Strowger selector operation diagrams – contents

Ordinary final selector – idle state

CD2

P wire

A1

B4

N3

B2

MR2

METER PULSE
CONNECTION
HERE

R2
200

B   1300

CD1

CD | 5 | 700 |

B1

R3
1k2

N2

NR2

E5

F6

A | 200 | 200 |

TO F, H AND
J RELAYS

E | 1500 |

ROTARY
RELEASE
CONNECTION

H5

E3

RM

VM

NR1

CD4

E1//D1

2

Final selector – moment of seizure – A operates and removes short-circuit of B

CURRENT FLOW IN RED
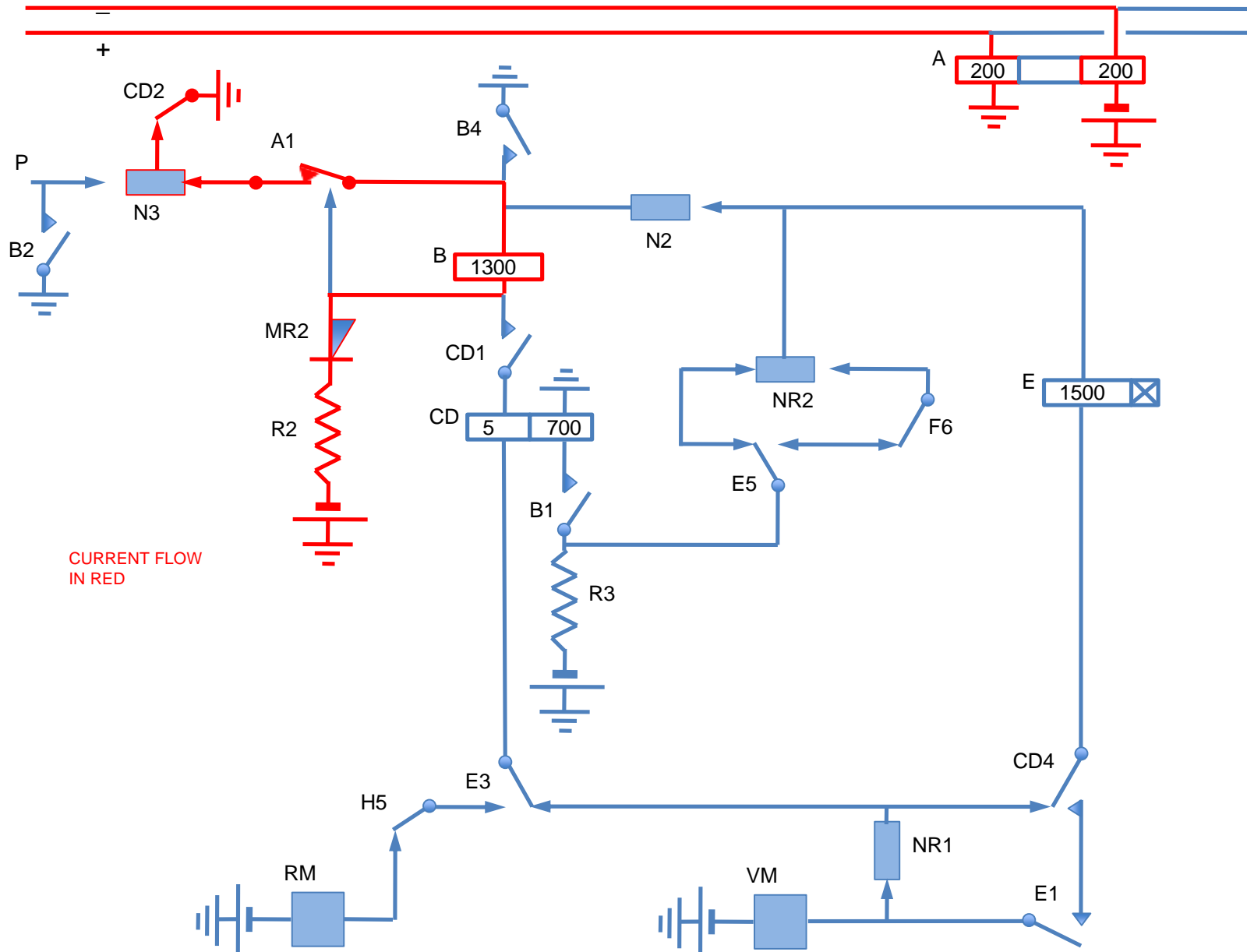
Final selector – just after seizure – A, B and CD operate
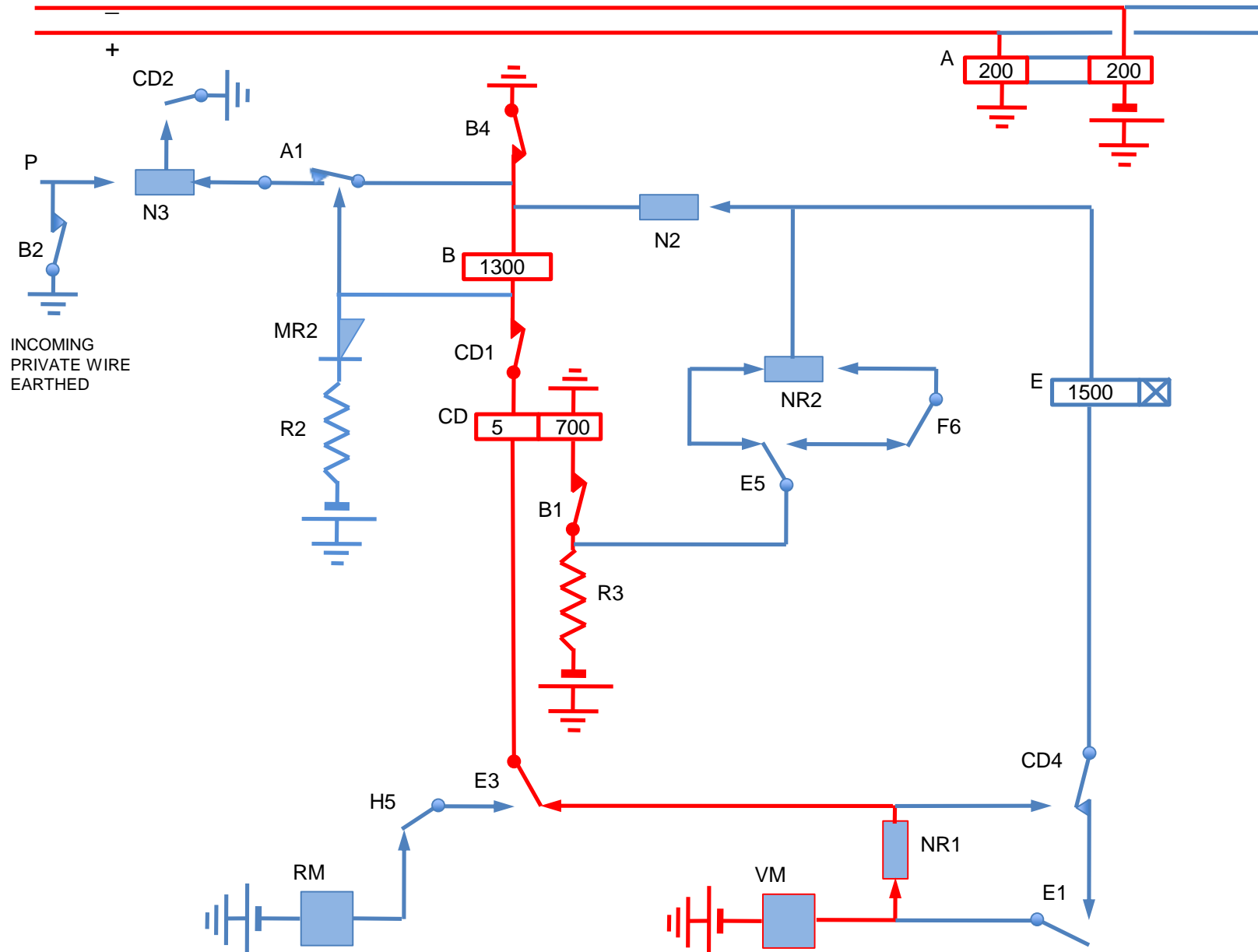
Final selector – vertical stepping – A and VM are pulsing, B and CD are holding on short circuits
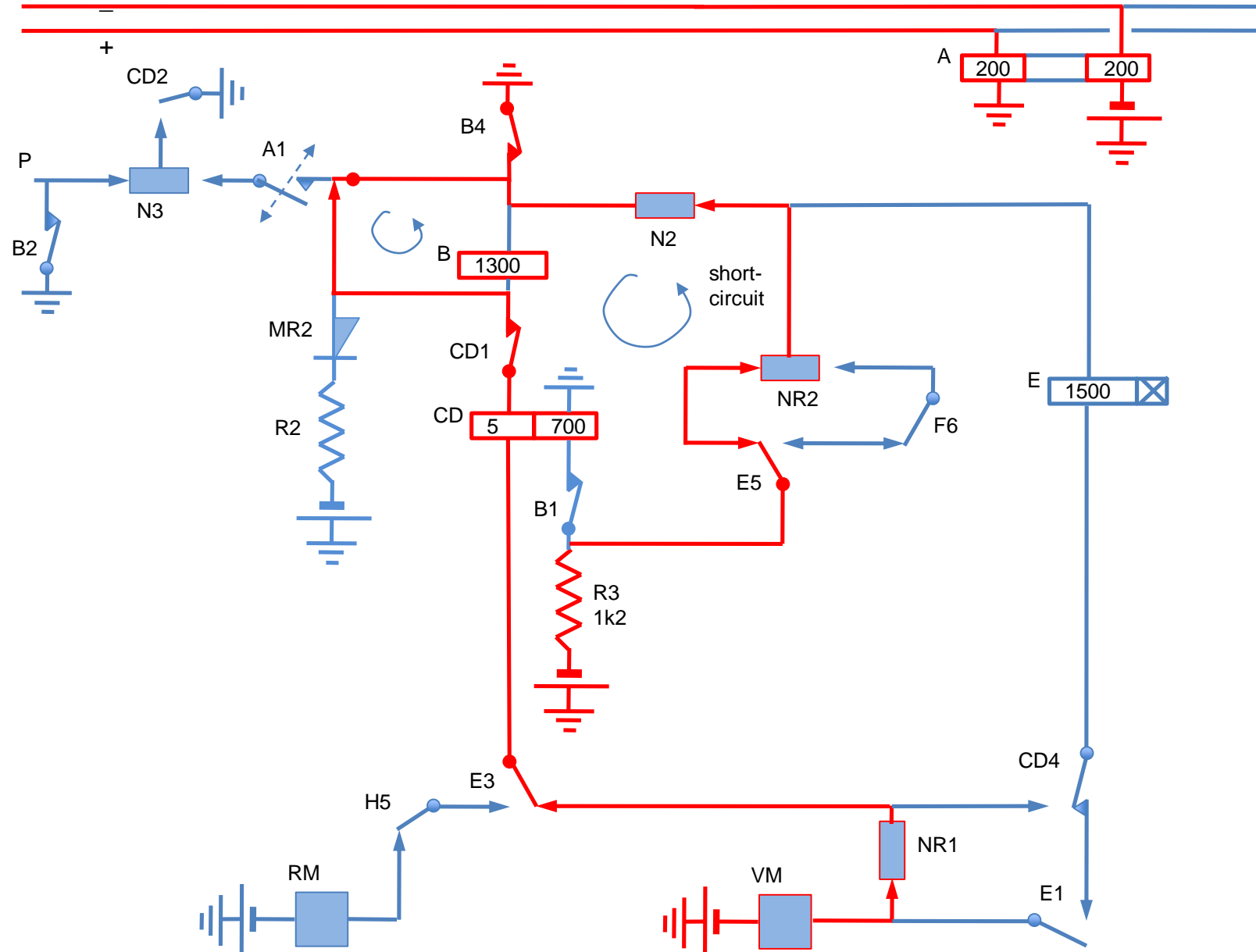
Final selector – end of vertical stepping – A and B operate, CD releases, E slow to operate
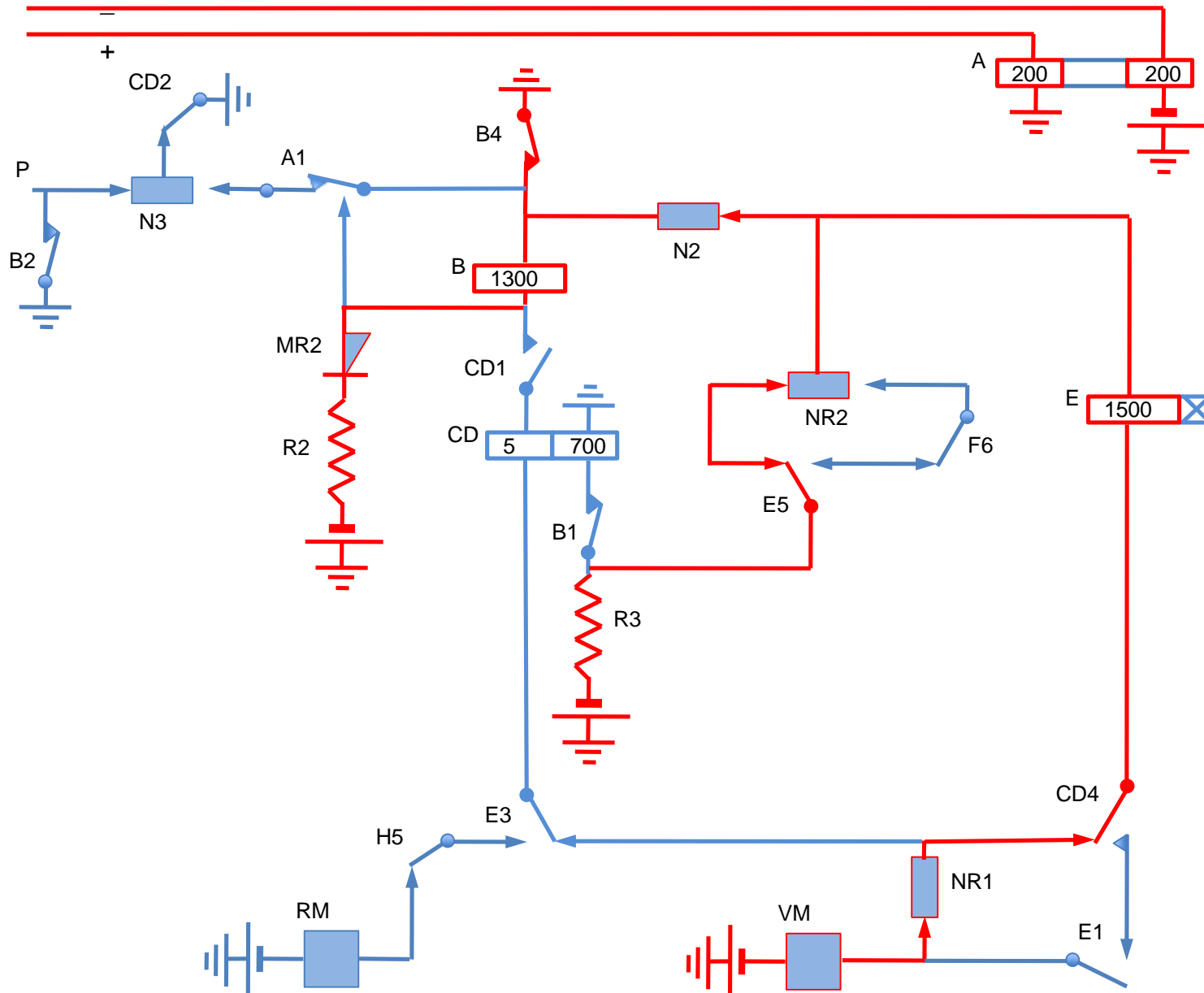
Final selector – switch over to rotary – A, B and E operate, CD re-operates

