



PERFORMANCE

TeSys is IE3/IE4 Ready
Type 2 coordination charts

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Premium-efficiency motor current load

IE3 premium motors are more energy efficient than IE2 motors. In Figure 1, IE3 motors have an higher inrush current and an higher starting current but in full run will have a lower current consumption than IE2. Figure 1 is a simplified version of Figure 2 made after some measurement on physical motors in our laboratory.

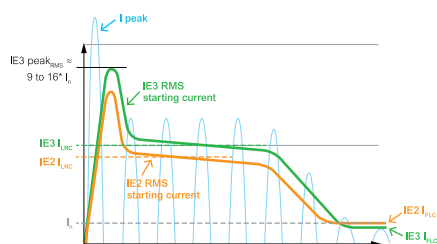


Figure 1

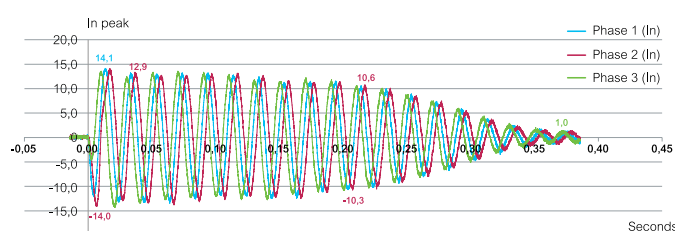


Figure 2

This higher inrush current has a potential impact on the performance of protection and control products due to the fact that the locked rotor current increases the thermal stress on all devices, risking untimely thermal tripping of circuit breakers and relays. The high peak of the inrush may also lead to circuit breaker nuisance tripping.

Motor manufacturers usually state the locked rotor current as an I_d/I_n ratio. However, it is hard to know in advance how high the initial peak of the inrush–

important information when selecting the right circuit breakers– will be.

The ratio between the highest inrush peak and the locked rotor current is commonly called the kappa ratio (k) and its order of magnitude is on average between 1.4 and 1.6 for IE3 motors; it can be as high as 2.0 for very high torque according to IEC 60034-12. The kappa ratio is calculated as follows:

$$K = \frac{I_{\text{peak}}}{\text{Locked Rotor Current}} \cong 1.4 \rightarrow 2.0$$

Circuit breaker and thermal relay

As starting current increases, so does the risk of nuisance tripping. Figure 9 shows the hypothetical case of a suboptimal circuit breaker and thermal relay. The green curve shows the starting current of an IE2 motor, and the red curve, its IE3 version. If the values between the motor's starting current and the equipment's threshold are too close to each other, using the IE2 configuration for the IE3 motor may result in nuisance tripping and downtime. This depends on the motor technology, the electrical equipment brand, and correct installation of all electrical wiring, devices, and equipment.

To select the right circuit breaker and overload relay, you should:

- Follow the recommendations of your motor protection manufacturer.
- Avoid over-dimensioning cable sections.
- Verify that the electrical characteristics stated by the motor manufacturer are in accordance with the motor starters used.
- Verify the coordination of the motor starter components if there are selected separately, without using a recommended coordination tables.
- Schneider Electric TeSys circuit breakers and thermal relays have undergone magnetic, electrical, and thermal endurance testing in laboratory conditions to ensure their compatibility with IE3 motors. The compatibility with IE4 has also been verified after performing relevant tests.

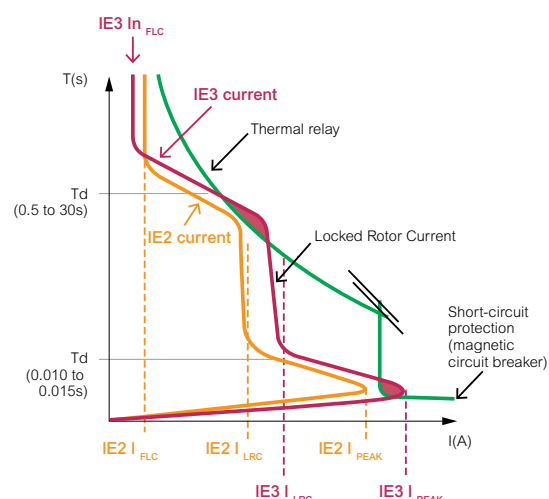


Figure 9. In the red zone: nuisance tripping with IE3 motors.

Contactor

A contactor is an electromechanical device designed to switch the current in an electrical circuit on and off. The maximum breaking current of a contactor is often given as a ratio of the nominal current: I_n . For standard applications, a contactor rated $12 I_n$ for closing and $10 I_n$ for opening is sufficient. But for IE3 motors, the contactor should be able to break and make even during the higher inrush peak at startup to avoid harm to people or equipment.

TeSys contactors are suitable for IE3 or IE4. The compatibility has been successfully tested.



Coordination between Protection and Control

This coordination is the optimal combination of different protection devices (for short circuits and overloads) and the control device (contactor) which make up a motor starter. Designed for a given power rating, it provides the best protection for the equipment controlled by the motor starter (see Fig. 40).

It has the double advantage of reducing equipment and maintenance costs, since the different protection devices are matched with each other as precisely as possible, without unnecessary redundancy.

■ There are different types of coordination.

Two types of coordination (type 1 and type 2) are defined by IEC 60947-4-1.

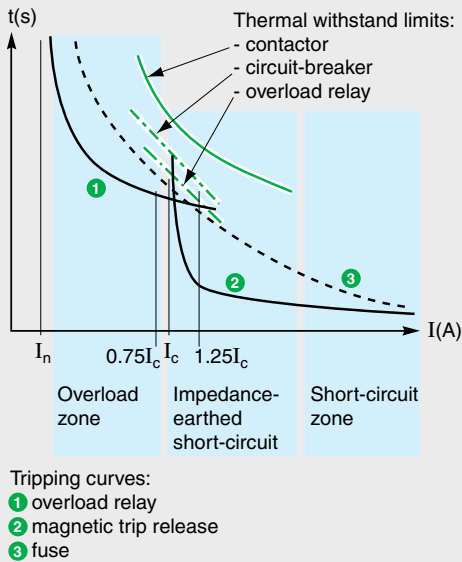
□ **Type 2 coordination:** this is the high performance version; it requires that the contactor or starter must not create any risk for personnel or installations, and

must be capable of operating afterwards. The risk of contact welding is accepted; if this occurs, the manufacturer must state the action to be taken for the maintenance of the equipment.

□ **Total Coordination:** There is a very high performance version, provided in CPS (control and protective switching devices) and offered by some manufacturers, called "Total Coordination" (IEC 60947-6-2).

This type of coordination requires that, in short-circuit conditions, the contactor or starter must not create any risk for personnel or installations, and must be capable of operating afterwards. The risk of contact welding is not acceptable; the motor starter must be capable of being restarted immediately.

□ When immediate restarting of the motor is essential, "Total Coordination" must be chosen. No maintenance is required.



To enable a motor starter to operate correctly, the coordination between all the devices must meet all the following requirements:

■ the overload relay must protect the magnetic circuit-breaker in the overload zone : its curve "1" must pass below that of the thermal withstand of the circuit-breaker;

■ and, conversely, in the short-circuit zones, in order to protect the thermal relay, the short-circuit trip curve must pass below that of the thermal withstand of the relay;

■ finally, in order to protect the contactor, its thermal withstand limit must be above the curves of the two trip releases (thermal, "1", and magnetic, "3") (or the fuse, "2").

Note that the standard specifies the limit test currents:

■ up to $0.75 I_c$ only the thermal protection must operate;
■ above $1.25 I_c$ only the short-circuit protection must operate.

Fig. 40 : The principles of coordination.

Type 2 Co-ordination chart with TeSys range

Type 2 co-ordination chart for Direct-On-Line starter with circuit breaker and overload protection built into the circuit breaker

Reliable
switching for
IE2/IE3/IE4
motors



IE2



IE3



IE4

Rated operational voltage, $U_e = 400/415V$, 50/60Hz
Short Circuit Current (I_q) = 50kA

Sr. No.	3Φ Motor power in kW	Current in A	Circuit Breaker	Setting range of thermal trips (A)	Contactor
1	0.06	0.2	GV2P02 or GV2ME02	0.16...0.25	LC1D09
2	0.09	0.3	GV2P03 or GV2ME03	0.25...0.4	LC1D09
3	0.12	0.44	GV2P04 or GV2ME04	0.4...0.63	LC1D09
4	0.18	0.6	GV2P04 or GV2ME04	0.4...0.63	LC1D09
5	0.25	0.85	GV2P05 or GV2ME05	0.63...1	LC1D09
6	0.37	1.0	GV2P05 or GV2ME05	0.63...1	LC1D09
7	0.55	1.5	GV2P06 or GV2ME06	1...1.6	LC1D09
8	0.75	1.9	GV2P07 or GV2ME07	1.6...2.5	LC1D09
9	1.1	2.7	GV2P08 or GV2ME08	2.5...4	LC1D09
10	1.5	3.6	GV2P08 or GV2ME08	2.5...4	LC1D09
11	2.2	4.9	GV2P10 or GV2ME10	4...6.3	LC1D09
12	3	6.5	GV2P14 or GV2ME14	6...10	LC1D09
13	4	8.5	GV2P14 or GV2ME14	6...10	LC1D09
14	5.5	11.5	GV2P16	9...14	LC1D25
15	7.5	15.5	GV2P20	13...18	LC1D25
16	9	18.1	GV2P21	17...23	LC1D25
17	11	22	GV2P22	20...25	LC1D25
18	15	29	GV2P32	25...40	LC1D32
19	18.5	35	GV3P40	30...40	LC1D50A
20	22	41	GV3P50	37...50	LC1D50A
21	30	55	GV3P65	48...65	LC1D65A
22	37	66	GV4PE/PEM80 ^{*(2)}	62...73	LC1D80
23	45	80	GV4PE/PEM115 ^{*(2)}	65...115	LC1D115
24	55	97	GV4PE/PEM115 ^{*(2)}	65...115	LC1D115
25	75	132	GV5P150 ^{*(2)}	70...150	LC1D150
26	90	160	GV5P220 ^{*(2)}	100...220	LC1G185
27	110	195	GV5P220 ^{*(2)}	100...220	LC1G225
28	132	230	GV6P320 ^{*(2)}	160...320	LC1G265
29	160	280	GV6P320 ^{*(2)}	160...320	LC1G330
30	220	385	GV6P500 ^{*(2)}	250...500	LC1G500
31	250	450	GV6P500 ^{*(2)}	250...500	LC1G500

