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Heynen works for innovators

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Features

- For resonant inductors and input/output chokes
- Nominal inductance from 10 μH to 250 μH
- Nominal current from 9 to 65 A
- Low loss designs, suitable for high frequency ripple current applications (i.e. resonant converters and interleaved PFCs)
- Multigap ferrite core design minimizing fringing losses
- High performance litz wire winding, minimizing R_{ac}
- Flat inductance vs current performance
- Design adaptability: R_{ac} and core loss vs frequency definition
- Working voltage up to 1000 V_{peak} maximum
- Typical frequency ranges from 50 to 250 kHz
- Operating temperature: -40°C to 125°C



PRAX Part Number	Nominal Inductance	RMS Current Rating (I_{rms})	Peak Current Rating (I_{peak})	Saturation Current (I_{peak})	R_{DC}	Dimensions (OD x ID x H)
	$(\mu\text{H}) \pm 10\%$	(A)	(A)	(A)	(m Ω) max	(mm) max
MXI-01020	10	14	20	58	10.7	36.0 x 2.5 x 46.0
MXI-01030	10	21	30	75	6.5	58.0 x 10.0 x 29.0
MXI-01050	10	35	50	175	3.5	70.0 x 16.0 x 49.0
MXI-01063	10	45	63	210	2.6	87.0 x 20.0 x 51.0
MXI-02013	20	9	13	45	32.2	35.5 x 3.0 x 45.5
MXI-02030	20	21	30	100	11.3	58.0 x 10.0 x 56.0
MXI-02045	20	32	45	140	5.5	86.5 x 19.5 x 50.5
MXI-02065	20	46	65	260	3.1	111.0 x 29.0 x 80.0
MXI-05009	50	6.4	9	24	62.7	35.0 x 3.0 x 45.0
MXI-05023	50	16	23	75	20.6	70.0 x 16.0 x 49.0
MXI-05038	50	27	38	145	13.9	86.0 x 25.0 x 87.0
MXI-03055	30	39	55	210	4.0	110.0 x 30.0 x 79.0
MXI-10010	100	7	10	33	96.0	55.0 x 13.0 x 35.0
MXI-10024	100	17	24	85	26.0	86.5 x 19.5 x 69.5
MXI-20011	200	8	11	37	139.2	68.0 x 18.0 x 47.0
MXI-20020	200	16	20	70	29.5	109.0 x 28.0 x 78.0
MXI-25010	250	7	10	33	156.0	68.0 x 18.0 x 47.0
MXI-25017	250	12	17	60	46.4	108.5 x 28.5 x 77.5

Notes

- 1- Electrical specifications at 25°C.
- 2- Current rating based on 60°C temperature rise (no cooling).
- 3- Operating temperature includes component self-heating.
- 4- Inductance measured at 150kHz/100mVac.
- 5- Simulations using a pure sinusoidal waveform.
- 6- Core losses calculated using core supplier simulation parameters.
- 7- Temperature rise graph simulated based on natural convection at 25°C ambient.
- 8- Losses calculated considering AC effects on wires as proximity and skin effect (based on Dowell's formula).
- 9- Design considering minimization of fringing effects but not included in losses definition.
- 10- Customized values are available under request. Contact PRAX (www.prax-power.com) for further information.

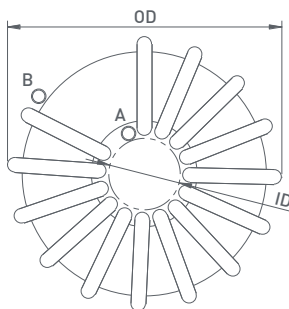
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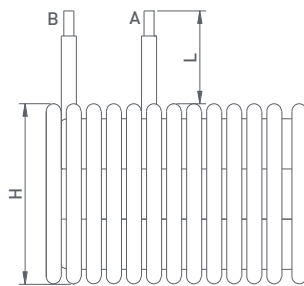
MXI High Performance & Low Losses Multi-Gap Toroidal Inductors

Dimensions

PRAX Part Number	Maximum external diameter (OD)	Typical internal diameter (ID)	Maximum height (H)	Output length (L)
	[mm]	[mm]	[mm]	[mm] +10% -10%
MXI-01020	36.0	2.5	46.0	100
MXI-01030	58.0	10.0	29.0	100
MXI-01050	70.0	16.0	49.0	100
MXI-01063	87.0	20.0	51.0	100
MXI-02013	35.5	3.0	45.5	100
MXI-02030	58.0	10.0	56.0	100
MXI-02045	86.5	19.5	50.5	100
MXI-02065	111.0	29.0	80.0	200
MXI-05009	35.0	3.0	45.0	100
MXI-05023	70.0	16.0	49.0	100
MXI-05038	86.0	25.0	87.0	200
MXI-03055	110.0	30.0	79.0	200
MXI-10010	55.0	13.0	35.0	100
MXI-10024	86.5	19.5	69.5	200
MXI-20011	68.0	18.0	47.0	100
MXI-20020	109.0	28.0	78.0	200
MXI-25010	68.0	18.0	47.0	100
MXI-25017	108.5	28.5	77.5	200



TOP VIEW



LATERAL VIEW

Notes

- 1- Output lead length from top side of windings until end of output.
- 2- Tinning length is 10 ± 1 mm.
- 3- Output length including tinning length.
- 4- Flexible outputs.
- 5- Ring or other terminals available upon request.
- 6- All outputs are sleeved.

Marking

Part Number
PRAX / Date Code

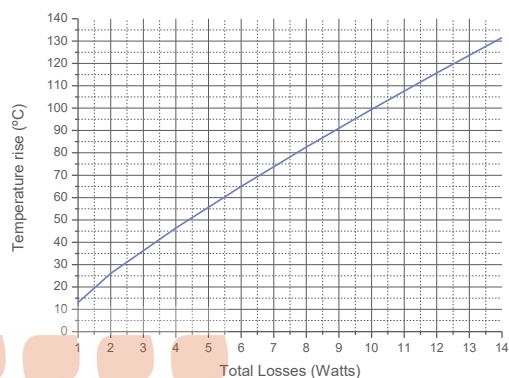
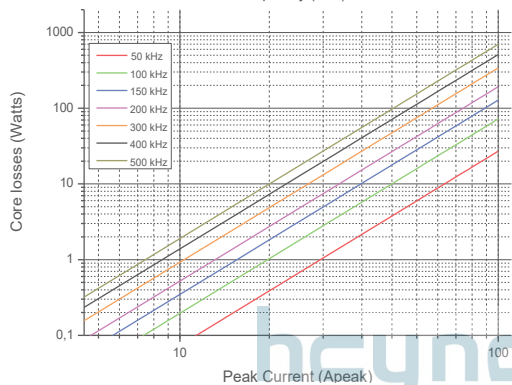
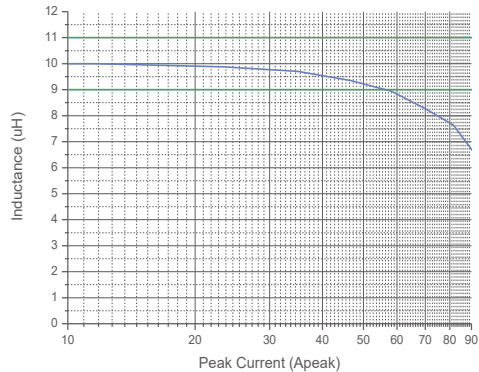
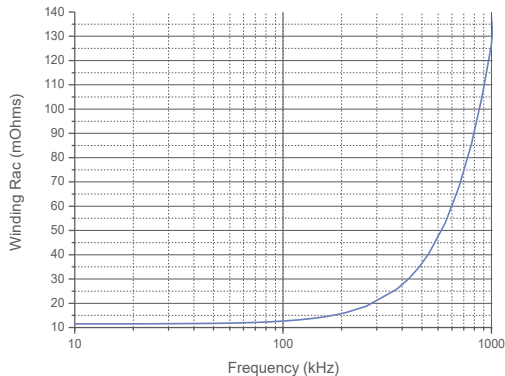
Electrical diagram



