

# General ratings information and catalog guide for single-phase and three-phase reclosers



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## Description

Automatic circuit reclosers are recognized by electric utilities throughout the world as an essential device for achieving their prime goal: providing maximum continuity of electric service to their customers simply and economically.

Reclosers sense and interrupt fault currents and automatically restore service after momentary outage.

The automatic circuit recloser is essentially a self-contained device with the necessary intelligence to sense overcurrents to time and interrupt fault currents and to re-energize the line by reclosing automatically. If a fault is permanent, the recloser locks open after a preset number of operations (usually three or four), isolating the faulted section from the main part of the system.

## Temporary faults

Extensive studies of overhead distribution systems have established that approximately 80 to 95 percent of all system faults are temporary in nature and, at most, last from only a few cycles to a few seconds.

Typical causes of these temporary faults are:

- Windblown conductors touching one another.
- Lightning surges flashing over an insulator.
- Birds, reptiles, or small animals bridging between an energized line and a grounded surface.
- Tree branches touching energized lines.
- Switching surges that flash over an insulator.

Based on statistics and observations, the need for a trip-and-reclose function was readily recognized; that is, if the line could be tripped open momentarily, a subsequent reclosure very likely would be successful because, by then, the cause of the fault would be gone. Thus, the automatic circuit recloser, in providing this trip-and-reclose function, virtually eliminates prolonged outages on distribution systems due to temporary faults or transient overcurrent conditions.

## Recloser classifying features

Major classifying features of automatic circuit reclosers are:

- Single-phase or three-phase
- Control: hydraulic or electronic
- Interrupters: oil or vacuum
- Insulation: oil, air, or epoxy

Table 1 contains a detailed listing of reclosers currently manufactured by Eaton's Cooper Power Systems Division.



Figure 1. Type H single-phase, hydraulically controlled recloser.

## Recloser: single-phase or three-phase

Both single- and three-phase reclosers are available to satisfy application requirements.

### Single-phase reclosers

Single-phase reclosers, as shown in Figure 1 and 2, are used to protect single-phase lines such as branches or taps of a three-phase feeder. They can also be used on three-phase circuits where the load is predominantly single-phase. Thus, when a permanent phase-to-ground fault occurs, one phase can be locked-out while service is maintained to the remaining two-thirds of the system.

### Three-phase reclosers

Two types of three-phase reclosers are available:

- Single-Phase tripping
- Three-Phase tripping



Figure 2. SPEAR™ single-phase, electronically controlled recloser.



Figure 3. NOVA™ triple-single, electronically controlled recloser.

Table 1. Recloser Ratings Summary (See Tables 2–5 for more detailed ratings data)

| Voltage Rating (kV) | Max. Cont. Current Rating (A) | Interrupting Rating (sym A at max. voltage) | Interrupting Medium | Control    | Recloser Type |
|---------------------|-------------------------------|---------------------------------------------|---------------------|------------|---------------|
| <b>Single-Phase</b> |                               |                                             |                     |            |               |
| 2.4 - 14.4          | 50                            | 1250                                        | Oil                 | Hydraulic  | H             |
|                     | 100                           | 2000*                                       | Oil                 | Hydraulic  | 4H            |
|                     | 200                           | 2000*                                       | Vacuum              | Hydraulic  | V4H           |
|                     | 280                           | 4000*                                       | Oil                 | Hydraulic  | L             |
|                     | 280                           | 6000                                        | Vacuum              | Hydraulic  | V4L           |
|                     | 560                           | 10000*                                      | Oil                 | Hydraulic  | D             |
|                     | 400                           | 8000                                        | Vacuum              | Electronic | SPEAR15-8     |
|                     | 630                           | 12500                                       | Vacuum              | Electronic | SPEAR15-12    |
|                     | 800                           | 12500                                       | Vacuum              | Electronic | SPEAR15-12    |
| 24.9                | 100                           | 2500                                        | Oil                 | Hydraulic  | E             |
|                     | 280                           | 4000                                        | Oil                 | Hydraulic  | 4E            |
|                     | 280                           | 6000                                        | Vacuum              | Hydraulic  | V4E           |
|                     | 400                           | 8000                                        | Vacuum              | Electronic | SPEAR27-8     |
|                     | 630                           | 12500                                       | Vacuum              | Electronic | SPEAR27-12    |
|                     | 800                           | 12500                                       | Vacuum              | Electronic | SPEAR27-12    |
| 24.9 - 34.5         | 560                           | 8000                                        | Oil                 | Hydraulic  | DV            |
|                     | 400                           | 8000                                        | Vacuum              | Electronic | SPEAR38-8     |
|                     | 630                           | 12500                                       | Vacuum              | Electronic | SPEAR38-12    |
|                     | 800                           | 12500                                       | Vacuum              | Electronic | SPEAR38-12    |
| <b>Three-Phase</b>  |                               |                                             |                     |            |               |
| 2.4 - 14.4          | 100                           | 2000*                                       | Oil                 | Hydraulic  | 6H            |
|                     | 200                           | 2000*                                       | Oil                 | Hydraulic  | V6H           |
|                     | 400                           | 8000                                        | Vacuum              | Electronic | NOVA-TS-15-8  |
|                     | 560                           | 10000*                                      | Oil                 | Hydraulic  | W             |
|                     | 560**                         | 10000*                                      | Oil                 | Electronic | WE            |
|                     | 560                           | 12000                                       | Vacuum              | Hydraulic  | VW            |
|                     | 560                           | 12000                                       | Vacuum              | Electronic | PWE***        |
|                     | 560**                         | 12000                                       | Vacuum              | Electronic | VWE           |
|                     | 600                           | 12000                                       | Vacuum              | Electronic | VSA12B        |
|                     | 630**                         | 12500†                                      | Vacuum              | Electronic | NOVA™ 15      |
|                     | 800                           | 12000                                       | Vacuum              | Electronic | VSA12         |
|                     | 800                           | 16000                                       | Vacuum              | Electronic | VSA16         |
|                     | 800                           | 20000                                       | Vacuum              | Electronic | VSA20         |
|                     | 630**                         | 12500†                                      | Vacuum              | Electronic | NOVA-TS-15-12 |
|                     | 630**                         | 12500†                                      | Vacuum              | Electronic | NOVA STS-15   |
|                     | 1200                          | 20000                                       | Vacuum              | Electronic | VSA20A        |
| 24.9                | 400                           | 8000                                        | Vacuum              | Electronic | NOVA-TS-27-8  |
|                     | 560                           | 8000                                        | Oil                 | Hydraulic  | WV27          |
|                     | 560**                         | 8000                                        | Oil                 | Electronic | WVE27         |
|                     | 560                           | 12000                                       | Vacuum              | Hydraulic  | VWV27         |
|                     | 560**                         | 12000                                       | Vacuum              | Electronic | VWVE27        |
|                     | 560                           | 12000                                       | Vacuum              | Electronic | PWVE***       |
|                     | 630**                         | 12500†                                      | Vacuum              | Electronic | NOVA 27       |
|                     | 630**                         | 12500†                                      | Vacuum              | Electronic | NOVA-TS-27-12 |
|                     | 630**                         | 12500†                                      | Vacuum              | Electronic | NOVA STS-27   |
| 34.5                | 400                           | 8000                                        | Vacuum              | Electronic | NOVA-TS-38-8  |
|                     | 560                           | 8000                                        | Oil                 | Hydraulic  | WV38X         |
|                     | 560**                         | 8000                                        | Oil                 | Electronic | WVE38X        |
|                     | 560                           | 12000                                       | Vacuum              | Hydraulic  | VWV38X        |
|                     | 560**                         | 12000                                       | Vacuum              | Electronic | VWVE38X       |
|                     | 560**                         | 12000                                       | Vacuum              | Electronic | VS012         |
|                     | 560**                         | 16000                                       | Vacuum              | Electronic | VS016         |
|                     | 630**                         | 12500                                       | Vacuum              | Electronic | NOVA 38       |
|                     | 630**                         | 12500                                       | Vacuum              | Electronic | NOVA-TS-38-12 |
|                     | 630**                         | 12500                                       | Vacuum              | Electronic | NOVA STS-38   |

\* Interrupting rating will be higher at lower voltage as shown in expanded tables.

