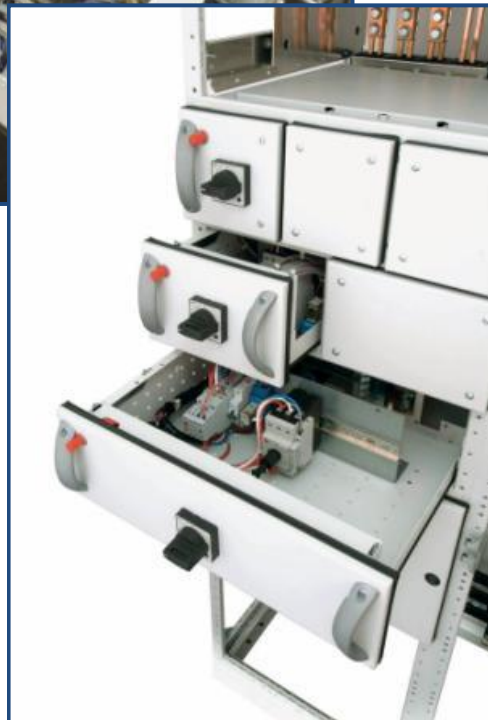
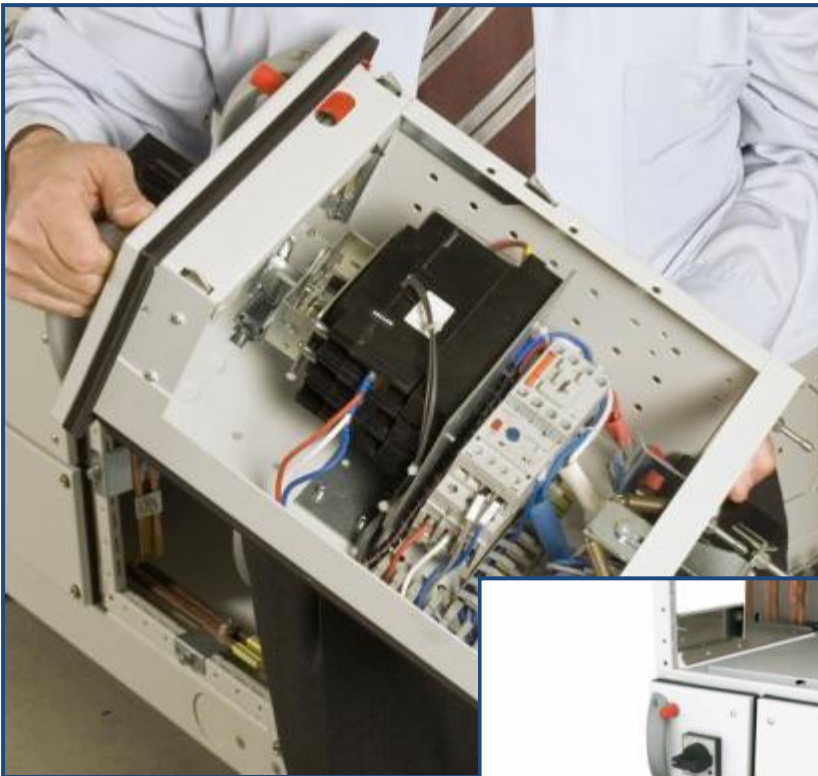


# Type 2 Coordination for Premium Efficiency Motor Starters

## TemBreak Pro

### Combination selections



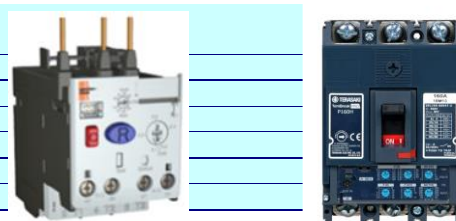
September 2022

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### FOR DIRECT ON LINE MOTOR STARTING

Circuit breaker	Terasaki Tembreak Pro
Contactors	Sprecher+Schuh CA7 / CA9
Overload relay	Sprecher+Schuh CEP7 Electronic
Rated operational voltage	400 / 415V AC
Motor types	Premium Efficiency class: IE3
Rated conditional AC current (I <sub>q</sub> ) :	50 kA (rms symmetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination



### COMPONENT SELECTION TABLE:

MOTOR		CIRCUIT BREAKER	CONTACTOR	OVERLOAD RELAY	C/B INSTANT TRIP AMPS & MOTOR FLC		
MOTOR kW	MOTOR AMP RATINGS @ 400V	MOULDED CASE CIRCUIT BREAKER	CONTACTOR TYPE	OVERLOAD RELAY (ELECTRONIC)	AMPERE SETTING RANGE	C/B INSTANT TRIP AMPS (± 20%)	MINIMUM TRIP AMP MULTIPLE OF MOTOR FLC
0.18	0.6	P160N2 / 20A TM	CA7-30	CEP7-1EF BB *	0.2 – 1.0	240	320
0.25	0.85	P160N2 / 20A TM	CA7-30	CEP7-1EF BB *	0.2 – 1.0	240	225
0.37	1.1	P160N2 / 20A TM	CA7-30	CEP7-1EF CB *	1.0 – 5.0	240	174
0.55	1.5	P160N2 / 20A TM	CA7-30	CEP7-1EF CB *	1.0 – 5.0	240	128
0.75	1.9	P160N2 / 20A TM	CA7-30	CEP7-1EF CB *	1.0 – 5.0	240	101
1.1	2.7	P160N2 / 20A TM	CA7-30	CEP7-1EF CB *	1.0 – 5.0	240	71.1
1.5	3.6	P160N2 / 20A TM	CA7-30	CEP7-1EF CB *	1.0 – 5.0	240	53.3
2.2	4.9	P160N2 / 20A TM	CA7-30	CEP7-1EF DB *	3.2 – 16	240	39.2
3	6.5	P160N2 / 20A TM	CA7-30	CEP7-1EF ED	5.4 – 27	240	29.5
4	8.5	P160N2 / 20A TM	CA7-30	CEP7-1EF ED	5.4 – 27	240	22.6
5.5	11.5	P160N2 / 20A TM	CA7-30	CEP7-1EF ED	5.4 – 27	240	16.7
7.5	15.5	P160N2 / 32A TM	CA7-30	CEP7-1EF ED	5.4 – 27	384	19.8
11	22	P160N2 / 32A TM	CA7-30	CEP7-1EF ED	5.4 – 27	384	14.0
15	29	P160N2 / 50A TM	CA7-43	CEP7-1EF FD	11 – 55	600	16.6
18.5	35	P160N2 / 63A TM	CA7-43	CEP7-1EF FD	11 – 55	756	17.3
22	41	P160N2 / 63A TM	CA7-55	CEP7-1EF FD	11 – 55	756	14.8
30	55	P160N2 / 100A TM	CA7-72	CEP7-1EF GE	20 – 100	1200	17.5
37	66	P160N2 / 100A TM	CA7-85	CEP7-1EF GE	20 – 100	1200	14.5
45	80	P160N2 / 160A TM	CA9-116	CEP7-1EF GE *	20 – 100	1600	16.0
55	97	P250N / 160A TM	CA9-146	CEP7-1EF GE *	20 – 100	2080	17.2
75	132	P250N / 250A TM	CA9-190	CTKIT400A	80 – 400	2500	15.2
90	160	P400N / 250A BE	CA9-265	CTKIT400A	80 – 400	3000	15.0
110	195	P400N / 400A BE	CA9-265	CTKIT400A	80 – 400	4800	20.9
132	230	P400N / 400A BE	CA9-305	CTKIT400A	80 – 400	4800	17.7
150	260	P630N / 630A BE	CA9-400	CTKIT400A	80 – 400	6930	22.7
160	280	P630N / 630A BE	CA9-400	CTKIT400A	80 – 400	6930	21.0
185	325	P630N / 630A BE	CA9-400	CTKIT400A	80 – 400	6930	18.1
200	350	P630N / 630A BE	CA9-460	CTKIT400A	80 – 400	6930	16.8
220	385	B800N / 630A BE	CA9-580	CTKIT400A	80 – 400	7560	16.7
250	430	B800N / 630A BE	CA9-580	CTKIT600A	120 – 600	7560	14.9
315	540	B800N / 800A BE	CA9-750	CTKIT600A	120 – 600	9600	15.1
355	610	B1000N / 1000A BE	CA9-750	CTKIT800A	160 – 800	10000	13.9
400	690	B1250N / 1250A BE	CA9-860	CTKIT1000A	200 – 1000	15000	18.5
450	770	B1250N / 1250A BE	CA9-1060	CTKIT1000A	200 – 1000	15000	16.6
500	850	B1250N / 1250A BE	CA9-1060	CTKIT1000A	200 – 1000	15000	15.0

#### NOTES:

A) Recommended circuit breaker size based on the following starting conditions:

Starting currents approx. 7.5...8 x motor FLC. Start time approx.5 sec.

Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10ms, that will vary by motor make.

\* Overloads separately mounted from contactor, or use Pass thru version.

