

# Installation Examples using MidNite Solar Rapid shut down equipment in a battery based environment



(360) 403-7207



# Rapid Shut Down NEC 2014 690.12

## What is it and Why?



- 690.12 was driven by fire fighters for Fire Fighter safety
- NEC 690.12: Rapid shutdown of PV systems on buildings
- Anything within 10ft of the array does not have to be controlled.
- Anything outside the 10ft mark **MUST** be controlled
- Controlled conductors must drop to 30 volts or less
- Must react in 10 seconds or less (It looks like 2014 will be amended to 30 seconds or less)
- May or May not apply to batteries (Some consider the 5ft inside a building as battery cables)

# The Initiator

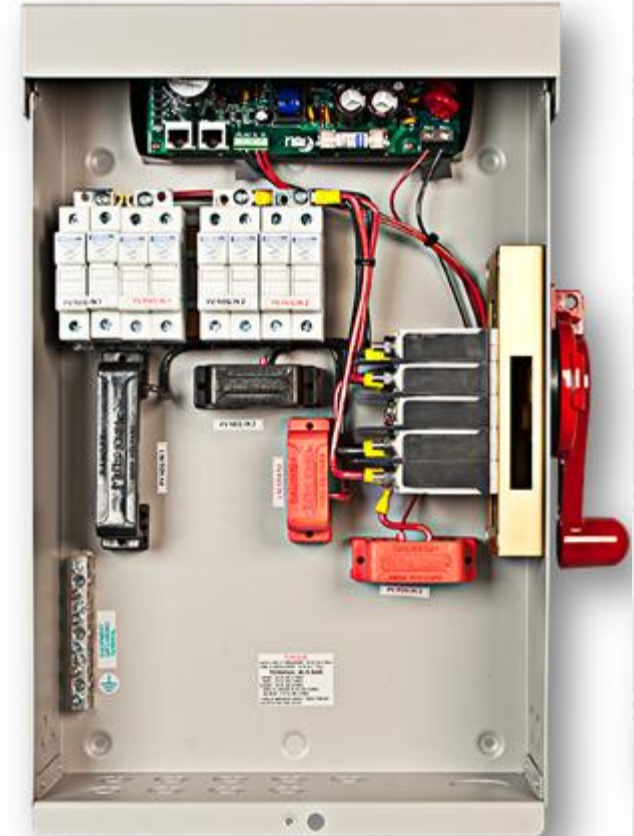
## “The Bird House”

- Up to 4 of the bird houses on a system
- Hardwired with 600v 8 conductor cable following the cat5 pin out
- Available in Red or Grey
- Positive Feedback ensures emergency responders safety
- Dry contacts to trigger a fire alarm or shut down battery based inverters etc.



# Initiated devices

- Must be within 10ft of the array!
- Available in 3R and 4X
- Combiners up to 16 strings
- Pass through boxes for dual channel MPPT
- Models for grounded and ungrounded as well as convertible models
- Full range of models for virtually any installation from grid tied to off grid
- All parts included, Strain reliefs, Hole plugs, etc



# Remote Trip breakers



- Available in multiple amperages
- Available in AC or DC
- Available up to 600 volts DC
- Warning, When NOT using a –PSB you must use the MNFX-CABLE



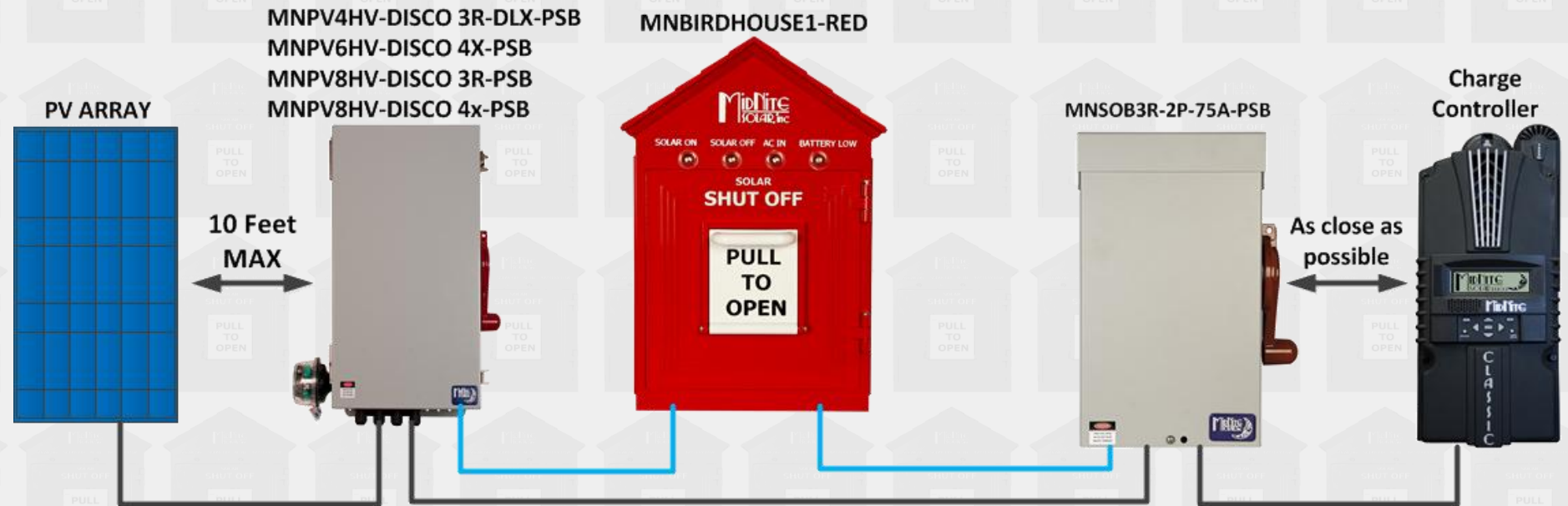
# Example 1

## “Off Grid with single Charge Controller”

- Single Inverter (Magnum 4448PAE)
- Single Classic 150 (can be any charge controller that is 600 volts or less)
- Example 1A will show disabling JUST the PV
- Example 1B will show disabling PV and AC