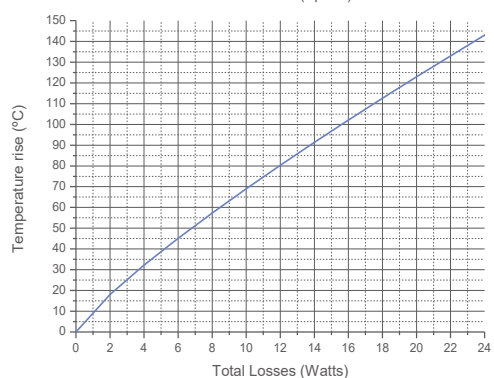
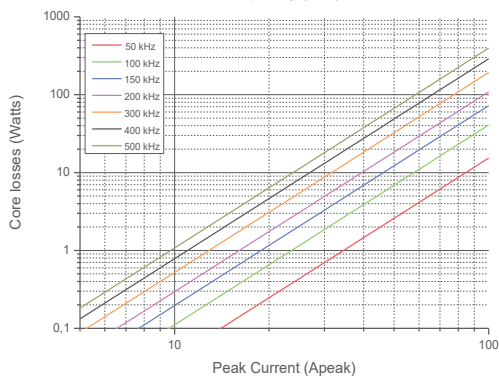
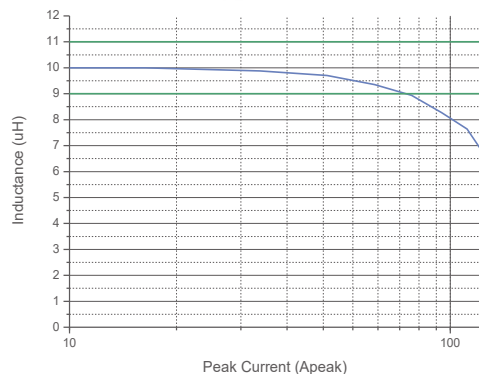
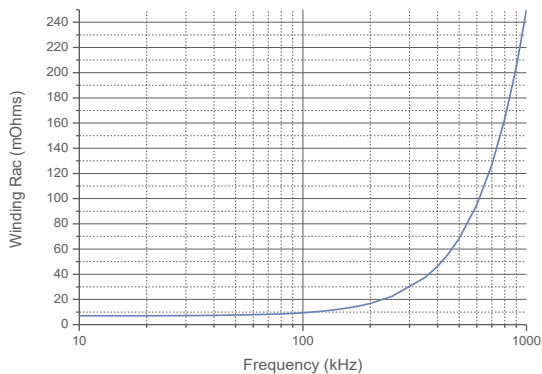
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MXI-01020



MXI-01030

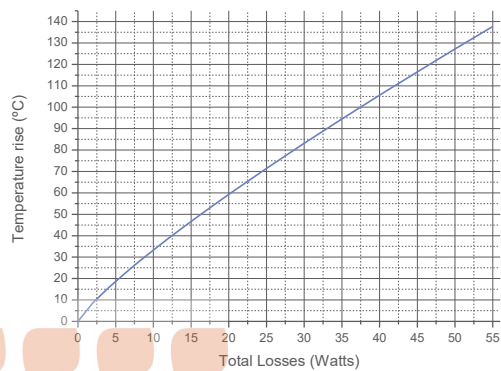
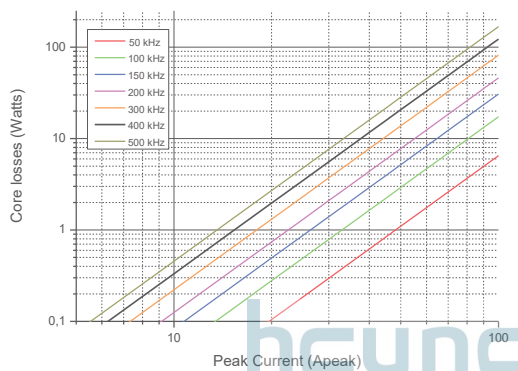
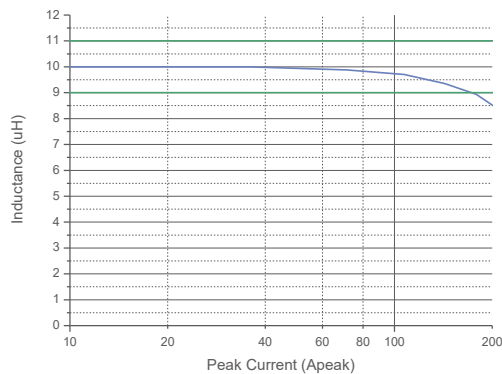
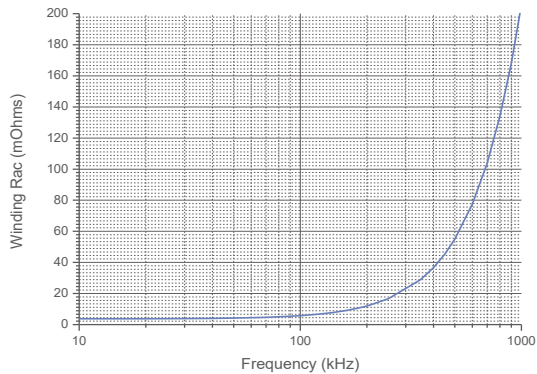


