



Delta presents you with an ideal drive for door applications

Automation for a Changing World

Delta Door Control Drive & Motor VFD-DD Series



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DELTA
Smarter. Greener. Together.

Door Drive Functions and Features

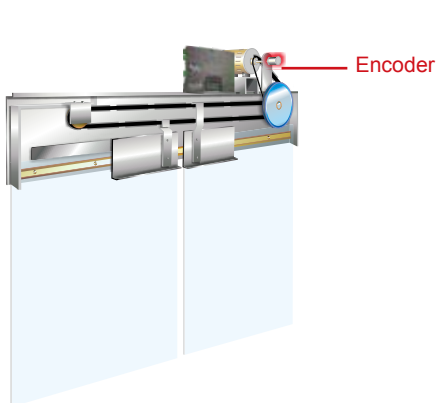
■ User Friendly Design



■ Door Control Solutions

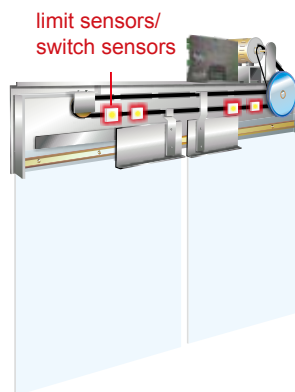
■ Distance Control Mode

For encoder applications this mode precisely controls the door's opening and closing position via encoder feedback signal.



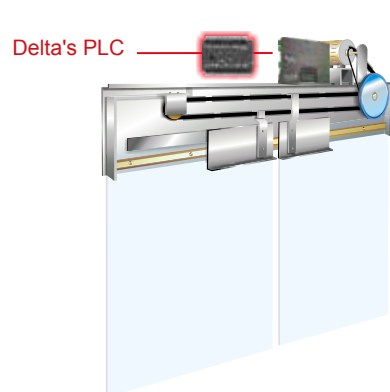
■ Speed Control Mode

For induction motor applications this mode executes door opening and closing via 2~4 limit sensors or switch sensors.



■ Multi-step Speed Control Mode

For PLC applications this mode uses Delta's PLC as a host controller to control door opening and closing in multi-step speeds.



■ Built-in Door Control Functions

▪Door Width Auto-tuning

Door width is automatically measured and saved as the door opens and closes. It will open and close twice to confirm the door width accuracy. Once confirmed, the measurement is recorded into the drive parameters.

▪Smooth Door Curve

The door will reopen in a reverse direction when door blockage is detected. The reopen is performed with a smooth curve to minimize the impact of vibration.

▪Demo Mode

Demo mode demonstrates the door open, close and reverse motions to ensure the performance and quality of the drive system and the door structure.

▪Asynchronous (IM) and Synchronous (PM) Motors Applications

Compatible with Delta ECMD series door control servo motor and other induction motors (signal type encoder that accepts open collector and differential signal with 5 or 12 V_{DC}).

▪Door Protection System

Passengers enter and exit the elevator with greater safety. When the light curtain and safety panel fail to function, the drive will command the door to re-open as it detects a rise of current caused by the blocked door.

▪Blockage Detection

4 steps: 1. precise torque detection at blockage; 2. door remains at current position for a few seconds; 3. door "OPEN/CLOSE" time-out; 4. forced open.


▪Built-in EMI Filters

(except for Basic Models)

