BORATORY DC POWER SUPPLY

GW

DUAL TRACKING WITH 5V FIXED
MODEL : GPC-3030

A

V

A

V

CURRENT

VOLTAGE

INDEP.
SERIES
PARALLEL

CURRENT

VOLTAGE

C.C. C.V.

PAR.

C.C. C.V.

OVER
LOAD
5V3A

SLAVE

TRACKING

MASTER

ON OFF

GND

GND

5V FIXED 3A

POWER

GW DIGITAL MULTIMETER

MODEL:GDM-8036G

8.8.8.8.

DC1200V
AC1000V
MAX

V·Ω

COM

500V
MAX

2A
MAX

20A
MAX

AC
DC

V

mA

kΩ

200mV 2 20 200

200μA 2 20 200 2000 20A

200Ω 2 20 200 2000 20MΩ

ON
OFF
PWR

VOLTAGE

MODEL

523A

CV CC

CURRENT

CURRENT CHECK

+

GND

−

DC POWER SUPPLY

TRIO 15MHz OSCILLOSCOPE CS-1560A

POWER ILLUM

OFF

VARIABLE
SWEEP TIME/DIV

mS 2 1 .5 .2 .1 50 10 5 20 50 .1 .2 .5 SEC

TVV TVH µS 2 .5 CAL X-Y

CAL
1VP-P

POSITION
PULL X5 MAG

INTENSITY

FOCUS

ASTIG

TRIGGERING
LEVEL
PULL AUTO

SYNC
NOR + − TV + −

SOURCE
CH1 CH2 EXT

EXT. TRIG

N.S.W. DEPT. OF TAFE
0122655AN

POSITION

CH1 or Y

INPUT
1MΩ ≈22pF

AC GND DC

BAL

SERIAL

VARIABLE
VOLTS/DIV

1 .5 .2 2 .1 5 .05 10 .02 .01 CAL

MODE
CH1 CH2 DUAL ADD SUB

VARIABLE
VOLTS/DIV

1 .5 .2 2 .1 5 .05 10 .02 20 CAL

AC GND DC

CH2 or X

INPUT
1MΩ ≈22pF

POSITION
X-Y

DC BAL


SUPPLY
+V SUPPLY
N
E
A1
A2
A3
A4
B1
B2
B3
240/240 VOLTS
H.1.24

FEEDBACK

VARIABLE PHASE FUNCTION GENERATOR TWG500

trigger

free run

gated — single shot

−ve start — +ve start

manual — set (vlf only)

−ve going — +ve going

level
0
− +

pull for line trigger

in

common

frequency range Hz

0·01 – 0·1
0·1 – 1·0
1·0 – 10
10 – 100
100 – 1K
1K – 10K
10K – 100K

phase

LEAD 90 120 150 180 150 120 90 LAG
0 30 60 90 120 150 180 150 120 90 60 30 0

power

on

+ve start waveforms
inverted for −ve start

external inputs
max input 20V pk to pk
input resistance 10KΩ

sweep

ref quad ref quad var 0° 90° 180° 270°
2V pk to pk 1KΩ

amplitudes

0 40

0 20

zero

max outputs
40V pk to pk
100mA

200Ω
2V pk to pk

normal
2KΩ
20V pk to pk 10mA

inverted

free

ground

common

6274B DC POWER SUPPLY

PERINI AND SCOTT (A/ASIA) PTY. LTD.

0 10 20 30

D.C. VOLTS

TD-66

MAINS

PERINI SCOTT

0 .5 1 1.5 2

D.C. AMPERES

TD-66

CURRENT CONTROL

COARSE VOLTAGE

+ ⏚ −

FINE VOLTAGE

REGULATED POWER SUPPLY

TYPE T30 – 2C

ANDBY
RIP
SET H.T.
ON INDICATOR

OFF
ON

110V.A.C.
50~

240V.A.C.
REGULATED SUPPLY

D.C.LOW VOLT
0-50V.
COMMON
+

3 PHASE 41-5/24V SUPPLY

A B C N E

H.T.STANDBY
& TRIP
RESET

H.T.

ON

INDICATOR

0V.D.C.

OFF

ON

110V.A.C.
50~

240V.A.C.
REGULATED SUPPLY

D.C.LOW VOLTAGE

0-50V.

COMMON

+

ISOLATING

SWITCH

On
Off

8A
Quicklag

3 PHASE 41-5/24V SUPPLY

A B C N E


New South Wales
TAFE 0501359
THE ZENITH ELECTRIC CO. LTD.
WAVENDON, MILTON KEYNES
VARIABLE TRANSFORMER
TYPE
INPUT V.
OUTPUT V. A.
NO. KVA
ON
OFF
10A
120
150
90
180
60
210
30
240
0
270
OFF
ON
110V A.C.
50~
240V A.C.
REGULATED SUPPLY
VARIAC

DANGER 300 VOLTS.

ELECTRICAL ENGINEERING
CERTIFICATE
PLANT NO.....

From m 3.7

Joe

DC LOW VOLTAGE

0-50V

COMMON

240V A.C.
REGULATED SUPPLY

OFF

ON

240V G.P.O

0-280V
VARIAC OUTPUT ONLY

240V MAIN SWITCH

BWD 880 POWERSCOPE

+ CH1 — POSITION VOLTS / DIV — DC — AC GND — BAL — CH SEL 1 2 3 4 — CMR — −

+ CH2 — POSITION VOLTS / DIV — DC — AC GND — BAL — CMR — −

+ CH3 — POSITION VOLTS / DIV — DC — AC GND — BAL — CMR — −

+ CH4 — POSITION VOLTS / DIV — DC — AC GND — BAL — CMR — −

±1000V MAX. EACH INPUT

PULL FOR OFFSET

CALIBRATE 10V 100V

ASTIG

POWER

GRATICULE PWR OFF

FOCUS

INTENSITY

READY

RESET SS PH DC

MAG FULL NON-AUTO

LEVEL

CH 1 2 3 4 EXT

0° LINE

VERNIER SEC/DIV

CAL

CH 1 2 3 4 EXT

0°

COUNT UP STOP DOWN

DEGREES

PHASE ANGLE

BEAM FIND

REFERENCE 0° 0°

MARKER OFF

180° 120° 240° ON

EXTERNAL TRIG / PH

±500V MAX

TRIO 15MHz OSCILLOSCOPE CS-1560A

POWER ILLUM

OFF

VARIABLE
SWEEP TIME/DIV

mS 2 1 .5 .2 .1 5 10 20 50 .1 .2 .5 SEC

TVV TVH μS 1 .5 CAL X-Y

CAL
1VP-P

POSITION
PULL X5 MAG

INTENSITY

ASTIG

FOCUS

TRIGGERING
LEVEL
PULL AUTO

SYNC
NOR + − TV + −

SOURCE
CH1 CH2 EXT

EXT. TRIG

N.S.W. DEPT. OF TAFE
0122659AN

POSITION
CH1 orY
INPUT
1MΩ ≈22pF
AC GND DC
DC BAL
SERIAL

VARIABLE
VOLTS/DIV
1 .5 .2 2 .1 5 .05 10 .02 CAL

MODE
CH1 CH2 DUAL ADD SUB

VARIABLE
VOLTS/DIV
1 .5 .2 2 .1 5 .05 10 .02 CAL

AC GND DC
CH2 orX
INPUT
1MΩ ≈22pF
POSITION
X-Y
DC BAL

SIGNAL SOURCES

FREQUENCY RANGE

Hz 50 500 0·5 5·0 kHz

FREQUENCY VERNIER

OSCILLATOR ATTENUATOR

SQUARE WAVE OUTPUT

SINE WAVE OUTPUT

0–2·5 V. RMS.

6·3V. 1A. OUTPUT

OSC. MOD. INPUT

bud 602

COMBINATION INSTRUMENT

OFF ON AC. POWER

AMPLIFIERS

POWER AMPLIFIER INPUT

AC. DC.

VOLTAGE AMPLIFIER

GAIN

AMPLIFIER INPUT

AMPLIFIER OUTPUT

ISOLATED COMMON

POWER SOURCES

POWER SELECTOR

POWER AMPLIFIER GAIN x 10

1-12V 2A 12-24V 1A

CHASSIS

POWER OUTPUT

DC STABILIZED VOLTAGE

POSITIVE VOLTAGE 35mA

NEGATIVE VOLTAGE 1mA.

+ −

mA @ −31 V

R.F. OUTPUT
SYNC. OUTPUT
AUDIO OUTPUT
CM 20

CH4
CH8
GND
OUTPUT
CM 6

LOW
R.F. INPUT
MOD. INPUT
EMITTER CURRENT
R.F. OUTPUT
CM 22A

AUDIO OUTPUT
CM 27

INPUT
OUTPUT
CM 32

6268B DC POWER SUPPLY
HEWLETT PACKARD 0-40V 0-30A

A4.1

VOLTS
0 10 20 30 40 50

AMPERES
0 5 10 15 20 25 30 35

OVERVOLTAGE

~ LINE
OFF OFF

VOLTAGE
COARSE FINE

CURRENT
COARSE FINE

OVERVOLTAGE ADJUST

APPLIED ELEC

Supply

Ammeter

R1

Meter
Element

R2

S

Close

Min R

Max R

Max R

Min R

R3

LAB. PRAC.

FAULT FINDING

⊖

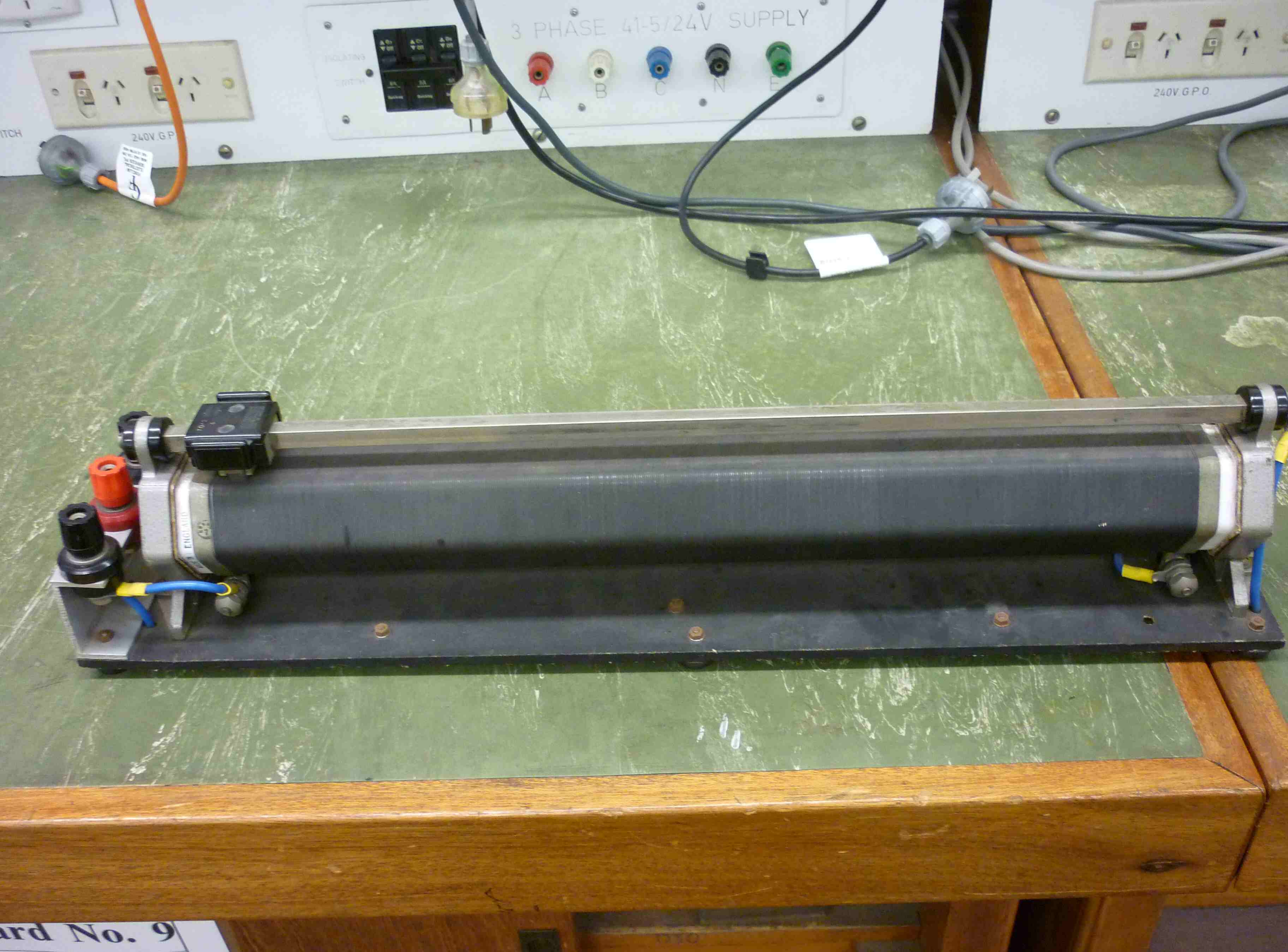
24 V.

⊕

3 2 1


70.2 OHM/4 AMP
BENCH 4A


240V G.P.O.
A
B
C
N
E
240V G.P.O.



ard No. 9

OHMS

10,000'S
8 mA MAX.

1,000'S
25 mA. MAX.

100'S
80 mA. MAX.

10'S
250 mA. MAX.

1'S
800 mA. MAX.

DECADE RESISTOR

TYPE : DR-1. No. 15

PATON ELECTRICAL PTY. LTD. SYDNEY.

OHMS

3 4 5 6

2 7

1 8

0 10,000'S 9

8 mA MAX.

X10K 8mA

X1K 25mA

X100 75mA

X10 250mA

X1 500mA

OHMS

DECADE RESISTANCE BOX

MADE IN AUSTRALIA

IPMENT & CONTROL P/L

X10 250mA

X1 500mA

10 0 1 2 3 4 5 6

10 0 1 2 3 4 5 6 7 8 9 10

DECADE RESISTANCE BOX

MADE IN AUSTRALIA

R1

R2

METER ELEMENT
CIRCUIT 2

X1

1·5V
BATTERY

METER ELEMENT
CIRCUIT 1.

S
CLOSE

X2

Ammeter

S

Close

Max R

Supply

Meter Element

R2

R3

R1

Min R

Min R

Max R

SUPPLY

RESISTOR

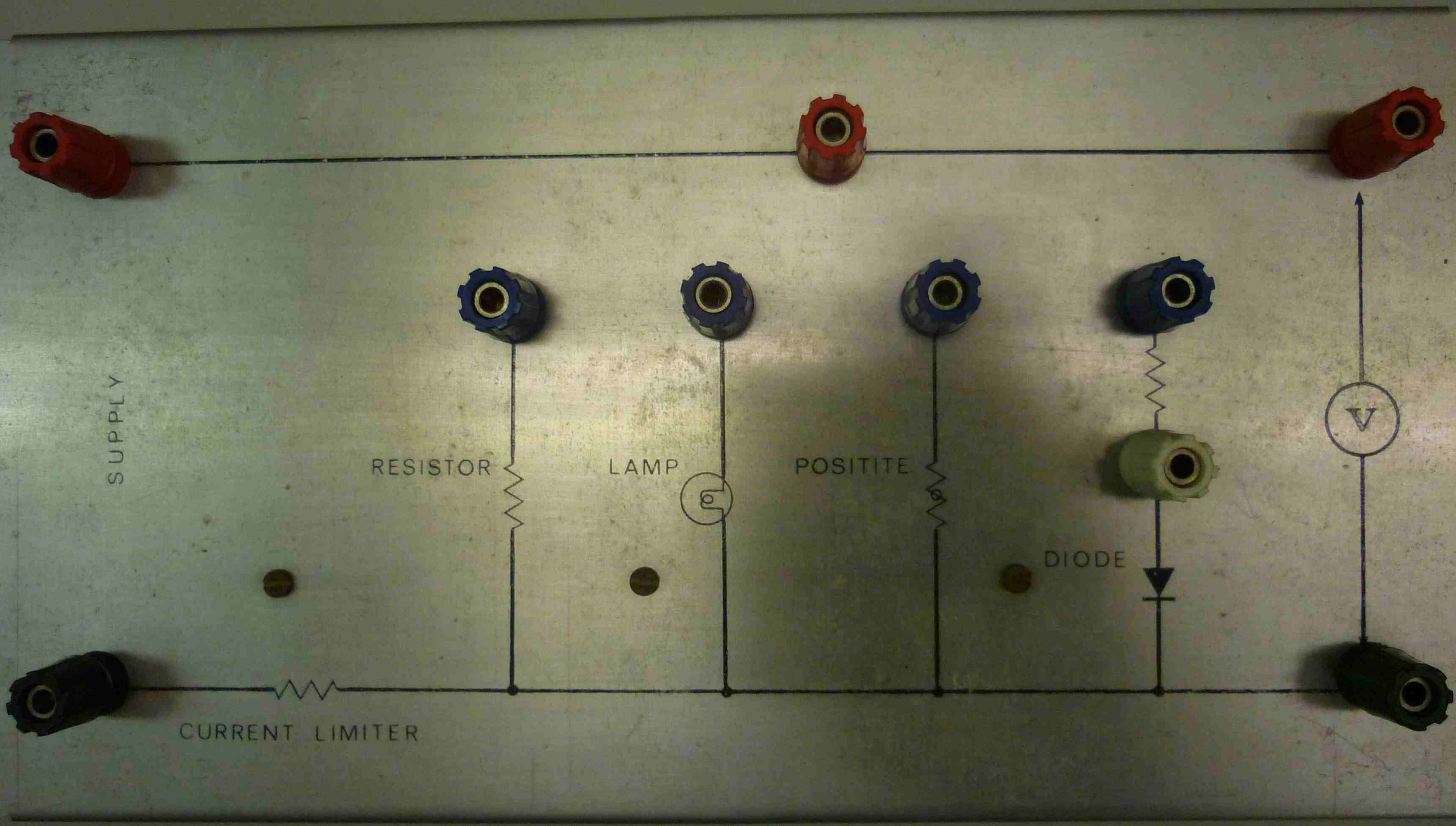
LAMP

POSITITE

DIODE

V

CURRENT LIMITER


SUPPLY
RESISTOR
LAMP
POSITITE
DIODE
V
CURRENT LIMITER

SUPPLY

RESISTOR

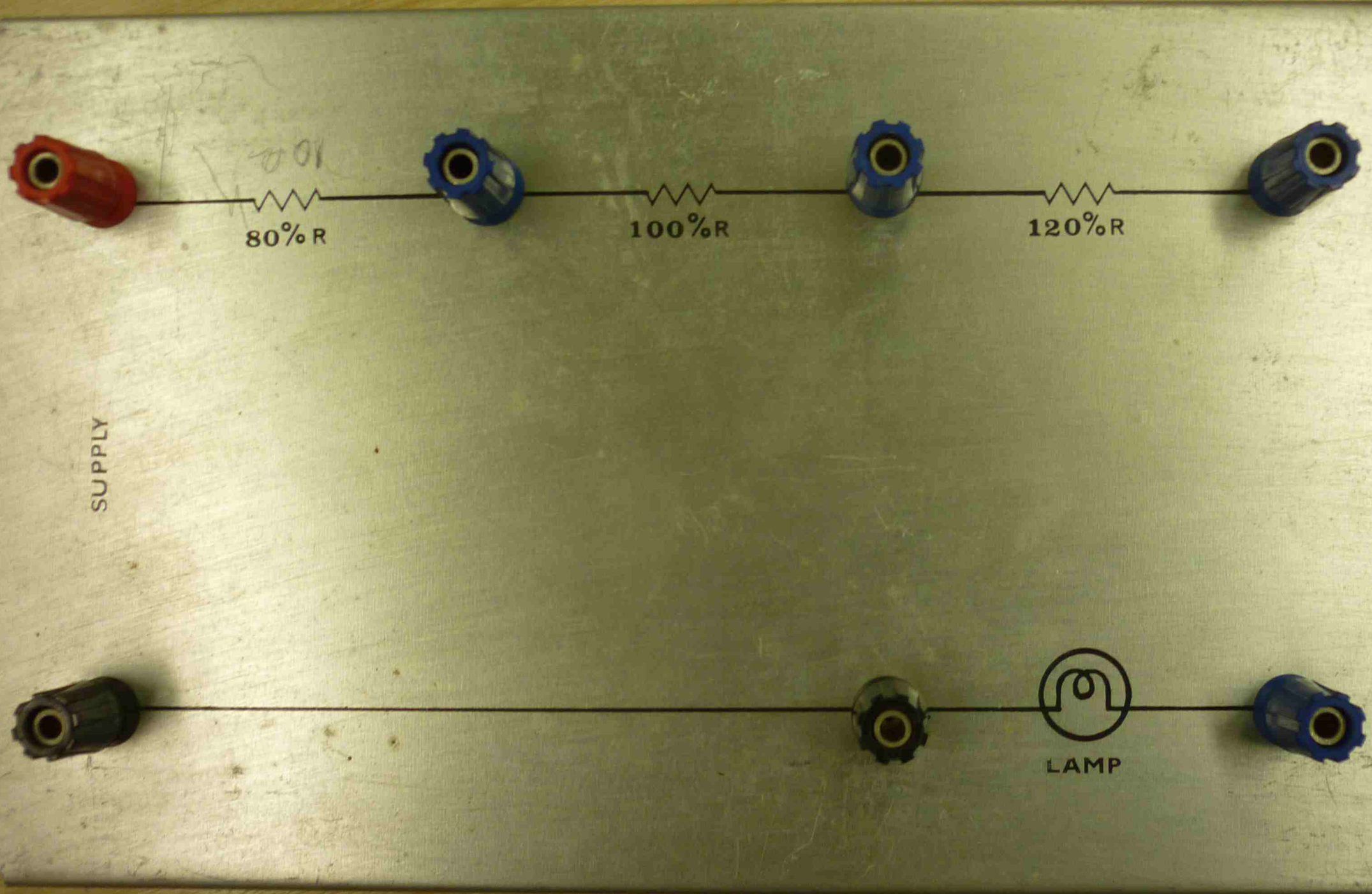
LAMP

POSITITE

DIODE

V

CURRENT LIMITER


80%R
100%R
120%R
SUPPLY
LAMP

SUPPLY

80%R

100%R

120%R

LAMP

C/A A.C. WAVEFORMS

T1

C. CORE

PROT. REST. T2

SPARE 2

C/A A.C. WAVEFORMS

T1

SPARE 2

C. CORE

PROT. RESIST. T2

DECADE RESISTANCE

x100K

x10K

x1K

x100

x10

x1

ELECTRICAL ENGINEERING S. T. C.

DECADE RESISTANCE

ELECTRICAL ENGINEERING

S. I. C

AIR CORED

INDUCTANCE

MODEL : SVL 33

ELECTRICAL ENGINEERING

PLANT NO 1106

% TOLERANCE

x100 mH
35 mA

x10 mH
60 mA

x1 mH
75 mA

TANCE

MODEL : SVL 33

6 7 8 9 10

4 5 6 3 7 2 8 1 9 0 10

x 1 mH
75 mA

H
A

CONNECT

250 R

PRECISION

RESISTOR

MEASURE

CONNECT

250 R

PRECISION

RESISTOR

MEASURE

over load

load

overload

100–500V 50Hz

A B C

H116A

AMMETE

SWITCH

CLOSE

V

R1

T2

MIN. R

SUPPLY

V

R1

T2

SWITCH

CLOSE

MIN R

C

6.2

R

E

SUPPLY 1

16V 0

1.3A

TLP80315W

50Hz

0 240V

16.2

H

G

CELL FOR

SUPPLY 2

F

C

SUPPLY 1

6.2

R1

E

16V 0

1.3A

TLP80315W

50Hz

0 240V

CELL FOR

SUPPLY 2

G

F

ET1 MODULE 22 TEST 37

INDUCTION.

S.N. 22

ET1 MODULE 22 TEST 37

INDUCTION

S.N. 22


Made in Germany
Normalwiderstand
Manganin


CPBD.4D/3
AEG
0,1Ω abs
max.10A
Nr 7242
Made in Germany


UTC
DECADE
INDUCTOR
DI- 4
1
2
3
4
5
6
7
8
HENRIES
PER STEP
10
UNITED TRANSFORMER COMPANY N. Y. N. Y. U. S. A.

TRANSFORMER

I E V

N

Y

E

X

X - HP

TRANSFORMER

A

N

I E V

Y

E

X

X - HP


WIRING DIAGRAM ADZ002-31
2·5 3·75 5 6·25 7·5 8·75 10 AMPS
SP4618
HZ 50
OVERCURRENT RELAY (INVERSE)
DMT 2·7 SECS
AUX 1·0 A DC.
INDUSTRIAL PRODUCTS DIVISION
TYPE
MODEL
SERIAL NO
RP 82213
AMLIAF74G
CDEU

S&C INDUSTRIAL PRODUCTS DIVISION

TYPE CDG11 ● MODEL AML1AF74G ● SERIAL Nº RP 82213

L618
HZ 50

OVERCURRENT RELAY (INVERSE)
DMT 2·7 SECS AUX 1.0.A DC.

2·5 3·75 5 6·25 7·5 8·75 10 AMPS

WIRING DIAGRAM ADZ002-31

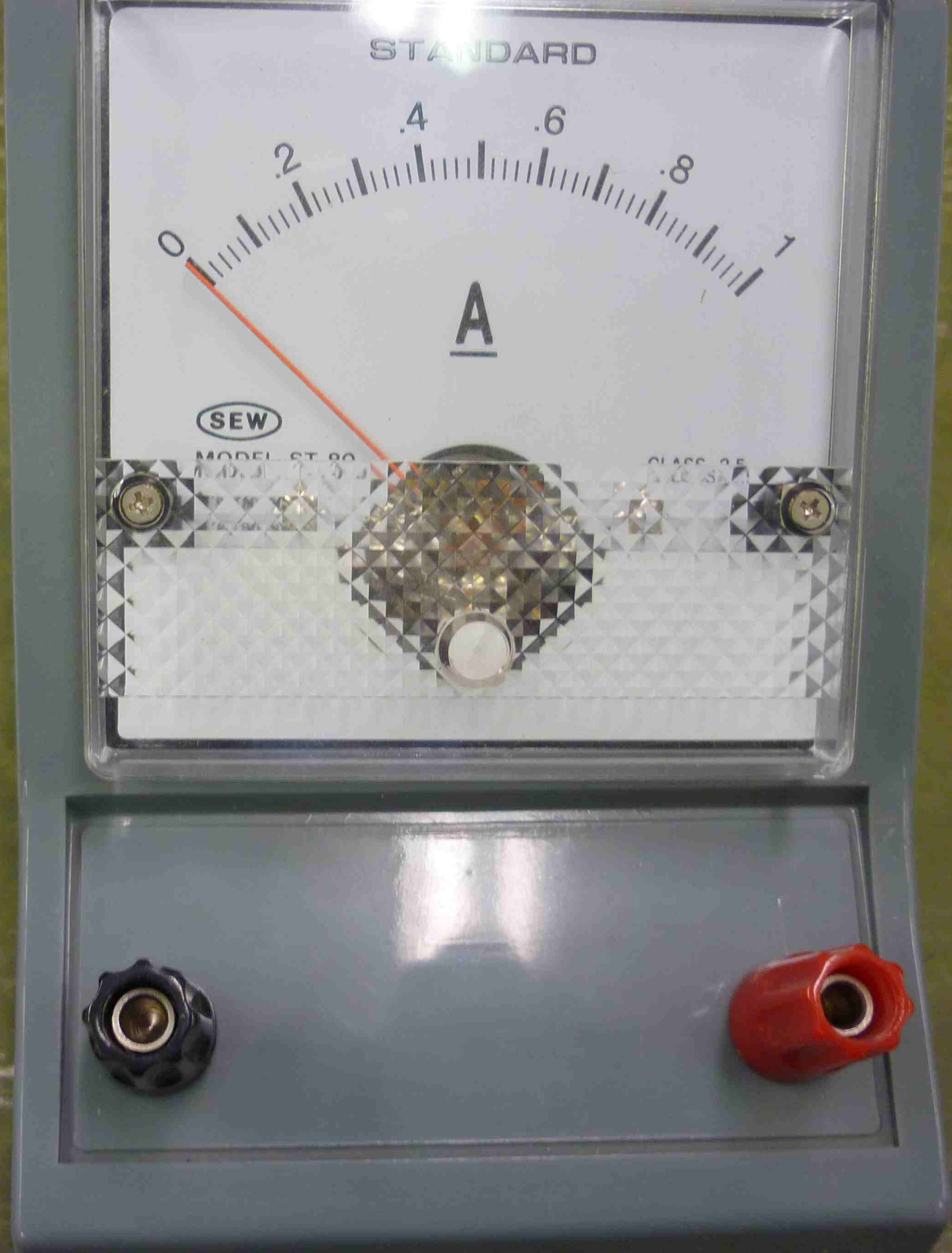

6·3V.A.C
240V.G.P.O
SWITCH
ELECTRO - TECHNOLOGY
APPLIED ELECTRICITY
S/F - ULTIMO


SPL618

OFF

0 80 100 120 180 200 220 240 260 280 60 40 20

VARIAC


STANDARD
0
.2
.4
.6
.8
1
A
SEW

PATON ELECTRICAL
SYDNEY

0 20 40 60 80 100 50 100 150 200 250

V

A.C.

MOD P70 No 89354

V3

V3

MOD. P70 No 89354

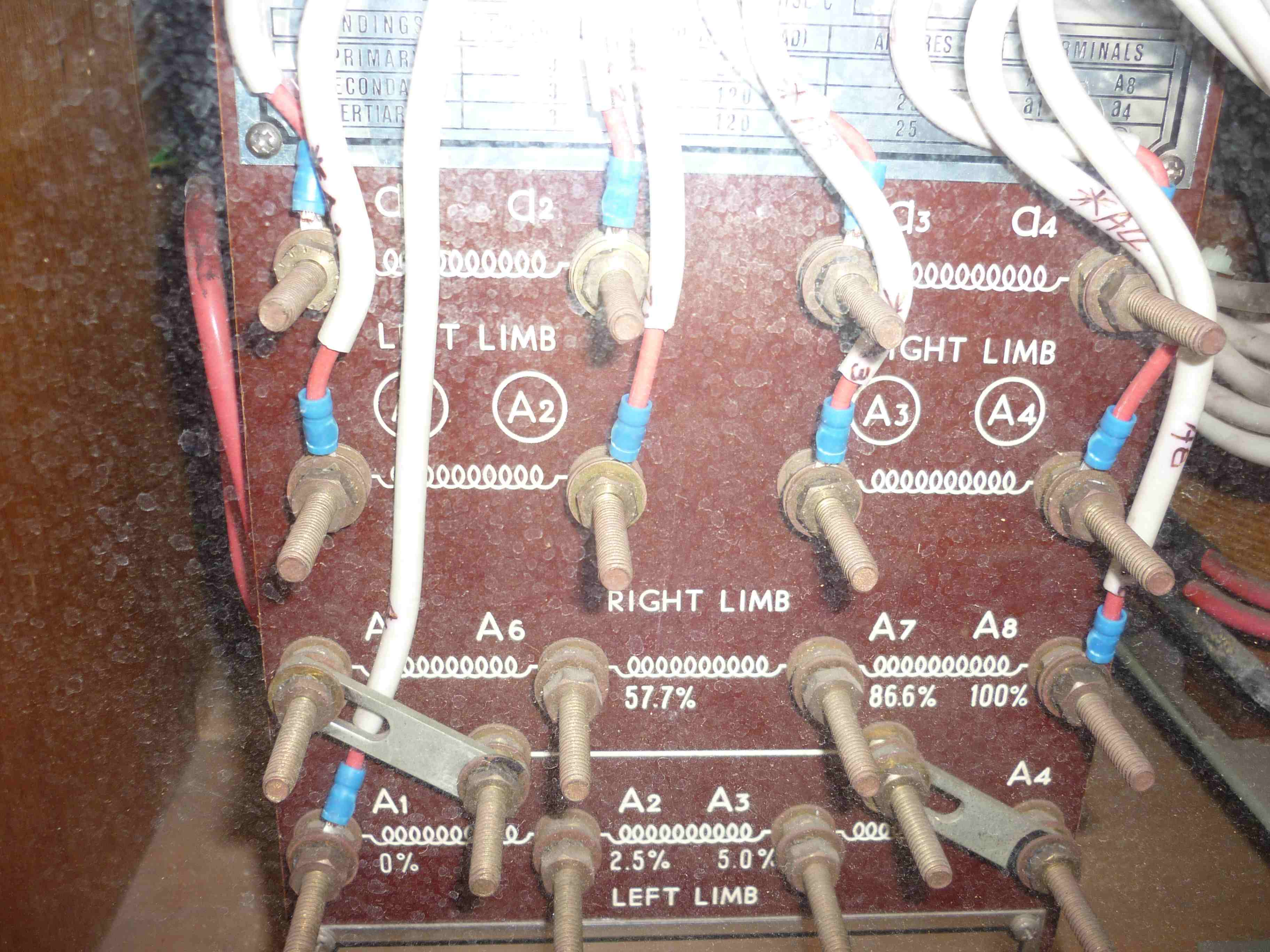
A.C.

V

0 20 40 60 80 100 150 200 250 50

PATON ELECTRICAL
SYDNEY

OFF 50 100 250 500


a2
a3
a4
A2
A3
A4
A6
A7
A8
57.7%
86.6%
100%
A1
A2
A3
A4
0%
2.5%
5.0%
RIGHT LIMB
LEFT LIMB

STANDARD MUTUAL
INDUCTOR

PRI

TYPE 4190 AM

SEC

·1 MILLIHENRY

№ 209388

H. TINSLEY & Co Ltd

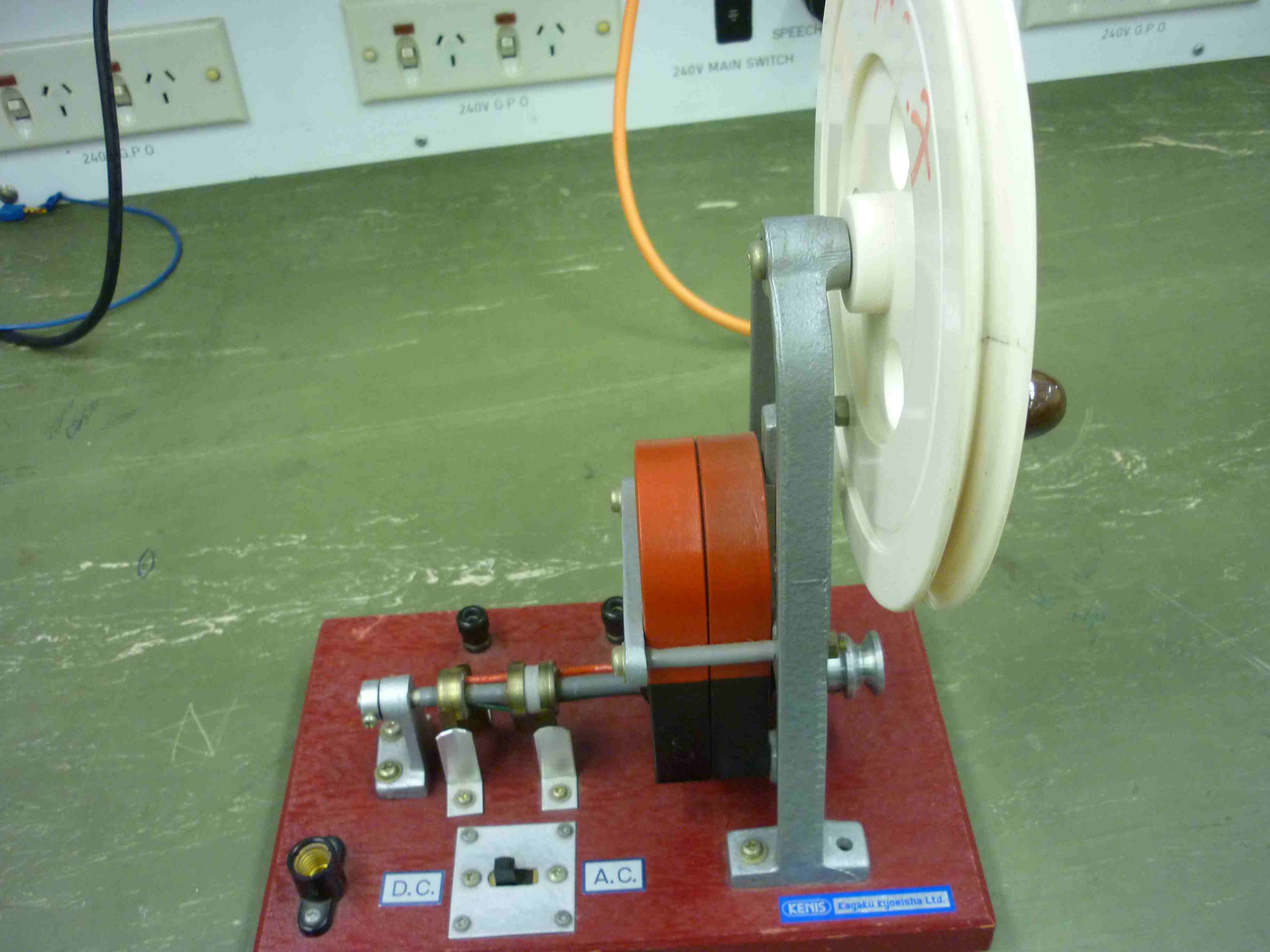
London S·E·25

STANDARD MUTUAL
INDUCTOR

TYPE 4190AM

1 MILLIHENRY

H. TINSLEY & Co Ltd London S.E.25


240V G.P.O
240V G.P.O
240V MAIN SWITCH
SPEECH
240V G.P.O
D.C.
A.C.
KENIS Kagaku Kyoeisha Ltd.

D.C.

A.C.

Polycentre

FOR

Westinghouse

QUICKLAG BREAKERS

ON

TRIPPED

QUICKLAG N28 50Hz ON

OFF

10A

Q110C 6kA 250V

TO RESTORE POWER WHEN TRIPPED
– SWITCH "OFF" THEN "ON" –

Glycentre

FOR

Westinghouse

QUICKLAG BREAKERS

TO RESTORE POWER WHEN TRIPPED
- SWITCH "OFF" THEN "ON" -

TRIPPED

OFF

ON

QUICKLAG N20 50Hz ON OFF 10A Q10C 6kA 250V

PATON ELEC.
PTY. LTD., SYDNEY

OVERLOAD
CUT-OUT

PRESS TO RESET

Palec
M-52

10 580

PRESS FOR
RED RANGES

A.C.-D.C.
MILLIAMPS
1000 - 3000
100 - 300
10 - 30
1 - 3
(01 -0·3V. D.C.)
Ω×1

A.C.-D.C.
AMPS
10 - 30
Ω×100

A.C.-D.C.
VOLTS
1000
100 - 300 +40db
10 - 30 +20db
1 - 3 +0db
Ω×1000

Ω ADJ.

A.C. - AMPS - mA
A.C.-VOLTS.-db
O/PT-VOLTS.

D.C. AMPS-mA
D.C. VOLTS.
OHMS

COM.

10A

30A

mA

Ω

V

db

−


S1
S2
S3
J.S. HANSOM & CO
INSTRUMENT TRANSFORMER
SER.NO.
VOLTS
AMPS
RATIO
TYPE
CLASS
OHMS
P1

S1

J.S. HANSOM & CO.

INSTRUMENT TRANS FORMER

A.S.S. C-45

SER.NO.	14874	TYPE	THRU
VOLTS	600	CLASS	10P40
AMPS	5	BURDEN	10 VA
RATIO	200 400/5	FREQ	50

P1 P2

J.S. HÅNSOM & CO.

INSTRUMENT TRANS FORMER

ASS 6-45

SER.NO.

