

# PRODUCT INFORMATIE

*AEGIS<sup>Plus</sup> ring main unit*

HANDELSONDERNEMING B.V.



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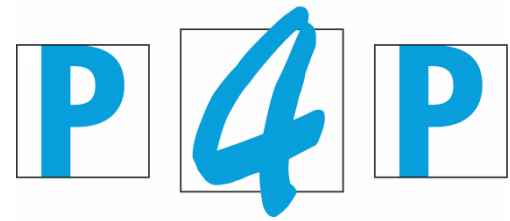


*engineering intelligent solutions*

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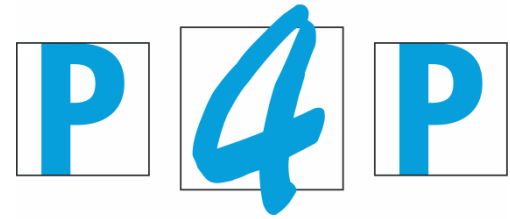
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Aegis Plus bouwt voort op de sterke basis van Aegis, om extra functies te bieden, die voor u als klant vele voordelen biedt:

- + Uitbreidbaar en niet uitbreidbaar
- + Automatiseringsklaar met geïntegreerde RTU
- + Netwerkconditie monitoring
- + Automatische overdrachtregeling (ATS)
- + Stroomonderbreker met automatische hersluitmechanisme
- + Breed scala aan beveiligingsrelais en TLF-apparaten
- + Installatie voor binnen en buiten
- + Verbeterde interne boogveiligheid
- + Meerdere kabeldoorvoerhoogtes
- + Verminderde ruimtelijke 'footprint'
- + Nieuwe opties en accessoires

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**Lucy Elekctric is wereldleider in schakel-, beveiligings- en automatiseringsoplossingen voor elektrotechnische distributiesystemen, met meer dan 100 jaar ervaring in de industrie. Tegenwoordig is het bedrijf een specialist in secundaire stroomdistributie, engineering van hoogwaardige midden-spanningsborden voor nutsvoorzieningen, industriële en commerciële toepassingen, bovengrondse apparatuur en retrofit en automatiseringsoplossingen voor klanten nationaal en internationaal.**

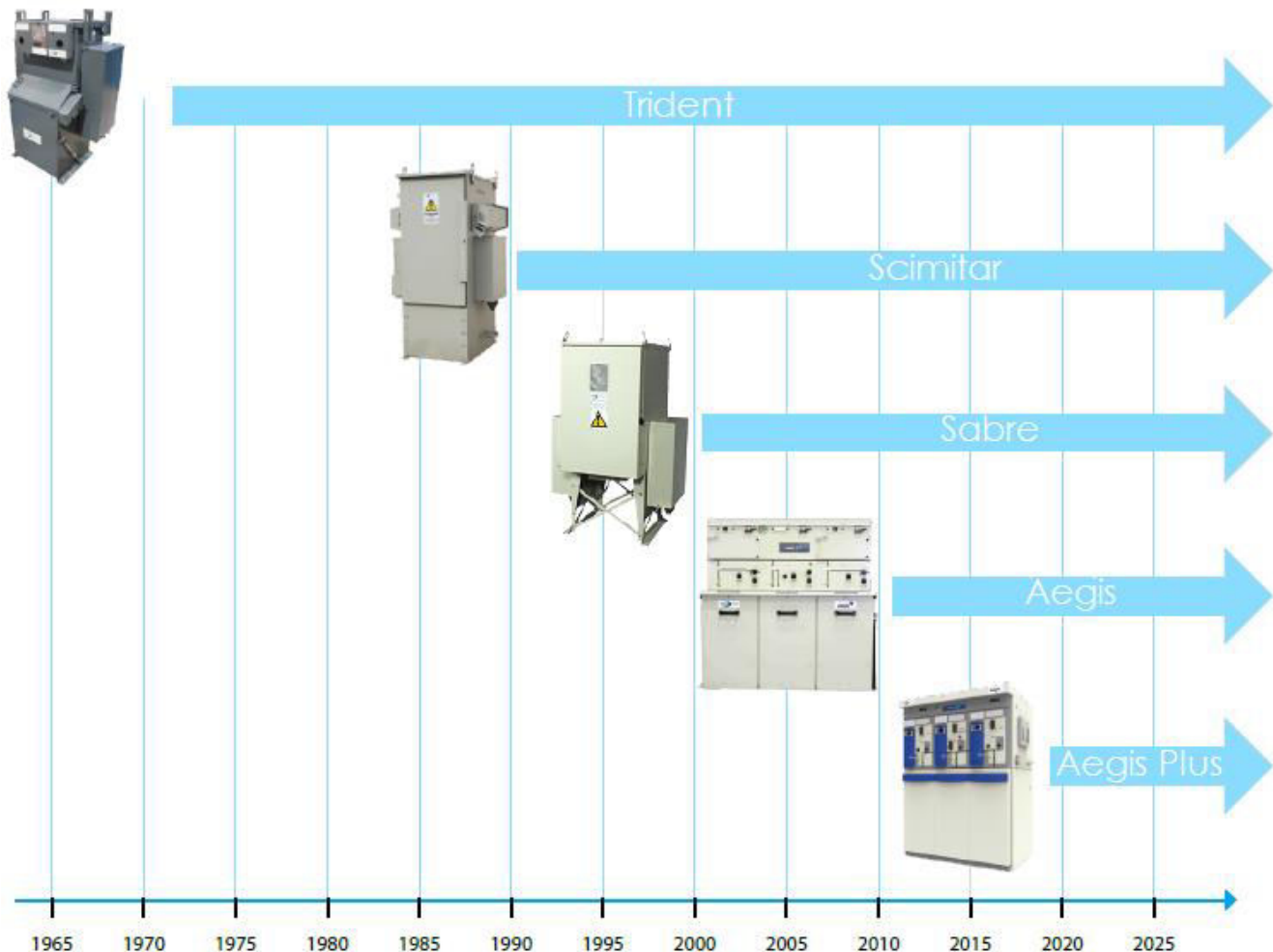
Technische uitmuntendheid, gebaseerd op een lange traditie van expertise, gekoppeld aan de modernste technologie om tegemoet te komen aan de soms strenge wensen van de klant, maakt van Lucy Electric een van de weinige bedrijven die echt op maat gemaakte oplossingen kunnen bieden. We hebben de

mogelijkheid om units te produceren voor elke locatie, elk klimaat of elke situatie en bieden een complete productportefolio met een breed scala aan services en toegewijde aftersales ondersteuning gedurende de levensduur van het product.

Een gespecialiseerde Britse onderzoeks- en ontwikkelingsfaciliteit met een doorlopend programma van R&D zorgt ervoor dat Lucy Electric producten altijd op het scherpst van de snede zijn, ontworpen om te anticiperen op de zich ontwikkelde technische en marktvraag van onze klanten. En onze multi-miljoen pond, speciaal gebouwde, moderne productiefaciliteit en Groot Brittannië biedt volledige controle over de productie.

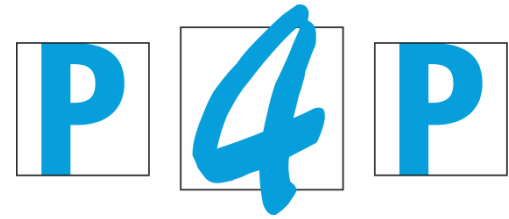
Lucy Electric is een echt internationaal bedrijf met kantoren in China, Thailand, Dubai, Maleisië en Zuid-Afrika; productie-faciliteiten in de Verenigde Arabische Emiraten, Saoedi-Arabië, Thailand van India; en een gevestigd wereldwijd netwerk van industriële partners en aannemers die actief zijn in meer dan 50 landen over de hele wereld.

### Ring main unit evolutie











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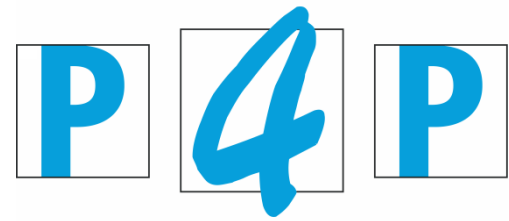
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| Ring main units  | Nominale spanning (tot) | Modus van fout-stroom-onderbreking | Isolatie-medium | Nominale stroom (tot) | Opstelling            | Installatie voorwaarden | Bediening           |
|--|-------------------------|------------------------------------|-----------------|-----------------------|-----------------------|-------------------------|---------------------|
| <br><b>Aegis Plus</b> | 24kV                    | Vacuüm                             | SF6             | 630A                  | Grond / Transformator | Binnen / Buiten         | Locaal / Op afstand |
| <br><b>Aegis</b>      | 24kV                    | Vacuüm                             | SF6             | 630A                  | Grond / Transformator | Binnen / Buiten         | Locaal / Op afstand |
| <br><b>Sabre</b>      | 24kV                    | Vacuüm                             | SF6             | 360A                  | Grond / Transformator | Binnen / Buiten         | Locaal / Op afstand |
| <br><b>Scimitar</b>  | 17.5kV                  | Fuse                               | SF6             | 630A                  | Grond / Transformator | Binnen / Buiten         | Locaal / Op afstand |
| <br><b>Trident</b>  | 15.5kV                  | Fuse                               | Oil             | 630A                  | Grond / Transformator | Binnen / Buiten Outdoor | Locaal / Op afstand |

| Ring main units  | Nominale spanning (tot) | Modus van fout-stroom-onderbreking | Isolatie-medium | Nominale stroom (tot) | Opstelling  | Installatie voorwaarden | Bediening           |
|--|-------------------------|------------------------------------|-----------------|-----------------------|-------------|-------------------------|---------------------|
| <br><b>DSB Rapier</b> | 145kV                   | -                                  | Lucht           | 2500A                 | Constructie | Buiten                  | Locaal / Op afstand |
| <br><b>GX Rapier</b>   | 38V                     | -                                  | Lucht           | 630A                  | Pool        | Buiten                  | Locaal / Op afstand |
| <br><b>Sabre</b>       | 36kV                    | -                                  | Lucht           | 800A                  | Pool        | Buiten                  | Locaal / Op afstand |

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## Inleiding Aegis<sup>Plus</sup>

**Aegis Plus bouwt voort op de sterke fundamenten van Aegis en dient als een uitbreiding van het RMU-assortiment dat extra functies en voordelen biedt om te voldoen aan de veranderende technische en functionele behoeften van klanten over de hele wereld. De units die klaar zijn voor automatisering hebben nu geïntegreerde Remote Terminal Units (RTU's) in de vorm van de volgende generatie Gemini 3, die smart-grid-functionaliteit mogelijk maakt door het gebruik van een automatisch overdrachtsschema (ATS).**

Het structurele tanklassen wordt uitgevoerd door robots, om een hoge betrouwbaarheid te garanderen met een verwachte levensduur van het product van meer dan 30 jaar. De behuizing is van verzinkt staal en volledig behandeld met elektrostatisch aangebrachte, in de oven uitgeharde verf om degradatie door vervuiling en barre klimatologische omstandigheden te weerstaan.

Aegis Plus biedt zowel uitbreidbare als niet-uitbreidbare opties met tal van functionele configuraties geïsoleerd in een enkele, afgesloten tank. Het assortiment is gebouwd voor de heftigste omgevingen, met een optie om units om te bouwen van binnen naar buiten; bescherming uitbreiden tot IP54. Al deze verbeteringen zijn gerealiseerd terwijl de ruimtelijke voetafdruk is verkleind, wat heeft geleid tot een ontwerp dat compacter en eenvoudiger te installeren is. Er is ook een reeks geavanceerde luchtmeeteenheden beschikbaar, die vanaf het begin zijn ontworpen met Aegis Plus in gedachten om volledige meetmogelijkheden te bieden.