(1) The breaking performance of circuit-breakers GV2 P can be increased by adding a current limiter GV1 L3

(2) Reference to be completed by replacing the * with the breaking performance code as per table given below:

Circuit breaker type	GV5P150*	GV5P220*	GV5P320*	GV6P500*	GV4PE/PEM80*	GV4PE/PEM115*
Breaking performance I_q (kA) at 400/415V	70	70	70	70	50	50
Breaking performance code	H	H	H	H	N	N

For advanced protection, protection with Electronic Overcurrent Relays, heavy starting, please contact our sales teams.

Type 2 Co-ordination chart

Type 2 co-ordination chart for Direct-On-Line starter with circuit breaker and separate thermal overload relay

Reliable
switching for
IE2/IE3/IE4
motors



IE2



IE3



IE4

Rated operational voltage, $U_e = 400/415V$, 50/60Hz

Short Circuit Current (I_q) = 50kA

Sr. No.	3Φ Motor power in kW	Current in Amps	Circuit Breaker	Contactor	Overload relay	
					Type	Range (A)
1	0.06	0.2	GV2L03 or GV2LE03	LC1D09	LRD02	0.16...0.25
2	0.09	0.3	GV2L03 or GV2LE03	LC1D09	LRD03	0.25...0.40
3	0.12	0.44	GV2L04 or GV2LE04	LC1D09	LRD04	0.4...0.63
4	0.18	0.6	GV2L04 or GV2LE04	LC1D09	LRD04	0.4...0.63
5	0.25	0.85	GV2L05 or GV2LE05	LC1D09	LRD05	0.63...1
6	0.37	1.0	GV2L05 or GV2P06	LC1D09	LRD05	0.63...1
7	0.55	1.5	GV2L06 or GV2LE06	LC1D09	LRD06	1...1.7
8	0.75	1.9	GV2L07 or GV2LE07	LC1D09	LRD07	1.6...2.5
9	1.1	2.7	GV2L08 or GV2LE08	LC1D09	LRD08	2.5...4
10	1.5	3.6	GV2L08 or GV2LE08	LC1D09	LRD08	2.5...4
11	2.2	4.9	GV2L10 or GV2LE10	LC1D09	LRD10	4...6
12	3	6.5	GV2L14 or GV2LE14	LC1D09	LRD12	5.5...8
13	4	8.5	GV2L14 or GV2LE14	LC1D09	LRD14	7...10
14	5.5	11.5	GV2L16	LC1D25	LRD16	9...13
15	7.5	15.5	GV2L20	LC1D25	LRD21	12...18
16	9	18.1	GV2L22	LC1D25	LRD22	16...24
17	11	22	GV2L22	LC1D25	LRD22	16...24
18	15	29	GV3L32	LC1D40A	LRD332	23...32
19	18.5	35	GV3L40	LC1D50A	LRD340	30...40
20	22	41	GV3L50	LC1D50A	LRD350	37...50
21	30	55	GV3L65	LC1D65A	LRD365	48...65
22	37	66	GV4L/LE80 ⁽¹⁾	LC1D80	LRD3363	63...80
23	45	80	GV4L/LE115 ⁽¹⁾	LC1D115	LR9D5367	60...100
24	55	97	GV4L/LE115 ⁽¹⁾	LC1D115	LR9D5369	90...150
25	75	132	NSX160*MA ⁽¹⁾	LC1D150	LR9D5369	90...150
26	90	160	NSX250*MA ⁽¹⁾	LC1G185	LR9G225	57...225
27	110	195	NSX250*MA ⁽¹⁾	LC1G225	LR9G225	57...225
28	132	230	NSX400* + Mic 1.3M ⁽¹⁾	LC1G265	LR9G500	125...500
29	160	280	NSX400* + Mic 1.3M ⁽¹⁾	LC1G330	LR9G500	125...500
30	200	350	NSX630* + Mic 1.3M ⁽¹⁾	LC1G400	LR9G500	125...500
31	220	388	NSX630* + Mic 1.3M ⁽¹⁾	LC1G500	LR9G500	125...500
32	250	430	NSX630* + Mic 1.3M ⁽¹⁾	LC1G500	LR9G500	125...500

(1) Reference to be completed by replacing the * with the breaking performance code as per table given below:

Circuit breaker type	NSX100*MA	NSX160*MA, NSX250*MA	NSX400* NSX630*	GV4L/LE80*	GV4L/LE115*
Breaking performance I_q (kA) at 400/415V	50	50	50	50	50
Breaking performance code	N	N	N	N	N

For advanced protection, protection with Electronic Overcurrent Relays, heavy starting, please contact our sales teams.

Type 2 Co-ordination chart

Type 2 co-ordination chart for Star Delta starters with circuit-breaker and separate thermal overload relay

Reliable
switching for
IE2/IE3/IE4
motors



IE2



IE3



IE4

Rated operational voltage, $U_e = 400/415V$, 50/60Hz

Short Circuit Current (I_q) = 50kA

Sr. No.	3Φ Motor power in kW	Line current in Amps	Phase current in Amps	Circuit Breaker	Main/Delta Contactor	Star Contactor	Overload Relay	
							Type	Range (A)
1	5.5	11.5	6.6	GV2L16	LC1D25	LC1D09	LRD12	5.5..8
2	7.5	15.5	8.9	GV2L20	LC1D25	LC1D09	LRD14	7..10
3	9	18.1	10.5	GV2L22	LC1D25	LC1D09	LRD16	9..13
4	11	22	12.7	GV2L22	LC1D25	LC1D09	LRD21	12..18
5	15	29	16.7	GV3L32	LC1D40A	LC1D09	LRD318	12..18
6	18.5	35	20.2	GV3L40	LC1D50A	LC1D09	LRD325	17..25
7	22	41	23.7	GV3L50	LC1D50A	LC1D18	LRD332	23..32
8	30	55	31.8	GV3L65	LC1D65A	LC1D18	LRD340	30..40
9	37	66	38.1	GV3L73	LC1D80A	LC1D32	LRD350	37..50
10	37	66	38.1	GV4L/LE80 ⁽¹⁾	LC1D80A	LC1D32	LRD3357	37..50
11	45	80	46.2	GV4L/LE115 ⁽¹⁾	LC1D115	LC1D65A	LRD3357	37..50
12	55	97	56	GV4L/LE115 ⁽¹⁾	LC1D115	LC1D65A	LRD3359	48..65
13	75	132	76.2	NSX160*MA150 ⁽¹⁾	LC1D150	LC1D65A	LR9D5367	60 ... 100
14	90	160	92.4	NSX250*MA220 ⁽¹⁾	LC1G115	LC1D65	LR9G115	28 ... 115
15	110	195	112.6	NSX250*MA220 ⁽¹⁾	LC1G150	LC1D80	LR9G225	57 ... 225
16	132	230	132.8	NSX400*Mic 1.3M ⁽¹⁾	LC1G150	LC1D80	LR9G225	57 ... 225
17	160	280	161.7	NSX400*Mic 1.3M ⁽¹⁾	LC1G185	LC1D115	LR9G225	57 ... 225
18	200	350	202.1	NSX630*Mic 1.3M ⁽¹⁾	LC1G225	LC1G150	LR9G225	57 ... 225
19	220	388	224	NSX630*Mic 1.3M ⁽¹⁾	LC1G265	LC1G150	LR9G500	125 ... 500
20	250	430	248.3	NSX630*Mic 1.3M ⁽¹⁾	LC1G265	LC1G150	LR9G500	125 ... 500

(1) Reference to be completed by replacing the * with the breaking performance code as per table given below:

Circuit breaker type	NSX100*MA	NSX160*MA, NSX250*MA	NSX400* NSX630*	GV4L/LE80*	GV4L/LE115*
Breaking performance I_q (kA) at 400/415V	50	50	50	50	50
Breaking performance code	N	N	N	N	N

For advanced protection, protection with Electronic Overcurrent Relays, heavy starting, please contact our sales teams.