\*\* Continuous current rating can be extended to 800 A with an accessory.

\*\*\* For pad-mounted installation.

† 16.0 kA option is also available.



**Figure 4. NOVA™ STS single-tank, triple-single electronically controlled recloser**

#### Single-phase tripping

The triple-single reclosers, shown in Figures 3 and 4, have three modes of operation:

- Three-phase trip and three-phase lockout. All three phases simultaneously trip on an overcurrent, reclose and sequence together.
- Single-phase trip and three-phase lockout. Each phase operates independently for overcurrent tripping and reclosing. If any phase sequences to lockout condition (due to permanent fault), or if "lockout" is locally or remotely asserted, the other two phases trip open and lock out. Thus, extended single-phase energization of three-phase loads is prevented.
- Single-phase trip and single-phase lockout. Each individual phase trips and sequences to lockout independent of each other. This is primarily for residential loads and/or where single-phasing of three-phase loads is protected by other means.

Another configurable option is also available to trip and lockout all three phases in the event of a phase-to-phase or three-phase fault. Should a phase-to-phase or three-phase fault be detected on the system, all three reclosers will trip and lockout whenever any one phase sequences to lockout. Three-phase lockout occurs if a multiple phase fault is present as the recloser advances to lockout.

#### Three-phase tripping

There are various types of three-phase tripping reclosers available to improve system reliability. The recloser selection is based upon electrical ratings required, interrupting and insulation medium, and the selection of hydraulic or electronic control.

- Three-phase trip and three-phase lockout. Larger reclosers such as the units shown in Figures 5 and 6, use this mode. For any fault—single-phase-to-ground, phase-to-phase, or three-phase—all contacts open simultaneously for each trip operation. The three phases, mechanically linked together for tripping and reclosing, are operated by a common mechanism.

### Controls: hydraulic or electronic

The intelligence that enables a recloser to sense overcurrents, select timing operation, time the tripping and reclosing functions, and finally lockout is provided by its control. There are two basic types of control schemes used: an integral hydraulic control or an electronic control located in a separate cabinet.

#### Hydraulic controls

Hydraulic recloser control is used in most single-phase reclosers and in three-phase recloser types 6H, V6H, W, VW, WV27, VVV27, WV38X, and VVV38X. It is built as an integral part of the recloser. With this type of control, an overcurrent is sensed by a trip coil



**Figure 5. NOVA™ three-phase, electronically controlled recloser.**



**Figure 6. Type VSA20A vacuum, three-phase, air-insulated, electronically controlled recloser.**

that is connected in series with the line.

When the overcurrent flows through the coil, a plunger is drawn into the coil to trip open the recloser contacts. Timing and sequencing are accomplished by pumping oil through separate hydraulic chambers or ducts.

For smaller reclosers, the reclosing energy is provided by springs that are charged by the series trip-coil plunger during overcurrent operation.

Larger reclosers are closed from a separate closing solenoid that is energized by line potential from the source side of the recloser.

#### Electronic controls

Eaton's Cooper Power series electronic recloser controls are used in most three-phase reclosers and in the single-phase SPEAR recloser control. Compared with the hydraulic control, they are more flexible, more easily customized and programmed, and many have advanced protection, metering, and automation functionality.

The electronic control is housed in a cabinet separate from the recloser and conveniently permits changes to operational settings. A wide range of accessories is available to customize the basic operation, solving many application problems.

#### Current sensing

Line current is sensed by special sensing current transformers in the recloser. The recloser and control are connected by a multi-conductor control cable that carries sensing transformer secondary currents to the control and the necessary trip and close signals from the control to the recloser.

#### Microprocessor-based controls

Eaton offers numerous Cooper Power series electronic controls that can be used in conjunction with its broad line of electronically controlled reclosers.

The Form 6 control, see Figures 7 and 8, provides maximum protective hardware design and simple interactive graphical interfaces for complete user customization. All standard control operating parameters, including minimum trip levels, time-current curve selection, and sequences of recloser operation, are keyboard programmable.

This control utilizes a powerful PC-based interface software to configure control settings, record metering information, and establish communication parameters. It also provides analysis tools that include fault locating, event recording, and oscillography functions.



Figure 7. Form 6-TS pole-mount recloser control (left). Form 6 pole-mount recloser control (right).



Figure 8. Form 6 rack-mount recloser control.



Figure 9. SPEAR recloser control.

For more information on the Form 6 control, refer to *Bulletin B280-08010, Maximum Functionality and Ultimate User Configurability* and for the SPEAR recloser control, refer to *Product Aid, PA280003EN, Smart Single-Phase Automation and Protection Solutions*.



Figure 10. Eaton's Cooper Power series vacuum interrupter.

## Interrupting medium: oil or vacuum

Reclosers use either oil or vacuum as the interrupting medium.

### Oil interrupters

Reclosers using oil for current interruption use the same oil for basic insulation. Most reclosers with hydraulic control (except the W-group reclosers) also use the same oil for timing and counting functions.

### Vacuum interrupters

Vacuum interrupters provide fast, low-energy arc interruption with long contact and interrupter life, low mechanical stress, and maximum operating safety. With arc interruption taking place in a vacuum, contact and interrupter life far exceeds other interrupting media.

Eaton's Cooper Power series vacuum interrupters (Figure 10) are designed with a metal and ceramic housing for maximum strength and long-term vacuum integrity. The high-alumina ceramic has more than five times the strength of glass, which permits a higher processing temperature to develop maximum purity of the assembly, and is impervious even to helium penetration to sustain the vacuum level.

Eaton has over 40 years of experience as a world leader in the design and manufacture of vacuum interrupters for use in its Cooper Power series distribution switchgear. A state-of-the-art vacuum interrupter clean room manufacturing facility ensures the production of very high quality interrupters that provide long and trouble-free operating life.

Depending on type, a vacuum recloser may use either oil, air, or epoxy as the insulating medium.

## Recloser application

Reclosers can be used anywhere on a distribution system where recloser ratings are adequate for system requirements. Locations for reclosers are:

- In substations as the primary feeder protective device.
- On distribution lines at a distance from a substation, to sectionalize long feeders and thus prevent outages of the entire feeder when a permanent fault occurs near the end of the feeder.
- On important taps of main feeders to protect the main feeder from interruptions and outages due to faults on the taps.

### Application criteria

To properly apply automatic circuit reclosers, five major factors must be considered:

1. System voltage. System voltage will be known. The recloser must have a voltage rating equal to – or greater than – system voltage.
2. Maximum fault current available at the recloser location. Maximum fault current will be known or can be calculated. The recloser interrupting must be equal to – or greater than – the maximum available fault current at the recloser location.
3. Maximum load current. The recloser continuous current rating must be equal to – or greater than – anticipated circuit load. For series-coil-type reclosers, the coil size can be selected to match the present load current, the anticipated future load current, or the substation transformer capacity. Minimum-trip current is nominally twice the coil continuous-current rating.
4. For electronically controlled reclosers, minimum-trip current must be greater than any anticipated peak load. Generally, a trip-current value of at least twice the expected load current is used.
5. Minimum-fault current within the zone to be protected. Minimum fault current that might occur at the end of the line section must be checked to confirm that the recloser will sense and interrupt this current.
6. Coordination with other protective devices on both the source and the load sides of the recloser.

### Coordination with other devices

After the first four application factors have been satisfied, coordination of the recloser with both the source- and the load-side devices must be determined. Proper selection of time delays and sequences is vital to assure that any momentary interruption or longer-term outage due to faults is restricted to the smallest possible section of the system.

Generally, recloser timing and sequences are selected to coordinate with the source-side devices. After the size and sequence of the required recloser has been determined, the protective equipment farther down the line is selected to coordinate with it as shown in Figure 11.

### Dual timing

Automatic circuit reclosers have dual-timing capabilities; that is, the first fault-current interruptions (one or more) are performed in accordance with a fast or instantaneous timing characteristic (no intentional time delay) and the remaining interruptions are performed in accordance with a predetermined time delay.

