

Aegis³⁶ ring main unit



Aegis 36 builds upon the strong foundations of the Aegis product family to provide the right features for our customers:

- + 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 a global leader in switching, protection and automation solutions for electrical distribution systems, with over 100 years' industry experience. Today the company is a specialist in secondary power distribution, engineering high-performance medium voltage switchgear for utility, industrial and commercial applications, overhead line equipment and providing retrofit and automation solutions to customers internationally.

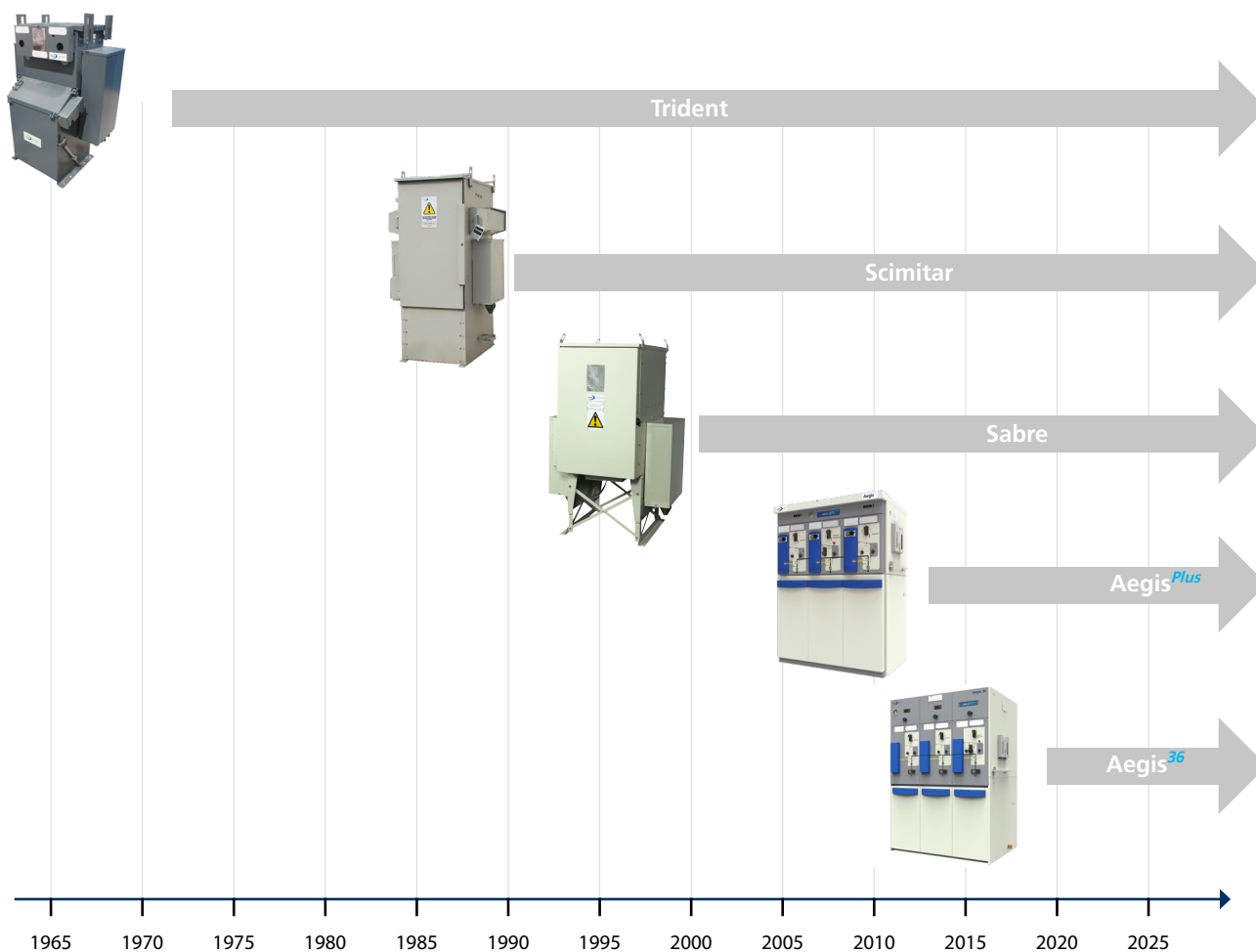
Engineering excellence, based on a long tradition of expertise, coupled with state of the art technology to meet customers' stringent specifications, make Lucy Electric one of the few companies that can offer truly bespoke solutions. We have the

capability to manufacture units for any location, climate or situation and offers a complete product portfolio, with a wide scope of services and dedicated after sales support throughout the product lifecycle.

A specialist UK research and development facility, with a continuous programme of R&D, ensures that Lucy Electric products are always at the cutting edge, designed to anticipate the evolving technical and market demands of our customers. And our multi-million pound, purpose built, state of the art UK manufacturing facility provides complete control over production.

Lucy Electric is a truly international company with offices in China, Thailand, Dubai, Malaysia and South Africa; manufacturing facilities in the United Arab Emirates, Saudi Arabia, Thailand and India; and an established global network of industrial partners and contractors operating in over 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	36 kV	Vacuum	SF6	630A	Ground	Indoor / Outdoor	Local / Remote
	Aegis Plus	24kV	Vacuum / HV fuse	SF6	630A	Ground / Transformer	Indoor / Outdoor	Local / Remote
	Sabre	24kV	Vacuum	SF6	630A	Ground / Transformer	Indoor / Outdoor	Local / Remote
	Scimitar	17.5kV	Fuse	SF6	630A	Ground / Transformer	Indoor / Outdoor	Local / Remote
	Trident	15.5kV	Fuse	Oil	630A	Ground / Transformer	Indoor / Outdoor	Local / Remote
Air Metering Units								
	Aegis Plus / Aegis 36	24 kV / 36 kV		Air	630 A	Ground	Indoor / Outdoor	
	Sabre	15.5 kV		Air	630 A	Ground	Indoor / Outdoor	
	Oil	15.5 kV		Oil	630 A	Ground	Indoor / Outdoor	

Introduction to Aegis³⁶

Aegis 36 is Lucy Electric's latest product, originating from the very successful Aegis product family. It is specially designed for secondary distribution networks, wind farms and photovoltaic power stations with ratings up to 36 kV. This range is available for indoor and outdoor environments, suiting various application needs. Aegis 36 offers high levels of reliability and operator safety. It is a compact, cost-effective and virtually maintenance-free product.

