Overload Relays and Thermal Unit Selection

Catalog

9065CT9701R03/21

Legal Information

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Overload Relay Selection

Introduction

Overload relays (OLRs) protect motors, controllers, and branch-circuit conductors against excessive heating due to prolonged motor overcurrents, up to and including locked rotor currents.

> **NOTE:** Protection of the motor and the other branch-circuit components from higher currents—due to short circuits or ground faults—is a function of the branch-circuit fuses, circuit breakers, or motor short-circuit protectors.

Electric motors make up a substantial percentage of power system loads. Market demands for reduced downtime and increased productivity compel the motor control industry to continually evaluate motor protection technology. As technology advances, more options for motor protection become available.

This section provides a brief review of traditional motor protection technologies and discusses newer electronic motor protection options. This information should help you understand the available technologies and how to choose the right solution for a given application. Important factors to consider in determining the appropriate overload protection include the following:

- Application requirements
- Cost per feature of a given technology
- Willingness and ability of all parts of your organization to embrace and implement newer technologies

Motor Failure and Protection

Motor failure can result from electrical or mechanical factors. A study commissioned by the Electrical Research Associates (ERA) of the United Kingdom in 1986 indicated that the most common causes of motor failure are:

1. Overcurrent: 30%
2. Contamination: 18%
3. Single Phasing: 15%
4. Bearing Failure: 12%
5. Aging (natural wear): 10%
6. Rotor Fault: 5%
7. Miscellaneous: 7%

Failure modes 1, 3 and 7 are attributable to electrical issues. Failure modes 2, 4, 5 and 6 are the result of mechanical (and some manufacturing) issues.

Historically, motor protection provided with the controller was only able to address the electrical causes of motor failure. These electrical issues account for at least 45% of the most common causes of motor failure.

Motor branch circuits are protected against short-circuits (instantaneous overload currents) and steady-state or low-level, sustained overloads. In the U.S., this protection is provided by the short-circuit protective device (SCPD) and the motor overload relay, when they are applied according to the National Electrical Code® (NEC®).

Trip Class Designation

Regardless of the product style (NEMA or IEC), overload relays respond to overload conditions according to trip curves. These trip curves are defined by the class of protection required (see the table Trip Classes, page 8).

The figure Typical Trip Curves, page 8 shows the three types of trip curves.

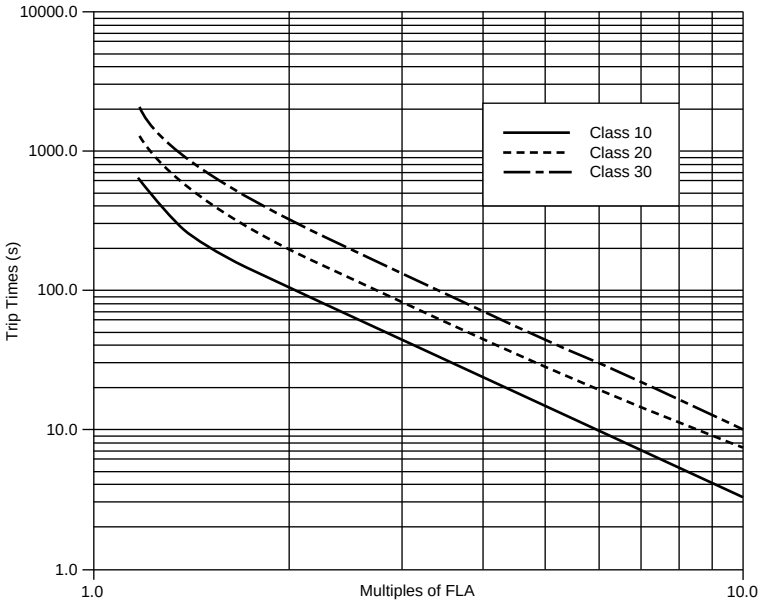
IEC components are typically application rated: the controller is sized very close to its operational limit for a given application. IEC motors are also generally more application rated. For these reasons, Class 10 trip is most common on IEC applications.

Because NEMA products are applied with more built-in excess capacity, the Class 20 trip is most common.

Table 1 - Trip Classes

Class Designation (Marking designation for tripping time at 600% of the current element rating)	**Tripping Time**
Class 10	10 seconds or less
Class 20	20 seconds or less
Class 30	30 seconds or less

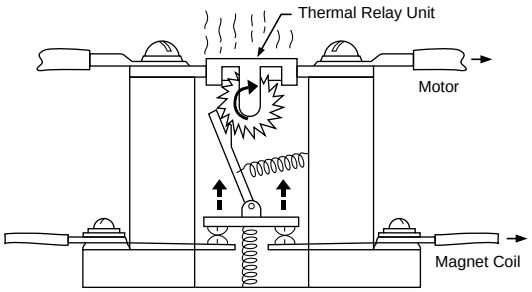
Figure 1 - Typical Trip Curves



Protection of Motor Branch-Circuits

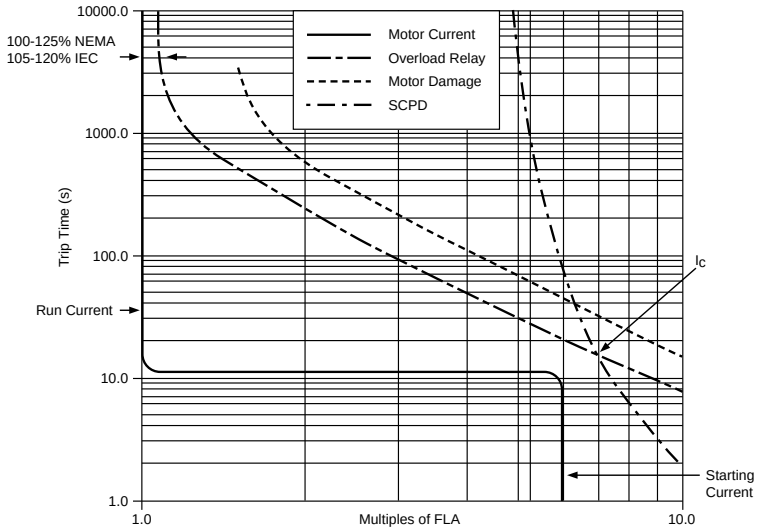
To protect the motor branch-circuit against short-circuits, overload relay protection must be coordinated with protection provided by the short-circuit protective device (SCPD). The SCPD may be a fused switch or a circuit breaker. The figure Typical Coordination Curves, page 9 shows the critical point (I_c) in this coordination.

Figure 2 - Operation of the Melting Alloy Overload Relay



As heat melts the alloy, a ratchet wheel is free to turn. The spring then pushes the contacts open.

Figure 3 - Typical Coordination Curves



At current values greater than I_c, the SCPD reacts quicker than the overload relay. At current values less than I_c, the overload relay reacts quicker. Refer to Articles 110 and 430 of the NEC for guidance in selecting the SCPD. These articles help with coordinating the components of a motor branch-circuit (such as determining the location of point I_c).

Withstand Ratings

Equipment withstand ratings are linked to branch-circuit protection. The same parameters that affect the trip point of a given protective device, also contribute to how much (or how little) let-through energy the device can be exposed to and still function after the clearing of the fault. Withstand does not explicitly show up in Operation of the Melting Alloy Overload Relay, page 9 or Typical Coordination Curves, page 9.

Traditional melting alloy and bimetallic overload relays have been the “weak link” in motor branch-circuit withstand ratings. Since these devices employ sensing elements directly in the current path, electrical faults leading to mechanical stresses are a concern. These devices typically contain small mechanical parts that can quickly become out-of-spec when exposed to let-through energy exceeding their withstand capability.

If the coordinated protection for the circuit operates properly (and the SCPD protects the circuit), the motor and the controller will be protected. The withstand rating of a branch-circuit must account for the withstandability of the lowest rated component in the circuit.

Thermal Overload Relay

In spite of being relatively simple and inexpensive, thermal overload relays are very effective in providing motor-running overcurrent protection. This is possible because the most vulnerable part of most motors is the winding insulation and this insulation is very susceptible to damage by excessively high temperature.

As a thermal model of a motor, the thermal overload relay produces a shorter trip time at a higher current, similar to the way a motor reaches its temperature limit in a shorter time at a higher current. Similarly, in a high ambient temperature, a thermal overload relay trips at a lower current or vice versa, allowing the motor to be used to its maximum capacity in its particular ambient temperature (as long as the motor and overload relay are in the same ambient).

Once tripped, the thermal overload relay will not reset until it has cooled, automatically allowing the motor to cool before it can be restarted.

> **NOTE:** The overload relay must be used in conjunction with a contactor. The overload relay has no power contacts and cannot disconnect the motor by itself. The overload relay control-circuit contact must be wired in series with the contactor coil so the contactor will de-energize the circuit when an overload occurs.

Schneider Electric manufactures three styles of overload relays:

- Melting alloy
- Bimetallic
- Solid-state

Melting alloy is ambient-sensitive and may require additional calculations.

Bimetallic and solid-state overload relays are both ambient-compensated and do not require special derating when in different ambients than the motor itself.

For additional information, see Solid-State Overload Relays, page 12.

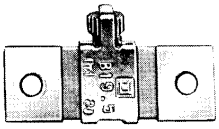
Melting Alloy Overload Relays

In melting alloy overload relays, the motor current passes through a small heater winding. The heater is combined with a solder pot in a one-piece, nontamperable thermal unit. During overload conditions, the heater causes the special solder to melt, allowing a ratchet wheel to spin free. This action opens the control circuit contacts, and the overload relay *trips*.

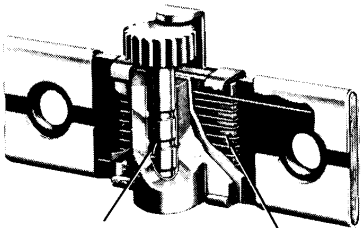
Melting alloy thermal overload relays must be reset manually after they trip. A reset button is usually mounted on the cover of enclosed starters.

Thermal units (heaters) are rated in amperes and are selected on the basis of motor full-load current, not horsepower. To obtain the appropriate tripping current for motors of different sizes, or different full-load currents, a range of thermal units is available.

Figure 4 - Melting Alloy Thermal Unit



One-Piece Thermal Unit



Solder pot (heat sensitive element) is an integral part of the thermal unit. It provides accurate response to overload current, yet prevents nuisance tripping.

Heating winding (heat producing element) is permanently joined to the solder pot. This helps ensure proper heat transfer and avoid the possibility of misalignment in the field.

Automatic Reset

These overload relays are field convertible from hand reset to automatic reset and vice-versa. On automatic reset, after tripping, the contacts automatically reclose when the overload relay has cooled down. This is an advantage when the overload relays are inaccessible.

However, automatic reset of overload relays should not normally be used with two-wire control. With this arrangement, after an overload relay trip, the motor restarts when the overload relay contacts reclose. This can result in the possibility of danger to personnel. The unexpected restarting of a machine can cause the operator or maintenance personnel to be in a hazardous situation while attempting to find out why the machine has stopped.

In addition, if the cause of the overload has not been resolved, when the motor restarts, the overload relay will trip again. This cycle will repeat, and eventually the motor will burn out due to the accumulated heat from the repeated inrush and overload current.

Ambient-Temperature Compensated Bimetallic Overload Relays

Ambient-compensated bimetallic overload relays are designed for one particular situation: that is, when the motor is at a constant ambient temperature, but the controller is located separately in a varying ambient temperature. In this case, if a standard thermal overload relay were used, it would not trip at the same level of motor current if the controller temperature changed.

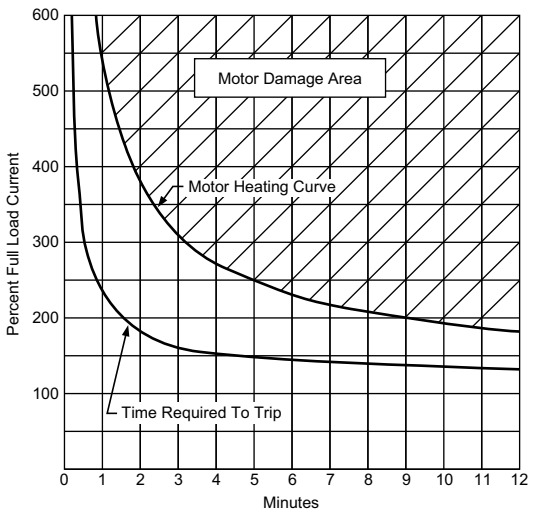
The standard thermal overload relay is always affected by the surrounding temperature. To compensate for temperature variations, an ambient-compensated overload relay is used. Its trip point is not affected by temperature, and it performs consistently at the same value of current.

Thermal Overload Relay Trip Characteristics

Melting alloy and bimetallic overload relays are designed to approximate the heat actually generated in the motor. As the motor temperature increases, so does the temperature of the thermal unit. The motor and relay heating curves (in the figure Overload Relay Trip Curve, page 12) show this relationship. When properly applied, no matter how high the current drawn, the overload relay provides protection without tripping unnecessarily.

See the figure Overload Relay Trip Curve, page 12 for the motor heating curve and overload relay trip curve. The curves show the overload relay tripping before motor damage occurs.

Figure 5 - Overload Relay Trip Curve



Solid-State Overload Relays

The solid-state overload relay (SSOLR) offers some substantial advantages as compared to the traditional NEMA devices, since thermal units are not required:

- The user does not have to be skilled at the thermal unit selection.
- Thermal units do not need to be stocked for repair or replacement.
- Installation time for a starter or separate overload relay can be reduced by 20% to 30%.

The SSOLR, when operated within its operating temperature range, does not require ambient compensation. Only the level of current drawn by the motor affects the tripping of the device.

SSOLRs are typically available as part of a starter or as a separate component. This adds to the flexibility of their application and mounting. Some SSOLRs are designed

to retrofit melting alloy or bimetallic devices from the same manufacturer. This flexibility offers you a migration path to the more advanced technology. Backward compatibility can be useful if you decide to standardize on the newer technology, and you wish to upgrade the existing installed base.

Product selection and application are not dramatically different from the traditional melting alloy or bimetallic devices. The mounting and the appearance are also similar to the traditional devices.

Phase Loss and Phase Unbalance

The most important feature offered by a solid-state overload relay (SSOLR) is phase loss protection. When a phase loss causes a significant current increase in the remaining phases of the motor circuit, there is a major increase in rotor current that can cause motor damage.

The time it takes for a melting alloy device to trip is determined only by the level of current in the remaining phases. The majority of the motors installed (world-wide) run at about 70% of their full-load capability. In these situations, the phase loss condition may result in a level of current in the remaining phases just slightly above the actual FLA of the motor and, therefore, only slightly above the rating of the thermal unit. Therefore, it could take a substantial amount of time for the melting alloy device in this application to respond to phase loss.

The bimetallic device offers a limited form of phase loss protection by means of a differential tripping mechanism, where the device trips slightly faster when an overload is detected on only two of the phases. This device contrasts with an SSOLR with phase loss protection, which trips in less than 3 seconds and alerts the operator of a potential distribution system problem in advance of motor failure. Consequently, the problem does not propagate to affect other equipment on the system.

The SSOLR also provides phase unbalance protection, where the device trips if the current on any phase is 25% greater than the average of all three phases. Phase unbalances are typically caused by an unbalanced upstream single-phase load that can disturb phase voltages. This condition can also lead to excessive rotor currents and motor damage.

Thermal Overload Relay Selection

Class 9065

NEMA Melting Alloy Overload Relay Selection Tables

Figure 6 - Type SEO5

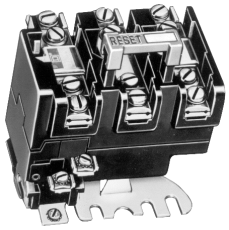
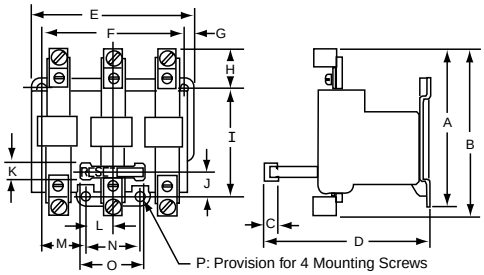


Figure 7 - Type SEO Dimensions



NEMA style thermal overload relays feature:

- Exclusive one-piece thermal unit
- Inverse time delay trip
- Trip-free reset mechanism
- Replaceable contact units

NOTE: These overload relays do not include thermal units, which must be ordered and field installed separately. Slow-trip (Class 30) and quick-trip (Class 10) melting alloy thermal units are available for all Size 1, 2, 5 and 6, and some Size 3 applications. For more information on thermal unit trip types, see the table Thermal Unit Trip Types, page 47.

Table 2 - Separate Mounting—Melting Alloy Overload Relays—600 V Maximum, AC or DC[1]

NEMA Size	Maximum Full Load Current (A)	Open Type for Separate Panel Mounting Left and Right Hand Types	Open Type Relay and Bracket Kit for Terminal Block Channel Mounting Type
NOTE: 3-pole construction (One Common N.C. Contact on Type S Only)—3 Thermal Units Required			
00–1	25	9065SEO5	9065SM2
2	45	9065SEO8	9065SM2
3	86	9065SEO12	—
4	133	9065SEO15	—

1. The maximum power circuit rating for Type S separate-mounting overload relays is 600 Vac only. The maximum control circuit contact rating for Type S versions is 600 Vac only.

Table 3 - Replacement Melting Alloy Overload Relays for Class 8536 Starters

Locate Class 8536 Starter in this Column				Order Class 9065 Overload Relay from this Column	
NEMA Size	**Type**	**Series**	**Number of Poles**	**Type**	**Number of Thermal Units Required**
00	SA	A & B	2	9065SDO4	1
			3	9065SDO5	3
0	SB	A	2	9065SDO4	1
			3–5	9065SDO5	3[2]
1	SC	A	2	9065SDO4	1
			3–5	9065SDO5	3[2]
1P	SC	A	2	9065SDO10	1
2	SD	A	2	9065SDO7	1
			3–5	9065SDO8	3[2]
3	SE	A	2	9065SDO11	1
			3	9065SDO12	3
			4	9065SDO13	2
			5	9065SDO14	3
4	SF	A	3	9065SDO15	3
			4	9065SDO16	2
			5	9065SDO17	3
5	SG	B [3]	3	9065SEO5	3
6	SH	A & B	3	9065SEO5	3

Table 4 - Special Features for Melting Alloy Overload Relays

Description	Form
Substitute 1-N.O. isolated alarm contact and 1-N.C. contact per relay. (Type S starters only)[4]	Y342
Substitute 2-N.C. contacts for standard N.C. contact per relay. (Type S starters only)[4]	Y344
Modify Type SDO12 relays to accept Type FB quick-trip or SB slow-trip thermal units. (Rejects Type CC standard trip units)[5]	Y81

2. For 4-pole starters used on two-phase systems, order two thermal units plus one Class 9998 Type SO31 jumper strap kit for every two starters. Each kit includes two jumper straps.
3. Also used for Series A with Form Y500. For series A without Forms, see .
4. Field modification possible. Order 9999S04 (for **Form Y342**) or 9999S05 (for **Form Y344**).
5. This Form cannot be field modified.

NOTE: These dimensions are for reference only. If you need precise measurements, contact the Customer Care Center at 1-888-778-2733.

Table 5 - NEMA Style Melting Alloy Overload Relays, Dimensions A–H

Type	Dimensions (in.)								Shipping Weight (lb)
	A	B	C	D	E	F	G	H	
SEO5	3.31	—	0.47	3.97	3.53	2.81	0.22	0.69	1
SEO8	3.31	—	0.47	3.97	3.5	2.81	0.19	0.69	1.25
SEO12	—	5.59	0.56	5.75	5.31	4.75	0.28	1.44	3
SEO15	—	6.97	0.56	5.75	5.31	4.75	0.28	2.13	4

NOTE: These dimensions are for reference only. If you need precise measurements, contact the Customer Care Center at 1-888-778-2733.

Table 6 - NEMA Style Melting Alloy Overload Relays, Dimensions I–P

Type	Dimensions (in.)								Shipping Weight (lb)
	I	J	K	L	M	N	O	P	
SEO5	2.31	0.5	0.5	0.5	0.84	1	1.38	#10	1
SEO8	2.31	0.5	0.5	0.13	0.84	1	1.38	#10	1.25
SEO12	3.56	0.75	0.56	0.88	1.5	1.75	2	#1/4	3
SEO15	3.56	0.75	0.56	0.88	1.5	1.75	2	#1/4	4

Separate Mounting—Melting Alloy Overload Relays

Table 7 - Separate Mounting—Melting Alloy—600 V Maximum, AC or DC[6]

NEMA Size	Maximum Full Load Current (A)	Open Type for Separate Panel Mounting Left and Right Hand Types	Open Type Relay and Bracket Kit for Terminal Block Channel Mounting Type
NOTE: 3-pole construction (One Common N.C. Contact on Type S Only)—3 Thermal Units Required			
00–1	25	9065SEO5	9065SM2
2	45	9065SEO8	9065SM2
3	86	9065SEO12	—
4	133	9065SEO15	—

6. The maximum power circuit rating for Type S separate-mounting overload relays is 600 Vac only. The maximum control circuit contact rating for Type S versions is 600 Vac only.

Replacement Melting Alloy Overload Relays for Class 8536 Starters

Table 8 - Replacement Melting Alloy Overload Relays for Class 8536 Starters

Locate Class 8536 Starter in this Column				Order Class 9065 Overload Relay from this Column	
NEMA Size	**Type**	**Series**	**Number of Poles**	**Type**	**Number of Thermal Units Required**
00	SA	A & B	2	9065SDO4	1
			3	9065SDO5	3
0	SB	A	2	9065SDO4	1
			3–5	9065SDO5	3[7]
1	SC	A	2	9065SDO4	1
			3–5	9065SDO5	3[7]
1P	SC	A	2	9065SDO10	1
2	SD	A	2	9065SDO7	1
			3–5	9065SDO8	3[7]
3	SE	A	2	9065SDO11	1
			3	9065SDO12	3
			4	9065SDO13	2
			5	9065SDO14	3
4	SF	A	3	9065SDO15	3
			4	9065SDO16	2
			5	9065SDO17	3
5	SG	B [8]	3	9065SEO5	3
6	SH	A & B	3	9065SEO5	3

Special Features for Melting Alloy Overload Relays

Table 9 - Special Features for Melting Alloy Overload Relays

Description	Form
Substitute 1-N.O. isolated alarm contact and 1-N.C. contact per relay. (Type S starters only)[9]	Y342
Substitute 2-N.C. contacts for standard N.C. contact per relay. (Type S starters only)[9]	Y344
Modify Type SDO12 relays to accept Type FB quick-trip or SB slow-trip thermal units. (Rejects Type CC standard trip units)[10]	Y81

7. For 4-pole starters used on two-phase systems, order two thermal units plus one Class 9998 Type SO31 jumper strap kit for every two starters. Each kit includes two jumper straps.
8. Also used for Series A with Form Y500. For series A without Forms, see .
9. Field modification possible. Order 9999S04 (for **Form Y342**) or 9999S05 (for **Form Y344**).
10. This Form cannot be field modified.

NEMA Style Melting Alloy Overload Relays Dimensions

NOTE: These dimensions are for reference only. If you need precise measurements, contact the Customer Care Center at 1-888-778-2733.

Table 10 - NEMA Style Melting Alloy Overload Relays, Dimensions A–H

Type	Dimensions (in.)								Shipping Weight (lb)
	A	B	C	D	E	F	G	H	
SEO5	3.31	—	0.47	3.97	3.53	2.81	0.22	0.69	1
SEO8	3.31	—	0.47	3.97	3.5	2.81	0.19	0.69	1.25
SEO12	—	5.59	0.56	5.75	5.31	4.75	0.28	1.44	3
SEO15	—	6.97	0.56	5.75	5.31	4.75	0.28	2.13	4

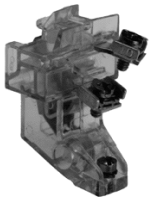
Table 11 - NEMA Style Melting Alloy Overload Relays, Dimensions I–P

Type	Dimensions (in.)								Shipping Weight (lb)
	I	J	K	L	M	N	O	P	
SEO5	2.31	0.5	0.5	0.5	0.84	1	1.38	#10	1
SEO8	2.31	0.5	0.5	0.13	0.84	1	1.38	#10	1.25
SEO12	3.56	0.75	0.56	0.88	1.5	1.75	2	#1/4	3
SEO15	3.56	0.75	0.56	0.88	1.5	1.75	2	#1/4	4

Melting Alloy Overload Relays Accessories

Class 9998 Contact Units

Figure 8 - Class 9998 Type SO1



One normally closed (N.C.) contact, Class 9998 Type SO1 contact unit, listed in Class 9998 Type SO1 Contact Units for Melting Alloy Overload Relays, page 19, is provided as standard in each Class 9065 melting alloy overload relay. Contact modules can be replaced if necessary. Isolated overload relay alarm circuit contacts are available as an optional feature. See the table Class 9999 Contact Unit for Melting Alloy Overload Relays, page 19. A pilot light or alarm bell can be wired in series with this contact to indicate that the overload relay has tripped. For further information, refer to Class 9999 Isolated Alarm Contacts, page 19.

Table 12 - Class 9998 Type SO1 Contact Units for Melting Alloy Overload Relays

Magnetic Starter			Description	Parts Kit Catalog Number
NEMA Size	Type	Series		
00–4 and 6	SA–SF SH	A & B	Standard N.C. contact unit	9998SO1[11]

Class 9999 Isolated Alarm Contacts

Figure 9 - Type SO4

Isolated overload relay alarm contacts are available factory-installed or in kit form for field installation in NEMA Size 00–6 Type S[12] starters that are factory installed with a Class 9065 Type SE melting alloy overload relay. NEMA Size 7 Type S devices use a solidstate overload relay which has isolated alarm contacts as an optional feature. See the table Isolated Auxiliary Contacts for Motor Logic Overload Relays, page 24. The alarm contacts allow the starter to be used in applications that require isolated contacts, such as inputs to a computer.

