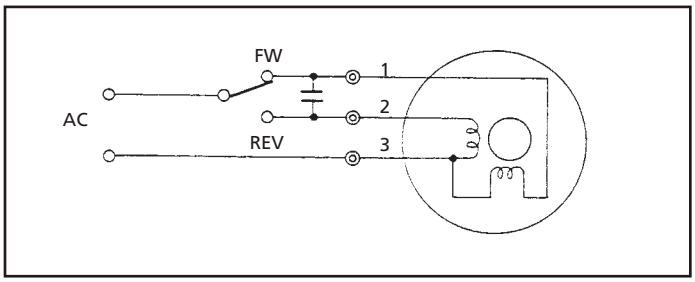
Fig 1.1: 1/50~1/6 Hp 1 Phase Wiring



Wire	Color Code 115V	Color Code 220V, 230V
1	Blue	Brown
2	Black	Black
3	Grey	Grey

Fig 1.2 UL/CSA/CE/RoHS

Voltage	Horsepower	UL/cUL File No.	RoHS	CE Details
Three Phase	1/50~1/6 Hp	E172017	Yes	Low Voltage Directive 73/23/EEC EN Standards: EN60034-1 (Regulations on motors in general)
Single Phase	1/50~1/6 Hp	E153713	Yes	

Notes:

1. Motors in File E172017 comply to UL1004 Standard for Safety Electric Motors.
2. Motors in UL File E153713 comply to UL2111 Overheating Protection for Motors.
3. Products bear the UL component recognition marking for UL and cUL (CSA).
4. Products with the cUL marking comply with CSA standards and can be legally sold in Canada.
5. Products bear the CE marking on the namplate.

Table 1.1: Single Phase 1/50~1/6 Hp Motors

Hp	G Frame	H Fame	F2 Frame	Cooling	Voltage V	Full Load (RPM)	Full Load Current (A)	Motor Torque (in-lb)	Start Torque (in-lb)	Starts per Minute	Capacitor	
						nmotor	Imotor	Tmotor	Tstart		mFd	Volts
1/50 Hp	12 22	15 22	12	TENV	115 220 230	1690 1680 1690	0.33 0.14 0.15	0.71	0.48 0.62 0.69	10	4 1 1	220 440 440
1/30 Hp	12 22	15 22	12	TENV	115 220 230	1630 1650 1650	0.44 0.23 0.20	1.17	0.76 0.87 0.76	10	5 1.5 1.2	220 440 440
	15 28	28	n/a	TENV	115 220 230	1650 1650 1650	0.45 0.23 0.21	1.17	0.82 1.15 0.83	10	5 1.5 1.2	220 440 440
1/20 Hp	15 28 32	18 28 32	15	TENV	115 220 230	1670 1640 1660	0.60 0.31 0.31	1.88	1.60 1.35 1.53	10	8 2 2	220 440 440
	18	n/a	n/a	TENV	115 220 230	1740 1730 1730	0.62 0.32 0.28	1.88	1.32 1.13 1.22	10	8 2 2	220 440 440
1/15 Hp	15 28 32	18 28 32	15	TEFC	115 220 230	1650 1660 1670	0.90 0.43 0.43	2.81	2.11 2.08 2.34	10	12 3 3	220 440 440
	18	n/a	n/a	TEFC	115 220 230	1700 1700 1700	0.87 0.45 0.45	2.81	1.97 1.91 1.91	10	12 3 3	220 440 440
1/10 Hp	15 28 32	18 28 32	15	TEFC	115 220 230	1600 1630 1640	1.20 0.62 0.62	4.23	2.96 2.78 2.78	10	15 3.5 3.5	220 440 440
	18 40	40	n/a	TEFC	115 220 230	1700 1680 1680	1.40 0.70 0.75	4.23	3.38 2.43 2.69	10	20 5 5	220 440 440
1/6 Hp	18	n/a	n/a	TEFC	115 220 230	1700 1700 1710	1.70 0.85 0.85	5.63	3.83 3.65 3.65	10	24 6 6	220 440 440

Table 1.2: Capacitors for 115V 1 Phase Motors

Part No.	mFd	Volts*	W	h	t	d	l
C4.0M220V	4	220V	1.22	1.06	0.67	1.06	0.18
C5.0M220V	5	220V	1.22	1.06	0.67	1.06	0.18
C8.0M220V	8	220V	1.50	1.14	0.75	1.14	0.18
C12M220V	12	220V	1.89	1.14	0.75	1.14	0.18
C15M220V	15	220V	2.28	1.22	0.83	1.22	0.18
C20M220V	20	220V	2.28	1.38	0.87	1.26	0.18
C24M220V	24	220V	2.28	1.46	0.93	1.52	0.28