VOLTS

AMPS

RATIO

TYPE

CLASS

BURDEN

FREQ

"

P1

P2


J.S. HANSOM &CO.
INSTRUMENT TRANS FORMER
SER.NO. 12874
VOLTS 500
AMPS
RATIO 5
TYPE THRU
CLASS 10P40
BURDEN 10 VA
FREQ 50
P1
P2

0 1 2 3 4 5

AMPERES

D. C.

PEAK

MK-65 NO. 385

CAT. NO. Z-3008

JAPAN

0 1 2 3 4 5

MILLIAMPS X100

D. C.

PEAK

MK-65 NO. 529

CAT. NO. Z-3008

JAPAN

+

10KOHM

1KOHM

10KOHM

1K2OHM

10KOHM

2K7OHM

5KOHM

ЧМ

15KOHM

22KOHM

10KOHM

6V2

BENCH 2J

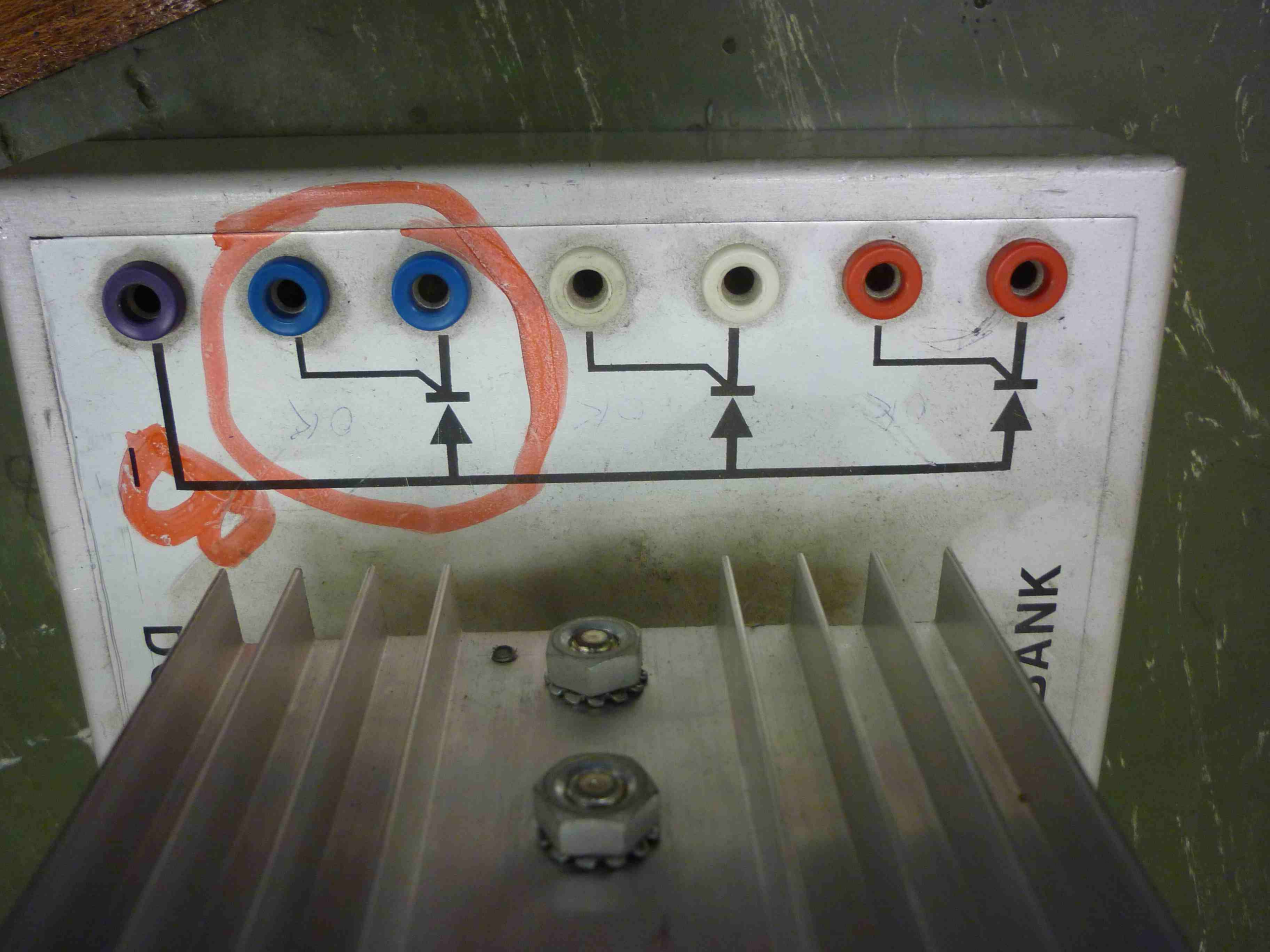
E.D.1 Triode Panel

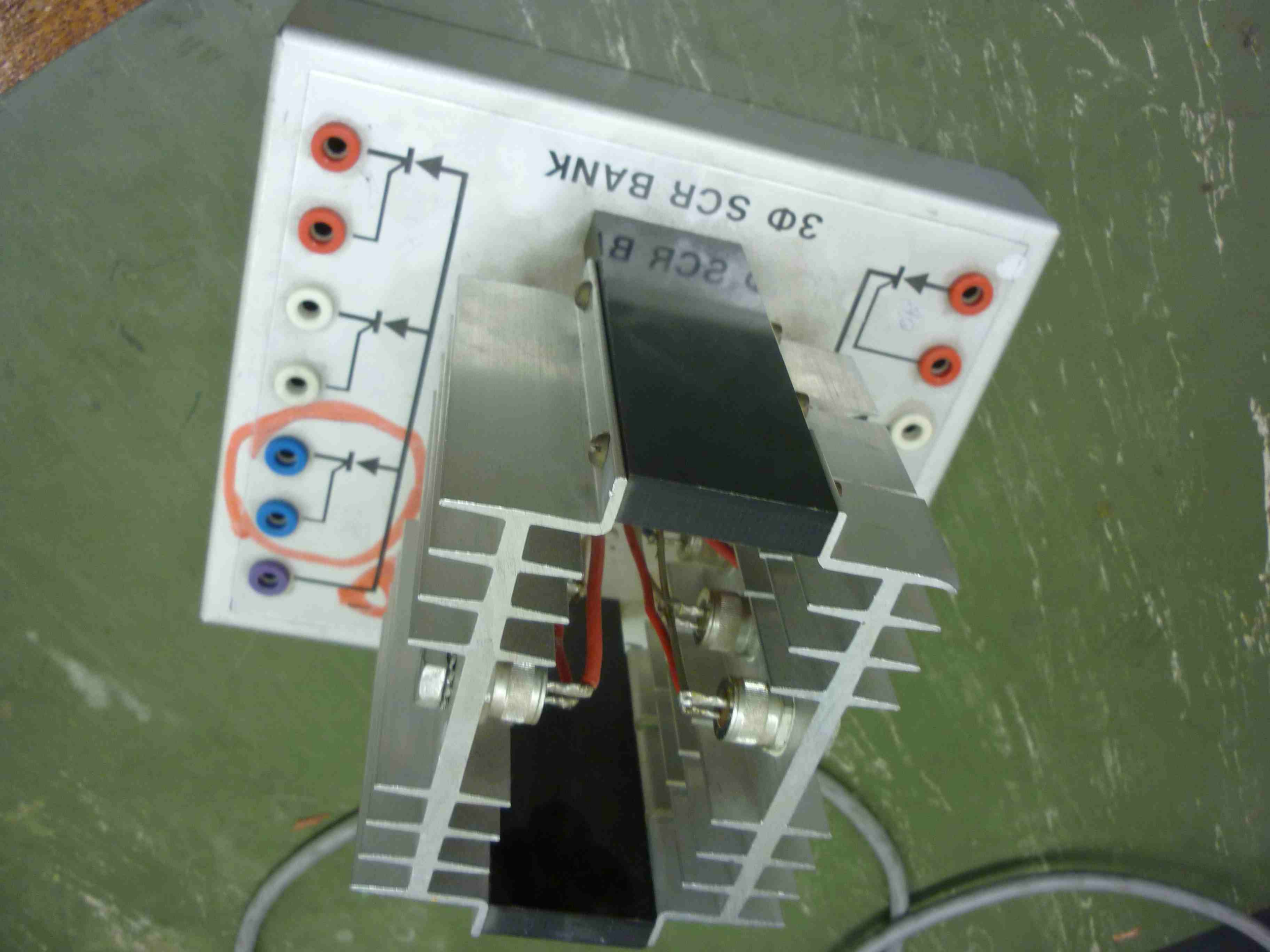
6.3 V

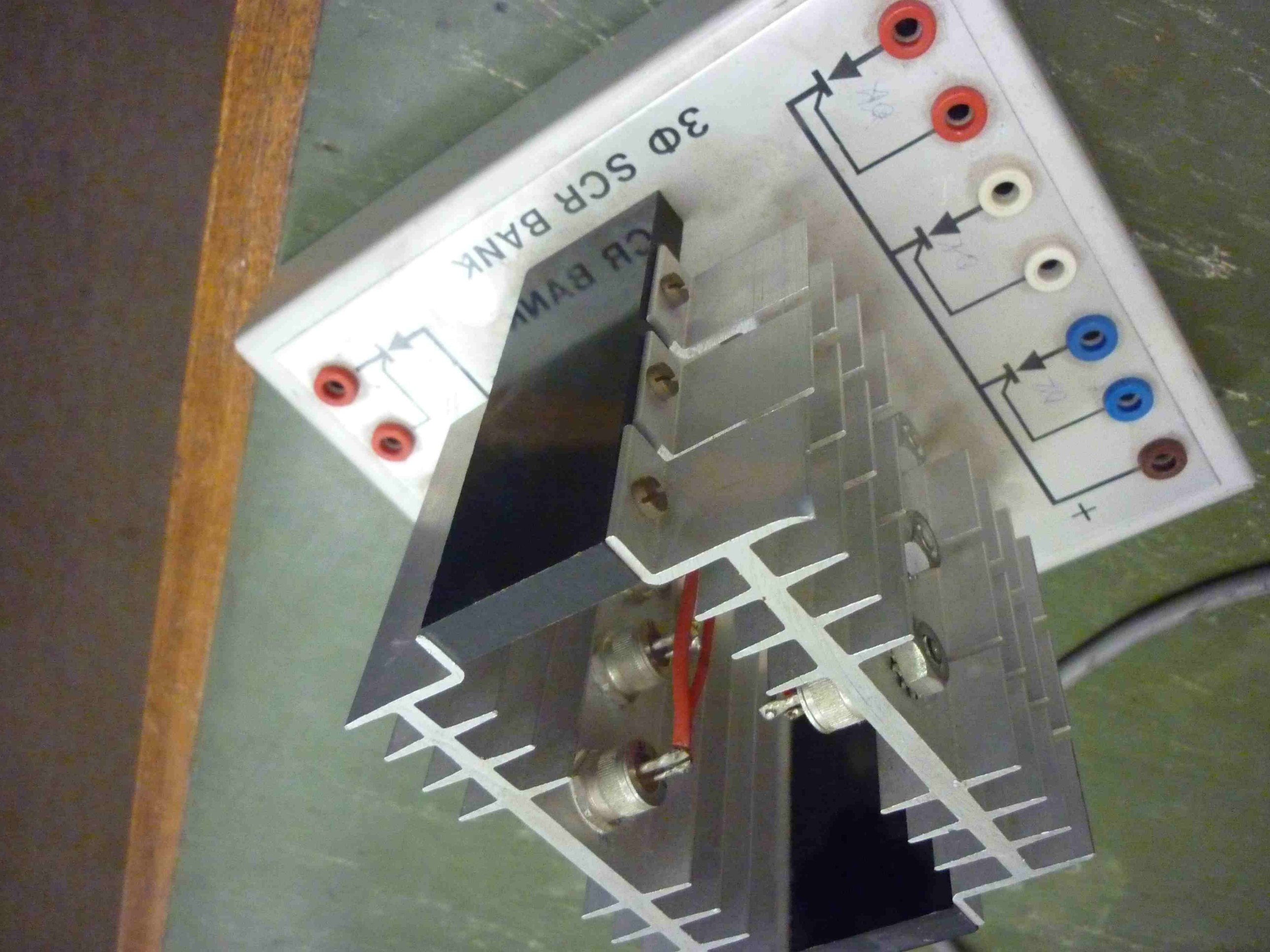
+

3Φ

PUT



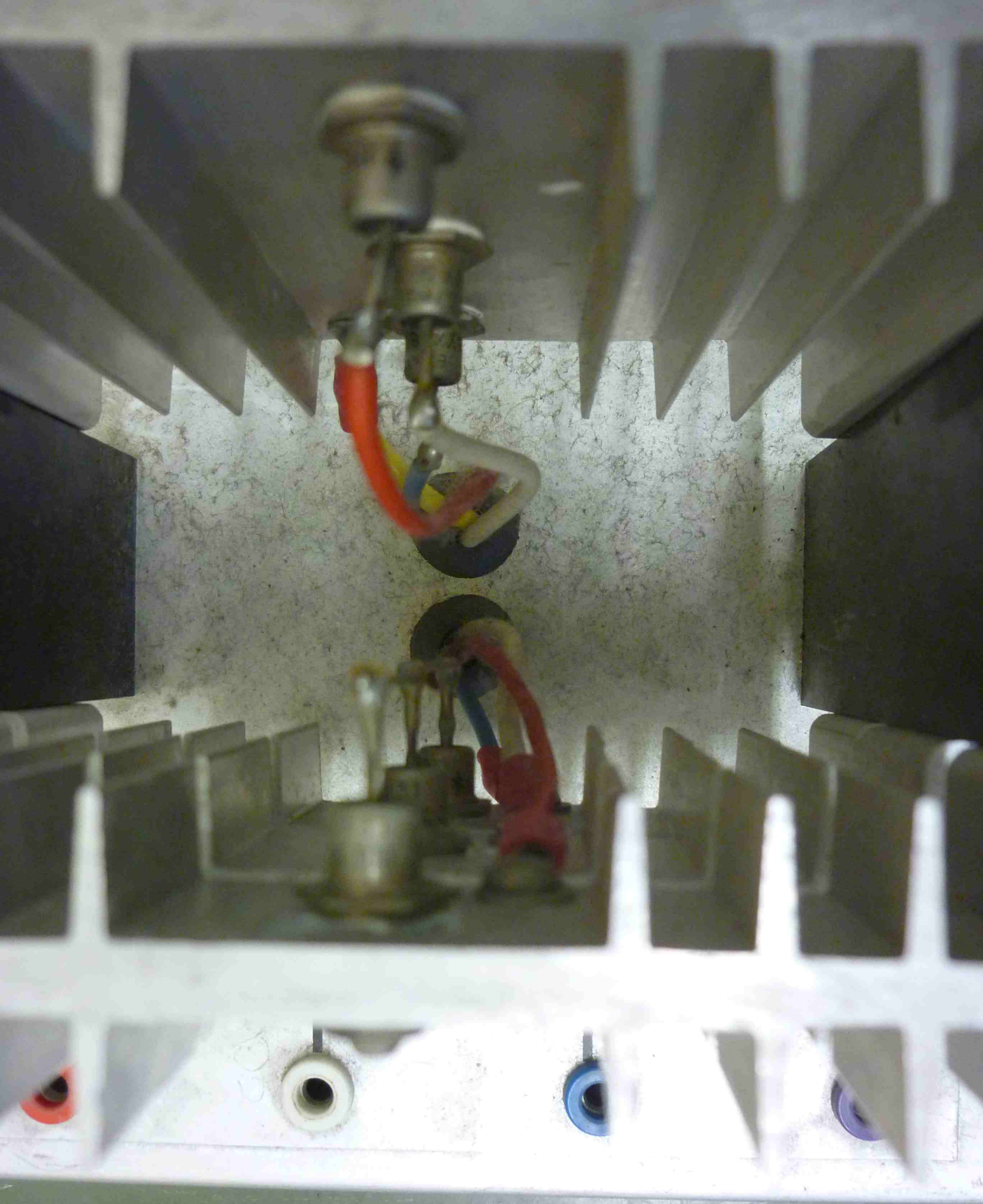

3Φ SCR BANK


3Ø SCR BANK

+

DC OUTPUT

−



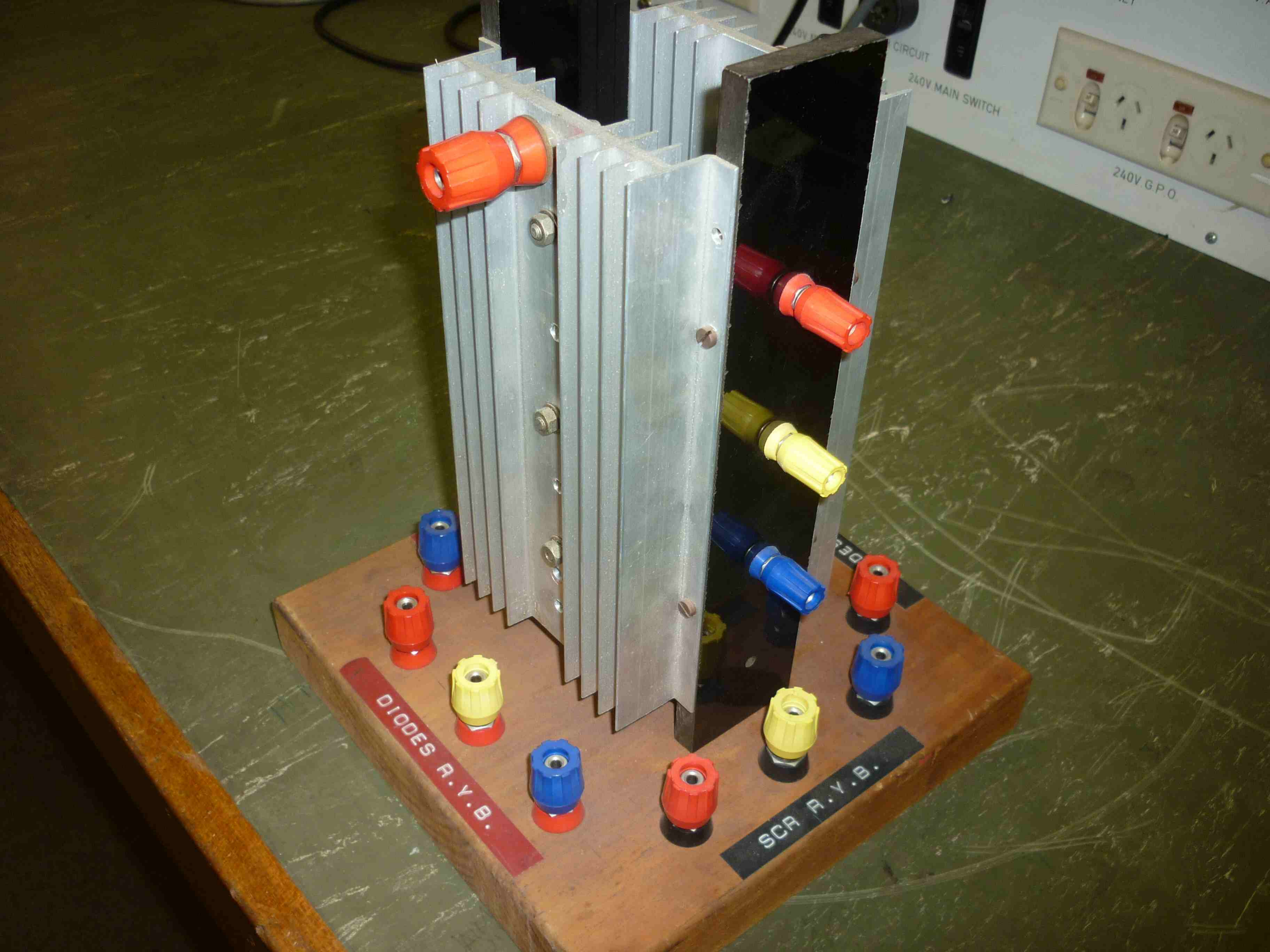
3Φ RE

+

UTPUT


BANK

3Φ RECTIFIER BANK


240V MAIN SWITCH
240V G.P.O
DIODES R.Y.B.
SCR R.Y.B.


DIODES R.Y.B.
SCR R.Y.B.

DIODES R.Y.B.

DIODES R.Y.B.

SCR R.Y.B.


R.V

-280V
OUTPUT ONLY
240V G.P.O
WITCH
6·3V.A.C.
DIODES R.Y.B.
SCR R.Y.B.

C/A SERIES A.C. CIRCUITS

C. CORE

CAP.

C/A SERIES A.C. CIRCUITS

C. CORE

CAP.

BENCH F

2

S2

1

PRIMARY COIL

D.C. INPUT.

X

SW. 1

Y

D.C. INPUT

COIL

D.C. INPUT

COIL

FRUM M 3-7 JUT

Y

SW. 1

X

PRIMARY COIL

D.C. INPUT.

1

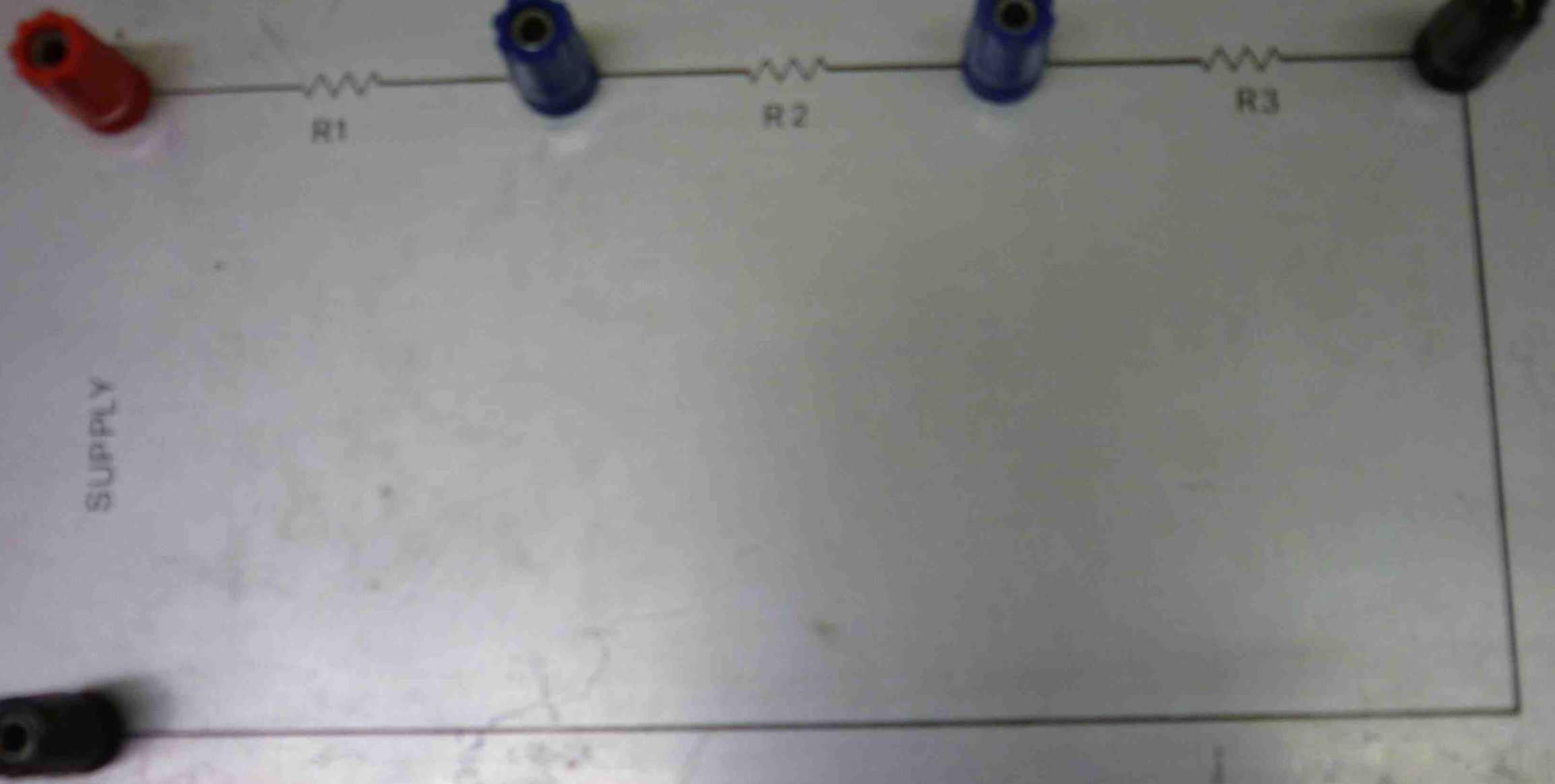
S2

2

C/A PARALLEL RESONANCE

·5 MFD
APPROX.

PROTOTYPE


R1
R2
R3
SUPPLY

POTENTIAL TERMINALS

V1 V2

500V 250V 100V 50V 25V OFF

POTENTIAL SWITCH

REVERSE CURRENT SHORT NORMAL

POLARITY SWITCH

PATON

0 10 20 30 40 50 60 70 80 90 100

W

121675 658

0·5 AS1042

CURRENT TERMINALS

M L

OFF 5A 2·5A 1·25A

CURRENT SWITCH

SCALE FACTORS

VOLTS / AMPS	25	50	100	250	500
1·25	0·078	0·156	0·312	0·781	1·562
2·5	0·156	0·312	0·625	1·562	3·125
5	0·312	0·625	1·25	3·125	6·25

TO OBTAIN WATTS MULTIPLY READING BY SCALE FACTOR ACCORDING TO POTENTIAL & CURRENT SWITCH SETTINGS

RATED COS Ø = 0·25

POTENTIAL TERMINALS

V1 V2

500V 250V 100V 50V 25V OFF

POTENTIAL SWITCH

REVERSE CURRENT SHORT NORMAL

POLARITY SWITCH

PATON

0 10 20 30 40 50 60 70 80 90 100

W

121675 658

CURRENT TERMINALS

M L

OFF 5A 2·5A 1·25A

CURRENT SWITCH

SCALE FACTORS

VOLTS / AMPS	25	50	100	250	500
1·25	0·078	0·156	0·312	0·781	1·562
2·5	0·156	0·312	0·625	1·562	3·125
5	0·312	0·625	1·25	3·125	6·25

TO OBTAIN WATTS MULTIPLY READING BY SCALE FACTOR ACCORDING TO POTENTIAL & CURRENT SWITCH SETTINGS

RATED COS Ø = 0·25

CURRENT SWITCH

SCALE FACTORS

A AMPS \ VOLTS	25	50	100	250	500
1·25	0·078	0·156	0·312	0·781	1·562
2·5	0·156	0·312	0·[illegible]	1·562	3·125
5	0·312	0·625	[illegible]	3·125	6·25

TO OBTAIN WATTS MULTIPLY READING BY SCALE FACTOR ACCORDING TO POTENTIAL & CURRENT SWITCH SETTINGS

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CURRENT SWITCH

SCALE FACTORS

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1·25	0·078	0·156	0·312	0·781	1·562
2·5	0·156	0·312	0·625	1·562	3·125
5	[illegible]	[illegible]	[illegible]	3·125	6·25

TO OBTAIN [illegible]ATTS MULTIPLY
READING BY SCALE FACTOR
ACCORDING TO POTENTIAL &
CURRENT SWITCH SETTINGS

RATED COS Ø = 0·25

V1

V2

250V

100V

500V

50V

OFF

25V

POTE SWITCH

CURRENT
SHORT

REVERSE

NORMAL

ITIAL TERMINA

V1

V2

250V

100V

500V

50V

OFF

25V

POTENTIAL SWITCH

CURRENT
SHORT

REVERSE

NORMAL

POLARITY SWITCH

PATON

94

V1 V2

100V
50V
25V
OFF

POTENTIAL SWITCH

REVERSE NORMAL

POLARITY SWITCH

PATON

M L

OFF 5A

CURRENT SWITCH

SCALE FACTORS

VOLTS / AMPS	25	50	100	250	500
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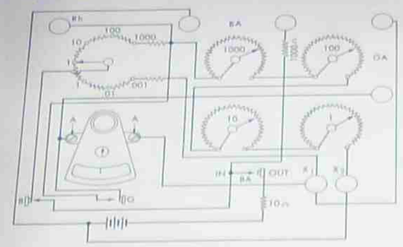
DIRECTIONS FOR OPERATING L&N NO. 5305 TEST SET



RESISTANCE MEASUREMENTS

Connect the unknown resistance to posts X_1 and X_2. Make no connections to Rh or BA except under conditions noted later.

Release the galvanometer pointer clamp by sliding the clamping button toward the galvanometer scale. Loosen the round head screw in the side of the moulded cap and turn the cap to bring the pointer to zero on the galvanometer scale. If desired, clamp the adjustment by tightening this screw carefully.

Set the BA key to the IN position when using the contained batteries and to the OUT position when using external batteries.

Set the ratio dial from the table. Balance the bridge by varying the rheostat dials until the galvanometer does not deflect when G and B keys are depressed. The unknown resistance equals the rheostat setting multiplied by the ratio dial setting.

UNKNOWN RESISTANCE		RATIO DIAL SETTING
Below 10	ohms	1/1000
10 ohms to 100	"	1/100
100 " " 1000	"	1/10
1000 " " 10000	"	1/1
10000 " " 100000	"	10/1
100000 " " 1000000	"	100/1
1000000 " " 10000000	"	1000/1

TO USE RHEOSTAT AS RESISTANCE BOX

Connect to Rh and X_2 terminals to obtain resistances from 0 to 9999 ohms. Safe rating ½ watt per coil.

INTERNAL BATTERY

Three Type D flashlight batteries, connected in series, are mounted in the box. When the batteries wear out they may be removed and replaced by unscrewing the two screws from the plate at the side of the case, removing the plate and sliding the batteries from the compartment.

TO USE EXTERNAL BATTERY

Disconnect the internal battery by placing the BA key in the OUT position. Connect the external battery to the BA posts. See section on SENSITIVITY for details.

INTERNAL GALVANOMETER

To remove the internal galvanometer, remove two screws A and lift the complete system from the case.

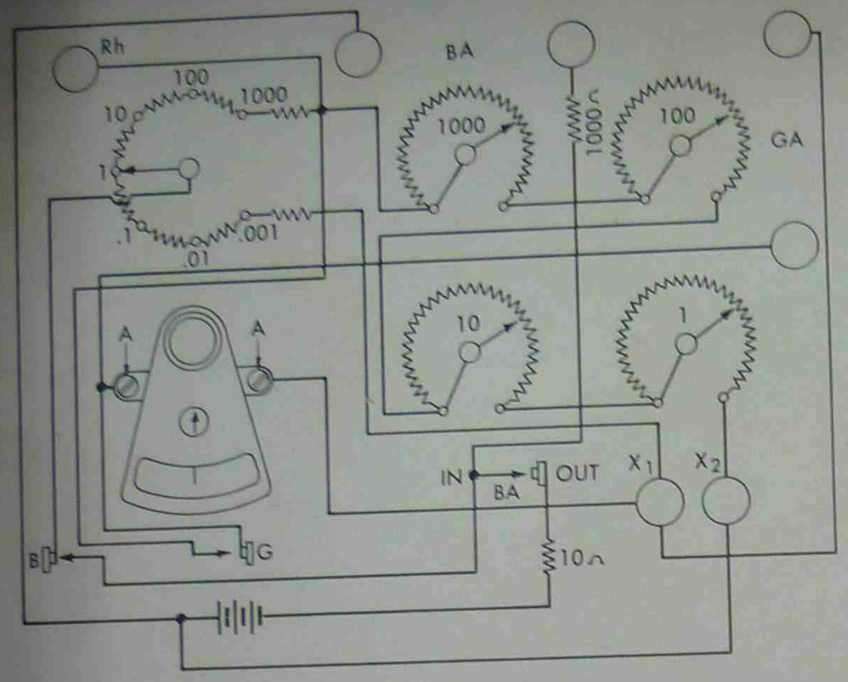
TO USE EXTERNAL GALVANOMETER

Disconnect the internal galvanometer by removing either screw A. Then connect the external galvanometer to the GA posts.

SENSITIVITY

When additional sensitivity is required beyond that provided by the internal battery, an external battery from 5 to 200 volts may be used. The internal galvanometer and batteries provide sensitivity adequate to balance the bridge within the guaranteed limit of error of ± (0.15% +0.01 ohm) when measuring resistances from 1 to 40,000 ohms. To measure higher resistances, an external galvanometer of greater sensitivity and/or an external battery of higher voltage are required. When the battery voltage exceeds 45 volts an external resistance of 40 ohms for each volt over 45 volts, up to 200 volts, must be added in series with the battery.

DIRECTIONS FOR OPERATING L&N NO. 5305 TEST SET



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100000	" " 1000000	"	...	100/1
1000000	" " 10000000	"	...	1000/1

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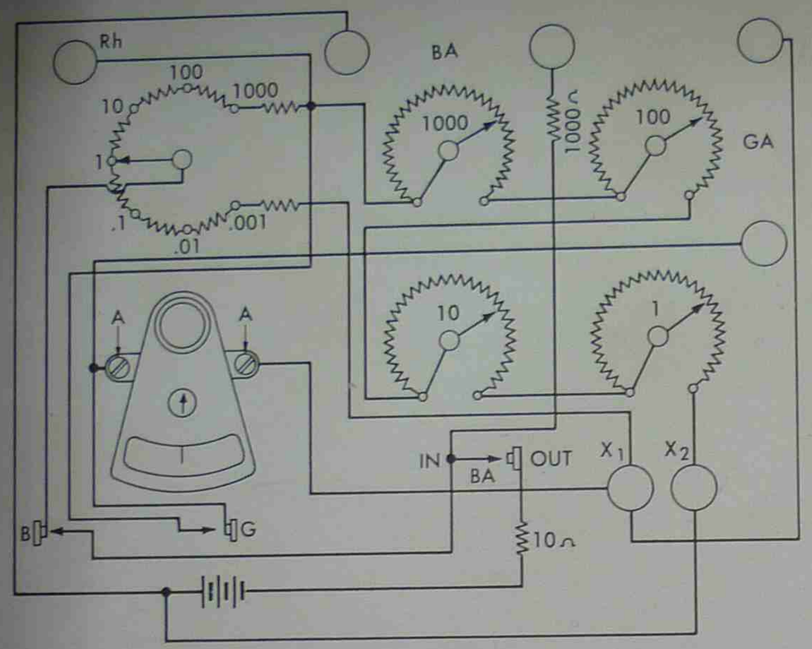
LEEDS & NORTHRUP COMPANY
SUMNEYTOWN PIKE, NORTH WALES, PA.

1834614

77-2-0-3 6-473
C/N 077606

Printed in U.S.A.

DIRECTIONS FOR OPERATING L&N NO. 5305 TEST SET



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LEEDS & NORTHRUP COMPANY

SUMNEYTOWN PIKE, NORTH WALES, PA.

1834614

77-2-0-3 6-473
C/N 077606

Printed in U.S.A.

ratio dial setting.

MULTIPLY BY

1000 100 10

1000

1000

100

100

CLAMP

MADE IN U.S.A.

– 10 5 0 5 10 +

LEEDS & NORTHRUP CO. PHILADELPHIA

LEEDS & NORTHRUP COMPANY
NORTH WALES, PA. MADE IN U.S.A.

IN OUT

BA

X

2

4 1 0 3 4 9 1 · N / S

FEEDBACK

FUNCTION GENERATOR FG600

Hz

FREQUENCY

RANGE

.01 – .1 – 1 – 10 – 100 – 1k – 10k – 100k

POWER

VCF

OUTPUT
Vpk-pk

600

COM

5VTTL

COM

2Vpk-pk 600Ω

FEEDBACK

POWER

VCF

FREQUENCY

.01 – .1 – 1 – 10 – 100 – 1k – 10k – 100k

RANGE

2V

FEEDBACK

FUNCTION GENERATOR FG600

Hz

FREQUENCY

RANGE

.01 – .1 – 1 – 10 – 100 – 1k – 10k – 100k

POWER

VCF

OUTPUT
Vpk-pk

600Ω

COM

5VTTL

COM

2Vpk-pk 600Ω

FENG YUAN

H.1.21

INPUT

MA

$V_{\overline{\sim}}$ Ω

FUSE

2V MAX

1200V MAX

1200V MAX

COMMON

FUNCTION

ACV | AC MA | DCV | DC MA | KΩ | 20MΩ

200MV 200 μA 200Ω | RANGE 2 | 20 | 200 | 1200V 2000MA 2000KΩ

POWER ON-OFF

FLUKE 63445 8000A DIGITAL MULTIMETER

H.1.21

INPUT

MA

$V_{\sim}^{-}$ Ω

2V MAX

1200V MAX

1200V MAX

COMMON

FUNCTION

ACV AC MA DCV DC MA KΩ 20MΩ

RANGE

200MV 200μA 200Ω 2 20 200 1200V 2000MA 2000KΩ

POWER ON-OFF

FLUKE 63445 8000A DIGITAL MULTIMETER


240V MAIN SWITCH
456A AC CURRENT PROBE
HEWLETT PACKARD
POWER
ON
BATTERY TEST
INPUT
OUTPUT
1 MV/MA

456A AC CURRENT PROBE

HEWLETT PACKARD

INPUT

OUTPUT
1 MV/MA

POWER

BATTERY TEST
(7V MIN.)

ON

—

AMPROBE®

MODEL: PF1050

VOLT/AMP/POWER FACTOR

ELECTRICAL ENGINEERING
CERTIFICATE
PLANT NO. B72720.

VOLTS/AMPS RANGE
0-999 0-999

AMPS PF
VOLTS

LEADING P.F.
INDICATOR

434996

POWER CONTROL DEVICES

NE05 SECTION 3

32V/40W

D1

13

9

+24V

S1

15

20

D2

17

32V/40W

MT2

S3

TRIAC

V1

MT1

S2

7

R1

3V

19

100R

5

V2

3

28

-(0V)

CRO GND

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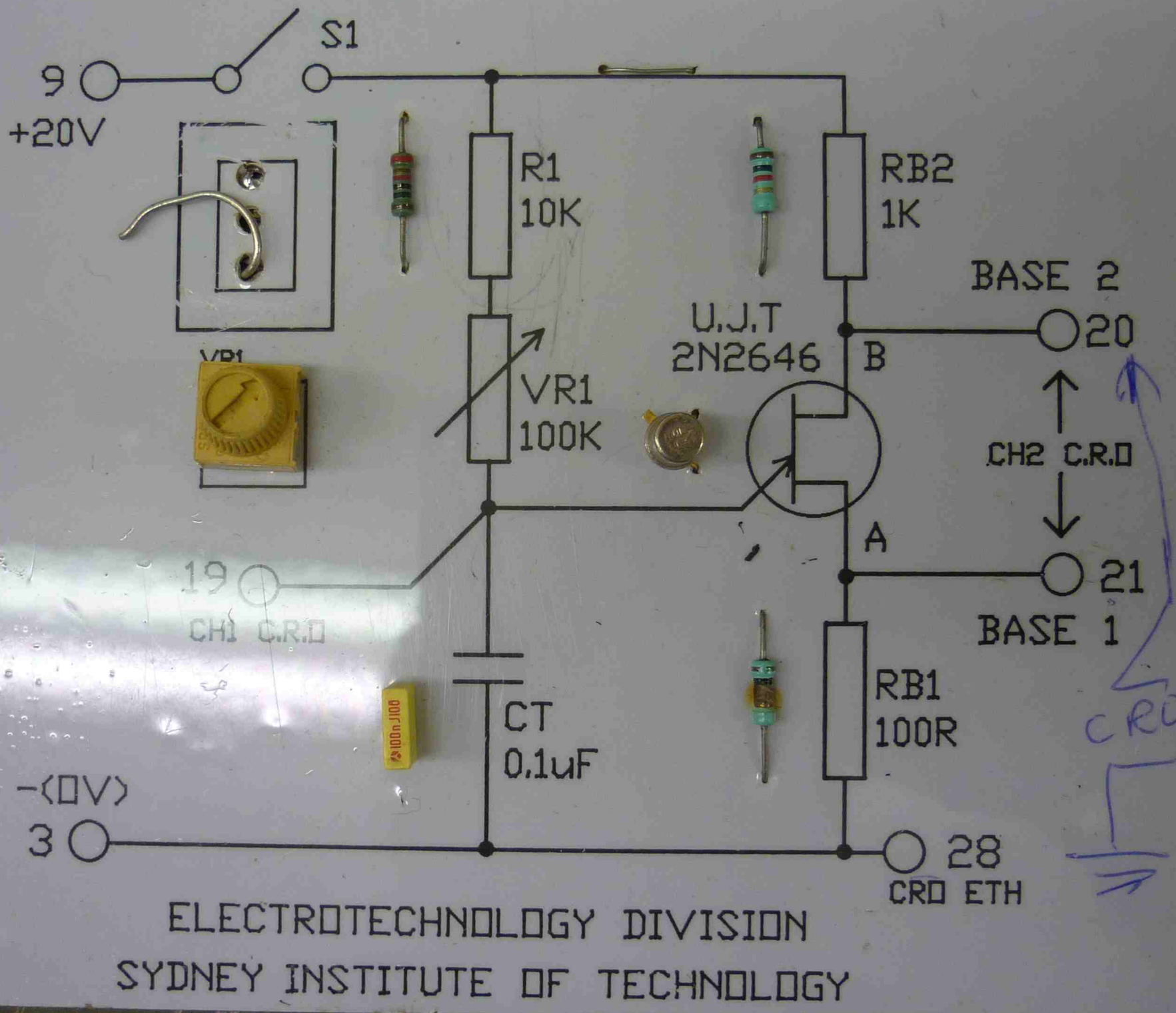
POWER CONTROL DEVICES NE05_4A

U.J.T RELAXATION OSCILLATOR



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POWER CONTROL 1
6016D

WEEK-8

BOOSTER 1 ← → 2 STANDARD

SW1

Q1
MJE2955

D1

1N5404

R_L
1k

S1

+Vin

S2

LED1

1
2

S28

+Vout

S27

7812
IN OUT
GND

+ C2
10uF

+ C3
10uF

S20

0V

S21

S8

0V

S9

CURRENT BOOSTED
7812 REGULATOR

GND

POWER CONT[illegible]O[illegible]1 WEEK-9

6016D

TREE TERMINAL
REGULATOR LM317T

D1
1N400[illegible]

IN
1
2
R1 OUT

S1
S2
+
R1
1k
LM317T
IN
OUT
ADJ
3
2
1
R1
2R2/5W
R2
120R
S28
S27
+
C2
10uF
LED1
P1
1k
+ C3
10uF
Vin
Vout
S8
0V
S9
GND
S20
0V
S21

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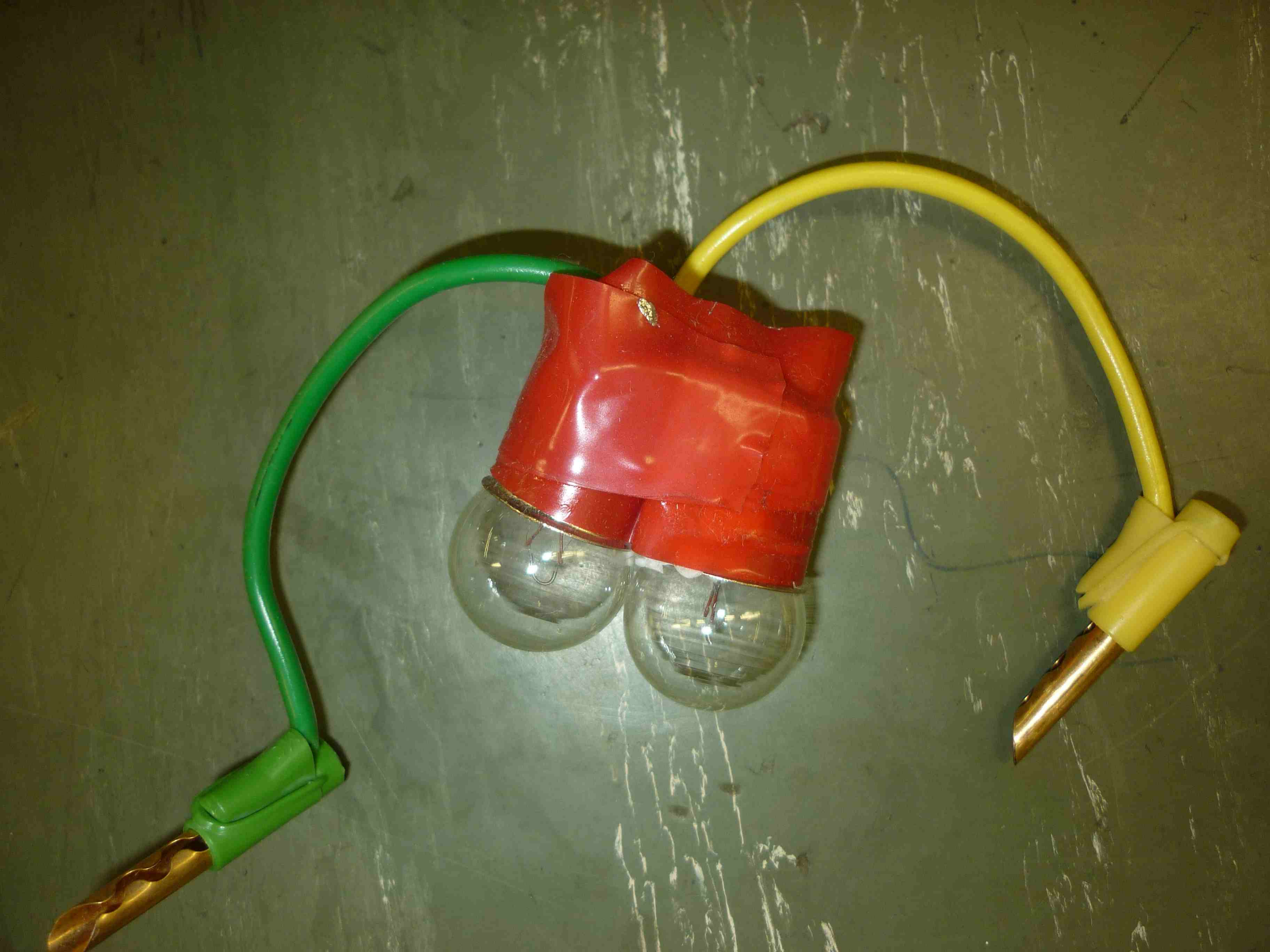
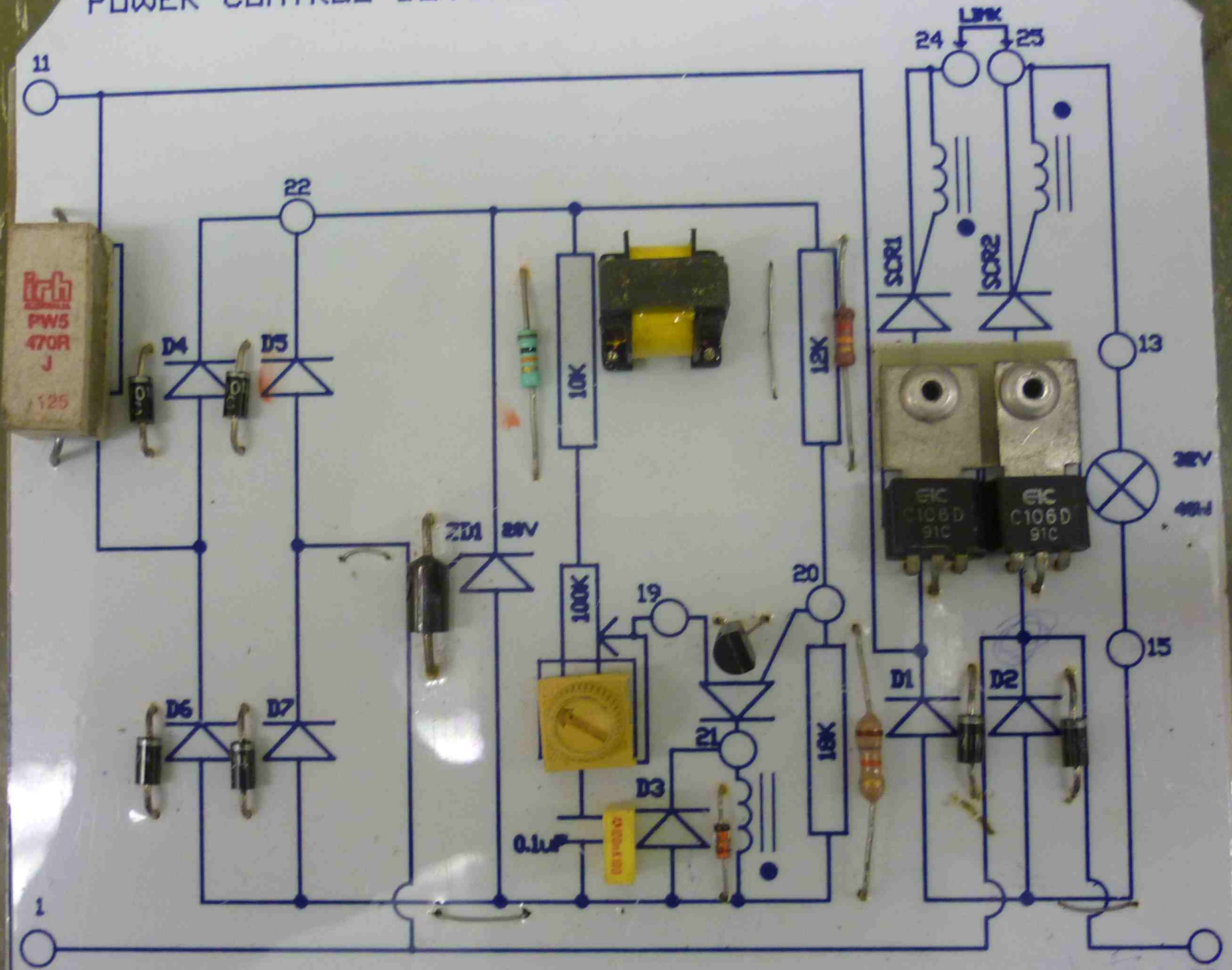
INDUSTRIAL ELECTRONICS DIVISION



