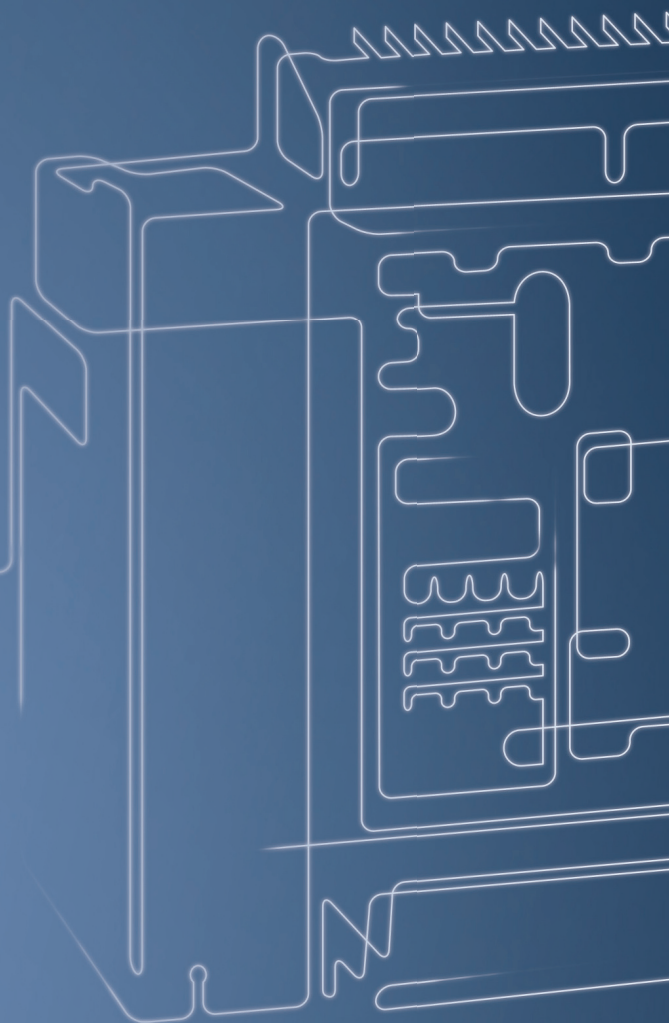
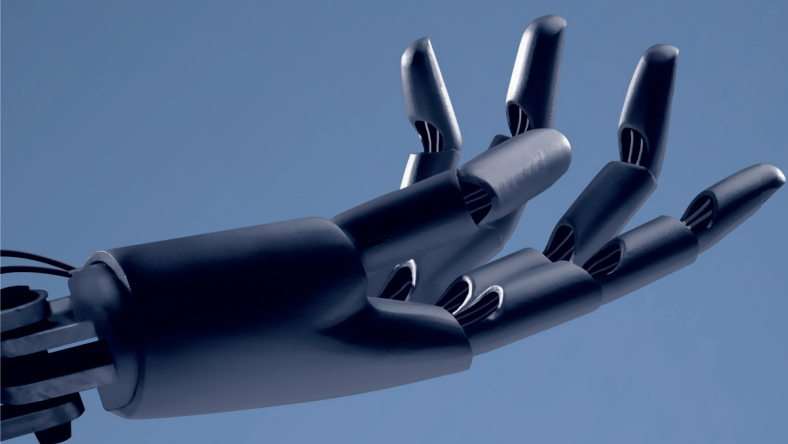


# New DMX<sup>3</sup>

Efficient protection  
up to 6 300 A



AIR CIRCUIT BREAKERS | PRODUCT GUIDE

# NEW DMX<sup>3</sup> ACBs UP TO 6 300 A

EFFICIENT PROTECTION  
AND CONTROL FOR ALL  
TYPE OF BUILDINGS





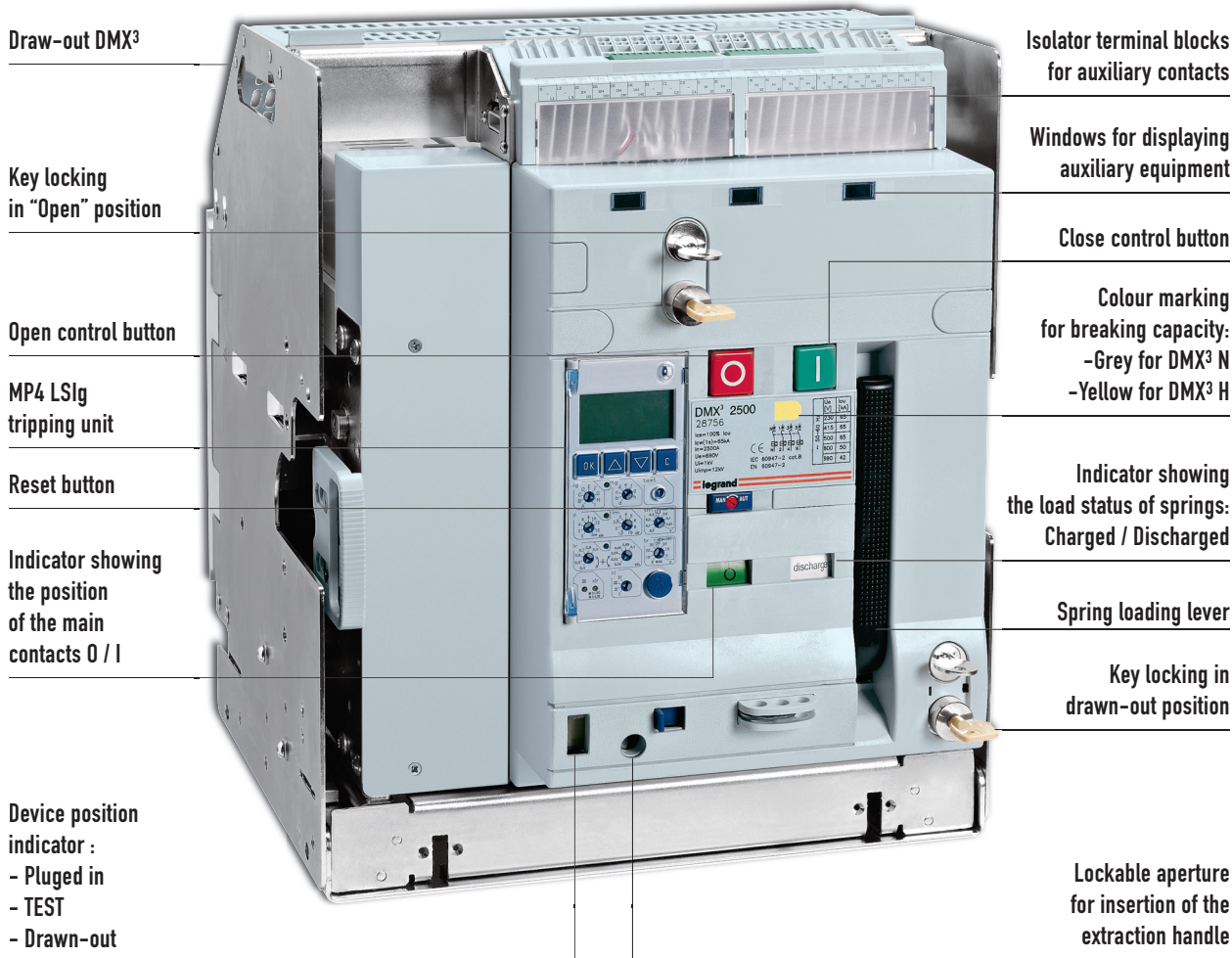
Electrical panel equipped with DPX MCCBs and modular MCBs up to 1 600 A

Electrical panel equipped with DPX MCCBs and modular MCBs up to 1 600 A

Main electrical panel equipped with DMX<sup>3</sup> ACBs and DPX MCCBs up to 4 000 A

Thanks to DPX range of MCCBs and to DX MCBs you can benefit of the advantages of a complete protection system at any level of the installation





Draw-out DMX<sup>3</sup>

Key locking  
in "Open" position

Open control button

MP4 LSIg  
tripping unit

Reset button

Indicator showing  
the position  
of the main  
contacts 0 / I

Device position  
indicator :  
- Plugged in  
- TEST  
- Drawn-out

Isolator terminal blocks  
for auxiliary contacts

Windows for displaying  
auxiliary equipment

Close control button

Colour marking  
for breaking capacity:  
- Grey for DMX<sup>3</sup> N  
- Yellow for DMX<sup>3</sup> H

Indicator showing  
the load status of springs:  
Charged / Discharged

Spring loading lever

Key locking in  
drawn-out position

Lockable aperture  
for insertion of the  
extraction handle

## Optimized performance up to 6 300 A

| DMX<sup>3</sup> air circuit breakers and DMX<sup>3</sup>-I isolating switches are available in three frame sizes. Three breaking capacities for circuit breakers: 50 kA for the DMX<sup>3</sup>-N designation 65 kA for DMX<sup>3</sup>-H and 100 kA for DMX<sup>3</sup>-L.

| The range covers 10 rated currents, between 800 A and 6 300 A.



| All range of DMX<sup>3</sup> air circuit breakers and DMX<sup>3</sup>-I isolating switches is available in fixed and draw-out version.



## BREAKING CAPACITIES AND RATED CURRENTS

	800 A	1 000 A	1 250 A	1 600 A	2 000 A	2 500 A	3 200 A	4 000 A	5 000 A	6 300 A
<b>DMX<sup>3</sup>-N</b>	50 kA   FIXED/DRAW-OUT									
<b>DMX<sup>3</sup>-H</b>	65 kA   FIXED/DRAW-OUT									
<b>DMX<sup>3</sup>-L</b>	100 kA   FIXED/DRAW-OUT								100 kA   F/D-O	

## OVERALL DIMENSIONS AND WEIGHT

Fixed version							
		Height	Depth	Width	Weight <sup>(1)</sup>		
<b>FRAME 1:</b> DMX <sup>3</sup> -N 2500 DMX <sup>3</sup> -H 2500	3P	419 mm	354 mm	273 mm	41 kg		
	4P	419 mm	354 mm	358 mm	48 kg		
<b>FRAME 2:</b> DMX <sup>3</sup> -L 2500 DMX <sup>3</sup> -N/H/L 4000	3P	419 mm	354 mm	408 mm	59 kg		
	4P	419 mm	354 mm	538 mm	76 kg		
<b>FRAME 3:</b> DMX <sup>3</sup> -L 6300	3P	419 mm	354 mm	797 mm	118 kg		
	4P	419 mm	354 mm	1064 mm	152 kg		
Draw-out version							
		Height	Depth	Width	Weight <sup>(1)</sup>		
<b>FRAME 1:</b> DMX <sup>3</sup> -N 2500 DMX <sup>3</sup> -H 2500	3P	465 mm	433 mm	327 mm	77 kg		
	4P	465 mm	433 mm	412 mm	94 kg		
<b>FRAME 2:</b> DMX <sup>3</sup> -L 2500 DMX <sup>3</sup> -N/H/L 4000	3P	465 mm	433 mm	425 mm	108 kg		
	4P	465 mm	433 mm	555 mm	137 kg		
<b>FRAME 3:</b> DMX <sup>3</sup> -L 6300	3P	465 mm	433 mm	804 mm	216kg		
	4P	465 mm	433 mm	1064 mm	274 kg		

(1) For trip-free switches, please consult us



### LEGRAND ADVANTAGE

The overall dimensions of the breaker contribute considerably to an efficient use of the space inside the electrical panel. The constant depth for all the rated currents facilitates connection of the busbars.

### OTHER ELECTRICAL FEATURES

Rated operational voltage U<sub>e</sub>: 690 Vac 50/60 Hz  
 Rated insulation voltage U<sub>i</sub>: 1 000 Vac 50/60 Hz  
 Rated impulse withstand voltage U<sub>imp</sub>: 12 kV  
 Category of use: B

Ambient temperature: - 5 °C to 70 °C  
 Humidity: + 55 °C with relative humidity of 95%,  
 conforms to IEC 68-2-30

MP4 LSlg  
electronic  
protection unit

Ig settings

Ii settings

Im settings

Ir settings

LEDs indicating  
correct operation



tg settings

tm settings

tr settings

Mini USB connector  
to PC for testing

Neutral  
protection

## Precise & user friendly LCD tripping units

Besides their easy mounting and connection, strength and good continuity of operation, 3 types of electronic units allow precise adjustment of different limits for current values and time delay. The result is an efficient protection against electrical faults while maintaining total discrimination with downstream breakers.

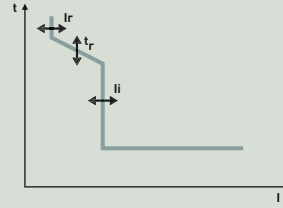
The LCD display lets you monitor the measured current values and informs you on fault adjustment and log (the cause of last trip and maintenance operations).

## MP4 LI ELECTRONIC PROTECTION UNIT CAT. N° 288 00



The following settings are adjusted using rotary selector switches:

- Long time delay protection against overloads: **I<sub>r</sub>**
- Long delay protection operation time: **t<sub>r</sub>**
- Instantaneous protection against very high short circuits: **I<sub>i</sub>**
- Neutral protection: **IN**

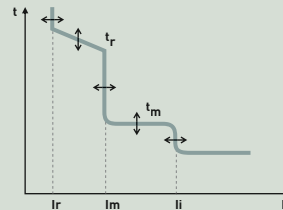


## MP4 LSI ELECTRONIC PROTECTION UNIT CAT. N° 288 01



The following settings are adjusted using rotary selector switches:

- Long time delay protection against overloads: **I<sub>r</sub>**
- Long delay protection operation time: **t<sub>r</sub>**
- Short time delay protection against short circuits: **I<sub>m</sub>**
- Short time delay protection operation time: **t<sub>m</sub>**
- Instantaneous protection against very high short circuits: **I<sub>i</sub>**
- Neutral protection: **IN**

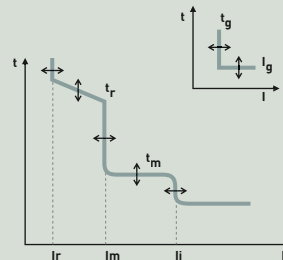


## MP4 LSIg ELECTRONIC PROTECTION UNIT CAT. N° 288 02



The following settings are adjusted using rotary selector switches:

- Long time delay protection against overloads: **I<sub>r</sub>**
- Long delay protection operation time: **t<sub>r</sub>**
- Short time delay protection against short circuits: **I<sub>m</sub>**
- Short time delay protection operation time: **t<sub>m</sub>**
- Instantaneous protection against very high short circuits: **I<sub>i</sub>**
- Earth fault current: **I<sub>g</sub>**
- Time delay on earth fault tripping: **t<sub>g</sub>**
- Neutral protection: **IN**



### + LEGRAND ADVANTAGE

All protection units are equipped with batteries so you can monitor the parameters even when the breaker is not connected.

### INFORMATION

All DMX<sup>3</sup> breakers are factory equipped with any MP4 protection unit LI, LSI or LSIg according to your requirements. You just need to select and indicate the 2 catalogue numbers when placing the order (1 for the breaker and 1 for the tripping unit).



LEDs indicating correct operation, pre-alarm and alarm for overload and temperature

Colour touch screen

Settings lock

Mini USB port for PC connection

ON button

## Innovative & user friendly touch screen tripping units

MP6 electronic protection units are equipped with a colour touch screen, particularly user friendly, thanks to intuitive icon-based navigation system. The colour display provides a clear presentation of the parameters of the installation.

Touch screen protection units integrate all the functions of LCD tripping units and have an advanced measurement function which, in addition to monitoring currents, can also be used to display voltages, active and reactive powers, frequency, power factor, and also energy.

Alarms can be programmed on a number of these parameters: max. voltage, min. voltage, voltage imbalance, max. and min. frequency, etc.



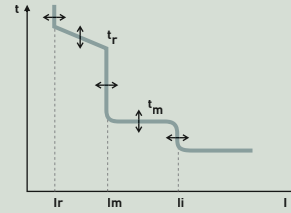
## MP6 LSI TOUCH SCREEN PROTECTION UNIT CAT.NO 288 03



Tripping curve preview

The following settings are adjusted using the touch screen:

- Long time delay protection against overloads: **Ir**
- Long delay protection operation time: **tr**
- Short time delay protection against short circuits: **Im**
- Short time delay protection operation time: **tm**
- Instantaneous protection against very high short circuits: **Ii**
- Neutral protection: **N**



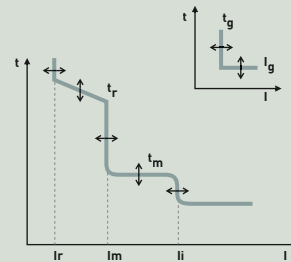
## MP6 LSI TOUCH SCREEN PROTECTION UNIT CAT.NO 288 04



Earth fault tripping curve preview

The following settings are adjusted using the touch screen:

- Long time delay protection against overloads: **Ir**
- Long delay protection operation time: **tr**
- Short time delay protection against short circuits: **Im**
- Short time delay protection operation time: **tm**
- Instantaneous protection against very high short circuits: **Ii**
- Earth fault current: **Ig**
- Time delay on earth fault tripping: **tg**
- Neutral protection: **N**



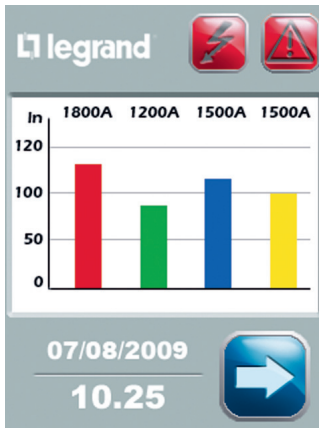
### + LEGRAND ADVANTAGE

The icon-based interface of the management software and the innovative touch screen technology used for MP6 tripping units simplify setting and preparing operations of the DMX<sup>3</sup> circuit breaker.

### INFORMATION

The MP4 and MP6 electronic protection units can communicate via an RS-485 port. This port is used for remote monitoring and management of the devices in the installation, using the MODBUS protocol. It is therefore possible to control circuit breaker opening and closing, display the electrical parameters and detect all the alarms generated by each device, from a PC.

## STARTING MENU



This menu displays the values of  $I_1$ ,  $I_2$ ,  $I_3$  and  $I_N$  as a diagram, the date and the hour, and the alarm icon.

