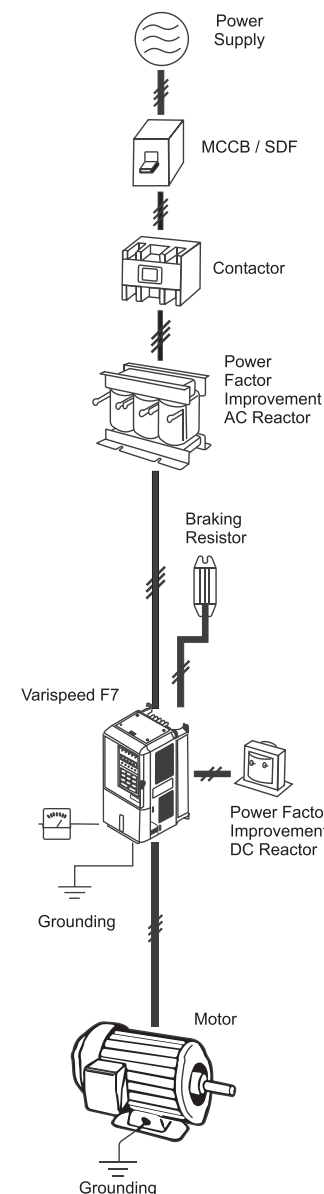
OPTIONS, PERIPHERAL DEVICES

Device	Objective	Details
MCCB or S-D-F	To protect inverter wiring	Always install the MCCB or S-D-F on the power supply side to protect the inverter wiring.
Contactor	To prevent burning of braking reactor	When Braking resistor is attached, install the contactor to prevent the braking resistor from burning. Also insert voltage surge suppressor on the coil.
DC/AC Reactor	To improve inverter power factor	Applied to further improve the power factor of the inverter. The Varispeed F7 incorporates DC Reactor on model of 22kW or more.
Braking Resistor	To stop machine within the preset time	Shortens the deceleration time by consuming the regenerative energy of the motor by the resistor.
Braking Unit		Used in combination with the braking resistor to reduce the deceleration time of the motor.

Braking Units and Resistors for V7, F7 & V1000 Drive

		Braking Unit		Braking Resistor			
MAX Applicable Motor output		Model CDBR	Qty.	Specifications of Recommended braking resistor	Qty.	Braking Torque %	Connectable Min. Resistance
kW	HP						
0.4	0.5	Built - in		70 W 750 Ω	1	230	96
0.75	1.0			70 W 750 Ω	1	130	96
1.5	2.0			260 W 400 Ω	1	125	64
2.2	3.0			260 W 250 Ω	1	135	64
3.7	5.0			390 W 150 Ω	1	135	32
5.5	7.5			520 W 100 Ω	1	135	32
7.5	10.0			780 W 75 Ω	1	130	32
11	15.0			1010 W 50 Ω	1	135	20
15	20			1560 W 40 Ω	1	125	20
18.5	25			4800 W 32 Ω	1	125	19.2
22	29.3	4030	1	4800 W 27.2 Ω	1	125	19.2
30	40	4030	1	6000 W 20 Ω	1	125	19.2
37	50	4045	1	9600 W 16 Ω	1	125	12.8
45	60	4045	1	9600 W 13.6 Ω	1	125	12.8
55	76.3	4030	2	6000 W 20 Ω	2	135	19.2
75	100	4045	2	9600 W 13.6 Ω	2	145	12.8
90	120	4220	1	6000 W 20 Ω	3	100	3.2
110	160	4220	1	6000 W 20 Ω	3	100	3.2
132	180	4220	1	9600 W 13.6 Ω	4	140	3.2
160	213.3	4220	1	9600 W 13.6 Ω	4	140	3.2
185	250	4220	1	9600 W 13.6 Ω	4	120	3.2
220	300	4220	1	9600 W 16 Ω	5	110	3.2
300	400	4220	2	9600 W 3.6 Ω	6	110	3.2

NOTE : 1. Up to 18.5kW only external braking resistors of the recommended rating is required. While using inverters of 22kW and above, CDBR kit and braking resistors of required numbers need to be added.
2. Ratings are for standard applications. For special applications, contact us.