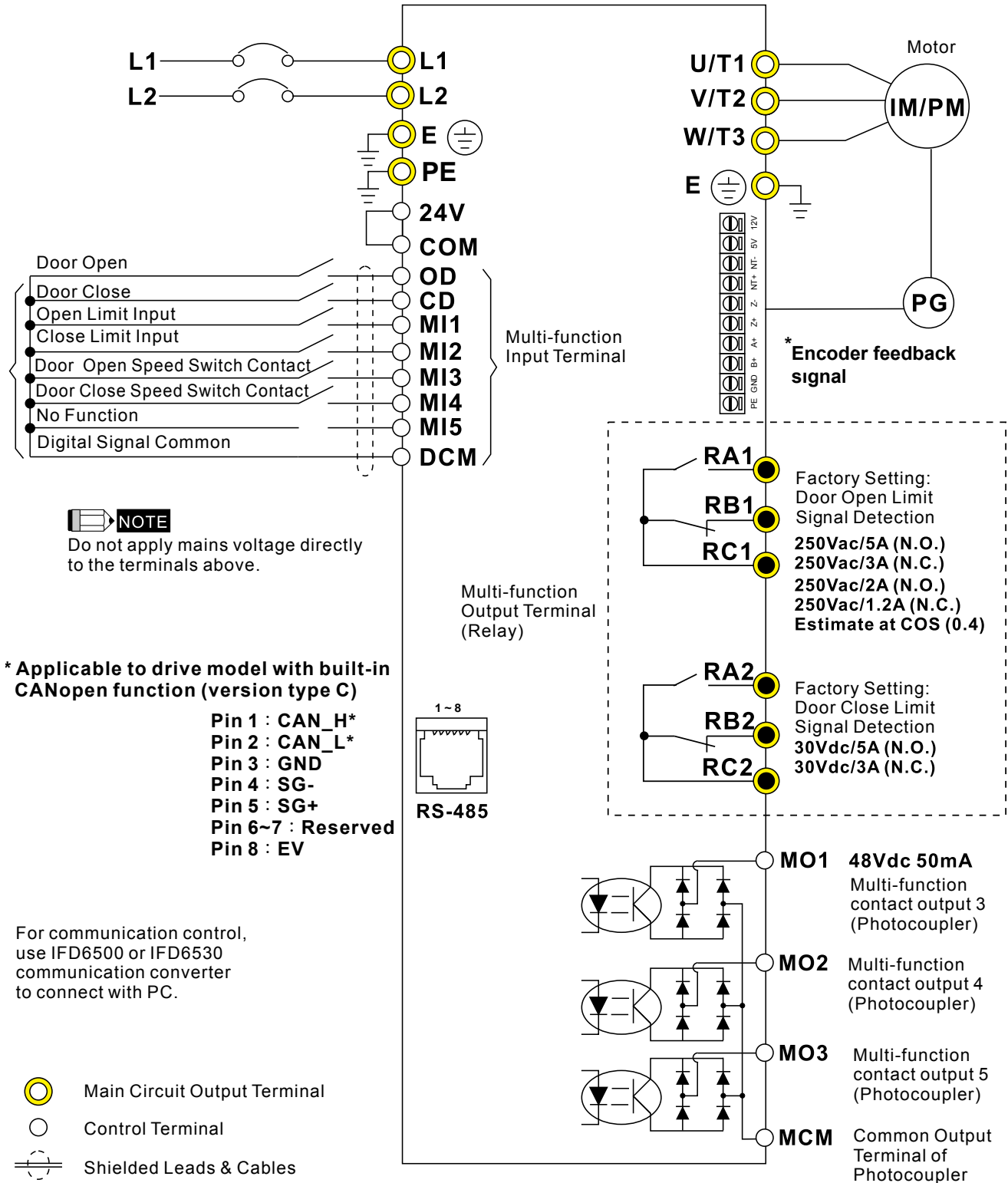
Specifications

230V 1-phase: 200W and 400W models			
Model Number VFD-__ __DD	002	004	
Max. Applicable Motor Output (W)	200	400	
Output Rating	Rated Output Capacity (KVA)	0.6	1.0
	Rated Output Current for Constant Torque (A)	1.5	2.5
	Maximum Output Voltage (V)	Proportional Input Voltage	
	Output Frequency (Hz)	0.00 ~ 120.00Hz	
	Carrier Frequency (kHz)	10 kHz	
	Rated Input Current (A)	4.9A	6.5A
Environment	Voltage Tolerance	Single Phase 200 -20% ~ 240V +10% (160~264V)	
	Frequency Tolerance	50/60Hz ±5% (47 ~ 63Hz)	
Cooling Method	200W natural cooling / 400W natural cooling		
Frame	W170 * L215 * H55 mm		

General Specifications

Control Characteristics	Starting Torque	At 0.5Hz, starting torque reaches above 150% at 0.5Hz; under FOC+PG mode, starting torque reaches above 150% at 0Hz.	
	Speed Control Range	1:100 (external PG installation can achieve 1:1000)	
	Speed Control Accuracy	±0.5% (external PG installation can achieve 0.02%)	
	Speed Response Ability	5Hz (vector control can attain 30Hz)	
	Max. Output Frequency (Hz)	0.00 to 120.00 Hz	
	Output Frequency Accuracy	Digital command ±0.005%	
	Frequency Setting Resolution	Digital command ±0.01Hz	
	Torque Limit	200% torque current as maximum	
	Accel/Decel Time	0.00 ~ 600.00 sec	
	V/F Curve Pattern	Adjustable V/F curve of 4 independent points	
Operating Characteristics	Frequency Setting Signal	Keypad	By parameter setting
		External Signal	Multi-function input selection 1 ~ 5 (15 step speeds; JOG), parameter setting on serial communication port (RS-485)
	Operation Setting Signal	Keypad	Set by RUN, STOP key
		External Signal	2 wires (Fwd, Rev, RUN), JOG operation, RS-485 serial interface, demo mode
	Multi-Function Input Signal	Multi-step speed selection MI1 ~ MI15, Jog, first to second accel/decel switches, demo mode, force stop, emergency stop, operation command source, parameter lock, driver reset, open/close limit signal, door open prohibited signal, force open signal, reposition, 2 nd step open/close curve selection	
Multi-Function Output Signal	(RC1,RA1,RB1), (RC2,RA2,RB2), (MO1,MO2,MO3 and MCM) AC drive operating, frequency attained, fault indication, over torque, over voltage, operation mode, alarm indication, demo mode indication, overheat alarm, drive is ready, emergency stop, braking signal, zero speed indication, PG indication error, position detection, limit signal, re-open/close indication, position finished		
Communication Interface		Built-in MODBUS, customize CAN Bus	
Alarm Output Contact		Contact "ON" when malfunctions occurs (relay with a "C" or "A" contact, or 2 open collector outputs)	
Operation Function		AVR, 4 set fault records, reverse inhibition, DC brake, auto torque/slip compensation, auto tuning, adjustable carrier frequency, output frequency upper and lower limits, parameter reset, vector control, MODBUS communication, abnormal reset, abnormal re-start, PG feedback control, fan control, demo mode, door width auto-tuning	
Protection Function		Over voltage, over current, under current, external fault, overload, ground fault, overload, overheating, electronic thermal, PG feedback error, external limit signal error, re-open/re-close	
Digital Keypad		7 function keys, 4-digit 7-segment LED, 4 status LEDs, master frequency, output frequency, output current, custom units, parameter values for setup, review and faults, RUN, STOP, RESET, FWD/REV	
Built-in EMI filter		Certified to EN55011 CLASS A	
Protection Characteristics	Motor Protection		Electronic thermal relay protection
	Over Current Protection		The current forces 180% of the over-current protection and 240% of the rated current
	Overload Capacity		150% for 120 seconds; 180% for 10 seconds
	Voltage Protection		Over-voltage level: Vdc>400; low-voltage level: Vdc<200
	Over-voltage Protection for Input Power		Varistor (MOV)
	Overheat Protection		Built-in temperature sensor
Environment	Enclosure Rating		IP20
	Operation Temperature		-10°C ~ 40°C
	Ambient Temperature		-20°C ~ 60°C
	Ambient Humidity		Below 90% RH (non-condensing)
	Vibration		1.0G less than 20Hz, 0.6G at 20 ~ 60 Hz
Installation Location		Altitude 1,000m or lower, keep from corrosive gasses, liquid and dust	
Certificate			

