

## Load shed, demand staging LS-\*\*1\*\*CX (2274C)

### Four circuit 100 Amp stand alone load shedding system

The main installation/hookup drawing represents the generic transfer switch and standby generator. As an ideal or desired feature, this assumes the ATS has a field usable contact closure representing the status of the device.

The following paragraphs are in reference to the various control points, connections, and description relating to this generic system main hookup drawing (LH403-1). This does not show the load shed contactors and line voltage wiring for the loads or sub-panels.

- A. Automatic Transfer Switch (ATS), the ATS logic interface and ground/bonding to the GEN is not shown.
- B. Standby generator (GEN), logic and/or connections between GEN and ATS are not shown, that information relates to the manufacturers of either or both devices.
- C. Load shed demand staging controller (2274C) and field hookup points.
- D. ATS internal status dry contact, closed contact when the ATS device determines the utility has returned. This UT OK contact is open with loss of utility.

*The load shed controller, upper right, plug-in terminal block needs to receive the two wires from the ATS dry contact.*

*If the ATS status output has a logic 12VDC or 24VAC output, connect one wire to the “-” terminal.*

- E. 12VDC power source for the load shed, demand staging controller (2274C). Connection polarity must be observed and correct.

*It is assumed the 12V battery has a trickle charger active during non-outage. This battery is the 10-14VAC source to the load shed, demand staging, control board at all times (see G). The standby requirement is less than 0.2 amps..*

- F. It is assumed the battery negative terminal is the same as the bonded ground connections within the system. The 12VDC “-” terminal is the common bonding point for the controller.

G. See separate installation paragraph on CT's and the GEN power wires. Extend each CT's two wires to the appropriate control board terminal block. For each CT polarity is not required; however, they must be “floating”, all wires must be connected as shown, do not tie any wires together. With 18-gauge wire, up to 20 feet is no problem. However, to reduce EMF coupling, these CT wires should be twisted pair and must be separated from any high voltage wires (especially the generator power wires) or cabling (at least 12” separation).

- H. Status LED for the load shed, demand staging operations:

- On solid = normal non-outage, UT OK is HI, GEN CT amps = 0
- 1 blink every 2 seconds = doing delay between stage step (typically 15 sec). This has precedence over all others.
- 2 blinks every 2 seconds = UT OK is LO and GEN CT amps = 0
- 3 blinks every 2 seconds = UT OK is LO and GEN CT amps > 5 amps

- I. Air conditioner or heat pump compressor control wire (typically Y) is routed through these two tabs. During stage 1 shed this low voltage or control wire is opened.

- The setup question “shedding AC/HP” must be answered “yes”.
- The “AC/HP amps” value must be onsite measured and entered.

**Special attention** - when using these control interrupt points, stage 1 main contactor can also be used. Stage 1 internal interrupt value is the sum of the measured AC/HP amps and stage 1 entered contactor amps.

- J. This REV C controller has provisions for a second AC/HP control. Basically it is identical to I above, except it is tied to stage 2 load shed. The same AC/HP measured amps value, summed with stage 2 entered amps value, etc. applies.

K. Control board interface connection point used to connect an LCD interface module. A LCD interface module is required to configure this device for use.

**Comments:** If these AC/HP low voltage or Class 2 contacts are not used, make sure the setup is entered “NO”.

**AC/HP blue LED:** The LED is illuminated when there is a non-staging interrupt. Within the logic design, there is a 3-minute ACD thus the interrupt contact (represented by these tabs) will be open during power-on start-up and/or at the end of the AC/HP thermostat call.

## Options

**DD-** When the UT OK status dry contact output is not available, a connection to the “live” utility service wires with a 240VAC relay coil can be used. Fusing is required, one side of the fuse will always be hot utility. As shown, the NO relay contacts are connected to the UT OK TB.

## PSP Load Shed, CT Demand – Definitions (2274C)

**UT OK** – high input (or contact closed) and assumes utility has returned and solid. Low input is outage.

**Outage, UT OK goes low** – 5-second debounce seems long enough. All stages go to off at the end of 5 sec. It is assumed GEN PWR will not go high in the 5 seconds. Anytime the UT OK returns to high, start the Outage Transfer Delay sequence.

