



BAT7001 V2 - Power Supply



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USER MANUAL

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Before You Begin

We would like to take a moment to thank you for purchasing the BAT7001 “Fault” driven Power Supply. To become completely familiar with this equipment and to ensure correct operation, we recommend that you take the time to read this user manual thoroughly.

CRN: 10152

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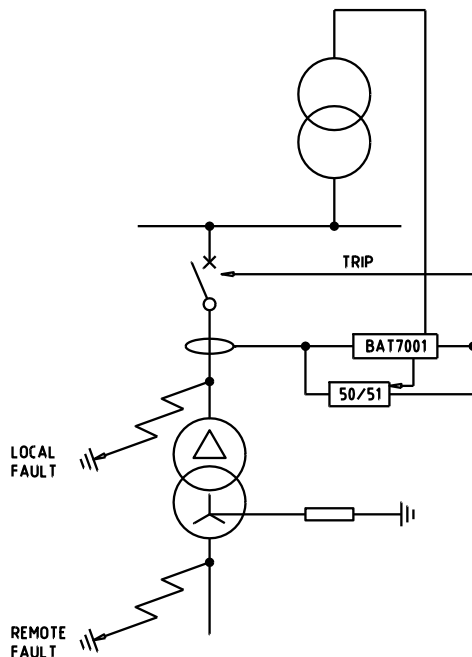
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1. Application



A source of auxiliary power is generally required in circuit breaker applications in order to:

1. Provide power to close and trip coils.
2. To allow protective relays to operate reliably.

In certain applications it may be uneconomic (remote installations) or contrary to safety regulations (eg. underground coal mines) to use a battery to provide auxiliary power.

It is not recommended to derive auxiliary power directly from the local AC supply. Under fault conditions this voltage may instantaneously fall to a level below which either the circuit breaker shunt trip coil or the protective relay may not operate correctly.

The BAT7001 Power Supply is designed to overcome these problems.

Under normal load conditions it uses the upstream voltage source to charge storage capacitors.

Under remote fault conditions the local voltage will be depressed, but the current can be expected to be greater than the rated current. This current is used by the BAT7001 Power Supply to supplement the available input voltage and so keep the capacitors charged.

For three phase faults in close proximity to the substation the substation bus voltage can fall to zero, however the current present at the BAT7001 Power Supply's inputs will be several multiples of rated current and is used to ensure that the capacitors remain fully charged.

It is not generally recommended to use the BAT7001 Power Supply without the presence of upstream voltage transformers. This is due to the fact that the BAT7001 Power Supply would not be charged up at the instant that the circuit breaker is closed.

If a "switch on to fault" condition occurs, without the BAT7001 Power Supply being supplied from an upstream VT, the available fault current would charge up the BAT7001 Power Supply, but only after a finite time period. This additional time delay in tripping the circuit may not be acceptable and is eliminated by the connection to an upstream voltage transformer.

Where applications without upstream voltage transformers are implemented the use of transistorised protective relays rather than microprocessor relays is preferred. This is because microprocessor relays generally undergo a start up routine upon power up and this may last several seconds.

2. Description

The BAT7001 Power Supply is designed to supply a DC voltage for the tripping of circuit breakers and/or power other protection devices.

The DC voltage is derived from a 110 VAC supply and three 1 or 5 amp Current

Transformers (to be specified) being used for protection purposes. See Schematic Drawing RELE002, Page 4.

The BAT7001 Power Supply provides two independent DC supplies. The main supply is 48VDC unregulated and is used for the trip supply of a circuit breaker. The auxiliary supply is a regulated 48VDC, 400mA supply and is suitable for the supply of protection relays.

The BAT7001 Power Supply is available in 1A or 5A units to suit the type of current transformer used in the installation.

