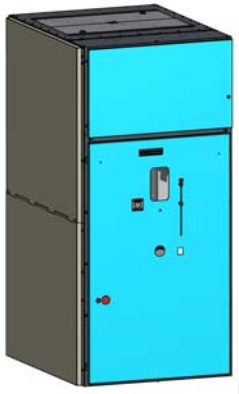
STROM • SICHER • SCHALTEN

DRIESCHER
Medium voltage switchgear
PRO-AIR H

- Indoor
- Air-insulated
- Rated voltage 36 kV



DRIESCHER
Moosburg • Eisleben

Contents

DRIESCHER

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PRO-AIR H - Your advantages

- *Easy access*
- *Simple operation*
- *Air-insulated, SF6-free*
- *Optimal environmental compatibility*
- *Minimal maintenance requirements*
- *Maximum safety and reliability*
- *Modular design, can be extended and expanded*

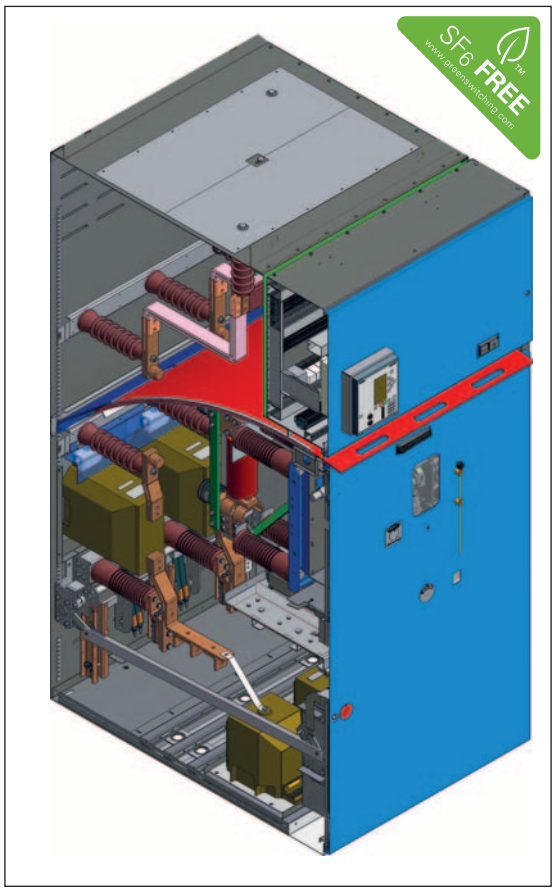


Fig. 1: Exemplified: PRO-AIR H•e•EL, I_k 31,5 kA

Short description

- *Type-tested acc. to EN 62271-200*
- *Rated voltage 36 kV*
- *Rated current up to 2000 A*
- *Rated short-time current up to 31,5 kA, 3s*
- *Degree of protection IP3X*
- *Loss of service continuity LSC2, PI*
- *Internal arc classification IAC A FL(R) 31,5 kA 1s*

Type description example

PRO-AIR
H•e•EL

Type panel: Circuit breaker panel-in withdrawable unit design*

*Size **a** 900 wide/1200 deep/2100 high*
*Size **c** 900 wide/1200 deep/2600 high*
*Size **e** 1200 wide/1500 deep/2600 high*

Rated voltage 36 kV

General description

The metal-clad, air-insulated medium-voltage switchgear from the PRO-AIR H panel range is used specifically when an extremely high supply reliability must be guaranteed and a high level of personal safety and operating comfort are essential. This switchgear fulfils the specific requirements of the user in all respects.

The PRO-AIR H is delivered as individual panels, which can be equipped with earthing switches, motor drives, current and voltage transformers etc. individually according to the customer specifications.
The PRO-AIR H switchgear is available in the following sizes and types:

Switchgear sizes	Dimensions Width x Depth x Height in mm	Rated short-time current I_k up to	Available Types*
PRO-AIR H•a	900 x 1200 x 2100	20 kA	K, T, Ü, H, M
PRO-AIR H•c	900 x 1200 x 2600	20 kA	K, T, Ü, H, M, L
PRO-AIR H•e	1200 x 1500 x 2600	31,5 kA	K, T, Ü, H, M, L, EL

**Types: K=Cable panel, T=Transformer feeder panel, Ü=Bus sectionalizer panel, H=Riser panel, M=Measuring panel, L=Circuit breaker panel (semi-fixed type), EL=Circuit breaker panel in withdrawable unit design*

Technical standards

The metal-clad, air-insulated PRO-AIR H panels are type-tested in accordance with EN 62271-200.
The switchgear and the switching devices comply with the following standards:

	High-voltage switchgear and switches -
EN 62271-1	Part 1: Common specifications
EN 62271-200	Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV
EN 62271-100	Part 100: Alternating current circuit breakers
EN 62271-102	Part 102: Alternating current disconnectors and earthing switches
EN 62271-103	Part 103: Switches for rated voltages above 1 kV up to and including 52 kV
EN 62271-105	Part 105: Alternating current switch-fuse combinations for rated voltages above 1 kV up to and including 52 kV

Operating conditions

The PRO-AIR H panels are installed in closed electrical operating facilities, which may only be accessed by specialist personnel and instructed persons (accessibility level A). They can be used up to an installation altitude of 1000 m above sea level.
For installation altitudes above 1000 m, the rated insulation level of the switchgear must be corrected accordingly. The panels are designed for use under normal operating conditions in accordance with EN 62271-1.

Installation

When installing the PRO-AIR medium-voltage switchgear, the following minimum installation room height must be observed:

Switchgear sizes	Minimum - Room height Rh	Minimum - Room height with pressure relief duct Rh
PRO-AIR H•a	2400 mm	2450 mm
PRO-AIR H•c	3000 mm	3000 mm
PRO-AIR H•e	3000 mm	3000 mm

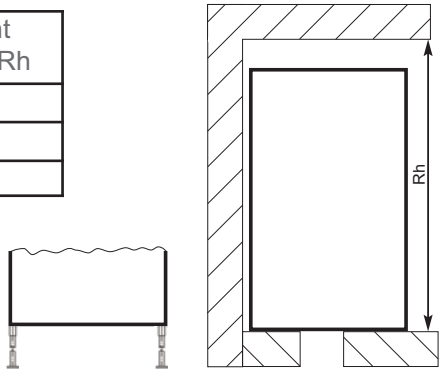


Fig. 2: PRO-AIR installation side view left side on access floor, right side on concrete floor

Switching devices

The following switching devices are used in the different versions of PRO-AIR H:

- Switch-disconnector H22 EK / EA
- Switch-disconnector H29 EA
- Disconnector ITr 36-630-20, ITr 36-1600-20
- Switch-fuse combination H22 SEA
- Switch-fuse combination H29 SEA
- Earthing switch ES 36-20, ES 36-31,5
- Vacuum circuit breaker V36-630-20 KUF, V36-1250-20 KUF, V36-2500-31,5 KUF

Equipment and setup

The panel structure is made of a screwed, hot-dip galvanised composite structure. On the front of the panels, there is a single-leaf steel sheet door. The door hinge can be on the right or left as desired. A inspection window made from laminated safety glass is installed in this door.

The plate in front of the busbar compartment is optionally designed as the door for the secondary cabinet behind it. It has the following dimensions WxDxH: 900/1200mm x 230/470mm x 690/900 mm (raised 900mm) and can be fitted with one or several protective relays according to customer specifications.
The corrosion protection of the doors and plates and the side walls of the switchgear is guaranteed with textured paint (colour RAL - according to customer specifications).

The side partitioning of the busbar compartment from the neighbouring panel is achieved using glass fibre reinforced plastic sheets with feedthroughs. Each panel has a screwed-on rear wall made from galvanized sheet metal.

The pressure relief takes place to the bottom and top. Cables to be connected are fed into the panels from below and placed on adjustable crossbars.
All panels have a central lock with double bit key. Locking options with profile cylinders or padlocks are also available on request.

The installed switching devices can be actuated manually or via motor drive when the panel door is closed. The optional interlocking between the switching devices helps to prevent operating errors.

