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MODULAR SWITCHGEAR

Abstract

A switchgear apparatus includes a vacuum interrupter assembly having a movable contact and a stationary contact, a main housing surrounding the vacuum interrupter assembly, and a first terminal electrically coupled to one of the movable contact and the stationary contact, the first terminal extending from the main housing along a first axis. The switchgear apparatus also includes a second terminal electrically coupled to the other of the movable contact and the stationary contact, the second terminal extending from the main housing along a second axis, and a mounting head couplable to the main housing in a plurality of orientations about the first axis.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS [0001] This patent application is a division of U.S. patent application Ser. No. 17/606,373, filed Apr. 24, 2020, which is a national phase entry pursuant to 35 U.S.C. § 371 of International Patent Application No. PCT/US2020/029865, filed on Apr. 24, 2020, which claims priority to U.S. Provisional Patent Application No. 62/839,278 filed on Apr. 26, 2019, and to U.S. Provisional Patent Application No. 62/882,060 filed on Aug. 2, 2019, the entire contents of all of which are incorporated herein by reference.

FIELD OF THE DISCLOSURE
[0002] The present disclosure relates to solid dielectric switchgear, and more particularly to reclosers.
BACKGROUND OF THE DISCLOSURE
[0003] Reclosers are switchgear that provide line protection, for example, on overhead electrical power lines and/or substations and serve to segment the circuits into smaller sections, reducing the number of potentially impacted customers in the event of a short circuit. Previously, reclosers were controlled using hydraulics. More recently, solid dielectric reclosers have been developed for use at voltages up to 38 kV. Solid dielectric reclosers may be paired with electronic control devices to provide automation and “smart” recloser functionality.
SUMMARY OF THE DISCLOSURE
[0004] A need exists for fault protection and circuit segmentation in power transmission circuits, which typically operate at higher voltages (e.g., up to 1,100 kV). Reclosers allow for multiple automated attempts to clear temporary faults on overhead lines. In power transmission systems, this function is typically achieved using circuit breakers in substations. The present disclosure provides a modular recloser that can operate at voltages up to 72.5 kV and that can be pole-mounted outside of a substation. By enabling the placement of reclosers outside the substation, the present disclosure advantageously enables over-current protection to be positioned closer to potential faults and thereby segment the portion of the power transmission circuit affected by the fault to a smaller section. This reduces the potential impact of a fault to a smaller number of customers or end users, improving the power transmission system's reliability.
[0005] The present disclosure provides, in one aspect, a switchgear apparatus including a vacuum interrupter assembly having a movable contact and a stationary contact, a main housing surrounding the vacuum interrupter assembly, and a first terminal electrically coupled to one of the movable contact and the stationary contact, the first terminal extending from the main housing along a first axis. The switchgear apparatus also includes a second terminal electrically coupled to the other of the movable contact and the stationary contact, the second terminal extending from the main housing along a second axis, and a mounting head couplable to the main housing in a plurality of orientations about the first axis.
[0006] The present disclosure provides, in another aspect, a switchgear apparatus and mounting bracket assembly that includes a switchgear apparatus. The switchgear apparatus includes a vacuum interrupter assembly having a movable contact and a stationary contact, a main housing surrounding the vacuum interrupter assembly, a first terminal electrically coupled to one of the movable contact and the stationary contact, the first terminal extending from the main housing

along a first axis, a second terminal electrically coupled to the other of the movable contact and the stationary contact, the second terminal extending from the main housing along a second axis, and a mounting head selectively couplable to the main housing in a plurality of orientations. The switchgear apparatus and mounting bracket assembly also includes a mounting bracket coupled to the mounting head.