**Outage Transfer Delay** – PC setup, 1-45 minutes. This starts when UT OK goes high. All stage contactors are opened. At delay end stage step in begins.

**UT OK is priority** – at the end of Outage Transfer Delay, all outputs will step in, CT current is no longer monitored.

Thus this product is not for manual transfer applications.

**Non-manual transfer switch application** – standby generator or its breaker must be off before the Outage Transfer Delay is run out.

**Standby generator test** – no Hot test allowed (ATS must stay in UT → LOAD position).

**Target** = kW (PC entry) x 1000/240

**Shed, step down stages** – CT current level, 2-second over target decision, highest stage. Next CT current decision (2 seconds) – if 20% over target also drop the next highest stage.

**AC/HP low voltage shed** – one function or relay tied directly to shed stage 1, the second function or relay tied directly to shed stage 2. Also see PC Setup.

**Detecting generator connection/power** – with this REV C and V6.0\*, the CT is used to detect generator function, power available. This is a direct sequence function when the UT OK contact opens. After the UT OK opens (+5 seconds) if the CT does not detect generator power greater than 5 amps, all shed stage contactors remain open.

When the UT OK dry contact is closed, the generator CT is ignored, all shed contacts are opened, and the Outage Transfer Delay is started. At the end of this PC setup time, the logic must assume utility is solid and the ATS has removed the generator from the load. Thus the load shed contactors step in and will be closed as long as UT OK dry contact is closed.

**Hardware/software logic** – each unique product model number (type and sizing) must relate to specific chip code and board hardware arrangement.

**Logic transitions** – except for real time generator current (CT amps) going up and down, where possible do not cause a function change when the status LED is doing a 1 count or blink.

## PSP Load Shed, demand staging 2274C V6.01

### DECAL

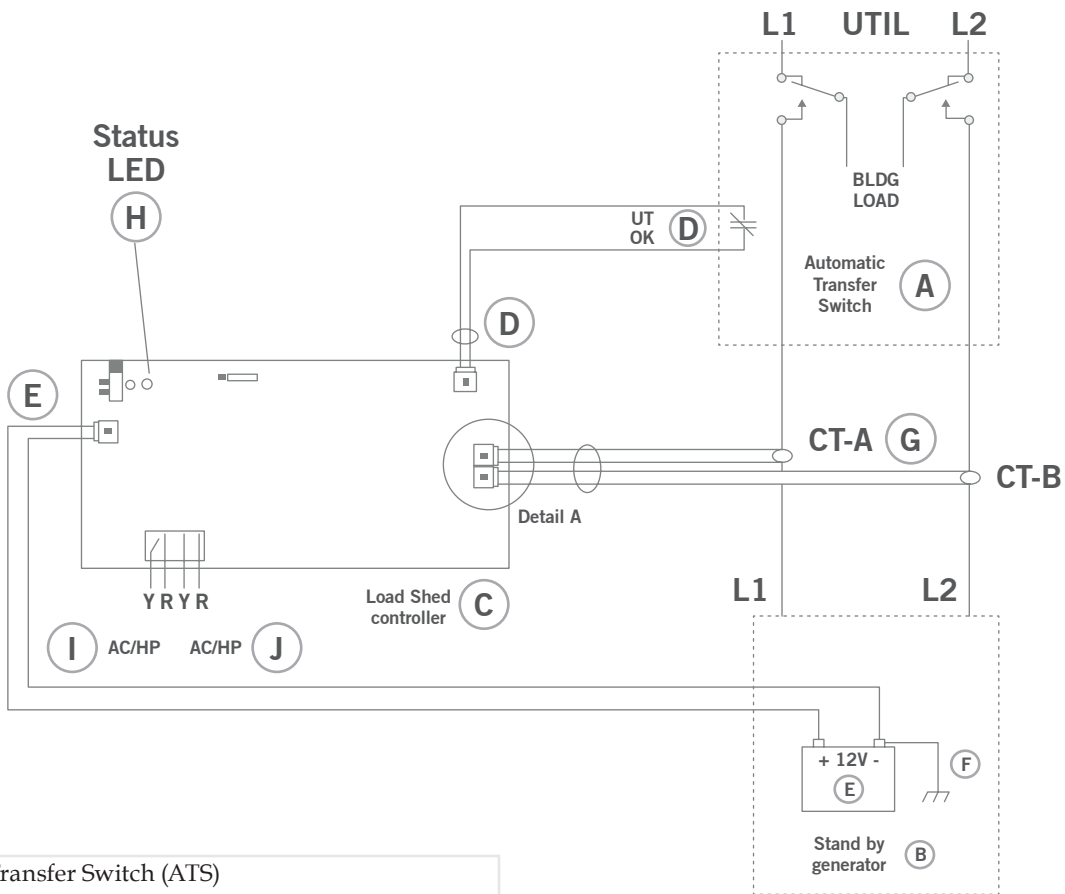
#### Status LED - Yellow Status LED 1:

On solid = normal non-outage, UT OK is HI, GEN CT Amps = 0

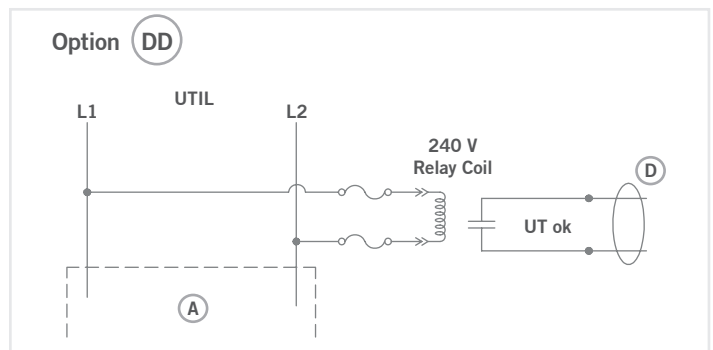
1 blink every 2 seconds = doing delay between stage step (typically 15 sec). This has precedence over all others

2 blinks every 2 seconds = UT OK and GEN CT Amps = 0

3 blinks every 2 seconds = UT OK and GEN CT Amps > 5 Amps

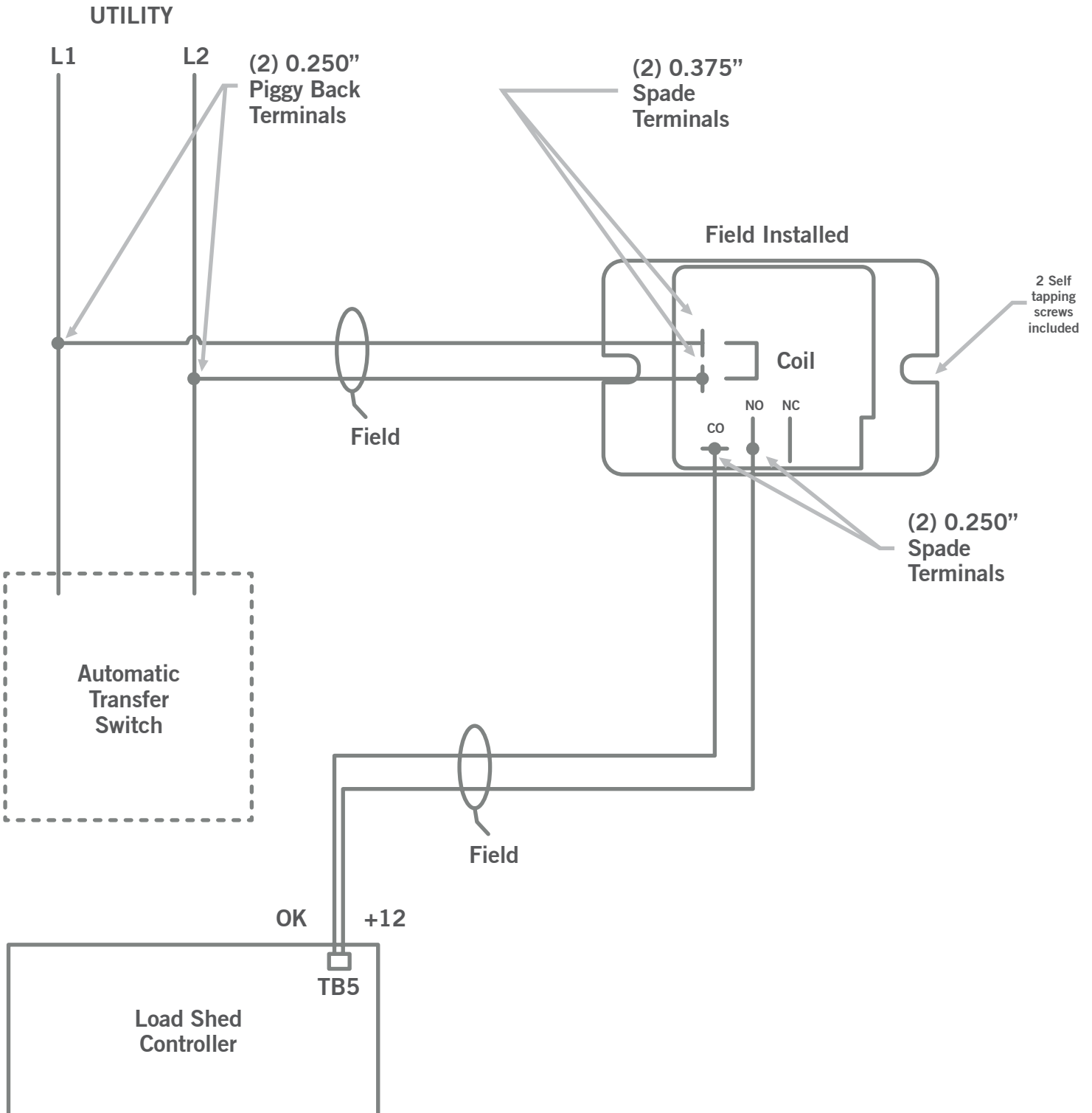


- A Automatic Transfer Switch (ATS)
- B Standby Generator (GEN)
- C Load Shed Controller
- D UT OK Status
- E 12 VDC Battery
- F BAT. NEG. Ground
- G CT's for GEN Power
- H Status LED - see DECAL
- I AC/HP - 1
- J AC/HP - 2
- DD 'Live' Util Service Relay
- EE ES-202\*\*



## Model number: LS-RLY-KIT

### Utility Monitor Isolation Relay Kit



## Model – SELSD2277 Programming Tool

### Programming Procedure

#### Shedding AC-1 or HP-1

Select 'Yes' or 'No'.

**If 'Yes' is selected:**

'AC-1 or HP-1 Amps' is added to 'Stage 1 Load' amps when determining the state of Stage 1 output.

**If 'No' is selected:**

'AC-1 or HP-1 Amps' is NOT added to 'Stage 1 Load' amps and K1 is kept ON (relay contacts open).

The above relates only when the utility input is NOT active.

#### Shedding AC-2 or HP-2

Select 'Yes' or 'No'.

**If 'Yes' is selected:**

'AC-2 or HP-2 Amps' is added to 'Stage 2 Load' amps when determining the state of Stage 2 output.

