



1B230 User Guide

Two Shot Auto Reclose Relay

relay monitoring systems Pty Ltd

Advanced Protection Devices



User Guide



Test Manual

1B230 User Guide

About This Manual

This User Guide covers all 1B230 relays manufactured from May 2003. Earlier relays do not necessarily incorporate all the features described. Our policy of continuous improvement means that extra features & functionality may have been added.

The 1B230 User Guide is designed as a generic document to describe the common operating parameters for all relays built on this platform. Some relay applications are described but for specific model information the individual "K" number Product / Test manuals should be consulted.

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To download a PDF version of this guide:
http://www.rmspl.com.au/userguide/1b230_user_guide.pdf

To download the model specific Test Manual:
<http://www.rmspl.com.au/search.asp>

How this guide is organised

This guide is divided into five parts:

Part 1 Overview

About this Manual

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Equipment Operating Conditions

Relay Dimensions & Other Mounting Accessories

Equipment Connections

Commissioning

Decommissioning & Disposal

Part 5 Maintenance

Mechanical Inspection

Test Intervals

Defect Report Form



Visit www.rmspl.com.au for the latest product information.

Due to RMS continuous product improvement policy this information is subject to change without notice. 1B230_Guide/lss E/25/08/08



Test Manual

This User Guide covers all 1B230 relay versions & describes the generic features & attributes common across all versions.

Different relay versions are required to cater for varying customer requirements such as auxiliary voltage range, I/O configuration, case style, relay functionality etc.

The product ordering code described in the Technical Bulletin is used to generate a unique version of the relay specification & is called a type number. The type number takes the form 1B230Kxx where the Kxx is the "K" or version number.

Refer to: www.rmspl.com.au/handbook/parta3.pdf
for a complete description of the RMS "K" number system.

Each 1B230 version has a specific Test Manual which provides details on the unique attributes of the relay. Each Test Manual includes the following information:

- Test Certificate
- Specific technical variations from the standard model if applicable
- Test & calibration record
- Wiring diagram

A Test Manual is provided with each relay shipped.

If you require a copy of the Test Manual for an RMS product the following options are available:

- Check the RMS web site at: www.rmspl.com.au/search.asp
- RMS CD catalogue select: [List all Product/Test Manuals](#) under [Technical Library](#)
- Contact RMS or a representative & request a hard copy or PDF by email.



Mechanical Configuration

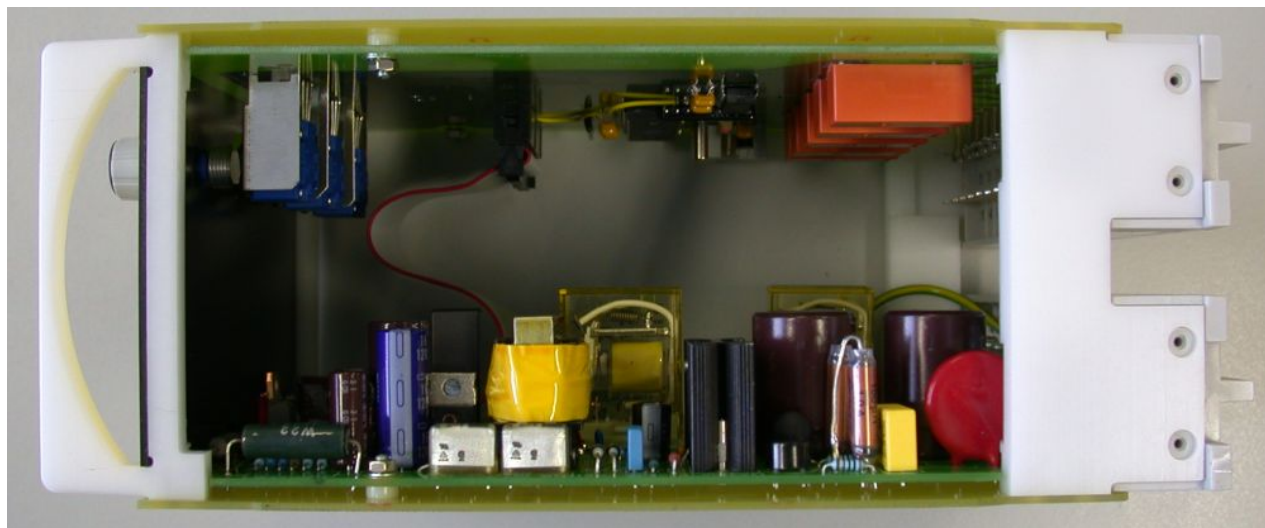
Great care has been taken to design a rugged, cost effective & flexible mechanical solution for the *MATRIX* range of RMS protection relays. The *MATRIX* range provides a compact draw out case solution with M4 screw terminals:

- 2M28 Size 2 with 28 terminals
- 4M28 Size 4 with 28 terminals
- 4M56 Size 4 with 56 terminals

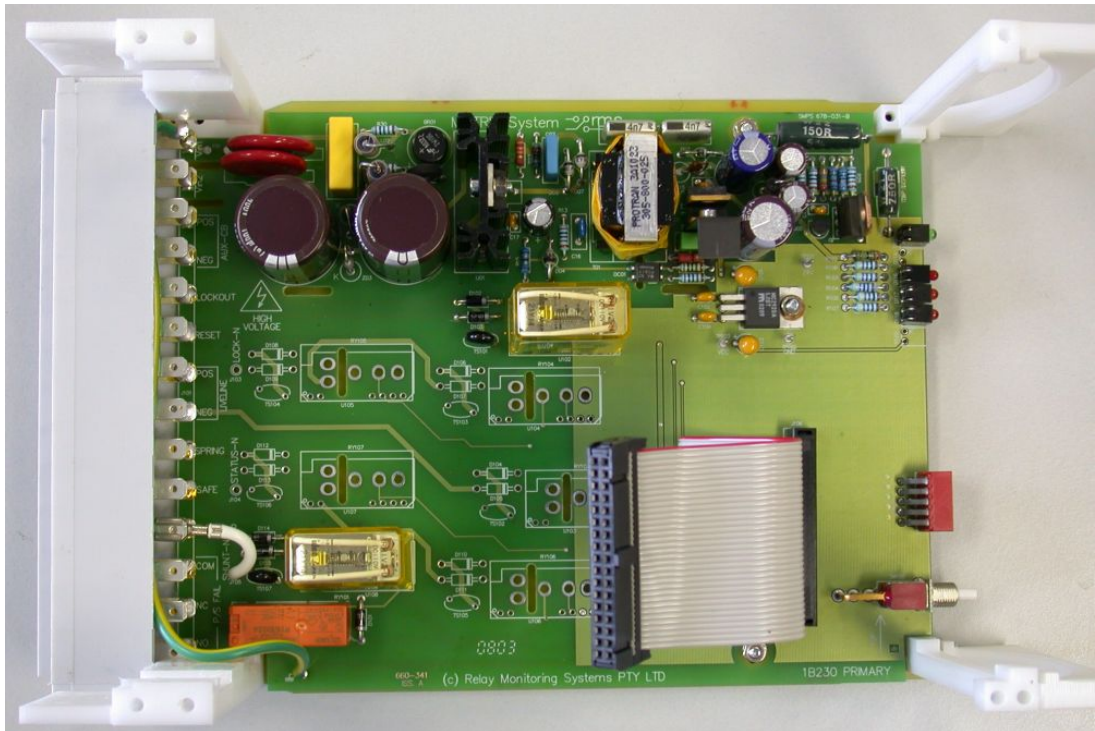
Complete details & attributes for the M (MATRIX) cases & accessories may be found at:

<http://www.rmspl.com.au/mseries.htm>

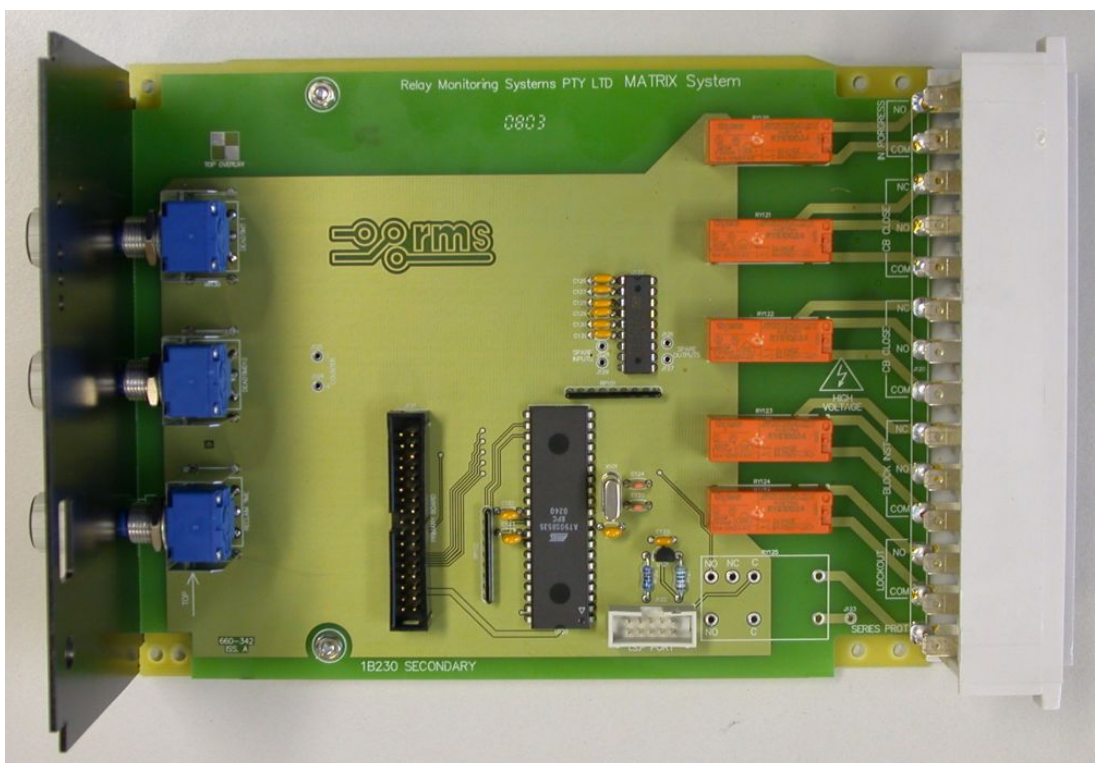
The 1B230 is configured in a 4M56 case & the following photographs depict the general mechanical configuration. It should be noted that re-usable screw rivets are used to bind the draw out relay module. A 1/16" hex key is required for disassembly.



1B230 Module viewed from top.



1B230 Primary PCB showing the switch mode power supply components at the top.



1B230 Secondary PCB showing time delay setting controls, output relays & CPU.



Technical Bulletin

The detailed technical attributes, functional description & performance specifications for the 1B230 are described in the attached Technical Bulletin. For the most up to date version go to:

www.rmspl.com.au/handbook/1b230.htm

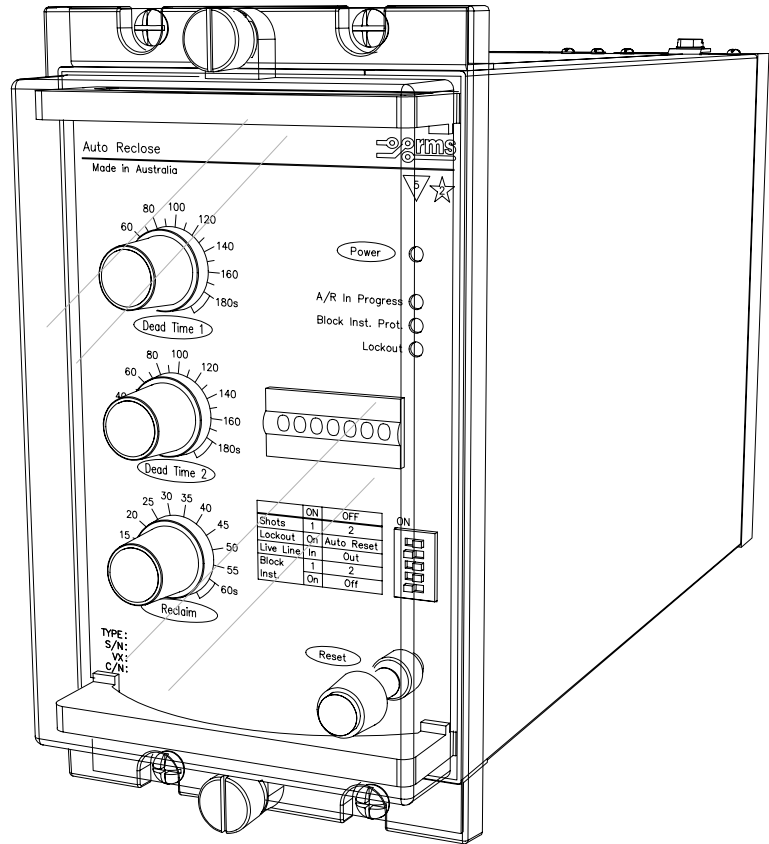
For any specific attributes of a particular version refer to the Test Manual for that type (K) number.

The order of precedence for technical information is as follows:

- Test Manual
- Technical Bulletin
- User Guide

Features

- Single or double shot reclose with selectable auto reset mode
- Shunt initiate input
- Optional series initiate input
- Safe to reclose input
- Line voltage interlock
- CB reclose spring status input to defer auto reclose pulse until fully charged
- Lockout LED indication
- Drive to lockout input
- Remote reset input
- Reclose in progress LED
- Instantaneous protection inhibit output & LED indication
- Wide auxiliary supply range with fail alarm contact
- Independently adjustable dead time delay per shot
- Common adjustable reclaim time delay
- Optional reclose counter
- Simple rugged design
- Size 4M draw out case



1B230 depicted in a 4M28 case

Application

Operating records for overhead power lines reveal that most faults are of a transient nature (e.g. lightning induced) & that service interruptions may be minimized by use of automatic reclosing of circuit breakers.

An automatic reclosure of the circuit breaker, after the fault clears, provides improved service continuity & system stability.

The 1B230 Series Reclose Relay provides for single or double shot automatic reclosing of circuit breakers, following interruption of supply due to a fault in the system.

Operation

Made in Australia

The 1B230 auto reclose relay provides up to two shot auto reclose control for distribution and transmission systems. Dead times for both shots (reclose attempts) are independently adjustable.

An auto reclose cycle is initiated by operation of a protective relay (INP Main Protn), provided the circuit breaker is closed until the instant of protection operation.

Dead time 1 or 2 start when the circuit breaker has tripped (INP CB Aux Switch) and the protection has reset.

At the end of the dead time, a CB close signal is given (output RLY CB Close Sig), provided input signals are present indicating that system conditions are suitable (INP Safe To Close), and the circuit breaker closing spring, or other energy source, is fully charged (INP Spring Charge).

The safe to close signal is taken from a contact on a separate voltage monitor or synchronism check relay, and the spring charged signal is taken from an auxiliary switch contact on the circuit breaker. The CB close signal is cut off when the circuit breaker closes.

Once the output pulse to close the circuit breaker is completed, the reclaim time starts. If the circuit breaker remains closed until the reclaim timer times out, the 1B230 resets if in auto mode or goes to lockout.

However if the protection operates again & the circuit breaker trips before the reclaim time has elapsed, the 1B230 either advances to the next shot in the programmed auto reclose cycle, or, if all programmed reclose attempts have been made, goes to lockout.

BLOCK INSTANTANEOUS TRIPS OUTPUT

A Block Instantaneous Trips output (**RLY Block Inst Pr**) can be arranged to block the trip function of non-discriminating protection, such as low set instantaneous overcurrent or earth fault protection, or distance protection operating with Zone 1 extension. This function is used to ensure that the final trip to lock out for a persistent fault is made by discriminating protection & can be set at the front panel to operate after the first trip, after the second trip or to OFF (Function disabled).

The output relay is normally reset and operates (contact closes) to block non-discriminating protection.

This is suitable for most modern protective relays such as Ohmega & Argus.

CIRCUIT BREAKER AUXILIARY CONTACT

An auxiliary contact on the circuit breaker (Closed when the CB is tripped) is required to monitor the operation of the CB using the **INP CB Aux Switch**.

LINE VOLTAGE INTERLOCK INPUT

Line status information is derived from input **INP Line Volt Mon**. This feature inserts additional checks in the auto reclose initiation and dead time start logic, such that an auto reclose cycle can only be initiated if the line was live until immediately before the protective relay operation, and the dead time cannot start until the line has gone dead.

Front panel switch selection of Live Line IN or OUT.

CB RECLOSE SPRING STATUS INPUT

Application of a control voltage to the **INP Spring Charge** input will defer the CB reclose output pulse (**RLY CB Close Sig**) until the signal is removed. This function is used to ensure that the CB will not receive a reclose pulse until after the reclose spring is fully charged.

The spring charged signal is taken from an auxiliary switch contact on the circuit breaker.

If the **INP Spring Charge** input defers the CB reclose output pulse for 60s the 1B230 will go to lockout.

MAIN PROTECTION INTERFACE

Two input types are provided to interface with the main protection to initiate the reclose cycle:

1. Shunt initiate Voltage input to **INP Main Protn Shunt**
Pulse Length >40 m Sec
2. Series initiate Current input to **INP Main Protn Series**
(optional) Current >1.2 Amp DC
Pulse Length >40 m Sec
Resistance <0.5 ohm

SAFE TO CLOSE INPUT

A control voltage to the **INP Safe To Close** input must be applied before a CB close pulse can be output.

If the CB reclose output pulse is delayed for 60s by the **INP Safe to Close** input is not being applied, the 1B230 will go to lockout.

DRIVE TO LOCKOUT INPUT

Application of a voltage pulse to the **INP Drive To Lockout** input will drive the 1B230 to the lockout condition.

RESET RELAY FROM LOCKOUT

The 1B230 may be reset from the lockout condition in 3 ways:

1. Application of a voltage pulse to the **INP Reset Lockout** input;
2. Pressing the front panel reset button;
3. Interruption of the auxiliary supply for >10s.

RECLOSE OPERATION

Front panel switch selection of Single (1) or double Shot (2)
Front panel switch selection of Lockout (L) or Auto Reset (A)
The contact closure output pulse (**RLY CB Close Sig**) is of 2 second duration.

TIME DELAY SETTING RANGES

Dead Time 1 (Reclose 1): 5 to 180s
Dead Time 2 (Reclose 1): 5 to 180s
Reclaim Time Delay: 5 to 60s

TIMING ACCURACY

Repeat ± 1% of setting
Setting ± 2% of max. setting

OPERATION INDICATORS

LED indication of relay healthy
LED indication of reclose in progress - Initiation to reset or lockout
LED indication of block non discriminating protection
LED indication of relay in lockout condition

OPTIONAL COUNTER (Cumulative)

7 Digit (non reset).

STATUS INPUT SUMMARY

Description	Signal	Comments
INP CB Aux Switch	Steady state	Apply volts
INP Main Protn Shunt	Pulse	Apply volts
INP Main Protn Series	Pulse	Apply current (Optional)
INP Safe To Close	Steady state	Apply volts
INP Spring Charge	Steady state	Apply volts
INP Drive To Lockout	Pulse	Apply volts
INP Reset Lockout	Pulse	Apply volts
INP Line Volt Mon	Steady State	Use Live Line In switch

RELAY OUTPUT SUMMARY

Description	Signal	Comments
RLY A/R In Prog	Steady state	1 C/O follows LED
RLY CB Close Sig 1	2s pulse	1 C/O
RLY CB Close Sig 2	2s pulse	1 C/O
RLY Block Inst Pr	Steady state	1 C/O
RLY A/R Lockout	Steady state	1 C/O
RLY Fail alarm	Steady state	1 C/O P/U when healthy

AUXILIARY SUPPLY BURDEN (At 110V DC)

Less than 5W independent of range with output relays picked up.

AUXILIARY SUPPLY

20-70V AC/DC switchmode supply or
40-275V AC / 40-300V DC switchmode supply
Burden: Less than 7 watts during timing

Inputs:

A high efficiency switchmode power supply is incorporated which provides a low burden to the auxiliary supply and operates over the range 75 to 140V AC & 70 to 150V DC.

Input Transients:

Withstands multiple high energy transients & ring waves in accordance with IEEE28 - ANSI C26.1 Cat. II, accordingly:

- 0.5uS 100KHz 6KV O/C, 500A S/C, 4J
- 1.2/50uS 6Kv O/C
- 8/20uS 3KA S/C, 80J clamped at 1,000V

Mains conducted EMI within limits specified by AS 3548 Class B.

Isolation:

The inputs are isolated from the outputs in accordance with AS 3260 Class II Limited Current Circuitry, accordingly:

- Withstand voltage of 2.5Kv RMS 50Hz for one minute
- Creepage & clearance distance greater than 4mm
- Output leakage current less than 0.25A to earth

Power Supply Alarm Relay:

A normally closed contact rated at 10A 250V AC & isolated as per AS 3260 is energized when both the auxiliary supply & internal 24V DC rail is within acceptable limits. The relay faulty alarm output will be set if the incoming supply or switch mode circuit fails.

Output Protection:

Outputs will withstand continuous short circuit. Output regulators & switching control regulator are thermally protected.

SCHRACK OUTPUT CONTACT RATINGS

Make & carry

30A AC or DC (Limits L/R=40ms & 300V max.) for 0.2s
20A AC or DC (Limits L/R=40ms & 300V max.) for 0.5s
5A AC or DC continuously

Break (Limits 5A & 300V max.)

1,250VA AC resistive
250VA at 0.4PF AC inductive
75W DC resistive
30W DC inductive L/R = 40ms
50W DC inductive L/R = 10ms

Minimum recommended load

0.5W, 10mA or 5V minimum.

Relay Ratings

AMBIENT OPERATING TEMPERATURE RANGE

-5 to 55 degrees C.

NOISE IMMUNITY

Withstands the high frequency interference test detailed in IEC 255-22-1.