POWER CONTROL DEVICES

NE05 SECTION 6



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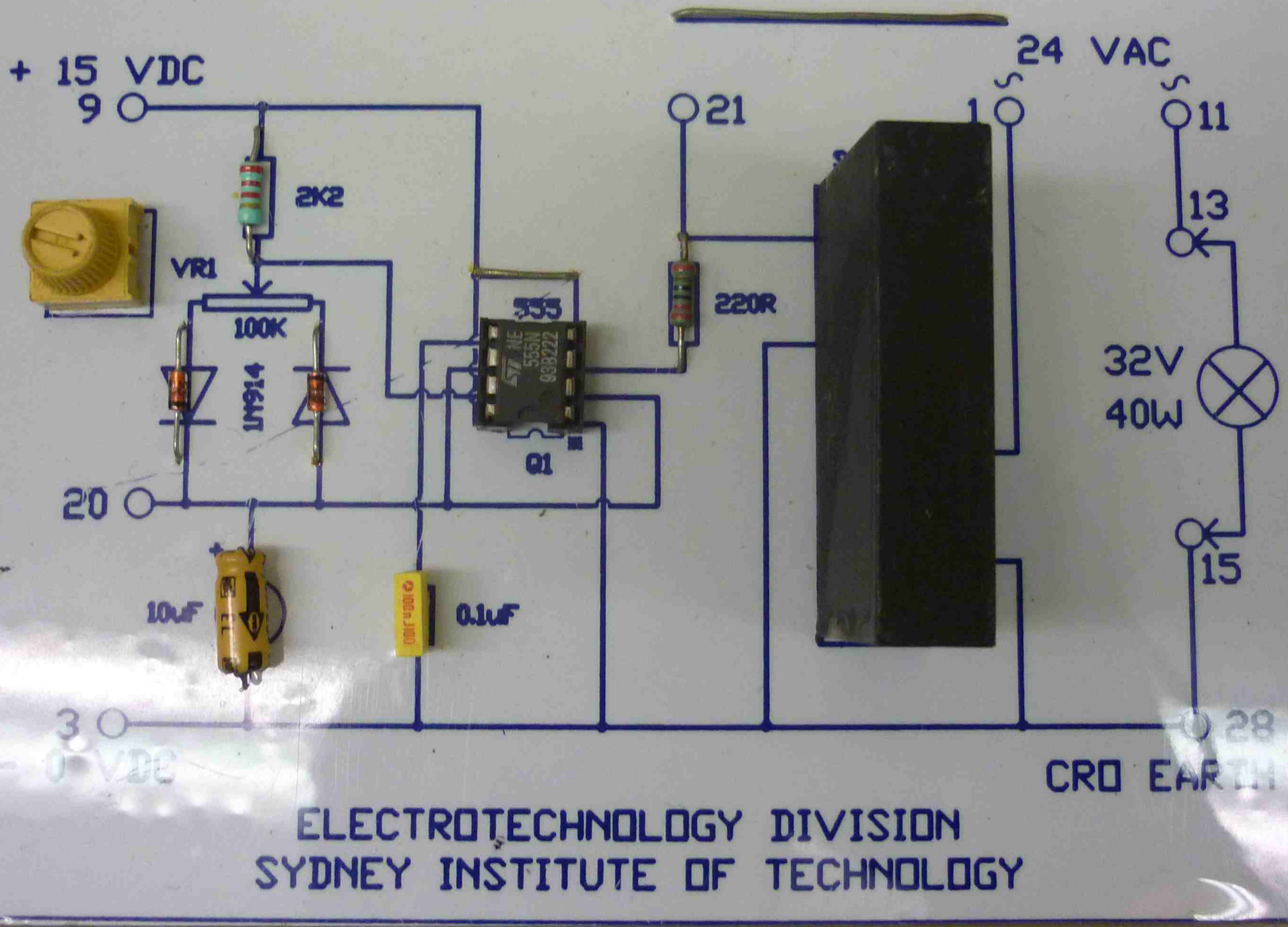
POWER CONTROL DEVICES NE05 SECTION 7

ZERO VOLTAGE SWITCHING



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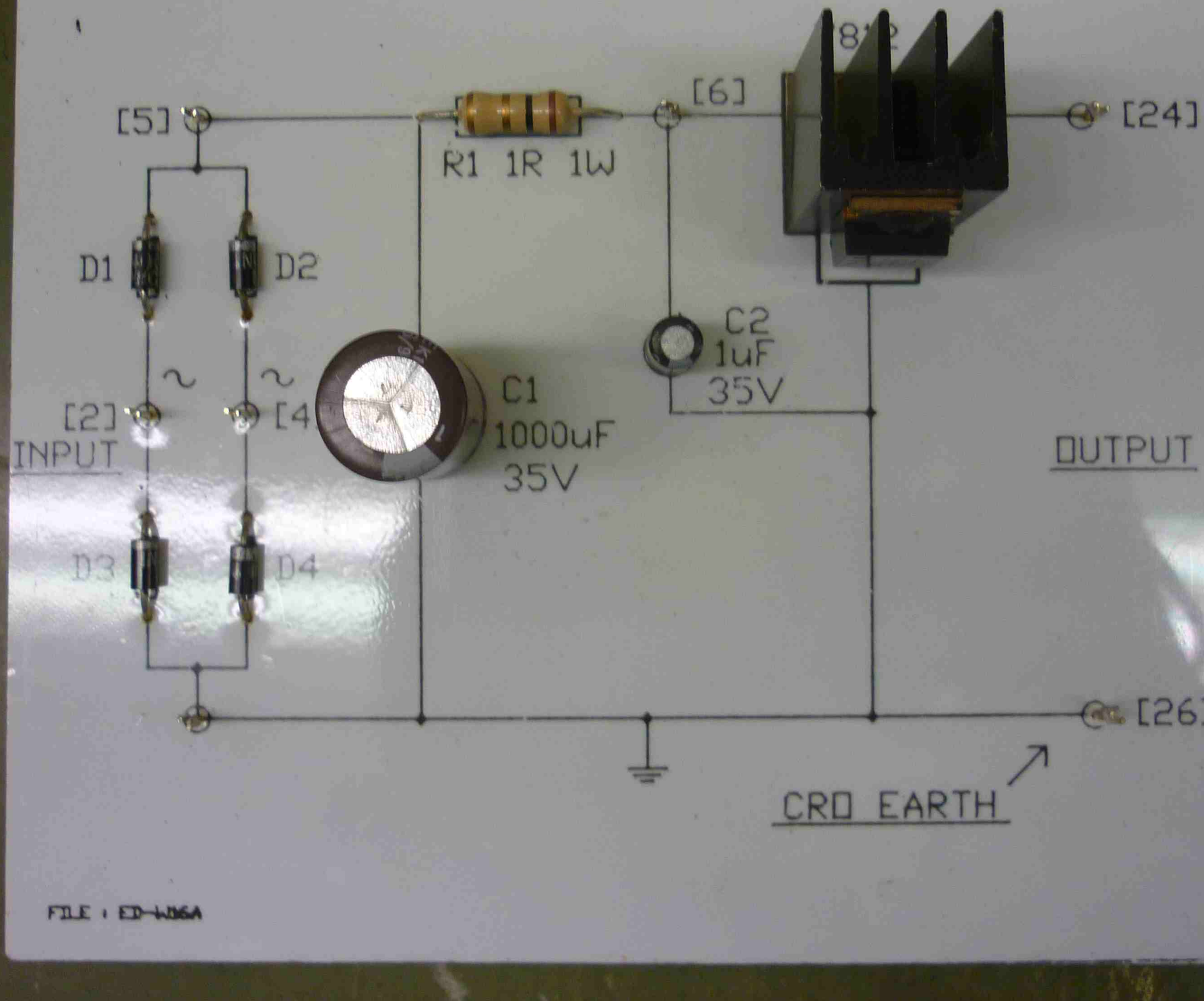
SIT ULTIMO INDUSTRIAL ELECTRONICS

ELECTRONIC DEVICES

FIXED 3 TERMINAL REGULATOR

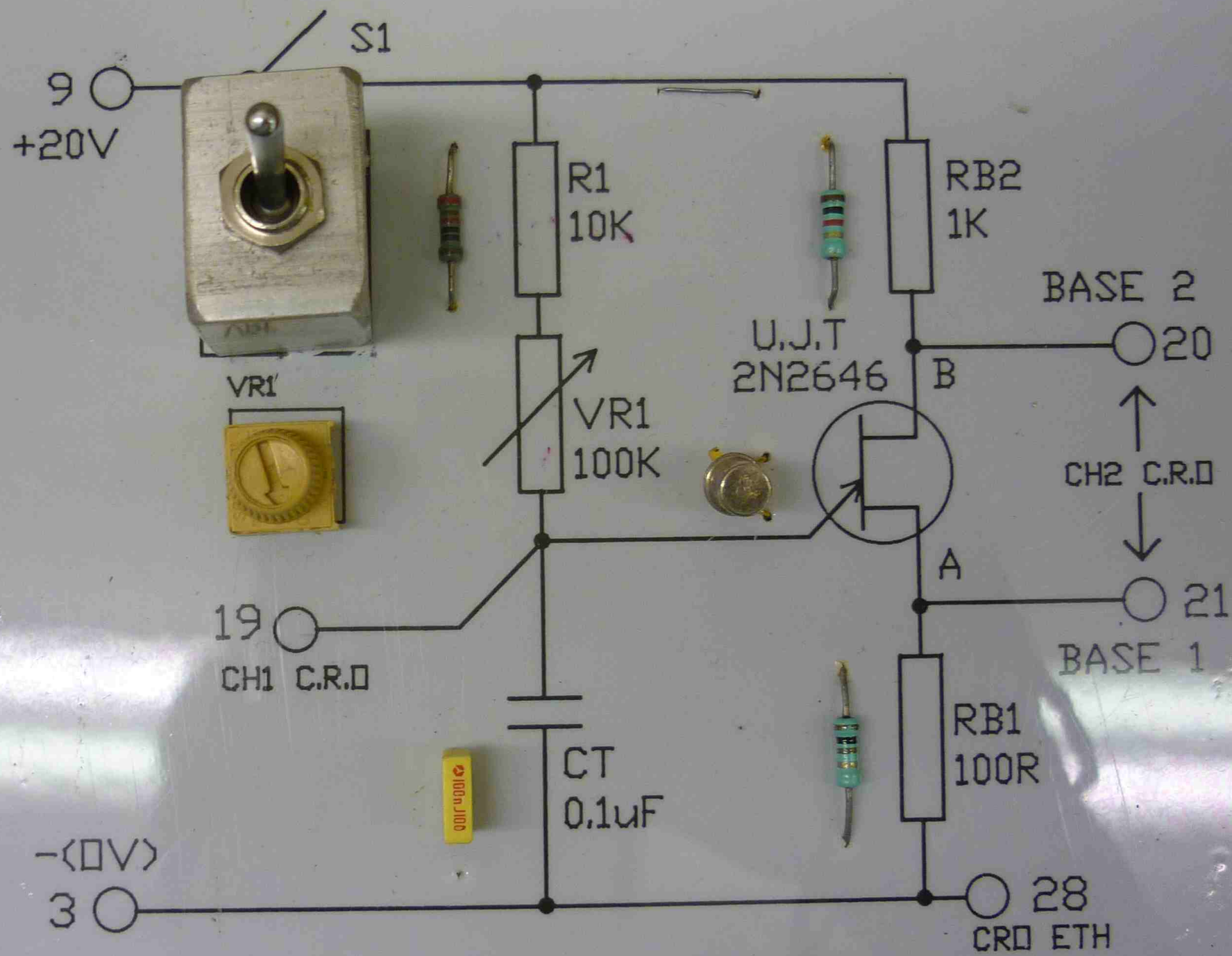
6016A # WEEK 16A



FILE : ED-W06A

POWER CONTROL DEVICES NE05_4A

U.J.T RELAXATION OSCILLATOR



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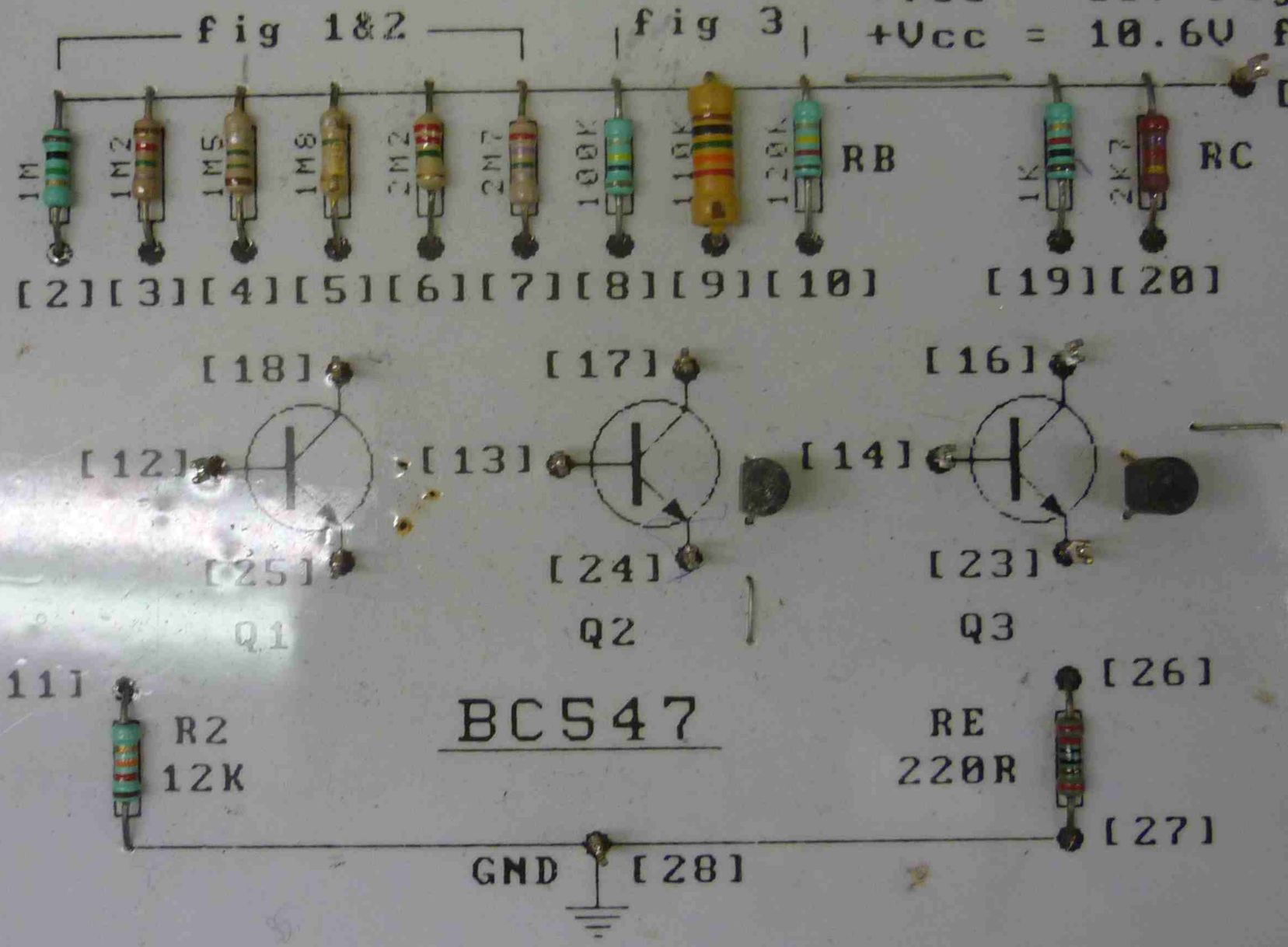
APPLIED ELECTRICITY INDUSTRIAL ELECTRONICS
ELECTRONIC DEVICES 6016A # WEEK 4

TRANSISTOR BIASING

+Vcc = 10V fig 2&3
+Vcc = 10.6V fig 1



FILE : ED-114

POWER CONTROL DEVICES

NE05 SECTION 7

ZERO VOLTAGE SWITCHING

CRO

+ 15 VDC

9

2K2

VR1

100K

555

LM 555CN

Q1

21

220R

24 VAC

1

11

13

32V

40W

15

20

10uF

0.1uF

3

- 0 VDC

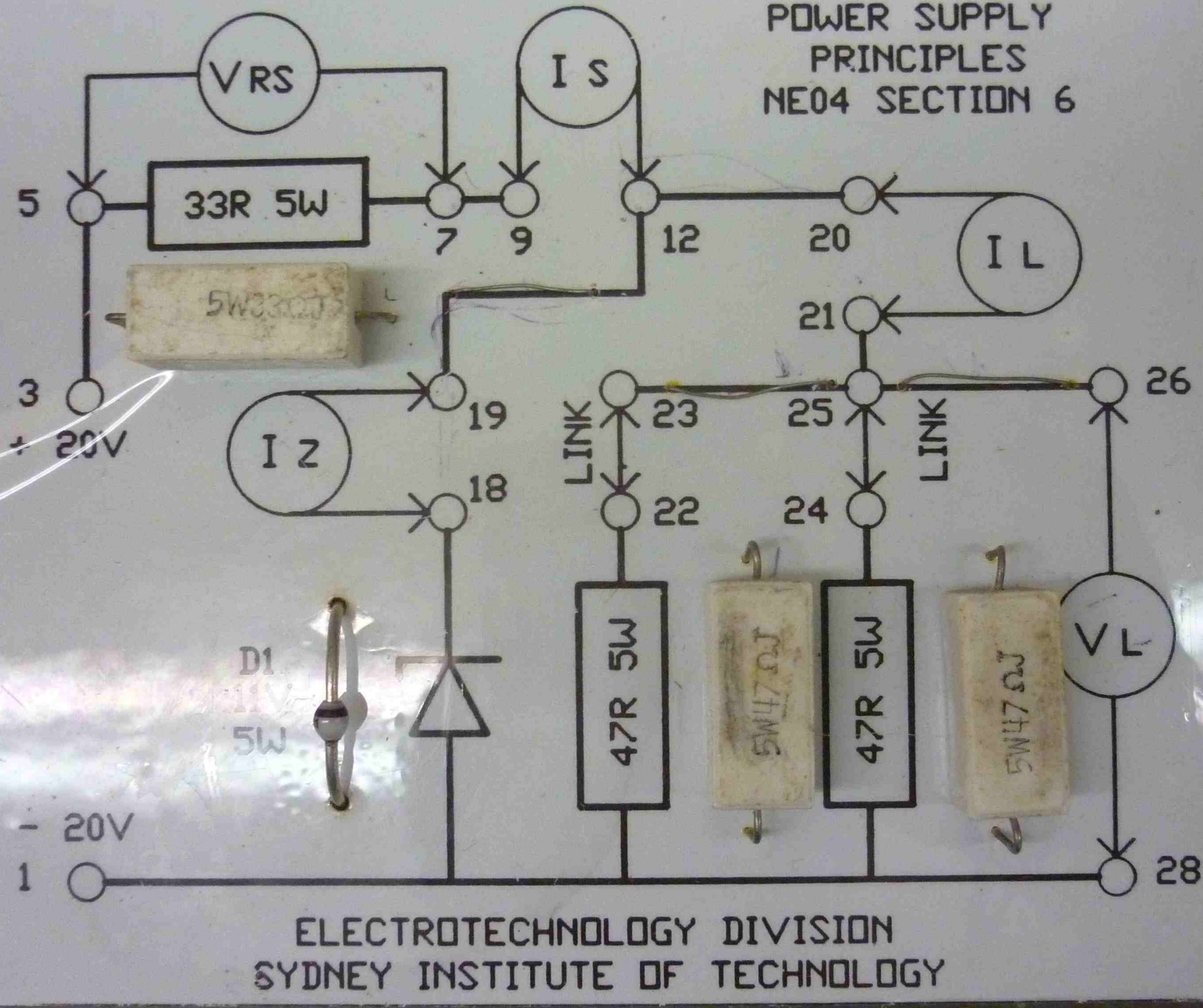
28

CRO EARTH

ELECTROTECHNOLOGY DIVISION

SYDNEY INSTITUTE OF TECHNOLOGY

POWER SUPPLY PRINCIPLES NE04 SECTION 6



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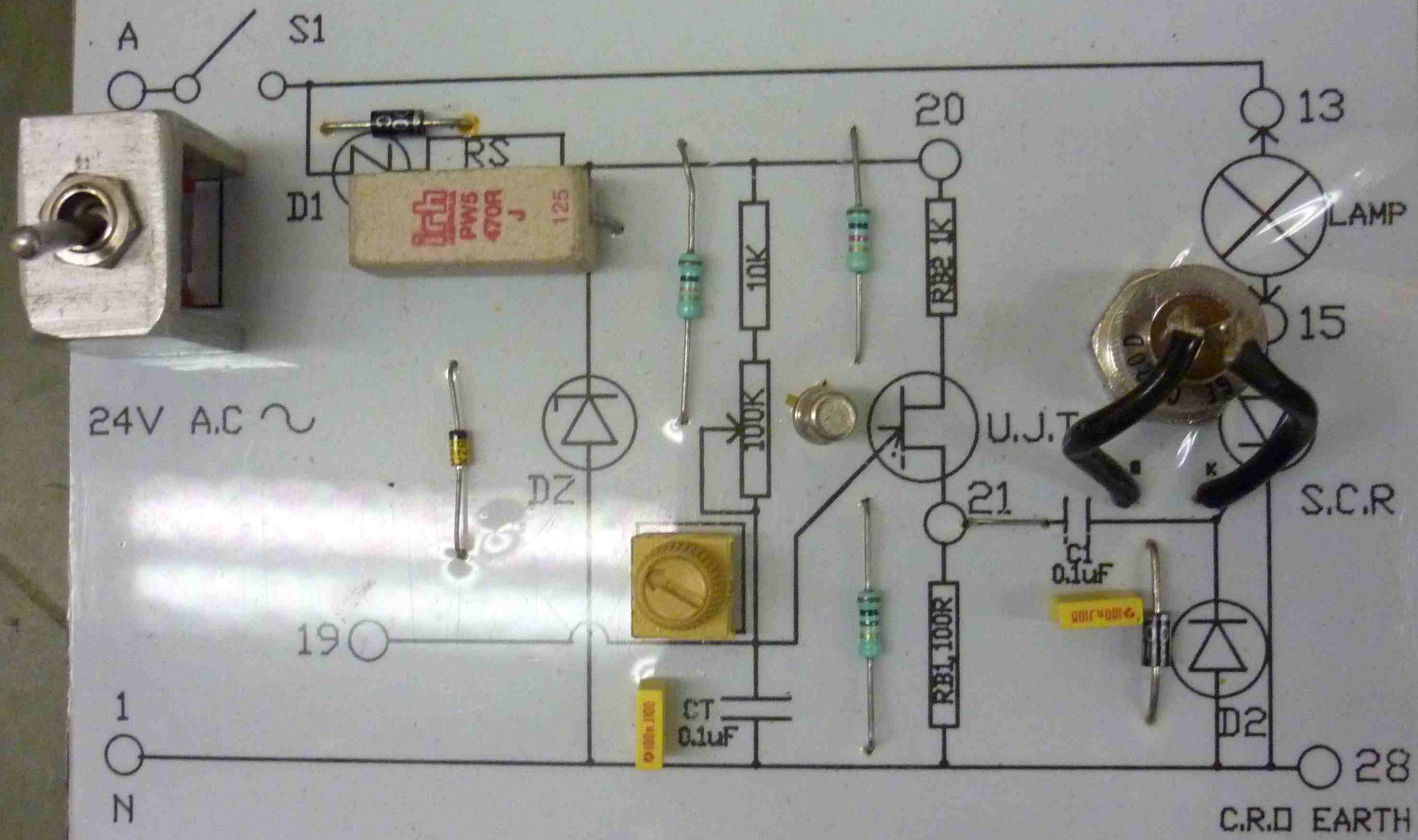
POWER CONTROL DEVICES NE05_4B

U.J.T TRIGGER PULSE GENERATOR - MAINS SYNCHRONISATION



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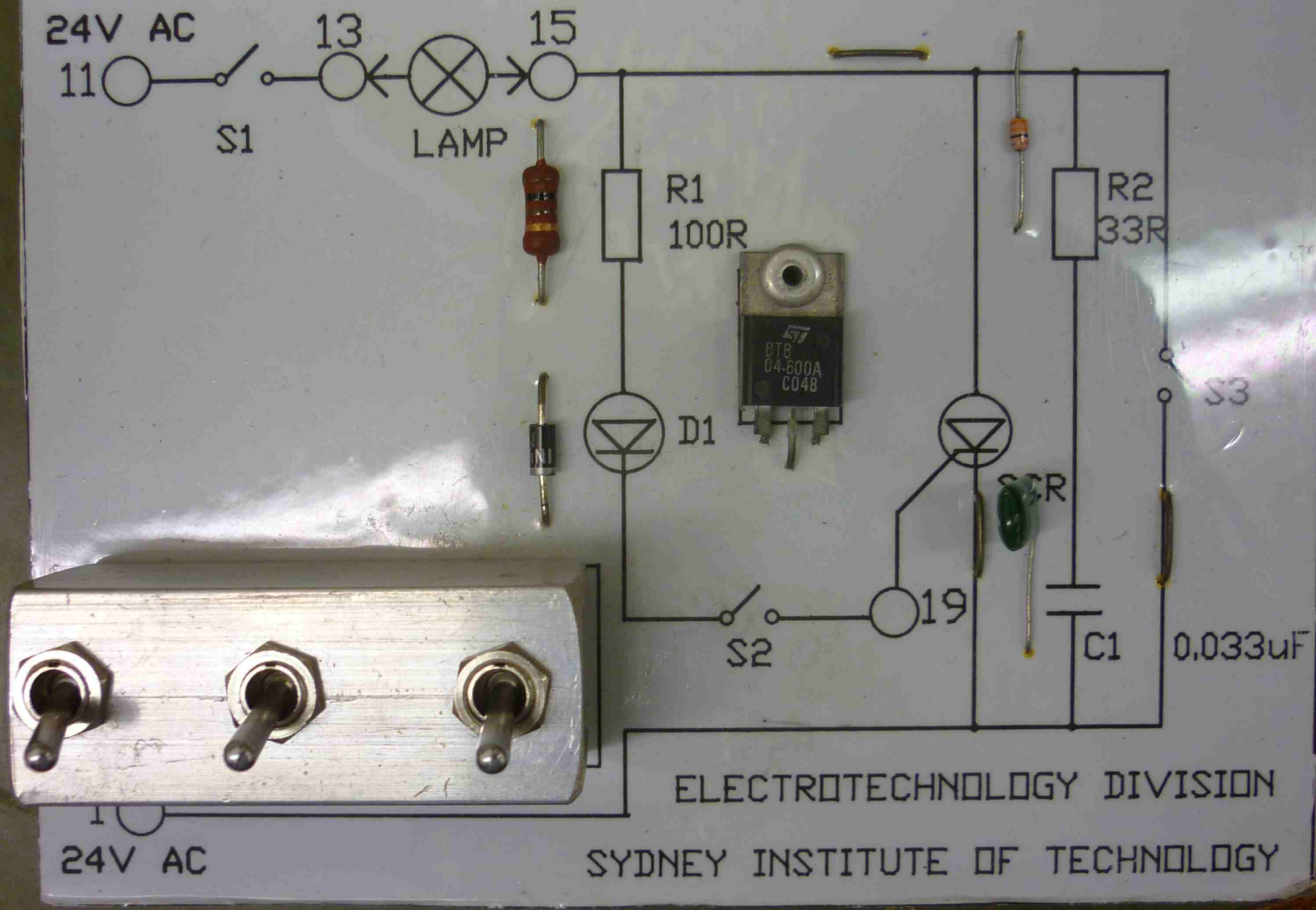
POWER CONTROL DEVICES

NE05 SECTION 2A



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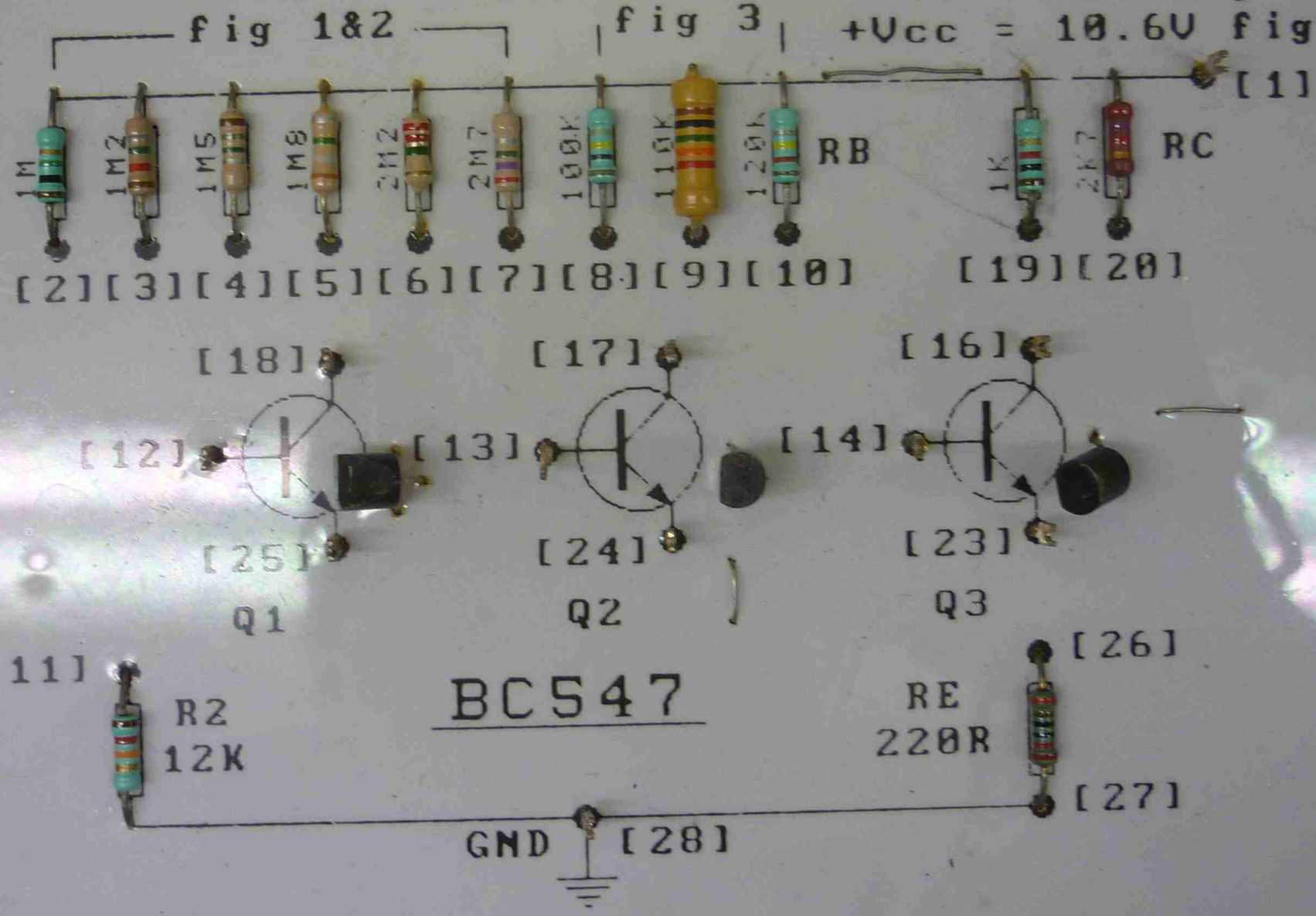
ELECTRONIC DEVICES 6016A # WEEK 4

TRANSISTOR BIASING

+Vcc = 10V fig 2&3
+Vcc = 10.6V fig 1



FILE : ED-04

+15V
COM.
−15V
EC. CONT. B3
317
4
5
EXTERNAL
FEEDBACK
1MFD
T= 0·1 SEC
100KΩ
100KΩ
100KΩ
SET
AMP.
ZERO
1
2
3
10'0KΩ
100KΩ
−A
-6
-6
-6
FEEDBACK
SELECTOR
F
B
OPERATIONAL UNIT OU150A

+15V

COM

−15V

INPUT

TRIM

50 Hz

FREQ TRIM

fo

INPUT

ZERO
LH/RH

60 Hz

WIDTH

TUNE

MIN

MAX

EC. CONT. B3
321

A. C. COMPENSATION UNIT CU150W

+15V

−15V

FROM PS150E
AC1
AC2

7

8

REF. IN
50/60
~

PHASE

COM

EXTERNAL
INPUT

6

30KΩ

10Vp MAX

DEMOD. OFF MOD.

10KΩ

3

ERROR

9

10KΩ COM

OUTPUT

-9

10 Vp MAX

4

30KΩ

FILTER SELECTOR

-9

A

B

FILTER ZERO

5

A,B SEE INST. BOOK

F
B

MOD./DEMOD. UNIT MD150S

POWER CONTROL 1

6016D

WEEK-13A

Basic 1/2 wave controler

S1

F1
1A

Vin
[AC]

D4 1N4148

-15V

RP
1k

R1
100k

D3

D1

D2

LED1

+15V

U1

R2
100k

LM324N
0187P06
8901VJ

D5 1N4148

C1 10nF

U2

R3
3k3

R7
15k

P1
100k

+15V

S3

S9

S4

S5

-15V

U3

R6
2k7

D6

S28

1N5404

Vout

SW3

ON

OFF

S20

SCR1
C106D

DP = 1N4148
D1-D6 = 1N4148
D7 = 1N5404
U1-U3 = LM324

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INDUSTRIAL ELECTRONICS DIVISION

+15V

COM.

−15V

4

5

EXTERNAL
FEEDBACK

1MFD

T=0·1 SEC

100KΩ

SET
AMP.
ZERO

1

100KΩ

100KΩ

-6

2

100KΩ

-6

3

100KΩ

-A

FEEDBACK
SELECTOR

F
B

OPERATIONAL UNIT OU150A

+15V

COM

−15V

INPUT

TRIM

50 Hz

FREQ TRIM

fo

ZERO
LH/RH

60 Hz

WIDTH

INPUT

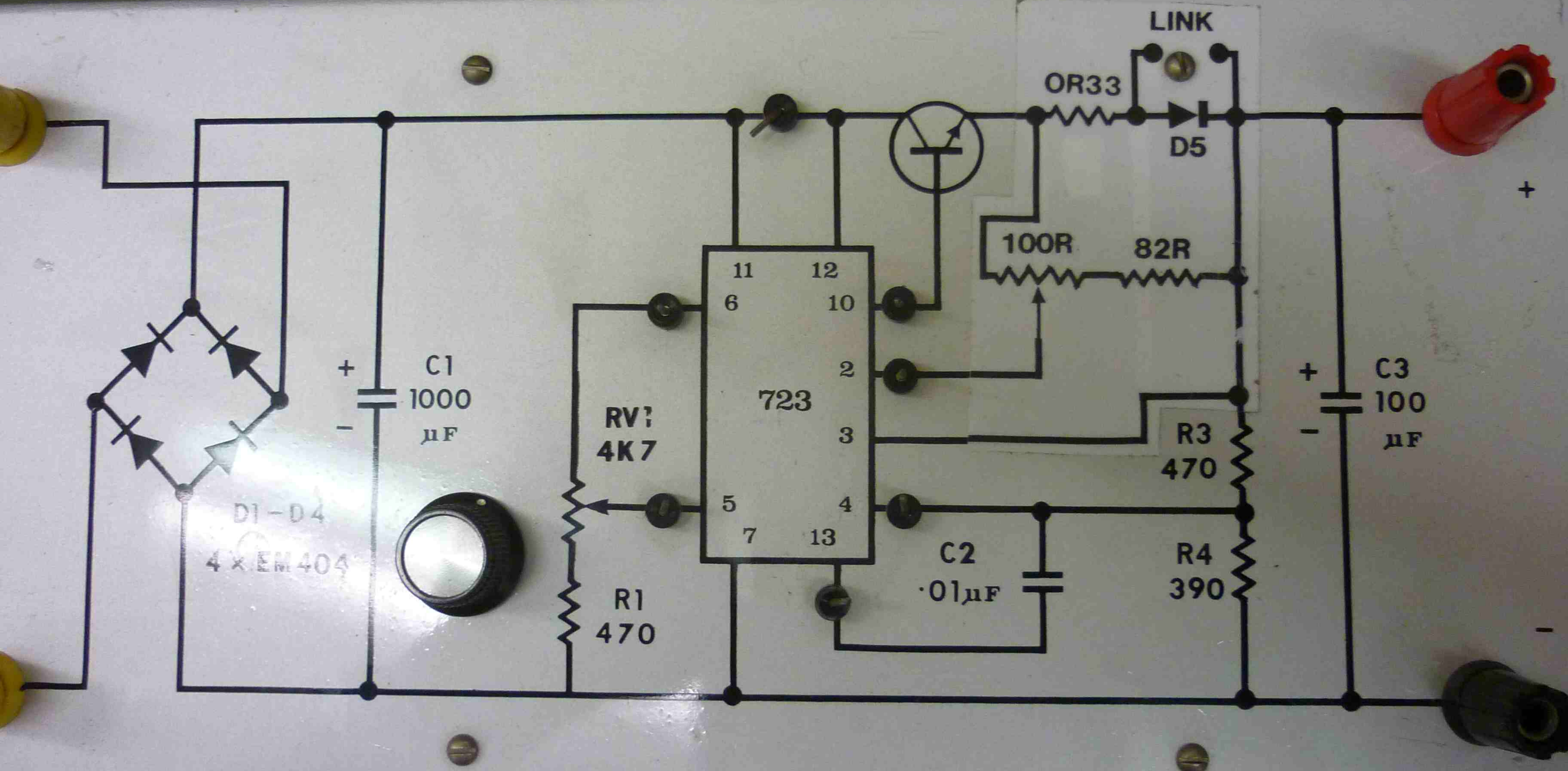
TUNE

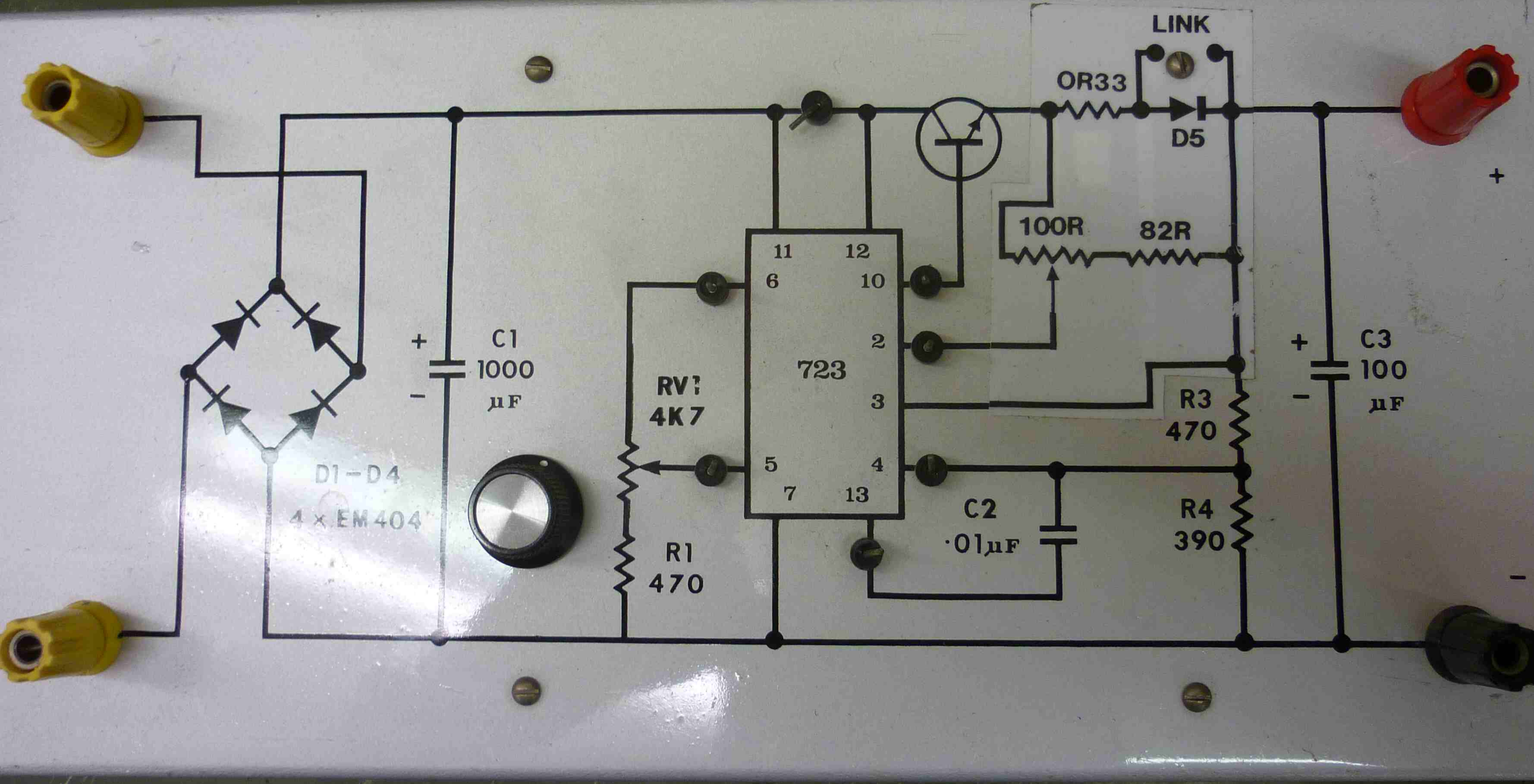
MIN

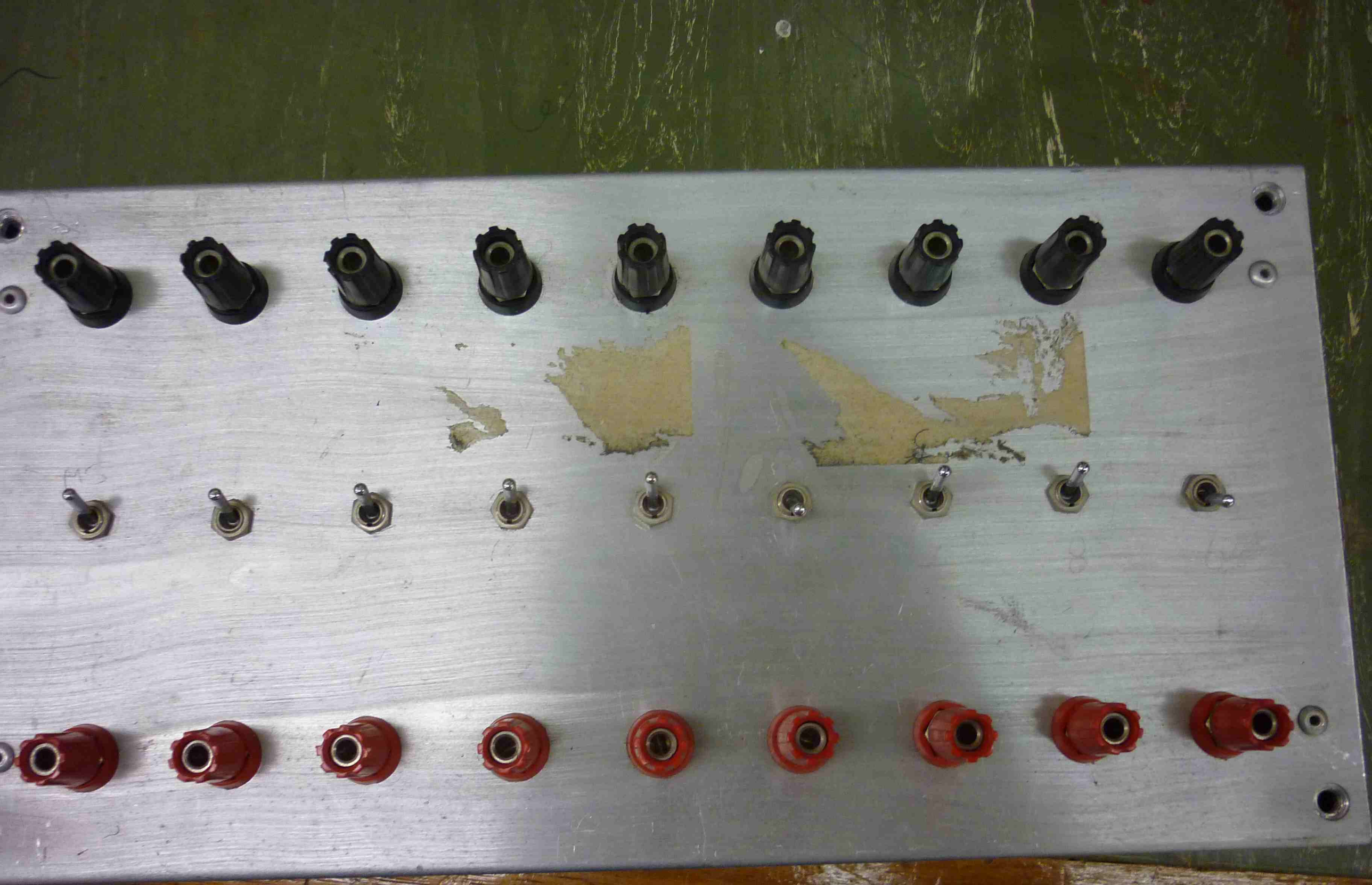
MAX

EC. CONT. B3
264

A. C. COMPENSATION UNIT CU150W


LINK
OR33
D5
+
100R
82R
11
12
6
10
2
723
3
5
4
7
13
+
C1
1000
µF
−
RV1
4K7
R3
470
+
C3
100
µF
−
D1-D4
4×EM404
C2
·01µF
R4
390
R1
470
−