# Example 1A, Disabling the PV only, Flow diagram



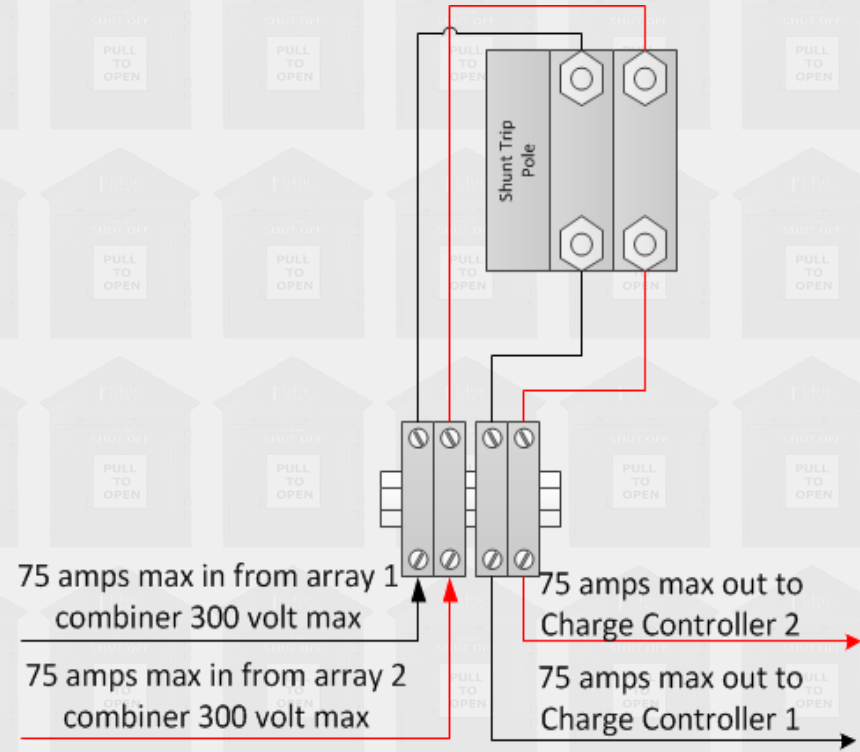
B.O.M.

- 1pc MNBIRDHOUSE1 Red or Grey
- 1pc MNPV4HV-DISCO 3R-DLX-PSB or MNPV6HV-DISCO 4X-PSB or MNPV8HV-DISCO 3R-PSB or MNPV8-DISCO 4x-PSB depending on number of strings
- 1pc MNSOB3R-2P-75A-PSB
- 1pc MNSBB-W
- xxx feet of MNCAT5-600



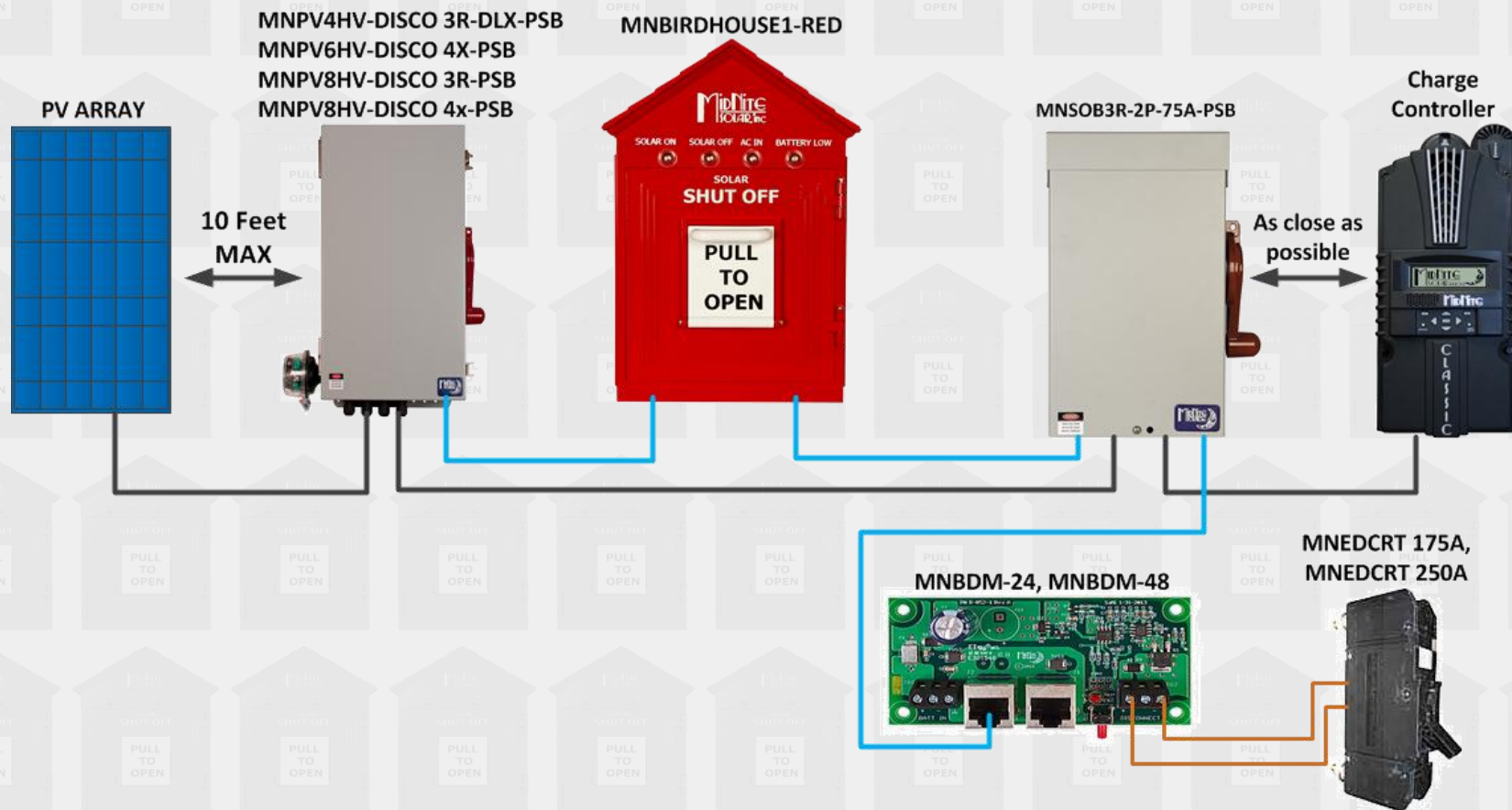
# Example 1A, Disabling the PV only, Schematic

- Allows for 2 positive circuits that are isolated
- Max of 300 volts per circuit
- Max of 75 amps per circuit
- Load break rated
- Can be used for a single 600 volt grounded or ungrounded charge controller (See slides at the end)