INSULATION WITHSTAND in accordance with IEC 255-5:

2KV RMS & 1.2/50 5KV impulse between:

- ◆ all input terminals & frame
- ◆ all output terminals & frame
- ◆ all input & output terminals
- ◆ each input group
- ◆ each output group

Across open contacts: 1KV RMS

ELECTROSTATIC DISCHARGE

EN61000-4-2:1995 8KV Level 3

FAST TRANSIENT DISTURBANCE

EN61000-4-4:1995 4KV Level 4

CASE

Size 4 draw out
56 M4 screw terminals
Flush panel mount or 4U high 1/4 width 19 inch rack mount
IP51 rating

ACCESSORIES SUPPLIED WITH EACH RELAY

1 x M4 self threading mounting screw kit P/N 290-406-151
2 x M4 terminal screw kit (28 per kit) P/N 290-407-153
1 x Product Test Manual

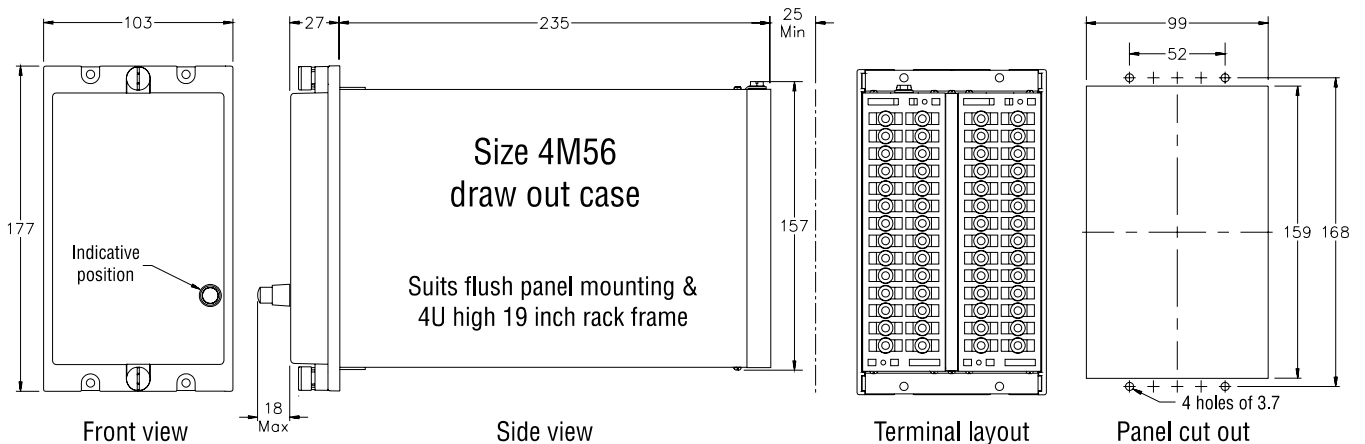
SHIPPING DETAILS

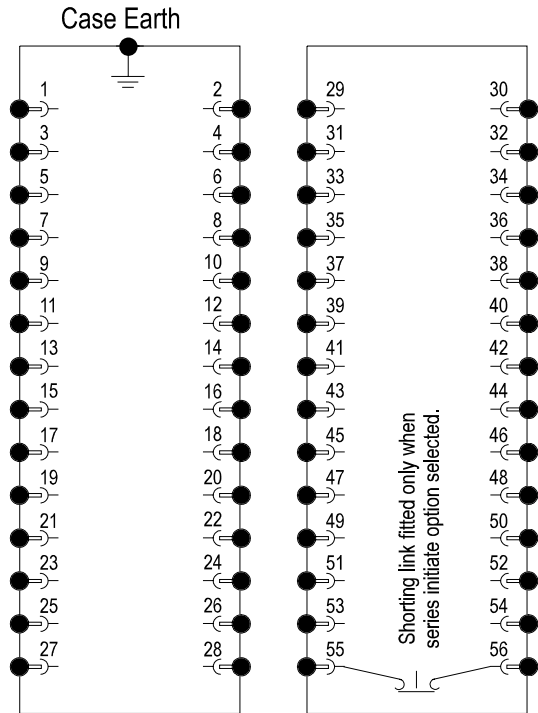
Each relay is supplied individually packed in pre formed cardboard cartons with internal moulded polystyrene former.

Weight: 3Kg

Size: 370(L) x 240(W) x 145(D)mm - Size 4 case

For large shipment individual cartons are packed in sturdy cardboard pallet boxes & surrounded by loose fill to absorb vibration & shock during transit.





4M56 Case terminations (REAR VIEW)

Ordering Information

Generate the required ordering code as follows:
e.g. 1B230 BAAHACCD

1B230 1 2 3 4 5 6 7 8

1 AUXILIARY SUPPLY RANGE

- A 20-70V DC
- B 40-275V AC / 40-300V DC

2 COUNTER

- A Not required
- B Required

3 SERIES INITIATE INPUT

- A Not required
- B Required

Select for status input codes 4 – 8

- | | |
|----------------------------|-------------------------|
| A Not required | |
| <u>Opto-isolated input</u> | <u>Relay coil input</u> |
| B 24-80V AC/DC | E 12V DC |
| C 75-150V AC/DC | F 24V DC |
| D 150-300V AC/DC | G 48V DC |
| | H 110V DC |

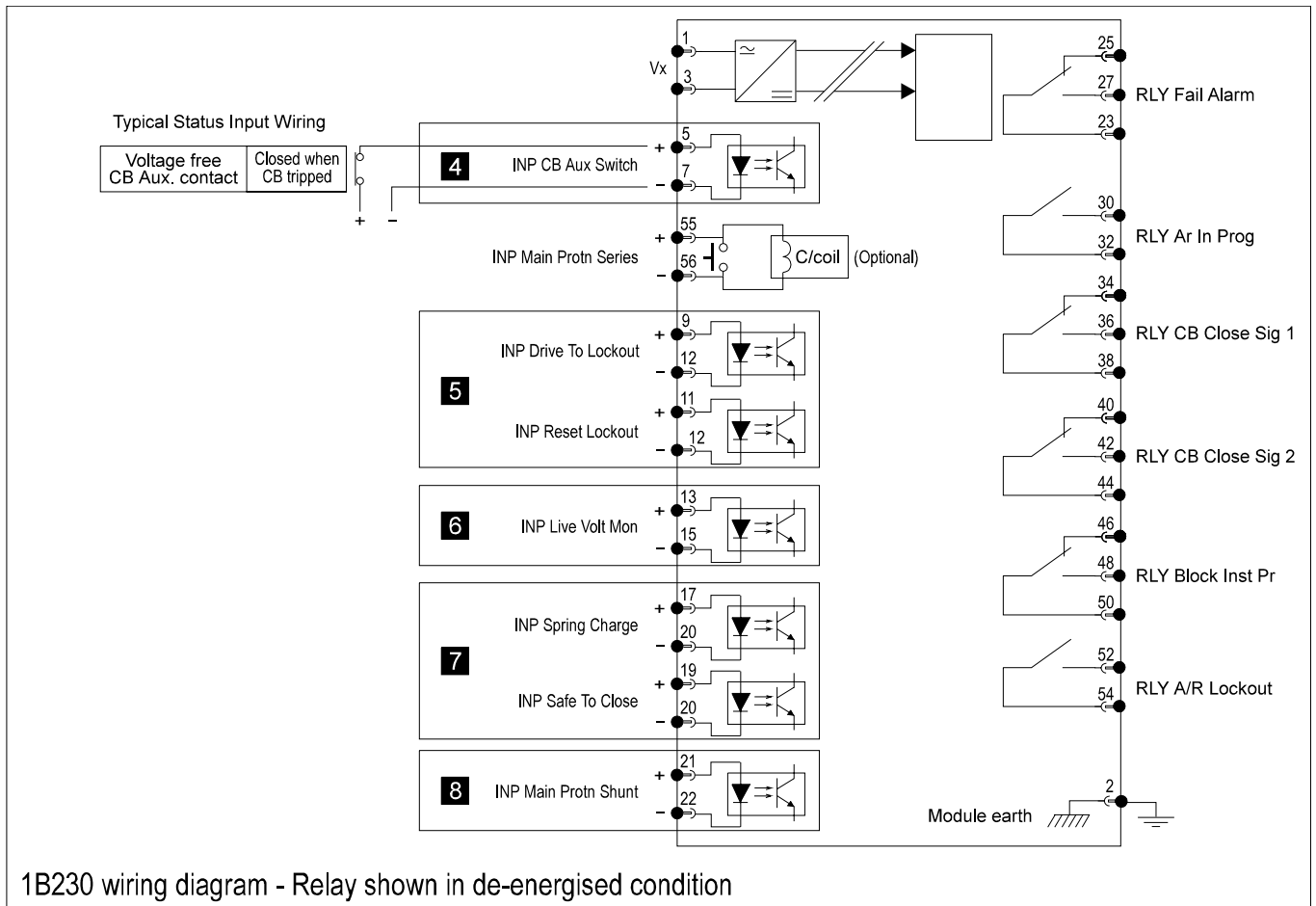
4 STATUS INPUT INP CB Aux Switch

5 STATUS INPUT INP Drive To Lockout / INP Reset Lockout

6 STATUS INPUT INP Line Volt Mon

7 STATUS INPUT INP Spring Charge / INP Safe To Close

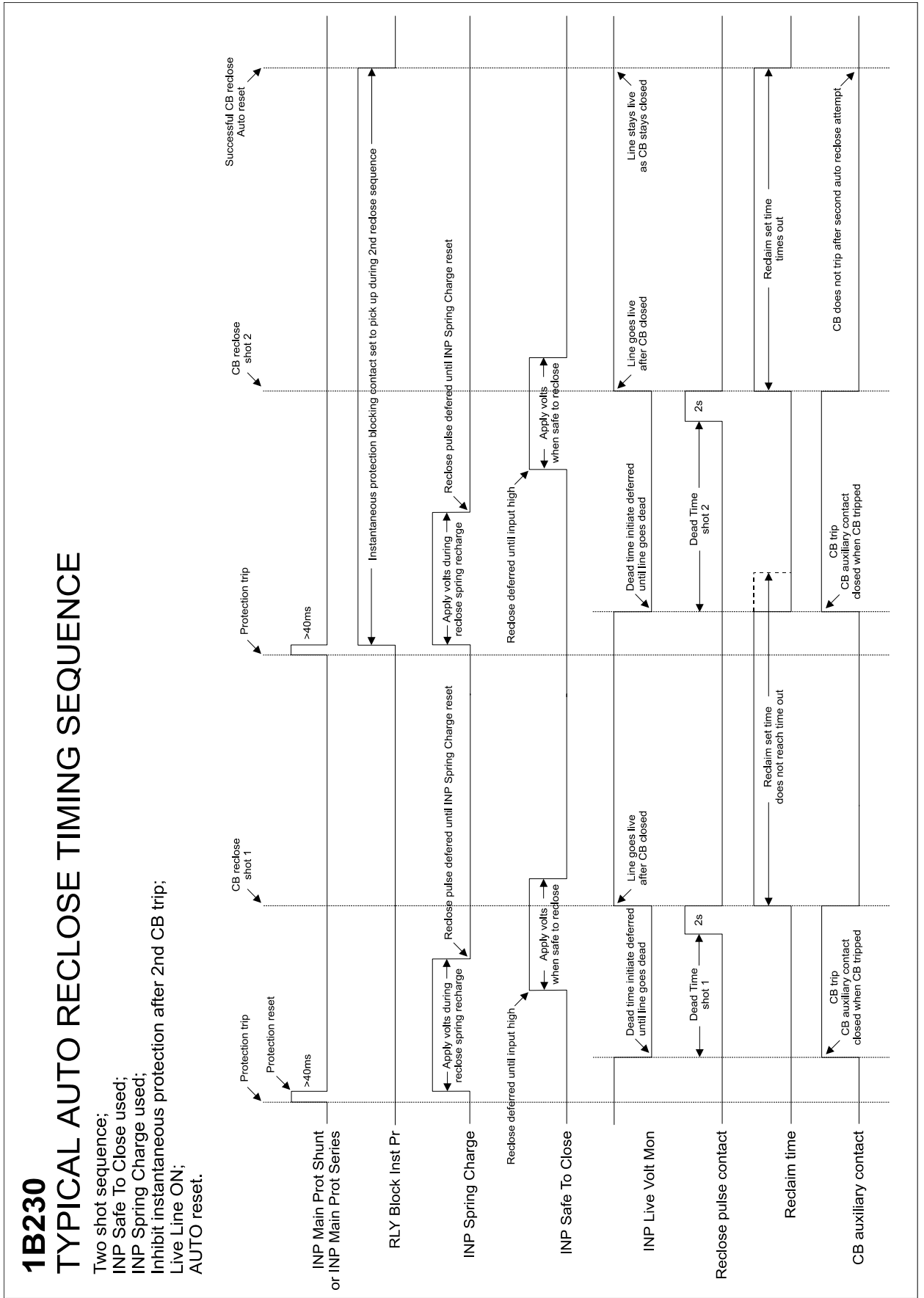
8 STATUS INPUT INP Main Protn Shunt



1B230 wiring diagram - Relay shown in de-energised condition

1B230 TYPICAL AUTO RECLOSE TIMING SEQUENCE

Two shot sequence;
INP Safe To Close used;
INP Spring Charge used;
Inhibit instantaneous protection after 2nd CB trip;
Live Line ON;
AUTO reset.



Description of Operation

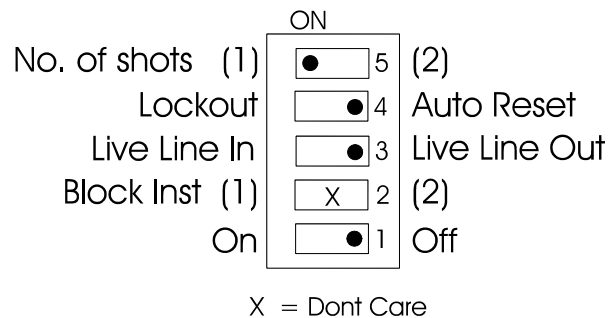
The 1B230 function is determined by the setting combination of five (5) switches located on the front panel. The following sections provide a description of each operating combination & a logic flow chart.

The function provided by the Live Line switch is to ensure that the Line voltage is zero before a reclose can be attempted. Switching this to the “Out” position removes this safety feature. Some relay versions do not have the hardware to support this feature & switch 3 position is designated “Not Used” which has the same effect as “Live Line Out”.

The following table summarizes all of the switch setting combinations & provides a reference to the relevant manual section:

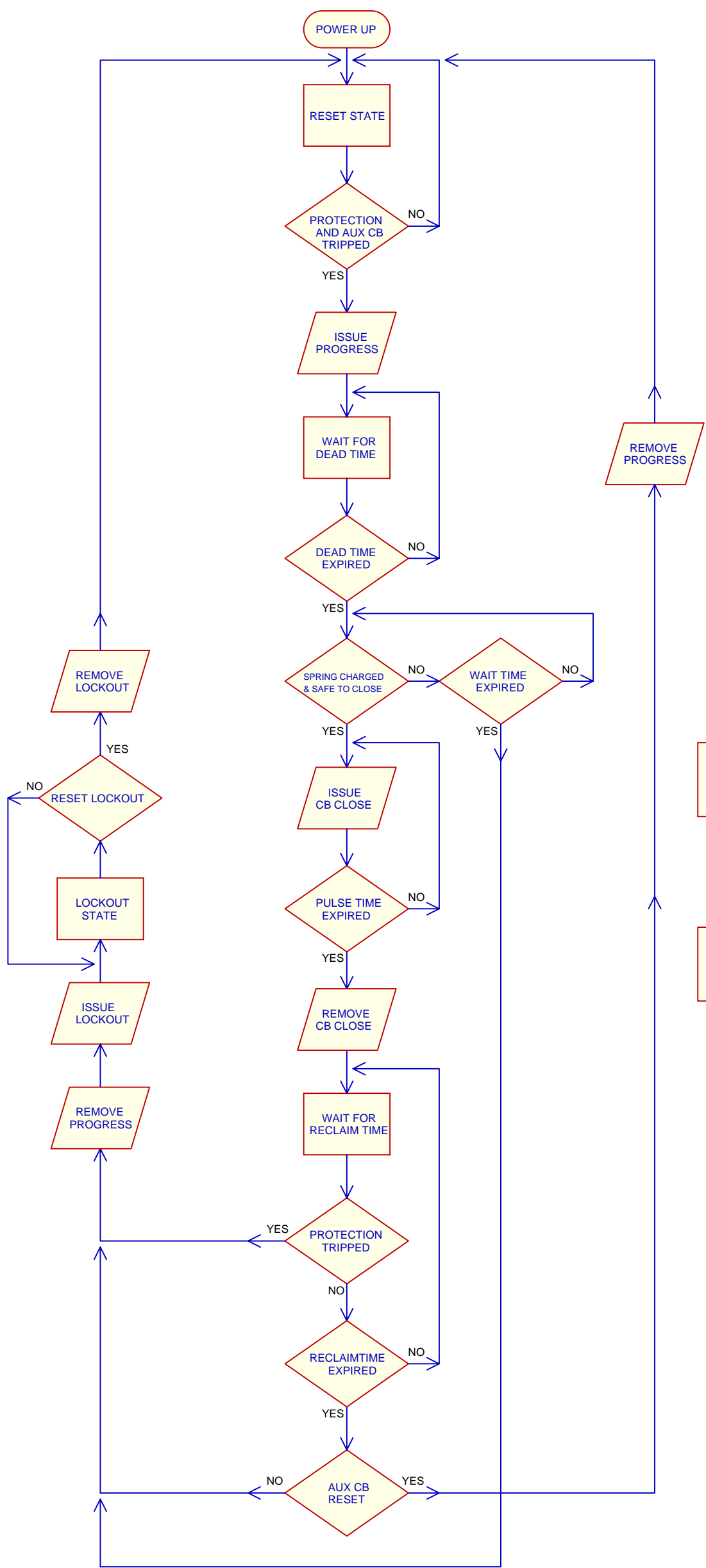
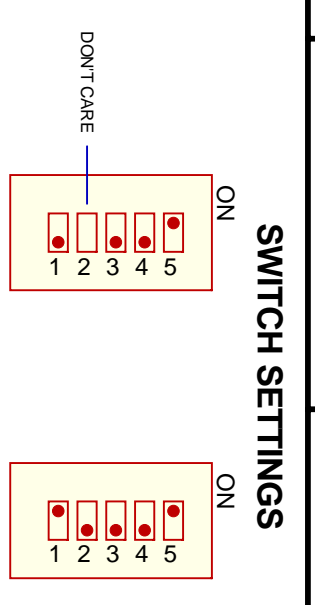
Section	Switch 1		Switch 2		Switch 3		Switch 4		Switch 5	
	Number of Shots		Lockout	Auto Reset	Live Line In	Live Line Out	Block Instantaneous			
	1	2					1	2	On	Off
3.1	X			X		X				X
3.2	X		X			X				X
3.3	X		X			X	X		X	
3.4	X			X		X	X		X	
3.5		X		X		X				X
3.6		X	X			X				X
3.7		X		X		X		X	X	
3.8		X	X			X		X	X	
3.9		X		X		X	X		X	
3.10		X	X			X	X		X	
3.11	X			X	X					X
3.12	X		X		X					X
3.13	X		X		X		X		X	
3.14	X			X	X		X		X	
3.15		X		X	X					X
3.16		X	X		X					X
3.17		X		X	X			X	X	
3.18		X	X		X			X	X	
3.19		X		X	X		X		X	
3.20		X	X		X		X		X	

3.1 Single Shot, Auto Reset, Live Line Out, Block Instantaneous OFF



1. Once the breaker has tripped and the Protection Trip Contact has closed the A/R in progress LED will flash and the A/R contact will close, the relay will wait for the setting of Dead Time 1 to expire, it will then issue a reclose output pulse, the counter will increment one count and the A/R in progress LED will become steady.
2. If the breaker closes and the protection opens the relay will reset after the Reclaim time expires and will be ready for the next breaker operation.
3. If however after issuing the reclose pulse the Protection Trip Contact is still present the relay will drive directly to Lockout. If the Protection Trip Contact has reset but the Circuit Breaker has not, the relay will wait for the Reclaim time to expire before it goes to lockout.
4. The Lockout indication and contact has to be reset from the front panel of the relay.
5. Refer to flowchart 1B230B-1-100 for the sequence of operation.

1B230B-1-100



Amendments



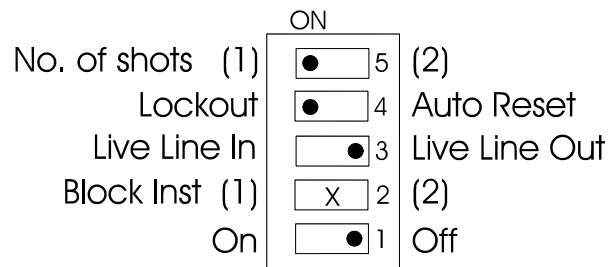
1B230B
FLOWCHART

1 SHOT, BLOCK INST OFF OR 2, AUTO LOCKOUT, LIVE LINE OUT

DATE: 16-Oct-2003	TIME: 10:07:46
FILE NAME: D:\THE_CHIP\RM\SY\B230\OCCO\Flowchart\1B230B-1-100.Sch	

DRAWN	DATE	D/O CHECK	DATE	APPV CHECK	DATE	DRAWING NUMBER	ISSUE
D.W.B	16-Oct-2003					1B230B-1-100	V1.00
SHEET: 1	SCALE:	CURRENT CN					ISSUE DATE
							N.I.

