31050136-SC V2.0

Virtec Instruments Inc.

Frequency Inverter Selection guide

Automated production and life

Virtec

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EM750 Basic HVAC Inverter

Single-phase/three-phase 220V-240V 0.4kW-2.2kW

Three-phase AC 340V-460V 0.75kW-450kW

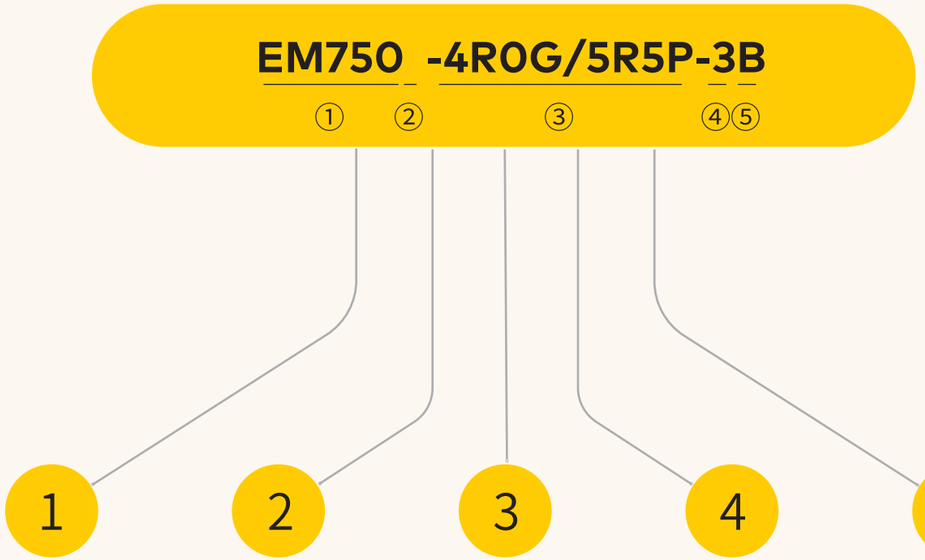
The Virtec Instruments HVAC VFD Series EM 750 is a state-of-the-art variable frequency drive designed for HVAC basic applications. This series is engineered to provide superior performance, energy efficiency, and reliability, making it an ideal choice for modern HVAC systems.

Key Features

- **HVAC-Dedicated Functionality:** The EM 750 series is tailored to meet the unique demands of HVAC systems. It includes advanced features such as automatic energy optimization, which ensures that the system operates at peak efficiency, reducing energy consumption and operational costs.
- **DC Reactor and EMC Filters:** To enhance performance and ensure compliance with international standards, the EM 760 series comes equipped with a built-in 5% Impedance DC reactor and EMC filters. The DC reactor helps in reducing harmonic distortion, improving the overall power quality. The EMC filters, C2 as standarad and C3 optional, minimize electromagnetic interference, ensuring smooth and reliable operation of the HVAC system.
- **User-Friendly Interface:** The VFD features an intuitive and user-friendly interface, making it easy for operators to configure and monitor the system. The interface includes a clear display and simple navigation, allowing for quick adjustments and troubleshooting.
- **Robust Design and Reliability:** Built to withstand the demanding conditions of HVAC environments, the EM 750 series boasts a robust design that ensures long-term reliability and durability. The VFD is designed to operate efficiently in a wide range of temperatures upto 50^{0}C and environmental conditions, providing consistent performance and reducing maintenance requirements.
- **Energy Efficiency and Cost Savings:** One of the primary benefits of the EM 750 series is its ability to significantly reduce energy consumption. By optimizing the operation of HVAC systems, the VFD helps in lowering energy bills and reducing the overall carbon footprint. The energy savings achieved with the EM 750 series contribute to a more sustainable and environmentally friendly operation.

The Virtec Instruments HVAC VFD Series EM 750 is a powerful and versatile solution for modern HVAC systems. With its dedicated HVAC functionality, advanced features, and robust design, it offers unparalleled performance and reliability. Whether you are looking to improve energy efficiency, enhance system control, or ensure long-term reliability, the EM 750 series is the ideal choice for your HVAC needs.

Model and Product List



em760:
High-performance series

Null:
Installation in cabinet
C: Cabinet type

Identification	Compatible motor type
G	Universal model
P	Fan pump type

Voltage level

2:Three-phase 220V
3:Three-phase 380V
6:Three-phase 660V

B: Built-in braking unit
None: Without braking unit

COMPATIBLE LOAD POWER

OR7	4R0	. . .	018	. . .
0.75kW	4.0kW	. . .	18.5kW	. . .