The main output supply is automatically disconnected when the output voltage falls below an internally preset level of 25 volts and is restored when the voltage rises to the second internally preset level of 48 volts. **In the event that the circuit breaker does not open successfully on the first discharge the BAT7001 Power Supply automatically recharges and re-applies the trip supply to the circuit breaker until it opens.**

To enable the unit to be used in hazardous locations (such as underground coal mines) the output voltage is guaranteed to self discharge (even when no load is connected to the supply) following the removal of power from the unit. The output voltage typically falls to less than 3 volts after 2 minutes and less than 0.5 Volts after 4 minutes.

The BAT7001 Power Supply is housed in a standard aluminium flush mounted case (see Drawing RELA010, Page 5 for case details).

2.1 LED Indication

There are two LEDs mounted on the front plate.

Supply – green LED which flashes when an input is present (voltage or current or both).

Output – red LED that flashes when the main output DC voltage is healthy.

3. Commissioning

The following steps must be followed to ensure the correct operation of the BAT 7001 Power Supply:

1. It is essential that the electric circuit to the circuit breaker trip coil is wired through a normally open (N/O) circuit breaker auxiliary contact. This will ensure that the trip circuit is broken as the circuit breaker opens and therefore prevent the BAT 7001 Power Supply from attempting unnecessary re-strikes on the trip coil.

Breaking the trip circuit with the auxiliary contact is the usual practice however it is essential in the case where the protection relay latches its output tripping contact.

2. Check the 110VAC supply on terminals 11 and 12.
3. Insert the BAT 7001 Power Supply into the panel and tighten the slotted holding screws.
4. Apply power and check that the output voltage between terminals 7 (+ve) and 8 (-ve) is approximately 50VDC.

Check that the output voltage between terminals 10 (+ve) and 9 (-ve) is 48V DC.

5. Simulate a trip condition by operating the protection relay or by bridging its output tripping contact. The circuit breaker should trip immediately.

4. Equipment List

- 144341 BAT7001 Version 2 - 1A Power Supply
- 144340 BAT7001 Version 2 - 5A Power Supply
- 144344 BAT7001 Version 2 - Power Supply User Manual
-

5. Specifications

Inputs

Rated Current	In = 5A 20VA burden at rated current
	In = 1A 20VA burden at rated current
Rated Voltage	Vn = 110 VAC Burden 20VA at rated voltage (Iac = 0)
CT Requirements	In = 5A, 10P25F20 In = 1A, 10P50F20 (not including overcurrent/earth fault relays and wiring impedances)
	Example of Designation System 10 P 50 F20 Where: 10 = 10% Composite Error P = Class 50 = Secondary Voltage F20 = Accuracy Limit Factor

Outputs

Main	Voltage Range 48VDC 13000 microfarad capacitor
Auxiliary	48VDC, 400mA
Typical Trip Coil Burden	< 300 watts