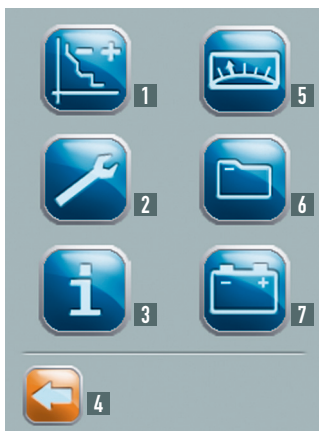
If the breaker opens following an electrical fault a specific icon will appear on the upper part of the screen.

Pressing this icon will open a new window showing the cause of the last event.

Other possible actions:

- Right arrow icon: access the main menu
- Alarm icon: preview the cause of the alarm in course

## MAIN MENU



The main menu allows accessing different windows for setting different parameters of the breaker or previewing measured values, battery status, tripping history, etc.

The following accesses are possible:

- 1 Setting according to the tripping curves (current and time)
- 2 Access tripping unit settings (luminosity, contrast and sound volume)
- 3 Access to general information of the breaker
- 4 Back to the previous page
- 5 Access measured values menu
- 6 Access archives
- 7 Preview battery charging status

# Innovative & user friendly touch screen tripping units (continued)

| MP6 electronic protection units collect all the useful information in 5 sections, each one easily reachable via the main menu in order to allow an efficient control.

Navigation through these sections is very simple thanks to the arrows at the bottom of each page.

| MP6 electronic protection units have an intuitive graphical interface. All useful information and selected settings are easy to understand and visible at a glance. For example current values can be visualized on the starting page thanks to a histogram. Different other settings can be simultaneously displayed on the "settings" screen in order to have a global view.

## PROTECTIONS SETTING MENU



**Vertical arrows allow scrolling between different electrical parameters:**

li, lm, tm, lr, tr, lg, tg, etc.

Pressing horizontal icons gives access to corresponding windows allowing value settings. Each value can be increased/decreased, validated or suppressed.

The values need to be saved into memory at the end of the process, for each setting.

## MEASURED VALUES MENU



**This window allows previewing of measured values for:**

- Currents
- Voltages (Ph/N and Ph/Ph)
- Active and reactive powers
- Power factor (total and per phase)
- Active and reactive energy
- Harmonics ( for currents and voltages )

Pressing **I**, **m**, **M** and **avg** icons at the bottom of the window will display respectively: instantaneous, minimum, maximum and average value of electrical parameters.

### INFORMATION

• The following events and values are registered into memory and can be accessed via specific menu: cause of the last event, event counter, events history with date and hour, alarms history with date and hour

• MP6 tripping units allow following application: logical selectivity, management of non priority loads, contact management (with Cat.No 288 12)

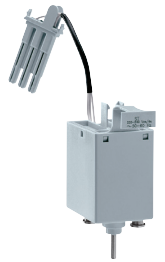
• MP6 tripping units allow following alarms: power reverse, current

imbalance, maximum and minimum voltage values U1N, U2N, U3N, maximum currents I1, I2, I3, voltage imbalance (phase-neutral), inversed phase rotation, maximum and minimum frequency values.

Undervoltage release



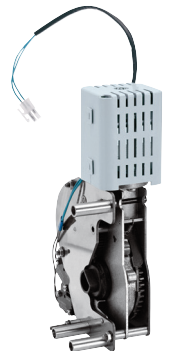
Shunt trip



Closing coil



Motor operators



# Fast clipping control accessories

- | You can remotely control the DMX<sup>3</sup> thanks to its range of accessories: shunt trips, undervoltage releases, motor operators and closing coils.
- | All the control accessories are simply clipped on to the front panel of the circuit breaker, which is especially configured in order to facilitate the clipping.
- | Every type of accessory is compatible with its own location, in order to avoid any possible mistake.



All control accessories can be easily installed without any special tool and in a very short time. The installation is to be done on the front panel of the air circuit breaker. In that way, the separation between power and control circuits is guaranteed.

**SHUNT TRIP**



Shunt trips are devices used for the remote instantaneous opening of the air circuit breaker. They are generally controlled through an N/O type contact. The actual offer of shunt trips proposes different supply voltages (from 24 V to 415 V), compatibles with AC and DC currents. The shunt trips are already equipped with a special fast connector, to be directly inserted into auxiliary contacts block. An auxiliary contact is connected in series with the coil, cutting off its power supply when the main poles are open.

**Technical characteristics:**

- Nominal voltage  $U_n$ : 24 V~ to 480 V~ and from 24 V= to 250 V=
- Tolerance on nominal voltage: 70 to 110%  $V_n$
- Maximum power consumption (max.power for 180 ms): 500 VA~/500 W =
- Continuous power: 5 VA~/5 W =
- Maximum opening time: 30 ms
- Insulation voltage: 2500 V 50 Hz for 1min
- Endurance on pulse: surge proof 4 kV 1.2/50  $\mu$ s

**UNDERVOLTAGE RELEASE**



Undervoltage releases are devices which are generally controlled by an N/C type contact. The trigger instantaneous opening of the circuit breaker if their supply voltage drops below a certain threshold and in particular if the control contact opens. These releases are equipped with a device for limiting their consumption after the circuit has been closed.

**Technical characteristics:**

- Nominal voltage  $U_n$ : 24 V~ to 480 V~ and from 24 V= to 250 V=
- Tolerance on nominal voltage: 85 to 110%  $V_n$
- Maximum power consumption (max.power for 180 ms): 500 VA~/500 W =
- Continuous power: 5 VA~/5 W =
- Opening time: 60 ms
- Insulation voltage: 2500 V 50 Hz for 1min
- Endurance on pulse: surge proof 4 kV 1.2/50  $\mu$ s

**CLOSING COILS**



These coils are used for remotely controlling the closing of the power contacts of the circuit breaker. The springs of the circuit breaker are to be loaded prior to the action of the closing coils. They are controlled by an N/O type contact.

**Technical characteristics:**

- Nominal voltage  $U_n$ : 24 V~ to 480 V~ and from 24 V= to 250 V=
- Tolerance on nominal voltage: 70 to 110%  $V_n$
- Maximum power consumption (max.power for 180 ms): 500 VA~/500 W =
- Continuous power: 5 VA~/5 W =
- Maximum closing time: 50 ms
- Insulation voltage: 2500 V 50 Hz for 1min
- Endurance on pulse: surge proof 4 kV 1.2/50  $\mu$ s



**LEGRAND ADVANTAGE**

Electrical connection is made in no time thanks to the fast connector supplied on all above accessories.

**NUMBER OF CONTROL AUXILIARIES FOR DMX<sup>3</sup> = 3**

- Shunt trip: 1
- Undervoltage release: 1
- Closing coils: 1



## MOTOR OPERATORS



Motor operators, are used for remotely reloading the springs of the circuit breaker mechanism immediately after the device closes. The device can thus be re-closed almost immediately after an opening operation. To motorise a DMX<sup>3</sup> it is necessary to add a release coil (undervoltage release or shunt trip) and a closing coil. If the supply voltage of the controls fails, it is still possible to reload the springs manually. Motor-driven controls have “limit switch” contacts which cut off the power supply of their motor after the springs have been reloaded. Motor operators are easy to mount, with only three screws.

### Technical characteristics:

- Nominal voltage  $U_n$ : from 24 V $\sim$  to 480 V $\sim$  and from 24 V $\equiv$  to 250 V $\equiv$
- Tolerance on nominal voltage: 85 to 110%  $V_n$
- Spring reloading time: 7s
- Maximum power consumption: 240 VA $\sim$ /240 W =
- Starting current: 2 up to 3 x  $I_n$  for about 80 ms
- Maximum cycle: 1/min

## SAFETY AND PADLOCKING ACCESSORIES FOR AN INCREASED SECURITY

The DMX<sup>3</sup> circuit breakers draw-out types are delivered as standard with safety padlocking shutters preventing access to live terminals. They have a number of other safety devices, such as:

- Key-operated locks:

Main contacts open

Circuit breaker in draw-out position

- Padlocks for:

Main contacts open

Contact shutters closed (for draw-out position)

- Door locking in order to prevent the opening of the electrical switchboard door when the contacts of the ACB are closed.



Fixed version equipped with padlocking system



Draw-out version equipped with key-operated locks

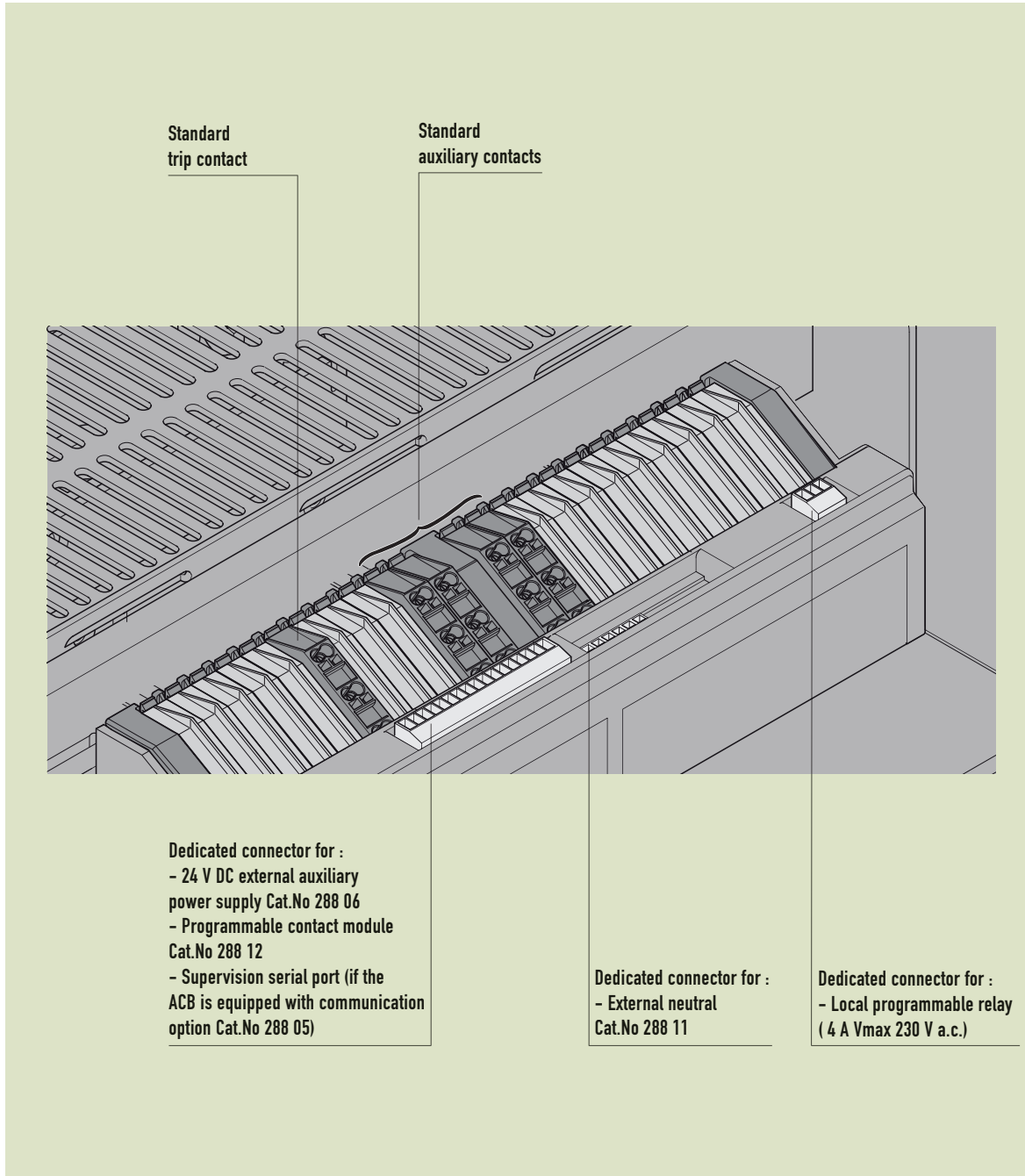
# Easy identification of control accessories

| Electrical auxiliaries are connected on the front panel on terminal blocks provided for this purpose. Accessories are identified on the front panel.

| As the cover has window, it is easy to ascertain, which devices are fitted on the circuit breaker.

## FRONT PANEL CONNECTION TERMINAL BLOCK

The terminal block of DMX<sup>3</sup> ACBs offers the possibility to connect a trip contact, up to 10 auxiliary contacts and different other control and signalling functions



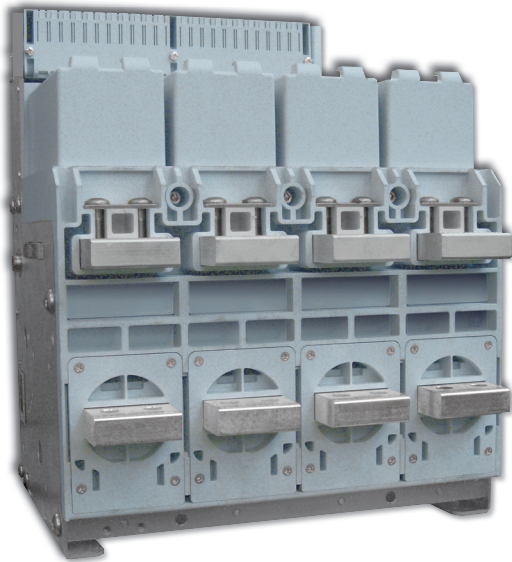
### NUMBER OF AUXILIARY CONTACTS FOR DMX<sup>3</sup> = 10

- 4 auxiliary contacts as standard (NO/NC)
- 6 additional auxiliary contacts (NO/NC)



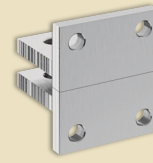
**FIXED VERSION-CHOOSE YOUR CONNECTION ACCESSORIES: 3 POSSIBILITIES**

The type of rear terminals can be easily changed according to your needs.



The breaker is supplied with rear terminals for horizontal connection

**REAR TERMINALS FOR FLAT CONNECTION**



Frame 1:	Frame 2:	Frame 3:
3P: Cat. N° 288 84	3P: Cat. N° 288 92	3P: Cat. N° 288 92 x 2
4P: Cat. N° 288 85	4P: Cat. N° 288 93	4P: Cat. N° 288 93 x 2

**REAR TERMINALS FOR VERTICAL CONNECTION**

This type of connection uses 2 accessories: the previous rear terminals for flat connection, which must be equipped with the vertical ones.



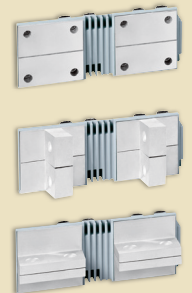
Frame 1:	Frame 2 and 3 <sup>(1)</sup> :
3P: Cat. N° 288 84 + 288 82	3P: Cat. N° 288 92 + 288 94
4P: Cat. N° 288 85 + 288 83	4P: Cat. N° 288 93 + 288 95

(1) For frame 3 the quantity is multiplied by 2

**SPREADERS**

For any situation requiring a bigger width for a safe connection (i.e. aluminium bus bars).

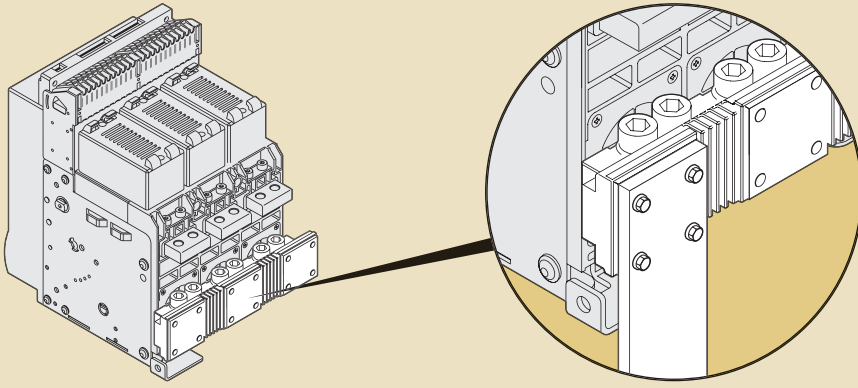
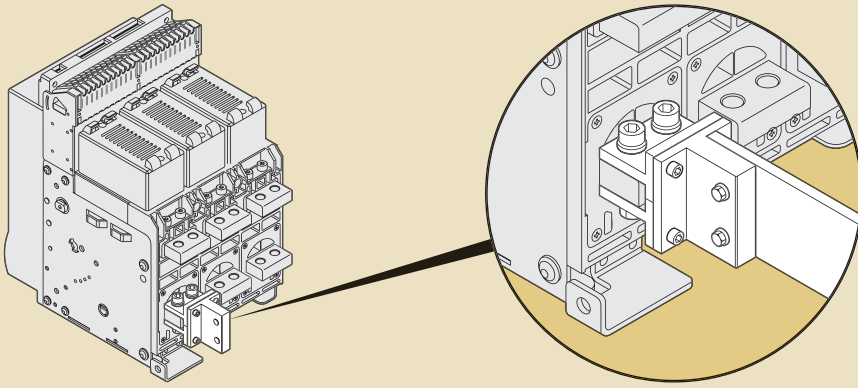
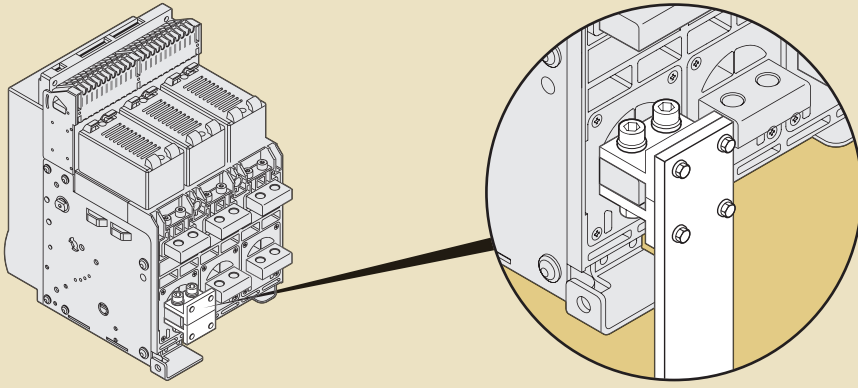
- Frame 1:**  
 3 types of accessories  
 - For flat connection  
 3P: Cat. N° 288 86  
 4P: Cat. N° 288 87  
 - For vertical connection  
 3P: Cat. N° 288 88  
 4P: Cat. N° 288 89  
 - For horizontal connection  
 3P: Cat. N° 288 90  
 4P: Cat. N° 288 91



# Connection: maximum adaptability

- | The fixed version of DMX<sup>3</sup> is equipped with rear terminals for horizontal connection with bars.
- | You can change connection type according to your needs.