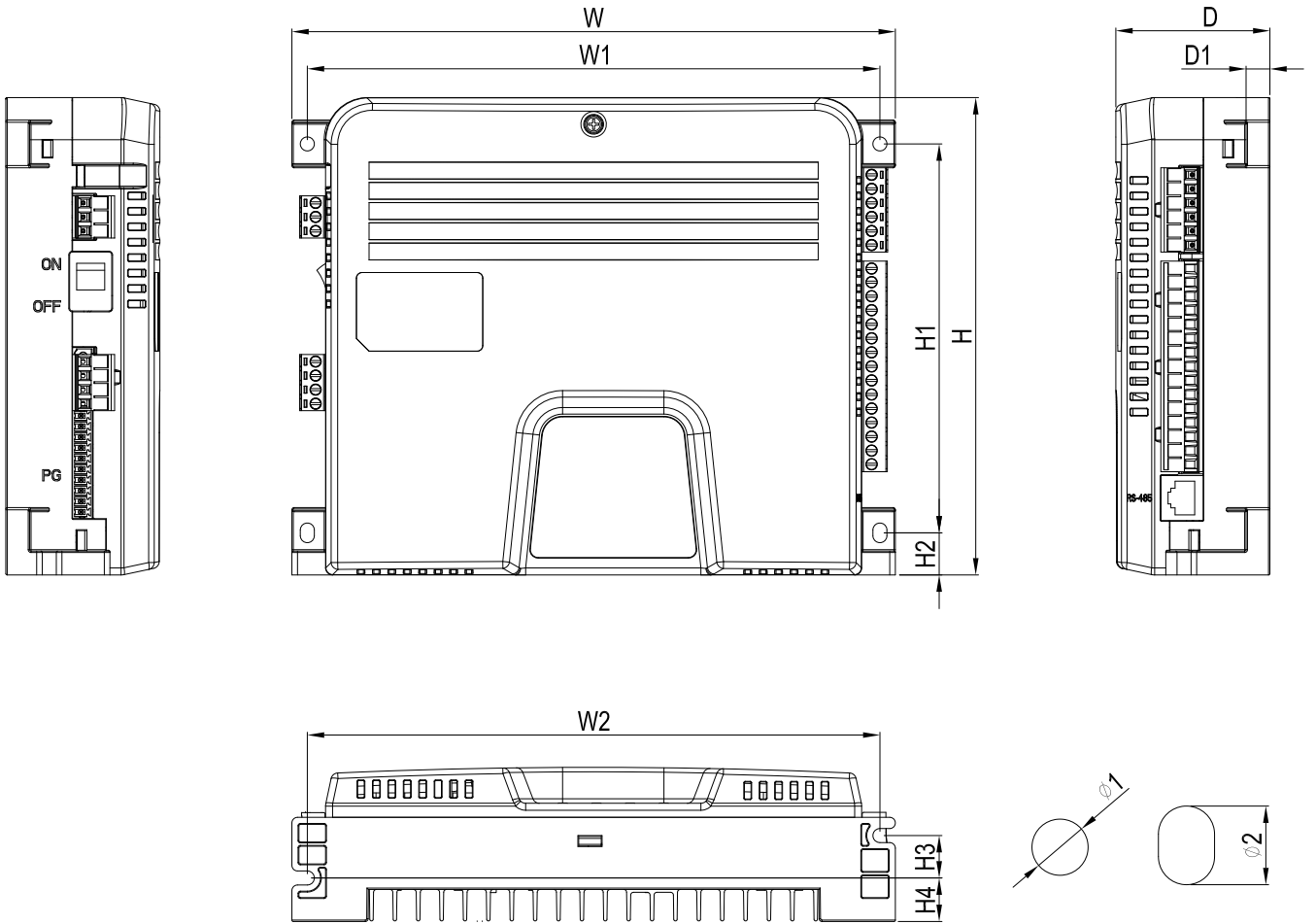
Wiring



*Please refer to VFD-DD series user manual for terminal definition of E type encoder.

