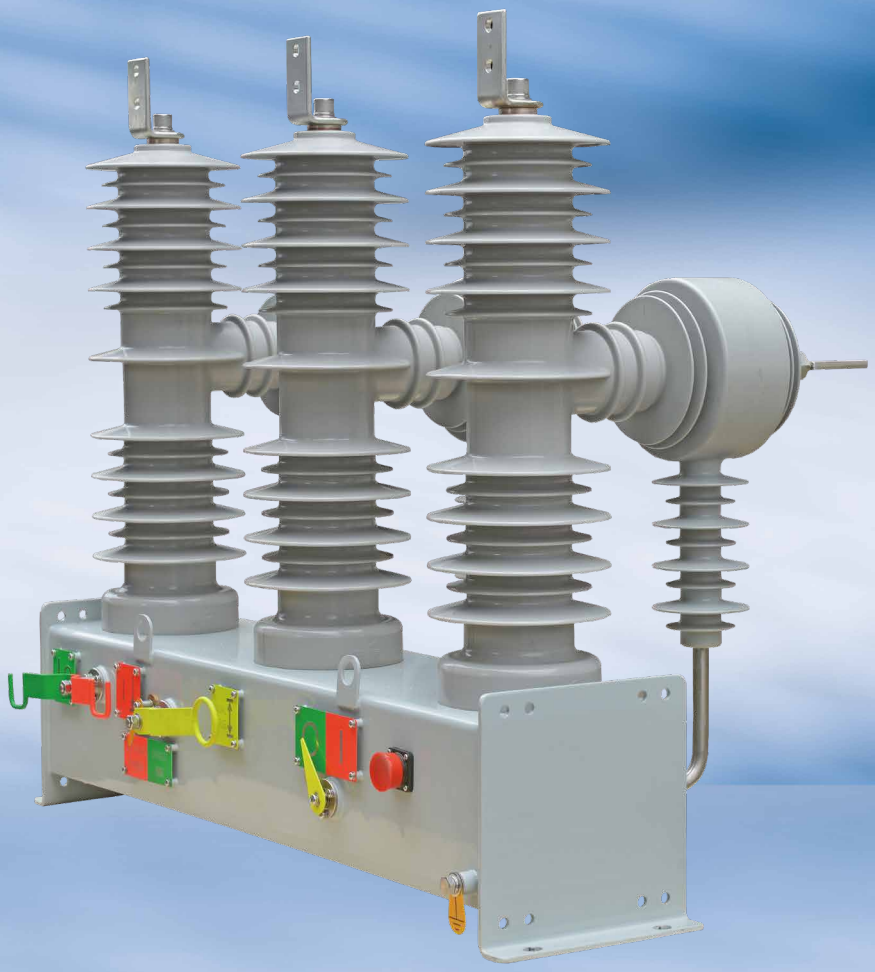
NOVAs Outdoor Pole Mounted
Vacuum Circuit Breaker

COOPER POWER SERIES



Powering Business Worldwide

COOPER

Powering business worldwide

Eaton delivers the power inside hundreds of products that are answering the demands of today's fast changing world.

We help our customers worldwide manage the power they need for buildings, aircraft, trucks, cars, machinery and entire businesses. And we do it in a way that consumes fewer resources.

Next generation transportation

Eaton is driving the development of new technologies – from hybrid drivetrains and emission control systems to advanced engine components – that reduce fuel consumption and emissions in trucks and cars.

Higher expectations

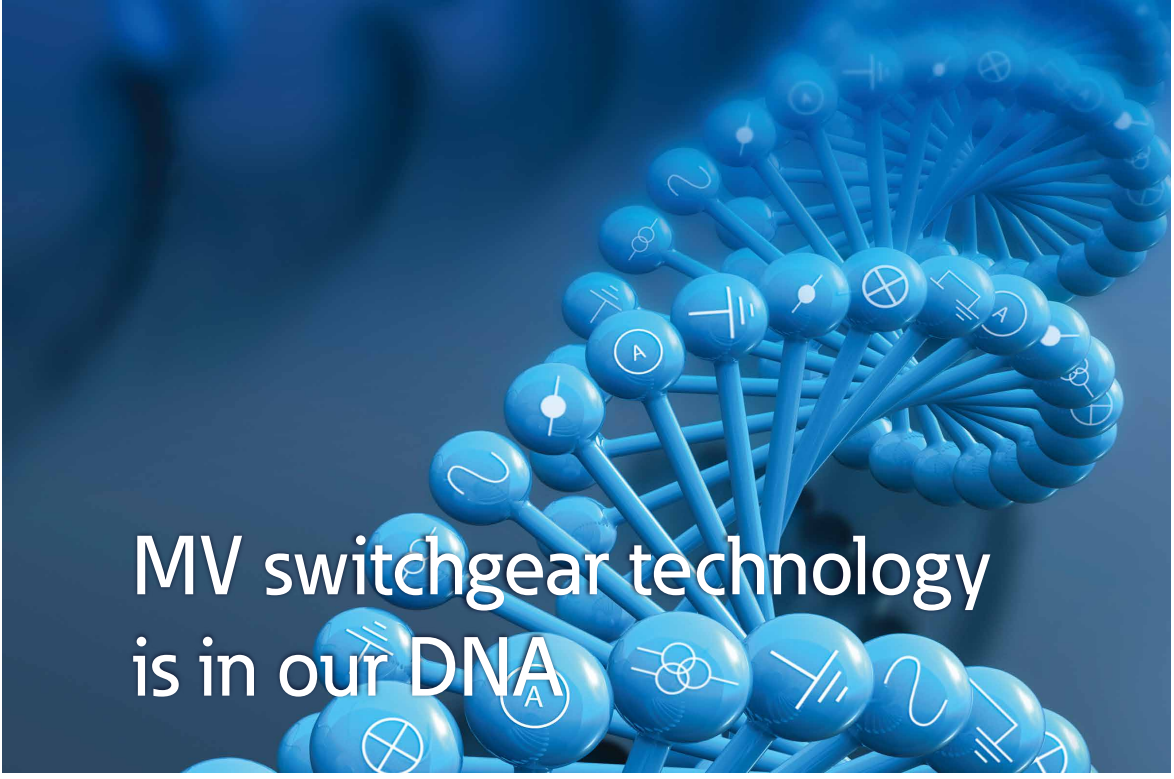
We continue to expand our aerospace solutions and services to meet the needs of new aviation platforms, including the high-flying light jet and very light jet markets.

Building on our strengths

Our hydraulics business combines localised service and support with an innovative portfolio of fluid power solutions to answer the needs of global infrastructure projects, including locks, canals and dams.