## DRAW-OUT VERSION-CHOOSE YOUR CONNECTION ACCESSORIES

Draw-out version of the DMX<sup>3</sup> breakers is supplied with rear terminals for flat connection with bars. You can easily transform those terminals into vertical or horizontal type by using the unique reversible connector.



The breaker is supplied with rear terminals for flat connection

### 2 TYPES OF FIXING

Reversible connector for vertical or ...



... horizontal connection.



#### Frame 1:

3P: Cat. N° 288 96

4P: Cat. N° 288 97

#### Frame 2:

3P: Cat. N° 288 94

4P: Cat. N° 288 95

#### Frame 3:

3P: Cat. N° 288 94 x 2

4P: Cat. N° 288 95 x 2

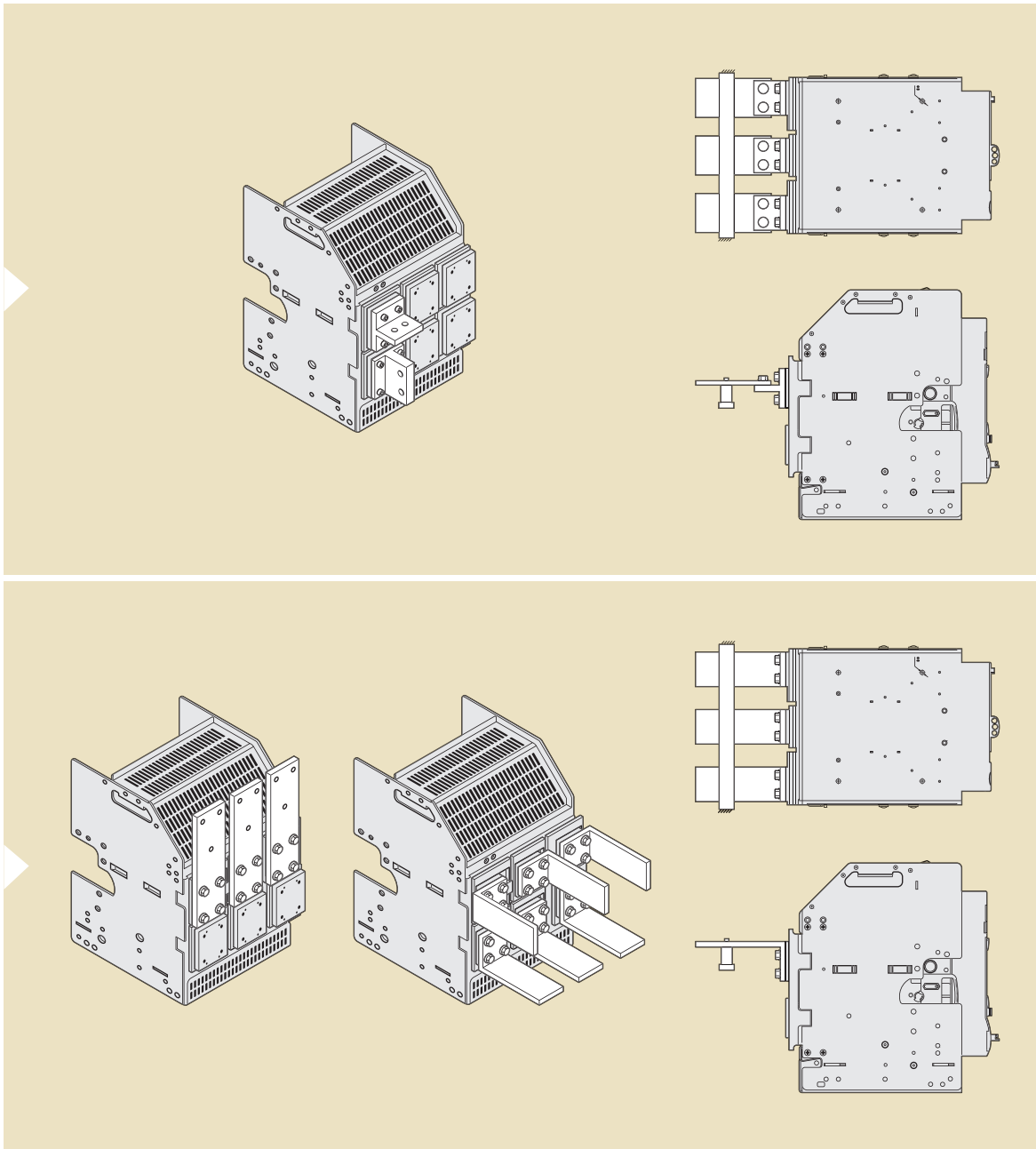
**FLAT CONNECTION USING THE REAR TERMINALS OF THE BREAKER**

# Connection: maximum adaptability (continued)

| The draw-out version is equipped with rear terminals for flat connection with bars.

## DRAW-OUT VERSION: EXAMPLES OF CONNECTIONS

Draw-out version of the DMX<sup>3</sup> breakers is supplied with rear terminals for flat connection with bars. You can easily transform those terminals into vertical or horizontal type by using the unique reversible connector.



### CONNECTIONS: A FEW RECOMMENDATIONS !

Connections provide the electrical connection of equipment and are also responsible for a considerable proportion of their heat dissipation.

Connections must never be under-sized.

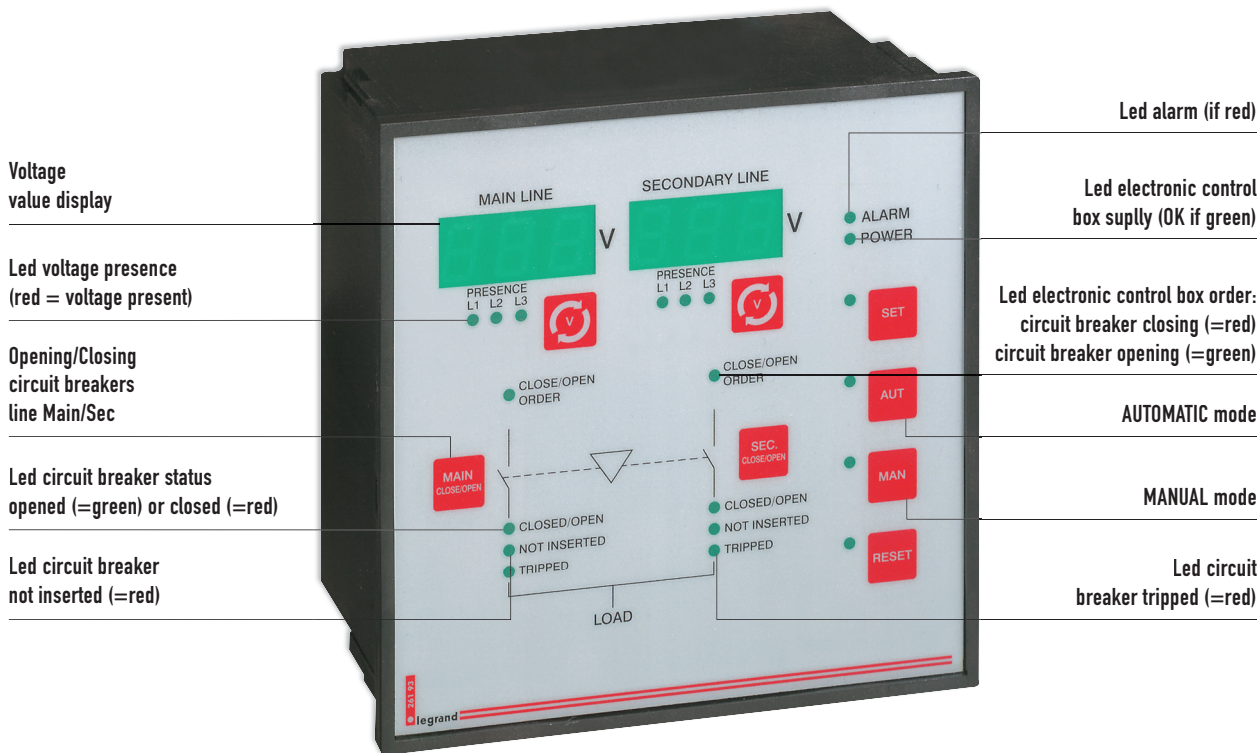
Plates or terminals must be used over a maximum area.

Heat dissipation is encouraged by arranging the bars vertically. If an uneven number of bars is connected, place the higher number of bars on the upper part of the terminal.

Avoid bars running side by side: this causes poor heat dissipation and vibrations.

Place spacers between the bars to maintain a distance between them which is at least equivalent to their thickness.





## Continuity of service and increased safety

Supply invertors answer the double need of continuity of service and greater safety (security). Traditionally used in hospitals, public buildings, industries with continuous manufacturing processes, airports and military applications, supply invertors become increasingly required for new applications such as telecommunications and computing treatment or in the management of energy sources, notably those say "renewable energies".



## AUTOMATIC SUPPLY INVERTORS

All DMX<sup>3</sup> air circuit breakers (fixed and draw-out version) can be fitted with an interlocking system which guarantees "mechanical safety" in the event of supply inversion. Interlocking is achieved using a cable system and interlocking units mounted on each circuit breaker. Every circuit breaker composing the supply inverter must be equipped with one interlocking unit.

This system allows devices of different sizes and types (3P, 4P, fixed, draw-out) to be interlocked. DMX<sup>3</sup> devices can be installed in different configurations inside the enclosure.

This mechanical interlocking system can be supplemented by motorised operators and an automation control unit making the inverter fully automatic.

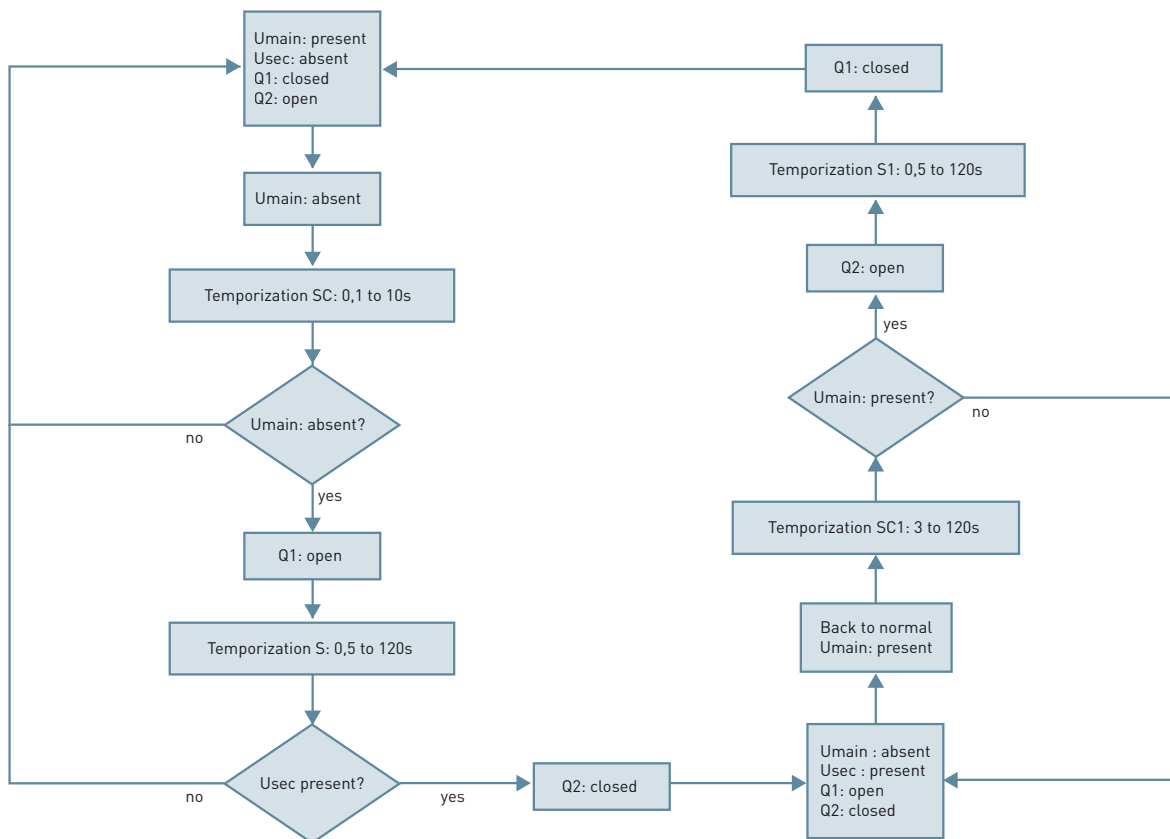
The Legrand automatic control unit Cat.N° 261 93 allows to easily manage the automatic switching of two sources.

Controlled by a microprocessor, the unit is fully programmable.

All the parameters are adjustable: values of the thresholds of tension, temporization between switching, starting up of a generator ...



Control panel of a supply inverter with automation control unit Cat. N° 261 93



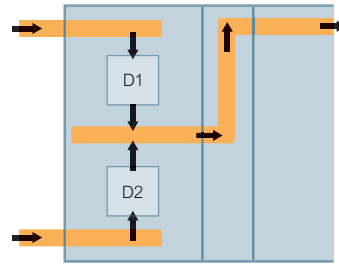
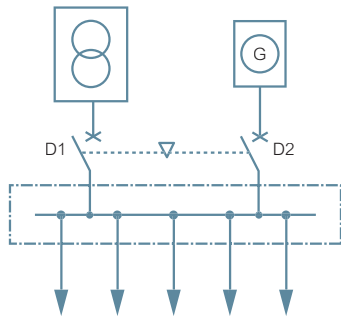
Example of algorithm for the functioning of an automatic supply inverter



### LEGRAND ADVANTAGE

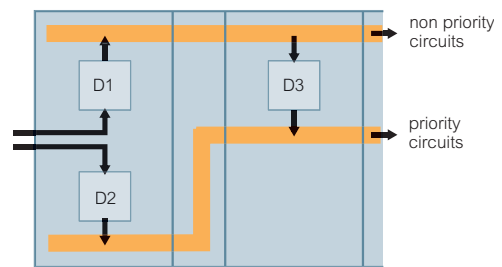
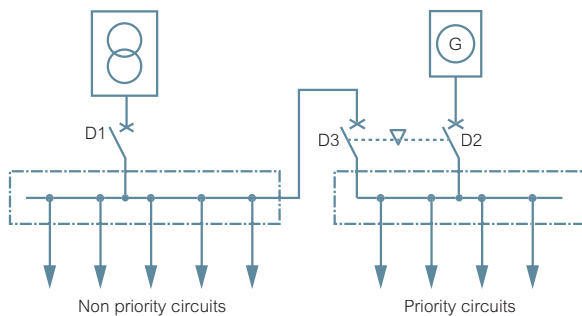
Thanks to its digital displays and different LEDs it is possible to watch permanently the state of the inverter, as well as the presence and the value of the voltage on each power supply.

## STAND-BY POWER SUPPLY (WITHOUT LOAD SHEDDING)



The two DMX<sup>3</sup> devices (D1 and D2) are connected to a central common busbar. Since they are not simultaneously on-load, they can be in the same enclosure.

## STAND-BY POWER SUPPLY (WITH LOAD SHEDDING)



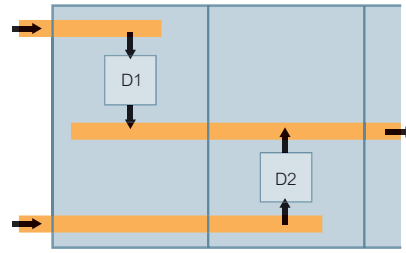
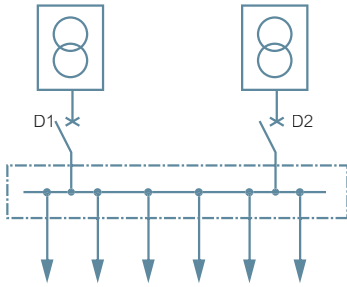
The two DMX<sup>3</sup> devices (D1 and D2) are not on-load simultaneously and can therefore be installed in the same enclosure. D3 can be on-load at the same time as D1, and must be installed in another enclosure.

# Flexible configurations (Examples of supply invertors)

Supply inverter assures the following functions:

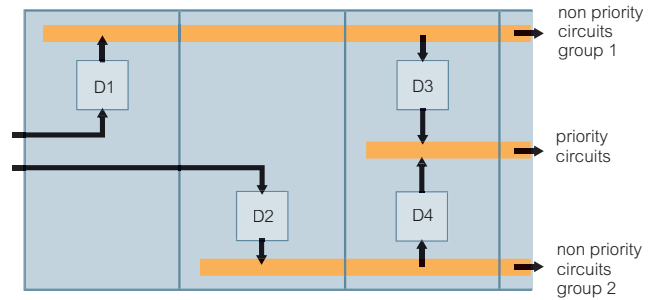
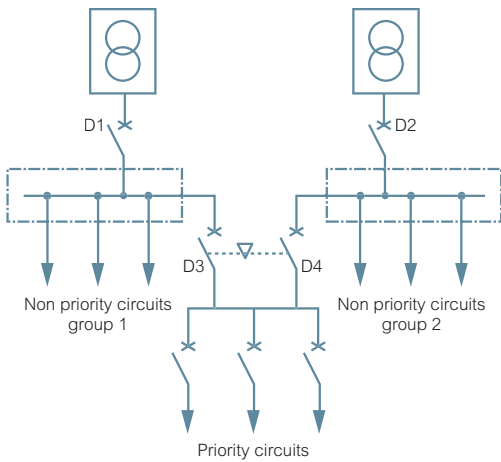
- Switching between a main source and a secondary source in order to supply the circuits requiring continuous service (for safety reasons) or for energy saving purpose (when the secondary source is different from the network).
- Management of the functioning of the secondary source (power generator) supplying the safety circuits.