## Kenmerken:

- \* 12kV, 17.5kV and 24kV-classificaties
- \* Uitbreidbaar en niet-uitbreidbaar met max. 5 schakelfuncties in één tank
- \* Hermetisch afgesloten roestvrijstalen tank, ongevoelig voor omgevingen
- \* Intuïtief enkellijns nabootsingsdiagram voor eenvoudig en veilige operatie
- \* Vacuüm stroomonderbreker voor effectiever en schoner onderbreking
- \* Voorziening voor motoractuators voor bediening op afstand en controle
- \* Geïntegreerde kabeltestfaciliteit op voorkant, waardoor het niet meer nodig is om kabels los te koppelen.
- \* Suitable for indoor and outdoor application
- \* Extensive range of Relays, TLF, VDS and EFI devices
- \* Low roof height designed for kiosks and mini substations
- \* Easy integration with SCADA networks

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## Installation and operation conditions



### IP54

#### Outdoor metal clad non-extensible units only

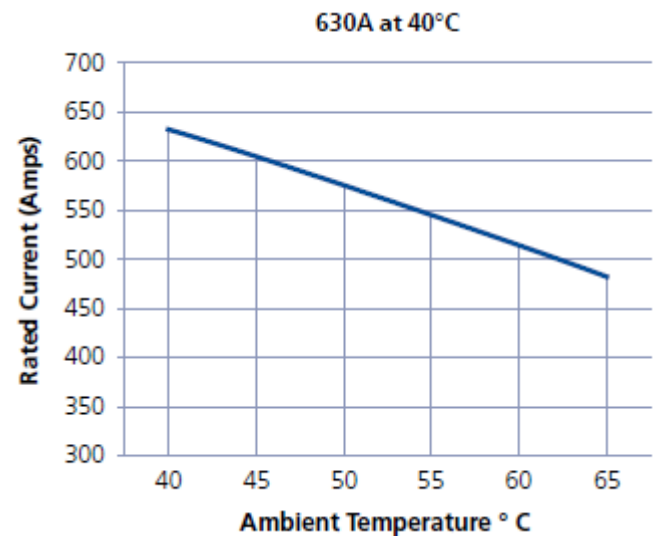
- i. Indoor and outdoor type units
- ii. Ambient temperature for operation without de-rating: 40°C (for higher temperature applications please refer to temperature de-rating curve below)
- iii. Average value over 24 hours max: 40°C
- iv. Maximum altitude for operation without de-rating: 1000m (above sea level)\*
- v. Insulation medium: SF6 Gas
- vi. Rated pressure at +20°C: 0.03 MPa
- vii. Interruption medium: vacuum
- \* For higher altitude applications please contact P4P



### IP41

#### Indoor extensible and non-extensible

### Temperature De-rating Curves



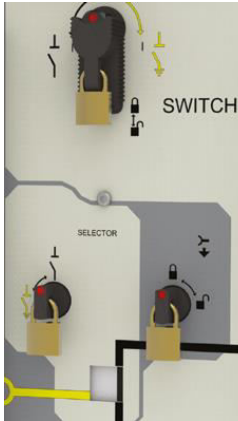
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## Safety features



### Operation mechanism

The mechanism consist 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's 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 breaker to trip and clear a fault.



### Internal Arc withstand

The SF<sub>6</sub> 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 Plus units are rated for AF (operator safety from the front of the unit) and there is an option to request AFL (front and side) and AFLR (front, side and rear protection).

For more details please refer to the internal arc protection page 31.



### 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's 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 of Breaks 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.

### 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 on the main earthing system.

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## Applications

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

### Energy

- i. Generation: wind power, solar power
- ii. Distribution: compact substations, ring main network protection

### Industries

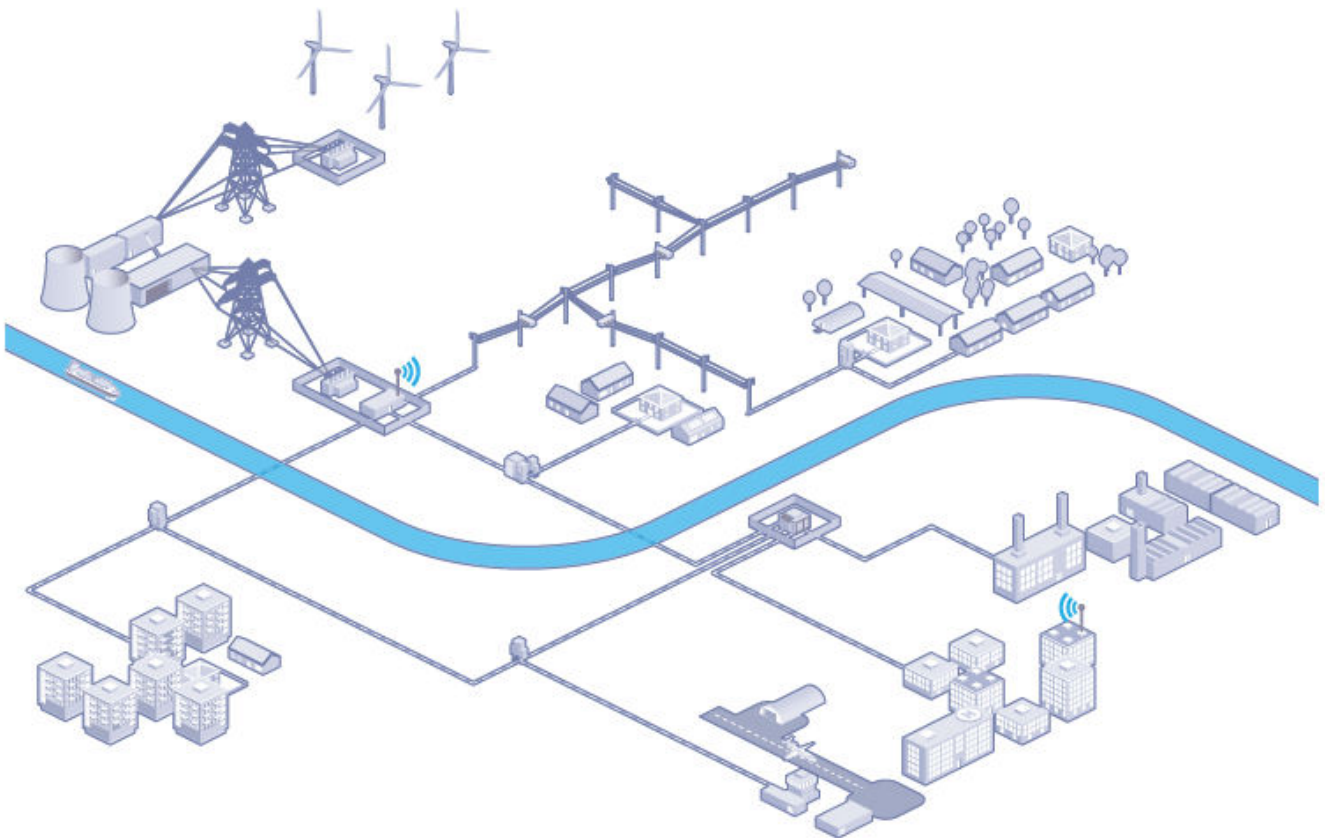
- i. Water and waste water, mining, minerals, automotive, iron and steel, cement and petroleum

### Infrastructure

- i. Tunnels, airports, seaports, metro stations, underground railways

### Buildings

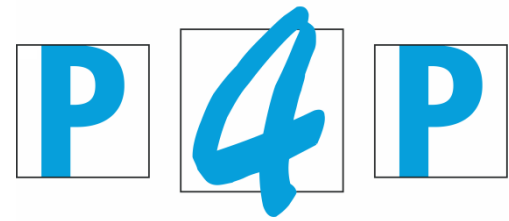
- i. Commercial buildings: hospitals, shopping centres, hotels, office buildings, data centres, schools
- ii. Residential buildings: houses, apartments





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## Aegis<sup>Plus</sup> range presentation

The AegisPlus range is available in Extensible and Non-Extensible formats, ranging from 1-function to 5-function configurations. An enhanced range of air metering units is also available, which offers four metering functions.

### Functions available:

#### Switching functions:

L: 360A Load break switch

#### Circuit breakers functions:

V: 630A Vacuum circuit breaker

T: 250A Vacuum circuit breaker

C: 630A Vacuum circuit breaker (Auto reclose mechanism)

#### Metering functions:

Mt: Tariff metering freestanding (Cable In/Cable Out)

M1: Busbar metering (Busbar In/ Busbar Out)

M2: Cable In/Busbar Out

M3: Busbar In/Cable Out

For further details on metering, please refer to the air metering unit section on page 32.

### Non-Extensible RMU range

This range has 3, 4 and 5 functions insulated by SF<sub>6</sub> gas in a single, hermetically sealed stainless steel tank. This solution is available in indoor (IP41) and outdoor (IP54) formats and is perfectly suited for integration into compact substations, to form standard ring main secondary networks with transformer protection.

Three voltage classes are available - 12kV, 17.5kV and 24kV.

### Indoor range (IP41)



3-function unit



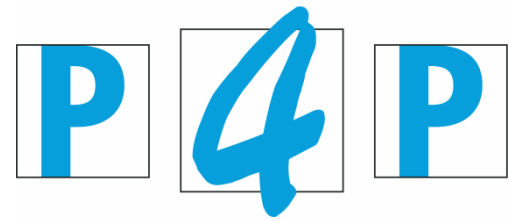
4-function unit



5-function unit

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### Outdoor range (IP54)

The outdoor units are completely self-contained with no added spatial footprint. The indoor-to-outdoor conversion process simply involves the addition of two retrofit doors, with minimal tooling or floor preparation. The result is an easily upgradable solution that can withstand the harshest environmental conditions. All configurations use the same enclosure, as shown below.



3-function outdoor unit

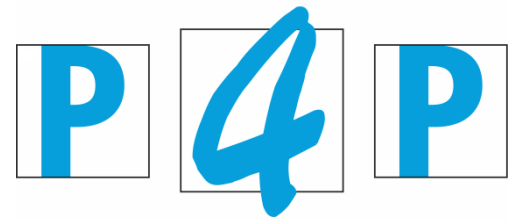
### Non-Extensible RMU range configurations

| 3-function | Indoor | Outdoor | 4-function        | Indoor | Outdoor | 5-function         | Indoor | Outdoor |
|------------|--------|---------|-------------------|--------|---------|--------------------|--------|---------|
| LLL        | ●      | ●       | LLLL              | ●      | ●       | LLLLL              | ●      | ●       |
| LLV        | ●      | ●       | LLL <del>V</del>  | ●      | ●       | LLLL <del>V</del>  | ●      | ●       |
| LVV        | ●      | ●       | LL <del>V</del> V | ●      | ●       | LLL <del>V</del> V | ●      | ●       |
| VVV        | ●      | ●       | L <del>V</del> VV | ●      | ●       | LL <del>V</del> VV | ●      | ●       |
| LLT        | ●      | ●       | V <del>V</del> VV | ●      | ●       | L <del>V</del> VVV | ●      | ●       |
| LTT        | ●      | ●       | LLL <del>T</del>  | ●      | ●       | V <del>V</del> VVV | ●      | ●       |
| TTT        | ●      | ●       | LL <del>T</del> T | ●      | ●       | LLL <del>L</del> T | ●      | ●       |
|            |        |         | L <del>T</del> TT | ●      | ●       | LL <del>L</del> TT | ●      | ●       |
|            |        |         | TT <del>T</del> T | ●      | ●       | L <del>L</del> TTT | ●      | ●       |
|            |        |         |                   |        |         | L <del>T</del> TTT | ●      | ●       |
|            |        |         |                   |        |         | TT <del>T</del> TT | ●      | ●       |
|            |        |         |                   |        |         | TTTT <del>T</del>  | ●      | ●       |

**Key** • Configuration available - Configuration not available

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## Aegis<sup>Plus</sup> 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, 4 and 5 functions insulated by SF<sub>6</sub> 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) format, these units can be easily extended in any combination on-site, without specific tooling or floor

preparation, and without the need to transfer SF<sub>6</sub> gas.

Three voltage classes are available - 12kV, 17.5kV and 24kV.

