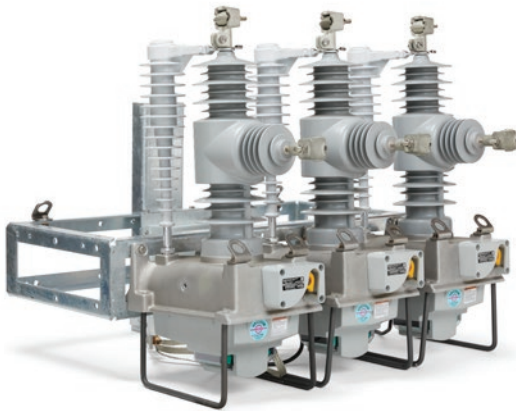


NOVA NX-T Triple-Single microprocessor-controlled recloser



Description

Eaton provides reliable, economical overcurrent protection, advanced metering, and automation systems for distribution circuits rated through 34.5 kV with its Cooper Power™ series NOVA™ NX-T reclosers.

The NOVA NX-T recloser combines solid cycloaliphatic-epoxy polymer-encapsulated vacuum interrupters with a reliable, lightweight operating mechanism that utilizes a magnetic actuator to provide a lifetime of trouble-free operation. The solid polymer system does not rely on a gaseous, liquid, or foam dielectric. The NOVA NX-T recloser is highly resistant to ozone, oxygen, moisture, contamination, and ultraviolet light.

The NOVA NX-T recloser is a control-powered interface design. Designed and tested to be compatible with Eaton's Cooper Power Form 7 recloser control, these automatic circuit reclosers offer superior coordination, protection, and application capabilities.

Recloser operations are programmed in the electronic control with accurate characteristics and a host of advanced features. Precise operating tolerances enable close coordination with other protective devices on the system. When system requirements change, program settings are easily altered with no sacrifice of accuracy or consistency.

Compact and lightweight, NOVA NX-T reclosers are easily installed on poles or in substations. Mounting equipment is available for both pole and substation applications.

Recloser and control accessories enable further tailoring of the protective program to achieve maximum system operating flexibility.

Eaton is strongly committed to improving the reliability of the electric power industry. Technological advances, including the new integrated resistive load side voltage sensor, new twist-lock cable connector system, and Form 7 control platform represent our investment in the future.

The NOVA NX-T recloser is not only a technological breakthrough, but a valuable protection system asset that brings significant operational savings to the utility business unit, lowering the installation, operation, training, and maintenance costs on your power distribution system.

When needed, application expertise, backed by world-wide systems engineering knowledge and experience, is available. Customer-focused design capability, based on more than 70 years of recloser experience, has made Eaton the industry leader.

NOVA NX-T reclosers are designed and manufactured in accordance with the latest IEEE Standard C37.60™.

EATON

Powering Business Worldwide

NOVA NX-T Recloser

Ordering information

To order a basic NOVA NX-T Recloser:

- From Table 1, construct a catalog number that describes the required recloser.
- From Table 2 thru Table 5, select the desired accessories.

Table 1. Base NOVA NX-T recloser configuration

Description	Catalog number								
Basic letters for a NOVA NX-T Recloser	KNXT								
Specify recloser voltage rating (Replace "XX")	KNXT	XX							
15 = For 15 kV									
27 = For 27 kV									
38 = For 38 kV									
Specify interrupting current (Replace "XX")	KNXT	XX							
12 = For 12.5 kA interrupting									
16 = For 16 kA interrupting (for 15 or 27 kV only)									
Specify continuous current (Replace "X")	KNXT		X						
6 = For 630 A continuous current									
8 = For 800 A continuous current									
Specify rated impulse voltage (BIL) (Replace "X")	KNXT			X					
S = BIL: 110 kV for 15 kV rated system 125 kV for 27 kV rated system 170 kV for 38 kV rated system									
C = Extra creepage: 125 kV BIL (extra creepage) for use with 15 kV system 150 kV BIL (extra creepage) for use with 27 kV system									
Specify terminals required (Replace "X")	KNXT				X				
1 = Eyebolt terminals; 1/0 - 500 MCM for use with 630 A continuous current*									
2 = Eyebolt terminals; 4/0 - 1000 MCM for use with 800 A continuous current**									
3 = Two-hole flat pad terminals*									
4 = Four-hole flat pad terminals									
Specify language (Replace "XX")	KNXT					XX			
EN = English									
XX = Other language required (contact factory)									
Specify voltage sensing required (Replace "X")	KNXT						X		
0 = None; no voltage sensing required									
1 = Internal voltage sensing (source-side) only									
2 = Internal voltage sensing and load-side sensors for sensing on both load and source; load-side sensor located to left of ECAP.									
Specify housing option	KNXT							0	
0 = Standard; grey thermoset polymer housing									
Specify auxiliary switch requirement (Replace "X")	KNXT								X
N = None (standard) - no auxiliary switch required									
A = Auxiliary switch, one 52a/52b contact per phase Refer to Table 2 to specify auxiliary switch cable.									
Specify contact position indicators	KNXT								N
N = Standard indicators; closed on red, open on green									

* For use with 630 A continuous current.

** For use with 800 A continuous current.

Table 1. Base NOVA NX-T recloser (continued)

Description	Catalog number								
Specify mounting style (Replace "X")	KNXT								X
1 = In-line, parallel (Figure 1); front-mounted, all ECAPs parallel. Includes junction box.									
2 = In-line, perpendicular (Figure 2); front-mounted, ECAPs of outside phases rotated 90 degrees outward. Includes junction box. †*									
3 = Tri-mount, parallel (Figure 3); outer phases side-mounted, all ECAPs parallel. Includes junction box. †*									
4 = Tri-mount, perpendicular (Figure 4); outer phases side-mounted, standard ECAP rotation. Includes junction box.									
5 = Substation mounting frame, upright (Figure 5). All phases front mounted with ECAPs parallel. Includes junction box with junction box cables.									
6 = Substation mounting frame, 45 degree mounting (Figure 6). All phases 45 degree mounted with ECAPs parallel. Includes junction box with junction box cables.									
7 = Single-phase adapter mounting frame, upright (Figure 7). All phases front mounted with ECAPs parallel. Includes junction box. Junction box cables ordered separately (Table 5).									
8 = Single-phase adapter mounting frame, 45 degree mounting (Figure 8). All phases front mounted with ECAPs parallel. Includes junction box. Junction box cables ordered separately (Table 5).									
A = Phase over phase mounting system (Figure 9 & Figure 10). Three (3) reclosers with all phases front mounted with ECAPs rotated 90 degrees clockwise (left). Includes provisions for arrester mounting. Includes junction box. Junction box cables ordered separately (Table 5). †‡									
B = Phase over phase mounting system (Figure 9 & Figure 11). Three (3) reclosers with all phases front mounted with ECAPs rotated 90 degrees counter clockwise (right). Includes provisions for arrester mounting. Includes junction box. Junction box cables ordered separately (Table 5). †‡									

† Not applicable to the 38kV NOVA NX-T recloser.

‡ Not applicable to the 27kV NOVA NX-T recloser with 150kV B.I.L (extra creepage).

* Contact factory if this mounting style is required for additional configuration details.

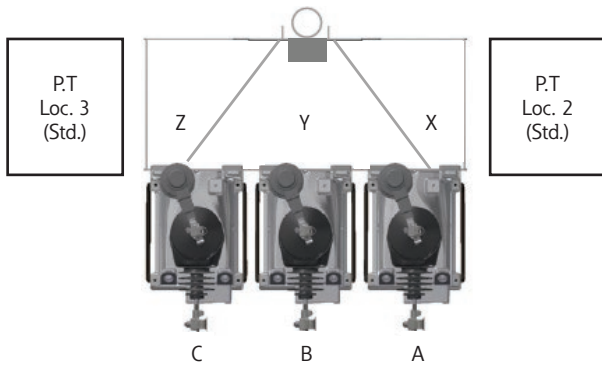


Figure 1: In-line, parallel frame

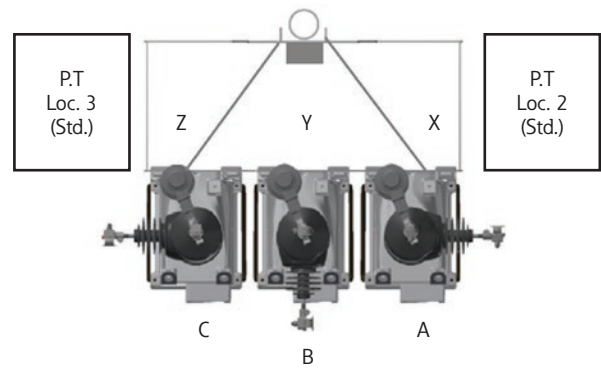


Figure 2: In-line, perpendicular frame

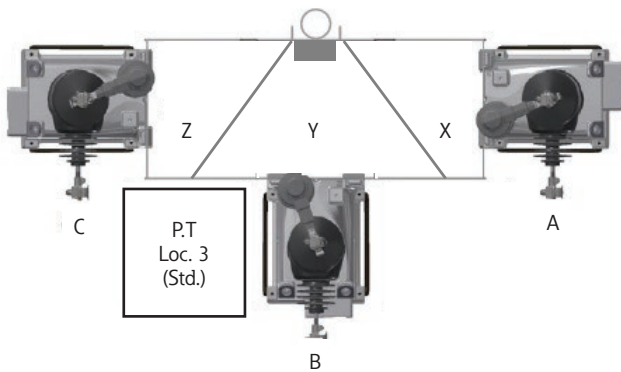


Figure 3: Tri-mount, parallel frame

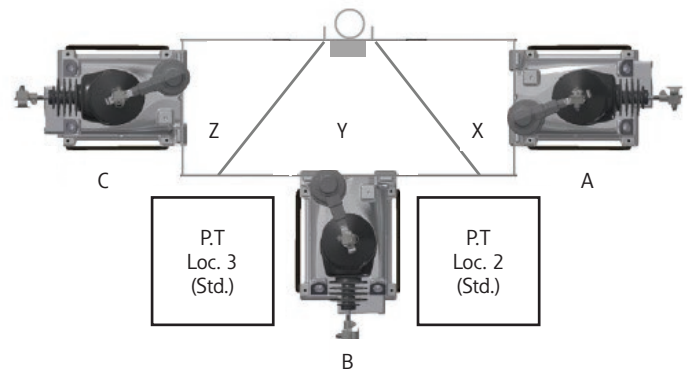


Figure 4: Tri-mount, perpendicular frame

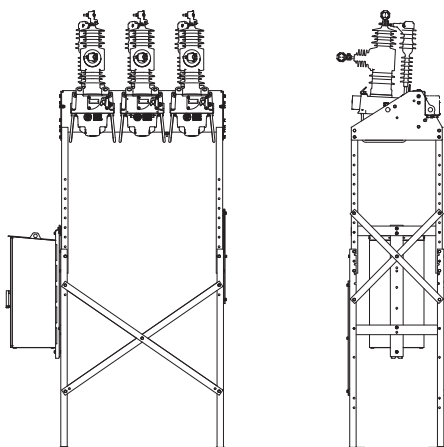


Figure 5. Substation frame, upright mount

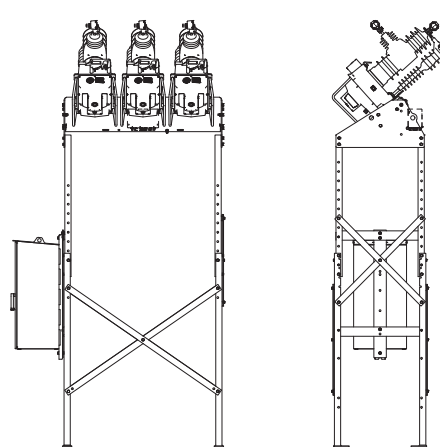


Figure 6. Substation frame, 45 degree mount



Figure 7. Single-phase adapter (individual mount only), upright



Figure 8. Single-phase adapter (individual mount only), 45 degree mount

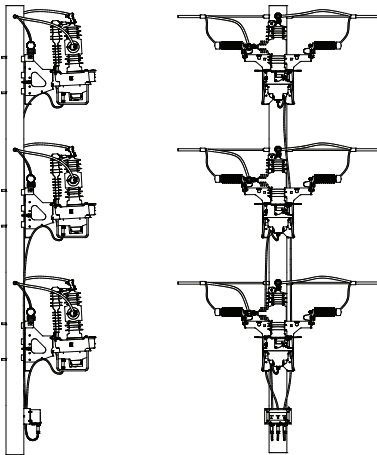


Figure 9. Phase over phase system (Select from Frame option A or B below)

