

Merlin Gerin

Genie*Evo* metalclad

MV switchgear 3.3-13.8kV

Selection guide



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Product overview

General presentation

GenieEvo offers a simple and flexible approach to switchgear with a wide choice of options covering all modern consumer applications.

The GenieEvo concept is an evolution from the extremely successful Genie philosophy which offers increased levels of flexibility and greater choice.

By allowing separate selection of the switchgear and protection and control modules. GenieEvo extends the concept of Genie by offering a gas free circuit breaker to the product portfolio.



The GenieEvo range of fixed pattern metalclad medium voltage switchgear has a compact metalclad design, with ratings up to 13.8kV, 25kA and 95kV BIL.

GenieEvo comprises

- Cast resin encapsulated MV system
- Demountable vacuum circuit breaker
- Controlled air, resin encapsulated series disconnector
- Flexible pre-engineered protection and control modules

The GenieEvo circuit breaker is a Schneider Electric design which offers main ON/OFF positions. The series disconnector has three positions (ON/ISOLATED/EARTH SELECT) which can only be selected when circuit breaker is in the OFF position. The integral cable test points are accessed through a convenient interlocked cover at the front of the unit.

GenieEvo offers 6 switchgear options and 18 protection and control module options, providing a total of 69 standard panel combinations.

Evolution

Launched in 1996 Genie met the demands of the modern market through its unique philosophy.



Fixed pattern

Offering the following customer benefits

- Reduced substation dimensions
 - Saving civil and land costs
- No racking mechanism
 - Fewer switchgear components
 - Easier to operate
 - No associated maintenance
 - Increased reliability
- No withdrawable isolation contacts
 - No associated maintenance
 - Fully encapsulated MV system
 - Increased reliability

Pre-engineered

Offering the following customer benefits

- Lower lead time
 - Reduced engineering at factory
 - Production line optimised for standard panels
 - Lower engineering time for client
- Lower selling costs
 - Reduced labour time during manufacture
 - Reduced contract engineering time
 - Manufacturing unit optimised for standard panels
- Less technical onus on client
 - Application based solutions
 - All information available pre-order
 - Schemes designed as a package solution



**GenieEvo embraces
this successful
formula utilising the
Schneider Electric
established Evolis
vacuum circuit
breaker.**

Product overview

General characteristics

Electrical characteristics - all equipment

Rated system voltage	13.8 kV
Impulse voltage withstand (1.2/50µs)	95 kV peak
Power frequency voltage withstand (1 min)	38 kV
Rated short time current (symm)	25 kA rms
Rated short time duration	3 seconds
Rated frequency	50/60 Hz
Busbar type	Copper single, cast resin insulated
Busbar ratings	630 A / 1250 A
Internal arc rating	Up to 25 kA for 1 second
AC class	AF
Partition class	SC2B-M

Electrical characteristics - circuit breaker equipment

Technology	Vacuum interrupter
Rated breaking current (symm)	25 kA
Rated peak making current	67.5 kA
Rated normal current	200A, 630 A, 1250A
Rated cable charging breaking current	25 A
Rated small inductive breaking current	10 A
Rated operating sequence	O - 0.3s - CO - 15s - CO
Mechanism charging time	< 10 seconds
Mechanism type	
Manual charge, stored energy, manual and electrical release	
Motor and manual charge, stored energy, manual and electrical release	

Electrical characteristics - series disconnecter

Technology	Sealed controlled air
Construction	Earth screened, cast resin encapsulation IP65
Rating	Off load device
Mechanism type	Dependent manual



Product overview

Genie*Evo*

The experience of a world leader

The guarantee of expertise

Schneider Electric has equipped medium voltage networks with switchgear and protection, monitoring and control solutions for over 40 years.

The Genie*Evo* benefits from the accumulated experience of an equipment base of over 100,000 functional units, 200,000 MV circuit breakers and 300,000 MV digital protection functions.

High electrical endurance

A magnetic field is applied in the axis of the vacuum interrupter contacts. This process maintains the arc in diffused mode even at high current values. It ensures optimal dispersion of the energy over the contact surface and avoids localised temperature rise.

The advantages of this technique are:

- A very compact vacuum interrupter
- Low energy dissipation of the arc in the vacuum interrupters

Evolis is in conformity with the highest electrical endurance class (IEC 60056: class E2).

High mechanical endurance

The magnetic field is generated by a patented outside coil which surrounds the contact area.

This solution has many advantages:

- A simplified and therefore reliable vacuum interrupter unit
- Heavy duty contacts which do not distort under repeated switching operations

This is the first time that a low voltage device control mechanism has been used on a medium voltage circuit breaker. The Masterpact control unit used on Evolis has the advantages of a system which has been proven for over 10 years in hundreds of thousands of installations.

Evolis is in conformity with the most demanding mechanical endurance class (IEC 60056: class M2).

Sealed for life disconnecter enclosure provides zero maintenance and maximum reliability

- High levels of operator safety and reliability are achieved through the isolators robust cast resin screened enclosure that offers:
- Safety; over pressure relief system that prevents injury to an operator
- High electrical endurance
- Reliability; insensitivity to atmospheric conditions
- Maintenance free technology
- High performance, low mechanical wear with main contact materials

The disconnecter is in conformity with mechanical endurance class (IEC 60056: class M1).

MV insulated systems

Encapsulated within cast resin, the system is virtually insensitive to ambient climate conditions offering benefits normally associated with gas insulated switchgear (GIS). An earth shielded system is also available.

Components include:

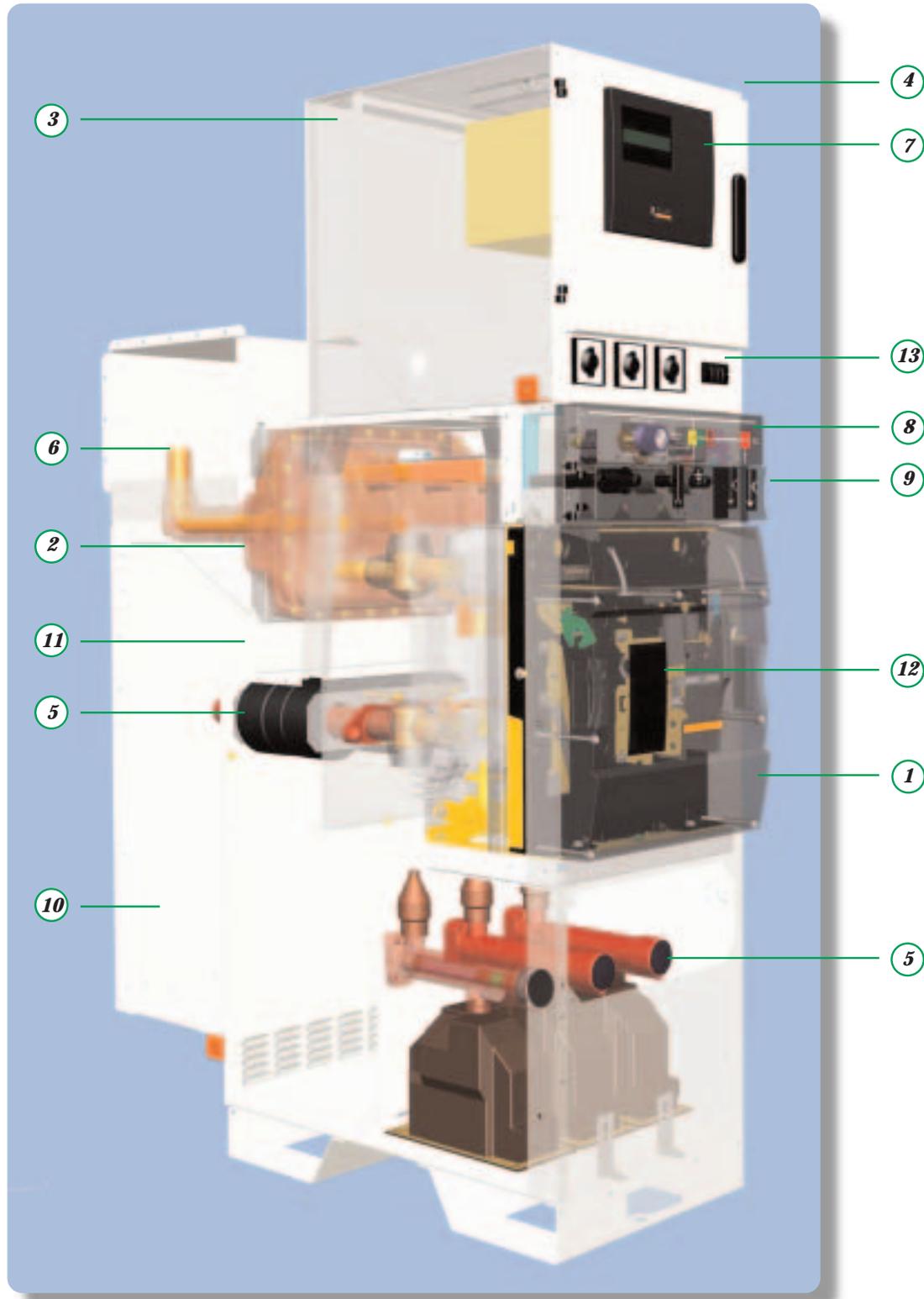
- Disconnecter enclosure (shielded as standard)
- Busbars
- Cable terminations
- Voltage transformers



Product overview

GenieEvo

Features at a glance

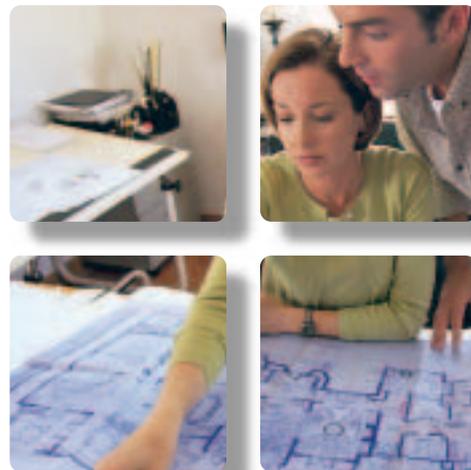


Genie's evolution is a result of valuable customer feedback and incorporates many improved features:

- 1 Vacuum circuit breaker
- 2 Controlled air disconnect
- 3 Top entry pilot box
- 4 Internal arc protection
- 5 CT and VT chambers
- 6 Cast resin insulated busbar system with optional earth shielding
- 7 Sepam multi functional protection and control unit
- 8 Unit fascia with active operating mimic display
- 9 Front access cable and vacuum test facility
- 10 Rear entry MV cable box (inverted option available)
- 11 Internal arc vented via dedicated trunking for complete operator safety
- 12 Mechanical operations counter
- 13 Circuit potential indicator as standard

The full GenieEvo range also benefits from:

- Separate selection of switchgear and protection and control modules for complete flexibility to meet the needs of any application
- Standard applications for embedded generation to the G59 standard, allowing the switchboard to be connected directly to the local utilities distribution network
- Designed, manufactured and assembled in compliance with ISO 9001 for the upmost quality and reliability of build
- Environmental production policies to ISO 14001 ensure the product is environmentally friendly
- Meets all necessary international standards: IEC 60044, IEC 60056, IEC 60255, IEC 60265, IEC 60694, BS 5311, EATS 41-36 and EATS 50-18



Product overview

PowerLogic®

Intelligent switchboard capability

Efficient monitoring and control

Schneider Electric PowerLogic is an advanced Electrical Network Management System (ENMS) with all the elements needed to monitor and control power in any installation. The system includes monitoring devices, interfaces, software, web solutions, support and consultancy.

PowerLogic integrates all the intelligent components of an electrical distribution system to enable users to reduce downtime, cut energy costs and help maintain power quality.

Using standard communications and powerful software, PowerLogic provides:

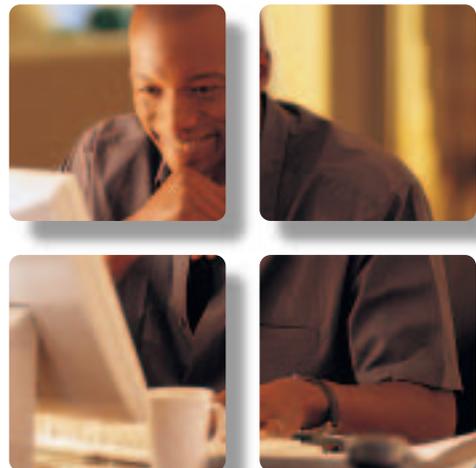
- Monitoring of power meters and analysers
- Real time monitoring
- Control of LV and MV circuit breakers and relays
- Monitoring of PLCs and other devices

Low cost of installation

- PowerLogic uses a buildings existing LAN (Local Area Network) infrastructure for data communications, avoiding the cost of new communication cables
- Networks can be monitored via standard web browser software such as Microsoft Internet Explorer or Netscape Navigator. This typically halves implementation costs by eliminating the need for PCs to be configured with bespoke client software
- Networks can be monitored and controlled from anywhere via the Internet. Users can stay in control from remote sites and even obtain text messages from the system on their mobile phone

Powerful monitoring and reporting

- Users can quickly analyse data through a wide variety of standard and user defined colour graphics and reports for power quality analysis. These include tables, bar charts, trend plots, graphs, visual alarms and meters. Single line diagrams, site plans and equipment drawings can also be incorporated
- Comprehensive historical data enables condition based maintenance programmes to be implemented to minimise downtime



Improved quality of supply and efficient management of energy costs are the key benefits of incorporating PowerLogic



PowerLogic uses System Management Software (SMS), a user friendly dependable operator interface.

SMS offers improved quality of supply and reliable information with the capability to understand and analyse events and loads.

Ease of operation, with the reassurance of continuity of service is provided by the fast intervention of remote control of the SMS switchboard, offering:

Flexible electrical historical database

- Data sharing from centralised open database
- Pre-defined typical billing and power quality logging templates
- Tabular viewing and trending of standard and user selectable qualities
- Multiple device quality comparison on same trend plot
- Historical data management archival and restoring

Integrated device support

- More than 1000 devices are supported per PowerLogic network server. Advanced open support for intelligent, compatible monitoring devices from other manufacturers displaying data, alarming, logging and manual control
- Complete online device setup for Schneider Electric supported devices
- Manual and automatic device resets eliminate redundant steps
- Manual control and setup of automatic onboard circuit monitor control

Real time power management

- Multi level network alarming
- Task execution(e-mail, paging, resets, file uploads) on schedule or upon alarm detection
- Pre-engineered real time data displays - tables, bar charts, meter panels
- Event recording and sorting that assist with troubleshooting of events sequence

Product overview

Integration protection, control and monitoring

Sepam

Genie*Evo* switchgear integrates Schneider Electric's proven Sepam system for advanced protection, control and monitoring.

Sepam offers comprehensive protection schemes and advanced control functions for even the most demanding application. For more basic applications such as cable and transformer feeders, the range also includes a lower specification device offering communications and fault recording capabilities coupled with overcurrent and earth fault protection.

Full integration achieves the highest level of system protection at a substantially reduced overall cost.

Sepam is a self contained unit and brings many advanced features. Sepam 2000 contains:

- Protection, metering, control, monitoring and annunciation functions
- Trip circuit supervision, logic selectivity, circuit breaker fail protection, intertripping and circuit breaker lockout
- Local indication of phase currents, maximum demand, line voltages, power factor, active and reactive power
- Integral analogue and digital disturbance recorder
- High level of electromagnetic compatibility
- High reliability from advanced self supervision systems
- Indication of phase and earth fault values at the time of tripping to aid fault analysis
- Simple to set and no routine maintenance help cut costs

The Sepam range

- **Sepam 1000+** is a numerical overcurrent and earth fault protection relay used for applications not needing complex protection and control schemes
- **Sepam 2000** is a numerical multi function unit that provides all the functions generally found in a MV control cabinet

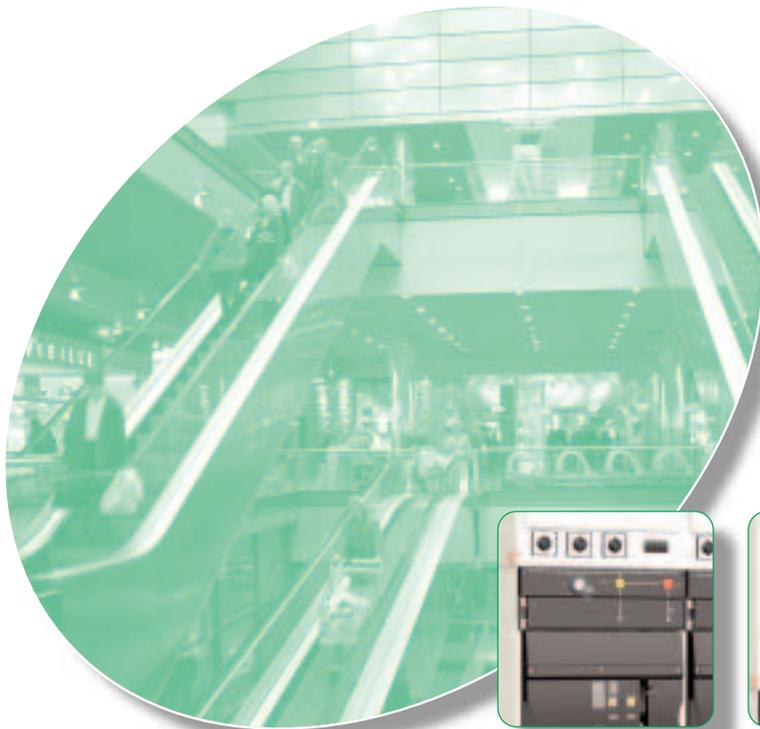


Section two

Introduction to the selection guide 16

How to choose standard panels 18

Selection flow chart 19



Introduction

How to select the panel type for your application

Introduction to the GenieEvo selection guide circuit breaker module specification

This section is designed to assist you with the selection of the circuit breaker module for your MV network distribution systems.

Standard circuit breaker modules allow easy product selection and specification.

Protection and control module specification

This section is designed to assist you with the selection of the protection and control module for your MV distribution network.

All protection and control modules are available as standard panel types to allow easy product selection and specification.

What is a circuit breaker and protection and control module?

All GenieEvo panels are available as a standard panel type. This is a simple model designation that allows easy selection for specific applications.

The standard panel type philosophy enables us to streamline the factory production facilities to give you:

- Best delivery
- Competitive price
- High quality
- Comprehensive documentation
- High level of flexibility

Circuit breaker protection and control module specifications

Each module has a detailed specification page. This includes all details of application, standard features and options available to customise equipment to suit your requirements. Use of the options and standard modules ensure we are able to give you the best delivery.

Drawings

- The installation diagrams for each GenieEvo panel type are included from page 95 of this selection guide to allow you to prepare your foundations before delivery
- Reference to drawings for each panel type is shown on each specification page

What do I do if I want something different?

- If the GenieEvo panel type you require is not listed, please contact your local Schneider Electric representative. We manufacture other equipment that can be customised to suit your requirements. If we are unable to provide your exact requirement with GenieEvo

Step 1 - Network function

This section assists you in the selection of a circuit breaker module reference which relates to your network function.

Select the network function requirements

- VC - circuit breaker
- VB - bus section

Select the current rating requirements

- 2 - 200 Amp
- 6 - 630 Amp
- 12 - 1250 Amp

Select the optional items associated with the circuit breakers

- Voltage transformers
- Metering/instrument current transformers
- Motor mechanism etc...

Step 2 - Application

This section assists you in the selection of the protection and control reference which relates to your application.

Select your Network application

- Transformers feeder/Incomer
- Cable feeder/Incomer
- Embedded generation feeder/Incomer
- Miscellaneous

Select your protection and control module requirements

- P1 General purpose feeder or incomer
- P2 Transformer feeder
- P3 Cable feeder with advanced monitoring and control
- P4 Unit protected cable feeder
- P5 Unit protected cable feeder with back up overcurrent and measurement
- P6 Unit protected cable feeder with back up overcurrent and power measurement
- P7 Single transformer incomer
- P8 Cable feeder or incomer with full measurement (suitable for automatic changeover)
- P9 Parallel cable feeder or incomer with directional overcurrent and earth fault
- P10 Parallel dual transformer incomer
- P11 Control logic for 2 out of 3 changeover scheme (fitted to bus section)
- P12 Interconnection breaker (G59 power export)
- P13 Interconnection breaker (G59 no power export)
- P14 REC metering for embedded generation
- P15 Transformer incomer for LV generator
- P16 MV generator incomer
- P17 Basic circuit breaker control no protection
- P18 Control logic for 1 out of 2 change over scheme

Complete Functional Design Specifications (FDS) are available for each of the above protection and control modules. These provide all information, control philosophy and signalling function



Introduction

How to select the panel type for your application

Select the optional items associated with the protection and control modules

- Transducer
- Power meter
- Serial communications etc...

Example:

A GenieEvo feeder for a 2 MVA, 11 KV transformer

(primary current 104 Amps) vacuum breaker current rating 200 Amps = VC2

Protection and control module = P2

Recommended panel reference = VC2 - P2

Note:

Please refer to the recommended panel combinations on page 41 of this selection guide to ensure your required protection and control module is available with your selected circuit breaker module. If the standard modules do not cover your requirements please consult Schneider Electric.

Step 3 - Accessories

This section details the type of accessories that are available on your selected GenieEvo panel type.

Select your accessories

- Gland plates
- Key interlocks
- Phase comparitors

Step 4 - Quotation request form

We have included a form which can be found at the rear of this document to assist you in the compilation of your requirements.

Once completed it can be sent to the address below and a quotation will be forwarded to you.

Schneider Electric Limited

Merlin Gerin Medium Voltage

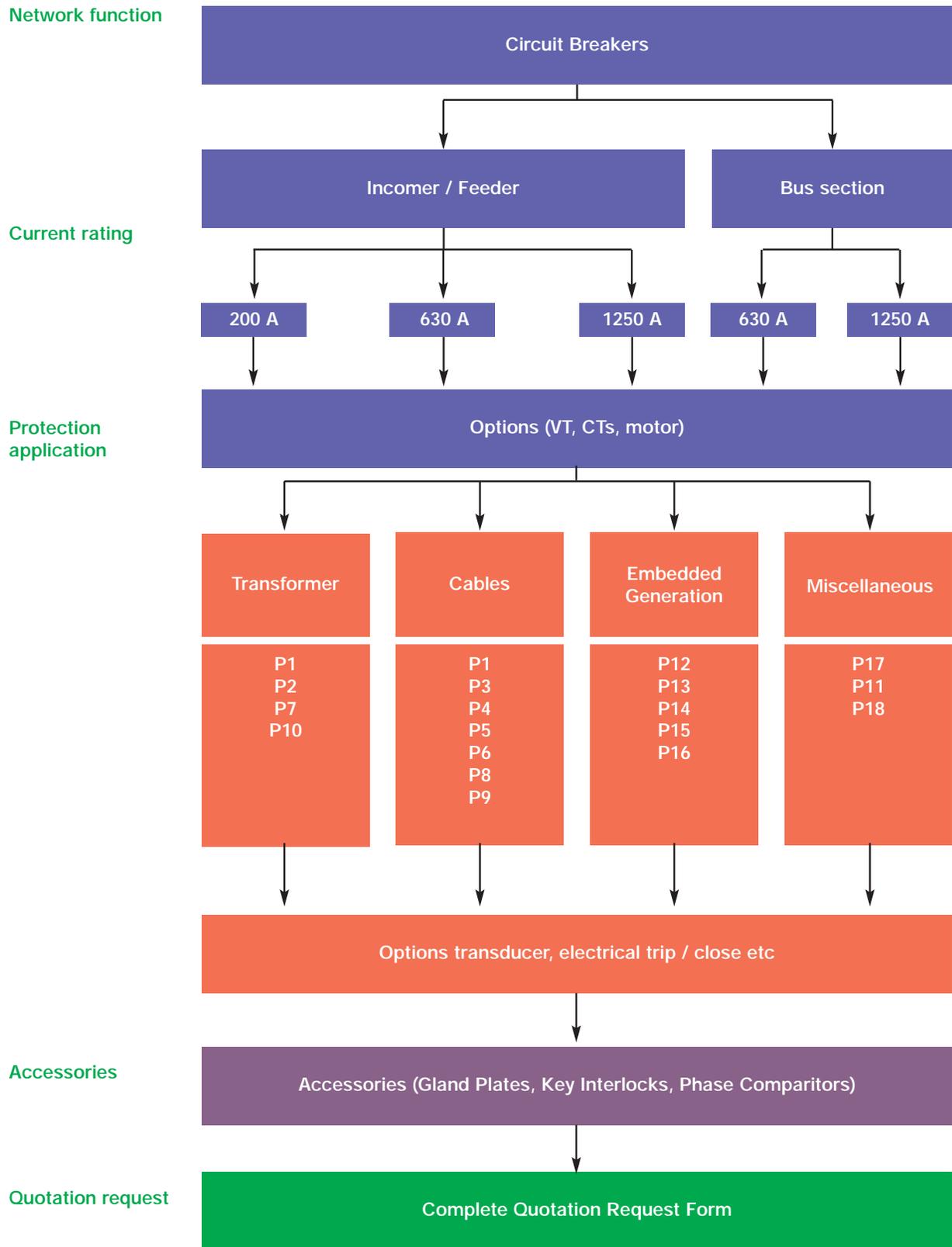
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Leeds LS10 1BS

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Network functions

Summary tables

Incomers/feeders

Circuit breaker module type		VC2	VC6	VC12
Page No.		28	30	32
Environment				
Indoor		■	■	■
IP3X (as standard)		■	■	■
Ratings				
Busbar current rating (630 Amp)		□	□	□
Busbar current rating (1250 Amp)		□	□	□
Circuit breaker normal rated current		200 A	630 A	1250 A
Highest system voltage		15.5 kV	15.5 kV	15.5 kV
Rated Voltage		13.8 kV	13.8 kV	13.8 kV
Service voltage 3.3, 6.6, 11, 13.8 kV		■	■	■
Rated BIL		95 kV	95 kV	95 kV
Rated frequency		50/60 Hz	50/60 Hz	50/60 Hz
Rated internal arc (1 sec)		25 kA	25 kA	25 kA
Rated breaking capacity		25 kA	25 kA	25 kA
Rated making capacity		67.5 kA	67.5 kA	67.5 kA
Rated short circuit withstand current		Main circuit	25 kA	25 kA
		Earth circuit	25 kA	25 kA
Circuit breaker mechanism				
Manual charge, stored energy, manual and electrical release		■	■	■
Motor and manual charge, stored energy, manual and electrical release		□	□	□
Current transformers ⁽¹⁾				
Protection Sepam	Ratio	200/100/1 A	600/300/1 A	1250/800/1 A
	Class	5P20	5P20	5P20
	Burden	2.5 VA	2.5 VA	2.5 VA
Protection (pilot wire differential) ⁽²⁾	Ratio	400/300/5 A	400/300/5 A	800/1 A
	Class	x	x	x
	Knee point	60/45 V	60/45 V	191 V
	CT resistance	0.2 Ω/0.16 Ω	0.2 Ω/0.16 Ω	4.2 Ω
	Instrumentation ⁽²⁾	Ratio	200/100/1 A	600/300/1 A
Metering ⁽²⁾	Class	1.0	1.0	1.0
	Burden	5 VA	5 VA	5 VA
	Ratio	200/100/5 A ⁽³⁾	600/300/5 A ⁽³⁾	1200/800/5 A
	Ratio		400/200/5 A ⁽³⁾	400/200/5 A ⁽³⁾
	Burden	7.5 VA	7.5 VA	7.5 VA
Voltage transformers				
Circuit connected		□	□	□
Service voltage 3.3, 6.6, 11, 13.8 kV	Ratio	Service voltage/110 V √3		
	Class	0.5/3P	0.5/3P	0.5/3P
	Burden	50 VA	50 VA	50 VA
	BIL	60 kV or 95 kV ⁽⁴⁾	60 kV or 95 kV ⁽⁴⁾	60 kV or 95 kV ⁽⁴⁾
	Fused link	■	■	■
Construction				
Dimensions (mm)		W x H x D		
Standard		500 x 1900 x 1200		
Front access space required for mechanical charging		735	735	735
Maximum weight (kg)		450 Max.	450 Max.	450 Max.
Rear access for cable termination		600	600	600

Circuit breaker module type		VC2	VC6	VC12
Page No.		28	30	32
Circuit breaker electrical control				
Trip coil	24 V DC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	30 V DC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	48 V DC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	110 V DC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Close coil	24 V DC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	30 V DC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	48 V DC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	110 V DC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Motorised stored energy	24 V DC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	48 V DC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	110 V DC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	220 V DC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	230 V AC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Indication				
Mechanical circuit breaker ON/OFF		■	■	■
Mechanical disconnecter MAIN/ISOLATED/EARTH SELECT		■	■	■
Neon indication facility 3.3 - 13.8 kV		■	■	■
Auxiliary contacts 4NO and 4NC spare for customer use		■	■	■
Test facility				
Integral cable test/earth facility		■	■	■
Standard features				
Operating handle - series disconnecter ⁽⁶⁾		■	■	■
Mechanical operations counter - circuit breaker		■	■	■
Main cable box ⁽⁵⁾				
Bottom entry	1 x 3c up to 300 mm or 3 x 1c up to 630 mm ²	<input type="checkbox"/>	<input type="checkbox"/>	
	2 x 3c up to 300 mm or 6 x 1c up to 630 mm ²	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Top entry	1 x 3c up to 300 mm or 3 x 1c up to 630 mm ²	<input type="checkbox"/>	<input type="checkbox"/>	
	2 x 3c up to 300 mm or 6 x 1c up to 630 mm ²	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Key ■ Standard feature □ Optional feature

- (1) Not every circuit breaker has all these CTs fitted it depends on the protection and control model selected. See page 43 for protection and control module details.
- (2) If the standard CT ratios quoted do not suit your network requirements please consult us.
- (3) Please advise which CT ratio quoted is required at order placement.
- (4) BIL is inline with the IEC 60185 standard for voltage transformers, i.e. 3.3 and 6.6 kV = 60 kV, 11 and 13.8 kV = 95 kV.
- (5) A choice of glands and gland plates are available to suit your cable requirements. See page 71 for accessories.
- (6) One supplied per switchboard.

