Reactors - Antiresonance Harmonic Filter

Type tested at CPRI • 'H' Class insulation • Thermal Micro Switch • Linearity 173%

General

The increasing use of modern power electronic apparatus (drives, uninterruptible power supplies, etc.) produces nonlinear current and thus influences and loads the network with harmonics (line pollution). The power factor correction or capacitance of the power capacitor forms a resonant circuit in conjunction with the feeding transformer. Experience shows that the self-resonant frequency of this circuit is typically between 250 and 500 Hz, i.e. in the region of the 5th and 7th harmonics.	 Such a resonance although can lead to the following undesirable effects: overloading of capacitors, overloading of transformers and transmission equipment, interference with metering and control systems, computers and electrical gear, resonance elevation, i.e. amplification of harmonics, voltage distortion. These resonance phenomena can be avoided by connecting capacitors in series with filter reactors in the PFC system. These so called "detuned" PFC systems are scaled in a way that the self-resonant	frequency is below the lowest line harmonic. The detuned PFC system is purely inductive seen by harmonics above this frequency. For the base line frequency (50 or 60 Hz usually), the detuned system on the other hand acts purely capacitive, thus correcting the reactive power.
Applications	Features	

- Avoidance of resonance conditions
- Tuned and detuned harmonic filters
- Reduction of harmonic distortion (network clearing)
- Reduction of power losses

- High harmonic loading capability
- Very low losses
 - High linearity to avoid choke tilt
 - Low noise
 - Convenient mounting
 - Long expected life time
 - Temperature protection (NC contact)

Technical data and limit values							
Filter reactors							
Harmonics*	$V_{_3} = 0.5\% V_{_{R}}$ (duty cycle = 100%)						
	$V_{s} = 6.0\% V_{R}$ (duty cycle = 100%)						
	$V_7 = 5.0\% V_R$ (duty cycle = 100%)						
	$V_{_{11}} = 3.5\% V_{_{R}}$ (duty cycle = 100%)						
	$V_{_{13}} = 3.0\% V_{_{R}}$ (duty cycle = 100%)						
Effective current	Irms = $\sqrt{(l_1^2 + l_3^2 \dots l_{13}^2)}$						
Fundamental current	$I_1 = 1.06 \cdot I_R$ (50 Hz or 60 Hz current of capacitor)						
Temperature protection	microswitch (NC)						
Dimensional drawings and terminals	see page 62 and 63						
Three-phase filter reactors to EN 60289							
Frequency	50 Hz or 60 Hz						
Voltage	400, 415, 440, 690*#						
Output	5 100 KVAr						
Detuning	5.67%, 7%, 14%						
Cooling	natural						
Ambient temperature	40 °C						
Class of insulation	Н						
Enclosure	1900						

* According to DIN ENV VV61000-2-2

Other voltage ratings on request

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Rated voltage - 440 V 7% aluminum wound reactors

Electrical Parameters and Terminations											
KVAr	Material Code	Rated Current (A)	I rms (A)	Inductance (mH)	Terminations						
5	B44066D7005K440N1	6.6	7.45	9.28	CU. 6/6 Sq. mm						
10	B44066D7010K440N1	13.2	14.9	4.65	CU. 6/6 Sq. mm						
12.5	B44066D7012K440N1	16.5	18.7	3.71	CU. 6/6 Sq. mm						
15	B44066D7015K440N1	19.65	22.35	3.1	AL. 8/35 Sq. mm						
20	B44066D7020K440N1	26.24	29.78	2.32	AL. 8/35 Sq. mm						
25	B44066D7025K440N1	32.8	37.2	1.86	AL. 8/35 Sq. mm						
30	B44066D7030K440N1	39.36	44.7	1.55	AL. 8/50 Sq. mm						
40	B44066D7040K440N1	52.49	59.6	1.16	AL. 8/50 Sq. mm						
50	B44066D7050K440N1	65.61	74.5	0.93	AL. 8/50 Sq. mm						
75	B44066D7075E440N1	98.41	111.68	0.62	20X3 CU BUSBAR						
100	B44066D7100E440N1	131.22	148.91	0.46	25X3 CU BUSBAR						

Rated voltage - 415 V 7% aluminum wound reactors

Electrical Parameters and Terminations

KVAr	Material Code	Rated Current (A)	I rms (A)	Inductance (mH)	Terminations
5	B44066D7005K415N1	6.96	7.89	8.257	CU. 6/6 Sq. mm
10	B44066D7010K415N1	13.91	15.79	4.128	CU. 6/6 Sq. mm
12.5	B44066D7012K415N1	17.39	19.73	3.303	CU. 6/6 Sq. mm
15	B44066D7015K415N1	20.87	23.68	2.752	AL. 8/35 Sq. mm
20	B44066D7020K415N1	27.82	31.58	2.064	AL. 8/35 Sq. mm
25	B44066D7025K415N1	34.78	39.47	1.651	AL. 8/35 Sq. mm
30	B44066D7030K415N1	41.74	47.36	1.376	AL. 8/50 Sq. mm
40	B44066D7040K415N1	55.65	63.15	1.032	AL. 8/50 Sq. mm
50	B44066D7050K415N1	69.56	78.94	0.826	AL. 8/50 Sq. mm
75	B44066D7075E415N1	104.34	118.41	0.55	20x3 CU BUSBAR
100	B44066D7100E415N1	139.12	157.88	0.413	25x3 CU BUSBAR

