

## Heater Selection

### General Information on Heater Coil Selection

For maximum motor protection and compliance with Article 430-32 of the National Electrical Code, select heater coils from the tables in this section on the basis of motor nameplate full load current.

When the full load current is unknown, selection may be made on the basis of average full load currents as shown on **Pages V5-T2-151 and V5-T2-152. Caution—The average ratings could be high or low for a specific**

**motor and therefore selection on this basis always involves risk. For fully reliable motor protection, select heater coils on the basis of full load current rating as shown on the motor nameplate.**

Heater coils are rated to protect 40°C rise motors, and open and drip-proof motors having a **service factor of 1.15** where the motor and the controller are at the same ambient temperature.

For other conditions:

1. For 50°C, 55°C, 75°C rise motors and **enclosed motors having a service factor of 1.0, select one size smaller coil.**
2. Ambient temperature of controller lower than motor by 26°C (47°F), use one size smaller coil.
3. Ambient temperature of controller higher than motor by 26°C (47°F), use one size larger coil.

Ultimate tripping current of heater coils is approximately 1.25 times the minimum current rating listed in the tables.

### Type A and B Overload Relays, Sizes 3 and 4

| Size Starter        | Ambient Compensated Enclosed Starters<br>All Applications<br>Full Load Current of Motor Amps | Non-Compensating Enclosed Starters | Heater (One Heater per Catalog Number)<br>Catalog Number |
|---------------------|----------------------------------------------------------------------------------------------|------------------------------------|----------------------------------------------------------|
| For Size 4 Starters | 12.8–14.1                                                                                    | 11.9–13.0                          | FH68                                                     |
|                     | 14.2–15.5                                                                                    | 13.1–14.3                          | FH69                                                     |
|                     | 15.6–17.1                                                                                    | 14.4–15.9                          | FH70                                                     |
|                     | 17.2–18.9                                                                                    | 16.0–17.4                          | FH71                                                     |
|                     | 19.0–20.8                                                                                    | 17.5–19.1                          | FH72                                                     |
|                     | 20.9–22.9                                                                                    | 19.2–21.1                          | FH73                                                     |
|                     | 23.0–25.2                                                                                    | 21.2–23.2                          | FH74                                                     |
|                     | 25.3–27.8                                                                                    | 23.3–25.6                          | FH75                                                     |
|                     | 27.9–30.6                                                                                    | 25.7–28.1                          | FH76                                                     |
|                     | 30.7–33.5                                                                                    | 28.2–30.8                          | FH77                                                     |
| For Size 3 Starters | 33.6–37.5                                                                                    | 30.9–34.5                          | FH78                                                     |
|                     | 37.6–41.5                                                                                    | 34.6–38.2                          | FH79                                                     |
|                     | 41.6–56.3                                                                                    | 38.3–42.6                          | FH80                                                     |
|                     | 46.4–50                                                                                      | 42.7–46                            | FH81                                                     |
|                     | 51–55                                                                                        | 47–51                              | FH82                                                     |
|                     | 56–61                                                                                        | 52–56                              | FH83                                                     |
|                     | 62–66                                                                                        | 57–61                              | FH84                                                     |
|                     | 67–73                                                                                        | 62–67                              | FH85                                                     |
|                     | 74–78                                                                                        | 68–72                              | FH86                                                     |
|                     | 79–84                                                                                        | 73–77                              | FH87                                                     |
|                     | 85–92                                                                                        | 78–84                              | FH88                                                     |
|                     | 93–101                                                                                       | 85–91                              | FH89                                                     |
|                     | 102–110                                                                                      | 92–99                              | FH90                                                     |
|                     | 111–122                                                                                      | 100–110                            | FH91                                                     |
|                     | 123–129                                                                                      | 111–122                            | FH92                                                     |
|                     | 130–133                                                                                      | 123–128                            | FH93                                                     |
|                     | —                                                                                            | 129–133                            | FH94                                                     |