**If 'No' is selected:**

'AC-2 or HP-2 Amps' is NOT added to 'Stage 2 Load' amps and K2 is kept ON (relay contacts open).

The above relates only when the utility input is NOT active.

#### Outage Transfer Return Delay

Enter a value in the range of 1 to 45 minutes.

Once the UT OK input (J1-2) goes from LO to HI, a timer is loaded with this value and started.

The utility input must remain HI during this time.

When the timer expires, the relays return to normal utility mode.

#### Generator kW Running Rating

Enter the kW rating of the generator.

The value must be in the range of 1 to 100 kW.

This is used by the program to calculate the target current.

The target current is used to determine the closing or opening of the load shed contactors.

#### AC-1 or HP-1 Amps

Enter the run current of any AC or HP unit connected to the NC relay contacts labeled '#1' on the board.

The value entered must be in the range of 0 to 60 amps.

If the 'Shedding AC-1 or HP-1' selection is set to 'Yes' this value will be added to 'Stage 1 Load' amps when determining the state of Stage 1 output.

If the 'Shedding AC-1 or HP-1' selection is set to 'No' this value is NOT used.

K1 will be kept ON (relay contacts open).

#### AC-2 or HP-2 Amps

Enter the run current of any AC or HP unit connected to the NC relay contacts labeled '#2' on the board.