Earthing switches or fixed ball points are available for earthing and short-circuiting. Where necessary, suitable surge voltage protectors can be installed in the panel.

An insulating protective barrier (in accordance with DIN VDE 0682, Part 552) can be pushed in when the panel door is closed. This insulating protective barrier is designed to prevent a prohibited approach or accidental contact with live components. It should be pushed in if work is to be carried out in the panel and the system can not be completely de-energised.

Mounting on existing switchgear is possible and the previous switchgear model W36 can also be upgraded.

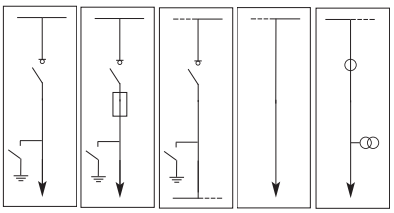
PRO-AIR H - Additional equipment

- *Panel lighting*
- *Busbar earthing with fixed ball points*
- *Capacitive voltage detection system*
- *Surge voltage protector (SVP)*
- *Short-circuit indicator*
- *Base plates*
- *Additional locking options with profil cylinders and lockable operating mechanism*
- *Mechanical and electrical Interlockings*
- *Remote control system*

PRO-AIR H•a

The H•a version is available as a cable panel, transformer feeder panel, bus sectionalizer panel, riser panel and measuring panel up to I_k 20 kA. The PRO-AIR H•a•K weighs approximately 450 kg in the standard version.

PRO-AIR H•a		
• *Rated voltage*	U_r	*36 kV*
• *Rated frequency*	f_r	*50 Hz*
• *Rated operating current, max.*	I_r	*630 A*
• *Rated short-time current, max.*	I_k	*20 kA*
• *Rated short-circuit time*	t_k	*3 s*
• *Rated peak withstand current*	I_p	*50 kA*
• *Rated lightning impulse withstand voltage*	U_p	*170 kV*
• *Rated power-frequency withstand voltage*	U_d	*70 kV*



PRO-AIR H•a - Types cable-, transformer feeder-, bus sectionalizer-, riser-, measuring panel.

Switchgear design

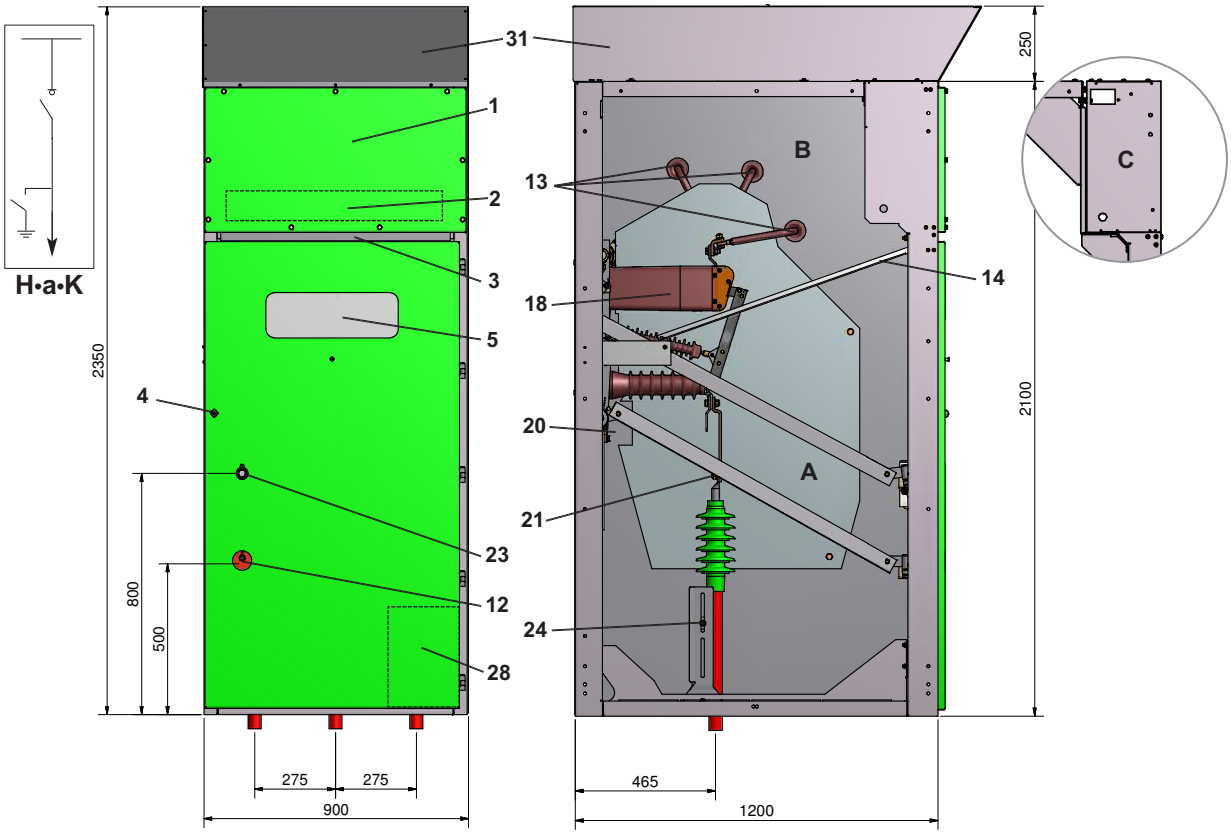


Fig. 3: PRO-AIR H•a•K, Type cable panel, right side secondary cabinet

1 Door or plate secondary cabinet
2 Area for voltage detection system[2], Short-circuit indicator[2]
3 Opening for insulating protective barrier
4 Door central lock
5 Inspection window
12 Operation and Position indication ES[1]
13 Busbar
14 Insulating protective barrier
18 Switch-disconnector H29
20 Earthing switch
21 Cable connection
23 Operation and Position indication SD[1]
24 Crossbar, adjustable
28 Wiring cabinet[2]
31 Arc rejection device
A Cable connection- and switchgear area
B Busbar area
C Secondary cabinet[1]