### Outdoor range (IP41)



1-function unit



2-function unit



3-function unit



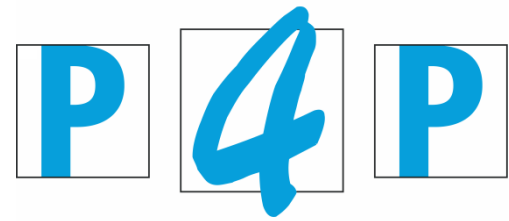
4-function unit



5-function unit

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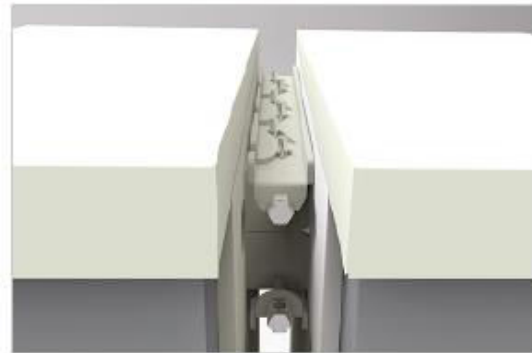
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### Extensibility system

The coupling of additional functions is achieved via the extensible bushings located on the upper sides of Aegis Plus (extensible model only).



Coupling bars as shown are inserted into the bushing slots to form a secure electrical connection. Units are then firmly bolted together via the fixing mounts to form a sturdy and lasting solution.



### Extensible RMU range configurations

| 1 Function | LE | RE | DE | Indoor | Outdoor |
|------------|----|----|----|--------|---------|
| L          | •  | •  | •  | •      | -       |
| V          | •  | •  | •  | •      | -       |
| T          | •  | •  | •  | •      | -       |
| C          | •  | •  | •  | •      | -       |

| 2 Function | LE | RE | DE | Indoor | Outdoor |
|------------|----|----|----|--------|---------|
| LL         | •  | •  | •  | •      | -       |
| LV         | •  | •  | •  | •      | -       |
| VV         | •  | •  | •  | •      | -       |
| LT         | •  | •  | •  | •      | -       |
| TT         | •  | •  | •  | •      | -       |

| 3 Function | LE | RE | DE | Indoor | Outdoor |
|------------|----|----|----|--------|---------|
| LLL        | •  | •  | •  | •      | -       |
| LLV        | •  | •  | •  | •      | -       |
| LVV        | •  | •  | •  | •      | -       |
| VVV        | •  | •  | •  | •      | -       |
| LLT        | •  | •  | •  | •      | -       |
| LTT        | •  | •  | •  | •      | -       |
| TTT        | •  | •  | •  | •      | -       |

| 4 Function       | LE | RE | DE | Indoor | Outdoor |
|------------------|----|----|----|--------|---------|
| LLLL             | •  | •  | •  | •      | -       |
| LLL <sub>V</sub> | •  | •  | •  | •      | -       |
| LL <sub>VV</sub> | •  | •  | •  | •      | -       |
| L <sub>VVV</sub> | •  | •  | •  | •      | -       |
| V <sub>VVV</sub> | •  | •  | •  | •      | -       |
| LLLT             | •  | •  | •  | •      | -       |
| LLTT             | •  | •  | •  | •      | -       |
| LTTT             | •  | •  | •  | •      | -       |
| TTTT             | •  | •  | •  | •      | -       |

| 5 Function        | LE | RE | DE | Indoor | Outdoor |
|-------------------|----|----|----|--------|---------|
| LLLLL             | •  | •  | •  | •      | -       |
| LLLL <sub>V</sub> | •  | •  | •  | •      | -       |
| LLL <sub>VV</sub> | •  | •  | •  | •      | -       |
| LL <sub>VVV</sub> | •  | •  | •  | •      | -       |
| L <sub>VVVV</sub> | •  | •  | •  | •      | -       |
| V <sub>VVVV</sub> | •  | •  | •  | •      | -       |
| LLLLT             | •  | •  | •  | •      | -       |
| LLLLTT            | •  | •  | •  | •      | -       |
| LLTTT             | •  | •  | •  | •      | -       |
| LTTTT             | •  | •  | •  | •      | -       |
| TTTTT             | •  | •  | •  | •      | -       |

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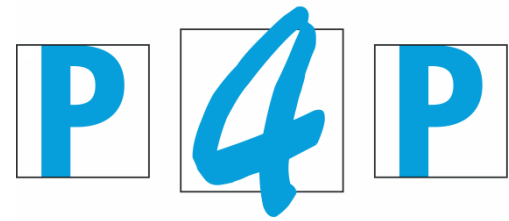
## Standards

**Aegis Plus complies with the latest international standards:**

|                        |   |
|------------------------|---|
| <b>IEC 62271 – 100</b> | Alternating current circuit breakers                    |
| <b>IEC 62271 – 102</b> | Alternating current disconnectors and earthing switches |
| <b>IEC 62271 – 103</b> | Switches for rated voltages between 1kV and 52kV        |
| <b>IEC 62271 – 105</b> | Alternating current switch fuse combinations            |
| <b>IEC 62271 – 200</b> | AC metal enclosed switchgear and control gear           |
| <b>IEC 62271 – 206</b> | VPIS systems for rated voltages between 1kV and 52kV    |
| <b>IEC 62271 – 1</b>   | Voltage detecting systems (VDS)                         |
| <b>IEC 60255</b>       | Measuring relays and protection equipment               |

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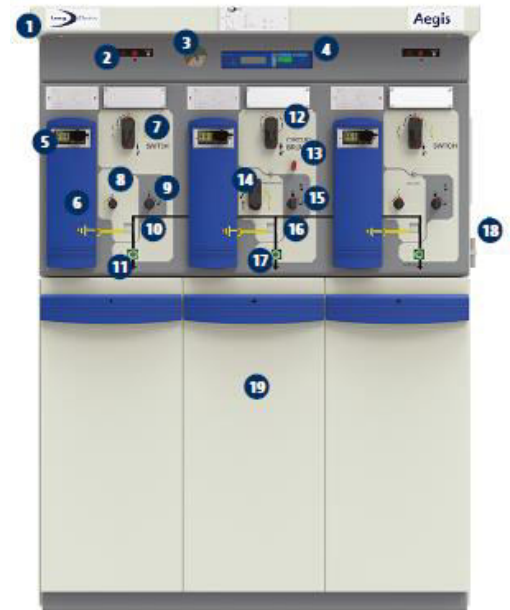
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## Product characteristics

### General

#### Product presentation

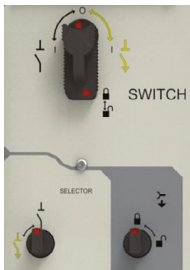
- |   |   |
|---|---|
| 1. Marshalling box  | 12. Circuit breaker operation                   |
| 2. EFI: Earth Fault Indication + SCI: Short Circuit Indication            | 13. Circuit breaker push-to-trip button         |
| 3. Gas pressure indicator   | 14. Circuit breaker disconnecter                |
| 4. Protection relay   | 15. Circuit breaker E&T and Cable box interlock |
| 5. VDS: Voltage Detection System/VPIS: Voltage Presence Indication System | 16. Circuit breaker disconnecter indicator      |
| 6. Earth & Test cover   | 17. Circuit breaker indicator                   |
| 7. Load switch operation  | 18. Operating handle                            |
| 8. Load switch selector   | 19. Interlocked cable box cover                 |
| 9. Load switch E&T and cable box interlock                                |   |
| 10. Load switch selector indicator  |   |
| 11. Load switch indicator   |   |



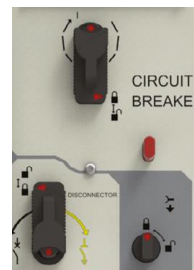
#### Product presentation

#### Safety interlocking

The LBS and 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 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 |                             |                        |
|-----------------------|------------------|-----------------------------|------------------------|
|                       | Selector         | Cable compartment interlock | Earth & Test interlock |
| Load Break Switch ON  | Main             | Locked                      | Locked                 |
| Load Break Switch OFF | Main             | Locked                      | Locked                 |
| Earth OFF             | Earth            | Locked                      | Locked                 |
| Earth ON              | Earth            | Unlocked                    | Unlocked               |

| Position                        | Interlock status |                             |                        |
|---------------------------------|------------------|-----------------------------|------------------------|
|                                 | Selector         | Cable compartment interlock | Earth & Test interlock |
| Load Break Switch ON            | Main             | Locked                      | Locked                 |
| Load Break Switch OFF (tripped) | Main             | Locked                      | Locked                 |
| Earth ON                        | Earth            | Unlocked                    | Unlocked               |
| Earth OFF (tripped)             | Earth            | Unlocked                    | Unlocked               |

# PRODUCT INFORMATIE

*AEGIS<sup>Plus</sup> ring main unit*



PRODUCTS • FOR • PROJECTS

## Product characteristics

### Switching function L: Load break switch

#### Standard features

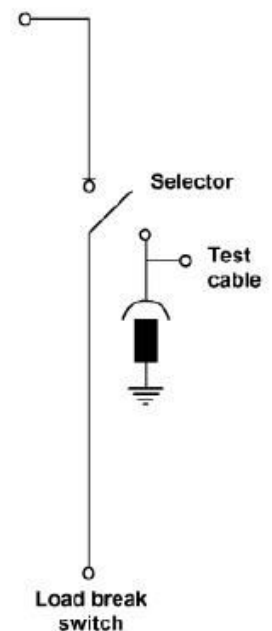
- Three positions (ON, OFF & Earth), spring loaded mechanism, independent manual operation
- Single mechanism with two independent operating shafts, one for switch ON/OFF position and another for selecting Mains and Earth operation
- Interlocked selector, locked from operation when switch ins in ON position
- Single line intuitive mimic diagram with clear indication to show the switch status (ON, OFF & Earth)
- Gas pressure indicator with Red and Green sectors to indicate minimum permissible pressure for safe operation (on per tank)
- Horizontal cable terminations at front of unit with DIN400 Type C bushings
- Fully interlocked cable compartment allowing entry only if function is in Earth ON position

#### Optional features, factory fitted

- Internal arc rated cable compartment for additional safety
- Remote low gas pressure alarm (1N/O)
- Voltage presence indication system (VPIS)
- Voltage detection system (VDS)
- Operation counters
- Mechanical key interlocks with Ronis / Castell keys
- Fully interlocked cable Earth and Test (E&T) facility Without needing to remove main cable connections
- Short circuit and Earth fault indicator (EFI)
- Wiring for motorization

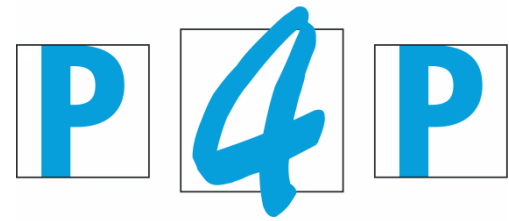
#### Optional features, available as retrofit

- Motor operation for Load Break Switch (only if unit is pre-wired for motorization)
- Double cable terminations
- Surge arrester
- Wide range of cable clamps and glands to accommodate 1 and 3 core cables (refer to cable compartment section for further information)



# PRODUCT INFORMATIE

## AEGIS<sup>Plus</sup> ring main unit



PRODUCTS • FOR • PROJECTS

### Product characteristics

#### Non-auto reclose mechanism

T module: 250A rated vacuum circuit breaker

V module: 630A rated vacuum circuit breaker

#### Auto reclose mechanism

C module: 630A rated vacuum circuit breaker

#### Standard features

- Three functions (ON, OFF & Earth, two position spring laded mechanism, independent manual operation
- Single mechanism with two independent operation shafts, One for circuit breaker ON/OFF position and another for selecting disconnecter in Mains or Earth (isolation)
- Interlocked disconnecter and selector, locked from Operation when circuit breaker is in ON position
- Mechanical push-to-trip button for local operation (V and T functions only)
- Mechanical Open and Close button for local operation (C function only)
- Trip coil for receiving tripping signal from relay or TLF devices
- Single line intuitive mimic diagram with clear indication to show the switch status (ON, OFF or Earth positions)
- Gas pressure indicator with Red and Green sectors to indicate minimum permissible pressure for safe operation (one per tank)
- Horizontal cable terminations at front of unit with DIN 400 Type C bushings
- Closing coil for remote operation (C function only)
- Protection CTs (current transformers) mounted on cable bushings / cables
- Fully interlocked cable compartment allowing entry only if function is in Earth ON position
- Padlock facility (8.5mm hole) for all operating positions