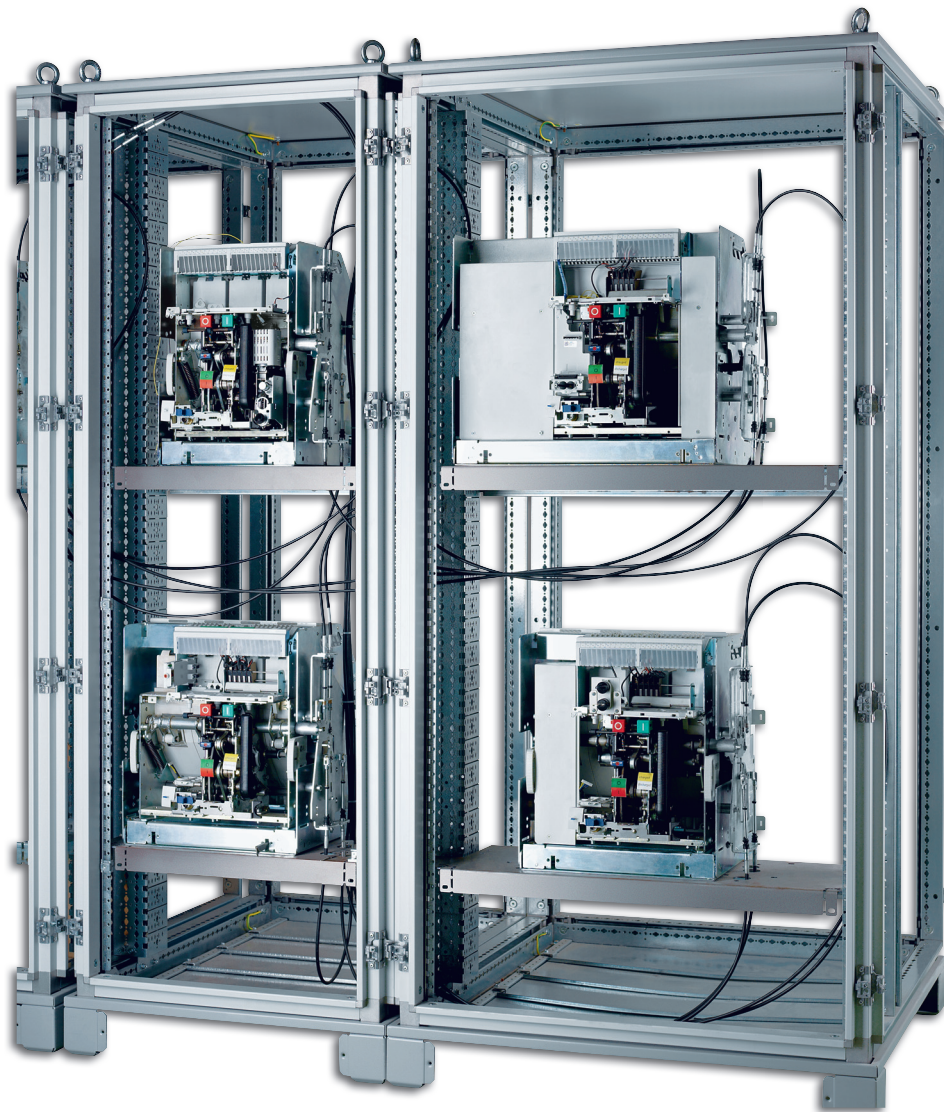
## DUAL POWER SUPPLY (TOTAL POWER)



The two DMX<sup>3</sup> devices (D1 and D2) draw current on a common busbar. They can only be installed in the same enclosure if the sum of their currents does not exceed the permissible value for the recommended size.

## DUAL POWER SUPPLY (REDUCED POWER WITH PRIORITY LOADS)





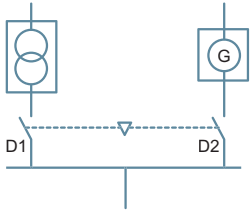
## Flexible configurations (Examples of supply invertors) (continued)

| DMX<sup>3</sup> and DMX<sup>3</sup>-I devices can be fitted with an interlocking mechanism which guarantees “mechanical safety” in the event of supply inversion.

| Interlocking is achieved using interlocking units mounted on the side of the devices and a cable system.



## MECHANICAL INTERLOCK FOR 2 CIRCUIT BREAKERS

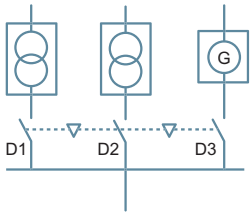


D1 is used for the main power supply of the installation (normal functioning), D2 for emergency power supply via power generator (in case of mains fault). For this configuration the two breakers can be simultaneously open, but can not be closed in the same time.

D1	D2
0	0
1	0
0	1

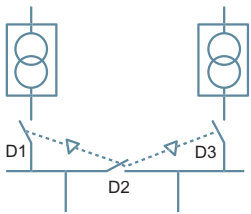
0 = circuit breaker is open  
1 = circuit breaker is closed

## MECHANICAL INTERLOCK FOR 3 CIRCUIT BREAKERS



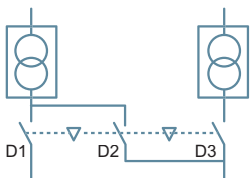
The three DMX<sup>3</sup> circuit breakers are connected to one common busbar. D1 and D2 breakers are supplying the energy from two different power transformers and D3 from a power generator (in case of emergency). For this configuration all the three breakers can be simultaneously open. At any time, only one single circuit breaker can be on-load. The following table presents all possible combinations of mechanical interlock of the 3 breakers.

D1	D2	D3
0	0	0
1	0	0
0	1	0
0	0	1



The following example presents three circuit breakers with double mechanical interlock for D2 circuit breaker. D1 and D3 breakers are supplying the electricity from 2 power transformers. There are 6 interlocking combinations possible.

D1	D2	D3
0	0	0
1	0	0
0	0	1
0	1	0
1	1	0
0	1	1
1	0	1



The following example presents three circuit breakers with double mechanical interlock for D2 circuit breaker. It is a possible version of the previous scheme, presenting four combinations. D1 and D3 breakers supply energy for independent circuits. D2 breaker is used in case of emergency for priority circuits.

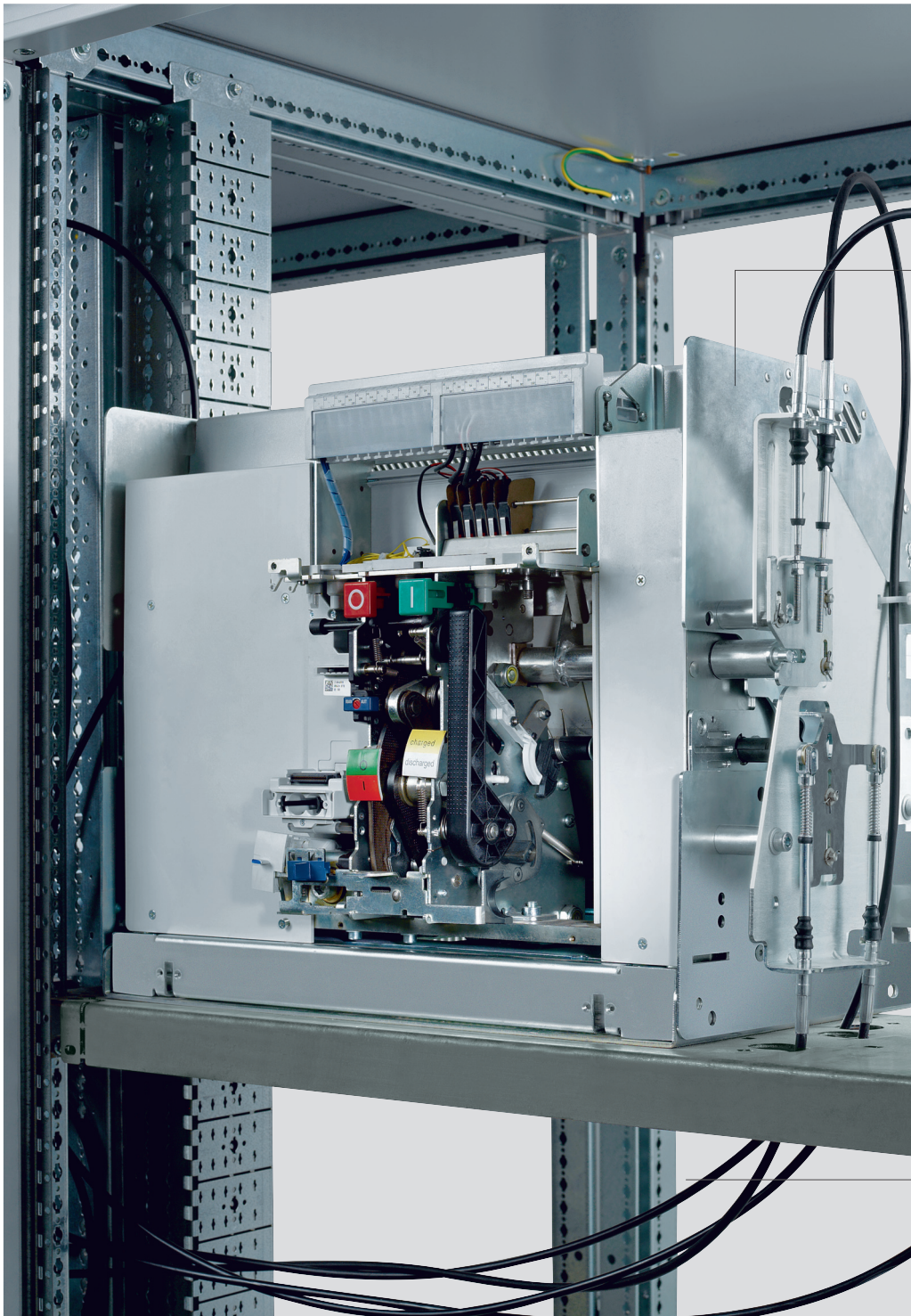
D1	D2	D3
0	0	0
1	0	0
0	0	1
1	0	1
0	1	0

0 = circuit breaker is open  
1 = circuit breaker is closed

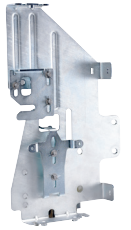
### INFORMATION

This system allows devices of different sizes and types to be interlocked. The cable system provides the flexibility to install DMX<sup>3</sup> devices in a vertical configuration in the same enclosure or in a horizontal configuration in different columns.





Mechanical interlock device



Cable for mechanical interlock



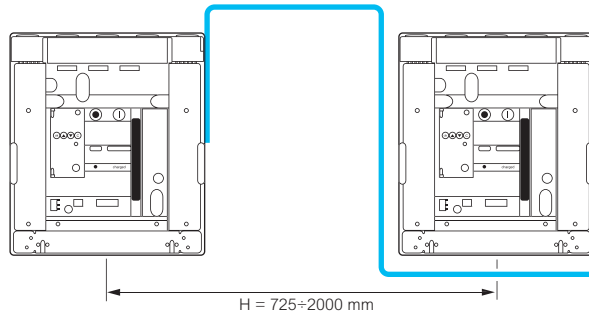
# Easy to install mechanical interlock system (The choice of cable for mechanical interlock)

- | Mechanical interlock is set up using cables and a mechanical interlock device and can interlock 2 or 3 devices, which may be different type in a vertical or horizontal configuration.
- | The interlock device is mounted on the right-hand side of the air circuit breaker.

### CABLE LENGTH SELECTION TABLE

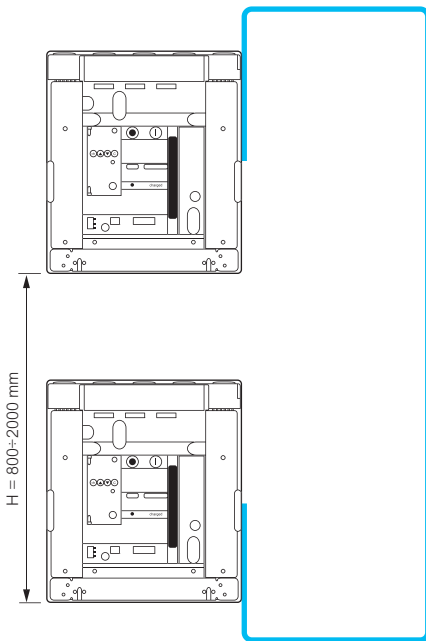
Length (mm)	Type	Cat. N°
2 600	1	289 20
3 000	2	289 21
3 600	3	289 22
4 000	4	289 23
4 600	5	289 24
5 600	6	289 25

### 2 DMX<sup>3</sup> - HORIZONTAL CONFIGURATION



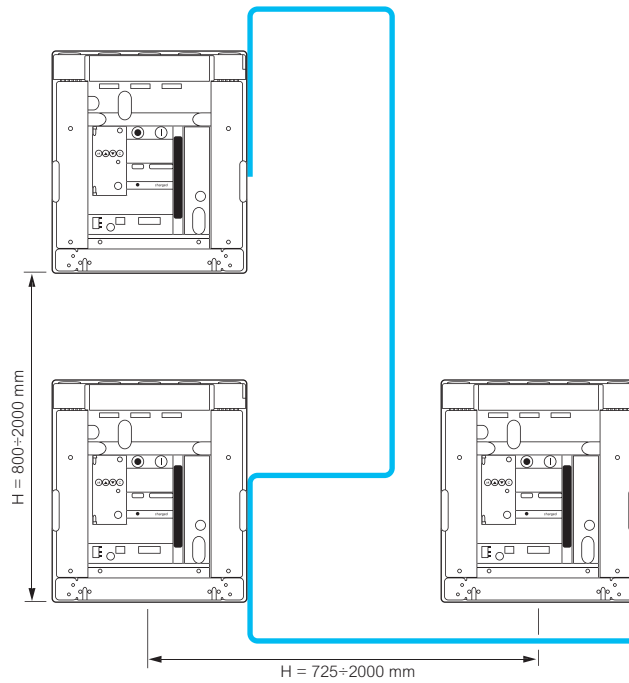
Required cable length:  
 $L = 1430 + H$

### 2 DMX<sup>3</sup> - VERTICAL CONFIGURATION



Required cable length:  
 $L = 1570 + V$

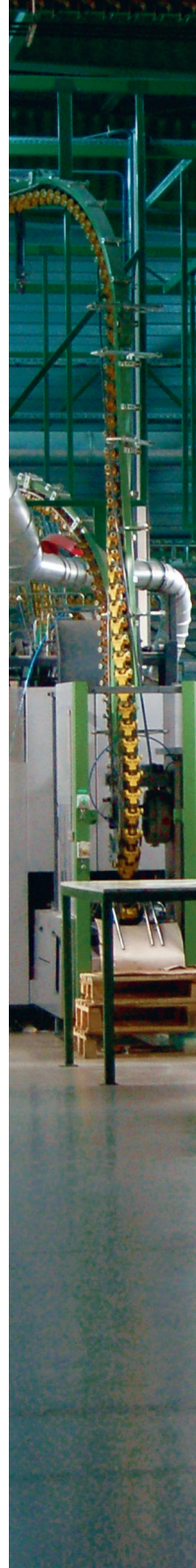
### 3 DMX<sup>3</sup> - VERTICAL + HORIZONTAL CONFIGURATION

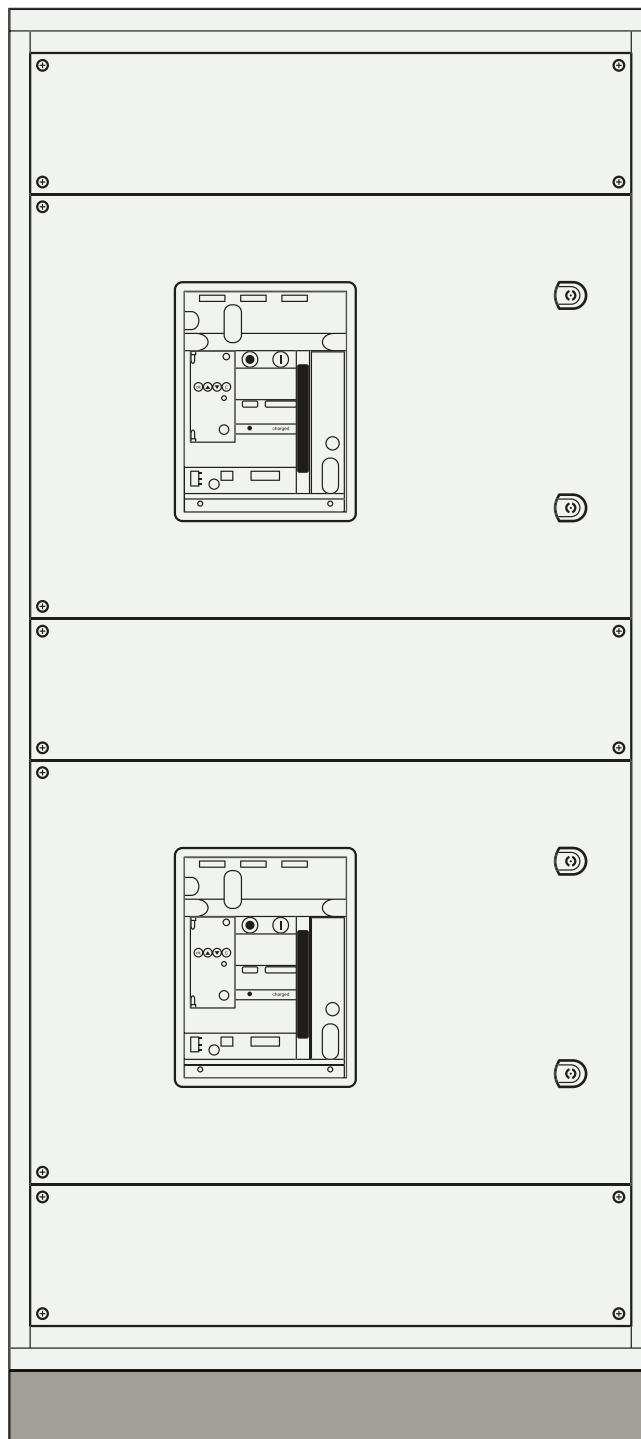


Required cable length:  
 $L = 1430 + V + H$

### EXAMPLES FOR 3 AIR CIRCUIT BREAKERS

Distance between air circuit breakers (mm)		Horizontal			
		725 mm	1 000 mm	1 450 mm	2 000 mm
Vertical	800 mm	Type 2	Type 3	Type 4	Type 5
	1 000 mm	Type 3	Type 3	Type 4	Type 5
	1 600 mm	Type 4	Type 5	Type 5	Type 6
	2 000 mm	Type 5	Type 5	Type 6	Type 6





## Be free to choose XL<sup>3</sup> fully adaptable enclosure

It is very easy to create the configuration you want thanks to the different available sizes of XL<sup>3</sup> 4000 enclosures: 2 widths, 3 depths, and 2 heights.

A full range of accessories, such as dedicated fixing plates and faceplates, facilitates the integration of DMX<sup>3</sup> devices inside XL<sup>3</sup> enclosures.



