

Overload Relay Trip Curves

Selection Index

Class 2510, 8536, 9065

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USING THERMAL OVERLOAD RELAY TRIP CURVES

Overview

Overload relay trip curves present trip time as a function of overload current. To use them properly, you must understand their application, construction, and limitations.

Trip curves for Square D® products assume a cold start with the coil energized at the rated voltage in an ambient temperature of 40 °C (104 °F). Different trip times would result under different conditions—if the starter coil were not energized, for example, or if the controller door were open.

Ambient temperature affects the performance of the thermal overload relay (OLR). Trip times increase in temperatures below 40 °C and decrease above 40 °C. But since motor capacity also varies with temperature in about the same proportion, this variation is not normally a factor in OLR selection. Most motors are also rated on the basis of a 40 °C ambient temperature, so the 40 °C OLR trip curves allow direct comparison with motor characteristics.

Application

Trip curves are most commonly used to determine whether protection against locked rotor current (LRC) is adequate should the motor stall or fail to start. Consult the manufacturer to determine the value of the locked rotor current and the length of time that the motor can withstand this condition. Then, compare this data to the OLR trip curve to ensure that the device will trip before the motor is damaged.

Trip curves can also indicate whether the OLR allows normal starting of a motor without tripping, especially in applications with a long acceleration period. For this type of analysis, calculate the rms (heating) value of the load current on the trip curve at cumulative intervals during and following the starting period. Plotting the actual motor current on the trip curve is not sufficient, because the OLR may trip even if the motor current curve does not intersect the OLR trip curve. Although the starting current falls off as the motor reaches full speed, the heat produced in the OLR (and in the motor) does not immediately dissipate.

The effect of this *thermal inertia* can be approximated by calculating the rms current over several cumulative time periods. For an accelerating time of 15 s, for instance, rms current values might be calculated for the following time periods: 0–5 s, 0–10 s, 0–15 s, and so forth. These rms current values can then be plotted; and if the resulting curve does not intersect the OLR trip curve, then no trip should occur during startup.

NOTE: If the curves do intersect at some point beyond the motor accelerating period, the OLRs may or may not trip during startup. The above calculation ignores heat losses, and therefore may give a false indication that the OLRs will trip. In such cases, we recommend conducting a trial.

Curve Construction

Square D trip curves come in two basic versions:

- *Curves with one solid line (maximum) and one dashed line (average)* apply to present-production melting-alloy thermal units (plain brass nameplate only) and present-production bimetallic thermal units.
- *Curves with two solid lines (with or without shaded area)* apply to older-design melting-alloy thermal units (red enamel nameplate) and older-design bimetallic thermal units.

The width of the band curve does not represent repeat accuracy of a particular thermal unit, nor does it imply a variation between thermal units of the same size. However, the thermal units of different sizes do have slightly different characteristics. These differences result in a band of values (or maximum and average values, depending on the type of curve) when data for several sizes of thermal units are included in one curve.

The load scale is expressed in three ways:

- *Multiples of trip current rating* is obtained by dividing the overload current by the trip current rating.
- *Percent of trip current rating* is obtained by dividing the overload current by the trip current rating¹ and multiplying by 100.
- *Percent of thermal unit number, element number, or relay rating* is obtained by dividing the overload current by the number stamped on the thermal unit nameplate and multiplying by 100. (For a B19.5 thermal unit, 100% corresponds to 19.5.)

¹ Also called the rated trip current or the ultimate trip current.

Calculating the Trip Current Rating

The trip current rating is a nominal value approximating the minimum current that will trip an OLR in an ambient temperature of 40 °C. To calculate the trip current rating:

1. Refer to the thermal unit selection table specified for the controller.
2. Locate the minimum full-load current (FLC) for the applicable thermal unit.
3. Multiply the minimum FLC by 1.25 (1.15 for Class 8198). The result is the trip current rating.

This procedure applies to controllers with bimetallic OLRs if the trip adjustment is set to 100%.

Calculating the Trip Current for Ambient Temperatures Other Than 40 °C

When the controller is in an ambient temperature other than 40 °C, calculate the trip current using the correction factor shown in [Figure 2](#).

$$\text{Trip Current} = M \times \text{trip current rating at } 40 \text{ } ^\circ\text{C}$$

where M is the multiplier corresponding to the temperature.

NOTE: Ambient temperature is the temperature surrounding the starter enclosure. Normal temperature rise inside the enclosure is accounted for in the thermal unit selection tables.

Limitations

For most magnetic starters, the trip curves are different for OLRs mounted in small enclosures than for those mounted in large enclosures. While curves for open-type starters are theoretically correct only for devices mounted without an enclosure, these curves provide a reasonable approximation of performance using a large enclosure.

- **Small enclosure** trip curves are for use with devices of the following Classes:
 - 8536 (starter in its own enclosure)
 - 8904 (non-combination or non-reversing)
 - 8998, 8999, I-Line, and QMB (motor control centers)
- **Large enclosure** trip curves are for use with devices of the following Classes:
 - 8536 (starter in its own enclosure)
 - 8539 (combination starter, non-reversing)
 - 8606, 8630, 8640 (reduced voltage starter)
 - 8736, 8739 (reversing starter)
 - 8810, 8811, 8812 (multi-speed starter)
 - 8940, 8941 (pump controller)
 - any other starter in a large enclosure

Curve accuracy should be sufficient for most applications. The curves are more accurate for high currents than for low currents. In particular, overload currents below 300% may yield different trip times. Conditions in the field may differ from those in a laboratory; the longer the trip time period, the more pronounced the differences.

Continued on next page

Examples

Motor 7.5 hp, 200 V, 3-phase, 1.15 SF, 22.6 A FLC, 136 A LRC

Starter Class 8536 Type SCG3 with B45 thermal units

Ambient Temperature 40 °C (104 °F)

Question

What is the average OLR trip time with a locked rotor current of 136 A (6 times FLC)?

Calculations

In a 40 °C ambient temperature, the trip current rating is 125% of the minimum current in the thermal unit selection table. For the Class 8536 Type SCG3 starter, B45 thermal units were selected from the 22.0–24.4 A FLC range shown in Thermal Unit Table 13 on [page 5](#).

Based on the minimum FLC for the thermal unit, the *Trip Current Rating* = $1.25 \times 22 = 27.5$

With a locked rotor current of 136 A, the *Multiple of Trip Current Rating* = $136 \div 27.5 = 4.95$

Solution

The trip curve index shows that curve 30068-407 should be used for a Class 8536 Type SCG3 starter in a small enclosure. For a multiple of 4.95, the average trip time shown in the curve is **19 seconds**.

Question

If the ambient temperature were 50 °C (122 °F), what would the average trip time be?

Calculations

[Figure 2](#) on page 5 shows that the ambient temperature correction factor at 50 °C is 0.9.

Trip Current Rating = $1.25 \times 22 \times 0.9 = 24.75$

With a locked rotor current of 136 A, the *Multiple of Trip Current Rating* = $136 \div 24.75 = 5.5$

Solution

For a multiple of 5.5, the average trip time shown in curve 30068-407 is **16 seconds**.

Question

If the load current were twice the FLC (45.2 A), and the ambient temperature were 40 °C (104 °F), what would the average trip time be?

Calculations

Trip Current Rating = $1.25 \times 22 = 27.5$

Multiple of Trip Current Rating = $45.2 \div 27.5 = 1.65$

Solution

For a multiple of 1.65, the average trip time shown in curve 30068-407 is **170 seconds**.

Question

If the load current were 28 A, what would the average trip time be?

Calculations

Trip Current Rating = $1.25 \times 22 = 27.5$

Multiple of Trip Current Rating = $28 \div 27.5 = 1.018$

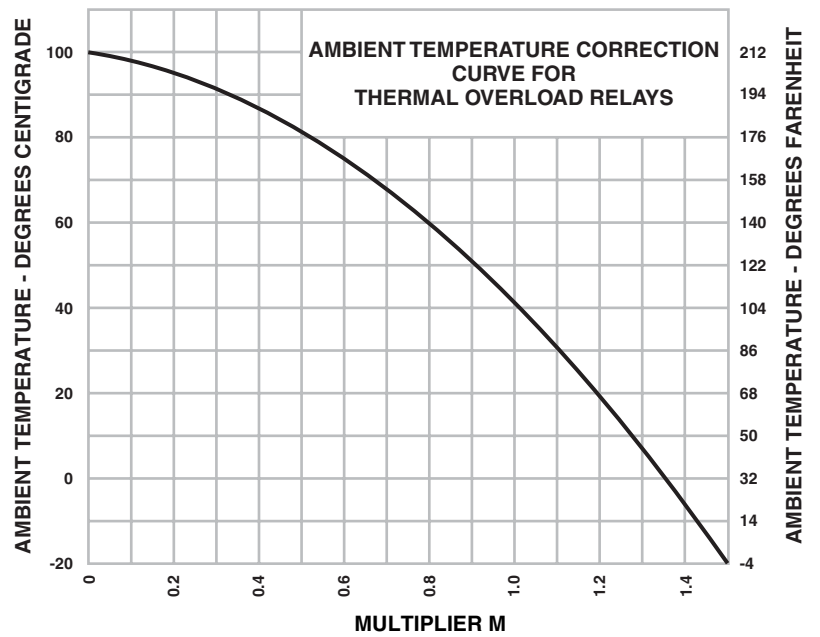
Solution

For a load current this close to the trip current rating, the trip time is difficult to predict. It would likely take hours for the OLR to trip.

Figure 1: Excerpt from Thermal Unit Table 13

Motor Full-Load Current (A)			Thermal Unit Number
1 T.U.	2 T.U.	3 T.U.	
5.20-5.73	5.20-5.73	4.94-5.21	B 8.20
5.74-6.39	5.74-6.39	5.22-5.84	B 9.10
6.40-7.13	6.40-7.13	5.85-6.67	B 10.2
7.14-7.90	7.14-7.90	6.68-7.54	B 11.5
7.91-8.55	7.91-8.55	7.55-8.14	B 12.8
8.56-9.53	8.56-9.53	8.15-8.72	B 14
9.54-10.6	9.54-10.6	8.73-9.66	B 15.5
10.7-11.8	10.7-11.8	9.67-10.5	B 17.5
11.9-13.2	11.9-12.0	10.6-11.3	B 19.5
13.3-14.9	...	11.4-12.0	B 22
15.0-16.6	B 25
16.7-18.0	B 28.0
Following Selections for Size 1 Only			
...	11.9-13.2	...	B 19.5
...	13.3-14.9	11.4-12.7	B 22
...	15.0-16.6	12.8-14.1	B 25
16.7-18.9	16.7-18.9	14.2-15.9	B 28.0
19.0-21.2	19.0-21.2	16.0-17.5	B 32
21.3-23.0	21.3-23.0	17.6-19.7	B 36
23.1-25.5	23.1-25.5	19.8-21.9	B 40
25.6-26.0	25.6-26.0	22.0-24.4	B 45
...	...	24.5-26.0	B 50

Figure 2: Ambient Temperature Correction Curve for OLRs



Class 2510 AC and DC Manual Starters Melting Alloy Overload Relay				Reference Drawing Number, 30068-xxx									
				Thermal Unit Type									
				A			B			FB			SB
Size	Type	Series	Application	1 TU	2 TU	3TU	1 TU	2 TU	3TU	1 TU	2 TU	3TU	1, 2, 3 TU
FHP	F	A	Open or Enclosed	447 page 66									
M-0	MB TB	A	Open							457 page 73	457 page 73	457 page 73	490 page 79
			Small Enclosure			279 page 20		312 page 30	456 page 72	456 page 72	456 page 72	456 page 72	490 page 79
			Large Enclosure					313 page 31	457 page 73	457 page 73	457 page 73	457 page 73	490 page 79
			2511, 2512, Small Enclosure					313 page 31					
M-1	MC TC	A	Open							457 page 73	457 page 73	457 page 73	490 page 79
			Small Enclosure			279 page 20		312 page 30	456 page 72	456 page 72	456 page 72	456 page 72	490 page 79
			Large Enclosure					313 page 31	457 page 73	457 page 73	457 page 73	457 page 73	490 page 79
			2511, 2512, Small Enclosure					313 page 31					
M-1P	MC TC	A	Open							457 page 73			490 page 79
			Small Enclosure			279 page 20			456 page 72				490 page 79
			Large Enclosure						457 page 73				490 page 79

Class 8536 AC Magnetic Starters Melting Alloy Overload Relay				Reference Drawing Number, 30068-xxx									
				Thermal Unit Type									
				A			B			FB			SB
Size	Type	Series	Application	1 TU	2 TU	3TU	1 TU	2 TU	3TU	1 TU	2 TU	3TU	1, 2, 3 TU
00	A ¹	B,C	Open	443 page 62		446 page 65							
			8536 Small Enclosure	444 page 63		445 page 64							
			Large Enclosure	443 page 62		446 page 65							
	SA	A	Open										490 page 79
			Enclosed				314 page 32	314 page 32	411 page 45				490 page 79
	0	SB	A	Open									
8536 Small Enclosure							272 page 15	272 page 15	407 page 41	454 page 70	454 page 70	454 page 70	490 page 79
Large Enclosure							310 page 28	310 page 28	408 page 42	453 page 69	453 page 69	453 page 69	490 page 79
1	SC	A	Open										490 page 79
			8536 Small Enclosure				272 page 15	272 page 15	407 page 41	454 page 70	454 page 70	454 page 70	490 page 79
			Model 4 MCC					319 page 37	319 page 37		454 page 70	454 page 70	490 page 79
			Model 3 MCC, QMB, I-Line				272 page 15	272 page 15	407 page 41	454 page 70	454 page 70	454 page 70	490 page 79
			Other Larger Enclosure				310 page 28	310 page 28	408 page 42	453 page 69	453 page 69	453 page 69	490 page 79
1P	SC	A	Open										490 page 79
			8536 Small Enclosure				278 page 19						490 page 79
			Large Enclosure				278 page 19						490 page 79
2	SD	A	Open										490 page 79
			8536 Small Enclosure				280 page 21	280 page 21	409 page 43	455 page 71	455 page 71	455 page 71	490 page 79
			Model 4 MCC					320 page 38	320 page 38	455 page 71	455 page 71	455 page 71	490 page 79
			Model 3 MCC, QMB, I-Line				280 page 21	280 page 21	409 page 43	455 page 71	455 page 71	455 page 71	490 page 79
			Other Larger Enclosure				315 page 33	315 page 33	410 page 44	463 page 78	463 page 78	463 page 78	490 page 79

¹⁾ Non-reversing.

Class 8536 AC Magnetic Starters Melting Alloy Overload Relay				Reference Drawing Number, 30068-xxx									
				Thermal Unit Type									
				B			CC			DD			FB (Form Y81)
Size	Type	Series	Application	3 TU	1 TU	2 TU	3TU	1 TU	2 TU	3TU	1 TU	2 TU	3TU
3	SE	A	Open									459 page 75	459 page 75
			8536 Small Enclosure			317 page 35	299 page 22					458 page 74	458 page 74
			MCC, QMB, I-Line			317 page 35	299 page 22					458 page 74	458 page 74
			Other Larger Enclosure			318 page 36	300 page 23					459 page 75	459 page 75
4	SF	A	Open									461 page 77	461 page 77
			8536 Small Enclosure				302 page 25					460 page 76	460 page 76
			MCC, QMB, I-Line				302 page 25						460 page 76
			Other Larger Enclosure				303 page 26					461 page 77	461 page 77
5	SG	A	Open										
			8536 Small Enclosure								273 page 16		
			MCC, QMB, I-Line								273 page 16		
			Other Larger Enclosure								274 page 17		
5	SG	B	Open										
			8536 Small Enclosure	311 page 29									
			MCC, QMB, I-Line	311 page 29									
			Other Larger Enclosure	311 page 29									
6	SH	A, B	Open										
			8536 Small Enclosure	348 page 39									
			MCC, QMB, I-Line	348 page 39									
			Other Larger Enclosure	349 page 40									

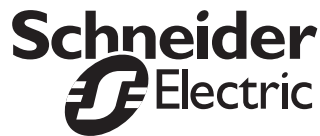
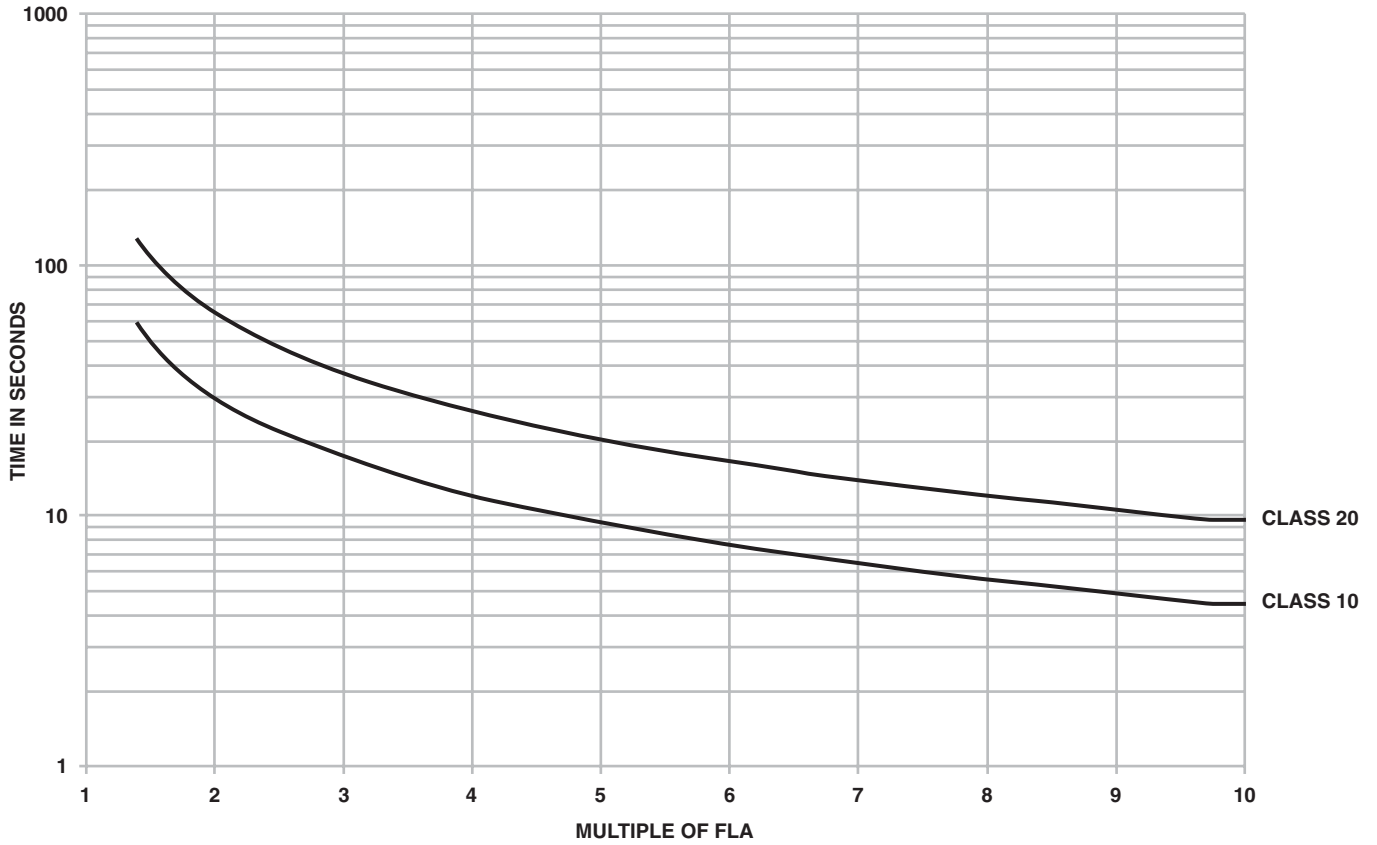
Class 8536 AC Magnetic Starters Bimetallic Overload Relay				Reference Drawing Number, 30068-xxx								
				Thermal Unit Type								
				Non-Compensated AR			Ambient-Temperature Compensated AR					
Size	Type	Series	Application	1 TU	2 TU	3TU	1 TU	2 TU	3TU			
0	SB Form B	B	8536 Small Enclosure						413 page 46			
			Large Enclosure (includes Reversing)						413 page 46			
	SB Form B2	A	8536 Small Enclosure			415 page 48						
			Large Enclosure (includes Reversing)			416 page 49						
1	SC Form B	B	8536 Small Enclosure						413 page 46			
			Large Enclosure (includes Reversing)						413 page 46			
	SC Form B2	A	8536 Small Enclosure			415 page 48						
			MCC, QMB, I-Line			415 page 48						
Large Enclosure (includes Reversing)					416 page 49							
2	SD Form B	A	8536 Small Enclosure						414 page 47			
			Large Enclosure (includes Reversing)						414 page 47			
	SD Form B2	A	8536 Small Enclosure			417 page 50						
			MCC, QMB, I-Line			417 page 50						
Large Enclosure (includes Reversing)					418 page 51							
Size	Type	Series	Application	Thermal Unit Type								
				Non-Compensated AU			Non-Compensated E or K			Ambient-Temperature Compensated E or K		
				1 TU	2 TU	3TU	1 TU	2 TU	3TU	1 TU	2 TU	3 TU
3	SE Form B5	A	8536 Small Enclosure			438 page 60						
			MCC, QMB, I-Line			438 page 60						
			Large Enclosure (includes Reversing)			439 page 61						
	SE Form B5	B	8536 Small Enclosure						820 page 82			
			MCC, QMB, I-Line						820 page 82			
			Large Enclosure (includes Reversing)						820 page 82			
	SE Form Y59	A	8536 Small Enclosure									820 page 82
			MCC, QMB, I-Line									820 page 82
			Large Enclosure (includes Reversing)									820 page 82

Class 8536 AC Magnetic Starters Bimetallic Overload Relay				Reference Drawing Number, 30068-xxx									
				Thermal Unit Type									
				Non-Compensated AU			Non-Compensated E or K			Ambient-Temperature Compensated E or K			
Size	Type	Series	Application	1 TU	2 TU	3TU	1 TU	2 TU	3TU	1 TU	2 TU	3TU	
4	SF Form B5	A	8536 Small Enclosure			423 page 56							
			MCC, QMB, I-Line			423 page 56							
			Large Enclosure (includes Reversing)			424 page 57							
	SF Form B5	B	8536 Small Enclosure						820 page 82				
			MCC, QMB, I-Line					820 page 82					
			Large Enclosure (includes Reversing)					820 page 82					
	SF Form Y59	A	8536 Small Enclosure										820 page 82
			MCC, QMB, I-Line										820 page 82
			Large Enclosure (includes Reversing)										820 page 82
Size	Type	Series	Application	Thermal Unit Type									
				Non-Compensated AR			Ambient-Temperature Compensated AR						
				1 TU	2 TU	3TU	1 TU	2 TU	3TU				
5	SG Form B2Y500	A	Standard or Large Enclosure			419 page 52							
			MCC, QMB, I-Line			419 page 52							
	SG Form BY500	A	Standard or Large Enclosure						413 page 46				
			MCC, QMB, I-Line					413 page 46					
	SG Form B2	B	Standard or Large Enclosure			419 page 52							
			MCC, QMB, I-Line			419 page 52							
	SG Form B	B	Standard or Large Enclosure						413 page 46				
			MCC, QMB, I-Line					413 page 46					
6	SH Form B2	A, B	Standard or Large Enclosure	Trip curves not available for this OLR									
			MCC, QMB, I-Line										
	SH Form B	A, B	Standard or Large Enclosure						413 page 46				
			MCC, QMB, I-Line					413 page 46					

Class 9065 Separately Mounted Melting Alloy Overload Relay				Reference Drawing Number, 30068-xxx								
				Thermal Unit Type								
				B			FB			SB		
Size	Type	Series	Application	1 TU	2 TU	3TU	1 TU	2 TU	3TU	1 TU	2 TU	3TU
25 A	C	A	Open or Enclosed	450 page 67						490 page 79		
	S	A	Open or Enclosed			311 page 29				490 page 79	490 page 79	490 page 79
45 A	T	A	Open or Enclosed	451 page 68						490 page 79		
	S	A	Open or Enclosed			316 page 34				490 page 79	490 page 79	490 page 79
Size	Type	Series	Application	Thermal Unit Type								
				C			CC					
				1 TU	2 TU	3TU	1 TU	2 TU	3TU			
86 A	U	A	Open or Enclosed									
	S	A	Open or Enclosed						301 page 24			
Size	Type	Series	Application	Thermal Unit Type								
				CC			DD					
				1 TU	2 TU	3TU	1 TU	2 TU	3TU			
133 A	F	B	Open or Enclosed									
	S	A	Open or Enclosed			304 page 27						
266 A	G	A	Open or Enclosed				275 page 18					

Class 9065 Separately Mounted Bimetallic Overload Relay				Reference Drawing Number, 30068-xxx					
				Thermal Unit Type					
				Ambient-Temperature Compensated E or K			Non-Compensated E or K		
Size	Type	Series	Application	1 TU	2 TU	3TU	1 TU	2 TU	3TU
25 A	DA	A	Open or Enclosed				820 page 82		
	DA2	A	Open or Enclosed	820 page 82					
60 A	GA	A	Open or Enclosed				820 page 82		
	GA2	A	Open or Enclosed	820 page 82					
100 A	HA	A	Open or Enclosed				820 page 82		
	HA2	A	Open or Enclosed	820 page 82					
180 A	JA	A	Open or Enclosed				820 page 82		
	JA2	A	Open or Enclosed	820 page 82					
Size	Type	Series	Application	Thermal Unit Type					
				Ambient-Temperature Compensated AR			Non-Compensated AR		
				1 TU	2 TU	3TU	1 TU	2 TU	3TU
26 A	SEO6B	B	Open or Enclosed			413 page 46			
	SEO6B2	A	Open or Enclosed						419 page 52
45 A	SEO9B	A	Open or Enclosed			414 page 47			
	SEO9B2	A	Open or Enclosed						420 page 53

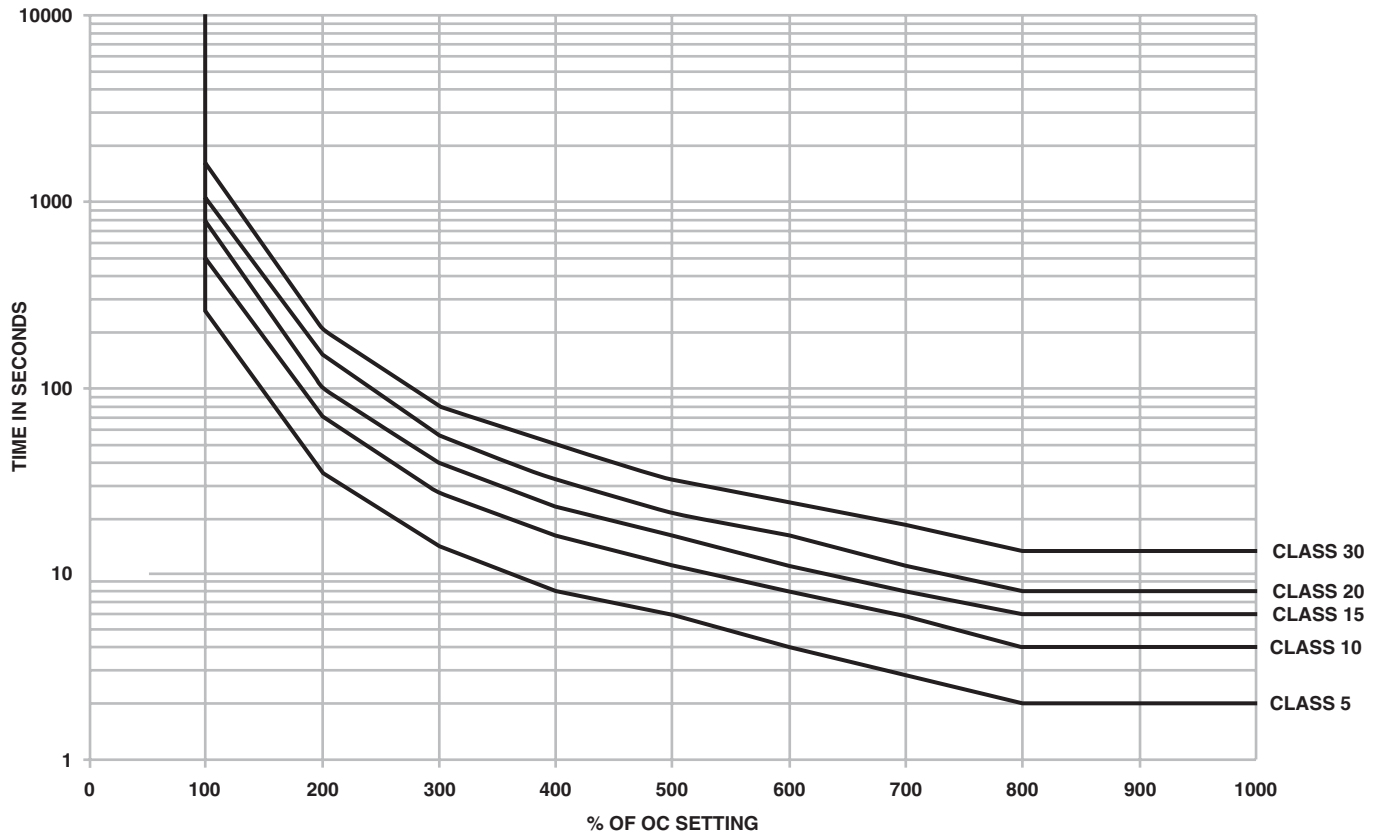
MOTOR LOGIC® Solid State Overload Relays
CHARACTERISTIC CURVE NO. 9065-0001
Class 9065 Type SS, SF, SR and ST



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Curve No. 9065TC0001
March 2000

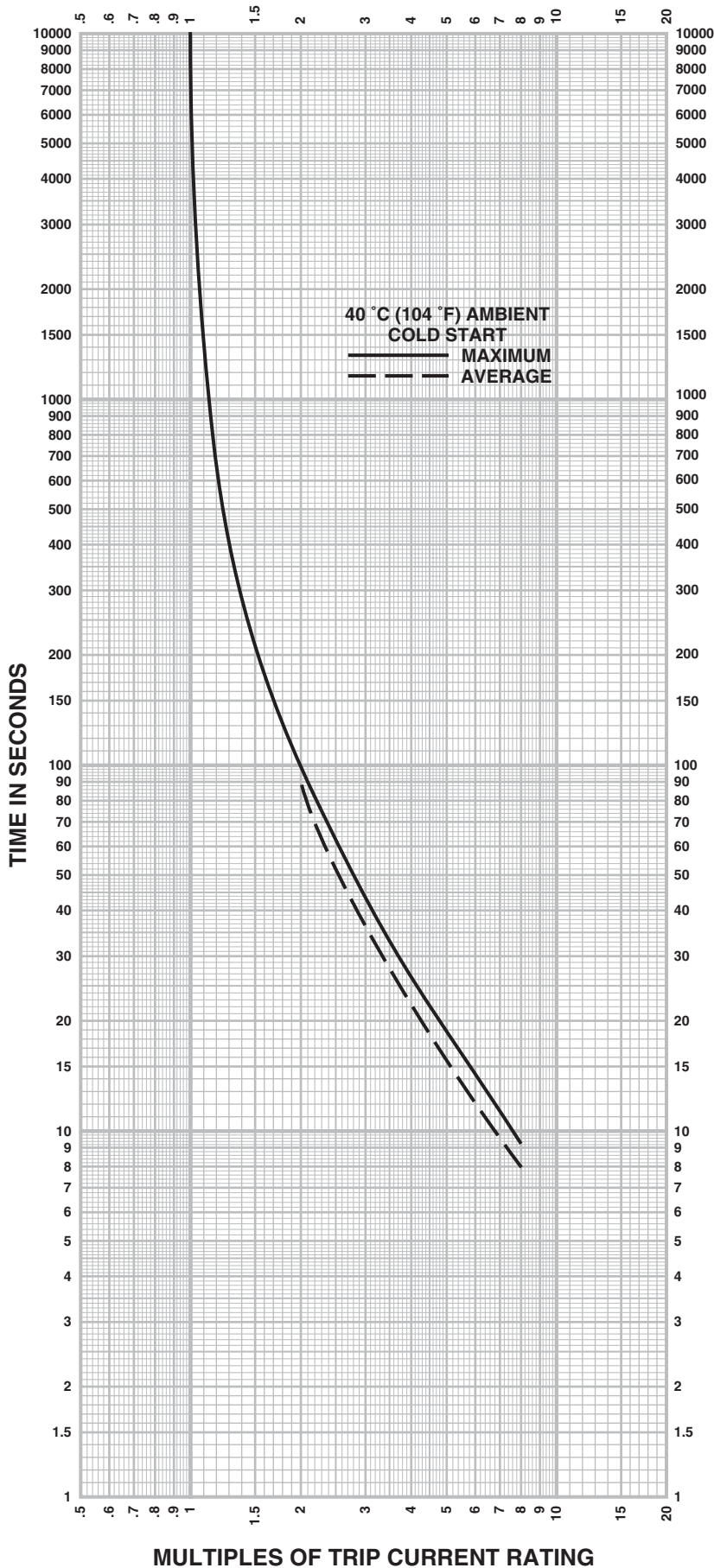
MOTOR LOGIC® PLUS Programmable Solid State Overload Relays
 CHARACTERISTIC CURVE NO. 9065-0002
 Class 9065 Type SP



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Curve No. 9065TC0002
 March 2000

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-272B

Relay Design	Melting Alloy
Thermal Unit Types	B0.44–B45

40 °C ambient cold start trip time characteristics of:

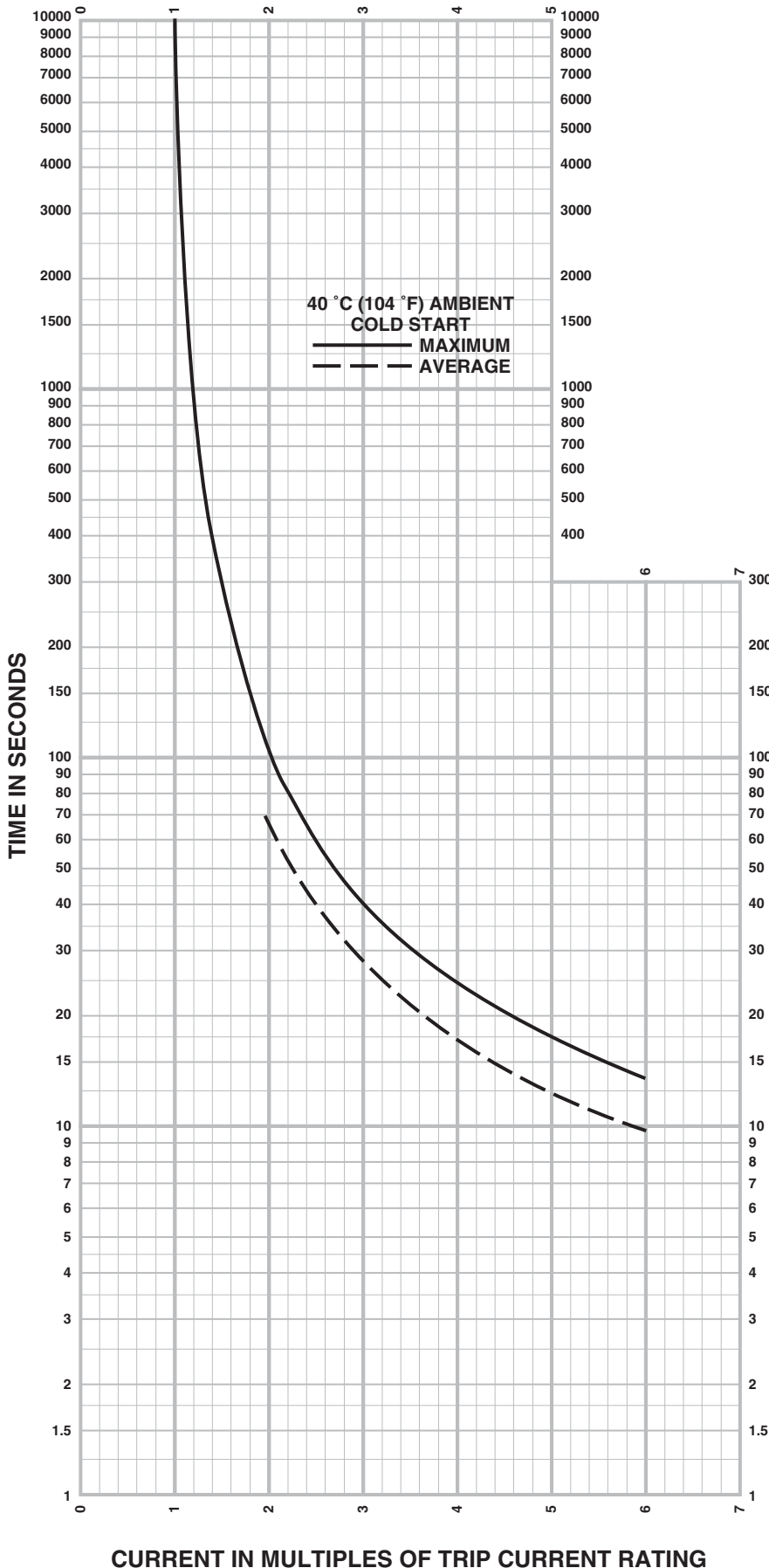
Equipment	AC Magnetic Starter
Size	0 & 1
Type	SB & SC
Series	A
Qty. of Thermal Units	1 or 2

When installed in:

- Small enclosure (Class 8536 only)
- QMB, I-Line®

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

CURRENT IN MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-273**

Relay Design	Melting Alloy
Thermal Unit Types	DD112–DD340

40 °C ambient cold start trip time characteristics of:

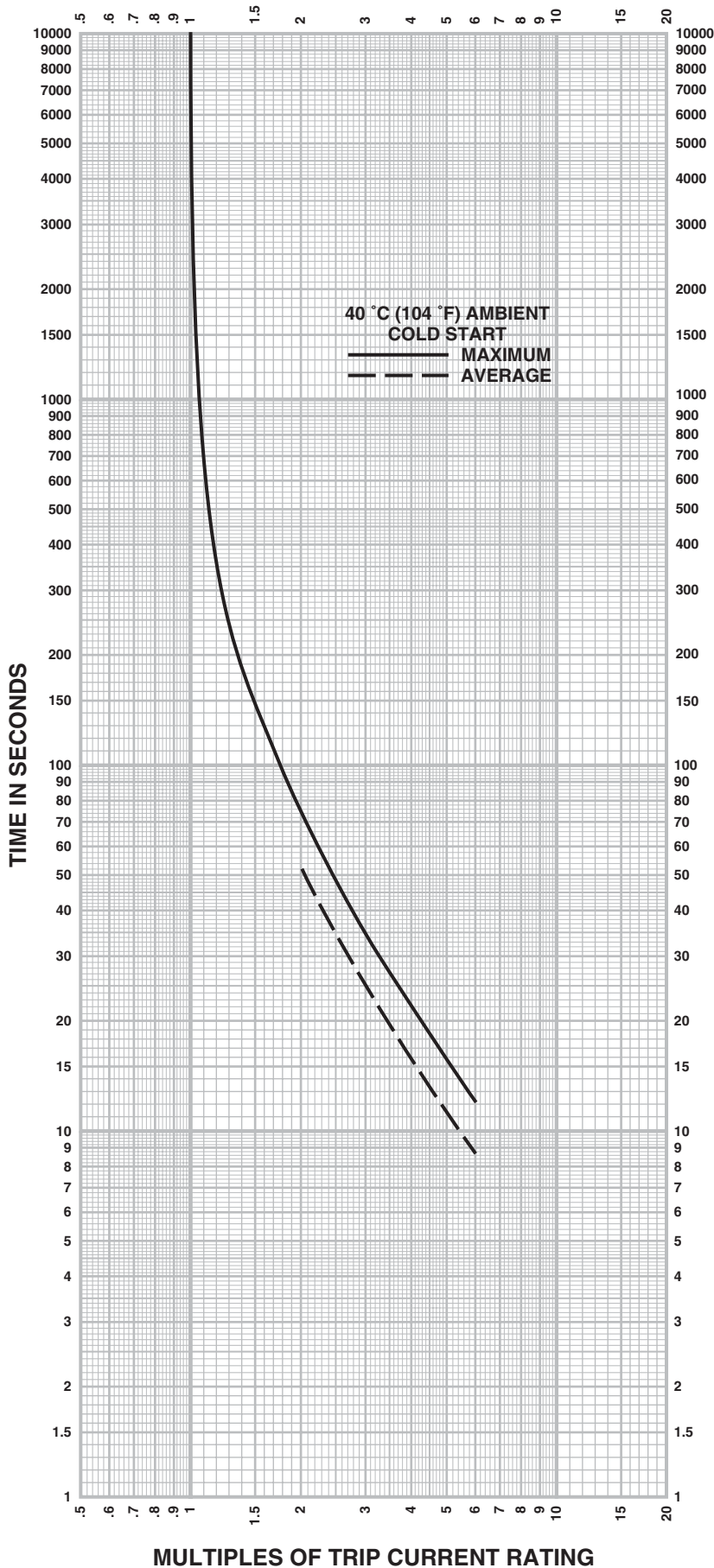
Equipment	AC Magnetic Starter
Size	5
Type	SG
Qty. of Thermal Units	3

When installed in:

- Small enclosure (Class 8536 only)
- Motor Control Center (Class 8998, 8999, QMB, or I-Line®)

Trip current rating can be determined from the instructions given with appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY TIME-CURRENT CHARACTERISTICS REFERENCE DRAWING NO. 30068-274A

Relay Design	Melting Alloy
Thermal Unit Types	DD112–DD320

40 °C ambient cold start trip time characteristics of:

Equipment	AC Magnetic Starter
Size	5
Type	SG
Series	A
Qty. of Thermal Units	3

When installed in:

- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

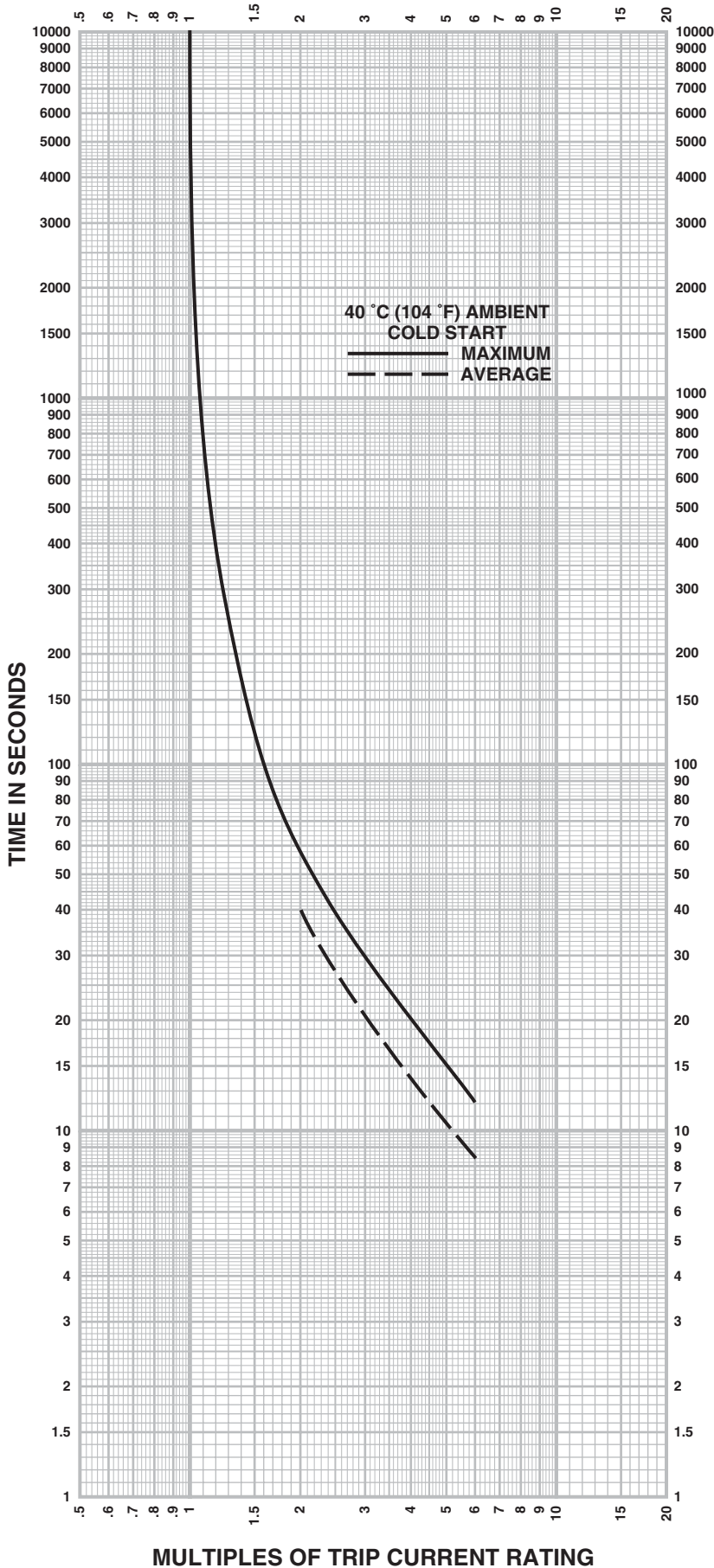
TIME IN SECONDS

TIME IN SECONDS

MULTIPLES OF TRIP CURRENT RATING



MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-275A

Relay Design	Melting Alloy
Thermal Unit Types	DD48-DD300

40 °C ambient cold start trip time characteristics of:

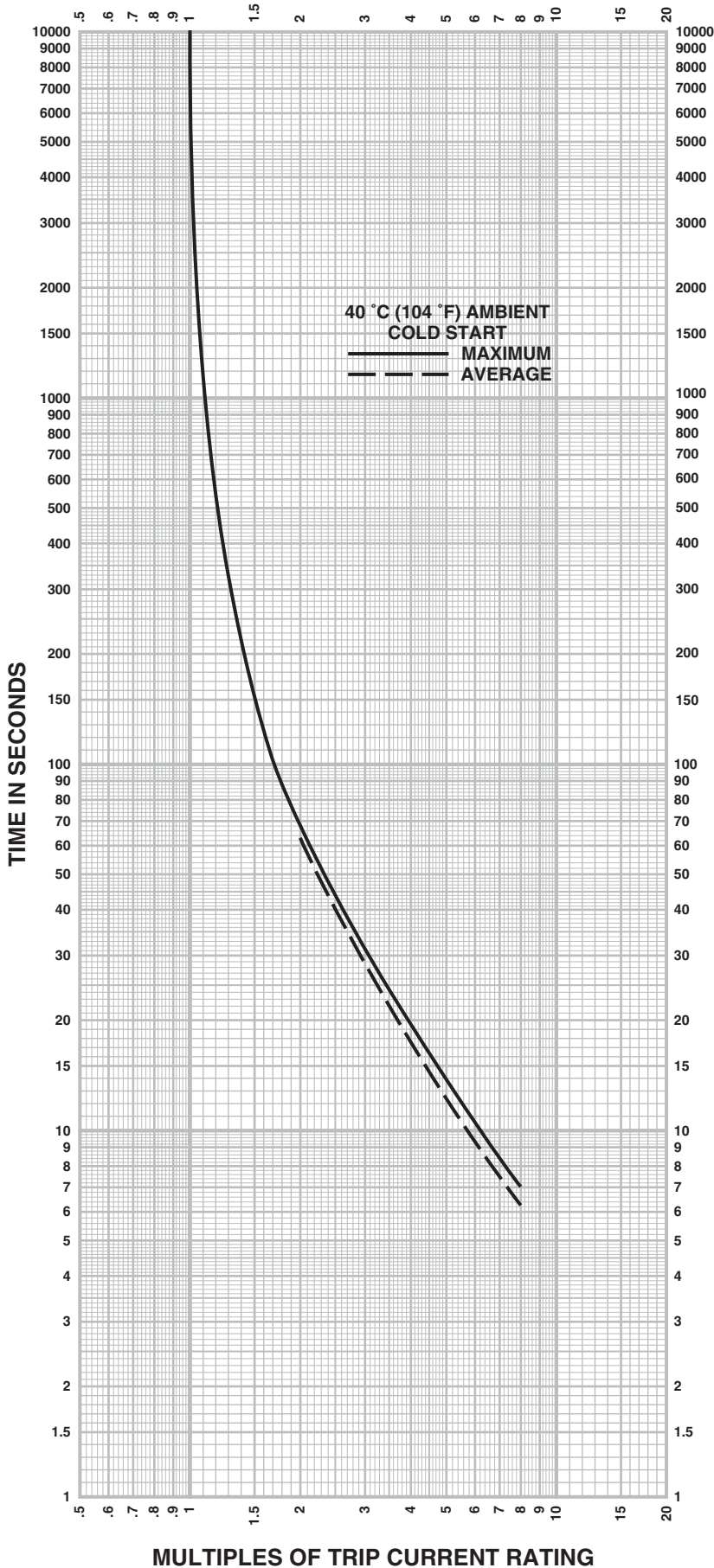
Equipment	Separate Overload Relay
Size	300 A (nominal)
Type	GG & GO
Series	A
Qty. of Thermal Units	1

When installed in:

- Small enclosure (Class 9065 only)
- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-278**

Relay Design	Melting Alloy
Thermal Unit Types	B1.16–B56

40 °C ambient cold start trip time characteristics of:

Equipment	AC Magnetic Starter
Size	1P
Type	SC
Series	A
Qty. of Thermal Units	1

When installed in:

- Small enclosure (Class 8536 only)
- Hinged door and all other (larger) enclosures

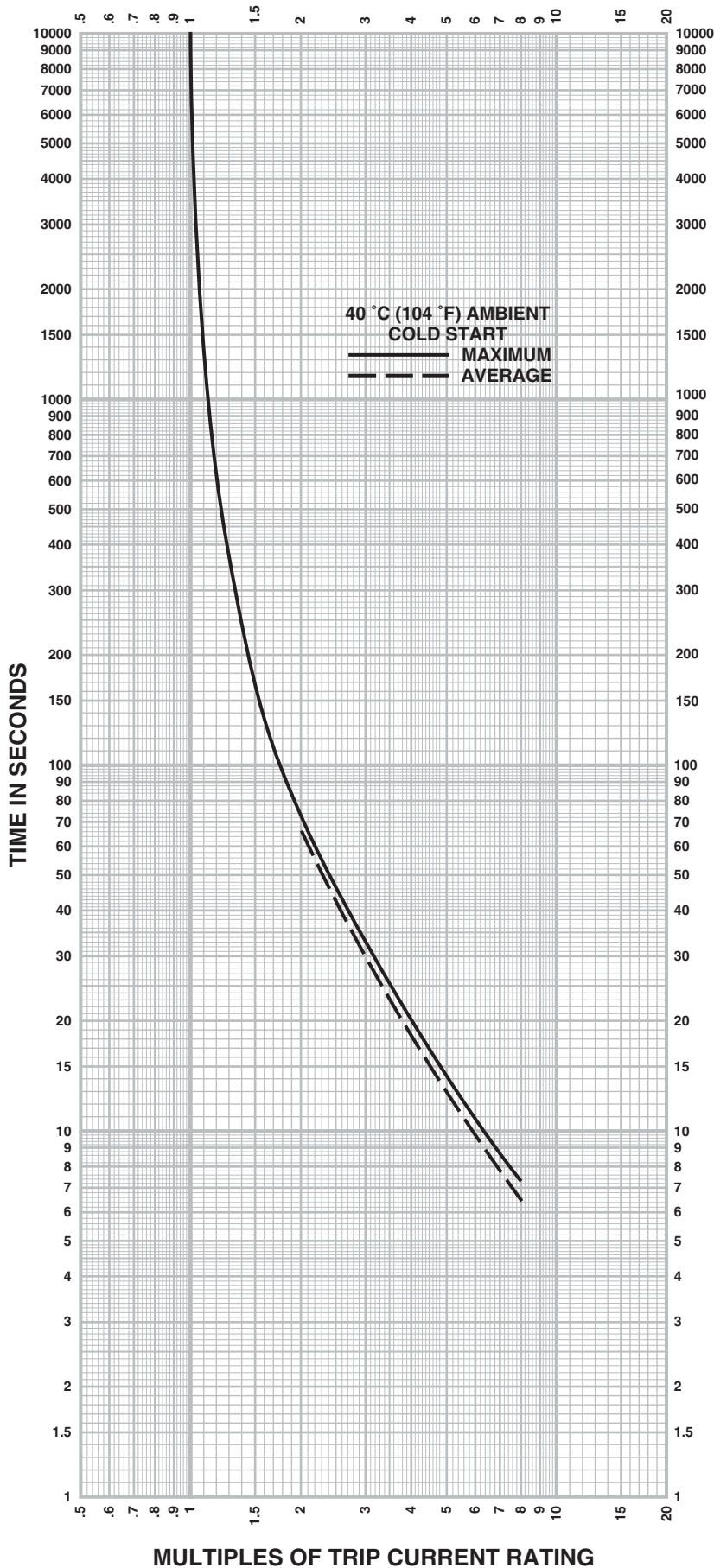
The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

TIME IN SECONDS

TIME IN SECONDS

MULTIPLES OF TRIP CURRENT RATING

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-279**

Relay Design	Melting Alloy
Thermal Unit Types	B0.44–B50

40 °C ambient cold start trip time characteristics of:

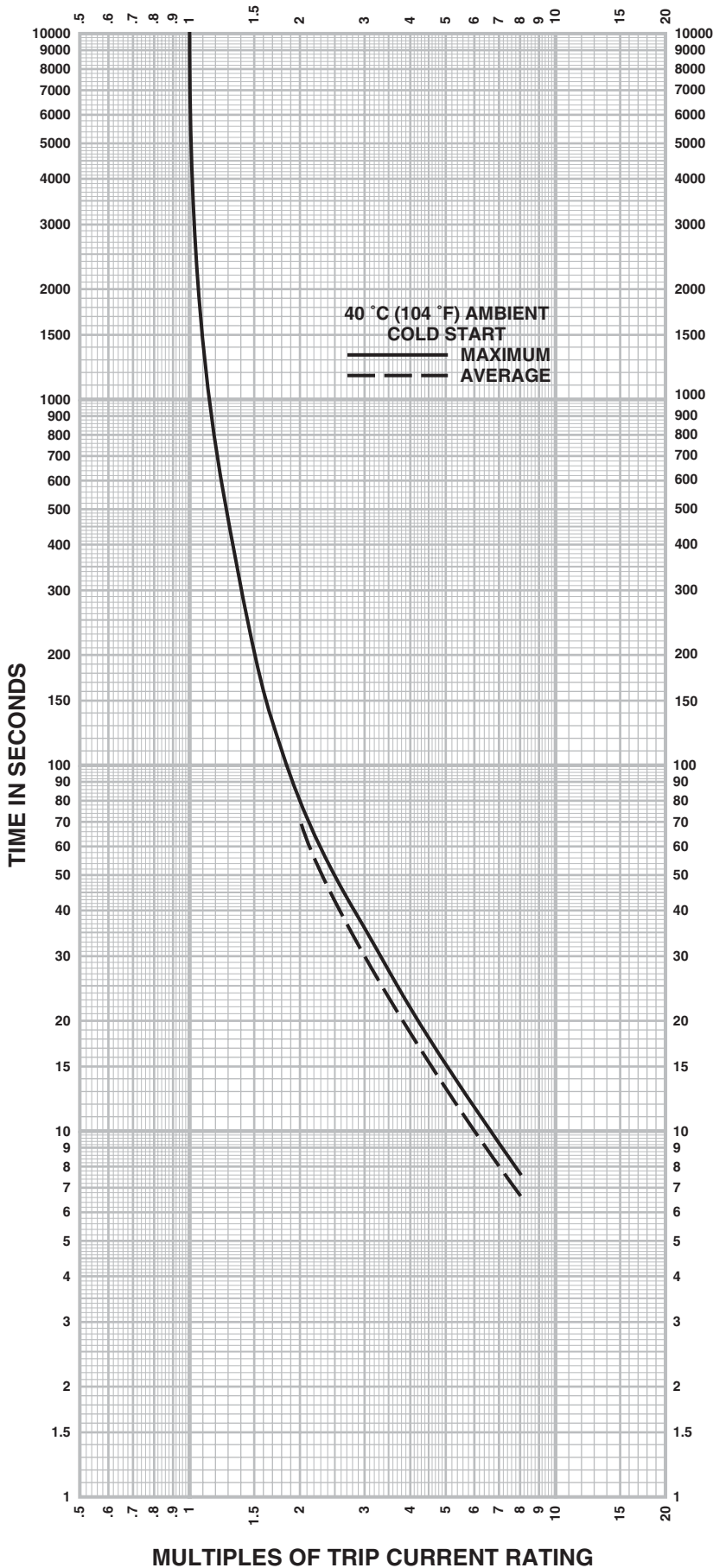
Equipment	AC Manual Starter
Size	M-0, M-1, M-1P
Type	M & T
Series	A
Qty. of Thermal Units	1

When installed in:

- Small enclosure (Class 2510 only)

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-280A

Relay Design	Melting Alloy
Thermal Unit Types	B4.85-B70

40 °C ambient cold start trip time characteristics of:

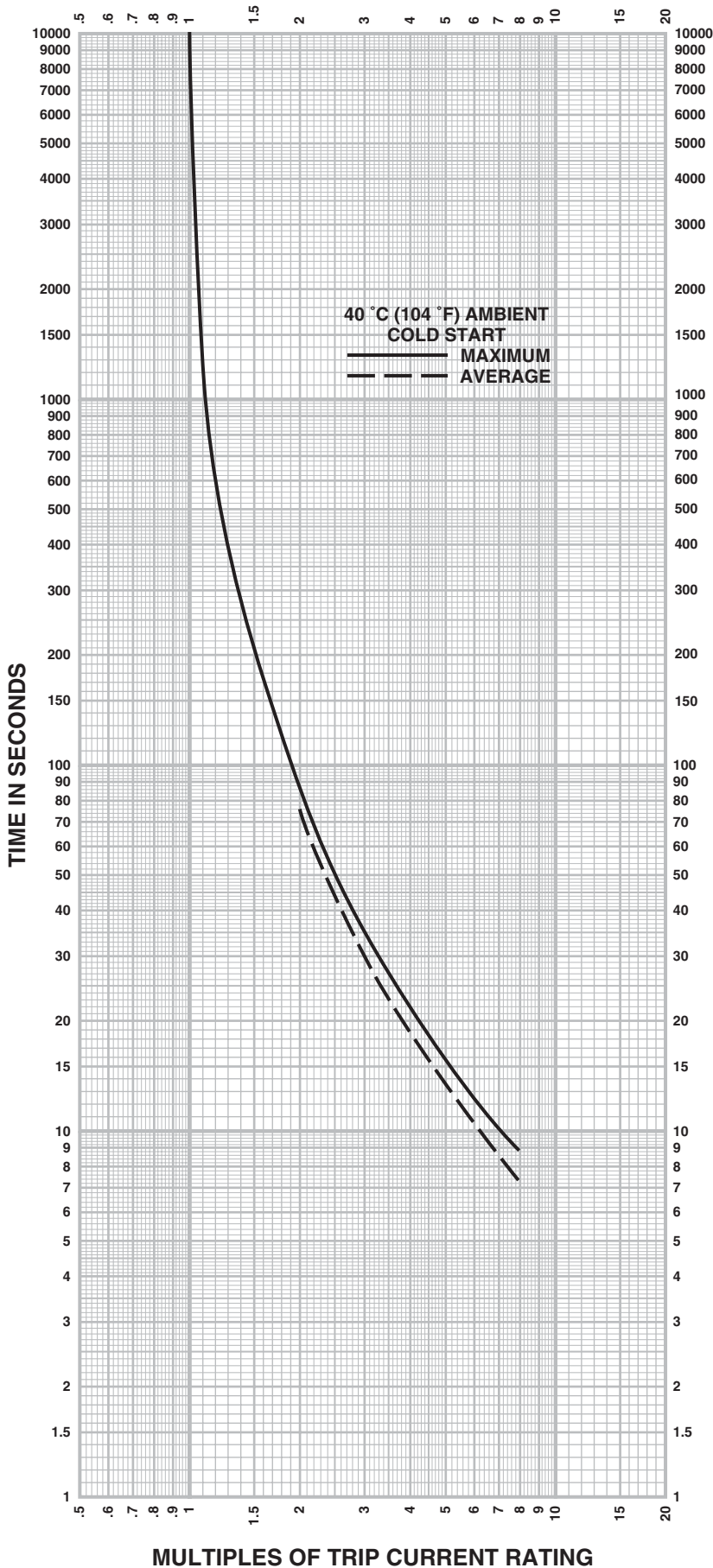
Equipment	AC Magnetic Starter
Size	2
Type	SD
Series	A
Qty. of Thermal Units	1 or 2

When installed in:

- Small enclosure (Class 8536 only)
- QMB, I-Line®

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



MULTIPLES OF TRIP CURRENT RATING

OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-299

Relay Design	Melting Alloy
Thermal Unit Types	CC20.9-CC196

40 °C ambient cold start trip time characteristics of:

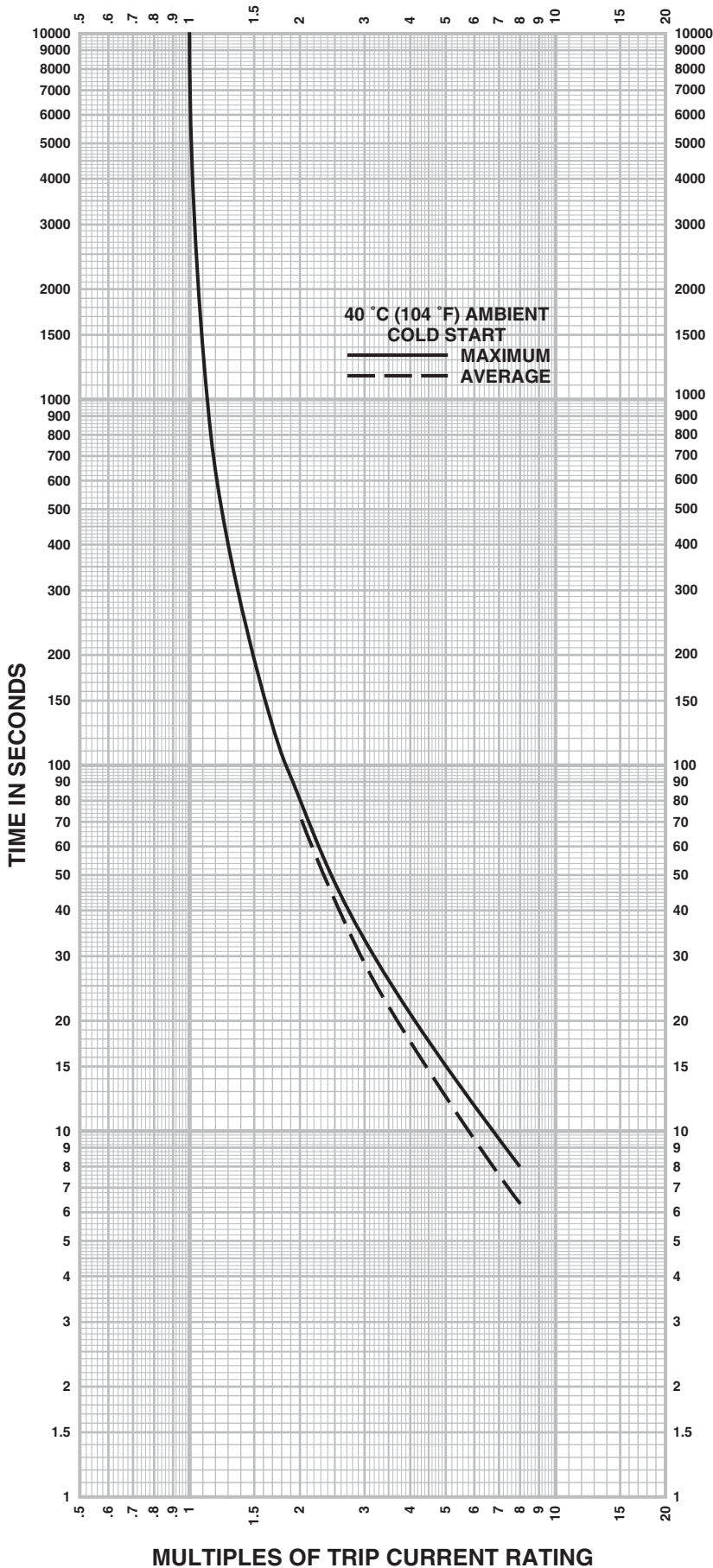
Equipment	AC Magnetic Starter
Size	3
Type	SE
Series	A
Qty. of Thermal Units	3

When installed in:

- Small enclosure (Class 8536 only)
- Motor Control Center (Class 8998, 8999, QMB, or I-Line®)

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-300**

Relay Design	Melting Alloy
Thermal Unit Types	CC20.9-CC180

40 °C ambient cold start trip time characteristics of:

Equipment	AC Magnetic Starter
Size	3
Type	SE
Series	A
Qty. of Thermal Units	3

When installed in:

- Hinged door and all other (larger) enclosures

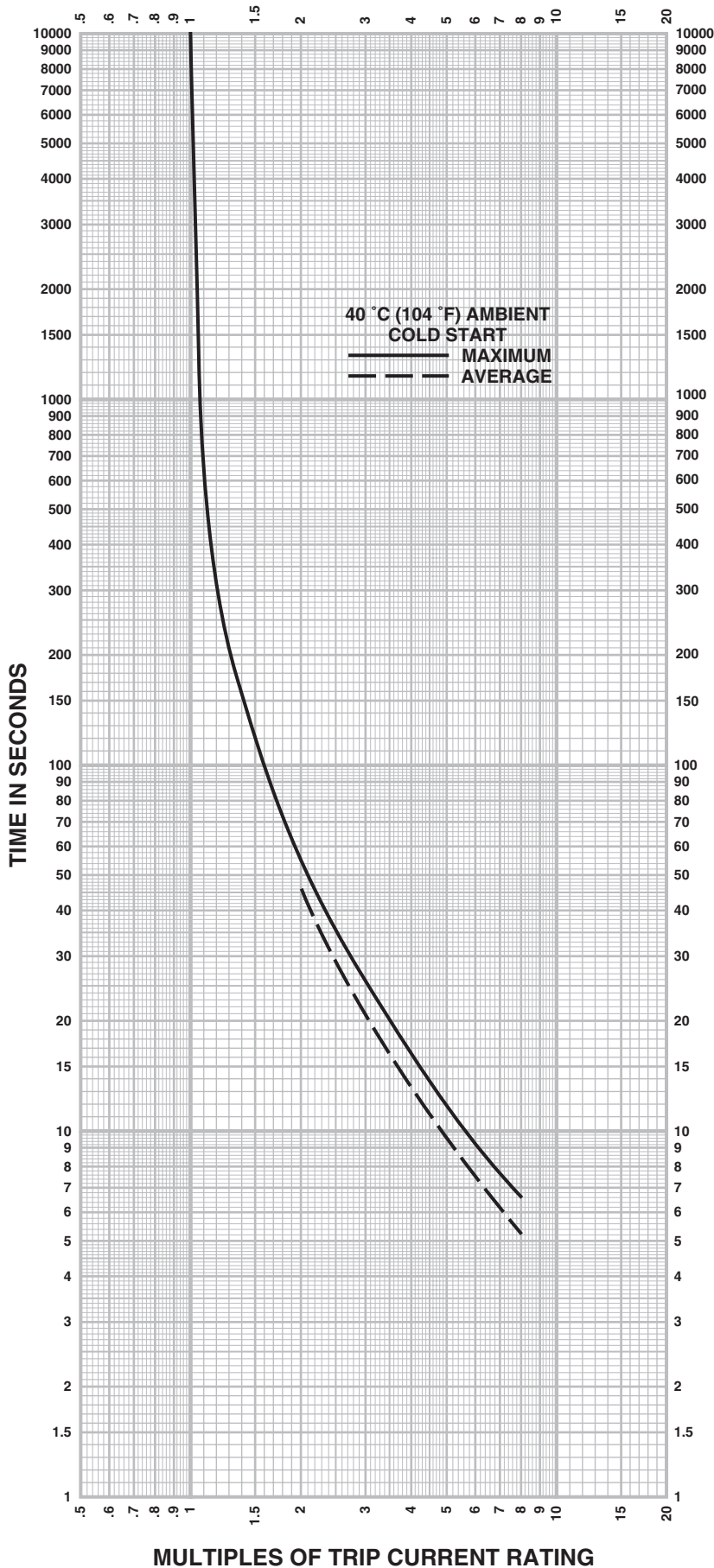
The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

TIME IN SECONDS

TIME IN SECONDS

MULTIPLES OF TRIP CURRENT RATING

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY TIME-CURRENT CHARACTERISTICS REFERENCE DRAWING NO. 30068-301A

Relay Design	Melting Alloy
Thermal Unit Types	CC20.9-CC112

40 °C ambient cold start trip time characteristics of:

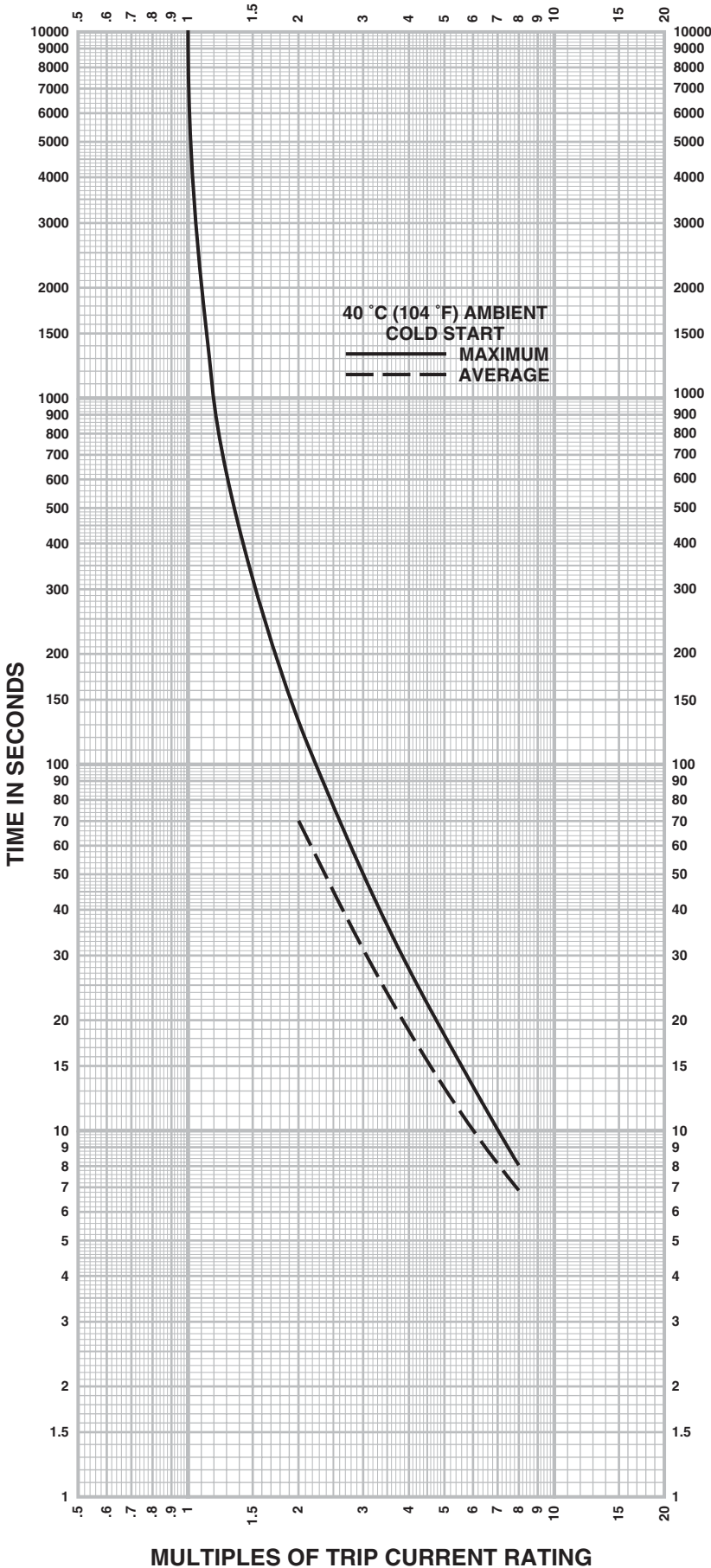
Equipment	Separate Overload Relay
Size	100 A (nominal)
Type	SEO
Series	A
Qty. of Thermal Units	3

When installed in:

- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-302**

Relay Design	Melting Alloy
Thermal Unit Types	CC64.3-CC219

40 °C ambient cold start trip time characteristics of:

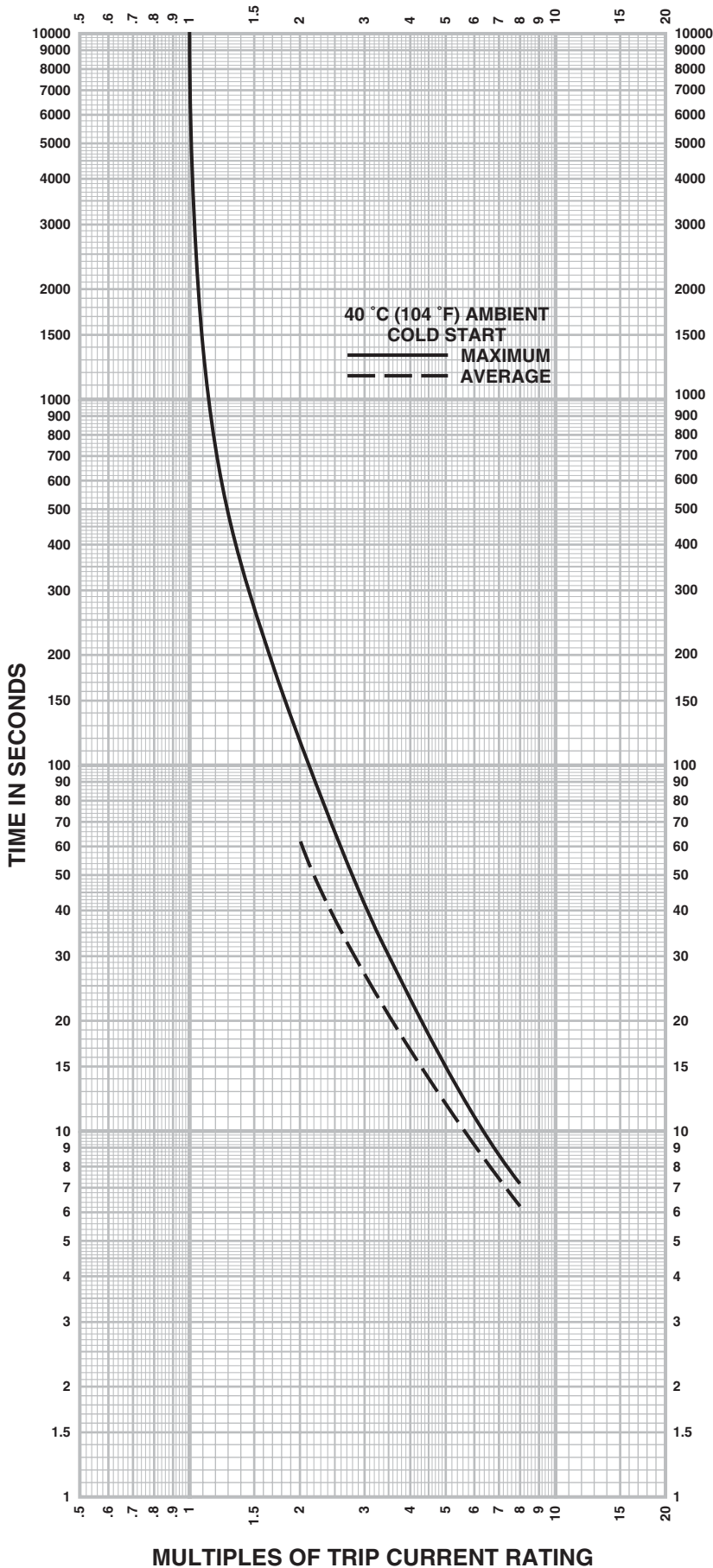
Equipment	AC Magnetic Starter
Size	4
Type	SF
Series	A
Qty. of Thermal Units	3