#### Additional options for C function

- Anti-pumping relay
- Additional shunt trip coil

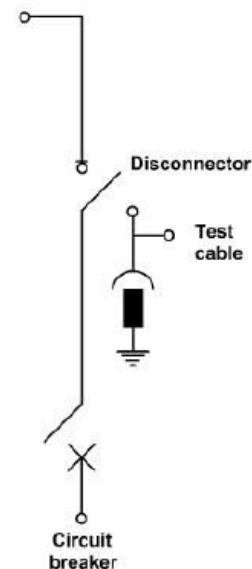
#### Optional features, factory fitted

- Internal arc rated cable compartment for additional safety
- Remote low gas pressure alarm (1N / O)
- Voltage presence indication system (VPIS)
- Voltage detection system (VDS)
- Operation counters

- Mechanical key interlocks Ronis / Castell keys
- Remote circuit breaker position indicator (1N / O, 1N / C and 2N / O, 2NC)
- Fully interlocked cable Earth and Test (E&T) facility without needing to remove main cable connections
- Self-powered relay for protection (customer specific)
- Alternative time limit fuse protection (TLF)
- Wide range of Current transformers for TLF and Relay protection
- Shunt trip coils for external tripping
- Under voltage release coil
- Secondary injection for testing protection relays
- Wiring for motorization

#### Optional features, available as retrofit

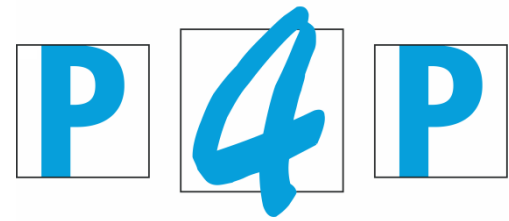
- Motor operation for CB (only if unit is pre-wired for motorization)- Additional shunt trip coil
- Wide range of cable clamps and glands to accommodate 1 and 3 core cables (refer to cable compartment section for further information)





# PRODUCT INFORMATIE

*AEGIS<sup>Plus</sup> ring main unit*



PRODUCTS • FOR • PROJECTS

## Product characteristics

### Circuit breaker protection - Time limit fuse

Two types of protection devices are offered to protect the circuit breaker:

- i. Time limit fuse (TLF)
- ii. Protection relays

#### TLF

When utilized in conjunction with circuit breaker type ring main units, time limit fuses (TLF) are a cost effective method of providing fault protection for overcurrent and earth faults (optional) to a transformer of 2000kVA or less. It is a recognized method of protection and was developed to comply with EA 41-26 (now superseded by ENA TS 41-36) with fuse links in accordance with ENA TS 12-6.

It should be noted that the TLF protection system is not a device for limiting overload levels of individual transformers. It should be used for fault protection only.

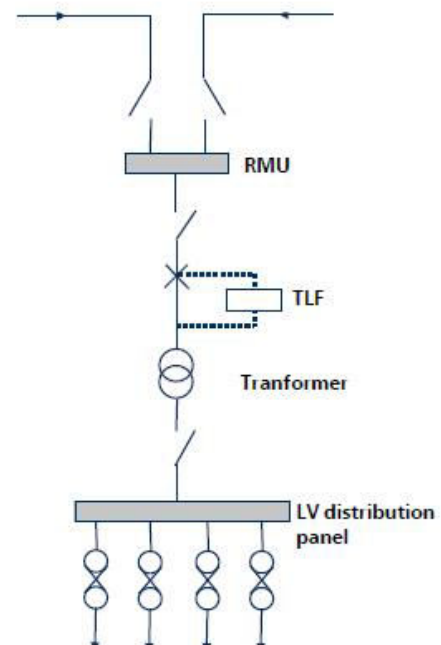
The TLF system provides protection for overcurrent and earth faults between the MV circuit breaker and the LV protection device. The selected TLF rating should be such that it allows for discrimination between the MV & LV devices. This will ensure that the circuit breaker does not open for faults beyond the LV device.

When fitted with TLF, the ring main unit can also be configured to enable tripping of the circuit breaker from remote devices (Buchholz, LV CB etc.).

Lucy Electric customers in Europe, the Middle East, Africa and Asia are currently using TLF protection system within their distribution networks.



Fuse dimensions: Length 57mm x Diameter 13mm



# PRODUCT INFORMATIE

*AEGIS<sup>Plus</sup> ring main unit*



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## Recommended TLF settings

|  |  | 200                 | 315 | 500  | 800   | 1000 | 1250  | 1600 | 2000 |
|--|--|---------------------|-----|------|-------|------|-------|------|------|
| Rated voltage (kV)                                   |  | TLF fuse rating (A) |     |      |       |      |       |      |      |
| CT Ratio<br>50/5                                     | 3.3  | 10A                 |     |      |       |      |       |      |      |
|  | 6.6  | 5A                  | 10A | 15A  |       |      |       |      |      |
|  | 11   | 3A                  | 5A  | 10A  | 15A   |      |       |      |      |
|  | Earth fault setting =<br>25A<br>(instantaneous trip) | 13.8                | 3A  | 5A   | 10A   | 15A  |       |      |      |
| CT Ratio<br>100/5                                    | 24   |                     |     | 3A   | 5A    | 7.5A |       |      |      |
|  | 3.3  | 5A                  | 10A | 15A  |       |      |       |      |      |
|  | 6.6  |                     | 5A  | 7.5A | 12.5A | 15A  |       |      |      |
|  | 11   |                     |     | 5A   | 7.5A  | 10A  | 12.5A | 15A  |      |
| Earth fault setting =<br>30A<br>(instantaneous trip) | 13.8   |                     |     | 5A   | 7.5A  | 10A  | 12.5A | 15A  |      |
|  | 24   |                     |     |      |       |      | 5A    | 5A   | 7.5A |

## Advantage of vacuum circuit breaker with TLF over HV fuses

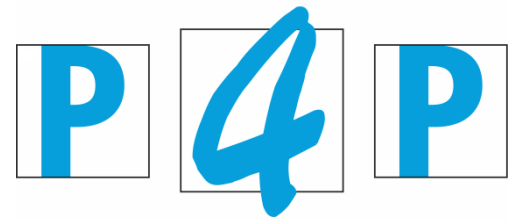
| Feature   | VCB with TLF                   | Fuse switch |
|---|--------------------------------|-------------|
| Overall cost of units   | Similar                        |             |
| Approximate fuse replacement cost   | \$5                            | \$50        |
| Maximum rating of transformer, can be protected                                     | 2MVA*                          | 1MVA        |
| Maximum rated normal current  | 630A                           | 200A        |
| Physical size of fuses  | Small                          | Large       |
| Possibility of some pollution while changing fuses causing PD and flash over issues | No                             | Yes         |
| Fuse location inside the unit   | LV side                        | HV side     |
| Range of fuses required for different rated transformers                            | Very small with multi ratio CT | Large       |

## Advantage of vacuum circuit breaker with TLF over protection relays

| Feature   | VCB with TLF | Protection relay |
|---|--------------|------------------|
| Installation cost of function   | Low          | High             |
| Auxiliary power source for operation                                    | Not required | As required      |
| Delay in activation of trip function due to capacitor charging time lag | No delay     | Delay            |
| Employee training on setting tripping curves                            | Not required | Required         |
| Additional training on different manufacturer setting up procedure      | Not required | Required         |
| Maintenance and repair cost   | Low          | High             |
| Operating temperature limitations                                       | None         | Up to 70°C       |
| Range of fuses required for different rated transformers                | Yes          | Yes              |
| Over current and earth fault protection                                 | Yes          | Yes              |

# PRODUCT INFORMATIE

*AEGIS<sup>Plus</sup> ring main unit*



PRODUCTS • FOR • PROJECTS

## Product characteristics

### Circuit breaker protection - relays

#### Protection relays

The Aegis Plus 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

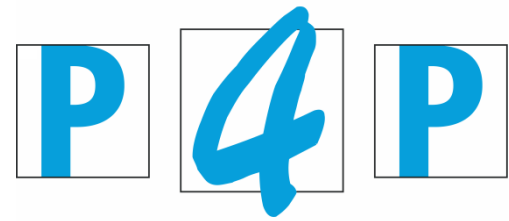
- Short circuit and overcurrent protection
- Dual and self-powered for greater operational assurance
- Earth fault and thermal overload protection
- Added tripping functionality including circuit breaker and remote tripping
- Tripping indication and fault recording
- Measurement of fault currents
- Multiple 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 INFORMATIE

*AEGIS<sup>Plus</sup> ring main unit*



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Aegis Plus is fully compatible with the relays below:

|                             | Woodward  |   | C&S   | Ashida   | Kries   | Fanox   |   |
|-----------------------------|---|---|---|--|---|---|---|
|                             | WIP1  | WIC1  | CSPR1-V2  | ADR241S  | IKI-30  | SIA-C   | SIA-B   |
|                             |  |  |  |  |  |  |  |
| <b>Power</b>                |   |   |   |  |   |   |   |
| Self powered                | •   | •   | •   | •  | •   | •   | •   |
| Auxiliary powered           | •   |   |   | •  | •   | •   | •   |
| Dual powered                | •   |   |   | •  | •   | •   | •   |
| <b>Protection</b>           |   |   |   |  |   |   |   |
| Earth fault protection      | •   | •   | •   | •  | •   | •   | •   |
| Overcurrent protection      | •   | •   | •   | •  | •   | •   | •   |
| Short circuit protection    | •   | •   | •   | •  | •   | •   | •   |
| Thermal overload protection |   |   |   | •  |   |   | •   |
| <b>Control</b>              |   |   |   |  |   |   |   |
| Circuit breaker tripping    | •   | •   | •   | •  | •   | •   | •   |
| Remote tripping             | •   | •   | •   | •  | •   | •   |   |
| Tripping indication         | •   | •   | •   | •  | •   | •   | •   |
| Fault recording             | •   | •   | •   | •  | •   |   |   |
| <b>Measurements</b>         |   |   |   |  |   |   |   |
| Earth fault current         | •   | •   | ○   | •  | •   | •   | •   |
| Peak demand current         |   |   | ○   |  |   | •   |   |
| Phase current               | •   | •   | ○   | •  | •   | •   | •   |
| <b>Inputs / Outputs</b>     |   |   |   |  |   |   |   |
| Phase current inputs        | •   | •   | •   | •  | •   | •   | •   |
| Earth fault current inputs  | •   |   | •   | •  | •   | •   |   |
| Logic inputs                |   |   |   | •  |   | •   |   |
| Logic relay outputs         |   |   |   | •  | •   | •   |   |
| RS485 communication port    | •   |   | •   | •  |   | •   |   |
| <b>Protocols</b>            |   |   |   |  |   |   |   |
| Modbus                      | •   |   |   | •  |   | •   | •   |
| <b>Characteristics</b>      |   |   |   |  |   |   |   |
| Display                     | •   |   |   | •  |   | •   | •   |
| LED indicator               | •   | •   | •   | •  | •   | •   | •   |
| Fault memory                | •   | •   | •   | •  | •   | •   | •   |
| Setting via buttons         | •   | •   |   | •  |   | •   | •   |
| Password protection         | •   | •   |   | •  |   | •   | •   |

