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| Traveler Title | P1 Cryomodule Commissioning | | | |
| Traveler Abstract | P1 cryomodule commissioning. This traveler covers testing of the cryomodule after installation in the injector or linacs. Assumes cryomodule has already been cooled. | | | |
| Traveler ID | P1-ACC-CM-COMM | | | |
| Traveler Revision | R1 | | | |
| Traveler Author | M. Drury | | | |
| Traveler Date | 14-Jun-21 | | | |
| NCR Informative Emails | areilly | | | |
| NCR Dispositioners | drury,fischer,fhumphry,king | | | |
| D3 Emails | areilly,drury,fischer,fhumphry | | | |
| Approval Names | M. Drury | L. King | A. Reilly |  |
| Approval Signatures |  |  |  |  |
| Approval Dates |  |  |  |  |
| Approval Title | Author | Reviewer | Project Manager |  |

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| References | List and Hyperlink all documents related to this traveler. This includes, but is not limited to: safety (THAs, SOPs, etc), drawings, procedures, and facility related documents. | | | |
|  | [Accelerator Operations Directive](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-244027/accel_ops_directives.pdf) | [RT Valve Connection Procedure](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-244028/operational_safety_procedure_form_80521%20RT%20Valve.pdf) |  |  |
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| Revision Note |  |
| R1 | Initial release of this Traveler. |

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| **Step No.** | **Instructions** | **Data Input** |
| 1 | Record the Cryomodule serial number | [[CMSN]] <<CMSN>> |
| 2 | Record the Cavity SN's for each cavity position. (Note: Cavity 1-Supply side, Cavity 8-Return side) | [[P1Cav1SN]] <<CAVSN>>  [[P1Cav2SN]] <<CAVSN>>  [[P1Cav3SN]] <<CAVSN>>  [[P1Cav4SN]] <<CAVSN>>  [[P1Cav5SN]] <<CAVSN>>  [[P1Cav6SN]] <<CAVSN>>  [[P1Cav7SN]] <<CAVSN>>  [[P1Cav8SN]] <<CAVSN>> |
| 3 | Record the installation location.  Format: xLyy  (x = 0,1 or 2 for Injector, North or South Linac.  y = 02 -25 for the zone number.) | [[InstallLocation]] <<SN>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 4 | Record the Insulating Vacuum pressure (VCGxLxx) as displayed in epics. Note any problems or concerns relating to the insulating vacuum in the comment block. | [[InsulatingVacInspector1]] <<SRF>>  [[InsulatingVacPreTestTime]] <<TIMESTAMP>>  [[InsulatingVacPreTest]] <<SCINOT>>  [[InsulatingVacComments]] <<COMMENT>> |
| 5 | Record the Beam Line Vacuum pressure (VIPxLxxB) as displayed in epics. Note any problems or concerns relating to the beamline vacuum in the comment block. | [[BLVacInspector1]] <<SRF>>  [[BLVacPreTestTime]] <<TIMESTAMP>>  [[BLVacPreTest]] <<SCINOT>>  [[BLVacComments]] <<COMMENT>> |
| 6 | Record the Waveguide Vacuum Pressures (VIPxLxx1C –VIPxLxx8C) as displayed in epics. Note any problems or concerns relating to the waveguide vacuums in the comment block. | [[WGVacInspector]] <<SRF>>  [[WGVacPreTestTime]] <<TIMESTAMP>>  [[WGVac1PreTest]] <<SCINOT>>  [[WGVac2PreTest]] <<SCINOT>>  [[WGVac3PreTest]] <<SCINOT>>  [[WGVac4PreTest]] <<SCINOT>>  [[WGVac5PreTest]] <<SCINOT>>  [[WGVac6PreTest]] <<SCINOT>>  [[WGVac7PreTest]] <<SCINOT>>  [[WGVac8PreTest]] <<SCINOT>>  [[WGVacComments]] <<COMMENT>> |

