

grup ARGE

Harmonic Filter Reactor User Manual



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PROPER USE AND SAFETY REGULATIONS



Cut all the power when connecting and disconnecting the device to a panel.



Do not clean the device with a solvent or similar material. Only use a dry cloth.



Please do not intervene to the device when a technical problem is encountered and get in contact with a technical service within the shortest time.



If the warnings are not taken into account, our company or the authorized dealer shall not be held responsible for the negative consequences.



Do not dispose in the trash, the device must be delivered to the collection centers (electronic device recycling centers). It should be recycled or disposed of without harming human health and environment.



The installation, assembly, activation and operation of the device should be done and used by only expert professionals and in accordance with safety regulations and instructions.



The device operates with current transformers. Do not strictly leave current transformer tips unattached. Dangerous high voltage can occur.

1. General Features

Under normal conditions, it is desirable that the mains voltage be in sinusoidal form, however, the mains voltage move away from the sinusoidal form for various reasons and high frequency components called harmonics are formed. When harmonics exceed certain limits, they can have very dangerous consequences for enterprises. For this reason, in enterprises with high harmonics harmonic filter reactors should be used in compensation panels. In this way, resonance events are prevented which are dangerous for the system. In addition, capacitors are protected from the harmful effects of harmonics.

- High permeability iron core, air gap design.
- Design in accordance with EN 61000-2-2, EN 61558-2-1, EN 61558-2-20 Standards.
- Thermal protection against overheating in the middle leg.
- Moisture protection and quiet operation with vacuum varnish. (Sizing is for information purposes , may change)

2. Technical Features

Standards	TS EN 60076-6 / TS EN 61558-2-20
Rated Voltage(V)	230 / 690
Rated Power(kVAr)	0.5 - 100
Rated Frequency (Hz)	50
Number of Phases	1 Faz / 3 Faz
Rector's Factor	%5,67 - %7 - %14
Inductivity Tolerance	%5
Protection Class	IP00
Thermal protection	120 °C, 1 NC Contact
Insulation Class	F (155 °C)
Cooling	Natural T40
Moisture	<%95
core	Low loss silica sheet, Air gap
Wrapping Material	Copper, Aluminum
Connection	terminal, lug or copper busbar..

2.1 Single phase Harmonic Filter(P=%5,67)

Product code	Product name	Voltage 230 (V)	P (210Hz)	Power (kVAr)	Thermal Protection	Dimensions (mm) (width x height x depth)	Weight (Kg)
GA5311	HRM 0.5/5.67	√	%5,67	0.5	√	70 x 85 x 85	1.35
GA5312	HRM 1.0/5.67	√	%5,67	1.0	√	85 x 85 x 85	1.95
GA5313	HRM 1.5/5.67	√	%5,67	1.5	√	85 x 100 x 100	2.45
GA5314	HRM 2.5/5.67	√	%5,67	2.5	√	90 x 120 x 115	3.80
GA5315	HRM 5.0/5.67	√	%5,67	5.0	√	110 x 150 x 130	6.35
GA5316	HRM 7.5/5.67	√	%5,67	7.5	√	120 x 150 x 130	8.30
GA5317	HRM 10.0/5.67	√	%5,67	10.0	√	150 x 150 x 130	11.30

2.2 Single phase Harmonic Filter(P=%7)

Product code	Product name	Voltage 230 (V)	P (210 Hz)	Power (kVAr)	Thermal Protection	Dimensions (mm) (width x height x depth)	Weight (Kg)
GA5411	HRM 0.5/7	√	%7	0.5	√	85 x 85 70	1.5
GA5412	HRM 1.0/7	√	%7	1.0	√	85 x 85 x 85	2.0
GA5413	HRM 1.5/7	√	%7	1.5	√	95 x 85 x 90	2.5
GA5414	HRM 2.5/7	√	%7	2.5	√	120 x 105 x 85	4.0
GA5415	HRM 5.0/7	√	%7	5.0	√	150 x 125 x 115	6.5
GA5416	HRM 7.5/7	√	%7	7.5	√	150 x 125 x 125	8.5
GA5417	HRM 10.0/7	√	%7	10.0	√	150 x 125 x 150	11.5