The first operations are as fast as possible in order to clear temporary faults before any line damage can occur. If the fault is permanent, the time-delay operation allows the down-line device – either another recloser or a fuse – to clear first.

Recloser-to-recloser coordination is achieved primarily by selecting different coil sizes or trip values with further coordination possible by different time delays or sequences. To coordinate a recloser with a downline fuse, the fuse link size should be selected to coordinate with the recloser fast and time-delay curves.

Figure 12 shows a typical recloser operating sequence-to-lockout for a permanent fault.

A recloser operating on its fast curve should clear a temporary fault before the fuse link can be damaged. When on its time-delay curve, a recloser operation should be more delayed than the fuse-link clearing time, allowing the fuse to clear permanent faults without tripping the recloser.

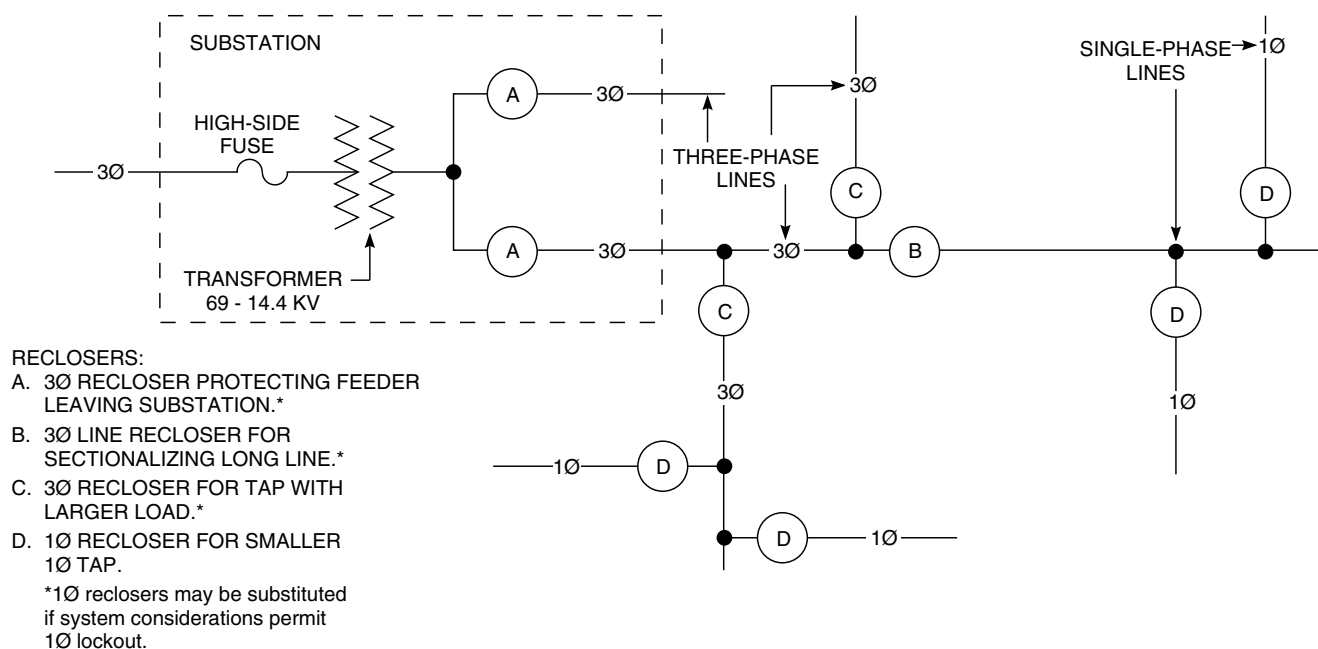


Figure 11. Typical line diagram of distribution circuit showing application of reclosers.



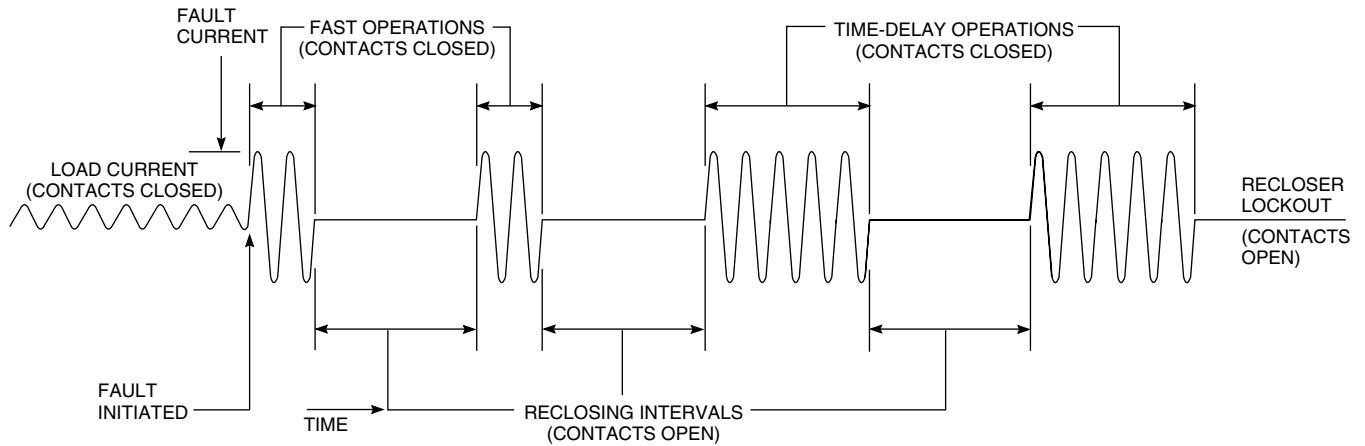


Figure 12. Recloser operating sequence when a permanent fault occurs.

Table 2. Single-Phase, Hydraulically Controlled Reclosers

| Recloser Type | Nominal Voltage (kV) | BIL (kV) | Max. Cont. Current Rating (A) | Interrupting Medium | Trip-Coil Rating (cont. A) | Min. Trip Rating (A) | Interrupting Rating (rms sym A) | For Detailed Description and Ordering Information See Catalog Section |            |
|---------------|----------------------|----------|-------------------------------|---------------------|----------------------------|----------------------|---------------------------------|-----------------------------------------------------------------------|------------|
|               |                      |          |                               |                     |                            |                      | 2.4 kV thru 14.4 kV             | Recloser                                                              | Mountings  |
| H             | 24.4-14.4            | 95       | 50                            | Oil                 | 5                          | 10                   | 125                             | CA280004EN                                                            | CA280004EN |
|               |                      |          |                               |                     | 10                         | 20                   | 250                             |                                                                       |            |
|               |                      |          |                               |                     | 15                         | 30                   | 375                             |                                                                       |            |
|               |                      |          |                               |                     | 25                         | 50                   | 625                             |                                                                       |            |
|               |                      |          |                               |                     | 35                         | 70                   | 875                             |                                                                       |            |
|               |                      |          |                               |                     | 50                         | 100                  | 1250                            |                                                                       |            |
| 4H            | 2.4-14.4             | 110      | 100                           | Oil                 |                            |                      | 4.8 kV 8.32 kV 14.4 kV          | CA280004EN                                                            | CA280004EN |
|               |                      |          |                               |                     | 5                          | 10                   | 200 200 200                     |                                                                       |            |
|               |                      |          |                               |                     | 10                         | 20                   | 400 400 400                     |                                                                       |            |
|               |                      |          |                               |                     | 15                         | 30                   | 600 600 600                     |                                                                       |            |
|               |                      |          |                               |                     | 25                         | 50                   | 1000 1000 1000                  |                                                                       |            |
|               |                      |          |                               |                     | 35                         | 70                   | 1400 1400 1400                  |                                                                       |            |
|               |                      |          |                               |                     | 50                         | 100                  | 2000 2000 2000                  |                                                                       |            |
|               |                      |          |                               |                     | 70                         | 140                  | 2800 2500 2000                  |                                                                       |            |
| V4H           | 2.4-14.4             | 110      | 200                           | Vacuum              |                            |                      |                                 | CA280004EN                                                            | CA280004EN |
|               |                      |          |                               |                     | 5                          | 10                   | 200 200 200                     |                                                                       |            |
|               |                      |          |                               |                     | 10                         | 20                   | 400 400 400                     |                                                                       |            |
|               |                      |          |                               |                     | 15                         | 30                   | 600 600 600                     |                                                                       |            |
|               |                      |          |                               |                     | 25                         | 50                   | 1000 1000 1000                  |                                                                       |            |
|               |                      |          |                               |                     | 35                         | 70                   | 1400 1400 1400                  |                                                                       |            |
|               |                      |          |                               |                     | 50                         | 100                  | 2000 2000 2000                  |                                                                       |            |
|               |                      |          |                               |                     | 70                         | 140                  | 2800 2500 2000                  |                                                                       |            |
|               |                      |          |                               |                     | 100                        | 200                  | 3000 2500 2000                  |                                                                       |            |
|               |                      |          |                               |                     | 140                        | 280                  | 3000 2500 2000                  |                                                                       |            |
|               |                      |          |                               |                     | 200                        | 400                  | 3000 2500 2000                  |                                                                       |            |

\* Trip rating is 140% of X coil ratings, all others are 200%.