Aegis 36 offers numerous functional configurations insulated in a single robot-welded sealed tank. This robust range has been built for the toughest environments, with an option to convert units from indoor to outdoor, extending its environmental protection rating.

All of these enhancements have been achieved whilst reducing the spatial footprint, resulting in a design that is more compact and easy to install.

Characteristics:

- 36 kV 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
- Hermetically 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:

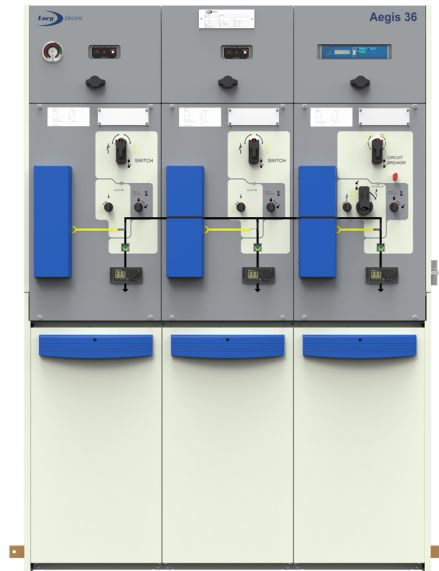
- | | |
|-----------------|---|
| IEC 62271 – 100 | Alternating current circuit breakers |
| IEC 62271 – 102 | Alternating current disconnectors and earthing switches |
| IEC 62271 – 103 | Switches for rated voltages between 1kV and 52kV |
| IEC 62271 – 105 | Alternating current switch fuse combinations |
| 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



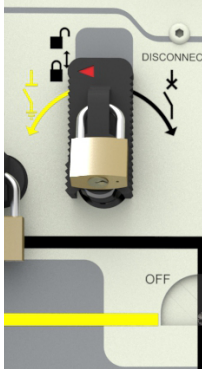
IP 41 - Indoor



- 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 application please contact your local Lucy Electric sales office

Safety features



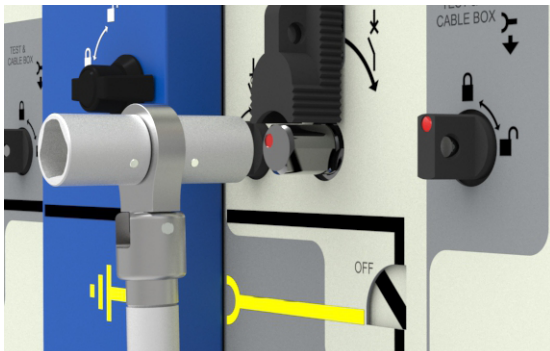
Operation mechanism

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.

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 (1N/O) 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.



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 21.



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
- ii. Wind farms
- iii. Photovoltaic power stations
- iv. Co-generation facilities

Industries

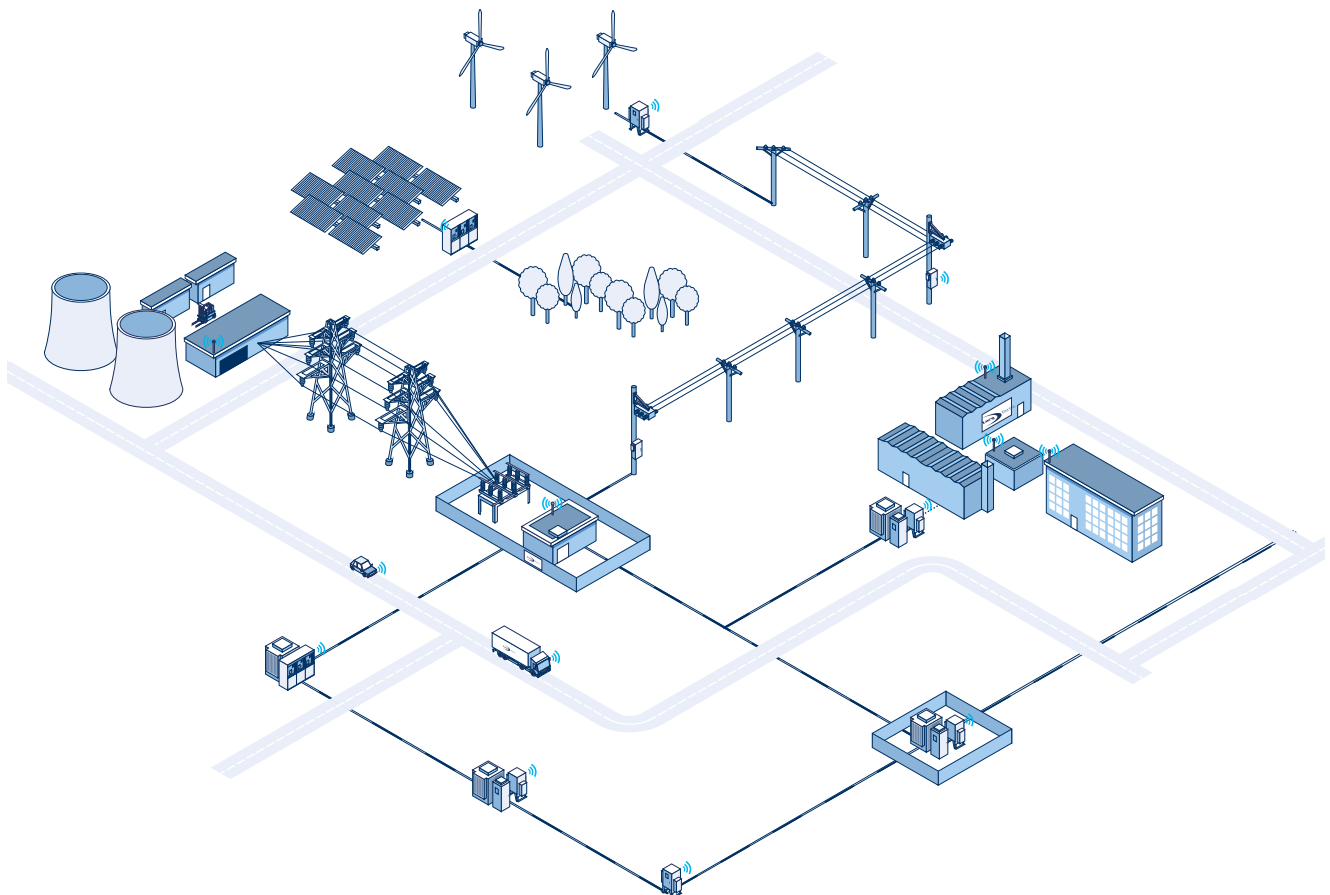
- i. Mining
- ii. Automotive
- iii. Iron and steel
- iv. Paper and pulp
- v. Cement and petroleum
- vi. Water and waste water

