

# Religador série U com Controlador ADVC

## Manual de Instalação, Operação e Manutenção

10/2017



---

A informação fornecida nessa documentação contém descrições gerais e características técnicas da performance dos produtos aqui contidos. Essa documentação não se destina como substituta e não deve ser usada para determinar a adequação ou confiabilidade desses produtos para aplicações específicas. É obrigação de qualquer usuário ou integrador realizar a análise completa de riscos, avaliação e teste dos produtos apropriados com relação as aplicações específicas ou ao uso dele. Nem a Schneider Electric ou qualquer uma de suas filiais ou subsidiárias podem ser responsáveis pelo mal uso da informação contida aqui. Se você tiver alguma sugestão de alteração, melhoria ou achar algum erro nesta publicação, favor nos notificar.

Nenhuma parte deste documento pode ser reproduzida em qualquer formato ou por qualquer meio, seja eletrônico ou mecânico, incluindo cópias, sem a permissão expressa da Schneider Electric.

Toda legislação pertinente, seja estadual, regional ou local deve ser observada ao instalar e durante o uso desse produto. Toda legislação pertinente, seja estadual, regional ou local deve ser observada ao instalar e usar esse produto. Por questões de segurança e para ajudar a garantir a conformidade com os dados documentados no sistema, apenas o fabricante deve realizar reparos nos componentes.

Quando os dispositivos são usados para aplicações com requerimentos de segurança técnica, as instruções relevantes devem ser seguidas.

Falha ao usar o software da Schneider Electric ou o software aprovado junto ao hardware de nossos produtos pode resultar em ferimentos, danos ou resultados operacionais impróprios.

Falha ao observar essa informação pode resultar em ferimentos ou danos de equipamentos.

© 2017 Schneider Electric. All Rights Reserved.





<b>Informação de Segurança</b> .....	<b>5</b>
<b>Sobre o manual</b> .....	<b>7</b>
<b>Capítulo 1 Introdução</b> .....	<b>9</b>
Visão Geral .....	<b>9</b>
<b>Capítulo 2 Religador Series U com Controlador ADVC</b> .....	<b>11</b>
Introdução .....	<b>11</b>
<b>Capítulo 3 Instalação</b> .....	<b>15</b>
Conteúdo da Caixa .....	<b>16</b>
Instalação .....	<b>19</b>
<b>Capítulo 4 Instalação de Acessórios e Comunicação</b> .....	<b>35</b>
Introdução .....	<b>36</b>
Instalação do Expansor de Entrada e Saída (IOEX3) .....	<b>38</b>
<b>Capítulo 5 Teste de Instalação</b> .....	<b>43</b>
Introdução .....	<b>44</b>
Designação do Terminal e da Rotação de Fase .....	<b>48</b>
Ajuste da Direção do Fluxo de Potencia .....	<b>50</b>
Teste de Direção do Fluxo de Potencia .....	<b>52</b>
<b>Capítulo 6 Operação do Controle Eletrônico</b> .....	<b>55</b>
Introdução .....	<b>55</b>
<b>Capítulo 7 Painel de Controle do Operador</b> .....	<b>59</b>
Interface do painel <i>seVUE</i> .....	<b>60</b>
Interface do painel <i>flexVUE</i> .....	<b>64</b>
<b>Capítulo 8 Log de Eventos</b> .....	<b>73</b>
Log de Eventos .....	<b>74</b>
Exibição da Sequência Típica de Disparos do Log de Eventos .....	<b>76</b>
<b>Capítulo 9 Medição do Sistema de Potencia</b> .....	<b>79</b>
Medição do Sistema de Potencia .....	<b>80</b>
Exibição em Tempo Real .....	<b>81</b>
<b>Capítulo 10 Instalação de Acessórios</b> .....	<b>83</b>
Instalação de Acessórios .....	<b>84</b>
Módulo de Entrada de Disparo Rápido (FTIM) .....	<b>86</b>
Conexões Elétricas IOEX .....	<b>89</b>
Conexões Elétricas FTIM .....	<b>91</b>
<b>Capítulo 11 Manutenção</b> .....	<b>97</b>
Introdução .....	<b>98</b>
Condições de Operação do ADVC .....	<b>100</b>
<b>Capítulo 12 Parametros e Especificações</b> .....	<b>103</b>
Equipamento e Dimensões do Compartimento .....	<b>104</b>
ADVC .....	<b>106</b>
<b>Apendices</b> .....	<b>111</b>
<b>Apendice A Partes Substituíveis e Ferramentas</b> .....	<b>113</b>
.....	<b>113</b>
<b>Appendix B Dimensões</b> .....	<b>121</b>
.....	<b>121</b>
<b>Glossario</b> .....	<b>123</b>







## Informação Importante

### NOTICE

Leia as instruções com cuidado e observe o equipamento para se tornar familiar com o dispositivo antes de tentar instalar, operar ou realizar manutenção. As mensagens especiais a seguir podem aparecer nessa documentação ou no equipamento para avisar sobre potenciais riscos ou para chamar a atenção para informações que esclareçam ou simplifiquem os procedimentos.



The addition of this symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

### **DANGER**

**DANGER** indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

### **WARNING**

**WARNING** indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

### **CAUTION**

**CAUTION** indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

### **NOTICE**

**NOTICE** is used to address practices not related to physical injury.

### ATENÇÃO

Equipamentos elétricos devem ser instalados, operados, reparados e mantidos somente por pessoal qualificado. Nenhuma responsabilidade será assumida pela Schneider Electric por quaisquer consequências do mal uso desse material.

Um profissional qualificado é alguém com habilidades e conhecimento em construção e operação de equipamentos elétricos, sua devida instalação e receber treinamento para reconhecer e evitar os riscos envolvidos.

---



---

# Sobre esse Manual



---

## Visão Geral

Esse document descreve os procedimentos de manutenção e instalação dos religadores automáticos série U com o controlador ADVC.

### Observação:

Esse documento é válido para religadores série U combinados ao ADVC remotamente controlados e monitorados.

### Documentos Relacionados

Título da Documentação	Número de referencia
Religador Automático Série U	U27-12/15 U27-12/27
Manual Operacional do Controlador Avançado	N00-812

Voce pode fazer dow nload dessas publicações técnicas e de outras informações técnicas no site <http://www.schneider-electric.com/en/download>

### Aviso de Marca Registrada

Todas as marcas registradas são propriedade da Schneider Electric Industries SAS ou de suas empresas afiliadas.



# Capítulo 1

## Introdução

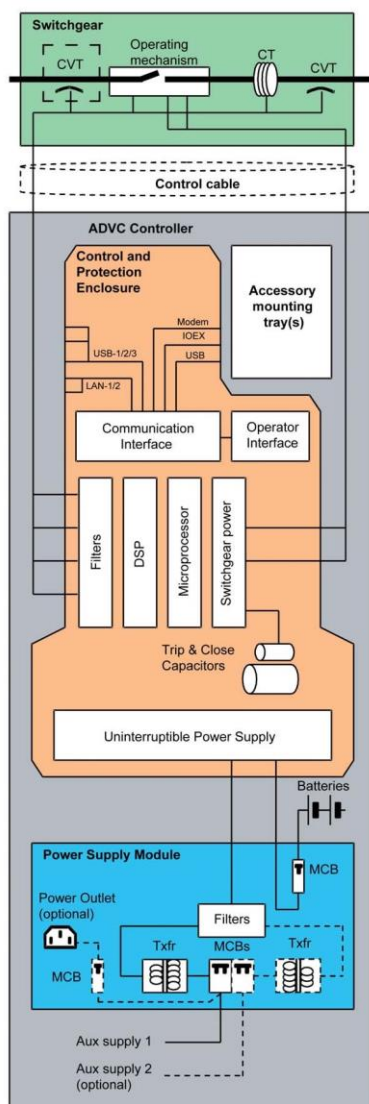
### Visão Geral

#### Introdução

Esse manual descreve a instalação e manutenção do religador automático série U e do controlador ADVC. Embora todo cuidado tenha sido tomado na preparação desse manual, não nos responsabilizamos por perda ou dano decorrentes do comprador ou do usuário devido a alguma omissão a esse documento. Inevitavelmente, nem todos os detalhes do equipamento são fornecidos e nem todas as instruções para cada variação ou contingência durante instalação, operação ou manutenção.

Para informações adicionais em problemas específicos ou requerimentos, por gentileza, entrar em contato com o fabricante ou o distribuidor.




#### Aparelhagem e Arquitetura do Controlador



ADVC Controller block diagram

## Símbolo

Os símbolos a seguir são usados no decorrer desse manual (e em outros). Eles são projetados para indicar de maneira rápida uma informação que é designada a determinadas áreas de interesse.

Símbolo	Significado
	O símbolo dasbuchas indica que a informação adjacente se aplica somente ao interruptor específico.
	O símbolo de set indica que a informação adjacente está relacionada somente a interface do operador do controlador ADVC com a interface flexVUE.
	O símbolo flex indica que a informação adjacente está relacionada apenas com a interface flexVUE do operador do ADVC.


Panel messages or Menu Navigation follows these icons in DOT MATRIX FONT

## Identificação do Software

O software carregado no controlador ADVC é identificado por meio da versão de seu número o qual possui o seguinte formato: **AXX-XX.XX**.

Isso precisamente identifica o carregamento do software no microprocessador do controlador.

Com o objetivo de obter suporte técnico efetivo do fabricante ou do seu distribuidor, é necessário gravar a versão do software e citá-la ao fazer o inquérito. Sem essa informação, é impossível para o departamento de atendimento ao cliente para identificar o software e fornecer o suporte de maneira correta.

 A versão do software é mostrada no Painel de Controle do Operador na página "Aparelhagem de Comutação/Detalhes Gerais" no campo version is shown on the Operator Control Panel "Switchgear Wear/ General Details" page, in the field "App.Ver":

```
-- Switchgear Wear/General Details-- S  
I Contact 100.0%      Cubicle S/N 1234  
II Contact 100.0%     AppVer A44-01.01  
III Contact 100.0%
```

**Obs:** As imagens são somente para propósitos ilustrativos.

 O Status do Comutador pode ser encontrado na interface **flexVUE** na seguinte localização: **MENU DO OPERADOR → Status do Comutador → Info do**

### Comutador

Para mais informações em como usar a Interface do Operador (I.O.) faça referência ao Painel de Controle do Operador.

([página 59](#)).

## Registro de Revisão

Nível	Data	Comentários
R00	Junho, 2017	Atualizações do Controlador ADVC

---

# Capítulo 2

## Religador Série U com Controlador ADVC

---

### Introdução

#### Geral

O religador automático monitorado e controlado remotamente consiste em um religador série U combinado a um controlador ADVC.

O religador automático Série U:

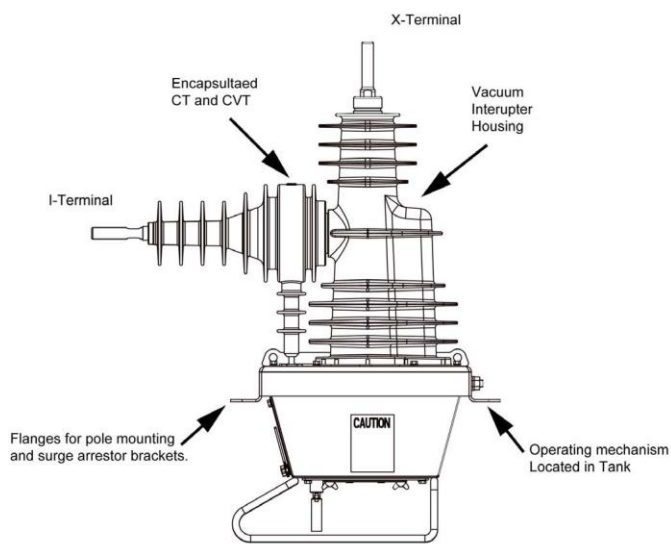
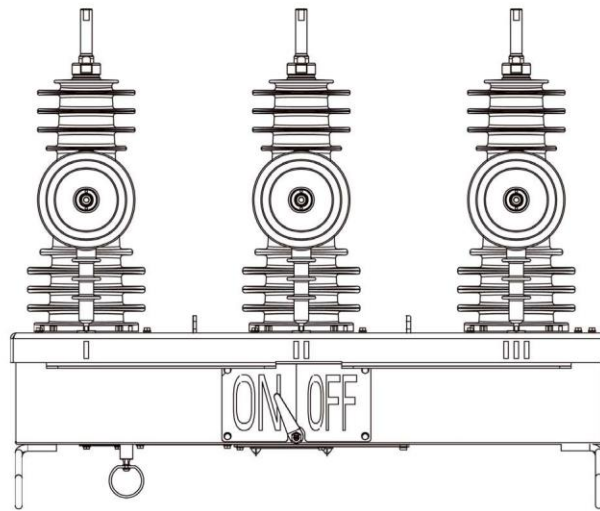
- Consiste em interruptores de vácuo agrupados isolados com moldes de resina epoxi cicloalifática
- É operador por meio de um atuador magnético tanto para disparo quanto para fechamento.
- O mecanismo é fechado em um tanque de aço inoxidável 316 e tampa com fundição de resina epoxi cicloalifática aparafusada a ele.
- Interruptores a vácuo são encapsulados com fundição de resina epoxi cicloalifática hidrofóbica em tanque de aço inoxidável.
- Para raios podem ser diretamente montados ao religador usando um suporte de montagem de para raios e deve ser adequado a instalação.
- Tem medição de tensão em cada lado I e pode ser medida nas buchas do lado X se os TP's externos estiverem montados.
- Tem medição de corrector em cada fase.
- Retem informação como número serial, tipo de religador, operações e aparelhagem de contato, independentemente do ADVC.
- Pode ser desarmado a partir do solo por meio de um gancho e em seguida bloquear mecanicamente puxando ainda mais a alavanca de desarme manual verticalmente para baixo. Em seguida, ser bloqueado eletronicamente ao abrir as chaves de isolamento localizados no ADVC.
- Tem um ponteiro externo claramente visível que mostra quando o religador está disparado ou fechado.
- Está conectado ao controlador ADVC via cabo de controle por meio da base do cubículo.
- Pode ser conectado a um sistema de condutor nu.

O controlador ADVC lê e exibe as informações armazenadas no religador e fornece propriedades de proteção e comunicação para o religador.

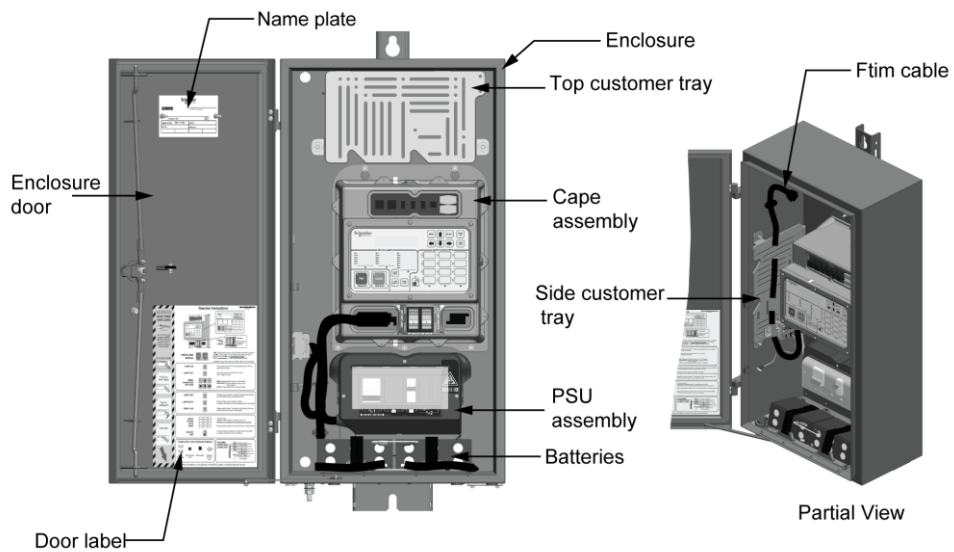
**Obs:** \* Para recursos de proteção, comunicação e medição, consultar o Manual Operacional do Controlador ADVC (N00-812).

- O Controlador ADVC consiste em:
  - Um painel de controle do operador montado na porta.
  - Um controlador que monitora o religador e fornece funções de comunicação e proteção.
  - A fonte de alimentação também fornece energia ao equipamento do consumidor.
  - Um compartimento de acessórios e equipamento do cliente.
- O Controlador ADVC é alimentado por uma fonte de alimentação auxiliar de 110, 220, ou 240 Vac.
- O ADVC é conectado ao religador por um cabo de controle destacável.

O compartimento do cliente fornece amplo espaço para o equipamento. Cabos de comunicação padrão podem ser usados para conexão nas portas de comunicação no ADVC e a energia é logo acessada por meio do terminal de bloqueio programável. Para mais informações, consultar Instalação de Acessórios e Comunicação ([see page 35](#)).



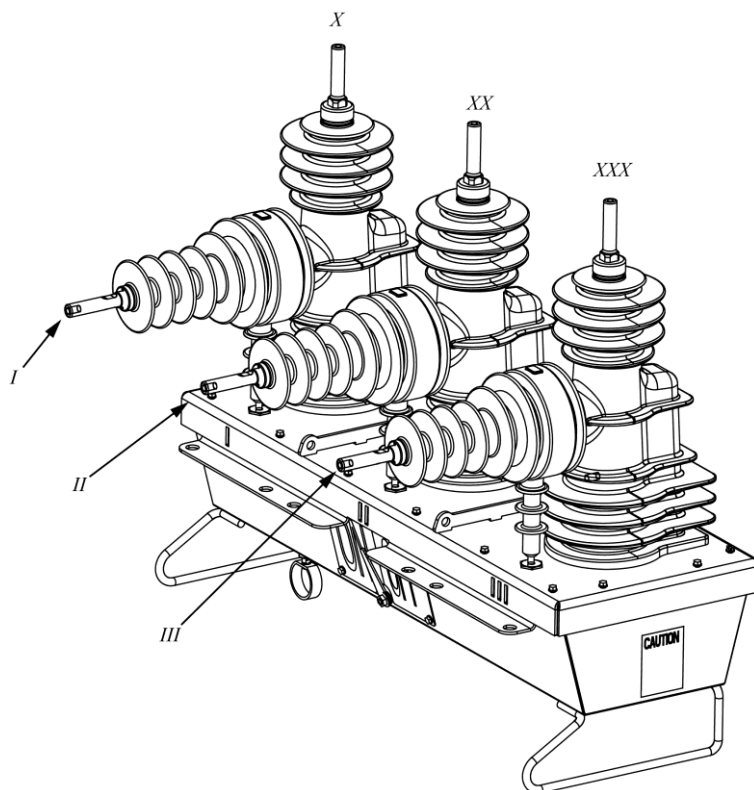
U-Series ACR Construction



ADVC Controller Components

**Terminologi**

- a** As buchas do religador Série U são identificadas como I, II e III, no mesmo lado em que os Transformadores de Corrente (TCs) os quais, por padrão, ficam do lado da fonte. As buchas no outro lado (lado da carga) são identificadas como X, XX e XXX.



ACR Bushings





---

# Capítulo 3

## Instalação

---

### Qual é o conteúdo desse capítulo?

Esse capítulo contém os seguintes tópicos:

Tópico	Página
Conteúdo da Caixa	16
Instalação	19

## Conteúdo do Compartimento

### Geral

Cada compartimento inclui:

- Religador Automático(ACR).
- Suporte de montagem com grampos, se solicitado, Se o suporte de uma subestação for encomendado, ele deve ser anexado a parte externa do compartimento.
- Seis conectores, se encomendado (15TP or 30TP).
- O kit de montagem apropriado.
- O cubículo de controle ADVC (o qual normalmente contém duas baterias, a menos que tenham sido tomadas providencias para envia-las separadamente).
- Cabo de controle.

No recebimento, o conteúdo deve ser verificado, em caso de danos durante o trajeto e o fabricante deve ser avisado imediatamente.

**Obs:** Certifique-se de que o controlador esteja armazenado em ambientes internos. Se o armazenamento externo foi inevitável, certifique-se de que o controlador ADVC seja mantido em posição vertical.

### Procedimento de Desempacotamento

A lista básica de ferramentas a qual é requerido desempacotamento é:

- Extrator de pregos (Pé de cabra).
- Manilha para içamento, dois estilingues e um guindaste com uma carga de 200 kg para levantar o religador.
- Chave de fenda ou broca de bateria com um soquete 8 mm.
- Chave inglesa de 16 mm ou soquete.

A seguinte lista é de procedimentos para o desempacotamento:

1. Remova o topo do compartimento e levante o cabo de controle. Armazene cuidadosamente em um lugar seco e limpo.
2. Desparafuse e remova os quatro parafusos localizados na parede do compartimento. O suporte de montagem, o kit de montagem e os dois pedaços de madeira que os parafusos removeram são armazenados juntos. Erga o suporte de montagem do compartimento.
3. Para os pontos de içamento do religador, erga ele para fora do compartimento e no chão usando o guindaste.
4. Incline a caixa para o lado.
5. Remova os parafusos que seguram o ADVC e deslize a unidade do compartimento.

### PERIGO

#### **RISCO DE DANO AO EQUIPAMENTO**

Não deixe o suporte cair no religador. A massa do suporte é de aproximadamente 30 kg (66 lb). **A falha ao seguir essas instruções podem resultar em ferimentos ou danos ao equipamento.**

### Conexão do Cabo de Controle

**Obs:** A massa do controle do cubículo é de aproximadamente 40 kg (88 lb).

Ao instalar ou testar o religador é necessário conectar ou desconectar o cabo de controle tanto do tanque quanto do ADVC. O cabo de controle é conectado na base do tanque do religador e o a outra parte no fim do ADVC, na parte de baixo, mais a direita do gabinete de controle e proteção CAPE).

A seguir está a lista com os procedimentos técnicos corretos para realizar a conexão dos cabos:

- Desligue o cubículo de controle para realizar a conexão dos mini disjuntores (MCBs). Esse procedimento deve ser seguido ao conectar e desconectar o cabo de controle.
- Ao conectar o cabo de controle, segure o plugue pelas laterais longas, verifique a orientação, ioscione-o gentilmente sobre o soquete e empurre firmemente. Verifique se ele está travado ao enroscar o plugue. Se o plugue não conseguir ser empurrado com uma força moderada, ele não está colocado de maneira correta. Força extrema nunca será requisitada.
- Para desconectar o cabo de controle, segure o plugue por meio dos lados menores e segure com força para soltra os cliques de dentro do plugue (não visíveis). Gire o plugue para permitir que eles sejam liberados. Depois puxe os plugues.

## OBSERVAÇÃO

### SAÍDAS DESPROTEGIDAS

Nunca puxe um plugue por meio do cabo.

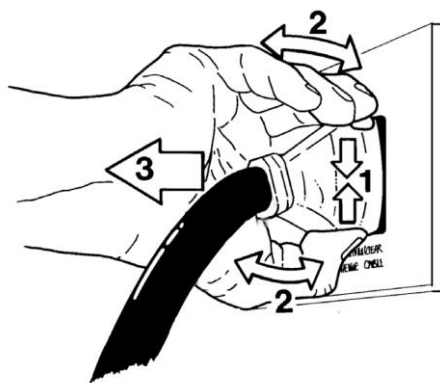
**Falha ao seguir essas instruções pode resultar em ferimentos ou danos ao equipamento.**

## ⚠ PERIGO

### RISCO DE PERDA DE COMUNICAÇÃO ENTRE O TANQUE E O CONTROLADOR SE O CABO DE CONTROLE NÃO ESTIVER CORRETAMENTE COLOCADO.

Aperte o cabo de controle no sentido horário até que ele encaixe.

**Falha ao seguir essas instruções pode resultar em ferimentos ou danos ao equipamento.**



Handling the control cable plug

## Testando e Configurando

Os teste podem ser feitos no local ou na oficina de preferencia.

Desempacote o compartimento conforme abaixo e coloque os cabos de alta tensão, botas e cabo de controle em um local limpo e preservado onde eles não poderão ser danificados ou sujos. Faça uma conexão de terra temporária entre o tanque e o controlador. Um fio de cobre de 1 mm<sup>2</sup> é adequado para essa proposta.

Erga o tanque usando um guindaste ou usando uma empilhadeira para obter acesso ao fundo do tanque. Desencaixe a placa de cobertura sob o modulo de entrada dos cabos da chave (SCEM) no fundo do tanque e conecte o tanque ao fim de um cabo de controle SCEM.

Abaixe o tanque com seus acessórios para que o cabo de controle não seja danificado por ser pego entre a base o tanque e o chão.

Then connect the ADV C Controller end of the cable to the socket at the lower right-hand corner of the CAPE located inside the ADV C cubicle. For more information refer to Site Procedure ([see page 19](#)). The LV auxiliary supply (if applicable) should be connected as shown in Auxiliary Supply Connection ([see page 19](#)).

Turn on the battery and auxiliary supply circuit breakers at the bottom of the control cubicle and perform the following tests:

- Manual trip and close of the ACR.
- Perform the megger test on the reclosure to check damage during shipping.
- Configure the protection settings.
- Perform primary current injection as required.
- Perform secondary current injection (if required by your Authority) using a Test and Training Set (TTS).
- Fit and test a radio or modem if required.
- Attend to the battery using the care instructions given in Battery Care ([see page 99](#)).

**NOTE:** An application note detailing workshop and field test procedures is available. Contact your agent or distributor.

---

**Transporte ao  
Local**

Se o desempacotamento e o teste forem realizados na oficina, então o tanque e o ADVC devem ser transportados devidamente ao local. Recomenda-se os seguintes passos:

- Desligue todos os MCBs do ADVC e desconecte todas as fontes auxiliares de tensão and desconecte todas as fontes de alimentação. Desconecte o cabo de controle do tanque e do controlador Disconnect the control cable from both ACR and ADVC and replace the cover plate on the bott
- Transport the ACR, ADVC and all accessories in a secure manner to the site.

## Instalação no Local

### Geral

**Obs:** Se voce está substituindo um cubículo de controle de pólo superior (PTCC) ou um controlador ADVC original com um controlador ADVC, os seguintes itens devem ser considerados:

Os passos seguintes são para a instalação do controlador ADVC:

- Os pontos de montagem do ADVC são diferentes.

**Obs:** Um acessório de suporte de montagem pode ser adquirido para permitir o uso dos mesmos orifícios de montagem conforme foram usados no PTCC do fabricante.(Part No. 99800125).

- A conexão com a fonte auxiliar entra no cubículo por um ponto diferente. O pino de aterramento está em uma posição diferente.
- Cabos de acessórios podem ser extensíveis.
- Ao contrário do PTCC o qual requer uma fonte de alimentação auxiliar classificada em 50VA, o controlador ADVC requer 200VA.
- Se a fonte auxiliar é fornecida por meio de um TP externo conectado no tanque, existem limitações as classificações dos equipamentos que os clientes podem ajustar. Para mais informações, consulte Fonte de Alimentação de Corrente Contínua Rádio/Modem. ([página 36](#)).
- A porta do controlador ADVC é mantida aberta por um mecanismo de retenção de porta que impede a porta de balançar ou fechar. Para desengatar a porta, siga as instruções na folha do operador, localizada dentro da porta.

### Ferramentas Requisitadas

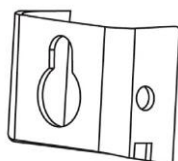
- Chave de torque e conjunto de soquete métrico, ferramentas de engenharia normais.
- Ferramentas para preparar o postes conforme requisitado
- Guindaste ou outro elevador para tanque e ADVC, manilha e a linga.

### Partes Requisitadas (Não fornecidas pelo fabricantes)

- Dois parafusos galvanizados ou de aço inoxidável de 20 mm com arruelas e porcas e assim em diante. Parafuse o suporte de montagem do tanque ao poste. Para maiores informações, consultar a figura Dimensões e Montagem do tanque ([página 24](#)). Se os grampos opcionais forem comprados, essa etapa não será necessária.
- Montagem de partes do Controlador ADVC. Cintas de aço de 20 mm ou porcas e parafusos galvanizados de aço inoxidável de 10 mm
- Fixação de hardware pelo cabo de controle. Esse conduto é revestido por 27 mm e pode ser fixado em poste com gravatas, cliques P ou selas.tiras.
- Condutor de terra e os diagramas de fiação de aterramento e peças para conexão auxiliar na rede de baixa tensão. Para maiores informações, consulte Conexão de fonte auxiliar ([página 19](#)), Exemplo de Montagem de Centro ([página 30](#)) e Transformador Auxiliar da Concessionária ([página 32](#)).
- Encaixes de entrada de 20 mm para encaixar cabos de alimentação auxiliares entrada glandulas de vedação de cabos de 16mm ou cabos de comunicação, conforme requisitado.
- Antena, cabo de alimentação da antena, e para raios conforme requisitado se um modem for encaixado 9a não ser que seja fornecido pelo fabricante).

### Procedimento no local

**NOTE:** The ADVC mounts have key holes as shown here so that you can lift the ADVC on to the mounting bolt and slide it into position.



Key Hole

To erect and test the ACR and ADVC, carry out the following steps. Mounting details are given in figure ACR End Mounting and Dimensions ([see page 19](#)).

1. Transport to site and carry out testing before erection as required.
2. Connect cable tails and surge arresters before raising the ACR. Refer Surge Arrester Mounting and Terminating.
3. Ensure that the pole is of sufficient strength to support the ACR. A structural engineer may be needed to calculate the stresses involved.
4. Securely mount the ACR mounting bracket on the power pole.

5. Erga o tanque em posição e depois abaixe-o na posição do suporte de montagem para que ele fique la.. Para mais informações, consultar as figuras Tanque e montagem e dimensões ([see page 24](#))Exemplo de Montagem do Centro ([see page 30](#))Centro de montagem e dimensões.

## NOTICE

### RISK OF EQUIPMENT DAMAGE

When lifting the ACR:

- Do not allow the slings to come in contact with the bushings or terminals.
- Avoid dropping objects on the sheds.

**Failure to follow these instructions can result in equipment damage.**

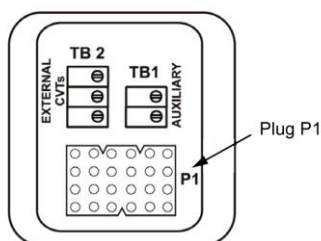
## NOTICE

### INOPERABLE EQUIPMENT

Ensure that your are not exposed to any sharp or pointed objects w ith in the Device.

**Failure to follow these instructions can result in equipment damage.**

6. Bolt the ACR to the mounting bracket w ith the four 12 mm nuts and bolts provided. Tighten to 50 Nm.
7. Complete the power (HV) cable connections.
8. Unbolt the SCEM compartment cover plate from the bottom of the ACR. Connect the control cable to plug P1 on the SCEM located inside the ACR. Then bolt up the cover.
- For more information, refer Handling control cable plug ([see page 16](#))for the correct way to connect/disconnect the control cable.



SCEM Card

9. Run the control cable from the ACR down n to the ADVC.
10. If the ADVC cubicle is to be bolted to the pole, drill the top hole and fit the bolt. If it is to be strapped, feed the straps through the slots on the upper and lower mounting brackets.
11. Lift the ADVC into position and bolt or strap it to the power pole.
12. Attach the control cable to the power pole maintaining maximum available separation from the main earth bond (at 200 mm for wood and concrete poles and 150 mm for steel poles). Ensure that there is enough cable available at each end to permit connection to the equipment.
13. Run the earth connections as described in Earthing (Grounding) ([see page 19](#)).

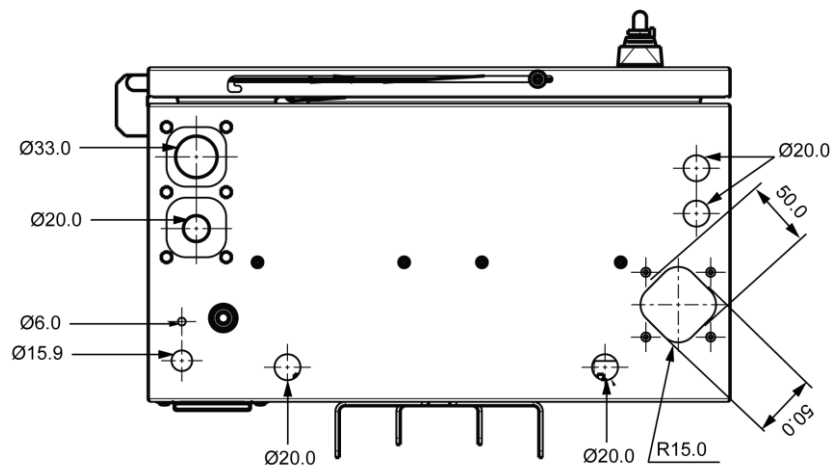


### HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Carry out earthing wiring diagram as instructed.

**Failure to follow these instructions will result in death or serious injury.**

14. Connect the control cable from the ACR through the base of the



ADVC **1**

Cable Entry

and then to the switchgear socket **2** on the CAPE.