When installed in:

- Small enclosure (Class 8536 only)
- Motor Control Center (Class 8998, 8999, QMB, or I-Line®)

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY TIME-CURRENT CHARACTERISTICS REFERENCE DRAWING NO. 30068-303

Relay Design	Melting Alloy
Thermal Unit Types	CC64.3-CC196

40 °C ambient cold start trip time characteristics of:

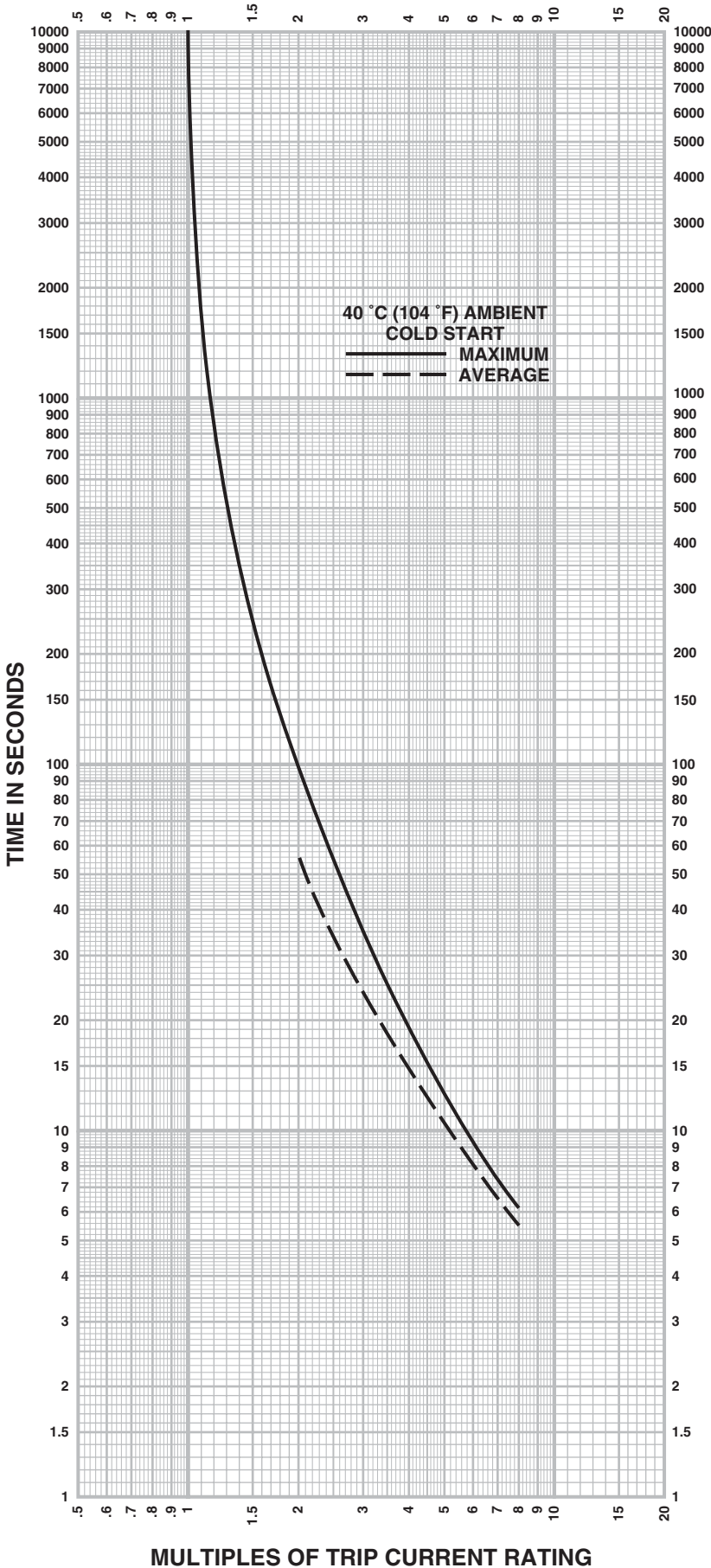
Equipment	AC Magnetic Starter
Size	4
Type	SF
Series	A
Qty. of Thermal Units	3

When installed in:

- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-304**

Relay Design	Melting Alloy
Thermal Unit Types	CC64.3-CC196

40 °C ambient cold start trip time characteristics of:

Equipment	Separate Overload Relay
Size	150 A (nominal)
Type	SEO
Series	A
Qty. of Thermal Units	3

When installed in:

- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

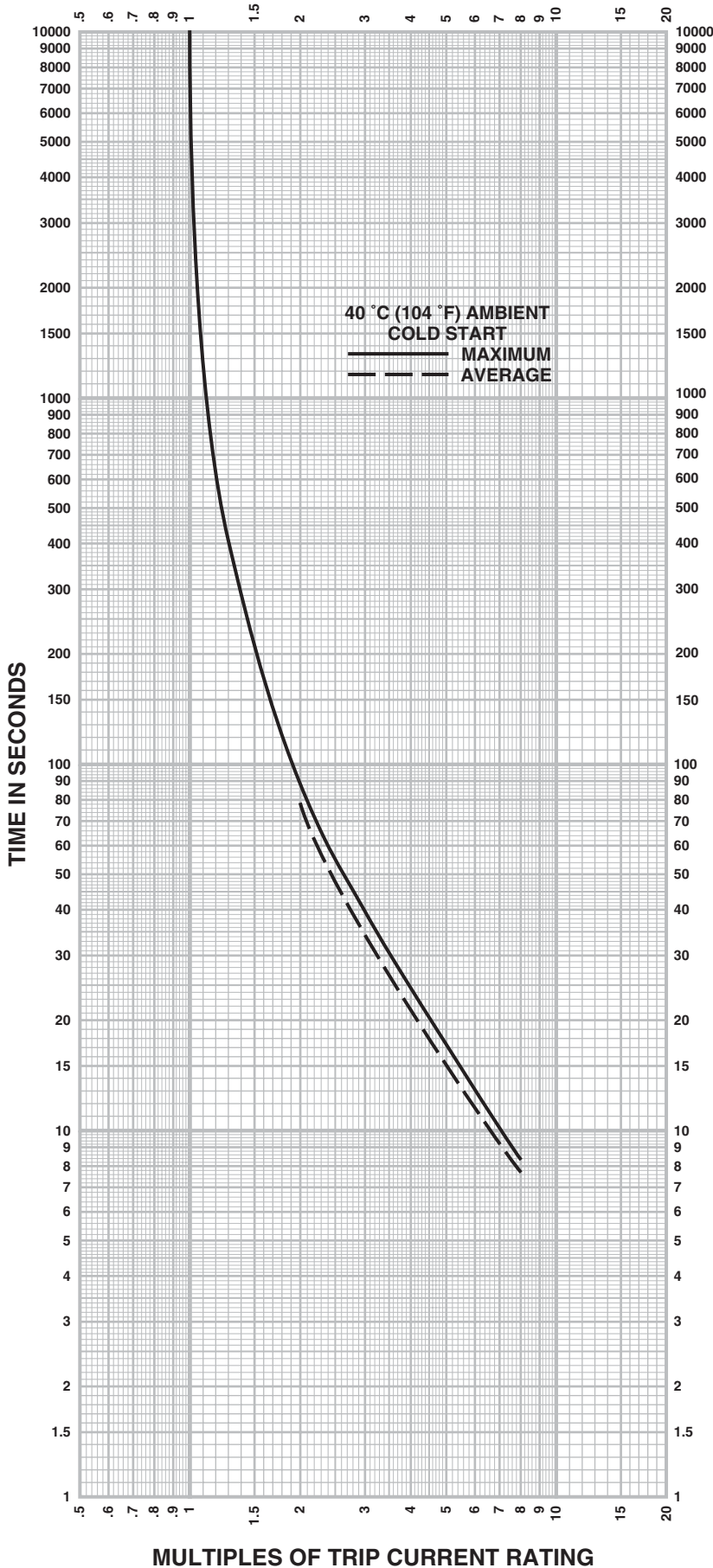
TIME IN SECONDS

TIME IN SECONDS

MULTIPLES OF TRIP CURRENT RATING



MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-310A

Relay Design	Melting Alloy
Thermal Unit Types	B0.44–B40

40 °C ambient cold start trip time characteristics of:

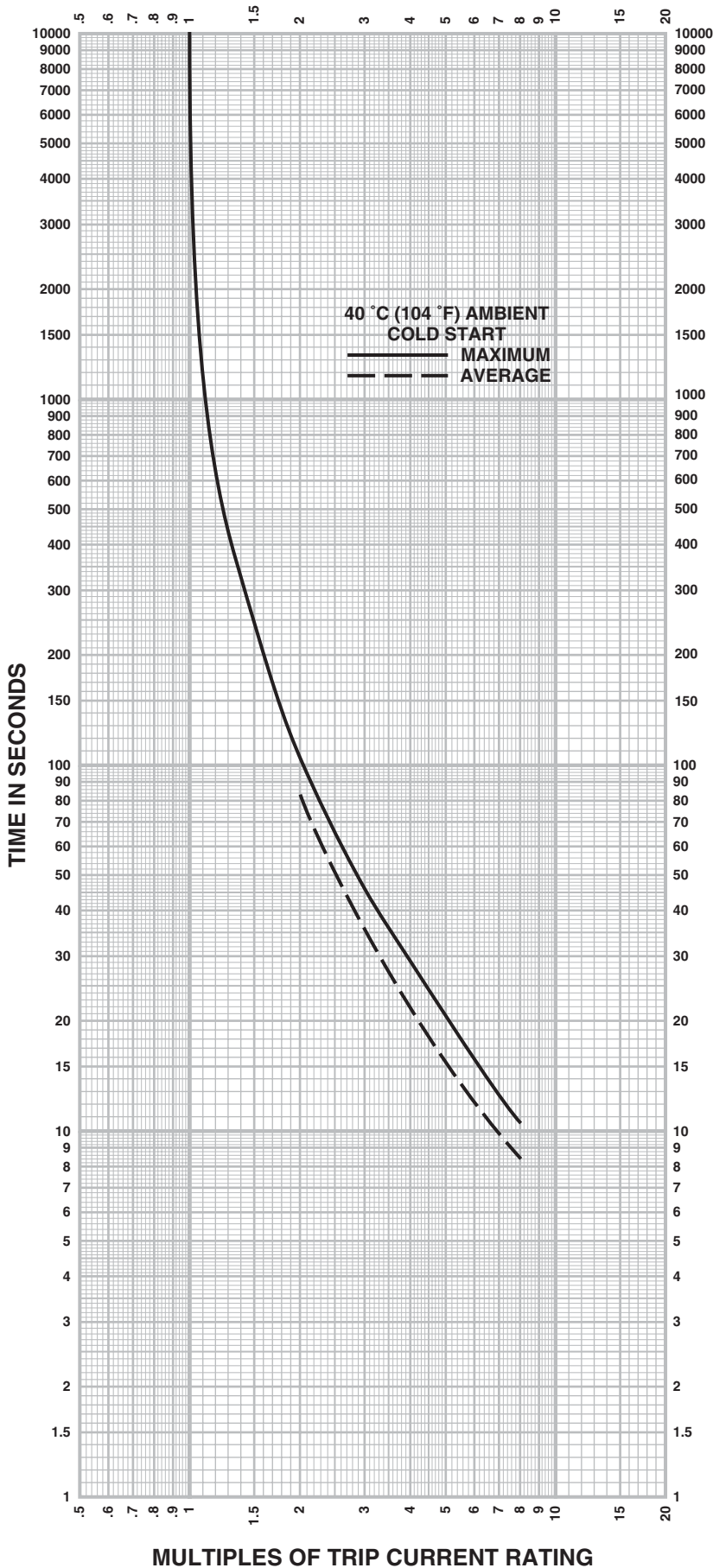
Equipment	AC Magnetic Starter
Size	0 & 1
Type	SB & SC
Series	A
Qty. of Thermal Units	1 or 2

When installed in:

- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



MULTIPLES OF TRIP CURRENT RATING

OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-311A

Relay Design	Melting Alloy
Thermal Unit Types	B0.44–B40

40 °C ambient cold start trip time characteristics of:

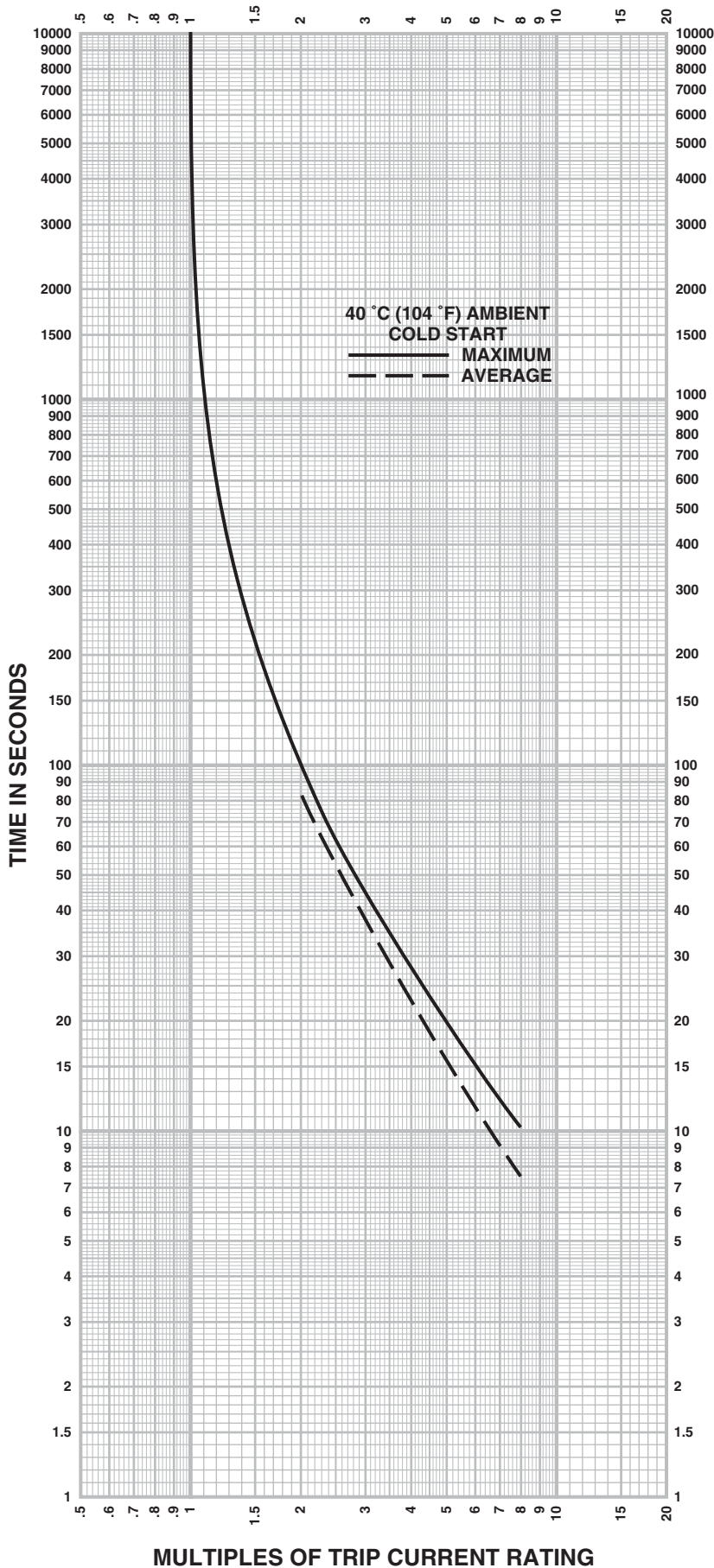
Equipment	Separate Overload Relay
Size	30 A (nominal)
Type	SEG & SEO
Series	A
Qty. of Thermal Units	3

When installed in:

- Small enclosure (Class 9065 only)
- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-312A**

Relay Design	Melting Alloy
Thermal Unit Types	B0.44–B45

40 °C ambient cold start trip time characteristics of:

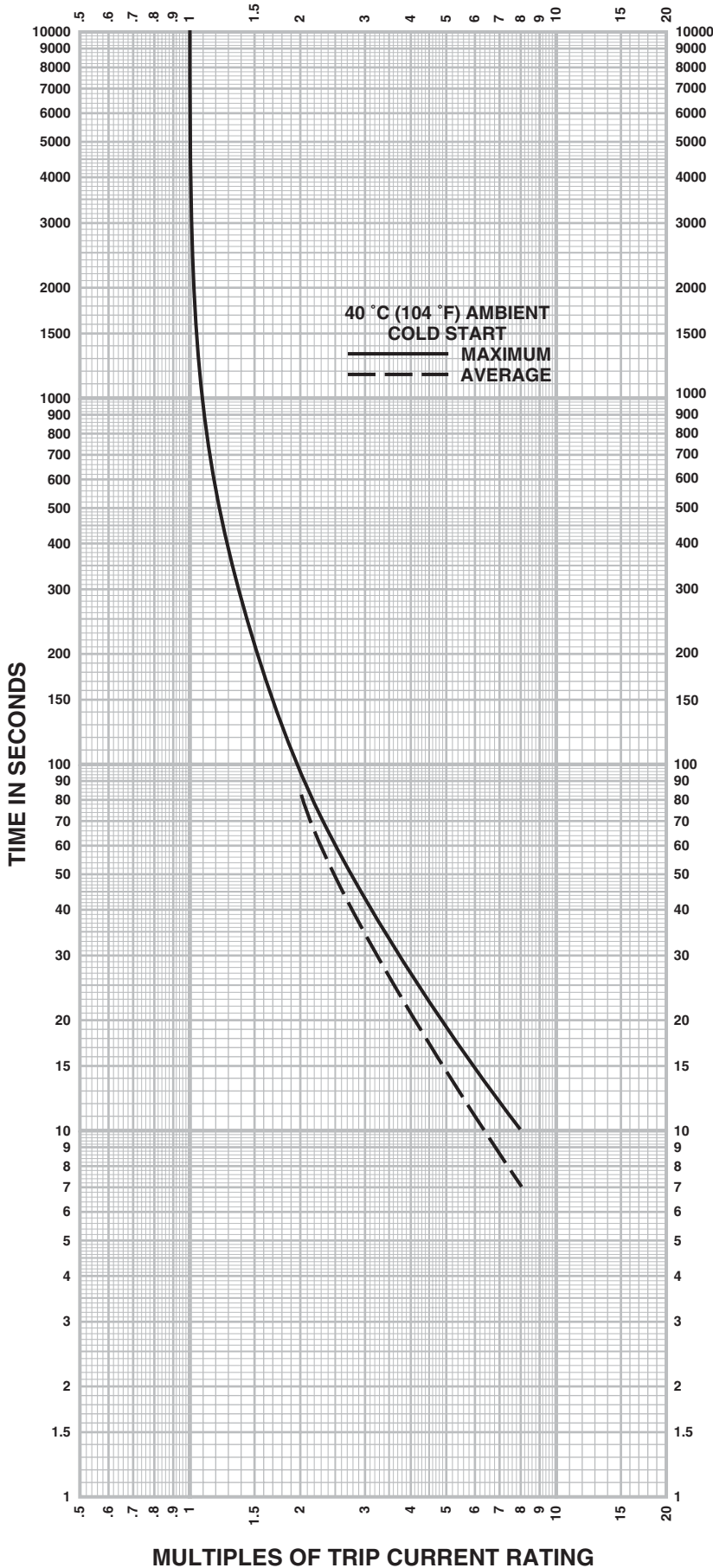
Equipment	AC Manual Starter
Size	M-0 & M-1
Type	M & T
Series	A
Qty. of Thermal Units	3

When installed in:

- Small enclosure (Class 2510 only)

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-313A

Relay Design	Melting Alloy
Thermal Unit Types	B0.44–B45

40 °C ambient cold start trip time characteristics of:

Equipment	AC Manual Starter
Size	M-0 & M-1
Type	M & T
Series	A
Qty. of Thermal Units	6

When installed in:

- Small enclosure (Class 2511, 2512 only)

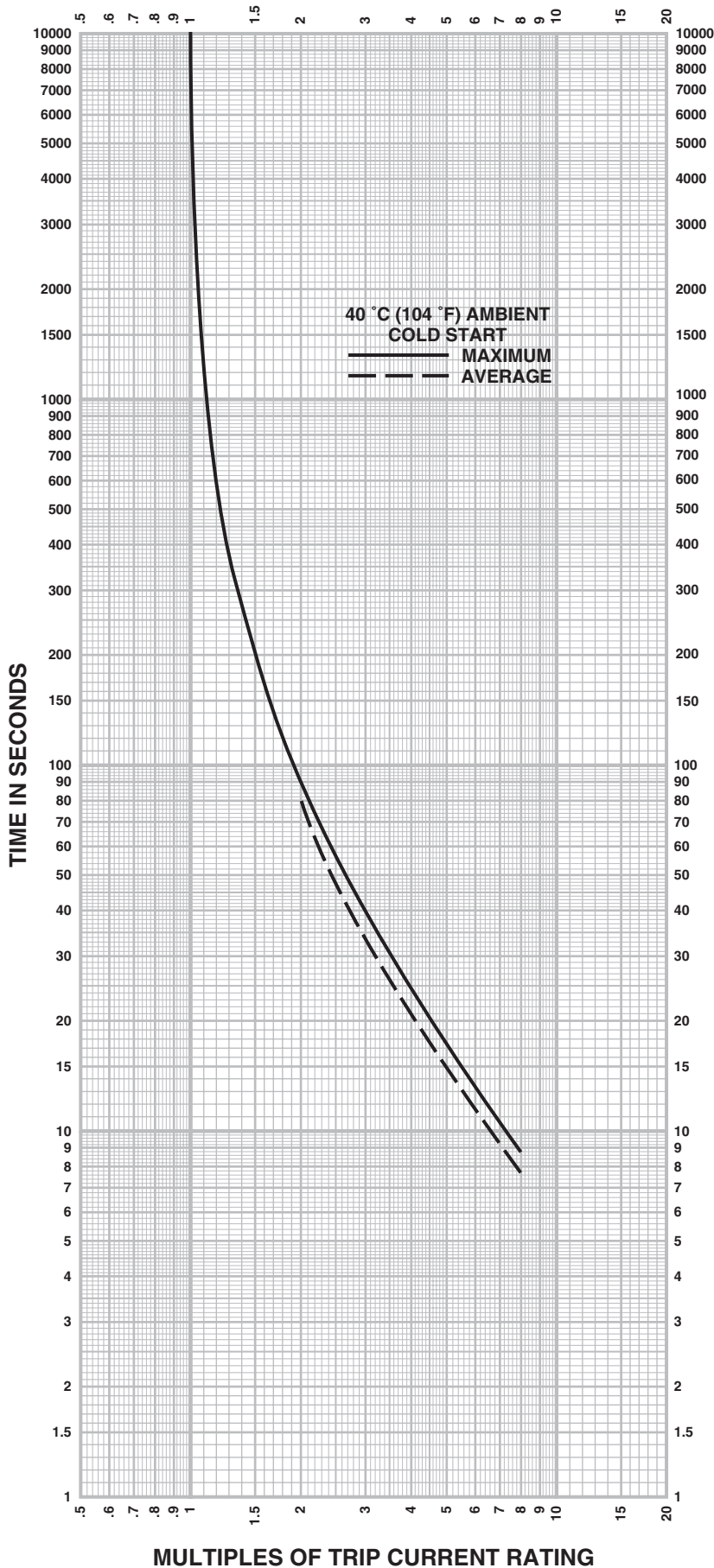
The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

TIME IN SECONDS

TIME IN SECONDS

MULTIPLES OF TRIP CURRENT RATING

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-314A**

Relay Design	Melting alloy
Thermal Unit Types	B0.44–B11.5

40 °C ambient cold start trip time characteristics of:

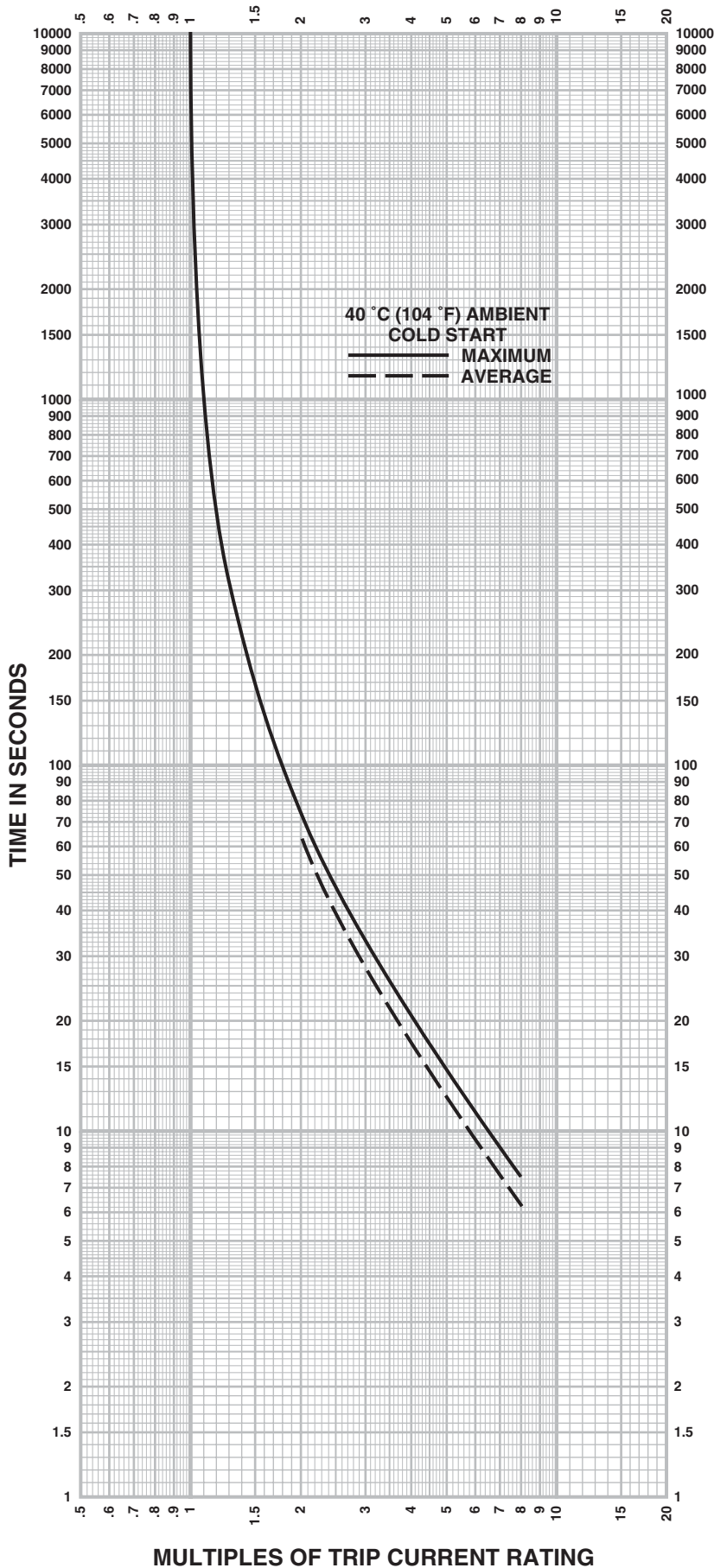
Equipment	Class 8736 Reversing Starter
Size	00
Type	SA
Series	A
Qty. of Thermal Units	1 or 2

When installed in:

- Small enclosure (Class 8736 only)
- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY TIME-CURRENT CHARACTERISTICS REFERENCE DRAWING NO. 30068-315A

Relay Design	Melting Alloy
Thermal Unit Types	B4.85–B70

40 °C ambient cold start trip time characteristics of:

Equipment	AC Magnetic Starter
Size	2
Type	SD
Series	A
Qty. of Thermal Units	1 or 2

When installed in:

- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

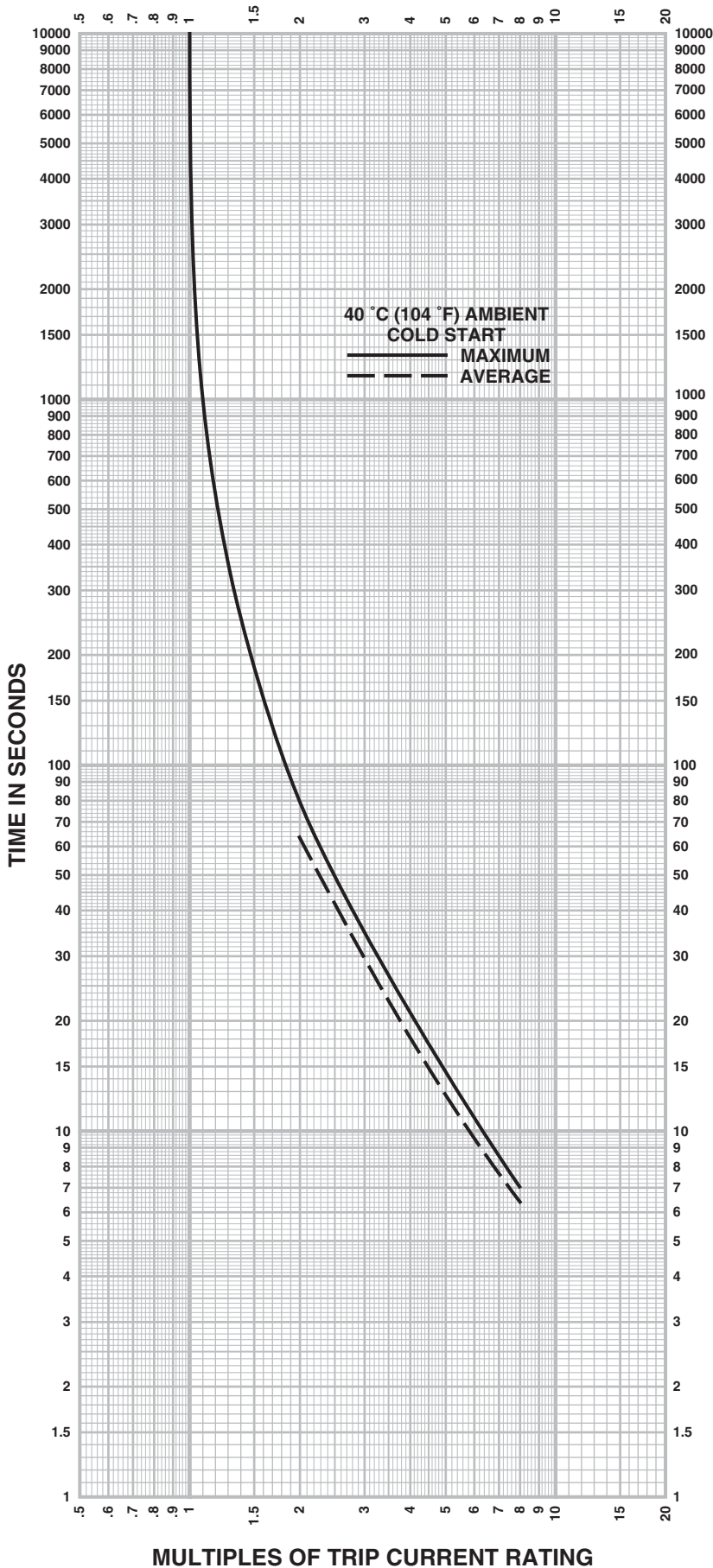
TIME IN SECONDS

TIME IN SECONDS

MULTIPLES OF TRIP CURRENT RATING



MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY TIME-CURRENT CHARACTERISTICS REFERENCE DRAWING NO. 30068-316A

Relay Design	Melting Alloy
Thermal Unit Types	B4.85–B62

40 °C ambient cold start trip time characteristics of:

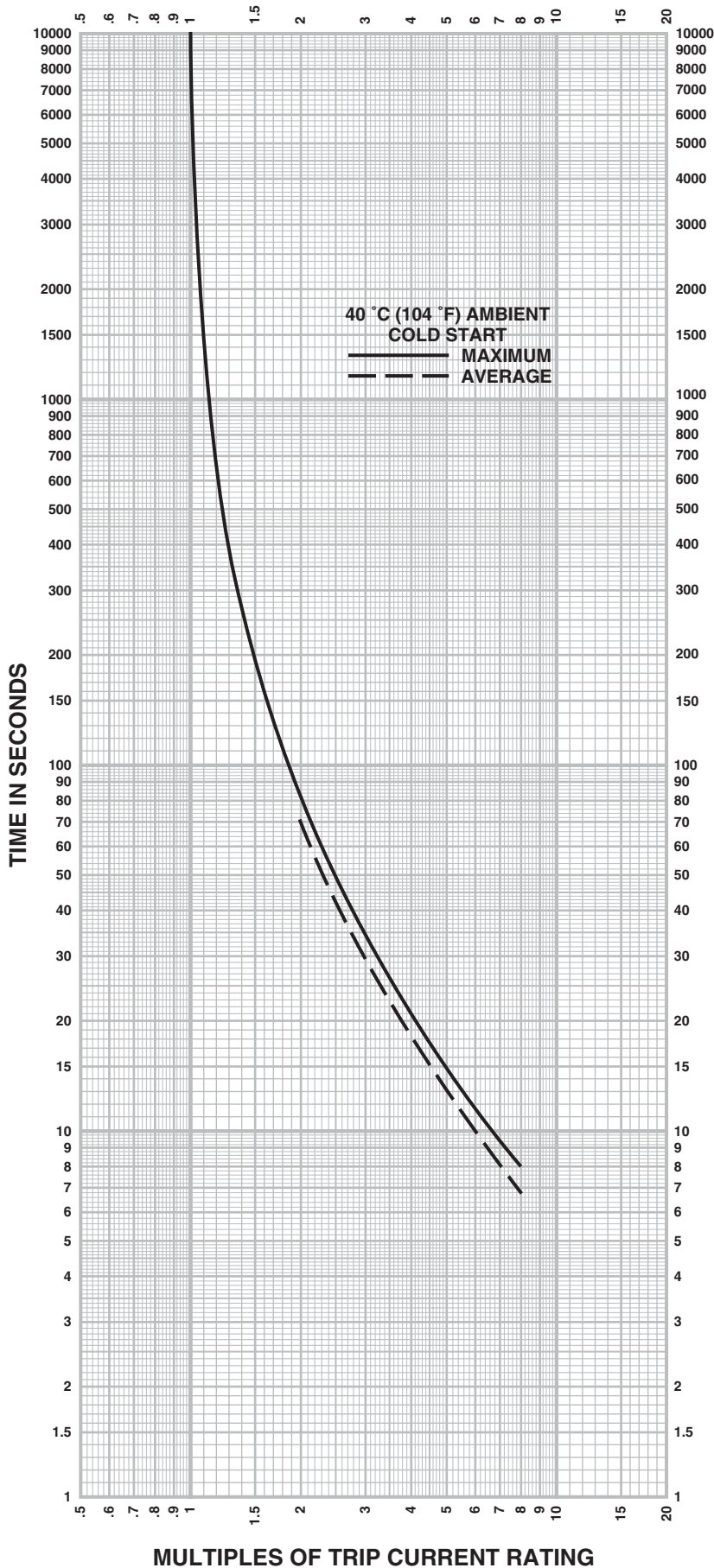
Equipment	Separate Overload Relay
Size	50 A (nominal)
Type	SEG & SEO
Series	A
Qty. of Thermal Units	3

When installed in:

- Small enclosure (Class 9065 only)
- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



MULTIPLES OF TRIP CURRENT RATING

OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-317A

Relay Design	Melting Alloy
Thermal Unit Types	CC20.9-CC196

40 °C ambient cold start trip time characteristics of:

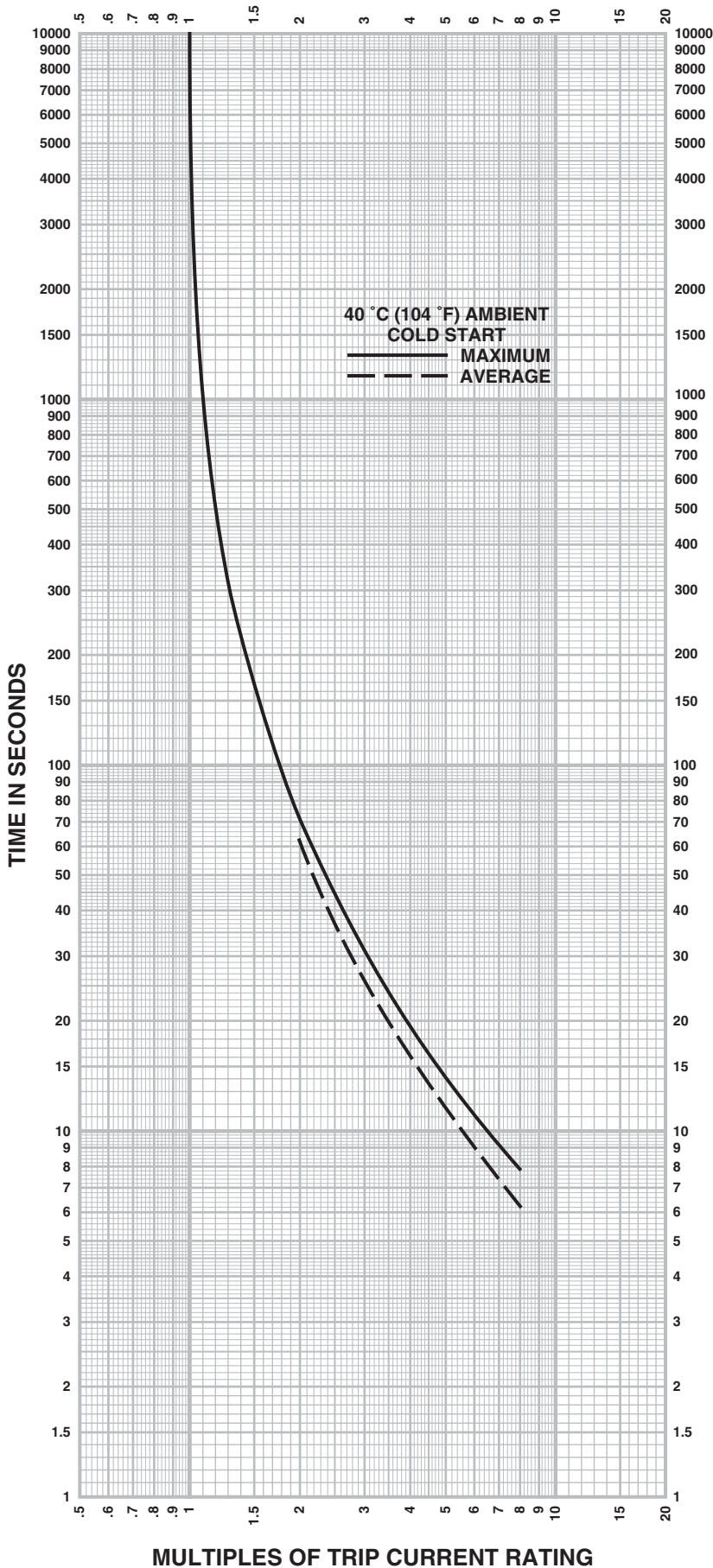
Equipment	AC Magnetic Starter
Size	3
Type	SE
Series	A
Qty. of Thermal Units	2

When installed in:

- Small enclosure (Class 8536 only)
- Motor Control Center (Class 8998, 8999, QMB, or I-Line®)

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-318A**

Relay Design	Melting Alloy
Thermal Unit Types	CC20.9-CC156

40 °C ambient cold start trip time characteristics of:

Equipment	AC Magnetic Starter
Size	3
Type	SE
Series	A
Qty. of Thermal Units	2

When installed in:

- Hinged door and all other (larger) enclosures

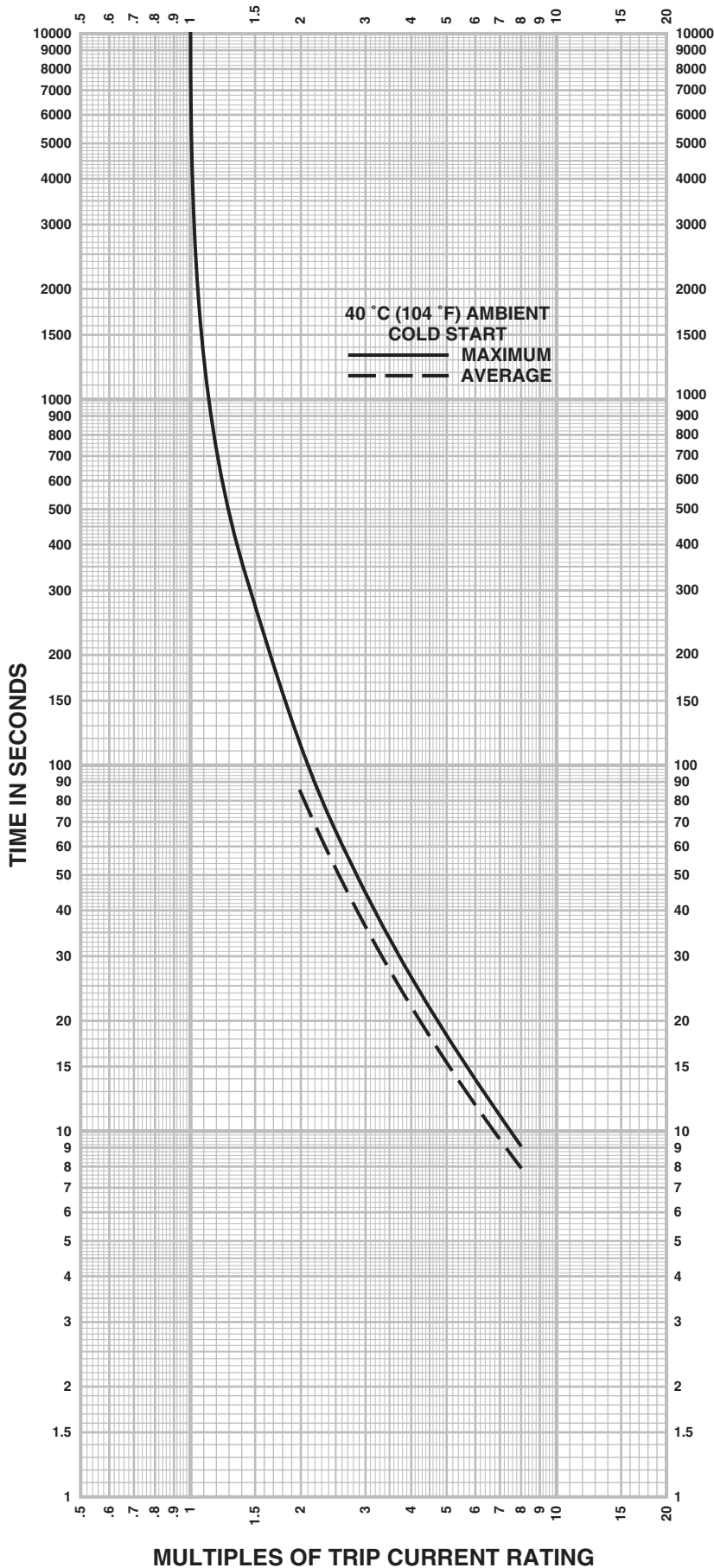
The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

TIME IN SECONDS

TIME IN SECONDS

MULTIPLES OF TRIP CURRENT RATING

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY TIME-CURRENT CHARACTERISTICS REFERENCE DRAWING NO. 30068-319

Relay Design	Melting Alloy
Thermal Unit Types	B0.44–B50

40 °C ambient cold start trip time characteristics of:

Equipment	AC Magnetic Starter
Size	1
Type	SC
Series	A
Qty. of Thermal Units	2 or 3

When installed in:

- Model 4 Motor Control Center only

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

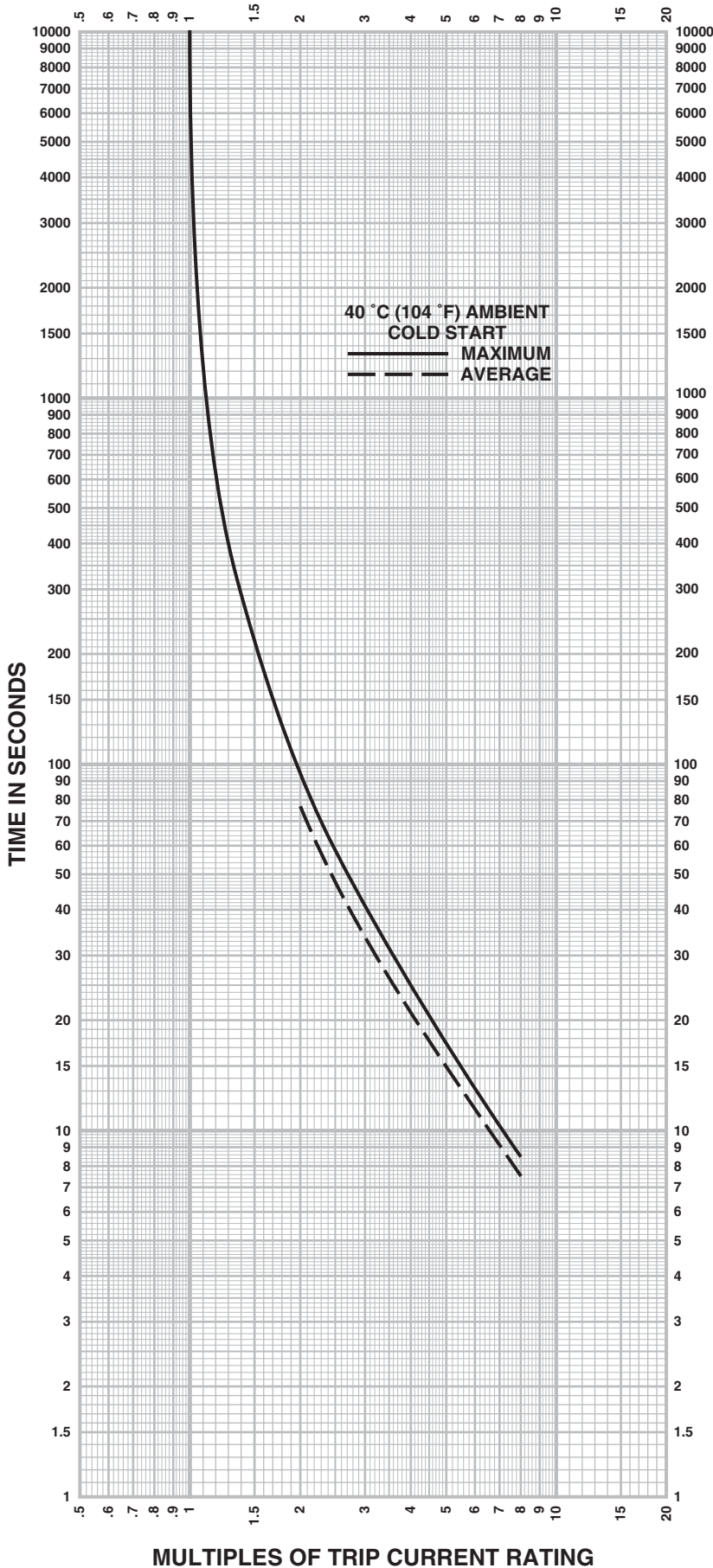
TIME IN SECONDS

TIME IN SECONDS

MULTIPLES OF TRIP CURRENT RATING



MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-320

Relay Design	Melting Alloy
Thermal Unit Types	B5.50–B88

40 °C ambient cold start trip time characteristics of:

Equipment	AC Magnetic Starter
Size	2
Type	SD
Series	A
Qty. of Thermal Units	2 or 3

When installed in:

- Model 4 Motor Control Center only

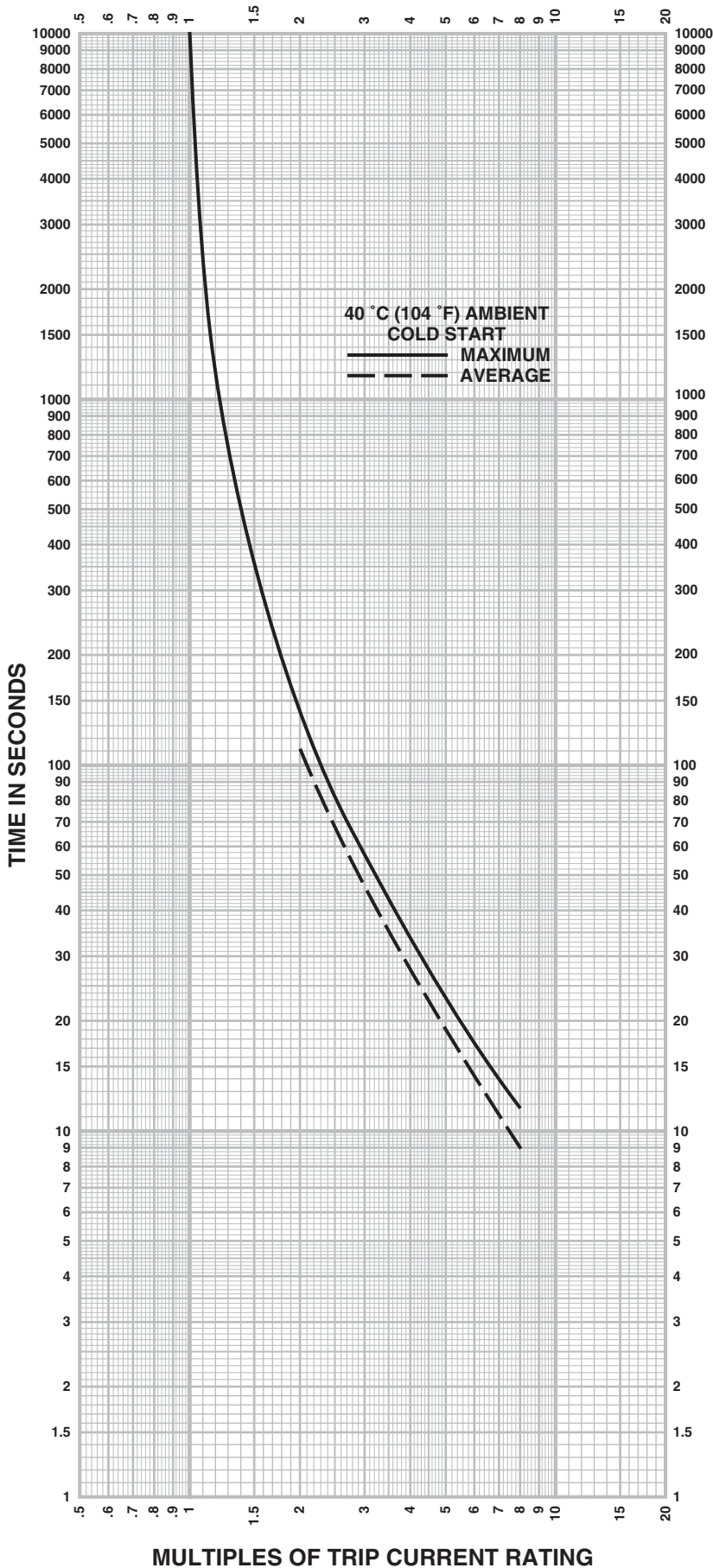
The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

TIME IN SECONDS

TIME IN SECONDS

MULTIPLES OF TRIP CURRENT RATING

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-348**

Relay Design	Melting Alloy
Thermal Unit Types	B1.30–B6.25

40 °C ambient cold start trip time characteristics of:

Equipment	AC Magnetic Starter
Size	6
Type	SH
Series	A
Qty. of Thermal Units	3

When installed in:

- Small enclosure (Class 8536 only)
- Motor Control Center (Class 8998, 8999, QMB, or I-Line®)

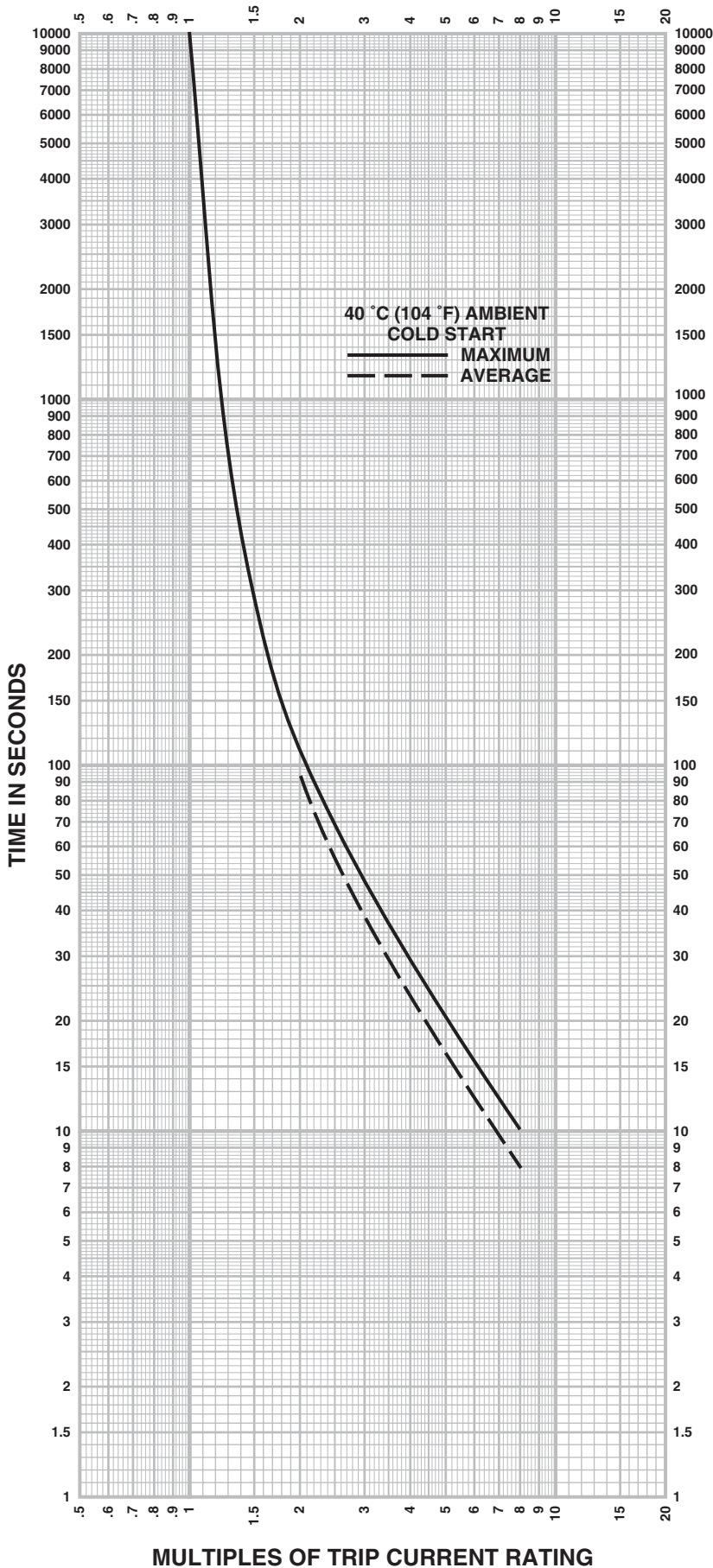
The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

TIME IN SECONDS

TIME IN SECONDS

MULTIPLES OF TRIP CURRENT RATING

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-349

Relay Design	Melting Alloy
Thermal Unit Types	B1.30–B4.85

40 °C ambient cold start trip time characteristics of:

Equipment	AC Magnetic Starter
Size	6
Type	SH
Series	A
Qty. of Thermal Units	3

When installed in:

- Hinged door and all other (larger) enclosures

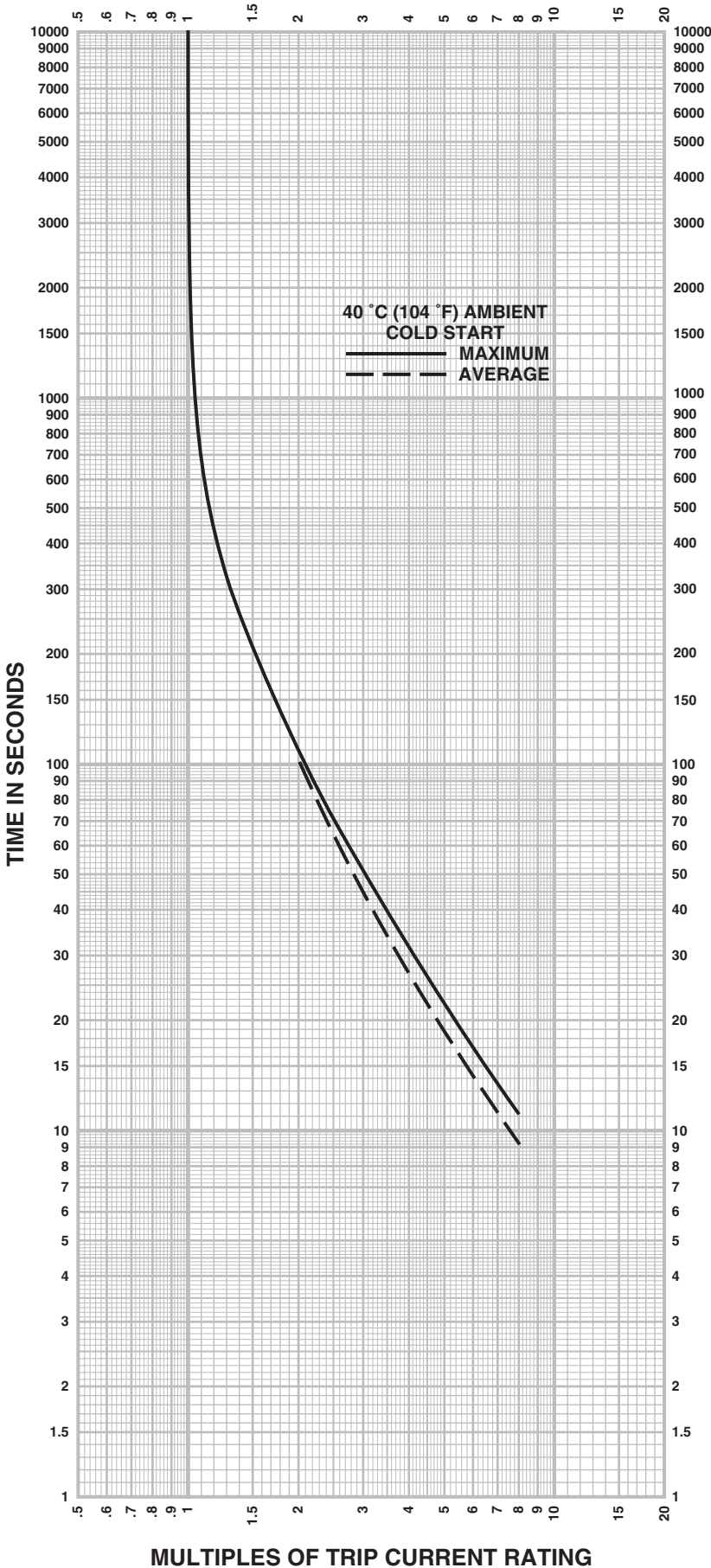
The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

TIME IN SECONDS

TIME IN SECONDS

MULTIPLES OF TRIP CURRENT RATING

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-407**

Relay Design	Melting Alloy
Thermal Unit Types	B0.44–B50

40 °C ambient cold start trip time characteristics of:

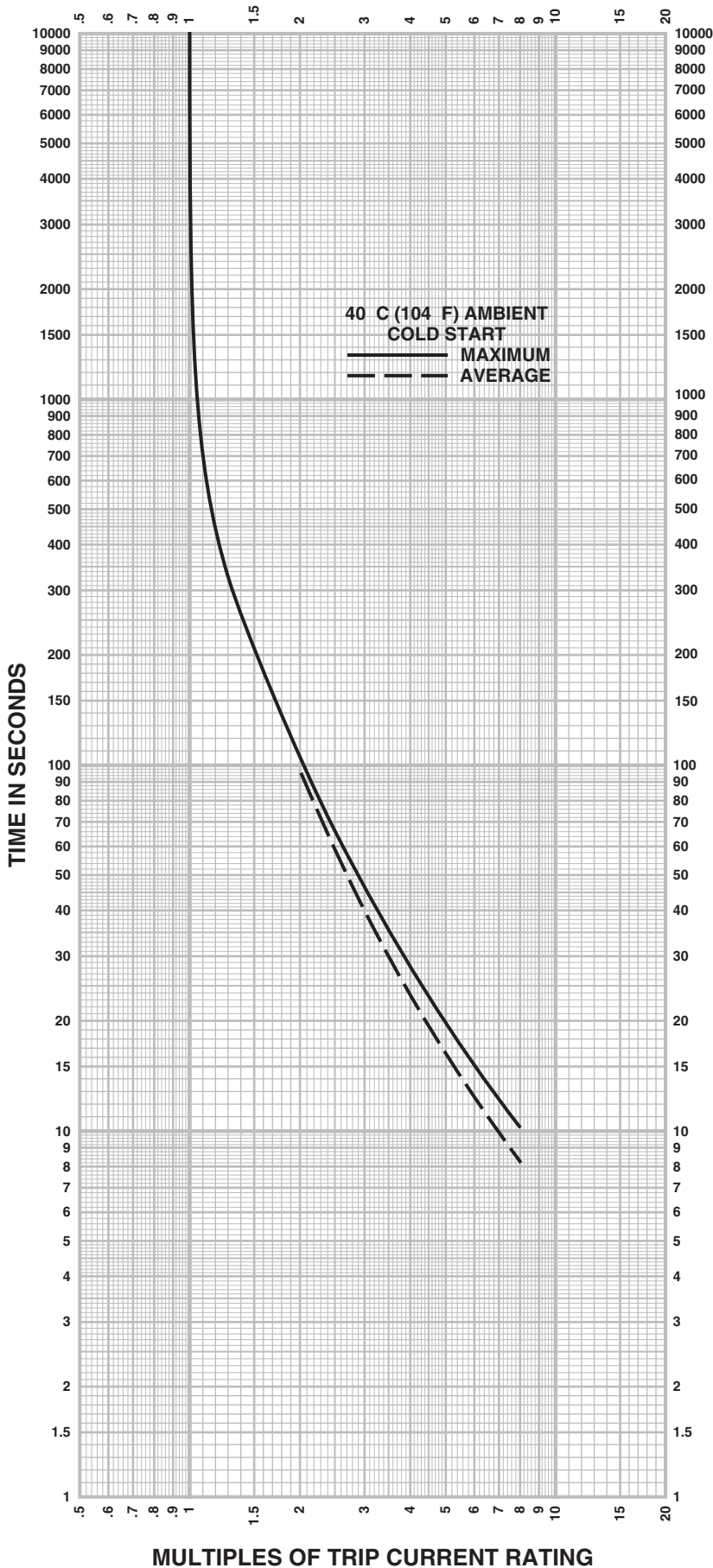
Equipment	AC Magnetic Starter
Size	0 & 1
Type	SB & SC
Series	A
Qty. of Thermal Units	3

When installed in:

- Small enclosure (Class 8536 only)
- QMB, I-Line®

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-408**

Relay Design	Melting Alloy
Thermal Unit Types	B0.44–B45

40 °C ambient cold start trip time characteristics of:

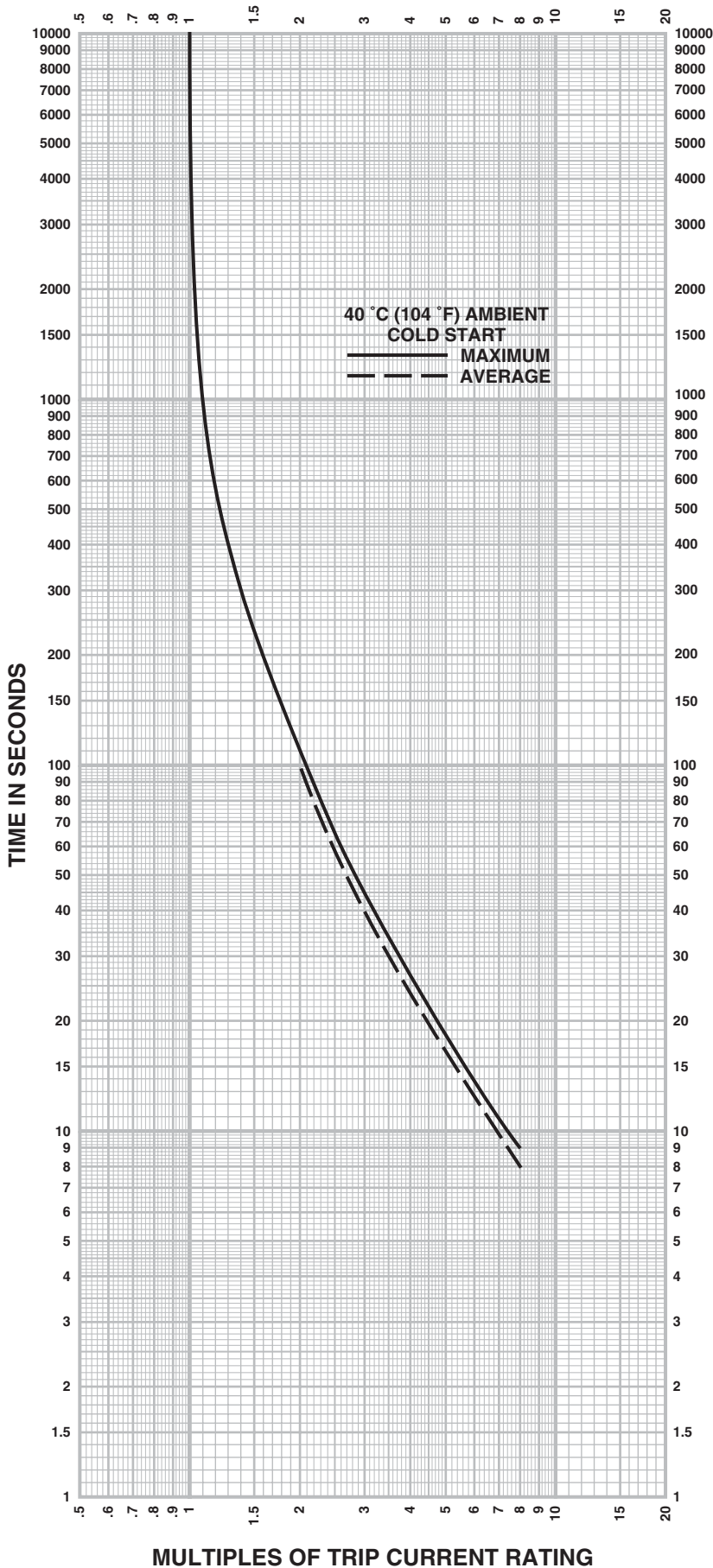
Equipment	AC Magnetic Starter
Size	0 & 1
Type	SB & SC
Series	A
Qty. of Thermal Units	3

When installed in:

- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-409**

Relay Design	Melting Alloy
Thermal Unit Types	B4.85–B88

40 °C ambient cold start trip time characteristics of:

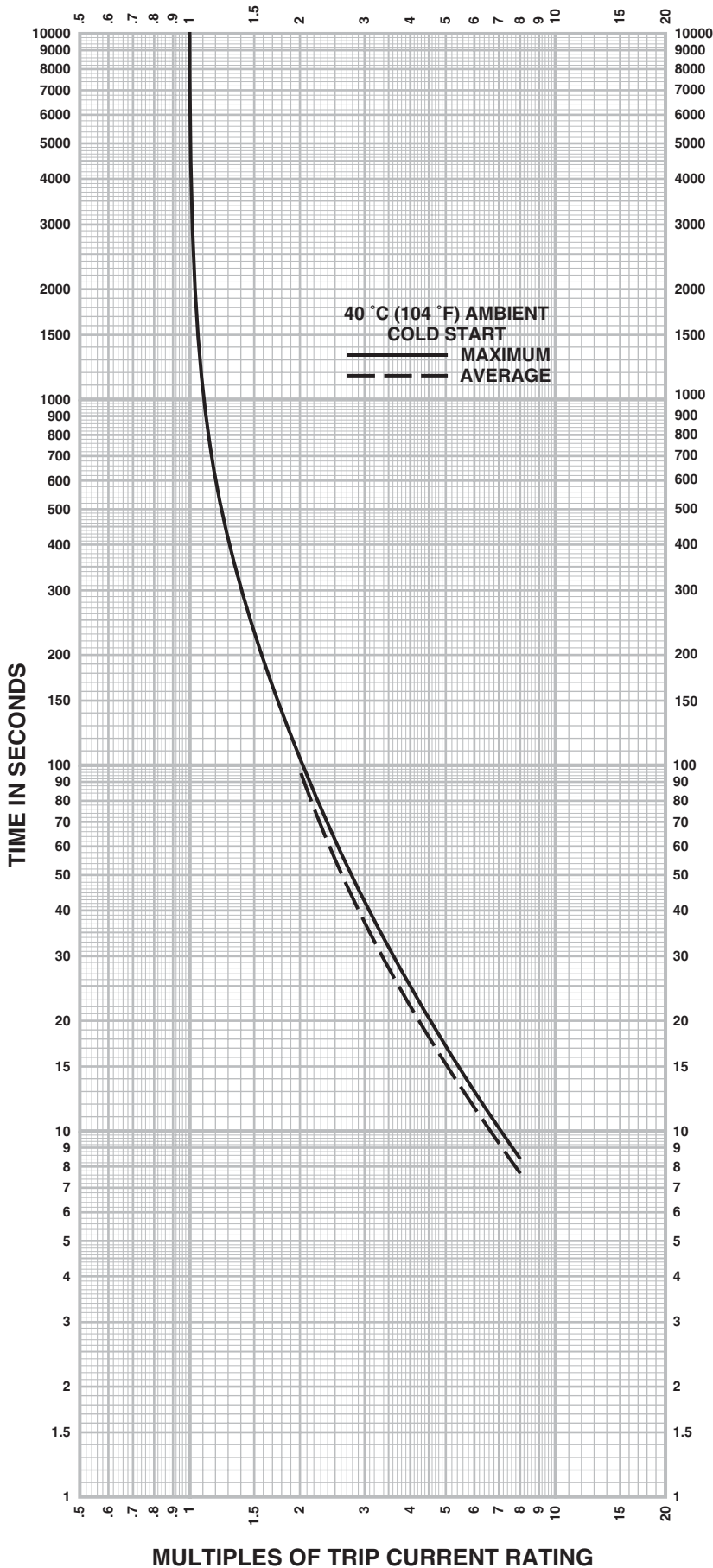
Equipment	AC Magnetic Starter
Size	2
Type	SD
Series	A
Qty. of Thermal Units	3

When installed in:

- Small enclosure (Class 8536 only)
- QMB, I-Line®

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-410**

Relay Design	Melting Alloy
Thermal Unit Types	B4.85–B79

40 °C ambient cold start trip time characteristics of:

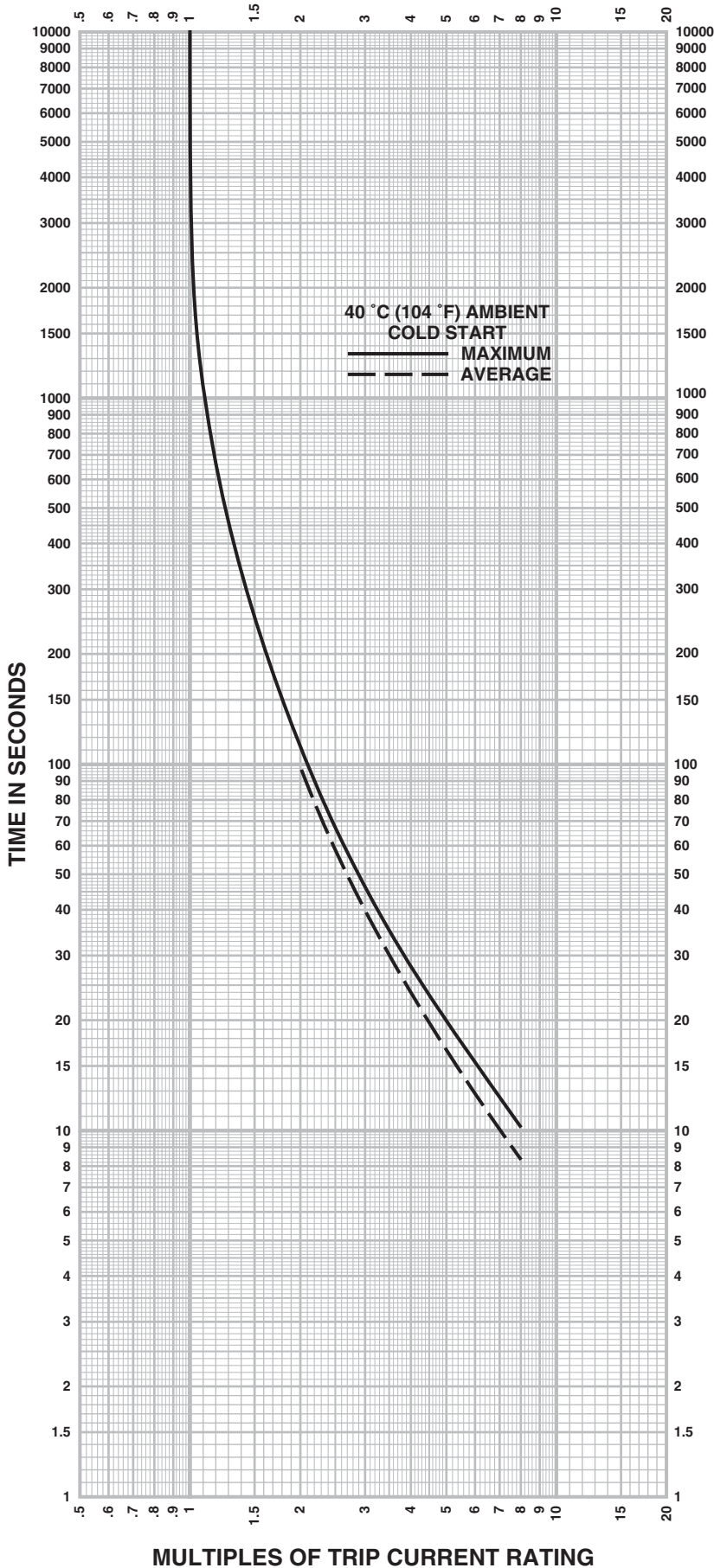
Equipment	AC Magnetic Starter
Size	2
Type	SD
Series	A
Qty. of Thermal Units	3