[1] *SD=Switch-disconnector H29, ES=Earthing switch,* [2] *as option*

Switchgear design

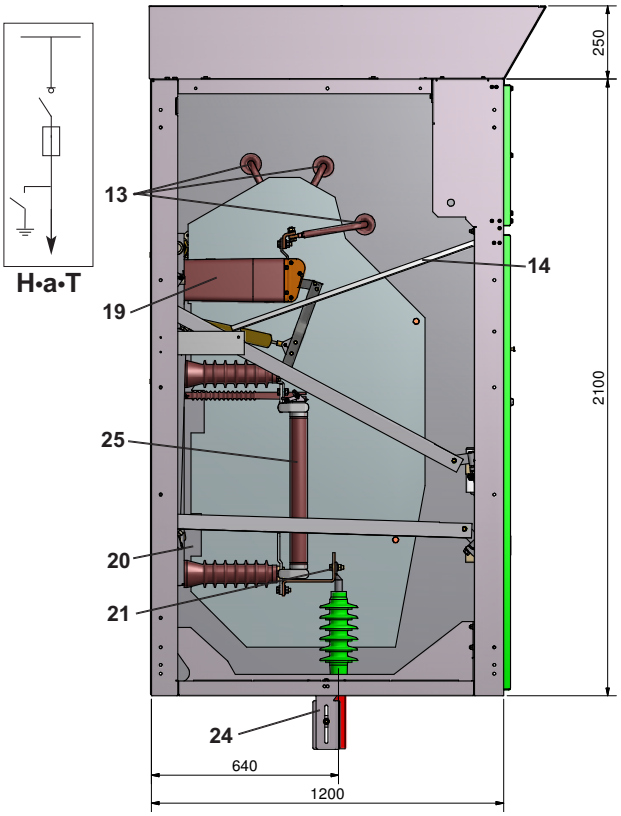


Fig. 4: PRO-AIR H•a•T, Type transformer feeder panel

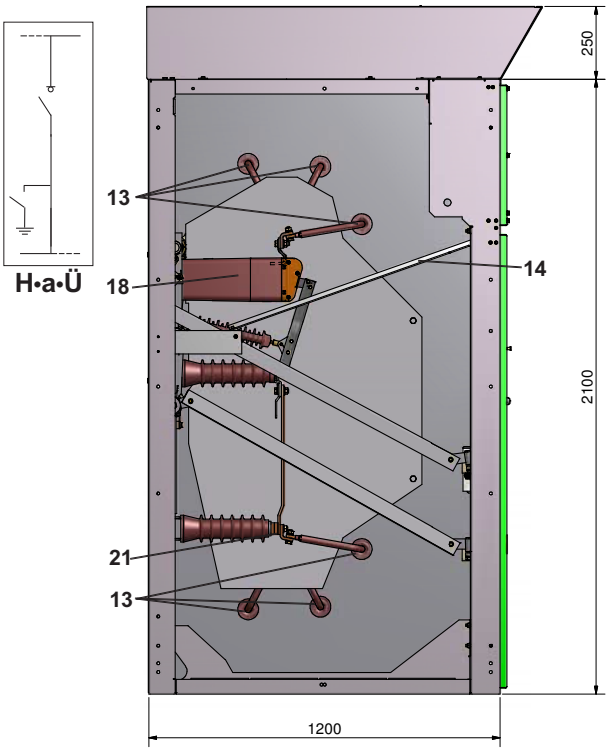


Fig. 5: PRO-AIR H•a•Ü, Type bus sectionalizer panel

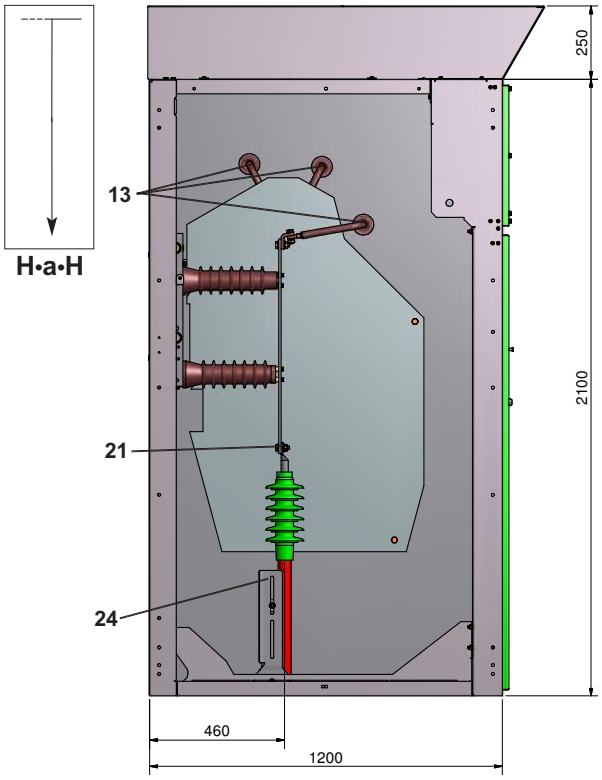


Fig. 6: PRO-AIR H•a•H, Type riser panel

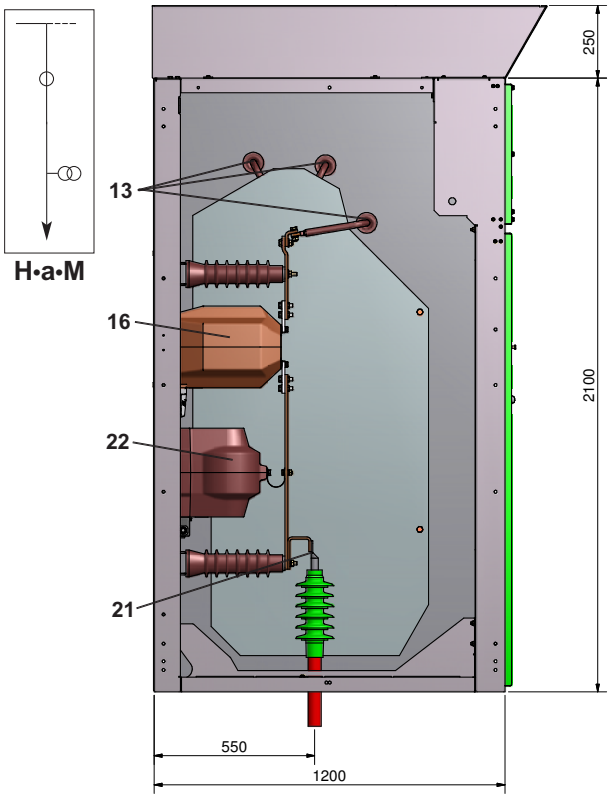


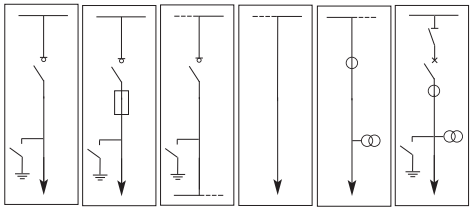
Fig. 7: PRO-AIR H•a•M, Type measuring panel

13 Busbar **14** Insulating protective barrier **16** Current transformer **18** Switch-disconnector H29 **19** Switch-fuse combination H29
20 Earthing switch **21** Cable connection **22** Voltage transformer **24** Crossbar, adjustable **25** H.v.h.b.c fuses

PRO-AIR H•c

The H•c version is available as a cable panel, transformer feeder panel, bus sectionalizer panel, riser panel, measuring panel and circuit breaker panel (semi-fixed type) up to I_k 20 kA. The PRO-AIR H•c•K weighs approximately 560 kg in the standard version.

PRO-AIR H•c		
• *Rated voltage*	U_r	*36 kV*
• *Rated frequency*	f_r	*50 Hz*
• *Rated operating current, max.*	I_r	*630 A*
• *Rated short-time current, max.*	I_k	*20 kA*
• *Rated short-circuit time*	t_k	*3 s*
• *Rated peak withstand current*	I_p	*50 kA*
• *Rated lightning impulse withstand voltage*	U_p	*170 kV*
• *Rated power-frequency withstand voltage*	U_d	*70 kV*



PRO-AIR H•c - Types cable-, transformer feeder-, bus sectionalizer-, riser-, measuring- and circuit breaker panel (semi-fixed type)