^ Motor Starters 75kW & above, Kit utilises separate 5P10-5A Current Transformers with 193-1EF\*Z overload

B) Other

1) CEP7-1EF overload add-on module available for: Ground Fault, Jam Protection & Remote reset,

Ground Fault requires toroid :- \*\*-CBCT#

C) Note

Set circuit breaker I<sub>r</sub> to 1 (=I<sub>n</sub>), and Overload is set to motor FLC

CH54.31 Type 2, 50 kA – Circuit breakers, with electronic overload



**FOR DIRECT ON LINE MOTOR STARTING**

Circuit breaker	Terasaki Tembreak Pro
Contactors	Sprecher+Schuh CA7 and CA9
Overload relay	Allen-Bradley 193-E3 Electronic E300 w-Ethernet/IP
Rated operational voltage	400 / 415V AC
Motor types	Premium Efficiency class: IE3
Rated conditional AC current (I <sub>q</sub> ) :	50 kA (rms symmetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination



**COMPONENT SELECTION TABLE:**

MOTOR		CIRCUIT BREAKER	CONTACTOR	OVERLOAD RELAY	C/B INSTANT TRIP AMPS & MOTOR FLC		
MOTOR kW	MOTOR AMP RATINGS @ 400V	MOULDED CASE CIRCUIT BREAKER	CONTACTOR TYPE	OVERLOAD RELAY (ELECTRONIC)	Earth Leakage	C/B INSTANT TRIP AMPS (± 20%)	MINIMUM TRIP AMP MULTIPLE OF MOTOR FLC
0.18	0.6	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	320
0.25	0.85	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	225
0.37	1.1	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	174
0.55	1.5	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	128
0.75	1.9	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	101
1.1	2.7	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	71.1
1.5	3.6	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	53.3
2.2	4.9	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	39.2
3	6.5	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	29.5
4	8.5	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	22.6
5.5	11.5	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	16.7
7.5	15.5	P160N2 / 32A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	384	19.8
11	22	P160N2 / 32A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	384	14.0
15	29	P160N2 / 50A TM	CA7-43	193 E3-63-24D-IG-60A - # -ETR	Int.	600	16.6
18.5	35	P160N2 / 63A TM	CA7-43	193 E3-63-24D-IG-60A - # -ETR	Int.	756	17.3
22	41	P160N2 / 63A TM	CA7-55	193 E3-63-24D-IG-60A - # -ETR	Int.	756	14.8
30	55	P160N2 / 100A TM	CA7-72	193 E3-63-24D-IG-100A - # -ETR	Int.	1200	17.5
37	66	P160N2 / 100A TM	CA7-85	193 E3-63-24D-IG-100A - # -ETR	Int.	1200	14.5
45	80	P160N2 / 160A TM	CA9-116	193 E3-63-24D-IG-200A - # -ETR	Int.	1600	16.0
55	97	P250N / 160A TM	CA9-146	193 E3-63-24D-IG-200A - # -ETR	Int.	2080	17.2
75	132	P250N / 250A TM	CA9-190	193 E3-63-24D-IG-200A - # -ETR	Int.	2500	15.2
90	160	P400N / 250A BE	CA9-265	193 E3-63-24D-IG-200A - # -ETR	Int.	3000	15.0
110	195	P400N / 400A BE	CA9-265	193 E3-63-24D-IG-200A - # -ETR	Int.	4800	20.9
132	230	P400N / 400A BE	CA9-305	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	4800	17.7
150	260	P630N / 630A BE	CA9-400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	22.7
160	280	P630N / 630A BE	CA9-400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	21.0
185	325	P630N / 630A BE	CA9-400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	18.1
200	350	P630N / 630A BE	CA9-460	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	16.8
220	385	B800N / 630A BE	CA9-580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	7560	16.7
250	430	B800N / 630A BE	CA9-580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	7560	14.9
315	540	B800N / 800A BE	CA9-750	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	9600	15.1
355	610	B1000N / 1000A BE	CA9-750	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	10000	13.9
400	690	B1250N / 1250A BE	CA9-860	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	18.5
450	770	B1250N / 1250A BE	CA9-1060	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	16.6
500	850	B1250N / 1250A BE	CA9-1060	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	15.0

**NOTES:**

A) Recommended circuit breaker size based on the following starting conditions:

Starting currents approx. 7.5... 8 x motor FLC. Start time approx.5 sec.

Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10ms, that will vary by motor make.

^ Motor Starters 132kW & above, require external 5P10-5A Current Transformers

B) E/L

-Int- Internal Ground Fault toroid in Sensing module – 500mA to 5 Amp

\* to use External toroid, and/or Thermistor protection, -GP42- Control module is required

-Ext- External Ground Fault toroid via 193-CBCT – 20mA to 5 Amp

C)Other

1) 24D denotes 24V DC control voltage

- # - Specify Contactor mount, or E3T / T for separate DIN mount, or P for Pass Thru

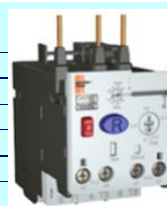
If Power & Voltage monitoring is required, change Sensing module to VIG versions

CH54.32 Type 2, 50 kA – Circuit breakers, electronic overload with Ethernet/IP communications



**FOR DIRECT ON LINE MOTOR STARTING**

Circuit breaker	Terasaki Tembreak Pro
Contactors	Allen-Bradley <b>100(S)-C / 100(S)-E</b>
Overload relay	Allen-Bradley <b>E100</b> 193-1EF Electronic
Rated operational voltage	400 / 415V AC
Motor types	Premium Efficiency class: IE3
Rated conditional AC current (I <sub>q</sub> ) :	50 kA (rms symmetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination



**COMPONENT SELECTION TABLE:**

MOTOR		CIRCUIT BREAKER	CONTACTOR	OVERLOAD RELAY	C/B INSTANT TRIP AMPS & MOTOR FLC		
MOTOR kW	MOTOR AMP RATINGS @ 400V	MOULDED CASE CIRCUIT BREAKER	CONTACTOR TYPE	OVERLOAD RELAY (ELECTRONIC)	AMPERE SETTING RANGE	C/B INSTANT TRIP AMPS (± 20%)	MINIMUM TRIP AMP MULTIPLE OF MOTOR FLC
0.18	0.6	P160N2 / 20A TM	100-C30	193-1EF BB *	0.2 – 1.0	240	320
0.25	0.85	P160N2 / 20A TM	100-C30	193-1EF BB *	0.2 – 1.0	240	225
0.37	1.1	P160N2 / 20A TM	100-C30	193-1EF CB *	1.0 – 5.0	240	174
0.55	1.5	P160N2 / 20A TM	100-C30	193-1EF CB *	1.0 – 5.0	240	128
0.75	1.9	P160N2 / 20A TM	100-C30	193-1EF CB *	1.0 – 5.0	240	101
1.1	2.7	P160N2 / 20A TM	100-C30	193-1EF CB *	1.0 – 5.0	240	71.1
1.5	3.6	P160N2 / 20A TM	100-C30	193-1EF CB *	1.0 – 5.0	240	53.3
2.2	4.9	P160N2 / 20A TM	100-C30	193-1EF DB *	3.2 – 16	240	39.2
3	6.5	P160N2 / 20A TM	100-C30	193-1EF ED	5.4 – 27	240	29.5
4	8.5	P160N2 / 20A TM	100-C30	193-1EF ED	5.4 – 27	240	22.6
5.5	11.5	P160N2 / 20A TM	100-C30	193-1EF ED	5.4 – 27	240	16.7
7.5	15.5	P160N2 / 32A TM	100-C30	193-1EF ED	5.4 – 27	384	19.8
11	22	P160N2 / 32A TM	100-C30	193-1EF ED	5.4 – 27	384	14.0
15	29	P160N2 / 50A TM	100-C43	193-1EF FD	11 – 55	600	16.6
18.5	35	P160N2 / 63A TM	100-C43	193-1EF FD	11 – 55	756	17.3
22	41	P160N2 / 63A TM	100-C55	193-1EF FD	11 – 55	756	14.8
30	55	P160N2 / 100A TM	100-C72	193-1EF GE	20 – 100	1200	17.5
37	66	P160N2 / 100A TM	100-C85	193-1EF GE	20 – 100	1200	14.5
45	80	P160N2 / 160A TM	100-E116	193-1EF GE *	20 – 100	1600	16.0
55	97	P250N / 160A TM	100-E146	193-1EF GE *	20 – 100	2080	17.2
75	132	P250N / 250A TM	100-E190	193-E200-200A #	20 – 200	2500	15.2
90	160	P400N / 250A BE	100-E265	193-E200-200A #	20 – 200	3000	15.0
110	195	P400N / 400A BE	100-E265	193-E200-200A #	20 – 200	4800	20.9
132	230	P400N / 400A BE	100-E305	CTKIT400A	80 – 400	4800	17.7
150	260	P630N / 630A BE	100-E400	CTKIT400A	80 – 400	6930	22.7
160	280	P630N / 630A BE	100-E400	CTKIT400A	80 – 400	6930	21.0
185	325	P630N / 630A BE	100-E400	CTKIT400A	80 – 400	6930	18.1
200	350	P630N / 630A BE	100-E460	CTKIT400A	80 – 400	6930	16.8
220	385	B800N / 630A BE	100-E580	CTKIT400A	80 – 400	7560	16.7
250	430	B800N / 630A BE	100-E580	CTKIT600A	120 – 600	7560	14.9
315	540	B800N / 800A BE	100-E750	CTKIT600A	120 – 600	9600	15.1
355	610	B1000N / 1000A BE	100-E750	CTKIT800A	160 – 800	10000	13.9
400	690	B1250N / 1250A BE	100-E860	CTKIT1000A	200 – 1000	15000	18.5
450	770	B1250N / 1250A BE	100-E1060	CTKIT1000A	200 – 1000	15000	16.6
500	850	B1250N / 1250A BE	100-E1060	CTKIT1000A	200 – 1000	15000	15.0

**NOTES:**

A) Recommended circuit breaker size based on the following starting conditions:

Starting currents approx. 7.5...8 x motor FLC. Start time approx.5 sec.

Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10ms, that will vary by motor make.

\* Overloads separately mounted from contactor, or use Pass thru version.