Winding Rac and core losses at 100°C

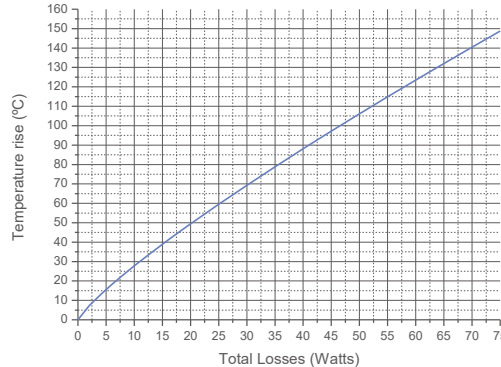
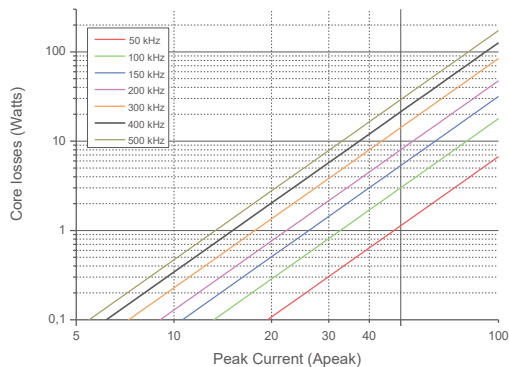
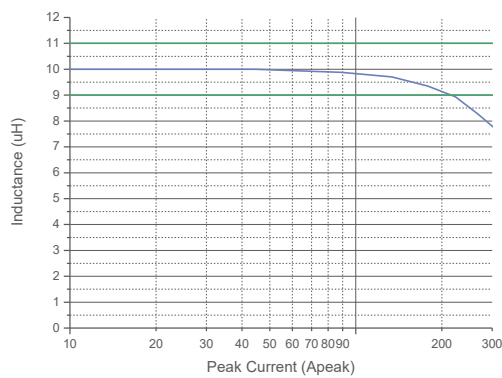
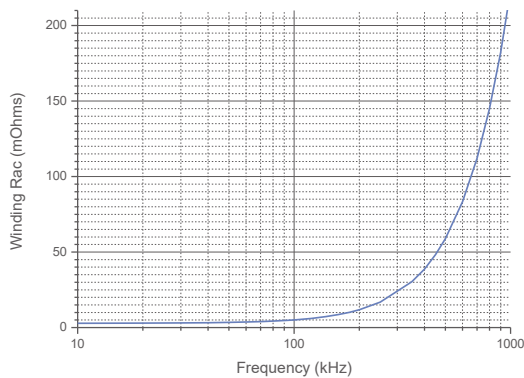
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MXI-01050



MXI-01063

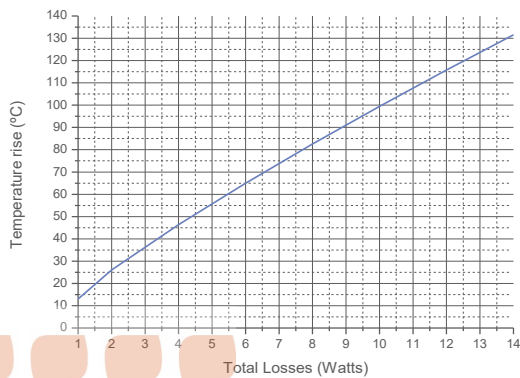
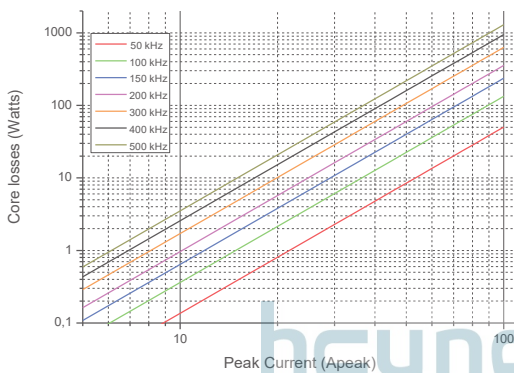
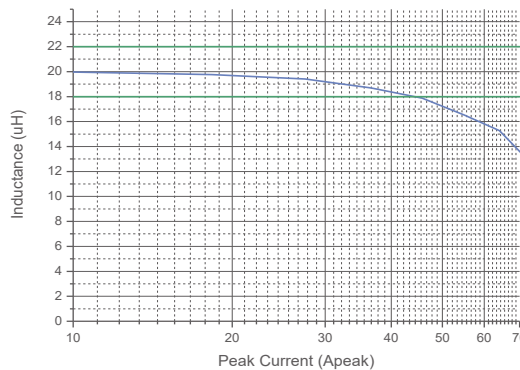
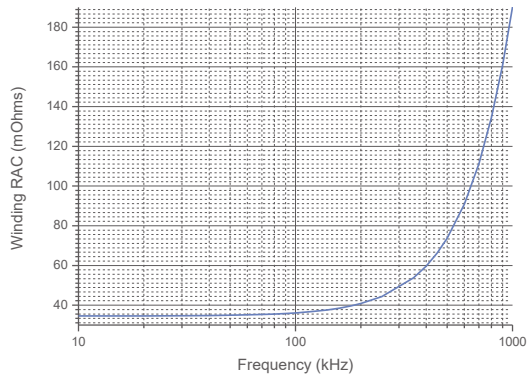


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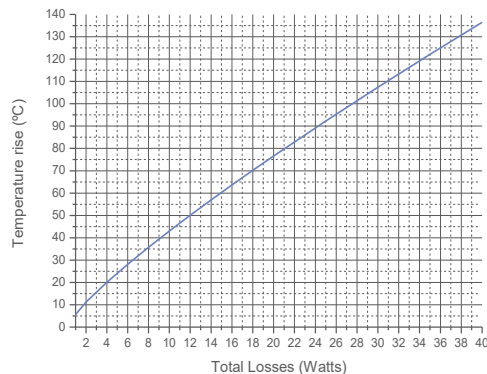
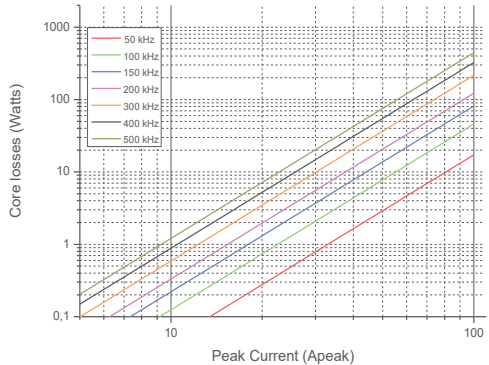
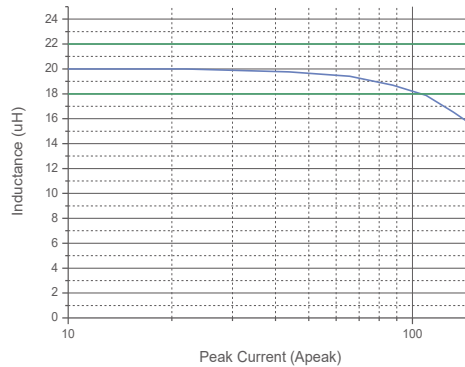
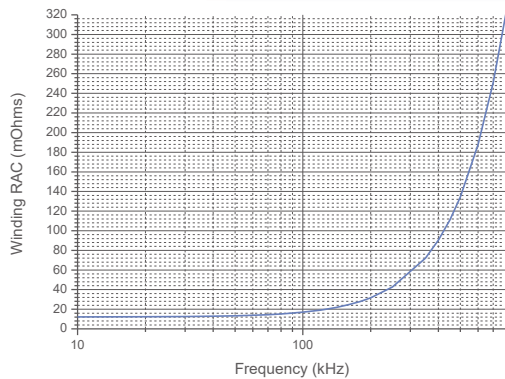
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MXI-02013