Type 2 Co-ordination chart

Type 2 co-ordination chart for Star Delta starter with circuit breaker and overload protection built into circuit breaker

Reliable switching for IE2/IE3/IE4 motors



IE2



IE3



IE4

Rated operational voltage, $U_e = 400/415V$, 50/60Hz
Short Circuit Current (I_q) = 50kA / 70kA as per table

Sr. No.	3 Φ Motor power in kW	Line current in Amps	Phase current in Amps	I_q (kA)	Circuit Breaker	Main/Delta Contactor	Star Contactor
1	5,5	11.5	6.6	50	GV2P16	LC1D25	LC1D09
2	7,5	15.5	8.9	50	GV2P20	LC1D25	LC1D09
3	9	18.1	10.5	50	GV2P21	LC1D25	LC1D09
4	11	22	12.7	50	GV2P22	LC1D25	LC1D09
5	15	29	16,7	50	GV3P32	LC1D40A	LC1D09
6	18,5	35	20.2	50	GV3P40	LC1D50A	LC1D09
7	22	41	23.7	50	GV3P50	LC1D50A	LC1D18
8	30	55	31.8	50	GV3P65	LC1D65A	LC1D32
9	37	66	38.1	50	GV3P73	LC1D80A	LC1D32
10	37	66	38.1	70	GV4PE/PEM80 ^{*(1)}	LC1D80A	LC1D32
11	45	80	46.2	70	GV4PE/PEM115 ^{*(1)}	LC1D115	LC1D65A
12	55	97	56.0	70	GV4PE/PEM115 ^{*(1)}	LC1D115	LC1D65A
13	75	132	76.2	70	GV5P150 ^{*(1)}	LC1 D150	LC1D150
14	90	160	92.4	70	GV5P220 ^{*(1)}	LC1 G115	LC1D65
15	110	195	112.6	70	GV5P220 ^{*(1)}	LC1 G150	LC1D80
16	132	230	132.8	70	GV6P320 ^{*(1)}	LC1G150	LC1D95
17	160	280	161.7	70	GV6P320 ^{*(1)}	LC1G185	LC1G115
18	220	388	224.0	70	GV6P500 ^{*(1)}	LC1G265	LC1G150
19	250	430	248.3	70	GV6P500 ^{*(1)}	LC1G265	LC1G150

(1) Reference to be completed by replacing the * with the breaking performance code as per table given below:

Circuit breaker type	GV5P150*	GV5P220*	GV5P320*	GV6P500*	GV4PE/PEM80*	GV4PE/PEM115*
Breaking performance I_q (kA) at 400/415V	70	70	70	70	50	50
Breaking performance code	H	H	H	H	N	N

Type 2 Co-ordination chart

Type 2 Co-ordination chart for Direct-On-Line starter with circuit breaker and separate thermal overload relay

Reliable
switching for
IE2/IE3/IE4
motors



IE2



IE3



IE4

Sr. No.	3Φ Motor power in kW	Circuit Breaker	Contactor	Thermal Overload Relay
1	0.18	GV4L/LE02*	LC1D09	LRD05
2	0.25	GV4L/LE02*	LC1D09	LRD05
3	0.37	GV4L/LE02*	LC1D09	LRD06
4	0.55	GV4L/LE02*	LC1D09	LRD06
5	0.75	GV4L/LE02*	LC1D09	LRD07
6	1.1	GV4L/LE03*	LC1D25	LRD08
7	1.5	GV4L/LE07*	LC1D32+GV1L3	LRD08
8	2.2	GV4L/LE07*	LC1D32+GV1L3	LRD10
9	3	GV4L/LE07*	LC1D40A	LRD12
10	4	GV4L/LE12*	LC1D65A	LRD14
11	5.5	GV4L/LE12*	LC1D65A	LRD313
12	7.5	GV4L/LE25*	LC1D65A	LRD318
13	10	GV4L/LE25*	LC1D65A	LRD325
14	11	GV4L/LE25*	LC1D65A	LRD325
15	15	GV4L/LE50*	LC1D65A	LRD332
16	18.5	GV4L/LE50*	LC1D65A	LRD340
17	22	GV4L/LE50*	LC1D65A	LRD350
18	30	GV4L/LE80*	LC1D65A	LRD365

* - Reference to be completed by replacing the * with the breaking performance code as per table given below:

Performance I_q (kA) at 415V

Circuit breaker	Breaking performance code		
	B	N	S
GV4L/LE02-12	-	50	100
GV4L/LE25-115	25	50	100

Type 2 Co-ordination chart

Type 2 Co-ordination chart for Star Delta starter with circuit breaker and separate thermal overload relay

Reliable
switching for
IE2/IE3/IE4
motors



IE2



IE3



IE4

Sr. No.	P (kW)	Ie (A)	Ie/1,73 (A)	Circuit Breaker	Main/Delta Contactor	Star Contactor	Thermal Overload Relay	
1	0.25	0.85	0.5	GV4L/LE02*	LC1D09	LC1D09	LRD05	0.63...1
2	0.37	1	0.6	GV4L/LE02*	LC1D09	LC1D09	LRD06	1...1.7
3	0.55	1.5	0.9	GV4L/LE02*	LC1D09	LC1D09	LRD06	1...1.7
4	0.75	1.9	1.1	GV4L/LE02*	LC1D09	LC1D09	LRD07	1.6...2.5
5	1.1	2.7	1.6	GV4L/LE03*	LC1D25	LC1D09	LRD08	2.5...4
6	1.5	3.6	2.1	GV4L/LE07*	LC1D32+GV1L3	LC1D09	LRD08	2.5...4
7	2.2	4.9	2.8	GV4L/LE07*	LC1D32+GV1L3	LC1D09	LRD10	4...6
8	3	6.5	3.8	GV4L/LE07*	LC1D40A	LC1D09	LRD12	5.5...8
9	4	8.5	4.9	GV4L/LE12*	LC1D65A	LC1D09	LRD14	7...10
10	5.5	11.5	6.6	GV4L/LE12*	LC1D65A	LC1D09	LRD313	9...13
11	7.5	15.5	8.9	GV4L/LE25*	LC1D65A	LC1D09	LRD318	12...18
12	9	18.1	10.5	GV4L/LE25*	LC1D65A	LC1D09	LRD325	16...24
13	11	22	12.7	GV4L/LE25*	LC1D65A	LC1D09	LRD325	16...24
14	15	29	16.7	GV4L/LE50*	LC1D65A	LC1D18	LRD332	23...32
15	18.5	35	20.2	GV4L/LE50*	LC1D65A	LC1D18	LRD340	30...40
16	22	41	23.7	GV4L/LE50*	LC1D65A	LC1D18	LRD350	37...50
17	30	55	31.8	GV4L/LE80*	LC1D65A	LC1D25	LRD365	48...65
18	37	66	38.1	GV4L/LE80*(1)	LC1D80A	LC1D32	LRD3357	37...50

* - Reference to be completed by replacing the * with the breaking performance code as per table given below:

Performance Iq (kA) at 415V

Circuit breaker	Breaking performance code		
	B	N	S
GV4L/LE02-12	-	50	100
GV4L/LE25-115	25	50	100

Type 2 Co-ordination chart with TeSys range (With TeSys G Contactors and Relays) NEW

Type 2 co-ordination chart for Direct-On-Line starter with circuit breaker and overload protection built into the circuit breaker

Reliable
switching for
IE2/IE3/IE4
motors



IE2



IE3



IE4

Rated operational voltage, $U_e = 400/415V$, 50/60Hz
Short Circuit Current (I_q) = 50kA

45 to 250 kW at 400/415V: type 2 coordination (with ref. GV4, GV5, GV6 circuit breakers)							
Sr. No.	Standard power ratings of 3-phase motors 50/60 Hz in category AC-3e			Circuit breaker			Contactor
				Reference ⁽¹⁾	Ir Setting	Irm	Reference
	400/415V						
	P	Ie	Iq (max)		A	A	
kW	A	kA					
1	45	80	100	GV4P/GV4PE/GV4PEM115●	86	1118	LC1G115
2	55	97	100	GV4P115●	100	1300	LC1G115
3	55	97	70	GV5P150●	100	1300	LC1G115
4	75	132	70	GV5P150●	140	1820	LC1G150
5	90	160	70	GV5P220●	170	2210	LC1G185
6	110	195	70	GV5P220●	200	2600	LC1G225
7	110	195	70	GV6P320●	200	2600	LC1G265
8	132	230	70	GV6P320●	240	3120	LC1G265
9	160	280	70	GV6P320●	300	3900	LC1G330
10	200	350	70	GV6P500●	380	4940	LC1G400
11	220	380	70	GV6P500●	400	5200	LC1G500
12	250	430	70	GV6P500●	440	5720	LC1G500

(1) Reference to be completed by replacing the ● with the breaking performance code:

Breaking performance Iq (kA)

Code	GV4P/GV4PE/GV4PEM115●			GV5P150●/ 220● GV6P320●/ 500●	
	B	N	S	F	H
400/415V	25	50	100	36	70

Type 2 Co-ordination chart with TeSys range (With TeSys G Contactors and Relays) NEW

Type 2 co-ordination chart for Direct-On-Line starter with circuit breaker and separate relay

Reliable
switching for
IE2/IE3/IE4
motors



IE2



IE3



IE4

Rated operational voltage, $U_e = 400/415V$, 50/60Hz
Short Circuit Current (I_q) = 50kA

45 to 335 kW at 400/415V: type 2 coordination (with ref GV4, or NSX circuit breakers)