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| **Step No** | **Instructions** | **Data Inputs** |
|  | **High Power Checklist** |  |
| 7 | Upload completed RF Cable Calibration spreadsheet. Ensure that calibration numbers have been entered into the appropriate fields in the Labview power measurement vi. | [[RFCableTech]] <<SRF>>  [[RFCableCompleteTime]] <<TIMESTAMP>>  [[RFCableCalWorksheet]] <<FILEUPLOAD>>  [[RFCableProblems]] <<COMMENT>> |
| 8 | Verify that Decarad chassis is in place and connected Ensure that Geiger-Mueller tubes are connected and correctly positioned around cryomodule. Verify that Decarad signals are live and updating in epics.  Typical setup for this type of cryomodule   * Channel 1 at Tophat for Cavities 1 and 2 * Channel 3 at Tophat for Cavities 3 and 4 * Channel 5 at Top Center of Cryomodule * Channel 6 at Tophat for Cavities 5 and 6 * Channel 7 at Tophat for Cavities 7 and 8 * Channel 9 at Supply Side of Beamline * Channel 10 at Return Side of Beamline. | [[DecaRadInspector]] <<SRF>>  [[DecaRadTime]]<<TIMESTAMP>>  [[DecaRadComments]] <<COMMENT>> |

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| 9 | Test Arc Detectors for Cavities 1-8. Verify that each detector generates a fault and disables RF. Record whether the interlock is working correctly **(Good)** or not **(No)**. Note any problems in the Comment block  **\*\*Do Not Attempt to Supply High Power RF to Cavity if the Arc Detector and Interlock are not Functioning Correctly!\*\*** | [[ArcDetectorInspector]] <<SRF>>  [[ArcDetectorTime]] <<TIMESTAMP>>  [[Cav1ArcDetectorIntlkGood]] <<YESNO>>  [[Cav2ArcDetectorIntlkGood]] <<YESNO>>  [[Cav3ArcDetectorIntlkGood]] <<YESNO>>  [[Cav4ArcDetectorIntlkGood]] <<YESNO>>  [[Cav5ArcDetectorIntlkGood]] <<YESNO>>  [[Cav6ArcDetectorIntlkGood]] <<YESNO>>  [[Cav7ArcDetectorIntlkGood]] <<YESNO>>  [[Cav8ArcDetectorIntlkGood]] <<YESNO>> |
| 10 | Test Warm Window IR Detectors for Cavities 1-8. Verify that each detector generates a fault and disables RF. Record whether the interlock is working correctly **(Good)** or not **(No)**. Note any problems in the Comment block.  **\*\*Do Not Attempt to Supply High Power RF to Cavity if the IR Detector and Interlock are not Functioning Correctly!\*\*** | [[IRDetectorInspector]] <<SRF>>  [[IRDetectorTime]] <<TIMESTAMP>>  [[Cav1IRDetectorIntlkGood]] <<YESNO>>  [[Cav2IRDetectorIntlkGood]] <<YESNO>>  [[Cav3IRDetectorIntlkGood]] <<YESNO>>  [[Cav4IRDetectorIntlkGood]] <<YESNO>>  [[Cav5IRDetectorIntlkGood]] <<YESNO>>  [[Cav6IRDetectorIntlkGood]] <<YESNO>>  [[Cav7IRDetectorIntlkGood]] <<YESNO>>  [[Cav8IRDetectorIntlkGood]] <<YESNO>> |
| 11 | Use the Comment block to list any problems associated with Arc and/or IR detectors. | [[ArcAndIRIntlkComments]] <<COMMENT>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 12 | Test the Beamline Vacuum Interlock. Verify that a fault is generated and RF is disabled. Record whether the interlock is working correctly **Good (Yes)** or not **(No)**.  **\*\* Do Not Attempt to Supply High Power RF to any Cavity if the Beamline Vacuum Interlock is Not Working Properly \*\*** | [[BLVacIntlkInspector]] <<SRF>>  [[BLVacIntlkInspectTime]] <<TIMESTAMP>>  [[BLVacIntlkGood]] <<YESNO>> |