Reactor dimensional details



Reactors - Antiresonance Harmonic Filter

Type tested at CPRI • 'H' Class insulation • Thermal Micro Switch • Linearity 173%

Rated voltage - 440 V 7% aluminum wound reactors

		Din	nensions											
KVAr	Material Code	L	W	н	l1	12	n1	n2	b	е	d1	d2	Α	в
5	B44066D7005K440N1	175	95 ± 5	158	150	150	100	56 ± 3	73	60 ± 5	10.8	15.5	125	56
10	B44066D7010K440N1	175	124 ± 5	160	150	150	100	78 ± 3	95	75 ± 5	10.8	15.5	125	78
12.5	B44066D7012K440N1	175	124 ± 5	160	150	150	100	78 ± 3	95	75 ± 5	10.8	15.5	125	78
15	B44066D7015K440N1	225	150 ± 5	230	190	190	150	73 ± 3	93	105 ± 5	10.8	15.5	180	73
20	B44066D7020K440N1	225	165 ± 5	205	190	190	150	95 ± 3	114	115 ± 5	10.8	15.5	180	95
25	B44066D7025K440N1	225	165 ± 5	205	190	190	150	95 ± 3	114	115 ± 5	10.8	15.5	180	95
30	B44066D7030K440N1	260	225 ± 5	240	220	220	150	165 ± 3	185	127 ± 5	10.8	15.5	175	165
40	B44066D7040K440N1	260	225 ± 5	240	220	220	150	165 ± 3	185	127 ± 5	10.8	15.5	175	165
50	B44066D7050K440N1	260	225 ± 5	240	220	220	150	165 ± 3	185	127 ± 5	10.8	15.5	175	165
75	B44066D7075E440N1	310	180 ± 5	270	265	265	150	132 ± 3	150	97 ± 5	10.8	15.5	175	132
100	B44066D7100E440N1	330	180 ± 5	270	285	285	150	132 ± 3	155	97 ± 5	10.8	15.5	175	132

* All dimensions are in mm.