2.3 Single phase Harmonic Filter(P=%14)

Product code	Product name	Voltage 230 (V)	P (210 Hz)	Power(kVAr)	Thermal Protection	Dimensions (mm) (width x height x depth))	Weight (Kg)
GA5511	HRM 0.5/14	√	%14	0.5	√	70 x 85 x 85	1.35
GA5512	HRM 1.0/14	√	%14	1.0	√	85 x 85 x 85	1.95
GA5513	HRM 1.5/14	√	%14	1.5	√	85 x 100 x 100	2.45
GA5514	HRM 2.5/14	√	%14	2.5	√	90 x 120 x 115	3.80
GA5515	HRM 5.0/14	√	%14	5.0	√	110 x 150 x 130	6.35
GA5516	HRM 7.5/14	√	%14	7.5	√	120 x 150 x 130	8.30
GA5517	HRM 10.0/14	√	%14	10.0	√	150 x 150 x 130	11.30

2.4 Three Phase Harmonic Filters(P=%5.67)

Product code	Product name	Voltage 400 (V)	P (210 Hz)	Power (kVAr)	Thermal Protection	Dimensions (mm) (width x height x depth))	Weight (Kg)
GA5321	HRT 0.5/5.67	√	%5.67	0.5	√	150 x 140 x 75	2.4
GA5322	HRT 1.0/5.67	√	%5.67	1.0	√	120 x 110 x 70	2.6
GA5323	HRT 1.5/5.67	√	%5.67	1.5	√	150 x 135 x 80	2.8
GA5324	HRT 2.5/5.67	√	%5.67	2.5	√	150 x 135 x 85	4.0
GA5325	HRT 3.12/5.67	√	%5.67	3.12	√	180 x 180 x 100	4.5
GA5326	HRT 5.0/5.67	√	%5.67	5.0	√	180 x 180 x 105	5.5
GA5327	HRT 6.25/5.67	√	%5.67	6.25	√	180 x 180 x 110	5.8
GA5328	HRT 7.5/5.67	√	%5.67	7.5	√	180 x 180 x 120	6.5
GA5329	HRT 10.0/5.67	√	%5.67	10.0	√	180 x 180 x 130	8.0
GA5330	HRT 12.5/5.67	√	%5.67	12.5	√	180 x 180 x 140	9.0

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GA5331	HRT 15.0/5.67	√	%5.67	15.0	√	240 x 205 x 140	15.0
GA5332	HRT 20.0/5.67	√	%5.67	20.0	√	240 x 205 x 150	15.0
GA5333	HRT 25.0/5.67	√	%5.67	25.0	√	240 x 205 x 160	17.0
GA5334	HRT 30.0/5.67	√	%5.67	30.0	√	240 x 205 x 160	21.0
GA5335	HRT 40.0/5.67	√	%5.67	40.0	√	300 x 255 x 160	27.0
GA5336	HRT 50.0/5.67	√	%5.67	50.0	√	320 x 150 x 260	30.0
GA5337	HRT 60.0/5.67	√	%5.67	60.0	√	300 x 260 x 160	35.0
GA5338	HRT 75.0/5.67	√	%5.67	75.0	√	320 x 160 x 260	37.0
GA5339	HRT 100.0/5.67	√	%5.67	100.0	√	390 x 160 x 310	44.0

2.5 Three Phase Harmonic Filters(P=%7)

Product code	Product name	Voltage 400 (V)	P (189 Hz)	Power (kVAr)	Thermal Protection	Dimensions (mm) (width x height x depth))	Weight (Kg)
GA5421	HRT 0.5/7	√	%7	0.5	√	120 x 110 x 60	1.5
GA5422	HRT 1.0/7	√	%7	1.0	√	120 x 110 x 70	2.0
GA5423	HRT 1.5/7	√	%7	1.5	√	150 x 135 x 80	2.8
GA5424	HRT 2.5/7	√	%7	2.5	√	150 x 135 x 85	3.5
GA5425	HRT 3.12/7	√	%7	3.12	√	150 x 150 x 100	4.3
GA5426	HRT 5.0/7	√	%7	5.0	√	180 x 180 x 100	5.0
GA5427	HRT 6.25/7	√	%7	6.25	√	180 x 180 x 110	5.8
GA5428	HRT 7.5/7	√	%7	7.5	√	180 x 180 x 110	6.5
GA5429	HRT 10.0/7	√	%7	10.0	√	180 x 180 x 120	7.0
GA5430	HRT 12.5/7	√	%7	12.5	√	180 x 180 x 140	8.5
GA5431	HRT 15.0/7	√	%7	15.0	√	240 x 205 x 140	11.0