Table 2. Single-Phase, Hydraulically Controlled Reclosers (continued)

| Recloser Type | Nominal Voltage (kV) | BIL (kV) | Max. Cont. Current Rating (A) | Interrupting Medium | Trip-Coil Rating (cont. A) | Min. Trip Rating (A) | Interrupting Rating (rms sym A) |         |         | For Detailed Description and Ordering Information See Catalog Section |            |
|---------------|----------------------|----------|-------------------------------|---------------------|----------------------------|----------------------|---------------------------------|---------|---------|-----------------------------------------------------------------------|------------|
|               |                      |          |                               |                     |                            |                      | 4.8 kV                          | 8.32 kV | 14.4 kV | Recloser                                                              | Mountings  |
| L             | 2.4 - 14.4           | 110      | 280                           | Oil                 | 25                         | 50                   | 1500                            | 1500    | 1500    | CA280004EN                                                            | CA280004EN |
|               |                      |          |                               |                     | 35                         | 70                   | 2100                            | 2100    | 2100    |                                                                       |            |
|               |                      |          |                               |                     | 50                         | 100                  | 3000                            | 3000    | 3000    |                                                                       |            |
|               |                      |          |                               |                     | 70                         | 140                  | 4200                            | 4200    | 4000    |                                                                       |            |
|               |                      |          |                               |                     | 100                        | 200                  | 6000                            | 5000    | 4000    |                                                                       |            |
|               |                      |          |                               |                     | 140                        | 280                  | 6000                            | 5000    | 4000    |                                                                       |            |
|               |                      |          |                               |                     | 200                        | 400                  | 6000                            | 5000    | 4000    |                                                                       |            |
|               |                      |          |                               |                     | 280                        | 560                  | 6000                            | 5000    | 4000    |                                                                       |            |
|               |                      |          |                               |                     |                            |                      | 2.4 thru 14.4 kV                |         |         |                                                                       |            |
| V4L           | 2.4 - 14.4           | 110      | 280                           | Vacuum              | 25                         | 50                   | 1500                            |         |         | CA280004EN and Bulletin 89007                                         | CA280004EN |
|               |                      |          |                               |                     | 35                         | 70                   | 2100                            |         |         |                                                                       |            |
|               |                      |          |                               |                     | 50                         | 100                  | 3000                            |         |         |                                                                       |            |
|               |                      |          |                               |                     | 70                         | 140                  | 4200                            |         |         |                                                                       |            |
|               |                      |          |                               |                     | 100                        | 200                  | 6000                            |         |         |                                                                       |            |
|               |                      |          |                               |                     | 140                        | 280                  | 6000                            |         |         |                                                                       |            |
|               |                      |          |                               |                     | 170                        | 340                  | 6000                            |         |         |                                                                       |            |
|               |                      |          |                               |                     | 200                        | 400                  | 6000                            |         |         |                                                                       |            |
|               |                      |          |                               |                     |                            |                      | 4.8 kV 8.32 kV 14.4 kV          |         |         |                                                                       |            |
| D             | 2.4 - 14.4           | 110      | 560                           | Oil                 | 70X                        | 100*                 | 3000                            | 3000    | 3000    | CA280007EN                                                            | CA280007EN |
|               |                      |          |                               |                     | 100                        | 200                  | 6000                            | 6000    | 6000    |                                                                       |            |
|               |                      |          |                               |                     | 100X                       | 140*                 | 4200                            | 4200    | 4200    |                                                                       |            |
|               |                      |          |                               |                     | 140                        | 280                  | 8400                            | 8400    | 8400    |                                                                       |            |
|               |                      |          |                               |                     | 140X                       | 200*                 | 6000                            | 6000    | 6000    |                                                                       |            |
|               |                      |          |                               |                     | 160                        | 320                  | 9600                            | 9600    | 9600    |                                                                       |            |
|               |                      |          |                               |                     | 185                        | 370                  | 11100                           | 10000   | 10000   |                                                                       |            |
|               |                      |          |                               |                     | 225                        | 450                  | 12000                           | 10000   | 10000   |                                                                       |            |
|               |                      |          |                               |                     | 280                        | 560                  | 12000                           | 10000   | 10000   |                                                                       |            |
|               |                      |          |                               |                     | 280X                       | 400*                 | 12000                           | 10000   | 10000   |                                                                       |            |
|               |                      |          |                               |                     | 400                        | 800                  | 12000                           | 10000   | 10000   |                                                                       |            |
|               |                      |          |                               |                     | 400X                       | 560*                 | 12000                           | 10000   | 10000   |                                                                       |            |
|               |                      |          |                               |                     | 560                        | 1120                 | 12000                           | 10000   | 10000   |                                                                       |            |
|               |                      |          |                               |                     | 560X                       | 750*                 | 12000                           | 10000   | 10000   |                                                                       |            |
|               |                      |          |                               |                     |                            |                      | 24.9 kV                         |         |         |                                                                       |            |
| E             | 24.9                 | 150      | 100                           | Oil                 | 5                          | 10                   | 300                             |         |         | CA280004EN                                                            | CA280004EN |
|               |                      |          |                               |                     | 10                         | 20                   | 600                             |         |         |                                                                       |            |
|               |                      |          |                               |                     | 15                         | 30                   | 900                             |         |         |                                                                       |            |
|               |                      |          |                               |                     | 25                         | 50                   | 1500                            |         |         |                                                                       |            |
|               |                      |          |                               |                     | 35                         | 70                   | 2100                            |         |         |                                                                       |            |
|               |                      |          |                               |                     | 50                         | 100                  | 2500                            |         |         |                                                                       |            |
|               |                      |          |                               |                     | 70                         | 140                  | 2500                            |         |         |                                                                       |            |
|               |                      |          |                               |                     | 100                        | 200                  | 2500                            |         |         |                                                                       |            |
| 4E            | 24.9                 | 150      | 280                           | Oil                 | 50                         | 100                  | 3000                            |         |         | CA280004EN                                                            | CA280004EN |
|               |                      |          |                               |                     | 70                         | 140                  | 4000                            |         |         |                                                                       |            |
|               |                      |          |                               |                     | 100                        | 200                  | 4000                            |         |         |                                                                       |            |
|               |                      |          |                               |                     | 140                        | 280                  | 4000                            |         |         |                                                                       |            |
|               |                      |          |                               |                     | 170                        | 340                  | 4000                            |         |         |                                                                       |            |
|               |                      |          |                               |                     | 200                        | 400                  | 4000                            |         |         |                                                                       |            |
|               |                      |          |                               |                     | 280                        | 560                  | 4000                            |         |         |                                                                       |            |

\* Trip rating is 140% of X coil ratings, all others are 200%.