| 13 | Test the Waveguide Vacuum Interlock. Verify that a fault is generated and RF is disabled. Record whether the interlock is working correctly **Good (Yes)** or not **(No)**.  **\*\* Do Not Attempt to Supply High Power RF to Cavity if the Waveguide Vacuum Interlock is Not Working Properly \*\*** | [[WGVacIntlkInspector]] <<SRF>>  [[WGVacIntlkInspectTime]] <<TIMESTAMP>>  [[WG1VacIntlkGood]] <<YESNO>>  [[WG2VacIntlkGood]] <<YESNO>>  [[WG3VacIntlkGood]] <<YESNO>>  [[WG4VacIntlkGood]] <<YESNO>>  [[WG5VacIntlkGood]] <<YESNO>>  [[WG6VacIntlkGood]] <<YESNO>>  [[WG7VacIntlkGood]] <<YESNO>>  [[WG8VacIntlkGood]] <<YESNO>> |
| 14 | Use the Comment block to list any problems associated with vacuum interlocks. | [[VacuumIntlkComments]] <<COMMENT>> |

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| **Step No** | **Instructions** | | **Data Inputs** |
|  | **Mechanical Tuner Section** | |  |
| 15 | Tune each cavity to 1497 MHz: ± 1 kHz.  Record the initial frequency.  Tune the cavity.  Record the final tuned frequency. | | [[CavityTuneOperator]] <<SRF>>  [[CavityTuneCompletion]] <<TIMESTAMP>> |
| **Cavity** | **Initial Frequency (MHz)** | **Limit Switch Activation?** | **Tuned Frequency (MHz)** |
| **1** | [[Cav1InitFreq]] <<FLOAT>> | [[Cav1LimitSwitchActivate]] {{Upper Limit,Lower Limit}} <<RADIO>> | [[Cav1TunedFreq]] <<FLOAT>> |
| **2** | [[Cav2InitFreq]] <<FLOAT>> | [[Cav2LimitSwitchActivate]] {{Upper Limit,Lower Limit}} <<RADIO>> | [[Cav2TunedFreq]] <<FLOAT>> |
| **3** | [[Cav3InitFreq]] <<FLOAT>> | [[Cav3LimitSwitchActivate]] {{Upper Limit,Lower Limit}} <<RADIO>> | [[Cav3TunedFreq]] <<FLOAT>> |
| **4** | [[Cav4InitFreq]] <<FLOAT>> | [[Cav4LimitSwitchActivate]] {{Upper Limit,Lower Limit}} <<RADIO>> | [[Cav4TunedFreq]] <<FLOAT>> |
| **5** | [[Cav5InitFreq]] <<FLOAT>> | [[Cav5LimitSwitchActivate]] {{Upper Limit,Lower Limit}} <<RADIO>> | [[Cav5TunedFreq]] <<FLOAT>> |
| **6** | [[Cav6InitFreq]] <<FLOAT>> | [[Cav6LimitSwitchActivate]] {{Upper Limit,Lower Limit}} <<RADIO>> | [[Cav6TunedFreq]] <<FLOAT>> |
| **7** | [[Cav7InitFreq]] <<FLOAT>> | [[Cav7LimitSwitchActivate]] {{Upper Limit,Lower Limit}} <<RADIO>> | [[Cav7TunedFreq]] <<FLOAT>> |
| **8** | [[Cav8InitFreq]] <<FLOAT>> | [[Cav8LimitSwitchActivate]] {{Upper Limit,Lower Limit}} <<RADIO>> | [[Cav8TunedFreq]] <<FLOAT>> |
| 16 | Use the Comment block to list any problems associated with the tuners. | | [[TunerComments]] <<COMMENT>> |

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| **Step No.** | | **Instructions** | | | | | **Data Inputs** | | |
| 17 | | Measure the **Cold Cavity Passband Frequencies** (in MHz) using a network analyzer.  Record the frequencies (in MHz) and Loaded Q's (QL) in the tables that follow.  Use file upload to save additional information of interest.  **Complete this measurement after the cavities are tuned to 1497 MHz.** | | | | | [[InstalledPassbandTech]] <<SRF>>  [[InstalledPassbandComplete]] <<TIMESTAMP>> | | |
| **Cavity** | **1/7pi (MHz)** | | **2/7pi (MHz)** | **3/7pi (MHz)** | **4/7pi (MHz)** | **5/7pi (MHz)** | | **6/7pi (MHz)** | **Pi (MHz)** |
| **1** | [[C1Inst17Pi]] <<FLOAT>> | | [[C1Inst27Pi]] <<FLOAT>> | [[C1Inst37Pi]] <<FLOAT>> | [[C1Inst47Pi]] <<FLOAT>> | [[C1Inst57Pi]] <<FLOAT>> | | [[C1Inst67Pi]] <<FLOAT>> | [[C1InstPi]] <<FLOAT>> |