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GA5432	HRT 20.0/7	√	%7	20.0	√	240 x 205 x 140	12.0
GA5433	HRT 25.0/7	√	%7	25.0	√	240 x 205 x 140	15.0
GA5434	HRT 30.0/7	√	%7	30.0	√	240 x 205 x 140	18.0
GA5435	HRT 40.0/7	√	%7	40.0	√	250 x 240 x 150	23.0
GA5436	HRT 50.0/7	√	%7	50.0	√	320 x 160 x 260	23.5
GA5437	HRT 60.0/7	√	%7	60.0	√	300 x 255 x 150	30.0
GA5438	HRT 75.0/7	√	%7	75.0	√	320 x 170 x 260	35.0
GA5439	HRT 100.0/7	√	%7	100.0	√	390 x 170 x 310	50.0

2.6 Three Phase Harmonic Filters(P=%14)

Product code	Product name	Voltage 400 (V)	P (134 Hz)	Power(kVAr)	Thermal Protection	Dimensions (mm) (width x height x depth))	Weight (Kg)
GA5521	HRT 0.5/14	√	%14	0.5	√	150 x 140 x 75	2.4
GA5522	HRT 1.0/14	√	%14	1.0	√	150 x 150 x 100	2.6
GA5523	HRT 1.5/14	√	%14	1.5	√	150 x 150 x 100	4.5
GA5524	HRT 2.5/14	√	%14	2.5	√	150 x 150 x 100	5.5
GA5525	HRT 3.12/14	√	%14	3.12	√	180 x 180 x 110	6.5
GA5526	HRT 5.0/14	√	%14	5.0	√	180 x 180 x 120	8.0
GA5527	HRT 6.25/14	√	%14	6.25	√	180 x 180 x 125	8.5
GA5528	HRT 7.5/14	√	%14	7.5	√	180 x 180 x 125	9.0
GA5529	HRT 10.0/14	√	%14	10.0	√	180 x 180 x 140	11.0
GA5530	HRT 12.5/14	√	%14	12.5	√	240 x 205 x 140	15.0
GA5531	HRT 15.0/14	√	%14	15.0	√	240 x 205 x 140	17.0

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GA5532	HRT 20.0/14	√	%14	20.0	√	240 x 205 x 160	21.0
GA5533	HRT 25.0/14	√	%14	25.0	√	250 x 240 x 150	22.0
GA5534	HRT 30.0/14	√	%14	30.0	√	300 x 255 x 150	30.0
GA5535	HRT 40.0/14	√	%14	40.0	√	300 x 255 x 160	34.0
GA5536	HRT 50.0/14	√	%14	50.0	√	390 x 180 x 310	38.0
GA5537	HRT 60.0/14	√	%14	60.0	√	300 x 260 x 170	42.0
GA5538	HRT 75.0/14	√	%14	75.0	√	390 x 200 x 310	45.0
GA5539	HRT 100.0/14	√	%14	100.0	√	460 x 200 x 370	55.0

2.7 Harmonic Filter Comparison Charts

(P=%5.67, 210 Hz P=%7, 189 Hz P=14, 134 Hz)	
Harmonic Filter code	Capacitor Code
HRM 0.5/5.67 - HRM 0.5/7 - HRM 0.5/14	KND M0.5
HRM 1.0/5.67 - HRM 1.0/7 - HRM 1.0/14	KND M1.0
HRM 1.5/5.67 - HRM 1.5/7 - HRM 1.5/14	KND M1.5
HRM 2.5/5.67 - HRM 2.5/7 - HRM 2.5/14	KND M2.5
HRM 5.0/5.67 - HRM 5.0/7 - HRM 5.0/14	KND M5.0
HRM 7.5/5.67 - HRM 7.5/7 - HRM 7.5/14	KND M7.5
HRM 10.0/5.67 - HRM 10.0/7 - HRM 10.0/14	KND M10.0

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Harmonic filters on our list, it can be used in case of $THDV \leq 8$. In cases above these values, special wound harmonic filters are required.