Network functions

Summary tables

Bus sections

Circuit breaker module type		VB6	VB12
Page No.		34	36
Environment			
Indoor		■	■
IP3X (as standard)		■	■
Ratings			
Busbar current rating (630 Amp)		<input type="checkbox"/>	<input type="checkbox"/>
Busbar current rating (1250 Amp)		<input type="checkbox"/>	<input type="checkbox"/>
Circuit breaker normal rated current		630 A	1250 A
Highest system voltage		15.5 kV	15.5 kV
Rated Voltage		13.8 kV	13.8 kV
Service voltage 3.3, 6.6, 11, 13.8 kV		■	■
Rated BIL		95 kV	95 kV
Rated frequency		50/60 Hz	50/60 Hz
Rated internal arc (1 sec)		25 kA	25 kA
Rated breaking capacity		25 kA	25 kA
Rated making capacity		67.5 kA	67.5 kA
Rated short circuit withstand current		Main circuit	25 kA
		Earth circuit	25 kA
Circuit breaker mechanism			
Manual charge, stored energy, manual and electrical release		■	■
Motor and manual charge, stored energy, manual and electrical release		■	■
Current transformers ⁽¹⁾			
Protection Sepam	Ratio	600/300/1 A	1250/800/1 A
	Class	5P20	5P20
	Burden	2.5 VA	2.5 VA
Instrumentation ⁽²⁾	Ratio	600/300/1 A	1250/800/1 A
	Class	1.0	1.0
	Burden	5 VA	5 VA
Metering ⁽²⁾	Ratio	600/300/5 A ⁽³⁾	1200/800/5 A
	Ratio	400/200/5 A ⁽³⁾	
	Class	0.5 s	0.5 s
	Burden	7.5 VA	7.5 VA
Voltage transformers			
Busbar connected		<input type="checkbox"/>	<input type="checkbox"/>
Service voltage 3.3, 6.6, 11, 13.8 kV	Ratio	Service voltage/110 V √3	
	Class	0.5/3P	0.5/3P
	Burden	50 VA	50 VA
	BIL	60 kV or 95 kV ⁽⁵⁾	
	Fused link	■	■
Construction			
Dimensions (mm)		W x H x D	
		Standard	
Standard		1000 x 1900 x 1200	
Front access space required for mechanical charging		735	735
Maximum weight (kg)		500 Max.	500 Max.

Circuit breaker module type		VB6	VB12
Page No.		34	36
Circuit breaker electrical control			
Trip coil	24 V DC	<input type="checkbox"/>	<input type="checkbox"/>
	30 V DC	<input type="checkbox"/>	<input type="checkbox"/>
	48 V DC	<input type="checkbox"/>	<input type="checkbox"/>
	110 V DC	<input type="checkbox"/>	<input type="checkbox"/>
Close coil	24 V DC	<input type="checkbox"/>	<input type="checkbox"/>
	30 V DC	<input type="checkbox"/>	<input type="checkbox"/>
	48 V DC	<input type="checkbox"/>	<input type="checkbox"/>
	110 V DC	<input type="checkbox"/>	<input type="checkbox"/>
Motorised stored energy	24 V DC	<input type="checkbox"/>	<input type="checkbox"/>
	30 V DC	<input type="checkbox"/>	<input type="checkbox"/>
	48 V DC	<input type="checkbox"/>	<input type="checkbox"/>
	110 V DC	<input type="checkbox"/>	<input type="checkbox"/>
	220 V DC	<input type="checkbox"/>	<input type="checkbox"/>
	230 V AC	<input type="checkbox"/>	<input type="checkbox"/>
Indication			
Mechanical circuit breaker ON/OFF		■	■
Mechanical disconnecter MAIN/ISOLATED/EARTH SELECT		■	■
Neon indication facility 3.3 - 13.8 kV both RHS and LHS busbars		■	■
Auxiliary contacts 4NO and 4NC spare for customer use		■	■
Test facility			
Integral right and left hand busbar test/earth facility		■	■
Standard features			
Operating handle - series disconnecter ⁽⁶⁾		■	■
Mechanical operations counter - circuit breaker			

Key ■ Standard feature □ Optional feature

(1) Not every circuit breaker has all these CTs fitted, it depends on the protection and control model selected. See page 43 for protection and control module details.

(2) If the standard CT ratios quoted do not suit your network requirements please consult us.

(3) Please advise which CT ratio is required at order placement.

(4) Busbar VTs can only be fitted to the right hand side busbar of a bus section panel, left hand side shall be achieved via a separate busbar earth panel. (BBM)

(5) BIL is inline with the IEC 60185 standard for voltage transformers, i.e. 3.3 and 6.6 kV = 60 kV, 11 and 13.8 kV = 95 kV.

(6) One supplied per switchboard.

Network functions

Summary tables

Busbar metering

Module type		BBM
Page No.		38
Environment		
Indoor		■
IP3X (as standard)		■
Rating		
Busbar current rating (630 Amp)		□
Busbar current rating (1250 Amp)		□
Highest system voltage		15.5 kV
Rated Voltage		13.8 kV
Service voltage 3.3, 6.6, 11, 13.8 kV		■
Rated BIL		95 kV
Rated frequency		50/60 Hz
Rated internal arc (1 sec)		25 kA
Current transformers ⁽¹⁾		
Instrumentation ⁽²⁾	Ratio	600/300/1 A
	Class	1.0
	Burden	5 VA
Metering ⁽²⁾	Ratio	1200/800/5 A ⁽²⁾
	Ratio	600/300/5 A ⁽²⁾
	Ratio	400/200/5 A ⁽²⁾
	Ratio	200/100/5 A ⁽²⁾
	Class	0.5 s
	Burden	7.5 VA

Key ■ Standard feature □ Optional feature

Voltage transformers		
Busbar connected		■
Service voltage 3.3, 6.6, 11, 13.8 kV	Ratio	Service voltage/110 V $\sqrt{3}$
	Class	0.5/3P
	Burden	60 kV or 50 VA
	BIL	60 kV or 95 kV ⁽³⁾
	Fused link	■
Construction		
Dimensions (mm)		W x H x D
	Standard	500 x 1200 x 1900 ⁽¹⁾
Front access space required for VT fuse isolation		735
Maximum weight (kg)		250 Max.
Indication		
Neon indication facility 3.3 - 13.8 kV		■
Key ■ Standard feature □ Optional feature		

(1) If busbar current transformers are required, the width of the busbar metering chamber increases to 1000mm.

If the standard CT ratios quoted do not suit your network requirements please consult us.

(2) Please advise which CT ratios quoted is required at order placement.

(3) BIL is inline with the IEC 60185 standard for voltage transformers, i.e. 3.3 and 6.6 kV = 60 kV, 11 and 13.8 kV = 95 kV.



Network functions

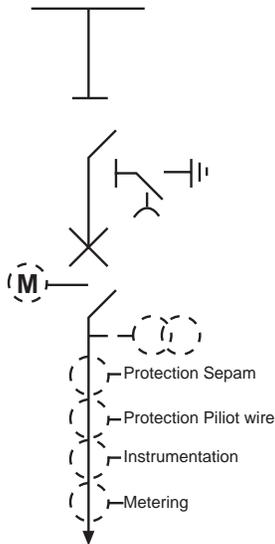
Circuit breakers

VC2 incomer/feeder

Application

Circuit breaker module for feeder/incomer network applications up to 3.8MVA@11kV within MV/MV utility, consumer and industrial substations.

Incorporating appropriate rated current and voltage transformers for protection, monitoring or metering and control of the network distribution system.



Circuit breaker mechanism

Independent manual stored energy

Ratings

Busbar current	630 A, 1250 A
Normal current	200 A
Highest system voltage	15.5 kV
Rated voltage	13.8 kV
Service voltage	3.3, 6.6, 11 and 13.8 kV
Rated B.I.L	95 kV
Rated internal arc	25 kA (1 sec)
Frequency	50/60 Hz
Rated breaking	25 kA
Rated making capacity	67.5 kA
Short time withstand current	Main 25 kA (3 secs) Earth 25 kA (3 secs)

Environment

Location	Indoor, IP3X
Ambient temperature	-5°C to +40°C
Altitude	up to 1000 m

For values outside these ranges please contact Schneider Electric

Protection/instrumentation/metering and indication

Current transformers

Protection - Sepam	200/100/1 A
Class	5P20
Burden	2.5 VA

Optional current transformers

Protection - Pilot wire differential	400/300/5 A
Class	X
Knee point	60/45 V
CT resistance	0.2 / 0.16Ω
Instrumentation	200/100/1 A
Class	1.0
Burden	5 VA
Metering - Tariff	200/100/5 A
Class	0.5 s
Burden	7.5 VA

If the optional CTs do not suit your network requirements please consult us.

Voltage transformer - circuit

MV protection	Fused
Service voltage	3.3, 6.6, 11 and 13.8 kV
Secondary voltage	110 V √3
Class	0.5/3 P
Burden	50 VA
Impulse voltage	60/95 kV

Indications

Vacuum circuit breaker	Main on/off
Series disconnector	Main select
	Isolated
	Earth select
Mechanical operations counter	
Spare volt free auxiliary contacts 4NO and 4NC	
Provision for live line indication	

Standard options

Optional accessories	
Trip and close coil voltage ratings	DC: 24 V, 30 V, 48 V, 110 V
Mechanism motorisation - c.b.	DC: 24 V, 30 V, 48 V, 110 V, 220 V
Voltage ratings	AC: 110 V, 230 V
Key type interlocks	
Earth on key free, earth off key trapped	
Main off key free, main on key trapped	
Please consult us for any other key interlocking requirements	

Cabling

MV cabling and glands

Standard cable box	Bottom entry
Optional cable box	Inverted entry
Cable sizes	1 x 3 core up to 300 mm ² or 2 x 3 core up to 300 mm ² 3 x 1 core up to 630 mm ² or 6 x 1 core up to 630 mm ²

Refer to accessories on page 71 for the following

Glands and glands plates	
2 cables/phase	

MV insulation systems

Busbars

Standard	Cast resin
Optional	Earth screened

Voltage transformers

Standard	Cast resin
Optional	Earth screened

Cable terminations

Standard	Cast resin
Optional	Earth screened

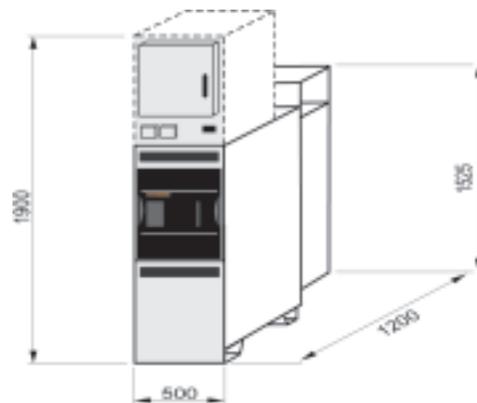
Cable termination kits can be provided if required

Accessories

Refer to page 71

Documents

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Network functions

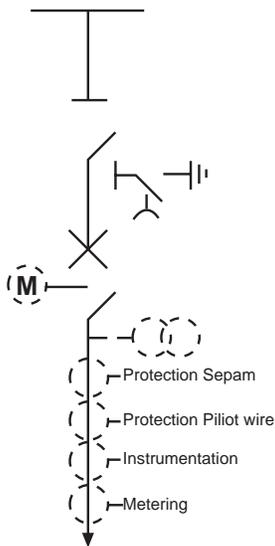
Circuit breakers

VC6 incomer/feeder

Application

Circuit breaker module for feeder/incomer network applications up to 12MVA@11kV within MV/MV utility, consumer and industrial substations.

Incorporating appropriate rated current and voltage transformers for protection, monitoring or metering and control of the network distribution system.



Circuit breaker mechanism

Independent manual stored energy

Ratings

Busbar current	630 A, 1250 A
Normal current	630 A
Highest system voltage	15.5 kV
Rated voltage	13.8 kV
Service voltage	3.3, 6.6, 11 and 13.8 kV
Rated B.I.L	95 kV
Rated internal arc	25 kA (1 sec)
Frequency	50/60 Hz
Rated breaking	25 kA
Rated making capacity	67.5 kA
Short time withstand current	Main 25 kA (3 secs) Earth 25 kA (3 secs)

Environment

Location	Indoor, IP3X
Ambient temperature	-5°C to +40°C
Altitude	up to 1000 m

For values outside these ranges please contact Schneider Electric

Protection/instrumentation/metering and indication

Current transformers

Protection - Sepam	600/300/1 A
Class	5P20
Burden	2.5 VA

Optional current transformers

Protection - pilot wire differential	400/300/5 A
Class	X
Knee point	60/45 V
CT resistance	0.2 / 0.16Ω
Instrumentation	600/300/5 A
Class	1.0
Burden	5 VA
Metering - Tariff	600/300/5 A or 400/200/5 A
Class	0.5 s
Burden	7.5 VA

If the optional CTs do not suit your network requirements please consult us

Voltage transformer - circuit

MV protection	Fused
Service voltage	3.3, 6.6, 11 and 13.8 kV
Secondary voltage	110 V √3
Class	0.5/3 P
Burden	50 VA
Impulse voltage	60/95 kV

Indications

Vacuum circuit breaker	Main on/off
Series disconnector	Main select
	Isolated
	Earth select
Mechanical operations counter	
Spare volt free auxiliary contacts 4NO and 4NC	
Provision for live line indication	

Standard options

Optional accessories	
Trip and close coil voltage ratings	DC: 24 V, 30 V, 48 V, 110 V
Mechanism motorisation - c.b. voltage ratings	DC: 24 V, 30 V, 48 V, 110 V, 220 V AC: 230 V
Key type interlocks	
Earth on key free, earth off key trapped	
Main off key free, main on key trapped	
Please consult us for any other key interlocking requirements	

Cabling

MV cabling and glands

Standard cable box	Bottom entry
Optional cable box	Inverted entry
Cable sizes	1 x 3 core up to 300 mm ² or 2 x 3 core up to 300 mm ² 3 x 1 core up to 630 mm ² or 6 x 1 core up to 630 mm ²

Refer to accessories on page 71 for the following

Glands and glands plates

2 cables/phase

MV insulation systems

Busbars

Standard	Cast resin
Optional	Earth screened

Voltage transformers

Standard	Cast resin
Optional	Earth screened

Cable terminations

Standard	Cast resin
Optional	Earth screened

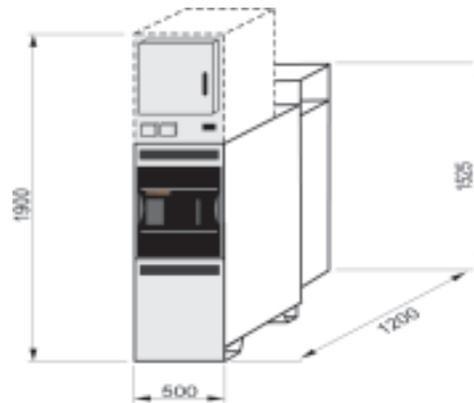
Cable termination kits can be provided if required

Accessories

Refer to page 71

Documents

Installation drawing ref. GDVINST-01 page 96



Network functions

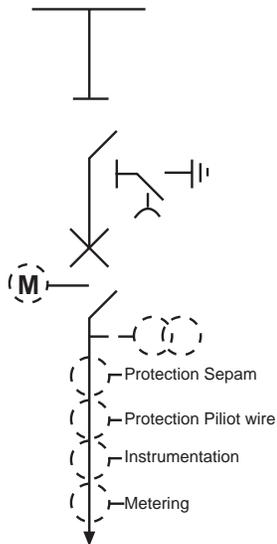
Circuit breakers

VC12 incomer/feeder

Application

Circuit breaker module for feeder/incomer network applications up to 24MVA@11kV within MV/MV utility, consumer and industrial substations.

Incorporating appropriate rated current and voltage transformers for protection, monitoring or metering and control of the network distribution system.



Circuit breaker mechanism

Independent manual stored energy

Ratings

Busbar current	630 A, 1250 A
Normal current	1250 A
Highest system voltage	15.5 kV
Rated voltage	13.8 kV
Service voltage	3.3, 6.6, 11 and 13.8 kV
Rated B.I.L	95 kV
Rated internal arc	25 kA (1 sec)
Frequency	50/60 Hz
Rated breaking	25 kA
Rated making capacity	67.5 kA
Short time withstand current	Main 25 kA (3 secs) Earth 25 kA (3 secs)

Environment

Location	Indoor, IP3X
Ambient temperature	-5°C to +40°C
Altitude	up to 1000 m

For values outside these ranges please contact Schneider Electric

Protection/instrumentation/metering and indication

Current transformers

Protection - Sepam	1250/800/1 A
Class	5P20
Burden	2.5 VA

Optional current transformers

Protection - pilot wire differential:	800/1 A
Class	X
Knee point	191 V
CT resistance	4.2Ω
Instrumentation	1250/800/1 A
Class	1.0
Burden	5 VA
Metering - Tariff	1200/800/5 A
Class	0.5 s
Burden	7.5 VA

If the optional CTs do not suit your network requirements please consult us.

Voltage transformer - circuit

MV protection	Fused
Service voltage	3.3, 6.6, 11 and 13.8 kV
Secondary voltage	110 V $\sqrt{3}$
Class	0.5/3 P
Burden	50 VA
Impulse voltage	60/95 kV

Indications

Vacuum circuit breaker	Main on/off
Series disconnecter	Main select
	Isolated
	Earth select
Mechanical operations counter	
Spare volt free auxiliary contacts 4NO and 4NC	
Provision for live line indication	

Standard options

Optional accessories	
Trip and close coil voltage ratings	DC: 24 V, 30 V, 48 V, 110 V
Mechanism motorisation - c.b. voltage ratings	DC: 24 V, 30 V, 48 V, 110 V, 220 V AC: 110 V, 230 V
Key type interlocks	
Earth on key free, earth off key trapped	
Main off key free, main on key trapped	
Please consult us for any other key interlocking requirements	

Cabling

MV cabling and glands

Standard cable box	Bottom entry
Optional cable box	Inverted entry
Cable sizes	1 x 3 core up to 300 mm ² or 2 x 3 core up to 300 mm ² 3 x 1 core up to 630 mm ² or 6 x 1 core up to 630 mm ²

Refer to accessories on page 71 for the following

Glands and glands plates

2 cables/phase

MV insulation systems

Busbars

Standard	Cast resin
Optional	Earth screened

Voltage transformers

Standard	Cast resin
Optional	Earth screened

Cable terminations

Standard	Cast resin
Optional	Earth screened

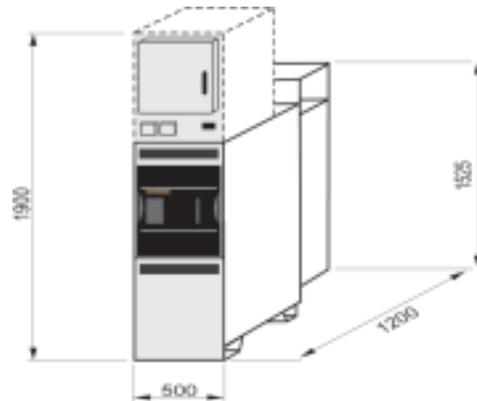
Cable termination kits can be provided if required

Accessories

Refer to page 71

Documents

Installation drawing ref. GDVINST-01 page 96



Network functions

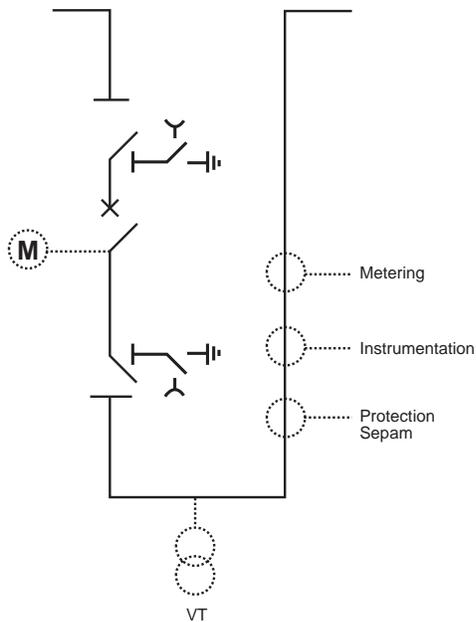
Bus sections

VB6 bus section

Application

Circuit breaker module for bus section applications up to 12MVA@11kV within MV/MV utility, consumer and industrial substations.

Incorporating appropriate rated current and voltage transformers for protection, monitoring or metering and control of the network distribution system.



Circuit breaker mechanism

Independent manual stored energy

Ratings

Busbar current	630 A
Normal current	630 A
Highest system voltage	15.5 kV
Rated voltage	13.8 kV
Service voltage	3.3, 6.6, 11 and 13.8 kV
Rated B.I.L	95 kV
Rated internal arc	25 kA (1 sec)
Frequency	50/60 Hz
Rated breaking	25 kA
Rated making capacity	67.5 kA
Short time withstand current	Main 25 kA (3 secs) Earth 25 kA (3 secs)

Environment

Location	Indoor, IP3X
Ambient temperature	-5°C to +40°C
Altitude	up to 1000 m

For values outside these ranges please contact Schneider Electric

Protection/instrumentation/metering and indication

Current transformers

Protection - Sepam	600/300/1 A
Class	5P20
Burden	2.5 VA

Optional current transformers

Instrumentation	600/300/1 A
Class	1.0
Burden	5 VA
Metering - Tariff	600/300/5 A
	400/200/5 A
Class	0.5 s
Burden	7.5 VA

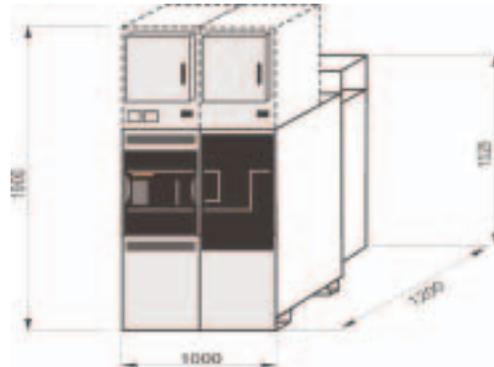
If the optional CTs do not suit your network requirements please consult us.

Voltage transformer - busbar

MV protection	Fused
Service voltage	3.3, 6.6, 11 and 13.8 kV
Secondary voltage	110 V $\sqrt{3}$
Class	0.5/3 P
Burden	50 VA
Impulse voltage	60/95 kV

Indications

Vacuum circuit breaker	Main on/off
LHS disconnector	Main select
	Isolated
	RHS earth select
RHS disconnector	Main select
	Isolated
	LHS earth select
Mechanical operations counter	
Spare volt free auxiliary contacts 4NO and 4NC	
Provision for live line indication	



Standard options

Optional accessories

Trip and close coil voltage ratings	DC: 24 V, 30 V, 48 V, 110 V
Mechanism motorisation - c.b. voltage ratings	DC: 24 V, 30 V, 48 V, 110 V, 220 V AC: 110 V, 230 V
Key type interlocks	
Main off key free, main on key trapped	
Please consult us for any other key interlocking requirements.	

MV insulation systems

Busbars

Standard	Cast resin
Optional	Earth screened

Voltage transformers

Standard	Cast resin
Optional	Earth screened

Accessories

Refer to page 71

Documents

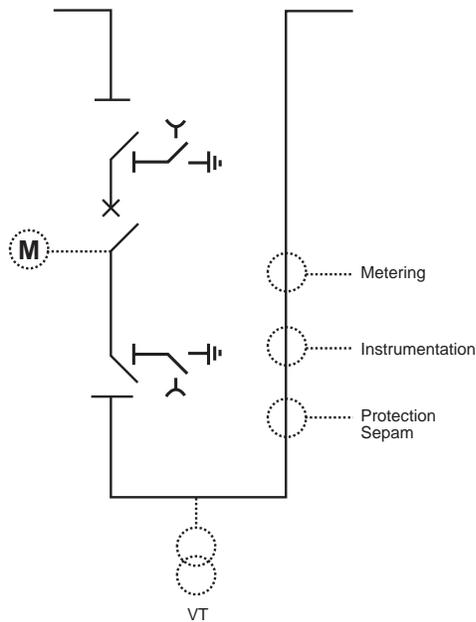
Installation drawing ref. GDVINST-02 page 98

VB12 bus section

Application

Circuit breaker module for bus section applications up to 24MVA@11kV within MV/MV utility, consumer and industrial substations.

