

GE Consumer & Industrial
Power Protection

SEN Plus ED.02

Pan-European metalclad
low voltage system

The heart of your business

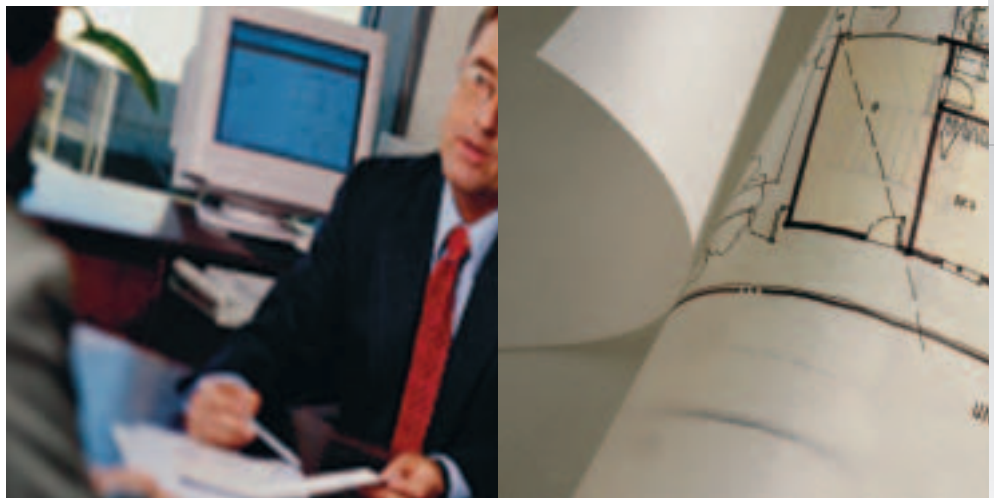


GE imagination at work

Designed with electrical and engineering contractors for the process industry, telecommunications and infrastructure markets

When GE designed the new modular SEN Plus system, our customers were involved right from the beginning. Based on customer needs assessed from the derived target market segments. The new SEN Plus provides significantly increased flexibility, reliability, availability and value for money you can not ignore whatever your application.

SEN Plus type tested factory built assemblies are designed and manufactured in accordance with the highest quality of the internationally recognised standards applicable to low voltage equipment.



Due to the smart and simple design of the SEN Plus "lead times" are reduced significantly. The comprehensive range of SEN Plus system applications varies from withdrawable and fixed Power Centres with air circuit breakers; Distribution Panels in withdrawable, plug-in and fixed versions with moulded case circuit breakers; and switch fuses to Motor Control Centres in withdrawable, plug-in or fixed technique for fuse/fuseless motor starter applications. Special adapters in different sizes enable combinations of fused load break switch units and motor starter applications in one column. The equipment can be executed with a four or five phase busbar system, which is fully shrouded to ensure maximum safety level for the operator.

SEN Plus

SEN Plus is the new name for GEApplus.

Designed with *electrical contractors for electrical contractors*

New

Fixed design

As a complementary addition of SEN Plus plug-in and withdrawable technology, GE has released a new Control Centre fixed solution.

All type of feeders, fused as well as fuseless applications are available; 3 and 4 pole MCCB's in 4 rated current steps: 160A, 250A, 400A and 630A.

The range of module sizes varies form 6E up to 24E. Connections to distribution bars can be executed by means of cables, flexible or solid bars.

The new solution can be mixed with plug-in and withdrawable technology in one column.

High protection degrees IP30 and IP54 and internal form of separation up to form 4 will fulfil the highest customer expectations.

New

New solution for more demanding customers

The arc proof design provides personal protection under arcing condition due to internal fault acc. to IEC/TR 61641:2008-01.

The new design is able to withstand high pressure inside the enclosure during arc conditions.

Arc proof version is available for Power Centres as well as for Motor Control Centres with module sizes from 5E up to 36E.