### Type A and B Overload Relays, Sizes 5 and 6 ①

| Compensated Overload Relay<br>Open Starter<br>Full Load Current of Motor (Amps) | Enclosed Starter<br>Full Load Current of Motor (Amps) | Heater (One Heater per Catalog Number)<br>Catalog Number |
|---------------------------------------------------------------------------------|-------------------------------------------------------|----------------------------------------------------------|
| <b>Size 5 (with 300/5 Current Transformers)</b>                                 |                                                       |                                                          |
| —                                                                               | —                                                     | FH23                                                     |
| 118–129                                                                         | 118–129                                               | FH24                                                     |
| 130–141                                                                         | 130–141                                               | FH25                                                     |
| 142–155                                                                         | 142–155                                               | FH26                                                     |
| 156–170                                                                         | 156–170                                               | FH27                                                     |
| 171–187                                                                         | 171–187                                               | FH28                                                     |
| 188–205                                                                         | 188–205                                               | FH29                                                     |
| 206–224                                                                         | 206–224                                               | FH30                                                     |
| 225–244                                                                         | 225–244                                               | FH31                                                     |
| 245–263                                                                         | 245–263                                               | FH32                                                     |
| 264–292                                                                         | 264–292                                               | FH33                                                     |
| 293–300                                                                         | —                                                     | FH34                                                     |
| <b>Size 6 (with 600/5 Current Transformers)</b>                                 |                                                       |                                                          |
| —                                                                               | —                                                     | FH23                                                     |
| 236–259                                                                         | 236–259                                               | FH24                                                     |
| 260–283                                                                         | 260–283                                               | FH25                                                     |
| 284–310                                                                         | 284–310                                               | FH26                                                     |
| 311–340                                                                         | 311–340                                               | FH27                                                     |
| 341–374                                                                         | 341–374                                               | FH28                                                     |
| 375–411                                                                         | 375–411                                               | FH29                                                     |
| 412–448                                                                         | 412–448                                               | FH30                                                     |
| 449–489                                                                         | 449–489                                               | FH31                                                     |
| 490–527                                                                         | 490–527                                               | FH32                                                     |
| 528–585                                                                         | 528–540                                               | FH33                                                     |
| 586–600                                                                         | —                                                     | FH34                                                     |

#### Note

① Size 7 and larger—advise full load current.