15. For LV mains supply run auxiliary wiring as shown in figure Common Earthing and LV Supply (see page 31). Make the connection inside the ADVC as shown in figure Auxiliary Supply Connection (see page 19).
16. For LV supply from a dedicated transformer supplied by the utility, connect as shown in figure Utility Auxiliary Transformer (see page 32).
17. For Integrated supply from an external transformer, connect as shown in figure Utility Auxiliary Transformer. (see page 24).
18. Power down the ADVC by switching off all MCBs. This should be done whenever connecting or disconnecting the control cable from the ADVC.
19. Fit the batteries if they are not already in place.
20. If communications equipment is to be installed, refer to Communications and Accessories Installation (see page 36). Otherwise refer to Testing Your Installation (see page 44).

## NOTICE

### UNPROTECTED OUTPUTS

- Maintain proper polarity when connecting and inserting batteries, to avoid damage to electronic systems.
- Fitting the batteries with reverse polarity cause damage to the electronic systems.

**Failure to follow these instructions can result in equipment damage.**

### Surge Arrester Mounting and Terminating

The ACR is type tested for Impulse Withstand Voltages up to 125 kV depending on the model. For more information, refer to Ratings and Specifications (see page 104). When there is a possibility that lightning or network switching conditions may produce peak voltages in excess of 70 % of the Impulse Withstand Voltage, the manufacturer recommends the use of suitably rated surge arresters connected to each terminal of the ACR.

The arresters should be mounted on the mounting brackets supplied by the manufacturer and earthed as described in figure and End Mounting Example (see page 26) and Centre Mounting Example (see page 30).

Lightning induced damage to the ACR or ADVC voids the warranty if surge arresters are not fitted. Mounting brackets are provided for surge arresters on the ACR. This is illustrated in figure End Mounting Example (see page 26) and Centre Mounting and Dimensions (see page 28).

---

The surge arresters can be mounted on top of the brackets or clamped to the side of the brackets using the holes provided. Top holes are 12 mm diameter, side holes are 16 mm diameter. In this way, most types of surge arrester can be accommodated.

The user should check that phase/phase and phase/earth clearance is sufficient for their particular surge arresters and line voltages. For some types of side clamping surge arresters, the phase/earth clearance may be insufficient at the center phase on the pole side at higher voltages. In this case, the surge arrester can be mounted on the side of the power pole or an increased clearance ACR mounting bracket fitted.

Connections from the surge arresters to the cable tails can be made by stripping off the cable tail insulation and using a parallel or "T" type clamp to make the connection to the cable tail. The connection should be made far enough up the tail so that phase/phase and phase/earth clearances are maintained. It is good practice to tape the joint using a bitumen or mastic tape to maintain the cabling system insulation.

## CAUTION

### **RISK OF EQUIPMENT DAMAGE**

If the arresters are not mounted close to the ACR, the protection they provide is reduced.

**Failure to follow these instructions can result in injury or equipment damage.**

## CAUTION

### **RISK TO EMIT X-RAYS IF VOLTAGE HIGHER THAN RATED MAXIMUM IS APPLIED ACROSS THE OPEN CONTACT**

Do not apply voltage higher than rated maximum across the open contact without being protected with appropriate shielding.

**Failure to follow these instructions can result in injury or equipment damage.**

### **Earthing (Grounding)**



### **HAZARD OF EQUIPMENT DAMAGE**

- Do not earth surge arresters by a different path, doing this may cause damage to the control electronics or ACR.
- Also, any antenna must be bonded to the ACR or the main earth bond.

**Failure to follow these instructions will result in death or serious injury.**

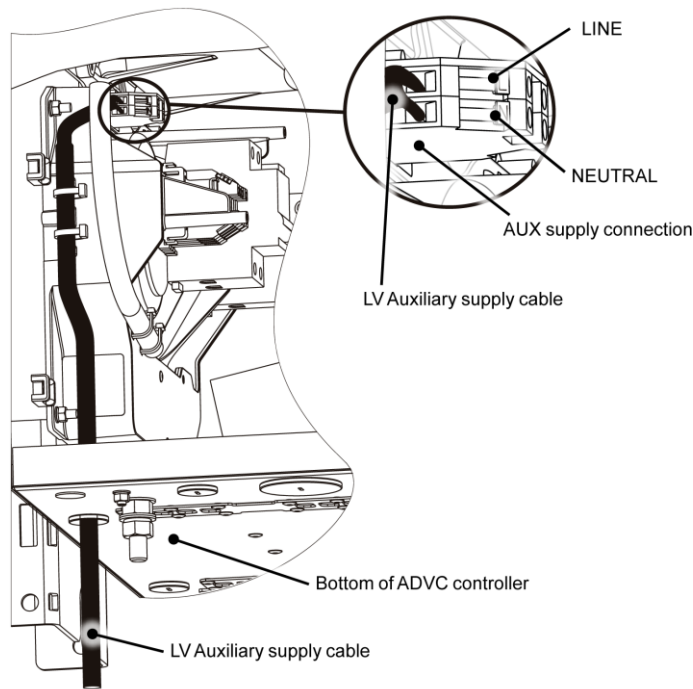
Figure Common Earthing and LV Supply ([see page 31](#)) shows the earthing common to the installations.

This arrangement earths the ACR frame and the surge arresters directly to earth through a main earth bond consisting of a copper conductor of 70 mm<sup>2</sup>. Any surges flow down this path. The control cubicle is connected to this main earth bond by a tee-off. The control cubicle electronics are internally protected from potential differences which may occur between the ACR frame and control cubicle frame while surge currents are flowing down the main earth bond. No other connections to earth from the control cubicle are allowed since surge currents will also flow in those paths. Follow this arrangement on both conducting and insulating power poles. Keep the main earth bond physically separated from the control cable, as they run down the power pole, by the maximum spacing available and at least 150 mm.

### **LV Auxiliary Power from Mains**

Where the LV mains are connected to the control cubicle to provide auxiliary power, the connection must connect the neutral of the LV system to a tee-off from the main earth bond. For more information, refer figure Common Earthing and LV Supply ([see page 31](#)). A low voltage surge arrester must also be fitted from the LV phase connection to this tee-off. This wiring diagram bonds the LV and HV earths and so protects the primary insulation of the auxiliary supply transformer in the control cubicle when surge currents are flowing. Fit additional LV surge arresters to the other LV phases (if they exist), to balance the supply for other users connected to the LV system. If local conditions or wiring rules prohibit bonding the HV and LV systems in this way, providing the auxiliary supply to the control cubicle from the LV mains system is not possible. Instead, use one of the alternative arrangements detailed below.





*Auxiliary Supply Connection*

#### **LV Auxiliary Power from Dedicated Utility Transformer**

Figure Utility Auxiliary Transformer ([see page 32](#)) shows wiring and earthing if a dedicated transformer is supplied by the utility. This should not be used to supply any other equipment without consulting the manufacturer, which helps to ensure that no hazard is caused to the control cubicle electronics. Figure Utility Auxiliary Transformer ([see page 32](#)) shows that the transformer and any steel works are earthed to the switchgear tank and that one side of the transformer secondary is earthed to the earth stud on the equipment panel inside the control cubicle.

#### **Auxiliary Power from Integrated Transformer**

The manufacturer can provide a dedicated voltage transformer outside the ACR tank which connects directly into the control electronics. This is called an Integrated Auxiliary Supply. An external transformer is mounted on the pole as shown in figure Utility Auxiliary Transformer ([see page 32](#)) which also shows suggested HV connections. The secondary of the external transformer connects into the SCEM on the underside of the ACR. To connect the transformer secondary, remove the SCEM compartment cover plate, pass the cable which is pre-fitted with a cable gland through the hole, secure the gland, connect the auxiliary supply to the screw terminal block on the SCEM and replace the compartment cover. No additional earthing for Integrated Auxiliary Supply is required in addition to the common earthing shown in figure Common Earthing and LV Supply ([see page 31](#)).



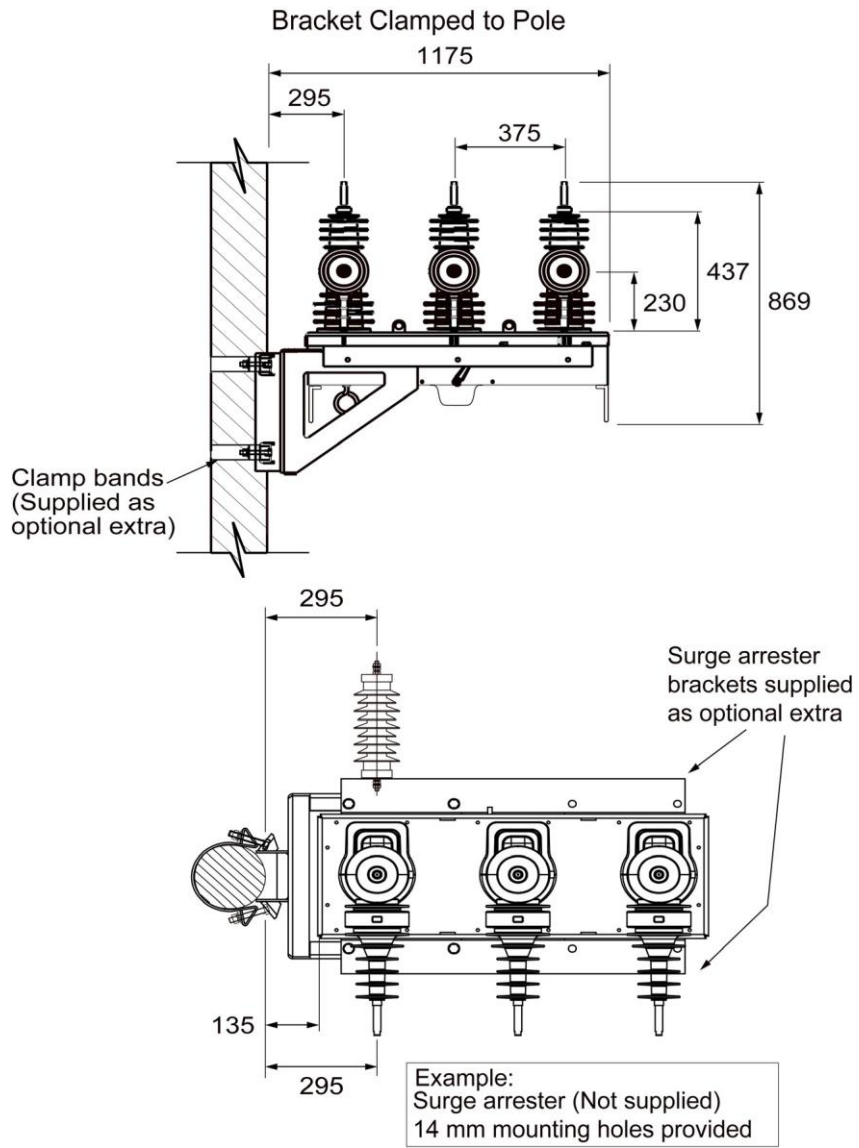

---

#### **HAZARD OF EQUIPMENT DAMAGE**

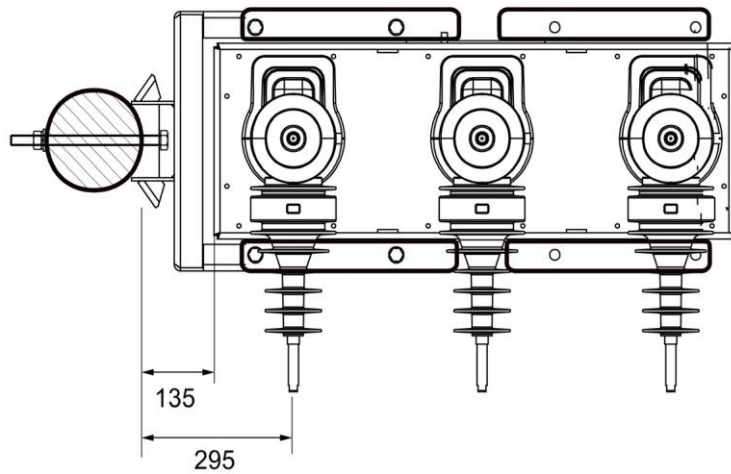
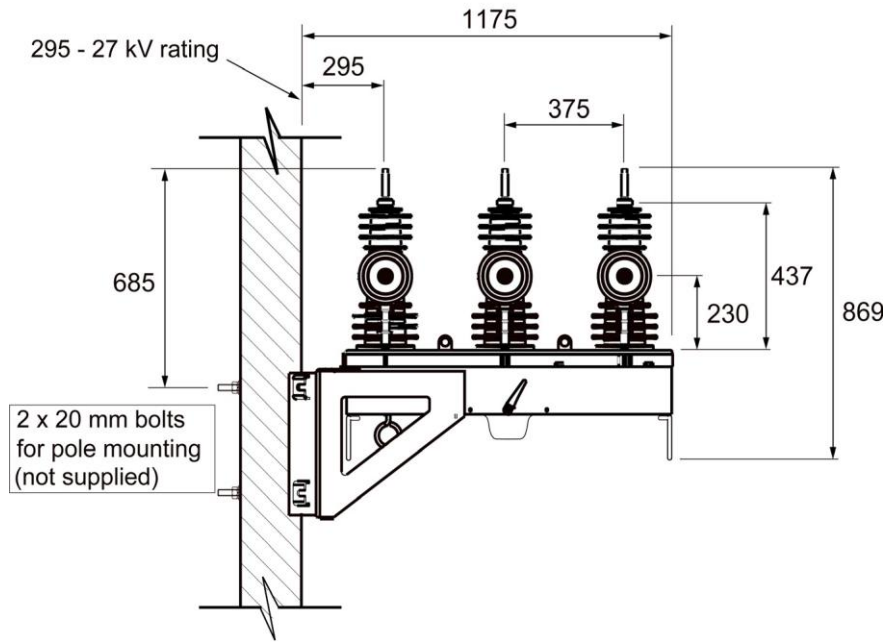
If the secondary of the VT is earthed, electronics damage occurs. **Failure to follow these instructions will result in death or serious injury.**

---

## ACR End Mounting and Dimensions

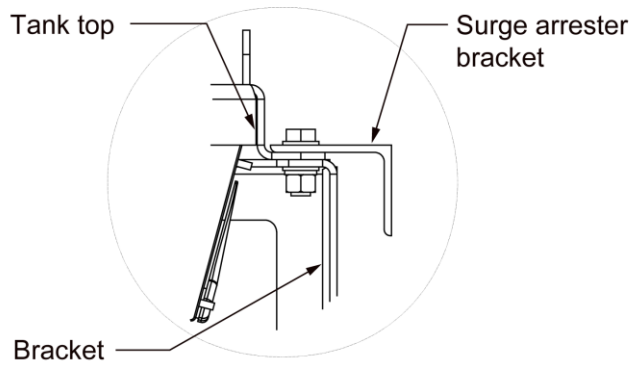


Bracket Bolted to Pole



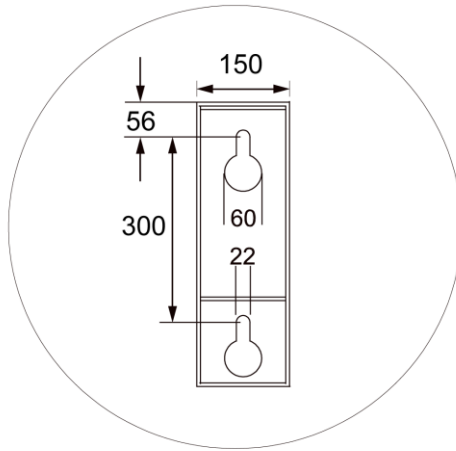
ACR End Mounting and Dimensions

Detail Showing Correct Surge Arrester Bracket Assembly



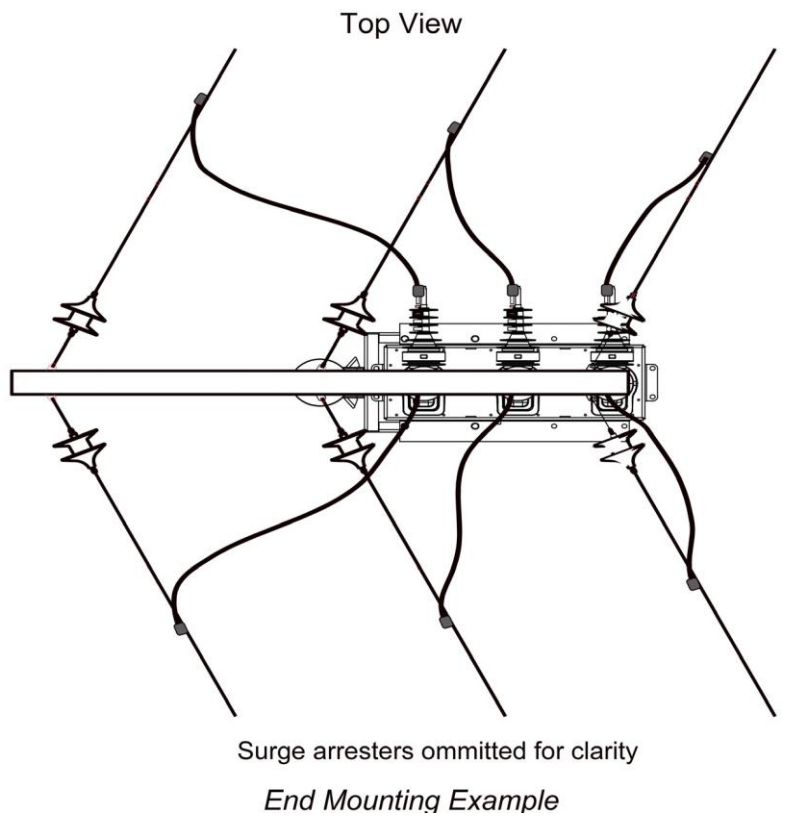
ACR End Mounting and Dimensions

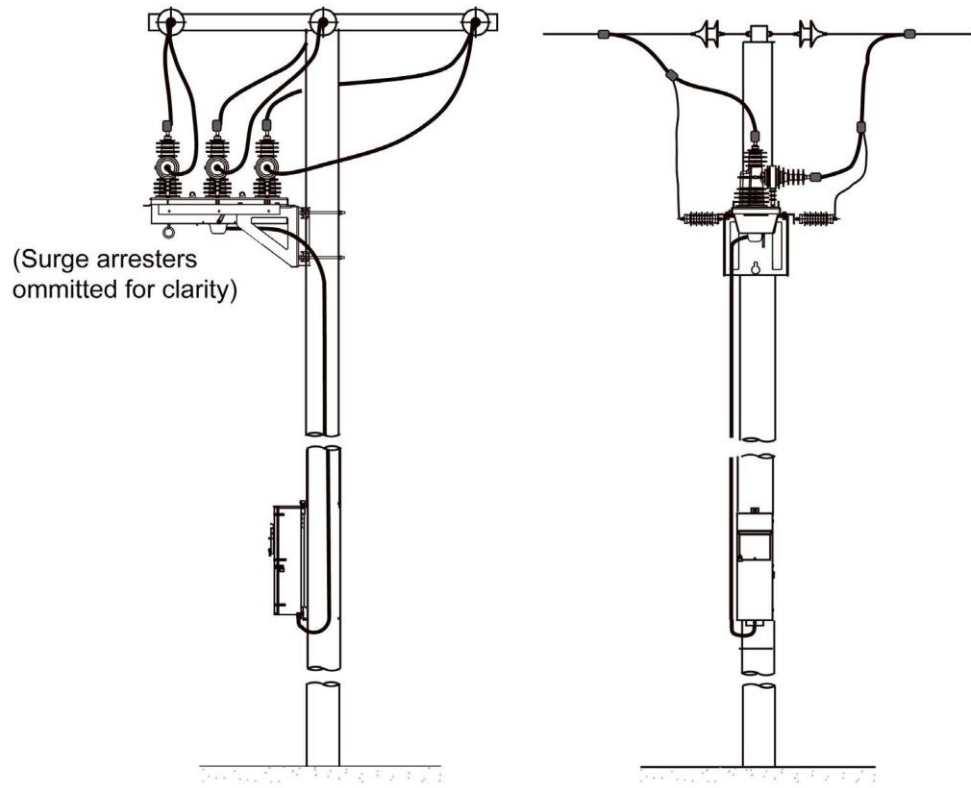
## Mounting Channel Details



## ACR End Mounting and Dimensions

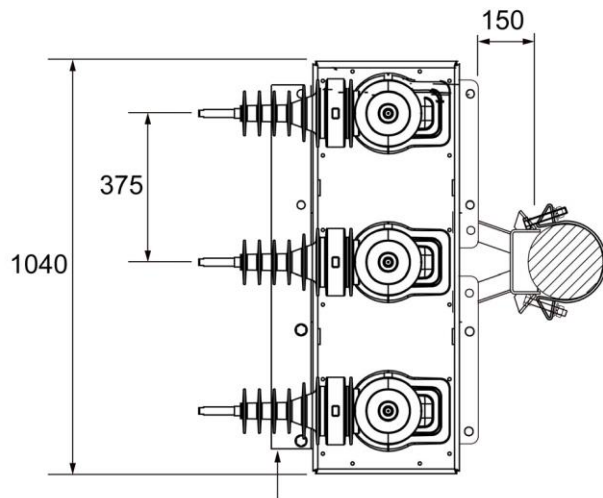
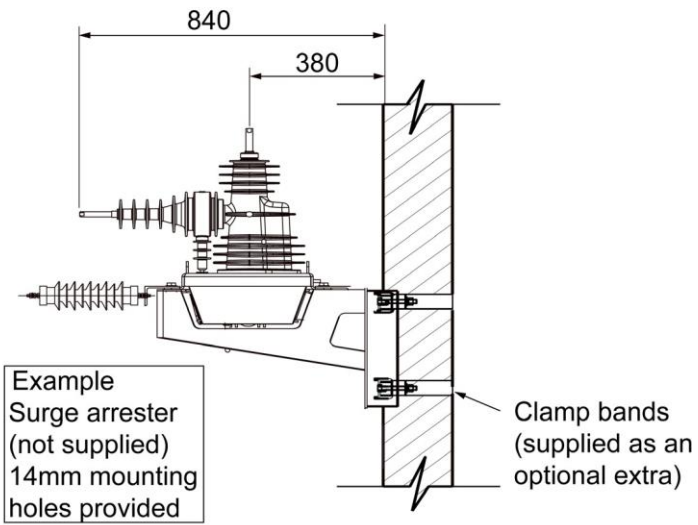
### End Mounting Example





*End Mounting Example*

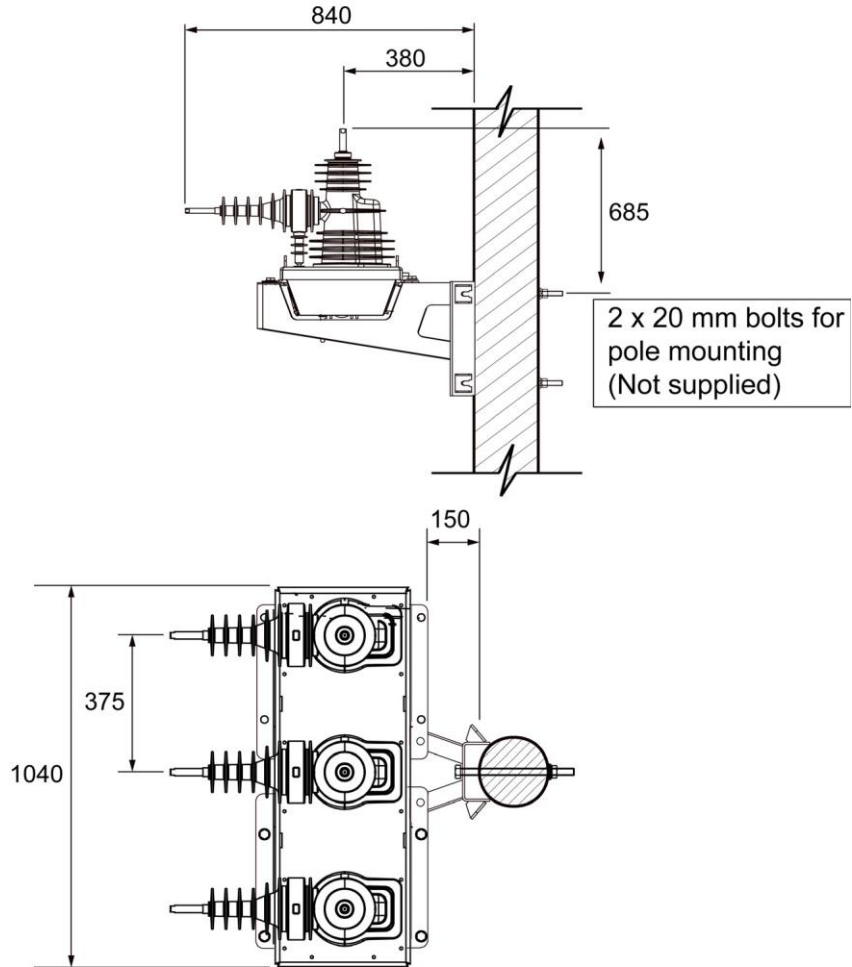
Bracket Bolted to Pole



Surge arrester bracket supplied as an optional extra

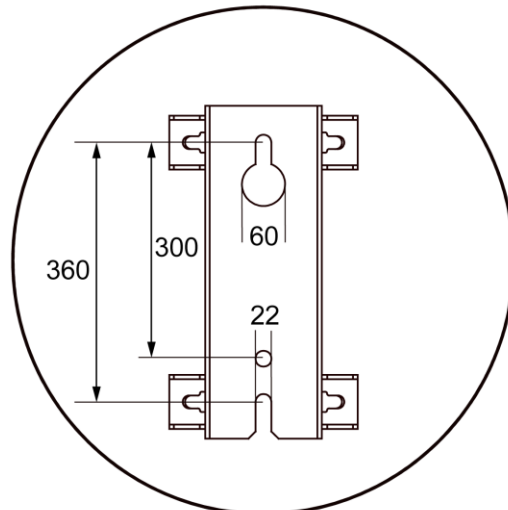
*Centre Mounting and Dimensions*

Bracket Bolted to Pole



Centre Mounting and Dimensions

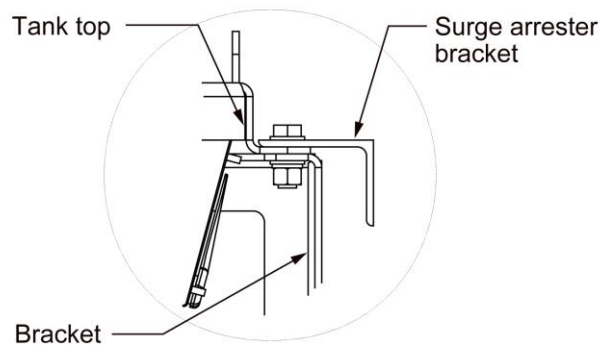
Mounting Channel Details



Centre Mounting and Dimensions

---

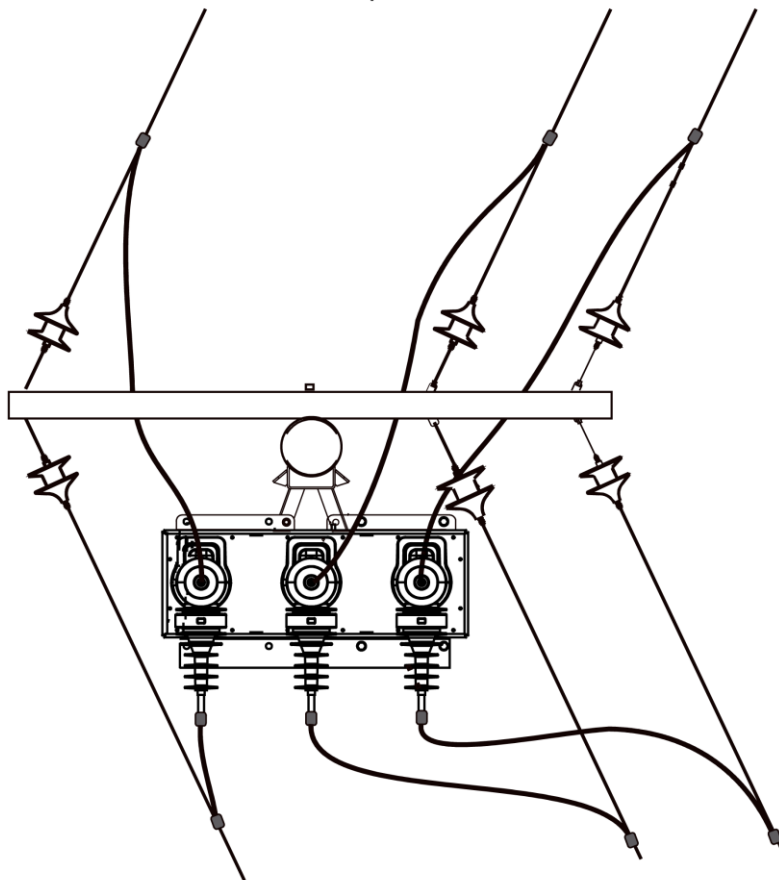
Detail Showing Correct Surge Arrester Bracket Assembly



*Centre Mounting and Dimensions*

**Exemplo de Centro de Montagem**

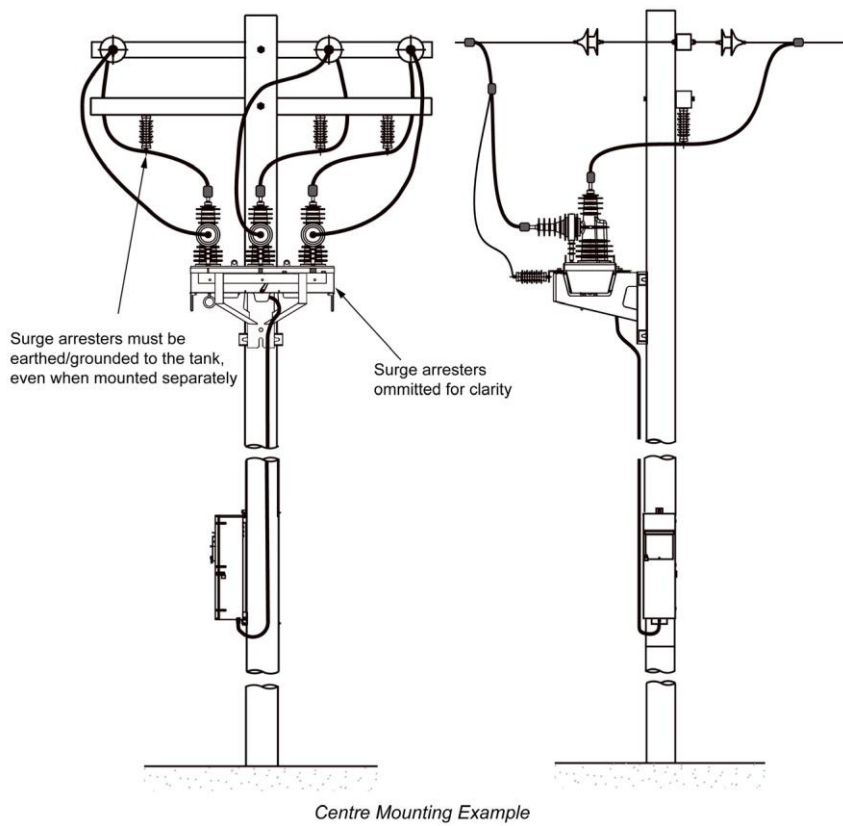
Top View



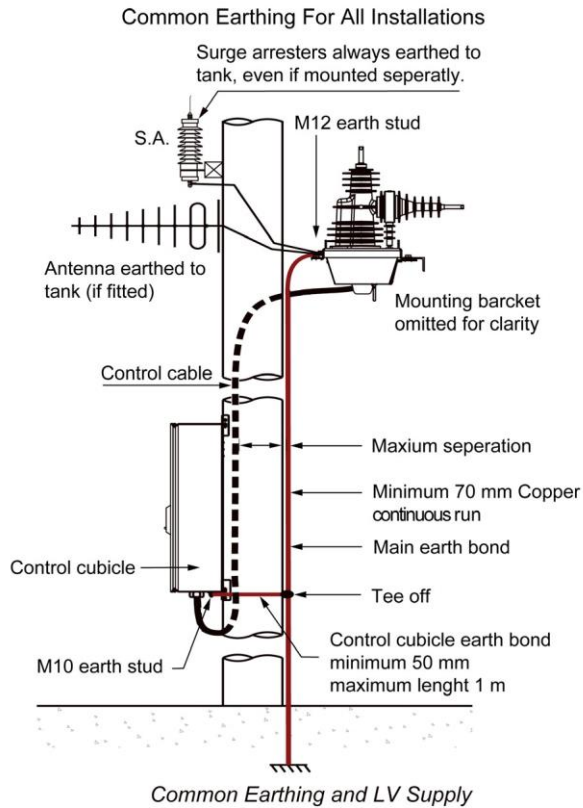
(Surge arresters omitted for clarity)