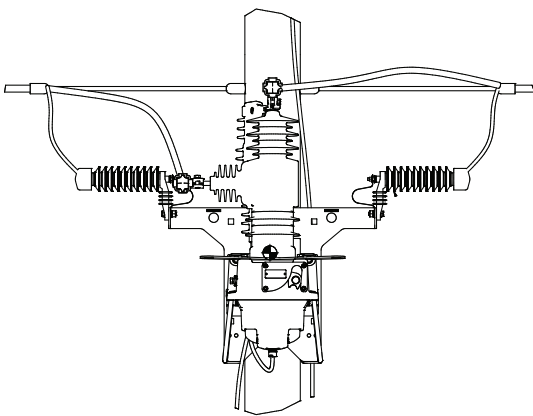


Figure 10. Phase over phase mounting (Frame option A)

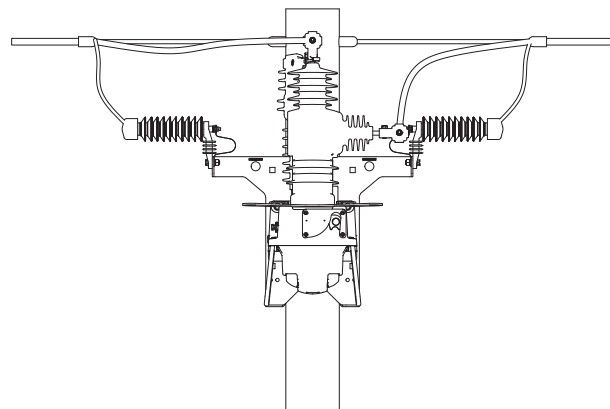


Figure 11. Phase over phase mounting (Frame option B)

Accessories

Table 2. Auxiliary switch cable*

Description	Catalog number
Auxiliary switch cable, 12/c, 16 AWG with (1) 14-pin female connector. Select from 5 - 95 feet. Connects from the auxiliary switch receptacle located within the integrated junction box to customer termination.	
Female 14-pin connector only; customer to supply cable	KA66ME-0
Length adder	KA66ME-X

* Auxiliary switch cable or connector only must be specified when the Auxiliary Switch accessory is ordered.

Table 3. Environmental protection

Description	Catalog number
Terminal shields for enhanced environmental protection	
For use with 630 A eyebolt, or two-hole flat pads	
For use without load-side sensing	KNXT74A
For use with load-side sensing	KNXT74B
For use with 800 A eyebolt, four-hole flat pad terminals, with or without load-side sensing	KNXT87A
Wildlife protection (bird guards)	
For use without load-side sensing	KAMB27B
For use with load-side sensing	KAMB27A

Table 4. Mounting accessories (pole mount application)

Description	Catalog number
Adapter for concrete pole mounting	KNXT28A
Arrester mounting options	
Source (front) arrester mounting for three (3) arresters	
Packed as a kit with the system	PK-KNX29A
Factory-assembled onto the frame	FA-KNX29A
Source (front) and load (rear) arrester mounting for six (6) arresters	
Packed as a kit with the system	PK-KNX29C
Factory-assembled onto the frame	FA-KNX29C
Power transformer (P.T.) mounting bracket options*	
For oil type P.T.s	
Mounting bracket for one (1) P.T.	
Packed as a kit with the system	PK-KNX26A
Factory-assembled onto the frame	FA-KNX26A
Mounting brackets for two (2) P.T.s	
Packed as a kit with the system	PK-KNX26B
Factory-assembled onto the frame	FA-KNX26B
For solid/dry type P.T.s	
Mounting bracket for one (1) P.T.	
Packed as a kit with the system	PK-KNX26D
Factory-assembled onto the frame	FA-KNX26D
Mounting brackets for two (2) P.T.s	
Packed as a kit with the system	PK-KNX26E
Factory-assembled onto the frame	FA-KNX26E

* Locations 2 and 3 are standard P.T. mounting locations. Contact factory if other locations are required.

P.T.s and Arresters (pole or substation applications) can be included; contact factory.

Full site-ready assembly and wiring is available; contact factory for details.

Table 5. Junction box cable*

Description	Catalog number
Specify the 3 recloser to junction box cables and lengths desired:	
Note: The overall combined length of the longest junction box cable and mating control cable should not exceed 95 feet.	
Junction box cable 1: Basic cable, no length:	KA167ME
Length adder: select from 5 to 25 feet. Replace "X" with desired length.	KA167ME-X
Junction box cable 2: Basic cable, no length:	KA167ME
Length adder: select from 5 to 25 feet. Replace "X" with desired length.	KA167ME-X
Junction box cable 3: Basic cable, no length:	KA167ME
Length adder: select from 5 to 25 feet. Replace "X" with desired length.	KA167ME-X

* Selectable junction box cable lengths applicable for substation single-phase adapter applications or phase over phase systems.

Note: For phase over phase applications, default junction box cables shall be 16, 11, and 6 feet in length, top to bottom, respectively, with the junction box mounted 16 inches below the bottom phase. Lengths are based upon 5 foot phase spacing and all components mounted to the same side of the pole.

Ratings and characteristic features

Single and three-phase protection on nominal voltage systems rated 2.4 through 14.4 kV is provided by 15 kV NOVA NX-T reclosers. The 27 kV NOVA NX-T reclosers can be applied on nominal voltage systems rated through 24.9 kV. Higher-voltage system protection at 34.5 kV is provided by 38 kV NOVA NX-T reclosers. A ratings summary for NOVA NX-T reclosers is shown in "Table 6. Voltage Ratings (kV)"; "Table 7. Current Ratings (Amperes)"; and "Table 8. Mechanical Ratings." For ratings and basic application information of other Eaton's Cooper Power series reclosers, refer to *Catalog Data CA280002EN*.

Operation

Sensing current transformers, embedded in the recloser, supply fault-sensing information to the electronic control. Tripping and closing signals from the control energize the operating mechanism in the recloser. Due to a single CT ratio for all ratings, minimum-trip values of the electronic control are independent of the continuous-current and interrupting ratings of the recloser.

Flexibility in coordination with other protective devices is provided by varied time-current characteristics from a choice of standard or customized curves, minimum trip values, reclosing and resetting time settings, and a selection of accessories.

Vacuum interruption

A single break on each phase is accomplished by separating contacts inside the vacuum interrupter. All arcing is contained within the vacuum envelope. The patented axial-magnetic vacuum interrupter, used in NOVA NX-T reclosers, offers extended and increased duty cycles compared with oil or radial-magnetic vacuum interrupters. The axial-magnetic field keeps the arc in a diffused mode, resulting in less arc power to be dissipated and low thermal stress, which is suitable for encapsulation.

Surge protection

The best operating results are achieved if reclosers are protected with surge arresters. On line applications, arrester protection is recommended on both sides of the recloser. (If protection is on one side only, it should be on the source side.) In substations, arresters should be on the load side. Eaton provides excellent protection with its Cooper Power series distribution-class arresters, available with mounting brackets to fit our reclosers (refer to *Catalog Sections CA235005EN* and *CA235011EN*).

Ordering information

To order a NOVA NX-T recloser, refer to pages 2 through 7 to construct the catalog number and additional accessories.

For Form 7 ordering information, refer to catalog and order guide document CA280014EN for further details.



Figure 12. NOVA NX-T recloser in-line parallel site-ready configuration

Features and detailed description

NOVA NX-T microprocessor-controlled, triple-single reclosers protect systems operating through 34.5 kV (refer to **Ratings and Specifications** section of this catalog). These ratings and the wide range of programmable settings provided by Eaton's Cooper Power series Form 7 control satisfy a variety of application requirements.

Recloser operation

Fault currents are sensed by single 1000:1 ratio-sensing current transformers embedded in each recloser (three per system). These CTs provide a continuous measurement of line current, monitored by the electronic control. When current level exceeds the programmed minimum trip level, the magnitude of the overcurrent is integrated with time, using a programmed time-current curve characteristic. The control then signals the trip in the recloser, opening the main contacts of all (or individual) phases.

The control signals tripping and closing. The control always maintains energy for a tripping operation following a closing operation.

The electronic recloser control provides determination of phase- and ground-trip sequences, operations to lockout, and reclosing and resetting timing. Adjustments can be made with the control without de-energizing the recloser.

Construction

Recloser

Designed for long service life and no maintenance, the NOVA NX-T recloser is composed of three individual single-phase tanks built with solid-polymer interrupter modules with embedded current transformers. Anodized aluminum legs, designed to remain installed in service, provide a free-standing recloser even without the mounting frame. The smooth finish of the legs allows the user to easily slide the recloser across surfaces without the risk of damage to paint or sensitive low-hanging components. A cast aluminum head provides structural rigidity for internal components and external mounting while minimizing weight. A lightweight, high-impact, UV-resistant, thermoset polymer lower cover suitable for outdoor environments completes the enclosure.

Cycloaliphatic-epoxy polymer encapsulation provides solid insulation and maintenance-free, environmentally-safe operation. There is no monitoring or maintaining of gas pressure or oil levels; there are no toxic or environmentally unfriendly materials. There are no foam fillers or insulation seals, eliminating potential moisture ingress areas. The NOVA NX-T recloser module exhibits good absorption

of elastic energy and resistance to cracking and crack propagation. Additionally, durable environmental properties make the solid polymer suitable for outdoor applications, including sea coasts, deserts, and areas of high pollution.

Surface tracking

The cycloaliphatic epoxy is highly resistant to contaminants and resists tracking and flashovers under extreme pollution levels to reduce both flashovers and the associated cost of repairs.

Hydrophobicity

The module maintains excellent hydrophobicity, a property characterized by water beading into isolated drops, and is highly resistant to moisture absorption. Hydrophobicity prevents continuous sheets of water from forming leakage current paths that deteriorate the creepage withstand level.

Ultraviolet resistance

The cycloaliphatic epoxy resists ultraviolet radiation damage even in harsh climates, maintaining a smooth, unblemished, self-cleansing surface with low adhesion to contaminants.

Tensile strength

Outstanding tensile and flexural strength characteristics mean the NOVA NX-T recloser modules are tough and non-fragmenting, reducing shipment and handling charges.

Shed design

The shed design utilizes alternate-sized skirts. The major sheds shield and protect the minor sheds to enhance the hydrophobicity and ultraviolet resistance of the module, eliminate formation of microcracks, and ensure extra-protected creepage. Additionally, sharp edges direct water away from the unit. Water paths and ice formations are effectively eliminated.

Flashover recovery

Flashovers occur when an object, usually wildlife, contacts energized parts of the equipment. The NOVA NX-T recloser minimizes the effect of flashovers with remarkable physical resilience, arc-quenching properties, and a self-healing ability. NOVA NX-T reclosers can withstand the enormous forces experienced during faults without wholesale damage, and can re-energize after an external flashover without cleaning.

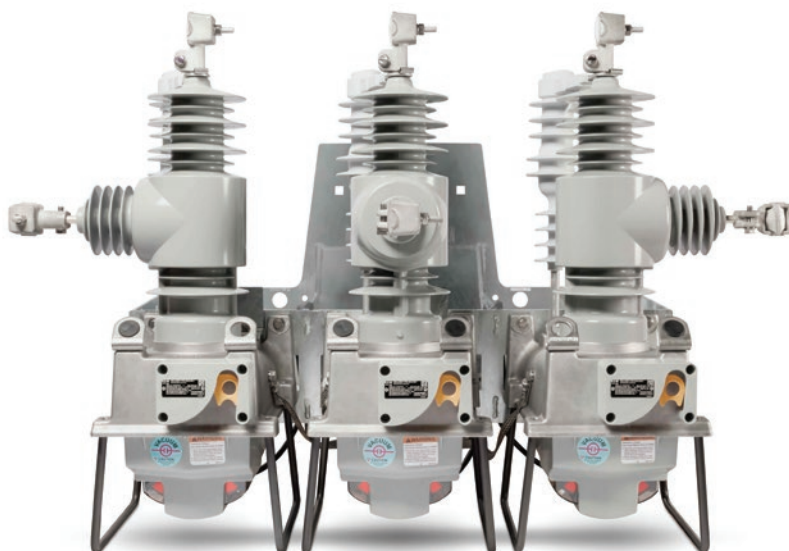


Figure 13. NOVA NX-T in-line perpendicular site-ready configuration

Vacuum interrupters

NOVA NX-T reclosers use vacuum as the interrupting medium. Vacuum interrupters (Figure 14) 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 are several times greater than with interruption in oil, virtually eliminating interrupter maintenance.

