

Achieving Type 2 “No Damage” Motor Start Protection

Cutler Hammer Freedom Series NEMA Interchangeable Heater Starters & Mersen Fuses

Type 2 “No Damage” Protection - What Is It and Which Fuses Are Best?

Type 2 protection, also referred to as “no damage” protection, simply means that if a short circuit occurs, the short circuit protective device will operate fast enough to prevent fault current damage to healthy equipment in the system. Tests show that current-limiting fuses are the best choice for the protection of the motor controllers if damage-free performance is required. To ensure that correct fuse choices are made, short circuit tests must be made on every possible combination of motor control and fuse. This sheet summarizes a major manufacturer’s motor starter and the Mersen time-delay fuses which give Type 2 “no damage” protection. All combinations are UL witnessed and certified.

200 Volt, Three-Phase Motors

HP	Size	Starter No.	Heater No.	Class RK1	SCCR (kA)
1/2	00	AN16ANO_C	H2006B-3	A6D5R	100
3/4	00	AN16ANO_C	H2007B-3	A6D6R	100
1	00	AN16ANO_C	H2008B-3	A6D8R	100
1 1/2	0	AN16NDO_C	H2009B-3	A6D12R	100
2	0	AN16BNO_C	H2010B-3	A6D17-1/2R	100
3	0	AN16BNO_C	H2011B-3	A6D25R	100
7 1/2	1	AN16DNO_B	H2013B-3	A6D45R	100
10	2	AN16GNO_B	H2015B-3	A6D70R	100
15	3	AN16KNO_	H2021-3	A6D110R	100
20	3	AN16KNO_	H2021-3	A6D110R	100
25	3	AN16KNO_	H2022-3	A6D175R	100
30	4	AN16NNO_	H2023-3	A6D200R	100
40	4	AN16NNO_	H2024-3	A6D200R	100
50	5	AN16SNO_B	H2007B-3	A6D400R	100
60	5	AN16SNO_B	H2007B-3	A6D400R	100
75	5	AN16SNO_B	H2008B-3	A6D400R	100

230 Volt, Three-Phase Motors

HP	Size	Starter No.	Heater No.	Class RK1	SCCR (kA)
1/2	00	AN16ANO_C	H2006B-3	A6D5R	100
3/4	00	AN16ANO_C	H2007B-3	A6D6R	100
1	00	AN16ANO_C	H2008B-3	A6D8R	100
1 1/2	00	AN16ANO_C	H2009B-3	A6D12R	100
2	0	AN16BNO_C	H2009B-3	A6D12R	100
3	0	AN16BNO_C	H2011B-3	A6D25R	100
5	1	AN16DNO_B	H2012B-3	A6D40R	100
7 1/2	1	AN16DNO_B	H2013B-3	A6D45R	100
10	2	AN16GNO_B	H2013B-3	A6D45R	100
15	2	AN16GNO_B	H2014B-3	A6D60R	100
20	3	AN16KNO_	H2021-3	A6D110R	100
25	3	AN16KNO_	H2022-3	A6D175R	100
30	3	AN16KNO_	H2022-3	A6D175R	100
40	4	AN16NNO_	H2023-3	A6D200R	100
50	4	AN16NNO_	H2024-3	A6D200R	100
60	5	AN16SNO_B	H2007B-3	A6D400R	100
75	5	AN16SNO_B	H2007B-3	A6D400R	100
100	5	AN16SNO_B	H2008B-3	A6D400R	100

“_” Empty space designates where coil suffix must be added.