Table 2. Single-Phase, Hydraulically Controlled Reclosers (continued)

| Recloser Type     | Nominal Voltage (kV) | BIL (kV) | Max. Cont. Current Rating (A) | Interrupting Medium | Trip-Coil Rating (cont. A) | Min. Trip Rating (A) | Interrupting Rating (rms sym A) | For Detailed Description and Ordering Information See Catalog Section |            |
|-------------------|----------------------|----------|-------------------------------|---------------------|----------------------------|----------------------|---------------------------------|-----------------------------------------------------------------------|------------|
|                   |                      |          |                               |                     |                            |                      |                                 | Recloser                                                              | Mountings  |
| 24.9 kV           |                      |          |                               |                     |                            |                      |                                 | CA280004EN and Bulletin 91036                                         | CA280004EN |
| V4E               | 24.9                 | 150      | 280                           | Vacuum              | 15                         | 30                   | 900                             |                                                                       |            |
|                   |                      |          |                               |                     | 25                         | 50                   | 1500                            |                                                                       |            |
|                   |                      |          |                               |                     | 35                         | 70                   | 2100                            |                                                                       |            |
|                   |                      |          |                               |                     | 50                         | 100                  | 3000                            |                                                                       |            |
|                   |                      |          |                               |                     | 70                         | 1410                 | 4200                            |                                                                       |            |
|                   |                      |          |                               |                     | 100                        | 200                  | 6000                            |                                                                       |            |
|                   |                      |          |                               |                     | 140                        | 280                  | 6000                            |                                                                       |            |
|                   |                      |          |                               |                     | 170                        | 340                  | 6000                            |                                                                       |            |
|                   |                      |          |                               |                     | 200                        | 400                  | 6000                            |                                                                       |            |
| 280               | 560                  | 6000     |                               |                     |                            |                      |                                 |                                                                       |            |
| 24.9 thru 34.5 kV |                      |          |                               |                     |                            |                      |                                 | CA280004EN                                                            | CA280004EN |
| DV                | 24.9-34.5            | 150      | 560                           | Oil                 | 70X                        | 100*                 | 3000                            |                                                                       |            |
|                   |                      |          |                               |                     | 100                        | 200                  | 6000                            |                                                                       |            |
|                   |                      |          |                               |                     | 100X                       | 140*                 | 4200                            |                                                                       |            |
|                   |                      |          |                               |                     | 140                        | 280                  | 8000                            |                                                                       |            |
|                   |                      |          |                               |                     | 140X                       | 200*                 | 6000                            |                                                                       |            |
|                   |                      |          |                               |                     | 160                        | 320                  | 8000                            |                                                                       |            |
|                   |                      |          |                               |                     | 185                        | 370                  | 8000                            |                                                                       |            |
|                   |                      |          |                               |                     | 225                        | 450                  | 8000                            |                                                                       |            |
|                   |                      |          |                               |                     | 280                        | 560                  | 8000                            |                                                                       |            |
|                   |                      |          |                               |                     | 280X                       | 400*                 | 8000                            |                                                                       |            |
|                   |                      |          |                               |                     | 400                        | 800                  | 8000                            |                                                                       |            |
|                   |                      |          |                               |                     | 400X                       | 560*                 | 8000                            |                                                                       |            |
|                   |                      |          |                               |                     | 560                        | 1120                 | 8000                            |                                                                       |            |
| 560X              | 750*                 | 8000     |                               |                     |                            |                      |                                 |                                                                       |            |

\* Trip rating is 140% of X coil ratings, all others are 200%.

Table 3. Single-Phase, Electronically Controlled Reclosers

| Recloser Type    | Nominal Voltage (kV) | BIL (kV) | Max. Cont. Current Rating (A) | Interrupting Medium | Interrupting Rating (rms sym A) | For Detailed Description and Ordering Information See Catalog Section |                    |            |
|------------------|----------------------|----------|-------------------------------|---------------------|---------------------------------|-----------------------------------------------------------------------|--------------------|------------|
|                  |                      |          |                               |                     |                                 | Recloser                                                              | Electronic Control | Mountings  |
| 2.4 thru 14.4 kV |                      |          |                               |                     |                                 |                                                                       |                    |            |
| SPEAR15-8        | 2.44-14.4            | 110*     | 400                           | Vacuum              | 8000                            | CA280001EN                                                            | CA280001EN         | S280-101-1 |
| SPEAR15-12       |                      |          | 630                           |                     | 12500                           |                                                                       |                    |            |
| SPEAR15-12       |                      |          | 800                           |                     | 12500                           |                                                                       |                    |            |
| 24.9 kV          |                      |          |                               |                     |                                 |                                                                       |                    |            |
| SPEAR27-8        | 24.9                 | 125**    | 400                           | Vacuum              | 8000                            | CA280001EN                                                            | CA280001EN         | S280-101-1 |
| SPEAR27-12       |                      |          | 630                           |                     | 12500                           |                                                                       |                    |            |
| SPEAR27-12       |                      |          | 800                           |                     | 12500                           |                                                                       |                    |            |
| 34.5 kV          |                      |          |                               |                     |                                 |                                                                       |                    |            |
| SPEAR38-8        | 34.5                 | 170      | 400                           | Vacuum              | 8000                            | CA280001EN                                                            | CA280001EN         | S280-101-1 |
| SPEAR38-12       |                      |          | 630                           |                     | 12500                           |                                                                       |                    |            |
| SPEAR38-12       |                      |          | 800                           |                     | 12500                           |                                                                       |                    |            |