Switchgear design

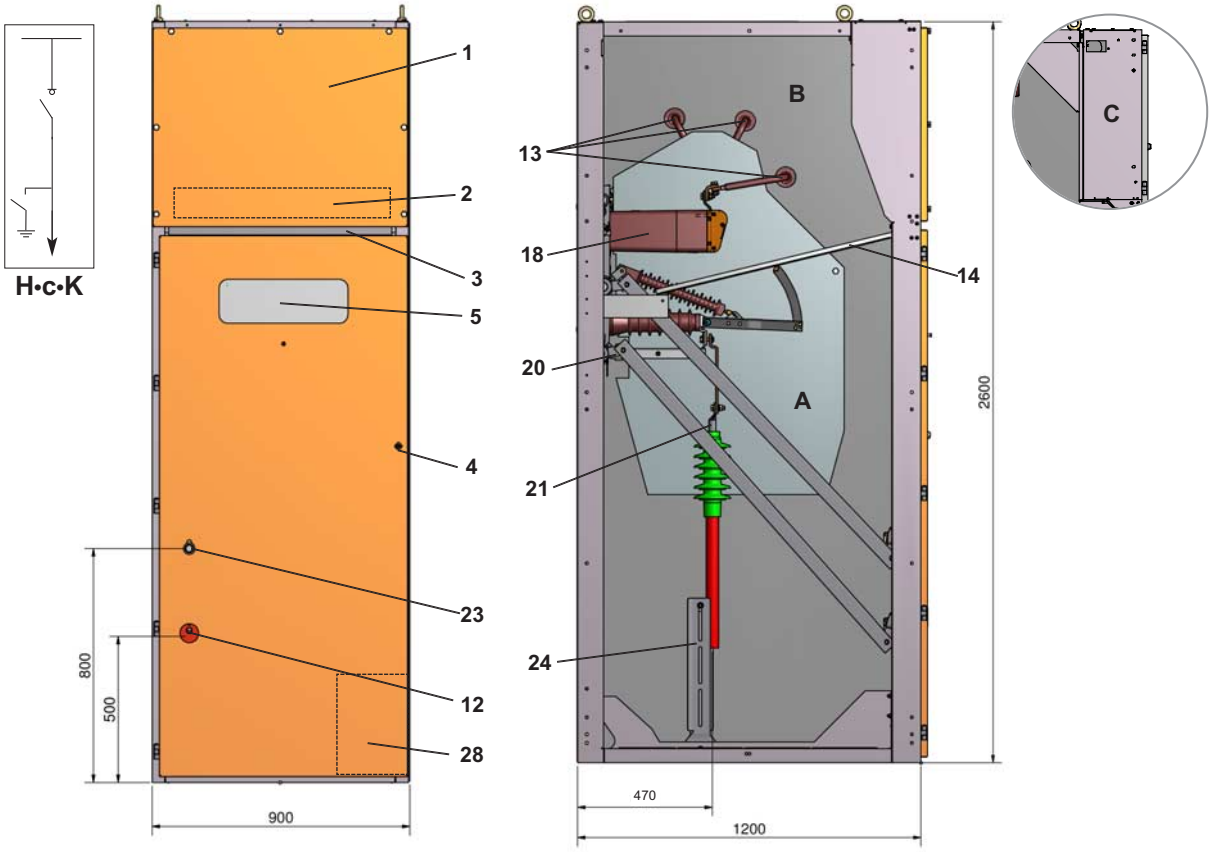


Fig. 8: PRO-AIR H•c•K, Type cable panel, right side secondary cabinet

1 Door or plate secondary cabinet
2 Area for voltage detection system[2], Short-circuit indicator[2]
3 Opening for insulating protective barrier
4 Door lock
5 Inspection window
12 Operation and Position indication ES[1]
13 Busbar
14 Insulating protective barrier
18 Switch-disconnector H29
20 Earthing switch
21 Cable connection
23 Operation and Position indication SD[1]
24 Crossbar, adjustable
28 Wiring cabinet[2]

A Cable connection- and switchgear area
B Busbar area
C Secondary cabinet[1]

[1] *SD=Switch-disconnector H29, ES=Earthing switch,* [2] *as option*

Switchgear design

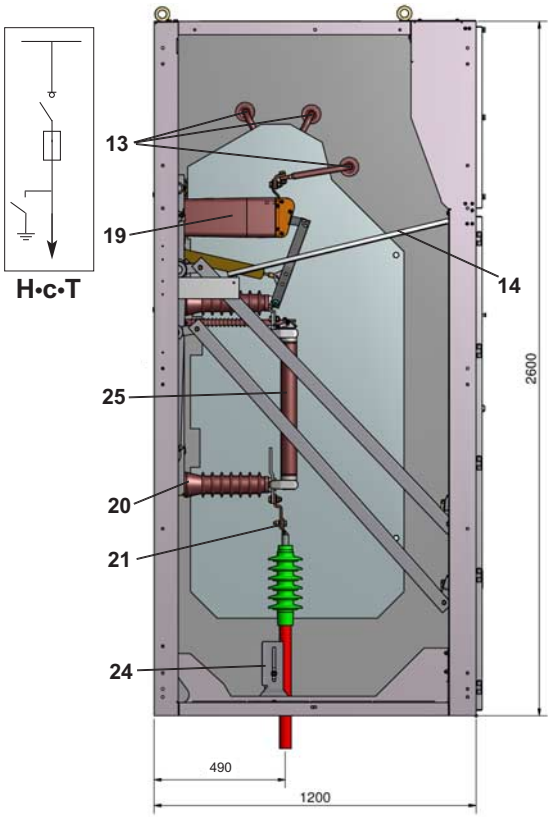


Fig. 9: PRO-AIR H•c•T, Type transformer feeder panel

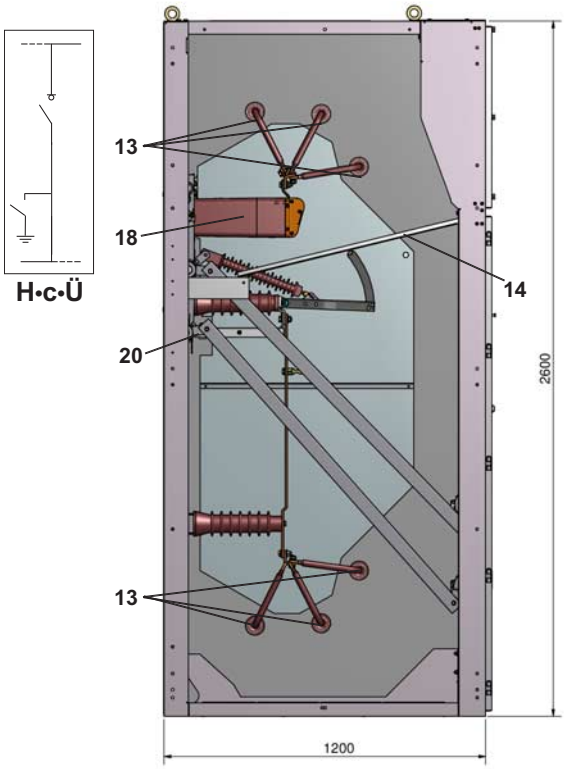


Fig. 10: PRO-AIR H•c•Ü, Type bus sectionalizer panel

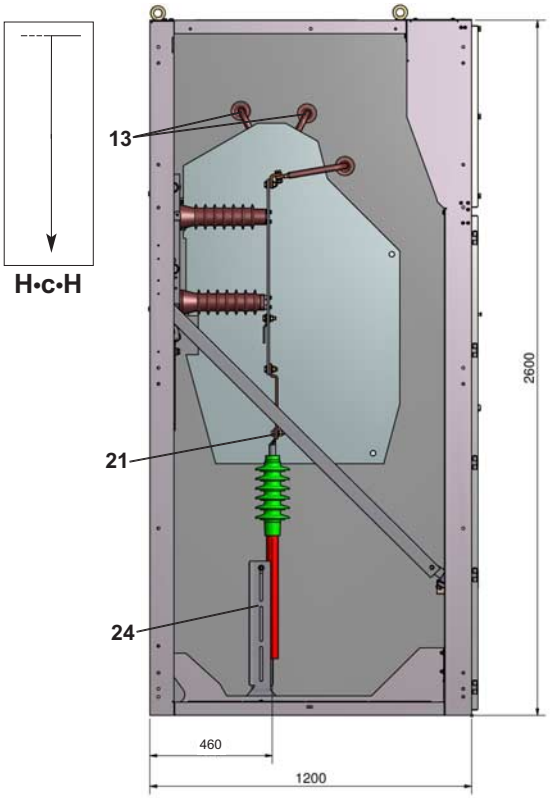


Fig. 11: PRO-AIR H•c•H, Type riser panel

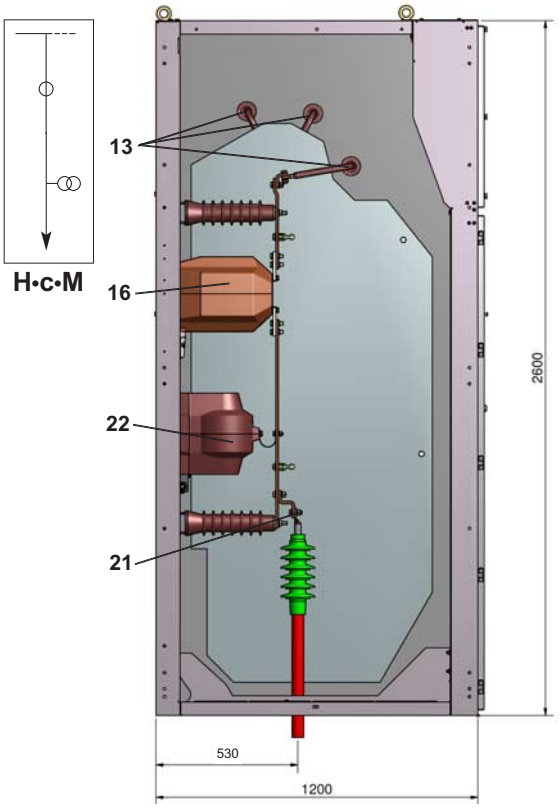


Fig. 12: PRO-AIR H•c•M, Type measuring panel

13 Busbar **14** Insulating protective barrier **16** Current transformer **18** Switch-disconnector H29 **19** Switch-fuse combination H29
20 Earthing switch **21** Cable connection **22** Voltage transformer **24** Crossbar, adjustable **25** H.v.h.b.c fuses