Sr. No.	Standard power ratings of 3-phase motors 50/60 Hz in category AC-3e			Circuit breaker		Contactor	Contactor	
	400/415V			Reference ⁽¹⁾	I _{rm}	Reference	Reference	Ir Setting
	P	I _e	I _q (max)					
	kW	A	kA		A			A
1	45	80	100	GV4L/GV4LE115●	1265	LC1G115	LR9G115	80
2	55	97	100	GV4L/GV4LE115●	1100	LC1G115	LR9G225	80
3	45	80	130	NSX100● + MA	1265	LC1G115	LR9G115	97
4	55	97	130	NSX160● + MA	1500	LC1G115	LR9G225	97
5	75	132	130	NSX160● + MA	1800	LC1G150	LR9G225	132
6	90	160	130	NSX250● + MA	2640	LC1G185	LR9G225	160
7	110	195	130	NSX250● + MA	2640	LC1G225	LR9G225	195
8	110	195	130	NSX400● + Micrologic 1.3M	3520	LC1G265	LR9G500	195
9	132	230	130	NSX400● + Micrologic 1.3M	3520	LC1G265	LR9G500	230
10	160	280	130	NSX400● + Micrologic 1.3M	3840	LC1G330	LR9G500	280
11	200	350	130	NSX630● + Micrologic 1.3M	5500	LC1G400	LR9G500	350
12	220	380	130	NSX630● + Micrologic 1.3M	5500	LC1G500	LR9G500	380
13	250	430	130	NSX630● + Micrologic 1.3M	6000	LC1G500	LR9G500	430
14	300	460	130	NS800● + Micrologic 5	8800	LC1G630	LR9G630	460
15	335	575	130	NS800● + Micrologic 5	9600	LC1G630	LR9G630	575

(1) Reference to be completed by replacing the ● with the breaking performance code:

Breaking performance I_q (kA)

Code	GV4L115●/ GV4LE115●			NSX100●/ NSX160●/ NSX250●/ NSX400●/ NSX630●				NS800●		
	B	N	S	F	N	H	R	N	H	L
400/415V	25	50	100	36	50	70	200	50	70	150

Magnetic circuit breakers + Contactor + TeSys T + current transformers

90 to 250 kW at 400/415V: type 2 coordination

Sr. No.	Standard power ratings of 3-phase motors 50/60 Hz in category AC-3e			Circuit breaker		Contactor	TeSys T Motor management controller		Current transformers
	400/415V			Reference ⁽¹⁾	Rating I _{rm}	Reference	Reference ⁽²⁾	Ir Setting	Reference
	P	I _e	I _q (max)						
	kW	A	kA		A			A	
1	90	160	130	NSX250● + MA	2200	LC1G185	LTMR08●●	160	LT6CT2001
2	110	195	130	NSX250● + MA	2640	LC1G225	LTMR08●●	195	LT6CT2001
3	132	230	130	NSX400● + Micrologic 1.3M	3200	LC1G265	LTMR08●●	230	LT6CT4001
4	150	280	130	NSX400● + Micrologic 1.3M	3840	LC1G330	LTMR08●●	280	LT6CT4001
5	200	350	130	NSX630● + Micrologic 1.3M	5000	LC1G400	LTMR08●●	350	LT6CT4001
6	220	388	130	NSX630● + Micrologic 1.3M	5500	LC1G500	LTMR08●●	388	LT6CT4001
7	250	430	130	NSX630● + Micrologic 1.3M	6000	LC1G500	LTMR08●●	430	LT6CT8001

(1) Reference to be completed by replacing the ● with the breaking performance code:

Breaking performance I_q (kA)

Code	NSX250●/ NSX400●/ NSX630●			
	F	N	H	R
400/415V	36	50	70	200

(2) Please refer to TeSys Catalogue to select the complete reference for TeSys T motor management controller.

Type 2 Co-ordination chart with TeSys range (With TeSys G Contactors and Relays) NEW

Type 2 co-ordination chart for Star Delta starter with circuit breaker and overload protection built into circuit breaker

Reliable
switching for
IE2/IE3/IE4
motors



IE2



IE3



IE4

Rated operational voltage, $U_e = 400/415V$, 50/60Hz
Short Circuit Current (I_q) = 50kA / 70kA as per table

Contactor: **Maximum operating rate:** 30 starts/hour - **Maximum starting time:** 30 seconds.

The coordination table is for normal starting conditions (Class 10e/ 20e). For other heavy starting applications with long start times, please contact technical support.

RE17RMMWS timer to be used for Star-Delta starter application.

90 to 250 kW at 400/415V: type 2 coordination

Sr. No.	Standard power ratings of 3-phase motors 50/60 Hz in category AC-3			Circuit breaker			Contactor Line/ Delta	Contactor Star
	400/415V			Reference ⁽¹⁾	Ir Setting	Irm	Reference	
	P	Ie	Iq (max)					
	kW	A	kA		A	A		
1	90	160	70	GV5P220●	170	1360	LC1G115	LC1D65
2	110	195	70	GV5P220●	200	1600	LC1G150	LC1D80
3	110	195	70	GV6P320●	200	1600	LC1G150	LC1D80
4	132	230	70	GV6P320●	240	1920	LC1G150	LC1D95
5	160	280	70	GV6P320●	300	2400	LC1G185	LC1G115
6	200	350	70	GV6P500●	380	3040	LC1G225	LC1G115
7	220	380	70	GV6P500●	400	3200	LC1G265	LC1G150
8	250	430	70	GV6P500●	440	3520	LC1G265	LC1G150

(1) Reference to be completed by replacing the ● with the breaking performance code:

Breaking performance Iq (kA)

Code	GV5P220● GV6P320●/GV6P500●	
	F	H
400/415V	36	70

90 to 450 kW at 400/415V: type 2 coordination

Sr. No.	Standard power ratings of 3-phase motors 50/60 Hz in category AC-3			Circuit breaker			Contactor Line/ Delta	Contactor Star
	400/415V			Reference ⁽¹⁾	Ir Setting	Irm	Reference	
	P	Ie	Iq (max)					
	kW	A	kA		A	A		
1	90	160	130	NSX250● + Micrologic 2.2M	170	1360	LC1G115	LC1D65
2	110	195	130	NSX250● + Micrologic 2.2M	200	1600	LC1G150	LC1D80
3	110	195	130	NSX400● + Micrologic 2.3M	200	1600	LC1G150	LC1D80
4	132	230	130	NSX400● + Micrologic 2.3M	240	1920	LC1G150	LC1D95
5	160	280	130	NSX400● + Micrologic 2.3M	300	2400	LC1G185	LC1G115
6	200	350	130	NSX630● + Micrologic 2.3M	380	3040	LC1G225	LC1G115
7	220	380	130	NSX630● + Micrologic 2.3M	400	3200	LC1G265	LC1G150
8	250	430	130	NSX630● + Micrologic 2.3M	440	3520	LC1G265	LC1G150
9	300	460	130	NS800● + Micrologic 5	480	3840	LC1G330	LC1G185
10	335	575	130	NS800● + Micrologic 5	640	5120	LC1G400	LC1G225
11	355	610	130	NS800● + Micrologic 5	640	5120	LC1G400	LC1G225
12	400	690	130	NS800● + Micrologic 5	720	5760	LC1G500	LC1G265
13	450	770	130	NS1000● + Micrologic 5	784	6272	LC1G500	LC1G330

(1) Reference to be completed by replacing the ● with the breaking performance code:

Breaking performance Iq (kA)

Code	NSX250●/ NSX400●/ NSX630●				NS800●/ NS1000●		
	F	N	H	R	N	H	L
400/415V	36	50	70	200	50	70	150

Type 2 Co-ordination chart with TeSys range (With TeSys G Contactors and Relays) NEW

Type 2 Co-ordination chart for Direct-On-Line starter with circuit breaker and separate thermal overload relay

Reliable
switching for
IE2/IE3/IE4
motors



IE2



IE3



IE4

Contactor: **Maximum operating rate:** 30 starts/hour - **Maximum starting time:** 30 seconds.

The coordination table is for normal starting conditions (Class 10e/ 20e). For other heavy starting applications with long start times, please contact technical support.

RE17RMMWS timer to be used for Star-Delta starter application.

90 to 450 kW at 400/415V: type 2 coordination

Sr. No.	Standard power ratings of 3-phase motors 50/60 Hz in category AC-3			Circuit breaker		Contactor Line/ Delta	Contactor Star	Thermal overload relay	
	400/415V			Reference ⁽¹⁾	I _{rm}	Reference		Reference	Setting range
	P	I _e	I _q (max)						
	kW	A	kA		A				A
1	90	160	130	NSX250● + MA	1980	LC1G115	LC1D65	LR9G115	92
2	110	195	130	NSX250● + MA	1980	LC1G150	LC1D80	LR9G225	113
3	110	195	130	NSX400● + Micrologic 1.3M	1920	LC1G150	LC1D80	LR9G225	113
4	132	230	130	NSX400● + Micrologic 1.3M	1920	LC1G150	LC1D80	LR9G225	133
5	160	280	130	NSX400● + Micrologic 1.3M	2560	LC1G185	LC1G115	LR9G225	162
6	200	350	130	NSX630● + Micrologic 1.3M	3000	LC1G225	LC1G150	LR9G225	202
7	220	380	130	NSX630● + Micrologic 1.3M	3500	LC1G265	LC1G150	LR9G500	219
8	250	430	130	NSX630● + Micrologic 1.3M	3500	LC1G265	LC1G150	LR9G500	248
9	300	460	130	NS800● + Micrologic 5	4000	LC1G330	LC1G185	LR9G500	266
10	335	575	130	NS800● + Micrologic 5	4800	LC1G400	LC1G225	LR9G500	332
11	355	610	130	NS800● + Micrologic 5	5600	LC1G400	LC1G225	LR9G500	352
12	400	627	130	NS800● + Micrologic 5	5600	LC1G400	LC1G225	LR9G500	362
13	450	695	130	NS800● + Micrologic 5	6400	LC1G500	LC1G265	LR9G500	401