Powering Greener Buildings and Businesses

Eaton's Electrical Group is a leading provider of power quality, distribution and control solutions that increase energy efficiency and improve power quality, safety and reliability. Our solutions offer a growing portfolio of "green" products and services, such as energy audits and real-time energy consumption monitoring. Eaton's Uninterruptible Power Supplies (UPS), variable-speed drives and lighting controls help conserve energy and increase efficiency.



MV switchgear technology is in our DNA

Eaton Corporation is a worldwide leader in the design, manufacture, and sale of safe, reliable and high-performance medium voltage power distribution equipment in accordance with IEC, ANSI and GB / DL standards

Complete Global Medium Voltage Switchgear Solutions

Eaton, a premier leader in designing and manufacturing power distribution and protection equipment in the electrical industry, offers a comprehensive range of medium voltage (MV) solutions to meet the needs of virtually every application. From products that feature cutting-edge design that allow for easy access, maintenance and space savings, to arc-resistant products that enhance safety, Eaton's medium voltage solutions provide a variety of products for every need. Additionally, Eaton's global service network provides maximum customer support in all regions of the world.

As one of the few completely vertically integrated and diversified industrial manufacturers in the world, Eaton designs not only MV assemblies, but also the key components that comprise the MV solutions – from steel housing and circuit breaker compartments to vacuum interrupters, circuit breakers, bus systems and fuses.

Eaton's MV heritage, strengthened by acquisitions such as Westinghouse DCBU, Cutler Hammer, MEM and Holec, has resulted in breakthrough MV technologies and numerous international patents over the years.

Part of Eaton's complete electrical PowerChain Solutions – which help businesses minimize risks while realizing greater reliability, cost efficiencies, capital utilization and safety – Eaton's medium voltage equipment meets all applicable standards and certifications such as IEC, NEMA / ANSI, GB / DL, UL, IEEE, KEMA and CSA.

When it comes to medium voltage solutions, you can trust the one name with a long history of proven performance: Eaton.

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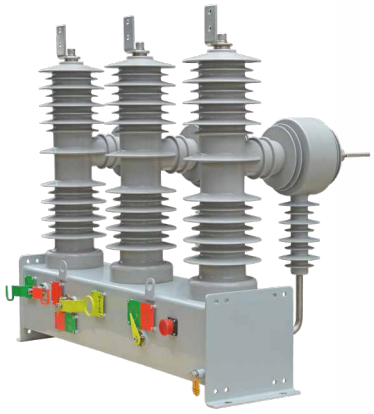
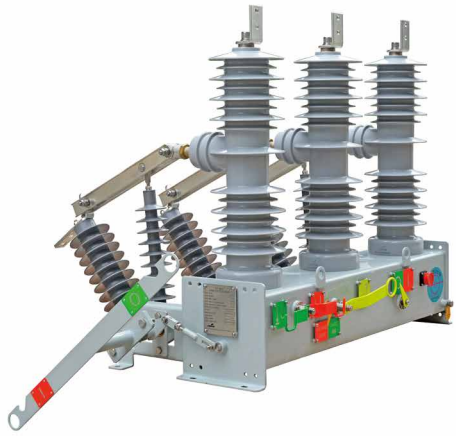
1. General

General

NOVAs outdoor circuit breaker is a three-phase vacuum circuit breaker suitable for pole or substation mounting. It can meet various metering and protection requirements equipped with automation control. NOVAs provides flexible choice to customer with optional supply of current transformer and disconnect.





Standard

GB/T 11022	Common specifications for high-voltage switchgear and controlgear standards
IEC 62271-1	High-voltage switchgear and controlgear- Part1: Common specifications
GB/T 1984	High-voltage alternating-current circuit-breakers
IEC 62271-100	High-voltage switchgear and controlgear- Part100: Alternating-current circuit-breakers.

2. Feature

- Solid-encapsulated pole with high-hydrophobicity outdoor epoxy, no oil, no SF6
- Embedded vacuum interrupt
- 3 internal and 3 external voltage sensors for both source side and load side voltage sensing(Optional)
- Spring mechanism with high reliability, up to 10000 times maintenance-free operation
- Manual open & close operation
- Manual or Motor charging (<12s)
- External protective current transformer (Optional)
- Multiple CT ratio of 600/400/200:5
- Integrated disconnector (Optional)
- Switch status indicator: Open/Close status, Charging status.
- Stainless steel or carbon steel tank (IP54)
- Surge protector option when only manual type
- Distribution automation with intelligent FXD control configured

3. Technical parameters

Environment

Temperature: Max 50°C, Min -40°C
Humidity: 95%
Altitude: 2000m
Ingress Protection: IP54