Buildings, machinery and processes

Commercial

- Small and large offices
- Warehouses
- Shopping malls
- Schools
- Hospitals
- Airports

Industrial

- Printing
- Machinery
- Pharmaceutical
- Automotive, paper & pulp
- Chemical industry
- Marine

Utilities

- Water treatment plants
- Waste management
- Energy distribution (Electricity and Gas)
- Telecommunications
- Cable providers
- Public transport





Technical data

Electrical data

Rated operational voltage
 Rated frequency
 Rated insulation voltage
 Rated current horizontal busbars
 Rated current vertical busbars
 Rated short time withstand current of the busbar system
 Rated impulse withstand current of the busbar system

| | |
|------------|---|
| Ue | 690Vac / 600Vdc 40-60 Hz |
| Ui | 1000V 1000 up to 4000A |
| Icw Ipk | 850 up to 1900A Max. 80kA 1s Max. 176kA |

Mechanical data

Dimensions

| | |
|--------|---|
| Height | 2000, 2200 mm <i>(other on request)</i> |
| Depth | 600, 800 mm |
| Width | 400, 500, 600, 800, 1000 and 1200 mm |

Modularity in height of functional units
 Standard module sizes
 Maximum stacking density per column

in steps of 25 mm = (E)
 4E up to 36E
 80E

Arc proof design

Permissible prospective current under arcing condition
 Permissible arc duration
 Rated operating voltage

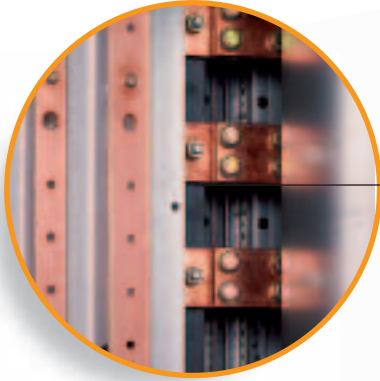
50kA
 100 / 200* ms
 400V

* 200 ms for PC columns

Great benefits

Easy commissioning at site

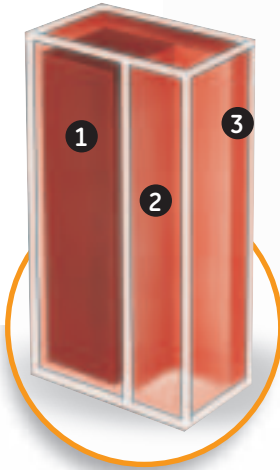
- Main busbar separation links are accessible from the front



For your safety

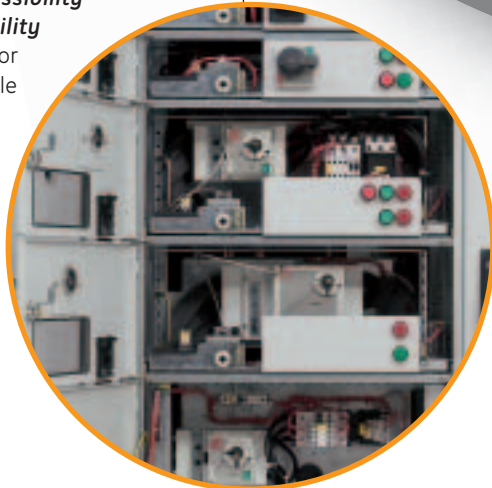
- Short-circuit proof and fatigue free self-aligning stabs secure a high safety level during operation.

1. Equipment zone
2. Cable zone
3. Busbar zone



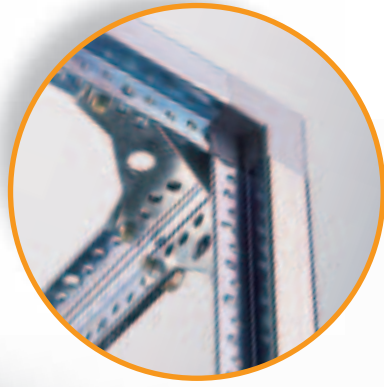
Optimum accessibility and survey ability

- 135/180° door opening angle



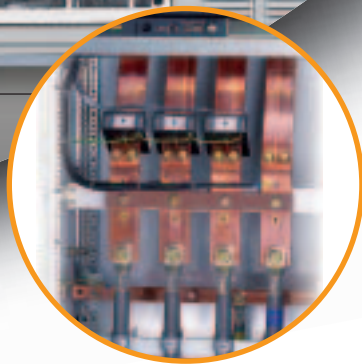
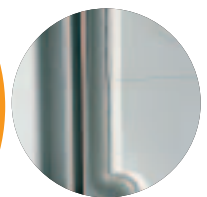
For your safety

- Finger proof shrouds and barriers prevents accidental contact with hazardous parts.