# Example 1B, Disabling the PV and AC, Flow diagram



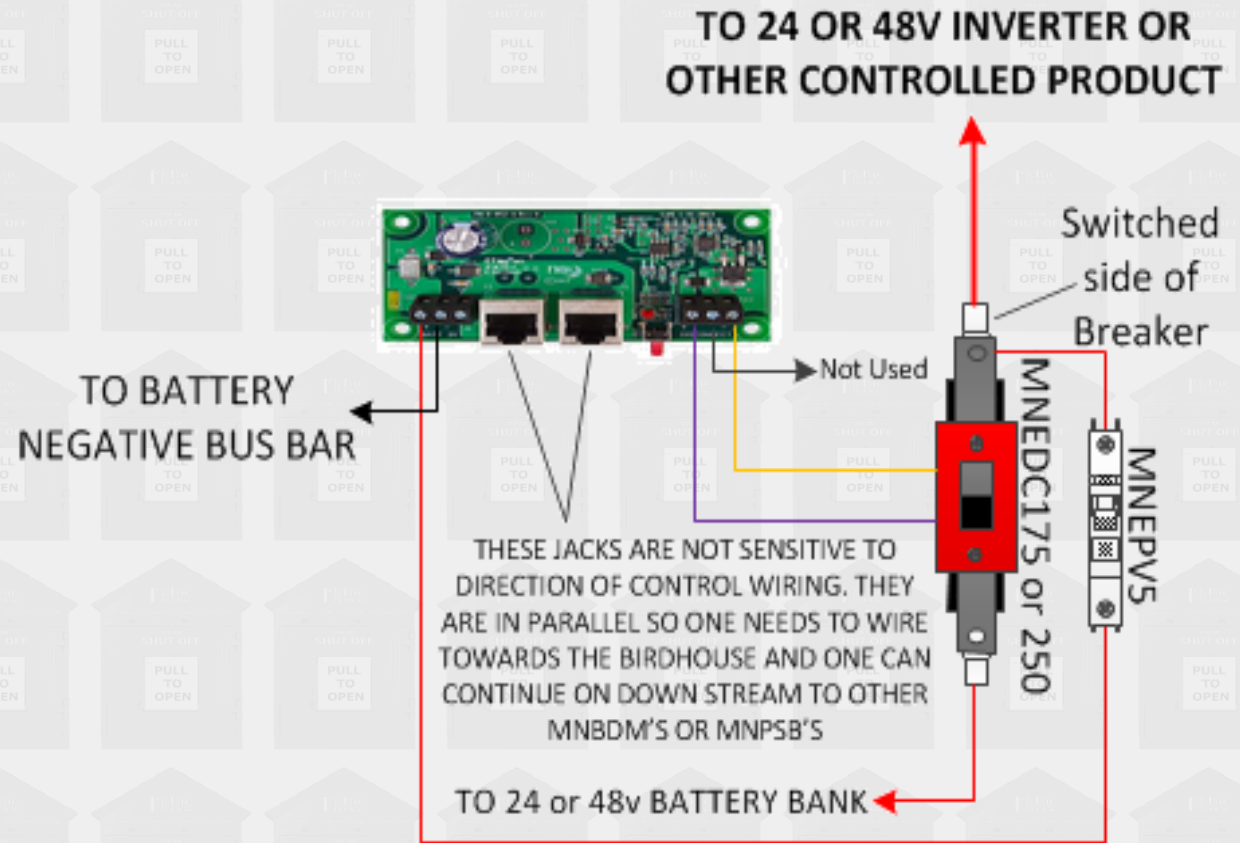
## B.O.M.

- 1pc MNBIRDHOUSE1 Red or Grey
- 1pc MNPV4HV-DISCO 3R-DLX-PSB or MNPV6HV-DISCO 4X-PSB or MNPV8HV-DISCO 3R-PSB or MNPV8-DISCO 4x-PSB depending on number of strings
- 1pc MNSOB3R-2P-75A-PSB
- 1pc MNSBB-W
- 1pc MNBDM
- 1pc MNEDCRT-175A or MNEDCRT-250A
- 1pc MNEPV5
- xxx feet of MNCAT5-600



# Example 1B, Disabling Battery based Inverter breaker. (AC power)

- Jacks are not polarity sensitive
- Must get DC from switched side of breaker
- RT wires are not polarized