Class 9999 Types SO4 and SO5 modules are interchangeable with the standard module (Class 9998 Type SO1) and can be installed on starters already in service. The case is made of clear plastic (polycarbonate) to allow for visual inspection of contacts.

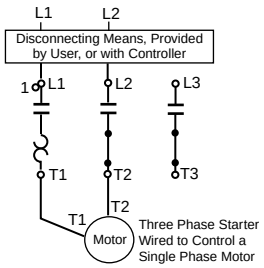
Table 13 - Class 9999 Contact Unit for Melting Alloy Overload Relays

Magnetic Starter		Parts Kit Description	Catalog Number
NEMA Size	Type		
00–6 [12]	SA–SH	N.O. Isolated Alarm Contact Plus Standard N.C. Overload Contact	9999SO4
		N.C. Isolated Alarm Contact Plus Standard N.C. Overload Contact	9999SO5

11. Also the replacement contact unit for Class 9065 melting alloy overload relays.
12. Isolated alarm contacts **cannot** be added in the field to the Size 5 Type S starter. Current transers and a Size 1 overload block must be used. For factory installation specify **Form Y342**.

Class 9998 Jumper Strap Kits

Figure 10 - Jumper Strap Kit Diagram



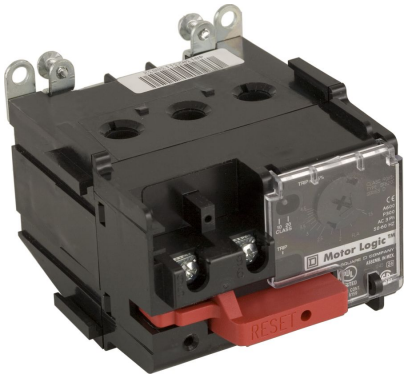
Jumper strap kits are for use on three-phase manual or magnetic starters with melting alloy overload relays only, where a three-phase starter is used to control a single-phase motor. These kits include two jumper straps, a wiring diagram showing how to wire a three-phase starter to control a single-phase motor, and single-phase (one thermal unit) selection tables.

Table 14 - Class 9998 Melting Alloy Overload Relay Jumper Strap Kits

Class	For Starter		Kit Catalog Number
	Size	Type	
ALL	00, 0, 1, 2 and M0 & M1	SA, SB, SC, SD and M & T (Manual)	9998SO31
	3,4	SE, SF	9998SO32
	5	SG	None Available

Motor Logic™ Solid-State Overload Relays (SSOLRS)

Figure 11 - Motor Logic™ Solid-State Overload Relays



Motor Logic solid-state overload relays (SSOLRs) feature:

- 3 to 1 adjustment for trip current
- Phase loss and unbalance protection
- Direct replacement for Type S melting alloy
- Ambient insensitive and self–powered
- Switch selectable trip class
- Class II ground fault detection
- Electrical remote reset is also available.

Other Features

Standard Features

- Repeat trip accuracy: ± 2%
- Normally closed trip contact
- Visible trip indication
- Trip free operation
- Harmonic immunity
- Thermal memory
- Trip test function
- Three-second trip on phase imbalance ≥ 25% (see Class 9999 Motor Logic Overload Relays Accessories, page 24)

Optional Features

- Auxiliary contacts
- Electrical remote reset
- Lug-lug kits for separate mounting
- DIN rail adapter bracket (00B, 00C, 0, 1)
- Lug extender kit for retrofit (00B, 00C, 0, 1)

Class 9065 Motor Logic SSOLR Selection Tables

Table 15 - Class 10 and 20 (Selectable): For Separate Mounting Solid-State Overload Relay, 600 Vac Maximum

NEMA Size[13] (3-Pole)	Full Load Current Range (A)	Open Type
		Trip Class 10 and 20
00B	1.5–4.5[14]	9065SFB20
00C	3–9[14]	9065SFC20
0	6–18[14]	9065SF020
1	9–27[14]	9065SF120
2	15–45	9065SF220
3	30–90	9065SF320
4	45–135	9065SF420
5	90–270	9065SF520

13. Size 00B and 00C are not actual NEMA sizes. These designations are used to differentiate the lower FLA of these devices from the NEMA Size 00 Motor Logic solid-state overload relay.
14. Size 00B, 00C, 0, and 1 come without lugs. Lower amperage loads can be protected by looping the power wires. Lugs are available. See Lug-Lug and Lug-Extender Kits, page 25.

Table 16 - Class 10 and 20 (Selectable): Replacement SSOLR for Retrofit of Type S Starter Solid-State Overload Relay 600 Vac Maximum

Locate 8536 Starter in this column		Order Class 9065 Overload Relay from this column
NEMA Size[15]	Full Load Current Range (A)	Open Type
		Trip Class 10 and 20
00B[16]	1.5–4.5	9065SFB20
00C[16]	3–9	9065SFC20
0[16]	6–18	9065SF020
1[16]	9–27	9065SF120
2	15–45	9065ST220
3	30–90	9065ST320
4	45–135	9065ST420
5[17]	90–270	9065ST520
5[18]	90–270	9065SF520
6[17]	180–540	9065ST620
7[17]	270–810	9065ST720

15. Size 00B and 00C are not actual NEMA sizes. These designations are used to differentiate the lower FLA of these devices from the NEMA Size 00 Motor Logic solid-state overload relay.
16. Size 00B, 00C, 0, and 1 come without lugs. Lower amperage loads can be protected by looping the power wires. Lugs are available. See Lug-Lug and Lug-Extender Kits, page 25.
17. Size 5, 6, and 7 replacement overload relays are only for existing NEMA style Type S starters with a Motor Logic overload relay. External CTs and additional components are not included.
18. Size 5 is a complete drop-in replacement for Square D Type S melting alloy, bimetallic, and Y500 overload relays **only**.

NEMA Style Dimensional Diagrams

NOTE: Sizes 00B and 00C are not actual NEMA sizes. These designations are used to differentiate the lower FLA of these devices from the NEMA Size 00 Motor Logic solid-state overload relay.

Figure 12 - NEMA Size 00B, 00C, 0, and 1 Devices

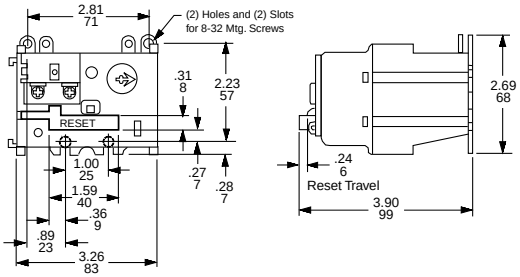


Figure 13 - Size 2 Devices

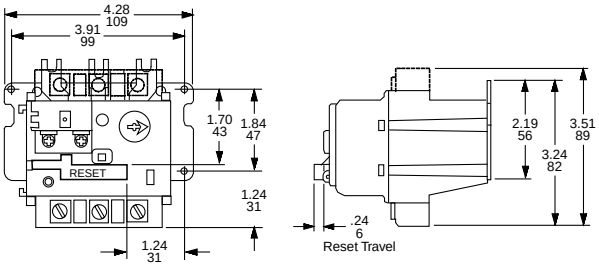


Figure 14 - Size 3 Devices

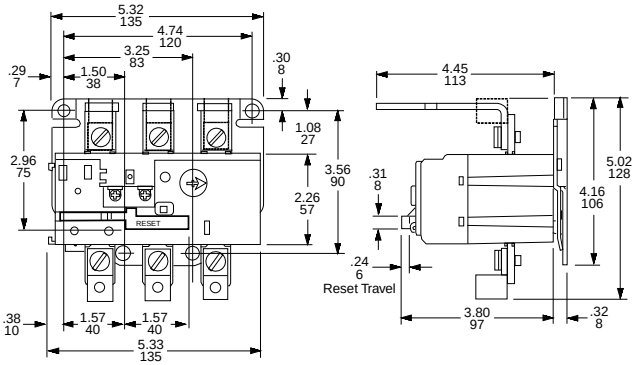


Figure 15 - Size 4 Devices

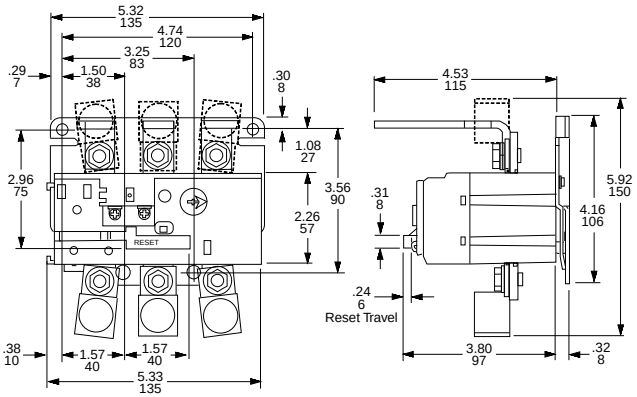
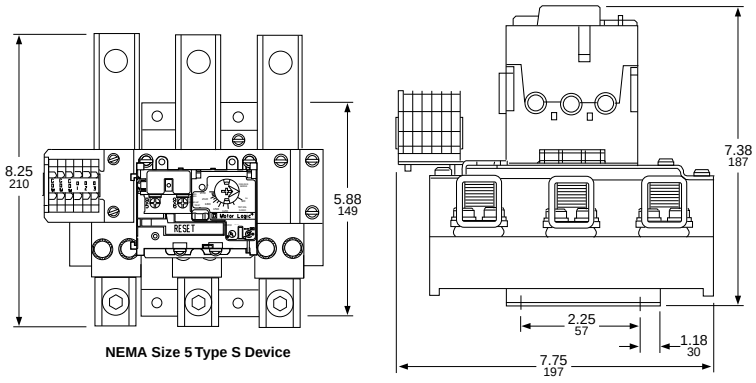


Figure 16 - NEMA Size 5 Type S Device

Note: The dimensions are for reference only.



NEMA Size 5 Type S Device

Class 9999 Motor Logic Overload Relays Accessories

Isolated Auxiliary Contacts

Overload relay auxiliary contacts are available factory installed or in kit form for field installation on motor logic overload relays. These contacts may be used for isolated alarm contact applications.

Table 17 - Isolated Auxiliary Contacts for Motor Logic Overload Relays

For Use With		Parts Kit Description	Catalog Number
Class & Type	NEMA Size[19]		
8536 SA–SJ	00B through 7	N.O. or N.C. Auxiliary Contact (Field Convertible)	9999AC04
9065 SF, ST	00B through 7		

DIN Adapter

The DIN adapter provides a method to mount the motor logic overload relay to a 35 mm DIN rail.

Table 18 - DIN Adapter (Separate Mount Only)

For Use With		Parts Kit Description	Catalog Number
Catalog Number	NEMA Size[19]		
9065SF	00B, 00C, 0, and 1	DIN Adapter	9999DA01

19. Size 00B and 00C are not actual NEMA sizes. These designations are used to differentiate the lower FLA of these devices from the NEMA Size 00 Motor Logic solid-state overload relay.

Lug-Lug and Lug-Extender Kits

A Class 9999 LL0 Lug-Lug Kit can be field installed on separately mounted overload relays. The standard Size 00B, 00C, 0, and 1 Class 9065 Type SS and SF overload relays are supplied without lugs. A Class 9999 LB0 Lug-Extender Kit is designed for Size 00B, 00C, 0, and 1 Retrofit Starter Applications. This kit allows the lugs to be in the same location as the Class 9065 melting alloy overload relay, eliminating the need for additional wire length.

Table 19 - Lug-Lug and Lug-Extender Kits

For Use With		Parts Kit Description	Catalog Number
Catalog Number	NEMA Size[20]		
9065SF	00B, 00C, 0, and 1	Lug-Lug Kit for separate mounting	9999LL0
9065SF	00B, 00C, 0, and 1	Lug-Extender Kit for retrofitting existing NEMA Type S starters	9999LB0

Remote Reset Module

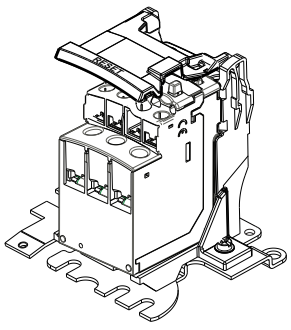
The Remote Reset Module can be field-installed on solid-state overload relays. This module will allow the overload relay to be reset from a remote location.

Table 20 - Remote Reset Module

For Use With		Parts Kit Description	Catalog Number
Class & Type	NEMA Size[20]		
8536 SA–SJ	00B through 7	Remote Reset Module	9999RR04[21]
9065 SF, ST	00B through 7		
8536 SE–SF	3 and 4	Top Mounting Bracket	9999RB34[21 22]
9065 SF, ST	3 and 4		

Adapted Bimetallic or SSOLR Mounting Bracket Adapter—NEMA Sizes 00–1

Figure 17 - Stand-Alone Mounting Bracket (Mounted to the Overload Relay)



The adapted bimetallic Type S starter incorporates a mounting bracket for use with a self-contained adjustable bimetallic or solid state overload relay. A separately

20. Size 00B and 00C are not actual NEMA sizes. These designations are used to differentiate the lower FLA of these devices from the NEMA Size 00 Motor Logic solid-state overload relay.
21. 120 Vac power required.
22. For mounting the remote reset module on the top of the overload relay.

mounted version of the bracket is also available for use with contactors that do not offer the same terminal configurations as the Type S, or for applications with height restraints that demand mounting next to the contactor rather than directly below as is typical for most starter configurations.

The bimetallic thermal overload relays feature Class 10 or Class 20 protection with automatic and manual (hand) reset and a trip-free mechanism. These overload relays are ambient temperature compensated, and available with or without phase imbalance protection. The component is available as a replacement on a starter with the adapter or as a separately mounted overload relay with the relay adapter. LRD and LR3D overload relays can be factory installed if the FLA of the application is known. They can also be purchased separately and field installed.

The solid-state overload relays feature Class 5, 10, 20, or 30 protection (dip switch selectable) with automatic and manual (hand) reset and a trip-free mechanism. These overload relays are ambient-temperature compensated and can be wired for single-phase applications (must use the 3-Pole unit). The component is available as field-installable on a starter with the adapter installed, or as a separately mounted overload relay with the relay adapter. If using the LR9D with a single-phase motor, the 3–Pole adapter must be purchased to accommodate looping of the motor leads.

For more information, see TeSys™ D Bimetallic Overload Relays for Sizes 00–1 Type S Starters, Non-Reversing and Reversing, Classes 8536, 8538, 8539, 8736, 8738, and 8739, page 27.

NOTE: The LRD, LR3D, or LR9D overload relays must be purchased separately.

Table 21 - Replacement or Retrofit Adapters

Description	Sizes	Maximum Full Load Current (A) of Overload Relay	Catalog Number
2–Pole	00, 0, 1	27	9065SADR751
3–Pole			9065SADR75

Table 22 - Stand Alone Adapters

Description	Sizes	Maximum Full Load Current (A) of Overload Relay	Catalog Number
2–Pole	00, 0, 1	27	9065SAD751
3–Pole			9065SAD75

TeSys™ D Solid-State Overload Relays for Type S Starters

NOTE: For Type S Starters Sizes 00–1, Non-Reversing (Classes 8536, 8538, 8539) and Reversing (Classes 8736, 8738 and 8739):

- **Field installed only**: The LR9D Overload Relay cannot be factory installed, it must be purchased separately and field installed.
- **Single-phase motor applications**: When using the LR9D Overload Relays with a single-phase motor, you must purchase the 3-Pole starter to accommodate looping of the motor leads.

Current Setting	Overload Relay Catalog Number (sold separately)
Range Amperes	Trip Class 5, 10, 20, and 30 Dip Switch Selectable
0.1–0.5	LR9D01
0.4–2	LR9D02
1.6–8	LR9D08
6.4–32	LR9D32

Table 23 - TeSys™ D Bimetallic Overload Relays for Sizes 00–1 Type S Starters, Non-Reversing and Reversing, Classes 8536, 8538, 8539, 8736, 8738, and 8739

Current Setting Range Amperes	Class 20 *with* Single-Phase Sensitivity	Class 20 *without* Single-Phase Sensitivity	Class 20 *with* Single-Phase Sensitivity	Class 20 *without* Single-Phase Sensitivity	Factory Installed— Catalog Number Suffix (CP1 List)
	Screw Termination	Screw Termination	Ring Tongue Connector	Ring Tongue Connector	
0.40–0.63	LRD04L	LR3D04L	LRD04L6	—	04
0.63–1	LRD05L	LR3D05L	LRD05L6	—	05
1–1.6	LRD06L	LR3D06L	LRD06L6	—	06
1.6–2.5	LRD07L	LR3D07L	LRD07L6	LR3D07L6	07
2.5–4	LRD08L	LR3D08L	LRD08L6	LR3D08L6	08
4–6	LRD10L	LR3D10L	LRD10L6	LR3D10L6	10
5.5–8	LRD12L	LR3D12L	LRD12L6	LR3D12L6	12
7–10	LRD14L	LR3D14L	LRD14L6	LR3D14L6	14
9–13	LRD16L	LR3D16L	LRD16L6	LR3D16L6	16
12–18	LRD21L	LR3D21L	LRD21L6	LR3D21L6	21
17–24	LRD22L	LR3D22L	LRD22L6	LR3D22L6	22
23–32	LRD32L	LR3D32L	LRD32L6	LR3D32L6	32

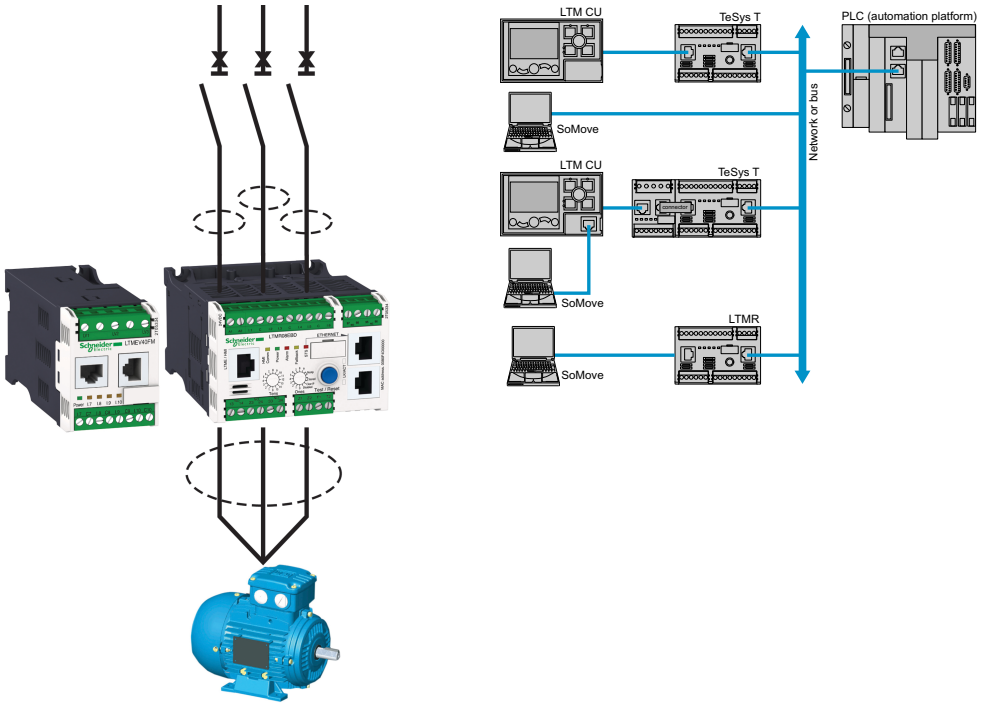
NOTE: For tripping class 10:

- With screw termination, remove the **L** from the end of the above part number (for example, LRD32 is a class 10 bimetallic overload relay with a 23–32 A setting range)
- With a ring tongue connector, change the **L6** to **6** at the end of the above part number (for example, LRD326 is a class 10 bimetallic overload relay with a 23–32 A setting range)

TeSys™ T Motor Management System

Overview

Table 24 - TeSys™ T Motor Management System Components



TeSys™ T is a motor management system that provides the following:

- Full motor monitoring, control, and protection when used with short-circuit protection and a contactor
- Manages most critical processes while reducing downtime and increasing productivity
- A flexible system that integrates seamlessly into your automation system through five major communication protocols
- Helps predict what will happen in the process, as it accurately monitors current, voltage, and power over a wide range
- A green motor management system with unique power monitoring capabilities for better energy management
- Carries all appropriate and necessary third party certifications

The following sections provide additional information about TeSys T functions.

For detailed information about TeSys T, visit our website at www.schneider-electric.us.com.

Communication Protocols

TeSys™ T Motor Management System is a flexible motor management system that supports six major communication protocols:

- Modbus™
- CANopen
- DeviceNet™
- Profibus
- Ethernet/IP

- Modbus/TCP

These communication protocols allow the TeSys T controller to integrate seamlessly into your automation systems.

Ethernet/IP and Modbus/TCP provide Fast/Fault Device Replacement (FDR) to enable quick replacement of products and minimize maintenance time.

Protection Functions

- Thermal overload
- Phase imbalance and phase failure
- Thermal motor protection via PTC probes
- Phase reversal
- Ground fault detection
- Long starting times and motor stalling
- Automatic load shedding and restarting
- Load fluctuations (current, voltage, power)
- Variations of Cos j (power factor)

Meter Functions

- **Measurements (rms values):**
  - Current on the three phases
  - Voltage on the three phases (shedding)
  - Motor temperature
  - Ground fault sensing
- **Values calculated:**
  - Average current
  - Frequency
  - Power factor, power, power consumption

Motor Control Functions

A motor managed by a TeSys™ T controller can be controlled:

- Locally, using the logic inputs present on the product, or via the human machine interface (HMI)
- Remotely, via the network

Motor Control Modes

Ten predefined motor control modes are incorporated in the controller. Each listed mode is available as two-wire or three-wire control.

- **Overload mode:** Monitoring of motors whose control is not managed by the controller
- **Independent mode:** Starting of full voltage non-reversing motors
- **Reverser mode:** Starting of full voltage reversing motors
- **Two-step mode:** Two-step starting of motors (star-delta, by autotransformer and by resistor)
- **Two-speed mode:** Two-speed starting of motors (Dahlander, pole changer)

A custom mode is available which allows you to create a specific motor control mode that is not predefined in the controller.

Custom Logic has the basic functions of a small programmable logic controller (PLC). Programming can be done in Structured Text mode or in Block Diagrams through SoMove™ software. To ensure consistency, the same software used to commission the TeSys™ T controller is used for Custom Logic programming.

Statistical and Diagnostic Functions

- History of the last five detected faults
- Motor statistics
- Controller operations
- Warning of pending faults

Standards and Certifications

Table 25 - Standards and Certifications

Product Type	LTMR Controllers	LTMEV40 Expansion Modules
Conforming to standards	IEC/EN 60947-4-1, UL 508, UL E164353 NKCR, CSA 22-2 n°14, CSA LR43364 Class 3211 03, IACS E10	
Product certifications	UL, CSA, BV, LROS, DNV, GL, RINA, ABS, RMRos, NOM, CCC, RCM, ATEX, EAC, KERI, UKCA	

Configuration

TeSys™ T controller is a flexible motor management system using the SoMove™ software commissioning tool. See SoMove™ Software for Configuration, page 36 for detail information about configuration..

LTMR Controllers

Figure 18 - LTMR27EBD

The controller is the central component in the motor management system. It manages the basic functions such as:

- Measurement of 3-phase current via integral current transformers from 0.4 to 100 A (up to 810 A by external current transformers)
- Measurement of ground current internally or external ground sensors
- Measurement of motor temperature
- Inputs and outputs for the various motor control modes, detected fault management, and other functions

As standard, the controller manages the following:

Control modes

- Overload mode
- Independent mode
- Reverser mode
- Two-speed mode
- Two-step mode
- Custom mode

Inputs/Outputs

- Six discrete logic inputs
- Three relay logic outputs (1 N.O. contact each)
- One relay output for detected fault signaling (1 N.O. + 1 N.C.) overload relay

Measurements

- Connection for a thermistor probe
- Connections for a ground sensor

Table 26 - LTMR Controllers

Setting Range (A)	Control Voltage	Current Range (A)	Catalog Number
Modbus™ Protocol			
8	24 Vdc	0.4–8	LTMR08MBD
	100–240 Vac	0.4–8	LTMR08MFM
27	24 Vdc	1.35–27	LTMR27MBD
	100–240 Vac	1.35–27	LTMR27MFM
100	24 Vdc	5–100	LTMR100MBD
	100–240 Vac	5–100	LTMR100MFM
Ethernet TCP/IP Communication (Protocols: Ethernet/IP and Modbus/TCP)			
8	24 Vdc	0.4–8	LTMR08EBD
	100–240 Vac	0.4–8	LTMR08EFM

Table 26 - LTMR Controllers (Continued)

Setting Range (A)	Control Voltage	Current Range (A)	Catalog Number
27	24 Vdc	1.35–27	LTMR27EBD
	100–240 Vac	1.35–27	LTMR27EFM
100	24 Vdc	5–100	LTMR100EBD
	100–240 Vac	5–100	LTMR100EFM
CANopen Protocol			
8	24 Vdc	0.4–8	LTMR08CBD
	100–240 Vac	0.4–8	LTMR08CFM
27	24 Vdc	1.35–27	LTMR27CBD
	100–240 Vac	1.35–27	LTMR27CFM
100	24 Vdc	5–100	LTMR100CBD
	100–240 Vac	5–100	LTMR100CFM
DeviceNet™ Protocol			
8	24 Vdc	0.4–8	LTMR08DBD
	100–240 Vac	0.4–8	LTMR08DFM
27	24 Vdc	1.35–27	LTMR27DBD
	100–240 Vac	1.35–27	LTMR27DFM
100	24 Vdc	5–100	LTMR100DBD
	100–240 Vac	5–100	LTMR100DFM
Profibus DP Protocol			
8	24 Vdc	0.4–8	LTMR08PBD
	100–240 Vac	0.4–8	LTMR08PFM
27	24 Vdc	1.35–27	LTMR27PBD
	100–240 Vac	1.35–27	LTMR27PFM
100	24 Vdc	5–100	LTMR100PBD
	100–240 Vac	5–100	LTMR100PFM

Components of the TeSys™ T Motor Management System

Expansion Module

Figure 19 - LTMEV40FM Module

The expansion module adds the following functions to the TeSys™ T controller:

- Voltage measurement between phases up to 690 V nominal
- Four additional inputs

Inputs

- Four discrete logic inputs (isolated)
- Two types of power for the inputs: 24 Vdc and 100 to 240 Vac
- A 24 Vdc LTMR controller can be assembled with a 240 Vac expansion module and vice versa

The LTMEV must be connected to the LTMR controller by a connecting cable.

