Aegis[36]
Ring Main Unit up to 38kV

engineering intelligent solutions

Aegis[36] builds upon the strong foundations of the Aegis product family, and is designed to deliver the features our customers need most:

+ Flexible and cost effective
+ Safe and intuitive operation
+ Compact design
+ Indoor and outdoor installation
+ Automation ready
+ Easy to install
+ Climate independent
+ Wide range of protection relays, VPIS and VDS
+ Virtually maintenance-free
+ Wide range of options and accessories

To find out more about us, visit:
www.lucyelectric.com

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Introduction to Lucy Electric

Lucy Electric is an international leader in switching, protection and automation solutions for electrical distribution networks. With more than 100 years of engineering heritage, the company specialises in secondary power distribution, delivering high-performance medium voltage switchgear, overhead line equipment, and advanced automation and retrofit solutions for utility, industrial and commercial customers worldwide.

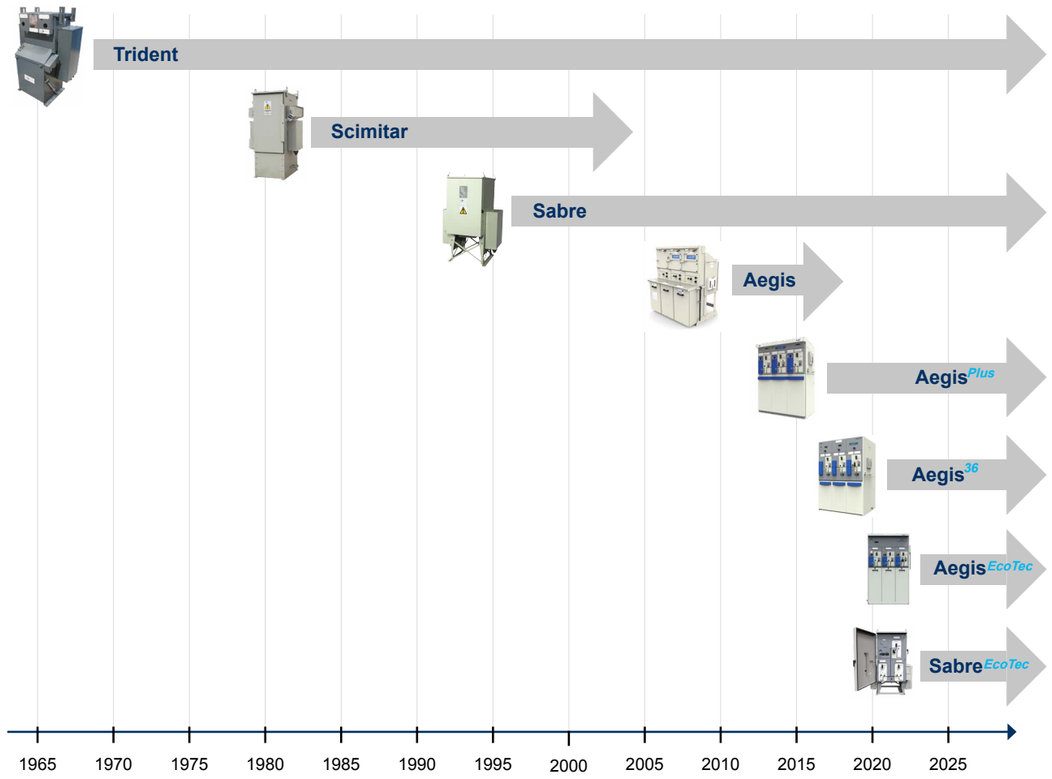
Engineering excellence sits at the heart of Lucy Electric. By combining deep technical expertise with advanced technology, the company delivers reliable, high-quality solutions designed to meet the most demanding operational and environmental requirements.

A comprehensive product portfolio is supported by specialist services and dedicated after-sales support throughout the entire product lifecycle.

Continuous innovation is driven by a specialist research and development centre in the UK, while dedicated manufacturing facilitates provide full control over production quality.

Lucy Electric's operations are truly global, with offices in Thailand, Africa, Brazil, Malaysia, Dubai, Saudi Arabia, South Africa and the UK. The company has manufacturing facilities in the UK, the UAE, Saudi Arabia, Thailand, Brazil and India. Together, with a network of industrial partners and contractors, the company's infrastructure supports projects in more than 50 countries worldwide.

Ring main unit range evolution



Product panorama: Lucy Electric medium voltage and high voltage range

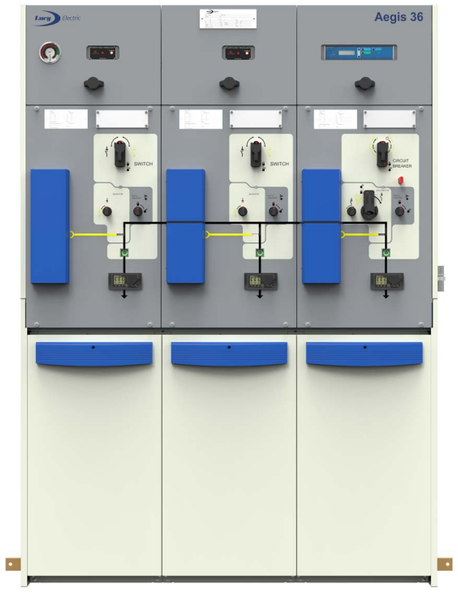
Ring Main Units		Rated Voltage (up to)	Mode of Fault Current Interruption	Insulation Medium	Rated Current (up to)	Mounting	Installation Condition	Operation
	**Aegis 36**	38kV	Vacuum	SF6	630A	Ground/ Transformer	Indoor/ Outdoor	Local/ Remote
	**Aegis EcoTec**	12kV/24kV	Vacuum	Synthetic Air	630A	Ground	Indoor/ Outdoor	Local/ Remote
	**Aegis Plus**	24kV	Vacuum/ HV Fuse	SF6	630A	Ground/ Transformer	Indoor/ Outdoor	Local/ Remote
	**Sabre EcoTec**	12kV/17.5kV	Vacuum	Synthetic Air	630A	Ground/ Transformer	Indoor/ Outdoor	Local/ Remote
	**Sabre**	24kV	Vacuum	SF6	630A	Ground/ Transformer	Indoor/ outdoor	Local/ Remote
	**Trident**	15.5kV	Fuse	Oil	630A	Ground/ Transformer	Indoor/ Outdoor	Local/ Remote
Metering Unit								
	**Aegis Plus/ Aegis 36**	24kV/ 38kV		Air	630A	Ground/ Transformer	Indoor/ Outdoor	
	**Sabre**	15.5kV		Air	630A	Ground/ Transformer	Indoor/ Outdoor	
	**Oil**	15.5kV		Oil	630A	Ground/ Transformer	Indoor/ Outdoor	

Introduction to Aegis^{36}

Aegis^{36} represents a significant addition to Lucy Electric's highly successful Aegis product family. It has been specifically designed for secondary distribution networks, wind farms, and photo voltaic power stations, with ratings up to 38kV. Available for both indoor and outdoor environments, the range is well-suited to a wide variety of application requirements. Aegis36 delivers high levels of reliability and operator safety, and is a compact, cost effective, and virtually maintenance-free product.

Aegis^{36} offers numerous functional configurations, insulated within a single, robot welded sealed tank. This robust range has been built for the most demanding environments, with the option to convert units from indoor to outdoor installation, extending its environmental protection rating.

These advances have been achieved alongside a reduction in spatial footprint, resulting in a more compact design that is straightforward to install.



Characteristics:

- 38kV and 630 A ratings
- Extensible and non-extensible range
- Flexible arrangements of functions, providing the exact solution
- 1 to 4 functions in a single SF6-insulated stainless steel enclosure
- Hermitically sealed stainless steel switching chamber
- No on-site SF6 gas handling for installation
- Intuitive single-line mimic diagram
- Vacuum interrupter technology for circuit breakers
- Suitable for indoor and outdoor applications
- Circuit breaker protection using a wide range of self-powered and auxiliary relays
- Motorisation for remote control
- Easy integration with SCADA networks
- Front access cable terminations, with DIN 400 Type C bushings
- Earth & test facility

Standards

Aegis^{36} complies with the latest international standards:

IEC 62271 – 100	Alternating current circuit breakers
IEC 62271 – 102	Alternating current disconnectors and earthing switches
IEC 62271 – 103	Switches for rated voltages between 1kV and 52kV
IEC 62271 – 105	Alternating current switch fuse combinations
IEC 62271 – 200	AC metal enclosed switchgear and control gear
IEC 62271 – 206	VPIS systems for rated voltages between 1kV and 52kV
IEC 62271 – 1	HV switchgear and control gear: common specifications
IEC 61243 – 5	Voltage detecting systems (VDS)
IEC 60255	Measuring relays and protection equipment

Installation and operating conditions

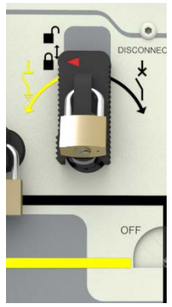
IP 54 - Outdoor

IP 41 - Indoor

- Indoor and outdoor type units
- Maximum altitude of operation without derating 1000m (above sea level) *
- Installation medium: SF6 Gas
- Rated pressure at +20°C: 0.04 mpa
- Interruption medium: vacuum

* For higher altitude applications, please contact your local Lucy Electric sales office

Safety features



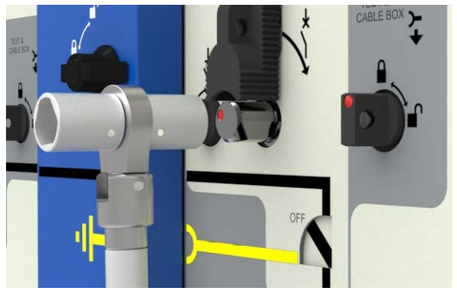
Operation mechanism

The mechanism consists of one operating shaft and one selector. The operating shaft is used for switching ON / OFF (Mains or Earth) and the selector is used for selection of the Mains or Earth positions. It is impossible to simultaneously close the Load Break Switch / Circuit Breaker and the Earth switch.