<http://www.eaton.com/EatonCom/Markets/Electrical/Products/MotorControl/NEMASTartersContactors/FreedomNEMA/index.htm?ssSourceNodId=3483&ssSourceSiteId=EatonCom>

USA T 978 462 6662 F 978 462 0181 info.nby@mersen.com
CANADA T 416 252 9371 F 416 252 6572 sales.tor@mersen.com

us-ferrazshawmut.mersen.com

FERRAZ SHAWMUT IS NOW MERSEN

MERSEN

Achieving Type 2 “No Damage” Motor Start Protection

Cutler Hammer Freedom Series NEMA Interchangeable Heater Starters & Mersen Fuses

460 Volt, Three-Phase Motors

HP	Size	Starter No.	Heater No.	Class RK1	SCCR (kA)
1/2	00	AN16ANO_C	H2004B-3	A6D2-1/4R	100
3/4	00	AN16ANO_C	H2005B-3	A6D3-2/10R	100
1	00	AN16ANO_C	H2006B-3	A6D5R	100
1 1/2	00	AN16ANO_C	H2007B-3	A6D6R	100
2	00	AN16ANO_C	H2008B-3	A6D8R	100
3	0	AN16BNO_C	H2009B-3	A6D12R	100
5	0	AN16BNO_C	H2010B-3	A6D17-1/2R	100
7 1/2	1	AN16DNO_B	H2011B-3	A6D25R	100
10	1	AN16DNO_B	H2012B-3	A6D40R	100
15	2	AN16GNO_B	H2013B-3	A6D45R	100
20	2	AN16GNO_B	H2014B-3	A6D60R	100
25	2	AN16GNO_B	H2015B-3	A6D70R	100
30	3	AN16KNO_	H2020-3	A6D80R	100
40	3	AN16KNO_	H2021-3	A6D110R	100
50	3	AN16KNO_	H2022-3	A6D175R	100
60	4	AN16NNO_	H2022-3	A6D175R	100
75	4	AN16NNO_	H2023-3	A6D200R	100
100	4	AN16NNO_	H2024-3	A6D200R	100
125	5	AN16SNO_B	H2007B-3	A6D400R	100
150	5	AN16SNO_B	H2007B-3	A6D400R	100
200	5	AN16SNO_B	H2008B-3	A6D400R	100

575 Volt, Three-Phase Motors

HP	Size	Starter No.	Heater No.	Class RK1	SCCR (kA)
3/4	00	AN16ANO_C	H2004B-3	A6D2-1/4R	100
1	00	AN16ANO_C	H2005B-3	A6D3-2/10R	100
1 1/2	00	AN16ANO_C	H2006B-3	A6D5R	100
2	00	AN16ANO_C	H2007B-3	A6D6R	100
3	0	AN16BNO_C	H2008B-3	A6D8R	100
5	0	AN16BNO_C	H2009B-3	A6D12R	100
7 1/2	1	AN16DNO_B	H2010B-3	A6D17-1/2R	100
10	1	AN16DNO_B	H2011B-3	A6D25R	100
15	2	AN16GNO_B	H2012B-3	A6D40R	100
20	2	AN16GNO_B	H2013B-3	A6D45R	100
25	2	AN16GNO_B	H2014B-3	A6D60R	100
30	3	AN16KNO_	H2019-3	A6D60R	100
40	3	AN16KNO_	H2020-3	A6D80R	100
50	3	AN16KNO_	H2021-3	A6D110R	100
60	4	AN16NNO_	H2021-3	A6D110R	100
75	4	AN16NNO_	H2022-3	A6D175R	100
100	4	AN16NNO_	H2023-3	A6D200R	100
125	5	AN16SNO_B	H2006B-3	A6D400R	100
150	5	AN16SNO_B	H2007B-3	A6D400R	100
200	5	AN16SNO_B	H2007B-3	A6D400R	100

“_” Empty space designates where coil suffix must be added.

<http://www.eaton.com/EatonCom/Markets/Electrical/Products/MotorControl/NEMASTartersContactors/FreedomNEMA/index.htm?ssSourceNodeId=3483&ssSourceSiteId=EatonCom>

USA T 978 462 6662 F 978 462 0181 info.nby@mersen.com
 CANADA T 416 252 9371 F 416 252 6572 sales.tor@mersen.com

us-ferrazshawmut.mersen.com

FERRAZ SHAWMUT IS NOW MERSEN



Achieving Type 2 “No Damage” Motor Start Protection

Cutler Hammer Freedom Series IEC Interchangeable Heater Starters & Mersen Fuses

Type 2 “No Damage” Protection - What Is It and Which Fuses Are Best?