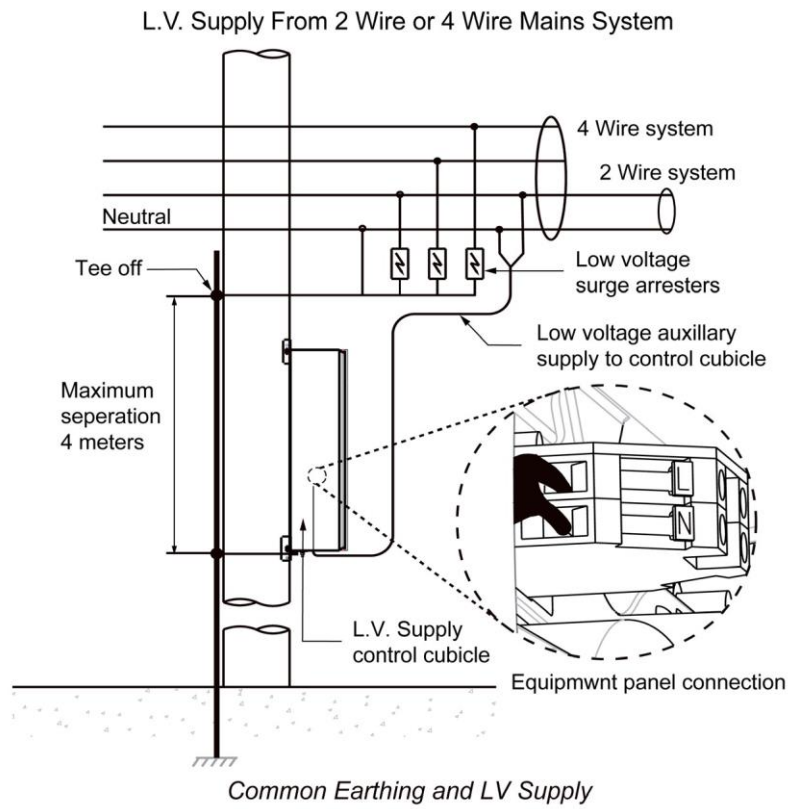
*Centre Mounting Example*



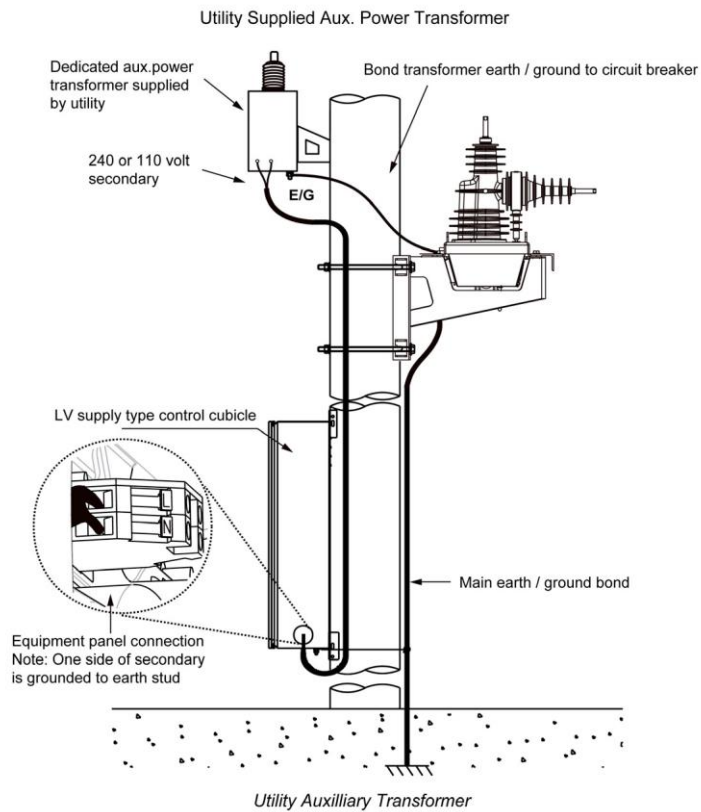


### Aterramento Comum e Fonte de Alimentação BT

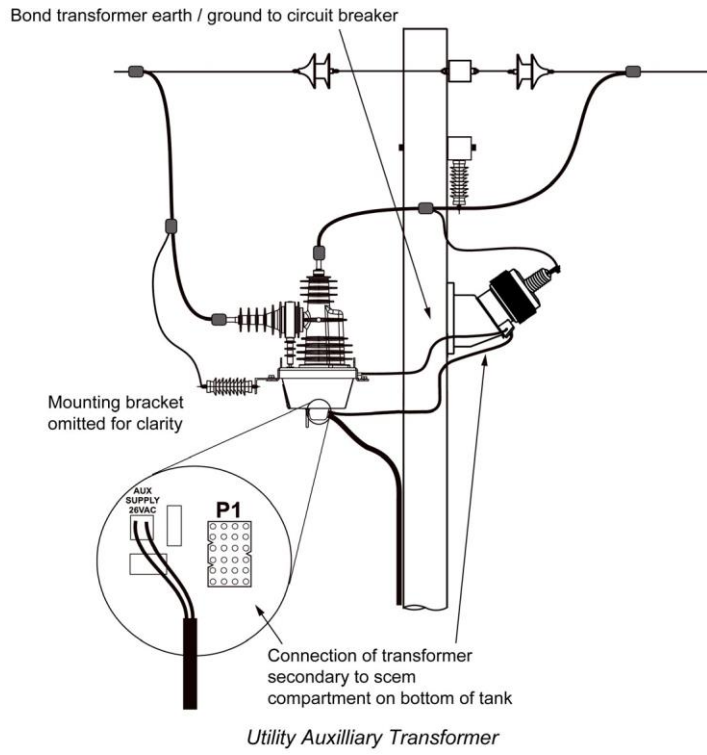




**Transformador Auxiliar de Concessionária**



Integrated H.V. Supply from External Transformer



---

---

# Capítulo 4

## Instalação de Acessórios e Comunicação

---

### O que contém nesse capítulo?

Esse capítulo contém os seguintes tópicos:

Tópico	Pag
Introdução	36
Instalação do Expansor de Entradas e Sídas (IOEX3)	38

## Introdução

### Antena do Rádio

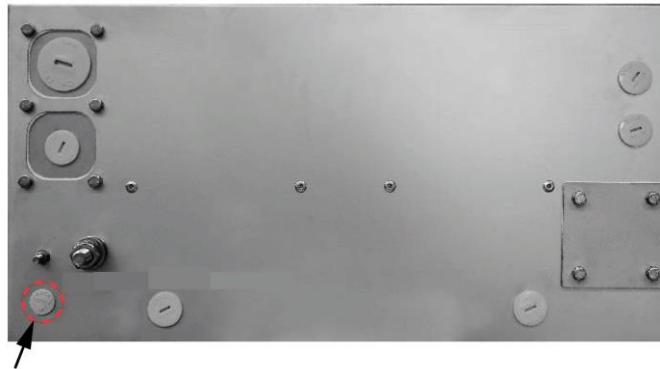
Monte a antena ou ligue a alimentação da antena ou o cabo de comunicação externa do ADVC. A antena de comunicação do rádio/cabo entra no cubículo em um orifício de 16mm que é disponibilizado abaixo do cubículo. Monte a antena e ligue ela ao ADVC por meio de um cabo de comunicação externo.

## ATENÇÃO

### RISCO DE DANO AO EQUIPAMENTO

Desligue o ADVC antes de instalar os acessórios.

**Falha ao seguir essas instruções pode resultar em ferimentos ou danos ao equipamento.**



Communications Cable Entry

ULTRA Cubicle - Cable Entry (bottom view)

### Proteção do Equipamento do Rádio:

É altamente recomendável conectar um pára raio de descarga de gás na alimentação de uma antena ao rádio. Negligência ao realizar tal procedimento resulta na perda da proteção eletrônica do controle e do rádio, em caso de o tanque ser submetido a desgargas elétricas, o que pode levar a um completo curto circuito no sistema.

Recomenda-se um pára raio do tipo alimentador ou anteparo instalado na parte inferior do cubículo de controle. Se for instalado internamente, o para raio deve ser aterrado a um pino de montagem do painel do equipamento pelo fio mais curto possível. Orifícios são fornecidos para um pára raio de anteparo.

Se o pára raio não for instalado, então a blindagem deve ser aterrada ao painel do equipamento por meio de um fio mais curto possível.

**OBS:** Um problema dessa natureza não está coberto pelos arranjos gerais de garantia do produto.

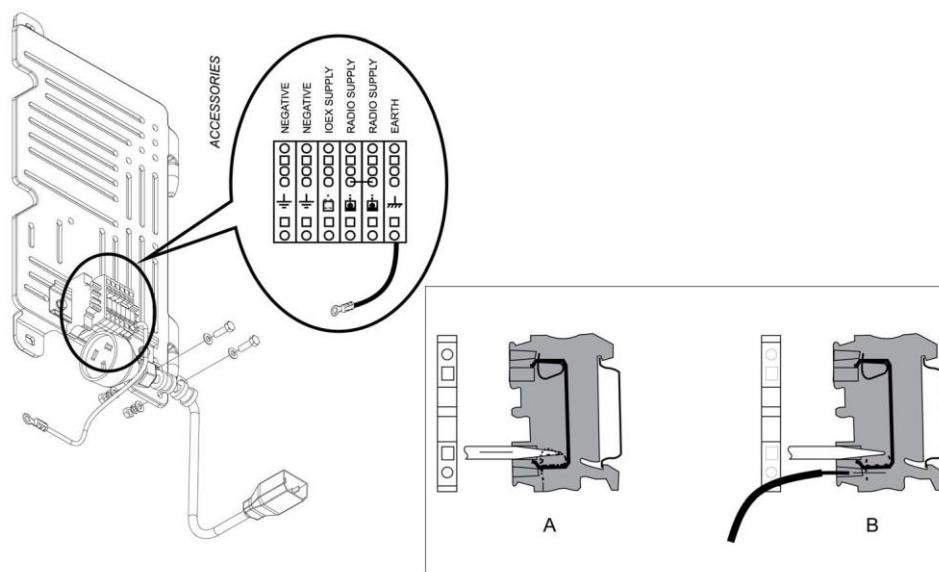
### Compartimento do Cliente

Na parte inferior da bandeja do equipamento do cliente, há um trilho de montagem de acessórios para instalar o equipamento e os acessórios do cliente.

O equipamento instalado nesse compartimento pode ser alimentado a partir dos blocos terminais e pode também ser montado no trilho.

#### Conectando ao Bloco Terminal

Passo A: Insira uma chave de fenda de 4 mm ou alguma ferramenta semelhante no orifício quadrado acima da fiação apropriado no bloco dos terminais. Incline a cabeça da chave de fenda suavemente para cima e empurre-a, em seguida alavanque-o para baixo.



Accessory Mounting Tray and Terminal Block

Passo B: Essa ação posiciona corretamente o grampo da fiação para que a extremidade removida do cabo possa ser inserida. Solte e remova a chave de fenda, em seguida puxe levemente o cabo inserido de forma que ele fique firmemente preso. Consulte a imagem acima.

#### Alimentação do Rádio/Modem

A fonte de alimentação da bateria para rádio/modem é fornecida a um bloco de terminais conforme descrito abaixo. Para conexão do ponto de maneira correta, consulte a figura Bandeja de Montagem de acessórios. e conexão do bloco de terminais ([página 36](#)).

A fonte de tensão do rádio/modem é configurada pelo usuário na seguinte página do menu:

**set** STATUS DO SISTEMA → RADIO → S → Alimentação do rádio 12 V

**flex** MENU DO ENGENHEIRO → MENU DE CONFIGURAÇÃO → AJUSTES DO RADIO → Alimentação do rádio 12 V

Esse é um parametro protegido por senha.

Se houver uma queda da fonte de energia auxiliar, então a fonte da bateria pode ser conservada automaticamente ao desligar a fonte de alimentação do rádio/modem. O desligamento ocorre após o tempo de retenção do rádio ter ocorrido. Esse parametro é configurado da seguinte forma:

**set** Status do Sistema → RADIO → S: Tempo de espera do rádio 60 min

**flex** MENU DO ENGENHEIRO → MENU DE CONFIGURAÇÃO → CONFIGURAÇÃO DO RADIO → Tempo de espera do rádio 60 min

Se o tempo de espera do rádio está configurado para zero, então a fonte de alimentação do rádio não irá desligar, a menos que esteja sob circunstancias especiais ou até que a unidade de alimentação desligue. A fonte de alimentação do rádio/modem é restaurada quando a fonte auxiliar retorna ao normal.

A fonte de alimentação do rádio/modem pode ser ligada e desligada pelo operador para a manutenção do rádio sem inserir a senha:

**set** Status do Sistema → RADIO → S: Fonte de alimentação do rádio ON/OFF

**flex** MENU DO ENGENHEIRO → MENU DE CONFIGURAÇÕES → AJUSTE DO RÁDIO → Fonte de alimentação do rádio ON/OFF

Quando tem uma queda na fonte de alimentação, essas páginas são indicadas.

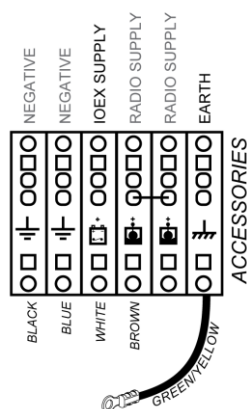
## Instalação do Expansor de Entrada e Saída (IOEX3)

### Introdução

O módulo IOEX3 é um invólucro lacrado e fundido que fornece entradas opticamente isoladas e saídas livre de tensão para permitir a conexão de dispositivos externos.

Tanto um como dois módulos IOEX3 podem ser usados com cada controlador ADVC. O segundo módulo IOEX3 só está disponível com o cubículo ADVC ULTRA equipado com uma bandeja superior opcional para cliente. Quando os dois módulos são usados, eles são designados como IOEX-A e IOEX-B.

Os módulos IOEX3 adquiridos no momento do pedido inicial, vem prontamente instalados no cubículo, localizados na bandeja do cliente, energizados e aterrados via bloco de terminais localizado na bandeja ao lado do cliente.



IOEX Supply and Earthing

Se um módulo IOEX3 for comprado separadamente, consulte instruções de instalação disponíveis em módulos separados. Para mais informação nas dimensões do IOEX, consulte Dimensões ([página 121](#))

Se o IOEX3 for instalado na fábrica, ele será conectado a porta IOEX/WSOS RS-232, com taxa de transmissão de 19,200 para corresponder a taxa do IOEX3. Se um segundo IOEX3 for instalado, ele pode ser conectado a porta MODEM RS-232 ou a qualquer uma das 3 portas USB ports, usando um conversor USB para RS-232 adequado (SANDY). Se for necessário modificar a taxa de transmissão de uma porta RS-232 com um IOEX3 instalado, por exemplo, uma porta IOEX/WSOS; siga os seguintes procedimentos:

**set** Comunicação → IOEX/WSOS PORT -1 → BAUD

**flex** MENU DO ENGENHEIRO → MENU DE TELEMETRIA → MENU DE CONFIGURAÇÃO DE PORTAS → IOEX/WSOS

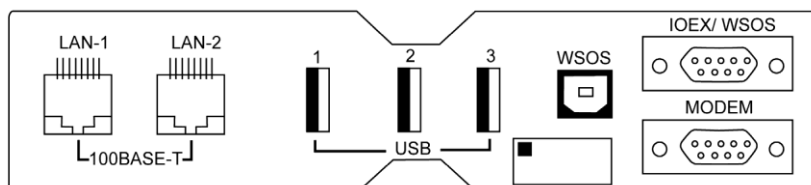
Configurações padrão para o IOEX3, incluindo **Seleção de Portas e Eventos Off/On** estão disponíveis na seguinte localização:

**set** Comunicação → IOEX+

**flex** ENGENHARIA → TELEMETRIA → Configuração de comandos → Configurações IOEX

### Portas de Comunicação

O Controlador ADVC tem várias portas de comunicação.



Elas são:

- USB 2.0 device port
- 3 x USB 2.0 host ports



- 2 x 100Base-T Ethernet
- 2 x RS 232

Essas portas são usadas tipicamente por qualquer uma das seguintes funções:

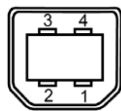
- Comunicação WSOS
- Comunicação SCADA
- IOEX

Tabela de alocação de portas de comunicação

Portas	Protocolos de Comunicação				
	WSOS	DNP3	IEC	MODBUS	IOEX
MODEM	WSOS	DNP3	IEC	MODBUS	IOEX
IOEX / WSOS	WSOS	DNP3	IEC	MODBUS	IOEX
USB – 1	WSOS	DNP3	IEC	MODBUS	IOEX
USB – 2	WSOS	DNP3	IEC	MODBUS	IOEX
USB – 3	WSOS	DNP3	IEC	MODBUS	IOEX
LAN – 1	WSOS	DNP3	IEC	MODBUS	
LAN – 2	WSOS	DNP3	IEC	MODBUS	
USB – WSOS	WSOS				

### Porta USB WSOS

A porta USB (WSOS) no controlador usa um receptor padrão USB tipo B.



A pinagem para essa porta está de acordo com a especificação USB 2.0 conforme mostrado na tabela abaixo. Pinagem da porta USB tipo B.

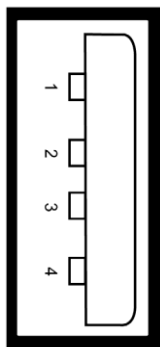
Pin	Nome	Descrição
1	V <sub>BUS</sub>	+5 V
2	D-	Data -
3	D+	Data +
4	GND	Ground

A porta USB é dedicada a executar o software WSOS e não pode ser usada para outro propósito. Conecte um PC que esteja com um WSOS em execução a essa porta usando um cabo USB tipo A a um cabo tipo B.

**Obs:** A versão WSOS a ser usada deve ser de até 5.16.xx, com a finalidade de se conectar e se comunicar com o controlador ADVC via USB.

### Portas USB de uso geral

O Controlador ADVC vem com 3 portas gerais USB 2.0 Tipo que são nomeadas USB-1, USB-2 e USB-3.



Essas portas podem ser configuradas para usar um conversor se existir necessidade de portas adicionais do tipo RS-232. Protocolos podem ser configurados para executar portas RS-232, e podem depois ser configuradas para executar as portas USB-1/2/3, com um conversor anexado a ele.

Os pinos de saída dessas portas de acordo com a especificação USB2.0 são mostrados nas tabelas abaixo. Pinos de saída USB do tipo A.

Pino	Nome	Descrição
1	V <sub>BUS</sub>	+5 V
2	D-	Data -
3	D+	Data +
4	GND	Ground

As portas USB do tipo A não estão isolados uns dos outros ou da eletrônica do controlador. Portanto, eles só podem ser conectados a dispositivos dentro do controlador que estão energizados pela fonte de controle do rádio, incluindo modems, isoladores ópticos e rádios.

## ATENÇÃO

### RISCO DE DANOS AO EQUIPAMENTO

- O uso de portas USB conectadas diretamente a outros dispositivos, fora do controlador podem causar danos e anular a garantia.
- Se as conexões de outros dispositivos forem requisitadas, então a interface de isolamento deve ser usada.

**Falha ao seguir essas instruções pode resultar em danos ao equipamento.**

### RS-232

Duas portas RS-232 (Modem and IOEX / WSOS) são fornecidas para serem conectadas a modems convencionais que fornecem a sinalização correta para a comunicação média utilizada, por exemplo, modem de fibra ótica, modem de discagem telefônica ou modem do rádio RS-232. Eles podem também ser conectados a um PC que esteja executando WSOS via modem de cabo nulo. A porta do modem tem linhas adicionais em "handshaking", os quais não são avaliados na porta IOEX/WSOS. Ambas as portas possuem conectores macho padrão de 9 pinos do tipo D e as conexões são descritas conforme a tabela seguinte.

RS-232 Pin Connections

RS-232 Pin No	Direção	Use	IOEX / WSOS	MODEM
1	To ADVC	Data Carrier Detect (DCD)		Yes
2	To ADVC	Rx Data (RxD)	Yes	Yes
3	From ADVC	Tx Data (TxD)	Yes	Yes
4	From ADVC	Data Terminal ready (DTR)		Yes
5		0 V (ground/earth)	Yes	Yes
6	Not connected			
7	From ADVC	Request to Send (RTS)		Yes
8	To ADVC	Clear to Send (CTS)		Yes
9		Reserved	Reserved	Not connected

As portas RS-232 não estão isoladas umas das outras ou da eletrônica do controlador. Portanto, elas podem somente ser conectadas a dispositivos dentro do controlador que são energizados pela fonte de alimentação do controlador do rádio, incluindo modems, isoladores ópticos e rádios.

## ATENÇÃO

### RISCO DE DANOS AO EQUIPAMENTO

- O uso de portas seriais para conectar diretamente outros dispositivos do lado de fora do controlador pode causar danos ou perda da garantia.
- Se forem requisitadas conexões a outros dispositivos, então a interface de isolamento deve ser usada.

**Falha ao seguir essas instruções pode resultar em danos ao equipamento.**

## Ethernet 100Base-T ports

O controlador tem duas portas 100Base-T Ethernet, marcadas como LAN-1 e LAN-2. Essas portas usam um conector padrão fêmea RJ45. Os pinos de saída das portas LAN-1 e LAN-2 são mostrados na tabela seguinte.

Conexões do pino Ethernet

Pino	Direção	Uso
1	From ADVC	TxData(Tx+)
2	From ADVC	TxData(Tx-)
3	To ADVC	RxData(Rx+)
4	Reserved	
5	Reserved	
6	To ADVC	RxData(Rx-)
7	Reserved	
8	Reserved	

O software Windows Switchgear Operating System (WSOS) está permanentemente sendo executado na porta Ethernet e não pode ser desabilitado. Mas isso pode ser configurado para serem executados somente LAN-1 ou LAN-2. Outros protocolos podem também ser configurados para serem executados ao mesmo tempo, junto com WSOS.

**Obs:** O controlador ADVC implementa um switch for o suporte de LAN-1 e LAN-2. Então, é essencial que ambas as portas sejam usadas, depois elas precisarão ser configuradas para diferentes sub-redes.

## Windows Switchgear Operating System (WSOS)

Windows Switchgear Operating System (WSOS) é um pacote de software que permite configuração, controle e monitoramento de um controlador em um computador Windows.

Por padrão, WSOS está rodando nas portas IOEX/WSOS, USB (WSOS), e com100Base-T.

As configurações padrão para as portas IOEX/WSOS são 115200 baud, 8 bit, sem paridade e 1 bit de parada. WSOS pode ser também configurado para executar uma porta de modem ou qualquer uma USB do tipo A que não esteja sendo utilizada, se requisitado, usando uma interface de conversão USB RS-232.

**Obs:** Um conversor adequado USB para RS-232 ou USB para RS-485 necessita ser instalado e configurado para uso da porta USB tipo A para propósitos de comunicação.

## Protocolos SCADA

Comunicações SCADA estão disponíveis no controlador e os protocolos suportados podem ser atribuídos a quaisquer portas RS-232 assim como portas USB do tipo A via um conversor adequado de USB para RS-232. Os protocolos de comunicação DNP3, IEC60870-5-104 e MODBUS podem ser executados nas portas LAN-1 ou LAN-2 100Base-T.

Os protocolos de suporte atuais podem ser vistos em:

 **STATUS DO SISTEMA → OPÇÕES → COMUNICAÇÃO 1**

 **MENU DO ENGENHEIRO → MENU DE CONFIGURAÇÃO → SELEÇÃO DE RECURSOS → COMUNICAÇÃO**

Somente o protocolo DNP3 está disponível segundo padrão. Outros protocolos devem ser protocol is available by default. Outros protocolos devem ser disponibilizados antes de aparecerem no menu de comunicação.

```
----- OPTIONS - COMMUNICATIONS 1 -----S
WSOS Available      DNP3 Available
MITS NotAvailable   Modbus Not Available
101/4 Not Available
```

**Obs:** As imagens exibidas são somente para propósitos ilustrativos.

Uma vez que voce torna o protocoloa SCADA disponível, seus parametros de comunicação podem ser configurados. Para maiores detalhes, consultar o Manual do Operador e os manuais técnicos de protocolos específicos.

---

---

# Capítulo 5

## Testes de Instalação

---

### Qual é o conteúdo desse capítulo?

O capítulo contém os seguintes tópicos:

Tópico	Pag
Introdução	44
Designação do Terminal e Rotação de Fase	48
Ajuste de Direcionamento de Fluxo de Potencia	50
Teste de Direcionamento de Fluxo de Potencia	52

## Introdução

### Visão

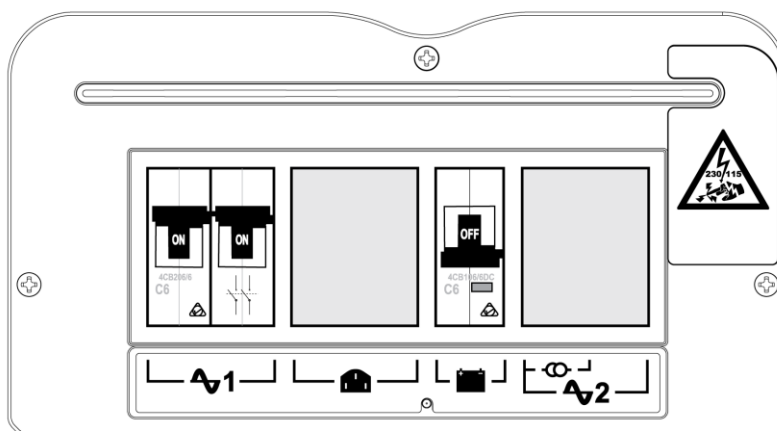
#### Geral

A seção seguinte detalha sobre a instalação do tanque. Para mais informações, consultar Instalação. (página 15).

**Obs:** Verifique que a instalação e as conexões externas tenham sido realizadas conforme descrito nesse manual e de acordo com as normas locais.

Verifique que nenhum dano visível tenha ocorrido durante a instalação. Realize todos os testes visuais e elétricos, assim como isolamento e resistencia de contato, considerado necessário para provar que a instalação é segura.

### Energizando ADVC



ADVC Controller PSU. located at the bottom of the cubicle



### RISCO DE CHOQUE ELÉTRICO, EXPLOÇÃO OU ARCO ELÉTRICO

Executar o esquema de aterramento conforme instruído

**Falha ao seguir essas instruções pode resultar em morte ou ferimentos graves.**





## PERIGO





### RISCO DE EXPLOÇÃO, FOGO OU QUÍMICA

- As baterias são capazes de fornecer altas correntes. Sempre desligue o circuito das baterias antes de conectar ou desconectar as baterias no cubículo.
- Nunca deixe cabos de ligação conectados a bateria.

**Falha ao seguir essas instruções pode resultar em morte ou ferimentos graves.**

Passos	Ação
1	Ligue o disjuntor de bateria monopolar, localizado acima do ícone  .
2	Ligue o disjuntor de alimentação auxiliar de polo duplo, localizado acima do ícone  se a fonte auxiliar estiver sendo fornecida por uma rede elétrica de baixa tensão ou por um transformador auxiliar dedicado.
3	Se uma segunda entrada AC é fornecida, o MCB de dois pólos localizado acima do ícone  deve ser ligado. (ou)
4	Ligue a alimentação do transformador ao disjuntor do cubículo se a fonte de alimentação está sendo fornecida por um transformador integrador (pólo único MCB está acima do ícones  .

Passos	Ação
5	<p>Powering up the ADV C with the recloser connected will cause the ADV C to read data from the SCEM card in the recloser. This will take up to 60 seconds during which time the message below will flash at the top of the display:</p> <p> <b>READING</b> → <b>Do NOT disconnect Switchgear</b></p> <p>The System OK LED on the OCP should also flash at this time to indicate that the ADV C is powered and functioning.</p> <p> <b>The flexVUE O.I. will create an ALERT with the same message.</b></p>
6	<p>If the configuration file containing the settings to be used in operation has not previously been loaded, it should be loaded now using WSOS. Alternatively the settings could be entered via the OCP.</p>

**NOTE:** If you are familiar with navigating operator control interface display groups, proceed with the checks described below. For more information refer, Operator Control Panel ([see page 59](#)) before proceeding.

The ACR will now be ready for operation. Before energizing the recloser, you should perform the following checks to confirm that the equipment is fully operational and properly configured.

## Battery

1. Check battery status, which is found on the following menu page:

 **System Status** → **SWITCHGEAR STATUS** → **S**

```

----- SWITCHGEAR STATUS ----- S
Work Tag OFF
Aux Supply Normal   Battery Normal 27.5V
Switch Connected    Switch Data Valid

```

**NOTE:** Images shown are for illustration purposes only.

 **OPERATOR MENU** → **SWITCHGEAR STATUS** → **SWITCHGEAR DATA** → **Battery Status**

The battery may be in any of the following four states: **Normal, OFF, Low, High**.



### HAZARD OF EXPLOSION, FIRE, OR CHEMICAL

- If the battery status is **Low** but the voltage is close to the normal range lower limit, the battery should recharge providing the auxiliary supply is turned on.
- If the voltage is low, the battery must be replaced.

**Failure to follow these instructions will result in death or serious injury.**

At this point, the battery state should be Normal with a voltage within the range 23 to 29.5 V. **Aux Supply** status should be **Normal**. If not, you cannot perform the remaining battery checks at this stage.

2. Switch off the battery circuit breaker and check whether the battery status changes to off status in 3 - 5 seconds.
3. Refer Event Log ([see page 73](#)) for details on how to do this, and check that the bottom line of the display (the most recent event) displays the battery off event.
4. Again switch the battery ON.

## Connection between the ADV C and the Recloser

1. Check the switch status, which is found on the following menu page:

 **System Status** → **SWITCHGEAR STATUS** → **S**

```

----- SWITCHGEAR STATUS ----- S
Work Tag OFF
Aux Supply Normal   Battery Normal 27.5V
Switch Connected    Switch Data Valid

```

**NOTE:** Images shown are for illustration purposes only.

 **OPERATOR MENU** → **SWITCHGEAR STATUS** → **SWITCHGEAR DATA** → **Switch Status**

The Switch status may be in either of the two states: *Connected* or *Disconnected*. *Connected* is the normal state. If Switch is *Disconnected*, check the connection at individual pins in the plug at each end. If the status remains “*Disconnected*”, with the cable plugged in at both ends, then the cable may be defective.

2. Check, if the Switch Data status is *Valid*.

In normal operation, Switch status will be *Connected*, and Switch Data *Valid*.

If the control cable has been unplugged (Switch status is *Disconnected* and Switch Data status is *Invalid*), when the control cable is replugged (Switch status is *Connected*), the Switch Data status will remain *Invalid*, as time is taken to read switch data from the SCEM, to display the status message.

If Switch data remains *Invalid*, do the following checks:

- Examine each end of the control cable, by checking for bent or broken pins and rectify if found. Also check the socket at both the SCEM and the Switchgear port in the ADVC for damage.
- If the pins are in good condition, then the cable may be defective and the continuity of each core should be checked. The pins at each end are numbered as 1 - 24 and connected “one to one”.
- If Switch Data remains *Invalid*, check the power supply to the SCEM by checking the voltage on pins 2 and 5 of the control cable. The voltage should be approximately 36 Vdc if the integrated supply is used, 45 Vdc for a 115/230 V auxiliary supply or approximately 26 Vdc, if the controller is running on battery.

## Auxiliary Supply

1. Check the Auxiliary Supply Status, which is found on the following menu page:

 **System Status → SWITCHGEAR STATUS → S**

```

----- SWITCHGEAR STATUS ----- S
Work Tag OFF
Aux Supply Normal    Battery Normal 27.5V
Switch Connected     Switch Data Valid
  
```

**NOTE:** Images shown are for illustration purposes only.

 **OPERATOR MENU → SWITCHGEAR STATUS → SWITCHGEAR DATA → Aux Supply Status**

The auxiliary supply may be in any of the following two states: *Normal* or *Fail*. The battery status should be *Normal*.

2. If using LV auxiliary supply, switch off the auxiliary supply; if using an integrated auxiliary supply and the VT is energized, switch off the VT supply to cubicle circuit breaker. Check whether the Aux Supply status changes to *Fail* in 3 - 5 seconds.
3. Check, whether the battery voltage has dropped slightly (by approximately 2 V), while remaining in the *Normal* state.
4. Go to Event Log ([see page 73](#)) for details on how to do this and check that the bottom line of the display (the most recent event) contains the Aux Supply Off event.
5. Switch on the auxiliary supply again.