**Key**    • Feature supported    ○ Refer to manufacturer documentation

# PRODUCT INFORMATIE

*AEGIS<sup>Plus</sup> ring main unit*



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## Product characteristics

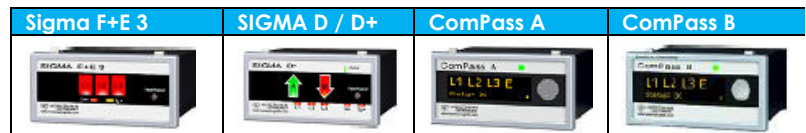
### Options and accessories - EFI's

#### 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 Plus, with a list of compatible devices below:

**Manufacturer: Horstmann**  
**models: SIGMA & ComPass**

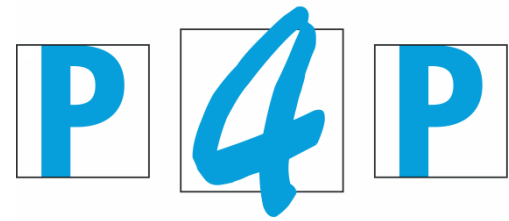


| Features                                   | Sigma F+E 3                                   | SIGMA D / D+                         | ComPass A       | ComPass B   |
|--|---|--------------------------------------|-----------------|-------------|
| Short-Circuit and Earth Fault Indication   | •   | •                                    | •               | •           |
| <b>Indication</b>                          |   |                                      |                 |             |
| Directional indication                     | Non-directional                               | Directional                          | Non-Directional | Directional |
| Phase selective                            | •   | •                                    | •               | •           |
| <b>Monitoring</b>                          |   |                                      |                 |             |
| Measurements                               | -   | Via software                         | •               | •           |
| Communication                              | -   | USB                                  | RS485/ModbusRTU |             |
| <b>General</b>                             |   |                                      |                 |             |
| Remote-, Manual-, Automatic-Rest           | •   | •                                    | •               | •           |
| Total flash time                           | >1000h  | >1500h                               | >1000h          |             |
| Self powered                               | •   | •                                    | -               | -           |
| Auxiliary power supply                     | Optional use<br>1260V DC                      | Optional use<br>24V AC, 24-60V<br>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                                  |                                      |                 |             |
| <b>Housing</b>                             | Plug-in                                       |                                      |                 |             |
| IP protection / enclosure                  | IP 40 / Polycarbonate (weather and sun-proof) |                                      |                 |             |
| Dimensions (WxHxD)                         | 96x48x96 mm                                   | 96x48x104 mm                         | 96x48x96 mm     |             |

**Key** • Standard - Feature not available

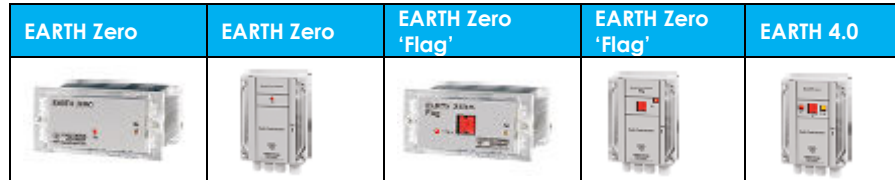
# PRODUCT INFORMATIE

AEGIS<sup>Plus</sup> ring main unit



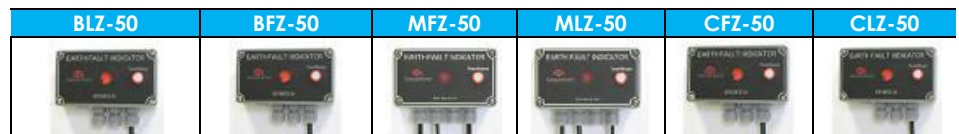
PRODUCTS • FOR • PROJECTS

Manufacturer: Horstmann  
EFI Model: EARTH Zero



| Features                        | EARTH Zero   | EARTH Zero    | EARTH Zero 'Flag'               | EARTH Zero 'Flag' | EARTH 4.0 |
|---------------------------------|--|---------------|---------------------------------|-------------------|-----------|
| 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    | (110-240V AC)  |               |                                 |                   |           |
| Total LED flash time            | > 1.200h   |               |                                 |                   |           |
| Low battery indication          | -  | -             | -                               | -                 | •         |
| Additional trip criteria        | Line De-energized  |               |                                 |                   | Vn=0      |
| Test/Reset (Manual by button)   | •  | •             | •                               | •                 | •         |
| Relay contacts                  | 2 x changeover   |               |                                 |                   |           |
| Remote flashing by external LED | • Relay contact provided, External LED as optional accessory |               |                                 |                   |           |

Manufacturer: SpaRule  
EFI Model: Sensorform



| Features                             | BLZ-50                        | BFZ-50          | MFZ-50                      | MLZ-50 | CFZ-50                       | CLZ-50 |
|--------------------------------------|-------------------------------|-----------------|-----------------------------|--------|------------------------------|--------|
| Power source                         | 3.6Vlithium1/2AA850mAHbattery |                 | 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 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 us for more information.

# PRODUCT INFORMATIE

AEGIS<sup>Plus</sup> ring main unit



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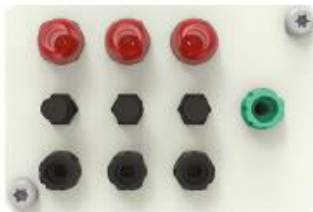
## Product characteristics

### Options and accessories - VPIS and VDS

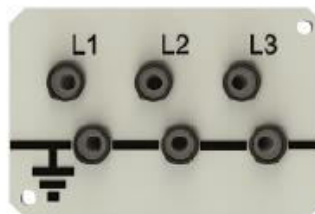
#### Voltage presence indication system

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 Plus:



Neon indicators with pus-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 Plus.

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

Manufacturer: Horstmann  
VDS Model: WEGA

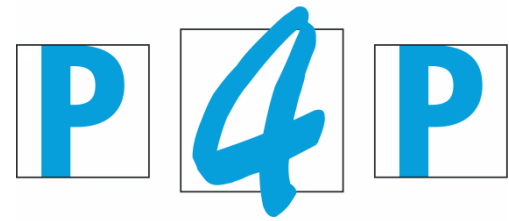
| Sigma F+E 3   | SIGMA D / D+   | ComPass A   | ComPass B   |
|---|--|---|---|
|  |  |  |  |

| Features   | Sigma F+E 3  | SIGMA D / D+   | ComPass A  | ComPass B                                       |
|--|--|--|--|---|
| 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 vanlue LRM connection:<br>L1/L2/L2/Ground<br>(conform to IEC 61243-5) |  |  | LRM test point applicable for phase comparators |
| Rear   | 4x4.8mm tab<br>4-pin AMP plug  | 4x4.8mm tab<br>4-pin AMP plug<br><br>2-pin, 6-pin<br>terminal block<br>(remote<br>indication, Aux) | 4x4.8mm tab<br>2x4-pin AMP<br>connector<br><br>Capacitor cube<br>(pluggable) | 4x4.8mm tab                                     |
| Dimensions (WxHxD)<br>For DIN cutout (acc. to DIN IEC 61554) | 96x48x20 mm  | 96x48x52 mm  | 96x48x38 mm  | 96x48x20 mm                                     |



**Key** • Standard - Feature not available

# PRODUCT INFORMATIE

*AEGIS<sup>Plus</sup> ring main unit*



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|  | Capdis S1+(R4)   | Capdis S2+(R4)   |
|--|--|--|
| <b>Manufacturer:</b> Kries<br><b>VDS Model:</b> Capdis |                 |                                     |
| <b>Features</b>  |  |  |
| Voltage detection                                      | •  | •  |
| Voltage monitoring                                     | -  | •  |
| Interlock of earth switch                              | -  | •  |
| Display  | LCD  | LCD+LED  |
| Testing  | Self and maintenance tests   |  |
| Relay output   | -  | 2 changeover   |
| Indication   | Voltage present<br>Maintenance test passed<br>Overvoltage<br>Asymmetric condition<br>Broken lead | Voltage present<br>Maintenance test passed<br>Overvoltage<br>Asymmetric condition<br>Broken lead<br>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 Plus 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 motorized actuators can be powered directly from the Gemini 3 RTU 24V DC battery; ensuring continuation of operation.

## Shunt trip coils

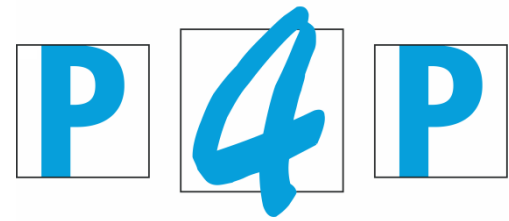
Shunt trips are magnetic coils that are used to trip circuit breakers through local push buttons, RTUs or additional transformer protection devices. Shunt trips are available in the following voltages:

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



# PRODUCT INFORMATIE

*AEGIS<sup>Plus</sup> ring main unit*



PRODUCTS • FOR • PROJECTS

## Product characteristics

### Cable bushings and cable terminations

#### Cable bushings

Aegis Plus 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.

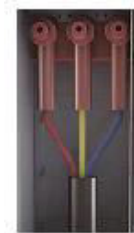
They are accessible by removing the interlocked cable compartment covers at the front of the unit.

The maximum supported cable sizes are:

- Up to 300 mm<sup>2</sup> : 1 – core
- Up to 500 mm<sup>2</sup> : 3 – core

#### Cable compartment

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



Single 3 core cabl

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.

#### Bolted separable connectors

Up to 12kV

TE Raychem insulated T-adapter for sf<sub>6</sub>-insulated Switchgear, according to EN 50181 Type C  
Model: RICS 3133 up to 12kV

| Cross section (mm <sup>2</sup> ) | Ordering description T-Adapter | Termination for polymeric cables;<br>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   |



#### Cable terminations

The Aegis Plus 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**

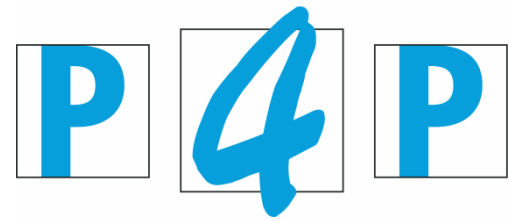
bushing boot  
Excellent cable protection against environmental hazards and moisture



We recommend the use of Tyco electronics cable connectors, with all its of available solutions below:

# PRODUCT INFORMATIE

AEGIS<sup>Plus</sup> ring main unit



PRODUCTS • FOR • PROJECTS

Up to 24 kV

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

| Screened separable connection system with DIN compression lugs |        |        |                                     |           | Screened separable connection system with DIN compression lugs |        |        |                                     |           |
|--|--------|--------|-------------------------------------|-----------|--|--------|--------|-------------------------------------|-----------|
| 12kV diameter core insulation                                  |        |        | Reference number conductor material |           | 24kV diameter core insulation                                  |        |        | Reference number Conductor material |           |
| Cross Section  | Min.mm | Max.mm | Al                                  | Cu        | Cross section  | 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 |

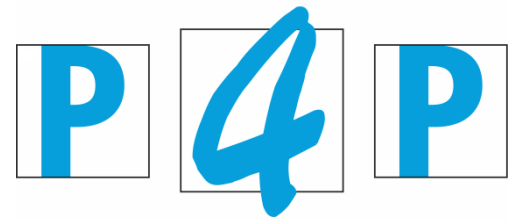
  

| Technical data – mechanical lugs and shear bolts |        |        |                                     |  |                               |        |        |                                     |  |
|--|--------|--------|-------------------------------------|--|-------------------------------|--------|--------|-------------------------------------|--|
| 12kV diameter core insulation                    |        |        | Reference number conductor material |  | 24kV diameter core insulation |        |        | Reference number Conductor material |  |
| Cross section                                    | Min.mm | Max.mm | Al or CU                            |  | Cross section                 | 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                           |  | 95-120                        | 17.0-  | 30.1   | RSTI-5853                           |  |
| 95-240   | 17.0-  | 30.1   | RSTI-5853                           |  | 95-240                        | 21.2-  | 34.6   | RSTI-5854                           |  |
| 150-240  | 21.2-  | 34.6   | RSTI-5854                           |  | 185-300                       | 21.2-  | 34.6   | RSTI-5855                           |  |
| 185-300  | 21.2   | 34.6   | RSTI-5855                           |  |                               |        |        |                                     |  |
| 240-400  | 21.2-  | 34.6   | RSTI-5856                           |  |                               |        |        |                                     |  |