MXI-02030

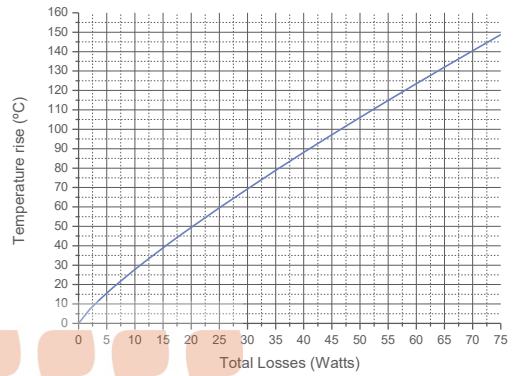
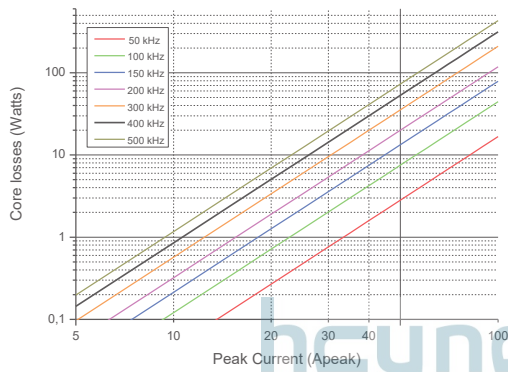
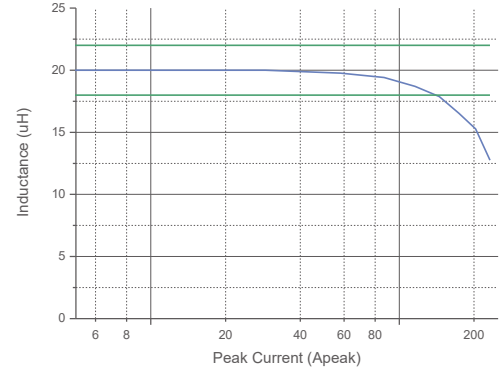
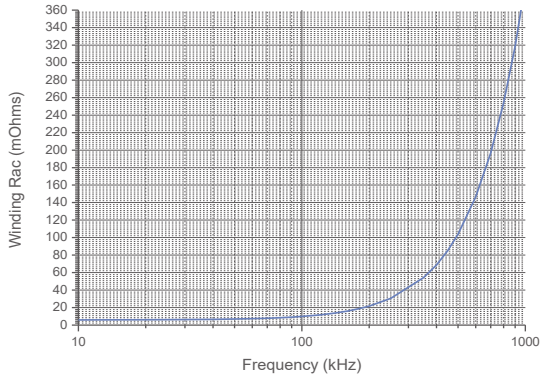


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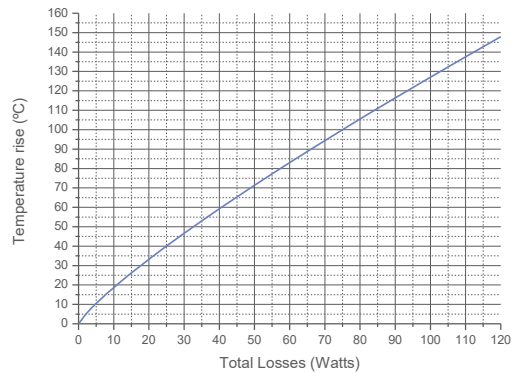
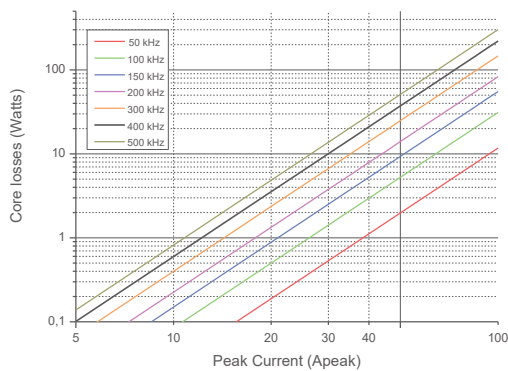
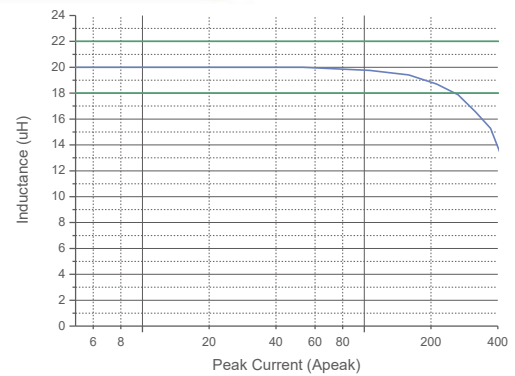
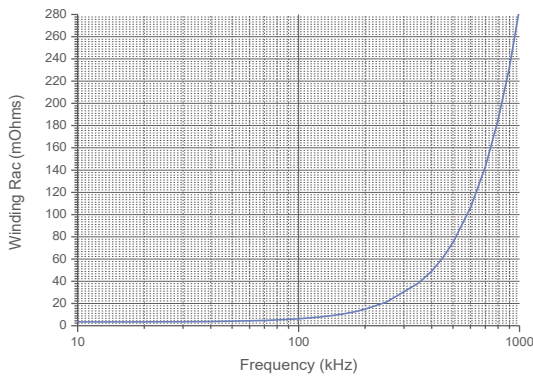
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MXI-02045



MXI-02065

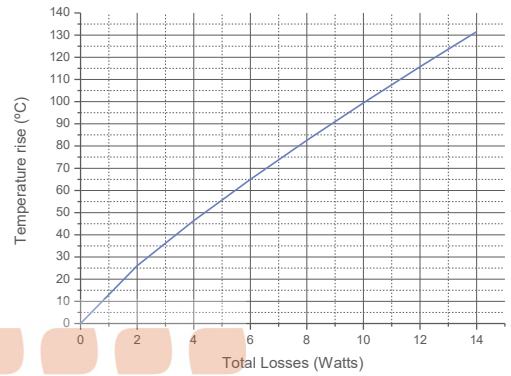
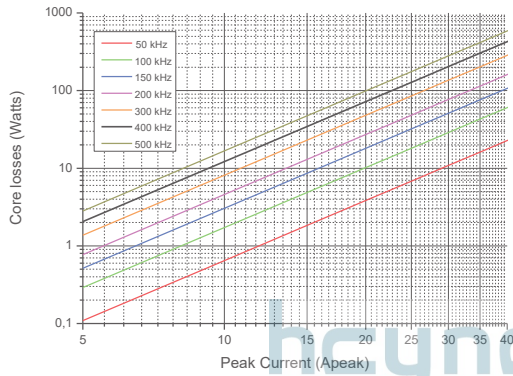
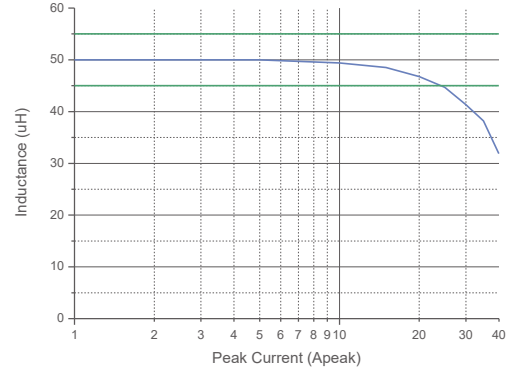
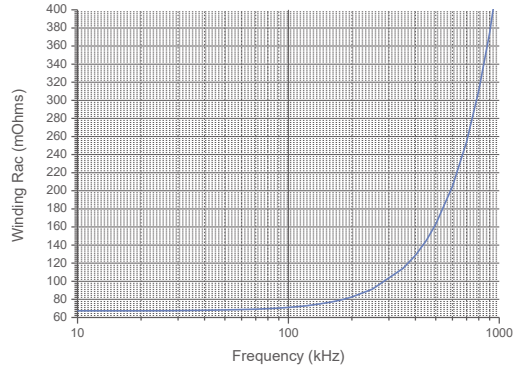