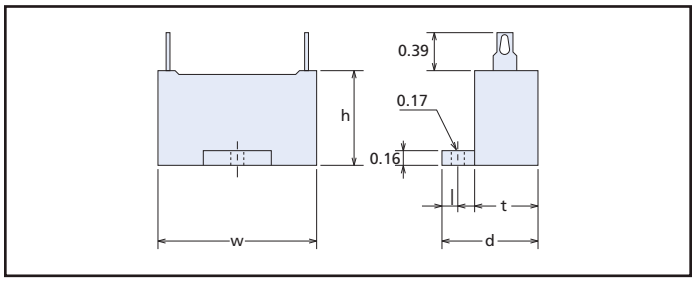
* 220V Capacitors are for operation with 115V Motors

Table 1.3: Capacitors for 220/230V 1 Phase Motors

Part No.	mFd	Volts*	W	h	t	d	l
C1.0M440V	1	440V	1.22	1.06	0.67	1.06	0.18
C1.2M440V	1.2	440V	1.46	1.06	0.71	1.10	0.18
C1.5M440V	1.5	440V	1.50	1.22	0.83	1.22	0.18
C2.0M440V	2	440V	1.89	1.14	0.75	1.14	0.18
C3.0M440V	3	440V	2.28	1.22	0.83	1.22	0.18
C3.5M440V	3.5	440V	2.28	1.22	0.83	1.22	0.18
C5.0M440V	5	440V	2.28	1.46	0.93	1.52	0.28
C6.0M440V	6	440V	2.28	1.61	1.14	1.73	0.28

* 440V Capacitors are for operation with 220V or 230V motors.

Fig 1.3: Capacitor Dimensional Drawing



Note : Capacitors are shipped with single phase motors.
They do not need to be ordered separately with gearmotors.
The part numbers are for spare parts orders only.

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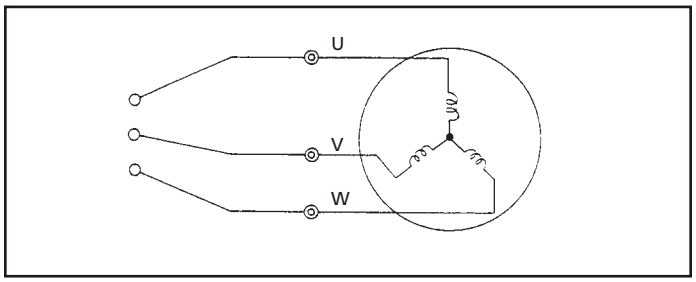
Fig 1.4: 1/50~1/6 Hp 3 Phase Wiring



Wire	Color Code 208/230V	460V
U	Black	Black
V	Grey	Brown
W	White	White

Table 1.4: Three Phase 1/50~1/6 Hp Motors

Hp	G Frame	H Fame	F2 Frame	Cooling	Voltage V	Full Load (RPM) nmotor	Full Load Current (A) Imotor	Motor Torque (in-lb) Tmotor	Start Torque (in-lb) Tstart	Starts per Minute
1/50 Hp	12 22	15 22	12	TENV	208 230 460	1610 1650 1700	0.13 0.13 0.12	0.71	1.58 2.03 3.99	10
1/30 Hp	12 22	15 22	12	TENV	208 230 460	1580 1630 1650	0.19 0.19 0.12	1.17	2.52 3.22 3.74	10
	15 28	28	n/a	TENV	208 230 460	1550 1610 1600	0.17 0.17 0.09	1.17	2.63 3.33 3.22	10
1/20 Hp	15 28 32	18 28 32	15	TENV	208 230 460	1560 1610 1650	0.26 0.28 0.14	1.88	5.17 6.20 5.64	10
	18	n/a	n/a	TENV	208 230 460	1620 1660 1650	0.21 0.19 0.10	1.88	4.51 5.45 4.89	10
1/15 Hp	15 28 32	18 28 32	15	TENV	208 230 460	1560 1610 1600	0.36 0.38 0.17	2.81	7.30 9.70 7.36	10
	18	n/a	n/a	TENV	208 230 460	1640 1670 1650	0.31 0.31 0.16	2.81	6.88 8.46 7.13	10
1/10 Hp	15 28 32	18 28 32	15	TEFC	208 230 460	1550 1610 1600	0.48 0.50 0.26	4.23	10.74 13.28 12.06	10
	18 40	40	n/a	TENV	208 230 460	1670 1690 1650	0.47 0.46 0.24	4.23	9.90 12.10 10.70	10
1/6 Hp	18	n/a	n/a	TEFC	208 230 460	1600 1650 1650	0.64 0.61 0.31	5.63	11.94 16.89 17.73	10

