

# Indoor load disconnectors H 22

**three-pole design**  
**rated voltage 12, 25 and 38.5 kV**  
**rated current 630 and 1250 A**



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ISO 9001  
ISO 14001  
BUREAU VERITAS  
Certification



## Indoor load disconnectors H 22

The load disconnectors are used as loading devices in medium voltage, indoor operating environment, in normal operating conditions (class „minus 15“, indoor design).

The design of H22 load disconnectors complies with the requirements of EN 62271-1, EN 62271-102, EN 62271-103 and EN 62271-105 standards.

All parts and frames made of steel are galvanized and chromate coated.

The drive shafts are seated in bronze bearings and this is why the material as such cannot be subjected to corrosion.

All parts of the current carrying path are made of drawn electrolytical copper and are silver coated with a layer of 10 µm.

An appropriate contact pressure is ensured by pressure springs made of stainless steel.

The control of load disconnectors occurs through the following:

- SHA, DK or FT hand operated drives (for disconnectors mounted on the front wall), adaptor for „D“ type drive, with an extension part (in case of necessity, for disconnectors mounted to the side wall)
- motor operated drives of types VM, NM and UM.

In case when the load disconnector is equipped with earthing switch there is to be additional drive mechanism for the control of the earthing switch.

**Under normal operating conditions it is not necessary for the load disconnectors to undergo a preventive maintenance during the period of ten years.**

## Main advantages

- a reliable and safe arc extinguishing
- increased safety of the operating personnel due to the use of earthing switches with an increased short-circuit withstand capability
- load disconnectors of a compact design, necessitating only a very limited area in the respective load gear frame or cubicle
- current disconnecting path which can visually be inspected
- easy operation
- high number of loading cycles
- very limited maintenance requirements

## Types of H 22 load disconnectors

|                 |                                                                                                                                                                                                                               |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>H 22 EK</b>  | quick-make and quick-break operation                                                                                                                                                                                          |
| <b>H 22 EA</b>  | quick-make and quick-break operation, trip-free                                                                                                                                                                               |
| <b>H 22 SEA</b> | quick-make and quick-break operation, trip-free, with fuse holders mounted below for high-voltage high-breaking-capacity (HV HBC) fuses with striker release, for all-pole disconnection of the switch when any fuse operates |

## Supplementary accessories

|                        |                                                                                                                                                                                                                                                                                                                                                                |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Working release -      | 24 V, 60 V, 110 V and 220 V DC, 110 V and 230 V AC<br>The H 22 EA and H 22 SEA load disconnectors can be equipped with a working release. Simultaneously, the function of release can be blocked with an additional switch.                                                                                                                                    |
| Additional switch -    | in order to indicate the switching position the disconnectors with built-in earthing switches can be equipped with additional switches.<br>The basic setup of switches can be modified without the necessity to disassemble the disconnector, by using special tools (such as when changing the contacts from making to breaking, or changeover contact etc.). |
| Motor operated drive - | see drives catalogue                                                                                                                                                                                                                                                                                                                                           |

## Function description

When breaking the current this is the main contact that is disconnected first, in which case there is a short-time current passing through the breaking contacts connected in parallel. During the process of disconnection of the main contacts energy is accumulated in the spring to be used for the control of breaking contact. When an appropriate distance of the main contact has been reached the breaking contacts are pulled apart.

At the same time electric arc starts to burn in the gap between the hold-up contact and the arcing tip of the breaking contact, which however, immediately is interrupted in the extinguishing chamber. The arcing chamber is of closed design, and partitioned on the pressure and expansion rooms.

In the ranges of small currents the arc extinguishing process is based on the deionisation effect of the arc, which is cooled down on the walls of arc extinguishing plates. High current arc is extinguished by gas flow which is generated by the arc in the chamber pressure room and which flows into the expansion room.