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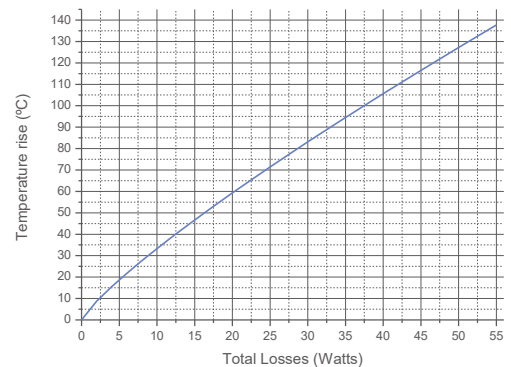
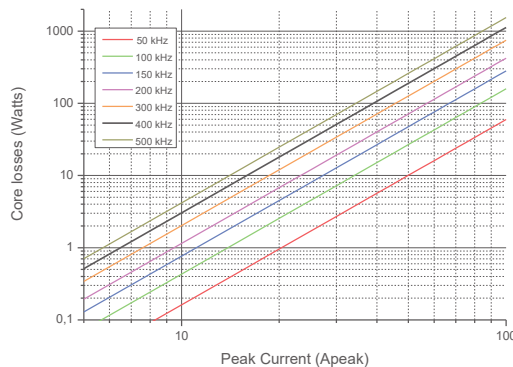
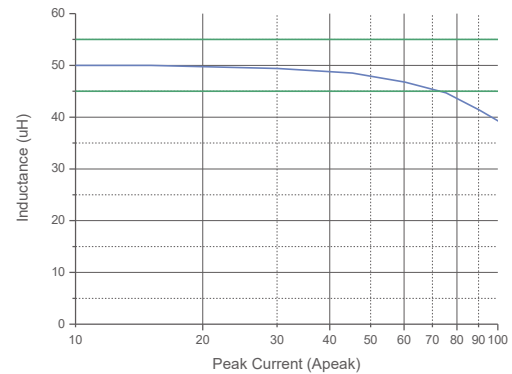
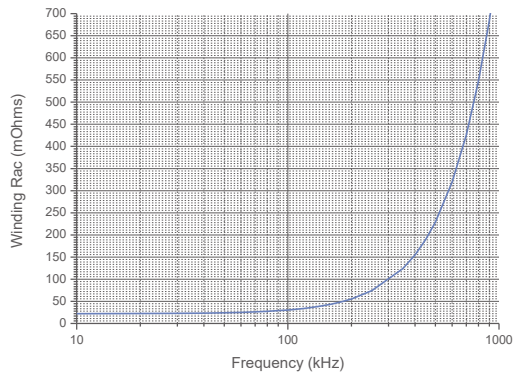
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MXI-05009



MXI-05023

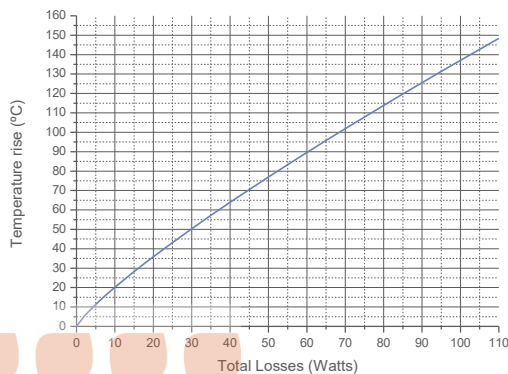
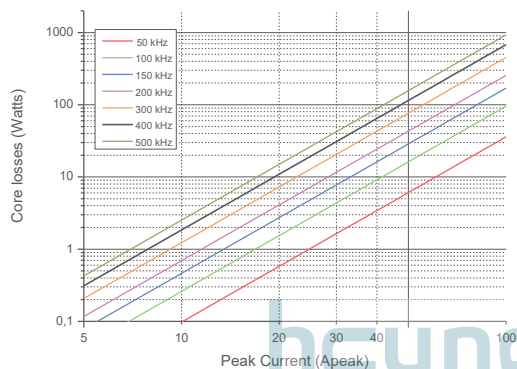
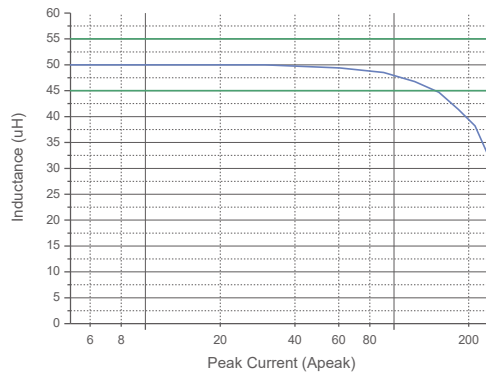
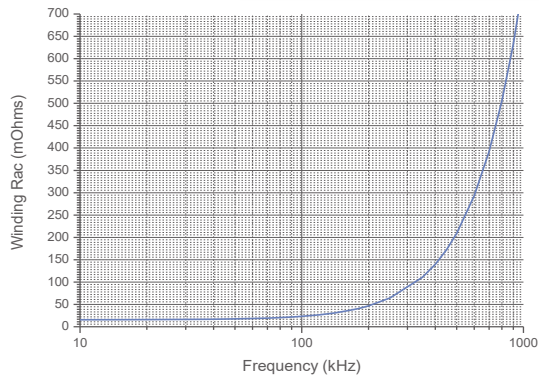