### HAZARD OF EXPLOSION, FIRE, OR CHEMICAL

- If the battery voltage is continuously dropping, then the battery state is **LOW** and the batteries may be flat.
- If the batteries are flat, they must be replaced.

**Failure to follow these instructions will result in death or serious injury.**

## Work Tag

1. Check that **Local Control** is **ON**. This setting is found in the following:

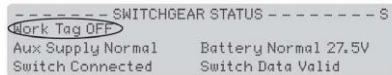
 **System Status → Operator Settings - 1 → S**

 **Operator Menu → Operator Controls → LOCAL CONTROL ON**

2. Check **Work Tag** Status on the following menu page

 **System Status → SWITCHGEAR STATUS → S**





**NOTE:** Images shown are for illustration purposes only.

**OPERATOR MENU → OPERATOR CONTROLS → Work Tag Applied/OFF**

The Work Tag has two possible settings: *Applied* or *OFF*. *OFF* is the default setting.

3. Press the **SELECT** key to select the work tag field.

4. Press (→ **set**) or (↓ **flex**) to change the setting to *Applied*. Then press (**ENTER** **set**) or (**SELECT** **flex**) to activate the setting.

The message: **set** Work Tag Applied will flash at the top of the display.

**flex** Work Tag Applied will be displayed in the **Alerts Menu**, which is on the same level as that of the **Operator** and **Engineer** menus.

**NOTE:** For more details, refer the Event Log ([see page 73](#)), check that the bottom line of the display (the most recent event) contains the Work Tag Applied event.

5. Return to **WORK TAG STATUS** and change the setting back to *OFF*

## Terminal Designation and Phase Rotation

### Introduction


The power system phase assigned to each set of bushings on the recloser must be correctly configured at the time of installation of the ACR. This process is called “setting the phasing”. Setting the phasing affects all the displays, events, and so on, that are concerned with switchgear terminals, for example: voltage measurements, live/dead terminal displays and maximum current events.

Normal/default Phasing is A, B and C for bushings I/X, II/XX and III/XXX respectively. Normal/ default phase rotation is ABC.

If the Phasing at the recloser and/or phase rotation of the network are different from the defaults, you must set the Phasing and/or the Phase rotation.

On the **seVUE** O.I., Phasing is set from the following:

 **SYSTEM STATUS** → **TERMINAL DESIGNATION/ROTATION** → **S**

1. Press the **SELECT** key to select the **A Phase** field.
2. Press  to modify the setting. This will cycle A, B & C Phase through the six possible phase/bushing combinations.

```
--- TERMINAL DESIGNATION/ROTATION --- S
A Phase = Bushings I + X      Phasing ABC
B Phase = Bushings II + XX
C Phase = Bushings III + XXX
```

**NOTE:** Images shown are for illustration purposes only

3. Press the **ENTER** key, when you have the required combination. The controller then orientates the currents and voltages to match the selection.
4. In the Phasing field, select the **phase rotation** - either ABC or ACB.  
**NOTE:** For more details, refer the Event log ([see page 73](#)), check that the bottom line of the display (the most recent event) contains the Work Tag Applied event.
5. After the phasing has been set, record the details on the label on the rear of the control cubicle door (above the operator panel) to indicate the non-standard relationship between the bushings and phases.  
**NOTE:** A-B-C remains steady and the associated I-II-III designation rotates through the six possible combinations as shown in the following order, when down arrow is used.
  1. A-B-C=I-II-III
  2. A-B-C=III-II-I
  3. A-B-C=II-III-I
  4. A-B-C=III-I-II
  5. A-B-C=II-I-III
  6. A-B-C=I-III-II

For information on how to identify the individual bushings, refer Terminology ACR Bushings. ([see page 13](#)).

### CAUTION

#### RISK OF EQUIPMENT DAMAGE

Incorrect terminal designation may cause incorrect operation, false trips, or even damage to the switch gear or controller.

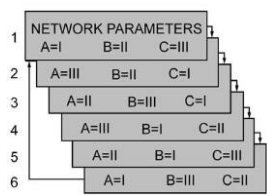
**Failure to follow these instructions can result in injury or equipment damage.**



On the ADVC flexVUE O.I., Terminal Designation is set from the following:

**ENGINEER MENU** → **CONFIGURATION MENU** → **SYSTEM SETTINGS** → **NETWORK PARAMETERS**  
→ **TERMINAL DESIGNATION/ROTATION**

1. Press the **SELECT** key and then use **↑** and **↓** to cycle through the possible combinations of bushing/phase relationship until the one representing the correct physical connection is found.



**NOTE:** Images shown are for illustration purposes only

2. Press the **SELECT** key when the required combination is displayed. The controller then orientates the currents and voltages to match the selection.

Use the **↑** and **↓** to scroll to the **Phasing ABC** option and select the correct phase rotation (either ABC or ACB) at:



**ENGINEER MENU → CONFIGURATION MENU → SYSTEM SETTINGS → NETWORK PARAMETERS → TERMINAL DESIGNATION/ROTATION → Phasing ABC**

**NOTE:** For more details, refer the Event log ([see page 73](#)), check that the bottom line of the display (the most recent event) contains the Work Tag Applied event.

3. After the phasing has been set, you should record the details on the label on the rear of the control cubicle door (above the operator panel) to indicate the non-standard relationship between the bushings and phases.

## Power Flow Direction Setting

### Introduction

The recloser is a symmetrical device meaning that, either side (I or X) can be connected to the supply. So, after installation, the controller must be configured to designate, which is the source side.

The power flow direction may be either **Source I, Load X** or **Source X, Load I** and is configured on page:

 **SYSTEM STATUS → PHASE VOLTAGE and POWER FLOW**

 **ENGINEER MENU → CONFIGURATION MENU → SYSTEM SETTINGS → METERING PARAMETERS → Source I, Load X**

Changing this setting, reverses the power flow direction but does not affect the phasing.

Power flow direction setting is used to determine:

- which power flow direction is positive for instantaneous metering purposes, when power is a signed value.
- whether power flow is forward or reverse for calculation of historical records
- whether the source or load corresponds to (I) or (X) on the voltage measurement displays.
- which power flow direction is considered positive by Automatic Protection Group Selection (APGS).
- which is the source or load for Live Load Blocking.
- which power flow direction is considered positive by Directional Blocking/Protection.

### Tripping and Closing

If system conditions allow, tripping or closing can be carried out.

- Trip and close the recloser from the ADVC. For more information on the trip and close controls, refer Operator Control Panel ([see page 59](#)).
- Trip and close cause the **TRIP** or **CLOSE** LED to illuminate, which indicates the on/off status respectively on the bottom of the recloser.

### Enable/Disable Switches

For each of the **TRIP** and **CLOSE** keys in turn, test **ENABLE** and **DISABLE** by:

- Disable either mechanism (e.g. **CLOSE**) using Disabled Switches located underneath the O.I.
- Go to the **EVENT LOG** and check that the bottom line of the display (the most recent event) contains the Close Coil Disconnect event. (For the same test of the **TRIP** mechanism the Event Log should display Trip Coil Disconnect.)
- With both mechanisms disabled, check that pressing each of the **CLOSE** and **TRIP** keys are ineffective.
- Enable both **TRIP** and **CLOSE** mechanisms.

**NOTE:** For more details, refer Event Log ([see page 73](#)), check that the bottom line of the display (the most recent event).

### Mechanical Trip

Step	Action
1	Use a hookstick to manually trip the recloser via the manual trip lever.
2	For more details, refer Event Log ( <a href="#">see page 73</a> ), check that the bottom line of the display (the most recent event) contains the Mechanical Trip event.
3	With the manual trip lever still in the lock position, attempt to close the switchgear from the <b>CLOSE</b> key on the control panel. The switchgear should not close and the event log should display: <ul style="list-style-type: none"> <li>• Panel Close Request</li> <li>• Mechanical Interlocked</li> <li>• Operation Denied</li> </ul>
4	Use the hookstick to return the manual trip lever to its normal position and check that the switchgear can be closed from the operator panel.

### Secondary Injection Testing

If secondary injection testing is required to test protection settings but operation of the recloser is not possible, secondary injection can be performed with a suitable current injection set and the Test and Training Set (TTS) in standalone mode connected to the ADVC, with the recloser disconnected.

---

If tripping and closing of the recloser is possible and preferred, perform secondary injection testing with the TTS in parallel mode.

**NOTE:** Any secondary injection must use a frequency, which corresponds to the frequency set in the controller

### Primary Injection Testing

If the recloser can be isolated from the network, primary injection testing can be performed if required.

## Power Flow Direction Testing

### Introduction

**NOTE:** Power flow direction test is valid only, if there closer is being supplied from a single source and can be energized before closing.

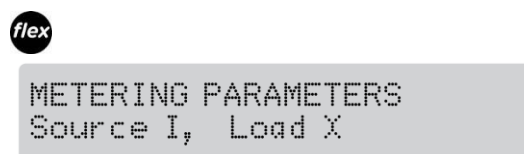
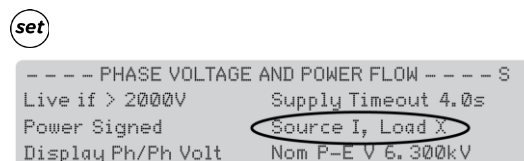
This test is to ensure that the source and load designations are correct.

Since either side of the recloser can be connected to the power source, the controller must be configured to designate which is the source side.

For more information about the configuration of Power Flow, refer Power Flow Direction Setting (see page 50).

If the I-side bushings are connected to the source, the Source/Load setting should be **Source I, Load X**.

1. Display the page as shown and check the Source/Load configuration.



**NOTE:** Images shown are for illustration purposes only.

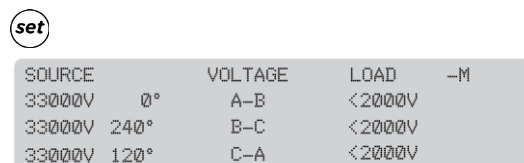
The correct power flow setting can be confirmed by energizing the recloser, while it is open.

2. With the recloser energized but still open, check the source side voltages at:

**set** **System Measurement** → **SOURCE SIDE VOLTAGES** → **M**

**flex** **ENGINEER MENU** → **MEASUREMENTS MENU** → **VOLTAGE** → **PHASE/LINE SRC** → **LD**

3. Check the source side voltages, for example whether it is phase to ground or phase to phase.

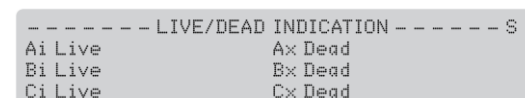


**NOTE:** Images shown are for illustration purposes only.

4. Check the **LIVE / DEAD INDICATION** of the recloser by going to:

**set** **System Status** → **LIVE/DEAD INDICATION** → **S**

The bushings indications are available on one screen on the **seVUE** O.I. for example:

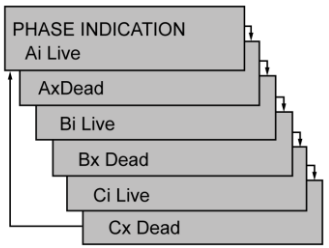


**NOTE:** Images shown are for illustration purposes only.

**flex** **OPERATOR MENU** → **MEASUREMENTS** → **PHASE INDICATION**

On the **flexVUE** panel, use the **↑** / **↓** keys to scroll through the individual displays for the six indicators, for example:

**NOTE:** Images shown are for illustration purposes only.



- If steps 3 and 4 indicate an incorrect power low setting, return to step 1, modify the setting and repeat steps 2 to 4.

### On Load Checks

Once the recloser is closed and taking load, the following on-load checks can be carried out. To confirm correct operation, check the current against a known reading.

- Check system currents on:

**set** **System Measurement** → **CURRENT**

**NOTE:** Images shown are for illustration purposes only.

CURRENT					
A Phase	120 Amp	0°	Earth	0A	0°
B Phase	120 Amp	0°	Ipps	120A	0°
C Phase	120 Amp	0°	Inps	0A	0°

**NOTE:** Scroll through separate pages for each current type.

**flex** **OPERATOR MENU** → **MEASUREMENTS** → **CURRENTS**

- Then check other measurements at:

**set** **System Measurements**

**NOTE:** Images shown are for illustration purposes only.

SYSTEM MEASUREMENTS			
Current	120 A	Power P	6754 kW
Voltage	33000 V	Power Q	1191 kVAR
Frequency	50.00 Hz	PF	0.98

**NOTE:** Scroll through separate pages for each measurement.

**flex** **OPERATOR MENU** → **MEASUREMENTS** → **SYSTEM MEASUREMENTS**

Use these pages to confirm that the system measurements and power flow signs are as per the expectation.

- Check the source and load side voltages at:

**set** **System Measurement** → **SOURCE VOLTAGE LOAD**

**NOTE:** Images shown are for illustration purposes only.

SOURCE	VOLTAGE	LOAD	-M
33000 0°	A-B	0°	33000 V
33000 240°	B-C	240°	33000 V
33000 120°	C-A	120°	33000 V

**NOTE:** Scroll through separate pages for each voltage measurement.

**flex** **ENGINEER MENU** → **MEASUREMENTS** → **VOLTAGE** → **PHASE/LINE SRC** → **LD**

**NOTE:** Images shown are for illustration purposes only.

```
PHASE/LINE SRC-LD
33000V A-B 33000V
```

This information displays system voltage as phase-ground or phase-phase values as configured on the **System Status, Phase Voltage & Power Flow** pages.

---

Source and load side voltages should be the same, when the recloser is closed.

4. Reset the **MAXIMUM DEMAND INDICATOR** go to:



**System Measurements** → **Maximum Demand Indicator** → **M**



**OPERATOR MENU** → **MEASUREMENTS** → **MAX DEMAND IND**

5. Press **SELECT** to display:  
**RESET MAXIMUM DEMAND INDICATOR**  
(This display scrolls on *flexVUE*)
6. Press **SELECT** again to reset the flags.



---

# Chapter 6

## Control Electronics Operation

---

### Introduction

#### Overview

The ADVC is designed for outdoor pole mounted operation. Both the **ULTRA** and **COMPACT** cubicles are vented and insulated to minimize internal temperature variation and maximize battery life. For more information about cubicle dimensions, refer Appendix B ADVC **COMPACT** Dimensions and ADVC **ULTRA** Dimensions (*see page 121*).

#### Sealing and Condensation

All cubicle vents are screened against vermin entry and the cubicle door is sealed with replaceable foam tape.

Complete sealing against water entry under all conditions is not expected, for example, during operation in the rain. Instead, the design is such that, if any water enters, it drains out of the bottom without affecting the electrical or electronic parts. A rain shield on the PSU protects MCBs, if the door is open during driving rain. The extensive use of stainless steel and other corrosion proof materials helps to ensure that the presence of moisture has no detrimental effects.

Condensation can be expected to form under some atmospheric conditions such as, tropical storms. However, condensation is on metal surfaces, where it is of no consequence. The water runs out in the same way as any other water entering the cubicle. Condensation runs out of the bottom or be dried by ventilation and self-heating.

All electronic modules are fully sealed to IP65 and are self-heating.

#### Auxiliary Power Source

The auxiliary supply is used to maintain charge on the sealed lead-acid batteries that provide stand-by power, when auxiliary power is lost. The controller monitors the status of both the auxiliary and battery supplies.

A low-power mode is activated when the batteries are nearly exhausted. This typically occurs due to loss of the auxiliary supply. Low-power mode minimizes power consumption, while still maintaining critical functionality.

#### Controller

The controller consists of three submodules.

- Power Supply Unit (PSU)
- Control and protection enclosure (CAPE) with Operating Interface (O.I.)
- Customer Compartment

For more information, refer to ADVC Block Diagram (*see page 58*).

##### **PSU Module**

The PSU module supplies power to the CAPE, and controls the supply from external auxiliary sources.

The power supply module encloses all 115/230 Vac mains connections. Internally, it provides terminals for the auxiliary power supply connection. Cable-tie points are provided to secure the auxiliary supply cables. Circuit breakers are used to protect and switch the battery and auxiliary power supplies on/off. A durable cover is used to enclose all the terminations.

**NOTE:** The 115/230 Vac mains connection can handle a +/- 20 % variance from the auxiliary supply.

##### **CAPE Module**

The main module of control electronics is the Control and Protection Enclosure (CAPE). The CAPE digitizes the current transformer (CT) signals and capacitive voltage transformer (CVT) signals from the recloser. These are used to provide various data for the operator.

The CAPE module contains the PCOM board, PSSM board, trip/close capacitors, and O.I. assembled into a housing that provides protection from the environment, sealing, and EMC shielding.

---

The CAPE performs the following functions:

- Operator Interface (O.I.)
- Operating the external communications interface to allow monitoring and control from a remote computer or operator over a communications link.
- Switchgear Monitoring and Control
- Communicating with WSOS5 over an RS-232, USB or Ethernet link. The IOEX/WSOS port is by default configured for WSOS connection. USB type B (WSOS) and Ethernet ports are permanently configured for WSOS.
- Supply power to all electronic circuits and the customer compartment.

### Ancillary Equipment

The ADVC Controller is fitted with a standard customer compartment tray that facilitates the mounting of ancillary equipment, for example, a radio or modem including any special interfaces. The compartment has a terminal block for the radio supply and power for accessories such as, an IOEX3.



*Standard Customer Compartment Tray*

### Protection and Communications Submodule (PCOM)

The PCOM submodule contains a Digital Signal Processor (DSP), which samples the current and voltage signals from the switchgear and processes them to derive the basic power system information such as current, voltage, frequency, real power, reactive power, and so on. This is then used by the General Purpose Processor (GPP) to provide protection and communications functions for example, over-current protection. It also presents this data to the outside world via various communications protocols.

### Power Supply and Switchgear Module (PSSM)

The PSSM fulfills power supply and switchgear functionality.

The power supply function controls and filters the supply from external auxiliary supplies. Power is supplied to all the electronic submodules in the ADVC Controller and customer compartment. It also manages the battery power level and performs battery testing.

The switchgear interface function provides controlled pulses of current to trip and close the switchgear.

### Operator Interface

The O.I. is mounted on the CAPE and is accessed by opening the cubicle door. Operators can view switchgear and system data as well as control and configure the system via the O.I. The O.I. has its own electronic processing and driver circuit, and operator control panel with LCD, membrane keyboard, and status LEDs.

## WSOS5 Interface

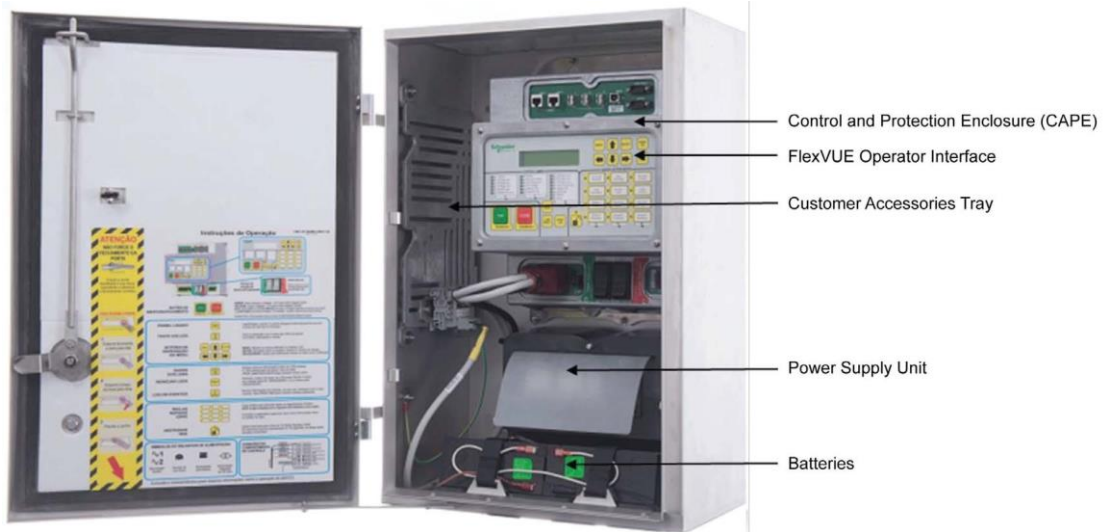
To use WSOS5 to upload or download data, connect between either:

- a serial port on the WSOS PC and the IOEX/WSOS RS-232 Port. Use an RS-232, DB9 female to DB9 female, crossover cable (also known as Null Modem).
- USB on the WSOS PC and the USB port on the controller. Use a standard USB Type A to Type B cable.
- 100Base-T Ethernet ports. Either a standard Ethernet cable or a cross-over cable can be used.

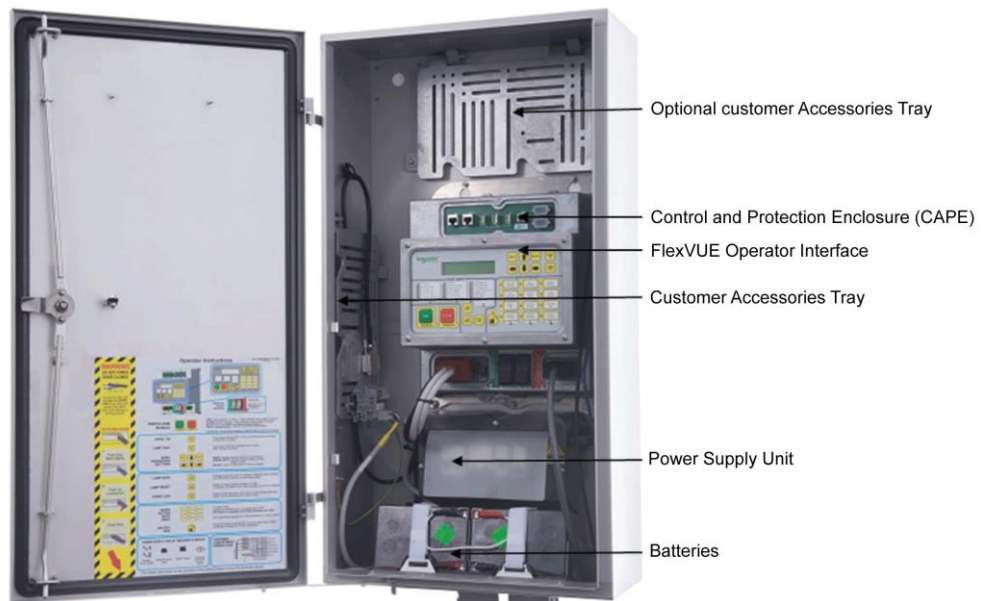
## Customer Compartments

The **COMPACT** cubicle compartment is fitted with an accessory tray that facilitates the mounting of your equipment, for example, a radio or modem.

The **ULTRA** cubicle has one standard, and one optional accessory tray to allow for more equipment. The standard tray has a terminal block for the radio power supply and power for accessories such as an IOEX3.

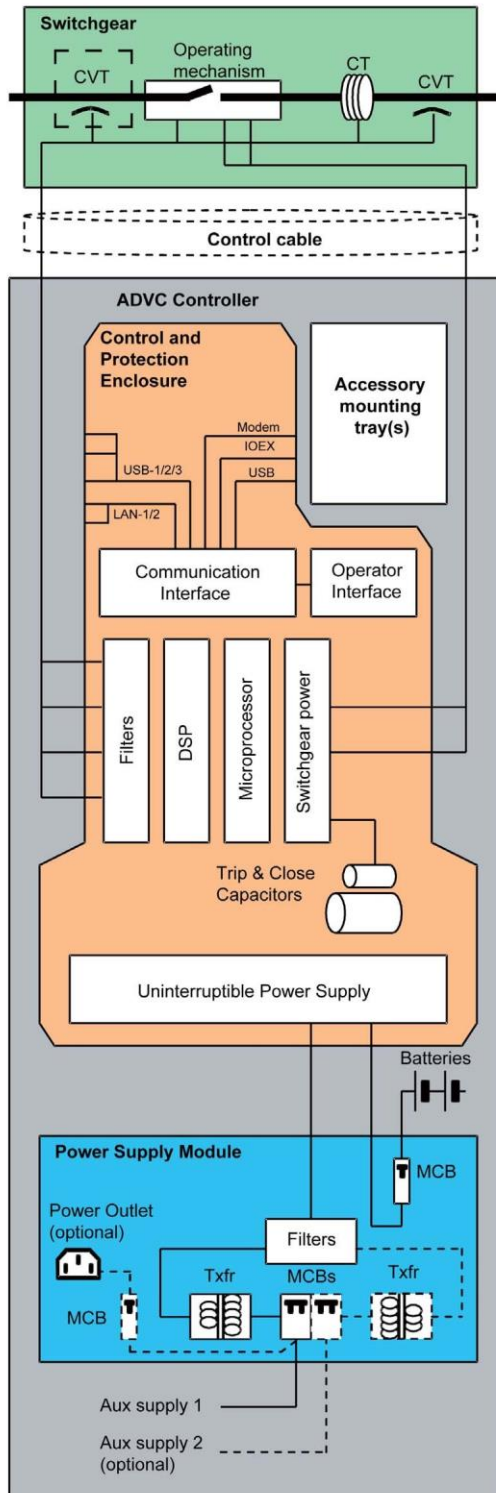


*Compact ADVC with flexVUE O.I.*



*Ultra ADVC with flexVUE O.I.*

## ADVC Block Diagram



ADVC Controller block diagram

---

# Chapter 7

## Operator Control Panel

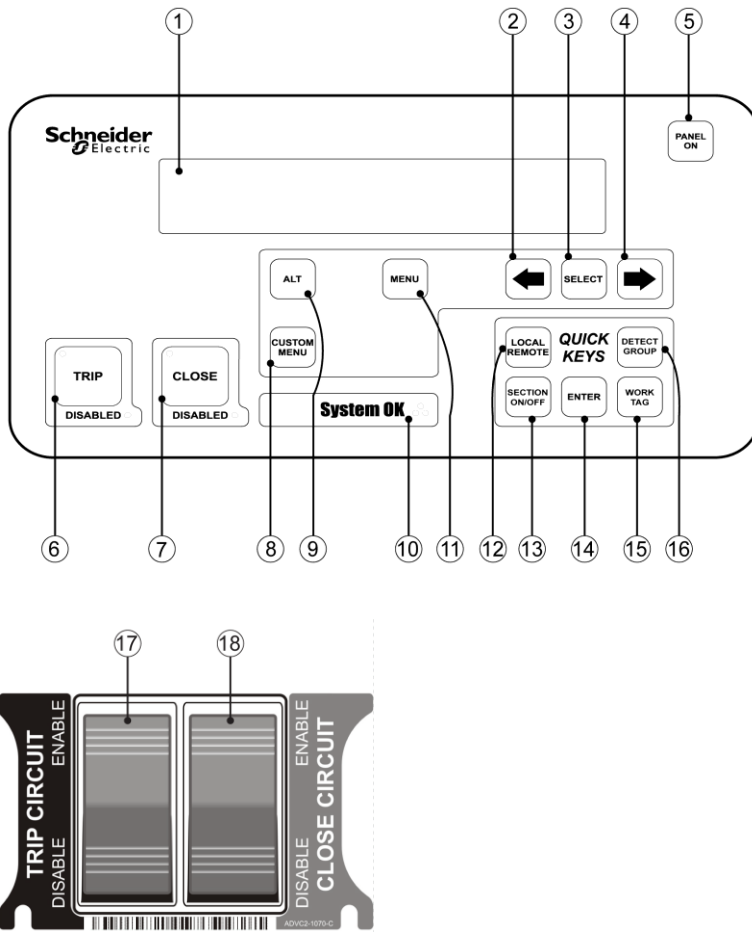
---

### What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
<b>seVUE</b> Panel Interface	60
<b>flexVUE</b> Panel Interface	64

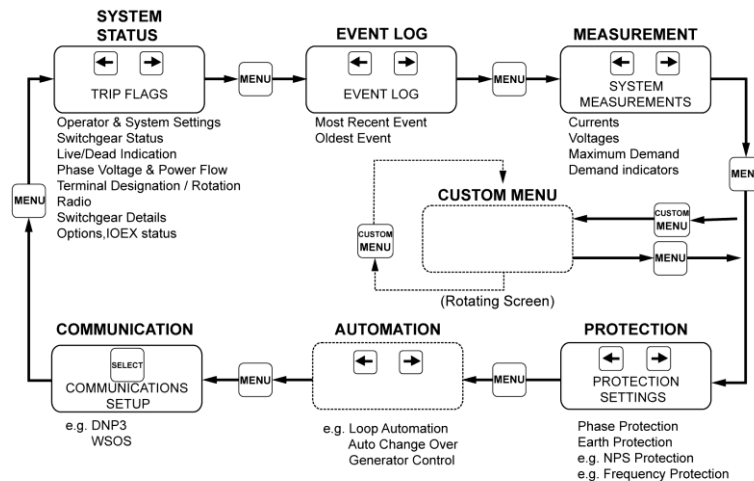
# setVUE Panel Interface



SI No.	Item	Description
1	Display	Back-lit LCD, 4 line with 40 characters per line.
2	<b>LEFT</b> scroll key	Selects the previous screen in a display group or, if a setting is selected, decreases its value.
3	<b>SELECT</b> key	Selects a data field/setting so that it can be changed.
4	<b>RIGHT</b> scroll key	Selects the next screen in a display group or, if a setting is selected, increases its value.
5	<b>PANEL ON</b> key	Turns on the O.I.. The O.I. turns on when the cubicle door is opened if a door proximity switch is fitted.
6	<b>Trip</b> key	Generates a Trip request to the CAPE when the panel is active. An LED is embedded in the key to indicate its operation. Another LED is used to indicate whether this key's operation is DISABLED.
7	<b>Close</b> key	Generates a Close request to the CAPE when the panel is active. An LED is embedded in the key to indicate its operation. Another LED is used to indicate whether this key's operation is DISABLED.
8	<b>CUSTOM MENU</b> key	Grants access to the custom menu, which was configured using WSOS5. The custom menu is configured to provide a regular, updated data display by allowing a cycle of up to 12 screens.
9	<b>ALT</b> key	Grants access to an alternative event log display.
10	<b>SYSTEM OK</b>	The three System OK LEDs flash while the controller is operating normally.
11	<b>MENU</b> scroll key	Displays the first page of the next group. Pressing the <b>MENU</b> key after changing a setting causes the setting change to take effect.
12	<b>Configurable Quick</b> Key	Default linkage is to LOCAL/REMOTE
13	<b>Configurable Quick</b> Key	Default linkage is to AUTO ON/OFF
14	<b>ENTER</b> key	Press this key in order to commit a setting change that has been made. (Unlike the adjacent Quick Keys, the <b>ENTER</b> key is not configurable.)

SI No.	Item	Description
15	<b>Configurable Quick Key</b>	Default linkage isto <b>PROT.GROUP</b>
16	<b>Configurable Quick Key</b>	Default linkage isto <b>EARTH PROT</b>
17	Enable/ Disable <b>TRIP</b> switch	Disables all <b>trip</b> Operations. When the switch is in the Disable position the trip coil in the recloser is electrically disconnected from the control electronics. Thus the switch provides a physical isolation point for the control circuitry. The recloser cannot be opened, and an audible alarm in the panel sounds and the DISABLED LED in the <b>TRIP</b> key will flash. The <b>TRIP</b> key operates normally when the switch is in the Enable position. This switch also stops a close operation, so that the switchgear cannot be carrying load without the ability to trip.
18	Enable/ Disable <b>CLOSE</b> switch	<b>Disables all close operations.</b> When the switch is in the Disable position the close coil in the recloser is electrically disconnected from the control electronics. Thus the switch provides a physical isolation point for the control circuitry. The recloser cannot be closed and an audible alarm in the panel will sound and the DISABLED LED in the <b>CLOSE</b> key will flash. The <b>CLOSE</b> key operates normally when the switch is in the Enable position.

## Display Groups



### Navigating the menu Structure

For more details on configuring the custom menu, refer to the diagram inside the controller door or to the Installation and Maintenance Manual for details of Navigation within groups.

For details on Navigation within groups, refer to ADVC Controller Operations Manual for more details. To use the custom menu, press the **CUSTOM MENU** button.

### Display Screen Layout

The display area consists of four lines, each forty character long.