When installed in:

- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-411

Relay Design	Melting alloy
Thermal Unit Types	B0.44–B10.2

40 °C ambient cold start trip time characteristics of:

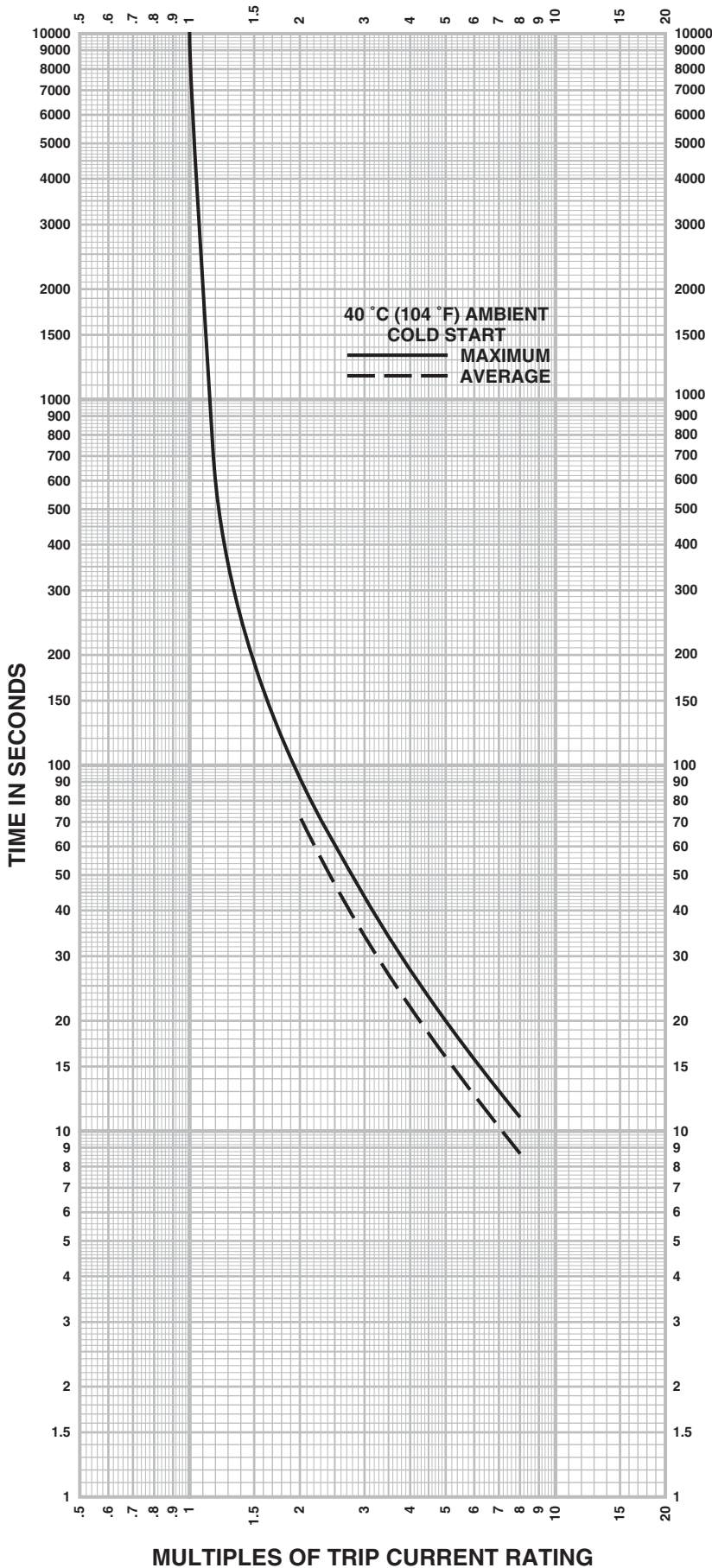
Equipment	Class 8736 Reversing Starter
Size	00
Type	SA
Series	A
Qty. of Thermal Units	3

When installed in:

- Small enclosure (Class 8736 only)
- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-413**

Relay Design	Bimetallic, Temperature-compensated
Thermal Unit Types	AR.44-AR40

40 °C ambient cold start trip time characteristics of:

Equipment	AC Magnetic Starter
Size	0 & 1
Type	SB & SC
Series	B
Form	B
Qty. of Thermal Units	3

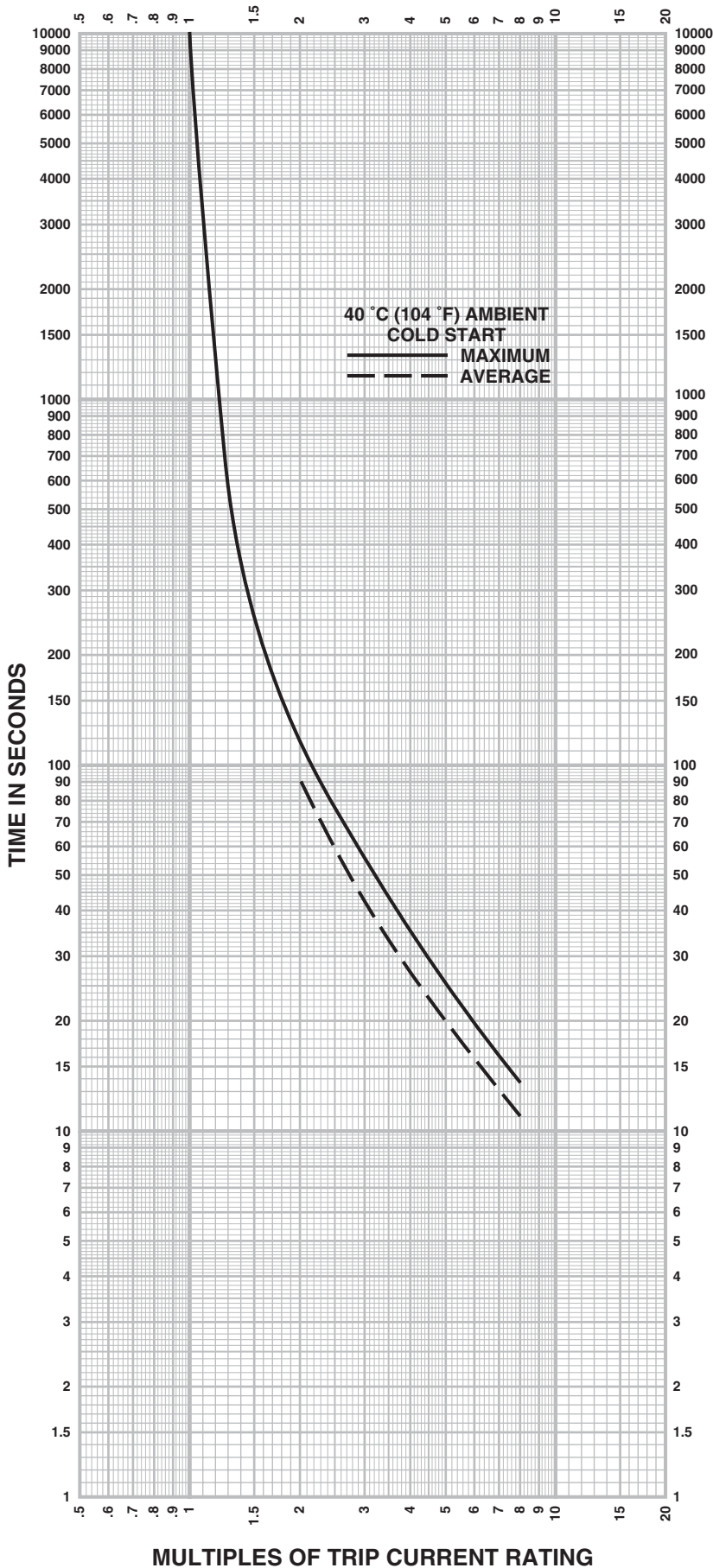
When installed in:

- Small enclosure (Class 8536 only)
- Motor Control Center (Class 8998, 8999, QMB, or I-Line®)
- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

NOTE: Curves also apply for Class 9065 Type SEO6B Series B separately mounted overload relays.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-414**

Relay Design	Bimetallic, Temperature-compensated
Thermal Unit Types	AR8.5–AR94

40 °C ambient cold start trip time characteristics of:

Equipment	AC Magnetic Starter
Size	2
Type	SD
Series	A
Form	B
Qty. of Thermal Units	3

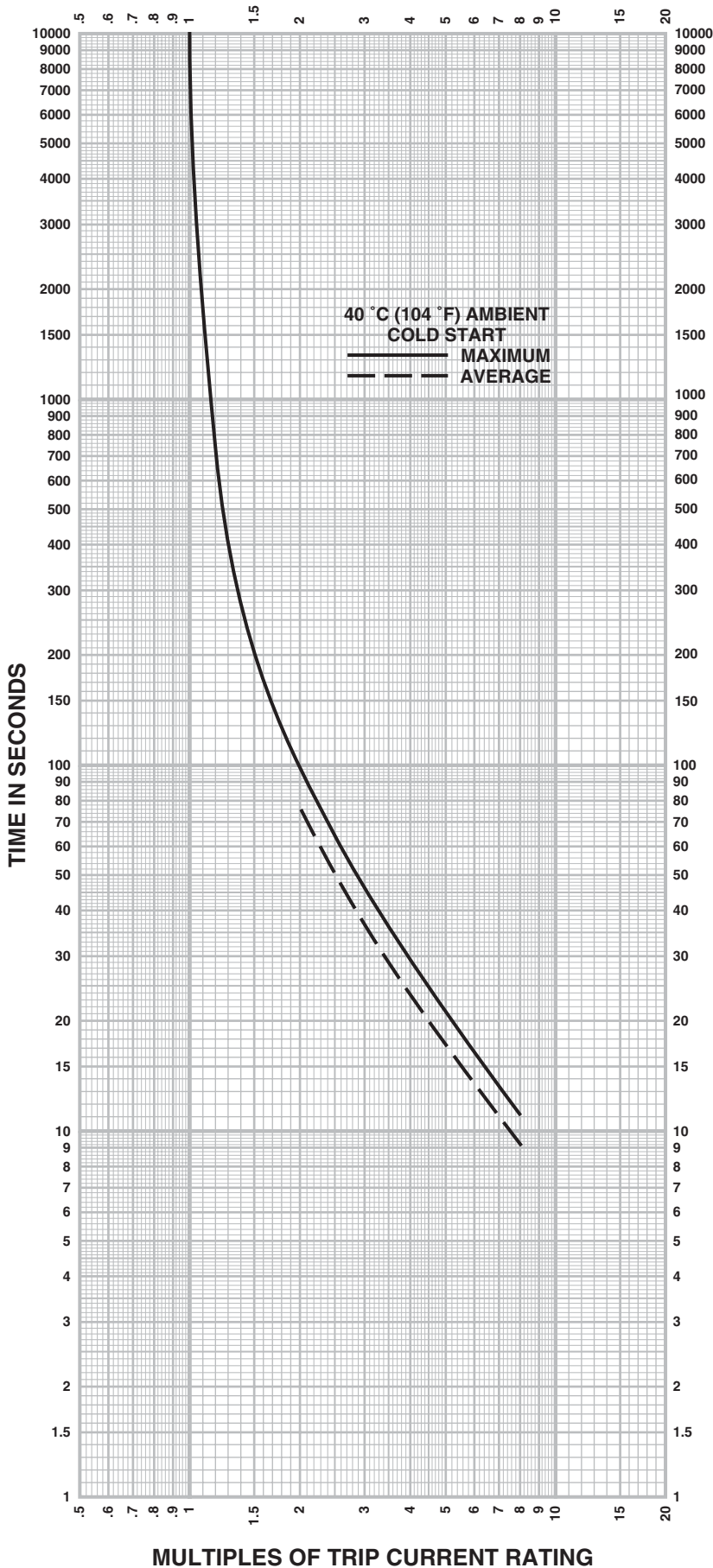
When installed in:

- Small enclosure (Class 8536 only)
- Motor Control Center (Class 8998, 8999, QMB, or I-Line®)
- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

NOTE: Curves also apply for Class 9065 Type SEO9B Series A separately mounted overload relays.

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-415

Relay Design	Bimetallic
Thermal Unit Types	AR.45-AR40

40 °C ambient cold start trip time characteristics of:

Equipment	AC Magnetic Starter
Size	0 & 1
Type	SB & SC
Series	A
Form	B2
Qty. of Thermal Units	3

When installed in:

- Small enclosure (Class 8536 only)
- Motor Control Center (Class 8998, 8999, QMB, or I-Line®)

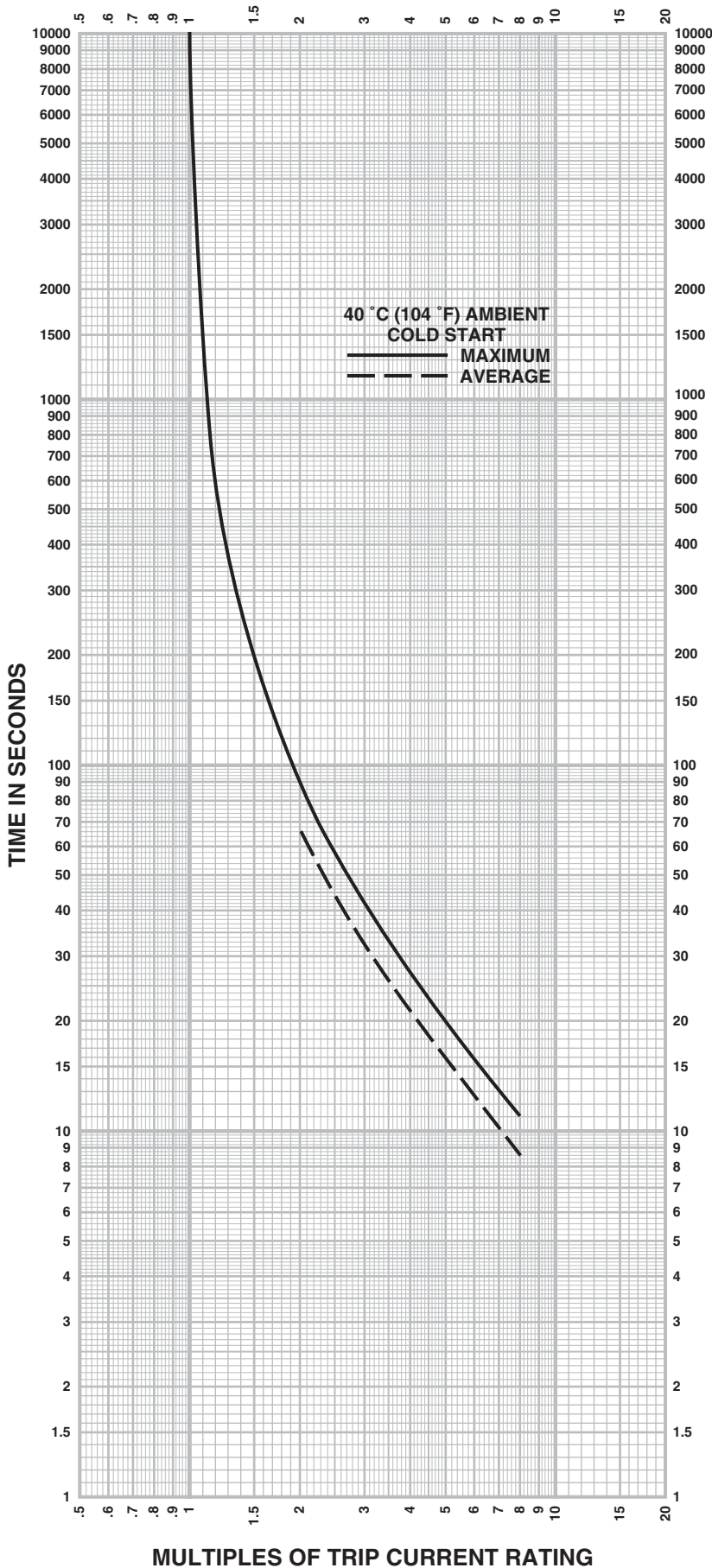
The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

TIME IN SECONDS

TIME IN SECONDS

MULTIPLES OF TRIP CURRENT RATING

MULTIPLES OF TRIP CURRENT RATING



MULTIPLES OF TRIP CURRENT RATING

OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-416

Relay Design	Bimetallic
Thermal Unit Types	AR.45-AR40

40 °C ambient cold start trip time characteristics of:

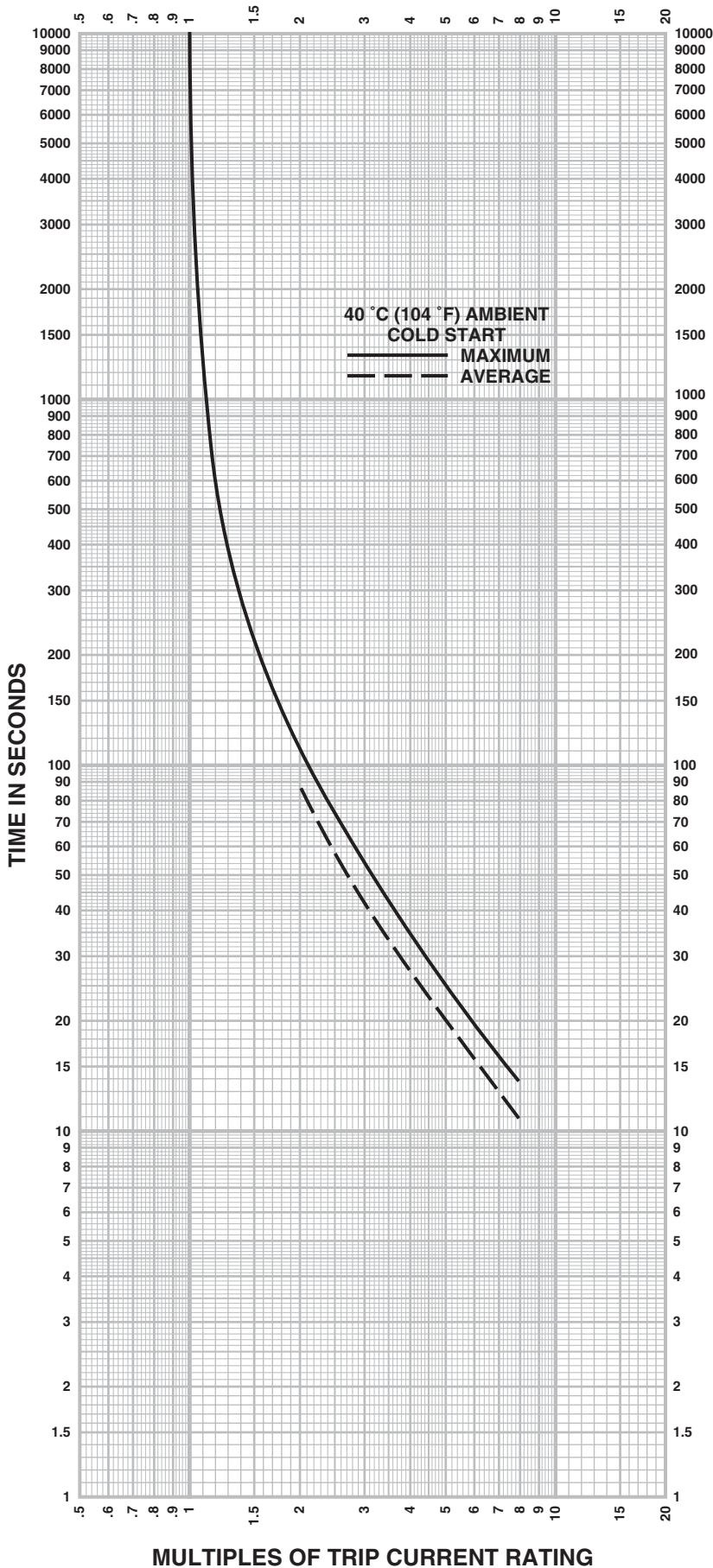
Equipment	AC Magnetic Starter
Size	0 & 1
Type	SB & SC
Series	A
Form	B2
Qty. of Thermal Units	3

When installed in:

- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-417

Relay Design	Bimetallic
Thermal Unit Types	AR8.5-AR86

40 °C ambient cold start trip time characteristics of:

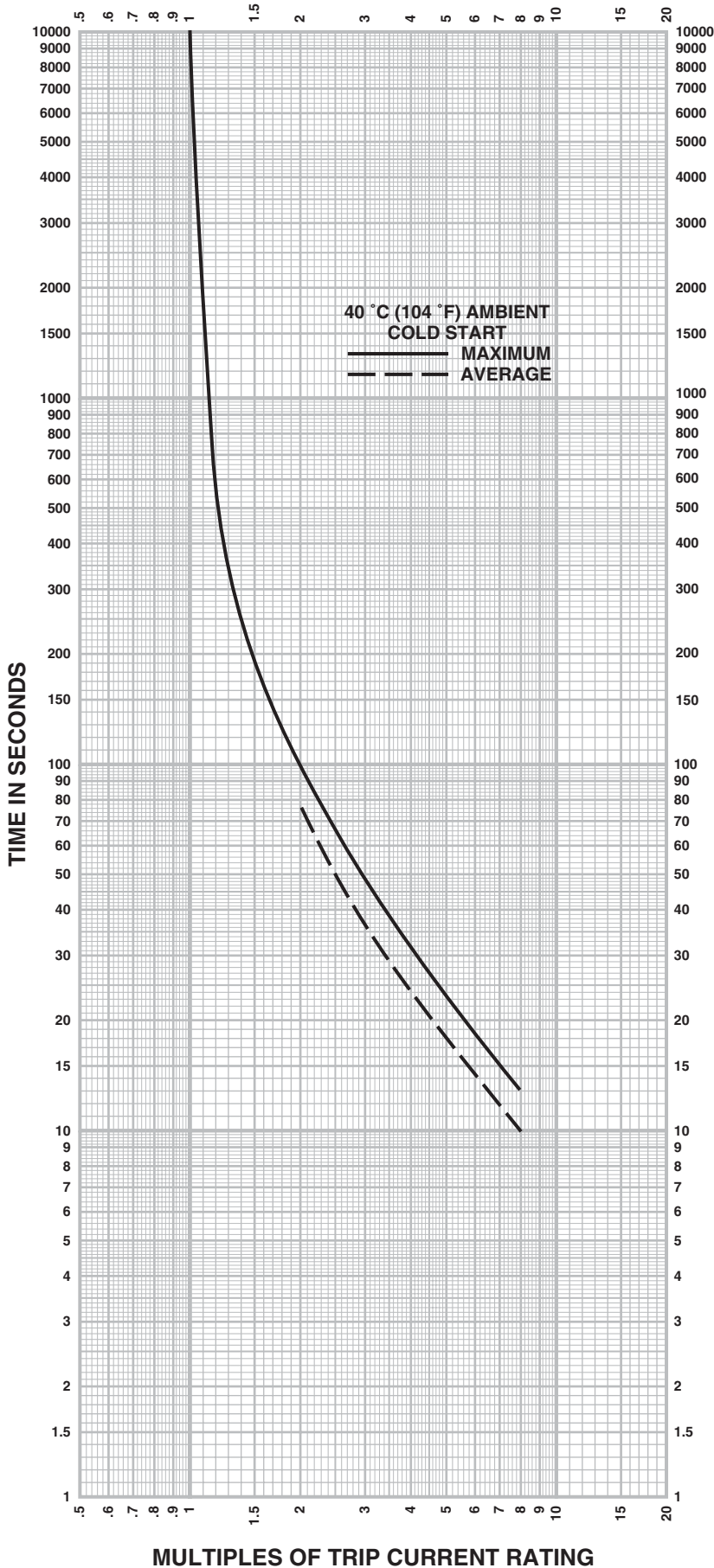
Equipment	AC Magnetic Starter
Size	2
Type	SD
Series	A
Form	B2
Qty. of Thermal Units	3

When installed in:

- Small enclosure (Class 8536 only)
- Motor Control Center (Class 8998, 8999, QMB, or I-Line®)

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-418**

Relay Design	Bimetallic
Thermal Unit Types	AR8.5-AR86

40 °C ambient cold start trip time characteristics of:

Equipment	AC Magnetic Starter
Size	2
Type	SD
Series	A
Form	B2
Qty. of Thermal Units	3

When installed in:

- Hinged door and all other (larger) enclosures

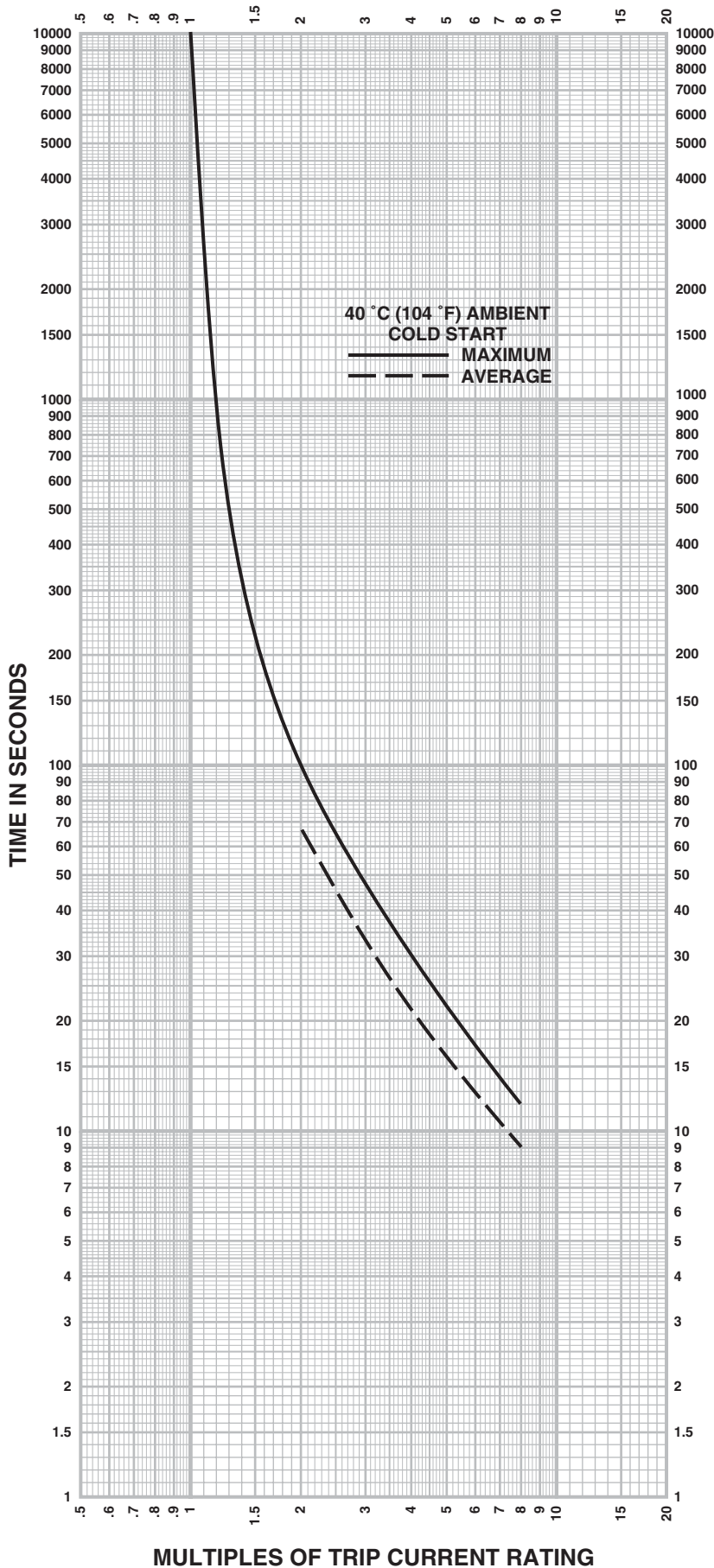
The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

TIME IN SECONDS

TIME IN SECONDS

MULTIPLES OF TRIP CURRENT RATING

MULTIPLES OF TRIP CURRENT RATING



MULTIPLES OF TRIP CURRENT RATING

**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-419A**

Relay Design	Bimetallic
Thermal Unit Types	AR.45-AR35

40 °C ambient cold start trip time characteristics of:

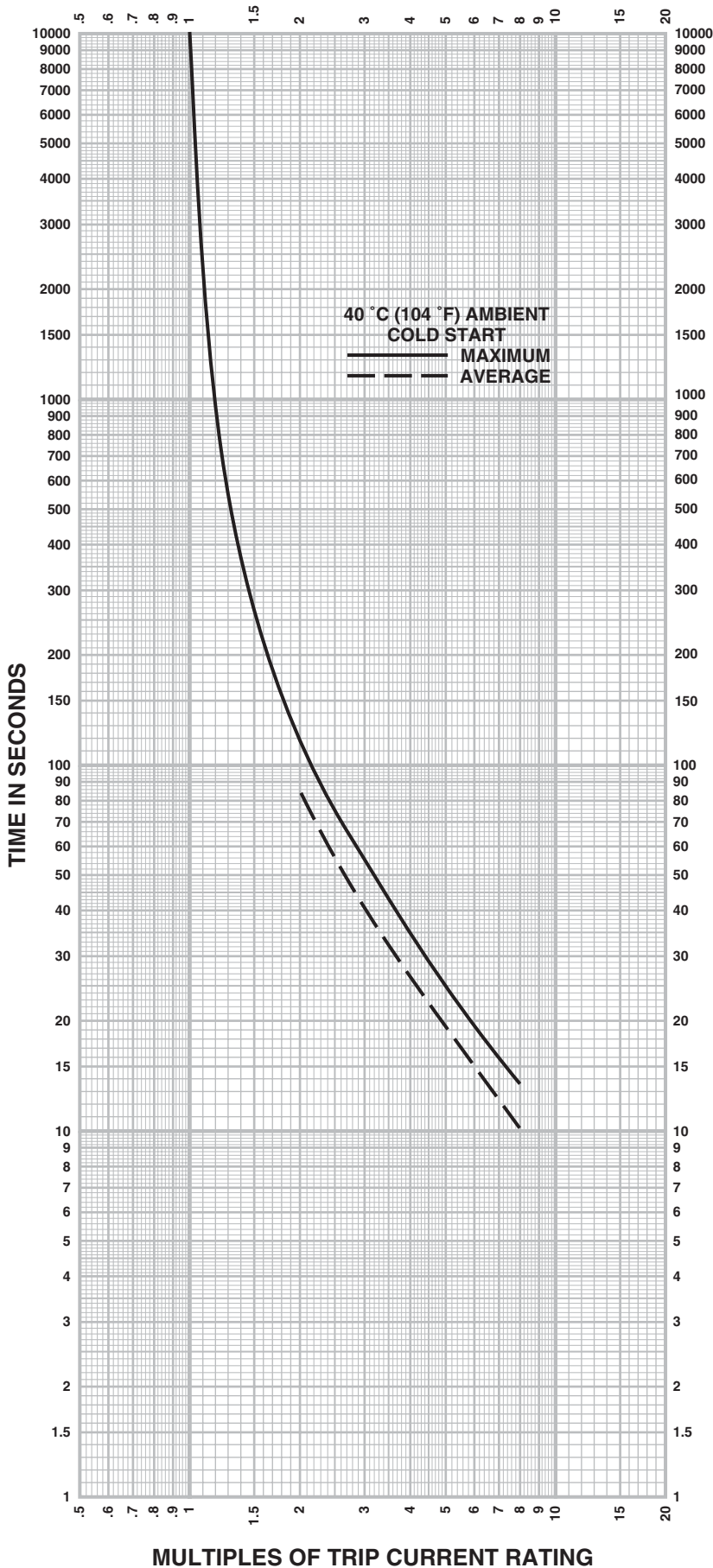
Equipment	Separate Overload Relay
Size	26 A (nominal)
Type	SEO6B2
Series	A
Qty. of Thermal Units	3

When installed in:

- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-420**

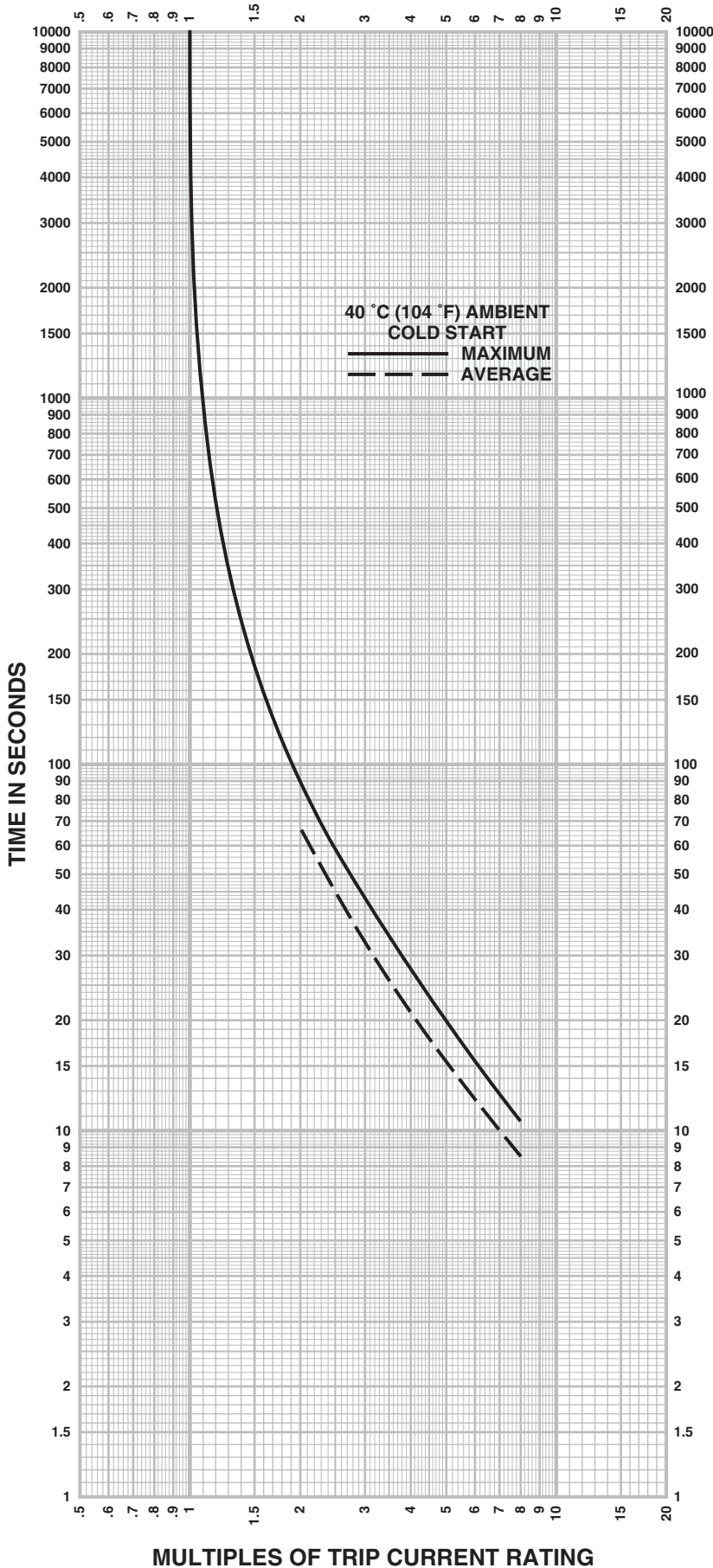
Relay Design	Bimetallic
Thermal Unit Types	AR8.5-AR86
40 °C ambient cold start trip time characteristics of:	
Equipment	Separate Overload Relay
Size	45 A (nominal)
Type	SEO9B2
Series	A
Qty. of Thermal Units	3

When installed in:

- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



MULTIPLES OF TRIP CURRENT RATING

**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-421**

Relay Design	Bimetallic
Thermal Unit Types	AR.45-AR9.3

40 °C ambient cold start trip time characteristics of:

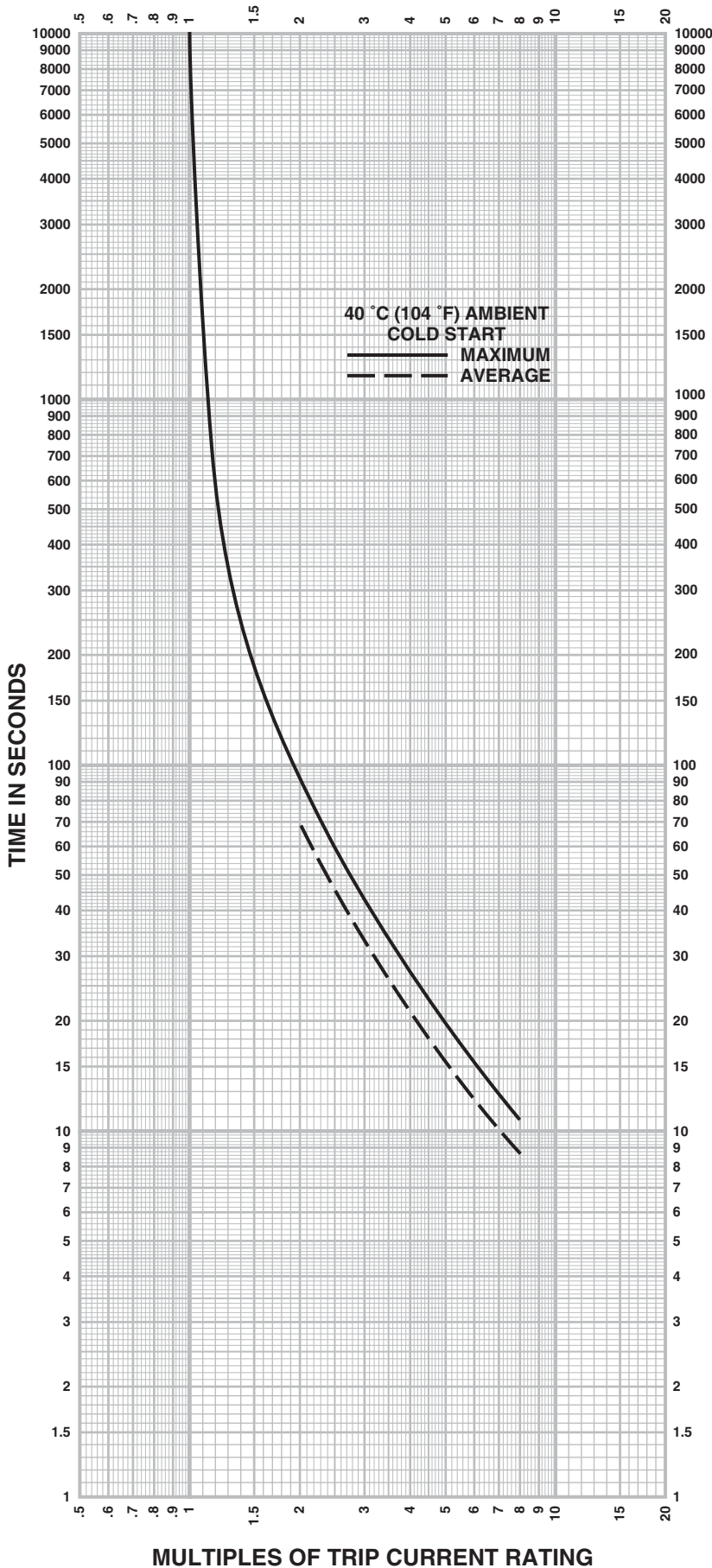
Equipment	Class 8736 Reversing Starter
Size	00
Type	SA
Series	A
Form	B2
Qty. of Thermal Units	3

When installed in:

- Small enclosure (Class 8736 only)
- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-422**

Relay Design	Bimetallic, Temperature-compensated
Thermal Unit Types	AR.45-AR10.2

40 °C ambient cold start trip time characteristics of:

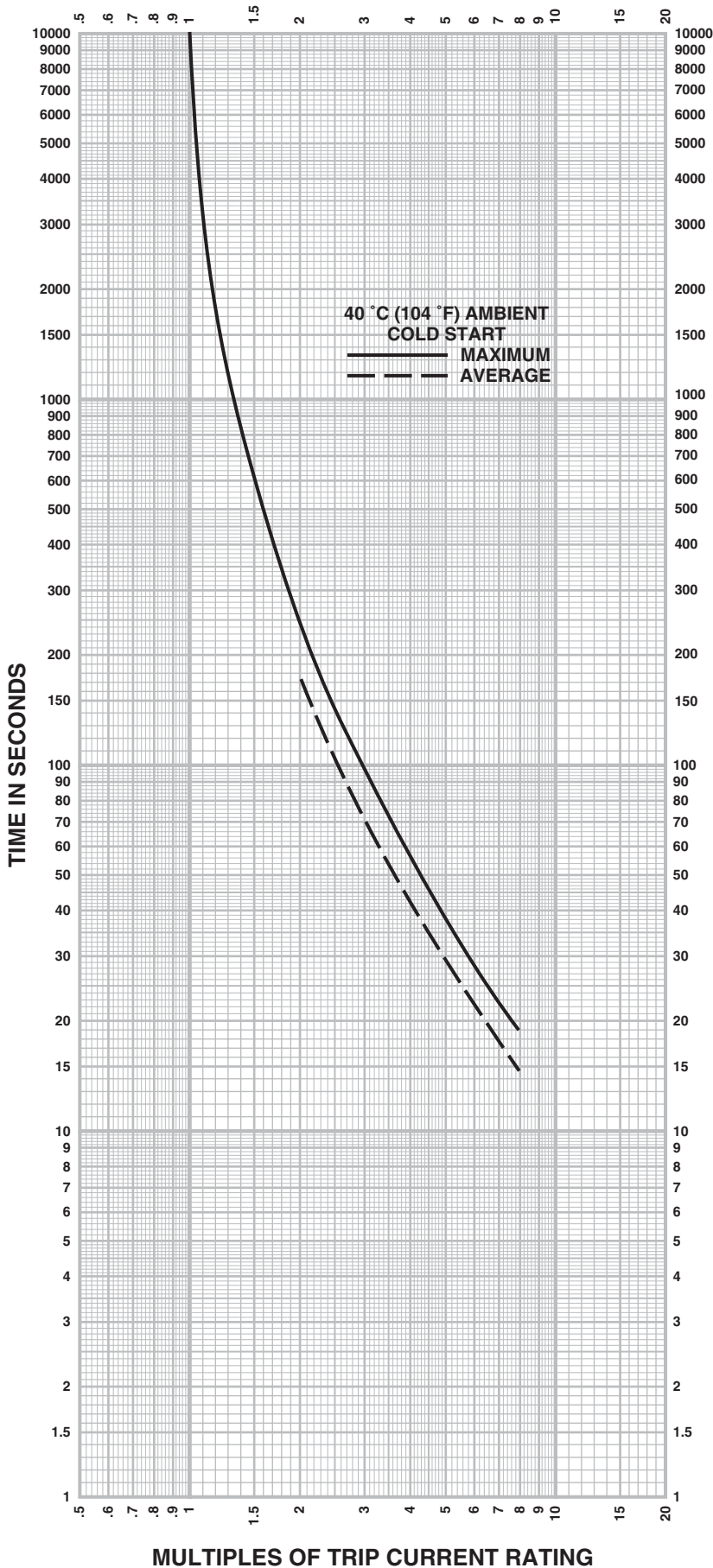
Equipment	Class 8736 Reversing Starter
Size	00
Type	SA
Series	A
Form	B
Qty. of Thermal Units	3

When installed in:

- Small enclosure (Class 8736 only)
- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-423**

Relay Design	Bimetallic
Thermal Unit Types	AU44–AU235

40 °C ambient cold start trip time characteristics of:

Equipment	AC Magnetic Starter
Size	4
Type	SF
Series	A
Form	B5
Qty. of Thermal Units	3

When installed in:

- Small enclosure (Class 8536 only)
- Motor Control Center (Class 8998, 8999, QMB, or I-Line®)

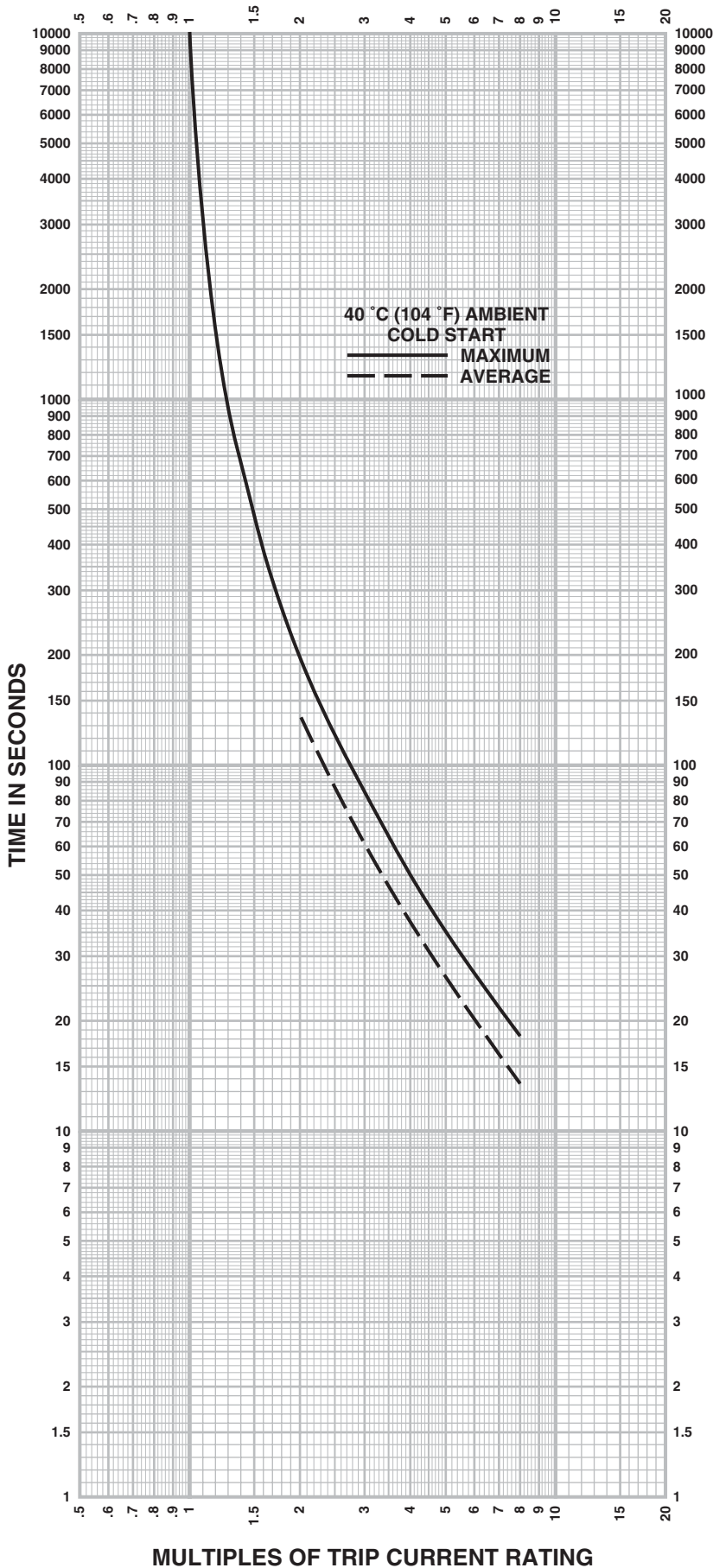
The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

TIME IN SECONDS

TIME IN SECONDS

MULTIPLES OF TRIP CURRENT RATING

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-424

Relay Design	Bimetallic
Thermal Unit Types	AU44-AU183

40 °C ambient cold start trip time characteristics of:

Equipment	AC Magnetic Starter
Size	4
Type	SF
Series	A
Form	B5
Qty. of Thermal Units	3

When installed in:

- Hinged door and all other (larger) enclosures

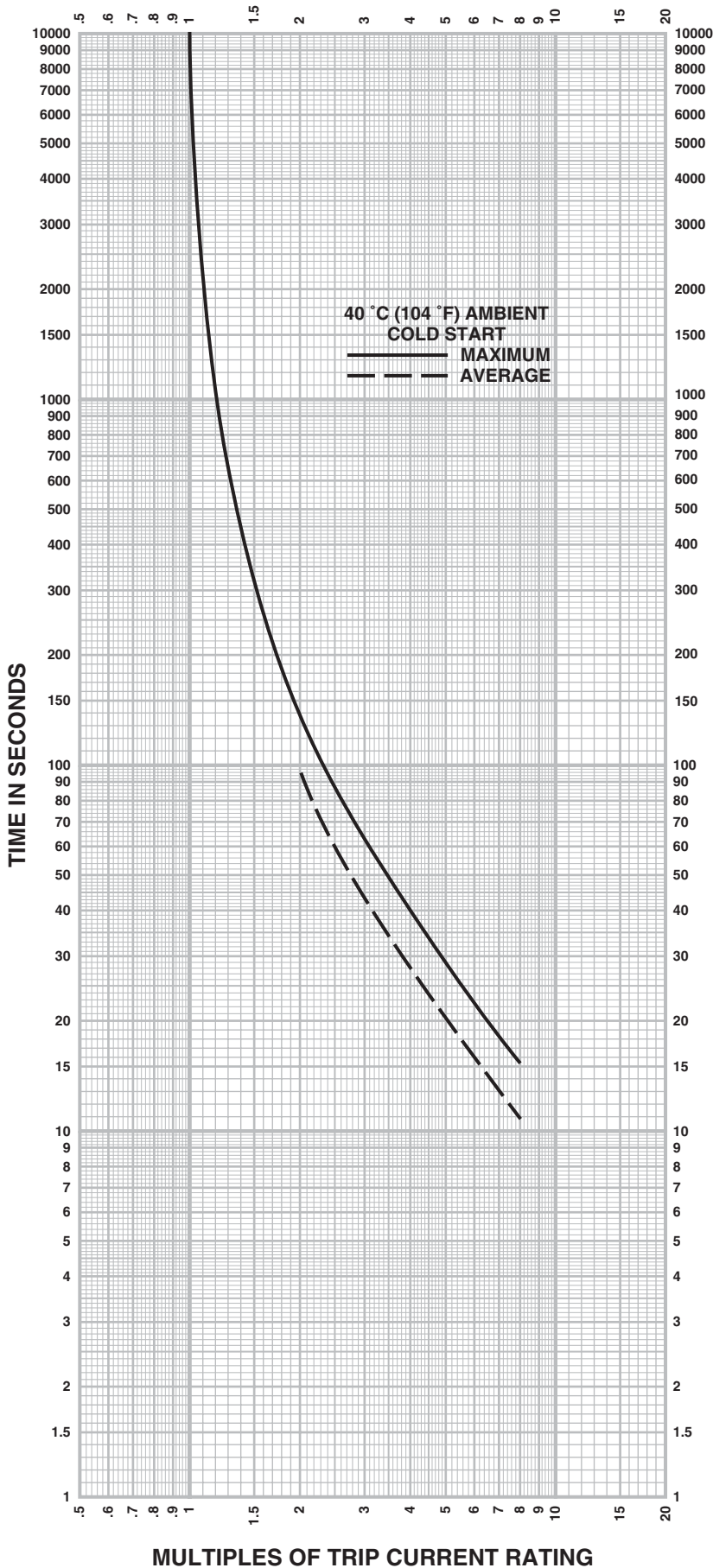
The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

TIME IN SECONDS

TIME IN SECONDS

MULTIPLES OF TRIP CURRENT RATING

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY TIME-CURRENT CHARACTERISTICS REFERENCE DRAWING NO. 30068-426

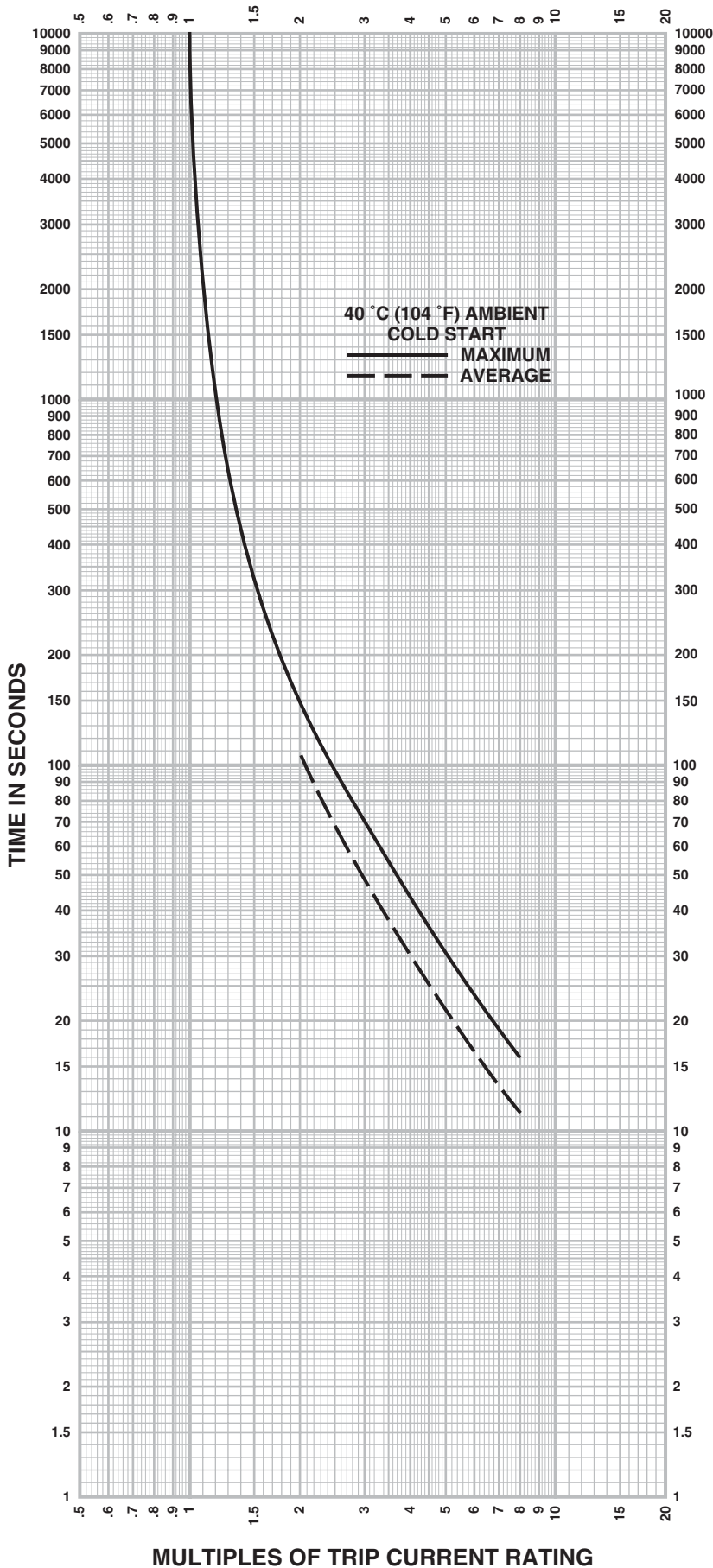
Relay Design	Bimetallic
Thermal Unit Types	AU44–AU152
40 °C ambient cold start trip time characteristics of:	
Equipment	Separate Overload Relay
Size	4
Type	SAF & AF
Series	A
Qty. of Thermal Units	1

When installed in:

- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY TIME-CURRENT CHARACTERISTICS REFERENCE DRAWING NO. 30068-427

Relay Design	Bimetallic
Thermal Unit Types	AU44–AU152

40 °C ambient cold start trip time characteristics of:

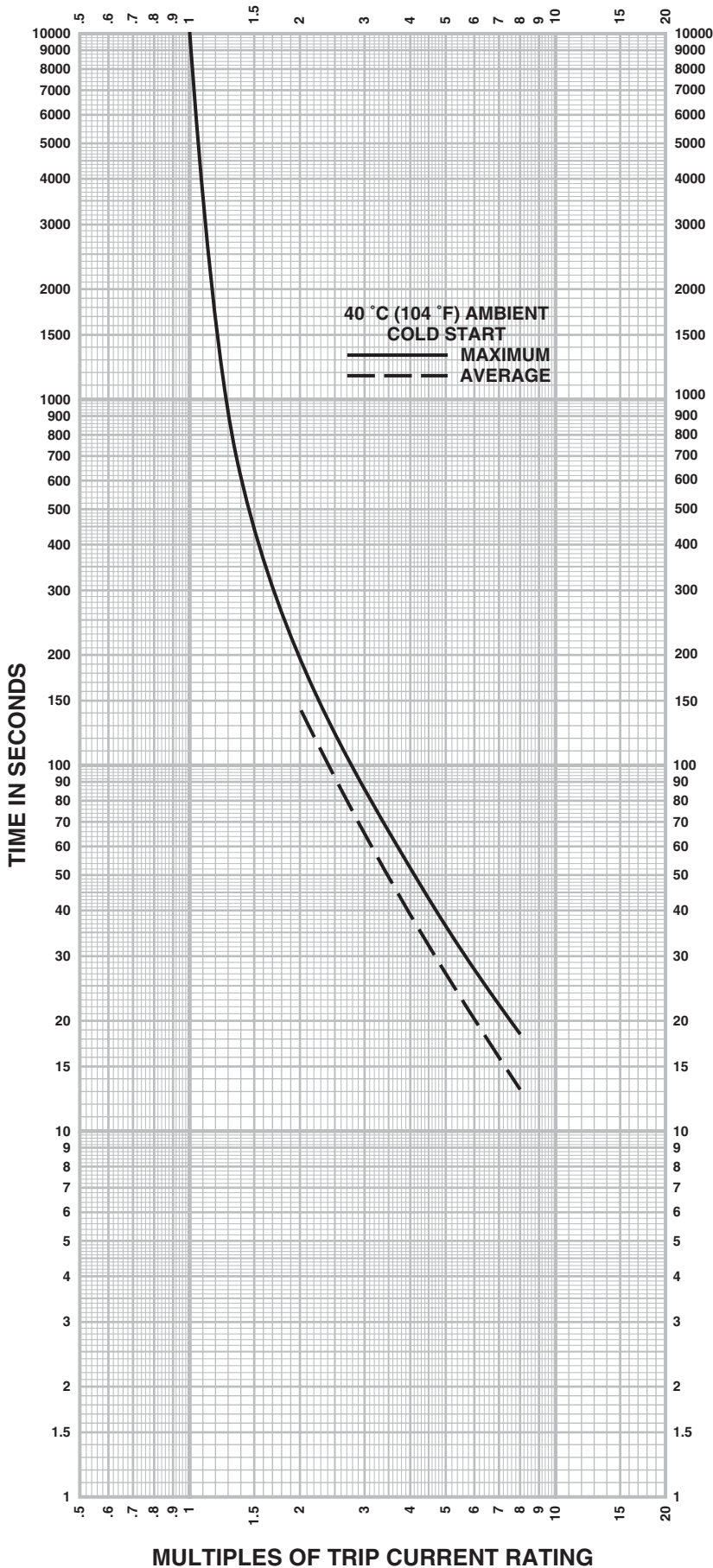
Equipment	Separate Overload Relay
Size	4
Type	SAF & AF
Series	A
Qty. of Thermal Units	1

When installed in:

- Small enclosure (Class 9065 only)

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-438**

Relay Design	Bimetallic
Thermal Unit Types	AU20–AU123
40 °C ambient cold start trip time characteristics of:	
Equipment	AC Magnetic Starter
Size	3
Type	SE
Series	A
Form	B5
Qty. of Thermal Units	3

When installed in:

- Small enclosure (Class 8536 only)
- Motor Control Center (Class 8998, 8999, QMB, or I-Line®)

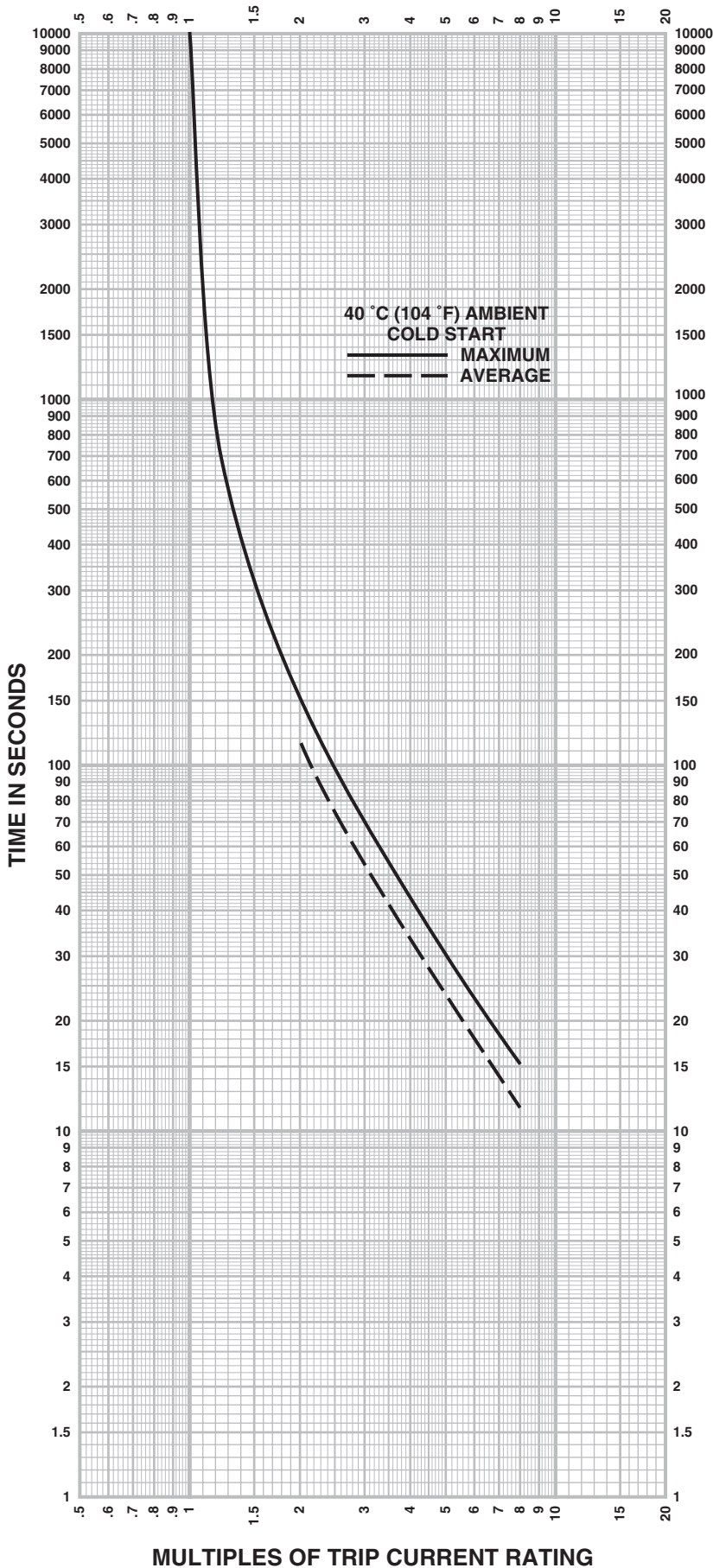
The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

TIME IN SECONDS

TIME IN SECONDS

MULTIPLES OF TRIP CURRENT RATING

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-439**

Relay Design	Bimetallic
Thermal Unit Types	AU20–AU110

40 °C ambient cold start trip time characteristics of:

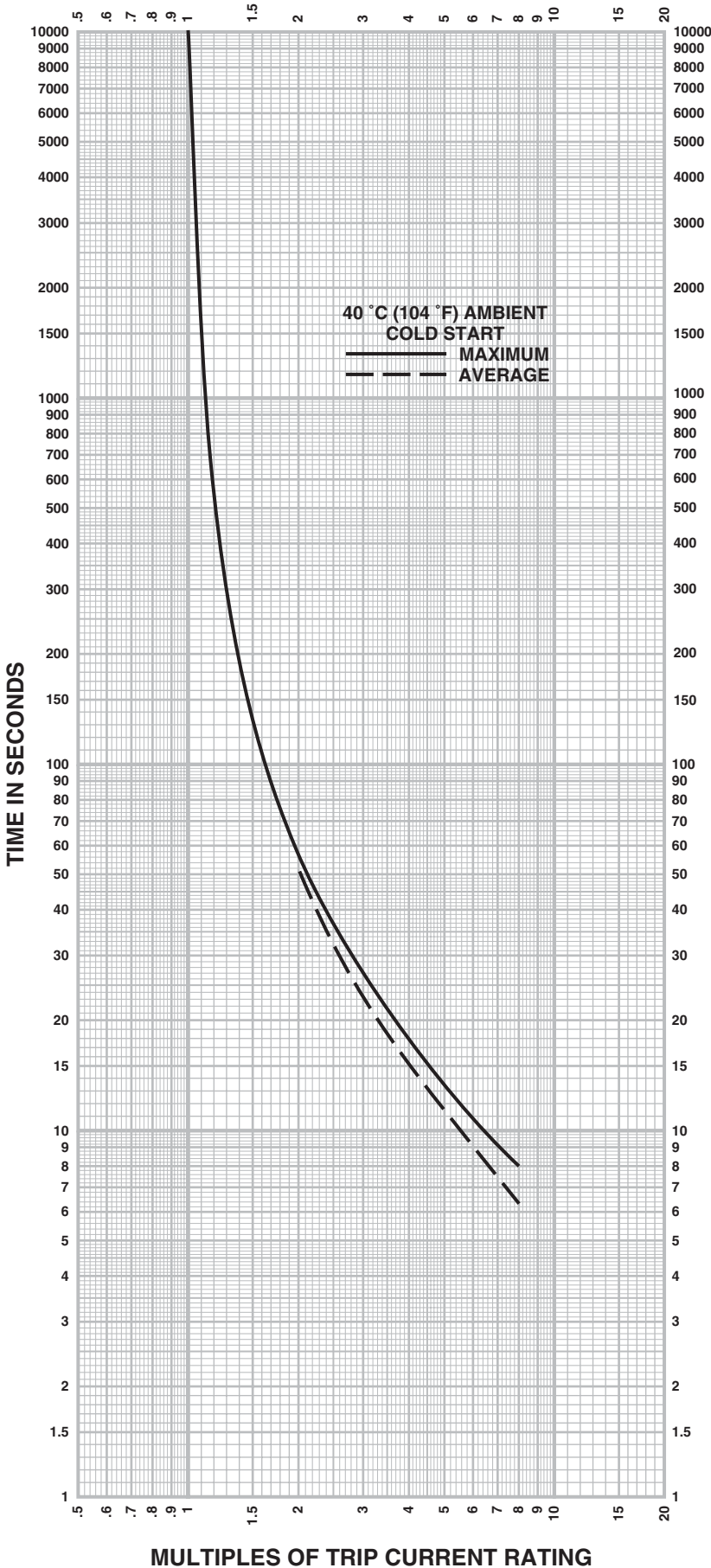
Equipment	AC Magnetic Starter
Size	3
Type	SE
Series	A
Form	B5
Qty. of Thermal Units	3

When installed in:

- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-443**

Relay Design	Melting Alloy
Thermal Unit Types	A.49-A11.0

40 °C ambient cold start trip time characteristics of:

Equipment	AC Magnetic Starter
Size	00
Type	A
Series	B & C
Qty. of Thermal Units	1

When installed in:

- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

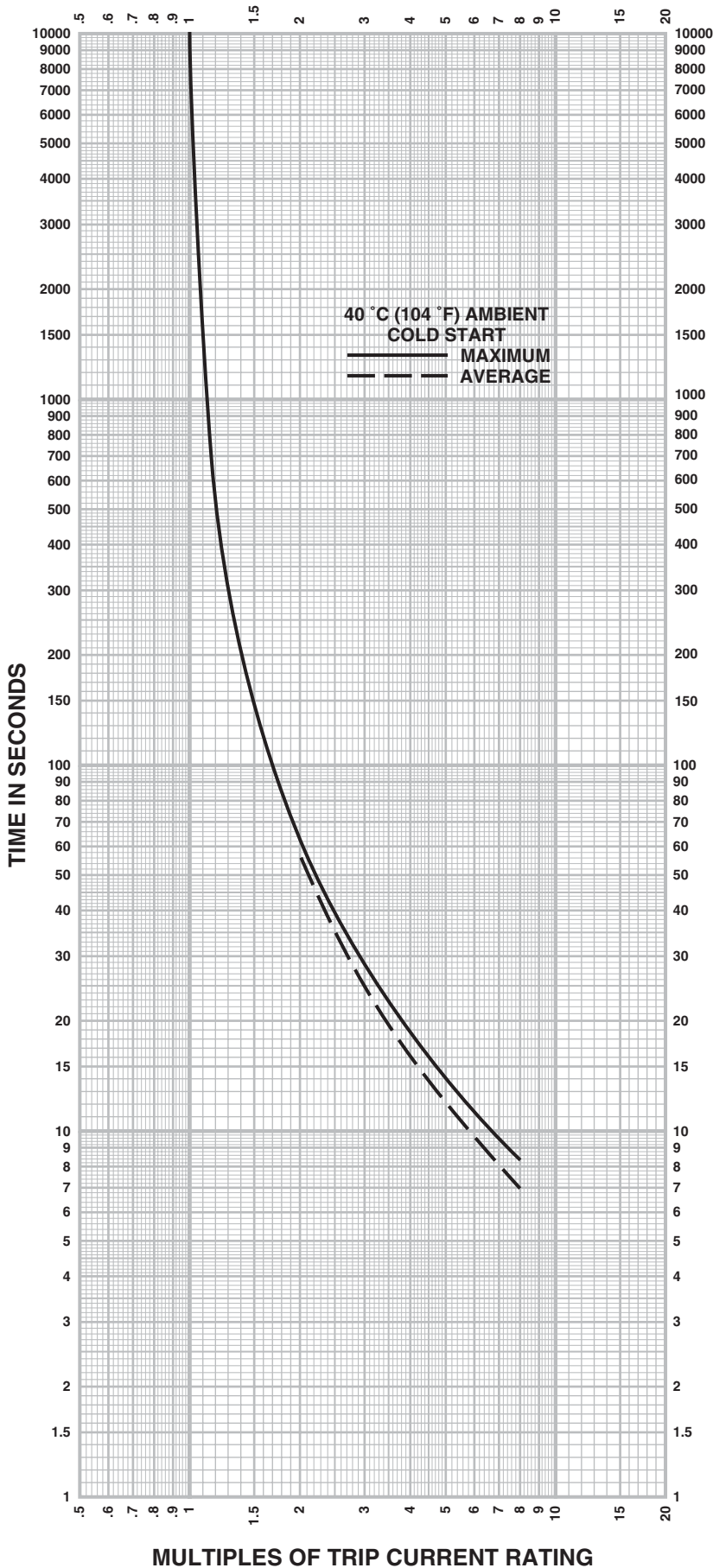
TIME IN SECONDS

TIME IN SECONDS

MULTIPLES OF TRIP CURRENT RATING



MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-444**

Relay Design	Melting Alloy
Thermal Unit Types	A.49-A11.0

40 °C ambient cold start trip time characteristics of:

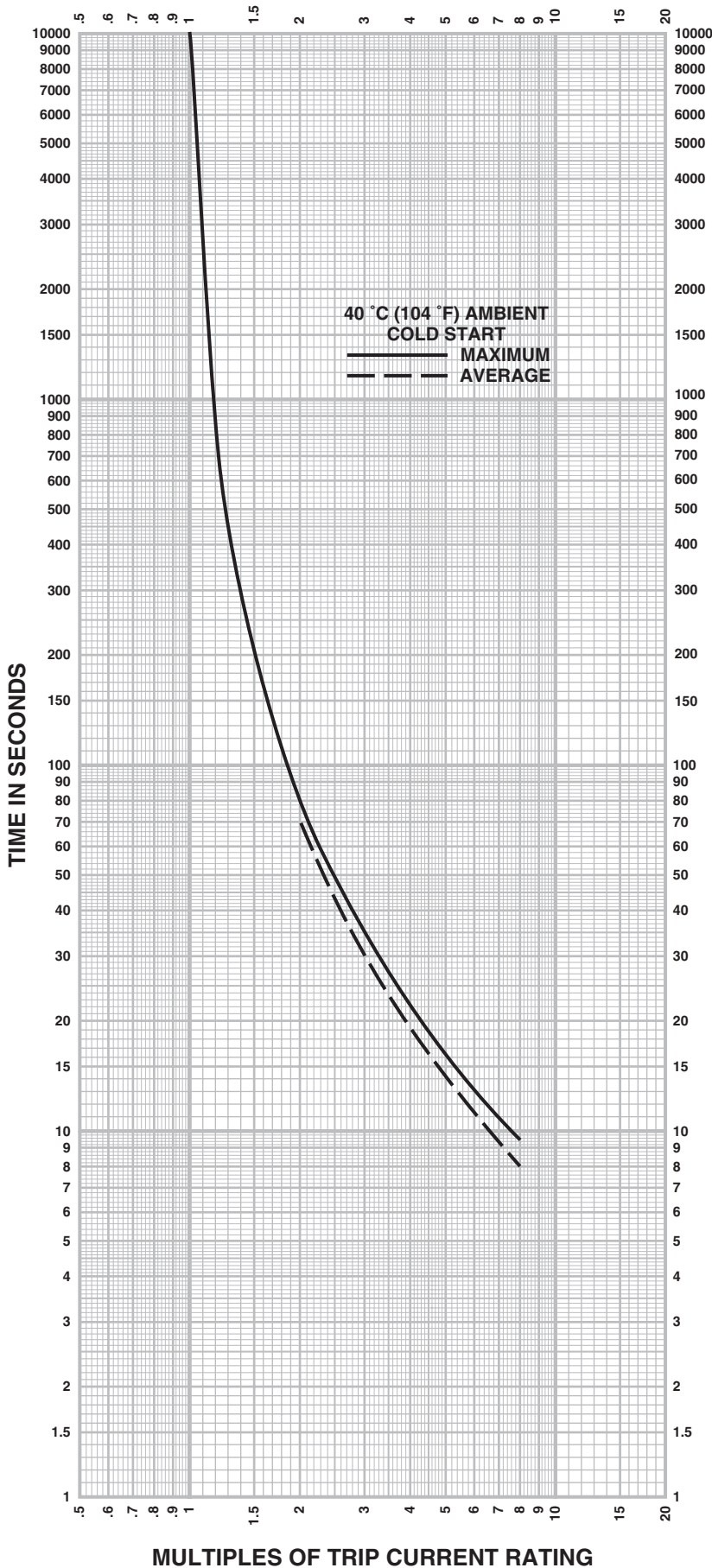
Equipment	AC Magnetic Starter
Size	00
Type	A
Series	B & C
Qty. of Thermal Units	1

When installed in:

- Small enclosure (Class 8536 only)

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY TIME-CURRENT CHARACTERISTICS REFERENCE DRAWING NO. 30068-445

Relay Design	Melting Alloy
Thermal Unit Types	A.49-A11.0

40 °C ambient cold start trip time characteristics of:

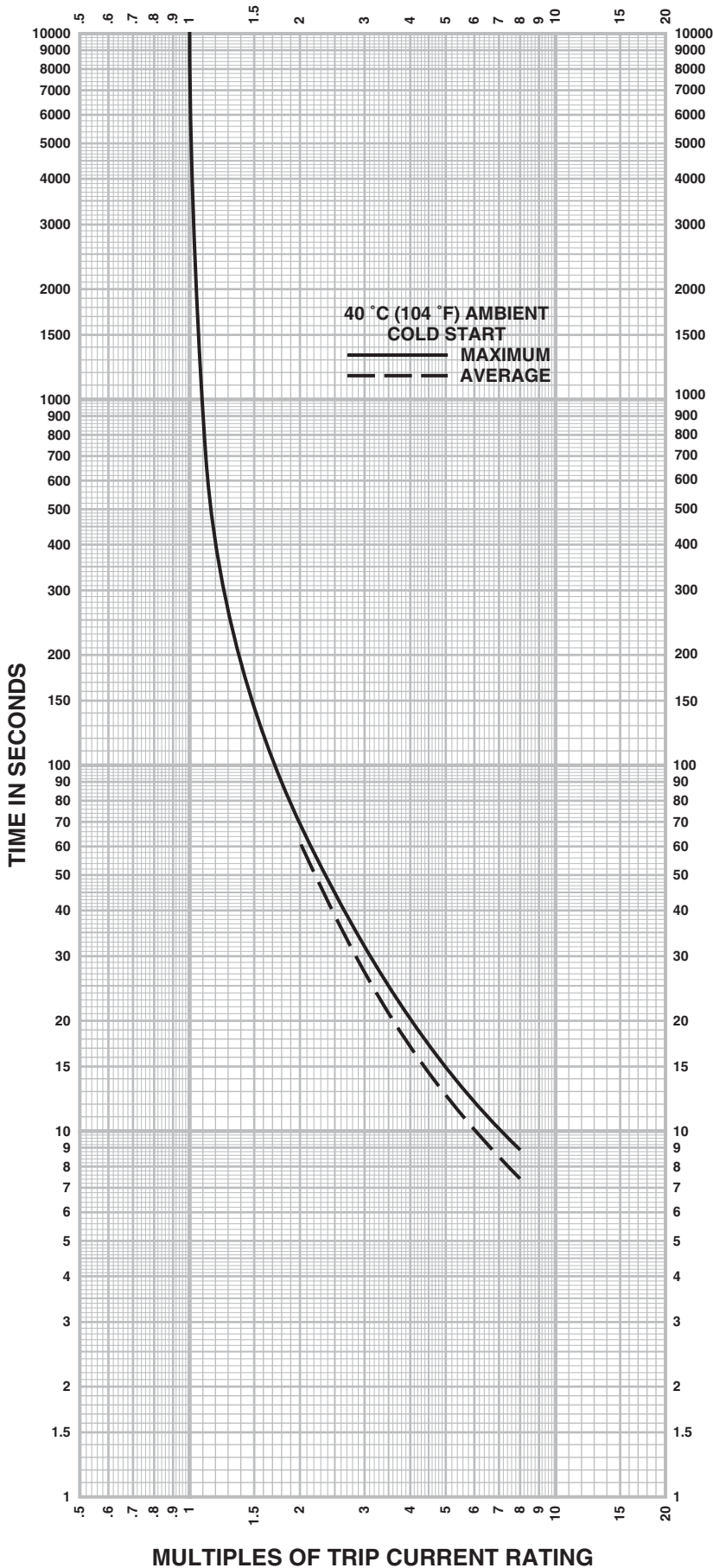
Equipment	AC Magnetic Starter
Size	00
Type	A
Series	C
Qty. of Thermal Units	3

When installed in:

- Small enclosure (Class 8536 only)

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY TIME-CURRENT CHARACTERISTICS REFERENCE DRAWING NO. 30068-446

Relay Design	Melting Alloy
Thermal Unit Types	A.49-A9.85

40 °C ambient cold start trip time characteristics of:

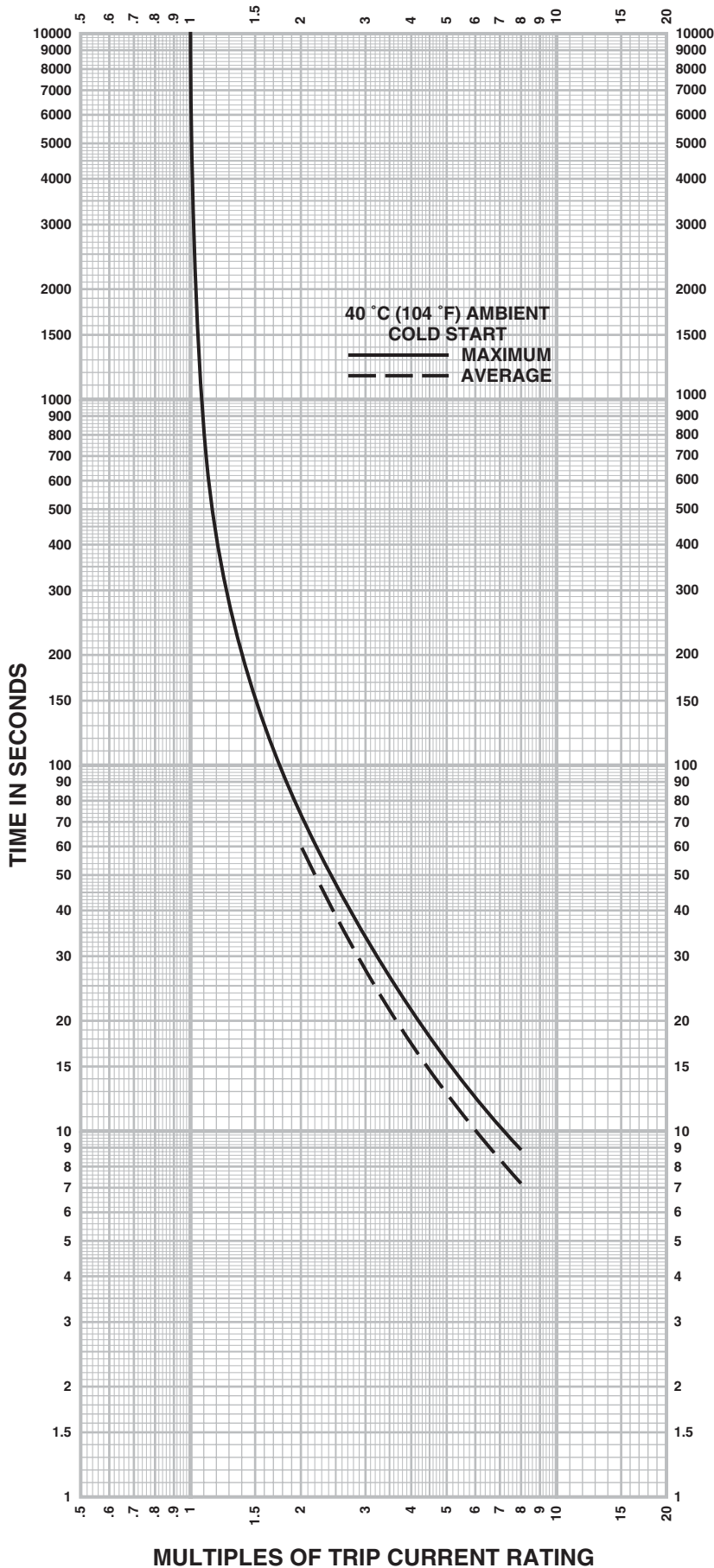
Equipment	AC Magnetic Starter
Size	00
Type	A
Series	C
Qty. of Thermal Units	3

When installed in:

- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY TIME-CURRENT CHARACTERISTICS REFERENCE DRAWING NO. 30068-447

Relay Design	Melting Alloy
Thermal Unit Types	A.49-A25.2

40 °C ambient cold start trip time characteristics of:

Equipment	AC Manual Starter
Size	FHP
Type	F
Qty. of Thermal Units	1

When installed in:

- Small enclosure (Class 2510 only)
- Hinged door and all other (larger) enclosures

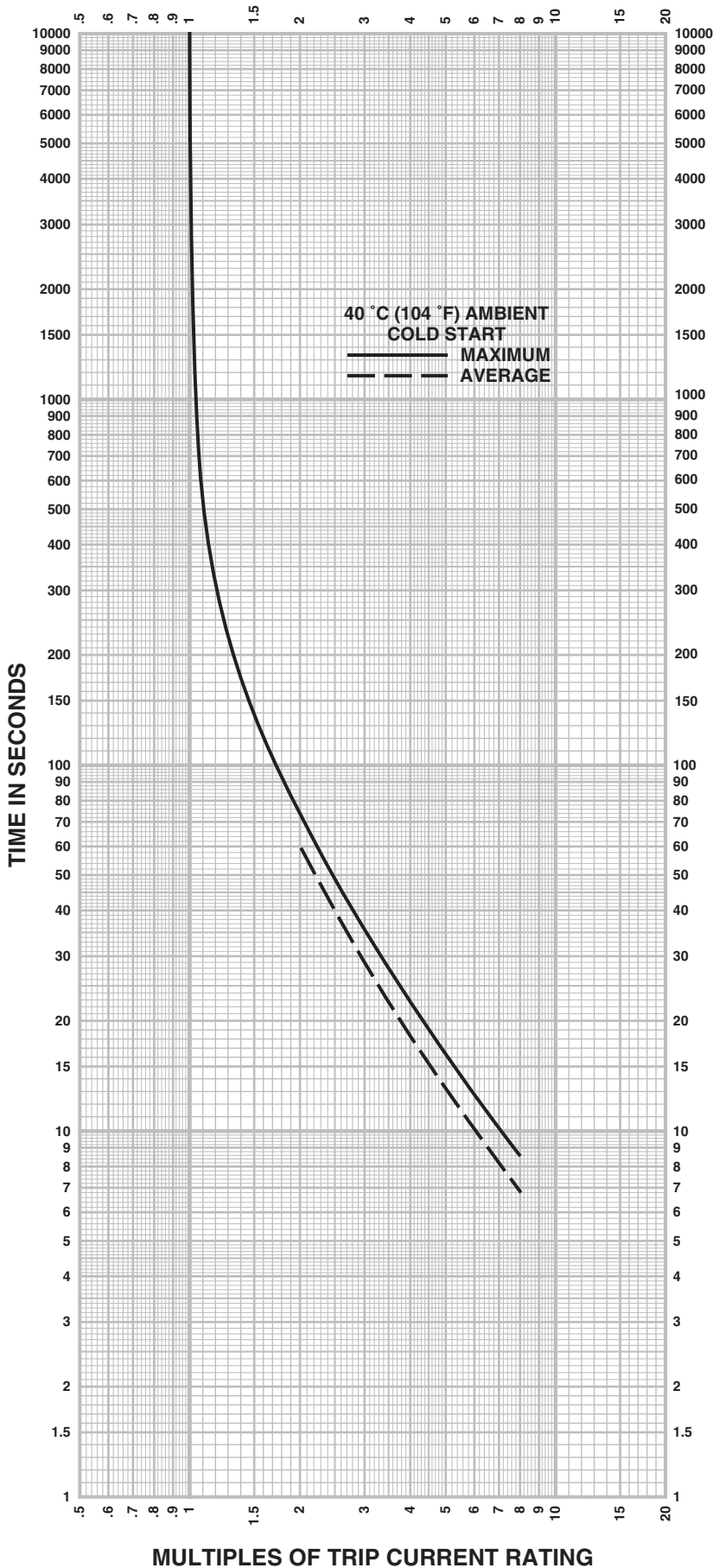
The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

TIME IN SECONDS

TIME IN SECONDS

MULTIPLES OF TRIP CURRENT RATING

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-450**

Relay Design	Melting Alloy
Thermal Unit Types	B0.44–B32

40 °C ambient cold start trip time characteristics of:

Equipment	Separate Overload Relay
Size	25 A
Type	CG & CO
Series	A
Qty. of Thermal Units	1

When installed in:

- Small enclosure (Class 9065 only)
- Hinged door and all other (larger) enclosures

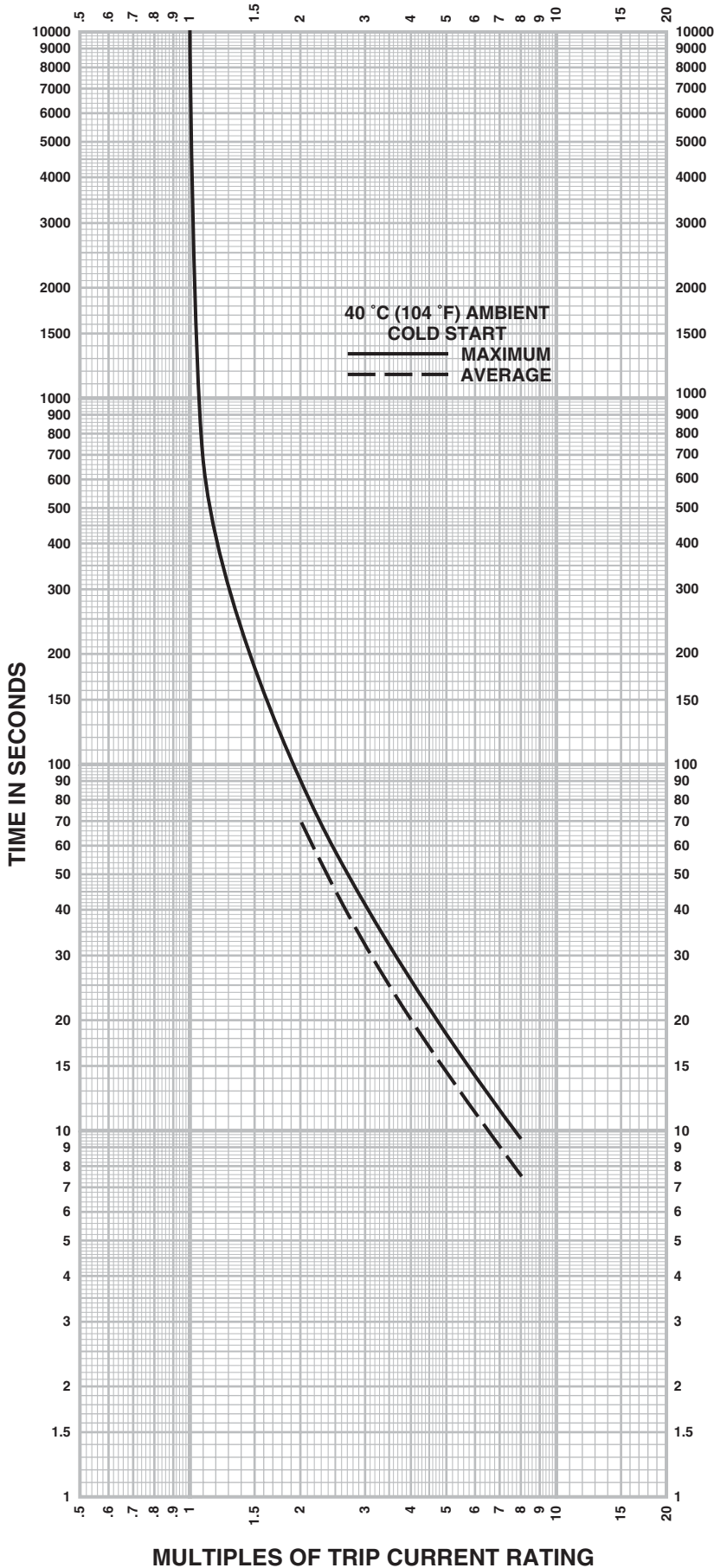
The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

TIME IN SECONDS

TIME IN SECONDS

MULTIPLES OF TRIP CURRENT RATING

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-451**

Relay Design	Melting Alloy
Thermal Unit Types	B0.44–B56

40 °C ambient cold start trip time characteristics of:

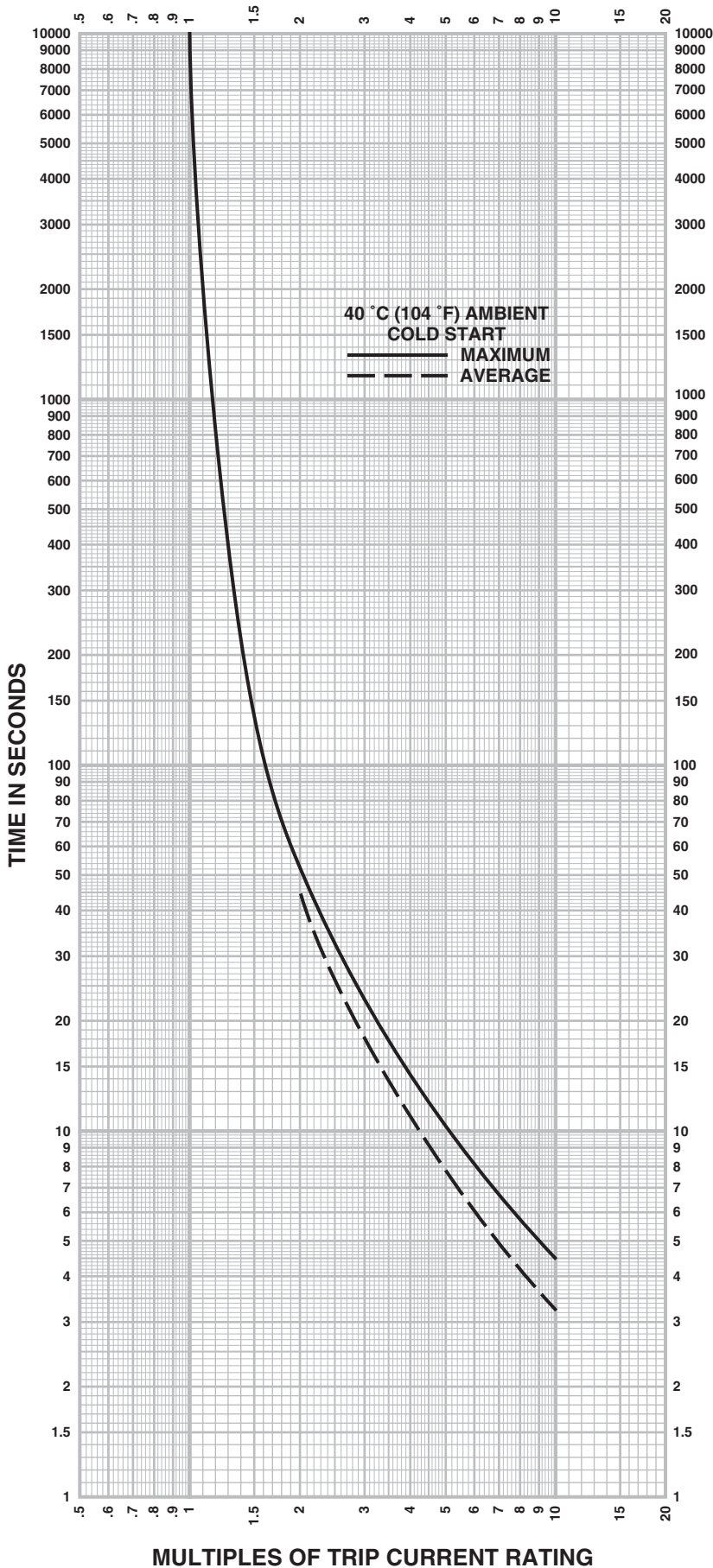
Equipment	Separate Overload Relay
Size	45 A
Type	TG & TO
Series	A
Qty. of Thermal Units	1

When installed in:

- Small enclosure (Class 9065 only)
- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-453**

Relay Design	Melting Alloy
Thermal Unit Types	FB3.33–FB35

40 °C ambient cold start trip time characteristics of:

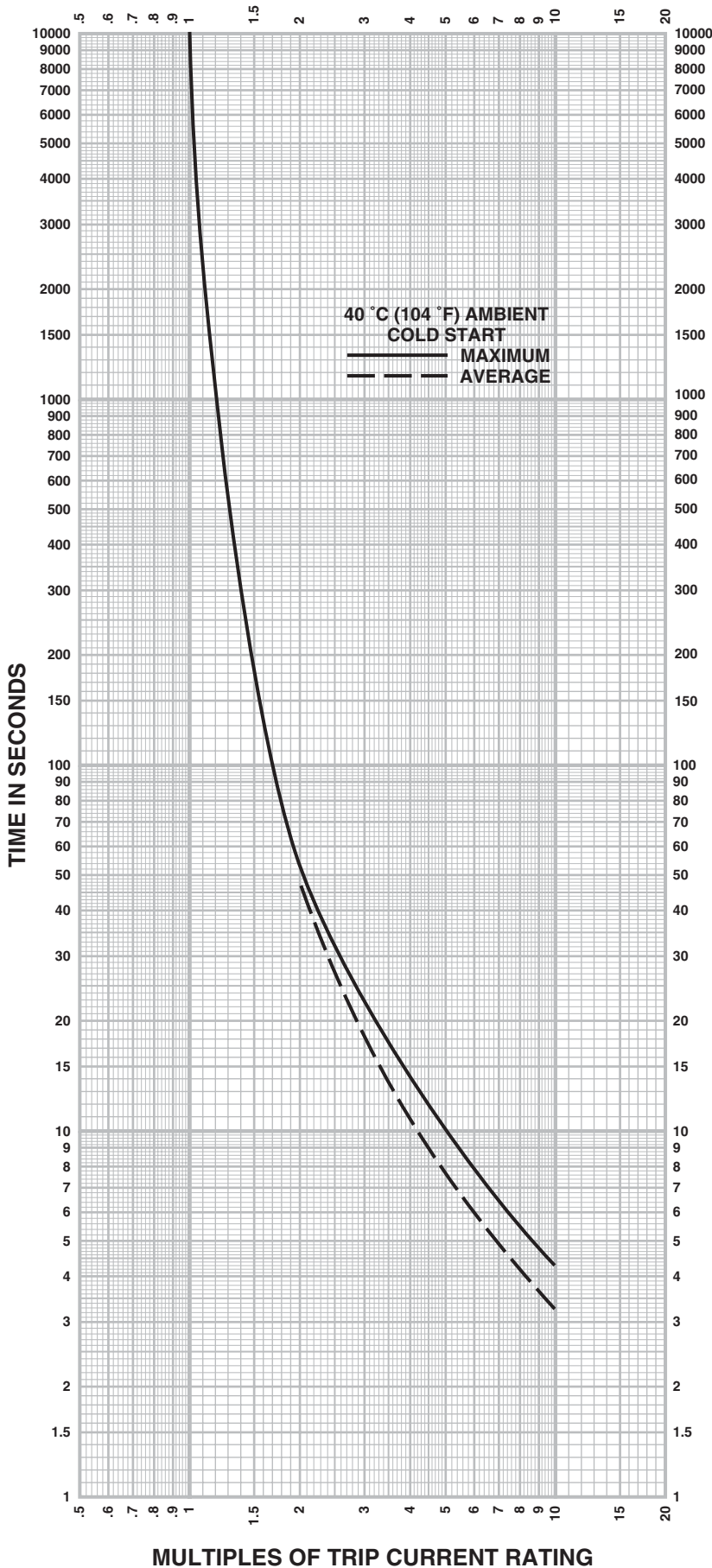
Equipment	AC Magnetic Starter
Size	0 & 1
Type	SB & SC
Series	A
Qty. of Thermal Units	1, 2, or 3

When installed in:

- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-454**

Relay Design	Melting Alloy
Thermal Unit Types	FB3.33–FB38.3

40 °C ambient cold start trip time characteristics of:

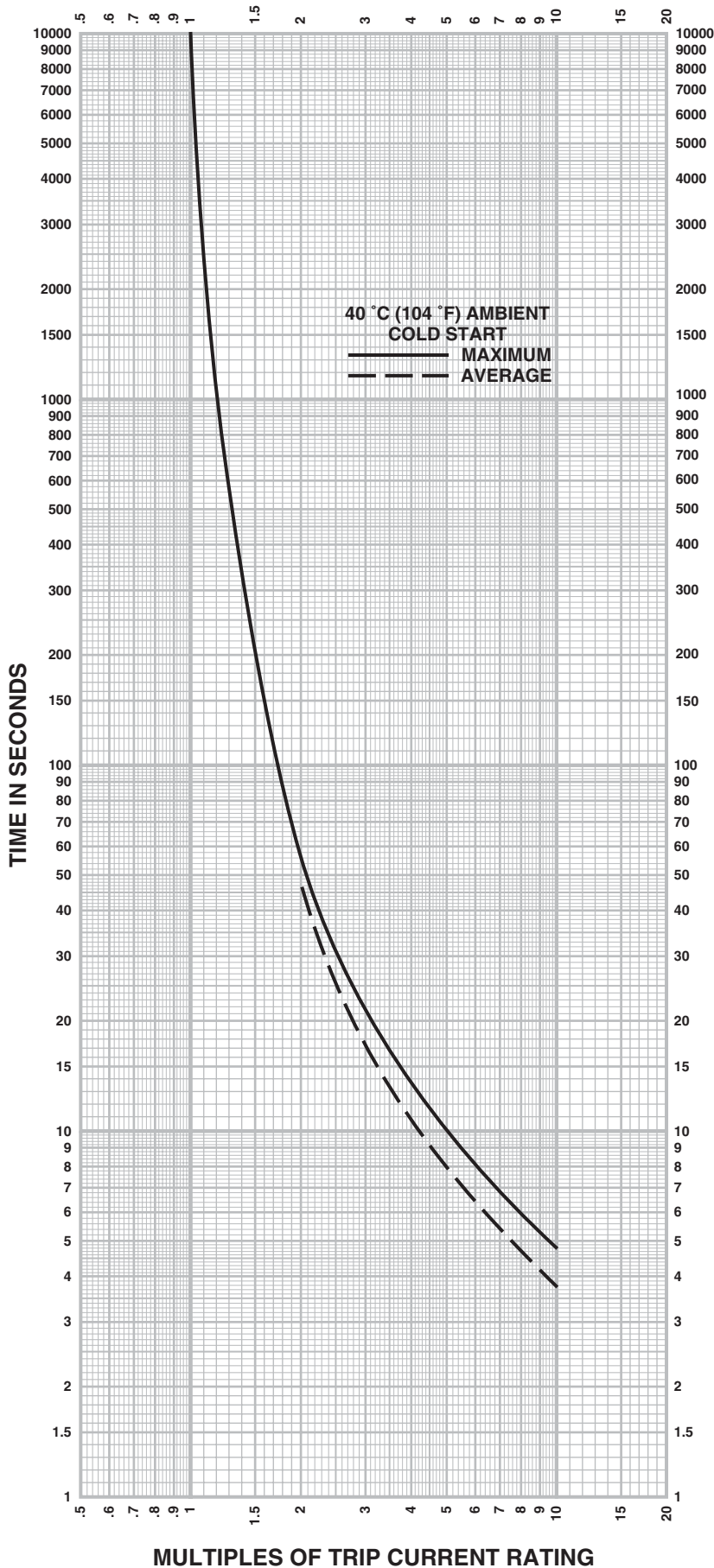
Equipment	AC Magnetic Starter
Size	0 & 1
Type	SB & SC
Series	A
Qty. of Thermal Units	1, 2, or 3

When installed in:

- Small enclosure (Class 8536 only)
- Motor Control Center (Class 8998, 8999, QMB, or I-Line®)

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



MULTIPLES OF TRIP CURRENT RATING

**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-455**

Relay Design	Melting Alloy
Thermal Unit Types	FB4.75–FB55.5

40 °C ambient cold start trip time characteristics of:

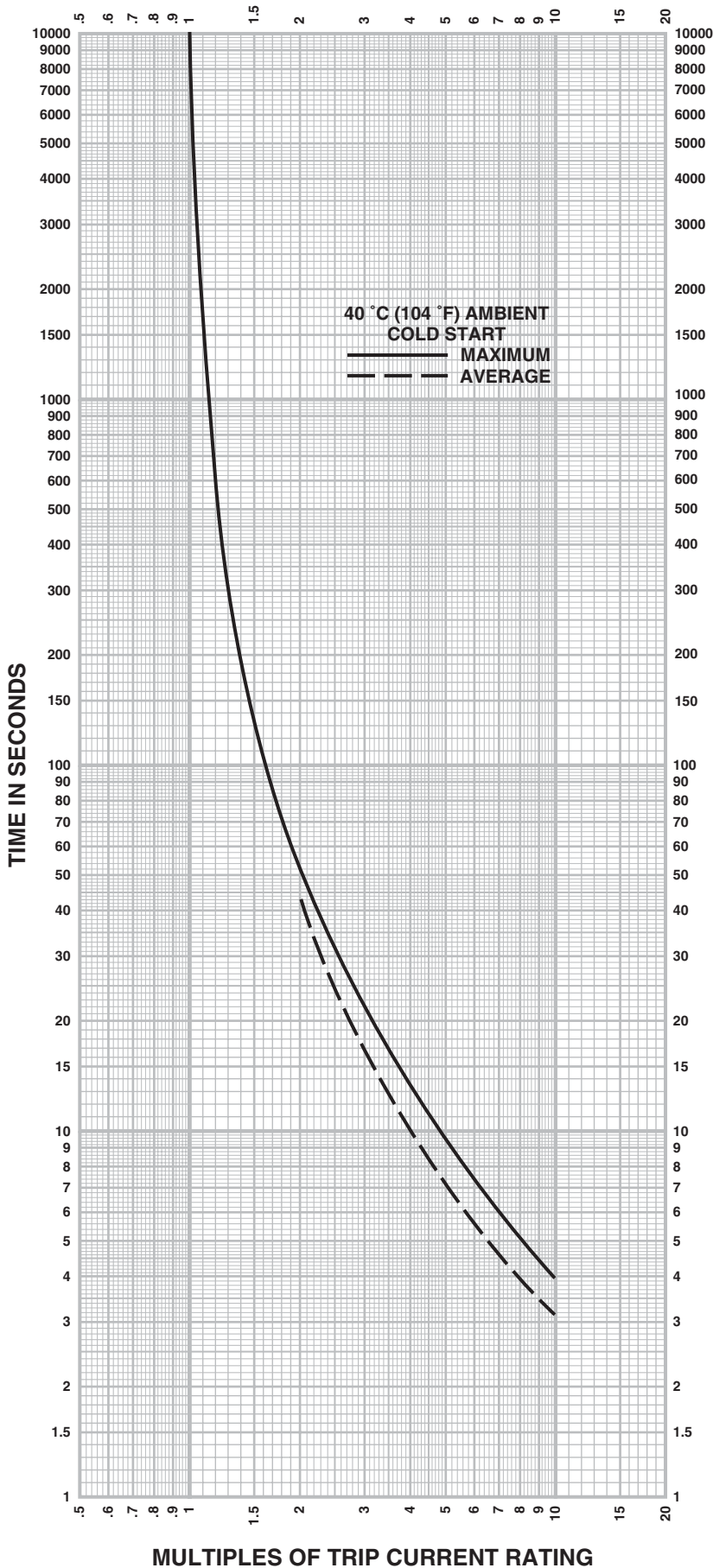
Equipment	AC Magnetic Starter
Size	2
Type	SD
Series	A
Qty. of Thermal Units	1, 2, or 3

When installed in:

- Small enclosure (Class 8536 only)
- Motor Control Center (Class 8998, 8999, QMB, or I-Line®)

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY TIME-CURRENT CHARACTERISTICS REFERENCE DRAWING NO. 30068-456

Relay Design	Melting Alloy
Thermal Unit Types	FB3.33–FB46

40 °C ambient cold start trip time characteristics of:

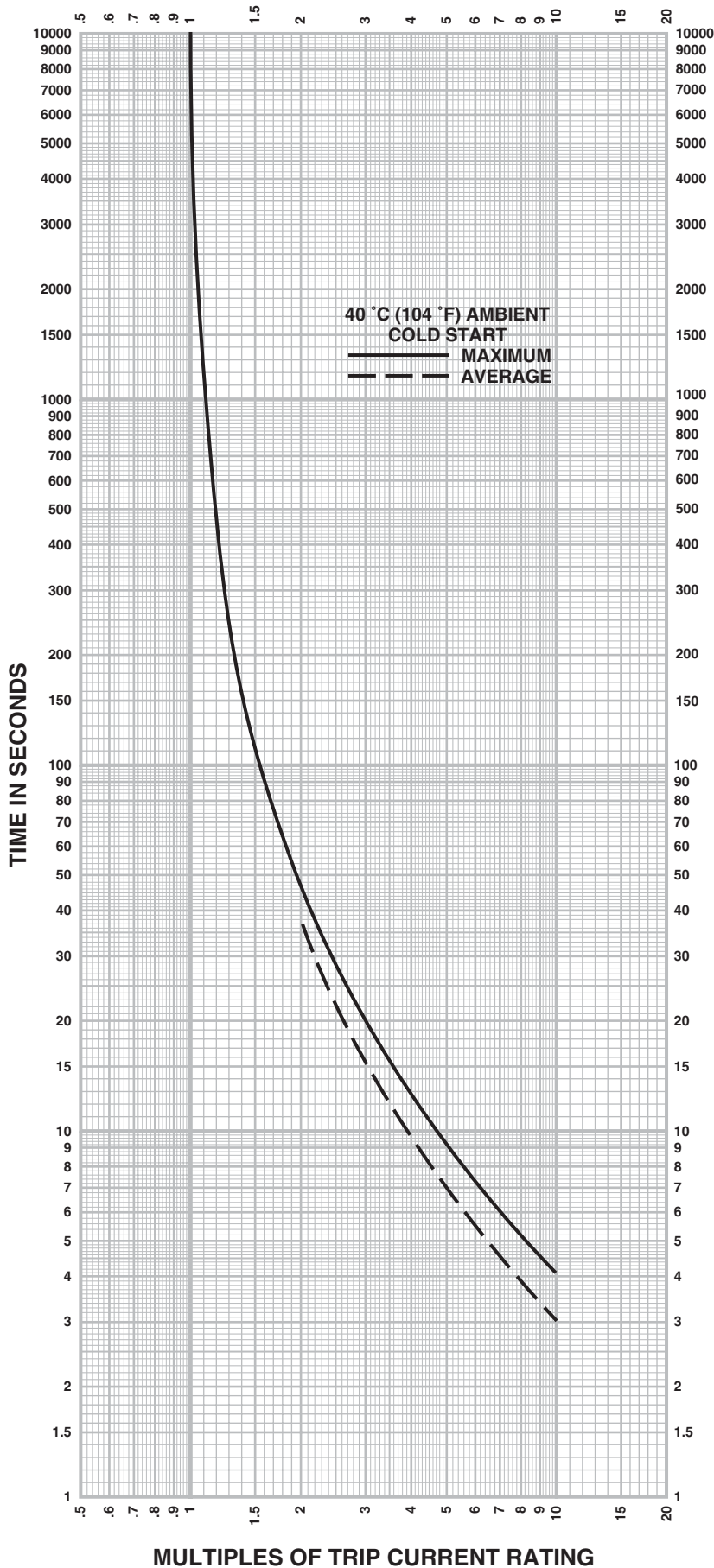
Equipment	AC Manual Starter
Size	M-0, M-1 & M-1P
Type	M & T
Series	A
Qty. of Thermal Units	1, 2, or 3

When installed in:

- Small enclosure (Class 2510 only)

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY TIME-CURRENT CHARACTERISTICS REFERENCE DRAWING NO. 30068-457

Relay Design	Melting Alloy
Thermal Unit Types	FB3.33-FB44

40 °C ambient cold start trip time characteristics of:

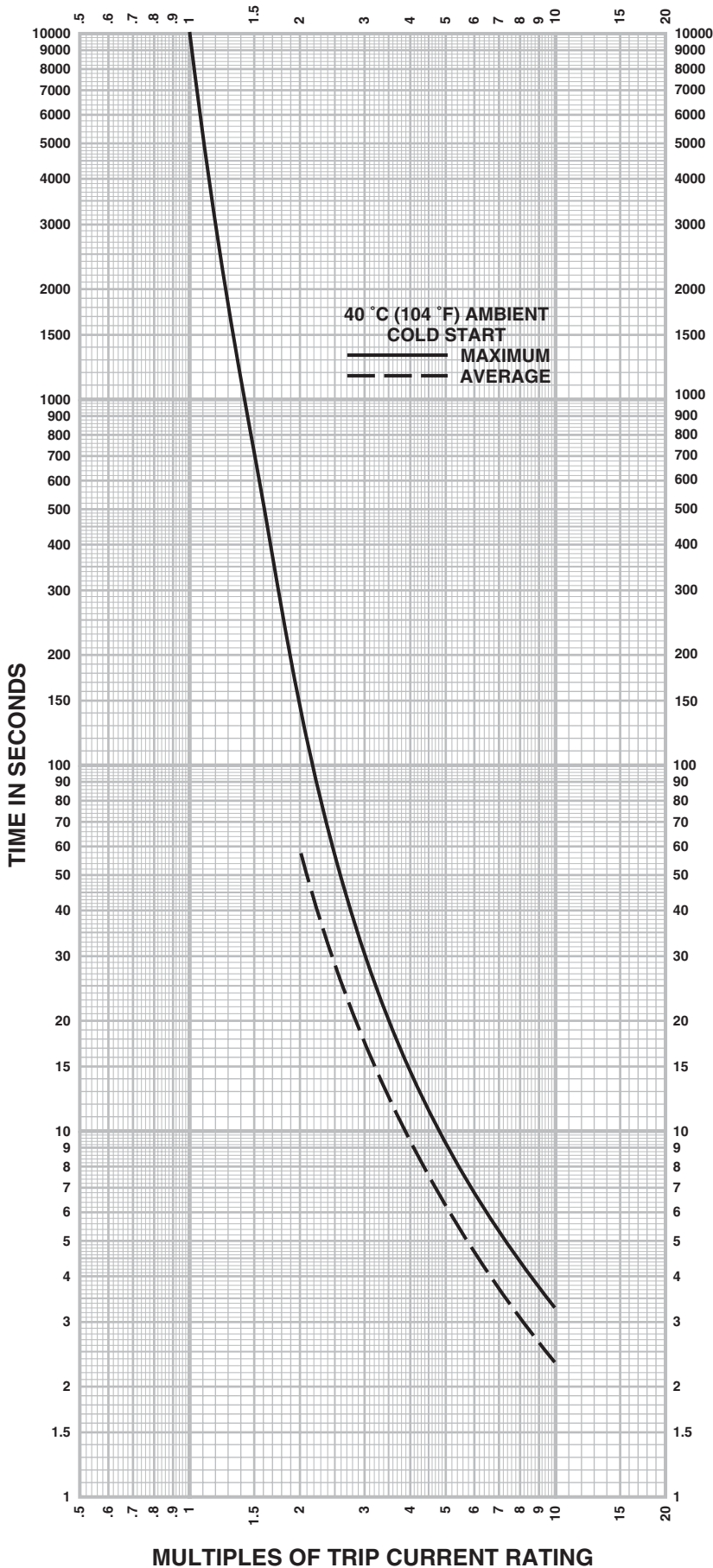
Equipment	AC Manual Starter
Size	M-0, M-1 & M-1P
Type	M & T
Series	A
Qty. of Thermal Units	1, 2, or 3