| **2** | [[C2Inst17Pi]] <<FLOAT>> | | [[C2Inst27Pi]] <<FLOAT>> | [[C2Inst37Pi]] <<FLOAT>> | [[C2Inst47Pi]] <<FLOAT>> | [[C2Inst57Pi]] <<FLOAT>> | | [[C2Inst67Pi]] <<FLOAT>> | [[C2InstPi]] <<FLOAT>> |
| **3** | [[C3Inst17Pi]] <<FLOAT>> | | [[C3Inst27Pi]] <<FLOAT>> | [[C3Inst37Pi]] <<FLOAT>> | [[C3Inst47Pi]] <<FLOAT>> | [[C3Inst57Pi]] <<FLOAT>> | | [[C3Inst67Pi]] <<FLOAT>> | [[C3InstPi]] <<FLOAT>> |
| **4** | [[C4Inst17Pi]] <<FLOAT>> | | [[C4Inst27Pi]] <<FLOAT>> | [[C4Inst37Pi]] <<FLOAT>> | [[C4Inst47Pi]] <<FLOAT>> | [[C4Inst57Pi]] <<FLOAT>> | | [[C4Inst67Pi]] <<FLOAT>> | [[C4InstPi]] <<FLOAT>> |
| **5** | [[C5Inst17Pi]] <<FLOAT>> | | [[C5Inst27Pi]] <<FLOAT>> | [[C5Inst37Pi]] <<FLOAT>> | [[C5Inst47Pi]] <<FLOAT>> | [[C5Inst57Pi]] <<FLOAT>> | | [[C5Inst67Pi]] <<FLOAT>> | [[C5InstPi]] <<FLOAT>> |
| **6** | [[C6Inst17Pi]] <<FLOAT>> | | [[C6Inst27Pi]] <<FLOAT>> | [[C6Inst37Pi]] <<FLOAT>> | [[C6Inst47Pi]] <<FLOAT>> | [[C6Inst57Pi]] <<FLOAT>> | | [[C6Inst67Pi]] <<FLOAT>> | [[C6InstPi]] <<FLOAT>> |
| **7** | [[C7Inst17Pi]] <<FLOAT>> | | [[C7Inst27Pi]] <<FLOAT>> | [[C7Inst37Pi]] <<FLOAT>> | [[C7Inst47Pi]] <<FLOAT>> | [[C7Inst57Pi]] <<FLOAT>> | | [[C7Inst67Pi]] <<FLOAT>> | [[C7InstPi]] <<FLOAT>> |
| **8** | [[C8Inst17Pi]] <<FLOAT>> | | [[C8Inst27Pi]] <<FLOAT>> | [[C8Inst37Pi]] <<FLOAT>> | [[C8Inst47Pi]] <<FLOAT>> | [[C8Inst57Pi]] <<FLOAT>> | | [[C8Inst67Pi]] <<FLOAT>> | [[C8InstPi]] <<FLOAT>> |
| 18 | | Use the Comment block to list any issues with passband measurement | | | | | [[PassBandComments]] <<COMMENT>> | | |

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| **High Power RF Measurements** | | |
| **Step No.** | **Instructions** | **Data Inputs** |
| 19 | * After initial tuning of RF to the Cavity under Test, measure the Qext's of the Fundamental Power Coupler and Field Probe. Record those values in the appropriate fields in the table for the Cavity under Test below. * Proceed with the determination of Emax for the Cavity under Test. Once Emax has been determined, record the requested data in the table below. * Proceed with the determination of Emaxop by completing a One Hour Run. Enter all requested data in the table for the Cavity under Test below. * At the end of a successful One Hour Run, use the automated Labview routine to ramp down the gradient and collect field emission data. Enter all requested data in the table for the Cavity under Test below. (Note: frequency data is also collected at this time for static Lorentz measurement.) * After completing all gradient measurements, proceed to Q0 measurements. Complete a Q0 vs. Eacc curve up to Emaxop in 1 MV/m steps. Collect pressure sensitivity data during pump downs for each cavity. Record the requested data in the table for the Cavity under Test below. | [[CommentOnInstructions]] <<COMMENT>> |

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| **Cavity 1** | | |
| **Step No** | **Instructions** | **Data Inputs** |
| 20 | Record QextFPC and QextFP for Cavity 1 and the gradient at which measurement was made (in MV/m). | [[Cav1QextOperator]] <<SRF>>  [[Cav1QextMeasTime]] <<TIMESTAMP>>  [[Cav1QextFPC]] <<SCINOT>>  [[Cav1QextFP]] <<SCINOT>>  [[Cav1QextMeasGradient]] <<FLOAT>> |
| 21 | Record the value displayed by the RxyzGMES field.that corresponds to the Gradient recorded in Step x.  Record the value of RxyzGGPRB if this value was modified. | [[Cav1GMES]] <<FLOAT>>  [[Cav1GGPRB]] <<SCINOT>> |