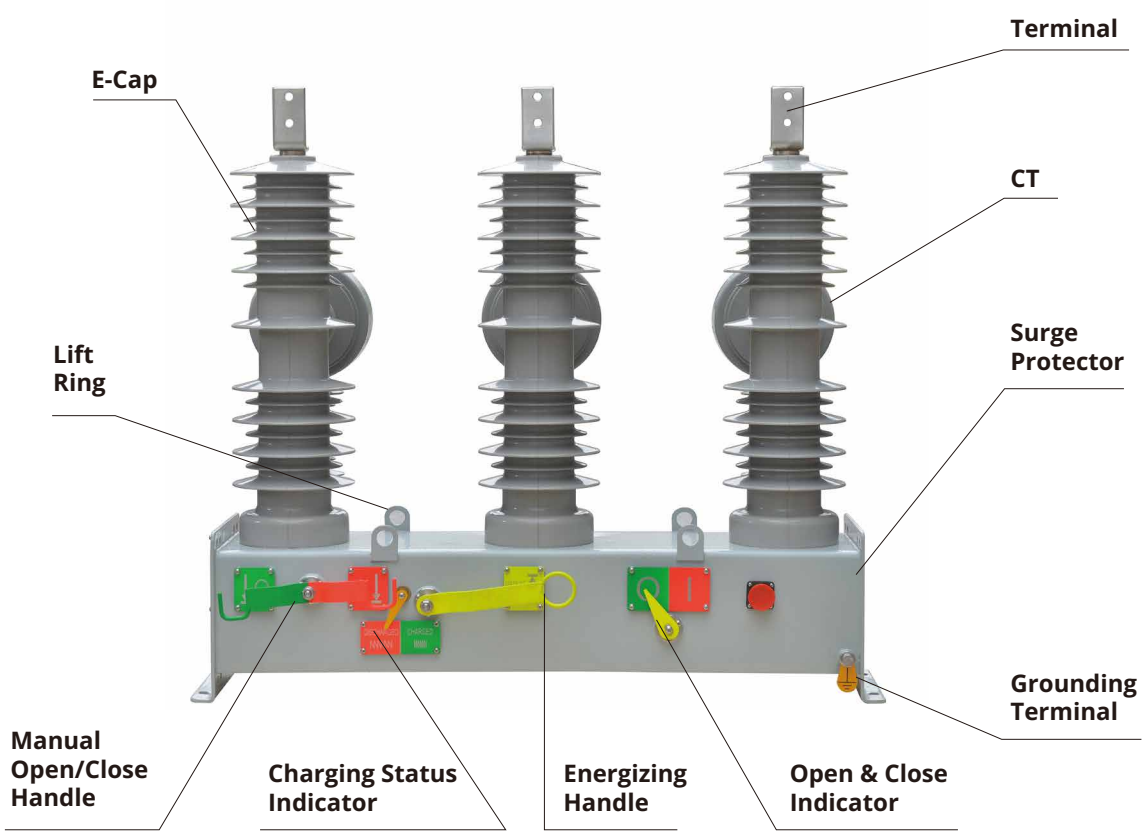
Parameters

		Unit	Value
Rated Voltage		kV	24
Rated Current		A	630
Frequency		Hz	50/60
Rated Current		A	630
Power frequency withstand voltage	Phrase to Phrase	kV/1min	50
	Gap		60
BIL	Phrase to Phrase	kV	125
	Gap		145
Operation Sequence			O-(0.3s)-CO-(15s)-CO
Short time withstand current		kA/s	20/4
Rated short circuit making current		kA	50
Rated short circuit breaking current		kA	20
Line Charging Breaking Current		A	10
Cable Charging Breaking Current		A	31.5
Circuit Breaker Level			C2-E2-M2
Mechanism Type			Spring Mechanism
Energizing Motor Voltage		V	DC24, AC220/DC220 (Optional)
Energizing Motor Power		W	80
Charging time		s	<12
Opening Release Voltage	Rated	V	DC24, AC220/DC220 (Optional)
	Range	V	80%~120% of DC24
Closing Release Voltage	Rated	V	DC24, AC220/DC220 (Optional)
	Range	V	70%~120% of DC24
Closing time		ms	40~70
Opening time		ms	20~70
Mechanical Lifetime		Times	10000

Disconnector parameter

Item	Unit	Data
Rated Voltage	kV	24
BIL	kV	145
PF withstand / 1min	kV	50/60
Rated current	A	630
Rated making current	kA	40
Short time withstand current	kA/3s	16
Mechanical life	Times	2000
Main Resistance (Incl SWG)	μΩ	150
Clearance distance	mm	300

4. Structure and functions



E-CAP

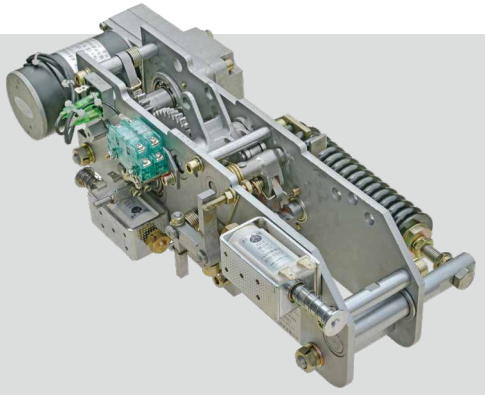
- Solid-encapsulated pole
- Vacuum Interrupt embedded (up to 20kA Breaker)
- Over design for creepage distance
- HCEP Insulation Material
  - Low leakage current
  - Low discharge activity
  - Low flash over probability
  - Environment Friendly (no SF6, no Oil)
- 2000m altitude application

NOVAs Outdoor Pole Mounted Vacuum Circuit Breaker

Structure and functions

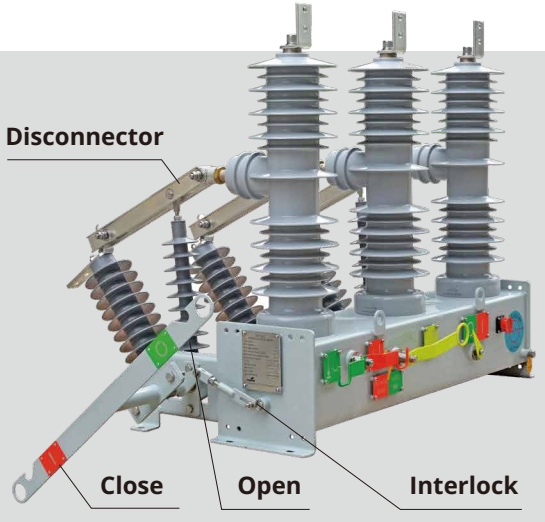
CT

- HCEP insulation material
- Ratio: 600/400/200/5
- Class: 10P10



Mechanism

- Spring charged, stored energy mechanism
- Up to 10000 times long mechanical life
- Optimized mechanical design
- Easy installation
- Motor / Manual operation
- Low energy
- Light weight



NOVAs-24 can configure a disconnector with integrated design

- Three phase design, moving simultaneously
- Manual Open/Close
- Interlock design to keep the disconnector manipulation safety
- Operation sequence:
  - Open: SWG -> Disconnect
  - Close: Disconnect -> SWG