^ Motor Starters 132kW & above, Kit utilises separate 5P10-5A Current Transformers with 193-1EF\*Z overload

B) Other

1) 193-1EF overload add-on module available for: Ground Fault, Jam Protection & Remote reset,

2) # - Specify E200 mounting, T for separate DIN mount, or P for Pass Thru

C) Note

Set circuit breaker I<sub>r</sub> to 1 (=I<sub>n</sub>), and Overload is set to motor FLC

RCH54.33 Type 2, 50 kA – Circuit breakers, with electronic overload





**FOR DIRECT ON LINE MOTOR STARTING**

Circuit breaker	Terasaki Tembreak Pro
Contactors	Allen-Bradley 100(S)-C / 100(S)-E
Overload relay	Allen-Bradley 193-E3 Electronic E300 w-Ethernet/IP
Rated operational voltage	400 / 415V AC
Motor types	Premium Efficiency class: IE3
Rated conditional AC current (I <sub>q</sub> ) :	50 kA (rms symmetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination



**COMPONENT SELECTION TABLE:**

MOTOR		CIRCUIT BREAKER	CONTACTOR	OVERLOAD RELAY	C/B INSTANT TRIP AMPS & MOTOR FLC		
MOTOR kW	MOTOR AMP RATINGS @ 400V	MOULDED CASE CIRCUIT BREAKER	CONTACTOR TYPE	OVERLOAD RELAY (ELECTRONIC)	Earth Leakage	C/B INSTANT TRIP AMPS (± 20%)	MINIMUM TRIP AMP MULTIPLE OF MOTOR FLC
0.18	0.6	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	320
0.25	0.85	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	225
0.37	1.1	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	174
0.55	1.5	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	128
0.75	1.9	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	101
1.1	2.7	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	71.1
1.5	3.6	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	53.3
2.2	4.9	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	39.2
3	6.5	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	29.5
4	8.5	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	22.6
5.5	11.5	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	16.7
7.5	15.5	P160N2 / 32A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	384	19.8
11	22	P160N2 / 32A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	384	14.0
15	29	P160N2 / 50A TM	100-C43	193 E3-63-24D-IG-60A - # -ETR	Int.	600	16.6
18.5	35	P160N2 / 63A TM	100-C43	193 E3-63-24D-IG-60A - # -ETR	Int.	756	17.3
22	41	P160N2 / 63A TM	100-C55	193 E3-63-24D-IG-60A - # -ETR	Int.	756	14.8
30	55	P160N2 / 100A TM	100-C72	193 E3-63-24D-IG-100A - # -ETR	Int.	1200	17.5
37	66	P160N2 / 100A TM	100-C85	193 E3-63-24D-IG-100A - # -ETR	Int.	1200	14.5
45	80	P160N2 / 160A TM	100-E116	193 E3-63-24D-IG-200A - # -ETR	Int.	1600	16.0
55	97	P250N / 160A TM	100-E146	193 E3-63-24D-IG-200A - # -ETR	Int.	2080	17.2
75	132	P250N / 250A TM	100-E190	193 E3-63-24D-IG-200A - # -ETR	Ext.	2500	15.2
90	160	P400N / 250A BE	100-E265	193 E3-63-24D-IG-200A - # -ETR	Ext.	3000	15.0
110	195	P400N / 400A BE	100-E265	193 E3-63-24D-IG-200A - # -ETR	Ext.	4800	20.9
132	230	P400N / 400A BE	100-E305	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	4800	17.7
150	260	P630N / 630A BE	100-E400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	22.7
160	280	P630N / 630A BE	100-E400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	21.0
185	325	P630N / 630A BE	100-E400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	18.1
200	350	P630N / 630A BE	100-E460	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	16.8
220	385	B800N / 630A BE	100-E580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	7560	16.7
250	430	B800N / 630A BE	100-E580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	7560	14.9
315	540	B800N / 800A BE	100-E750	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	9600	15.1
355	610	B1000N / 1000A BE	100-E750	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	10000	13.9
400	690	B1250N / 1250A BE	100-E860	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	18.5
450	770	B1250N / 1250A BE	100-E1060	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	16.6
500	850	B1250N / 1250A BE	100-E1060	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	15.0

**NOTES:**

A) Recommended circuit breaker size based on the following starting conditions:

Starting currents approx. 7.5... 8 x motor FLC. Start time approx. 5 sec.

Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10ms, that will vary by motor make.

^ Motor Starters 132kW & above, require external 5P10-5A Current Transformers

B) E/L

-Int- Internal Ground Fault toroid in Sensing module – 500mA to 5 Amp

\* to use External toroid, and/or Thermistor protection, -GP42- Control module is required

-Ext- External Ground Fault toroid via 193-CBCT – 20mA to 5 Amp

C) Other

2) 24D denotes 24V DC control voltage

# - Specify Contactor mount, or E3T / T for separate DIN mount, or P for Pass Thru

If Power & Voltage monitoring is required, change Sensing module to VIG versions

RCH54.34 Type 2, 50 kA – Circuit breakers, electronic overload with Ethernet/IP communications



**FOR DIRECT ON LINE MOTOR STARTING**

Circuit breaker	Terasaki Tembreak Pro
Contactors	Sprecher+Schuh CA7 / CA9
Overload relay	Sprecher+Schuh CEP7 Electronic
Rated operational voltage	400 / 415V AC
Motor types	Premium Efficiency class: IE3
Rated conditional AC current (I <sub>q</sub> ) :	70 kA (rms symmetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination



**COMPONENT SELECTION TABLE:**

MOTOR		CIRCUIT BREAKER	CONTACTOR	OVERLOAD RELAY	C/B INSTANT TRIP AMPS & MOTOR FLC		
MOTOR kW	MOTOR AMP RATINGS @ 400V	MOULDED CASE CIRCUIT BREAKER	CONTACTOR TYPE	OVERLOAD RELAY (ELECTRONIC)	AMPERE SETTING RANGE	C/B INSTANT TRIP AMPS (± 20%)	MINIMUM TRIP AMP MULTIPLE OF MOTOR FLC
0.18	0.6	P160H2 / 20A TM	CA7-30	CEP7-1EF BB *	0.2 – 1.0	240	320
0.25	0.85	P160H2 / 20A TM	CA7-30	CEP7-1EF BB *	0.2 – 1.0	240	225
0.37	1.1	P160H2 / 20A TM	CA7-30	CEP7-1EF CB *	1.0 – 5.0	240	174
0.55	1.5	P160H2 / 20A TM	CA7-30	CEP7-1EF CB *	1.0 – 5.0	240	128
0.75	1.9	P160H2 / 20A TM	CA7-30	CEP7-1EF CB *	1.0 – 5.0	240	101
1.1	2.7	P160H2 / 20A TM	CA7-30	CEP7-1EF CB *	1.0 – 5.0	240	71.1
1.5	3.6	P160H2 / 20A TM	CA7-30	CEP7-1EF CB *	1.0 – 5.0	240	53.3
2.2	4.9	P160H2 / 20A TM	CA7-30	CEP7-1EF DB *	3.2 – 16	240	39.2
3	6.5	P160H2 / 20A TM	CA7-30	CEP7-1EF ED	5.4 – 27	240	29.5
4	8.5	P160H2 / 20A TM	CA7-30	CEP7-1EF ED	5.4 – 27	240	22.6
5.5	11.5	P160H2 / 20A TM	CA7-30	CEP7-1EF ED	5.4 – 27	240	16.7
7.5	15.5	P160H2 / 32A TM	CA7-30	CEP7-1EF ED	5.4 – 27	384	19.8
11	22	P160H2 / 32A TM	CA7-30	CEP7-1EF ED	5.4 – 27	384	14.0
15	29	P160H2 / 50A TM	CA7-43	CEP7-1EF FD	11 – 55	600	16.6
18.5	35	P160H2 / 63A TM	CA7-43	CEP7-1EF FD	11 – 55	756	17.3
22	41	P160H2 / 63A TM	CA7-55	CEP7-1EF FD	11 – 55	756	14.8
30	55	P160H2 / 100A TM	CA7-72	CEP7-1EF GE	20 – 100	1200	17.5
37	66	P160H2 / 100A TM	CA7-85	CEP7-1EF GE	20 – 100	1200	14.5
45	80	P160H2 / 160A TM	CA9-116	CEP7-1EF GE *	20 – 100	1600	16.0
55	97	P250H / 160A TM	CA9-146	CEP7-1EF GE *	20 – 100	2080	17.2
75	132	P250H / 250A TM	CA9-190	CTKIT400A	80 – 400	2500	15.2
90	160	P400H / 250A BE	CA9-265	CTKIT400A	80 – 400	3000	15.0
110	195	P400H / 400A BE	CA9-265	CTKIT400A	80 – 400	4800	20.9
132	230	P400H / 400A BE	CA9-305	CTKIT400A	80 – 400	4800	17.7
150	260	P630H / 630A BE	CA9-400	CTKIT400A	80 – 400	6930	22.7
160	280	P630H / 630A BE	CA9-400	CTKIT400A	80 – 400	6930	21.0
185	325	P630H / 630A BE	CA9-400	CTKIT400A	80 – 400	6930	18.1
200	350	P630H / 630A BE	CA9-460	CTKIT400A	80 – 400	6930	16.8
220	385	B800H / 630A BE	CA9-580	CTKIT400A	80 – 400	7560	16.7
250	430	B800H / 630A BE	CA9-580	CTKIT600A	120 – 600	7560	14.9
315	540	B800H / 800A BE	CA9-750	CTKIT600A	120 – 600	9600	15.1
355	610	B1000H / 1000A BE	CA9-750	CTKIT800A	160 – 800	10000	13.9
400	690	B1250HL / 1250A BE	CA9-860	CTKIT1000A	200 – 1000	15000	18.5
450	770	B1250HL / 1250A BE	CA9-1060	CTKIT1000A	200 – 1000	15000	16.6
500	850	B1250HL / 1250A BE	CA9-1060	CTKIT1000A	200 – 1000	15000	15.0

**NOTES:**

A) Recommended circuit breaker size based on the following starting conditions:

Starting currents approx. 7.5...8 x motor FLC. Start time approx.5 sec.

Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10ms, that will vary by motor make.

\* Overloads separately mounted from contactor, or use Pass thru version.