Note : IP-65 Models cannot be made 460V

Fig 1.5 Three Phase Special Voltages 1/50~ 1/6 Hp

Voltage	Frequency (Hz)	UL/CSA	CE
230	50	No	Yes
240	50		
360	50		
400/400/440	50/60/60		
415	50		
420	50		
440	50		
220	50	Yes	
200/200/220	50/60/60		
380/400/400/440	50/50/60/60		No
380	60		
240	60		

Note: When selecting any of the above voltages:
Use special voltage code "8" in the part number
Specifiy the voltage/frequency rating on your P.O.
Note: IP-65 models cannot be made in 380~460V

Fig 1.6 Single Phase Special Voltages 1/50~ 1/6 Hp

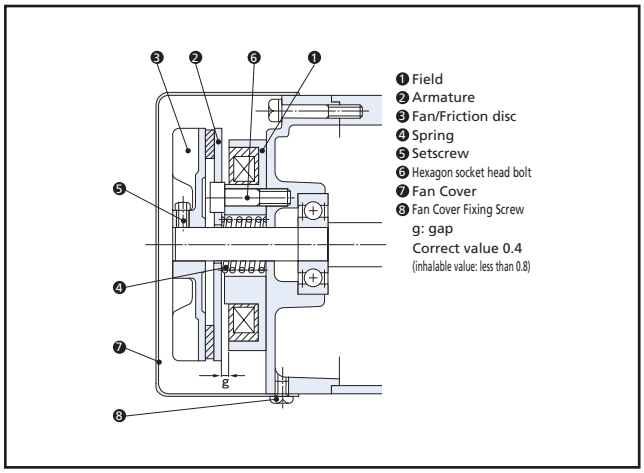
Voltage	Frequency (Hz)	UL/CSA	CE
120	60	Yes	No
220	60		
230	60		
240	60		
100/100	50/60		
200/200	50/60		
110	50	No	
115	50		
120	50		
220	50		
230	50		
240	50		

Note: When selecting any of the above voltages:
Use special voltage code "7" in the part number
Specifiy the voltage/frequency rating on your P.O.

Tabe 1.5: Standard Brake

	Specifications 220/230V Single Phase, 208/230V 3 Phase, 460V 3 Phase						115V Single Phase					
Specification	1/50 Hp	1/30 Hp	1/20 Hp	1/15 Hp	1/10 Hp	1/6 Hp	1/50 Hp	1/30 Hp	1/20 Hp	1/15 Hp	1/10 Hp	1/6 Hp
Brake Type	Power-off, Brake-on (Spring Close)											
Rated Torque (in-lb)	3.27				4.78		3.27				4.78	
Voltage	DC90V						DC45V					
Power (@ 75C)	12W						10W					
Current (@ 75C)	0.13A						0.25A					
Max Braking Frequency	10/min											

Fig 1.7: Standard Brake Structure



Specifications 220/230V Single Phase, 208/230V 3 Phase, 460V 3 Phase,115V Single Phase

Table 1.6: IP-65 Brake Specifications

Phase: Voltage	3 Ph: 208/230V		1 Ph: 220,230V		1 Ph: 115V	
Horsepower	1/50Hp 1/30 Hp	1/30 Hp 1/20 Hp 1/15 Hp 1/10 Hp	1/50Hp 1/30 Hp	1/30 Hp 1/20 Hp 1/15 Hp 1/10 Hp	1/50Hp 1/30 Hp	1/30 Hp 1/20 Hp 1/15 Hp 1/10 Hp
Specification	G-12 H-15 F2-12	G-15, G-18 H-18 F2-15	G-12 H-15 F2-12	G-15, G-18 H-18 F2-15	G-12 H-15 F2-12	G-15, G-18 H-18 F2-15
Brake Type	Power-off, Brake-on (Spring Close)					
Rated Torque (in-lb)	2.83	6.37	2.83	6.37	2.83	6.37
Voltage	DC90V				DC45V	
Power (@ 75C)	5.6W	6.5W	5.6W	6.5W	5.1W	6.4W
Current (@ 75C)	0.06A	0.07A	0.06A	0.07A	0.12A	0.14A
Max Braking Frequency	10/min					