| 22 | Record the Maximum gradient (Emax) for Cavity 1 and the gradient limiting condition. | [[Cav1EmaxOperator]] <<SRF>>  [[Cav1EmaxMeasTime]] <<TIMESTAMP>>  [[Cav1Emax]] <<FLOAT>> (MV/m)  [[Cav1EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault, BL Vacuum Fault, WG Vacuum Fault,RF Power, Heat Load,End Group Quench}} <<SELECT>> |
| 23 | Record the gradient at which a successful One Hour Run was completed for Cavity 1. Upload spreadsheet containing data on the One Hour run. | [[Cav1OneHourRunOperator]] <<SRF>>  [[Cav1OneHourRunTime]] <<TIMESTAMP>>  [[Cav1Emaxop]] <<FLOAT>>  [[Cav1OneHourRunFile]] <<FILEUPLOAD>> |
| 24 | Record the Field Emission Onset gradient for Cavity 1. Upload the file containing Field emission data. | [[Cav1FEOperator]] <<SRF>>  [[Cav1FEMeasTime]] <<TIMESTAMP>>  [[Cav1FEOnset]] <<FLOAT>> (MV/m)  [[Cav1FEMaxDoseRate]] <<FLOAT>> (R/hr)  [[Cav1FEFile]] <<FILEUPLOAD>> |
| 25 | After completing the Q0 measurement sequence for Cavity 1, record the values of Q0 at 19 MV/m and / or Emaxop. Upload the Q0 measurement file. | [[Cav1QoOperator]] <<SRF>>  [[Cav1QoMeasTime]] <<TIMESTAMP>>  [[Cav1QoNineteen]] <<SCINOT>>  [[Cav1QoEmaxop]] <<SCINOT>>  [[Cav1QoFile]] <<FILEUPLOAD>> |
| 26 | Record the Pressure Sensitivity data collected during the Q0 measurement sequence | [[Cav1PressureSensOperator]] <<SRF>>  [[Cav1PressureSensTime]] <<TIMESTAMP>>  [[Cav1PressureSensitivity]] <<FLOAT>>  [[Cav1PressureSensFile]] <<FILEUPLOAD>> |
| 27 | Record the Static Lorentz coefficient calculated from data gathered during field emission measurements. | [[Cav1StaticLorentzOperator]] <<SRF>>  [[Cav1StaticLorentzTime]] <<TIMESTAMP>>  [[Cav1StaticLorentzCoeff]] <<FLOAT>>  [[Cav1StaticLorentzFile]] <<FILEUPLOAD>> |
| 28 | Upload files containing microphonics calculations for Cavity 1. | [[Cav1MicrophonicsOperator]] <<SRF>>  [[Cav1MicrophonicsTime]] <<TIMESTAMP>>  [[Cav1MicrophonicsFile]] <<FILEUPLOAD>> |
| 29 | Use the comment box to list any problems or anything unusual about the performance of Cavity 1. | [[Cav1HPRFComments]] <<COMMENT>> |

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| **Cavity 2** | | |
| **Step No** | **Instructions** | **Data Inputs** |
| 30 | Record QextFPC and QextFP for Cavity 2 and the gradient at which measurement was made (in MV/m). | [[Cav2QextOperator]] <<SRF>>  [[Cav2QextMeasTime]] <<TIMESTAMP>>  [[Cav2QextFPC]] <<SCINOT>>  [[Cav2QextFP]] <<SCINOT>>  [[Cav2QextMeasGradient]] <<FLOAT>> |
| 31 | Record the value displayed by the RxyzGMES field.that corresponds to the Gradient recorded in Step x.  Record the value of RxyzGGPRB if this value was modified. | [[Cav2GMES]] <<FLOAT>>  [[Cav2GGPRB]] <<SCINOT>> |
| 32 | Record the Maximum gradient (Emax) for Cavity 2 and the gradient limiting condition. | [[Cav2EmaxOperator]] <<SRF>>  [[Cav2EmaxMeasTime]] <<TIMESTAMP>>  [[Cav2Emax]] <<FLOAT>> (MV/m)  [[Cav2EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault, BL Vacuum Fault, WG Vacuum Fault,RF Power, Heat Load,End Group Quench}} <<SELECT>> |
| 33 | Record the gradient at which a successful One Hour Run was completed for Cavity 2. Upload spreadsheet containing data on the One Hour run. | [[Cav2OneHourRunOperator]] <<SRF>>  [[Cav2OneHourRunTime]] <<TIMESTAMP>>  [[Cav2Emaxop]] <<FLOAT>>  [[Cav2OneHourRunFile]] <<FILEUPLOAD>> |