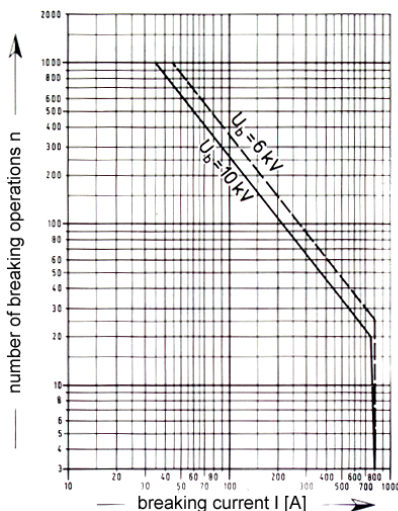
As you can see, in all the cases there is a combination of a series of arc extinguishing principles that provide for a safe current breaking over the whole current range of the switch disconnecter. Due to the fact that there is no a liquid to be used for arc extinguishing, nor a pressurized air, the arcing chambers as such are completely maintenance free.

## Technical data

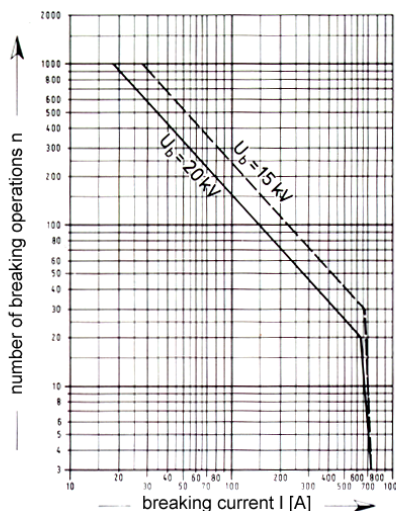
|                                                                    |                               |    |     |      |      |     |      |
|--------------------------------------------------------------------|-------------------------------|----|-----|------|------|-----|------|
| rated voltage                                                      | U <sub>r</sub>                | kV | 12  | 25   | 38,5 |     |      |
| rated frequency                                                    | f <sub>r</sub>                | Hz | 50  | 50   | 50   |     |      |
| rated current                                                      | I <sub>r</sub>                | A  | 630 | 1250 | 630  | 630 | 1250 |
| rated short-time current                                           | I <sub>k</sub> <sup>1)</sup>  | kA | 20  | 30   | 25   | 20  | 30   |
| rated peak withstand current                                       | I <sub>p</sub> <sup>1)</sup>  | kA | 50  | 75   | 63   | 50  | 75   |
| rated making current                                               | I <sub>ma</sub> <sup>1)</sup> | kA | 50  | 40   | 37   | 50  | 40   |
| rated breaking current – cos φ 0,7                                 | I <sub>load</sub>             | A  | 630 | 1250 | 630  | 630 | 1250 |
| rated breaking current of closed loop                              | I <sub>loop</sub>             | A  | 630 | 1250 | 630  | 630 | 1250 |
| rated breaking current of unloaded transformer                     | I <sub>nltr</sub>             | A  | 120 | 50   | 4,4  |     |      |
| rated breaking current of no-load cable                            | I <sub>cc</sub>               | A  | 90  | 20   |      |     |      |
| rated breaking current of no-load power line                       | I <sub>lc</sub>               | A  | 10  |      |      |     |      |
| rated breaking current of the earth fault                          | I <sub>ef1</sub>              | A  | 300 | 300  | 100  |     |      |
| rated cable charging breaking current below earth fault conditions | I <sub>ef2</sub>              | A  | 90  | 28   | 35   |     |      |

<sup>1)</sup> These values also apply to added earthing switches

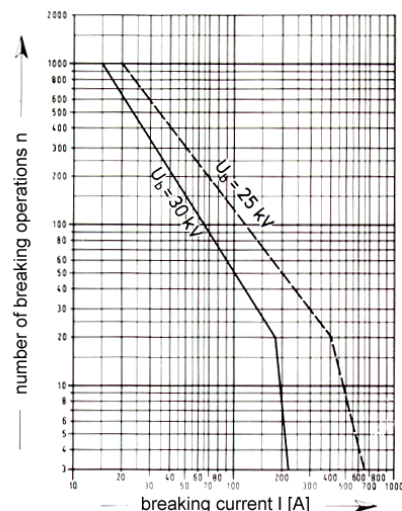
Rated voltage 12 kV



Rated voltage 25 kV



Rated voltage 38.5 kV



Maintenance-free load disconnector operations as a function of the breaking current at  $\cos \phi \geq 0,7$ .

