Heynen works for innovators

Features

- For high current PFC, Boost and Buck inductors.
- Flat wire windings with improved heat dissipation.
- Vertical mounting, optimized for air cooling systems.
- Multigap ferrite core design, minimizing core losses.
- Flat inductance vs current performance.
- One-layer winding. Reduced winding capacitance and high SRF.
- Low loss designs, suitable for high frequency ripple current applications (i.e., DCM, BCM, interleaved).
- Design adaptability: winding Rac, core losses and cooling performance definition.
- Woking voltage up to 1500 V_{peak}.
- Typical frequency ranges from 20 kHz to 200 kHz.
- Operating temperature: -40ºC to 155ºC.

Size	PRAX Part Number	Nominal Inductance	Current Rating (I_{RMS}) Forced air ($1\ ^m/_s$)	Current Rating (I_{RMS}) Natural convection	Saturation Current ($I_{Peak} = I_S$)	R_{DC}
#	#	[µH] ±10%	[A]	[A]	[A]	[mΩ] max
S	MXI-FW-10050	100	36	24	50	10,8
S	MXI-FW-31028	310	24	16	28	29,6
M	MXI-FW-13075	130	48	32	75	15,3
M	MXI-FW-19053	190	48	32	53	15,2
M	MXI-FW-25051	250	36	24	51	25,9
M	MXI-FW-29040	290	36	24	40	23,6
L	MXI-FW-19081	190	72	48	81	8,8
L	MXI-FW-20072	200	72	48	72	8,2

Notes

1- Electrical specifications @ 25ºC otherwise specified.
2- Inductance measured at 100 kHz/250 mV_{AC}.
3- Operating temperature includes component self-heating.
4- Self-resonant frequency over 2,5 MHz.
5- Saturation current defined at 90% of nominal value @ 100ºC.
6- Core losses calculated using core supplier simulation parameters at 100ºC with pure sinusoidal waveforms.
7- Design considering minimization of fringing effects but not included in Rac definition.
8- Customized values are available under request. Contact PRAX (info@prax-power.com) for further information.

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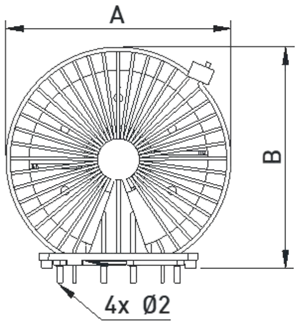
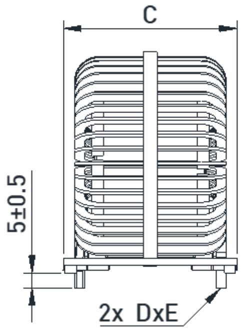
MXI-FW: FLAT WIRE MULTIGAP INDUCTOR

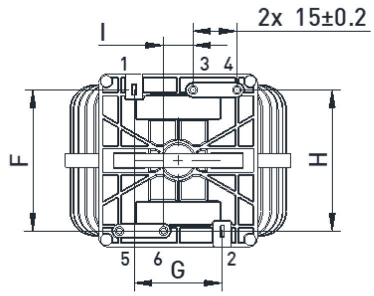
Dimensions



FRONT VIEW



LATERAL VIEW



BOTTOM VIEW

[mm]	External dimensions			Electrical pins (pins 1, 2)				Support pins (3, 4, 5, 6)		Weight
PRAX Part Number	A max	B max	C max	D	E	F (±0.4)	G (±0.4)	H(±0.4)	I	[g]
MXI-FW-10050	81	78	61	4,7	1,15	49,2	30	48	10±0.3	530
MXI-FW-31028	79	77	61	3,5	1	48	30	48	10±0.3	550
MXI-FW-13075	101	95	66	6	1.2	49,5	36	48	10±0.3	895
MXI-FW-19053	101	95	66	6	1,2	49,5	36	48	10±0.3	912
MXI-FW-25051	99	94	66	4,7	1,15	48,2	36	48	10±0.3	878
MXI-FW-29040	99	94	66	4,7	1,15	48,2	36	48	10±0.3	836
MXI-FW-19081	126	119	70	8	1.5	54,5	50	54	30±0.4	1665
MXI-FW-20072	126	119	70	8	1,5	54,4	50	54	30±0.4	1650

Notes

1- Pin trough hole for winding.
2- Pins 3,4,5, 6 for mechanical support only.
3- All dimensions in mm.

Tolerances (otherwise specified)	
0 < L < 6	±0.1
6 < L < 30	±0.2
30 < L < 120	±0.3

Marking

Part Number
PRAX / Lot number

Electrical diagram

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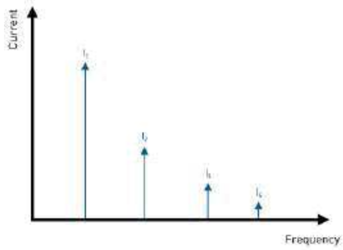
GUIDE FOR LOSSES AND TEMPERATURE RISE SIMULATION

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.

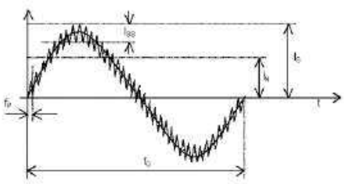
$$Cop_{Loss} = \sum I_n^{\,2} \cdot \mathrm{Rac_n}$$

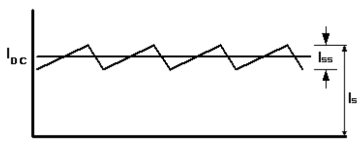
Core Loss

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 to peak (I_{SS}) 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 30 Amps plus a superimposed ripple current of 20 Amps peak-peak at 200kHz (I_{DC} = 30 Amps; I_{SS} = 20 App; I_S = 40 Amps).

Determine inductor core losses by selecting the 200 kHz line with I_{SS} =20 Amps in core losses chart.

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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 25ºC 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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