Master Connection Diagram for the Systems Pow-R Breaker All Frame Ratings

I.S. 15262-A

Westinghouse Electric Corporation
Beaver, PA

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SPB MASTER CONNECTION DIAGRAM ACCESSORY INDEX

LINE	REFERENCES	FRAME RATING	TYPE TRIP	DWG. NO.	NOTES (SEE SH. 3)
51	Modular Key Drawing	250-800	ϕ	1371D01	3
52	Modular Key Drawing	250-800	PRT	1371D05	3
53	Modular Key Drawing	1600	ϕ	1371D02	3
54	Modular Key Drawing	1600	PRT	1371D06	3
55	Modular Key Drawing	2000-3000	ϕ	1371D03	3*
56	Modular Key Drawing	2000-3000	PRT	1371D07	3*
57	Modular Key Drawing	4000	ϕ	1371D04	3
58	Modular Key Drawing	1200	ϕ	1371D01	3
59	Modular Key Drawing	1200	PRT	1371D05	3
60	Modular Key Drawing	2000	ϕ	1371D02	3**
61	Modular Key Drawing	2000	PRT	1371D06	3**
62	Master Wiring Diagram	All	All	1366D30	
63	Gnd. Fault Scheme	250-1600	ϕ	1273C41	4
64	Gnd. Fault Scheme	2000-4000	ϕ	1273C40	4
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80	Field Testing	All	All	I.L. 15094	
81	Mechanical Cable Interlock	All	–	I.L. 15129	
82	General Instructions	All	–	I.L. 15082	
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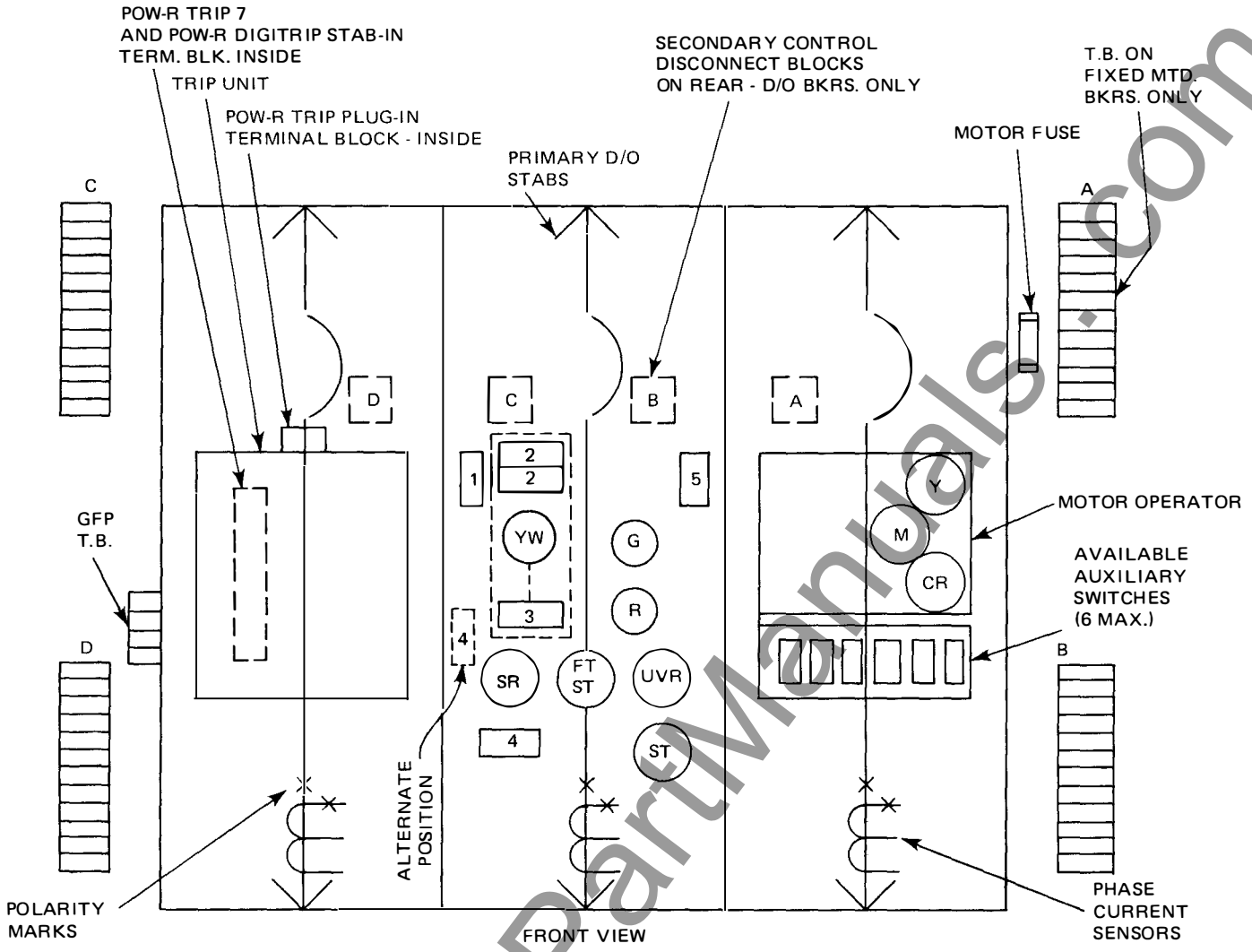
SPB MASTER CONNECTION DIAGRAM DRAWING REFERENCE INDEX

*2000A. in 22 in. high frame
**2000A. in compact, 16 in. high frame ϕ Pow-R Trip 7 or Pow-R Digitrip

1. On D/O Breakers color coded pigtail leads provided for connecting to customer's terminal block. Standard length 6 feet unless ordered special.
2. Term Blocks available for Mounting on Stationary D/O Frame Sides on special order.
3. For Reference purposes, specific accessory styles are shown on the appropriate Modular Key Drawings referenced on Sheet 2. The exact location of this style can be determined by combining the appropriate Modular Key Drawing No. and Key Code (from the individual diagram sheet utilized).
4. For Proper Ground Fault Sensing complete connections must be included from appropriate referenced drawing.
5. Any combination of accessories not utilizing same Secondary Control Stab Points may be used on any single breaker.
6. All SPB breakers equipped with GFP will trip near instantaneous (0.03-0.08 sec.) Regardless of the time band setting — if downstream interlock wiring is not employed and/or a jumper is not added between control terminals C4 and C5. With the jumper added, the breaker will respond to the pre-set time delay setting. Consider adding this jumper for all installations with GFP on the main breaker only. For installations with multiple levels of GFP, see Sheet 31.
7. On breakers with Pow-R Trip 7, Lead C6 (Blue) is used for factory test purposes only. On breakers with Pow-R Digitrip, Lead C6 (Blue) is used in ATR/Power Pack — See Sheet 41. On breakers with Pow-R Trip, Leads C5 (Green) and C6 (Blue) are used for factory test purposes only.
8. Pow-R breakers have been designed for maximum ground fault and electronic attachment flexibility and interchangeability. For this reason many Leads in the C and D block will be supplied but may not be used by a customer for his particular application.

SPB MASTER CONNECTION DIAGRAM
GENERAL NOTES



1 SPRING RELEASE CUT-OFF SWITCH (b)

2 TWO SPRING CHARGE SWS. (SC). TOP SW. IS (SR) CUT-OFF,– BOTTOM SW. IS (M) CUT-OFF.

3 MOTOR CHARGE P.B. CONTACT SWITCH

(SR) SPRING RELEASE

4 LATCH CHECK SWITCH (LC)

(UVR) UNDERVOLTAGE RELEASE

5 SHUNT TRIP CUT-OFF SWITCH (a/b)

(YW) MOTOR CHARGE P.B. (YELLOW)

(G) MECHANICAL CLOSE P.B. (GREEN)

(R) MECHANICAL OPEN P.B. (RED)

(Y) ANTI-PUMP RELAY

(CR) CHARGE RELAY

(M) MOTOR

(FT ST) FLUX TRANSFER SHUNT TRIP

(ST) SHUNT TRIP

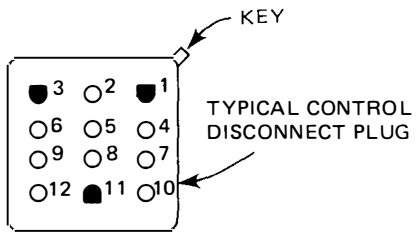
SPB MASTER CONNECTION DIAGRAM
SPB - Accessory Mounting Locations

LEGEND*

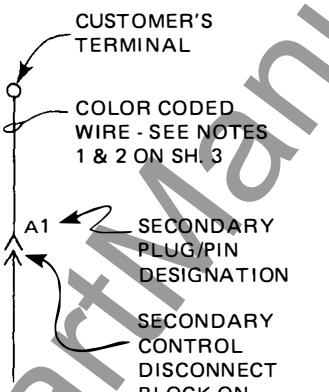
SR – SPRING RELEASE - CLOSES BKR. ON REMOTE SIGNAL
ST – SHUNT TRIP - OPENS BKR. ON REMOTE SIGNAL
FTST – FLUX TRANSFER SHUNT TRIP - OPENS BKR. ON SIGNAL FROM TRIP UNIT
CR – MOTOR CHARGE RELAY - 3 SECONDS CHARGE TIME
Y – ANTI-PUMP RELAY
SC – SPRING CHARGED SWITCH
LC – LATCH CHECK SWITCH - HELD IN OPEN POSITION BY ROTATING TRIPPER (D/O MECHANISM OR KEY INTERLOCK), OR OMISSION OF RATING PLUG
UVR – UNDERVOLTAGE RELEASE
a – AUXILIARY SWITCH "OPEN" WITH BKR., OPEN
b – AUXILIARY SWITCH "CLOSED" WITH BKR. OPEN
ATR – AUTOMATIC TRIP RELAY

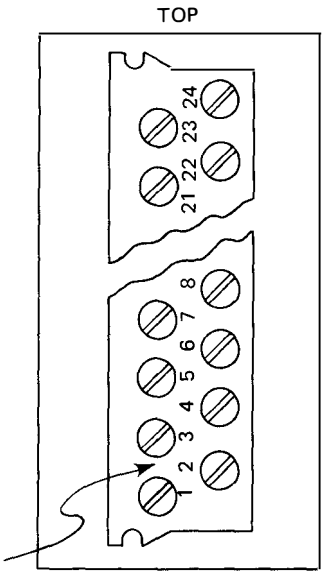
INDICATING LIGHT (W, WHITE; A, AMBER; R, RED; G, GREEN; L, COLOR TO SUIT; LED, LIGHT EMITTING DIODE)

*ALL CONTACTS SHOWN IN BREAKER "OPEN" POSITION



PLUG LAYOUT SHOWN AS VIEWED FROM FRONT OF BREAKER



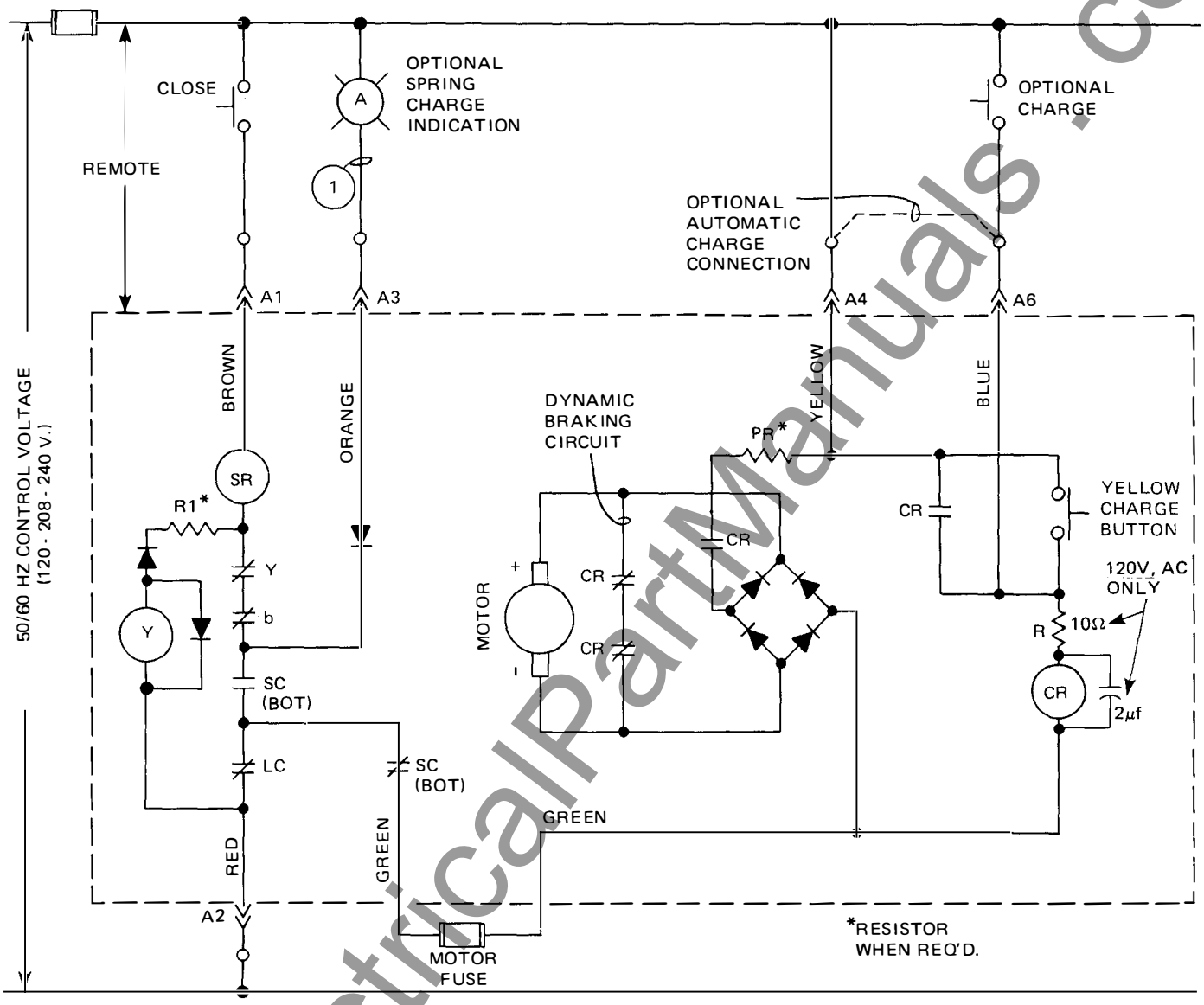


WIRING TERMINATIONS

MALE PIN - S#1268C07H10 OR
AMP "MATE-N-LOK" P/N 350705-1
FEMALE SOCKET - S#1268C07H08 OR
AMP "MATE-N-LOK" P/N 350550-1
HANDCRIMP TOOL -
AMP "MATE-N-LOK"
P/N - 90298-1 FOR #18-20
P/N - 90299-1 FOR #14-16
EXTRACTION TOOL -
AMP "MATE-N-LOK P/N 458994-1
1285C01H14

SPB MASTER CONNECTION DIAGRAM
SPB - Accessory Legend and Misc Details

Reference
I.L. 15377

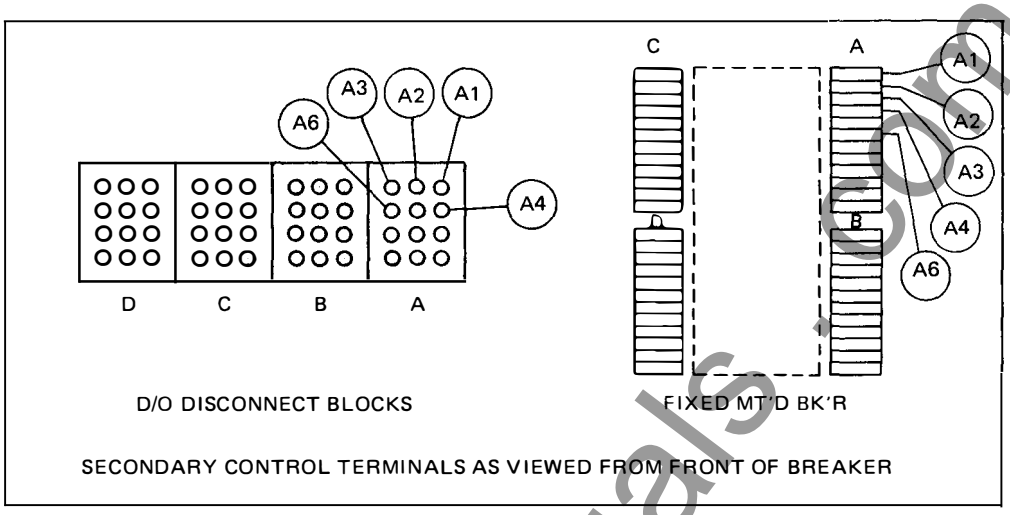


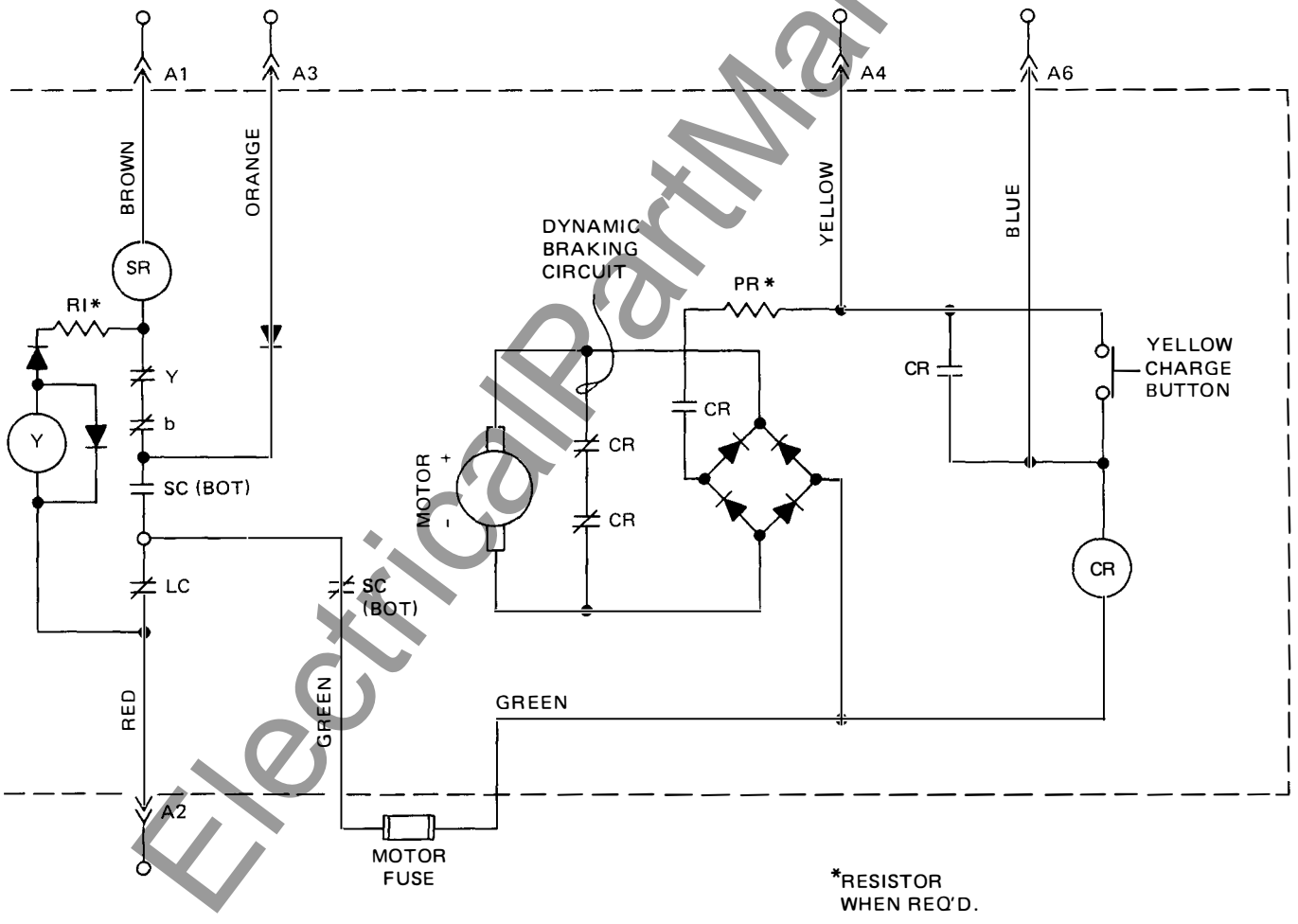
(1) - MAXIMUM CURRENT ALLOWED IN A3 CIRCUIT - 1.0 AMP

SPB MASTER CONNECTION DIAGRAM

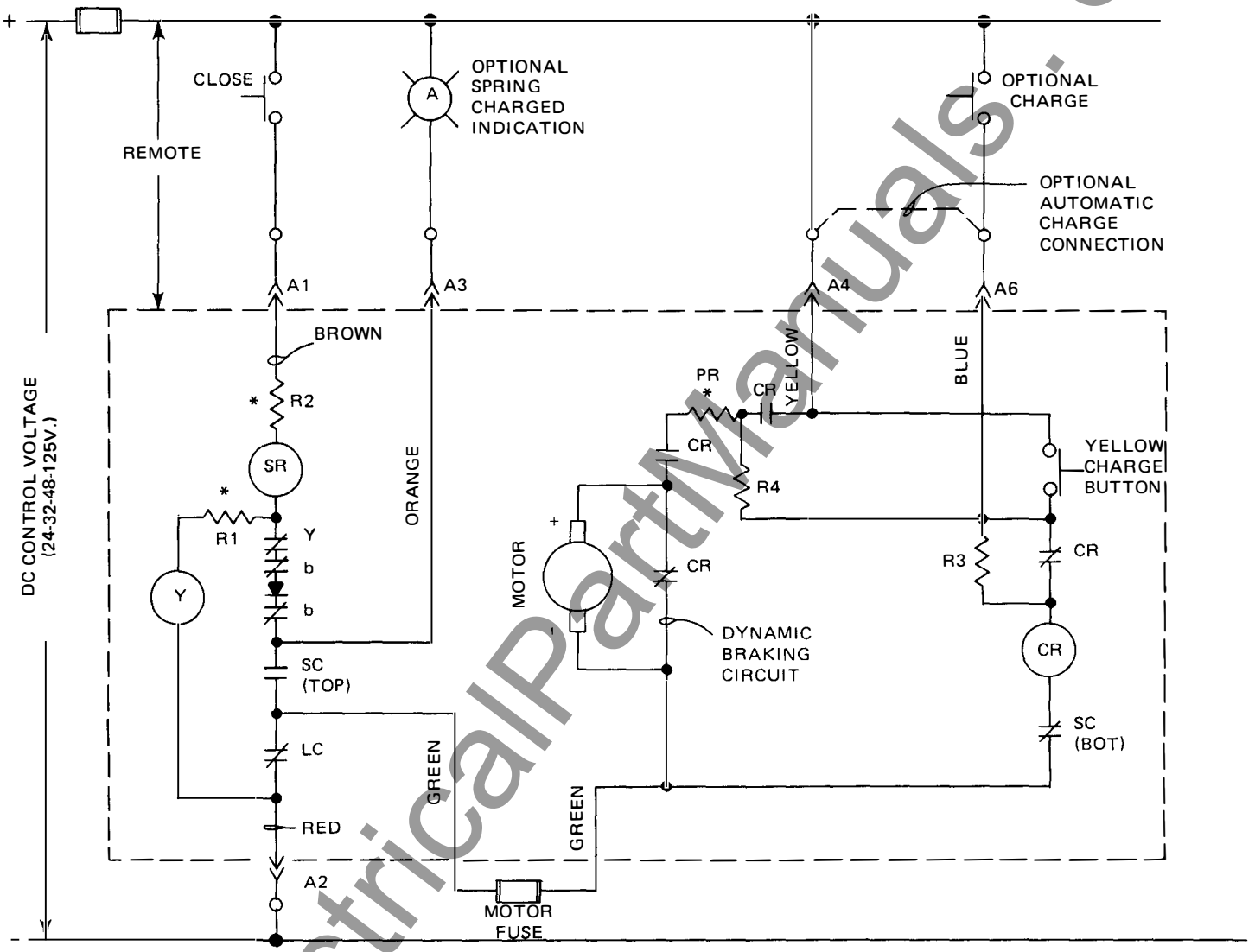
SPB - Typical AC Motor Operator with External Connections

AVAILABLE VOLTAGES 50/60 HZ	KEY CODE
120	H01
208	H02
240	H03





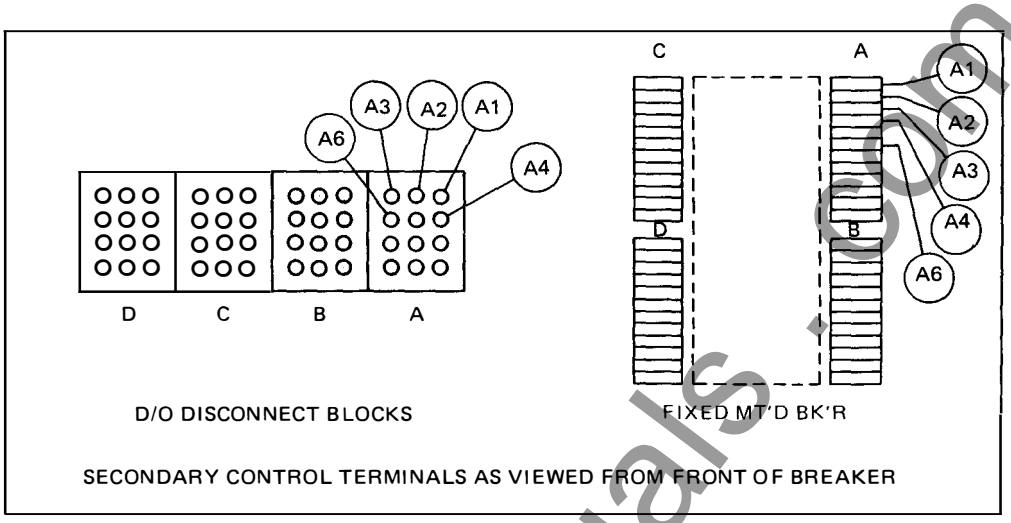
SPB MASTER CONNECTION DIAGRAM
SPB - AC Motor Operator Schematic

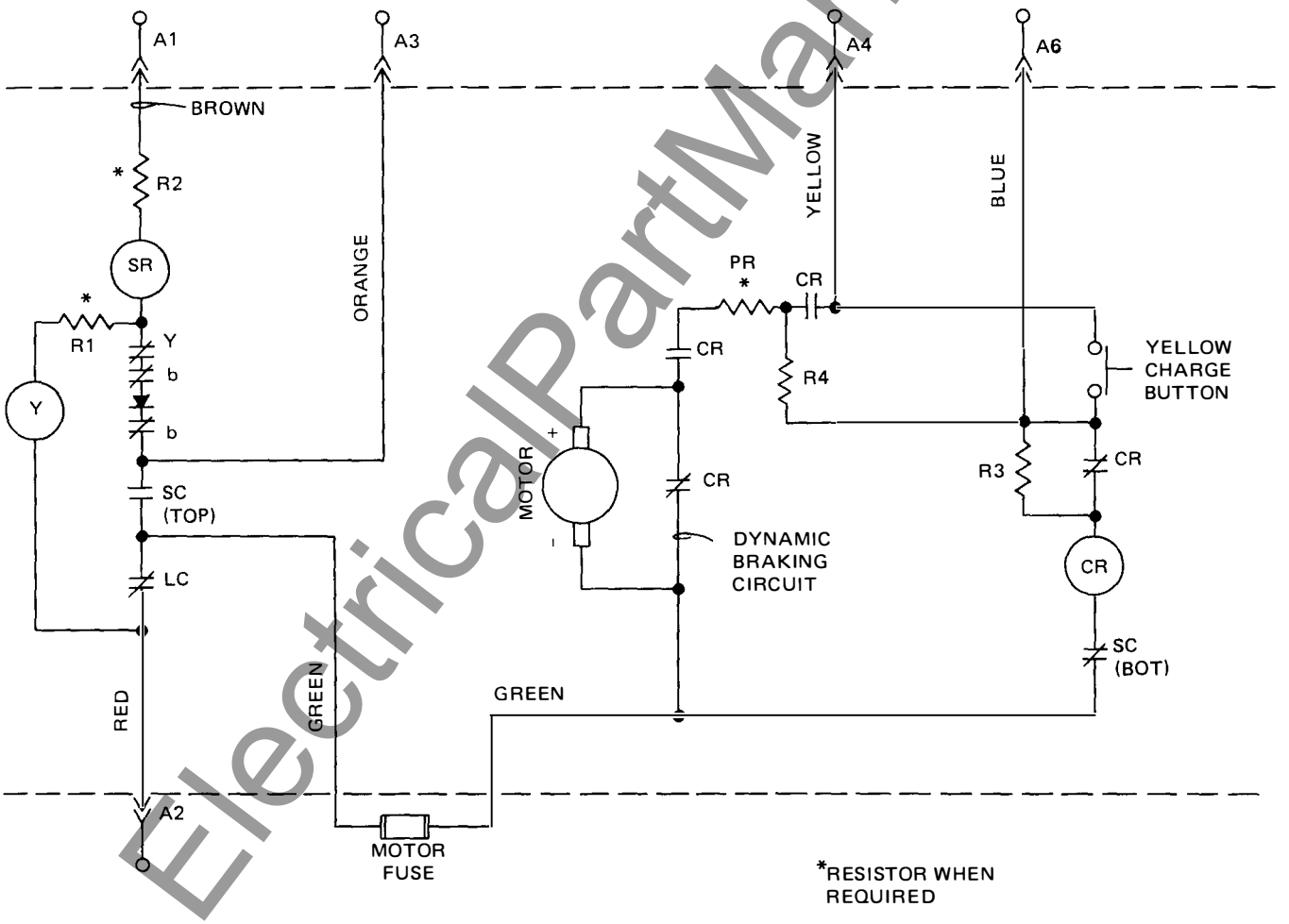


*RESISTOR WHEN REQUIRED

SPB MASTER CONNECTION DIAGRAM
SPB - Typical DC Motor Operator with External Connections

