PV Local Controller

Binary input

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Variable name** | **Description** | **Data type** | **Unit** | **Min** | **Max** |
|  | b\_MGCC\_DataLog\_PV\_Prio | Power / Reactive Power priority (Power=0, Reactive Power=1) | 1 bit | N/A | 0 | 1 |
|  | b\_MGCC\_DataLog\_PV\_MPPT | MPPT or Power curtailment (MPPT=0, Power curtailment=1) | 1 bit | N/A | 0 | 1 |
|  | b\_MGCC\_DataLog\_PV\_Curtail\_Mode | Curtailment Mode (Percentage=0, Absolute value=1) | 1 bit | N/A | 0 | 1 |

Analog inputs

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Variable name** | **Description** | **Data type** | **Unit** | **Min** | **Max** |
|  | i\_MGCC\_DataLog\_PV\_Status | Operating state (according to state machine) | 16 bits without flag | N/A | 0 | 7 |
|  | i\_MGCC\_DataLog\_PV\_Fault | Fault code (according to fault table) | 16 bits without flag | N/A | 0 | 999 |
|  | i\_MGCC\_DataLog\_PV\_Warning | Warning code (according to warning table) | 16 bits without flag | N/A | 0 | 999 |
|  | f\_MGCC\_DataLog\_PV\_Temperature | Local Controller Temperature | 16 bits with flag | °F | -100 | 200 |
|  | f\_MGCC\_DataLog\_PV\_Vol | Terminal voltage, RMS value | 16 bits without flag | V | 0 | 15000 |
|  | f\_MGCC\_DataLog\_PV\_Freq | Terminal frequency | 16 bits without flag | 0.01Hz | 0 | 6500 |
|  | f\_MGCC\_DataLog\_PV\_P | Output power | 16 bits with flag | W | -106 | 106 |
|  | f\_MGCC\_DataLog\_PV\_Q | Output reactive power | 16 bits with flag | Var | -106 | 106 |
|  | f\_MGCC\_DataLog\_PV\_PF | Power factor of PV inverter | 16 bits with flag | % | 90(leading)  -90(lagging) | 100(leading)  -99(lagging) |
|  | i\_MGCC\_DataLog\_PV\_Q\_Mode | Reactive Power Mode (Constant Q=0 Constant PF=1, Control V=2) | 16 bits without flag | N/A | 0 | 2 |

Binary output

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Variable name** | **Description** | **Data type** | **Unit** | **Min** | **Max** |
|  | b\_MGCC\_DataLog\_PV\_Fault\_Clr | Clear faults, warnings are not affected | 1 bit | N/A | 0 | 1 |
|  | b\_MGCC\_DataLog\_PV\_Warning\_Clr | Clear warnings, faults are not affected | 1 bit | N/A | 0 | 1 |
|  | b\_MGCC\_DataLog\_PV\_Prio\_cmd | Power / Reactive Power priority command (Power=0, Reactive Power=1) | 1 bit | N/A | 0 | 1 |
|  | b\_MGCC\_DataLog\_PV\_MPPT\_cmd | MPPT or Power curtailment command (MPPT=0, Power curtailment=1) | 1 bit | N/A | 0 | 1 |
|  | b\_MGCC\_DataLog\_PV\_Curtail\_Mode\_cmd | Curtailment mode command (Percentage=0, Absolute value=1) | 1 bit | N/A | 0 | 1 |