Eaton designs its Cooper Power series vacuum interrupters with a metal and ceramic housing for maximum strength and long-term vacuum integrity. Oxygen-free, high-conductivity copper, stainless steel, and a nickel-copper alloy are used in the vacuum interrupters. 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 to helium penetration, maintaining the vacuum level. Additionally, it provides wear resistance, chemical resistance, and a high dielectric strength.

Enclosed in the interrupter are a stationary and a moving contact assembly. The moving contact has a travel of approximately one half inch, its shaft passing through a flexible bellows that maintains vacuum integrity. Contacts consist of a high purity copper sintered with aluminothermic chromium.

Because the smallest amount of internal contamination can significantly shorten the life of a vacuum interrupter, special care is taken to avoid even minute contamination from any source, including dust particles, machining oils, or human body salts. No paraffinic oils are used in the machining process. All machined parts are put through a cleaning/degreasing process, and then all components are electro-polished in a positive-pressure, air-filtered area. A Class 100 clean room facility is used for the final interrupter production. The furnaces employ a custom-designed, three-stage pumping system to yield high levels of vacuum. Every vacuum interrupter is then tested and tracked with individual serial numbers.



Figure 14. Cross-section of a vacuum interrupter used in NOVA NX-T reclosers

Electronic control

NOVA NX-T reclosers are controlled by an Eaton's Cooper Power series Form 7 recloser control.

Control-powered interface

The NOVA NX-T recloser mechanism is fully operational with the Form 7 control equipped with the NX-T recloser interface circuit, and a fully shielded 37-pin twist-lock control cable. The Form 7 control provides the necessary power for tripping and closing the NOVA NX-T recloser. The recloser is not compatible with other controls that do not utilize the 37-pin control cable connection system.

The control-powered interface includes a 37-pin receptacle on the bottom of the pole-mount frame integrated junction box. Each of the three recloser cables connects to this junction box through a four-foot-long cable, terminated at an 18-pin twist-lock connector. The recloser end of this cable enters the recloser through a non-removable strain relief system designed to increase reliability and eliminate the need for a separate inventory of recloser cables.

All electronics required to operate the NOVA NX-T recloser are housed in the Form 7 control. The NOVA NX-T recloser was designed with zero-power electronics in the recloser unit for enhanced reliability.

In addition, all components inside the recloser housing and junction box are designed to be non-corrosive and impervious to moisture in case of humidity or condensation. This allows the NOVA NX-T to employ a vented design, which eliminates moisture entrapment and failure-prone seals without the need for heaters. Similarly, the junction box is also vented and allows moisture to freely drain without collecting. Each connection interface at the bottom of the junction box panel is designed to be moisture-proof to prevent improper operation and erroneous voltage/current readings from occurring.

In the absence of AC power to the electronic control, the control battery will provide the trip and close operations. The control can perform a complete four-trip sequence with minimal reclose intervals without AC power.



Figure 15. Junction box receptacle connections (viewed from below looking up)



Figure 16. Integrated junction box recloser cable

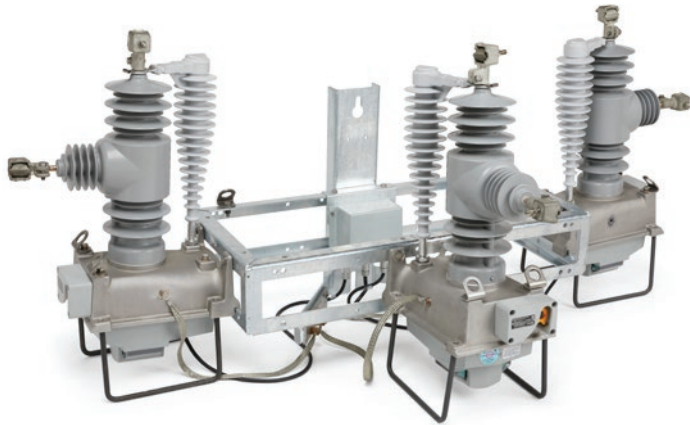


Figure 17. NOVA NX-T tri-mount perpendicular configuration

Site-ready designs

NOVA NX-T features a unique galvanized pole-mounting frame suitable for a variety of factory rotation and site-ready configurations. One mounting frame can be used to accommodate four main site-ready configurations: In-line Parallel, In-line Perpendicular, Tri-Mount Parallel, and Tri-Mount Perpendicular. These configurations are defined as follows:

- In-line Parallel: Three single-phase units mounted on the front of the pole-frame in a line, with the recloser bushings parallel with each other (facing away from the pole). This configuration is the most compact, suitable for pole applications with restricted space available.
- In-line Perpendicular: Three single-phase units mounted on the front of the pole-frame in a line, with the two outside phases (i.e., A-phase and C-phase) facing 90 degrees away from the center phase (towards the respective right or left side of the frame). This configuration gives additional dielectric clearance between side terminals while maintaining a compact overall width.
- Tri-Mount Parallel: One single-phase unit is mounted on the front of the frame, and a single-phase unit is mounted on the left and right sides of the frame. Each single-phase unit recloser bushing is parallel with each other (facing away from the pole).
- Tri-Mount Perpendicular: One single-phase unit is mounted on the front of the frame, and a single-phase unit is mounted on the left and right sides of the frame. The two outside phases (i.e., A-phase and C-phase) are facing 90 degrees away from the center phase (towards the respective right or left side of the frame). This configuration gives the maximum dielectric clearance for applications where wildlife contact is of special concern.

The pole-mounting frame provides six (two back, two side, two front) available mounting locations for oil or dry PT mounting. At the factory, single-bushing primary oil and dry PTs can be configured to be used for supplying control power. In the event a dual primary-bushing oil or dry PT is required, contact factory for further information.

When a site-ready configuration is specified, the factory can provide all accessories including arresters (source/load), PTs (source/load), and wiring (phase/ground). All components are pre-assembled and pre-wired per the customer's requirements. By utilizing a site-ready design, this will significantly reduce field installation and commissioning time. One single control cable is used to bring all current, voltage, recloser status, and trip/close information to the control.

The pole-mount frame can be adapted for use with a wood or concrete pole. An eyebolt is available on each recloser tank (standard) for customer ground connections, or grounding can be achieved with an optional ground bus bar accessory (for simplifying ground connections).

Refer to Figures 27 through 30 for example drawings showing each type of site-ready design.

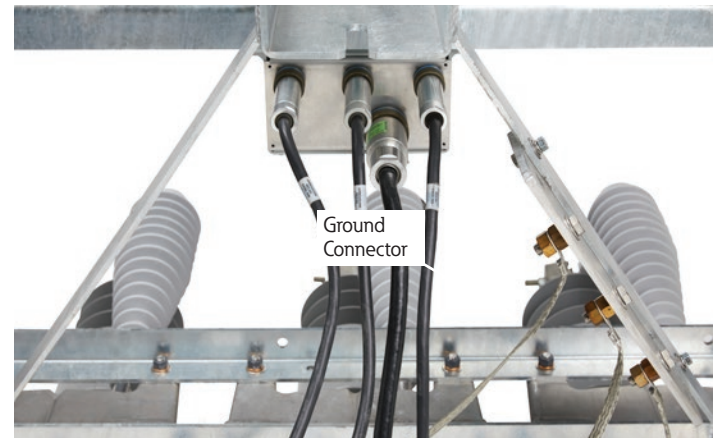


Figure 18. Frame ground bus bar accessory

Junction box

The NOVA NX-T pole mount frame incorporates a junction box as part of the frame construction. Each NOVA NX-T recloser junction box cable and the single control cable utilizes Eaton's MIL-DTL-38999 Series IV connector and is completely sealed against moisture. There are no terminal blocks, heaters, or exposed bare wires required within the junction box enclosure. The unique design of Eaton's MIL-DTL-38999 Series IV connector interface will prevent moisture from entering the connector system.

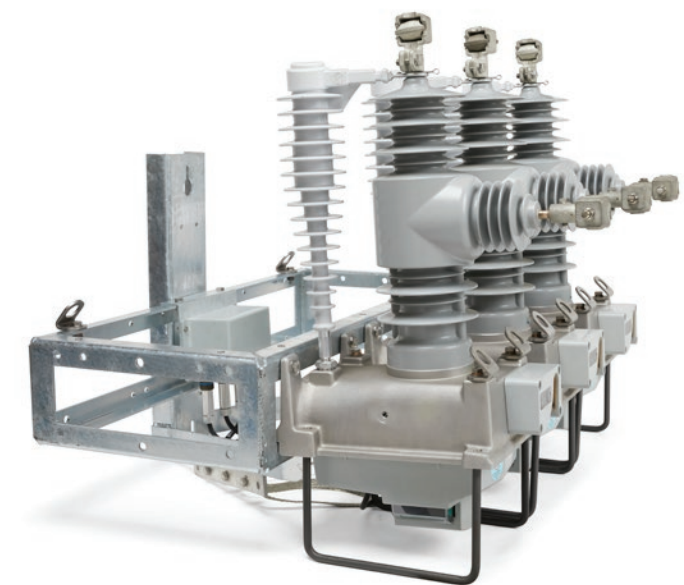


Figure 19. Junction box in the middle of frame



Figure 20. 37-pin control cable with 1/4-turn twist-lock connector

Manual operation

The recloser can be opened manually by using a hotstick to pull down the yellow manual OPEN handle under the sleet hood. With the handle in the OPEN position, the control cannot close the recloser.

Following a manual open, the recloser is closed by pushing the yellow handle back up under the sleet hood and then using the microprocessor control to close the recloser.

Similarly, the recloser can be operated from the manual control switch on the electronic control panel, provided the manual operating handle is up. A contact-position indicator flag, located on the bottom of each recloser unit, shows recloser contact position.

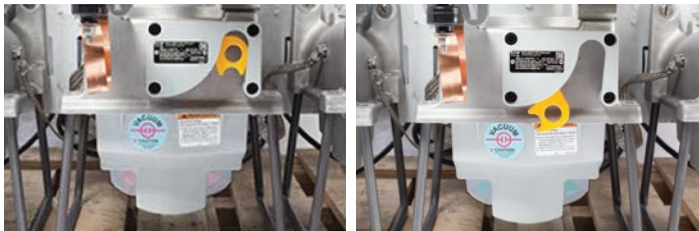


Figure 21. OPEN and CLOSE indicators

Mechanical interlock system

When the yellow manual OPEN handle is pulled down into the OPEN position, a mechanical interlock is automatically engaged. This prevents the recloser from closing when the yellow handle is in the down position. This is a backup to the recloser's electrical lockout function, and will physically block any type of erroneous closing from occurring.

Returning the yellow manual handle to the original upright position underneath the sleet hood disengages the mechanical interlock system, and allows the recloser to be closed electrically.

Indicator system

A 360-degree viewing system is available standard on the bottom of each NOVA NX-T phase unit, located within the thermoset polymer enclosure. The indicator flags for OPEN and CLOSE are non-fading, highly-reflective labels suitable for outdoor environments. The viewable total surface area is approximately five (5) square inches per side, and can easily be seen from ground level without magnification.



Figure 22. Large viewing indicator system

Cable connector system

The NOVA NX-T recloser uses a new twist-lock cable connector system to protect cabling from the weather. The connector design is based upon Eaton's MIL-DTL-38999 Series IV Breech-Lok™ Connector product family. This proven cable connector technology has been employed for many years in a variety of harsh environmental applications serving a plethora of markets including automotive, aerospace, NASA, and military.

The cable connector features an easy-to-use Breech-Lok™ coupling mechanism that only requires 90 degrees of rotation to engage and disengage. The connector provides both visible and audible feedback when engaging and disengaging the coupling mechanism. Simply align the blue master key marks on the connector and receptacle, mate the connector, and twist the collar 90 degrees clockwise for positive engagement. An audible click is heard when the cable connector is fully mated, and a visible red ring is recessed from view when engaged.

If the blue master key is not visible during mating due to connector orientation or environmental conditions, the connectors can still be easily aligned. With the collar in the unlocked position (red band exposed), insert the cable connector onto the receptacle, then rotate the cable connector in the clockwise direction. The connector will drop into place when alignment is achieved. Once mated, twist the collar 90 degrees clockwise for positive engagement.

