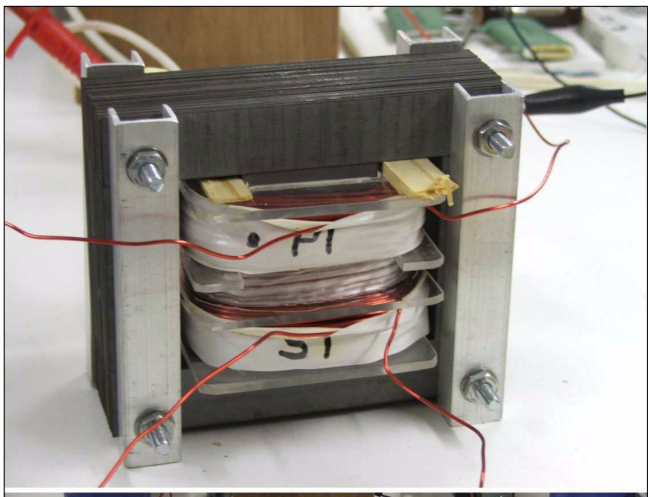
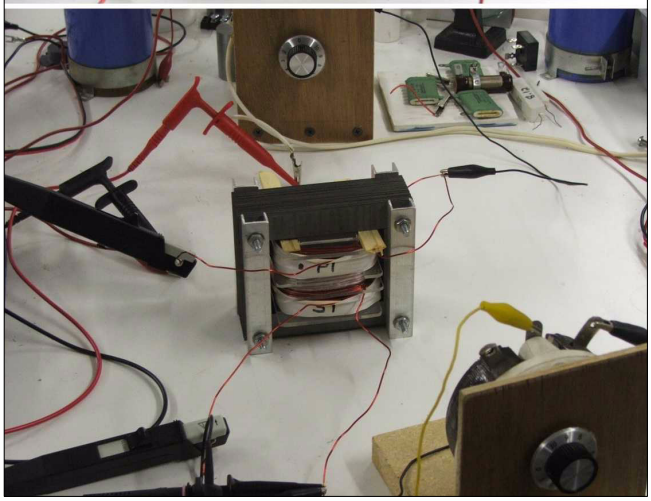
COBB-2 TEST RUN J22

THE DEVICE:





Close up showing the device.
Consists of (M-19?) EI laminations.
main core cross section is ~36 x 40 mm
path length is ~240 mm

Primary (P1) is 120 turns of 18AWG
Secondary (S1) is 120 turns of 18AWG
Return (Ret1) is 23 turns of 18AWG

as you can see, P1 and S1 are top and bottom, while Ret1 is sandwiched in between.

Acrylic bobbin holding the coils.

Core is assembled correctly, interleaving the E and I sections.

The clamping bolts are insulated with a heavy build of tape within the core holes.