Harmonic Limits for Filter Reactors:

5.Voltage Harmonic (V5) = %5

7.Voltage Harmonic (V7) = %5 Total Voltage Harmonic = %8

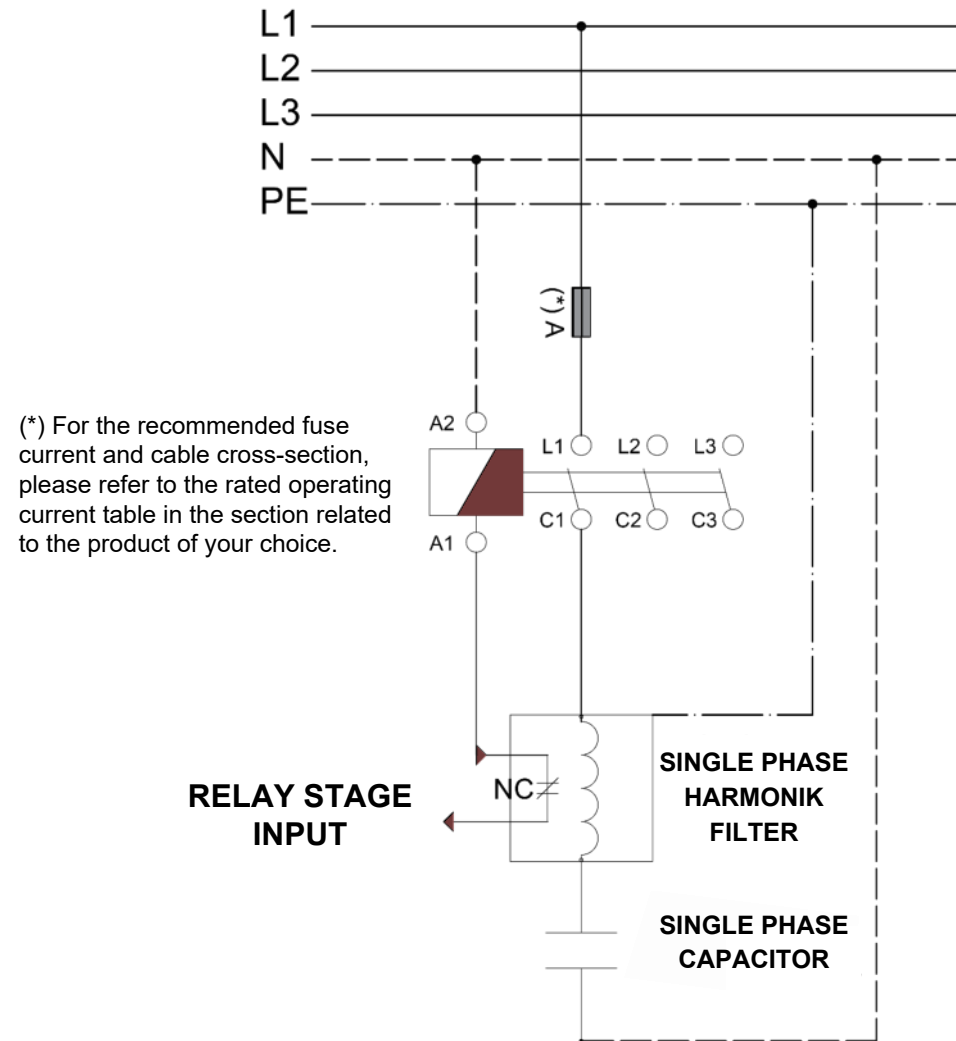
(P=%14, 134 Hz)	Capacitor Code
Harmonic Filter Code	525 V
HRT 3.1 / 14	KND B5.0
HRT 5.0 / 14	KND-B7.5
HRT 6.25 /14	KND-B10.0
HRT 10.0 / 14	KND B15.0
HRT 12.5 / 14	KND B20.0
HRT 15.0 / 14	KND B10.0+ KND T12.5
HRT 20.0 / 14	KND B30.0
HRT 25.0 / 14	KND B40.0
HRT 30.0 / 14	KND B25.0+ KND B20.0
HRT 40.0 / 14	2xKND B30.0
HRT 50.0 / 14	3xKND B25.0
HRT 60.0 / 14	3xKND B30.0
HRT 75.0 / 14	2xKND B40.0+ KND B30.0
HRT 100.0 / 14	3xKND B40.0+ KND B30.0