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
- iii. Airports
- iv. Seaports
- v. Tunnels

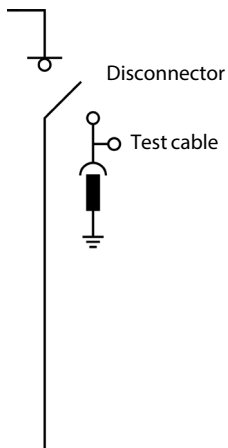


Aegis³⁶ range presentation

Available functions:

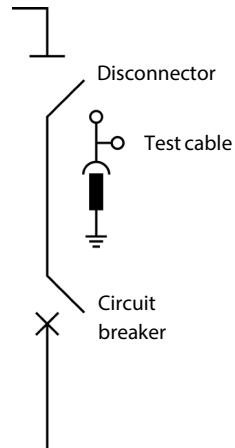
Switching function:

L: 630A Load break switch



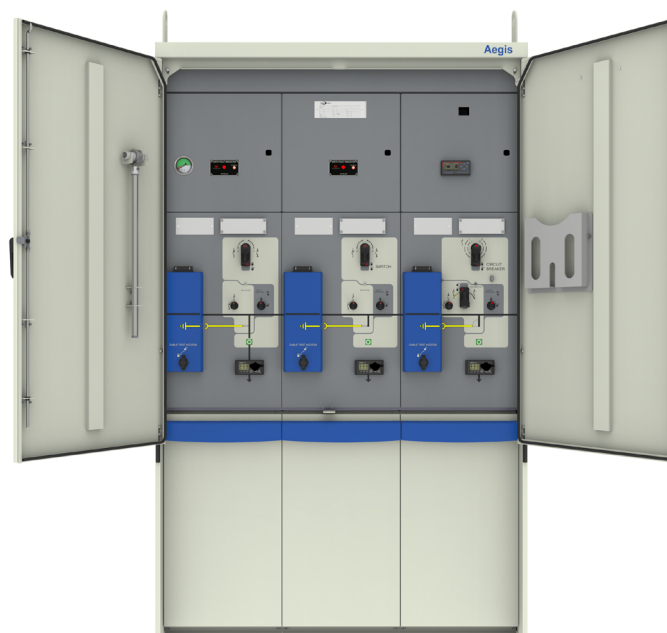
Circuit breaker function:

V: 630A Vacuum circuit breaker



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.



Aegis³⁶ range presentation

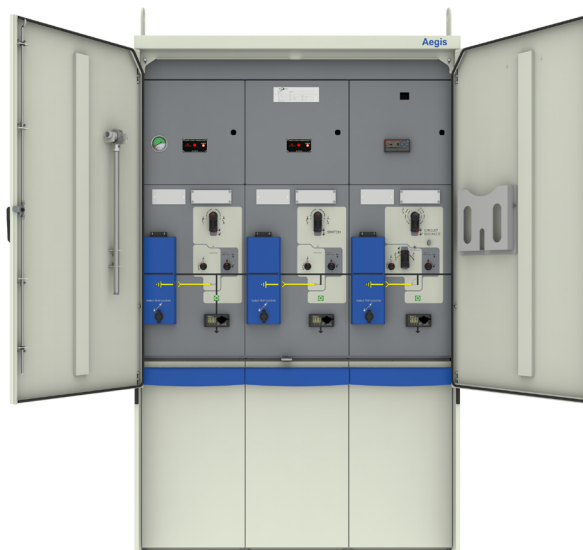
Extensible RMU range

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.

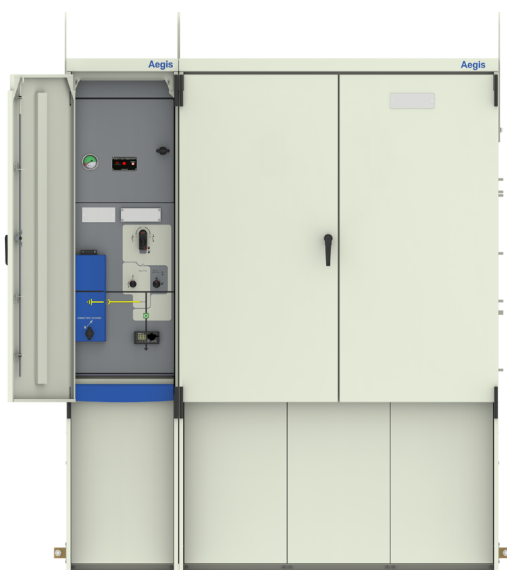
Available in indoor (IP41 and IP54) format, these units can be easily extended in any combination on-site, without specific tooling or floor preparation, and without the need to transfer SF₆ gas.