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PRODUCT LIST

Rated power supply voltage	model	Applicable motor power (kW)	Rated output current (A)
Single-phase/three-phase AC 200V～240V	EM750-0R4 G/0R7P -2B	0.4 /0.75	2.8 /4.8
	EM750-0R7 G/1R5P -2B	0.75 /1.5	4.8/8.0
	EM750-1R5 G/2R2P -2B	1.5 /2.2	8.0/10.0
	EM750-2R2 G/3R0P -2B	2.2 /3.0	10.0/13.0
Three-phase AC 340 ~ 460V	EM750-0R7G/1R5P-3B	0.75/1.5	2.5/4.2
	EM750-1R5G/2R2P-3B	1.5/2.2	4.2/5.6
	EM750-2R2G/3R0P-3B	2.2/3.0	5.6/7.2
	EM750-4R0G/5R5P-3B	4.0/5.5	9.4/12
	EM750-5R5G/7R5P-3B	5.5/7.5	13/17
	EM750-7R5G/9R0P-3B	7.5/9.0	17/20
	EM750-011G/015P-3B	11/15	25/32
	EM750-015G/018P-3B	15/18 .5	32/38
	EM750-018G/022P-3B	18.5/22	38/44
	EM750-022G/030P-3B	22/30	45/59
	EM750-030G/037P-3/3B	30/37	60/73
	EM750-037G/045P-3/3B	37/45	75/87
	EM750-045G/055P-3	45/55	90/106
	EM750-055G/075P-3	55/75	110/145
	EM750-075G/090P-3	75/90	150/169
	EM750-090G/110P-3	90/110	176/208
	EM750-110G/132P-3	110/132	210/248
	EM750-132G/160P-3	132/160	253/298
	EM750-160G/185P-3	160/185	304/350

Rated power supply voltage	model	Applicable motor power (kW)	Rated output current (A)
Three-phase AC 340 ~ 460V	EM750-185G - 3	185	350
	EM750-200 G- 3	200	380
	EM750-200P - 3	200	380
	EM750-220G - 3	220	426
	EM750-220P-3	220	426
	EM750-250G-3	250	4 65
	EM750-250P-3	250	465
	EM750-280G-3	280	5 20
	EM750-280P-3	280	5 20
	EM750-315G-3	315	5 85
	EM750-315P-3	315	5 85
	EM750-355G-3	355	6 50
	EM750-355P-3	355	6 50
	EM750-400G-3	400	7 25
	EM750-400P-3	400	7 25
	EM750-450G-3	450	8 20
	EM750-450 P- 3	450	8 20

NOTE:

G: This mode is for heavy duty applications like Compressors and Chillers.

P: This mode is for Pumps and Fans applications.

Technical Specification

POWER SUPPLY

Item	Specification
Rated voltage of power supply	Three-phase 340V-10% to 460V+10%, Single-phase/three-phase 200V-10% to 240V+10%; 50-60Hz ± 5%; voltage unbalance rate: <3%

OUTPUT

Item	Specification
Maximum output voltage	The maximum output voltage is the same as the input power voltage.
Rated output current	Continuous output of 100% rated current
Maximum overload current	150% of heavy-duty rated current for 60s (for Compressors) (185kW-450kW: 140% of heavy-duty rated current for 60s) 120% of light-duty rated current for 60s (for Pump & Fans)

CONTROL

Item	Specification
Driving mode	V/F control (VVF); speed sensorless vector control (SVC)
Input mode	Frequency (speed) input, torque input
Start and stop control mode	Keyboard, control terminal (two-line control and three-line control), communication
Frequency control range	0.00 ～ 600.00Hz/0.0 ～ 3000.0HZ
Input frequency resolution	Digital input: 0.01Hz/0.1Hz Analog input: 0.1% of maximum frequency
Speed control range	1:50（VVF）、1:200（SVC）
Speed control accuracy	Rated synchronous speed ± 0.2%
Acceleration and deceleration time	0.01 s to 600.00 s / 0.1 s to 6,000.0 s / 1 s to 60,000 s
Voltage/frequency characteristics	Rated output voltage: 20% to 100%, adjustable Fundamental frequency 1Hz to 600Hz/3000Hz, adjustable
Torque boost	Fixed torque boost curve Any V/F curve is acceptable.
Starting torque	150%/1Hz（VVF） 150%/0.25Hz（SVC）
Precision torque control	±5% rated torque (SVC)
Self-adjustment of output voltage	When the input voltage changes, the output voltage will basically remain unchanged.
Automatic current limitation	Output current is automatically limited to avoid frequent overcurrent trips.
Signal input source	Communication, multi-speed, analog, etc.