Connection Scheme

RECOMMENDED RATINGS OF REACTORS FOR ALL DRIVES MODEL

Max. Applicable Motor Output		Recommended Input line reactors for 400V class Drive (Rated Inductance/Current)	Recommended Output line reactors (Rated Inductance/Current)	Recommended DC reactor (Rated Inductance/Current)
kW	HP			
0.4	0.5	18mH / 1.3A	8.072mH / 2A	28mH / 3.2A
0.75	1.0	8.4mH / 2.5A	4.484mH / 3.6A	28mH / 3.2A
1.5	2.0	4.2mH / 5A	3.329mH / 5A	11mH / 6A
2.2	3.0	3.6mH / 7.5A	2.446mH / 6.6A	11mH / 6A
3.7	5.0	2.2mH / 10A	1.899mH / 8.5A	6.3mH / 12A
5.5	7.5	1.42mH / 15A	1.076mH / 15A	3.6mH / 23A
7.5	10.0	1.06mH / 20A	0.807mH / 20A	3.6mH / 23A
11	15	0.7mH / 30A	0.538mH / 30A	1.9mH / 33A
15	20	0.53mH / 40A	0.448mH / 36A	1.9mH / 33A
18.5	25	0.42mH / 50A	0.359mH / 45A	1.9mH / 33A
22	29.3	0.36mH / 60A	0.294mH / 56A	DC reactor inbuilt
30	40	0.26mH / 80A	0.231mH / 70A	
37	50.0	0.24mH / 90A	0.19mH / 80A	
45	60	0.16mH / 120A	0.161mH / 100A	
55	75	0.15mH / 150A	0.115mH / 140A	
75	100	0.11mH / 200A	0.090mH / 180A	
90	120	0.11mH / 200A	0.090mH / 180A	
110	150	0.09mH / 250A	0.067mH / 240A	
132	180	0.09mH / 250A	0.067mH / 240A	
160	215	0.06mH / 330A	0.050mH / 320A	
185	250	0.04mH / 490A	0.045mH / 360A	
220	300	0.04mH / 490A	0.034mH / 630A	
300	400	0.03mH / 660A	0.026mH / 630A	

1. Input line reactor should be a three phase, Iron core air cooled reactor.
2. Output line reactor should be a three phase, Iron core air cooled reactor.
3. DC reactor should be a single phase, Iron core air cooled reactor.

Accessories

Type	Cat. Nos.	Function	Applicable For
PG Speed Controller Card	PG - B2	<ul style="list-style-type: none"> Used for V / f control with PG Phase A & B pulse inputs (exclusively for complimentary input) PG frequency range: Approx. 30 kHz max. [Power supply output for PG: +12V, max. Current 30-200 mA] Pulse monitor output: Open collector, +24VDC, Max. Current 30mA 	F7
	PG - X2	<ul style="list-style-type: none"> Used for V / f control with PG Phase A, B & Z pulse (different pulse) inputs (RS-422 input) PG frequency range: Approx. 300 kHz max [Power supply output for PG: +5/12VDC, Max. Current 200 mA] Pulse monitor output: RS-422 	F7
Communications Option Card	SI - 485/J7	RS23C / 485 Convertor Card - J7	J7
	SI - P	Profibus - DP Communications I / F Card	F7
	SI - P3/N	Profibus - DP Communications Card	V1000
Digital Operator	JVOP - 160	Digital Operator (LCD) for F7	F7
	JVOP - 180	Digital Operator (LCD)	V1000

Dimensions & Weights J7 Drive

(For 200V 1-PHASE)

MODEL CAPACITY IN kW (HP)	REFERENCE FIGURE	DIMENSIONS IN mm			MASS IN KG
		W (W1)	H (H1)	D	
0.1 (0.13)	1	68 (56)	128 (118)	70	0.5
0.2 (0.25)	1	68 (56)	128 (118)	70	0.5
0.4 (0.5)	1	68 (56)	128 (118)	112	0.9
0.75 (1)	2	108 (96)	128 (118)	129	1.5
1.5 (2)	2	108 (96)	128 (118)	154	1.5

(For 400V 3-PHASE)

MODEL CAPACITY IN kW (HP)	REFERENCE FIGURE	DIMENSIONS IN mm			MASS IN KG
		W (W1)	H (H1)	D	
0.2 (0.25)	2	108 (96)	128 (118)	81	1
0.4 (0.5)	2	108 (96)	128 (118)	99	1.1
0.75 (1)	2	108 (96)	128 (118)	129	1.5
1.5 (2)	2	108 (96)	128 (118)	154	1.5
2.2 (3)	2	108 (96)	128 (118)	154	1.5
3.7 (5)	2	140 (128)	128 (118)	161	2.1