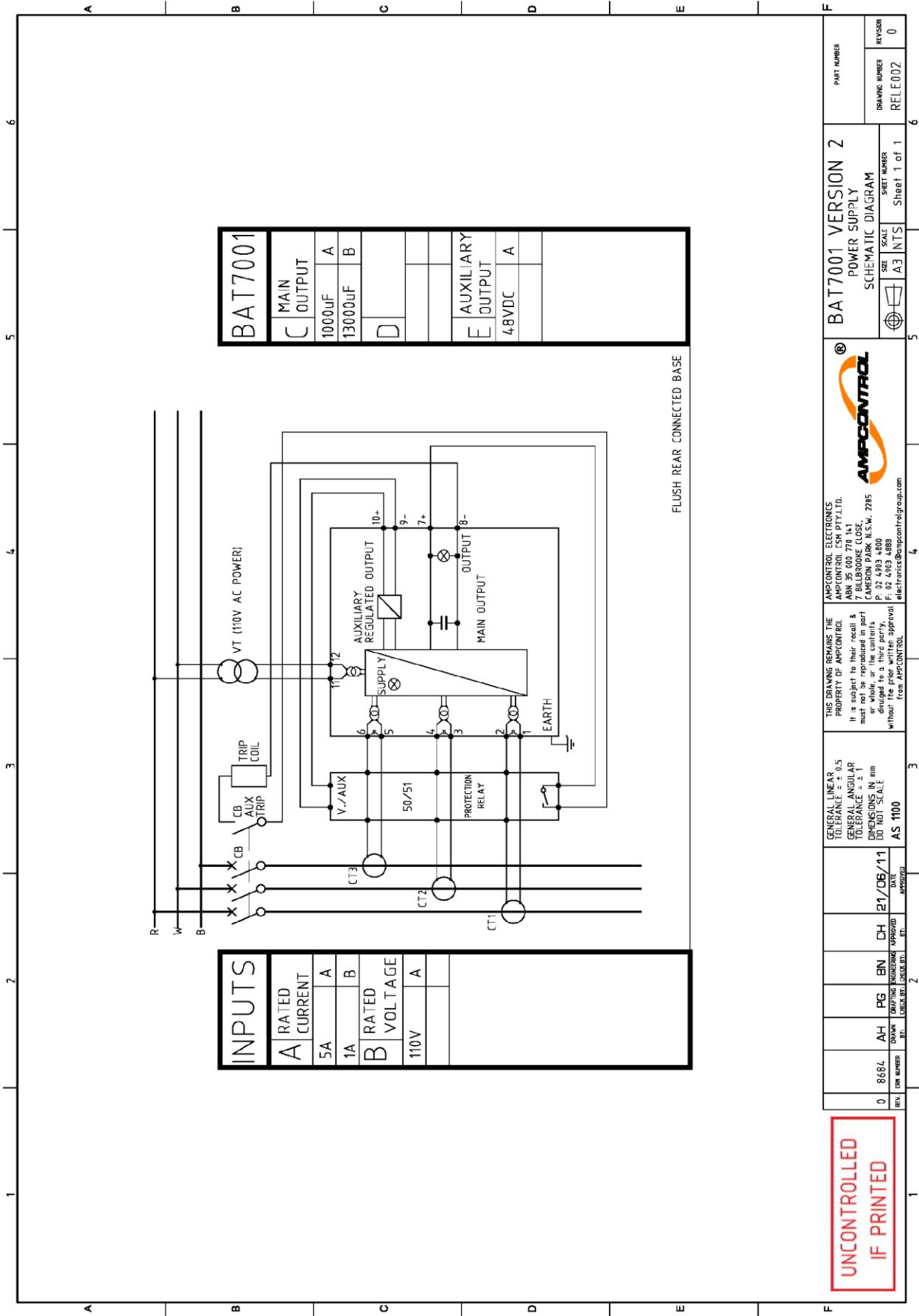
Discharge Time

<3V after 2 minutes, <0.5V after 4 minutes

LED Indication

Supply	Green LED flashes when input is present
Output	Red LED flashes when main voltage output is healthy