Winding Rac and core losses at 100°C

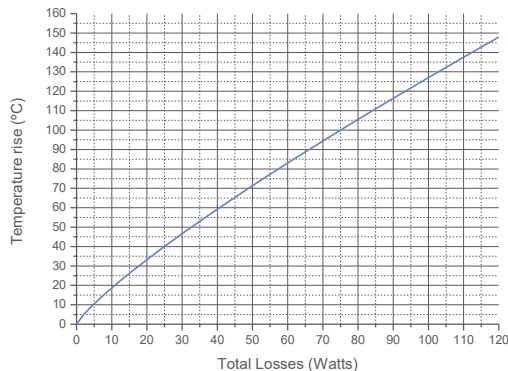
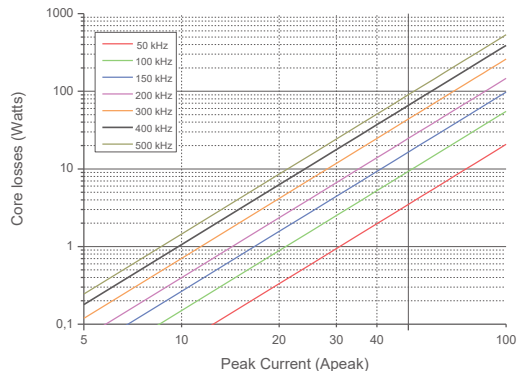
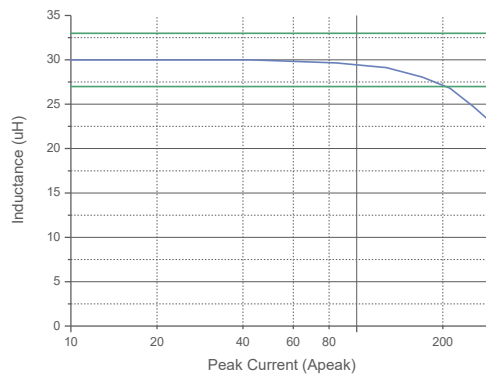
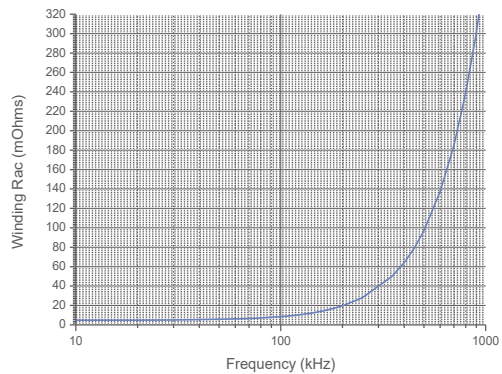
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MXI-05038



MXI-03055

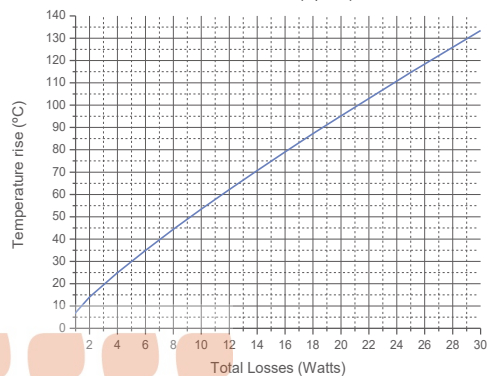
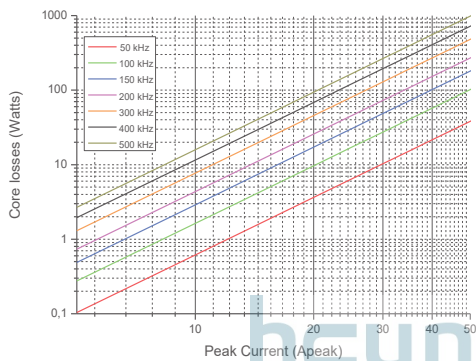
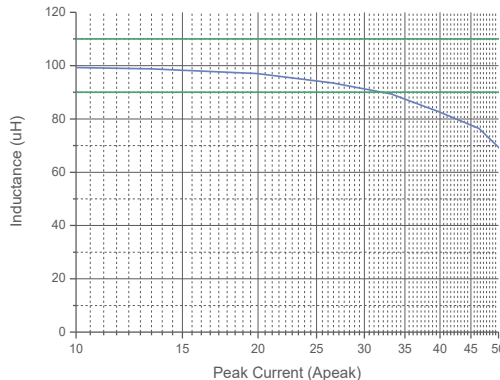
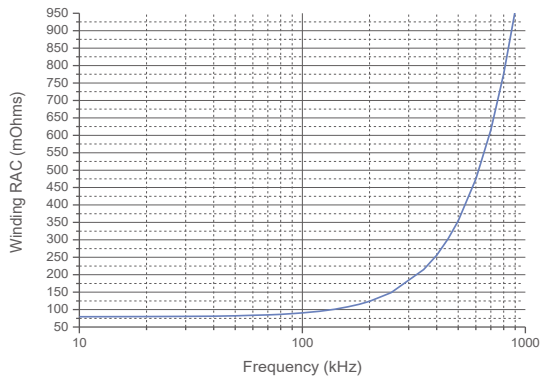


Winding Rac and core losses at 100°C

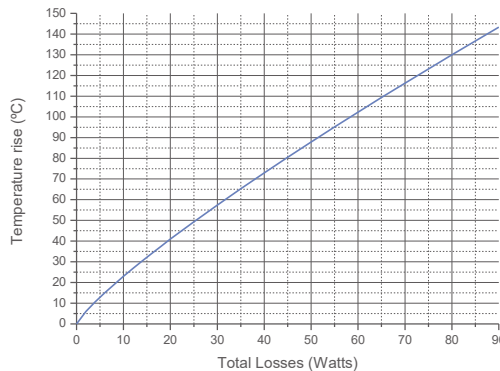
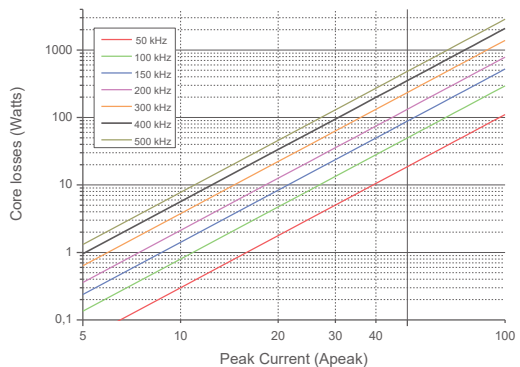
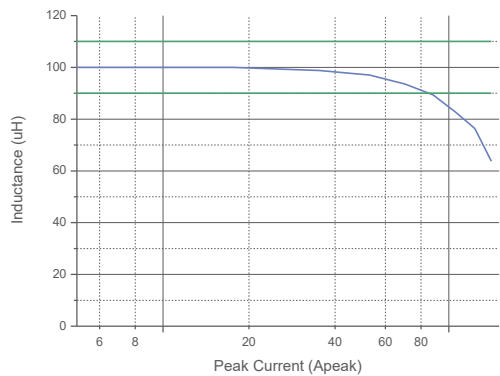
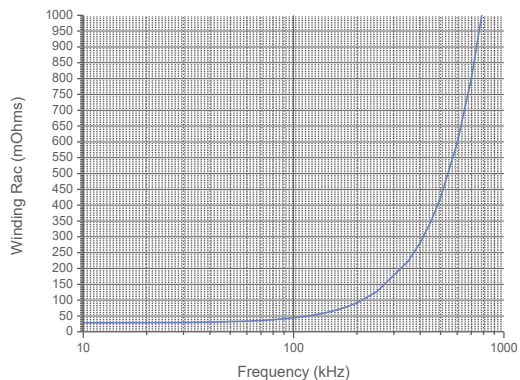
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MXI-10010