(1) Reference to be completed by replacing the ● with the breaking performance code:

Breaking performance I_q (kA)

Code	NSX250●/ NSX400●/ NSX630●				NS800●		
	F	N	H	R	N	H	L
400/415V	36	50	70	200	50	70	150

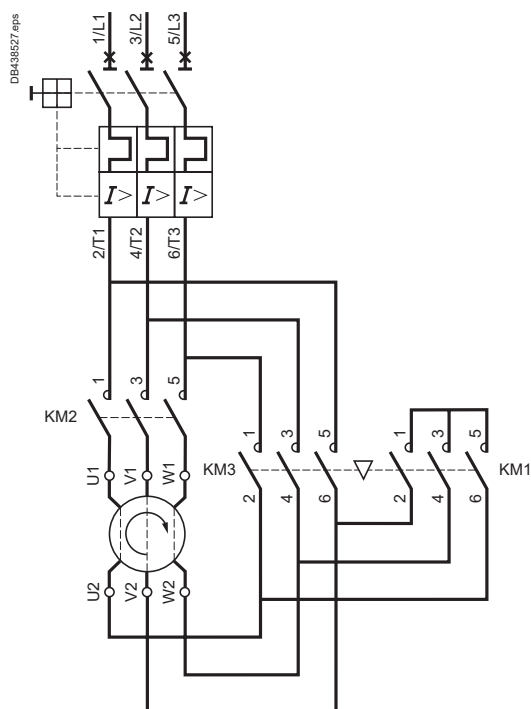
TeSys Giga series - Device selection

Coordination tables

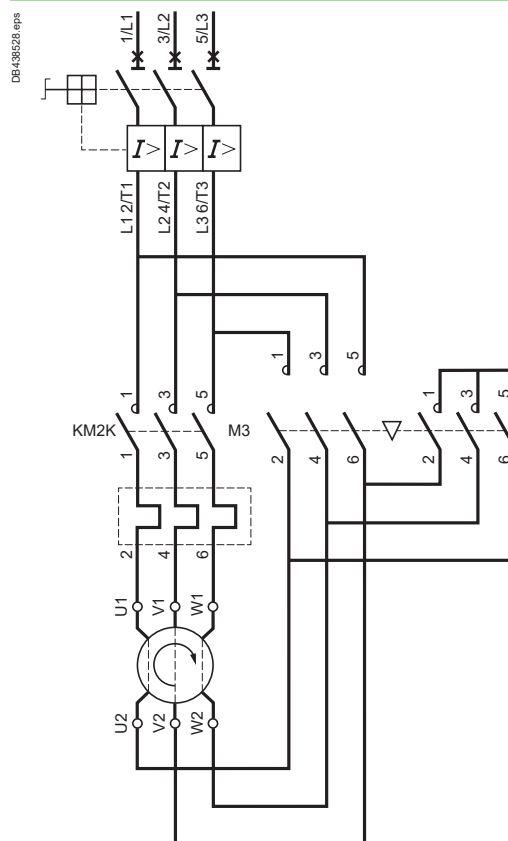
Star-Delta motor starter - Common circuit diagrams

Star-Delta motor 'Power' circuit diagram

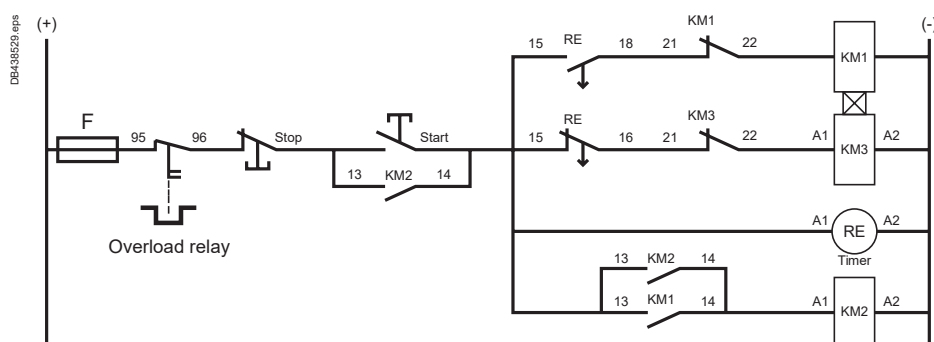
Thermal magnetic circuit breaker + contactors



Magnetic circuit breaker + contactors + overload relay



Star-Delta Motor 'Control' circuit diagram



Recommended timing relay (RE): Zelio Time ref. RE17RMMW (12...240 V AC/DC 50/60 Hz – 8 A AC/DC contacts)

Type 2 Recommended Selection Charts for Motor Feeder with EasyPact

Notes:

- Selection is for Normal Starting time (Relay Trip classes 10A/10) applications.
- Overload relay type LRE and EOCR both can be used. However, while using EOCR, setting of Trip class in EOCR should be up to 10/10A only.
- For high Inertia loads like Blowers, Pumps & ID/FD fans etc., if taking longer starting time, kindly consult us to derive the selection. However, this selection can still be used if these applications accept relay trip class 10A/10.
- Service factor of the motors considered is 1
- Selection is directly valid for Switching & Protection of Motors which comply to IS: 12615 efficiency class and can also be used for other non-standard motors whose starting current is less than or equal to starting currents as described in IS: 12615
- The rated motor current used for derivation is Full Load Current (FLC) for 3-phase, 4 Pole Squirrel Cage Induction Motors as indicated in IS: 12615. Selection can also be used for 2 Pole, 6 Pole and 8 Pole Motors based on rated motor current.
- Higher ratings of Contactors can be used in place of recommended combinations.
- These charts are derived basis Type-2 Methodology described in IEC 60947-4, Clause B.4.5.
- For Star-Delta Motor feeders, In-side delta wiring is considered.
- For Star Delta Motor feeders, proper Change-over time and Pause time must be ensured. Selected combination of Motor feeders components in this chart are valid only and only when used along with timer MSMI06 and equivalent timer from Schneider.
- This selection is valid only for suggested Product combinations. Change in any of the recommended combination including timer will invalidate the recommendations and Human safety, Installation safety and product safety requirements may not be fulfilled.
- In case of motor feeders with Circuit breaker, ensure proper Instantaneous setting as suggested in respective charts, if any.
- Max. Operating rate per Hour for contactors & Circuit breaker for Motor protection shall not be exceeded.
- Product evolution and improvement is a Continuous process at Schneider Electric. Hence, recommendations and guidelines are subject to change. Contact Schneider Electric for latest guidelines.

Contact our nearest sales office for application specific Custom / optimised selection for your motor feeders having motors with service factor more than 1, longer starting time applications, Closed transition star delta starters, other than 400/415V perational voltages, starting currents / inrush currents lower than specified in IS 12615

Selection Chart

Direct-on-Line starters with circuit-breaker and overload protection built into the circuit-breaker
Type GZ1E

Reliable
switching for
IE2/IE3 motors



IE2



IE3

Rated Operational Voltage, $U_e = 400/415V$, 50/60Hz
Short Circuit Current $I_q = 50kA$

Type-2 Recommended Selection

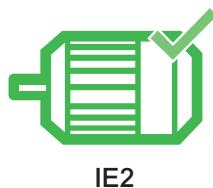
Sr. No.	3Φ Motors			I _q Current (kA)	Contactor	Overload Relay		Circuit Breaker	
	kW	HP	FLC - I _n (Amps)			Type	Range (A)	Type	Rating (A)
1	0.06	x	0.19	50	LC1E09	In-built in Circuit Breaker		GZ1E02	0.16 - 0.25
2	0.09	x	0.28	50	LC1E09			GZ1E03	0.25 - 0.4
3	0.12	0.16	0.51	50	LC1E09			GZ1E04	0.4 - 0.63
4	0.18	0.25	0.6	50	LC1E09			GZ1E04	0.4 - 0.63
5	0.25	0.33	0.8	50	LC1E09			GZ1E05	0.63 - 1
6	0.37	0.5	1.4	50	LC1E09			GZ1E06	1 - 1.6
7	0.55	0.75	1.7	50	LC1E09			GZ1E07	1.6 - 2.5
8	0.75	1	2.2	50	LC1E09			GZ1E07	1.6 - 2.5
9	1.1	1.5	2.9	50	LC1E09			GZ1E08	2.5 - 4
10	1.3	1.75	3	50	LC1E09			GZ1E08	2.5 - 4
11	1.5	2	3.8	50	LC1E09			GZ1E08	2.5 - 4
12	2.2	3	5.1	50	LC1E18			GZ1E10	4 - 6.3
13	3	4	6	50	LC1E18			GZ1E14	6 - 10
14	3.7	5	8.1	50	LC1E25			GZ1E14	6 - 10
15	4	5.5	8.5	50	LC1E25			GZ1E14	6 - 10
16	5.5	7.5	11.4	50*	LC1E32			GZ1E16	9 - 14
17	7.5	10	15.4	50*	LC1E32			GZ1E20	13 - 18
18	9.3	12.5	17.3	50*	LC1E40B			GZ1E21	17 - 23
19	11	15	22	50*	LC1E40B			GZ1E22	20 - 25
20	13	17.5	24	50*	LC1E50			GZ1E32	24 - 32
21	15	20	30	50*	LC1E50			GZ1E32	24 - 32