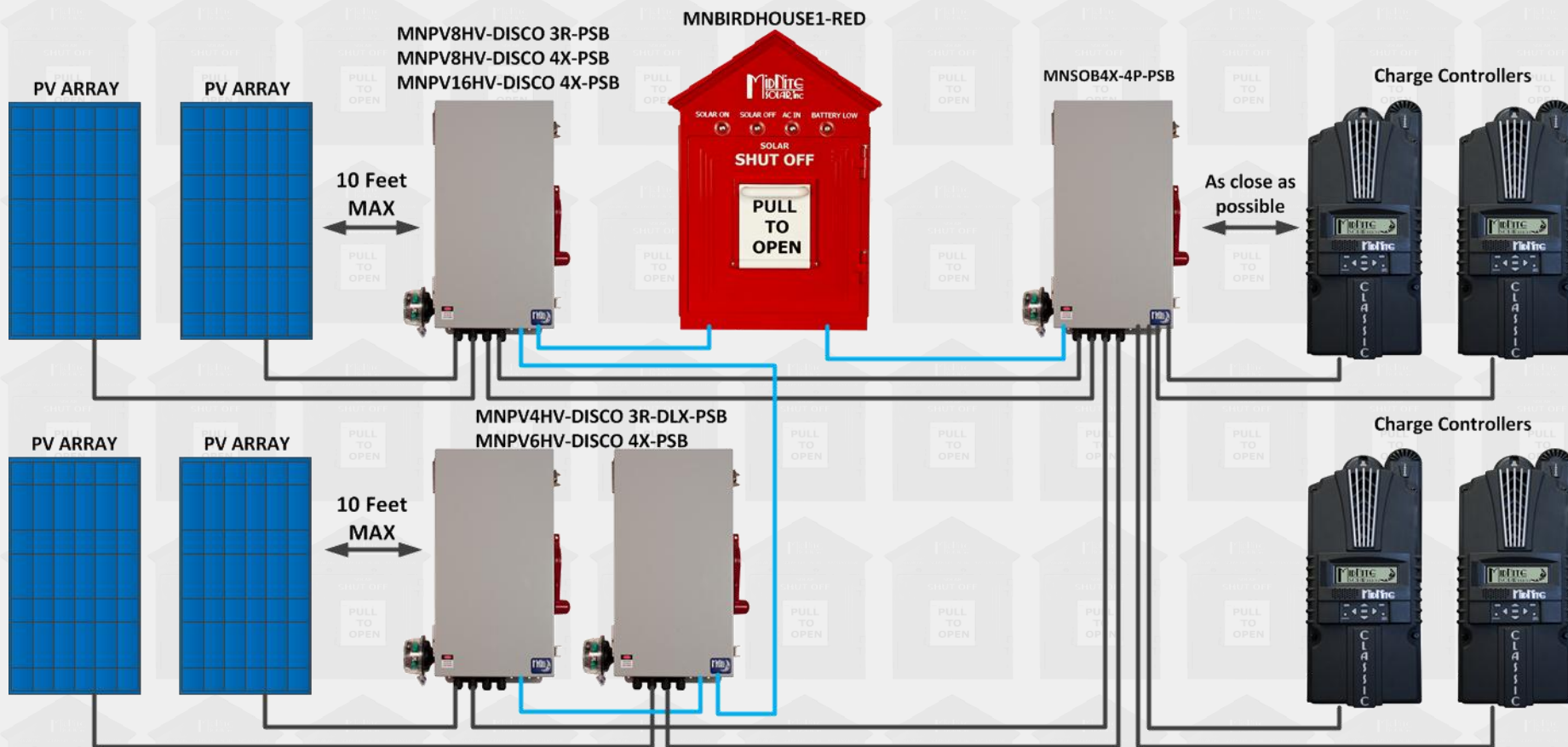
## Example 2

# “Off Grid or Battery based grid tie with 4 Charge Controllers”

- Dual Inverters, XW Plus 6848's
- 4 Classic 150s (Could be any Charger that is 600 volts or less)
- Example 2A will show disabling JUST the PV
- Example 2B will show disabling PV and AC