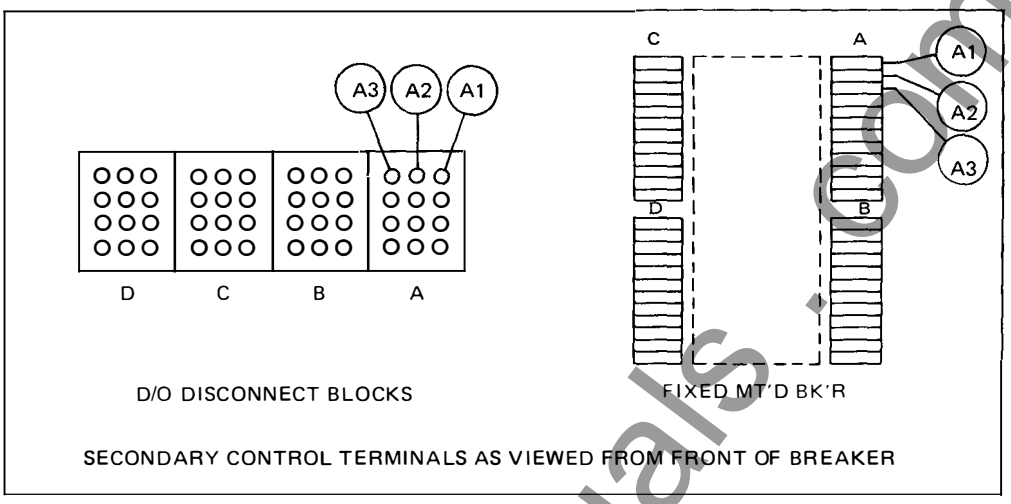
AVAILABLE VOLTAGES DC	KEY CODE
24	H06
32	H07
48	H08
125	H10

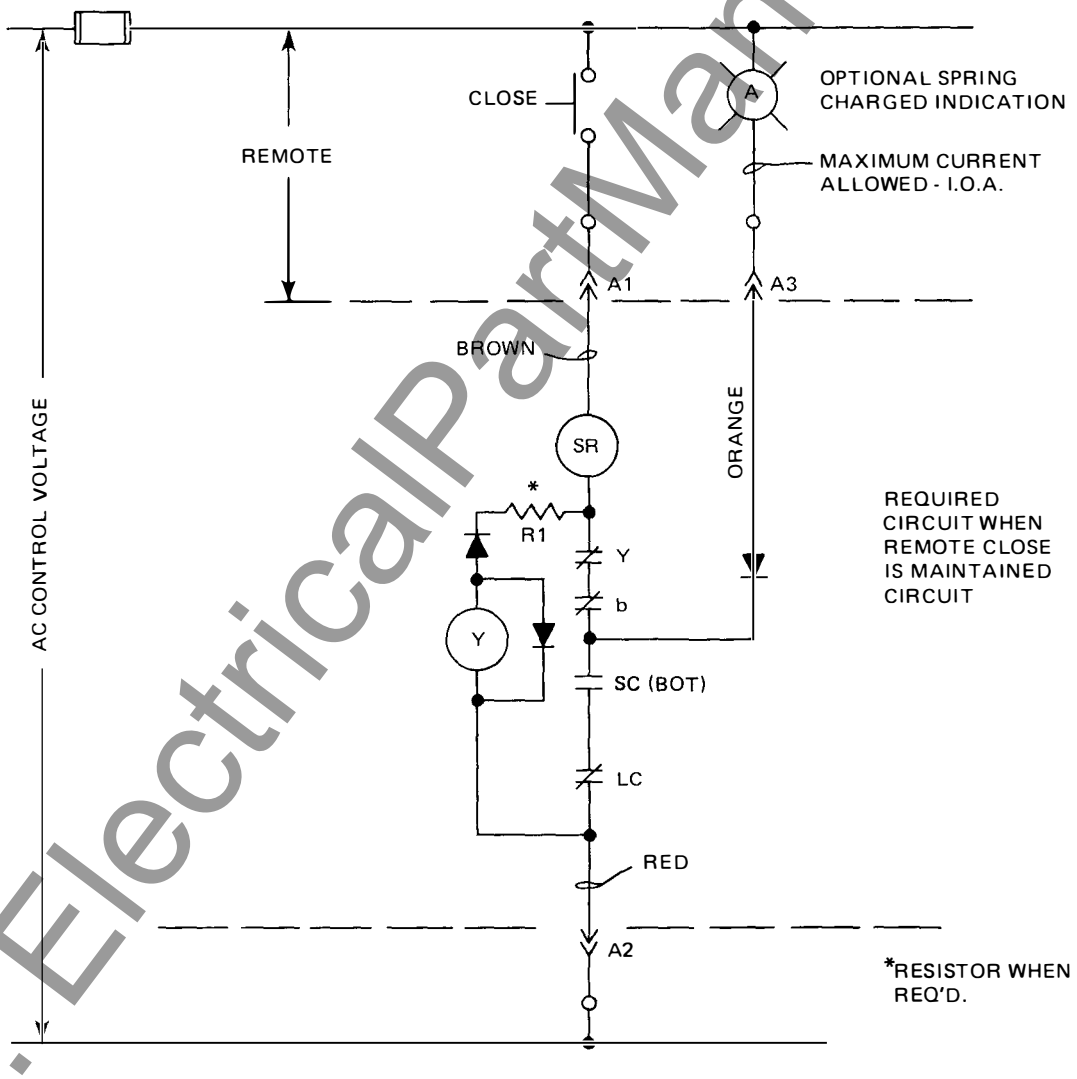




SPB MASTER CONNECTION DIAGRAM
SPB - DC Motor Operator Schematic

AVAILABLE VOLTAGES 50/60 HZ	KEY CODE
120	M23
208	M24
240	M25

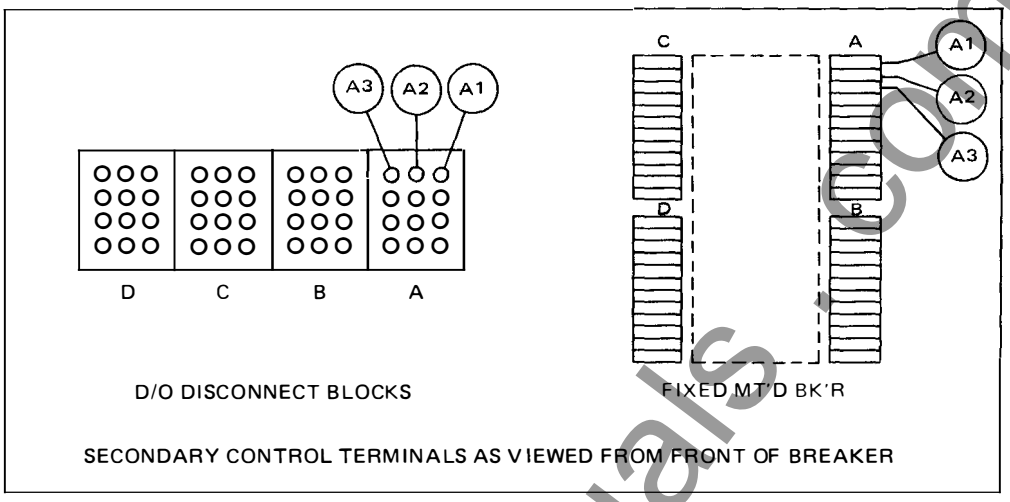


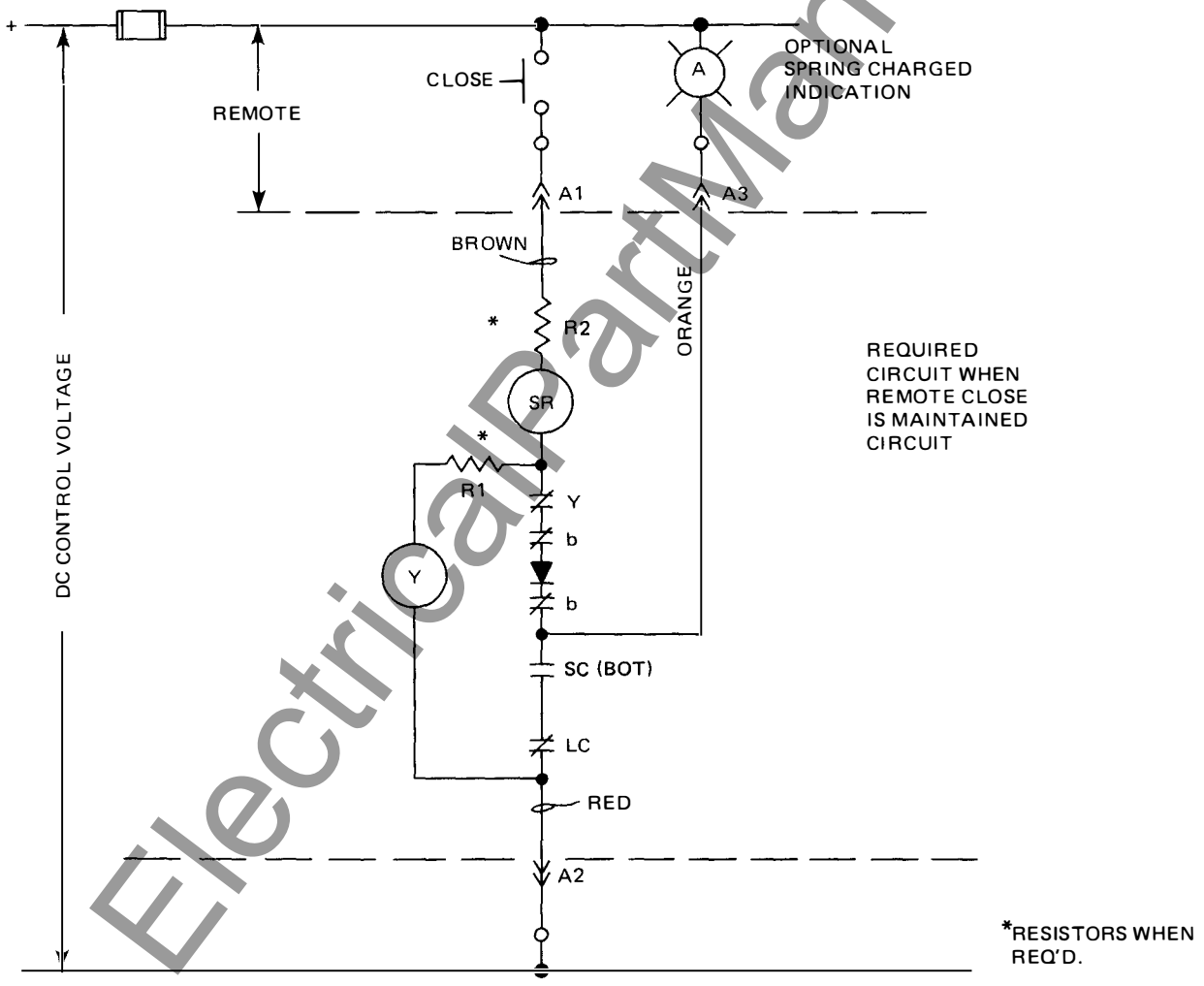


SPB MASTER CONNECTION DIAGRAM

SPB - AC Spring Release With Anti-Pump Relay Schematic Diagram (For Use With Manual Breakers)

AVAILABLE VOLTAGES DC	KEY CODE
24	M29
32	M30
48	M31
125	M33

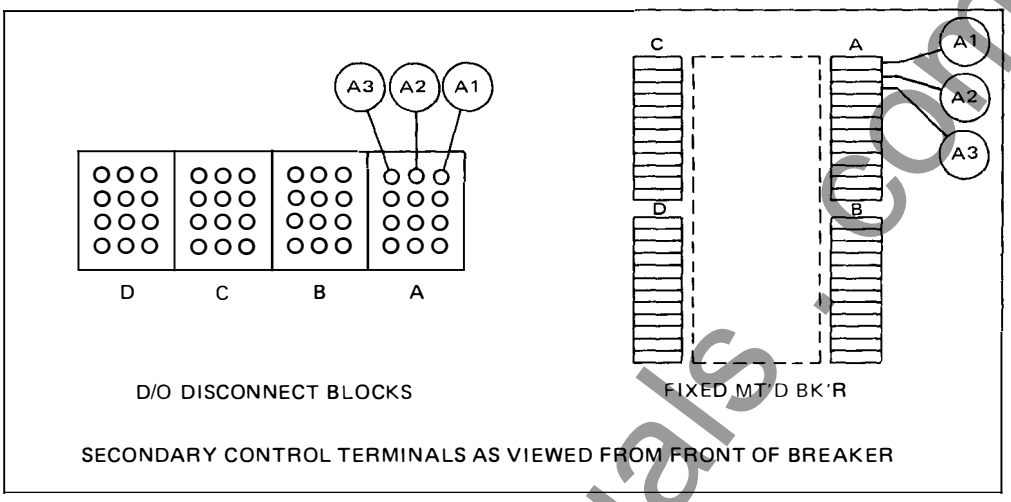


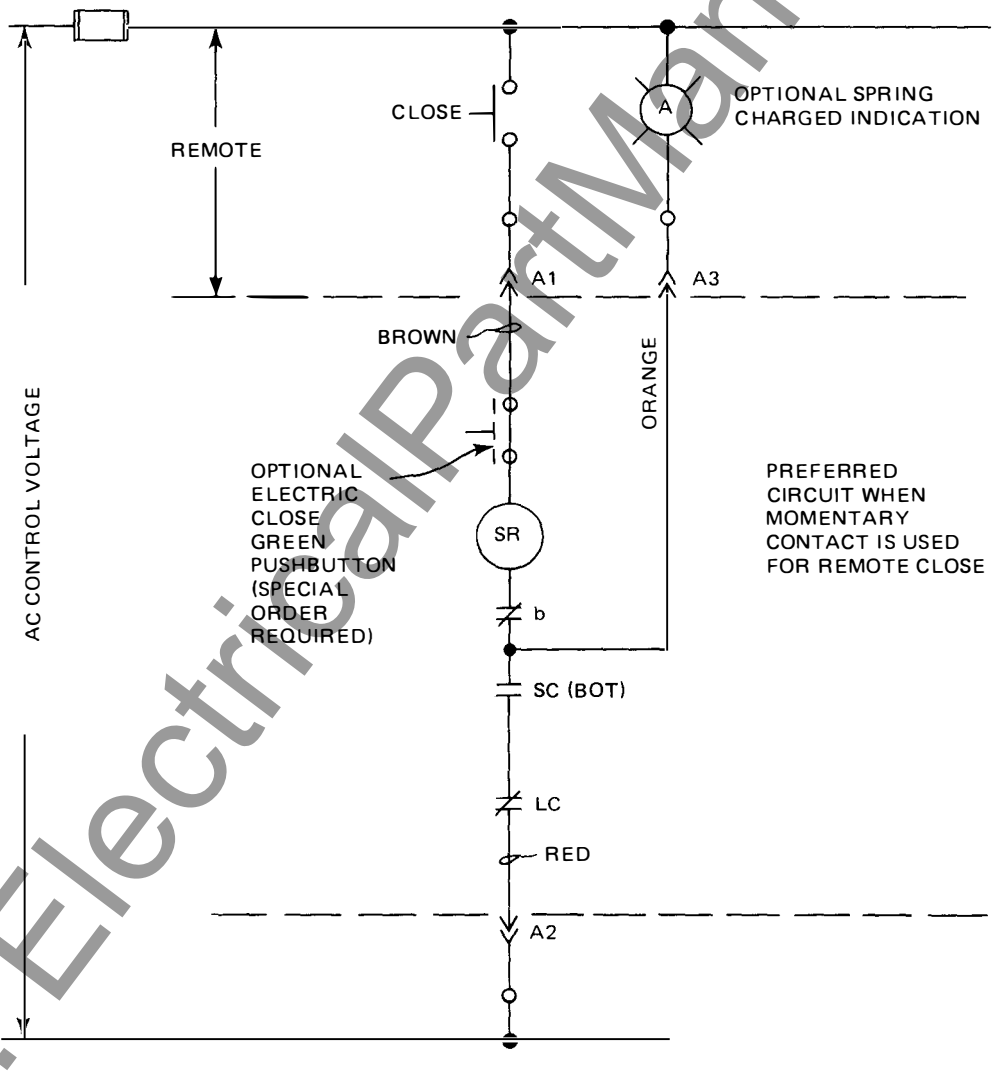


SPB MASTER CONNECTION DIAGRAM

SPB - DC Spring Release With Anti-Pump Relay Schematic Diagram (For Use With Manual Breakers)

AVAILABLE VOLTAGES 50/60 HZ	KEY CODE
120	M03
208	M04
240	M05

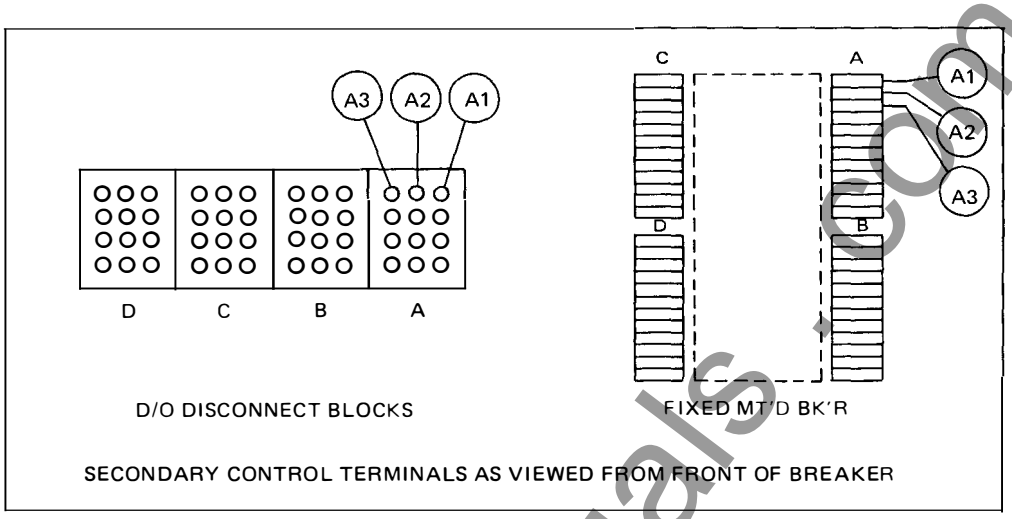


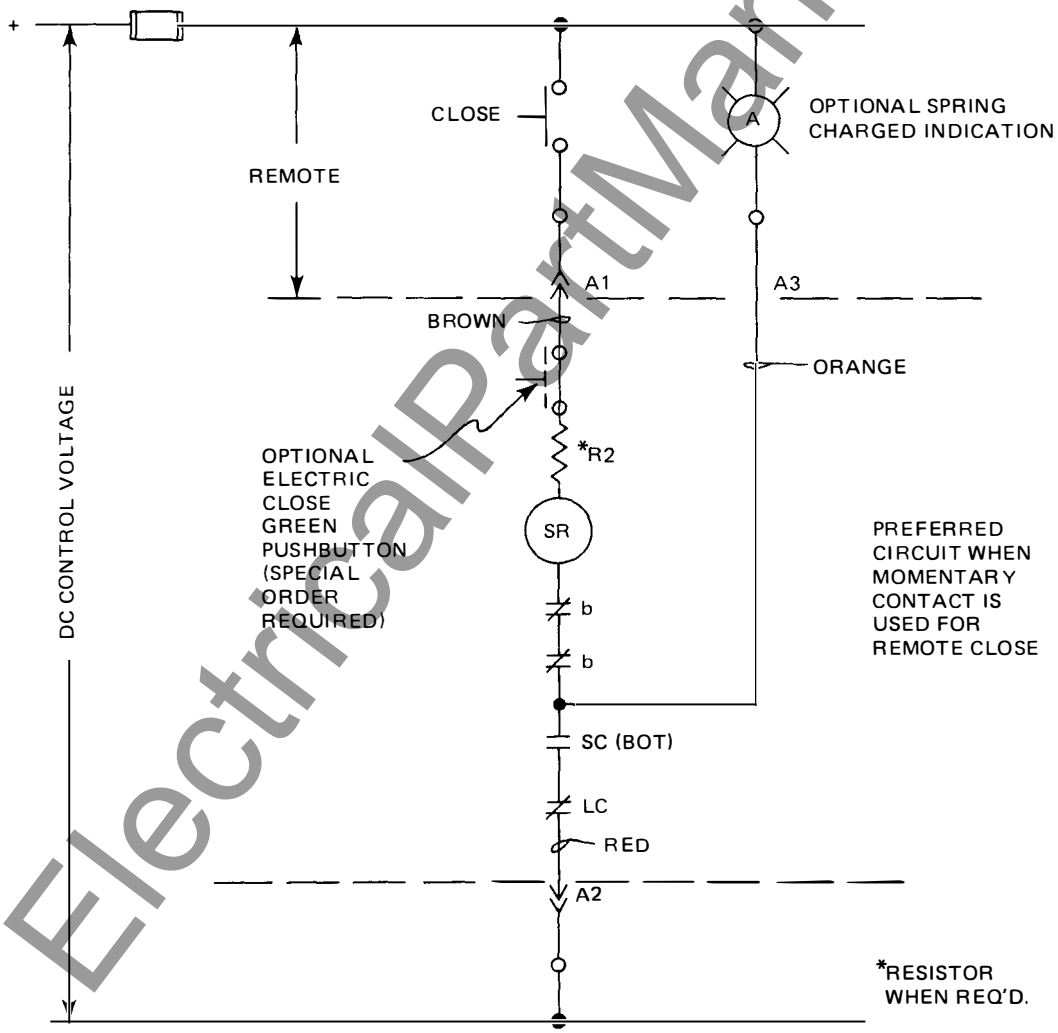


SPB MASTER CONNECTION DIAGRAM

SPB - AC Spring Release Without Anti-Pump Relay Schematic Diagram (For Use With Manual Breakers)

AVAILABLE VOLTAGES DC	KEY CODE
24	M09
32	M10
48	M11
125	M13

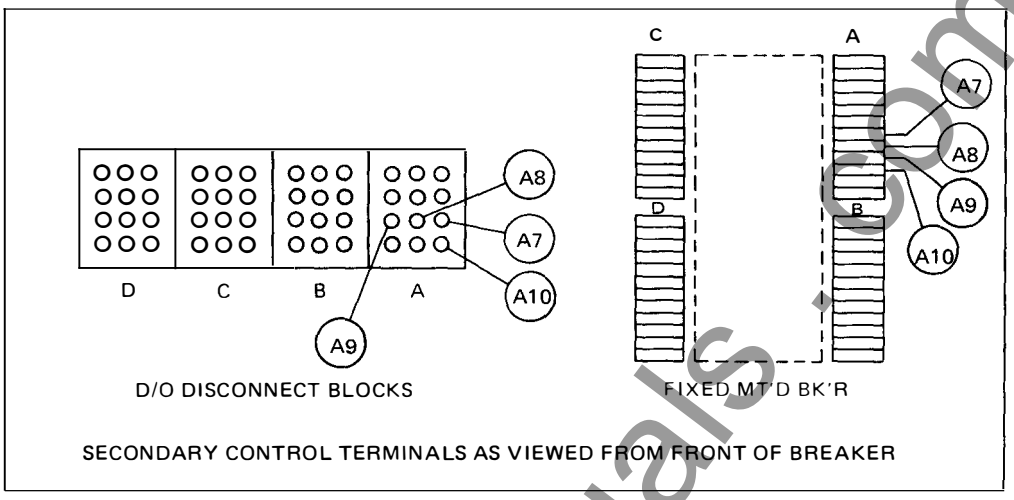


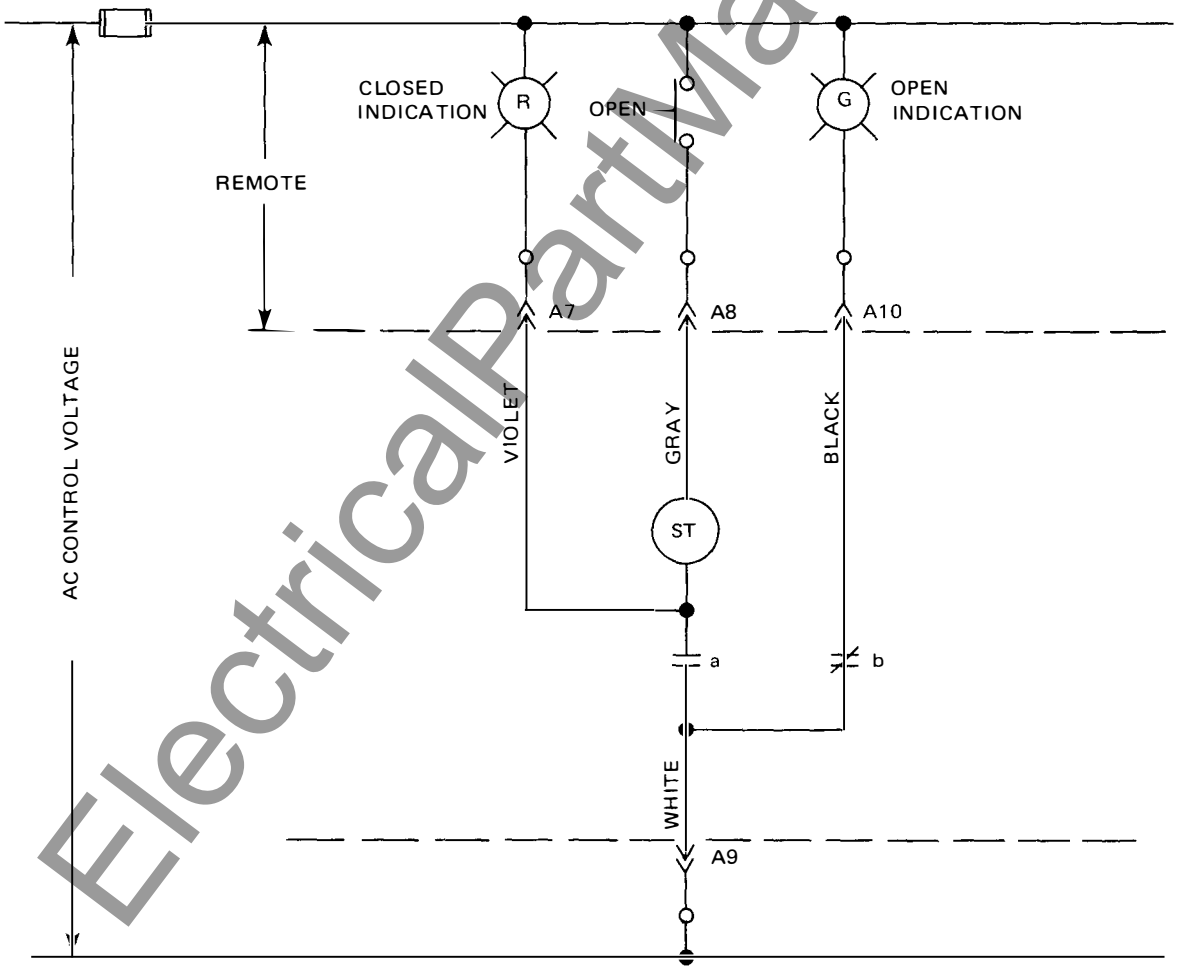


SPB MASTER CONNECTION DIAGRAM

SPB - DC Spring Release Without Anti-Pump Relay Schematic Diagram (For Use With Manual Breakers)

