

## General information

### Sizing capacitors at the motor load

### Using charts

#### An Alternate Selection Method — Using Charts

**TABLE 2: Suggested Maximum Capacitor Ratings for T-Frame NEMA Class B Motors**

| Induction motor rating (HP) | NOMINAL MOTOR SPEED     |                            |                         |                             |                         |                            |                         |                            |                         |                            |                         |                            |
|-----------------------------|-------------------------|----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|-------------------------|----------------------------|-------------------------|----------------------------|-------------------------|----------------------------|
|                             | 3600 R/MIN              |                            | 1800 R/MIN              |                             | 1200 R/MIN              |                            | 900 R/MIN               |                            | 720 R/MIN               |                            | 600 R/MIN               |                            |
|                             | Capacitor rating (kvar) | Line current reduction (%) | Capacitor rating (kvar) | Line current reductions (%) | Capacitor rating (kvar) | Line current reduction (%) | Capacitor rating (kvar) | Line current reduction (%) | Capacitor rating (kvar) | Line current reduction (%) | Capacitor rating (kvar) | Line current reduction (%) |
| 3                           | 1.5                     | 14                         | 1.5                     | 23                          | 2.5                     | 28                         | 3                       | 38                         | 3                       | 40                         | 4                       | 40                         |
| 5                           | 2                       | 14                         | 2.5                     | 22                          | 3                       | 26                         | 4                       | 31                         | 4                       | 40                         | 5                       | 40                         |
| 7.5                         | 2.5                     | 14                         | 3                       | 20                          | 4                       | 21                         | 5                       | 28                         | 5                       | 38                         | 6                       | 45                         |
| 10                          | 4                       | 14                         | 4                       | 18                          | 5                       | 21                         | 6                       | 27                         | 7.5                     | 36                         | 8                       | 38                         |
| 15                          | 5                       | 12                         | 5                       | 18                          | 6                       | 20                         | 7.5                     | 24                         | 8                       | 32                         | 10                      | 34                         |
| 20                          | 6                       | 12                         | 6                       | 17                          | 7.5                     | 19                         | 9                       | 23                         | 12                      | 25                         | 18                      | 30                         |
| 25                          | 7.5                     | 12                         | 7.5                     | 17                          | 8                       | 19                         | 10                      | 23                         | 12                      | 25                         | 18                      | 30                         |
| 30                          | 8                       | 11                         | 8                       | 16                          | 10                      | 19                         | 14                      | 22                         | 15                      | 24                         | 22.5                    | 30                         |
| 40                          | 12                      | 12                         | 13                      | 15                          | 16                      | 19                         | 18                      | 21                         | 22.5                    | 24                         | 25                      | 30                         |
| 50                          | 15                      | 12                         | 18                      | 15                          | 20                      | 19                         | 22.5                    | 21                         | 24                      | 24                         | 30                      | 30                         |
| 60                          | 18                      | 12                         | 21                      | 14                          | 22.5                    | 17                         | 26                      | 20                         | 30                      | 22                         | 35                      | 28                         |
| 75                          | 20                      | 12                         | 23                      | 14                          | 25                      | 15                         | 28                      | 17                         | 33                      | 14                         | 40                      | 19                         |
| 100                         | 22.5                    | 11                         | 30                      | 14                          | 30                      | 12                         | 35                      | 16                         | 40                      | 15                         | 45                      | 17                         |
| 125                         | 25                      | 10                         | 36                      | 12                          | 35                      | 12                         | 42                      | 14                         | 45                      | 15                         | 50                      | 17                         |
| 150                         | 30                      | 10                         | 42                      | 12                          | 40                      | 12                         | 52.5                    | 14                         | 52.5                    | 14                         | 60                      | 17                         |
| 200                         | 35                      | 10                         | 50                      | 11                          | 50                      | 10                         | 65                      | 13                         | 68                      | 13                         | 90                      | 17                         |
| 250                         | 40                      | 11                         | 60                      | 10                          | 62.5                    | 10                         | 82                      | 13                         | 87.5                    | 13                         | 100                     | 17                         |
| 300                         | 45                      | 11                         | 68                      | 10                          | 75                      | 12                         | 100                     | 14                         | 100                     | 13                         | 120                     | 17                         |
| 350                         | 50                      | 12                         | 75                      | 8                           | 90                      | 12                         | 120                     | 13                         | 120                     | 13                         | 135                     | 15                         |
| 400                         | 75                      | 10                         | 80                      | 8                           | 100                     | 12                         | 130                     | 13                         | 140                     | 13                         | 150                     | 15                         |
| 450                         | 80                      | 8                          | 90                      | 8                           | 120                     | 10                         | 140                     | 12                         | 160                     | 14                         | 160                     | 15                         |
| 500                         | 100                     | 8                          | 120                     | 9                           | 150                     | 12                         | 160                     | 12                         | 180                     | 13                         | 180                     | 15                         |

Applies to three-phase, 60Hz motors when switched with capacitors as a single unit.