This new twist-lock cable connector system is used for the 37-pin control cable, and for each 18-pin junction box cable at the integrated junction box.



Figure 23. Easy-to-use twist-lock cable connector

Integrated voltage sensor option (6 sensors)

The NOVA NX-T recloser is available with integrated voltage sensors for source- and load-side voltage sensing. This is accomplished by using a high-voltage resistor encapsulated within each interrupter module for source-side voltage sensing, and a load-side sensor encapsulated in silicone rubber insulation connected to the recloser's load-side terminal. The integrated voltage sensors and recloser control system support a voltage-sensing magnitude accuracy of $\pm 2\%$ and a phase-degree accuracy of $\pm 1.5^\circ$ over the full rated ambient temperature range of the recloser and control. The accuracy for this system applies when the following conditions are met:

- Voltage range is greater than 50% to 100% of the rated maximum voltage of the recloser
- Ratio of load-to-source voltage magnitudes is between 0.5 and 2.0, inclusive
- Phase angle difference between load and source voltages is no greater than 30 degrees

The load-side voltage sensor can be installed at the factory, or can be installed in the field as a service kit. When installed, the load-side top terminal is connected to the recloser load-side terminal, and the end of the sensor is securely connected to the recloser tank head. The load-side sensor connections are made within the recloser tank head and transmitted to the frame's integrated junction box through a single cable using Eaton's MIL-DTL-38999 Series IV connector system.

A single 37-pin control cable is used to bring source and load voltages to the Form 7 control, in conjunction with other control cable signals including TRIP and CLOSE, recloser status, and current values. The control cable uses Eaton's MIL-DTL-38999 Series IV twist-lock cable connector design.



Figure 24. Load-side voltage sensor side by side (15 kV on right and 27/38 kV on left)

Accessories

Auxiliary switch

A single-stage auxiliary switch can be provided as an accessory. The auxiliary switch has two independent contacts: a single "a" contact (follows state of recloser contacts) and a single "b" contact (opposite recloser contacts). The switch contacts are insulated for 250 Vac and have a continuous current rating of 5 A. The interrupting ratings are shown in Table 6.

Terminals

The standard terminal is an eyebolt, 1/0–500 MCM (630 A). Eyebolt 4/0–1000 MCM (800 A), 2-hole and 4-hole flat-pad terminals are available as an accessory.

Pole-mounting hanger

One pole-mounting hanger, which allows a variety of recloser mounting configurations (and PTs), is available for pole-mount installations for wood or concrete poles. Refer to Figures 27 through 30 for available site-ready configurations.

As an alternative option, Eaton offers a phase over phase pole frame adapter for each recloser phase. This will allow a set of three (3) three recloser phase units to be mounted vertically on one side of a pole for 15kV and 27kV applications. If 38kV is required, contact factory for further information.

Refer to Figures 37 and 38 for additional phase over phase pole frame adapter details.

Arrester mounting brackets

Each phase of the NOVA NX-T recloser has three (3) mounting locations available on the head to mount a source and load-side arrester. The arrester brackets can be factory or field-installed. If installed at the factory, optional arresters can be factory-installed with phase and/or ground wiring.

Substation mounting frame

A substation mounting frame accessory is available for substation mounting applications. This single substation frame shall allow the recloser to be mounted at 45 or 90 degrees with a single frame. A junction box with cabling shall be supplied and is mounted on the rear of the substation frame.

As an alternative option, a substation single-phase adapter mounting frame is available to allow mounting individual NOVA NX-T recloser tanks in a substation to replace existing single-phase hydraulics or NOVA Triple-Single Reclosers. For installations requiring reclosers mounted at 45 degrees, a frame accessory is available for ordering. Either single-phase adapter mounting frame is easy to use for installation, and matches the same bolt-hole patterns used for other Cooper Power Series single-phase recloser-type products. A separate junction box shall be provided with configurable length cabling to accommodate a variety of substation installations.

Refer to Figures 31 through 36 for additional drawings related to substation mounting solutions.

Wildlife guards

Wildlife guard protection is available as an accessory for the recloser's source- and load-side recloser terminals. When the load-side sensor accessory is installed, the load-side wildlife guard has a notched opening to fully enclose the load-side terminal.

The wildlife guard allows visual inspection without opening the wildlife guard and can allow water, dust, dirt, and other environmental material to easily flow through the guard without build up. In addition, the wildlife guard does not obstruct hot-spots from being seen in infrared scanning applications due to its unique screen design.

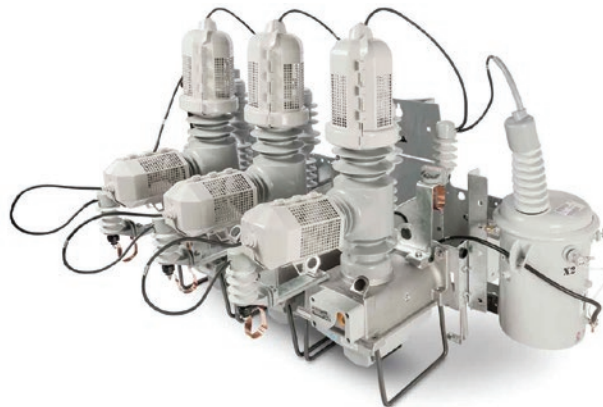


Figure 25. Wildlife guards installed

Ratings and specifications

Check recloser ratings prior to installation.

The recloser must be applied within its specified ratings. Check data plate ratings and compare with the system characteristics at the point of application prior to installation. Tables 6 through 10 list the ratings and specifications for the NOVA NX-T recloser.

Table 6. Voltage Ratings (kV)

Description	15 kV		27 kV		38 kV	
	Std	Opt	Std	Opt	Std	Opt
Rated Maximum Voltage (kV, rms)	15.5		27.0*		38.0	
Nominal System Voltage (kV, rms)	14.4		24.9		34.5	
Rated Short-Duration Power-Frequency Withstand Voltage (kV, rms)	50	50	60	60	70	70
Rated Lightning Impulse Withstand Voltage (kV, peak)	110	125	125	150	170	170

* Available with 29.3 kV rated maximum voltage. Short-circuit breaking current is limited to 12.5 kA in this rating configuration.

Table 7. Current Ratings (Amperes)

Description	15 kV		27 kV		38 kV	
	Std	Opt*	Std	Opt*	Std	Opt
Rated Continuous Current (A)	630	800	630	800	630	800
Rated Short-Time Withstand Circuit Current (kA)	12.5	16	12.5	16	12.5	12.5
Rated Peak Withstand Circuit Current (kA peak)	32.5	41.6	32.5	41.6	32.5	32.5
Rated Duration of Short-Circuit (s)	3	3	3	3	3	3
Rated Short-Circuit Breaking Current (kA, sym)	12.5	16	12.5	16	12.5	12.5
Rated Symmetrical (Short-Circuit) Making Current (kA, sym)	12.5	16	12.5	16	12.5	12.5
Rated Line Charging Interrupting Current (A)	2	2	5	5	5	5
Rated Cable Charging Interrupting Current (A)	10	10	25	25	40	40

* Other selections may include 800 A continuous current with 12.5 kA short-time withstand circuit current rating, or 630 A continuous current with 16 kA short-time withstand circuit current rating. All remaining ratings shall follow beneath the short-time withstand circuit current rating as depicted above.

Table 8. Mechanical Ratings

Description	15 kV (110 kV BIL)	15 kV (125 kV BIL)	27 kV (125 kV BIL)	27 kV (150 kV BIL)	38 kV (170 kV BIL)
Min. Mechanical/Electrical Operations Without Maintenance (C-O)	10,000	10,000	10,000	10,000	10,000
Mass (Weight) - kg (lbs), 1-ph recloser	45 (100)	50 (110)	50 (110)	54 (120)	54 (120)
Mass (Weight) - kg (lbs), 3-ph reclosers with frame	189 (418)	203 (448)	203 (448)	216 (478)	216 (478)

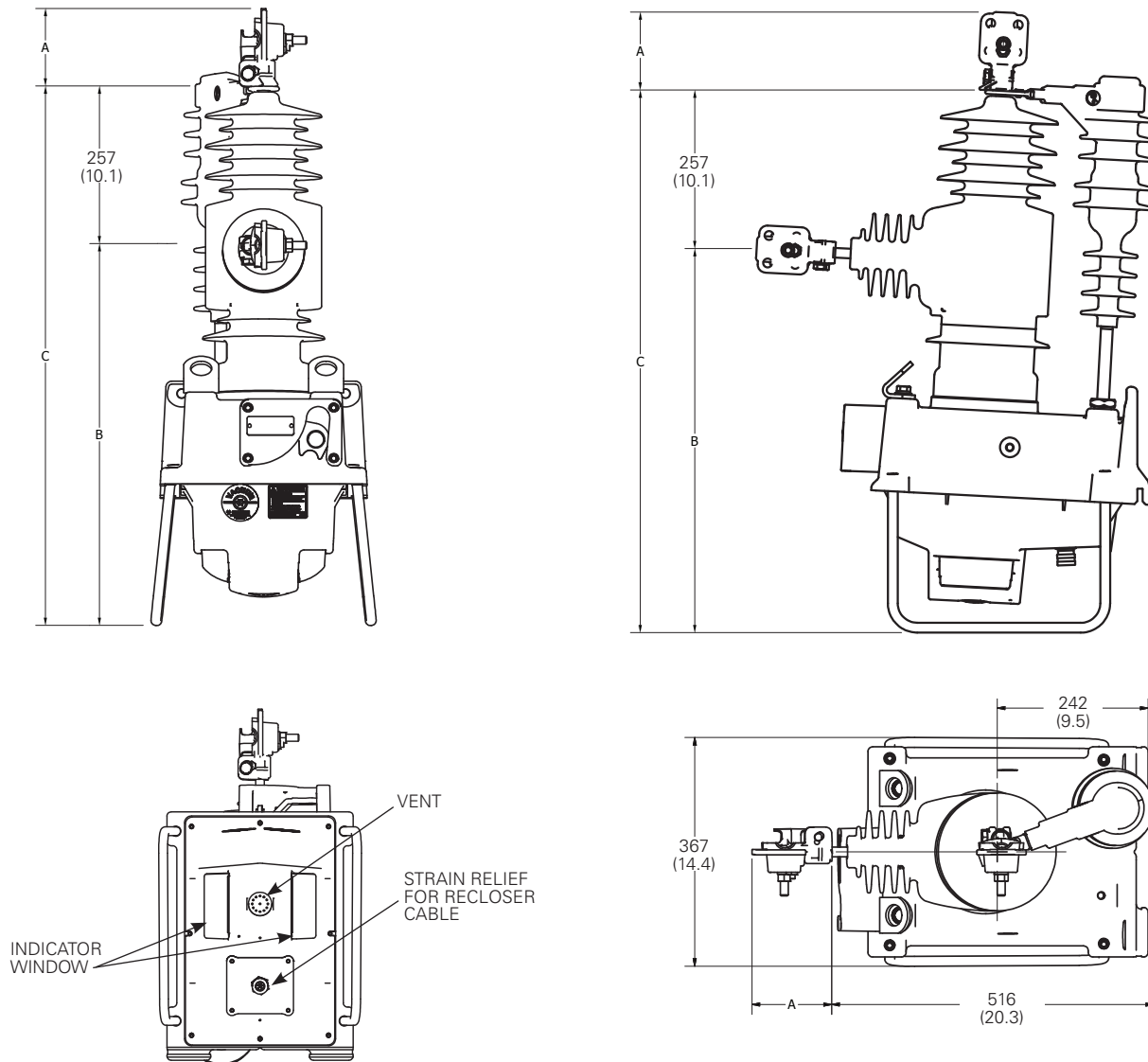
Table 9. Duty Cycle

Type	Percentage of Maximum Circuit Interrupting Rating	Minimum X/R Ratio	Number of Unit Operations at 12.5 kA	Number of Unit Operations at 16.0 kA
NOVA NX-T	15-20	4	88	88
	45-55	8	112	112
	90-100	17	32	32
			Total 232	Total 232

Table 10. Auxiliary Switch Ratings

Volts	Amperes
Up to 30 Vdc	5 A
Up to 250 Vac	5 A
Minimum applicable load	0.16 A @ 5.0 Vdc