Table 27 - Expansion Module

Input Control Voltage	Number of Inputs	Supply to the Electronics	Catalog Number
24 Vdc	4	via the LTMR controller	LTMEV40BD
100–240 Vac	4		LTMEV40FM

HMI Modules

The following Human Machine Interface (HMI) modules can be used with the motor management system.

- The **LTMCU operator control unit:** Control and monitoring of a 1 to 1 LTMR controller.
- The **LTMCUF operator control unit (LTMCU with Fast Device Replacement (FDR) on HMI):**
  - Backup and store the configuration and custom logic of the LTMR controller.
  - Facilitate the operator task when replacing a drawer in an environment of high continuity of service without using a computer.

Figure 20 - LTMCU Module

The LTMCU Compact Display provides the following functions:

- Configure the parameters

- Display information
- Monitor the alarms and detected faults
- Local control of the motor via the local control interface (keys can be customized)
- Three different languages can be loaded into the LTMCU controller at the same time: English, French, Spanish are the defaults.

A language download utility (LangTool), together with all the other languages, are available on the website www.schneider-electric.com.

This tool allows the languages present in the LTMCU control unit to be adapted.

The LTMCU HMI control unit has an additional front panel RJ45 port, protected by a flexible cover.

Figure 21 - LTMCUF (LTMCU with FRD on HMI) Module

The LTMCUF Compact Display enables:

- LTMR monitoring and settings
- LTMR configuration backup and restoration
- Copy and paste of configuration at commissioning

Two applications have been predefined for the TeSys T controller. Depending on the application loaded, the HMI terminal makes it possible to:

- Configure and monitor a motor starter (LTM_1T1_V1.dop)
- Monitor and modify certain parameters up to 8 motor starters (LTM_1T8_X_V1.dop)

Table 28 - HMI Modules

Description	Supply Voltage	Catalog Number
LTMCU Operator Control unit	via the LTMR controller	LTMCU
LTMCUF with FDR Operator Control unit	via the LTMR controller	LTMCUF

Transformers, Senors, and Probes

Figure 22 - LT6CT4001

Figure 23 - DA1TT●●

Table 29 - Current Transformers

Current Transformer Ratio[23]	Catalog Number
100:1	LT6CT1001
200:1	LT6CT2001
400:1	LT6CT4001
800:1	LT6CT8001

Table 30 - Ground Fault Sensors

Rated Operational Current Ie (A)	Internal Toroid Ø (mm)	Catalog Number
Closed Toroids, Type A		
65	30	50437
85	50	50438
160	80	50439
250	120	50440
400	200	50441
630	300	50442
Split Toroids, Type QA		
85	46	50485
250	110	50486

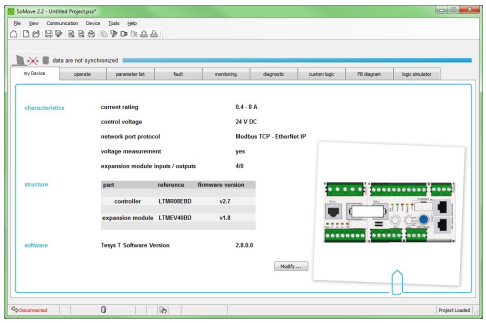
23. For use with LTMR08●● controllers. Three current transformers are required for 3-phase applications.

Table 31 - PTC Thermistor Probes[24]

Description	Nominal Operating Temperature (NOT) °C	Color	Catalog Number[25]
Triple Probes	90	Green/green	DA1TT090
	110	Brown/brown	DA1TT110
	120	Gray/gray	DA1TT120
	130	Blue/blue	DA1TT130
	140	White/blue	DA1TT140
	150	Black/black	DA1TT150
	160	Blue/red	DA1TT160
	170	White/green	DA1TT170

SoMove™ Software for Configuration

Figure 24 - SoMove™ Software Configurator Screen



The TeSys™ T configurator is incorporated in the SoMove™ software application, versions 2.2 and higher.

SoMove software allows configuration, commissioning and maintenance of motor starters protected by a TeSys T controller.

A library containing predefined motor control mode functions is available to:

- Allow standardization
- Avoid errors
- Reduce motor starter setup times

By using logic functions, a custom mode makes it possible to:

- Easily adapt these predefined motor control mode functions to the specific needs of your applications
- Create new functions

The defined functions can be saved and used to build your function library for future applications.

To create special functions, a logic editor is incorporated in the configurator and allows a choice of two programming languages:

- Function block
- Structured text

24. PTC = Positive Temperature Coefficient.
25. Sold in lots of 10.

Table 32 - Configuration Tools

Description	Composition	Catalog Number
Connection kit for PC serial port for Modbus™ PLC multidrop connection	1 x 3 m length cable with two RJ45 connectors	VW3A8106
	One RS232/RS485 converter with one 9-pin female SUB-D connector and one RJ45 connector.	
USB serial port adapter for connecting a TeSys T controller to your PC[26]	1 USB / serial port adapter[26]	TSXCUSB485
USB serial port cable for connecting a TeSys T controller to your PC	1 USB / serial port cable	TCSMCNAM3M002P

Accessories for Connecting the Components

Figure 25 - 8536SCO3V02H626

Table 33 - Connection Accessories

Description		Length m (ft)	Catalog Number
For Ethernet TCP/IP connection:			
Shielded twisted pair cables, UL and CA 22.1 approved			
Cables fitted with 2 x RJ45 connectors for connection to terminal equipment	Straight	2 (7)	490NTW00002U
		5 (16)	490NTW00005U
		12 (39)	490NTW00012U
		40 (131)	490NTW00040U
		80 (263)	490NTW00080U
For Modbus™ PLC connection:			
Cables fitted with 2 x RJ45 connectors		0.3 (1)	VW3A8306R03
		1 (3)	VW3A8306R10
		3 (10)	VW3A8306R30

26. Modbus RS–485 cable required, not included.

Table 33 - Connection Accessories (Continued)

Description		Length m (ft)	Catalog Number
T-junctions		0.3 (1)	VW3A8306TF03
		1 (3)	VW3A8306TF10
RS485 line terminator		—	VW3A8306R
For CANopen connection:			
Cables		50 (164)	TSXCANCA50
		100 (328)	TSXCANCA100
		300 (984)	TSXCANCA300
IP20 connectors SUB-D 9-pin female Line end adapter switch	Elbowed (90°)	—	TSXCANKCDF90T
	Straight	—	TSXCANKCDF180T
	Elbowed (90°) SUB-D 9-pin connector for connection to PC or diagnostic tool	—	TSXCANKCDF90TP
For DeviceNet™ connection:			
Cables		50 (164)	TSXCANCA50
		100 (328)	TSXCANCA100
		300 (984)	TSXCANCA300
For Profibus DP connection:			
Cables		100 (328)	TSXPBSCA100
		400 (1313)	TSXPBSCA400
Connectors	With line terminator	—	490NAD91103
	Without line terminator	—	490NAD91104
	With line terminator and terminal port	—	490NAD91105

Table 34 - Connecting Cables

Description	Number and type of connectors	Length m (ft)	Catalog Number
LTMCU control unit	2 x RJ45	1 (3)	VW3A1104R10
		3 (10)	VW3A1104R30
		5 (16)	VW3A1104R50
XBTN410	SUB-D 25-pin female to RJ45	2.5 (8)	XBTZ938
LTME expansion module	2 x RJ45	0.04 (0.13)	LTMCC004
		0.3 (1)	LU9R03
		1 (3)	LU9R10
180 degree Ethernet external connector	1 x RJ45	–	LTM9CE180T

Table 35 - Marking Accessories

Description	Composition	Sold in lots of	Catalog Number
Clip-in markers (maximum of 5 per unit)	Strips of 10 identical numbers (0 to 9)	25	AB1R●[27]
	Strips of 10 identical capital letters (A to Z)	25	AB1G●[27]

Dimensional Diagrams (mm)

Table 36 - LTMR•• controllers

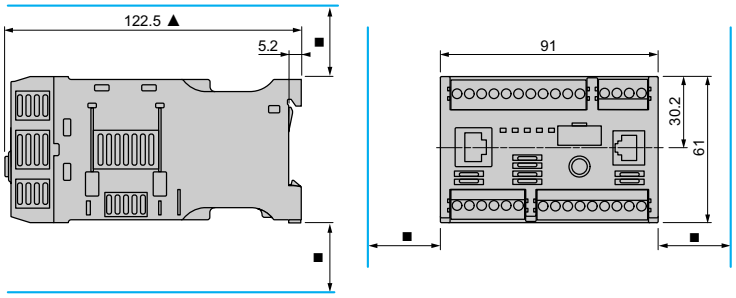
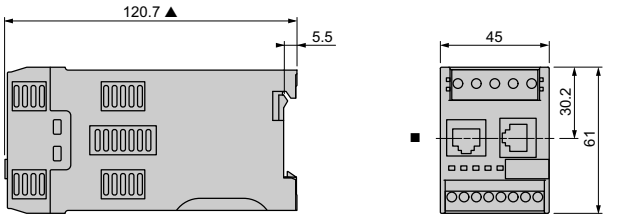


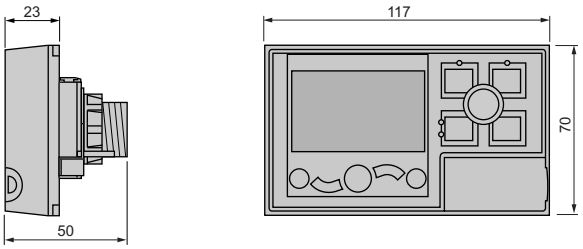
Table 37 - LTMEV40•• expansion modules



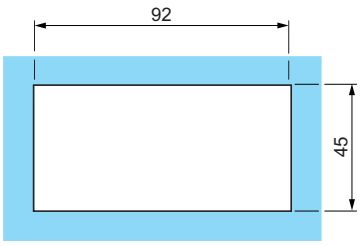
■ Leave a gap around the device of: 9 mm at 45 °C, 9–40 mm from 45–50 °C, 40 mm at 60 °C.

▲ 140 mm with an RJ45 connector for connection to an expansion module and a network; 166 mm with a Profibus DP/CANopen connector.

Table 38 - LTMCU operator control unit

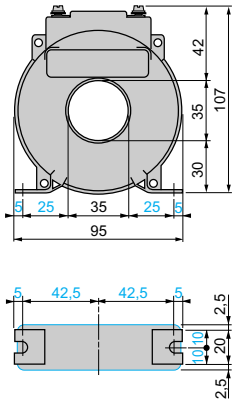


Panel mounting, cut-out



27. When ordering, replace the ● in the catalog number with the number or letter required.

Figure 26 - LT6CT Current Transformer



Class 9066

External Reset Mechanisms — Class 9066

Figure 27 - Type RB1

Figure 28 - Type W1

Figure 29 - Type RA2 Series B

Figure 30 - Type SC1

Type RA kits provide a convenient external means for resetting overload relays mounted in control enclosures of almost any depth. Designed for use on NEMA 1, 4, or 12 enclosures, they can be used with any Schneider Electric open type magnetic starter or Class 9065 overload relay. All kits are individually packaged for easy stocking and include complete installation instructions.

- A single mounting hole is required in the enclosure door.
- Each kit contains one or more threaded reset rods, grooved at intervals of 3/4 inch so they can be cut to the approximate length required without thread damage.
- Final adjustment can be made after installation by rotating a plunger and tightening the lock nut.
- Mechanisms with more than one reset rod include a steel cross bar with mounting holes located at 1/2 inch intervals, providing a choice of rod locations to suit any application.
- All steel parts are electrically isolated from the enclosure and the operator.

Type RB kits make it possible to field-install external reset mechanisms to Type S combination starters in NEMA 12 enclosures. They can also be used to replace external reset mechanisms on Type S combination starters in NEMA 1, 4, and 12 enclosures.

Table 39 - Class 9066 External Reset Mechanisms

Where Used	Type of Enclosure	Reset Mechanism Kit	
		Description	Catalog Number
OEM Kit for commercial enclosures	NEMA 1, 12	With 1 Rod	9066RA1
		With 2 Rods	9066RA2
		With 3 Rods	9066RA3
Replacement on 8538, 8539 starters	NEMA 1, 12	Size 0 and 1	9066RB1
		Size 2	9066RB2

Table 39 - Class 9066 External Reset Mechanisms (Continued)

Where Used	Type of Enclosure	Reset Mechanism Kit	
		Description	Catalog Number
On commercial enclosures or Type S combination starters	NEMA 4	W1 is a boot only and must be used with RA or RB Kit listed above	9066W1
Replacement on Class 8536 Type S starters	NEMA 1 with slip-on covers	Size 00, 0 and 1	9066SC1
		Size 2	9066SD1
		Size 3	9066SE1
Retro-fit kit Class 8940 Pump Panel	NEMA 3R	Reset for use with 9065TJF, Series B, OLR	9066RTJF

Application Data

Application Data—Type S

Nameplate vs. NEC Full-Load Current

In the 1996 National Electrical Code® (NEC®), Tables 430-147, 430-148, 430-149, and 430-150 list full-load currents according to motor horsepower and voltage. According to Article 430-6, these full-load currents should be used, rather than the motor nameplate full-load current, to determine the ampacity of conductors, ampere ratings of switches, or branch-circuit overcurrent devices, and so on. It is specifically stated in Article 430-6, however, that “separate motor-running overcurrent (overload) protection shall be based on the motor nameplate current rating.”

Service Factor

NEMA standards for motors list service factors of 1.15–1.25 for general-purpose AC motors from 1/2 to 200 horsepower. Other motors, such as totally enclosed, fan-cooled, and motors over 200 horsepower have a standard 1.0 service factor. Given the established standards, the service factor cannot be determined without checking the information on the motor nameplate. For this reason, all the thermal unit selection tables in this catalog are designed for 1.15–1.25 service factor motors, except the tables for Class 8198 High Voltage Starters.

The Class 8198 High Voltage Starters tables are designed for 1.0 service factor. It is important to know when a motor has a service factor of 1.0, because failure to do so will result in an oversized thermal unit selection and reduced motor protection.

Motor Branch-Circuit Design

Minimum safety provisions for the control of motors are set forth in the National Electrical Code (NEC). Although these minimum provisions must be met, they are no substitute for an intelligent selection of protective devices made on the basis of the motor circuit being designed. The code describes this fact in Article 430, Section IV: “Where maximum branch-circuit short-circuit and ground-fault protective device ratings are shown in the manufacturer’s overload relay table for use with a motor controller or are otherwise marked on the equipment, they shall not be exceeded even if higher values are allowed [by the code].”

NOTE: An instruction sheet included with each starter contains thermal unit selections, as well as fuse or circuit breaker selections, or both, as applicable.

The capability of industrial systems to deliver high short-circuit currents has been increasing steadily over the years. This has caused much concern about the capability of motor controllers to withstand high-current faults, without creating hazards for personnel and destruction of equipment.

NEMA standards require that contactors be able to interrupt currents up to ten times motor full-load current. Therefore, it is acceptable for the overload relay to respond before the short-circuit protector up to this level. At currents more than ten times motor full-load current, the short-circuit protective device must respond first to minimize equipment damage.

A fully coordinated system is achieved when the overload relays operate in response to motor overloads before the fuses or circuit breaker, and the fuses or circuit breaker open the circuit before the overload relays trip or burn out on short-circuit currents.

Proper coordination requires a thorough knowledge of the time-versus-current limits of all of the branch-circuit components, as well as the time-versus-current trip characteristics of the overload relay and short-circuit protective device.

Overload Relays

Figure 31 - Cutaway View of Standard Trip Melting Alloy Thermal Unit

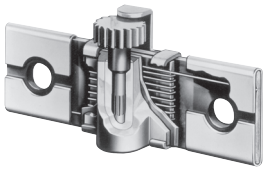
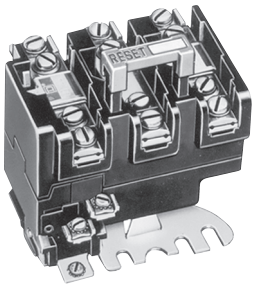


Figure 32 - Class 9065 Type SEO5 3-Pole Construction



Thermal Overload Relays

Thermal overload relays sense motor current by converting this current to heat in a resistance element. The heat generated is used to open a normally closed contact in series with a starter coil, causing the motor to be disconnected from the line.

Thermal overload relays are very effective in providing motor-running overcurrent protection. The most vulnerable part of most motors is the winding insulation, and this insulation is very susceptible to damage by excessively high temperature.

As a thermal model of a motor, the thermal overload relay produces a shorter trip time at a higher current, similar to the way a motor reaches its temperature limit in a shorter time at a higher current.

Similarly, in a high ambient temperature, a thermal overload relay trips at a lower current or vice versa, allowing the motor to be used to its maximum capacity in its particular ambient temperature (if the motor and the overload relay are in the same ambient).

Once tripped, the thermal overload relay will not reset until it has cooled, automatically allowing the motor to cool before it can be restarted.

Schneider Electric brand offers two basic types of thermal overload relays: melting alloy and bimetallic. In some types, the bimetallic overload relay is available in both noncompensated and ambient-temperature compensated versions. In both melting alloy and bimetallic types, single-element and three-element overload relays are available.

Motor Logic Solid-State Overload Relays

Motor Logic™ solid-state overload relays (SSOLRs) use an electronic method of detection, which responds directly to the motor current. When tripped, the overload relay can be reset manually, or remotely using the remote reset module. The SSOLR provides overload protection only for three-phase motors rated up to 600 Vac.

The SSOLR provides protection for phase-loss and phase-unbalance. In addition, this overload relay is ambient insensitive. The SSOLR is available as a selectable trip Class 10 or 20 device.

The Motor Logic SSOLR must be selected based on the Full-Load Amperage (FLA) of the motor it is to protect. Applications involving a motor with an FLA less than 1.5 A can be addressed by passing multiple looped turns of the motor leads through the current transformer windows.

Hand Reset Melting Alloy

Application

Hand reset melting alloy overload relays use a eutectic alloy solder, which responds to the heat produced in a heater element by the motor current. When tripped, the overload relay can be reset manually after allowing a few minutes for the motor and overload relay to cool and the solder to solidify.

Schneider Electric one-piece thermal unit construction provides overload protection for the majority of motors. Repeated tripping does not affect the original calibration. Melting alloy thermal units are available in three designs:

- **Standard Trip** (Class 20): All standard trip thermal units provide trip characteristics for normal motor acceleration up to approximately 7 seconds on a full voltage start.
- **Slow Trip** (Class 30): Type SB thermal units provide trip characteristics for motor acceleration up to approximately 12 seconds on a full voltage start. The motor must be suitable for extended starting periods.
- **Quick Trip** (Class 10): Type FB thermal units are used to protect hermetically sealed, submersible pump motors and other motors that can endure locked-rotor current for a very short time, or motors that have a low ratio of locked-rotor to full-load current.

Contacts

- **Replaceable Contacts**: The contact modules of Type S overload relays are replaceable.
- **Alarm Contacts**: Contact modules with one normally open (N.O.) and one normally closed (N.C.) contact are available for Type S. Specify Form Y34-2, which indicates a four-terminal isolated contact module.

For these contact modules and the overload relay control-circuit contact ratings, see the table Contact Ratings and Power Circuit Voltage Ratings, page 45.

Table 40 - Contact Ratings and Power Circuit Voltage Ratings

Vac—50 or 60 Hz							Vdc			
Type	NEMA Contact Ratings	Volts [28]	Inductive, 35% Power Factor				Type	Form	Volts	Inductive / Resistive
			Make		Break					Make and Break (A)
			A	VA	A	VA				
SS, SSF, SR, ST	A600	120 240 480 600	60 30 15 12	7200 7200 7200 7200	6 3 1.5 1.2	720 720 720 720	—	—	—	—
							—	—	—	—
SD & SE (Sizes 0–4 & 6), Class 9998 Type SO1, Class 9999 Type SO4 and SO5 Contact Modules	B600	120 240 480 600	30 15 7.5 6.0	3600 3600 3600 3600	3.0 1.5 0.75 0.6	360 360 360 360	SD & SE (Sizes 0–4 & 6)	Std.	—	—
							SD & SE (Sizes 0–4 & 6)	Y34 or Y342	125	0.22
							Class 9999 Type SO4 and SO5	Std.		
							SS, SF, SR, ST	Std.	125 250	1.1 0.55

28. A minimum of 110 V is recommended.

Thermal Unit Selection

Introduction

All tables in this chapter are based on the operation of the motor and controller in the same ambient temperature, 40 °C (104 °F) or less.

- Always make sure that the correct thermal units are installed in the starter before operating the motor.
- Each thermal unit should be installed with its catalog number visible.
- For melting alloy thermal units, the ratchet wheel must engage the pawl assembly.

See Thermal Unit Selection on an Approximate Basis—Based on Horsepower and Voltage, page 55 for more information on installing thermal units.

Procedure for Thermal Unit Selection

1. Determine motor data:
   a. Full-load current rating
   b. Service factor

      NOTE: If motor full-load current (FLC) is not known, a tentative thermal unit selection could be made, based on horsepower and voltage. Refer to Thermal Unit Selection on an Approximate Basis—Based on Horsepower and Voltage, page 55.
2. Motor and controller in *same ambient temperature:*
   a. All starter classes, except Class 8198:
      (1) For 1.15 to 1.25 service factor motors use 100% of motor FLC for thermal unit selection.
      (2) For 1.0 service factor motors use 90% of motor FLC for thermal unit selection.
   b. Class 8198 only:
      (1) For 1.0 service factor motors use 100% of motor FLC for thermal unit selection.
      (2) For 1.15 to 1.25 service factor motors use 110% of motor FLC for thermal unit selection.
3. Motor and controller in *different ambient temperatures:*
   a. Multiply motor FLC by the multiplier in the table Selection of Thermal Units for Special Applications, page 47. Use the resultant full-load current for thermal unit selection.
4. Locate the proper selection table from Thermal Unit Selection, page 48 .
   a. The proper thermal unit number will be found adjacent to the right of the range of full-load currents in which the motor FLC or resultant full-load current falls.
5. See Trip Current Rating Calculation, page 53 for calculation of trip current rating.

Selecting Slow Trip Thermal Units

To select Type SB slow trip thermal units, the selection table for a standard Type B thermal unit may be used with the following modifications:

- For continuous rated motors having service factors of 1.15 to 1.25, select thermal units from the standard Type B table using 93% (102% for Class 8198) of the full-load current shown on the motor nameplate.
- Substitute an SB for the B in the thermal unit type number.

Example:

A motor with a full-load current of 12 A controlled by an 8536SCG3 would require B22 thermal units for standard trip applications and SB19.5 thermal units for slow trip applications. The SB is selected by multiplying 12 A times 93% for 11.16 A and using this value to select B19.5. Then, add the S prefix to arrive at SB19.5.

For continuous rated motors having a service factor of 1.0, select thermal units from the standard Type B table using 84% (93% for Class 8198) of full-load current shown on the motor nameplate.

NOTE: SB thermal units are used on Size 0, 1, 2, and only some Size 3 applications. Check thermal unit tables for current ranges.

Table 41 - Thermal Unit Trip Types

Melting Alloy	
Type of Trip	**Thermal Unit Type**
Standard	A
	B
	C
	CC
	DD
Quick	FB
Slow	SB

Table 42 - Selection of Thermal Units for Special Applications

Class of Controller	Continuous Duty Motor Service Factor	Melting Alloy		
		Ambient Temperature of Motor		
		Same as Controller Ambient	Constant 10 °C (18 °F) Higher Than Controller Ambient	Constant 10 °C (18 °F) Lower Than Controller Ambient
		Full Load Current Multiplier		
All Classes, Except 8198	1.15 to 1.25	1.0	0.9	1.05
	1.0	0.9	0.8	0.95
Class 8198	1.15 to 1.25	1.1	1.0	1.15
	1.0	1.0	0.9	1.05

Selecting Thermal Units

NOTE: For thermal unit selection tables for other devices including obsolete devices, consult the Customer Care Center at 1-888-778-2733.

Table 43 - Thermal Unit Selection

Controller					Thermal Unit Selection Table Number		
					Hand Reset Melting Alloy		
Starter Type	**Class**	**Type**	**Series[29]**	**Size**	**Standard Trip (20)**	**Quick Trip (10)**	**Slow Trip (30)**
Manual Starters FHP	2510 2512 8908	F	A	FHP	Table 43, page 78[30]	—	—
Manual Starters (Small Enclosure)	2510	M, T	A	M–0	Table 1, page 56	Table 72, page 91	[31]
				M–1	Table 1, page 56	Table 72, page 91	[31]
				M–1P	Table 1, page 56	Table 72, page 91	[31]
Manual Starters (Large Enclosure)	2510 2511 2512 8925	M, T	A	M–0 M–1 M–1P	Table 2, page 58	Table 73, page 93	[31]
DC Magnetic Starters EC & M Crane Control Product	7135 7136 7735 7736	C, D	—	1, 2	Table 65, page 86	—	[31]
		E	—	3	Table 9, page 62	—	—
		F	—	4	Table 10, page 63	—	—
		G	—	5	Table 12, page 63	—	—

29. Series letters listed refer to the marking on the nameplate of the basic openstyle starter. When the starter comes in a controller containing other devices, the controller may have a different series letter marked on the enclosure nameplate.
30. Type A thermal units for full-load currents lower than those listed in this table are available. For complete information, consult Customer Care Center at 1-888-778-2733.
31. This device will accept Type SB slow trip (Class 30) thermal units. For selection, see Selecting Slow Trip Thermal Units, page 47.

