

The detuned reactors are designed to protect the capacitors by preventing amplification of the harmonics present on the network.



As we know systems with significant non-linear loads generate harmonics and harmonics shortening steadily operating life of capacitors.

Amplification of harmonic currents is very high when the natural resonance frequency of the capacitor and the network combined happened to be close to any of the harmonic frequencies present.

To avoid this possibility detuned reactors have to be associated to Power Factor Correction capacitors. Capacitors and reactors are configured in a series resonant circuit in the way that the series resonant frequency is below the lowest harmonic frequency present in the system.

Detuned harmonic reactors prevents harmonic resonance problems, avoids the risk of overloading the capacitors and contributes to reducing voltage harmonic distortion in the network.

The most common values of reactors tuning frequency are 189 Hz and 134 Hz. (134 Hz is used with high level of 3rd harmonic voltages).

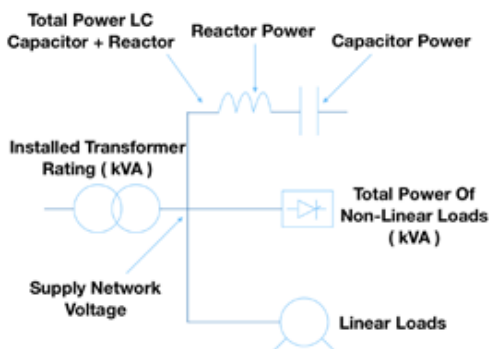
## CAPACITORS RATED VOLTAGE WITH DETUNED REACTORS

INTACT R-POWER capacitors are oppositely designed to be used with detuned GE-RT3 reactors. This is because, capacitance and inductance must be chosen properly for series resonant circuit. Moreover the rated voltage of capacitors must be higher that network service voltage.

The recommended rated voltage of capacitors to be used with detuned harmonic reactors with respect to different network service voltage, relative tuning frequency and capacitance - inductive connection is given in the table below.

Network Service Voltage	Network Service Frequency	Tuning Frequency	Relative Impedance	INTACT R-POWER Rated Voltage	
400 V	50 Hz / 60 Hz	189 Hz	7 %	440 V	STANDARD SOLUTION
		134 Hz	14 %		
400 V	50 Hz / 60 Hz	189 Hz	7 %	525 V	EXTRA LIFE SOLUTION
		134 Hz	14 %		

## EXAMPLE OF CAPACITOR SELECTION WITH A DETUNED REACTOR



### Case:

For a 400 V 50 Hz system, it is required to compensate 25 kVar reactive power with a detuned reactor, tuning frequency 189 Hz and 7% relative impedance.

### Step 1:

Go to page 11 and check for 25 kVar in the "Total Power LC Capacitor + Reactor" column. Select the capacitor power from standard solution at 440 V or extra live solution at 525 V. The selection of the 25 kVar detuned reactor can be made on the page 13.

### Step 2:

Combination of capacitor with order code **3PF28,1E440INR257** and detuned reactor with order code **GE3RTM25.400R189** will give 25 kVar reactive power as required.

## GE-RT3 DETUNED HARMONIC REACTORS GENERAL CHARACTERISTICS

### General

Standards:	IEC 61558-2-20 EN 61558-2-20
Origin:	100% made in Italy
Voltage range:	220 V to 690 V
Frequency:	50 Hz — 60 Hz
Relative impedance:	5,7%, 7%, 14%
Tuning frequency:	189 Hz / 230 Hz, 134 Hz / 160 Hz, 210 Hz / 250 Hz ( at 50 Hz / 60 Hz )
Power range:	2,5 kVar to 100 kVar
Insulation class:	Class H
Winding material:	Al ( Cu on request )
Working class:	Class F
Protection degree:	IP00
Test voltage:	3kV/1'
Maximum ambient temperature:	Ta 40 °C

## GE-RT3 REACTORS - REACTORS RATED VOLTAGE: 400 V - 189 Hz - P=7%

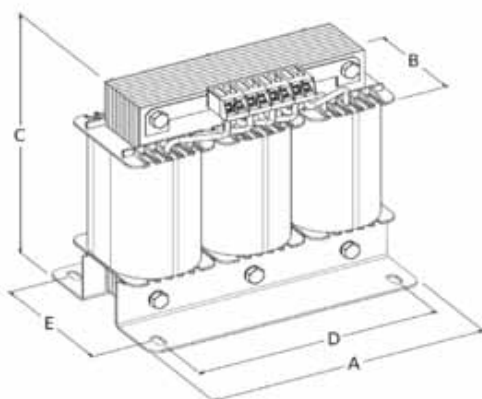
ORDER CODE	POWER	RATED INDUCTANCE	REACTOR CURRENT	REACTOR LOSSES	DIMENSIONS*			WEIGHT	TERMINAL TYPE	CLAMP SIZE	TYPE
	400 V kVar	3 x mH	A	At 75° C W	A (mm)	B (mm)	C (mm)	Kg	mmq		
GE3RTM5.400R189	5	7,66	7,2	47	180	90	173	5	Connector	6 sqmm	1
GE3RTM10.400R189	10	3,84	14,4	68	180	102	173	7	Connector	6 sqmm	1
GE3RTM12,5.400R189	12,5	3,07	18	72	180	113	173	10	Connector	6 sqmm	1
GE3RTM15.400R189	15	2,50	22	75	180	128	173	12	Connector	6 sqmm	1
GE3RTM20.400R189	20	1,90	29	108	240	160	185	15	Bars	25 x 3 mm M8	2
GE3RTM25.400R189	25	1,53	36	120	240	160	185	16	Bars	25 x 3 mm M8	2
GE3RTM50.400R189	50	0,77	72,1	177	250	175	205	24	Bars	25 x 3 mm M8	2
GE3RTM75.400R189	75	0,51	108,2	240	300	175	260	31	Bars	30 x 3 mm M8	2
GE3RTM100.400R189	100	0,38	144,3	320	300	200	260	42	Bars	30 x 3 mm M8	2

Other reactor powers and voltages are available on request. Contact us [info@gruppoenergia.it](mailto:info@gruppoenergia.it)

## CONSTRUCTION DIAGRAM

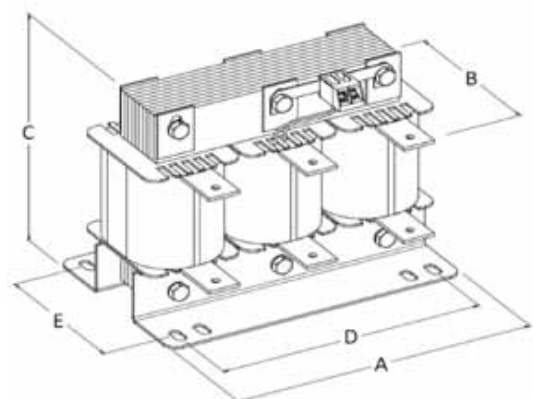
### TYPE 1

Thermal PTC inserted in the middle coil



### TYPE 2

Thermal PTC inserted in the middle coil



\*All dimensions are in "mm" and will be confirmed at the time of order.