Incorporating appropriate rated current and voltage transformers for protection, monitoring or metering and control of the network distribution system.



Circuit breaker mechanism

Independent manual stored energy

Ratings

Busbar current	1250 A
Normal current	1250 A
Highest system voltage	15.5 kV
Rated voltage	13.8 kV
Service voltage	3.3, 6.6, 11 and 13.8 kV
Rated B.I.L	95 kV
Rated internal arc	25 kA (1 sec)
Frequency	50/60 Hz
Rated breaking	25 kA
Rated making capacity	67.5 kA
Short time withstand current	Main 25 kA (3 secs) Earth 25 kA (3 secs)

Environment

Location	Indoor, IP3X
Ambient temperature	-5°C to +40°C
Altitude	up to 1000 m

For values outside these ranges please contact Schneider Electric

Protection/instrumentation/metering and indication

Current transformers

Protection - Sepam	1250/800/1 A
Class	5P20
Burden	2.5 VA

Optional current transformers

Instrumentation	1250/800/1 A
Class	1.0
Burden	5 VA
Metering - Tariff	1200/800/5 A
Class	0.5 s
Burden	7.5 VA

If the optional CTs do not suit your network requirements please consult us.

Voltage transformer - busbar

MV protection	Fused
Service voltage	3.3, 6.6, 11 and 13.8 kV
Secondary voltage	110 V $\sqrt{3}$
Class	0.5/3 P
Burden	50 VA
Impulse voltage	60/95 kV

Indications

Vacuum circuit breaker	Main on/off
LHS disconnector	Main select
	Isolated
	RHS earth select
RHS disconnector	Main select
	Isolated
	LHS earth select
Mechanical operations counter	
Spare volt free auxiliary contacts 4NO and 4NC	
Provision for live line indication	

Standard options

Optional accessories

Trip and close coil voltage ratings	DC: 24 V, 30 V, 48 V, 110 V
Mechanism motorisation - c.b. voltage ratings	DC: 24 V, 30 V, 48 V, 110 V, 220 V AC: 110 V, 230 V
Key type interlocks	
Main off key free, main on key trapped	
Please consult us for any other key interlocking requirements.	

MV insulation systems

Busbars

Standard	Cast resin
Optional	Earth screened

Voltage transformers

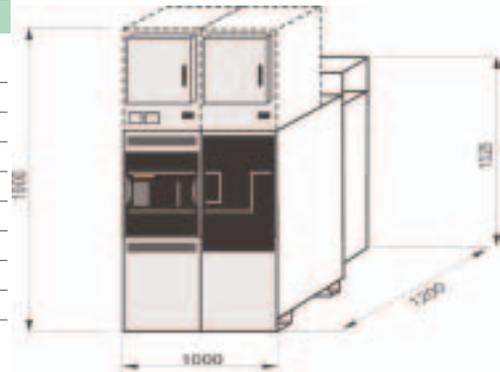
Standard	Cast resin
Optional	Earth screened

Accessories

Refer to page 71

Documents

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Network functions

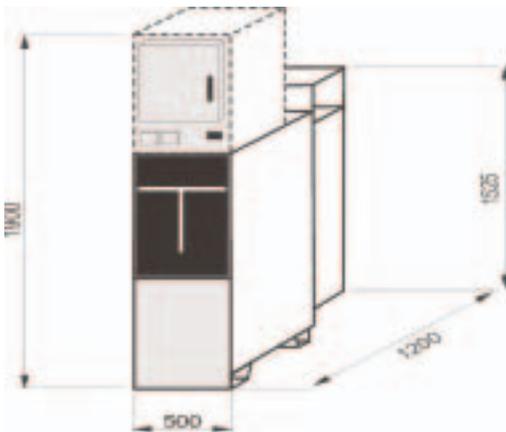
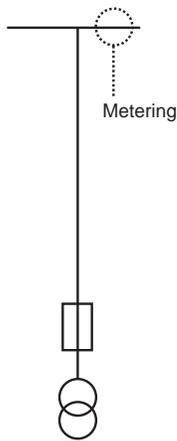
Busbar metering

BBM busbar metering

Application

This dedicated busbar metering panel allows busbar connected voltage and current transformers to be placed anywhere in the switchboard arrangement.

Ideal for tariff check metering on joint ownership switchboards or to reduce the number of circuit VTs traditionally used with feeder metering.



Ratings

Busbar current	1250 A
Normal current	1250 A
Highest system voltage	15.5 kV
Rated voltage	13.8 kV
Service voltage	3.3, 6.6, 11 and 13.8 kV
Rated B.I.L	95 kV
Frequency	50/60 Hz
Short time withstand current:	25 kA (3 secs)

Environment

Location	Indoor, IP3X
Ambient temperature	-5°C to +40°C
Altitude	up to 1000 m

For values outside these ranges please contact Schneider Electric

Protection/instrumentation/metering and indication

Optional Current transformers

Instrumentation	600/300/1 A
Class	1.0
Burden	5 VA
Metering - Tariff	1200/800/5 A
	600/300/5 A
	or 400/200/5 A
	or 200/100/5 A
Class	0.5 s
Burden	7.5 VA

If the optional CTs do not suit your network requirements please consult us.

Voltage transformer - busbar

MV protection	Fused
Service voltage	3.3, 6.6, 11 and 13.8 kV
Secondary voltage	110 V $\sqrt{3}$
Class	0.5/3 P
Burden	50 VA
Impulse voltage	60/95 kV

MV insulation systems

Busbars

Standard	Cast resin
Optional	Earth screened

Voltage transformers

Standard	Cast resin
Optional	Earth screened

Accessories

Refer to page 71

Documents

Installation drawing ref.

GDVINST-09 page 101



Main components

- All units are Internal arc tested to EATS 41-36/IEC298. This ensures operator safety in the extremely unlikely event of an internal fault within any MV compartment of the switchgear
Rating: 25 kA for 1 second
- All units are fitted with an active mimic which clearly details the condition of the circuit breaker and series disconnecter. All operating lever/selectors are comprehensively interlocked in accordance with EATS 41-36 and IEC 60298. In addition to this all have the facility for padlocking



Mechanism type

- Each unit is fitted with a rigorously prototype tested operating mechanism. The unit utilises stainless steel components which are self lubricating, resulting in minimal maintenance requirements

The mechanism has mechanical charging and open/closing. However, electrical operation can be provided as an option. The standard mechanism has a stored charge facility to allow an auto reclose duty of O-0.3 seconds-CO-15 secs-CO. Please consult Schneider Electric if this facility is required.

- Circuit breakers
 - Manual charge, stored energy, manual and electrical release
 - Motor and manual charge, stored energy, manual and electrical release
- A mechanical operations counter is mounted on the front facia of all units to count the number of vacuum circuit breaker operations

Test access

- A fully interlocked integral cable test system employing a removable circuit earth star-point, accessed from the front of the panel interlocked without the need for a loose key, is fitted to every panel. On bus section circuit breakers this facility allows you to test the bus bars. In addition to this it also ensures that the cable or busbar is at earth potential before removing the earth star point connection to allow testing

Live line indication

- Jack sockets provide a voltage reference for circuit (incomers or feeders only) for right hand busbar (bus sections only) potential indication and phasing out on all panels except the busbar earthing switch. In order to utilise these options please refer to section 3 of this document ancillary items for the loose devices required.

Permanent neon indication is provided via lamps on the circuit side of cable connected units or busbars for bus section panels. Integral jack sockets allow the use of an external phase capacitor, easy for phasing out during commissioning



Current transformers

- Ring type, air insulated current transformers are used for protection, indication and metering

Standard CT specification (ratio, class and burden) have been selected to suit the network requirements. However, if the standard current transformers do not suit your specific application please consult us.



Voltage transformers

- Cast resin voltage transformers are used for protection, indication and metering. Standard VT specification (system voltage, class and burden) have been selected to suit the network requirements. However, if the standard voltage transformers do not suit your specific application please consult us

- Circuit breakers
 - Circuit - fused
- Bus sections

Right hand busbar only - fused.

- Busbar metering
 - Busbar - fused



Electrical operation

- A low energy motor gearbox providing an automatic close spring charging facility for remote operation.
- Trip Coil

A solenoid is used for the electrical tripping and opening of the circuit breaker.

- Close Coil

A solenoid is used for the electrical closing of the circuit breaker.

- All units, have 8 normally open and 8 normally closed contact auxiliary switch fitted as standard.

The contacts are arranged as follows:

- Circuit breaker control
 - 4 normally open
 - 4 normally closed
- Spare, volt free contacts wired to outgoing terminals
 - 4 normally open
 - 4 normally closed





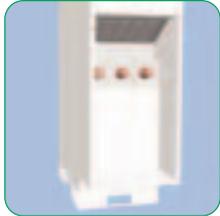
Bottom entry

This cable box is intended for termination of PILC or XLPE cables from below in accordance with Electrical Association technical specification EA12-11. The box is suitable for dry type hot or cold fit termination kits using angled boots. If Dyscon terminations are used then termination kits with a straight boot should be used.

Cable sizes

- 1 x 3 core up to 300 mm²
- 3 x 1 core up to 630 mm²
- 2 x 3 core up to 300 mm²
- 6 x 1 core up to 630 mm²

For other cable types/sizes please consult us.



Top entry

This cable box is intended for termination of PILC or XLPE cables from above in accordance with Electrical Association technical specification EA12-11. The box is suitable for dry type hot or cold fit termination kits using angled boots. If Dyscon terminations are used then termination kits with a straight boot should be used.

Cable sizes

- 1 x 3 core up to 300 mm²
- 3 x 1 core up to 630 mm²
- 2 x 3 core up to 300 mm²
- 6 x 1 core up to 630 mm²

For other cable types/sizes please consult us.

Please refer to installation drawing GDVINST-04 on page 97.



Section four

GenieEvo module combinations 44

Network applications summary tables 45

Protection and control module summary sheets 49

Protection and control module panorama 67



Protection and control modules

Summary sheet

The table below shows the protection and control modules that are designed to fit with a circuit breaker or bus section for a particular application.

Note: If the protection and control module you require is not listed or available with your circuit breaker type/rating, please contact your local Schneider Electric representative.

Circuit breakers		Transformers				Cables							Embedded generation					Miscellaneous	
Rating	Reference	P1	P2	P7	P10	P1	P3	P4	P5	P6	P8	P9	P12	P13	P14	P15	P16	P17	P18
200 A	VC2	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
630 A	VC6	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■
1250 A	VC12	■		■	■	■	■	■	■	■	■	■	■	■	■		■	■	■
Bus section		General purpose				Miscellaneous		Embedded generation											
Rating	Reference	P1	P3	P8	P9	P11	P17	P12	P13	P14									
630 A	VB6	■	■	■	■	■	■	■	■	■									
1250 A	VB12	■	■	■	■	■	■	■	■	■									

Protection and control modules

Summary tables

Transformer feeders and incomers protection

Protection and control module type	Transformer feeders and incomers			
	P1	P2	P7	P10
Page No.	49	50	55	58
Application	General purpose feeder or incomer	Transformer feeder	Single transformer incomer	Parallel dual transformer incomer
Environment				
Indoor	■	■	■	■
IP3X	■	■	■	■
Protection relays				
Sepam 1000+ (type)	S20			
Sepam 2000 (type)		N06	N07	N02
Power meter				
PM600, PM620 or PM650 power meter	<input type="checkbox"/>			
Protection function				
	ANSI			
3 ph overcurrent	50/51	■	■	■
Earth fault	50N/51N	■	■	
Standby earth fault	51G		■	■
Negative seq. O/C	46	■		
Thermal overload	49		■	■
3 ph dir overcurrent	67			■
Restricted earth fault	87N		■	■
Measurement				
Phase current		■	■	■
Max. demand current		■	■	■
Phase voltages	<input type="checkbox"/> ⁽²⁾		■	■
kW, kVA, cos ϕ	<input type="checkbox"/> ⁽²⁾		■	■
kWh, kVARh	<input type="checkbox"/> ⁽²⁾		■	■
kWh pulsed output	<input type="checkbox"/> ⁽²⁾			
Thermal capacity used		■	■	■
Tripping current	■	■	■	■
Monitoring and control				
Trip circuit supervision	<input type="checkbox"/>	■	■	■
Circuit breaker ready to close supervision		■	■	■
Lockout relay	<input type="checkbox"/>	■	■	■
Intertrip send	<input type="checkbox"/>	■	■	■
Intertrip receive	<input type="checkbox"/>	■	■	■
VT supervision				■
Remote emergency trip	<input type="checkbox"/>	■	■	■
Logic selectivity (block send)	■	■	■	■
Logic selectivity (block receive)	<input type="checkbox"/>	■	■	■
Current transducer (1 A/4-20 mA)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Modbus RS485 serial comms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Earth selector status (via Modbus)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Earth status (via Modbus)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spring charge status (via Modbus)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Winding temperature alarm		■	■	■
Winding temperature trip		■	■	■
Buchholz alarm		■	■	■
Buchholz trip		■	■	■
Tripped on fault indication contact	■	■	■	■
Trip circuit fault alarm contact	■	■	■	■
Interposing trip/close	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Trip/neutral/close switch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local/remote switch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Motor ON/OFF switch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CB aux contact (4 N/O + 4 N/C) spare volt free	■	■	■	■
Remote tariff metering				
Tariff metering CTs wired out ⁽¹⁾	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Key ■ Standard feature □ Optional feature

(1) Tariff metering CTs are fitted to the CB module. Ratio and class to be selected from a list of standard options given in section 3 of this document.

(2) Measurement available locally and via Modbus RS485 serial communication with PM600, PM620 or PM650 power meter option

Protection and control modules

Summary tables

Cable feeders or incomers

Protection and control module type	Cable feeders and incomers						
	P1	P3	P4	P5	P6	P8	P9
Page No.	49	51	52	53	54	56	57
Application	General purpose feeder or incomer	Cable feeder with advanced monitoring and control	Unit protected cable feeder	Unit protected cable feeder with back up overcurrent	Unit protected Cable cable feeder with back up overcurrent and power measurements	Cable feeder or incomer with full measurement (suitable for automatic changeover)	Parallel cable feeder or incomer with directional OCEF
Environment							
Indoor	■	■	■	■	■	■	■
IP3X	■	■	■	■	■	■	■
Protection relays							
Sepam 1000+ (type)	S20			S20			
Sepam 2000 (type)		N01			N04	N04	N03
Solkor RF or MBCI01 or MH0R04			■	■	■		
Power meter							
PM600, PM620 or PM650 Power Meter	□		□	□			
Protection function ANSI							
3 ph overcurrent	50/51	■		■	■	■	■
Earth fault	50N/51N	■	■	■	■	■	■
Negative seq. O/C	46	■		■			
Pilot wire differential	87 F		■	■	■		
3 ph dir overcurrent	67						■
Directional earth fault	67N						■
Undervoltage	27				■	■	
Measurement							
Phase current	■	■	□ ^{(2) (3)}	■	■	■	■
Max demand current	■	■	□ ⁽²⁾	■	■	■	■
Phase voltages	□ ⁽²⁾		□ ⁽²⁾	□ ⁽²⁾	■	■	■
kW, kVA, cos φ	□ ⁽²⁾		□ ⁽²⁾	□ ⁽²⁾	■	■	■
kWh, kVARh	□ ⁽²⁾		□ ⁽²⁾	□ ⁽²⁾	■	■	■
kWh pulsed output	□ ⁽²⁾		□ ⁽²⁾	□ ⁽²⁾			
Tripping current	■	■	■	■	■	■	
Monitoring and control							
Trip circuit supervision	□	■	□	□	■	■	■
Circuit breaker ready to close supervision	□	■		□	■	■	■
Lockout relay	□	■		□	■	■	■
Intertrip send	□	■		□	■	■	■
Intertrip receive	□	■		□	■	■	■
VT supervision					■	■	■
Remote emergency trip	□	■		□	■	■	■
Logic selectivity (block send)	■	■		■	■	■	■
Logic selectivity (block receive)	□	■		□	■	■	■
Current transducer (1 A/4-20 mA)	□	□	□	□	□	□	□
Modbus RS485 serial comms	□	□	□	□	□	□	□
Earth selector status (via Modbus)	□	□		□	□	□	□
Earth status (via Modbus)		□			□	□	□
Spring charge status (via Modbus)	□	□		□	□	□	□
Tripped on fault indication contact	■	■		■	■	■	■
Trip circuit fault alarm contact	□	■	□	□	■	■	■
Loss of voltage indication contact					■	■	
Interposing trip/close	□	□	□	□	□	□	□
Trip/neutral/close switch	□	□	□	□	□	□	□
Local/remote switch	□	□	□	□	□	□	□
Motor ON/OFF switch	□	□	□	□	□	□	□
CB aux contact (4 N/O + 4 N/C) spare volt free	■	■		■	■	■	■
Remote tariff metering							
Tariff metering CTs wired out ⁽¹⁾	□	□	□	□	□	□	□

Key ■ Standard feature □ Optional feature

(1) Tariff metering CTs are fitted to the CB module. Ratio and class to be selected from a list of standard options given in section 3 of this document

(2) Measurement available locally and via Modbus RS485 serial communication with PM600, PM620 or PM650 power meter option

(3) Yellow phase ammeter also available

Protection and control modules

Summary tables

Embedded generation feeders and incomers

Protection and control module type	Embedded generation feeders and incomers				
	P12	P13	P14	P15	P16
Page No.	60	61	62	63	64
Application	Interconnection Breaker(G59 power export)	Interconnection Breaker (G59 no power export)	REC metering for embedded generation	Transformer incomer for LV generator	MV generator incomer
Environment					
Indoor	■	■	■	■	■
IP 3X	■	■	■	■	■
Protection relays					
Sepam 2000 (type)	N14	N13	N11	N15	N16
Protection function					
ANSI					
3 ph overcurrent	50/51	■	■	■	■
Earth fault	50N/51N	■	■	■	■
Standby earth fault	50G/51G				■
Voltage restrained O/C	50V/51V		■		■
3 phase directional O/C	67		■	■	
Negative sequence O/C	46	■			■
Undervoltage	59	■			■
Neutral voltage displacement	59N		■		
Reverse active power	32P	■			■
Reverse reactive power	32Q/40				■
Low forward power	37P				■
Over/under frequency	81	■			■
Loss of mains (dF/dt)	81R	■			
Generator differential	87G				■
Measurement					
Phase current	■	■	■	■	■
Max demand current	■	■	■	■	■
Phase voltages	■	■	■	■	■
kW, kVA, cos φ	■	■	■	■	■
kWh, kVARh	■	■	■	■	■
Maximum demand active/reactive power	■	■	■	■	■
Tripping current	■	■	■	■	■
Monitoring and control					
Trip circuit supervision	■	■	■	■	■
Circuit breaker ready to close supervision	■	■	■	■	■
Lockout relay	■	■	■	■	■
Intertrip send	■	■	■	■	■
Intertrip receive	■	■	■	■	■
Check synchronising	□	□		□	□
Parallel operation timer (5 minutes)		■			
Generator breaker status monitoring				■	■
Earthing contactor status monitoring				■	■
Open/close neutral earthing point	■	■	■	■	■
VT supervision	■	■	■	■	■
Remote emergency trip					■
Enable/disable local earthing contact					■
Exciter trip output contact					■
Engine/turbine trip output contact					■
Excitation failure alarm					■
Diode failure alarm					■
Logic selectivity (block send/receive)	■	■	■	■	■
Current transducer (1 A/4-20 mA)	□	□	□	□	□
Modbus RS485 serial comms	□	□	□	□	□
Earth selector status (via Modbus)	□	□	□	□	□
CB spring charge status (via Modbus)	□	□	□	□	□
CB earth status (via Modbus)	□	□	□	□	□
Tripped on fault indication contact	■	■	■	■	■
Trip circuit fault indication contact	■	■	■	■	■
Interposing trip/close	■	■	■	■	■
Trip/neutral/close switch	□	□	□	□	□
Local/remote switch	□	□	□	□	□
Motor ON/OFF switch	□	□	□	□	□
CB aux contact (4 N/O + 4 N/C) spare volt free	■	■	■	■	■
Remote tariff metering					
Tariff metering CTs wired out ⁽¹⁾	□	□	□	□	□

Key ■ Standard feature □ Optional feature

(1) Tariff metering CTs are fitted to the CB module. Ratio and class to be selected from a list of standard options given in section 3 of this document.

Protection and control modules

Summary tables

Miscellaneous

Protection and control module type	Miscellaneous		
	P11	P17	P18
Page No.	59	65	66
Application	Control logic for 2 out of 3 changeover scheme (fitted to bus section)	Basic circuit breaker control no protection	Control logic for 1 out of 2 changeover scheme (fitted to incomers)
Environment			
Indoor	■	■	■
IP 3X	■	■	■
Protection relays			
Sepam 2000 (type)	N05		N04
Measurement			
Phase current	■	<input type="checkbox"/> ^{(2),(3)}	■
Max. demand current	■	<input type="checkbox"/> ⁽²⁾	■
Phase voltages	■	<input type="checkbox"/> ⁽²⁾	■
kW, kVA, cos φ	■	<input type="checkbox"/> ⁽²⁾	■
kWh, kVARh	■	<input type="checkbox"/> ⁽²⁾	■
Maximum demand active/reactive power	■	<input type="checkbox"/> ⁽²⁾	■
Tripping current	■		■
Monitoring and control			
Trip circuit supervision	■	<input type="checkbox"/>	■
Circuit breaker ready to close supervision	■		■
Lockout relay	■		■
2 out of 3 changeover logic	■		
1 out of 2 changeover	■		■
Current transducer (1 A/4-20 mA)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Modbus RS485 serial comms	<input type="checkbox"/>		<input type="checkbox"/>
Earth selector status (via Modbus)	<input type="checkbox"/>		<input type="checkbox"/>
CB spring charge status (via Modbus)	<input type="checkbox"/>		<input type="checkbox"/>
CB earth status (via Modbus)	<input type="checkbox"/>		<input type="checkbox"/>
Trip circuit fault indication contact	■	<input type="checkbox"/>	■
Interposing trip/close	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Trip/neutral/close switch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local/remote switch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Motor ON/OFF switch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CB aux contact (4 N/O + 4 N/C) spare volt free		■	■
Remote tariff metering			
Tariff metering CTs wired out ⁽¹⁾	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Key ■ Standard feature □ Optional feature

(1) Tariff metering CTs are fitted to the CB module. Ratio and class to be selected from a list of standard options given in section 3 of this document.

(2) Measurement available locally and via Modbus RS485 serial communication with PM600, PM620 or PM650 power meter option

(3) Yellow phase ammeter also available

Note: There is a complete Functional Design Specification (FDS) available for each of the above detailed 18 protection and control modules.

To receive a copy please contact your local Schneider Electric representative or local Schneider Electric office.

Protection and control modules

Summary sheet

P1

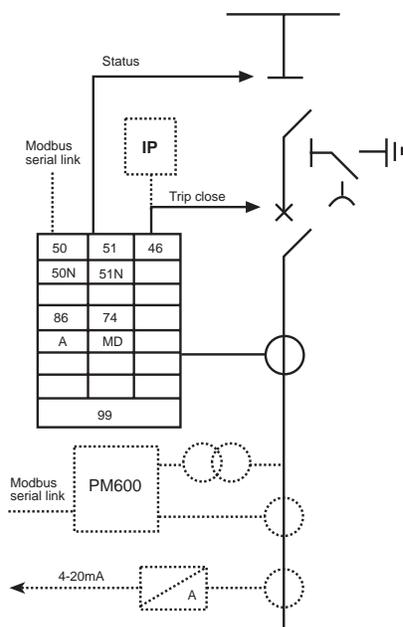
Application

This protection and control module is for use as a general purpose feeder or incomer where the protection requirements are overcurrent and earth fault.

Typical applications include:

- Cable feeder/incomer
- Transformer feeder/incomer
- Standby generator
- Back up protection for remote generator protection and control package
- Bus section protection

Several standard options are available to ensure maximum flexibility and cost effectiveness in meeting the requirements of different systems.



Protection

Sepam 1000+ S20 (99)

50/51 overcurrent – IDMT, DT (4 settings)

50N/51 N earth fault – IDMT, DT (4 settings)

46 negative sequence overcurrent

Instrumentation

Sepam 1000+, LED display

Digital ammeters: I1, I2, I3

Record of tripping current: I1, I2, I3, I0

Maximum demand: I1, I2, I3

Unbalance ratio

Disturbance recorder

Control

Sepam 1000+ S20

Trip CB output

Tripped on fault indication contact

Logic selectivity block send

Optional features

Extra facilities on Sepam 1000+

Input/output module:

CB status indication

Trip circuit supervision (74)

Intertrip send/receive

Remote emergency trip

Logic selectivity block receive

Circuit breaker ready to close

External protection trip

Local/remote control selection

Earth status

Lockout (86)

CB operating time

CB spring charging time

CB close control

CB close inhibit

Trip circuit fault alarm contact

Serial communication facility, RS485/Modbus

PM600, PM620 or PM650 digital power meter with Modbus communications providing:

Current, voltage, frequency

Power, energy, power factor

THD voltage and current per phase

kWh pulse output

See PowerLogic selection guide for further information

Interposing trip/close relays

Current transducer 0-1 A, 0-10 V, 2-10 V, 0-5 V, +/-10 V, 0-1 mA, 0-20 mA, 4-20 mA

Trip/neutral/close switch

Local/remote selector switch

Spring charge motor on/off switch

Protection and control modules

Summary sheet

P2

Application

This protection and control module provides overcurrent, earth fault and thermal overload protection for transformer feeders above 2MVA.

It also monitors the transformer winding temperature and Buchholz devices providing local and remote indication of operation.

Several standard options are available to ensure maximum flexibility and cost effectiveness in meeting the requirements of different systems.

Transformer feeder (>2MVA)

Protection

Sepam 2000 N06 (99)

50/51 overcurrent – IDMT, DT (4 settings)

50N/51 N earth fault – IDMT, DT (4 settings)

49 Thermal overload

Instrumentation

Sepam 2000, N06 LED display c/w

Digital ammeters: I1, I2, I3

Record of tripping current: I1, I2, I3, I0

Maximum demand: I1, I2, I3

Thermal capacity used

I² accumulated trip currents

Disturbance recorder

Control

Sepam 2000 N06

Trip/close CB control

Trip circuit supervision (74)

Circuit breaker ready to close

External protection trip

Remote emergency trip

Intertrip send/receive

CB close inhibit

Lockout (86)

Logic selectivity block send/receive

Spring charge status

Disconnecter and earth status

Local/remote control selection

Winding temperature alarm/trip

Buchholz alarm/trip

Optional features

Serial Communication facility, RS485/Modbus

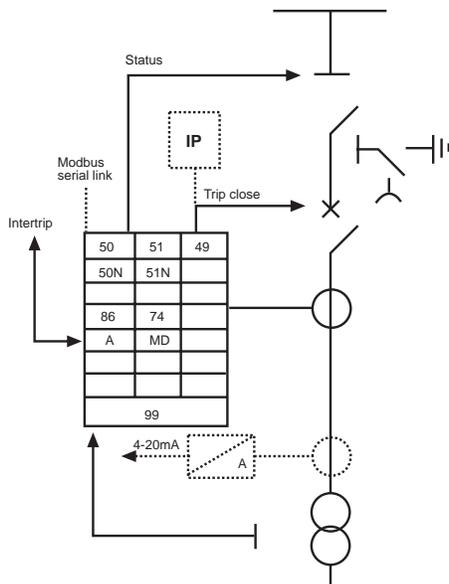
Current transducer 0-1 A, 0-10 V, 2-10 V, 0-5 V, +/-10 V, 0-1 mA, 0-20 mA, 4-20 mA

Interposing trip/close relays

Trip/neutral/close switch

Local/remote selector switch

Spring charge motor on/off switch



Protection and control modules

Summary sheet

P3

Application

This protection and control module provides phase overcurrent, earth fault protection for distribution cable feeders.