Dimensions

FRAME_A1

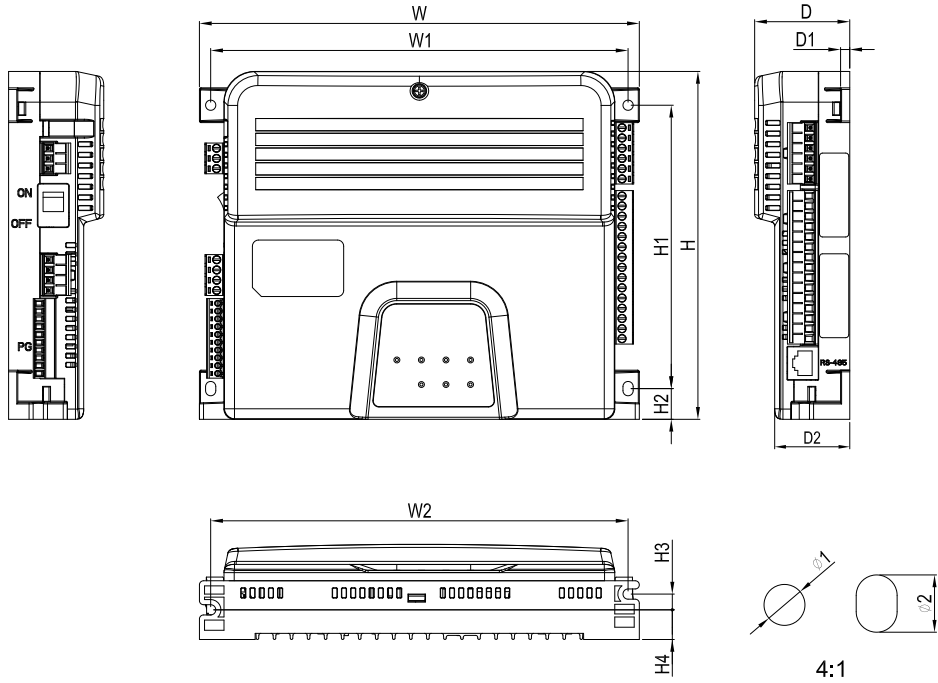


MODEL

VFD002DD21S
VFD002DD21V
VFD002DD21T
VFD004DD21S
VFD004DD21V
VFD004DD21T

Frame		W	H	D	W1	W2	H1	H2	H3	H4	D1	Ø1	Ø2
A1	mm	215.0	170.0	55.0	204.0	204.0	138.5	15.0	15.1	15.5	8.5	5.0	7.0
	inch	8.46	6.69	2.17	8.03	8.03	5.45	0.59	0.59	0.61	0.34	0.20	0.28

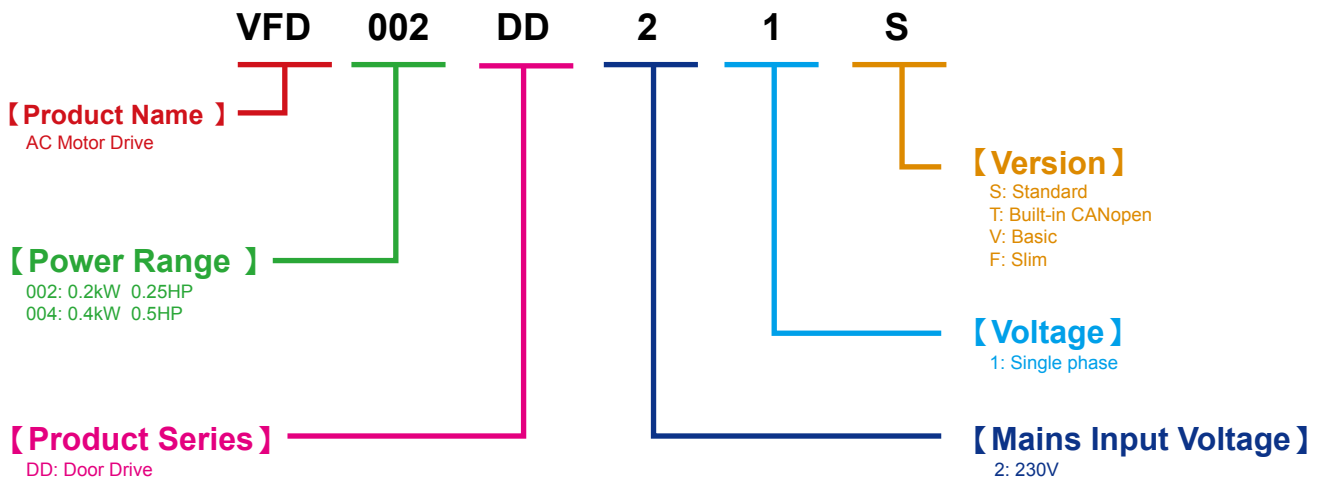
FRAME_A2



MODEL
VFD002DD21F

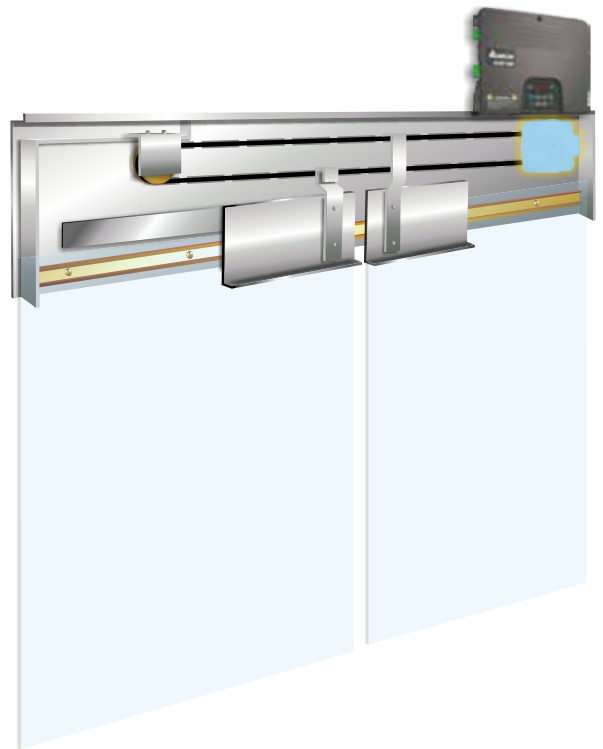
Frame		W	H	D	W1	W2	H1	H2	H3	H4	D1	Ø1	Ø2
A2	mm	215.0	170.0	46.5	204.0	204.0	138.5	15.0	7.7	14.5	4.5	5.0	7.0
	inch	8.46	6.69	1.83	8.03	8.03	5.45	0.59	0.3	0.57	0.17	0.20	0.28

Model Name of Door Drive



Servo Motors ECMD Series

- 55mm thin design
- Instant torque up to 5N-m
- Maximizes installation flexibility
Both sides of motor can be installed
- Motor temperature detection and overheating protection