3.2 Single Shot, Lockout ON, Live Line Out, Block Instantaneous OFF

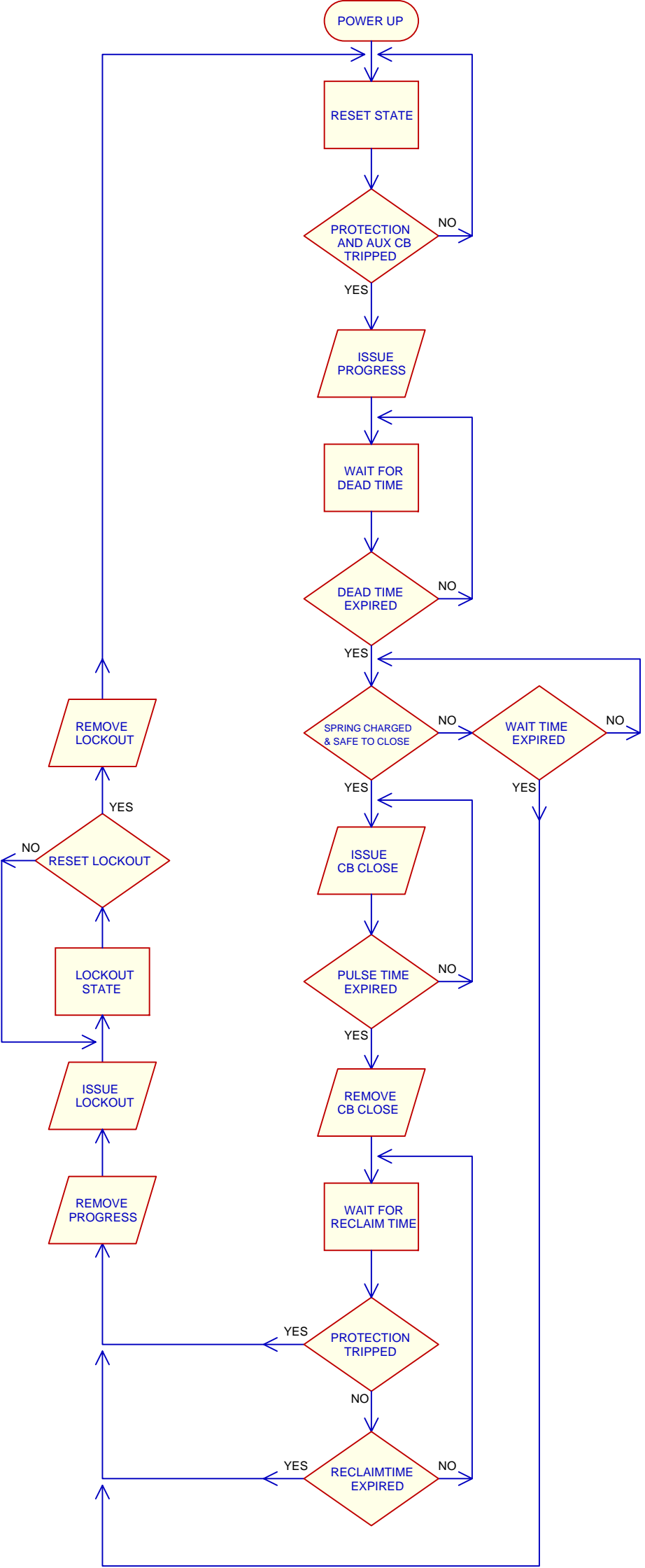
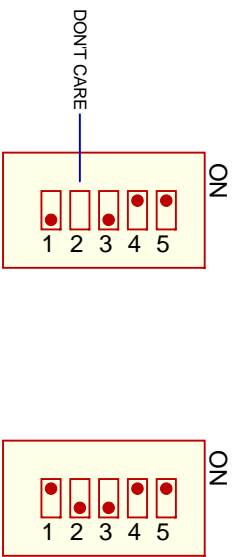


X = Dont Care

1. Once the breaker has tripped and the Protection Trip Contact has closed the A/R in progress LED will flash and the A/R contact will close. The relay will wait for the setting of Dead Time 1 to expire, it will then issue a reclose output pulse, the counter will increment one count and the A/R in progress LED will become steady.
2. If the Circuit Breaker and the Protection Trip Contact opens the relay will wait for the Reclaim time to expire and will then go to Lockout.
3. If after the Reclose pulse the Protection Trip Contact is still present the relay will go directly to Lockout.
4. The Lockout indication and contact has to be reset from the front panel of the relay.
5. Refer to flowchart 1B230B-2-100 for the sequence of operation.

1B230B-2-100

SWITCH SETTINGS



Amendments

DATE	TIME	FILE NAME
16-Oct-2003	10:13:00	D:\P\R\MS\1B230B\1B230B-2-100.Sch



1B230B FLOWCHART

1 SHOT, BLOCK INST off or 2, LOCKOUT ON, LIVE LINE OUT

DRAWN	DATE	D/O CHECK	DATE	APPV CHECK	DATE	DRAWING NUMBER	ISSUE
D.W.B	16-Oct-2003					1B230B-2-100	V1.00

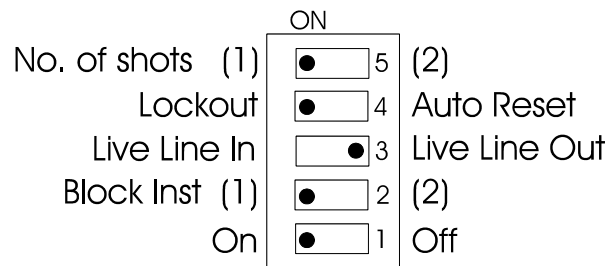
DATE: 16-Oct-2003 TIME: 10:13:00
 FILE NAME: D:\P\R\MS\1B230B\1B230B-2-100.Sch

SHEET: 1 OF: 1

SCALE: CURRENT CN

ISSUE DATE: N.I.

3.3 Single Shot, Lockout ON, Live Line Out, Block Instantaneous after 1st Trip

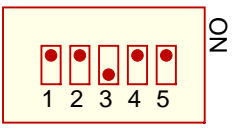


X = Dont Care

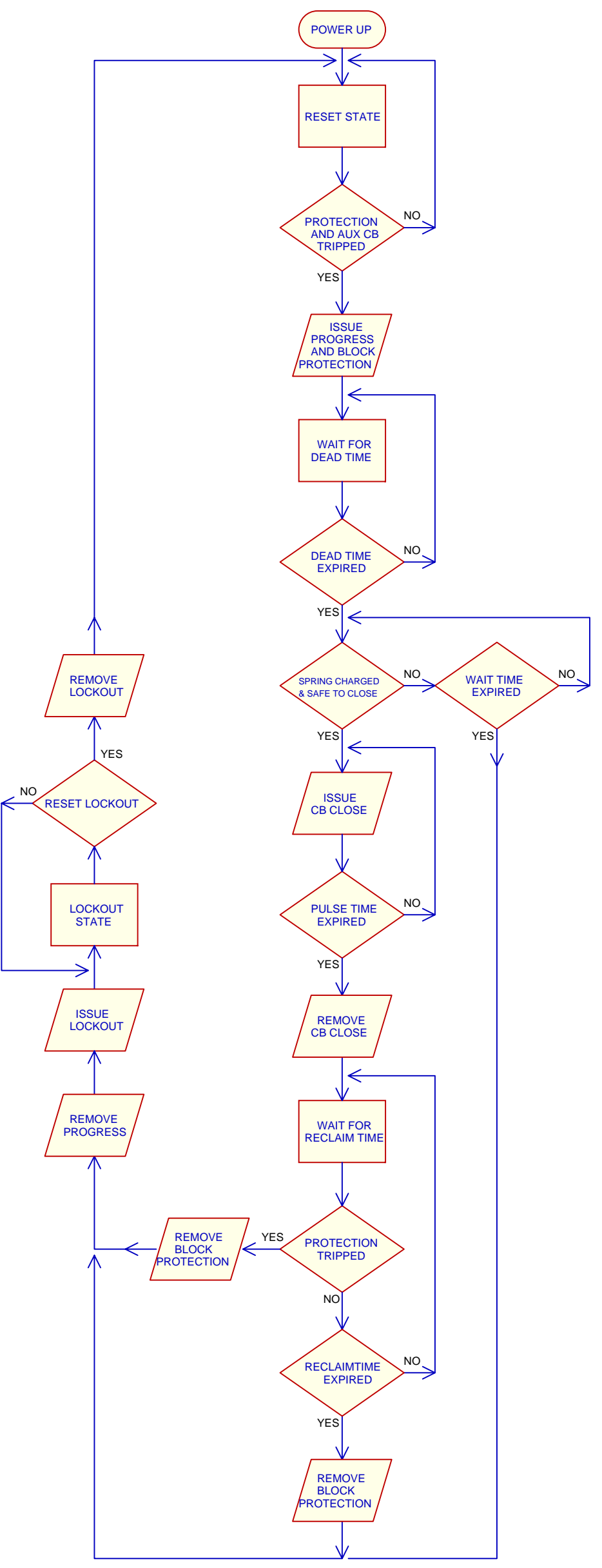
With the switch setting depicted above the relay will go through the following operations.

1. Once the breaker has tripped and the Protection trip contact has closed the A/R in progress LED will flash and the A/R contact will close. The relay will wait for the setting of Dead Time 1 to expire, it will then issue a reclose output pulse, the counter will increment one count and the A/R in progress LED will become steady.
2. If the Protection Trip Contact is still closed after the reclose pulse, the Block Instantaneous Protection contact will open, the LED will extinguish and the relay will go directly to Lockout.
3. If the Protection Trip Contact has opened the relay will wait for the Reclaim Time to expire before removing the Block Instantaneous Protection contact and LED and driving to Lockout.
4. The Lockout indication and contact has to be reset from the front panel of the relay.
5. Refer to flowchart 1B230B-3-100

SWITCH SETTINGS



1B230B-3-100



Amendments

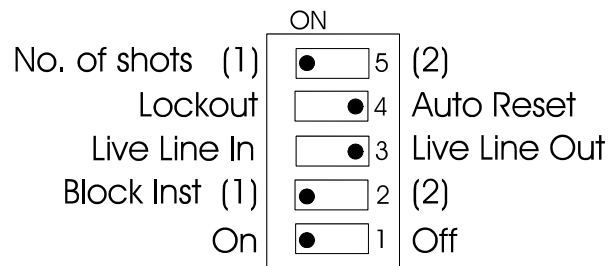


1B230B
FLOWCHART

1 SHOT, BLOCK INST 1, LOCKOUT ON, LIVE LINE OUT

DATE: 16-Oct-2003	TIME: 10:13:17	DRAWN		DATE	D/O CHECK	DATE	APPV CHECK	DATE	DRAWING NUMBER	ISSUE
FILE NAME: D:\THE_CHIP\RMS\1B230B\OCCOIFlowchart\1B230B-3-100.Sch		D.W/B	16-Oct-2003	SCALE:	CURRENT CN	1B230B-3-100	V1.00	N.I.		
SHEET: 1		OF: 1		ISSUE DATE						

3.4 Single Shot, Auto Reset, Live Line Out, Block Instantaneous after 1st Trip

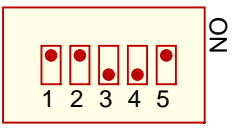


X = Dont Care

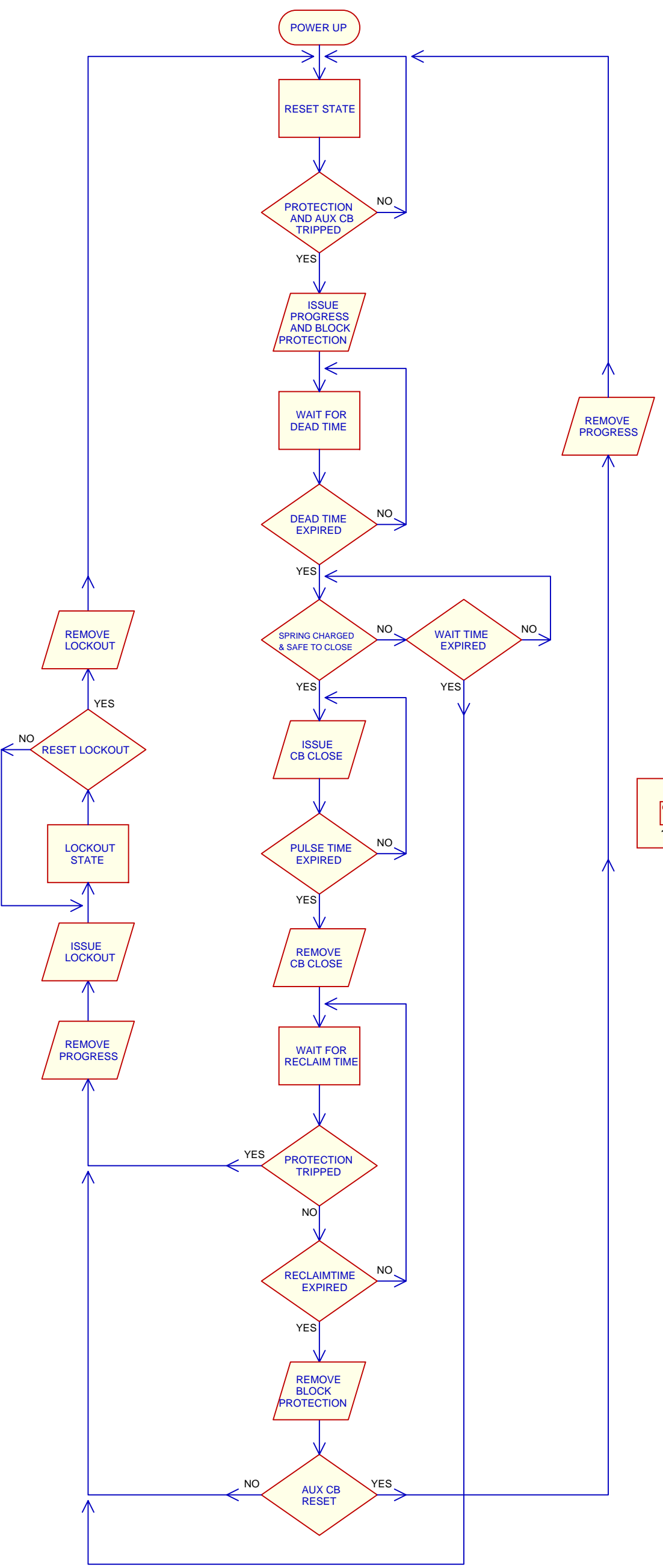
With the switch setting depicted above the relay will go through the following operations.

1. Once the breaker has tripped and the Protection trip contact has closed the Block Instantaneous contact will pick up and the front panel LED will be lit, the A/R in progress LED will flash and the A/R contact will close. The relay will wait for the setting of Dead Time 1 to expire, it will then issue a reclose output pulse, the counter will increment one count and the A/R in progress LED will become steady.
2. If the Protection Trip Contact and Circuit Breaker has closed the relay will wait for the Reclaim time to expire then the Block Instantaneous Protection LED and contact will reset and the relay will reset ready for the next operation.
3. If the Protection Trip Contact is still operated after the Reclose Pulse the relay will drive directly to Lockout.
4. If after the Reclaim time has expired but the Circuit Breaker has not closed the Block Instantaneous Protection LED and contact will reset and the relay will go to Lockout.
5. The Lockout indication and contact has to be reset from the front panel of the relay.
6. Refer to flowchart 1B230B-4-100

SWITCH SETTINGS



1B230B-4-100



Amendments

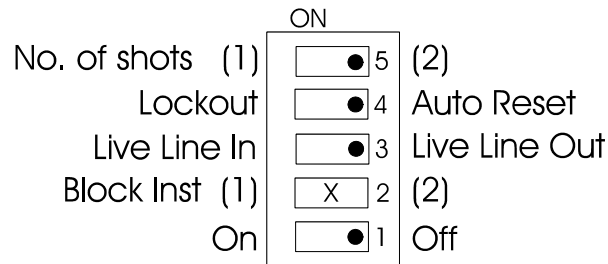


1B230B FLOWCHART

1 SHOT, BLOCK INST 1, AUTO LOCKOUT, LIVE LINE OUT

DATE: 16-Oct-2003	TIME: 10:13:35	DRAWN		DATE	D/O CHECK	DATE	APPV CHECK	DATE	DRAWING NUMBER	ISSUE
FILE NAME: D:\THE_CHIP\RMS\1B230B\OCCO\Flowchart\1B230B-4-100.Sch		D.W/B	16-Oct-2003	SCALE:	CURRENT CN	1B230B-4-100			1B230B-4-100	V1.00
SHEET: 1		OF: 1		ISSUE DATE		N.I.				

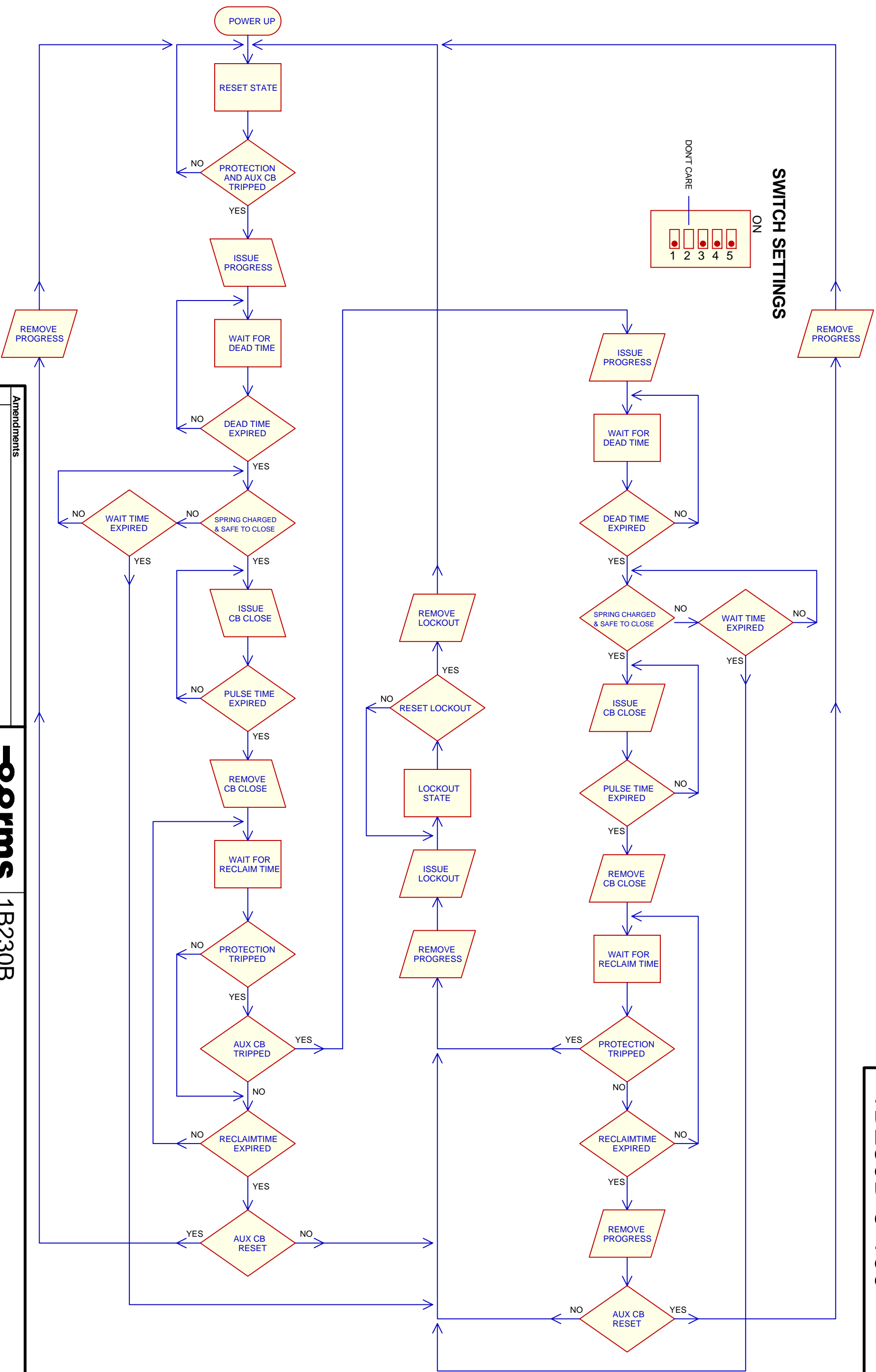
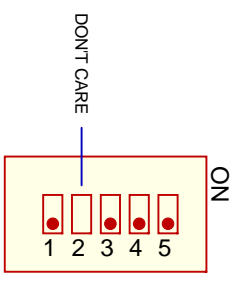
3.5 Double Shot, Auto Reset, Live Line Out, Block Instantaneous OFF



X = Dont Care

With the switch setting depicted above the relay will go through the following operations.

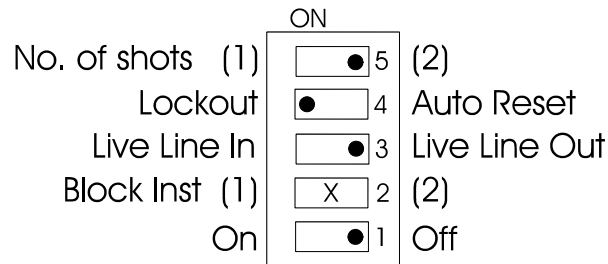
1. Once the breaker has tripped and the Protection trip contact has closed the Block Instantaneous contact will pick up and the front panel LED will be lit, the A/R in progress LED will flash and the A/R contact will close. The relay will wait for the setting of Dead Time 1 to expire, it will then issue a reclose output pulse, the counter will increment one count and the A/R in progress LED will become steady.
2. If the Protection Trip Contact and Circuit Breaker aux have both reset the relay will wait for the Reclaim time to expire then reset ready for the next operation.
3. If the after the Reclose Pulse the Protection Trip Contact and Circuit Breaker are still tripped the relay will wait for Dead Time 2 to expire then issue another Reclose Pulse, the counter will increment one count. If after the second pulse the Protection Trip Contact and Circuit Breaker has reset the relay will reset ready for the next operation.
4. If after the second pulse the Protection Trip Contact is still closed the relay will drive directly to Lockout.
5. If the Protection Trip Contact has reset but the Circuit Breaker has not the relay will wait for the Reclaim time to expire before driving to Lockout.
6. The Lockout indication and contact has to be reset from the front panel of the relay.
7. Refer to flowchart 1B230B-5-100



Amendments			
DATE: 16-Oct-2003	TIME: 10:13:51		
FILE NAME: D:\THE_CHIP\RM\S\1B230B\100\Flowchart\1B230B-5-100.Sch			
orms			
1B230B			
FLOWCHART			
2 SHOT, BLOCK INST OFF, AUTO LOCKOUT, LIVE LINE OUT			
DRAWN	DATE	D/O CHECK	DATE
D.W.B	16-Oct-2003		
SHEET: 1		SCALE:	CURRENT CN
1B230B-5-100			
DRAWING NUMBER			
1B230B-5-100			
SHEET: 1		OF: 1	
ISSUE	ISSUE DATE		
V1.00	N.I.		