[0007] The present disclosure provides, in another aspect, a switchgear apparatus and mounting bracket assembly including a mounting bracket and a switchgear apparatus. The switchgear apparatus includes a vacuum interrupter assembly having a movable contact and a stationary contact, a main housing surrounding the vacuum interrupter assembly, a first terminal electrically coupled to one of the movable contact and the stationary contact, the first terminal extending from the main housing along a first axis, a second terminal electrically coupled to the other of the movable contact and the stationary contact, the second terminal extending from the main housing along a second axis, and a mounting head configured to be coupled to the mounting bracket such that the mounting bracket is configured to at least partially support the switchgear apparatus via the mounting head. The switchgear apparatus is configurable to position at least one of the first axis or the second axis in a plurality of different orientations with respect to the mounting bracket when the mounting head is coupled to the mounting bracket.

[0008] Other aspects of the invention will become apparent by consideration of the detailed description and accompanying drawings.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. **1** is a perspective view of a recloser according to an embodiment of the present disclosure.

[0010] FIG. **2** is a cross-sectional view of the recloser of FIG. **1**.

[0011] FIG. **3** is an exploded perspective view of a housing of the recloser of FIG. **1**.

[0012] FIG. **4** is a perspective view of a mount of the recloser of FIG. **1**.

[0013] FIG. **5** is a cross-sectional view of the recloser of FIG. **1**, illustrating the mount of FIG. **4**.

[0014] FIG. **6** is a perspective view of an assembly including the recloser of FIG. **1** coupled to a bracket in a first vertical orientation.

[0015] FIG. **7**A is a top view of the assembly of FIG. **6**.

[0016] FIG. **7**B is a top view of the assembly of FIG. **6** illustrating the recloser in a second vertical orientation.

[0017] FIG. **7**C is a top view of the assembly of FIG. **6** illustrating the recloser in a third vertical orientation.

[0018] FIG. **7**D is a top view of the assembly of FIG. **6** illustrating the recloser in a fourth vertical orientation.

[0019] FIG. **7**E is a top view of the assembly of FIG. **6** illustrating the recloser in a fifth vertical orientation.

[0020] FIG. **7**F is a top view of the assembly of FIG. **6** illustrating the recloser in a sixth vertical orientation.

[0021] FIG. **8** is a front view of the assembly of FIG. **6** illustrating the recloser in a first horizontal orientation.

[0022] FIG. **9**A is a right side view of the assembly of FIG. **8**.

[0023] FIG. **9**B is a right side view of the assembly of FIG. **6** illustrating the recloser in a second horizontal orientation.

[0024] FIG. **9**C is a right side view of the assembly of FIG. **6** illustrating the recloser in a third horizontal orientation.