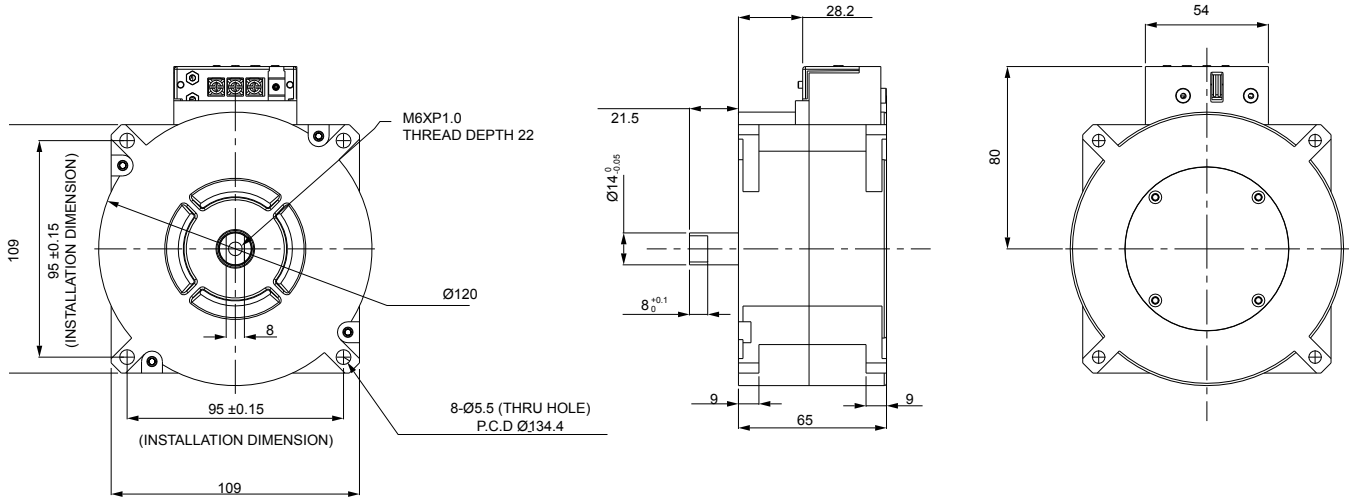


Specifications

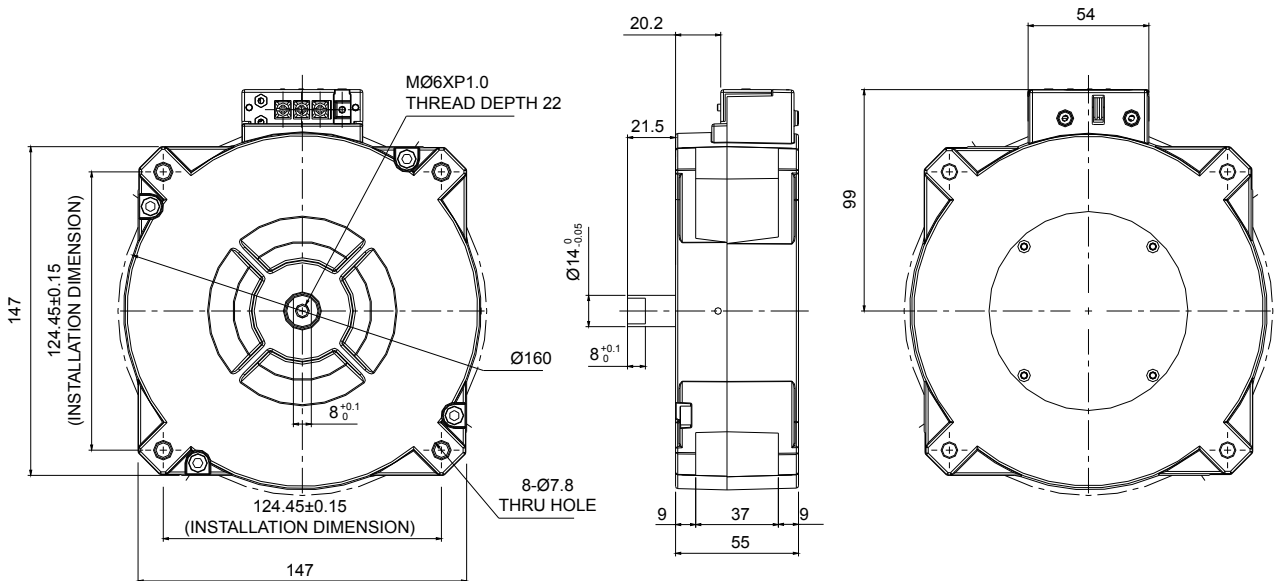
Model Name		ECMD-B91207M_	ECMD-B91608M_	ECMD-B81610M_
Rated Speciation	Rated Power (W)	70	80	100
	Rated Voltage (V)	220	220	220
	Rated Torque (N-m)	2.0	3.0	3.5
	Rated Speed (rpm)	350	250	280
	Rated Current (A)	0.7	1.0	0.95
Rated Speciation	Pole Numbers	10	16	16
	Encoder Resolution	10 bit (256ppr)	10 bit (256ppr)	12 bit (1024ppr)
	Continuous Stall Torque (N-m)	2.0	3.0	3.5
	Max. Instant Torque (N-m)	5.0	5.0	5.5
	Max. Speed (rpm)	750	600	500
	Max. Instant Current (A)	2.5	2.5	2.5
	Rotor Moment of Inertia (Kg.m ²)	3.0X10 ⁻⁴	4.9X10 ⁻⁴	4.9X10 ⁻⁴
	Armature Resistance (Ohm)	18.7	15.8	24.3
	Armature Inductance (mH)	195	177	273
	Mechanical Time Constant (ms)	1.96	2.42	2.13
	Electrical Time Constant (ms)	10.4	11.2	11.2
	Insulation Class	B		
	Insulation Resistance	10MΩ DC500V		
	Insulation Strength	1.5 k V _{AC} , 1 min.		
	Max. Radial Shaft Load (N)	98		
	Max. Thrust Shaft Load (N)	49		
	Weight (kg)	2.5	3.0	3.0
Environment	Maximum Winding Temperature	130 °C		
	Operating Temperature	5 ~ 45 °C		
	Storage Temperature	-10 ~ 50 °C		
	Operating Humidity (%RH)	20 ~ 95%RH (Non-condensing)		
	Storage Humidity (%RH)	20 ~ 95%RH (Non-condensing)		
	IP Rating	IP20 (Standard)		