short-circuit on
CD removed
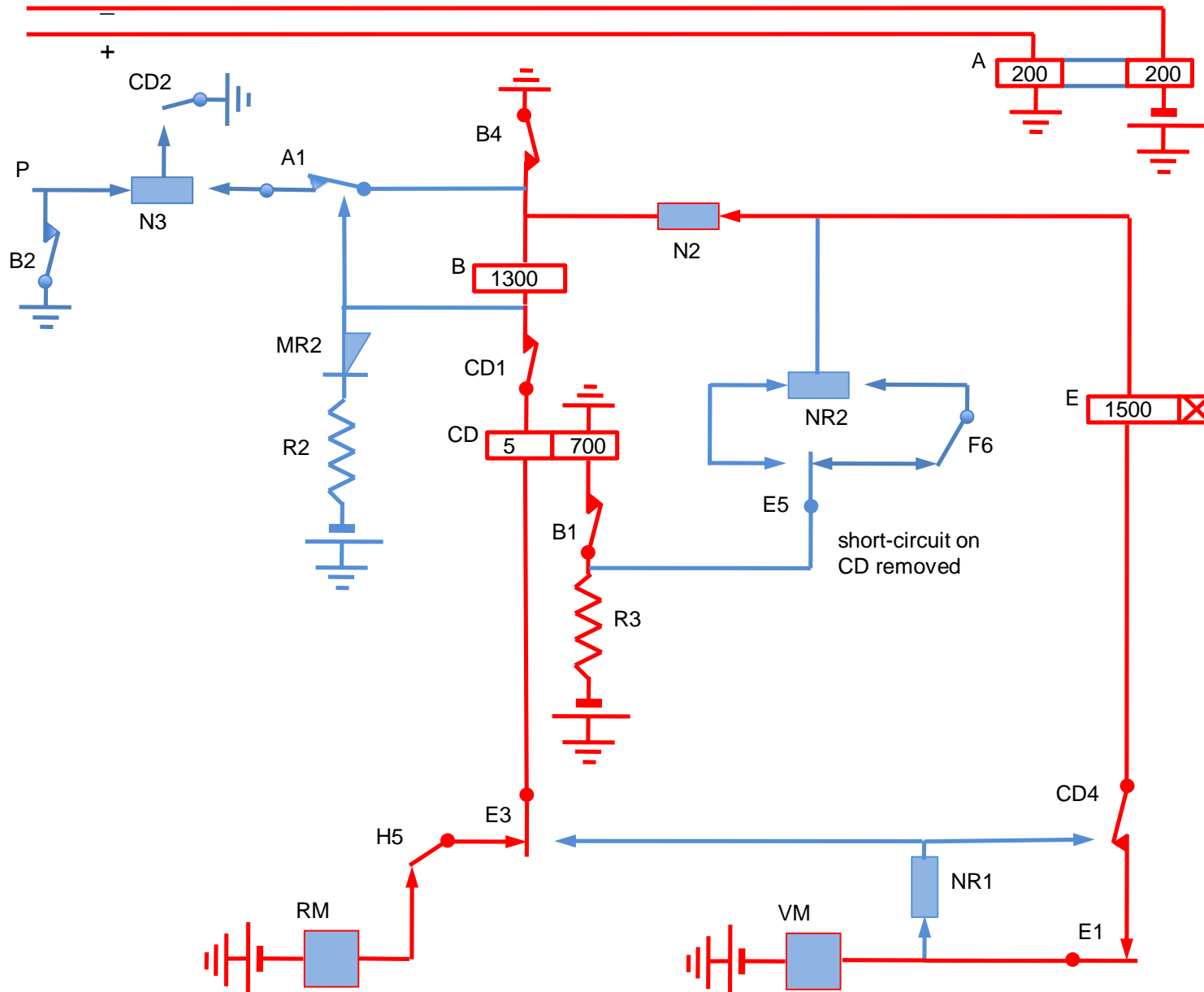
Final selector – rotary stepping – A and RM pulsing, B and CD holding, E operates
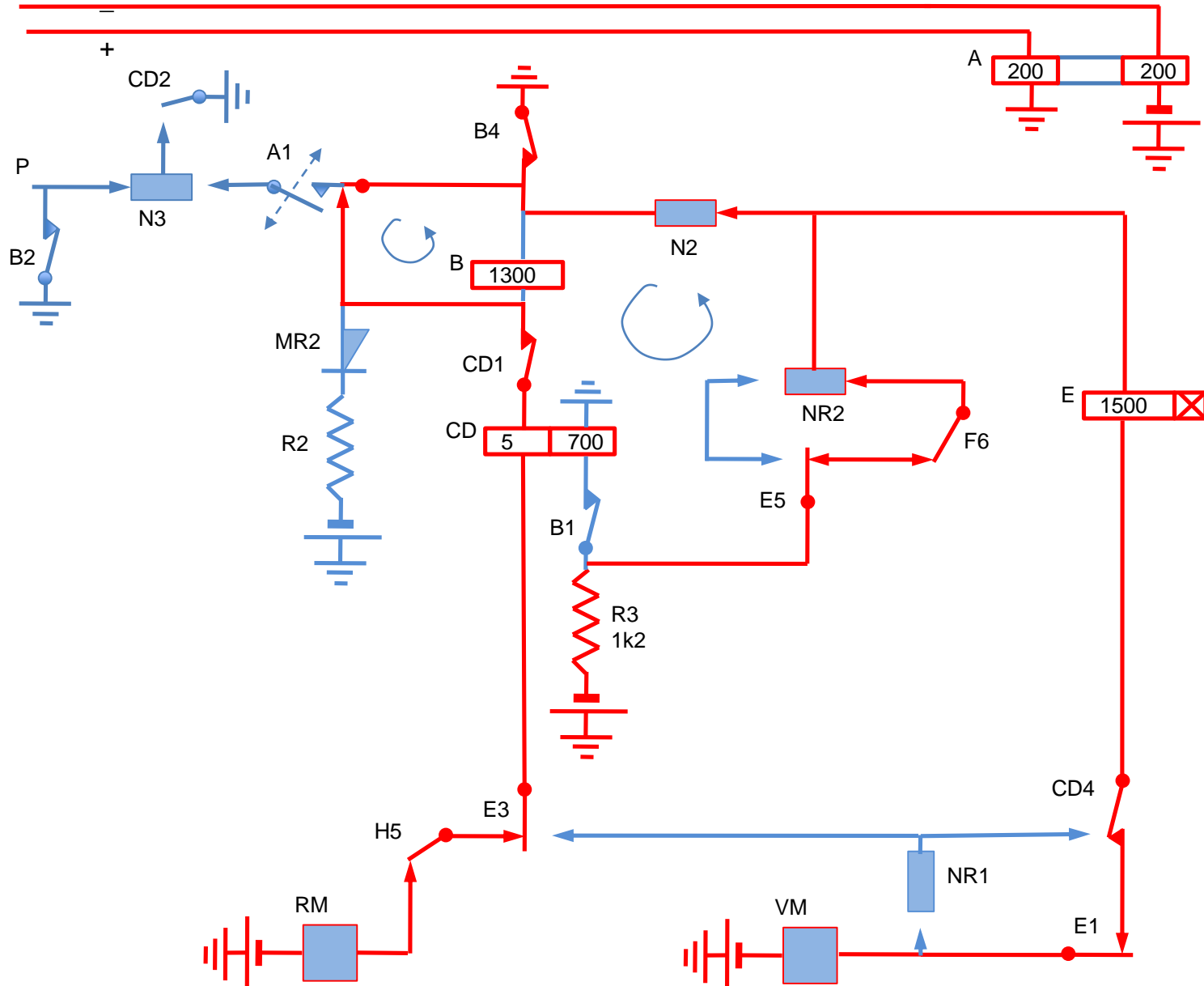
Final selector – end of rotary steps – A and B operate, CD and E release slowly, CD re-operates
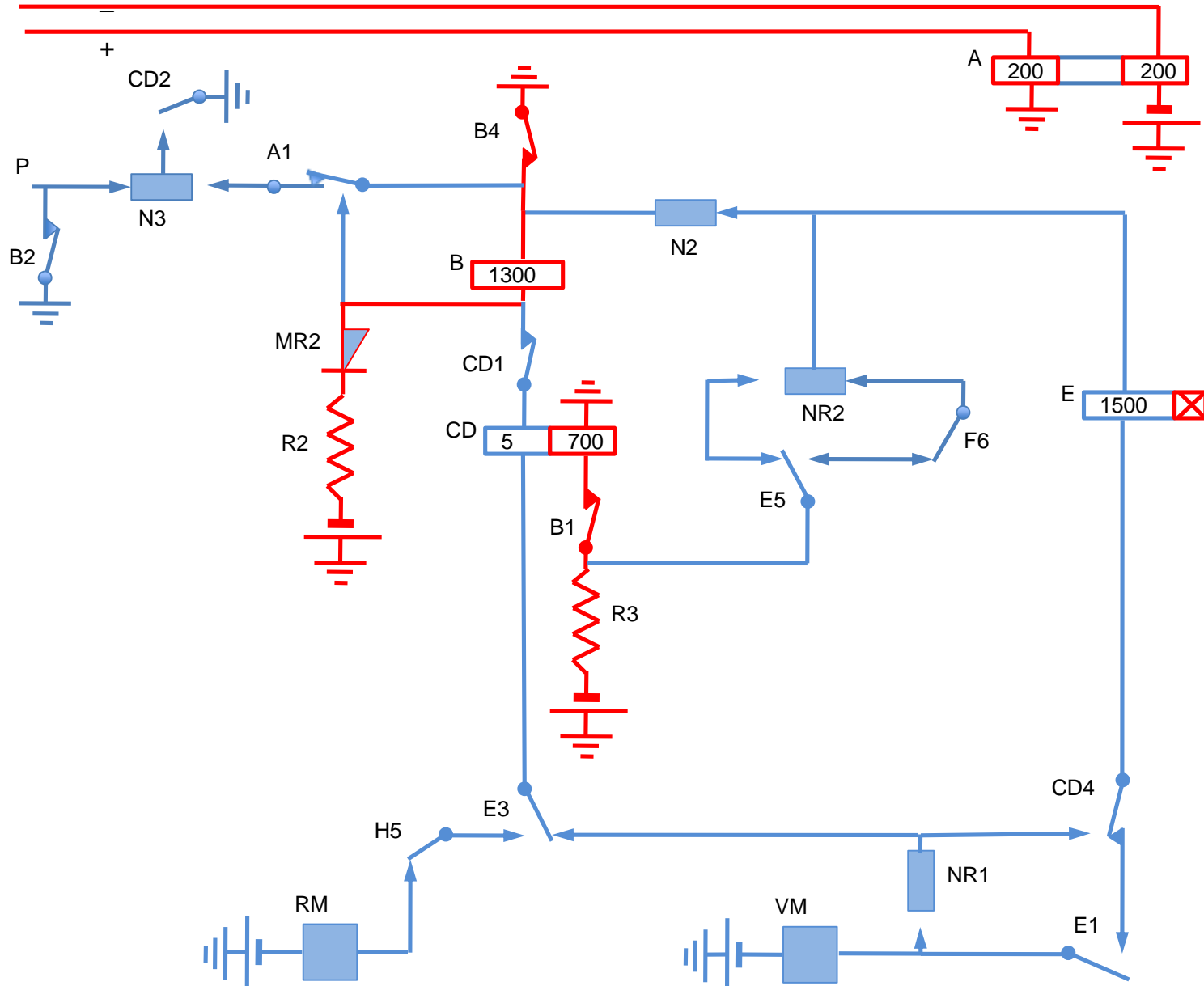
Subscriber's uniselector with DOUBLE homing arc – idle state
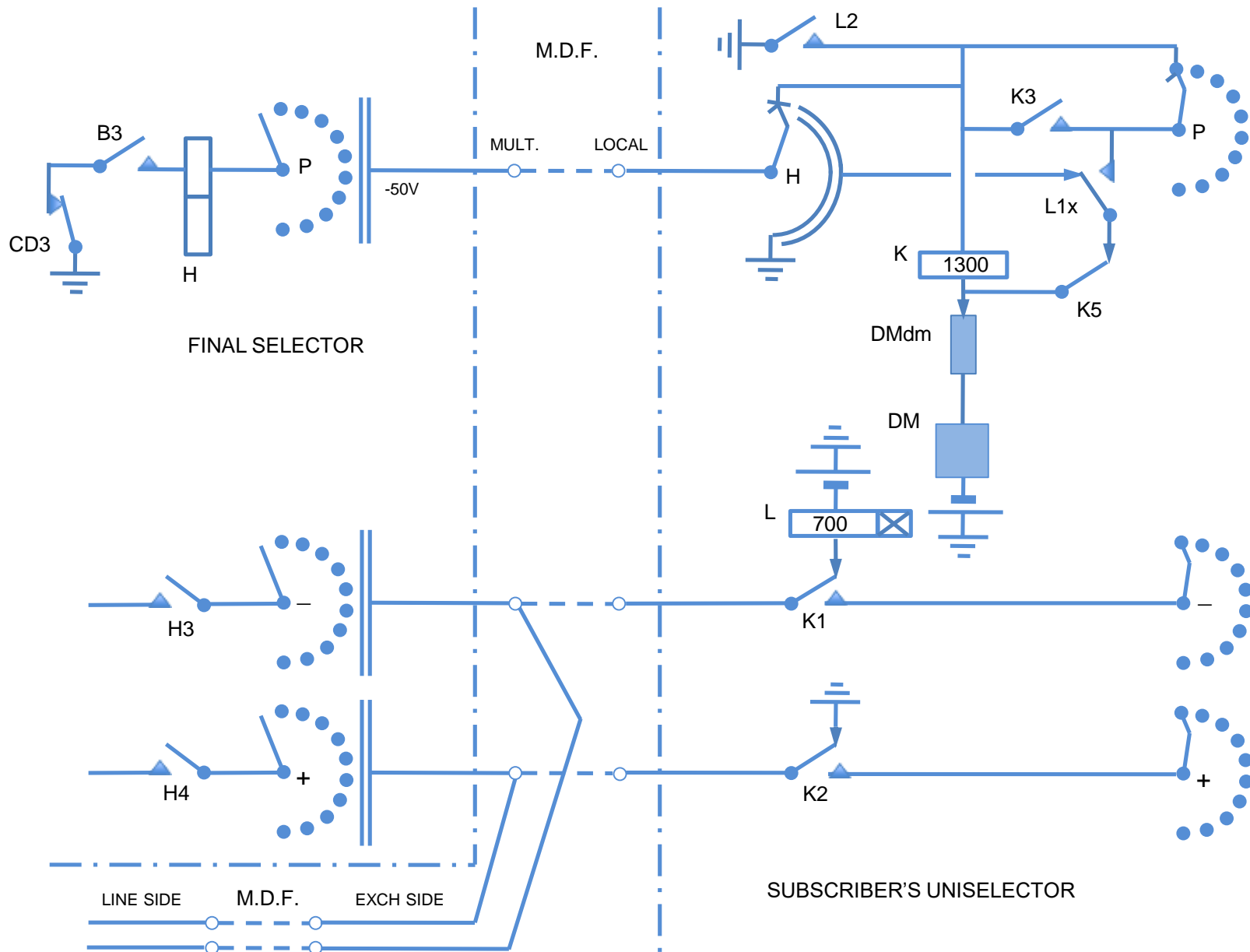
Final selector – called line is free – CD releases, H (900 Ohm) and K operate, L is disconnected

FINAL SELECTOR
(after last digit dialled)

Ringing current in green

PREPARED FOR RINGING

M.D.F.

MULT.   LOCAL

B3

900

H

P

CD3

L2

K3

P

H

L1x

K

1300

K5

DMdm

DM

L

700

H3

−

K1

−

H4

+

K2

+

LINE SIDE   M.D.F.   EXCH SIDE

CALLED
PHONE

CALLED SUBSCRIBER'S UNISELECTOR
IF NOT ENGAGED

11
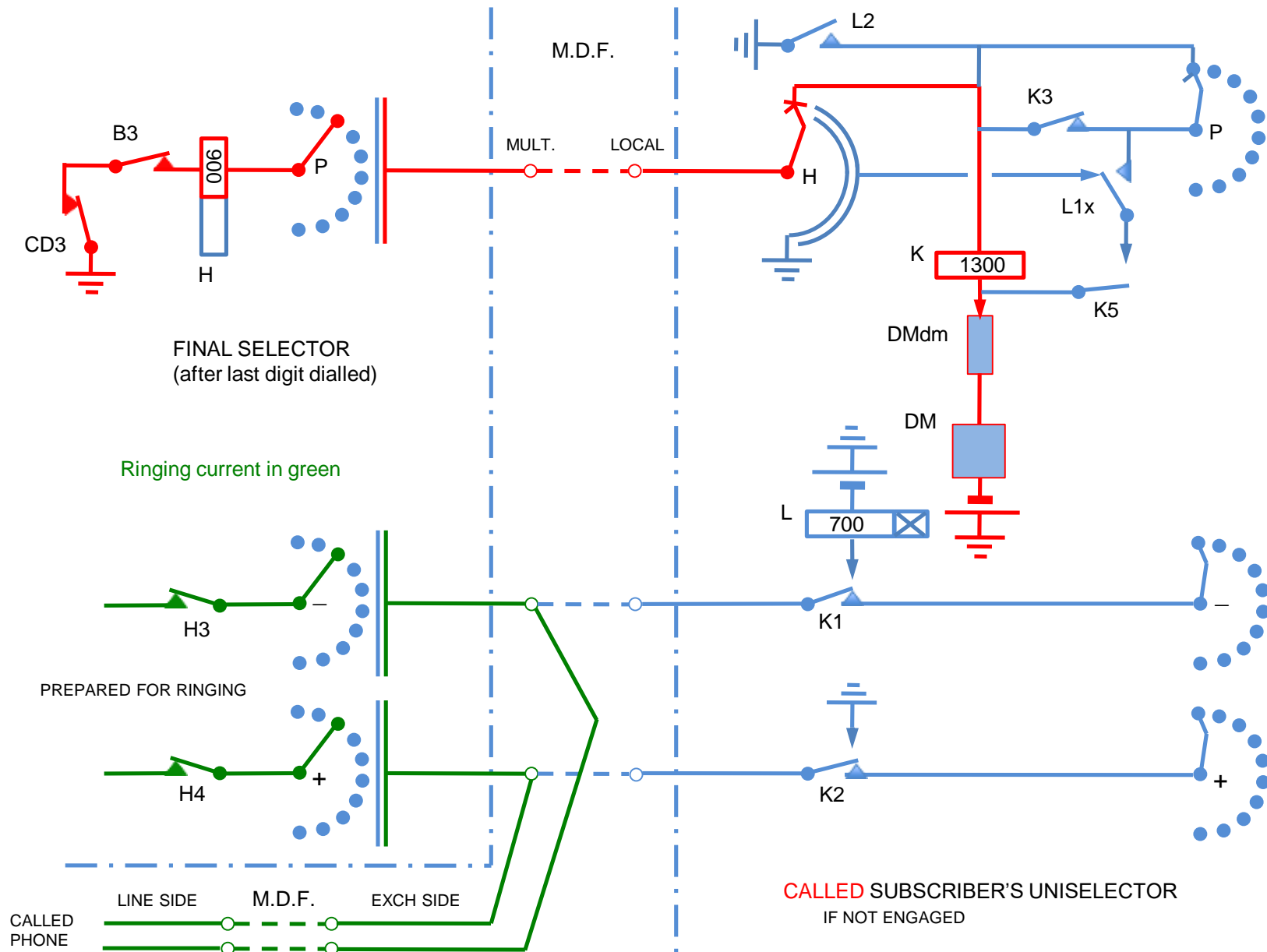
Final selector – ringing a free line – E releases slowly, CD, J and H (on 400 Ohm winding) operate

F7

H3

F8

H4

R1

F1

F2

D

A | 200 | 570 | 200

H2

P

CD4

J3

E | 1500 |

F5

D1

H1

F4x

VM

N2

RING TONE
TO CALLER

B4

E4

F | 300 | 400

J1

RING RTN
BATTERY

HOLDING
UNISELECTOR
K RELAY

J | 800 |

INT RING
TO CALLED
BELL

400 | 900 | H

B3

CD3
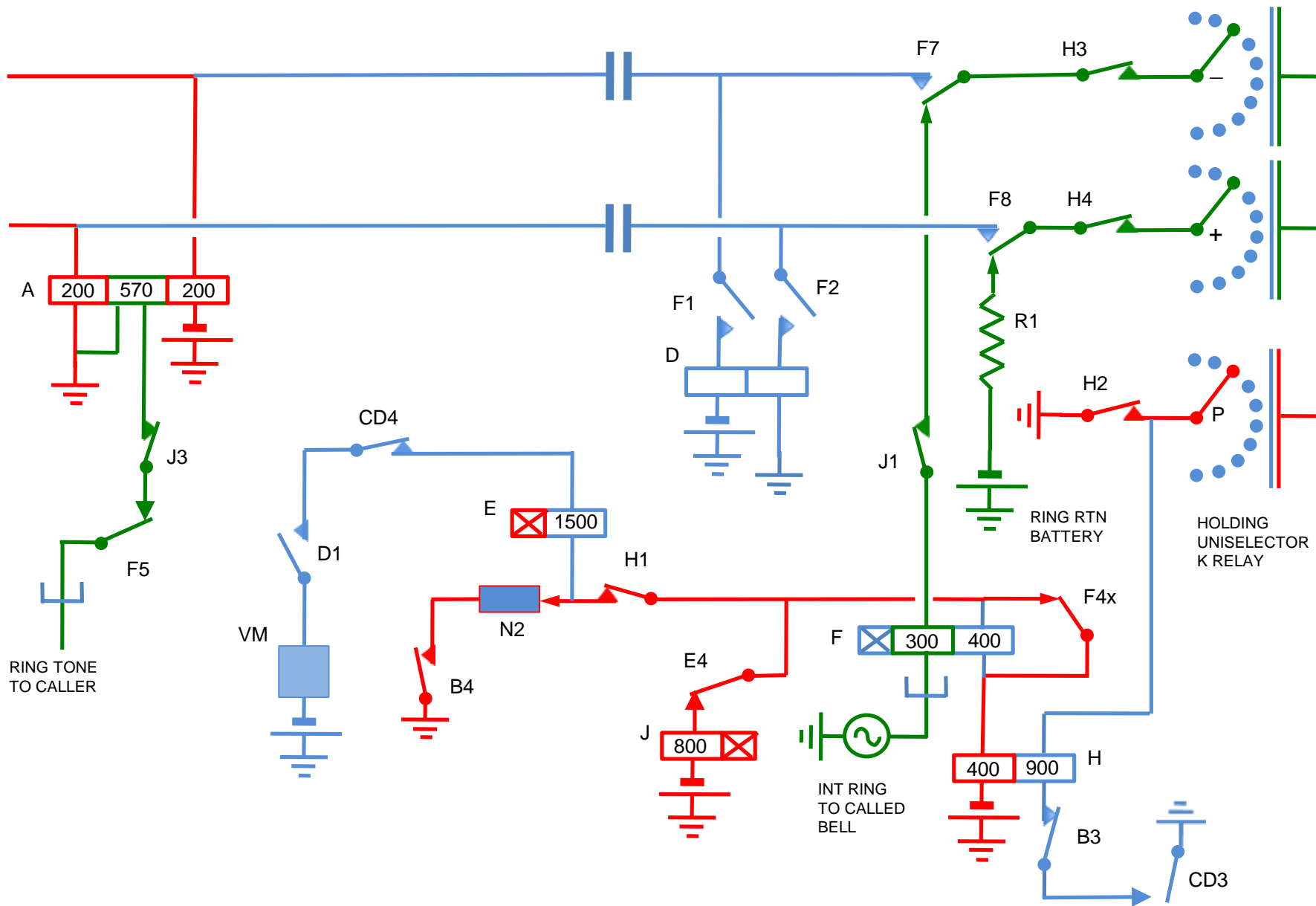
Final selector – call answered – CD, D, E and F operate, J releases (slowly) after meter pulse