The mechanism incorporates mechanical interlocks and padlocking facilities to improve operational safety and security.

Anti-reflex mechanism

Ensures a time delay between switching operations to allow sufficient time for the main (primary or upstream) breaker to trip and clear a fault.



Earth stud in cable compartment

A fully rated earth stud is fixed inside the cable compartment, located towards the bottom of the unit. It is used for connection to the main earthing system.

Earth and test facility

The cable earth and test facility is an optional feature on the Load Break Switch and the Circuit Breaker. It is located at the front of the unit for ease of access. It is used for testing cable insulation and to locate faults in the circuit without the need to remove the main cables from the cable compartment, which improves the operator safety.

The cable test access cover is fully interlocked and cannot be opened until the Load Break Switch or Circuit Breaker Switch is in the Earth ON position. The test bushings are earthed with a star bar which has to be removed for cable tests.

Cable compartment

The cable compartments are located at the front of the unit with horizontally mounted DIN 400 Type C bushings for ease of cable connection.

For enhanced operator safety, the cable compartments are earthed and fully interlocked, allowing operator access only if the function is in the Earth ON position. There is an option to select these cable compartments with Internal Arc ratings as per IEC standard.

Internal Arc withstand

The SF6 gas insulated, stainless steel tanks are fully internal arc rated and this feature is also available on the cable compartments (optional) to ensure maximum operator safety in the event of internal faults. As standard, Aegis^{36} units are rated for AF (operator safety from the front of the unit), AFL (front and lateral), and AFLR (front, lateral and rear).

For more details, please refer to the internal arc protection page 27.

Gas pressure indicator

- A gas pressure indicator is fitted to the tank which has green and red sectors to indicate the minimum permissible pressure for safe operation
- An optional remote gas pressure alarm (1NO) can be specified to alert the operator in the event of gas pressure falling below the permissible operable limit
- Temperature compensated gauge available as an option.

Applications

Aegis^{36} has been designed and developed for optimal performance in a range of applications, from diverse industrial requirements to power generation and distribution.

Power Generation and Distribution

i. Ring Main network protection/compact substation
ii. Wind farms/solar farms
iii. Photovoltaic power stations
iv. Co-generation facilities

Industries

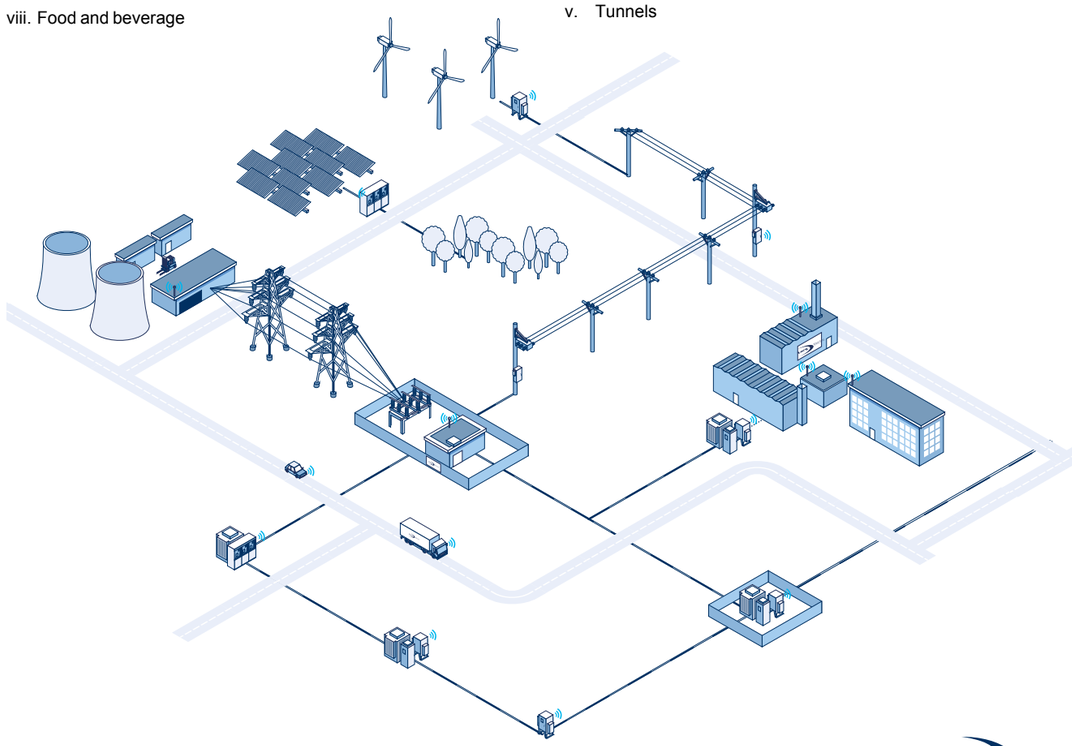
i. Mining
ii. Automotive
iii. Iron and steel
iv. Paper and pulp
v. Cement and petroleum
vi. Water and wastewater
vii. Oil and gas
viii. Food and beverage

Commercial Buildings

i. Shopping centres
ii. Hospitals
iii. Schools
iv. Hotels
v. Office buildings
vi. Warehouses
vii. Data centres

Infrastructure

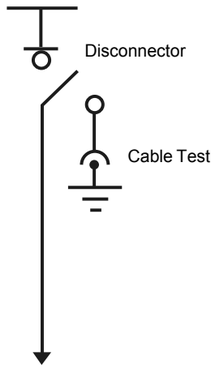
i. Metro stations
ii. Railway stations/underground railways
iii. Airports
iv. Seaports
v. Tunnels



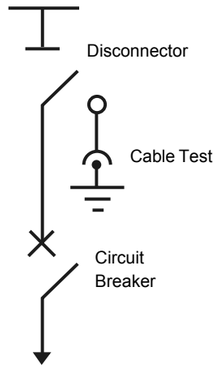
Aegis^{36} range presentation

Available functions:

L
Load Break Switch
630 Amps



V
Vacuum Circuit Breaker
630 Amps



R
Direct Cable
630 Amps

Non-extensible range

This range is available in 3 and 4 functions for both indoor and outdoor formats. This solution is perfectly suited for integration into compact substations to form standard ring main secondary networks with transformer protection. The range features switching and protection functions.

Aegis^{36} range presentation

Extensible RMU range

The extensible range enables the addition of further functions to the left, right, or both sides of switchgear installed in secondary networks. This range has **1**, **2**, **3**, and **4 functions** insulated by SF6 gas in a single, hermetically sealed stainless steel tank. It is an ideal solution if additional functions are required at present, and provides freedom for further additions into the future.

Available in indoor (IP41 and IP54) format, these units can be easily extended in any combination on-site, without specific tooling or floor preparation, and without the need to transfer SF6 gas.

