

# protection of DC circuits

## Protection of DC circuits

DX<sup>3</sup> 6000 and DX<sup>3</sup> 10000 MCBs (1P/2P/3P/4P -  $I_n \leq 63$  A) designed for use in 230/400 V $\sim$  supplies, can also be used in DC circuits. In this case, the following deratings and precautions must be taken into account

### 1 - Protection against short-circuits

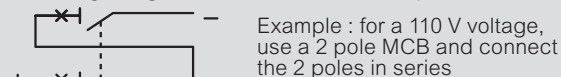
Max. magnetic tripping threshold : multiplied by 1-4  
 Example : For a C curve MCB for which the AC tripping threshold is between 5 and 10  $I_n$ , the DC tripping threshold will be between 7 and 14  $I_n$

### 2 - Protection against overloads

The time/current thermal tripping curve is the same as for AC

### 3 - Operating voltage

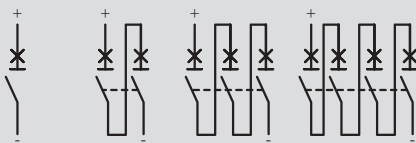
Max. operating voltage : 80 V per pole (60 V for single pole + N MCBs)  
 For voltages higher than this value, several poles must be wired in series



### 4 - Breaking capacity

4000 A for a single pole MCB at max. voltage (80 V= per pole)

For other voltages, the breaking capacities are as follows:



DX <sup>3</sup> 6000	voltage	single pole	2P	3P
Acc. to IEC 60947-2	$\leq 48$ V	6 kA	6 kA	
	110 V		6 kA	6 kA
	230 V			
Ics <sup>1</sup>	$\leq 48$ V	100 %	100 %	
	110 V		100 %	100 %
	230 V			

DX <sup>3</sup> 10000	voltage	single pole	2P	3P	4P
Acc. to IEC 60947-2	$\leq 48$ V	10 kA	10 kA		
	110 V		10 kA	10 kA	
	230 V				15 kA
Ics <sup>1</sup>	$\leq 48$ V	100 %	100 %		
	110 V		100 %	100 %	
	230 V				100 %

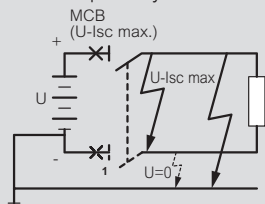
1 : As a % of Icu

### 5 - Distribution of breaking poles

To choose the MCB and determine the pole distribution necessary for breaking on each of the polarities, it is necessary to know how the installation is earthed

#### • Supply with one polarity earthed:

Place all the poles necessary for breaking on the other polarity. If isolation is required, an additional pole must be added on the earthed polarity

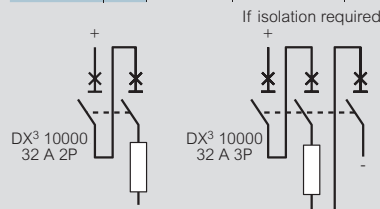


1 : Only if isolation required

Example : circuit earthed via the negative polarity /  $U = 110$  V= /  $I_{sc} = 10$  kA /  $I_n = 32$  A

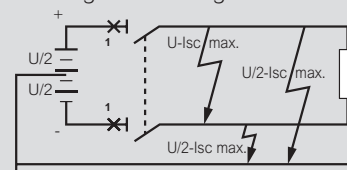
Protect the positive polarity using an MCB capable of breaking 10 kA at 110 V (DX<sup>3</sup> 10000 2P 32 A with 2 poles on the positive polarity)  
 For isolation, use a DX<sup>3</sup> 10000 3P 32 A with 2 poles on the positive polarity and one pole on the negative polarity

DX <sup>3</sup> 10000	voltage	single pole	2P	3P	4P
Acc. to IEC 60947-2	$\leq 48$ V	10 kA	10 kA		
	110 V		10 kA	10 kA	
	230 V				15 kA



#### • Network earthed via a middle point:

Place on each polarity the number of poles necessary for max.  $I_{sc}$  breaking at half voltage

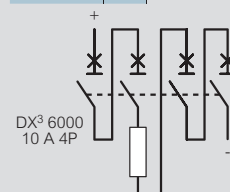


1 : MCB (U/2-Isc max.)