1B230B-5-100

3.6 Double Shot, Lockout ON, Live Line Out, Block Instantaneous OFF

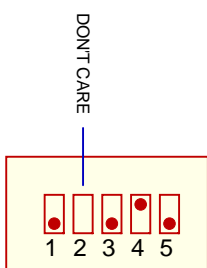


X = Dont Care

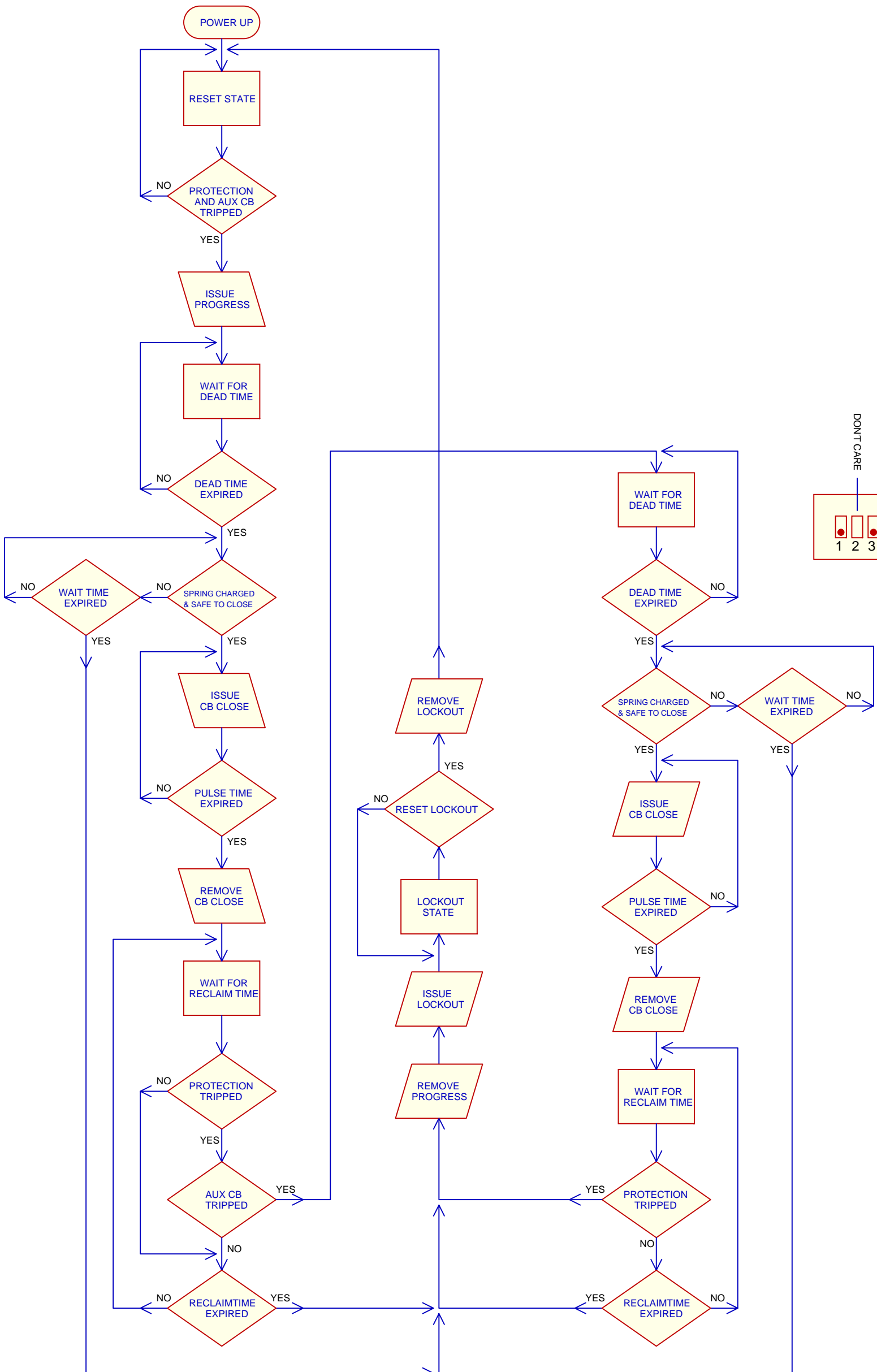
With the switch setting depicted above the relay will go through the following operations.

1. Once the breaker has tripped and the Protection trip contact has closed the A/R in progress LED will flash and the A/R contact will close. The relay will wait for the setting of Dead Time 1 to expire, it will then issue a reclose output pulse, the counter will increment one count and the A/R in progress LED will become steady.
2. If both the Protection Trip Contact and the Circuit Breaker have reset, the relay will drive directly to Lockout.
3. If the Protection Trip Contact and Circuit Breaker have not reset the relay waits for Dead time 2 to expire then issues another Reclose pulse, the counter will increment one count. If the Protection Trip Contact and Circuit Breaker have still not reset the relay drives to Lockout.
4. If the Protection Trip Contact and Circuit Breaker have both reset, the relay waits for the Reclaim Time to expire before driving to Lockout.
5. The Lockout indication and contact has to be reset from the front panel of the relay.
6. Refer to flowchart 1B230B-6-100

SWITCH SETTINGS



1B230B-6-100



Amendments



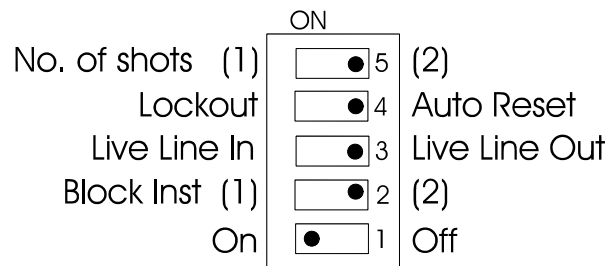
1B230B

FLOWCHART

2 SHOT, BLOCK INST OFF, LOCKOUT ON, LIVE LINE OUT

DATE: 16-Oct-2003	TIME: 10:14:08	DRAWN		DATE	D/O CHECK	DATE	APPV CHECK	DATE	DRAWING NUMBER	SHEET: 1	OF: 1	ISSUE
FILE NAME: D:\THE_CHIP\RMIS\1B230B\OCC\Flowchart\1B230B-6-100.Sch		D.W/B	16-Oct-2003	SCALE:	CURRENT CN	1B230B-6-100	N.I.		V1.00	ISSUE DATE		

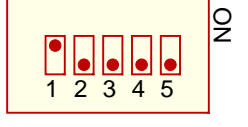
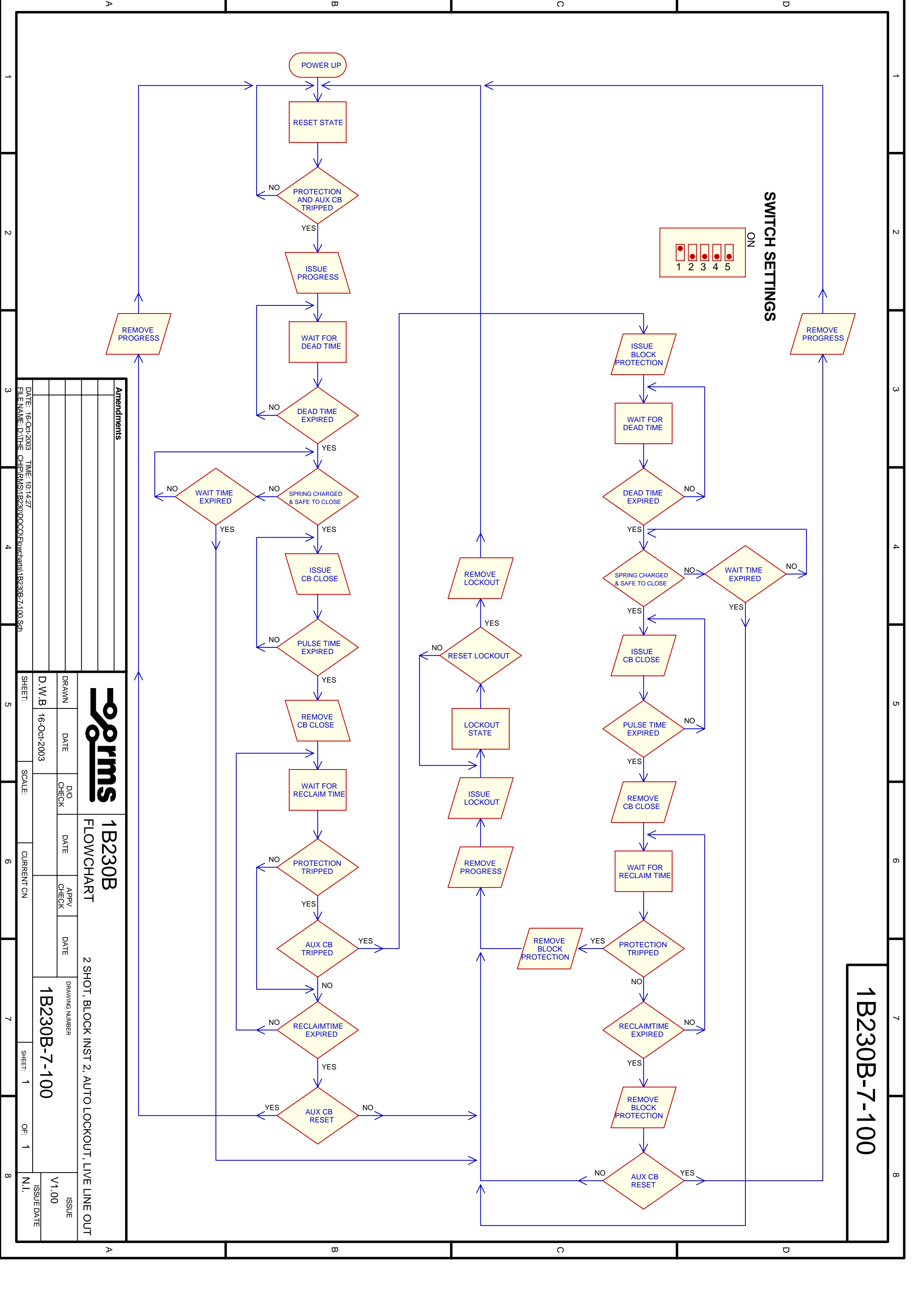
3.7 Double Shot, Auto Reset, Live Line Out, Block Instantaneous after 2nd Trip



X = Dont Care

With the switch setting depicted above the relay will go through the following operations.

1. Once the breaker has tripped and the Protection trip contact has closed the A/R in progress LED will flash and the A/R contact will close. The relay will wait for the setting of Dead Time 1 to expire, it will then issue a reclose output pulse, the counter will increment one count and the A/R in progress LED will become steady.
2. If both the Protection Trip Contact and the Circuit Breaker have reset the relay will wait for the Reclaim time to expire and reset the relay ready for the next operation.
3. If the Protection Trip Contact and Circuit Breaker have not reset the Block Instantaneous Protection contact and LED will operate and after Dead time 2 has expired the relay will issue another reclose pulse, the counter will increment one count. If the Circuit Breaker and Protection Trip Contact still have not reset then the Block Instantaneous Protection contact and LED are reset and the relay drives to Lockout.
4. If the Protection Trip Contact and Circuit Breaker have both reset the relay waits for the Reclaim time to expire and then resets ready for the next operation.
5. The Lockout indication and contact has to be reset from the front panel of the relay.
6. Refer to flowchart 1B230B-7-100

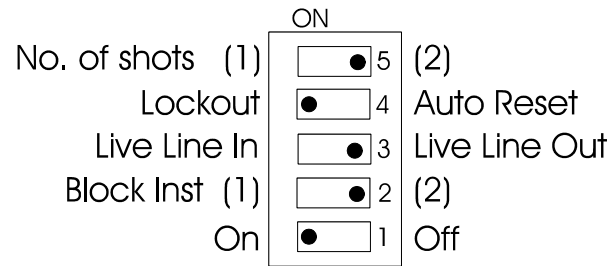


SWITCH SETTINGS

Amendments	
DATE: 16-Oct-2003	TIME: 10:14:27
FILE NAME: D:\THE_CHIP\RM\SV\1B230B\1B230B-7-100.Sch	
prms	
1B230B	
FLOWCHART	
2 SHOT, BLOCK INST 2, AUTO LOCKOUT, LIVE LINE OUT	
DRAWN	DATE
D.W.B	16-Oct-2003
D/O CHECK	DATE
SCALE:	CURRENT CN
SHEET: 1	OF: 1
1B230B-7-100	
ISSUE	ISSUE DATE
V1.00	N.I.

1B230B-7-100

3.8 Double Shot, Lockout ON, Live Line Out, Block Instantaneous after 2nd Trip

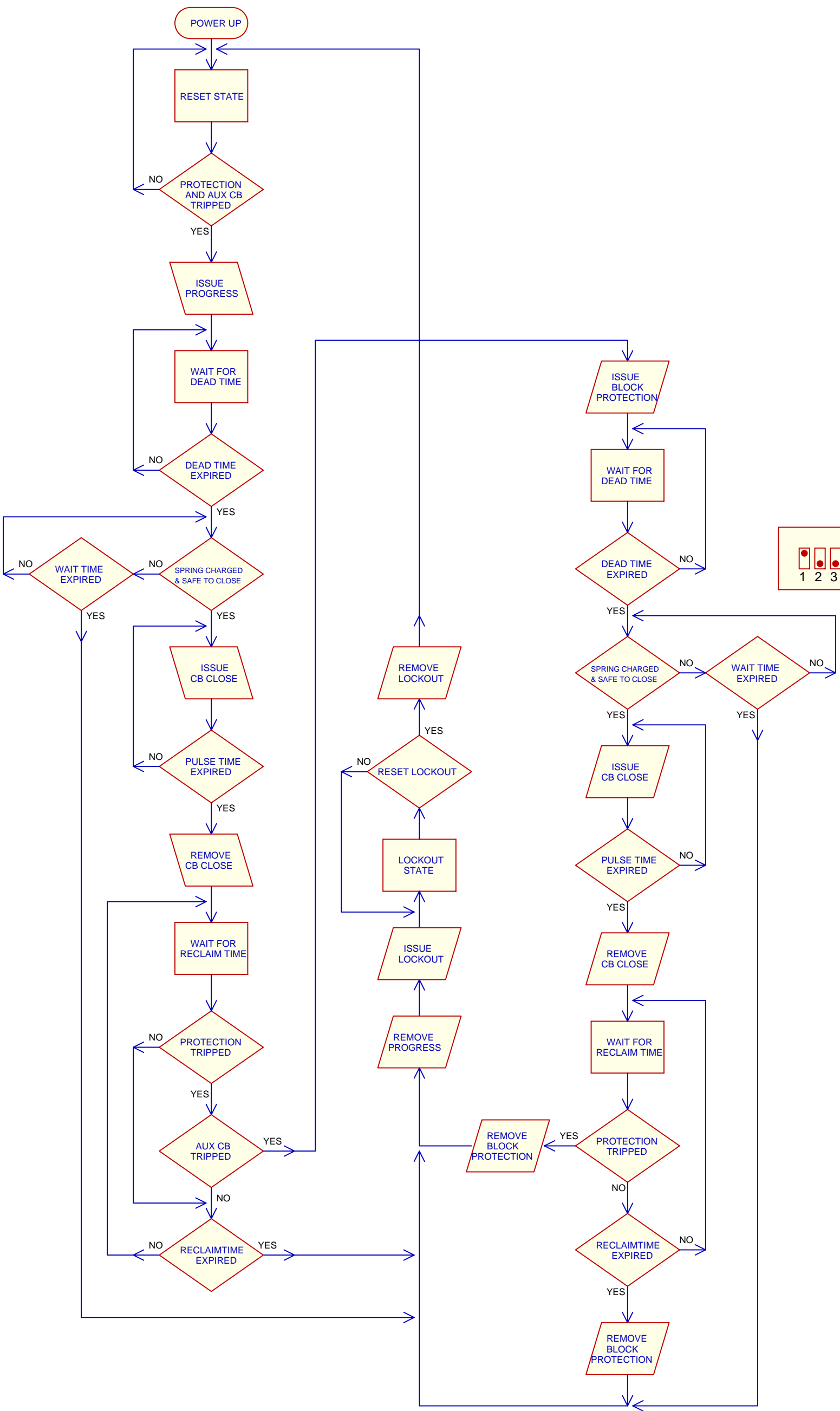
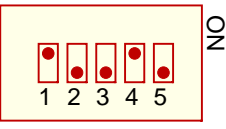


X = Dont Care

With the switch setting depicted above the relay will go through the following operations.

1. Once the breaker has tripped and the Protection trip contact has closed the A/R in progress LED will flash and the A/R contact will close. The relay will wait for the setting of Dead Time 1 to expire, it will then issue a reclose output pulse, the counter will increment one count and the A/R in progress LED will become steady.
2. If the Protection Trip Contact and Circuit Breaker have both reset the relay waits for the Reclaim time to expire then drives to Lockout.
3. If the Protection Trip Contact and Circuit Breaker have not reset the Block Instantaneous Protection LED and contact operate. The relay waits for Dead time 2 to expire then issues another Reclose pulse, the counter will increment one count. If the Protection Trip Contact and Circuit Breaker have not reset the Block Instantaneous Protection LED and contact are reset and the relay drives to Lockout.
4. If both the Protection Trip Contact and Circuit Breaker have reset the relay waits for the Reclaim time to expire then resets the Block Instantaneous Protection LED and contact and then drives to Lockout.
5. The Lockout indication and contact has to be reset from the front panel of the relay
6. Refer flowchart 1B230B-8-100.

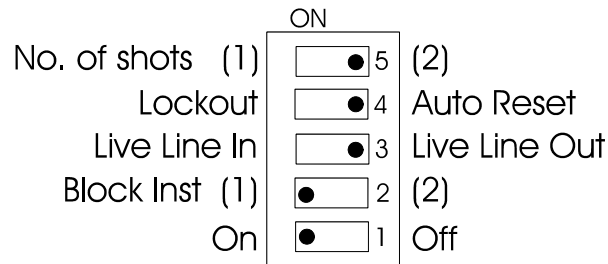
SWITCH SETTINGS



Amendments		DATE: 16-Oct-2003 TIME: 10:14:43		DRAWN		DATE		D/O CHECK		DATE		APPV CHECK		DATE		DRAWING NUMBER		ISSUE	
FILE NAME: D:\THE_CHIP\RM\SY\1B230B\1B230B-8-100.Sch				D.W.B		16-Oct-2003		SCALE:		CURRENT CN		1B230B-8-100		SHEET: 1		OF: 1		ISSUE DATE	
				1B230B		FLOWCHART		2 SHOT, BLOCK INST 2, LOCKOUT ON, LIVE LINE OUT				1B230B-8-100		SHEET: 1		OF: 1		N.I.	

1B230B-8-100

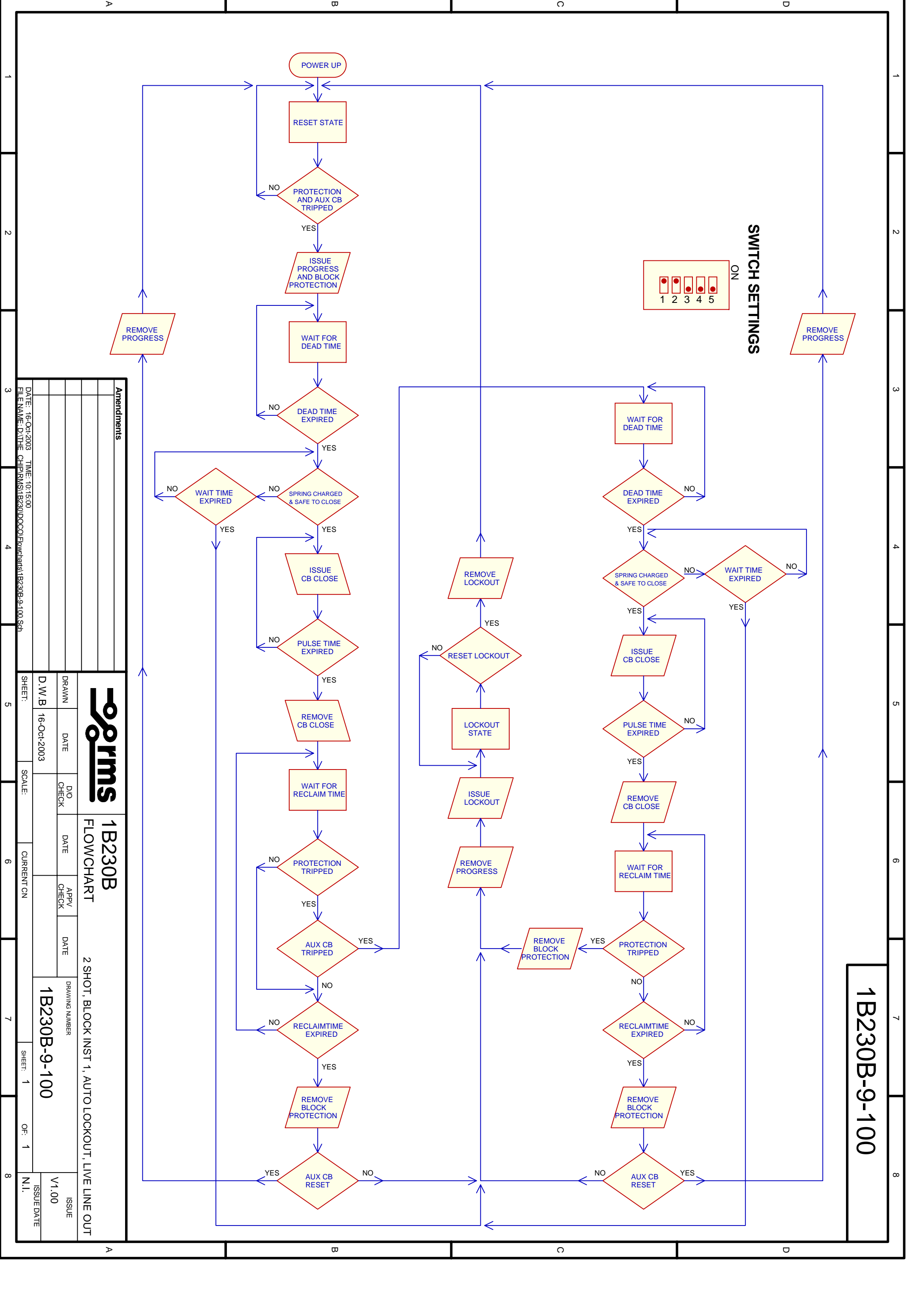
3.9 Double Shot, Auto Reset, Live Line Out, Block Instantaneous after 1st Trip



X = Dont Care

With the switch setting depicted above the relay will go through the following operations.

