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|-----------------------------------------------------------------------------------|-----------------------|---------------|-------|------------|------------------|-----|
|  | Doc or ECO #:         | ECO-71599-001 | Date: | 11/18/2020 | Author:          | JV  |
|                                                                                   | Rev. #:               | 001           |       |            |                  |     |
| Engineering Change Order (ECO)                                                    | Engineering Approval: | Aeg           | Date: | 11/18/2020 | Quality Approval | aeg |

|               |                       |                        |                   |
|---------------|-----------------------|------------------------|-------------------|
| <b>P/N #:</b> | 71850                 | <b>Effective Date:</b> | November 30, 2020 |
| <b>Title:</b> | UPDATES TO PPS SYSTEM |                        |                   |

## 1.0 Purpose / Summary

Updates have been done to the Battery box to change the power on procedure. This allows for two things, it first allows for “passive” start up which is required for certain battery types to prevent in rush current. It also allows us to break the connection of the battery monitor which is required to allow the batteries to restart from their overload state. A breaker was also added to prevent the need for ever replacing a physical fuse in the battery monitor circuit.

## 2.0 Parts Affected

| Part Number | Notes                                              | Removed                             | Added                               | Modified                            | REV |
|-------------|----------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-----|
| 71850       |                                                    |                                     |                                     |                                     |     |
| 71599       | Control panel assembly modified                    | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | B   |
| 71607       | Old inverter remote removed                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |     |
| 52330       | New inverter power led ;existing pn                | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | A   |
| 52331       | New inverter fault led ;existing pn                | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | A   |
| 72969       | New inverter control plate                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | A   |
| 72970       | Overlay for inverter control plate                 | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | A   |
| 72971       | Flat head sealing screw for inverter control plate | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | A   |
| 72972       | DPDT switch for inverter power                     | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | A   |
| 72982       | New PN for sealing boot                            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | A   |
| 73117       | 1W 1kilohm Carbon film resistor                    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | A   |
| 73118       | Contact holder for circuit breaker                 | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | A   |
| 71845       | Breaker fuse added to assembly                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | B   |
| 71840       | #6 sealing screws, qty increased                   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |     |
| 71835       | Mount holes added                                  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | B   |
| 73016       | Mount for circuit breaker                          | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | A   |
| 73017       | Resettable circuit breaker                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | A   |
| 70316       | Nuts for mounting breaker mount ;existing pn       | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | A   |

## 3.0 Detail

It was found from the first delivery of PPS systems that specific variations of the 2590 battery handle the in rush current of the PPS inverter differently. When the inveter is set to ON & the power mains is

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switched, the start up current is greater than if the inverter was set to OFF, power mains flipped, then inverter powered on. For this reason we decided to break the start up procedure into multiple steps. Added the use of a DPDT switch, this allows for a “soft start” which can aid if starting up with more battery types. Additionally, the ability to turn off the battery monitor allows us to reset the batteries internal cutoff without having to physically disconnect the battery.

After adding the DPDT switch, In some instances, it was noticed that the fuse of the battery monitor would blow. We suspect this was due to a large back current causes from turning off the DC mains while the system is active. Adding the resettable breaker fuse allows us to have a customer diagnose and easily fix this scenario without the need for repairs.

#### 4.0 Disposition of Material

The three PPS systems already in the field BB2020009, 010, and 011 will be updated to rev B during joe’s SD trip; week of 12/7.

BB2020012 went to DSTL / UK navy. This was the first box built as rev B.

All future PPS systems will be built as rev B.

#### 5.0 Action Items

| Action                                             | Department | Acknowledgement Initials |
|----------------------------------------------------|------------|--------------------------|
| Revision sync / rework with all units in the field | ENGR       | JV                       |

#### 6.0 Modified / Referenced Documents:

| Document                      | Current Revision |
|-------------------------------|------------------|
| 71850 – USER DOC              | B                |
| QC-71850                      | B                |
| WI-71850                      | B                |
| 71850- Serial number template | B                |
| 71850-schemantic              | B                |

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## 7.0 Revision History

| Date Revised<br>(mm-dd-yyyy) | Location of<br>Change (section,<br>paragraph no.,<br>step no., etc.) | Description of Change Made | Name of Person making the<br>Change |
|------------------------------|----------------------------------------------------------------------|----------------------------|-------------------------------------|
| 09/08/2020                   |                                                                      | Initial entry              | JV                                  |
| 11/30/2020                   |                                                                      | Submission                 | JV                                  |
|                              |                                                                      |                            |                                     |