Switchgear design

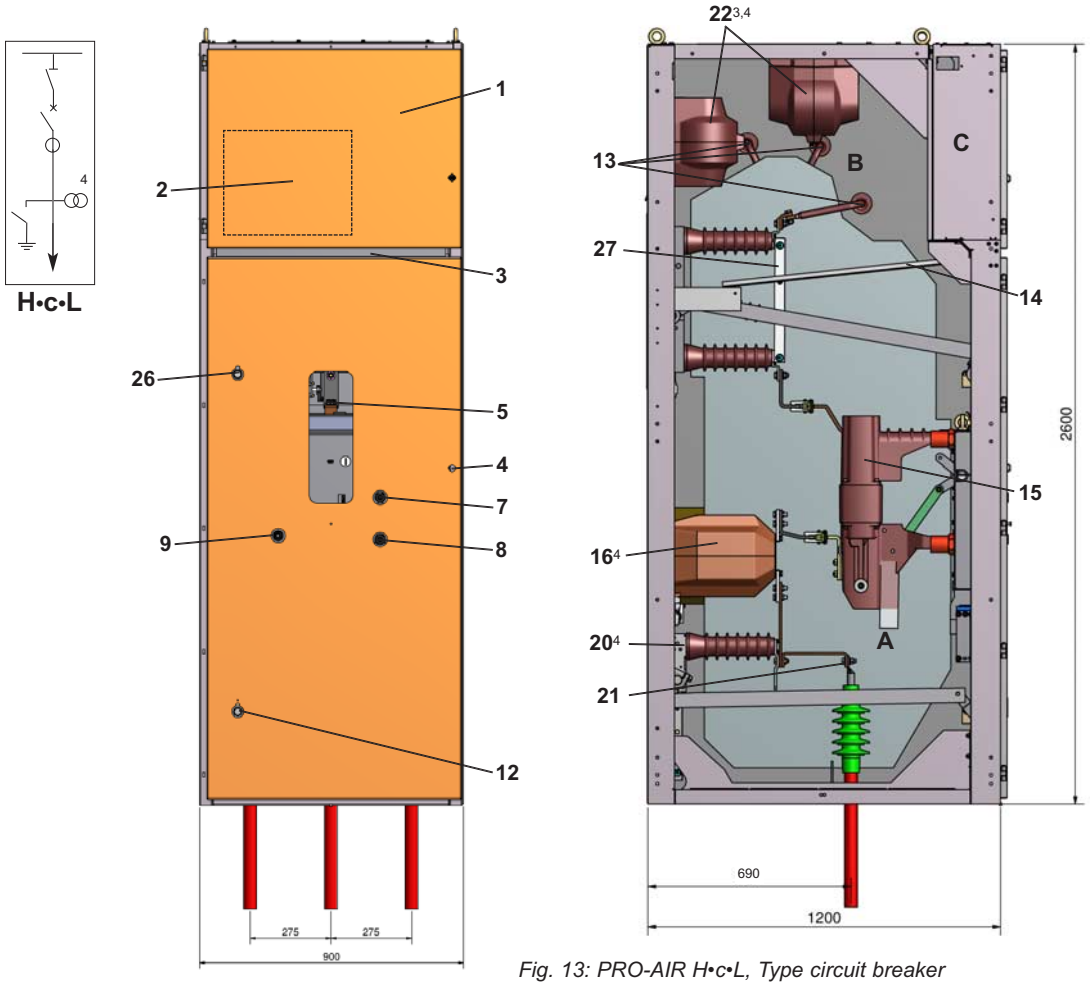


Fig. 13: PRO-AIR H•c•L, Type circuit breaker panel (semi-fixed type)

1 Door secondary cabinet
2 Area for Protective relay[2], Operation-elements[2], Voltage detection system[2]
3 Opening for insulating protective barrier
4 Door central lock
5 Inspection window for indication VCB[1]
7 Manual operation VCB[1] ON
8 Manual operation VCB[1] OFF
9 Hand-wound mechanism VCB[1]
12 Operation and Position indication ES[1]
13 Busbar
14 Insulating protective barrier
15 Vacuum circuit breaker
16 Current transformer[4]
20 Earthing switch[4]
21 Cable connection
22 Voltage transformer[3,4]
24 Crossbar, adjustable
26 Operation and Position indication DI[1]
27 Disconnector
30 Service truck[2], *see fig. 20*

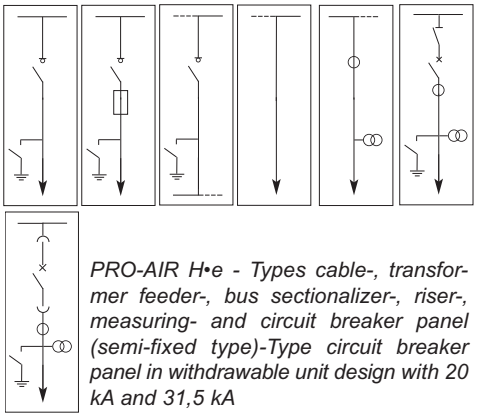
A Cable connection- and switch-gear area
B Busbar area
C Secondary cabinet

[1] *VCB=Vacuum circuit breaker, DI=Disconnector, ES=Earthing switch,*
[2] *as option*
[3] *voltage transformers in the busbar are only possible in the left end panel*
[4] *possible combinations:*
current transformer - earthing switch
current transformer - voltage transformer
voltage transformer - earthing switch

PRO-AIR H•e

The H•e version is available as a cable panel, transformer feeder panel, bus sectionalizer panel, riser panel, measuring panel and circuit breaker panel (semi-fixed type and in withdrawable unit design) up to I_k 20 kA resp. 31,5 kA. The PRO-AIR H•e•K weighs approximately 650 kg in the standard version.

PRO-AIR H•e		
• *Rated voltage*	U_r	*36 kV*
• *Rated frequency*	f_r	*50 Hz*
• *Rated operating current, max.*	I_r	*2000 A*
• *Rated short-time current, max.*	I_k	*31,5 kA*
• *Rated short-circuit time*	t_k	*3 s*
• *Rated peak withstand current, max.*	I_p	*80 kA*
• *Rated lightning impulse withstand voltage*	U_p	*170 kV*
• *Rated power-frequency withstand voltage*	U_d	*70 kV*



PRO-AIR H•e - Types cable-, transformer feeder-, bus sectionalizer-, riser-, measuring- and circuit breaker panel (semi-fixed type)-Type circuit breaker panel in withdrawable unit design with 20 kA and 31,5 kA