| 34 | Record the Field Emission Onset gradient for Cavity 2. Upload the file containing Field emission data. | [[Cav2FEOperator]] <<SRF>>  [[Cav2FEMeasTime]] <<TIMESTAMP>>  [[Cav2FEOnset]] <<FLOAT>> (MV/m)  [[Cav2FEMaxDoseRate]] <<FLOAT>> (R/hr)  [[Cav2FEFile]] <<FILEUPLOAD>> |
| 35 | After completing the Q0 measurement sequence for Cavity 2, record the values of Q0 at 19 MV/m and / or Emaxop. Upload the Q0 measurement file. | [[Cav2QoOperator]] <<SRF>>  [[Cav2QoMeasTime]] <<TIMESTAMP>>  [[Cav2QoNineteen]] <<SCINOT>>  [[Cav2QoEmaxop]] <<SCINOT>>  [[Cav2QoFile]] <<FILEUPLOAD>> |
| 36 | Record the Pressure Sensitivity data collected during the Q0 measurement sequence | [[Cav2PressureSensOperator]] <<SRF>>  [[Cav2PressureSensTime]] <<TIMESTAMP>>  [[Cav2PressureSensitivity]] <<FLOAT>>  [[Cav2PressureSensFile]] <<FILEUPLOAD>> |
| 37 | Record the Static Lorentz coefficient calculated from data gathered during field emission measurements. | [[Cav2StaticLorentzOperator]] <<SRF>>  [[Cav2StaticLorentzTime]] <<TIMESTAMP>>  [[Cav2StaticLorentzCoeff]] <<FLOAT>>  [[Cav2StaticLorentzFile]] <<FILEUPLOAD>> |
| 38 | Upload files containing microphonics calculations for this Cavity 2. | [[Cav2MicrophonicsOperator]] <<SRF>>  [[Cav2MicrophonicsTime]] <<TIMESTAMP>>  [[Cav2MicrophonicsFile]] <<FILEUPLOAD>> |
| 39 | Use the comment box to list any problems or anything unusual about the performance of Cavity 2. | [[Cav2HPRFComments]] <<COMMENT>> |

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|  | **Cavity 3** |  |
| **Step No** | **Instructions** | **Data Inputs** |
| 40 | Record QextFPC and QextFP for Cavity 3 and the gradient at which measurement was made (in MV/m). | [[Cav3QextOperator]] <<SRF>>  [[Cav3QextMeasTime]] <<TIMESTAMP>>  [[Cav3QextFPC]] <<SCINOT>>  [[Cav3QextFP]] <<SCINOT>>  [[Cav3QextMeasGradient]] <<FLOAT>> |
| 41 | Record the value displayed by the RxyzGMES field.that corresponds to the Gradient recorded in Step x.  Record the value of RxyzGGPRB if this value was modified. | [[Cav3GMES]] <<FLOAT>>  [[Cav3GGPRB]] <<SCINOT>> |
| 42 | Record the Maximum gradient (Emax) for Cavity 3 and the gradient limiting condition. | [[Cav3EmaxOperator]] <<SRF>>  [[Cav3EmaxMeasTime]] <<TIMESTAMP>>  [[Cav3Emax]] <<FLOAT>> (MV/m)  [[Cav3EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault, BL Vacuum Fault, WG Vacuum Fault,RF Power, Heat Load,End Group Quench}} <<SELECT>> |
| 43 | Record the gradient at which a successful One Hour Run was completed for Cavity 3. Upload spreadsheet containing data on the One Hour run. | [[Cav3OneHourRunOperator]] <<SRF>>  [[Cav3OneHourRunTime]] <<TIMESTAMP>>  [[Cav3Emaxop]] <<FLOAT>>  [[Cav3OneHourRunFile]] <<FILEUPLOAD>> |
| 44 | Record the Field Emission Onset gradient for Cavity 3. Upload the file containing Field emission data. | [[Cav3FEOperator]] <<SRF>>  [[Cav3FEMeasTime]] <<TIMESTAMP>>  [[Cav3FEOnset]] <<FLOAT>> (MV/m)  [[Cav3FEMaxDoseRate]] <<FLOAT>> (R/hr)  [[Cav3FEFile]] <<FILEUPLOAD>> |
| 45 | After completing the Q0 measurement sequence for Cavity 3, record the values of Q0 at 19 MV/m and / or Emaxop. Upload the Q0 measurement file. | [[Cav3QoOperator]] <<SRF>>  [[Cav3QoMeasTime]] <<TIMESTAMP>>  [[Cav3QoNineteen]] <<SCINOT>>  [[Cav3QoEmaxop]] <<SCINOT>>  [[Cav3QoFile]] <<FILEUPLOAD>> |