[0025] FIG. **10** is a front view of the assembly of FIG. **6** illustrating the recloser in a fourth horizontal orientation.
[0026] FIG. **11**A is a left side view of the assembly of FIG. **10**.
[0027] FIG. **11**B is a left side view of the assembly of FIG. **6** illustrating the recloser in a fifth horizontal orientation.
[0028] FIG. **11**C is a left side view of the assembly of FIG. **6** illustrating the recloser in a sixth horizontal orientation.
[0029] FIG. **12** illustrates a plurality of the assemblies of FIG. **6** mounted to a pole, with each recloser in the first vertical orientation.
[0030] FIG. **13** illustrates a plurality of the assemblies of FIG. **8** mounted to a pole, with each recloser in the first horizontal orientation.
[0031] FIG. **14** is a side view of an assembly according to another embodiment, the assembly including a bracket and a recloser coupled to the bracket in an angled orientation.
DETAILED DESCRIPTION
[0032] Before any embodiments are explained in detail, it is to be understood that the arrangements are not limited in application to the details of construction and arrangement of components set forth in the following description or illustrated in the following drawings. The invention is capable of other embodiments and of being practiced or of being carried out in various ways.
[0033] FIG. **1** illustrates a recloser **10** according to an embodiment of the present disclosure. The recloser **10** includes a housing assembly **14**, a vacuum interrupter ("VI") assembly **18**, a conductor assembly **22**, which in some embodiments may be a load-side conductor assembly **22** and in other embodiments may be a source-side conductor assembly **22**, and an actuator assembly **26**. The VI assembly **18** includes a first terminal **30** extending from the housing assembly **14** along a first longitudinal axis **34**, and the conductor assembly **22** includes a second terminal **38** extending from the housing assembly **14** along a second longitudinal axis **42** perpendicular to the first longitudinal axis **34**. In other embodiments, the second longitudinal axis **42** may be obliquely oriented relative to the first longitudinal axis **34**. As described in greater detail below, the actuator assembly **26** operates the VI assembly **18** to selectively break and/or reestablish a conductive pathway between the first and second terminals **30**, **38**. Although the recloser **10** is illustrated individually in FIG. **1**, the recloser **10** may be part of a recloser system **10**A (e.g., FIGS. **12-13**) including a plurality of reclosers **10**, each associated with a different phase of a three-phase power transmission system and ganged together such that operation of the plurality of reclosers **10** is synchronized. In some embodiments, the reclosers **10** of the recloser system **10**A may be operable individually (i.e. the reclosers **10** may open and/or close independently from one another).
[0034] The illustrated housing assembly **14** includes a main housing **46** constructed from an insulating material, such as epoxy, that forms a solid dielectric module. For example, the main housing **46** can be constructed from a silicone or cycloaliphatic epoxy or a fiberglass molding compound. In the illustrated embodiment, the main housing **46** is covered with a silicone rubber layer that withstands heavily polluted environments and serves as a dielectric material for the recloser **10**. The silicone rubber layer may be overmolded onto the main housing **46**. In the illustrated embodiment, the main housing **46** includes a first bushing **50** that surrounds and at least partially encapsulates the VI assembly **18**, and a second bushing **54** that surrounds and at least partially encapsulates the conductor assembly **22**. The silicone rubber layer includes a plurality of sheds **58** extending radially outward from both bushings **50**, **54**. The first and second bushings **50**, **54** are integrally formed together with the main housing **46** as a single monolithic structure in the illustrated embodiment. Alternatively, the first and second bushings **50**, **54** may be formed separately and coupled to the main housing **46** in a variety of ways (e.g., via a threaded connection, snap-fit, etc.).
[0035] With reference to FIG. **2**, the VI assembly **18** includes a vacuum bottle **62** at least partially molded within the first bushing **50** of the main housing **46**. The vacuum bottle **62** encloses a

movable contact **66** and a stationary contact **70** such that the movable contact **66** and the stationary contact **70** are hermetically sealed within the vacuum bottle **62**. In some embodiments, the vacuum bottle **62** has an internal absolute pressure of about 1 millipascal or less. The movable contact **66** is movable along the first longitudinal axis **34** between a closed position (illustrated in FIG. **2**) and an open position (not shown) to selectively establish or break contact with the stationary contact **70**. The vacuum bottle **62** quickly suppresses electrical arcing that may occur when the contacts **66**, **70** are opened due to the lack of conductive atmosphere within the bottle **62**.

[0036] The conductor assembly **22** includes a conductor **74** and a sensor assembly **78**, each at least partially molded within the second bushing **54** of the main housing **46**. The sensor assembly **78** can include a current sensor, voltage sensor, partial discharge sensor, voltage indicated sensor, and/or other sensing devices. One end of the conductor **74** is electrically coupled to the movable contact **66** via a current interchange **82**. The opposite end of the conductor **74** is electrically coupled to the second terminal **38**. The first terminal **30** is electrically coupled to the stationary contact **70**. The first terminal **30** and the second terminal **38** are configured for connection to respective electrical power transmission lines.