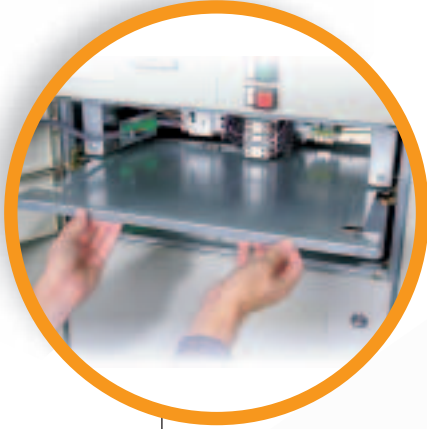
Rigid frame construction

- Non welded self supporting construction made out of just 3 basic parts
- Zinc-plated
- No sharp edges
- Doors and covers in 2mm sheet steel powder painted



Fast and easy cabling

- Through pre-configured copper links or directly to the switchgear or terminal strips
- Cable trays for servicing of all cables are provided as standard
- Vertical PE/PEN bar
- Special cable requirement up to Form 4b Typical 7 as per BSEN 60439-1 (termination for each functional unit with own integral glanding facility)



Flexibility

- Adjustable module separation sheets enables simple upgrade of the Form of segregation of the functional units.



Modularity

- Increased stacking density in the equipment zone due to apertures in the shrouds of the vertical riser at intervals of 25mm.

