Detuned reactors

Characteristics

The detuned reactors (DR) are designed to protect the capacitors and prevent amplification of the harmonics present on the network.

PB100036_SE-35

Detuned reactor.

Detuned reactor for 400 V - 50 Hz network Tuning order: 4.3 (215 Hz)				
Power restored by the assembly reactor-capacitor	L (mH)	I_1 (A)	Power losses (W)	Ref.
6.25 kvar/400 V - 50 Hz	4.71	9	100	**51573**
12.5 kvar/400 V - 50 Hz	2.37	17.9	150	**52404**
25 kvar/400 V - 50 Hz	1.18	35.8	200	**52405**
50 kvar/400 V - 50 Hz	0.592	71.7	320	**52406**
100 kvar/400 V - 50 Hz	0.296	143.3	480	**52407**
Tuning order: 3.8 (190 Hz)				
Power restored by the assembly reactor-capacitor	L (mH)	I_1 (A)	Power losses (W)	Ref.
6.25 kvar/400 V - 50 Hz	6.03	9.1	100	**51568**
12.5 kvar/400 V - 50 Hz	3	18.2	150	**53352**
25 kvar/400 V - 50 Hz	1.5	36.4	200	**53353**
50 kvar/400 V - 50 Hz	0.75	72.8	300	**52354**
100 kvar/400 V - 50 Hz	0.37	145.5	450	**51569**
Tuning order: 2.7 (135 Hz)				
Power restored by the assembly reactor-capacitor	L (mH)	I_1 (A)	Power losses (W)	Ref.
6.25 kvar/400 V - 50 Hz	12.56	9.3	100	**51563**
12.5 kvar/400 V - 50 Hz	6.63	17.6	150	**51564**
25 kvar/400 V - 50 Hz	3.14	37.2	200	**51565**
50 kvar/400 V - 50 Hz	1.57	74.5	400	**51566**
100 kvar/400 V - 50 Hz	0.78	149	600	**51567**

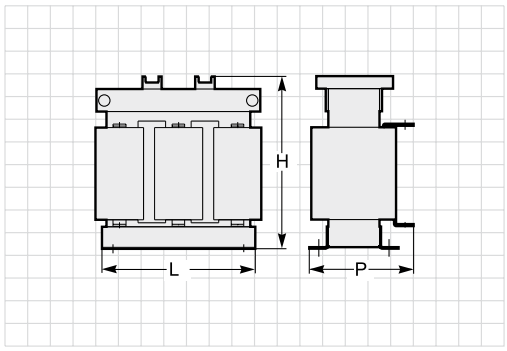
Characteristics

- three-phase, dry, magnetic circuit, impregnated
- cooling: natural
- degree of protection: IP00
- insulation class: H
- standards: IEC 60289, EN 60289
- rated voltage: 400/415 V three-phase 50 Hz
- tuning order (relative impedance): 4.3 (5.4 %); 3.8 (6.9 %); 2.7 (13.7 %)
- inductance tolerance per phase: - 5, +5 %
- maximum constant current: $Imp = \sqrt{[(1,1 \cdot I_1)^2 + I_3^2 + I_5^2 + I_7^2 + I_{11}^2]}$
  - Imp = 1.31 . I1 for 4.3 tuning
  - Imp = 1.19 . I1 for 3.8 tuning
  - Imp = 1.12 . I1 for 2.7 tuning
- harmonic current spectrum

As a % of the current of the fundamental (I1)	Tuning order 4.3	Tuning order 3.8	Tuning order 2.7
Current I_3	2 %	3 %	6 %
Current I_5	69 %	44 %	17 %
Current I_7	19 %	13 %	6 %
Current I_{11}	6 %	5 %	2 %

- insulation level: 1.1 kV
- thermal withstand Isc: 25 x Ie, 2 x 0.5 second
- dynamic withstand: 2.2 Isc (peak value)
- dielectric test 50 Hz between windings and windings/earth: 3.3 kV, 1 min
- thermal protection restored on terminal block 250 V AC, 2 A.