**INTEGRATION INTO XL<sup>3</sup> 4000 ENCLOSURES**

XL <sup>3</sup> 4000 24 MODULES USABLE WIDTH 600 MM	FRAME 1 DMX <sup>3</sup> 2500		FRAME 2 DMX <sup>3</sup> 2500 AND DMX <sup>3</sup> 4000	
	3P	4P	3P	4P <sup>(1)</sup>
	FIXED OR DRAW-OUT		FIXED OR DRAW-OUT	
	Depth of enclosures: 725 or 975 mm		Depth of enclosures: 725 or 975 mm up to 2 500 A 975 mm up to 4 000 A	

<sup>(1)</sup> Except supply invertors

XL <sup>3</sup> 4000 36 MODULES USABLE WIDTH 850 MM	FRAME 1 DMX <sup>3</sup> 2500		FRAME 2 DMX <sup>3</sup> 2500 AND DMX <sup>3</sup> 4000	
	3P	4P	3P	4P
	FIXED OR DRAW-OUT		FIXED OR DRAW-OUT	
	Depth of enclosures: 725 or 975 mm		Depth of enclosures: 725 or 975 mm up to 2 500 A 975 mm up to 4 000 A	

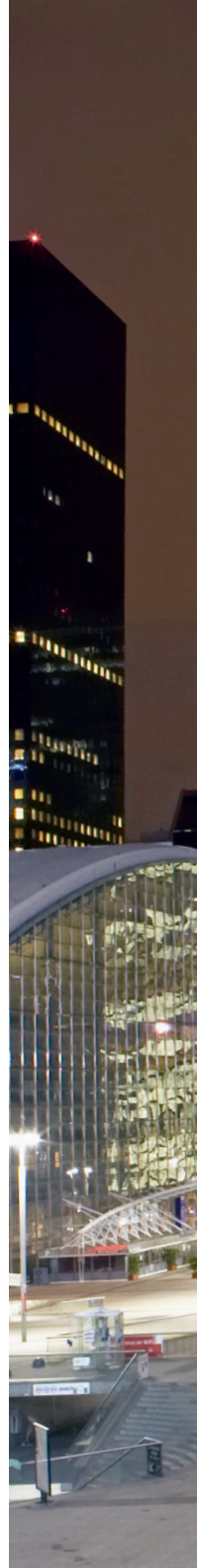


**LEGRAND ADVANTAGE**

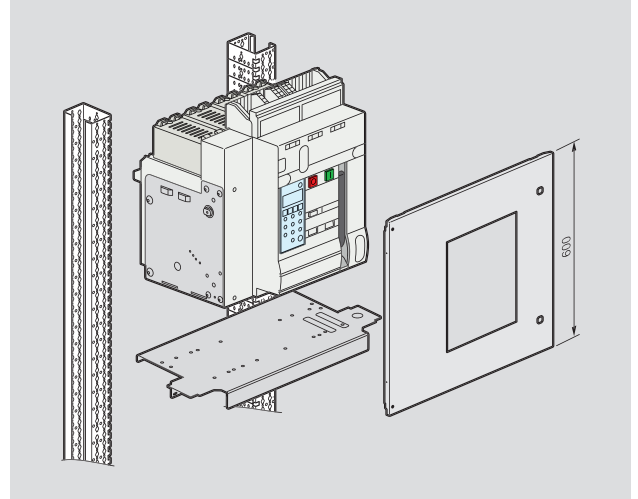
Optimized space and reduced width of main distribution board:  
XL<sup>3</sup> 4000 – 600 mm width enclosures can be equipped with frame 2 air circuit breakers thanks to their compact size.

The correct size for the enclosure, and thus the power to be dissipated, is obtained by adapting the depth of the assembly:

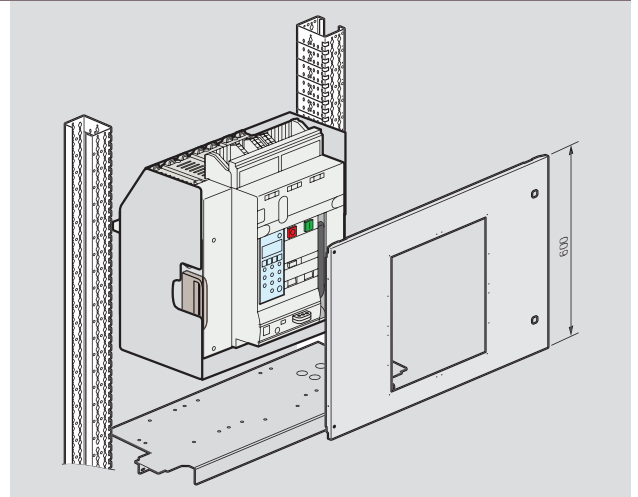
- 725 mm min. up to 2 500 A
- 975 mm min. up to 4 000 A



## DMX<sup>3</sup> FIXED VERSION



## DMX<sup>3</sup> DRAW-OUT VERSION



# Be free to choose XL<sup>3</sup> fully adaptable enclosure (continued)

- | DMX<sup>3</sup> circuit breakers and switches are mounted on horizontal plates.
- | Four different plates are available for fixed version or draw-out version of the breaker and for 24 modules (width 600 mm) and 36 modules (width 850 mm) XL<sup>3</sup> 4000 enclosures. They consist of a horizontal plate and a strengthening crosspiece.

## FIXING PLATES SELECTION CHART

DMX<sup>3</sup> devices are placed on the plate and fixed using screws and nuts.  
The use of lifting equipment is strongly recommended for placing DMX<sup>3</sup> devices on the plate.

Version		DMX <sup>3</sup> fixed version		DMX <sup>3</sup> draw-out version	
XL <sup>3</sup> 4000 enclosure type		24 modules (600 mm width)	36 modules (850 mm width)	24 modules (600 mm width)	36 modules (850 mm width)
DMX <sup>3</sup> - N 2500 DMX <sup>3</sup> - H 2500 DMX <sup>3</sup> - L 2500 DMX <sup>3</sup> - I 2500	3P	<b>207 51</b>	<b>207 52</b>	<b>207 53</b>	<b>207 54</b>
	4P				
DMX <sup>3</sup> - N 4000 DMX <sup>3</sup> - H 4000 DMX <sup>3</sup> - L 4000 DMX <sup>3</sup> - I 4000	3P				
	4P				

## FACEPLATES SELECTION CHART

All XL<sup>3</sup> 4000 metallic faceplates are equipped with hinges and locks in order to facilitate installation and maintenance operations.

Version		DMX <sup>3</sup> fixed version		DMX <sup>3</sup> draw-out version	
XL <sup>3</sup> 4000 enclosure type		24 modules (600 mm width)	36 modules (850 mm width)	24 modules (600 mm width)	36 modules (850 mm width)
DMX <sup>3</sup> - N 2500 DMX <sup>3</sup> - H 2500 DMX <sup>3</sup> - I 2500	3P	<b>209 38</b>	<b>209 48</b>	<b>209 38</b>	<b>209 48</b>
	4P				
DMX <sup>3</sup> - L 2500	3P				
	4P				
DMX <sup>3</sup> - N 4000 DMX <sup>3</sup> - H 4000 DMX <sup>3</sup> - L 4000 DMX <sup>3</sup> - I 4000	3P	<b>209 38</b>	<b>209 48</b>	<b>209 38</b>	<b>209 48</b>
	4P				
DMX <sup>3</sup> - N 4000 DMX <sup>3</sup> - H 4000 DMX <sup>3</sup> - L 4000 DMX <sup>3</sup> - I 4000	3P				
	4P				



### MOUNTING PRINCIPLE

In XL<sup>3</sup>, the DMX<sup>3</sup> devices and the associated busbars are arranged according to an identical principle for all power ratings, that is, the possibility of mounting three busbars and two devices per enclosure. The installation height of DMX<sup>3</sup> units is always 600 mm whatever the type and size of the device. When 2 DMX<sup>3</sup> devices are installed in the same cell, this leaves at least a useful 600 mm for running the busbars.

## trip free switches DMX<sup>3</sup>-I

from 1250 to 6300 A



0 286 96

0 287 96

Dimensions p. 36 to 40

Pack	Cat.Nos	Fixed version
		Supplied with: - 4 auxiliary contacts: NO/NC - flat rear terminals for connection with bars - door sealing
		<b>DMX<sup>3</sup>-I 2500</b>
		In (A)
	Frame 1	
	3P   4P	
1	0 286 83   0 286 93	1250
1	0 286 84   0 286 94	1600
1	0 286 85   0 286 95	2000
1	0 286 86   0 286 96	2500
		<b>DMX<sup>3</sup>-I 4000</b>
		In (A)
	Frame 2	
	3P   4P	
1	0 286 87   0 286 97	3200
1	0 286 88   0 286 98	4000
		<b>DMX<sup>3</sup>-I 6300</b>
		In (A)
	Frame 3	
	3P   4P	
1	0 289 70   0 289 71	6300

Pack	Cat.Nos	Draw-out version
		Supplied with: - 4 auxiliary contacts: NO/NC - draw-out base and kit - flat rear terminals for connection with bars - door sealing
		<b>DMX<sup>3</sup>-I 2500</b>
		In (A)
	Frame 1	
	3P   4P	
1	0 287 83   0 287 93	1250
1	0 287 84   0 287 94	1600
1	0 287 85   0 287 95	2000
1	0 287 86   0 287 96	2500
		<b>DMX<sup>3</sup>-I 4000</b>
		In (A)
	Frame 2	
	3P   4P	
1	0 287 87   0 287 97	3200
1	0 287 88   0 287 98	4000
		<b>DMX<sup>3</sup>-I 6300</b>
		In (A)
	Frame 3	
	3P   4P	
1	0 289 77   0 289 78	6300

## trip free switches DMX<sup>3</sup>-I

from 1250 to 6300A

### Technical characteristics

Trip free switch DMX <sup>3</sup> -I	2500	4000	6300
Frame	1	2	3
Rating In à 40° C (A)	1250 1600 2000 2500	3200 4000	6300
Rated insulation voltage Ui (V)	1000	1000	1000
Rated impulse withstand voltage Uimp (kV)	12	12	12
Rated operational voltage (50/60Hz) Ue (V)	690	690	690
Isolation behaviour	Yes	Yes	Yes
Short-circuit making capacity Icm (kA)	230 V~	143	220
	415 V~	143	220
	500 V~	143	220
	600 V~	132	165
	690 V~	121	143
Short time withstand current Icw (kA) pour t = 1 s	230 V~	65	85
	415 V~	65	85
	500 V~	65	85
	600 V~	60	75
	690 V~	55	65
Endurance (cycles)	mechanical	10000	10000
	electrical	5000	5000
Temperature	operation	-5°C to +70°C	-5°C to +70°C
	storage	-25°C to +85°C	-25°C to +85°C

### Temperature derating

#### Fixed version

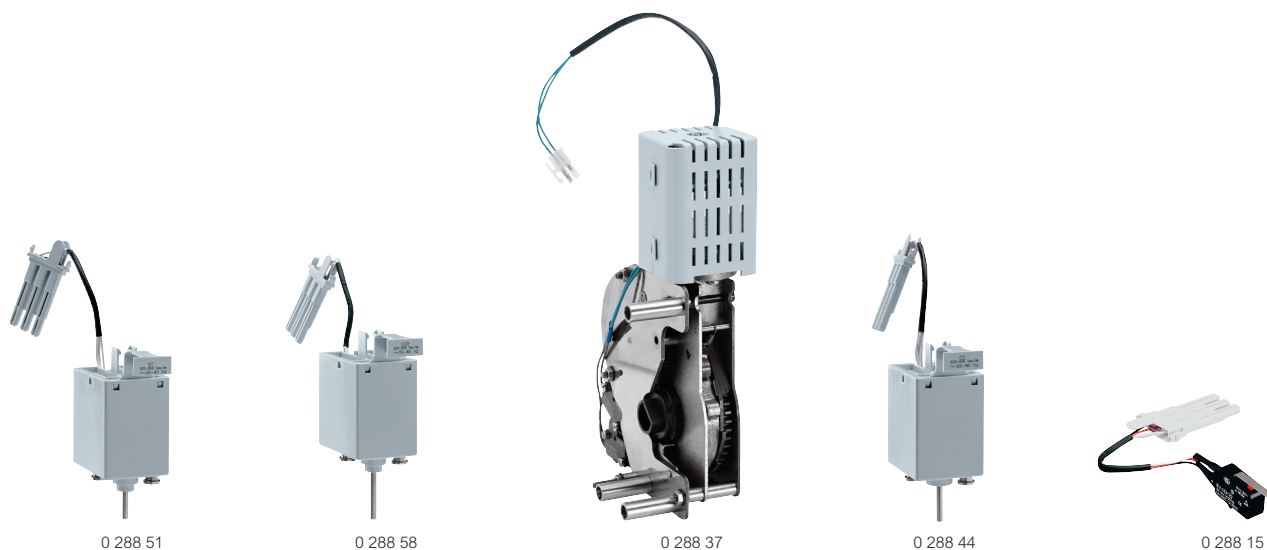
	Temperature									
	40°C		50°C		60°C		65°C		70°C	
	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>
DMX <sup>3</sup> -I 2500	1250	1	1250	1	1250	1	1250	1	1250	1
	1600	1	1600	1	1600	1	1600	1	1600	1
	2000	1	2000	1	1960	0.98	1920	0.96	1880	0.94
	2500	1	2450	0.98	2350	0.94	2250	0.9	2150	0.86
DMX <sup>3</sup> -I 4000	3200	1	3200	1	3200	1	3136	0.98	3008	0.94
	4000	1	3920	0.98	3680	0.92	3440	0.86	3120	0.78
DMX <sup>3</sup> -I 6300	6300	1	6300	1	6048	0.96	5796	0.92	5544	0.88

#### Draw-out version

	Temperature									
	40°C		50°C		60°C		65°C		70°C	
	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>
DMX <sup>3</sup> -I 2500	1250	1	1250	1	1250	1	1250	1	1250	1
	1600	1	1600	1	1600	1	1600	1	1600	1
	2000	1	2000	1	1960	0.98	1920	0.96	1875	0.94
	2500	1	2400	0.96	2250	0.9	2100	0.84	1950	0.78
DMX <sup>3</sup> -I 4000	3200	1	3200	1	3200	1	3072	0.96	2880	0.9
	4000	1	3760	0.94	3440	0.86	3200	0.8	2960	0.74
DMX <sup>3</sup> -I 6300	6300	1	6174	0.98	5985	0.95	5796	0.92	5292	0.84



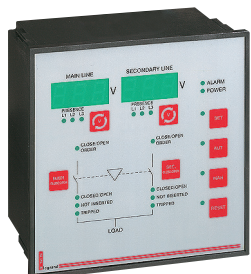
# auxiliaries and accessories for DMX<sup>3</sup>



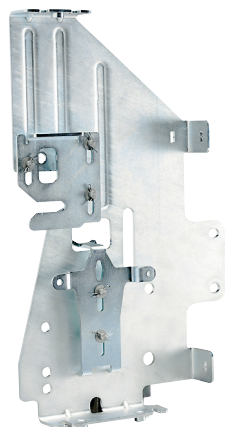
Pack	Cat.Nos	Control and signalling auxiliaries
		<b>Shunt trip</b>
		When energised the circuit breaker will be tripped
1	0 288 48	24 V/
1	0 288 49	48 V/
1	0 288 50	110 - 130 V/
1	0 288 51	220 - 250 V/
1	0 288 52	415 - 480 V
		<b>Undervoltage releases</b>
		When the coil is de-energised, the circuit breaker will be tripped
1	0 288 55	24 V/
1	0 288 56	48 V/
1	0 288 57	110 - 130 V/
1	0 288 58	220 - 250 V/
1	0 288 59	415 - 480 V
		<b>Module for delayed tripping</b>
		To be used with above undervoltage releases
1	0 288 62	110 V/
1	0 288 63	230 V/
		<b>Motor operators</b>
		To motorize a DMX, it is possible to attach, to the motor operators, a release coil (undervoltage or trip on energising) and a closing coil
1	0 288 34	24 V/
1	0 288 35	48 V/
1	0 288 36	110 - 130 V/
1	0 288 37	220 - 250 V/
1	0 288 38	415 - 440 V
		1 0 288 40 480 V/
		<b>Closing coils</b>
		Enables remote closing of the circuit breaker if the closing spring is charged
1	0 288 41	24 V/
1	0 288 42	48 V/
1	0 288 43	110 - 130 V/
1	0 288 44	220 - 250 V/
		1 0 288 45 415 - 480 V
		<b>Signalling contact for auxiliaries</b>
1	0 288 16	Signalling contact for shunt trips, undervoltage releases and closing coils
		<b>Signalling contact for draw-out version</b>
1	0 288 13	Inserted / test / draw-out signalling contact 3 changeover contacts per position

Pack	Cat.Nos	Locking
		<b>Key locking in "open" position</b>
1	0 288 30	Profalux lock (key included) - to be fitted on the frame Cat.No 0 288 28
1	0 288 31	Ronis lock (key included) - to be fitted on the frame Cat.No 0 288 28
1	0 288 28	2 hole support frame for Ronis or Profalux locks Cat.Nos 0 288 30/31
1	0 288 29	Set of 5 Ronis key barrels
		<b>Key locking in the draw-out position</b>
1	0 288 32	Mounting of the lock on the base
1	0 288 33	Profalux lock (key included) Ronis lock (key included)
		<b>Door locking</b>
		Prevents opening of the door with the circuit breaker closed
1	0 288 20	Left-hand and right-hand side mounting
		<b>Padlocks in "open" position</b>
1	0 288 21	Padlocking system for ACB (padlock not supplied)
1	0 288 24	Padlock for buttons
1	0 288 26	Padlocking system for shutters (padlock not supplied)
		<b>Equipment for conversion of a fixed device into draw-out device</b>
		<b>Bases for draw-out device</b>
1	0 289 02	3P
1	0 289 04	4P
1	0 289 13	0 289 03
		0 289 05
		0 289 14
		0 289 16
		<b>Transformation kit for draw-out version</b>
1	0 289 09	0 289 10
1	0 289 11	0 289 12
1	0 289 15	0 289 16
		For DMX <sup>3</sup> /DMX <sup>3</sup> -I frame 1
		For DMX <sup>3</sup> /DMX <sup>3</sup> -I frame 2
		For DMX <sup>3</sup> /DMX <sup>3</sup> -I frame 3
		<b>Accessories</b>
1	0 288 25	Rating mis-insertion device Prevents the insertion of a draw-out circuit breaker in an incompatible base
1	0 288 23	Operations counter Counts total number of operation cycles of the device
1	0 288 14	Contact "ready to close" with charged springs
1	0 288 15	Additional signalling contact
1	0 288 79	Lifting plate