\* 125 kV BIL accessory option available

\*\* 150 kV BIL accessory option available

Table 4. Three-Phase, Hydraulically Controlled Reclosers

| Recloser Type | Nominal Voltage (kV) | BIL (kV) | Max. Cont. Current Rating (A) | Interrupting Medium | Trip-Coil Rating (cont. A) | Min. Trip Rating (A) | Interrupting Rating (rms sym A) |         |         | For Detailed Description and Ordering Information See Catalog Section |                          |
|---------------|----------------------|----------|-------------------------------|---------------------|----------------------------|----------------------|---------------------------------|---------|---------|-----------------------------------------------------------------------|--------------------------|
|               |                      |          |                               |                     |                            |                      | 4.8 kV                          | 8.32 kV | 14.4 kV | Recloser                                                              | Mountings                |
| 6H*           | 2.4-14.4             | 110      | 100                           | Oil                 | 5                          | 10                   | 200                             | 200     | 200     | CA280004EN                                                            | MN280044EN               |
|               |                      |          |                               |                     | 10                         | 20                   | 400                             | 400     | 400     |                                                                       |                          |
|               |                      |          |                               |                     | 15                         | 30                   | 600                             | 600     | 600     |                                                                       |                          |
|               |                      |          |                               |                     | 25                         | 50                   | 1000                            | 1000    | 1000    |                                                                       |                          |
|               |                      |          |                               |                     | 35                         | 70                   | 1400                            | 1400    | 1400    |                                                                       |                          |
|               |                      |          |                               |                     | 50                         | 100                  | 2000                            | 2000    | 2000    |                                                                       |                          |
|               |                      |          |                               |                     | 70                         | 140                  | 2800                            | 2500    | 2000    |                                                                       |                          |
|               |                      |          |                               |                     | 100                        | 200                  | 3000                            | 2500    | 2000    |                                                                       |                          |
| V6H*          | 2.4-14.4             | 110      | 200                           | Vacuum              | 5                          | 10                   | 200                             | 200     | 200     | CA280004EN                                                            | S280-85-11               |
|               |                      |          |                               |                     | 10                         | 20                   | 400                             | 400     | 400     |                                                                       |                          |
|               |                      |          |                               |                     | 15                         | 30                   | 600                             | 600     | 600     |                                                                       |                          |
|               |                      |          |                               |                     | 25                         | 50                   | 1000                            | 1000    | 1000    |                                                                       |                          |
|               |                      |          |                               |                     | 35                         | 70                   | 1400                            | 1400    | 1400    |                                                                       |                          |
|               |                      |          |                               |                     | 50                         | 100                  | 2000                            | 2000    | 2000    |                                                                       |                          |
|               |                      |          |                               |                     | 70                         | 140                  | 2800                            | 2500    | 2000    |                                                                       |                          |
|               |                      |          |                               |                     | 100                        | 200                  | 3000                            | 2500    | 2000    |                                                                       |                          |
| W             | 2.4-14.4             | 110      | 560                           | Oil                 | 140                        | 280                  | 3000                            | 2500    | 2000    | CA280005EN                                                            | MN280044EN<br>MN280039EN |
|               |                      |          |                               |                     | 200                        | 400                  | 3000                            | 2500    | 2000    |                                                                       |                          |
|               |                      |          |                               |                     | 5                          | 10                   | 300                             | 300     | 300     |                                                                       |                          |
|               |                      |          |                               |                     | 10                         | 20                   | 600                             | 600     | 600     |                                                                       |                          |
|               |                      |          |                               |                     | 15                         | 30                   | 900                             | 900     | 900     |                                                                       |                          |
|               |                      |          |                               |                     | 25                         | 50                   | 1500                            | 1500    | 1500    |                                                                       |                          |
|               |                      |          |                               |                     | 35                         | 70                   | 2100                            | 2100    | 2100    |                                                                       |                          |
|               |                      |          |                               |                     | 50                         | 100                  | 3000                            | 3000    | 3000    |                                                                       |                          |
|               |                      |          |                               |                     | 70                         | 140                  | 4200                            | 4200    | 4200    |                                                                       |                          |
|               |                      |          |                               |                     | 70X                        | 100**                | 3000                            | 3000    | 3000    |                                                                       |                          |
|               |                      |          |                               |                     | 100                        | 200                  | 6000                            | 6000    | 6000    |                                                                       |                          |
|               |                      |          |                               |                     | 100X                       | 140**                | 4200                            | 4200    | 4200    |                                                                       |                          |
|               |                      |          |                               |                     | 140                        | 280                  | 8400                            | 8400    | 8400    |                                                                       |                          |
|               |                      |          |                               |                     | 140X                       | 200**                | 6000                            | 6000    | 6000    |                                                                       |                          |
|               |                      |          |                               |                     | 160                        | 320                  | 9600                            | 9600    | 9600    |                                                                       |                          |
|               |                      |          |                               |                     | 160X                       | 225**                | 6750                            | 6750    | 6750    |                                                                       |                          |
|               |                      |          |                               |                     | 185                        | 370                  | 11100                           | 10000   | 10000   |                                                                       |                          |
|               |                      |          |                               |                     | 185X                       | 260**                | 7800                            | 7800    | 7800    |                                                                       |                          |
|               |                      |          |                               |                     | 200                        | 400                  | 12000                           | 10000   | 10000   |                                                                       |                          |
|               |                      |          |                               |                     | 225                        | 450                  | 12000                           | 10000   | 10000   |                                                                       |                          |
|               |                      |          |                               |                     | 225X                       | 315**                | 9450                            | 9450    | 9450    |                                                                       |                          |
|               |                      |          |                               |                     | 280                        | 560                  | 12000                           | 10000   | 10000   |                                                                       |                          |
|               |                      |          |                               |                     | 280X                       | 400**                | 12000                           | 10000   | 10000   |                                                                       |                          |
|               |                      |          |                               |                     | 400                        | 800                  | 12000                           | 10000   | 10000   |                                                                       |                          |
|               |                      |          |                               |                     | 400X                       | 560**                | 12000                           | 10000   | 10000   |                                                                       |                          |
|               |                      |          |                               |                     | 560                        | 1120                 | 12000                           | 10000   | 10000   |                                                                       |                          |
|               |                      |          |                               |                     | 560X                       | 750**                | 12000                           | 10000   | 10000   |                                                                       |                          |

\* Phases trip individually on overcurrent, but trip and lock out all three phases at the final step in sequence.  
Other reclosers operate all three phases simultaneously under all conditions.

\*\* Trip rating is 140% of X coil ratings, all others are 200%.

Table 4. Three-Phase, Hydraulically Controlled Reclosers (continued)

| Recloser Type | Nominal Voltage (kV) | BIL (kV) | Max. Cont. Current Rating (A) | Interrupting Medium | Trip-Coil Rating (cont. A) | Min. Trip Rating (A) | Interrupting Rating (rms sym A) | For Detailed Description and Ordering Information See Catalog Section |                          |
|---------------|----------------------|----------|-------------------------------|---------------------|----------------------------|----------------------|---------------------------------|-----------------------------------------------------------------------|--------------------------|
|               |                      |          |                               |                     |                            |                      |                                 | Recloser                                                              | Mountings                |
| VW            | 2.4-14.4             | 110      | 560                           | Vacuum              |                            |                      | 14.4 kV                         | CA280005EN                                                            | MN280044EN<br>MN280039EN |
|               |                      |          |                               |                     | 5                          | 10                   | 300                             |                                                                       |                          |
|               |                      |          |                               |                     | 10                         | 20                   | 600                             |                                                                       |                          |
|               |                      |          |                               |                     | 15                         | 30                   | 900                             |                                                                       |                          |
|               |                      |          |                               |                     | 25                         | 50                   | 1500                            |                                                                       |                          |
|               |                      |          |                               |                     | 35                         | 70                   | 2100                            |                                                                       |                          |
|               |                      |          |                               |                     | 50                         | 100                  | 3000                            |                                                                       |                          |
|               |                      |          |                               |                     | 70                         | 140                  | 4200                            |                                                                       |                          |
|               |                      |          |                               |                     | 70X                        | 100**                | 3000                            |                                                                       |                          |
|               |                      |          |                               |                     | 100                        | 200                  | 6000                            |                                                                       |                          |
|               |                      |          |                               |                     | 100X                       | 140**                | 4200                            |                                                                       |                          |
|               |                      |          |                               |                     | 140                        | 280                  | 8400                            |                                                                       |                          |
|               |                      |          |                               |                     | 140X                       | 200**                | 6000                            |                                                                       |                          |
|               |                      |          |                               |                     | 160                        | 320                  | 9600                            |                                                                       |                          |
|               |                      |          |                               |                     | 160X                       | 225**                | 6750                            |                                                                       |                          |
|               |                      |          |                               |                     | 185                        | 370                  | 11100                           |                                                                       |                          |
|               |                      |          |                               |                     | 185X                       | 260**                | 7800                            |                                                                       |                          |
|               |                      |          |                               |                     | 200                        | 400                  | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 225                        | 450                  | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 225X                       | 315**                | 9450                            |                                                                       |                          |
|               |                      |          |                               |                     | 280                        | 560                  | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 280X                       | 400**                | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 400                        | 800                  | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 400X                       | 560**                | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 560                        | 1120                 | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 560X                       | 750**                | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     |                            |                      | 24.9 kV                         |                                                                       |                          |
| VW27          | 24.9                 | 150      | 560                           | Oil                 | 5                          | 10                   | 300                             | CA280005EN                                                            | MN280044EN<br>MN280039EN |
|               |                      |          |                               |                     | 10                         | 20                   | 600                             |                                                                       |                          |
|               |                      |          |                               |                     | 15                         | 30                   | 900                             |                                                                       |                          |
|               |                      |          |                               |                     | 25                         | 50                   | 1500                            |                                                                       |                          |
|               |                      |          |                               |                     | 35                         | 70                   | 2100                            |                                                                       |                          |
|               |                      |          |                               |                     | 50                         | 100                  | 3000                            |                                                                       |                          |
|               |                      |          |                               |                     | 70                         | 140                  | 4200                            |                                                                       |                          |
|               |                      |          |                               |                     | 70X                        | 100**                | 3000                            |                                                                       |                          |
|               |                      |          |                               |                     | 100                        | 200                  | 6000                            |                                                                       |                          |
|               |                      |          |                               |                     | 100X                       | 140**                | 4200                            |                                                                       |                          |
|               |                      |          |                               |                     | 140                        | 280                  | 8000                            |                                                                       |                          |
|               |                      |          |                               |                     | 140X                       | 200**                | 6000                            |                                                                       |                          |
|               |                      |          |                               |                     | 160                        | 320                  | 8000                            |                                                                       |                          |
|               |                      |          |                               |                     | 160X                       | 225**                | 6750                            |                                                                       |                          |
|               |                      |          |                               |                     | 185                        | 370                  | 8000                            |                                                                       |                          |
|               |                      |          |                               |                     | 185X                       | 260**                | 7800                            |                                                                       |                          |
|               |                      |          |                               |                     | 225                        | 450                  | 8000                            |                                                                       |                          |
|               |                      |          |                               |                     | 225X                       | 315**                | 8000                            |                                                                       |                          |
|               |                      |          |                               |                     | 280                        | 560                  | 8000                            |                                                                       |                          |
|               |                      |          |                               |                     | 280X                       | 400**                | 8000                            |                                                                       |                          |
|               |                      |          |                               |                     | 400                        | 800                  | 8000                            |                                                                       |                          |
|               |                      |          |                               |                     | 400X                       | 560**                | 8000                            |                                                                       |                          |
|               |                      |          |                               |                     | 560                        | 1120                 | 8000                            |                                                                       |                          |
|               |                      |          |                               |                     | 560X                       | 750**                | 8000                            |                                                                       |                          |

\* Phases trip individually on overcurrent, but trip and lock out all three phases at the final step in sequence. Other reclosers operate all three phases simultaneously under all conditions.