Table 43 - Thermal Unit Selection (Continued)

Controller					Thermal Unit Selection Table Number		
					Hand Reset Melting Alloy		
Starter Type	**Class**	**Type**	**Series[32]**	**Size**	**Standard Trip (20)**	**Quick Trip (10)**	**Slow Trip (30)**
AC Magnetic Starters (Small Enclosure)	8536 8904[33] (Starter In Own Enclosure) 8933 8998 8999 (Model 3 Control Center) I-LINE™ and QMB Motor Starter Centers	A (8536 only)	B, C	00	Table 17, page 68[34]	—	—
		SA	A, B	00	Table 13, page 64	—	[35]
		SB	A	0	Table 13, page 64	Table 74, page 94	[35]
		SC	A	1	Table 13, page 64	Table 74, page 94	[35]
			A	1P	Table 41, page 77	—	[35]
		SD	A	2	Table 56, page 83	Table 75, page 95	[35]
		SE	A	3	Table 18, page 69	Table 76, page 97[36]	Table 134, page 123[35] [36]
		SF	A	4	Table 54, page 82	—	—
		SG	A	5	Table 49, page 80	—	—
			B[37]	5	Table 59, page 84	Table 83, page 102	—
		SH	A, B	6	Table 21, page 71	—	—

32. Series letters listed refer to the marking on the nameplate of the basic openstyle starter. When the starter comes in a controller containing other devices, the controller may have a different series letter marked on the enclosure nameplate.
33. Small enclosure tables apply for **Class 8904** non-combination and non-reversing starters. For combination and reversing **Class 8904** starters, refer to the large enclosure selections, index above.
34. Type A thermal units for full-load currents lower than those listed in this table are available. For complete information, consult Customer Care Center at 1-888-778-2733.
35. This device will accept Type SB slow trip (Class 30) thermal units. For selection, see Selecting Slow Trip Thermal Units, page 47.
36. **Form Y81** must be specified to use quick trip (Class 10) or slow trip (Class 30) thermal units on Size 3 starters.
37. Divide the motor FLC by 60 and use this quotient to select the appropriate thermal units.

Table 43 - Thermal Unit Selection (Continued)

Controller					Thermal Unit Selection Table Number		
					Hand Reset Melting Alloy		
Starter Type	**Class**	**Type**	**Series[38]**	**Size**	**Standard Trip (20)**	**Quick Trip (10)**	**Slow Trip (30)**
AC Magnetic Starters (Small Enclosure)	8998 8999 (Model 4 Control Center)	SC	A	1 Fusible	Table 66, page 87	Table 74, page 94	—
				1 Circuit Breaker	Table 15, page 66	Table 74, page 94	—
		SD	A	2 Fusible	Table 67, page 89	Table 75, page 95	—
				2 Circuit Breaker	Table 58, page 84[39]	Table 75, page 95	—
		SE	A	3 Small Enclosure	Table 16, page 67	Table 76, page 97[40]	Table 134, page 123 [41][40]
				3 Large Enclosure	Table 68, page 89[39]	Table 76, page 97[40]	Table 133, page 123[41] [40]
		SF	A	4	Table 61, page 86	—	—
		SG	A	5	Table 24, page 73	—	—
		SH	A	6	Table 20, page 71	—	—
AC Magnetic Starters (Small Enclosure)	8998 (Model 5 and Model 6 MCCs)	SC[42]	A	1	Table 109, page 115	—	—
				1 COMPAC 6	Table 104, page 113	—	—
		SD [42]	A	2	Table 110, page 116	—	—
		SE[42]	A	3	Table 111, page 117	—	—
		SF[42]	A	4	Table 112, page 117	—	—
		SG[42]	A	5	Table 113, page 118	—	—
			B	5 CT	Table 103, page 113	—	—
		SH [42]	A	6	Table 114, page 119	—	—
	8911	DPSG	C	20–30 A	Table 135, page 124	—	—
				40 A	Table 145, page 126	—	—
			A	50 A	Table 146, page 127	—	—

38. Series letters listed refer to the marking on the nameplate of the basic openstyle starter. When the starter comes in a controller containing other devices, the controller may have a different series letter marked on the enclosure nameplate.
39. Use for autotransformer starters (fusible and circuit breaker).
40. **Form Y81** must be specified to use quick trip (Class 10) or slow trip (Class 30) thermal units on Size 3 starters.
41. This device will accept Type SB slow trip (Class 30) thermal units. For selection, see Selecting Slow Trip Thermal Units, page 47.
42. Refers to the starter Type number in the MCC, not the Type number of the MCC.

Table 43 - Thermal Unit Selection (Continued)

Controller					Thermal Unit Selection Table Number		
					Hand Reset Melting Alloy		
Starter Type	**Class**	**Type**	**Series[43]**	**Size**	**Standard Trip (20)**	**Quick Trip (10)**	**Slow Trip (30)**
AC Magnetic Starters (Large Enclosure)	8198	G, S	—	—	Table 5, page 62	—	[44]
	8536 (Starter Used in Multi-Motor Panel) 8538, 8904[45] 8539, 8906 8606, 8907 8630[46], 8920 8640[47], 8922 9089, 8924 8647, 8925 8650, 8930 8736, 8738, 8739, 8941	A (8536 only)	B, C	00	Table 14, page 65[48]	—	—
		SA	A, B	00	Table 53, page 80	—	[44]
		SB, NB	A	0	Table 15, page 66	Table 78, page 98	[44]
		SC, NC	A	1	Table 15, page 66	Table 78, page 98	[44]
		SD, ND	A	2	Table 58, page 84	Table 79, page 99	[44]
		SE, NE	A	3	Table 16, page 67	Table 80, page 100[49]	Table 133, page 123[49] [44]
		SF, NF	A	4	Table 61, page 86	—	—
		SG	A	5	Table 24, page 73	—	—
			B[50]	5	Table 59, page 84	Table 83, page 102	—
		SH	A, B	6	Table 20, page 71	—	[44]

43. Series letters listed refer to the marking on the nameplate of the basic openstyle starter. When the starter comes in a controller containing other devices, the controller may have a different series letter marked on the enclosure nameplate.
44. This device will accept Type SB slow trip (Class 30) thermal units. For selection, see Selecting Slow Trip Thermal Units, page 47.
45. Large enclosure tables apply for Class 8904 combination and reversing starters. For non-combination and non-reversing Class 8904 starters, see small enclosure selections above in this table.
46. For **Class 8630** starters, divide the delta-connected motor full-load current by 1.73, and use this quotient to select thermal units.
47. For **Class 8640** and **Class 8940**starters (MD, PD, ME, PE, MF, PF, MG and PG), use the full-load current of each motor winding as a basis for thermal unit selection—normally one-half the total motor current.
48. Type A thermal units for full-load currents lower than those listed in this table are available. For complete information, consult the Customer Care Center at 1–888–778–2733.
49. **Form Y81** must be specified to use quick trip (Class 10) or slow trip (Class 30) thermal units on Size 3 starters.
50. Divide the motor FLC by 60, and use this quotient to select the appropriate thermal units.

Table 43 - Thermal Unit Selection (Continued)

Controller					Thermal Unit Selection Table Number		
					Hand Reset Melting Alloy		
Starter Type	**Class**	**Type**	**Series[51]**	**Size**	**Standard Trip (20)**	**Quick Trip (10)**	**Slow Trip (30)**
AC Magnetic Starters (Large Enclosure)	8810, 8811 8812	CB, DB, SB, UB	A	0	Table 15, page 66	Table 78, page 98	[52]
		CC, DC, SC, UC	A	1	Table 15, page 66	Table 78, page 98	[52]
		CD, DD, SD, UD	A	2	Table 58, page 84	Table 79, page 99	[52]
		CE, DE, SE, UE	A	3	Table 16, page 67	Table 80, page 100[53]	Table 133, page 123[53] [52]
		CF, DF, SF, UF	A	4	Table 61, page 86	—	—
		CG, DG, SG, UG	A	5	Table 24, page 73	—	—
			B[54]	5	Table 59, page 84	Table 83, page 102	—
		CH, DH, SH, UH	A	6	Table 20, page 71	—	[52]
	8940 WELL-GUARD™ Control	WC, XC	A	1	Table 13, page 64	Table 78, page 98	—
		WD, XD, MD, RD, VD	A	2	Table 56, page 83	Table 79, page 99	—
		WE, XE, ME, RE, VE	A	3	Table 18, page 69	Table 80, page 100[53]	—
		PF, WF, XF, MF, RF, VF, PE	A	4	Table 54, page 82	—	—
	8911	DPSO	C	20–30 A	Table 136, page 125	—	—
				40 A	Table 147 , page 128	—	—
			A	50 A	Table 148, page 129	—	—
AC Magnetic Part-Winding	8998 (Model 5 and Model 6 MCCs)	SC[55]	A	1	Table 127, page 120	—	—
		SD[55]	A	2	Table 128, page 121	—	—
		SE[55]	A	3	Table 129, page 122	—	—
		SF	A	4	Table 105, page 114	—	—
		SG	A	5	Table 115, page 119	—	—
			B[54]	5 CT	Table 116, page 120	—	—

51. Series letters listed refer to the marking on the nameplate of the basic openstyle starter. When the starter comes in a controller containing other devices, the controller may have a different series letter marked on the enclosure nameplate.
52. This device will accept Type SB slow trip (Class 30) thermal units. For selection, see Selecting Slow Trip Thermal Units, page 47.
53. **Form Y81** must be specified to use quick trip (Class 10) or slow trip (Class 30) thermal units on Size 3 starters.
54. Divide the motor FLC by 60, and use this quotient to select the appropriate thermal units.
55. Refer to the Type number of the starter in the MCC, not the Type number of the MCC.

Table 43 - Thermal Unit Selection (Continued)

Controller					Thermal Unit Selection Table Number		
					Hand Reset Melting Alloy		
Starter Type	Class	Type	Series[56]	Size	Standard Trip (20)	Quick Trip (10)	Slow Trip (30)
Separately Mounted Overload Relays	9065	C	A	1 (25 A)	Table 44, page 79	Table 82, page 101	[57]
		F	B	4 (133 A)	Table 19, page 70	—	—
		G	A	5 (266 A)	Table 22, page 72	—	—
		MEO	A	(32 A)	Table 86, page 105	—	—
		S	A	1 (26 A)	Table 59, page 84	Table 83, page 102	[57]
				2 (45 A)	Table 69, page 90	Table 84, page 103	[57]
				3 (86 A)	Table 34, page 75	—	—
				4 (133 A)	Table 28, page 74	—	—
		T	A	2 (45 A)	Table 31, page 74	—	[57]
		U	—	3 (86 A)	Table 40, page 76	—	—

Trip Current Rating Calculation

The trip current rating is a nominal value that approximates the minimum current to trip an overload relay in an ambient temperature, outside of the enclosure, of 40 °C (104 °F). In all selection tables except Class 8198, the trip current rating is 1.25 times the minimum full-load current shown for the thermal unit selected. For Class 8198, the trip current rating is 1.15 times the minimum full-load current. This applies to bimetallic overload relays with the trip adjustment set at 100 percent.

Procedure for Calculating the Trip Current Rating

1. Use the selection table for the specific controller involved.
2. Find the minimum motor full-load current listed for the thermal unit.
3. Multiply that current by 1.25 (1.15 for Class 8198). The result is the trip current rating.

Example 1:

Determine the thermal unit selection and trip current rating for thermal units in a Class 8536 Type SCG3 Size 1 magnetic starter used to control a three-phase, 1.15 service factor motor with a full-load current of 17.0 Amperes, where the motor and controller are both located in a 40°C (104°F) ambient temperature.

1. From thermal unit Table 13, page 64, the proper selection is B32.

56. Series letters listed refer to the marking on the nameplate of the basic openstyle starter. When the starter comes in a controller containing other devices, the controller may have a different series letter marked on the enclosure nameplate.
57. This device will accept Type SB slow trip (Class 30) thermal units. For selection, see Selecting Slow Trip Thermal Units, page 47.

2. The minimum motor full-load current is 16. 0 Amperes.
3. Trip current rating is 16.0 x 1.25= 20.0 Amperes.

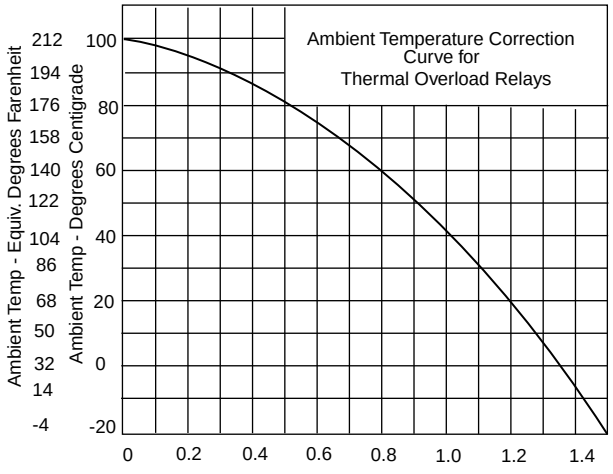
- **Protection Level:** Is the relationship between trip current rating and full-load current. Protection level, in percent, is the trip current rating divided by the motor full-load current times 100. In the example above, the protection level for the B32 thermal unit is: 20.0/17.0 x 100=118%.

  National Electrical Code, Section 430-32, allows a maximum protection level of 125% for the motor in the above example.
- **Minimum Trip Current:** Also called ultimate current, may vary from the trip current rating value, since ratings are established under standardized test conditions. Factors which influence variations include:
  - The number of thermal units installed
  - Enclosure size
  - Proximity to heat producing devices
  - Size of conductors installed
  - Ambient (room) temperature, and others

Except for ambient temperature-compensated overload relays, an ambient temperature higher than 40°C would lower the trip current, and a lower temperature would increase it. This variation is not a factor in selecting thermal units for the average application, since most motor ratings are based on an ambient temperature of 40 °C, and motor capacity varies with temperature in about the same proportion as the change in trip current. Temperature-compensated relays maintain a nearly constant trip current over a wide range of ambient temperature, and are intended for use where the relay, because of its location, cannot sense changes in the motor ambient temperature.

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

Figure 33 - Ambient Temperature Correction Curve for Thermal Overload Relays



A controller ambient temperature other than 40 °C (104 °F) trip current can be calculated by applying a correction factor from the curve in the figure Ambient Temperature Correction Curve for Thermal Overload Relays, page 54. The approximate trip current for a particular ambient temperature is the product of: (1) the multiplier M corresponding to the temperature and (2) the 40 °C trip current rating.

NOTE: Ambient temperature is the temperature surrounding the starter enclosure. Normal temperature rise inside the enclosure has been taken into account in preparing the thermal unit selection tables listed in the section Thermal Unit Selection Tables, page 56.

Example 2:

Determine the trip current for the motor and controller as shown in the Example 1 in Procedure for Calculating the Trip Current Rating, page 53, except the controller is in a 30 °C (86 °F) ambient temperature. From the curve in the figure Ambient Temperature Correction Curve for Thermal Overload Relays, page 54, the multiplier M is 1.1 at 30 °C. The approximate trip current is 16.0 × 1.25 × 1.1 = 22 A.

Thermal Unit Selection on an Approximate Basis—Based on Horsepower and Voltage

Thermal units selected using approximate full-load currents from the table titled Use This Table Only When the Motor Full-Load Current Is Not Known, page 55 will provide a trip current between 101% and 125% of full-load current for many 4-pole, single speed, normal torque, 60 Hz motors. Since full-load current rating of different makes and types of motors vary widely, these selections might not be suitable.

Thermal units should be selected on the basis of motor nameplate full-load current and service factor. Thermal unit sizes originally selected on an approximate basis should always be rechecked and corrected at the time of installation if required.

How to use the table titled Use This Table Only When the Motor Full-Load Current Is Not Known, page 55:

1. Locate the motor horsepower and voltage.
2. Determine the approximate full-load current from the table Use This Table Only When the Motor Full-Load Current Is Not Known, page 55.
3. Use the approximate full-load current in place of actual nameplate full-load current and follow the selection procedure in Procedure for Thermal Unit Selection, page 46.

   NOTE: These currents should not be used for selection of fuses, circuit breakers, or wire sizes. See NEC tables 430-248 through 430-250. For motors rated 208-220 volts, use 230 V column. For motors rated 440 to 550 volts, use 460 and 575 V columns, respectively.

Table 44 - Use This Table Only When the Motor Full-Load Current Is Not Known

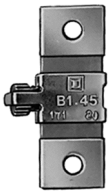
Motor Horsepower	Motor Full-Load Current					
	Three Ø				Single Ø	
	200 V	230 V	460 V	575 V	115 V	230 V
1/6	—	—	—	—	4.4	2.2
1/4	—	—	—	—	5.8	2.9
1/3	—	—	—	—	7.2	3.6
1/2	2.5	2.2	1.1	0.9	9.8	4.9
3/4	3.7	3.2	1.6	1.3	13.8	6.9
1	4.8	4.2	2.1	1.7	16	8
1-1/2	6.9	6.0	3.0	2.4	20	10
2	7.8	6.8	3.4	2.7	24	12
3	11.0	9.6	4.8	3.9	34	17
5	17.5	15.2	7.6	6.1	56	28
7-1/2	25.3	22	11	9	80	40
10	32.2	28	14	11	—	50
15	48.3	42	21	17	—	—
20	62.1	54	27	22	—	—

Table 44 - Use This Table Only When the Motor Full-Load Current Is Not Known (Continued)

Motor Horsepower	Motor Full-Load Current					
	Three Ø				Single Ø	
	200 V	230 V	460 V	575 V	115 V	230 V
25	78.2	68	34	27	—	—
30	92	80	40	32	—	—
40	120	104	52	41	—	—
50	150	130	65	52	—	—
60	177	154	77	62	—	—
75	221	192	96	77	—	—
100	285	248	124	99	—	—
125	359	312	156	125	—	—
150	414	360	180	144	—	—
200	552	480	240	192	—	—

Mounting the Thermal Units

Figure 34 - Example of Thermal Unit Type Designation on front of Starter



Always be certain the correct thermal units are installed in the starter before operating the motor. Thermal units should always be mounted so that their type designation can be viewed from the front of the starter as shown in the figure Example of Thermal Unit Type Designation on front of Starter, page 56. Melting alloy thermal units should be mounted so that the tooth of the pawl assembly can engage the teeth of the ratchet wheel when the reset button is pushed.

Mounting surfaces of starter and thermal units should be clean and care should be taken to insure that thermal unit mounting screws are fastened securely.

Thermal Unit Selection Tables

Table 1

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 1		
Motor FLC (A)		Thermal Unit Number
1 T.U	3 T.U	
0.33–0.36	0.29–0.32	B0.44
0.37–0.40	0.33–0.36	B0.51
0.41–0.45	0.37–0.39	B0.57

Thermal Unit — Table 1		
Motor FLC (A)		Thermal Unit Number
1 T.U	3 T.U	
0.46–0.52	0.40–0.47	B0.63
0.53–0.59	0.48–0.56	B0.71
0.60–0.66	0.57–0.63	B0.81
0.67–0.73	0.64–0.69	B0.92
0.74–0.81	0.70–0.77	B1.03
0.82–0.91	0.78–0.86	B1.16
0.92–1.02	0.87–0.96	B1.30
1.03–1.14	0.97–1.11	B1.45
1.15–1.29	1.12–1.23	B1.67
1.20–1.42	1.24–1.37	B1.88
1.43–1.64	1.38–1.55	B2.10
1.65–1.80	1.56–1.75	B2.40
1.81–2.10	1.76–1.92	B2.65
2.11–2.30	1.93–2.16	B3.00
2.31–2.61	2.17–2.50	B3.30
2.62–2.99	2.51–2.81	B3.70
3.00–3.37	2.82–3.16	B4.15
3.38–3.94	3.17–3.40	B4.85
3.95–4.24	3.41–3.76	B5.50
4.25–4.54	3.77–4.00	B6.25
4.55–5.29	4.01–4.68	B6.90
5.30–5.73	4.69–5.18	B7.70
5.74–6.35	5.19–5.51	B8.20
6.36–7.08	5.52–6.19	B9.10
7.09–7.83	6.20–7.12	B10.2
7.84–8.47	7.13–8.15	B11.5
8.48–9.83	8.16–8.60	B12.8
9.84–10.5	8.61–9.21	B14.0
10.6–11.4	9.22–10.1	B15.5
11.5–12.8	10.2–11.2	B17.5
12.9–13.9	11.3–12.0	B19.5
14.0–16.1	—	B22.0
16.2–18.0	—	B25.0
Following Selections for Size M-1 & M-1P Only.		
—	11.3–12.1	B19.5
—	12.2–13.6	B22.0
16.2–17.6	13.7–15.3	B25.0
17.7–20.6	15.4–17.3	B28.0
20.7–23.1	17.4–19.1	B32.0
23.2–26.0	19.2–21.7	B36.0
—	21.8–24.2	B40.0

Thermal Unit — Table 1		
Motor FLC (A)		Thermal Unit Number
1 T.U	3 T.U	
—	24.3–26.0	B45.0
Following Selections for Size M-1P Only		
23.2–27.1	—	B36.0
27.2–29.2	—	B40.0
29.3–33.0	—	B45.0
33.1–36.0	—	B50.0

Table 2

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 2		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
0.35–0.38	0.30–0.32	B0.44
0.39–0.43	0.33–0.37	B0.51
0.44–0.48	0.38–0.39	B0.57
0.49–0.56	0.40–0.48	B0.63
0.57–0.63	0.49–0.57	B0.71
0.64–0.71	0.58–0.64	B0.81
0.72–0.78	0.65–0.70	B0.92
0.79–0.88	0.71–0.78	B1.03
0.89–0.99	0.79–0.87	B1.16
1.00–1.15	0.88–0.98	B1.30
1.16–1.23	0.99–1.13	B1.45
1.24–1.43	1.14–1.25	B1.67
1.44–1.51	1.26–1.40	B1.88
1.52–1.75	1.41–1.58	B2.10
1.76–1.93	1.59–1.79	B2.40
1.94–2.25	1.80–1.91	B2.65
2.26–2.47	1.92–2.20	B3.00
2.48–2.81	2.21–2.55	B3.30
2.82–3.20	2.56–2.87	B3.70
3.21–3.63	2.88–3.24	B4.15
3.64–4.19	3.25–3.48	B4.85
4.20–4.53	3.49–3.85	B5.50
4.54–4.89	3.86–4.10	B6.25
4.90–5.68	4.11–4.79	B6.90
5.69–6.27	4.80–5.31	B7.70
6.28–6.85	5.32–5.65	B8.20
6.86–7.73	5.66–6.35	B9.10

Thermal Unit — Table 2		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
7.74–8.50	6.36–7.31	B10.2
8.51–9.29	7.32–8.34	B11.5
9.30–10.4	8.35–8.84	B12.8
10.5–11.3	8.85–9.47	B14.0
11.4–12.3	9.48–10.4	B15.5
12.4–13.9	10.5–11.5	B17.5
14.0–15.0	11.6–12.0	B19.5
15.1–18.0	—	B22.0
Following Selections for Size M-1 & M-1P Only.		
—	11.6–12.4	B19.5
15.1–17.4	12.5–14.0	B22.0
17.5–19.2	14.1–15.8	B25.0
19.3–22.0	15.9–17.8	B28.0
22.1–24.6	17.9–19.7	B32.0
24.7–26.0	19.8–22.4	B36.0
—	22.5–25.1	B40.0
—	25.1–26.0	B45.0
Following Selections for Size M-1P Only.		
24.7–29.1	—	B36.0
29.2–31.7	—	B40.0
31.8–36.0	—	B45.0

Table 3

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 3		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
0.29–0.31	0.28–0.29	B0.44
0.32–0.36	0.30–0.33	B0.51
0.37–0.39	0.34–0.36	B0.57
0.40–0.47	0.37–0.44	B0.63
0.48–0.56	0.45–0.52	B0.71
0.57–0.63	0.53–0.59	B0.81
0.64–0.69	0.60–0.64	B0.92
0.70–0.77	0.65–0.71	B1.03
0.78–0.86	0.72–0.80	B1.16
0.87–0.97	0.81–0.90	B1.30
0.98–1.12	0.91–1.03	B1.45

Thermal Unit — Table 3		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
1.13–1.24	1.04–1.14	B1.67
1.25–1.39	1.15–1.27	B1.88
1.40–1.57	1.28–1.44	B2.10
1.58–1.78	1.45–1.63	B2.40
1.79–1.96	1.64–1.79	B2.65
1.97–2.20	1.80–2.01	B3.00
2.21–2.41	2.02–2.19	B3.30
2.42–2.75	2.20–2.52	B3.70
2.76–3.25	2.53–2.95	B4.15
3.26–3.50	2.96–3.17	B4.85
3.51–3.87	3.18–3.50	B5.50
3.88–4.13	3.51–3.73	B6.25
4.14–4.69	3.74–4.22	B6.90
4.70–5.20	4.23–4.68	B7.70
5.21–5.53	4.69–4.98	B8.20
5.54–6.23	4.99–5.59	B9.10
6.24–7.18	5.60–6.43	B10.2
7.19–8.20	6.44–7.41	B11.5
8.21–8.98	7.42–8.02	B12.8
8.99–9.63	8.03–8.59	B14.0
9.64–10.6	8.60–9.52	B15.5
10.7–11.8	9.53–10.5	B17.5
11.9–12.7	10.6–11.2	B19.5
12.8–14.3	11.3–12.0	B22.0
14.4–16.1	—	B25.0
16.2–18.0	—	B28.0
Following Selections for Size M-1 & M-1P Only.		
—	11.3–12.7	B22.0
—	12.8–14.3	B25.0
16.2–18.3	14.4–16.1	B28.0
18.4–20.2	16.2–17.8	B32.0
20.3–23.0	17.9–20.1	B36.0
23.1–26.0	20.2–22.6	B40.0
—	22.7–25.5	B45.0
—	25.6–26.0	B50.0
Following Selections for Size M-1P Only		
25.9–29.0	—	B45.0
29.1–30.8	—	B50.0
30.9–32.7	—	B56.0
32.8–36.0	—	B62.0

Table 4

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 4		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
0.32–0.33	0.29–0.30	B0.44
0.34–0.38	0.31–0.35	B0.51
0.39–0.41	0.36–0.37	B0.57
0.42–0.50	0.38–0.45	B0.63
0.51–0.61	0.46–0.54	B0.71
0.62–0.68	0.55–0.61	B0.81
0.69–0.74	0.62–0.66	B0.92
0.75–0.83	0.67–0.74	B1.03
0.84–0.93	0.75–0.83	B1.16
0.94–1.05	0.84–0.93	B1.30
1.06–1.21	0.94–1.07	B1.45
1.22–1.34	1.08–1.19	B1.67
1.35–1.50	1.20–1.33	B1.88
1.51–1.70	1.34–1.51	B2.10
1.71–1.93	1.52–1.70	B2.40
1.94–2.12	1.71–1.87	B2.65
2.13–2.38	1.88–2.10	B3.00
2.39–2.61	2.11–2.29	B3.30
2.62–2.99	2.30–2.63	B3.70
3.00–3.53	2.64–3.09	B4.15
3.54–3.80	3.10–3.32	B4.85
3.81–4.21	3.33–3.67	B5.50
4.22–4.49	3.68–3.91	B6.25
4.50–5.10	3.92–4.43	B6.90
5.11–5.66	4.44–4.91	B7.70
5.67–6.03	4.92–5.23	B8.20
6.04–6.79	5.24–5.88	B9.10
6.80–7.84	5.89–6.77	B10.2
7.85–8.96	6.78–7.90	B11.5
8.97–9.82	7.91–8.44	B12.8
9.83–10.4	8.45–9.05—	B14.0
10.5–11.6	9.06–9.99	B15.5
11.7–12.9	10.0–11.0	B17.5
13.0–13.9	11.1–11.9	B19.5
14.0–15.7	12.0–12.0	B22.0
15.8–18.0	—	B25.0
Following Selections for Size M-1 & M-1P Only.		