1 - function unit

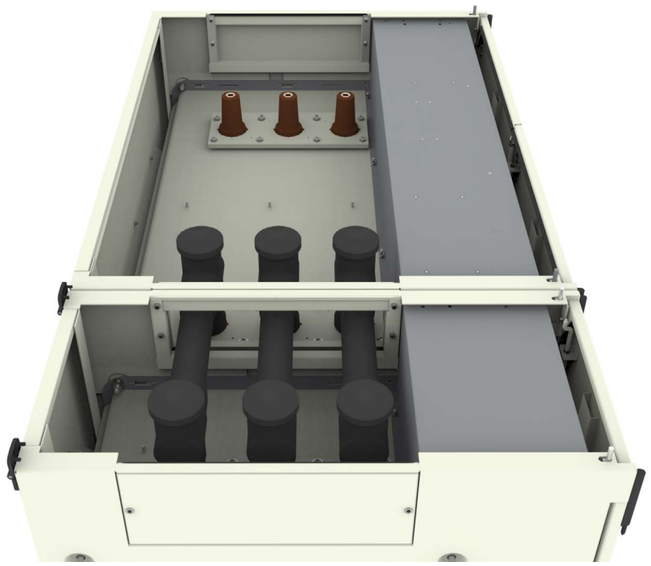
3 - function unit

1 + 3 - function unit

Extensibility system

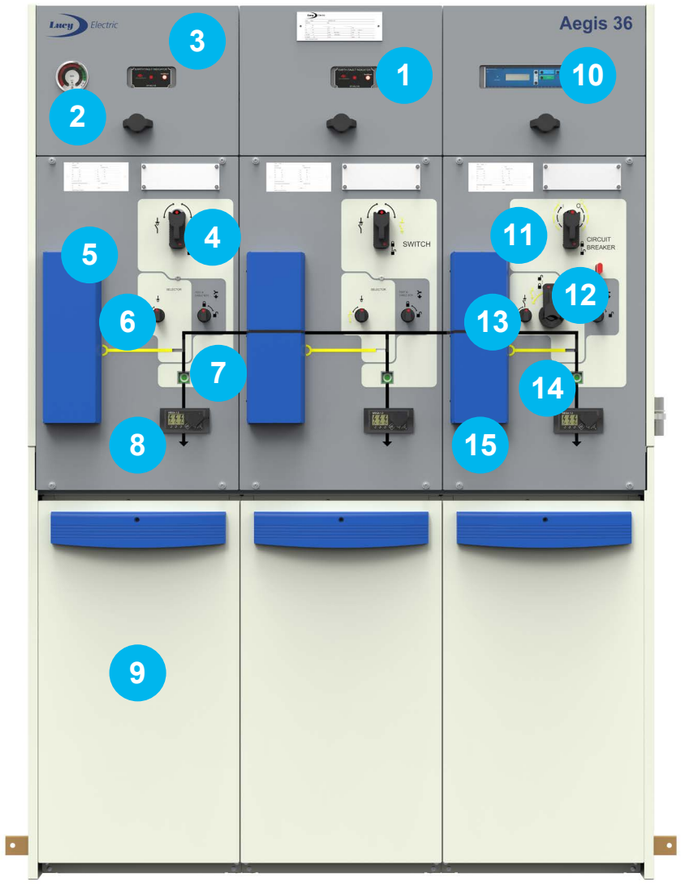
Top extensibility IP41 and IP54

Top extensibility can also be achieved by DIN 400 Type C bushings located on the top of the unit. The busbar connection is earth-screened (non-screened available as option). Suitable for both indoor (IP41) and outdoor (IP54) installations.



Product characteristics

1. EFI: Earth Fault Indication + SCI: Short-circuit Indication
2. Gas pressure indicator
3. Marshalling box
4. Load break switch operation
5. Earth & test cover
6. Load break switch selector
7. Load break switch indicator
8. VDS: Voltage Detection System/ VPIS: Voltage Presence Indication System
9. Interlocked cable box cover
10. Protection relay
11. Circuit breaker operation
12. Circuit breaker disconnector
13. Circuit breaker push-to-trip button
14. Circuit breaker indicator
15. Circuit breaker earth & test and cable box interlock

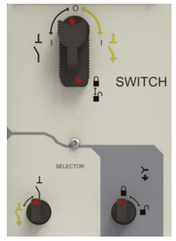


User interface and interlocking mechanism

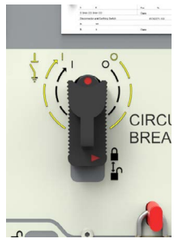
Safety interlocking

The Load Break Switch (LBS) and Vacuum Circuit Breaker (VCB) modules have safety interlocked mechanisms via a manual, pull-down operation collar on the fascia. This collar inhibits the use of the operating handle when in the upper position and, when used in conjunction with padlocks, it prevents unauthorised access to the mechanisms. The LBS selector and VCB disconnector have interlocked access via a rotary knob and operation collar respectively, which can be secured with padlocks to prevent unauthorised operation.

The cable boxes and Earth & test facility also have safety interlocked access, via a single rotary knob located on the fascia. This too can be secured with padlocks to prevent unauthorised access to the cables and test bushings.



Load Break Switch



Circuit Breaker

Position		Interlock status	
Load Break Switch	Selector	Cable compartment interlock	Earth & Test interlock
ON	Main	Locked	Locked
OFF	Main	Locked	Locked
Earth OFF	Earth	Locked	Locked
Earth ON	Earth	Unlocked	Unlocked

Position		Interlock status	
Circuit Breaker	Selector	Cable compartment interlock	Earth & Test interlock
ON	Main	Locked	Locked
OFF (Tripped)	Main	Locked	Locked
Earth ON	Earth	Unlocked	Unlocked
Earth OFF (Tripped)	Earth	Locked	Locked
OFF (Isolated)	OFF	Locked	Locked

Product characteristics

Switching function - Load break switch (L)

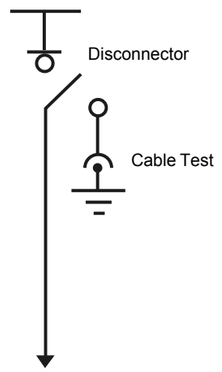
Standard features

- Interlocked 3 function (ON, OFF & EARTH) device
- Spring loaded, manual independent operation
- Single mechanism with independent operating shaft for switching ON/OFF/EARTH position
- Additional selector knob for selecting mains and earth position
- DIN400 type C bushing for cable connections
- Fully interlocked cable compartment
- Padlocking facility

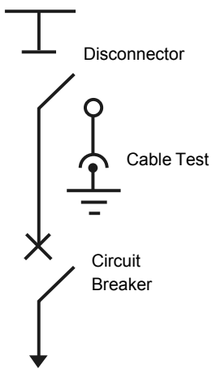
Optional features

- Remote low gas pressure alarm (one per tank)
- Remote switch position indicator 2NO+2NC each for load switch and earth switch
- Interlocked cable earth and test facility (E&T)
- Motor for remote operation
- VPIS/VDS
- EFI/SCI
- Key interlocks with Ronis/Castell keys
- Operation counters

L
Load Break Switch
630 Amps



V
Vacuum Circuit Breaker
630 Amps



R
Direct Cable
630 Amps

Product characteristics

Vacuum Circuit Breaker (V)

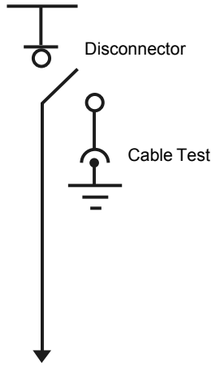
Standard features

- Interlocked 3 function (ON, OFF and EARTH) device
- Spring loaded, manual independent operation
- Single mechanism with an independent operating shaft for switching ON/OFF
- Additional selector shaft for selecting mains, off and earth position
- DIN400 type C bushing for cable connections
- Fully interlocked cable compartment
- Padlocking facility with 10 mm hole diameter
- Local mechanical push to trip button
- Trip coil for relay tripping

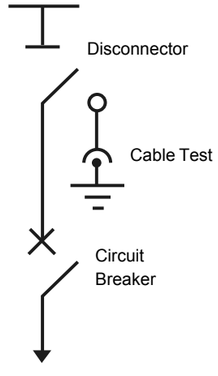
Optional features

- Remote low gas pressure alarm (one per tank)
- VPIS/VDS
- Operation counters
- Interlocked cable earth and test facility (E&T)
- Self-powered IDMT relay protection
- Key interlocks Ronis/Castell keys
- Remote switch position indicator 2NO+2NC each for vacuum breaker and earth switch
- Motor for remote operation
- Trip coils for remote tripping
- Under voltage release coil
- Secondary injection for testing protection CT operation
- Wide range of cable clamps for single and 3-core cables

L
Load Break Switch
630 Amps



V
Vacuum Circuit Breaker
630 Amps



R
Direct Cable
630 Amps

Product characteristics

R: 630A direct cable connection

Standard features

- Horizontal cable terminations at front of unit with DIN400 Type C bushings
- Left, Right or both side extensible

Optional features

- Voltage presence indication system (VPIS)
- Voltage detection system (VDS)
- Short circuit and Earth fault indicators (EFI)
- Double cable terminations
- Surge arrester in cable compartment (only available with Single cable termination)
- Wide range of cable clamps and glands to accommodate 1 and 3 core cables (refer to cable compartment section for further information)

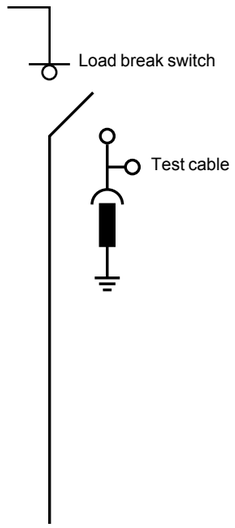
Product characteristics

D: Direct incomer

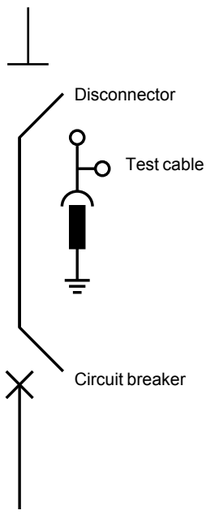
Key features

- Interlocked 3 function (ON, OFF and EARTH) device
- Available with single function
- “DV” Vacuum Circuit Breaker
- “DL” Load Break Switch
- Side cable termination directly onto the busbars
- DIN 400 Type C bushing for cable termination
- Available in IP41 indoor and IP54 outdoor formats
- Suitable for renewable applications such as wind or solar farms

DL: Direct load break switch



DV: DirectVacuum circuit breaker



Product characteristics

Circuit breaker protection relays

Protection relays

The Aegis^{36} range can be fitted with self-powered relays designed to protect the transformer or downstream network from fault currents by tripping the circuit breaker. These relays incorporate a range of advanced features and offer a wide variety of settings to provide discrimination protection in networks.