**NOTE:** Images shown are for illustration purposes only.



The top line of the display is the page title. To the right of the title is a letter, indicating the display group to which the page belongs:

Display Group Codes

Code	Display Group
<b>S</b>	<b>System Status Display Group</b>
<b>P</b>	<b>Protection Display Group</b>
<b>D</b>	<b>Detection Display Group</b>
<b>M</b>	<b>Measurement Display Group</b>
<b>A</b>	<b>Automation Display Group</b>
<b>C</b>	<b>Communications Setup</b>

Code	Display Group
E	Event Log

The next three lines are the data on display. Most displays have six data fields. A field may contain either:

- a setting, which can be changed - ON/OFF is the most common; or
- a status





### Changing Settings

Three types of settings can be changed:

- Operator settings
- Password protected settings
- Protection settings

#### Operator Settings



To change an operator setting:

Steps	Action
1	Navigate to the display page containing the setting to be changed
2	Press the <b>MENU</b> key to step through the Display Groups.
3	Communications Group (only) is divided into subgroups for different protocols. Press <b>SELECT</b> to display the subgroup required.
4	When the Display Group containing the setting to be changed is displayed, press  or  to locate the correct page.
5	Press <b>SELECT</b> until the field containing the setting to be changed is flashing.
6	Once you have selected the field to be changed, use  or  to change its setting.
7	Press <b>ENTER</b> to put the new setting into service.

**NOTE:** If a **QUICK KEY** is linked to the setting to be changed, you can use it to go directly to the relevant display page where the field with that setting will be selected. For more information, refer Quick Keys (see page 63).

#### Password Protected Settings

Some settings are password protected. You are prompted for a password before you can change the setting. To enter the password:

Step	Action
1	Press either of the  /  keys until the first character of the password is displayed.
2	Press the <b>SELECT</b> key to move to the next character selection.
3	Repeat Steps 1 and 2 until the password is complete.
4	Press <b>ENTER</b> .

While the operator panel remains ON, you will not be required to enter the password again.

The default factory password is **AAAA** but you can change it using the Windows Switchgear Operator System (WSOS5) program. The factory password does not have to be remembered - the controller prompts you for it automatically.

#### Protection Settings

Protection settings are password protected. To change a protection setting, follow the steps detailed in the Operator Settings section above but, in addition, enter the password when prompted. When you have completed the setting change by pressing **ENTER**, the following message flashes at the top of the screen:

Active Protection Setting has changed.

At this point, the changed setting is displayed but not in service. If further setting changes are required, they can be made now.

When you have completed making all the setting changes you require, press **ENTER**. The following text is displayed:

CHANGED ACTIVE PROTECTION SETTING [A]

The changed active PROTECTION SETTINGS are now in service.

Select the **MENU** or **ENTER** key to continue.



The changed settings are now in service. Press **MENU** or **ENTER** to return to the normal menu display.

### Quick Keys

The operator settings that you will frequently change can each be linked to a **QUICK KEY**. You use a **QUICK KEY** for instant display and selection of the linked setting which, otherwise, you would have to find by navigation.

You can link operator settings to individual Quick Keys using the Operator Interface or **WSOS5**.

A **QUICK KEY** can be set to blank if it is not required.

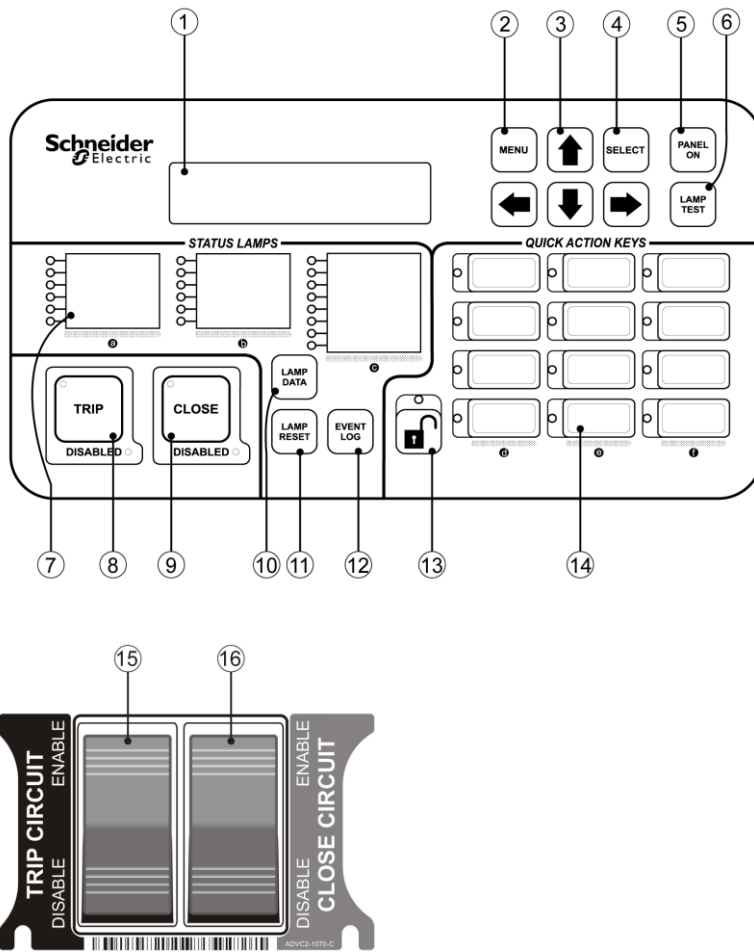
Otherwise, any one of the settings in below table, can be linked to one of the four Quick Keys.

Configurable Quick Key Settings

Setting	Default status
LOCAL/Remote / Hit & Run	Default setting, upper left key
Loop Auto ON/OFF	Configurable
Protection Group	Default setting, lower right key
Reset Flags	Configurable
Work Tag ON/OFF	Configurable
Auto ON/OFF Protection OFF	Default setting, lower left key
Cold Load ON/OFF	Configurable
Earth Protection	Default setting, upper right key
Live Block	Configurable
Negative Phase Sequence Protection OFF/ON/Alarm	Configurable
Detection Group	Configurable
Earth Detection	Configurable
Section ON/OFF	Configurable

For more information, refer to the ADVC Controller Operations manual (N00-812).

# flexVUE Panel Interface



SI No.	Item	Description
1	Display	Back-Lit LCD. 2 x 20 character display.
2	<b>MENU</b> key	Allows the user to enter the configuration menu from where it is possible to navigate the menu structure, select fields and edit settings. Navigating these pages is described separately.
3	Arrow/Navigation keys	Helps browse between display groups, fields, and change values.
4	<b>SELECT</b> key	Selects fields or values when changes are made.
5	<b>PANEL ON</b> key	Turns the panel on or off. An optional door switch is available to turn on the panel, when an operator opens the door and off, when the door is closed. If the controller is fitted with this option, the button can be used to turn the panel on/off while the door is open. Closing the door turns off the panel.
6	<b>LAMP TEST</b> key	Tests all lamps on the panel. The purpose is to alert the user of any lamps or colors that may not be working correctly. The test simultaneously cycles all lamps through red, orange, and green.

SI No.	Item	Description
7	<b>Indicator LEDs</b>	<p>Provide instant indication of the controller and switchgear status. Depending on the configuration, the lamps can be red, green, or orange and on, off or FLASHING. The multiple colors allow for grouping of similar functions for example, red for protection, orange for voltage and green for system health.</p> <div style="display: flex; justify-content: space-around; border: 1px solid black; padding: 5px;"> <div style="width: 45%;"> <ul style="list-style-type: none"> <li>● LOCKOUT</li> <li>● A - PHASE O/C</li> <li>● B - PHASE O/C</li> <li>● C - PHASE O/C</li> <li>● GROUND FAULT</li> <li>● SENSITIVE G/F</li> </ul> </div> <div style="width: 45%;"> <ul style="list-style-type: none"> <li>● A SOURCE LIVE</li> <li>● B SOURCE LIVE</li> <li>● C SOURCE LIVE</li> <li>● MECH LOCK</li> <li>● CONTROL OK</li> <li>● AC POWER</li> <li>● BATTERY PWR</li> <li>● ALARM</li> </ul> </div> </div> <p><b>[For example]</b> The configuration of the status lamps can be changed within WSOS Version 5.</p>
8	<b>TRIP</b> key	Trips the switchgear to Lockout and the green lamp located inside the button indicates the open state of the recloser.
9	<b>CLOSE</b> key	Closes the switchgear and the red lamp located inside the button indicates the close state.
10	<b>LAMP DATA</b> key	Provides the operator with additional data specific to each status lamp.
11	<b>LAMP RESET</b> key	Resets the status lamps. Lamps requiring further attention from the operator remain lit. <b>NOTE:</b> Some of the status lamps such as “controller power” and “terminal live” are continuously updated and therefore not affected by the reset command.
12	<b>EVENT LOG</b> key	Displays the recloser and controller Event Log on the LCD display. Older events can be viewed by pressing the UP arrow key.
13	QuickAction Key Unlock	To use the QuickAction Keys, an operator must first press the <b>unlock</b> key. The lamp above the <b>unlock</b> key remains lit while the quickaction keys are active. To deactivate the quickaction keys an operator can press the <b>unlock</b> key again. The lamp turns off. Alternatively the quick action keys will be deactivated automatically a short configurable delay after the last quick action key was selected.
14	QuickAction Keys (QAK)	Allows the user to activate/deactivate functions directly from the interface without having to use the menu. The status of the function is indicated by the lamp next to the button. The lamp can be configured to be red, green, or orange in color and flashing. Before using the quickaction keys, it is necessary to unlock the keys using the unlock button described above. Pressing a quick action key applies that action without any further confirmation and the lamp next to the key indicates the new status.
15	Enable/ Disable <b>TRIP CIRCUIT</b> key	Disables all trip operations. When the switch is in the Disable position, the trip coil in the recloser is electrically disconnected from the control electronics. Thus the switch provides a physical isolation point for the control circuitry. The recloser cannot be opened, and an audible alarm in the panel sounds and the DISABLED LED in the <b>TRIP</b> key flashes. The <b>TRIP</b> key operates normally when the switch is in the Enable position. This switch also stops a close operation, so that the switchgear cannot be closed unless it is able to trip.
16	Enable/ Disable <b>CLOSE CIRCUIT</b> key	Disables all close operations. When the switch is in the disable position, the close coil in the recloser is electrically disconnected from the control electronics. Thus the switch provides a physical isolation point for the control circuitry. The recloser cannot be closed and an audible alarm in the panel sounds and the DISABLED LED in the <b>CLOSE</b> key flashes. The <b>CLOSE</b> key operates normally when the switch is in the Enable position.

### Default Configuration

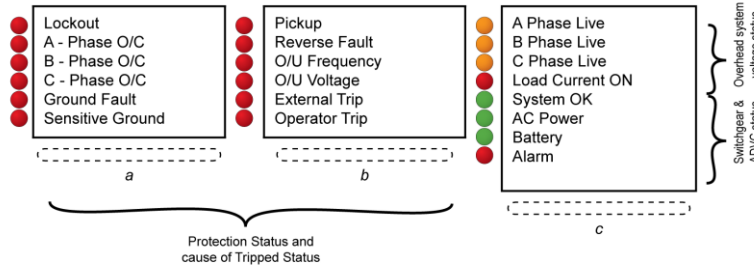
The status lamps and the quick action keys are programmed in the factory to a default configuration. This can be changed to suit the needs of the user through Windows Switchgear Operating System (WSOS5).

### Status Lamps

These lamps are used to indicate the controller and switchgear status. The default configuration is shown below. Each lamp indicates that the state of the function described next to it. When a state is active, the lamp is lit.

**For example:**

When, the recloser is in Lockout the lamp next to "Lockout" is on. Conversely, if the lamp is off, the recloser is not in a lockout state.



It is possible that more than one lamp is lit at a given time.

**For example:**

**When, a recloser tripped to lockout due to an overcurrent fault on Phase A, both "Lockout" and "A-Phase O/C" lamps are lit.**

LED#	Color	Description	Possible Causes
<b>Column A</b>			
a-1	Red	<b>Lockout</b>	Recloser has tripped to lock-out due to a protection sequence or operator command. Automatic close operations are not possible and the operator has to close the recloser using the control panel or a remote command.
a-2	Red	<b>A-Phase O/C</b>	The most recent protection trip of the recloser was caused by an over current detected fault on the network phase/sindicated.
a-3	Red	<b>B-Phase O/C</b>	
a-4	Red	<b>C-Phase O/C</b>	
a-5	Red	<b>Ground Fault</b>	A ground fault has caused the recloser to trip.
a-6	Red	<b>Sensitive Ground</b>	The recloser has tripped due to a sensitive ground fault.
<b>Column B</b>			
b-1	Red	<b>Pickup</b>	One of the protection elements has picked up. For example, when the phase current exceeds the trip setting value.
b-2	Red	<b>Reverse Fault</b>	Protection has detected a fault on the source side of the recloser.
b-3	Red	<b>O/U Frequency</b>	An over or under frequency detected fault has caused the recloser to trip.
b-4	Red	<b>O/U Voltage</b>	The switchgear has tripped due to the operation of an external device.
b-5	Red	<b>External Trip</b>	The switchgear has tripped due to the operation of an external device.
b-6	Red	<b>Operator</b>	A local or remote operator has tripped the recloser.
<b>Column C</b>			
c-1	Orange	<b>A Phase Live</b>	The source or load side bushing of the phases/sindicated are live.
c-2	Orange	<b>B Phase Live</b>	
c-3	Orange	<b>C Phase Live</b>	
c-4	Red	<b>Load Current On</b>	A current greater than 2 A is flowing through one or more phases.
c-5	Green	<b>System OK</b>	The controller is functioning normally. Maintenance may be required when the lamp is flashing red. For more information, consult the event log.
c-6	Green	<b>AC Power</b>	Flashing red LED when auxiliary power is off.
c-7	Green	<b>Battery</b>	Flashing red LED when battery is off or test failed.
c-8	Red	<b>Alarm</b>	Flashing red LED when <b>TRIP</b> or <b>CLOSE</b> circuits are isolated, contact life is low or the switchgear is locked.

## Quick Action Keys (QAK)

The quick action keys allow the operator to select functions directly from the panel. Selecting a quick action applies that action without any additional confirmation and the LED next to the key indicates that the action was performed.

Before selecting a quick action, the operator must first unlock the **Quick Action** keys. This is done by pressing the **unlock** key.

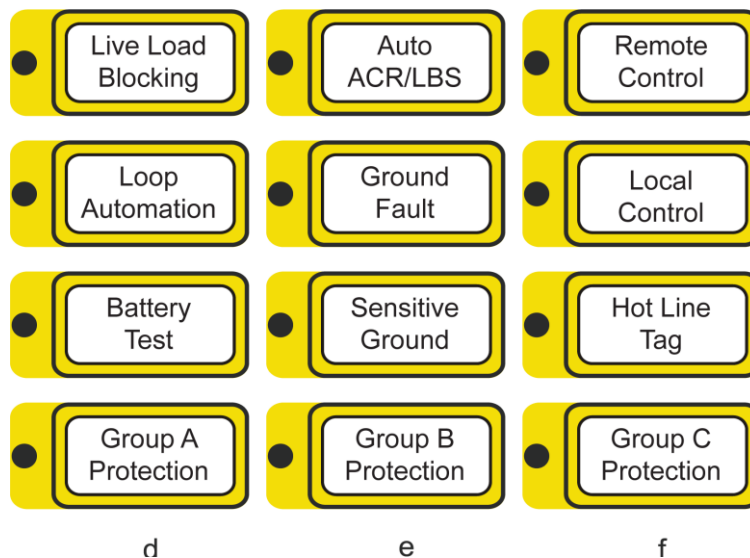
### Example:

To, activate supervisory control (Remote Control) an operator should press the following keys:



It is possible to press a sequence of quick action keys while the unlock LED is lit. The keys will be locked automatically after a short delay after the last key press or alternatively when the **unlock** key is pressed a second time.

This controller is programmed with a default quick action key configuration that provides access to frequently used actions. The default configuration is shown below.

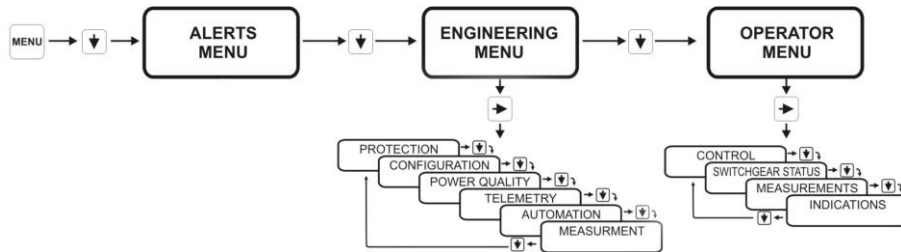


LED#	Color	Description	Possible Causes
<b>Column D</b>			
d-1	Red	Live Load Blocking	The key toggles the Live Load Blocking feature on/off. A red LED indicator
d-2	Red	Loop Automation	Turns the Loop Automation feature on/off
d-3	Red	Battery Test	This QAK performs a battery Test and the result is displayed in the Event Log.
d-4	Red	Group A Protection	Activates the settings configured in Protection Group A.
<b>Column E</b>			
e-1	Red	Auto ACR/LBS	The key toggles the Auto Reclose feature on/off. A red LED indicator shows when Auto Reclose is on.
e-2	Red	Ground Fault	Turns Ground (Earth) Fault protection on/off.
e-3	Red	Sensitive Ground Fault	Turns Sensitive Ground (Earth) Fault protection on/off.

LED#	Color	Description	Possible Causes
e-4	Red	Group B Protection	Activates protection settings configured in Protection Group B.
<b>Column F</b>			
f-1	Red	Remote Control	The key turns REMOTE control on and LOCAL control off. A red LED indicator shows when the controller is in Remote mode
f-2	Red	Local Control	The key turns LOCAL control on and REMOTE control off. A red LED indicator shows when the controller is in Local mode.
f-3	Red	Hot Line Tag	Hot Line Tag (WorkTag) is applied using this QAK. Hot Line Tagging helps to ensure that closing cannot take place and also activates the Hot Line Tag protection settings.
f-4	Red	Group C Protection	Activates protection settings configured in Protection Group C

### Display Groups

The *flexVUE* O.I. displays are organized into three logical groups. Within each group is a menu of pages and those pages have various sub-menus.



### Navigating the Menu Structure

Refer to the diagram inside the controller door or to the Installation and Maintenance Manual for details of Navigation within groups.

### Display Screen Layout

The display area consists of two lines, each 20 character long as shown below.



The top line of the display is the page title. The top line of the display shows the current menu position and the second line lists the options available one option at a time. An operator uses the UP and DOWN arrows to scroll through the list of options. The RIGHT arrow will progress to the next level of the option shown on the second line of the display. Use the LEFT arrow to go back one level. When an operator is editing a setting, the top line of the display shows a few basic instructions and the bottom line shows the setting value.



### Changing Settings

Three types of settings can be changed:

- Operator settings
- Password protected settings
- Protection settings

### Operator Settings

Find the display page containing the setting to be changed:

Step	Action
1	Press the <b>MENU</b> key to enter the menu structure.
2	Press the ↓ arrow and then the → arrow to enter the <b>Operator Menu</b> .

Step	Action
3	Use the ← or → arrow keys to navigate to the setting to be changed.
4	Press <b>SELECT</b> key.
5	Use ↑ or ↓ arrow keys to change the setting.
6	Press the <b>SELECT</b> key to accept the change, or press the ← arrow to escape and leave the setting unchanged.

Alternatively, if a QAK operates the setting you wish to change:

Step	Action
1	Press the <b>QAK UNLOCK</b> .
2	Press the required Quick Action Key within 10 s (Configurable).

**NOTE:** Actions are executed without any confirmation via the arrow or select keys. The LED indicates the new state.

### Password Protected Settings

Some settings are password protected. You will be prompted for a password before you can change the setting. To enter the password:

Step	Action
1	Press the ↑ or ↓ arrows until you find the required character for the password.
2	Press the → arrow key.
3	Repeat steps 1 and 2 until the password is complete
4	Press <b>SELECT</b> to enter the password. While the operator panel remains ON, you will not be required to enter the password again.

The default factory password is **AAAA** but you can change it using Windows Switchgear Operator System (WSOS5) software. The factory password does not need to be remembered - the controller prompts you for it automatically.

### Alerts Menu

The **flexVUE** panel provides the user with a specific location to deal with alerts from the controller. The **ALERTS MENU** is found as part of the **MAIN MENU** on the operator interface. You can view these alerts in the same way you would view any other menu options. Alerts are split into two categories, critical and normal.

#### Normal Alerts

All normal alerts go into the **ALERTS MENU**. The activation of a normal alert causes the title line of the current display to show:

#### xx Alerts Active

This alternates with the current display title at a sufficient rate that the current display is easily readable so that panel usage and field editing can easily continue. **XX** is the number of alerts that are present at the time.

The displayed number of normal alerts may change from one flash to the next if a new alert is added or an old one is removed.

The title of the alert menu contains the number of alerts that are present. This is shown as:

#### ALERT MENU X/Y

Where 'X' is the alert currently displayed and 'Y' is the total number of alerts present.

A normal alert message will generally be longer than 20 characters and will automatically scroll to allow viewing of the complete message. If a normal alert is present a beep occurs at a fixed time interval.

All buttons function normally while a normal alert is present.

#### Critical Alerts

A critical alert will completely subvert the operation of the LCD display regardless of what is being displayed. There is no way to remove the critical alert from the display while it is active.

If a critical alert is present, a beep occurs at a fixed time interval.

---

All buttons except for the navigation buttons (←, →, ↑, ↓, **MENU**, **SELECT**, **LAMP DATA**, **EVENT LOG**) operates normally while a critical alert is present.

### Activating Protection Settings

When settings are changed in the Active protection group (via the *flexVUE* O.I.), those new settings are saved but will not be put into service until they are made ACTIVE

When changing Active Protection Group settings, once the first setting is changed the following screen appears: (scrolling)

**NOTE:** Images shown are for illustration purposes only.



```
Settings Changed
SELECT to activate, ← continue changes
```

This message is displayed if:

- Settings are changed within the **ACTIVE PROTECTION GROUP**
- The current setting is the first one to be changed.
- Before changing this setting; all the current settings were ACTIVE in service

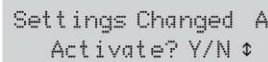
Once this message is displayed, there are three options:

- **NO ACTION:** The new setting will automatically go in service if the operator ignores the above message and turns off the operator interface, or the interface turns off automatically.
- **PRESS SELECT:** If the operator presses the **SELECT** key, the new setting is put into service immediately. The operator can continue to browse the menu. With all the current settings in active service, if the operator makes another setting change the above message is prompted when the first of the new settings are saved.
- **PRESS THE ARROW:** This allows the operator to browse other settings and allow them to be changed.

### Exiting the Protection Menu

The operator will not be prompted to ACTIVATE the settings again until they try to exit the **PROTECTION MENU**, when the following screen appears:

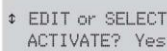
**NOTE:** Images shown are for illustration purposes only.



```
Settings Changed A
Activate? Y/N ↓
```

The operator has to press the **UP** or **DOWN ARROW** key. That displays the following:

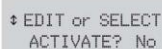
**NOTE:** Images shown are for illustration purposes only.



```
↓ EDIT or SELECT
ACTIVATE? Yes
```

↑ ↓

Images shown are for illustration purposes only.



```
↓ EDIT or SELECT
ACTIVATE? No
```

When the operator scrolls to **YES** and presses **SELECT**, the settings are put in service. If the operator selects **NO** and presses the **SELECT** key, the following message is displayed: (scrolling)

**NOTE:** Images shown are for illustration purposes only.



```
← Continue
Settings activate on panel shutdown
```

### Re-Entering the Protection Menu



---

The operator may exit the **Protection Menu** without activating the saved settings, and then re-enter the **Protection Menu** at a later time. In this case the process will run through the same activation sequence as shown in Exiting the Protection Menu ([see page 63](#)), providing the settings haven't already been put into service by a panel shutdown.



---

# Chapter 8

## Event Log

---

### What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Event Log	74
Typical Event Log Trip Sequence Display	76

# Event Log

## Introduction

The ADVC maintains a log of up to 1,00,000 events that record changes to the switchgear, control electronics, and ADVC logic. The log also records critical setting changes. The events can be viewed via the O.I. in the **EVENT LOG** display group.

The event log display updates automatically as new events occur. The most recent event appears on the bottom line of the display and older events are scrolled upwards. When the event log is full, the oldest events are deleted to allow new events to be logged as they occur.

All events are date and time stamped to a 10 ms resolution and displayed in the order that they occurred. The source of each event is also recorded.

It is possible to apply event category filters when viewing events via the O.I.

WSOS5 software can also be used to upload and display the event log. In addition to O.I.-like time stamp, source identification and filter category features, it also allows text searches and go to a particular date/time. The event log can be saved as a text file or as a .csv file. For more information, refer to the WSOS5 help file.

## Reading the Event Log

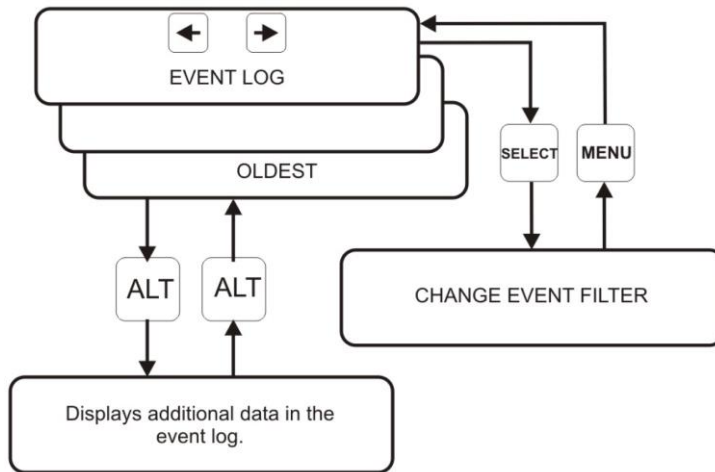


On the **setVUE** panel, the event log display group is one of the main display groups.

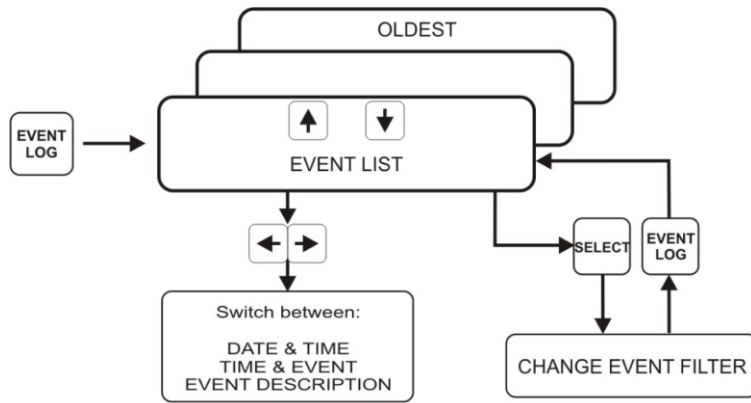


On the **flexVUE** panel, the event log is found via a dedicated key on the O.I.

The **EVENT LOG** is navigated slightly differently depending on which O.I. is installed. For more information on navigation diagrams, refer the following figures setVUE Navigation Diagram and flexVUE Navigation Diagram (see page 74)



setVUE Navigation Diagram



flexVUE Navigation Diagram

Description	set	flex
Number of Events shown on screen	4 Max.	2 Max.
Key to Scroll to OLDER events	←	↑
Key to Scroll to NEWER events	→	↓
Show the <b>CHANGE EVENT FILTER</b> screen	<b>SELECT</b>	<b>SELECT</b>
Return to <b>EVENTLOG</b> from <b>FILTER</b> screen	<b>MENU</b>	<b>EVENT LOG</b>
View additional information about event (if available)	<b>ALT</b>	<b>EVENT LOG</b>
Switch between <b>DATE/TIME, TIME/EVENT &amp; EVENT DESCRIPTION</b>	-	← →

## Typical Event Log Trip Sequence Display

### General

The following **EVENTLOG** is an example of a phase trip sequence with two trips to lockout.

-----EVENTLOG-----E	Comment
08/06/05 09:27:52.64 Lockout	Lockout
08/06/05 09:27:52.63 C 305 Amp	C phase current at trip
08/06/05 09:27:52.63 B 302 Amp	B phase current at trip
08/06/05 09:27:52.63 A 303 Amp	A phase current at trip
08/06/05 09:27:52.36 Prot Trip 2	2nd trip after 17.26s
08/06/05 09:27:52.36 Phase Prot Trip	Phase element trip
08/06/05 09:27:52.36 Prot Group A Active	Protection group A
08/06/05 09:27:35.10 Pickup	Pickup again
08/06/05 09:27:33.70 Automatic Reclose	1st reclose
08/06/05 09:27:33.69 C 302 Amp	C phase current at trip
08/06/05 09:27:33.69 B 300 Amp	B phase current at trip
08/06/05 09:27:33.69 A 301 Amp	A phase current at trip
08/06/05 09:27:33.42 Prot Trip 1	1st trip after 17.27s
08/06/05 09:27:33.42 Phase Prot Trip	Phase element trip
08/06/05 09:27:33.42 Prot Group A Active	Protection group A
08/06/05 09:27:16.15 Pickup	Start of fault (pick up)

**NOTE:** Images shown are for illustration purposes only.

The following **EVENTLOG** is an example of a sequence reset.

-----EVENT LOG-----E	Comment
09/01/05 10:39:22.50 Sequence Reset	Sequence reset after 10s
09/01/05 10:39:12.50 Automatic Reclose	1st reclose
09/01/05 10:39:12.49 C Max 301 Amp	Max C phase fault current
09/01/05 10:39:12.49 B Max 302 Amp	Max B phase fault current
09/01/05 10:39:12.49 A Max 300 Amp	Max A phase fault current
09/01/05 10:39:12.22 Prot Trip 1	1st trip after 17.27s
09/01/05 10:39:12.22 Phase Prot Trip	Phase element trip
09/01/05 10:39:12.22 Prot Group A Active	Protection group A
09/01/05 10:38:54.95 Pickup	Start of fault (pick up)

**NOTE:** Images shown are for illustration purposes only.

### Display of Events



The difference in the display on the **setVUE** and **flexVUE** are shown in the following example.

Consider the following events, as shown on the **setVUE**:

**NOTE:** Images shown are for illustration purposes only.

```
09/01/15 10:39:12.49 B Max 302 Amp
09/01/15 10:39:12.49 C Max 301 Amp
09/01/15 10:39:12.50 Automatic Reclose
09/01/15 10:39:12.50 Sequence Reset
```



The **flexVUE**, by default, would display the bottom two lines (the most recent) first. See below :

```
10:39 Automatic Recl
10:39 Sequence Reset
```

**NOTE:** Images shown are for illustration purposes only.

From this screen, a complete **TIME** or **EVENT DESCRIPTION** is available by pressing the **←** or **→** keys respectively:

For the **TIME**, press **←**:

**NOTE:** Images shown are for illustration purposes only.

```
09/01/15 10:39:12.50
09/01/15 10:39:12.50
```

For the **EVENT DESCRIPTION** press **→**:

```
Automatic Reclose
Sequence Reset
```



In this example, pressing the **↓** twice would scroll to the next two events.

```
10:39 B Max 302 Amp
10:39 C Max 301 Amp
```

### Setting Change Events

A settings change can come from various sources - WSOS5, Operator Interface, SCADA protocol, and IOEX. The controller includes in its log, information regarding the source of each setting change.

If the **ALT** key () or **EVENT LOG** key () is pressed whilst the event log is on the display then the date and time details are replaced with extra information that includes the setting source and, if

applicable, the protection group, curve, and trip number. Pressing the **ALT** () or **EVENT LOG** () key redisplay the date and time information.

Identifier	Settings change source
WSOS	WSOS5
OCP	Operator Control Panel
PTCL	SCADA protocol
IOEX	IOEX

As it is possible for multiple WSOS5 applications to be simultaneously connected to the controller via Ethernet, a source identification of 'WSOS' can be insufficient information. For WSOS5 over Ethernet connections the first four letters of the PC login name are logged. The usage of 'WSOS' is therefore restricted to serial port point-to-point communication links only.



For example, a **seVUE** event log display that looks like this:

```
08/06/15 11:05:50.25 Very Inv IEC255
08/06/15 11:07:15.66 Parity EVEN
08/06/15 11:09:23.03 Work Tag Applied
08/06/15 11:10:35.19 Load Supply ON
```

---

becomes:

```
WSOS Phase Trip 2 D   Very Inv IEC255
OCP RS232-B          Parity EVEN
PTCL                  Work Tag Applied
                      Load Supply ON
```

**NOTE:** Images shown are for illustration purposes only.

When the **ALT** key is pressed.

In the above example it can be seen that:

- WSOS5 has been used to set a Very Inverse IEC255 curve for phase trip 2, group D.
- The O.I. has been used to set the controller's RS-232 port communications parity to EVEN.
- The work tag has been applied via a SCADA protocol communications link.
- The controller has detected restoration of load supply. There is no setting change source associated with this event.



