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| **HYBRID ACTIVE POWER FACTOR CORRECTION SYSTEM** | | | |
| **CLIENT** |  | **PROJECT NO.** |  |
| **EQUIPMENT** |  | **SERIAL NO.** |  |

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| **INSTALLED BY** |  | **LOCATION** |  |

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| **1. INSTALLATION INSPECTION** | | | |
| **WARNING: SYSTEM MUST BE DE-ENERGISED** | | | |
| ITEM | RESULT (OK) | RESULT (X) | COMMENTS |
| SIGNS OF EXTERNAL DAMAGE | [ ] ABSENT | [ ] PRESENT |  |
| SIGNS OF INTERNAL DAMAGE | [ ] ABSENT | [ ] PRESENT |  |
| ENCLOSURE SECURELY MOUNTED | [ ] CORRECT | [ ] INCORRECT |  |
| ENCLOSURE VENTILATION | [ ] SUFFICIENT | [ ] INSUFFICIENT |  |
| SIZE OF POWER CABLE | [ ] CORRECT | [ ] INCORRECT |  |
| SIZE OF NEUTRAL CABLE | [ ] CORRECT | [ ] INCORRECT |  |
| SIZE OF PE CABLE | [ ] CORRECT | [ ] INCORRECT |  |
| CABLE CONNECTIONS | [ ] CORRECT | [ ] INCORRECT |  |
| PHASE SEQUENCE | [ ] CORRECT | [ ] INCORRECT |  |
| POSITION OF CT'S | [ ] CORRECT | [ ] INCORRECT |  |
| POWER FUSES | [ ] CORRECT | [ ] INCORRECT |  |
| CONTROL FUSES | [ ] CORRECT | [ ] INCORRECT |  |
| CT LINKS | [ ] REMOVED | [ ] ABSENT |  |

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| **2. INSULATION RESISTANCE** | | | | | |
| **WARNING: SYSTEM MUST BE DE-ENERGISED** | | | **INSTRUMENT S/N** | |  |
| CIRCUITS | MEGGER VALUE | OTHER SPECIFY | | COMMENTS | |
| L1 - L2 | >200MΩ PASS [ ] | FAIL [ ] | |  | |
| L1 - L3 | >200MΩ PASS [ ] | FAIL [ ] | |  | |
| L2 - L3 | >200MΩ PASS [ ] | FAIL [ ] | |  | |
| L1 - N | >200MΩ PASS [ ] | FAIL [ ] | |  | |
| L2 - N | >200MΩ PASS [ ] | FAIL [ ] | |  | |
| L3 - N | >200MΩ PASS [ ] | FAIL [ ] | |  | |
| L1 - PE | >200MΩ PASS [ ] | FAIL [ ] | |  | |
| L2 - PE | >200MΩ PASS [ ] | FAIL [ ] | |  | |
| L3 - PE | >200MΩ PASS [ ] | FAIL [ ] | |  | |
| N - PE | >200MΩ PASS [ ] | FAIL [ ] | |  | |

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| **3. RESISTANCE OF EARTHING SYSTEM** | | | | | |
| **WARNING: SYSTEM MUST BE DE-ENERGISED** | | | **INSTRUMENT S/N** | |  |
| PART | MEGGER VALUE | OTHER SPECIFY | | COMMENTS | |
| GLAND PLATE | <0.5Ω PASS [ ] | FAIL [ ] | |  | |
| ENCLOSURE | <0.5Ω PASS [ ] | FAIL [ ] | |  | |
| DOORS | <0.5Ω PASS [ ] | FAIL [ ] | |  | |

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| **4. CIRCUIT BREAKER SETTINGS** | | | | | | |
| **WARNING: SYSTEM MUST BE DE-ENERGISED** | | | | | | |
| CIRCUIT BREAKER INSTALLED | | in switchboard | [ ] | in HAPFC system | [ ] | |
| PROTECTION FUNCTION | | RECOMMENDED SETTING | | SETTING AT COMMISSIONING | | |
| Long Delay Overload | | 1.25 to 1.5 times In | |  | | |
| Instant Short Circuit | | 5 times In | |  | | |
| To determine In, use the following formula: | | | | | | |
| **In (A) = ((Q kVAr/50kVAr) x 70A + IAHF)) x 1.3** | | | | | | |
| Where: | In – Total Nominal Current of HAPFC unit (expressed in Amps)  Q – Total Nominal Reactive Power of Capacitor bank (expressed in kVAr)  IAHF – Total Rated Current of HPQ modules (expressed in Amps) | | | |  |  |
| **NOTE** | **IT IS ESSENTIAL TO CHECK AND MAKE ALL NECESSARY ADJUSTMENTS TO THE HAPFC CIRCUIT BREAKER(S) TO ENSURE DISCRIMINATION IS CO-ORDINATED WITH**  **THE UPSTREAM PROTECTION.** | | | | | |

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| **5. THERMO CONTROLLER** | | | |
| **WARNING: SYSTEM MUST BE DE-ENERGISED** | | | |
| STAGE #1 | | STAGE #2 | |
| Set to |  | Set to |  |

|  |  |  |  |
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| **6. CONTROLLER** | | | |
| Model |  | HMI Version |  |
| Serial Number |  | HMI Data Version |  |
| **7. HPQ MODULE - MASTER** | | | |
| Model |  | Manufacturer |  |
| Serial Number |  | MCC Version |  |