1. Once the breaker has tripped and the Protection trip contact has closed the Block Instantaneous Protection LED and contact operates and the A/R in progress LED will flash and the A/R contact will close. The relay will wait for the setting of Dead Time 1 to expire, it will then issue a reclose output pulse, the counter will increment one count and the A/R in progress LED will become steady.
2. If the Protection Trip Contact and Circuit Breaker did not reset the relay will wait for Dead time 2 to expire and then issue another Reclose Pulse, the counter will increment one count. If the Circuit Breaker and Protection Trip Contact reset after this second pulse the Block Instantaneous Protection LED and contact are reset after the Reclaim time has expired and the relay resets ready for the next operation.
3. If the Protection Trip Contact and Circuit Breaker did not reset after the second pulse the Block Instantaneous Protection LED and contact are reset and the relay drives to Lockout.
4. The Lockout indication and contact has to be reset from the front panel of the relay.
5. Refer to flowchart 1B230B-9-100



Amendments

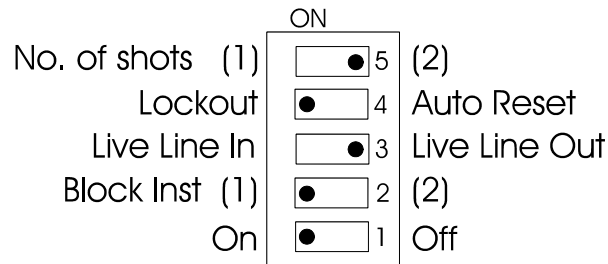


1B230B
FLOWCHART

2 SHOT, BLOCK INST 1, AUTO LOCKOUT, LIVE LINE OUT

DATE: 16-Oct-2003 TIME: 10:15:00				
FILE NAME: D:\THE_CHIP\RM\SV\B230\DOC\Flowchart\1B230B-9-100.Sch				
DRAWN	DATE	D/O CHECK	DATE	APPV CHECK
D.W.B	16-Oct-2003	SCALE:	CURRENT CN	DRAWING NUMBER
			1B230B-9-100	
SHEET: 1	OF: 1	ISSUE		ISSUE DATE
			V1.00	
			N.I.	

3.10 Double Shot, Lockout ON, Live Line Out, Block Instantaneous after 1st Trip

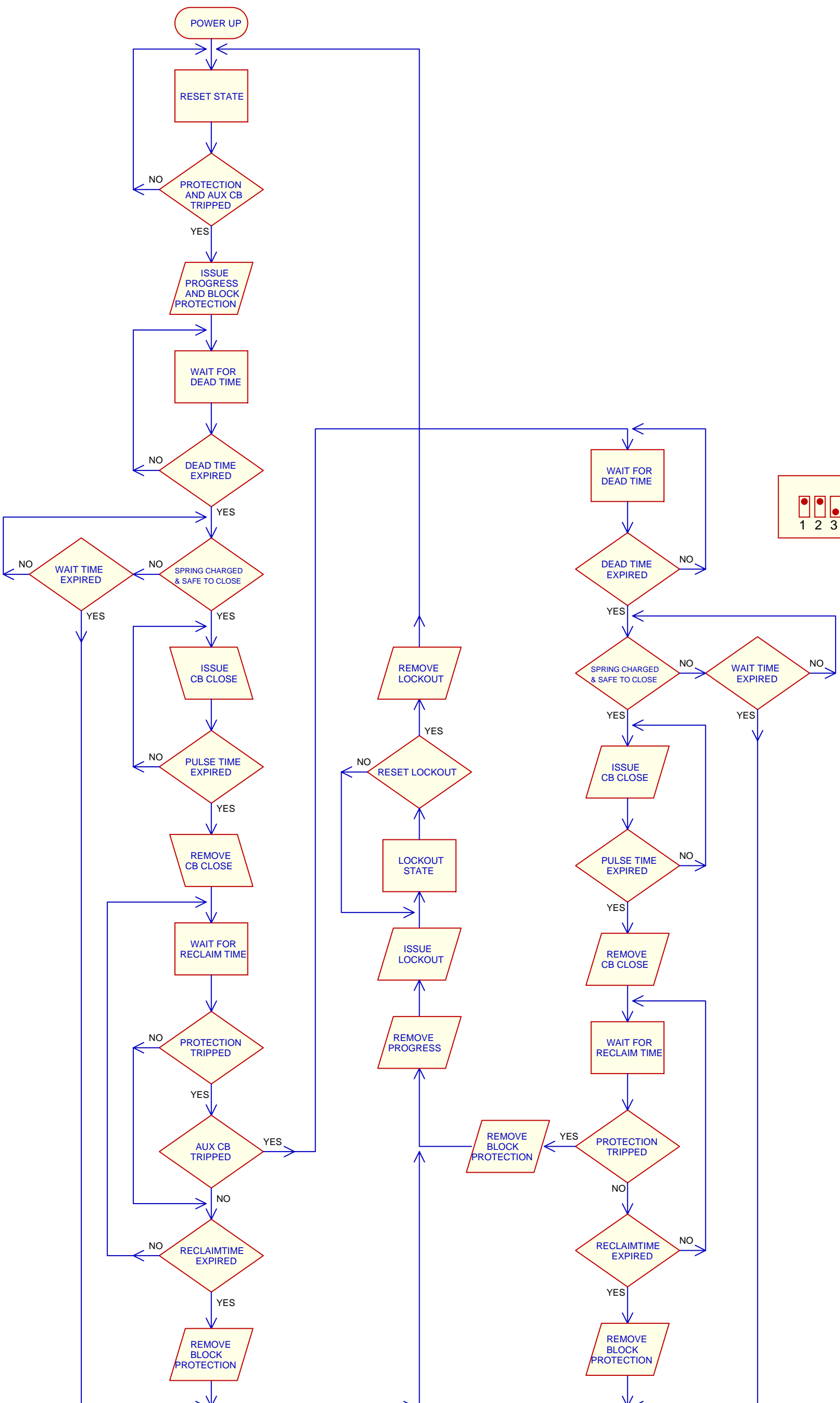
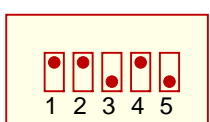


X = Dont Care

With the switch setting depicted above the relay will go through the following operations.

1. Once the breaker has tripped and the Protection trip contact has closed the Block Instantaneous Protection LED and contact operates and the A/R in progress LED will flash and the A/R contact will close. The relay will wait for the setting of Dead Time 1 to expire, it will then issue a reclose output pulse, the counter will increment one count and the A/R in progress LED will become steady.
2. The relay will wait for the Dead time 1 setting to expire and issue a reclose pulse, if the Protection Trip Contact and Circuit Breaker reset, the Block Instantaneous Protection LED and contact are reset after the Reclaim time has expired and the relay drives to Lockout.
3. If the Protection Trip Contact and Circuit Breaker have not reset the relay will wait for the Dead time 2 setting to expire and the relay will issue a second reclose pulse, the counter will increment one count. If the Circuit Breaker and Protection Trip Contact have not reset after the second pulse, the Block Instantaneous Protection LED and contact are reset and the relay drives to Lockout.
4. If the Protection Trip Contact and Circuit Breaker have reset after the second pulse the Block Instantaneous Protection LED and contact are reset and the relay waits for the Reclaim time to expire then resets ready for the next operation.
5. The Lockout indication and contact has to be reset from the front panel of the relay.
6. Refer to flowchart 1B230B-10-100

SWITCH SETTINGS



1B230B-10-100

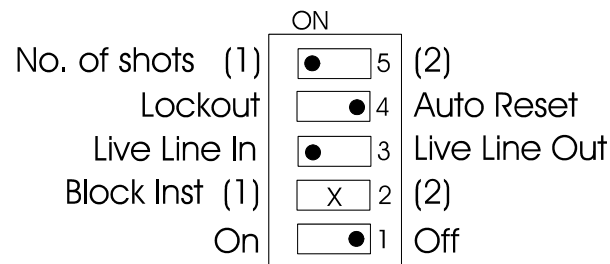


1B230B
FLOWCHART

2 SHOT, BLOCK INST 1, LOCKOUT ON, LIVE LINE OUT

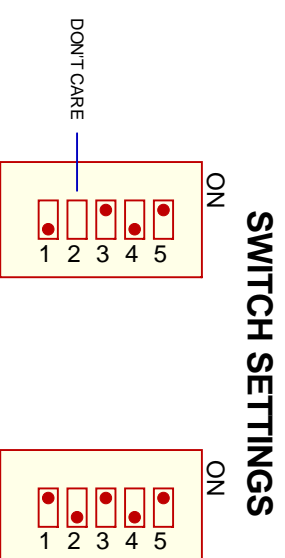
Amendments			
DATE: 16-Oct-2003	TIME: 10:08:56		
FILE NAME: D:\THE_CHIP\RMIS\1B230B\10-100.sch			
DRAWN	DATE	D/O CHECK	
D.W.B	16-Oct-2003		
SHEET: 1	SCALE:	CURRENT CN	
DRAWING NUMBER		APPV CHECK	DATE
1B230B-10-100			
SHEET: 1	OF: 1	ISSUE	ISSUE DATE
		V1.00	N.I.

3.11 Single Shot, Auto Reset, Live Line In, Block Instantaneous OFF

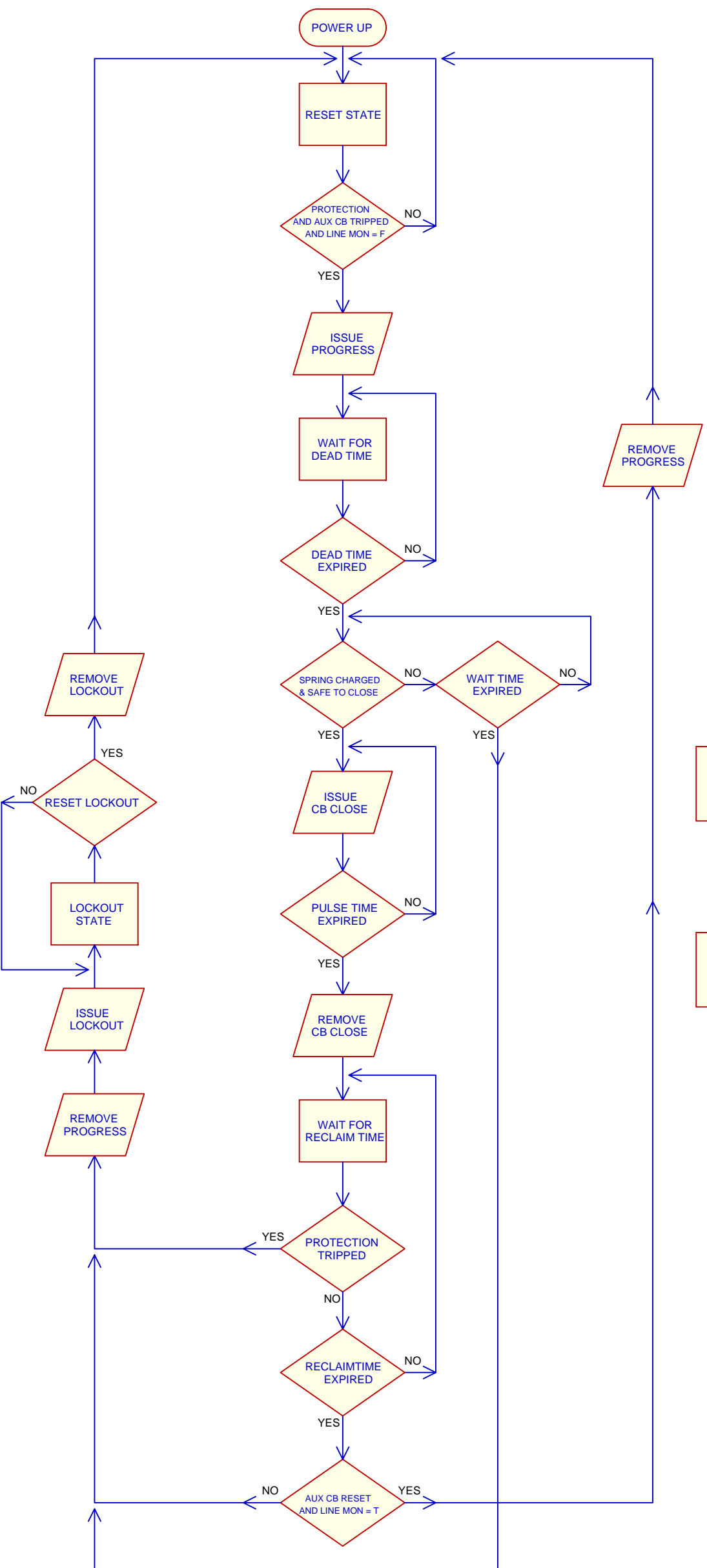


X = Dont Care

1. Once the breaker has tripped and the Protection Trip Contact has closed, providing the line voltage is zero the A/R in progress LED will flash and the A/R contact will close, if the line voltage is not zero the relay will wait in the reset state until it is, it will then wait for the setting of Dead Time 1 to expire, and then issue a reclose output pulse, the counter will increment one count and the A/R in progress LED will become steady.
2. If the breaker closes and the protection opens the relay will reset after the Reclaim time expires and will be ready for the next breaker operation.
3. If however after issuing the reclose pulse the Protection Trip Contact is still present the relay will drive directly to Lockout. If the Protection Trip Contact has reset but the Circuit Breaker has not, the relay will wait for the Reclaim time to expire before it goes to lockout.
4. The Lockout indication and contact has to be reset from the front panel of the relay.
5. Refer to flowchart 1B230B-11-100 for the sequence of operation.



1B230B-11-100



Amendments



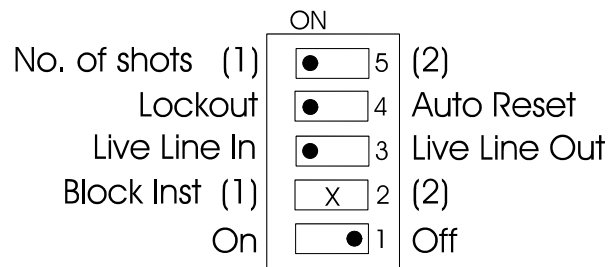
1B230B
FLOWCHART

1 SHOT, BLOCK INST OFF OR 2, AUTO LOCKOUT, LIVE LINE IN

DATE: 16-Oct-2003	TIME: 10:09:32
FILE NAME: D:\THE_CHIP\RMST\1B230B\OCCOIFlowchart\1B230B-11-100.Sch	

DRAWN	DATE	D/O CHECK	DATE	APPV CHECK	DATE	DRAWING NUMBER	ISSUE
D.W.B	16-Oct-2003					1B230B-11-100	V1.00
SHEET: 1	SCALE:	CURRENT CN					ISSUE DATE
							N.I.

3.12 Single Shot, Lockout ON, Live Line In, Block Instantaneous OFF

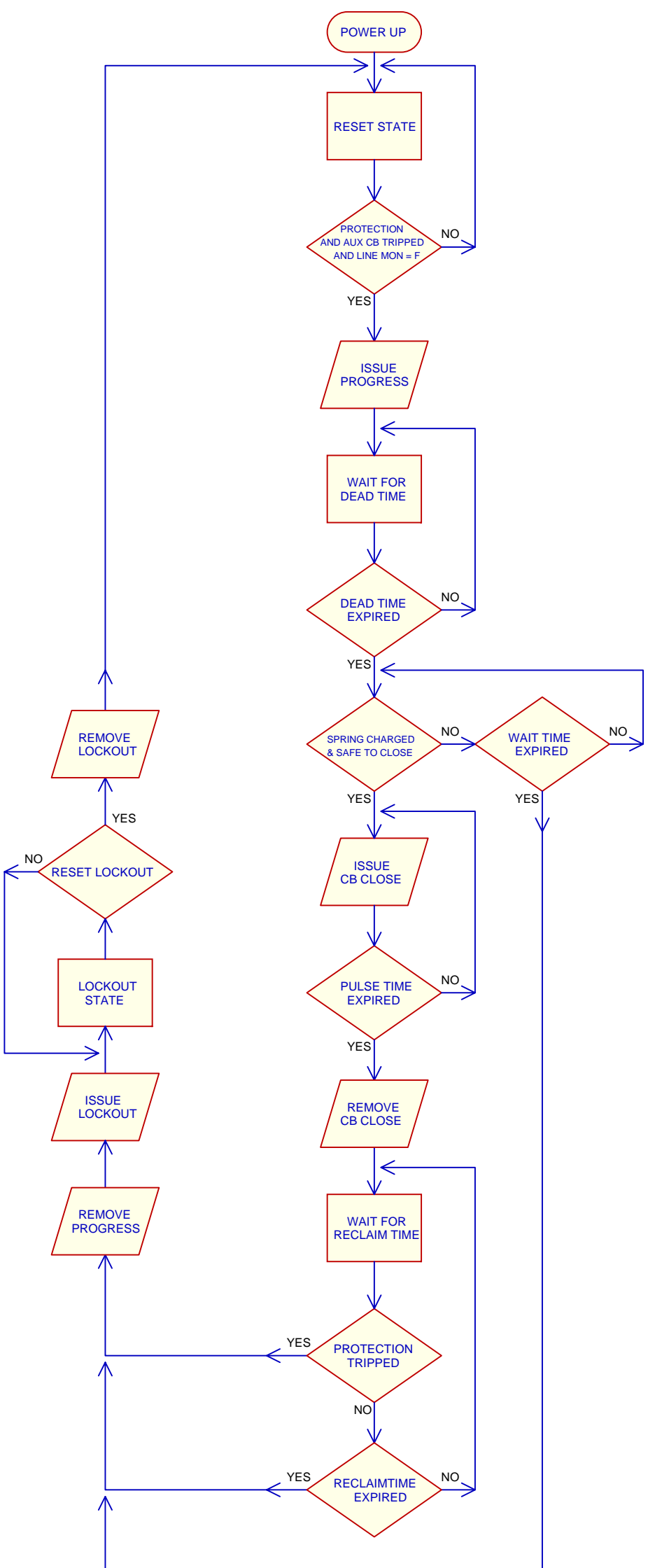
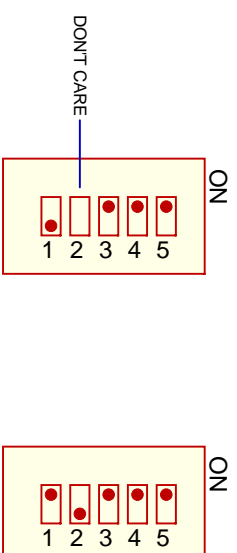


X = Dont Care

1. Once the breaker has tripped and the Protection Trip Contact has closed, providing the line voltage is zero the A/R in progress LED will flash and the A/R contact will close if the line voltage is not zero the relay will wait in the reset state until it is, it will then wait for the setting of Dead Time 1 to expire, and then issue a reclose output pulse, the counter will increment one count and the A/R in progress LED will become steady.
2. If the Circuit Breaker and the Protection Trip Contact opens the relay will wait for the Reclaim time to expire and will then go to Lockout.
3. If after the Reclose pulse the Protection Trip Contact is still present the relay will go directly to Lockout.
4. The Lockout indication and contact has to be reset from the front panel of the relay.
5. Refer to flowchart 1B230B-12-100 for the sequence of operation.

1B230B-12-100

SWITCH SETTINGS



Amendments

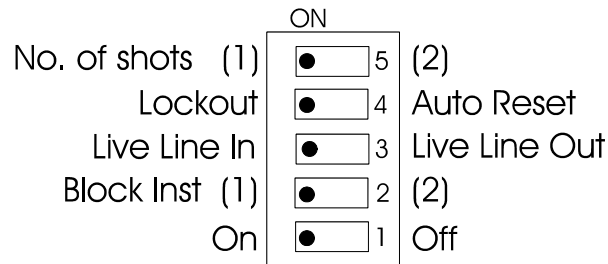


1B230B FLOWCHART

1 SHOT, BLOCK INST off or 2, LOCKOUT ON, LIVE LINE IN

DATE: 16-Oct-2003		TIME: 10:09:54		FILE NAME: D:\THE_CHIP\RM\SYSTEM\B230\OCCOIFlowchart\1B230B-12-100.Sch	
DRAWN	DATE	D/O CHECK	DATE	APPV CHECK	DATE
D.W.B	16-Oct-2003				
SHEET: 1		SCALE:		CURRENT CN	
DRAWING NUMBER			ISSUE		
1B230B-12-100			V1.00		
SHEET: 1			OF: 1		ISSUE DATE
					N.I.