^ Motor Starters 75kW & above, Kit utilises separate 5P10-5A Current Transformers with 193-1EF\*Z overload

B) Other

1) CEP7-1EF overload add-on module available for: Ground Fault, Jam Protection & Remote reset,

Ground Fault requires toroid :- \*\*-CBCT#

C) Note

Set circuit breaker I<sub>r</sub> to 1 (=I<sub>n</sub>), and Overload is set to motor FLC

CH74.1 Type 2, 70 kA – Circuit breakers, with electronic overload



**FOR DIRECT ON LINE MOTOR STARTING**

Circuit breaker	Terasaki Tembreak Pro
Contactors	Sprecher+Schuh CA7 and CA9
Overload relay	Allen-Bradley 193-E3 Electronic E300 w-Ethernet/IP
Rated operational voltage	400 / 415V AC
Motor types	Premium Efficiency class: IE3
Rated conditional AC current (I <sub>q</sub> ) :	70 kA (rms symmetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination



**COMPONENT SELECTION TABLE:**

MOTOR		CIRCUIT BREAKER	CONTACTOR	OVERLOAD RELAY	C/B INSTANT TRIP AMPS & MOTOR FLC		
MOTOR kW	MOTOR AMP RATINGS @ 400V	MOULDED CASE CIRCUIT BREAKER	CONTACTOR TYPE	OVERLOAD RELAY (ELECTRONIC)	Earth Leakage	C/B INSTANT TRIP AMPS (± 20%)	MINIMUM TRIP AMP MULTIPLE OF MOTOR FLC
0.18	0.6	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	320
0.25	0.85	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	225
0.37	1.1	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	174
0.55	1.5	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	128
0.75	1.9	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	101
1.1	2.7	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	71.1
1.5	3.6	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	53.3
2.2	4.9	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	39.2
3	6.5	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	29.5
4	8.5	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	22.6
5.5	11.5	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	16.7
7.5	15.5	P160H2 / 32A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	384	19.8
11	22	P160H2 / 32A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	384	14.0
15	29	P160H2 / 50A TM	CA7-43	193 E3-63-24D-IG-60A - # -ETR	Int.	600	16.6
18.5	35	P160H2 / 63A TM	CA7-43	193 E3-63-24D-IG-60A - # -ETR	Int.	756	17.3
22	41	P160H2 / 63A TM	CA7-55	193 E3-63-24D-IG-60A - # -ETR	Int.	756	14.8
30	55	P160H2 / 100A TM	CA7-72	193 E3-63-24D-IG-100A - # -ETR	Int.	1200	17.5
37	66	P160H2 / 100A TM	CA7-85	193 E3-63-24D-IG-100A - # -ETR	Int.	1200	14.5
45	80	P160H2 / 160A TM	CA9-116	193 E3-63-24D-IG-200A - # -ETR	Int.	1600	16.0
55	97	P250H / 160A TM	CA9-146	193 E3-63-24D-IG-200A - # -ETR	Int.	2080	17.2
75	132	P250H / 250A TM	CA9-190	193 E3-63-24D-IG-200A - # -ETR	Int.	2500	15.2
90	160	P400H / 250A BE	CA9-265	193 E3-63-24D-IG-200A - # -ETR	Int.	3000	15.0
110	195	P400H / 400A BE	CA9-265	193 E3-63-24D-IG-200A - # -ETR	Int.	4800	20.9
132	230	P400H / 400A BE	CA9-305	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	4800	17.7
150	260	P630H / 630A BE	CA9-400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	22.7
160	280	P630H / 630A BE	CA9-400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	21.0
185	325	P630H / 630A BE	CA9-400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	18.1
200	350	P630H / 630A BE	CA9-460	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	16.8
220	385	B800H / 630A BE	CA9-580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	7560	16.7
250	430	B800H / 630A BE	CA9-580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	7560	14.9
315	540	B800H / 800A BE	CA9-750	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	9600	15.1
355	610	B1000H / 1000A BE	CA9-750	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	10000	13.9
400	690	B1250HL / 1250A BE	CA9-860	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	18.5
450	770	B1250HL / 1250A BE	CA9-1060	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	16.6
500	850	B1250HL / 1250A BE	CA9-1060	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	15.0

**NOTES:**

A) Recommended circuit breaker size based on the following starting conditions:

Starting currents approx. 7.5... 8 x motor FLC. Start time approx.5 sec.

Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10ms, that will vary by motor make.

^ Motor Starters 132kW & above, require external 5P10-5A Current Transformers

B) E/L

-Int- Internal Ground Fault toroid in Sensing module – 500mA to 5 Amp

\* to use External toroid, and/or Thermistor protection, -GP42- Control module is required

-Ext- External Ground Fault toroid via 193-CBCT – 20mA to 5 Amp

C)Other

3) 24D denotes 24V DC control voltage

- # - Specify Contactor mount, or E3T / T for separate DIN mount, or P for Pass Thru

If Power & Voltage monitoring is required, change Sensing module to VIG versions

CH74.2 Type 2, 70 kA – Circuit breakers, electronic overload with Ethernet/IP communications



**FOR DIRECT ON LINE MOTOR STARTING**

Circuit breaker	Terasaki Tembreak Pro
Contactors	Allen-Bradley 100(S)-C / 100(S)-E
Overload relay	Allen-Bradley E100 193-1EF Electronic
Rated operational voltage	400 / 415V AC
Motor types	Premium Efficiency class: IE3
Rated conditional AC current (I <sub>q</sub> ) :	70 kA (rms symmetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination



**COMPONENT SELECTION TABLE:**

MOTOR		CIRCUIT BREAKER	CONTACTOR	OVERLOAD RELAY	C/B INSTANT TRIP AMPS & MOTOR FLC		
MOTOR kW	MOTOR AMP RATINGS @ 400V	MOULDED CASE CIRCUIT BREAKER	CONTACTOR TYPE	OVERLOAD RELAY (ELECTRONIC)	AMPERE SETTING RANGE	C/B INSTANT TRIP AMPS (± 20%)	MINIMUM TRIP AMP MULTIPLE OF MOTOR FLC
0.18	0.6	P160H2 / 20A TM	100-C30	193-1EF BB *	0.2 – 1.0	240	320
0.25	0.85	P160H2 / 20A TM	100-C30	193-1EF BB *	0.2 – 1.0	240	225
0.37	1.1	P160H2 / 20A TM	100-C30	193-1EF CB *	1.0 – 5.0	240	174
0.55	1.5	P160H2 / 20A TM	100-C30	193-1EF CB *	1.0 – 5.0	240	128
0.75	1.9	P160H2 / 20A TM	100-C30	193-1EF CB *	1.0 – 5.0	240	101
1.1	2.7	P160H2 / 20A TM	100-C30	193-1EF CB *	1.0 – 5.0	240	71.1
1.5	3.6	P160H2 / 20A TM	100-C30	193-1EF CB *	1.0 – 5.0	240	53.3
2.2	4.9	P160H2 / 20A TM	100-C30	193-1EF DB *	3.2 – 16	240	39.2
3	6.5	P160H2 / 20A TM	100-C30	193-1EF ED	5.4 – 27	240	29.5
4	8.5	P160H2 / 20A TM	100-C30	193-1EF ED	5.4 – 27	240	22.6
5.5	11.5	P160H2 / 20A TM	100-C30	193-1EF ED	5.4 – 27	240	16.7
7.5	15.5	P160H2 / 32A TM	100-C30	193-1EF ED	5.4 – 27	384	19.8
11	22	P160H2 / 32A TM	100-C30	193-1EF ED	5.4 – 27	384	14.0
15	29	P160H2 / 50A TM	100-C43	193-1EF FD	11 – 55	600	16.6
18.5	35	P160H2 / 63A TM	100-C43	193-1EF FD	11 – 55	756	17.3
22	41	P160H2 / 63A TM	100-C55	193-1EF FD	11 – 55	756	14.8
30	55	P160H2 / 100A TM	100-C72	193-1EF GE	20 – 100	1200	17.5
37	66	P160H2 / 100A TM	100-C85	193-1EF GE	20 – 100	1200	14.5
45	80	P160H2 / 160A TM	100-E116	193-1EF GE *	20 – 100	1600	16.0
55	97	P250H / 160A TM	100-E146	193-1EF GE *	20 – 100	2080	17.2
75	132	P250H / 250A TM	100-E190	193-E200-200A #	20 – 200	2500	15.2
90	160	P400H / 250A BE	100-E265	193-E200-200A #	20 – 200	3000	15.0
110	195	P400H / 400A BE	100-E265	193-E200-200A #	20 – 200	4800	20.9
132	230	P400H / 400A BE	100-E305	CTKIT400A	80 – 400	4800	17.7
150	260	P630H / 630A BE	100-E400	CTKIT400A	80 – 400	6930	22.7
160	280	P630H / 630A BE	100-E400	CTKIT400A	80 – 400	6930	21.0
185	325	P630H / 630A BE	100-E400	CTKIT400A	80 – 400	6930	18.1
200	350	P630H / 630A BE	100-E460	CTKIT400A	80 – 400	6930	16.8
220	385	B800H / 630A BE	100-E580	CTKIT400A	80 – 400	7560	16.7
250	430	B800H / 630A BE	100-E580	CTKIT600A	120 – 600	7560	14.9
315	540	B800H / 800A BE	100-E750	CTKIT600A	120 – 600	9600	15.1
355	610	B1000H / 1000A BE	100-E750	CTKIT800A	160 – 800	10000	13.9
400	690	B1250HL / 1250A BE	100-E860	CTKIT1000A	200 – 1000	15000	18.5
450	770	B1250HL / 1250A BE	100-E1060	CTKIT1000A	200 – 1000	15000	16.6
500	850	B1250HL / 1250A BE	100-E1060	CTKIT1000A	200 – 1000	15000	15.0

**NOTES:**

A) Recommended circuit breaker size based on the following starting conditions:

Starting currents approx. 7.5...8 x motor FLC. Start time approx.5 sec.

Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10ms, that will vary by motor make.

\* Overloads separately mounted from contactor, or use Pass thru version.