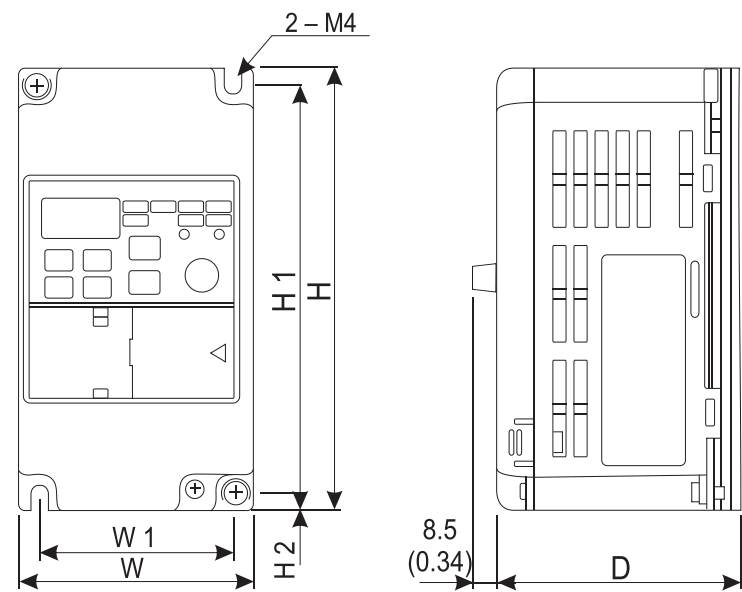


Figure1

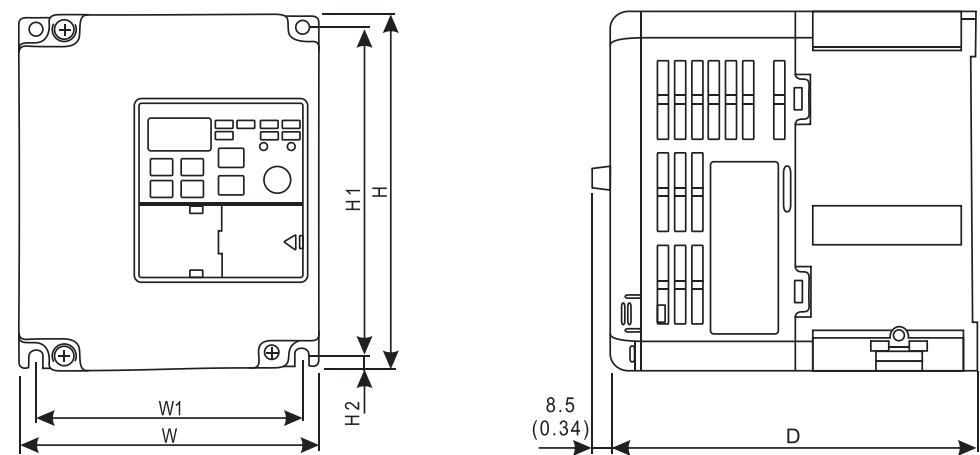


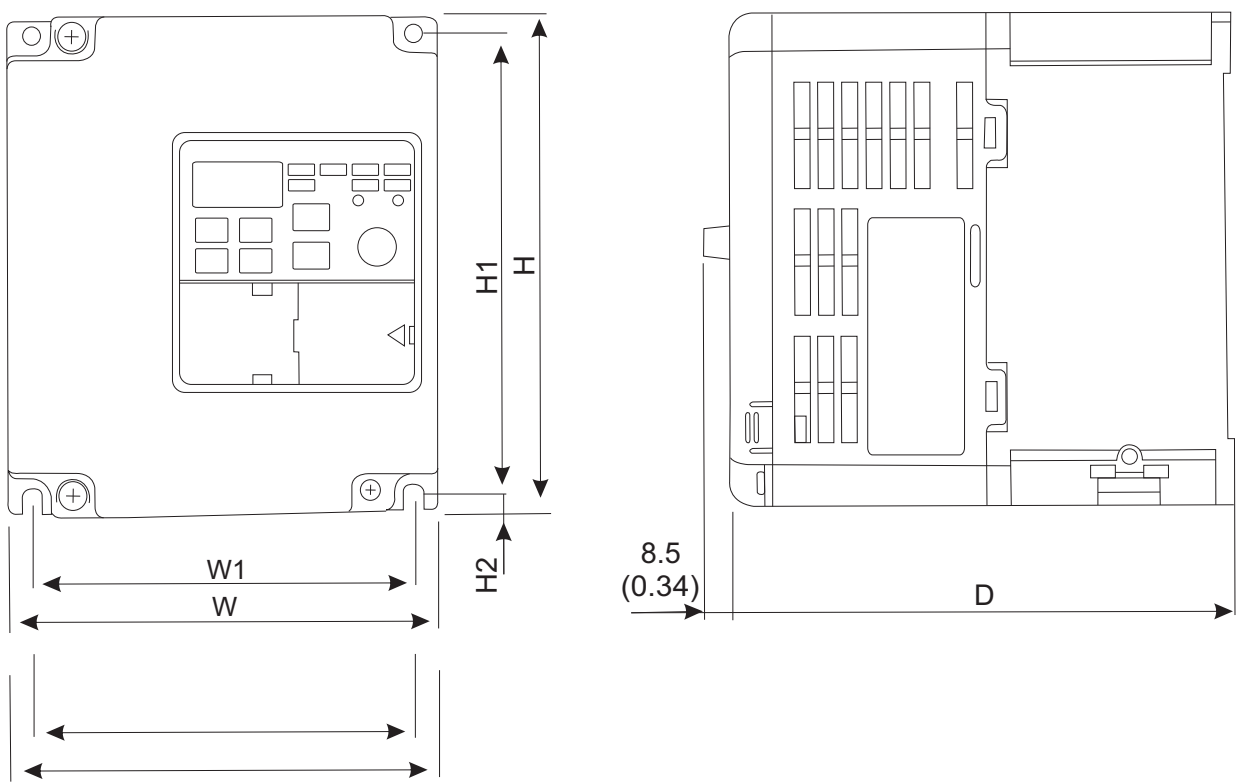
Figure2

Dimensions in mm

Dimensions & Weights V7 Drive

Mechanical Dimension And Weight For 400V-3 Phase

Model Capacity In KW (HP)	Reference Figure	Dimensions in mm			Mass In KG
		W (W1)	H (H1)	D	
0.2(0.25)	3	108(96)	128(118)	92	1
0.4(0.5)	3	108(96)	128(118)	110	1.1
0.75(1)	3	108(96)	128(118)	140	1.5
1.5(2)	3	108(96)	128(118)	156	1.5
2.2(3)	3	108(96)	128(118)	156	1.5
3.7(5)	3	140(128)	128(118)	143	2.1
5.5(7.5)	3	180(164)	260(244)	170	4.8
7.5(10)	3	180(164)	260(244)	170	4.8



All mounting screws are M4
Dimensions in mm

Figure3

Dimensions & Weights F7 Drive

Voltage Output	Motor kW	Open Chassis Type (IP00) mm			Mass Kg	Enclosed Type [NEMA1 (Type1)] mm			Mass Kg	DC Reactor
		W	H	D		W	H	D		
400 V Class	0.4	140	280	160	3	140	280	160	3	Option
	0.75									
	1.5									
	2.2									
	3.7									
	5.5	140	280	180	4	140	280	180	4	
	7.5									
	11									
	15									
	18.5									
	22	240	350	210	10	240	350	210	10	
	30									
	37									
	45									
	55									
	75	275	450	260	21	279	535	260	24	
	90									
	110									
	132									
	160									
	185	325	550	285	36	329	635	285	40	
	220						715			
	300									
37										
45										
55	450	725	350	88	455	1100	350	96		
75				89				97		
90				102				122		
110				120				130		
132				160				170		
160	710	1305	413	260	Not available					
185				280						
220										
300										
300				916	1475	413	405			