# Example 2A, Disabling the PV only, Flow diagram

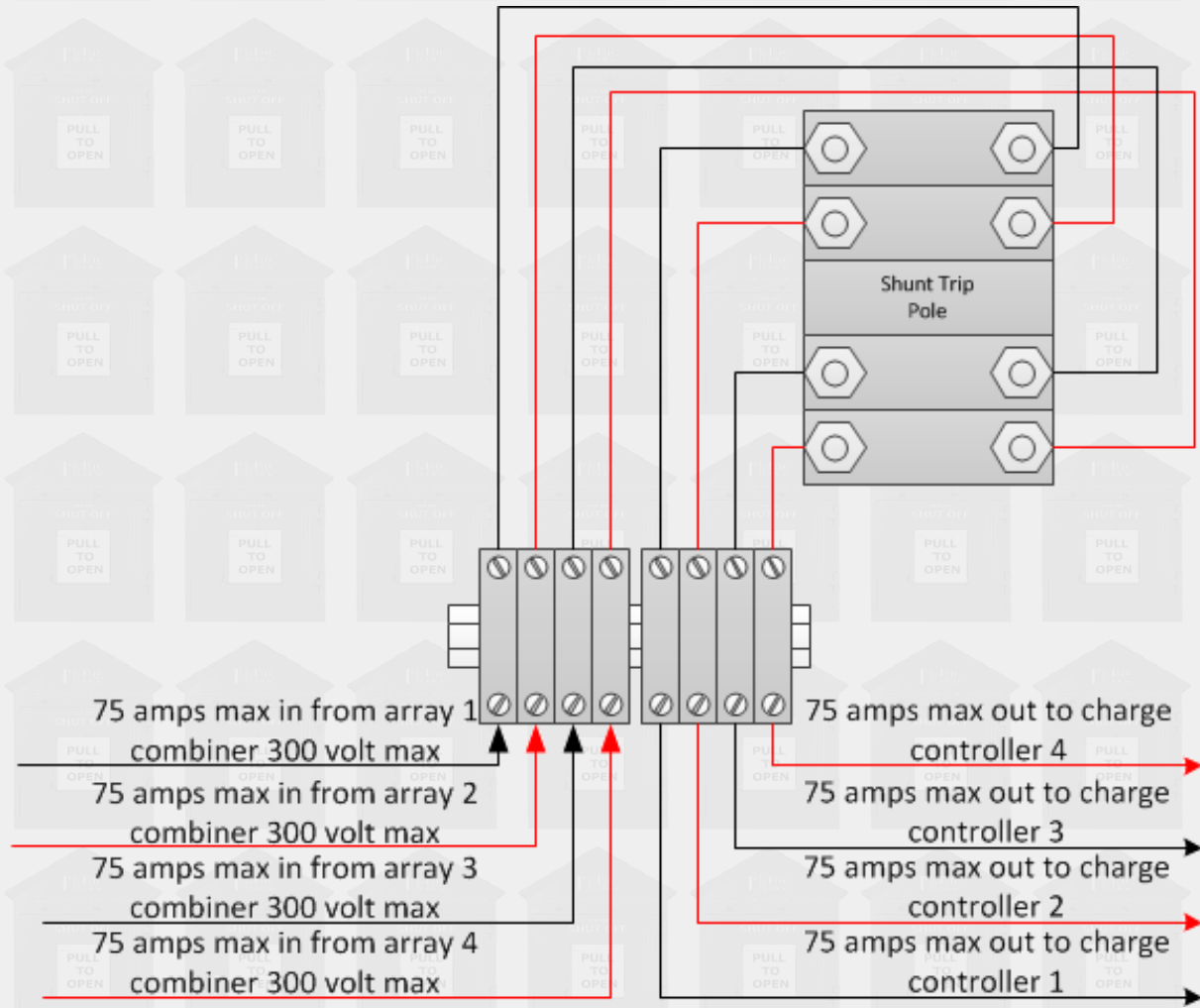


## B.O.M.

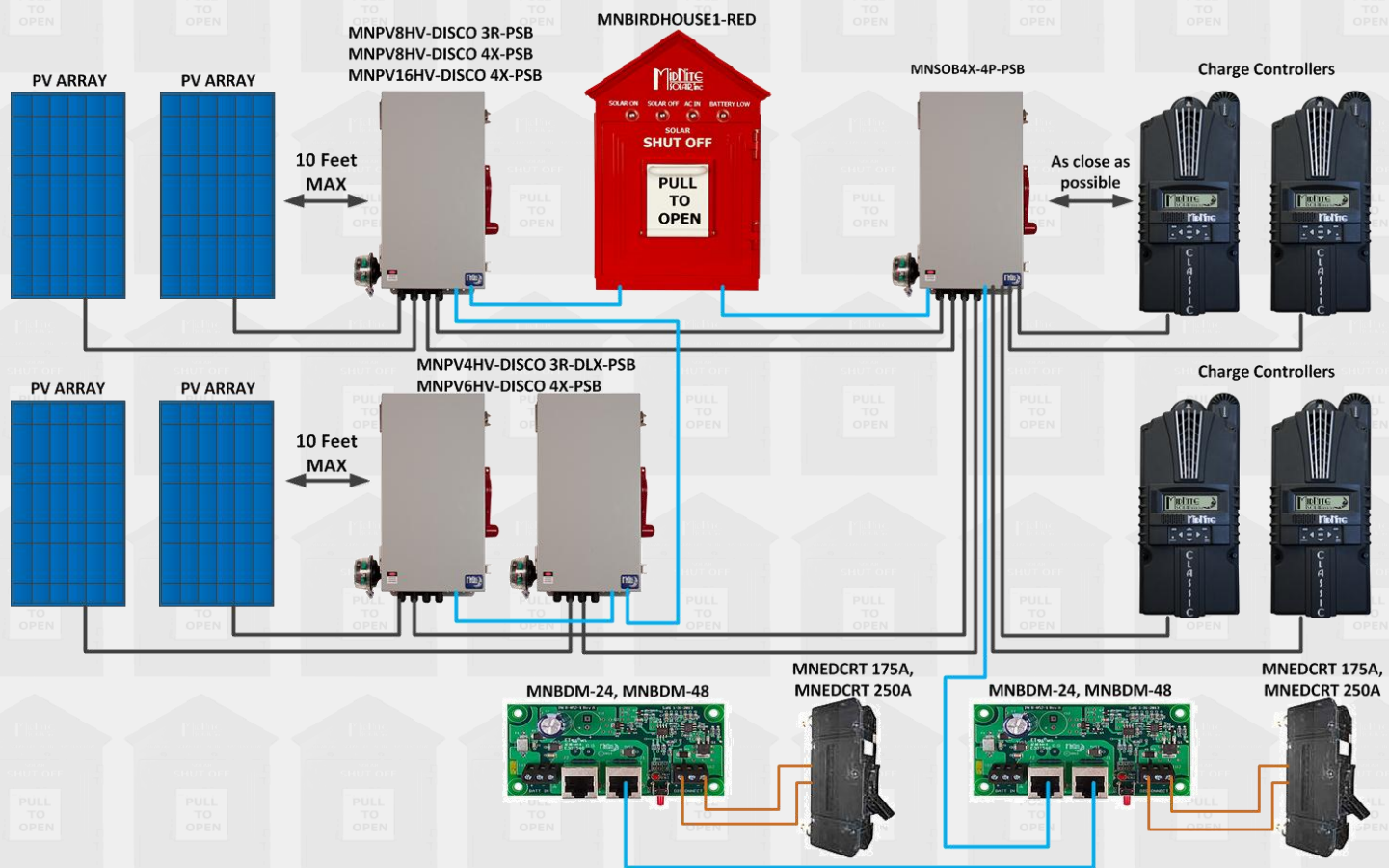
- 1pc MNBIRDHOUSE1 Red or Grey
- 2pcs MNPV4HV-DISCO 3R-DLX-PSB or MNPV6HV-DISCO 4X-PSB or MNPV8HV-DISCO 3R-PSB or MNPV8-DISCO 4x-PSB depending on number of strings
- 1pc MNSOB4X-4P-75A-PSB
- 1pc MNTBB2-15W
- xxx feet of MNCAT5-600



# Example 2A, Disabling the PV only, Schematic



# Example 2B, Disabling the PV and AC, Flow diagram



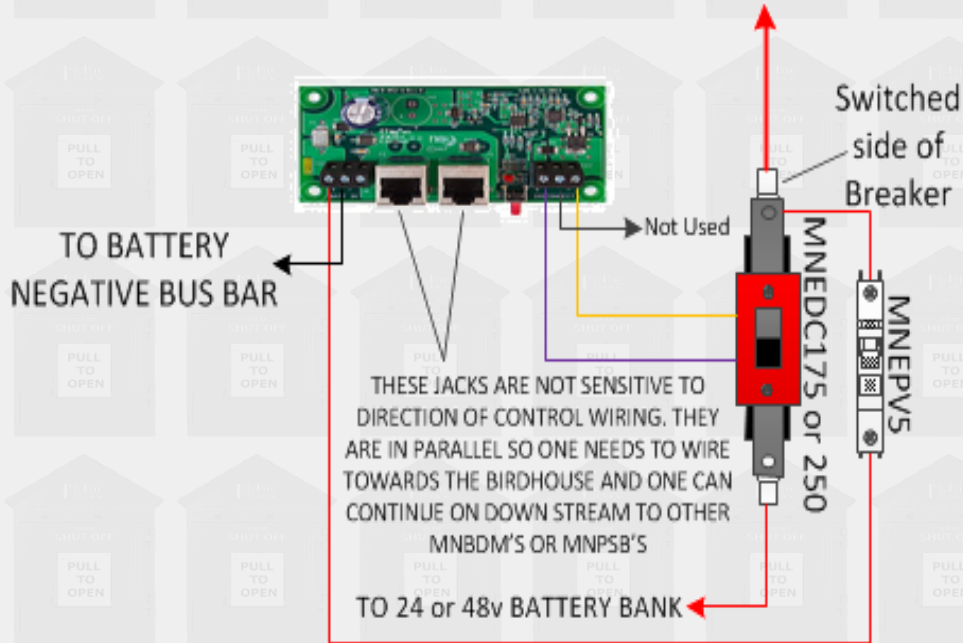
B.O.M.

- 1pc MNBIRDHOUSE1 Red or Grey
- 2pcs MNPV4HV-DISCO 3R-DLX-PSB or MNPV6HV-DISCO 4X-PSB or MNPV8HV-DISCO 3R-PSB or MNPV8-DISCO 4x-PSB depending on number of strings
- 1pc MNSOB4X-4P-75A-PSB
- 1pc MNTBB2-15W
- 2pcs MNBDM
- 2pcs MNEDCRT-175A or MNEDCRT-250A
- 2pcs MNEPV5
- xxx feet of MNCAT5-600