It includes extensive circuit breaker monitoring and control features as standard and is ideally suited for integration into a supervisory system using its Modbus serial interface.

Several standard options are available to ensure maximum flexibility and cost effectiveness in meeting the requirements of different systems.

Cable feeder with advanced monitoring and control

Protection

Sepam 2000 N01 (99)

50/51 overcurrent – IDMT, DT (4 settings)

50 N/51 N earth fault – IDMT, DT (4 settings)

Instrumentation

Sepam 2000, N01 LED display c/w

Digital ammeters: I1, I2, I3

Record of tripping current: I1, I2, I3, I0

Maximum demand: I1, I2, I3

I² accumulated trip currents

Disturbance recorder

Control

Sepam 2000 N01

Trip/close CB control

Trip circuit supervision (74)

Circuit breaker ready to close

External protection trip

Remote emergency trip

Intertrip send/receive

CB close inhibit

Lockout (86)

Logic selectivity block send/receive

Spring charge status

Disconnecter and earth status

Local/remote control selection

Optional features

Serial communication facility, RS485/Modbus

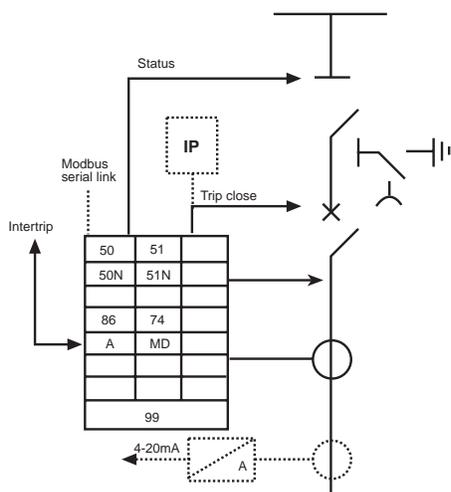
Current transducer 0-1 A, 0-10 V, 2-10 V, 0-5 V, +/-10 V, 0-1 mA, 0-20 mA, 4-20 mA

Interposing trip/close relays

Trip/neutral/close switch

Local/remote selector switch

Spring charge motor on/off switch



Protection and control modules

Summary sheet

P4

Application

This protection and control module provides a high speed differential protection in interconnected systems using pilot wires between each substation.

A choice of three of the most common relays is offered to allow matching of both ends of the feeder.

Several standard options are available to ensure maximum flexibility and cost effectiveness in meeting the requirements of different systems.

Unit protected cable feeder

Protection

87F pilot wire unit protection relay, choice of:

Solkor Rf

MBCI

Control

Tripped on fault indication contact

Optional features

PM600, PM620 or PM650 digital power meter with Modbus communications providing:

Current, voltage, frequency

Power, energy, power factor

THD voltage and current per phase

kWh pulse output

Note: See PowerLogic selection guide for further information

MVAX31 trip circuit supervision relay

Ammeter

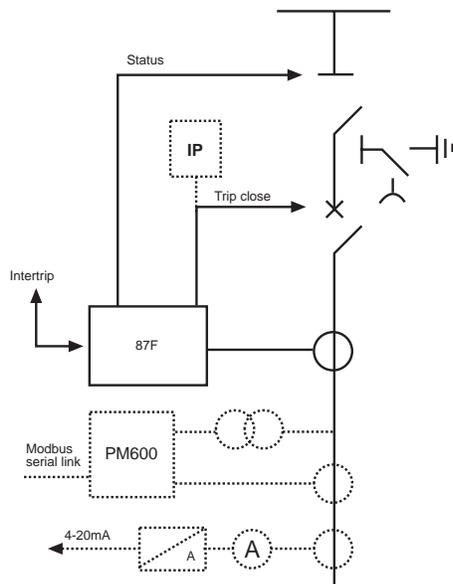
Current transducer 0-1 A, 0-10 V, 2-10 V, 0-5 V, +/-10 V, 0-1 mA, 0-20 mA, 4-20 mA

Interposing trip/close relays

Trip/neutral/close switch

Local/remote selector switch

Spring charge motor on/off switch



Protection and control modules

Summary sheet

P5

Application

This protection and control module provides a high speed differential protection in interconnected systems using pilot wires between each substation with backup overcurrent and earth fault, (provided by a Sepam 1000+ S20).

Several optional features are available to ensure maximum flexibility and cost effectiveness in meeting the requirements of different systems.

Unit protected cable feeder with back up overcurrent and earth fault

Protection

Sepam 1000+ S20 (99)

50/51 overcurrent – IDMT, DT (4 settings)

50N/51N earth fault – IDMT, DT (4 settings)

46 negative sequence overcurrent

87F pilot wire unit protection relay, choice of :

Solkor Rf

MBCI

Instrumentation

Sepam 1000+, LED display c/w

Digital ammeters: I1, I2, I3

Record of tripping current: I1, I2, I3, I0

Maximum demand: I1, I2, I3

Unbalance ratio

Disturbance recorder

Control

Sepam 1000+ S20 relay c/w

Trip CB output

Tripped on fault indication contact

Logic selectivity block send

Optional features

Extra features on Sepam 1000+

Input/output module to provide

CB status indication

Trip circuit supervision

Intertrip send/receive

Remote emergency trip

Logic selectivity block receive

Circuit breaker ready to close

External protection trip

Local/remote control selection

Earth switch status

Lockout (86)

CB operating time

CB spring charging time

CB close control

CB close inhibit

Trip circuit fault alarm contact

Serial Communication facility, RS485/Modbus

PM600, PM620 or PM650 digital power meter with Modbus communications providing:

Current, voltage, frequency

Power, energy, power factor

THD voltage and current per phase

kWh pulse output

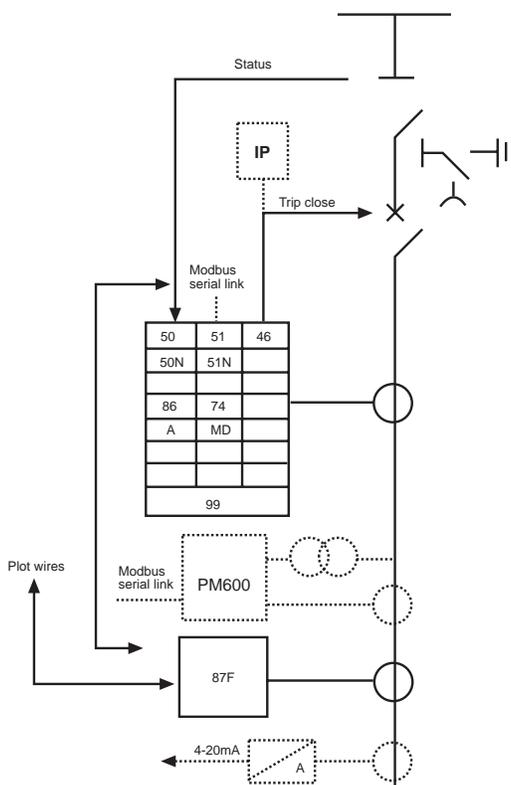
Note: See PowerLogic selection guide for further information

Interposing trip/close relays

Trip/neutral/close switch

Local/remote selector switch

Spring charge motor on/off switch



Protection and control modules

Summary sheet

P6

Application

This protection and control module is similar to P4 in that it provides a high speed differential protection in interconnected systems using pilot wires between each substation.

In addition to the differential protection, backup overcurrent and earth fault protection is provided by a Sepam 2000.

This includes extensive circuit breaker metering, monitoring and control features as standard and is ideally suited for integration into a supervisory system using its Modbus serial interface.

Several standard options are available to ensure maximum flexibility and cost effectiveness in meeting the requirements of different systems.

Unit protected cable feeder with back up overcurrent, earth fault and power measurements

Protection

Sepam 2000 N04 (99)

50/51 overcurrent – IDMT, DT (4 settings)

50N/51N earth fault – IDMT, DT (4 settings)

27 undervoltage

Pilot wire unit protection relay, choice of:

Solkor RF

MBCI

Instrumentation

Sepam 2000, N04 LED display c/w

Digital ammeters: I1, I2, I3

Record of tripping current: I1, I2, I3, I0

Maximum demand: I1, I2, I3

Digital voltmeters: U21, U32, U13

PFI, F, kWh (+/-), kVAh (+/-)

MD and inst kW and kVA

I² accumulated trip currents

Disturbance recorder

Control

Sepam 2000 N04

Trip/close CB control

Trip circuit supervision (74)

Circuit breaker ready to close

External protection trip

Remote emergency trip

Intertrip send/receive

CB close inhibit

Lockout (86)

Logic selectivity block send/receive

Spring charge status

Disconnecter and earth status

Local/remote control selection

Optional features

Serial communication facility, RS485/Modbus

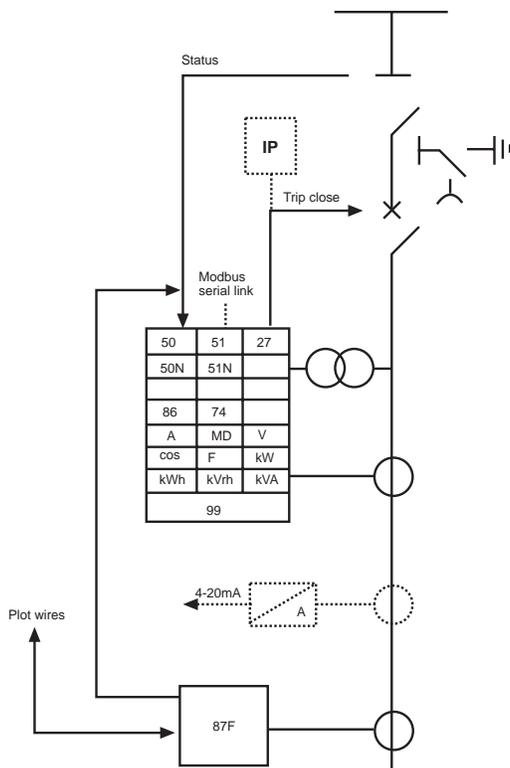
Current transducer 0-1 A, 0-10 V, 2-10 V, 0-5 V, +/-10 V, 0-1 mA, 0-20 mA, 4-20 mA

Interposing trip/close relays

Trip/neutral/close switch

Local/remote selector switch

Spring charge motor on/off switch



Protection and control modules

Summary sheet

P7

Application

This protection and control module provides a comprehensive protection package for switchboards with one transformer incomer or dual transformer incomers without directional overcurrent protection.

It also includes monitoring of the transformer winding temperature and Buchholz devices for local and remote indication of operation.

This includes extensive circuit breaker metering, monitoring and control features as standard and is ideally suited for integration into a supervisory system using its Modbus serial interface.

Several standard options are available to ensure maximum flexibility and cost effectiveness in meeting the requirements of different systems.

Single transformer incomer

Protection

Sepam 2000 N07 (99)

50/51 overcurrent – IDMT, DT (4 settings)

50N/51N standby earth fault – IDMT, DT (4 settings)

49 thermal overload

87N restricted earth fault

Instrumentation

Sepam 2000, N07 LED display c/w

Digital ammeters: I1, I2, I3

Record of tripping current: I1, I2, I3, I0

Maximum demand: I1, I2, I3

Digital voltmeters: U21, U32, U13

PFI, F, kWh (+/-), kVArh (+/-)

MD and inst kW and kVA

I² accumulated trip currents

Thermal capacity used

Disturbance recorder

Control

Sepam 2000 N07

Trip/close CB control

Trip circuit supervision (74)

Circuit breaker ready to close

External protection trip

Remote emergency trip

Intertrip send/receive

CB close inhibit

Lockout (86)

Logic selectivity block send/receive

Spring charge status

Disconnecter and earth status

Local/remote control selection

Winding temperature alarm/trip

Buchholz alarm/trip

Optional features

Serial communication facility, RS485/Modbus

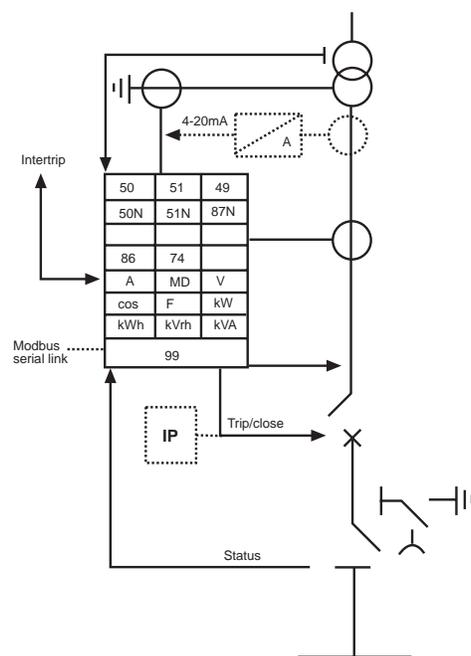
Current transducer 0-1 A, 0-10 V, 2-10 V, 0-5 V, +/-10 V, 0-1 mA, 0-20 mA, 4-20 mA

Interposing trip/close relays

Trip/neutral/close switch

Local/remote selector switch

Spring charge motor on/off switch



Protection and control modules

Summary sheet

P9

Application

This protection and control module is for use on the incomer circuit breaker of a switchboard which has 2 cable incomers operating in parallel. It could also be applied on a feeder circuit breaker if directional protection is required.

It includes extensive metering, monitoring and control features as standard and is ideally suited for integration into a supervisory system using its Modbus serial interface.

Several standard options are available to ensure maximum flexibility and cost effectiveness in meeting the requirements of different systems.

Parallel cable incomer/feeder with directional protection

Protection

Sepam 2000 N03 (99)

50/51 overcurrent – IDMT, DT (4 settings)

50N/51N earth fault – IDMT, DT (4 settings)

67 directional overcurrent

67N directional earth fault

Instrumentation

Sepam 2000, N03 LED display c/w

Digital ammeters: I1, I2, I3

Record of tripping current: I1, I2, I3, I0

Maximum demand: I1, I2, I3

Digital voltmeters: U21, U32, U13

PFI, F, kWh (+/-), kVAh (+/-)

MD and inst kW and kVA

I² accumulated trip currents

Disturbance recorder

Control

Sepam 2000 N03

Trip/close CB control

Trip circuit supervision (74)

Circuit breaker ready to close

External protection trip

Remote emergency trip

Intertrip send/receive

CB close inhibit

Lockout (86)

Logic selectivity block send/receive

Spring charge status

Disconnecter and earth status

Local/remote control selection

Optional features

Serial communication facility, RS485/Modbus

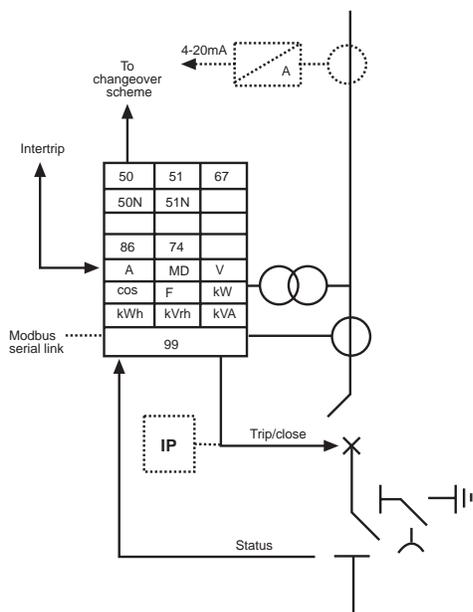
Current transducer 0-1 A, 0-10 V, 2-10 V, 0-5 V, +/-10 V, 0-1 mA, 0-20 mA, 4-20 mA

Interposing trip/close relays

Trip/neutral/close switch

Local/remote selector switch

Spring charge motor on/off switch



Protection and control modules

Summary sheet

P10

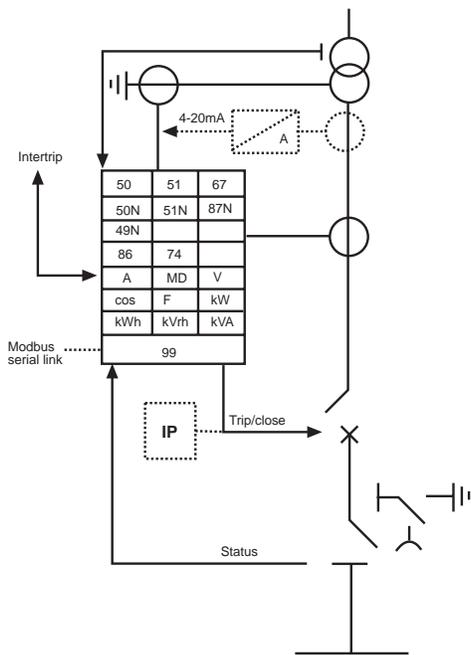
Application

This protection and control module is for use on the incomer circuit breaker of a switchboard which has 2 transformer incomers operating in parallel.

It includes extensive metering, monitoring and control features as standard and is ideally suited for integration into a supervisory system using its Modbus serial interface.

It provides monitoring of the transformer winding temperature and Buchholz devices providing local and remote indication of operation.

Several standard options are available to ensure maximum flexibility and cost effectiveness in meeting the requirements of different systems.



Parallel transformer incomer

Protection

Sepam 2000 N02 (99)

50/51 overcurrent – IDMT, DT (4 settings)

50N/51N standby earth fault – IDMT, DT (4 settings)

67 directional overcurrent

49 thermal overload

87N restricted earth fault*

Instrumentation

Sepam 2000, N02 LED display c/w

Digital ammeters: I1, I2, I3

Record of tripping current: I1, I2, I3, I0

Maximum demand: I1, I2, I3

Digital voltmeters: U21, U32, U13

PFI, F, kWh (+/-), kVAh (+/-)

MD and inst kW and kVA

I² accumulated trip currents

Thermal capacity used

Disturbance recorder

Control

Sepam 2000 N02

Trip/close CB control

Trip circuit supervision (74)

Circuit breaker ready to close

VT supervision

External protection trip

Remote emergency trip

Intertrip send/receive

CB close inhibit

Lockout (86)

Logic selectivity block send/receive

Spring charge status

Disconnecter and earth status

Local/remote control selection

Winding temperature alarm/trip

Buchholz alarm/trip

Optional features

Serial communication facility, RS485/Modbus

Current transducer 0-1 A, 0-10 V, 2-10 V, 0-5 V, +/-10 V, 0-1 mA, 0-20 mA, 4-20 mA

Interposing trip/close relays

Trip/neutral/close switch

Local/remote selector switch

Spring charge motor on/off switch

* REFTX neutral CT supplied by others

Protection and control modules

Summary sheet

P11

Application

This module has no protection functions but includes the control logic for a 2 out of 3 changeover scheme and should be fitted to the bus section circuit breaker.

It has two different changeover schemes which are easily selectable within the Sepam 2000. Both schemes are fully documented and tested therefore greatly reducing the overall delivery cycle.

It also provides comprehensive circuit breaker monitoring and the possibility of power measurements if CTs and a VT are fitted.

This module is intended for use in conjunction with 2 incoming circuit breakers equipped with P8.

Several standard options are available to ensure maximum flexibility and cost effectiveness in meeting the requirements of different systems.

Control logic for 2 out of 3 changeover scheme (fitted to bus section)

Instrumentation

Sepam 2000, N05 LED display c/w (99)

Digital ammeters: I1, I2, I3

Record of tripping current: I1, I2, I3, I0

Maximum demand: I1, I2, I3

Digital voltmeters: U21, U32, U13

PFI, F, kWh (+/-), kVARh (+/-)

MD and inst kW and kVA

I² accumulated trip currents

Disturbance recorder

Control

Sepam 2000 N05

Trip/close CB control

Trip circuit supervision (74)

Circuit breaker ready to close

CB close inhibit

Lockout (86)

Spring charge status

Disconnecter and earth status

Local/remote control selection

2 out of 3 changeover logic

Changeover on/off selector switch

Optional features

Serial communication facility, RS485/Modbus

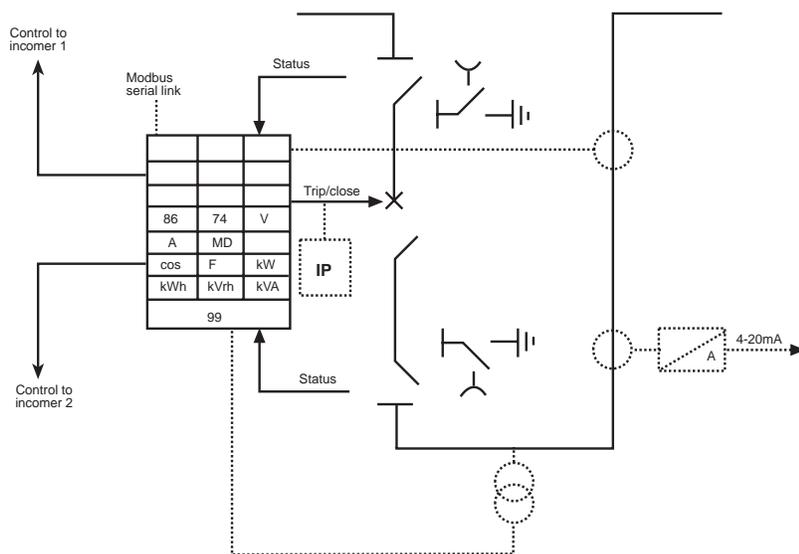
Current transducer 0-1 A, 0-10 V, 2-10 V, 0-5 V, +/-10 V, 0-1 mA, 0-20 mA, 4-20 mA

Interposing trip/close relays

Trip/neutral/close switch

Local/remote selector switch

Spring charge motor on/off switch



Protection and control modules

Summary sheet

P13

Application

This protection and control module is for use in embedded generator applications, where the generator operates in parallel with the utility supply.

It satisfies the requirements of Engineering Recommendation G59/1 1991 for the point of interconnection between the generator and the utility network.

The main function is to ensure that the generators system is isolated from the public supply in the event of any abnormal operating conditions.

The module is designed for applications where there is no power exported to the utility.

It is intended for use in conjunction with metered incoming supply module P14 and generator modules P15 and P16.

Several standard options are available to ensure maximum flexibility and cost effectiveness in meeting the requirements of different systems.

G59/1 point of interconnection –no power export

Protection

Sepam 2000 N13 (99)

50/51 overcurrent – IDMT, DT (4 settings)
50N/51N earth fault – IDMT, DT (4 settings)
46 negative sequence overcurrent
27 undervoltage
59 overvoltage
32P reverse real power
81O over frequency
81U under frequency

Instrumentation

Sepam 2000, N13 LED display c/w

Digital ammeters: I1, I2, I3
Record of tripping current: I1, I2, I3, I0
Maximum demand: I1, I2, I3
Digital voltmeters: U21, U32, U13
PFI, F, kWh (+/-), kVAh (+/-)
MD and inst kW and kVA
I² accumulated trip currents
Disturbance recorder

Control

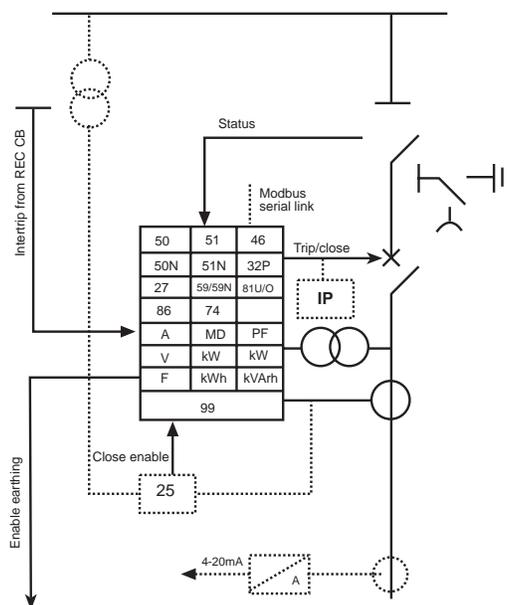
Sepam 2000 N13

Trip/close CB control
Trip circuit supervision
Circuit breaker ready to close
VT supervision
External protection trip
Remote emergency trip
Intertrip send/receive
CB close inhibit
Lockout (86)
Logic selectivity block send/receive
Spring charge status
Disconnecter and earth status
Local/remote control selection
Check synch close inhibit
Parallel limit timer
Earthing connection interlocking
Circuit breaker 52b contact for earthing connection interlocking
Limit timer in/out control switch
Trip/neutral/close switch

Optional features

KAVS100 relay for synchronising check (25)
Serial communication facility, RS485/Modbus
Current transducer 0-1 A, 0-10 V, 2-10 V, 0-5 V, +/-10 V, 0-1 mA, 0-20 mA, 4-20 mA
Interposing trip/close relays
Local/remote selector switch
Spring charge motor on/off switch

It is recommended that the FDS is read in conjunction with this page in order to review the control inputs and outputs available



Protection and control modules

Summary sheet

P14

Application

This protection and control module is for use in embedded generation schemes and fulfils the requirements of the utility metering breaker.

The protection package includes overcurrent, earth fault and neutral voltage displacement.

It provides a backup protection function to the main internal breaker having the G59 protection package.

Several standard options are available to ensure maximum flexibility and cost effectiveness in meeting the requirements of different systems.