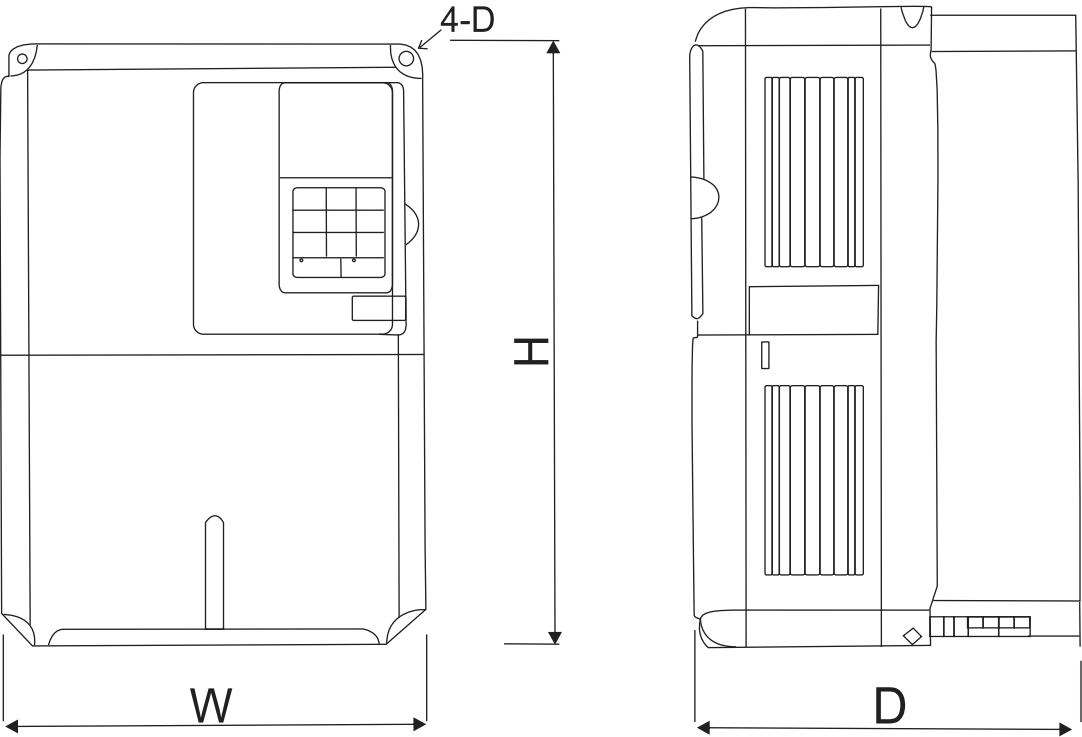


Figure4

Dimensions & Weights V1000 Drive

Enclosures

Voltage Class	MODEL CIMR- VT	Figure	Dimensions (mm) Weight									Weight kg	Cooling
			W	H	D	W1	H1	H2	D1	t1	Mtg. Holes		
200 V Class Single-phase	BA0001	1	68	128	76	56	118	5	6.5	3	M4	0.6	Self-cooled
	BA0002		68	128	76	56	118	5	6.5	3	M4	0.6	
	BA0003	1	68	128	118	56	118	5	38.5	5	M4	1.0	Fan cooled
	BA0006		108	128	137.5	96	118	5	58	5	M4?	1.7	
	BA0010	1	108	128	154	96	118	5	58	5	M4	1.8	
	BA0012		140	128	163	128	118	5	65	5	M4	2.4	
	BA0018	170	128	180	158	118	5	65	5	M4	3.0		
400 V Class Three-phase	4A0001	1	108	128	81	96	118	5	10	5	M4	1.0	Self-cooled
	4A0002		108	128	99	96	118	5	28	5	M4	1.2	
	4A0004		108	128	137.5	96	118	5	58	5	M4	1.7	
	4A0005		108	128	154	96	118	5	58	5	M4	1.7	
	4A0007	1	108	128	154	96	118	5	58	5	M4	1.7	Fan cooled
	4A0009		108	128	154	96	118	5	58	5	M4	1.7	
	4A0011		140	128	143	128	118	5	65	5	M4	2.4	
	4A0018*		140	254	140	122	248	13	55	5	M5	3.8	
	4A0023*	2	140	254	140	122	248	13	55	5	M5	3.8	Fan cooled
	4A0031*		180	290	143	160	284	13	55	5	M5	5.2	
	4A0038*		180	290	163	160	284	13	75	5	M5	5.5	