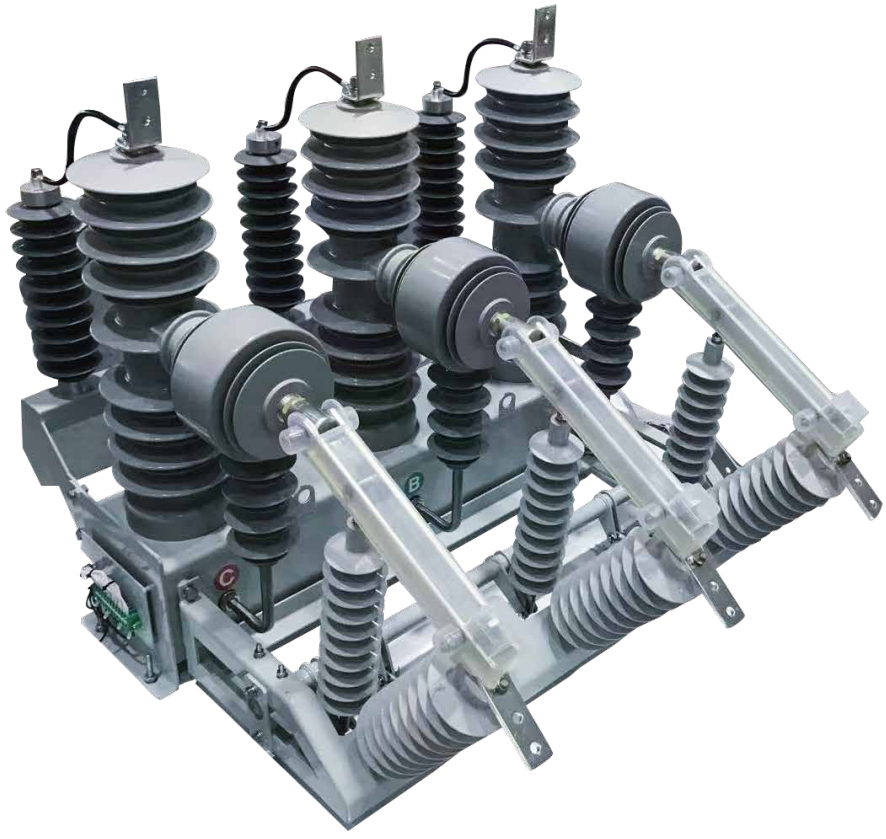
Voltage sensing option

3 Internal voltage sensors in source side busing

The internal voltage sensor is located internal to the NOVAs module and connected to the horizontal bushing. The internal voltage sensor is used to provide low voltage input to the FXD control for metering and/or protective functionality. The sensing option, cable, and control support a magnitude accuracy of 2% or better and a phase degree accuracy of ±1.5° throughout the temperature range of -40°C to +65°C.

3 Integrated voltage sensors in load side

NOVAs circuit breaker is also available with additional 3 external voltage sensors in load side to support voltage sensing from both source side and load side at time of order. Using a high-voltage resistor with outdoor bushing, the sensing option, cable, and control support a magnitude accuracy of 2% or better and a phase degree accuracy of ±1.5° throughout the temperature range of -40°C to +65°C.



5. Cortrol unit

The FXD recloser control offers advanced protection, monitoring and communication function for distribution automation needs. It contains modular components for easy maintenance.

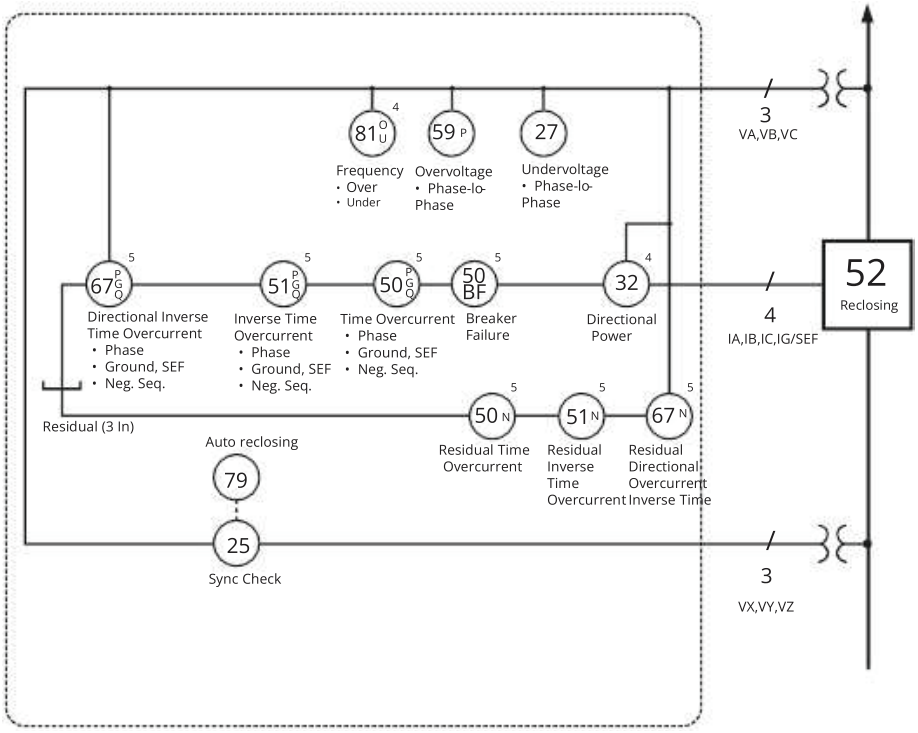
Local Human Machine Interface

- Large LCD (160mm x 160mm)，10 lines and 20 characters for each line
- User friendly navigation Buttons: Up, Down, Right, Left, ENTER, EDIT, ESC, RESET and LAMP TEST
- 25 LED Status Indicators:
  - Phase/Earth/SEF Fault, Voltage/Frequency Trip and Above Min Trip status;
  - Reclosing status of Ready, Cycle and Lockout.
  - System operation healthy status of Self Check, AC Power, Battery Low and Com Status
  - Voltage energizing status for source side and load side of the Recloser
  - 4 programmable indicators

- 2 Operation Buttons: Trip and Close with LED indication
- 12 shortcut Buttons:
  - HOT LINE TAG
  - REMOTE ENABLED
  - RECLOSING BLOCKED
  - BATTERY TEST
  - OC BLOCKED
  - EF. BLOCKED
  - S.E.F. BLOCKED
  - ALT PROFILE
  - OPTION #1
  - OPTION #2
  - OPTION #3
  - AUTHORIZATION
- Front RJ45 & USB engineering port

Modular Design

- Control cube support plug & play and IO expansion
- Capacitor housing
- Power supply module
- Battery
- MCB and Surge Protection Device
- Hygrostat-controlled heaters



Metering / Monitoring functions

- Operational measured values V, A, f
- Energy metering values Wp, Wq
- THD (Current & Voltage); Up to 16th Harmonic
- Duty cycle monitoring
- SOE Recorder
- Data Profiler
- Oscillography fault records

Communication Ports

- Front RJ45 & USB engineering port
- RS-232 & RS-485 ports
- Ethernet port, RJ45

Communication Protocol

- Modbus RTU & TCP
- DNP3 Serial & TCP
- IEC 60870-5-101
- IEC 60870-5-104
- SNTP
- IEC 61850 (Optional)