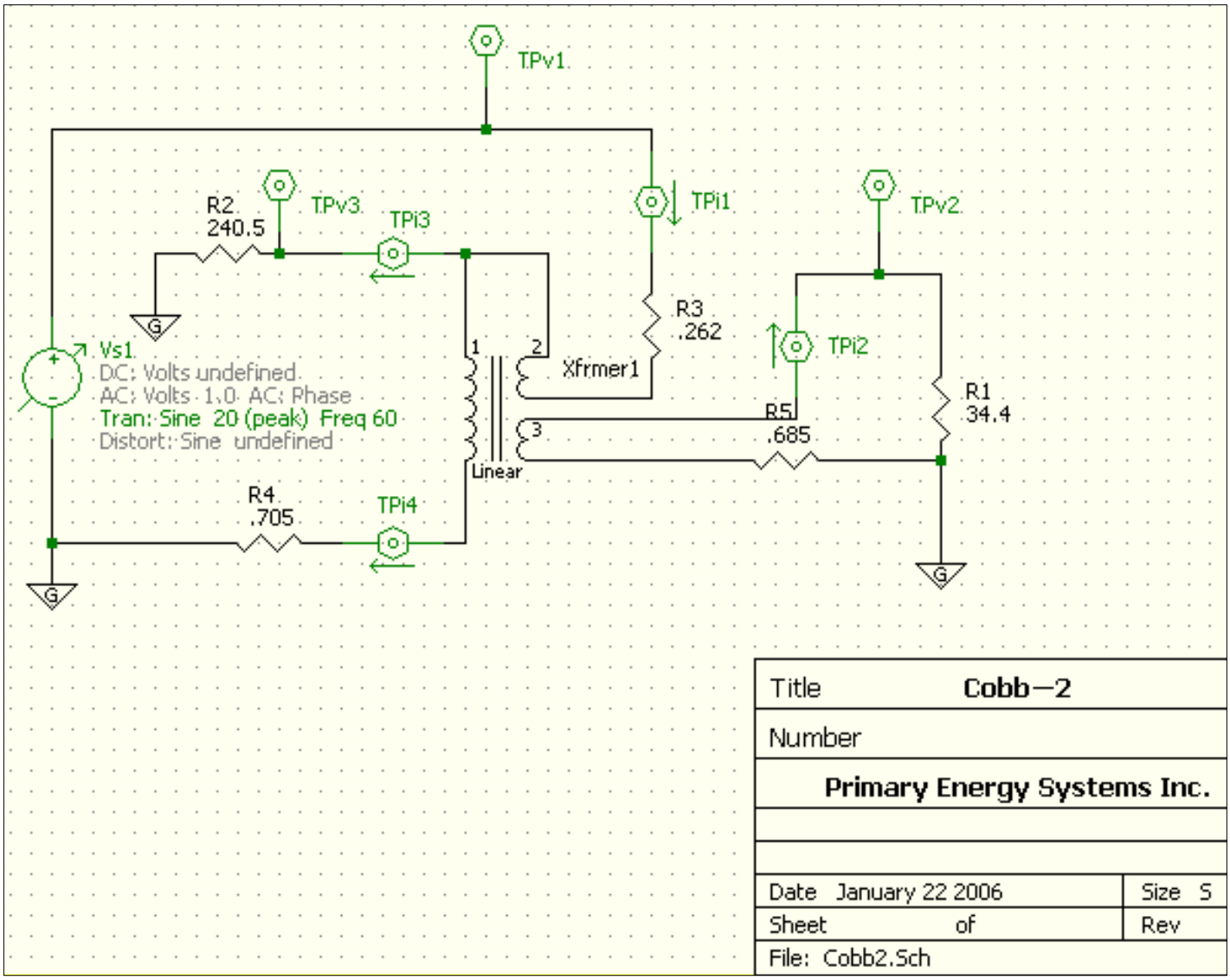
at left is a wider view, (ignore bench clutter there are several other projects in process) showing the rheostats as loads, and scope probes.

the visible caps and resistors are just - well clutter - not part of this circuit.

Ret1 connections - on the far side of the device.

Wooden wedges are merely to prevent bobbin from buzzing.

THE SCHEMATIC:



Schematic:

source and ground are obvious. coil1 is P1, coil2 is Ret1, and coil3 is S1
coil number indicates phase of that coil.

small R values in series with each coil represent the coil resistance, as measured dynamically (with application of DC current in 1,2,5 amp amounts and reading DCV)

Test points:

TPv1 and TPi1 are INPUT voltage and current
TPv2 and TPi2 are Secondary load output voltage and current.
TPv3 and TPi3 are Return load voltage and current
TPi4 minus TPi3 is Primary coil current, for it's Joule calculation

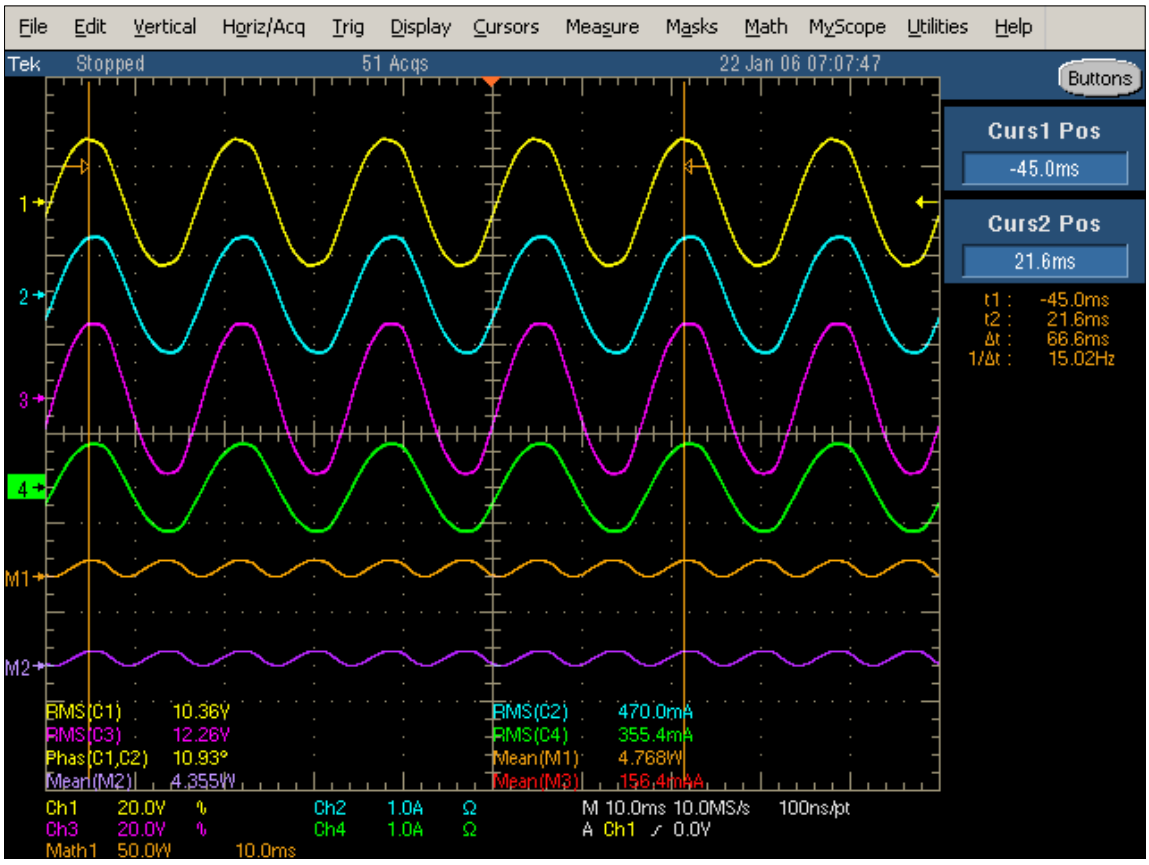
All voltage test points are referenced to ground in this schematic.
current test points use a clamp on current probe and direction is for polarity.