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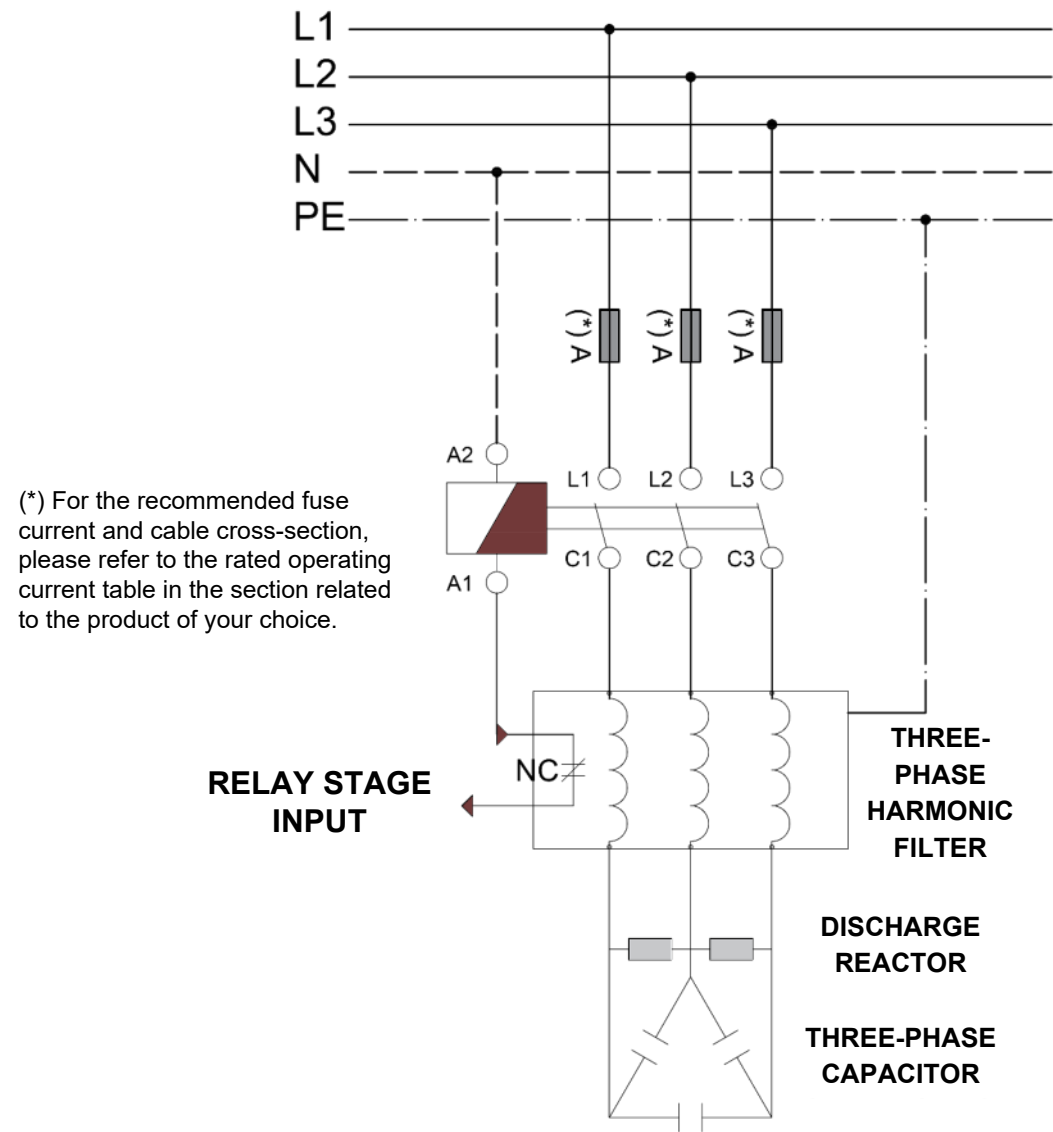
(P=%5.67, 210 Hz)	Capacitor Code		(P=%7.189 Hz)	Capacitor Code	
Harmonic Filter Code	440 V	525 V	Harmonic Filter Code	440 V	525 V
HRT 0.5/5.67	KND T0.5	-	HRT 0.5/7	KND T0.5	-
HRT 1.0/5.67	KND T1.0	-	HRT 1.0/7	KND T1.0	-
HRT 1.5/5.67	KND T1.5	-	HRT 1.5/7	KND T1.5	-
HRT 2.5/5.67	KND T2.5	-	HRT 2.5/7	KND T2.5	-
HRT 3.1/5.67	2xKND T1.5	KND B5.0	HRT 3.1/7	2xKND T1.5	KND B5.0
HRT 5.0/5.67	KND T5.0	KND B7.5	HRT 5.0/7	KND T5.0	KND B7.5
HRT 6.25/5.67	KND T5.0+KND T1.0	KND B10.0	HRT 6.25/7	KND T5.0+KND T1.0	KND B10.0
HRT 7.5/5.67	KND T7.5	KND B12.5	HRT 7.5/7	KND T7.5	KND B12.5
HRT 10.0/5.67	KND T10.0	KND B15.0	HRT 10.0/7	KND T10.0	KND B15.0