The self-powered design eliminates dependence on external power sources, delivering enhanced operational reliability. Optional password protection provides users with full control, while fault event data can be stored in non-volatile memory for greater assurance.

Features

- Short-circuit and overcurrent protection
- Dual and self-powered for greater operational assurance
- Earth fault and thermal overload protection
- Added tripping functionality, including circuit breaker and remote tripping
- Tripping indication and fault recording
- Measurement of fault currents
- Multiple I / O for diverse applications
- Modbus protocol support
- Digital display and LED indication
- Password protection

Benefits

- Reduced fault time with detailed diagnostics
- Wide range of transformers supported
- Fast response protection of MV networks
- Support for diverse industrial applications
- Improves reliability of circuit breaker
- Simple operation with minimal maintenance

Product characteristics

Circuit breaker protection – relays

Aegis[36] is fully compatible with the relays below:

	Woodward	Fanox	
	WIP1	SIA-C	SIA-B
			
Power			
Self powered	•	•	•
Auxiliary powered	•	•	•
Dual powered	•	•	•
Protection			
Earth fault protection	•	•	•
Overcurrent protection	•	•	•
Short-circuit protection	•	•	•
Thermal overload protection			•
Control			
Circuit breaker tripping	•	•	•
Remote tripping	•	•	
Tripping indication	•	•	•
Fault recording	•	•	•
Measurements			
Earth fault current	•	•	•
Peak demand current		•	
Phase current	•	•	•
Inputs / Outputs			
Phase current inputs	•	•	•
Earth fault current inputs	•	•	
Logic inputs		•	
Logic relay outputs		•	
RS 485 communication port	•	•	
Protocols			
Modbus	•	•	•
Characteristics			
Display	•	•	•
LED indicator	•	•	•
Fault memory	•	•	•
Setting via buttons	•	•	•
Password protection	•	•	•

Key • Feature supported ○ Refer to manufacturer documentation
NB: Other manufacturer relays are available on request

Product characteristics

Options and accessories – EFI's

Earth fault and short-circuit indicators

Earth fault and short-circuit indicators are used for rapid location and isolation of faults on medium voltage, open loop ring main networks. Information can be forwarded via Relay or ModBus RS-485 communication for remote SCADA access.

We recommend the use of SupaRule and Horstmann EFIs with Aegis[36], with a list of compatible devices below:

Manufacturer: Horstmann **Models: SIGMA & ComPass**	SIGMA F+E 3	SIGMA D / D+	ComPass A	ComPass B
				
Features				
Short-circuit and earth fault indication	•	•	•	•
Indication				
Directional indication	Non-directional	Directional	Non-directional	Directional
Phase selective	•	•	•	•
Monitoring				
Measurements	-	via software	•	•
Communication	-	USB	RS485/Modbus RTU	
General				
Remote-, manual-, automatic-rest	•	•	•	•
Total flash time	>1000h	>1500h	>1000h	
Self-powered	•	•	-	-
Auxiliary power supply	optional use 12-60V DC	optional use 24V AC, 24-60V DC	24-230V AC/DC	
Backup power supply	Long-life lithium cell, shelf life ≥ 20 years			
Relay contacts, permanent/momentary, NO/NC	3	4	4	4
Operating temperature	-30 to + 70 °C			
Housing	Plug-in			
IP protection / enclosure	IP 40		IP 50	
Dimensions (W x H x D)	96 x 48 x 96 mm	96 x 48 x 104 mm	96 x 48 x 96 mm	

Key: • Standard – Feature not available

	EARTH Zero	EARTH Zero	EARTH Zero 'Flag'	EARTH Zero 'Flag'	EARTH 4.0
Manufacturer: Horstmann **EFI Model: EARTH Zero**					
Features					
Earth fault indicator	•	•	•	•	•
Directional Indication	Non-directional				
Housing	Plug-in	Surface mount	Plug-in	Surface mount	
IP protection	IP40	IP65	IP40	IP65	
Enclosure	Polycarbonate (weather and sun-proof)				
Operating temperature	-30 to +70°C				
Power supply	Long-life lithium cell, shelf life ≥ 20 years				
Primary indication	Super bright RED LED		Super bright RED LED + RED flag		
Reset-Automatic by time	•	•	•	•	•
Reset-By voltage restoration	(110 - 240 V AC)				
Total LED flash time	> 1.200 h				
Low battery indication	–	–	–	–	•
Additional trip criteria	Line De-Energized				Vn = 0
Test/ Reset (Manual/ Automatic/ Remote)	o / o / –				o / o / o
Relay contacts	2 x changeover				2 x NO / NC
Remote flashing by external LED	• Relay contact provided, External LED as optional accessory				

Key: • Standard * Other values possible on request.

		BLZ-50	BFZ-50	MFZ-50	MLZ-50	CFZ-50	CLZ-50
Manufacturer: SupaRule **EFI Model: Sensorform**							
Features							
Power source		3.6V lithium ½ AA 850mAH battery		110-240V a.c.		CT on current carrying phase	
Voltage range		1-38kV					
Trip current		50A					
Primary indication		LED	Mech-flag (RED)		LED	Mech-flag (RED)	LED
Flashing duration		>1000 hrs	–	–	10 hrs	–	10 hrs
Minimum fault duration		2.5 cycles					
Manual reset		Push button					
Automatic timer reset		4 or 8 hrs selectable		10 secs after mains restore			
Manual trip test		Push button					
Operating temperature		-40°C to +80°C					
Operating humidity		0-100% RH					
Ingress protection		IP65					
Current sensor diameter:	CT100: 100mm	•	•	•	•	•	•
	CT150: 150mm	O	O	O	O	O	O
	CT300: 300mm	O	O	O	O	O	O
Remote flashing LED indicator		O	O	O	O	O	O
Auxiliary relay, 1N / O latching		O	O	O	O	O	O

Key: • Standard O Option

Other manufacturers' EFIs are also available on request, please contact your local Lucy Electric sales office for more information.

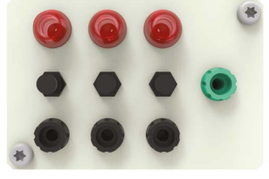
Product characteristics

Options and accessories – VPIS and VDS

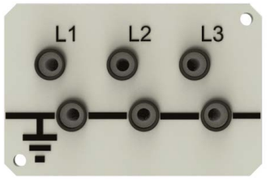
Voltage Presence Indication System

The Voltage Presence Indication System (VPIS) receives a voltage signal through the voltage divider built into the cable bushings, enabling the operator to detect live voltage. It can also be fitted with neon lights and momentary latching push buttons to show voltage presence without needing external testing probes.

Two types of VPIS devices are available with Aegis[36]:



Neon indicators with push-to-test buttons and phase comparator sockets



Pfisterer sockets

Voltage Detection System

In addition to detecting the presence of voltage signals, the Voltage Detection System (VDS) can also detect the absence of voltage. This provides an additional layer of assurance and offers a reliable solution for monitoring voltage status within Aegis[36].