The **flexVUE** screen might look like this:

```
11:05 Very Inv IEC255
11:07 Parity EVEN
```

Pressing **EVENT LOG** would change it to:

```
WSOS Phase Trip 2 D
OCP RS232 - B
```

**NOTE:** Images shown are for illustration purposes only.



---

# Chapter 9

## Power System Measurements

---

### What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Power System Measurements	80
Real Time Displays	81

---

## Power System Measurements

### Introduction

The Current Transformer (CT) signals and voltage sensor (CVT) signals from the recloser are digitized by the ADVC Controller and used to provide various data for the operator.

The ADVC Controller measures up to 10 power system components:

- A, B, C, phase and spill currents,
- Phase to earth voltage on all six terminals.

The ADVC Controller uses the above measurements to derive many system measurements including:

- frequency
- phase to phase voltages
- total and per phase power (kW, kVA, and kVAR)
- total and per phase power factor
- harmonics
- earth current, and
- sequence components

In addition, the ADVC Controller also measures internal values such as:

- CAPE temperature
- switchgear temperature
- auxiliary voltage
- gas pressure
- battery voltage.

### Power System Frequency

The controller must be set for the correct power system frequency (either 50 Hz or 60 Hz). This can be set on page:



**SYSTEM STATUS → PHASE VOLTAGE and POWER FLOW**



**ENGINEER MENU → CONFIGURATION MENU → SYSTEM SETTINGS → NETWORK**

**PARAMETERS → System Frequency 50 Hz/60 Hz**

#### NOTE:

The setting to change the display between Phase-Phase or Phase-Earth voltages is found at the following location:



- **SYSTEM STATUS → PHASE VOLTAGE and POWER FLOW → Display Phase → Phase Voltage**



- **ENGINEER MENU → CONFIGURATION MENU → System Settings → Metering Parameters → Display Voltage Phase/ Earth Voltage or Phase/Phase Voltage**

# Real Time Displays

## Introduction

There are a number of measurements that are shown in real time within the ADVC Controller. The measurements are:

- **SYSTEM MEASUREMENTS** (Including average voltage, current and power)
- A, B and C Phase Current (includes phase angles)
- Earth Current (includes phase angle)
- Sequence Currents (I<sub>ps</sub>, I<sub>pps</sub>)
- A, B, and C Phase Voltage (shown as phase-phase or phase-earth)
- Sequence Voltages (V<sub>zps</sub>, V<sub>pps</sub> and V<sub>nps</sub>)
- A, B, and C Phase Power
- A, B, and C Phase Maximum Demand Indicators

## System Measurements

### SYSTEM MEASUREMENTS-M

SYSTEM MEASUREMENTS				M
Current	120 A	Power P	6754 kW	
Voltage	33000 V	Power Q	1191 kVAR	
Frequency	50.00Hz	PF	0.98	

**NOTE:** Images shown are for illustration purposes only.

### OPERATOR MENU → MEASUREMENTS → SYSTEMS MEASUREMENTS

**NOTE:** (Scroll through Average Current, Average Voltage, Frequency, Power Factor, 3PH Power P [Kw], 3PH Power Q [kVAR] and Power Factor)

This is a summary of the system measurements. Current and voltage values displayed are an average of the three phases. Frequency is measured on the first available bushing and is displayed as 'Unavailable' if all the bushings are dead.

- **Current:**

CURRENT					M
A Phase	120 A	0°	Earth	0A	0°
B Phase	120 A	0°	I <sub>pps</sub>	120A	0°
C Phase	120 A	0°	I <sub>nps</sub>	0A	0°

### SYSTEM MEASUREMENTS → Current → M

**NOTE:** Images shown are for illustration purposes only.

### ENGINEER MENU → MEASUREMENTS → CURRENT

**NOTE:** (Scroll through Magnitude and Angle-A, B, C and Earth and Sequence-I1 (I<sub>pps</sub>), I2 (I<sub>nps</sub>))

These screens display the Current and Phase Angle for each Phase, Earth Current, Positive Phase Sequence Current (I<sub>pps</sub>) and Negative Phase Sequence Current (I<sub>nps</sub>).

- **Voltage:**

SOURCE	VOLTAGE	LOAD	M
33000V 0°	A-B	0°	33000 V
33000V 240°	B-C	240°	33000 V
33000V 120°	C-A	120°	33000 V

### SYSTEM MEASUREMENTS → Voltage → M

**NOTE:** Images shown are for illustration purposes only.

### ENGINEER MENU → MEASUREMENTS → VOLTAGE → PHASE/LINE\SRC-LD

**NOTE:** (Scroll through A, B and C-Phase)

- **Sequence Voltage:**

### SYSTEM MEASUREMENTS → Sequence Voltage →

SEQUENCE VOLTAGE		M
V <sub>zps</sub>	554 Volt	
V <sub>pps</sub>	19034 Volt	
V <sub>nps</sub>	554 Volt	

**M**

**NOTE:** Images shown are for illustration purposes only.

**flex** ENGINEER MENU → MEASUREMENTS → VOLTAGE → SEQUENCE

**NOTE:** (Scroll through **Vpps**, **Vnps** and **Vzps**)

These screens display the zero, positive and negative phase sequence voltages.

● **Power:**

	POWER		
A	2222 kW	527 kVAR	PF 0.97
B	2300 kW	443 kVAR	PF 0.98
C	2188 kW	417 kVAR	PF 0.98

**set** SYSTEM MEASUREMENTS → Power → M

**NOTE:** Images shown are for illustration purposes only.

**flex** ENGINEER MENU → MEASUREMENTS → POWER → 3-Phase, A, B & C-Phase

**NOTE:** (Scroll through Real Power, Apparent and Reactive Power, Power Factor)

These screens display real and reactive power, as well as the power factor on a per phase basis. Real Power (kW) is a signed quantity unless Power Flow Unsigned has been selected on page:

**set** SYSTEM STATUS → PHASE VOLTAGE → and POWER FLOW:

Power Flow Signed/Unsigned

**flex** ENGINEER MENU → CONFIGURATION → SYSTEM SETTINGS → METERING PARAMETERS

→ Power Signed/Unsigned

Power Factor (PF) is an unsigned quantity.

● **Maximum Demand Indicators**

**set** SYSTEM MEASUREMENTS → Daily, Weekly, Monthly, Maximum Demand

**flex** ENGINEER MENU → MEASUREMENTS → DEMAND → DAILY, WEEKLY, MONTHLY MAX DEMAND

**NOTE:** (Scroll through Date, Total kWh, Peak Period, Power/PF)

The Maximum Demand Indicator on the **flexVUE** panel is available in a different location at the following menu:

**flex** OPERATOR MENU → MEASUREMENTS - MAX DEMAND IND

**NOTE:** (Scroll through A, B, C Phase Max and Time and Reset MDI)

These screens display real and reactive power, as well as the power factor on a per phase basis. Daily, Weekly and Monthly Demand Indicators display collected historical data while the Maximum Demand Indicator contains a mixture of real-time and historical data.

---

# Chapter 10

## Accessories Installation

---

### What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Accessories Installation	84
Fast Trip Input Module (FTIM)	86
IOEX Electrical Connections	89
FTIM Electrical Connections	91

## Accessories Installation

### General

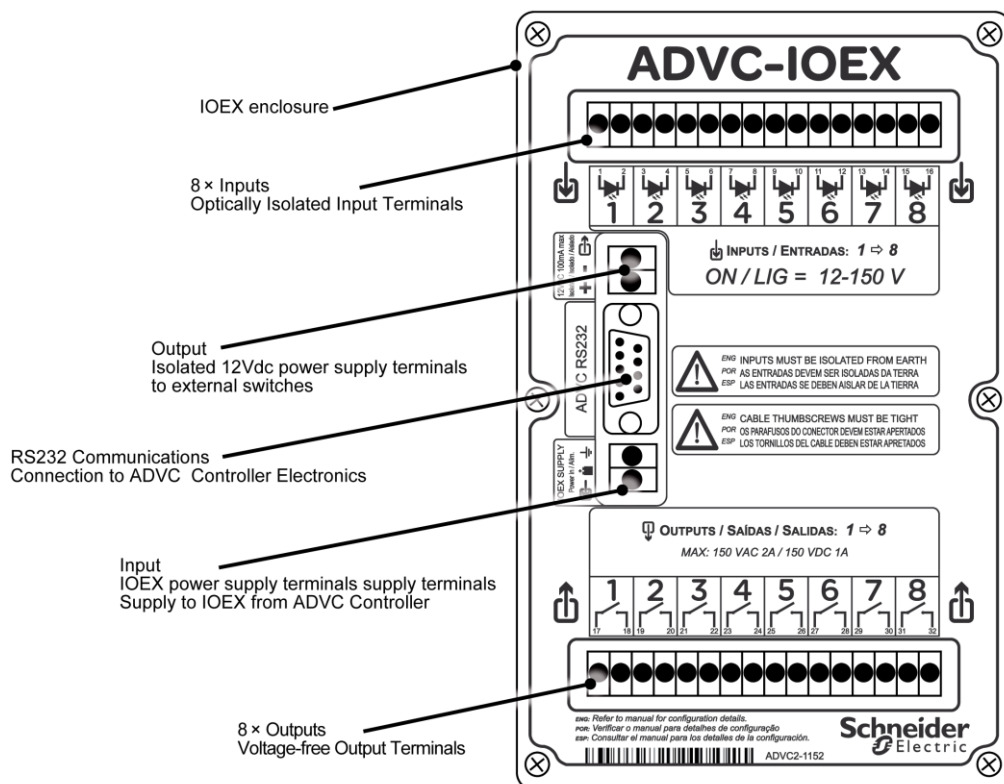
There are a number of accessories available for the ADVC Controller that can be used to extend the capabilities of the switchgear and the controller.

This section contains details on the installation of the following accessories. Refer to these sections if you need to install:

- Input Output Expander Module (IOEX)
- Fast Trip Input Module (FTIM)
- General Purpose Outlet (GPO)

### Input Output Expander Module (IOEX)

The IOEX is an ADVC Controller Range accessory that accepts external control signals from third-party devices. It provides optically isolated inputs and voltage-free outputs. These allow connection of an external protection relay or Remote Terminal Unit (RTU). The electronic circuit is installed in a die cast, sealed enclosure which is attached to the upper accessory mounting tray of an ADVC **ULTRA** controller.



### IOEX Compatibility

The IOEX is compatible with the **ULTRA** model of the ADVC Controller range where the upper accessory tray is used to mount the IOEX module. The controller electronics includes a regulated power supply for the IOEX module/s. Connection to the power supply is via two terminals mounted on the side accessory tray.

RS-232 communications is used to interface the IOEX module/s to the control electronics.

The ADVC **ULTRA** model includes the following features to accommodate the IOEX module/s:

- Upper accessory tray for up to two IOEX modules
- Additional holes in the base of the controller for IOEX cable entry.
- Cable tie point on the cubicle side helps to protect the cables.

**NOTE:** Shielded cable (not supplied) for external connections and the EMC gland are essential for reliable operation.

---

## Parts Supplied with The IOEX

The following parts are supplied with each IOEX module:

- 1 x IOEX module
- 1x RS-232 cable
- 1 x Power cable
- 4 x MS stainless steel screws and washers.
- 1 x EMC cable gland

## IOEX Specifications

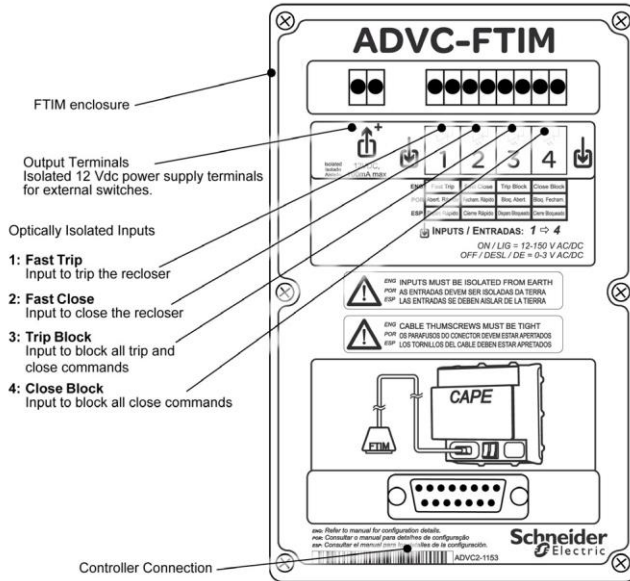
Isolated power supply output:	12–15 Vdc 100 mA max
IOEX power supply input:	18–36 Vdc, 200 mA max. Supplied by controller electronics.
Optically isolated inputs:	Eight inputs per IOEX module. ON=12–150 Vdc, 12–150 Vac. OFF=0–3 Vdc, 0–3 Vac
Voltage-free outputs:	Eight outputs per IOEX module. 150 Vdc at 1 A max 150 VAC RMS at 2 A Non-inductive max.
Dimensions [mm]:	188 high, 119.5 wide, 37 deep.
Controller connection:	RS232–DB9 Male/Female cable (part number ADC–640).

# Fast Trip Input Module (FTIM)

## General

The FTIM is an ADVC Controller range accessory that accepts external control signals from third-party devices. It provides optically isolated inputs. These allow connection of an external protection relay or Remote Terminal Unit (RTU). The electronic circuit is installed in a die cast, sealed enclosure which is attached to the upper accessory mounting tray of an ADVC **ULTRA** controller.

It is possible to interface external trip, close, or block signals to the recloser controller via the FTIM.



## FTIM Compatibility

The FTIM is compatible with the ADVC Controller range. If a controller is to be used with an FTIM, a connection cable for the module has to be included during manufacturing. It is therefore necessary to specify the intended use of an FTIM when ordering the controller. Note this connection cable cannot be retrofitted in the field.

Part Number	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
86xxx2xxx	8	6	x	x	x	x	2	x	x	x
86xxx3xxx	8	6	x	x	x	x	3	x	x	x
86xxx5xxx	8	6	x	x	x	x	5	x	x	x

The part number has to start with **86** and the 7th digit must be a **2, 3 or 5**.

## Parts Supplied with The FTIM

The following parts are supplied with each FTIM.

- 1 x FTIM module
- 4 x M5 stainless steel screws
- 4 x flat washers and 4 x spring washer
- 1 x EMC cable gland

## FTIM Specifications

Isolated power supply output	12–15 Vdc, 100 mA max
Optically isolated inputs:	ON = 12–150 Vdc, 12–150 Vac
Dimensions (mm)	188 high, 119.5 wide, 37 deep.
Dimensions (mm)	Shielded cable with shielded 15-pin D-type connector

## IOEX and FTIM Installation

The IOEX and/or FTIM must be fitted to the accessory mounting tray



### 1. Removing and installing the mounting tray:

The upper accessory mounting tray can be removed in three steps:

- Undo and remove the self-locking nuts and washers
- Rotate the accessory tray to the slide-out position by lifting the bottom of the tray away from the cubicle; and
- Slide the tray to the left.



To install the upper tray, locate the accessory tray hinges to the left of the brackets in the top corner of the cubicle. Use the corner as a guide and slide the tray to your right. The self-locating hinges guide the tray into the brackets. Continue to slide the tray until the hinges are completely inside the brackets. Rotate the tray into the lock-down position and fasten the nuts.

### 2. Attaching the IOEX:

- Remove the upper accessory mounting tray from the ADVC **ULTRA** cubicle;
- The design of the mounting tray provides flexibility in terms of how the device is mounted.
- It is recommended that Nyloc nuts be used for fastening the device where possible.
- Slot width on the tray is 6 mm; bolts may require stacking mud-guard washers with standard washers for bolts smaller than M5. For example, for M3 bolts, it is recommended to use M5 mud-guard washers, M3 flat washer, and a M3 Nyloc nut.
- Holes provided on the customer tray act as a guide holes to identify the equipment position for installation. It is recommended that at least one guide hole is used for installing the device.
- Fit the tray containing the IOEX in the upper accessory mounting space using the existing mounting points. Refer figure, Accessory tray removal ([see page 86](#)).



Accessory tray mounting provisions

#### If Connecting an IOEX

### 3. Connect the IOEX to the controller:

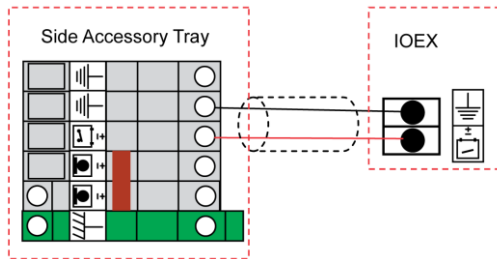
- Connect the IOEX power supply lead to the terminals on the side accessory tray. The terminals are marked with the following symbols.



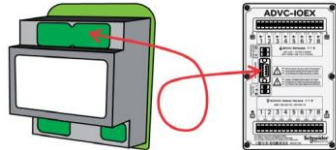
Ground Terminal



IOEX Positive power terminal



- Using the RS233 cable (ADC-640), connect the IOEX/WSOS Port on the ADVC Controller to the IOEX.
- Before you can use the IOEX, make IOEX available in the WSOS Feature Selection tool, download the configuration map, and select the IOEX communication port. For more information, refer the ADVC Operation Guide (ADVC2- 1160) and Configurable IOEX manual (N00-685).



## ⚠ WARNING

### RISK OF EQUIPMENT DAMAGE

When connecting the FTIM to the CAPE, the controller must be switched off to avoid unwanted trip/close operation.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## NOTICE

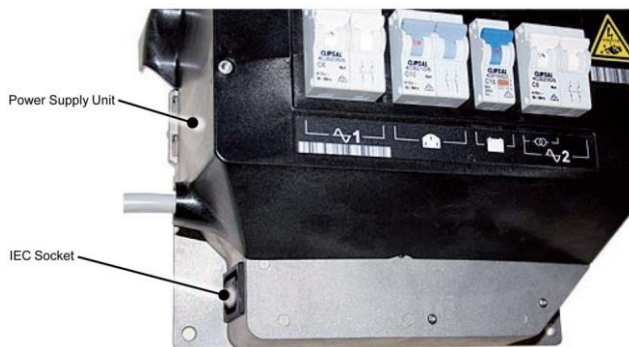
### RISK OF UNEXPECTED INPUT ACTIVATION

Field excitation must not be provided from the battery nor the radio power supply.

**Failure to follow these instructions can result in equipment damage.**

#### 4. If Connecting an FTIM

- Turn off power to the controller.



- Connect the shielded 15-pin D-connector to the FTIM. Fasten the connector properly to ensure a reliable connection.

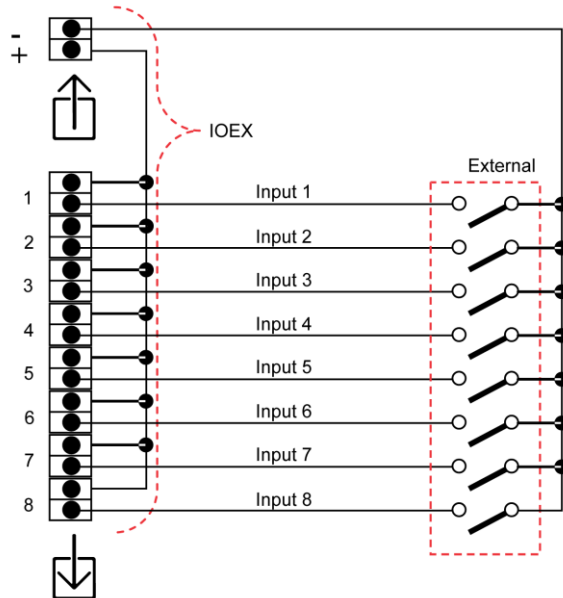


- Turn all power to the controller on when the installation is complete.

## IOEX Electrical Connections

### Connecting Inputs Using Built-in Isolated Supply

The IOEX has a built-in isolated power supply that can be used as field excitation voltage. The following connection diagram describes using this DC voltage as a source to supply the external switches.



## NOTICE

### RISK OF UNEXPECTED INPUT ACTIVATION

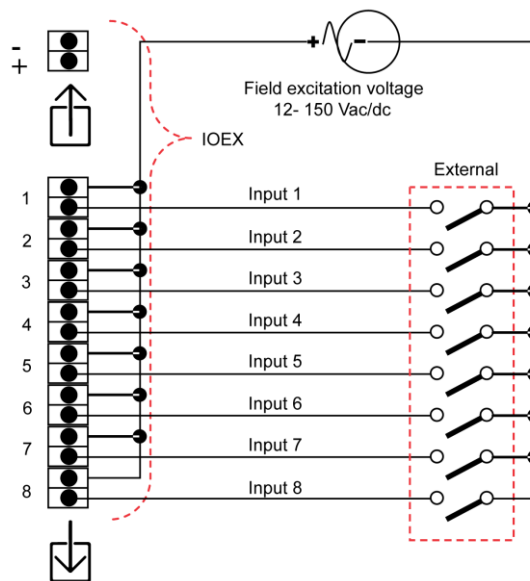
Isolate the field excitation power supply from earth

**Failure to follow these instructions can result in equipment damage.**

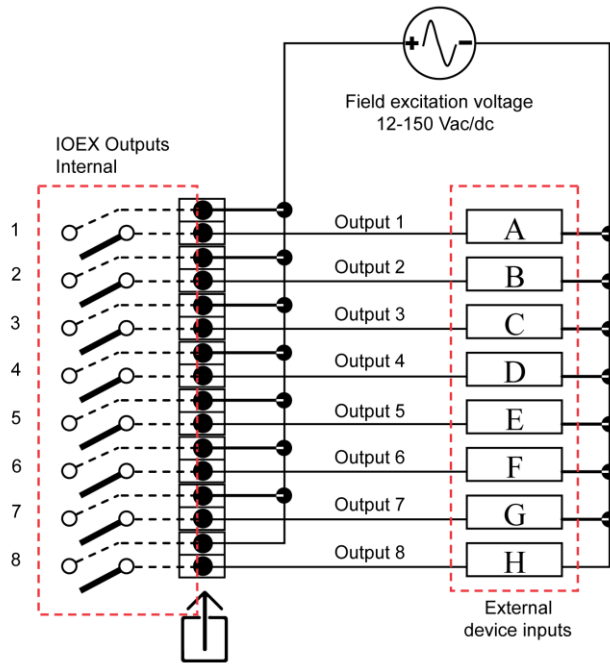
### Connecting Inputs Using an External Source

It is also possible to use a custom AC or DC source for field excitation of the external switches. This supply must be isolated from earth.

Field excitation voltage: 12 Vac/dc up to 150 Vac/dc.



## IOEX Voltage-Free Outputs



### **NOTICE**

#### **RISK OF UNEXPECTED INPUT ACTIVATION**

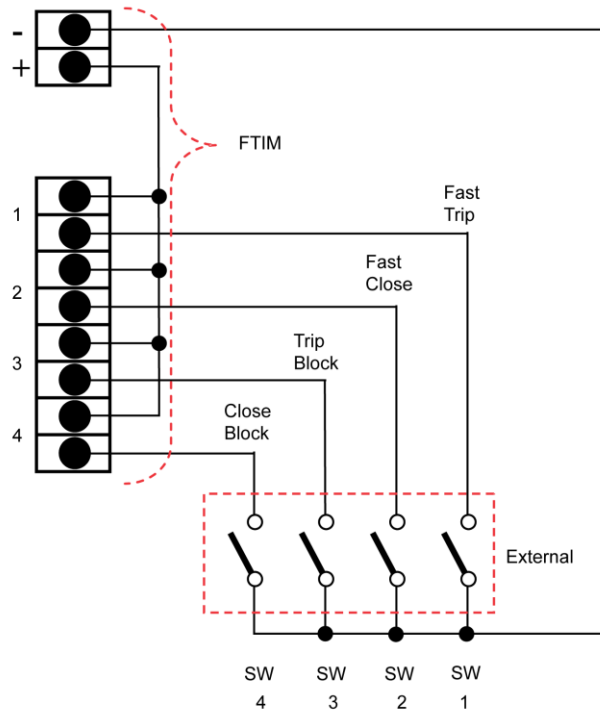
- Field excitation must not be provided from the battery nor the radio power supply.
- Isolate the field excitation power supply from earth

**Failure to follow these instructions can result in equipment damage.**

## FTIM Electrical Connections

### Using The Built-in Isolated Supply

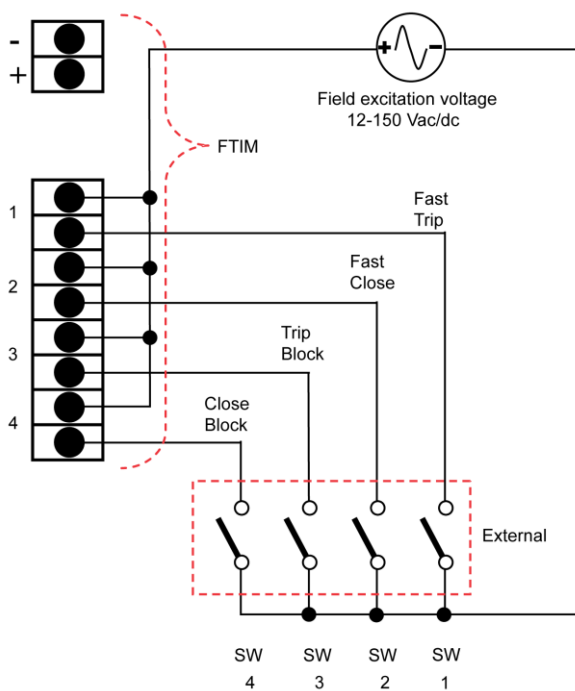
The FTIM has a built-in isolated power supply that can be used as field excitation voltage. The following connection diagram describes using this DC voltage as a source to supply the external switches.



### Using an External Source

It is also possible to use a custom AC or DC source for field excitation of the external switches. This supply must be isolated from earth.

Field excitation voltage: 12 Vac/dc up to 150 Vac/dc.



## Shielded Cable

For the external connections, shielded cable with the following main characteristics is recommended:

**Operating Temperature:**

-55 °C to +105 °C

**Voltage Rating:**

600 V

**Product Description:**

- Conductor: stranded tinned copper
- Area Conductor: 0.22 mm<sup>2</sup>
- External Diameter: 6-12 mm
- Screen Diameter: 5 mm min
- Insulation: Colour-Coded PVC
- Shield: Braided Tinned Copper (90 % coverage)
- Jacket: PVC



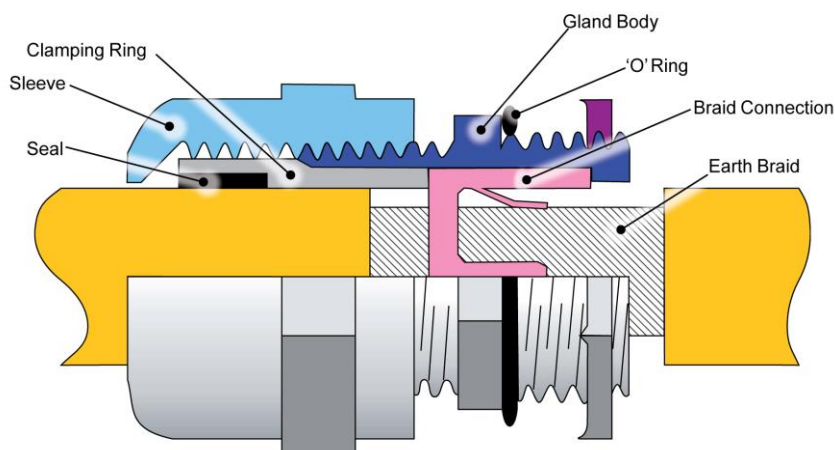
Picture of the shielded cable (not supplied)

## Customer Cable Installation

### EMC Gland Specification

An M20 EMC cable gland with the following main characteristics is required:

- Diameter, cable max: 12 mm
- Diameter, cable min: 6 mm
- Diameter, cable screen min: 5 mm
- Material: Brass
- Plating: Nickel
- Thread size: M20
- Length, thread: 8 mm
- IP Rating: IP68



## NOTICE

**UNEXPECTED BEHAVIOUR**

Correct installation of the EMC gland is essential for reliable operation.

**Failure to follow these instructions can result in equipment damage.**

## NOTICE

### RISK OF EQUIPMENT DAMAGE

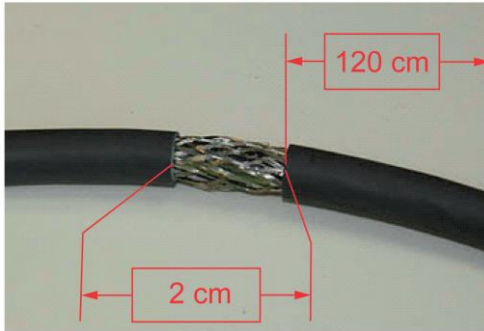
Do not push the cable in the opposite direction, doing so damages the gland.

**Failure to follow these instructions can result in equipment damage.**

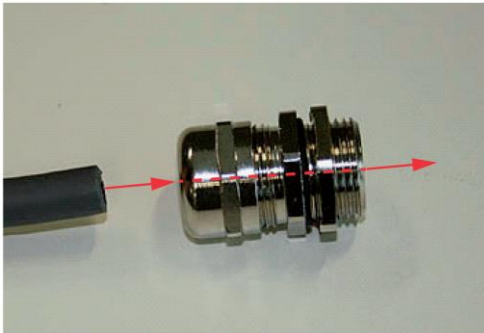
### EMC Gland Installation

Follow the following procedure for the EMC gland installation:

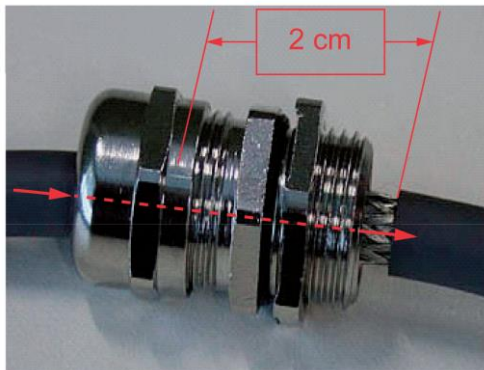
1. At 120 cm from the cable-end that is connected to the IOEX/FTIM, remove 2 cm of the plastic sheath to expose the earth braid.



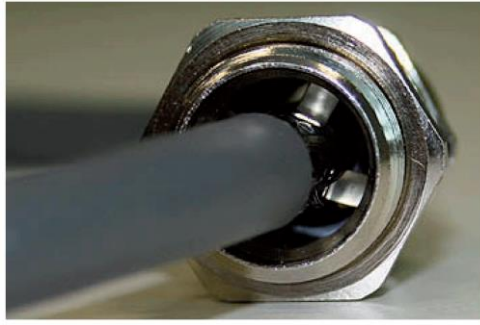
2. Push the end of the cable that is connected to the IOEX/FTIM through the cable gland in the direction as shown.



3. Continue pushing the cable through the gland, until the earth braid aligns with the gland.



4. Ensure that the earth braid is in contact with the braid connection ring in the gland.

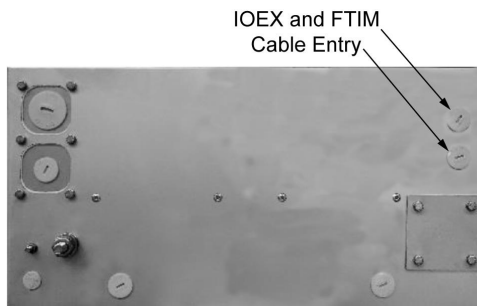


**NOTE:** Shielded cable is essential for reliable operation. Refer figure Shielded Cable.

5. Ensure that the seal and clamping mechanism is overlapping with the plastic sheath. Tighten the gland sleeve to firmly grip the cable in place.



6. Select a 20 mm hole in the base of the controller. The two holes on the right-hand side are provided for this purpose.



7. Remove the plug and fit the cable with gland.



#### **Cable termination**

- Use cable ties to fix the cable to the cubicle wall.
- Cut the cable to the appropriate length, and terminate the cable at the IOEX/FTIM connectors.

**NOTE:** Auxiliary power supply 1 is used to supply power to the GPO socket.

#### **General Purpose Outlet (GPO)**

The GPO allows the user to power extra devices such as a laptop computer while operating the ADVC Controller.