## Type A and B Overload Relays, Sizes 0, 1 and 2

| Size Starter                      | Non-Compensated Open Starters and Ambient Comp. Open and Enclosed Starters |                           | Heater (One Heater per Catalog Number) Catalog Number | Non-Compensating Enclosed Starters      |                           | Heater Catalog Number |           |      |
|-----------------------------------|----------------------------------------------------------------------------|---------------------------|-------------------------------------------------------|-----------------------------------------|---------------------------|-----------------------|-----------|------|
|                                   | Block Type Overload sing Three Heaters                                     | Single-Pole Type Overload |                                                       | Block Type Overload Using Three Heaters | Single-Pole Type Overload |                       |           |      |
| Full Load Current of Motor (Amps) |                                                                            |                           |                                                       |                                         |                           |                       |           |      |
| For Size 2 Starters               | For Size 1 Starters                                                        | For Size 0 Starters       | 0.25–0.27                                             | 0.29–0.31                               | FH03                      | 0.24–0.25             | 0.28–0.30 | FH03 |
|                                   |                                                                            |                           | 0.28–0.31                                             | 0.32–0.35                               | FH04                      | 0.26–0.28             | 0.31–0.34 | FH04 |
|                                   |                                                                            |                           | 0.32–0.34                                             | 0.36–0.39                               | FH05                      | 0.29–0.31             | 0.35–0.37 | FH05 |
|                                   |                                                                            |                           | 0.35–0.38                                             | 0.40–0.43                               | FH06                      | 0.32–0.35             | 0.38–0.42 | FH06 |
|                                   |                                                                            |                           | 0.39–0.42                                             | 0.44–0.48                               | FH07                      | 0.36–0.39             | 0.43–0.47 | FH07 |
|                                   |                                                                            |                           | 0.43–0.46                                             | 0.49–.053                               | FH08                      | 0.40–0.43             | 0.48–0.52 | FH08 |
|                                   |                                                                            |                           | 0.47–0.50                                             | 0.54–0.58                               | FH09                      | 0.44–0.47             | 0.53–0.56 | FH09 |
|                                   |                                                                            |                           | 0.51–0.55                                             | 0.59–0.64                               | FH10                      | 0.48–0.51             | 0.57–0.63 | FH10 |
|                                   |                                                                            |                           | 0.56–0.62                                             | 0.65–0.71                               | FH11                      | 0.52–0.57             | 0.64–0.70 | FH11 |
|                                   |                                                                            |                           | 0.63–0.68                                             | 0.72–0.79                               | FH12                      | 0.58–0.63             | 0.71–0.77 | FH12 |
|                                   |                                                                            |                           | 0.69–0.75                                             | 0.80–0.87                               | FH13                      | 0.64–0.70             | 0.78–0.85 | FH13 |
|                                   |                                                                            |                           | 0.76–0.83                                             | 0.88–0.96                               | FH14                      | 0.71–0.77             | 0.86–0.94 | FH14 |
|                                   |                                                                            |                           | 0.84–0.91                                             | 0.97–1.06                               | FH15                      | 0.78–0.85             | 0.95–1.03 | FH15 |
|                                   |                                                                            |                           | 0.92–1.00                                             | 1.07–1.16                               | FH16                      | 0.86–0.93             | 1.04–1.13 | FH16 |
|                                   |                                                                            |                           | 1.01–1.11                                             | 1.17–1.28                               | FH17                      | 0.94–1.03             | 1.14–1.25 | FH17 |
|                                   |                                                                            |                           | 1.12–1.22                                             | 1.29–1.41                               | FH18                      | 1.04–1.13             | 1.26–1.38 | FH18 |
|                                   |                                                                            |                           | 1.23–1.34                                             | 1.42–1.55                               | FH19                      | 1.14–1.25             | 1.39–1.52 | FH19 |
| 1.35–1.47                         | 1.56–1.71                                                                  | FH20                      | 1.26–1.37                                             | 1.53–1.67                               | FH20                      |                       |           |      |
| 1.48–1.62                         | 1.72–1.87                                                                  | FH21                      | 1.38–1.51                                             | 1.68–1.83                               | FH21                      |                       |           |      |
| 1.63–1.78                         | 1.88–2.06                                                                  | FH22                      | 1.52–1.65                                             | 1.84–2.01                               | FH22                      |                       |           |      |
| 1.79–1.95                         | 2.07–2.26                                                                  | FH23                      | 1.66–1.81                                             | 2.02–2.21                               | FH23                      |                       |           |      |
| 1.96–2.15                         | 2.27–2.48                                                                  | FH24                      | 1.82–1.99                                             | 2.22–2.43                               | FH24                      |                       |           |      |
| 2.16–2.35                         | 2.49–2.72                                                                  | FH25                      | 2.00–2.19                                             | 2.44–2.66                               | FH25                      |                       |           |      |
| 2.36–2.58                         | 2.73–2.99                                                                  | FH26                      | 2.20–2.39                                             | 2.67–2.92                               | FH26                      |                       |           |      |
| 2.59–2.83                         | 3.00–3.28                                                                  | FH27                      | 2.40–2.63                                             | 2.93–3.21                               | FH27                      |                       |           |      |