We recommend the use of Horstmann and Kries VDS devices, with a list of compatible systems below:

	WEGA 1.2 C	WEGA 2.2 C	WEGA 1.2 C vario	WEGA 3
Manufacturer: Horstmann **VDS Model: WEGA**				
Features				
Maintenance free	•	•	•	•
Connectivity	Always ready for connection to SIGMA D / D+, ComPass B			–
External power supply	–	24 – 230V (AC / DC)	–	–
Type of protection	IP54			
Enclosure	Fully moulded			
Operating temperature	-25 to +65°C			
Maintenance test	Automatic integrated maintenance test			
Display test function	By button			–
LRM interface	Full value LRM connection: L1 / L2 / L3 / Ground (Conform to IEC 61243-5)			LRM Test point applicable for phase comparators
Rear	4 x 4.8mm tab 4-pin AMP plug	4 x 4.8mm tab 4-pin AMP plug 2-pin, 6-pin terminal block (Remote indication, Aux)	4 x 4.8mm tab 2 x 4-pin AMP connector Capacitor cube (pluggable)	4 x 4.8mm tab
Dimensions (W x H x D) For DIN cutout (according to DIN IEC 61554)	96 x 48 x 20 mm	96 x 48 x 52 mm	96 x 48 x 38 mm	96 x 48 x 20 mm

Key: • Standard – Feature not available

Manufacturer: Kries VDS Model: Capdis	Capdis S1+ (R4)	Capdis S2+ (R4)
		
Features		
Voltage detection	•	•
Voltage monitoring	–	•
Interlock of earth switch	–	•
Display	LCD	LCD + LED
Testing	Self and maintenance tests	
Relay output	–	2 changeover
Indication	Voltage present Maintenance test passed Overvoltage Asymmetric condition Broken lead	Voltage present Maintenance test passed Overvoltage Asymmetric condition Broken lead Aux. power missing
Auxiliary power	-	24 – 230V (AC/DC)
Interface to IKI	Y-Cable	
Accessories	Cable set	

Key: • Standard – Feature not available
Other manufacturers' VDS devices are also available on request, please contact your local Lucy Electric sales office for more information.

Secondary injection

Secondary injection is used to test the relays or TLF operation without switching on the high voltage supply to the unit. A low voltage is applied to the secondary side of the CT connection (located in terminal box) to test the operation of the protection devices at the time of commissioning and routine tests.

Actuators (motors)

Aegis^{36} units are fitted on request with integrated 24V DC motors. When used in conjunction with the Gemini 3 RTU, these actuators enable remote operation of ring switches and circuit breakers.

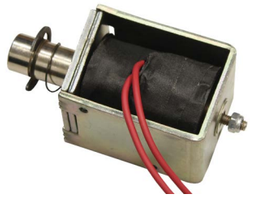
In the event of mains AC supply failure, the motorised actuators can be powered directly from the Gemini 3 RTU 24V DC battery, ensuring continuation of operation.

NB: Motors on other voltages (other than 24 VDC) are available on request.

Shunt trip coils

Shunt trips are magnetic coils that are used to trip circuit breakers through local push buttons, RTUs, or additional transformer protection devices. Shunt trips are available in the following voltages:

- DC voltage: 12V, 24V, 48V and 110V
- AC voltages: 110V, 240V
- Multiple voltage range: 24VDC – 240VAC



Product characteristics

Cable bushings and cable terminations

Cable bushings

Aegis^{36} uses the industry standard DIN 400 Type C bushings with in-line bolted connections and M16 threaded bolts in accordance with EN50181. The same bushings are used for both the Ring Switch and Circuit Breaker functions.

They are accessible by removing the interlocked cable compartment covers at the front of the unit.

The maximum supported cable sizes are:

- Up to 300mm² : 1 – core
- Up to 500mm² : 3 – core

Cable compartment

All of the cable clamps, glands and cable compartment sealing devices are available as retrofit options.

Single 3 core cable

3 single core cables

An extensive range of additional cable compartment clamps and sealing devices are available on request, please contact your local Lucy Electric sales office for more information.

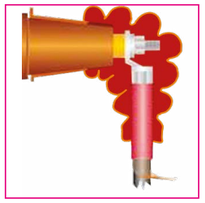
Cable terminations

The Aegis^{36} cable compartment is spacious and enables the easy installation of a range of cable termination types.

Up to 24kV

Profile 'C' bolted separable

High performance with rapid connection and disconnection



Up to 17.5kV

Insulating bushing boot

Tool free application with simple and easy installation

Up to 17.5kV

Heat-shrink insulating bushing boot

Excellent cable protection against environmental hazards and moisture

Bolted separable connectors

We recommend the use of Tycoelectronics cable connectors, with a list of available solutions below:

Up to 12kV

TE Raychem Insulated T-adapter for SF6-insulated Switchgear, according to EN 50181 Type C

Model: RICS 3133 up to 12kV

Cross section (mm^2)	Ordering description T-Adapter	Termination for polymeric cables, incl. mechanical lugs
70 – 150	RICS - 3133	IXSU-F3131-ML-2-17
95 – 240	RICS - 3133	IXSU-F3131-ML-4-17
120 – 300	RICS - 3133	IXSU-F3131-ML-5-17

TE Raychem Screened, Separable Connection System

Model: RSTI-58 800 A up to 24kV (Single cable termination)

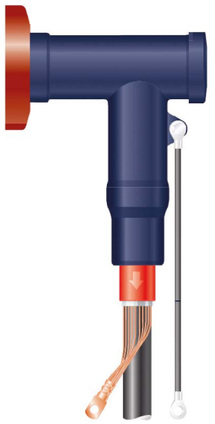
Technical data – with DIN compression lugs

Screened separable connection system with DIN compression lugs

Cross section	12kV Diameter core insulation		Reference number Conductor material		Cross section	24kV Diameter core insulation		Reference number Conductor material	
mm²	min. mm	max. mm	Al	Cu	mm²	min. mm	max. mm	Al	Cu
25	12.7-	23.4	RSTI-5810	RSTI-5830	25	12.7-	23.4	RSTI-5810	RSTI-5830
35	12.7-	23.4	RSTI-5811	RSTI-5831	35	12.7-	23.4	RSTI-5811	RSTI-5831
50	12.7-	23.4	RSTI-5812	RSTI-5832	50	12.7-	23.4	RSTI-5812	RSTI-5832
70	12.7-	23.4	RSTI-5813	RSTI-5833	70	12.7-	23.4	RSTI-5813	RSTI-5833
95	12.7-	23.4	RSTI-5814	RSTI-5834	95	21.2-	34.6	RSTI-5824	RSTI-5844
120	12.7-	23.4	RSTI-5815	RSTI-5835	120	21.2-	34.6	RSTI-5825	RSTI-5845
150	21.2-	34.6	RSTI-5826	RSTI-5846	150	21.2-	34.6	RSTI-5826	RSTI-5846
185	21.2-	34.6	RSTI-5827	RSTI-5847	185	21.2-	34.6	RSTI-5827	RSTI-5847
240	21.2-	34.6	RSTI-5828	RSTI-5848	240	21.2-	34.6	RSTI-5828	RSTI-5848
300	21.2-	34.6	RSTI-5829	RSTI-5849	300	21.2-	34.6	RSTI-5829	RSTI-5849

Technical data – mechanical lugs and shear bolts

Cross section	12kV Diameter core insulation		Reference number Conductor material	Cross section	24kV Diameter core insulation		Reference number Conductor material
mm²	min. mm	max. mm	Al or Cu	mm²	min. mm	max. mm	Al or Cu
35-95	12.7-	23.4	RSTI-5851	35-70	12.7-	23.4	RSTI-5851
95-120	12.7-	23.4	RSTI-5852	95-185	17.0-	30.1	RSTI-5853
95-240	17.0-	30.1	RSTI-5853	95-240	2l.2-	34.6	RSTI-5854
150-240	21.2-	34 6	RSTI-5854	185-300	2l.2-	34.6	RSTI-5855
185-300	21.2-	34 6	RSTI-5855				
240-400	21.2-	34 6	RSTI-5856				



Product characteristics

Cable bushings and cable terminations

TE Raychem Screened, Separable Coupling System

Model: RSTI-CC-58 800 A up to 24kV (Double cable termination)

Technical data – with DIN compression lugs

Screened separable connection system with DIN compression lugs

Cross section	12kV Diameter core insulation		Reference number Conductor material		Cross section	24kV Diameter core insulation		Reference number Conductor material	
mm²	min. mm	max. mm	Al	Cu	mm²	min. mm	max. mm	Al	Cu
25	12.7-	23.4	RSTICC-5810	RSTI-CC-5830	25	12.7-	23.4	RSTICC-5810	RSTI-CC-5830
35	12.7-	23.4	RSTI-CC-5811	RSTI-CC-5831	35	12.7-	23.4	RSTI-CC-5811	RSTI-CC-5831
50	12.7-	23.4	RSTI-CC-5812	RSTI-CC-5832	50	12.7-	23.4	RSTI-CC-5812	RSTI-CC-5832
70	12.7-	23.4	RSTI-CC-5813	RSTI-CC-5833	70	12.7-	23.4	RSTI-CC-5813	RSTI-CC-5833
95	12.7-	23.4	RSTI-CC-5814	RSTI-CC-5834	95	12.7-	23.4	RSTI-CC-5824	RSTI-CC-5844
120	12.7-	23.4	RSTI-CC-5815	RSTI-CC-5835	120	21.2-	34.6	RSTI-CC-5825	RSTI-CC-5845
150	21.2-	34.6	RSTI-CC-5826	RSTI-CC-5846	150	21.2-	34.6	RSTI-CC-5826	RSTI-CC-5846
185	21.2-	34.6	RSTI-CC-5827	RSTI-CC-5847	185	21.2-	34.6	RSTI-CC-5827	RSTI-CC-5847
240	21.2-	34.6	RSTI-CC-5828	RSTI-CC-5848	240	21.2-	34.6	RSTI-CC-5828	RSTI-CC-5848
300	21.2-	34.6	RSTI-CC-5829	RSTI-CC-5849	300	21.2-	34.6	RSTI-CC-5829	RSTI-CC-5849