| 46 | Record the Pressure Sensitivity data collected during the Q0 measurement sequence | [[Cav3PressureSensOperator]] <<SRF>>  [[Cav3PressureSensTime]] <<TIMESTAMP>>  [[Cav3PressureSensitivity]] <<FLOAT>>  [[Cav3PressureSensFile]] <<FILEUPLOAD>> |
| 47 | Record the Static Lorentz coefficient calculated from data gathered during field emission measurements. | [[Cav3StaticLorentzOperator]] <<SRF>>  [[Cav3StaticLorentzTime]] <<TIMESTAMP>>  [[Cav3StaticLorentzCoeff]] <<FLOAT>>  [[Cav3StaticLorentzFile]] <<FILEUPLOAD>> |
| 48 | Upload files containing microphonics calculations for this Cavity 3. | [[Cav3MicrophonicsOperator]] <<SRF>>  [[Cav3MicrophonicsTime]] <<TIMESTAMP>>  [[Cav3MicrophonicsFile]] <<FILEUPLOAD>> |
| 49 | Use the comment box to list any problems or anything unusual about the performance of Cavity 3. | [[Cav3HPRFComments]] <<COMMENT>> |

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| **Cavity 4** | | |
| **Step No** | **Instructions** | **Data Inputs** |
| 50 | Record QextFPC and QextFP for Cavity 4 and the gradient at which measurement was made (in MV/m). | [[Cav4QextOperator]] <<SRF>>  [[Cav4QextMeasTime]] <<TIMESTAMP>>  [[Cav4QextFPC]] <<SCINOT>>  [[Cav4QextFP]] <<SCINOT>>  [[Cav4QextMeasGradient]] <<FLOAT>> |
| 51 | Record the value displayed by the RxyzGMES field.that corresponds to the Gradient recorded in Step x.  Record the value of RxyzGGPRB if this value was modified. | [[Cav4GMES]] <<FLOAT>>  [[Cav4GGPRB]] <<SCINOT>> |
| 52 | Record the Maximum gradient (Emax) for Cavity 4 and the gradient limiting condition. | [[Cav4EmaxOperator]] <<SRF>>  [[Cav4EmaxMeasTime]] <<TIMESTAMP>>  [[Cav4Emax]] <<FLOAT>> (MV/m)  [[Cav4EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault, BL Vacuum Fault, WG Vacuum Fault,RF Power, Heat Load,End Group Quench}} <<SELECT>> |
| 53 | Record the gradient at which a successful One Hour Run was completed for Cavity 4. Upload spreadsheet containing data on the One Hour run. | [[Cav4OneHourRunOperator]] <<SRF>>  [[Cav4OneHourRunTime]] <<TIMESTAMP>>  [[Cav4Emaxop]] <<FLOAT>>  [[Cav4OneHourRunFile]] <<FILEUPLOAD>> |
| 54 | Record the Field Emission Onset gradient for Cavity 4. Upload the file containing Field emission data. | [[Cav4FEOperator]] <<SRF>>  [[Cav4FEMeasTime]] <<TIMESTAMP>>  [[Cav4FEOnset]] <<FLOAT>> (MV/m)  [[Cav4FEMaxDoseRate]] <<FLOAT>> (R/hr)  [[Cav4FEFile]] <<FILEUPLOAD>> |
| 55 | After completing the Q0 measurement sequence for Cavity 4, record the values of Q0 at 19 MV/m and / or Emaxop. Upload the Q0 measurement file. | [[Cav4QoOperator]] <<SRF>>  [[Cav4QoMeasTime]] <<TIMESTAMP>>  [[Cav4QoNineteen]] <<SCINOT>>  [[Cav4QoEmaxop]] <<SCINOT>>  [[Cav4QoFile]] <<FILEUPLOAD>> |
| 56 | Record the Pressure Sensitivity data collected during the Q0 measurement sequence | [[Cav4PressureSensOperator]] <<SRF>>  [[Cav4PressureSensTime]] <<TIMESTAMP>>  [[Cav4PressureSensitivity]] <<FLOAT>>  [[Cav4PressureSensFile]] <<FILEUPLOAD>> |
| 57 | Record the Static Lorentz coefficient calculated from data gathered during field emission measurements. | [[Cav4StaticLorentzOperator]] <<SRF>>  [[Cav4StaticLorentzTime]] <<TIMESTAMP>>  [[Cav4StaticLorentzCoeff]] <<FLOAT>>  [[Cav4StaticLorentzFile]] <<FILEUPLOAD>> |