Dimensions

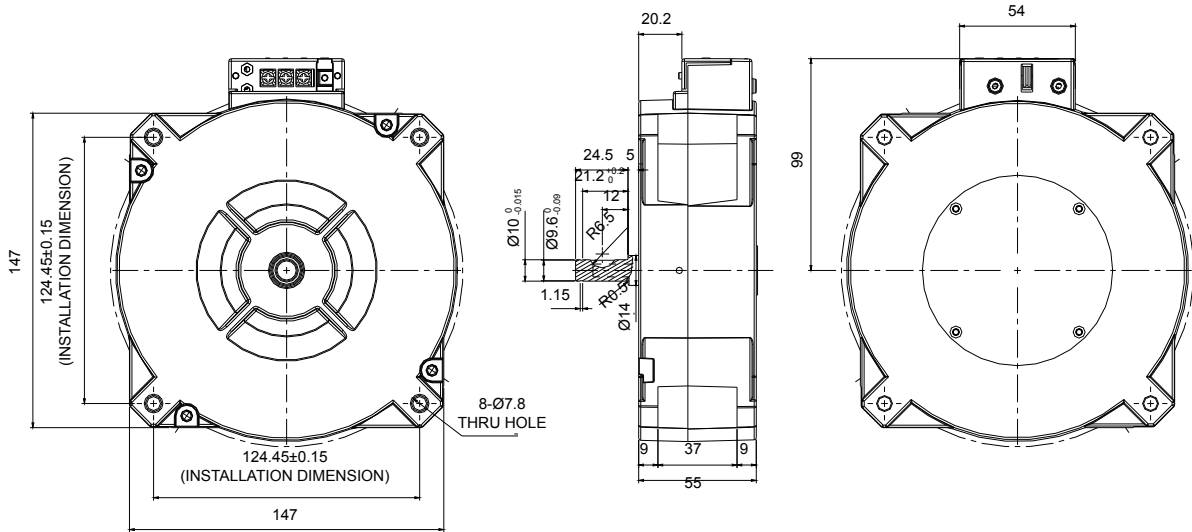
■ ECMD-B91207MS



■ ECMD-B91608MS/ECMD-B81610MS

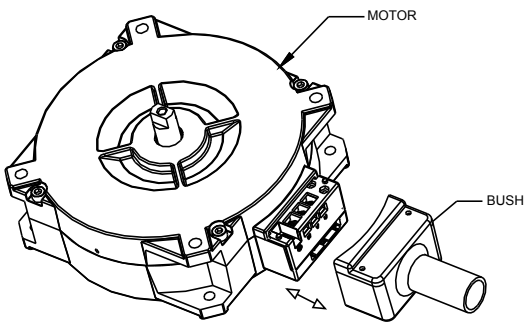


■ ECMD-B81610MG

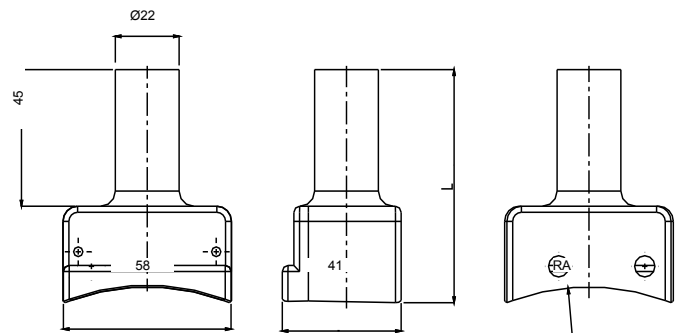


ECMD Motor Dust Cap

■ ECMD Motor Dust Cap Installation



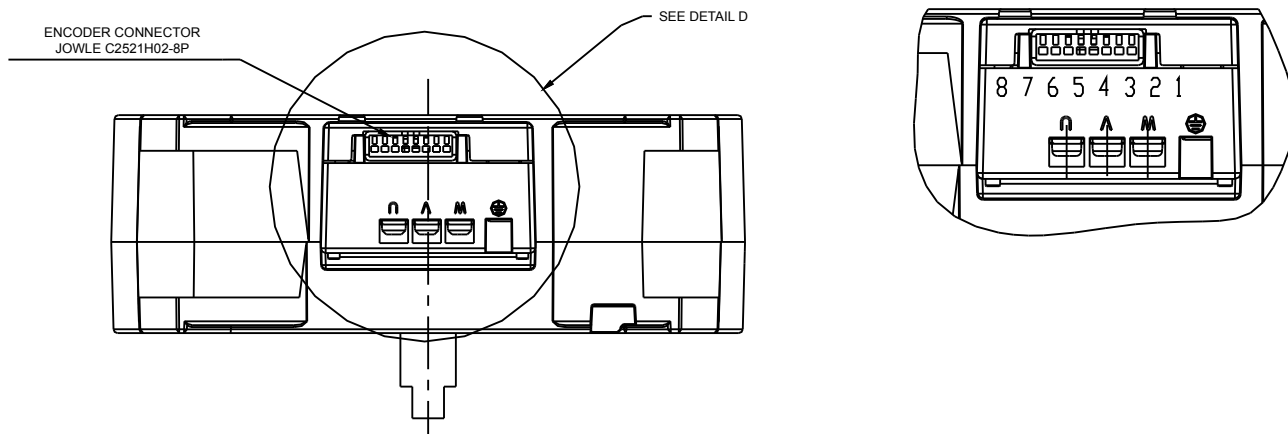
■ ECMD Motor Dust Cap Specification



MODEL NAME	L (mm)	RA (mm)	USED ON
DPB-N7860	77.4	60	ECMD-B91207M_
DPB-N7779	76.8	79	ECMD-B81610M_ ECMD-B91608M_

Pin Definitions

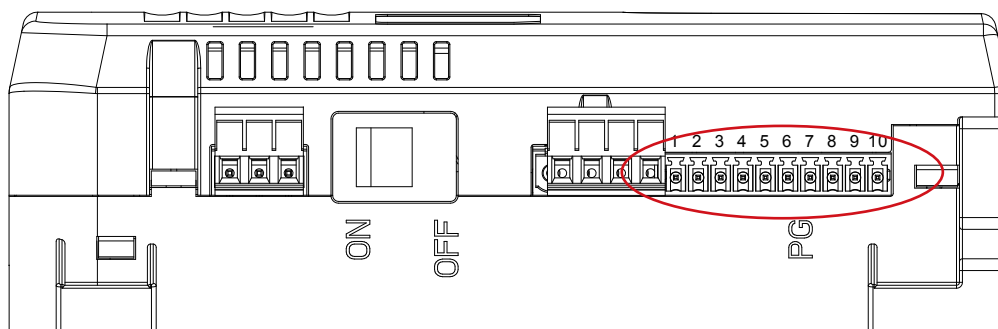
■ ECMD Motor Pin Definitions



PIN NO.	1	2	3	4	5	6	7	8
FUNCTION	A+	NTC+	B+	NTC-	PWM+	PWM-	+5V	GND

※ NTC+, NTC- function still under development.

■ VFD-DD Pin Definitions of Encoder Feedback Terminal