VOICE CONNECTION

F7 H3

F8 H4

R1

F1 F2

D

J1

A 200 570 200

J3

F5

RING TONE
TO CALLER

CD4

E 1500

D1

VM

N2

H1

B4

E4

J 800

INT RING

F 300 400

F4x

400 900 H

B3

CD3

P

H2

HOLDING
UNISELECTOR
K RELAY

13
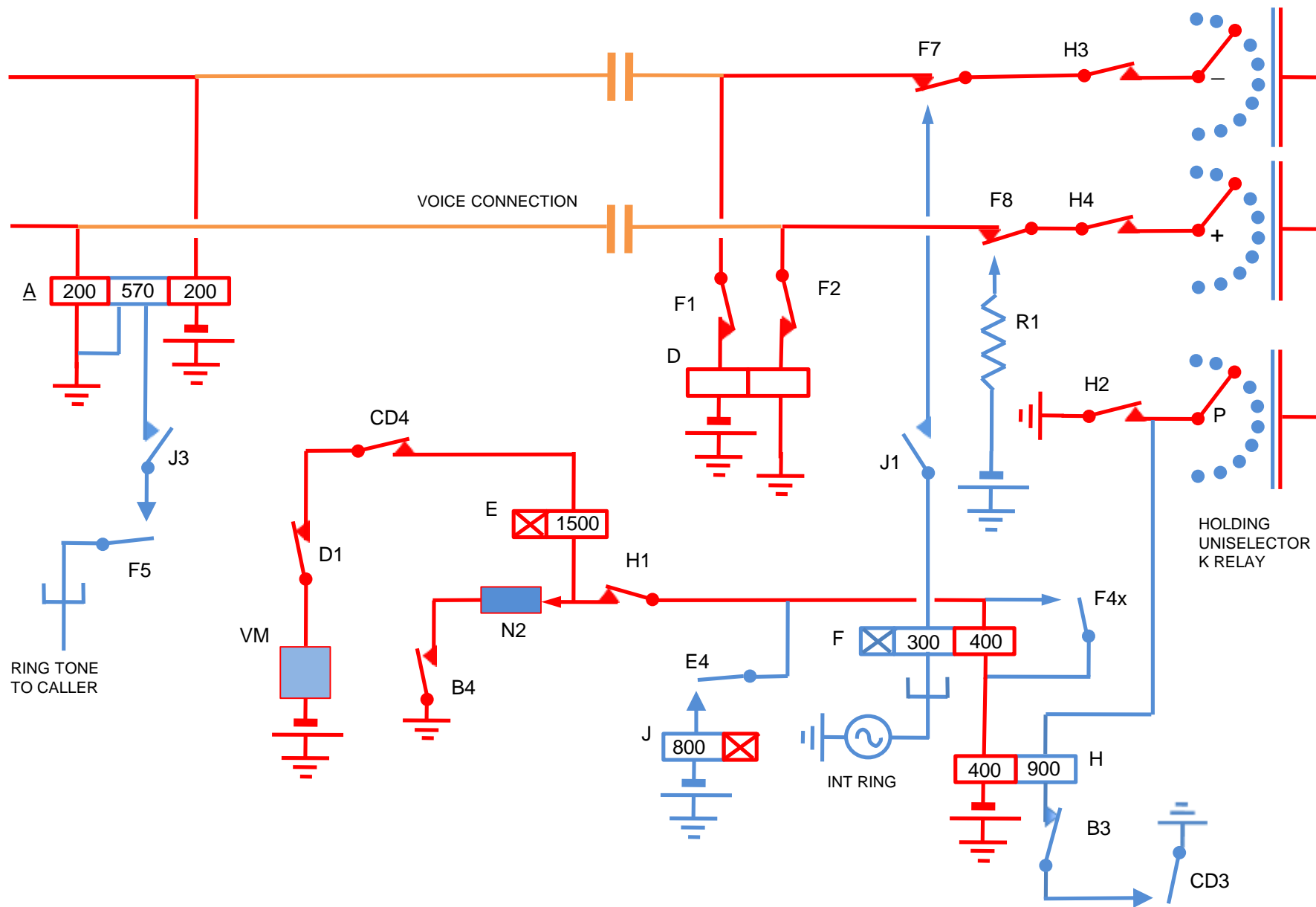
Caller's uniselector – lifting the handset – L operates slowly

TO GROUP
SELECTORS

M.D.F.

MULT.   LOCAL

K1

H3   −

H4   +

K2

L   700

−   +

CALLER
LINE SIDE   EXCH SIDE

GUARDED
GROUP
SELECTORS

L2

K3

P

B3   P   H

L1x

CD3

H   K   1300

K5

DM   DMdm

MULTIPLE FINAL SELECTORS

CALLER'S UNISELECTOR
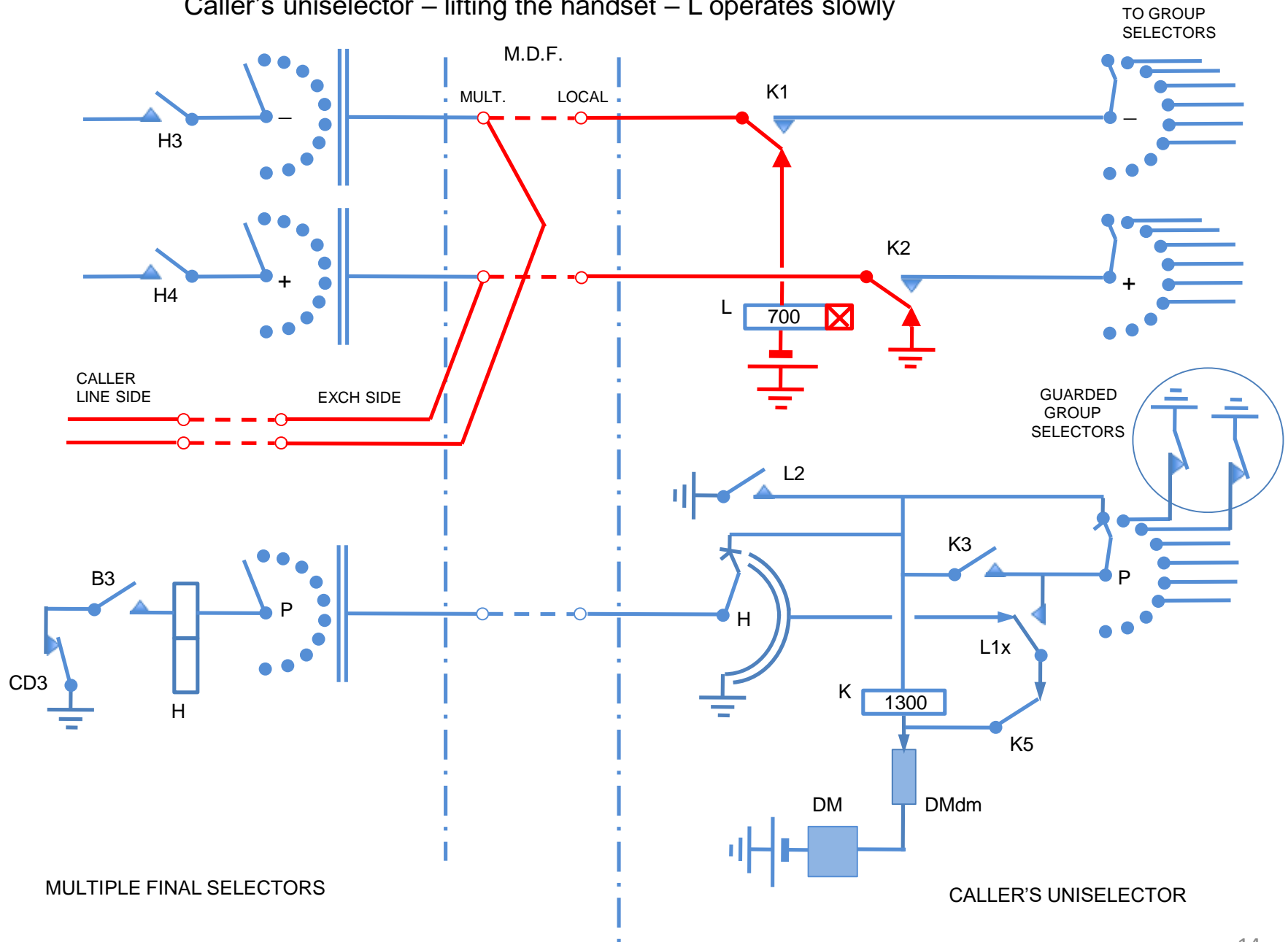
Caller's uniselector – hunting for free group selector - L operates, DM pulsing
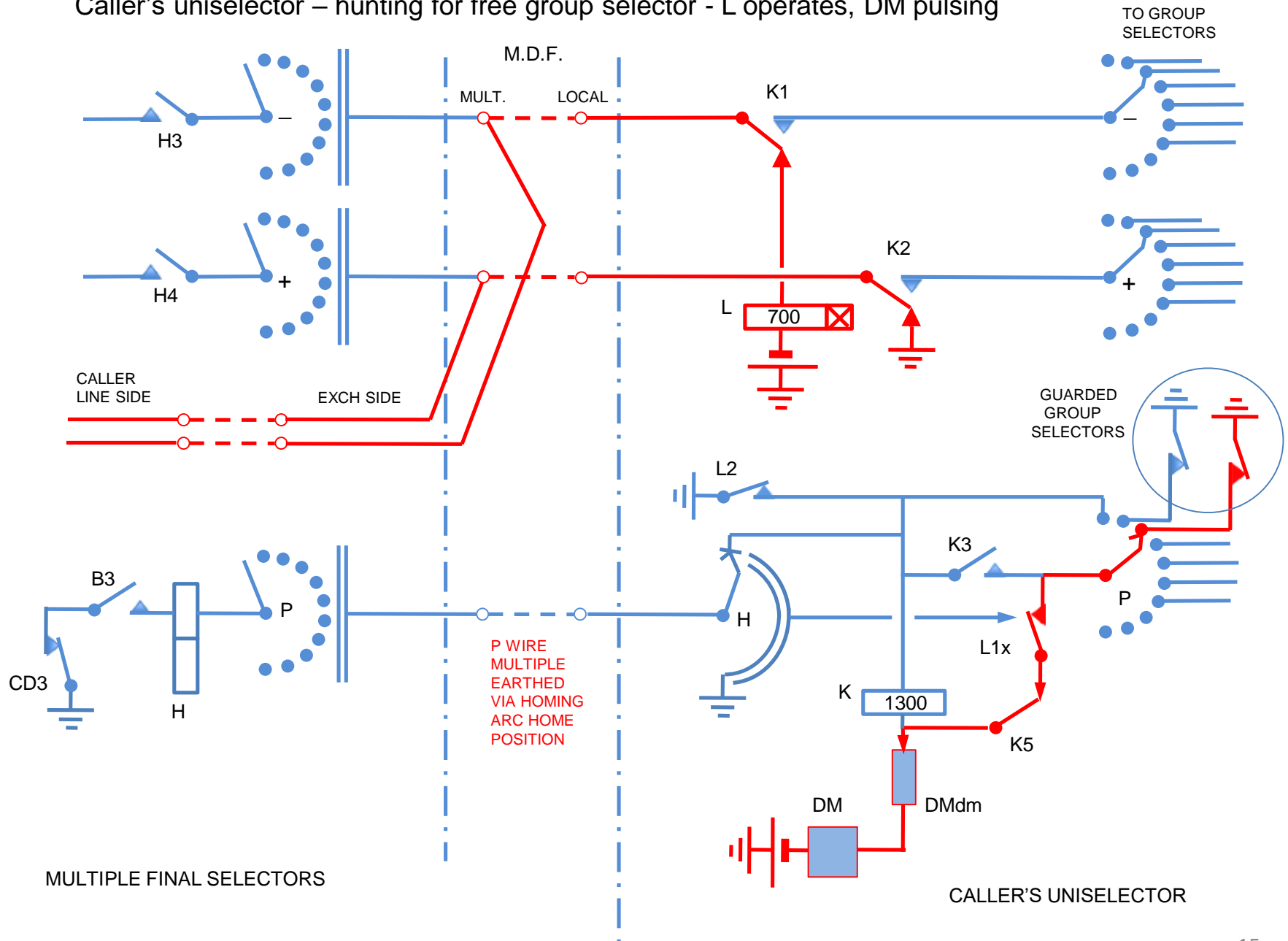
Caller's uniselector – free group selector found – K operates, L releases slowly

M.D.F.

H3 −

H4 +

MULT. LOCAL

K1

LOOP CURRENT
FROM GROUP
SELECTOR

−

K2

+

L 700

CALLER
LINE SIDE

EXCH SIDE

GUARDED
GROUP
SELECTORS

L2

K3

P

B3

P

H

H

CD3

L1x

P WIRE
MULTIPLE
EARTHED
VIA HOMING
ARC

K 1300

L2 AND K3 PROVIDE
TEMPORARY EARTH
TO SEIZED SELECTOR

K5

DM DMdm

MULTIPLE FINAL SELECTORS

CALLER'S UNISELECTOR
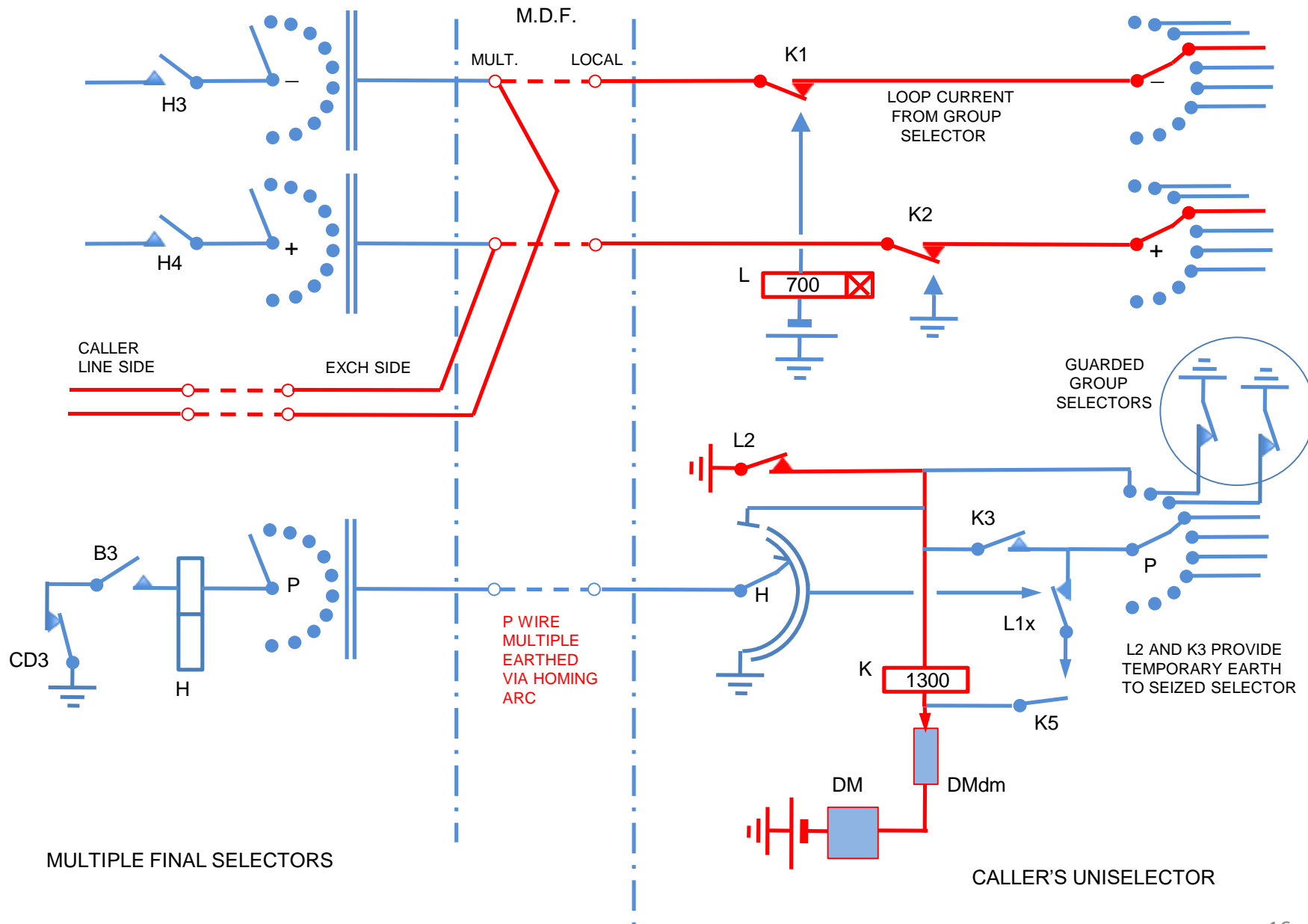
Caller's uniselector – call established – K held by group selector P wire

H3

H4

CALLER
LINE SIDE

EXCH SIDE

MULT.

LOCAL

M.D.F.

−

+

K1

K2

L   700

LOOP CURRENT
FROM GROUP
SELECTOR

−

+

SEIZED SELECTOR
RETURNS EARTH

L2

K3

P

L1x

B3

P

H

H

CD3

H

P WIRE
MULTIPLE
EARTHED
VIA HOMING
ARC

K   1300

K5

DM   DMdm

MULTIPLE FINAL SELECTORS

CALLER'S UNISELECTOR
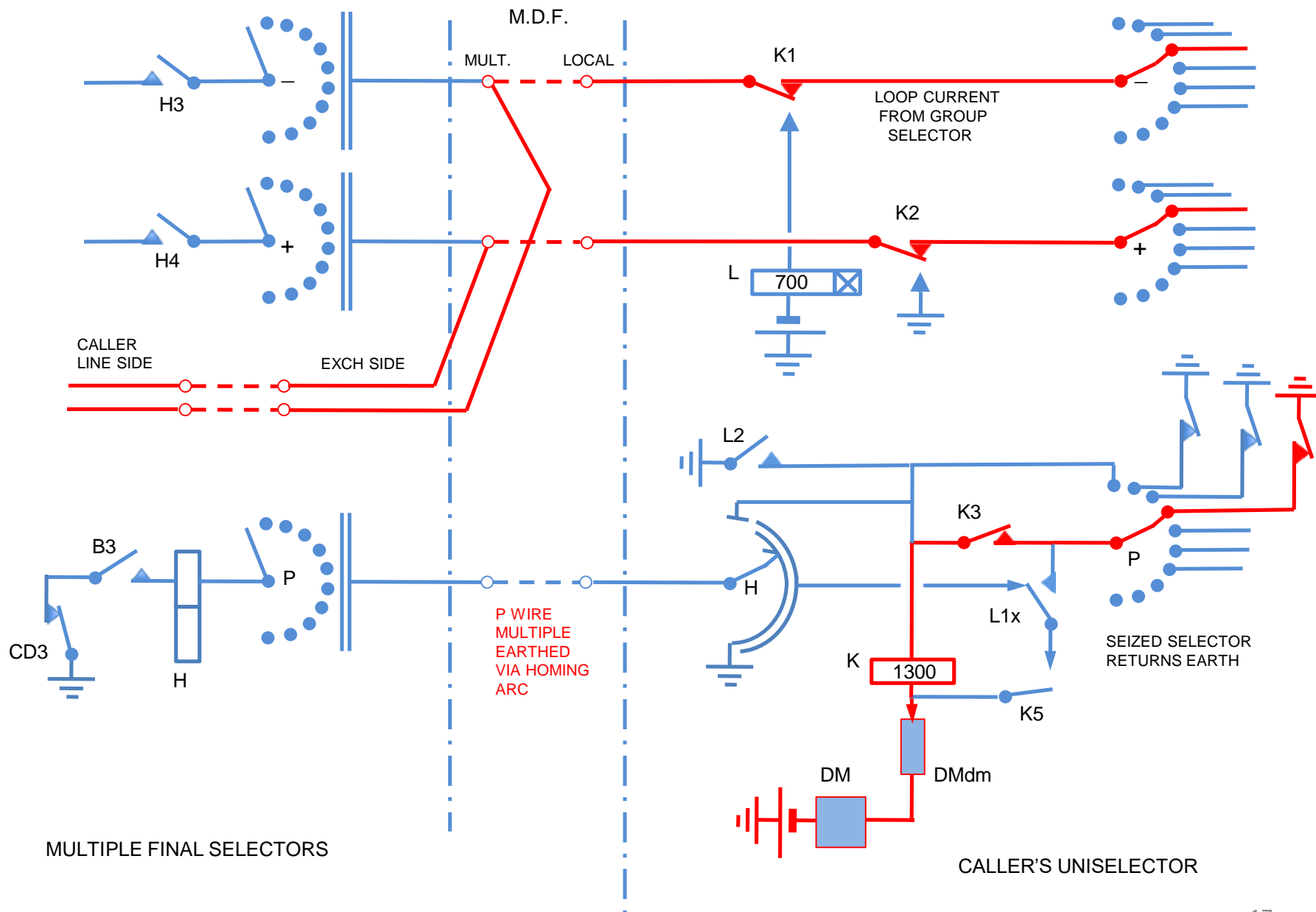
Caller's uniselector - call terminates - no loop current – K releases – DM steps home

M.D.F.