#### **Compatibility**



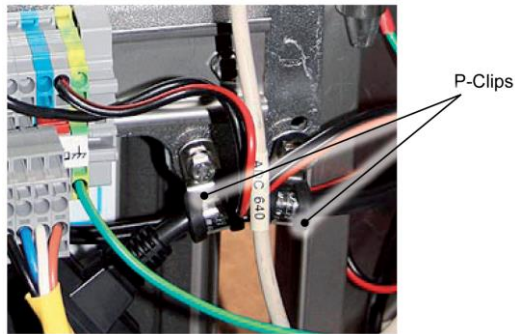
---

Controller: ADVC **ULTRA** and **COMPACT**

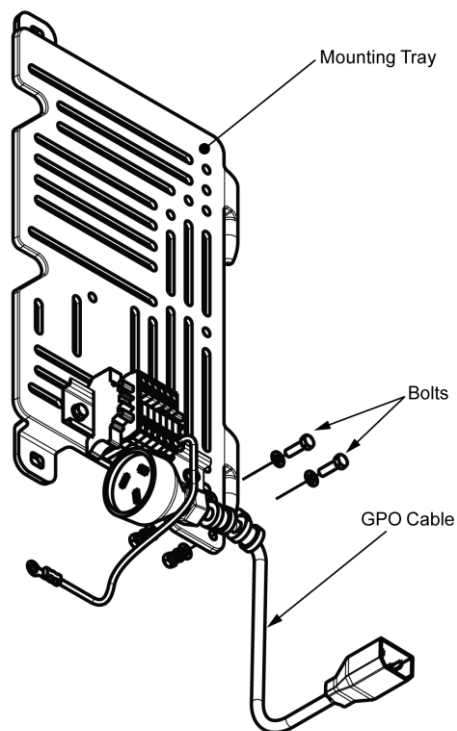
Power Supply: Models equipped with the IEC power outlet option

### **GPO Cable Installation**

- Remove the side accessory mounting tray.
- Fit the two P-clips around the GPO cable.



- Using the bolts provided, fix the cable to the accessory mounting tray.



- Install the accessory mounting tray in the normal position.



---

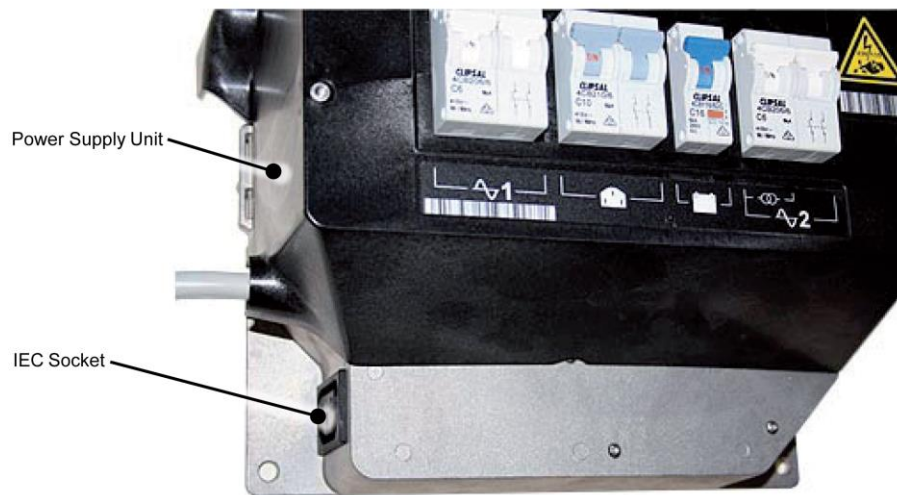
### **HAZARD OF EXPLOSION**

Rate the auxiliary 1 power source appropriately to provide GPO current required.

**Failure to follow these instructions will result in death or serious injury.**

---

- Plug the IEC male cable end connector into the female connector on the side of the power supply module



**GPO Cable Ratings**

Voltage: 110 Vac or 240 Vac

Current: 2 A max.

---

# Capítulo 11

## Manutenção

---

### Qual é o conteúdo desse capítulo?

Esse capítulo contém os seguintes tópicos:

Tópico	Pag
Introdução	9 8
Condições de Operação do ADVC	100

## Introdução

### Manutenção do Religador

A manutenção pode ser realizada usando ferramentas elétricas e mecânicas padronizadas.

## ⚠️ ATENÇÃO

### SAÍDAS DESPROTEGIDAS

Evite a entrada de água nos disjuntores ou tomada de energia geral ao trabalhar no ADVC com a porta aberta durante chuvas pesadas.

**Falha ao seguir essas instruções pode resultar em ferimentos ou danos ao equipamento.**

Nenhuma manutenção do usuário com relação ao mecanismo do religador é requerida.

O religador deve ser retornado ao fabricante para remodelação se a durabilidade mecânica for excedida. Isso é verificado ao examinar a vida útil dos contatos remanescentes no painel do controlador. Quando a vida útil dos contatos remanescentes em qualquer fase que se aproxima de zero, o religador chegou ao fim de sua vida útil e deve ser substituído. A cada 5 anos as botas das buchas devem ser verificadas e limpas se necessário e o ponteiro, se necessário, deve ser verificado para garantir que ele está livre de obstruções mecânicas. Em áreas de grande poluição atmosférica mais limpezas frequentes seriam adequadas.

## OBSERVAÇÃO

### EQUIPAMENTO INOPERÁVEL

A mensagem de alerta é exibida no log de eventos quando a vida útil remanescente do contato atinge 20%. **Falha ao seguir essas instruções pode resultar em danos ao equipamento.**

A manutenção do ADVC é requisitada a cada 5 dias. O fabricante recomenda o procedimento descrito abaixo:

### Limpeza

Verifique se existe excessiva sujeira no cubículo, particularmente no teto, e limpe. Garanta que a malha que cobre as aberturas de ventilação e os orifícios de drenagem de água da base estejam limpos.

### Substituição de Baterias

A substituição de baterias é recomendada após um período de 5 anos. Para mais informações, consulte Cuidados com a bateria. (pag 99).

**Obs:** Garanta que a polaridade da bateria está correta.

O procedimento para a substituição das baterias é o seguinte:

- Desligue o disjuntor da bateria.
- Desconecte as baterias e substitua por novas baterias.
- Ligue o disjuntor das baterias e garanta que o status BATTERY NORMAL está restaurado via:

**set**

**STATUS DO SISTEMA → Status do**

**religador → -S Obs:** As imagens mostradas são somente para propósitos ilustrativos.

```
----- SWITCHGEAR STATUS ----- S
Work Tag OFF
Aux Supply Normal
SWGR Connected
```

**Battery Normal 27.5V**

```
SWGR Data Valid
```

Por exemplo:

ou

**flex**

**MENU DO OPERADOR → STATUS DO RELIGADOR → DADOS DO RELIGADOR → Status da**

**Bateria**

**Obs:** As imagens mostradas são somente para propósitos ilustrativos.

```
SWITCHGEAR DATA
Battery Normal 27.3V
```

Por exemplo:

### Acessório de Aquecedor da Bateria

**Obs:** Garanta que a polaridade da bateria esteja correta.

Quando o acessório de aquecedor da bateria for instalado, deve ser seguido os seguintes procedimentos:

- Desligue o disjuntor da bateria.
- Desconecte as baterias e o aquecedor.
- Remova baterias e substitua por novas baterias.
- Retorne o aquecedor para a posição original, feche as tiras.
- Reconecte as baterias e o aquecedor.
- Ligue o disjuntor da bateria e garanta que o status de “bateria normal” esteja restaurado. Para fazer isso, consulte PASSO 3 de Substituição de Baterias (pag 97).

## OBSERVAÇÃO

### EQUIPAMENTO INOPERÁVEL

A falha no aquecedor da bateria é reportada ao Log de Eventos.

**Falha ao seguir essas instruções pode resultar em danos ao equipamento.**

### Selagem das portas

Verifique se a borracha de vedação da porta está perecendo ou endurecendo excessivamente. Se necessário, renove o selo.

### Cuidados com a Bateria



### RISCOS DE DANOS AO EQUIPAMENTO

- Essas baterias são capazes de fornecer altas correntes. Sempre desligue o disjuntor da bateria antes de conectar ou desconectar as baterias no cubículo.
- Nunca deixe cabos expostos conectados a bateria.

**Falha ao seguir essas instruções pode resultar em morte ou ferimentos graves.**

Preve-se que essa bateria forneça boa performance pelo período de 5 anos recomendados de serviço. Isso é baseado nos dados do fabricante referente a bateria. Nenhuma garantia da bateria é dada pelo fabricante do ADVC.

Uma vez em serviço, baterias necessitam de certo cuidado. Seguem procedimentos de armazenamento e outros contingentes:

- Baterias devem ser armazenadas em uma temperatura entre 0 °C e 30 °C (32–86°F) e recarregadas a cada 6 meses. Baterias devem ser armazenadas por no máximo 1 ano.
- Baterias devem ser recarregadas antes de serem colocadas em serviço, se elas não tiverem sido recarregadas nos últimos 3 meses.  
Quando enviadas pelo fabricante, as baterias devem ter sido recarregadas em um período de 30 dias.
- Se as baterias ficarem esgotadas durante o serviço e forem deixadas por mais de 2 semanas sem a fonte auxiliar ter sido restaurada pelo ADVC, elas devem ser retiradas, recarregadas e ter sua capacidade verificada antes de retornar ao serviço

Para recarregar uma bateria, descarregue com resistores de 10 Ω, 15 W para um terminal de tensão de 10V. Em seguida, recarregue com uma tensão regulada to a terminal de tensão de 10 V. A seguir, recarregue com uma fonte DC regulada e ajustada em 13.8 V. Uma corrente de 3 A limitada pela alimentação é apropriada.

Mais informação quanto aos cuidados com a bateria estão disponíveis por meio do fabricante das baterias.

## Condições de Operação do ADVC

### Condições de Operações Anormais

A operação de inversão de carga do capacitor pode ser afetada sob condições anormais, como quando a capacidade da bateria está muito baixa. Os seguintes recursos são usados para proteger o ADVC nessa situação enquanto ainda permite o religador de continuar operando.

#### Modo de Baixo Consumo

Quando as baterias estão quase esgotadas, o ADVC irá mudar seu modo de carregador de capacitores de normal para baixo consumo. No modo de baixo consumo, o controlador demora mais para carregar os capacitores e a fonte do rádio é desligada. No modo de baixo consumo o controlador demora mais tempo para carregar os capacitores e o evento "**Low Power Mode**" está logado sempre que isso ocorre.

Quando um disparo ocorre no modo de baixo consumo, o religador irá travar se os capacitores não conseguirem, serem carregados rápido o suficiente. Operações de fechamento e de disparo podem ser realizadas, mas em um tempo maior do que o normal. Se o pedido do operador de disparo ou fechamento for negado, um evento de "**Cap Charg**" será logado.

Para retornar ao modo de alimentação normal, a fonte de alimentação auxiliar deve ter sido ligada novamente por no mínimo 15 minutos e as baterias devem ter sido substituídas.

#### Operações de Fechamento Excessivo

Durante os testes é possível realizar várias operações de disparo e fechamento em que o inversor de carga do capacitor desliga sozinho antes de superaquecer. Ele demora mais de 20 operações por minuto para realizar essa ação e não irá ocorrer durante serviço (isso só ocorre durante testes excessivos).

Quando isso ocorre, o inversor desliga por 5 minutos e um evento "Cap Excess Closes" é logado. Durante esse tempo, todos os requerimentos serão negados.

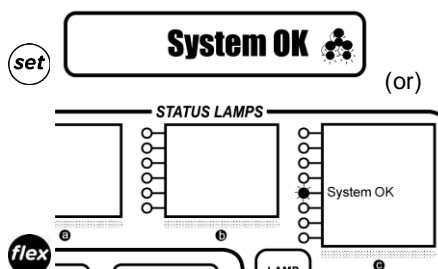
### Localização de Defeitos

#### Verificação do Controlador ADVC

A localização de defeitos do ADVC envolve determinar se o defeito mente nos módulos eletrônicos, a fiação ou algo semelhante. Os módulos eletrônicos são itens substituíveis. Outros defeitos requerem que o ADVC retorne a fábrica.

Uma abordagem sugerida para a localização de defeitos é a seguinte:

- Se o LED OK do sistema, localizado na interface do operador (O.I.), estiver piscando, então o microprocessador CAPE está sendo executado. Se a O.I. não operar, execute o passo 4. Os LEDs OK do Sistema estão localizados em diferentes lugares nos painéis setVUE e flexVUE:



**Obs:** (Localização padrão – pode ser configurados diferentemente)

- Se o display estiver operando, verifique:
  - set** STATUS DO SISTEMA → Status do Religador → S
  - flex** MENU DO OPERADOR → STATUS DO RELIGADOR → DADOS DO RELIGADOR → Status da Bateria e
  - flex** OPERADOR → STATUS DO RELIGADOR → DADOS DO RELIGADOR → Status da Alimentação Auxiliar

Página para obter indicações de quaisquer problemas referentes a fontes de alimentação (Falha da fonte de alimentação auxiliar e/ou bateria desligada) o qual pode ser rastreados e corrigidos.

- Se o LED OK do Sistema não está brilhando, verifique pela perda de energia. Verifique se o disjuntor da bateria está ligado e se toda a tensão está presente nos terminais. Verifique a presença da fonte de alimentação auxiliar no disjuntor de tensão auxiliar. Verifique se a fonte entre PSU e CAPE não foi desconectada. Retifique se o problema for descoberto.

Se a fonte de alimentação está presente, então tente entrar em linha com o WSOS para determinar se o CAPE está funcionando corretamente. Substitua o CAPE se necessário.

- Se isso não retificar o problema, então o Controlador ADVC deve retornar a fábrica para reparo.

---

---

## Substituição de Módulos Eletrônicos e Atualizações

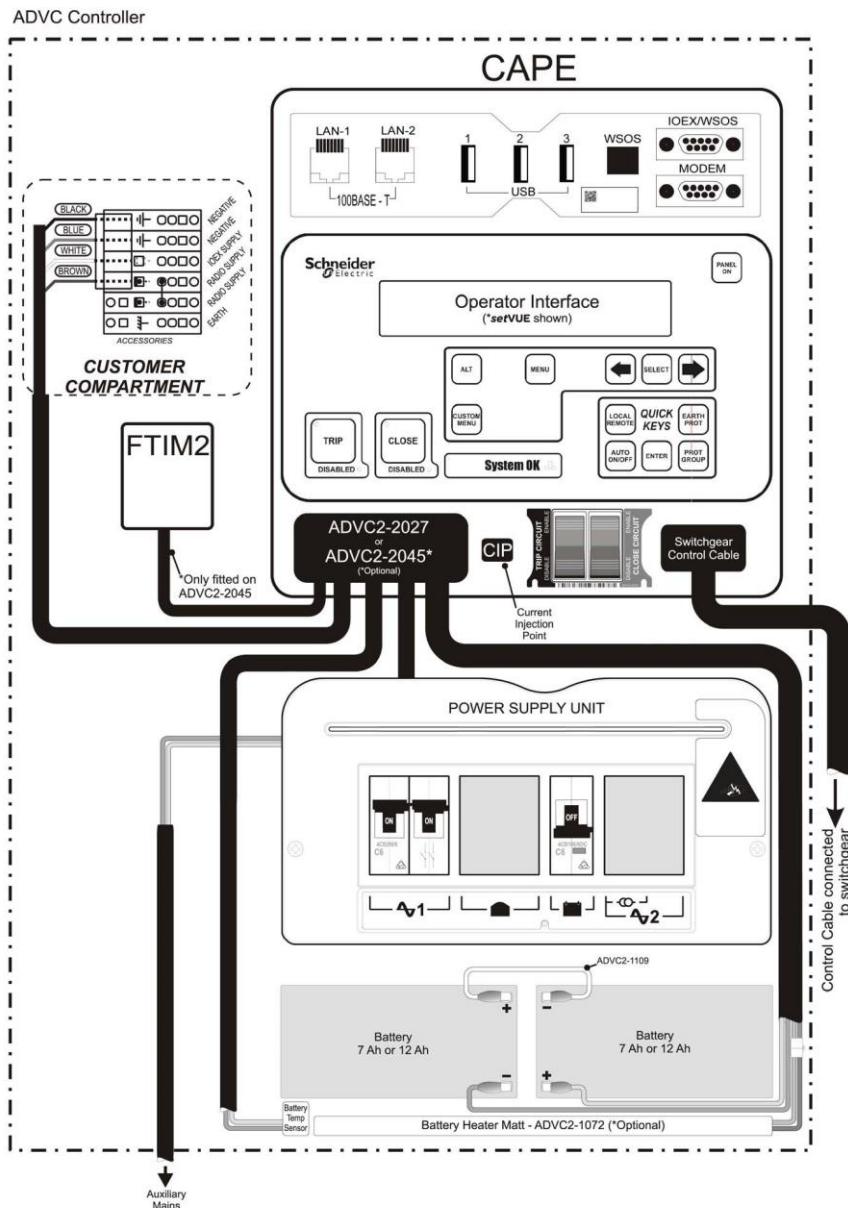
Módulos eletrônicos podem ser substituídos pelo usuário. Deve ser tomado certo cuidado para evitar danos aos módulos enquanto eles estão fora do cubículo e a substituição só deve ser realizada por pessoal capacitado. O firmware do CAPE pode ser atualizado por meio do WSOS. Para maiores informações, consultar o Manual do Operador.

# OBSERVAÇÃO

## EQUIPAMENTO INOPERÁVEL

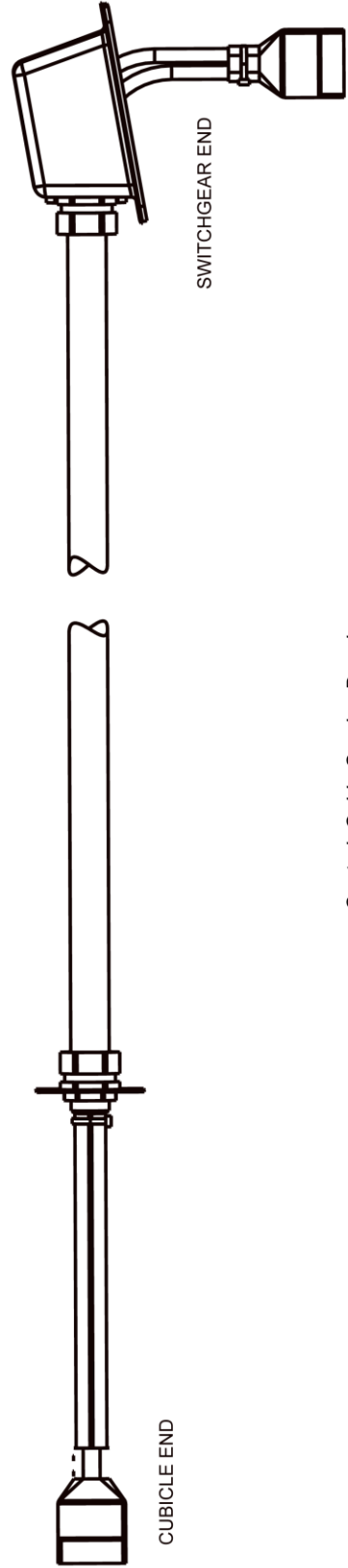
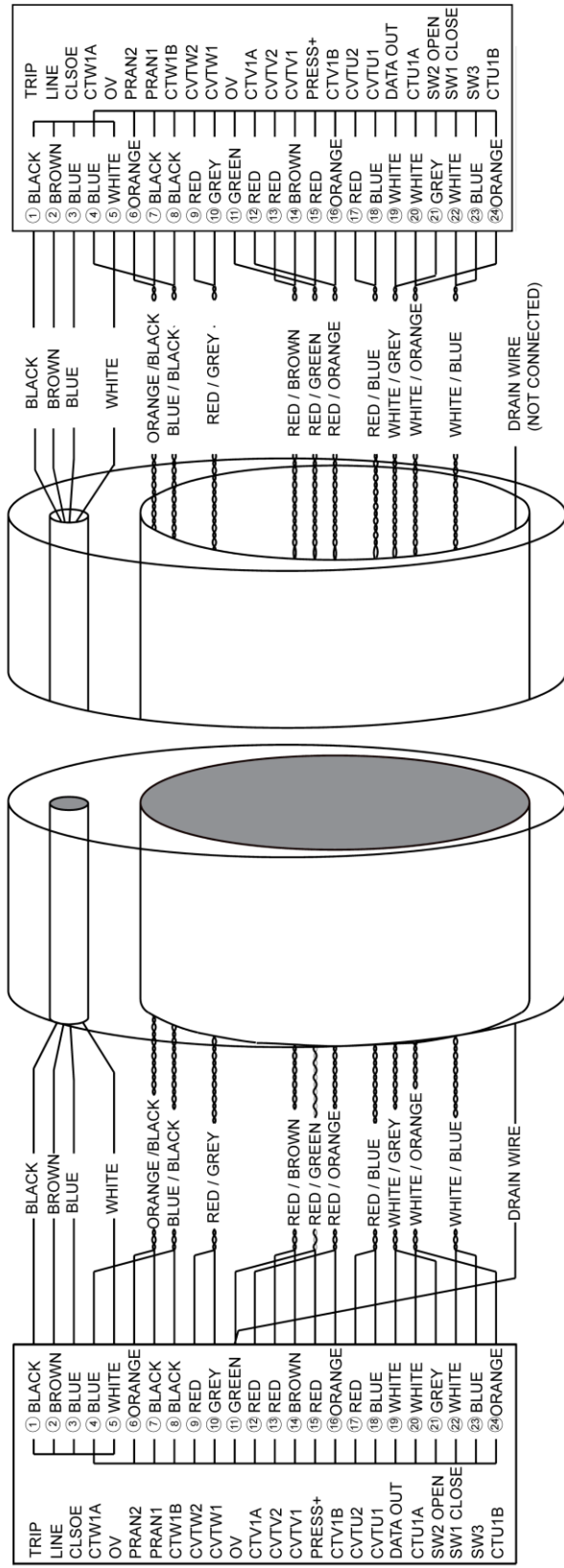
A remoção de partes dos módulos irá anular a garantia.

**Falha ao seguir essas instruções pode resultar em danos ao equipamento.**









Control Cable Service Drawing

---

# Chapter 12

## Ratings and Specifications

---

### What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Equipment and Crating Dimensions	104
ADVC	106

## Equipment and Crating Dimensions

<b>Equipment Weights</b>	
<b>Part</b>	<b>Weight kg (lbs)</b>
Control cable	6 (13)
Control cubicle	37 (81) (without accessories and with 7 Ah batteries)
HV cables (185 mm <sup>2</sup> Al cables, qty 6, length as ordered) complete with bushing boots.	26 (57)
Pole Mounted ACR	118 (261)
Pole mounting bracket	24 (53)
Surge Arrester Mounting Bracket	16 (36)
Sundry Mounting items	8 (18)
Gross weight of crate	297 (655)
<b>Dimensions mm (in)</b>	
Cubicle (for more information, refer Appendix B ( <a href="#">see page 121</a> ))	1000 x 375 x 305 mm (39.4 in x 14.8 in x 12.0 in)
<b>Crate Dimensions</b>	
Width	1150 / 45.3
Depth	1150 / 45.3
Height	570 / 22.4

## ACR

Rated maximum voltage (27 kV Rating)	27 kV
Rated maximum voltage (15.5 kV Rating)	15.5 kV
Rated Continuous Current	630 A
Rated Frequency	50/60 Hz
Rated Mainly Active (0.7 pf) Breaking Capacity	630 A
Rated Cable Charging Interrupting Current	25 A
Rated Line Charging Interrupting Current	5 A
Rated Transformer Magnetising Interrupting Current	22 A
<b>Rated Symmetrical Interrupting Current</b>	12.5 kA
Rated Asymmetrical Making Current (Peak)	32.5 kA
Rated Asymmetrical Making Current (RMS)	12.5 kA
<b>Short Time Current for 3 Seconds</b>	12.5 kA
Short Time Current Recovery Time	180 s
Rated Impulse Withstand Voltage (27 kV Rating)	125 kV
<b>Rated Impulse Withstand Voltage (15.5 kV Rating)</b>	110 kV
Power Frequency Withstand Phase/Earth and across interrupter	60 kV
Opening/Closing Mechanism	Latching magnetic actuator
D.C. Resistance Terminal/Terminal	<120 $\mu\Omega$
Tank Construction	Stainless steel
Bushings/VI Housings	Outdoor Cyclo- Aliphatic Epoxy Resin
Maintenance Interval	5 years
Earthing	12 mm stud provided
Applicable standards	ANSI C37.60

## Breaking Duty

Mechanical operations	10000
Contact wear - 630 A	10000
Contact wear - 2 kA	1955

Contact wear - 6 kA	217
Contact wear - 12.5 kA	50

Circuit breaker is rated for ANSI C37.60 duty cycle. Contact wear is automatically calculated for each interrupter by the control cubicle based on fault current and mechanical operations.

The remaining contact life is shown on the operator control panel.

### Duty Cycle

Maximum allowable duty cycle at full short current rating:

- Open-0.3 s-close
- Open-2 s-close
- Open-2 s-close
- Open followed by 300 second recovery time

### Terminal Clearance/Creepage

Insulator Material Type	Outdoor Cyclo-Aliphatic Epoxy Resin
Phase/Phase Centres	375 mm
Creepage distance	864 mm
Taut String clearance phase/earth (centre mount bracket)	295 mm
Taut String clearance phase/earth (end mount bracket)	295 mm
Taut String clearance phase/phase	325 mm

### Current Transformers

There is no access to current transformer connections on the equipment. This data is supplied for information only.

Ratio	2000:1
Accuracy 10–630 A	±1%
Accuracy 630–12500 A	±2.5%

### Environmental

Operating Temperature <sup>1</sup>	-30° C to +50° C
Operating Humidity	0 to 100%
Operating Solar Radiation	1.1 kW/m <sup>2</sup> max
Operating Altitude <sup>2</sup>	3000 m max
1. Temperature range depends on control cubicle versions	
2. Altitudes above 1000 m must be de-rated per ANSI C37.60.	

### Basic Timings

Contact Close from energisation of close coil <sup>1</sup>	< 50 ms
Opening Time <sup>1</sup>	< 35 ms
Interrupting Time <sup>1</sup>	< 45 ms
Fault Clearing Time on Instantaneous protection for fault > 4 x Setting Current	< 70 ms
Time to contact part from receipt of trip command by operator, telemetry protocol, or IOEX	< 150 ms
Time to contact touch from receipt of close command by operator, telemetry protocol, or IOEX	< 150 ms
1. The precise definition of these times is given in ANSI C37.60	

## ADVC

### General Specifications

Cubicle material	<b>COMPACT</b>	304 stainless steel
	<b>ULTRA</b>	316 stainless steel
Cubicle shell sealing	<b>COMPACT</b>	IP 54
	<b>ULTRA</b>	IP 65
Electronic enclosure sealing		IP 65
Wind loading resistance of structure		>160 km/hr
Wind loading on door when latched in open position		>60 km/hr
Angle of door opening		135°
Standard ambient operating temperature range		-10° C to 50 °C
Extended operating temperature range (battery heater required) ULTRA Only		-40° C to 50 °C
Electronics Temperature Range		-40 °C to 50 °C
Maximum radiation		1.1 kW/m <sup>2</sup>
Humidity		0 to 100%
Standard control cable length <sup>a</sup>		7m (23 in)
Maximum vertical separation from ACR with standard control cable		5 m (16.4 in)
Auxiliary supply voltage (LV AC mains supply)		As Ordered 115/230 Vac nominal 20% to +10%
Required auxiliary supply rating		100 VA
Battery (With battery heater option, 12 Ah batteries are standard.)		2 x 12 V 7.2 Ah
Battery hold up time from fully charged at 25 °C		28 hrs with 7 Ah 48 hrs with 12 Ah
Capacity available for communications, hold up time (no heater, OCP, or IOEX) 13.8 V TX:2.1 A, 15 min, RX 320 mA		20 hrs
Battery recharge time (new battery to 80% nominal capacity)		10 hrs
Battery replacement interval <sup>b</sup>		Five yrs
Battery Low Voltage <sup>c</sup>		23 V
Battery High Voltage <sup>c</sup>		33 V
Earthing <sup>d</sup>		10 mm earth stud
Battery Heater Power (where fitted)		10 W
Battery Heater Element Life		30,000 hrs
Radio/Modem A radio or modem may be fitted by the manufacturer or by the utility, for remote communications. Space, power, and data interfaces are provided within the control cubicle.		
Radio/Modem Power Supply Voltage (set by user)		5–15 Vdc
Radio/Modem Power Supply Continuous Current <sup>e</sup>		3A
Radio/Modem Power Supply Max Current		8 A for 30 s with 10% duty cycle
Radio/Modem Power Supply continuous power		45 W
Radio/Modem Power Supply peak power		120 W for 15 mins at 10% duty cycle
Radio/Modem Space on Radio Panel		300 x 250 x 150 mm
Radio/Modem Interface		V23, RS-232, RS-485
Radio/Modem Power Shutdown Time (user configurable)		1–1440 min
Shutdown time increment		10 s
<b>Control Electronics</b>		
Continuous Primary current		800 A
Continuous secondary current		0.8 A
Short time primary current		16 kA for 3 s
<p>(a) Other control cable lengths available -4, 11, and 20 m.            (b) Battery replacement interval is influenced by environmental temperature.            (c) Temperature compensated at 48 m V/°C.            (d) Earthing details in described in Earthing (Grounding) (<a href="#">see page 19</a>) must be strictly adhered to.            (e) For an external VT, the maximum continuous current drawn from the radio supply should be limited to 0.5 A.</p>		

Short time secondary current	12 A for 3 s
Short time current recovery time	60 s
Required auxiliary supply rating	32 Vac, 100 VA
Real time clock hold time	20 days
Recloser Operations	20 in 1 minute, 1 per minute thereafter
<p>(a) Other control cable lengths available -4, 11, and 20 m.</p> <p>(b) Battery replacement interval is influenced by environmental temperature.</p> <p>(c) Temperature compensated at 48 m V/°C.</p> <p>(d) Earthing details in described in Earthing (Grounding) (<a href="#">see page 19</a>) must be strictly adhered to.</p> <p>(e) For an external VT, the maximum continuous current drawn from the radio supply should be limited to 0.5 A.</p>	

## Controller EMC Type Tests

Immunity Tests			
Standard	Description	Application	Test Level
IEC 61000-4-2	Electrostatic Discharge	Contact	+/- 8 kV
		Air	+/- 15 kV
IEC 61000-4-3	Radiated Electromagnetic Field (Antennae transmitting 3M away)	Four faces (Door open)	10 V/m, 80 MHz-1000 MHz
			10 V/m, 1000 MHz-2700 MHz
IEC 61000-4-4	Fast Transient (5ns/50ns 5 kHz, 15 ms burst 300 ms spaced)	A.C. Power Port	+/- 4 kV
		RS232 (WSOS)	+/- 4 kV
		RS232 (Modem)	+/- 4 kV
		USB (WSOS)	+/- 4 kV
		USB1 + USB to RS485 isolated converter	+/- 4 kV
		LAN 1	+/- 4 kV
		LAN 2	+/- 4 kV
		Umbilical port	+/- 4 kV
		IOEX2 port input	+/- 4 kV
		IOEX2 port output	+/- 4 kV
		FTIM2 port	+/- 4 kV
IEC 61000-4-5	Surge	A.C. Power Port	+/- 4 kV line-to-earth, +/- 2 kV line-to-line, 1.25/50 µsec
		RS232 (WSOS)	+/- 4 kV, 1.25/50 µsec
		RS232 (Modem)	+/- 4 kV, 1.25/50 µsec
		USB (WSOS)	+/- 4 kV, 1.25/50 µsec
		USB1 + USB to RS485 isolated converter	+/- 4 kV, 1.25/50 µsec
		LAN 1	+/- 4 kV, 10/700 µsec
		LAN 2	+/- 4 kV, 10/700 µsec
		Umbilical port	+/- 4 kV, 1.25/50 µsec
		IOEX2 port input	+/- 4 kV, 1.25/50 µsec
		IOEX2 port output	+/- 4 kV, 1.25/50 µsec
		FTIM2 port	+/- 4 kV, 1.25/50 µsec

Immunity Tests			
Standard	Description	Application	Test Level
IEC 61000-4-6	Conducted Disturbances	A.C. Power Port	10 V RMS
		RS232 (WSOS)	10 V RMS
		RS232 (Modem)	10 V RMS
		USB (WSOS)	10 V RMS
		USB1 + USB to RS485 isolated converter	10 V RMS
		LAN 1	10 V RMS
		LAN 2	10 V RMS
		Umbilical port	10 V RMS
		IOEX2 port input	10 V RMS
		IOEX2 port output	10 V RMS
		FTIM2 port	10 V RMS
IEC 61000-4-8	Power Frequency Magnetic Field	Three axis X, Y, Z	100 A/m continuous, 1000 A/m for 1 s
IEC 61000-4-11	Voltage Dips and Interruptions	A.C. Power Port	Voltage dips - 0% 1 cycle, 40% for 10 cycles, 70% for 25 cycles, 80% for 250 cycles
			Voltage interruptions - 0% for 250 cycles
IEC 61000-4-12	Oscillatory Wave immunity test	A.C. Power Port	1 kV common mode, 0.5 kV differential mode
		Umbilical port	2.5 kV common mode
IEC 61000-4-16	Conducted Common mode disturbances 0-150 kHz (direct on L and N)	A.C. Power Port	30 V continuous, 300 V 1 sec, 50/60 Hz
		Umbilical port	30 V continuous, 300 V 1 sec, 50/60 Hz
IEC 61000-4-18	Damped Oscillatory Wave (Decaying waveform)	A.C. Power Port	2.5 kV common mode, 1 kV diff. at 100 kHz and 1 MHz
		Umbilical port	2.5 kV common mode at 100 kHz and 1 MHz

Emissions			
Standard	Description	Application	Test Level
EN61000-6-4	Emission for Industrial Environmental	A.C. Power Port + Enclosure	Class A
EN61000-3-2	Harmonics	A.C. Power Port (50 Hz & 60 Hz)	Class A
EN61000-3-3	Voltage Fluctuations and Flicker	A.C. Power Port (50 Hz & 60 Hz)	Pst < 1, Pl < 0.65%, Dc < 3.3%, Dmax < 4%, Dt < 3.3% for less 500 ms
FCC Part 15 Subpart B (Similar to EN61000-6-4 but American standard)	Radio Frequency Devices Unintentional radiators	A.C. Power Port + Enclosure	Class A digital devices
		Mains set to 110 VAC 60 HZ	

### Power System Measurements

HV line measurements on the three phases are made as follows:

Voltage Range (RMS Phase/Earth)	2–15 kV
Voltage Resolution	1 V
Voltage Accuracy <sup>a</sup>	2.5% ±25 V
<p>(a) Includes accuracy of switchgear current and voltage transformers.</p> <p>(b) Used for live/dead display, Live load blocking, and Loss of supply detection.</p> <p>(c) Measurements are zeroed for currents less than lower value in range.</p> <p>(d) In database for transmission by a protocol.</p> <p>(e) Used to accumulate kWh reading for weekly maximum demand data.</p>	



Live Terminal Threshold Voltage range <sup>b</sup>	2–15 kV
Live Terminal Threshold Voltage setting resolution <sup>b</sup>	1V
Live Terminal Threshold Voltage accuracy <sup>a, b</sup>	5% ±250 V
Live Terminal Threshold Hysteresis	-20%
Phase Current Range (True RMS) <sup>c</sup>	2.5–800 A
Earth Current Range (True RMS) <sup>c</sup>	1–800 A
Current Resolution	1 A
Phase Current Accuracy <sup>a</sup>	2.5% ±2 A over range 10 - 800 A
Earth Current Accuracy <sup>a</sup>	2.5% ±2 A over range 1–800 A
Apparent Power Range	0 - 36 MVA
Apparent Power Resolution	1 kVA
Apparent Power Accuracy <sup>a</sup>	±5% over range 20–800 A
Real Power Ranged. <sup>e</sup>	-36 –36 mW
Real Power Accuracy <sup>a, e</sup>	±5% of apparent power
Real Power Resolution	1 kW
Reactive Power Range <sup>d</sup>	0 - 36 MVAR
Reactive Power Resolution	1 kVAR
Reactive Power Accuracy <sup>a</sup>	±5% of apparent power
Unsigned Power Factor	0.5 - 1.0
Power Factor Resolution	0.01
Power Factor Accuracy	±0.05
Measurement Filter Time Constant (Step Response)	2 s
Measurement Update Rate	0.5 s
<p><b>(a)</b> Includes accuracy of switchgear current and voltage transformers.</p> <p><b>(b)</b> Used for live/dead display, Live load blocking, and Loss of supply detection.</p> <p><b>(c)</b> Measurements are zeroed for currents less than lower value in range.</p> <p><b>(d)</b> In database for transmission by a protocol.</p> <p><b>(e)</b> Used to accumulate kWh reading for weekly maximum demand data.</p>	



---

# Appendices

---



## What Is in This Appendix?

The appendix contains the following chapters:

Chapter	Chapter Name	Page
A	Replaceable Parts and Tools	113
B	Dimensions	121

---

# Appendix A

## Replaceable Parts and Tools

### ACR and ADVC Part List

All the replacement parts are listed in the following table which are available from the manufacturer.