# PRODUCT INFORMATIE

AEGIS<sup>Plus</sup> ring main unit



PRODUCTS • FOR • PROJECTS

## Product characteristics

### Cable bushings and cable terminations

Up to 24kV

TE Raychem Screened, Separable Couplings 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<br>Mm <sup>2</sup> | 12kV diameter core insulation |        | Reference number conductor material |             | Cross section<br>Mm <sup>2</sup> | 24kV diameter core insulation |        | Reference number Conductor material |             |
|----------------------------------|-------------------------------|--------|-------------------------------------|-------------|----------------------------------|-------------------------------|--------|-------------------------------------|-------------|
|                                  | Min.mm                        | Max.mm | Al                                  | Cu          |                                  | Min.mm                        | Max.mm | Al                                  | Cu          |
| 25                               | 12.7-                         | 23.4   | RSTICC-5810                         | RSTICC-5830 | 25                               | 12.7-                         | 23.4   | RSTICC-5810                         | RSTICC-5830 |
| 35                               | 12.7-                         | 23.4   | RSTICC-5811                         | RSTICC-5831 | 35                               | 12.7-                         | 23.4   | RSTICC-5811                         | RSTICC-5831 |
| 50                               | 12.7-                         | 23.4   | RSTICC-5812                         | RSTICC-5832 | 50                               | 12.7-                         | 23.4   | RSTICC-5812                         | RSTICC-5832 |
| 70                               | 12.7-                         | 23.4   | RSTICC-5813                         | RSTICC-5833 | 70                               | 12.7-                         | 23.4   | RSTICC-5813                         | RSTICC-5833 |
| 95                               | 12.7-                         | 23.4   | RSTICC-5814                         | RSTICC-5834 | 95                               | 12.7-                         | 23.4   | RSTICC-5824                         | RSTICC-5844 |
| 120                              | 12.7-                         | 23.4   | RSTICC-5815                         | RSTICC-5835 | 120                              | 21.2                          | 34.6   | RSTICC-5825                         | RSTICC-5845 |
| 150                              | 21.2-                         | 34.6   | RSTICC-5816                         | RSTICC-5846 | 150                              | 21.2-                         | 34.6   | RSTICC-5826                         | RSTICC-5846 |
| 185                              | 21.2-                         | 34.6   | RSTICC-5827                         | RSTICC-5847 | 185                              | 21.2-                         | 34.6   | RSTICC-5827                         | RSTICC-5847 |
| 240                              | 21.2-                         | 34.6   | RSTICC-5828                         | RSTICC-5848 | 240                              | 21.2                          | 34.6   | RSTICC-5828                         | RSTICC-5848 |
| 300                              | 21.2                          | 34.6   | RSTICC-5829                         | RSTICC-5849 | 300                              | 21.2-                         | 34.6   | RSTICC-5829                         | RSTICC-5849 |

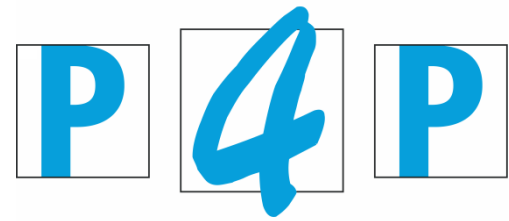


#### Technical data – mechanical lugs and shear bolts

| Cross Section<br>Mm <sup>2</sup> | 12kV diameter core insulation |        | Reference number conductor material | Cross section<br>Mm <sup>2</sup> | 24kV diameter core insulation |        | Reference number Conductor material |
|----------------------------------|-------------------------------|--------|-------------------------------------|----------------------------------|-------------------------------|--------|-------------------------------------|
|                                  | Min.mm                        | Max.mm | Al or Cu                            |                                  | Min.mm                        | Max.mm | Al or Cu                            |
| 35-95                            | 12.7-                         | 23.4   | RSTICC-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                        |                                  |                               |        |                                     |

# PRODUCT INFORMATIE

*AEGIS<sup>Plus</sup> ring main unit*



PRODUCTS • FOR • PROJECTS

## 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

|   | RCAB4110                 | Rcab4120                |  |
|---|--------------------------|-------------------------|--|
| 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:<br>to DIN, CENELEC, ANSI | -                        | 400/630 A               |  |
| Cable cross section                     | 34 – 400 mm <sup>2</sup> | 35 -400 mm <sup>2</sup> |  |
|   |                          |                         |  |

## Heat shrink insulating bushing boot connectors

Up to 17.5kV

TE Raychem Heat shrink Insulating bushing Boot  
Model: RSRB series up to 17.5kV

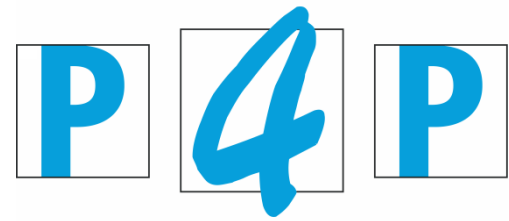
### Technical data – Right angle boots (long)

| Catalogue Reference                        | Application Range (mm <sup>2</sup> ) |  |
|--|--------------------------------------|--|
| 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 us for more information.

# PRODUCT INFORMATIE

*AEGIS<sup>Plus</sup> ring main unit*



PRODUCTS • FOR • PROJECTS

## Product characteristics

### Cable bushings and cable terminations

#### Surge Arresters

Aegis Plus 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 Plus; maximizing protection.

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

We recommend the use of Tyco electronics 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 parallel connection

|   |      |      |      |    |
|---|------|------|------|----|
| Rated Discharge Current IN                  | 5kA  |      |      |    |
| Operating duty High current Impulse 4/10µs  | 65kA |      |      |    |
| Short Circuit Current I <sub>S</sub>        | 16kA |      |      |    |
| Long duration current impulse (1ms)         | 75A  |      |      |    |
| Residual Voltages (kV)                      |      |      |      |    |
| Continuous operating voltage U <sub>c</sub> | 6    | 12   | 18   | 24 |
| Rated Voltage U <sub>R</sub>                | 7.5  | 15   | 22.5 | 30 |
| Lighting Current Impulse 8/20 µs            |      |      |      |    |
| 2.5kA                                       | 19   | 38   | 57   | 76 |
| 5kA   | 20   | 40   | 60   | 80 |
| 10kA  | 21.7 | 43.5 | 65.2 | 87 |
| Steep lightning current impulse 1/20 µs     |      |      |      |    |
| 5kA   | 21   | 42   | 63   | 84 |



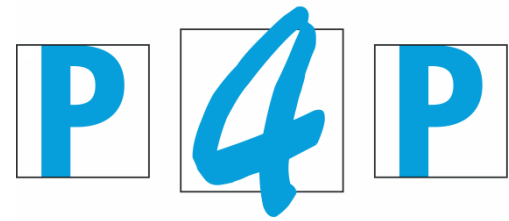
#### Technical data

|                                      |                  |                 |                 |                  |
|--------------------------------------|------------------|-----------------|-----------------|------------------|
| 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_CC58SA1205 | RSTI-CC-58A1805 | RSTI-CC-58SA2405 |
| Dimension and Weight                 |                  |                 |                 |                  |
| 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 us for more information.

# PRODUCT INFORMATIE

## AEGIS<sup>Plus</sup> ring main unit



PRODUCTS • FOR • PROJECTS

### 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 SF<sub>6</sub> 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 in two formats; venting down through the cable trench, or by venting upwards through a dedicated chimney. These options maximize operational safety and provide a truly secure switchgear solution.



**AF / AFL**  
Venting through rear



**AFLR**  
Venting down into trench



**AFLR**  
Venting up via chimney

# PRODUCT INFORMATIE

*AEGIS<sup>Plus</sup> ring main unit*

HANDELSONDERNEMING B.V.



PRODUCTS • FOR • PROJECTS

## Air metering unit

### Product characteristics

**Aegis Plus is compatible with a range of advanced air metering units, 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

- 12, 17.5 and 24kV ratings
  - Rated current 360A
  - HV fuse protection for VT (optional)
  - Isolation switch for testing / fuse change
  - Panel door locking facility
  - Double cable termination (option)
  - Anti-condensation space heater (option)
  - 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)

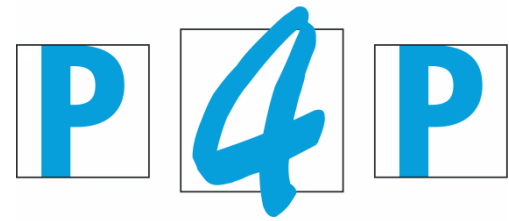
#### Low voltage compartment

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



# PRODUCT INFORMATIE

*AEGIS<sup>Plus</sup> ring main unit*



PRODUCTS • FOR • PROJECTS

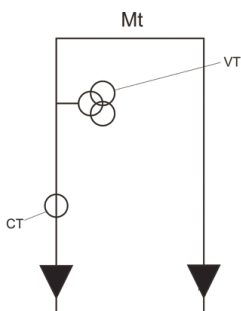
## Air metering unit

### Configurations available

Four metering functions are available:

#### Non-extensible range

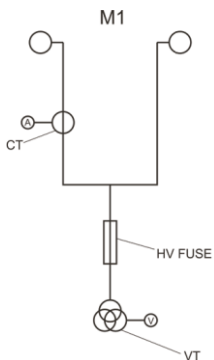
- Mt: Cable In / Cable Out



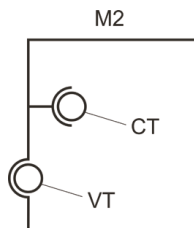
| Metering Unit | Indoor | Outdoor |
|---------------|--------|---------|
| Mt            | •      | •       |

#### Extensible range

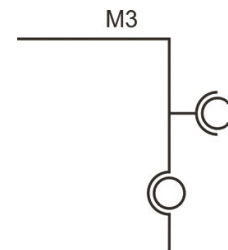
- M1: Busbar In / Busbar Out



- M2: Cable In / Busbar Out



- M3: Busbar In / Cable Out



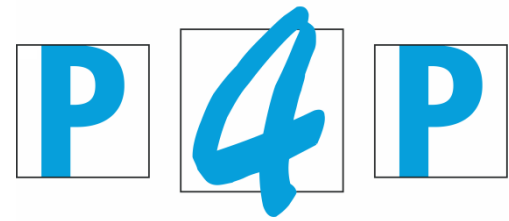
| Metering units              | LE | RE | DE | Indoor | Outdoor |
|-----------------------------|----|----|----|--------|---------|
| M1 (Busbar in / Busbar out) | -  | -  | •  | •      | -       |
| M2 (Cable in / Busbar out)  | -  | •  | -  | •      | -       |
| M3 (Busbar in / Cable out)  | •  | -  | -  | •      | -       |

**Key** • Available - Not available



# PRODUCT INFORMATIE

*AEGIS<sup>Plus</sup> ring main unit*



PRODUCTS • FOR • PROJECTS

## Air metering unit

### CTs and VTs available

#### 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<br>15VA | 0.5<br>0.5         |
|          | 200-100/1A | 10VA<br>15VA | 0.2/0.5<br>0.2/0.5 |
|          | 300/150/5A | 5VA<br>15VA  | 0.5<br>0.5         |
|          | 300/150/5A | 5VA<br>15VA  | 0.5<br>1           |
|          | 400/200/5A | 15VA<br>20VA | 0.2/0.5<br>0.5     |

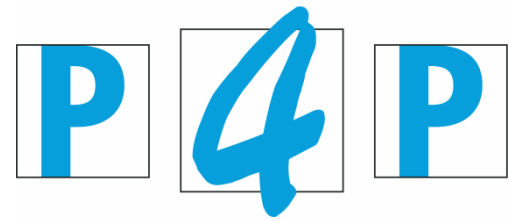
#### VT: All VTs are as per DIN42600 narrow type standard

| No of VT | Type | VT ratio   | Burden                | Class |
|----------|------|------------|-----------------------|-------|
| 1        | 3ph  | 11000/110V | 10VA<br>50VA<br>100VA | 0.5   |
| 1        | 3ph  | 11000/110V | 50VA                  | 0.2   |
| 1        | 3ph  | 11000/110V | 100VA                 | 1     |
| 1        | 3ph  | 22000/110V | 50VA<br>60VA          | 0.5   |
| 3        | 1ph  | 11000/110V | 50VA                  | 0.5   |
| 3        | 1ph  | 22000/110V | 50VA                  | 0.5   |
| 3        | 1ph  | 11000/110V | 30VA<br>50VA          | 0.2   |
| 3        | 1ph  | 11000/110  | 50VA                  | 1     |

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

# PRODUCT INFORMATIE

*AEGIS<sup>Plus</sup> ring main unit*



PRODUCTS • FOR • PROJECTS

## Smart-grid ready

### Gemini 3 RTU integration

**Aegis Plus 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 (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 authorized Engineer (security enabled) or just provide data to be viewed locally.