HRT 12.5/5.67	KND T12.5	KND B20.0	HRT 12.5/7	KND T12.5	KND B20.0
HRT 15.0/5.67	KND T15.0	KND B25.0	HRT 15.0/7	KND T15.0	KND B25.0
HRT 20.0/5.67	KND T18.6	KND B20.0+ KND B12.5	HRT 20.0/7	KND T18.6	KND B20.0 + KND B12.5
HRT 25.0/5.67	KND T23.2	KND B40.0	HRT 25.0/7	KND T23.2	KND B40.0
HRT 30.0/5.67	KND T15.0+KND T12.5	2xKND B25.0	HRT 30.0/7	KND T15.0+KND T12.5	2xKND B25.0
HRT 40.0/5.67	2xKND T18.6	KND B40.0 + KND B25.0	HRT 40.0/7	2xKND-T18.6	KND B40.0 + KND B25.0
HRT 50.0/5.67	2xKND T23.2	2xKND B40.0	HRT 50.0/7	2xKND-T23.2	2xKND B40.0
HRT 60.0/5.67	KND T30.0+KND T25	2xKND B40.0+KND B15.0	HRT 60.0/7	KND T30.0+KND T25	2xKND B40.0+KND B15.0
HRT 75.0/5.67	3xKND T23.2	3xKND B40.0	HRT 75.0/7	3xKND T23.2	3xKND B40.0
HRT 100.0/5.67	4xKND T23.2	4xKND B40.0	HRT 100.0/7	4xKND T23.2	4xKND B40.0