Switchgear design

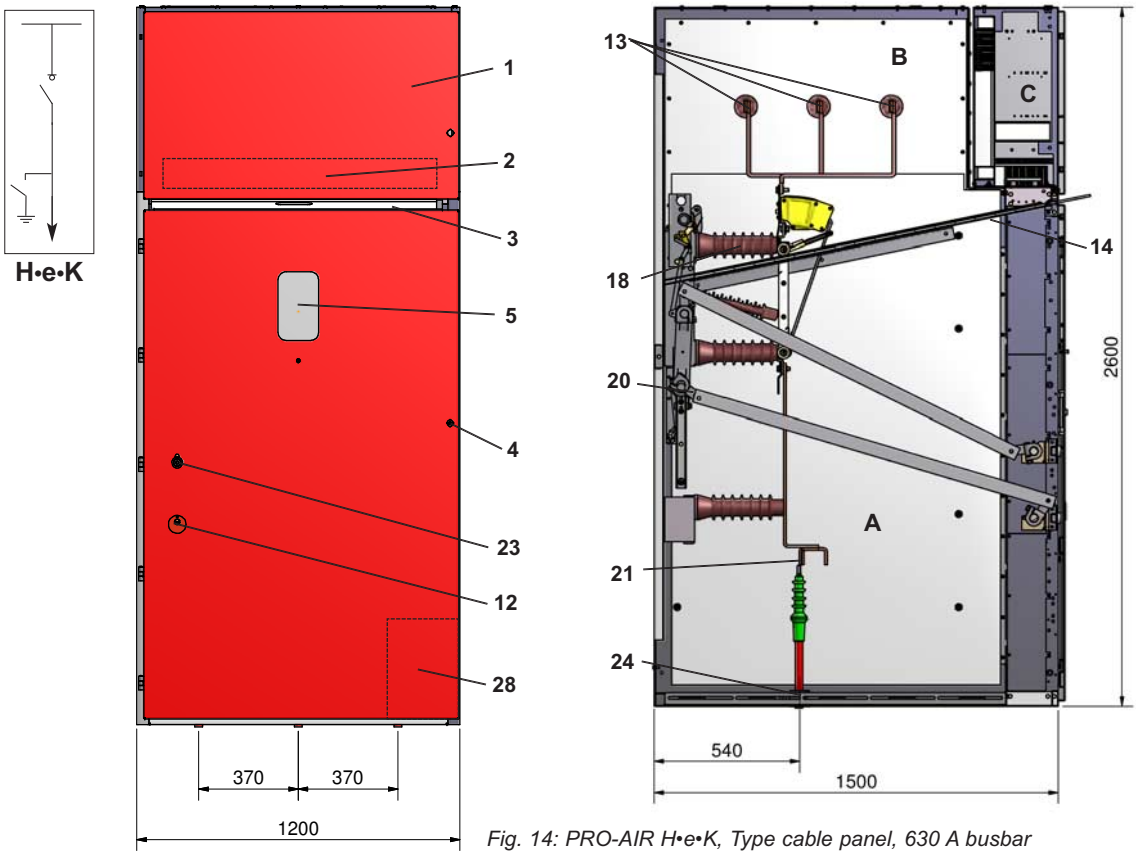


Fig. 14: PRO-AIR H•e•K, Type cable panel, 630 A busbar

1 Door or plate secondary cabinet
2 Area for voltage detection system[2], Short-circuit indicator
3 Opening for insulating protective barrier
4 Door central lock
5 Inspection window
12 Operation and Position indication ES[1]
13 Busbar
14 Insulating protective barrier
18 Switch-disconnector H22
20 Earthing switch
21 Cable connection
23 Operation and Position indication SD[1]
24 Crossbar, adjustable
28 Wiring cabinet[2]

A Cable connection- and switchgear area
B Busbar area
C Secondary cabinet[1]