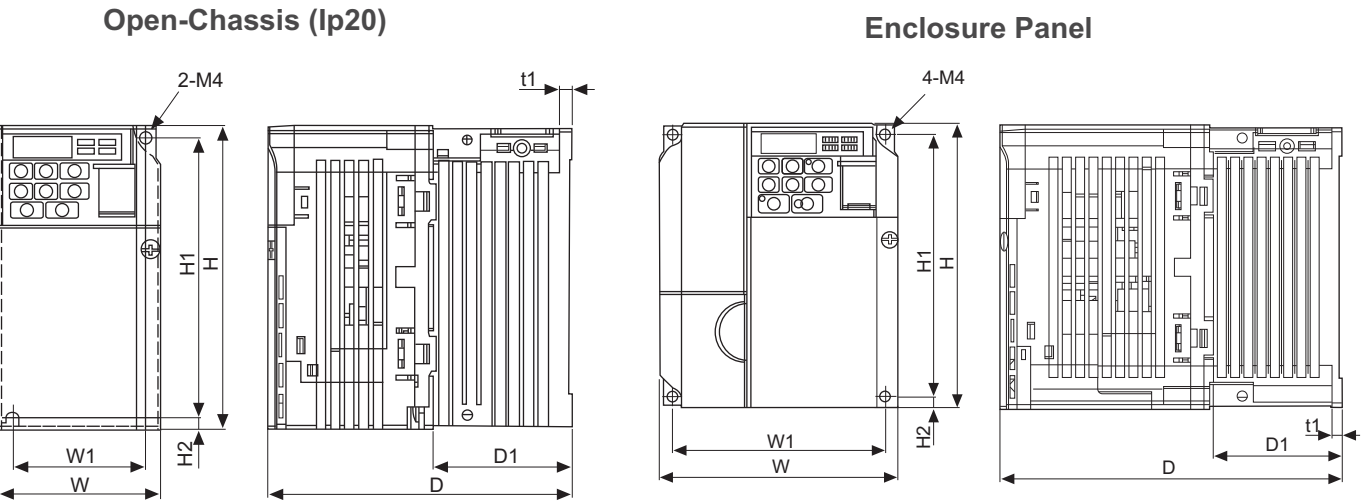


Figure 1

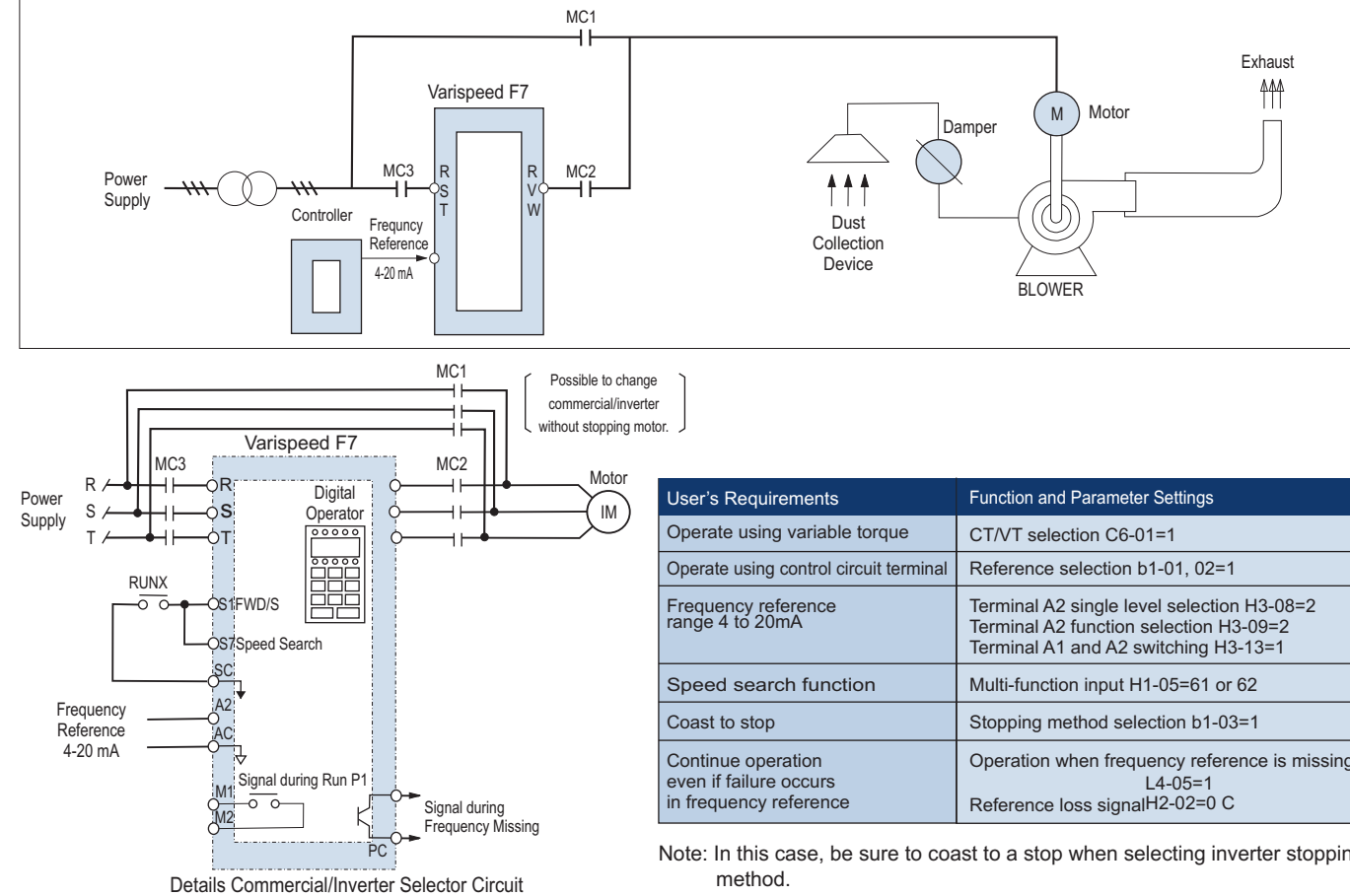
Figure 2

Dimensions in mm

Application Examples

Fans and Blowers (contributes to Energy-Saving and Improved Performance)