Fig 1.7: Standard Brake Structure

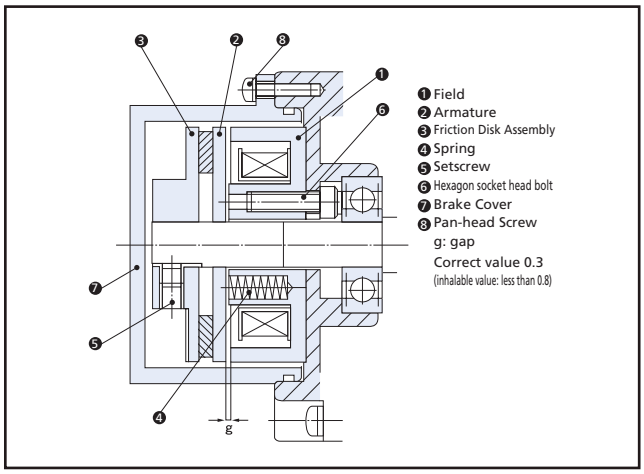


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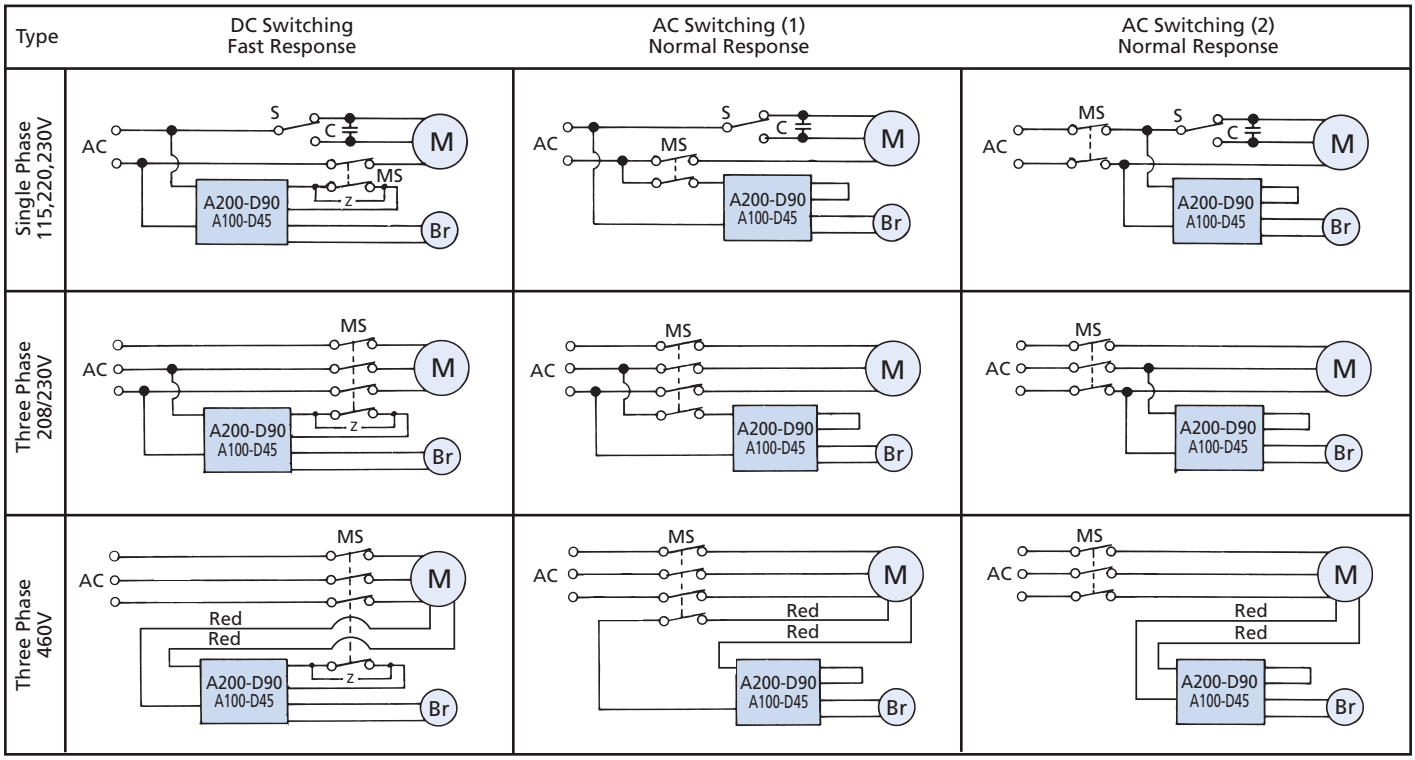
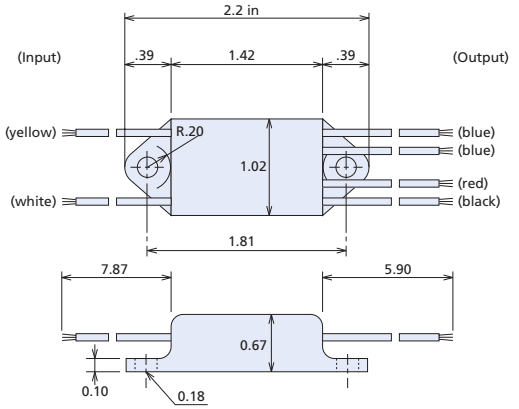
Fig 1.9: Brake Wiring without Inverter (VFD)