Utility metering circuit breaker

Protection

Sepam 2000 N11 (99)

50/51 overcurrent – IDMT, DT (4 settings)

50N/51N earth fault – IDMT, DT (4 settings)

67 directional overcurrent

50V/51V voltage restrained overcurrent

59N neutral voltage displacement

Instrumentation

Sepam 2000, N11 LED display c/w

Digital ammeters: I1, I2, I3

Record of tripping current: I1, I2, I3, I0

Maximum demand: I1, I2, I3

Digital voltmeters: U21, U32, U13

PFI, F, kWh (+/-), kVAh (+/-)

MD and inst kW and kVA

I² accumulated trip currents

Disturbance recorder

Control

Sepam 2000 N11

Trip/close CB control

Trip circuit supervision (74)

Circuit breaker ready to close

VT supervision

External protection trip

Remote emergency trip

Intertrip send/receive

CB close inhibit

Lockout (86)

Logic selectivity block send/receive

Spring charge status

Disconnecter and earth status

Local/remote control selection

Optional features

Serial communication facility, RS485/Modbus

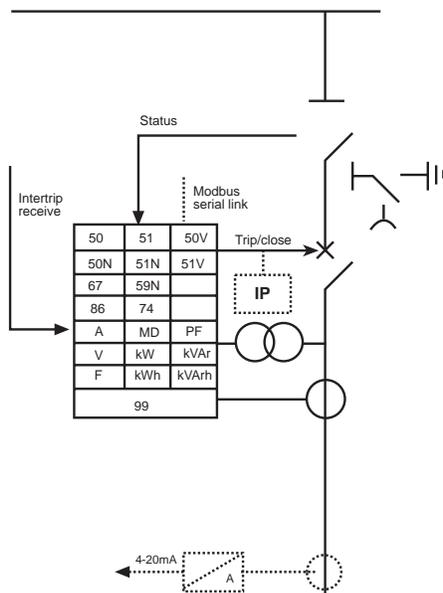
Current transducer 0-1 A, 0-10 V, 2-10 V, 0-5 V, +/-10 V, 0-1 mA, 0-20 mA, 4-20 mA

Interposing trip/close relays

Trip/neutral/close switch

Local/remote selector switch

Spring charge motor on/off switch



Protection and control modules

Summary sheet

P15

Application

This protection and control module is intended for embedded generator applications, in which an LV generator is connected to the MV distribution network via an LV/MV step up transformer for parallel operation with a utility supply.

It is intended for use with metered incoming supply module P14 and point of interconnection modules P12 and P13.

Several standard options are available to ensure maximum flexibility and cost effectiveness in meeting the requirements of different systems.

Transformer incomer for connection of lv embedded generator

Protection

Sepam 2000 N15 (99)

50/51 overcurrent – IDMT, DT (4 settings)

50N/51N earth fault – IDMT, DT (4 settings)

67 directional overcurrent

59N neutral voltage displacement for VT supervision only

Instrumentation

Sepam 2000, N15 LED display c/w

Digital ammeters: I1, I2, I3

Record of tripping current: I1, I2, I3, I0

Maximum demand: I1, I2, I3

Digital voltmeters: U21, U32, U13

PFI, F, kWh (+/-), kVARh (+/-)

MD and inst kW and kVAR

I² accumulated trip currents

Disturbance recorders

Control

Sepam 2000 N15

Trip/close CB control

Trip circuit supervision (74)

Circuit breaker ready to close

VT Supervision

External protection trip

Remote emergency trip

Intertrip send/receive

CB close inhibit

Lockout (86)

Logic selectivity block send/receive

Spring charge status

Disconnecter and earth status

Local/remote control selection

Check synch close inhibit

LV CB interlocking

Earthing connection interlocking

Neutral earth point control

Trip/neutral/close switch

Optional features

KAVS100 relay for synchronising check (25)

Serial Communication facility, RS485/Modbus

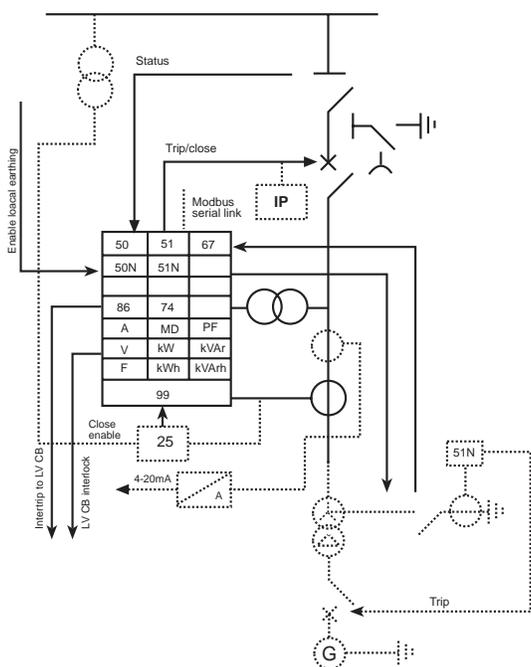
Current transducer 0-1 A, 0-10 V, 2-10 V, 0-5 V, +/-10 V, 0-1 mA, 0-20 mA, 4-20 mA

Interposing trip/close relays

Local/remote selector switch

Spring charge motor on/off switch

It is recommended that the FDS is read in conjunction with this page in order to review the control inputs and outputs available.



Protection and control modules

Summary sheet

P16

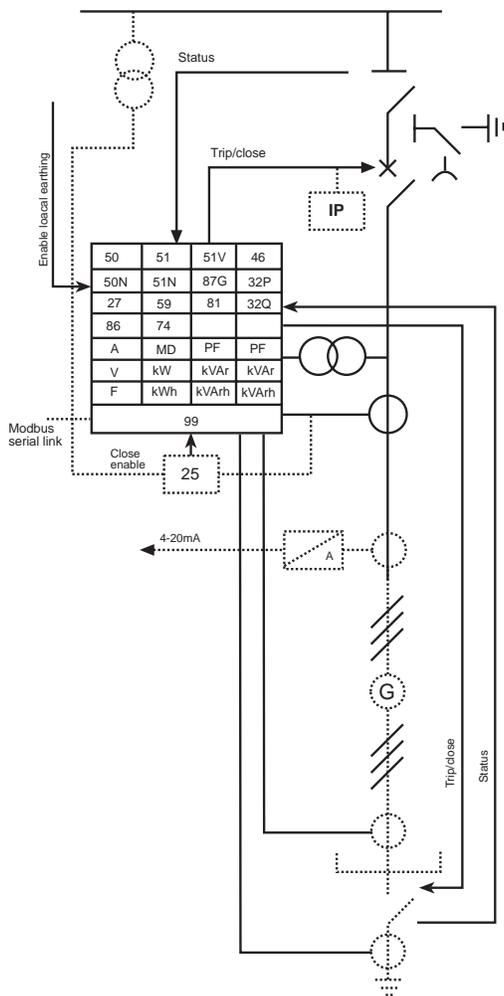
Application

This protection and control module is for use with Medium Voltage (MV) generators directly connected to a MV system.

Full differential protection is provided, ensuring fast, discriminative clearance of faults within the generator. It is therefore suitable for use regardless of whether the generator operates in island mode or in parallel with a utility supply.

It is intended for use in conjunction with metered incoming supply module P14 and point of interconnection modules P12 or P13.

Several standard options are available to ensure maximum flexibility and cost effectiveness in meeting the requirements of different systems.



MV generator incomer

Protection

Sepam 2000 N16 (99)

50/51 overcurrent – IDMT, DT (4 settings)
50N/51N earth fault – IDMT, DT (4 settings)
51V voltage restrained overcurrent
46 negative sequence overcurrent (2 settings)
27 under voltage (2 settings)
59 over voltage (2 settings)
32P reverse real power
32Q reverse reactive power
81O over frequency (2 settings)
81U under frequency (2 settings)
59N neutral voltage displacement
87G generator differential

Instrumentation

Sepam 2000, N16 LED display c/w

Digital ammeters: I1, I2, I3
Record of tripping current: I1, I2, I3, I0
Maximum demand: I1, I2, I3
Digital voltmeters: U21, U32, U13
PFI, F, kWh (+/-), kVArh (+/-)
MD and inst kW and kVA
I² accumulated trip currents
Disturbance recorder

Control

Sepam 2000 N16

Trip/close CB control
Trip circuit supervision (74)
Circuit breaker ready to close
External protection trip
Intertrip receive
CB close inhibit
Lockout (86)
Logic selectivity block send/receive
Spring charge status
Disconnecter and earth status
Local/remote control selection
Check synch close inhibit
Earthing contactor interlocking and monitoring
Exciter control alarm monitoring
Leading VAR limiter alarm monitoring
Diode failure alarm monitoring
Engine/turbine trip output

Optional features

KAVS100 relay for synchronising check (25)
Serial communication facility, RS485/Modbus
Current transducer 0-1 A, 0-10 V, 2-10 V, 0-5 V, +/-10 V, 0-1 mA, 0-20 mA, 4-20 mA
Interposing trip/close relays
Trip/neutral/close switch
Local/remote selector switch
Spring charge motor on/off switch

It is recommended that the FDS is read in conjunction with this page in order to review the control inputs and outputs available.

Protection and control modules

Summary sheet

P17

Application

This protection and control module is for use on a circuit breaker with control but no protection, such as a bus section.

Several standard options are available to ensure maximum flexibility and cost effectiveness in meeting the requirements of different customers.

Basic circuit breaker control no protection

Optional features

MVAX31 trip circuit supervision relay

Ammeter

Current transducer 1 A, 4...20 mA, 0...20 mA, 0...10 mA, 0...10 V

Interposing trip/close relays

Trip/neutral/close switch

Local/remote selector switch

Spring charge motor on/off switch

PM600, PM620 or PM650 digital power meter with Modbus communications providing:

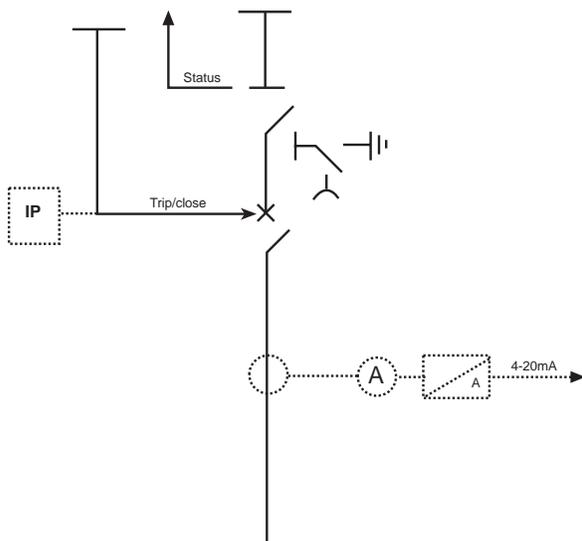
Current, voltage, frequency

Power, energy, powerfactor

THD voltage and current per phase

kWh pulse output

Note: See powerLogic selection guide for further information



Protection and control modules

Summary sheet

P18

Application

This protection and control module is for use as a cable incomer with undervoltage and overcurrent and earth fault protection.

It has 1 out of 2 changeover source intended for use in conjunction with another incoming circuit breaker equipped with P18.

Several standard options are available to ensure maximum flexibility and cost effectiveness in meeting the requirements of different systems.

Control logic for 1 out of 2 changeover scheme

Protection

Sepam 2000 N04 (99)

50/51 overcurrent – IDMT, DT (4 settings)

50N/51N earth fault – IDMT, DT (4 settings)

27 undervoltage

Instrumentation

Sepam 2000, N04 LED display c/w

Digital ammeters: I1, I2, I3

Record of tripping current: I1, I2, I3, I0

Maximum demand: I1, I2, I3

Digital voltmeters: U21, U32, U13

PFI, F, kWh (+/-), kVARh (+/-)

MD and inst kW and kVA

I² accumulated trip currents

Disturbance recorder

Control

Sepam 2000 N04

Trip/close CB control

Trip circuit supervision (74)

Circuit breaker ready to close

External protection trip

Remote emergency trip

Intertrip send/receive

CB close inhibit

Lockout (86)

Logic selectivity block send/receive

Spring charge status

Disconnecter and earth status

Local/remote control selection

Output contact (for interface in 1 out of 2 changeover logic)

Changeover on/off selector switch

Optional features

Serial communication facility, RS485/Modbus

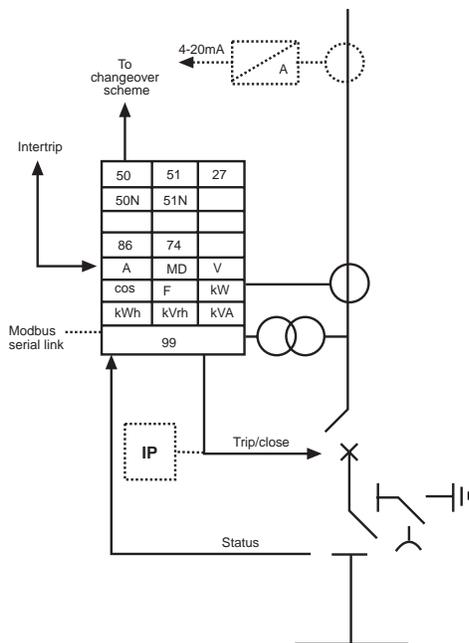
Current transducer 0-1 A, 0-10 V, 2-10 V, 0-5 V, +/-10 V, 0-1 mA, 0-20 mA, 4-20 mA

Interposing trip/close relays

Trip/neutral/close switch

Local/remote selector switch

Spring charge motor on/off switch



Protection and control modules

Panorama



The LV cabinet contains all the protection functions and the terminals for user connection of controls and indications. The cabinet utilises a standard harness, which has the protection and/or control kits added to meet customer requirements.

If required, units can be supplied with the LV cabinet removed to allow installation in areas where access is restrictive. The cabinet can then be easily fitted after installation.



Sepam 1000+ is used in applications requiring overcurrent and earth fault protection, current measurements and basic control and monitoring (e.g. cable or transformer feeder).

Sepam 1000+ key features are

- Comprehensive graphic display
- Easy to use function keys
- Alarm and trip indication via LED
- Serial Communication facility available (RS485/Modbus)
- Fault recorder

Sepam 2000 is used for applications requiring more comprehensive protection schemes and additional control functionality (e.g. G59 Interconnectors for embedded generation). Sepam 2000 is configured according to the functionality required. A set of standard software modules for protection, instrumentation and control logic are combined to develop a specific application. This programme is transferred to a programmable cartridge that “plugs in” to the unit.

Sepam 2000 features are

- Comprehensive range of protection functions
- Full instrumentation capability (I, V, kW, kVA, kWh, kVARh)
- Pre-defined control logic schemes (e.g. 2 out of 3 autochangeover)
- Alarm annunciation (Buchholz, temperature)
- Serial communication facility available (RS485/Modbus)
- Disturbance fault recorder





The Translay S differential relay in this application is for the protection of underground feeders.

The majority of plain feeders can be protected using this arrangement which features a unit protection scheme with no time or current grading problems, even on ring circuits.

MBCI features are

- High stability for through faults
- High speed operation for in zone faults
- Low earth fault settings
- Can be used as definite time overcurrent relay in the event of pilot failure

This feeder protection is based on the Merz-Price circulating current system. The majority of plain feeders can be protected using this arrangement which features a unit protection scheme with no time or current grading problems, even on ring circuits.

The MVAX31 relay supervises the trip circuit of the Genie circuit breakers, initiating alarm contacts and visual indication if the trip circuit or mechanism fails. It gives supervision with the circuit breaker in either state, open or closed.

MVAX31 features are

- Low burden
- Trip circuit can be supervised with breaker open or closed
- Mis-tripping of breaker by accidental short circuits avoided
- No false alarms given due to protection operation

The KAVS100 measures phase angle difference and slip frequency and blocks for differential voltage above setting.

The relay provides an electrical interlock, which prevents manual electrical closing of the circuit breaker when the supplies to be paralleled are outside set limits.

When the optional check synchronism relay is fitted the output is monitored by the Sepam 2000 relay, which inhibits electrical closing.

KAVS100 features are

- Wide range of phase angle setting adjustments
- Wide range of slip frequency timer settings
- Zero to infinity settings available on timer
- Live line/dead bus and dead line/live bus can be independently selected





Power Meter is a high performance low cost communicating meter. There are three different models to choose from PM600, PM620 or PM650 (refer to the PowerLogic selection guide for specific details).

Power Meter features are

- Comprehensive measurements (I, V, kW, kVA, kWh, kVARh)
- Power quality data (total harmonic distortion)
- Load consumption monitoring via RS485 Modbus serial communications
- Easy integration in the PowerLogic SMS software
- kWh pulsed output



Analogue ammeter

Metric 72 mm, short scale (90 degrees) moving iron ammeter. This is connected via a 1 amp Instrument current transformer in the yellow phase (I2) to give an accurate reading of the line current. The instrument will be scaled to suit the load requirements.

Current transducer. This is connected via a 1 amp Instrument current transformer in the yellow phase (I2) to give an accurate reading of the line current. The instrument will be scaled to suit the load requirements.

There is a choice of outputs, which should be specified at order placement.

The choice is

- 0...1 mA, 0...20 mA and 4...20 mA
- 0...10 V, 2...10 V, 0...5 V and 1...5 V

Each Sepam 2000 may be linked to the network cable via an optional integral Jbus communications and external CCA 609 connection box mounted inside the protection and control module. The connection box is used to tap on the communications cable.

CCA 609 features are

- Possible to remove a particular Sepam from the network without disruption to other Sepam relays



Protection and control modules

Panorama



Each Sepam 1000+ may be linked to the network communication cable via a ACE 949 connection box mounted inside the protection and control module. The connection box is used to tap on the communications cable.

ACE 949 features are

- Possible to remove a particular Sepam from the network without disruption to other Sepam relays

These terminals are specifically designed to satisfy all the secondary injection and test requirements for the CT and VT circuits. The terminals have the facility to allow shorting of current before opening the secondary circuits to begin testing of the protection and monitoring equipment.



Miniature circuit breakers are used in the protection and control auxiliary circuits. They are connected in the live and neutral, or positive and negative sides to ensure complete circuit isolation. The opening lever of the MCBs ensure both live and neutral, or positive and negative circuits are switched at the same time.

Use of MCBs provides the following benefits

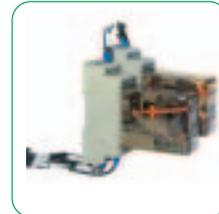
- 10,000 breaking capabilities
- Positive indication of the main contacts by the toggle handle
- No need to carry replacement parts
- Ability to padlock in off position
- Ability to fit auxiliary switch (used for supervision of VT with Sepam 2000)

Fuses and links are used in the protection and control auxiliary circuits when the control voltage is below 48 volts. They are connected in the live and neutral, or positive and negative sides to ensure complete circuit isolation. Fuse holders allow for easy removal and take industry standard 6.35 mm x 32 mm ($1/4 \times 1 1/4$ inch) fuses.

All panels are fitted with an LV pilot wire termination box to allow connection of remote indication/control and power supplies. It is directly mounted behind the protection and control module and allows connection of pilot wires from above the switchboard or from a rear cable trench. GEC Prima relays are used as interposing relays. The interposing relays are an optional kit which can be chosen when the customer requires their remote control circuit to be isolated from the control circuit in the LV cabinet.

The interposing relays are available in

- 24V dc
- 30V dc
- 48V dc
- 110V dc



Solkor RF is a development of the well proven Solkor-R protection relay which offers improved performance and is suitable for an increased range of pilot wire. The majority of plain feeders can be protected using this arrangement which features a unit protection scheme with no time or current grading problems, even on ring circuits.

Solkor RF features are

- High transient stability
- High speed operation for in zone faults
- Low phase and earth fault settings
- Bleed off up to 20% of CT primary ratings



Section five

A number of accessories are available to enhance the basic panel specifications.

These are detailed in the following section.

- Accessories are dispatched either as:
 - Factory fitted items. These are accessories that are either too bulky to despatch loose or require testing prior to despatch: i.e. GDV-F127 - Top entry cable box
 - Loose, boxed, for assembly on site. These items are those that need to be supplied loose to ease installation: i.e. GDV-A123, which is a gland plate, or test equipment such as GDV-A145 – foundation fixing kit

Summary tables

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Accessories panorama

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Accessories

Summary table

Circuit breaker ancillaries	Circuit breaker			Bus sections		Misc	Kit N°
	VC2	VC6	VC12	VB6	VB12	BECB	
Cable Kits							
1 x 3 core gland plate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	GDV-F119
3 x 1 core gland plate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	GDV-F128
2 x 3 core large gland plate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	GDV-F116
2 x 3 core small gland plate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	GDV-F116
6 x 1 core gland plate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	GDV-F115
Blank metal gland plate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	GDV-F121
1 x 3 core CES5 gland plate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	GDV-F120
2 x 3 core CES5 gland plate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	GDV-F117
1 x 3, 2 x 3 core (large T1) up to 300 mm brass wiping gland	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	GDV-A125
3 x 1, 6 x 1 core (small T1) up to 630 mm brass wiping gland	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	GDV-A123
1 x 3, 2 x 3 core (large) up to 300 mm tubular gland	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	GDV-A124
3 x 1, 6 x 1 core (small) up to 630 mm tubular gland	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	GDV-A122
1 x 3, 2 x 3 core CES5 gland	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	GDV-A126
3 x 630 A single dyscon termination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	GDV-A202
6 x 630 A single dyscon termination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	GDV-A203
Busbar end cable box bottom entry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				GDV-F110
Busbar end cable box top entry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				GDV-F111
Busbar kits							
630 A standard busbar kit	<input type="checkbox"/>		GDV-A105				
1250 A standard busbar kit	<input type="checkbox"/>	<input type="checkbox"/>	■	<input type="checkbox"/>	<input type="checkbox"/>		GDV-A106
Standard bus section busbar kit				■	■		GDV-F97
4 way busbar connection kit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				GDV-A100
3 way busbar connection kit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				GDV-A102
630 A earthed screened busbar kit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				GDV-A107
1250 A earthed screened busbar kit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				GDV-A108
bus section earthed screened busbar kit				<input type="checkbox"/>	<input type="checkbox"/>		GDV-F98
4 way earthed screened busbar connection kit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				GDV-A103
3 way earthed screened busbar connection kit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				GDV-A101
Installation items							
Set of foundation bolts	■	■	■	■	■		GDV-A145
Mechanical padlocks	<input type="checkbox"/>		GDV-A142				
Control switch padlocks (please specify quantity)	<input type="checkbox"/>		GDV-A143				

Key ■ Standard feature □ Optional feature

Accessories

Summary table

Circuit breaker ancillaries	Circuit breaker			Bus sections		Misc	Kit N°	
	VC2	VC6	VC12	VB6	VB12	BECB		
Ancillary items								
Interpanel kit	■	■	■	■	■	■	GDV-A313	
Single panel lifting kit	■	■	■	■			GDV-F285	
Single bus - section lifting kit				■	■		GDV-F285	
Operating handle one per switchboard as standard	■	■	■	■	■		GDV-A325	
Key interlock (earth on key free)	□	□	□	□	□		GDV-F139	
Key interlock (incomer/bus section, main on key trapped)	□	□	□	□	□		GDV-F138	
Phase sequence indicator	□	□	□	□	□		RMR-A25	
End panel earthing kit (standard cable box) required	□	□	□	□	□			
End panel earthing kit (inverted cable box) required	□	□	□	□	□			
TSM2001: pocket terminal used to programme (Sepam 2000)	1 off Standard with all Sepam 2000 switchboards							GEN-A145
SFT2801: software to programme Sepam via PC (Sepam 2000)	Optional with all Sepam 2000 switchboards							GEN-A385
SFT2821: software to load parameters and protection settings (Sepam 2000)	Optional with all Sepam 2000 switchboards							GEN-A394
SFT2826: oscillography analysis on PC (Sepam 1000+ and 2000)	Optional with all Sepam 1000+ and 2000 switchboards							GEN-A386
SFT2841: software to programme Sepam via PC (Sepam 1000+)	Optional with all Sepam 1000+ switchboards							GEN-A387
Tool Box	Optional with all switchboards							GEN-A162

Key ■ Standard feature □ Optional feature

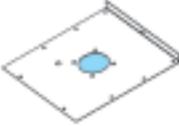
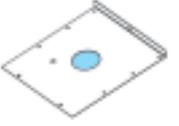
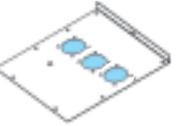
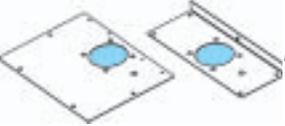
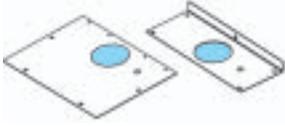
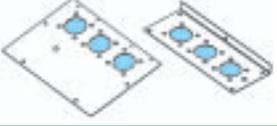


Accessories

Summary table

Gland plates

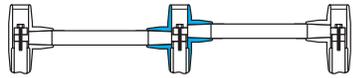
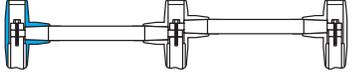
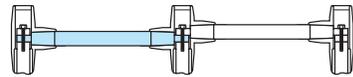
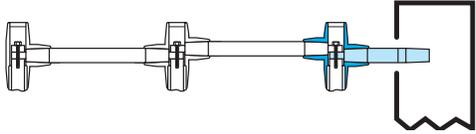
To assist in the selection of gland plates the guide shows the available range.

Standard	CES5	Description
GDV-F119 	GDV-F120 	1 x 3 core (large gland)
GDV-F128 		3 x 1 core (small gland)
GDV-F116 	GDV-F117 	2 x 3 core (large gland)
GDV-F115 		6 x 1 core (small gland)
GDV-F121 		Blank metal

Accessories

Summary table

Busbar options

Applications	Kit reference		Qty Panel
	Non-screened	Screened	
Mid panel busbar connection 	630A or 1250A GDV-A100: 4 way busbar connection kit	630A or 1250A GDV-A103: 4 way busbar connection kit	1/ mid panel
RHS or LHS end panel busbar connection 	630A or 1250A GDV-A102: 3 way busbar connection kit	630A or 1250A GDV-A101: 3 way busbar connection kit	1/ end panel
Panel to panel busbar connection 	630A GDV-A105: 630A busbar kit 1250A GDV-A105: 1250A busbar kit	630A GDV-A107: 630A busbar kit 1250A GDV-A108: 1250A busbar kit	1/ end panel 1/ end panel
RHS or LHS busbar end cable box 	1250A only 1250A busbar end cable box GDV-F110: Bottom entry GDV-F111: Top entry	1250A only SBECB: 1250A busbar end cable box	1/ end panel

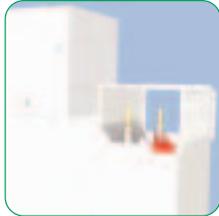


- All 500mm wide GenieEvo units can be off loaded by forklift truck or by using a single panel lifting kit consisting of a single fixing point and can be off loaded using a crane

Kit ref: GDV-F285

- All 1000mm wide GenieEvo units can be off loaded by forklift truck or by using a single panel lifting kit consisting of two fixing points and can be off loaded using a crane

kit ref: GDV-F285



- 630 amp disconnectable cable terminations (Dyscon) can be provided to facilitate the removal of cables without the breaking down of the cable joint

Kit ref: RMR-F58 (1 X 3)

RMR-F82 (1 X 6)

- All GenieEvo switchboards are delivered with one disconnecter operating handle. An additional handle can be ordered if required

Kit ref: GDV-A325



- Key type bolt interlock or equivalent. Two options are available. One to ensure that the earth has been applied to the cable before the key can be released. The second to ensure the circuit breaker is in the open position before the key is release

Kit ref: GDV-F139 (earth on key free)

GEN-F138 (main on key trapped)

- The units can be directly bolted to the concrete floor using 2 x 10 mm rawbolts for single width panels or 4 x 10 mm rawbolts for bus section

Kit ref: GDV-F145

- This kit contains the padlocks which can be attached to the mechanism to prevent any unauthorised manual closing, tripping or earthing operation. The use of these padlocks does not prevent any electrical closing or tripping in accordance with EATS 41-36

Kit ref: GDV-A142

- This kit contains the padlocks required to prevent unauthorised operation of the electrical control switches. The size of these padlocks are in accordance with EATS 50-18

Kit ref: GDV-A143

- The phase sequence indicator is a microprocessor controlled phase comparator. This device allows you to evaluate the rated frequency of the measuring signal to distinguish reliability between phase balance and phase unbalance

Kit ref: GEN-A25





- This kit is used to connect the front earth bar to the rear earth bar fitted on the end of a panel which has a standard cable box

Kit ref: GDV-F191

- This kit is used to connect the front earth bar to the rear earth bar fitted on the end of a panel which has an inverted cable box

Kit ref: GDV-F144



- A 19 inch barn type lockable tool box, complete with the following:

- | | |
|---|--|
| <input type="checkbox"/> 1 x Engineers pliers 4 1/2" | <input type="checkbox"/> 1 x 3/8" 13-67 NM torque wrench |
| <input type="checkbox"/> 1 x 5 mm A/F Allen key | <input type="checkbox"/> 1 x 3/8" Ratchet handle |
| <input type="checkbox"/> 1 x 4 mm socket | <input type="checkbox"/> 1 x 5" Ratchet extension |
| <input type="checkbox"/> 1 x 6 mm hexagon allen head wrench | <input type="checkbox"/> 1 x 17 mm 3/8" deep socket |
| <input type="checkbox"/> 1 x 7/8 mm o/e spanner | <input type="checkbox"/> 1 x 19 mm 3/8" deep socket |
| <input type="checkbox"/> 1 x 10/13 mm o/e spanner | <input type="checkbox"/> 1 x Terminal screwdriver |
| <input type="checkbox"/> 1 x 17/19 mm o/e spanner | <input type="checkbox"/> 1 x 3/8", 4-20 NM torque wrench |
| <input type="checkbox"/> 1 x Stanley 2006, 8" screwdriver | <input type="checkbox"/> 1 x Union 3104 padlock |

Kit ref: GEN-A162

- The TSM 2001 plugs directly into the front of Sepam 2000 relay and allows settings (password protected) of the protection functions and parameters (CT/VT ratio etc). Monitoring and control program logic (input/output status, telecontrol signal bits etc), and full metering information including resetting of the metering statistics, (e.g. maximum power demand) are also available.