* 50kA With current Limiter type GV1L3, 10kA without current limiter

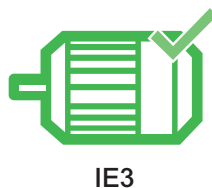
Selection Chart

Direct-On-Line starters with circuit-breaker GZL 1LE and separate thermal overload relay

Reliable
switching for
IE2/IE3 motors



IE2



IE3

Rated Operational Voltage, $U_e = 400/415V, 50/60Hz$
Short Circuit Current $I_q = 50kA$ upto 4kw and above 4kw with 50kA
With current Limiter type GV1L3, 10kA without current limiter

Type-2 Recommended Selection

Sr. No.	P (kW)	I _e (A)	Circuit Breaker	Contactor	Thermal Overload relay	Range (A)
1	0.09	0.4	GZ1LE03	LC1E09	LRE03	0.25...0.40
2	0.18	0.63	GZ1LE04	LC1E09	LRE04	0.4...0.63
3	0.25	1	GZ1LE05	LC1E09	LRE05	0.63...1
4	0.37	1.4	GZ1LE06	LC1E09	LRE06	1...1.6
5	0.75	2.2	GZ1LE07	LC1E09	LRE07	1.6...2.5
6	1.5	3.8	GZ1LE08	LC1E09	LRE08	2.5...4
7	2.2	5.1	GZ1LE10	LC1E18	LRE10	4...6
8	4	8.5	GZ1LE14	LC1E25	LRE14	7...10
9	5.5	11.4	GZ1LE16	LC1E32	LRE16	9...13
10	7.5	15.4	GZ1LE20	LC1E32	LRE21	12...18
11	9.3	17.3	GZ1LE22	LC1E40	LRE22	16...24
12	11	22	GZ1LE22	LC1E40	LRE22	16...24
13	15	30	GZ1LE32	LC1E50	LRE32	23...32

Star Delta starters with circuit-breaker GZL 1LE and separate thermal overload relay

Type-2 Recommended Selection

Sr. No.	P (kW)	I _e (A)	I _e /1,73 (A)	Circuit Breaker	Main/Delta Contactor	Star Contactor	Thermal Overload Relay	
1	0.09	0.4	0.2	GZ1LE03	LC1E09	LC1E09	LRE02	0.16...0.25
2	0.18	0.63	0.4	GZ1LE04	LC1E09	LC1E09	LRE03	0.25...0.40
3	0.25	1	0.6	GZ1LE05	LC1E09	LC1E09	LRE04	0.4...0.63
4	0.37	1.4	0.8	GZ1LE06	LC1E09	LC1E09	LRE05	0.63...1
5	0.75	2.2	1.3	GZ1LE07	LC1E09	LC1E09	LRE06	1...1.6
6	1.5	3.8	2.2	GZ1LE08	LC1E09	LC1E09	LRE07	1.6...2.5
7	2.2	5.1	2.9	GZ1LE10	LC1E18	LC1E09	LRE08	2.5...4
8	4	8.5	4.9	GZ1LE14	LC1E25	LC1E09	LRE10	4...6
9	5.5	11.4	6.6	GZ1LE16	LC1E32	LC1E09	LRE12	5.5...8
10	7.5	15.4	8.9	GZ1LE20	LC1E32	LC1E09	LRE14	7...10
11	9.3	17.3	10.0	GZ1LE22	LC1E40B	LC1E18	LRE16	9...13
12	11	22	12.7	GZ1LE22	LC1E40B	LC1E18	LRE16	9...13
13	15	30	17.3	GZ1LE32	LC1E50	LC1E18	LRE21	12...18

Selection Chart

Direct-on-Line starters with Fuses and overload protection by separate overload relay type LRE (thermal) or EOCR** (up to Trip class 10/10A)

Reliable
switching for
IE2 motors



Rated Operational Voltage, $U_e = 400/415V, 50/60Hz$
Short Circuit Current $I_q = 50kA$

Type-2 Recommended Selection

Sr. No.	3Φ Motors			Contactor	Overload Relay		Nominal Back-up Fuse			SDF
	kW	HP	FLC - I_n (Amps)		Type	Range (A)	Fuse	Fuse Rating	Fuse Size	
1	0.12	0.16	0.51	LC1E09	LRE04	0.4-0.63	4NHG000B	4	000	NX032
2	0.18	0.25	0.6	LC1E09	LRE04	0.4-0.63	4NHG000B	4	000	NX032
3	0.25	0.33	0.8	LC1E09	LRE05	0.63-1	4NHG000B	4	000	NX032
4	0.37	0.5	1.4	LC1E09	LRE06	1-1.6	4NHG000B	4	000	NX032
5	0.55	0.75	1.7	LC1E09	LRE06	1-1.6	4NHG000B	4	000	NX032
6	0.75	1	2.2	LC1E09	LRE07	1.6-2.5	6NHG000B	6	000	NX032
7	1.1	1.5	2.9	LC1E09	LRE08	2.5-4	10NHG000B	10	000	NX032
8	1.3	1.75	3	LC1E09	LRE08	2.5-4	10NHG000B	10	000	NX032
9	1.5	2	3.8	LC1E09	LRE08	2.5-4	10NHG000B	10	000	NX032
10	2.2	3	5.1	LC1E09	LRE10	4-6	16NHG000B	16	000	NX032
11	3	4	6	LC1E09	LRE12	5.5-8	20NHG000B	20	000	NX032
12	3.7	5	8.1	LC1E09	LRE14	7-10	20NHG000B	20	000	NX032
13	4	5.5	8.5	LC1E09	LRE14	7-10	20NHG000B	20	000	NX032
14	5.5	7.5	11.4	LC1E12	LRE16	9-13	25NHG000B	25	000	NX032
15	7.5	10	15.4	LC1E18	LRE21	12-18	32NHG000B	32	000	NX063
16	9.3	12.5	17.3	LC1E25	LRE22	16-24	50NHG000B	50	000	NX063
17	11	15	22	LC1E25	LRE22	16-24	50NHG000B	50	000	NX063
18	13	17.5	24	LC1E32	LRE32	23-32	50NHG000B	50	000	NX063
19	15	20	30	LC1E32	LRE32	23-32	63NHG000B	63	000	NX063
20	18.5	25	36	LC1E40	LRE355	30-40	80NHG000B	80	000	NX080
21	22	30	43	LC1E50	LRE357	37-50	80NHG000B	80	000	NX080
22	30	40	56	LC1E65	LRE359	48-65	100NHG000B	100	000	NX100
23	37	50	69	LC1E80	LRE363	63-80	125NHG00B	125	00	NX125
24	45	60	84	LC1E95	LRE365	80-104	160NHG00B	160	00	NX160
25	55	75	99	LC1E120	LRE482	84-135	160NHG00B	160	00	NX160
26	75	100	134	LC1E160	LRE483*	124-198	250NHG1B	250	1	NX250
27	80	110	139	LC1E160	LRE483*	124-198	250NHG1B	250	1	NX250
28	90	120	164	LC1E200	LRE483	124-198	250NHG1B	250	1	NX250
29	110	150	204	LC1E250	LRE484	146-234	250NHG1B	250	1	NX250
30	125	170	234	LC1E250	LRE485	174-279	315NHG2B	315	2	NX315
31	132	180	247	LC1E250	LRE485	174-279	315NHG2B	315	2	NX315
32	160	215	288	LC1E300	LRE486	208-333	400NHG2B	400	2	NX400
33	180	240	298	LC1E300	LRE486	208-333	400NHG2B	400	2	NX400
34	200	270	348	LC1E400	LRE487	258-414	400NHG2B	400	2	NX400
35	225	300	360	LC1E400	LRE487	258-414	500NHG3B	500	3	NX630
36	250	335	435	LC1E500	LRE488	321-513	630NHG3B	630	3	NX630
37	275	370	440	LC1E500	LRE488	321-513	630NHG3B	630	3	NX630
38	315	425	548	LC1E630	LRE489	394-630	800NHG3B	800	3	NA
39	335	452	580	LC1E630	LRE489	394-630	800NHG3B	800	3	NA

* Relay can match with contactor electrically (i.e Cannot be directly mounted), rest all relays are suitable for direct mounting as per catalogue.

** Selection valid upto Trip class 10/10A, Contact nearest sales office for details of EOCR to be used with this selection charts.