M: Motor Br: Brake S: Reversing switch C: Capacitor MS: Magnetic switch Z: R-C circuit (OP-CRM-2)
For Wiring a brake equipped gearmotor with an Inverter (VFD), please see page 15.

Fig 1.10: Rectifier Dimensions



Dimensions of A200-D90 Input Voltage: 200-220VAC / Output: 90VDC
(A100-D45) (Input Voltage: 100-110VAC / Output: 45VDC)

Alternate Rectifier (Same Dimensions)
A100-D90 Input Voltage: 100~120V
Output Voltage: 90VDC

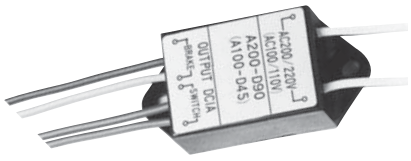
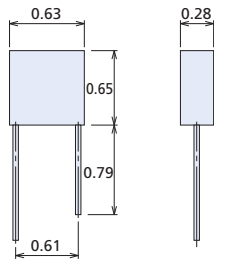
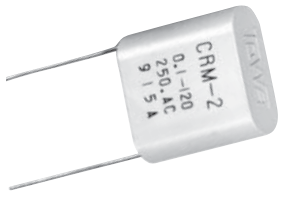


Fig 1.11: Snubber Dimensions (OP-CRM-2)



(Z) OP-CRM-2
(120 Ohm-0.1 mFd)
R-C Circuit Dimensions



Note:

1. The rectifier is shipped with the brakemotor as an accessory. It must be mounted remotely in a panel or box. It may not fit in the terminal box supplied on the gearmotor.
2. The OP-CRM-2 is an optional part. Please order it separately if it is required.

Table 1.7: C Box and A Box Dimensions

Dimension		M2 (From Motor Center)		M3 (Both "C" and "A" Box) (From End of Motor)			Box Rotation
Type	Frame	"C" Box	"A" Box	TENV	TEFC	Brakemotor	(1)(2)
BG	12	3.52	3.85	1.67	3.17	3.17	180°
	15	3.80	4.13	1.67	3.11	3.11	
	18	4.11	4.44	1.67	3.13	3.13	
	22	3.52	3.85	1.67	3.17	3.17	
	28	3.80	4.13	1.67	3.11	3.11	
	32	3.80	4.13	1.67	3.11	3.11	
BH	15	3.52	3.85	1.67	3.17	3.17	180°
	18	3.80	4.13	1.67	3.11	3.11	
	22	3.52	3.85	1.67	3.17	3.17	
	28	3.80	4.13	1.67	3.11	3.11	
	32	3.80	4.13	1.67	3.11	3.11	
	40	4.11	4.44	1.67	3.13	3.13	
BF2	12	3.52	3.85	1.67	3.17	3.17	180°
	15	3.80	4.13	1.67	3.11	3.11	

(1) Rotation is around motor centerline. Also see Fig. 2.11.
(2) The box cannot be repositioned in the field. It must be done at the factory by stator insertion.