## Withstand voltages

|                                                            |    |    |     |      |
|------------------------------------------------------------|----|----|-----|------|
| rated voltage                                              | kV | 12 | 25  | 38,5 |
| rated short-time withstand power frequency voltage / 1min. |    |    |     |      |
| against the earth, across the poles and between contacts   | kV | 75 | 125 | 180  |
| across the isolating distance                              | kV | 85 | 145 | 210  |
| rated lightning pulse withstand voltage                    |    |    |     |      |
| against the earth, across the poles and between contacts   | kV | 28 | 50  | 80   |
| across the isolating distance                              | kV | 32 | 60  | 90   |

## Indoor load disconnectors H 22 EK, rated current 630 A

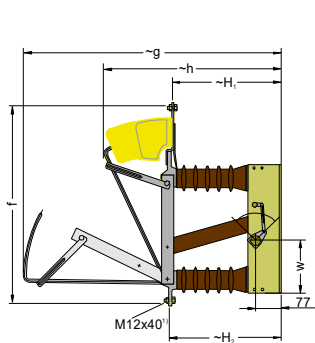


Figure: H 22 EK  
without earthing switch

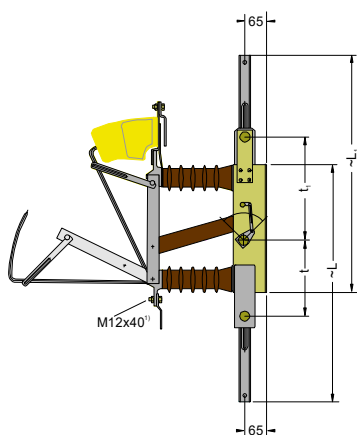
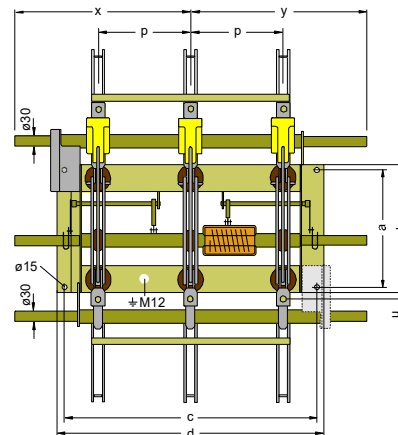


Figure: H 22 EK with earthing switch  
mounted below or above



<sup>1)</sup> hexagon head nut screw with nut, washer and spring washer

### without earthing switch

| $U_r$<br>[kV] | $I_r$<br>[A] | p   | part nr.  | a   | b   | c    | d    | f   | $\approx g$ | $\approx h$ | $\approx H_1$ | $\approx H_2$ | u  | w   | x/y     | weight<br>[kg] |
|---------------|--------------|-----|-----------|-----|-----|------|------|-----|-------------|-------------|---------------|---------------|----|-----|---------|----------------|
| 12            | 630          | 210 | 722 40000 | 280 | 310 | 600  | 630  | 483 | 604         | 408         | 245           | 255           | 45 | 115 | 450     | 31             |
| 12            | 630          | 155 | 722 40200 | 280 | 310 | 450  | 480  | 483 | 604         | 408         | 245           | 255           | 45 | 115 | 290/340 | 28,5           |
| 25            | 630          | 275 | 722 50000 | 350 | 380 | 750  | 790  | 565 | 764         | 523         | 325           | 335           | 35 | 155 | 565     | 42,5           |
| 38,5          | 630          | 400 | 722 60907 | 450 | 500 | 1000 | 1040 | 700 | 1040        | 661         | 465           | 475           | 35 | 195 | 775     | 77             |

### with earthing switch with short-circuit making capability mounted below – UESV with earthing switch mounted below – UEV

| $U_r$<br>[kV] | $I_r$<br>[A] | p   | part nr.  |           | $\approx L$ | t   | weight<br>[kg] |
|---------------|--------------|-----|-----------|-----------|-------------|-----|----------------|
|               |              |     | UESV      | UEV       |             |     |                |
| 12            | 630          | 210 | 722 40014 | -         | 566         | 195 | 42             |
| 12            | 630          | 155 | 722 40214 | -         | 566         | 195 | 38             |
| 25            | 630          | 275 | 722 50014 | -         | 706         | 225 | 55,5           |
| 38,5          | 630          | 400 | 722 60924 | 722 60910 | 975         | 275 | 91,5           |