Thermal Unit — Table 4		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
—	12.0–13.4	B22.0
—	13.5–15.1	B25.0
17.8–20.1	15.2–17.0	B28.0
20.2–22.2	17.1–18.9	B32.0
22.3–25.3	19.0–21.4	B36.0
25.4–26.0	21.5–24.0	B40.0
—	24.1–26.0	B45.0
Following Selections for Size M-1P Only.		
25.4–28.4	—	B40.0
28.5–33.1	—	B45.0
33.2–36.0	—	B50.0

Table 5

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 5										
Current Transformer Ratio										Thermal Unit Number
25/5	50/5	75/5	100/5	150/5	200/5	250/5	300/5	400/5	500/5	
Motor FLC										
10.6–11.7	21.1–23.6	31.7–35.4	42.3–47.2	63.4–70.9	84.5–94.6	106.–117.	127.–141.	169.–188.	211.–236.	B3.00
11.8–13.2	3.7–26.5	35.5–39.8	47.3–53.1	71.0–79.7	94.7–105.	118.–132.	142.–159.	189.–212.	237.–265.	B3.30
13.3–14.8	26.6–29.6	39.9–44.5	53.2–59.4	79.8–89.1	106.–118.	133.–148.	160.–177.	213.–237.	266.–296.	B3.70
14.9–17.2	29.7–34.5	44.6–51.8	59.5–69.2	89.2–103.	119.–138.	149.–172.	178.–207.	238.–276.	297.–345.	B4.15
17.3–19.6	34.6–39.2	51.9–58.9	69.3–78.6	104.–117.	139.–156.	173.–196.	208.–235.	277.–314.	346.–360.	B4.85
19.7–22.3	39.3–44.6	59.0–67.0	78.7–89.3	118.–133.	157.–178.	197.–223.	236.–267.	315.–357.	—	B5.50

Table 9

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 9	
Motor FLC (A)	Thermal Unit Number
15.3–16.7	C20.0
16.8–19.8	C22.0
19.9–22.8	C26.0
22.9–25.8	C30.0
25.9–30.4	C34.0
30.5–31.9	C40.0
32.0–34.2	C42.0
34.3–38.8	C45.0

Thermal Unit — Table 9	
Motor FLC (A)	**Thermal Unit Number**
38.9–44.2	C51.0
44.3–50.2	C58.0
50.3–57.1	C66.0
57.2–63.2	C75.0
63.3–68.6	C83.0
68.7–78.6	C90.0
78.7–86.9	C103.0
87.0–100.0	C114.0

Table 10

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 10	
Motor FLC (A)	**Thermal Unit Number**
43.6–47.3	CC54.5
47.4–51.3	CC59.4
51.4–54.6	CC64.3
54.7–59.7	CC68.5
59.8–65.1	CC74.6
65.2–70.1	CC81.5
70.2–75.1	CC87.7
75.2–82.2	CC94.0
82.3–89.2	CC103.0
89.3–96.5	CC112.0
96.6–104.	CC121.0
105.–113.	CC132.0
114.–123.	CC143.0
124.–132.	CC156.0
133.–150.	CC167.0

Table 12

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 12	
Motor FLC (A)	**Thermal Unit Number**
92.–100.	DD112.0
101.–109.	DD121.0
110.–119.	DD128.0
120.–131.	DD140.0
132.–139.	DD150.0
140.–156.	DD160.0

Thermal Unit — Table 12	
Motor FLC (A)	**Thermal Unit Number**
157.–166.	DD185.0
167.–180.	DD213.0
181.–189.	DD220.0
190.–209.	DD230.0
210.–225.	DD250.0
226.–238.	DD265.0
239.–263.	DD280.0
264.–300.	DD300.0

Table 13

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 13			
Motor FLC (A)			**Thermal Unit Number**
1.T.U.	**2 T.U.**	**3 T.U.**	
0.29–0.31	0.29–0.31	0.28–0.30	B0.44
0.32–0.34	0.32–0.34	0.31–0.34	B0.51
0.35–0.38	0.35–0.38	0.35–0.37	B0.57
0.39–0.45	0.39–0.45	0.38–0.44	B0.63
0.46–0.54	0.46–0.54	0.45–0.53	B0.71
0.55–0.61	0.55–0.61	0.54–0.59	B0.81
0.62–0.66	0.62–0.66	0.60–0.64	B0.92
0.67–0.73	0.67–0.73	0.65–0.72	B1.03
0.74–0.81	0.74–0.81	0.73–0.80	B1.16
0.82–0.94	0.82–0.94	0.81–0.90	B1.30
0.95–1.05	0.95–1.05	0.91–1.03	B1.45
1.06–1.22	1.06–1.22	1.04–1.14	B1.67
1.23–1.34	1.23–1.34	1.15–1.27	B1.88
1.35–1.51	1.35–1.51	1.28–1.43	B2.10
1.52–1.71	1.52–1.71	1.44–1.62	B2.40
1.72–1.93	1.72–1.93	1.63–1.77	B2.65
1.94–2.14	1.94–2.14	1.78–1.97	B3.00
2.15–2.40	2.15–2.40	1.98–2.32	B3.30
2.41–2.72	2.41–2.72	2.33–2.51	B3.70
2.73–3.15	2.73–3.15	2.52–2.99	B4.15
3.16–3.55	3.16–3.55	3.00–3.42	B4.85
3.56–4.00	3.56–4.00	3.43–3.75	B5.50
4.01–4.40	4.01–4.40	3.76–3.98	B6.25
4.41–4.88	4.41–4.88	3.99–4.48	B6.90
4.89–5.19	4.89–5.19	4.49–4.93	B7.70
5.20–5.73	5.20–5.73	4.94–5.21	B8.20
5.74–6.39	5.74–6.39	5.22–5.84	B9.10

Thermal Unit — Table 13			
Motor FLC (A)			Thermal Unit Number
1.T.U.	2 T.U.	3 T.U.	
6.40–7.13	6.40–7.13	5.85–6.67	B10.2
7.14–7.90	7.14–7.90	6.68–7.54	B11.5
7.91–8.55	7.91–8.55	7.55–8.14	B12.8
8.56–9.53	8.56–9.53	8.15–8.72	B14.0
9.54–10.6	9.54–10.6	8.73–9.66	B15.5
10.7–11.8	10.7–11.8	9.67–10.5	B17.5
11.9–13.2	11.9–12.0	10.6–11.3	B19.5
13.3–14.9	—	11.4–12.0	B22.0
15.0–16.6	—	—	B25.0
16.7–18.0	—	—	B28.0
Following Selections for Size 1 Only			
—	11.9–13.2	—	B19.5
—	13.3–14.9	11.4–12.7	B22.0
—	15.0–16.6	12.8–14.1	B25.0
16.7–18.9	16.7–18.9	14.2–15.9	B28.0
19.0–21.2	19.0–21.2	16.0–17.5	B32.0
21.3–23.0	21.3–23.0	17.6–19.7	B36.0
23.1–25.5	23.1–25.5	19.8–21.9	B40.0
25.6–26.0	25.6–26.0	22.0–24.4	B45.0
—	—	24.5–26.0	B50.0

Table 14

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 14			
Motor FLC (A)			Thermal Unit Number
1.T.U.	2 T.U.	3 T.U.	
0.43–0.47	0.41–0.45	0.40–0.41	A.49
0.48–0.51	0.46–0.50	0.42–0.46	A.54
0.52–0.56	0.51–0.55	0.47–0.51	A.59
0.57–0.64	0.56–0.62	0.52–0.57	A.65
0.65–0.69	0.63–0.67	0.58–0.62	A.71
0.70–0.76	0.68–0.72	0.63–0.67	A.78
0.77–0.84	0.73–0.81	0.68–0.75	A.86
0.85–0.91	0.82–0.88	0.76–0.80	A.95
0.92–1.01	0.89–0.97	0.81–0.89	A1.02
1.02–1.15	0.98–1.08	0.90–1.02	A1.16
1.16–1.23	1.09–1.18	1.03–1.09	A1.25
1.24–1.37	1.19–1.32	1.10–1.21	A1.39
1.38–1.45	1.33–1.40	1.22–1.29	A1.54
1.46–1.56	1.41–1.48	1.30–1.37	A1.63

Thermal Unit — Table 14			
Motor FLC (A)			Thermal Unit Number
1.T.U.	2 T.U.	3 T.U.	
1.57–1.67	1.49–1.60	1.38–1.48	A1.75
1.68–1.77	1.61–1.72	1.49–1.58	A1.86
1.78–1.92	1.73–1.84	1.59–1.72	A1.99
1.93–2.09	1.85–2.00	1.73–1.85	A2.15
2.10–2.31	2.01–2.22	1.86–2.05	A2.31
2.32–2.56	2.23–2.45	2.06–2.29	A2.57
2.57–2.92	2.46–2.82	2.30–2.62	A2.81
2.93–3.16	2.83–3.08	2.63–2.84	A3.61
3.17–3.48	3.09–3.39	2.85–3.10	A3.95
3.49–3.83	3.40–3.75	3.11–3.46	A4.32
3.84–4.24	3.76–4.16	3.47–3.85	A4.79
4.25–4.62	4.17–4.51	3.86–4.16	A5.30
4.63–4.92	4.52–4.83	4.17–4.46	A5.78
4.93–5.61	4.84–5.49	4.47–5.08	A6.20
5.62–5.85	5.50–5.67	5.09–5.35	A6.99
5.86–6.36	5.68–6.16	5.36–5.82	A7.65
6.37–6.99	6.17–6.75	5.83–6.34	A8.38
7.00–7.67	6.76–7.00	6.35–6.95	A9.25
7.68–8.15	—	6.96–7.00	A9.85
8.16–9.00	—	—	A11.0

Table 15

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 15			
Motor FLC (A)			Thermal Unit Number
1.T.U.	2 T.U.	3 T.U.	
0.31–0.33	0.31–0.33	0.29–0.31	B0.44
0.34–0.36	0.34–0.36	0.32–0.36	B0.51
0.37–0.40	0.37–0.40	0.37–0.38	B0.57
0.41–0.48	0.41–0.48	0.39–0.46	B0.63
0.49–0.57	0.49–0.57	0.47–0.55	B0.71
0.58–0.64	0.58–0.64	0.56–0.61	B0.81
0.65–0.70	0.65–0.70	0.62–0.66	B0.92
0.71–0.77	0.71–0.77	0.67–0.75	B1.03
0.78–0.85	0.78–0.85	0.76–0.83	B1.16
0.86–0.99	0.86–0.99	0.84–0.93	B1.30
1.00–1.10	1.00–1.10	0.94–1.06	B1.45
1.11–1.28	1.11–1.28	1.07–1.18	B1.67
1.29–1.41	1.29–1.41	1.19–1.31	B1.88
1.42–1.58	1.42–1.58	1.32–1.47	B2.10

Thermal Unit — Table 15			
Motor FLC (A)			Thermal Unit Number
1.T.U.	2 T.U.	3 T.U.	
1.59–1.80	1.59–1.80	1.48–1.67	B2.40
1.81–2.03	1.81–2.03	1.68–1.83	B2.65
2.04–2.25	2.04–2.25	1.84–2.04	B3.00
2.26–2.51	2.26–2.51	2.05–2.38	B3.30
2.52–2.83	2.52–2.83	2.39–2.60	B3.70
2.84–3.29	2.84–3.29	2.61–3.13	B4.15
3.30–3.75	3.30–3.75	3.14–3.59	B4.85
3.76–4.22	3.76–4.22	3.60–3.94	B5.50
4.23–4.65	4.23–4.65	3.95–4.19	B6.25
4.66–5.16	4.66–5.16	4.20–4.72	B6.90
5.17–5.53	5.17–5.53	4.73–5.21	B7.70
5.54–6.09	5.54–6.09	5.22–5.51	B8.20
6.10–6.80	6.10–6.80	5.52–6.17	B9.10
6.81–7.60	6.81–7.60	6.18–7.07	B10.2
7.61–8.35	7.61–8.35	7.08–8.05	B11.5
8.36–9.04	8.36–9.04	8.06–8.69	B12.8
9.05–9.99	9.05–9.99	8.70–9.32	B14.0
10.0–11.1	10.0–11.1	9.33–10.2	B15.5
11.2–12.3	11.2–12.0	10.3–11.3	B17.5
12.4–13.7	—	11.4–12.0	B19.5
13.8–15.4	—	—	B22.0
15.5–18.0	—	—	B25.0
Following Selections for Size 1 Only			
—	11.2–12.3	—	B17.5
—	12.4–13.7	11.4–12.1	B19.5
—	13.8–15.4	12.2–13.7	B22.0
15.5–17.2	15.5–17.2	13.8–15.2	B25.0
17.3–19.4	17.3–19.4	15.3–17.2	B28.0
19.5–21.7	19.5–21.7	17.3–18.9	B32.0
21.8–23.9	21.8–23.9	19.0–21.4	B36.0
24.0–26.0	24.0–26.0	21.5–23.7	B40.0
—	—	23.8–26.0	B45.0

Table 16

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 16			
Motor FLC (A)			Thermal Unit Number
1.T.U.	2 T.U.	3 T.U.	
16.2–17.5	15.1–16.2	14.3–15.4	CC20.9
17.6–18.8	16.3–17.3	15.5–16.4	CC22.8

Thermal Unit — Table 16			
Motor FLC (A)			Thermal Unit Number
1.T.U.	2 T.U.	3 T.U.	
18.9–20.5	17.4–19.5	16.5–18.5	CC24.6
20.6–22.2	19.6–20.7	18.6–19.6	CC26.3
22.3–23.7	20.8–22.3	19.7–21.1	CC28.8
23.8–25.4	22.4–24.0	21.2–22.7	CC31.0
25.5–27.3	24.1–25.7	22.8–24.4	CC33.3
27.4–29.3	25.8–27.5	24.5–26.1	CC36.4
29.4–31.5	27.6–29.6	26.2–28.1	CC39.6
31.6–33.9	29.7–31.7	28.2–30.0	CC42.7
34.0–36.2	31.8–33.9	30.1–32.1	CC46.6
36.3–39.3	34.0–36.6	32.2–34.7	CC50.1
39.4–42.3	36.7–39.3	34.8–37.3	CC54.5
42.4–45.3	39.4–42.3	37.4–40.1	CC59.4
45.4–48.3	42.4–44.9	40.2–42.6	CC64.3
48.4–52.0	45.0–48.3	42.7–45.8	CC68.5
52.1–54.9	48.4–50.9	45.9–48.3	CC74.6
55.0–59.7	51.0–55.5	48.4–52.6	CC81.5
59.8–65.4	55.6–59.9	52.7–56.8	CC87.7
65.5–69.6	60.0–64.2	56.9–60.9	CC94.0
69.7–74.8	64.3–68.7	61.0–65.1	CC103.0
74.9–79.7	68.8–71.4	65.2–67.7	CC112.0
79.8–83.1	71.5–74.8	67.8–70.9	CC121.0
83.2–86.0	74.9–78.0	71.0–73.9	CC132.0
—	78.1–80.7	74.0–76.5	CC143.0
—	80.8–86.0	76.6–80.2	CC156.0
—	—	80.3–83.1	CC167.0
—	—	83.2–86.0	CC180.0

Table 17

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 17			
Motor FLC (A)			Thermal Unit Number
1.T.U.	2 T.U.	3 T.U.	
0.42–0.46	0.39–0.43	0.38–0.40	A.49
0.47–0.50	0.44–0.47	0.41–0.44	A.54
0.51–0.55	0.48–0.52	0.45–0.49	A.59
0.56–0.62	0.53–0.58	0.50–0.55	A.65
0.63–0.67	0.59–0.64	0.56–0.60	A.71
0.68–0.73	0.65–0.68	0.61–0.65	A.78
0.74–0.81	0.69–0.77	0.66–0.72	A.86
0.82–0.89	0.78–0.84	0.73–0.79	A.95

Thermal Unit — Table 17			
Motor FLC (A)			Thermal Unit Number
1.T.U.	2 T.U.	3 T.U.	
0.90–0.98	0.85–0.93	0.80–0.88	A1.02
0.99–1.12	0.94–1.05	0.89–0.98	A1.16
1.13–1.20	1.06–1.13	0.99–1.07	A1.25
1.21–1.34	1.14–1.25	1.08–1.17	A1.39
1.35–1.41	1.26–1.33	1.18–1.25	A1.54
1.42–1.51	1.34–1.42	1.26–1.33	A1.63
1.52–1.62	1.43–1.52	1.34–1.44	A1.75
1.63–1.73	1.53–1.63	1.45–1.53	A1.86
1.74–1.86	1.64–1.75	1.54–1.65	A1.99
1.87–2.02	1.76–1.90	1.66–1.79	A2.15
2.03–2.25	1.91–2.13	1.80–1.99	A2.31
2.26–2.46	2.14–2.33	2.00–2.18	A2.57
2.47–2.77	2.34–2.73	2.19–2.45	A2.81
2.78–2.99	2.74–2.86	2.46–2.65	A3.61
3.00–3.26	2.87–3.14	2.66–2.90	A3.95
3.27–3.59	3.15–3.47	2.91–3.19	A4.32
3.60–3.99	3.48–3.83	3.20–3.56	A4.79
4.00–4.42	3.84–4.16	3.57–3.83	A5.30
4.43–4.61	4.17–4.43	3.84–4.08	A5.78
4.62–5.23	4.44–5.00	4.09–4.64	A6.20
5.24–5.39	5.01–5.16	4.65–5.00	A6.99
5.40–5.88	5.17–5.56	5.01–5.36	A7.65
5.89–6.56	5.57–6.22	5.37–5.87	A8.38
6.57–7.18	6.23–6.89	5.88–6.43	A9.25
7.19–7.80	6.90–7.00	6.44–6.79	A9.85
7.81–9.00	—	6.80–7.00	A11.0

Table 18

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 18			
Motor FLC (A)			Thermal Unit Number
1.T.U.	2 T.U.	3 T.U.	
15.5–16.4	14.4–15.3	13.6–14.5	CC20.9
16.5–17.6	15.4–16.4	14.6–15.5	CC22.8
17.7–19.1	16.5–18.4	15.6–17.4	CC24.6
19.2–20.4	18.5–19.6	17.5–18.5	CC26.3
20.5–22.1	19.7–21.0	18.6–19.9	CC28.8
22.2–23.4	21.1–22.7	20.0–21.5	CC31.0
23.5–25.6	22.8–24.2	21.6–22.9	CC33.3
25.7–27.3	24.3–25.9	23.0–24.5	CC36.4

Thermal Unit — Table 18			
Motor FLC (A)			Thermal Unit Number
1.T.U.	2 T.U.	3 T.U.	
27.4–29.4	26.0–27.8	24.6–26.3	CC39.6
29.5–31.5	27.9–29.8	26.4–28.2	CC42.7
31.6–33.7	29.9–31.7	28.3–30.0	CC46.6
33.8–36.5	31.8–34.2	30.1–32.3	CC50.1
36.6–39.1	34.3–36.9	32.4–34.9	CC54.5
39.2–41.7	37.0–39.8	35.0–37.6	CC59.4
41.8–44.8	39.9–42.3	37.7–40.0	CC64.3
44.9–48.0	42.4–45.3	40.1–42.8	CC68.5
48.1–50.7	45.4–47.9	42.9–45.3	CC74.6
50.8–54.9	48.0–51.9	45.4–49.1	CC81.5
55.0–59.9	52.0–56.5	49.2–53.4	CC87.7
60.0–63.3	56.6–60.7	53.5–57.4	CC94.0
63.4–67.2	60.8–64.8	57.5–61.3	CC103.0
67.3–72.4	64.9–67.1	61.4–63.5	CC112.0
72.5–74.9	67.2–70.1	63.6–66.3	CC121.0
75.0–77.4	70.2–72.9	66.4–69.0	CC132.0
77.5–80.7	73.0–74.9	69.1–70.9	CC143.0
80.8–83.1	75.0–77.9	71.0–73.7	CC156.0
83.2–86.0	78.0–80.9	73.8–76.5	CC167.0
—	81.0–82.9	76.6–78.4	CC180.0
—	83.0–86.0	78.5–86.0	CC196.0

Table 19

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 19	
Motor FLC (A)	Thermal Unit Number
43.6–47.3	CC54.5
47.4–51.3	CC59.4
51.4–54.6	CC64.3
54.7–59.7	CC68.5
59.8–65.1	CC74.6
65.2–70.1	CC81.5
70.2–75.1	CC87.7
75.2–82.2	CC94.0
82.3–89.2	CC103.0
89.3–96.5	CC112.0
96.6–104.	CC121.0
105.–113.	CC132.0
114.–123	CC143.0
124.–133.	CC156.0

Table 20

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 20	
Motor FLC (A)	**Thermal Unit Number**
133.–148.	B1.30
149.–174.	B1.45
175.–195.	B1.67
196.–219.	B1.88
220.–239.	B2.10
240.–271.	B2.40
272.–308.	B2.65
309.–348.	B3.00
349.–397.	B3.30
398.–429.	B3.70
430.–495.	B4.15
496.–520.	B4.85

Table 21

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 21	
Motor FLC (A)	**Thermal Unit Number**
128.–140.	B1.30
141.–163.	B1.45
164.–179.	B1.67
180.–201.	B1.88
202.–227.	B2.10
228.–251.	B2.40
252.–278.	B2.65
279.–308.	B3.00
309.–346.	B3.30
347.–380.	B3.70
381.–426.	B4.15
427.–454.	B4.85
455.–489.	B5.50
490.–520.	B6.25

Table 22

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 22	
Motor FLC (A)	Thermal Unit Number
92.0–100.	DD112.0
101.–109.	DD121.0
110.–119.	DD128.0
120.–131.	DD140.0
132.–139.	DD150.0
140.–156.	DD160.0
157.–166.	DD185.0
167.–180.	DD213.0
181.–189.	DD220.0
190.–209.	DD230.0
210.–225.	DD250.0
226.–238.	DD265.0
239.–266.	DD280.0

Table 24

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 24	
Motor FLC (A)	**Thermal Unit Number**
88.2–95.1	DD112.0
95.2–101.	DD121.0
102.–111.	DD128.0
112.–119.	DD140.0
120.–131.	DD150.0
132.–149.	DD160.0
150.–170.	DD185.0
171.–180.	DD220.0
181.–197.	DD240.0
198.–204.	DD250.0
205.–213.	DD265.0
214.–237.	DD280.0
238.–243.	DD300.0
244.–266.	DD320.0

Table 26

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 26		
Size 7 Type J	**Size 8 Type K**	**Thermal Unit Number**
Current Transformer Ratio		
120/5	**2000/5**	
Motor FLC		
166.–187.	277.–312.	B1.03
188.–211.	313.–352.	B1.16
212.–232.	353.–388.	B1.30
233.–267.	389.–445.	B1.45
268.–301.	446.–503.	B1.67
302.–336.	504.–561.	B1.88
337.–383.	562.–640.	B2.10
384.–425.	641.–708.	B2.40
426.–466.	709.–777.	B2.65
467.–522.	778.–870.	B3.00
523.–587.	871.–978.	B3.30
588.–656.	979.–1093.	B3.70
657.–764.	1094.–1215.	B4.15