Software

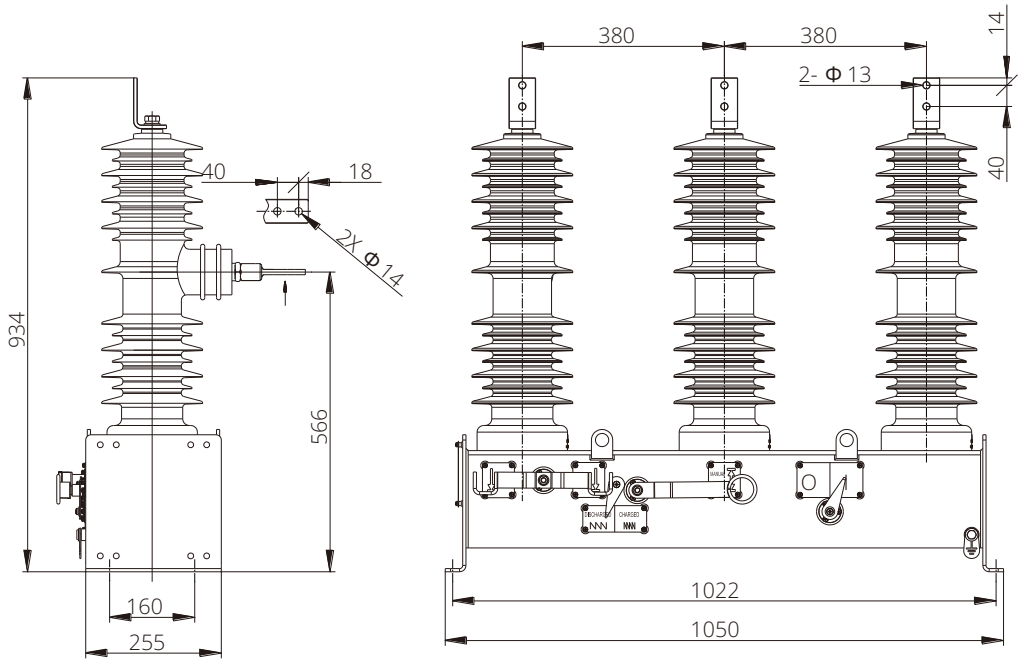
- Agile View

Protection functions

- 50P, Time Overcurrent – Phase
- 50G, Time Overcurrent – Earth, SEF
- 50Q, Time Overcurrent - Neq. Seq
- 51P, Inverse Time Overcurrent – Phase
- 51G, Inverse Time Overcurrent – Earth, SEF
- 51Q, Inverse Time Overcurrent - Neq. Seq
- 59, Overvoltage - Phase or Phase-to-Phase
- 27, Undervoltage - Phase or Phase-to-Phase
- 67P, Directional Inverse Time Overcurrent – Phase
- 67G, Directional Inverse Time Overcurrent - Ground, SEF
- 67Q, Directional Inverse Time Overcurrent - Neg. seq.
- 32, Directional Power
- 50BF, Breaker failure
- 81O, Frequency – Over
- 81U, Frequency – Under
- 79, Auto-recloser Sequence (4 shots)
- 25, Sync Check
- 21, Fault Locator
- Loss of Phase Protection
- Broken conductor protection