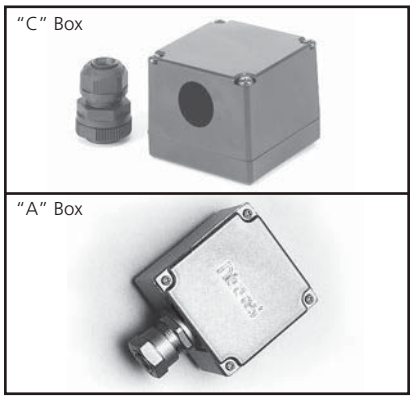


Fig 1.12: C Box Dimensions

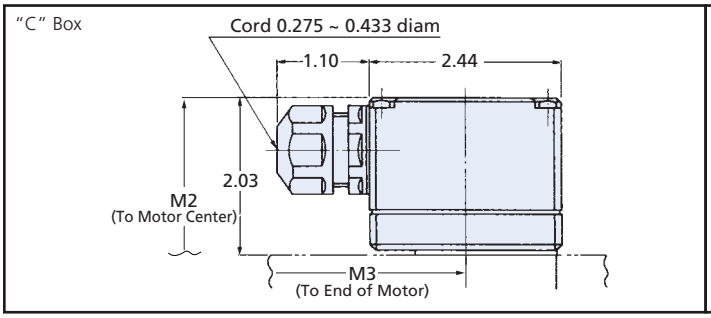


Fig 1.13: A Box Dimensions

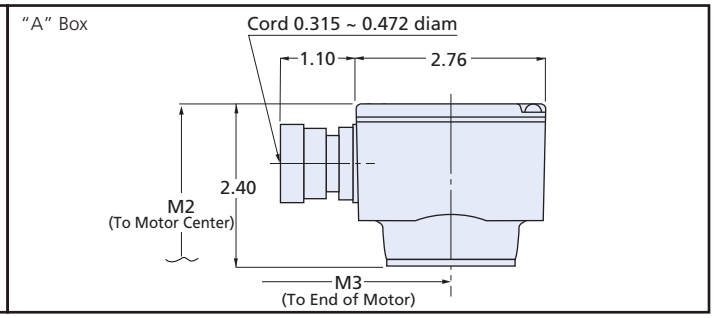


Fig 1.14: G, H Mini Lead Exit Options, Standard Motors

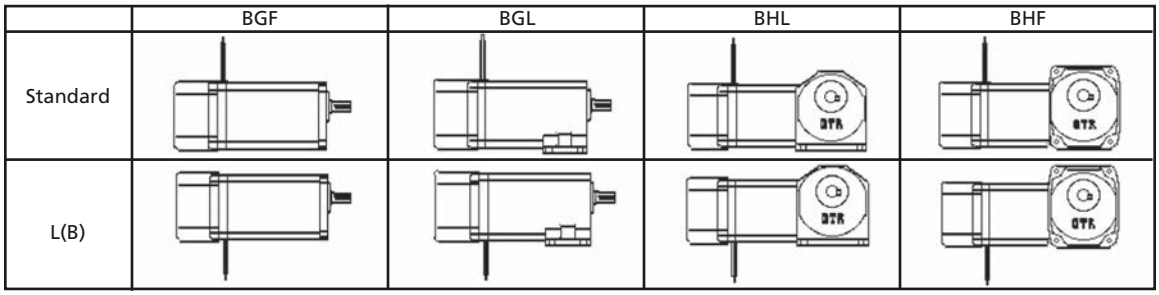


Fig 1.15: G, H Mini Terminal Box Position Options, Standard Motors

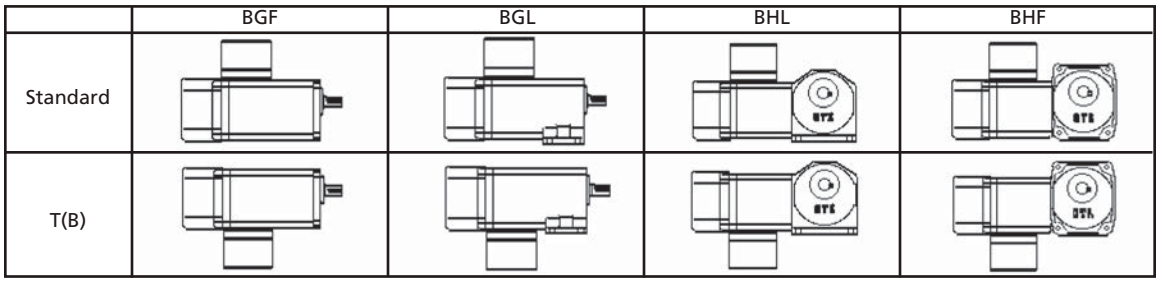