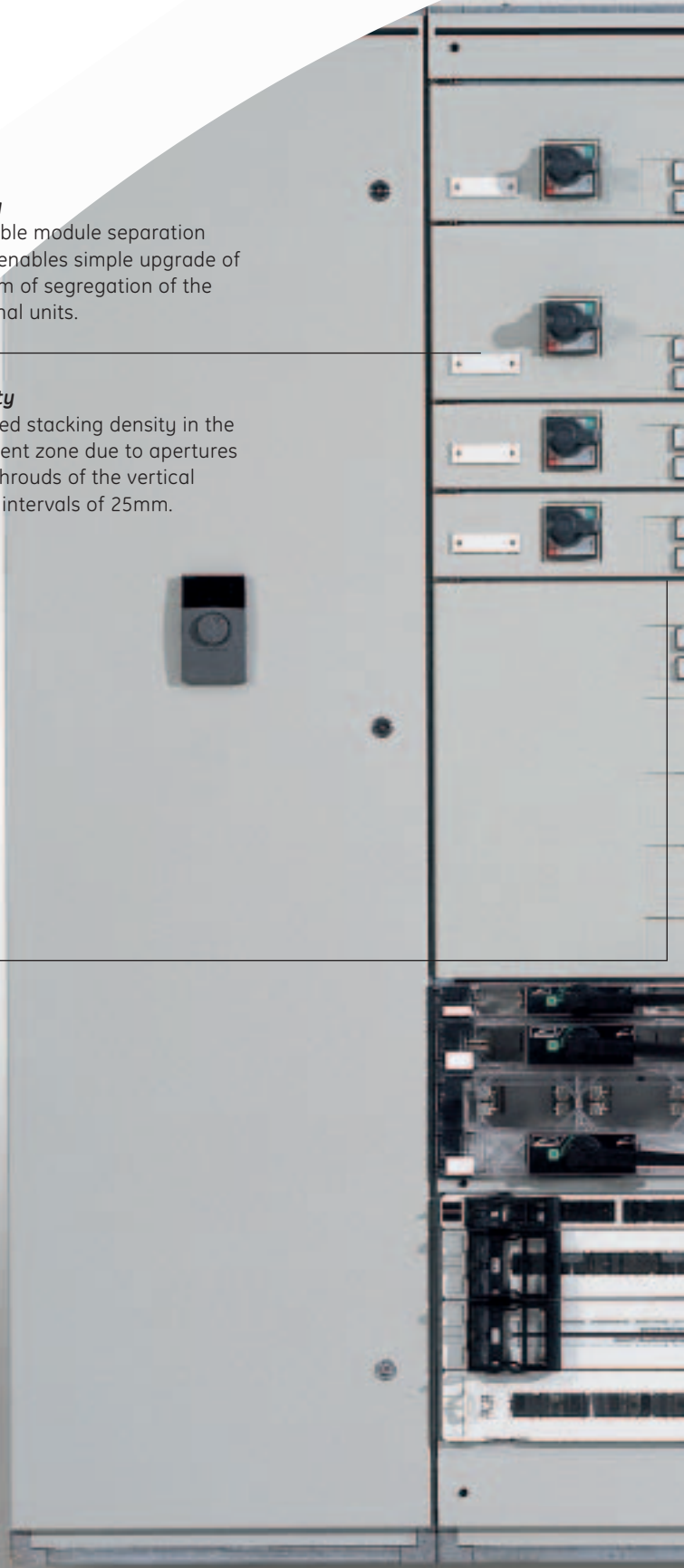


Modules with single or multi compartment door

- Control and indication components mounted on the instrument in the door.
- Operating handles of the main isolating devices behind the door or on front of the door with interlocking facility.

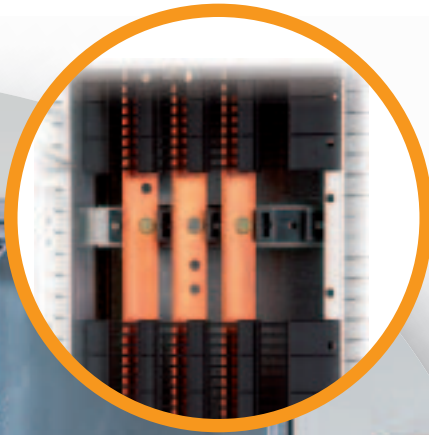
VPS modules

- For modular components on DIN-rails
- Mounting plates



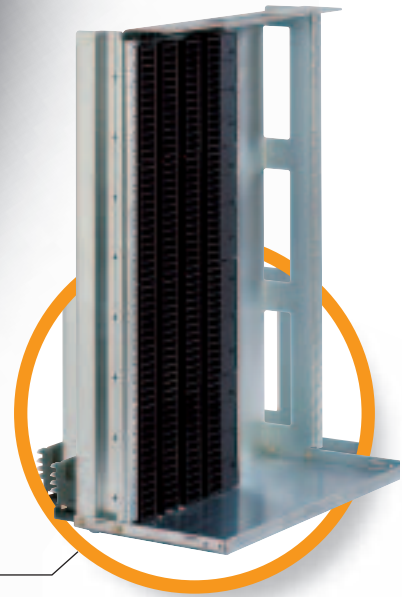
Increased short-circuit strength of the vertical riser system

- Fully rated 3 and 4 pole system matches to the fault rating of the main horizontal busbar system.



Distribution and Control applications in one column

- Standard adapters in 2 different heights ensures combinations of standard 3 and 4 pole fuse load break switch units and motor starters in one column.



Complete system integration

- Functional units match with the new range of IEC 947 designed and tested, and rated industrial components.

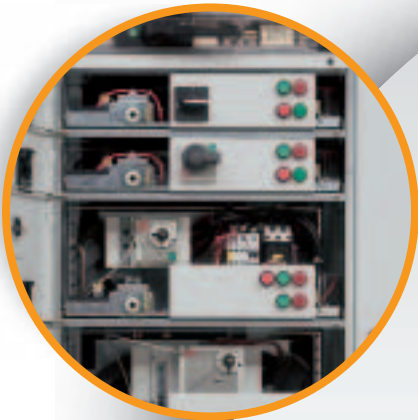


Great benefits

New

Cost competitive fixed solution

- Control Center for distribution applications with moulded case circuit breakers.
Modern design in reliable technology.