1 - function unit



3 - function unit

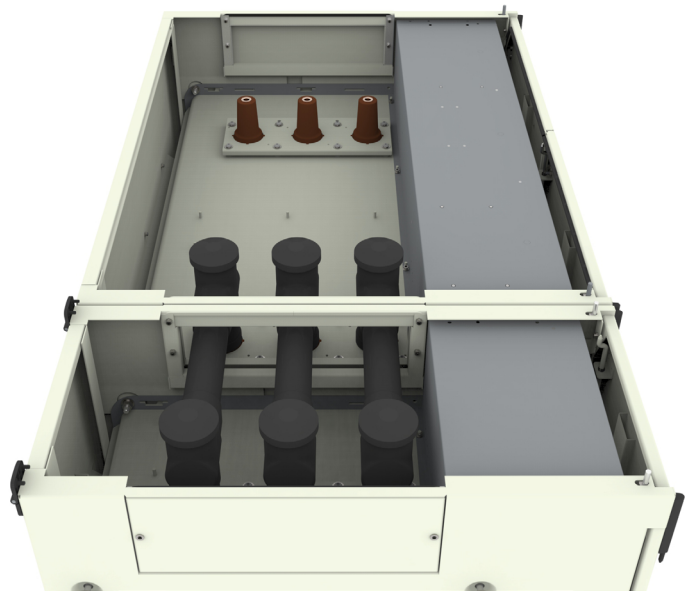
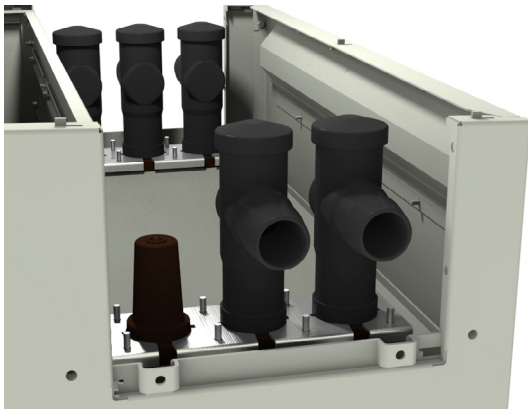


1 + 3 - function unit

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

EFI: Earth Fault Indication +
SCI: Short Circuit Indication

Protection relay

Gas pressure indicator

Marshalling box

Load switch operation

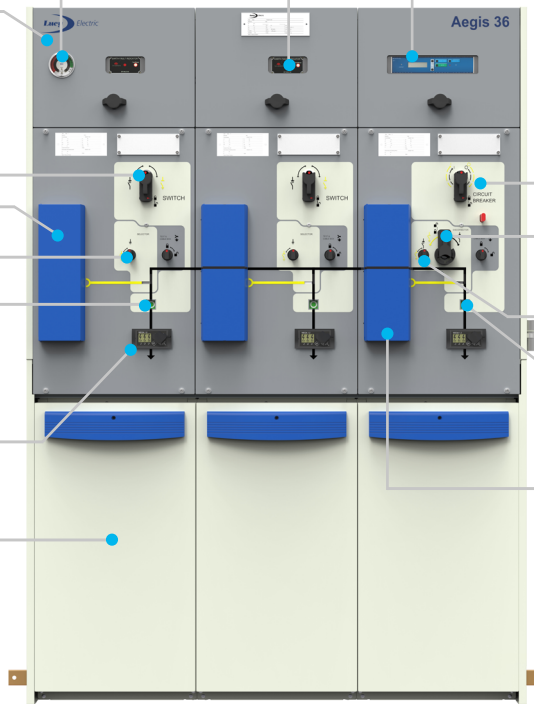
Earth & test cover

Load switch selector

Load switch indicator

VDS: Voltage Detection
System/ VPIS: Voltage
Presence Indication System

Interlocked cable box cover



Circuit breaker operation

Circuit breaker disconnecter

Circuit breaker push-to-trip button

Circuit breaker indicator

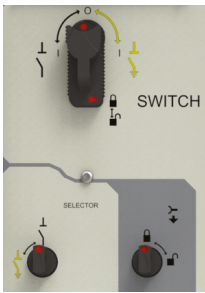
Circuit breaker E&T and
cable box interlock

User interface and interlocking mechanism

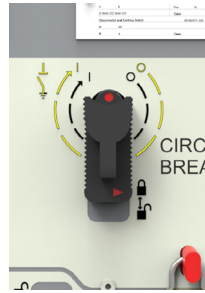
Safety interlocking

The Load break switch and Vacuum circuit breaker 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 disconnecter 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	Mains	Locked	Locked
OFF	Mains	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	Mains	Locked	Locked
OFF (Tripped)	Mains	Locked	Locked
Earth ON	Earth	Unlocked	Unlocked
Earth OFF (Tripped)	Earth	Locked	Locked
OFF (Isolated)	OFF	Locked	Locked

Product characteristics

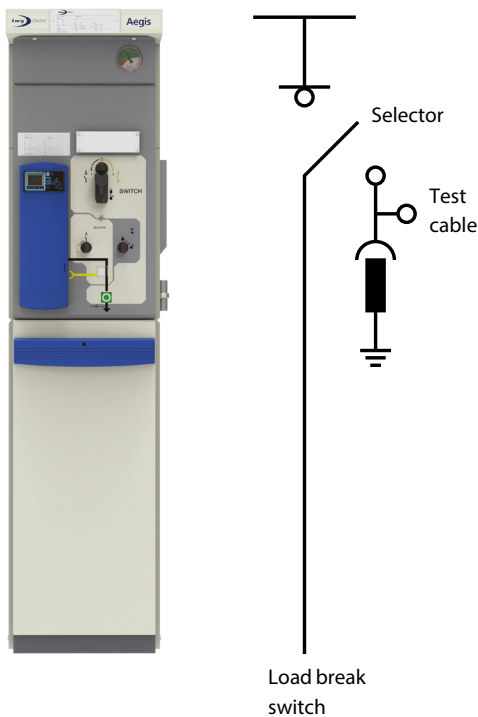
Switching function - Load break switch (L)