INPUT/OUTPUT

Item	Specification
Reference power supply	10V/20mA
Terminal control power	24V/100mA
Digital input terminal	5-channel digital multi-function input: X1 to X5 X5 can be used as the high-speed pulse input (max. 100kHZ).
Analog input terminal	2-channel analog inputs: One (AI1) voltage source: -10 to 10V input; One channel (AI2): 0 to 10V input voltage or 0 to 20mA input current optional;
Digital output terminal	Multi-function output of one open collector and one relay Maximum output current of the collector: 50mA; Relay contact capacity: 250VAC/3A or 30VDC/1A, EA-EC: normally open; EB-EC: normally closed
Analog output terminal	Two multi-function analog terminal output M1 & M2: 0-10V/0-20mA multi-function analog output terminal.

OPERATION PANEL

Item	Specification
Display	Alphanumeric keypad.

PROTECTION

Item	Specification
Protective Function	Short circuit, overcurrent, overvoltage, undervoltage, phase loss, overload, overheat, load loss, external fault, etc.

USE CONDITIONS

Item	Specification
Location	Indoor, at an altitude of less than 1 km, free of dust, corrosive gases and direct sunlight. When the altitude is higher than 1km, it is derated by 1% per 100m. The maximum allowable altitude is 3km.
Applicable environment	-10°C to +60°C, 5% to 95% RH (non-condensing). When the ambient temperature exceeds 50°C, it needs to be derated by 3% per 1°C temperature rise. The maximum allowable ambient temperature is 60°C.
Vibration	Less than 0.5g
Storage environment	-40°C～ +70°C
Installation method	Wall-mounted or installed in the cabinet

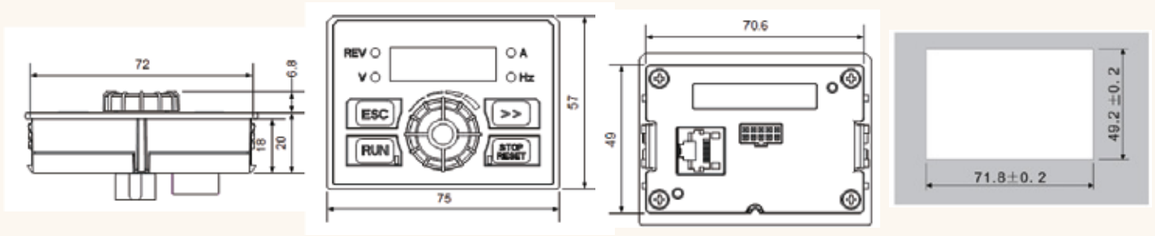
PROTECTION LEVEL

Item	Specification
Protection level	Standard IP20/IP21 (with plastic baffle)