Type 2 protection, also referred to as “no damage” protection, simply means that if a short circuit occurs, the short circuit protective device will operate fast enough to prevent fault current damage to healthy equipment in the system. Tests show that current-limiting fuses are the best choice for the protection of the motor controllers if damage-free performance is required. To ensure that correct fuse choices are made, short circuit tests must be made on every possible combination of motor control and fuse. This sheet summarizes a major manufacturer’s motor starter and the Mersen time-delay fuses which give Type 2 “no damage” protection. All combinations are UL witnessed and certified.

200 Volt, Three-Phase Motors

HP (FLC)	Starter No.	Heater No.	Class J	Class CC	SCCR (kA)
1/2	AE16ANSO_C	H2106B-3	AJT6	ATDR6	100
3/4	AE16ANSO_C	H2107B-3	AJT6	ATDR6†	100
1	AE16ANSO_C	H2108B-3	AJT15	ATDR15	100
1 1/2	AE16ANSO_C	H2109B-3	AJT15	ATDR15	100
2	AE16BNSO_C	H2110B-3	AJT25	ATDR25	100
3	AE16CNSO_C	H2111B-3	AJT35	-	100
5	AE16DNSO_C	H2112B-3	AJT50	-	100
7 1/2	AE16ENSO_B	H2114B-3	AJT60	-	100
10	AE16HNSO_B	H2115B-3	AJT80	-	100
15	AE16JNSO_B	H2116B-3	AJT110	-	100
20	AE16KNSO_B	H2117B-3	AJT110	-	100
25	AE16LNSO_	H2022-3	AJT150	-	100
30	AE16MNSO_	H2023-3	AJT200	-	100
40	AE16NNSO_	H2024-3	AJT200	-	100

460 Volt, Three-Phase Motors

HP (FLC)	Starter No.	Heater No.	Class J	Class CC	SCCR (kA)
1/2	AE16ANSO_C	H2104B-3	AJT3	ATDR3	100
3/4	AE16ANSO_C	H2105B-3	AJT3	ATDR3†	100
1	AE16ANSO_C	H2105B-3	AJT3	ATDR3	100
1 1/2	AE16ANSO_C	H2106B-3	AJT6	ATDR6	100
2	AE16ANSO_C	H2108B-3	AJT15	ATDR15	100
3	AE16ANSO_C	H2108B-3	AJT15	ATDR15	100
5	AE16BNSO_C	H2110B-3	AJT25	ATDR25	100
7 1/2	AE16CNSO_C	H2111B-3	AJT35	-	100
10	AE16DNSO_C	H2111B-3	AJT35	-	100
15	AE16ENSO_C	H2113B-3	AJT50	-	100
20	AE16FNSO_B	H2114B-3	AJT60	-	100
25	AE16GNSO_B	H2115B-3	AJT80	-	100
30	AE16HNSO_B	H2116B-3	AJT110	-	100
40	AE16JNSO_B	H2116B-3	AJT110	-	100
50	AE16KNSO_B	H2117B-3	AJT110	-	100
60	AE16LNSO_	H2022-3	AJT150	-	100
75	AE16MNSO_	H2023-3	AJT200	-	100
100	AE16NNSO_	H2024-3	AJT200	-	100