MULT.   LOCAL

K1

H3   −

K2

H4   +

−

+

L 700

CALLER
LINE SIDE

EXCH SIDE

L2

B3

P

K3

P

CD3

H

H

L1x

K   1300

K5

P WIRE
MULTIPLE
EARTHED
VIA HOMING
ARC

DM   DMdm

MULTIPLE FINAL SELECTORS

CALLER'S UNISELECTOR
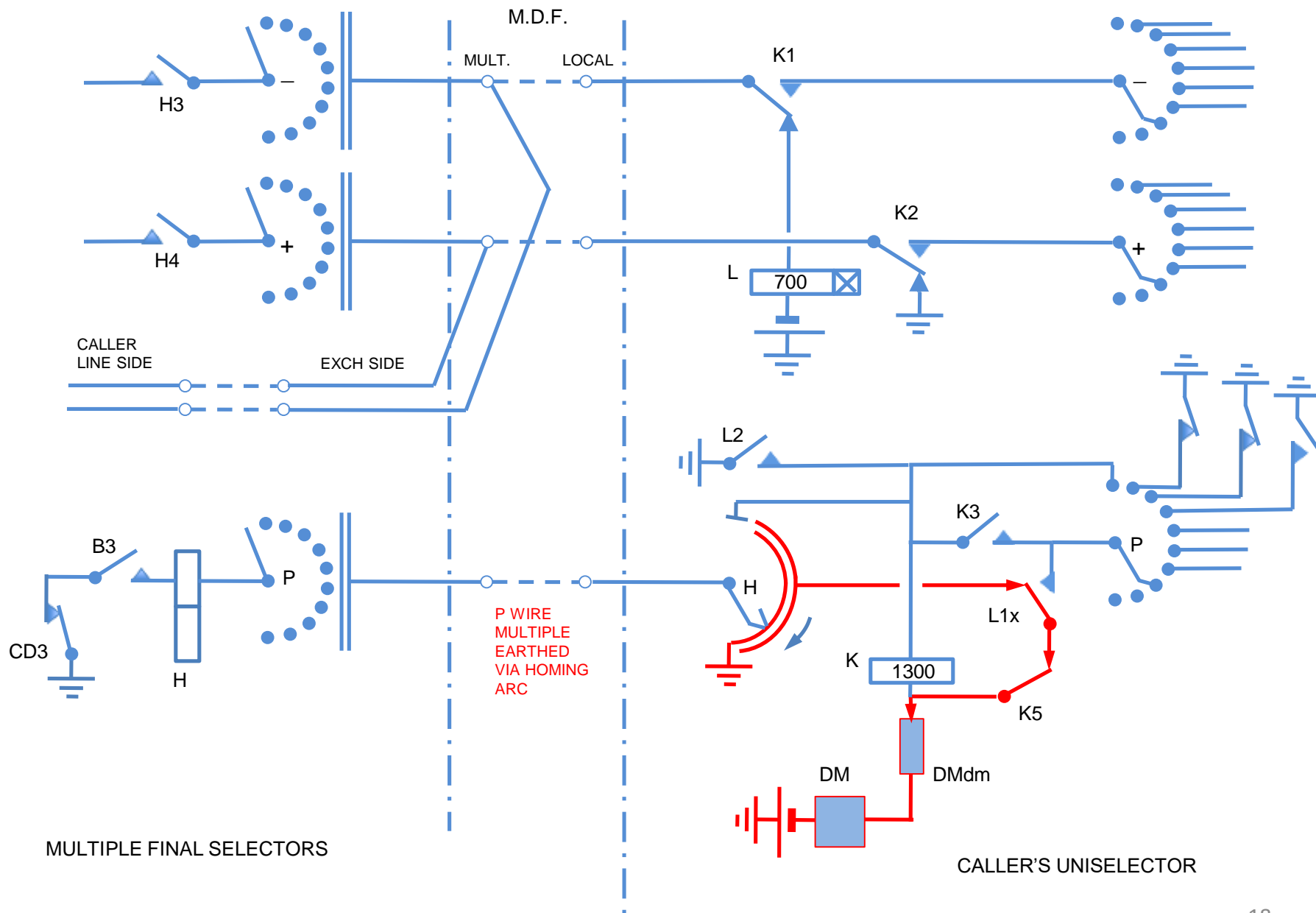
Subscriber's uniselector with SINGLE homing arc - idle state - H, K and L not operating

M.D.F.

L2

K3

P

B3

900

400

P

CD3

H

FINAL SELECTOR

MULT.

LOCAL

- 50V

L1

K

1300

K5

H

DMdm

DM

L

700

H3

−

K1

H4

+

K2

−

+

SUBSCRIBER'S UNISELECTOR

LINE SIDE

M.D.F.

EXCH SIDE

BELL
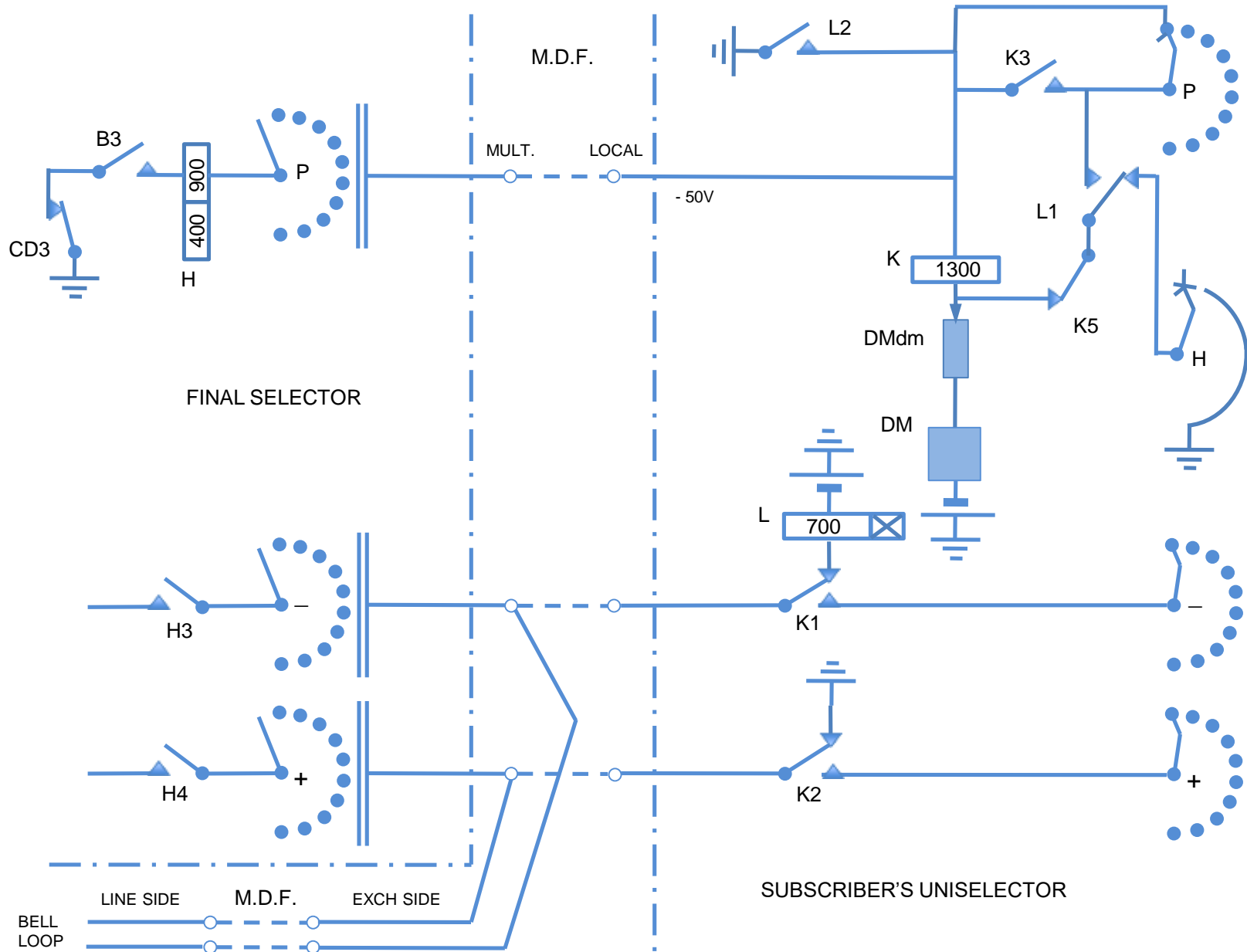
LOOP

Uniselector – incoming call – H (900) operates on brief CD release, K operates, L releases

M.D.F.

L2

K3

P

B3

900

P

H

MULT.

LOCAL

L1

CD3

K

1300

K5

DMdm

H

FINAL SELECTOR
(last digit dialled)

DM

L

700

H3

−

K1

PREPARED FOR RINGING

H4

+

K2

+

LINE SIDE   M.D.F.   EXCH SIDE

CALLED SUBSCRIBER'S UNISELECTOR
IF NOT ENGAGED

BELL
LOOP
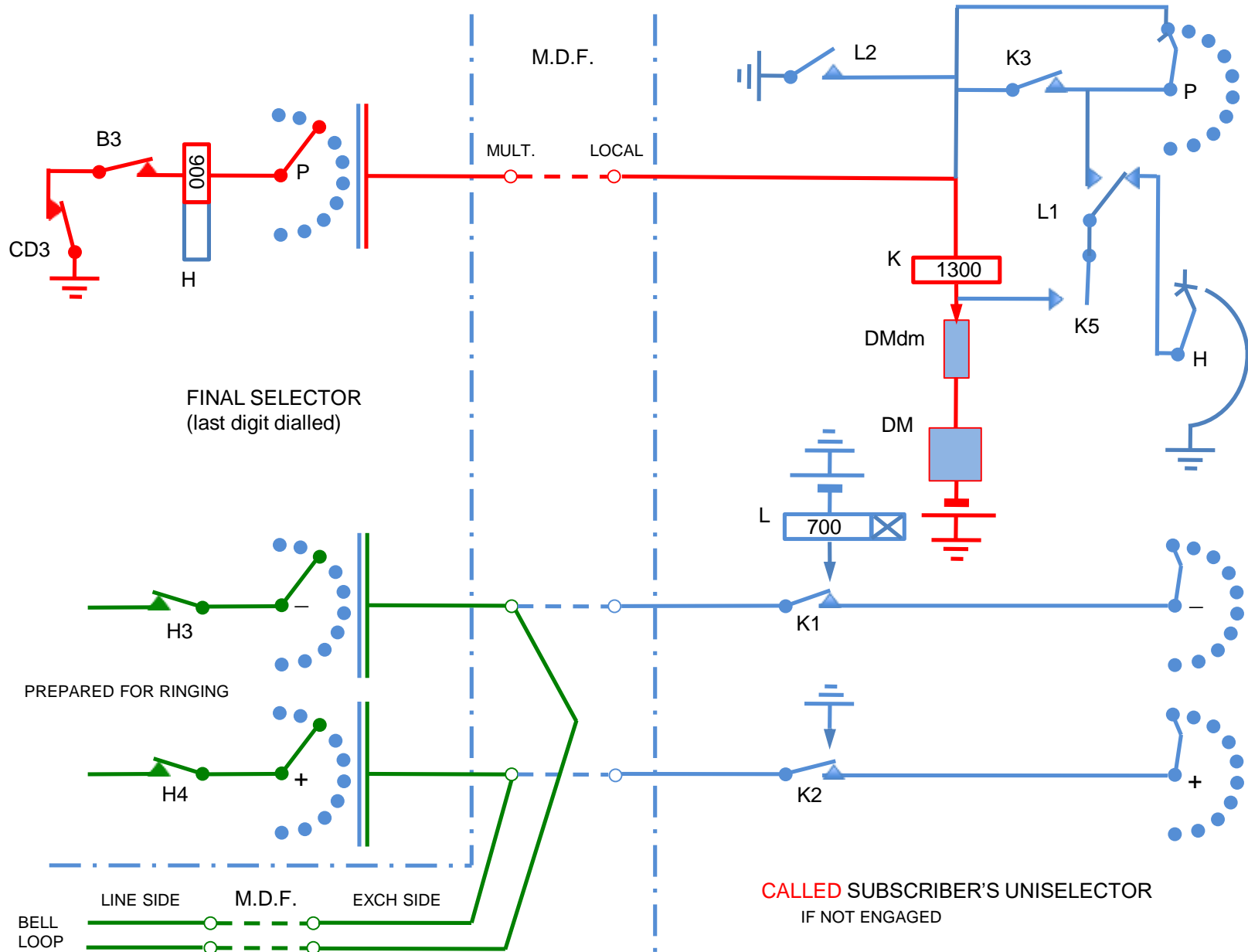
Uniselector– P guarding during ringing – CD operates again, H(400) takes over from H(900)

M.D.F.

H2

B3

900

400

H

P

CD3

FINAL SELECTOR

MULT.   LOCAL

L2   K3

P

L1

K   1300

DMdm

K5

H

DM

L   700

PREPARED FOR RINGING

H3   –

K1   –

H4   +

K2   +

LINE SIDE   M.D.F.   EXCH SIDE

BELL
LOOP

CALLED SUBSCRIBER'S UNISELECTOR
IF NOT ENGAGED
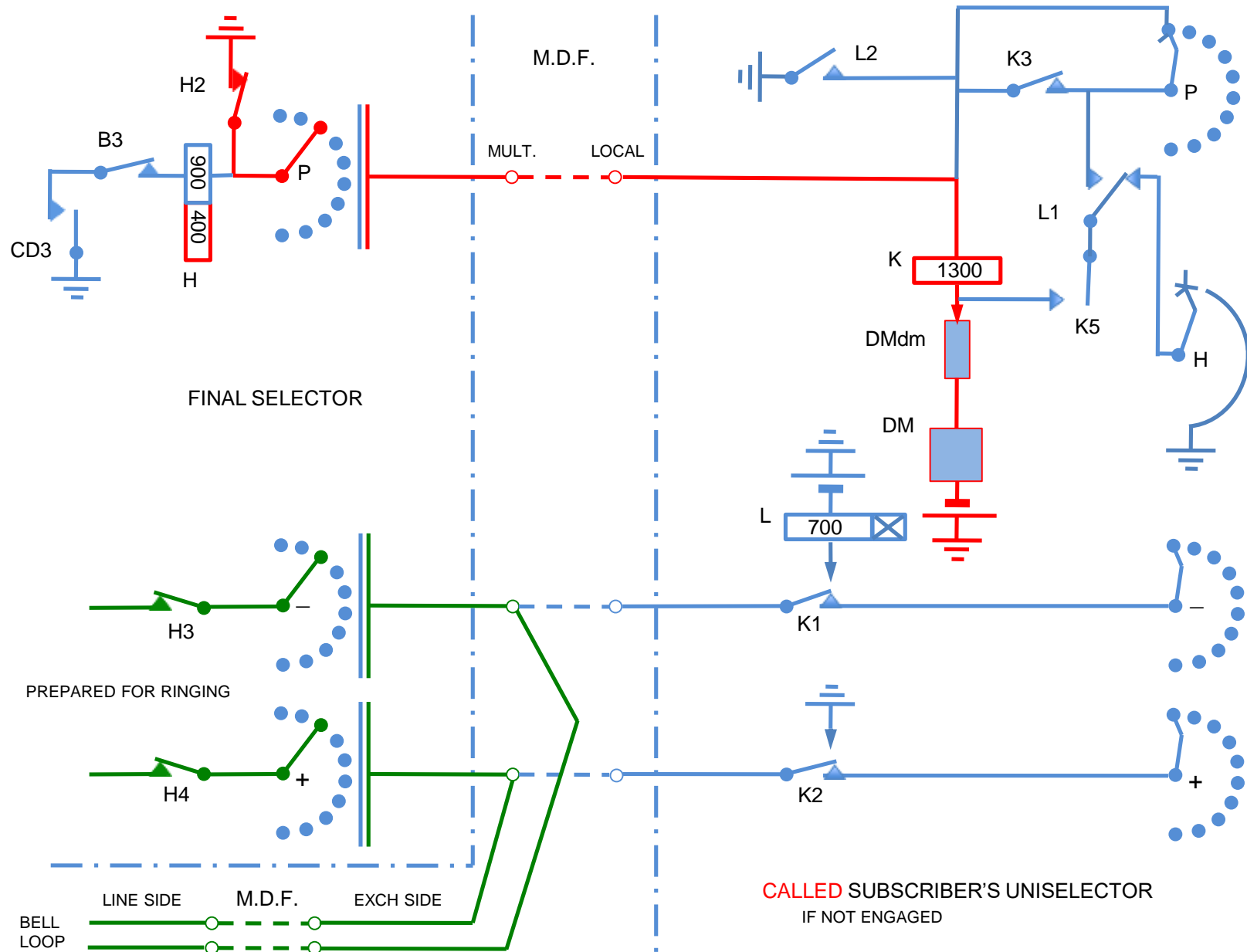
Uniselector – caller lifts handset – L operates on caller loop, DM steps on DMdm

M.D.F.

L2

K3

P

B3

900

400

P

H

CD3

MULT.

LOCAL

L1

K

1300

DMdm

K5

H

DM

FINAL SELECTOR

L

700

H3

—

K1

H4

+

K2

LINE SIDE

M.D.F.

EXCH SIDE

CALLER
LOOP

CALLING SUBSCRIBER'S UNISELECTOR

22
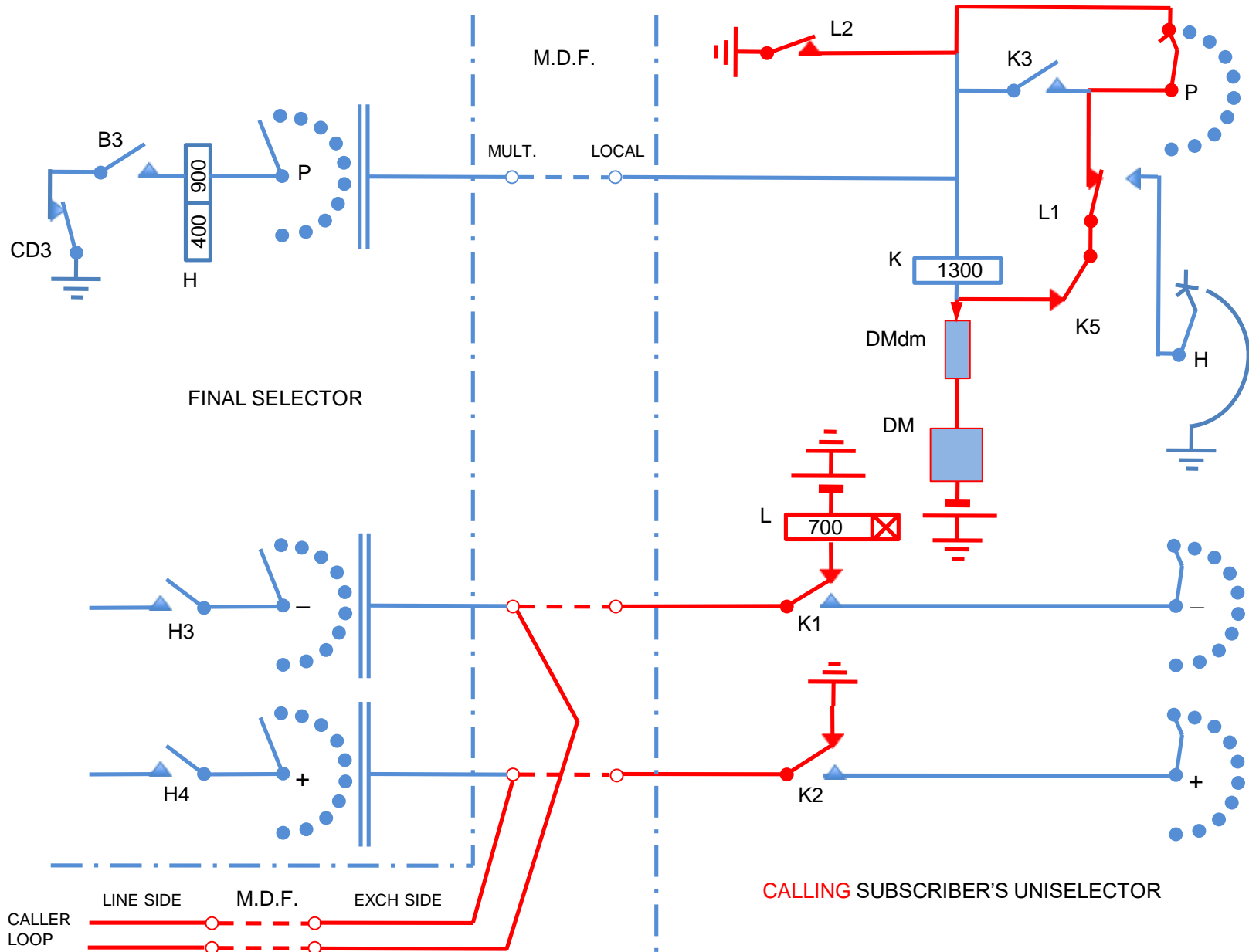
Uniselector – free 1st selector found – K operates, L releases slowly

M.D.F.