Detuned reactors

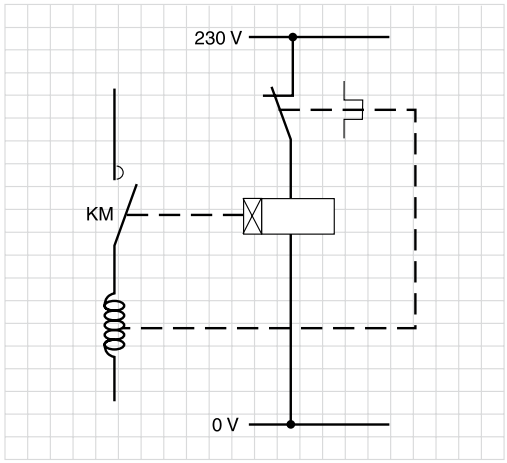


Detuned reactor.

Operating conditions

- use: indoor
- storage temperature -40 °C, +60 °C
- relative humidity in operation: 20 to 80 %
- saline mist withstand: 250 hours
- operating temperature/altitude:

Altitude	Minimum	Maximum	Highest average over any period of:	
(m)	(°C)	(°C)	1 year	24 hours
1000	0	55	40	50
> 1000, y 2000	0	50	35	45



Normally closed dry contact.

Installation

- forced ventilation required (see chapter 6 page 48)
- vertical detuned reactor winding for better heat dissipation
- electrical connection:
  - ☐ to a screw terminal block for 6.25 and 12.5 kvar detuned reactors
  - ☐ to a drilled pad for 25, 50 and 100 kvar detuned reactors
- 480 V capacitors must be used with the detuned reactors in the case of a 400/415 V, 50 Hz network.

As the detuned reactor is fitted with thermal protection,
it is imperative that the normally closed dry contact be used to disconnect the step in the event of overheating
(see drawing at left).

Dimensions

Tuning order: 4.3 (215 Hz)					
Power restored by the detuned reactor/ capacitor assembly	Fixing centre distance	Maximum dimensions (mm)			Weight
	(mm)	H	W	D	(kg)
6.25 kvar/400 V - 50 Hz	110 x 87	230	200	140	8.6
12.5 kvar/400 V - 50 Hz	205 x 110	230	245	140	12
25 kvar/400 V - 50 Hz	205 x 110	230	240	140	18.5
50 kvar/400 V - 50 Hz	(1)	270	260	160	25
100 kvar/400 V - 50 Hz	205 x 120	330	380	220	42
Tuning order: 3.8 (190 Hz)					
Power restored by the detuned reactor/ capacitor assembly	Fixing centre distance	Maximum dimensions (mm)			Weight
	(mm)	H	W	D	(kg)
6.25 kvar/400 V - 50 Hz	110 x 87	230	200	140	8.5
12.5 kvar/400 V - 50 Hz	205 x 110	230	245	140	10
25 kvar/400 V - 50 Hz	205 x 110	230	240	140	18
50 kvar/400 V - 50 Hz	(1)	270	260	160	27
100 kvar/400 V - 50 Hz	205 x 120	330	380	220	42
Tuning order: 2.7 (135 Hz)					
Power restored by the detuned reactor/ capacitor assembly	Fixing centre distance	Maximum dimensions (mm)			Weight
	(mm)	H	W	D	(kg)
6.25 kvar/400 V - 50 Hz	110 x 87	230	200	140	9
12.5 kvar/400 V - 50 Hz	205 x 110	230	245	145	13
25 kvar/400 V - 50 Hz	205 x 110	230	240	140	22
50 kvar/400 V - 50 Hz	(1)	270	260	160	32
100 kvar/400 V - 50 Hz	205 x 120	330	380	220	57