230 Volt, Three-Phase Motors

HP (FLC)	Starter No.	Heater No.	Class J	Class CC	SCCR (kA)
1/2	AE16ANSO_C	H2106B-3	AJT6	ATDR6	100
3/4	AE16ANSO_C	H2106B-3	AJT6	ATDR6†	100
1	AE16ANSO_C	H2108B-3	AJT15	ATDR15	100
1 1/2	AE16ANSO_C	H2109B-3	AJT15	ATDR15	100
2	AE16BNSO_C	H2109B-3	AJT15	ATDR15	100
3	AE16BNSO_C	H2110B-3	AJT25	ATDR25	100
5	AE16DNSO_C	H2112B-3	AJT50	-	100
7 1/2	AE16ENSO_C	H2113B-3	AJT50	-	100
10	AE16FNSO_B	H2114B-3	AJT60	-	100
15	AE16HNSO_B	H2116B-3	AJT110	-	100
20	AE16JNSO_B	H2117B-3	AJT110	-	100
25	AE16KNSO_B	H2117B-3	AJT110	-	100
30	AE16LNSO_	H2022-3	AJT150	-	100
40	AE16MNSO_	H2023-3	AJT200	-	100
50	AE16NNSO_	H2024-3	AJT200	-	100

575 Volt, Three-Phase Motors

HP (FLC)	Starter No.	Heater No.	Class J	Class CC	SCCR (kA)
3/4	AE16ANSO_C	H2104B-3	AJT3	ATDR3	100
1	AE16ANSO_C	H2105B-3	AJT3	ATDR3†	100
1 1/2	AE16ANSO_C	H2106B-3	AJT6	ATDR6	100
2	AE16ANSO_C	H2107B-3	AJT6	ATDR6	100
3	AE16ANSO_C	H2108B-3	AJT15	ATDR15	100
5	AE16ANSO_C	H2109B-3	AJT15	ATDR15	100
7 1/2	AE16BNSO_C	H2110B-3	AJT25	ATDR25	100
10	AE16CNSO_C	H2111B-3	AJT35	-	100
15	AE16DNSO_C	H2112B-3	AJT50	-	100
20	AE16ENSO_C	H2113B-3	AJT50	-	100
25	AE16FNSO_B	H2114B-3	AJT60	-	100
30	AE16GNSO_B	H2115B-3	AJT80	-	100
40	AE16HNSO_B	H2116B-3	AJT110	-	100
50	AE16KNSO_B	H2116B-3	AJT110	-	100
60	AE16LNSO_	H2021-3	AJT110	-	100
75	AE16LNSO_	H2022-3	AJT150	-	100
100	AE16MNSO_	H2023-3	AJT200	-	100
125	AE16NNSO_	H2024-3	AJT200	-	100

“_” Empty space designates where coil suffix must be added.

<http://www.eaton.com/EatonCom/Markets/Electrical/Products/MotorControl/NEMASTartersContactors/FreedomNEMA/index.htm?ssSourceNodId=3483&ssSourceSiteId=EatonCom>

USA T 978 462 6662 F 978 462 0181 info.nby@mersen.com
CANADA T 416 252 9371 F 416 252 6572 sales.tor@mersen.com

us-ferrazshawmut.mersen.com

FERRAZ SHAWMUT IS NOW MERSEN

MERSEN

Achieving Type 2 “No Damage” Motor Start Protection

Cutler Hammer Freedom Series IEC Fixed Heater Starters & Mersen Fuses

200 Volt, Three-Phase Motors

HP (FLC)	Starter No. (Fixed Heaters)	Class J	Class CC	SCCR (kA)
1/2	AE17ANSO_FJ	AJT6	ATDR6	100
3/4	AE17ANSO_FK	AJT6	ATDR6	100
1	AE17ANSO_FL	AJT15	ATDR15	100
1 1/2	AE17ANSO_FM	AJT15	ATDR15	100
2	AE17BNSO_FP	AJT25	ATDR25	100
3	AE17CNSO_FQ	AJT35	-	100
5	AE17DNSO_FR	AJT35	-	100
7 1/2	AE17FNSO_FT	AJT60	-	100
10	AE17HNSO_KC	AJT80	-	100
15	AE17JNSO_KE	AJT110	-	100
20	AE17KNSO_KF	AJT110	-	100