Standard features

- Interlocked 3 functions (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)
- Surge arresters in Load break switch functions
- Motor for remote operation
- VPIS/VDS
- EFI/FPI
- Key interlocks with Ronis/Castell keys
- Operation counters
- Wide range of cable clamps for single and 3-core cables



Product characteristics

Vacuum Circuit Breaker (V)

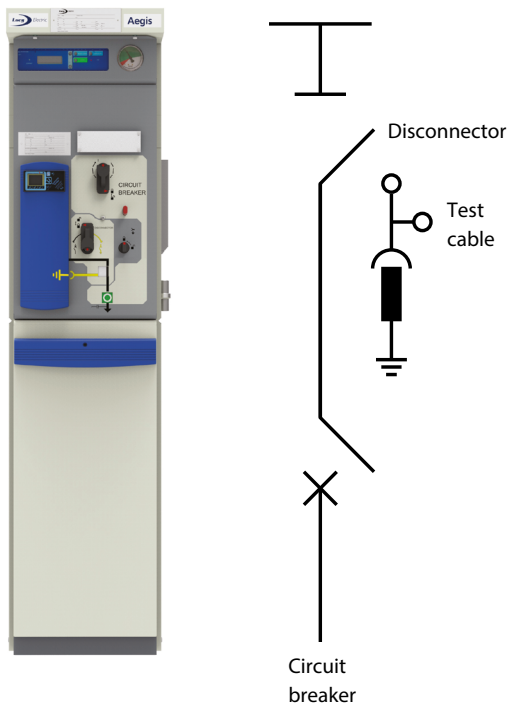
Standard features

- Interlocked 3 functions (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



Product characteristics

r cable riser (direct incomer)

Key features

- Interlocked 3 functions (ON, OFF and EARTH) device
- Available with single function
- "rV" Vacuum Circuit Breaker
- "rL" 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



Product characteristics

Circuit breaker protection relays

Protection relays

The Aegis 36 range can be fitted with self-powered relays for protecting the transformer or downstream network from fault currents by tripping the Circuit Breaker. These relays incorporate many advanced features and have a variety of settings to provide discrimination protection in networks.

The self-powered feature eliminates reliance on external power sources to provide greater operational reliability. Optional password protection ensures that users have complete control of the device, and fault occurrences 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	Kries	Fanox	
	WIP1	IKI-35	SIA-C	SIA-B
				
Power				
Self powered	•	•	•	•
Auxiliary powered	•	•	•	•
Dual powered	•	•	•	•
Protection				
Earth fault protection	•	•	•	•
Overcurrent protection	•	•	•	•
Short circuit protection	•	•	•	•
Thermaloverloadprotection				•
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		•	•	
RS485communicationport	•		•	
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 EFI's with Aegis 36, with a list of compatible devices below:

	SIGMA F+E 3	SIGMA D / D+	ComPass A	ComPass B
Manufacturer: Horstmann Models: SIGMA & ComPass				
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

Manufacturer: Horstmann
EFI Model: EARTH Zero

	EARTH Zero	EARTH Zero	EARTH Zero 'Flag'	EARTH Zero 'Flag'	EARTH 4.0
					
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.

Manufacturer: SupaRule
EFI Model: Sensorform

	BLZ-50	BFZ-50	MFZ-50	MLZ-50	CFZ-50	CLZ-50
						
Features						
Power source	3.6V/lithium ½AA850mAh 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	○	○	○	○	○
	CT300: 300mm	○	○	○	○	○
Remote flashing LED indicator	○	○	○	○	○	○
Auxiliary relay, 1N/O latching	○	○	○	○	○	○

Key • Standard ○ Option

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

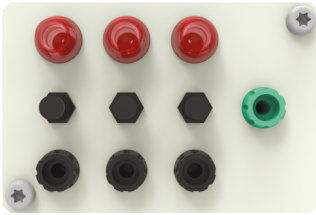
Product characteristics

Options and accessories – VPIS and VDS

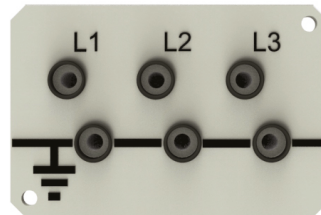
Voltage presence indication system

The 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 voltage presence indication 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 VDS can additionally detect the absence of voltage. This provides an additional layer of assurance and offers a more 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:

Manufacturer: Horstmann
VDS Model: WEGA

	WEGA 1.2 C	WEGA 2.2 C	WEGA 1.2 C vario	WEGA 3
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

	Capdis S1+ (R4)	Capdis S2+ (R4)
Manufacturer: Kries VDS Model: Capdis		
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)

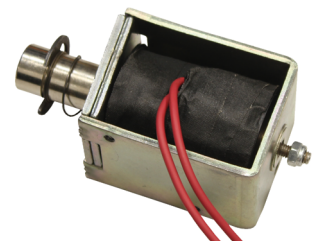
Aegis 36 units are fitted on request with integrated 24V DC motors. When used in conjunction with the Gemini 3 RTU, these actuators enable remote operation of ring switches and circuit breakers.

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.

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



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

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.

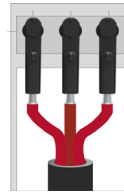
They are accessible by removing the interlocked cable compartment covers at the front of the unit.