[0037] With continued reference to FIG. **2**, the actuator assembly **26** includes a drive shaft **86** extending through the main housing **46** and coupled at one end to the movable contact **66** of the VI assembly **18**. In the illustrated embodiment, the drive shaft **86** is coupled to the movable contact **66** via an encapsulated spring **90** to permit limited relative movement between the drive shaft **86** and the movable contact **66**. The encapsulated spring **90** biases the movable contact **66** toward the stationary contact **70**. The opposite end of the drive shaft **86** is coupled to an output shaft **94** of an electromagnetic actuator **98**. The electromagnetic actuator **98** is operable to move the drive shaft **86** along the first longitudinal axis **34** and thereby move the movable contact **66** relative to the stationary contact **70**. In additional or alternative embodiments, the functionality provided by the encapsulated spring **90** may be provided with an external spring and/or a spring positioned otherwise along the drive shaft **86**. For example, the spring may be instead positioned at a first end or at a second end of the drive shaft **86**.

[0038] The actuator assembly **26** includes a controller (not shown) that controls operation of the electromagnetic actuator **98**. In some embodiments, the controller receives feedback from the sensor assembly **78** and energizes or de-energizes the electromagnetic actuator **98** in response to one or more sensed conditions. For example, the controller may receive feedback from the sensor assembly **78** indicating that a fault has occurred. In response, the controller may control the electromagnetic actuator **98** to automatically open the VI assembly **18** and break the circuit. The controller may also control the electromagnetic actuator **98** to automatically close the VI assembly **18** once the fault has been cleared (e.g., as indicated by the sensor assembly **78**).

[0039] In the illustrated embodiment, the actuator assembly **26** further includes a manual trip assembly **102** that can be used to manually open the VI assembly **18**. The manual trip assembly **102** includes a handle **104** accessible from an exterior of the housing assembly **14** (FIG. **1**). The handle **104** is rotatable to move a yoke **106** inside the housing assembly **14** (FIG. **2**). The yoke **106** is engageable with a collar **110** on the output shaft **94** to move the movable contact **66** toward the open position.

[0040] Referring to FIGS. **2** and **3**, the housing assembly **14** further includes an actuator housing **114** enclosing the electromagnetic actuator **98** and a mounting head **118** coupled between the actuator housing **114** and the main housing **46**. In the illustrated embodiment, the mounting head **118** is coupled to the main housing **46** by a first plurality of threaded fasteners **122**, and the actuator housing **114** is coupled to the mounting head **118** opposite the main housing **46** by a second plurality of threaded fasteners **125** (FIG. **3**). Referring to FIGS. **4** and **5**, the mounting head **118** includes a main body **126** and a plurality of mounting bosses **130** spaced along the outer periphery of the main body **126**. In the illustrated embodiment, the plurality of mounting bosses **130** includes a first pair of bosses **130***a* extending from the main body **126** in a first direction, a second pair of

bosses **130***b* extending from the main body **126** in a second direction opposite the first direction, and a third pair of bosses **130***c* extending from the main body **126** in a third direction orthogonal to the first and second directions. In other embodiments, the mounting head **118** may include a different number and/or arrangement of mounting bosses **130**.

[0041] The mounting head **118** is couplable to the main housing **46** in a plurality of different orientations such that the pairs of bosses **130** (**130***a*, **130***b*, **130***c*) may be positioned in a number of different rotational orientations about axis **34** with respect to the main housing **46**. That is, the rotational orientation of the pairs of bosses **130** about the circumference of the main housing **46** may be varied as desired by rotating the orientation of the mounting head **118** and main housing **46** relative to one another about the axis **34** to a desired position before coupling the mounting head **118** and the main housing **46**. In some embodiments, the mounting head **118** may be coupled to the main housing **46** in at least three different orientations. In other embodiments, the mounting head **118** may be coupled to the main housing **46** in at least six different orientations. In other embodiments, the main housing **46**, the mounting head **118**, and the actuator housing **114** may be coupled together in other ways (e.g., via direct threaded connections or the like).

[0042] With reference to FIG. **5**, the handle **104** of the manual trip assembly **102** extends along a side of the main body **126** opposite the third pair of bosses **130***c*. The handle **104** is coupled to the yoke **106** via a shaft **134** extending through the main body **126**. In the illustrated embodiment, the main body **126** of the mounting head **118** also supports a connector **138**. In the illustrated embodiment, the connector **138** is positioned between the handle **104** and the first pair of bosses **130***a* along the outer periphery of the main body **126**. The connector **138** is in communication with the sensor assembly **78** such that feedback from the sensor assembly **78** may be obtained by interfacing with the connector **138**.

