



FLP HIGH VOLTAGE SWITCHGEAR

11KV

- Quick Release Enclosure Doors
- Modular Rackable Switchgear
- Compact HV switch with power bus technology
- Disconnection and earthing device
- PHDO cubicles can be coupled for distribution
- Operating parameters set via “IS” display modules

SWITCHGEAR OVERVIEW

The PHDI and PHDO High Voltage switch cubicles are designed in accordance to “d” flameproof protection and are used for HV electrical reticulation and protection in underground coal mines.

The Becker Mining PHDI and PDHO 6.6/11kV flameproof switchgear uses our market leading Endis technology that has been designed specifically for the global coal mining industry. Although a new concept for the Australian market the no bolt door and modular electrical design has been manufactured since 1994.

The HV cubicles PHDI (incoming) and PHDO (outgoing) are designed to stand individually or to be coupled in a switchboard configuration also enabling distribution ring mains.

PHDO (11KV) CUBICLE

The switchgear type PHDO is used exclusively cable protection purposes. It can be used individually or coupled on the left or right for distribution switchboards and with high-voltage switchgear type PHDI.



The PHDI can be fitted with:

- A vacuum circuit-breaker module type HVCB-SE.
- Adapter and “half coupler” or cable entry fittings for cable connection.
- A lighting module IMTU-HT for auxiliary power circuits
- A field bus adapter type FB058.3 for connection to BETACONTROL.
- A field bus adapter type PE4200AT for connection to the PROMOS AST.
- A door interlock contact.

The PHDO has a lamp provided for the incoming phases, the lamp is supplied with power via capacitive coupling in the bushings.

PHDI & PHDO HV CUBICLES

The flameproof HV modular switchgear units are for supply and distribution purposes, the units are free standing and consist of three separate compartments:

- One (1) “d” Device and output compartment.
- One (1) “d” incoming and busbar compartment.
- One (1) “IS” – IP 56 compartment for display and monitoring.

The device compartment with quick-opening door is provided with an HV plug-in circuit-breaker module providing electrical protection for outgoing circuits, the quick opening door is mechanically interlocked and can only be accessed when the out-going circuit is isolated. In the “off” position the circuit breaker is completely disconnected from the bus. The outgoing circuit is connected to earth potential in a disconnected condition via a mechanism (earthed). An inspection window allows observation of the earth contacts.

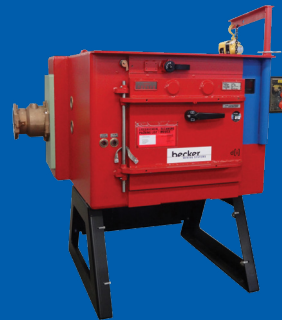
The Incoming and Busbar compartment is where HV connections can be made directly to the terminals in the compartment via bushings or via HV receptacles and allows up to two supply cables to be connected and busbars to be mounted.

PHDI & HV CUBICLE

The switchgear type PHDI is used exclusively for supply or coupling purposes. It can be used coupled on the left or right for distribution switchboards and with high-voltage switchgear type PHDO.

The PHDI can be fitted with:

- A vacuum circuit-breaker module type HVCB-SE.
- Adapter and “half coupler” or cable entry fittings for cable connection.
- A field bus adapter type FB058.3 for connection to BETACONTROL.
- A field bus adapter type PE4200AT for connection to the PROMOS AST.
- A door interlock contact.



COMMUNICATION DETECTION SAFETY

SWITCHGEAR OVERVIEW

VOLTAGE INDICATING LAMPS

The PHDI has two indicating lamps provided for each of the incoming phases, the lamps are supplied with power via capacitive coupling in the bushings.

AUTOMATION

The HVCB switch modules can either be controlled in a parallel manner using contacts or in a serial manner using various interfaces.

HVCB CIRCUIT BREAKER 11KV

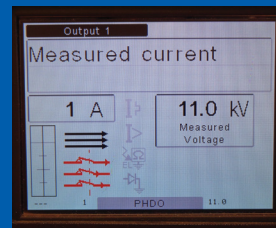
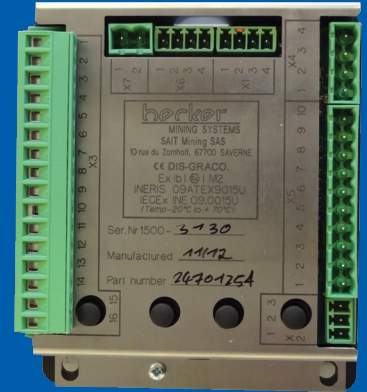
The compact 11kV plug in circuit breaker module with integrated electronic unit combines all monitoring and protective functions for outgoing circuits (short-circuit, overload, phase monitoring (unbalance & failure), earth-fault protection, temperature and pilot monitoring). The supply of the electronic unit is made via an auxiliary transformer situated in the device compartment of the PHDI and PHDO cubicles.



FUSEFREE TECHNOLOGY

The use of vacuum switching tubes with a nominal breaking capacity of 31 kAeff at 11 kV makes power fuses redundant. Fuse failures due to age and the resulting downtimes no longer occur, and time and cost intensive changes are no longer required.

Fuses inherently degrade overtime and potential disrupt operations unnecessarily when they fail and increase preventative maintenance requirements.



PARAMETER SETTING AND MONITORING DISPLAY

Protection parameters are set via the display module s installed in intrinsically safe compartments on the 11kV flameproof cubicles. The stored parameters are communicated via serial bus to the circuit breaker modules and no additional parameter setup is required if the circuit breakers are changed.



DISCONNECTING DEVICE

The slide-in module has a disconnecting device. When disconnected, the slide-in module is removed from the power bus, the supply contacts in the power bus are insulated, and the linkage contacts are earthed.

The quick-acting door cannot be opened until the slide-in module has been disconnected.

PHDI

Electrical data	
Insulating class	12 kV
Nominal voltage, max	11 kV
Mains frequency	50/60 Hz
Current, max.	800 A
Short-circuit resistance	31.5 KA
Surge strength	80 kA
Physical and Mechanical (single device)	Dimensions (W) 1218mm x (H) 1423mm x (D) 1187mm
Weight (approx)	890 kg
Explosion protection	
Category	I (M1/M2) M1/M2
Type of protection	EEx d [ia/ib] ia/ ib m I

PHDO

Electrical data	
Insulating class	12 kV
Nominal voltage, max	11 kV
Mains frequency	50/60 Hz
Current, max.	630 A
Short-circuit resistance	31.5 KA
Surge strength	80 kA
Physical and Mechanical (single device)	Dimensions (W) 1426mm x (H) 1266mm x (D) 1135mm
Weight (approx)	1080 kg
Explosion protection	
Category	I (M1/M2) M1/M2
Type of protection	Ex d [ia/ib] ia/ib mb I

HVCB

Electrical data	
Nominal voltage	11 kV
Mains frequency	50/60 Hz
Nominal current	630 A
Norminal breaking capacity	31 kAeff
Mechanical data	
ENDIS slot	Type 10
Height approx	460 mm
Width approx	525 mm
Depth approx	545 mm
Weight approx	138 kg
Degree of protection	IP 20
Explosion protection	
Category	I (M1/M2) M1/M2
Type of protection	EEx d [ia/ib] ia/ ib m I