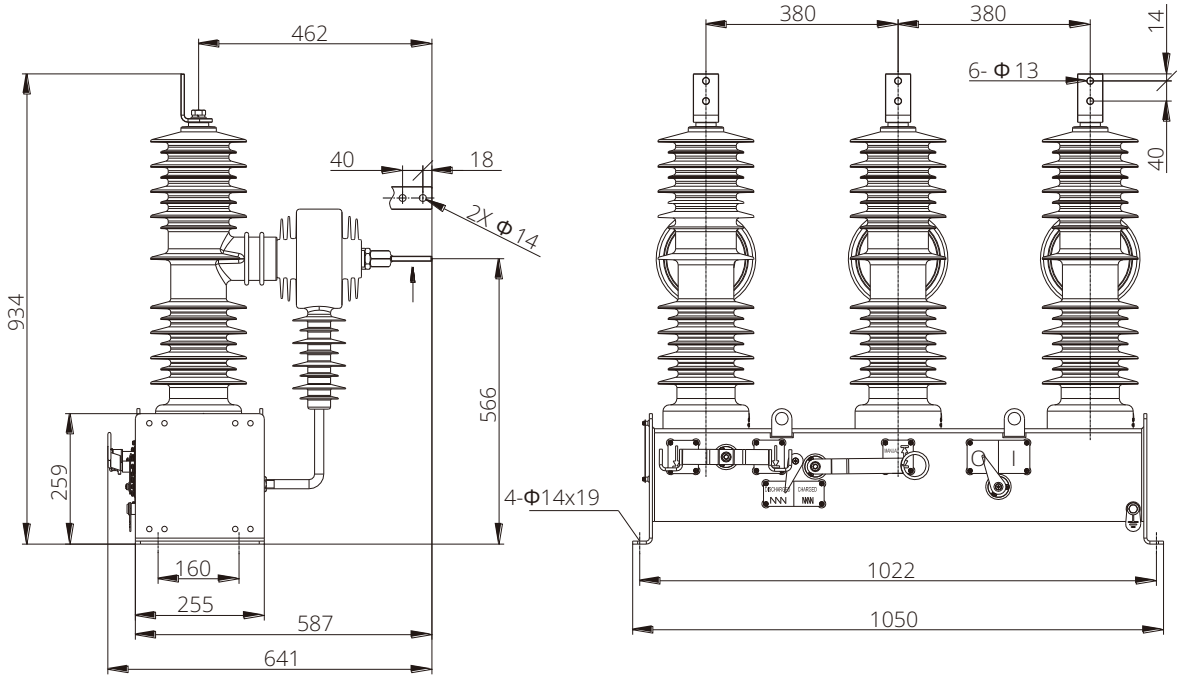
6. Outline drawing

- **Without Current Transformer**



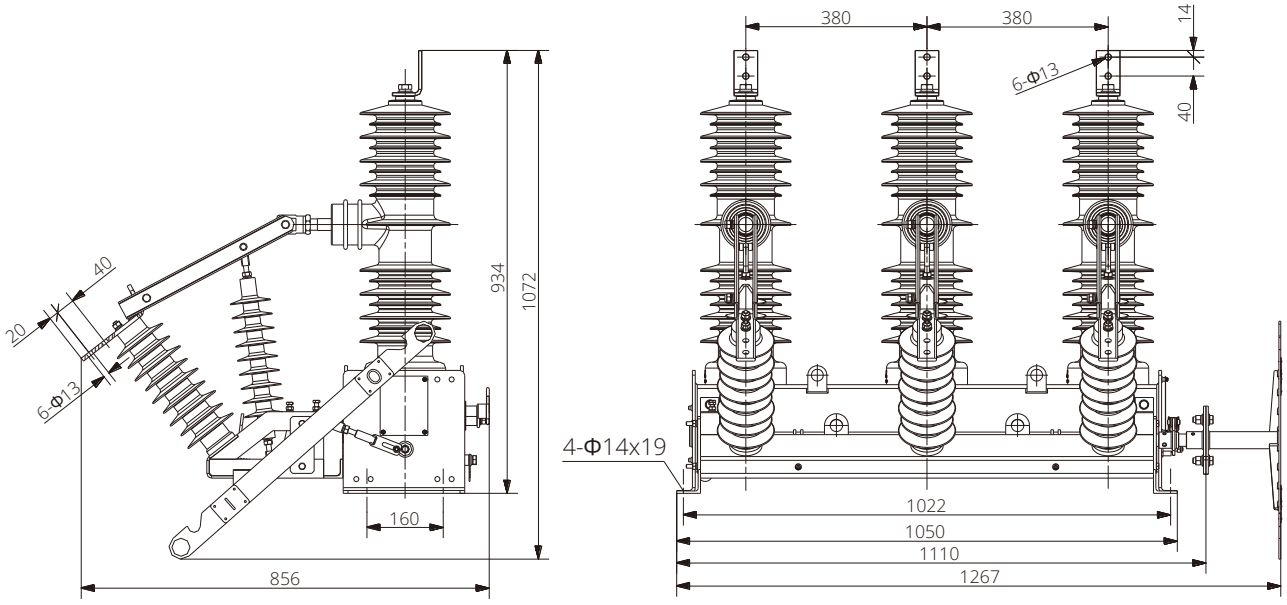
Weight: 85kg

- **With Current Transformer**



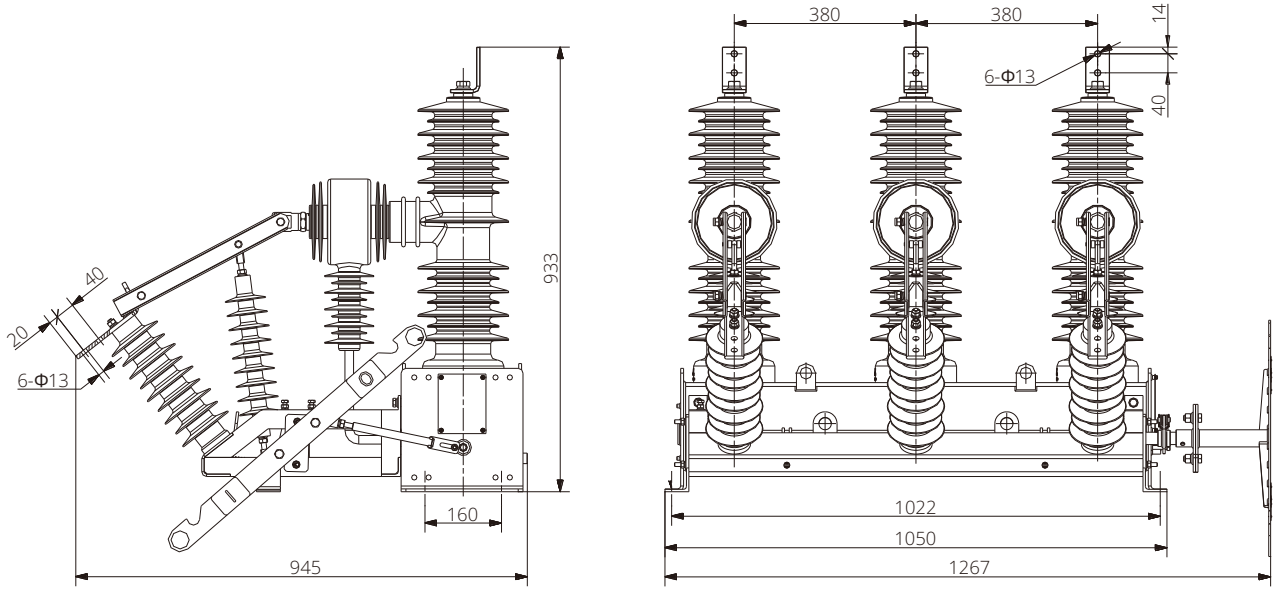
Weight: 105kg

- **With Disconnector**



Weight: 115kg