AVAILABLE VOLTAGES 50/60 HZ	KEY CODE
24	J01
48	J02
120	J03
208	J04
240	J05
480	J06
600	J07

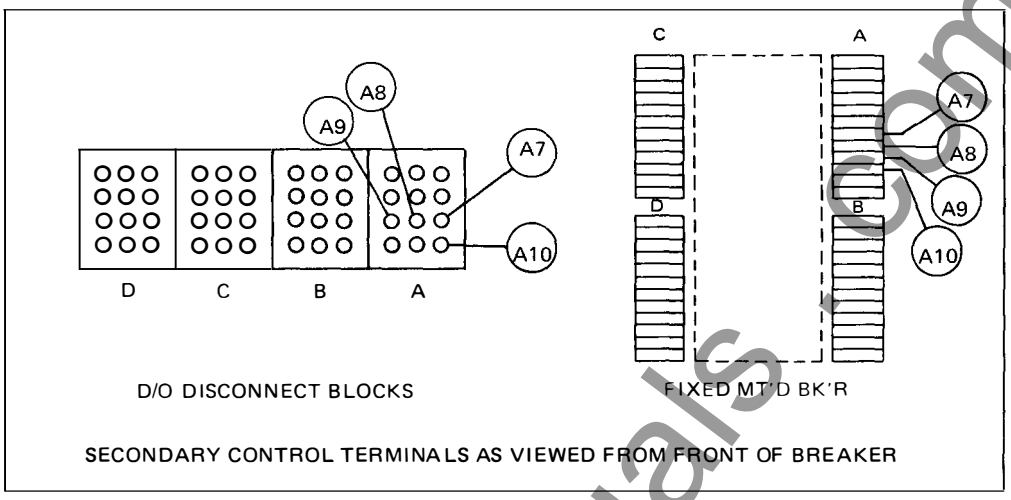


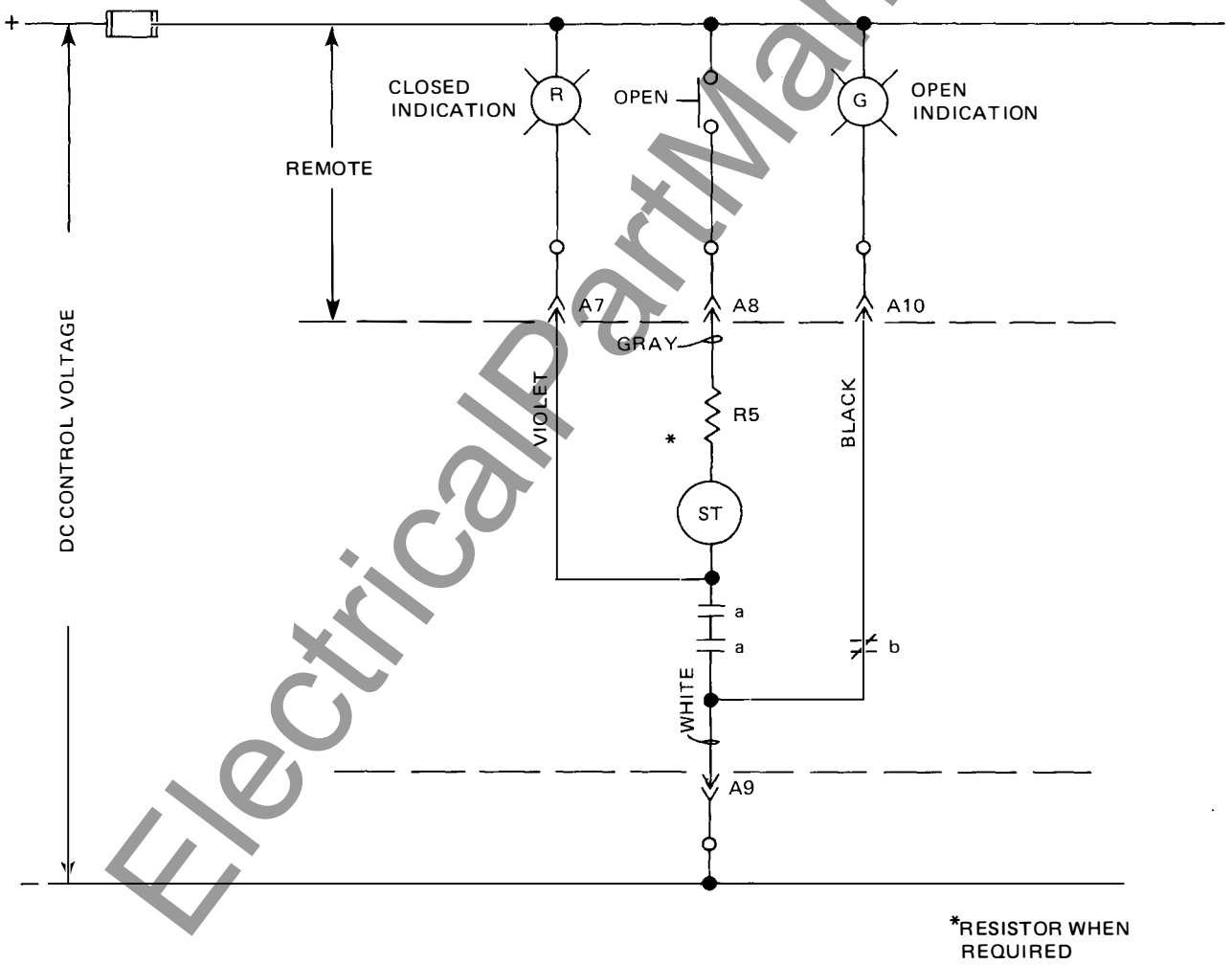


SPB MASTER CONNECTION DIAGRAM
SPB - AC Shunt Trip Schematic Diagram

Reference
I.L. 15158

AVAILABLE VOLTAGES DC	KEY CODE
24	J09
32	J10
48	J11
60	J12
125	J13

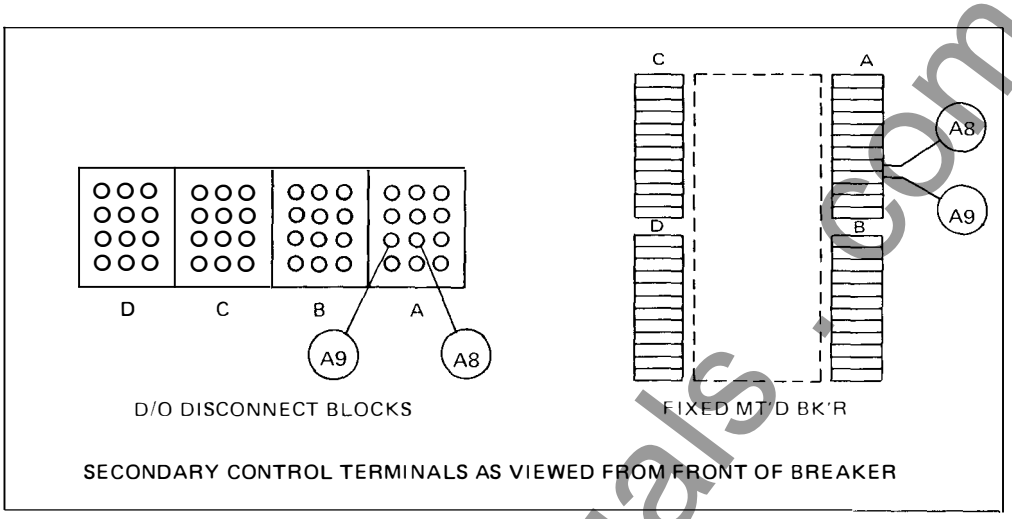


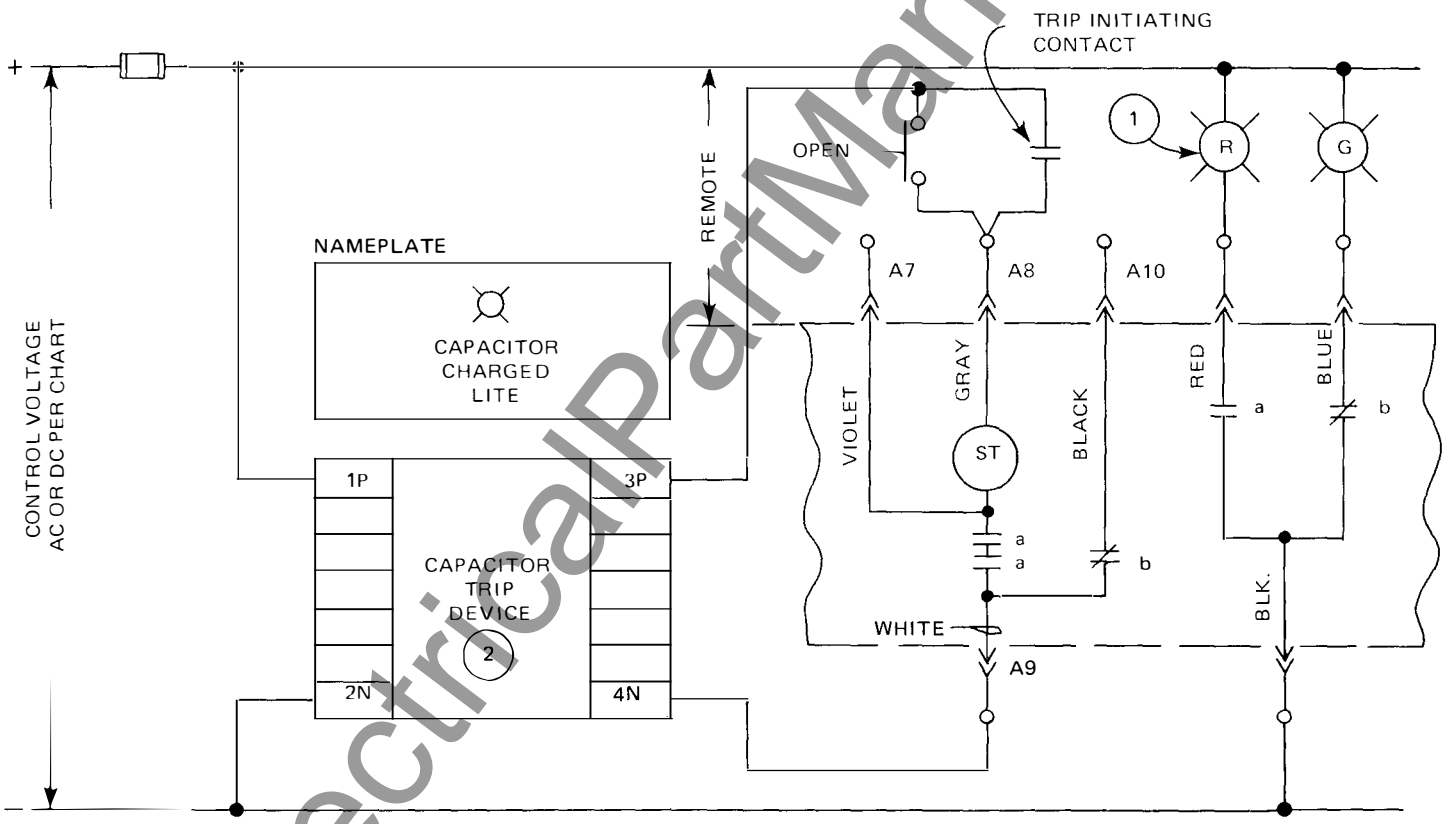


SPB MASTER CONNECTION DIAGRAM
SPB - DC Shunt Trip Schematic Diagram

Reference
I.L. 15158

CAP. TRIP STYLE 1283C62	SPB SHUNT TRIP VOLTAGE KEY CODE	
	50/60 HZ	DC
G01	120 ③	125
	J13 ③	J13
G02	60 ③	60
	J12	J12
G03	48	48
	J2	J11
G04	24	24
	J1	J9





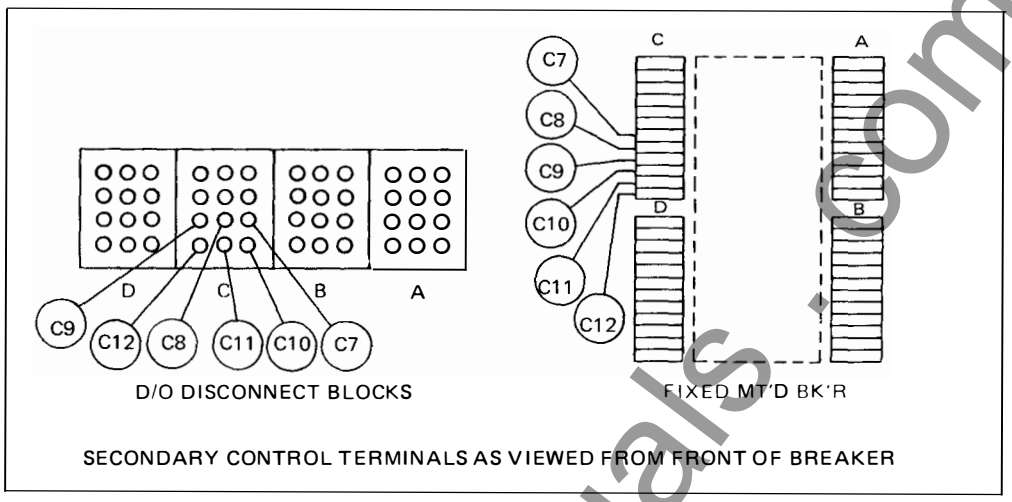
1. TO AVOID UNNECESSARY DRAIN ON CAPACITOR, USE SPARE AUXILIARY CONTACTS FOR REMOTE INDICATION.
2. MINIMUM STORAGE TIME – 5 SECONDS TO 75% VOLTAGE.
3. FOR 50/60 HZ CONTROL VOLTAGE, SELECT DC SHUNT TRIP WITH KEY CODE AS INDICATED.

SPB MASTER CONNECTION DIAGRAM
SPB - Capacitor Trip Device Connection Diagram

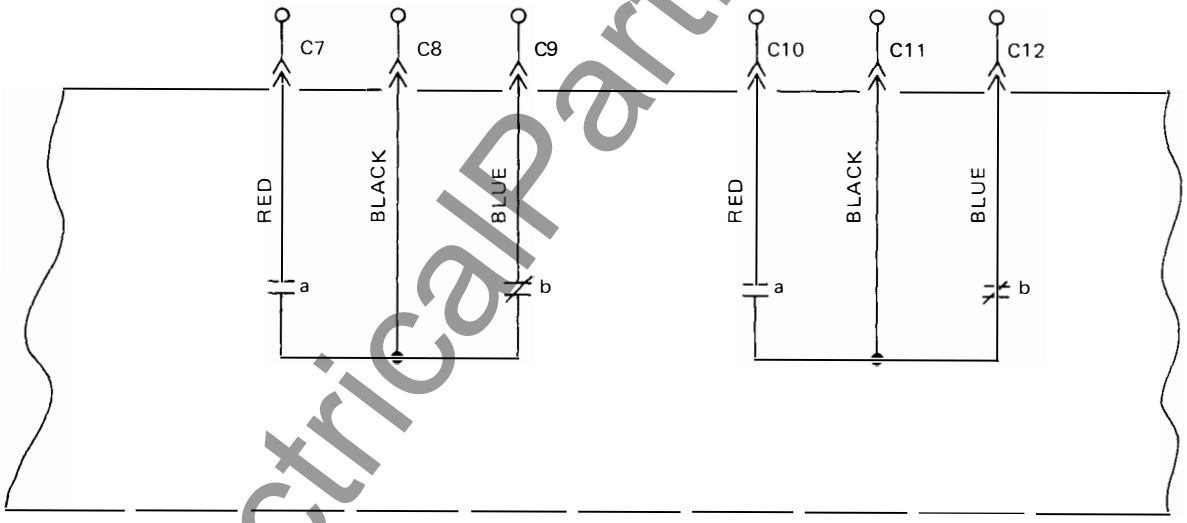
Reference
I.L. 15146

NO. OF a/b SWITCHES	KEY CODE
2	L01

AUXILIARY SW. CONTACT RATING (MAX.)	
120-600 VOLTS 50/60 HZ.	24-125 VOLTS DC
6.0A.	0.5A.



SECONDARY CONTROL TERMINALS AS VIEWED FROM FRONT OF BREAKER

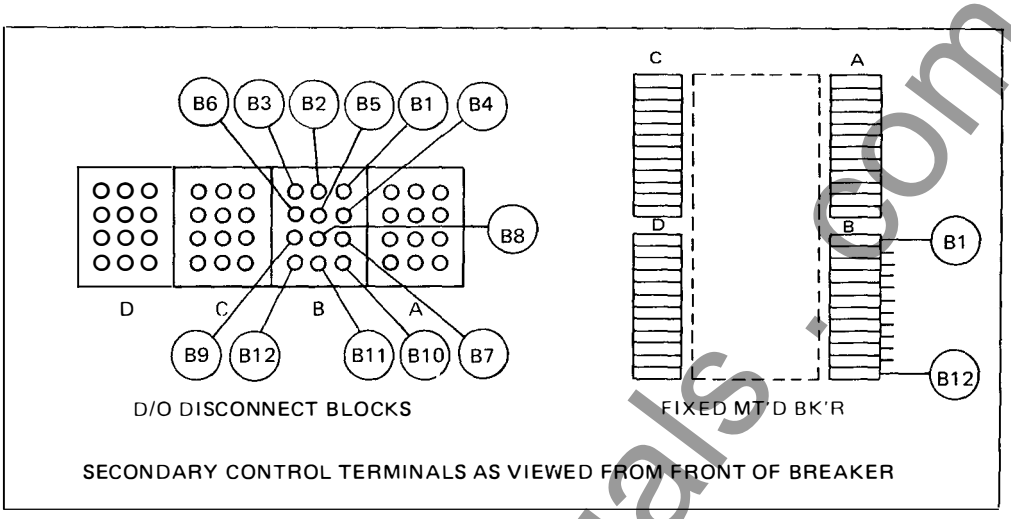


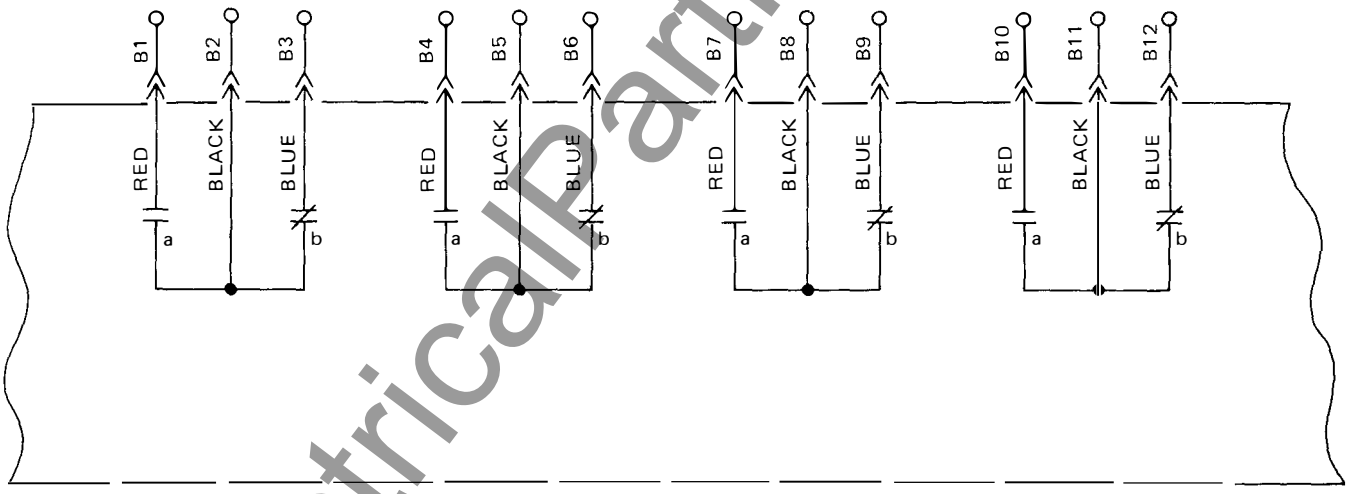
SPB MASTER CONNECTION DIAGRAM
SPB - 2 (a/b) Spare Auxiliary Switches

Reference
I.L. 15159

NO. OF a/b SWITCHES	KEY CODE
4	L02

AUXILIARY SW. CONTACT RATING (MAX.)	
120-600 VOLTS 50/60 HZ.	24-125 VOLTS DC
6.0 A.	0.5 A.



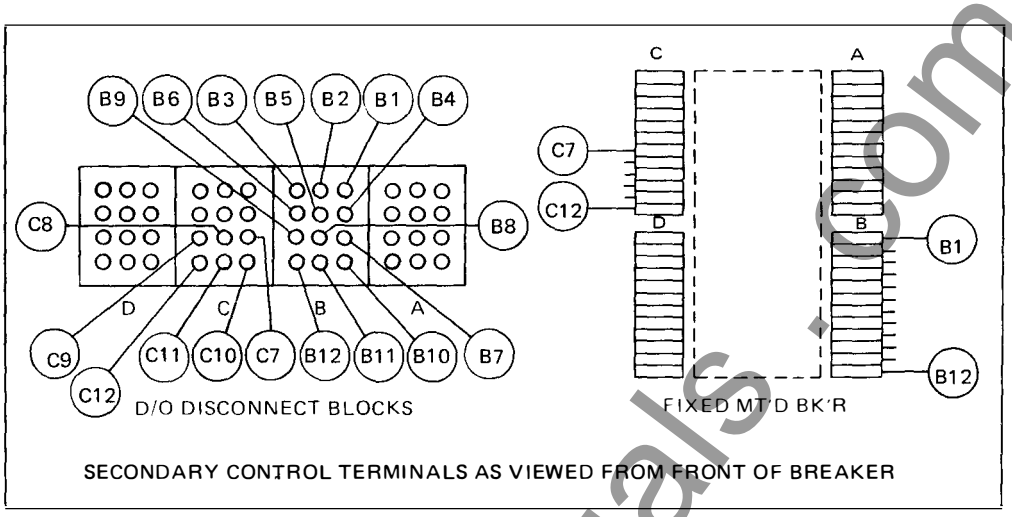


SPB MASTER CONNECTION DIAGRAM
SPB - 4 (a/b) Spare Auxiliary Switches

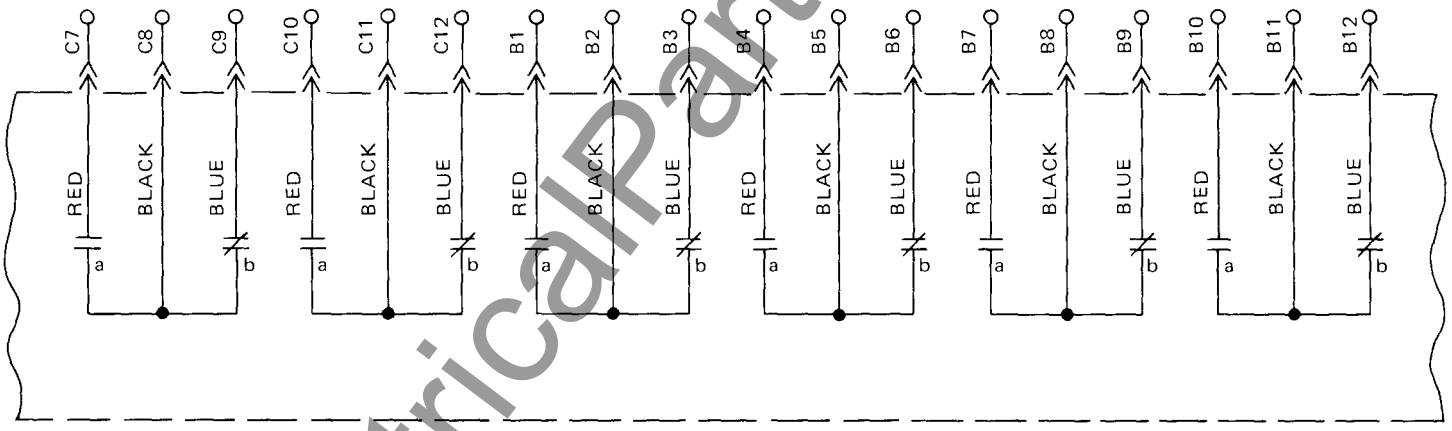
Reference
I.L. 15159

NO. OF a/b SWITCHES	KEY CODE
6	L03

AUXILIARY SW. CONTACT RATING (MAX.)	
120 - 600 VOLTS 50/60 HZ.	24-125 VOLTS DC
6.0A.	0.5A.