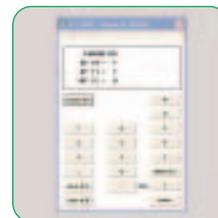
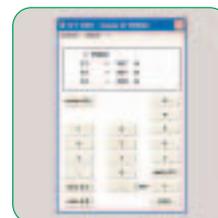
- The unit is powered directly from the Sepam 2000 relay

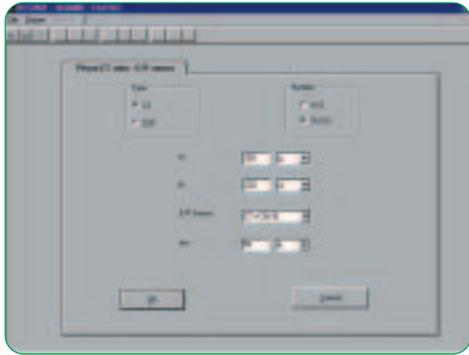
Kit ref: GEN-A145

- The SFT2801 is a PC based software tool that may be used instead of the "TSM2001" pocket terminal. Furthermore, the SFT 2801 application provides additional functions for reading, printing and storage of Sepam 2000 parameters and for retrieving disturbance records. It can be installed on a PC and connected to the front of the Sepam 2000 via an adaptor. Recommended system requirements:

- Pentium Processor 133 MHz or more
- 32 Mb of RAM (minimum)
- Hard disk (4Mb free space)
- MS-Windows 95, 98, NT 4.00 or higher

Kit ref: GEN-A385





GEN-A387

■ The SFT 2821 is a PC based software tool that may be used to upload and download parameter and protection settings into Sepam 2000. It can also be used as a design office tool for the preparation of parameter and protection setting files prior to being connected to Sepam 2000. Recommended system requirements:

- Pentium Processor 133 MHz or more
- 32 Mb of RAM (minimum)
- Hard disk (4 Mb free space)
- MS-Windows 95, 98, NT 4.00 or higher

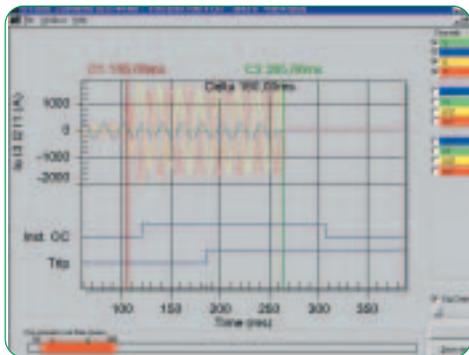
Kit ref: GEN-A394

■ The SFT 2826 is a PC based software tool that may be used to display and analyse the disturbance records provided by the Sepam 1000+/ 2000.

It can be used for post fault analysis and displays both digital (status of Inputs and KFRs) and analogue (current and voltage wave forms) information.

- Pentium Processor 133 MHz or more
- 32 Mb of RAM (minimum)
- Hard disk (4 Mb free space)
- MS-Windows 95, 98, NT 4.00 or higher

Kit ref: GEN-A386



GEN-A394

■ The SFT 2841 software is a compliment to the user machine interface on the Sepam 1000+. It allows, via connection of a PC to the front of the relay display of all the metering, operating, system diagnosis and alarm data, setting of the protection functions, system data and parameters (password protected). It also allows the retrieval of the disturbance records and the downloading of complete settings and system data.

Recommended system requirements:

- Pentium Processor 133 MHz or more
- 32 Mb of RAM (minimum)
- Hard disk (4 Mb free space)
- MS-Windows 95, 98, NT 4.00 or higher

Kit ref: GEN-A387



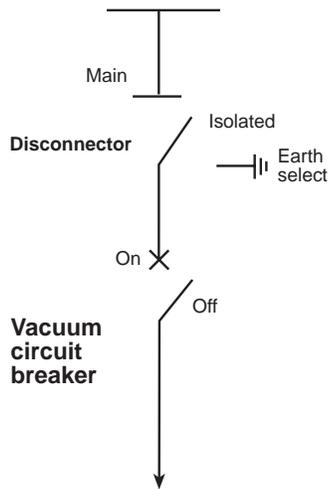
GEN-A386

Accessories

Earthing scheme

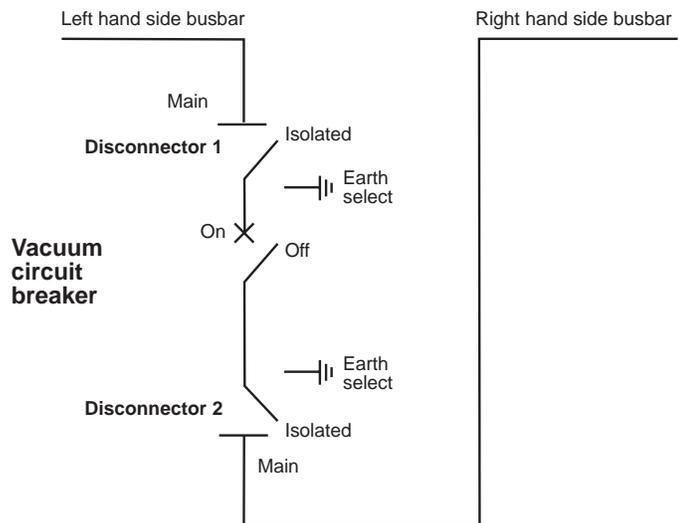
Circuit earthing

All circuit breaker panels have the ability to earth the circuit as standard. The circuit is earthed via the main vacuum circuit breaker and the position of the series disconnecter. Being an off load device the circuit earth can only be selected with the circuit breaker in the open position. As can be seen on the single line diagram once the disconnecter is in the earth select position the breaker can be closed earthing the circuit.



Busbar earthing

The bus section panel has two series disconnectors utilised to offer either right hand or left hand side busbar earthing from the same panel, this does away with the need for an additional busbar earth panel. To earth the right hand side of the switchboards busbars, with the vacuum circuit breaker in the off position disconnecter number two can be moved to the main select position and number one to the earth position. When the circuit breaker is then closed the right hand side of the switchboards busbars are earthed. The position of the two disconnectors is reversed to earth the left hand sides of the switchboards busbars.



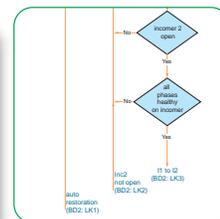
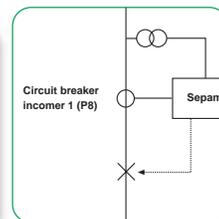
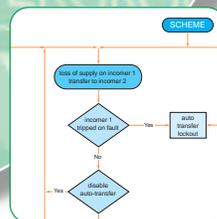
Section six

1 out of 2 auto changeover scheme 82

2 out of 3 auto changeover schemes 86

□ Scheme 1 87

□ Scheme 2 90



Standard schemes

Application

1 out of 2 auto changeover scheme

General description of 1 out of 2 auto changeover scheme

The following scheme includes the control logic for a 1 out of 2 changeover scheme and is fitted to the two alternative supply, incoming circuit breakers. This scheme is fully documented and tested. Therefore greatly reducing the overall delivery cycle.

- Protection and control module P18 - page 66 incorporates the following scheme:
- One incomer in service, the other incomer on standby

Manual or automatic restoration of the setup once supply is restored can be selected.

- The 2 incomers must be equipped with P18 protection modules that supply the following information to one another:
 - Incomer position
 - Incomer tripped on fault
 - Undervoltage on incomer
 - Inhibit auto transfer

Legend for auto changeover schemes

 = Start/finish of process

 = Decision

 = Process

BD = block diagram

LK = link to other diagram

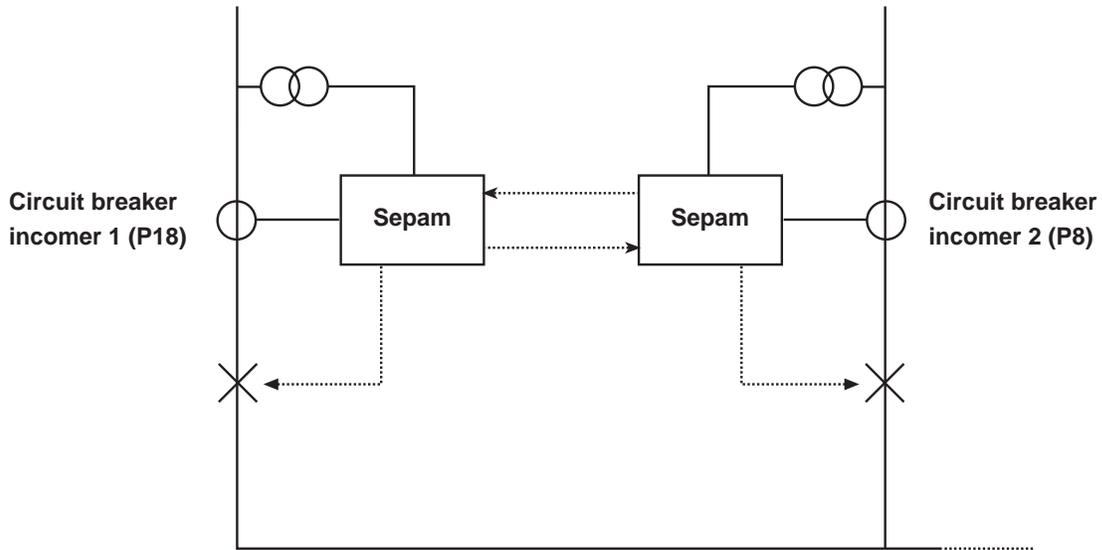


Figure 1. 1 out of 2 auto changeover scheme

1 out of 2 auto changeover scheme

- The normal operating configuration for scheme is either:
 - Incomer 1 main supply, incomer 2 standby supply
 - Incomer 2 main supply, incomer 1 standby supply

When the main supply is lost, providing the standby supply is available, the main supply breaker is tripped and the standby supply breaker is closed.

Loss of main supply is detected by an undervoltage condition on one or more phases for a time in excess of 2.5s*, without the incoming supply protection detecting an overcurrent or earth fault condition.

Once the transfer sequence is initiated the message TF IN PROG (transfer in progress) is displayed whilst the transfer sequence is carried out.

If the main supply CB does not open or if the standby supply CB does not close the message TF FAILED (transfer failed) is displayed and further operation is inhibited until the system is manually reconfigured and the auto changeover scheme is reset.

When the transfer is complete and manual restoration has been selected (KP6=0) the message TF COMPLETE (transfer complete) is displayed and further operation is inhibited until the auto changeover scheme is reset.

If automatic restoration is selected (KP6=1) no message is displayed when the transfer is complete. The system will remain in the new configuration unless the supply is lost.

If this occurs the sequence will be reversed by tripping the standby supply CB and closing the main supply CB provided that the main supply has returned (indicated by presence of voltage on all three phases for more than 25s*).

If both supplies are unavailable the auto changeover scheme is inhibited until one of the supplies returns. Transfer to this supply will then take place.

Tripping of either the main supply CB or the standby supply CB due to a fault condition will lock out the auto changeover scheme. The message TF LOCKOUT (transfer locked out) is displayed and further operation is inhibited until the system is manually reconfigured and the auto changeover scheme is reset.

- One of the following conditions must be satisfied before reset of the auto changeover scheme is permitted:
 - Incomer 1 closed, incomer 2 open, incomer 1 supply healthy
 - Incomer 2 closed, incomer 1 open, incomer 2 supply healthy

Note:

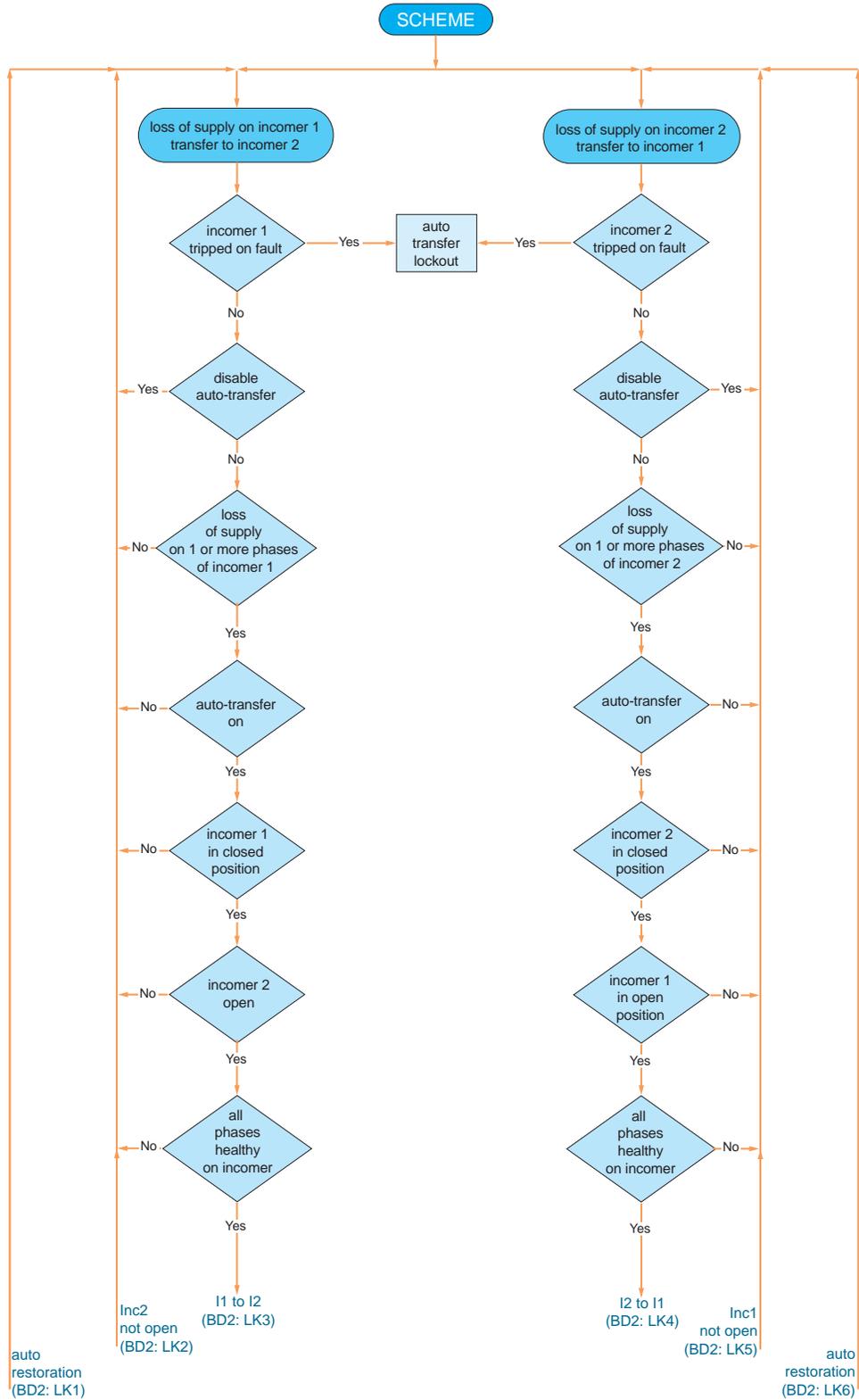
* The time settings used in the auto changeover schemes are recommended settings, however they can be adjusted to suit specific customer requirements at the time of commissioning (time adjustable between 50 ms and 655 s).

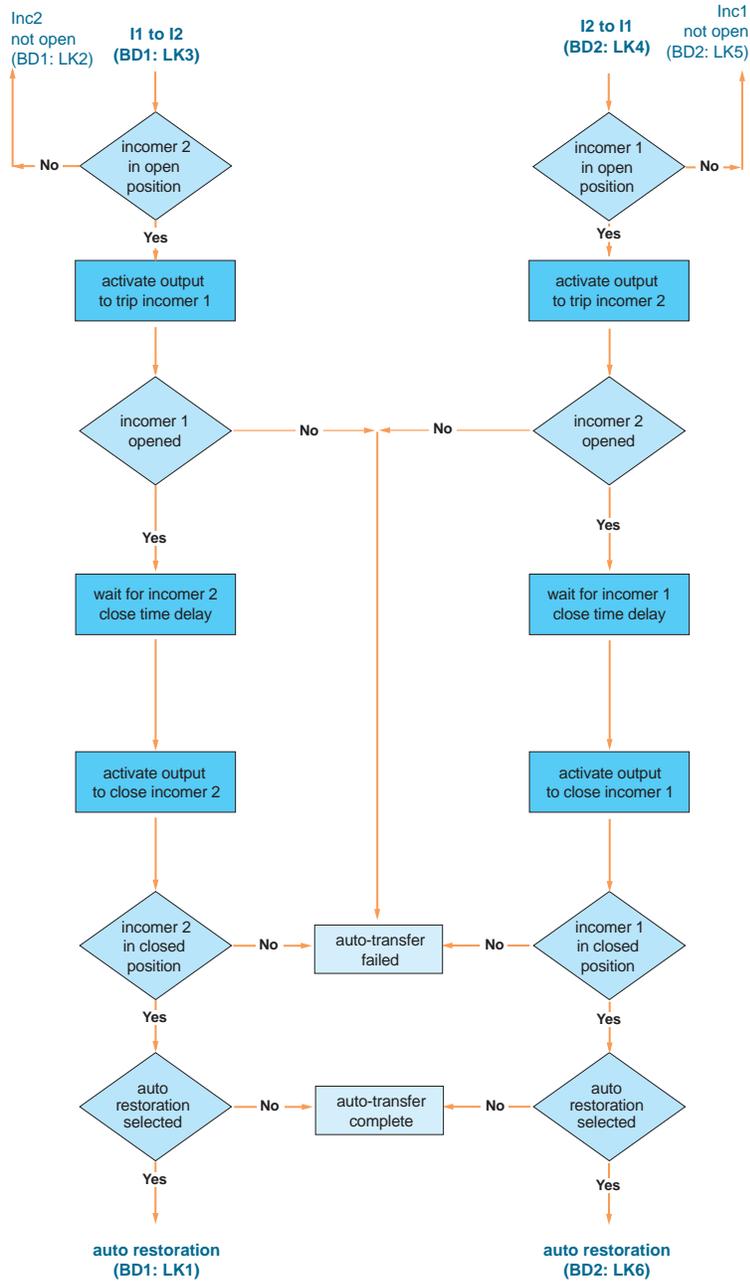


Standard schemes

Application

1 out of 2 auto changeover scheme





Standard schemes

Application

2 out of 3 auto changeover scheme

General description of 2 out of 3 auto changeover scheme

The following 2 schemes include the control logic for a 2 out of 3 changeover scheme and are fitted to the bus section circuit breaker. This scheme is fully documented and tested. Therefore greatly reducing the overall delivery cycle.

- Protection and control module P11 - page 59 incorporates all the functionality to control the 2 schemes detailed below:
- Scheme 1 - one incomer in service, the other incomer on standby and the bus section closed,
- Scheme 2 - both incomers in service and the bus section open

Manual or automatic restoration of the setup once supply is restored can be selected.

- The 2 incomers must be equipped with P8 protection modules that supply the following information to the bus section P11:
 - Incomer position
 - Incomer tripped on fault
 - Undervoltage on incomer
 - Inhibit auto transfer
- The following control signals are sent to the two incomers from P11 on the bus section:
 - Trip incomer
 - Close incomer
 - Inhibit incomer closing

Legend for auto changeover schemes

 = Start/finish of process

 = Decision

 = Process

BD = block diagram
LK = link to other diagram

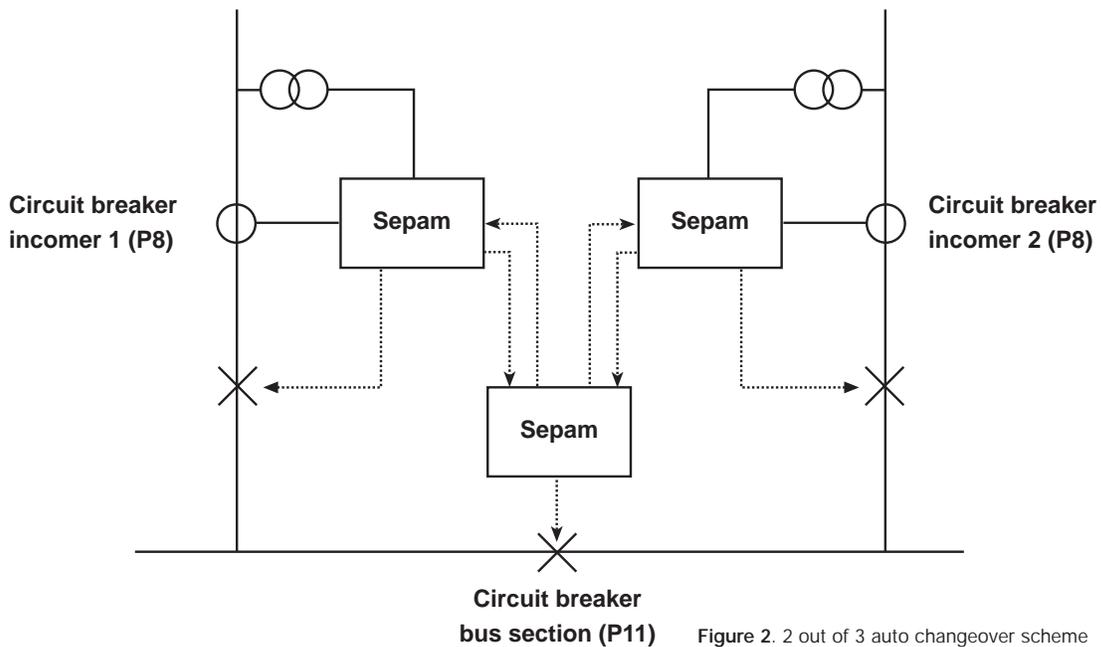


Figure 2. 2 out of 3 auto changeover scheme

2 out of 3 auto changeover scheme

Scheme 1 operation

- The normal operating configuration for scheme 1 (KP1=0) is either:
 - Incomer 1 main supply, Incomer 2 standby supply and the bus section closed
 - Incomer 2 main supply, Incomer 1 standby supply and the bus section closed

When the main supply is lost, providing the standby supply is available, the main supply breaker is tripped and the standby supply breaker is closed. Loss of main supply is detected by an undervoltage condition on one or more phases for a time in excess of 2.5s*, without the incoming supply protection detecting an overcurrent or earth fault condition.

Once the transfer sequence is initiated the message TF IN PROG (transfer in progress) is displayed whilst the transfer sequence is carried out.

If the main supply CB does not open or if the standby supply CB does not close the message TF FAILED (transfer failed) is displayed and further operation is inhibited until the system is manually reconfigured and the auto changeover scheme is reset. When the transfer is complete and manual restoration has been selected (KP6=0) the message TF COMPLETE (transfer complete) is displayed and further operation is inhibited until the auto changeover scheme is reset.

If automatic restoration is selected (KP6=1) no message is displayed when the transfer is complete. The system will remain in the new configuration unless the supply is lost.

If this occurs the sequence will be reversed by tripping the standby supply CB and closing the main supply CB provided that the main supply has returned (indicated by presence of voltage on all three phases for more than 25s*).

If both supplies are unavailable the auto changeover scheme is inhibited until one of the supplies returns. Transfer to this supply will then take place.

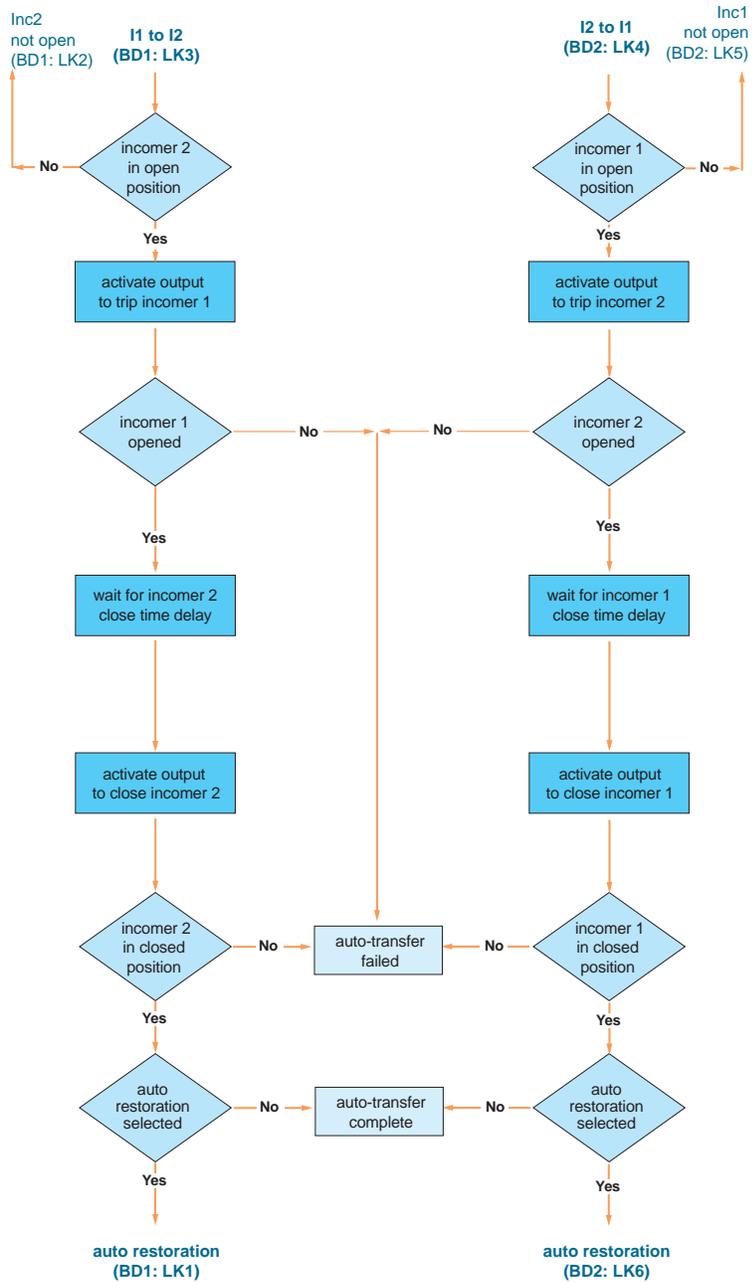
Tripping of either the main supply CB or the standby supply CB due to a fault condition will lock out the auto changeover scheme. The message TF LOCKOUT (transfer locked out) is displayed and further operation is inhibited until the system is manually reconfigured and the auto changeover scheme is reset.