LINK
OR33
D5
+
100R
82R
11
12
6
10
2
723
3
5
4
7
13
RV1
4K7
R1
470
C1
1000
µF
D1–D4
4×EM404
C2
·01µF
R3
470
R4
390
C3
100
µF
–



ON

OFF

WARNING!!! 32 VOLTS MAXIMUM

LAMPS PANEL

D 1

D 2

D 3

10Ω

R1

10Ω

R2

10Ω

R3

10Ω

R4

10Ω

R5

D 4

D 5

D 6

10UF

10UF

10UF

25UF

25UF

C5

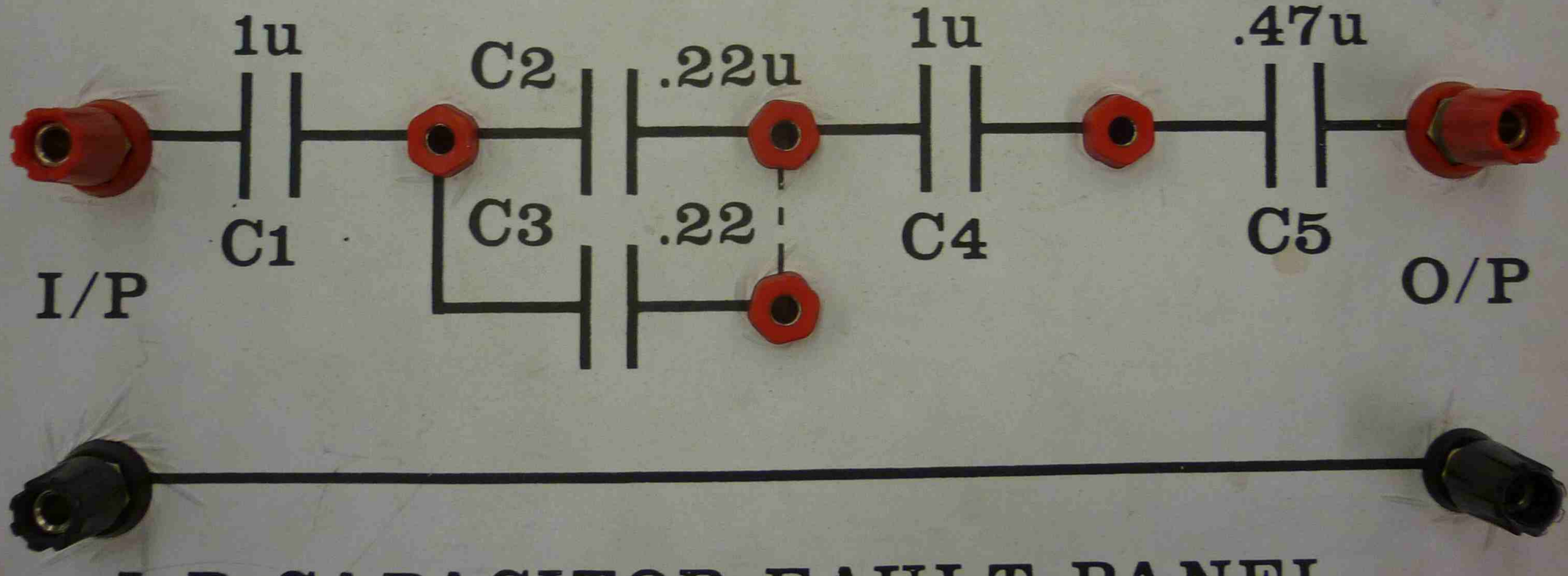
CROSS-OVER BOARD

ERO NO
MKT1813-610/015-3
10nF ±10%
400V═ EN
−40°/+100°C
2.2/400

NORMAL

1 2 3 4

FAULT



L.P. CAPACITOR FAULT PANEL

A

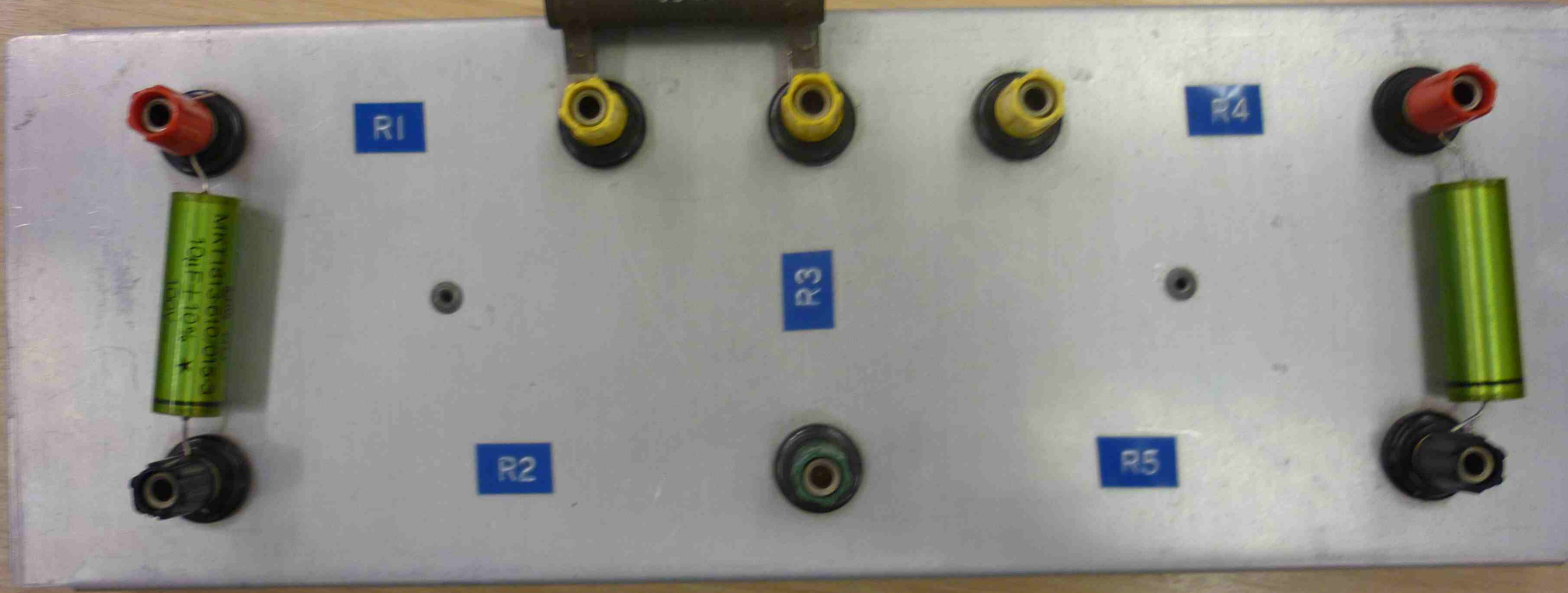
32 VOLTS ONLY

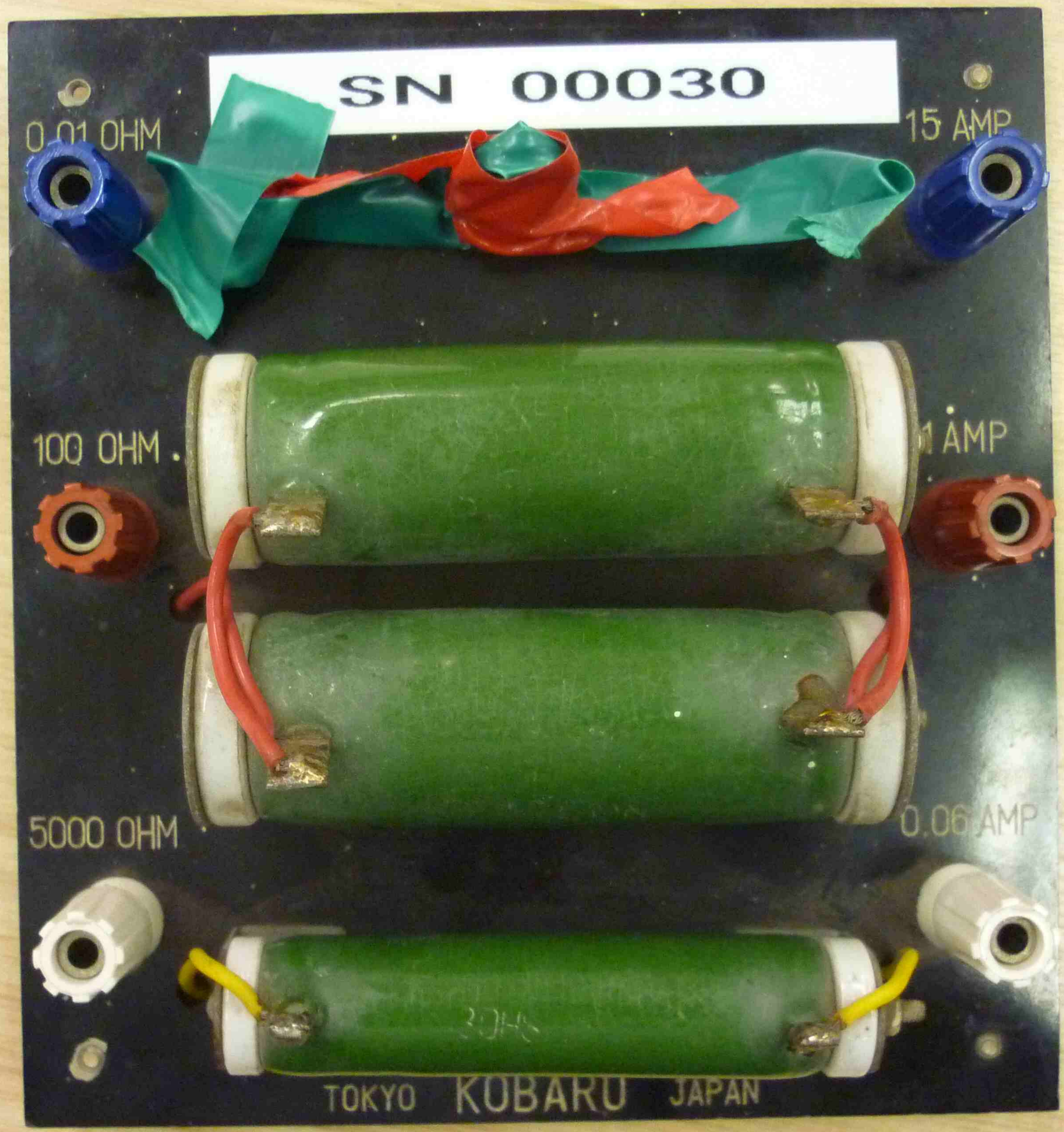
From

m3.7

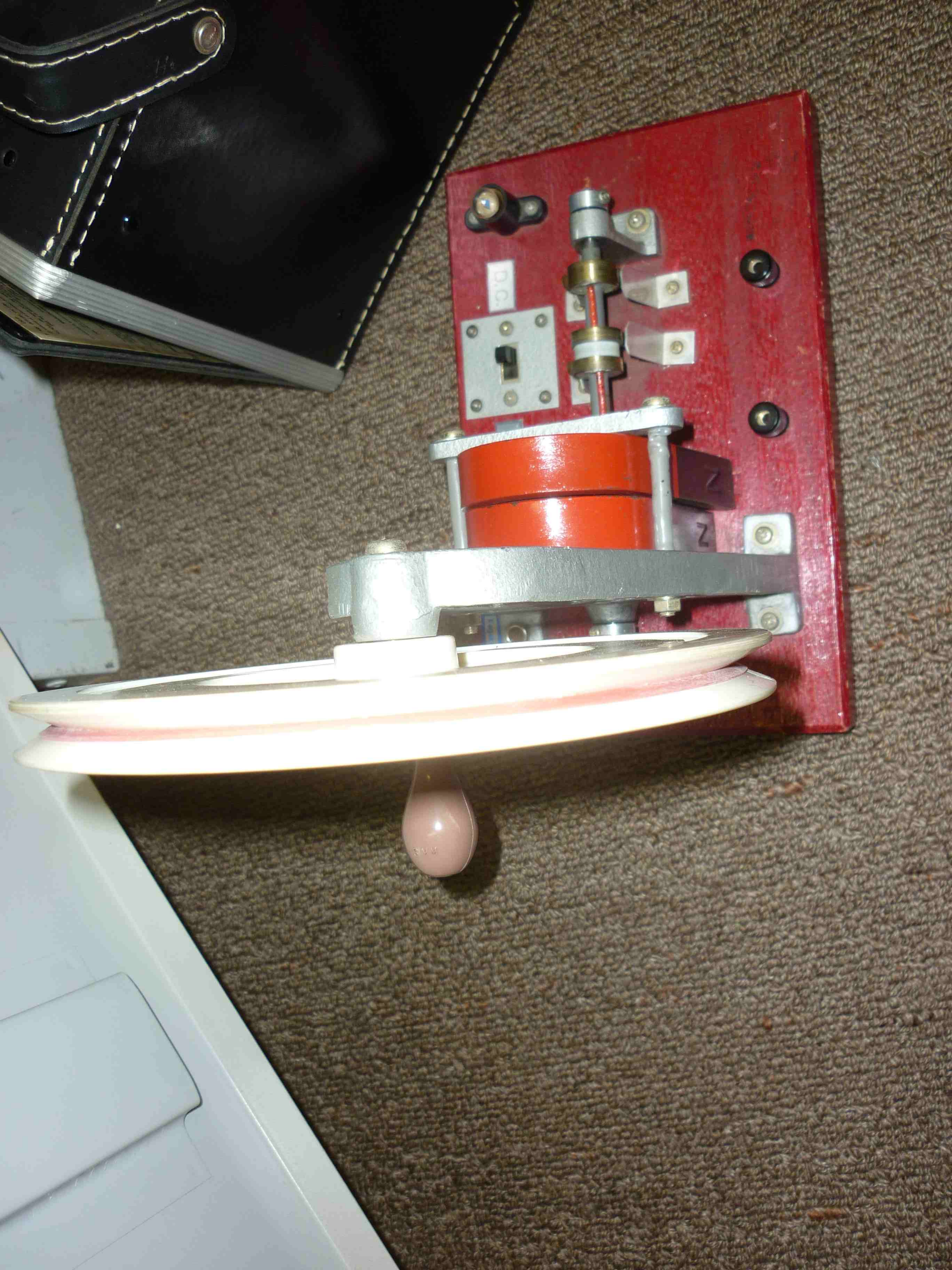
TOF

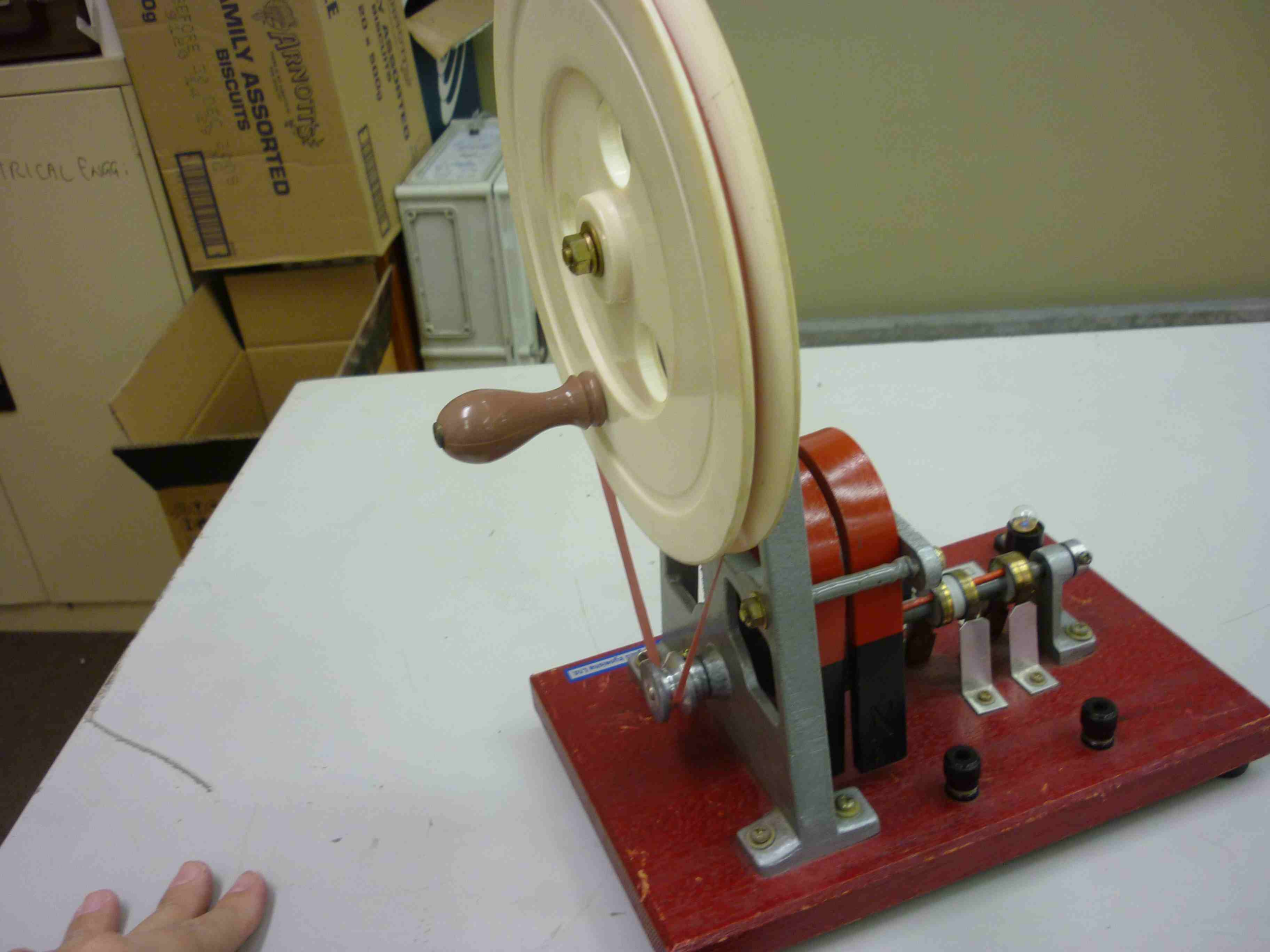
CROSS-OVER BOARD


R1
R3
R4
R2
R5


SN 00030
0.01 OHM
15 AMP
100 OHM
1 AMP
5000 OHM
0.06 AMP
TOKYO KOBARU JAPAN

1 OHM




FAMILY ASSORTED
BISCUITS

D.C.

A.C.

SIGNAL SOURCES

FREQUENCY RANGE

Hz 50 500 0·5 5·0 kHz

FREQUENCY VERNIER

OFF ON A.C. POWER

AMPLIFIERS

POWER AMPLIFIER INPUT

A.C. D.C.

VOLTAGE AMPLIFIER GAIN

AMPLIFIER INPUT

AMPLIFIER OUTPUT

ISOLATED COMMON

POWER SOURCES

POWER SELECTOR

POWER AMPLIFIER GAIN x 10

1-12V 2A 12-24V 1A

DC. STABILIZED VOLTAGE

POSITIVE VOLTAGE 35mA.

NEGATIVE VOLTAGE 1mA.

CHASSIS

POWER OUTPUT

bud 602

COMBINATION INSTRUMENT

OSCILLATOR ATTENUATOR

SQUARE WAVE OUTPUT

0-20V P-P

SINE WAVE OUTPUT

0-2·5V R.M.S.

6·3V 1A. OUTPUT

OSC. MOD. INPUT

1mA @ -31v

SIGNAL SOURCES

FREQUENCY RANGE

Hz 50 | 500 0·5 | 5·0 kHz

5·0 | 50 0·5 | 5·0 5·0 | 50 50 | 500

FREQUENCY VERNIER

b.w.d 602

COMBINATION INSTRUMENT

OSCILLATOR ATTENUATOR

10 1·5 1 15 5 2 0·5 2·5

SQUARE WAVE OUTPUT

SINE WAVE OUTPUT

OSC. MOD. INPUT

AMPLIFIERS

POWER AMPLIFIER

INPUT

AC

DC

602

ATION

MENT

VER SELECTOR

1-12V
2A.

12-24V
1A.

DC. STABILIZED VOLTAGE

POSITIVE VOLTAGE

35mA.

NEGATIVE VOLTAGE

1mA.

15
14
13
12
3
2
1
11
12
22
23
24

DC. STABILIZED VOLTAGE

POSITIVE VOLTAGE

35mA.

150
100
200
50
250
0
300

NEGATIVE VOLTAGE

1mA.

25
20
30
15
35
10
40
45
0
50

POWER
OUTPUT

+

−

POWER SOURCES

POWER SELECTOR

POWER AMPLIFIER GAIN x 10

6-12V 2A.

12-24V 1A.

DC. STABILIZED VOLTAGE

POSITIVE VOLTAGE 35mA.

NEGATIVE VOLTAGE 1mA.

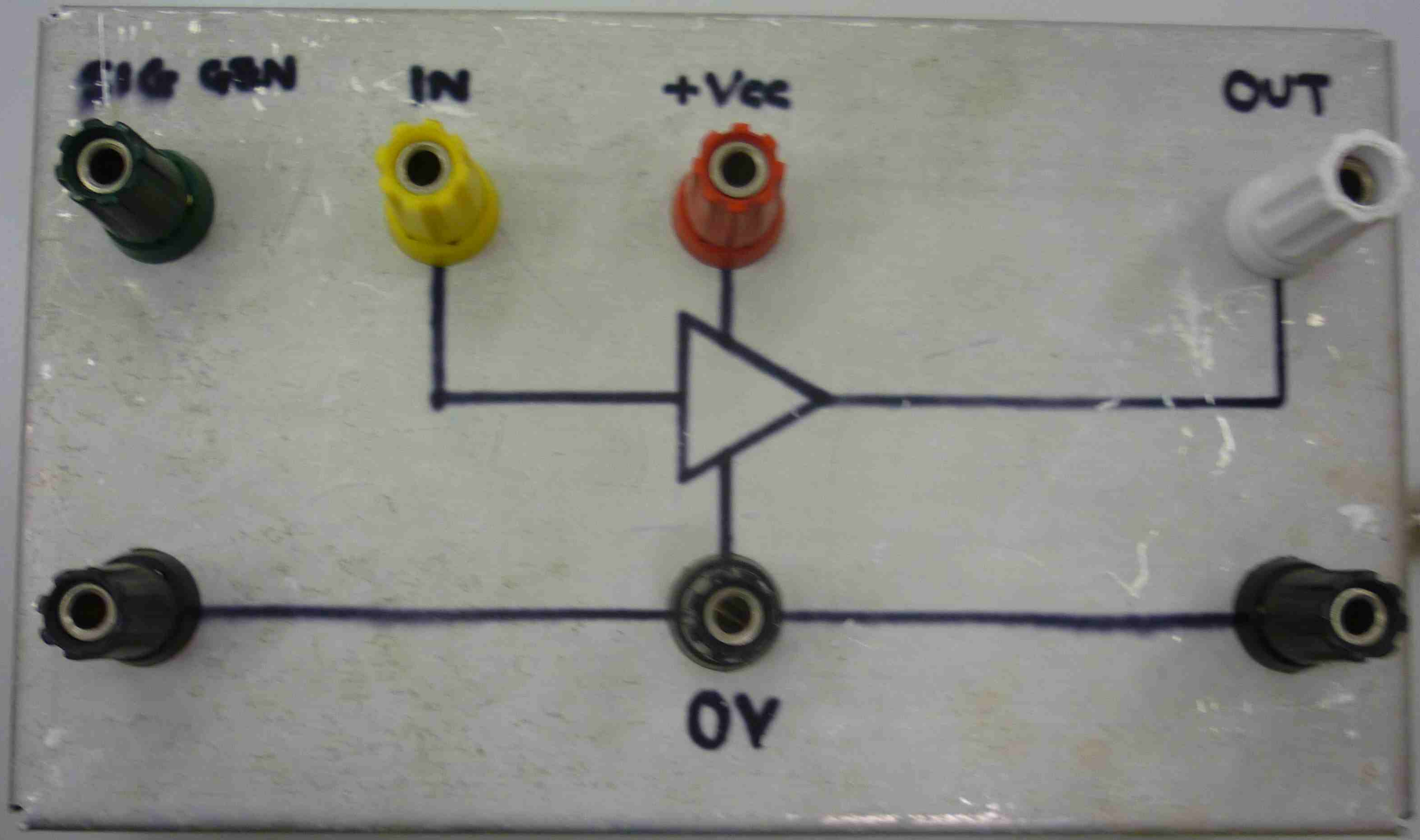
CHASSIS

DESIGNED & BUILT BY
SCHOOL OF APPLIED ELECTRICITY
SYDNEY TECHNICAL COLLEGE

MAXIMUM RATINGS:

250V. AC. TO FRAME
125V. AC. BETWEEN ADJACENT TERMINALS
3A. AC. PER TERMINAL

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28


SIG GEN
IN
+Vcc
OUT
0V

MagneTek

Type: D 40-22.3-4

LAMP/W	V~	Hz	A~	λ	fw	Δt
1x40 (36)	240	50	0,43	0,50	130	55

N11564
IEC 82
86 2818

MagneTek, May&Christe GmbH
Made in Germany

374

CROSS-OVER BOARD

EAO NO
MKT1813-610/015-3
10µF ±10% *
400V— LN
−40°/+100°C
2,2/400

USE ONLY 22 SWG WIRE

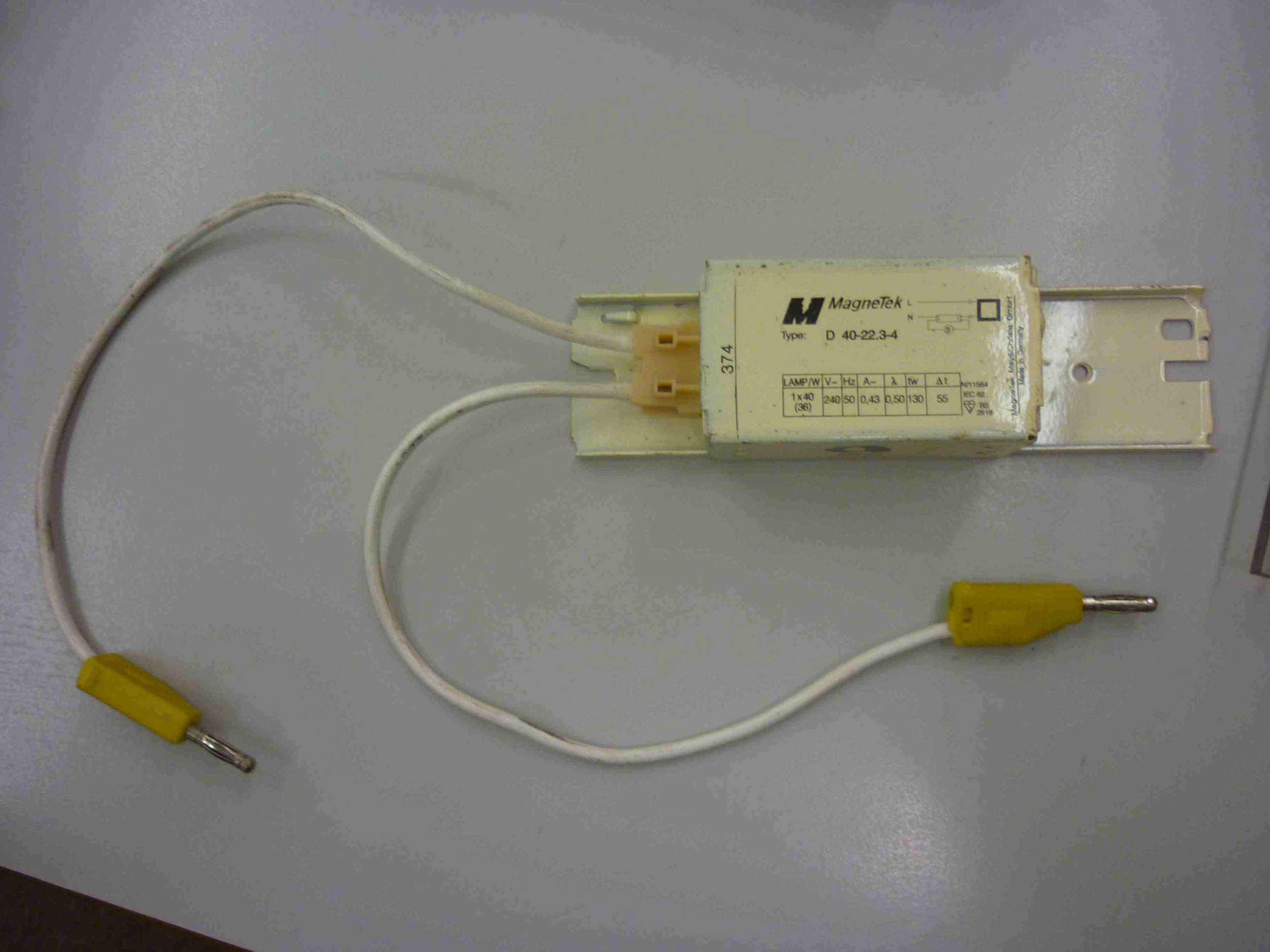
SIG GEN

IN

+Vcc

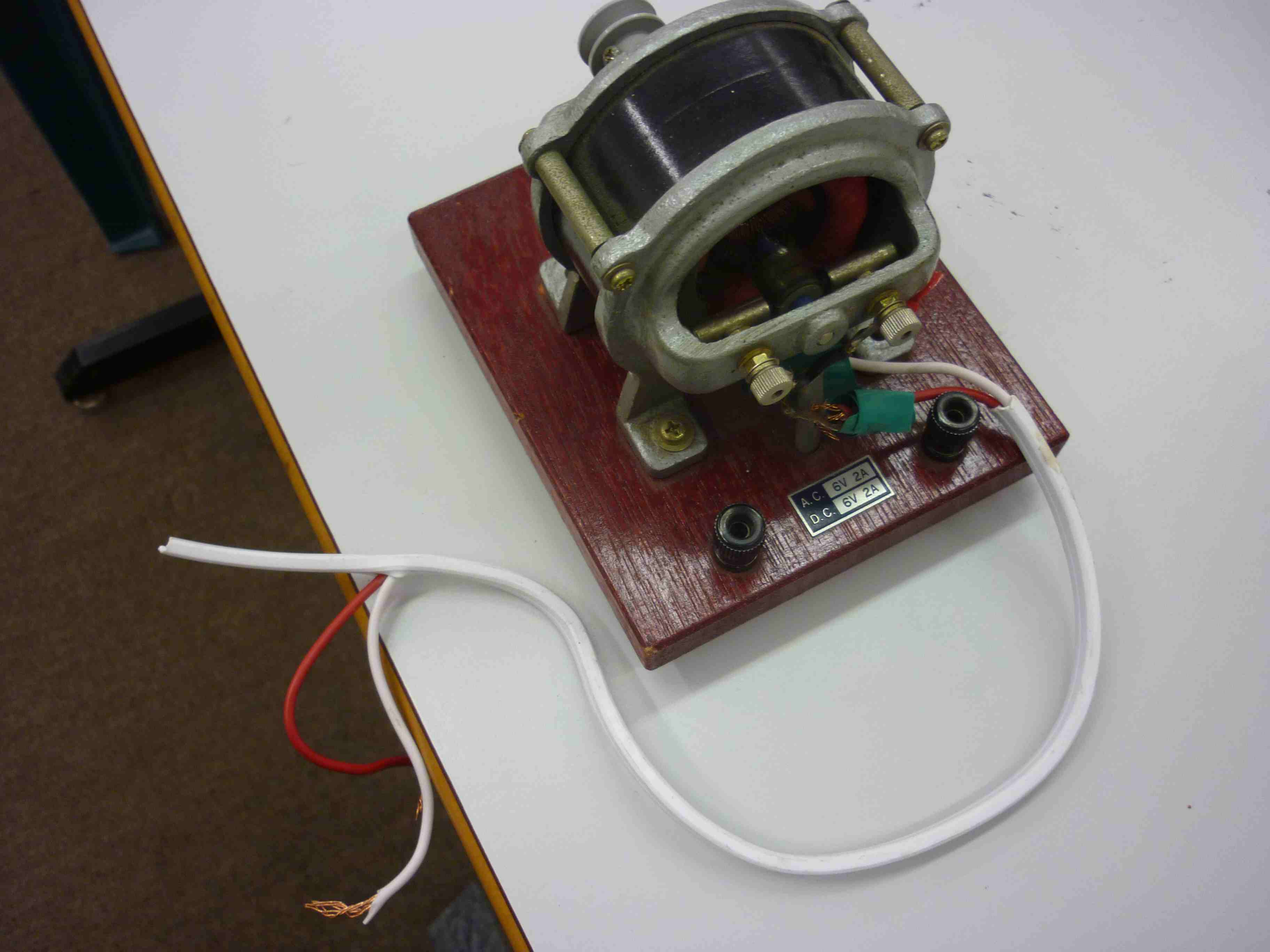
OUT

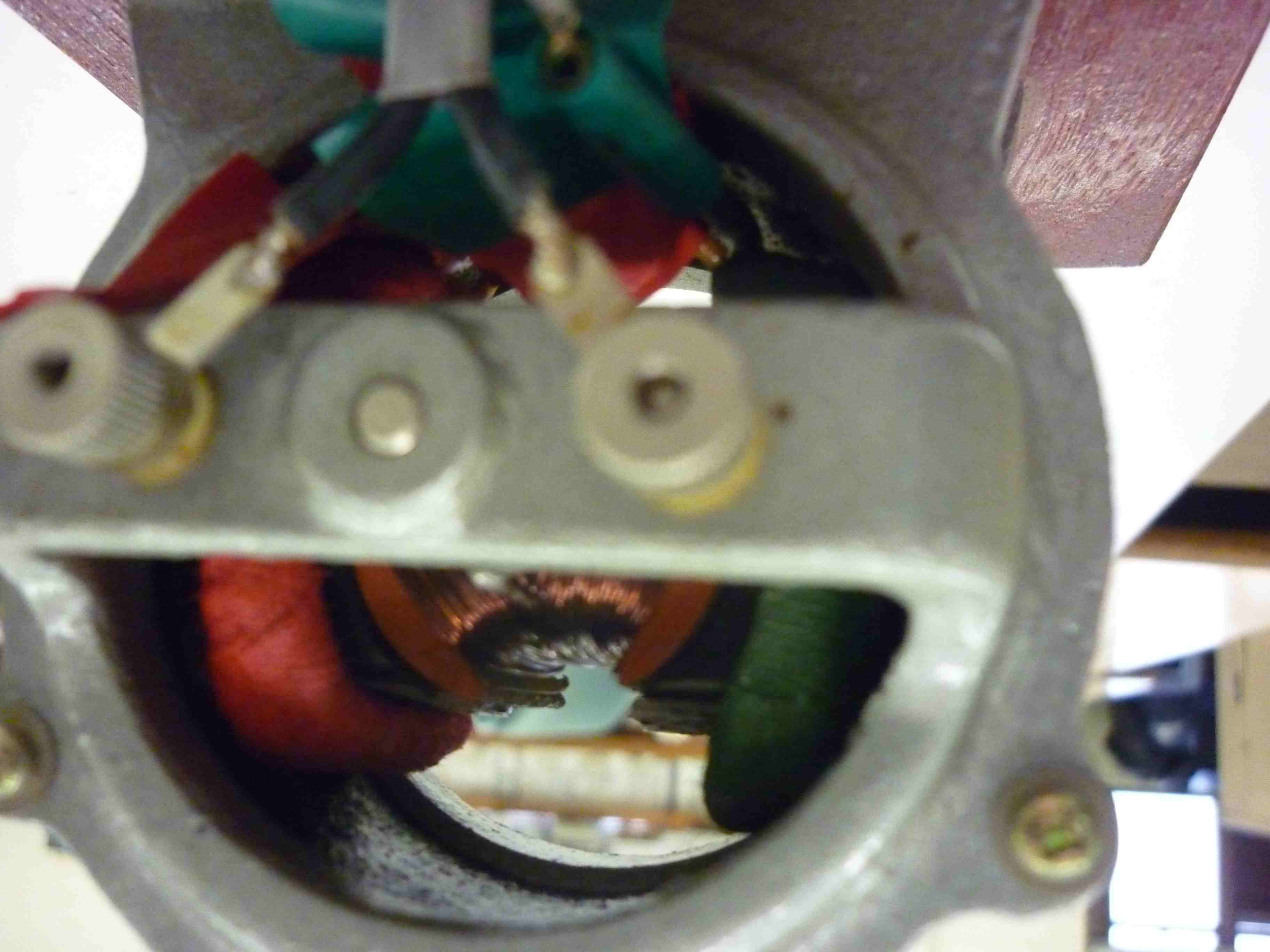
0V


MagneTek
Type: D 40-22.3-4
L
N
LAMP/W
V~
Hz
A~
λ
tw
Δt
1x40 (36)
240
50
0,43
0,50
130
55
374

1 OHM

CROSS-OVER BOARD


A.C. 6V 2A
D.C. 6V 2A



MINI-LAB

MODEL 603B bwd INSTRUMENTS

FUNCTION GENERATOR

FREQUENCY

ALL OUT X 200 kHz

X0·1 BOTH IN X0·01 Hz | X1 | X10 | X100 — Hz | X1 | X10 | X100 — kHz

RAMP AMPLITUDE

SYMMETRY

SYMM OFF

MIN MAX

DC OFFSET/RAMP FREQ.

(OUT) 0V (IN)

−5V +5V

AMPLITUDE

MIN MAX

RAMP 0-10V

TTL OUTPUT

FM

AM

ON OFF

VOLTAGE/OPERATIONAL AMPLIFIER

GAIN

OP AMP 1 100

INPUT

OUTPUT

BI-POLAR POWER SUPPLY

0

−15V 15V

P.A. $A_V = 10$

INPUT

± 15V 1 AMP

+5V FIXED

POWER OFF ON

75 100 125 50 150 25 0 VOLTS

POWER SUPPLY +

REGULATED POWER SUPPLY

1 AMP MAX

6·3 VAC

0

6·3 VAC

ISOLATED TO ±200V MAX

1.5-15V 1 AMP

− 0 +

1.5-15V 1 AMP

ISOLATED TO ±200V MAX

SERIAL NO.

SYMMETRY

SYMM
OFF

MIN MAX

DC OFFSET/RAMP FREQ.
(OUT) 0V (IN)

−5V +5V

AMPLITUDE

MIN MAX

FREQUENCY

ALL OUT X 200 kHz

X0·1 BOTH X0·01 Hz | X1 IN Hz | X10 | X100 — Hz

X1 | X10 | X100 — kHz

TTL OUTPUT

FM

AM

ON OFF

RAMP

0-10V

VOLTAGE/
AM

INPUT

BI-POLAR PO

INPUT

+5

NI-LAB

ODEL 603B bwd INSTRUMENTS

POWER OFF

ON

75 100 125
50 150
25 175
0 200
VOLTS

\+
POWER SUPPLY

GAIN

ERATIONAL
FIER

OP AMP 100

OUTPUT

REGULATED POWER SUPPLY

1 AMP MAX

6·3 VAC

0

6·3 VAC

ISOLATED TO ±200V MAX

AR POWER SUPPLY

0

-15 +15V

P.A.
$A_V = 10$

+5V FIXED

± 15V
1 AMP

1.5-15V
1 AMP

ISOLATED TO ±200V MAX

1.5-15v
1 AMP

-LAB

EL 603B bwd INSTRUMENTS

POWER OFF ON

75 100 125 50 150 25 175 0 200 VOLTS

\+ POWER SUPPLY −

GAIN

TIONAL R

OP AMP 100

OUTPUT

REGULATED POWER SUPPLY

1 AMP MAX

6·3 VAC

0

6·3 VAC

ISOLATED ± 200V MAX

0 POWER SUPPLY −15 +15V

P.A. Av = 10

± 15V 1 AMP

+5V FIXED

1.5−15V 1 AMP

ISOLATED TO ± 200V MAX

− 0 +

1.5-15v 1 AMP

CPBD.4E/3

500T

PRIMA...