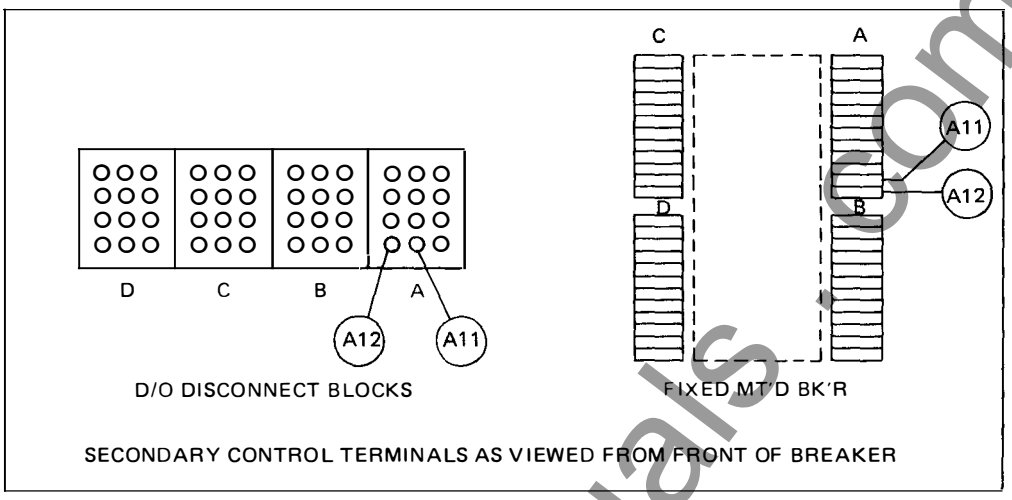
SECONDARY CONTROL TERMINALS AS VIEWED FROM FRONT OF BREAKER

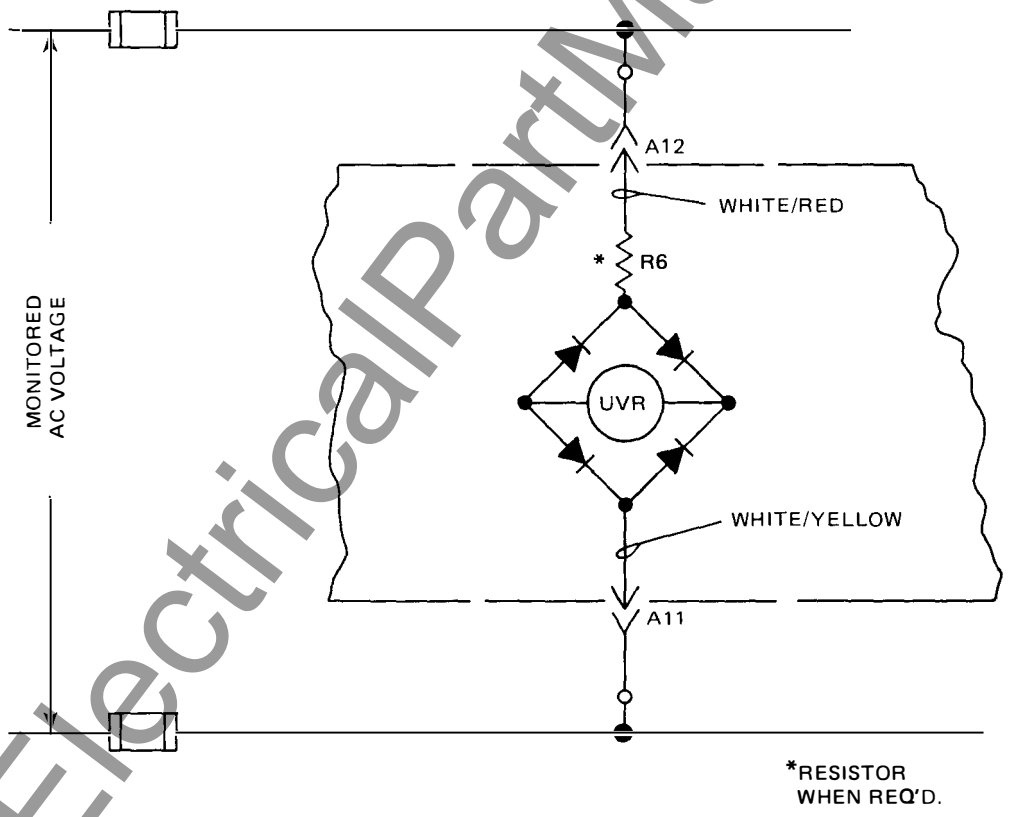


SPB MASTER CONNECTION DIAGRAM
SPB - 6 (a/b) Spare Auxiliary Switches

Reference
I.L. 15159

AVAILABLE VOLTAGES 50/60 HZ	KEY CODE
24	K01
48	K02
120	K03
208	K04
240	K05
480	K06
600	K07



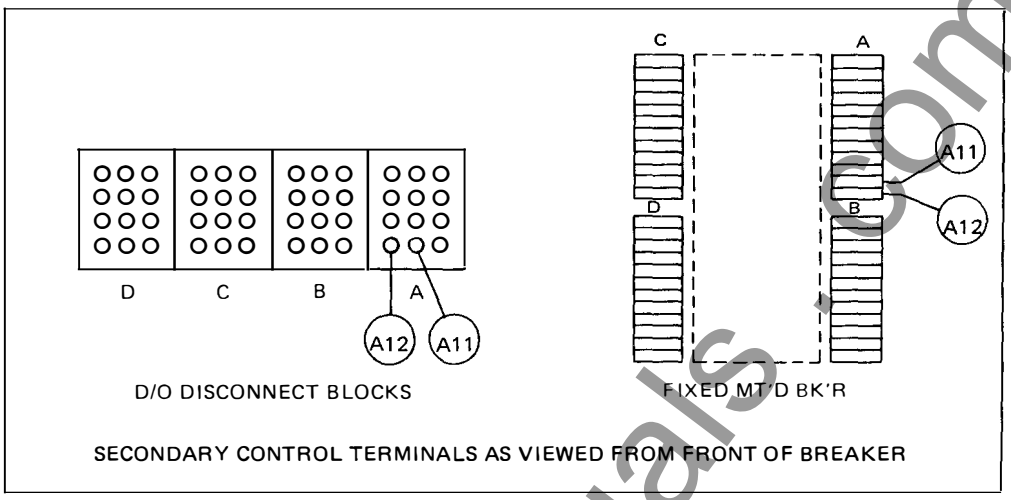


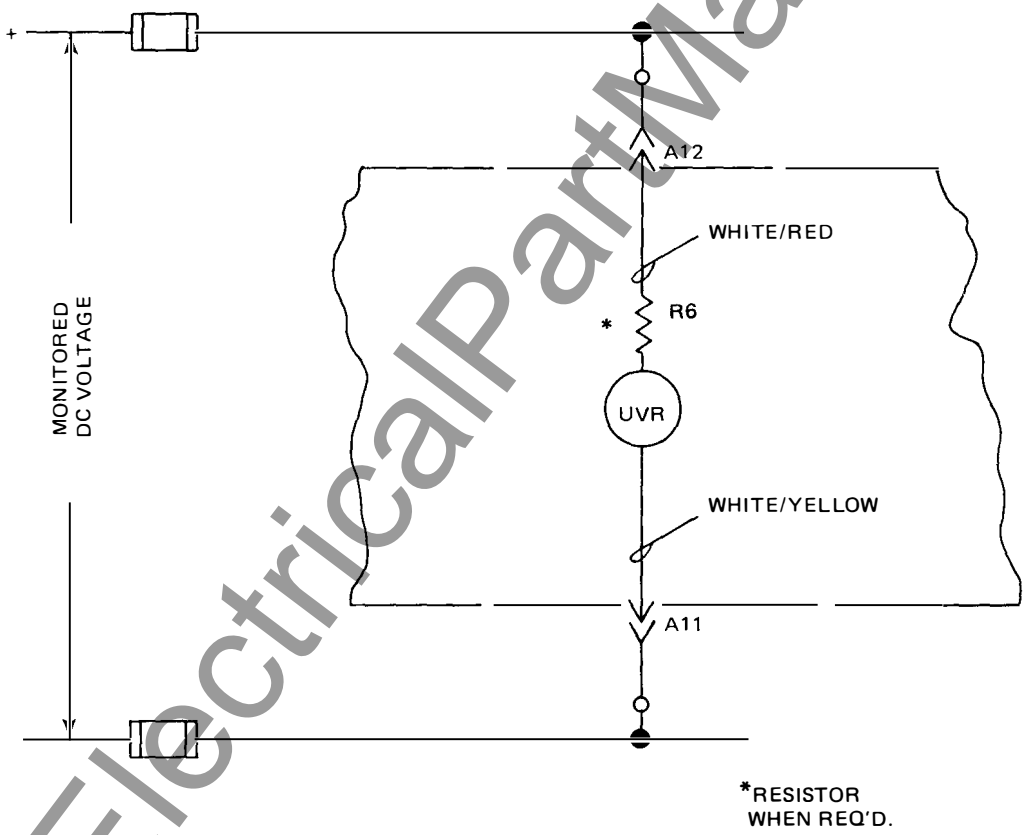
SPB MASTER CONNECTION DIAGRAM

SPB - AC Undervoltage Release - Instantaneous Only - Schematic Diagram

Reference
I.L. 15162

AVAILABLE VOLTAGES DC	KEY CODE
12	K08
24	K09
32	K10
48	K11
60	K12
125	K13
60 Special (1)	K14



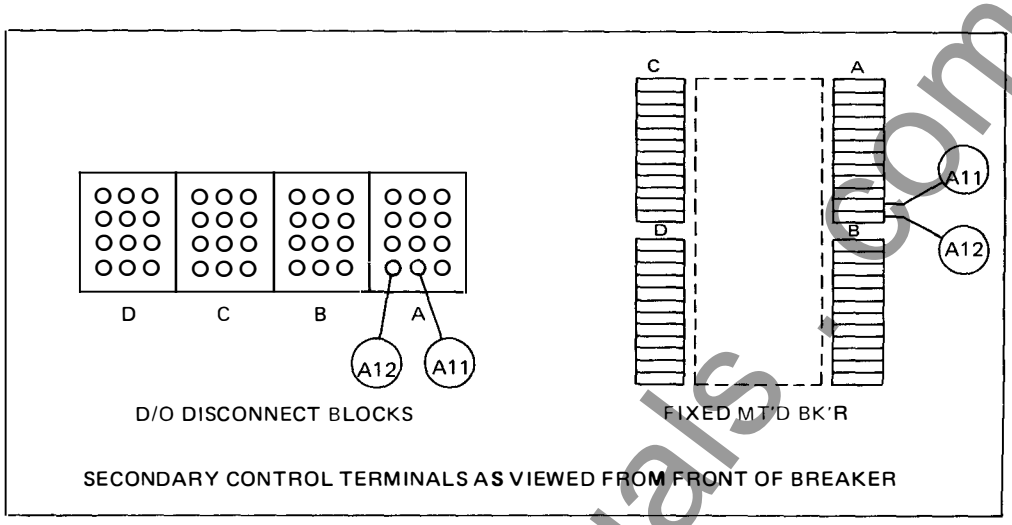


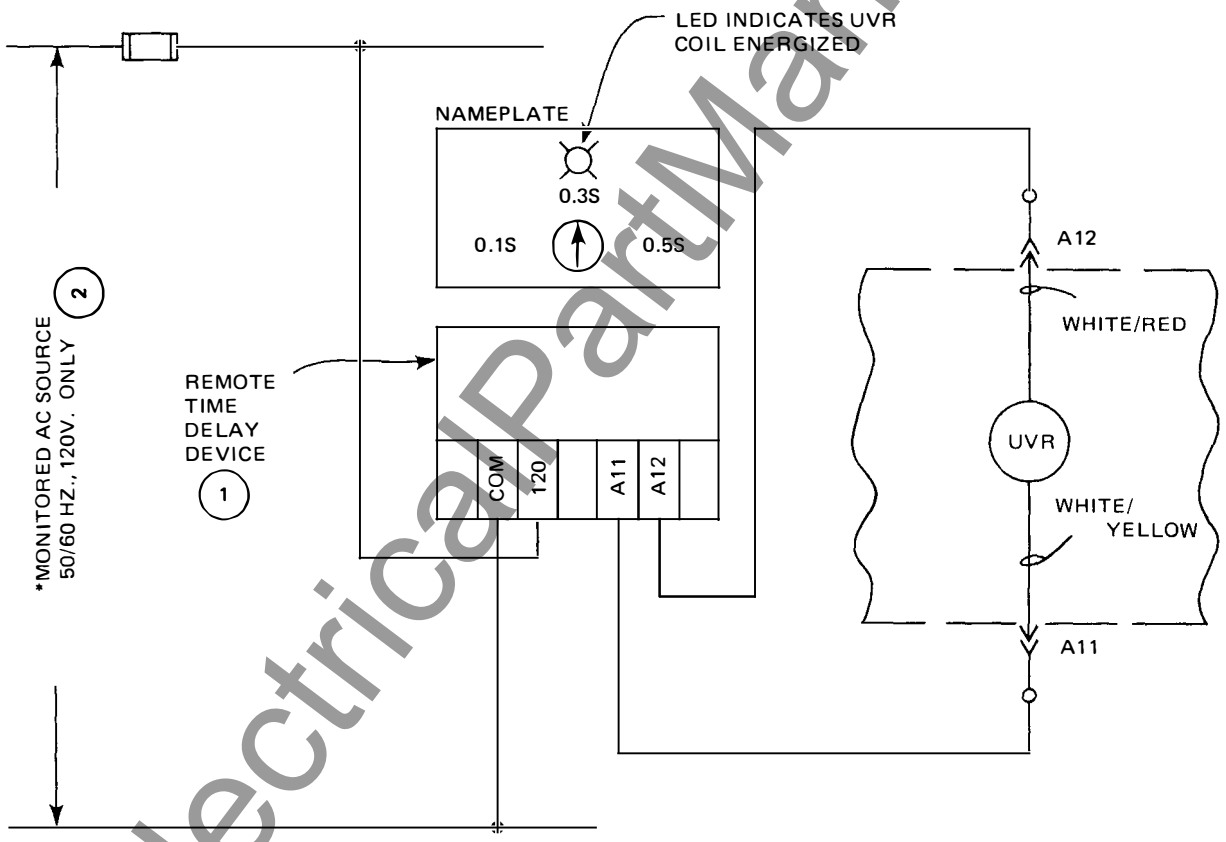
(1) USE ONLY WITH TIME DELAY DEVICE, OPTIONS Y1 AND Y2

SPB MASTER CONNECTION DIAGRAM
SPB - DC Under Voltage Release - Instantaneous Only - Schematic Diagram

Reference
I.L. 15162

	UVR TIME DELAY DEVICE CAT. NO.	KEY CODE
(1)	SPBTDDS	Y01





(1) FOR USE ONLY WITH (CODE K14) UNDERVOLTAGE RELEASE DEVICE

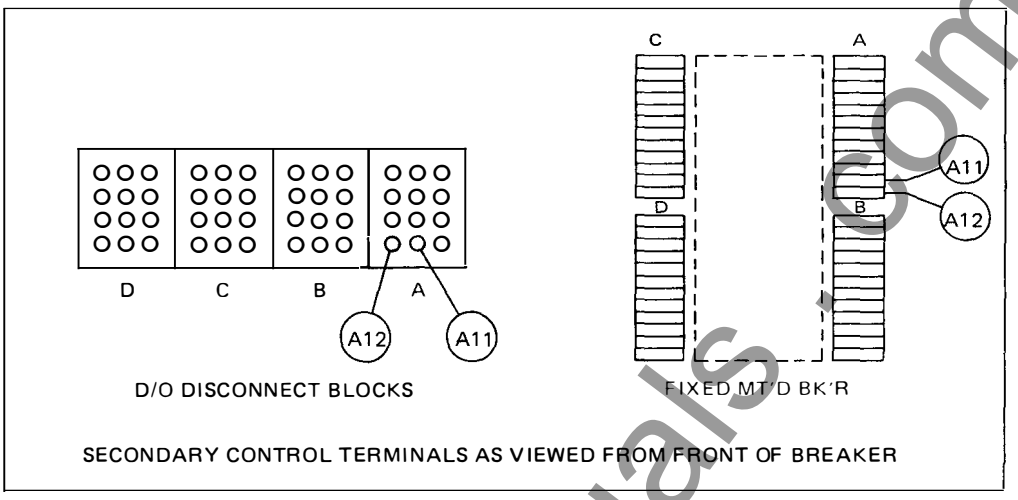
(2) USE STEP DOWN TRANSFORMER WHERE REQUIRED TO INSURE 120V. MAX. ON UVR TIME DELAY DEVICE.

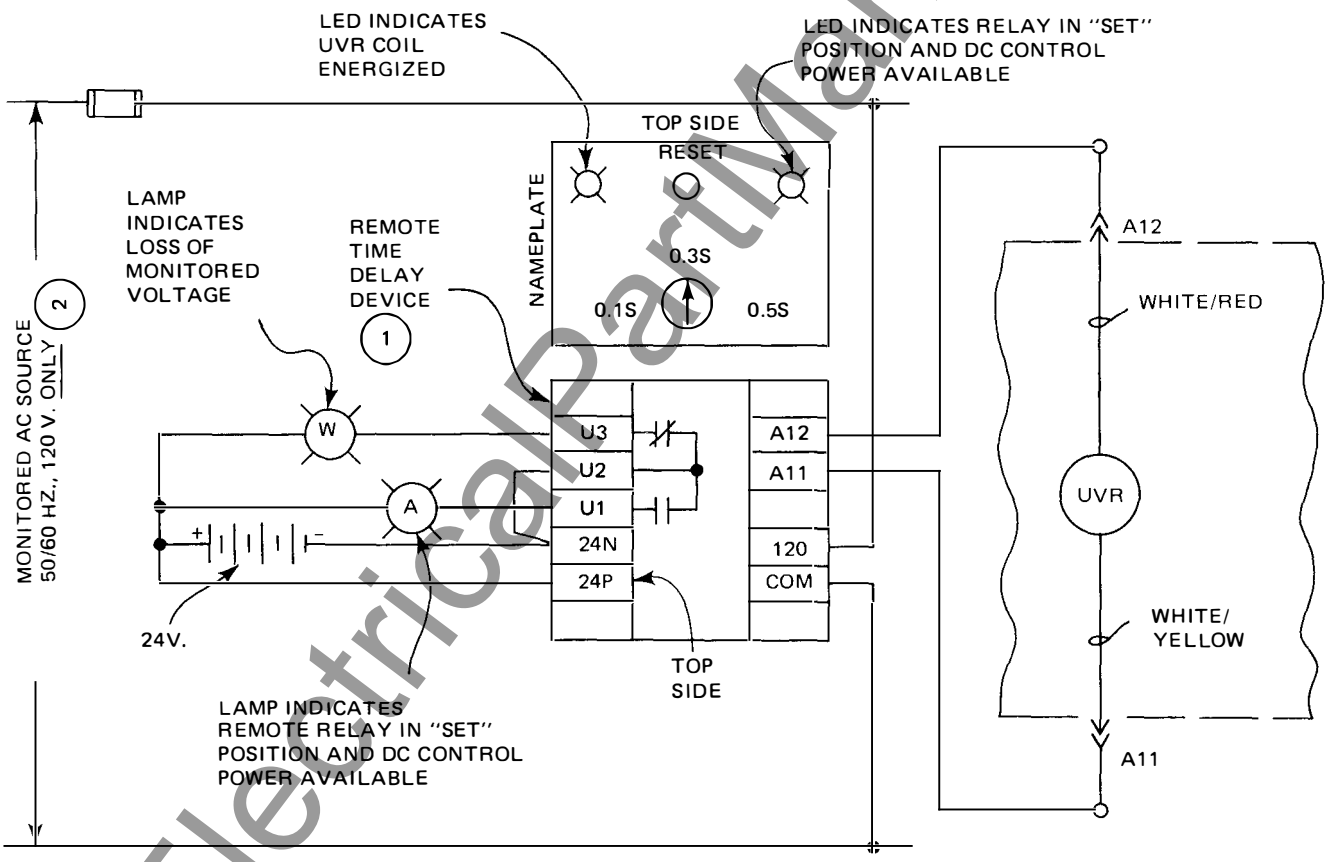
SPB MASTER CONNECTION DIAGRAM
SPB - AC Time Delay Device Connection Diagram

Reference
I.L. 15141
I.L. 15162

	UVR TIME DELAY DEVICE CAT. NO.	KEY CODE
(1)	SPBTDIS	Y02

MEMORY CONTACT MAX. RATING	
120V. 50/60 HZ.	28V. DC
2 AMPS	2 AMPS





(1) FOR USE ONLY WITH (CODE K14) UNDERVOLTAGE RELEASE DEVICE

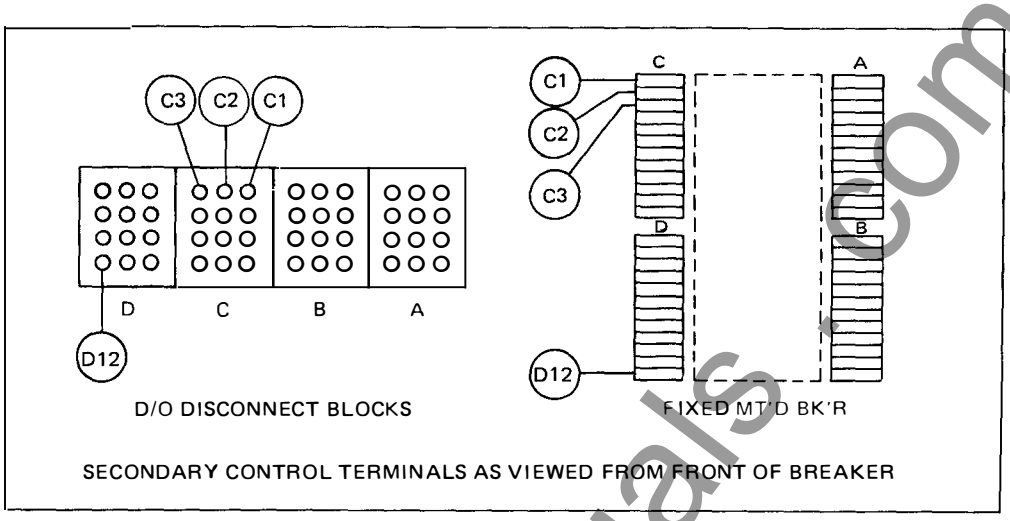
(2) USE STEP DOWN TRANSFORMER WHERE REQUIRED TO INSURE 120 V. MAX. ON UVR TIME DELAY DEVICE

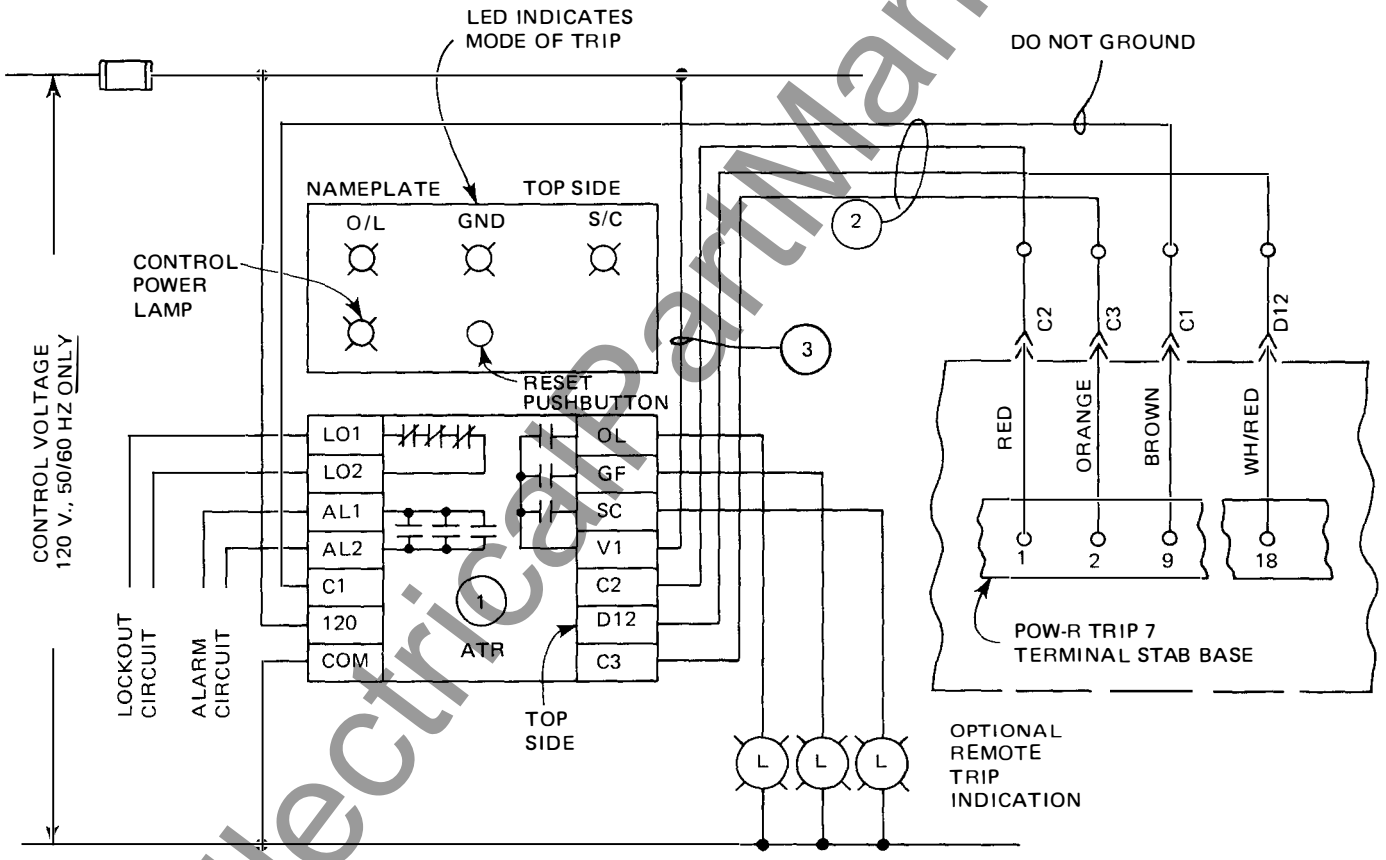
SPB MASTER CONNECTION DIAGRAM
SPB - Time Delay Device with Memory Contact Connection (Requires 24 vdc Control Voltage)

Reference
I.L. 15141
I.L. 15162

AUTO TRIP RELAY CAT. NO.	KEY CODE
SPBATROIS	X01

CONTACT RATING (MAX)	
120 VOLT 50/60 HZ	28 VOLT DC
2.0 AMP	2.0 AMP





(1) RELAY CONTACTS RESET ON LOSS OF CONTROL POWER

(2) RUN SEPARATE FROM POWER CABLES, WIRE SIZE NOT CRITICAL. SHIELDED CABLE (PREFERRED) OR TWISTED CONDUCTORS REQUIRED. MAX. RUN OF 50 FT. SUGGESTED.

(3) SELECT VOLTAGE SOURCE TO MATCH REMOTE PILOT LIGHT REQUIREMENTS – 120 V., 50/60 HZ MAX.

SPB MASTER CONNECTION DIAGRAM
SPB - Comb. Remote Trip Mode Indicator and Auto Trip Relay Connection Diagram (Use with Pow-R Trip 7 only)

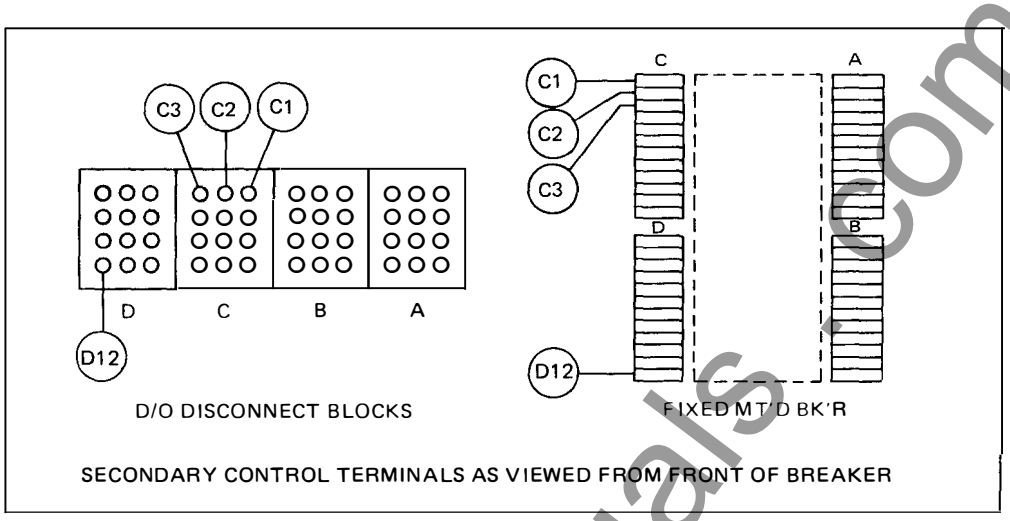
Reference I.L. 15087

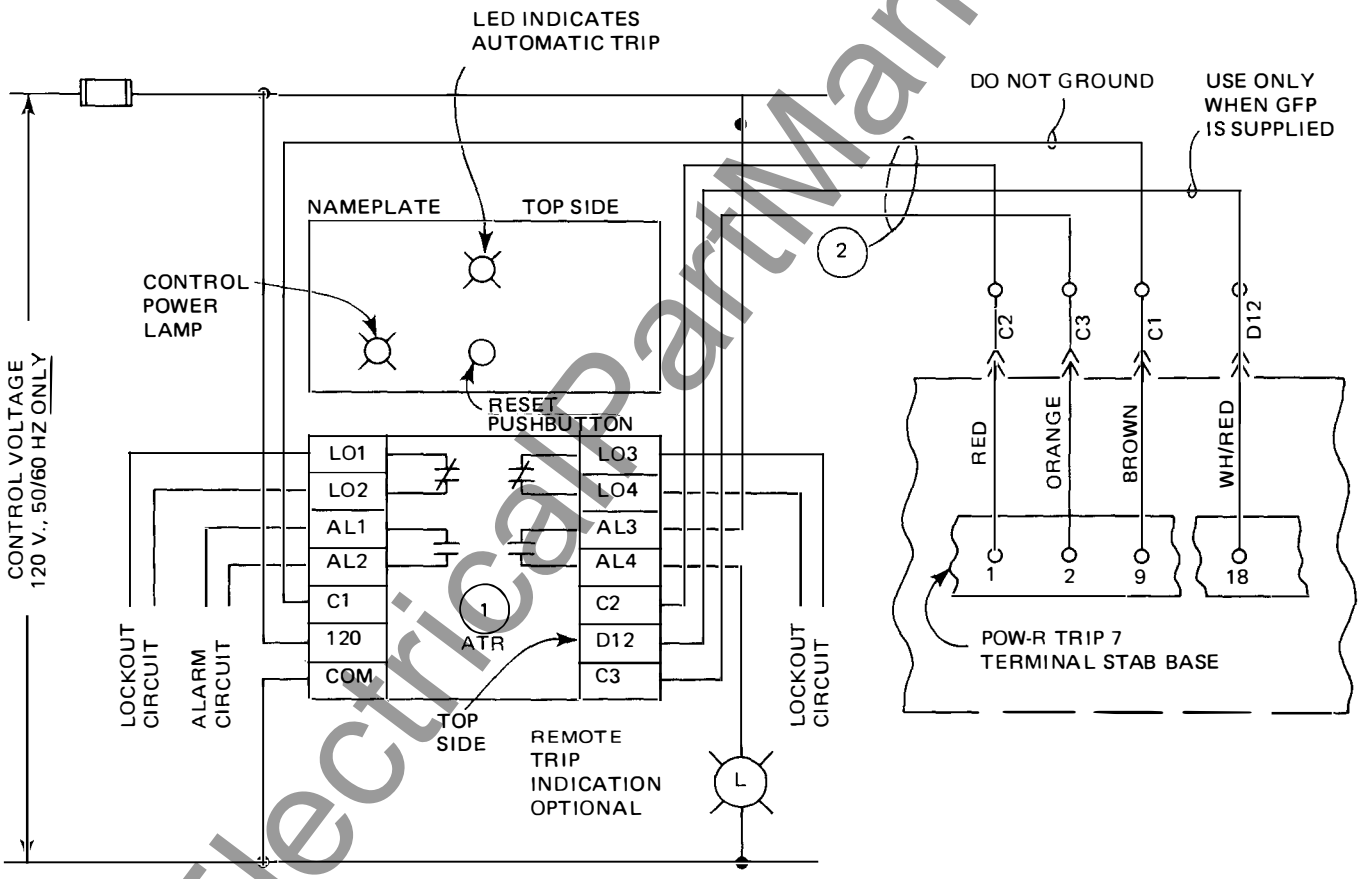
Westinghouse Electric Corporation
Beaver, PA

I.S. 15262-A
Sheet 24

AUTO TRIP RELAY CAT. NO.	KEY CODE
SPBATR02S	X02

CONTACT RATING (MAX.)	
120 VOLT 50/60 HZ	28 VOLT DC
2.0 AMP	2.0 AMP





(1) RELAY CONTACTS RESET ON LOSS OF CONTROL POWER

(2) RUN SEPARATE FROM POWER CABLES, WIRE SIZE NOT CRITICAL. SHIELDED CABLE (PREFERRED) OR TWISTED CONDUCTORS REQUIRED. MAX. RUN OF 50 FT. SUGGESTED.