### with earthing switch with short-circuit making capability mounted above – OESV with earthing switch mounted above – OEV

| $U_r$<br>[kV] | $I_r$<br>[A] | p   | part nr.  |           | $\approx L$ | t     | weight<br>[kg] |
|---------------|--------------|-----|-----------|-----------|-------------|-------|----------------|
|               |              |     | OESV      | OEV       |             |       |                |
| 12            | 630          | 210 | 722 40015 | -         | 573         | 290   | 42             |
| 12            | 630          | 155 | 722 40215 | -         | 573         | 290   | 38             |
| 25            | 630          | 275 | 722 50015 | -         | 723         | 320   | 55,5           |
| 38,5          | 630          | 400 | 722 60925 | 722 60912 | 1012,5      | 457,5 | 91,5           |

## Indoor load disconnectors H 22 EA, rated current 630 A

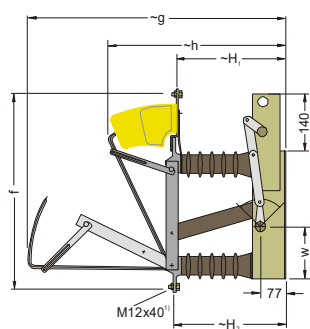


Figure: H 22 EA  
without earthing switch

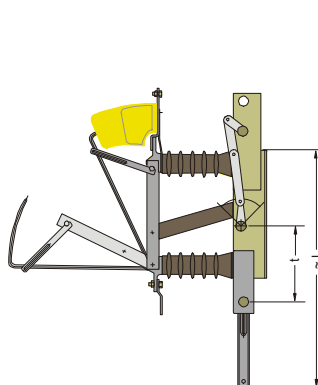
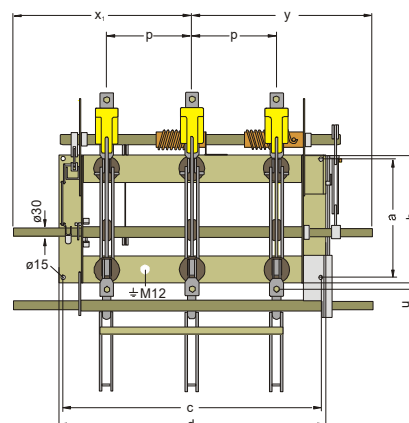


Figure: H 22 EA with earthing switch  
mounted below or above



¹) hexagon head nut screw with nut, washer and spring washer

### without earthing switch

| U <sub>r</sub><br>[kV] | I <sub>r</sub><br>[A] | p   | part nr.  | a   | b   | c    | d    | f   | ≈g   | ≈h  | ≈H <sub>1</sub> | ≈H <sub>2</sub> | u  | w   | x/y     | weight<br>t<br>[kg] |
|------------------------|-----------------------|-----|-----------|-----|-----|------|------|-----|------|-----|-----------------|-----------------|----|-----|---------|---------------------|
| 12                     | 630                   | 210 | 722 42000 | 280 | 310 | 600  | 630  | 483 | 604  | 408 | 245             | 255             | 45 | 115 | 450     | 31                  |
| 12                     | 630                   | 155 | 722 42200 | 280 | 310 | 450  | 480  | 483 | 604  | 408 | 245             | 255             | 45 | 115 | 290/340 | 28,5                |
| 25                     | 630                   | 275 | 722 52000 | 350 | 380 | 750  | 790  | 565 | 764  | 523 | 325             | 335             | 35 | 155 | 565     | 42,5                |
| 38,5                   | 630                   | 400 | 722 62907 | 450 | 500 | 1000 | 1040 | 700 | 1040 | 661 | 465             | 475             | 35 | 195 | 775     | 92                  |

### with earthing switch with short-circuit making capability mounted below – UESV with earthing switch mounted below – UEV

| U <sub>r</sub><br>[kV] | I <sub>r</sub><br>[A] | p   | part nr.  |           | ≈L  | t   | weight<br>[kg] |
|------------------------|-----------------------|-----|-----------|-----------|-----|-----|----------------|
|                        |                       |     | UESV      | UEV       |     |     |                |
| 12                     | 630                   | 210 | 722 42014 | -         | 566 | 195 | 53,5           |
| 12                     | 630                   | 155 | 722 42214 | -         | 566 | 195 | 48,5           |
| 25                     | 630                   | 275 | 722 52014 | -         | 706 | 225 | 68             |
| 38,5                   | 630                   | 400 | 722 62924 | 722 62911 | 975 | 275 | 110            |

Indoor load disconnectors H 22 EA with earthing switch with short-circuit making capability mounted above (OESV) on request.