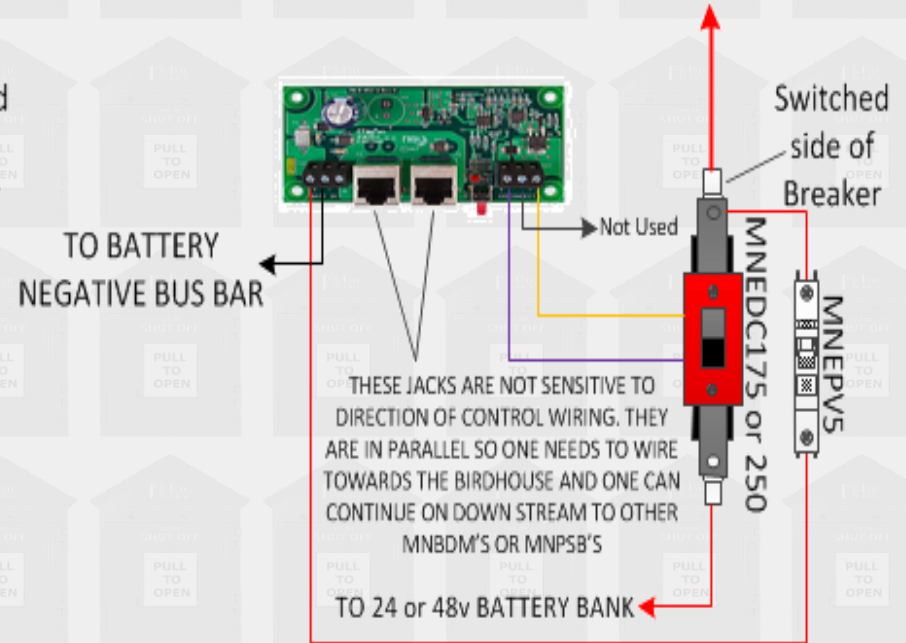


# Example 2B, Disabling Battery based Inverter breaker. (AC power)

TO 24 OR 48V INVERTER OR  
OTHER CONTROLLED PRODUCT



TO 24 OR 48V INVERTER OR  
OTHER CONTROLLED PRODUCT



# Example 3

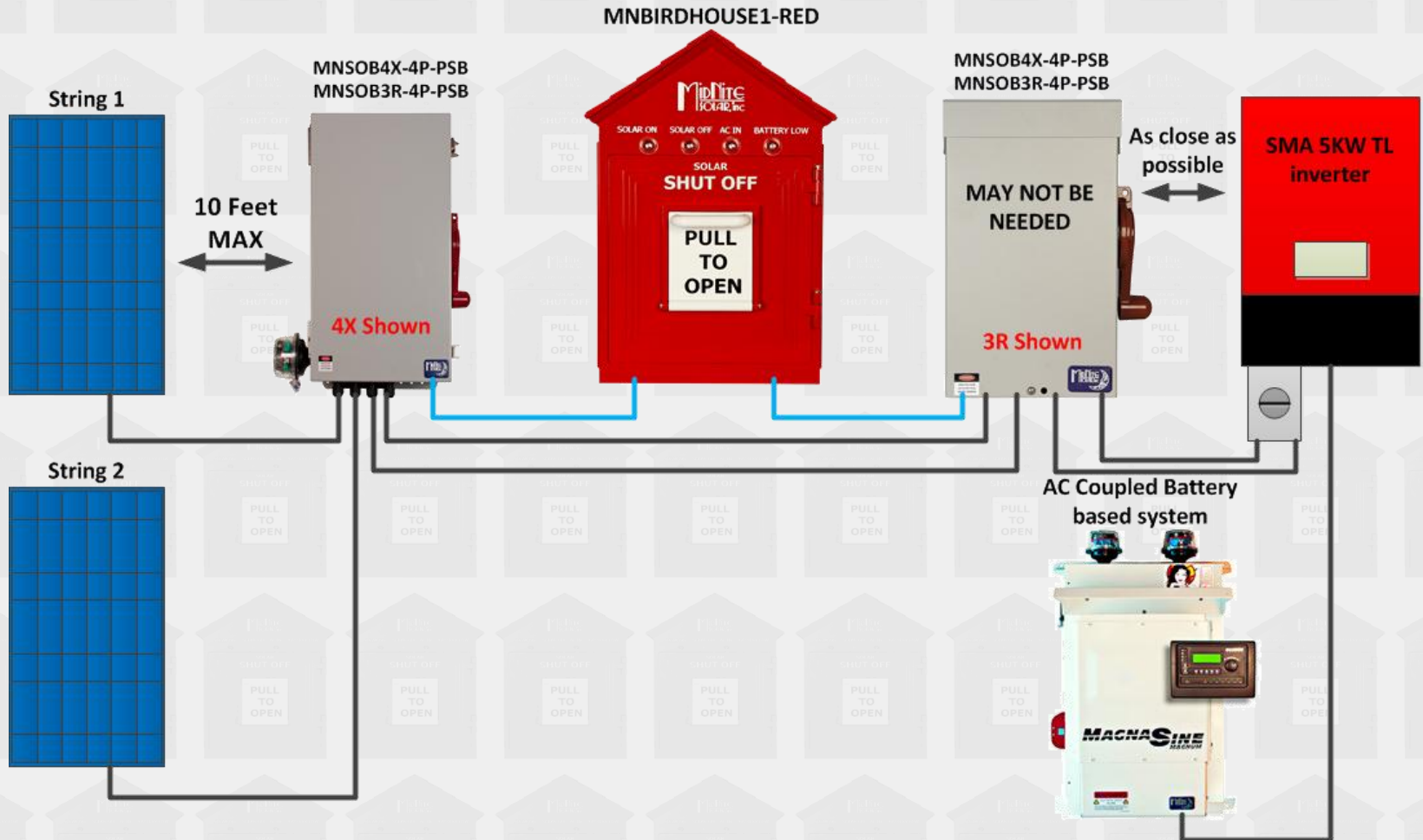
## “AC Coupled with Battery back up”

- Dual Sunny Island 6048 Inverters
- Dual Sunny Boy non isolated inverters
- Example 3A will show disabling JUST the PV
- Example 3B will show disabling PV and AC