MXI-10024

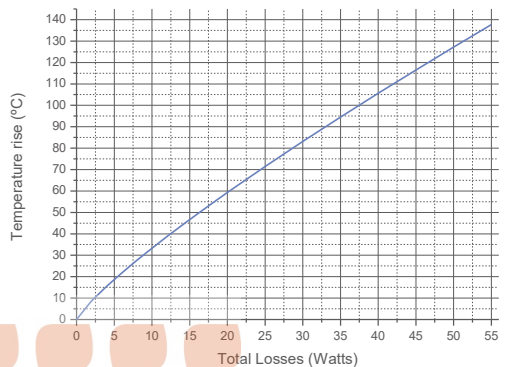
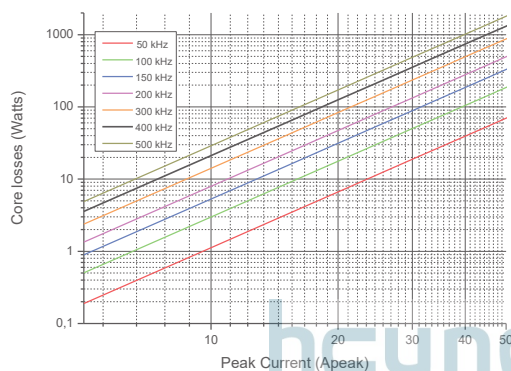
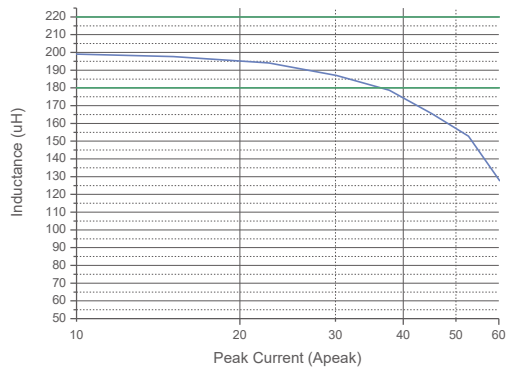
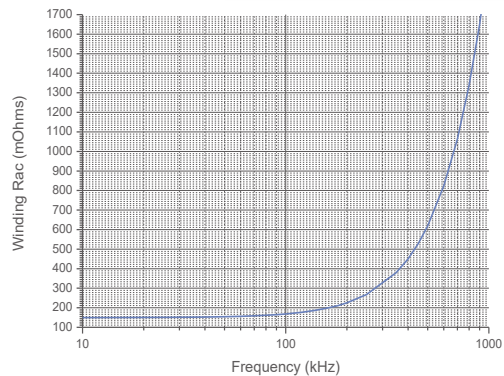


Winding Rac and core losses at 100°C

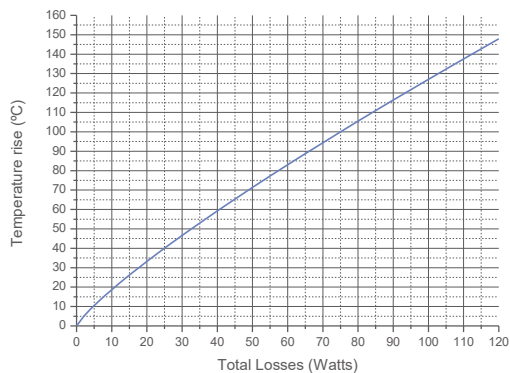
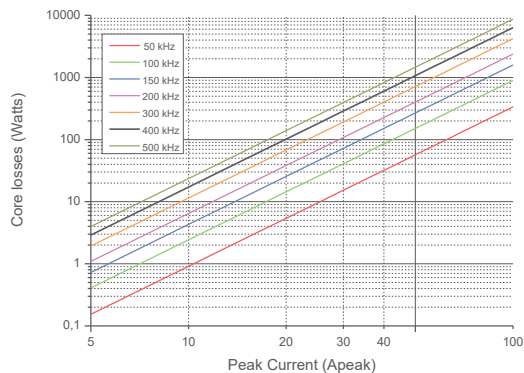
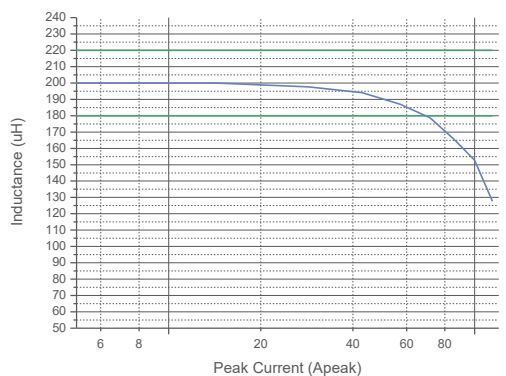
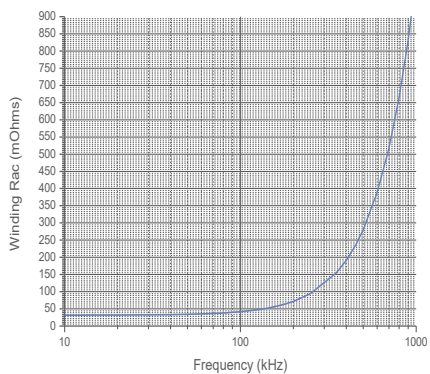
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MXI-20011



MXI-20020

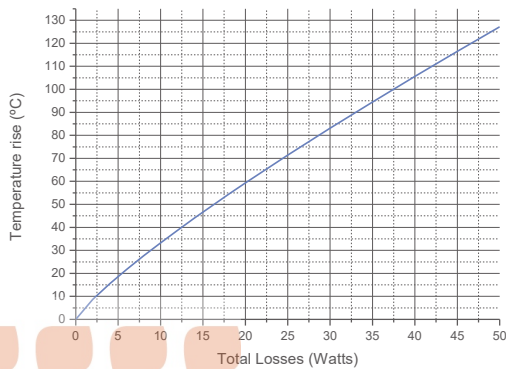
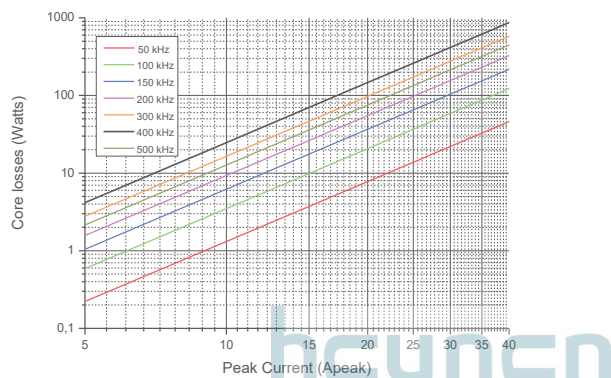
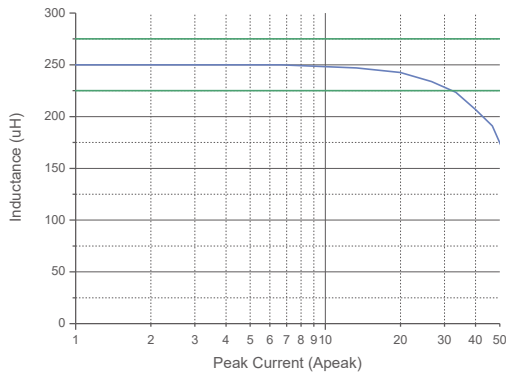
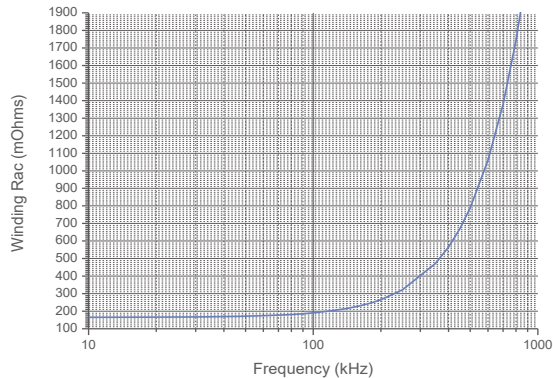