C 10T 15T

SEARCH COIL

CAST IRON CORE

OD = 13·98 cm
ID = 10·0 cm
WIDTH = 1·27 cm

SUPPLIED BY WARBURTON FRANKI

WF

MAGNETISATION & HYSTERESIS UNIT SERIAL No. 29

CPBD.4E/3

500T

PRIMARY

C 10T 15T

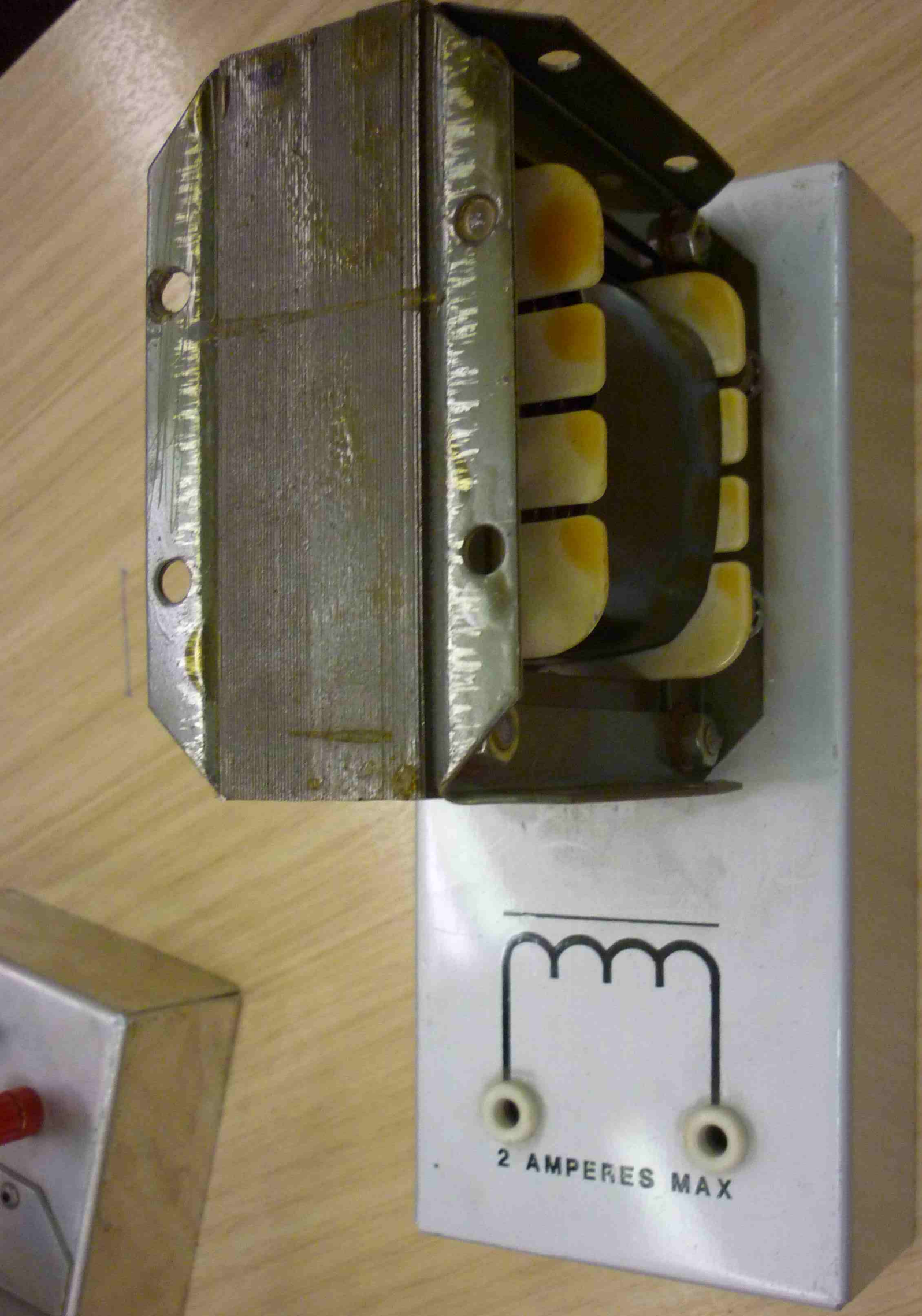
CAST IRON CORE

OD = 13·98 cm
ID = 10·0 cm
WIDTH = 1·27 cm

SUPPLIED BY
WARBURTON FRANKI

MAGNETISATION & HYSTERESIS UNIT SERIAL No. 29


2 AMPERES MAX


2 AMPERES MAX


2 AMPERES MAX


2 AMPERES MAX

HANIMEX

PR 110

TIME

HANIMEX

PR110

TIME

1 2 3 4 5 6 7 8 9

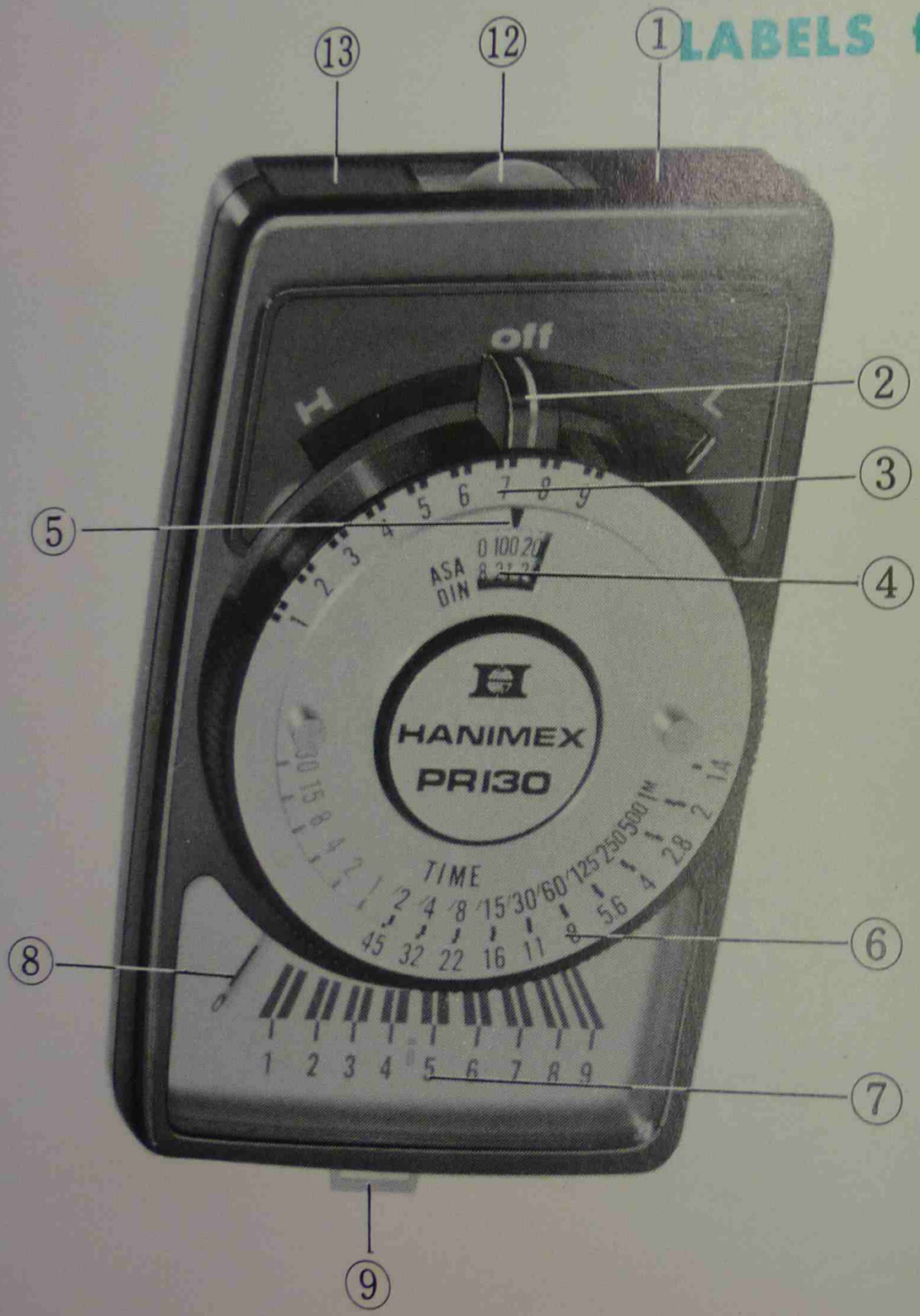
HANIMEX

EXPOSURE METERS

Models PR-130, PR-120, PR-110

Instruction Book

LABELS for PR-120 and PR-130 illustrations

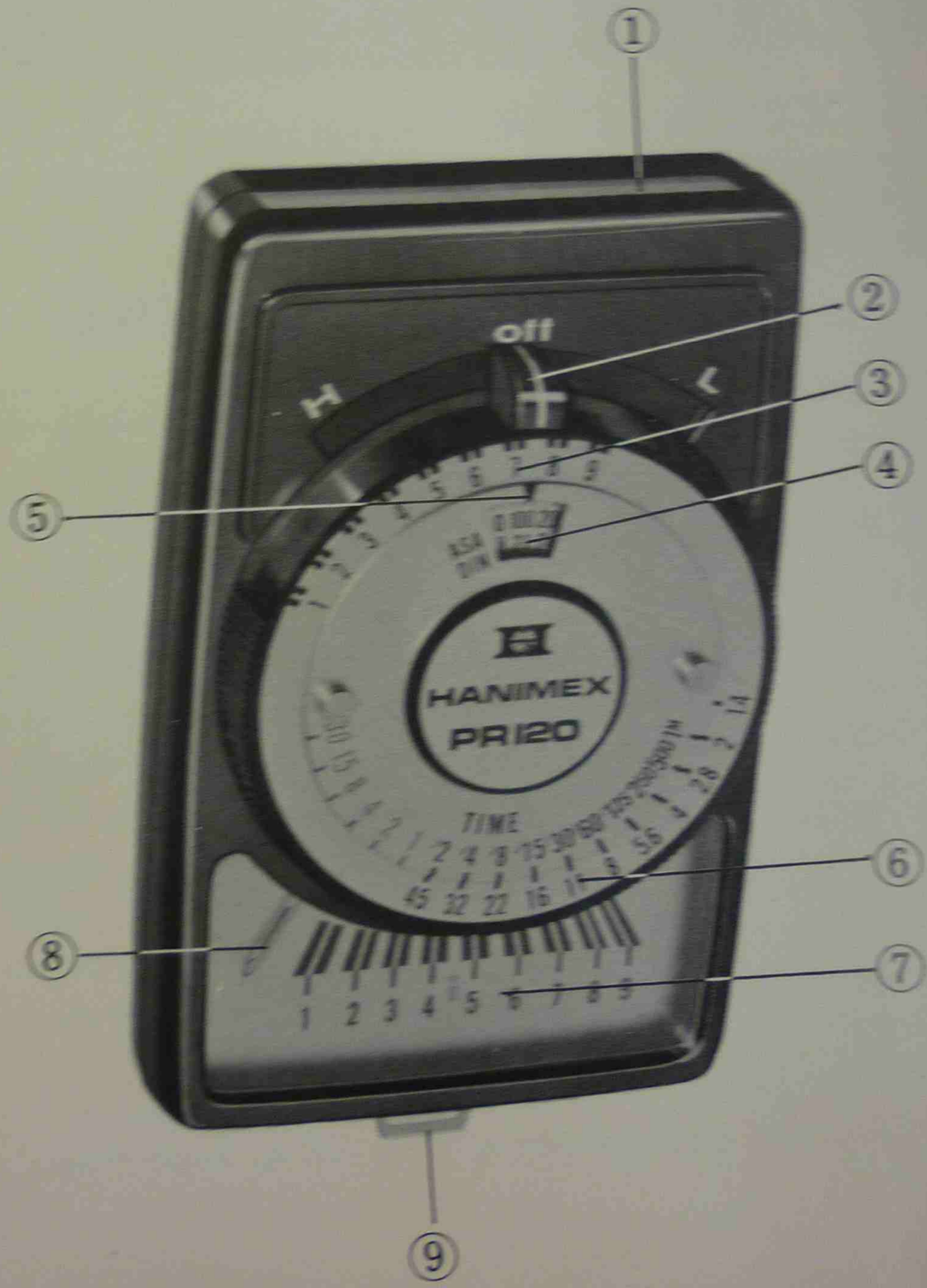


1. PHOTOCELL WINDOW
2. OFF/HIGH/LOW SELECTOR SWITCH AND INDEX MARK
3. INDEX SCALE
4. FILM SPEED SCALE
5. FILM SPEED DIAL AND INDICATOR
6. f-STOP SCALE
7. LIGHT SCALE

8. LIGHT INDICATOR POINTER
9. NECK STRAP TAG
10. (Underside) ZERO CORRECTOR
11. (Underside) BATTERY COVER

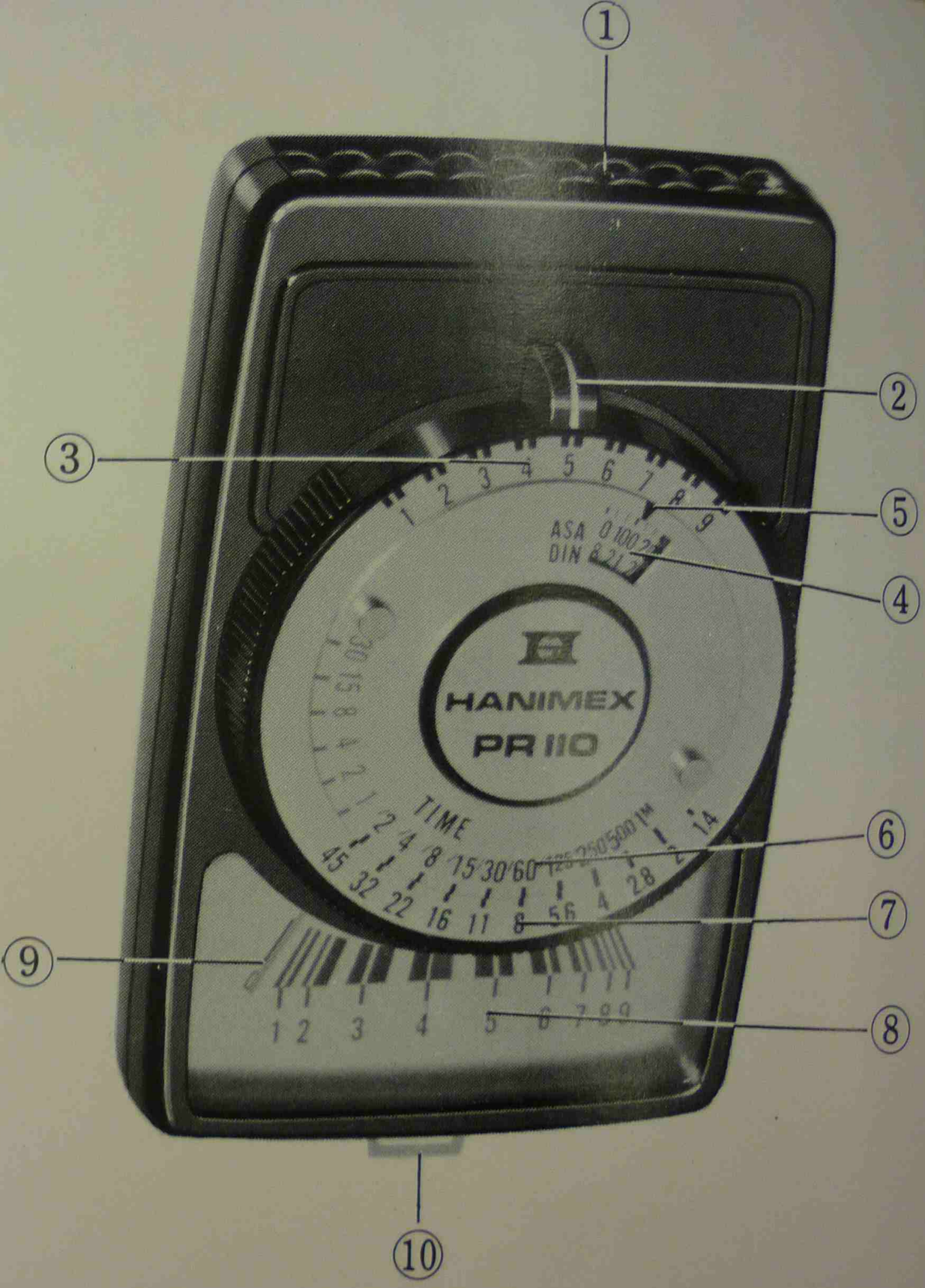
for PR-130 only

12. INCIDENT LIGHT DIFFUSER
13. BAFFLE SLIDE



LABELS for PR-110 illustration

1. PHOTOCELL WINDOW
2. INDEX MARK
3. INDEX SCALE
4. FILM SPEED SCALE
5. FILM SPEED DIAL & INDICATOR
6. SHUTTER SPEED SCALE AND DIAL
7. f-STOP SCALE
8. LIGHT SCALE
9. LIGHT INDICATOR POINTER
10. NECK STRAP TAG
11. (Underside) ZERO CORRECTOR



Why use a meter ?

Many cameras now have inbuilt meters -- or even fully-coupled meters that make the camera automatic. So, why bother with a hand-held meter? Is it just another piece of equipment to be carried and juggled along with a camera, extra lenses and other gear ?

Hardly! Just consider that very few of the really top professional photographers rely solely on an inbuilt camera meter.

The advantages of the separate meter especially for colour are far-reaching: for instance, you've probably seen what could have been well-exposed photographs of scenery spoiled by underexposure of everything but the sky. This is caused by the wide angle of view through which the usual inbuilt meter measures its light. The large area of sky, requiring little exposure, tends to override the other, darker areas in the picture, and so the wrong exposure is made for important parts of the composition.

Another common problem is that of backlighting: much the same thing happens here, where the usual inbuilt meter reads to expose the very bright background, and the subject of the photo emerges as a silhouette.

If you wish to take a mood photograph of a particular object which requires a special exposure in relation to what surrounds it in the field of your framing, you may have to trust to luck with the inbuilt meter, or bracket you exposures around a standard, hoping to chance upon the exact effect you want.

All these problems can be overcome effectively with your hand-held meter, and we shall give you more information on their use in obtaining critical control over your exposures in this booklet.

Now that you've decided to use a meter, we should congratulate you on your choice -- whether it's the Hanimex PR-110, the PR-120 or the PR-130.

We know you'll enjoy using your new Hanimex meter and will be delighted with the results you'll get, the improvement in your photography and the wider scope you'll have in all your picture-taking situations.

Preparing to use your meter

PR-110 Model: If you have the PR-110 model, note that the gold selenium cell needs no batteries and is ready to operate at any time.

PR-120 and PR-120 Models: With these models, make sure the battery is correctly inserted.

Turn the meter upside down, where you will see the aluminium battery cover. A coin will open this easily and you should insert the battery so that the "+" (positive) side is facing up. Then replace the cover and you're ready to go. The battery can be tested by pressing the small white button on the underside of the meter and watching the light indicating pointer. If the battery is fresh, the pointer will move to the red "B" point on the light scale. The selector switch should be at "OFF" for the operation. If the needle doesn't reach the "B" mark, you should replace the battery. Remember to switch to "OFF" when you're not using the meter.

All Models: It's always advisable to keep your meter in the protective case. The long strap can be clipped into the neck strap tag, with the free and fed through the opening in the back of the case. This way you can wear the meter round your neck, but still have it ready to use at short notice without having to fuss.

Ensuring correct zero calibration

It is important that the meter is calibrated properly before you begin to use it. Test this by removing the cell completely. If you have the PB-113 model fit an by switching to "OFF" with the others and checking to see that the pointer indicates ZERO on the light scale.

If you need to make an adjustment turn the zero corrector on the underside of the meter, with a screwdriver until the pointer rests on the zero mark. Those with the PB-113 model should ensure that absolutely no light enters the meter during the operation. Your finger pressed tightly over the height of the cell should cover this

Using your meter

All three models are operated in basically the same way:

1. Set the **Film speed scale** (both ASA and DIN values are given) by rotating the **film speed dial** (by the two small knobs) until the film speed indicator is opposite the number corresponding to your film speed.
2. Point the meter toward your subject.
3. You will note movement of the **pointer** along the **light indicating** scale. There are readings between 0 and 9 here.
4. Turn the **index scale** until the number corresponding to the light value is opposite the index mark.
5. This gives you the range of exposure combinations you can use for that particular set of circumstances. You read it by matching the **shutter speed scale** with the **f-stop scale** and selecting the combination you want.

For example, if your film speed is 100 ASA (or 21 DIN) and the light value is shown as 5 on the scale, move the index scale so that 5 is opposite the index mark, and you will see that you have quite a wide choice of shutter/aperture combinations for that particular photograph. In fact, on this reading you can range from 1/1000 sec at f2 down to 1/2 sec at f45. We'll discuss various uses you can make of this facility later in the booklet.

High and low light levels (PR-120 and PR-130 models only)

Both these models have the facility of switching the **index mark** over an extended range of high and low light levels. The "H" mark should be used for normal light conditions, or where very strong artificial light is used; and the "L" for situations where light is weak or low.
Having set the **index mark** to the appropriate light level, proceed as previously outlined.

Reflected and Incident Light (PR-130 model only)

This model is equipped with a sliding baffle which allows you to measure light, either by having it enter the cell directly, or via the white diffusing "bubble". Generally speaking, you should use the direct method when measuring reflected light (i. e. the light reflected **from** your subject and measured by pointing the meter **at** your subject); and the diffuser when you want to know what amount of light is falling **onto** your subject. This is done by pointing the meter towards the source of light from a position near the subject.
Your relative settings of "high" and "low" will still operate whether or not you use the diffuser, and you should proceed to read your meter in the normal way for both incident and reflected light measurements.
The section on "Hints and Tips" will give you some ideas about these two methods.

Hints and tips for using your HANIMEX exposure meter

1. What are you measuring?

The technique of using a meter is not complicated, and certainly a little common sense goes a long way. For instance, it's pointless to measure reflected light from a person standing in the sunlight if your own shadow gets in the way -- and yet lots of people do it!

Again, if you want to measure incident light, it's not smart to put the meter right next to the light -- the amount of light near its source is far greater than the amount further away.

You need to know the volume of light falling on (or reflected) from your subject in order to make a correct exposure for the type of film you're using. You may assume, for all practical purposes when using colour film that the quality of the light will fall into one of two categories: daylight or equivalent, for which you use normal daylight film -- or artificial lighting which needs either type "B" film, or a blue correcting filter.

The volume of light needs fairly careful measurement -- and only your hand-held meter can give you the physical flexibility and selective angle of acceptance to achieve critical results.

2. Using the information from your meter to best advantage

You will note that your meter usually doesn't give you just one exposure combination -- it gives quite a range from which you can choose.

To return to our earlier reading, but to arrange the values differently, we have a table to which we may add the effects the different factors of shutter and aperture settings will have on the finished photograph:

Shutter	f-stop	Shutter Features	f-stop features
1/1000	2	stops fast motion	shallow depth of field.
1/500	2.8		
1/250	4		
1/125	5.6		
1/60	8		
1/30	11		
1/15	16		
1/8	22	fast movement "blurred"	maximum depth of field

You may assume that between the two extremes there is a graduation proportionate to the position on the scale. i.e. there will be more blurring of movement at 1/30 sec than at 1/60 sec; and there will be a greater depth of field at f8 than at f5.6. By using this set of proportionate values you can decide what effect you wish to produce in your picture and expose accordingly.

For instance, if you want a picture of a child riding a scooter, you should first measure your exposure, (let's for the purpose of this exercise assume it works out at our previous reading).

If you'd like to "freeze" the movement of your subject, you should choose a fast shutter, say 1/500 sec. That will mean you need the fairly large aperture of f2.8, which gives you little depth of field and means that you

will have to focus carefully to ensure your subject comes within the plane of focus.
On the other hand, you may wish to convey the feeling of movement by allowing the image to "blur" on the film. That requires a slower shutter speed, and, consequently, a smaller aperture-- which gives a great depth of field and allows you to include more detail of the background and foreground.
You may want your picture to be taken somewhere about the middle of these ranges, or you might want the best of both worlds -- "freezings" the motion and maximum depth of field -- in which case you will choose a relatively slow shutter speed and "pan" your camera in the direction of the movement to compensate for the motion of the subject while the shutter is open. You must expect that your background will appear blurred when you do this.
In other situations, you may be interested only in one or another of these factors. You may wish to have a foreground object in sharp focus, or a tree branch framing a scene to be very soft. By selecting a combination of the shutter and aperture indications from your meter you can manipulate the combinations to obtain a wonderful variety of photographic effects.

3. Approximations

If your camera doesn't have exactly the same shutter speeds as indicated on this meter, it doesn't mean that it won't be able to work for you.

Many cameras have shutter speeds of 1/50, 1/100, or 1/200. All you need to do here, is to make an intelligent approximation of your f-stop, based on the meter's scale.

For instance, you may decide that on your reading you would select an exposure of 1/250 at f4, but because your camera shutter is set for 1/200 you are unsure about the correct setting. Note that a speed of 1/200 would come between the 1/125 and 1/250 marks on the time scale -- perhaps a little closer to 1/250 side. Similarly, where f-stops or 5.6 and 4 are shown, the corresponding f-number should be between 5.6 and 4 -- and a shade closer to 4.

Set your camera with these approximations and you won't be wrong.

4. Using your meter for cine work

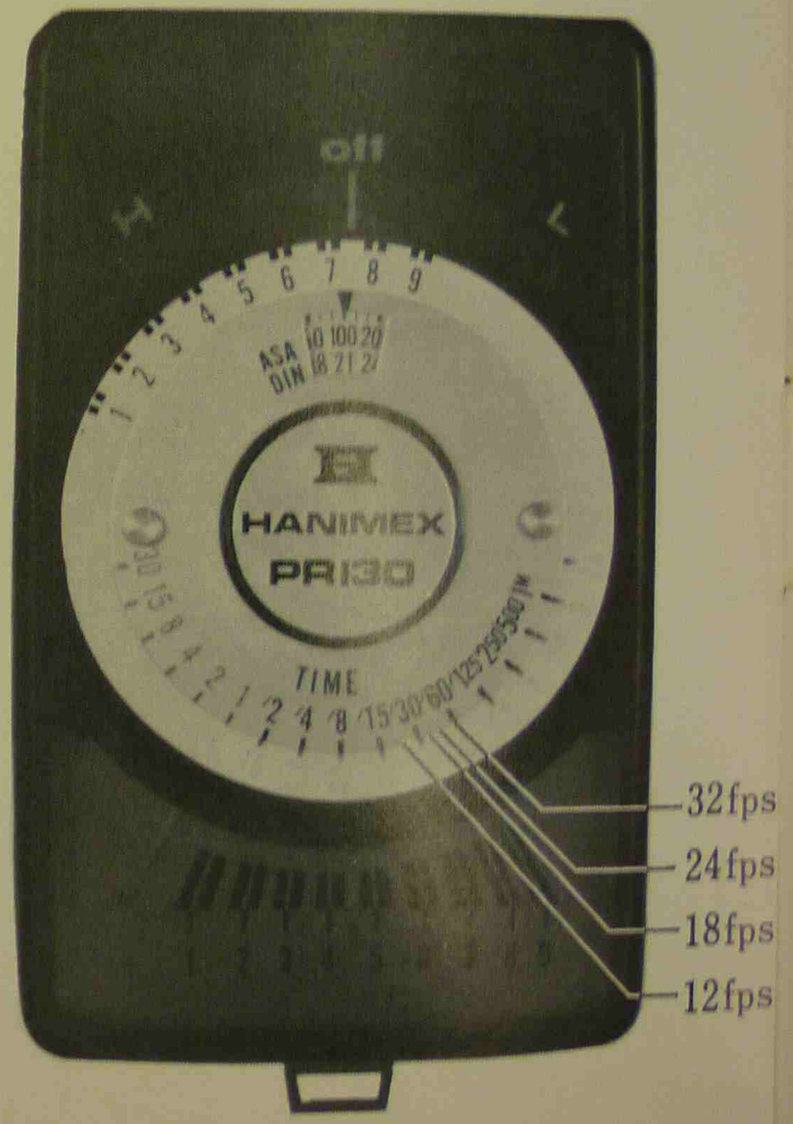
Although your meter isn't marked precisely for use with a cine camera, you can use it to good effect in this area, thus saving the expense of a separate movie meter.

You may assume that whatever your shooting speed, it represents about double its numerical value in shutter speed as seen by the meter scale.

When shooting at 18 f.p.s., your equivalent shutter speed is approximately 1/36 sec, to allow for frame exposure, blanking and pull-down time between frames.

The following table applies generally:

f.p.s.	shutter epuivalent
12	1/25 sec
18	1/40 sec
24	1/50 sec
32	1/60 sec



5. Background control

It often happens that you want to take a photograph of a person or object when the background is a totally different exposure for the subject.
In this case, unless you want a specific effect, you should expose for your subject only, ignoring the background almost entirely.
If you want good photos of people, the only way to achieve perfectly acceptable exposure in such situations, is to concentrate on flesh tones. Even in top-class professional work, or in films, there are great efforts made to preserve the constancy of flesh tones -- and in situations where only one factor can be catered for, everything is sacrificed for the sake of preserving the flesh tones.
You may wish to take a photograph of a person in front of an open window. If you aim your meter in the general direction of your subject, you'll be disappointed with the result -- a silhouette. You need to come in close to the subject and expose for the face (which as seen by the photocell is virtually in "shadow") Your background will be very light indeed, but under most circumstances, this is a secondary cosideration to obtaining the picture of the person.
A note of caution, however, where you have subjects very close to and in front of bright lights or the sun: you should be wary of halation -- a characteristic of the film where a very bright light gives an imperfect line of demarkation between dark and light sections of the photograph. The wider the aperture, the more likely this effect is to show itself.

32fps
24fps
18fps
12fps

Another reason for taking your reading very close to the subject is to allow for "bounce" light from your subject's surroundings. Sea, sand, snow light coloured buildings, clothing and even the reflection from a black tar road all contain a great deal of light, and unless this is know, irregularities in your exposure can occur.
You can use your meter to good effect when shooting outdoors and find that the contrast between sections of your intended photograph are too great. For instance if you wanted to take some detail of a statue outdoors and found that the reading on the sunlit part was say, 9 and the shaded part was say, 1, you would know that you would lose some part of the photograph by exposing solely for the other. A "middle course" -- by exposing half way between the too extremes relies perhaps too much on the exposure tolerance of the film -- and so in this case, your meter is really telling you that there is too great a contrast ratio in that frame for successful results. Here, you either change your framing, or introduce another controlled light source for the shadow -- such as a fill-in flash, a reflector or (if you're working with artificial lights in similar situations) re-positioning your key light.

6. Inci

Owners of
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Incident lig
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Incident lig
are likely
You can m
backlights.
Incident lig
effects of

6. Incident or Reflected light readings?

Owners of the S-130 meter can use it in two ways: to measure either incident or reflected light -- this gives great versatility in the metering, and the opportunity for greater control in photographic exposures.

Incident light reading would probably be most used under conditions of artificial light.

The idea is to measure the exact amount of light falling on the subject and expose for that; where preservation of flesh tones is critical such readings can be invaluable and many photographers are convinced that incident light readings are generally more reliable than those taken of reflected light.

Imagine a subject lit by just one light. The light falling **onto him** is **incident light** -- the light normally measured by pointing the meter **towards him** is the **reflected light.** Naturally, you won't get the same reading for both systems of measurement.

You will find that the white bulb on the sliding baffle, which should be placed over the photocell for incident readings, is critically made to the exact density required to compensate between the two readings, so that they may both be read off the same scale.

Incident light readings are useful in backlit situations, or ones where the background or general surroundings are likely to confuse your exposure calculations.

You can make very accurate exposures for artifically-lit portraits by measuring separately for your key, fill and backlights. Here, you can capture the "mood" you want, or make a compromising exposure for all the lights.

Incident light readings can give you much more control over "bounce" light and allow you to assess the general effects of ambient light surrounding your subject.

7. Using filters

If you wish to use filters for your photography, there are two ways in which you can make the necessary compensation in exposure.

You can take your light reading in the normal way, then either open the lens or select a slower shutter speed to allow for the filter. Alternatively, you can place the filter over the meter cell and calculate your exposure directly. Whichever method you choose, it is always handy to check the filter factor with your meter.

You can do this by taking a reading of an unchanging light source without the filter and comparing it with the reading of the same light source with filter. If the filter is rated at a factor of X2, there should be a difference of two stops in the reading. If the light meter and the filter rating don't agree, it may be better to trust the meter, because densities can change with age.

Remember, however, owners of the PR-110 can only do this if the filter is large enough to cover the photocell completely, with no extraneous light entering it, and no "blanking" with fingers or the rim of the filter.

PR-120 and PR-130 owners should be able to work with filters of quite a small size, having a much reduced cell area to cover.

necessary

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.

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difference
trust the

photocell
r.
reduced

8. Care of your Meter

You can look forward to years of good service from your Hanimex meter **provided** you take reasonable care of it.

For instance, those of you with the PR-110 shouldn't leave it in the light for long periods without the protective case zipped up. The photocell should be shielded at all times when you're not actually using it -- and NEVER pointed straight to the sun.

Owners of the other models should make sure they've turned the meter OFF after they've finished using them.

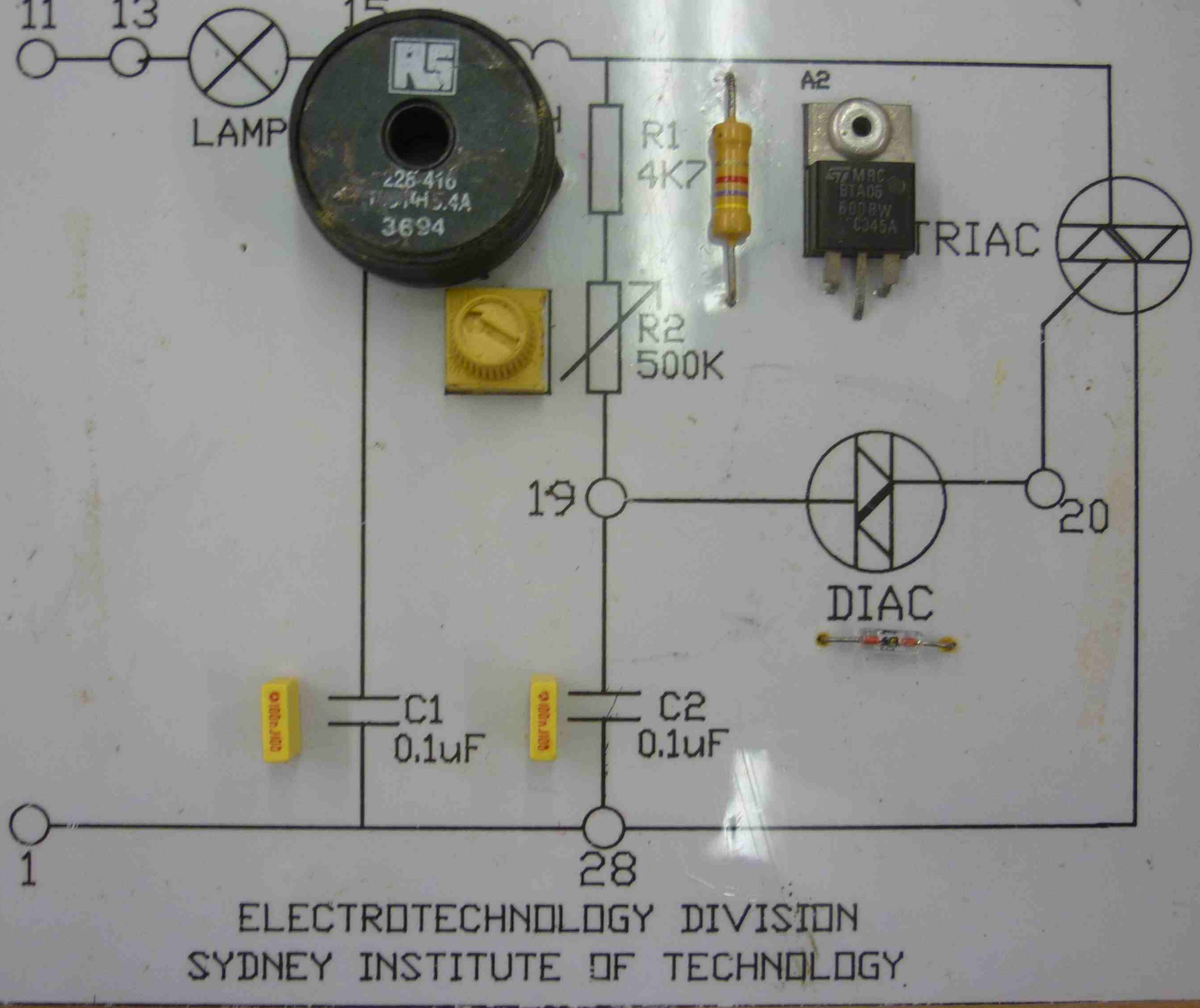
Be careful about knocking your meter -- if you wear it around your neck, make sure it doesn't swing and hit other objects if you bend over.

The white bulb on the PR-130 model should be guarded against scratching and dirt. A rub over with a lens cleaner should keep it free of the build-up of dust and grit which can affect its performance -- and the grooved fingerpiece should be used to move the baffle.

Finally, don't try to open the meter or to "service" it yourself. Your Hanimex service cetre will best make any repairs that may become necessary.

POWER CONTROL DEVICES

NE05 SECTION 5B



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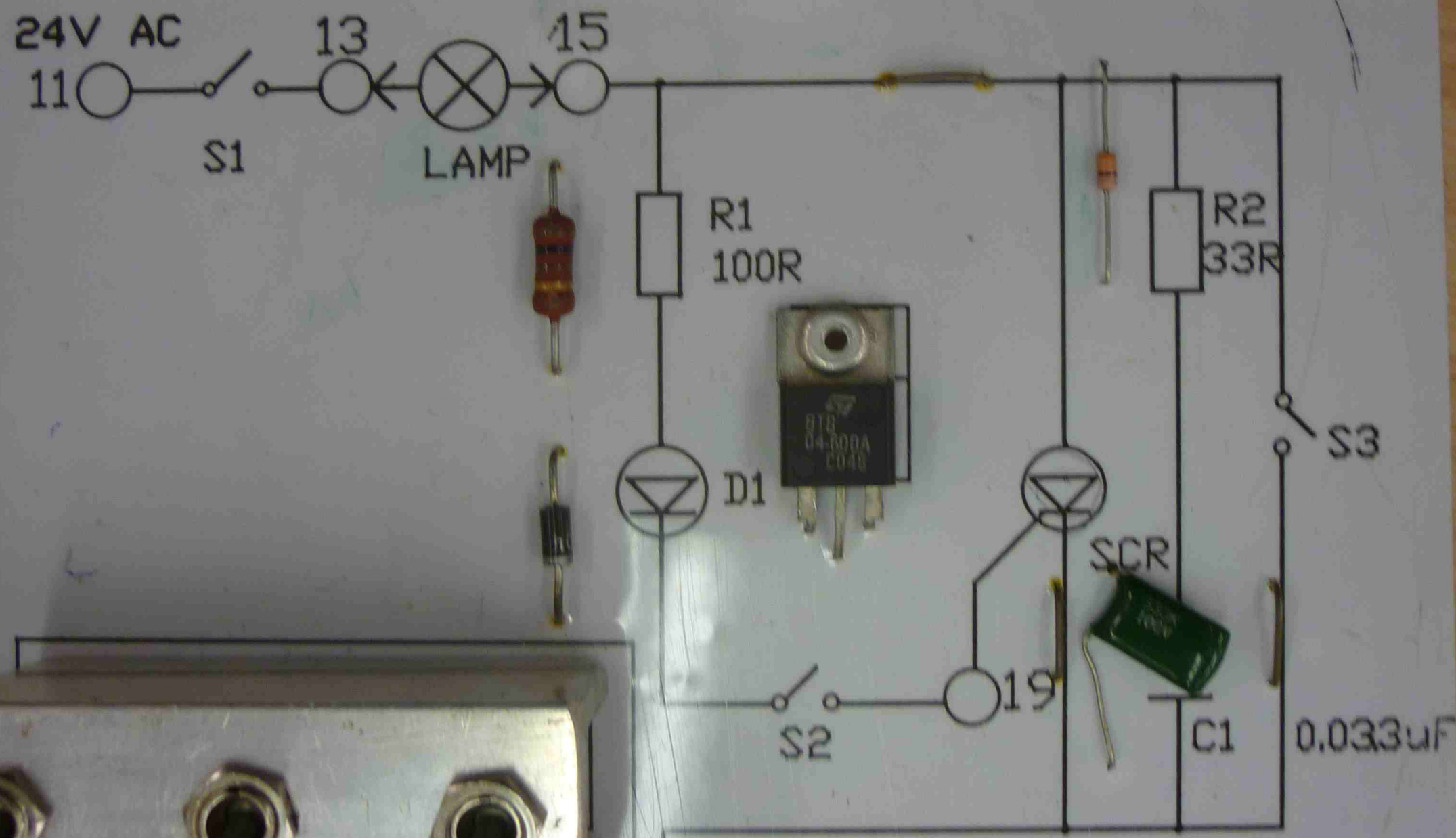
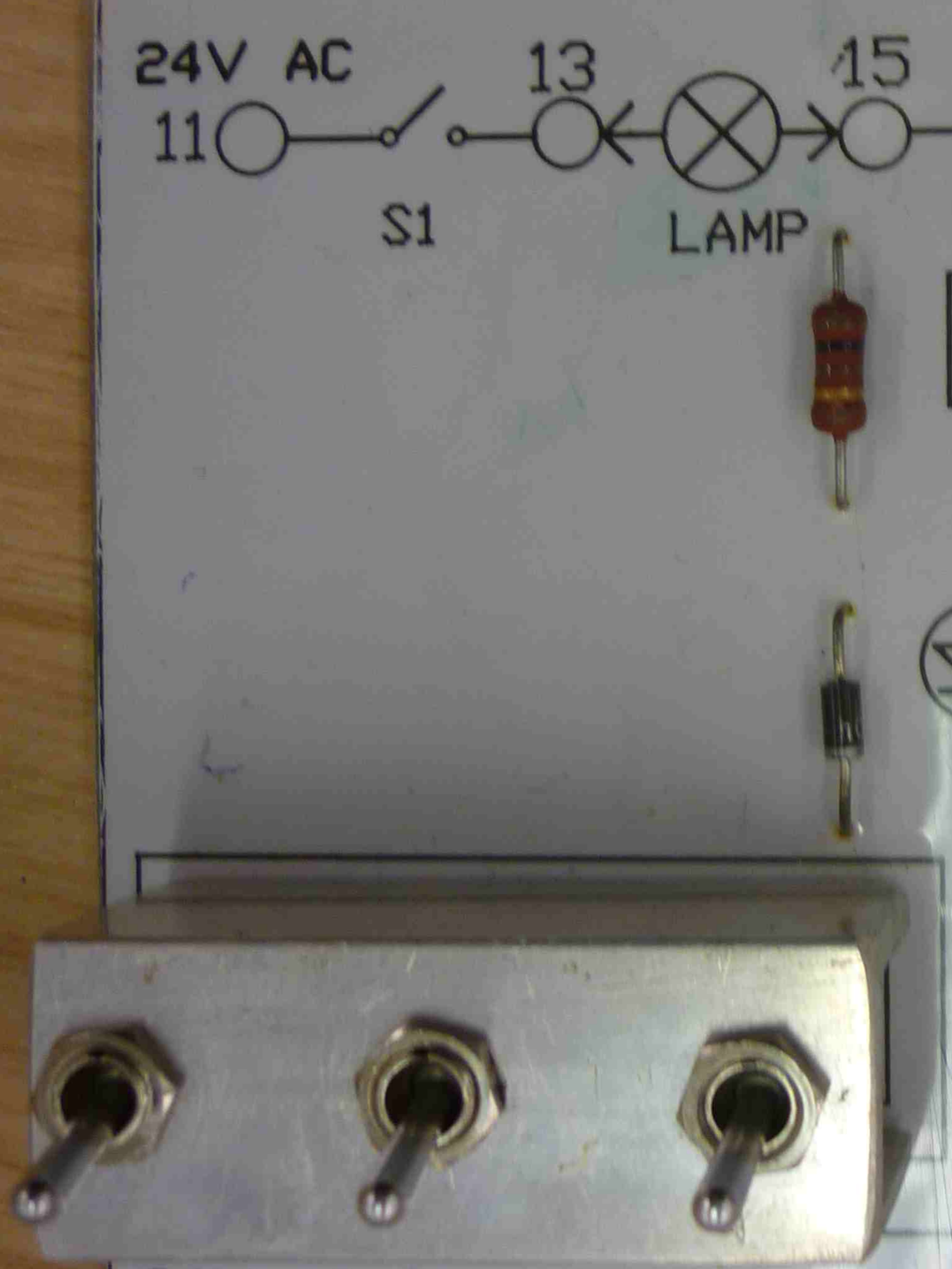
SYDNEY INSTITUTE OF TECHNOLOGY