The value entered must be in the range of 0 to 60 amps.

If the 'Shedding AC-2 or HP-2' selection is set to 'Yes' this value will be added to 'Stage 2 Load' amps when determining the state of Stage 2 output.

If the 'Shedding AC-2 or HP-2' selection is set to 'No' this value is NOT used.

K2 will be kept ON (relay contacts open).

#### Stage 1, 2, 3 and 4 Load

Enter the run current of each load.

The value for stages 1, 2, 3 and 4 must be in the range of 1 to 100 amps.

**If the 'Shedding AC-1 or HP-1' selection is set to 'Yes':**

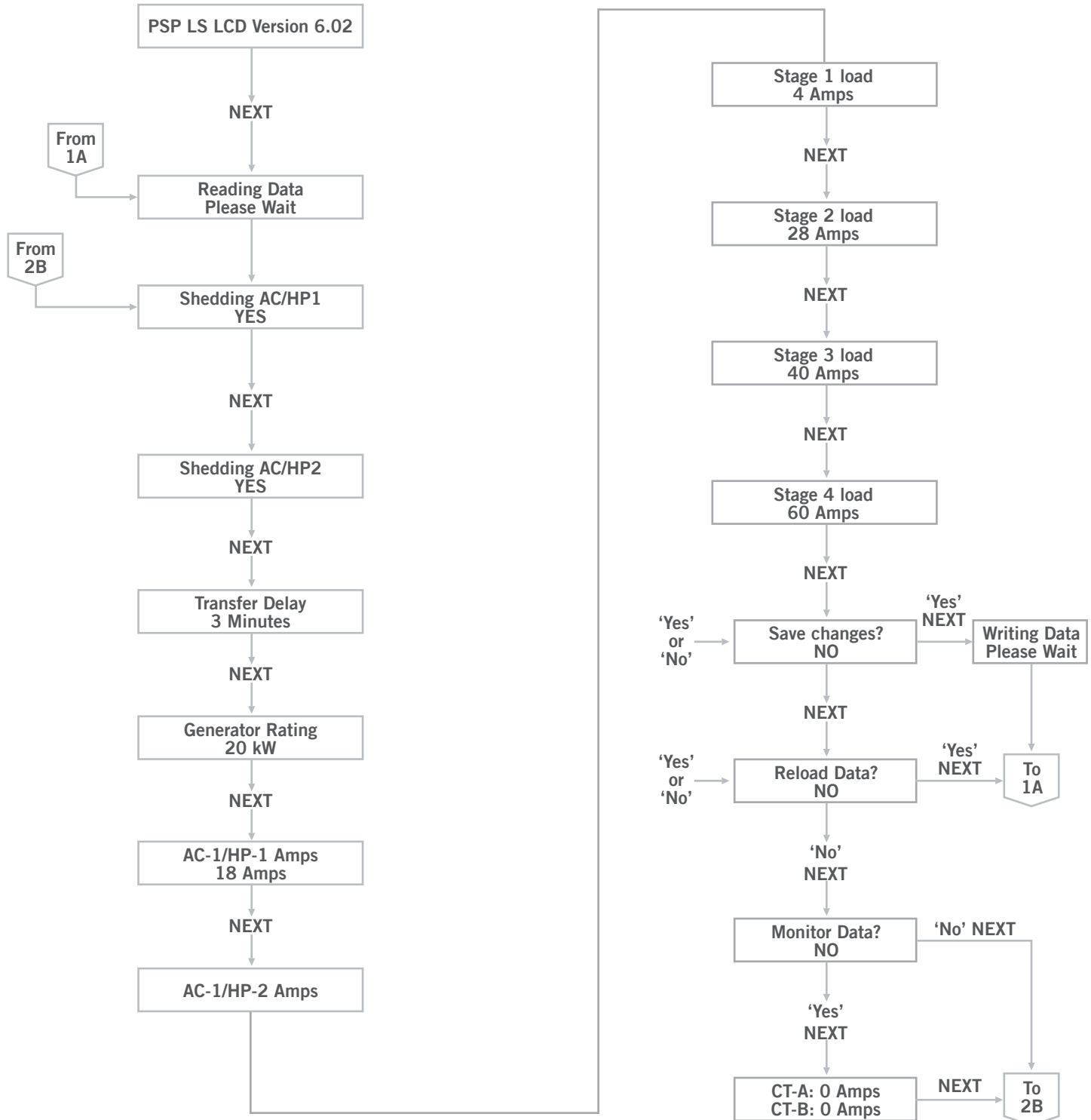
The value entered for 'AC-1 or HP-1 Amps' is added to Stage 1 Load amps to determine the state of Stage 1 output.