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| **8. HPQ MODULE - SLAVE** | | | |
| Model |  | Manufacturer |  |
| Serial Number |  | MCC Version |  |

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| **9. CAPACITOR BANK** | | | | | | | | | | |
| **WARNING: UNIT MUST BE DE-ENERGISED** | | | | | | | | | | |
| Stage | Size, kVAr | Capacitance, uF | | |  | Stage | Size, kVAr | Capacitance, uF | | |
| L1-L2 | L1-L3 | L2-L3 | L1-L2 | L1-L3 | L2-L3 |
|  |  |  |  |  |  |  |  |  |  |
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LINE VOLTAGE

|  |  |  |  |
| --- | --- | --- | --- |
| **10. VOLTAGE WHEN SYSTEM DE-ENERGISED** | | | |
|  | L1-L2 | L1-L3 | L2-L3 |
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| **11. CAPACITOR BANK - CURRENT** | | | | | | | | | | |
| Stage | Size, kVAr | Current, A | | |  | Stage | Size, kVAr | Current, A | | |
| L1 | L2 | L3 | L1 | L2 | L3 |
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| **12. CONNECTION SETTINGS** | | | |
|  | Controller | HPQ Master | HPQ Slave |
| Name |  |  |  |
| IP-address |  |  |  |
| Port |  |  |  |

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| **13. HPQ SETTINGS** | | | | |
| Menu | Parameter | HPQ - Master | HPQ - Slave | Comments |
| COMMISSIONING | ENABLE IGBT OPERATION |  |  |  |
| CONNECTION TYPE |  |  |  |
| ELECTRICAL CONNECTION (3W/4W) |  |  |  |
| CONFIRMED FREQUENCY |  |  |  |
| Confirmed voltage |  |  |  |
| COMPENSATION MODE |  |  |  |
| BALANCING DEGREE |  |  |  |
| X1 CT-RATIO (CUSTOMER CTS) |  |  |  |
| TOTAL INSTALLED CURRENT |  |  |  |
| X3 CT-RATIO (AUXILIARY CTS) |  |  |  |
| ENABLE AUTOSTART |  |  |  |
| ENABLE AUTOACK |  |  |  |
| ENABLE STAND-BY |  |  |  |
| STAND BY TRIGGER LEVEL |  |  |  |
| X1 CT-POLARITY L1 |  |  |  |
| X1 CT-POLARITY L2 |  |  |  |
| X1 CT-POLARITY L3 |  |  |  |
| DIGITAL OUTPUT 0 |  |  |  |
| DIGITAL OUTPUT 1 |  |  |  |
| DIGITAL OUTPUT 2 |  |  |  |
| DIGITAL OUTPUT 3 |  |  |  |
| DIGITAL INPUT 1 |  |  |  |
| DIGITAL INPUT 2 |  |  |  |
| DIGITAL INPUT 3 |  |  |  |

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| HPQ PARAMETERS | Enable HPQ |  |  |  |
| HPQ-MODE |  |  |  |
| UNIT ROLE |  |  |  |
| ENABLE FO |  |  |  |
| OVERVOLTAGE LIMIT |  |  |  |
| THDU TRIP LIMIT |  |  |  |
| STEP COUNT |  |  |  |
| STEP SIZE |  |  |  |
| SERIES REACTOR |  |  |  |
| RATED CAPACITOR VOLTAGE |  |  |  |
| HYSTERESIS LIMIT |  |  |  |
| DISCHARGE TIME |  |  |  |
| ENABLE LAST DO AS TRIP |  |  |  |
| CONNECTION ALARM COUNT |  |  |  |
| TARGET POWER FACTOR |  |  |  |
| CAPACITIVE POWER FACTOR |  |  |  |
| SECONDARY POWER FACTOR |  |  |  |
| PRIORITY CURRENT LEVEL |  |  |  |
| COMPENSATION DEGREE | Ih2 |  |  |  |
| Ih3 |  |  |  |
| Ih4 |  |  |  |
| Ih5 |  |  |  |
| Ih6 |  |  |  |
| Ih7 |  |  |  |
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| Ih10 |  |  |  |
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| Ih24 |  |  |  |
| Ih25 |  |  |  |
| Ih1 |  |  |  |

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| **14. POWER QUALITY PARAMETERS** | | | | | | | |
| HAPFC Mode | THD\_V, L1 | THD\_V, L2 | THD\_V, L3 | THD\_I, L1 | THD\_I, L2 | THD\_I, L3 | PF |
| "STOP" |  |  |  |  |  |  |  |
| "RUN" |  |  |  |  |  |  |  |

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| **15. VOLTAGE WHEN SYSTEM OPERATING** | | | |
| LINE VOLTAGE | L1-L2 | L1-L3 | L2-L3 |
|  |  |  |
| PHASE VOLTAGE | L1-N | L2-N | L3-N |
|  |  |  |

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| **16. FUNCTIONAL TEST** | | | | | |
| PASS | [ ] | FAIL | [ ] | OTHER |  |
| COMMENTS | |  | | | |

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|  | NAME | COMPANY | SIGNATURE | DATE | TIME |
| COMMISSIONED BY |  |  |  |  |  |
| ACCEPTED BY |  |  |  |  |  |