\*\* Trip rating is 140% of X coil ratings, all others are 200%.

Table 4. Three-Phase, Hydraulically Controlled Reclosers (continued)

| Recloser Type | Nominal Voltage (kV) | BIL (kV) | Max. Cont. Current Rating (A) | Interrupting Medium | Trip-Coil Rating (cont. A) | Min. Trip Rating (A) | Interrupting Rating (rms sym A) | For Detailed Description and Ordering Information See Catalog Section |                          |
|---------------|----------------------|----------|-------------------------------|---------------------|----------------------------|----------------------|---------------------------------|-----------------------------------------------------------------------|--------------------------|
|               |                      |          |                               |                     |                            |                      |                                 | Recloser                                                              | Mountings                |
|               |                      |          |                               |                     |                            |                      |                                 | 24.9 kV                                                               |                          |
| VWV27         | 24.9                 | 125      | 560                           | Vacuum              | 5                          | 10                   | 300                             | CA280005EN                                                            | MN280044EN<br>MN280039EN |
|               |                      |          |                               |                     | 10                         | 20                   | 600                             |                                                                       |                          |
|               |                      |          |                               |                     | 15                         | 30                   | 900                             |                                                                       |                          |
|               |                      |          |                               |                     | 25                         | 50                   | 1500                            |                                                                       |                          |
|               |                      |          |                               |                     | 35                         | 70                   | 2100                            |                                                                       |                          |
|               |                      |          |                               |                     | 50                         | 100                  | 3000                            |                                                                       |                          |
|               |                      |          |                               |                     | 70                         | 140                  | 4200                            |                                                                       |                          |
|               |                      |          |                               |                     | 70X                        | 100**                | 3000                            |                                                                       |                          |
|               |                      |          |                               |                     | 100                        | 200                  | 6000                            |                                                                       |                          |
|               |                      |          |                               |                     | 100X                       | 140**                | 4200                            |                                                                       |                          |
|               |                      |          |                               |                     | 140                        | 280                  | 8400                            |                                                                       |                          |
|               |                      |          |                               |                     | 140X                       | 200**                | 6000                            |                                                                       |                          |
|               |                      |          |                               |                     | 160                        | 320                  | 9600                            |                                                                       |                          |
|               |                      |          |                               |                     | 160X                       | 225**                | 6750                            |                                                                       |                          |
|               |                      |          |                               |                     | 185                        | 370                  | 11100                           |                                                                       |                          |
|               |                      |          |                               |                     | 185X                       | 260**                | 7800                            |                                                                       |                          |
|               |                      |          |                               |                     | 200                        | 400                  | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 225                        | 450                  | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 225X                       | 315**                | 9450                            |                                                                       |                          |
|               |                      |          |                               |                     | 280                        | 560                  | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 280X                       | 400**                | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 400                        | 800                  | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 400X                       | 560**                | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 560                        | 1120                 | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 560X                       | 750**                | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     |                            |                      |                                 | 34.5 kV                                                               |                          |
| VWV38X        | 34.5                 | 150      | 560                           | Vacuum              | 5                          | 10                   | 300                             | CA280005EN                                                            | MN280044EN<br>MN280039EN |
|               |                      |          |                               |                     | 10                         | 20                   | 600                             |                                                                       |                          |
|               |                      |          |                               |                     | 15                         | 30                   | 900                             |                                                                       |                          |
|               |                      |          |                               |                     | 25                         | 50                   | 1500                            |                                                                       |                          |
|               |                      |          |                               |                     | 35                         | 70                   | 2100                            |                                                                       |                          |
|               |                      |          |                               |                     | 50                         | 100                  | 3000                            |                                                                       |                          |
|               |                      |          |                               |                     | 70                         | 140                  | 4200                            |                                                                       |                          |
|               |                      |          |                               |                     | 70X                        | 100**                | 3000                            |                                                                       |                          |
|               |                      |          |                               |                     | 100                        | 200                  | 6000                            |                                                                       |                          |
|               |                      |          |                               |                     | 100X                       | 140**                | 4200                            |                                                                       |                          |
|               |                      |          |                               |                     | 140                        | 280                  | 8400                            |                                                                       |                          |
|               |                      |          |                               |                     | 140X                       | 200**                | 6000                            |                                                                       |                          |
|               |                      |          |                               |                     | 160                        | 320                  | 9600                            |                                                                       |                          |
|               |                      |          |                               |                     | 160X                       | 225**                | 6750                            |                                                                       |                          |
|               |                      |          |                               |                     | 185                        | 370                  | 11100                           |                                                                       |                          |
|               |                      |          |                               |                     | 185X                       | 260**                | 7800                            |                                                                       |                          |
|               |                      |          |                               |                     | 200                        | 400                  | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 225                        | 450                  | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 225X                       | 315**                | 9450                            |                                                                       |                          |
|               |                      |          |                               |                     | 280                        | 560                  | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 280X                       | 400**                | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 400                        | 800                  | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 400X                       | 560**                | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 560                        | 1120                 | 12000                           |                                                                       |                          |
|               |                      |          |                               |                     | 560X                       | 750**                | 12000                           |                                                                       |                          |

\* Phases trip individually on overcurrent, but trip and lock out all three phases at the final step in sequence.  
Other reclosers operate all three phases simultaneously under all conditions.

\*\* Trip rating is 140% of X coil ratings, all others are 200%.

Table 4. Three-Phase, Hydraulically Controlled Reclosers (continued)

| Recloser Type | Nominal Voltage (kV) | BIL (kV) | Max. Cont. Current Rating (A) | Interrupting Medium | Trip-Coil Rating (cont. A) | Min. Trip Rating (A) | Interrupting Rating (rms sym A) | For Detailed Description and Ordering Information See Catalog Section |                          |
|---------------|----------------------|----------|-------------------------------|---------------------|----------------------------|----------------------|---------------------------------|-----------------------------------------------------------------------|--------------------------|
|               |                      |          |                               |                     |                            |                      |                                 | Recloser                                                              | Mountings                |
|               |                      |          |                               |                     |                            |                      | 34.5 kV                         |                                                                       |                          |
| VWV38X        | 34.5                 | 170      | 560                           | Oil                 | 5                          | 10                   | 300                             | CA280005EN                                                            | MN280044EN<br>MN280039EN |
|               |                      |          |                               |                     | 10                         | 20                   | 600                             |                                                                       |                          |
|               |                      |          |                               |                     | 15                         | 30                   | 900                             |                                                                       |                          |
|               |                      |          |                               |                     | 25                         | 50                   | 1500                            |                                                                       |                          |
|               |                      |          |                               |                     | 35                         | 70                   | 2100                            |                                                                       |                          |
|               |                      |          |                               |                     | 50                         | 100                  | 3000                            |                                                                       |                          |
|               |                      |          |                               |                     | 70                         | 140                  | 4200                            |                                                                       |                          |
|               |                      |          |                               |                     | 70X                        | 100**                | 3000                            |                                                                       |                          |
|               |                      |          |                               |                     | 100                        | 200                  | 6000                            |                                                                       |                          |
|               |                      |          |                               |                     | 100X                       | 140**                | 4200                            |                                                                       |                          |
|               |                      |          |                               |                     | 140                        | 280                  | 8400                            |                                                                       |                          |
|               |                      |          |                               |                     | 140X                       | 200**                | 6000                            |                                                                       |                          |
|               |                      |          |                               |                     | 160                        | 320                  | 8000                            |                                                                       |                          |
|               |                      |          |                               |                     | 160X                       | 225**                | 6750                            |                                                                       |                          |
|               |                      |          |                               |                     | 185                        | 370                  | 8000                            |                                                                       |                          |
|               |                      |          |                               |                     | 185X                       | 260**                | 7800                            |                                                                       |                          |
|               |                      |          |                               |                     | 225                        | 450                  | 8000                            |                                                                       |                          |
|               |                      |          |                               |                     | 225X                       | 315**                | 8000                            |                                                                       |                          |
|               |                      |          |                               |                     | 280                        | 560                  | 8000                            |                                                                       |                          |
|               |                      |          |                               |                     | 280X                       | 400**                | 8000                            |                                                                       |                          |
|               |                      |          |                               |                     | 400                        | 800                  | 8000                            |                                                                       |                          |
|               |                      |          |                               |                     | 400X                       | 560**                | 8000                            |                                                                       |                          |
|               |                      |          |                               |                     | 560                        | 1120                 | 8000                            |                                                                       |                          |
|               |                      |          |                               |                     | 560X                       | 750**                | 8000                            |                                                                       |                          |