Dimensions



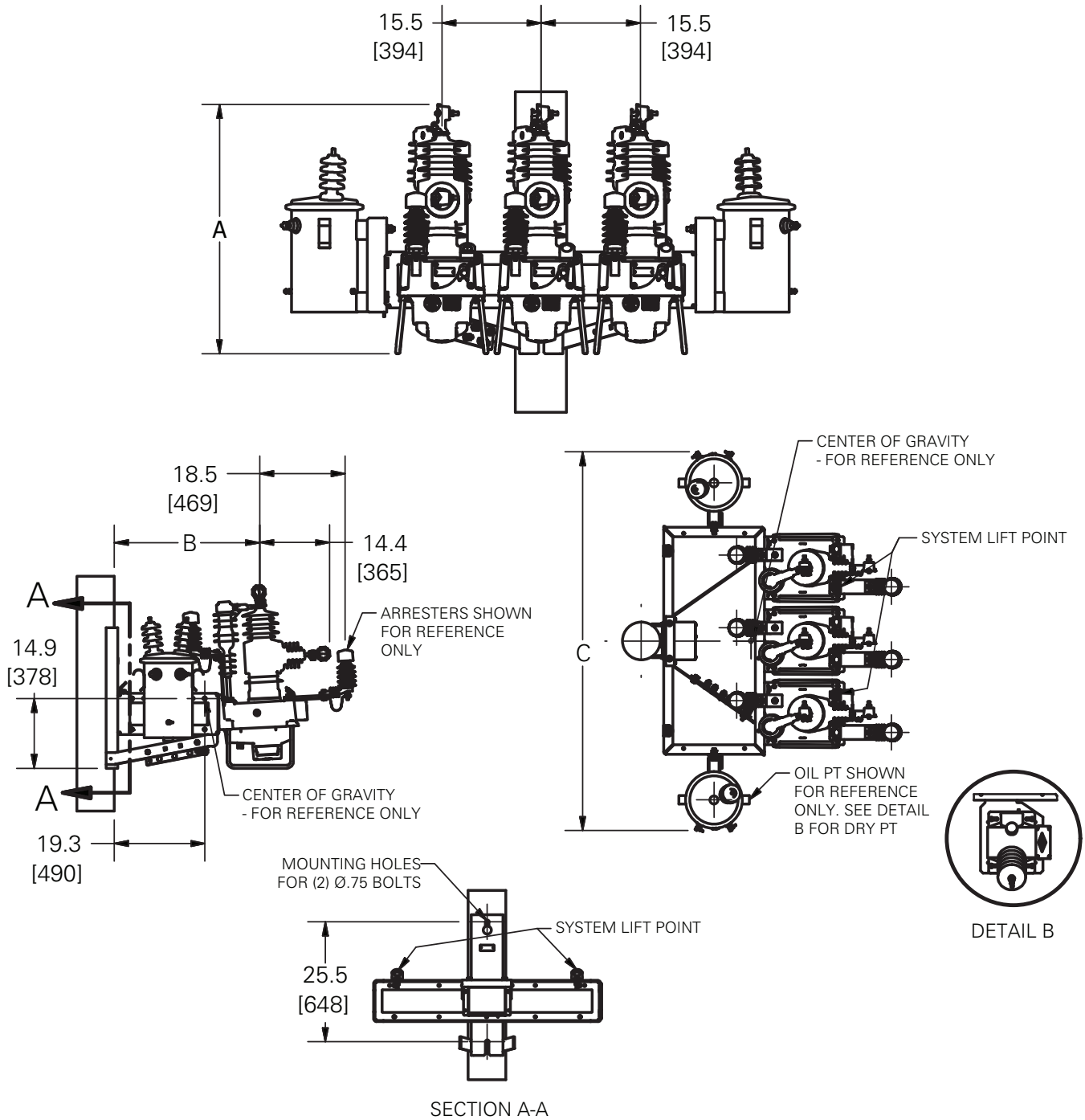
Terminal Option Type	A mm (in.)
Eyebolt - (630 A) 1/0 to 500 MCM Cable Range	80 (3.25)
Eyebolt - (800 A) 4/0 to 1000 MCM Cable Range	108 (4.25)
Flat Pad - 2-hole (630 A max)	114 (4.5)
Flat Pad - 4-hole (800 A max)	121 (4.75)

NOTE: All dimensions are mm (inches). Dimensions shown are approximate.

	B mm (in.)	C mm (in.)
NOVA NX-T 15 (110 kV BIL)	612 (24.1)	889 (35.0)
NOVA NX-T 15 (125 kV BIL)	668 (26.3)	945 (37.2)
NOVA NX-T 27 (125 kV BIL)	668 (26.3)	945 (37.2)
NOVA NX-T 27 (150 kV BIL)	767 (30.2)	1044 (41.1)
NOVA NX-T 38 (170 kV BIL)	767 (30.2)	1044 (41.1)

Rating - Creepage Distances	15 kV mm (in.)	27 kV mm (in.)	38 kV mm (in.)
Terminal to terminal	1052 (41.5)	1052 (41.5)	1052 (41.5)
Lower terminal to ground	673 (26.5)	775 (30.5)	980 (38.6)

Figure 26. NOVA NX-T single-phase recloser dimensions

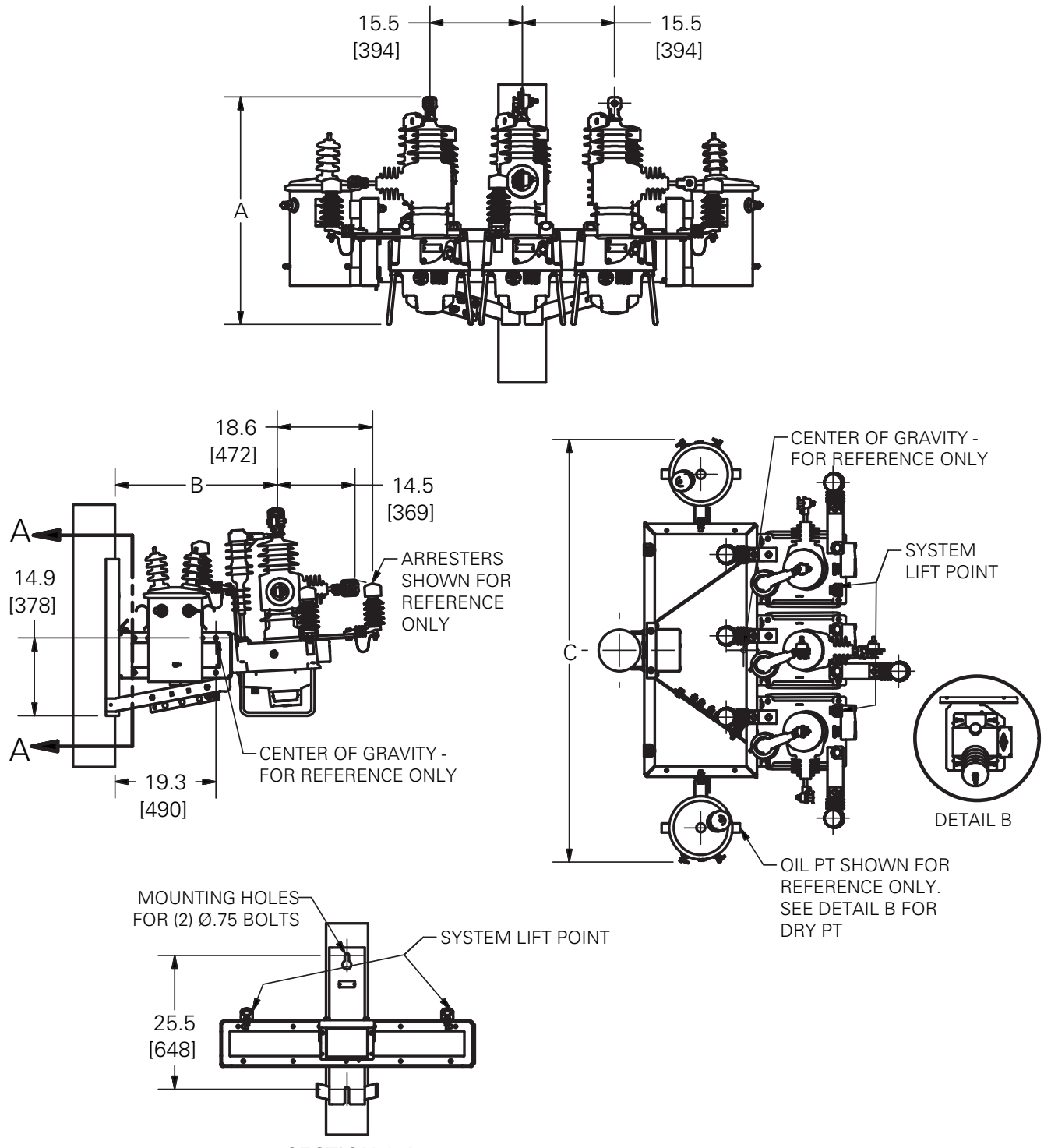


kV Rating	A in. (mm)	B in. (mm)
15.5 (110 kV BIL)	38.2 [969]	30.8 [782]
15.5 (125 kV BIL)	40.4 [1025]	30.7 [780]
27.0 (125 kV BIL)	40.4 [1025]	30.7 [780]
27.0 (150 kV BIL)	44.3 [1124]	30.5 [774]
38.0 (170 kV BIL)*	44.3 [1124]	30.5 [774]

NOTE: All dimensions are in. (mm). Dimensions shown are approximate. * Center of gravity does not include PT and arrester weights.

PT Type	C in. (mm)
Oil	80.6 [2047]
Dry	85.7 [2176]

Figure 27. NOVA NX-T in-line parallel site-ready configuration

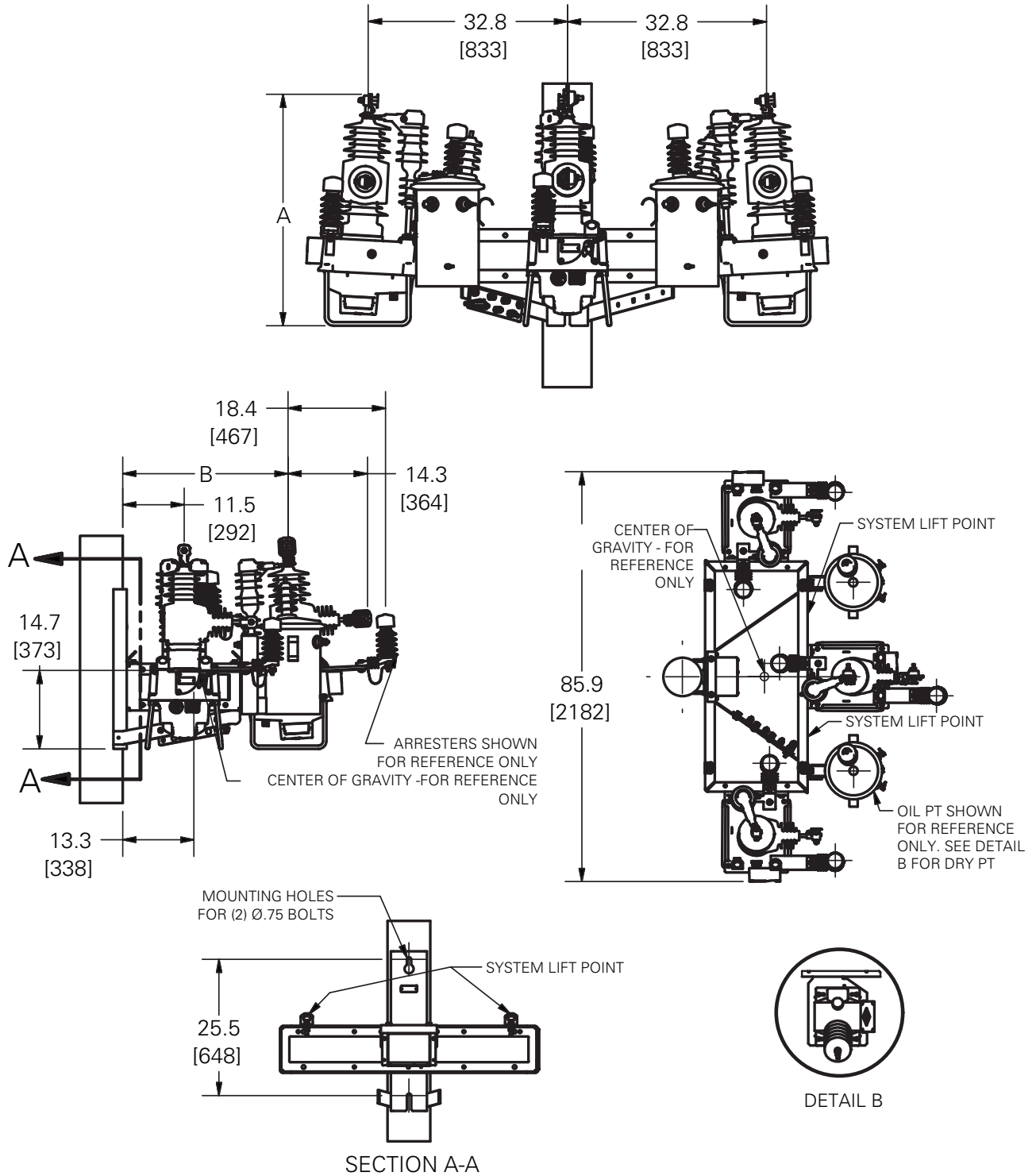


kV Rating	A in. (mm)	B in. (mm)
15.5 (110 kV BIL)	38.2 [969]	30.8 [782]
15.5 (125 kV BIL)	40.4 [1025]	30.7 [780]
27.0 (125 kV BIL)	40.4 [1025]	30.7 [780]
27.0 (150 kV BIL)	44.3 [1124]	30.5 [774]
38.0 (170 kV BIL)*	-	-

NOTE: All dimensions are in. (mm). Dimensions shown are approximate. * Center of gravity does not include PT and arrester weights.

