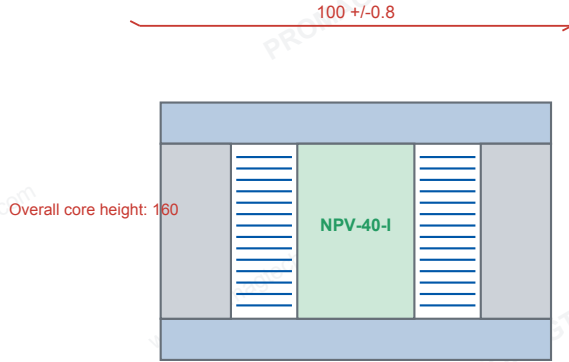
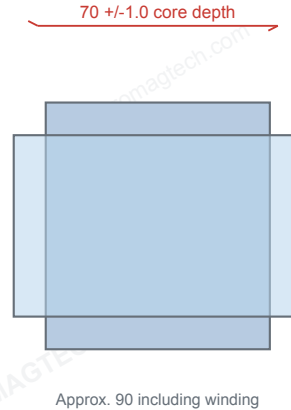


OVERALL DIMENSIONS, WINDOW AND MAGNETIC CROSS-SECTIONS

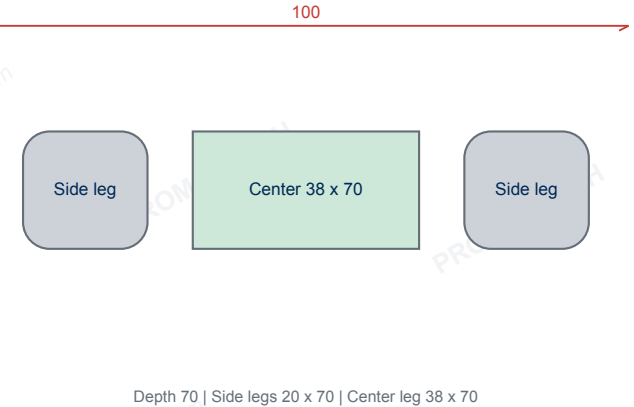
1. Assembly Front View



2. Assembly Side View



3. Leg Cross-Section - Top View



Calculated / design item	Value	Condition / boundary
Outer core envelope	100 x 70 x 160 mm	Cover length 100; leg height 120
Center leg Ae	2,660 mm ²	38 x 70
Side leg Ae (each)	1,400 mm ²	20 x 70; two parallel return paths
Yoke Ae	1,400 mm ²	20 x 70
Turns / conductor	28 T / T3.8 x 10	Single-layer edge winding
L0 calculated	Approx. 338 uH	16 kHz / 1 V
L at +300 A calculated	Approx. 158 uH nominal	Single-circuit DC-bias model
Worst-case L at +300 A	>=137 uH calculated	Material -10% plus temperature derating
Peak flux density at +300 A	Center 0.99 T; side/yoke 0.95 T	Representative saturation approx. 1.5 T

DESIGN NOTES AND EVIDENCE BOUNDARY

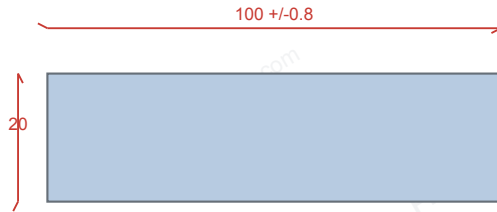
- This is the engineering drawing for one inductor in a two-independent-circuit solution. Two complete inductors are required per system.
- The prior shared-center-leg concept produced calculated coupling k approx. -0.24 and common-mode inductance near 85 uH; it did not support the 100 uH target.
- The independent-circuit topology assumes no shared magnetic path. Verify the customer decoupling requirement $|k| \leq 0.05$ on the physical system.
- The model predicts worst-case L at +300 A ≥ 137 uH, about 37% above the 100 uH target. This is calculation margin, not sample measurement.
- All core parts use NPV-40-I with zero functional gap. Joint adhesive thickness is an assembly clearance, not an inductance adjustment gap.
- Calculated DCR is approx. 4.4 mOhm at 100 C. Calculated copper loss is approx. 177 W at 200 Arms and 399 W at 300 A peak; forced-air cooling is required.
- The calculation uses a first-order nonlinear magnetic model and representative NPV-40-I data. Final release requires POCO measured B-H data and prototype DVP results.