Technical data – mechanical lugs and shear bolts

Cross section	12kV Diameter core insulation		Reference number Conductor material	Cross section	24kV Diameter core insulation		Reference number Conductor material
mm²	min. mm	max. mm	Al or Cu	mm²	min. mm	max. mm	Al or Cu
35-95	12.7-	23.4	RSTI-CC-5851	35-70	12.7-	23.4	RSTI-CC-5851
95-120	12.7-	23.4	RSTI-CC-5852	95-185	17.0-	30.1	RSTI-CC-5853
95-240	17.0-	30.1	RSTI-CC-5853	95-240	21.2-	34.6	RSTI-CC-5854
150-240	21.2-	34.6	RSTI-CC-5854	185-300	21.2-	34.6	RSTI-CC-5855
185-300	21.2-	34.6	RSTI-CC-5855				
240-400	21.2-	34.6	RSTI-CC-5856				

Insulating bushing boot connectors

Up to 17.5kV

TE Raychem Elastomeric Insulating Bushing Boot

Model: RCAB up to 17.5kV Single cable termination)

Technical data		
	RCAB 4110	RCAB 4120
Maximum system voltage.	17.5kV	17.5kV
Basic impulse level	95kV	95kV
Collar size	No.1	none
Bushing diameter	31 - 45 mm	46 -70 mm
Bushing types: to DIN, CENELEC, ANSI	–	400/630 A
Cable cross section	35 - 400 mm²	35 - 400 mm²

Heat shrink insulating bushing boot connectors

Up to 17.5kV

TE Raychem Heat Shrink Insulating Bushing Boot

Model: RSRB Series up to 17.5kV

Technical data – Right angle boots (long)	
Catalogue Reference	Application Range (mm²)
RSRB-4042	10 - 35
RSRB-4044	50 - 95
RSRB-4046	120 - 300
Technical data – Right angle boots (short)	
RSRB-4062	10 - 35
RSRB-4064	50 - 95
RSRB-4066	120 - 300

Other manufacturers' cable terminations can be incorporated on request, please contact your local Lucy Electric sales office for more information.

Product characteristics

Cable bushings and cable terminations

Surge Arresters

Aegis^{36} is also fully compatible with surge arresters, which provide added protection against external and internal overvoltage occurrences. They ensure that voltage surges do not exceed the peak withstand voltage of Aegis^{36}; maximising protection.

Surge arrestors are easily installed via direct connection onto the DIN Type C bushings.

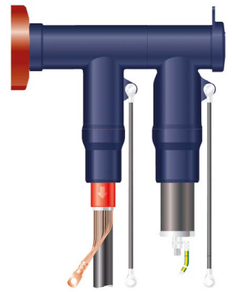
We recommend the use of Tycoelectronics surge arrestors, with a list of available solutions below:

Up to 24kV

TE Raychem Screened, Separable Surge Arrester

Model: RSTI-SA-05 up to 24kV

Technical data				
Technical data for single and parallel connection				
Rated Discharge Current I_N	5kA			
Operating duty High current Impulse 4/10 µs	65kA			
Short Circuit Current I_5	16kA			
Long duration current impulse (1ms)	75A			
Residual Voltages (kV)				
Continuous operating voltage U_C	6	12	18	24
Rated Voltage U_R	7.5	15	22.5	30
Lightning Current Impulse 8/20 µs				
2.5kA	19	38	57	76
5kA	20	40	60	80
IOkA	21.7	43.5	65.2	87
Steep lightning current impulse 1/20 µs				
5kA	21	42	63	84
Characteristics				
Voltage Class (kV)	6.0	12.0	18.0	24.0
Reference Number Single connection	RSTI-58A0605	RSTI-58SA1205	RSTI-58A1805	RSTI-58SA2405
Reference Number Parallel connection	RSTI-CC-58SA0605	RSTI-CC-58SA1205	RSTI-CC-58A1805	RSTI-CC-58SA2405
Dimension and Weight	6.0	12.0	18.0	24.0
Length L* (mm)	285.0	285.0	400.0	400.0
Weight (kg/pc)				
(SBSA)	2.4	2.7	3.0	3.3
(–CC–58SA)	2.5	2.8	3.1	3.4



Other manufacturers' surge arresters can be incorporated on request, please contact your local Lucy Electric sales office for more information.

Air metering unit

Aegis^{36} is compatible with a range of advanced Air Metering Units (AMUs), which offer full tariff metering capability. The range is fully type tested to IEC 62271-200, and supports a wide range of conventional CTs and VTs.

Non-extensible and extensible options are available in both indoor and outdoor formats to suit a wide range of applications.

Characteristics

- 36kV ratings
- Rated current 630A
- HV fuse protection for VT (optional)
- Isolation switch for testing / fuse change
- Isolation switch for disconnection of non-fused variant (optional)
- Panel door locking facility
- Double cable termination (optional)
- Anti-condensation space heater (optional)
- Wide range of CTs and VTs supported
- IP41 for indoor and IP54 for outdoor applications

NB: IP54 is available in (non-extensible) freestanding range only

Non-extensible AMU - Mt

Low voltage compartment

- Facility to lock and seal the terminal (marshalling) box (optional)
- Provision to disconnect and Short-circuit the CTs
- DIN96 size kWh meter, ammeter and voltmeters
- MCB / fuse protection for VT secondary side (optional)
- Trip lock out relay (for resetting relay in marshalling box before resetting circuit breaker (optional)
- Space heater with 110V Auxiliary supply (optional)
- 2.5mm diameter hole with glands for connecting remote KWH meter

Air metering unit

Configurations available

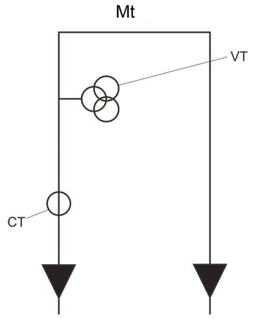
Four metering functions are available:

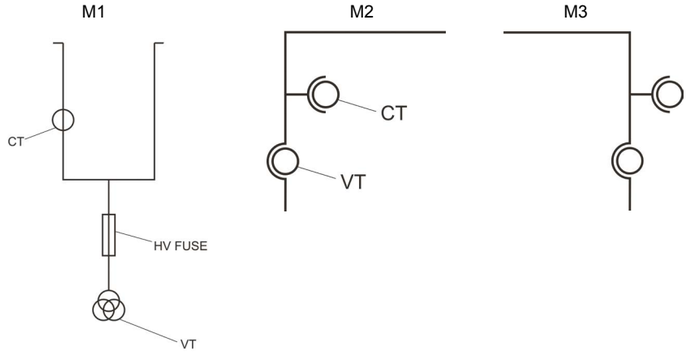
Non-extensible range

- Mt: Cable In / Cable Out

Extensible range

- M1: Busbar In / Busbar Out
- M2: Cable In / Busbar Out
- M3: Busbar In / Cable Out





Metering Unit	Indoor	Outdoor
Mt	•	•

Key • Available – Not available

Metering units	LE	RE	DE	Indoor	Outdoor
M1 (Busbar In / Busbar Out)	–	–	•	•	–
M2 (Cable In / Busbar Out)	–	•	–	•	–
M3 (Busbar In / Cable Out)	•	–	–	•	–

VT: All VTs are as per DIN42600 narrow type standard

No of VT	Type	VT Ratio	Burden	Class
1	3ph	33000 / 110V	10VA 50VA 100VA	0.5
1	3ph	33000 / 110V	50VA	0.2
1	3ph	33000 / 110V	100VA	1
1	3ph	33000 / 110V	50VA 60VA	0.5
3	1ph	33000 / 110V	50VA	0.5
3	1ph	33000 / 110V	50VA	0.5
3	1ph	33000 / 110V	30VA 50VA	0.2
3	1ph	33000 / 110V	50VA	1

CT ratios

No of CT	CT Ratio	Burden	Class
2 / 3	50-25 / 1A	10VA	0.2 / 0.5
	50 / 25 / 5A	10VA	0.5
	100-50 / 1A	10VA	0.2 / 0.5
	100 / 50 / 5A	10VA 15VA	0.5 0.5
	200-100 / 1A	10VA 15VA	0.2 / 0.5 0.2 / 0.5
	200 / 100 / 5A	5VA 15VA	0.5 0.5
	300 / 150 / 5A	5VA 15VA	0.5 1
	400 / 200 / 5A	15VA 20VA	0.2 / 0.5 0.5

NB: CTs and VTs shown above are part of our standard range, a wider range is available on request

Internal arc protection

Internal arc classification (IAC)

Aegis^{36} is available in three internal arc protection formats:

- AF (Front protection)
- AFL (Front and lateral protection)
- AFLR (Front, lateral and rear protection)

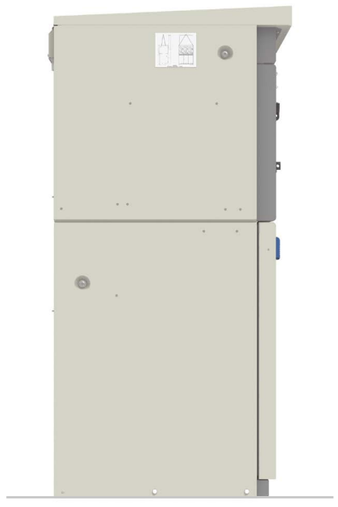
These ratings are applicable to the SF6 insulated gas tank and the cable compartments. The units are configured to order, allowing for protection to be tailored to application requirements.