^ Motor Starters 132kW & above, Kit utilises separate 5P10-5A Current Transformers with 193-1EF\*Z overload

B) Other

1) 193-1EF overload add-on module available for: Ground Fault, Jam Protection & Remote reset,

2) # - Specify E200 mounting, T for separate DIN mount, or P for Pass Thru

C) Note

Set circuit breaker I<sub>r</sub> to 1 (=I<sub>n</sub>), and Overload is set to motor FLC

RCH74.3 Type 2, 70 kA – Circuit breakers, with electronic overload





**FOR DIRECT ON LINE MOTOR STARTING**

Circuit breaker	Terasaki Tembreak Pro
Contactors	Allen-Bradley 100(S)-C / 100(S)-E
Overload relay	Allen-Bradley 193-E3 Electronic E300 w-Ethernet/IP
Rated operational voltage	400 / 415V AC
Motor types	Premium Efficiency class: IE3
Rated conditional AC current (I <sub>q</sub> ) :	70 kA (rms symmetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination



**COMPONENT SELECTION TABLE:**

MOTOR		CIRCUIT BREAKER	CONTACTOR	OVERLOAD RELAY	C/B INSTANT TRIP AMPS & MOTOR FLC		
MOTOR kW	MOTOR AMP RATINGS @ 400V	MOULDED CASE CIRCUIT BREAKER	CONTACTOR TYPE	OVERLOAD RELAY (ELECTRONIC)	Earth Leakage	C/B INSTANT TRIP AMPS (± 20%)	MINIMUM TRIP AMP MULTIPLE OF MOTOR FLC
0.18	0.6	P160H2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	320
0.25	0.85	P160H2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	225
0.37	1.1	P160H2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	174
0.55	1.5	P160H2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	128
0.75	1.9	P160H2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	101
1.1	2.7	P160H2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	71.1
1.5	3.6	P160H2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	53.3
2.2	4.9	P160H2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	39.2
3	6.5	P160H2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	29.5
4	8.5	P160H2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	22.6
5.5	11.5	P160H2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	16.7
7.5	15.5	P160H2 / 32A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	384	19.8
11	22	P160H2 / 32A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	384	14.0
15	29	P160H2 / 50A TM	100-C43	193 E3-63-24D-IG-60A - # -ETR	Int.	600	16.6
18.5	35	P160H2 / 63A TM	100-C43	193 E3-63-24D-IG-60A - # -ETR	Int.	756	17.3
22	41	P160H2 / 63A TM	100-C55	193 E3-63-24D-IG-60A - # -ETR	Int.	756	14.8
30	55	P160H2 / 100A TM	100-C72	193 E3-63-24D-IG-100A - # -ETR	Int.	1200	17.5
37	66	P160H2 / 100A TM	100-C85	193 E3-63-24D-IG-100A - # -ETR	Int.	1200	14.5
45	80	P160H2 / 160A TM	100-E116	193 E3-63-24D-IG-200A - # -ETR	Int.	1600	16.0
55	97	P250H / 160A TM	100-E146	193 E3-63-24D-IG-200A - # -ETR	Int.	2080	17.2
75	132	P250H / 250A TM	100-E190	193 E3-63-24D-IG-200A - # -ETR	Ext.	2500	15.2
90	160	P400H / 250A BE	100-E265	193 E3-63-24D-IG-200A - # -ETR	Ext.	3000	15.0
110	195	P400H / 400A BE	100-E265	193 E3-63-24D-IG-200A - # -ETR	Ext.	4800	20.9
132	230	P400H / 400A BE	100-E305	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	4800	17.7
150	260	P630H / 630A BE	100-E400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	22.7
160	280	P630H / 630A BE	100-E400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	21.0
185	325	P630H / 630A BE	100-E400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	18.1
200	350	P630H / 630A BE	100-E460	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	16.8
220	385	B800H / 630A BE	100-E580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	7560	16.7
250	430	B800H / 630A BE	100-E580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	7560	14.9
315	540	B800H / 800A BE	100-E750	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	9600	15.1
355	610	B1000H / 1000A BE	100-E750	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	10000	13.9
400	690	B1250HL / 1250A BE	100-E860	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	18.5
450	770	B1250HL / 1250A BE	100-E1060	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	16.6
500	850	B1250HL / 1250A BE	100-E1060	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	15.0

**NOTES:**

A) Recommended circuit breaker size based on the following starting conditions:

Starting currents approx. 7.5... 8 x motor FLC. Start time approx. 5 sec.

Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10ms, that will vary by motor make.

^ Motor Starters 132kW & above, require external 5P10-5A Current Transformers

B) E/L

-Int- Internal Ground Fault toroid in Sensing module – 500mA to 5 Amp

\* to use External toroid, and/or Thermistor protection, -GP42- Control module is required

-Ext- External Ground Fault toroid via 193-CBCT – 20mA to 5 Amp

C) Other

4) 24D denotes 24V DC control voltage

# - Specify Contactor mount, or E3T / T for separate DIN mount, or P for Pass Thru

If Power & Voltage monitoring is required, change Sensing module to VIG versions

RCH74.4 Type 2, 70 kA – Circuit breakers, electronic overload with Ethernet/IP communications



**FOR DIRECT ON LINE MOTOR STARTING**

Circuit breaker	Terasaki Tembreak Pro
Contactors	Sprecher+Schuh CA7 / CA9
Overload relay	Sprecher+Schuh CEP7 Electronic
Rated operational voltage	400 / 415V AC
Motor types	Premium Efficiency class: IE3
Rated conditional AC current (I <sub>q</sub> ) :	70 kA (rms symmetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination



**COMPONENT SELECTION TABLE:**

MOTOR		CIRCUIT BREAKER	CONTACTOR	OVERLOAD RELAY	C/B INSTANT TRIP AMPS & MOTOR FLC		
MOTOR kW	MOTOR AMP RATINGS @ 400V	MOULDED CASE CIRCUIT BREAKER	CONTACTOR TYPE	OVERLOAD RELAY (ELECTRONIC)	AMPERE SETTING RANGE	C/B INSTANT TRIP AMPS (± 20% *)	MINIMUM TRIP AMP MULTIPLE OF MOTOR FLC
0.18	0.6	XM30PB / 0.7A	CA7-9	CEP7-1EF BB	0.2 – 1.0	11 A	14.6
0.25	0.85	XM30PB / 1.4A	CA7-9	CEP7-1EF BB	0.2 – 1.0	21 A	19.8
0.37	1.1	XM30PB / 1.4A	CA7-9	CEP7-1EF CB	1.0 – 5.0	21 A	15.3
0.55	1.5	XM30PB / 2.0 A	CA7-9	CEP7-1EF CB	1.0 – 5.0	30 A	16.0
0.75	1.9	XM30PB / 2.6A	CA7-9	CEP7-1EF CB	1.0 – 5.0	40 A	16.8
1.1	2.7	XM30PB / 4A	CA7-16	CEP7-1EF CB	1.0 – 5.0	60 A	17.8
1.5	3.6	XM30PB / 5A	CA7-16	CEP7-1EF CB	1.0 – 5.0	75 A	16.7
2.2	4.9	XM30PB / 8A	CA7-16	CEP7-1EF DB	3.2 – 16	120 A	19.6
3	6.5	XM30PB / 10A	CA7-23	CEP7-1EF ED	5.4 – 27	150 A	18.5
4	8.5	XM30PB / 12A	CA7-23	CEP7-1EF ED	5.4 – 27	180 A	16.9
5.5	11.5	P160H2 / 20A TM	CA7-30	CEP7-1EF ED	5.4 – 27	240	16.7
7.5	15.5	P160H2 / 32A TM	CA7-30	CEP7-1EF ED	5.4 – 27	384	19.8
11	22	P160H2 / 32A TM	CA7-30	CEP7-1EF ED	5.4 – 27	384	14.0
15	29	P160H2 / 50A TM	CA7-43	CEP7-1EF FD	11 – 55	600	16.6
18.5	35	P160H2 / 63A TM	CA7-43	CEP7-1EF FD	11 – 55	756	17.3
22	41	P160H2 / 63A TM	CA7-55	CEP7-1EF FD	11 – 55	756	14.8
30	55	P160H2 / 100A TM	CA7-72	CEP7-1EF GE	20 – 100	1200	17.5
37	66	P160H2 / 100A TM	CA7-85	CEP7-1EF GE	20 – 100	1200	14.5
45	80	P160H2 / 160A TM	CA9-116	CEP7-1EF GE *	20 – 100	1600	16.0
55	97	P250H / 160A TM	CA9-146	CEP7-1EF GE *	20 – 100	2080	17.2
75	132	P250H / 250A TM	CA9-190	CTKIT400A	80 – 400	2500	15.2
90	160	P400H / 250A BE	CA9-265	CTKIT400A	80 – 400	3000	15.0
110	195	P400H / 400A BE	CA9-265	CTKIT400A	80 – 400	4800	20.9
132	230	P400H / 400A BE	CA9-305	CTKIT400A	80 – 400	4800	17.7
150	260	P630H / 630A BE	CA9-400	CTKIT400A	80 – 400	6930	22.7
160	280	P630H / 630A BE	CA9-400	CTKIT400A	80 – 400	6930	21.0
185	325	P630H / 630A BE	CA9-400	CTKIT400A	80 – 400	6930	18.1
200	350	P630H / 630A BE	CA9-460	CTKIT400A	80 – 400	6930	16.8
220	385	B800H / 630A BE	CA9-580	CTKIT400A	80 – 400	7560	16.7
250	430	B800H / 630A BE	CA9-580	CTKIT600A	120 – 600	7560	14.9
315	540	B800H / 800A BE	CA9-750	CTKIT600A	120 – 600	9600	15.1
355	610	B1000H / 1000A BE	CA9-750	CTKIT800A	160 – 800	10000	13.9
400	690	B1250HL / 1250A BE	CA9-860	CTKIT1000A	200 – 1000	15000	18.5
450	770	B1250HL / 1250A BE	CA9-1060	CTKIT1000A	200 – 1000	15000	16.6
500	850	B1250HL / 1250A BE	CA9-1060	CTKIT1000A	200 – 1000	15000	15.0

**NOTES:**

A) Recommended circuit breaker size based on the following starting conditions:

Starting currents approx. 7.5...8 x motor FLC. Start time approx.5 sec.

Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10ms, that will vary by motor make.

\* Overloads separately mounted from contactor, or use Pass thru version.

^ Motor Starters 75kW & above, Kit utilises separate 5P10-5A Current Transformers with 193-1EF\*Z overload

B) Other

1) CEP7-1EF overload add-on module available for: Ground Fault, Jam Protection & Remote reset,

Ground Fault requires toroid :- \*\*-CBCT#

C) Note

Set circuit breaker I<sub>r</sub> to 1 (=I<sub>n</sub>), and Overload is set to motor FLC

CH74.5 Type 2, 70 kA – Circuit breakers, with electronic overload



**FOR DIRECT ON LINE MOTOR STARTING**

Circuit breaker	Terasaki Tembreak Pro and XMPB
Contactors	Sprecher+Schuh CA7 and CA9
Overload relay	Allen-Bradley 193-E3 Electronic E300 w-Ethernet/IP
Rated operational voltage	400 / 415V AC
Motor types	Premium Efficiency class: IE3
Rated conditional AC current (I <sub>q</sub> ) :	70 kA (rms symmetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination



**COMPONENT SELECTION TABLE:**

MOTOR		CIRCUIT BREAKER	CONTACTOR	OVERLOAD RELAY	C/B INSTANT TRIP AMPS & MOTOR FLC		
MOTOR kW	MOTOR AMP RATINGS @ 400V	MOULDED CASE CIRCUIT BREAKER	CONTACTOR TYPE	OVERLOAD RELAY (ELECTRONIC)	Earth Leakage	C/B INSTANT TRIP AMPS (± 20%)	MINIMUM TRIP AMP MULTIPLE OF MOTOR FLC
0.18	0.6	XM30PB / 0.7A	CA7-9	193 E3-63-24D-IG-30A - # -ETR	Int.	11 A	14.6
0.25	0.85	XM30PB / 1.4A	CA7-9	193 E3-63-24D-IG-30A - # -ETR	Int.	21 A	19.8
0.37	1.1	XM30PB / 1.4A	CA7-9	193 E3-63-24D-IG-30A - # -ETR	Int.	21 A	15.3
0.55	1.5	XM30PB / 2.0 A	CA7-9	193 E3-63-24D-IG-30A - # -ETR	Int.	30 A	16.0
0.75	1.9	XM30PB / 2.6A	CA7-9	193 E3-63-24D-IG-30A - # -ETR	Int.	40 A	16.8
1.1	2.7	XM30PB / 4A	CA7-16	193 E3-63-24D-IG-30A - # -ETR	Int.	60 A	17.8
1.5	3.6	XM30PB / 5A	CA7-16	193 E3-63-24D-IG-30A - # -ETR	Int.	75 A	16.7
2.2	4.9	XM30PB / 8A	CA7-16	193 E3-63-24D-IG-30A - # -ETR	Int.	120 A	19.6
3	6.5	XM30PB / 10A	CA7-23	193 E3-63-24D-IG-30A - # -ETR	Int.	150 A	18.5
4	8.5	XM30PB / 12A	CA7-23	193 E3-63-24D-IG-30A - # -ETR	Int.	180 A	16.9
5.5	11.5	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	16.7
7.5	15.5	P160H2 / 32A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	384	19.8
11	22	P160H2 / 32A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	384	14.0
15	29	P160H2 / 50A TM	CA7-43	193 E3-63-24D-IG-60A - # -ETR	Int.	600	16.6
18.5	35	P160H2 / 63A TM	CA7-43	193 E3-63-24D-IG-60A - # -ETR	Int.	756	17.3
22	41	P160H2 / 63A TM	CA7-55	193 E3-63-24D-IG-60A - # -ETR	Int.	756	14.8
30	55	P160H2 / 100A TM	CA7-72	193 E3-63-24D-IG-100A - # -ETR	Int.	1200	17.5
37	66	P160H2 / 100A TM	CA7-85	193 E3-63-24D-IG-100A - # -ETR	Int.	1200	14.5
45	80	P160H2 / 160A TM	CA9-116	193 E3-63-24D-IG-200A - # -ETR	Int.	1600	16.0
55	97	P250H / 160A TM	CA9-146	193 E3-63-24D-IG-200A - # -ETR	Int.	2080	17.2
75	132	P250H / 250A TM	CA9-190	193 E3-63-24D-IG-200A - # -ETR	Int.	2500	15.2
90	160	P400H / 250A BE	CA9-265	193 E3-63-24D-IG-200A - # -ETR	Int.	3000	15.0
110	195	P400H / 400A BE	CA9-265	193 E3-63-24D-IG-200A - # -ETR	Int.	4800	20.9
132	230	P400H / 400A BE	CA9-305	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	4800	17.7
150	260	P630H / 630A BE	CA9-400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	22.7
160	280	P630H / 630A BE	CA9-400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	21.0
185	325	P630H / 630A BE	CA9-400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	18.1
200	350	P630H / 630A BE	CA9-460	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	16.8
220	385	B800H / 630A BE	CA9-580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	7560	16.7
250	430	B800H / 630A BE	CA9-580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	7560	14.9
315	540	B800H / 800A BE	CA9-750	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	9600	15.1
355	610	B1000H / 1000A BE	CA9-750	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	10000	13.9
400	690	B1250HL / 1250A BE	CA9-860	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	18.5
450	770	B1250HL / 1250A BE	CA9-1060	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	16.6
500	850	B1250HL / 1250A BE	CA9-1060	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	15.0

**NOTES:**

A) Recommended circuit breaker size based on the following starting conditions:

Starting currents approx. 7.5... 8 x motor FLC. Start time approx.5 sec.

Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10ms, that will vary by motor make.

^ Motor Starters 132kW & above, require external 5P10-5A Current Transformers

B) E/L

-Int- Internal Ground Fault toroid in Sensing module – 500mA to 5 Amp

\* to use External toroid, and/or Thermistor protection, -GP42- Control module is required

-Ext- External Ground Fault toroid via 193-CBCT – 20mA to 5 Amp

C)Other

5) 24D denotes 24V DC control voltage

- # - Specify Contactor mount, or E3T / T for separate DIN mount, or P for Pass Thru

If Power & Voltage monitoring is required, change Sensing module to VIG versions

CH74.6 Type 2, 70 kA – Circuit breakers, electronic overload with Ethernet/IP communications



**FOR DIRECT ON LINE MOTOR STARTING**

Circuit breaker	Terasaki Tembreak <b>XM30 &amp; TBPro</b>
Contactora	Sprecher + Schuh <b>CA7 / CA9</b>
Overload relay	Sprecher + Schuh <b>CEP7-1 Electronic</b>
Rated operational voltage	400 / 415V AC
Motor types	Premium Efficiency class: IE3
Rated conditional AC current (I <sub>q</sub> ) :	85 kA (rms symmetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination



**COMPONENT SELECTION TABLE:**

MOTOR		CIRCUIT BREAKER	CONTACTOR	OVERLOAD RELAY	C/B INSTANT TRIP AMPS & MOTOR FLC		
MOTOR kW	MOTOR AMP RATINGS @ 400V	MOULDED CASE CIRCUIT BREAKER	CONTACTOR TYPE	OVERLOAD RELAY (ELECTRONIC)	AMPERE SETTING RANGE	C/B INSTANT TRIP AMPS (± 20%)	MINIMUM TRIP AMP MULTIPLE OF MOTOR FLC
0.18	0.6	XM30PB / 0.7A	CA7-9	CEP7-1EF BB	0.2 – 1.0	11	14.7
0.25	0.85	XM30PB / 1.4A	CA7-9	CEP7-1EF BB	0.2 – 1.0	21	19.8
0.37	1.1	XM30PB / 1.4A	CA7-9	CEP7-1EF CB	1.0 – 5.0	21	15.3
0.55	1.5	XM30PB / 2.0 A	CA7-9	CEP7-1EF CB	1.0 – 5.0	30	16.0
0.75	1.9	XM30PB / 2.6A	CA7-9	CEP7-1EF CB	1.0 – 5.0	40	16.8
1.1	2.7	XM30PB / 4A	CA7-16	CEP7-1EF CB	1.0 – 5.0	60	17.8
1.5	3.6	XM30PB / 5A	CA7-16	CEP7-1EF CB	1.0 – 5.0	75	16.7
2.2	4.9	XM30PB / 8A	CA7-16	CEP7-1EF DB	3.2 – 16	120	19.6
3	6.5	XM30PB / 10A	CA7-23	CEP7-1EF ED	5.4 – 27	150	18.5
4	8.5	XM30PB / 12A	CA7-23	CEP7-1EF ED	5.4 – 27	180	16.9
5.5	11.5	B160P / 20A TM	CA7-30	CEP7-1EF ED	5.4 – 27	240	16.7
7.5	15.5	B160P / 32A TM	CA7-30	CEP7-1EF ED	5.4 – 27	384	19.8
11	22	B160P / 32A TM	CA7-30	CEP7-1EF ED	5.4 – 27	384	14.0
15	29	B160P / 50A TM	CA7-43	CEP7-1EF FD	11 – 55	600	16.6
18.5	35	B160P / 63A TM	CA7-43	CEP7-1EF FD	11 – 55	756	17.3
22	41	B160P / 63A TM	CA7-55	CEP7-1EF FD	11 – 55	756	14.8
30	55	B160P / 100A TM	CA7-72	CEP7-1EF GE	20 – 100	1200	17.5
37	66	B160P / 100A TM	CA7-85	CEP7-1EF GE	20 – 100	1200	14.5
45	80	B160P / 160A TM	CA9-265	CEP7-1EF GE *	20 – 100	2080	20.8
55	97	B160P / 160A TM	CA9-265	CEP7-1EF GE *	20 – 100	2080	17.2
75	132	B250P / 250A TM	CA9-265	CTKIT400A	40 – 200	2500	15.2
90	160	P400S / 250A BE	CA9-400	CTKIT400A	40 – 200	3000	15.9
110	195	P400S / 400A BE	CA9-400	CTKIT400A	80 – 400	4800	20.9
132	230	P400S / 400A BE	CA9-400	CTKIT400A	80 – 400	4800	17.7
150	260	P400S / 400A BE	CA9-400	CTKIT400A	80 – 400	4800	15.7
160	280	P400S / 400A BE	CA9-400	CTKIT400A	80 – 400	4800	14.6
185	325	P630S / 630A BE	CA9-580	CTKIT400A	80 – 400	6930	18.1
200	350	P630S / 630A BE	CA9-580	CTKIT400A	80 – 400	6930	16.8
220	385	P630S / 630A BE	CA9-580	CTKIT400A	80 – 400	6930	15.3
250	430	B800P / 800A BE	CA9-750	CTKIT600A	120 – 600	9600	19.0
315	540	B800P / 800A BE	CA9-750	CTKIT600A	120 – 600	9600	15.1
355	610	B1250HL / 1250A BE	CA9-860	CTKIT800A	160 – 800	15000	20.9
400	690	B1250HL / 1250A BE	CA9-860	CTKIT1000A	200 – 1000	15000	18.5
450	770	B1250HL / 1250A BE	CA9-1060	CTKIT1000A	200 – 1000	15000	16.6
500	850	B1250HL / 1250A BE	CA9-1060	CTKIT1000A	200 – 1000	15000	15.0