Selection Chart

Star Delta starters with Fuses and overload protection by separate overload relay type LRE (thermal) or EOCR** (up to Trip class 10/10A)

Reliable
switching for
IE2 motors



IE2

Rated Operational Voltage, $U_e = 400/415V$, 50/60Hz
Short Circuit Current $I_q = 50kA$

Type-2 Recommended Selection

Sr. No.	3Φ Motors				Contactor			Overload Relay		Nominal Back-up Fuse			SDF	Minimum Pause time (mSec)	Star-Delta Timer#
	kW	HP	FLC - I _n (Amps)					Type	Range (A)	Fuse type	Fuse Rating	Fuse Size			
			Line	Phase	Main	Delta	Star								
1	0.75	1	2.2	1.3	LC1E09	LC1E09	LC1E09	LRE06	1-1.6	4NHG000B	4	000	NX032	50	MSMI06
2	1.1	1.5	2.9	1.7	LC1E09	LC1E09	LC1E09	LRE07	1.6-2.5	4NHG000B	4	000	NX032	50	MSMI06
3	1.3	1.75	3	1.7	LC1E09	LC1E09	LC1E09	LRE07	1.6-2.5	4NHG000B	4	000	NX032	50	MSMI06
4	1.5	2	3.8	2.2	LC1E09	LC1E09	LC1E09	LRE07	1.6-2.5	6NHG000B	6	000	NX032	50	MSMI06
5	2.2	3	5.1	2.9	LC1E09	LC1E09	LC1E09	LRE08	2.5-4	10NHG000B	10	000	NX032	50	MSMI06
6	3	4	6	3.5	LC1E09	LC1E09	LC1E09	LRE08	2.5-4	10NHG000B	10	000	NX032	50	MSMI06
7	3.7	5	8.1	4.7	LC1E09	LC1E09	LC1E09	LRE10	4-6	10NHG000B	10	000	NX032	50	MSMI06
8	4	5.5	8.5	4.9	LC1E09	LC1E09	LC1E09	LRE10	4-6	16NHG000B	16	000	NX032	50	MSMI06
9	5.5	7.5	11.4	6.6	LC1E09	LC1E09	LC1E09	LRE12	5.5-8	16NHG000B	16	000	NX032	50	MSMI06
10	7.5	10	15.4	8.9	LC1E09	LC1E09	LC1E09	LRE14	7-10	20NHG000B	20	000	NX032	50	MSMI06
11	9.3	12.5	17.3	10.0	LC1E12	LC1E12	LC1E09	LRE14	7-10	20NHG000B	20	000	NX032	50	MSMI06
12	11	15	22	12.7	LC1E18	LC1E18	LC1E09	LRE16	9-13	32NHG000B	32	000	NX032	50	MSMI06
13	15	20	30	17.3	LC1E18	LC1E18	LC1E09	LRE21	12-18	40NHG000B	40	000	NX063	50	MSMI06
14	18.5	25	36	20.8	LC1E25	LC1E25	LC1E09	LRE22	16-24	40NHG000B	40	000	NX063	50	MSMI06
15	22	30	43	24.8	LC1E25	LC1E25	LC1E25	LRE32	23-32	50NHG000B	50	000	NX063	50	MSMI06
16	30	40	56	32.3	LC1E40	LC1E40	LC1E25	LRE355	30-40	63NHG000B	63	000	NX063	50	MSMI06
17	37	50	69	39.8	LC1E50	LC1E50	LC1E32	LRE355	30-40	80NHG000B	80	000	NX080	50	MSMI06
18	45	60	84	48.5	LC1E50	LC1E50	LC1E32	LRE357	37-50	100NHG000B	100	00	NX125	50	MSMI06
19	55	75	99	57.2	LC1E65	LC1E65	LC1E40	LRE359	48-65	125NHG000B	125	00	NX125	50	MSMI06
20	75	100	134	77.4	LC1E80	LC1E80	LC1E65	LRE363	63-80	160NHG000B	160	00	NX160	50	MSMI06
21	80	110	139	80.3	LC1E80	LC1E80	LC1E80	LRE363	63-80	160NHG000B	160	00	NX160	50	MSMI06
22	90	120	164	94.7	LC1E95	LC1E95	LC1E80	LRE365	80-104	200NHG1B	200	1	NX200	50	MSMI06
23	110	150	204	117.8	LC1E120	LC1E120	LC1E95	LRE482	84-135	250NHG1B	250	1	NX250	50	MSMI06
24	125	170	234	135.1	LC1E160	LC1E160	LC1E120	LRE483*	124-198	250NHG1B	250	1	NX250	50	MSMI06
25	132	180	247	142.6	LC1E160	LC1E160	LC1E120	LRE483*	124-198	250NHG1B	250	1	NX250	50	MSMI06
26	150	200	248	143.2	LC1E160	LC1E160	LC1E120	LRE483*	124-198	250NHG1B	250	1	NX250	50	MSMI06
27	160	215	288	166.3	LC1E200	LC1E200	LC1E160	LRE483	124-198	315NHG2B	300	2	NX315	50	MSMI06
28	180	240	298	172.1	LC1E200	LC1E200	LC1E160	LRE483	124-198	315NHG2B	300	2	NX315	50	MSMI06
29	200	270	348	200.9	LC1E250	LC1E250	LC1E160	LRE484	146-234	400NHG2B	400	2	NX400	50	MSMI06
30	225	300	360	207.9	LC1E250	LC1E250	LC1E160	LRE484	146-234	400NHG2B	400	2	NX400	50	MSMI06
31	250	335	435	251.2	LC1E300	LC1E300	LC1E200	LRE485	174-279	450NHG3B	450	3	NX630	50	MSMI06
32	275	370	440	254.0	LC1E300	LC1E300	LC1E200	LRE485	174-279	450NHG3B	450	3	NX630	50	MSMI06
33	315	425	548	316.4	LC1E400	LC1E400	LC1E250	LRE486	208-333	630NHG3B	630	3	NX630	50	MSMI06
34	335	452	580	334.9	LC1E400	LC1E400	LC1E250	LRE487	258-414	630NHG3B	630	3	NX630	50	MSMI06
35	355	475	618	356.8	LC1E400	LC1E400	LC1E250	LRE487	258-414	630NHG3B	630	3	NX630	50	MSMI06
36	375	502	653	377.0	LC1E400	LC1E400	LC1E250	LRE487	258-414	800NHG3B	800	3	NA	50	MSMI06
37	400	535	674	389.1	LC1E500	LC1E500	LC1E300	LRE487	258-414	800NHG3B	800	3	NA	200	MSMI06

* Relay can match with contactor electrically (i.e Cannot be directly mounted), rest all relays are suitable for direct mounting as per catalogue.
Use alternate suggested for direct mounting.

**Selection valid upto Trip class 10/10A, Contact nearest sales office for details of EOCR to be used with this selection charts.

For guaranteed performance, Motor feeders built using this chart must make use of MSMI06 or equivalent Schneider Electric make timer only.

Selection Chart

Direct-on-Line starters with circuit-breaker type CVS and overload protection by separate overload relay type LRE (thermal) or EOOCR** (up to Trip class 10/10A)

Reliable
switching for
IE2/IE3 motors



IE2



IE3

Rated Operational Voltage, $U_e = 400/415V$, 50/60Hz
Short Circuit Current $I_q = 50kA$

Type-2 Recommended Selection

Sr. No.	3Φ Motors			Contactor	Overload Relay		Circuit Breaker			
	kW	HP	FLC - I_n (Amps)		Type	Range (A)	Type	Trip Unit Rating	Magnetic Setting Range	Setting on Trip Unit in Amps
1	0.37	0.5	1.4	LC1E09	LRE06	1-1.6	CVS100-MA	2.5	6-14	15
2	0.55	0.75	1.7	LC1E09	LRE07	1.6-2.5	CVS100-MA	2.5	6-14	17.5
3	0.75	1	2.2	LC1E09	LRE07	1.6-2.5	CVS100-MA	2.5	6-14	22.5
4	1.1	1.5	2.9	LC1E09	LRE08	2.5-4	CVS100-MA	6.3	6-14	31.5
5	1.3	1.75	3	LC1E09	LRE08	2.5-4	CVS100-MA	6.3	6-14	31.5
6	1.5	2	3.8	LC1E09	LRE08	2.5-4	CVS100-MA	6.3	6-14	37.8
7	2.2	3	5.1	LC1E18	LRE10	4-6	CVS100-MA	6.3	6-14	63
8	3	4	6	LC1E18	LRE10	4-6	CVS100-MA	6.3	6-14	69.3
9	3.7	5	8.1	LC1E25	LRE14	7-10	CVS100-MA	12.5	6-14	100
10	4	5.5	8.5	LC1E25	LRE14	7-10	CVS100-MA	12.5	6-14	100
11	5.5	7.5	11.4	LC1E32	LRE16	9-13	CVS100-MA	12.5	6-14	137.5
12	7.5	10	15.4	LC1E32	LRE21	12-18	CVS100-MA	25	6-14	175
13	9.3	12.5	17.3	LC1E32	LRE21	12-18	CVS100-MA	25	6-14	200
14	11	15	22	LC1E40B	LRE22	16-24	CVS100-MA	25	6-14	275
15	13	17.5	24	LC1E40B	LRE22	16-24	CVS100-MA	25	6-14	300
16	15	20	30	LC1E50	LRE32* or LRE353	23-32	CVS100-MA	50	6-14	350
17	18.5	25	36	LC1E65	LRE35* or LRE355	30-38* 30-40	CVS100-MA	50	6-14	450
18	22	30	43	LC1E65	LRE357	37-50	CVS100-MA	50	6-14	500
19	30	40	56	LC1E80	LRE359	48-65	CVS100-MA	100	6-14	700
20	37	50	69	LC1E95	LRE361	55-70	CVS100-MA	100	6-14	800
21	45	60	84	LC1E120	LRE482	84-135	CVS100-MA	100	6-14	1000
22	55	75	99	LC1E160	LRE482	84-135	CVS100-MA	100	6-14	1200
23	75	100	134	LC1E160	LRE482	84-135	CVS250-MA	150	9-14	1650
24	80	110	139	LC1E160	LRE483	124-198	CVS250-MA	150	9-14	1650
25	90	120	164	LC1E200	LRE483	124-198	CVS250-MA	220	9-14	1980
26	110	150	204	LC1E250	LRE484	146-234	CVS250-MA	220	9-14	2420
27	125	170	234	LC1E300	LRE484	146-234	CVS400-MA	320	6-13	2880
28	132	180	247	LC1E300	LRE485	174-279	CVS400-MA	320	6-13	3200
29	160	215	288	LC1E400	LRE486	208-333	CVS400-MA	320	6-13	3520
30	180	240	298	LC1E400	LRE486	208-333	CVS400-MA	320	6-13	3520
31	200	270	348	LC1E400	LRE487	258-414	CVS630-MA	500	6-13	4500
32	225	300	360	LC1E500	LRE487* or LRE488	258-414* 321-513	CVS630-MA	500	6-13	4500
33	250	335	435	LC1E500	LRE488	321-513	CVS630-MA	500	6-13	5500
34	275	370	440	LC1E630	LRE489	394-630	CVS630-MA	500	6-13	5500
35	315	425	548	LC1E630	LRE489	394-630	CVS630-ETS	630	2-10	6300
36	335	452	580	LC1E630	LRE489	394-630	CVS630-ETS	630	2-10	6300
37	355	475	618	LC1E630	LRE489	394-630	CVS800-TMD	800	3.5-10	8000

* Relay can match with contactor electrically (i.e Cannot be directly mounted), rest all relays are suitable for direct mounting as per catalogue.
Use alternate suggested for direct mounting.