3.13 Single Shot, Lockout ON, Live Line In, Block Instantaneous after 1st Trip

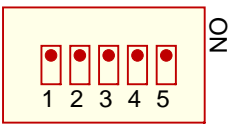


X = Dont Care

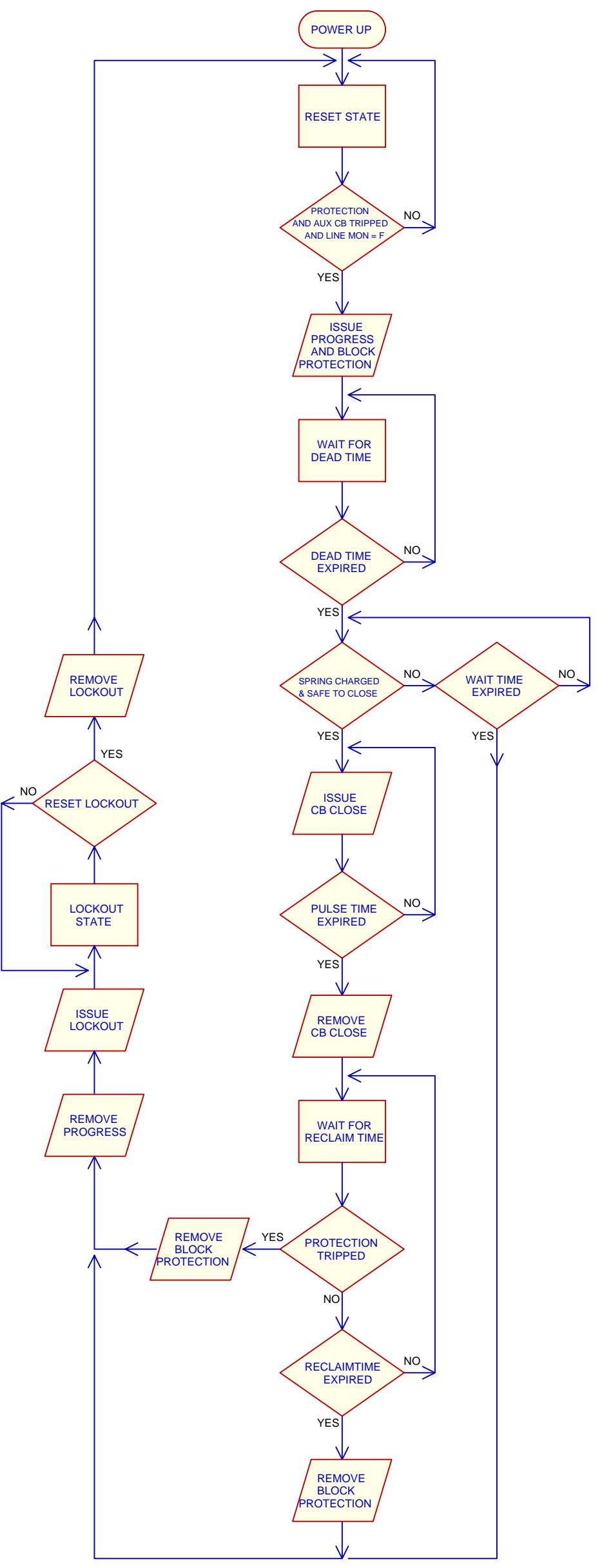
With the switch setting depicted above the relay will go through the following operations.

1. Once the breaker has tripped and the Protection Trip Contact has closed, providing the line voltage is zero the A/R in progress LED will flash and the A/R contact will close, if the line voltage is not zero the relay will wait in the reset state until it is, it will then wait for the setting of Dead Time 1 to expire, and then issue a reclose output pulse, the counter will increment one count and the A/R in progress LED will become steady.
2. If the Protection Trip Contact is still closed after the reclose pulse, the Block Instantaneous Protection contact will open, the LED will extinguish and the relay will go directly to Lockout.
3. If the Protection Trip Contact has opened the relay will wait for the Reclaim Time to expire before removing the Block Instantaneous Protection contact and LED and driving to Lockout.
4. The Lockout indication and contact has to be reset from the front panel of the relay.
5. Refer to flowchart 1B230B-13-100

SWITCH SETTINGS



1B230B-13-100



Amendments

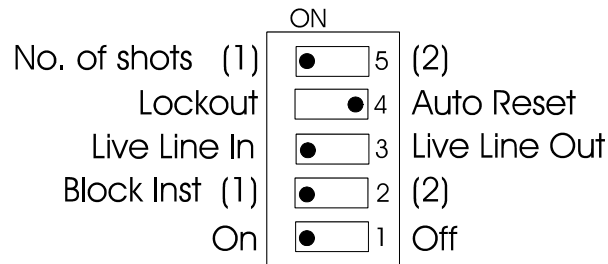


1B230B
FLOWCHART

1 SHOT, BLOCK INST 1, LOCKOUT ON, LIVE LINE IN

DATE: 16-Oct-2003	TIME: 10:10:15	FILE NAME: D:\THE_CHIP\RMIS\1B230B\OCCOIFlowchart\1B230B-13-100.Sch	
DRAWN	DATE	D/O CHECK	DATE
D.W.B	16-Oct-2003	SCALE:	CURRENT CN
DRAWING NUMBER		ISSUE	
1B230B-13-100		V1.00	
SHEET: 1		OF: 1	
SHEET: 1		N.I.	

3.14 Single Shot, Auto Reset, Live Line In, Block Instantaneous after 1st Trip

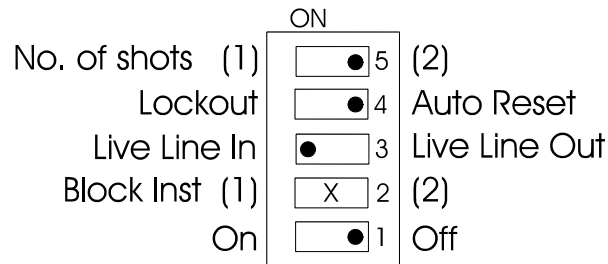


X = Dont Care

With the switch setting depicted above the relay will go through the following operations.

1. Once the breaker has tripped and the Protection Trip Contact has closed, providing the line voltage is zero the Block Instantaneous contact will pick up and the front panel LED will be lit, the A/R in progress LED will flash and the A/R contact will close, if the line voltage is not zero the relay will wait in the reset state until it is, it will then wait for the setting of Dead Time 1 to expire, and then issue a reclose output pulse, the counter will increment one count and the A/R in progress LED will become steady.
2. If the Protection Trip Contact and Circuit Breaker has closed the relay will wait for the Reclaim time to expire then the Block Instantaneous Protection LED and contact will reset and the relay will reset ready for the next operation.
3. If the Protection Trip Contact is still operated after the Reclose Pulse the relay will drive directly to Lockout.
4. If after the Reclaim time has expired but the Circuit Breaker has not closed the Block Instantaneous Protection LED and contact will reset and the relay will go to Lockout.
5. The Lockout indication and contact has to be reset from the front panel of the relay.
6. Refer to flowchart 1B230B-14-100

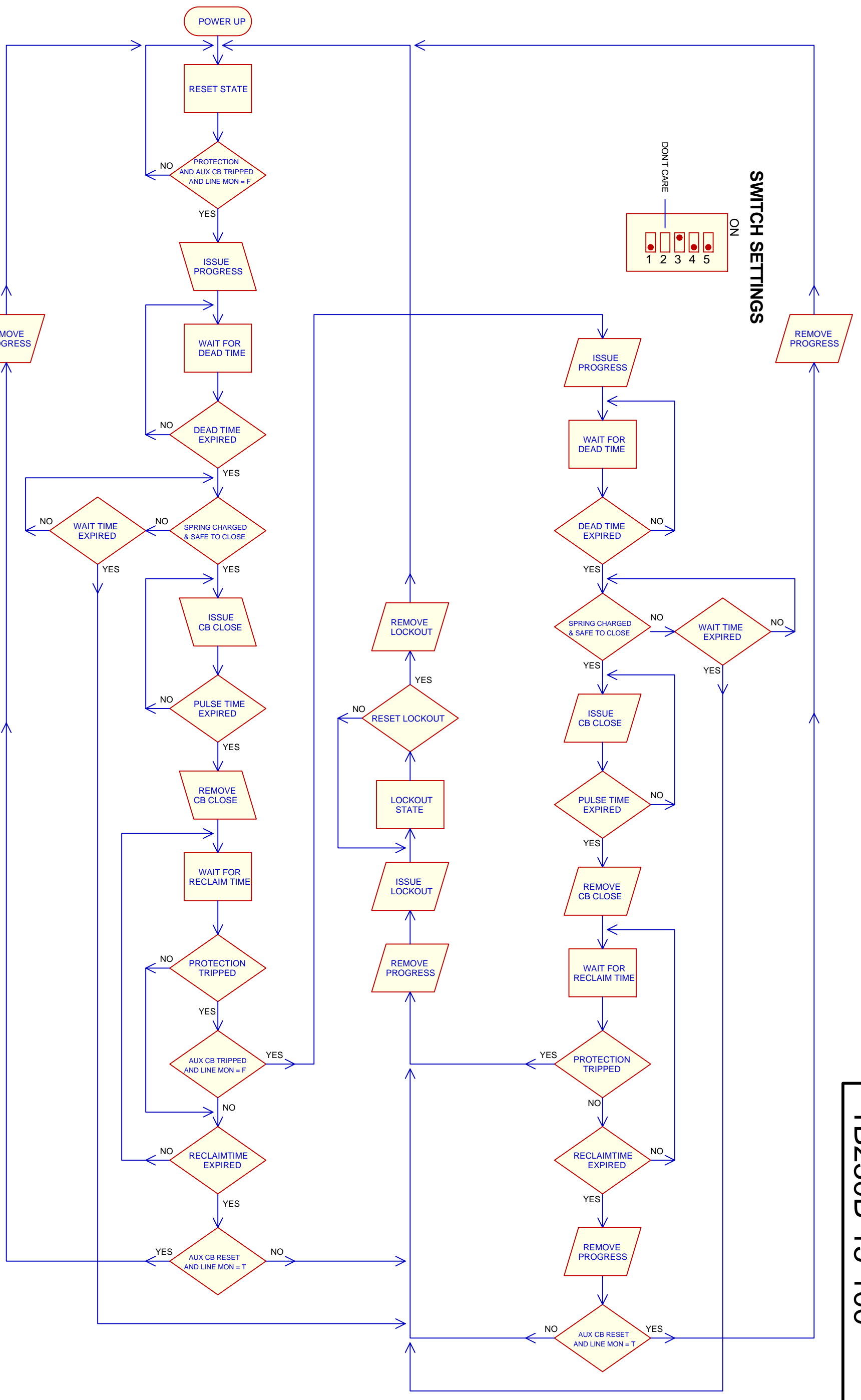
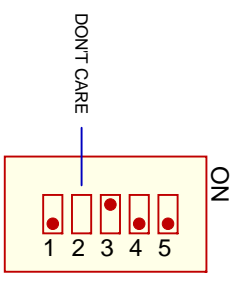
3.15 Double Shot, Auto Reset, Live Line In, Block Instantaneous OFF



X = Dont Care

With the switch setting depicted above the relay will go through the following operations.

1. Once the breaker has tripped and the Protection Trip Contact has closed providing the line voltage is zero, the Block Instantaneous contact will pick up and the front panel LED will be lit, the A/R in progress LED will flash and the A/R contact will close, if the line voltage is not zero the relay will wait in the reset state until it is, it will then wait for the setting of Dead Time 1 to expire, then issue a reclose output pulse, the counter will increment one count and the A/R in progress LED will become steady.
2. If the Protection Trip Contact and Circuit Breaker aux have both reset the relay will wait for the Reclaim time to expire then reset ready for the next operation.
3. If the after the Reclose Pulse the Protection Trip Contact and Circuit Breaker are still tripped the relay will wait for Dead Time 2 to expire then issue another Reclose Pulse, the counter will increment one count. If after the second pulse the Protection Trip Contact and Circuit Breaker has reset the relay will reset ready for the next operation.
4. If after the second pulse the Protection Trip Contact is still closed the relay will drive directly to Lockout.
5. If the Protection Trip Contact has reset but the Circuit Breaker has not the relay will wait for the Reclaim time to expire before driving to Lockout.
6. The Lockout indication and contact has to be reset from the front panel of the relay.
7. Refer to flowchart 1B230B-15-100



1B230B-15-100

Amendments

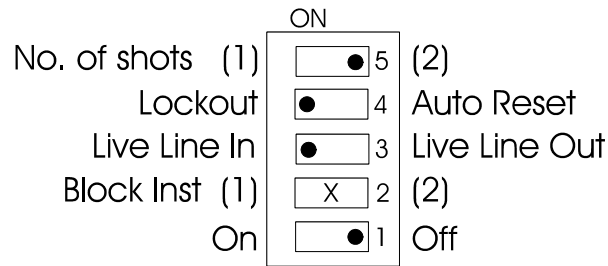
DATE: 16-Oct-2003 TIME: 10:10:55
 FILE NAME: D:\THE_CHIP\RMIS\1B230B\1B230B-15-100.Sch

1B230B
 FLOWCHART
 2 SHOT, BLOCK INST OFF, AUTO LOCKOUT, LIVE LINE IN

DRAWN	DATE	D/O CHECK	DATE	APPV CHECK	DATE	DRAWING NUMBER	ISSUE
D.W.B	16-Oct-2003					1B230B-15-100	V1.00

SHEET: 1 OF: 1
 SCALE: N.I.
 SHEET: 1 OF: 1
 ISSUE DATE

3.16 Double Shot, Lockout ON, Live Line In, Block Instantaneous OFF

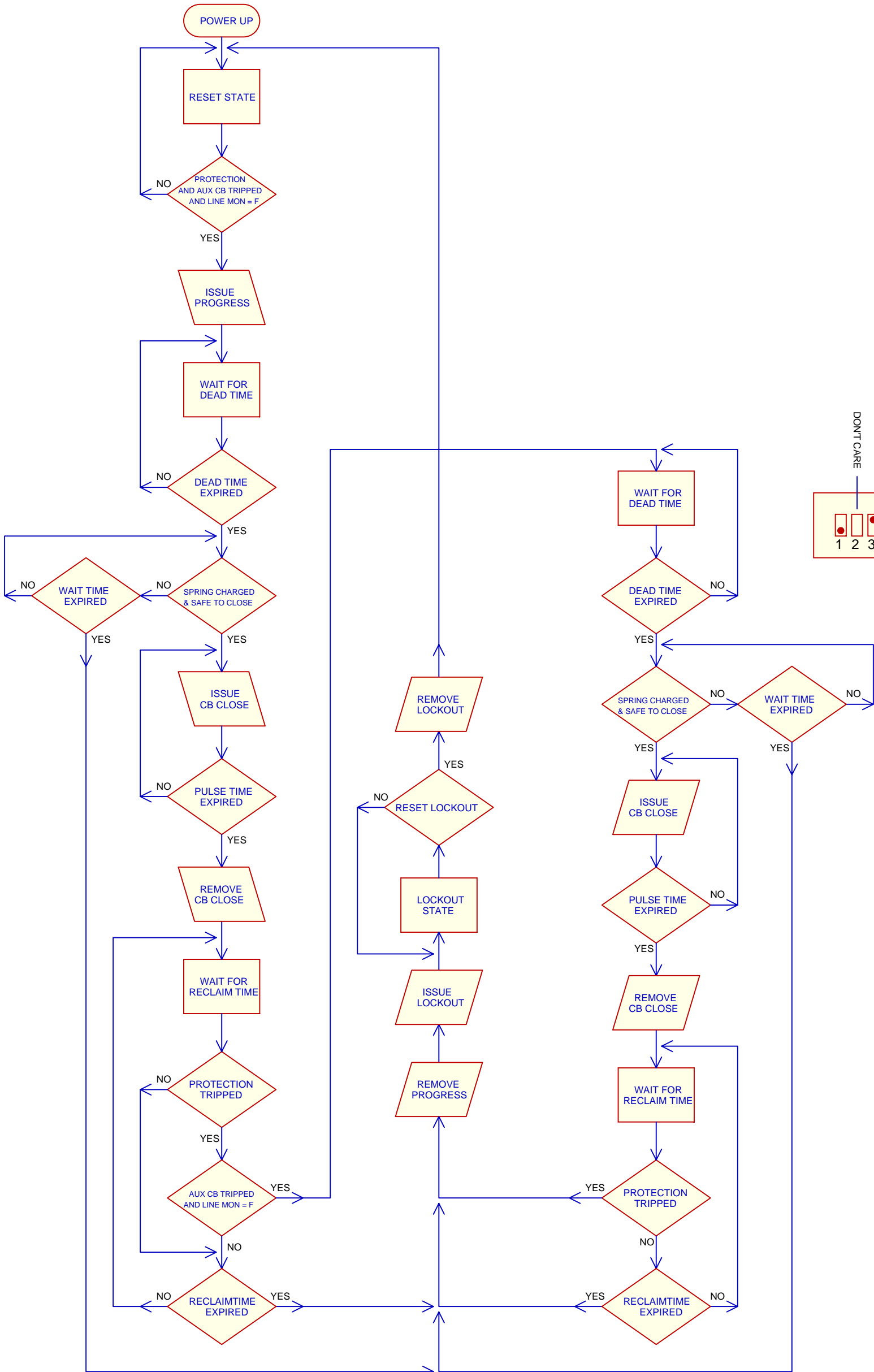
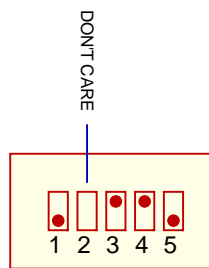


X = Dont Care

With the switch setting depicted above the relay will go through the following operations.

1. Once the breaker has tripped and the Protection Trip Contact has closed providing the line voltage is zero the A/R in progress LED will flash and the A/R contact will close, if the line voltage is not zero the relay will wait in the reset state until it, it will then wait for the setting of Dead Time 1 to expire, then issue a reclose output pulse, the counter will increment one count and the A/R in progress LED will become steady.
2. If both the Protection Trip Contact and the Circuit Breaker have reset, the relay will drive directly to Lockout.
3. If the Protection Trip Contact and Circuit Breaker have not reset the relay waits for Dead time 2 to expire then issues another Reclose pulse, the counter will increment one count .If the Protection Trip Contact and Circuit Breaker have still not reset the relay drives to Lockout.
4. If the Protection Trip Contact and Circuit Breaker have both reset, the relay waits for the Reclaim Time to expire before driving to Lockout.
5. The Lockout indication and contact has to be reset from the front panel of the relay.
6. Refer to flowchart 1B230B-16-100

SWITCH SETTINGS



Amendments

DATE	TIME	FILE NAME
16-Oct-2003	10:11:13	C:\P\R\MS\1B230B\1B230B-16-100.Sch



1B230B

FLOWCHART

2 SHOT, BLOCK INST OFF, LOCKOUT ON, LIVE LINE IN

DRAWN	DATE	D/O CHECK	DATE	APPV CHECK	DATE	DRAWING NUMBER	ISSUE
D.W.B	16-Oct-2003					1B230B-16-100	V1.00

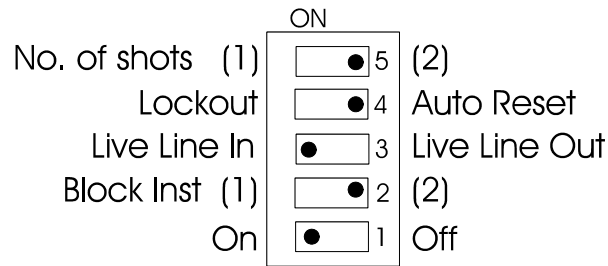
SHEET: 1 OF: 1

SCALE: CURRENT CN

ISSUE DATE: N.I.

1B230B-16-100

3.17 Double Shot, Auto Reset, Live Line In, Block Instantaneous after 2nd Trip

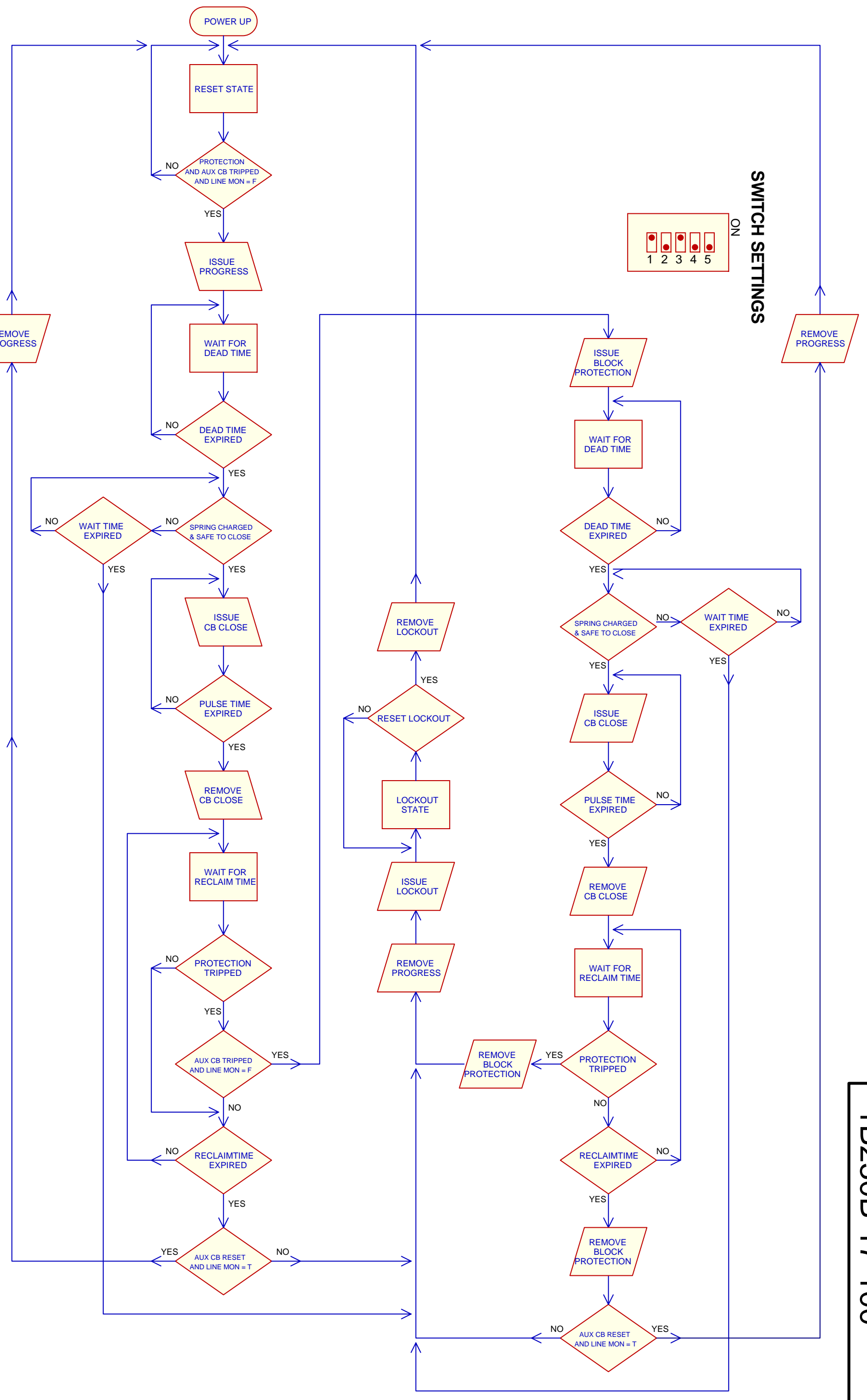
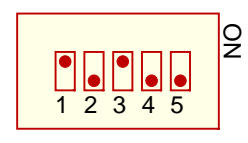


X = Dont Care

With the switch setting depicted above the relay will go through the following operations.