**NOTES:**

A) Recommended circuit breaker size based on the following starting conditions:

Starting currents approx. 7.5...8 x motor FLC. Start time approx.5 sec.

Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10mS, that will vary by motor make.

\* Overloads separately mounted from contactor, or use Pass thru version.

^ Motor Starters 75kW & above, Kit utilises separate 5P10-5A Current Transformers with \*\*-1EF\*Z overload

B) Other

1) CEP7-1EF overload add-on module available for: Ground Fault, Jam Protection & Remote reset,  
Ground Fault requires toroid \*\*-CBCT#

C) Note

1) Set circuit breaker set to I<sub>r</sub>, and Overload is set to motor FLC





**FOR DIRECT ON LINE MOTOR STARTING**

Circuit breaker	Terasaki Tembreak <b>XM30 &amp; TBPro</b>
Contactors	Sprecher+Schuh <b>CA7 and CA9</b>
Overload relay	Allen-Bradley 193-E3 Electronic <b>E300 w-Ethernet/IP</b>
Rated operational voltage	400 / 415V AC
Motor types	Premium Efficiency class: IE3
Rated conditional AC current (I <sub>q</sub> ) :	85 kA (rms symmetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination



**COMPONENT SELECTION TABLE:**

MOTOR		CIRCUIT BREAKER	CONTACTOR	OVERLOAD RELAY	C/B INSTANT TRIP AMPS & MOTOR FLC		
MOTOR kW	MOTOR AMP RATINGS @ 400V	MOULDED CASE CIRCUIT BREAKER	CONTACTOR TYPE	OVERLOAD RELAY (ELECTRONIC)	Earth Leakage	C/B INSTANT TRIP AMPS (± 20%)	MINIMUM TRIP AMP MULTIPLE OF MOTOR FLC
0.18	0.6	XM30PB / 0.7A	CA7-9	193 E3-63-24D-IG-30A - # -ETR	Int.	11	14.7
0.25	0.85	XM30PB / 1.4A	CA7-9	193 E3-63-24D-IG-30A - # -ETR	Int.	21	19.8
0.37	1.1	XM30PB / 1.4A	CA7-9	193 E3-63-24D-IG-30A - # -ETR	Int.	21	15.3
0.55	1.5	XM30PB / 2.0 A	CA7-9	193 E3-63-24D-IG-30A - # -ETR	Int.	30	16.0
0.75	1.9	XM30PB / 2.6A	CA7-9	193 E3-63-24D-IG-30A - # -ETR	Int.	40	16.8
1.1	2.7	XM30PB / 4A	CA7-16	193 E3-63-24D-IG-30A - # -ETR	Int.	60	17.8
1.5	3.6	XM30PB / 5A	CA7-16	193 E3-63-24D-IG-30A - # -ETR	Int.	75	16.7
2.2	4.9	XM30PB / 8A	CA7-16	193 E3-63-24D-IG-30A - # -ETR	Int.	120	19.6
3	6.5	XM30PB / 10A	CA7-23	193 E3-63-24D-IG-30A - # -ETR	Int.	150	18.5
4	8.5	XM30PB / 12A	CA7-23	193 E3-63-24D-IG-30A - # -ETR	Int.	180	16.9
5.5	11.5	B160P / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	16.7
7.5	15.5	B160P / 32A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	384	19.8
11	22	B160P / 32A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	384	14.0
15	29	B160P / 50A TM	CA7-43	193 E3-63-24D-IG-60A - # -ETR	Int.	600	16.6
18.5	35	B160P / 63A TM	CA7-43	193 E3-63-24D-IG-60A - # -ETR	Int.	756	17.3
22	41	B160P / 63A TM	CA7-55	193 E3-63-24D-IG-60A - # -ETR	Int.	756	14.8
30	55	B160P / 100A TM	CA7-72	193 E3-63-24D-IG-100A - # -ETR	Int.	1200	17.5
37	66	B160P / 100A TM	CA7-85	193 E3-63-24D-IG-100A - # -ETR	Int.	1200	14.5
45	80	B160P / 160A TM	CA9-265	193 E3-63-24D-IG-200A - # -ETR	Int.	2080	20.8
55	97	B160P / 160A TM	CA9-265	193 E3-63-24D-IG-200A - # -ETR	Int.	2080	17.2
75	132	B250P / 250A TM	CA9-265	193 E3-63-24D-IG-200A - # -ETR	Int.	2500	15.2
90	160	P400S / 250A BE	CA9-400	193 E3-63-24D-IG-200A - # -ETR	Int.	3000	15.9
110	195	P400S / 400A BE	CA9-400	193 E3-63-24D-IG-200A - # -ETR	Int.	4800	20.9
132	230	P400S / 400A BE	CA9-400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	4800	17.7
150	260	P400S / 400A BE	CA9-400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	4800	15.7
160	280	P400S / 400A BE	CA9-400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	4800	14.6
185	325	P630S / 630A BE	CA9-580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	18.1
200	350	P630S / 630A BE	CA9-580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	16.8
220	385	P630S / 630A BE	CA9-580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	15.3
250	430	B800P / 800A BE	CA9-750	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	9600	19.0
315	540	B800P / 800A BE	CA9-750	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	9600	15.1
355	610	B1250HL / 1250A BE	CA9-860	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	20.9
400	690	B1250HL / 1250A BE	CA9-860	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	18.5
450	770	B1250HL / 1250A BE	CA9-1060	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	16.6
500	850	B1250HL / 1250A BE	CA9-1060	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	15.0

**NOTES:**

A) Recommended circuit breaker size based on the following starting conditions:

Starting currents approx. 7.5... 8 x motor FLC. Start time approx.5 sec.

Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10mS, that will vary by motor make.

^ Motor Starters 132kW & above, require external 5P10-5A Current Transformers

B) E/L

-Int- Internal Ground Fault torroid in Sensing module – 500mA to 5 Amp

\* to use External toroid, and/or Thermistor protection, -GP42- Control module is required

-Ext- External Ground Fault torroid via 193-CBCT# – 20mA to 5 Amp

C)Other

1) 24D denotes 24V DC control voltage

- # - Specify Contactor mount, or E3T / T for separate DIN mount, or P for Pass Thru

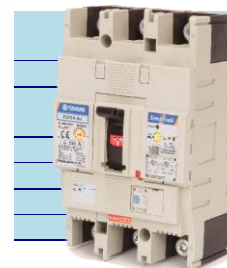
If Power & Voltage monitoring is required, change Sensing module to VIG versions





### FOR DIRECT ON LINE MOTOR STARTING

Circuit breaker	Terasaki <b>ZS</b> Earth Leakage
Contactors	Sprecher+Schuh <b>CA7</b> and <b>CA9</b>
Overload relay	Allen-Bradley 193-E3 Electronic <b>E300 w-</b> Ethernet/IP
Rated operational voltage	400 / 415V AC
Motor types	High efficiency, class: IE2, IE3
Rated conditional AC current (Iq) :	50 kA (rms symmetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination



### COMPONENT SELECTION TABLE: Starter components, Earth leakage circuit breakers

MOTOR		CIRCUIT BREAKER		CONTACTOR		OVERLOAD RELAY		C/B INSTANT TRIP AMPS & MOT FLC	
MOTOR kW	FLC RATINGS @ 400V	CIRCUIT BREAKER	EARTH LEAKAGE Setting Range	CONTACTOR TYPE	OVERLOAD RELAY (ELECTRONIC)	AMPERE SETTING RANGE	C/B INSTANT TRIP AMPS (± 20%)	MINIMUM TRIP AMP MULTIPLE OF MOTOR FLC	
0.18	0.6	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	320	
0.25	0.85	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	226	
0.37	1.1	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	174	
0.55	1.5	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	128	
0.75	1.9	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	101	
1.1	2.7	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	71.1	
1.5	3.6	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	53.3	
2.2	4.9	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	39.2	
3	6.5	ZS125M / 20A	30mA – 3A	CA7-30	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	29.5	
4	8.5	ZS125M / 20A	30mA – 3A	CA7-30	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	22.6	
5.5	11.5	ZS125M / 20A	30mA – 3A	CA7-30	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	16.7	
7.5	15.5	ZS125M / 32A	30mA – 3A	CA7-30	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	384 A	19.8	
11	22	ZS125M / 32A	30mA – 3A	CA7-30	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	384 A	14.0	
15	29	ZS125M / 50A	30mA – 3A	CA7-43	193 E3-63-24D-I-60A - # -ETR	6 – 60	600 A	16.6	
18.5	35	ZS125M / 63A	30mA – 3A	CA7-43	193 E3-63-24D-I-60A - # -ETR	6 – 60	756 A	17.3	
22	41	ZS125M / 63A	30mA – 3A	CA7-55	193 E3-63-24D-I-60A - # -ETR	6 – 60	756 A	14.8	
30	55	ZS125M / 100A	30mA – 3A	CA7-72	193 E3-63-24D-I-100A - # -ETR	10 – 100	1200 A	17.5	
37	66	ZS125M / 100A	30mA – 3A	CA7-85	193 E3-63-24D-I-100A - # -ETR	10 – 100	1200 A	14.5	
45	80	ZS250M / 160A	30mA – 3A	CA9-190	193 E3-63-24D-I-200A - # -ETR	20 – 200	2080 A	20.8	
55	97	ZS250M / 160A	30mA – 3A	CA9-190	193 E3-63-24D-I-200A - # -ETR	20 – 200	2080 A	17.2	
75	132	ZS250M / 250A	30mA – 3A	CA9-190	193 E3-63-24D-I-200A - # -ETR	20 – 200	2500 A	15.2	

#### Notes:

#### A) Recommended circuit breaker size based on the following starting conditions:

Starting currents approx. 7.5...8 x motor FLC. Start time approx.5 sec.

Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10ms that will vary by motor make.

For 5.5 to 11kW starters 60A Sensing module can be used with CA7-30 contactors

#### B) E/L

\* to use External GF toroid, and Thermistor protection, -GP42- Control module is required

#### C) Other

1) 24D denotes 24V DC control voltage

- # - Specify Contactor mount, or E3T / T for separate DIN mount, or P for Pass Thru

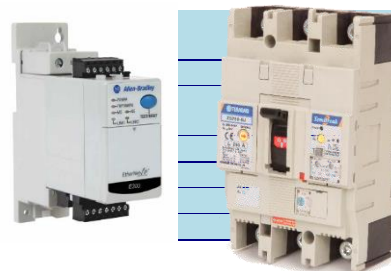
If Power & Voltage monitoring is required, change Sensing module to VIG versions

Rev: 5



**FOR DIRECT ON LINE MOTOR STARTING**

Circuit breaker	Terasaki <b>ZS</b> Earth Leakage
Contactors	Sprecher+Schuh <b>CA7</b> and <b>CA9</b>
Overload relay	Allen-Bradley 193-E3 Electronic <b>E300 w-</b> Ethernet/IP
Rated operational voltage	440V AC
Motor types	High efficiency, class: IE2, IE3
Rated conditional AC current (I <sub>q</sub> ) :	50 kA (rms symmetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination



**COMPONENT SELECTION TABLE: Starter components, Earth leakage circuit breakers**

MOTOR		CIRCUIT BREAKER		CONTACTOR	OVERLOAD RELAY	C/B INSTANT TRIP AMPS & MOT FLC		
MOTOR kW	FLC RATINGS @ 440V	CIRCUIT BREAKER	EARTH LEAKAGE Setting Range	CONTACTOR TYPE	OVERLOAD RELAY (ELECTRONIC)	AMPERE SETTING RANGE	C/B INSTANT TRIP AMPS (± 20%)	MINIMUM TRIP AMP MULTIPLE OF MOTOR FLC
0.18	0.55	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	349
0.25	0.78	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	246
0.37	1.0	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	192
0.55	1.4	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	137
0.75	1.7	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	113
1.1	2.5	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	76
1.5	3.3	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	58
2.2	4.5	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	42
3	5.9	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	32
4	7.8	ZS125M / 20A	30mA – 3A	CA7-30	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	24.9
5.5	10.5	ZS125M / 20A	30mA – 3A	CA7-30	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	18.3
7.5	14.1	ZS125M / 32A	30mA – 3A	CA7-30	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	384 A	21.8
11	20	ZS125M / 32A	30mA – 3A	CA7-30	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	384 A	15.4
15	26	ZS125M / 50A	30mA – 3A	CA7-43	193 E3-63-24D-I-60A - # -ETR	6 – 60	600 A	18.5
18.5	32	ZS125M / 63A	30mA – 3A	CA7-43	193 E3-63-24D-I-60A - # -ETR	6 – 60	756 A	18.9
22	37	ZS125M / 63A	30mA – 3A	CA7-55	193 E3-63-24D-I-60A - # -ETR	6 – 60	756 A	16.3
30	50	ZS125M / 100A	30mA – 3A	CA7-72	193 E3-63-24D-I-100A - # -ETR	10 – 100	1200 A	19.2
37	60	ZS125M / 100A	30mA – 3A	CA7-85	193 E3-63-24D-I-100A - # -ETR	10 – 100	1200 A	16.0
45	73	ZS250M / 160A	30mA – 3A	CA9-190	193 E3-63-24D-I-200A - # -ETR	20 – 200	2080 A	22.8
55	88	ZS250M / 160A	30mA – 3A	CA9-190	193 E3-63-24D-I-200A - # -ETR	20 – 200	2080 A	18.9
75	120	ZS250M / 250A	30mA – 3A	CA9-190	193 E3-63-24D-I-200A - # -ETR	20 – 200	2500 A	16.7
90	145	ZS250M / 250A	30mA – 3A	CA9-190	193 E3-63-24D-I-200A - # -ETR	20 – 200	2500 A	13.8

Notes:

**A) Recommended circuit breaker size based on the following starting conditions:**

Starting currents approx. 7.5...8 x motor FLC. Start time approx.5 sec.

Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10mS that will vary by motor make.

For 5.5 to 11kW starters 60A Sensing module can be used with CA7-30 contactors

**B) E/L**

\* to use External GF toroid, and/or Thermistor protection, -GP42- Control module is required

External Ground Fault toroid via 193-CBCT – 20mA to 5 Amp

**C) Other**

1) 24D denotes 24V DC control voltage

- # - Specify Contactor mount, or E3T / T for separate DIN mount, or P for Pass Thru

If Power & Voltage monitoring is required, change Sensing module to VIG versions

ECH54.14 Type 2, 440V 50 kA – Circuit breakers c/w Earth Fault, and overloads with Ethernet/IP communications







### FOR DIRECT ON LINE MOTOR STARTING

Circuit breaker	Terasaki Earth Leakage
Contactor	Sprecher+Schuh CA7 and CA9
Overload relay	Allen-Bradley 193-E3 Electronic E300 w- Ethernet/IP
Rated operational voltage	400 / 415V AC
Motor types	High efficiency, class: IE2, IE3
Rated conditional AC current (I <sub>q</sub> ) :	65 kA (rms symmetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination



### COMPONENT SELECTION TABLE: Starter components, Earth leakage circuit breakers or separate earth leakage relays

MOTOR		CIRCUIT BREAKER		CONTACTOR	OVERLOAD RELAY	C/B INSTANT TRIP AMPS & MOT FLC		
MOTOR kW	FLC RATINGS @ 400V	CIRCUIT BREAKER	EARTH LEAKAGE Setting Range	CONTACTOR TYPE	OVERLOAD RELAY (ELECTRONIC)	AMPERE SETTING RANGE	C/B INSTANT TRIP AMPS (± 20%)	MINIMUM TRIP AMP MULTIPLE OF MOTOR FLC
0.18	0.6	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	320
0.25	0.85	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	226
0.37	1.1	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	174
0.55	1.5	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	128
0.75	1.9	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	101
1.1	2.7	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	71.1
1.5	3.6	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	53.3
2.2	4.9	ZS125M / 20A	30mA – 3A	CA7-23	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	39.2
3	6.5	ZS125M / 20A	30mA – 3A	CA7-30	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	29.5
4	8.5	ZS125M / 20A	30mA – 3A	CA7-30	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	22.6
5.5	11.5	ZS125M / 20A	30mA – 3A	CA7-30	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	240 A	16.7
7.5	15.5	ZS125M / 32A	30mA – 3A	CA7-30	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	384 A	19.8
11	22	ZS125M / 32A	30mA – 3A	CA7-30	193 E3-63-24D-I-30A - # -ETR	0.5 – 30	384 A	14.0
15	29	ZS125M / 50A	30mA – 3A	CA7-43	193 E3-63-24D-I-60A - # -ETR	6 – 60	600 A	16.6
18.5	35	ZS125M / 63A	30mA – 3A	CA7-43	193 E3-63-24D-I-60A - # -ETR	6 – 60	756 A	17.3
22	41	ZS125M / 63A	30mA – 3A	CA7-55	193 E3-63-24D-I-60A - # -ETR	6 – 60	756 A	14.8
30	55	ZS125M / 100A	30mA – 3A	CA7-72	193 E3-63-24D-I-100A - # -ETR	10 – 100	1200 A	17.5
37	66	ZS125M / 100A	30mA – 3A	CA7-85	193 E3-63-24D-I-100A - # -ETR	10 – 100	1200 A	14.5
45	80	ZS250M / 160A	30mA – 3A	CA9-190	193 E3-63-24D-I-200A - # -ETR	20 – 200	2080 A	20.8
55	97	ZS250M / 160A	30mA – 3A	CA9-190	193 E3-63-24D-I-200A - # -ETR	20 – 200	2080 A	17.2
75	132	ZS250M / 250A	30mA – 3A	CA9-190	193 E3-63-24D-I-200A - # -ETR	20 – 200	2500 A	15.2

Notes:

A) Recommended circuit breaker size based on the following starting conditions:

Starting currents approx. 7.5 - 8 x motor FLC. Start time approx.5 sec.

Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10ms that will vary by motor make.

For 5.5 to 11kW starters 60A Sensing module can be used with CA7-30 contactors

B) E/L

\* to use External GF toroid, and Thermistor protection, -GP42- Control module is required

C)Other

- 24D denotes 24V DC control voltage  
 - # - Specify Contactor mount, or E3T / T for separate DIN mount, or P for Pass Thru  
 If Power & Voltage monitoring is required, change Sensing module to VIG versions

ECH64.13 Type 2, 65 kA – Circuit breakers c/w Earth Fault, overloads with EtherNet/IP communications