Table 28

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 28		
Motor FLC (A)		Thermal Unit Number
2 or 3 T.U.		
Large Enclosure	Small Enclosure	
45.3–48.2	40.3–42.8	CC64.3
48.3–52.4	42.9–46.2	CC68.5
52.5–56.4	46.3–49.8	CC74.6
56.5–61.2	49.9–54.9	CC81.5
61.3–66.1	55.0–57.9	CC87.7
66.2–71.4	58.0–62.5	CC94.0
71.5–77.0	62.6–67.3	CC103.0
77.1–80.7	67.4–73.4	CC112.0
80.8–87.7	73.5–78.9	CC121.0
87.8–94.9	79.0–84.9	CC132.0
95.0–102.	85.0–91.0	CC143.0
103.–110.	91.1–97.2	CC156.0
111.–117.	97.3–104.	CC167.0
118.–133.	105.–121.	CC180.0
—	122.–133.	CC196.0

Table 31

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 31	
Motor FLC (A)	Thermal Unit Number
0.31–0.35	B0.44
0.36–0.39	B0.51
0.40–0.44	B0.57
0.45–0.50	B0.63
0.51–0.61	B0.71
0.62–0.68	B0.81
0.69–0.73	B0.92
0.74–0.82	B1.03
0.83–0.92	B1.16
0.93–1.03	B1.30
1.04–1.19	B1.45
1.20–1.34	B1.67
1.35–1.50	B1.88
1.51–1.74	B2.10
1.75–1.97	B2.40

Thermal Unit — Table 31	
Motor FLC (A)	**Thermal Unit Number**
1.98–2.14	B2.65
2.15–2.47	B3.00
2.48–2.91	B3.30
2.92–3.31	B3.70
3.32–3.75	B4.15
3.76–4.05	B4.85
4.06–4.94	B6.25
4.95–5.52	B6.90
5.53–6.11	B7.70
6.12–6.52	B8.20
6.53–7.31	B9.10
7.32–8.43	B10.2
8.44–9.83	B11.5
9.84–10.7	B12.8
10.8–11.6	B14.0
11.7–12.9	B15.5
13.0–14.3	B17.5
14.4–15.7	B19.5
15.8–17.8	B22.0
17.9–20.3	B25.0
20.4–23.3	B28.0
23.4–26.6	B32.0
26.7–30.3	B36.0
30.4–35.3	B40.0
35.4–41.5	B45.0
41.6–45	B50.0

Table 34

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 34	
Motor FLC (A)	**Thermal Unit Number**
15.1–16.2	CC20.9
16.3–17.5	CC22.8
17.6–19.1	CC24.6
19.2–20.7	CC26.3
20.8–22.2	CC28.8
22.3–24.0	CC31.0
24.1–25.7	CC33.3
25.8–27.8	CC36.4
27.9–30.1	CC39.6
30.2–32.5	CC42.7

Thermal Unit — Table 34	
Motor FLC (A)	**Thermal Unit Number**
32.6–35.1	CC46.6
35.2–38.0	CC50.1
38.1–41.1	CC54.5
41.2–44.0	CC59.4
44.1–47.2	CC64.3
47.3–51.1	CC68.5
51.2–55.8	CC74.6
55.9–59.5	CC81.5
59.6–64.5	CC87.7
64.6–69.5	CC94.0
69.6–75.0	CC103.0
75.1–78.1	CC112.0
78.2–82.3	CC121.0
82.4–86.0	CC132.0

Table 40

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 40	
Motor FLC (A)	**Thermal Unit Number**
15.3–16.7	C20.0
16.8–19.8	C22.0
19.9–22.8	C26.0
22.9–25.8	C30.0
25.9–30.4	C34.0
30.5–31.9	C40.0
32.0–34.2	C42.0
34.3–38.8	C45.0
38.9–44.2	C51.0
44.3–50.2	C58.0
50.3–57.1	C66.0
57.2–63.2	C75.0
63.3–68.6	C83.0
68.7–78.6	C90.0
78.7–86.0	C103.0

Table 41

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 41	
Motor FLC (A)	**Thermal Unit Number**
0.81–0.92	B1.16
0.93–1.07	B1.30
1.08–1.14	B1.45
1.15–1.26	B1.67
1.27–1.49	B1.88
1.50–1.73	B2.10
1.74–1.89	B2.40
1.90–2.16	B2.65
2.17–2.37	B3.00
2.38–2.66	B3.30
2.67–2.99	B3.70
3.00–3.40	B4.15
3.41–3.94	B4.85
3.95–4.15	B5.50
4.16–4.49	B6.25
4.50–5.15	B6.90
5.16–5.77	B7.70
5.78–6.61	B8.20
6.62–7.14	B9.10
7.15–7.97	B10.2
7.98–8.15	B11.5
8.16–9.32	B12.8
9.33–9.97	B14.0
9.98–10.7	B15.5
10.8–12.0	B17.5
12.1–13.9	B19.5
14.0–15.7	B22.0
15.8–18.4	B25.0
18.5–21.6	B28.0
21.7–24.0	B32.0
24.1–28.6	B36.0
28.7–30.7	B40.0
30.8–33.5	B45.0
33.6–36.0	B50.0

Table 43

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 43	
Motor FLC (A)	**Thermal Unit Number**
0.41–0.44	A.49
0.45–0.49	A.54
0.50–0.53	A.59
0.54–0.58	A.65
0.59–0.65	A.71
0.66–0.71	A.78
0.72–0.78	A.86
0.79–0.85	A.95
0.86–0.96	A1.02
0.97–1.04	A 1.16
1.05–1.16	A1.25
1.17–1.29	A1.39
1.30–1.37	A1.54
1.38–1.47	A1.63
1.48–1.56	A1.75
1.57–1.65	A1.86
1.66–1.79	A1.99
1.80–1.95	A2.15
1.96–2.15	A2.31
2.16–2.38	A2.57
2.39–2.75	A2.81
2.76–2.84	A3.61
2.85–3.06	A3.95
3.07–3.45	A4.32
3.46–3.70	A4.79
3.71–4.07	A5.30
4.08–4.32	A5.78
4.33–4.90	A6.20
4.91–5.35	A6.99
5.36–5.85	A7.65
5.86–6.41	A8.38
6.42–6.79	A9.25
6.80–7.57	A9.85
7.58–8.15	A11.0
8.16–8.98	A11.9
8.99–9.67	A13.2
9.68–9.95	A14.1
9.96–10.8	A14.8
10.9–12.1	A16.2

Thermal Unit — Table 43	
Motor FLC (A)	**Thermal Unit Number**
12.2–13.1	A17.9
13.2–13.9	A19.8
14.0–15.0	A21.3
15.1–16.0	A25.2

Table 44

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 44	
Motor FLC (A)	**Thermal Unit Number**
0.34–0.38	B0.44
0.39–0.43	B0.51
0.44–0.48	B0.57
0.49–0.53	B0.65
0.54–0.62	B0.71
0.63–0.69	B0.81
0.70–0.78	B0.92
0.79–0.88	B1.03
0.89–0.99	B1.16
1.00–1.10	B1.30
1.11–1.26	B1.45
1.27–1.43	B1.67
1.44–1.59	B1.88
1.60–1.81	B2.10
1.82–2.00	B2.40
2.01–2.28	B2.65
2.29–2.52	B3.00
2.53–2.87	B3.30
2.88–3.28	B3.70
3.29–3.75	B4.15
3.76–4.27	B4.85
4.28–4.77	B5.50
4.78–5.27	B6.25
5.28–5.91	B6.90
5.92–6.25	B7.70
6.26–6.83	B8.20
6.84–7.65	B9.10
7.66–8.55	B10.2
8.56–9.56	B11.5
9.57–10.3	B12.8
10.4–11.3	B14.0
11.4–12.4	B15.5

Thermal Unit — Table 44	
Motor FLC (A)	**Thermal Unit Number**
12.5–14.1	B17.5
14.2–15.7	B19.5
15.8–17.9	B22.0
18.0–20.1	B25.0
20.2–22.5	B28.0
22.6–25.0	B32.0

Table 49

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 49	
Motor FLC (A)	**Thermal Unit Number**
82.5–88.2	DD112.0
88.3–95.9	DD121.0
96.0–102.	DD128.0
103.–109.	DD140.0
110.–121.	DD150.0
122.–139.	DD160.0
140.–154.	DD185.0
155.–163.	DD220.0
164.–175.	DD240.0
176.–184.	DD250.0
185.–195.	DD265.0
196.–215.	DD280.0
216.–224.	DD300.0
225.–243.	DD320.0
244.–266.	DD340.0

Table 53

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 53		
Motor FLC (A)		**Thermal Unit Number**
1.T.U.	**3 T.U.**	
0.31–0.33	0.29–0.31	B0.44
0.34–0.36	0.32–0.36	B0.51
0.37–0.40	0.37–0.38	B0.57
0.41–0.48	0.39–0.46	B0.63
0.49–0.57	0.47–0.55	B0.71
0.58–0.64	0.56–0.61	B0.81
0.65–0.70	0.62–0.66	B0.92

Thermal Unit — Table 53		
Motor FLC (A)		Thermal Unit Number
1.T.U.	3 T.U.	
0.71–0.77	0.67–0.75	B1.03
0.78–0.85	0.76–0.83	B1.16
0.86–0.99	0.84–0.93	B1.30
1.00–1.10	0.94–1.06	B1.45
1.11–1.28	1.07–1.18	B1.67
1.29–1.41	1.19–1.31	B1.88
1.42–1.58	1.32–1.47	B2.10
1.59–1.80	1.48–1.67	B2.40
1.81–2.03	1.68–1.83	B2.65
2.04–2.25	1.84–2.04	B3.00
2.26–2.51	2.05–2.38	B3.30
2.52–2.83	2.39–2.60	B3.70
2.84–3.29	2.61–3.13	B4.15
3.30–3.75	3.14–3.59	B4.85
3.76–4.22	3.60–3.94	B5.50
4.23–4.65	3.95–4.19	B6.25
4.66–5.16	4.20–4.72	B6.90
5.17–5.53	4.73–5.21	B7.70
5.54–6.09	5.22–5.51	B8.20
6.10–6.80	5.52–6.17	B9.10
6.81–7.60	6.18–7.00	B10.2
7.61–8.35	—	B11.5
8.36–9.00	—	B12.8

Table 54

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 54		
Motor FLC (A)		Thermal Unit Number
2.T.U.	3 T.U.	
43.6–45.5	41.1–43.5	CC64.3
45.6–49.6	43.6–46.8	CC68.5
49.7–53.1	46.9–50.0	CC74.6
53.2–57.6	50.1–54.9	CC81.5
57.7–62.4	55.0–57.5	CC87.7
62.5–67.5	57.6–61.8	CC94.0
67.6–71.1	61.9–66.2	CC103.0
71.2–75.9	66.3–72.4	CC112.0
76.0–81.9	72.5–78.1	CC121.0
82.0–84.6	78.2–80.7	CC132.0
84.7–90.7	80.8–86.5	CC143.0
90.8–98.4	86.6–93.9	CC156.0
98.5–105.	94.0–100.	CC167.0
106.–117.	101.–112.	CC180.0
118.–123.	113.–117.	CC196.0
124.–133.	118.–123.	CC208.0
—	124.–133.	CC219.0

Table 56

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 56		
Motor FLC (A)		Thermal Unit Number
1 or 2.T.U.	3 T.U.	
3.29–3.74	3.18–3.40	B4.85
3.75–4.23	3.41–3.76	B5.50
4.24–4.68	3.77–4.00	B6.25
4.69–5.22	4.01–4.57	B6.90
5.23–5.67	4.58–5.03	B7.70
5.68–6.13	5.04–5.32	B8.20
6.14–6.91	5.33–5.97	B9.10
6.92–7.70	5.98–6.88	B10.2
7.71–8.56	6.89–7.82	B11.5
8.57–9.39	7.83–8.47	B12.8
9.40–10.4	8.48–9.15	B14.0
10.5–11.6	9.16–10.1	B15.5
11.7–12.9	10.2–11.2	B17.5
13.0–14.6	11.3–12.0	B19.5
14.7–16.5	12.1–13.6	B22.0
16.6–18.5	13.7–15.2	B25.0
18.6–21.0	15.3–17.1	B28.0
21.1–23.6	17.2–19.0	B32.0
23.7–26.3	19.1–21.5	B36.0
26.4–29.3	21.6–24.1	B40.0
29.4–35.1	24.2–27.0	B45.0
35.2–36.1	27.1–28.7	B50.0
36.2–39.1	28.8–30.4	B56.0
39.2–41.5	30.5–32.2	B62.0
41.6–45.0	32.3–35.4	B70.0
—	35.5–38.2	B79.0
—	38.3–45.0	B88.0

Table 58

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 58		
Motor FLC (A)		Thermal Unit Number
1 or 2.T.U.	3 T.U.	
3.37–3.82	3.28–3.51	B4.85
3.83–4.33	3.52–3.89	B5.50
4.34–4.79	3.90–4.14	B6.25
4.80–5.33	4.15–4.73	B6.90
5.34–5.79	4.74–5.22	B7.70
5.80–6.27	5.23–5.53	B8.20
6.28–7.03	5.54–6.21	B9.10
7.04–7.88	6.22–7.17	B10.2
7.89–8.73	7.18–8.19	B11.5
8.74–9.55	8.20–8.90	B12.8
9.56–10.6	8.91–9.57	B14.0
10.7–11.8	9.58–10.6	B15.5
11.9–13.1	10.7–11.8	B17.5
13.2–14.9	11.9–12.7	B19.5
15.0–16.9	12.8–14.4	B22.0
17.0–18.8	14.5–16.1	B25.0
18.9–21.5	16.2–18.2	B28.0
21.6–24.1	18.3–20.2	B32.0
24.2–26.8	20.3–22.8	B36.0
26.9–29.9	22.9–25.6	B40.0
30.0–35.5	25.7–28.8	B45.0
35.6–36.5	28.9–30.6	B50.0
36.6–39.6	30.7–32.4	B56.0
39.7–41.5	32.5–34.6	B62.0
41.6–45.0	34.7–38.6	B70.0
—	38.7–45.0	B79.0

Table 59

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 59		
Motor FLC (A)		Thermal Unit Number
1 or 2 T.U.	3 T.U.	
0.34–0.38	0.29–0.31	B0.44
0.39–0.43	0.32–0.35	B0.51
0.44–0.47	0.36–0.38	B0.57
0.48–0.53	0.39–0.46	B0.63

Thermal Unit — Table 59		
Motor FLC (A)		Thermal Unit Number
1 or 2 T.U.	3 T.U.	
0.54–0.60	0.47–0.55	B0.71
0.61–0.68	0.56–0.62	B0.81
0.69–0.76	0.63–0.67	B0.92
0.77–0.86	0.68–0.75	B1.03
0.87–0.97	0.76–0.84	B1.16
0.98–1.07	0.85–0.95	B1.30
1.08–1.23	0.96–1.09	B1.45
1.24–1.39	1.10–1.21	B1.67
1.40–1.55	1.22–1.35	B1.88
1.56–1.77	1.36–1.53	B2.10
1.78–1.96	1.54–1.73	B2.40
1.97–2.15	1.74–1.90	B2.65
2.16–2.41	1.91–2.14	B3.00
2.42–2.71	2.15–2.34	B3.30
2.72–3.03	2.35–2.67	B3.70
3.04–3.53	2.68–3.22	B4.15
3.54–4.01	3.23–3.48	B4.85
4.02–4.56	3.49–3.87	B5.50
4.57–5.03	3.88–4.14	B6.25
5.04–5.59	4.15–4.73	B6.90
5.60–5.95	4.74–5.28	B7.70
5.96–6.58	5.29–5.64	B8.20
6.59–7.31	5.65–6.39	B9.10
7.32–8.15	6.40–7.43	B10.2
8.16–9.13	7.44–8.55	B11.5
9.14–9.91	8.56–9.40	B12.8
9.92–10.7	9.41–10.0	B14.0
10.8–12.1	10.1–11.2	B15.5
12.2–13.5	11.3–12.5	B17.5
13.6–15.1	12.6–13.5	B19.5
15.2–17.0	13.6–15.4	B22.0
17.1–18.9	15.5–17.5	B25.0
19.0–21.5	17.6–19.9	B28.0
21.6–24.0	20.0–22.2	B32.0
24.1–26.0	22.3–25.5	B36.0
—	25.6–26.0	B40.0

Table 61

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 61		
Motor FLC (A)		Thermal Unit Number
2 T.U.	3 T.U.	
46.8–50.0	45.3–48.2	CC64.3
50.1–54.2	48.3–52.4	CC68.5
54.3–58.3	52.5–56.4	CC74.6
58.4–63.6	56.5–61.2	CC81.5
63.7–68.5	61.3–66.1	CC87.7
68.6–74.0	66.2–71.4	CC94.0
74.1–79.8	71.5–77.0	CC103.0
79.9–83.0	77.1–79.0	CC112.0
83.1–88.9	79.1–84.7	CC121.0
89.0–95.6	84.8–91.1	CC132.0
95.7–102.	91.2–98.1	CC143.0
103.–109.	98.2–104.	CC156.0
110.–119.	105.–113.	CC167.0
120.–133.	114.–123.	CC180.0
—	124.–133.	CC196.0

Table 65

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 65	
Motor FLC (A)	Thermal Unit Number
0.31–0.35	B0.44
0.36–0.39	B0.51
0.40–0.44	B0.57
0.45–0.50	B0.63
0.51–0.58	B0.71
0.59–0.65	B0.81
0.66–0.73	B0.92
0.74–0.82	B1.03
0.83–0.92	B1.16
0.93–1.03	B1.30
1.04–1.19	B1.45
1.20–1.34	B1.67
1.35–1.50	B1.88
1.51–1.67	B2.10
1.68–1.89	B2.40
1.90–2.14	B2.65

Thermal Unit — Table 65	
Motor FLC (A)	**Thermal Unit Number**
2.15–2.36	B3.00
2.37–2.65	B3.30
2.66–2.97	B3.70
2.98–3.47	B4.15
3.48–3.94	B4.85
3.95–4.44	B5.50
4.45–4.94	B6.25
4.95–5.52	B6.90
5.53–5.88	B7.70
5.89–6.52	B8.20
6.53–7.31	B9.10
7.32–8.21	B10.2
8.22–9.18	B11.5
9.19–9.90	B12.8
10.0–11.0	B14.0
11.1–12.4	B15.5
12.5–13.9	B17.5
14.0–15.7	B19.5
15.8–17.8	B22.0
17.9–20.0	B25.0
20.1–22.9	B28.0
23.0–25.0	B32.0
Following Selections for Size 2 Only.	
23.0–25.7	B32.0
25.8–28.6	B36.0
28.7–32.2	B40.0
32.3–35.8	B45.0
35.9–40.1	B50.0
40.2–44.4	B56.0
44.5–50.0	B62.0

Table 66

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 66	
Motor FLC (A)	**Thermal Unit Number**
0.31–0.32	B0.44
0.33–0.36	B0.51
0.37–0.41	B0.57
0.42–0.49	B0.63
0.50–0.54	B0.71

Thermal Unit — Table 66	
Motor FLC (A)	**Thermal Unit Number**
0.55–0.61	B0.81
0.62–0.67	B0.92
0.68–0.76	B1.03
0.77–0.87	B1.16
0.88–0.98	B1.30
0.99–1.05	B1.45
1.06–1.25	B1.67
1.26–1.33	B1.88
1.34–1.56	B2.10
1.57–1.71	B2.40
1.72–1.97	B2.65
1.98–2.15	B3.00
2.16–2.42	B3.30
2.43–2.78	B3.70
2.79–3.28	B4.15
3.29–3.88	B4.85
3.89–4.13	B5.50
4.14–4.43	B6.25
4.44–4.96	B6.90
4.97–5.35	B7.70
5.36–5.91	B8.20
5.92–6.79	B9.10
6.80–7.56	B10.2
7.57–7.83	B11.5
7.84–8.09	B12.8
8.10–9.51	B14.0
9.52–10.1	B15.5
10.2–11.3	B17.5
11.4–13.1	B19.5
13.2–14.9	B22.0
15.0–16.1	B25.0
16.2–17.8	B28.0
17.9–19.1	B32.0
19.2–22.4	B36.0
22.5–23.5	B40.0
23.6–26.0	B45.0

Table 67

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 67	
Motor FLC (A)	**Thermal Unit Number**
3.79–4.14	B5.50
4.15–4.44	B6.25
4.45–5.22	B6.90
5.23–5.29	B7.70
5.30–5.99	B8.20
6.00–6.82	B9.10
6.83–7.68	B10.2
7.69–7.92	B11.5
7.93–8.47	B12.8
8.48–9.99	B14.0
10.0–10.8	B15.5
10.9–12.3	B17.5
12.4–12.9	B19.5
13.0–15.1	B22.0
15.2–16.7	B25.0
16.8–17.9	B28.0
18.0–20.1	B32.0
20.2–23.8	B36.0
23.9–25.8	B40.0
25.9–28.3	B45.0
28.4–29.6	B50.0
29.7–32.1	B56.0
32.2–34.4	B62.0
34.5–38.3	B70.0
38.4–39.9	B79.0
40.0–45.0	B88.0

Table 68

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 68	
Motor FLC (A)	**Thermal Unit Number**
14.9–16.1	CC20.9
16.2–17.3	CC22.8
17.4–19.5	CC24.6
19.6–20.7	CC26.3
20.8–22.4	CC28.8
22.5–23.9	CC31.0

Thermal Unit — Table 68	
Motor FLC (A)	**Thermal Unit Number**
24.0–25.8	CC33.3
25.9–27.6	CC36.4
27.7–29.7	CC39.6
29.8–31.8	CC42.7
31.9–34.2	CC46.6
34.3–37.0	CC50.1
37.1–39.6	CC54.5
39.7–42.5	CC59.4
42.6–45.0	CC64.3
45.1–48.6	CC68.5
48.7–51.2	CC74.6
51.3–56.0	CC81.5
56.1–60.1	CC87.7
60.2–64.3	CC94.0
64.4–68.9	CC103.0
69.0–71.9	CC112.0
72.0–75.4	CC121.0
75.5–78.9	CC132.0
79.0–82.1	CC143.0
82.2–86.0	CC156.0

Table 69

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 69		
Motor FLC (A)		**Thermal Unit Number**
1 or 2.T.U.	**3 T.U.**	
3.46–3.90	3.38–3.65	B4.85
3.91–4.44	3.66–4.07	B5.50
4.45–4.91	4.08–4.36	B6.25
4.92–5.51	4.37–5.19	B6.90
5.52–5.84	5.20–5.59	B7.70
5.85–6.54	5.60–5.98	B8.20
6.55–7.33	5.99–6.78	B9.10
7.34–8.31	6.79–7.91	B10.2
8.32–9.22	7.92–9.12	B11.5
9.23–10.0	9.13–10.0	B12.8
10.1–11.2	10.1–10.7	B14.0
11.3–12.5	10.8–12.0	B15.5
12.6–14.2	12.1–13.5	B17.5
14.3–16.1	13.6–14.6	B19.5
16.2–18.4	14.7–16.7	B22.0

Thermal Unit — Table 69		
Motor FLC (A)		Thermal Unit Number
1 or 2.T.U.	3 T.U.	
18.5–20.5	16.8–18.9	B25.0
20.6–23.2	19.0–21.6	B28.0
23.3–26.6	21.7–24.1	B32.0
26.7–29.6	24.2–27.6	B36.0
29.7–33.5	27.7–31.2	B40.0
33.6–37.2	31.3–35.5	B45.0
37.3–41.5	35.6–37.8	B50.0
41.6–45.0	37.9–41.5	B56.0
—	41.6–45.0	B62.0

Table 72

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 72		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
2.38–2.62	2.38–2.62	FB3.33
2.63–2.94	2.63–2.94	FB3.71
2.95–3.31	2.95–3.31	FB4.1
3.32–3.43	3.32–3.43	FB4.5
3.44–3.81	3.44–3.81	FB4.75
3.82–4.32	3.82–4.32	FB5.3
4.33–4.75	4.33–4.75	FB6.1
4.76–5.38	4.76–5.38	FB6.75
5.39–5.75	5.39–5.75	FB7.45
5.76–5.97	5.76–5.97	FB7.8
5.98–6.30	5.98–6.30	FB8.21
6.31–6.55	6.31–6.55	FB8.6
6.56–6.89	6.56–6.89	FB9.0
6.90–7.14	6.90–7.14	FB9.5
7.15–7.36	7.15–7.36	FB10.0
7.37–8.30	7.37–8.30	FB10.6
8.31–8.59	8.31–8.59	FB11.2
8.60–9.01	8.60–9.01	FB12.1
9.02–9.68	9.02–9.68	FB13.1
9.69–9.99	9.69–9.99	FB13.9
10.0–10.9	10.0–10.9	FB14.8
11.0–11.3	11.0–11.3	FB15.6
11.4–12.4	11.4–12.0	FB16.4
12.5–12.9	—	FB17.6
13.0–14.0	—	FB18.4

Thermal Unit — Table 72		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
14.1–14.5	—	FB19.4
14.6–15.7	—	FB21.1
15.8–16.6	—	FB22.6
16.7–18.0	—	FB23.6
Following Selections for Size M–1 & M–1P Only.		
—	11.4–12.4	FB16.4
—	12.5–12.9	FB17.6
—	13.0–14.0	FB18.4
—	14.1–14.5	FB19.4
—	14.6–15.7	FB21.1
—	15.8–16.6	FB22.6
16.7–17.6	16.7–17.6	FB23.6
17.7–18.3	17.7–18.3	FB24.8
18.4–19.4	18.4–19.4	FB26.7
19.5–20.5	19.5–20.5	FB28.3
20.6–21.7	20.6–21.7	FB29.6
21.8–22.8	21.8–22.8	FB30.5
22.9–24.3	22.9–24.3	FB32.5
24.4–24.7	24.4–24.7	FB34.1
24.8–25.4	24.8–25.4	FB35.0
25.5–26.0	25.5–26.0	FB36.6
Following Selections for Size M–1P Only.		
26.1–27.7	—	FB38.3
27.8–28.9	—	FB40.2
29.0–30.6	—	FB42.0
30.7–32.5	—	FB44.0
32.6–36.0	—	FB46.0