** Selection valid upto Trip class 10/10A, Contact nearest sales office for details of EOOCR to be used with this selection charts.

Selection Chart

Star Delta starters with circuit-breaker type CVS and overload protection by separate overload relay type LRE (thermal) or EOCR** (up to Trip class 10/10A)

Reliable
switching for
IE2/IE3 motors



IE2



IE3

Rated Operational Voltage, $U_e = 400/415V$, 50/60Hz
Short Circuit Current $I_q = 50kA$

Type-2 Recommended Selection

Sr. No.	3Φ Motors				Contactor			Overload Relay		Circuit Breaker				Minimum Pause time (mSec)	Star-Delta Timer#
	kW	HP	FLC - I _n (Amps)					Type	Range (A)	Type	Trip Unit Rating	Mag- netic Setting Range	Setting on Trip Unit in Amps		
			Line	Phase	Main	Delta	Star								
1	0.75	1	2.2	1.3	LC1E09	LC1E09	LC1E09	LRE06	1-1.6	CVS100-MA	6.3	6-14	37.8	50	MSMI06
2	1.1	1.5	2.9	1.7	LC1E09	LC1E09	LC1E09	LRE07	1.6-2.5	CVS100-MA	6.3	6-14	50.4	50	MSMI06
3	1.3	1.8	3	1.7	LC1E09	LC1E09	LC1E09	LRE07	1.6-2.5	CVS100-MA	6.3	6-14	50.4	50	MSMI06
4	1.5	2	3.8	2.2	LC1E09	LC1E09	LC1E09	LRE07	1.6-2.5	CVS100-MA	6.3	6-14	63	50	MSMI06
5	2.2	3	5.1	2.9	LC1E09	LC1E09	LC1E09	LRE08	2.5-4	CVS100-MA	12.5	6-14	100	50	MSMI06
6	3	4	6	3.5	LC1E09	LC1E09	LC1E09	LRE08	2.5-4	CVS100-MA	12.5	6-14	112.5	50	MSMI06
7	3.7	5	8.1	4.7	LC1E09	LC1E09	LC1E09	LRE10	4-6	CVS100-MA	12.5	6-14	150	50	MSMI06
8	4	5.5	8.5	4.9	LC1E09	LC1E09	LC1E09	LRE10	4-6	CVS100-MA	12.5	6-14	162.5	50	MSMI06
9	5.5	7.5	11.4	6.6	LC1E12	LC1E12	LC1E09	LRE12	5.5-8	CVS100-MA	25	6-14	225	50	MSMI06
10	7.5	10	15.4	8.9	LC1E18	LC1E18	LC1E09	LRE14	7-10	CVS100-MA	25	6-14	300	50	MSMI06
11	9.3	13	17.3	10	LC1E25	LC1E25	LC1E12	LRE14	7-10	CVS100-MA	25	6-14	325	50	MSMI06
12	11	15	22	12.7	LC1E25	LC1E25	LC1E12	LRE16	9-13	CVS100-MA	50	6-14	400	50	MSMI06
13	13	18	24	13.9	LC1E32	LC1E32	LC1E12	LRE21	12-18	CVS100-MA	50	6-14	450	50	MSMI06
14	15	20	30	17.3	LC1E32	LC1E32	LC1E18	LRE21	12-18	CVS100-MA	50	6-14	550	50	MSMI06
15	18.5	25	36	20.8	LC1E40B	LC1E40B	LC1E25	LRE22	16-24	CVS100-MA	50	6-14	700	50	MSMI06
16	22	30	43	24.8	LC1E40	LC1E40	LC1E32	LRE32* or LRE353	23-32	CVS100-MA	100	6-14	800	50	MSMI06
17	30	40	56	32.3	LC1E50	LC1E50	LC1E38	LRE355	30-40	CVS100-MA	100	6-14	1100	50	MSMI06
18	37	50	69	39.8	LC1E65	LC1E65	LC1E40	LRE355	30-40	CVS100-MA	100	6-14	1300	50	MSMI06
19	45	60	84	48.5	LC1E80	LC1E80	LC1E50	LRE357	37-50	CVS250-MA	150	9-14	1650	50	MSMI06
20	55	75	99	57.2	LC1E95	LC1E95	LC1E65	LRE359	48-65	CVS250-MA	150	9-14	1950	50	MSMI06
21	75	100	134	77.4	LC1E120	LC1E120	LC1E80	LRE481	62-99	CVS250-MA	220	9-14	2640	50	MSMI06
22	80	110	139	80.3	LC1E120	LC1E120	LC1E80	LRE481	62-99	CVS250-MA	220	9-14	2640	50	MSMI06
23	90	120	164	94.7	LC1E160	LC1E160	LC1E95	LRE482	84-135	CVS250-MA	220	9-14	3080	50	MSMI06
24	110	150	204	117.8	LC1E200	LC1E200	LC1E120	LRE482*	84-135	CVS400-MA	320	6-13	3840	50	MSMI06
25	125	170	234	135.1	LC1E250	LC1E250	LC1E120	LRE483*	124-198	CVS630-MA	500	6-13	4500	50	MSMI06
26	132	180	247	142.6	LC1E250	LC1E250	LC1E120	LRE483*	124-198	CVS630-MA	500	6-13	5000	50	MSMI06
27	150	200	248	143.2	LC1E250	LC1E250	LC1E120	LRE483*	124-198	CVS630-MA	500	6-13	5000	50	MSMI06
28	160	215	288	166.3	LC1E300	LC1E300	LC1E160	LRE483*	124-198	CVS630-MA	500	6-13	5500	50	MSMI06
29	180	240	298	172.1	LC1E300	LC1E300	LC1E160	LRE483*	124-198	CVS630-MA	500	6-13	6000	50	MSMI06
30	200	270	348	200.9	LC1E400	LC1E400	LC1E200	LRE484	146-234	CVS630-MA	500	6-13	6500	50	MSMI06
31	225	300	360	207.9	LC1E400	LC1E400	LC1E200	LRE484	146-234	CVS630-MA	500	6-13	6500	50	MSMI06
32	250	335	435	251.2	LC1E400	LC1E400	LC1E250	LRE485	174-279	CVS630-MA	500	6-13	6500	50	MSMI06
33	275	370	440	254	LC1E400	LC1E400	LC1E250	LRE485	174-279	CVS630-MA	500	6-13	6500	50	MSMI06
34	315	425	548	316.4	LC1E500	LC1E500	LC1E300	LRE486*	208-333	CV630-ETS	630	2-10	6300	200	MSMI06

* Relay can match with contactor electrically (i.e Cannot be directly mounted), rest all relays are suitable for direct mounting as per catalogue.
Use alternate suggested for direct mounting.

**Selection valid upto Trip class 10/10A, Contact nearest sales office for details of EOCR to be used with this selection charts.

For guaranteed performance, Motor feeders built using this chart must make use of MSMI06 or equivalent Schneider Electric make timer only.

Note

Note

[illegible]

Life Is 

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Tel.:044-71912000

Jaipur
Schneider Electric India (P) Ltd.
Jaipur Business Centre 309
3rd Floor, Sangam Tower 190
Church Road, Jaipur-302001
Tel.: 0141-2374810

Mumbai
Schneider Electric India (P) Ltd.
Marwah House, 2nd Floor
Krishanlal Marwah Marg
Andheri (East), Mumbai - 400072
Tel.: 022-62280000

Vadodara
Schneider Electric India (P) Ltd.
Notus IT Park, 10th Floor, Block-D
Sarabhai Campus, Vadiwadi
Vadodara, Gujarat - 390017

Cochin
Schneider Electric India (P) Ltd.
Alapatt Properties Private Limited
(Trade Name : Centre A)
Main Door Number : 66/4971
(Old Door Number: 40/6584-H)
7th Floor Alapatt Heritage Building
MG Road Kochi - 682035

Kolkata
Schneider Electric (I) Pvt.Ltd,
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6, Vasant Vihar Complex
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Vishakhapatnam
Schneider Electric India (P) Ltd.
D.N.10-1-43, 1st Floor
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Siripuram Fort, C.B.M.Compound
Visakhapatnam - 530016
Tel.: 0891-6675500

Customer Care Centre

Monday-Saturday, 9 a.m. to 8 p.m.

Toll-free numbers: 1800 419 4272, 1800 103 0011

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