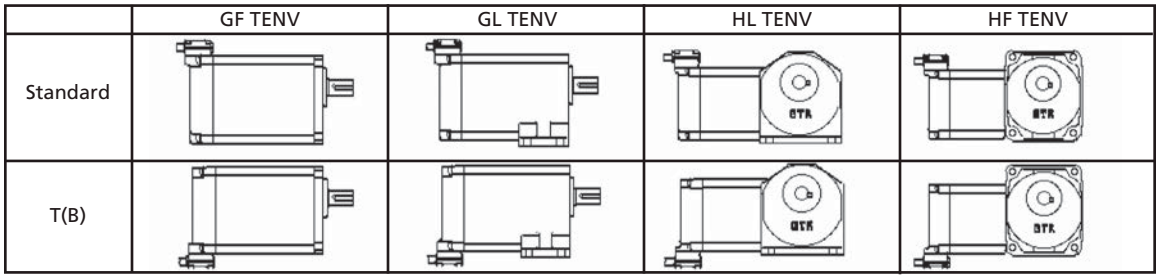


Fig 1.16: G, H Mini Cord Position Options, IP-65 Motors



Please specify on your order if you require the terminal box or lead wires in the T(B) or L(B) position.

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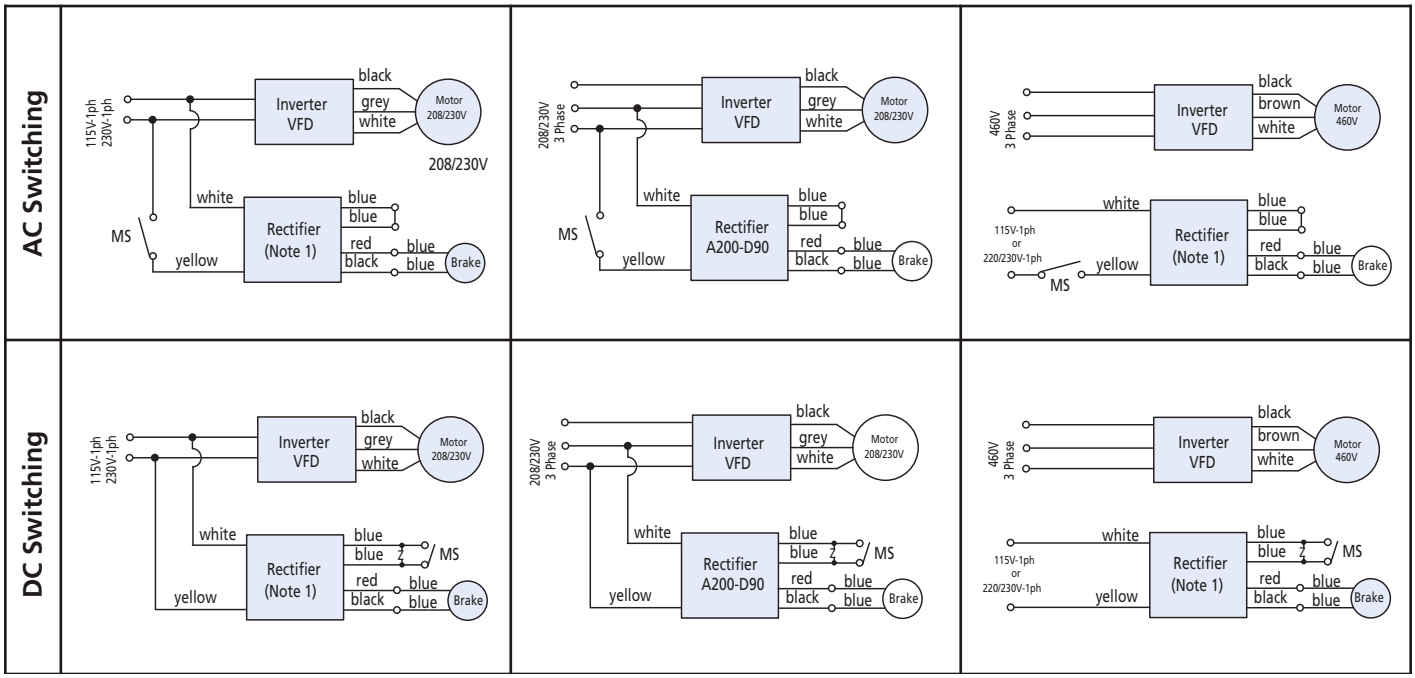
Fig 1.17A: VFD Wiring 115V 1 Phase 220/230V 1 Phase