PIN NO.	1	2	3	4	5	6	7	8	9	10
FUNCTION	PE	G	B	A	Z	\bar{Z}	+T*	-T*	5V	12V

※ +T, -T would be connected to pin NTC+, NTC- on the ECMD motor, keep it empty if the chosen motor does not support NTC function (motor overheat protection).

VFD-DD & ECMD

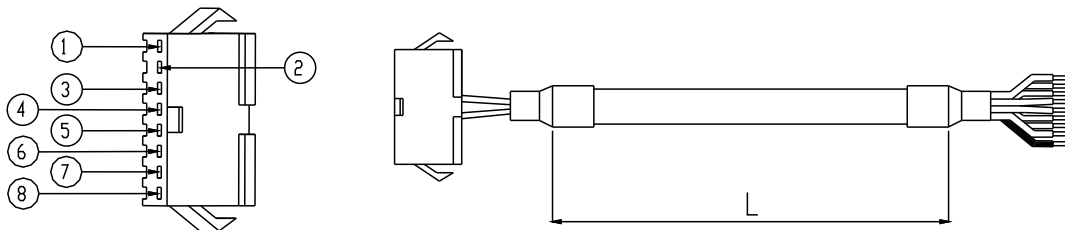
Pin definitions and connection for the encoder feedback signal of motor

Pin Definition of DD	Pin Definition of ECMD	Color of Core Wire
PE	--	--
G	GND	BLU
B	B+	WHT
A	A+	BLK
Z	PWM+	ORG
Z̄	PWM-	ORG/RED
+T	NTC+*	BLK/RED
-T	NTC-*	WHT/RED
5V	+5VDC	BRN
12V	--	--

※ NTC+, NTC- functions are still under development.

ECMD Motor

Pin Definitions and Signal Cable Specifications (Without D-SUB connector)