L2

K3

FREE 1st SELECTOR

P

MULT.   LOCAL

B3

P

900

400

H

CD3

FINAL SELECTOR

K   1300

DMdm

DM

L   700

L1

K5

H

H3

—

K1

H4

+

K2

—

+

1st SELECTOR LOOP

CALLING SUBSCRIBER'S UNISELECTOR

LINE SIDE   M.D.F.   EXCH SIDE

CALLER LOOP
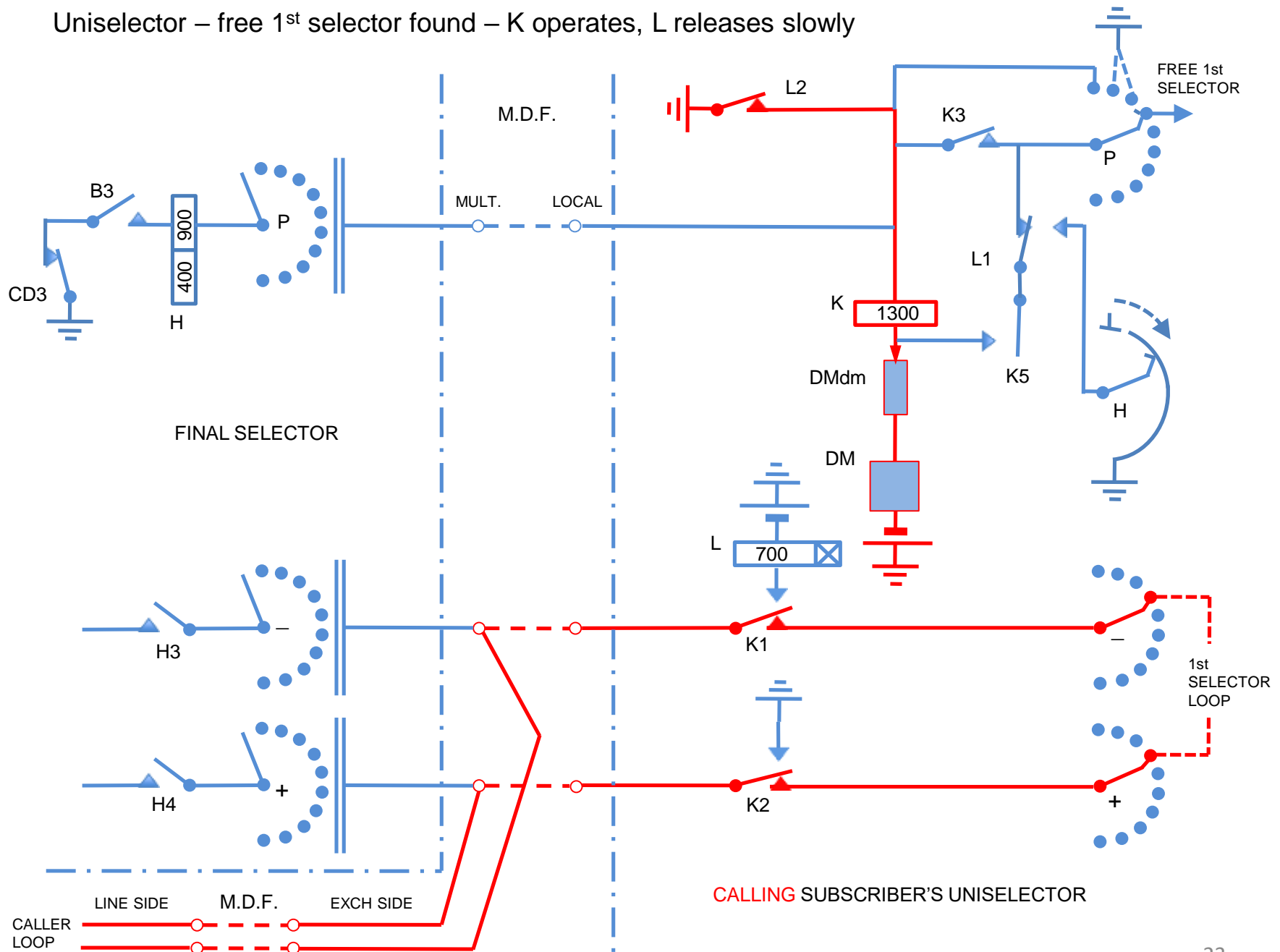
Uniselector – connected – K operates on 1st selector earth

M.D.F.

L2

K3

P

FREE 1st
SELECTOR
EARTH
RETURNED

B3

P

MULT.   LOCAL

900

400

H

CD3

K

1300

L1

DMdm

K5

DM

H

FINAL SELECTOR

L

700

H3

K1

−

H4

K2

+

1st
SELECTOR
LOOP

LINE SIDE   M.D.F.   EXCH SIDE

CALLING SUBSCRIBER'S UNISELECTOR

CALLER
LOOP

24
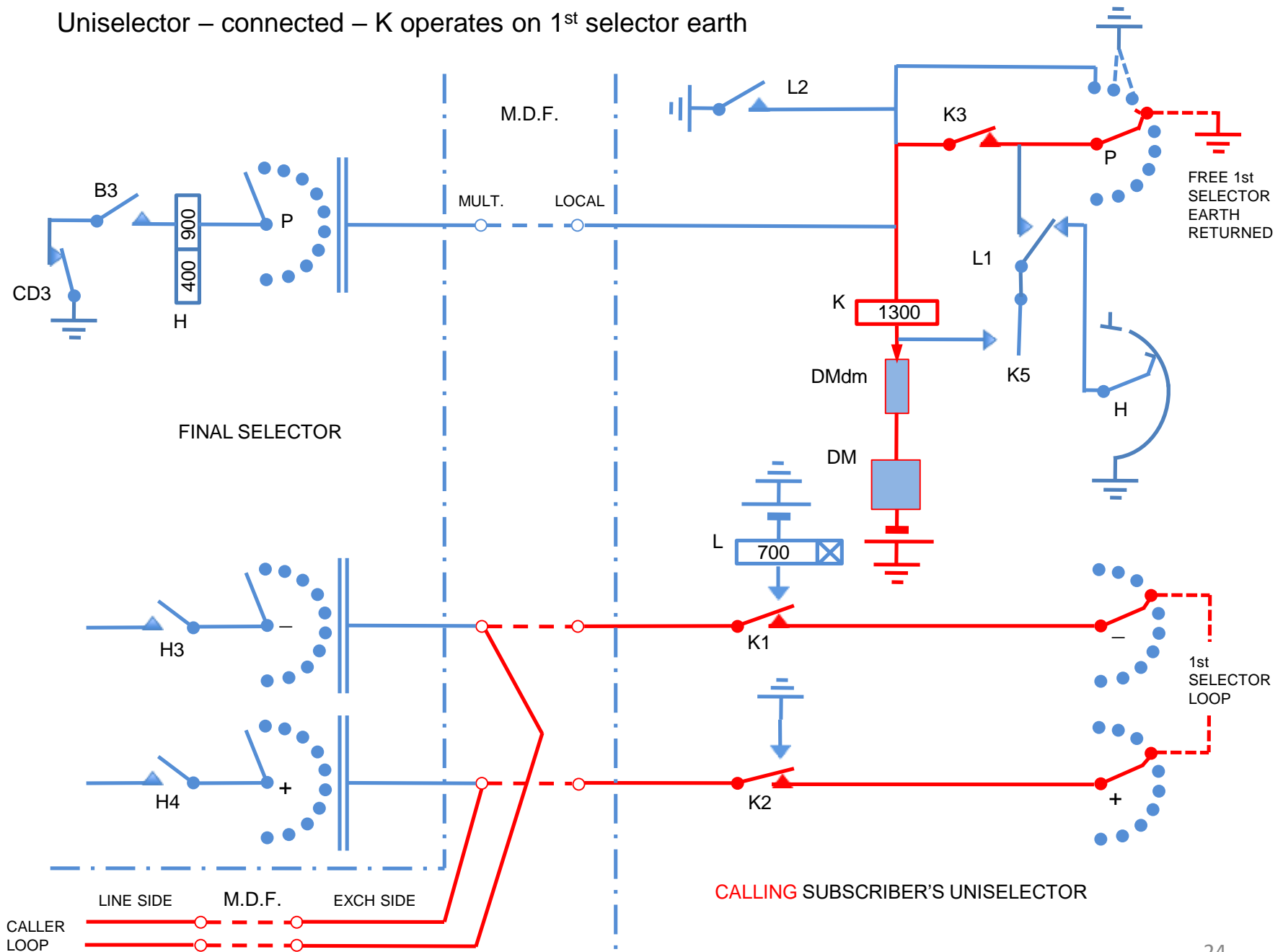
Uniselector – end of call – P earth removed, K releases, DM steps home

M.D.F.

L2

K3

P

FREE 1st
SELECTOR
EARTH
REMOVED

B3

900

400

P

MULT.

