

## Application of Star-Delta Starting

### Voltage, Current, Torque for Start-Delta Starting

Starting Method	Starting (Start Type Magnetic Contactor / C3)				Operating (Delta Type Magnetic Contactor / C2)		
	Starting Current	Torque	Full Load Current	Contact Voltage	Full Load Current	Contact Current	Contact Voltage
Direct	6 Im	1.5 T	6 Im	$Em/\sqrt{3}$	Im	Im	$Em/\sqrt{3}$
Star-Delta	2 Im	0.5 T	2 Im	$Em/\sqrt{3}$	Im	$Im/\sqrt{3}$	Em

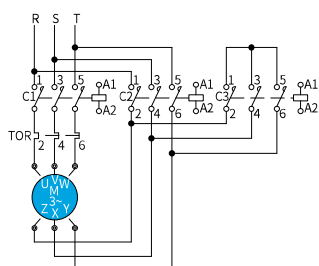
※ Im : Load current in case the motor is connected to delta Em : Line voltage T : Rated torque (Estimated torque fluctuation)

### Application of Magnetic Contactor for Star – Delta Starting

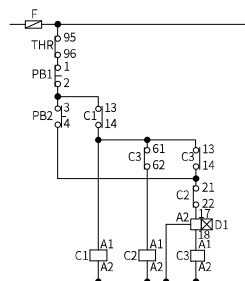
200 ~ 240 V AC, 3 Ø, 60 Hz							380 ~ 440 V AC, 3 Ø, 60 Hz						
Motor Capacity			Main Circuit	Δ Circuit	Y Circuit	TOR	Motor Capacity			Main Circuit	Δ Circuit	Y Circuit	TOR
kW	Hp	FLC	(C1)	(C2)	(C3)		kW	Hp	FLC	(C1)	(C2)	(C3)	
5.5	7.5	22	HGC25	HGC25	HGC18	HGT40K	5.5	7.5	12	HGC25	HGC25	HGC25	HGT40K
7.5	10	32	HGC32	HGC32	HGC25	HGT40K	7.5	10	18	HGC25	HGC25	HGC25	HGT40K
11	15	40	HGC40	HGC40	HGC32	HGT40K	11	15	22	HGC25	HGC25	HGC25	HGT40K
15	20	50	HGC50	HGC50	HGC32	HGT65K	15	20	32	HGC32	HGC32	HGC25	HGT40K
18.5	25	70	HGC50	HGC50	HGC40	HGT65K	18.5	25	40	HGC40	HGC40	HGC25	HGT40K
22	30	80	HGC75	HGC75	HGC40	HGT100K	22	30	50	HGC40	HGC40	HGC32	HGT40K
30	40	110	HGC100	HGC100	HGC50	HGT100K	30	40	65	HGC50	HGC50	HGC40	HGT65K
37	50	130	HGC115	HGC115	HGC65	HGT150K	37	50	80	HGC75	HGC75	HGC40	HGT100K
45	60	150	HGC130	HGC130	HGC65	HGT150K	45	60	90	HGC75	HGC75	HGC40	HGT100K
55	75	180	HGC150	HGC150	HGC100	HGT150K	55	75	110	HGC100	HGC100	HGC50	HGT100K
75	100	260	HGC185	HGC185	HGC115	HGT265K	75	100	150	HGC115	HGC115	HGC65	HGT150K
90	125	300	HGC225	HGC225	HGC130	HGT265K	90	125	180	HGC130	HGC130	HGC100	HGT150K
110	150	367	HGC300	HGC300	HGC150	HGT500K	110	150	220	HGC150	HGC150	HGC115	HGT150K
132	180	434	HGC400	HGC400	HGC225	HGT500K	132	180	260	HGC185	HGC185	HGC115	HGT265K
160	220	519	HGC400	HGC400	HGC225	HGT500K	160	220	300	HGC225	HGC225	HGC130	HGT265K
250	350	810	HGC630	HGC630	HGC400	HGT800K	250	350	500	HGC400	HGC400	HGC225	HGT500K
300	-	-	-	-	-	-	300	402	560	HGC400	HGC400	HGC300	HGT500K

※ The data of this table is subject to change depending on the grade and manufacturer of the motor and is a reference for using AC3 category squirrel cage motor or AC2 category slip-ring motor. The starting time of the motor is based on less than 10 seconds. Select separately in case the starting time has a long load (Ex : Fan, Blower, Compressor). As for the load applied with phase advance condenser, consider the inrush current for selection. As for the transfer time of the timer contact for transfer, 30 ~ 80 ms is appropriate. As for the current setting of the overload relay (UTH), set the current of motor full load at 58 %.

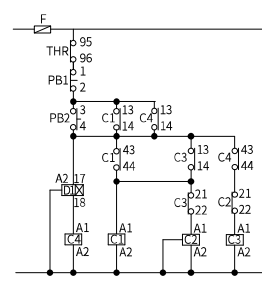
#### Main Circuit



#### Control Circuit



Connection Diagram 1 (HGC9 ~ 100)



Connection Diagram 2 (HGC115 ~ 800)

C1 : Main MC C2 : Delta MC C3 : Star MC D1 : Timer C4 : Auxiliary relay