Methods of protection

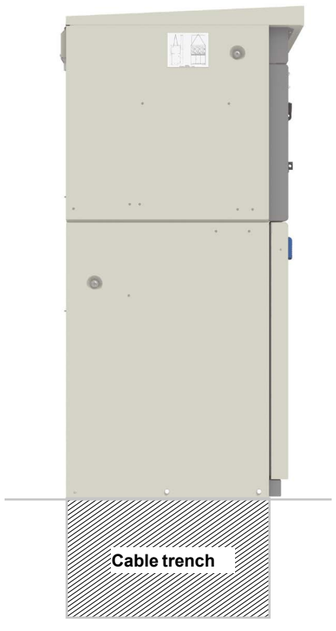
AF and AFL protection is achieved by venting arc gases through the rear of the unit via a sacrificial metallic plate.

AFLR protection is available by venting down through the cable trench. This option maximises operational safety and provides a truly secure switchgear solution.

AF / AFL
Venting through rear



AFLR
Venting down into trench



Smart-grid ready

Gemini 3 RTU integration

Aegis^{36} can be configured with the next- generation Gemini 3 RTU. This highly flexible Remote Terminal Unit (RTU) incorporates a range of features, allowing customers to build flexibility and scalability into their network automation needs.

The Gemini 3 has a modular design such that it can be configured from a simple monitoring only device to a fully functional automated switch controller. It has the ability to transition from a basic to an advanced RTU by plugging in additional modules. These modules are rugged, making the device field serviceable and future proof.

The Gemini 3 modules available are:

Master Control Module (MCM) – This contains the main processor and supervises all modules. The MCM handles the protocol communications.

Dual Switch Module (DSM) – This provides the inputs and outputs to perform secure interlocked control of two MV ring switches

Power Supply Module (PSM) – This module works with the switch control modules to provide secure switching operations. The PSM generates regulated power to all other modules and external communication equipment. The PSM also provides the intelligent battery charging function to maintain a secure supply.

Input Output Module (IOM) – This is a general-purpose module that covers digital and analogue inputs and relay outputs.

Fault Passage Module (FPM) – This is a dual fault passage indicator module which detects and alarms for Overcurrent and Earth Faults.

Human to Machine Interface (HMI) – This is an optional module that allows local control and monitoring without the need for a Computer. It allows local controls to be issued by an authorised Engineer (security enabled) or just provide data to be viewed locally.

Characteristics

- Safe control of multiple switches (patent number GB2534376)
- Battery management functions
- Automation schemes include
  - Automatic sectionalising
  - Automatic change-over
  - Parasitic load tripping for meshed LV networks
- Flexible inputs and outputs
- Fault detection (Earth and Phase)
- LED status indicators
- Real time clock (SCADA synchronised)
- Flexible connectivity
- Dual isolated Ethernet and RS232 ports
  - Isolated RS485 port
- Supervisory selection and indication
- Event memory – 7000 events in non-volatile memory
- Communication protocol
  - DNP 3.0 TCP/IP or Serial
  - IEC 60870-5-101
  - IEC60870-5-103
  - IEC 60870-5-104
  - Modbus TCP or RTU
- Rugged design for harsh environments
- Maintenance free

Advanced cybersecurity

The Gemini RTU uses a number of techniques to eliminate security vulnerabilities including:

- Role Based Access Control (RBAC)
- Centralized Authentication using LDAP
- Secure Firmware Updates
- Ethernet Port Management
- SNMP
- Non-erasable cyber event recorder (Syslog for SEM)
- Enhanced Authentication & Encryption
- Secure IEC 60870-5-104 connection based on IEC 62351-3 TLS

Integrated design

Gemini 3 is an optional feature for Aegis^{36}, integrated neatly in the upper LV compartment of the unit (factory fitted). This eliminates the need for an additional exterior control box and associated cabling on site.

Smart-grid ready

Gemini 3 RTU integration

Key features of Gemini 3

- Embedded auto change over and auto sectionalising functions
- Real time network condition monitoring of voltage, current, power, power factor and frequency
- Flexible communication through radio, RS232, RS485, packet data network, GSM, GPRS, PSTN, ethernet TCP / IP and optical fibre.
- Advanced battery pack to operate under mains AC input failure
- Fully tested to ENATS (Energy Network Association Technical Standards), EMC and environmental standards

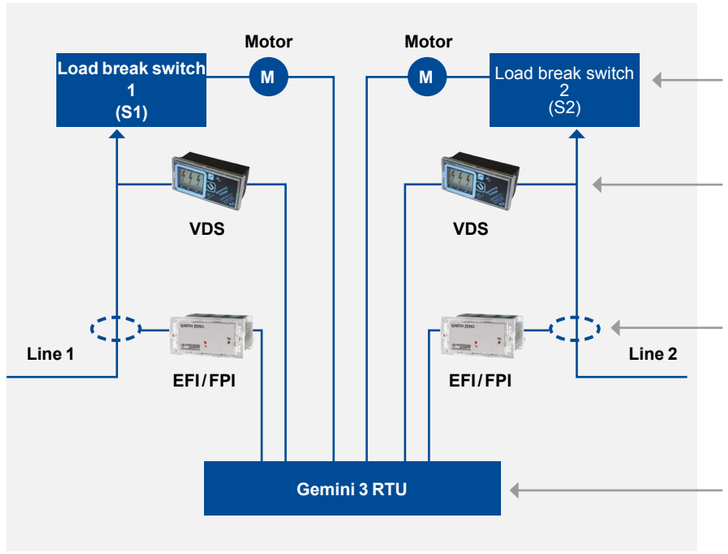
Automatic transfer scheme

Aegis[36] coupled with Gemini 3 offers full Automatic Transfer Scheme support. This provides the rapid and reliable transfer of the system from one power source to another, in the event of normal source failure. The result is an added layer of reliability in the power supply.

Benefits of Automation

- Reduced time in diagnosing system anomalies as well as locating and isolating faulty sections of the network
- Faster response time and quick network reconfiguration
- Optimisation of asset management through the implementation of customised automation schemes
- Reduced operational cost associated with routine network switching
- Increased operator safety

The Gemini 3 has a modular design such that it can be configured from a simple monitoring only device to a fully functional automated switch controller. It has the ability to transition from a basic to an advanced RTU by plugging in additional modules. These modules are rugged, making the device field serviceable and future proof.



Motors for load switch operation.

VDS for detecting voltage in the line. In the event voltage loss, a relay is activated which sends a signal to the RTU control unit.

If a line fault is detected, the EFI sends a signal to the RTU to avoid closing the incoming line onto a fault.

RTU detects the signal coming from the VDS and EFI and deploys changeover schemes by opening / closing the load break switches S1 and S2.

Gemini 4 RTU integration

The Gemini 4 RTU forms part of the Gemini platform, providing advanced monitoring and control capabilities for medium voltage switchgear.

The Gemini 4 RTU is DIN rail mounted, providing the optimum suitability and footprint for controlling overhead and ground mount switchgear. The Gemini 4 RTU comprises up to seven factory fitted sub-assemblies which can control up to seven switches. This can be extended to 28 switch control with the addition of Gemini 4 Expansion Units.

- Web browser interface for configuration
- Programmable logic
- Automation schemes support (eg. Automatic sectionalising, Automatic change-over)
- Enhanced cyber security features for use in Critical National Infrastructure
- Secure firmware and configurable SMS reset function
- Simple DIN rail mounting, saving time and simplifying maintenance
- Optimised form factor providing efficient assembly into control cabinets and switchgear panels
- Easy to configure, customisable product adapting to different solutions
- Pluggable terminal blocks improving installation times

Key features

- Dedicated “motor power enable” relay output providing safe and secure operation of switchgear
- Secure control operations for multiple switches using dedicated signals
- User configurable inputs and outputs, optional HMI
- Analogue inputs via communication interface
- I/O have associated LED indicators
- Digital inputs support dry contacts—no external wetting voltage required
- Flexible communication options
  - IEC 60870-5-101, IEC 60870-5-103 and IEC 60870-5-104
  - DNP 3.0
  - Modbus
  - Multiple masters

Gemini Analogue Measurement Module (AMM)

The Gemini Analogue Measurement Module (AMM) is part of the Gemini platform, providing advanced 3 phase measurement of power system currents, voltages, power, energy, sequence components, power quality, and directional fault passage indication. AMM module seamlessly integrates with the Gemini RTUs providing enhanced grid situational awareness and cover utility & industrial applications effectively.

