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|  | Energy Storage Unit (ESU) – Requirements Description Form |  |  |
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|  | **Section A – Project Details** | |  |
| Quotation Number | 9001 |
| Customer | Gary |
| Customer Project Number | 1.1 |
| Shipyard | Singapore |
| Shipyard Number | 65 |
| Classification Society | CCS |
| Required DP Class | 1 |
| Additional Class Battery Notation | Battery Power |
| Revision Number | 1.0 |
| Revision Description | Input Form 2 |
| Revision Date | 24/04/2016 |
| Author | Feng Hao |
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|  | **Section B – Energy Storage Sizing Requirements**  ***Enter total required kW and kWh or expected energy storage operating profile cases*** | |  |
| Total power required (kW) | 45 |
| Total capacity required (kWh) | 300 |
|  | Required battery lifetime (years) | 70 |  |
|  | | | |
|  | Case 1 description | Case 1 description |  |
| Power required in case 1 (kW) | 100 |
| Duration of required power in case 1 (h) | 1000 |
| Case 2 description | Case 2 description |
| Power required in case 2 (kW) | 200 |
| Duration of required power in case 2 (h) | 2000 |
| Case 3 description | Case 3 description |
| Power required in case 3 (kW) | 300 |
| Duration of required power in case 3 (h) | 3000 |
| Case 4 description | Case 4 description |
| Power required in case 4 (kW) | 400 |
| Duration of required power in case 4 (h) | 4000 |
| Case 5 description | Case 5 description |
| Power required in case 5 (kW) | 500 |
| Duration of required power in case 5 (h) | 5000 |
| Case 6 description | Case 6 description |
| Power required in case 6 (kW) | 600 |
| Duration of required power in case 6 (h) | 6000 |
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|  | System Overview Diagram | |  |
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|  | **Section C – Energy Storage Unit Technical Details**  ***Enter technical details as applicable to the vessel power system design and philosophy*** | |  |
| Number of ESU | 4 |
| Main switchboard AC voltage (V) | 400 |
| Main switchboard AC frequency (Hz) | 55 |
| DC link voltage (V) | 750 |
| Battery type | High energy batteries |
| Converter control method | Virtual Generator |
| Largest motor starting current (A) | 150 |
| Number of shore connections | 2 |
| Shore connection 1 voltage levels: | |
| Level 1 high (V) | 10 |
| Level 1 low (V) | 1 |
| Level 2 high (V) | 20 |
| Level 2 low (V) | 2 |
| Level 3 high (V) | 30 |
| Level 3 low (V) | 3 |
| Shore connection 1 current rating (A) | 5 |
| Shore connection 2 voltage levels: | |
| Level 1 high (V) | 10 |
| Level 1 low (V) | 1 |
| Level 2 high (V) | 20 |
| Level 2 low (V) | 2 |
| Level 3 high (V) | 30 |
| Level 3 low (V) | 3 |
| Shore connection 2 current rating (A) | 8 |
|  | Hours to engineer ESU (h) | 60 |  |
|  | Days to commission ESU (days) | 365 |  |
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