## Indoor load disconnectors H 22 SEA, rated current 630 A

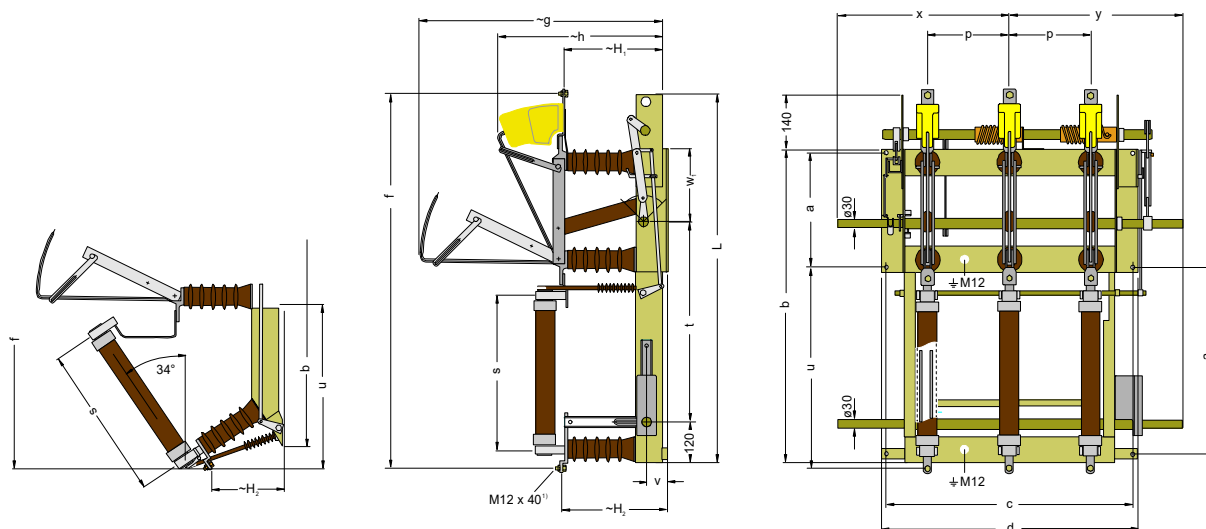


Figure: H 22 SEA with earthing switch mounted below

<sup>1)</sup> hexagon head nut screw with nut, washer and spring washer

### without earthing switch

| $U_r$<br>[kV]    | $I_r$<br>[A] | p   | a   | $a_1$ | b    | c    | d    | f    | $\approx g$ | $\approx h$ | $\approx H_1$ | $\approx H_2$ | u     | w   | x/y     |
|------------------|--------------|-----|-----|-------|------|------|------|------|-------------|-------------|---------------|---------------|-------|-----|---------|
| 12               | 630          | 210 | 280 | 420   | 750  | 600  | 630  | 918  | 604         | 408         | 245           | 247           | 480   | 195 | 450     |
| 12               | 630          | 155 | 280 | 420   | 750  | 450  | 480  | 918  | 604         | 408         | 245           | 247           | 480   | 195 | 290/340 |
| 25 <sup>1)</sup> | 630          | 275 | 350 | -     | 752  | -    | -    | 993  | 764         | 523         | 325           | 232           | 463   | 225 | 565     |
| 25               | 630          | 275 | 350 | 570   | 970  | 750  | 790  | 1150 | 764         | 523         | 325           | 327           | 620   | 225 | 565     |
| 38,5             | 630          | 400 | 450 | 770   | 1175 | 1000 | 1040 | 1380 | 1040        | 661         | 465           | 467           | 732,5 | 305 | 775     |

| $U_r$<br>[kV]    | $I_r$<br>[A] | p   | part nr.  | s   | weight<br>[kg] |
|------------------|--------------|-----|-----------|-----|----------------|
| 12               | 630          | 210 | 722 44000 | 325 | 52             |
| 12               | 630          | 155 | 722 44100 | 325 | 47             |
| 25 <sup>1)</sup> | 630          | 275 | 722 55000 | 475 | 68,5           |
| 25               | 630          | 275 | 72254000  | 475 | 70,5           |
| 38,5             | 630          | 400 | 722 64907 | 570 | 115            |