Key features

- Accurate current and voltage measurement
- Real-time power, energy, and power factor data
- Advanced Power Quality monitoring (incl. Harmonics)
- Directional Fault Passage Indication
- Ethernet & CAN Bus communication
- Compatible with standard CTs, VTs and instrument transformers complaint to IEC 61869 10/11
- Supports Multi Feeder Monitoring (up to 3 feeders)
- High performance signal processing
- Compact, robust design with no internal Batteries
- Hardened for Substation environments
- Suitable for both overhead and ground Mounted Installations

Gemini DC Analogue Input Module (AI)

The Gemini DC Analogue Input Module is part of the Gemini platform, providing DC analogue measurement inputs for the Gemini RTUs. This product can be applied for covering applications like Transformer monitoring (temperature, tap position indication), underground cable oil/gas pressure monitoring and humidity measurement.

Key features

- DC Analogue signal inputs (up to 4)
  - 0V to +5V / -5V to +5V
  - 0V to +10V / -10V to +10V
  - 4mA to 20mA /-20mA to +20mA
  - 0mA to +20mA
- Temperature inputs (up to 2)
  - PT100 (4 wire)
- Accurate measurement
- Sensor Fault detection & reporting
- Standard Modbus interface for seamless integration

Technical data

Aegis[36] ring main unit

Rated voltage	kV	38
General		
Rated frequency	Hz	50/60
Switchgear Classification		PM Class Metallic Partitioning
Loss of Service Continuity		LSC2
Rated lightning impulse withstand voltage		
Phase-to-earth	kVp	170
Across isolating gap	kVp	195/220
Rated power frequency withstand voltage		
Phase-to-earth	kV for 1 min	70
Across isolating gap	kV for 1 min	80
Degree of Protection		
Indoor	IP	IP41
Outdoor	IP	IP54
Tank with HV parts	IP	IP67
Mechanical impact protection	IK	IK07
Internal arc rating		
AF / AFLR	kA 1 sec	25
SF6 gas		
Annual leakage rate	%	≤ 0.1%
Filled pressure (at 20ºC)	Bar (G)	0.4
Minimum operating pressure	Bar (G)	0.3
Installation conditions		
Maximum altitude	m	1000
Relative humidity (max) – over period of 24hrs		95%
Continuity of service	Class	LSC2
Partition class	Class	PM
Ambient air temperature	°C	-25 + 55 °C

Busbars

Rated normal current	A	630
Rated short time withstand current	kA	21 kA (3 s), 25 kA (1 s)
Rated peak withstand current	kA	52.5, 62.5

Load Break Switch: L function

Rated normal current	A	630
Rated cable charging breaking current	A	35
Rated line charging breaking current	A	35
Rated cable and line charging current	A	60
Rated earth fault breaking current	A	105
Main electrical circuit		
Rated short time withstand current	kA	21 kA (3s), 25 kA (1s)
Rated peak withstand current	kA	52.5, 62.5
Earthing circuit		
Rated short time withstand current	kA	21 kA (3 s), 25 kA (1s)
Rated peak withstand current	kA	52.5, 62.5
Mechanical endurance class		
Load break switch	Class	M1

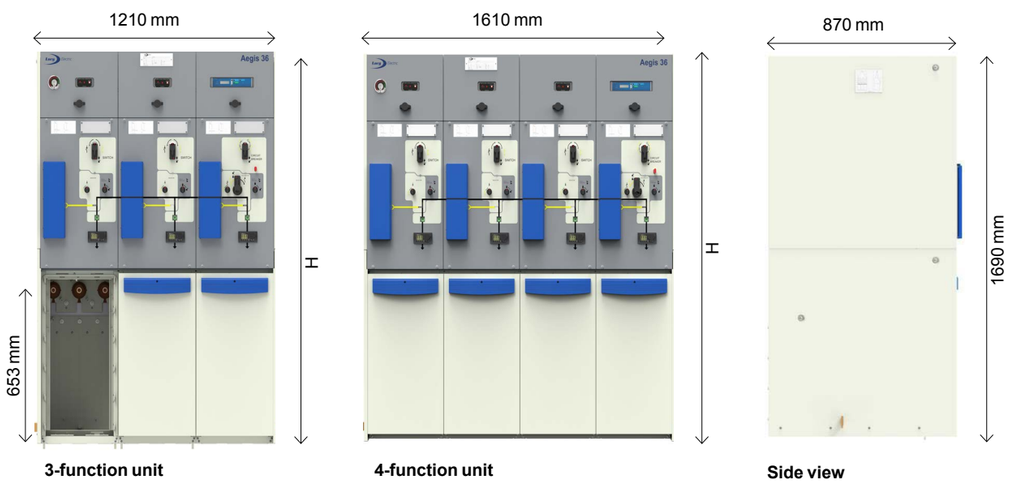
Rated voltage	kV	38
Earth switch	Class	M0
Electrical endurance class Short-circuit making		
Load break switch	Class	E3
Earth switch	Class	E2
Operating mechanism		
Local: Close – Open		Hand Lever
Remote: Close – Open		Motor

Circuit Breaker: V function

Rated normal current	A	200/630
Rated Short-circuit breaking current	kA	25
Rated Short-circuit making current	kA	50, 62.5
Rated cable charging breaking current	A	100
Rated line charging breaking current	A	10
Main electrical circuit		
Rated short time withstand current	kA	21 kA (3 s), 25 kA (1 s)
Rated peak withstand current	kA	52.5, 62.5
Earthing circuit		
Rated short time withstand current	kA	21 kA (3 s), 25 kA (1 s)
Rated peak withstand current	kA	52.5, 62.5
Mechanical endurance class		
Circuit breaker	Class	M1
Earth switch	Class	M0
Electrical endurance class		
Circuit breaker	Class	E2
Earth switch	Class	E2
Operating mechanism		
Operating sequence for mechanism		O-3min-CO-3min-CO
Local: Close - Open		Hand Lever - Push button
Remote: Close - Open		Motor – Coil

Dimensions

Non-extensible



3-function unit **4-function unit** **Side view**

Aegis^{36} order form

To use this form, please fill in the appropriate sections and return the completed form to your nearest Lucy Electric sales office

Name:
Address:

Company:
Tel no:
Email:
Order number:

Order quantity / number of units (please fill separate form for each type)

Extensibility (choose any one)
Non-extensible
Top extensible

left hand right hand both sides

IP rating: Installation conditions (choose any one)
IP54 Metal clad outdoor (available for non-extensible range only)
IP41 Indoor (available for extensible and non-extensible range)

Functions required:

Type of function	36 kV/38kV
L – LBS	630 A
V – VCB	630 A
R - DCC	630 A

First Second Third Fourth

Motor wiring only (required for future motorisation)
Motor with wiring (tick for each selected function, if needed)
Cable Earth & Test facility (E&T) (tick for each selected function, if needed)

Cable compartment

Cable clamp material (choose any one)
Metal
Plastic

Cable entry type (choose any one)
Single core cable
3 core cable
Cable cross section

Internal arc

Gas enclosure
Cable box
Internal arc classification
Rear vent AF
AFL
Bottom venting into cable trench – AFLR

Auxiliary switches (choose any one)
Voltage indication
1N/O, 1N/C
2N/O, 2N/C

VPIS (choose one)
Neon indicator with push to test button
Horstmann Wega 1.2

Optional features applicable to L (Load break switch) function only

EFI (choose any one)	**Sensorform** BFZ-50				
	MFZ-50				
	MLZ-50				
	CFZ-50				
	CLZ-50				
	BLZ-50				

Optional features applicable to V or T (Vacuum Circuit Breaker) function only

Secondary injection (tick for each function, if needed)					
Protection device (choose any one)					
	Ashida ADR241S Relay				
	Fanox SIA-C Relay				
	Protection CT for Relay (choose any one)				
	Dual (Primary) Ratio CT 100:50/-				
	Dual (Primary) Ratio CT 200:100/-				
Shunt trips (choose any one)	12V DC				
	24V DC				
	48V DC				
	110V DC				
	110V AC				
	240V AC				
	Multiple voltage (24V DC – 240V AC/DC)				

CT Ratio	Burden and Class	Mounting type
600 - 200/1A	2.5 VA, CL-5P10	Bushing mounted
	5 VA, CL-5P20	Cable mounted
400-200/1A	2.5 VA, CL-5P10	Bushing mounted
	5 VA , CL-5P20	Cable mounted
200-100/1A	2.5 VA, CL-5P10	Bushing mounted
	5 VA, CL-5P20	Cable mounted
100-50/1A	2.5 VA, CL-5P10	Bushing mounted
	5 VA, CL-5P20	Cable mounted

***Please add any additional details in the comment section below.**

Comments

Notes

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