SPB MASTER CONNECTION DIAGRAM
SPB - Automatic Trip Relay Connection Diagram (Use with Pow-R Trip 7 only)

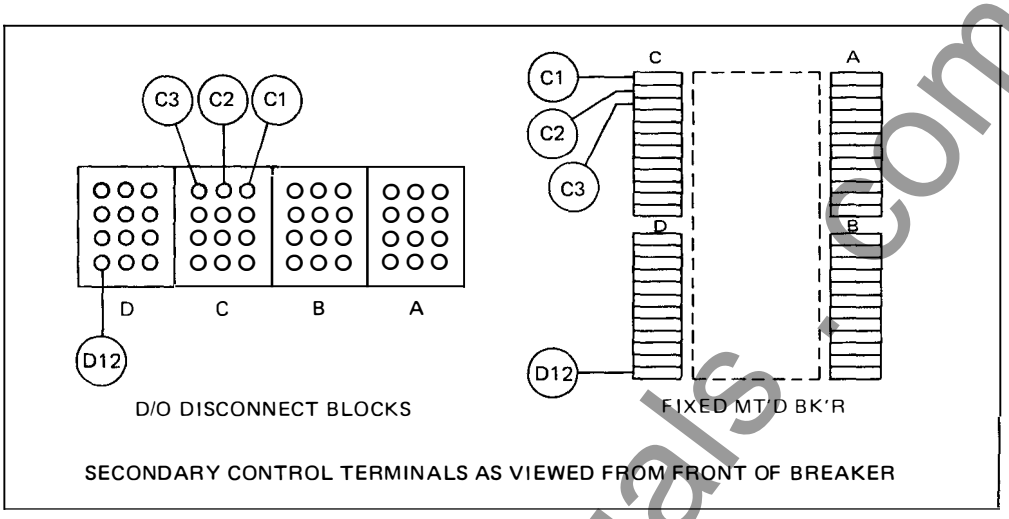
Reference I.L. 15087

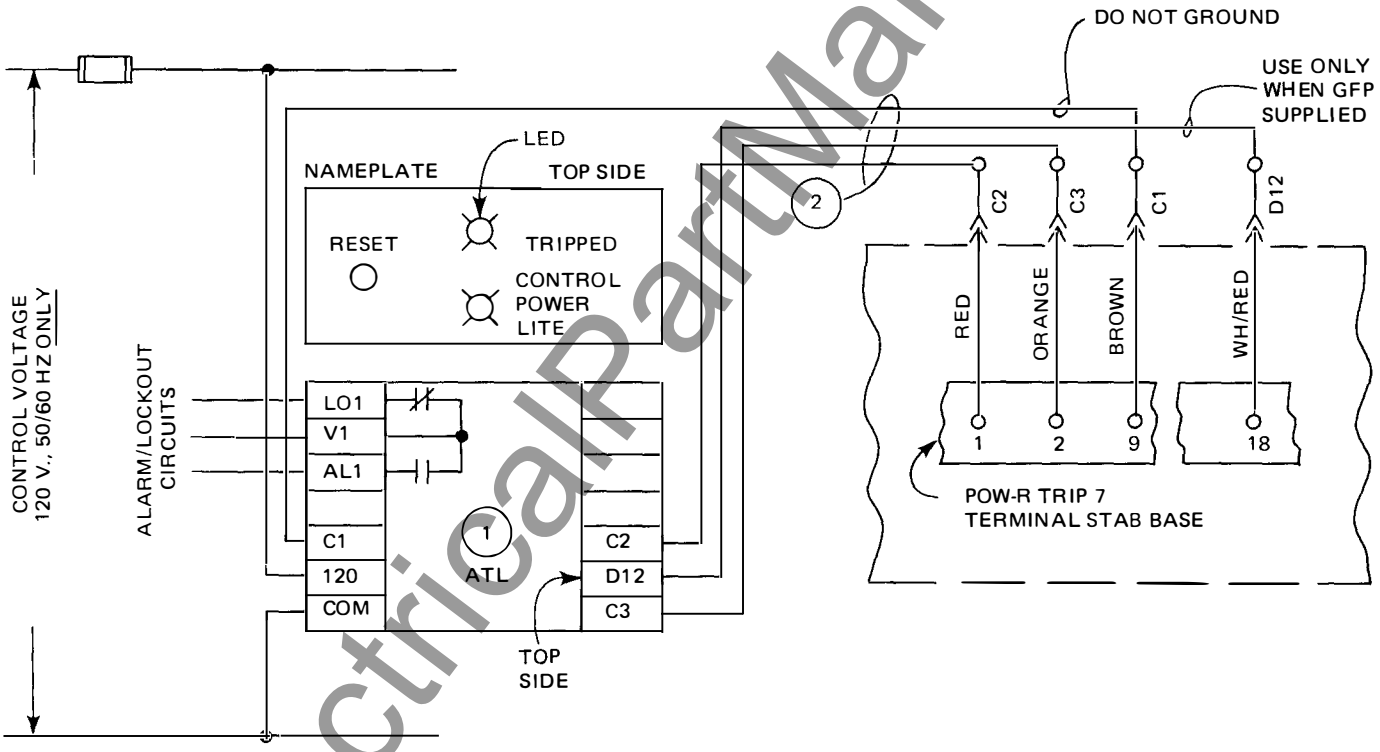
Westinghouse Electric Corporation
Beaver, PA

I.S. 15262-A
Sheet 25

	AUTO TRIP RELAY CAT. NO.	KEY CODE
1	SPBATL	X03

CONTACT RATING (MAX.)	
240 VOLTS 50/60 HZ	28 VOLTS DC
10.0 A @ 80% P.F.	10.0 A





(1) RELAY CONTACTS LATCH FOLLOWING TRIP INDICATION AND MUST BE MECHANICALLY UNLATCHED WITH LOCAL RESET PROVIDED.

(2) RUN SEPARATE FROM POWER CABLES, WIRE SIZE NOT CRITICAL. SHIELDED CABLE (PREFERRED) OR TWISTED CONDUCTORS REQUIRED. MAX. RUN OF 50 FT. SUGGESTED.

SPB MASTER CONNECTION DIAGRAM
SPB - Automatic Trip Relay (With Latching Contacts)
Connection Diagram (Use with Pow-R Trip 7 only)

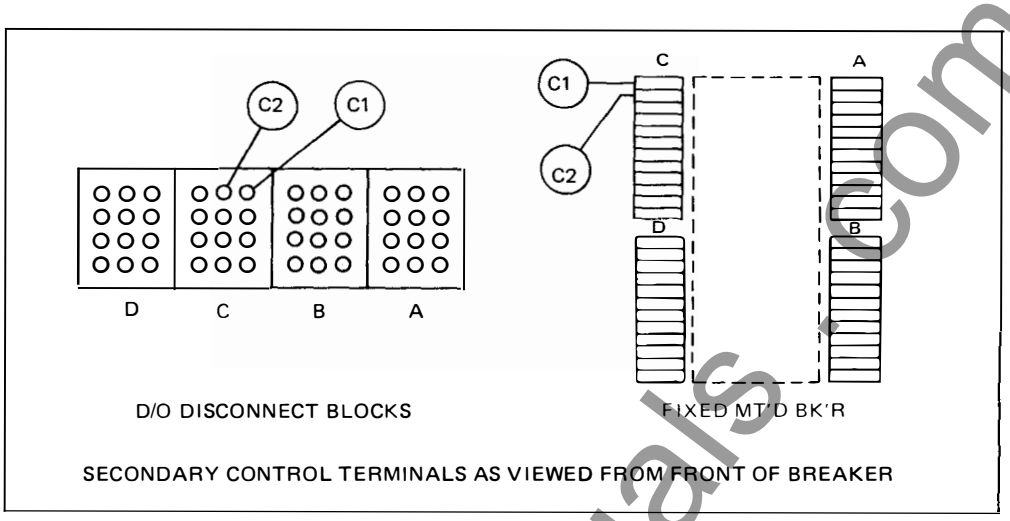
Reference
I.L. 15087

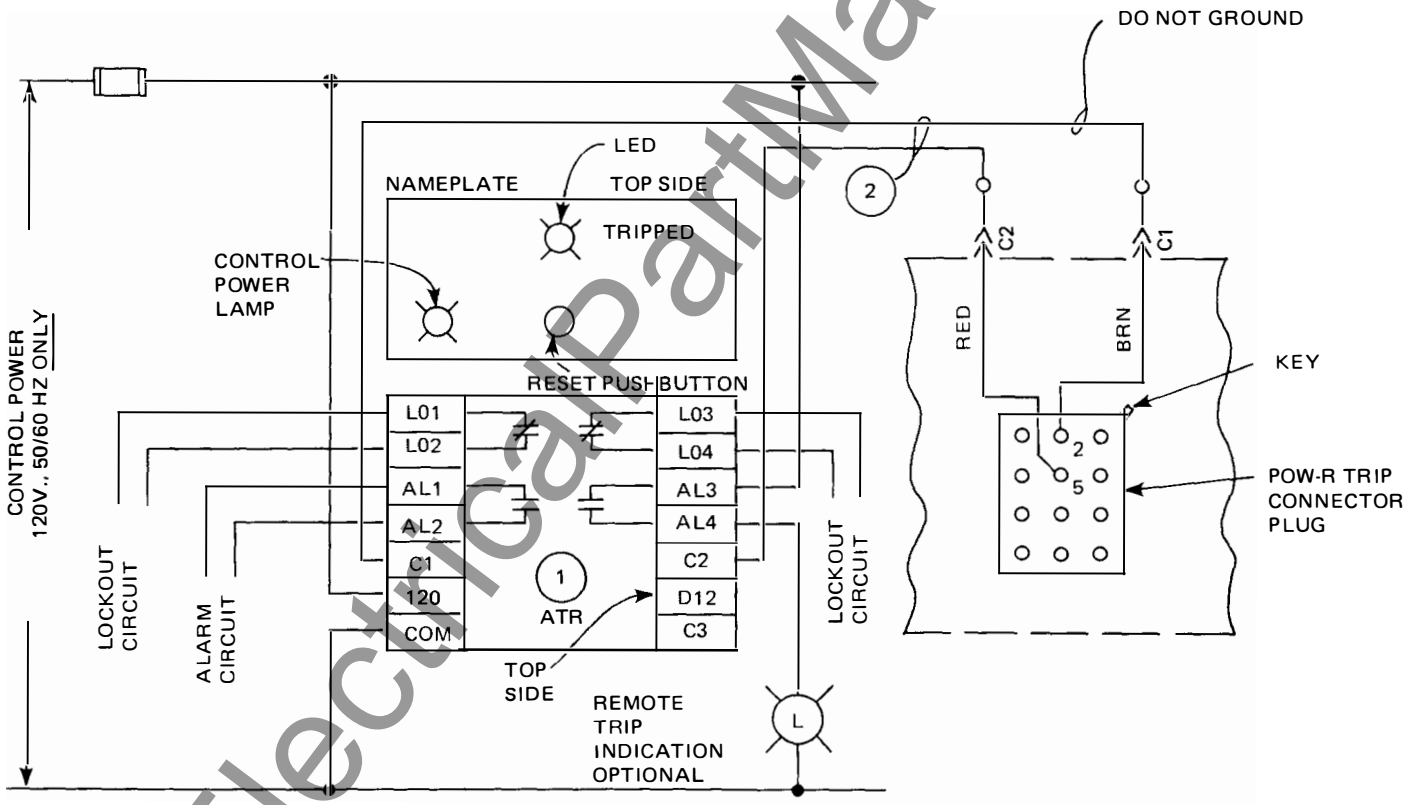
Westinghouse Electric Corporation
Beaver, PA

I.S. 15262-A
Sheet 26

	AUTO TRIP RELAY CAT. NO.	KEY CODE
(1)	SPBATRO2S	X02

CONTACT RATING (MAX)	
120 VOLT 50/60 HZ	28 VOLT DC
2.0A.	2.0A.





(1) RELAY CONTACTS RESET ON LOSS OF CONTROL POWER

(2) RUN SEPARATE FROM POWER CABLES, WIRE SIZE NOT CRITICAL. SHIELDED CABLE (PREFERRED) OR TWISTED CONDUCTORS REQUIRED. MAX. RUN OF 50 FT. SUGGESTED.

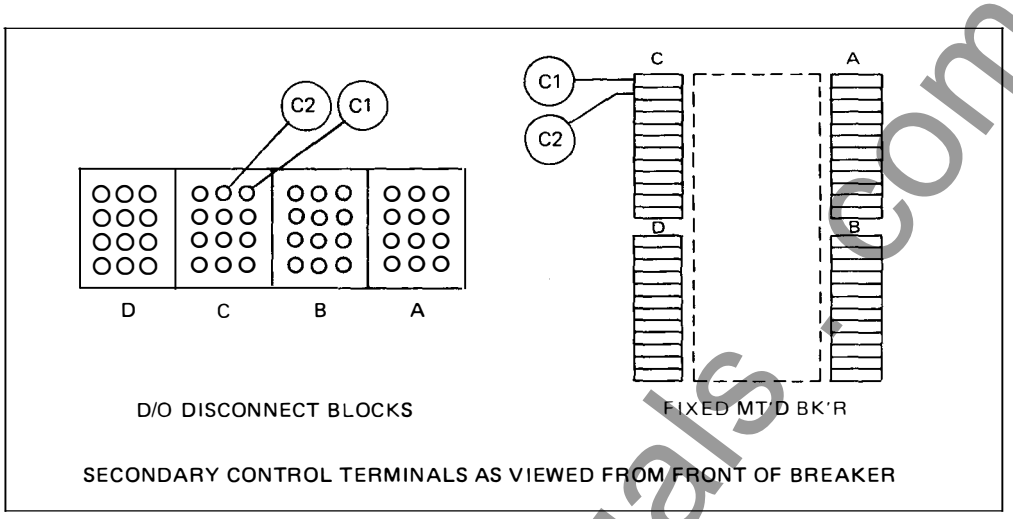
SPB MASTER CONNECTION DIAGRAM

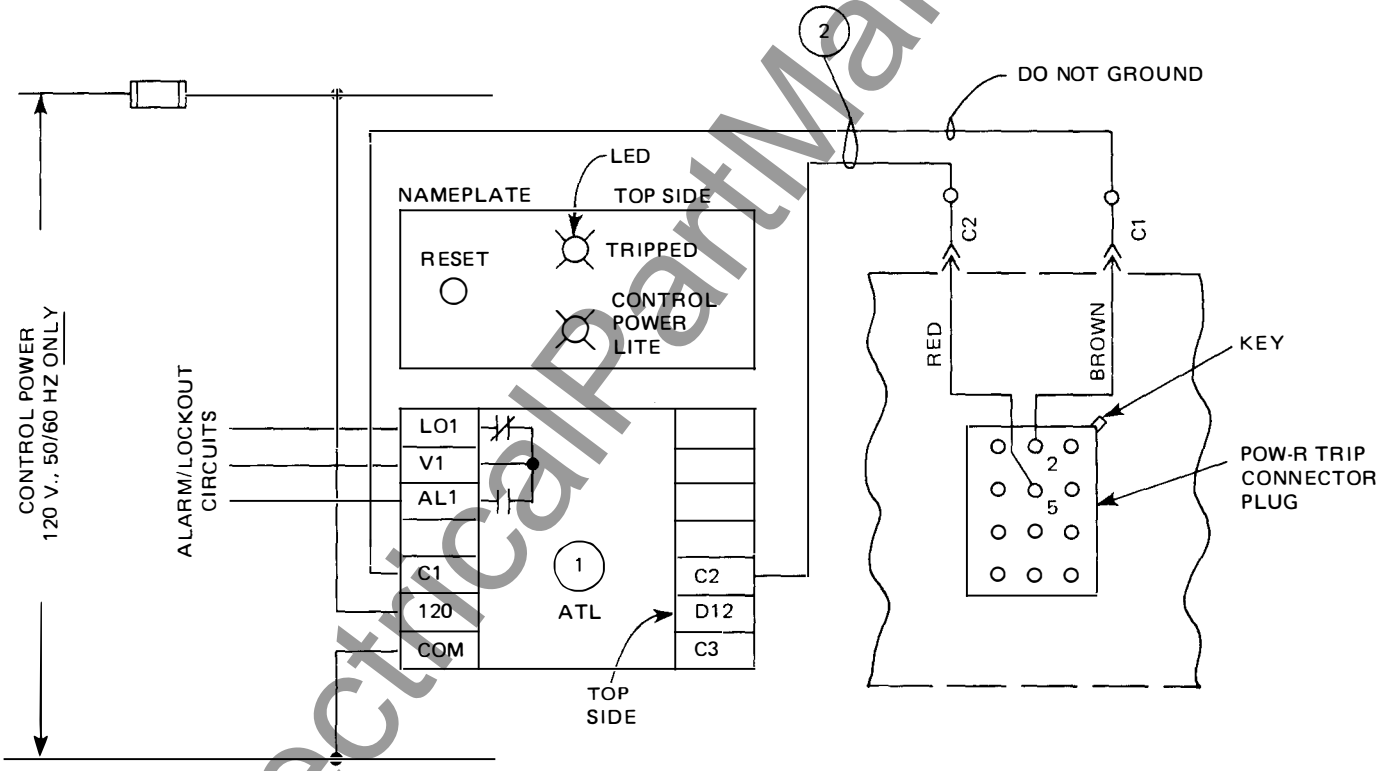
SPB - Automatic Trip Relay Connection Diagram (Use with Pow-R Trip Only)

Reference
I.L. 15087

	AUTO TRIP RELAY CAT. NO.	KEY CODE
(1)	SPBATL	X03

CONTACT RATING (MAX.)	
240 VOLTS 50/60 HZ	28 VOLTS DC
10.0 A. @ 80% P.F.	10.0 A.





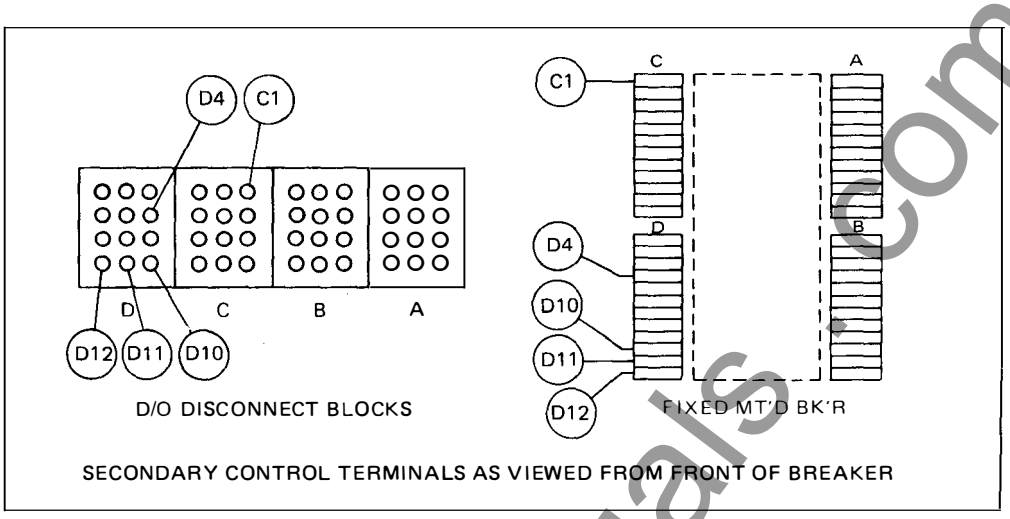
(1) RELAY CONTACTS LATCH FOLLOWING TRIP INDICATION AND MUST BE MECHANICALLY UNLATCHED WITH RESET PROVIDED.

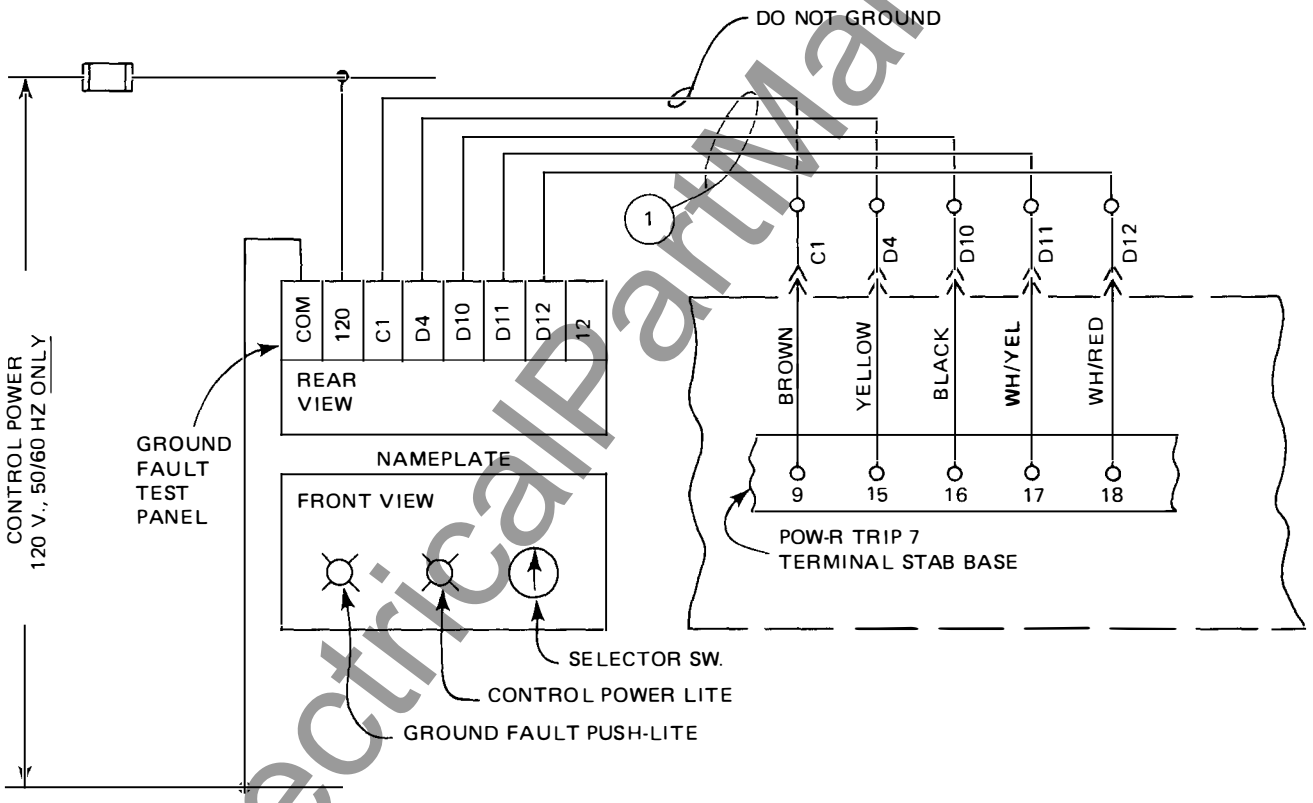
(2) RUN SEPARATE FROM POWER CABLES, WIRE SIZE NOT CRITICAL. SHIELDED CABLE (PREFERRED) OR TWISTED CONDUCTORS REQUIRED. MAX. RUN OF 50 FT. SUGGESTED.

SPB MASTER CONNECTION DIAGRAM
SPB - Automatic Trip Relay (With Latching Contacts)
Connection Diagram (Use with Pow-R Trip only)

Reference
I.L. 15087

GROUND FAULT TEST PANEL CAT. NO.	KEY CODE
SPBGFTP	U01



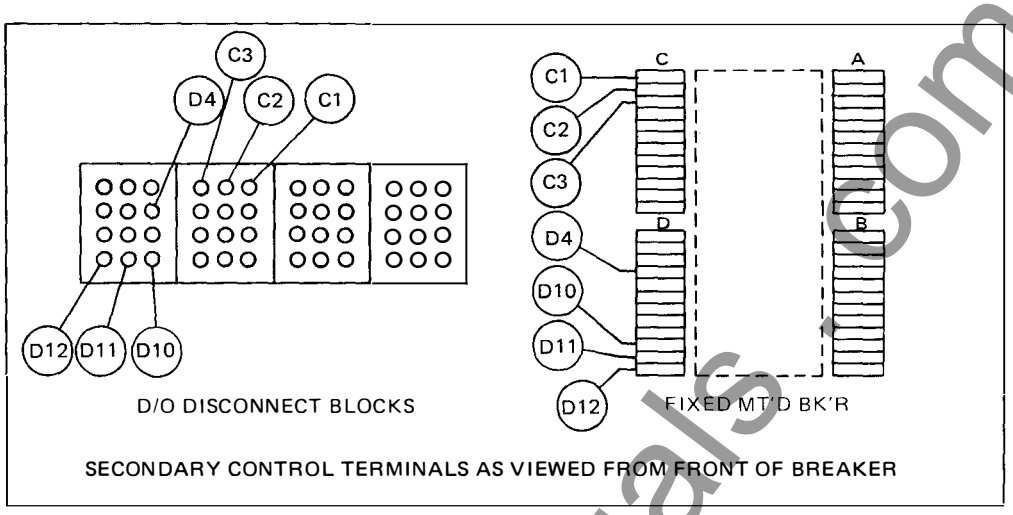


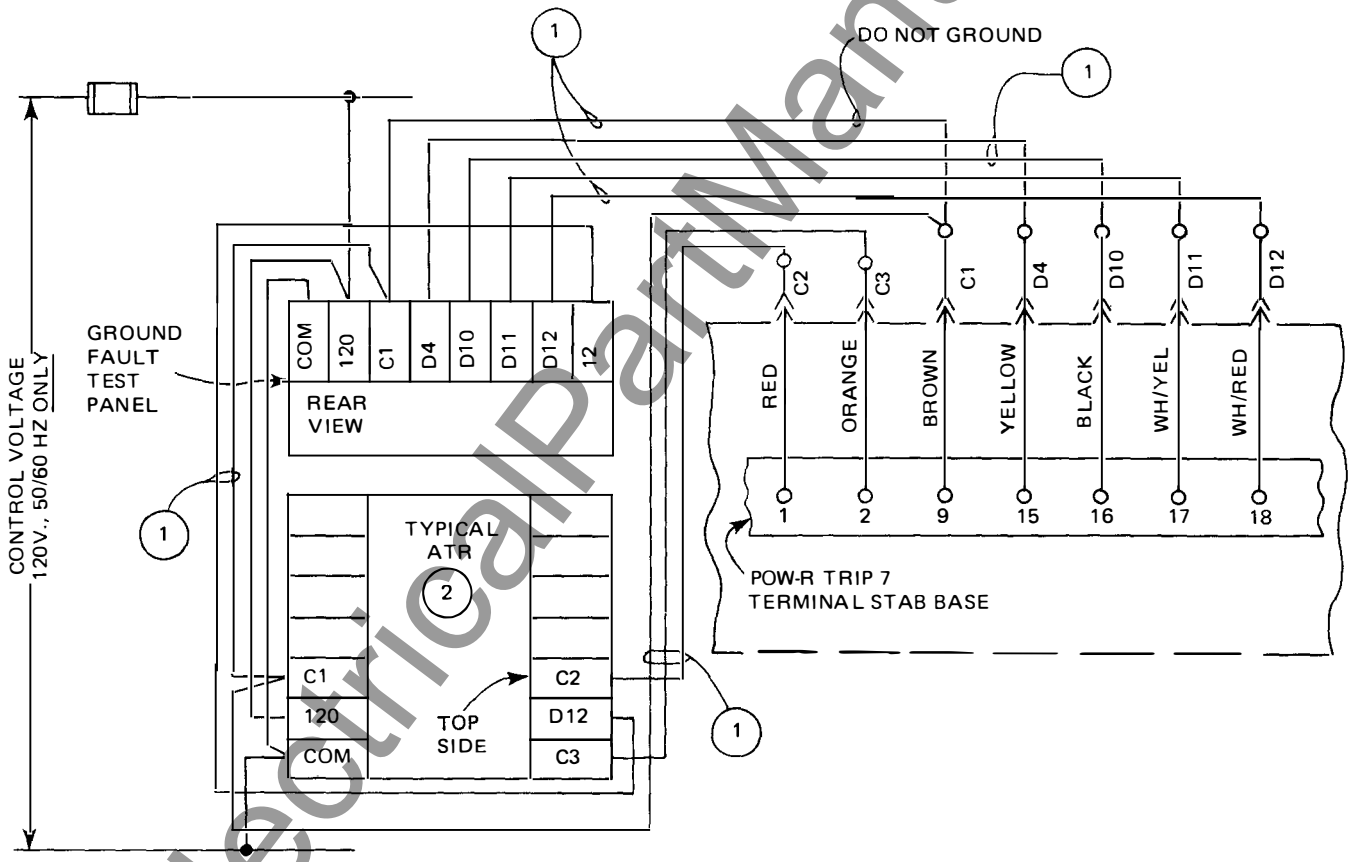
(1) RUN SEPARATE FROM POWER CABLES, WIRE SIZE NOT CRITICAL. SHIELDED CABLE (PREFERRED) OR TWISTED CONDUCTORS REQUIRED. MAX. RUN OF 50 FT. SUGGESTED.