EVIDENCE LEVEL: ENGINEERING CALCULATION / DESIGN REVIEW - NO SAMPLE MEASUREMENT INCLUDED

TITLE: NPV100 x 70 NPV-40-I INDEPENDENT-CIRCUIT 300 A FILTER INDUCTOR (2 UNITS/SYSTEM)	DRAWING: PMT-NPV100X70-300A-28T-JND	REV: V1.0	SCALE: NTS
STATUS: DESIGN REVIEW / VALIDATION PROTOTYPE - NOT A PRODUCTION PERFORMANCE GUARANTEE	MATERIAL: POCO NPV-40-I FeSi	UNIT: mm	PAGE: 1/4 DATE: 2026-07-24

INDIVIDUAL CORE-PART MANUFACTURING DIMENSIONS

P1/P2 TOP AND BOTTOM COVERS - QTY 2

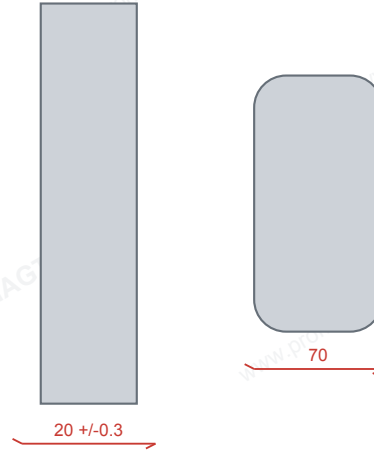


100 x 20 x 70

POCO NPV-40-I FeSi
Full mating surface; ground flat
Edge break: 0.5 MAX

Do not tune inductance by cover length

P3/P5 LEFT AND RIGHT SIDE LEGS - QTY 2

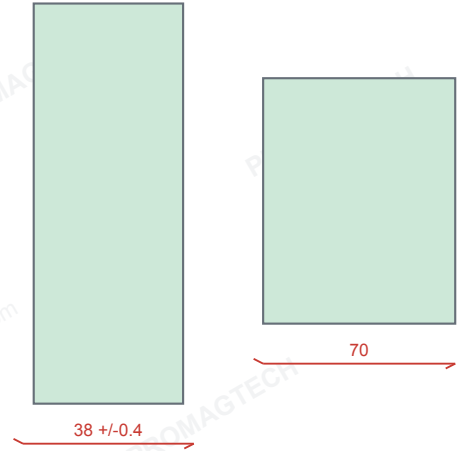


20 x 120 x 70 (R10)

POCO NPV-40-I FeSi
Racetrack 20 x 70; 2 x R10
Effective area approx. 1,400 mm²

Ground end faces; no end rounding

P4 CENTER LEG - QTY 1



38 x 120 x 70

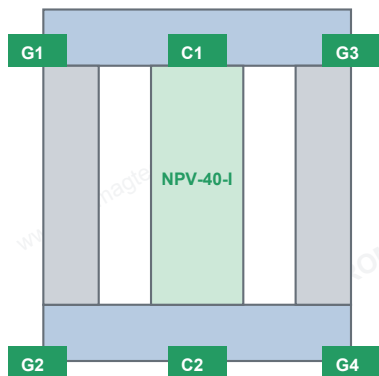
POCO NPV-40-I FeSi
Cross-section 2,660 mm²
Direct contact at both ends; no shim
May be assembled from symmetric units

Item	Description	Material	Section / dimensions (mm)	Qty per inductor
P1/P2	Top and bottom covers	NPV-40-I	100 x 20 x 70	2
P3/P5	Left and right side legs	NPV-40-I	20 x 120 x 70 (R10)	2
P4	Center leg	NPV-40-I	38 x 120 x 70	1
A1	Thin structural adhesive	Structural adhesive	Mating surface; included in assembly clearance	As required

NOTE: Two complete independent cores are required per system. Prepare material for 2x the single-inductor BOM.

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1. Mating Surface Locations - One Inductor



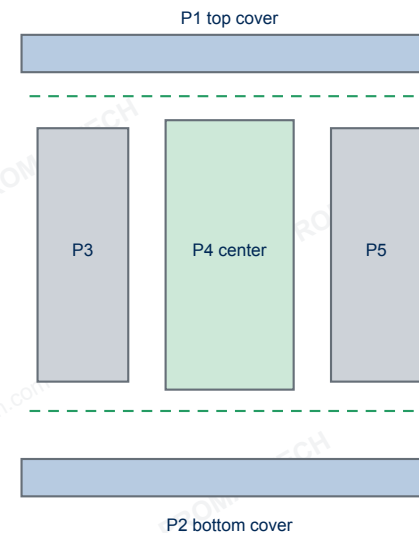
Green markers: direct mating surfaces; functional gap = 0