[1] *SD=Switch-disconnector H22, ES=Earthing switch,* [2] *as option*

Switchgear design

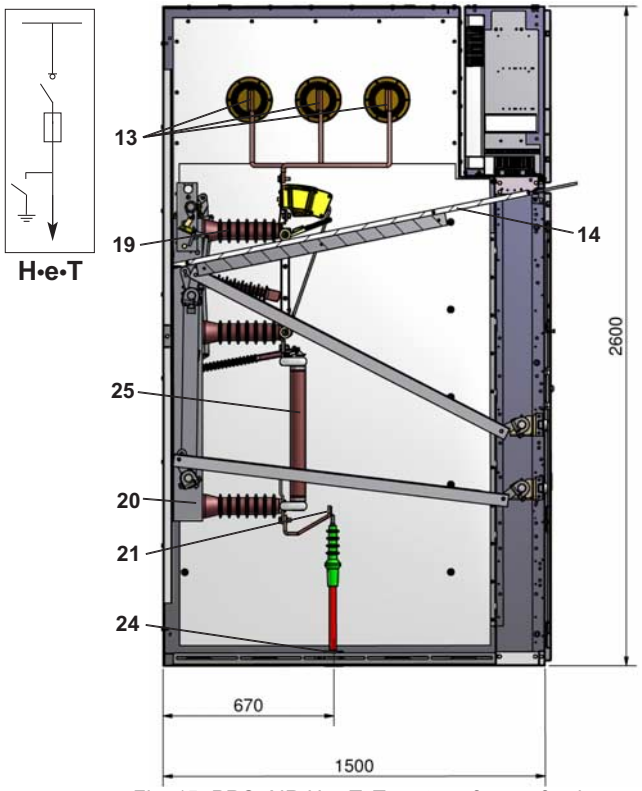


Fig. 15: PRO-AIR H•e•T, Type transformer feeder panel, 1250 A busbar

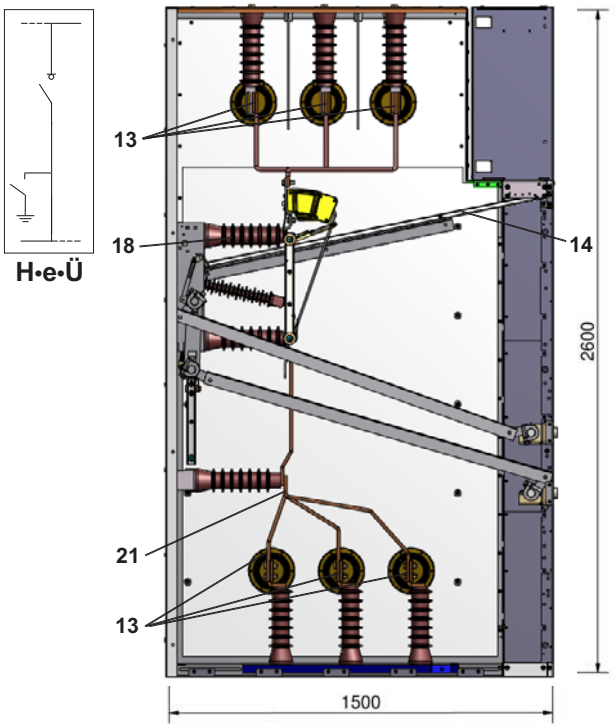


Fig. 16: PRO-AIR H•e•Ü, Type bus sectionalizer panel, 630 A busbar

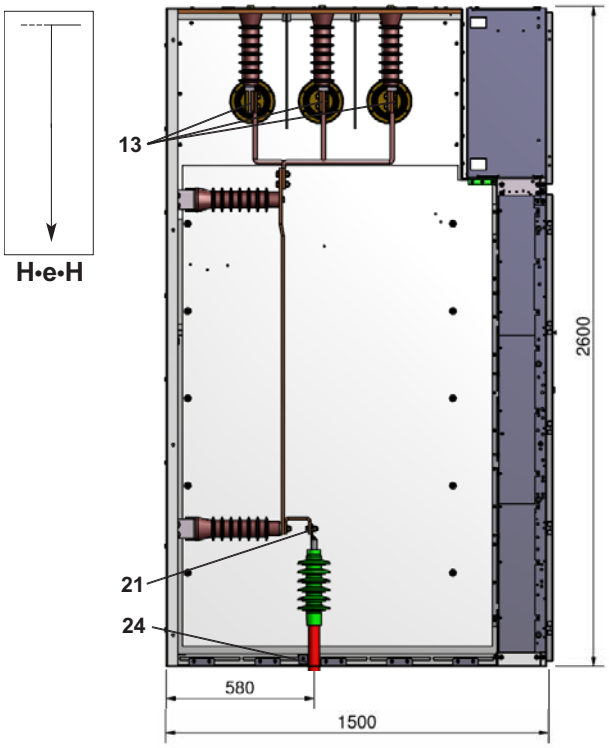


Fig. 17: PRO-AIR H•e•H, Type riser panel, 630 A busbar

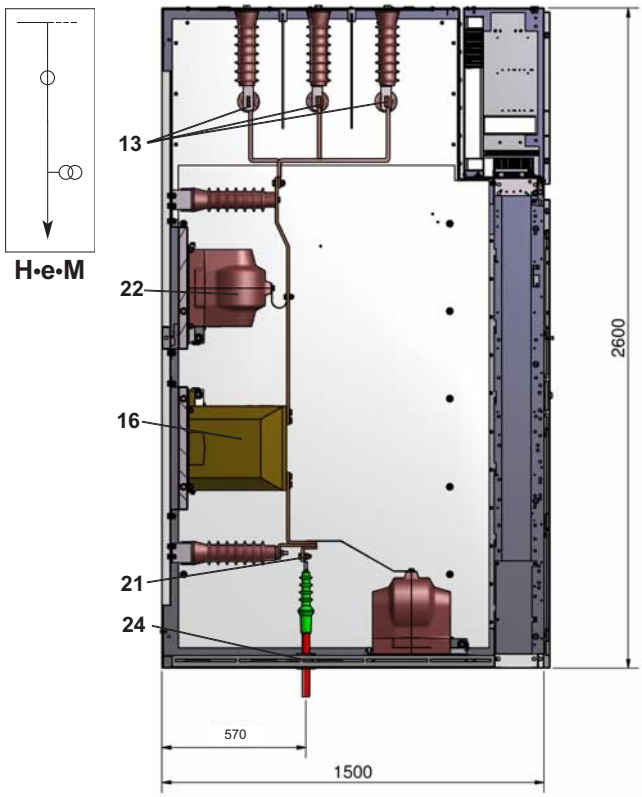


Fig. 18: PRO-AIR H•e•M, Type measuring panel, 630 A busbar

13 Busbar **14** Insulating protective barrier **16** Current transformer **18** Switch-disconnector H22 **19** Switch-fuse combination H22
20 Earthing switch **21** Cable connection **22** Voltage transformer **24** Crossbar, adjustable **25** H.v.h.b.c fuses

Switchgear design

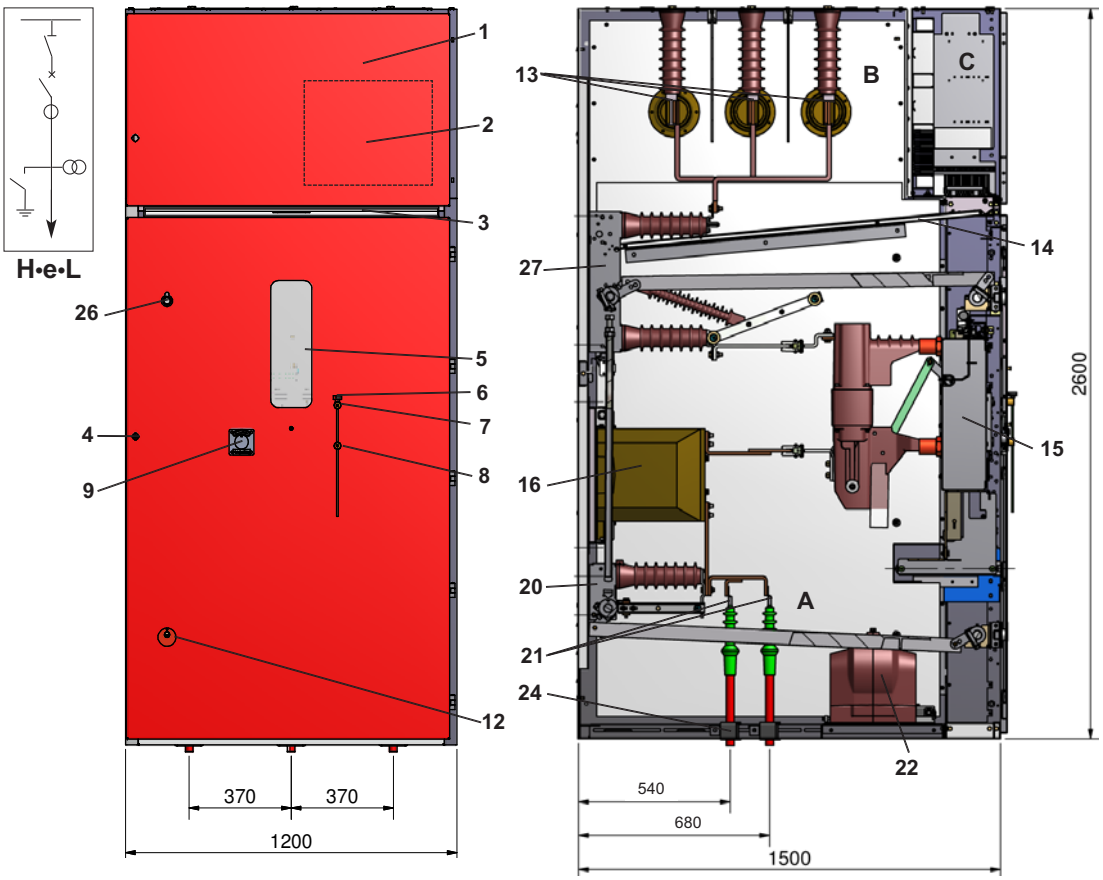


Fig. 19: PRO-AIR H•e•L, Type circuit breaker panel 20 kA (semi-fixed type), 1250 A busbar

1 Door secondary cabinet
2 Area for Protective relay[2], Operation-elements[2], Voltage detection system[2]
3 Opening for insulating protective barrier
4 Door central lock
5 Inspection window for indication VCB[1]
6 Manual operation stick VCB[1]
7 Manual operation VCB[1] ON
8 Manual operation VCB[1] OFF
9 Hand-wound mechanism VCB[1]
12 Operation and Position indication ES[1]
13 Busbar
14 Insulating protective barrier
15 Vacuum circuit breaker
16 Current transformer
20 Earthing switch
21 Cable connection
22 Voltage transformer
24 Crossbar, adjustable
26 Operation and Position indication DI[1]
27 Disconnector
30 Service truck[2]

A Cable connection- and switch-gear area
B Busbar area
C Secondary cabinet

[1] *VCB=Vacuum circuit breaker, ES=Earthing switch, DI=Disconnector* [2] *as option*

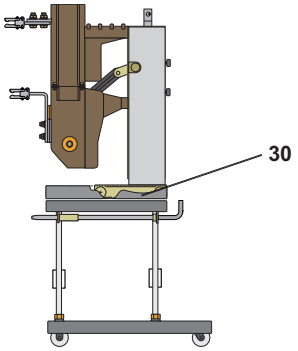


Fig. 20: Service truck

PRO-AIR H•e•EL, 20 kA

The type H•e•EL (circuit breaker panel in withdrawable unit design) is available with rated short-time current I_k 20 kA. The Type PRO-AIR H•e•EL (20 kA) weighs approximately 850 kg in the standard version.