Analog outputs

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Variable name** | **Description** | **Data type** | **Unit** | **Min** | **Max** |
|  | i\_MGCC\_DataLog\_PV\_Status\_Cmd | Operating state (according to state machine) | 16 bits without flag | N/A | 0 | 11 |
|  | f\_MGCC\_DataLog\_PV\_Vol\_cmd | Terminal voltage command for Control V mode | 16 bits without flag | V | 0 | 15000 |
|  | f\_MGCC\_DataLog\_PV\_P\_cmd | Output power curtail command (absolute value) | 16 bits with flag | W | -106 | 106 |
|  | f\_MGCC\_DataLog\_PV\_P\_percent | Output power curtail command (percentage) | 16 bits without flag | ‰ | 0 | 1000 |
|  | f\_MGCC\_DataLog\_PV\_Q\_cmd | Output reactive power command | 16 bits with flag | var | -106 | 106 |
|  | f\_MGCC\_DataLog\_PV\_Q\_PF\_cmd | Output power factor command  1 unit indicates 0.001 | 16 bits with flag | N/A | -1000 | 1000 |
|  | f\_MGCC\_DataLog\_PV\_Q\_Mode\_cmd | Reactive power mode command (Constant Q=0 Constant PF=1, Control V=2) | 16 bits without flag | N/A | 0 | 2 |
|  | f\_MGCC\_DataLog\_PV\_P\_lim | Output power limit | 16 bits with flag | W | -106 | 106 |
|  | f\_MGCC\_DataLog\_PV\_Q\_lim | Output reactive power limit | 16 bits with flag | var | -106 | 106 |
|  | f\_MGCC\_DataLog\_PV\_P\_ramp | Output power ramp rate | 16 bits with flag | W/s | -106 | 106 |
|  | f\_MGCC\_DataLog\_PV\_Q\_ramp | Output reactive power ramp rate | 16 bits with flag | Var/ | -106 | 106 |

Reserved

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Variable name** | **Description** | **Data type** | **Unit** | **Min** | **Max** |
|  | Reserved\_1 |  |  |  |  |  |
|  | Reserved\_2 |  |  |  |  |  |
|  | Reserved\_3 |  |  |  |  |  |
|  | Reserved\_4 |  |  |  |  |  |
|  | Reserved\_5 |  |  |  |  |  |

**Battery Local controller**

Binary input

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Variable name** | **Description** | **Data type** | **Unit** | **Min** | **Max** |
|  | b\_MGCC\_DataLog\_Batt\_IE | Inertia Emulation Function Enable (Disable=0, Enable=1) | 1 bit | N/A | 0 | 1 |
|  | b\_MGCC\_DataLog\_Batt\_Prio | Power / Reactive Power priority  (Power=0, Reactive Power=1) | 1 bit | N/A | 0 | 1 |

Analog inputs

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | i\_MGCC\_DataLog\_Batt\_Status | Operating state (according to state machine) | 16 bits without flag | N/A | 0 | 11 |
|  | i\_MGCC\_DataLog\_Batt\_Fault | Fault code (according to fault table) | 16 bits without flag | N/A | 0 | 999 |
|  | i\_MGCC\_DataLog\_Batt\_Warning | Warning code (according to warning table) | 16 bits without flag | N/A | 0 | 999 |
|  | f\_MGCC\_DataLog\_Batt\_Temp | Local Controller Temperature | 16 bits with flag | °F | -100 | 200 |
|  | f\_MGCC\_DataLog\_Batt\_Vol | Terminal voltage, RMS value | 16 bits without flag | V | 0 | 15000 |
|  | f\_MGCC\_DataLog\_Batt\_Freq | Terminal frequency | 16 bits without flag | 0.01Hz | 0 | 6500 |
|  | f\_MGCC\_DataLog\_Batt\_P | Output power | 16 bits with flag | W | -106 | 106 |
|  | f\_MGCC\_DataLog\_Batt\_Q | Output reactive power | 16 bits with flag | var | -106 | 106 |
|  | f\_MGCC\_DataLog\_Batt\_SOC | State of Charge | 16 bits without flag | ‰ | 0 | 1000 |
|  | i\_MGCC\_DataLog\_Batt\_Q\_Mode | Reactive Power Mode (Constant Q=0 Constant PF=1, Control V=2) | 16 bits without flag | N/A | 0 | 2 |

Binary output

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Variable name** | **Description** | **Data type** | **Unit** | **Min** | **Max** |
|  | b\_MGCC\_DataLog\_Batt\_Fault\_Clr | Clear faults, warnings are not affected | 1 bit | N/A | 0 | 1 |
|  | b\_MGCC\_DataLog\_Batt\_Warning\_Clr | Clear warnings, faults are not affected | 1 bit | N/A | 0 | 1 |
|  | b\_MGCC\_DataLog\_Batt\_IE\_cmd | Inertia emulation function enable command (Disable=0, Enable=1) | 1 bit | N/A | 0 | 1 |