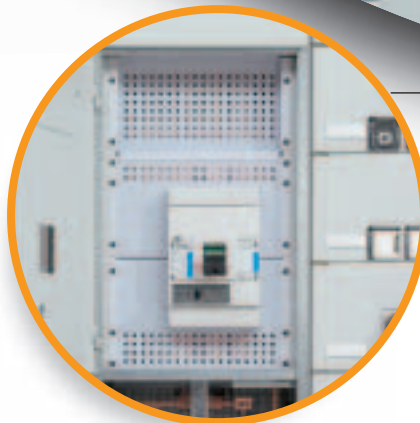
High flexibility

- According your specific needs all available modules (fully withdrawable, plug-in, VPS and HSE loadbreakswitch units) can be combined in the same column.



User friendly

- The optional mounting frame allows all kind of individual installations inside of the control compartment door.



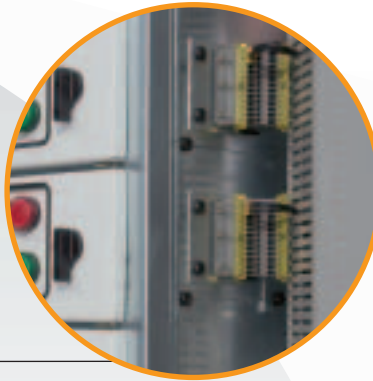
Compact design

- The use of moulded case circuit breakers offers compact, space saving solutions with a high density and an optimum price-performance ratio.



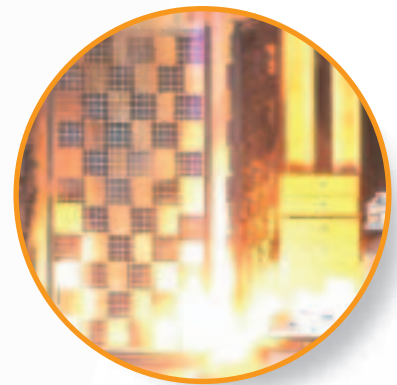
Easy and safe operation

- A special mechanism allows full operation of the module while the door is closed. This ensures the maximum safety level for the operator.



Easy to connect

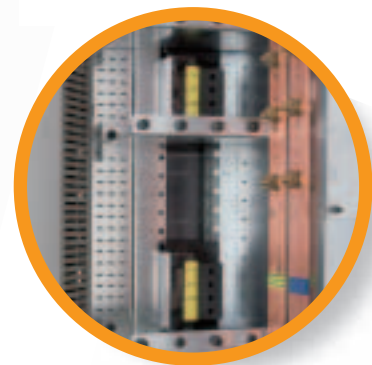
- The 24 pole auxiliary contact plug is designed to facilitate the easy connection of the control cabling.



New

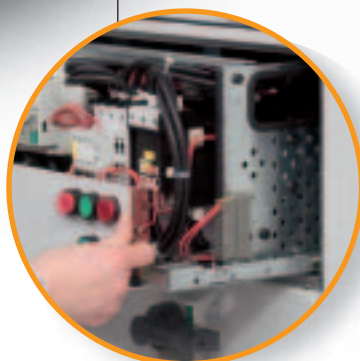
Operator protection

- In case of an internal arc the operator will be protected. Tests done under arc fault conditions according IEC 61641.



For your safety

- The fully withdrawable design can be provided with internal separations up to form 4b (type 7).

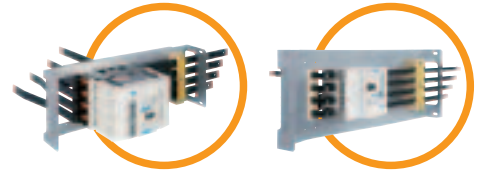


High availability

- The fully withdrawable module design allows a fast replacement of the modules.