**If the 'Shedding AC-2 or HP-2' selection is set to 'Yes':**

The value entered for 'AC-2 or HP-2 Amps' is added to Stage 2 Load amps to determine the state of Stage 2 output.

## PSP Load Shed LCD Module

### V6.02 Program Flo-Chart

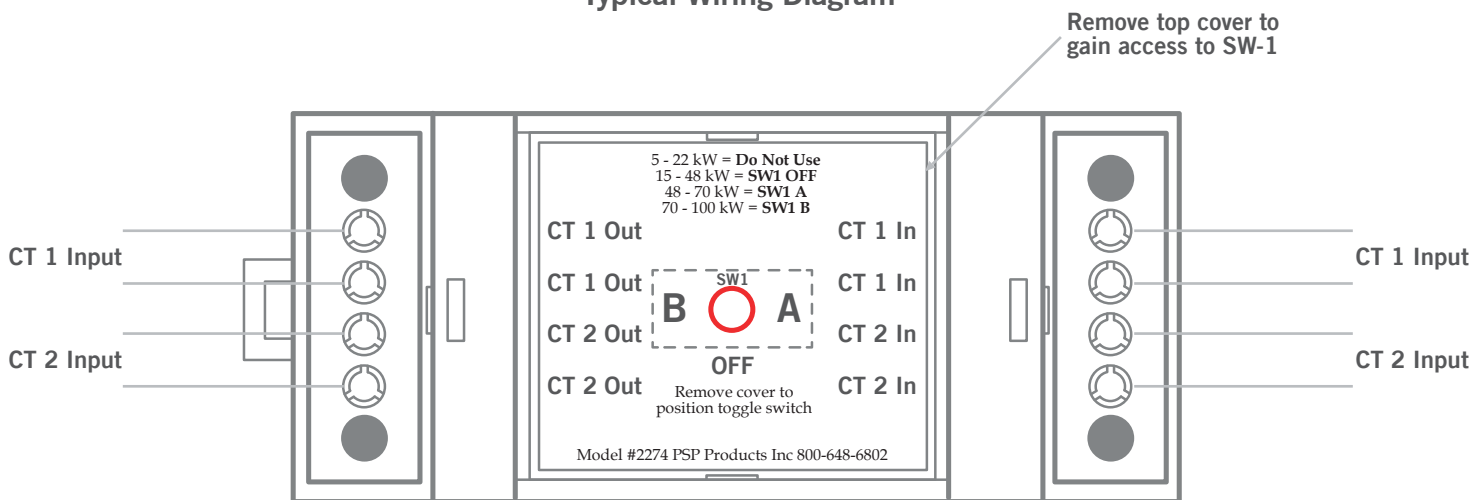


## CT Adaptor Module For 22KW Generator and Above ONLY

### Model-2274: CT Adaptor Module

For use with the LS101X (2,3,4) CX Series load shedding controllers for generator installations from 24 KW to 100 KW (not required for generators 22 KW or less)

Typical Wiring Diagram



**Important:** J-12 & J13 jumpers need to be adjusted as necessary per the chart below for accurate load shedding and reading on the CT