SPB MASTER CONNECTION DIAGRAM
SPB - Ground Fault Test Panel Connection Diagram
(Use with Pow-R Trip 7 only)

Reference
I.L. 15072

GROUND FAULT TEST PANEL CAT. NO.	KEY CODE
SPBGFTP	U01





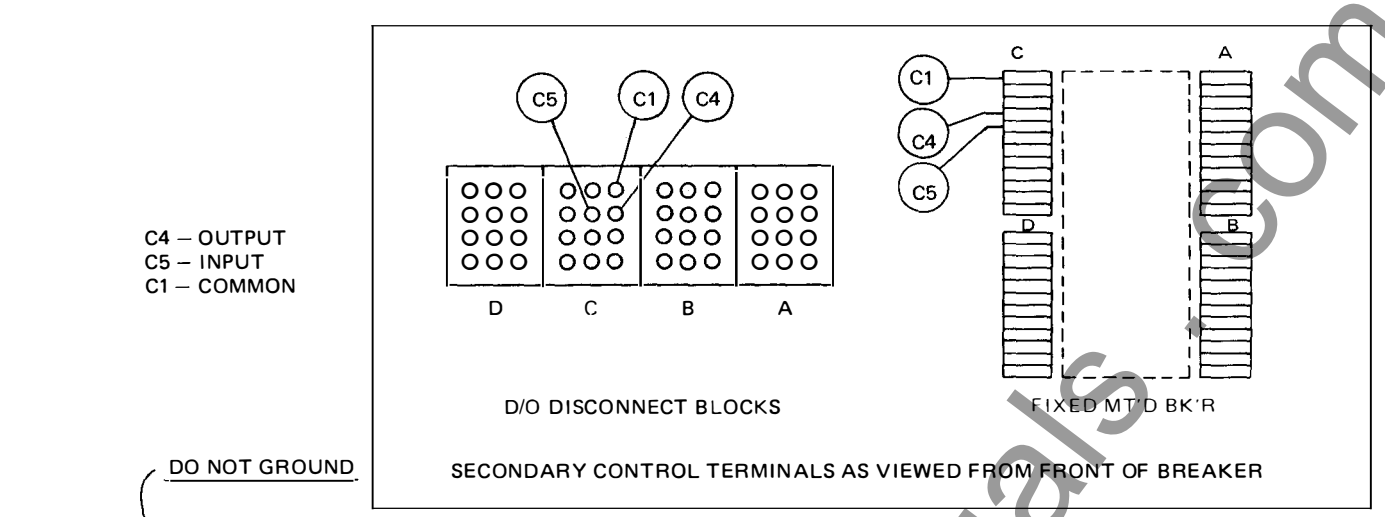
(1) RUN SEPARATE FROM POWER CABLES. WIRE SIZE NOT CRITICAL. SHIELDED CABLE (PREFERRED) OR TWISTED CONDUCTORS. REQUIRED MAX. RUN OF 50 FT. SUGGESTED.

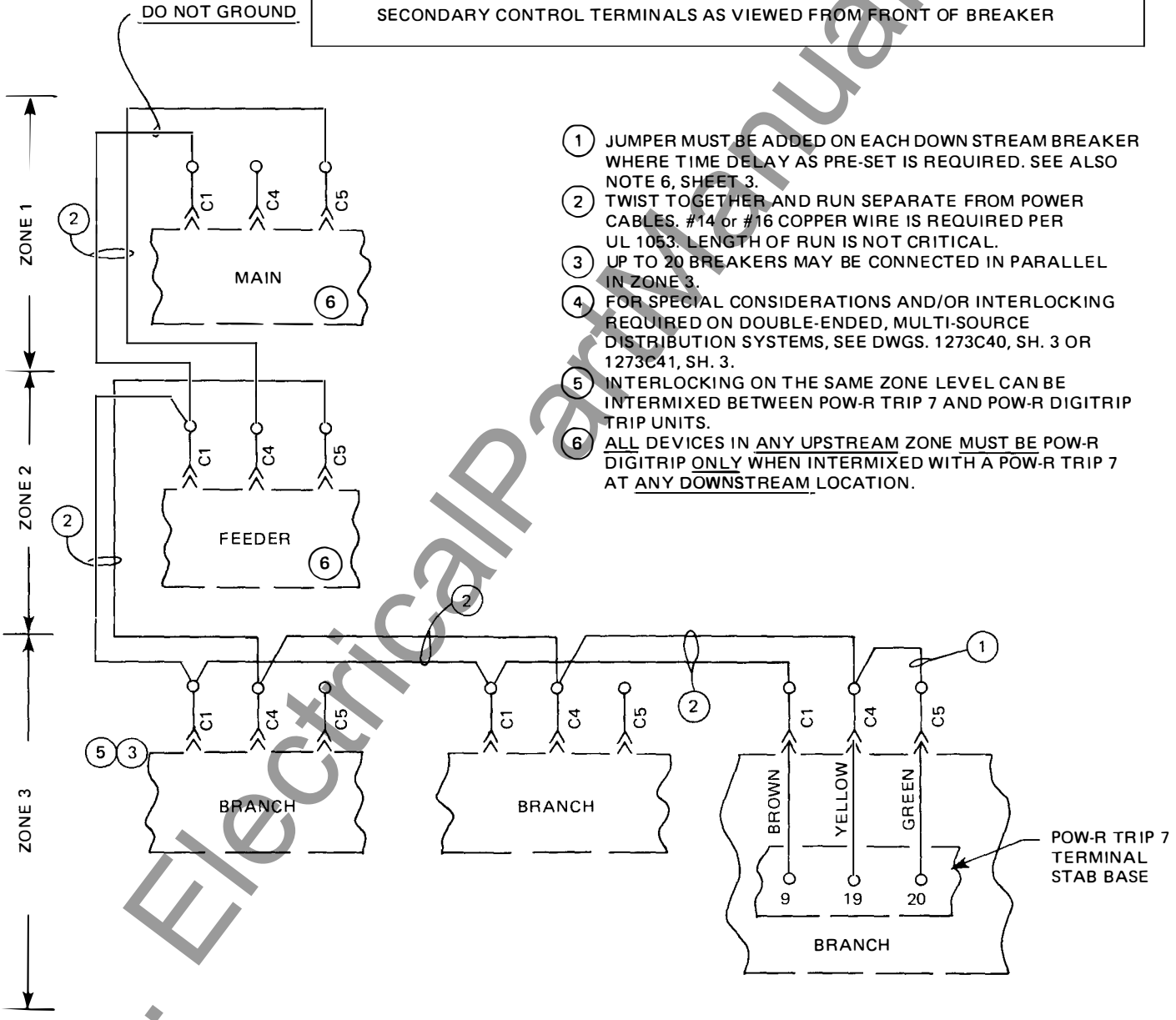
(2) REFER TO SPECIFIC DIAGRAM FOR TERMINAL. CONFIGURATION OF ATR USED.

SPB MASTER CONNECTION DIAGRAM

SPB - Ground Fault Test Panel Connection Diagram When Used in Conjunction With Automatic Trip Relay. (Use With Pow-R Trip 7 Only)

Reference
I.L. 15072
I.L. 15087

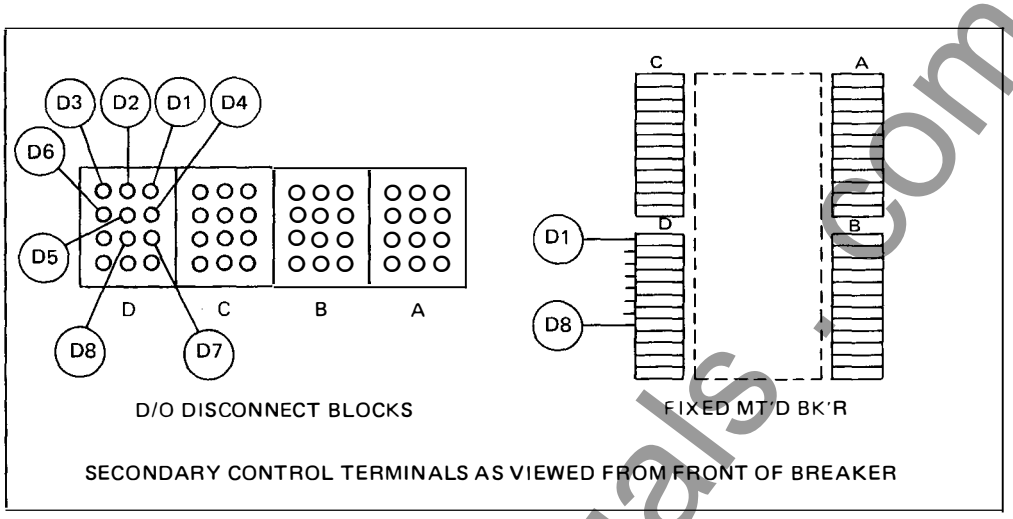




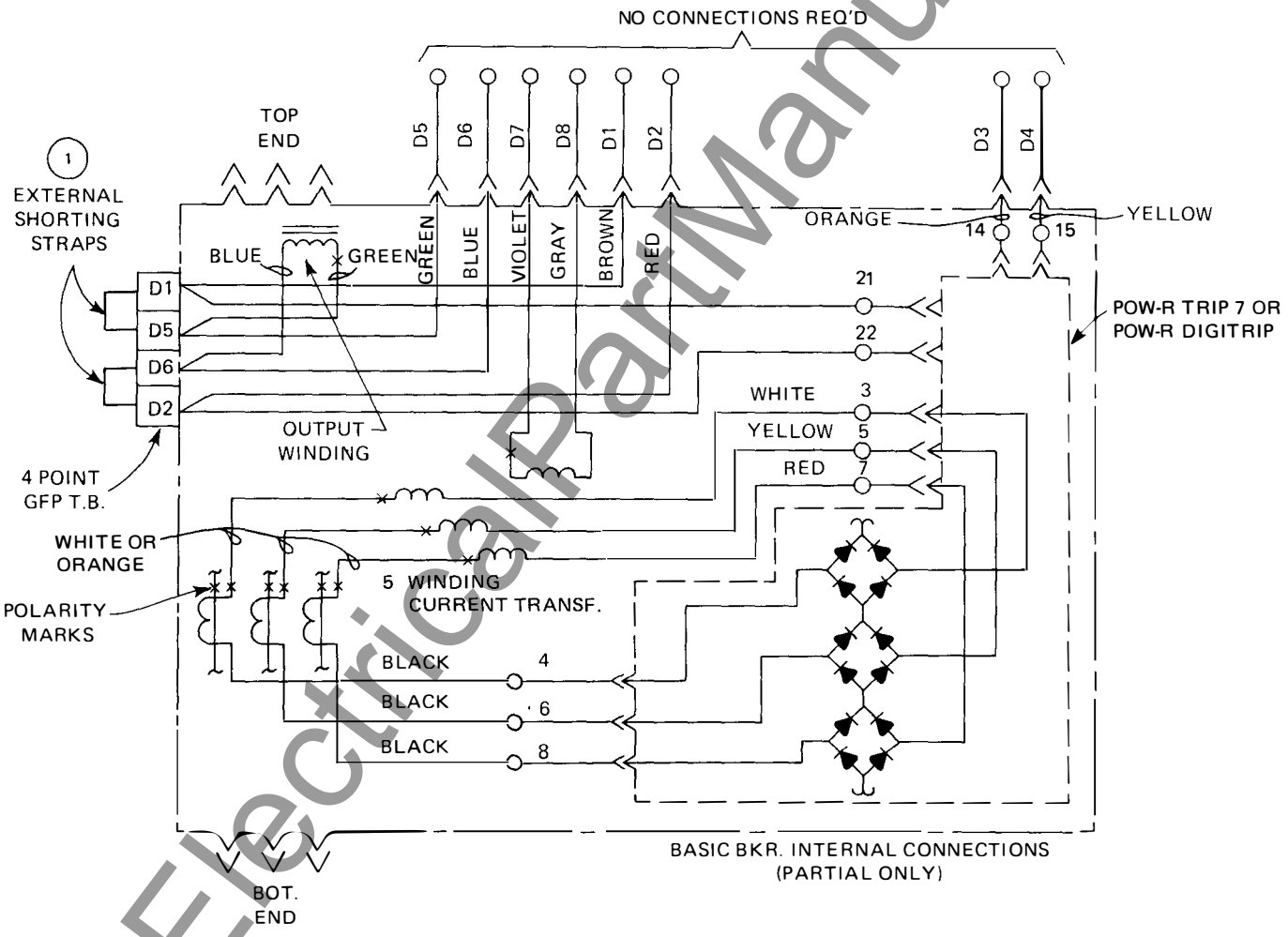
1. JUMPER MUST BE ADDED ON EACH DOWN STREAM BREAKER WHERE TIME DELAY AS PRE-SET IS REQUIRED. SEE ALSO NOTE 6, SHEET 3.
2. TWIST TOGETHER AND RUN SEPARATE FROM POWER CABLES. #14 or #16 COPPER WIRE IS REQUIRED PER UL 1053. LENGTH OF RUN IS NOT CRITICAL.
3. UP TO 20 BREAKERS MAY BE CONNECTED IN PARALLEL IN ZONE 3.
4. FOR SPECIAL CONSIDERATIONS AND/OR INTERLOCKING REQUIRED ON DOUBLE-ENDED, MULTI-SOURCE DISTRIBUTION SYSTEMS, SEE DWGS. 1273C40, SH. 3 OR 1273C41, SH. 3.
5. INTERLOCKING ON THE SAME ZONE LEVEL CAN BE INTERMIXED BETWEEN POW-R TRIP 7 AND POW-R DIGITRIP TRIP UNITS.
6. ALL DEVICES IN ANY UPSTREAM ZONE MUST BE POW-R DIGITRIP ONLY WHEN INTERMIXED WITH A POW-R TRIP 7 AT ANY DOWNSTREAM LOCATION.

SPB MASTER CONNECTION DIAGRAM

SPB - Typical Ground Fault Zone Interlocking Connections for RADIAL④ Distribution System



SECONDARY CONTROL TERMINALS AS VIEWED FROM FRONT OF BREAKER



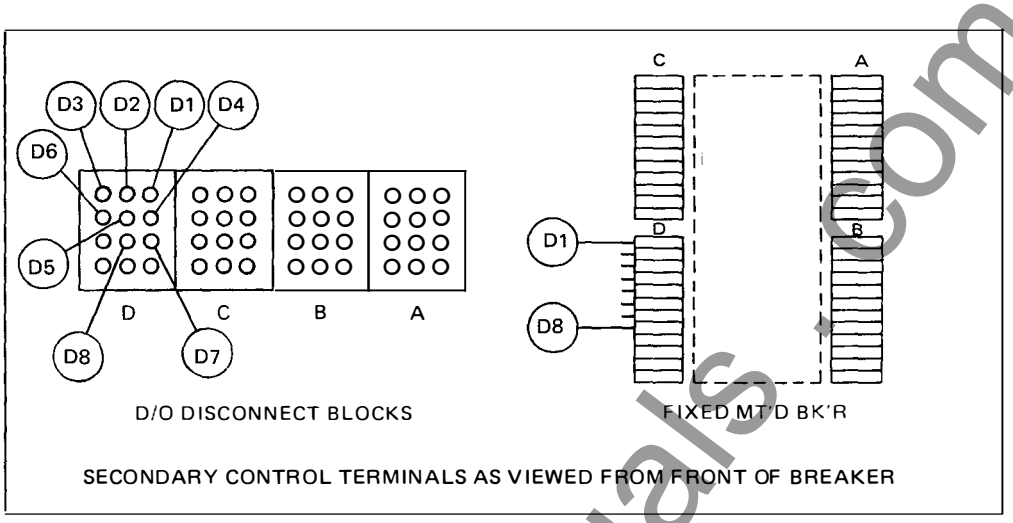
(1) EXTERNAL SHORTING STRAPS MUST BE IN PLACE DURING TESTING AND OPERATING CONDITIONS PER INSTRUCTION N.P. ON SIDE OF BREAKER

(2) SEE NOTE 6 ON SHEET 3 RE TERMINALS C4 AND C5

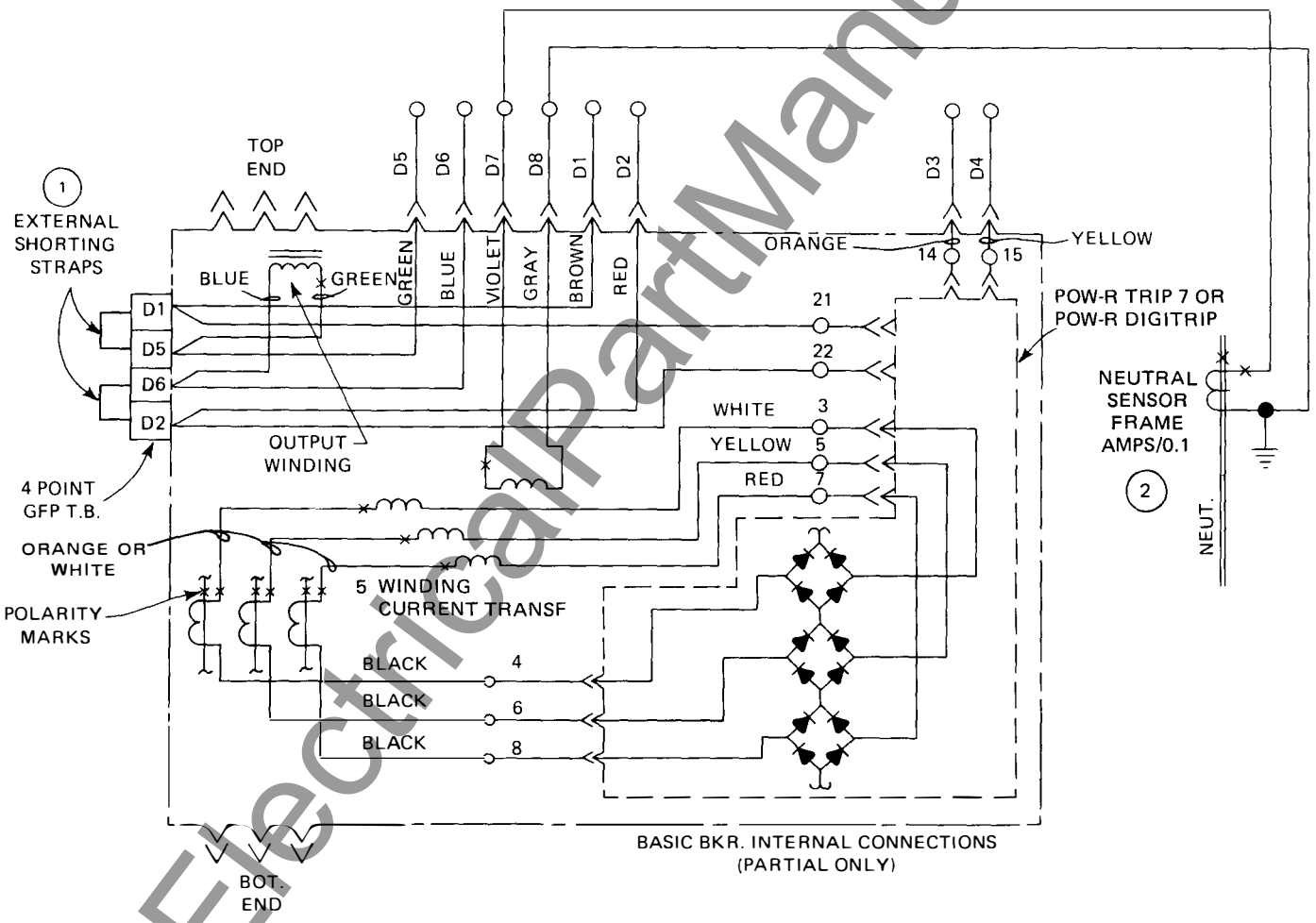
SPB MASTER CONNECTION DIAGRAM

SPB - Ground Fault External Connections 3PH., 3W., 250/800/1200/1600/2000A. Breakers (2000A. in Compact, 16 in. High Frame)

NEUTRAL SENSOR RATING	KEY CODE
250 A.	D01
800 A.	D02
1200 A.	D03
1600 A.	D01
2000 A.	D02



SECONDARY CONTROL TERMINALS AS VIEWED FROM FRONT OF BREAKER



(1) EXTERNAL SHORTING STRAPS MUST BE IN PLACE DURING TESTING AND OPERATING CONDITIONS PER INSTRUCTION N.P. ON SIDE OF BREAKER.

(2) CONNECT NEUTRAL SENSOR SO THAT POLARITY RELATIONSHIP TOWARDS SOURCE IS IDENTICAL FOR PHASE AND NEUTRAL SENSORS. NO. 14 OR NO. 12 COPPER WIRE IS REQUIRED PER UL 1053 FOR SECONDARY WIRING OF NEUTRAL SENSORS.

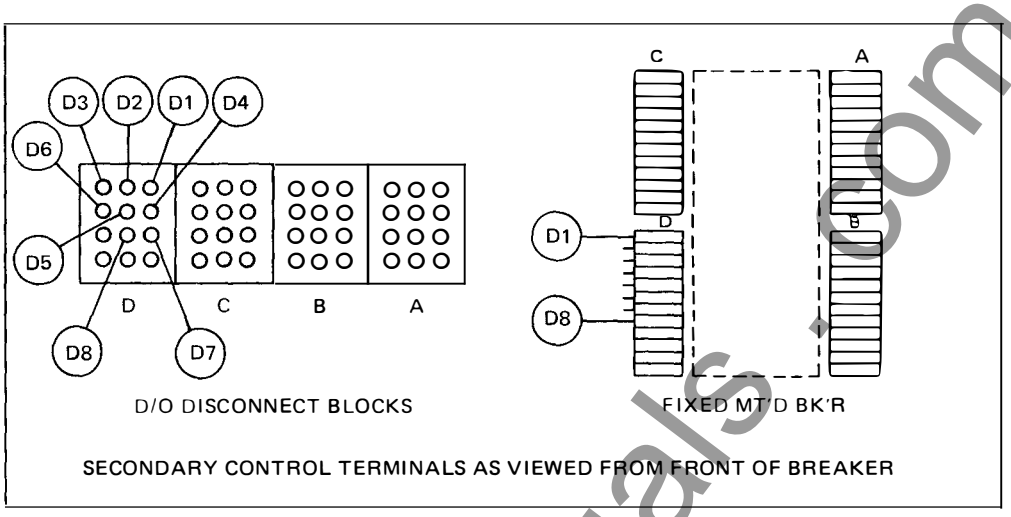
(3) SEE NOTE 6 ON SEET 3 RE TERMINALS C4 AND C5

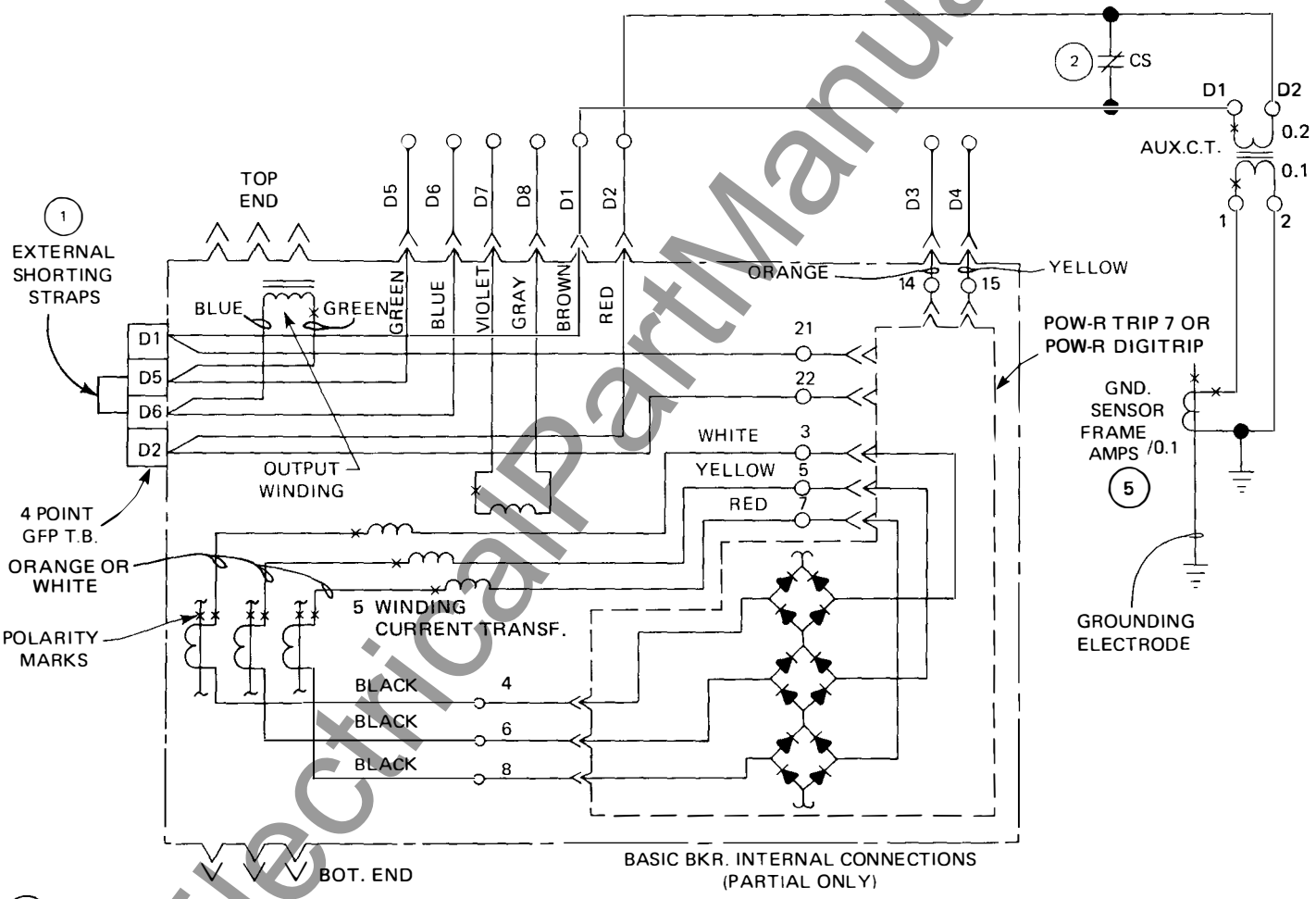
SPB MASTER CONNECTION DIAGRAM

SPB - Ground Fault External Connection 3PH., 4W., Residual, 250/800/1200/1600/2000A. Bkrs. (2000A. in Compact, 16 in. High Frame)

GROUND SENSOR RATING AMPS	KEY CODE *
250	D05
800	D06
1200	D07
1600	D05
2000	D06

* INCLUDES AUX. C.T.





(1) EXTERNAL SHORTING STRAPS MUST BE IN PLACE DURING TESTING AND OPERATING CONDITIONS PER INSTRUCTION N.P. ON SIDE OF BREAKER

(2) ON MULTIPLE SOURCE SYSTEMS, USE CELL POSITION SWITCH TO AVOID VOLTAGE SURGES ON GROUND FAULT CURRENTS WITH D/O BKR IN WITHDRAWN POSITION. (CELL SW. SHOWN IN BKR. WITHDRAWN POSITION.)

(3) SEE NOTE 6 ON SHEET 3 RE TERMINALS C4 AND C5

(4) GROUND FAULT SENSOR AND AUX. C.T. WIRING MUST BE NO. 14 OR NO. 12 COPPER WIRE PER UL 1053.

(5) LOWER THAN STANDARD GROUND FAULT TRIP LEVELS ARE POSSIBLE WITH THIS SCHEME. CONSULT THE FACTORY.