- One of the following conditions must be satisfied before reset of the auto changeover scheme is permitted:
 - Incomer 1 closed, Incomer 2 open, Incomer 1 supply healthy and bus section closed
 - Incomer 2 closed, Incomer 1 open, Incomer 2 supply healthy and bus section closed

Note:

* The time settings used in the auto changeover schemes are recommended settings, however they can be adjusted to suit specific customer requirements at the time of commissioning (time adjustable between 50 ms and 655 s).





Standard schemes

Application

2 out of 3 auto changeover scheme

2 out of 3 auto changeover scheme

Scheme 2 operation

- The normal operating configuration for scheme 2 (KP1=1) is:
 - Incomer 1 closed, incomer 2 closed and the bus section open

When Incomer 1 supply is lost, providing incomer 2 supply is available, Incomer 1 breaker is tripped and the bus section breaker is closed.

Loss of main supply is detected by an undervoltage condition on one or more phases for a time in excess of 2.5s*, without the incoming supply protection detecting an overcurrent or earth fault condition.

Once the transfer sequence is initiated the message TF IN PROG (transfer in progress) is displayed whilst the transfer sequence is carried out.

If Incomer 1 CB does not open or if the bus section CB does not close the message TF FAILED (transfer failed) is displayed and further operation is inhibited until the system is manually reconfigured and the auto changeover scheme is reset.

When the transfer is complete and manual restoration has been selected (KP11=0) the message TF COMPLETE (transfer complete) is displayed and further operation is inhibited until the auto changeover scheme is reset.

If automatic restoration is selected (KP6=1) no message is displayed when the transfer is complete. The system will remain in the new configuration until Incomer 1 supply is restored (indicated by presence of voltage on all three phases for more than 25s*). When this occurs the transfer sequence will be reversed by tripping the bus section and closing Incomer 1.

If incomer 2 supply is lost in normal operating configuration the auto changeover scheme operates in mirror image to the transfer from Incomer 1 to Incomer 2 i.e. providing that Incomer 1 supply is available Incomer 2 is tripped and the bus section is closed etc.

If both supplies are unavailable the auto changeover scheme is inhibited until one of the supplies returns. Transfer to this supply will then take place.

Tripping of either the main supply CB or the standby supply CB due to a fault condition will lock out the auto changeover scheme. The message TF LOCKOUT (transfer locked out) is displayed and further operation is inhibited until the system is manually reconfigured and the auto changeover scheme is reset.

- One of the following conditions must be satisfied before reset of the auto changeover scheme is permitted:
 - Incomer 1 closed, Incomer 2 closed, Incomer 1 supply healthy, Incomer 2 supply healthy and bus section open. (This is the only configuration which will allow the auto changeover scheme to be reset when manual restoration is selected and the transfer is completed)
 - Incomer 1 closed, incomer 2 open, incomer1 supply healthy and bus section supply closed
 - Incomer 2 closed, incomer 1 open, incomer 2 supply healthy and bus section closed

The auto changeover operation for both schemes is shown in more detail in the flow charts and block diagrams within the control logic section of this document.

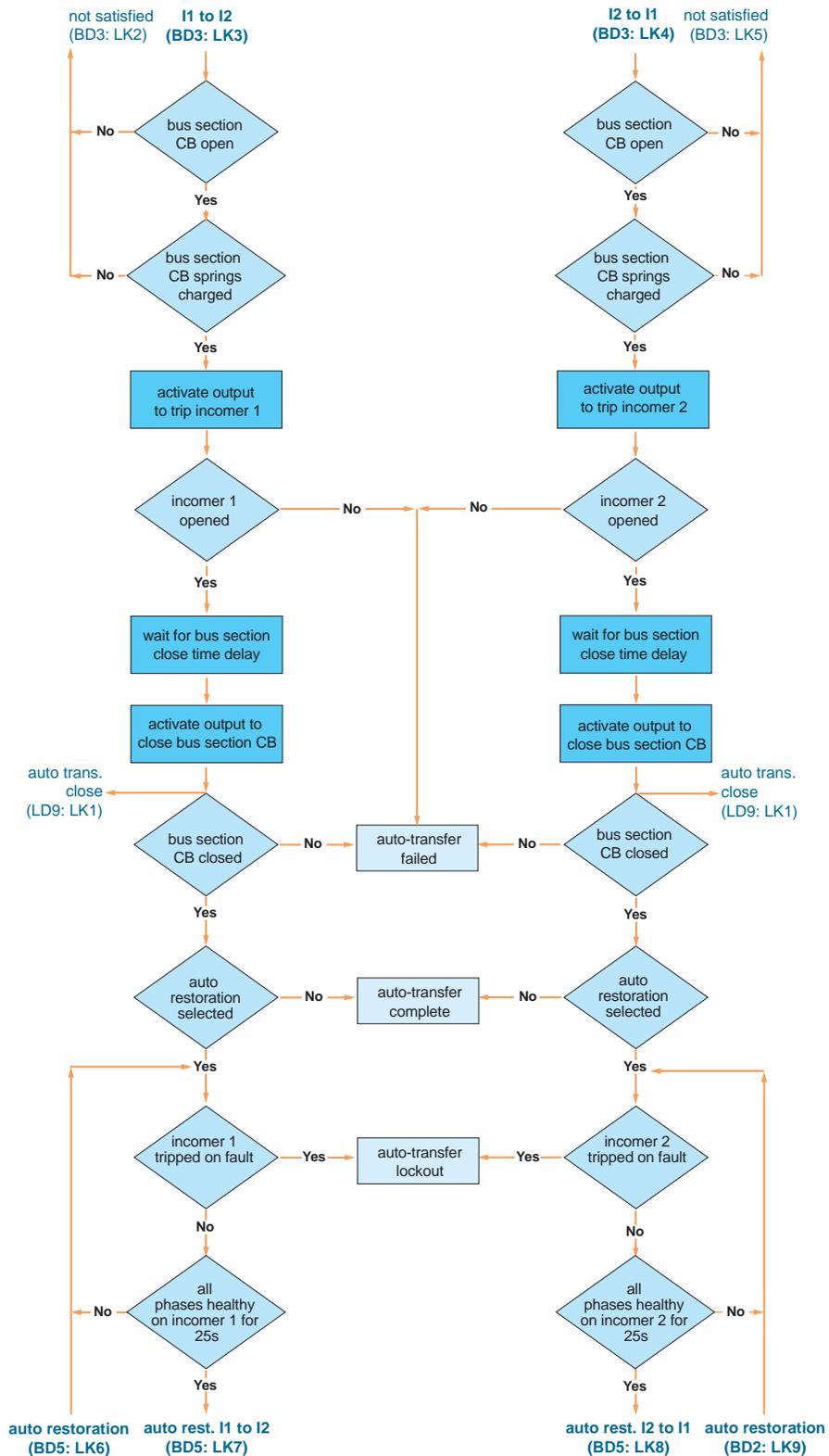
Note:

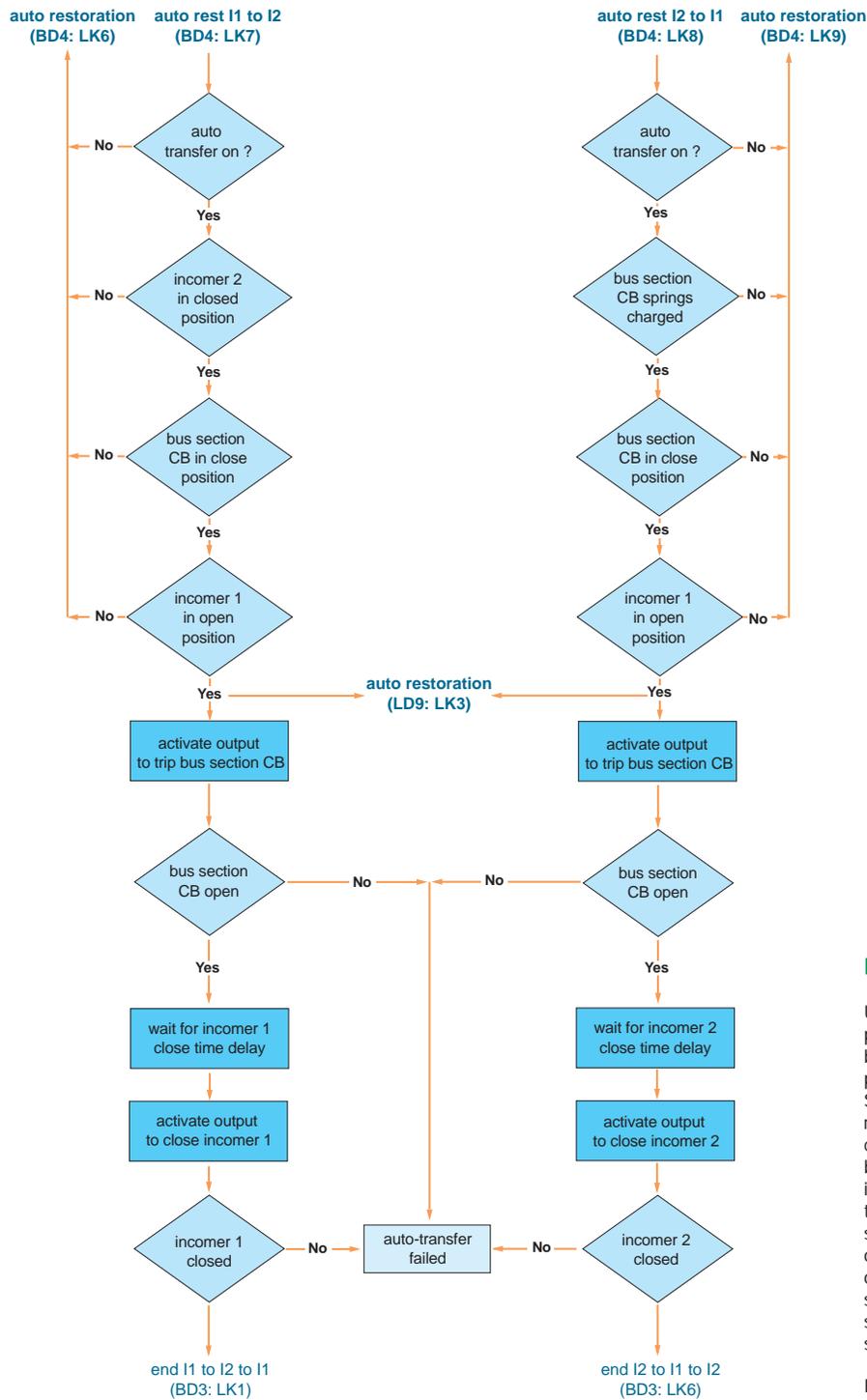
* The time settings used in the auto changeover schemes are recommended settings, however they can be adjusted to suit specific customer requirements at the time of commissioning (time adjustable between 50 ms and 655 s).

Standard schemes

Application

2 out of 3 auto changeover scheme





Parallel operation

Under normal operating conditions paralleling of the 2 incoming circuit breakers is not allowed and is prevented by interlocking within the Sepam. However, if manual restoration is selected and a changeover has taken place it may be desirable to parallel the 2 incomers for a short period of time to avoid a further interruption in supply, when changing back to the original configuration. This should only be done if the 2 incoming supplies come from the same switchboard and therefore are in synchronism.

KP12 is used to select whether parallel operation is allowed, KP12 = 0 parallel operation not allowed, KP12 = 1 parallel operation allowed.

Section seven

Drawing Ref: GDVINST-01 96

Circuit breaker module VC2, VC6 and VC12

Drawing Ref: GDVINST-04 97

Circuit breaker module VC2, VC6 and VC12

Drawing Ref: GDVINST-02 98

Bus section circuit breaker module VB6 and VB12

Drawing Ref: GDVINST-08 99

Bus end cable box (bottom entry)

Drawing Ref: GDVINST-07 100

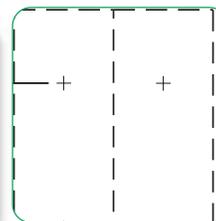
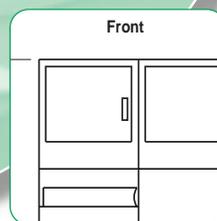
Bus end cable box (top entry)