Another method of selecting the proper capacitor employs the use of only a selection chart shown in Table 2 or 3. These tables take other variables such as motor RPM into consideration in making recommendations for capacitor applications. They are convenient because they only require that the user know the horsepower and RPM of the motor. Both tables estimate the percentage reduction in full load current drawn by the motor as a result of the capacitor's installation.

**WARNING!**

Never oversize capacitors or exceed 1.0 power factor or resulting problems with the motor can occur!!

**If calculations or a kvar determination chart indicate a kvar rating not found in a pricing and selection chart, always refer to the next lower kvar rating!**

EXAMPLE: A manufacturer needs to determine the proper capacitors required for a 1200 RPM, 75HP T-Frame NEMA class B motor.

1. First find 75 in the horsepower column of the chart.
2. Locate the 1200 RPM capacitor rating (kvar) column. Note the figure of 25 kvar.
3. Now refer to the appropriate pricing and selection chart Table 1, page 19.5. The appropriate kvar rating is 25 kvar. Depending on the desired enclosure, the price and catalog number can then be easily determined.

**NOTE**

Using the above charts for selecting capacitors will correct power factor to approximately .95.

**TABLE 3: Suggested Maximum Capacitor Ratings for U-Frame NEMA Class B Motors**

| H.P. Rating | NEMA Motor Design A or B<br>Normal Starting Torque<br>Normal Running Current |     |          |     |          |     |         |     |         |     |         |     |
|-------------|--|-----|----------|-----|----------|-----|---------|-----|---------|-----|---------|-----|
|             | 3600 RPM   |     | 1800 RPM |     | 1200 RPM |     | 900 RPM |     | 720 RPM |     | 600 RPM |     |
|             | kvar   | %AR | kvar     | %AR | kvar     | %AR | kvar    | %AR | kvar    | %AR | kvar    | %AR |
| 3           | 1.5  | 14  | 1.5      | 15  | 1.5      | 20  | 2       | 27  | 2.5     | 35  | 3.5     | 41  |
| 5           | 2  | 12  | 2        | 13  | 2        | 17  | 3       | 25  | 4       | 32  | 4.5     | 37  |
| 7.5         | 2.5  | 11  | 2.5      | 13  | 2        | 15  | 4       | 22  | 5.5     | 30  | 6       | 34  |
| 10          | 3  | 10  | 3        | 11  | 3.5      | 14  | 5       | 21  | 6.5     | 27  | 7.5     | 31  |
| 15          | 4  | 9   | 4        | 10  | 5        | 13  | 6.5     | 18  | 8       | 23  | 9.5     | 27  |
| 20          | 5  | 9   | 5        | 10  | 5        | 11  | 7.5     | 18  | 10      | 20  | 10      | 25  |
| 25          | 5  | 6   | 5        | 8   | 7.5      | 11  | 7.5     | 13  | 10      | 20  | 10      | 21  |
| 30          | 5  | 5   | 5        | 8   | 7.5      | 11  | 10      | 15  | 15      | 22  | 15      | 25  |
| 40          | 7.5  | 8   | 10       | 8   | 10       | 10  | 15      | 16  | 15      | 18  | 15      | 20  |
| 50          | 10   | 7   | 10       | 8   | 10       | 9   | 15      | 12  | 20      | 15  | 25      | 22  |
| 60          | 10   | 6   | 10       | 8   | 15       | 10  | 15      | 11  | 20      | 15  | 25      | 20  |
| 75          | 15   | 7   | 15       | 8   | 15       | 9   | 20      | 11  | 30      | 15  | 40      | 20  |
| 100         | 20   | 8   | 20       | 8   | 25       | 9   | 30      | 11  | 40      | 14  | 45      | 18  |
| 125         | 20   | 6   | 25       | 7   | 30       | 9   | 30      | 10  | 45      | 14  | 50      | 17  |
| 150         | 30   | 6   | 30       | 7   | 35       | 9   | 40      | 10  | 50      | 17  | 60      | 17  |
| 200         | 40   | 6   | 40       | 7   | 45       | 8   | 55      | 11  | 60      | 12  | 75      | 17  |
| 250         | 45   | 5   | 45       | 6   | 60       | 9   | 70      | 10  | 75      | 12  | 100     | 17  |
| 300         | 50   | 5   | 50       | 6   | 75       | 9   | 75      | 9   | 80      | 12  | 105     | 17  |

Applies to three-phase, 60Hz motors when switched with capacitors as a single unit.