Example of the Use of Inverter with Air Scrubber

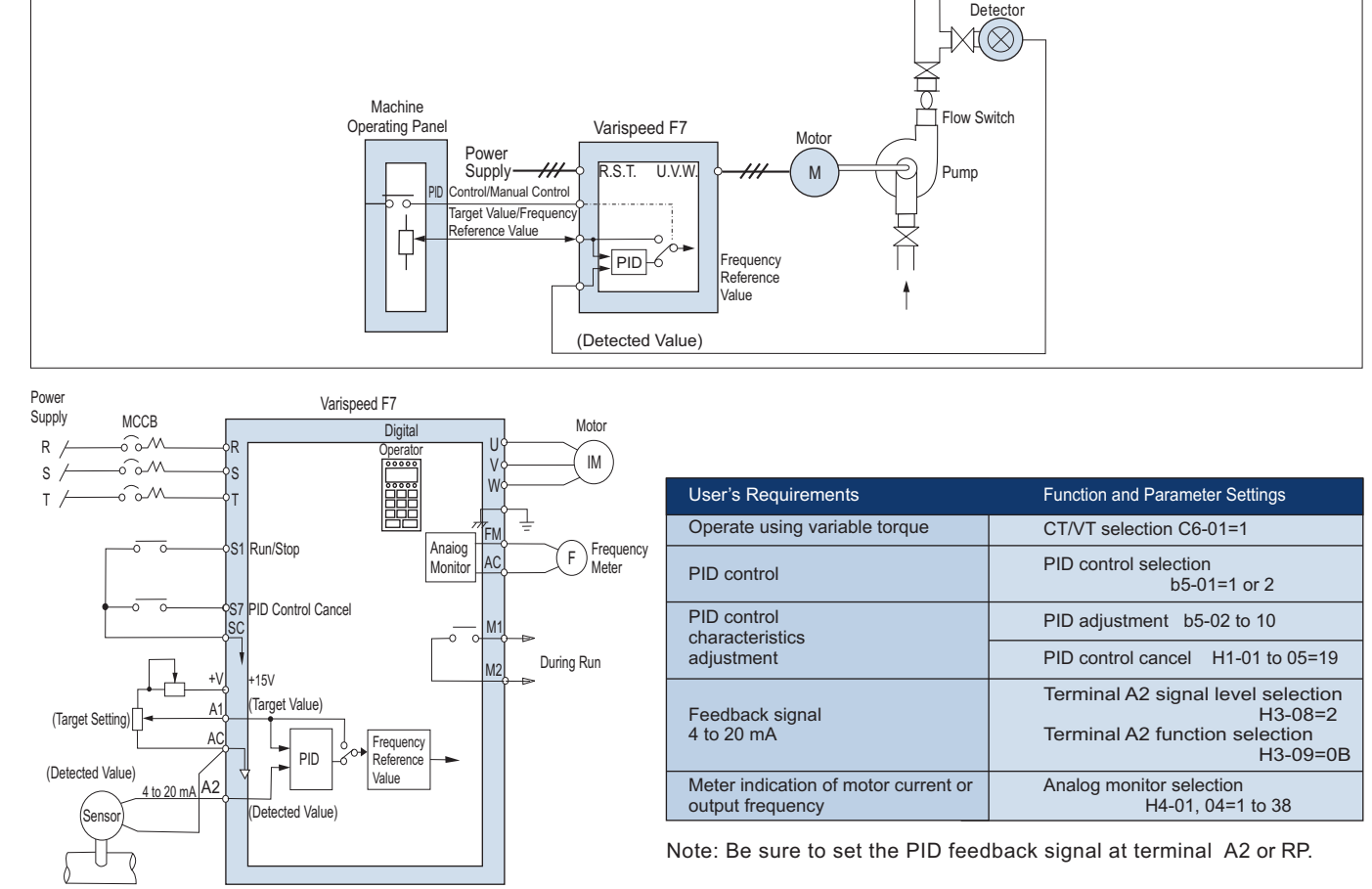


Application Example	User's Requirements	Applicable Varispeed F7 Function	Function and Parameter Settings
Dust Collection System Blower, Fan for Boilers	Switch commercial power supply and inverter drive without stopping the motor.	Use the speed search operation.	Multi-function input H1-01 to 05=61 or 62
	To start a coasting motor to desired frequency without stopping the motor.		
	Save energy since the load is not heavy at low-speed operation.	Apply the variable load V/f.	V/f selection E1-03=05 or 07
	Avoid overload tripping.	Apply the torque limit function.	Torque limit L7-01=0-300 %
	Continue operation even when momentary power loss not longer than 2 second occur.	Select the momentary power loss reset and restart mode.	Momentary power loss protection L2-01=0 to 2
Fan for Cooling Towers	Continue operation in case of loss of reference signal.	Select the automatic continues operation mode when frequency reference is missing.	Operating single selection L4-05=0 to 1 Frequency reference is missing H2-01 to 03=0 C
	Monitor output power.	Turn the monitor to the output power indication.	Monitor display U1-08
	R/ min lower limit for lubricating the gear bearing.	Use the frequency reference lower limit.	Frequency reference lower limit d2-02=0 to 110 %
	Avoid mechanical resonance.	Use the preset frequency band prohibition function (frequency jump control). Up to 3 frequencies prohibited.	Jump frequency d3-01 to 03=0 to 400 Hz Jump frequency width d3-04=0 to 20.0 Hz
	To prevent machine stoppage caused by inverter tripping.	Use the fault retry function.	Fault retry count L5-01=0 to 10 times

*Above mentioned scheme and parameter settings correspond to F7 drives, however the same application can be addressed using other models.