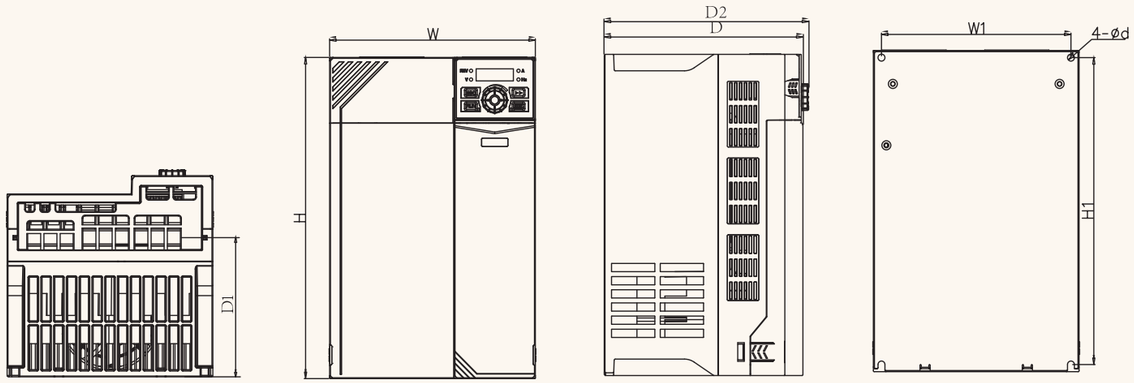
COOLING METHOD

Item	Specification
Cooling method	Forced air cooling

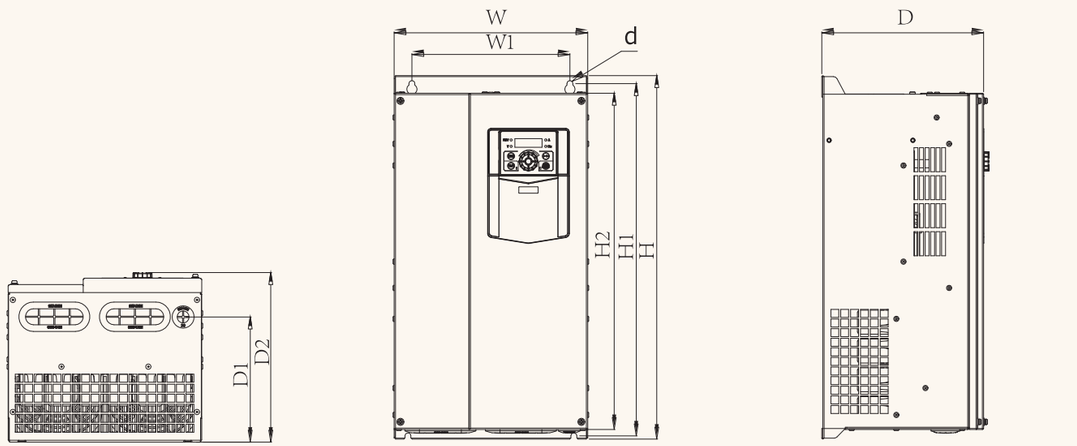
Dimension



Outline Dimension of EM750 Series Inverter and Keyboard



(a) Appearance of EM750 Inverter



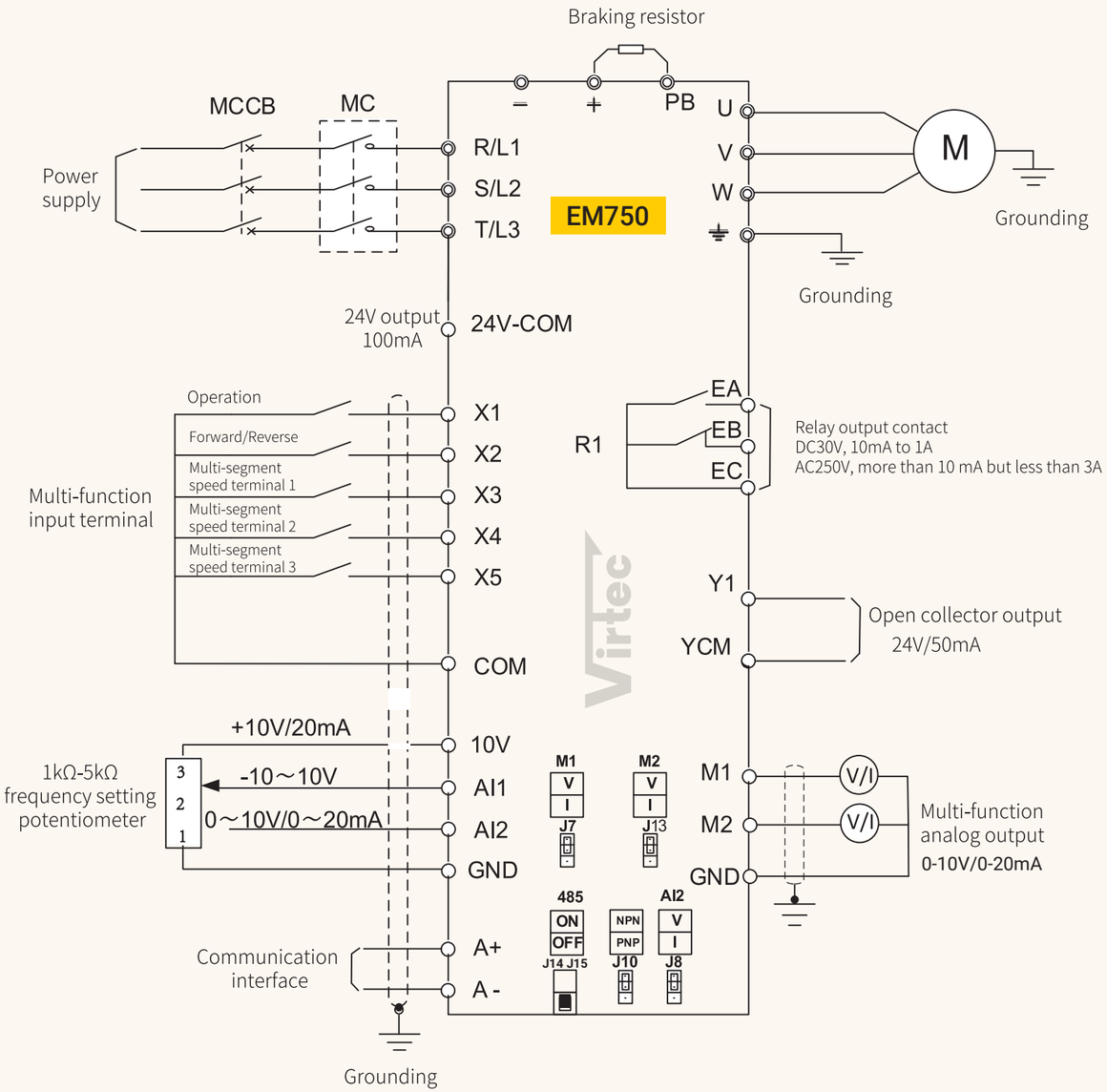
(b) Appearance of EM750 Inverter

Dimension

Model	W	W1	H	H1	H2	D	D1	D2	d
EM750-0R4G/0R7P-2B EM750-0R7G/1R5P-2B	75	65	142	132		1 46	67	1 52	4.5
EM750-1R5G/2R2P-2B EM750-2R2G/3R0P-2B	93	82	172	163		1 36	8 5	1 41	4.7
EM750-0R7G/1R5P-3B EM750-1R5G/2R2P-3B	75	65	142	132		1 46	67	1 52	4.5
EM750-2R2G/3R0P-3B EM 750-4R0G/5R5P-3B	93	82	172	163		1 36	8 5	1 41	4.7
EM750-5R5G/7R5P-3B EM750-7R5G/9R0P-3B	109	98	207	196		1 54	103	1 60	5.5
EM750-011G/015P-3B EM750-015G/018P-3B	136	125	250	240		1 69	115	1 74	5.5
EM750-018G/022P-3B EM750-022G/030P-3B	190	175	293	280		18 4	145	18 9	6.5
EM750-030G/037P-3B EM750-037G/045P-3B	245	200	454	440	420	205	156	212	7.5
EM750-045G/055P-3 EM750-055G/075P-3	300	266	524	508	480	229	174	236	9
EM750-075G/090P-3	335	286	580	563	536	228	177	235	9
EM750-090G/110P-3 EM750-110G/132P-3	335	286	63 0	60 8	570	310	247	317	11
EM750-132G/160P-3 EM750-160G/185P-3	430	330	770	747	710	311	248	31 9	13
EM750-1 85G /200P-3	4 22	3 20	786	7 58	709	335	2 71	256.4	1 1.5

All Dimensions are in MM. Dimensions subject to change without Prior Notice.

Standard Wiring Diagram of Control Circuit