### Characteristics

- Fault detection (Earth and Phase)
- LED status indicators
- Real time clock (SCADA synchronized)
- 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

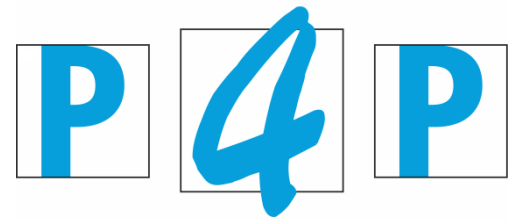
### Integrated design

Gemini 3 is an optional feature for Aegis Plus, 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.



# PRODUCT INFORMATIE

*AEGIS<sup>Plus</sup> ring main unit*



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## Smart-grid ready

### Gemini 3 RTU integration

#### Key features of Gemini 3

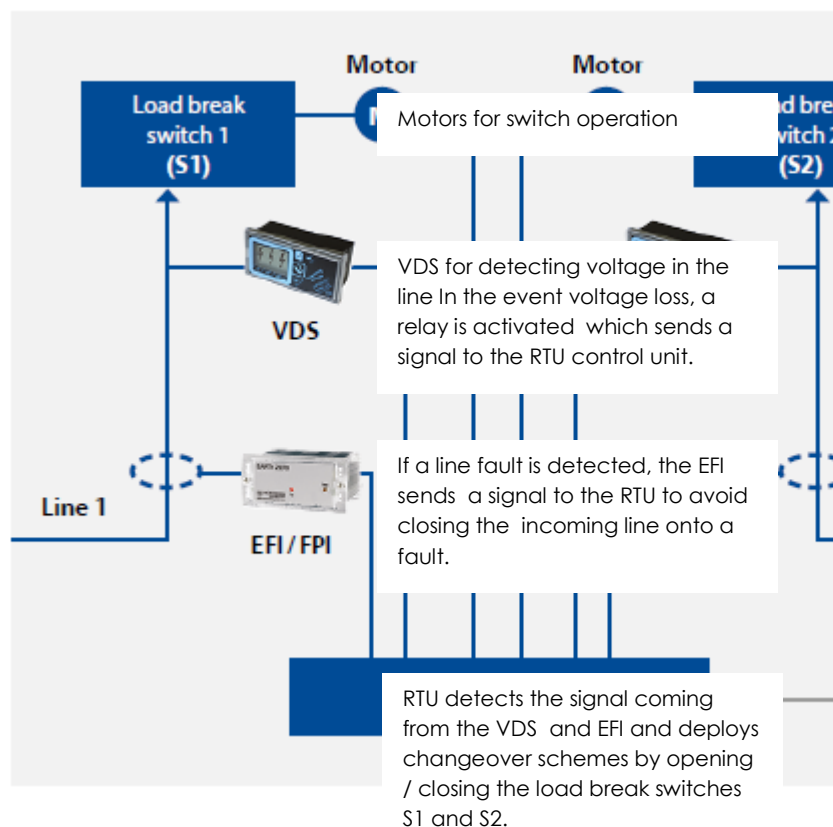
- Embedded auto change over and auto sectionalizing functions
- Real time network condition monitoring of voltage, current, power, power factor and frequency
- Flexible communication through radio, RS232, RS485, packet data network, GSM, GPRS, PSTN, Ethernet TCP / IP and optical fiber.
- Advanced battery 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 Plus 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
- Optimization of asset management through the implementation of customized automation schemes
- Reduced operational cost associated with routine network switching
- Increased operator safety



# PRODUCT INFORMATIE

## AEGIS<sup>Plus</sup> ring main unit



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|   |            |                                |       |     |
|---|------------|--------------------------------|-------|-----|
| Rated voltage   | kV         | 12                             | 17.5  | 24  |
| <b>General</b>  |            |                                |       |     |
| Rated frequency   | Hz         | 50                             | 50/60 | 50  |
| <b>Rated lightning impulse withstand voltage</b>                              |            |                                |       |     |
| Directly earthed  | kV         | 75                             | 95    | 125 |
| Across disconnector   | kV         | 85                             | 110   | 145 |
| <b>Rated power frequency withstand voltage</b>                                |            |                                |       |     |
| Directly earthed  | kV         | 28                             | 38    | 50  |
| Across disconnector   | kV         | 32                             | 110   | 145 |
| <b>Protection</b>   |            |                                |       |     |
| Indoor  | IP         | IP4X                           |       |     |
| Outdoor (Non-extensible)  | IP         | IP54                           |       |     |
| Tank with HV parts  | IP         | IP67                           |       |     |
| Mechanical impact protection  | IK         | IK7 (indoor)<br>IK10 (outdoor) |       |     |
| <b>Internal arc rating</b>  |            |                                |       |     |
| AFL   | kA<br>1sec | 21                             |       |     |
| AFLR  | kA<br>1sec | 21                             |       |     |
| <b>SF<sub>6</sub> gas</b>   |            |                                |       |     |
| Annual leakage rate   |            | ≤ 0.1%                         |       |     |
| Filled pressure (at 20°C)   | Bar<br>(G) | 0.4                            |       |     |
| Minimum operating pressure  | Bar<br>(G) | 0.1                            |       |     |
| <b>Installation conditions</b>  |            |                                |       |     |
| Ambient air temperature (without derating)                                    | °C         | -25 to +40                     |       |     |
| Maximum altitude (without derating)*  | M          | 1000                           |       |     |
| Relative humidity (max) – over period of 24 hrs (IEC 62271-1, sub-clause 2.1) |            | 95%                            |       |     |

### BusBars

|                                    |    |      |           |      |
|------------------------------------|----|------|-----------|------|
| Rated normal current               | A  | 630  |           |      |
| Rated short time withstand current | kA | 21   | 21        | 21   |
| Rated duration of short circuit    | s  | 3    | 3         | 3    |
| Rated peak withstand current       | kA | 52.5 | 52.5/54.6 | 52.5 |

### Load Break Switch: L function

|                                       |   |     |    |    |
|---------------------------------------|---|-----|----|----|
| Rated normal current                  | A | 630 |    |    |
| Rated active load breaking current    | A | 630 |    |    |
| Rated cable charging breaking current | A | 10  | 10 | 16 |

### Main electrical circuit

|                                    |    |      |           |      |
|------------------------------------|----|------|-----------|------|
| Rated short time withstand current | kA | 21   | 21        | 21   |
| Rated duration of short circuit    | s  | 3    | 3         | 3    |
| Rated peak withstand current       | kA | 52.5 | 52.5/54.6 | 52.5 |

### Earthing circuit

|                                    |    |      |           |      |
|------------------------------------|----|------|-----------|------|
| Rated short time withstand current | kA | 21   | 21        | 21   |
| Rated duration of short circuit    | s  | 3    | 3         | 3    |
| Rated peak withstand current       | kA | 52.5 | 52.5/54.6 | 52.5 |

|  |    |              |      |    |
|--|----|--------------|------|----|
| Rated voltage  | kV | 12           | 17.5 | 24 |
| <b>Mechanical endurance class</b>                      |    |              |      |    |
| Load break switch                                      |    | M2 (5,000)   |      |    |
| Earth Switch   |    | M0 (1,000)   |      |    |
| <b>Electrical endurance class short circuit making</b> |    |              |      |    |
| Load break switch                                      |    | E3 (5 times) |      |    |
| Earth switch   |    | E2 (5 times) |      |    |
| <b>Operating mechanism</b>                             |    |              |      |    |
| Local: Close – Open                                    |    | Hand Lever   |      |    |
| Remote: Close – Open                                   |    | Motor        |      |    |

### Circuit Breaker: V function (Non-auto reclose)

|                                       |    |      |           |      |
|---------------------------------------|----|------|-----------|------|
| Rated normal current                  | A  | 630  |           |      |
| Rated active load breaking current    | kA | 630  |           |      |
| Rated short circuit breaking current  | kA | 21   | 21        | 21   |
| Rated short circuit making current    | kA | 52.5 | 52.5/54.6 | 52.5 |
| Rated cable charging breaking current | A  | 25   | 31.5      | 31.5 |

### Main Electrical circuit

|                                    |    |      |           |      |
|------------------------------------|----|------|-----------|------|
| Rated short time withstand current | kA | 21   | 21        | 21   |
| Rated duration of short circuit    | s  | 3    | 3         | 3    |
| Rated peak withstand current       | kA | 52.5 | 52.5/54.6 | 52.5 |

### Earthing circuit

|                                    |    |      |           |      |
|------------------------------------|----|------|-----------|------|
| Rated short time withstand current | kA | 52.5 | 52.5/54.6 | 52.5 |
| Rated duration of short circuit    | s  | 3    | 3         | 3    |
| Rated peak withstand current       | kA | 52.5 | 52.5/54.6 | 52.5 |

### Mechanical endurance class

|                 |  |             |  |  |
|-----------------|--|-------------|--|--|
| Circuit breaker |  | M2 (10,000) |  |  |
| Earth switch    |  | M0 (1,000)  |  |  |

### Electrical endurance class

|                 |  |              |  |  |
|-----------------|--|--------------|--|--|
| Circuit breaker |  | E2 (4 times) |  |  |
| Earth switch    |  | E2 (5 times) |  |  |

### Operating mechanism

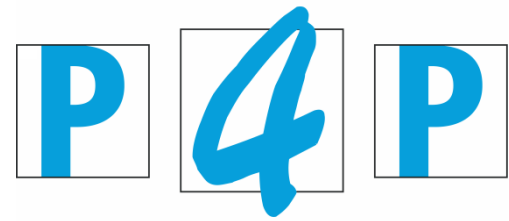
|                                  |  |                  |  |  |
|----------------------------------|--|------------------|--|--|
| Operating sequence for mechanism |  | O-0.3s-CO-15s-CO |  |  |
| Local: Close – Open              |  | Pushbutton       |  |  |
| Remote: Close – Open             |  | Motor - coil     |  |  |

### Circuit breaker: C function (Auto reclose)

|                                       |    |      |           |      |
|---------------------------------------|----|------|-----------|------|
| Rated normal current                  | A  | 630  |           |      |
| Rated active load breaking current    | A  | 630  |           |      |
| Rated short circuit breaking current  | kA | 21   | 21        | 21   |
| Rated short circuit making current    | kA | 52.5 | 52.5/54.6 | 52.5 |
| Rated cable charging breaking current | A  | 25   | 31.5      | 31.5 |