Switchgear design

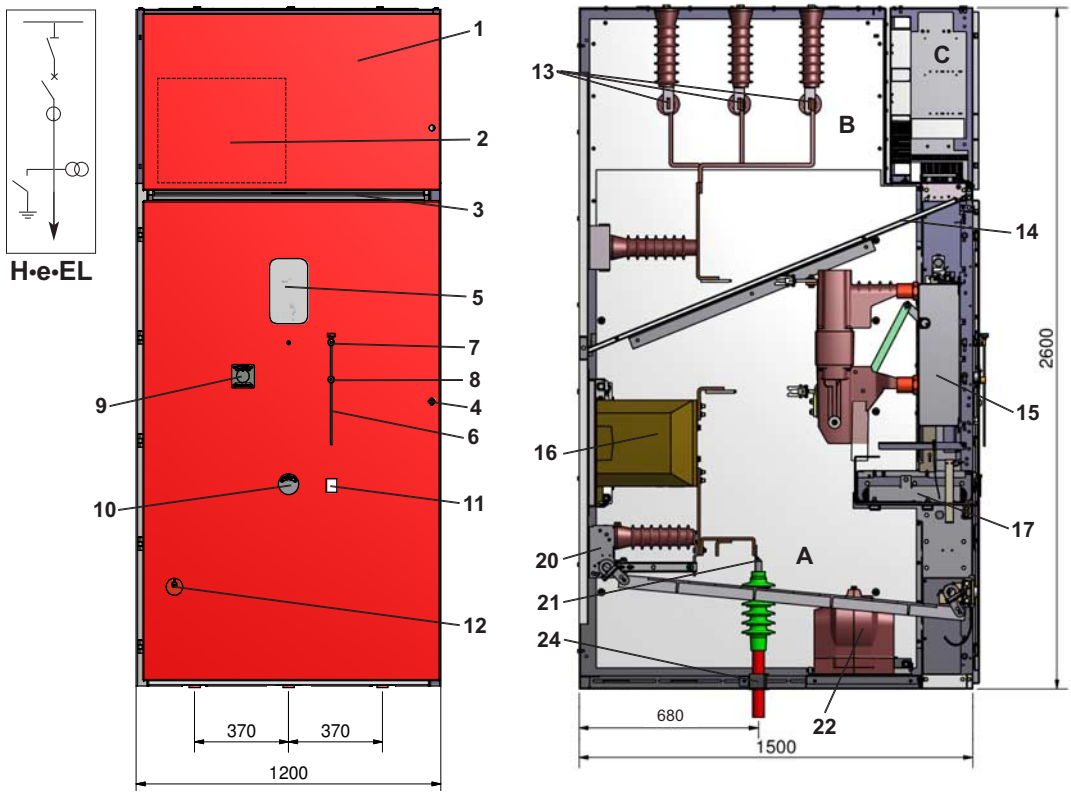


Fig. 21: PRO-AIR H•e•EL, Type Circuit breaker in withdrawable unit design 20 kA, 630 A busbar

1 Door secondary cabinet
2 Area for Protective relay[2], Operation-elements[2], Voltage detection system[2]
3 Opening for insulating protective barrier
4 Door central lock
5 Inspection window for indication VCB[1]
6 Manual operation stick VCB[1]
7 Manual operation VCB[1] ON
8 Manual operation VCB[1] OFF
9 Hand-wound mechanism VCB[1]
10 Operation for WC[1]
11 Position indication for WC[1]
12 Operation and Position indication ES[1]
13 Busbar
14 Insulating protective barrier
15 Vacuum circuit breaker
16 Current transformer
17 Withdrawable cassette for VCB[1]
20 Earthing switch
21 Cable connection
22 Voltage transformer
24 Crossbar, adjustable
30 Service truck, service fork lift[2]

A Cable connection- and switch-gear area
B Busbar area
C Secondary cabinet

[1] *VCB=Vacuum circuit breaker, ES=Earthing switch, WC=Withdrawable cassette* [2] *as option*

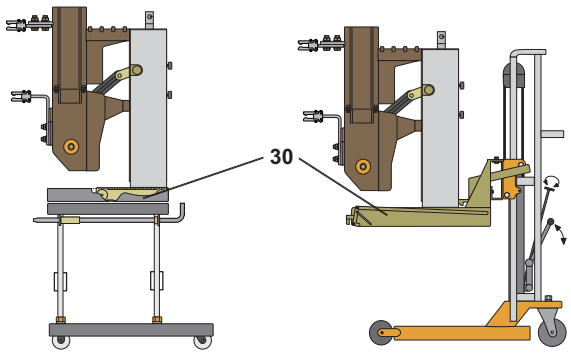


Fig. 22: Left side :Service truck, right side: Service fork lift

PRO-AIR H•e•EL, 31,5 kA

The type H•e•EL (circuit breaker panel in withdrawable unit design) is available with rated short-time current I_k 31,5 kA. The Type PRO-AIR H•e•EL (31,5 kA) weighs approximately 1100 kg in the standard version.

Switchgear design

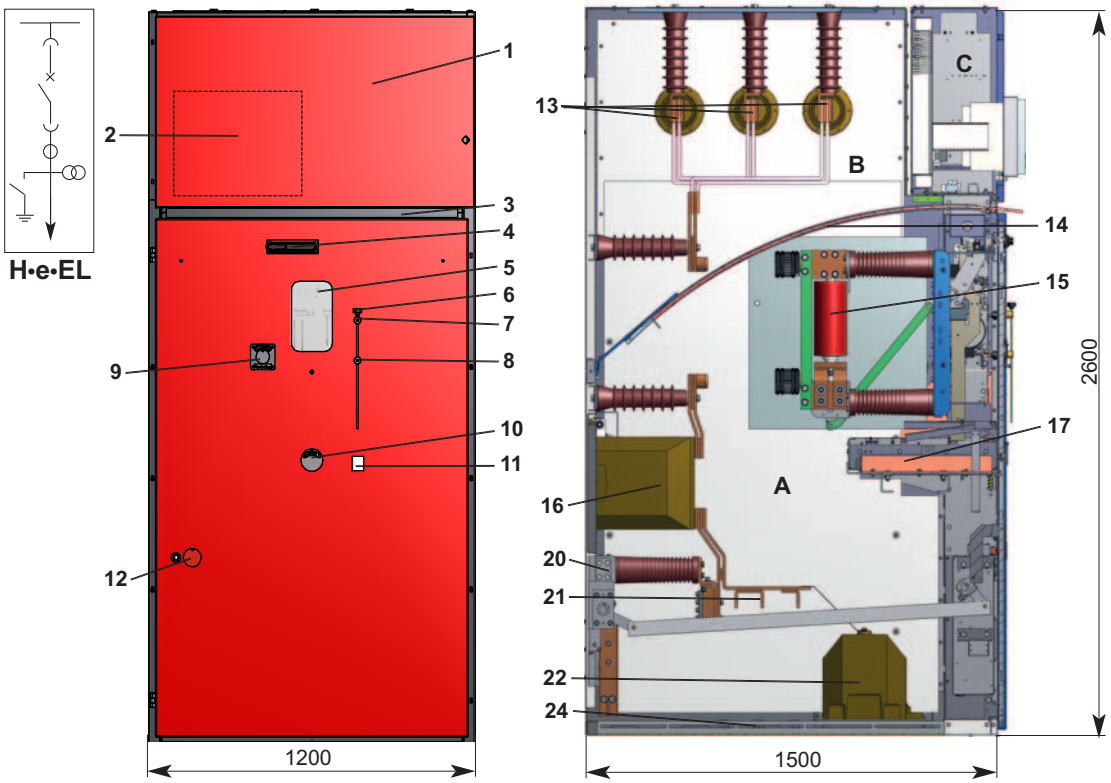


Fig. 23: PRO-AIR H•e•EL, Type circuit breaker in withdrawable unit design 31,5 kA, 2000 A busbar

1 Door secondary cabinet
2 Area for Protective relay[2], Operation-elements[2], Voltage detection system[2]
3 Opening for insulating protective barrier
4 Door central lock
5 Inspection window for indication VCB[1]
6 Manual operation stick VCB[1]
7 Manual operation VCB[1] ON
8 Manual operation VCB[1] OFF
9 Hand-wound mechanism VCB[1]
10 Operation for WC[1]
11 Position indication for WC[1]
12 Operation and Position indication ES[1]
13 Busbar
14 Insulating protective barrier
15 Vacuum circuit breaker
16 Current transformer
17 Withdrawable cassette for VCB[1]
20 Earthing switch
21 Cable connection
22 Voltage transformer
24 Crossbar, adjustable
30 Service truck[2]

A Cable connection- and switch-gear area
B Busbar area
C Secondary cabinet

[1] *VCB=Vacuum circuit breaker, ES=Earthing switch, WC=Withdrawable cassette* [2] *as option*

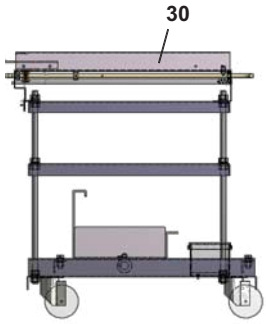


Fig. 24: Service truck

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