- **With Current Transformer and Disconnector**

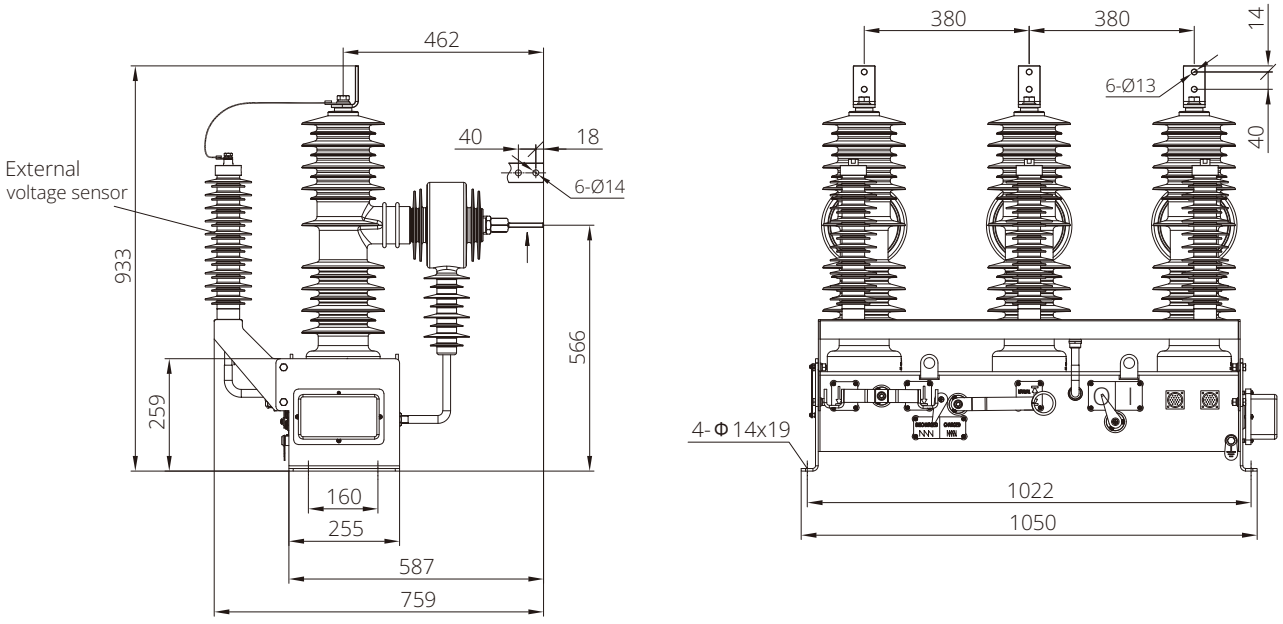


Weight: 135kg

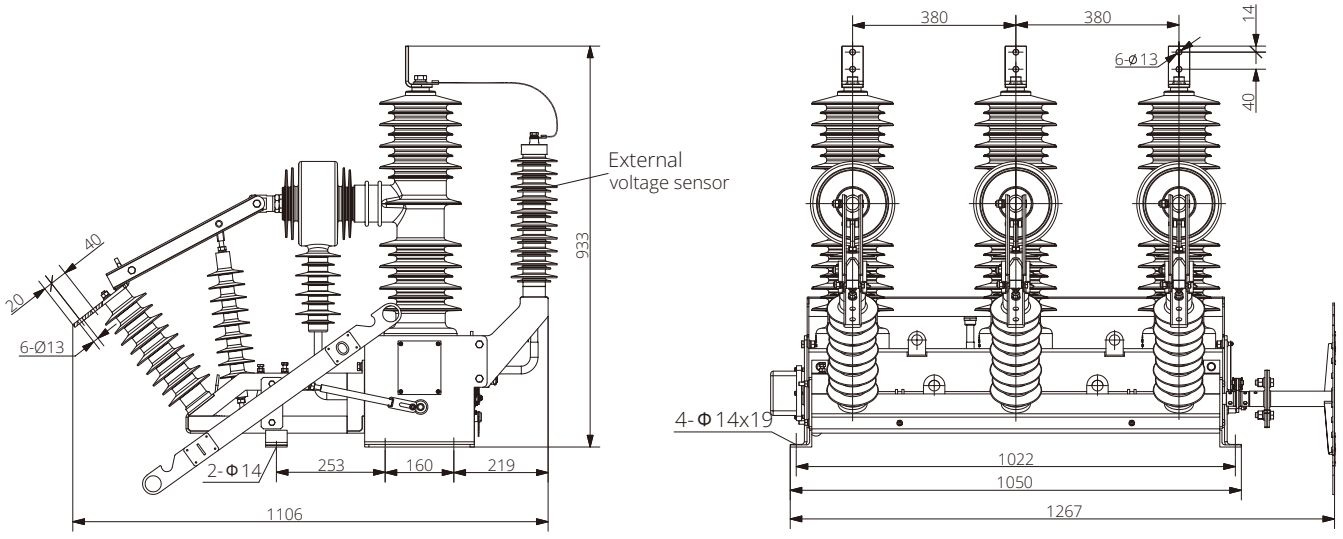
NOVAs Outdoor Pole Mounted Vacuum Circuit Breaker

Ordering guideline

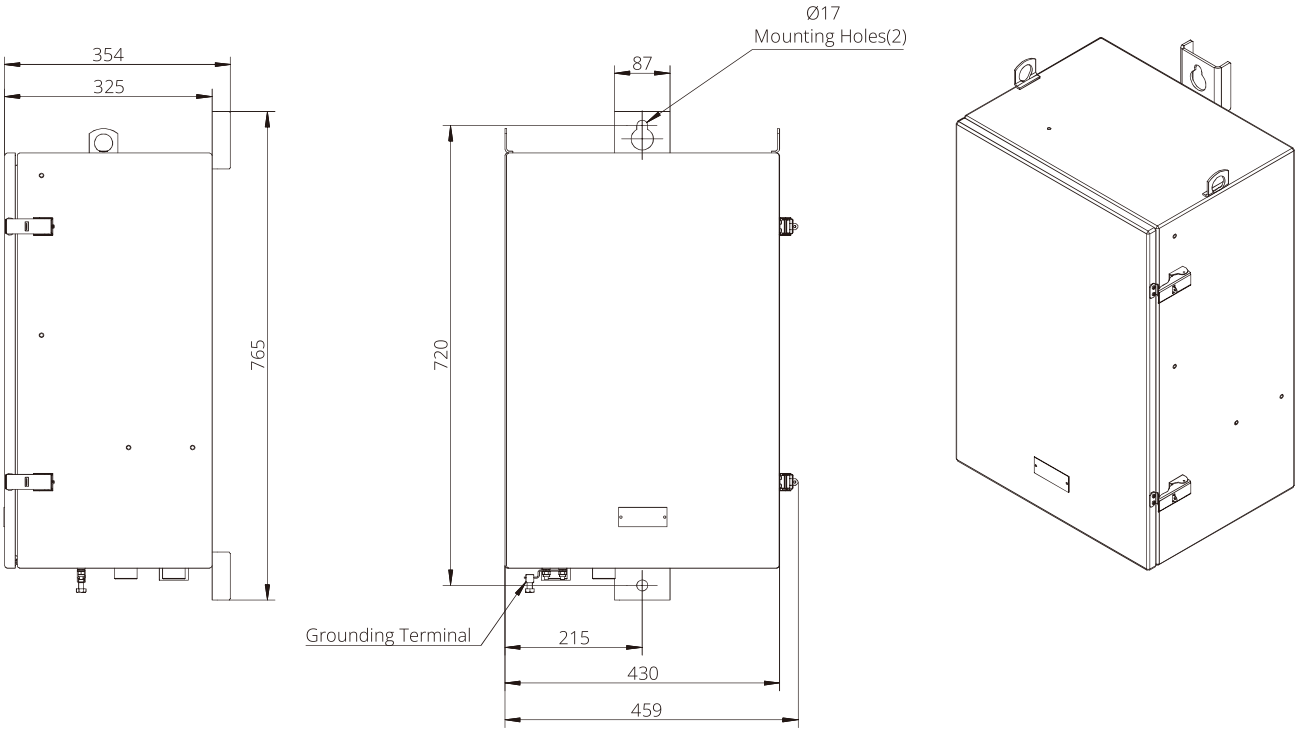
- **With Current Transformer and External voltage sensors**