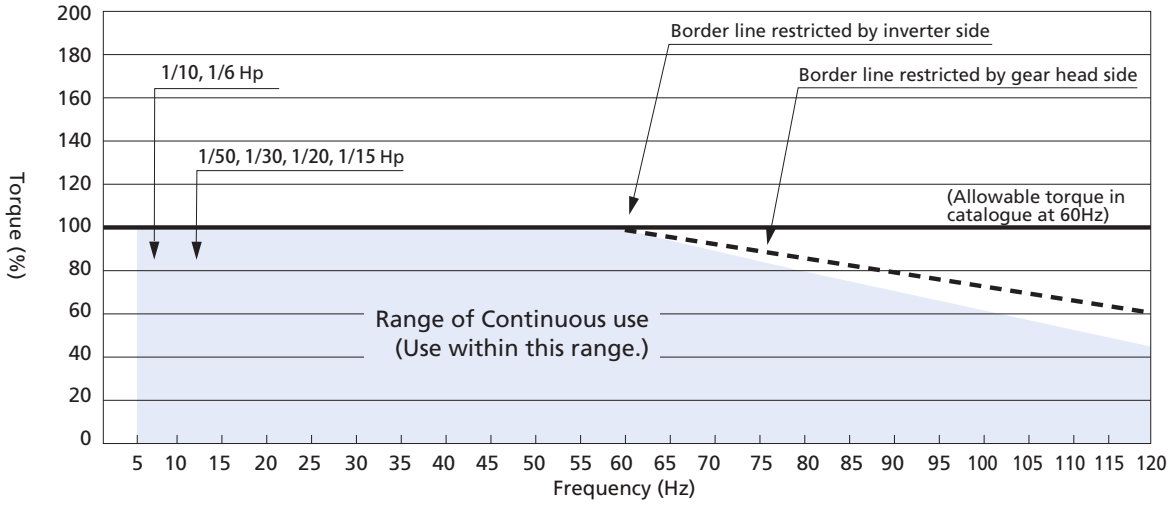
Fig 1.17B: VFD Wiring 208/230V 3 Phase

Fig 1.17C: VFD Wiring 460V



Note: If the input power is 115V 1 phase, use Rectifier A100-D90. If the input power is 220/230V 1 phase, use rectifier A200-D90. (Input power to the brake is 90vdc)
MS: Magnetic Switch (not supplied by Brother) Z : Surge Suppressor. Optional Part OP-ENE471D-10A

Fig 1.18 Speed/Torque with a VFD (1/50, 1/30, 1/20, 1/15, 1/10, and 1/6 Hp) Inverter: CIMR-J7AA20P1



Cautionary Notes for Use with a VFD:

1. In applications requiring operation above 60 hz, vibration and noise will increase. The life of the oil seal will also be reduced due to increased circumferential velocity.
2. In low speed operations the effect of the cooling fan decreases. Be sure to check the motor temperature rise remains below allowable limits. The surface temperature of the motor should not exceed 176°F (80°C).
3. The torque characteristics of the motor differ according to the VFD brand and type used. The above speed/torque curves were generated using a commercially available Volts/Hertz VFD. You should test the brand you use to confirm the performance.
4. When using a brake equipped motor, be sure to bypass the VFD and power the rectifier on the input side. Powering the rectifier using the output wires from the VFD to the motor will result in motor and/or brake failure.
5. When operating a VFD at 400~480V a repetitive surge voltage may arise and weaken the insulation of the motor causing premature failure. There are two ways to supress surge voltage…
   A. **Output Reactor:** may be effective if the lead wires are reletively short. Install it on the inverter output side.
   B. **Output Filter:** install it near the inverter output side.

The remedies A and B may be effective. However, we recommend you consult the inverter manufacturer for more detailed recommendations as the inverter settings, lead length, etc effect the recommendation.