230 Volt, Three-Phase Motors

HP (FLC)	Starter No. (Fixed Heaters)	Class J	Class CC	SCCR (kA)
1/2	AE17ANSO_FH	AJT3†	ATDR3†	100
3/4	AE17ANSO_FK	AJT6	ATDR6†	100
1	AE17ANSO_FL	AJT6†	ATDR6†	100
1 1/2	AE17ANSO_FM	AJT15	ATDR15	100
2	AE17BNSO_FN	AJT15	ATDR15	100
3	AE17CNSO_FP	AJT25	ATDR25	100
5	AE17DNSO_FR	AJT35	-	100
7 1/2	AE17ENSO_FS	AJT50	-	100
10	AE17FNSO_FT	AJT60	-	100
15	AE17HNSO_KD	AJT110	-	100
20	AE17JNSO_KE	AJT110	-	100
25	AE17KNSO_KF	AJT110	-	100

460 Volt, Three-Phase Motors

HP (FLC)	Starter No. (Fixed Heaters)	Class J	Class CC	SCCR (kA)
1/2	AE17ANSO_FF	AJT2	ATDR2	100
3/4	AE17ANSO_FG	AJT3	ATDR3	100
1	AE17ANSO_FH	AJT3	ATDR3†	100
1 1/2	AE17ANSO_FJ	AJT6	ATDR6	100
2	AE17ANSO_FK	AJT6	ATDR6†	100
3	AE17ANSO_FM	AJT15	ATDR15	100
5	AE17BNSO_FN	AJT15	ATDR15	100
7 1/2	AE17CNSO_FQ	AJT35	-	100
10	AE17DNSO_FR	AJT35	-	100
15	AE17ENSO_FS	AJT50	-	100
20	AE17FNSO_FT	AJT60	-	100
25	AE17GNSO_KC	AJT80	-	100
30	AE17HNSO_KD	AJT110	-	100
40	AE17JNSO_KE	AJT110	-	100
50	AE17KNSO_KF	AJT110	-	100

575 Volt, Three-Phase Motors

HP (FLC)	Starter No. (Fixed Heaters)	Class J	Class CC	SCCR (kA)
3/4	AE17ANSO_FF	AJT2	ATDR2†	100
1	AE17ANSO_FG	AJT3	ATDR3†	100
1 1/2	AE17ANSO_FH	AJT3†	ATDR3†	100
2	AE17ANSO_FJ	AJT6	ATDR6	100
3	AE17ANSO_FL	AJT15	ATDR15	100
5	AE17ANSO_FM	AJT15	ATDR15	100
7 1/2	AE17BNSO_FP	AJT25	ATDR25	100
10	AE17CNSO_FQ	AJT35	-	100
15	AE17DNSO_FR	AJT35	-	100
20	AE17ENSO_FS	AJT50	-	100
25	AE17FNSO_FT	AJT60	-	100
30	AE17GNSO_KC	AJT80	-	100
40	AE17HNSO_KD	AJT110	-	100
50	AE17KNSO_KE	AJT110	-	100

“_” Empty space designates where coil suffix must be added.
 † May be too small to allow some motors to start.

<http://www.eaton.com/EatonCom/Markets/Electrical/Products/MotorControl/NEMAStartersContactors/FreedomNEMA/index.htm?ssSourceNodeId=3483&ssSourceSiteId=EatonCom>

Disclaimer: Regarding information available in this document, Mersen does not warrant or assume any legal liability or responsibility for the accuracy or usefulness of any information disclosed. The content in this guide is for informational purposes only. All information has been gathered from the individual websites of the product manufacturers listed in this document.

USA T 978 462 6662 F 978 462 0181 info.nby@mersen.com
 CANADA T 416 252 9371 F 416 252 6572 sales.tor@mersen.com

us-ferrazshawmut.mersen.com

FERRAZ SHAWMUT IS NOW MERSEN