Drawing Ref: GDVINST-09 101

Busbar metering panel

Drawing Ref: GDVINST-05 102

Cabling options

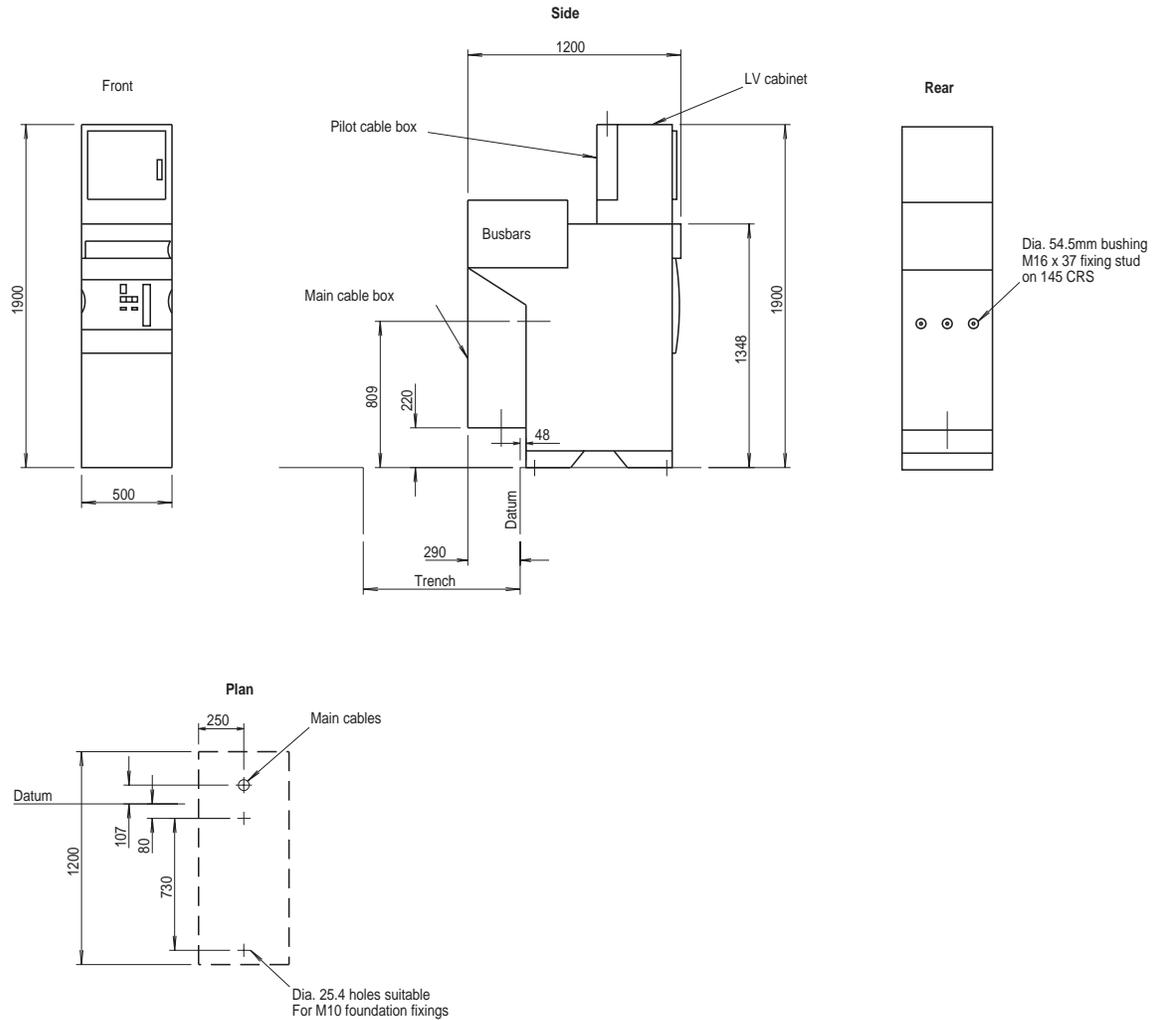


Installation drawings

Circuit breaker - bottom entry

Drawing Ref. GDVINST-01

Panel type	Page
VC2	28
VC6	30
VC12	32



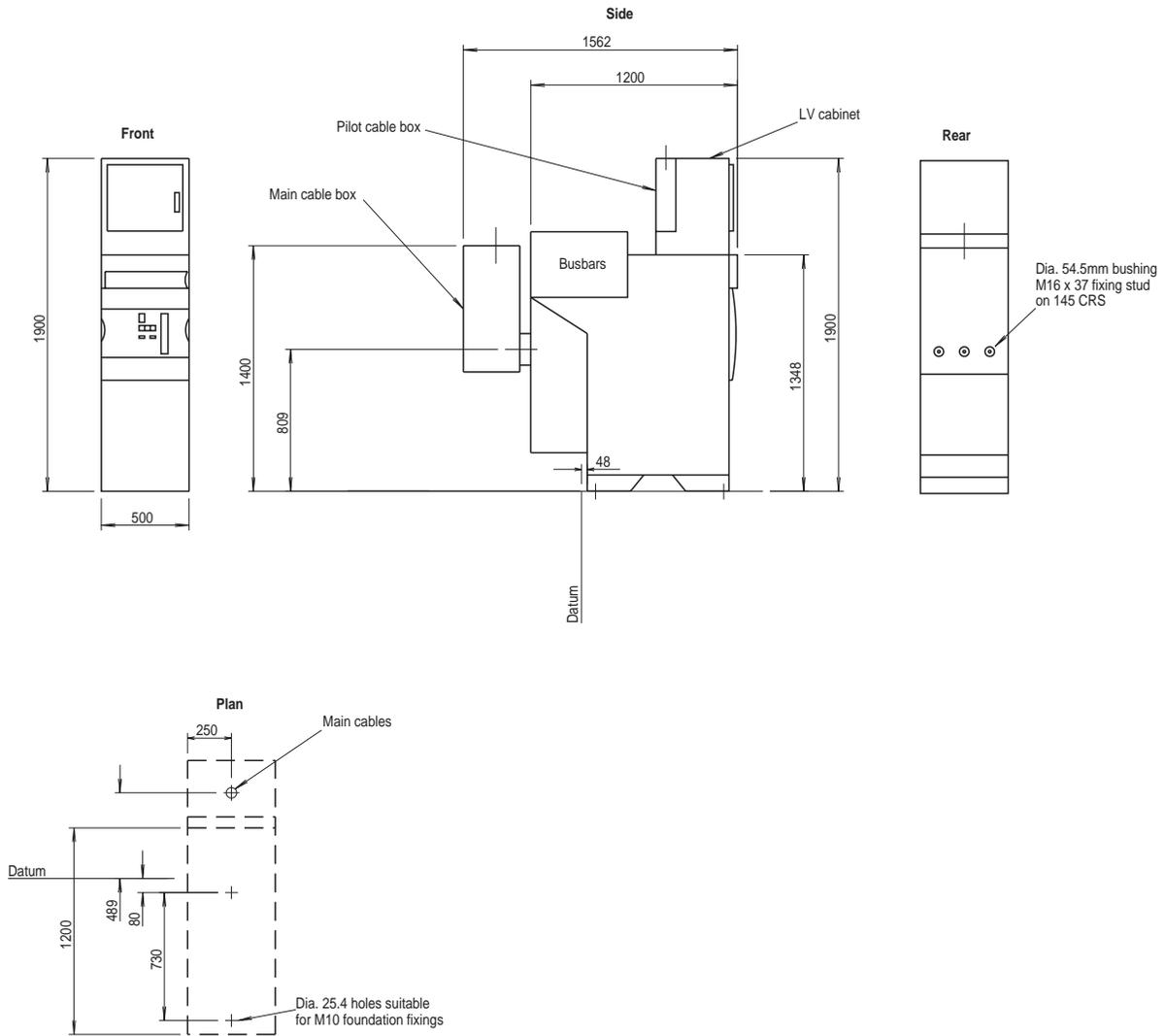
All dimensions are in mm

Installation drawings

Circuit breaker - top entry

Drawing Ref. GDVINST-04

Panel type	Page
VC2	28
VC6	30
VC12	36



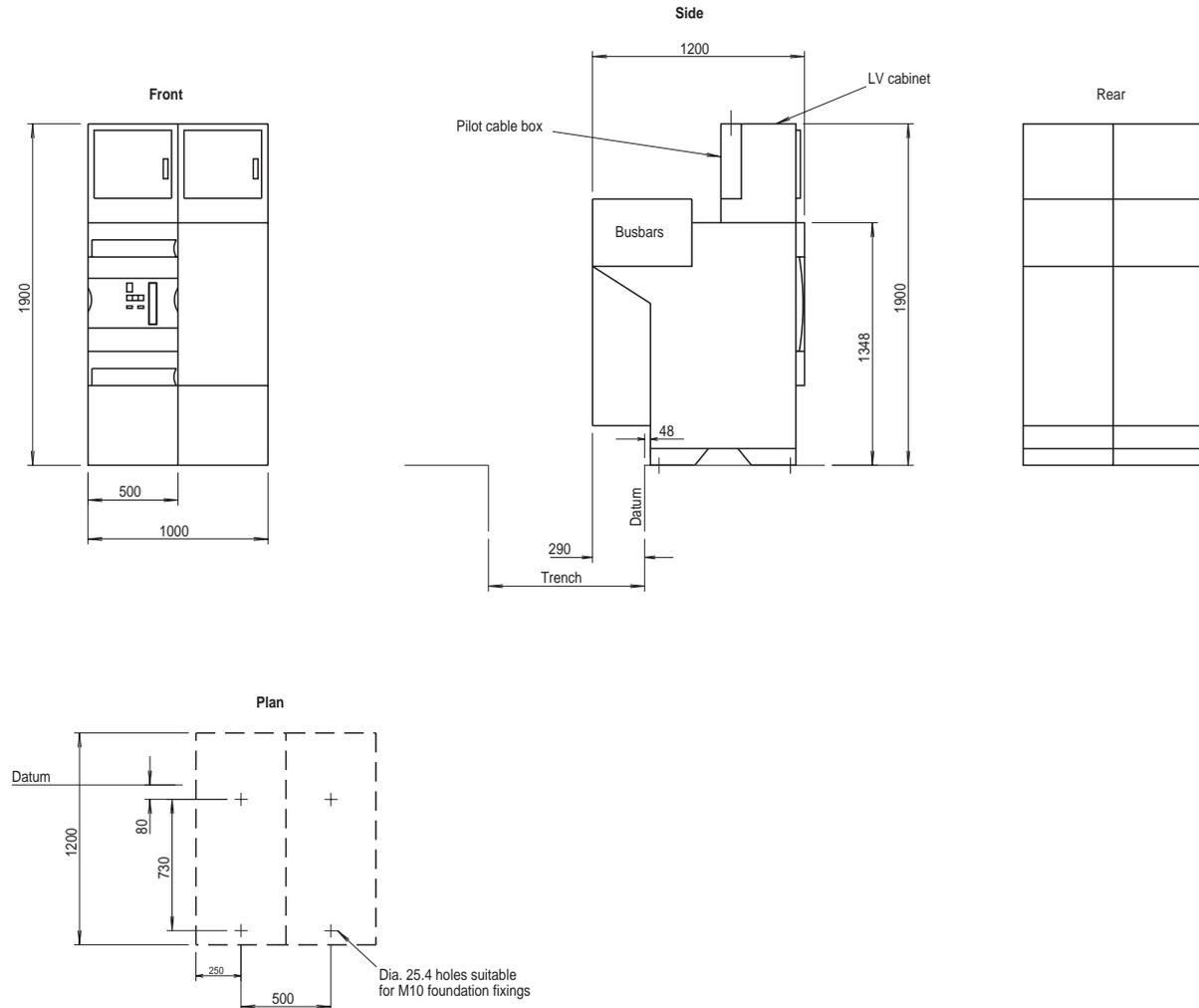
All dimensions are in mm

Installation drawings

Bus section circuit breaker module

Drawing Ref. GDVINST-02

Panel type	Page
VB2	34
VB12	36

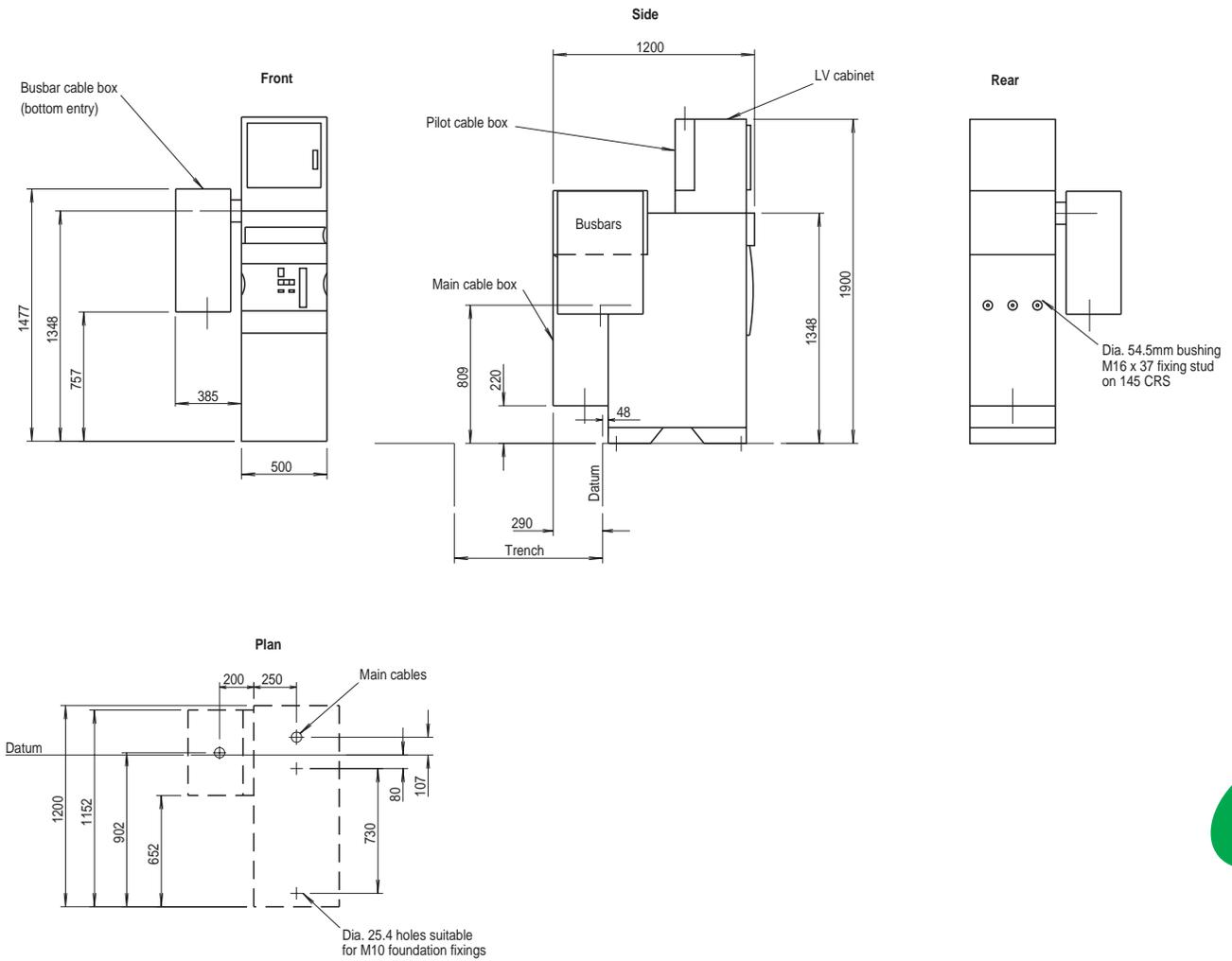


All dimensions are in mm

Installation drawings

Bus end cable box - bottom entry

Drawing Ref. GDVINST-08

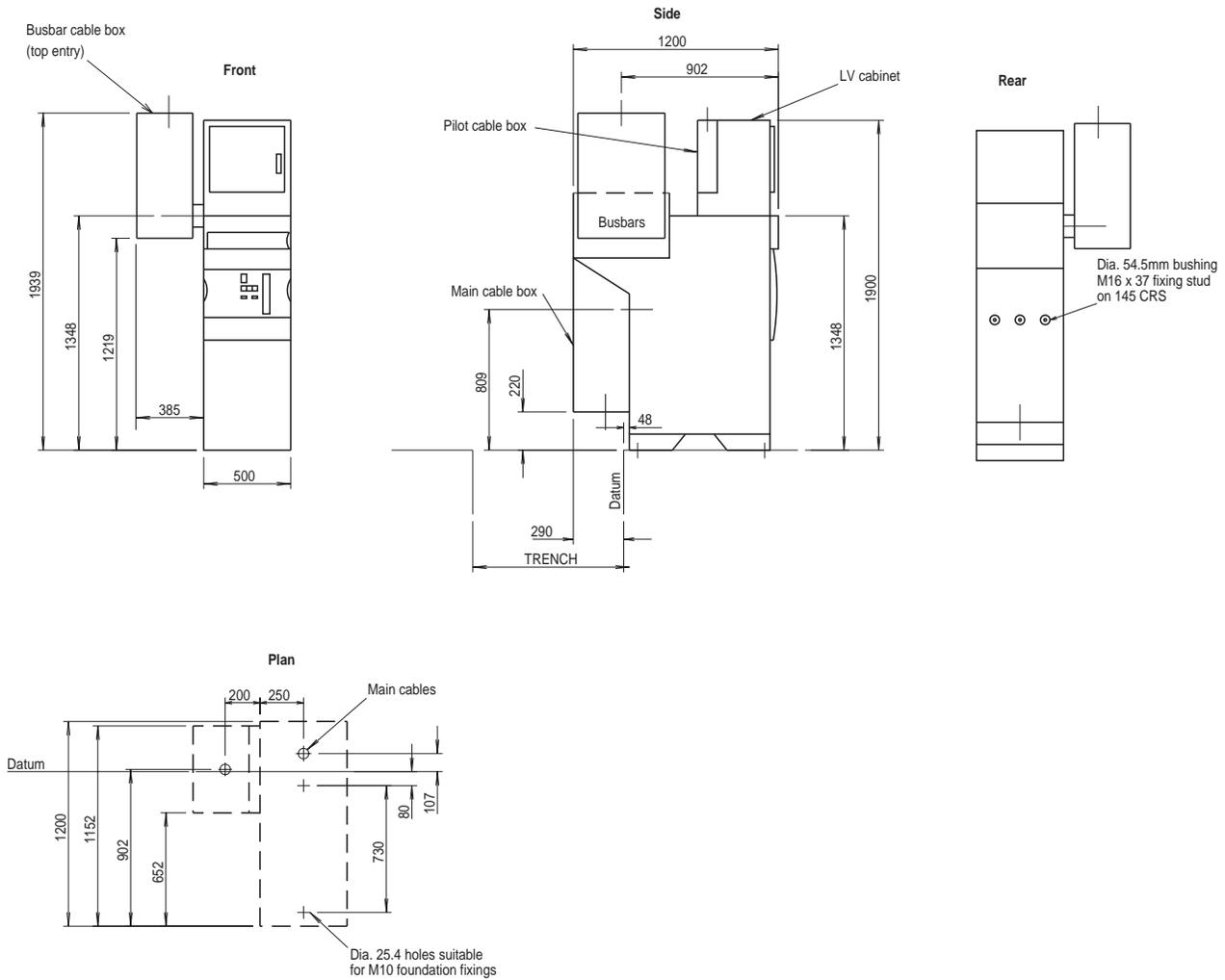


All dimensions are in mm

Installation drawings

Bus end cable box - top entry

Drawing Ref. GDVINST-07



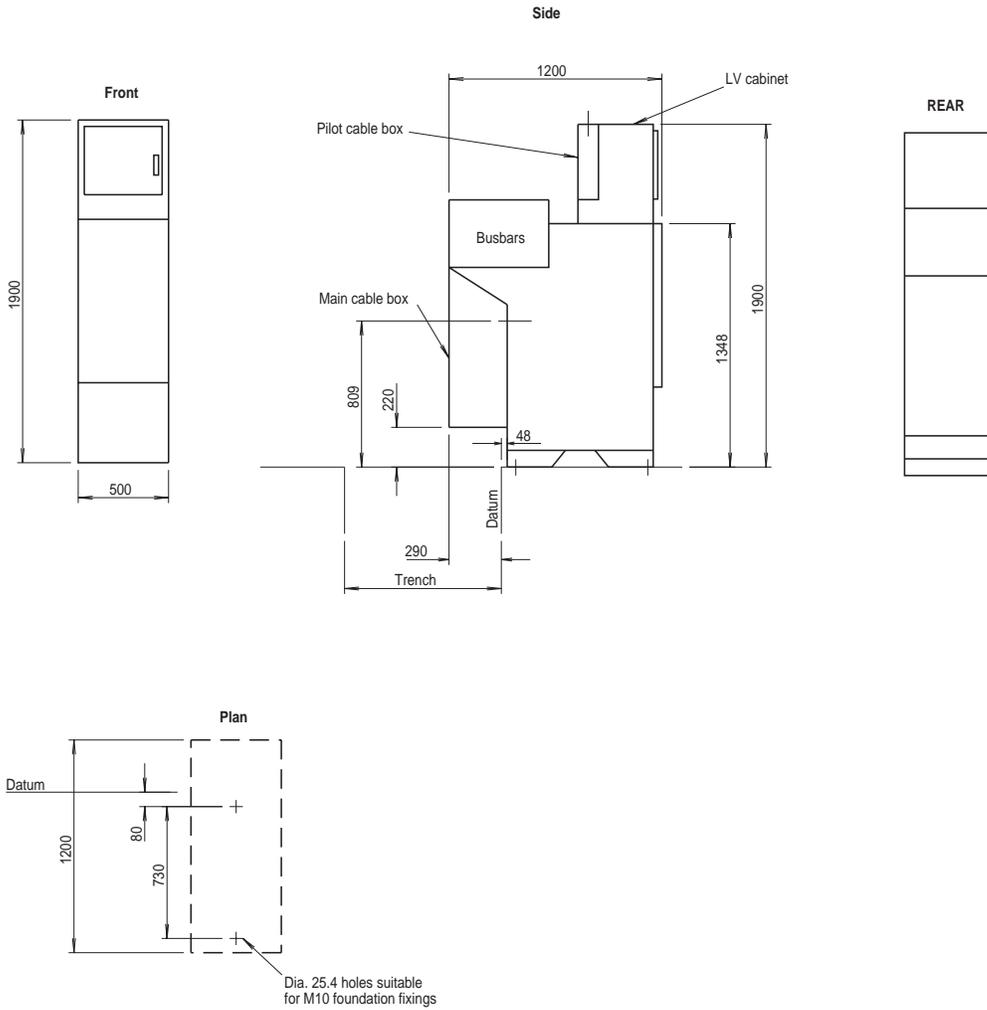
All dimensions are in mm

Installation drawings

Busbar voltage transformer

Drawing Ref. GDVINST-09

Panel type	Page
BBM	38

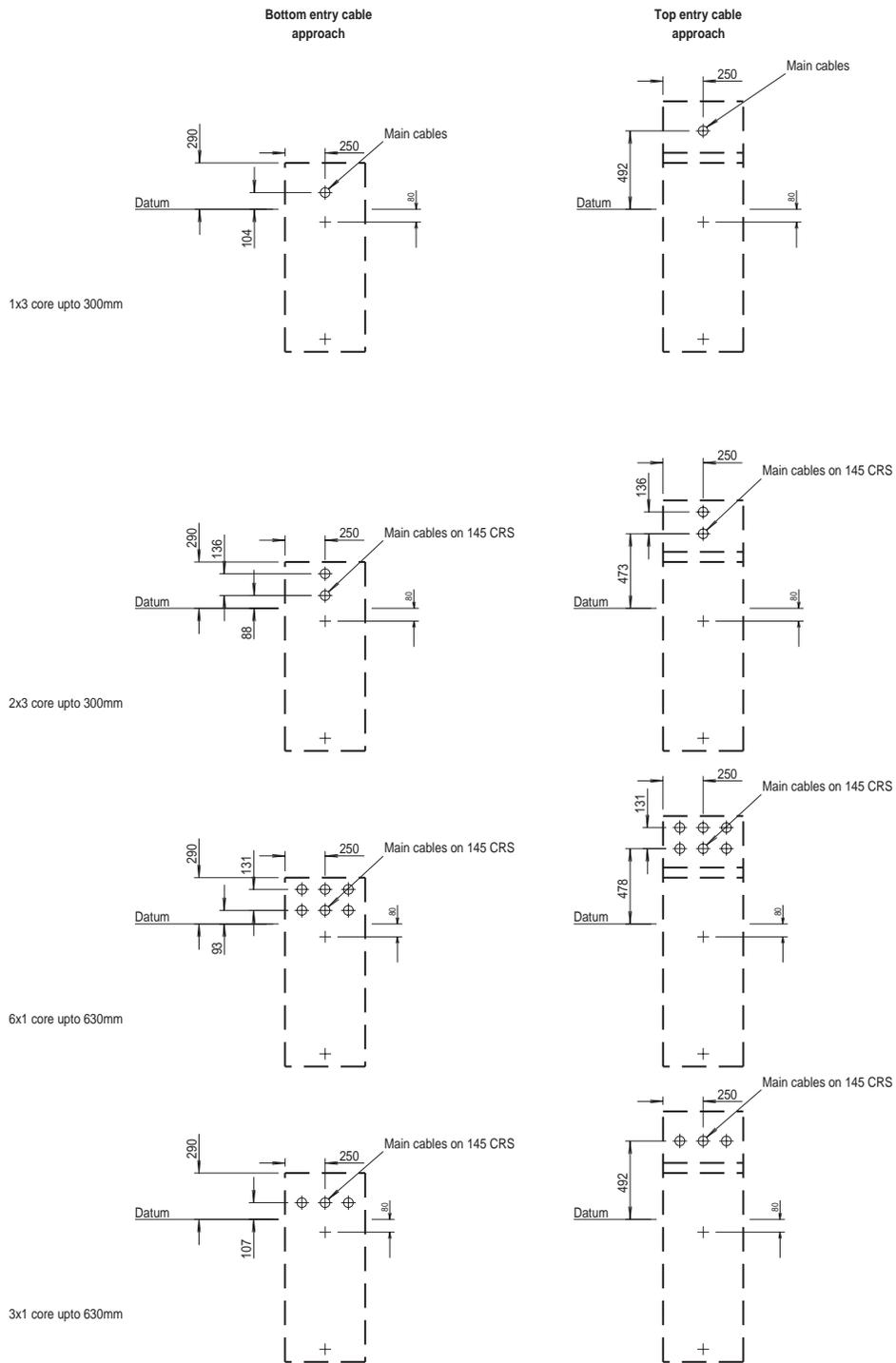


All dimensions are in mm

Installation drawings

Cabling options

Drawing Ref. *GDVINST-05*



All dimensions are in mm

Section eight

This section of the selection guide is designed to assist us in the preparation of a budget quotation to your specific switchboard requirement.

However if you have a detailed specification and would like a firm price against its contents please forward it to:

Schneider Electric Ltd
 Merlin Gerin Medium Voltage
 123 Jack Lane
 Leeds, LS10 1BS
 United Kingdom

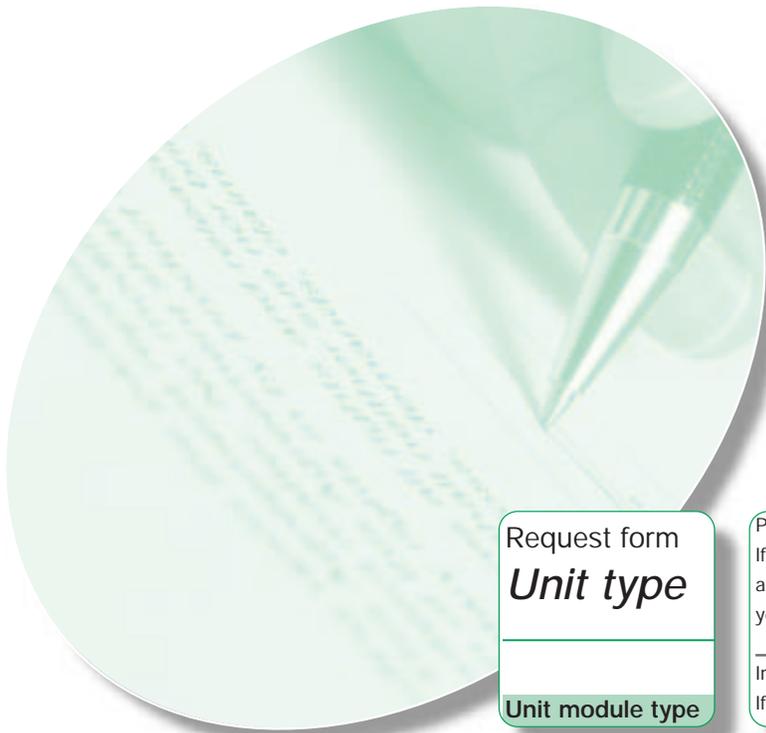
www.schneider.co.uk

MVswitchgearGB@Schneider.co.uk

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Unit type	105
-----------	-----

Protection and control module	106
-------------------------------	-----



Request form
Unit type

Unit module type

Protection Pilot wire diff
 If standard current trans
 are not suitable please s
 your requirement

Instrumentation*
 If standard current trans

630 A	Y	N
1250 A	Y	N
r 13.8 kV		
240 V AC		

Quotations

Request form

Switchboard details

Panel N°	1	2	3	4	5	6	7	8	9	10	11	12	13
Unit details ⁽¹⁾													
Circuit breaker module													
Protection and control module													
Main cable box ⁽²⁾													
Bottom entry (standard)													
Top entry													
Cable type (eg 1 x 3 core PILC)													
Size in mm ²													
Dyson terminations required *													
Cable glands required (specify kit number)	Y N	Y N	Y N	N Y	N Y	N Y	N Y	N Y	N Y	N Y	N Y	N Y	Y N
Unit accessories													
Mechanical padlocks*													
Control switch padlocks (please specify quantity)	Y N	Y N	Y N	N Y	N Y	N Y	N Y	N Y	N Y	N Y	N Y	N Y	Y N
Key interlock (earth on key free)*	Y N	Y N	Y N	N Y	N Y	N Y	N Y	N Y	N Y	N Y	N Y	N Y	Y N
Key interlock (main on key trapped)*	Y N	Y N	Y N	N Y	N Y	N Y	N Y	N Y	N Y	N Y	N Y	N Y	Y N

Switchboard accessories	Standard Qty	Optional Qty
Operating handle	1	
Phase sequence indicator	0	
TSM2001 - pocket terminal used to programme (Sepam 2000)	1 ⁽³⁾	
SFT2801 - software to programme Sepam via PC (Sepam 2000)	0	
SFT2821 - software for loading of parameters and protection settings (Sepam 2000)	0	
SFT2826 - oscillography analysis on PC (Sepam 1000+ and 2000)	0	
SFT2841 - software to programme Sepam via PC (Sepam 1000+)	0	
Tool box	0	

(1) Please refer to section 4 to ensure your selection of circuit breaker module is available with your choice protection and control module.

(2) Not available on bus sections or earthing switches

(3) This item is supplied with switchboards that include Sepam 2000.

* Yes or No, check the appropriate box

Quotations

Request form

Unit type

Unit module type	Circuit breaker						Bus section				
	VC2		VC6		VC12		VB6		VB12		
Quantity											
Ratings											
Busbar current rating* 630 A	Y	N	Y	N	Y	N	Y	N	Y	N	
Busbar current rating* 1250 A	Y	N	Y	N	Y	N	Y	N	Y	N	
Service voltage 3.3, 6.6, 11 or 13.8 kV											
Control voltage 24, 48, 110 V DC or 240 V AC											
Current transformers											
Protection Sepam	Ratio	Standard		Standard		Standard		Standard		Standard	
	Class	Standard		Standard		Standard		Standard		Standard	
	Burden	Standard		Standard		Standard		Standard		Standard	
Protection Pilot wire differential* If standard current transformer are not suitable please specify your requirement	Standard	Y	N	Y	N	Y	N				
	Ratio										
	Class										
	Knee point Resistance										
Instrumentation* If standard current transformer are not suitable please specify your requirement	Standard	Y	N	Y	N	Y	N	Y	N	Y	N
	Ratio										
	Class										
	Burden										
Metering* If VC6, or VB6 is selected or the standard current transformer are not suitable please specify your requirement	Standard	Y	N	Y	N	Y	N	Y	N	Y	N
	Ratio										
	Class										
	Burden										
Voltage transformers											
Circuit connected*	Y	N	Y	N	Y	N					
Connection type Fused											
Electrical control											
Trip coil	Y	N	Y	N	Y	N	Y	N	Y	N	
Close coil	Y	N	Y	N	Y	N	Y	N	Y	N	
Motor mechanism	Y	N	Y	N	Y	N	Y	N	Y	N	
Voltage required (24, 48, 110, 220 V DC or 230 V AC)											

* Yes or No, check the appropriate box



Quotations

Request form

Application

Protection and control module type	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18
Quantity																		
Measurement																		
Phase current																		
Max demand current																		
Phase voltages																		
kW, kVA, cos																		
kWh, kVARh																		
kWh pulsed output																		
Monitoring and control																		
Trip circuit supervision																		
Lockout relay																		
Intertrip send																		
Intertrip receive																		
Check synchronising																		
Remote emergency trip																		
Logic selectivity (block receive)																		
Current transducer (1A specify output required)																		
Modbus RS485 serial comms																		
Trip circuit fault alarm contact																		
Interposing trip/close																		
Trip/neutral/close switch																		
Local/remote switch																		
Motor ON/OFF switch																		
Note: This sheets allows you to select the options that are available on a particular protection and control module.																		

Section nine

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Industrial systems and solutions 110

Energy and infrastructure systems and solutions 111

Projects and Services 112





Schneider Electric's expertise is founded on its four international brands – Merlin Gerin, Modicon, Square D and Telemecanique.

With over 100 years experience in the electrical industry, Schneider Electric has established itself as a world and UK leader in the supply and manufacture of products for the distribution, monitoring and control of electrical power.

Schneider Electric regards its customers as commercial partners, who, like us, demand the highest standards of excellence in terms of products, projects and services.

Schneider Electric is proud to provide the solutions to meet their needs.

Schneider Electric operates the largest, dedicated sales force in the UK electrical industry.

Sales engineers have specialist expertise and an understanding of the customer needs within each of the following market sectors:

- Building systems and solutions
- Industrial systems and solutions
- Energy and infrastructure systems and solutions



Building systems and solutions



The real reason for putting technology into buildings is to simplify tasks, enhance safety and improve the quality of life.

Schneider Electric knows this and has created attractive, functional products for the residential building sector. Well being comfort and entertainment are key concepts in this area.

The same objectives apply to commercial buildings such as offices, hotels, shopping centres, hospitals, schools and care facilities for the elderly.

Schneider Electric offer a wide range of solutions in the area of building management services and uses its expertise in all of these buildings to protect people and equipment.



Schneider Electric means greater comfort, lower operating costs and enhanced safety.

Related industries

- Retail
- Education
- Health
- Entertainment centres
- Offices
- Warehouses
- Agriculture
- Factory
- Private residential
- Public residential

Principal customers in the construction market

- Contracting authorities
- Main contractors
- Building engineers



Industrial systems and solutions

Schneider Electric focus on performance in all areas of industry.

Our products and services adapt to each specific business and environment, from discrete manufacturing and production lines to continuous processes in a wide variety of industries such as:

- Automotive
- Food and beverage
- Pharmaceuticals
- Construction materials
- Waste management



Across a wide range of applications including:

- Conveyors
- Packaging
- Materials handling
- Hoisting

Energy infrastructure systems and solutions

Schneider Electric is involved in the entire electrical distribution chain from power plants to end users. Customer demand for complete availability, uncompromising quality and absolute safety has made the search for excellence our key mission.

Today, electrical substation and network protection, monitoring and control are highly effective in reducing outage time.

Proven technologies offer a wide range of simple, efficient and flexible solutions for optimised, step by step investments.



Infrastructure

Schneider Electric is involved in developing infrastructure and transportation systems around the world. In areas where no failures can be tolerated, such as road and rail equipment, harbour installations and airports, Schneider Electric provides solutions in electrical distribution, control and monitoring, automation and supervision.



Key markets

- Electricity distribution
- Water
- Rail
- Airports
- Seaports
- Defence
- Gas
- Telecommunications
- Road

Principal customers in the electric power market

- Power suppliers involved in generation and distribution
- Utility companies
- Major contractors
- Large end user sites
- Government departments



Projects and services - delivering tailored solutions for your business

We provide solutions enabling you to reduce the total cost and lifetime ownership risk of your electrical distribution and automation systems, whilst fulfilling your ongoing quality, safety and environmental obligations.

Choice of services

Our services aim to add value to each project phase, but the choice of services you use is entirely yours. You may want a full set of services that together provide a package of support covering the entire lifecycle of your project, or you can select a combination of services to complement your resources or knowledge.

If you are not sure of what you need, our consultation services will help you to define the parameters of your solution.

Consultation

These services provide you with an assured way to road map your project. We take your ideas and requirements and apply our wide range of application experience and technical competence to produce conceptual designs and indicative costings.

Design

Using the analysis from the consultation phase, or information that you may provide, the design phase selects the most suitable equipment and provides detailed drawings and technical specifications.

Implementation

This is often the most time-pressured stage of a project when schedules demand fast implementation and commissioning. These services provide high quality installation and commissioning, preceded by thorough preparation.

Operation

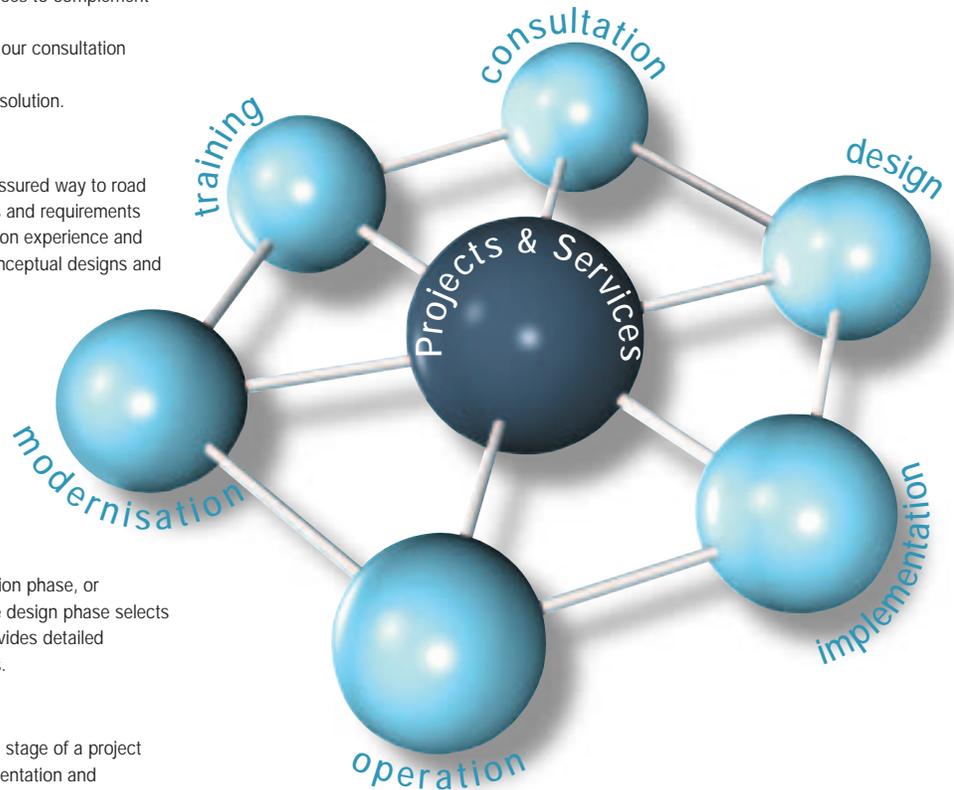
Efficient operation is vital to derive the best value from your investment. These services ensure that installations achieve the highest operational efficiency and are cost-effectively maintained with minimum downtime.

Modernisation

Faulty or ageing equipment can be refurbished and repaired if this is the most cost-effective action.

Training

A wide range of training services are available including product standards and legislation. Each is regularly updated to stay current with the latest technology. Training can be delivered at a Schneider Electric training facility, or at a customer's own site.



Section ten



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Please note: Due to the constant progress in standards and equipment, the characteristics shown in the texts and images in this document are only binding once expressly confirmed by ourselves





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