[0043] Referring to FIG. **6**, the illustrated recloser **10** is provided with a mounting bracket **200** that interfaces with the bosses **130** on the mounting head **118** to facilitate mounting the recloser **10** in a variety of different orientations. The illustrated mounting bracket **200** includes a backing frame **204**, a first arm **208** extending perpendicularly from the backing frame **204**, a second arm **212** extending perpendicularly from the backing frame **204** and spaced from the first arm **208**, a first brace **216** extending at an angle between the backing frame **204** and the first arm **208**, and a second brace (not shown) structured and oriented in the same manner as the first brace **216** extending at an angle between the backing frame **204** and the second arm **212**. As such, the illustrated mounting bracket **200** is generally U-shaped.

[0044] The recloser **10** is received within a space defined between the arms **208**, **212** such that the handle **104** and connector **138** face away from the backing frame **204**. As such, the handle **104** and connector **138** are easily accessible when the recloser **10** is attached to the mounting bracket **200**. The first arm **208** is coupled to the first pair of bosses **130***a*, and the second arm **212** is coupled to the second pair of bosses **130***b* (e.g., with a plurality of threaded fasteners; not shown). In some embodiments, the backing frame **204** may be coupled to the third pair of bosses **130***c*, either directly or intermediate mounting hardware. Thus, the mounting bracket **200** may be attached to the mounting head **118** of the recloser **10** on three different sides to securely hold the recloser **10**. In some embodiments, the backing frame **204** may not be coupled to the third pair of bosses **130***c*, such that the mounting bracket **200** and the mounting head **118** of the recloser **10** may be attached on only two different sides.

[0045] With reference to FIGS. **12-13**, the recloser **10** may be part of a recloser system **10**A including three reclosers **10**—each associated with a different phase of a three-phase power transmission system. The mounting bracket **200** advantageously allows each recloser **10** to be mounted to, for example, a pole **300** in a vertical orientation (FIG. **12**), in which the first axis **34** is oriented generally parallel to the pole **300** and generally perpendicular to the ground, and in a horizontal orientation for the exemplary vertical pole **300** (FIG. **13**), in which the first axis **34** is oriented generally perpendicular to the pole **300** and generally parallel to the ground. Of course,

depending on the orientation of the pole **300**, the possible varied orientations of a particular recloser **10** relative to the ground would be different from those illustrated in the exemplary embodiments of FIGS. **12** and **13**. Each recloser **10** can thus be conveniently used with different wiring configurations, clearances, or spacings when mounted to a pole **300**, which facilitates installation of the recloser system **10**A outside of substations. The mounting bracket **200** may also be used to mount the recloser **10** in a substation in either a vertical or horizontal orientation.

[0046] With reference to FIGS. **7**A-**7**F, the exemplary embodiment of the mounting head **118** allows the recloser **10** (specifically, the main housing **46** of the recloser **10** in some embodiments) to be coupled to the bracket **200** in at least six different rotational orientations about the first axis **34** to provide the recloser **10** with an even greater variety of mounting configurations. As explained above, the rotational orientation about first axis **34** in which the mounting head **118** can be coupled to the main housing **46** can be varied. In other embodiments, the rotational orientation of the second axis **42** and the second terminal **38** of the recloser **10** can be varied relative to the mounting bracket **200** by coupling the mounting head **118** to the mounting bracket **200** in different rotational orientations about the first axis **34**. Thus, the orientation of the second axis **42** (and thus, the second terminal **38**) of the recloser **10** can be varied relative to the mounting bracket **200** to facilitate making connections to the second terminal **38**.