# Example 3A, Disabling the PV only, Flow diagram

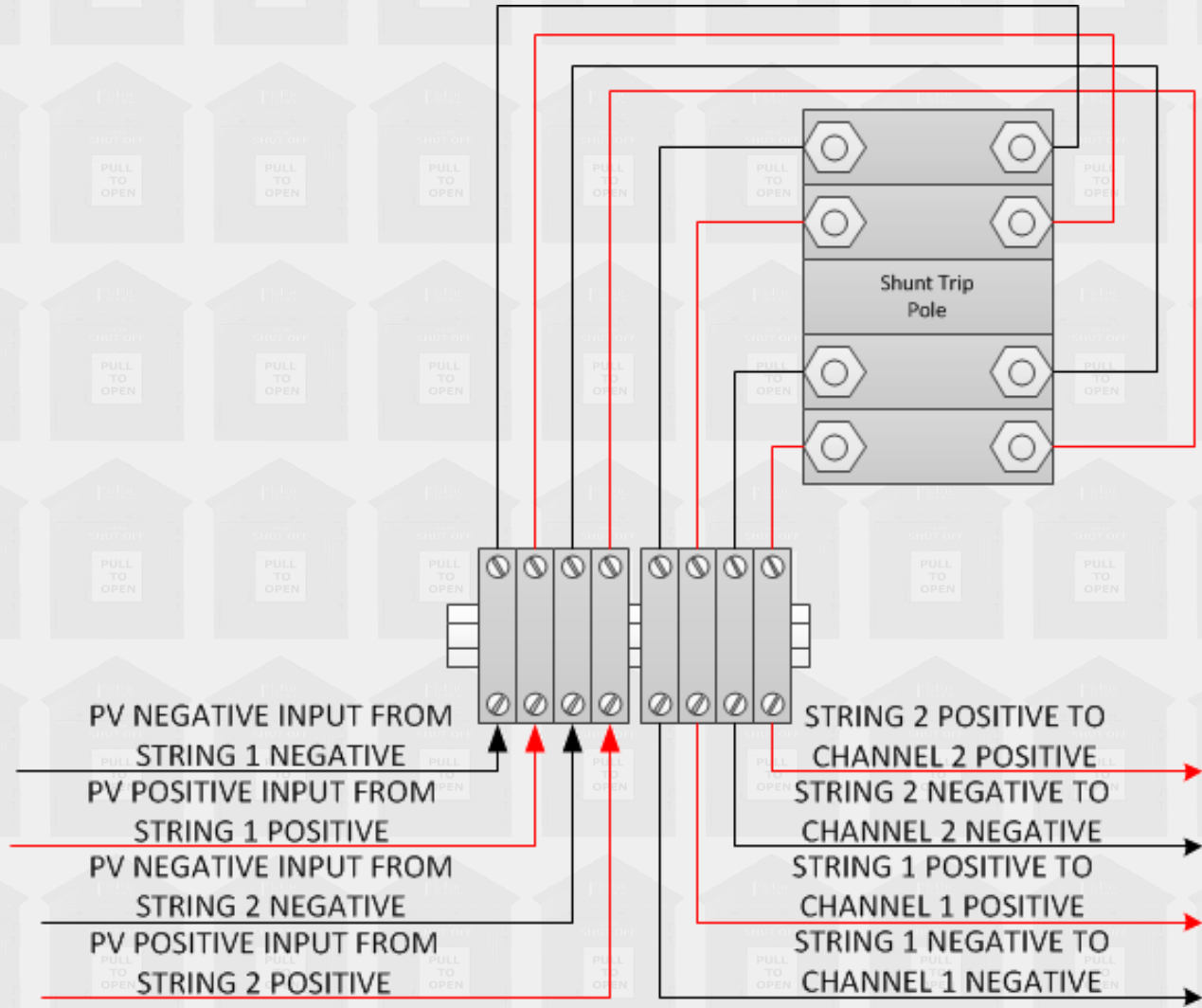


B.O.M.

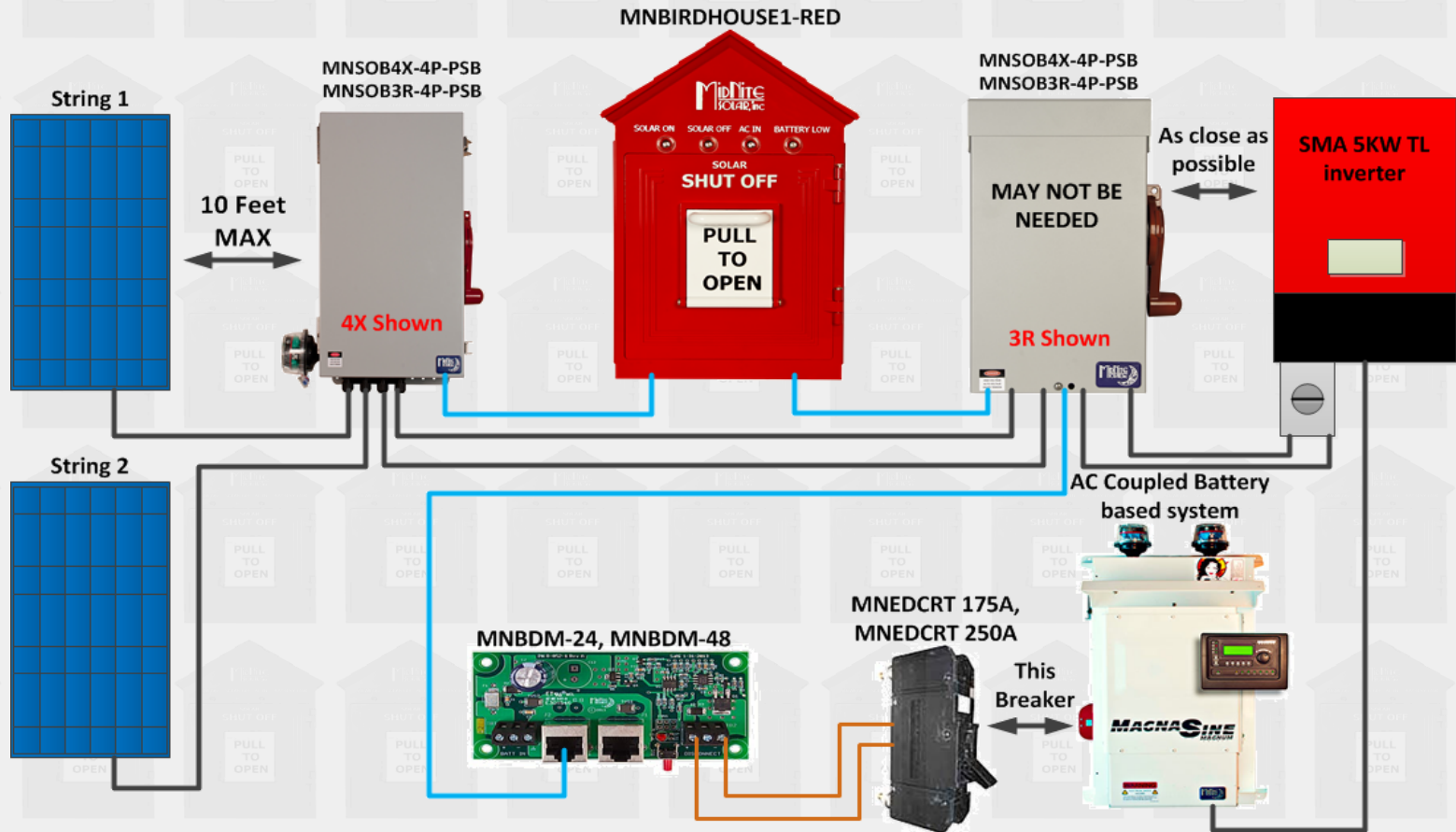
- 1pc MNBIRDHOUSE1 Red or Grey
- 1pc MNSOB3R-4P-PSB or MNSOB4X-4P-PSB
- 1pc MNSOB3R-4P-PSB or MNSOB4X-4P-PSB (may be required at the Sunny Boys for cap bleed down)
- xxx feet of MNCAT5-600



# Example 3A, Disabling the PV only, Schematic



# Example 3B, Disabling the PV and AC, Flow diagram



B.O.M.