Standard applications Control Center - Fixed modules



Function with circuit breakers at 400Vac

| Feeder [3 pole] | | Feeder [4 pole] | |
|-----------------|--------------------|-----------------|--------------------|
| Current in [A] | Module size in [E] | Current in [A] | Module size in [E] |
| 160 | 8 | 160 | 8 |
| 250 | 10 | 250 | 10 |
| 400 | 10 | 400 | 10 |
| 630 | 10 | 630 | 10 |

Function with circuit breakers at 500Vac

| Feeder [3 pole] | | Feeder [4 pole] | |
|-----------------|--------------------|-----------------|--------------------|
| Current in [A] | Module size in [E] | Current in [A] | Module size in [E] |
| 160 | 8 | 160 | 8 |
| 250 | 10 | 250 | 10 |
| 400 | 10 | 400 | 10 |
| 630 | 10 | 630 | 10 |

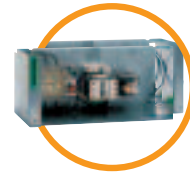
Function with circuit breakers at 690Vac

| Feeder [3 pole] | | Feeder [4 pole] | |
|-----------------|--------------------|-----------------|--------------------|
| Current in [A] | Module size in [E] | Current in [A] | Module size in [E] |
| 160 | 8 | 160 | 8 |
| 250 | 10 | 250 | 10 |
| 400 | 10 | 400 | 10 |
| 630 | 10 | 630 | 10 |

Optionally empty modules can be used for motor control purposes

| Height in [E] | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 18 | 24 | 30 | 36 |
|---------------|---|---|---|---|----|----|----|----|----|----|----|
| Fixed | | | x | x | x | x | | x | x | | |

Standard applications Control Center - Plug-in modules

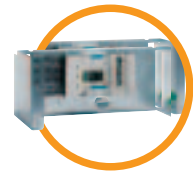
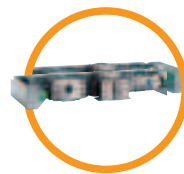


Functions with fuses (DIN) at 400Vac

| Motor starter DOL | | Motor starter Reverse | | Motor starter Star/Delta | | Feeder [3 pole] | | Feeder [4 pole] | |
|-------------------|--------------------|-----------------------|--------------------|--------------------------|--------------------|-----------------|--------------------|-----------------|--------------------|
| Max. load in [kW] | Module size in [E] | Max. load in [kW] | Module size in [E] | Max. load in [kW] | Module size in [E] | Current in [A] | Module size in [E] | Current in [A] | Module size in [E] |
| 18.5 | 5 | 11 | 5 | 37 | 8 | 160 | 2 | 160 | 4 |
| 37 | 8 | 37 | 8 | 55 | 8 | 250 | 3 | 250 | 6 |
| 90 | 18 | 45 | 12 | 90 | 18 | 400 | 6 | 400 | 10 |
| 132 | 24 | 55 | 18 | 200 | 30 | 630 | 6 | 630 | 10 |
| 220 | 36 | 90 | 24 | 220 | 36 | | | | |
| | | 132 | 30 | | | | | | |
| | | 220 | 36 | | | | | | |

Functions with fuses (DIN) at 690Vac

| Motor starter DOL | | Motor starter Reverse | | Motor starter Star/Delta | | Feeder [3 pole] | | Feeder [4 pole] | |
|-------------------|--------------------|-----------------------|--------------------|--------------------------|--------------------|-----------------|--------------------|-----------------|--------------------|
| Max. load in [kW] | Module size in [E] | Max. load in [kW] | Module size in [E] | Max. load in [kW] | Module size in [E] | Current in [A] | Module size in [E] | Current in [A] | Module size in [E] |
| 22 | 5 | 11 | 5 | 15 | 8 | 160 | 2 | 160 | 4 |
| 45 | 8 | 30 | 8 | 37 | 8 | 250 | 3 | 250 | 6 |
| 55 | 12 | 37 | 8 | 132 | 18 | 400 | 6 | 400 | 10 |
| 132 | 18 | 75 | 24 | 220 | 30 | 630 | 6 | 630 | 10 |
| 220 | 18 | 132 | 24 | | | | | | |
| | | 220 | 30 | | | | | | |