[0047] For example, in the illustrated embodiment, the recloser **10** can be mounted in a first orientation (FIG. **7**A) in which the second axis **42** and second terminal **38** are perpendicular to the backing frame **204**, a second orientation (FIG. **7**B) in which the second axis **42** and second terminal **38** are offset 45 degrees from the first orientation, a third orientation (FIG. **7**C) in which the second axis **42** and second terminal **38** are offset 90 degrees from the first orientation, a fourth orientation (FIG. **7**D) in which the second axis **42** and second terminal **38** are offset 180 degrees from the first orientation, a fifth orientation (FIG. **7**E) in which the second axis **42** and second terminal **38** are offset 270 degrees from the first orientation, and a sixth orientation (FIG. **7**F) in which the second axis **42** and second terminal **38** are offset 315 degrees from the first orientation.

[0048] Referring to FIGS. **8**-**11**C, the orientation of the mounting bracket **200** may also be varied to change the orientation of the first terminal **30** of the recloser **10** (e.g., from vertical to horizontal) to facilitate making connections to the first terminal **30**. For example, in the illustrated embodiment, the recloser **10** can be mounted in a first plurality of orientations (FIGS. **8**-**9**C) with the first terminal **30** extending in a first direction (i.e. to the right in FIG. **8**), and the recloser **10** can be mounted in a second plurality of orientations (FIGS. **10**-**11**C) with the first terminal **30** extending in a second direction (i.e. to the left in FIG. **10**) opposite the first direction. In each case, the recloser **10** can be mounted in at least first orientation (FIG. **9**A and FIG. **11**A) in which the second axis **42** and the second terminal **38** are perpendicular to the backing frame **204**, a second orientation (FIG. **9**B and FIG. **11**B) in which the second axis **42** and second terminal **38** are offset 45 degrees from the first orientation, and a third orientation (FIG. **9**C and FIG. **11**C) in which the second axis **42** and second terminal **38** are offset 90 degrees from the first orientation.

[0049] With reference to FIG. **14**, in some embodiments, the mounting bracket **200** may be configured to support the recloser **10** such that the first axis **34** is oriented at an angle relative to the backing frame **204** and the horizontal and vertical directions. For example, the embodiment illustrated in FIG. **14**, the mounting bracket **200** supports the recloser **10** such that the first axis **34** is angled at 45 degrees relative to vertical. In such embodiments, the backing frame **204** may have an L-shape to facilitate mounting the backing frame **204** to a pole, a concrete pad, or the like.

[0050] Thus, the present disclosure provides a high voltage recloser **10** suitable for use in power transmission applications up to 72.5 kV. The recloser **10** includes a mounting head **118** and mounting bracket **200** that allow the recloser **10** to be mounted on a pole or at a substation in a variety of different vertical, horizontal, and angled orientations. That is, the recloser **10** can be assembled to suit a wide variety of different applications, which may provide significant cost

savings and manufacturing efficiency.
[0051] Various features and advantages of the invention are set forth in the following claims.