## supply invertors equipment for DMX<sup>3</sup>



0 261 93



0 288 64



Electrical characteristics p. 35

Pack	Cat.Nos	Automation control unit
1	0 261 93	For setting the conditions for supply inversion, generator on/off, status acquisition for DMX and DPX circuit-breakers, open/closed Power supply: 230 V $\sim$ and 12-24-48 V $\equiv$ Connection by plug-in terminals
1	0 261 94	Standard unit Communicating unit, enabling data transmission (RS 485 port)

Pack	Cat.Nos	Equipment for supply invertors
1	0 288 64	The mechanical interlock is set up using cables and can interlock 2 or 3 devices, which may be different type in a vertical or horizontal configuration The interlock unit is mounted on the right-hand side of the device Cable interlock to be ordered separately (cable length to be specified according to every configuration - see below)
1	0 288 65	Interlock for DMX <sup>3</sup> frame 1
1	0 288 66	Interlock for DMX <sup>3</sup> frame 2
1	0 288 66	Interlock for DMX <sup>3</sup> frame 3

Pack	Cat.Nos	Cable interlock
1	0 289 20	Type 1 (2600 mm)
1	0 289 21	Type 2 (3000 mm)
1	0 289 22	Type 3 (3600 mm)
1	0 289 23	Type 4 (4000 mm)
1	0 289 24	Type 5 (4600 mm)
1	0 289 25	Type 6 (5600 mm)

## rear terminals for DMX<sup>3</sup>



0 288 84



0 288 82



0 288 96



0 288 94



0 288 91



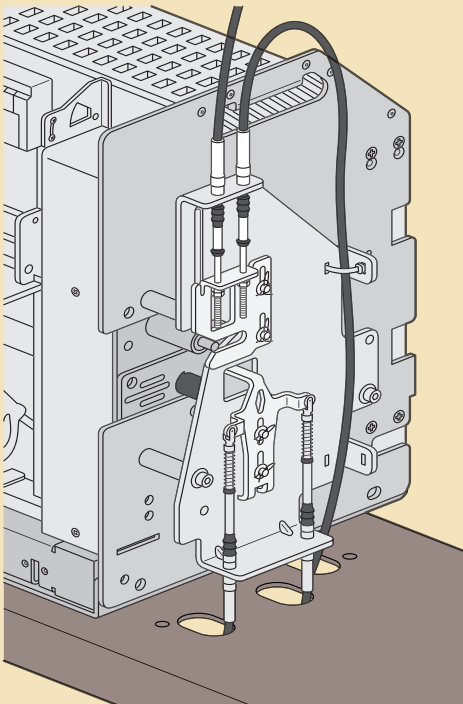
Dimensions p. 36 to 40

Pack	Cat.Nos		Rear terminals
	3P	4P	
1	0 288 84	0 288 85	<b>For DMX<sup>3</sup> frame 1 fixed version</b> For flat connection with bars To be fixed onto horizontal rear terminals of the circuit breaker
1	0 288 82	0 288 83	For vertical connection with bars Those terminals are used in order to transform a flat connection into a vertical one To be fixed onto Cat.Nos 0 288 84/85 according to the number of poles
1	0 288 96	0 288 97	<b>For DMX<sup>3</sup> frame 1 draw-out version</b> For vertical or horizontal connection with bars To be fixed onto plate rear terminals of the circuit breaker
1	0 288 92	0 288 93	<b>For DMX<sup>3</sup> frame 2 and 3 fixed version</b> For flat connection with bars To be fixed onto horizontal rear terminals of the circuit breaker 2 sets are required for frame 3
1	0 288 94	0 288 95	<b>For DMX<sup>3</sup> frame 2 and 3 fixed or draw-out version</b> On DMX <sup>3</sup> fixed version: - For vertical connection with bars - To be fixed onto Cat.Nos 0 288 92/93 according to the number of poles On DMX <sup>3</sup> draw-out version: - For vertical or horizontal connection with bars - To be fixed directly onto plate rear terminals of the circuit breaker 2 sets are required for frame 3

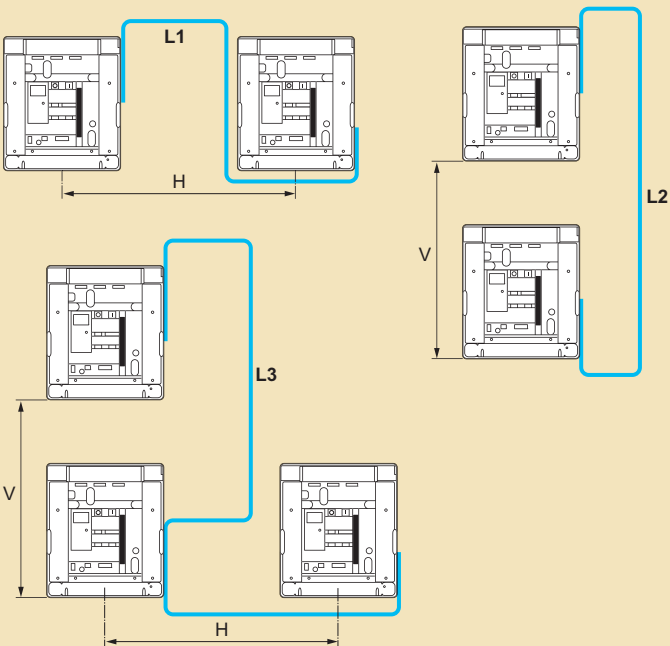
Pack	Cat.Nos		Spreaders for DMX <sup>3</sup> frame 1 fixed version
	3P	4P	
1	0 288 86	0 288 87	To be fixed onto horizontal rear terminals of the circuit breaker For flat connection with bars
1	0 288 88	0 288 89	For vertical connection with bars
1	0 288 90	0 288 91	For horizontal connection with bars

# supply invertors equipment for DMX<sup>3</sup>

## ■ Mounting of interlock unit



## ■ Choice of cable interlock



Calculation of cable length:  
 $L1 = 1430 + H$   
 $L2 = 1570 + V$   
 $L3 = 1430 + V + H$

## ■ Functions

### Standard unit Cat.No 0 261 93

Used to adjust and manage the source inversion operating conditions (DMX<sup>3</sup>):

- Remote control (opening/closing) of MCBs
- Microprocessor output from unit (positive safety)
- Programmable I/O
- Voltage reading: 3-phase
  - phase-neutral
  - phase-phase
- Control (on/off) of generator set
- Indication of the state of the MCBs (open/closed/tripped)
- Source inversion blocked in the event of:
  - Tripping of 1 or 2 devices
  - If a draw-out ACB is not inserted in its base, as the open/close command of the unit is inoperative

### Communicating unit Cat.No 0 261 94

All the standard functions, plus:

- Maximum voltage reading
- Reading of phase rotation direction
- Frequency reading
- Communication: data transmission via the RS 485 port (Modbus protocol)

## ■ Technical characteristics

Power supply: 187 to 264 V $\sim$   
 9 to 65 V $\equiv$

Frequency: 45 to 65 Hz

Un: 80 to 690 V $\sim$

Control relay (1 and 4): 1 NO - 12 A - 250 V $\sim$

1 NO - 5 A - 250 V $\sim$

1 NO/NC - 5 A - 250 V $\sim$

Cable cross-section: 0.2 to 2.5 mm<sup>2</sup>

Dimensions (width x height x depth): 144 x 144 x 90 mm

Protection: IP 20 at the rear

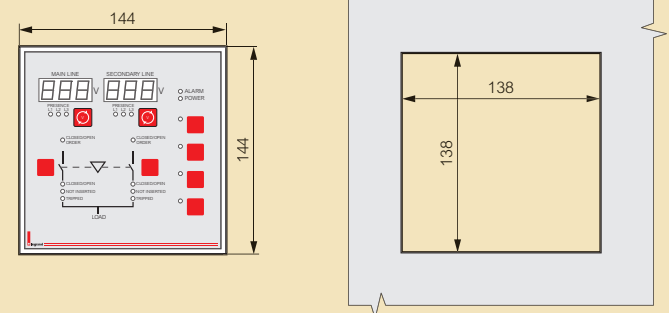
IP 41 at the front

IP 54 at the front with protective screen

Operating temperature: - 20 °C to + 60 °C

	Operating ranges
Main/secondary minimum voltage range	70-98 % Un
Main/secondary voltage absence range	60-85 % Un
Main/secondary minimum voltage delay	0.1-900 s
Main/secondary voltage absence delay	0.1-30 s
Generator operating delay	0-900 s
Main to secondary switching delay	0.1-90 s
Main line presence delay	1-3600 s
Secondary to main switching delay	0.1-90 s
Generator set stopping delay	1-3600 s

## Dimensions and panel board faceplate cut-out

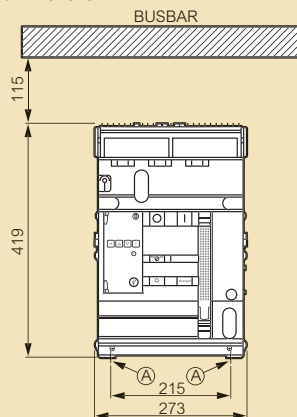


# DMX<sup>3</sup> 2500 and DMX<sup>3</sup>-I 2500 - frame 1 dimensions

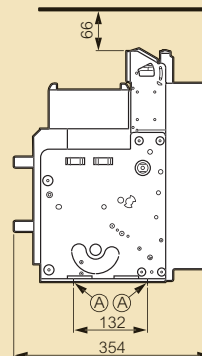
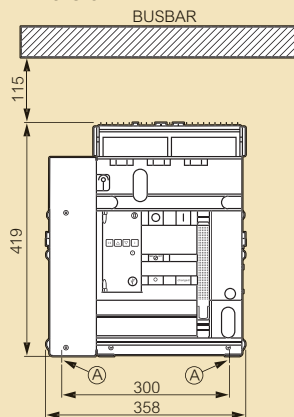
## ■ Fixed version - frame 1

### Overall dimensions

#### 3P version



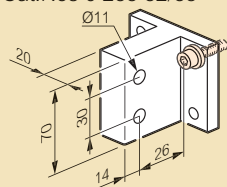
#### 4P version



A = fixing point on plate of enclosure

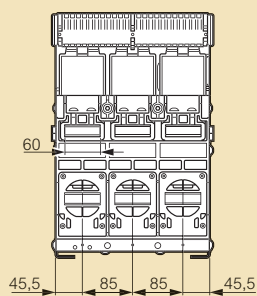
### Rear terminals for vertical connection with bars

Cat.Nos 0 288 82/83

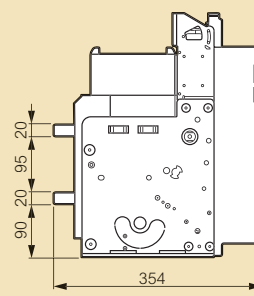
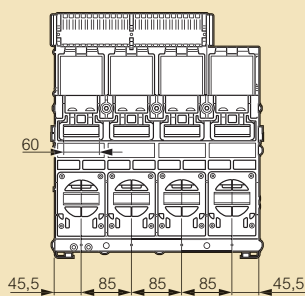


### Rear terminals for horizontal connection with bars

#### 3P version

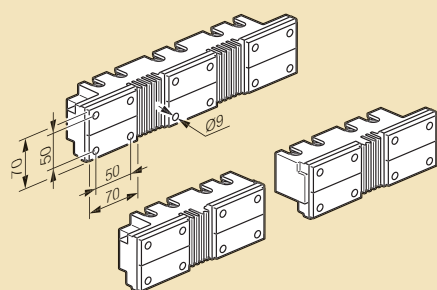


#### 4P version



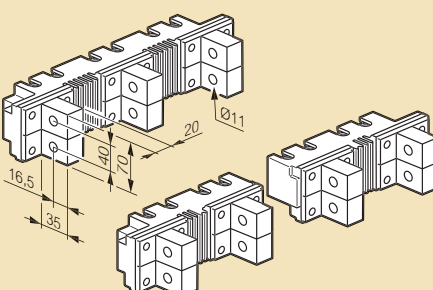
### Spreaders for flat connection with bars

Cat.Nos 0 288 86/87



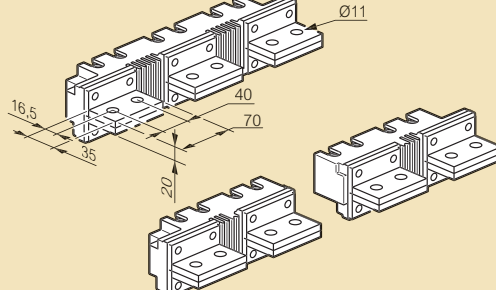
### Spreaders for vertical connection with bars

Cat.Nos 0 288 88/89



### Spreaders for horizontal connection with bars

Cat.Nos 0 288 90/91



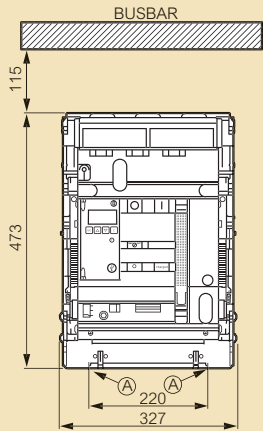


# DMX<sup>3</sup> 2500 and DMX<sup>3</sup>-I 2500 - frame 1

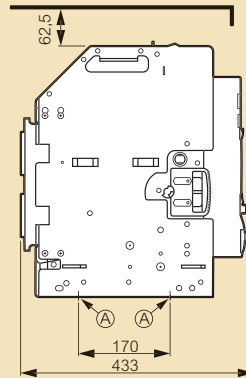
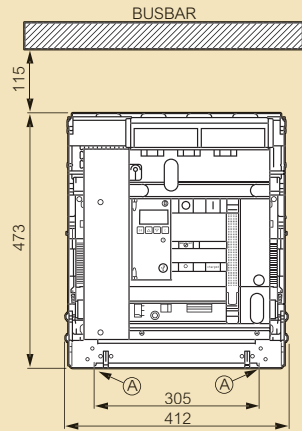
dimensions (continued)

## ■ Draw-out version - frame 1

### Overall dimensions 3P version



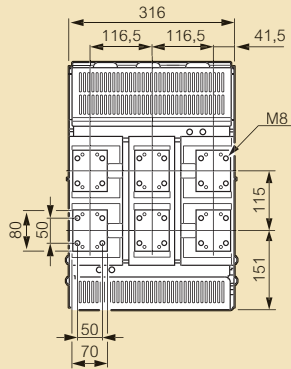
### 4P version



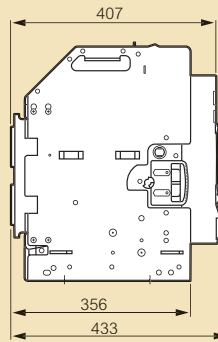
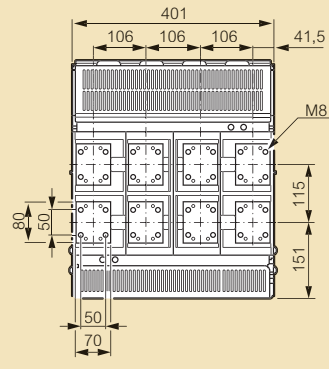
A = fixing point on plate of enclosure

### Rear terminals for flat connection with bars

#### 3P version

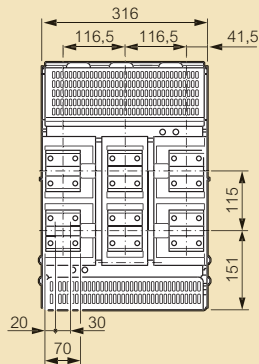


#### 4P version

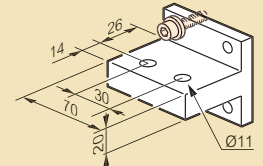
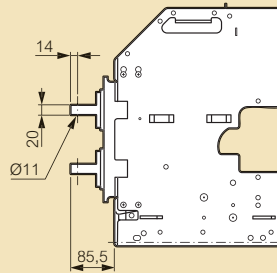
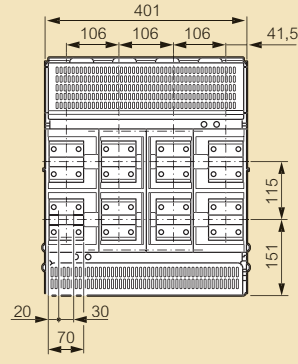


### Rear terminals for horizontal connection with bars - Cat.Nos 0 288 96/97

#### 3P version

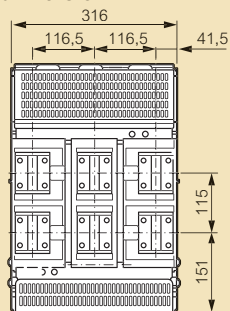


#### 4P version

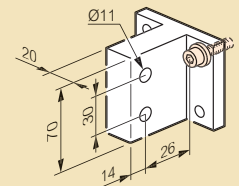
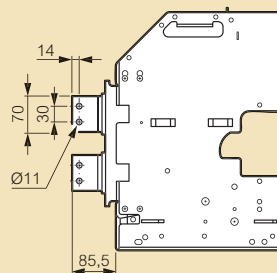
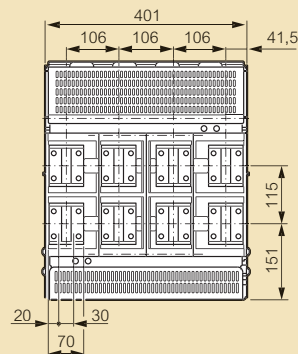


### Rear terminals for vertical connection with bars - Cat.Nos 0 288 96/97

#### 3P version



#### 4P version

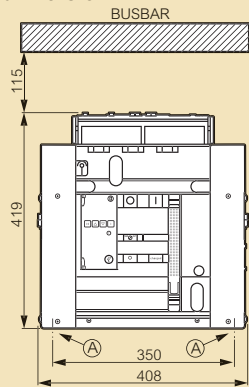


**DMX<sup>3</sup> 2500, DMX<sup>3</sup>-I 2500, DMX<sup>3</sup> 4000 and DMX<sup>3</sup>-I 4000 - frame 2**  
**dimensions**

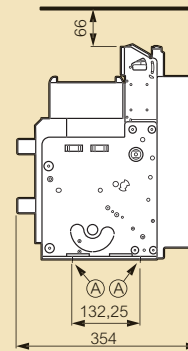
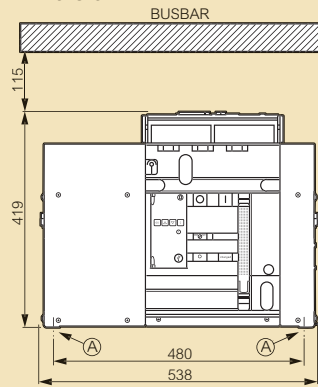
■ **Fixed version - frame 2**