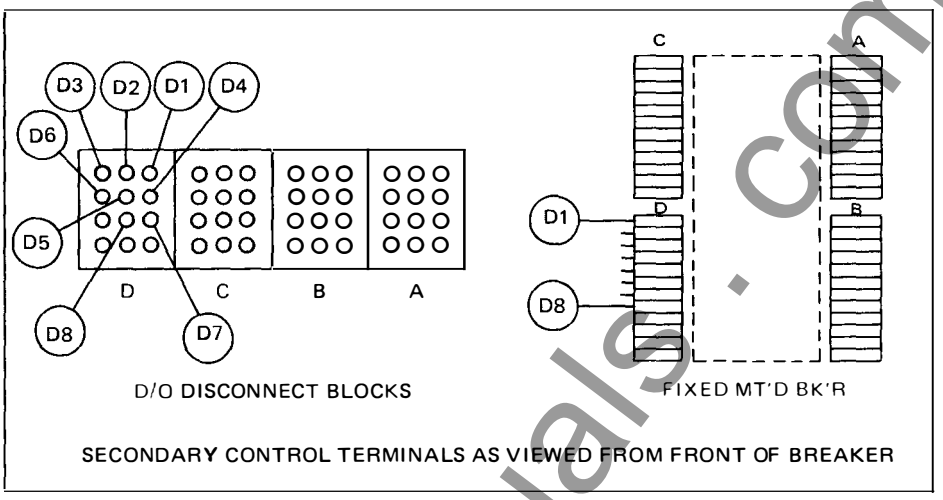
SPB MASTER CONNECTION DIAGRAM

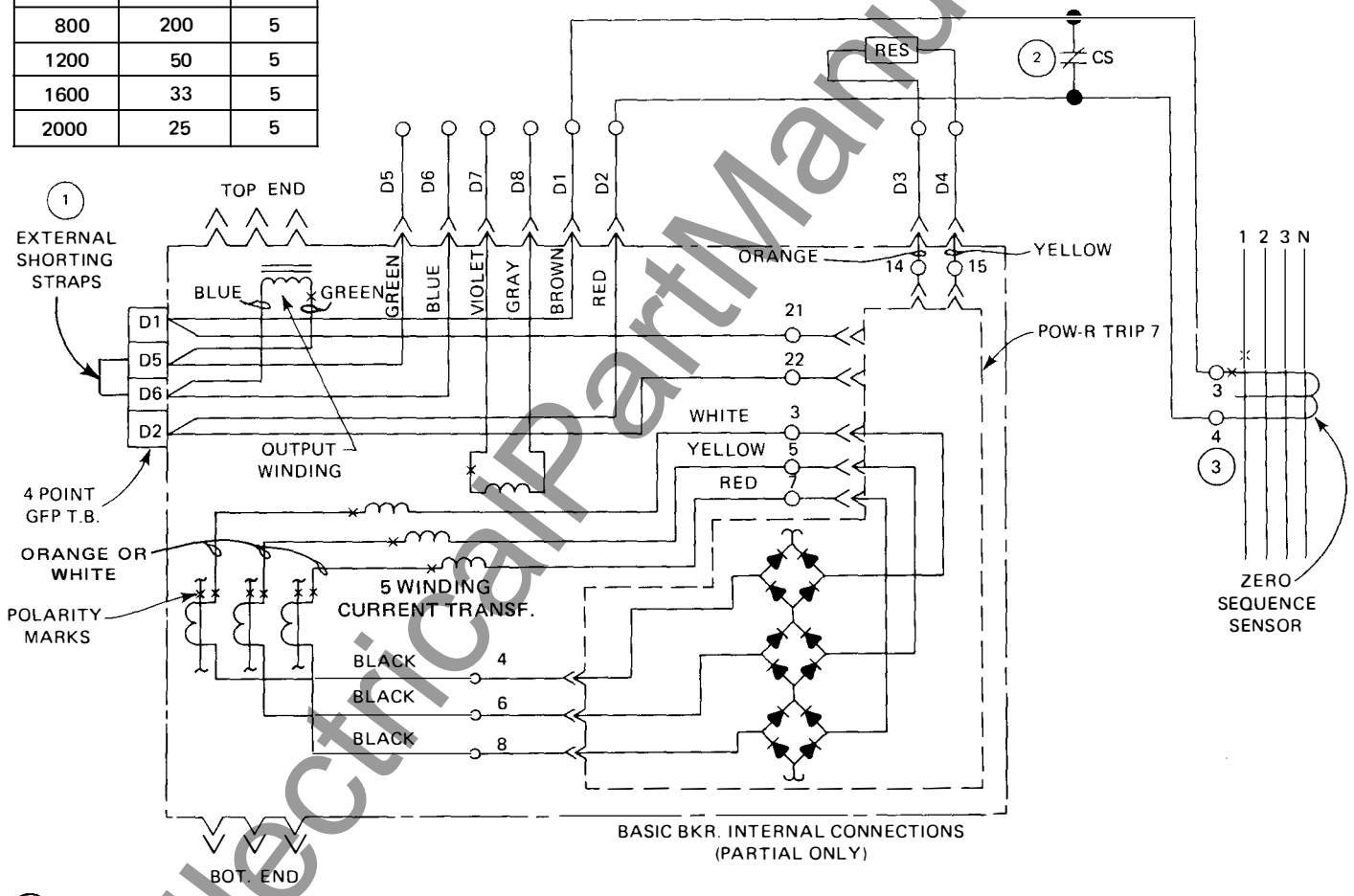
SPB - Ground Fault External Connections 3PH., 4W., Source Ground, 250/800/1200/1600/2000A. Bkrs. (2000A. in Compact, 16 in. High Frame)

FRAME RATING AMPS	WINDOW OPENING (INCHES)	KEY CODE *
250	8.25 I.D.	D10
800 or 1600	7.81 x 11	D11
1200 or 2000		D14
800 or 1600	9.94 x 17	D12
1200 or 2000		D15
800 or 1600	5.81 x 33.5	D13
1200 or 2000		D16

* INCLUDES RESISTOR

FRAME AMPS	RES. OHMS	RES. WATTS
250	78	5
800	200	5
1200	50	5
1600	33	5
2000	25	5





(1) EXTERNAL SHORTING STRAPS MUST BE IN PLACE DURING TESTING AND OPERATING CONDITIONS PER INSTRUCTION N.P. ON SIDE OF BREAKER

(2) ON MULTIPLE SOURCE SYSTEMS, USE CELL POSITION SWITCH ON MAINS AND TIES TO AVOID VOLTAGE SURGES ON GROUND FAULT CURRENTS WITH D/O BKR. IN WITHDRAWN POSITION. (CS SHOWN IN BKR. WITHDRAWN POSITION.)

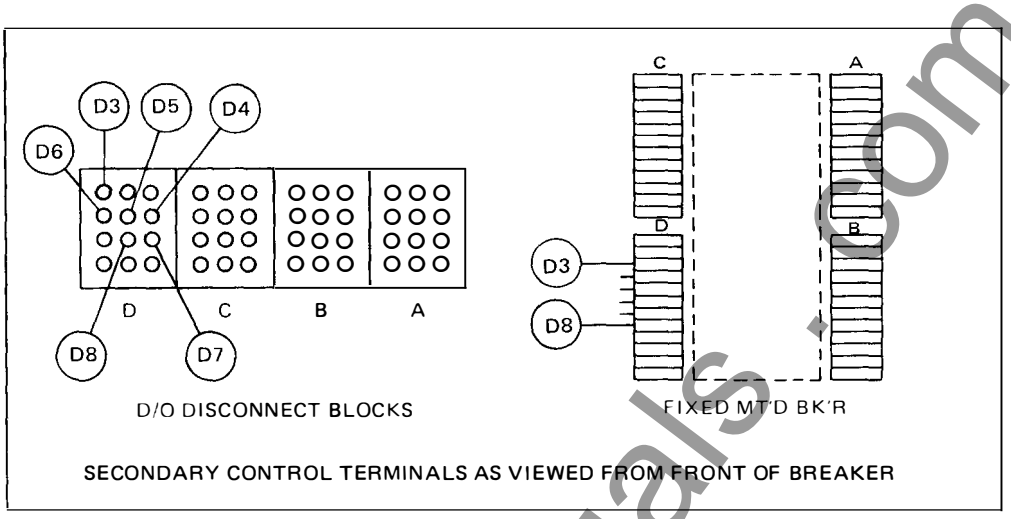
(3) ZERO SEQUENCE SENSOR MUST NOT BE GROUNDED

(4) SEE NOTE 6 ON SHEET 3 RE TERMINALS C4 AND C5

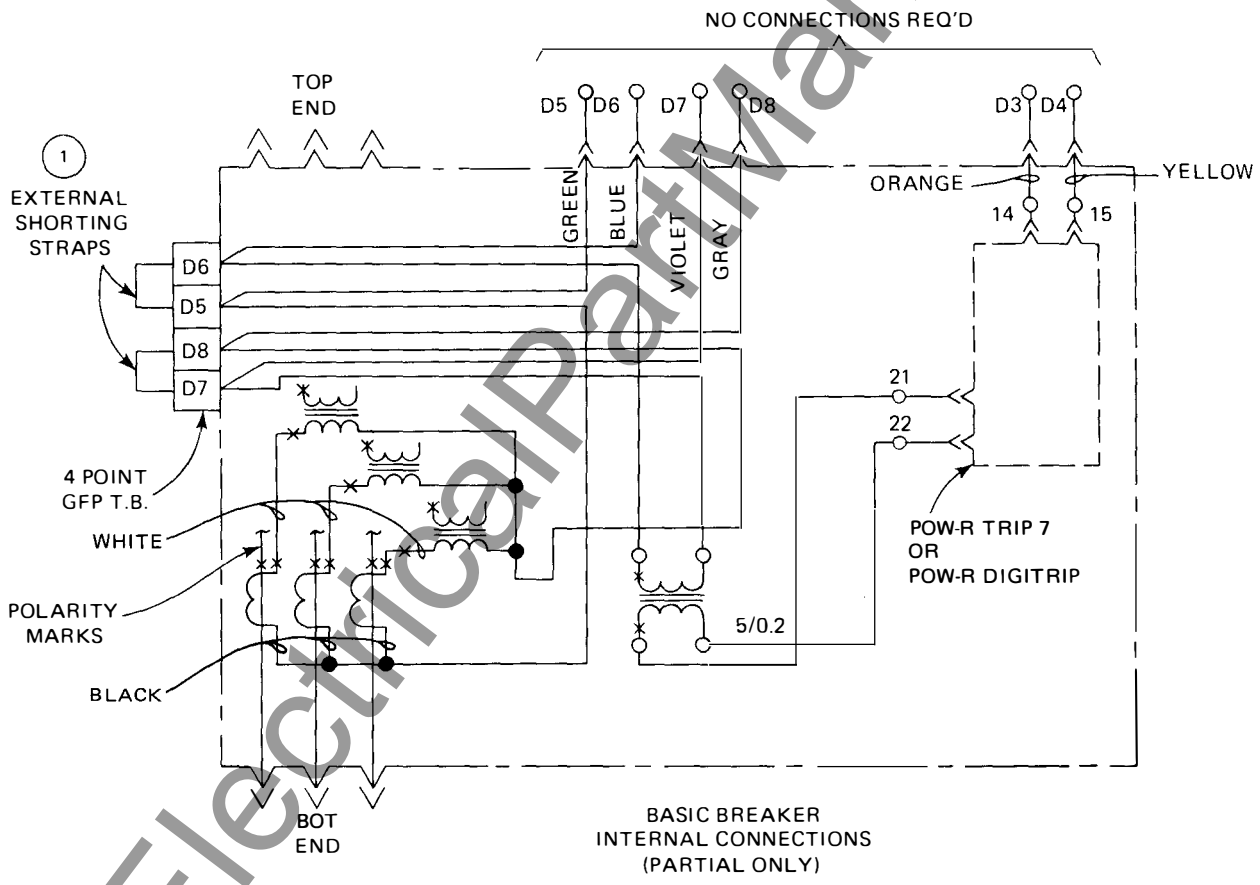
(5) NO. 14 OR NO. 12 COPPER WIRE IS REQUIRED PER UL 1053 FOR SECONDARY WIRING OF ZERO SEQUENCE SENSOR

SPB MASTER CONNECTION DIAGRAM

SPB - Ground Fault External Connections 3 PH., 4W., Zero Sequence, 250/800/1200/1600/2000A. Breakers (2000A. in Compact, 16 in. High Frame) (Use with Pow-R Trip 7 only)



SECONDARY CONTROL TERMINALS AS VIEWED FROM FRONT OF BREAKER



BASIC BREAKER INTERNAL CONNECTIONS (PARTIAL ONLY)

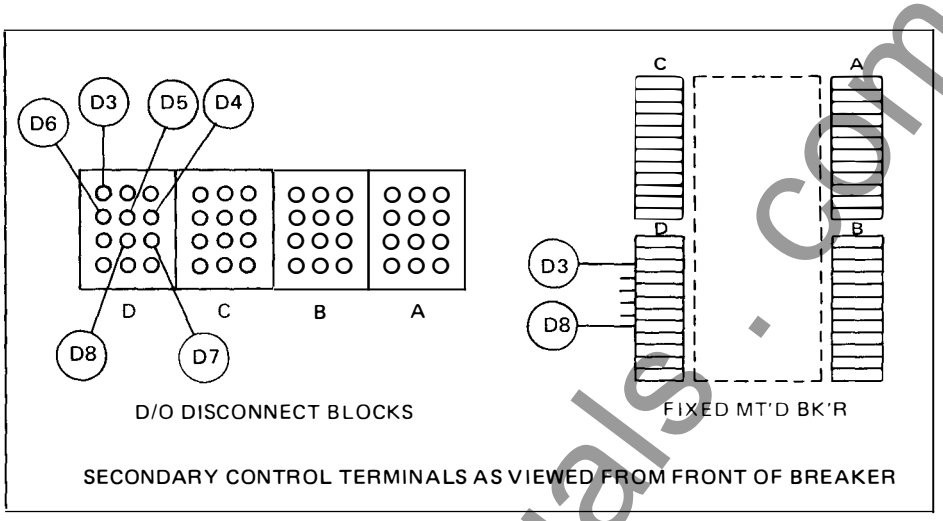
(1) EXTERNAL SHORTING STRAPS MUST BE IN PLACE DURING TESTING AND OPERATING CONDITIONS PER INSTRUCTION N.P. ON SIDE OF BREAKER

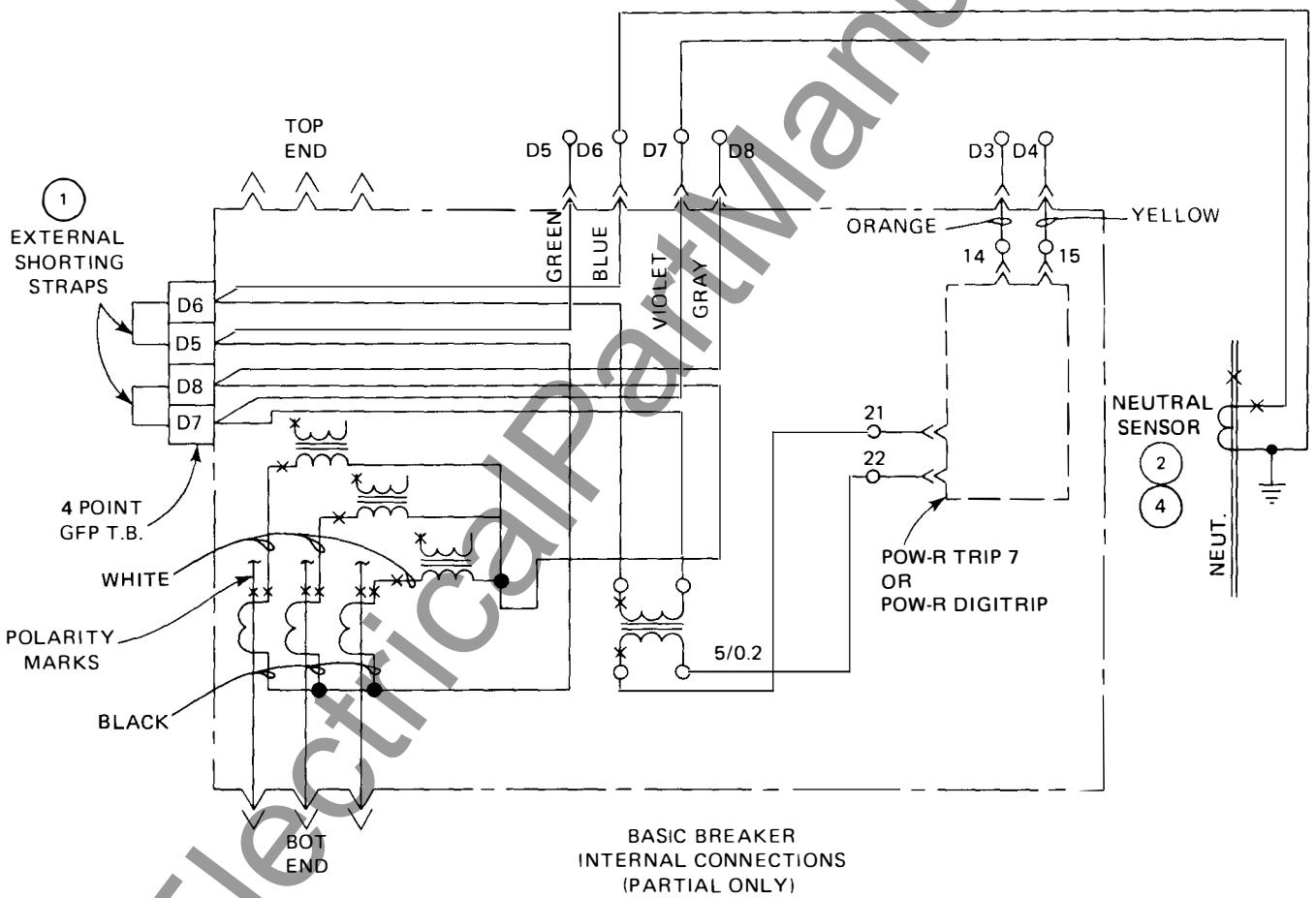
(2) SEE NOTE 6 ON SHEET 3 RE TERMINALS C4 AND C5

SPB MASTER CONNECTION DIAGRAM

SPB - Ground Fault External Connections 3PH., 3W., 2000/2500/3000/4000/5000A. Breakers (2000A. in 22 in. High Frame)

BREAKER FRAME RATING	NEUTRAL SENSOR RATING	KEY CODE
2000 2500 3000	3000/5	D01
4000	4000/5	D01
6000	6000/5	D02





(1) EXTERNAL SHORTING STRAPS MUST BE IN PLACE DURING TESTING AND OPERATING CONDITIONS PER INSTRUCTION N.P. ON SIDE OF BREAKER.

(2) CONNECT NEUTRAL SENSOR SO THAT POLARITY RELATIONSHIP TOWARDS SOURCE IS IDENTICAL FOR PHASE AND NEUTRAL SENSORS

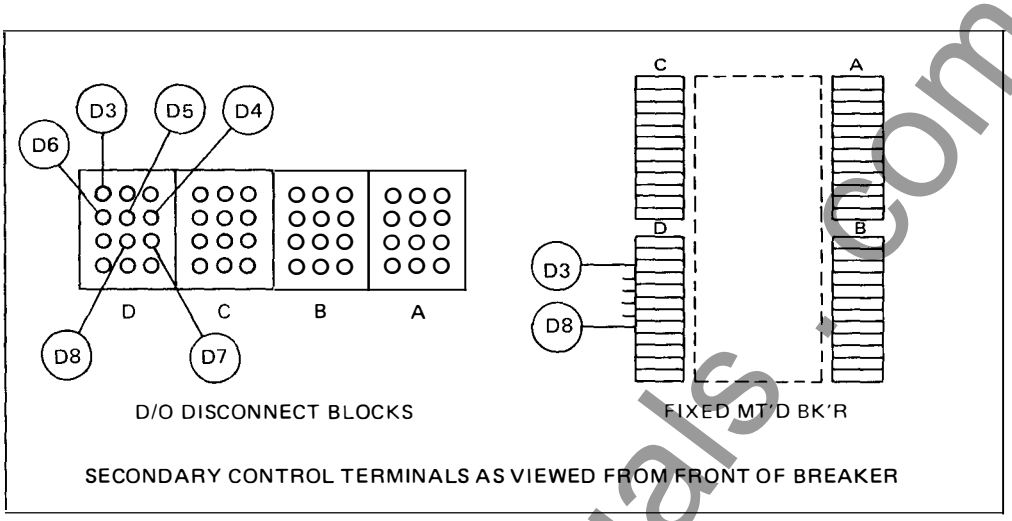
(3) SEE NOTE 6 ON SHEET 3 RE TERMINALS C4 AND C5

(4) USE NO. 14 OR NO. 12 COPPER WIRE PER UL 1053 ON NEUTRAL SENSOR SECONDARY CONNECTIONS.

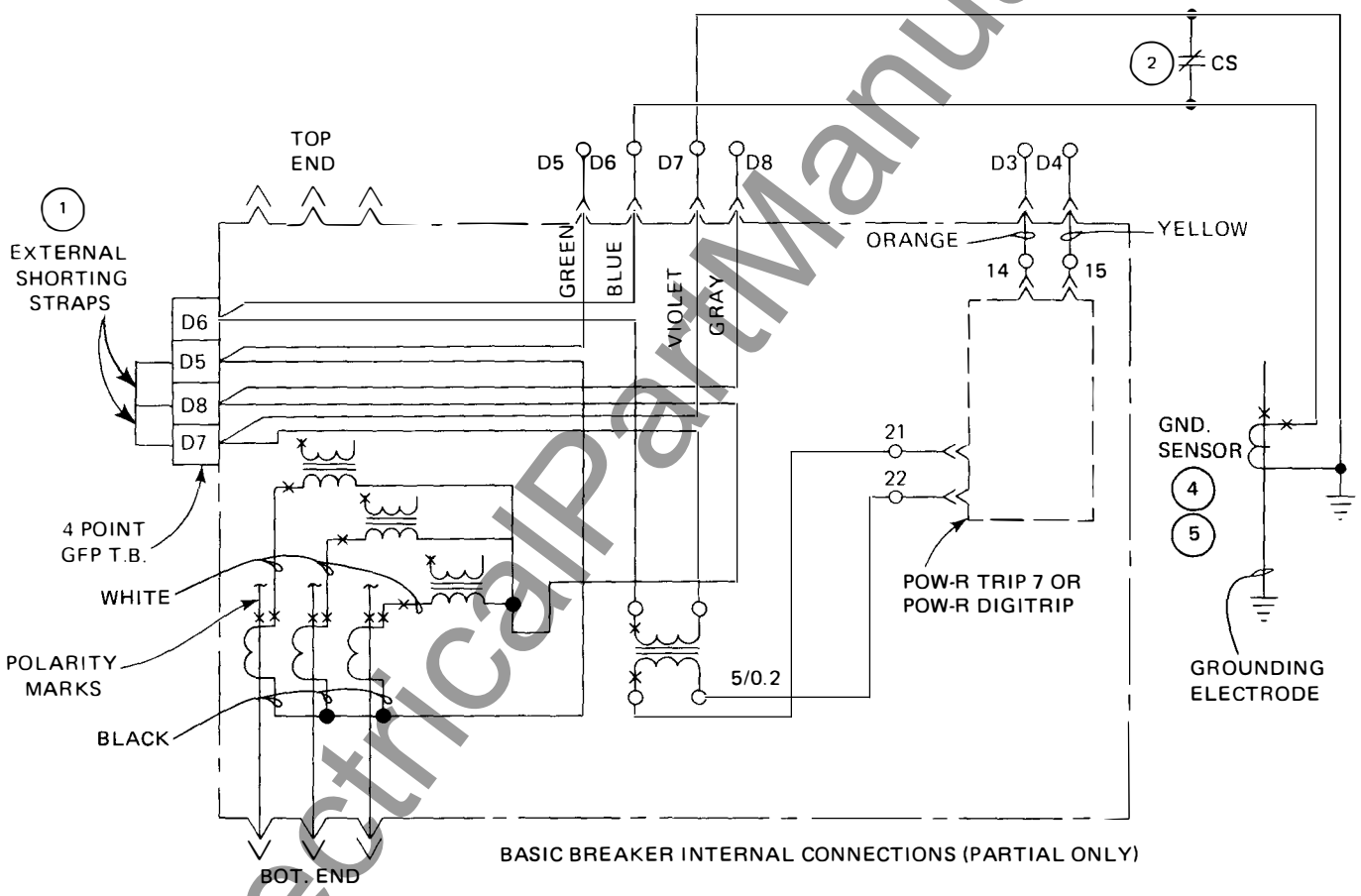
SPB MASTER CONNECTION DIAGRAM

SPB - Ground Fault External Connections 3PH., 4W., Residual, 2000/2500/3000/4000/5000A. Breakers (2000A. in 22 in. High Frame)

GROUND SENSOR RATING AMPS	KEY CODE
2000/2500/3000	D03
4000	D05
5000	D06



SECONDARY CONTROL TERMINALS AS VIEWED FROM FRONT OF BREAKER



BASIC BREAKER INTERNAL CONNECTIONS (PARTIAL ONLY)

(1) EXTERNAL SHORTING STRAPS MUST BE IN PLACE DURING TESTING AND OPERATING CONDITIONS PER INSTRUCTION N.P. ON SIDE OF BREAKER

(2) ON MULTIPLE SOURCE SYSTEMS, USE CELL POSITION SWITCH TO AVOID VOLTAGE SURGES ON GROUND FAULT CURRENTS WITH D/O BREAKER IN WITHDRAWN POSITION. (CELL SWITCH SHOWN IN BKR. WITHDRAWN POSITION.)

(3) SEE NOTE 6 ON SHEET 3 RE TERMINALS C4 AND C5

(4) GROUND SENSOR WIRING MUST BE NO. 14 OR NO. 12 COPPER WIRE PER UL 1053.

(5) LOWER THAN STANDARD GROUND FAULT TRIP LEVELS ARE POSSIBLE WITH THIS SCHEME. CONSULT THE FACTORY.

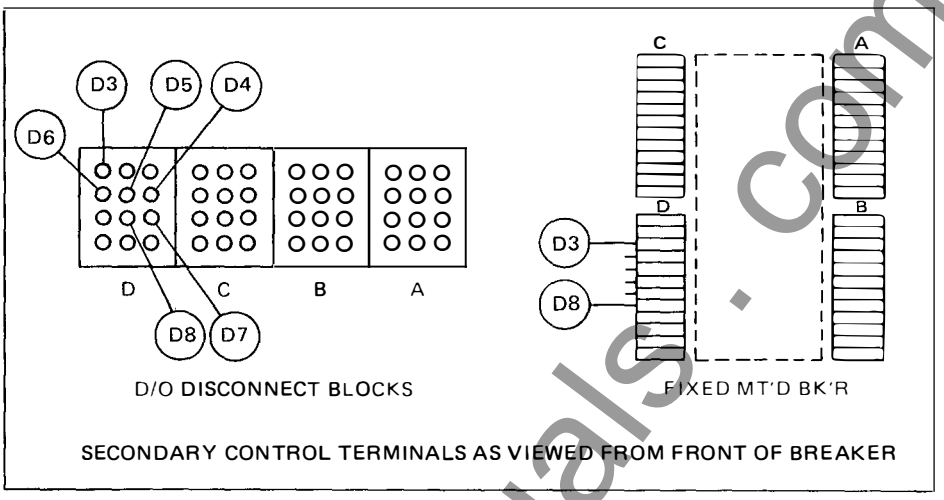
SPB MASTER CONNECTION DIAGRAM

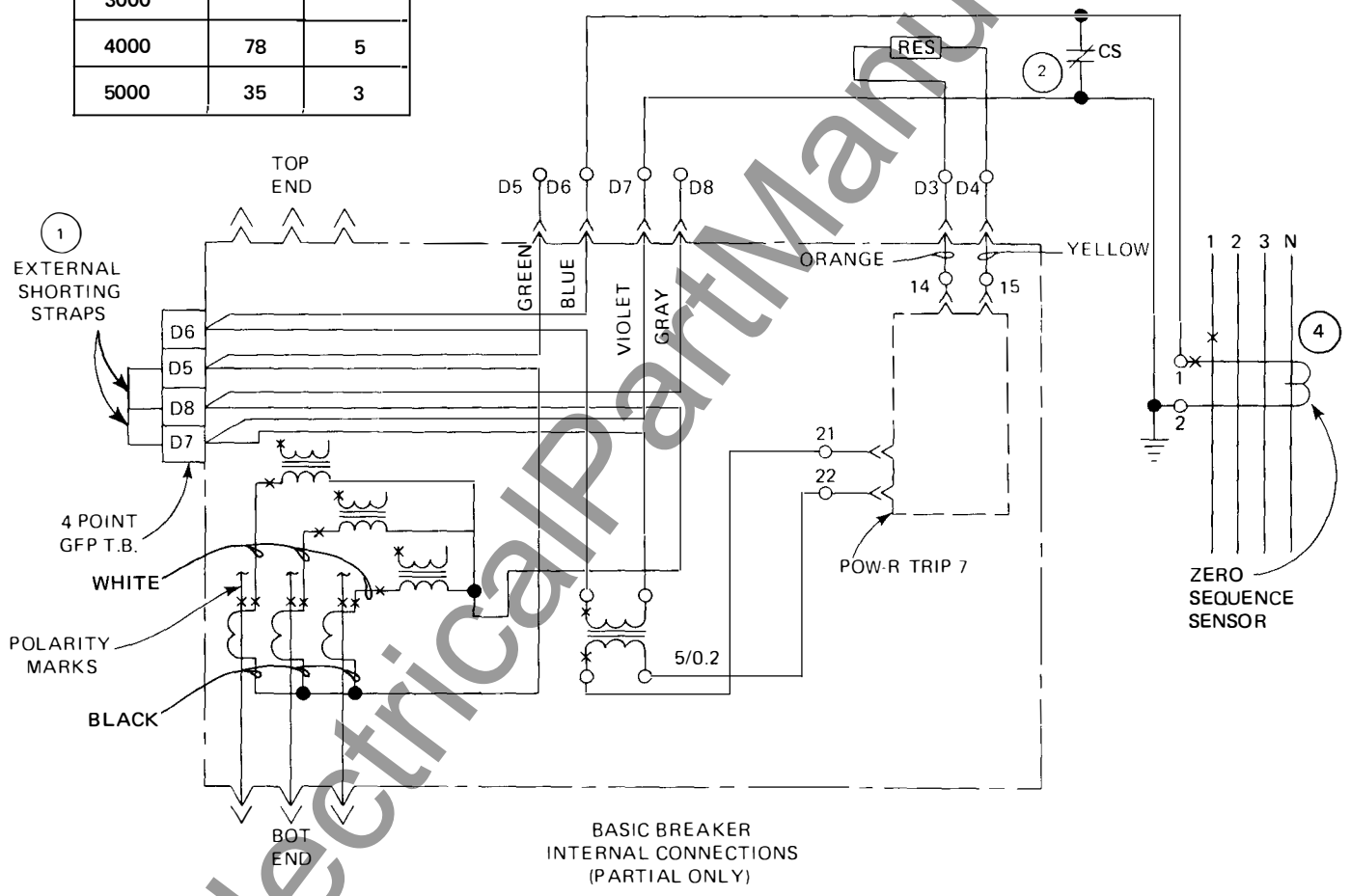
SPB - Ground Fault External Connections 3PH., 4W., Source Ground, 2000/2500/3000/4000/5000A. Breakers (2000A. in 22 in. High Frame)

FRAME RATING AMPS	WINDOW OPENING (INCHES)	KEY CODE *
2000 2500 3000	7.81 x 11	D11
	9.94 x 17	D12
	5.81 x 33.5	D13
4000	5.81 x 33.5	D10
5000		D11

* INCLUDES RESISTOR

FRAME AMPS	RES. OHMS	RES. WATTS
2000/2500/ 3000	500	5
4000	78	5
5000	35	3





BASIC BREAKER
INTERNAL CONNECTIONS
(PARTIAL ONLY)

(1) EXTERNAL SHORTING STRAPS MUST BE IN PLACE DURING TESTING AND OPERATING CONDITIONS PER INSTRUCTION N.P. ON SIDE OF BREAKER

(2) ON MULTIPLE SOURCE SYSTEMS, USE CELL POSITION SWITCH ON MAINS AND TIES TO AVOID VOLTAGE SURGES ON GROUND FAULT CURRENTS WITH D/O BKR IN WITHDRAWN POSITION. (CS SHOWN IN BREAKER WITHDRAWN POSITION.)