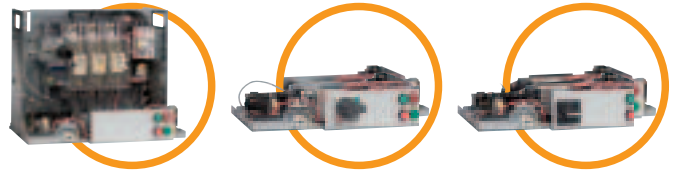
Functions with circuit breaker at 400Vac

| Motor starter DOL | | Motor starter Reverse | | Motor starter Star/Delta | | Feeder [3 pole] | | Feeder [4 pole] | |
|-------------------|--------------------|-----------------------|--------------------|--------------------------|--------------------|-----------------|--------------------|-----------------|--------------------|
| Max. load in [kW] | Module size in [E] | Max. load in [kW] | Module size in [E] | Max. load in [kW] | Module size in [E] | Current in [A] | Module size in [E] | Current in [A] | Module size in [E] |
| 30 | 4 | 30 | 4 | 30 | 4 | 63 | 4 | 63 | 8 |
| 37 | 5 | 55 | 18 | 55 | 24 | 160 | 8 | 160 | 8 |
| 55 | 10 | 90 | 24 | 90 | 30 | 400 | 10 | 400 | 10 |
| 220 | 18 | 110 | 30 | 110 | 36 | 630 | 18 | 630 | 18 |
| | | 220 | 30 | 200 | 36 | | | | |

Functions with circuit breaker at 690Vac

| Motor starter DOL | | Motor starter Reverse | | Motor starter Star/Delta | | Feeder [3 pole] | | Feeder [4 pole] | |
|-------------------|--------------------|-----------------------|--------------------|--------------------------|--------------------|-----------------|--------------------|-----------------|--------------------|
| Max. load in [kW] | Module size in [E] | Max. load in [kW] | Module size in [E] | Max. load in [kW] | Module size in [E] | Current in [A] | Module size in [E] | Current in [A] | Module size in [E] |
| 11 | 10 | 11 | 10 | 15 | 10 | 63 | 8 | 63 | 8 |
| 30 | 10 | 30 | 10 | 75 | 24 | 160 | 8 | 160 | 8 |
| 75 | 18 | 75 | 18 | 132 | 24 | 400 | 24 | 400 | 24 |
| 132 | 18 | 160 | 24 | 220 | 36 | 630 | 24 | 630 | 24 |
| 220 | 18 | 250 | 36 | 250 | 36 | | | | |

Standard applications Control Center - Fully withdrawable modules

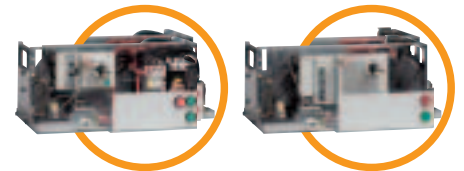


Functions with fuses (DIN) at 400Vac

| Motor starter DOL | | Motor starter Reverse | | Motor starter Star/Delta | | Feeder [3 pole] | | Feeder [4 pole] | |
|-------------------|--------------------|-----------------------|--------------------|--------------------------|--------------------|-----------------|--------------------|-----------------|--------------------|
| Max. load in [kW] | Module size in [E] | Max. load in [kW] | Module size in [E] | Max. load in [kW] | Module size in [E] | Current in [A] | Module size in [E] | Current in [A] | Module size in [E] |
| 18.5 | 5 | 11 | 5 | 37 | 10 | 160 | 2 | 160 | 4 |
| 37 | 10 | 37 | 10 | 55 | 10 | 250 | 3 | 250 | 6 |
| 90 | 24 | 45 | 12 | 90 | 24 | 400 | 6 | 400 | 10 |
| 132 | 36 | 55 | 24 | 200 | 36 | 630 | 6 | 630 | 10 |
| 220 | 36 | 90 | 30 | 220 | 36 | | | | |
| | | 132 | 36 | | | | | | |
| | | 220 | 36 | | | | | | |