Winding Rac and core losses at 100°C

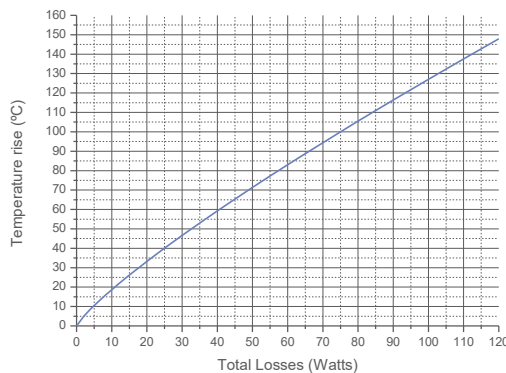
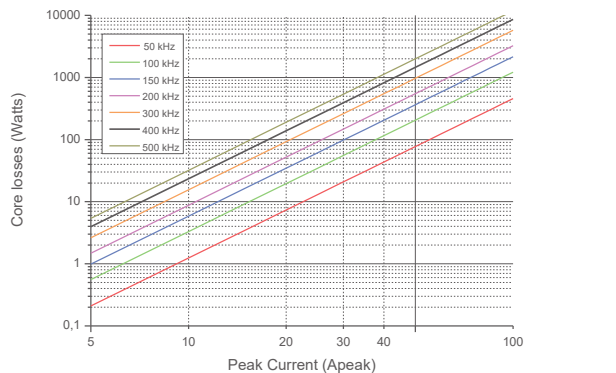
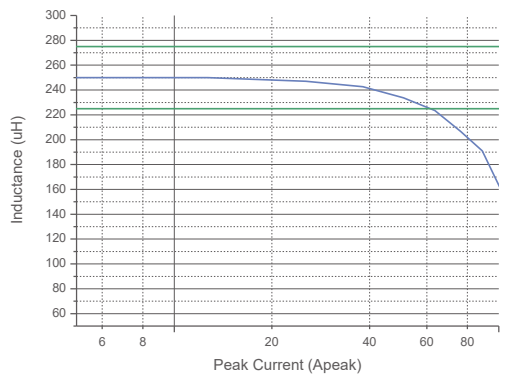
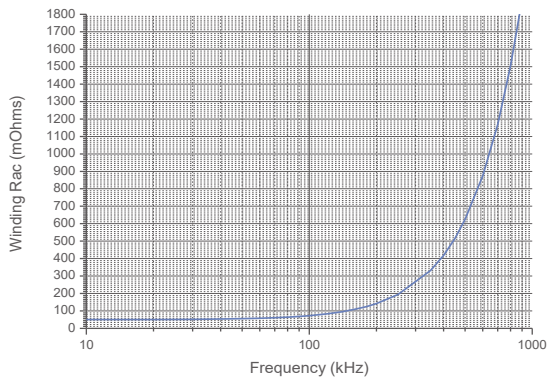
Revised: 10/06/2022

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MXI-25010



MXI-25017



Winding Rac and core losses at 100°C

Revised: 10/06/2022

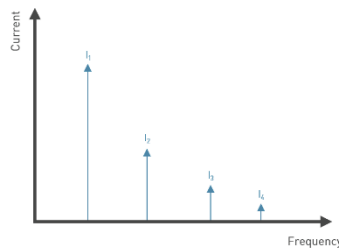
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GUIDE FOR LOSSES AND TEMPERATURE RISE SIMULATION

This catalogue and its charts allow loss and temperature rise calculations based on the actual current waveform of the application.

Copper Loss

- Determine your current waveform and its harmonics



- Using Rac vs frequency chart, get corresponding Rac value for each harmonic
- Calculate Copper Loss using a summation of each loss at each harmonic. Accuracy depends on number of harmonics used.

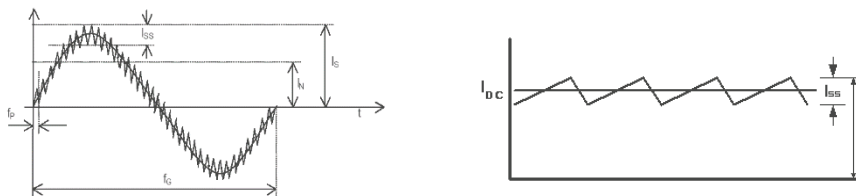
$$Copper_{Loss} = \sum I_n^2 \cdot Rac_n$$

Core Loss

Core loss charts defined in this catalogue are based on general Steinmetz equation under sinusoidal excitation using constants provided by core manufacturer.

For non-sinusoidal excitation the improved General Steinmetz Equation (iGSE) should be used to get more accurate core loss calculations.

In waveforms containing DC or low frequency plus a superimposed high frequency ripple current, peak current in core loss chart is selected considering the high frequency ripple only, I_{SS} in below charts.



For example, consider a DC current of 30Amps plus a superimposed ripple current of 20Amps peak-peak at 200kHz ($I_{DC} = 30Amps$; $I_{SS} = 20App$; $I_s = 40Amps$).

Peak Current (A_{peak}) in core losses chart is equal to $I_{SS}/2 = 10Amps$. Determine inductor core losses by selecting the 200kHz line with $A_{peak}=10Amps$.

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Temperature rise

Once Copper and Core loss are calculated, inductor total loss can be determined by the simple summation of both losses

$$\text{Total Losses} = Cop_{LOSS} + Core_{LOSS}$$

Using total losses vs temperature rise chart, inductor temperature in the application can be determined.

Chart is simulated based on natural convection at 25°C ambient, therefore if the application provides sufficient cooling system (i.e. heatsink or fan) over the inductor, higher losses might be accepted without incurring in excessive inductor heat.

NOTE

All parameters and charts stated in this catalogue are based on accurate theoretical calculations. However, actual results might differ from those defined in this catalogue. PRAX strongly recommends validating product in final application before production.

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