The maximum supported cable sizes are:

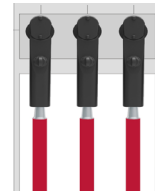
- Up to 300mm²: Single core
- Up to 400mm²: Three core

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

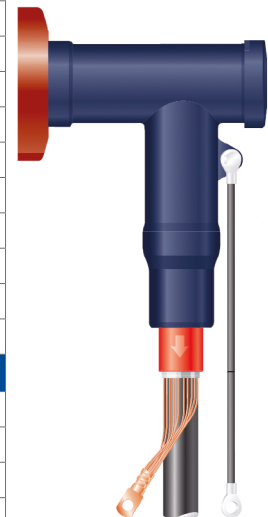
An extensive range of additional cable compartment clamps and sealing devices are available on request, please contact your local Lucy Electric sales office for more information.

Single cable per phase (available for L and V functions)

Brand	Interface type (As per EN60580)	Model Number	Cable Cross-section (mm ²)
Euromold	C	3X(M480TB/G-18-16.95UN5+KIT MT) MT	35-70
		3X(M480TB/G-18-95.240UN5+KIT MT) MT	95
		3X(M480TB/G-27-95.240UN5+KIT MT) MT	120-240
		3X(M480TB/G-30-120.300UN5+KIT MT) MT	300
		3X(M484TB/G-37-185.400UN5+KIT MT) MT	400
NKT	C	CB 36-630 + 2152488	35-120
		CB 36-630 + 2152493	150-300
		CB 36-630 + 2152494	400
Tyco Electronics	C	RSTI-6851	35-95
		RSTI-6852	120-150
		RSTI-6853	185
		RSTI-6855	240-300
		RSTI-6951	400

Single cable per phase and surge arrester (for L function only)

Euromold	C	3X(M480TB/G-18-16.95UN5+KIT MT) MT + 3X(800SA-10-36N)	35-70
		3X(M480TB/G-18-95.240UN5+KIT MT) MT + 3X(800SA-10-36N)	95
		3X(M480TB/G-27-95.240UN5+KIT MT) MT + 3X(800SA-10-36N)	120-240
		3X(M480TB/G-30-120.300UN5+KIT MT) MT + 3X(800SA-10-36N)	300
		3X(M484TB/G-37-185.400UN5+KIT MT) MT + 3X(800SA-10-36N)	400
NKT	C	CB 36-630/CSA 36-10 + 2152488	35-120
		CB 36-630/CSA 36-10 + 2152493	150-300
		CB 36-630/CSA 36-10 + 2152494	400
Tyco Electronics	C	RSTI-6851 + RSTI-CC-68SA3610	35-95
		RSTI-6852 + RSTI-CC-68SA3610	120-150
		RSTI-6853 + RSTI-CC-68SA3610	185
		RSTI-6855 + RSTI-CC-68SA3610	240-300
		RSTI-6951 + RSTI-CC-68SA3610	400

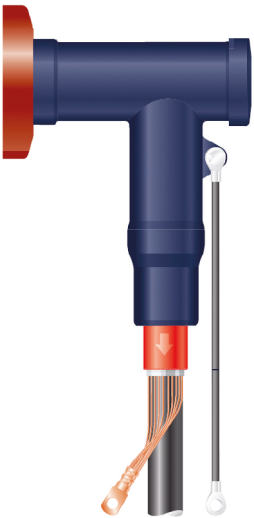


Double cable per phase (L function only)

Euromold	C	P2-3X(M480TBM-18-16.95UN5+KIT MT) MT	35-70
		P2-3X(M480TBM-18-95.240UN5+KIT MT) MT	95
		P2-3X(M480TBM-27-95.240UN5+KIT MT) MT	120-240
		P2-3X(M480TBM-30-120.300UN5+KIT MT) MT	300
		P2-3X(M484TBM-37-185.400UN5+KIT MT) MT	400
NKT	C	CB 36-630/CSA 36-10 + 2 x 2152488	35-120
		CB 36-630/CSA 36-10 + 2 x 2152493	150-300
		CB 36-630/CSA 36-10 + 2 x 2152494	400
Tyco Electronics	C	RSTI-6851 + RSTI-CC-6851	35-95
		RSTI-6852 + RSTI-CC-6852	120-150
		RSTI-6853 + RSTI-CC-6853	185
		RSTI-6855 + RSTI-CC-6855	240-300
		RSTI-6951 + RSTI-CC-6951	400

Three core cable

Euromold	C	T-(M480TB/G-18-16.95UN5) MT + T-HSBK-30-DR1F/DR2F	35-70
		T-(M480TB/G-18-95.240UN5) MT + T-HSBK-30-DR1F/DR2F	95
		T-(M480TB/G-27-95.240UN5) MT + T-HSBK-40-DR1F/DR2F	120-240
		T-(M480TB/G-30-120.300UN5) MT + T-HSBK-50-DR1F/DR2F	300
		T-(M484TB/G-37-185.400UN5) MT + T-HSBK-50-DR1F/DR2F	400
NKT	C	CB 36-630 + 2152414	35-50
		CB 36-630 + 2125414	70-150
		CB 36-630 + 2152416	185-400
Tyco Electronics	C	RSTI-6851-3C	35-95
		RSTI-6852-3C	120-150
		RSTI-6853-3C	185
		RSTI-6855-3C	240-300
		RSTI-6951-3C	400



Note: For other connector types, please consult Lucy Electric. The above data for connectors is provided as general information therefore please consult the connectors manufacturer for latest information regarding these products.