3. CONNECTION DIAGRAMS

3.1 Single phase Harmonic Filter Connection Diagram

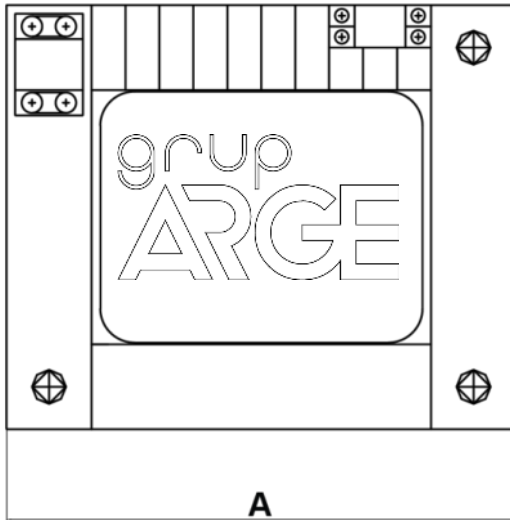


3.2 Three phase Harmonic Filter Connection Diagram

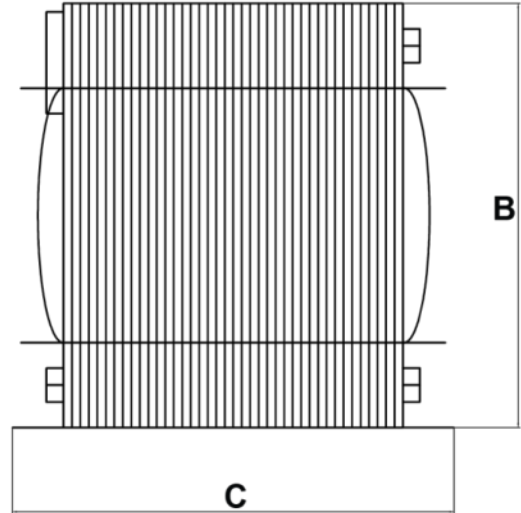


4. Product Dimensions

4.1 Product Dimensions of Single phase Harmonic Filters



FRONT VIEW



SIDE VIEW

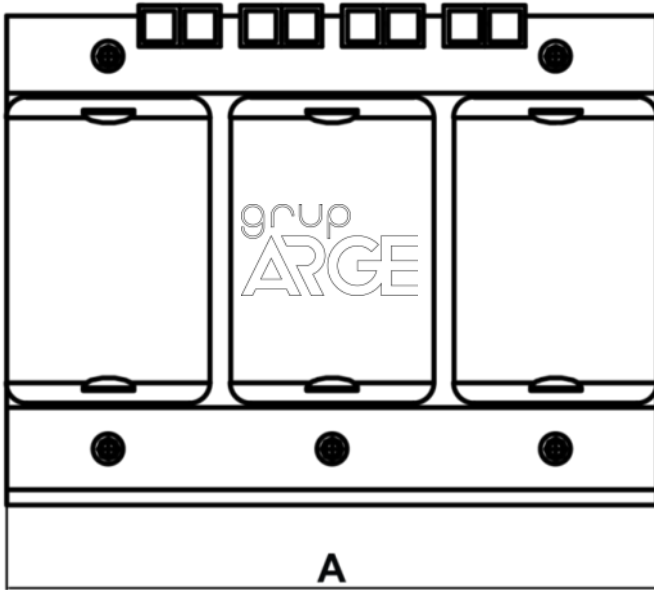
<i>P=5.67</i> Dimensions (mm)				
Product Code	Product Name	<i>A</i>	<i>B</i>	<i>C</i>
GA5311	HRM 0.5 / 5.67	70	85	85
GA5312	HRM 1.0 / 5.67	85	85	85
GA5313	HRM 1.5 / 5.67	85	100	100
GA5314	HRM 2.5 / 5.67	90	120	115
GA5315	HRM 5.0 / 5.67	110	150	130
GA5316	HRM 7.5 / 5.67	120	150	130
GA5317	HRM 10.0 / 5.67	150	150	130

<i>P=7</i> Dimensions (mm)				
Product Code	Product Name	<i>A</i>	<i>B</i>	<i>C</i>
GA5411	HRM 0.5 / 7	85	85	65
GA5412	HRM 1.0 / 7	85	85	70
GA5413	HRM 1.5 / 7	95	85	90
GA5414	HRM 2.5 / 7	120	105	90
GA5415	HRM 5.0 / 7	150	125	105
GA5416	HRM 7.5 / 7	150	125	125
GA5417	HRM 10.0 / 7	150	125	150

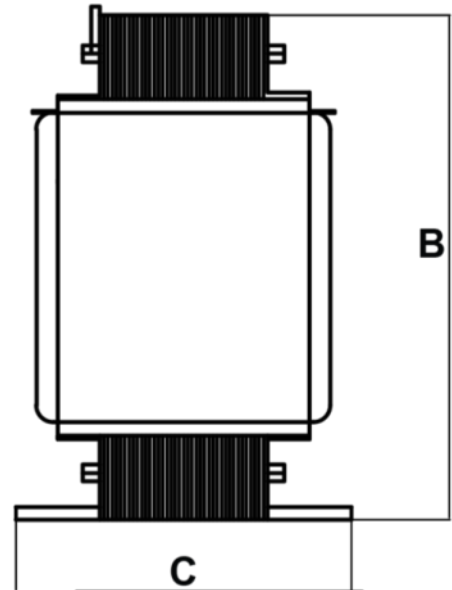
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<i>P=% 14</i> Dimensions' (mm)				
Product Code	Product Name	<i>A</i>	<i>B</i>	<i>C</i>
GA5511	<i>HRM 0.5 / 14</i>	<i>70</i>	<i>85</i>	<i>85</i>
GA5512	<i>HRM 1.0 / 14</i>	<i>85</i>	<i>85</i>	<i>85</i>
GA5513	<i>HRM 1.5 / 14</i>	<i>85</i>	<i>100</i>	<i>100</i>
GA5514	<i>HRM 2.5 / 14</i>	<i>90</i>	<i>120</i>	<i>115</i>
GA5515	<i>HRM 5.0 / 14</i>	<i>110</i>	<i>150</i>	<i>130</i>
GA5516	<i>HRM 7.5 / 14</i>	<i>120</i>	<i>150</i>	<i>130</i>
GA5517	<i>HRM 10.0 / 14</i>	<i>150</i>	<i>150</i>	<i>130</i>