# PRODUCT INFORMATIE

*AEGIS<sup>Plus</sup> ring main unit*



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## Technical data

### Aegis<sup>Plus</sup> ring main unit

|                                       |    |                         |           |      |
|---------------------------------------|----|-------------------------|-----------|------|
| Rated voltage                         | kV | 12                      | 17.5      | 24   |
| <b>Main electrical circuit</b>        |    |                         |           |      |
| Rated short time withstand current    | kA | 21                      | 21        | 21   |
| Rated duration of short circuit       | s  | 3                       | 3         | 3    |
| Rated peak withstand current          | kA | 52.5                    | 52.5/54.6 | 52.5 |
| <b>Earthing circuit</b>               |    |                         |           |      |
| Rated short time withstand current    | kA | 21                      | 21        | 21   |
| Rated duration of short circuit       | s  | 3                       | 3         | 3    |
| Rated peak withstand current          | kA | 52.5                    | 52.5/54.6 | 52.5 |
| <b>Mechanical endurance class</b>     |    |                         |           |      |
| Circuit breaker                       |    | M2 (10,000)             |           |      |
| Earth switch                          |    | M0 (1,000)              |           |      |
| <b>Operating mechanism</b>            |    |                         |           |      |
| Operating sequence for mechanism      |    | E2 (4 times)            |           |      |
| Local: Close – Open                   |    | Pushbutton              |           |      |
| Remote: Close – Open                  |    | Motor – Coil            |           |      |
| <b>Circuit Breaker: T function</b>    |    |                         |           |      |
| Rated normal current                  | A  | 250                     |           |      |
| Rated active load breaking current    | A  | 250                     |           |      |
| Rated short circuit breaking current  | kA | 21                      | 21        | 21   |
| Rated short circuit making current    | kA | 52.5                    | 52.5/54.6 | 52.5 |
| Rated cable charging breaking current | A  | 25                      | 31.5      | 31.5 |
| <b>Main electrical circuit</b>        |    |                         |           |      |
| Rated short time withstand current    | kA | 21                      | 21        | 21   |
| Rated duration of short circuit       | s  | 3                       | 3         | 3    |
| Rated peak withstand current          | kA | 52.5                    | 52.5/54.6 | 52.5 |
| <b>Earthing circuit</b>               |    |                         |           |      |
| Rated short time withstand current    | kA | 3.15                    | 36.15     | 3.15 |
| Rated duration of short circuit       | s  | 3                       | 3         | 3    |
| Rated peak withstand current          | kA | 7.9                     | 7.9       | 7.9  |
| <b>Mechanical endurance class</b>     |    |                         |           |      |
| Circuit breaker                       |    | M1 (2,000)              |           |      |
| Earth switch                          |    | M0 (1,000)              |           |      |
| <b>Electrical endurance class</b>     |    |                         |           |      |
| Circuit breaker                       |    | E2 (2 times)            |           |      |
| Earth switch                          |    | E2 (5 times)            |           |      |
| <b>Operating mechanism</b>            |    |                         |           |      |
| Operating sequence for mechanism      |    | O-3min-CO-3min-CO       |           |      |
| Local: Close – Open                   |    | Hand lever – Pushbutton |           |      |
| Remote: Close – Open                  |    | Motor - Coil            |           |      |

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

# PRODUCT INFORMATIE

*AEGIS<sup>Plus</sup> ring main unit*



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## Technical data

### Air metering unit

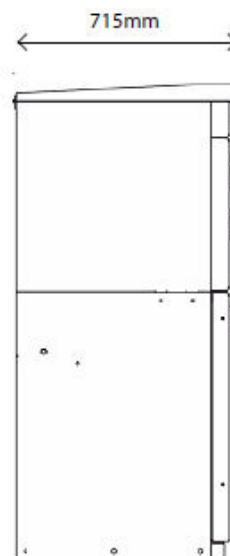
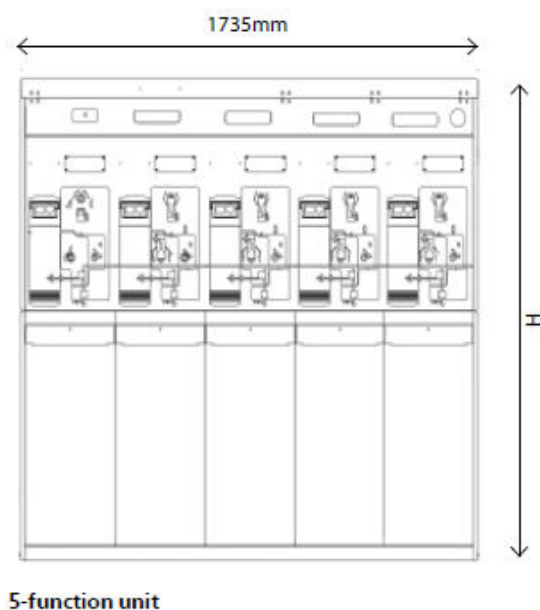
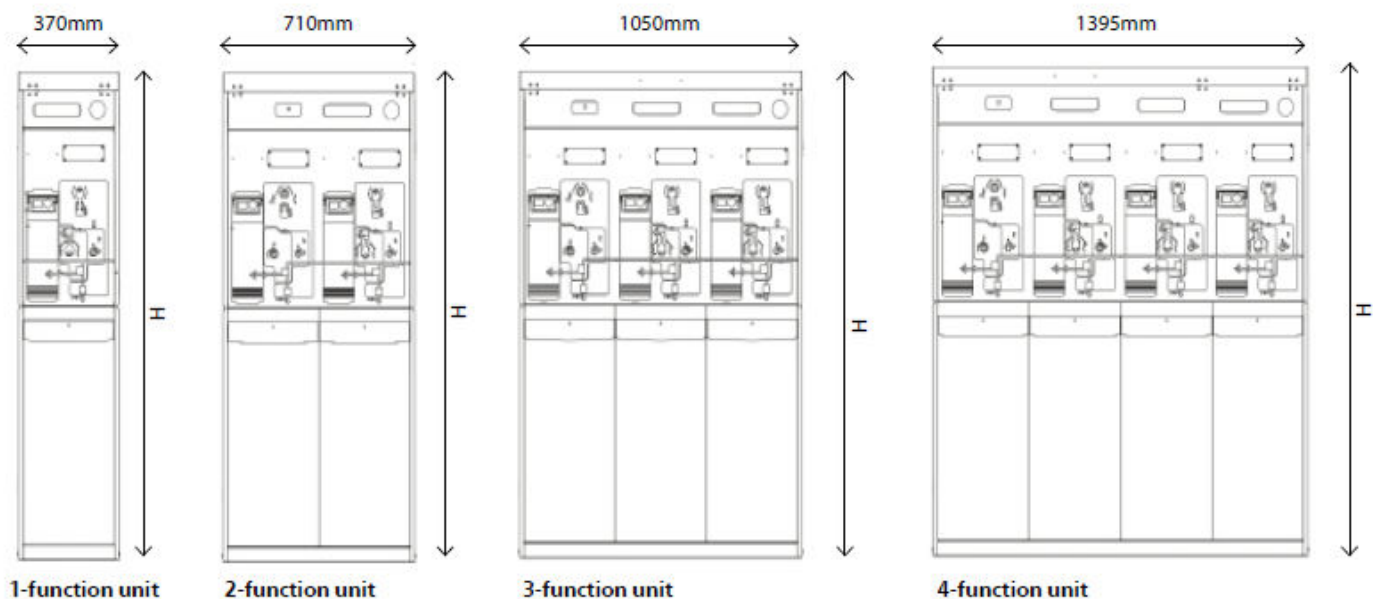
| Rated voltage  | kV              | 12    | 17.5       | 24  |
|--|-----------------|-------|------------|-----|
| Frequency  | Hz              | 50    | 50/60      | 50  |
| Rated current  | A               | 630   | 630        | 630 |
| Impulse withstand voltage (Between Poles and Earth)                  | kV              | 75    | 95         | 125 |
| Power frequency with stand voltage (1 min – Between Poles and Earth) | kV              | 28    | 38         | 50  |
| Peak with stand current  | kA              | 50    | 50         | 50  |
| Short circuit making current   | kA              | 50    | 50         | 50  |
| Short time withstand current   | kA 1s/3s        | 20/21 | 20/21      | 20  |
| BusBar size cross section  | mm <sup>2</sup> | 160   | 160        | 160 |
| Internal Arc<br>AFL  | kA 1s           |       | 20         |     |
| AFLR   | kA 1s           |       | 20         |     |
| IP rating  |                 |       | IP41/IP54  |     |
| Power frequency withstand voltage secondary side                     | kV 1min         |       | 3          |     |
| Ambient operating temperature  | °C              |       | -25 to +40 |     |

# PRODUCT INFORMATIE

*AEGIS<sup>Plus</sup> ring main unit*



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| Cable Termination Height (mm) | H=Overall unit height (mm) <sup>1,2</sup> |               |
|-------------------------------|---|---------------|
|                               | Relay / TLF fitted                        | G3 RTU fitted |
| 450                           | 1280                                      | 1430          |
| 600                           | 1430                                      | 1580          |
| 750                           | 1580                                      | 1730          |

The distance between two coupled Aegis Plus units is 60mm

<sup>1</sup> Extensible units have 100mm additional height

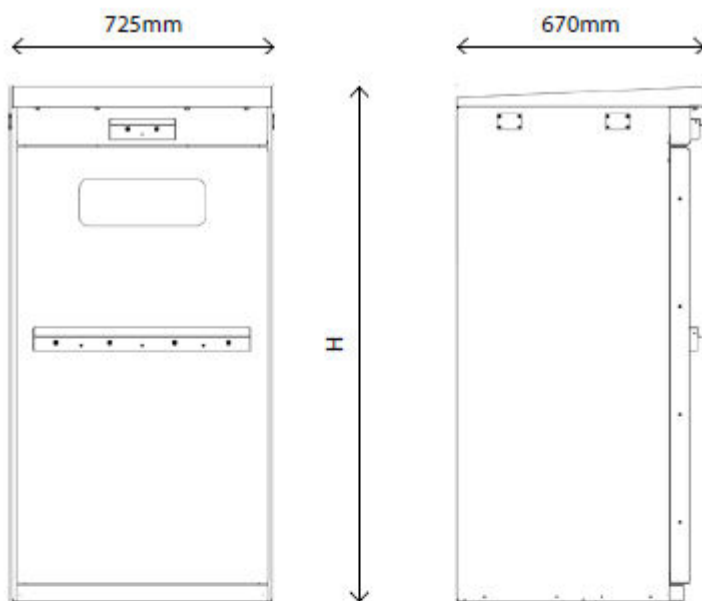
<sup>2</sup> Outdoor (NE) units have 10mm additional height

# PRODUCT INFORMATIE

*AEGIS<sup>Plus</sup> ring main unit*

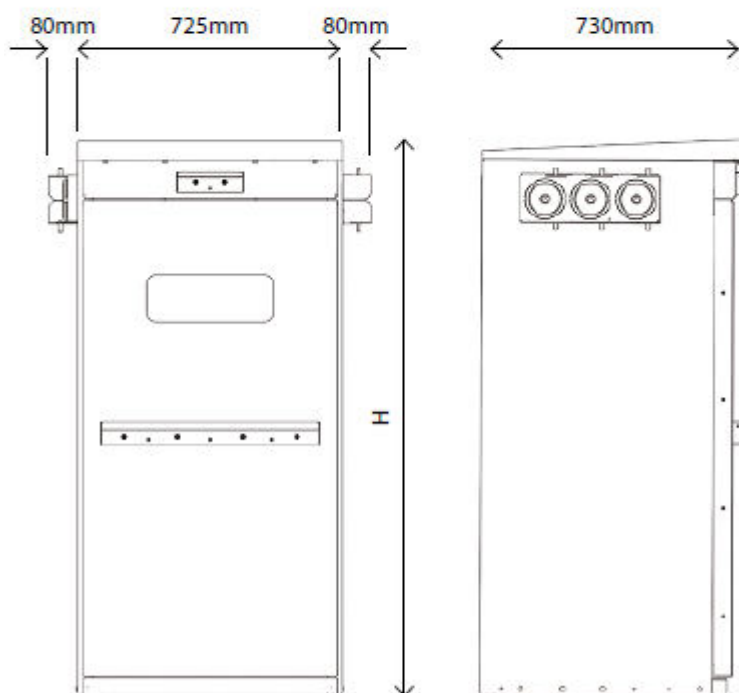


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**Non-extensible air metering unit**

| Cable termination height (mm) | Height (mm) |
|-------------------------------|-------------|
| 450                           | 1280        |
| 600                           | 1430        |
| 750                           | 1580        |



**Extensible air metering unit**

| Cable termination height (mm) | Height (mm) |
|-------------------------------|-------------|
| 450                           | 1280        |
| 600                           | 1530        |
| 750                           | 1680        |

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