Table 73

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 73		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
2.42–2.67	2.42–2.67	FB3.33
2.68–3.00	2.68–3.00	FB3.71
3.01–3.36	3.01–3.36	FB4.1
3.37–3.53	3.37–3.53	FB4.5
3.54–3.91	3.54–3.91	FB4.75
3.92–4.41	3.92–4.41	FB5.3
4.42–4.83	4.42–4.83	FB6.1
4.84–5.45	4.84–5.45	FB6.75
5.46–5.89	5.46–5.89	FB7.45
5.90–6.04	5.90–6.04	FB7.8
6.05–6.55	6.05–6.55	FB8.21
6.56–6.72	6.56–6.72	FB8.6
6.73–7.00	6.73–7.00	FB9.0
7.01–7.39	7.01–7.39	FB9.5
7.40–7.54	7.40–7.54	FB10.0
7.55–8.41	7.55–8.41	FB10.6
8.42–8.91	8.42–8.91	FB11.2
8.92–9.16	8.92–9.16	FB12.1
9.17–10.0	9.17–10.0	FB13.1
10.1–10.3	10.1–10.3	FB13.9
10.4–11.4	10.4–11.4	FB14.8
11.5–11.8	11.5–11.8	FB15.6
11.9–12.9	11.9–12.9	FB16.4
13.0–13.4	—	FB17.6
13.5–14.2	—	FB18.4
14.3–15.1	—	FB19.4
15.2–18.0	—	FB21.1
Following Selections for Size M–1 & M–1P Only.		
—	11.5–11.8	FB15.6
—	11.9–12.9	FB16.4
—	13.0–13.4	FB17.6
—	13.5–14.2	FB18.4
—	14.3–15.1	FB19.4
15.2–17.1	15.2–17.1	FB21.1
17.2–18.0	17.2–18.0	FB22.6
18.1–18.9	18.1–18.9	FB23.6
19.0–19.7	19.0–19.7	FB24.8
19.8–20.9	19.8–20.9	FB26.7

Thermal Unit — Table 73		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
21.0–21.9	21.0–21.9	FB28.3
22.0–23.1	22.0–23.1	FB29.6
23.2–24.3	23.2–24.3	FB30.5
24.4–25.5	24.4–25.5	FB32.6
25.6–26.0	25.6–26.0	FB34.1
Following Selections for Size M–1P Only.		
26.1–26.8	—	FB35.0
26.9–27.3	—	FB36.6
27.4–28.7	—	FB38.3
28.8–30.2	—	FB40.2
30.3–31.9	—	FB42.0
32.0–36.0	—	FB44.0

Table 74

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 74		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
2.23–2.47	2.23–2.47	FB3.33
2.48–2.76	2.48–2.76	FB3.71
2.77–3.04	2.77–3.04	FB4.1
3.05–3.24	3.05–3.24	FB4.5
3.25–3.61	3.25–3.61	FB4.75
3.62–4.19	3.62–4.19	FB5.3
4.20–4.62	4.20–4.62	FB6.1
4.63–5.14	4.63–5.14	FB6.75
5.15–5.39	5.15–5.39	FB7.45
5.40–5.69	5.40–5.69	FB7.8
5.70–5.99	5.70–5.99	FB8.21
6.00–6.29	6.00–6.29	FB8.6
6.30–6.64	6.30–6.64	FB9.0
6.65–6.99	6.65–6.99	FB9.5
7.00–7.39	7.00–7.39	FB10.0
7.40–7.79	7.40–7.79	FB10.6
7.80–7.94	7.80–7.94	FB11.2
7.95–8.49	7.95–8.49	FB12.1
8.50–8.99	8.50–8.99	FB13.1
9.00–9.59	9.00–9.59	FB13.9
9.60–10.1	9.60–10.1	FB14.8
10.2–10.6	10.2–10.6	FB15.6

Thermal Unit — Table 74		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
10.7–11.3	10.7–11.3	FB16.4
11.4–12.0	11.4–12.0	FB17.6
12.0–12.6	—	FB18.4
12.7–13.8	—	FB19.4
13.9–14.7	—	FB21.1
14.8–15.2	—	FB22.6
15.3–16.2	—	FB23.6
16.3–18.0	—	FB24.8
Following Selections for Size 1 Only.		
—	12.0–12.6	FB18.4
—	12.7–13.8	FB19.4
13.9–14.7	13.9–14.7	FB21.1
14.8–15.2	14.8–15.2	FB22.6
15.3–16.2	15.3–16.2	FB23.6
16.3–17.4	16.3–17.4	FB24.8
17.5–18.5	17.5–18.5	FB26.7
18.6–19.6	18.6–19.6	FB28.3
19.7–20.2	19.7–20.2	FB29.6
20.3–21.5	20.3–21.5	FB30.5
21.6–22.4	21.6–22.4	FB32.6
22.5–23.2	22.5–23.2	FB34.1
23.3–24.3	23.3–24.3	FB35.0
24.4–25.4	24.4–25.4	FB36.6
25.5–26.0	25.5–26.0	FB38.3

Table 75

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 75	
Motor FLC (A)	Thermal Unit Number
3.22–3.57	FB4.75
3.58–4.14	FB5.3
4.15–4.56	FB6.1
4.57–5.10	FB6.75
5.11–5.39	FB7.45
5.40–5.64	FB7.8
5.65–5.96	FB8.21
5.97–6.25	FB8.6
6.26–6.58	FB9.0
6.59–6.91	FB9.5
6.92–7.41	FB10.0

Thermal Unit — Table 75	
Motor FLC (A)	**Thermal Unit Number**
7.42–7.82	FB10.6
7.83–8.32	FB11.2
8.33–8.89	FB12.1
8.90–9.47	FB13.1
9.48–10.0	FB13.9
10.1–10.5	FB14.8
10.6–11.1	FB15.6
11.2–12.0	FB16.4
12.1–12.7	FB17.6
12.8–13.5	FB18.4
13.6–14.6	FB19.4
14.7–15.7	FB21.1
15.8–16.5	FB22.6
16.6–17.4	FB23.6
17.5–18.8	FB24.8
18.9–20.1	FB26.7
20.2–21.0	FB28.3
21.1–21.6	FB29.6
21.7–23.3	FB30.5
23.4–24.3	FB32.6
24.4–25.0	FB34.1
25.1–26.3	FB35.0
26.4–27.6	FB36.6
27.7–29.1	FB38.3
29.2–30.4	FB40.2
30.5–32.0	FB42.0
32.1–33.3	FB44.0
33.4–35.2	FB46.0
35.3–37.0	FB48.0
37.1–38.5	FB50.5
38.6–40.7	FB52.5
40.8–45.0	FB55.5

Table 76

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 76	
Motor FLC (A)	**Thermal Unit Number**
19.9–20.8	FB26.7
20.9–22.2	FB28.3
22.3–23.8	FB29.6
23.9–25.4	FB30.5
25.5–27.2	FB32.6
27.3–29.2	FB34.1
29.3–31.9	FB38.3
32.0–33.8	FB40.2
33.9–36.1	FB42.0
36.2–38.5	FB44.0
38.6–41.4	FB46.0
41.5–43.6	FB48.0
43.7–45.9	FB50.5
46.0–48.2	FB52.5
48.3–50.7	FB55.5
50.8–53.9	FB58.0
54.0–56.7	FB60.0
56.8–60.8	FB63.5
60.9–67.6	FB69.0
67.7–73.6	FB77.0
73.7–82.9	FB84.0
83.0–86.0	FB92.0

Table 77

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 77	
Motor FLC (A)	**Thermal Unit Number**
48.0–50.9	FB50.5
51.0–53.7	FB52.5
53.8–57.0	FB55.5
57.1–60.4	FB58.0
60.5–64.0	FB60.0
64.1–71.9	FB63.5
72.0–83.9	FB69.0
84.0–93.1	FB77.0
93.2–104	FB84.0
105–109	FB92.0

Thermal Unit — Table 77	
Motor FLC (A)	**Thermal Unit Number**
110–123	FB105.0
124–133	FB115.0

Table 78

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 78		
Motor FLC (A)		**Thermal Unit Number**
1 T.U.	**2 or 3 T.U.**	
2.26–2.51	2.26–2.51	FB3.33
2.52–2.82	2.52–2.82	FB3.71
2.83–3.09	2.83–3.09	FB4.1
3.10–3.30	3.10–3.30	FB4.5
3.31–3.69	3.31–3.69	FB4.75
3.70–4.27	3.70–4.27	FB5.3
4.28–4.72	4.28–4.72	FB6.1
4.73–5.25	4.73–5.25	FB6.75
5.26–5.53	5.26–5.53	FB7.45
5.54–5.81	5.54–5.81	FB7.8
5.82–6.14	5.82–6.14	FB8.21
6.15–6.44	6.15–6.44	FB8.6
6.45–6.81	6.45–6.81	FB9.0
6.82–7.19	6.82–7.19	FB9.5
7.20–7.59	7.20–7.59	FB10.0
7.60–7.99	7.60–7.99	FB10.6
8.00–8.17	8.00–8.17	FB11.2
8.18–8.74	8.18–8.74	FB12.1
8.75–9.31	8.75–9.31	FB13.1
9.32–9.94	9.32–9.94	FB13.9
9.95–10.5	9.95–10.5	FB14.8
10.6–11.1	10.6–11.1	FB15.6
11.2–11.9	11.2–12.0	FB16.4
12.0–12.4	—	FB17.6
12.5–13.1	—	FB18.4
13.2–14.3	—	FB19.4
14.4–15.3	—	FB21.1
15.4–15.9	—	FB22.6
16.0–18.0	—	FB23.6
Following Selections for Size 1 Only.		
—	12.0–12.4	FB17.6
—	12.5–13.1	FB18.4
—	13.2–14.3	FB19.4

Thermal Unit — Table 78		
Motor FLC (A)		Thermal Unit Number
1 T.U.	2 or 3 T.U.	
14.4–15.3	14.4–15.3	FB21.1
15.4–15.9	15.4–15.9	FB22.6
16.0–16.9	16.0–16.9	FB23.6
17.0–18.3	17.0–18.3	FB24.8
18.4–19.5	18.4–19.5	FB26.7
19.6–20.5	19.6–20.5	FB28.3
20.6–21.1	20.6–21.1	FB29.6
21.2–22.6	21.2–22.6	FB30.5
22.7–23.7	22.7–23.7	FB32.6
23.8–24.3	23.8–24.3	FB35.0
24.4–26.0	24.4–26.0	FB35.0

Table 79

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 79	
Motor FLC (A)	Thermal Unit Number
3.31–3.67	FB4.75
3.68–4.23	FB5.3
4.24–4.69	FB6.1
4.70–5.21	FB6.75
5.22–5.49	FB7.45
5.50–5.74	FB7.8
5.75–6.07	FB8.21
6.08–6.35	FB8.6
6.36–6.71	FB9.0
6.72–7.03	FB9.5
7.04–7.53	FB10.0
7.54–7.91	FB10.6
7.92–8.53	FB11.2
8.54–9.14	FB12.1
9.15–9.71	FB13.1
9.72–10.2	FB13.9
10.3–10.8	FB14.8
10.9–11.5	FB15.6
11.6–12.3	FB16.4
12.4–13.0	FB17.6
13.1–13.9	FB18.4
14.0–15.1	FB19.4
15.2–16.1	FB21.1
16.2–16.9	FB22.6

Thermal Unit — Table 79	
Motor FLC (A)	**Thermal Unit Number**
17.0–17.9	FB23.6
18.0–19.4	FB24.8
19.5–20.7	FB26.7
20.8–21.7	FB28.3
21.8–22.3	FB29.6
22.4–23.9	FB30.5
24.0–25.1	FB32.6
25.2–25.9	FB34.1
26.0–27.1	FB35.0
27.2–28.6	FB36.6
28.7–30.1	FB38.3
30.2–31.7	FB40.2
31.8–33.3	FB42.0
33.4–34.5	FB44.0
34.6–36.5	FB46.0
36.6–38.5	FB48.0
38.6–39.9	FB50.5
40.0–45.0	FB52.5

Table 80

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 80	
Motor FLC (A)	**Thermal Unit Number**
20.5–21.7	FB26.7
21.8–23.1	FB28.3
23.2–24.8	FB29.6
24.9–26.5	FB30.5
26.6–28.4	FB32.6
28.5–30.4	FB34.1
30.5–32.8	FB38.3
32.9–34.9	FB40.2
35.0–37.3	FB42.0
37.4–39.8	FB44.0
39.9–42.5	FB46.0
42.6–45.8	FB48.0
45.9–48.2	FB50.5
48.3–50.6	FB52.5
50.7–53.1	FB55.5
53.2–56.5	FB58.0
56.6–59.4	FB60.0
59.5–63.4	FB63.5

Thermal Unit — Table 80	
Motor FLC (A)	**Thermal Unit Number**
63.5–71.0	FB69.0
71.1–78.8	FB77.0
78.9–86.0	FB84.0

Table 81

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 81	
Motor FLC (A)	**Thermal Unit Number**
52.2–55.6	FB50.5
55.7–58.8	FB52.5
58.9–62.5	FB55.5
62.6–66.0	FB58.0
66.1–70.1	FB60.0
70.2–78.6	FB63.5
78.7–92.0	FB69.0
92.1–102	FB77.0
103–114	FB84.0
115–123	FB92.0
124–133	FB105.0

Table 82

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 82	
Motor FLC (A)	**Thermal Unit Number**
2.36–2.63	FB3.33
2.64–2.96	FB3.71
2.97–3.23	FB4.1
3.24–3.45	FB4.5
3.46–3.86	FB4.75
3.87–4.44	FB5.3
4.45–4.95	FB6.1
4.96–5.47	FB6.75
5.48–5.75	FB7.45
5.76–6.09	FB7.8
6.10–6.42	FB8.21
6.43–6.75	FB8.6
6.76–7.16	FB9.0
7.17–7.43	FB9.5
7.44–7.99	FB10.0

Thermal Unit — Table 82	
Motor FLC (A)	**Thermal Unit Number**
8.00–8.46	FB10.6
8.47–9.19	FB11.2
9.20–9.74	FB12.1
9.75–10.3	FB13.1
10.4–10.8	FB13.9
10.9–11.6	FB14.8
11.7–12.2	FB15.6
12.3–13.1	FB16.4
13.2–13.7	FB17.6
13.8–14.3	FB18.4
14.4–15.5	FB19.4
15.6–16.7	FB21.1
16.8–17.6	FB22.6
17.7–18.6	FB23.6
18.7–19.9	FB24.8
20.0–21.1	FB92.0
21.2–25.0	FB105.0

Table 83

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 83	
Motor FLC (A)	**Thermal Unit Number**
2.30–2.60	FB3.33
2.61–2.87	FB3.71
2.88–3.17	FB4.1
3.18–3.37	FB4.5
3.38–3.76	FB4.75
3.77–4.29	FB5.3
4.30–4.75	FB6.1
4.76–5.26	FB6.75
5.27–5.51	FB7.45
5.52–5.78	FB7.8
5.79–6.13	FB8.21
6.14–6.41	FB8.6
6.42–6.75	FB9.0
6.76–7.09	FB9.5
7.10–7.57	FB10.0
7.58–7.90	FB10.6
7.91–8.81	FB11.2
8.82–9.47	FB12.1
9.48–10.0	FB13.1

Thermal Unit — Table 83	
Motor FLC (A)	**Thermal Unit Number**
10.1–10.7	FB13.9
10.8–11.4	FB14.8
11.5–12.1	FB15.6
12.2–13.1	FB16.4
13.2–13.7	FB17.6
13.8–14.7	FB18.4
14.8–16.0	FB19.4
16.1–17.3	FB21.1
17.4–18.2	FB22.6
18.3–19.4	FB23.6
19.5–20.7	FB24.8
20.8–22.3	FB26.7
22.4–23.5	FB28.3
23.6–24.2	FB29.6
24.3–26.0	FB30.5

Table 84

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 84	
Motor FLC (A)	**Thermal Unit Number**
3.38–3.78	FB4.75
3.79–4.37	FB5.3
4.38–4.87	FB6.1
4.88–5.51	FB6.75
5.52–5.73	FB7.45
5.74–6.09	FB7.8
6.10–6.44	FB8.21
6.45–6.75	FB8.6
6.76–7.15	FB9.0
7.16–7.57	FB9.5
7.58–8.07	FB10.0
8.08–8.47	FB10.6
8.48–8.81	FB11.2
8.82–9.46	FB12.1
9.47–10.1	FB13.1
10.2–10.8	FB13.9
10.9–11.4	FB14.8
11.5–12.1	FB15.6
12.2–13.1	FB16.4
13.2–13.8	FB17.6
13.9–14.8	FB18.4

Thermal Unit — Table 84	
Motor FLC (A)	**Thermal Unit Number**
14.9–16.1	FB19.4
16.2–17.4	FB21.1
17.5–18.3	FB22.6
18.4–19.5	FB23.6
19.6–21.0	FB24.8
21.1–22.5	FB26.7
22.6–23.7	FB28.3
23.8–24.5	FB29.6
24.6–26.4	FB30.5
26.5–27.7	FB32.6
27.8–28.7	FB34.1
28.8–29.9	FB35.0
30.0–31.8	FB36.6
31.9–33.5	FB38.3
33.6–35.1	FB40.2
35.2–37.1	FB42.0
37.2–38.8	FB44.0
38.9–41.1	FB46.0
41.2–45.0	FB48.0

Table 85

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 85	
Motor FLC (A)	**Thermal Unit Number**
42.9–45.4	FB44.0
45.6–48.3	FB46.0
48.4–52.4	FB48.0
52.5–55.9	FB50.5
56.0–59.8	FB52.5
59.9–63.8	FB55.5
63.9–67.9	FB58.0
68.0–72.6	FB60.0
72.7–83.2	FB63.5
83.3–94.7	FB69.0
94.8–105	FB77.0
106–116	FB84.0
117–121	FB92.0
122–133	FB105.0

Table 86

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 86	
Motor FLC (A)	**Thermal Unit Number**
0.43–0.44	A.49
0.45–0.47	A.54
0.48–0.53	A.59
0.54–0.61	A.65
0.62–0.65	A.71
0.66–0.71	A.78
0.72–0.79	A.86
0.80–0.86	A.95
0.87–0.96	A1.02
0.97–1.04	A1.16
1.05–1.17	A1.25
1.18–1.31	A1.39
1.32–1.38	A1.54
1.39–1.47	A1.63
1.48–1.57	A1.75
1.58–1.65	A1.86
1.66–1.77	A1.99
1.78–1.93	A2.15
1.94–2.18	A2.31
2.19–2.46	A2.57
2.47–2.68	A2.81
2.69–2.87	A3.61
2.88–3.07	A3.95
3.08–3.59	A4.32
3.60–3.79	A4.79
3.80–4.27	A5.30
4.28–4.59	A5.78
4.60–4.90	A6.20
4.91–5.06	A6.99
5.07–5.44	A7.65
5.45–6.24	A8.38
6.25–7.21	A9.25
7.22–7.69	A9.85
7.70–8.24	A11.0
8.25–8.81	A11.9
8.82–9.32	A13.2
9.33–9.99	A14.1
10.0–10.5	A14.8
10.6–11.5	A16.2

Thermal Unit — Table 86	
Motor FLC (A)	**Thermal Unit Number**
11.6–12.2	A17.9
12.3–13.3	A21.3
13.4–15.8	A25.2
15.9–18.4	A27.1
18.5–20.5	A29.5
20.6–21.5	A31.9
21.6–23.9	A33.8
24.0–26.8	A35.9
26.9–28.2	A40.0
28.3–29.8	A42.3
29.9–32.0	A44.7

Table 87

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 87	
Motor FLC (A)	**Thermal Unit Number**
0.40–0.41	A.49
0.42–0.45	A.54
0.46–0.51	A.59
0.52–0.58	A.65
0.59–0.63	A.71
0.64–0.68	A.78
0.69–0.76	A.86
0.77–0.83	A.95
0.84–0.93	A1.02
0.94–1.01	A1.16
1.02–1.14	A1.25
1.15–1.28	A1.39
1.29–1.34	A1.16
1.35–1.44	A1.25
1.45–1.55	A1.39
1.29–1.34	A1.54
1.35–1.44	A1.63
1.45–1.55	A1.75
1.56–1.61	A1.86
1.62–1.71	A1.99
1.72–1.85	A2.15
1.86–2.04	A2.31
2.05–2.38	A2.57
2.39–2.60	A2.81
2.61–2.77	A3.61

Thermal Unit — Table 87	
Motor FLC (A)	**Thermal Unit Number**
2.78–2.98	A3.95
2.99–3.40	A4.32
3.41–3.64	A4.79
3.65–4.08	A5.30
4.09–4.38	A5.78
4.39–4.68	A6.20
4.69–4.79	A6.99
4.80–5.11	A7.65
5.12–5.84	A8.38
5.85–6.70	A9.25
6.71–7.18	A9.85
7.19–7.70	A11.0
7.71–8.14	A11.9
8.15–8.56	A13.2
8.57–9.15	A14.1
9.16–9.80	A14.8
9.81–10.6	A16.2
10.7–11.0	A17.9

Table 88

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 88	
Motor FLC (A)	**Thermal Unit Number**
0.39–0.40	A.49
0.41–0.44	A.54
0.45–0.49	A.59
0.50–0.57	A.65
0.58–0.61	A.71
0.62–0.66	A.78
0.67–0.73	A.86
0.74–0.80	A.95
0.81–0.90	A1.02
0.91–0.97	A1.16
0.98–1.09	A1.25
1.10–1.23	A1.39
1.24–1.57	A1.86
1.58–1.66	A1.99
1.67–1.79	A2.15
1.80–1.99	A2.31
2.00–2.31	A2.57
2.32–2.50	A2.81

Thermal Unit — Table 88	
Motor FLC (A)	**Thermal Unit Number**
2.51–2.66	A3.61
2.67–2.85	A3.95
2.86–3.26	A4.32
3.27–3.49	A4.79
3.50–3.92	A5.30
3.93–4.20	A5.78
4.21–4.49	A6.20
4.50–4.64	A6.99
4.65–4.94	A7.65
4.95–5.62	A8.38
5.63–6.39	A9.25
6.40–6.82	A9.85
6.83–7.27	A11.0
7.28–7.71	A11.9
7.72–8.13	A13.2
8.14–8.64	A14.1
8.65–9.15	A14.8
9.16–9.97	A16.2
9.98–11.0	A17.9

Table 89

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 89	
Motor FLC (A)	**Thermal Unit Number**
10.0–11.1	B17.5
11.2–12.0	B19.5
12.1–13.3	B22.0
13.4–15.1	B25.0
15.2–17.1	B28.0
17.2–18.6	B32.0
18.7–21.4	B36.0
21.5–25.7	B40.0
25.8–28.2	B45.0
28.3–29.7	B50.0
29.8–31.2	B56.0
31.3–32.1	B62.0
32.2–35.7	B70.0
35.8–40.7	B79.0
40.8–48.0	B88.0

Table 90

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 90	
Motor FLC (A)	**Thermal Unit Number**
4.88–5.13	A7.65
5.14–5.85	A8.38
5.86–6.67	A9.25
6.68–7.09	A9.85
7.10–7.62	A11.0
7.63–8.04	A11.9
8.05–8.46	A13.2
8.47–9.11	A14.1
9.12–9.69	A14.8
9.70–10.5	A16.2
10.6–11.6	A17.9
11.7–12.3	A21.3
12.4–14.6	A25.2
14.7–16.8	A27.1
16.9–17.9	A29.5
18.0–18.7	A31.9
18.8–19.8	A33.8
19.9–21.4	A35.9
21.5–22.8	A40.0
22.9–23.8	A42.3
23.9–26.0	A44.7

Table 91

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 91	
Motor FLC (A)	**Thermal Unit Number**
4.80–5.07	A7.65
5.08–5.73	A8.38
5.74–6.48	A9.25
6.49–6.90	A9.85
6.91–7.25	A11.0
7.26–7.81	A11.9
7.82–8.29	A13.2
8.30–8.81	A14.1
8.82–9.40	A14.8
9.41–10.0	A16.2
10.1–11.1	A17.9

Thermal Unit — Table 91	
Motor FLC (A)	**Thermal Unit Number**
11.2–11.7	A21.3
11.8–13.7	A25.2
13.8–16.0	A27.1
16.1–16.9	A29.5
17.0–17.7	A31.9
17.8–18.7	A33.8
18.8–20.2	A35.9
20.3–21.4	A40.0
21.5–22.5	A42.3
22.6–23.8	A44.7
23.9–26.0	A48.0

Table 92

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 92	
Motor FLC (A)	**Thermal Unit Number**
10.5–11.7	B17.5
11.8–12.5	B19.5
12.6–14.0	B22.0
14.1–15.8	B25.0
15.9–18.0	B28.0
18.1–19.6	B32.0
19.7–23.5	B36.0
23.6–27.4	B40.0
27.5–30.5	B45.0
30.6–32.2	B50.0
32.3–34.0	B56.0
34.1–35.2	B62.0
35.3–39.5	B70.0
39.6–43.9	B79.0
44.0–48.0	B88.0

Table 93

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 93	
Motor FLC (A)	**Thermal Unit Number**
23.8–25.2	CC36.4
25.3–26.8	CC39.6
26.9–28.4	CC42.7

Thermal Unit — Table 93	
Motor FLC (A)	**Thermal Unit Number**
28.5–30.3	CC46.6
30.4–32.1	CC50.1
32.2–34.2	CC54.5
34.3–36.3	CC59.4
36.4–40.2	CC64.3
40.3–43.1	CC68.5
43.2–45.9	CC74.6
46.0–49.2	CC81.5
49.3–51.6	CC87.7
51.7–54.2	CC94.0
54.3–55.7	CC103.0
55.8–60.3	CC112.0
60.4–63.5	CC121.0
63.6–67.1	CC132.0
67.2–70.3	CC143.0
70.4–74.1	CC156.0
74.2–78.3	CC167.0
78.4–83.3	CC180.0
83.4–86.0	CC196.0