(1) *205 x 120 or 205 x 130 mm.*

Detuned reactors

Detuned reactor / capacitor / contactor combination tables

Maximum temperature 40 °C and maximum altitude 2000 m

480 V capacitors			fr = 135 Hz		
Qc 400 V	**Qc 480 V**	**Capacitor ref.**	**DR ref.**	**Specific contactors**	**Standard contactors**
6.25 kvar	8 kvar	**51337** x 1	**51563** x 1	LC1-DFK11M7 x 1	LC1D12 x 1
12.5 kvar	15.5 kvar	**51331** x 1	**51564** x 1	LC1-DFK11M7 x 1	LC1D25 x 1
25 kvar	31 kvar	**51331** x 2	**51565** x 1	LC1-DMK11M7 x 1	LC1D38 x 1
50 kvar	62 kvar	**51335** x 2 + **51333**	**51566** x 1	LC1-DWK12M7 x 1	LC1D95 x 1
100 kvar	124 kvar	**51335** x 4 + **51333** x 2	**51567** x 1	-	LC1D115 x 1

480 V capacitors			fr = 215 Hz	fr = 190 Hz		
Qc 400 V	**Qc 480 V**	**Capacitor ref.**	**DR ref.**	**DR ref.**	**Specific contactors**	**Standard contactors**
6.25 kvar	9 kvar	**51327** x 1	**51573** x 1	**51568** x 1	LC1-DFK11M7 x 1	LC1D12 x 1
12.5 kvar	17 kvar	**51333** x 1	**52404** x 1	**52352** x 1	LC1-DFK11M7 x 1	LC1D25 x 1
25 kvar	34 kvar	**51333** x 2	**52405** x 1	**52353** x 1	LC1-DMK11M7 x 1	LC1D38 x 1
50 kvar	68 kvar	**51335** x 3	**52406** x 1	**52354** x 1	LC1-DWK12M7 x 1	LC1D95 x 1
100 kvar	136 kvar	**51335** x 6	**52407** x 1	**51569** x 1	-	LC1D115 x 1

Maximum temperature 50 °C and maximum altitude 1000 m (see chapter 6 page 49)

550 V capacitors			fr = 135 Hz		
Qc 400 V	**Qc 550 V**	**Capacitor ref.**	**DR ref.**	**Specific contactors**	**Standard contactors**
6.25 kvar	10.5 kvar	**51363** x 1	**51563** x 1	LC1-DFK11M7 x 1	LC1D12 x 1
12.5 kvar	21 kvar	**51363** x 2	**51564** x 1	LC1-DGK11M7 x 1	LC1D25 x 1
25 kvar	40.5 kvar	**51353** x 3	**51565** x 1	LC1-DPK11M7 x 1	LC1D40 x 1
50 kvar	81 kvar	**51357** x 3 + **51353** x 2	**51566** x 1	LC1-DWK12M7 x 1	LC1D95 x 1
100 kvar	162 kvar	**51357** x 9	**51567** x 1	-	LC1F185 x 1

550 V capacitors			fr = 215 Hz	fr = 190 Hz		
Qc 400 V	**Qc 550 V**	**Capacitor ref.**	**DR ref.**	**DR ref.**	**Specific contactors**	**Standard contactors**
6.25 kvar	11.5 kvar	**51351** x 1	**51573** x 1	**51568** x 1	LC1-DFK11M7 x 1	LC1D12 x 1
12.5 kvar	23 kvar	**51351** x 2	**52404** x 1	**52352** x 1	LC1-DGK11M7 x 1	LC1D25 x 1
25 kvar	46 kvar	**51357** x 1 + **51353** x 2	**52405** x 1	**52353** x 1	LC1-DPK11M7 x 1	LC1D40 x 1
50 kvar	90 kvar	**51357** x 5	**52406** x 1	**53354** x 1	LC1-DWK12M7 x 1	LC1D95 x 1
100 kvar	180 kvar	**51357** x 10	**52407** x 1	**53359** x 1	-	LC1F185 x 1

Note: *LC1D contactors not incorporating a preinstalled resistor can be used with detuned reactors.*
The inductance of the detuned reactor limits the energising current to a value that can be accepted by the contactor.