Air metering unit

Aegis 36 is compatible with a range of advanced Air Metering Units (AMUs), which offer full tariff metering capability. The new 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

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



Non-extensible AMU - Mt

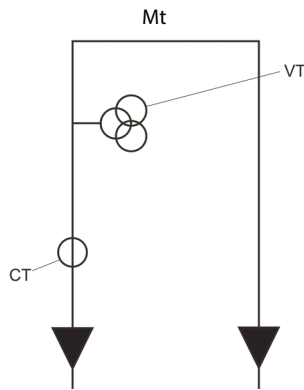
Air metering unit

Configurations available

Four metering functions are available:

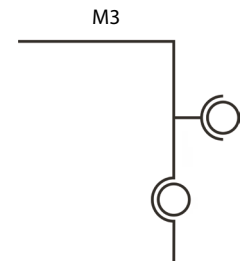
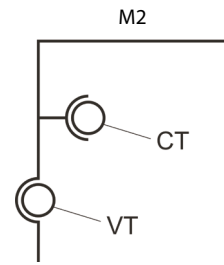
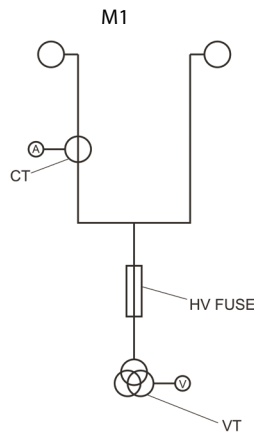
Non-extensible range

- 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 Plus is available in three internal arc protection formats:

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

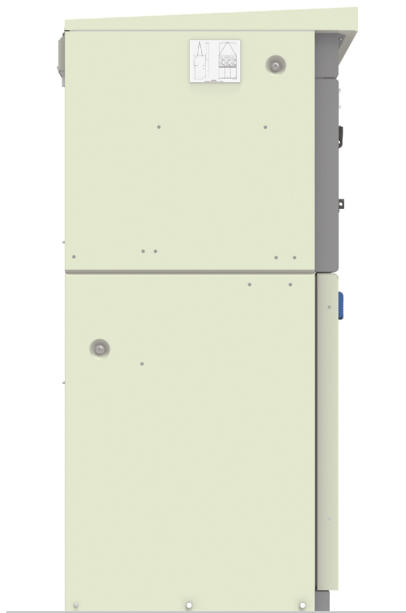
These ratings are applicable to the SF₆ insulated gas tank and the cable compartments. The units are configured on order, allowing for protection to be tailored to application requirements.

Methods of protection

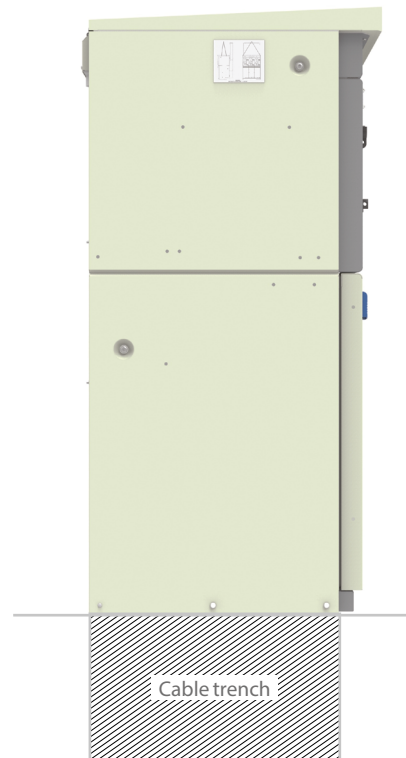
AF and AFL protection is achieved by venting arc gases through the rear of the unit via a sacrificial metallic plate.

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 is an all new, highly flexible, general-purpose Remote Terminal Unit designed to remotely monitor and control medium and high voltage switchgear.

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.

Single Switch Module (SSM) – This provides the inputs and outputs to perform secure interlocked control of a single gas enclosed switch.

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

- Fault detection (Earth and Phase)
- LED status indicators
- Real time clock (SCADA synchronised)
- 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
 - IEC 60870-5-104
 - Modbus TCP or RTU
- Maintenance free



Smart-grid ready

Gemini 3 RTU integration

Key features of Gemini 3

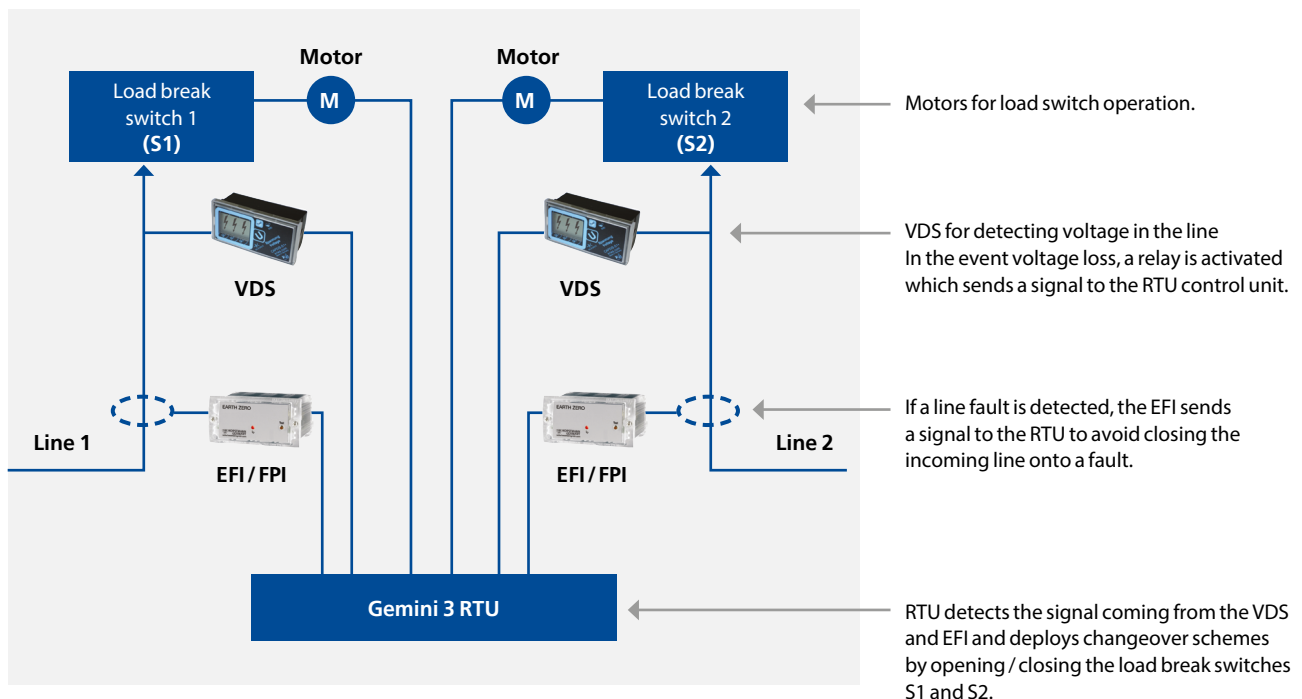
- Embedded auto change over and auto sectionalising functions
- Real time network condition monitoring of voltage, current, power, power factor and frequency
- Flexible communication through radio, RS232, RS485, packet data network, GSM, GPRS, PSTN, ethernet TCP / IP and optical fibre.
- Advanced battery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