Analog outputs

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Variable name** | **Description** | **Data type** | **Unit** | **Min** | **Max** |
|  | i\_MGCC\_DataLog\_ Batt\_Status\_Cmd | Operating state (according to state machine) | 16 bits without flag | N/A | 0 | 11 |
|  | i\_MGCC\_DataLog\_ Batt\_Vol\_cmd | Terminal voltage command for islanded operation and control V mode | 16 bits without flag | V | 0 | 15000 |
|  | i\_MGCC\_DataLog\_ Batt\_Freq\_cmd | Terminal frequency command for islanded operation | 16 bits without flag | 0.01Hz | 0 | 6500 |
|  | f\_MGCC\_DataLog\_ Batt\_P\_cmd | Output power command | 16 bits with flag | W | -106 | 106 |
|  | f\_MGCC\_DataLog\_ Batt\_Q\_cmd | Output reactive power command | 16 bits with flag | var | -106 | 106 |
|  | f\_MGCC\_DataLog\_ Batt\_Q\_PF\_cmd | Output power factor command  1 unit indicates 0.001 | 16 bits with flag | N/A | -1000 | 1000 |
|  | i\_MGCC\_DataLog\_ Batt\_Q\_Mode\_cmd | Reactive power mode command (Constant Q=0 Constant PF=1, Control V=2) | 16 bits without flag | N/A | 0 | 2 |
|  | f\_MGCC\_DataLog\_ Batt\_P\_lim | Output power limit | 16 bits with flag | W | -106 | 106 |
|  | f\_MGCC\_DataLog\_ Batt\_Q\_lim | Output reactive power limit | 16 bits with flag | var | -106 | 106 |
|  | f\_MGCC\_DataLog\_ Batt\_P\_ramp | Output power ramp rate | 16 bits with flag | W/s | -106 | 106 |
|  | f\_MGCC\_DataLog\_ Batt\_Q\_ramp | Output reactive power ramp rate | 16 bits with flag | Var/ | -106 | 106 |

Reserved

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Variable name** | **Description** | **Data type** | **Unit** | **Min** | **Max** |
|  | Reserved\_1 |  |  |  |  |  |
|  | Reserved\_2 |  |  |  |  |  |
|  | Reserved\_3 |  |  |  |  |  |
|  | Reserved\_4 |  |  |  |  |  |
|  | Reserved\_5 |  |  |  |  |  |

**IntelliRupter**

binary input

|  |  |  |
| --- | --- | --- |
|  | b\_MGCC\_DataLog\_PCR-CB-OPN | **IntelliRupter Fault Interrupter Open—All Poles—**On when Pole 1, Pole 2, and Pole 3 interrupter contact status is **Open**. Otherwise off. |
|  | b\_MGCC\_DataLog\_PCR-CB | **IntelliRupter Fault Interrupter Closed—All Poles—**On when Pole 1, Pole 2, and Pole 3 interrupter contact status is **Closed**. Otherwise off. |
|  | b\_MGCC\_DataLog\_PCR-SOURCE-VOLT-X | **Good Source Voltage—Terminal X—**On when the X-side terminal voltages equal or exceed the **Source Voltage Indication** setting for the active profile. Otherwise off. |
|  | b\_MGCC\_DataLog\_PCR-SOURCE-VOLT-Y | **Good Source Voltage—Terminal Y—**On when the Y-side terminal voltages equal or exceed the **Source Voltage Indication** setting for the active profile. Otherwise off. |
|  | b\_MGCC\_DataLog\_PCR-PULSE-FAULT-A | **Pulseclosing, Fault Detected—**On when a fault is detected during the PulseClosing® Technology operation. Off when the IntelliRupter fault interrupter closes or a **Close** command is received. |
|  | b\_MGCC\_DataLog\_PCR-PULSE-FAULT-B |  |
|  | b\_MGCC\_DataLog\_PCR-PULSE-FAULT-C |  |