1. Once the breaker has tripped and the Protection trip contact has closed providing the line voltage is zero the A/R in progress LED will flash and the A/R contact will close, if the line voltage is not zero the relay will wait in the reset state until it is, it will then wait for the setting of Dead Time 1 to expire, then issue a reclose output pulse, the counter will increment one count and the A/R in progress LED will become steady.
2. If both the Protection Trip Contact and the Circuit Breaker have reset the relay will wait for the Reclaim time to expire and reset the relay ready for the next operation.
3. If the Protection Trip Contact and Circuit Breaker have not reset the Block Instantaneous Protection contact and LED will operate and after Dead time 2 has expired the relay will issue another reclose pulse, the counter will increment one count. If the Circuit Breaker and Protection Trip Contact still have not reset then the Block Instantaneous Protection contact and LED are reset and the relay drives to Lockout.
4. If the Protection Trip Contact and Circuit Breaker have both reset the relay waits for the Reclaim time to expire and then resets ready for the next operation.
5. The Lockout indication and contact has to be reset from the front panel of the relay.
6. Refer to flowchart 1B230B-17-100

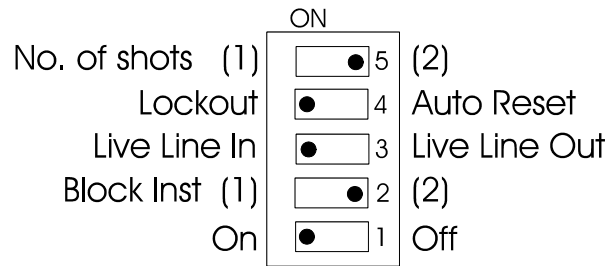
1B230B-17-100



Amendments		DATE: 16-Oct-2003		TIME: 10:11:44	
FILE NAME: D:\THE_CHIP\RM\SY\1B230B\17-100.Sch		DRAWN		DATE	
D.W.B		16-Oct-2003		SCALE:	
SHEET: 1		CURRENT CN		DRAWING NUMBER	
1B230B-17-100		DATE		APPV CHECK	
SHEET: 1		OF: 1		ISSUE DATE	
N.I.		V1.00		ISSUE	

1B230B
FLOWCHART
2 SHOT, BLOCK INST 2, AUTO LOCKOUT, LIVE LINE IN

3.18 Double Shot, Lockout ON, Live Line In, Block Instantaneous after 2nd Trip

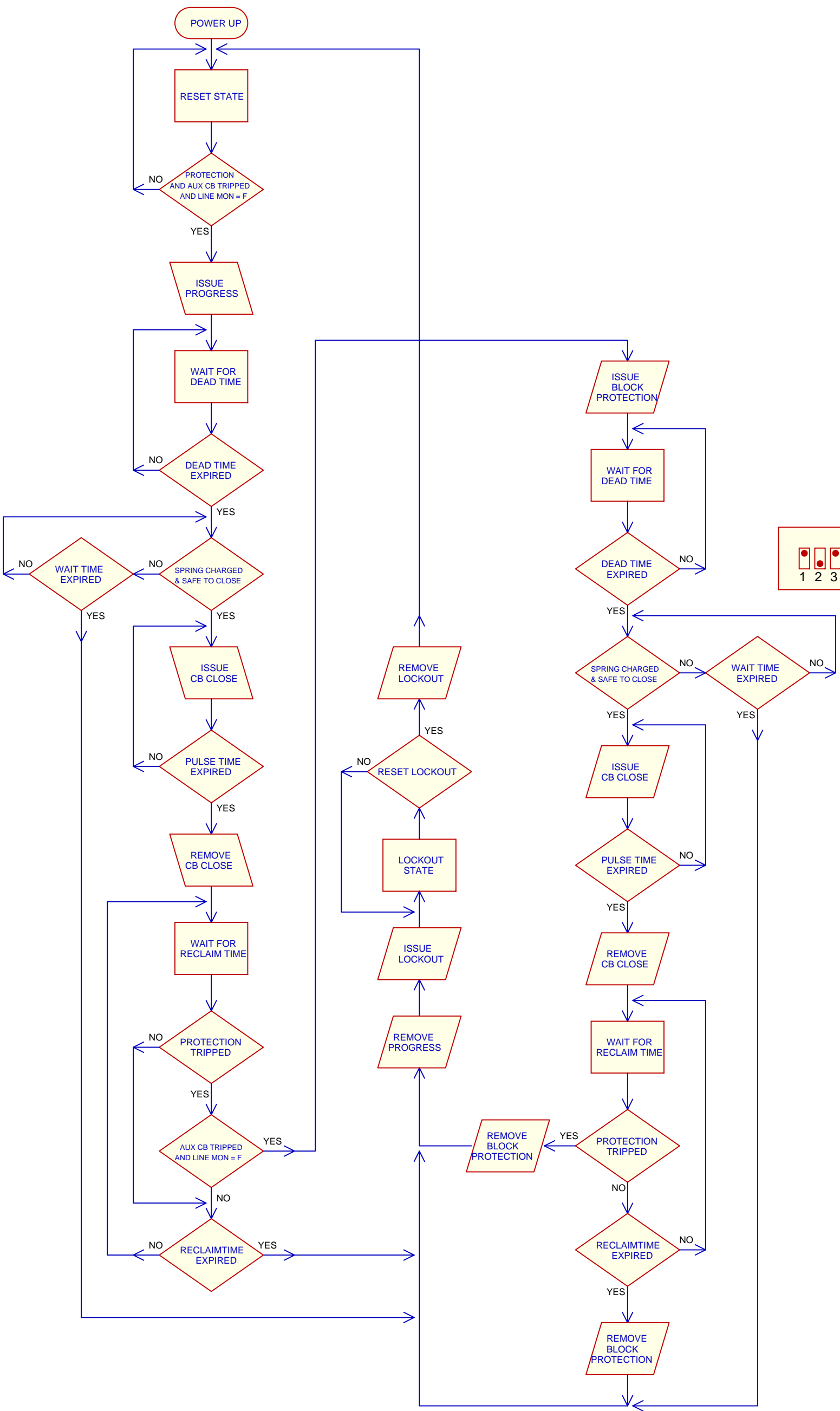
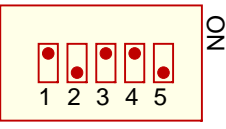


X = Dont Care

With the switch setting depicted above the relay will go through the following operations.

1. Once the breaker has tripped and the Protection Trip Contact has closed, providing the line voltage is zero the A/R in progress LED will flash and the A/R contact will close, if the line voltage is not zero the relay will wait in the reset state until it is, it will then wait for the setting of Dead Time 1 to expire, then issue a reclose output pulse, the counter will increment one count and the A/R in progress LED will become steady.
2. If the Protection Trip Contact and Circuit Breaker have both reset the relay waits for the Reclaim time to expire then drives to Lockout.
3. If the Protection Trip Contact and Circuit Breaker have not reset the Block Instantaneous Protection LED and contact operate. The relay waits for Dead time 2 to expire then issues another Reclose pulse, the counter will increment one count. If the Protection Trip Contact and Circuit Breaker have not reset the Block Instantaneous Protection LED and contact are reset and the relay drives to Lockout.
4. If both the Protection Trip Contact and Circuit Breaker have reset the relay waits for the Reclaim time to expire then resets the Block Instantaneous Protection LED and contact and then drives to Lockout.
5. The Lockout indication and contact has to be reset from the front panel of the relay
6. Refer flowchart 1B230B-18-100.

SWITCH SETTINGS

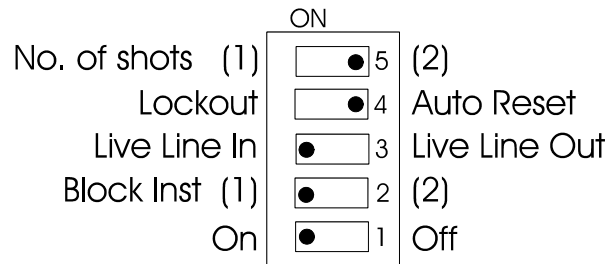


Amendments		DATE: 16-Oct-2003		TIME: 10:12:01	
FILE NAME: D:\THE_CHIP\RMIS\1B230B\18-100\Flowchart\1B230B-18-100.Sch		DRAWN		DATE	
D.W.B		16-Oct-2003		SCALE:	
SHEET: 1		CURRENT CN		DRAWING NUMBER	
1B230B-18-100		DATE		DATE	
SHEET: 1		OF: 1		ISSUE DATE	
N.I.		ISSUE		V1.00	

1B230B
FLOWCHART
 2 SHOT, BLOCK INST 2, LOCKOUT ON, LIVE LINE IN

1B230B-18-100

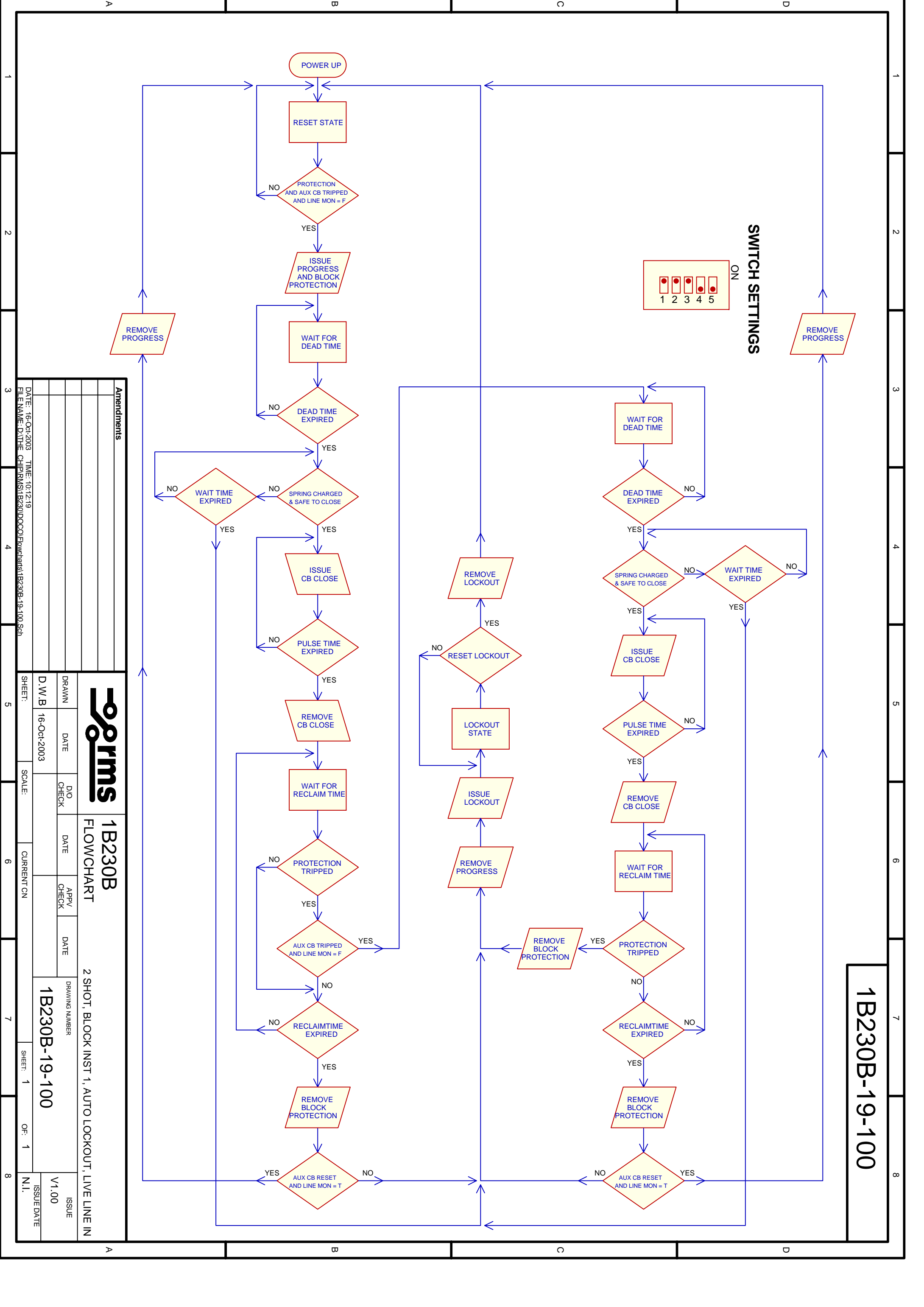
3.19 Double Shot, Auto Reset, Live Line In, Block Instantaneous after 1st Trip



X = Dont Care

With the switch setting depicted above the relay will go through the following operations.

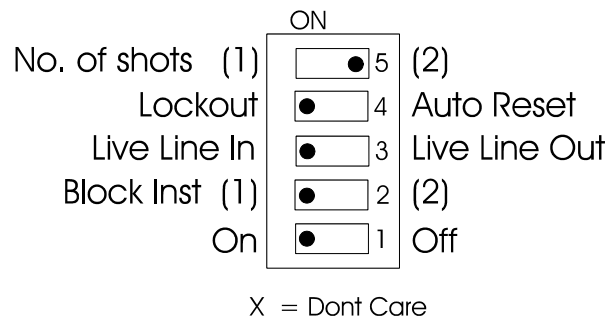
1. Once the breaker has tripped and the Protection Trip Contact has closed, providing the line voltage is zero the Block Instantaneous Protection LED and contact operates and the A/R in progress LED will flash and the A/R contact will close, if the line voltage is not zero the relay will wait in the reset state until it is, it will then wait for the setting of Dead Time 1 to expire, then issue a reclose output pulse, the counter will increment one count and the A/R in progress LED will become steady.
2. If the Protection Trip Contact and Circuit Breaker did not reset the relay will wait for Dead time 2 to expire and then issue another Reclose Pulse, the counter will increment one count. If the Circuit Breaker and Protection Trip Contact reset after this second pulse the Block Instantaneous Protection LED and contact are reset after the Reclaim time has expired and the relay resets ready for the next operation.
3. If the Protection Trip Contact and Circuit Breaker did not reset after the second pulse the Block Instantaneous Protection LED and contact are reset and the relay drives to Lockout.
4. The Lockout indication and contact has to be reset from the front panel of the relay.
5. Refer to flowchart 1B230B-19-100



Amendments	
DATE: 16-Oct-2003	TIME: 10:12:19
FILE NAME: D:\THE_CHIP\RM\SY\1B230B\1B230B-19-100.Sch	
prms	
1B230B	
FLOWCHART	
2 SHOT, BLOCK INST 1, AUTO LOCKOUT, LIVE LINE IN	
DRAWN	DATE
D.W.B	16-Oct-2003
D/O CHECK	DATE
SCALE:	CURRENT CN
SHEET: 1	OF: 1
ISSUE	ISSUE DATE
V1.00	N.I.

1B230B-19-100

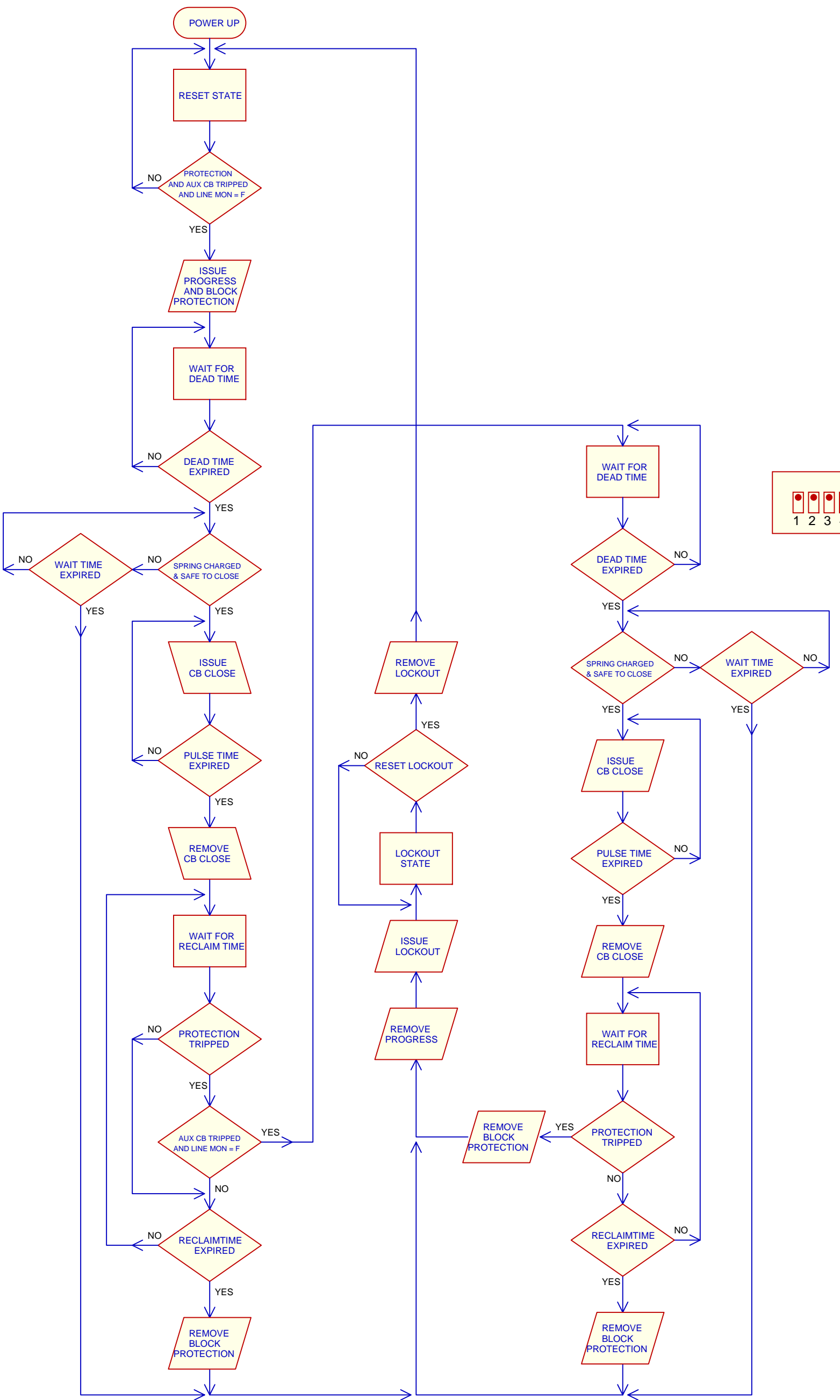
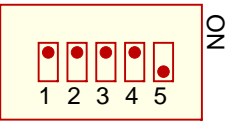
3.20 Double Shot, Lockout ON, Live Line In, Block Instantaneous after 1st Trip



With the switch setting depicted above the relay will go through the following operations.

1. Once the breaker has tripped and the Protection trip contact has closed providing the line voltage is zero, the Block Instantaneous Protection LED and contact operates and the A/R in progress LED will flash and the A/R contact will close, if the line voltage is not zero the relay will wait in the reset state until it is, it will then wait for the setting of Dead Time 1 to expire, then issue a reclose output pulse, the counter will increment one count and the A/R in progress LED will become steady.
2. The relay will wait for the Dead time 1 setting to expire and issue a reclose pulse, if the Protection Trip Contact and Circuit Breaker reset, the Block Instantaneous Protection LED and contact are reset after the Reclaim time has expired and the relay drives to Lockout.
3. If the Protection Trip Contact and Circuit Breaker have not reset the relay will wait for the Dead time 2 setting to expire and the relay will issue a second reclose pulse, the counter will increment one count. If the Circuit Breaker and Protection Trip Contact have not reset after the second pulse, the Block Instantaneous Protection LED and contact are reset and the relay drives to Lockout.
4. If the Protection Trip Contact and Circuit Breaker have reset after the second pulse the Block Instantaneous Protection LED and contact are reset and the relay waits for the Reclaim time to expire then resets ready for the next operation.
5. The Lockout indication and contact has to be reset from the front panel of the relay.
6. Refer to flowchart 1B230B-20-100

SWITCH SETTINGS



1B230B-20-100

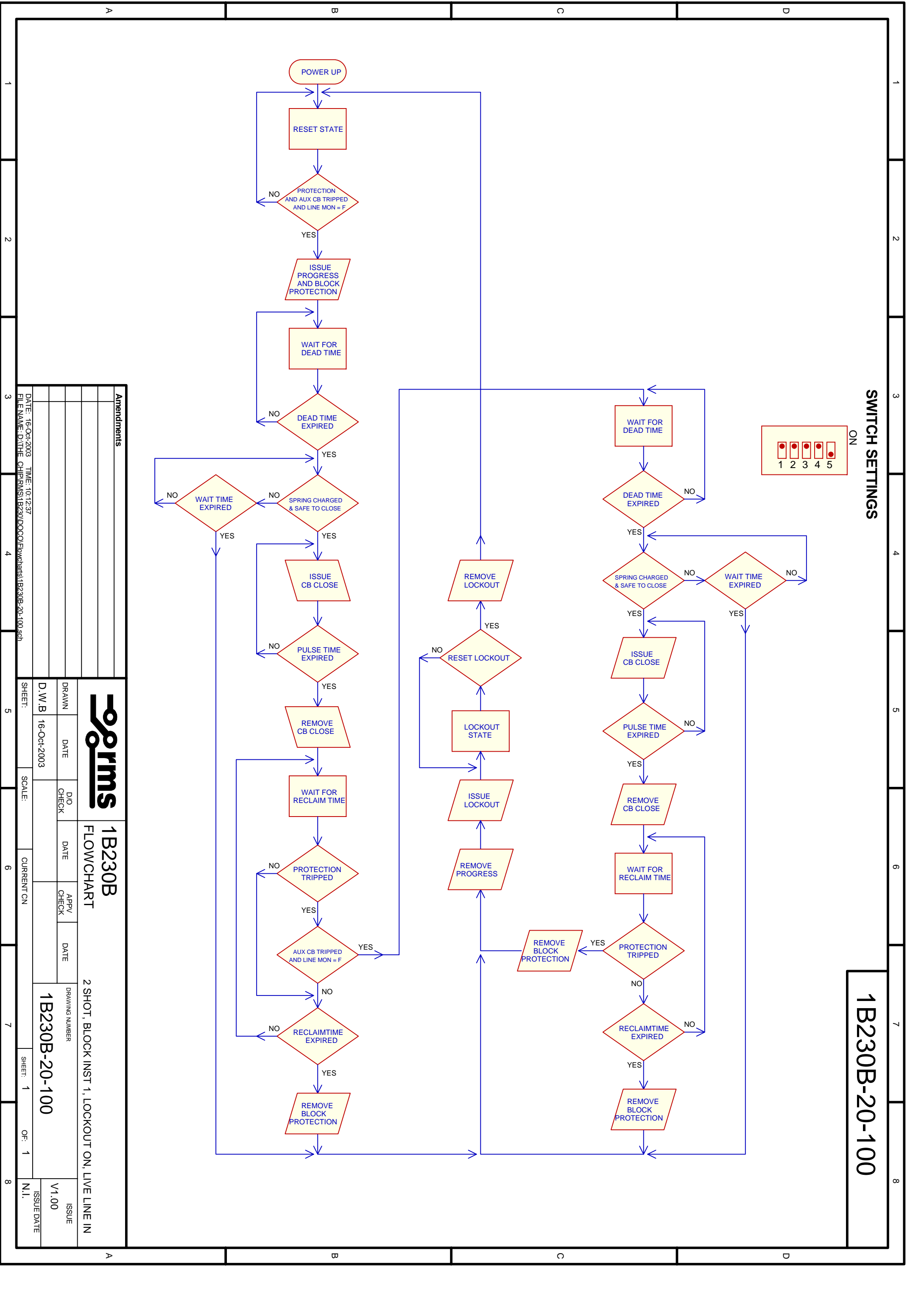
Amendments



1B230B
FLOWCHART

2 SHOT, BLOCK INST 1, LOCKOUT ON, LIVE LINE IN

DATE: 16-Oct-2003	TIME: 10:12:37	DRAWN		DATE	D/O CHECK	DATE	APPV CHECK	DATE	DRAWING NUMBER	ISSUE
FILE NAME: D:\THE_CHIP\RM\SY\1B230B\100\OCQ\Flowchart\1B230B-20-100.sch		D.W.B	16-Oct-2003						1B230B-20-100	V1.00
		SHEET: 1	SCALE:	CURRENT CN						ISSUE DATE
										N.I.