- It is recommended to use the wires with a diameter of 0.5-1mm2 in the control circuit.
- Install the control circuit terminals with the PH0 Phillips screwdriver. The tightening torque should be 0.5N.m.

EM750

Options of EM750 HVAC Basic Inverter

Select accessories	Name & Model	Function	Photo
Communication card	EM750-CM-C1	This communication card is required for BACnet IP bus communication. Connect the inverter to BMS on IP layer.	
IO expansion card	EM750-IO-A1	The IO expansion card is used for expansion to 3 multi-function digital inputs, 2 relay outputs and 4 analog inputs, supporting PT100/PT1000/PTC/KTY84 and other common motor temperature sensors, respectively.	

KEY FEATURES

Fire Mode

Enables safe and efficient operation during emergency situations by running motor at full speed for maximum smoke extraction in ventilation application

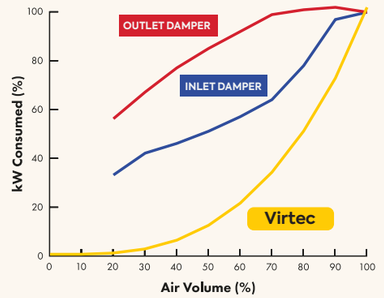
Communication

Modbus RTU is standard communication. BACnet IP can be offered as option.

Coated PCB

Coated printed circuit boards (PCBs) enhance reliability and durability in drives by protecting against environmental factors like moisture, dust, and chemicals. This coating ensures better performance and extends the lifespan of electronic components.

Energy Saving



The graph above shows a comparison between the efficiency of various methods which can be used to control the airflow produced by a fan.

Built-in PID, expandable upto 3 PID's