PT Type	C in. (mm)
Oil	80.6 [2047]
Dry	85.7 [2176]

Figure 28. NOVA NX-T in-line perpendicular site-ready configuration

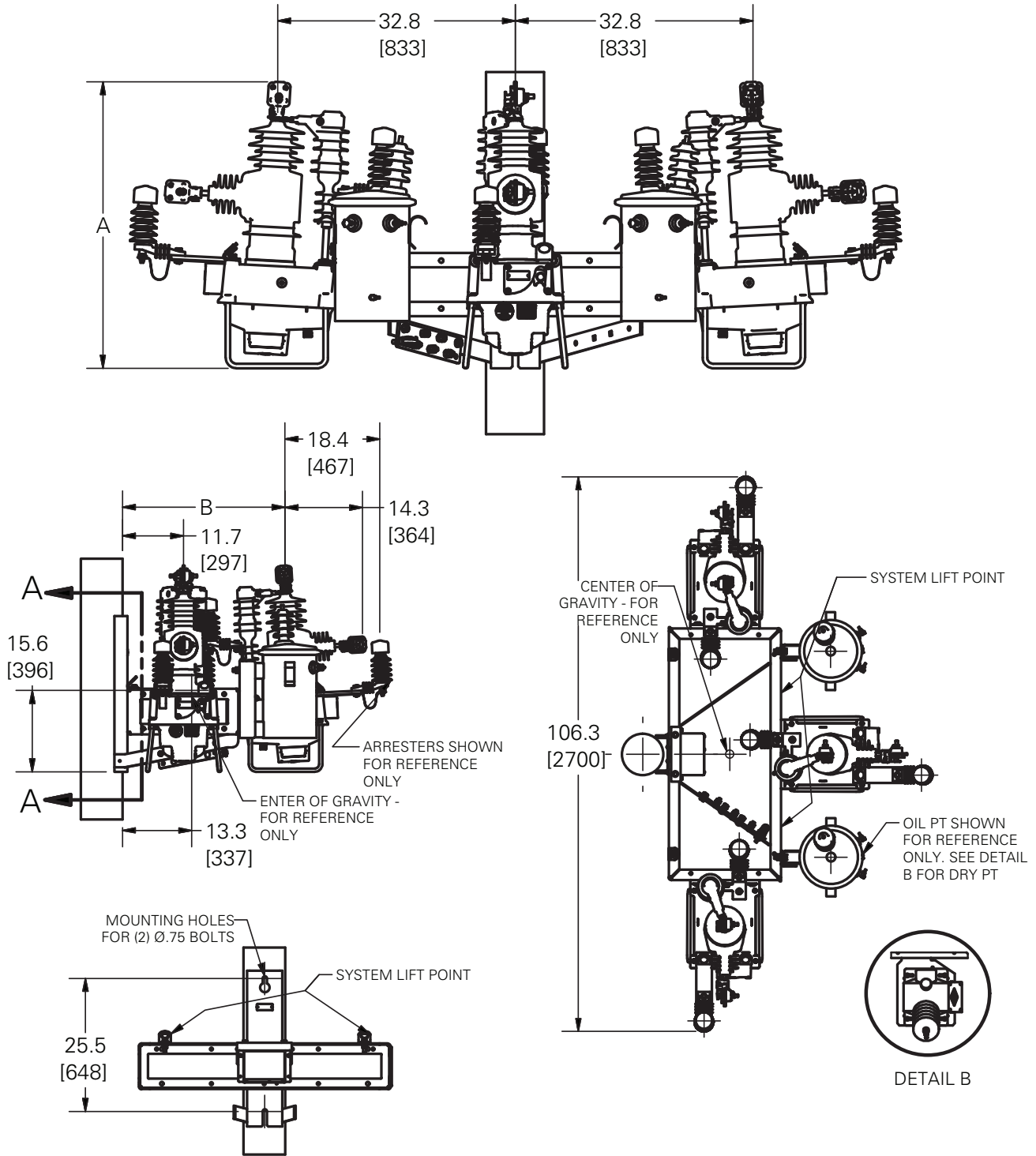


kV Rating	A in. (mm)	B in. (mm)
15.5 (110 kV BIL)	38.2 [969]	30.8 [782]
15.5 (125 kV BIL)	40.4 [1025]	30.7 [780]
27.0 (125 kV BIL)	40.4 [1025]	30.7 [780]
27.0 (150 kV BIL)	44.3 [1124]	30.5 [774]
38.0 (170 kV BIL)*	—	—

NOTE: All dimensions are in. (mm). Dimensions shown are approximate. * Center of gravity does not include PT and arrester weights.

PT Type	C in. (mm)
Oil	80.6 [2047]
Dry	85.7 [2176]

Figure 29. NOVA NX-T tri-mount parallel site-ready configuration



kV Rating	A in. (mm)	B in. (mm)
15.5 (110 kV BIL)	38.2 [969]	30.8 [782]
15.5 (125 kV BIL)	40.4 [1025]	30.7 [780]
27.0 (125 kV BIL)	40.4 [1025]	30.7 [780]
27.0 (150 kV BIL)	44.3 [1124]	30.5 [774]
38.0 (170 kV BIL)*	44.3 [1124]	30.5 [774]

NOTE: All dimensions are in. (mm).
Dimensions shown are approximate.
* Center of gravity does not include
PT and arrester weights.