| 2.84–3.11                         | 3.29–3.60                                                                  | FH28                      | 2.64–2.89                                             | 3.22–3.53                               | FH28                      |                       |           |      |
| 3.12–3.42                         | 3.61–3.95                                                                  | FH29                      | 2.90–3.17                                             | 3.54–3.87                               | FH29                      |                       |           |      |
| 3.43–3.73                         | 3.96–4.31                                                                  | FH30                      | 3.18–3.47                                             | 3.88–4.22                               | FH30                      |                       |           |      |
| 3.74–4.07                         | 4.32–4.71                                                                  | FH31                      | 3.48–3.79                                             | 4.23–4.61                               | FH31                      |                       |           |      |
| 4.08–4.39                         | 4.72–5.14                                                                  | FH32                      | 3.80–4.11                                             | 4.62–4.9                                | FH32                      |                       |           |      |
| 4.40–4.87                         | 5.15–5.6                                                                   | FH33                      | 4.12–4.55                                             | 5.0–5.5                                 | FH33                      |                       |           |      |
| 4.88–5.3                          | 5.7–6.2                                                                    | FH34                      | 4.56–5.0                                              | 5.6–6.0                                 | FH34                      |                       |           |      |
| 5.4–5.9                           | 6.3–6.8                                                                    | FH35                      | 5.1–5.5                                               | 6.1–6.6                                 | FH35                      |                       |           |      |
| 6.0–6.4                           | 6.9–7.5                                                                    | FH36                      | 5.6–5.9                                               | 6.7–7.3                                 | FH36                      |                       |           |      |
| 6.5–7.1                           | 7.6–8.2                                                                    | FH37                      | 6.0–6.6                                               | 7.4–8.0                                 | FH37                      |                       |           |      |
| 7.2–7.8                           | 8.3–9.0                                                                    | FH38                      | 6.7–7.2                                               | 8.1–8.7                                 | FH38                      |                       |           |      |
| 7.9–8.5                           | 9.1–9.9                                                                    | FH39                      | 7.3–7.9                                               | 8.8–9.7                                 | FH39                      |                       |           |      |
| 8.6–9.4                           | 10.0–10.8                                                                  | FH40                      | 8.0–8.7                                               | 9.8–10.5                                | FH40                      |                       |           |      |
| 9.5–10.3                          | 10.9–11.9                                                                  | FH41                      | 8.8–9.5                                               | 10.6–11.7                               | FH41                      |                       |           |      |
| 10.4–11.3                         | 12.0–13.1                                                                  | FH42                      | 9.6–10.5                                              | 11.8–12.7                               | FH42                      |                       |           |      |
| 11.4–12.4                         | 13.2–14.3                                                                  | FH43                      | 10.6–11.5                                             | 12.8–14.0                               | FH43                      |                       |           |      |
| 12.5–13.5                         | 14.4–15.7                                                                  | FH44                      | 11.6–12.6                                             | 14.1–15.3                               | FH44                      |                       |           |      |
| 13.6–14.9                         | 15.8–17.2                                                                  | FH45                      | 12.7–13.8                                             | 15.4–16.6                               | FH45                      |                       |           |      |
| 15.0–16.3                         | 17.3–18.9                                                                  | FH46                      | 13.9–15.1                                             | 16.7–18.3                               | FH46                      |                       |           |      |
| 16.4–18.0                         | 19.0–20.8                                                                  | FH47                      | 15.2–16.7                                             | 18.4–20.0                               | FH47                      |                       |           |      |
| 18.1–19.8                         | 20.9–22.9                                                                  | FH48                      | 16.8–18.3                                             | 20.1–21.9                               | FH48                      |                       |           |      |
| 19.9–21.7                         | 23.0–25.2                                                                  | FH49                      | 18.4–20.2                                             | 22.0–23.9                               | FH49                      |                       |           |      |
| 21.8–23.9                         | 25.3–27.6                                                                  | FH50                      | 20.3–22.2                                             | 24.0–26.2                               | FH50                      |                       |           |      |
| 24.0–26.2                         | 27.7–30.3                                                                  | FH51                      | 22.3–24.3                                             | 26.3–28.8                               | FH51                      |                       |           |      |
| 26.3–28.7                         | 30.4–33.3                                                                  | FH52                      | 24.4–26.6                                             | 28.9–31.4                               | FH52                      |                       |           |      |
| 28.8–31.4                         | 33.4–36.4                                                                  | FH53                      | 26.7–29.1                                             | 31.5–34.5                               | FH53                      |                       |           |      |
| 31.5–34.5                         | 36.5–39.9                                                                  | FH54                      | 29.2–32.0                                             | 34.6–37.9                               | FH54                      |                       |           |      |
| 34.6–37.9                         | 40.0–43.9                                                                  | FH55                      | 32.1–35.2                                             | 38.0–41.9                               | FH55                      |                       |           |      |
| 38.0–41.5                         |                                                                            | FH56                      | 35.3–38.5                                             | 42.0–45.0                               | FH56                      |                       |           |      |
| 41.6–45.0                         |                                                                            | FH57                      | 38.6–42.3                                             |                                         | FH57                      |                       |           |      |