Pump (Ease of Automatic Control Ensures Performance Consistency)

Block Diagram of Feed Water Pump Application



Application Example	User's Requirements	Applicable Varispeed F7 Function	Function and Parameter Settings
General Pump	Easy automatic control.	Use PID function inside the inverter. (External PID control is not required.)	PID adjustment b5-01 to 11
Chemical Feeding Pump	Save energy since the load is not heavy at low-speed operation.	Available with standard function (open loop vector control)	Control method selection A1-02=2
	Keep the mixed water ratio constant.	Directly input PID output (4 to 20 mA)	Operating single selection b1-01, 02=1
	Manual/Auto switching function.	Use the master / Aux. switching functions. Two toggle switches do the job.	Master/Aux. switching H1-01 to 05=03
	Ammeter for monitoring load conditions.	Use an analog monitor (2CN provided as standard)	Output selection function H4-01, 04=02, 03
Warm/Cold Water Circulation Pump	Drive the pump directly using 4-20mA signal.	Use external terminals A2 and AC.	Run signal selection b1-01, 02=1
	Function to maintain minimum speed.	Use the lower-limit of the reference frequency.	Frequency reference lower limit d2-02=0 to 110 %
	Run the system using the commercial power supply when an emergency occurs, then return to inverter.	Use a selector circuit together with the speed search function to restart turning motor.	Speed search function selection H1-01 to 05=61 or 62
	Function that can keep the system working without resetting it even when a momentary power loss occurs.	Use the continuous operation function to restart after momentary power loss within two seconds. Use toggle switch for start and stop.	Momentary power loss protection L2-01=0 to 2
Discharge Pump	Keep a constant water level inside a tank using a water gauge.	Read signals directly sent from the water-level adjusting unit. (4 to 20 mA).	Run signal selection b1-01, 02=1
	Keep the monitor min-1 above the minimum because if the min-1 is too low, water flows in the reverse direction.	Control the water level by PID control.	PID control b5-01 to 11 setting Frequency reference lower limit d2-02=0 to 110 %

*Above mentioned scheme and parameter settings correspond to F7 drives, however the same application can be addressed using other models.

General Information

- ➔ An AC or DC reactor should be installed in the following conditions:
 - to suppress harmonic currents.
 - to suppress peak currents when power factor correction capacitors in the power supply network are switched.
 - when the drive is connected to the same power supply system with thyristor converters like DC drives.
- ➔ When running a specialized motor or more than one motor in parallel from a single drive, the capacity of the drive should be larger than 1.1 times of the total motor rated current.
- ➔ Terminals B1, B2, F, +1, +2, - are provided for connecting optional features for the drive. Do not connect other equipment designed by other manufacturers.
- ➔ Acceleration / deceleration times are affected by how much torque the motor generates the load torque.
- ➔ Never connect the power supply lines to output terminals U/T1, V/T2 or W/T3. Doing so will destroy the drive. Be sure to perform a final check of all sequence wiring and other connections before turning the power on. Make sure there are no short circuits on the control terminals (+V, AC, etc.), as this could damage the drive.
- ➔ As a general principle, the user should avoid opening and closing the magnetic contactor between the motor and the drive during run. Doing so can cause high peak currents and over current faults. If magnetic contactors are used to bypass the drive by connecting the motor to the power supply directly, make sure to close the bypass not before the drive is stopped and fully disconnected from the motor. If the motor start running even while coasting, select the speed search functions. Set up delayed release when using a magnetic contactor to handle momentary power loss.
- ➔ In case of submersible motor, since rated current is greater than a standard motor, select the drive capacity accordingly. Be sure to use a large enough motor cable to avoid decreasing the maximum torque level on account of voltage drop caused by a long motor cable.
- ➔ Variable speed drives are not designed for operating single phase motor. Using a capacitor to start the motor causes excessive current to flow into the capacitor, potentially causing damage. A split-phase start or a repulsion start can end up burning out the starting coils because the internal centrifugal switch is not activated. The drive can only be used with three phase motors.

Notes

[illegible]