**Overall dimensions**

**3P version**



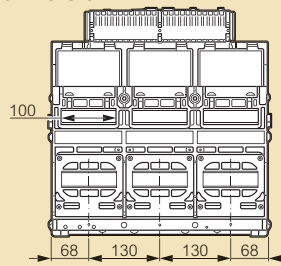
**4P version**



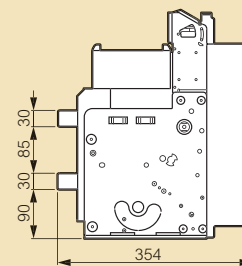
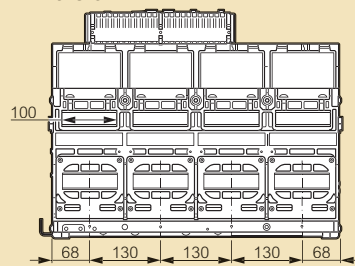
A = fixing point on plate of enclosure

**Rear terminals**

**3P version**



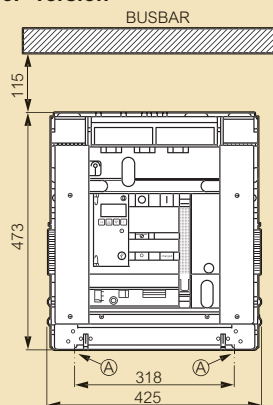
**4P version**



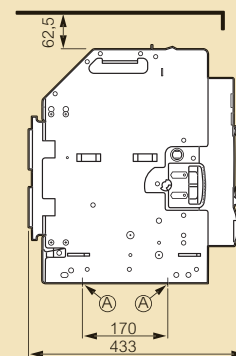
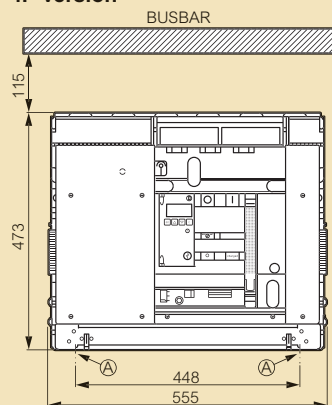
■ **Draw-out version - frame 2**

**Overall dimensions**

**3P version**



**4P version**

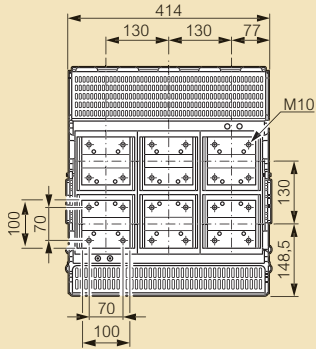


# DMX<sup>3</sup> 2500, DMX<sup>3</sup>-I 2500, DMX<sup>3</sup> 4000 and DMX<sup>3</sup>-I 4000 - frame 2 dimensions (continued)

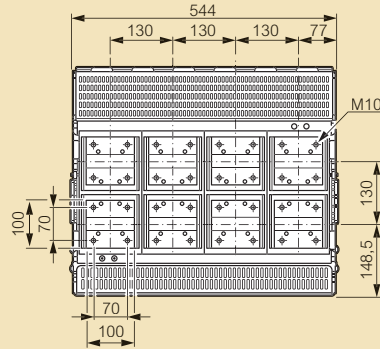
## ■ Draw-out version - frame 2 (continued)

### Rear terminals for flat connection with bars

#### 3P version



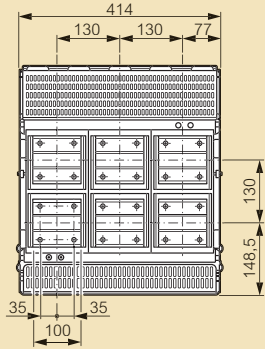
#### 4P version



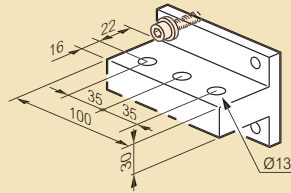
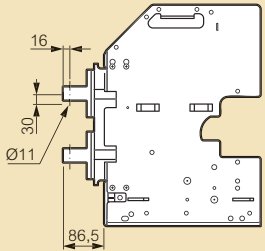
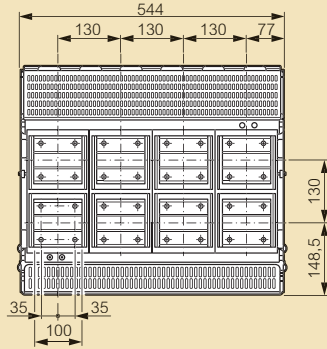
### Rear terminals for horizontal connection with bars

Cat.Nos 0 288 92/93

#### 3P version



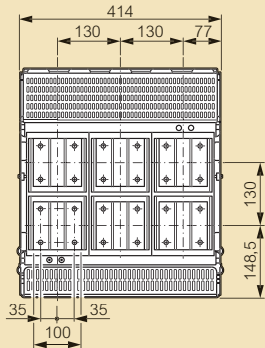
#### 4P version



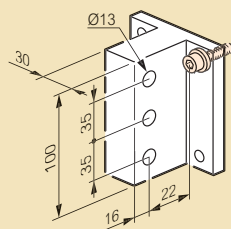
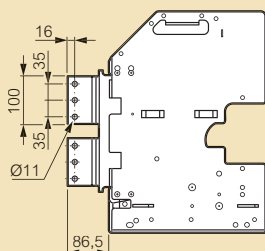
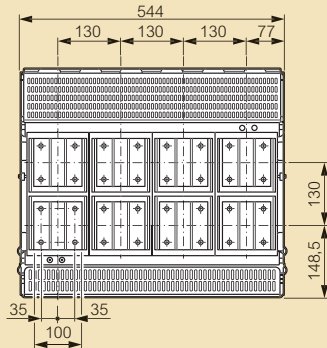
### Rear terminals for vertical connection with bars

Cat.Nos 0 288 92/93

#### 3P version

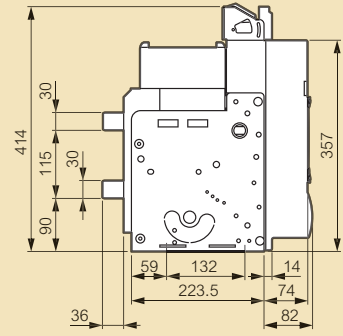
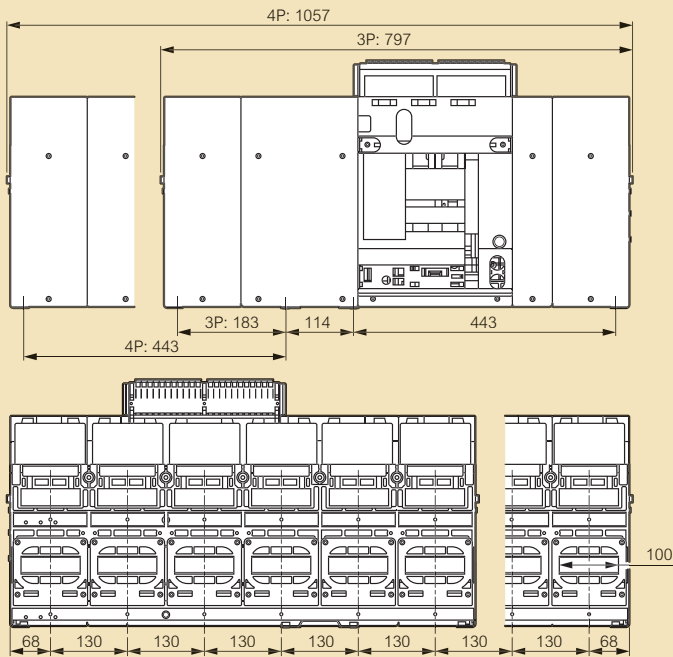


#### 4P version

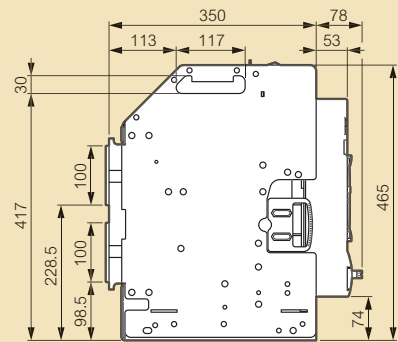
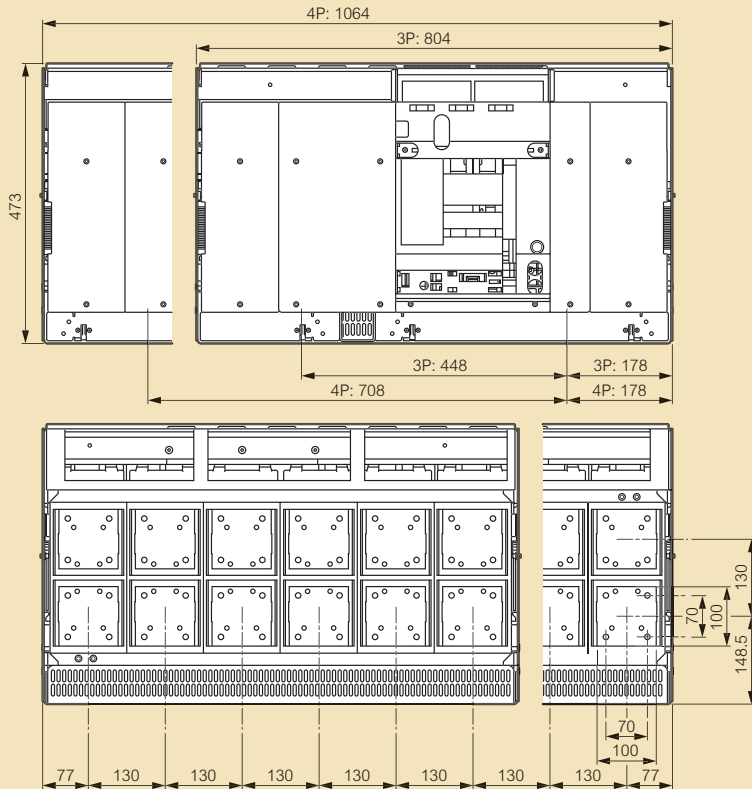


**DMX<sup>3</sup> 6300 et DMX<sup>3</sup>-I 6300 - frame 3**  
**dimensions**

■ **Fixed version - frame 3**



■ **Draw-out version - frame 3**





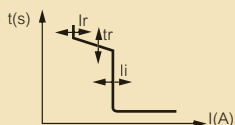
# DMX<sup>3</sup>

## electronic protection units

### Settings of the electronic protection units

#### MP4 LI

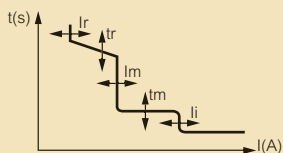
$I_r$ ,  $I_i$ ,  $t_r$  adjustment on front panel



- **Long time delay protection against overloads**  
 $I_r$  from 0.4 to 1 x  $I_n$  (6 + 6 steps) on two selectors (0.4 ÷ 0.9, by steps of 0.1 and 0.0 ÷ 0.1, by steps of 0.02)
- **Long delay protection operation time**  
 $t_r$  - at 6 x  $I_r$  (4 + 4 steps)  
 $t_r$  = 5-10-20-30 s (MEM ON) 30-20-10-5 s (MEM OFF)
- **Instantaneous protection against very high short circuits**  
 $I_i$  from 2 to 15 x  $I_n$  or  $I_{cw}$  (9 steps)  $I_i$  = 2-3-4-5-6-8-10-12-15 x  $I_n$  or  $I_{cw}$
- **Neutral protection:**  $I_N$  = I-II-III-IV x  $I_r$  (0-50-100-100 %)

#### MP4 LSI

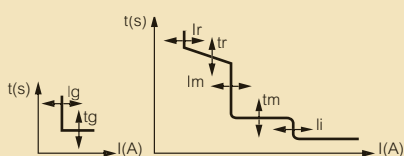
$I_r$ ,  $t_r$ ,  $I_m$ ,  $t_m$ ,  $I_i$  adjustment on front panel



- **Long time delay protection against overloads**  
 $I_r$  from 0.4 to 1 x  $I_n$  (6 + 6 steps) on two selectors (0.4 ÷ 0.9, by steps of 0.1 and 0.0 ÷ 0.1, by steps of 0.02)
- **Long delay protection operation time**  
 $t_r$  - at 6 x  $I_r$  (4 + 4 steps)  $t_r$  = 5-10-20-30 s (MEM ON) 30-20-10-5 s (MEM OFF)
- **Short time delay protection against short circuits**  
 $I_m$  from 1.5 to 10 x  $I_r$  (9 steps)  $I_m$  = 1.5-2-2.5-3-4-5-6-8-10 x  $I_r$
- **Short time delay protection operation time**  
 $t_m$  from 0 to 0.3 s (4 + 4 steps)  $t_m$  = 0-0.1-0.2-0.3 s ( $t$ =const), 0.3-0.2-0.1-0.01 s ( $I_{2t}$ =const)
- **Instantaneous protection against very high short circuits**  
 $I_i$  from 2 to 15 x  $I_n$  or  $I_{cw}$  (9 steps)  $I_i$ =off-2-3-4-6-8-10-12-15 x  $I_n$  or  $I_{cw}$
- **Neutral protection:**  $I_N$  = I-II-III-IV x  $I_r$  (0-50-100-100 %)

#### MP4 LSIg

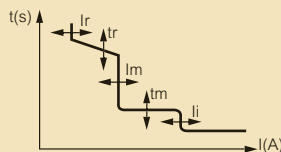
$I_r$ ,  $t_r$ ,  $I_i$ ,  $I_g$ ,  $t_g$ ,  $I_m$ ,  $t_m$ , adjustment on front panel



- **Long time delay protection against overloads**  
 $I_r$  from 0.4 to 1 x  $I_n$  (6 + 6 steps) on two selectors (0.4 ÷ 0.9, by steps of 0.1 and 0.0 ÷ 0.1, by steps of 0.02)
- **Long delay protection operation time**  
 $t_r$  - at 6 x  $I_r$  (4 + 4 steps)  $t_r$  = 5-10-20-30 s (MEM ON) 30-20-10-5 s (MEM OFF)
- **Short time delay protection against short circuits**  
 $I_m$  from 1.5 to 10 x  $I_r$  (9 steps)  $I_m$  = 1.5-2-2.5-3-4-5-6-8-10 x  $I_r$
- **Short time delay protection operation time**  
 $t_m$  from 0 to 0.3 s (4 + 4 steps)  $t_m$  = 0-0.1-0.2-0.3 s ( $t$ =constant), 0.3-0.2-0.1-0.01 s ( $I_{2t}$ =constant)
- **Instantaneous protection against very high short circuits**  
 $I_i$  from 2 to 15 x  $I_n$  or  $I_{cw}$  (9 steps)  $I_i$  = OFF-2-3-4-6-8-10-12-15 x  $I_n$  or  $I_{cw}$
- **Earth fault current**  
 $I_g$  from 0.2 to 1 x  $I_n$  (9 steps)  $I_g$  = 0.2-0.3-0.4-0.5-0.6-0.7-0.8-1 x  $I_n$ , OFF
- **Time delay on earth fault tripping**  
 $t_g$  from 0.1 to 1 x  $I_n$  (4 steps)  $T_g$  = 0,1-0,2-0,5-1 s (both  $t$ =constant and  $I_{2t}$ =constant)
- **Neutral protection:**  $I_N$  = I-II-III-IV x  $I_r$  (0-50-100-100 %)

#### MP6 LSI

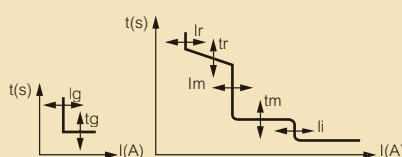
$I_r$ ,  $t_r$ ,  $I_m$ ,  $t_m$ ,  $I_i$  adjustment on front panel



- **Long time delay protection against overloads**  
 $I_r$  from 0.4 to 1 x  $I_n$  (7 steps)  $I_r$  = 0.4-0.5-0.6-0.7-0.8-0.9-1 x  $I_n$
- **Long delay protection operation time**  
 $t_r$  - at 6 x  $I_r$  (4 steps)  $t_r$  = 5-10-20-30 s (both MEM ON and MEM OFF)
- **Short time delay protection against short circuits**  
 $I_m$  from 1.5 to 10 x  $I_r$  (9 steps)  $I_m$  = 1.5-2-2.5-3-4-5-6-8-10 x  $I_r$
- **Short time delay protection operation time**  
 $t_m$  from 0.03 to 1 s (11 steps)  $t_m$  = 0.03-0.1-0.2-0.3-0.4-0.5-0.6-0.7-0.8-0.9-1 s (both  $t$ =constant and  $I_{2t}$ =constant)
- **Instantaneous protection against very high short circuits**  
 $I_i$  from 2 to 15 x  $I_n$  or  $I_{cw}$  (9 steps)  $I_i$ =2-3-4-6-8-10-12-15 x  $I_n$  or  $I_{cw}$
- **Neutral protection:**  $I_N$  = I-II-III-IV x  $I_r$  (0-50-100-100 %)

#### MP6 LSIg

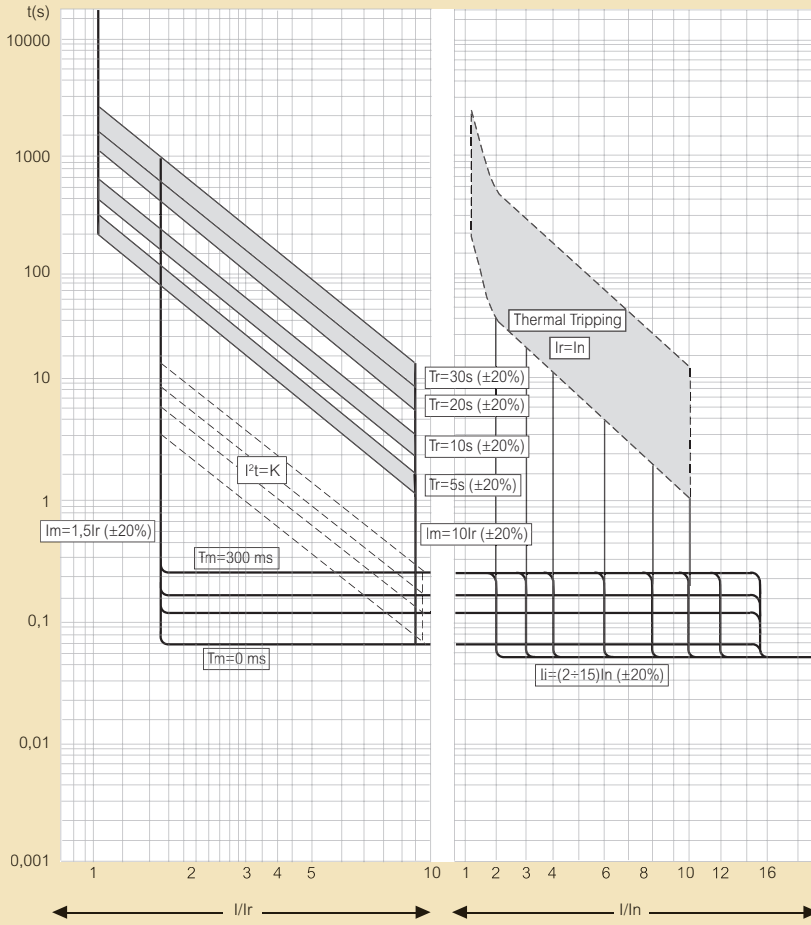
$I_r$ ,  $t_r$ ,  $I_i$ ,  $I_g$ ,  $t_g$ ,  $I_m$ ,  $t_m$ , adjustment on front panel