POWER CONTROL DEVICES

NE05 SECTION 2A





24V AC

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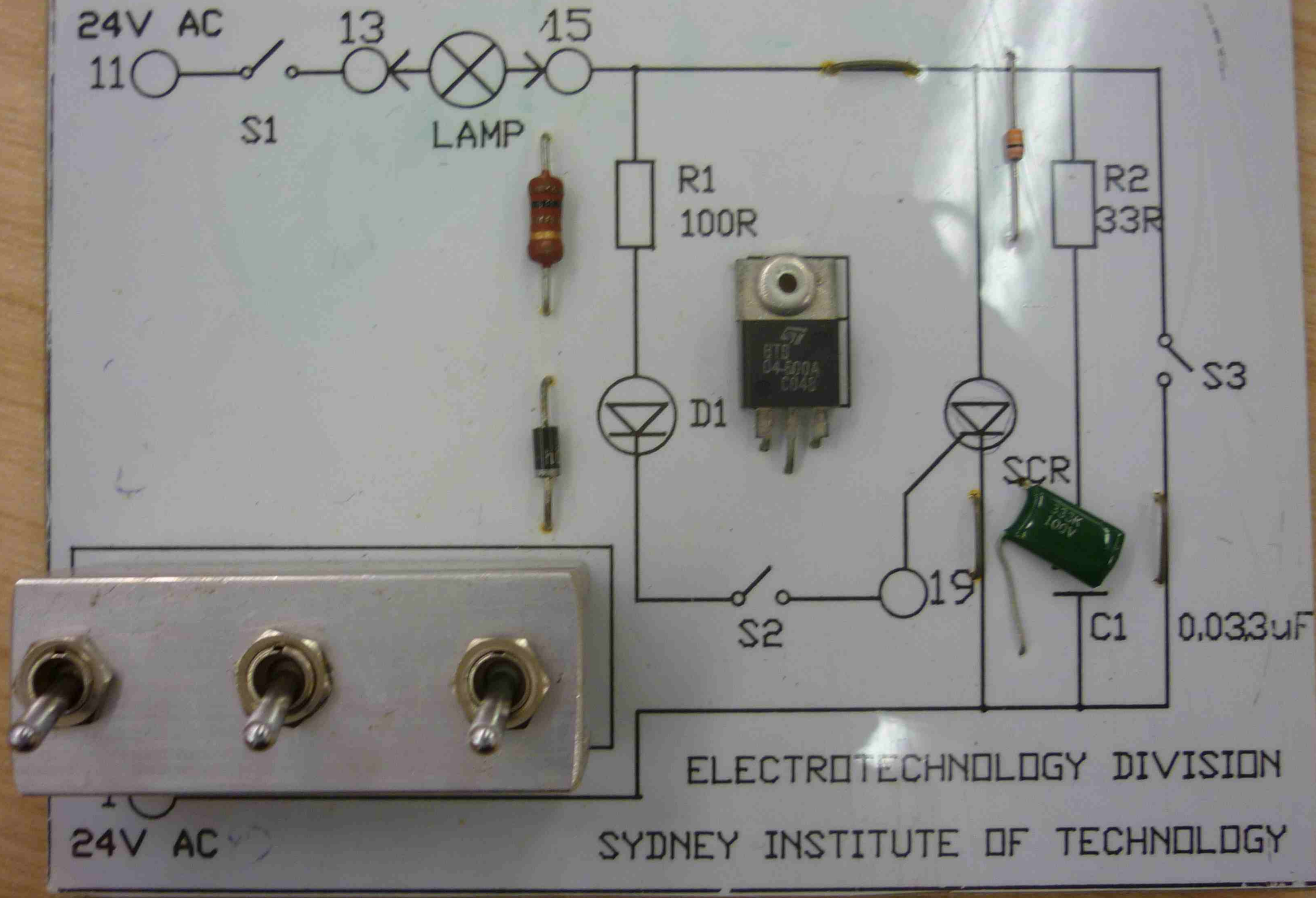
POWER CONTROL DEVICES

NE05 SECTION 2A



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POWER CONTROL DEVICES

NE05 SECTION 2B

9

+ 5V

S1

R1
100R 0.5W

13

A

15

BTB
04-600A
C048

SCR

19

S2

R2
47R 0.5W

7

1.5V

5

3

- 0V

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SYDNEY INSTITUTE OF TECHNOLOGY

POWER CONTROL DEVICES

NE05 SECTION 2B

9

+ 5V

S1

R1
100R 0.5W

13

A

15

SCR

SCR

19

S2

R2
47R 0.5W

7

1.5V

5

3

- 0V

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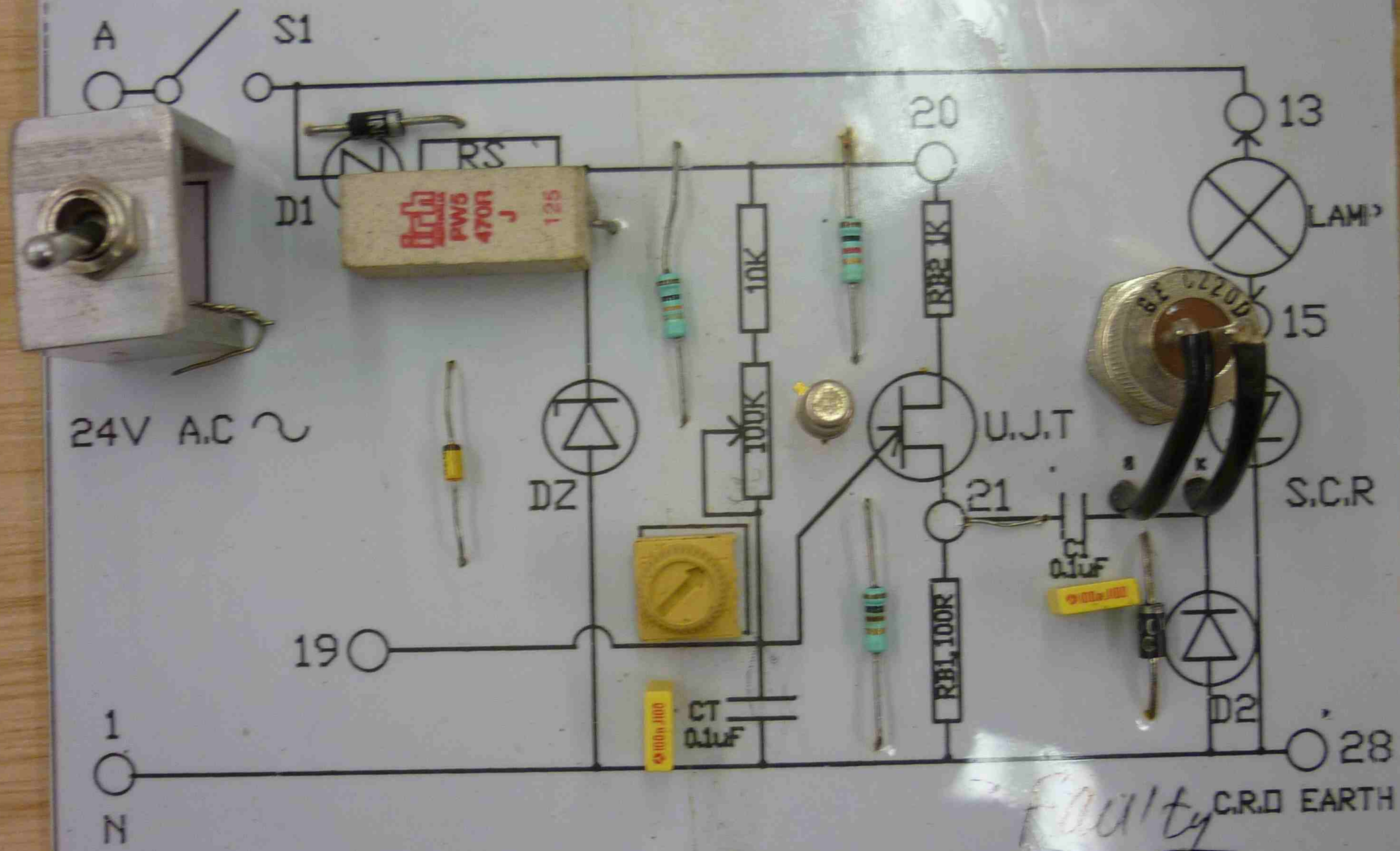
POWER CONTROL DEVICES NE05_4B

U.J.T TRIGGER PULSE GENERATOR - MAINS SYNCHRONISATION

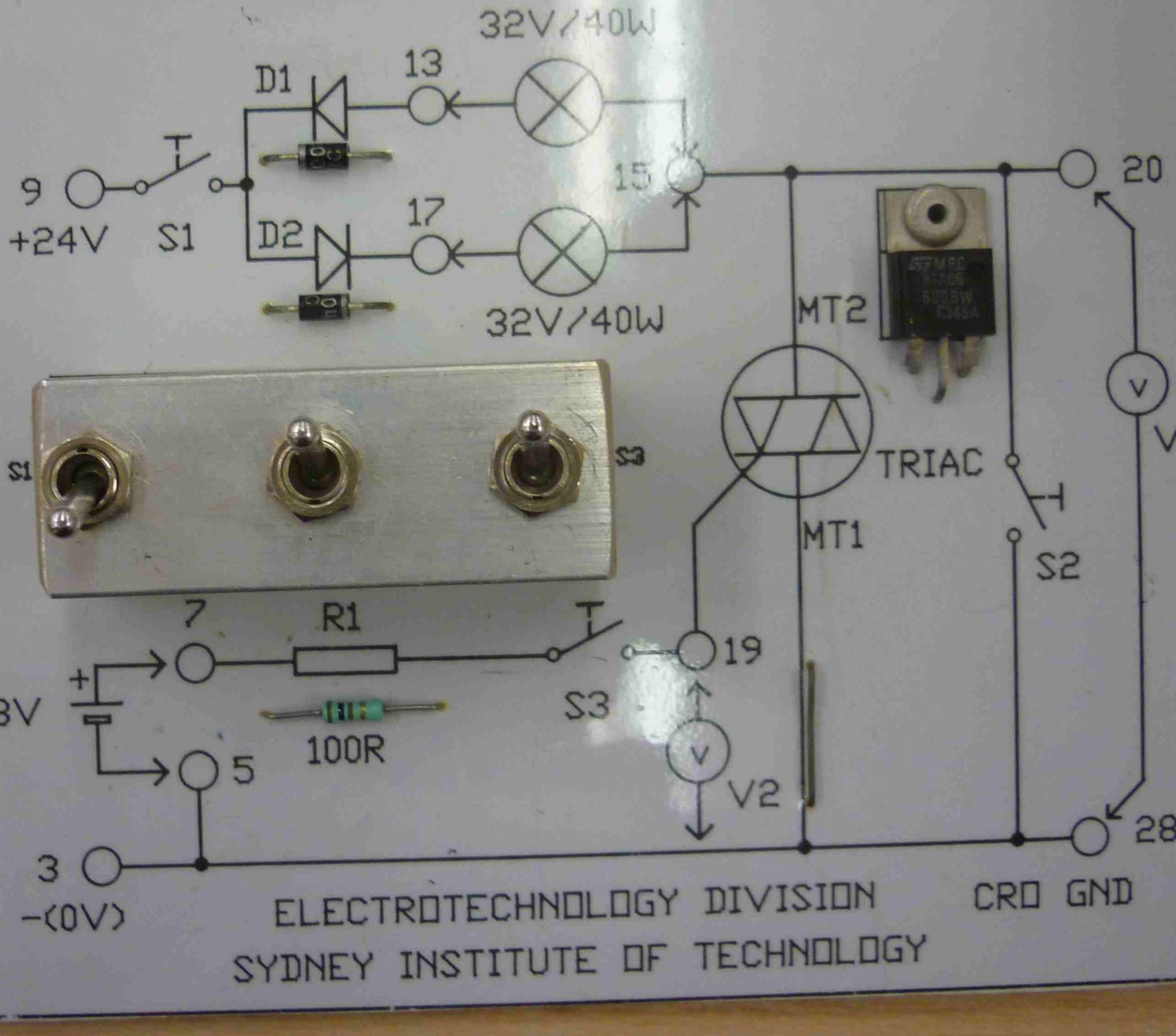


Faulty In

ELECTROTECHNOLOGY DIVISION
SYDNEY INSTITUTE OF TECHNOLOGY

POWER CONTROL DEVICES

NE05 SECTION 3



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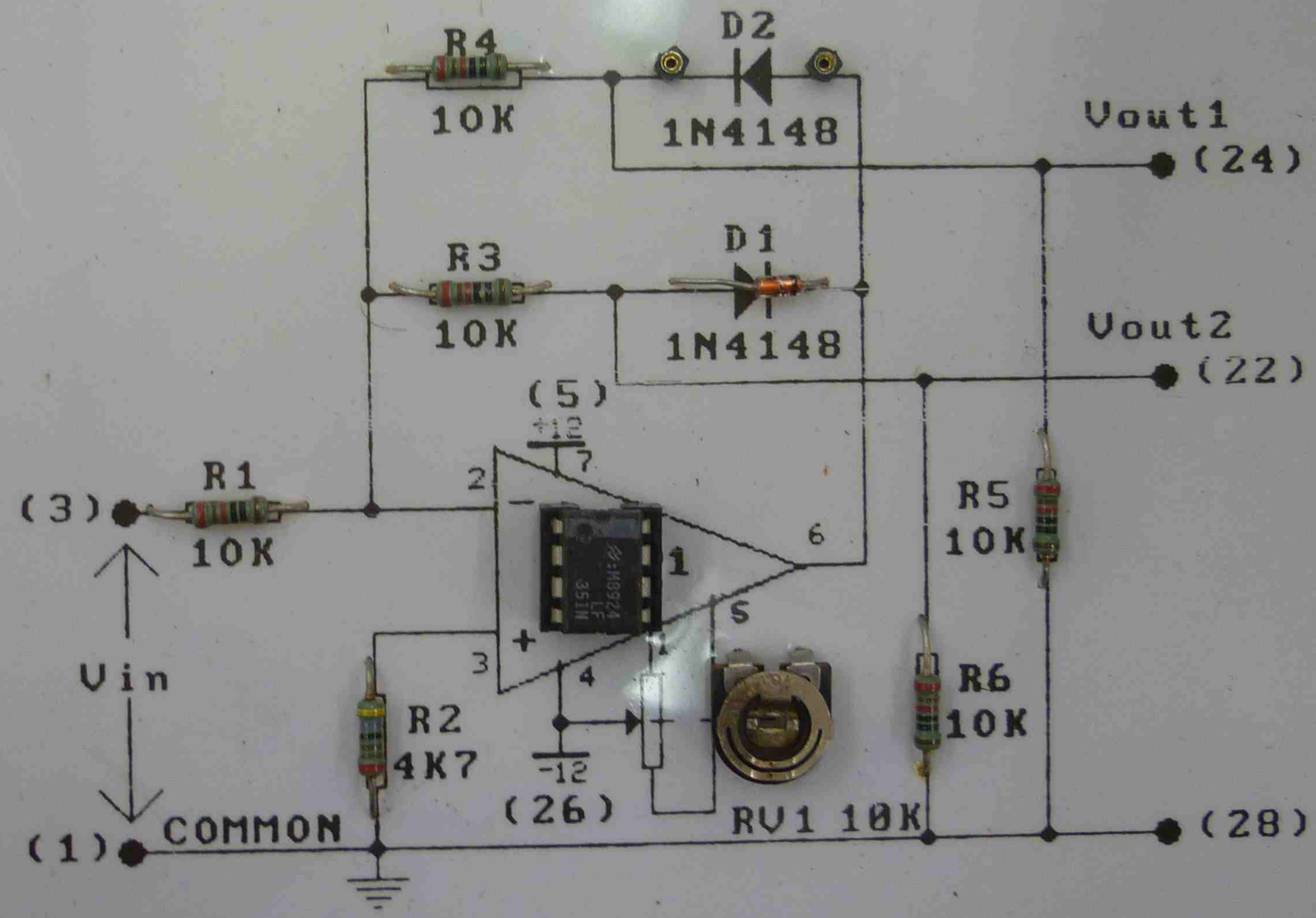
SYDNEY INSTITUTE OF TECHNOLOGY, ULTIMO
CONSTRUCTION & ENGINEERING COURSES
APPLIED ELECTRICITY INDUSTRIAL ELECTRONICS
OPERATIONAL AMPLIFIERS 6009C #9

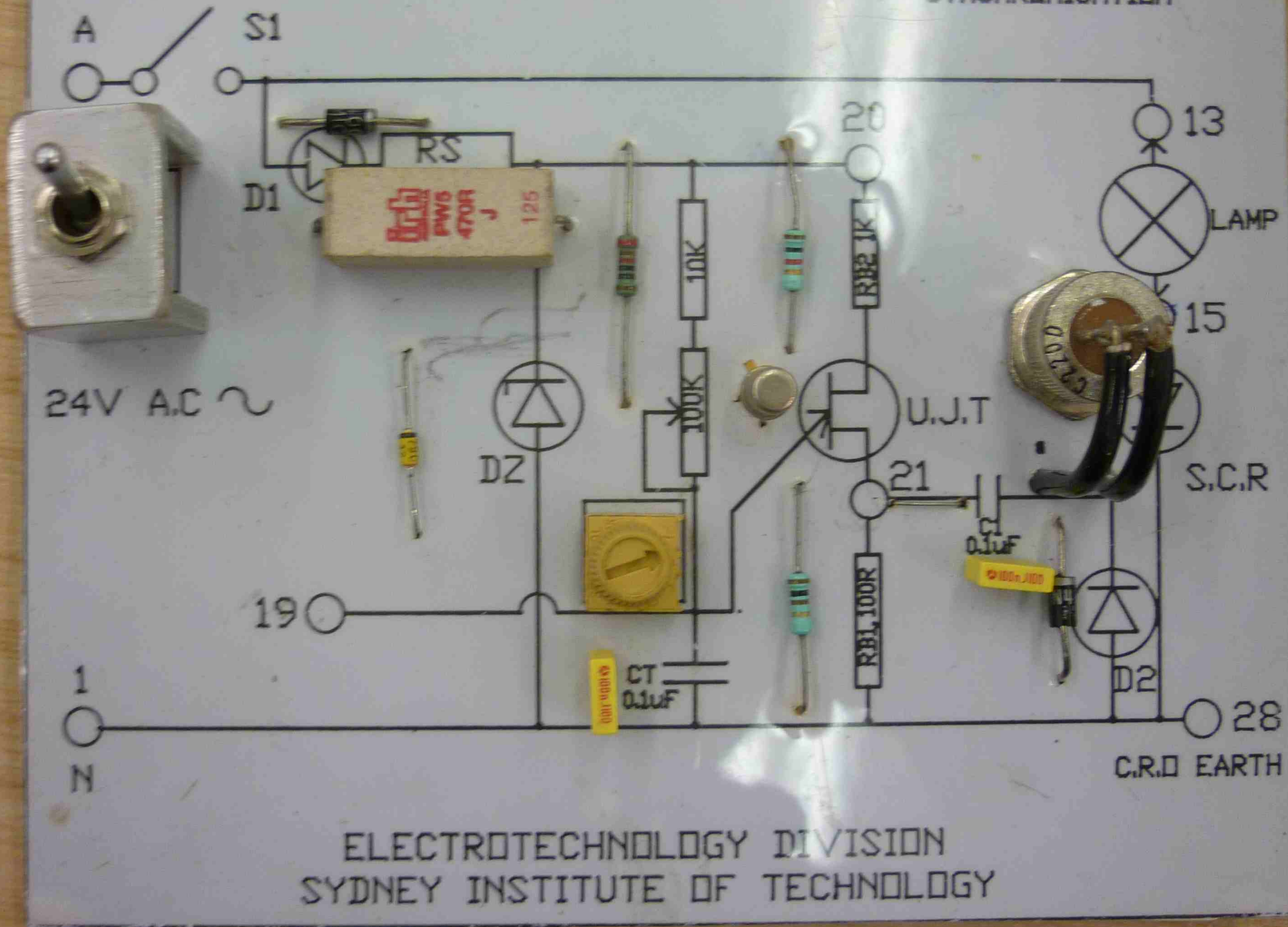
PRECISION HALF WAVE RECTIFIER



FILEREF: OPAMP1P

POWER CONTROL DEVICES NE05_4B

U.J.T TRIGGER PULSE GENERATOR - MAINS SYNCHRONISATION



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POWER CONTROL DEVICES

NE05 SECTION 2B

9

+ 5V

S1

R1

13

A

15

SCR

SCR

19

S2

R2

47R 0.5W

7

1.5V

5

3

- 0V

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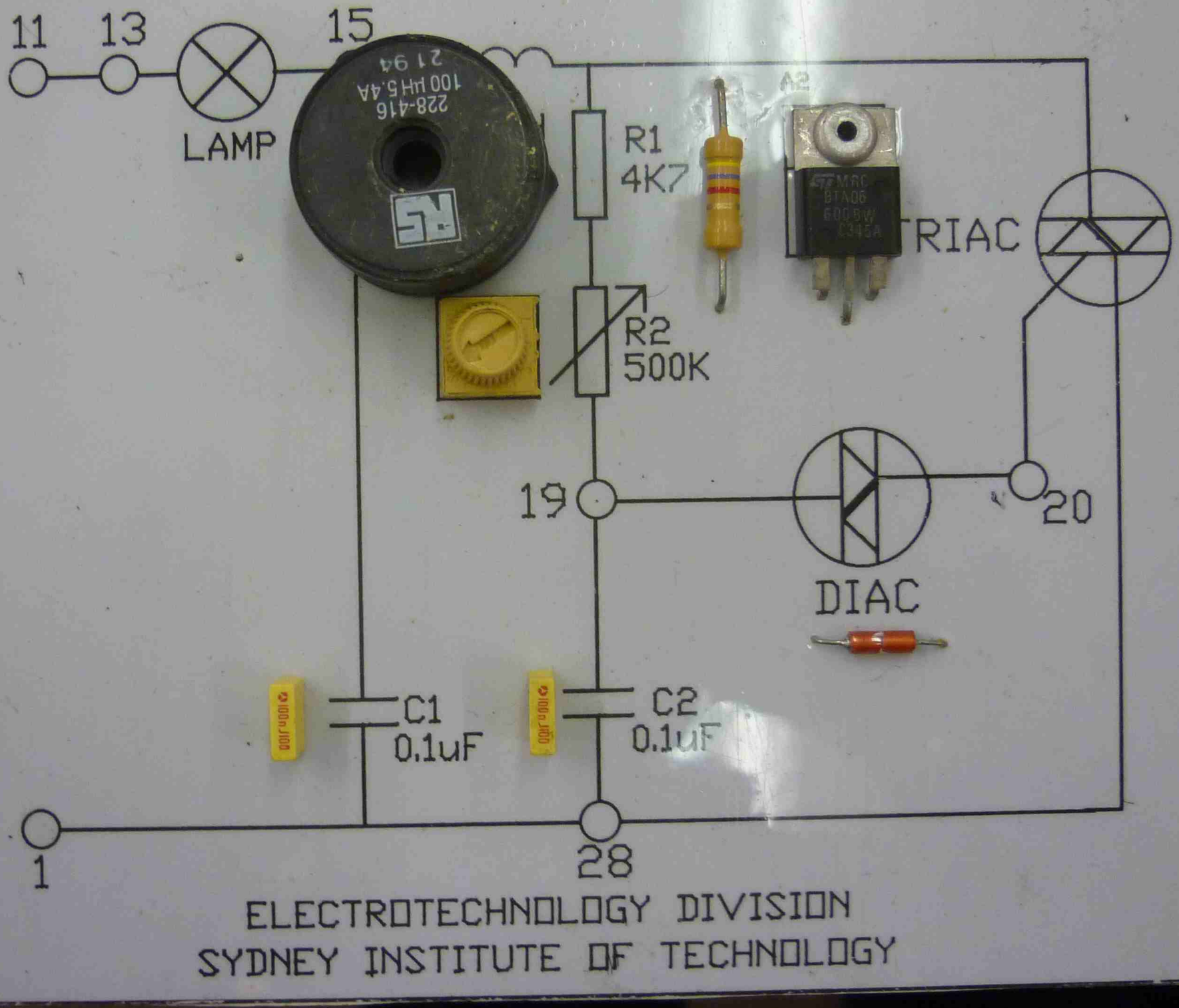
POWER CONTROL DEVICES

NE05 SECTION 5B



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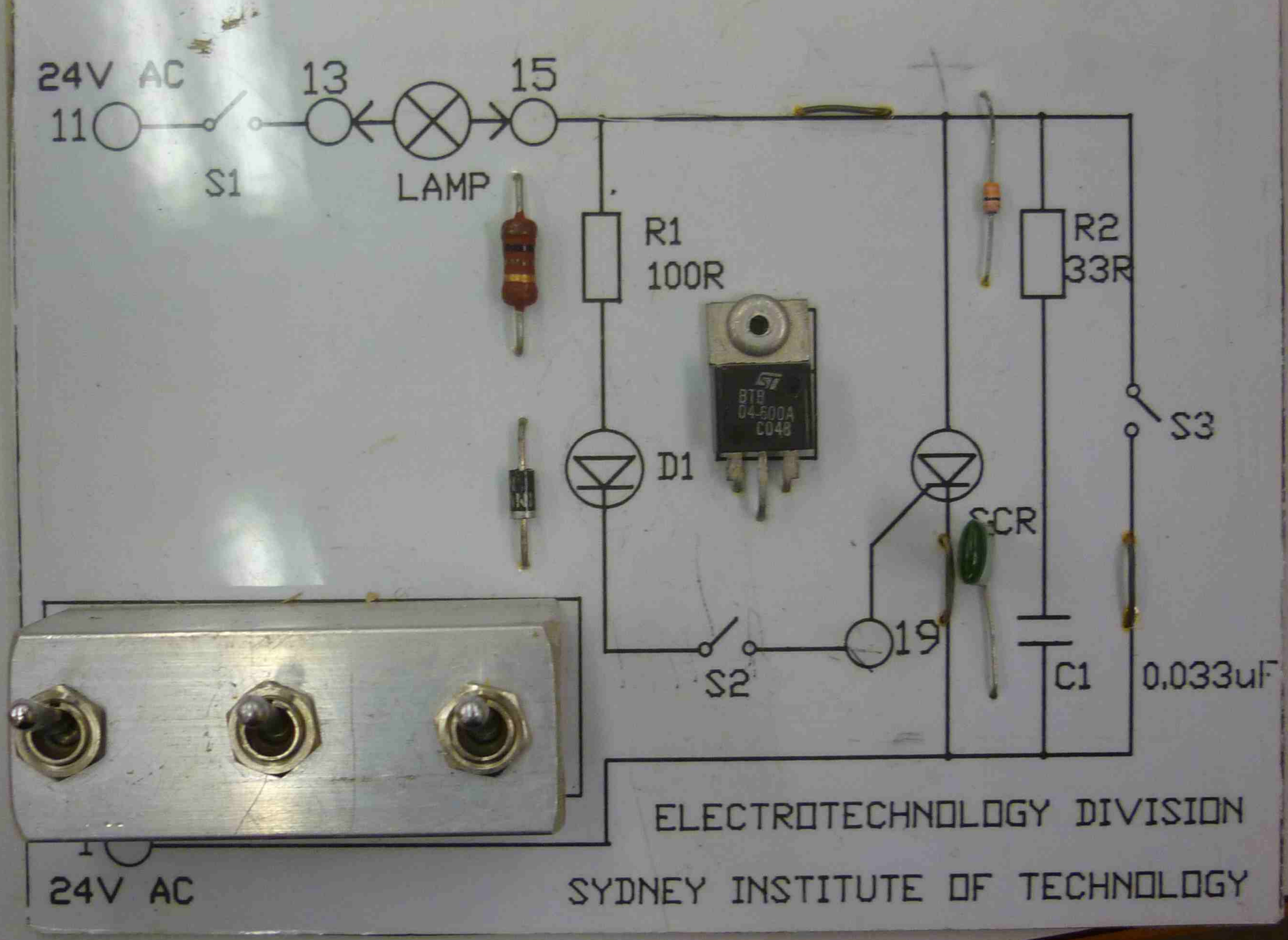
POWER CONTROL DEVICES

NE05 SECTION 2A



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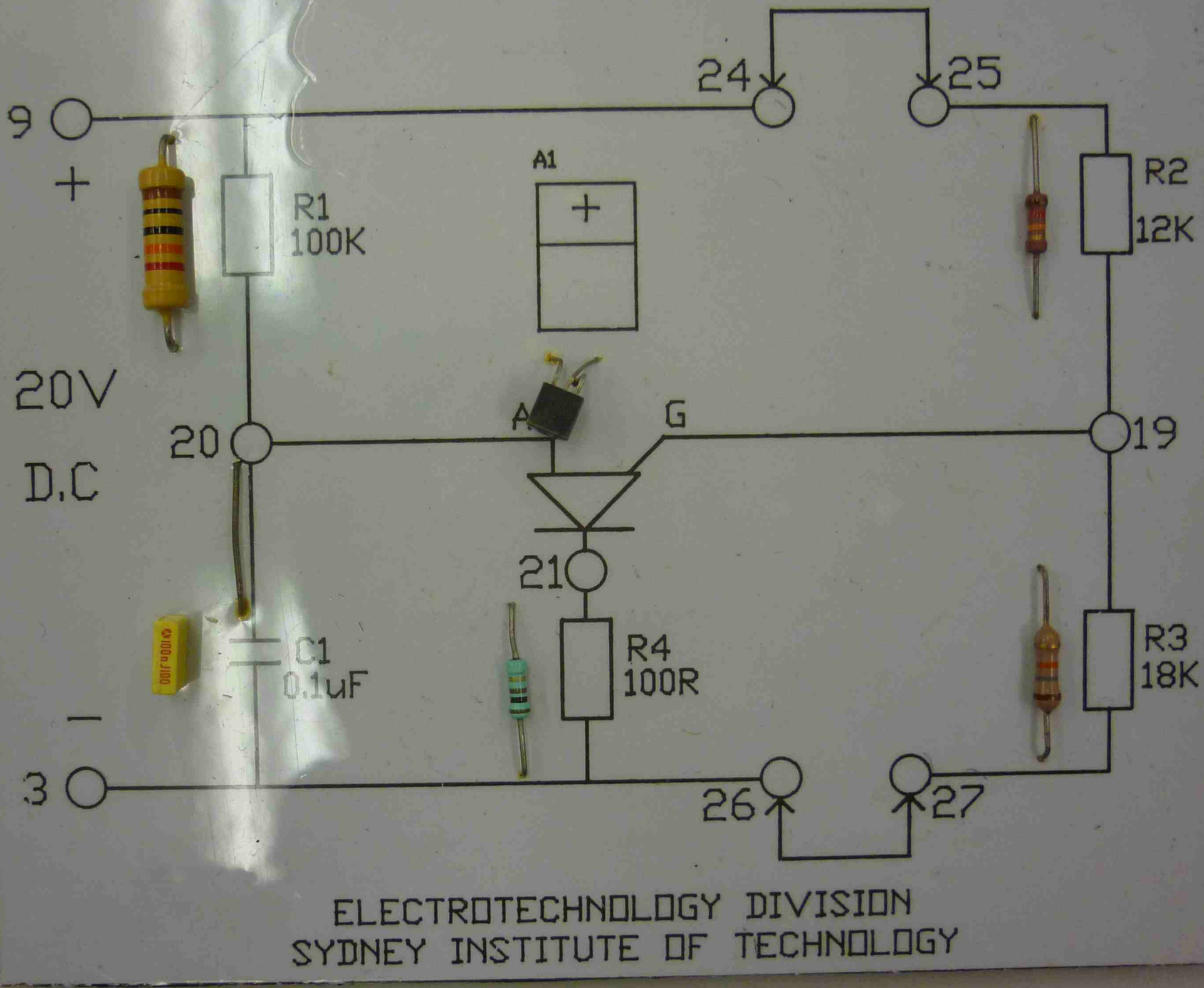
POWER CONTROL DEVICES

NE05 SECTION 5A



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POWER CONTROL DEVICES

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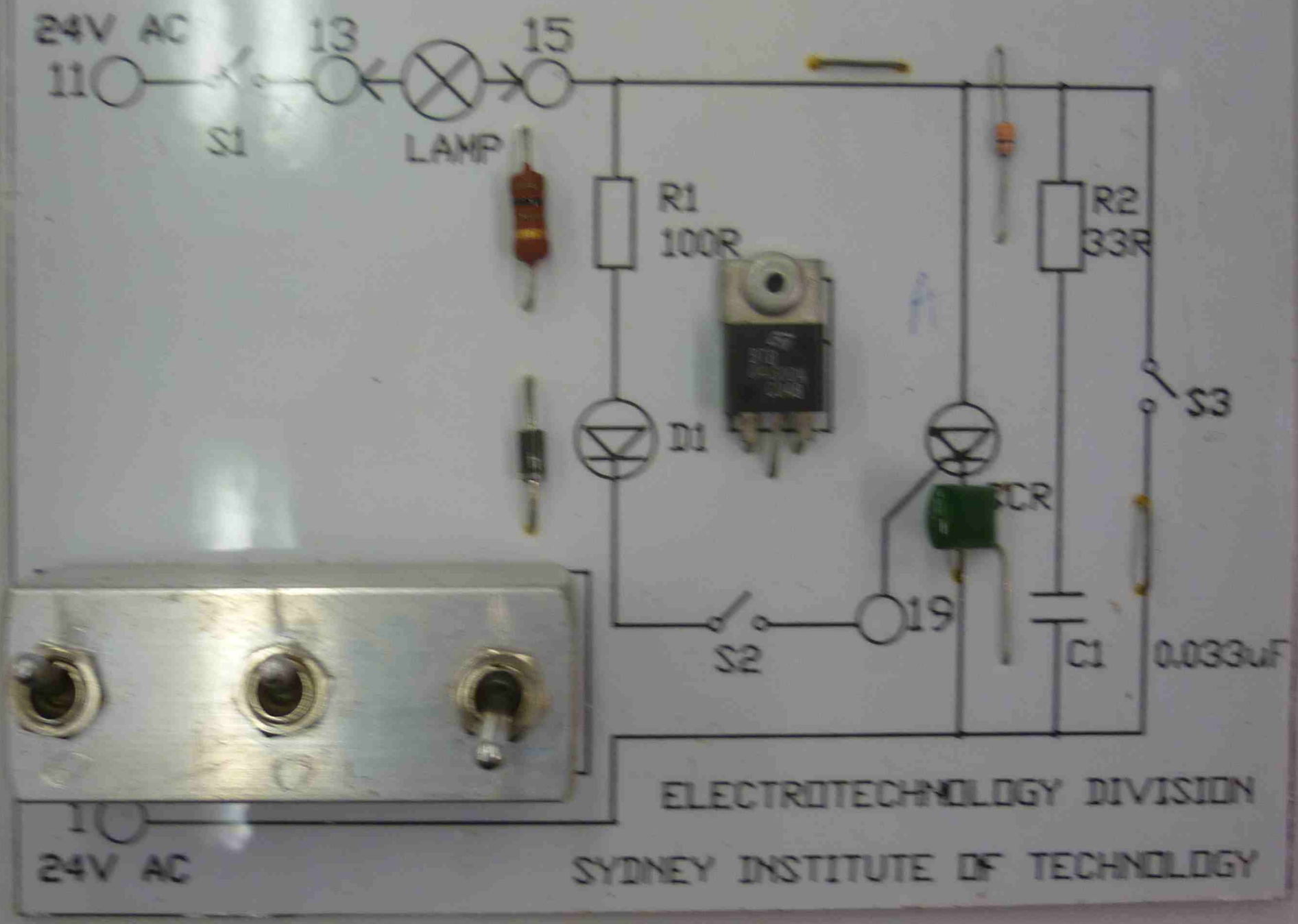

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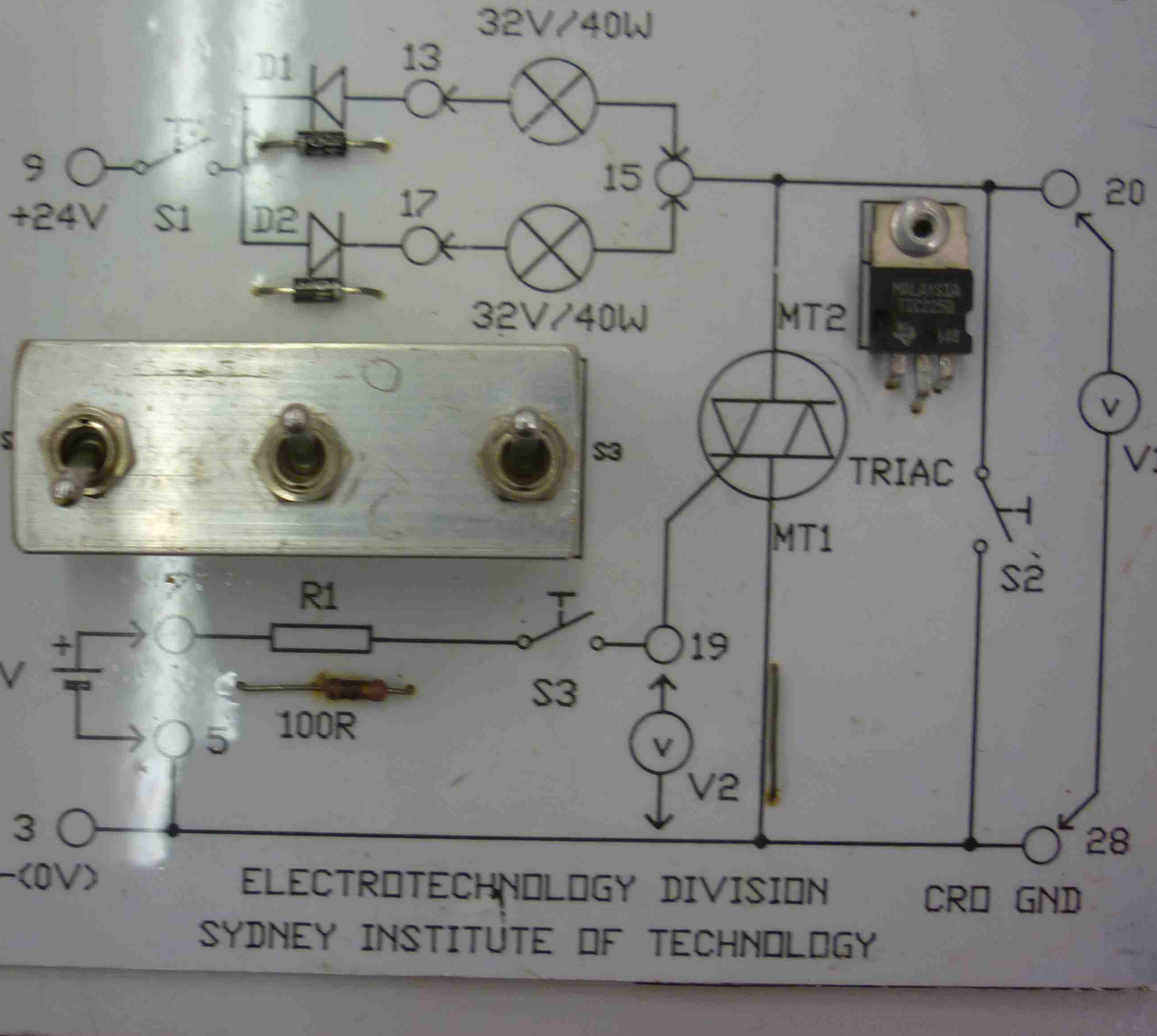
POWER CONTROL DEVICES

NE05 SECTION 3



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POWER CONTROL DEVICES

NE05 SECTION 2B

9

+ 5V

S1

R1
100R 0.5W

13

A

15

SCR

SCR

19

S2

R2
47R 0.5W

7

1.5V

5

3

- 0V

ELECTROTECHNOLOGY DIVISION
SYDNEY INSTITUTE OF TECHNOLOGY

ZENER
MSC

FREQUENCY (Hz)

SPEED

0 1 2 3 4 5 6 7 8 9 10

FORWARD

STOP/
RESET

REVERSE

POWER

ENABLED

CURRENT
LIMIT

OVER
CURRENT

OVER
VOLTAGE

GROUND
FAULT

OVER
TEMP

LOCAL

OFF OFF

REMOTE

VOLTAGE SIGNAL INPUT

+ —

0-10 DC MAX.

CURRENT SIGNAL INPUT

+ —

4-20 mA


OFF
OFF
REMOTE
L1
L2
L3
3Φ INPUT 41.5V
U
V
W
MOTOR OUTPUT

L1 L2 L3

3Φ INPUT 41.5V

U V W

MOTOR OUTPUT


BETTS ELECTRIC MOTORS

BETTS ELECTRIC MOTORS

A DIVISION OF JAMES N. KIRBY PTY LIMITED. AUSTRALIA

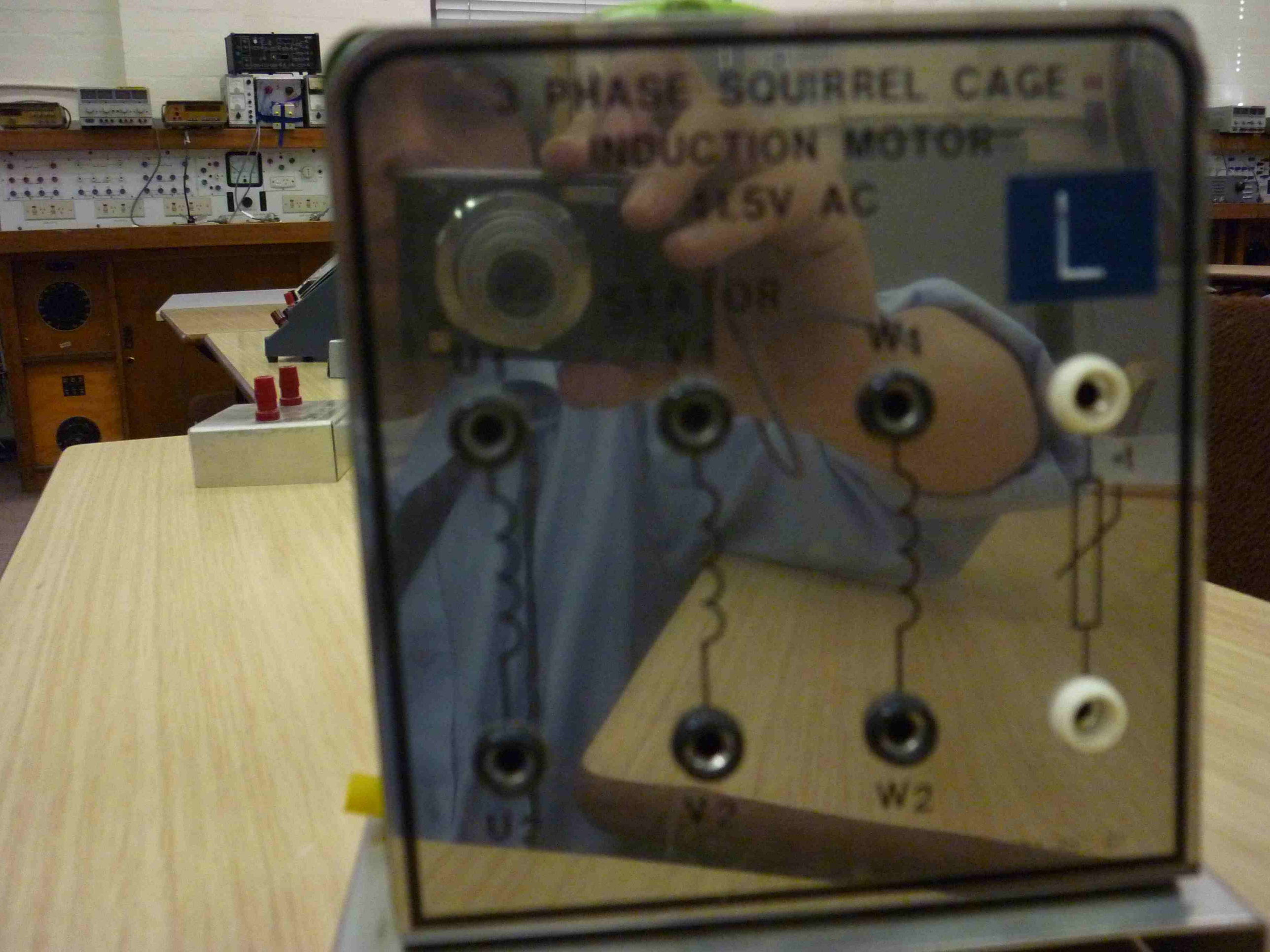
3 PHASE INDUCTION MOTOR

PART No. 1-BEPIM3/01

41.5 Vac 50W

BETTS

EDUCATIONAL PRODUCTS


3 PHASE SQUIRREL CAGE
INDUCTION MOTOR
415V AC
L
W1
U2
V2
W2

3 PHASE SQUIRREL CAGE
INDUCTION MOTOR
41.5V AC

L

STATOR

U1 V1 W1

-t

U_2 V_2 W_2

3 PHASE SQUIRREL CAGE
INDUCTION MOTOR
41.5V AC

STATOR

L

U1 V1 W1

+t

U2 V2 W2


3 PHASE SQUIRREL CAGE
INDUCTION MOTOR
41.5V AC
L
STATOR
U1
V1
W1
U2
V2
W2

3 PHASE SQUIRREL CAGE
INDUCTION MOTOR
41.5V AC

STATOR

U1 V1 W1

L

+t

U2 V2 W2


390 OHMS


10W390ΩJ

560 OHM

10KOHM

1KOHM

2OHM

10KOHM

2K7OHM

5KOHM

22KOHM

15KOHM

6V2


0
5
10
15
20
V
PEAK
KR-65

STANDARD

0 .2 .4 .6 .8 1

A

SEW

MODEL ST-80

CLASS 2.5


1000
100
2000
200
3000
300
4000
400
5000
500
00
0
10
20
30
40
50
mA
EDM
DC
CLASS-2.5
5A
500mA
50mA

0 1 2 3 4 5

A

YF-86

University

PERINI AND SCOTT (ASIA) PTY. LTD.