<sup>1)</sup> oblique fuse holders

### with earthing switch with short-circuit making capability mounted below – UESV with earthing switch mounted below – UEV

| $U_r$<br>[kV] | $I_r$<br>[A] | p   | part nr.  |           | $\approx L$ | t   | weight<br>[kg] |
|---------------|--------------|-----|-----------|-----------|-------------|-----|----------------|
|               |              |     | UESV      | UEV       |             |     |                |
| 12            | 630          | 210 | 722 44014 | -         | 890         | 445 | 63             |
| 12            | 630          | 155 | 722 44114 | -         | 890         | 445 | 55,5           |
| 25            | 630          | 275 | 722 54014 | -         | 1110        | 620 | 83,5           |
| 38,5          | 630          | 400 | 722 64924 | 722 64909 | 1380        | 720 | 132,5          |

## Indoor load disconnectors H 22 EA, rated current 1250 A

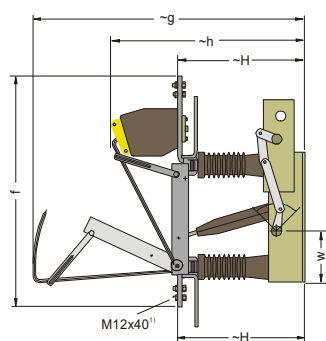


Figure: H 22 EA  
without earthing switch

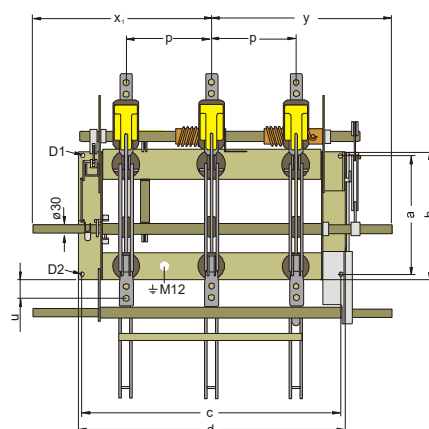
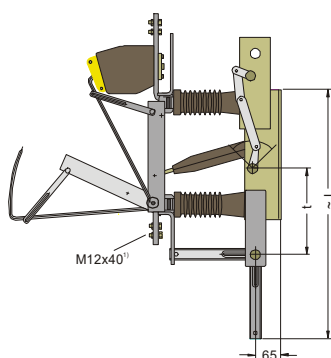


Figure: H 22 EA with earthing switch  
mounted below

¹) hexagon head nut screw with nut, washer and spring washer

### without earthing switch

| $U_r$<br>[kV] | $I_r$<br>[A] | p   | part nr.  | a   | b   | c   | d   | f   | g   | h   | H   | u   | w   | D <sub>1</sub> | D <sub>2</sub> | x/y | weight<br>t<br>[kg] |
|---------------|--------------|-----|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----------------|----------------|-----|---------------------|
| 12            | 1250         | 210 | 722 72000 | 280 | 380 | 600 | 640 | 695 | 717 | 488 | 286 | 115 | 155 | ø15            | ø15            | 450 | 66,5                |
| 25            | 1250         | 275 | 722 82000 | 350 | 380 | 750 | 750 | 695 | 808 | 568 | 366 | 80  | 155 | ø15            | ø15            | 565 | 85                  |

### with earthing switch with short-circuit making capability mounted below – UESV

### with earthing switch mounted below – UEV

| $U_r$<br>[kV] | $I_r$<br>[A] | p   | part nr.  | L   | t   | weight<br>[kg] |
|---------------|--------------|-----|-----------|-----|-----|----------------|
| 12            | 1250         | 210 | 722 72011 | 655 | 250 | 78             |
| 25            | 1250         | 275 | 722 82011 | 735 | 250 | 98             |

Indoor load disconnectors H 22 EA with earthing switch with short-circuit making capability mounted above (OESV) on request.

## Switch-fuse combination on distribution transformers

Switch-fuse combinations are three-pole switches comprising a functional unit of load switch and current-limiting fuse. The scope of application of these combinations is predominantly in transformer protection systems where it covers the range of small and medium ratings.

The standard specification of the switch-fuse combinations governs complete protection, i.e. all fault currents above a permissible overload range (usually 1.5 times the rated capacity of the transformer) up to the rated short-circuit breaking current are reliably controlled.