Example : circuit earthed via a middle point /  $U = 230$  V= /  $I_{sc} = 6$  kA /  $I_n = 10$  A

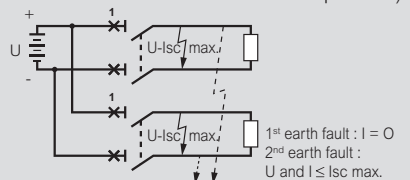
Protect each polarity using an MCB capable of breaking 6 kA at half voltage, i.e. 115 V (DX<sup>3</sup> 6000 4P 10 A with 2 poles on each polarity)

DX <sup>3</sup> 6000	voltage	single pole	2P	3P
Acc. to IEC 60947-2	$\leq 48$ V	6 kA	6 kA	
	110 V		6 kA	6 kA
	230 V			



#### • Isolated earth supply:

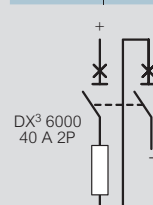
Distribute the poles necessary for breaking over the 2 polarities to provide protection in the event of a double earth fault (particularly if there are a number of circuits in parallel)



1 : MCB (U-Isc max.)

Example : isolated earth circuit /  $U = 48$  V= /  $I_{sc} = 4.5$  kA /  $I_n = 40$  A  
 Protect the installation with an MCB capable of breaking 4.5 kA at 48 V and protect each polarity (DX<sup>3</sup> 6000 MCB 2P 40 A with one pole on each polarity)

DX <sup>3</sup> 6000	voltage	single pole	2P	3P
Acc. to IEC 60947-2	$\leq 48$ V	6 kA	6 kA	
	110 V		6 kA	6 kA
	230 V			



**NEW**

# RCDs - DX<sup>3</sup>-ID

residual current devices 16 A to 100 A - AC and A types



4115 25



4117 05



4117 60



4117 90

Dimensions **p. 65**  
 Technical information **p. 62**

Conform to IEC 61008-1

• AC type : detect AC component faults

• A type : detect AC and DC component faults

Enhanced immunity to unwanted tripping in disturbed environments

Can be equipped with DX<sup>3</sup> auxiliaries and accessories **p. 62**

Pack	Cat. Nos.	Double pole - 230 V $\sim$	
1	4115 00	<b>AC Type  10 mA</b> Nominal rating I <sub>n</sub> (A) 16	Number of modules 2
1	4115 04	<b>AC Type  30 mA</b> 25	2
1	4115 05	40	2
1	4115 06	63	2
1	4115 07	80	2
1	4115 08	100	2
1	4115 14	<b>AC Type  100 mA</b> 25	2
1	4115 15	40	2
1	4115 16	63	2
1	4115 17	80	2
1	4115 24	<b>AC Type  300 mA</b> 25	2
1	4115 25	40	2
1	4115 26	63	2
1	4115 27	80	2
1	4115 37	<b>AC Type  100 mA discriminating</b> 100	2
1	4115 43	<b>AC Type  300 mA discriminating</b> 63	2
1	4115 50	<b>A Type  10 mA</b> 16	2
1	4115 54	<b>A Type  30 mA</b> 25	2
1	4115 55	40	2
1	4115 56	63	2
1	4115 57	80	2
1	4115 69	<b>A Type  300 mA</b> 25	2
1	4115 70	40	2
1	4115 71	63	2
1	4115 72	80	2
1	4115 84	<b>A Type  300 mA discriminating</b> 63	2

Pack	Cat. Nos.	Four pole - 400 V $\sim$ - neutral on right-hand side	
1	4117 02	<b>AC Type  30 mA</b> Nominal rating I <sub>n</sub> (A) 25	Number of modules 4
1	4117 03	40	4
1	4117 04	63	4
1	4117 05	80	4
1	4117 12	<b>AC Type  100 mA</b> 25	4
1	4117 13	40	4
1	4117 14	63	4
1	4117 15	80	4
1	4117 22	<b>AC Type  300 mA</b> 25	4
1	4117 23	40	4
1	4117 24	63	4
1	4117 25	80	4
1	4117 32	<b>AC Type  500 mA</b> 25	4
1	4117 33	40	4
1	4117 34	63	4
1	4117 35	80	4
1	4117 45	<b>AC Type  300 mA discriminating</b> 40	4
1	4117 46	63	4
1	4117 59	<b>A Type  30 mA</b> 25	4
1	4117 60	40	4
1	4117 61	63	4
1	4117 62	80	4
1	4117 69	<b>A Type  100 mA</b> 25	4
1	4117 70	40	4
1	4117 71	63	4
1	4117 72	80	4
1	4117 73	100	4
1	4117 79	<b>A Type  300 mA</b> 25	4
1	4117 80	40	4
1	4117 81	63	4
1	4117 82	80	4
1	4117 83	100	4
1	4117 90	<b>A Type  500 mA</b> 40	4
1	4117 91	63	4
1	4117 92	80	4
1	4118 00	<b>A Type  300 mA discriminating</b> 40	4
1	4118 01	63	4

Auxiliaries and accessories **p. 62**



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