Analog input

|  |  |  |
| --- | --- | --- |
|  | **Variable name** | **Description** |
|  | f\_MGCC\_DataLog\_PCR-X-IVOLT-A | **Voltage, Pole 1X—**Primary phase-to-ground or phase-to-phase (1X to 2X voltage depending on setup) measured on Pole 1 Terminal X. Each count equals one Vac RMS. |
|  | f\_MGCC\_DataLog\_PCR-X-IVOLT-B | **Voltage, Pole 2X—**Primary phase-to-ground or phase-to-phase (2X to 3X voltage depending on setup) measured on Pole 2 Terminal X. Each count equals one Vac RMS. |
|  | f\_MGCC\_DataLog\_PCR-X-IVOLT-C | **Voltage, Pole 3X—**Primary phase-to-ground or phase-to-phase (3X to 1X voltage depending on setup) measured on Pole 3 Terminal X. Each count equals one Vac RMS. |
|  | f\_MGCC\_DataLog\_PCR-Y-IVOLT-A | **Voltage, Pole 1Y—**Primary phase-to-ground or phase-to-phase (1Y to 2Y voltage depending on setup) measured on Pole 1 Terminal Y. Each count equals one Vac RMS. |
|  | f\_MGCC\_DataLog\_PCR-Y -IVOLT-B | **Voltage, Pole 2Y—**Primary phase-to-ground or phase-to-phase (2Y to 3Y voltage depending on setup) measured on Pole 2 Terminal Y. Each count equals one Vac RMS. |
|  | f\_MGCC\_DataLog\_PCR-Y -IVOLT-C | **Voltage, Pole 3Y—**Primary phase-to-ground or phase-to-phase (3Y to 1Y voltage depending on setup) measured on Pole 3 Terminal Y. Each count equals one Vac RMS. |
|  | f\_MGCC\_DataLog\_PCR-IAMP-A | **Current, Pole 1—**Single-phase true RMS current measured on Pole 1. Each count equals one ampere. |
|  | f\_MGCC\_DataLog\_PCR-IAMP-B | **Current, Pole 2—**Single-phase true RMS current measured on Pole 2. Each count equals one ampere. |
|  | f\_MGCC\_DataLog\_PCR-IAMP-C | **Current, Pole 3—**Single-phase true RMS current measured on Pole 3. Each count equals one ampere. |
|  | f\_MGCC\_DataLog\_PCR-KW-A | **kW, Pole 1—**Single-phase kW on Pole 1 calculated using instantaneous voltage and current. Each count equals one kW. |
|  | f\_MGCC\_DataLog\_PCR-KW-B | **kW, Pole 2—**Single-phase kW on Pole 2 calculated using instantaneous voltage and current. Each count equals one kW. |
|  | f\_MGCC\_DataLog\_PCR-KW-C | **kW, Pole 3—**Single-phase kW on Pole 3 calculated using instantaneous voltage and current. Each count equals one kW. |
|  | f\_MGCC\_DataLog\_PCR-KVAR-A | **kvar, Pole 1—**Single-phase kvar on Pole 1 calculated using apparent power, true power, and phase angle. Each count equals one kvar. |
|  | f\_MGCC\_DataLog\_PCR-KVAR-B | **kvar, Pole 2—**Single-phase kvar on Pole 2 calculated using apparent power, true power, and phase angle. Each count equals one kvar. |
|  | f\_MGCC\_DataLog\_PCR-KVAR-C | **kvar, Pole 3—**Single-phase kvar on Pole 3 calculated using apparent power, true power, and phase angle. Each count equals one kvar. |
|  | f\_MGCC\_DataLog\_PCR-PF-A | **Power Factor, Pole 1—**Single-phase power factor measured on Pole 1 reported as the cosine of the phase angle. A leading power factor is represented by a negative number. Each count equals 0.001 with a 1000 offset (0 = -1.0 PF, 1000 = 0.0 PF, 2000 = 1.0 PF). |
|  | f\_MGCC\_DataLog\_PCR-PF-B | **Power Factor, Pole 2—**Single-phase power factor measured on Pole 2 reported as the cosine of the phase angle. A leading power factor is represented by a negative number. Each count equals 0.001 with a 1000 offset (0 = -1.0 PF, 1000 = 0.0 PF, 2000 = 1.0 PF). |
|  | f\_MGCC\_DataLog\_PCR-PF-C | **Power Factor, Pole 3—**Single-phase power factor measured on Pole 3 reported as the cosine of the phase angle. A leading power factor is represented by a negative number. Each count equals 0.001 with a 1000 offset (0 = -1.0 PF, 1000 = 0.0 PF, 2000 = 1.0 PF). |
|  | f\_MGCC\_DataLog\_PCR-LineFreq | **Line Frequency—**Each count equals 0.01 Hz. |
|  | f\_MGCC\_DataLog\_PCR- PhaseAng\_A | **Phase Angle, X Side Voltage to Y Side Voltage, Pole 1—**Phase angle in degrees between the X side and Y side voltage signals. A positive value indicates that the X side is leading. Each count equals one-eighth degree. |
|  | f\_MGCC\_DataLog\_PCR- PhaseAng\_B | **Phase Angle, X Side Voltage to Y Side Voltage, Pole 2—**Phase angle in degrees between the X side and Y side voltage signals. A positive value indicates that the X side is leading. Each count equals one-eighth degree. |
|  | f\_MGCC\_DataLog\_PCR- PhaseAng\_C | **Phase Angle, X Side Voltage to Y Side Voltage, Pole 3—**Phase angle in degrees between the X side and Y side voltage signals. A positive value indicates that the X side is leading. Each count equals one-eighth degree. |
|  | f\_MGCC\_DataLog\_PCR-LineFreqDiff | **Delta Frequency—**The difference in frequency between the X and Y sides. Reports X frequency minus Y frequency, therefore a positive value indicates higher frequency on the X side and a negative value indicates higher frequency on the Y side. |