LOCAL

CD3

H

L1

K

1300

DMdm

K5

H

FINAL SELECTOR

DM

L

700

H3

−

K1

−

H4

+

K2

+

LINE SIDE   M.D.F.   EXCH SIDE

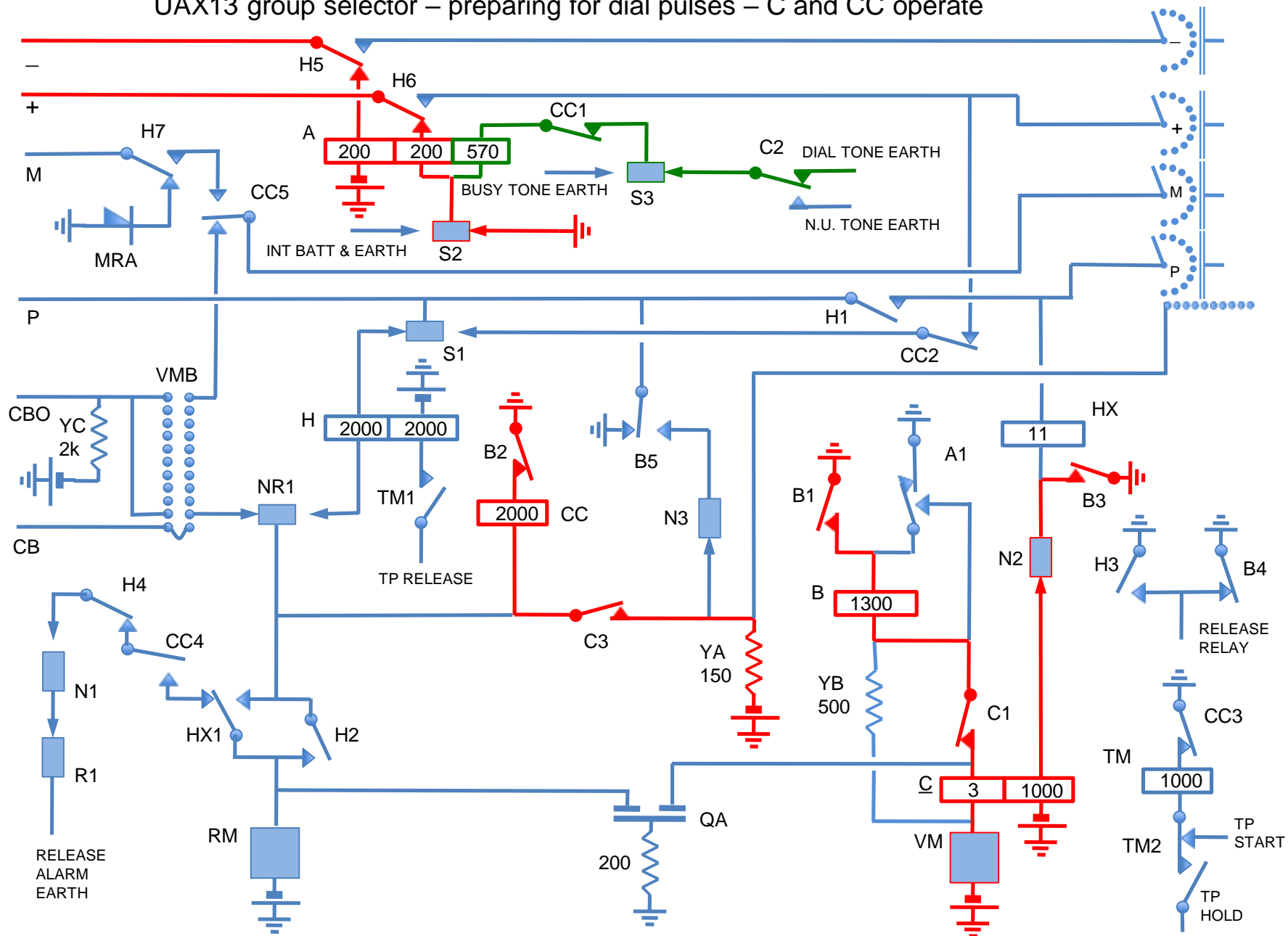CALLING SUBSCRIBER'S UNISELECTOR

OPEN
LOOP

25
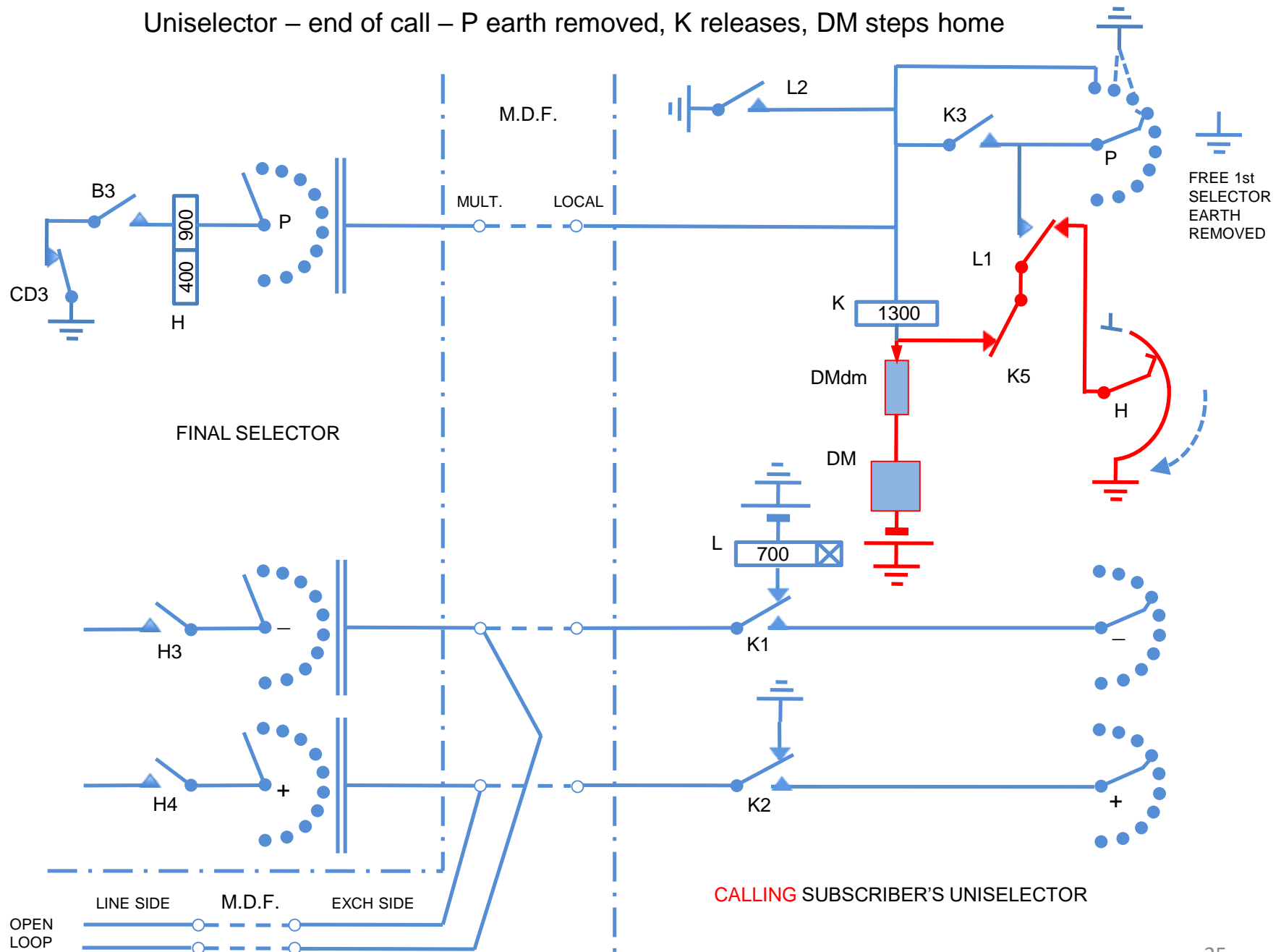
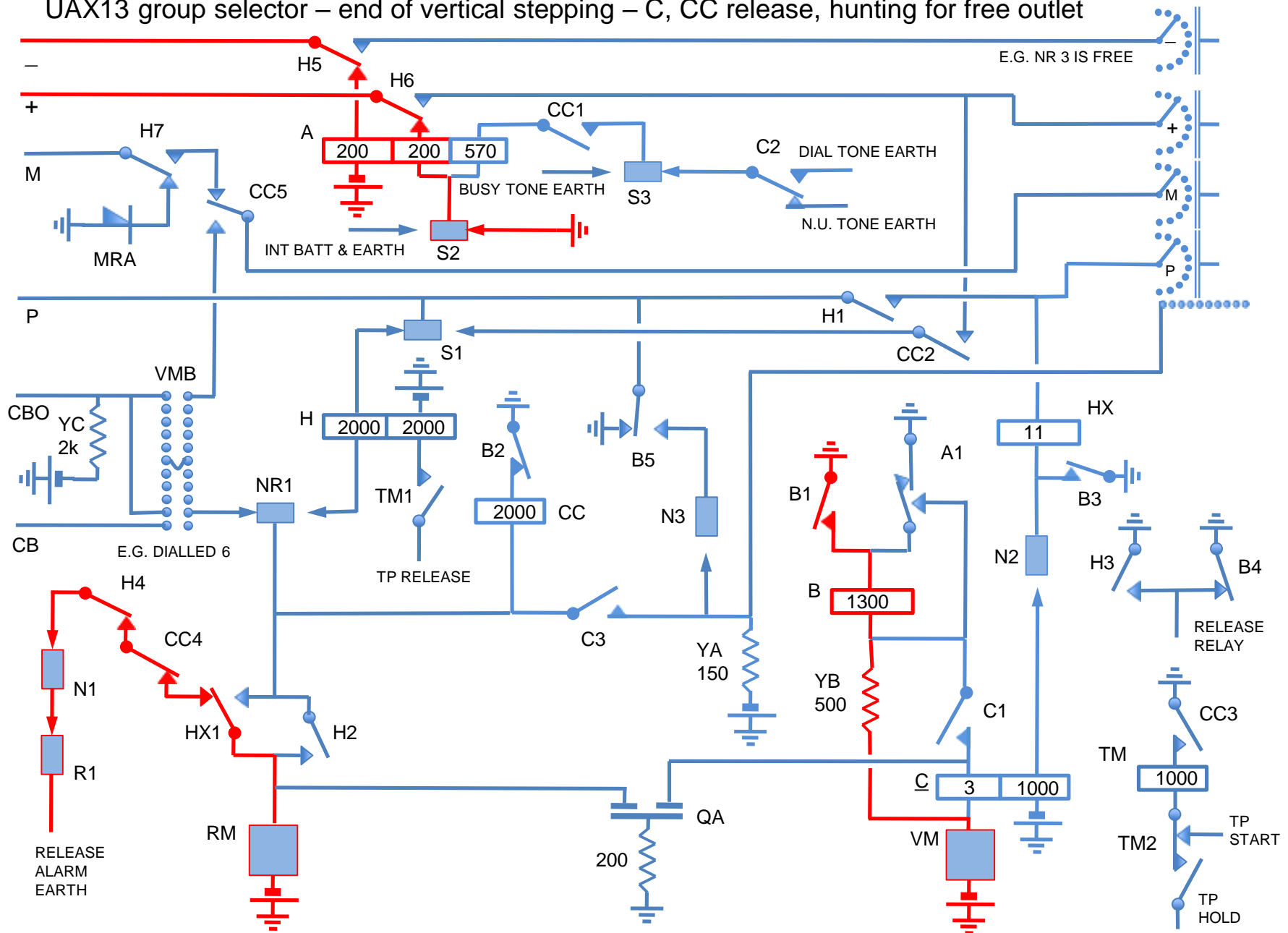UAX13 group selector – idle state
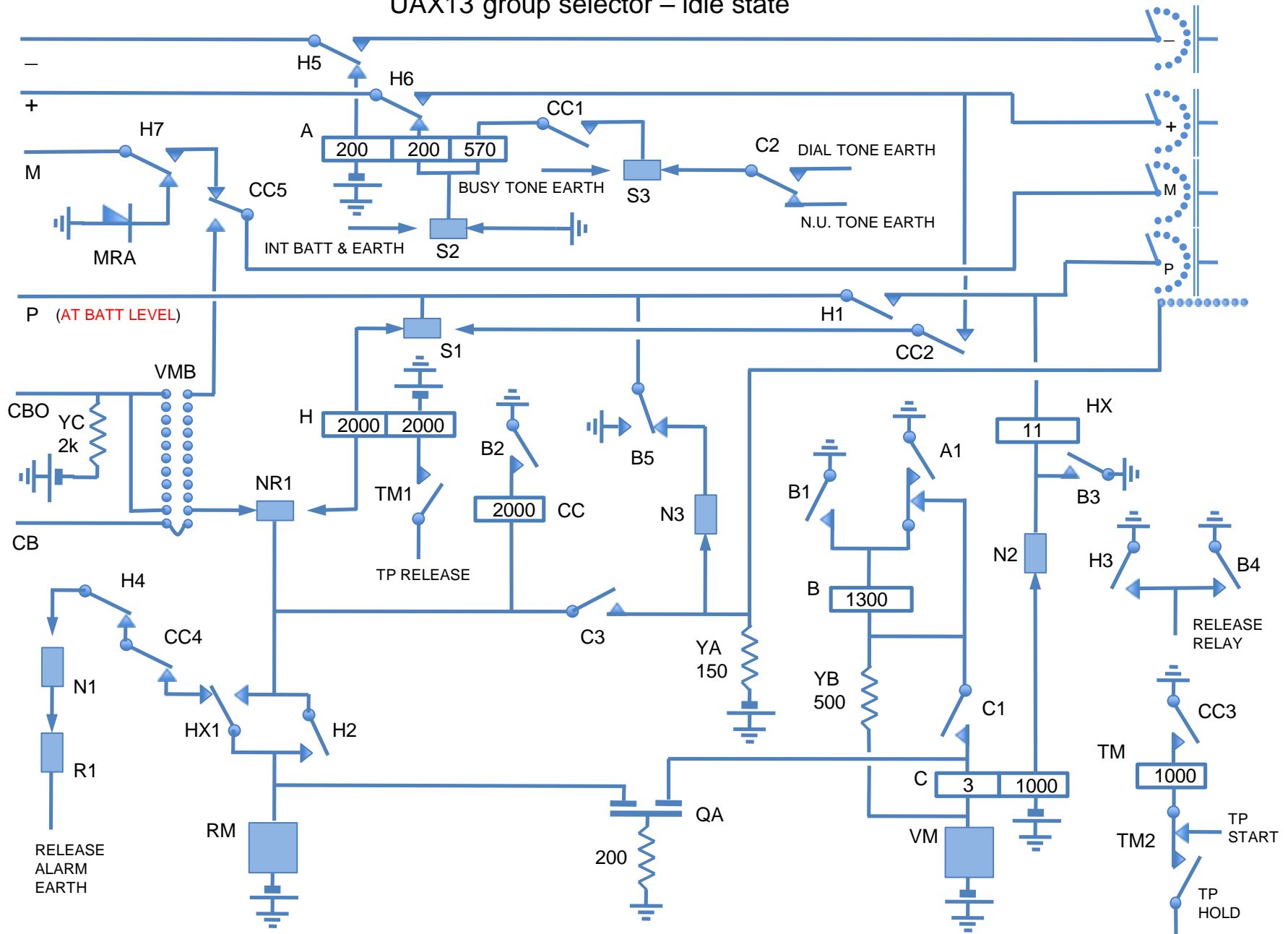
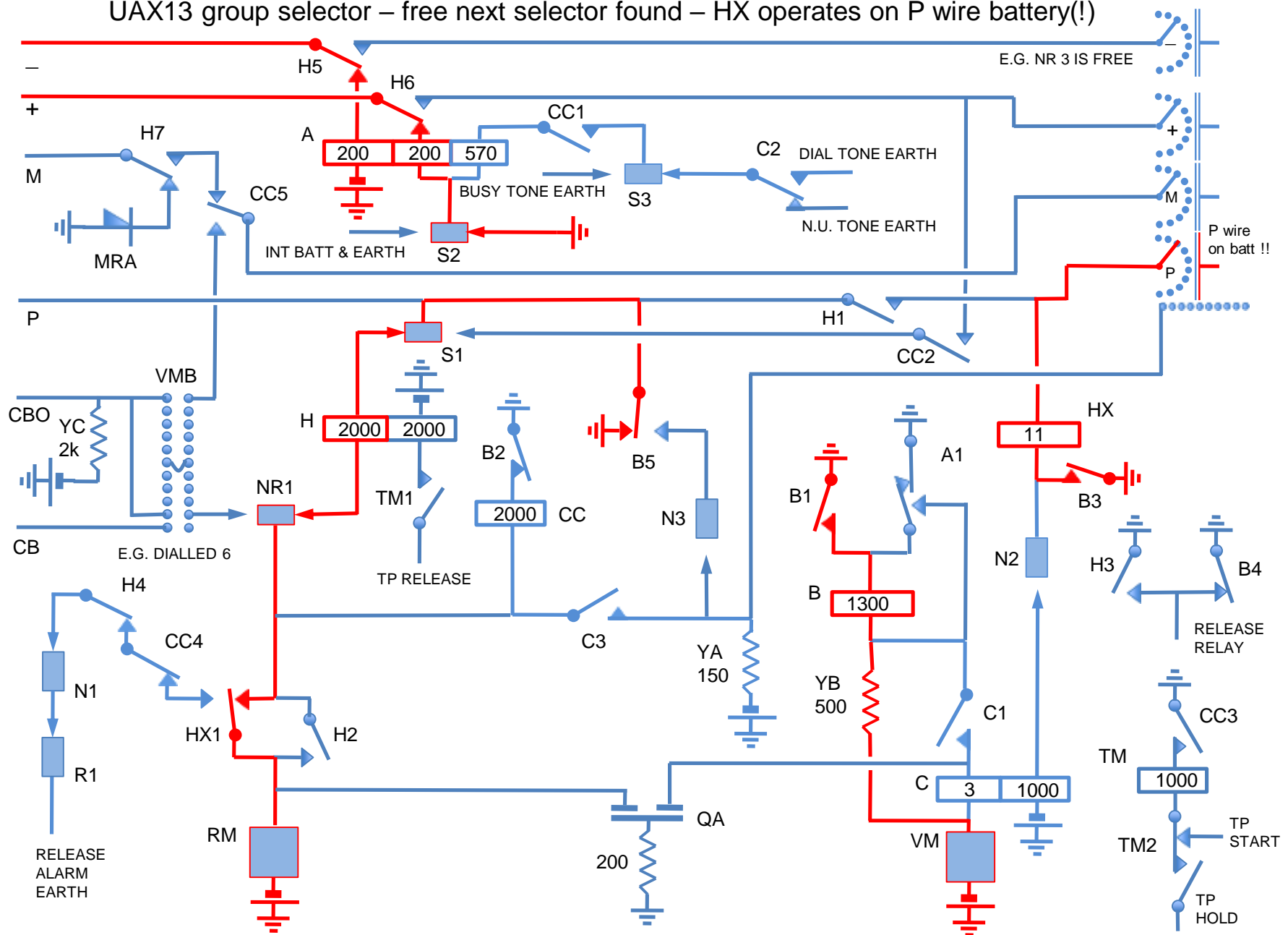UAX13 group selector – moment of seizure – A and B operate
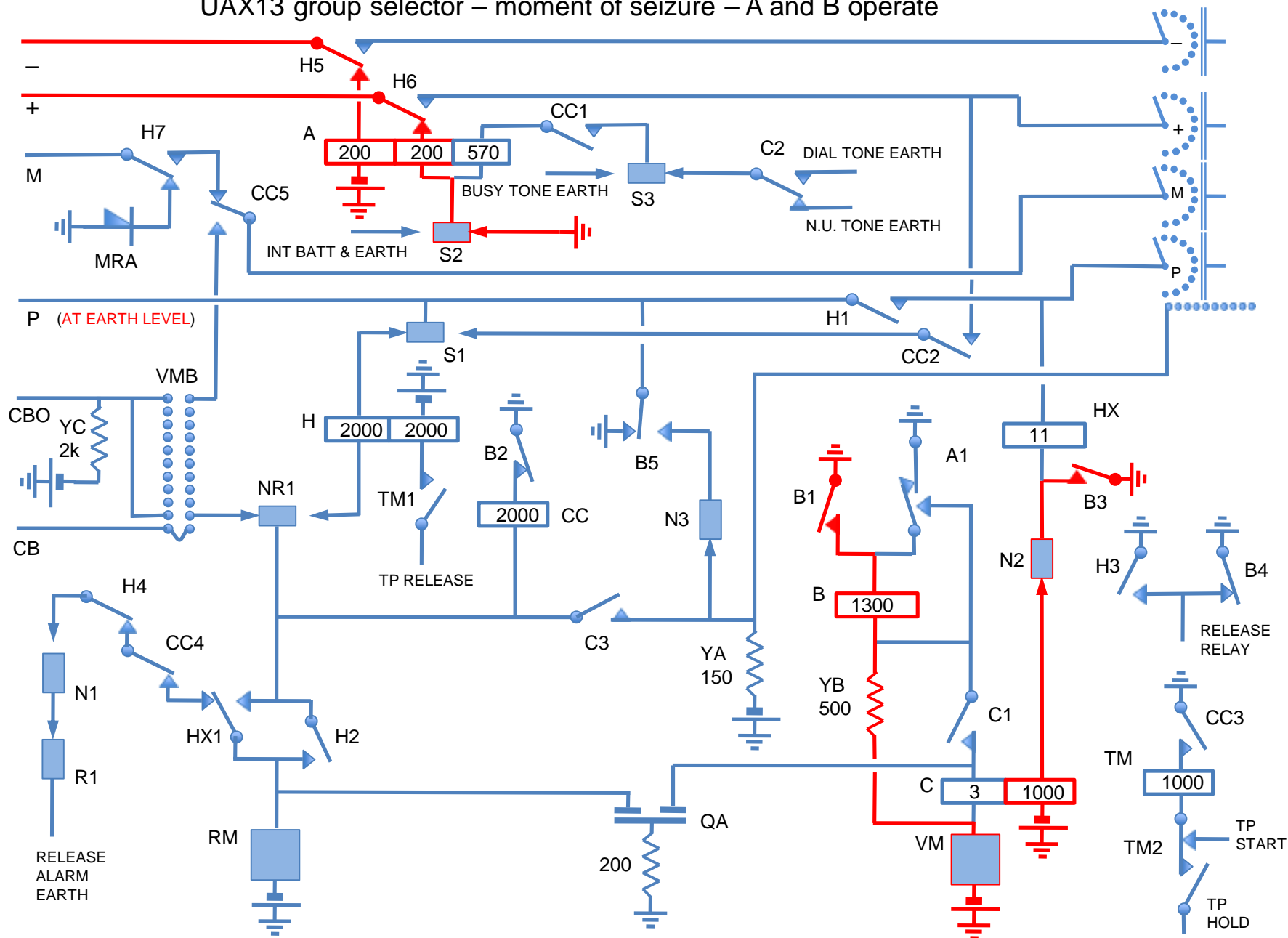
UAX13 group selector – preparing for dial pulses – C and CC operate
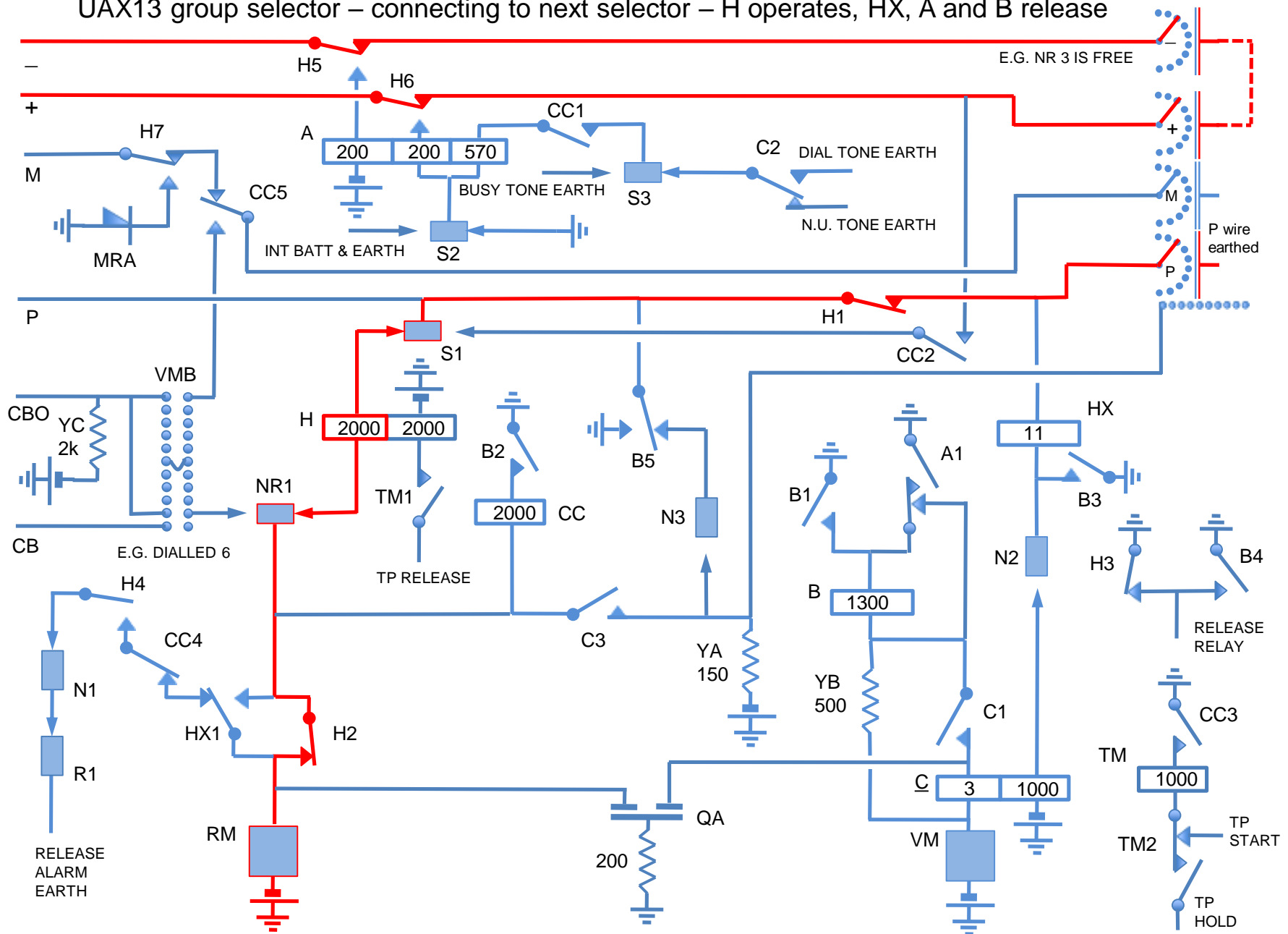
UAX13 group selector – end of vertical stepping – C, CC release, hunting for free outlet

UAX13 group selector – free next selector found – HX operates on P wire battery(!)