ID	Location	Functional gap	Assembly clearance
C1/C2	Center leg upper/lower ends	0	<=0.05 target
G1/G2	Left side leg upper/lower ends	0	<=0.05 target
G3/G4	Right side leg upper/lower ends	0	<=0.05 target

2. Assembly Technical Requirements

- No functional-gap shim at any interface.
- Ground mating surfaces; use a thin adhesive layer.
- Left/right total-height difference <=0.05 target.
- Identify material and prevent mix-up.
- Measure L0 before the single-circuit +300 A test.
- Do not tune inductance with unilateral adhesive thickness.

3. Exploded Assembly Diagram



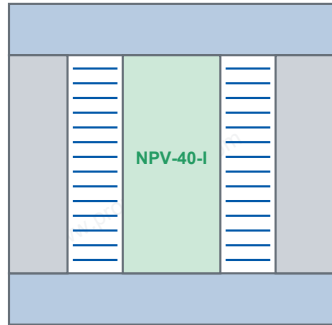
Gate	Required evidence / acceptance	If not met	Evidence state
Gate 0 - Input confirmation	Confirm one circuit at 300 A, 16 kHz carrier and acceptance of measured NPV-40-I curve	Pause until inputs are clear	OPEN
Gate 1 - Calculation / FEA	Predict L at +300 A >=110 uH at three temperatures; center-leg Bmax <=1.10 T	Adjust section or turns	CALCULATION
Gate 2 - A prototype at 25 C	Measure L at +300 A >=105 uH; no abnormal temperature rise or noise	One structural iteration only	NOT PROVIDED
Gate 3 - Hot condition	Hottest-state L at +300 A >=100 uH; hi-pot passes; temperature rise meets customer limit	Increase cross-section and revalidate	NOT PROVIDED
Gate 4 - Production control	Control plan includes L0, DCR, L at +300 A and hot-condition data	Do not release on room-temperature point only	NOT RELEASED

Independent circuits remove the shared magnetic path, but physical-system decoupling and all prototype gates still require measurement.

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WINDING ENVELOPE AND SINGLE-CIRCUIT 300 A VALIDATION CONDITIONS

1. Winding Front View and 2. T3.8 x 10 Window Layout



Axial: $28 \times 3.8 = 106.4$ mm within 120 mm window
Radial window 11 mm; axial margin 13.6 mm

W: 28 T | T3.8 x 10 | Single-layer edge winding | Center-leg winding

Calculated item	Calculated value	Boundary / note
Center-leg Ae	2,660 mm ²	B at +300 A approx. 0.99 T
Side-leg Ae (each)	1,400 mm ²	B at +300 A approx. 0.95 T
L0	Approx. 338 uH	16 kHz / 1 V
L at +300 A nominal	Approx. 158 uH	Single-circuit DC-bias model
L at +300 A worst case	>=137 uH	Material -10% plus temperature derating
DCR at 100 C	Approx. 4.4 mOhm	MLT approx. 266 mm
Copper loss	177 W at 200 Arms / 399 W at 300 A peak	Forced-air cooling required

Condition	I (A)	Purpose	Acceptance
S0	0	Record L0	Record only; do not tune gap
S1	+300	Full DC bias	Measured L at +300 A >=100 uH; target >=110 uH
S1n	-300	Reverse symmetry	Within +/-5% of +300 A
Hot	+300	100 C condition	Measured hot L >=100 uH

No second winding in this design; former S3/S4/S5 coupled-circuit conditions are not applicable.

5. Design-Review Conclusion

- The model predicts single-circuit L at +300 A >=137 uH after stated derating, about 37% calculation margin over the 100 uH target.
- Two physically independent inductors are used per system. The design assumption is k=0; physical-system coupling must still be measured.
- Compared with the rejected integrated concept, this option uses about 60% more total volume to recover modeled inductance margin and simplify validation.
- All NPV-40-I powder-core parts use zero functional gap. Claims for noise, edge loss and manufacturability remain subject to sample validation.
- OPEN ACTIONS: obtain the POCO measured NPV-40-I B-H curve; build the A prototype; complete S0/S1, hot-condition, hi-pot and temperature-rise DVP.

CONCEPT / DESIGN-REVIEW DRAWING - NOT A PRODUCTION PERFORMANCE GUARANTEE

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