Figure 30. NOVA NX-T in-line perpendicular site-ready configuration

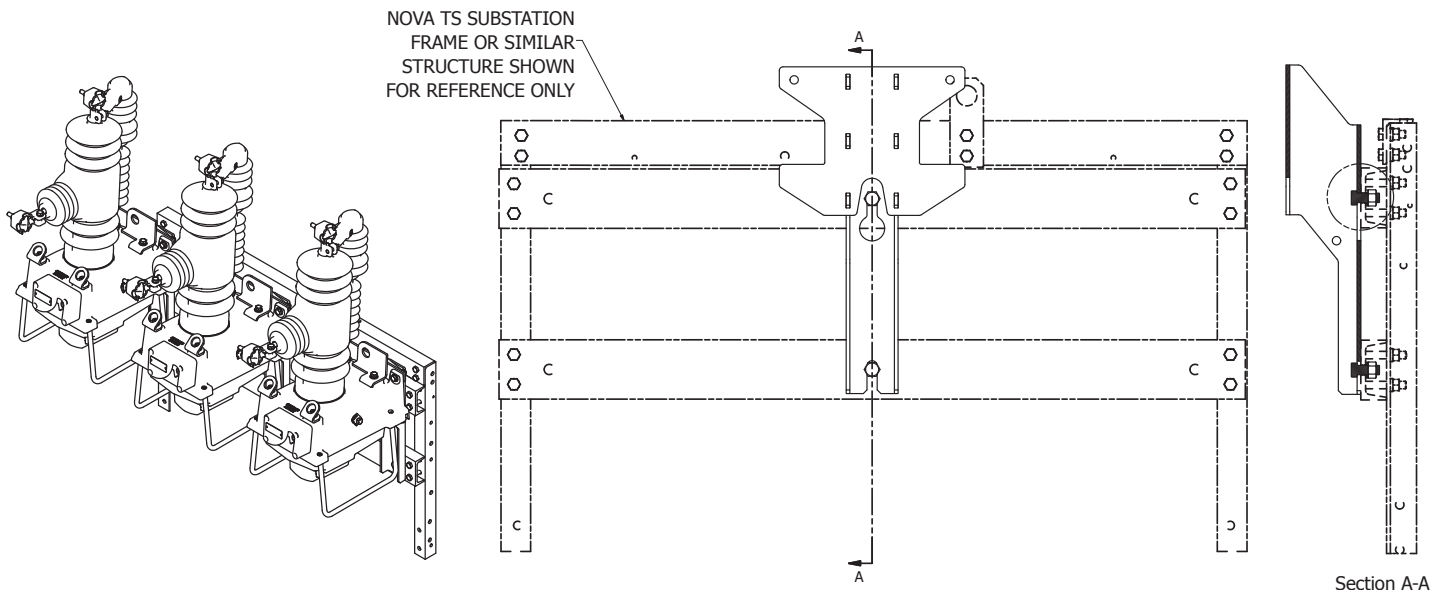


Figure 31. NOVA NX-T single phase adapter, upright mount

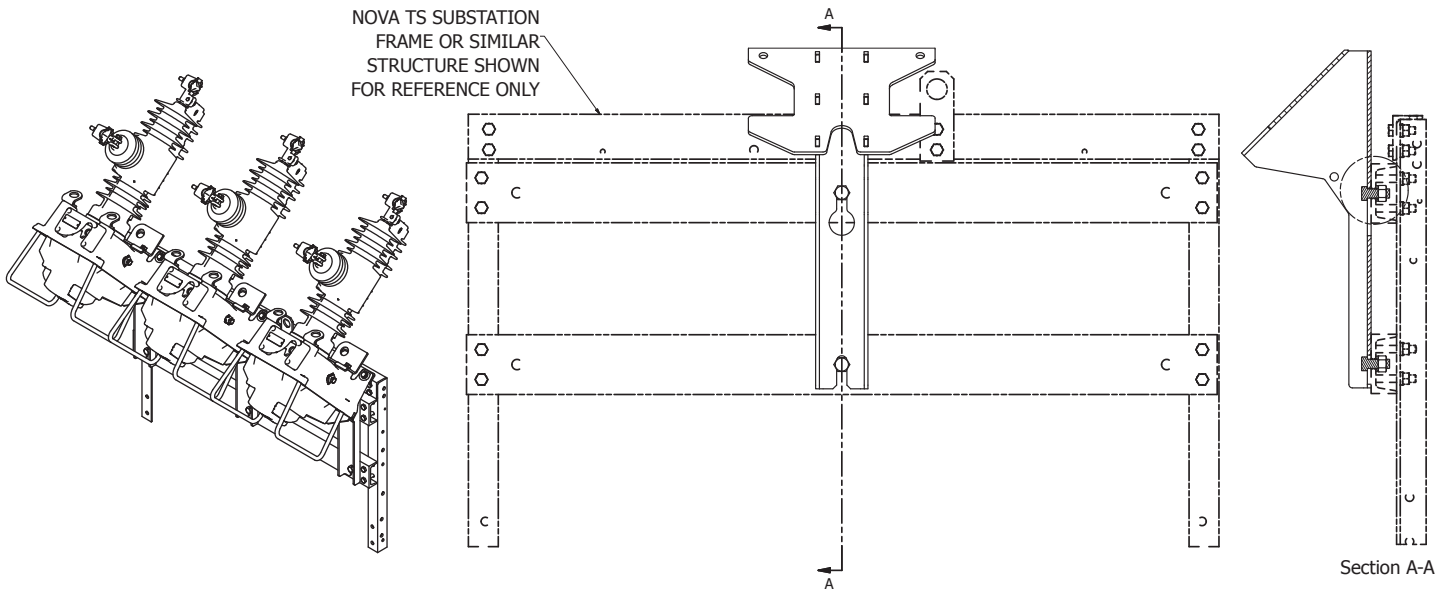
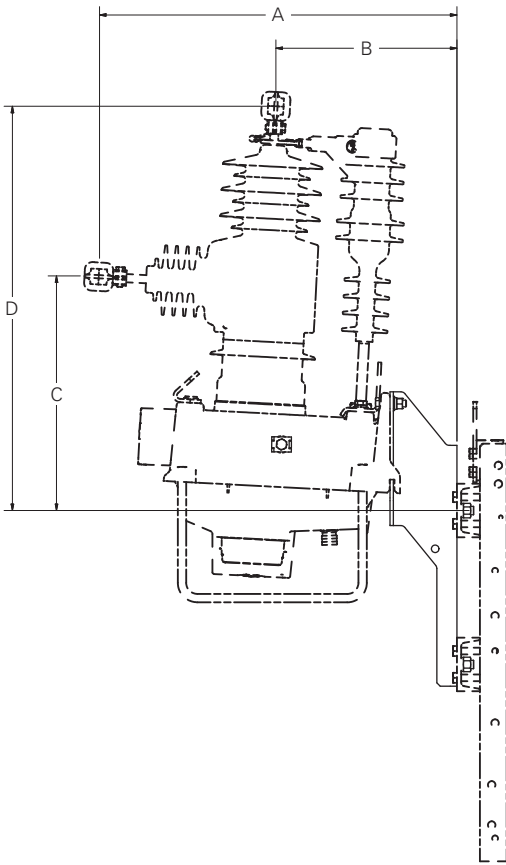
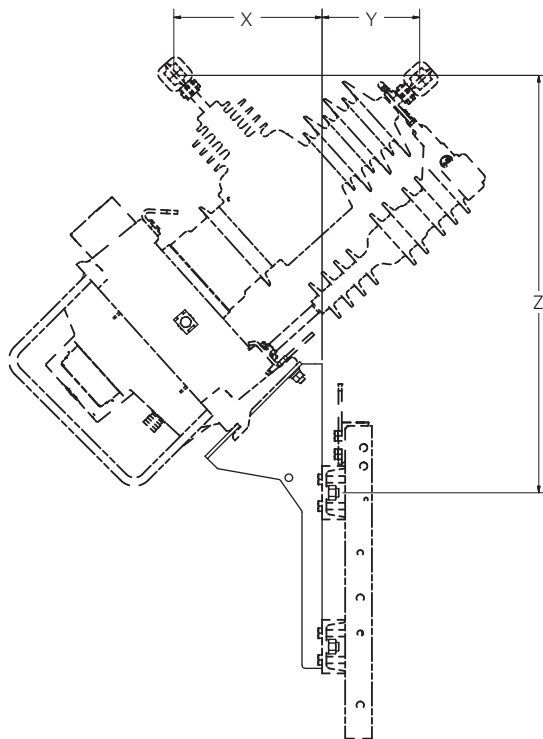


Figure 32. NOVA NX-T single phase adapter, 45 degree mount



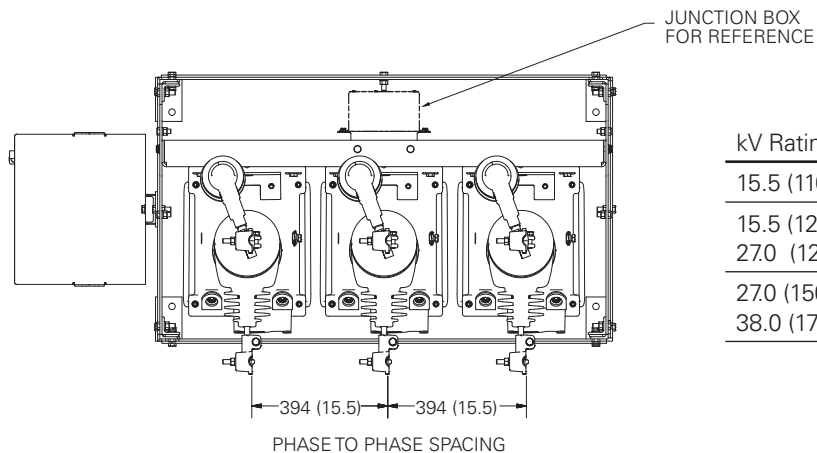
kV Rating	A mm (in.)	B mm (in.)	C mm (in.)	D mm (in.)
15.5 (110 kV BIL)	678 (26.7)	343 (13.5)	445 (17.5)	767 (30.2)
15.5 (125 kV BIL) / 27.0 (125 kV BIL)	686 (27.0)	338 (13.3)	503 (19.8)	836 (32.9)
27.0 (150 kV BIL) / 38.0 (170 kV BIL)	681 (26.8)	333 (13.1)	602 (23.7)	935 (36.8)

Figure 33. NOVA NX-T single-phase adapter, upright mount dimensions

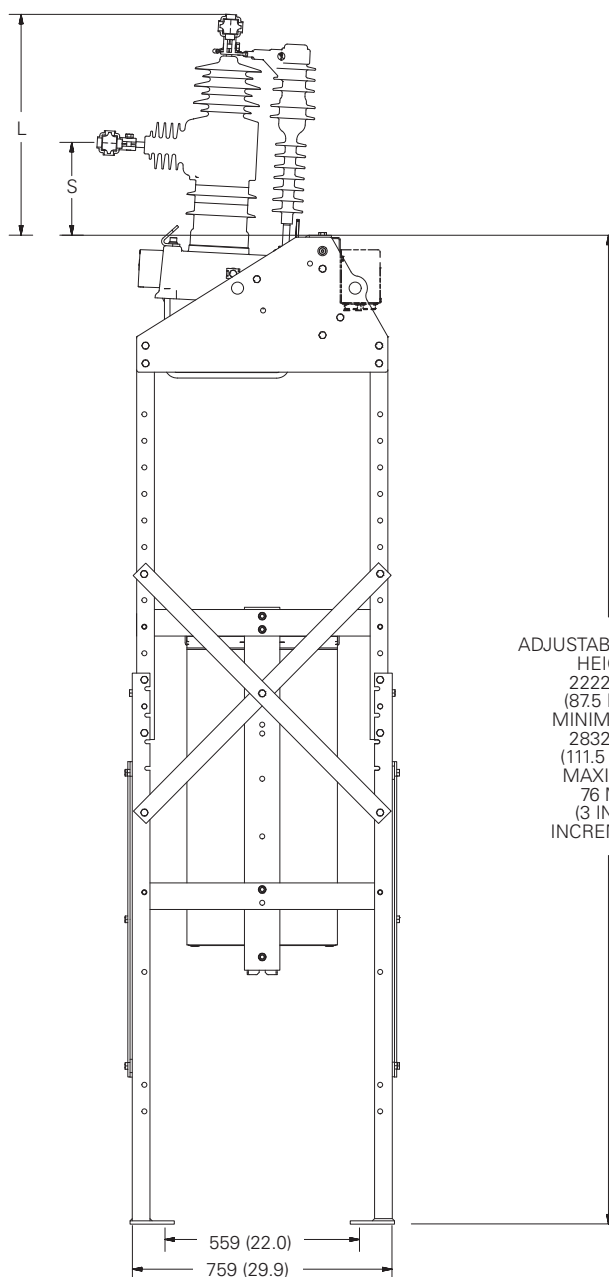
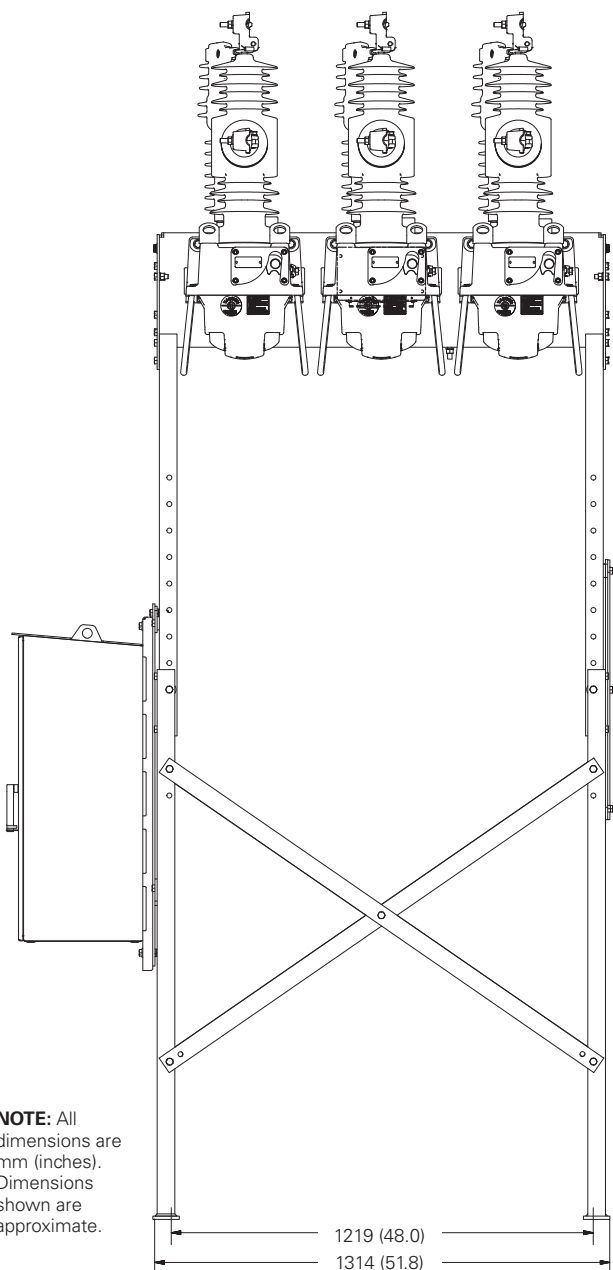


kV Rating	X mm (in.)	Y mm (in.)	Z mm (in.)
15.5 (110 kV BIL)	282 (11.1)	185 (7.3)	792 (31.2)
15.5 (125 kV BIL) / 27.0 (125 kV BIL)	241 (9.5)	234 (9.2)	831 (32.7)
27.0 (150 kV BIL) / 38.0 (170 kV BIL)	168 (6.6)	315 (12.4)	897 (35.3)

Figure 34. NOVA NX-T single-phase adapter, 45 degree mount dimensions

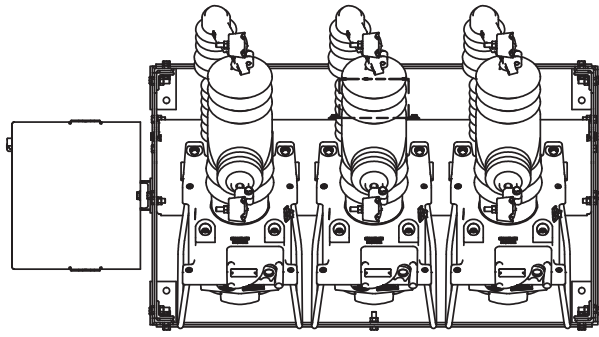


kV Rating	Source mm (in.)	Load mm (in.)
15.5 (110 kV BIL)	216 (8.5)	538 (21.2)
15.5 (125 kV BIL) / 27.0 (125 kV BIL)	272 (10.7)	605 (23.8)
27.0 (150 kV BIL) / 38.0 (170 kV BIL)	371 (14.6)	704 (27.7)