Rated voltage - 415V 7% aluminum wound reactors

Material code	L	w	н	11	12	n1	n2	b	е	d1	d2	A	в
B44066D7005K415N1	175	95 ± 5	158	150	150	100	56 ± 3	73	60 ± 5	10.8	15.5	125	56
B44066D7010K415N1	175	124 ± 5	160	150	150	100	78 ± 3	95	75 ± 5	10.8	15.5	125	78
B44066D7012K415N1	175	124 ± 5	160	150	150	100	78 ± 3	95	75 ± 5	10.8	15.5	125	78
B44066D7015K415N1	225	150 ± 5	230	190	190	150	73 ± 3	93	105 ± 5	10.8	15.5	180	73
B44066D7020K415N1	225	165 ± 5	205	190	190	150	95 ± 3	114	115 ± 5	10.8	15.5	180	95
B44066D7025K415N1	225	165 ± 5	205	190	190	150	95 ± 3	114	115 ± 5	10.8	15.5	180	95
B44066D7030K415N1	260	225 ± 5	240	220	220	150	165 ± 3	185	127 ± 5	10.8	15.5	175	165
B44066D7040K415N1	260	225 ± 5	240	220	220	150	165 ± 3	185	127 ± 5	10.8	15.5	175	165
B44066D7050K415N1	260	225 ± 5	240	220	220	150	165 ± 3	185	127 ± 5	10.8	15.5	175	165
B44066D7075E415N1	310	180 ± 5	270	265	265	150	132 ± 3	150	97 ± 5	10.8	15.5	175	132
44066BD7100E415N1	330	180 ± 5	270	285	285	150	132 ± 3	155	97 ± 5	10.8	15.5	175	132
	Material code B44066D7005K415N1 B44066D7010K415N1 B44066D7012K415N1 B44066D7012K415N1 B44066D7020K415N1 B44066D7025K415N1 B44066D7030K415N1 B44066D7030K415N1 B44066D7030K415N1 B44066D7040K415N1 B44066D7050K415N1 B44066D7050K415N1 B44066D7050K415N1 B44066D7075E415N1	Material code L B44066D7005K415N1 175 B44066D7010K415N1 175 B44066D7012K415N1 175 B44066D7012K415N1 225 B44066D702K415N1 225 B44066D702K415N1 225 B44066D7025K415N1 260 B44066D7030K415N1 260 B44066D7050K415N1 260 B44066D7050K415N1 310 B44066D7075E415N1 330	Dimensions Material code L W B44066D7005K415N1 175 95 ± 5 B44066D7010K415N1 175 124 ± 5 B44066D7012K415N1 175 124 ± 5 B44066D7012K415N1 175 124 ± 5 B44066D7012K415N1 225 150 ± 5 B44066D7020K415N1 225 165 ± 5 B44066D7025K415N1 226 125 ± 5 B44066D7030K415N1 260 225 ± 5 B44066D7040K415N1 260 225 ± 5 B44066D7050K415N1 260 225 ± 5 B44066D7050K415N1 260 180 ± 5 B44066D7075E415N1 310 180 ± 5	Dimensions Material code L W H B44066D7005K415N1 175 95 ± 5 158 B44066D7010K415N1 175 124 ± 5 160 B44066D7012K415N1 175 124 ± 5 160 B44066D7015K415N1 225 150 ± 5 230 B44066D7020K415N1 225 165 ± 5 205 B44066D7020K415N1 225 165 ± 5 205 B44066D7030K415N1 260 225 ± 5 240 B44066D7040K415N1 260 225 ± 5 240 B44066D7050K415N1 260 225 ± 5 240 B44066D7050K415N1 260 225 ± 5 240 B44066D7050K415N1 260 225 ± 5 240 B44066D7075E415N1 310 180 ± 5 270 B44066D7075E415N1 330 180 ± 5 270	Dimensions Material code L W H I1 B44066D7005K415N1 175 95 ± 5 158 150 B44066D7010K415N1 175 124 ± 5 160 150 B44066D7012K415N1 175 124 ± 5 160 150 B44066D7012K415N1 175 124 ± 5 160 150 B44066D7015K415N1 225 150 ± 5 230 190 B44066D7020K415N1 225 165 ± 5 205 190 B44066D7030K415N1 226 165 ± 5 205 190 B44066D7030K415N1 260 225 ± 5 240 220 B44066D7050K415N1 260 225 ± 5 240 220 B44066D7050K415N1 260 225 ± 5 240 220 B44066D7075E415N1 310 180 ± 5 270 265 B44066D7075E415N1 330 180 ± 5 270 285	Dimensions Material code L W H I1 I2 B44066D7005K415N1 175 95 ± 5 158 150 150 B44066D7010K415N1 175 124 ± 5 160 150 150 B44066D7012K415N1 175 124 ± 5 160 150 150 B44066D7012K415N1 225 150 ± 5 230 190 190 B44066D702K415N1 225 165 ± 5 205 190 190 B44066D7025K415N1 225 165 ± 5 205 190 190 B44066D7030K415N1 260 225 ± 5 240 220 220 B44066D7040K415N1 260 225 ± 5 240 220 220 B44066D7050K415N1 260 225 ± 5 240 220 220 B44066D7050K415N1 260 225 ± 5 240 220 220 B44066D7075E415N1 310 180 ± 5 270 265 265 B44066D7075E415N1 330	Dimensions Material code L W H I1 I2 n1 B44066D7005K415N1 175 95 ± 5 158 150 150 100 B44066D7010K415N1 175 124 ± 5 160 150 150 100 B44066D7012K415N1 175 124 ± 5 160 150 100 B44066D7012K415N1 225 150 ± 5 230 190 190 150 B44066D7020K415N1 225 165 ± 5 205 190 190 150 B44066D7025K415N1 225 165 ± 5 205 190 190 150 B44066D7030K415N1 226 125 ± 5 240 220 220 150 B44066D7030K415N1 260 225 ± 5 240 220 220 150 B44066D7040K415N1 260 225 ± 5 240 220 220 150 B44066D7050K415N1 260 225 ± 5 240 220 220 150	Material code L W H I1 I2 n1 n2 B44066D7005K415N1 175 95 ± 5 158 150 100 56 ± 3 B44066D7010K415N1 175 124 ± 5 160 150 100 78 ± 3 B44066D7012K415N1 175 124 ± 5 160 150 100 78 ± 3 B44066D7012K415N1 175 124 ± 5 160 150 100 78 ± 3 B44066D7012K415N1 225 150 ± 5 230 190 190 150 73 ± 3 B44066D7026K415N1 225 165 ± 5 205 190 190 150 95 ± 3 B44066D7030K415N1 225 165 ± 5 205 190 190 150 95 ± 3 B44066D7030K415N1 260 225 ± 5 240 220 150 165 ± 3 B44066D7040K415N1 260 225 ± 5 240 220 150 165 ± 3 B44066D7050K415N1 260 225 ± 5 240	Dimensions Material code L W H I1 I2 n1 n2 5 B44066D7005K415N1 175 95 ± 5 158 150 150 100 56 ± 3 73 B44066D7010K415N1 175 124 ± 5 160 150 100 78 ± 3 95 B44066D7012K415N1 175 124 ± 5 160 150 100 78 ± 3 95 B44066D7012K415N1 175 124 ± 5 160 150 100 78 ± 3 95 B44066D7015K415N1 225 150 ± 5 230 190 190 150 95 ± 3 114 B44066D7020K415N1 225 165 ± 5 205 190 190 150 95 ± 3 114 B44066D7030K415N1 220 165 ± 5 240 220 150 165 ± 3 185 B44066D7030K415N1 260 225 ± 5 240 220 150 165 ± 3 185 B44066D7050K415N1 260	Material code L W H I1 I2 n1 n2 b e B44066D7005K415N1 175 95 ± 5 158 150 100 56 ± 3 73 60 ± 5 B44066D7010K415N1 175 124 ± 5 160 150 100 78 ± 3 95 75 ± 5 B44066D7012K415N1 175 124 ± 5 160 150 100 78 ± 3 95 75 ± 5 B44066D7012K415N1 175 124 ± 5 160 150 100 78 ± 3 95 75 ± 5 B44066D7012K415N1 175 124 ± 5 160 150 100 78 ± 3 95 75 ± 5 B44066D702K415N1 225 155 ± 3 205 190 190 150 95 ± 3 114 115 ± 5 B44066D7025K415N1 225 165 ± 5 205 190 190 150 95 ± 3 114 115 ± 5 B44066D7030K415N1 260 225 ± 5 240 220 150	Dimensions Material code L W H I1 I2 n1 n2 b e d1 B44066D7005K415N1 175 95±5 158 150 100 56±3 73 60±5 10.8 B44066D7010K415N1 175 124±5 160 150 100 78±3 95 75±5 10.8 B44066D7012K415N1 175 124±5 160 150 100 78±3 95 75±5 10.8 B44066D7012K415N1 125 150±5 230 190 150 73±3 93 105±5 10.8 B44066D702K415N1 225 165±5 205 190 190 150 95±3 114 115±5 10.8 B44066D7025K415N1 225 165±5 205 190 190 150 95±3 114 115±5 10.8 B44066D7030K415N1 260 225±5 240 220 150 165±3 185 127±5	Material code L W H I1 I2 n1 n2 b e d1 d2 B44066D7005K415N1 175 95±5 158 150 100 56±3 73 60±5 10.8 155 B44066D7010K415N1 175 124±5 160 150 100 78±3 95 75±5 10.8 155 B44066D7012K415N1 175 124±5 160 150 100 78±3 95 75±5 10.8 155 B44066D7012K415N1 175 124±5 160 150 100 78±3 95 75±5 10.8 155 B44066D7012K415N1 225 150±5 230 190 190 150 73±3 93 105±5 10.8 155 B44066D7026K415N1 225 165±5 205 190 190 150 95±3 114 115±5 10.8 155 B44066D7030K415N1 260 225±5 240 220 <td>Material code L W H I1 I2 n1 n2 b e d1 d2 A B44066D7005K415N1 175 95 ± 5 158 150 100 56 ± 3 73 60 ± 5 10.8 15.5 124 B44066D7010K415N1 175 124 ± 5 160 150 100 78 ± 3 95 75 ± 5 10.8 15.5 125 B44066D7012K415N1 175 124 ± 5 160 150 150 100 78 ± 3 95 75 ± 5 10.8 15.5 125 B44066D7012K415N1 225 150 ± 5 230 190 150 73 ± 3 93 105 ± 5 10.8 15.5 126 B44066D702K415N1 225 165 ± 5 205 190 150 95 ± 3 114 115 ± 5 10.8 15.5 180 B44066D7025K415N1 226 165 ± 5 240 220 150 165 ± 3 185 127 ± 5 10.8</td>	Material code L W H I1 I2 n1 n2 b e d1 d2 A B44066D7005K415N1 175 95 ± 5 158 150 100 56 ± 3 73 60 ± 5 10.8 15.5 124 B44066D7010K415N1 175 124 ± 5 160 150 100 78 ± 3 95 75 ± 5 10.8 15.5 125 B44066D7012K415N1 175 124 ± 5 160 150 150 100 78 ± 3 95 75 ± 5 10.8 15.5 125 B44066D7012K415N1 225 150 ± 5 230 190 150 73 ± 3 93 105 ± 5 10.8 15.5 126 B44066D702K415N1 225 165 ± 5 205 190 150 95 ± 3 114 115 ± 5 10.8 15.5 180 B44066D7025K415N1 226 165 ± 5 240 220 150 165 ± 3 185 127 ± 5 10.8

* All dimensions are in mm.

Reactor dimensional details