When installed in:

- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



MULTIPLES OF TRIP CURRENT RATING

**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-458**

Relay Design	Melting alloy
Thermal Unit Types	FB26.7-FB92

40 °C ambient cold start trip time characteristics of:

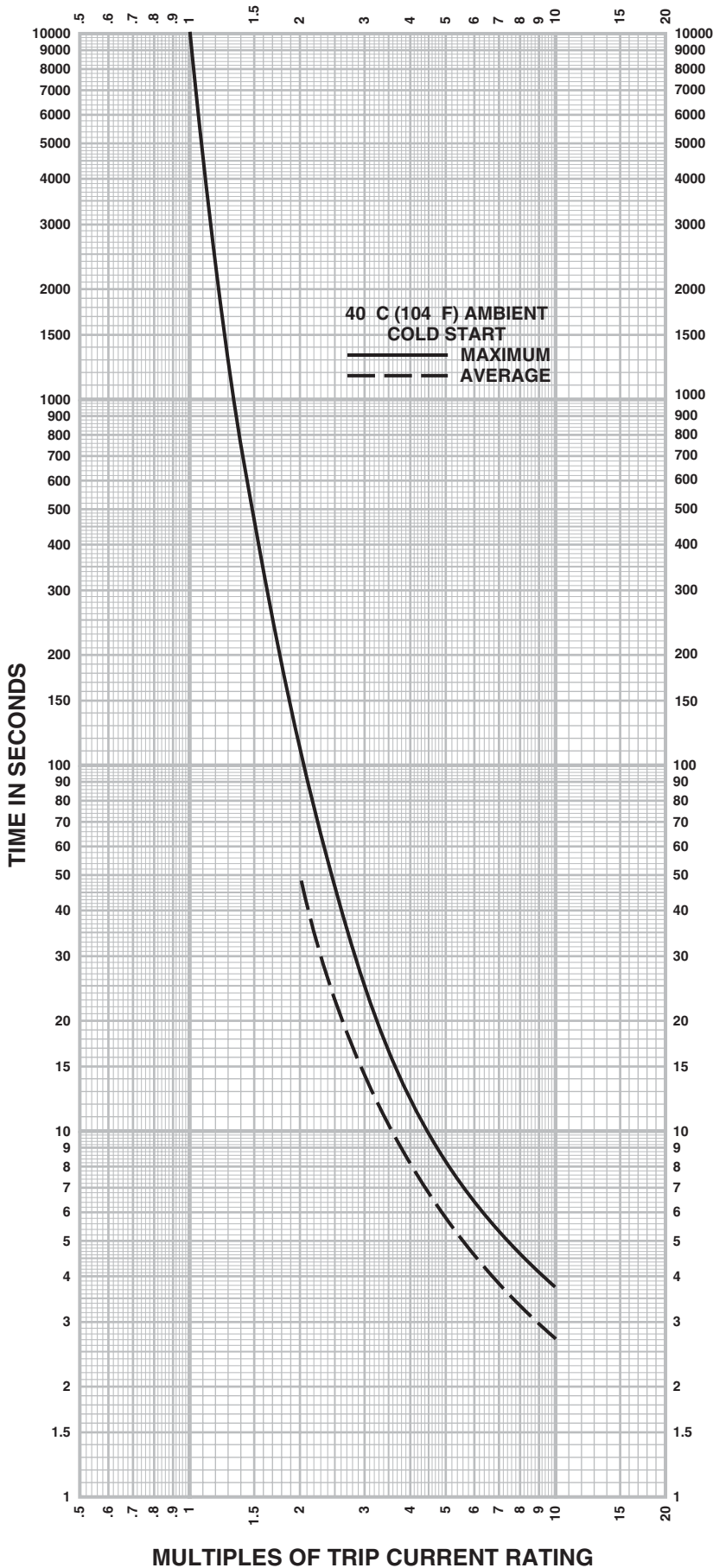
Equipment	AC Magnetic Starter
Size	3
Type	SE
Series	A
Form	Y81
Qty. of Thermal Units	2 or 3

When installed in:

- Small enclosure (Class 8536 only)
- Motor Control Center (Class 8998, 8999, QMB, or I-Line®)

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-459**

Relay Design	Melting Alloy
Thermal Unit Types	FB26.7-FB84

40 °C ambient cold start trip time characteristics of:

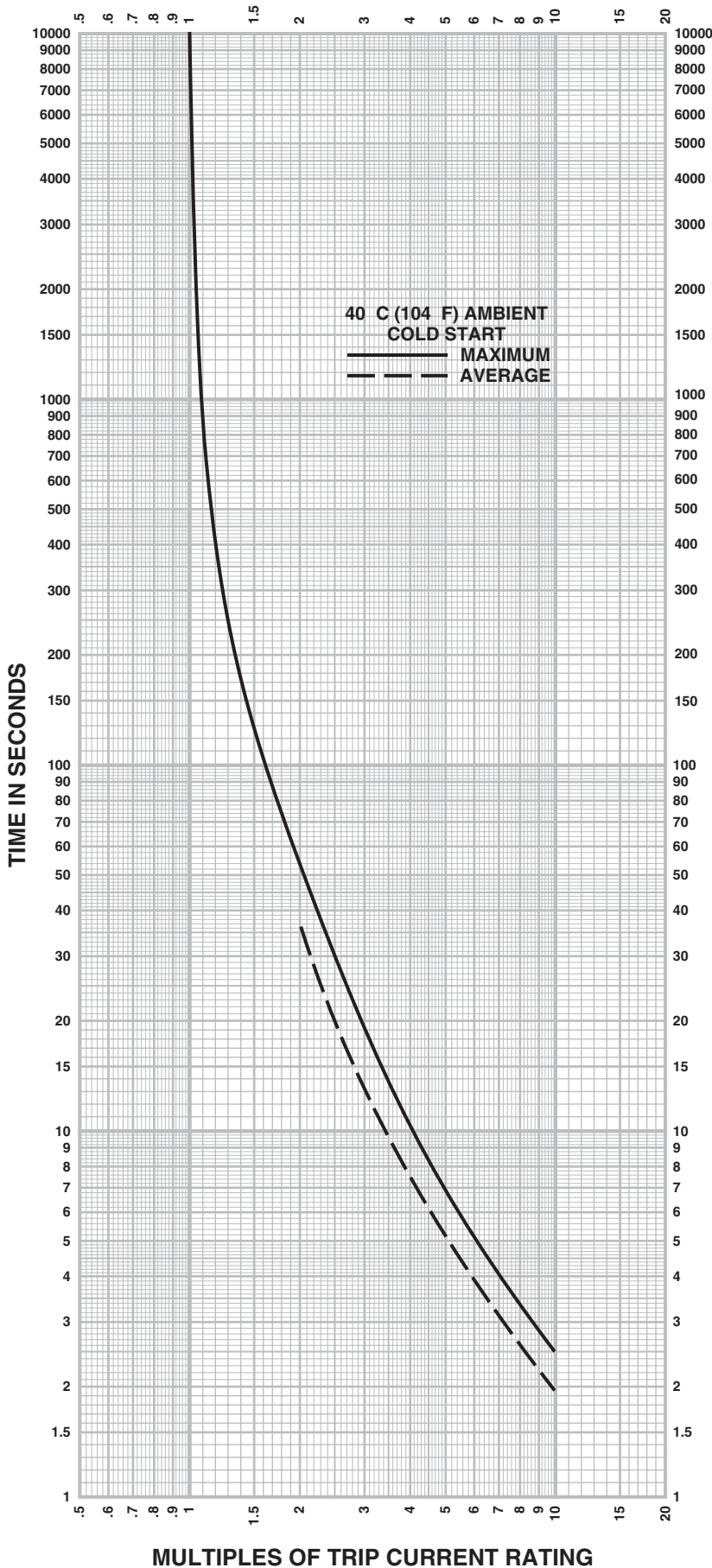
Equipment	AC Magnetic Starter
Size	3
Type	SE
Series	A
Form	Y81
Qty. of Thermal Units	2 or 3

When installed in:

- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-460**

Relay Design	Melting Alloy
Thermal Unit Types	FB50.5–FB115

40 °C ambient cold start trip time characteristics of:

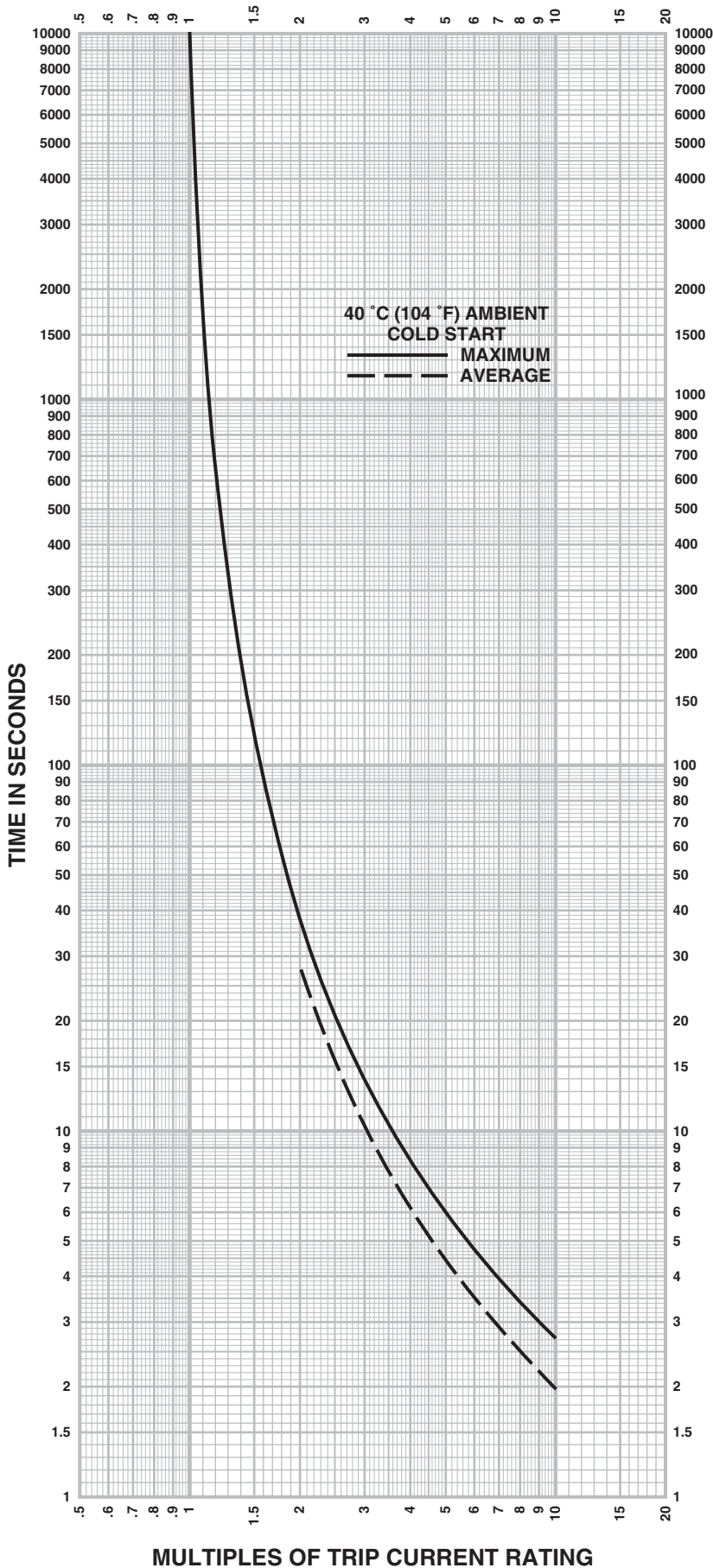
Equipment	AC Magnetic Starter
Size	4
Type	SF
Series	A
Form	Y81
Qty. of Thermal Units	2 or 3

When installed in:

- Small enclosure (Class 8536 only)
- Motor Control Center (Class 8998, 8999, QMB, or I-Line®)

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-461**

Relay Design	Melting Alloy
Thermal Unit Types	FB50.5–FB105

40 °C ambient cold start trip time characteristics of:

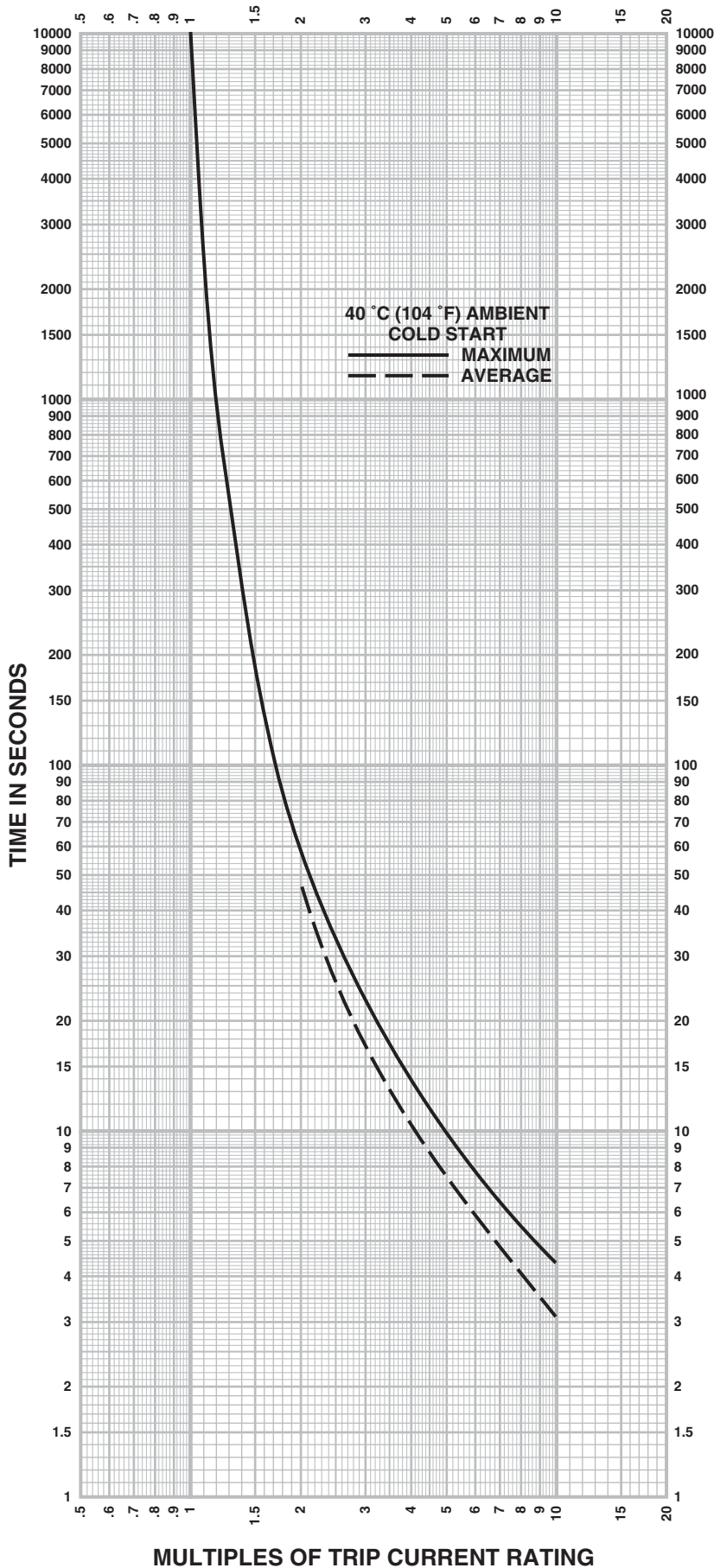
Equipment	AC Magnetic Starter
Size	4
Type	SF
Series	A
Form	Y81
Qty. of Thermal Units	2 or 3

When installed in:

- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



OVERLOAD RELAY TIME-CURRENT CHARACTERISTICS REFERENCE DRAWING NO. 30068-463

Relay Design	Melting Alloy
Thermal Unit Types	FB4.75–FB52.5

40 °C ambient cold start trip time characteristics of:

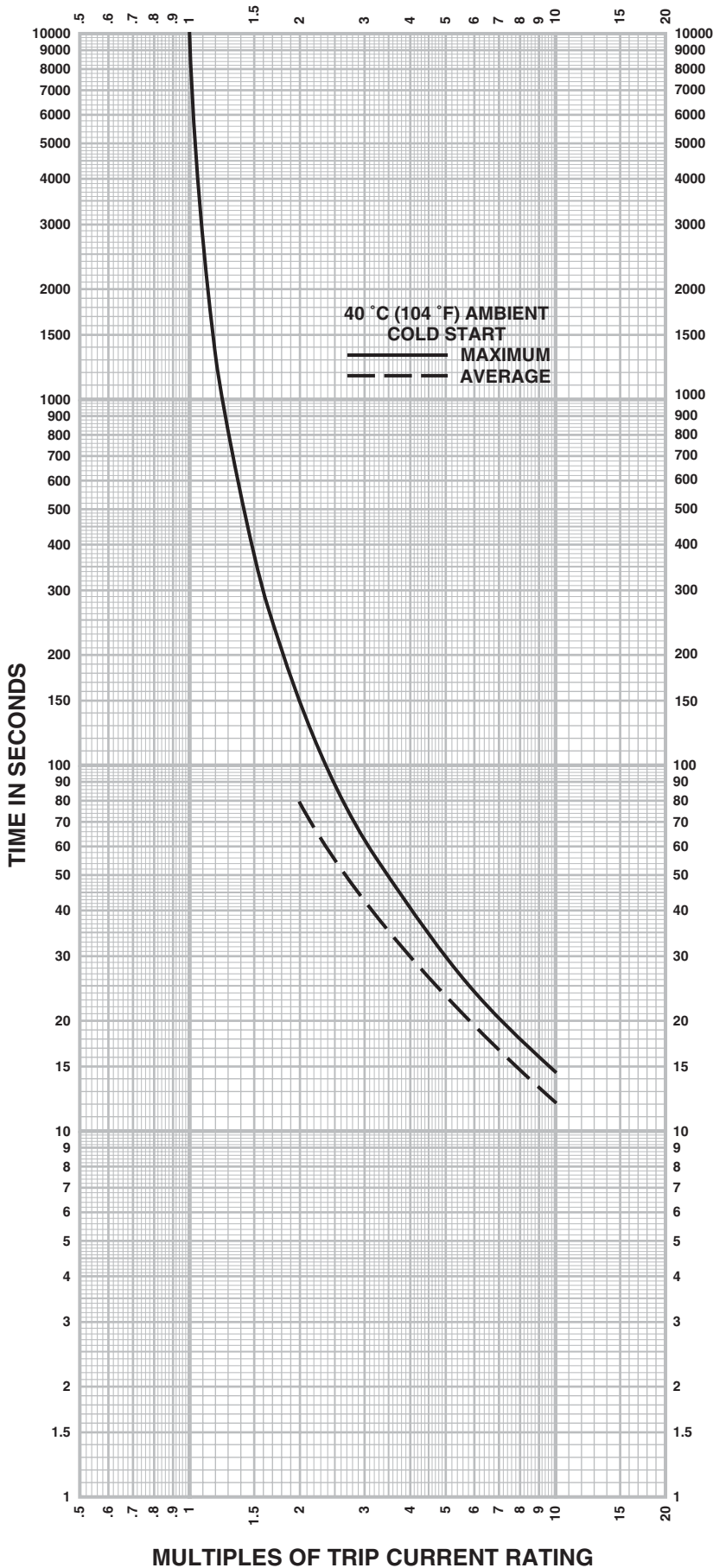
Equipment	AC Magnetic Starter
Size	2
Type	SD
Series	A
Qty. of Thermal Units	1, 2, or 3

When installed in:

- Hinged door and all other (larger) enclosures

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

MULTIPLES OF TRIP CURRENT RATING



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-490**

Relay Design	Melting Alloy
Thermal Unit Types	SB0.44–SB88

40 °C ambient cold start trip time characteristics of:

AC Magnetic Starter	Type S
AC Manual Starter	Type M & T
Separate Overload Relay	Type S, C & T
Qty. of Thermal Units	1, 2, or 3

When installed in:

- Small enclosure
- Motor Control Center (Class 8998, 8999, QMB, or I-Line®)
- Hinged door and all other (larger) enclosures
- Open

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

TIME IN SECONDS

TIME IN SECONDS

MULTIPLES OF TRIP CURRENT RATING

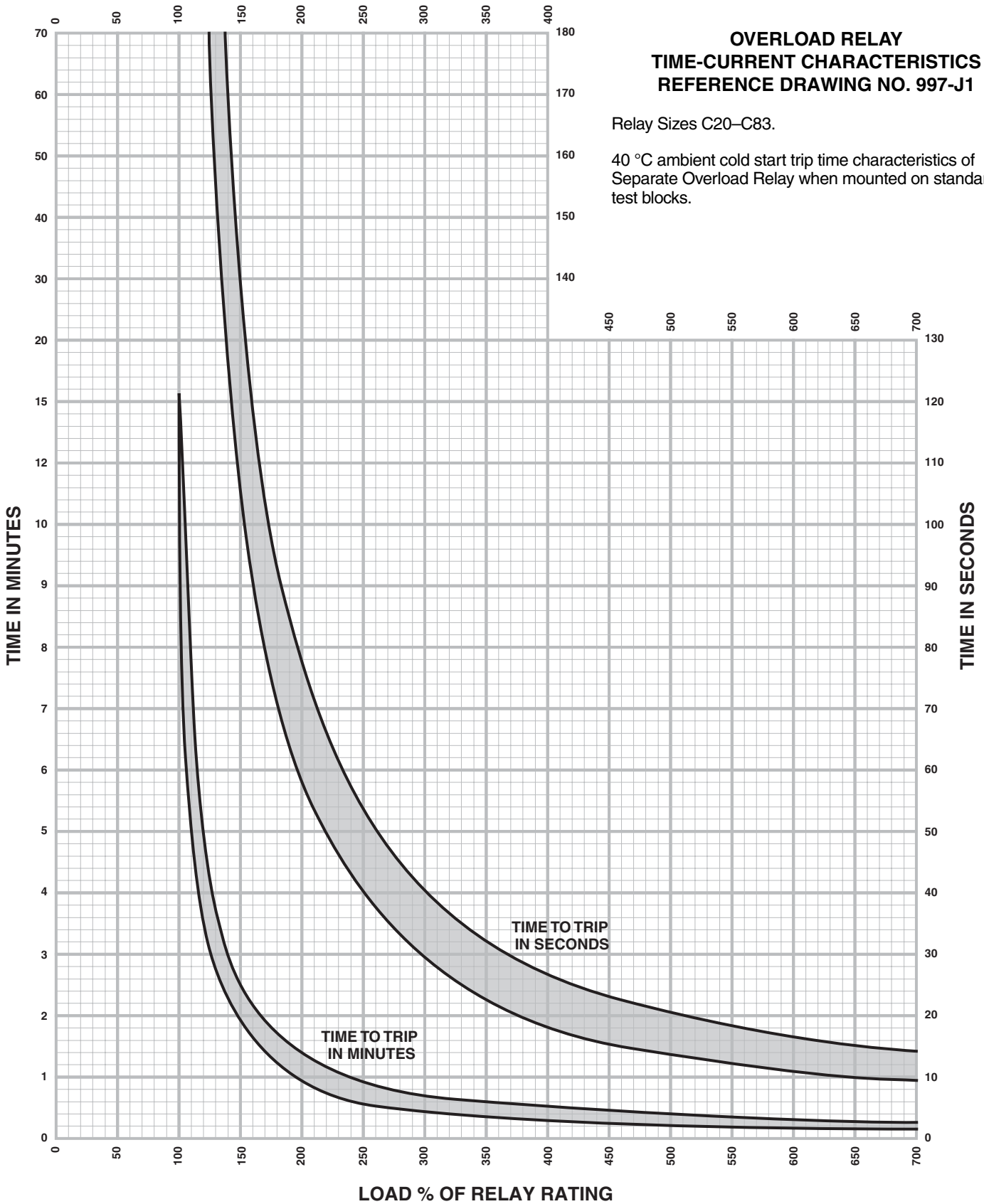


LOAD % OF RELAY RATING

**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 997-J1**

Relay Sizes C20–C83.

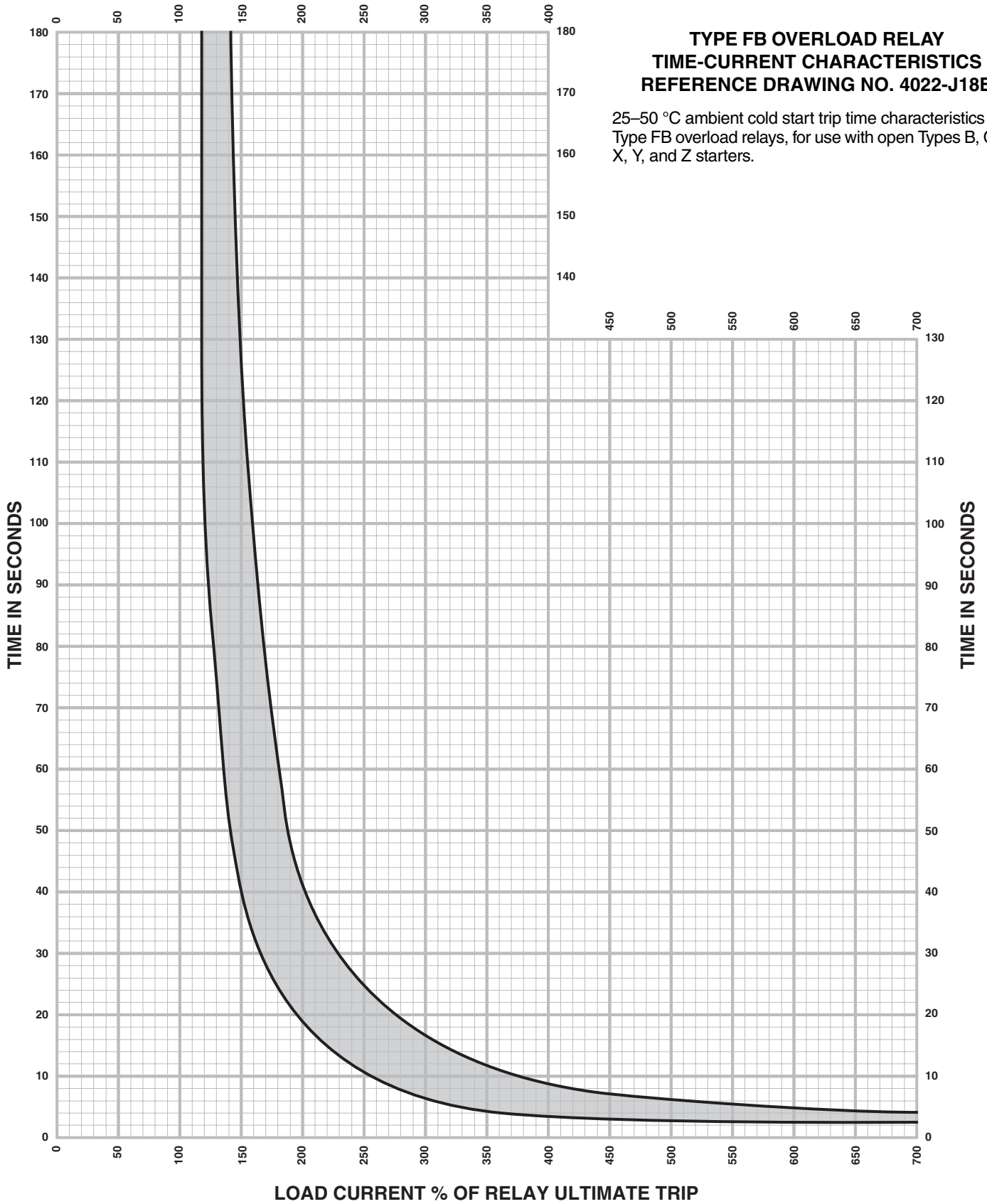
40 °C ambient cold start trip time characteristics of Separate Overload Relay when mounted on standard test blocks.



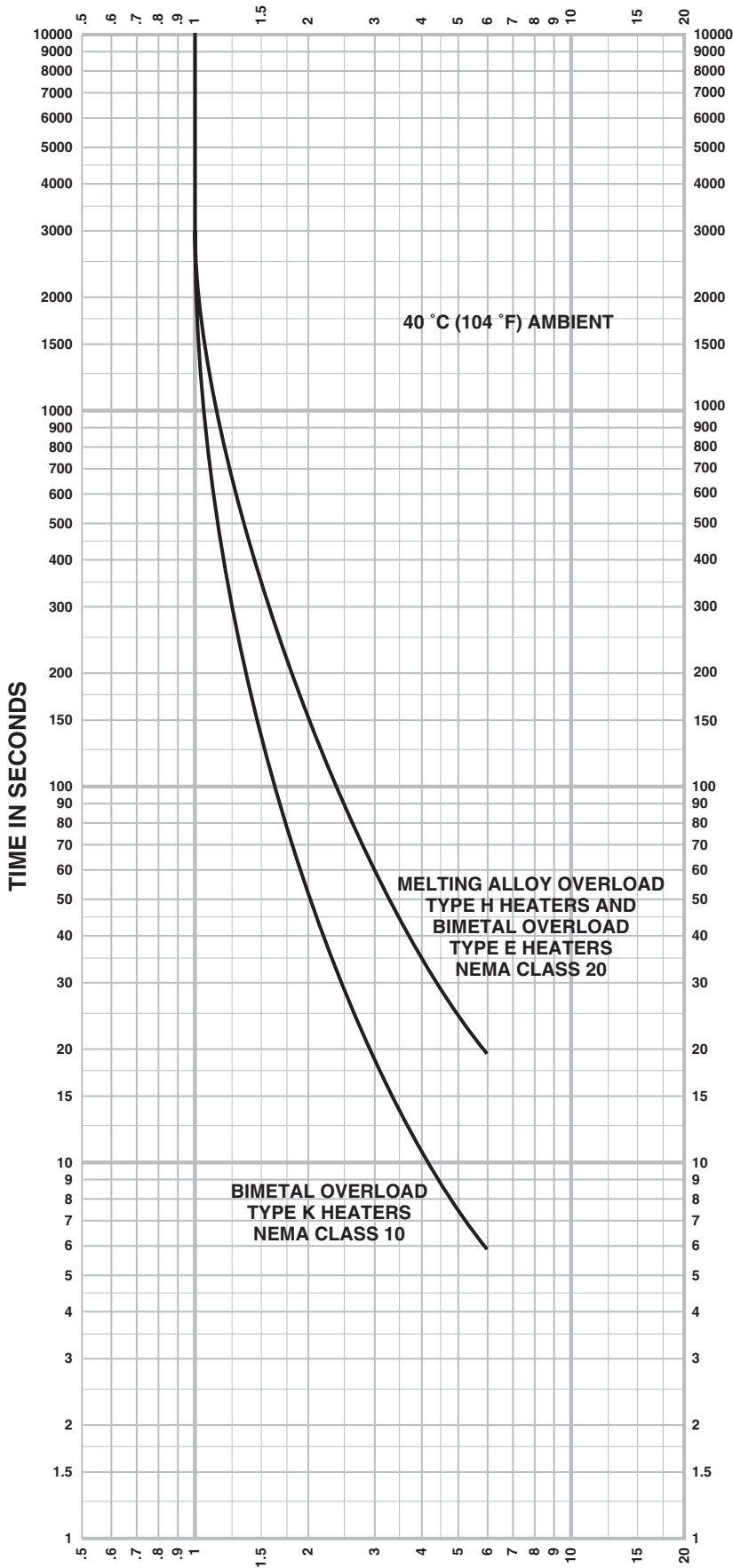
LOAD CURRENT % OF RELAY ULTIMATE TRIP

**TYPE FB OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 4022-J18B**

25–50 °C ambient cold start trip time characteristics of Type FB overload relays, for use with open Types B, C, D, X, Y, and Z starters.



MULTIPLES OF OVERLOAD RELAY TRIP CURRENT RATING



MULTIPLES OF OVERLOAD RELAY TRIP CURRENT RATING

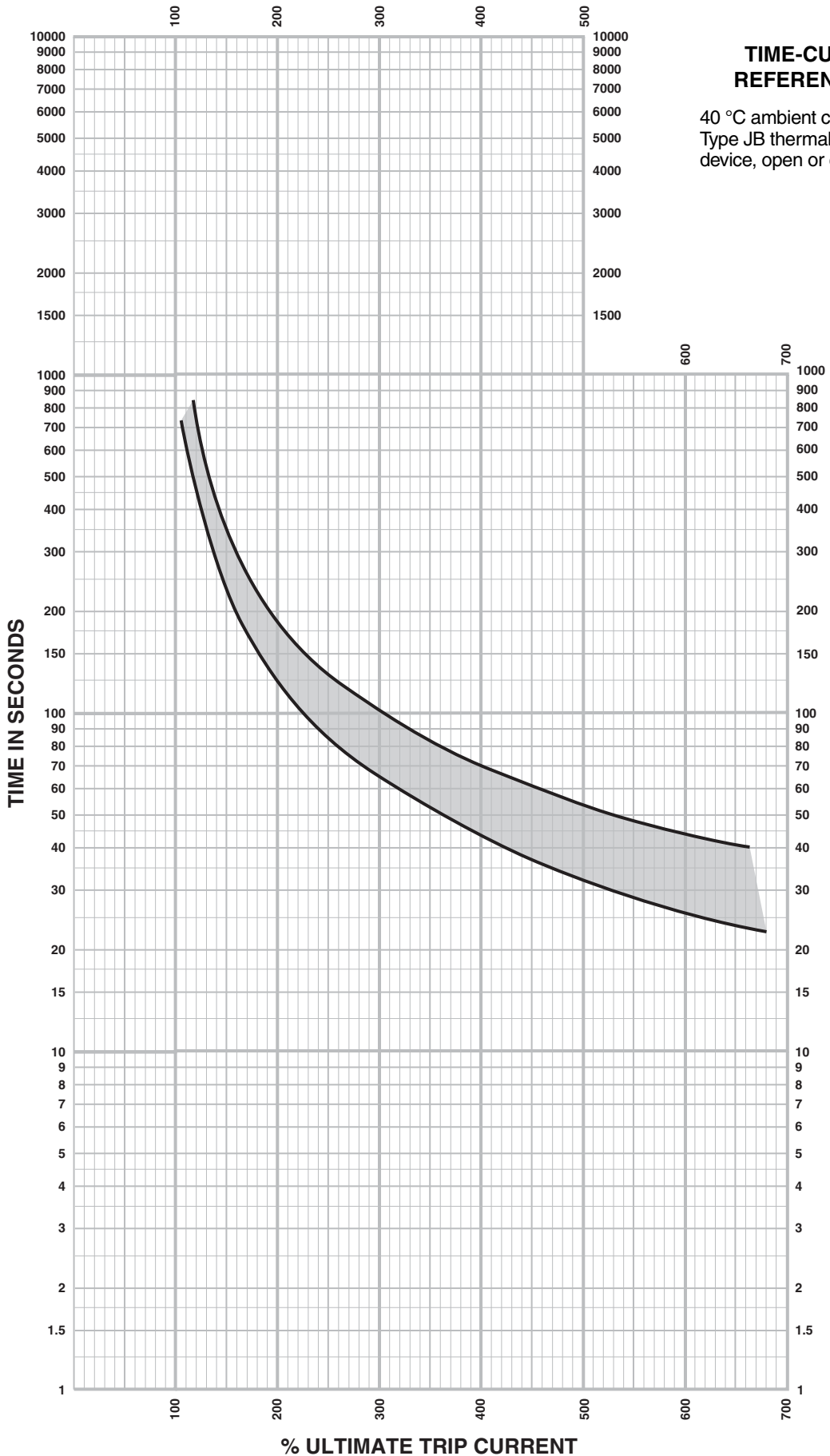
**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-820**

Relay Design	Melting Alloy
Thermal Unit Types	H

Relay Design	Bimetallic
Thermal Unit Types	E (Class 20) K (Class 10)

The trip current rating can be determined from the instructions given with the appropriate thermal unit selection table. The characteristics shown do not necessarily apply to equipment manufactured before the date of the referenced drawing.

% ULTIMATE TRIP CURRENT



**OVERLOAD RELAY
TIME-CURRENT CHARACTERISTICS
REFERENCE DRAWING NO. 30068-810**

40 °C ambient cold start trip time characteristics of Type JB thermal units, 1, 2, or 3 element, on any Type S device, open or enclosed starter, or Class 9065.



Overload Relay Trip Curves

Schneider Electric USA

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Knightdale, NC 27545
1-888-SquareD
(1-888-778-2733)
www.us.SquareD.com

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