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

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.



Technical data

Aegis³⁶ ring main unit

Rated voltage	kV	36
---------------	----	----

General

Rated frequency	Hz	50/60
-----------------	----	-------

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
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Mechanical impact protection	IK	IK07
------------------------------	----	------

Internal arc rating

AF	KA 1 sec	16, 20, 25
----	----------	------------

SF6 gas

Annual leakage rate	%	≤ 0.1%
---------------------	---	--------

Filled pressure (at 20°C)	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
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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, 65
------------------------------	----	----------------

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, 65
------------------------------	----	----------------

Earthing circuit

Rated short time withstand current	kA	21 kA (3 s), 25 kA (1s)
------------------------------------	----	-------------------------

Rated peak withstand current	kA	52.5, 62.5, 65
------------------------------	----	----------------

Mechanical endurance class

Load break switch	Class	M1
-------------------	-------	----

Rated voltage	kV	36
---------------	----	----

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
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Rated short circuit breaking current	kA	25
--------------------------------------	----	----

Rated short circuit making current	kA	50, 62.5, 65
------------------------------------	----	--------------

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, 65
------------------------------	----	----------------

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, 65
------------------------------	----	----------------

Mechanical endurance class

Circuit breaker	Class	M1
-----------------	-------	----

Earth switch	Class	M0
--------------	-------	----

Electrical endurance class

Circuit breaker	Class	E2
-----------------	-------	----

Earth switch	Class	E2
--------------	-------	----

Operating mechanism

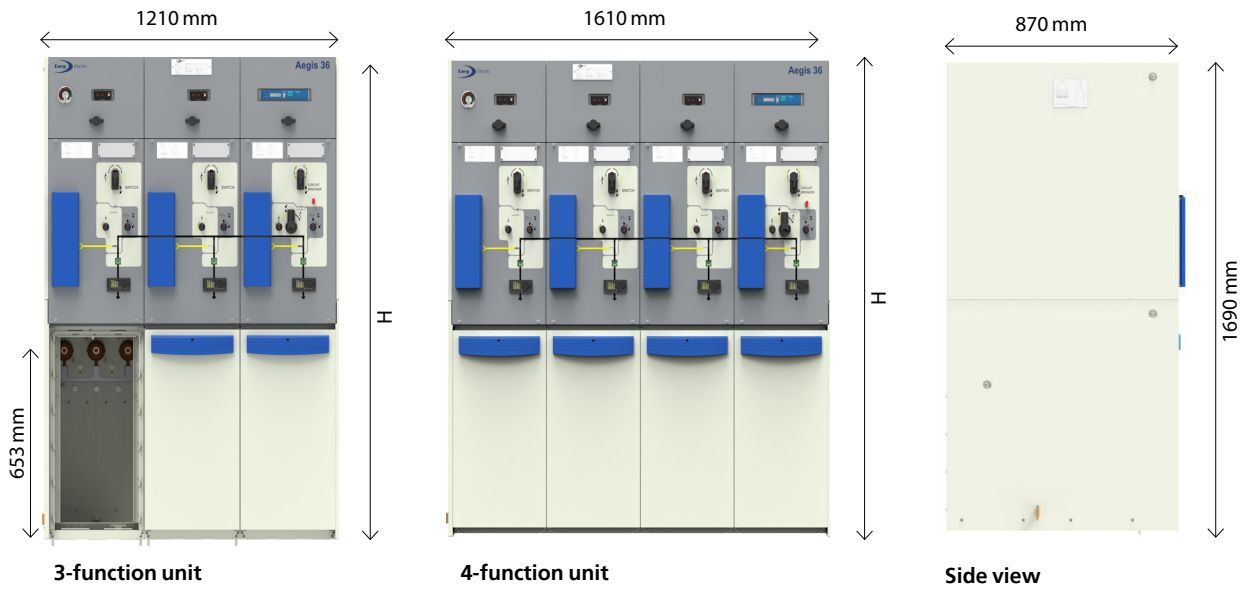
Operating sequence for mechanism		O-3min-CO-3min-CO
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Local	Close – Open	Hand Lever - Pushbutton
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Remote	Close – Open	Motor – Coil
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Dimensions

Non-extensible



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

EFI (choose any one)	Sensorform BFZ-50	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	MFZ-50	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	MLZ-50	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	CFZ-50	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	CLZ-50	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	BLZ-50	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

Secondary injection (tick for each function, if needed)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protection device (choose any one)				
Ashida ADR241S Relay	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kries IKI-35 Relay	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fanox SIA-C Relay	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protection CT for Relay (choose any one)				
Dual (Primary) Ratio CT 100:50/-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dual (Primary) Ratio CT 200:100/-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shunt trips (choose any one)				
12V DC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24V DC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48V DC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
110V DC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
110V AC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
240V AC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Multiple voltage (24V DC – 240V AC/DC)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

Disclaimer

Lucy Electric has a policy of continuous research and development and accordingly reserves the right to change the design and specification of its products without prior notice.

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