Binary output

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| --- | --- | --- | --- | --- | --- | --- |
|  | **Variable name** | **Description** | **Data type** | **Unit** | **Min** | **Max** |
|  | b\_MGCC\_DataLog\_PCR\_Reclose\_Ena | Reclosing enable signal | 1bit | N/A | 0 | 1 |
|  | b\_MGCC\_DataLog\_ PCR\_Close | close signal | 1bit | N/A | 0 | 1 |
|  | b\_MGCC\_DataLog\_ PCR\_Open | open signal | 1bit | N/A | 0 | 1 |

Analog output

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Variable name** | **Description** | **Data type** | **Unit** | **Min** | **Max** |
|  | i\_MGCC\_DataLog\_PCR\_RelaySetting | Relay setting group # | 1bit | N/A | 0 | 1 |

Reserved

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Variable name** | **Description** | **Data type** | **Unit** | **Min** | **Max** |
|  | Reserved\_1 |  |  |  |  |  |
|  | Reserved\_2 |  |  |  |  |  |
|  | Reserved\_3 |  |  |  |  |  |
|  | Reserved\_4 |  |  |  |  |  |
|  | Reserved\_5 |  |  |  |  |  |

MGCC

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Variable name** | **Description** | **Data type** | **Unit** | **Min** | **Max** |
|  | b\_MGCC\_DataLog\_Req\_Conn\_MGCC | MGCC sends request to DMS/SCADA for reconnection | 1bit | N/A | 0 | 1 |
|  | b\_MGCC\_DataLog\_Req\_Disconn\_MGCC | MGCC sends request to DMS/SCADA for disconnection | 1bit | N/A | 0 | 1 |
|  | b\_MGCC\_DataLog\_Resp\_Conn\_req\_DMS | MGCC sends response to reconnection request, requested by DMS/SCADA | 1bit | N/A | 0 | 1 |
|  | b\_MGCC\_DataLog\_Resp\_Disconn\_req\_DMS | MGCC sends response to disconnection request, requested by DMS/SCADA | 1bit | N/A | 0 | 1 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Variable name** | **Description** | **Data type** | **Unit** | **Min** | **Max** |
|  | b\_MGCC\_DataLog\_ Req\_Conn\_DMS | DMS/SCADA sends request to MGCC for reconnection | 1bit | N/A | 0 | 1 |
|  | b\_MGCC\_DataLog\_ Req\_Disconn\_DMS | DMS/SCADA sends request to MGCC for disconnection | 1bit | N/A | 0 | 1 |
|  | b\_MGCC\_DataLog\_ Resp\_Conn\_req\_MGCC | DMS/SCADA sends response to reconnection request, requested by MGCC | 1bit | N/A | 0 | 1 |
|  | b\_MGCC\_DataLog\_ Resp\_Disconn\_req\_MGCC | DMS/SCADA sends response to disconnection request, requested by MGCC | 1bit | N/A | 0 | 1 |

Questions

1. For HTB, how many local controller do we have? Each local controller should have an individual communication port and data set.
2. Do we need to continue working on RTDS for further function implement? If so, I need to create an independent project for RTDS specially.
3. Need feedback of node voltage, active, reactive power, switch states, frequency, phase angle, double check with LIN.