(3) SEE NOTE 6 ON SEET 3 RE TERMINALS C4 AND C5.

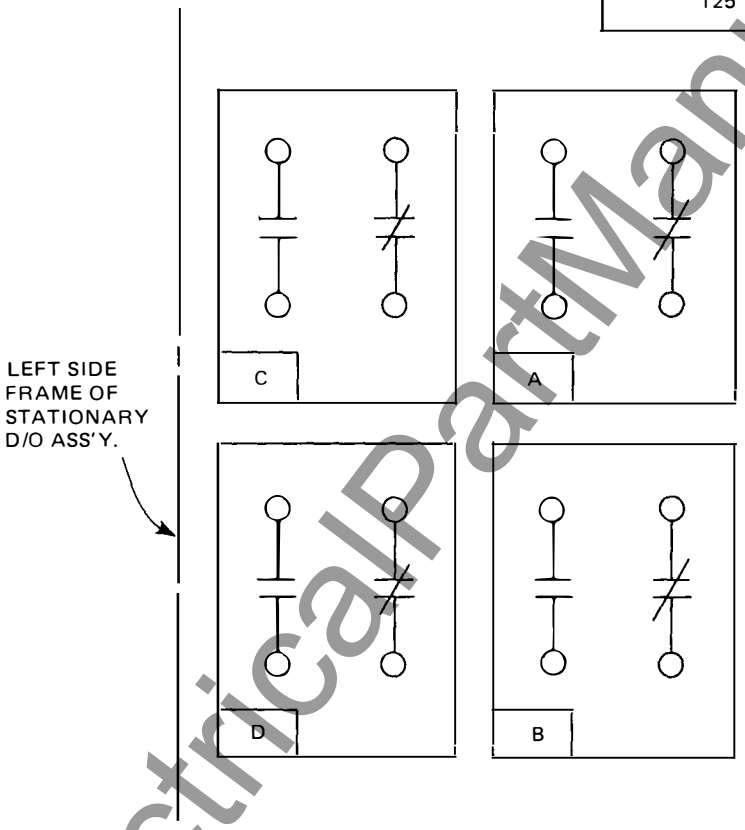
(4) ZERO SEQUENCE SENSOR SECONDARY WIRING MUST BE NO. 14 OR NO. 12 PER UL 1053.

SPB MASTER CONNECTION DIAGRAM

SPB - Ground Fault External Connections 3PH., 4W., Zero Sequence, 2000/2500/3000/4000/5000A. Breakers (2000A. in 22 in. High Frame) (Use with Pow-R Trip 7 only)

NO. OF CELL SWITCHES	SWITCH MOUNTING POSITIONS	KEY CODE
1a-1b	A	N01
2a-2b	A/B	N02
4a-4b	A/B/C/D	N03

SWITCH RATING (AMPS)		
50/60 HZ	CONT.	INRUSH
115	15	40
230	10	20
440	6	10
550	5	8
DC	IND	RES
125	0.3	0.6



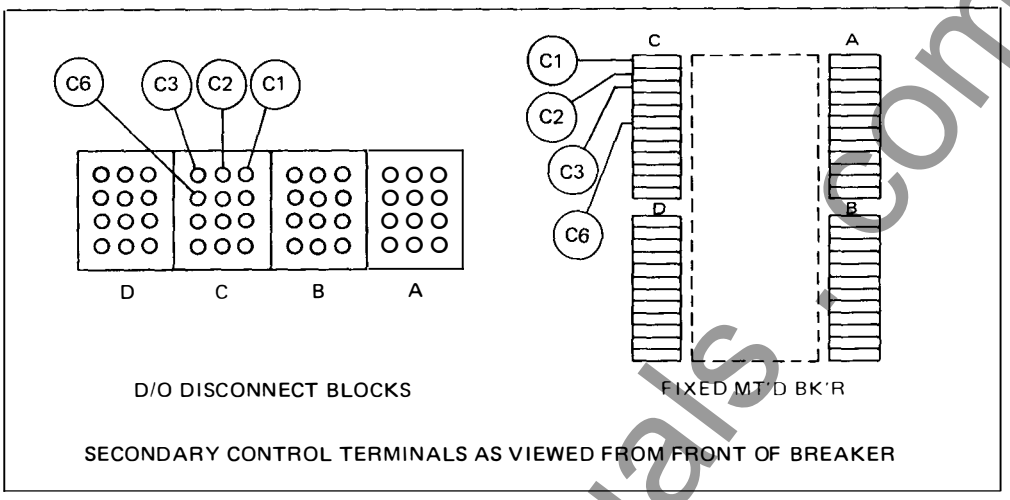
(1) SWITCHES SHOWN IN BREAKER TEST/DISCONNECT/ WITHDRAWN POSITIONS. POSITIONS REVERSE WITH BREAKER IN CONNECTED POSITION.

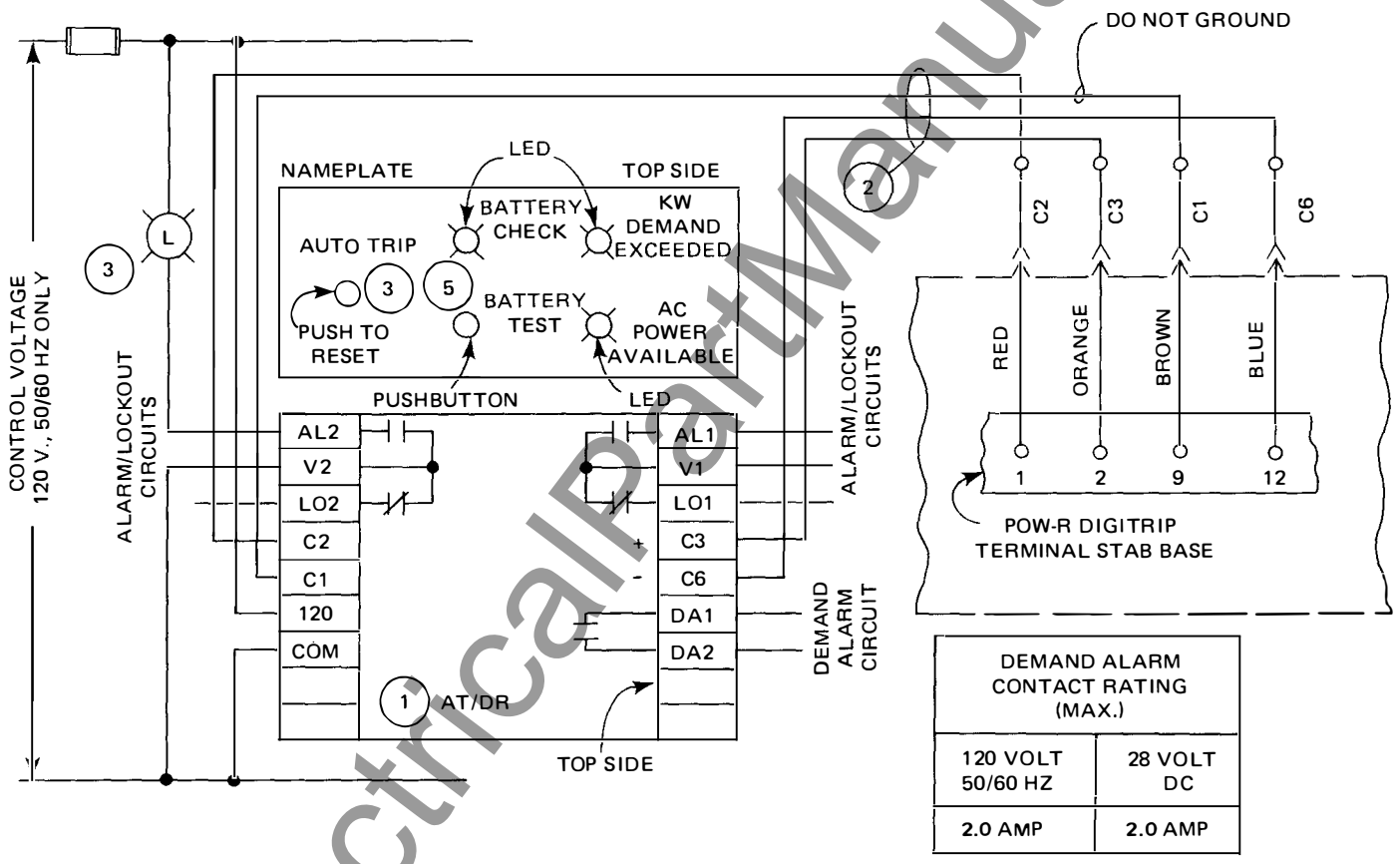
SPB MASTER CONNECTION DIAGRAM
SPB - Cell Position Switches

AUTO TRIP RELAY CAT. NO.	KEY CODE
SPBATRDB	XX01
SPBATRDO	XX02

(5)

ALARM/LOCKOUT CONTACT RATING (MAX.) (4)	
240 VOLTS 50/60 HZ	28 VOLTS DC
10.0 A @ 80% P.F.	10.0 A





DEMAND ALARM CONTACT RATING (MAX.)	
120 VOLT 50/60 HZ	28 VOLT DC
2.0 AMP	2.0 AMP

(1) RELAY CONTACTS LATCH FOLLOWING TRIP. PUSH SYSTEM RESET ON ASSOCIATED POW-R DIGITRIP FIRST AND THEN AT/DR MUST BE MECHANICALLY UNLATCHED WITH LOCAL RESET PROVIDED.

(2) RUN SEPARATE FROM POWER CABLES. WIRE SIZE NOT CRITICAL. SHIELDED CABLE (PREFERRED) OR TWISTED CONDUCTORS REQUIRED. MAX RUN OF 50 FT. SUGGESTED.

(3) AUTO TRIP INDICATION IS INCLUDED WITH RESET BUTTON. HOWEVER BECAUSE OF LOW-VISIBILITY A SEPARATE PILOT LIGHT IS RECOMMENDED TO BE WIRED TO ALARM CONTACTS TO INDICATE TRIP WHEN DESIRED.

(4) A MAKE/BREAK RATING OF 1.1 AMPERES @ 125 VOLT DC CAN BE OBTAINED BY WIRING THE TWO ALARM/LOCKOUT CONTACTS IN SERIES.

(5) INTERNAL BATTERY MODULE AND RELATED BATTERY CHECK COMPONENTS ARE NOT SUPPLIED WITH SPBATRO.

SPB MASTER CONNECTION DIAGRAM
SPB - Automatic Trip Relay (With Latching Contacts) and Demand Relay Connection Diagram (Use with Pow-R Digitrip only)

Reference
I.L. 15164

Westinghouse Electric Corporation
Beaver, PA

I.S. 15262
Sheet 41

Master Connection Diagram for the Systems Pow-R Breaker All Frame Ratings

8IE6427#7

I.S. 15262-B

Westinghouse Electric Corporation
Beaver, PA

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4	Legend and Misc Details	5
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SPB MASTER CONNECTION DIAGRAM ACCESSORY INDEX

LINE	REFERENCES	FRAME RATING	TYPE TRIP	DWG. NO.	NOTES (SEE SH. 3)
51	Modular Key Drawing	250-800	ϕ	1371D01	3
52	Modular Key Drawing	250-800	PRT	1371D05	3
53	Modular Key Drawing	1600	ϕ	1371D02	3
54	Modular Key Drawing	1600	PRT	1371D06	3
55	Modular Key Drawing	2000-3000	ϕ	1371D03	3*
56	Modular Key Drawing	2000-3000	PRT	1371D07	3*
57	Modular Key Drawing	4000	ϕ	1371D04	3
58	Modular Key Drawing	1200	ϕ	1371D01	3
59	Modular Key Drawing	1200	PRT	1371D05	3
60	Modular Key Drawing	2000	ϕ	1371D02	3**
61	Modular Key Drawing	2000	PRT	1371D06	3**
62	Master Wiring Diagram	All	All	1366D30	
63	Gnd. Fault Scheme	250-1600	ϕ	1273C41	4
64	Gnd. Fault Scheme	2000-4000	ϕ	1273C40	4
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80	Field Testing	All	All	I.L. 15094	
81	Mechanical Cable Interlock	All	–	I.L. 15129	
82	General Instructions	All	–	I.L. 15082	
83	Shunt Trip Devices	All	–	I.L. 15158	
84	Capacitor Trip Device	All	–	I.L. 15146	
85	Auxiliary Switches	All	–	I.L. 15159	
86	GFP Test Panel	All	PRT-7	I.L. 15072	
87	UVR Time Delay Device	All	–	I.L. 15141	
88	Automatic Trip Relays	All	PRT-7	I.L. 15087	
89	Digitrip Instructions	All	–	I.L. 15164	
90					
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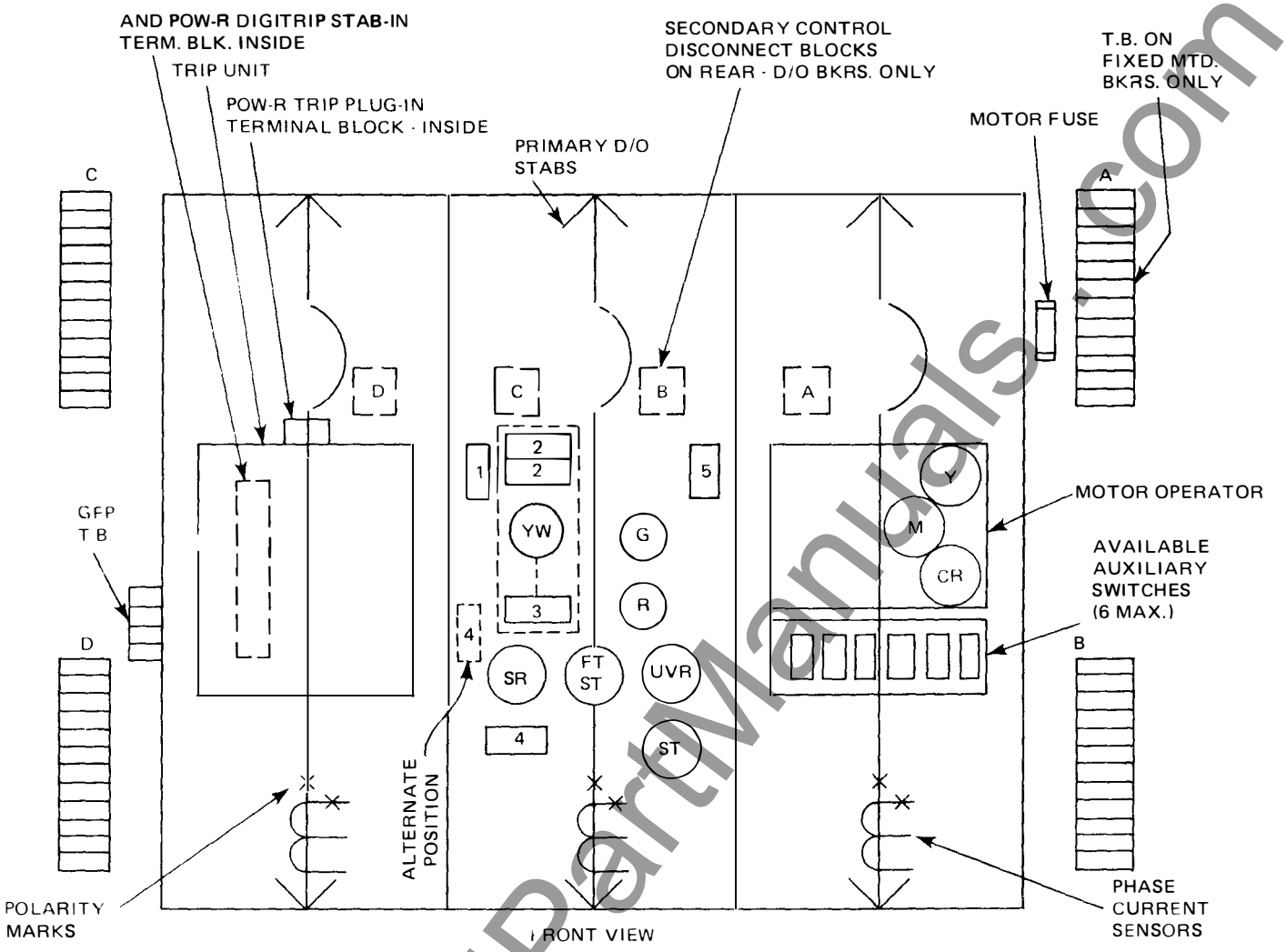
SPB MASTER CONNECTION DIAGRAM DRAWING REFERENCE INDEX

*2000A. in 22 in. High Frame
**2000A. in Compact, 16 in. High Frame ϕ Pow-R Trip 7 or Pow-R Digitrip

1. On D/O Breakers color coded pigtail leads provided for connecting to customer's terminal block. Standard length 6 feet unless ordered special.
2. Term Blocks available for Mounting on Stationary D/O Frame Sides on special order.
3. For Reference purposes, specific accessory styles are shown on the appropriate Modular Key Drawings referenced on Sheet 2. The exact location of this style can be determined by combining the appropriate Modular Key Drawing No. and Key Code (from the individual diagram sheet utilized).
4. For Proper Ground Fault Sensing complete connections must be included from appropriate referenced drawing.
5. Any combination of accessories not utilizing same Secondary Control Stab Points may be used on any single breaker.
6. All SPB breakers equipped with GFP will trip near instantaneous (0.03-0.08 sec.) Regardless of the time band setting – if downstream interlock wiring is not employed and/or a jumper is not added between control terminals C4 and C5. With the jumper added, the breaker will respond to the pre-set time delay setting. Consider adding this jumper for all installations with GFP on the main breaker only. For installations with multiple levels of GFP, see Sheet 31.
7. On breakers with Pow-R Trip 7, Lead C6 (Blue) is used for factory test purposes only. On breakers with Pow-R Digitrip, Lead C6 (Blue) is used in ATR/Power Pack – See Sheet 41. On breakers with Pow-R Trip, Leads C5 (Green) and C6 (Blue) are used for factory test purposes only.
8. Pow-R breakers have been designed for maximum ground fault and electronic attachment flexibility and interchangeability. For this reason many Leads in the C and D block will be supplied but may not be used by a customer for his particular application.
9. Care must be taken in choosing a DC supply voltage for SPB DC attachments. The inductive reactance introduced due to ripple can affect attachment performance.

SPB MASTER CONNECTION DIAGRAM
GENERAL NOTES



1 SPRING RELEASE CUT-OFF SWITCH (b)

2 TWO SPRING CHARGE SWS. (SC). TOP SW. IS SR CUT-OFF,– BOTTOM SW. IS M CUT-OFF.

3 MOTOR CHARGE P.B. CONTACT SWITCH

SR SPRING RELEASE

4 LATCH CHECK SWITCH (LC)

UVR UNDERVOLTAGE RELEASE

5 SHUNT TRIP CUT-OFF SWITCH (a/b)

YW MOTOR CHARGE P.B. (YELLOW)

G MECHANICAL CLOSE P.B. (GREEN)

R MECHANICAL OPEN P.B. (RED)

Y ANTI-PUMP RELAY

CR CHARGE RELAY

M MOTOR

FT ST FLUX TRANSFER SHUNT TRIP

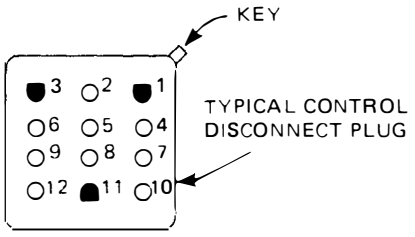
ST SHUNT TRIP

SPB MASTER CONNECTION DIAGRAM
SPB - Accessory Mounting Locations

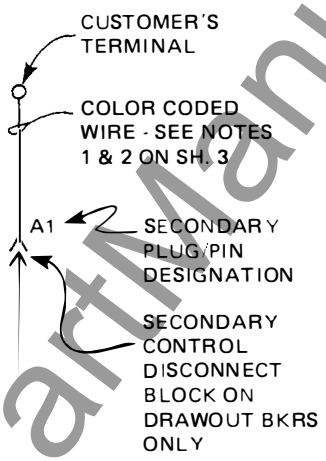
LEGEND*

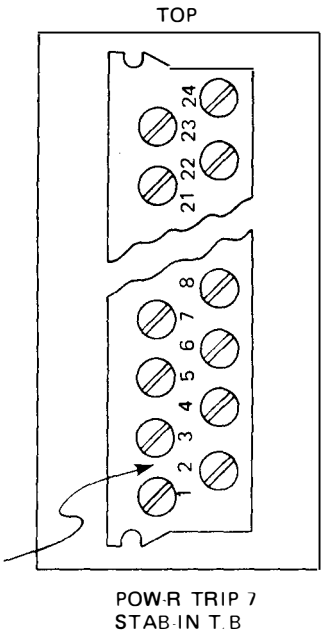
SR – SPRING RELEASE - CLOSES BKR. ON REMOTE SIGNAL
ST – SHUNT TRIP - OPENS BKR. ON REMOTE SIGNAL
FTST – FLUX TRANSFER SHUNT TRIP - OPENS BKR. ON SIGNAL FROM TRIP UNIT
CR – MOTOR CHARGE RELAY - 3 SECONDS CHARGE TIME
Y – ANTI-PUMP RELAY
SC – SPRING CHARGED SWITCH
LC – LATCH CHECK SWITCH - HELD IN OPEN POSITION BY ROTATING TRIPPER (D/O MECHANISM OR KEY INTERLOCK), OR OMISSION OF RATING PLUG
UVR – UNDERVOLTAGE RELEASE
a – AUXILIARY SWITCH "OPEN" WITH BKR., OPEN
b – AUXILIARY SWITCH "CLOSED" WITH BKR. OPEN
ATR – AUTOMATIC TRIP RELAY
INDICATING LIGHT (W, WHITE; A, AMBER; R, RED; G, GREEN; L, COLOR TO SUIT; LED, LIGHT EMITTING DIODE)

*ALL CONTACTS SHOWN IN BREAKER "OPEN" POSITION



PLUG LAYOUT SHOWN AS VIEWED FROM FRONT OF BREAKER





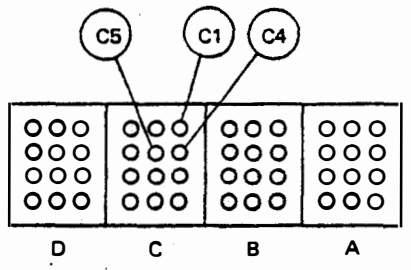
WIRING TERMINATIONS

MALE PIN - S#1268C07H10 OR
AMP "MATE-N-LOK" P/N 350705-1
FEMALE SOCKET - S#1268C07H08 OR
AMP "MATE-N-LOK" P/N 350550-1
HANDCRIMP TOOL -
AMP "MATE-N-LOK"
P/N - 90298-1 FOR #18-20
P/N - 90299-1 FOR #14-16
EXTRACTION TOOL -
AMP "MATE-N-LOK P/N 458994-1
1285C01H14

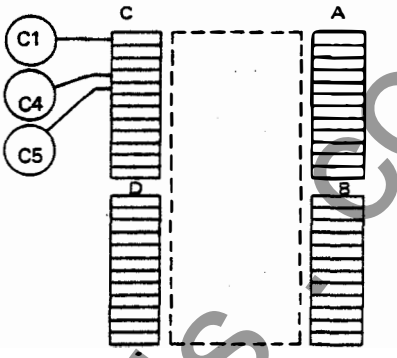
SPB MASTER CONNECTION DIAGRAM
SPB - Accessory Legend and Misc Details

Reference
I.L. 15377

C4 – OUTPUT
C5 – INPUT
C1 – COMMON

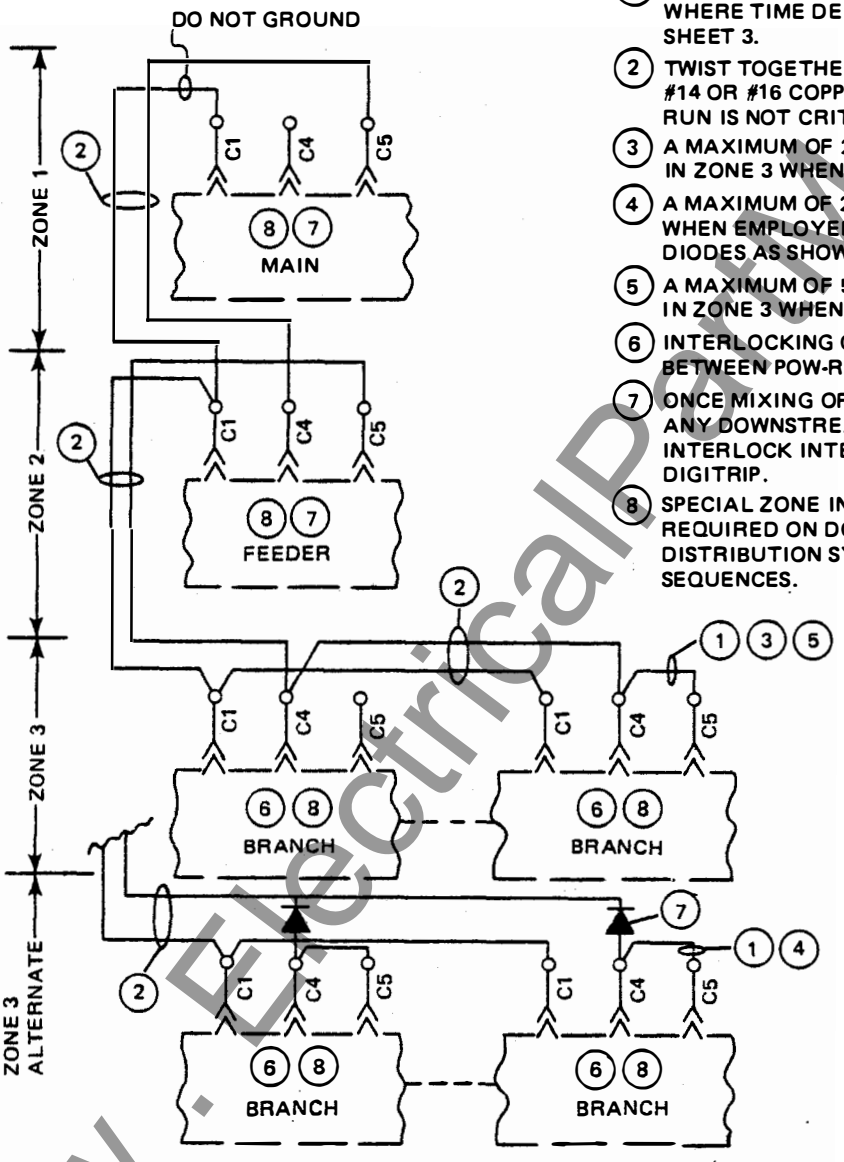


D/O DISCONNECT BLOCKS



FIXED MOUNTED BREAKER

SECONDARY CONTROL TERMINALS AS VIEWED FROM FRONT OF BREAKER



1. JUMPER MUST BE ADDED ON EACH DOWN STREAM BREAKER WHERE TIME DELAY AS PRE-SET IS REQUIRED. SEE ALSO NOTE 6, SHEET 3.
2. TWIST TOGETHER AND RUN SEPARATE FROM POWER CABLES. #14 OR #16 COPPER WIRE IS REQUIRED PER UL-1053. LENGTH OF RUN IS NOT CRITICAL.
3. A MAXIMUM OF 20 BREAKERS MAY BE CONNECTED IN PARALLEL IN ZONE 3 WHEN EMPLOYED WITHOUT SELF-INTERLOCK.
4. A MAXIMUM OF 20 BREAKERS MAY BE CONNECTED IN PARALLEL WHEN EMPLOYED WITH SELF-INTERLOCKING BY ADDING SIGNAL DIODES AS SHOWN IN ZONE 3 ALTERNATE.
5. A MAXIMUM OF 5 BREAKERS MAY BE CONNECTED IN PARALLEL IN ZONE 3 WHEN EMPLOYED WITH SELF-INTERLOCK.
6. INTERLOCKING ON THE SAME ZONE LEVEL CAN BE INTERMIXED BETWEEN POW-R TRIP 7 AND POW-R DIGITRIP UNITS.
7. ONCE MIXING OF POW-R DIGITRIP AND POW-R TRIP 7 OCCURS ON ANY DOWNSTREAM LEVEL THEN ALL TRIP DEVICES IN ANY ZONE INTERLOCK INTERCONNECTED UPSTREAM ZONE MUST BE POW-R DIGITRIP.
8. SPECIAL ZONE INTERLOCKING CONSIDERATIONS MUST BE REQUIRED ON DOUBLE-ENDED (DUAL SOURCE) OR MULTI-SOURCE DISTRIBUTION SYSTEMS TO PROVIDE DESIRED INTERLOCKING SEQUENCES.

SPB MASTER CONNECTION DIAGRAM

SPB – Typical Ground Fault Zone Interlocking Connections for RADIAL® Distribution System