UAX13 group selector – connecting to next selector – H operates, HX, A and B release

Ordinary group selector 200 outlet – idle state
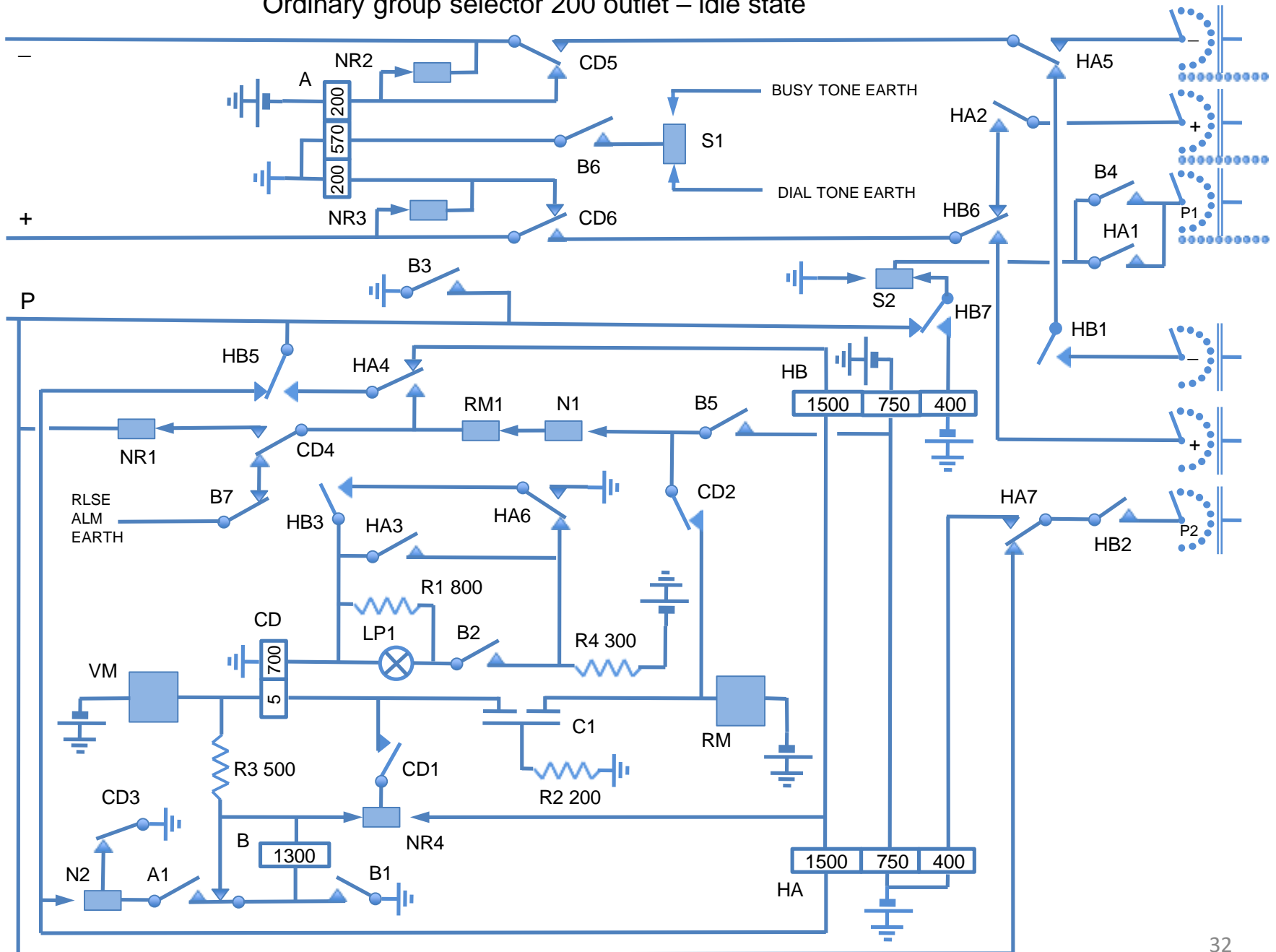
Ordinary group selector – moment of seizure – A, B and CD operate
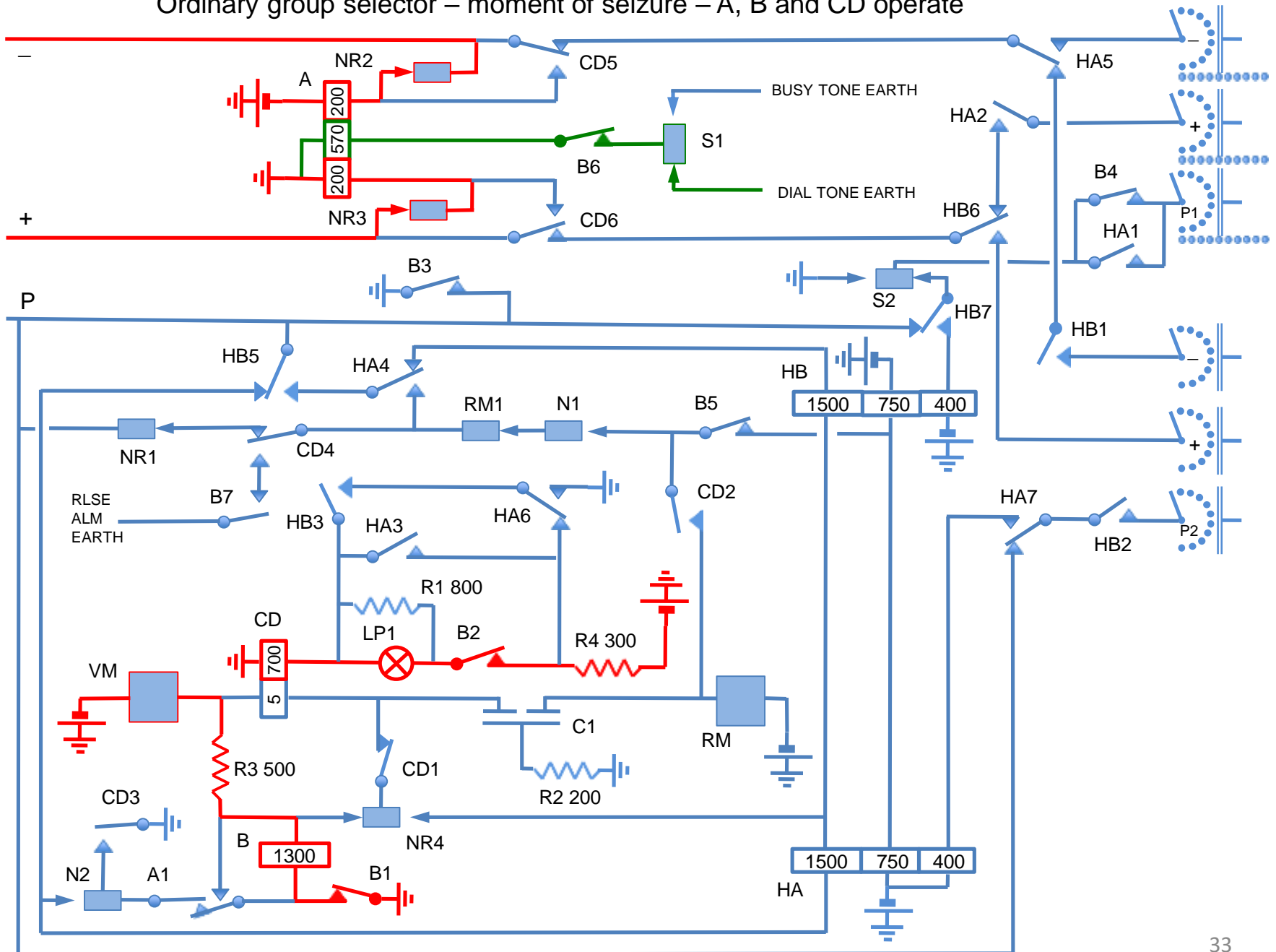
Ordinary group selector – vertical stepping – N1, N2, HA and HB (750 Ohm) operate
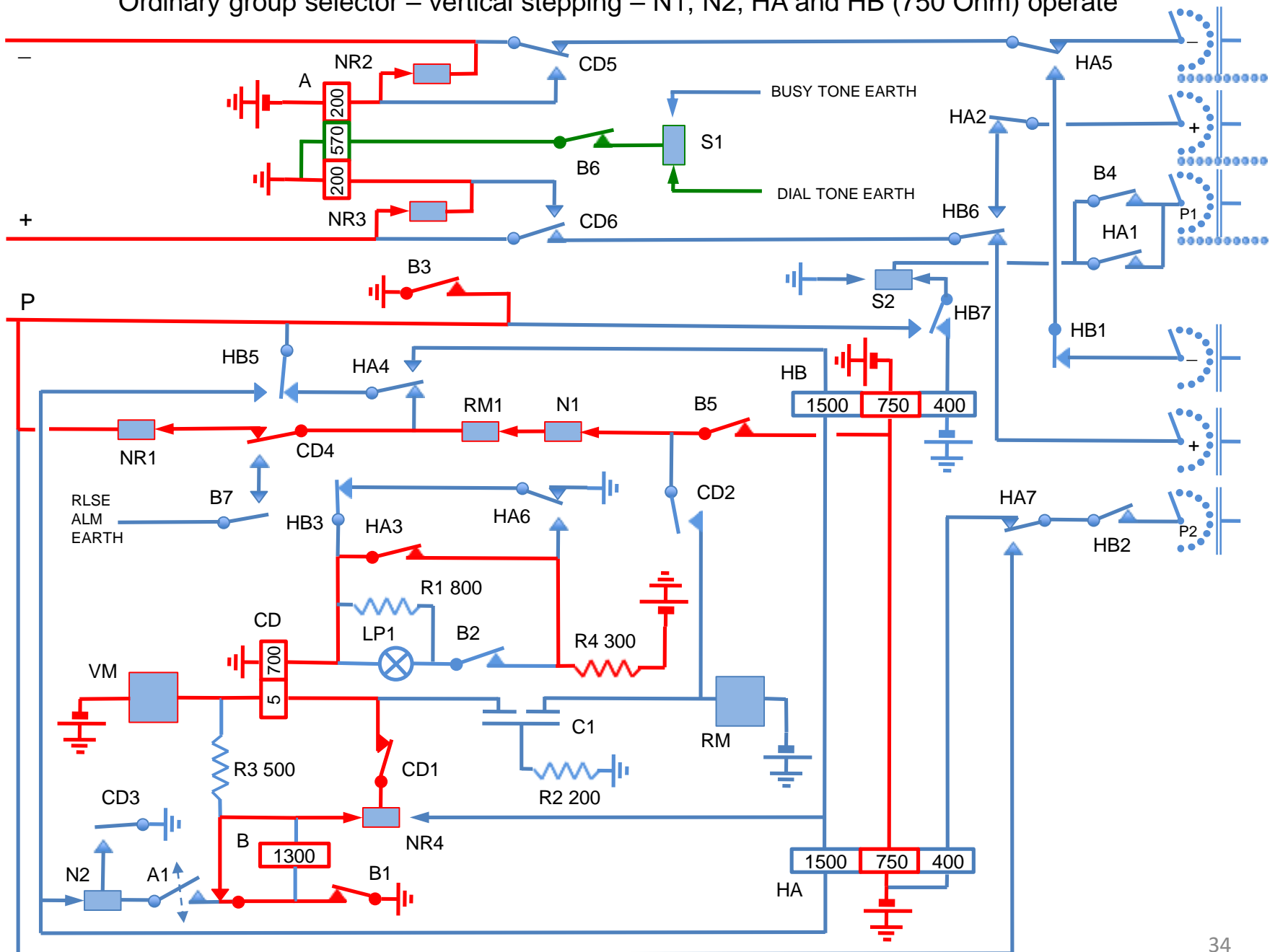
Ordinary group selector – end of vertical stepping – CD releases slowly, RM operates
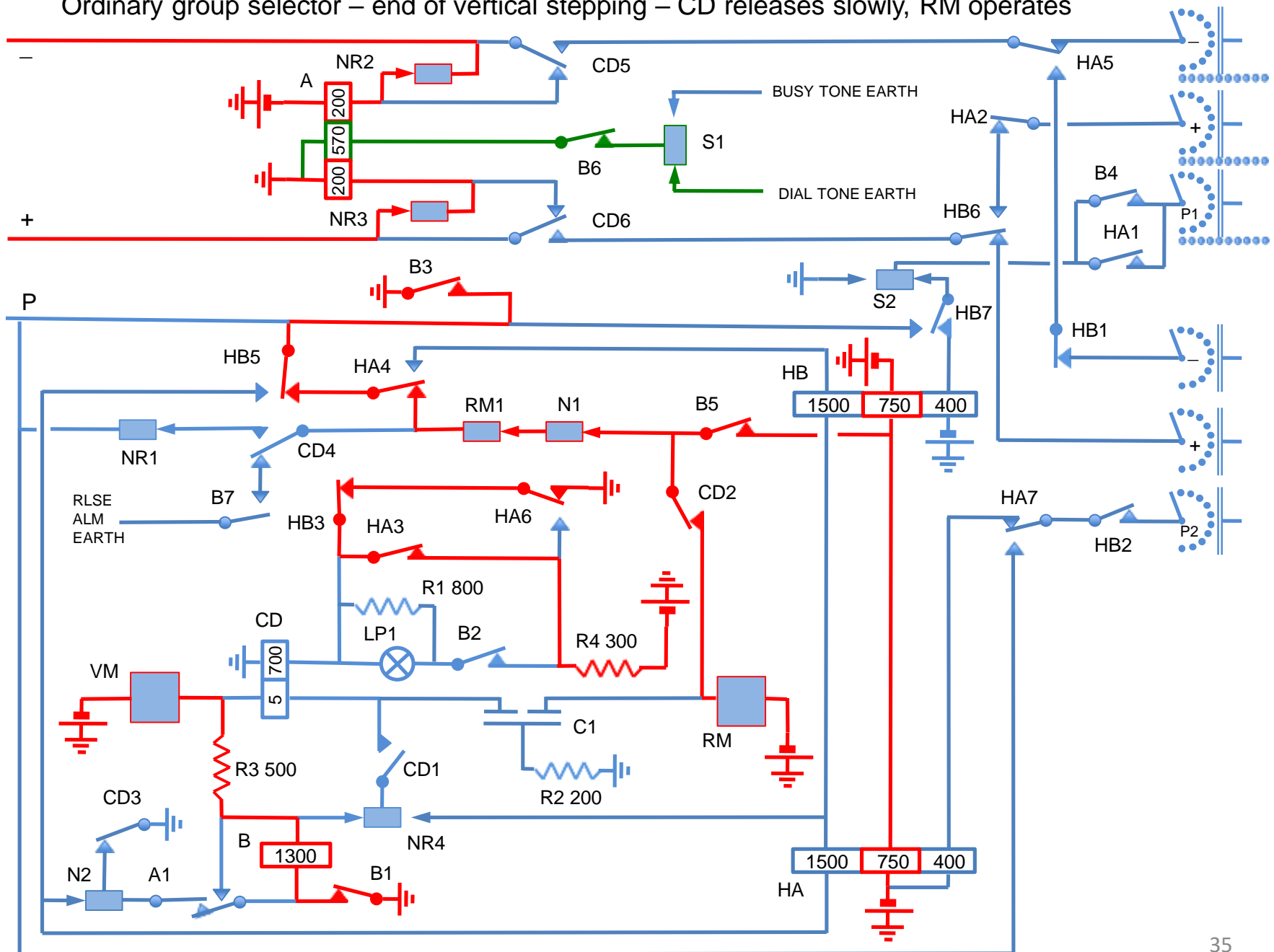
ASSUME BOTH P1
AND P2 EARTHED
ON FIRST OUTLET:
HA AND HB HOLD
ON 400 OHM COIL
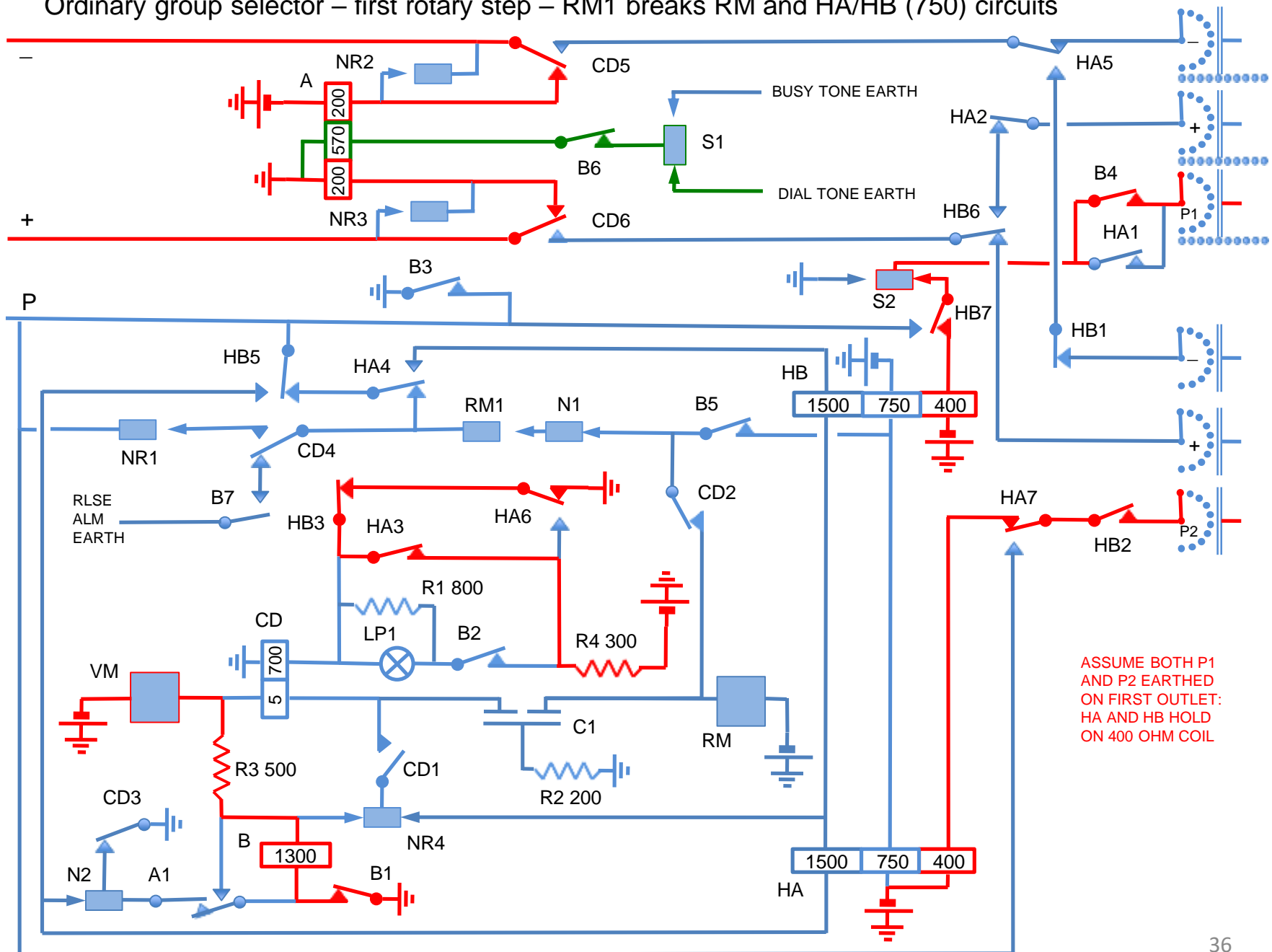
Ordinary group selector – free outlet found – HA and HB release, CD re-operates

37
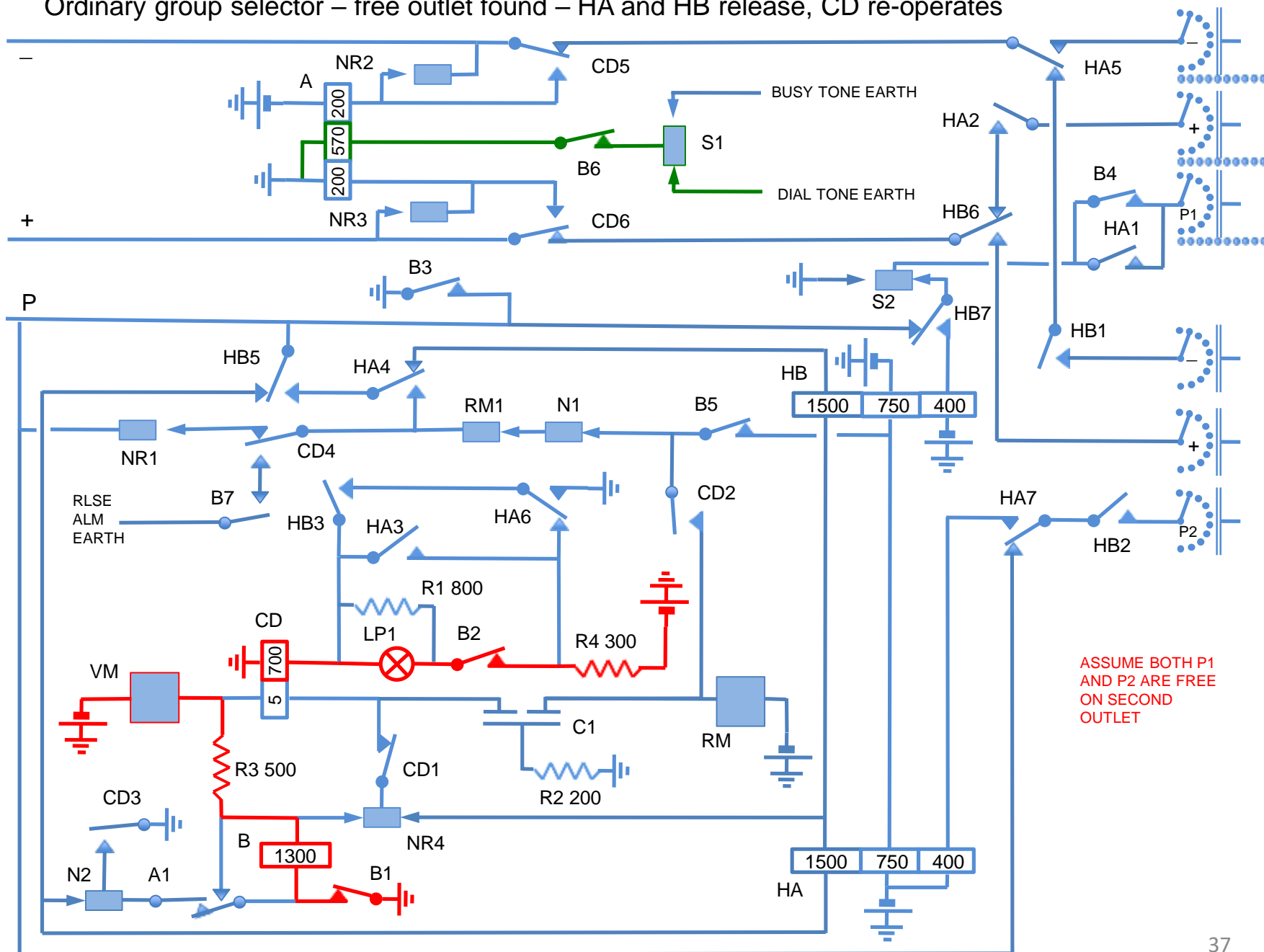
Ordinary group selector – connecting – A and B release, HA operates on 1500 Ohm coil