\* Phases trip individually on overcurrent, but trip and lock out all three phases at the final step in sequence.  
Other reclosers operate all three phases simultaneously under all conditions.

\*\* Trip rating is 140% of X coil ratings, all others are 200%.

Table 5. Three-Phase, Electronically Controlled Reclosers

| Recloser Type | Nominal Voltage (kV) | BIL (kV) | Max. Cont. Current Rating (A) | Interrupting Medium | Interrupting Rating (rms sym A) |         |         | For Detailed Description and Ordering Information See Catalog Section |                     |                          |
|---------------|----------------------|----------|-------------------------------|---------------------|---------------------------------|---------|---------|-----------------------------------------------------------------------|---------------------|--------------------------|
|               |                      |          |                               |                     | 4.8 kV                          | 8.32 kV | 14.4 kV | Reclosers                                                             | Electronic Control  | Mountings                |
| WE            | 2.4 - 14.4           | 110      | 560**                         | Oil                 | 12000                           | 10000   | 10000   | 280-40                                                                | Bulletin B280-08010 | MN280044EN<br>MN280039EN |
|               |                      |          |                               |                     | 2.4 thru 14.4 kV                |         |         |                                                                       |                     |                          |
| PWE*          | 2.4 - 14.4           | 95       | 560                           | Vacuum              | 12000                           |         |         | 285-71                                                                | Bulletin B280-08010 | Not Applicable           |
| VWE           | 2.4 - 14.4           | 110      | 560**                         | Vacuum              | 12000                           |         |         | 280-40                                                                | Bulletin B280-08010 | MN280044EN<br>MN280039EN |
| VSA12B        | 2.4 - 14.4           | 110      | 600                           | Vacuum              | 12000                           |         |         | CA280008EN                                                            | Bulletin B280-08010 | CA280008EN               |
| VSA12         | 2.4 - 14.4           | 110      | 800                           | Vacuum              | 12000                           |         |         | CA280008EN                                                            | Bulletin B280-08010 | CA280008EN               |
| VSA16         | 2.4 - 14.4           | 110      | 800                           | Vacuum              | 16000                           |         |         | CA280008EN                                                            | Bulletin B280-08010 | CA280008EN               |
| VSA20         | 2.4 - 14.4           | 110      | 800                           | Vacuum              | 20000                           |         |         | CA280008EN                                                            | Bulletin B280-08010 | CA280008EN               |
| VSA20A        | 2.4 - 14.4           | 110      | 1200                          | Vacuum              | 20000                           |         |         | CA280008EN                                                            | Bulletin B280-08010 | CA280008EN               |
| NOVA-TS-15-8  | 2.4 - 14.4           | 110      | 400                           | Vacuum              | 8000                            |         |         | S280-42-2                                                             | Bulletin B280-08012 | S280-42-2                |
| NOVA15        | 2.4 - 14.4           | 110      | 630**                         | Vacuum              | 12500***                        |         |         | CA280003EN                                                            | Bulletin B280-08010 | MN280042EN<br>MN280043EN |
| NOVA-TS-15-12 | 2.4 - 14.4           | 110      | 630**                         | Vacuum              | 12500***                        |         |         | S280-42-2                                                             | Bulletin B280-08012 | S280-42-2                |
| NOVA STS-15   | 2.4 - 14.4           | 110      | 630**                         | Vacuum              | 12500***                        |         |         | S280-44-1                                                             | Bulletin B280-08012 | S280-44-1                |
|               |                      |          |                               |                     | 24.9 kV                         |         |         |                                                                       |                     |                          |
| NOVA-TS-27-8  | 24.9                 | 125      | 400                           | Vacuum              | 8000                            |         |         | S280-42-2                                                             | Bulletin B280-08012 | S280-42-2                |
| NOVA 27       | 24.9                 | 125      | 630**                         | Vacuum              | 12500***                        |         |         | CA280003EN                                                            | Bulletin B280-08010 | MN280042EN<br>MN280043EN |
| PWVE*         | 24.9                 | 125      | 560                           | Vacuum              | 12000                           |         |         | 285-71                                                                | Bulletin B280-08010 | Not Applicable           |
| WVE27         | 24.9                 | 150      | 560**                         | Oil                 | 8000                            |         |         | 280-40                                                                | Bulletin B280-08010 | MN280044EN<br>MN280039EN |
| VWVE27        | 24.9                 | 125      | 560**                         | Vacuum              | 12000                           |         |         | 280-40                                                                | Bulletin B280-08010 | MN280044EN<br>MN280039EN |
| NOVA-TS-27-12 | 24.9                 | 125      | 630**                         | Vacuum              | 12500***                        |         |         | S280-42-2                                                             | Bulletin B280-08012 | S280-42-2                |
| NOVA STS-27   | 24.9                 | 125      | 630**                         | Vacuum              | 12500***                        |         |         | S280-44-1                                                             | Bulletin B280-08012 | S280-44-1                |
|               |                      |          |                               |                     | 34.5 kV                         |         |         |                                                                       |                     |                          |
| NOVA-TS-38-8  | 34.5                 | 170      | 400                           | Vacuum              | 8000                            |         |         | S280-42-2                                                             | Bulletin B280-08012 | S280-42-2                |
| WVE38X        | 34.5                 | 170      | 560**                         | Oil                 | 8000                            |         |         | 280-40                                                                | Bulletin B280-08010 | MN280044EN<br>MN280039EN |
| VWVE38X       | 34.5                 | 150      | 560**                         | Vacuum              | 12000                           |         |         | 280-40                                                                | Bulletin B280-08010 | MN280044EN<br>MN280039EN |
| VS012         | 34.5                 | 150      | 560**                         | Vacuum              | 12000                           |         |         | 280-57                                                                | Bulletin B280-08010 | 280-57                   |
| VS016         | 34.5                 | 150      | 560**                         | Vacuum              | 16000                           |         |         | 280-57                                                                | Bulletin B280-08010 | 280-57                   |
| NOVA38        | 34.5                 | 170      | 630**                         | Vacuum              | 12500                           |         |         | CA280003EN                                                            | Bulletin B280-08010 | MN280042EN<br>MN280043EN |
| NOVA-TS-38-12 | 34.5                 | 170      | 630**                         | Vacuum              | 12500                           |         |         | S280-42-2                                                             | Bulletin B280-08012 | S280-42-2                |
| NOVA STS-38   | 34.5                 | 170      | 630**                         | Vacuum              | 12500                           |         |         | S280-44-1                                                             | Bulletin B280-08012 | S280-44-1                |

\* For pad-mounted installation.

\*\* Continuous current rating can be extended to 800 A with an accessory.

\*\*\* 16.0 kA option is also available.