BAT7001 Version 2 USER MANUAL ISSUE 1



BAT7001	
C MAIN OUTPUT	
1000µF	A
13000µF	B
	D
E AUXILIARY OUTPUT	
48VDC	A

INPUTS	
A RATED CURRENT	
5A	A
1A	B
B RATED VOLTAGE	
110V	A

BAT7001 VERSION 2

POWER SUPPLY

SCHEMATIC DIAGRAM

SIZE: A3 INTS
SHEET NUMBER: Sheet 1 of 1

PART NUMBER: RELE002
REVISION: 0

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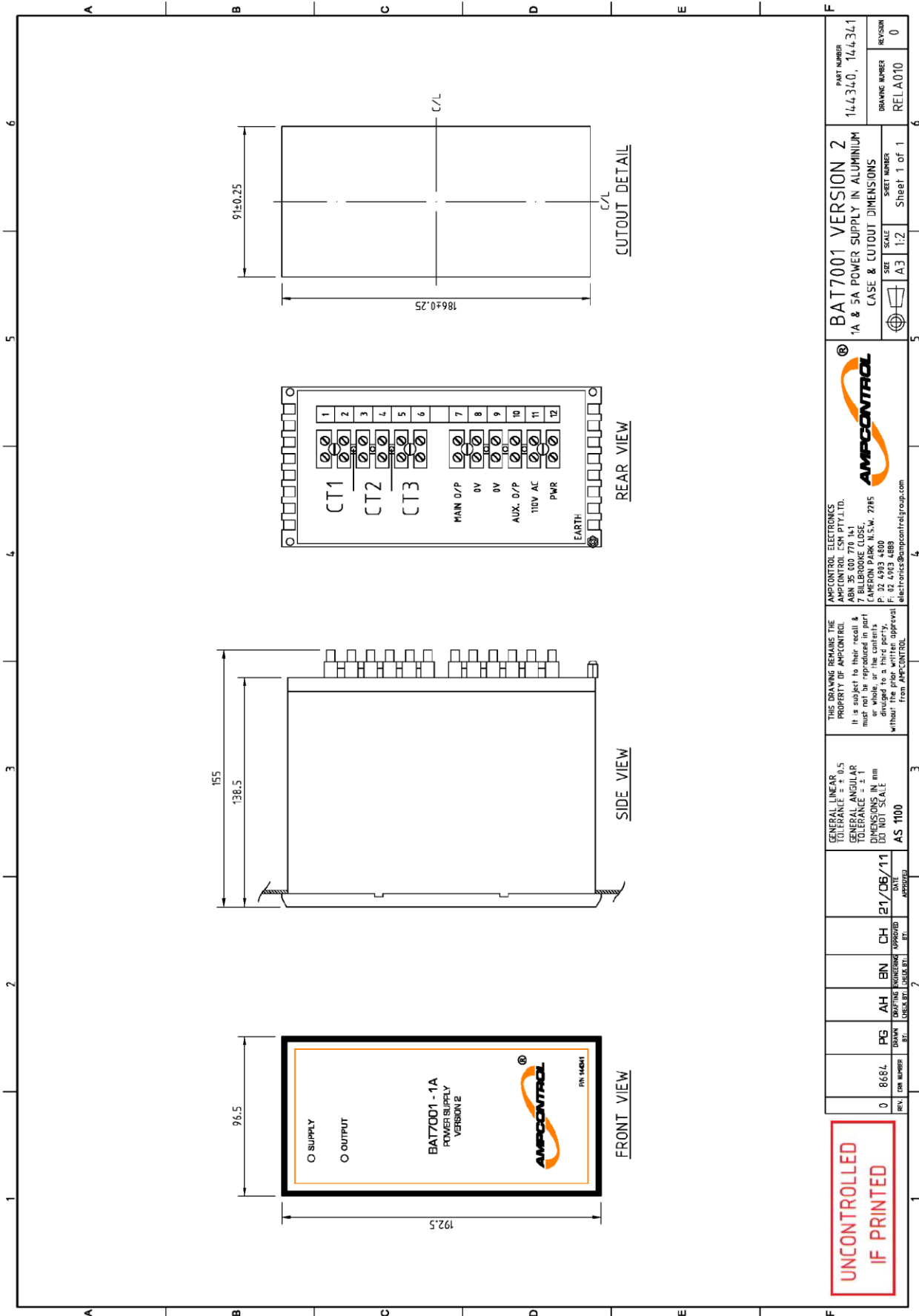
GENERAL LINEAR TOLERANCE = ± 0.5
 GENERAL ANGULAR TOLERANCE = 1°
 DIMENSIONS IN mm
 DO NOT SCALE

AS 100

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GENERAL LINEAR TOLERANCE 0.5
 GENERAL ANGULAR TOLERANCE ± 1
 DIMENSIONS IN mm DO NOT SCALE
 AS 1100

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BAT7001 VERSION 2
 1A & 5A POWER SUPPLY IN ALUMINIUM CASE & CUTOUT DIMENSIONS

SIZE	A3	SCALE	1:2	SHEET NUMBER	Sheet 1 of 1
DRAWING NUMBER	REL A010	REVISION	0	PART NUMBER	144340, 144341