Functions with fuses (DIN) at 690Vac

| Motor starter DOL | | Motor starter Reverse | | Motor starter Star/Delta | | Feeder [3 pole] | | Feeder [4 pole] | |
|-------------------|--------------------|-----------------------|--------------------|--------------------------|--------------------|-----------------|--------------------|-----------------|--------------------|
| Max. load in [kW] | Module size in [E] | Max. load in [kW] | Module size in [E] | Max. load in [kW] | Module size in [E] | Current in [A] | Module size in [E] | Current in [A] | Module size in [E] |
| 22 | 5 | 11 | 5 | 15 | 10 | 160 | 2 | 160 | 4 |
| 45 | 10 | 30 | 5 | 37 | 10 | 250 | 3 | 250 | 6 |
| 55 | 12 | 37 | 10 | 132 | 24 | 400 | 6 | 400 | 10 |
| 132 | 30 | 75 | 30 | 220 | 30 | 630 | 6 | 630 | 10 |
| 220 | 36 | 132 | 30 | | | | | | |
| | | 220 | 36 | | | | | | |



Functions with circuit breaker at 400Vac

| Motor starter DOL | | Motor starter Reverse | | Motor starter Star/Delta | | Feeder [3 pole] | | Feeder [4 pole] | |
|-------------------|--------------------|-----------------------|--------------------|--------------------------|--------------------|-----------------|--------------------|-----------------|--------------------|
| Max. load in [kW] | Module size in [E] | Max. load in [kW] | Module size in [E] | Max. load in [kW] | Module size in [E] | Current in [A] | Module size in [E] | Current in [A] | Module size in [E] |
| 30 | 5 | 30 | 8 | 30 | 10 | 63 | 5 | 63 | 6 |
| 37 | 5 | 55 | 12 | 55 | 12 | 160 | 5 | 160 | 6 |
| 55 | 12 | 90 | 24 | 90 | 24 | 400 | 10 | 400 | 12 |
| 220 | 24 | 110 | 30 | 110 | 30 | 630 | 10 | 630 | 12 |
| | | 220 | 30 | 200 | 30 | | | | |

Functions with circuit breaker at 690Vac

| Motor starter DOL | | Motor starter Reverse | | Motor starter Star/Delta | | Feeder [3 pole] | | Feeder [4 pole] | |
|-------------------|--------------------|-----------------------|--------------------|--------------------------|--------------------|-----------------|--------------------|-----------------|--------------------|
| Max. load in [kW] | Module size in [E] | Max. load in [kW] | Module size in [E] | Max. load in [kW] | Module size in [E] | Current in [A] | Module size in [E] | Current in [A] | Module size in [E] |
| 11 | 12 | 11 | 12 | 15 | 12 | 63 | 5 | 63 | 10 |
| 30 | 12 | 30 | 12 | 75 | 12 | 160 | 10 | 160 | 10 |
| 75 | 12 | 75 | 12 | 132 | 12 | 400 | 10 | 400 | 12 |
| 132 | 18 | 160 | 24 | 220 | 24 | 630 | 10 | 630 | 12 |
| 220 | 30 | 250 | 36 | 250 | 36 | | | | |



Why SEN Plus?



Test and standards

Four pole type-tested assembly as per IEC 439-1/EN 60439-1 certified by KEMA.
Tests under conditions of arcing due to an internal fault as per IEC /TR 61641 certified by IPH

Enables a boundaryless environment

boundaryless



Dust and waterproof

IP30 up to IP54 as per IEC 529-1

Enables the erection of the equipment in a production environment

production environment



Internal form of separation

Up to Form 4B as per IEC 439-1

Enables safe modification under energised conditions

safe modifications



Compact

Increase functional floor space in building services

functional floor space



Smart and simple design

Secure fast deliveries

fast delivery



Durable surface protection

Shock and scratch resistant

Minimise damages during transportation

resistant



Maintenance free busbar system

Lower investment costs

lower investment



Ready for the e-commerce take-off

With the interactive CD-Rom you have the ability to compose and customise your own SEN Plus Power Centres, Distribution Boards and Motor Control Centres (design, calculate general arrangement drawings and purchase order tool).

e-commerce

GE Consumer & Industrial Power Protection

Power Protection (formerly GE Power Controls), a division of GE Consumer & Industrial, is a first class European supplier of low-voltage products including wiring devices, residential and industrial electrical distribution components, automation products, enclosures and switchboards. Demand for the company's products comes from wholesalers, installers, panel-board builders, contractors, OEMs and utilities worldwide.


www.ge.com/eu/powerprotection
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GE imagination at work