- **With Current Transformer, Disconnector and External voltage sensors**



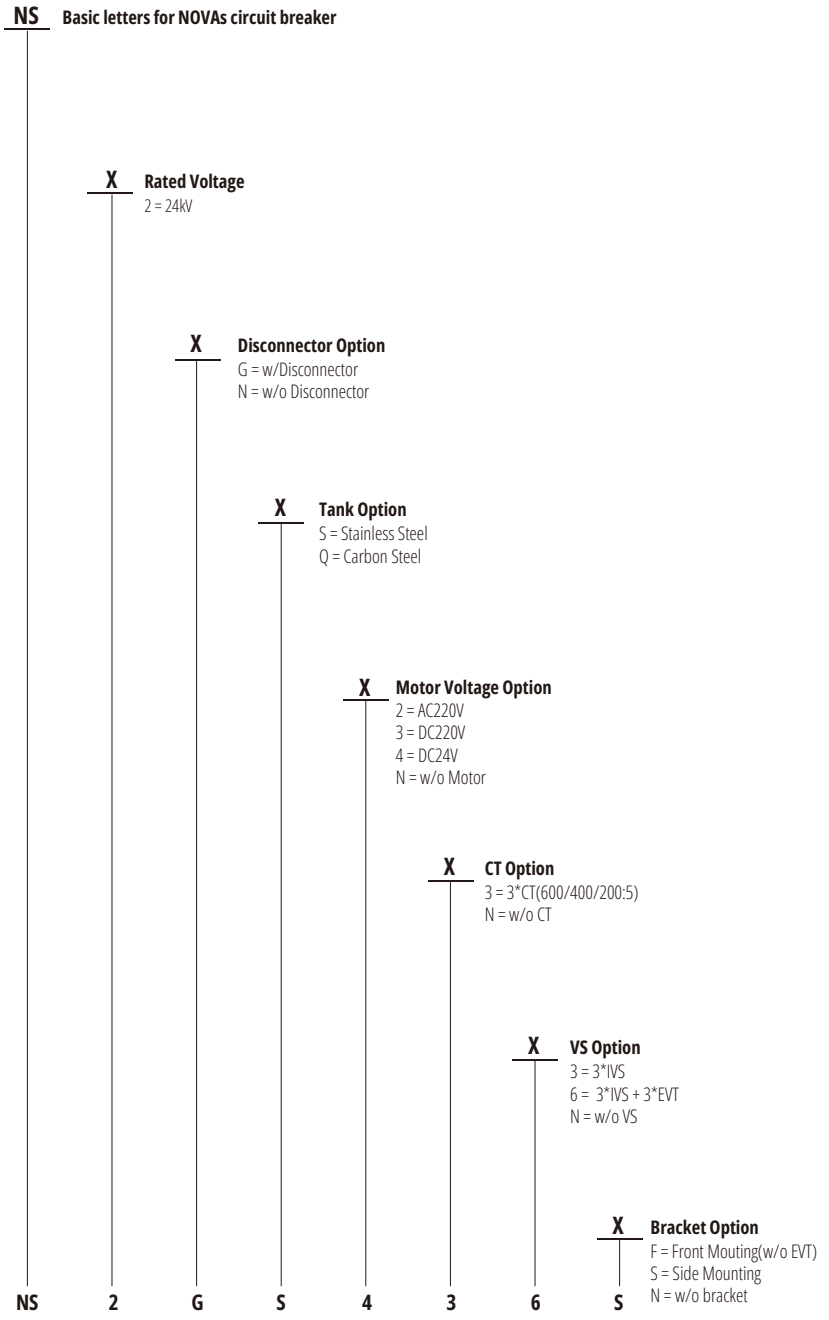
Cortrol unit



NOVAs Outdoor Pole Mounted Vacuum Circuit Breaker

Ordering guideline

7. Ordering guideline



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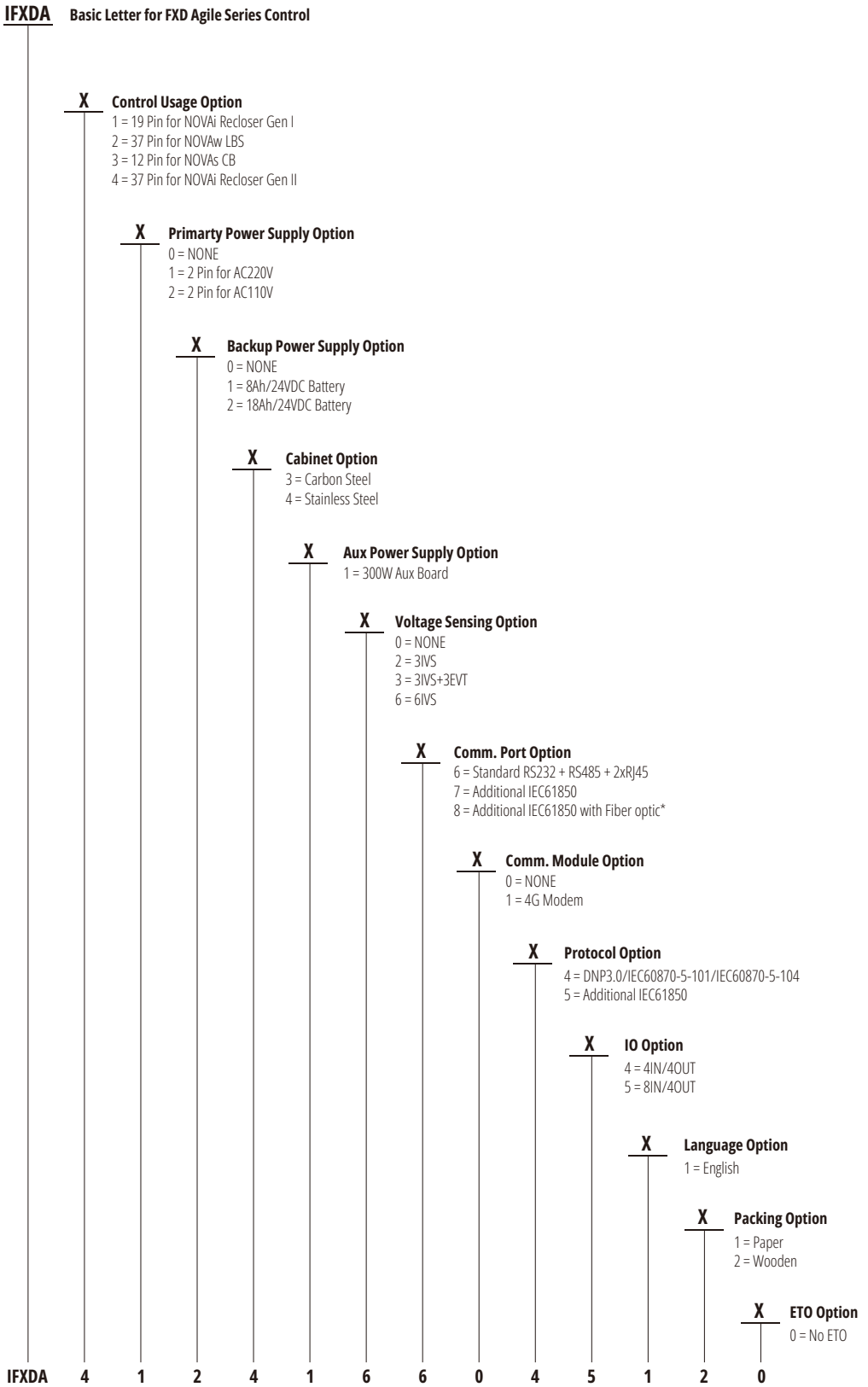

Eaton is an intelligent power management company dedicated to protecting the environment and improving the quality of life for people everywhere. We make products for the data center, utility, industrial, commercial, machine building, residential, aerospace and mobility markets. We are guided by our commitment to do business right, to operate sustainably and to help our customers manage power- today and well into the future. By capitalizing on the global growth trends of electrification and digitalization, we're accelerating the planet's transition to renewable energy sources, helping to solve the world's most urgent power management challenges, and building a more sustainable society for people today and generations to come.

Eaton was founded in 1911 and has been listed on the New York Stock Exchange for more than a century. We reported revenues of $23.2 billion in 2023 and serve customers in more than 160 countries. Eaton entered the Chinese market in 1993 and has grown significantly since then. In 2004, Eaton moved its Asia-Pacific headquarters from Hong Kong to Shanghai. Today, Eaton has nearly 8,000 employees and 19 manufacturing facilities in China.

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