Table 94

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 94	
Motor FLC (A)	**Thermal Unit Number**
25.8–27.5	CC36.4
27.6–29.4	CC39.6
29.5–31.4	CC42.7
31.5–33.2	CC46.6
33.3–36.2	CC50.1
36.3–38.8	CC54.5
38.9–41.6	CC59.4
41.7–44.7	CC64.3
44.8–47.9	CC68.5
48.0–50.9	CC74.6
51.0–54.4	CC81.5
54.5–57.4	CC87.7
57.5–60.6	CC94.0
60.7–63.9	CC103.0
64.0–68.4	CC112.0
68.5–73.4	CC121.0
73.5–78.7	CC132.0

Thermal Unit — Table 94	
Motor FLC (A)	**Thermal Unit Number**
78.8–83.8	CC143.0
83.9–86.0	CC156.0

Table 95

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 95	
Motor FLC (A)	**Thermal Unit Number**
42.5–44.7	CC64.3
44.8–47.9	CC68.5
48.0–51.2	CC74.6
51.3–55.2	CC81.5
55.3–59.4	CC87.7
59.5–63.8	CC94.0
63.9–68.8	CC103.0
68.9–73.8	CC112.0
73.9–77.7	CC121.0
77.8–82.5	CC132.0
82.6–86.6	CC143.0
86.7–91.9	CC156.0
92.0–97.2	CC167.0
97.3–104	CC180.0
105–114	CC196.0
115–123	CC208.0
124–150	CC219.0

Table 96

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 96	
Motor FLC (A)	**Thermal Unit Number**
49.5–52.0	CC64.3
52.1–54.8	CC68.5
54.9–58.7	CC74.6
58.8–63.3	CC81.5
63.4–68.3	CC87.7
68.4–73.6	CC94.0
73.7–79.4	CC103.0
79.5–85.5	CC112.0
85.6–89.7	CC121.0
89.8–94.8	CC132.0

Thermal Unit — Table 96	
Motor FLC (A)	**Thermal Unit Number**
94.9–99.9	CC143.0
100–105	CC156.0
106–111	CC167.0
112–126	CC180.0
127–131	CC196.0
132–141	CC208.0
142–150	CC219.0

Table 103

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 103	
Motor FLC (A)	**Thermal Unit Number**
40.8–45.5	B1.03
45.6–49.9	B1.16
51.0–57.5	B1.30
57.6–65.9	B1.45
66.0–73.1	B1.67
73.2–81.5	B1.88
81.6–92.3	B2.10
92.4–104	B2.40
105–114	B2.65
115–128	B3.00
129–140	B3.30
141–160	B3.70
161–193	B4.15
194–209	B4.85
210–232	B5.50
233–248	B6.25
249–266	B6.90

Table 104

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 104		
Motor FLC (A)	**Thermal Unit Number**	**Max. Fuse Rating (A)**
0.65–0.73	B1.03	1.50
0.74–0.82	B1.16	1.50
0.93–0.91	B1.30	1.60
0.92–1.04	B1.45	2.00
1.05–1.16	B1.67	2.00

Thermal Unit — Table 104			
Motor FLC (A)	**Thermal Unit Number**	**Max. Fuse Rating (A)**	
1.17–1.26	B1.88	2.25	
1.27–1.47	B2.10	2.60	
1.48–1.65	B2.40	3.00	
1.66–1.89	B2.65	3.50	
1.90–2.17	B3.00	4.00	
2.18–2.49	B3.30	4.50	
2.50–2.79	B3.70	5.00	
2.80–3.13	B4.15	5.60	
3.14–3.36	B4.85	6.00	
3.37–3.69	B5.50	7.00	
3.70–3.92	B6.25	7.00	
3.93–4.42	B6.90	8.00	
4.43–4.99	B7.70	9.00	
5.00–5.27	B8.20	10.0	
5.28–5.84	B9.10	12.0	
5.85–6.61	B10.2	12.0	
6.62–7.42	B11.5	15.0	
7.43–8.02	B12.8	15.0	
8.03–8.53	B14.0	15.0	
8.54–9.34	B15.5	17.5	
9.35–10.1	B17.5	17.5	
10.2–10.8	B19.5	20.0	
10.9–12.0	B22.0	25.0	
12.1–13.0	B25.0	25.0	
13.1–15.5	B28.0	30.0	
		600 V Max.	250 V Max.
15.6–17.9	B32.0	30	30
18.0–21.4	B36.0	30	40
21.5–25.1	B40.0	30	40
25.2–27.0	B45.0	30	40

Table 105

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 105	
Motor FLC (A)	**Thermal Unit Number**
105–112	CC74.6
113–122	CC81.5
123–131	CC87.7
132–142	CC94.0
143–153	CC103.0
154–157	CC112.0

Thermal Unit — Table 105	
Motor FLC (A)	**Thermal Unit Number**
158–169	CC121.0
170–181	CC132.0
182–195	CC143.0
196–209	CC156.0
210–227	CC167.0
228–247	CC180.0
248–266	CC196.0

Table 109

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 109	
Motor FLC (A)	**Thermal Unit Number**
0.56–0.63	B0.81
0.64–0.68	B0.92
0.69–0.77	B1.03
0.78–0.85	B1.16
0.86–0.97	B1.30
0.98–1.09	B1.45
1.10–1.21	B1.67
1.22–1.33	B1.88
1.34–1.53	B2.10
1.54–1.73	B2.40
1.74–1.89	B2.65
1.90–2.17	B3.00
2.18–2.53	B3.30
2.54–2.87	B3.70
2.88–3.22	B4.15
3.23–3.49	B4.85
3.50–3.85	B5.50
3.86–4.11	B6.25
4.12–4.70	B6.90
4.71–5.21	B7.70
5.22–5.53	B8.20
5.54–6.17	B9.10
6.18–7.02	B10.2
7.03–7.92	B11.5
7.93–8.61	B12.8
8.62–9.17	B14.0
9.18–10.0	B15.5
10.1–11.0	B17.5
11.1–11.8	B19.5

Thermal Unit — Table 109	
Motor FLC (A)	**Thermal Unit Number**
11.9–13.5	B22.0
13.6–15.3	B25.0
15.4–17.4	B28.0
17.5–19.4	B32.0
19.5–22.2	B36.0
22.3–25.1	B40.0
25.2–27.0	B45.0

Table 110

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 110	
Motor FLC (A)	**Thermal Unit Number**
3.94–4.45	B6.90
4.46–4.97	B7.70
4.98–5.28	B8.20
5.29–5.97	B9.10
5.98–6.89	B10.2
6.90–7.92	B11.5
7.93–8.71	B12.8
8.72–9.27	B14.0
9.28–10.2	B15.5
10.3–11.4	B17.5
11.5–12.3	B19.5
12.4–13.9	B22.0
14.0–15.8	B25.0
15.9–17.9	B28.0
18.0–19.9	B32.0
20.0–22.8	B36.0
22.9–25.4	B40.0
25.5–28.9	B45.0
29.0–30.8	B50.0
30.9–32.5	B56.0
32.6–34.9	B62.0
35.0–39.7	B70.0
39.8–44.7	B79.0

Table 111

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 111	
Motor FLC (A)	**Thermal Unit Number**
14.0–14.9	CC20.9
15.0–16.2	CC22.8
16.3–17.2	CC24.6
17.3–18.7	CC26.3
18.8–20.2	CC28.8
20.3–21.7	CC31.0
21.8–23.3	CC33.3
23.4–25.2	CC36.4
25.3–27.1	CC39.6
27.2–29.4	CC42.7
29.5–31.6	CC46.6
31.7–34.0	CC50.1
34.1–36.8	CC54.5
36.9–39.8	CC59.4
39.9–42.3	CC64.3
42.4–45.7	CC68.5
45.8–49.2	CC74.6
49.3–52.8	CC81.5
52.9–56.8	CC87.7
56.9–61.2	CC94.0
61.3–66.1	CC103.0
66.2–71.2	CC112.0
71.3–76.7	CC121.0
76.8–82.9	CC132.0
83.0–90.0	CC143.0

Table 112

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 112	
Motor FLC (A)	**Thermal Unit Number**
44.0–46.8	CC64.3
46.9–50.6	CC68.5
50.7–54.5	CC74.6
54.6–58.4	CC81.5
58.5–62.9	CC87.7
63.0–67.7	CC94.0
67.8–72.9	CC103.0

Thermal Unit — Table 112	
Motor FLC (A)	**Thermal Unit Number**
73.0–78.1	CC112.0
78.2–83.9	CC121.0
84.0–91.1	CC132.0
91.2–97.5	CC143.0
97.6–104	CC156.0
105–113	CC167.0
114–133	CC180.0

Table 113

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 113	
Motor FLC (A)	**Thermal Unit Number**
88.2–95.1	DD112.0
95.2–101	DD121.0
102–111	DD128.0
112–119	DD140.0
120–131	DD150.0
132–149	DD160.0
150–170	DD185.0
171–180	DD220.0
181–197	DD240.0
198–204	DD250.0
205–213	DD265.0
214–237	DD280.0
238–243	DD300.0
244–266	DD320.0

Table 114

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — 114	
Motor FLC (A)	**Thermal Unit Number**
133–148	B1.30
149–174	B1.45
175–195	B1.67
196–219	B1.88
220–239	B2.10
240–271	B2.40
272–308	B2.65
309–348	B3.00
349–397	B3.30
398–429	B3.70
430–495	B4.15
496–520	B4.85

Table 115

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 115	
Motor FLC (A)	**Thermal Unit Number**
176–190	DD112.0
191–203	DD121.0
203–223	DD128.0
224–239	DD140.0
240–253	DD150.0
254–299	DD160.0
300–341	DD185.0
342–361	DD220.0
362–395	DD240.0
396–409	DD250.0
410–427	DD265.0
428–475	DD289.0
476–487	DD300.0
488–532	DD320.0

Table 116

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 116	
Motor FLC (A)	**Thermal Unit Number**
81.6–91.1	B1.03
91.2–101	B1.16
102–115	B1.30
116–131	B1.45
132–146	B1.67
147–163	B1.88
164–184	B2.10
185–209	B2.40
210–229	B2.65
230–257	B3.00
258–281	B3.30
282–321	B3.70
322–387	B4.15
388–419	B4.35
420–465	B5.60
466–497	B6.25
496–532	B6.90

Table 127

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 127	
Motor FLC (A)	**Thermal Unit Number**
1.12–1.27	B0.81
1.28–1.37	B0.92
1.38–1.55	B1.03
1.56–1.71	B1.16
1.72–1.95	B1.30
1.96–2.19	B1.45
2.20–2.43	B1.67
2.44–2.67	B1.88
2.68–3.07	B2.10
3.08–3.47	B2.40
3.48–3.79	B2.65
3.80–4.35	B3.00
4.36–5.07	B3.30
5.08–5.75	B3.70
5.76–6.45	B4.15

Thermal Unit — Table 127	
Motor FLC (A)	**Thermal Unit Number**
6.46–6.99	B4.85
7.00–7.71	B5.50
7.72–8.23	B6.25
8.24–9.41	B6.90
9.42–10.43	B7.70
10.44–11.07	B8.20
11.08–12.35	B9.10
12.36–14.05	B10.2
14.06–15.85	B11.5
15.86–17.23	B12.8
17.24–18.35	B14.0
18.36–20.1	B15.5
20.2–22.1	B17.5
22.2–23.7	B19.5
23.8–27.1	B22.0
27.2–30.7	B25.0
30.8–34.9	B28.0
35.0–38.9	B32.0
39.0–44.5	B36.0
44.6–50.3	B40.0
50.4–54.0	B45.0

Table 128

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 128	
Motor FLC (A)	**Thermal Unit Number**
7.88–8.91	B6.90
8.92–9.95	B7.70
9.96–10.57	B8.20
10.58–11.95	B9.10
11.96–13.79	B10.2
13.80–15.85	B11.5
15.86–17.43	B12.8
17.44–18.55	B14.0
18.56–20.5	B15.5
20.6–22.9	B17.5
23.0–24.7	B19.5
24.8–27.9	B22.0
28.0–31.7	B25.0
31.8–35.9	B28.0
36.0–39.9	B32.0

Thermal Unit — Table 128	
Motor FLC (A)	**Thermal Unit Number**
40.0–45.7	B36.0
45.8–50.9	B40.0
51.0–61.7	B45.0
61.8–65.1	B50.0
65.2–69.9	B56.0
70.0–79.5	B62.0
79.6–89.4	B70.0

Table 129

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 129	
Motor FLC (A)	**Thermal Unit Number**
28.0–29.9	CC20.9
30.0–32.5	CC22.8
32.6–34.5	CC24.6
34.6–37.5	CC26.3
37.6–40.5	CC28.8
40.6–43.5	CC31.0
43.6–46.7	CC33.3
46.8–50.5	CC36.4
50.6–54.3	CC39.6
54.4–58.9	CC42.7
59.0–63.3	CC46.6
63.4–68.1	CC50.1
68.2–73.7	CC54.5
73.8–79.7	CC59.4
79.8–84.7	CC64.5
84.8–91.5	CC68.5
91.6–98.5	CC74.6
98.6–105.7	CC81.5
105.8–113.7	CC87.7
113.8–122.5	CC94.0
122.6–132.3	CC103.0
132.4–142.5	CC112.0
142.6–153.5	CC121.0
153.6–165.9	CC132.0
166.0–180.0	CC143.0

Table 133

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 133	
Motor FLC (A)	**Thermal Unit Number**
4.60–5.23	B6.90
5.24–5.86	B7.70
5.87–6.25	B8.20
6.26–7.09	B9.10
7.10–8.25	B10.2
8.26–9.49	B11.5
9.50–10.3	B12.8
10.4–11.2	B14.0
11.3–12.5	B15.5
12.6–13.8	B17.5
13.9–15.0	B19.5
15.1–16.9	B22.0
17.0–19.1	B25.0
19.2–22.0	B28.0
22.1–24.4	B32.0
24.5–28.0	B36.0
28.1–31.8	B40.0
31.9–36.0	B45.0
36.1–38.5	B50.0
38.6–41.2	B56.0
41.3–44.4	B62.0
44.5–50.3	B70.0
50.4–56.9	B79.0
57.0–59.0	B88.0

Table 134

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 134	
Motor FLC (A)	**Thermal Unit Number**
4.30–4.98	B6.90
4.99–5.57	B7.70
5.58–5.94	B8.20
5.95–6.71	B9.10
6.72–7.79	B10.2
7.80–8.93	B11.5
8.94–9.77	B12.8
9.78–10.5	B14.0

Thermal Unit — Table 134	
Motor FLC (A)	**Thermal Unit Number**
10.6–11.7	B15.5
11.8–13.0	B17.5
13.1–14.0	B19.5
14.1–15.0	B22.0
15.1–17.2	B25.0
17.3–19.9	B28.0
20.0–22.3	B32.0
22.4–26.0	B36.0
26.1–29.8	B40.0
29.9–34.0	B45.0
34.1–36.7	B50.0
36.8–39.5	B56.0
39.6–42.1	B62.0
42.2–46.6	B70.0
46.7–51.5	B79.0
51.6–54.0	B88.0

Table 135

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 135		
Motor FLC (A)		**Thermal Unit Number**
1 T.U.	**3 T.U.**	
0.77–0.88	0.85–0.95	B1.30
0.89–1.02	0.96–1.09	B1.45
1.03–1.19	1.10–1.21	B1.67
1.20–1.37	1.22–1.35	B1.88
1.38–1.62	1.36–1.56	B2.10
1.63–1.90	1.57–1.76	B2.40
1.91–2.12	1.77–1.94	B2.65
2.13–2.46	1.95–2.22	B3.00
2.47–2.83	2.23–2.57	B3.30
2.84–3.19	2.58–2.87	B3.70
3.20–3.61	2.88–3.21	B4.15
3.62–3.89	3.22–3.50	B4.85
3.90–4.32	3.51–3.79	B5.50
4.33–4.57	3.80–4.04	B6.25
4.58–5.19	4.05–4.53	B6.90
5.20–5.79	4.54–5.03	B7.70
5.80–6.16	5.04–5.36	B8.20
6.17–6.94	5.37–5.97	B9.10
6.95–7.99	5.98–6.89	B10.2

Thermal Unit — Table 135		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
7.80–8.99	6.90–7.79	B11.5
9.00–9.98	7.80–8.53	B12.8
9.99–10.6	8.54–9.09	B14.0
10.7–11.6	9.10–9.99	B15.5
11.7–13.1	10.0–10.9	B17.5
13.2–14.2	11.0–11.7	B19.5
14.3–15.4	11.8–13.4	B22.0
15.5–17.6	13.5–15.4	B25.0
17.7–20.0	15.5–17.9	B28.0
–	18.0–20.0	B32.0
For Type DPSG12 & DPSG13, 20 A starter, select Thermal Units from above.		
20.1–22.7	18.0–20.2	B32.0
22.8–25.0	20.3–23.2	B36.0
–	23.3–25.0	B40.0
For Type DPSG22 & DPSG23, 25 A starter, select any of the Thermal Units from above.		
22.8–26.1	–	B36.0
26.2–29.6	23.3–25.8	B40.0
29.7–30.0	25.9–28.6	B45.0
For Type DPSG32 & DPSG33, 30 A starter, select any of the Thermal Units from above.		

Table 136

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — 136		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
0.98–1.09	0.88–0.98	B1.30
1.10–1.24	0.99–1.13	B1.45
1.25–1.41	1.14–1.26	B1.67
1.42–1.59	1.27–1.38	B1.88
1.60–1.81	1.39–1.62	B2.10
1.82–2.04	1.63–1.82	B2.40
2.05–2.19	1.83–2.04	B2.65
2.20–2.52	2.05–2.36	B3.00
2.53–2.90	2.37–2.72	B3.30
2.91–3.29	2.73–3.07	B3.70
3.30–3.69	3.08–3.44	B4.15
3.70–3.99	3.45–3.69	B4.85
4.00–4.42	3.70–4.11	B5.50
4.43–4.69	4.12–4.34	B6.25

Thermal Unit — 136		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
4.70–5.37	4.35–4.89	B6.90
5.38–5.94	4.90–5.44	B7.70
5.95–6.34	5.45–5.80	B8.20
6.35–7.05	5.81–6.47	B9.10
7.06–8.14	6.48–7.45	B10.2
8.15–9.39	7.46–8.49	B11.5
9.40–10.3	8.50–9.29	B12.8
10.4–11.1	9.30–9.99	B14.0
11.2–12.2	10.0–10.8	B15.5
12.3–13.5	10.9–12.1	B17.5
13.6–14.7	12.2–13.1	B19.5
14.8–16.1	13.2–14.6	B22.0
16.2–18.3	14.7–16.4	B25.0
18.4–20.0	16.5–18.9	B28.0
–	19.0–20.0	B32.0
For Type DPSO12 & DPSO13, 20 A starter, select Thermal Units from above.		
18.4–20.9	–	B28.0
21.0–23.6	19.0–20.9	B32.0
23.7–25.0	21.0–24.1	B36.0
–	24.2–25.0	B40.0
For Type DPSO22 & DPSO23, 25 A starter, select any of the Thermal Units from above.		
23.7–27.2	–	B36.0
27.3–30.0	24.2–27.2	B40.0
–	27.3–30.0	B45.0
For Type DPSO32 & DPSO33, 30 A starter, select any of the Thermal Units from above.		

Table 145

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 145		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
1.00–1.11	0.91–1.02	B1.30
1.12–1.27	1.03–1.15	B1.45
1.28–1.36	1.16–1.27	B1.67
1.37–1.53	1.28–1.39	B1.88
1.54–1.78	1.40–1.61	B2.10
1.79–2.02	1.62–1.84	B2.40
2.03–2.20	1.85–2.03	B2.65
2.21–2.52	2.04–2.34	B3.00

Thermal Unit — Table 145		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
2.53–2.94	2.35–2.69	B3.30
2.95–3.30	2.70–3.02	B3.70
3.31–3.70	3.03–3.39	B4.15
3.71–4.02	3.40–3.65	B4.85
4.03–4.46	3.66–4.04	B5.50
4.47–4.69	4.05–4.28	B6.25
4.70–5.37	4.29–4.85	B6.90
5.38–5.94	4.86–5.38	B7.70
5.95–6.34	5.39–5.71	B8.20
6.35–7.09	5.72–6.39	B9.10
7.10–8.46	6.40–7.53	B10.2
8.47–9.32	7.54–8.34	B11.5
9.33–10.2	8.35–9.14	B12.8
10.3–10.9	9.15–9.74	B14.0
11.0–12.1	9.75–10.7	B15.5
12.2–13.4	10.8–11.8	B17.5
13.5–14.2	11.9–12.2	B19.5
14.3–16.0	12.3–14.4	B22.0
16.1–18.1	14.5–16.4	B25.0
18.2–20.5	16.5–18.9	B28.0
20.6–23.5	19.0–21.3	B32.0
23.6–27.2	21.4–23.3	B36.0
27.3–30.8	23.4–27.9	B40.0
30.9–35.0	28.0–31.4	B45.0
35.1–37.2	–	B50.0
37.3–40.0	–	B56.0
For Type DPSG42 & DPSG43, 40 A starter, select any of the Thermal Units from above.		

Table 146

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 146		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
3.90–4.22	3.60–3.89	B5.50
4.23–4.49	3.90–4.15	B6.25
4.50–5.14	4.16–4.76	B6.90
5.15–5.78	4.77–5.30	B7.70
5.79–6.23	5.31–5.70	B8.20
6.24–7.03	5.71–6.46	B9.10
7.04–8.23	6.47–7.65	B10.2

Thermal Unit — Table 146		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
8.24–9.31	7.66–8.55	B11.5
9.32–10.1	8.56–9.36	B12.8
10.2–10.7	9.37–9.9	B14.0
10.8–11.9	10.0–10.9	B15.5
12.0–13.1	11.0–12.0	B17.5
13.2–13.9	12.1–12.8	B19.5
14.0–15.9	12.9–14.2	B22.0
16.0–18.0	14.3–16.0	B25.0
18.1–20.8	16.1–18.5	B28.0
20.9–23.1	18.6–21.2	B32.0
23.2–26.9	21.3–24.9	B36.0
27.0–31.4	25.0–28.0	B40.0
31.5–36.0	28.1–31.7	B45.0
36.1–38.8	31.8–34.6	B50.0
38.9–41.7	34.7–37.4	B56.0
41.8–46.3	37.5–40.0	B62.0
46.4–50.0	40.1–46.4	B70.0
—	46.5–50.0	B79.0
For Type DPSG52 & DPSG53, 50 A starter, select any of the Thermal Units from above.		

Table 147

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 147		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
1.04–1.14	0.93–1.04	B1.30
1.15–1.29	1.05–1.18	B1.45
1.30–1.43	1.19–1.33	B1.67
1.44–1.56	1.34–1.43	B1.88
1.57–1.79	1.44–1.67	B2.10
1.80–2.03	1.68–1.88	B2.40
2.04–2.26	1.89–2.09	B2.65
2.27–2.51	2.10–2.41	B3.00
2.52–3.03	2.42–2.79	B3.30
3.04–3.31	2.80–3.15	B3.70
3.32–3.73	3.16–3.54	B4.15
3.74–4.07	3.55–3.75	B4.85
4.08–4.49	3.76–4.22	B5.50
4.50–4.76	4.23–4.46	B5.25
4.77–5.44	4.47–5.09	B6.90

Thermal Unit — Table 147		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
5.45–6.04	5.10–5.61	B7.70
6.05–6.46	5.62–5.99	B8.20
6.47–7.24	6.00–6.70	B9.10
7.25–8.64	6.71–8.19	B10.20
8.65–9.59	8.20–8.79	B11.5
9.60–10.5	8.80–9.66	B12.8
10.6–11.3	9.67–10.2	B14.0
11.4–12.6	10.3–11.4	B15.5
12.7–13.9	11.5–12.6	B17.5
14.0–14.9	12.7–13.5	B19.5
15.0–16.5	13.6–15.1	B22.0
16.6–18.9	15.2–17.2	B25.0
19.0–22.2	17.3–19.9	B28.0
22.3–24.6	20.0–22.5	B32.0
24.7–28.6	22.6–26.2	B36.0
28.7–32.4	26.3–29.9	B40.0
32.5–37.3	–	B45.0
37.4–39.5	–	B50.0
39.6–40.0	–	B56.0
For Type DPSO42 & DPSO43, 40 A starter, select any of the Thermal Units from above.		

Table 148

For additional information and instructions for thermal units, see the previous sections Introduction, page 46 through Mounting the Thermal Units , page 56 in this chapter.

Thermal Unit — Table 148		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
4.14–4.45	3.70–4.09	B5.50
4.46–4.88	4.10–4.35	B6.25
4.89–5.44	4.36–5.07	B6.90
5.45–6.08	5.08–5.79	B7.70
6.09–6.42	5.80–6.27	B8.20
6.43–7.28	6.28–7.16	B9.10
7.29–8.42	7.17–8.58	B10.2
8.43–9.64	8.59–9.55	B11.5
9.65–10.4	9.56–10.2	B12.8
10.5–11.2	10.3–10.9	B14.0
11.3–12.3	11.0–11.9	B15.5
12.4–13.7	12.0–13.1	B17.5
13.8–14.8	13.2–14.0	B19.5
14.9–16.5	14.1–14.8	B22.0

Thermal Unit — Table 148		
Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
16.6–18.7	14.9–17.0	B25.0
18.8–21.4	17.1–19.6	B28.0
21.5–24.3	19.7–22.1	B32.0
24.4–28.0	22.2–26.0	B36.0
28.1–33.3	26.1–29.4	B40.0
33.4–37.6	29.5–34.0	B45.0
37.7–41.1	34.1–36.4	B50.0
41.2–44.1	36.5–39.2	B56.0
44.2–47.8	39.3–42.4	B62.0
47.9–50.0	42.5–49.3	B70.0
—	49.4–50.0	B79.0
For Type DPSO52 & DPSO53, 50 A starter, select any of the Thermal Units from above.		

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