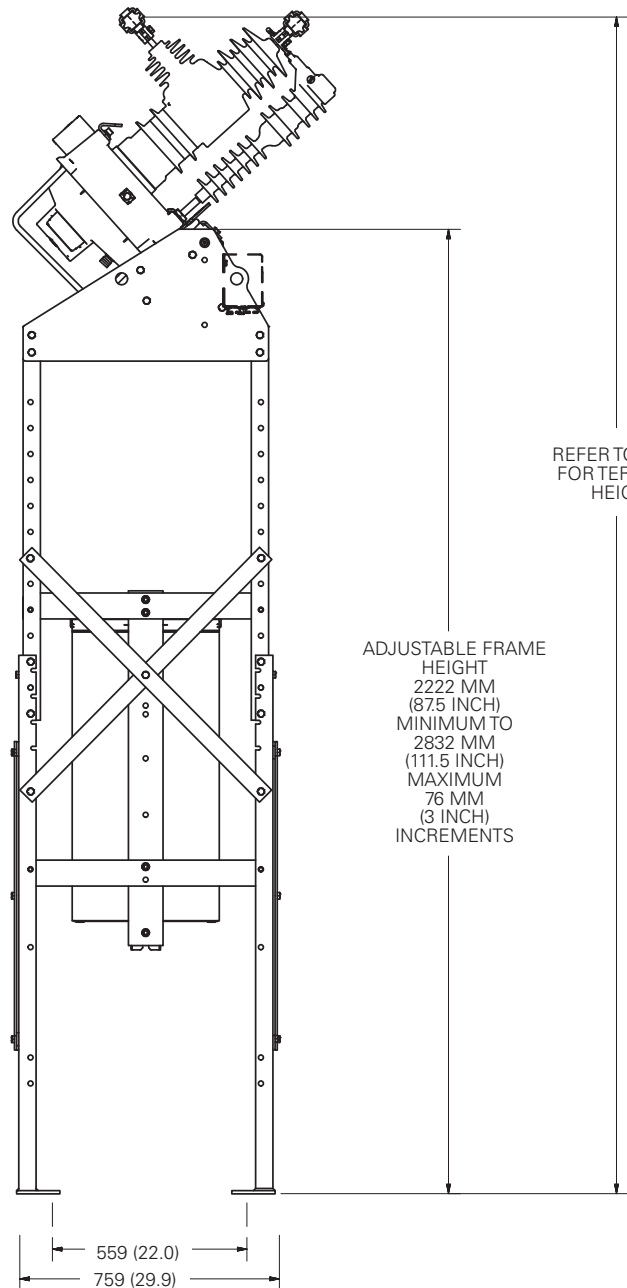
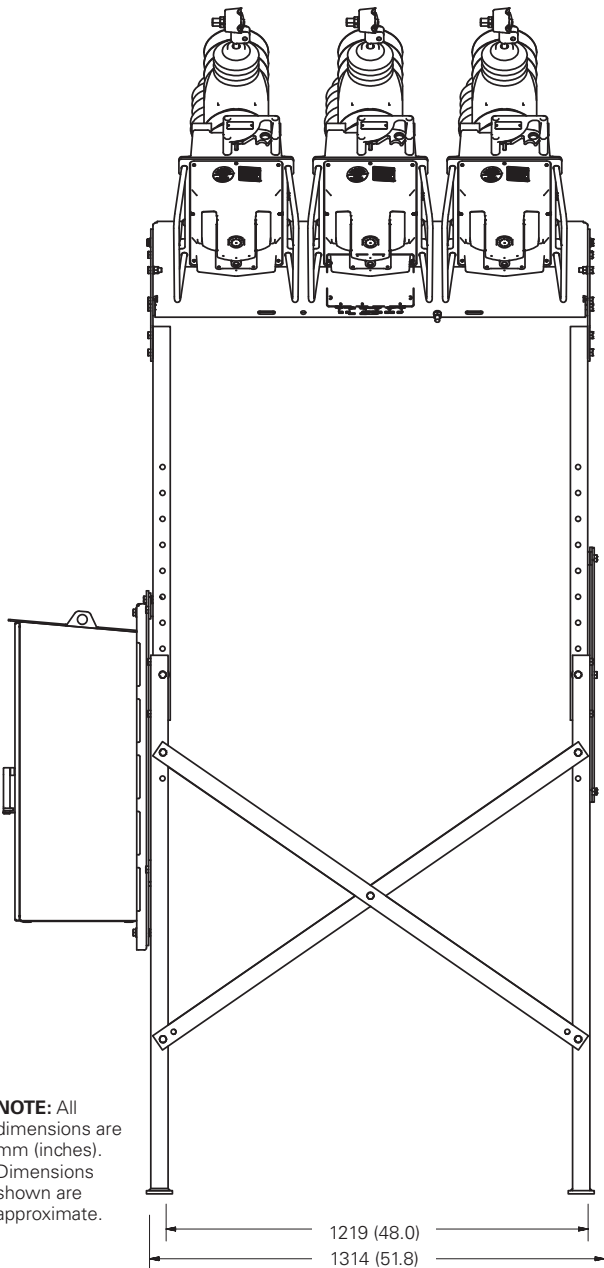


NOTE: All dimensions are mm (inches). Dimensions shown are approximate.

Figure 35. NOVA NX-T substation frame, upright mount



kV Rating	Min. mm (in.)	Max. mm (in.)
15.5 (110 kV BIL)	2791 (109.9)	3401 (133.9)
15.5 (125 kV BIL) / 27.0 (125 kV BIL)	2837 (111.7)	3447 (135.7)
27.0 (150 kV BIL) / 38.0 (170 kV BIL)	2903 (114.3)	3513 (138.3)



NOTE: All dimensions are mm (inches). Dimensions shown are approximate.

Figure 36. NOVA NX-T substation frame, 45 degree mount

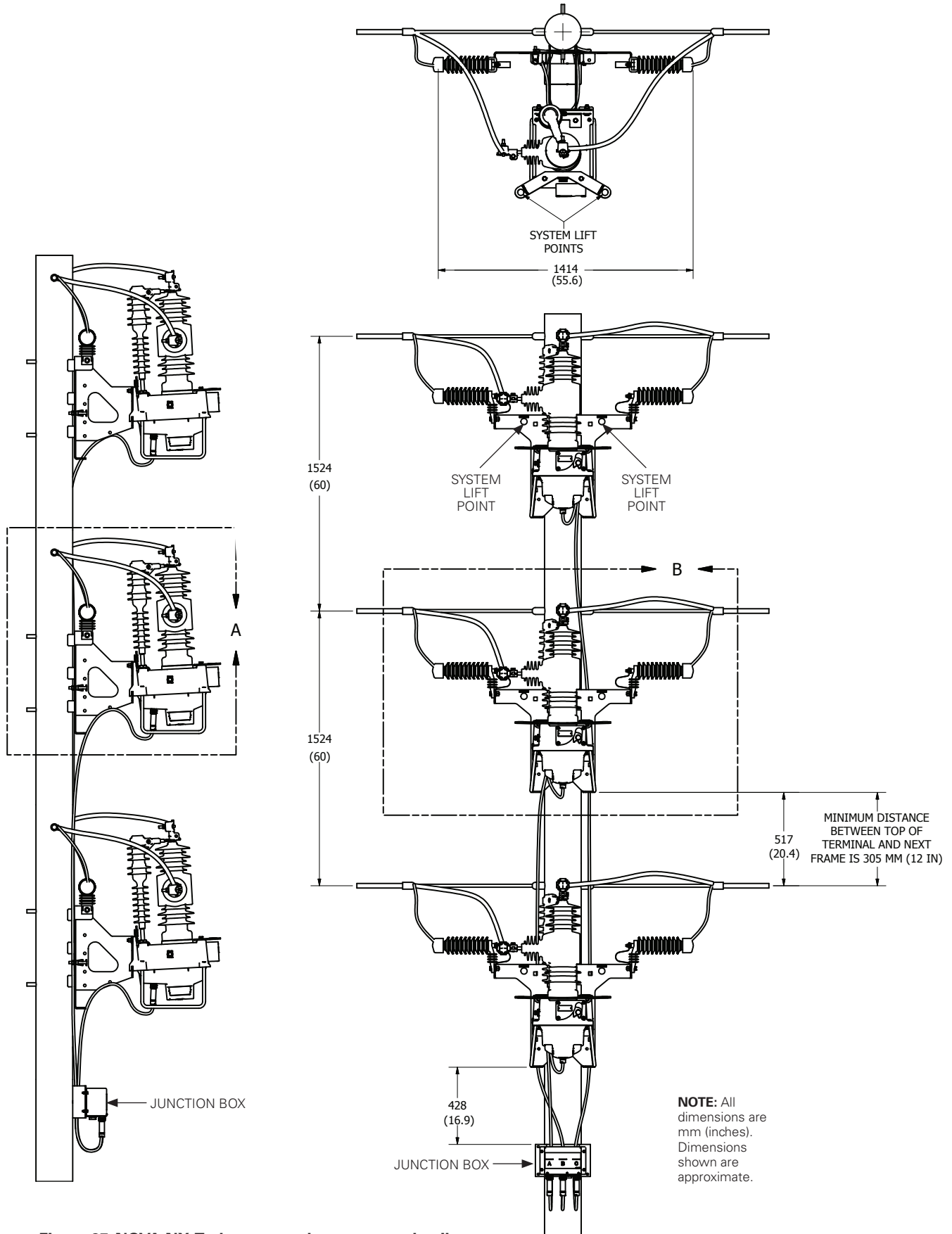
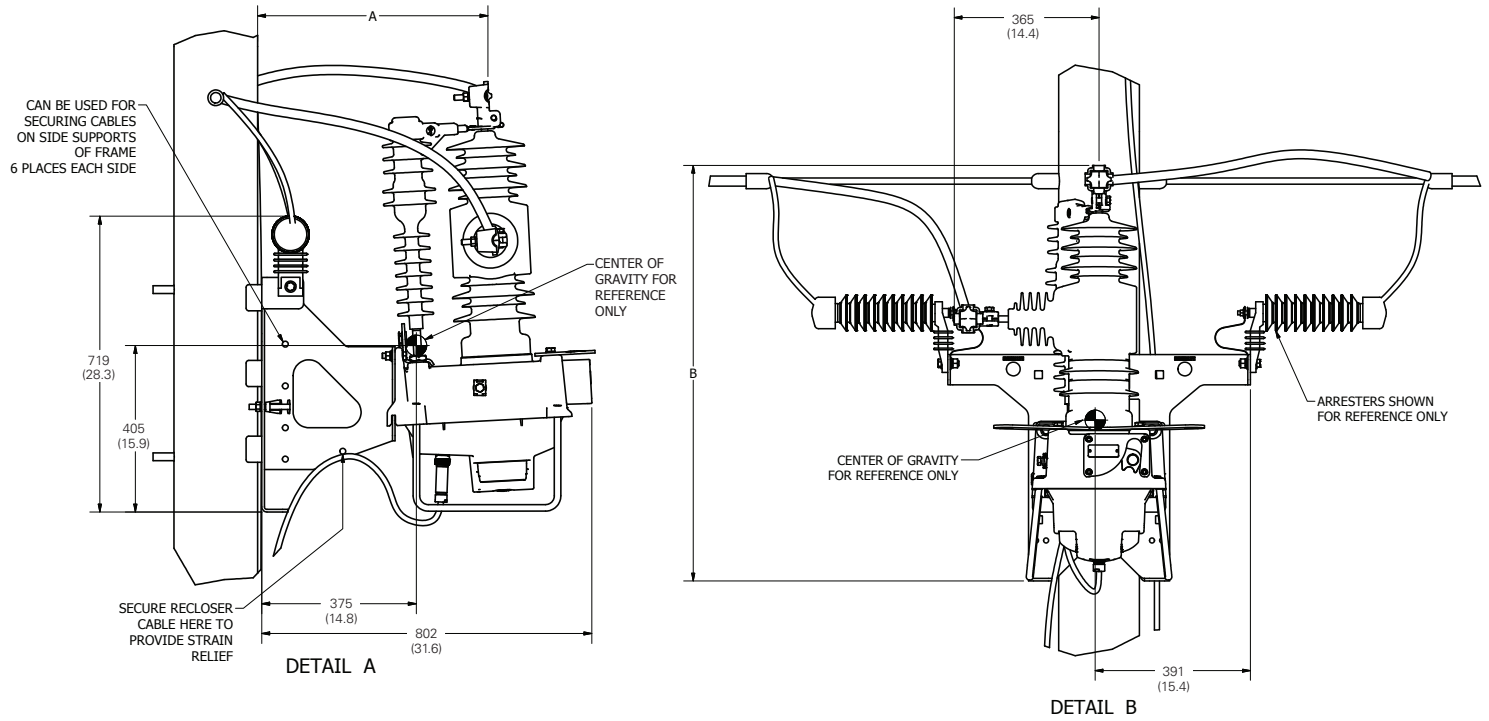


Figure 37. NOVA NX-T phase over phase system details



kV Rating	A mm (in.)	B mm (in.)
15.5 (110 kV BIL)	561 (22.1)	969 (38.1)
15.5 (125 kV BIL) / 27.0 (125 kV BIL)	559 (22.0)	1025 (40.4)

NOTE: All dimensions are mm (inches). Dimensions shown are approximate.

Figure 38. NOVA NX-T phase over phase dimensions (one phase)

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