38
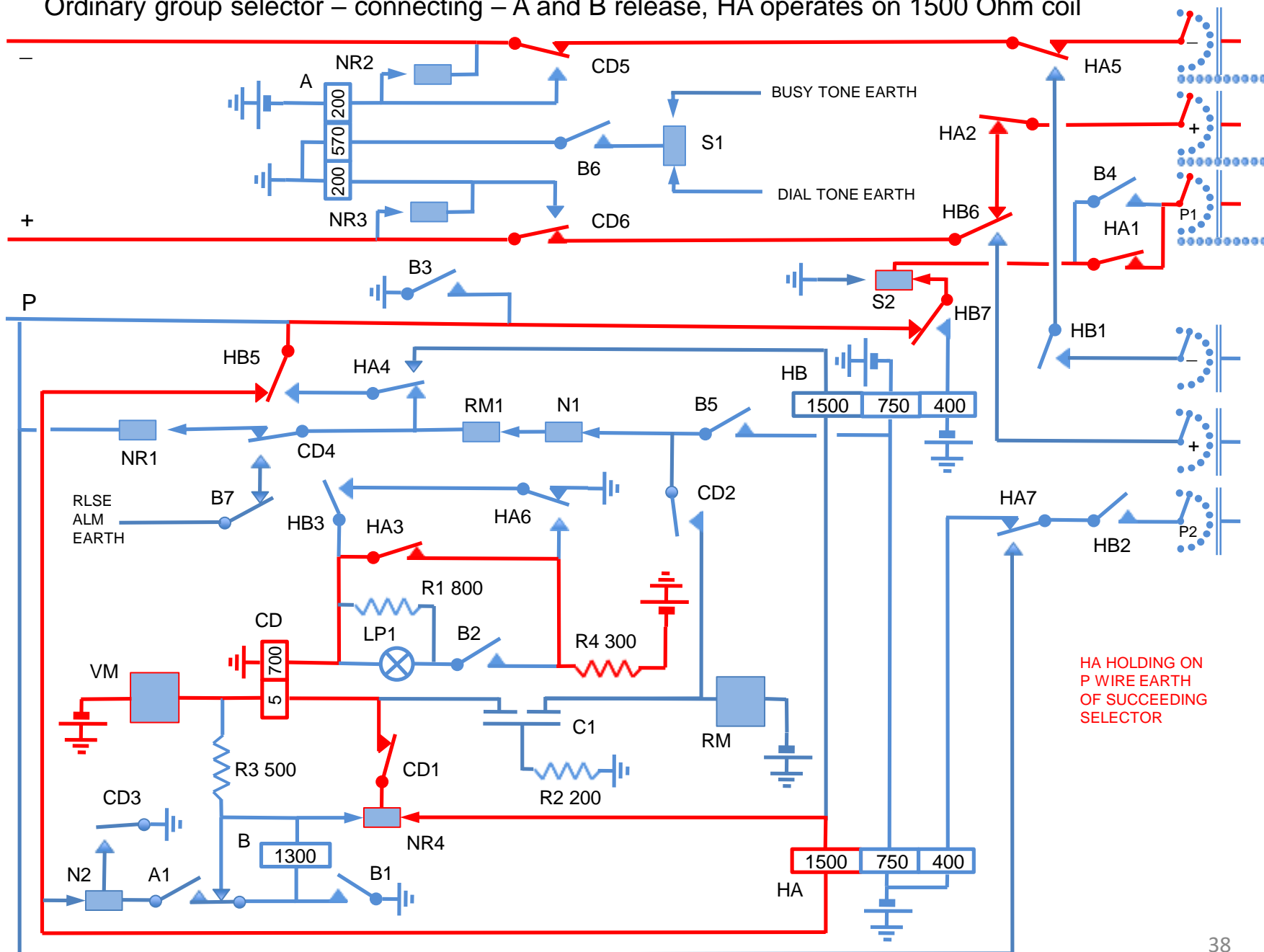
Ordinary group selector – normal release – HA and CD release, RM steps home
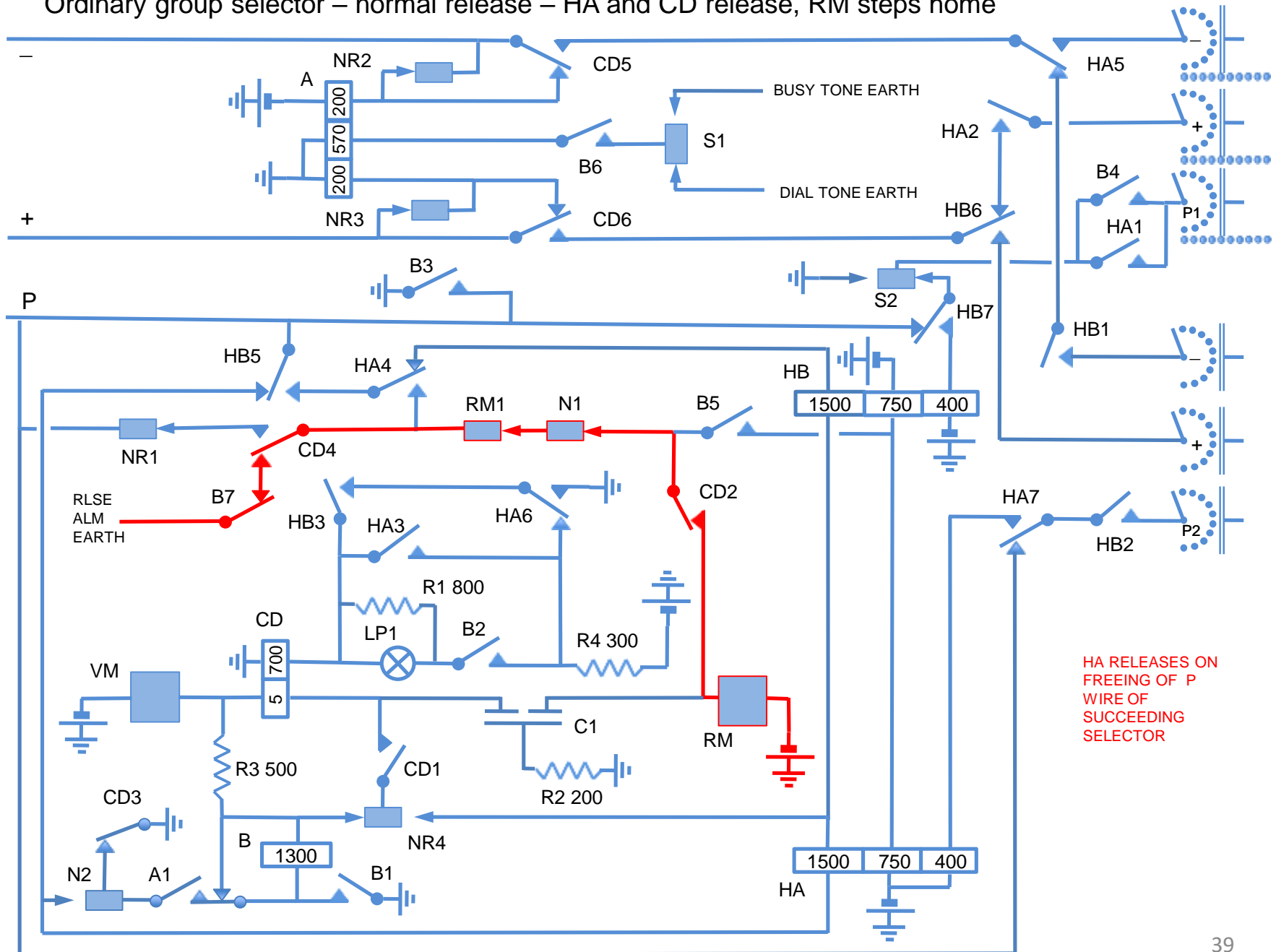
UAX13 Group Selector connected to an Ordinary Final Selector
(Example: ATW 600670 connected to ATW 52160)

to Final Selector

P

U9

S1

H7

P

U25

H | 2000 | 2000

B3

HX | 11

NR1

N2

B5

U10

N3

HX1

H6

150

RM

A UAX13 GROUP SELECTOR EXPECTS A 150 OHM BATTERY ON THE P WIRE OF A FREE FINAL SELECTOR TO OPERATE RELAY HX.
A FREE ORDINARY FINAL SELECTOR DOES NOT PROVIDE POWER ON ITS INCOMING P WIRE
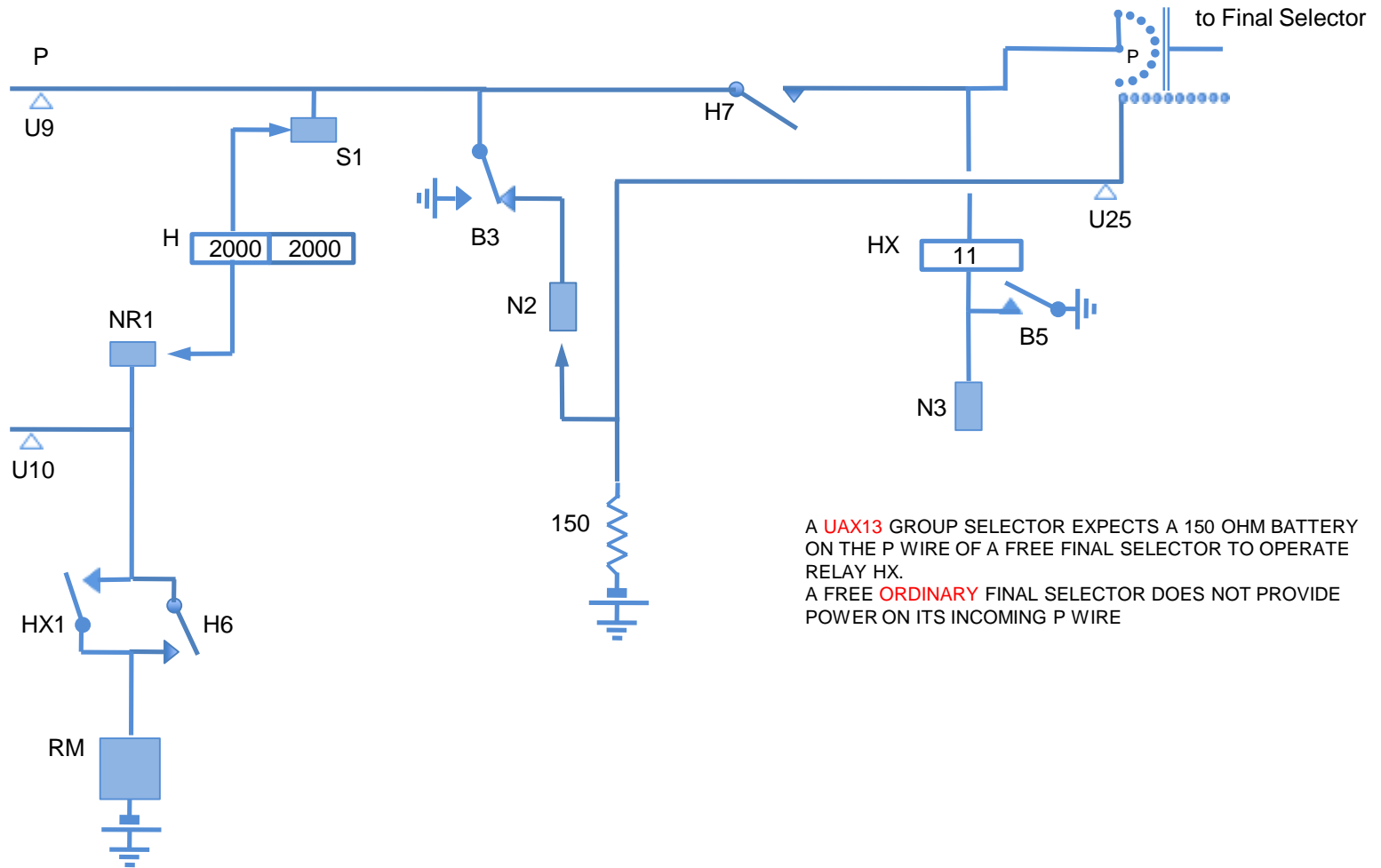
When group selector and final selector are both UAX13 – HX operates on 150 Ohm P wire battery

P wire
on batt !!

P

U9

S1

H7

P

U25

H 2000 2000

B3

HX 11

NR1

N2

B5

U10

N3

150

HX1   H6

CURRENT FLOW SHOWN IN RED, JUST
AFTER HX OPERATES ON P WIRE
BATTERY

H CONTACTS NOT YET ACTIVATED

RM

P wire gets earthed

P

U9

S1

H7

P

U25

H 2000 2000

B3

HX 11

NR1

N2

HX

B5

U10

N3

HX1   H6

150

RM

B RELEASES, P WIRE IS EARTHED BY NEXT SELECTOR
H6 TAKES OVER FROM HX1

Providing 150 Ohm battery

to Final Selector

P

HY1

U9

HY

S1

H7

P

U25

47uF
160V

H 2000 2000

B3

HX 11

NR1

N2

B5

U10

N3

150

HX1 H6

RM

TEMPORARY BATTERY CAN BE ARRANGED BY
CONNECTING AN ADDITIONAL RELAY HY BETWEEN POINTS
U9 AND U10.
RELAY B (NOT SHOWN HERE) OPERATES WHEN THE
GROUP SELECTOR IS SEIZED. IT PUTS AN EARTH TO U9.
A 150 OHM BATTERY IS ALREADY AVAILABLE ON POINT U25.
HY1 CONNECTS THE BATTERY TO THE P BANK.
THE EXTERNAL RELAY IS ACTIVATED WHEN HX OPERATES
ON TESTING A FREE FINAL SELECTOR. THAT DISCONNECTS
THE BATTERY FROM THE P WIRE. BY THAT TIME THE FREE
FINAL SELECTOR IS SEIZED.
A CAPACITOR HAS BEEN ADDED TO DELAY THE SEQUENCE.
A RELAY WITH A SLUG MAY ALSO BE USED.

UAX13 group selector – additional external relay HY to provide temporary batt on P wire

P wire on batt !!

P

U9

S1

HY

H 2000 2000

NR1

U10

HX1   H6

RM

B3

N2

150

HX 11

B5

N3

H7

U25

HY1

47uF 160V

CURRENT FLOW SHOWN IN RED, JUST AFTER HX OPERATES ON P WIRE BATTERY

H CONTACTS AND HY1 NOT YET ACTIVATED

RELAY HY: SONGLE SRD-48VDC-SL-C ADDED 47uF CAPACITOR TO CONTACTS TO SLOW THE RESPONSE
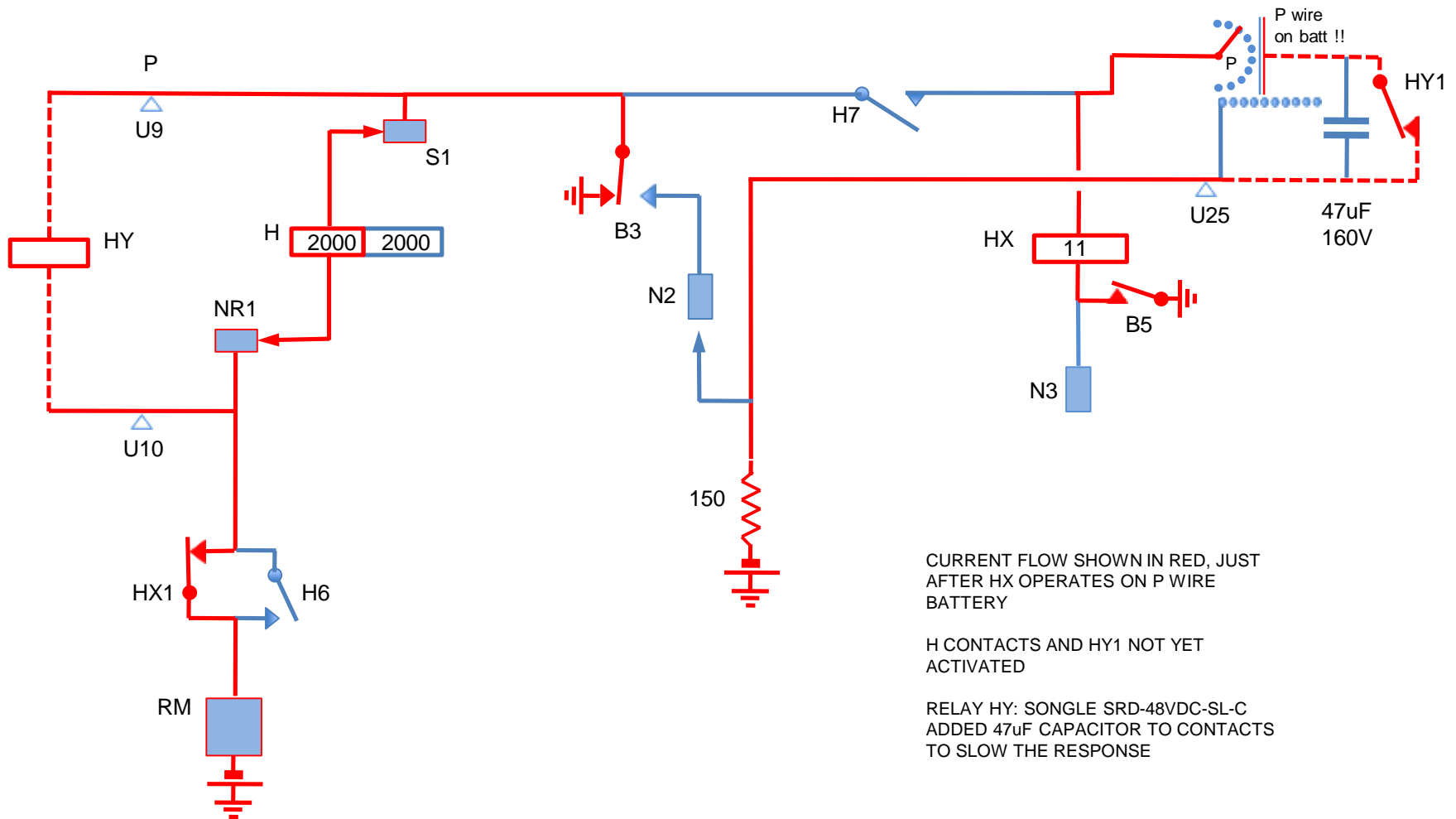
UAX13 group selector – connecting to ordinary selector – H and HY operate, B and HX release

P wire gets earthed

P

HY1

H7

U9

P

S1

HY

H 2000 2000

U25

47uF
160V

NR1

B3

N2

HX 11

U10

B5

N3

150

HX1   H6

CURRENT FLOW SHOWN IN RED, JUST
AFTER H OPERATES
B RELEASES, P WIRE EARTED BY NEXT
SELECTOR
H6 TAKES OVER FROM HX1

RM