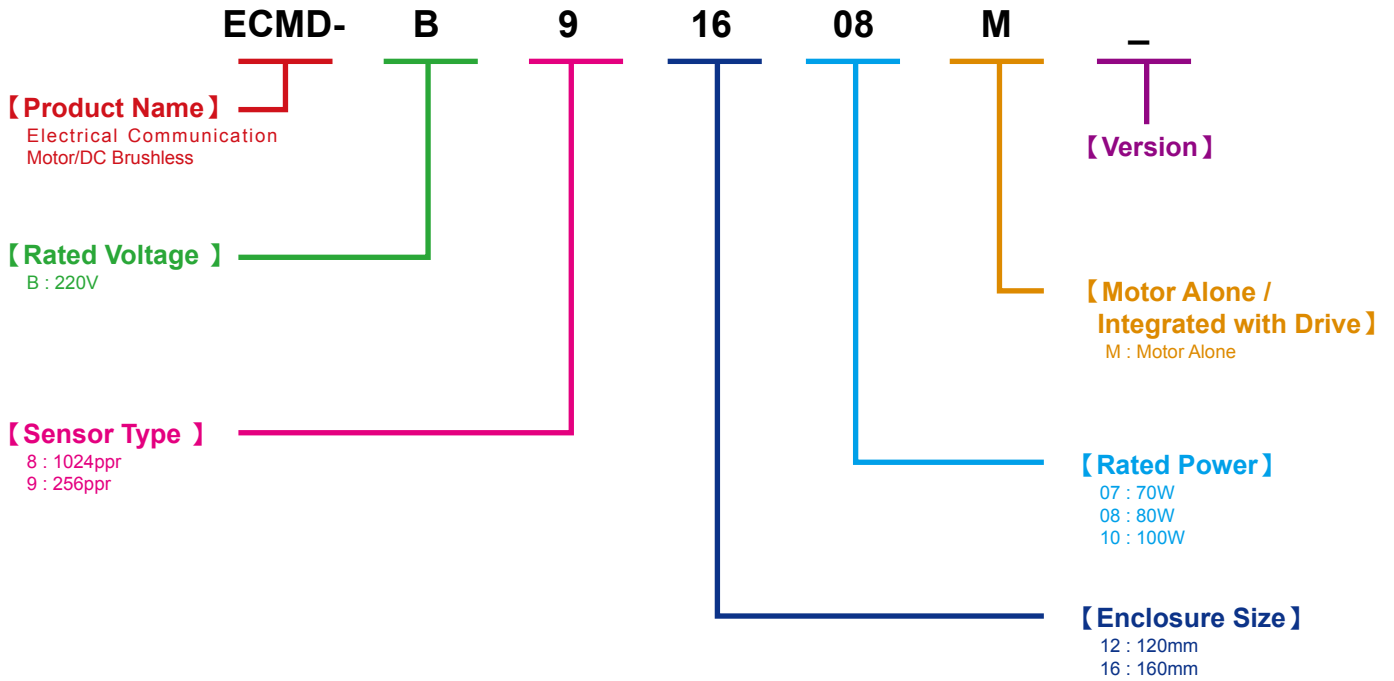


JOWLE C2522H02-8P DETAIL		
COLOR	DESCRIPTION	COLOR
1	A+	BLK
2	NTC+*	BLK/RED
3	B+	WHT
4	NTC-*	WHT/RED
5	PWM+	ORG
6	PWM-	ORG/RED
7	+5V	BRN
8	GND	BLUE

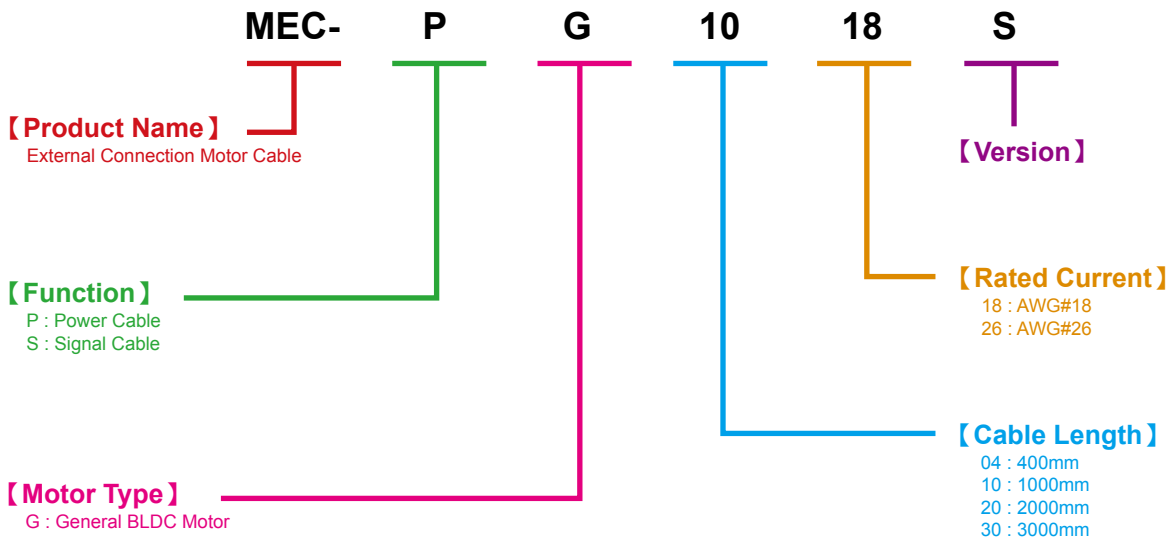
MODEL NAME	L (mm)
MEC-SG0426S	385
MEC-SG1026S	1000
MEC-SG2026S	2000
MEC-SG3026S	3000

*NTC+, *NTC- are under development, now are empty pins

Model Name of ECMD Motor



Model Name of Motor Cable



Ordering Information

VFD-DD Series	Description
VFD002DD21S	230VAC-1Phase 200W AC motor drive, supports IM & PM motors, built-in EMI filter
VFD004DD21S	230VAC-1Phase 400W AC motor drive, supports IM & PM motors, built-in EMI filter
VFD002DD21V	230VAC-1Phase 200W AC motor drive, supports IM & PM motors
VFD004DD21V	230VAC-1Phase 400W AC motor drive, supports IM & PM motors
VFD002DD21T	230VAC-1Phase 200W AC motor drive, supports IM & PM motors, built-in EMI filter/CAN*
VFD004DD21T	230VAC-1Phase 400W AC motor drive, supports IM & PM motors, built-in EMI filter/CAN*
VFD002DD21F	230VAC-1Phase 200W motor drive, Supports IM&PM motors, built-in EMI Filter, slim type

* CANopen protocol is provided upon request, please contact Industrial Automation Business Group

ECMD Motor	Description
ECMD-B91207MS	Servo motor enclosure size 120mm, rated power 70W, torque 2.0 N-m, speed 350 rpm
ECMD-B91608MS	Servo motor enclosure size 160mm, rated power 80W, torque 3.0 N-m, speed 250 rpm
ECMD-B81610MS	Servo motor enclosure size 160mm, rated power 100W, torque 3.5 N-m, speed 280 rpm
ECMD-B81610MG	Servo motor enclosure size 160mm, rated power 100W, torque 3.5 N-m, speed 280 rpm (different shaft shape)

* Without power cable and encoder cable

Accessories	Description
MEC-SG0426S	385mm ECMD motor encoder cable, without D-SUB connector
MEC-SG1026S	1,000mm ECMD motor encoder cable, without D-SUB connector
MEC-SG2026S	2,000mm ECMD motor encoder cable, without D-SUB connector
MEC-SG3026S	3,000mm ECMD motor encoder cable, without D-SUB connector
MEC-PG0418S	370mm ECMD motor power cable
MEC-PG1018S	1,000mm ECMD motor power cable
MEC-PG2018S	2,000mm ECMD motor power cable
MEC-PG3018S	3,000mm ECMD motor power cable
DPB-N7860	ECMD-B91207MS dust cap
DPB-N7779	ECMD-B91608M_/ECMD-B81610M_dust cap



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