- **Long time delay protection against overloads**  
 $I_r$  from 0.4 to 1 x  $I_n$  (7 steps)  $I_r$  = 0.4-0.5-0.6-0.7-0.8-0.9-1 x  $I_n$
- **Long delay protection operation time**  
 $t_r$  - at 6 x  $I_r$  (4 steps)  $t_r$  = 5-10-20-30 s (both MEM ON and MEM OFF)
- **Short time delay protection against short circuits**  
 $I_m$  from 1.5 to 10 x  $I_r$  (9 steps)  $I_m$  = 1.5-2-2.5-3-4-5-6-8-10 x  $I_r$
- **Short time delay protection operation time**  
 $t_m$  from 0.03 to 1 s (11 steps)  $t_m$  = 0.03-0.1-0.2-0.3-0.4-0.5-0.6-0.7-0.8-0.9-1 s (both  $t$ =constant and  $I_{2t}$ =constant)
- **Instantaneous protection against very high short circuits**  
 $I_i$  from 2 to 15 x  $I_n$  or  $I_{cw}$  (9 steps)  $I_i$ =2-3-4-6-8-10-12-15 x  $I_n$  or  $I_{cw}$
- **Earth fault current**  
 $I_g$  from 0.2 to 1 x  $I_n$  (9 steps)  $I_g$  = 0.2-0.3-0.4-0.5-0.6-0.7-0.8-1 x  $I_n$ , OFF
- **Time delay on earth fault tripping**  
 $t_g$  from 0.1 to 1 x  $I_n$  (4 steps)  $T_g$  = 0,1-0,2-0,5-1 s (both  $t$ =constant and  $I_{2t}$ =constant)
- **Neutral protection:**  $I_N$  = I-II-III-IV x  $I_r$  (0-50-100-100 %)

**DMX<sup>3</sup>**  
tripping curves

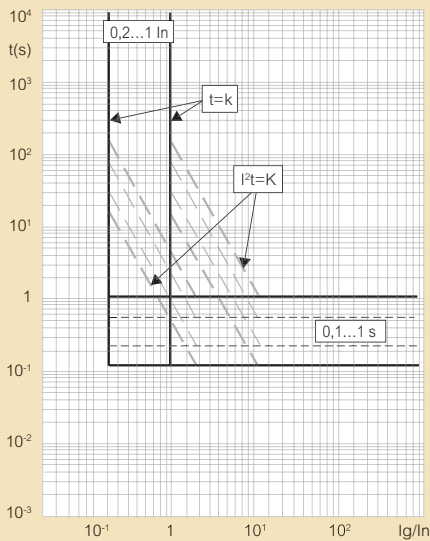
■ Selective time-current tripping characteristic for MP4 and MP6 protection units



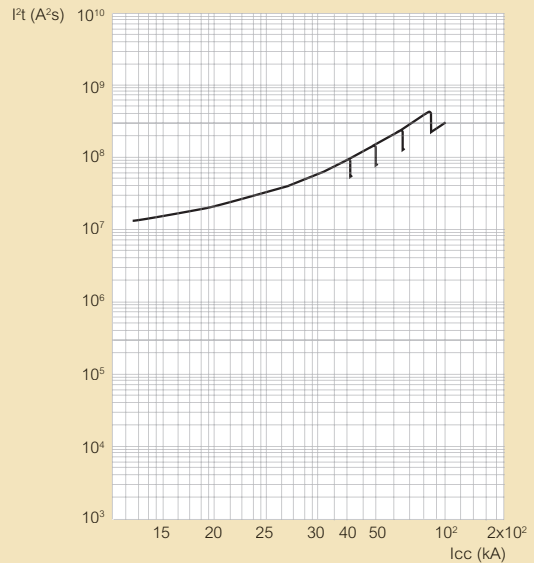
If short-circuit current is higher than  $I_{cw}$  value or  $I_i$  is setted at  $I_{cw}$  position, tripping time is equal to 30ms

- $I_r$  = long time setting current
- $T_r$  = long time delay
- $I_m$  = short time setting current
- $T_m$  = short time delay
- $I_f$  = instantaneous intervention current

■ Ground fault tripping curve for LSig protection unit



■ Pass-through specific energy characteristic



$I_{cc}$  (kA) = estimated short circuit symmetrical current (RMS value)  
 $I^2t$  (A<sup>2</sup>s) = pass-through specific energy

# DMX<sup>3</sup> selectivity table

## ■ Selectivity in three-phase network 400 V $\sim$

### DMX3/DPX

Downstream \ Upstream	DMX <sup>3</sup> 2500						DMX <sup>3</sup> 4000		DMX <sup>3</sup> 6300	
	800 A	1000 A	1250 A	1600 A	2000 A	2500 A	3200 A	4000 A	5000 A	6300 A
DPX 125 <sup>(1)</sup>	T	T	T	T	T	T	T	T	T	T
DPX 160 <sup>(1)</sup>	T	T	T	T	T	T	T	T	T	T
DPX 250 ER <sup>(1)</sup>	T	T	T	T	T	T	T	T	T	T
DPX 250 <sup>(1)</sup> TM and electronic	T	T	T	T	T	T	T	T	T	T
DPX 630 <sup>(1)</sup> TM and electronic	T	T	T	T	T	T	T	T	T	T
DPX 1600 <sup>(1)</sup> thermal magnetic	630 A	T	T	T	T	T	T	T	T	T
	800 A		T	T	T	T	T	T	T	T
	1000 A			T	T	T	T	T	T	T
	1250 A				T	T	T	T	T	T
DPX 1600 <sup>(1)</sup> electronic	630 A			T	T	T	T	T	T	T
	800 A			T	T	T	T	T	T	T
	1000 A				T	T	T	T	T	T
	1250 A					T	T	T	T	T
	1600 A						T	T	T	T

(1) All breaking capacity

T: total selectivity, up to downstream circuit breaker breaking capacity according to IEC 60947-2

### DMX<sup>3</sup>/DMX<sup>3</sup>

Downstream \ Upstream	DMX <sup>3</sup>										
	800 A	1000 A	1250 A	1600 A	2000 A	2500 A	3200 A	4000 A	5000 A	6300 A	
DMX <sup>3</sup>	800 A	T	T	T	T	T	T	T	T	T	
	1000 A		T	T	T	T	T	T	T	T	
	1250 A			T	T	T	T	T	T	T	
	1250 A				T	T	T	T	T	T	
	1600 A					T	T	T	T	T	
	2000 A						T	T	T	T	
	2500 A							T	T	T	
	3200 A								T	T	
	4000 A									T	T
	5000 A										T
	6300 A										

T: total selectivity, up to downstream circuit breaker breaking capacity according to IEC 60947-2

Icu of downstream circuit breaker  $\leq$  Icu of upstream circuit breaker

Selectivity values are intended with protection unit properly adjusted

### DMX<sup>3</sup>/DX

	DMX <sup>3</sup>									
	800 A	1000 A	1250 A	1600 A	2000 A	2500 A	3200 A	4000 A	5000 A	6300 A
DX <sup>3</sup> 6000 - 10 kA	T	T	T	T	T	T	T	T	T	T
DX <sup>3</sup> 10000 - 16 kA	T	T	T	T	T	T	T	T	T	T
DX <sup>3</sup> 25 kA	T	T	T	T	T	T	T	T	T	T
DX <sup>3</sup> 36 kA	T	T	T	T	T	T	T	T	T	T
DX <sup>3</sup> 50 kA	T	T	T	T	T	T	T	T	T	T

T: total selectivity, up to downstream circuit breaker breaking capacity according to IEC 60947-2

Icu of downstream circuit breaker  $\leq$  Icu of upstream circuit breaker

Selectivity values are intended with protection unit properly adjusted

# DMX<sup>3</sup>

## technical characteristics

### ■ Technical characteristics

#### DMX<sup>3</sup> 2500

DMX <sup>3</sup> according to IEC 60947-2	DMX <sup>3</sup> 2500																		
	800			1000			1250			1600			2000			2500			
	N	H	L	N	H	L	N	H	L	N	H	L	N	H	L	N	H	L	
Number of poles	3P - 4P			3P - 4P			3P - 4P			3P - 4P			3P - 4P			3P - 4P			
Rating In (A)	800			1000			1250			1600			2000			2500			
Rated insulation voltage Ui (V)	1000			1000			1000			1000			1000			1000			
Rated impulse withstand voltage Uimp (kV)	12			12			12			12			12			12			
Rated operational voltage (50/60Hz) Ue (V)	690			690			690			690			690			690			
Frame	1		2	1		2	1		2	1		2	1		2	1		2	
Ultimate breaking capacity Icu (kA)	230 V~	50	65	100	50	65	100	50	65	100	50	65	100	50	65	100	50	65	100
	415 V~	50	65	100	50	65	100	50	65	100	50	65	100	50	65	100	50	65	100
	500 V~	50	65	100	50	65	100	50	65	100	50	65	100	50	65	100	50	65	100
	600 V~	50	60	75	50	60	75	50	60	75	50	60	75	50	60	75	50	60	75
	690 V~	50	55	65	50	55	65	50	55	65	50	55	65	50	55	65	50	55	65
Service breaking capacity Ics (% Icu)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
Short-circuit making capacity Icm (kA)	230 V~	105	143	220	105	143	220	105	143	220	105	143	220	105	143	220	105	143	220
	415 V~	105	143	220	105	143	220	105	143	220	105	143	220	105	143	220	105	143	220
	500 V~	105	143	220	105	143	220	105	143	220	105	143	220	105	143	220	105	143	220
	600 V~	105	132	165	105	132	165	105	132	165	105	132	165	105	132	165	105	132	165
	690 V~	105	121	143	105	121	143	105	121	143	105	121	143	105	121	143	105	121	143
Short time withstand current Icw (kA) for t = 1s	230 V~	50	65	85	50	65	85	50	65	85	50	65	85	50	65	85	50	65	85
	415 V~	50	65	85	50	65	85	50	65	85	50	65	85	50	65	85	50	65	85
	500 V~	50	65	85	50	65	85	50	65	85	50	65	85	50	65	85	50	65	85
	600 V~	50	60	75	50	60	75	50	60	75	50	60	75	50	60	75	50	60	75
	690 V~	50	55	65	50	55	65	50	55	65	50	55	65	50	55	65	50	55	65
Category of use	B			B			B			B			B			B			
Isolation behavior	Yes			Yes			Yes			Yes			Yes			Yes			
Endurance (cycles)	mechanical	10000			10000			10000			10000			10000			10000		
	electrical	5000			5000			5000			5000			5000			5000		

#### DMX<sup>3</sup> 4000

DMX <sup>3</sup> according to IEC 60947-2	DMX <sup>3</sup> 4000						
	3200			4000			
	N	H	L	N	H	L	
Number of poles	3P - 4P			3P - 4P			
Rating In (A)	3200			4000			
Rated insulation voltage Ui (V)	1000			1000			
Rated impulse withstand voltage Uimp (kV)	12			12			
Rated operational voltage (50/60Hz) Ue (V)	690			690			
Frame	2		2	2		2	
Ultimate breaking capacity Icu (kA)	230 V~	50	65	100	50	65	100
	415 V~	50	65	100	50	65	100
	500 V~	50	65	100	50	65	100
	600 V~	50	60	75	50	60	75
	690 V~	50	55	65	50	55	65
Service breaking capacity Ics (% Icu)	100	100	100	100	100	100	
Short-circuit making capacity Icm (kA)	230 V~	105	143	220	105	143	220
	415 V~	105	143	220	105	143	220
	500 V~	105	143	220	105	143	220
	600 V~	105	132	165	105	132	165
	690 V~	105	121	143	105	121	143
Short time withstand current Icw (kA) for t = 1s	230 V~	50	65	85	50	65	85
	415 V~	50	65	85	50	65	85
	500 V~	50	65	85	50	65	85
	600 V~	50	60	75	50	60	75
	690 V~	50	55	65	50	55	65
Category of use	B			B			
Isolation behavior	Yes			Yes			
Endurance (cycles)	mechanical	10000			10000		
	electrical	5000			5000		

#### DMX<sup>3</sup> 6300

DMX <sup>3</sup> according to IEC 60947-2	DMX <sup>3</sup> 6300		
	5000	6300	
	L	L	
Number of poles	3P - 4P	3P - 4P	
Rating In (A)	5000	5000	
Rated insulation voltage Ui (V)	1000	1000	
Rated impulse withstand voltage Uimp (kV)	12	12	
Rated operational voltage (50/60Hz) Ue (V)	690	690	
Frame	3	3	
Ultimate breaking capacity Icu (kA)	230 V~	100	100
	415 V~	100	100
	500 V~	100	100
	600 V~	75	75
	690 V~	65	65
Service breaking capacity Ics (% Icu)	100	100	
Short-circuit making capacity Icm (kA)	230 V~	220	220
	415 V~	220	220
	500 V~	220	220
	600 V~	165	165
	690 V~	143	143
Short time withstand current Icw (kA) for t = 1s	230 V~	100	100
	415 V~	100	100
	500 V~	100	100
	600 V~	75	75
	690 V~	65	65
Category of use	B	B	
Isolation behavior	Yes	Yes	
Endurance (cycles)	mechanical	5000	5000
	electrical	2500	2500



## Temperature derating

### Fixed version

Temperature	40°C		50°C		60°C		65°C		70°C	
	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>
DMX <sup>3</sup> 2500	800	1	800	1	800	1	800	1	800	1
	1000	1	1000	1	1000	1	1000	1	1000	1
	1250	1	1250	1	1250	1	1250	1	1250	1
	1600	1	1600	1	1600	1	1600	1	1600	1
	2000	1	2000	1	1960	0.98	1920	0.96	1880	0.94
DMX <sup>3</sup> 4000	2500	1	2450	0.98	2350	0.94	2250	0.9	2150	0.86
	3200	1	3200	1	3200	1	3136	0.98	3008	0.94
DMX <sup>3</sup> 6300	4000	1	3920	0.98	3680	0.92	3440	0.86	3120	0.78
	5000	1	5000	1	5000	1	5000	1	5000	1
	6300	1	6300	1	6048	0.96	5796	0.92	5544	0.88

### Draw-out version

Temperature	40°C		50°C		60°C		65°C		70°C	
	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>
DMX <sup>3</sup> 2500	800	1	800	1	800	1	800	1	800	1
	1000	1	1000	1	1000	1	1000	1	1000	1
	1250	1	1250	1	1250	1	1250	1	1250	1
	1600	1	1600	1	1600	1	1600	1	1600	1
	2000	1	2000	1	1960	0.98	1920	0.96	1875	0.94
DMX <sup>3</sup> 4000	2500	1	2400	0.96	2250	0.9	2100	0.84	1950	0.78
	3200	1	3200	1	3200	1	3072	0.96	2880	0.9
DMX <sup>3</sup> 6300	4000	1	3760	0.94	3440	0.86	3200	0.8	2960	0.74
	5000	1	5000	1	5000	1	5000	1	5000	1
	6300	1	6174	0.98	5985	0.95	5796	0.92	5292	0.84

## Derating at different altitudes

Air circuit breaker	DMX <sup>3</sup> 2500, DMX <sup>3</sup> 4000 and DMX <sup>3</sup> 6300			
Altitude H (m)	< 2000	3000	4000	5000
Rated current (at 40°C) I <sub>n</sub> (A)	I <sub>n</sub>	0.98 x I <sub>n</sub>	0.94 x I <sub>n</sub>	0.90 x I <sub>n</sub>
Rated voltage U <sub>e</sub> (V)	690	600	500	440
Rated insulation voltage U <sub>i</sub> (V)	1000	900	750	600

## Minimum recommended dimension of busbars per pole

### Frame 1 - fixed and draw-out versions

I <sub>n</sub> (A)	Vertical bars (mm)	Horizontal bars (mm)
630	50 x 10	60 x 10
800	60 x 10	60 x 10
1000	80 x 10	80 x 10
1250	80 x 10	2 x 60 x 10
1600	2 x 60 x 10	2 x 80 x 10
2000	2 x 80 x 10	3 x 80 x 10
2500	3 x 80 x 10	3 x 80 x 10

### Frame 3 - fixed and draw-out versions

I <sub>n</sub> (A)	Vertical bars (mm)	Horizontal bars (mm)
5000	6 x 100 x 10	6 x 100 x 10
6300	7 x 100 x 10	7 x 100 x 10

Note: The tables presenting the minimum recommended dimensions of connection plates and bars per pole should be used solely as a general guideline for selecting products. Due to extensive variety of switchgear constructions shapes and conditions that can affect the behavior of the apparatus, the solution used must always be verified

### Frame 2 - fixed and draw-out versions

I <sub>n</sub> (A)	Vertical bars (mm)	Horizontal bars (mm)
630	1 x 40 x 10 or 2 x 40 x 5	2 x 40 x 5
800	1 x 50 x 10 or 2 x 50 x 5	2 x 50 x 5
1000	1 x 50 x 10 or 2 x 50 x 5	2 x 50 x 5
1250	2 x 50 x 5	1 x 50 x 10 + 1 x 50 x 5
1600	1 x 50 x 10 + 1 x 50 x 5	2 x 50 x 10
2000	2 x 50 x 10	2 x 60 x 10
2500	3 x 50 x 10	3 x 60 x 10
3200	3 x 100 x 10	3 x 100 x 10
4000	4 x 100 x 10	5 x 100 x 10



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