- 1pc MNBIRDHOUSE1 Red or Grey
- 1pc MNSOB3R-4P-PSB or MNSOB4X-4P-PSB
- 1pc MNSOB3R-4P-PSB or MNSOB4X-4P-PSB (may be required at the Sunny Boys for cap bleed down)
- 1pc MNBDM-48 (note use MNBDM-24 if this is a 24 volt inverter)
- 1pc MNEDCRT-175A or MNEDCRT-250A
- 1pc MNEPV5
- xxx feet of MNCAT5-600



# Using the MNDC-GFP100RT-2P INSTEAD OF THE SOB for 150v grounded Charge Controllers

- For 150v max charge controllers
- MAX of 100 amps per controller
- Also serves as Charge Controller battery disconnect

**REMOVE GROUND FAULT STICKERS FROM BREAKER. Breaker is non polarized so current flow can go in either direction**



THESE JACKS ARE NOT SENSITIVE TO DIRECTION OF CONTROL WIRING. THEY ARE IN PARALLEL SO ONE NEEDS TO WIRE TOWARDS THE BIRDHOUSE AND ONE CAN CONTINUE ON DOWN STREAM TO OTHER MNBDM'S OR MNPSB'S

TO 24 OR 48 VOLT BATTERY + AND - BUS BARS, NO FUSING NEEDED

DC OUT TO BATTERY POSITIVE BUS

DC OUT TO BATTERY POSITIVE BUS

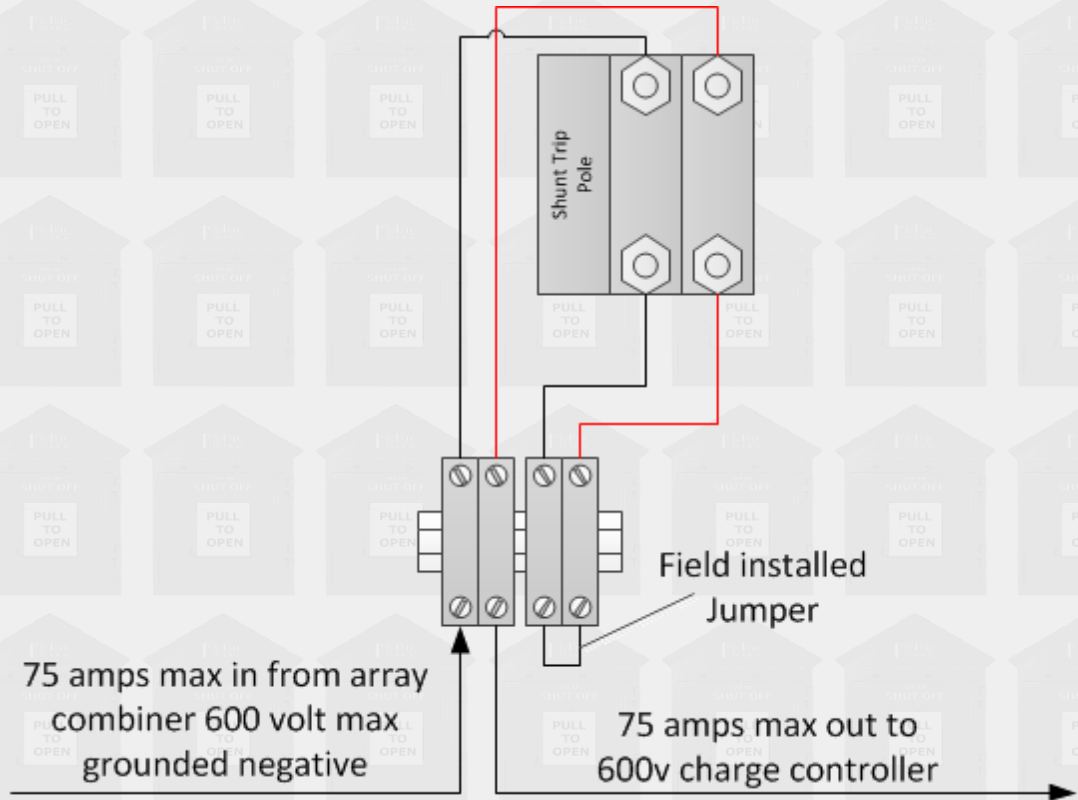
DC IN FROM CHARGE CONTROLLER 1 BATTERY +

DC IN FROM CHARGE CONTROLLER 2 BATTERY +



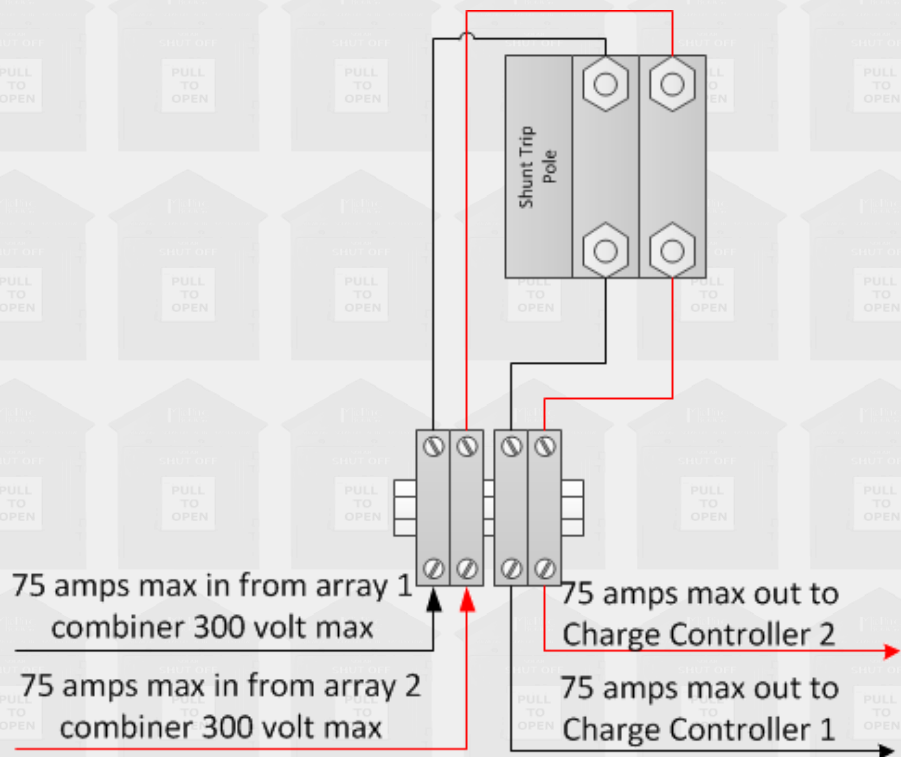
# Using the SOB 2P for 600v grounded Charge Controllers

- For grounded pv array only
- Use the SOB 4P for 2 600v charge controllers
- See other slides for 600v ungrounded



# Using the SOB 2P for 600v ungrounded Charge Controllers

- For ungrounded pv array only
- Use the SOB 4P for 2 600v charge controllers



# Questions?



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