4.2 Product Dimensions of Three-Phase Harmonic Filters



FRONT VIEW



SIDE VIEW

<i>P=5.67 Dimensions (mm)</i>				
Product Code	Product Name	A	B	C
GA5321	HRT 0.5 / 5.67	150	140	75
GA5322	HRT 1.0 / 5.67	120	110	70
GA5323	HRT 1.5 / 5.67	150	135	80
GA5324	HRT 2.5 / 5.67	150	135	85
GA5325	HRT 3.12 / 5.67	180	180	100
GA5326	HRT 5.0 / 5.67	180	180	105
GA5327	HRT 6.25 / 5.67	180	180	110
GA5328	HRT 7.5 / 5.67	180	180	120
GA5329	HRT 10.0 / 5.67	180	180	130
GA5330	HRT 12.5 / 5.67	180	180	140
GA5331	HRT 15.0 / 5.67	240	205	140
GA5332	HRT 20.0 / 5.67	240	205	150
GA5333	HRT 25.0 / 5.67	240	205	160
GA5334	HRT 30.0 / 5.67	240	205	160
GA5335	HRT 40.0 / 5.67	300	255	160
GA5336	HRT 50.0 / 5.67	320	260	150
GA5337	HRT 60.0 / 5.67	320	260	155
GA5338	HRT 75.0 / 5.67	320	260	160
GA5339	HRT 100.0 / 5.67	390	310	160

<i>P=7 Dimensions (mm)</i>				
Product Code	Product Name	A	B	C
GA5421	HRT 0.5 / 7	120	110	60
GA5422	HRT 1.0 / 7	120	110	70
GA5423	HRT 1.5 / 7	150	135	80
GA5424	HRT 2.5 / 7	150	135	85
GA5425	HRT 3.12 / 7	150	150	100
GA5426	HRT 5.0 / 7	180	180	100
GA5427	HRT 6.25 / 7	180	180	110
GA5428	HRT 7.5 / 7	180	180	110
GA5429	HRT 10.0 / 7	180	180	120
GA5430	HRT 12.5 / 7	180	180	140
GA5431	HRT 15.0 / 7	240	205	140
GA5432	HRT 20.0 / 7	240	205	140
GA5433	HRT 25.0 / 7	240	205	140
GA5434	HRT 30.0 / 7	240	205	150
GA5435	HRT 40.0 / 7	250	240	150
GA5436	HRT 50.0 / 7	320	260	160
GA5437	HRT 60.0 / 7	320	260	165
GA5438	HRT 75.0 / 7	320	260	170
GA5439	HRT 100.0 / 7	390	310	170

Harmonic Filter Reactor User Manual

<i>P=</i> 14 Dimensions (mm)				
Product Code	Product Name	<i>A</i>	<i>B</i>	<i>C</i>
GA5521	<i>HRT 0.5/14</i>	150	140	75
GA5522	<i>HRT 1.0/14</i>	150	150	100
GA5523	<i>HRT 1.5/14</i>	150	150	100
GA5524	<i>HRT 2.5/14</i>	150	150	100
GA5525	<i>HRT 3.12/14</i>	180	180	110
GA5526	<i>HRT 5.0/14</i>	180	180	120
GA5527	<i>HRT 6.25/14</i>	180	180	125
GA5528	<i>HRT 7.5/14</i>	180	180	125
GA5529	<i>HRT 10.0/14</i>	180	180	140
GA5530	<i>HRT 12.5/14</i>	240	205	140
GA5531	<i>HRT 15.0/14</i>	240	205	140
GA5532	<i>HRT 20.0/14</i>	240	205	160
GA5533	<i>HRT 25.0/14</i>	250	240	150
GA5534	<i>HRT 30.0/14</i>	300	255	150
GA5535	<i>HRT 40.0/14</i>	300	255	160
GA5536	<i>HRT 50.0/14</i>	390	310	180
GA5537	<i>HRT 60.0/14</i>	390	310	190
GA5538	<i>HRT 75.0/14</i>	390	310	200
GA5539	<i>HRT 100.0/14</i>	460	370	200