### SW-1, J12 & J13 Termination Chart

Load Shed 5-22 KW Settings 2274 CT Adaptor = NOT USED J-12 = CLOSED J13 = CLOSED

Load Shed 23-48 KW Settings 2274 CT Adaptor SW1 = OFF J-12 = OPEN J13 = CLOSED

Load Shed 48-70 KW Settings 2274 CT Adaptor SW1 = A J-12 = CLOSED J13 = OPEN

Load Shed 70-100 KW Settings 2274 CT Adaptor SW1 = B J-12 = OPEN J13 = OPEN



**Important:** Risk of electrical shock. This device should only be installed by qualified personnel.

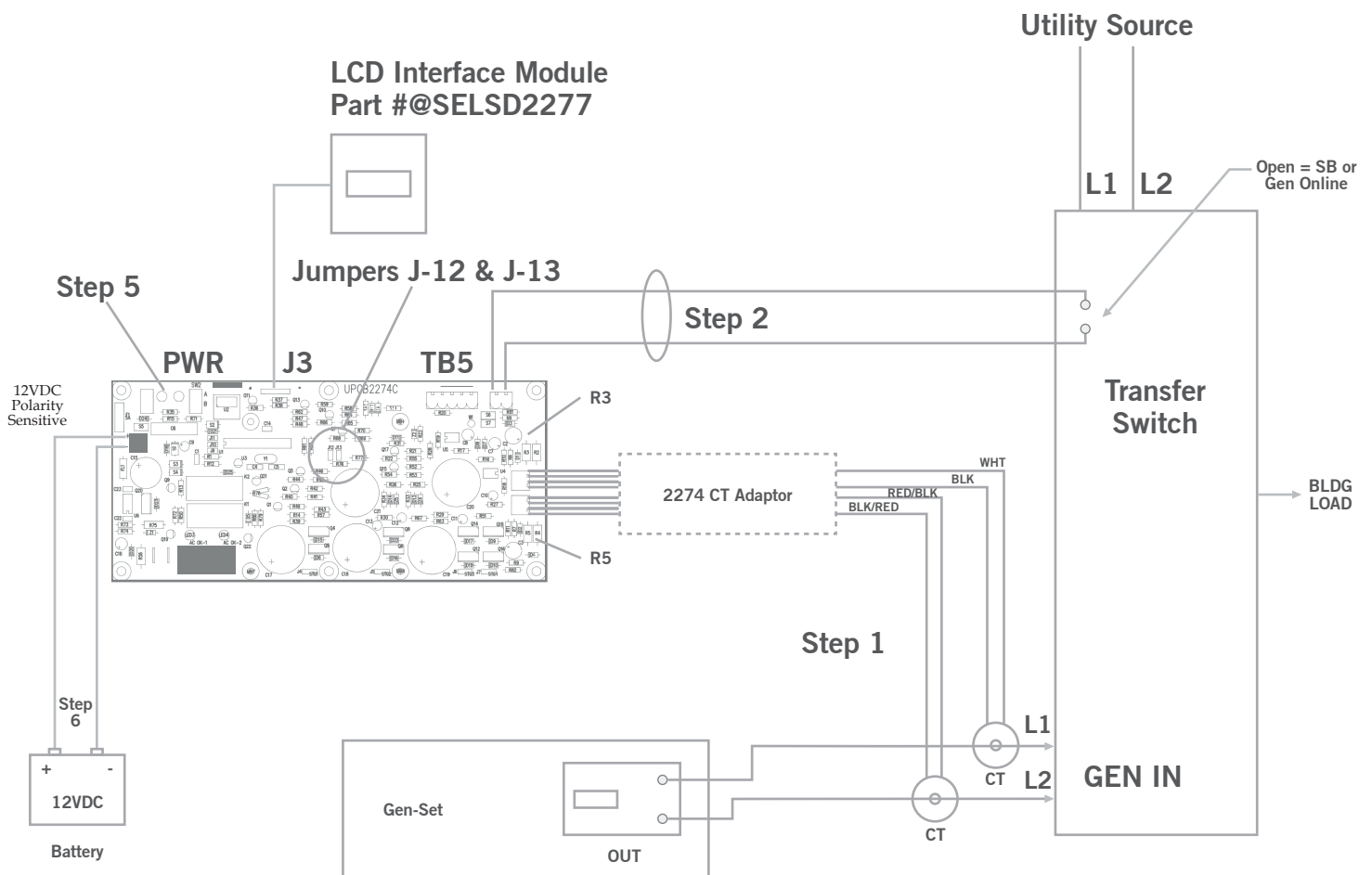
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Load Shed 70-100 KW Settings 2274 CT Adaptor SW1 = B J-12 = OPEN J13 = OPEN



NOTE: Resistors URES1703, RES 100 OHM 3W 1%