RESULTS:

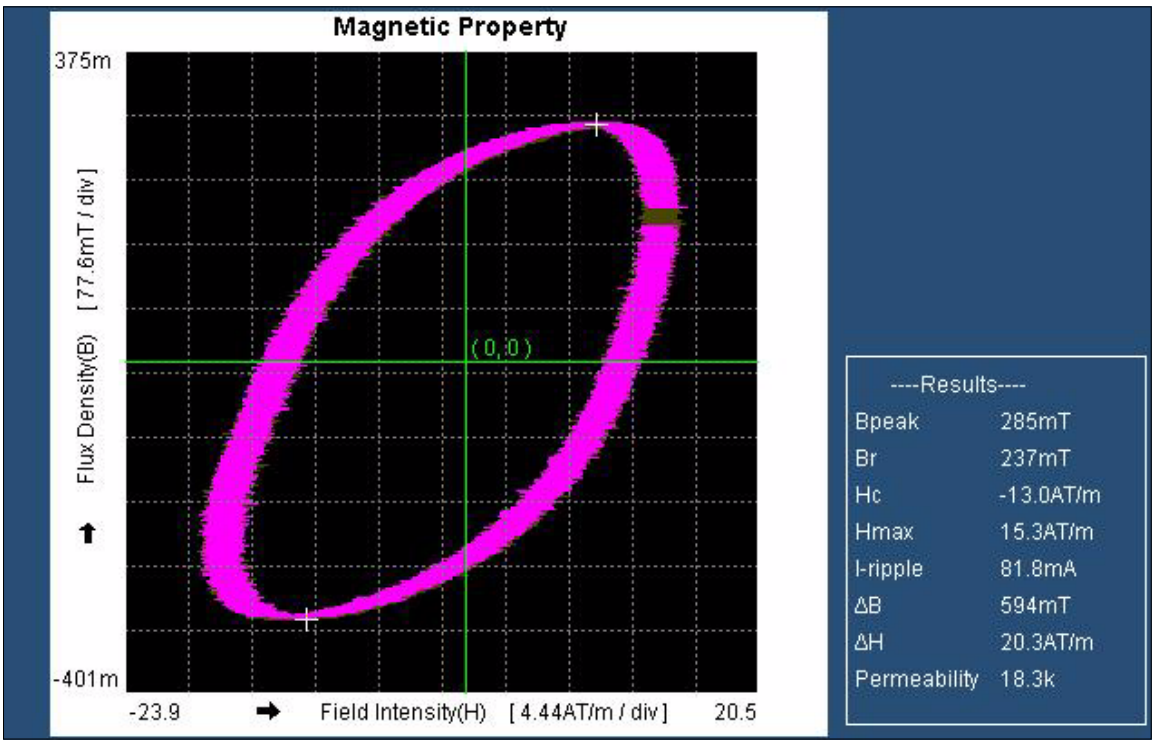
Loads	Sec	34.4	Ohms	Input Voltage	10.35	Vrms
	Return	240.5	Ohms	freq	60	Hz (mains)
	INPUT POWER	**4.768**	**watts (true)**			
	OUTPUT POWER:					
	Secondary Load	4.355	watts (true)			
	Return Load	0.676	watts (true)	**USEFUL COP:**	**1.055**	
	TOTAL USEFUL OUTPUT	**5.031**	**watts (true)**			
	eddy/hysteresis loss	0.213	watts (true)			
	Primary Joule heating	0.156	watts (true)			
	Secondary Joule heating	0.087	watts (true)			
	Return Joule heating	0.001	watts (true)	**ABSOLUTE COP:**	**1.151**	
	TOTAL ABSOLUTE OUTPUT	**5.488**	**watts (true)**			