SI No.	Stock or Part Number	Part Description
<b>Manuals</b>		
1	998001511	INSTALL MANUAL RL SERIES ADVC ENG
2	998001506	INSTALL MANUAL U SERIES ADVC ENG
3	998001516	INSTALL MANUAL W SERIES ADVC ENG
4	998001508	INSTALL MANUAL E SERIES ADVC ENG
<b>ADVC Spares</b>		
5	998002003	ADVC CAPE FLEXVUE ENG
6	998002013	ADVC CAPE FLEXVUE ESP
7	998002023	ADVC CAPE FLEXVUE POR
8	998002235	ADVC CAPE SETVUE ENG
9	998002395	ADVC CAPE SETVUE ESP
10	998002825	ADVC CAPE SETVUE POR
<b>ADVC Spares</b>		
Batteries		
11	997000000	ADVC BATTERY 2X 12V 7.2AH STD CSB
12	998000055	ADVC BATTERY 2X 12V 12AH LRG CSB
13	998000056	ADVC BATTERY 2X 12V 12AH LRGP YUASA
14	998002050	ADVC BATTERY HEATER MAT
Cubicle Enclosure		
15	998002065	ADVC COMPACT DOOR NO DOOR LABEL
16	998002045	ADVC COMPACT ENCLOSURE NO DOOR LABEL
17	998002060	ADVC ULTRA DOOR - NO DOOR LABEL
18	998002040	ADVC ULTRA ENCLOSURE - NO DOOR LABEL
19	998002300	ADVC DOOR LABEL FLEXVUE ENG
20	998002310	ADVC DOOR LABEL FLEXVUE ESP
21	998002320	ADVC DOOR LABEL FLEXVUE POR
22	998002305	ADVC DOOR LABEL SETVUE ENG
23	998002315	ADVC DOOR LABEL SETVUE ESP
24	998002325	ADVC DOOR LABEL SETVUE POR
25	998002030	ADVC CUSTOMER TRAY
26	998002035	ADVC CUSTOMER TRAY & DINRAIL TBLOCK
27	998001025	ADVC DINRAIL TBLOCK FOR CUSTOMER TRAY
Communications		
28	997000115	ADVC COMS MODEM BNC CABLE KIT
29	998001041	ADVC COMS MODEM MAESTRO E200 E205XT02
30	997000165	ADVC COMS RADIOSUPPRESSOR 125-1000MHZ
31	998002055	ADVC FTIM FIELD INSTALL KIT 1X
32	998002070	ADVC IOEX3 FIELD INSTALL KIT 1X
33	998001110	ADVC IOEX/FTIM EXTRA MOUNT BRACKETKIT (Note: Only required when 3 IOEX/FTIMs required)

SI No.	Stock or Part Number	Part Description
GPO Cables		
34	998001075	ADVC GPO CABLE AUS SPARES KIT
35	998001090	ADVC GPO CABLE EU-A EUROPE CEE 7/5KIT
36	998001095	ADVC GPO CABLE EU-B EUROPE CEE 7/4KIT
37	998001085	ADVC GPO CABLE UK SPARES KIT
38	998001080	ADVC GPO CABLE US SPARES KIT
Power Supply Units (PSU)		
39	998002110	ADVC PSU COMPACT/ULTRA 115
40	998002100	ADVC PSU COMPACT/ULTRA 115 GPO
41	998002150	ADVC PSU COMPACT/ULTRA 115 INT
42	998002140	ADVC PSU COMPACT/ULTRA 115 INT GPO
43	998002115	ADVC PSU COMPACT/ULTRA 230
44	998002105	ADVC PSU COMPACT/ULTRA 230 GPO
45	998002155	ADVC PSU COMPACT/ULTRA 230 INT
46	998002145	ADVC PSU COMPACT/ULTRA 230 INT GPO
47	998002191	ADVC PSU ULTRA 115 DUAL FTIM
48	998002181	ADVC PSU ULTRA 115 DUAL FTIM GPO
49	998002130	ADVC PSU ULTRA 115 FTIM
50	998002120	ADVC PSU ULTRA 115 FTIM GPO
51	998002170	ADVC PSU ULTRA 115 FTIM INT
52	998002160	ADVC PSU ULTRA 115 FTIM INT GPO
53	998002196	ADVC PSU ULTRA 230 DUAL FTIM
54	998002186	ADVC PSU ULTRA 230 DUAL FTIM GPO
55	998002135	ADVC PSU ULTRA 230 FTIM
56	998002125	ADVC PSU ULTRA 230 FTIM GPO
57	998002175	ADVC PSU ULTRA 230 FTIM INT
58	998002165	ADVC PSU ULTRA 230 FTIM INT GPO
59	998002080	ADVC PSU TOROIDAL 115/230V-32V 100VA
60	997000150	ADVC & PTCC VARISTOR CNR-20D681K
ADVC BRACKET FOR PTCC FRAME		
61	998000125	ADVC BRACKET FOR PTCC FRAME
USB Cables		
62	998001045	ADVC USB CABLE
63	998000100	ADVC USB TO SERIAL CONVERTER
<b>Bare Terminal Kits for RL15KV BT</b>		
64	994000030	BT KIT RL2 2 HOLE PALM 6X
65	994000060	BT KIT RL2 2 HOLE PALM ANSI 6X
<b>HJ Connectors for U, E &amp; W Series</b>		
		<b>Spare Part HJ Connector for U &amp; W Series</b>
66	992000065	U/W SERIES HJ 400A 15TP 1X
67	992000060	U/W SERIES HJ 630A 30TP 1X
68	992000095	U/W SERIES HJ 630A 2 HOLE ANSI PALM 1X
W Series HJ Connector		
69	992000067	W SERIES HJ 400A 15TP 2X
70	992500062	W SERIES HJ 630A 30TP 2X
71	992000097	W SERIES HJ 630A 2 HOLE ANSI PALM 2X
U Series HJ Connector		
72	992000066	U SERIES HJ 400A 15TP 6X
73	992000061	U SERIES HJ 630A 30TP 6X
74	992000096	U SERIES HJ 630A 2 HOLE ANSI PALM 6X

SI No.	Stock or Part Number	Part Description
<b>E Series HJ Connector</b>		
75	995000005	E SERIES HJ 630A 6X
76	995000001	E SERIES HJ 630A 2 HOLE ANSI PALM 6X
77	995000003	E SERIES HJ 630A 4 HOLE ANSI PALM 6X
<b>Bushing Boots for N &amp; RL Series</b>		
78	990000337	BUSHING BOOT 27KV 630A 1X BOOT ONLY
79	990000332	BUSHING BOOTS KIT 27KV 630A 1X
80	990000331	BUSHING BOOTS KIT 27KV 630A 3X
81	990000330	BUSHING BOOTS KIT 27KV 630A 6X
82	990000335	BUSHING BOOTS KIT 27KV 630A 6X NOGREASE
83	990000309	BUSHING BOOTS KIT 38KV 800A 1X
84	990000306	BUSHING BOOTS KIT 38KV 800A 3X
85	990000305	BUSHING BOOTS KIT 38KV 800A 6X
86	990000308	BUSHING BOOTS KIT 38KV 800A 6X NOGREASE
87	990000345	BUSHING BOOT GREASE & SPANNER KIT
88	990000340	BUSHING BOOT GREASE DOW CORNING 7 18.1KG
89	990000325	BUSHING BOOT GREASE DOW CORNING 7 300G
90	990000322	BUSHING BOOTS CAULKING GUN RATCHET TYPE
91	990000315	BUSHING BOOTS CLAMPING RING 1 ONLY
<b>Control Cables E Series</b>		
92	995000302	CONTROL CABLE E ONLY - 7M
93	995000304	CONTROL CABLE E ONLY - 11M
94	995000306	CONTROL CABLE E ONLY - 20M
<b>Control Cables U/W/RL Series</b>		
95	992000025	CONTROL CABLE U/W/RL - 4M
96	992000030	CONTROL CABLE U/W/RL - 7M
97	992000035	CONTROL CABLE U/W/RL - 8M
98	992000075	CONTROL CABLE U/W/RL - 9M
99	992000040	CONTROL CABLE U/W/RL - 10M
100	992000045	CONTROL CABLE U/W/RL - 11M
101	992000115	CONTROL CABLE U/W/RL - 12M
14 M to 20 M only works with RL Motorpackwith a White 'A' Sticker		
102	992000082	CONTROL CABLE U/W/RL - 14M
103	992000175	CONTROL CABLE U/W/RL - 15M
104	992000100	CONTROL CABLE U/W/RL - 20M
Control Cables PTCC to ADVC Replacement		
105	998002200	CONTROL CABLE EXTENSION PTCC TO ADVC
<b>High Voltage Cables For N and RL Series</b>		
Set Of 1		
106	990000600	HV CABLE 250A 3M 80MM 1xALLUG&PALM2HOLE
107	990000601	HV CABLE 250A 4M 80MM 1xALLUG&PALM2HOLE
108	990000603	HV CABLE 250A 6M 80MM 1xALLUG&PALM2HOLE
109	990000620	HV CABLE 340A 3M 120MM 1xALLUG&PALM2HOLE
110	990000640	HV CABLE 400A 3M 180MM 1xALLUG&PALM2HOLE
111	990000641	HV CABLE 400A 4M 180MM 1xALLUG&PALM2HOLE
112	990000642	HV CABLE 400A 5M 180MM 1xALLUG&PALM2HOLE
113	990000643	HV CABLE 400A 6M 180MM 1xALLUG&PALM2HOLE
114	990000645	HV CABLE 400A 8M 180MM 1xALLUG&PALM2HOLE
115	990000650	HV CABLE 400A 10M 180MM 1xALLUG&PALM2HOLE
116	990003150	HV CABLE 630A 3M 240MM 1xCULUG&PALM2HOLE

SI No.	Stock or Part Number	Part Description
117	990003135	HV CABLE 630A 4M 240MM 1xCULUG&PALM2HOLE
118	990003130	HV CABLE 630A 6M 240MM 1xCULUG&PALM2HOLE
119	990003180	HV CABLE 630A 7M 240MM 1xCULUG&PALM2HOLE
120	990003230	HV CABLE 800A 3M 400MM 1xCULUG&PALM2HOLE
121	990000116	HV CABLE 800A 4M 400MM 1xCULUG&PALM2HOLE
122	990000170	HV CABLE 800A 5M 400MM 1xCULUG&PALM2HOLE
123	990003120	HV CABLE 800A 6M 400MM 1xCULUG&PALM2HOLE
Set Of 6		
124	990000607	HV CABLE 250A 3M 80MM 6xALLUG&PALM2HOLE
125	990000602	HV CABLE 250A 4M 80MM 6xALLUG&PALM2HOLE
126	990000604	HV CABLE 250A 6M 80MM 6xALLUG&PALM2HOLE
127	990000623	HV CABLE 340A 3M 120MM 6xALLUG&PALM2HOLE
128	990000660	HV CABLE 400A 3M 180MM 6xALLUG&PALM2HOLE
129	990000670	HV CABLE 400A 4M 180MM 6xALLUG&PALM2HOLE
130	990000680	HV CABLE 400A 5M 180MM 6xALLUG&PALM2HOLE
131	990000690	HV CABLE 400A 6M 180MM 6xALLUG&PALM2HOLE
132	990000646	HV CABLE 400A 8M 180MM 6xALLUG&PALM2HOLE
133	990000651	HV CABLE 400A 10M 180MM 6xALLUG&PALM2HOLE
134	990003190	HV CABLE 630A 1M 240MM 6xCULUG&PALM2HOLE
135	990003100	HV CABLE 630A 3M 240MM 6xCULUG&PALM2HOLE
136	990003105	HV CABLE 630A 4M 240MM 6xCULUG&PALM2HOLE
137	990003115	HV CABLE 630A 6M 240MM 6xCULUG&PALM2HOLE
138	990003181	HV CABLE 630A 7M 240MM 6xCULUG&PALM2HOLE
139	990003182	HV CABLE 630A 10M 240MM 6xCULUG&PALM2HOLE
140	990000115	HV CABLE 800A 3M 400MM 6xCULUG&PALM2HOLE
141	990000117	HV CABLE 800A 4M 400MM 6xCULUG&PALM2HOLE
142	990000171	HV CABLE 800A 5M 400MM 6xCULUG&PALM2HOLE
143	990003121	HV CABLE 800A 6M 400MM 6xCULUG&PALM2HOLE
Set Of 3		
144	990000665	HV CABLE 400A 3M 180MM 3xALLUG&PALM2HOLE
145	990000695	HV CABLE 400A 6M 180MM 3xALLUG&PALM2HOLE
146	990003145	HV CABLE 630A 3M 240MM 3xCULUG&PALM2HOLE
147	990003155	HV CABLE 630A 4M 240MM 3xCULUG&PALM2HOLE
148	990003170	HV CABLE 630A 6M 240MM 3xCULUG&PALM2HOLE
HV Cables Per Meter		
149	990000120	HV CABLE XLPE 250A 80MM CABLE PER METRE
150	990000125	HV CABLE XLPE 400A 180MM CABLE PER METRE
151	990000130	HV CABLE XLPE 630A 240MM CABLE PER METRE
HV Cable Connectors - Lugs (Crimped on HV cables)		
152	990000270	HV 250A 80MM 1xALLUG2HOLE
153	990000280	HV 340A 120MM 1xALLUG2HOLE
154	990000265	HV 400A 185MM 1xALLUG2HOLE
155	990000201	HV 630A 240MM 1xCULUG2HOLE
156	990000275	HV 800A 400MM 1xCULUG2HOLE
HV Cable Connectors - Palms (Screw into RL and N Series Bushing)		
157	990000212	HV 400A 1xALPALM2HOLE KIT WITH SCREWS
158	990000205	HV 800A 1xCUPALM2HOLE KIT WITH SCREWS - ALSO USED FOR 630A
<b>Mounting Brackets &amp; Substation Mounts</b>		
159	992500005	MOUNTING BRACKET POLE W SERIES
160	994000005	MOUNTING BRACKET POLE RL SERIES



SI No.	Stock or Part Number	Part Description
161	992000010	MOUNTING BRACKET CENTRE U SERIES
162	992000005	MOUNTING BRACKET END U SERIES
163	992000092	MOUNTING SUB U SERIES 2290MM ULTRA ONLY - WAS SUBSTATION U SERIES ADJUSTABLE
164	995000104	MOUNTING BRACKET POLE E SERIES
165	995000106	MOUNTING SUB E SERIES 1750MM ULTRA ONLY
<b>Pole Clamp Bands</b>		
1 x required for the VT		
2 x required for the N, W, RL & W Series		
166	990000400	MOUNTING POLE CLAMP BAND KIT 230-270 1X
167	990000405	MOUNTING POLE CLAMP BAND KIT 270-310 1X
168	990000410	MOUNTING POLE CLAMP BAND KIT 310-360 1X
169	990000401	MOUNTING POLE CLAMP BAND KIT 230-270 2X
170	990000406	MOUNTING POLE CLAMP BAND KIT 270-310 2X
171	990000411	MOUNTING POLE CLAMP BAND KIT 310-360 2X
172	990000402	MOUNTING POLE CLAMP BAND KIT 230-270 3X
173	990000407	MOUNTING POLE CLAMP BAND KIT 270-310 3X
174	990000412	MOUNTING POLE CLAMP BAND KIT 310-360 3X
<b>SCEMs</b>		
175	999900055	SCEM 11B U SERIES
176	999900065	SCEM 11D W SERIES
177	999900070	SCEM 12 RL2 SERIES 15KV/27KV
178	999900220	SCEM 13 RL2 SERIES 38KV
179	999900205	SCEM 4 TO 11A N15KV/27KV UPGRADE KIT
180	999900210	SCEM 5 TO 11C N38KV UPGRADE KIT
181	999900145	SCEM ASSEMBLY BOSS-CEM11
182	991000085	SCEM FIELD SERVICE ADAPTOR
<b>Voltage Transformers Accessories</b>		
183	990000086	VT HV 2X CABLE KIT 250A 1.5M 80MM
184	990000087	VT HV 2X CABLE KIT 250A 3M 80MM
185	990000099	VT HV 2X CABLE KIT 250A 4M 80MM
186	990000088	VT HV 1X CABLE KIT 250A 3M 80MM SWER - W SERIES ONLY
187	990000063	VT LV CABLE 9M
188	990000089	VT LV CABLE KIT 1.5M
189	990000090	VT LV CABLE KIT 3M
190	990000091	VT LV CABLE KIT 9M
191	990000092	VT LV CABLE KIT 11M
192	990000078	VT LV CABLE KIT 13M
193	990000076	VT LV CABLE KIT 18M
194	990000080	VT LV CABLE KIT 22M
195	990000740	VT LVCABLE FUSED SHEATH 9M ADVC 240/110V
196	990000765	VT LVCABLE FUSED SHEATH 13M ADVC 240/110V
197	990000700	VT LVCABLE FUSED SHEATH 3M N ONLY 28V
198	990000735	VT LVCABLE FUSED SHEATH 3M U/W/RL 28V
199	990000745	VT LVCABLE FUSED SHEATH 5M N ONLY 28V
200	990000093	VT MOUNTING BRACKET KIT N SERIES MOUNT
201	990000094	VT MOUNTING BRACKET KIT POLE MOUNT
202	990000066	VT MOUNTING BRACKET ONLY N SERIES MOUNT
<b>Surge Arresters</b>		
Surge Arresters Spares for N, U, E, W & RL Series Set of 1		

SI No.	Stock or Part Number	Part Description
203	990000560	SURGE ARRESTER 12KV BRITECH OB12 1X
204	990000562	SURGE ARRESTER 15KV BRITECH OB15 1X
205	990000540	SURGE ARRESTER 21KV BRITECH OB21 1X
206	990000566	SURGE ARRESTER 24KV BRITECH OB24 1X
207	990000570	SURGE ARRESTER 30KV BRITECH OB30 1X
208	990000572	SURGE ARRESTER 36KV BRITECH OB36 1X
209	990000574	SURGE ARRESTER 38KV BRITECH OB38 1X
210	990000505	SURGE ARRESTER 12KV ABB MWK10 1X
211	990000510	SURGE ARRESTER 15KV ABB MWK12 1X
212	990000515	SURGE ARRESTER 21KV ABB MWK17 1X
213	990000520	SURGE ARRESTER 24KV ABB MWK18 1X
214	990000525	SURGE ARRESTER 30KV ABB MWK24 1X
215	990000530	SURGE ARRESTER 36KV ABB MWK30 1X
216	990000535	SURGE ARRESTER 38KV ABB MWK36 1X
Surge Arresters for W Series Set of 2		
217	990000576	SURGE ARRESTER 12KV BRITECH OB12 2X
218	990000578	SURGE ARRESTER 15KV BRITECH OB15 2X
219	990000580	SURGE ARRESTER 21KV BRITECH OB21 2X
220	990000582	SURGE ARRESTER 24KV BRITECH OB24 2X
221	990000507	SURGE ARRESTER 12KV ABB MWK10 2X
222	990000512	SURGE ARRESTER 15KV ABB MWK12 2X
223	990000517	SURGE ARRESTER 21KV ABB MWK17 2X
224	990000522	SURGE ARRESTER 24KV ABB MWK18 2X
Surge Arresters for N, U, E & RL Series Set of 6		
225	990000584	SURGE ARRESTER 12KV BRITECH OB12 6X
226	990000586	SURGE ARRESTER 15KV BRITECH OB15 6X
227	990000588	SURGE ARRESTER 21KV BRITECH OB21 6X
228	990000590	SURGE ARRESTER 24KV BRITECH OB24 6X
229	990000594	SURGE ARRESTER 30KV BRITECH OB30 6X
230	990000596	SURGE ARRESTER 36KV BRITECH OB36 6X
231	990000598	SURGE ARRESTER 38KV BRITECH OB38 6X
232	990000506	SURGE ARRESTER 12KV ABB MWK10 6X
233	990000511	SURGE ARRESTER 15KV ABB MWK12 6X
234	990000516	SURGE ARRESTER 21KV ABB MWK17 6X
235	990000521	SURGE ARRESTER 24KV ABB MWK18 6X
236	990000526	SURGE ARRESTER 30KV ABB MWK24 6X
237	990000531	SURGE ARRESTER 36KV ABB MWK30 6X
238	990000536	SURGE ARRESTER 38KV ABB MWK36 6X
Surge Arresters Brackets		
239	994000000	SURGE ARRESTER BRACKET RL2 15KV & 27KV
240	994000070	SURGE ARRESTER BRACKET RL2 38KV
241	992000015	SURGE ARRESTER BRACKET U CENTRE MOUNT
242	992000020	SURGE ARRESTER BRACKET U END MOUNT
243	995000102	SURGE ARRESTER BRACKET E SERIES
<b>Wildlife Guards</b>		
244	992500075	WILDLIFE GUARD W SERIES 2X
245	992000190	WILDLIFE GUARD U SERIES 6X
246	994000145	WILDLIFE GUARD N & RL SERIES 6X
247	995000152	WILDLIFE GUARD E SERIES LOAD 1X
248	995000156	WILDLIFE GUARD E SERIES SOURCE 1X

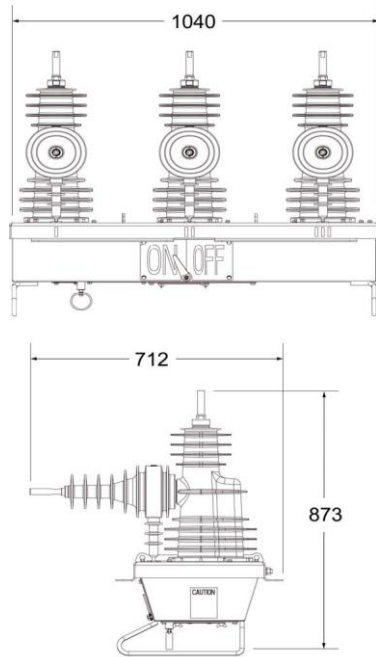
<b>SI No.</b>	<b>Stock or Part Number</b>	<b>Part Description</b>
249	995000150	WILDLIFE GUARD E SERIES 6X
<b>Miscellaneous</b>		
Gas Toolsfor RL & N Series		
250	999700065	GAS FILL TOOL SF6 N & RL
251	999700050	GAS GAUGE RL SERIES 0-200KPA
U SeriesCVTs		
252	992000050	U SERIES EXTERNAL CVT KIT 3 PHASE
RL Motorpack		
253	994000245	RL2 - MA & FA MOTOR PACK V3 RETROFIT KIT (Replaces994000035)



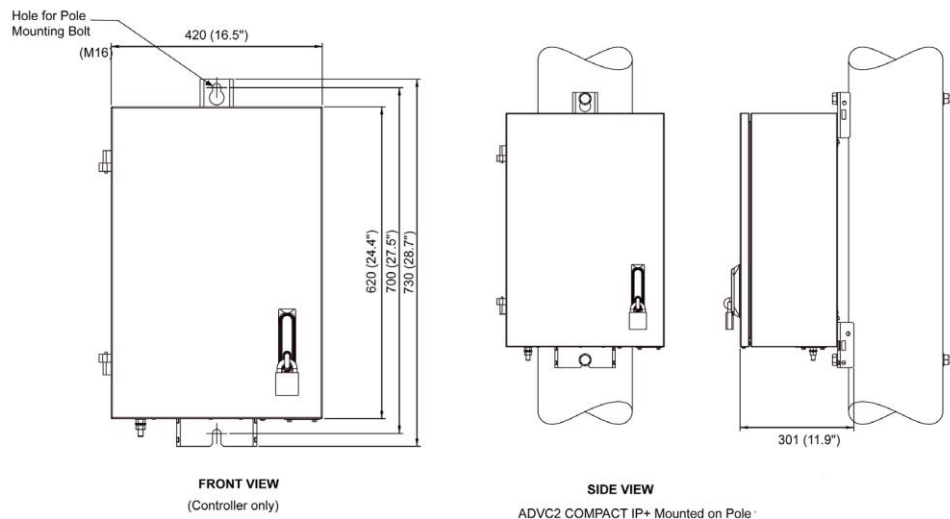
# Appendix B

## Dimensions

### ACR

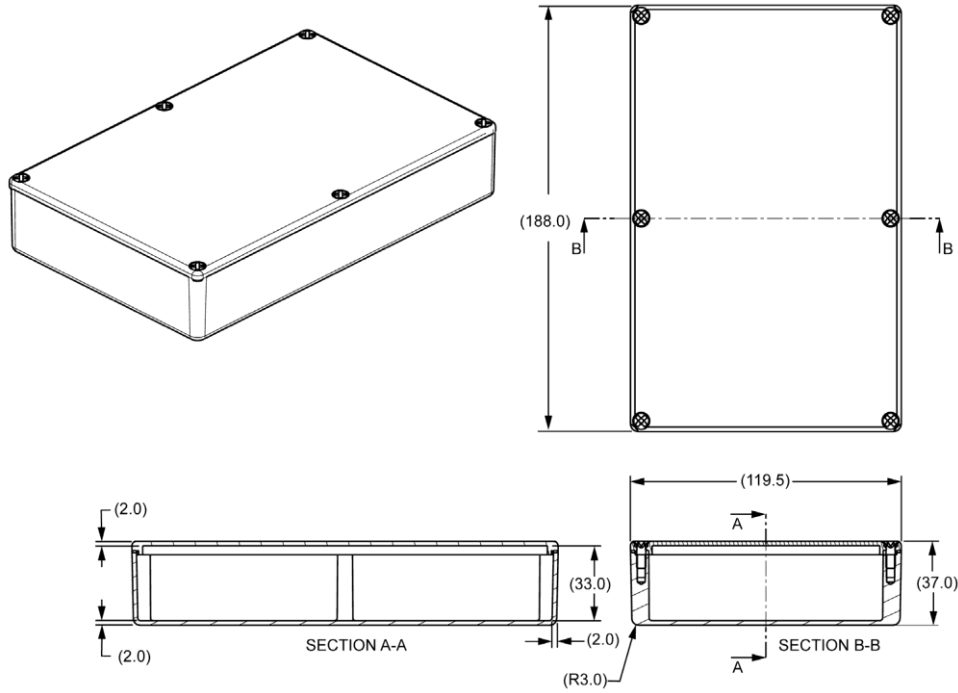


### ADVC COMPACT



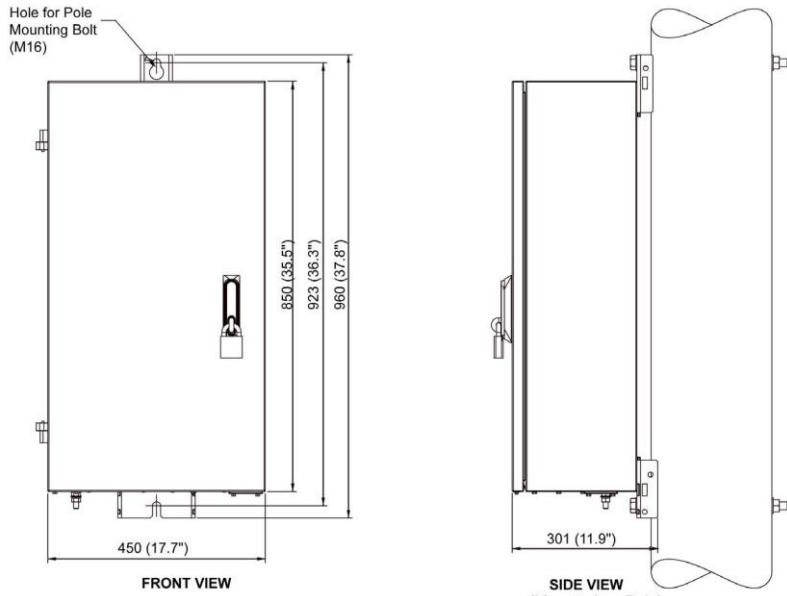
Front and Side View of ADVC COMPACT cubicle

**IOEX3**



IOEX 3 Dimensions

**ADVC ULTRA**



Front and Side View of ADVC ULTRA Cubicle



## A

**ACR**  
Automatic Circuit Recloser

**ADVC**  
ADVC Controller

## B

**BDU**  
Basic Display Unit

## C

**CAPE**  
Control and Protection Enclosure

**CT**  
Current Transformer

**CVT**  
Capacitive Voltage Transducer

## H

**HMI**  
Human Machine Interface

## L

**LCD**  
Liquid Crystal Display

**LED**  
Light Emitting Diode

## M

**MCB**  
Miniature Circuit Breaker

## O

**O.I**  
Operator Interface

**OCP**  
Operator Control Panel

## P

**PCOM**  
Protection and Communication Module

**PSSM**  
Power Supply and Switchgear Module

**PSU**

Power Supply Unit

**PTCC**

Pole Top Control Cubicle

**Q**

**QAK**

Quick Action Keys

**S**

**SCEM**

Switch Cable Entry Module

**SWG M**

Switchgear Module

**W**

**WSOS**

Windows Switchgear Operating System











**N00-809-00**

**Schneider Electric Industries SAS**

35, rue Joseph Monier

CS30323

F - 92506 Rueil Malmaison Cedex

*As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication.*