Installation

Handling of Electronic Equipment

A person's normal movements can easily generate electrostatic potentials of several thousand volts. Discharge of these voltages into semiconductor devices when handling electronic circuits can cause serious damage, which often may not be immediately apparent but the reliability of the circuit will have been reduced.

The electronic circuits of Relay Monitoring Systems Pty Ltd products are immune to the relevant levels of electrostatic discharge when housed in the case. Do not expose them to the risk of damage by withdrawing modules unnecessarily.

Each module incorporates the highest practicable protection for its semiconductor devices. However, if it becomes necessary to withdraw a module, the following precautions should be taken to preserve the high reliability and long life for which the equipment has been designed and manufactured.

1. Before removing a module, ensure that you are at the same electrostatic potential as the equipment by touching the case.
2. Handle the module by its front-plate, frame, or edges of the printed circuit board.
3. Avoid touching the electronic components, printed circuit track or connectors.
4. Do not pass the module to any person without first ensuring that you are both at the same electrostatic potential. Shaking hands achieves equipotential.
5. Place the module on an antistatic surface, or on a conducting surface which is at the same potential as yourself.
6. Store or transport the module in a conductive bag.

If you are making measurements on the internal electronic circuitry of an equipment in service, it is preferable that you are earthed to the case with a conductive wrist strap.

Wrist straps should have a resistance to ground between 500k – 10M ohms. If a wrist strap is not available, you should maintain regular contact with the case to prevent the build up of static.

Instrumentation which may be used for making measurements should be earthed to the case whenever possible.



Safety Section

This Safety Section should be read before commencing any work on the equipment.

The information in the Safety Section of the product documentation is intended to ensure that products are properly installed and handled in order to maintain them in a safe condition. It is assumed that everyone who will be associated with the equipment will be familiar with the contents of the Safety Section.

Explanation of Symbols & Labels

The meaning of symbols and labels which may be used on the equipment or in the product documentation, is given below.

Caution: refer to product information

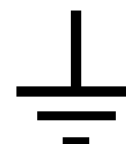


Caution: risk of electric shock



Functional earth terminal

Note: this symbol may also be used for a protective/safety earth terminal if that terminal is part of a terminal block or sub-assembly eg. power supply.





Unpacking

Upon receipt inspect the outer shipping carton or pallet for obvious damage.

Remove the individually packaged relays and inspect the cartons for obvious damage.

To prevent the possible ingress of dirt the carton should not be opened until the relay is to be used. Refer to the following images for unpacking the relay:



Outer packing carton showing shipping documentation pouch.
Address label on top of carton.



Inner packing carton showing front label detailing the customer name, order number, relay part number & description, the relay job number & packing date. (Size 2 inner packing carton depicted)



Visit www.rmspl.com.au for the latest product information.

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Unpacking (Continued)



Inner packing carton with lid open showing protective foam insert.

CD depicted supplied with digital relay models or upon request at time of order.

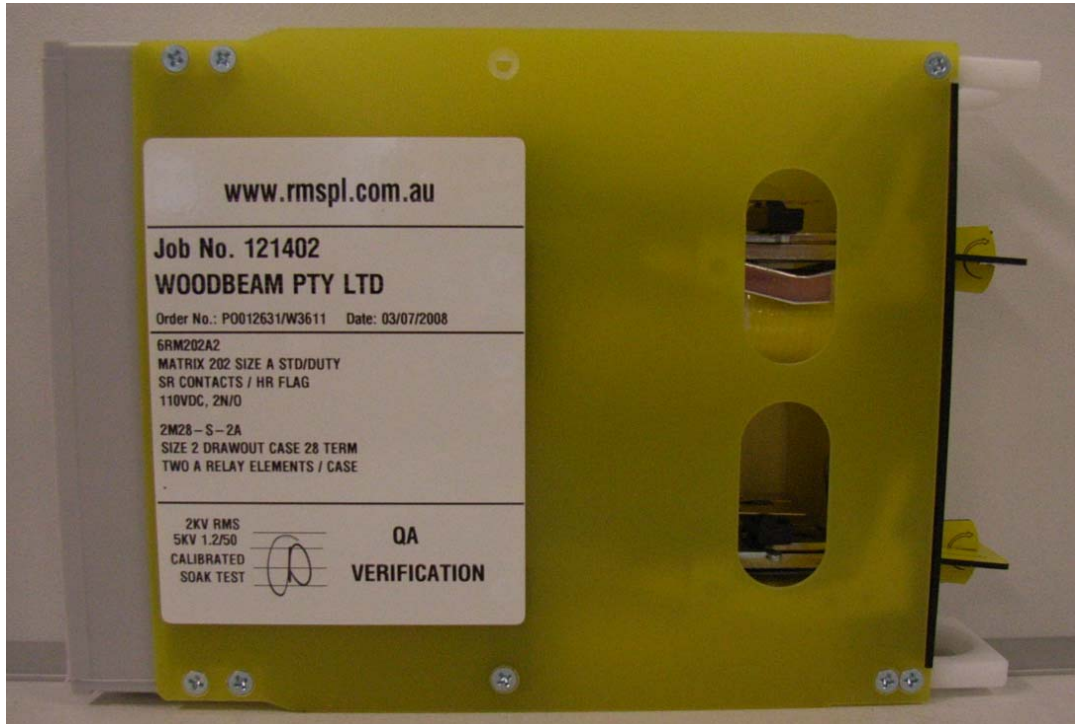


Inner packing carton with protective foam insert removed showing relay location.

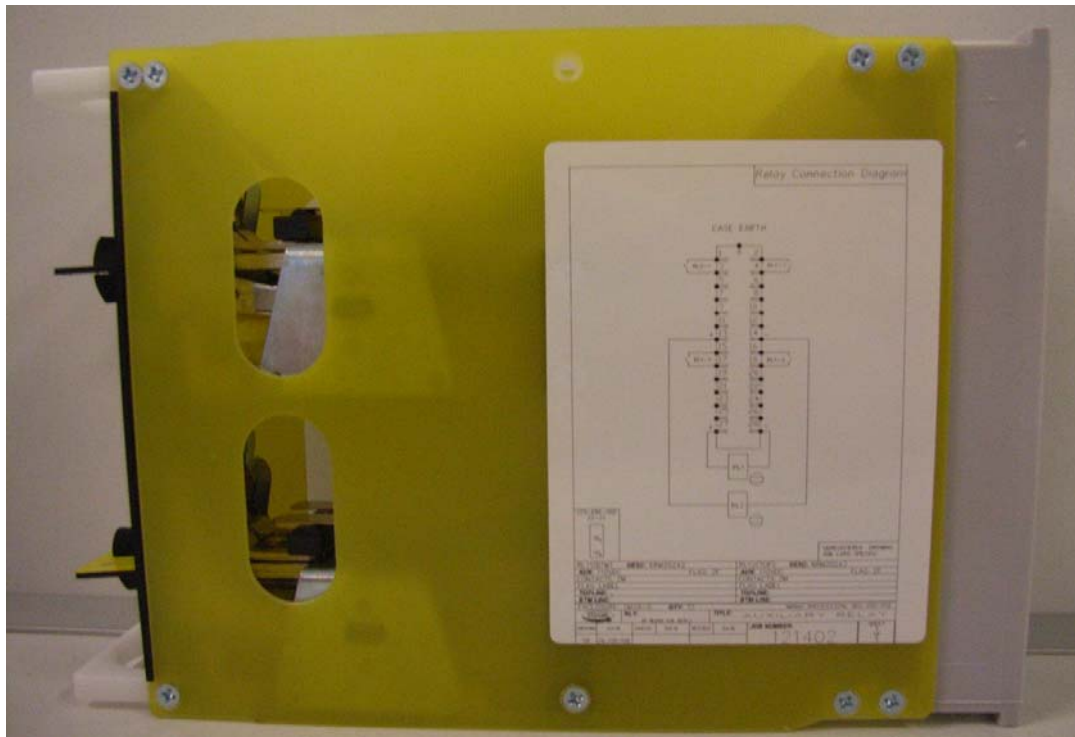


Where mechanical flags are fitted the yellow transit wedge must be removed before operation using a gentle twisting action. The wedge should be stored with the original packaging material.

Relay Module Side Label Depicting Product Details



Relay Module Side Label Depicting Wiring Diagram (6R MATRIX relays only)



Accessories Supplied With Each Relay



Self threading M4 mounting screws



M4 terminal screws with captured lock washers

Storage & Handling

If damage has been sustained a claim should immediately be made against the carrier, also inform Relay Monitoring Systems Pty Ltd and the nearest RMS agent

When not required for immediate use, the relay should be returned to its original carton and stored in a clean, dry place.

Relays which have been removed from their cases should not be left in situations where they are exposed to dust or damp. This particularly applies to installations which are being carried out at the same time as constructional work.

If relays are not installed immediately upon receipt they should be stored in a place free from dust and moisture in their original cartons.

Dust which collects on a carton may, on subsequent unpacking, find its way into the relay; in damp conditions the carton and packing may become impregnated with moisture and the de-humidifying agent will lose its efficiency.



Equipment Operating Conditions

The equipment should be operated within the specified electrical and environmental limits.

Protective relays, although generally of robust construction, require careful treatment prior to installation and a wise selection of site. By observing a few simple rules the possibility of premature failure is eliminated and a high degree of performance can be expected.

Care must be taken when unpacking and installing the relays so that none of the parts are damaged or their settings altered and must at all times be handled by skilled persons only.

Relays should be examined for any wedges, clamps, or rubber bands necessary to secure moving parts to prevent damage during transit and these should be removed after installation and before commissioning.

The relay should be mounted on the circuit breaker or panel to allow the operator the best access to the relay functions.

Relay Dimensions & Other Mounting Accessories

Refer drawing in Technical Bulletin. Relevant Auto Cad files & details on other accessories such as 19 inch sub rack frames, semi projection mount kits & stud terminal kits may be down loaded from:

<http://www.rmspl.com.au/mseries.htm>



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Equipment Connections

Personnel undertaking installation, commissioning or servicing work on this equipment should be aware of the correct working procedures to ensure safety. The product documentation should be consulted before installing, commissioning or servicing the equipment.

Terminals exposed during installation, commissioning and maintenance may present hazardous voltage unless the equipment is electrically isolated.

If there is unlocked access to the rear of the equipment, care should be taken by all personnel to avoid electric shock or energy hazards.

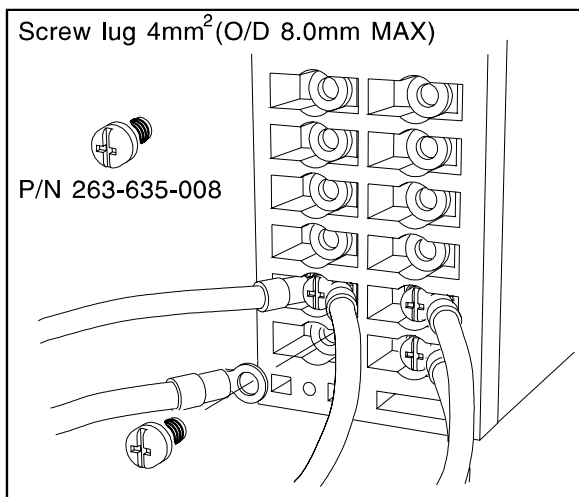
Voltage and current connections should be made using insulated crimp terminations to ensure that terminal block insulation requirements are maintained for safety. To ensure that wires are correctly terminated, the correct crimp terminal and tool for the wire size should be used.

Before energising the equipment it must be earthed using the protective earth terminal, or the appropriate termination of the supply plug in the case of plug connected equipment. Omitting or disconnecting the equipment earth may cause a safety hazard.

The recommended minimum earth wire size is 2.5mm², unless otherwise stated in the technical data section of the product documentation.

Before energising the equipment, the following should be checked:

1. Voltage rating and polarity;
2. CT circuit rating and integrity of connections;
3. Protective fuse rating;
4. Integrity of earth connection (where applicable)





Current Transformer Circuits

Do not open the secondary circuit of a live CT since the high voltage produced may be lethal to personnel and could damage insulation.

External Resistors

Where external resistors are fitted to relays, these may present a risk of electric shock or burns, if touched.

Insulation & Dielectric Strength Testing

Insulation testing may leave capacitors charged up to a hazardous voltage. At the end of each part of the test, the voltage should be gradually reduced to zero, to discharge capacitors, before the test leads are disconnected.

Insertion of Modules

These must not be inserted into or withdrawn from equipment whilst it is energised, since this may result in damage.

Electrical Adjustments

Pieces of equipment which require direct physical adjustments to their operating mechanism to change current or voltage settings, should have the electrical power removed before making the change, to avoid any risk of electric shock.

Mechanical Adjustments

The electrical power to the relay contacts should be removed before checking any mechanical settings, to avoid any risk of electric shock.

Draw Out Case Relays

Removal of the cover on equipment incorporating electromechanical operating elements, may expose hazardous live parts such as relay contacts.

Insertion & Withdrawal of Heavy Current Test Plugs

When using a heavy current test plug, CT shorting links must be in place before insertion or removal, to avoid potentially lethal voltages.



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Commissioning Preliminaries

Carefully examine the module and case to see that no damage has occurred during transit. Check that the relay serial number on the module, case and cover are identical, and that the model number and rating information are correct.

Carefully remove any elastic bands/packing fitting for transportation purposes.

Check that the external wiring is correct to the relevant relay diagram or scheme diagram. The relay diagram number appears inside the case.

Particular attention should be paid to the correct wiring and value of any external resistors indicated on the wiring diagram/relay rating information.

Note that shorting switches shown on the relay diagram are fitted internally across the relevant case terminals and close when the module is withdrawn. It is essential that such switches are fitted across all CT circuits.

If a test block system is to be employed, the connections should be checked to the scheme diagram, particularly that the supply connections are to the 'live' side of the test block.

Earthing

Ensure that the case earthing connection above the rear terminal block, is used to connect the relay to a local earth bar.

Insulation

The relay, and its associated wiring, may be insulation tested between:

- all electrically isolated circuits
- all circuits and earth

An electronic or brushless insulation tester should be used, having a dc voltage not exceeding 1000V. Accessible terminals of the same circuit should first be strapped together. Deliberate circuit earthing links, removed for the tests, subsequently must be replaced.



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Commissioning Tests

If the relay is wired through a test block it is recommended that all secondary injection tests should be carried out using this block.

Ensure that the main system current transformers are shorted before isolating the relay from the current transformers in preparation for secondary injection tests.

DANGER

DO NOT OPEN CIRCUIT THE SECONDARY CIRCUIT OF A CURRENT TRANSFORMER SINCE THE HIGH VOLTAGE PRODUCED MAY BE LETHAL AND COULD DAMAGE INSULATION.

It is assumed that the initial preliminary checks have been carried out.

Relay CT shorting switches

With the relay removed from its case, check electrically that the CT shorting switch is closed.

Primary injection testings

It is essential that primary injection testing is carried out to prove the correct polarity of current transformers.

Before commencing any primary injection testing it is essential to ensure that the circuit is dead, isolated from the remainder of the system and that only those earth connections associated with the primary test equipment are in position.

Decommissioning & Disposal

Decommissioning: The auxiliary supply circuit in the relay may include capacitors across the supply or to earth. To avoid electric shock or energy hazards, after completely isolating the supplies to the relay (both poles of any dc supply), the capacitors should be safely discharged via the external terminals prior to decommissioning.

Disposal: It is recommended that incineration and disposal to water courses is avoided. The product should be disposed of in a safe manner.

Maintenance

Mechanical Inspection

Relay Assembly

Inspect the relay for obvious signs of damage or ingress of moisture or other contamination.

Relay Module

Isolate the relay, remove the front cover & carefully withdraw the relay module from the case.

Care must be taken to avoid subjecting the relay element to static discharge which may damage or degrade sensitive electronic components.

Inspect the relay module for signs of any overheating or burn marks which may have been caused by overvoltage surge or transient conditions on the power supply or digital status inputs.

Inspect the VT & CT stages for degradation of insulation on the terminal wiring & transformer windings.



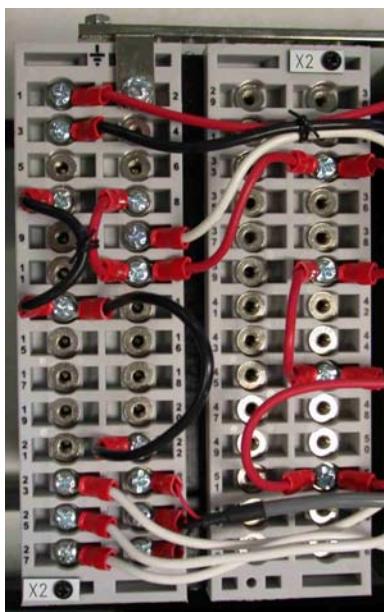
Remove cover by unscrewing black thumb screws & withdraw the relay module from the case.

Relay Case

Inspect the outer terminals checking insulation integrity & tightness.

Inspect inside the case and use a blower to remove dust.

Inspect the inner terminals for worn, distorted or tarnished contacts and if necessary clean the contacts using a brush dipped in a suitable substance.



Case outer terminals



Case inner terminals



Module plug in terminals

Test Intervals

The maintenance tests required will largely depend upon experience and site conditions, but as a general rule it is recommended that the following inspection and tests are performed every twelve months.

- ◆ Mechanical Inspection
- ◆ Check of Connections
- ◆ Insulation Resistance Test
- ◆ Fault Setting Tests by Secondary Injection
- ◆ Tests using Load Current
- ◆ Check the continuity of the neutral CT loop with a bell test set or an ohmmeter



Defect Report Form

Please copy this sheet and use it to report any defect which may occur.

Customers Name & Address:	Contact Name:
	Telephone No:
	Fax No:
Supplied by:	Date when installed:
Site:	Circuit:

When Defect Found

Date:	Commissioning?	Maintenance?	Systems Fault?	Other, Please State:
Product Part No:			Serial Number:	
Copy any message displayed by the relay:				
Describe Defect:				
Describe any other action taken:				
Signature:		Please Print Name:		Date:

For RMS use only

Date Received:	Contact Name:	Reference No:	Date Acknowledged:	Date of Reply:	Date Cleared:
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Australian Content

Unless otherwise stated the product(s) quoted are manufactured by RMS at our production facility in Melbourne Australia. Approximately 60% of our sales volume is derived from equipment manufactured in house with a local content close to 90%. Imported components such as semi-conductors are sourced from local suppliers & preference is given for reasonable stock holding to support our build requirements.

Quality Assurance

RMS holds NCSI (NATA Certification Services International), registration number 6869 for the certification of a quality assurance system to AS/NZS ISO9001-2008. Quality plans for all products involve 100% inspection and testing carried out before despatch. Further details on specific test plans, quality policy & procedures may be found in section A4 of the RMS product catalogue.

Product Packaging

Protection relays are supplied in secure individual packing cardboard boxes with moulded styrene inserts suitable for recycling. Each product & packing box is labeled with the product part number, customer name & order details.

Design References

The products & components produced by RMS are based on many years of field experience since Relays Pty Ltd was formed in 1955. A large population of equipment is in service throughout Australia, New Zealand, South Africa & South East Asia attesting to this fact. Specific product & customer reference sites may be provided on application.

Product Warranty

All utility grade protection & auxiliary relay products, unless otherwise stated, are warranted for a period of 24 months from shipment for materials & labour on a return to factory basis. Repair of products damaged through poor application or circumstances outside the product ratings will be carried out at the customer's expense.

Standard Conditions of Sale

Unless otherwise agreed RMS Standard Terms & Conditions (QF 907) shall apply to all sales. These are available on request or from our web site.



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