True power is via instantaneous V x I to math channel, and mean of that math channel, all being gated with cursors on 4 cycles.
Joule power is via coil I^2 x coil R
eddy/hyst is via true power of composite primary at no loads. (which is same as cos theta times V I)
(and the core loss remains unchanged under load, only magnetizing current changes)

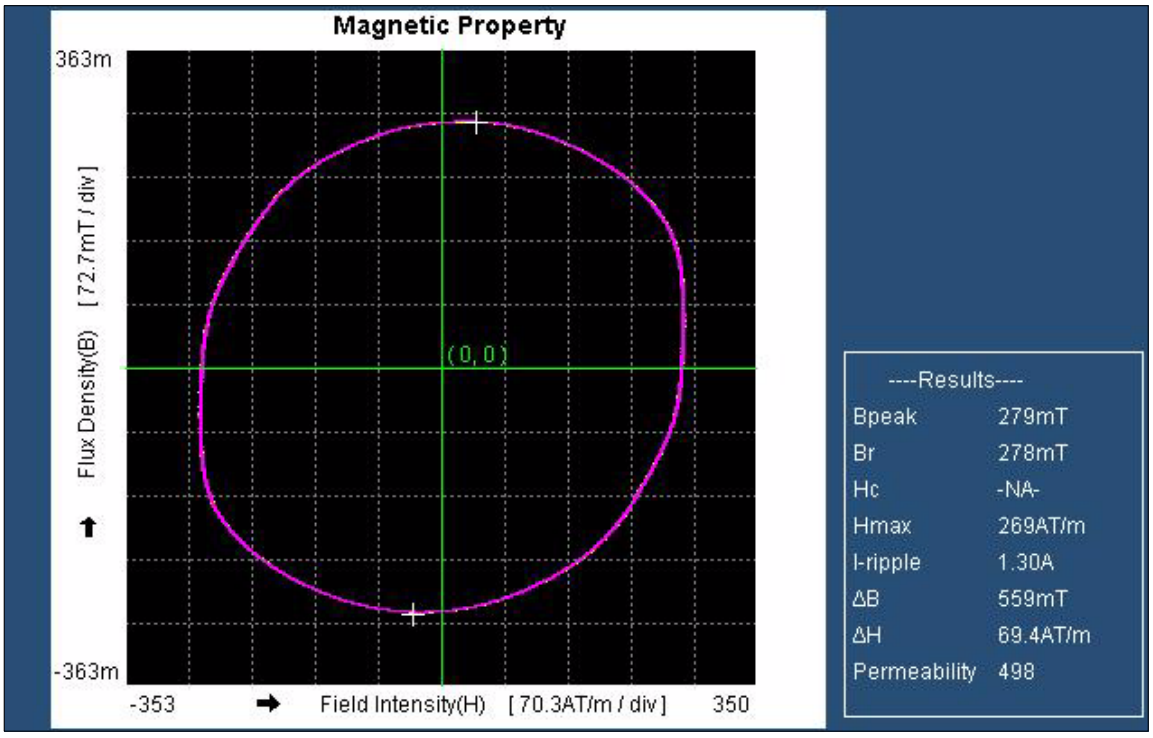
SCOPE SHOTS:



SCREEN SHOT SHOWING:
INPUT V ON CH1
INPUT I ON CH2
SEC V ON CH3
SEC I ON CH4
MATH1 IS CH1 x CH2
MATH2 IS CH3 x CH4
MATH 3 AND 4 ARE USE FOR JOULE CALCS (but probes need to be moved to locations in schematic)
measure values are as indicated
cursor is set for 4 cycles, and is gating on MATH1 (which gates all channels: input, math and measure)



Above shows BH curve for unloaded composite primary (P1 and Ret1)



Above shows loaded BH curve again measuring composite primary.

The delta B reflects the P-P voltage, while delta H reflects P-P current.
This is using the PWR3 software included with the TDS5034B scope, which was calibrated prior to this test run.

Note this gainful mode is operating way down on the BH curve for this core. It gets a delta B of close to 3Tesla before saturation effects manifest. Right now it is operating at 0.559 Tesla delta B.
(i.e. the peak flux is only 2800 gauss, whereas it can go to 15,000 guass peak)