Claims

1. A switchgear apparatus comprising: a vacuum interrupter assembly having a movable contact and a stationary contact; a main housing surrounding the vacuum interrupter assembly; a first terminal electrically coupled to the movable contact, the first terminal extending from the main housing along a first axis; a second terminal electrically coupled to the stationary contact, the second terminal extending from the main housing along a second axis; and a mounting head couplable to the main housing in a plurality of orientations about the first axis.
2. The switchgear apparatus of claim 1, further comprising an actuator assembly configured to move the movable contact relative to the stationary contact; and an actuator housing at least partially enclosing the actuator assembly.
3. The switchgear apparatus of claim 2, wherein the actuator housing is coupled to the mounting head opposite the main housing.
4. The switchgear apparatus of claim 2, wherein the actuator assembly includes an electromagnetic actuator and a manual trip assembly.
5. The switchgear apparatus of claim 4, wherein the manual trip assembly includes a handle and a shaft coupled to the handle, wherein the shaft extends through the mounting head.
6. The switchgear apparatus of claim 2, wherein the mounting head is coupled between the main housing and the actuator housing, and wherein the mounting head is configured to be selectively coupled to the main housing in a plurality of different rotational orientations about the first axis relative to the main housing such that the main housing may be selectively positioned in a plurality of different rotational orientations about the first axis relative to the actuator housing.
7. The switchgear apparatus of claim 6, wherein the mounting head includes a plurality of mounting bosses extending from an exterior surface of the mounting head, each mounting boss spaced apart from each adjacent mounting boss about a perimeter of the mounting head.
8. The switchgear apparatus of claim 7, wherein each mounting boss is configured to be coupled to a same support such that the main housing may be selectively positioned in a plurality of different rotational orientations about at least one of the first axis or the second axis relative to the support when the mounting head is coupled to the support.
9. The switchgear apparatus of claim 8, wherein the support is a mounting bracket configured to couple the switchgear apparatus to a pole.
10. The switchgear apparatus of claim 9, wherein the plurality of mounting bosses includes a first pair of mounting bosses, a second pair of mounting bosses, and a third pair of mounting bosses.
11. The switchgear apparatus of claim 10, wherein the first pair of mounting bosses is configured to be coupled to a first arm of the mounting bracket, wherein the second pair of mounting bosses is configured to be coupled to a second arm of the mounting bracket, and wherein the third pair of mounting bosses is configured to be coupled to a backing frame of the mounting bracket.
12. A switchgear apparatus comprising: a vacuum interrupter assembly having a movable contact and a stationary contact; a main housing surrounding the vacuum interrupter assembly; an actuator assembly configured to move the movable contact relative to the stationary contact, and an actuator housing at least partially enclosing the actuator assembly; a first terminal electrically coupled to the stationary contact, the first terminal extending from the main housing along a first axis; a second terminal electrically coupled to the movable contact, the second terminal extending from the main housing along a second axis; and a mounting head coupled between the main housing and the actuator housing, wherein the mounting head is configured to selectively position the main housing in a plurality of different orientations about the first axis relative to the actuator housing.
13. The switchgear apparatus of claim 12, wherein the actuator housing is coupled to the mounting

head opposite the main housing.

14. The switchgear apparatus of claim 12, wherein the actuator assembly includes an electromagnetic actuator and a manual trip assembly, the manual trip assembly having a handle accessible from an exterior of the switchgear apparatus and a shaft operatively coupled between the handle and the movable contact, and wherein the mounting head is configured such that the main housing can be selectively positioned in a plurality of different orientations about the first axis relative to the handle.

15. The switchgear apparatus of claim 12, wherein the mounting head includes a first pair of mounting bosses, a second pair of mounting bosses, and a third pair of mounting bosses, and further comprising a mounting bracket having a first arm configured to be coupled to the first pair of mounting bosses, a second arm configured to be coupled to the second pair of mounting bosses, and a backing frame configured to be coupled to the third pair of mounting bosses.

16. The switchgear apparatus of claim 15, wherein the mounting bracket is configured to couple the switchgear apparatus to a pole.

17. The switchgear apparatus of claim 15, wherein the backing frame defines a plane and the mounting bracket is configured to selectively position the switchgear apparatus such that the first axis extends in a direction that is not parallel to the plane when the mounting head is coupled to the mounting bracket.

18. The switchgear apparatus of claim 15, wherein the mounting head and mounting bracket are configured to selectively position each of the first axis and the second axis in a plurality of different orientations relative to the mounting bracket when the mounting head is coupled to the mounting bracket.

19. The switchgear apparatus of claim 15, wherein the mounting head is configured to selectively position the switchgear apparatus such that the first terminal extends in a first direction relative to the backing frame and a second direction different from the first direction relative to the backing frame.

20. The switchgear apparatus of claim 15, wherein the mounting head is configured to selectively position the main housing in a plurality of different orientations about the first axis relative to the mounting bracket when the mounting head is coupled to the mounting bracket.