MAINS

PERINI COTT

CURRENT CONTROL

COARSE VOLTAGE

\+

⏚

−

FINE VOLTAGE

REGULATED POWER SUPPLY

TYPE T30 – 2C

DUAL FUNCTION GENERATOR

FREQUENCY

A B

OUTPUT FREQUENCY

Hz

KHz

A B

OUTPUT LEVEL

A B

MIN MAX MIN MAX

FUNCTION

FREQUENCY RANGE
Hz

A

100 1 k 10 k 100 k

B

FREQUENCY MODULATION
(CHANNEL A)

INPUT DEVIATION

kΩ MIN MAX

SYNC / TTL
OUTPUTS

A B

ATTENUATOR
dB

A

0 20 40

B

OUTPUTS
50 Ω

A B

MAINS

trigger

external inputs
max input 20V pk to pk
input resistance 10KΩ

sweep

ref quad ref quad var 0° 90° 180° 270°
2V pk to pk 1KΩ

0 40

0 20

normal
20V pk to pk 10mA
inverted

2V pk to pk
2KΩ

free
ground
common

4B DC POWER SUPPLY
ETT • PACKARD C 60V 0-15A

VOLTS
0 10 20 30 40 50 60 70

AMPERES
0 3 6 9 12 15 18

VOLTAGE
COARSE FINE

CURRENT
COARSE FINE

OVERVOLT
ADJUST

MONITORING TER
3 AMPS MAX
+ −

LINE
ON ON

VOLTAGE

COARSE

FINE

CURRENT

COARSE

FINE

ON

SN/ 1712A02735

RISON 6268A DC POWER SUPPLY

ETT • PACKARD

0—40 V 0—30 A

10 20 30 40 0 50

VOLTS

5 10 15 20 25 30 35 0

AMPERES

LINE

ON ON

VOLTAGE

COARSE

FINE

CURRENT

COARSE

FINE

+

PERINI
COTT
CURRENT CONTROL
COARSE VOLTAGE
FINE VOLTAGE
REGULATED POWER SUPPLY
TYPE T30-2C

GOOD WILL REGULATED DC POWER SUPPLY GPS —

POWER

COARSE FINE

COARSE FINE VOLTAGE

LIANG I ELECTRIC INSTRUMENT CO., LTD.


SUPPLY
N
E
H124

ADD ZERO CAPACITY 0·000058 MFDS

EARTH

10 0 1 2 3 4 5 6 7 8 9

X0·1

10 0 1 2 3 4 5 6 7 8 9

X·01

10 0 1 2 3 4 5 6 7 8 9

X·001

MICROFARADS

CAMBRI[illegible] Co. LTD. ENGLAND.

№ L-347766

ADD ZERO CAPACITY 0·000058 MFDS

EARTH

X0·1

X·01

X·001

MICROFARADS

CAMBRIDGE INSTRUMENT CO LTD., ENGLAND.

№ L-347766

ADD ZERO CAPACITY 0·000058 MFDS

X0·1

X·01

X·001

MICROFARADS

CAMBRIDGE INSTRUMENT CO. LTD., ENGLAND.

№ L-347766

ELECTRICAL ENGINEERING
CERTIFICATE
PLANT NO.

ELECT.ENG.
CERTIFICATE.

Supply

Ammeter

Meter Element

R2

S

Close

Max R

R3

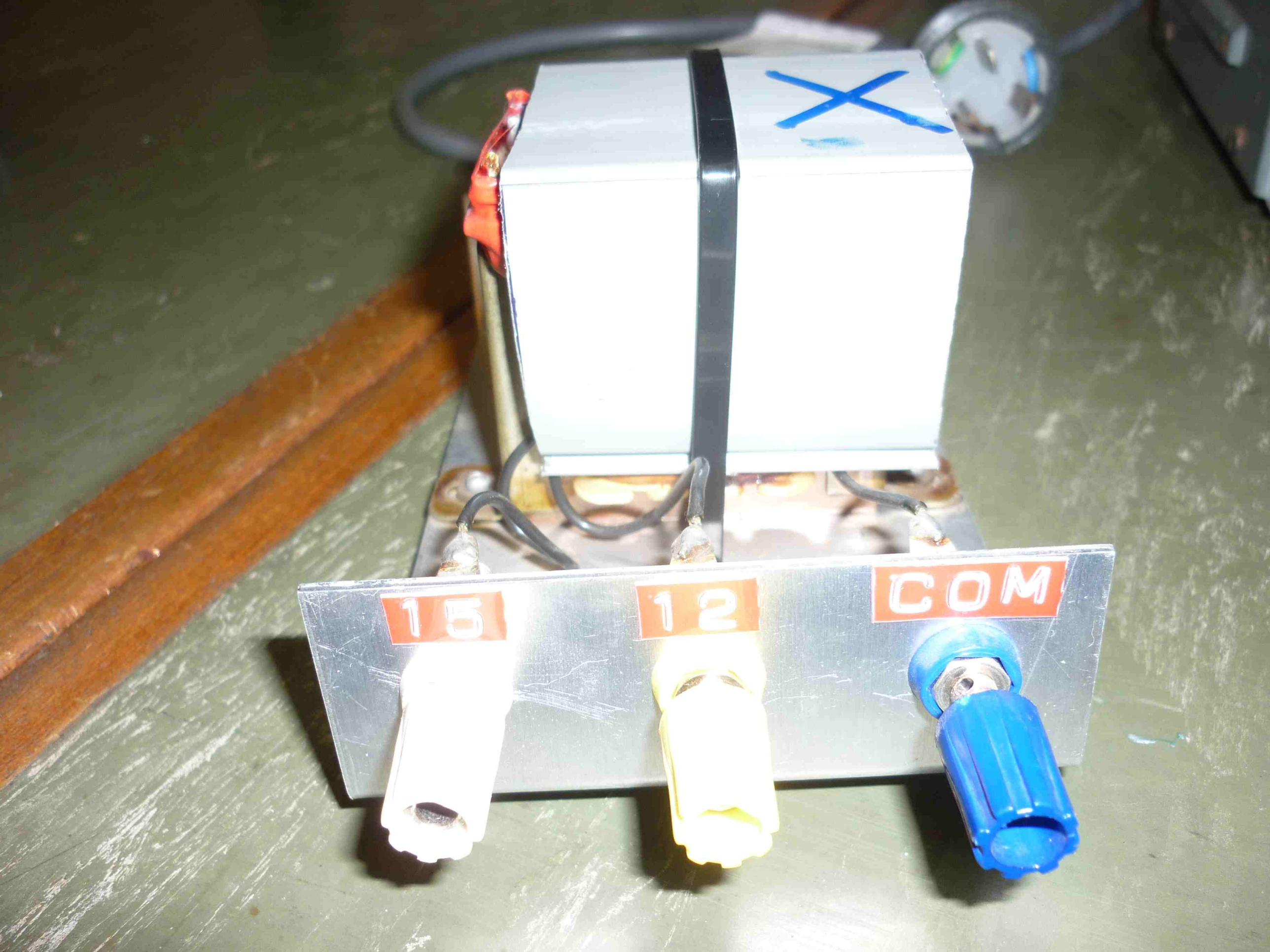
Min R

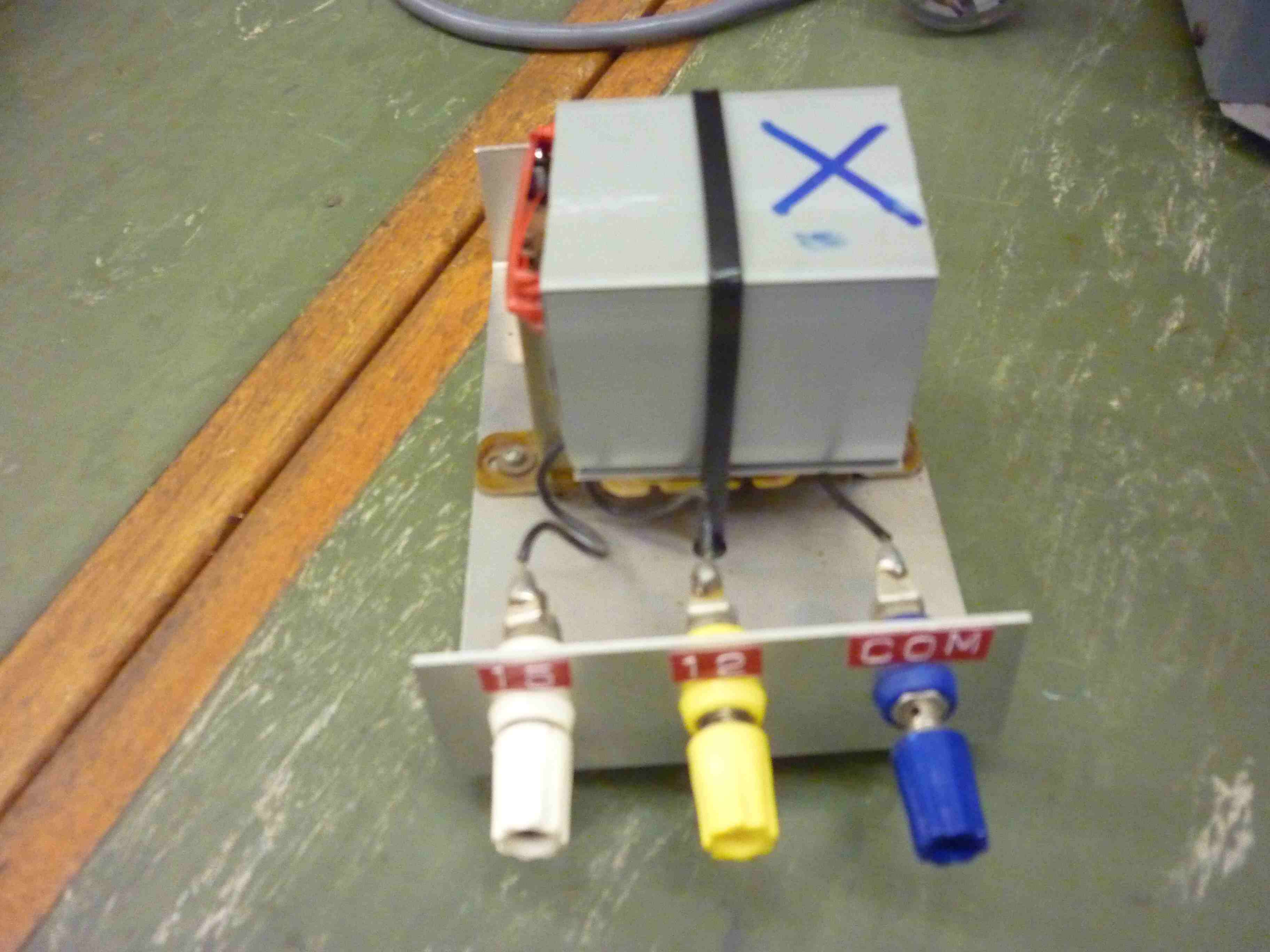
R1

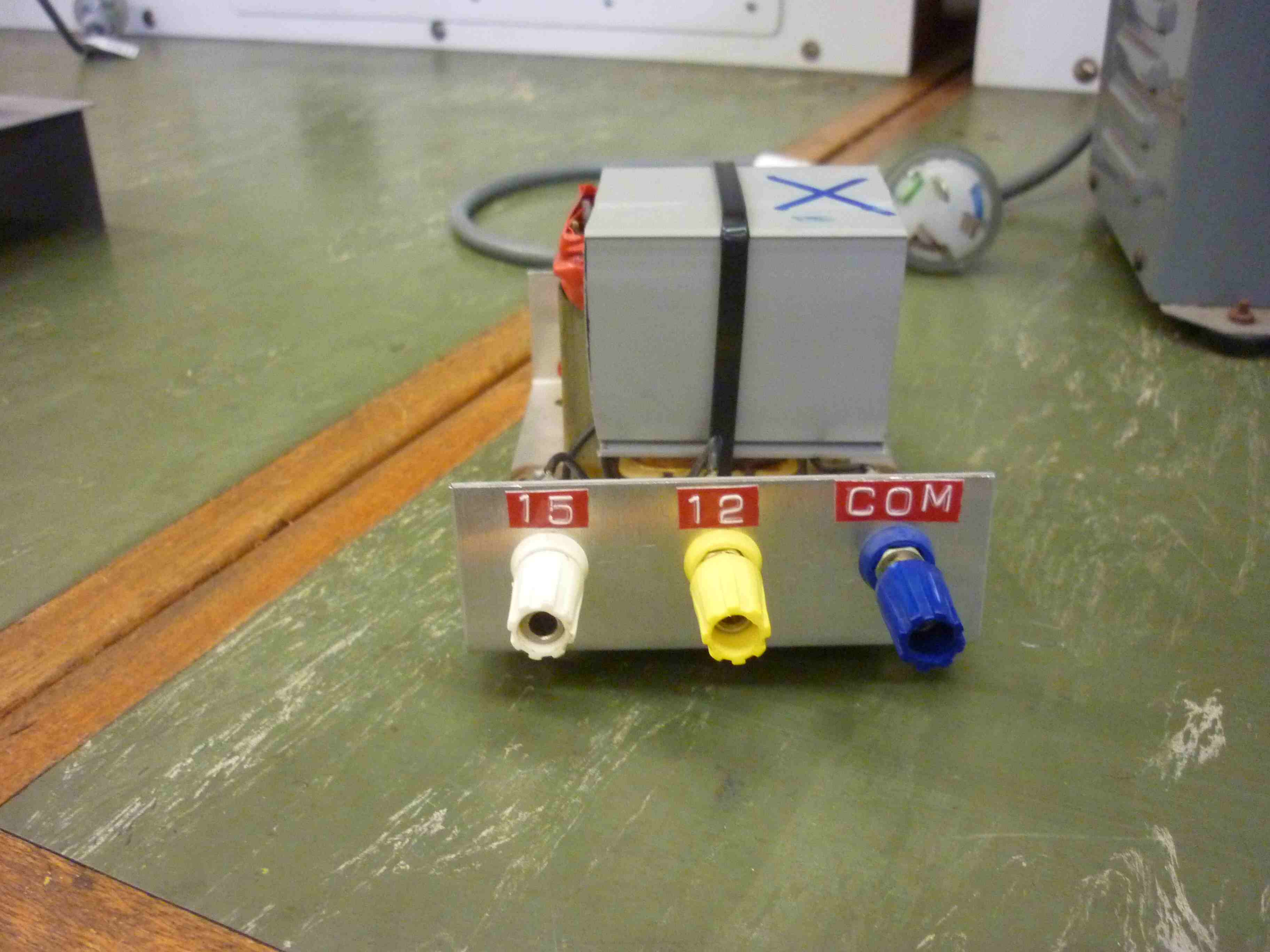
Min R

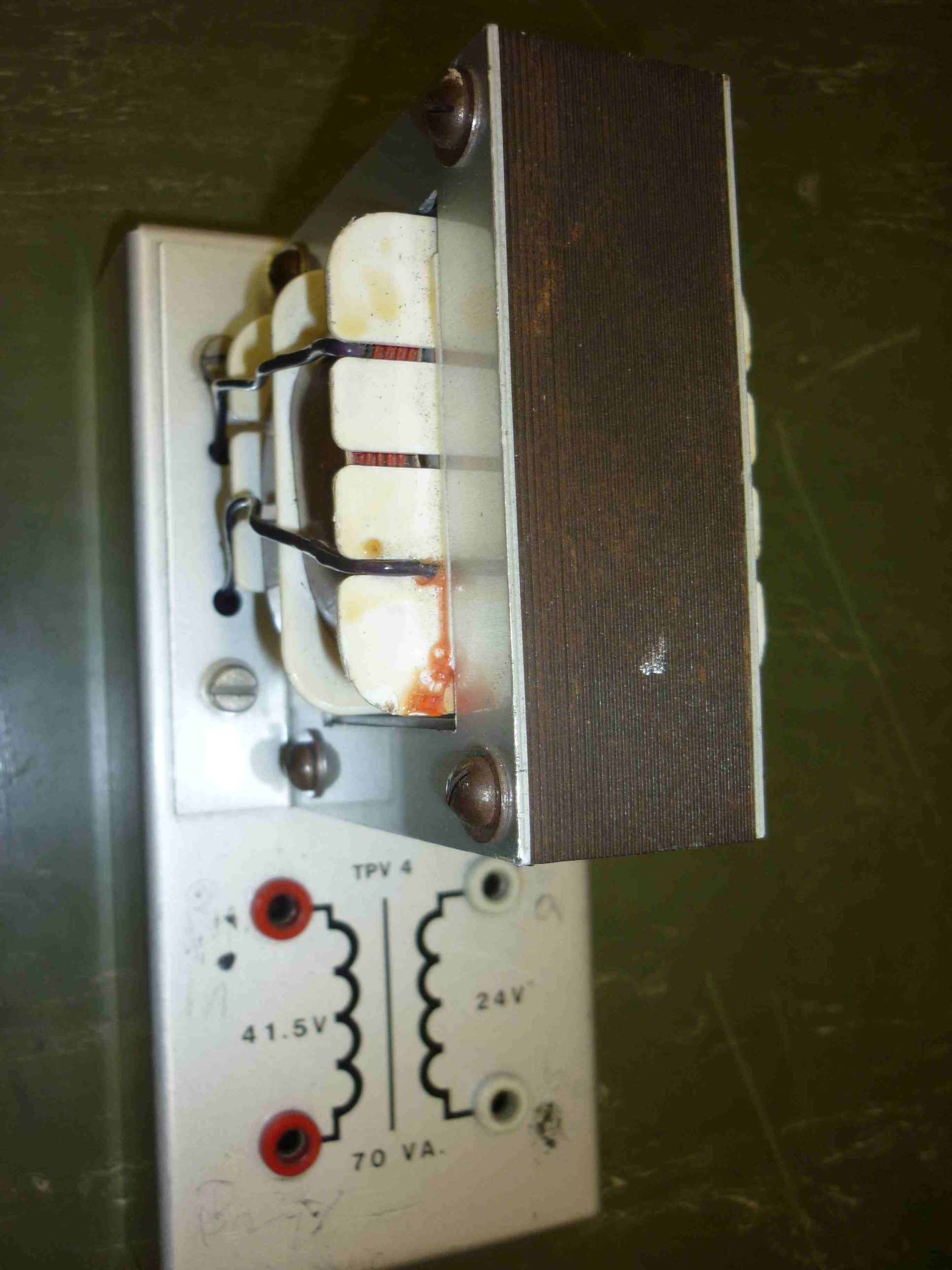
Max R


240


15
12
COM


1-1
1-2
COM


15
12
COM


TPV 4
41.5V
24V
70 VA.

TPV 4

41.5V

24V

70 VA.

TPV 4

41.5V

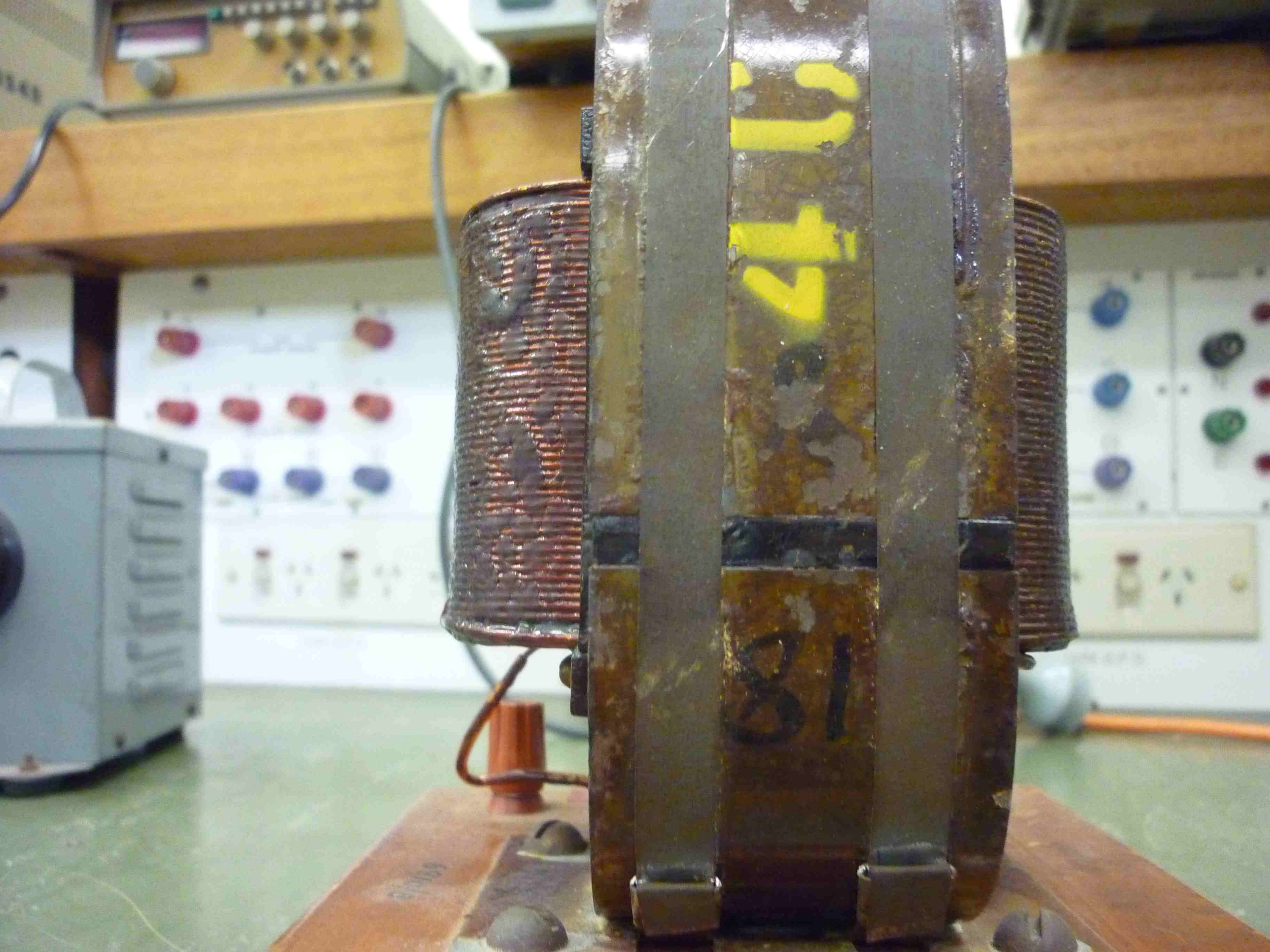
24V

70 VA.


CPBD.4E/3


CPBD.4E/3


CPBD.4E/3


41
31


240V GPO

Ammeter

Supply

Meter Element

R1

R2

S

Close

Min R

Max R

Max R

Min R

R3


Ammeter
Supply
Meter Element
R2
S
Close
Max R
R3
Min R
R1
Min R
Max R

UH

LOW VOLTAGE AC/DC PWR SUPPLY

SYDNEY INSTITUTE OF TECHNOLOGY

MAINS SWITCH

MAINS INPUT

12V/4A

A0

A1

B0

B1

E

F

G

+

H

I

K

BR1

220uF

470uF

2200uF

FROM IN37 —

POWER ON RESET

POWER OFF

D0

D1

L

M

2VAC OUT

TO OSCILLOSCOPE

JOE

ZERO CROSSING DETECTOR OUTPUT

ON

LOW VOLTAGE AC/DC PWR SUPPLY

SYDNEY INSTITUTE OF TECHNOLOGY

MAINS SWITCH

MAINS INPUT

12V/4A

A0

A1

E

BR1

G

+

H

I

K

220uF

470uF

2200uF

B0

3V/4A

B1

F

POWER ON RESET

12V/

1

C

D0

D1

L

M

—

From M37

Joe

POWER OFF

2VAC OUT T TO OSCILLOSCOPE

ZERO CROSSING DETECTOR OUTPUT

LOW VOLTAGE AC/DC PWR SUPPLY

SYDNEY INSTITUTE OF TECHNOLOGY

MAINS SWITCH

MAINS INPUT

POWER ON RESET

POWER OFF

12V/4A

A0

A1

B0

B1

C

D

E

F

BR1

G

H

I

K

220uF

470uF

2200uF

+

−

D0

D1

L

M

2VAC OUTPUT TO OSCILLOSCOPE

ZERO CROSSING DETECTOR OUTPUT

From M3-7

JOE

BENCH B-2

A>B A=B A<B
COMPARATOR
A1 B1 A2 B2 A3 B3 A4 B4

LOGIC I
LOGIC O

D C B A D C B A
B C D INPUT

0 1 2 3 4 5 6 7 8 9
BCD-DECIMAL DECODER
D C B A

I LOGIC
0

≤1 ≤2 ≤3 ≤4
PARALLEL ADDER
A1 B1 A2 B2 A3 B3 A4 B4
Sub/Add
C out
C in

D C B A
BCD BIN
COUNTER
INPUT
Clock
Reset

D C B A
BCD BIN
COUNTER
INPUT
Clock
Reset

Ser.in
Clock
Mode
0 1 2 3 4 5 6 7
SHIFT REGISTER
INPUT

I Logic
Logic O
Logic I
+5V
I
0

CLOCK
RANGE Hz
FINE
PULSERS
INDICATORS
INPUT
SWITCH REGISTER
OUTPUT
LOGIC

DSE
DIGITAL SYSTEMS ENGINEERING P/L
DIGITAL SYSTEMS TRAINER
MODEL DSE 12

BENCH B-2

COMPARATOR
A>B A=B A<B
A1 B1 A2 B2 A3 B3 A4 B4

BCD-DECIMAL DECODER
0 1 2 3 4 5 6 7 8 9
D C B A

LOGIC
I
O

B C D INPUT
D C B A D C B A

PARALLEL ADDER
Σ1 Σ2 Σ3 Σ4
A1 B1 A2 B2 A3 B3 A4 B4
Sub/Add
C out
C in

COUNTER
BCD BIN
D C B A
INPUT
Clock
Reset

SHIFT REGISTER
0 1 2 3 4 5 6 7
Ser in
Clock
Mode
INPUT

I Logic
Logic O
Logic I
+5V

CLOCK
RANGE Hz
10 10² 10³ 10⁴ 1 10⁵
FINE
PULSERS

INDICATORS
INPUT

SWITCH REGISTER
OUTPUT
LOGIC

DSE
DIGITAL SYSTEMS ENGINEERING P/L
DIGITAL SYSTEMS TRAINER
MODEL DSE 12

BENCH B-

A>B A=B A<B

COMPARATOR

AI BI A2 B2 A3 B3 A4 B4

LOGIC

I

O

D C B A

D C B A

B C D INPUT

0 1 2 3 4 5 6 7 8

BCD-DECIMAL DECODER

D C B A

Σ1 Σ2 Σ3 Σ4

PARALLEL ADDER

AI BI A2 B2 A3 B3 A4 B4

Sub/Add

C out

C in

BCD
BIN

D C B A

COUNTER

INPUT

Reset

BCD
BIN

Clock

Reset

D C B A

COUNTER

INPUT

Ser. in

Clock

Mode

0 1 2 3 4 5 6 7

SHIFT REGISTER

INPUT

I Logic

I

0

A1 A2 B

Q Q

BENCH B-2

A>B A=B A<B

COMPARATOR

AI BI A2 B2 A3 B3 A4 B4

LOGIC I

LOGIC O

D C B A

D C B A

B C D INPUT

0 1 2 3 4 5 6 7 8 9

BCD-DECIMAL DECODER

D C B A

LOGIC I

LOGIC 0

≤1 ≤2 ≤3 ≤4

PARALLEL ADDER

AI BI A2 B2 A3 B3 A4 B4

Sub/Add

C out

C in

D C B A

COUNTER

INPUT

BCD BIN

Reset

D C B A

COUNTER

INPUT

BCD BIN

Clock

Reset

Ser in

Clock

Mode

0 1 2 3 4 5 6 7

SHIFT REGISTER

INPUT

I Logic

I

0

+5V

A1 A2

B

Q̄ Q

PARALLEL ADDER

A1 B1 A2 B2 A3 B3 A4 B4

C in

INPUT

Clock

Reset

INPUT

Reset Mode

INPUT

I Logic

Logic O

Logic I

+5V

CLOCK

INDICATORS

DSE

OGIC

0

PARALLEL ADDER

Σ1 Σ2 Σ3 Σ4

A1 B1 A2 B2 A3 B3 A4 B4

Sub/Add

C out

C in

B C D INPUT

D C B A

COUNTER

INPUT

BCD / BIN

Clock

Reset

COUNTER

SHIFT REGISTER

0 1 2 3 4 5 6 7

Ser in

Clock

Mode

LOGIC

0

I Logic

Logic O

Logic I

+5V

J C K Q Q

A1 A2 B

Logic O

Logic O

DSE

DIGITAL SYSTEMS ENGINEERING

DIGITAL SYSTEMS TRAINER

MODEL DSE 12

CLOCK

RANGE Hz

10^2 10^3 10^4 10^5 10 1

FINE

INDICATORS

INPUT

SWITCH REGISTER

PULSERS

OUTPUT

OUTPUT

LOGIC 0 1

LOGIC 0 1

Logic O

0

0

0

0

Logic O

+5V

0

CLOCK

RANGE Hz

10^2 10^3 10 10^4 1 10^5

FINE

PULSERS

INDICATORS

INPUT

SWITCH REGISTER

OUTPUT

OUTPUT

LOGIC 0 1

LOGIC 0 1

DSE

DIGITAL SYSTEMS ENGINEERING P/L

DIGITAL SYSTEMS TRAINER

MODEL DSE 12

LOGIC
I
LOGIC
O
B C D INPUT
LOGIC
0
PARALLEL ADDER
A1 B1 A2 B2 A3 B3 A4 B4
Σ1 Σ2 Σ3 Σ4
Sub/Add
C out
C in
COUNTER
D C B A
INPUT
BCD
BIN
Clock
Reset
COUNTER
D C B A
INPUT
BCD
BIN
Clock
Reset
SHIFT REGISTER
0 1 2 3 4 5 6 7
INPUT
Ser.in
Clock
Mode
I Logic
Logic O
Logic I
+5V
INDICATORS
CLOCK

BENCH B-2

A>B A=B A<B

COMPARATOR

AI BI A2 B2 A3 B3 A4 B4

I

LOGIC

O

D C B A

D C B A

B C D INPUT

0 1 2 3 4 5 6 7 8 9

BCD-DECIMAL DECODER

D C B A

I

LO

0

≤1 ≤2 ≤3 ≤4

PARALLEL ADDER

AI BI A2 B2 A3 B3 A4 B4

Sub/Add

C out

C in

D C B A

COUNTER

INPUT

BCD
BIN

Reset

D C B A

COUNTER

INPUT

BCD
BIN

Clock

Reset

Ser.in

Clock

Mode

0 1 2 3 4 5 6 7

SHIFT REGISTER

INPUT

I Logic

I

I

I

I

I

I

A1 A2

B

Q Q

I

0

+5V

BENCH B-2

A>B A=B A<B
COMPARATOR
A1 B1 A2 B2 A3 B3 A4 B4

LOGIC I
LOGIC O

D C B A D C B A
B C D INPUT

0 1 2 3 4 5 6 7 8 9
BCD-DECIMAL DECODER
D C B A

LOGIC I
LOGIC O

≤1 ≤2 ≤3 ≤4
PARALLEL ADDER
A1 B1 A2 B2 A3 B3 A4 B4
Sub/Add
C out
C in

BCD BIN
D C B A
COUNTER
INPUT
Clock
Reset

BCD BIN
D C B A
COUNTER
INPUT
Clock
Reset

Ser in
0 1 2 3 4 5 6 7
SHIFT REGISTER
INPUT
Clock
Mode

I Logic
Logic O
Logic I
+5V

CLOCK
RANGE Hz
10 10^2 10^3 10^4 1 10^5
FINE
PULSERS

INDICATORS
INPUT
SWITCH REGISTER
OUTPUT
LOGIC
OUTPUT
LOGIC

DSE
DIGITAL SYSTEMS ENGINEERING P/L
DIGITAL SYSTEMS TRAINER
MODEL DSE 12

PM RECEIVER
MAIN SWITCH

CRYSTAL OSCILLATOR

+9V dc

10kΩ

4.7kΩ

MHz

0.1 μF

47 pf

OUTPUT

6.8kΩ

360pf

5.6kΩ

0.001 μF

270Ω

EXPERIMENT BOARD 3

INPUT

10μF +

10μF +

470kΩ

1kΩ

2.7kΩ

4.7kΩ

10μF

10μF

0.0 μF

3.9 Ω

3.9 Ω

IC AUDIO AMPLIFIER

+9 V dc

8,2Ω

OUTPUT

GND

+9 VDC

47kΩ

4.7kΩ

0.01 μF

10μF

0.1μF

215μH

0.1μF

0.01μF

10 kΩ

1 kΩ

100 Ω

4.7 kΩ

R.F. AMPLIFIER

0.1μF

4.7kΩ

1kΩ

330pf

390p

215 μH

4.7

10–40pf

CRYSTAL OSCILLATOR

10kΩ

4.7kΩ

MHz

0.1μF

C

B

E

47pf

OUTPUT

6.8kΩ

360pf

5.6kΩ

0.001μF

270Ω

EXPERIMENT BOARD 3

+9 V dc

10μF +

10μF +

1kΩ

470kΩ

2.7kΩ

4.7kΩ

10μF

INPUT

10μF

0.0 μF

3.9 Ω

3.9 Ω

T–5

8.2Ω

OUTPUT

GND

IC AUDIO AMPLIFIER

+9 VDC

47kΩ

4.7kΩ

10μF

0.01μF

0.1μF

215μH

0.1μF

C

B

E

0.01μF

10 kΩ

1 kΩ

100 Ω

4.7 kΩ

390p

215 μH

4.7

1kΩ

330pf

4.7kΩ

10–40pf

R.F. AMPLIFIER

EXPERIMENT BOARD 3

EXPERIMENT BOARD 2

OUT

AUDIO PUSH-PULL OUTPUT STAGE

T — 5

AUDIO DRIVE STAGE

T — 4

AUDIO PRE-AMPL

DET & AVC STAGE

2nd IF AMPL STAGE

1st IF AMPL STAGE

LOCAL OSC & CONV

RF TUNING STAGE

TP1

TP2

TP3

J1

J2

J3

AVC

EXPERIMENT BOARD 2

FM TRANSMITTER

AUDIO IN

EXPERIMENT BOARD #8

100K

10K

+5 VDC

.1µF

76KHz OUT

76KHz IN

+5V

19KHz OUT

19KHz IN

TP1

56K

R BAL

5K

12K

4.7K

CR1

CR2

.1µF

R(−R)

TP3

TP2

+5V

47K

1K

.1 µF

100Ω

1.8K

10µF

+12 VDC

10K

R

L1

3µF

38KHz PHASE

1K

100Ω

L

TP4

15K

4.7K

CR3

CR4

3.3K

120K

COMPOSITE OUT

STEREO GENERATOR

IF AMPLIFIER

RATIO DETECTOR

+12 VDC

100

50 µF

.1 µF

47 K

T1

T2

IF DET.

390 Ω

10K

15K

.002 µF

47K

DET. OUT

3.3 K

.01 µF

1K

10.7 MHz IN

47Ω

.1 µF

DEMOD. OUTPUT

DET. INPUT

100Ω

L2

L3

L4

L5

CR1

CR2

1.2K

330 pF

5.6K

10 µF

3.3K

.005 µF

5.6 K

AUDIO OUTPUT

Lab-Volt®

FIBER OPTICS COMMUNICATION TRAINER

-8V

GND

+8V

FO RECEIVER/PHOTODETECTOR

OFF ON

S2

J26

J27

J28

GND

CAL ADJ

OFFSET ADJ

DEMULTIPLEXER

J29

J31

J30A

J30B

J32

J33

GND

RECEIVER INTERFACE

J36

J38

J40

J42

J44

J37

J39

J41

J43

J45

J46

J47

TRANSMITTER INTERFACE

J1

J3

J5

J7

J9

J2

J4

J6

J8

J10

MALAYSIA 8835EN SN74HC04N

MC74HC7266 N M8745A

DC LEVEL ADJ

DUTY CYCLE ADJ

MULTIPLEXER

J11A

J11B

J11C

J11D

J13

J14

J12

J15

J16

FREQ ADJ

J17

J18

J19

GND

FO TRANSMITTER

OFF ON

S1

J20

J21

+5V

GND

FORWARD CURRENT ADJ

FINE

COARSE

J22

J23

J24

J25

TUNER

1ST IF STAGE

FILTER

2ND IF STAGE AND DET

STEREO DECODER

J1

J2

J3

TP1

TP2

TP3

TP4

TP5

TP6

TP7

TP8

TP9

TP10

+V

AGC

OFF

MUTE

ON

MUTE ADJ

19KHz ADJ

STEREO

MONO

19KHz

COM

L

R

AUDIO

BALANCE

B

C

E

1

2

NTE738
863E

CA3075E
RCA Z 628

CA3086
RCA H 836

UA758PC
F 7725
KOREA

WMF05P22
.22 MFD
WMF05P22

LM1877N
MB40A

100μF 35 V

16v220μF

LAB. PRAC.

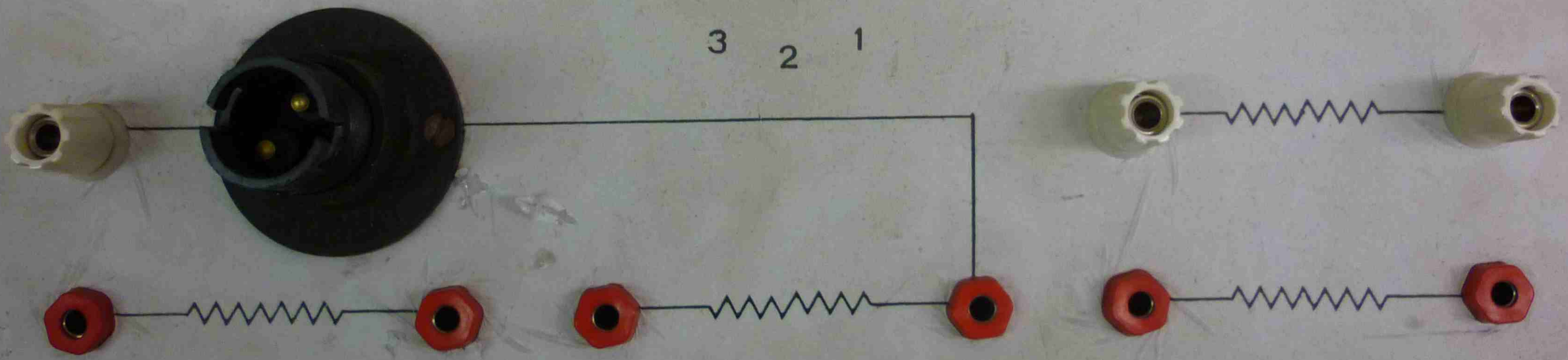
FAULT FINDING

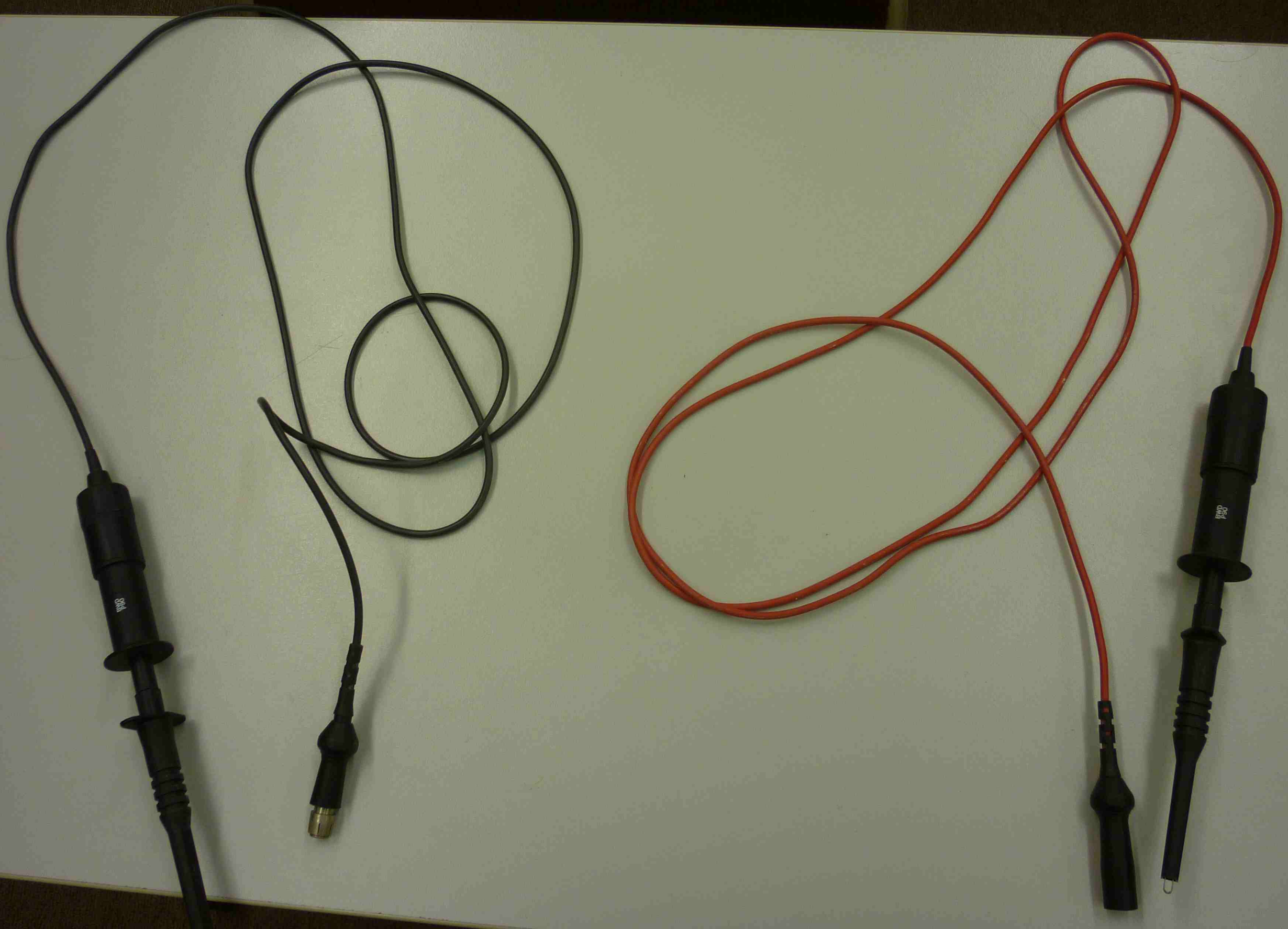
24 V.