Transformer protection can therefore be implemented reliably, simply and most economically using a switch-fuse combination, making a circuit-breaker with overcurrent time protection and associated current transformers no alternative. Protection measures such as Buchholz protection or thermal protection can still be implemented with the switch.

| Rated voltage<br>kV | Transformer rated capacity<br>kVA | Type of load<br>disconnecter<br>H 22 | Rated current<br>of HV fuse |                 |
|---------------------|-----------------------------------|--------------------------------------|-----------------------------|-----------------|
|                     |                                   |                                      | min. A                      | max. A          |
| 12                  | 50                                | Yes                                  | 6,3                         | 6,3             |
|                     | 80                                | Yes                                  | 10                          | 10              |
|                     | 100                               | Yes                                  | 10                          | 16              |
|                     | 125                               | Yes                                  | 16                          | 20              |
|                     | 160                               | Yes                                  | 20                          | 25              |
|                     | 200                               | Yes                                  | 25                          | 31,5            |
|                     | 250                               | Yes                                  | 31,5                        | 40              |
|                     | 315                               | Yes                                  | 31,5                        | 50              |
|                     | 400                               | Yes                                  | 40                          | 50              |
|                     | 500                               | Yes                                  | 50                          | 63              |
|                     | 630                               | Yes                                  |                             | 63              |
|                     | 800                               | Yes                                  |                             | 80              |
|                     | 1000                              | Yes                                  |                             | 100             |
|                     | 1250                              | Tripping delay                       |                             | 125             |
| 25                  | 1600                              | No                                   |                             | Circuit breaker |
|                     | 50                                | Yes                                  | 6,3                         | 6,3             |
|                     | 80                                | Yes                                  | 6,3                         | 6,3             |
|                     | 100                               | Yes                                  | 6,3                         | 10              |
|                     | 125                               | Yes                                  | 10                          | 16              |
|                     | 160                               | Yes                                  | 10                          | 20              |
|                     | 200                               | Yes                                  | 16                          | 20              |
|                     | 250                               | Yes                                  | 16                          | 25              |
|                     | 315                               | Yes                                  | 20                          | 25              |
|                     | 400                               | Yes                                  | 25                          | 31,5            |
|                     | 500                               | Yes                                  | 25                          | 40              |
|                     | 630                               | Yes                                  | 31,5                        | 50              |
|                     | 800                               | Yes                                  | 40                          | 50              |
|                     | 1000                              | Yes                                  | 50                          | 63              |
|                     | 1250                              | Yes                                  |                             | 63              |
|                     | 1600                              | Yes                                  |                             | 80              |
|                     | 2000                              | Tripping delay                       |                             | 100             |
|                     | 2500                              | Tripping delay                       |                             | 125             |
| 38,5                | 3150                              | No                                   |                             | Circuit breaker |
|                     | 50                                | Yes                                  | 6,3                         | 6,3             |
|                     | 80                                | Yes                                  | 6,3                         | 6,3             |
|                     | 100                               | Yes                                  | 6,3                         | 10              |
|                     | 125                               | Yes                                  | 6,3                         | 16              |
|                     | 160                               | Yes                                  | 6,3                         | 20              |
|                     | 200                               | Yes                                  | 10                          | 20              |
|                     | 250                               | Yes                                  | 10                          | 25              |
|                     | 315                               | Yes                                  | 16                          | 25              |
|                     | 400                               | Yes                                  | 20                          | 25              |
|                     | 500                               | Yes                                  | 25                          | 31,5            |
|                     | 630                               | Yes                                  | 31,5                        | 31,5            |
|                     | 800                               | Yes                                  | 31,5                        | 40              |
|                     | 1000                              | Yes                                  | 40                          | 40              |
|                     | 1250                              | Yes                                  | 40                          | 50              |
|                     | 1600                              | Yes                                  | 50                          | 63              |
|                     | 2000                              | Yes                                  |                             | 63              |
|                     | 2500                              | Tripping delay                       |                             | 80              |
|                     | 3150                              | Tripping delay                       |                             | 100             |
|                     | 4000                              | No                                   |                             | 125             |
|                     | 5000                              | No                                   |                             | Circuit breaker |

Specifications are subject to change without notice.

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