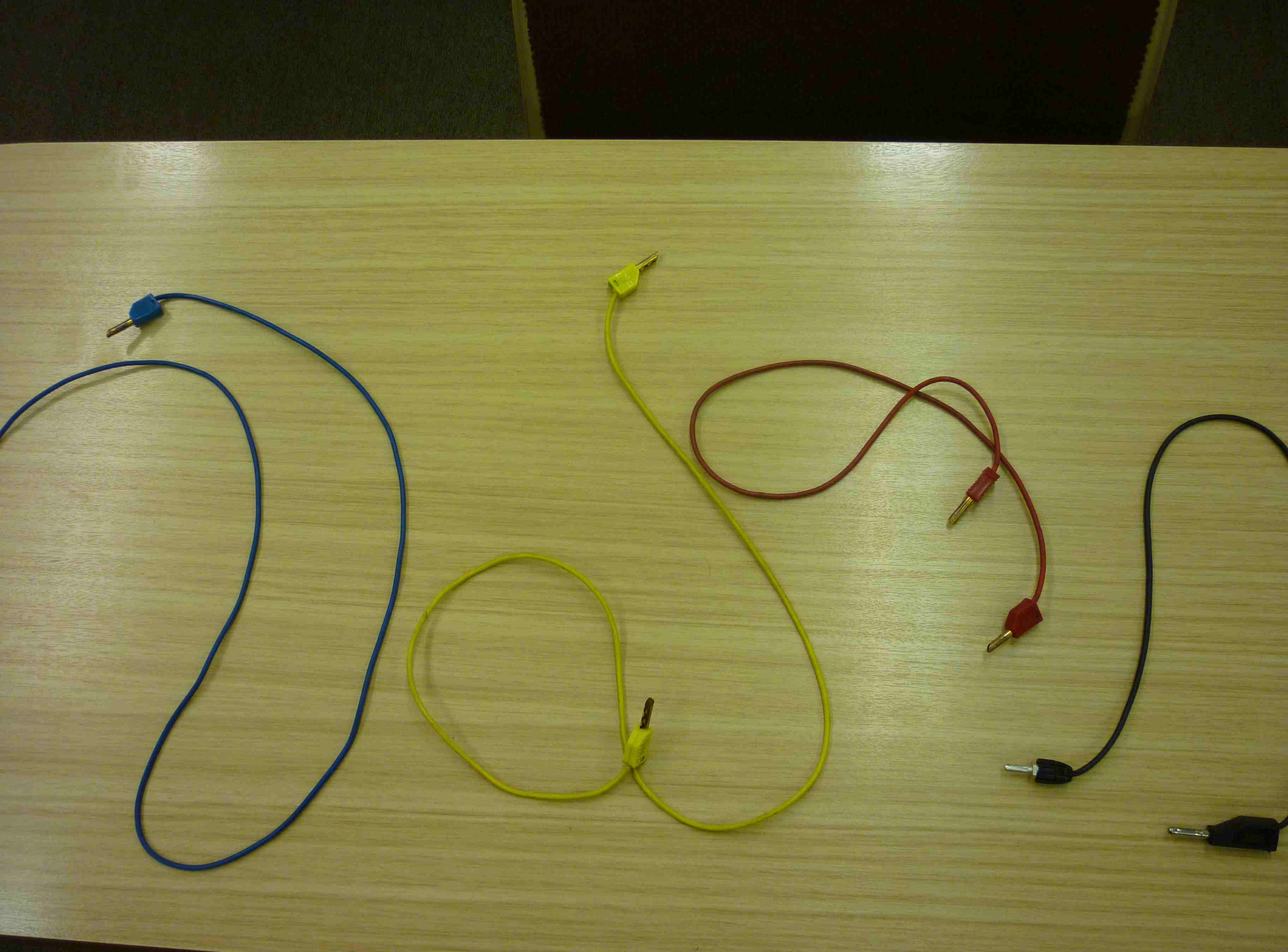
⊖

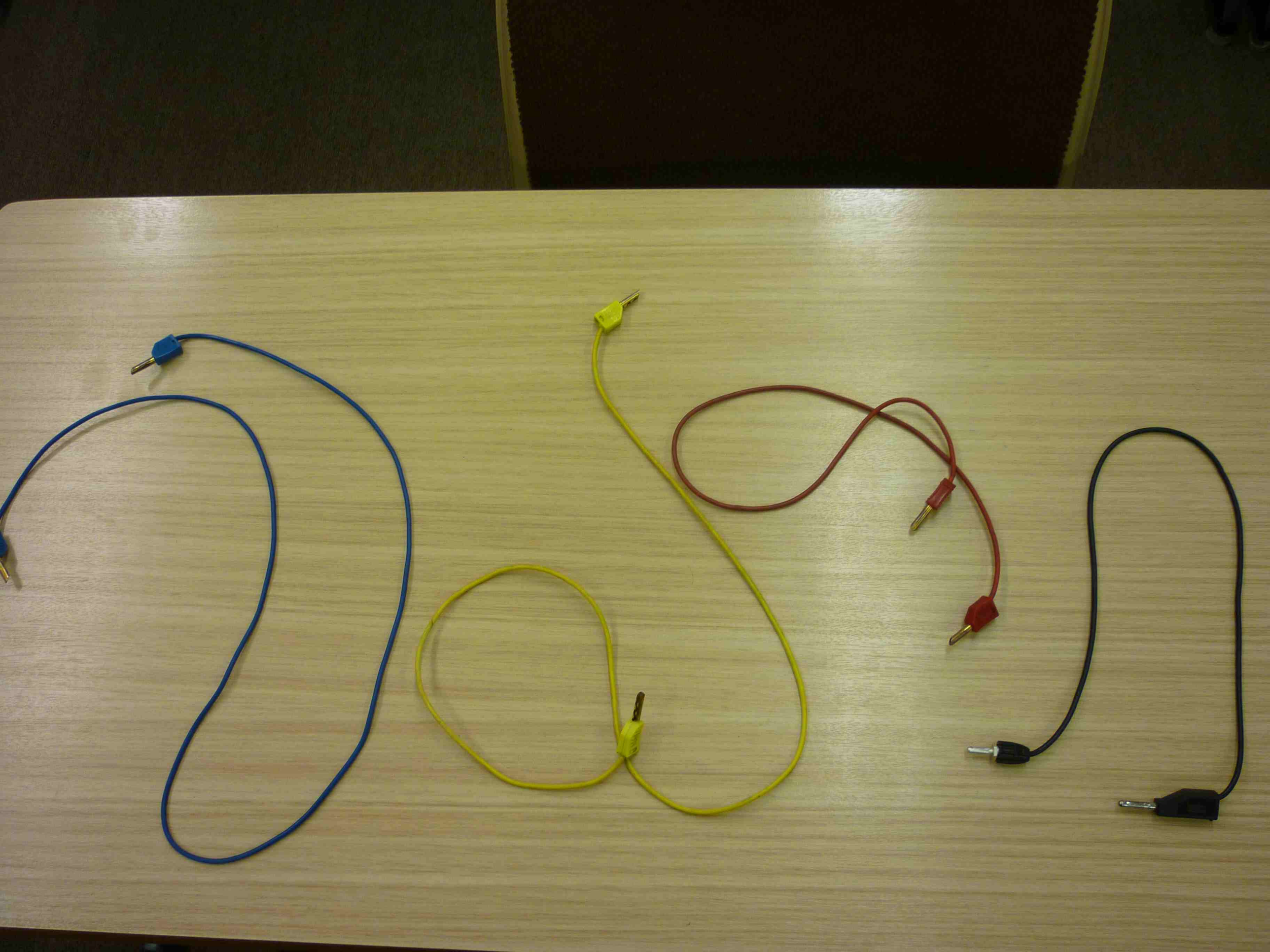
⊕

3 2 1









Ammeter

Supply

Meter Element

S

Close

R2

R1

R3

Max R

Min R

Min R

Max R


M
L
L
M

Type: Stw 2	class: 0,2	output:
operating voltage: 650 Volts	f = 50 c.p.s.	burden: 0,4 Ohm

		pass primary through core opening:		
	adjustable to:	2 turns	1 turn	1 turn
primary:	5/10/20/50/100 Amps	200 Amps	400 Amps	800 Amps
	M – L	M – L	M – L	M – L
secondary:	5 Amps	5 Amps	5 Amps	5 Amps
	M – L	M – L	M – L	M – L, v connected to L

voltage terminal "v" is connected to "M"	switch adjustment: optional / fixed at 5 Amps

P. GOSSEN & CO. G.m.b.H. — Erlangen / Bavaria / Germany

Type: Stw 2	class: 0,2	output: 10 VA
operating voltage: 650 Volts	f = 50 c.p.s.	burden: 0,4 Ohms

		pass primary through core opening:		
	adjustable to: 5/10/20/50/100 Amps M – L	2 turns 200 Amps M–L	1 turn 400 Amps M–L	1 turn 800 Amps M–L
primary:				
secondary:	5 Amps M–L	5 Amps M–L	5 Amps M–L	5 Amps M – L, v connected to L

voltage terminal "v" is connected to "M"	switch adjustment: optional / fixed at 5 Amps

P. GOSSEN & CO. G. m. b. H. — Erlangen / Bavaria / Germany

Type: Stw 2				output: 10 VA
operating voltage: 650 Volts				burden: 0,4 Ohms
primary:	adjustable to: 5/10/20/50/100 Amps M — L	2 turns 200 Amps M–L	1 turn 400 Amps M–L	1 turn 800 Amps M–L
secondary:	5 Amps M–L	5 Amps M–L	5 Amps M–L	5 Amps M — L, v connected to L
voltage terminal "v" is connected to "M"		switch adjustment: optional		fixed at 5 Amps

P. GOSSEN & CO. G. m. b. H. — Erlangen / Bavaria / Germany

Type: Stw 2	class: 0,2	output: 10 VA
operating voltage: 650 Volts	f = 50 c.p.s.	burden: 0,4 Ohms

	adjustable to:	pass primary through core opening: 2 turns 200 Amps	1 turn 400 Amps	1 turn 800 Amps
primary:	5/10/20/50/100 Amps M — L	M — L	M — L	M — L
secondary:	5 Amps M — L	5 Amps M — L	5 Amps M — L	5 Amps M — L, v connected to L

voltage terminal "v" is connected to "M"	switch adjustment: optional / fixed at 5 Amps

P. GOSSEN & CO. G.m.b.H. — Erlangen / Bavaria / Germany


M
V
L
L
M
20
50


V
M
L
L
M


V
L
M
L

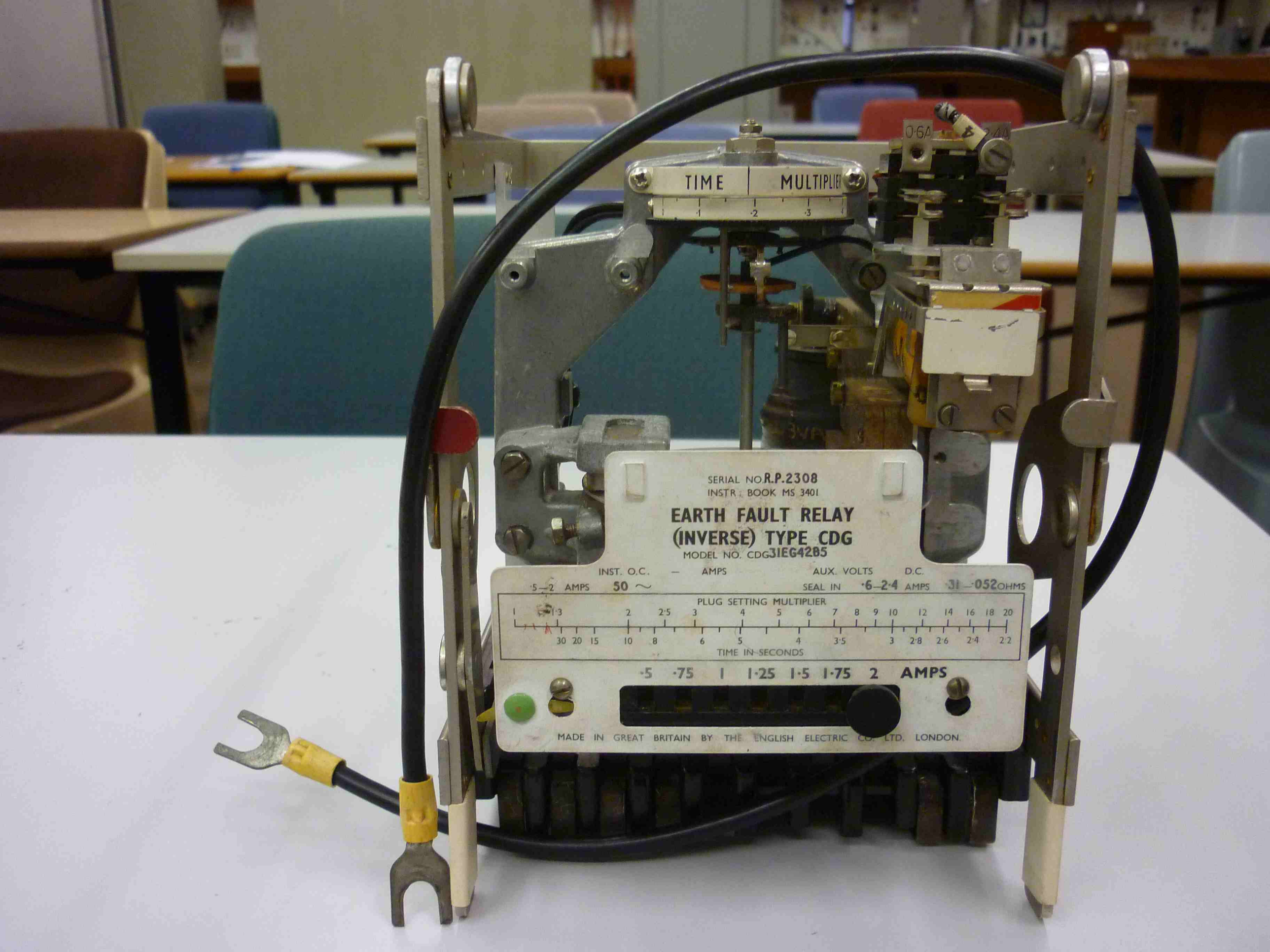

M
L
L
M

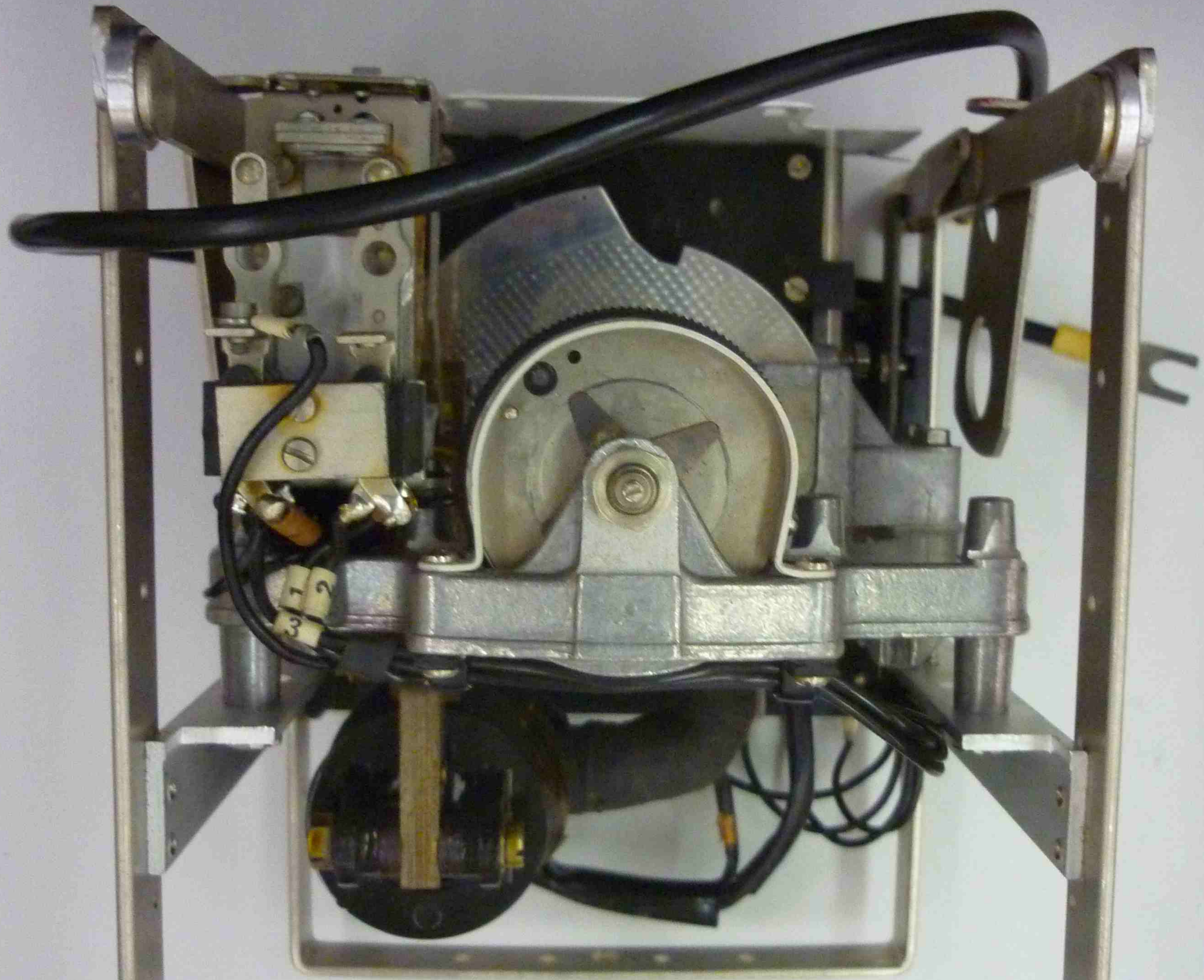
Type: Stw 2	class: 0,2	output: 10
operating voltage: 650 Volts	f = 50 c.p.s.	burden: 0.4 Ohms

	adjustable to: 5/10/20/50/100 Amps	pass primary through core opening: 2 turns 200 Amps	1 turn 400 Amps	1 turn 800 Amps
primary:	M – L	M – L	M – L	M – L
secondary:	5 Amps M – L	5 Amps M – L	5 Amps M – L	5 Amps M – L v connected to L

voltage terminal "v" is connected to "M"	switch adjustment: optional	fixed at 5 Amps

P. GOSSEN & CO. G.m.b.H. — Erlangen / Bavaria / Germany


TIME
MULTIPLIER
SERIAL NO. R.P.2308
INSTR. BOOK MS 3401
EARTH FAULT RELAY
(INVERSE) TYPE CDG
MODEL NO. CDG31EG4285
INST. O.C. — AMPS
AUX. VOLTS D.C.
·5—2 AMPS 50 ~
SEAL IN ·6—2·4 AMPS 31—052 OHMS
PLUG SETTING MULTIPLIER
1 1·3 2 2·5 3 4 5 6 7 8 9 10 12 14 16 18 20
30 20 15 10 8 6 5 4 3·5 3 2·8 2·6 2·4 2·2
TIME IN SECONDS
·5 ·75 1 1·25 1·5 1·75 2 AMPS
MADE IN GREAT BRITAIN BY THE ENGLISH ELECTRIC CO. LTD. LONDON.


1
2
3


TIME
MULTIPLI
1
2
3

INST. D.C. — AMPS AUX. VOLTS D.C.

·5–2 AMPS 50 ~ SEAL IN ·6–2·4 AMPS ·31–·052 OHMS

PLUG SETTING MULTIPLIER

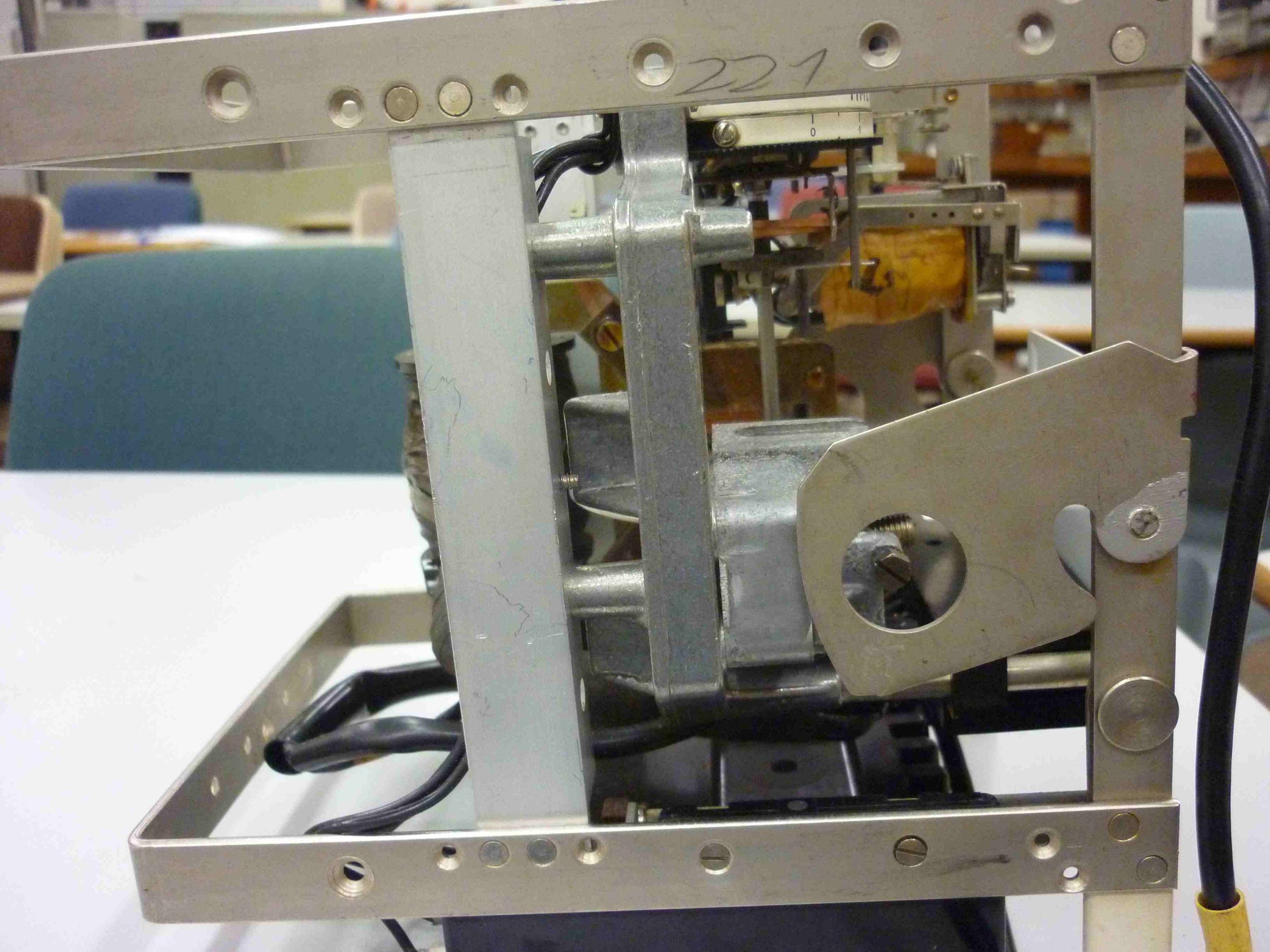
1 1·3 2 2·5 3 4 5 6 7 8 9 10 12 14 16 18 20

30 20 15 10 8 6 5 4 3·5 3 2·8 2·6 2·4 2·2

TIME IN SECONDS

·5 ·75 1 1·25 1·5 1·75 2 AMPS

MADE IN GREAT BRITAIN BY THE ENGLISH ELECTRIC CO. LTD. LONDON.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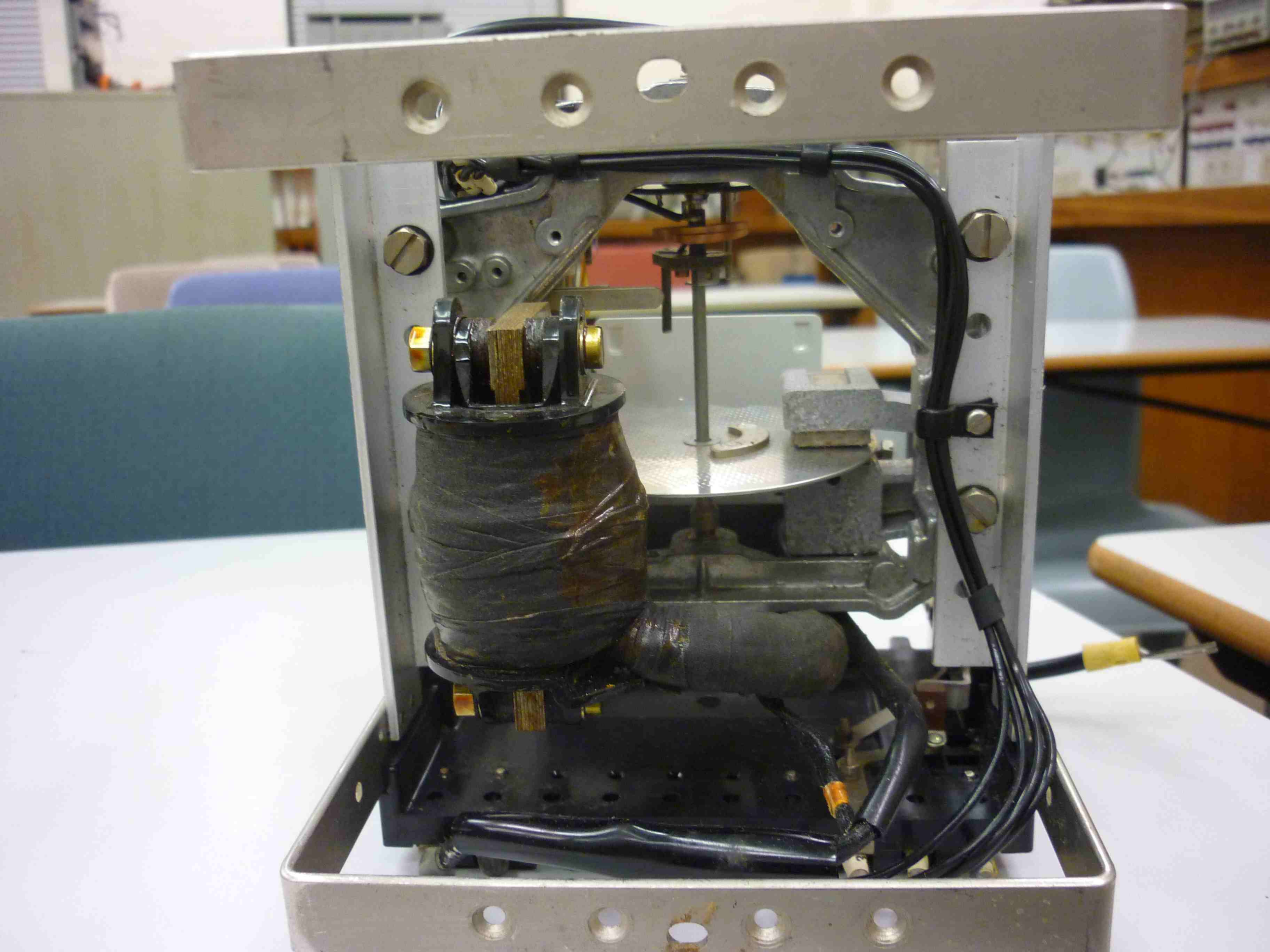
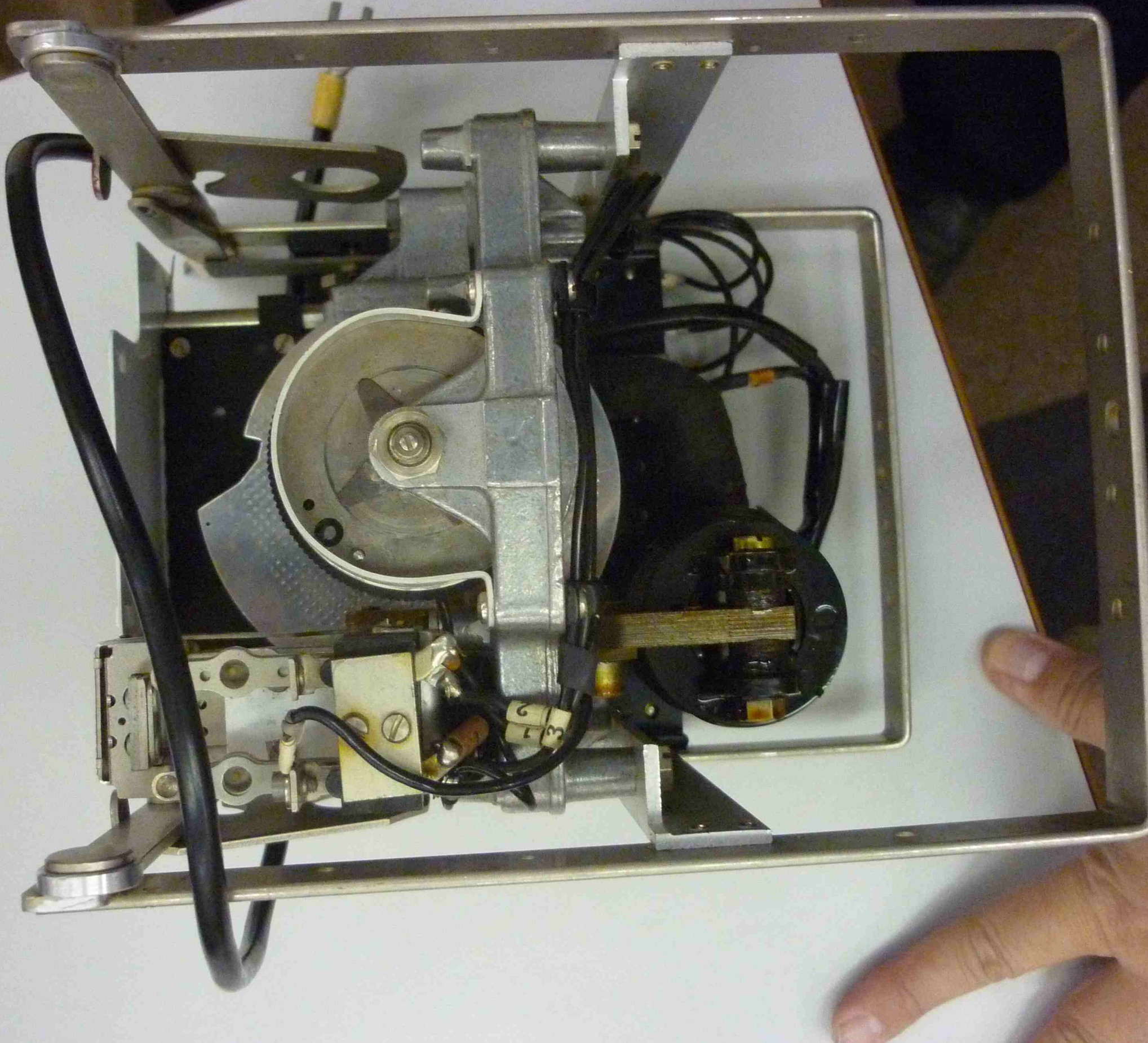
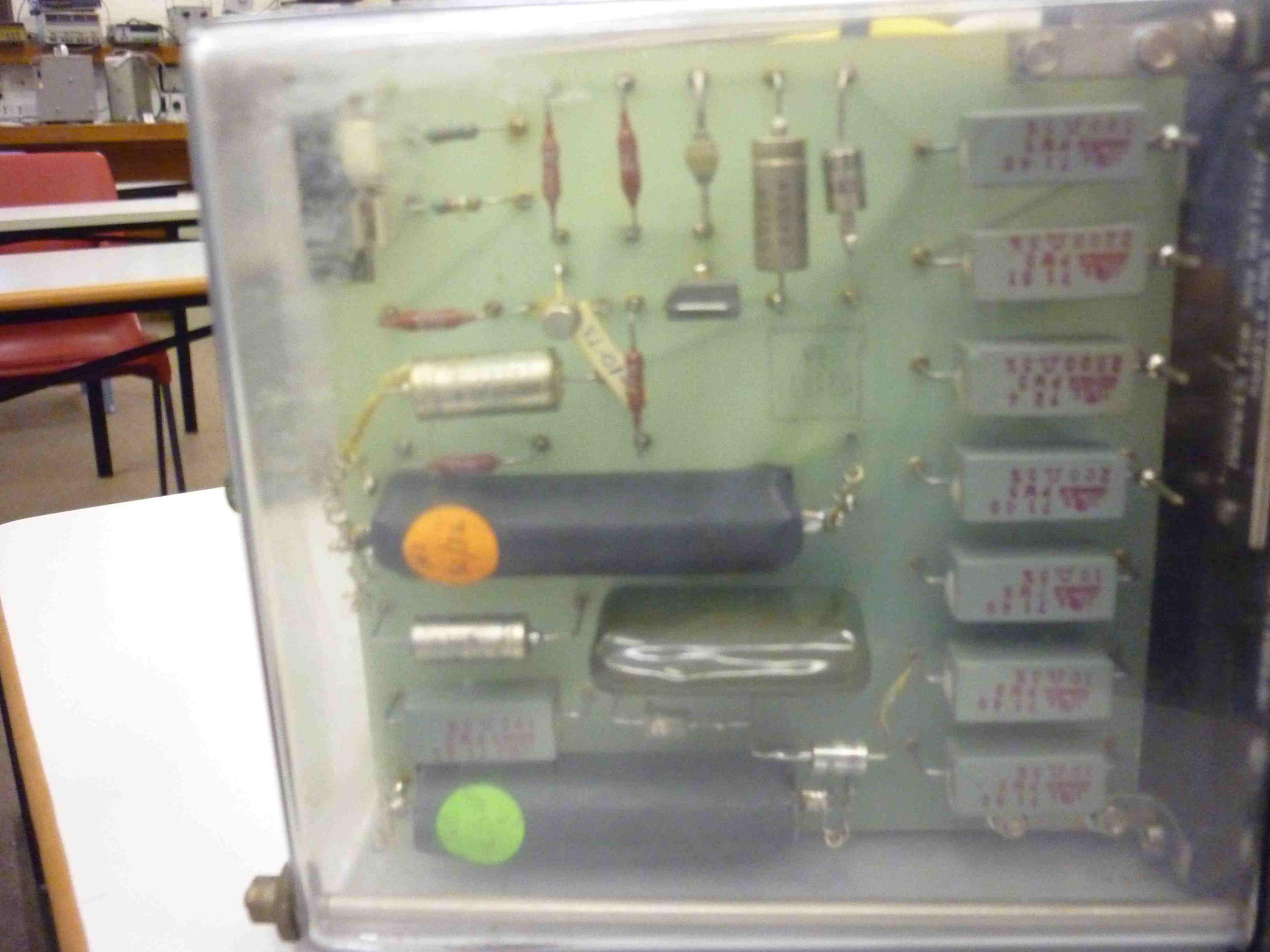
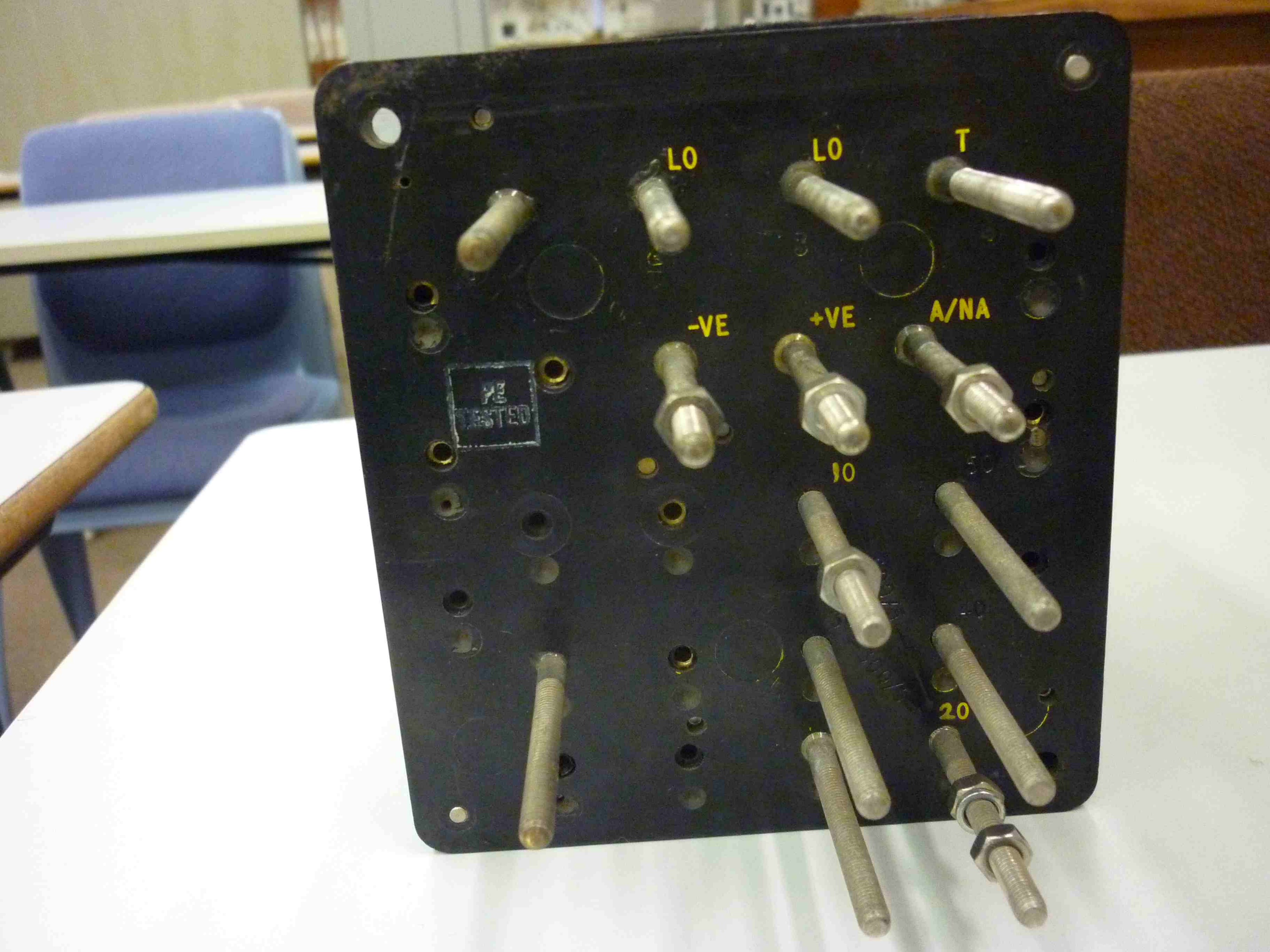




SP1129 SEL 8087



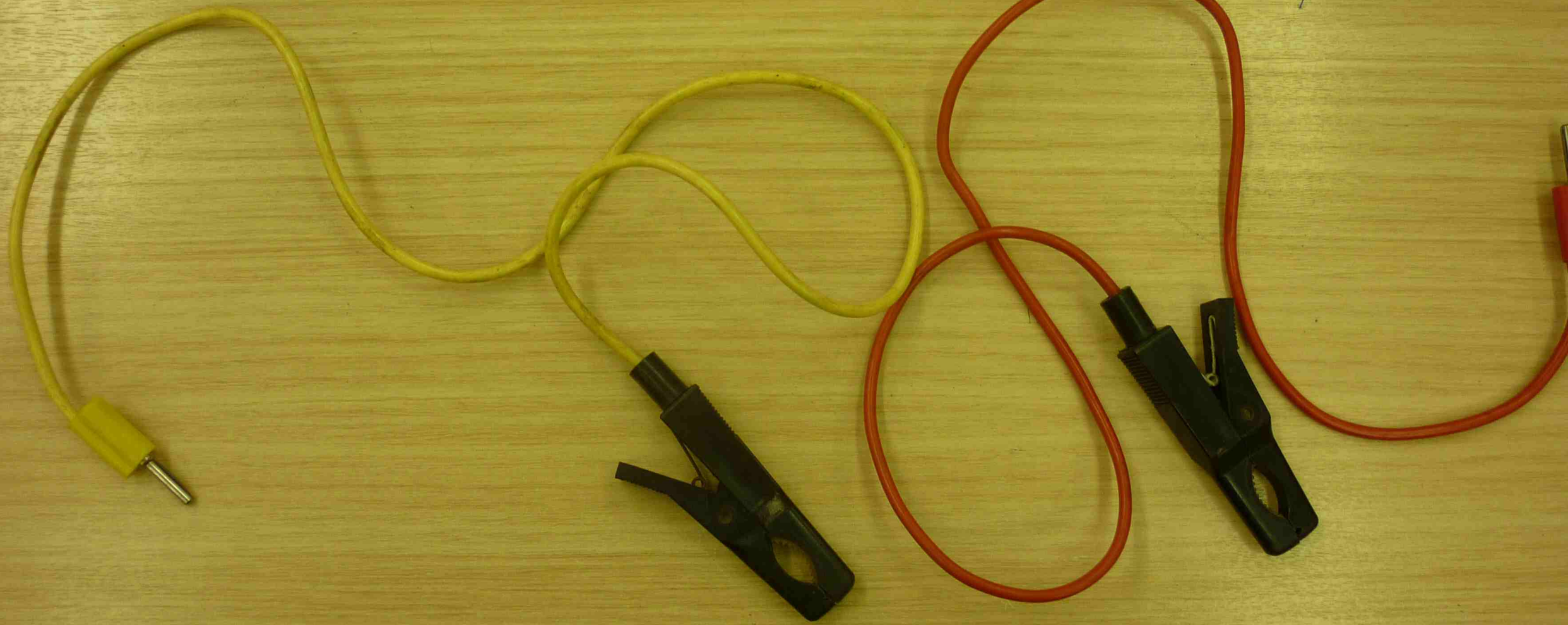

LO
LO
T
-VE
+VE
A/NA
10
20


54 TURNS 19 SWG

SENSITIVE
EARTH LEAKAGE

TRIP

RELAY
TIMING




EMERGENCY PROCEDURES
PLEASE
Turn lights off an
doors when leavi
TAFE
Chubb

3Ø 415V
MAINS
ISOLATION Switch

3Ø LOW VOLTAGE
41/24V
ISOLATION Switch

LOCAL
MAIN
SWITCH

40A
40A
40A
16A
16A
16A
16A
16A
16A

1
2
3
4
5
6
7
8
9
10
11

12
13
14
15
16
17
18
19
20
21
22
23
24
25
26

20A
20A
20A
20A
20A
20A
20A
20A
20A
20A
20A
20A
20A

and lock
aving! THANK YOU

H.T. STANDBY
& TRIP
RESET

ON

H.T.

INDICATOR

50V D.C.

OFF

ON

110V.A.C.
50~

240V.A.C.
REGULATED SUPPLY

D.C. LOW VOLTAGE

0-50V

COMM

+

3 PHASE 41-5/24V SUPPLY

A

B

C

N

E

3ΦVARIAC 0–415

A

N

B

E

50 100 150 200 250

0 AC V 300

IND

TYPE S.S.C.S
No 20742

1ΦVARIAC

A

E

240

N

SPEECH CIRCUIT

240V.MAIN SWITCH

240V.MAIN SWITCH

240V.G.P.O.

240V.G.P.O.

A1

A8

240V
PRIMARY WINDING

B1

a1 a2 a3 a4

b1

SECONDARY WINDING

A1 A2 A3 A4

B1

LEFT LIMB

RIGHT LIMB

LIMB

H.T. STA BY
& TR
RESE
H.T.
ON INDI TOR
0V D.C.
OFF
ON
110V.A.C
50~
240V.A.C.
REGULATED SUPPLY
D.C.LOW VOLTAGE
0-50
COM.
+
ISOLATING
SWITCH
On
Off
8A
Quicklag
PHASE 41-5/24V SUPPLY
A
N
E