| 58 | Upload files containing microphonics calculations for this Cavity 4. | [[Cav4MicrophonicsOperator]] <<SRF>>  [[Cav4MicrophonicsTime]] <<TIMESTAMP>>  [[Cav4MicrophonicsFile]] <<FILEUPLOAD>> |
| 59 | Use the comment box to list any problems or anything unusual about the performance of Cavity 4. | [[Cav4HPRFComments]] <<COMMENT>> |

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| **Cavity 5** | | |
| **Step No** | **Instructions** | **Data Inputs** |
| 60 | Record QextFPC and QextFP for Cavity 5 and the gradient at which measurement was made (in MV/m). | [[Cav5QextOperator]] <<SRF>>  [[Cav5QextMeasTime]] <<TIMESTAMP>>  [[Cav5QextFPC]] <<SCINOT>>  [[Cav5QextFP]] <<SCINOT>>  [[Cav5QextMeasGradient]] <<FLOAT>> |
| 61 | Record the value displayed by the RxyzGMES field.that corresponds to the Gradient recorded in Step x.  Record the value of RxyzGGPRB if this value was modified. | [[Cav5GMES]] <<FLOAT>>  [[Cav5GGPRB]] <<SCINOT>> |
| 62 | Record the Maximum gradient (Emax) for Cavity 5 and the gradient limiting condition. | [[Cav5EmaxOperator]] <<SRF>>  [[Cav5EmaxMeasTime]] <<TIMESTAMP>>  [[Cav5Emax]] <<FLOAT>> (MV/m)  [[Cav5EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault, BL Vacuum Fault, WG Vacuum Fault,RF Power, Heat Load,End Group Quench}} <<SELECT>> |
| 63 | Record the gradient at which a successful One Hour Run was completed for Cavity 5. Upload spreadsheet containing data on the One Hour run. | [[Cav5OneHourRunOperator]] <<SRF>>  [[Cav5OneHourRunTime]] <<TIMESTAMP>>  [[Cav5Emaxop]] <<FLOAT>>  [[Cav5OneHourRunFile]] <<FILEUPLOAD>> |
| 64 | Record the Field Emission Onset gradient for Cavity 5. Upload the file containing Field emission data. | [[Cav5FEOperator]] <<SRF>>  [[Cav5FEMeasTime]] <<TIMESTAMP>>  [[Cav5FEOnset]] <<FLOAT>> (MV/m)  [[Cav5FEMaxDoseRate]] <<FLOAT>> (R/hr)  [[Cav5FEFile]] <<FILEUPLOAD>> |
| 65 | After completing the Q0 measurement sequence for Cavity 5, record the values of Q0 at 19 MV/m and / or Emaxop. Upload the Q0 measurement file. | [[Cav5QoOperator]] <<SRF>>  [[Cav5QoMeasTime]] <<TIMESTAMP>>  [[Cav5QoNineteen]] <<SCINOT>>  [[Cav5QoEmaxop]] <<SCINOT>>  [[Cav5QoFile]] <<FILEUPLOAD>> |
| 66 | Record the Pressure Sensitivity data collected during the Q0 measurement sequence | [[Cav5PressureSensOperator]] <<SRF>>  [[Cav5PressureSensTime]] <<TIMESTAMP>>  [[Cav5PressureSensitivity]] <<FLOAT>>  [[Cav5PressureSensFile]] <<FILEUPLOAD>> |
| 67 | Record the Static Lorentz coefficient calculated from data gathered during field emission measurements. | [[Cav5StaticLorentzOperator]] <<SRF>>  [[Cav5StaticLorentzTime]] <<TIMESTAMP>>  [[Cav5StaticLorentzCoeff]] <<FLOAT>>  [[Cav5StaticLorentzFile]] <<FILEUPLOAD>> |
| 68 | Upload files containing microphonics calculations for this Cavity 5. | [[Cav5MicrophonicsOperator]] <<SRF>>  [[Cav5MicrophonicsTime]] <<TIMESTAMP>>  [[Cav5MicrophonicsFile]] <<FILEUPLOAD>> |
| 69 | Use the comment box to list any problems or anything unusual about the performance of Cavity 5. | [[Cav5HPRFComments]] <<COMMENT>> |

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| **Cavity 6** | | |
| **Step No** | **Instructions** | **Data Inputs** |
| 70 | Record QextFPC and QextFP for Cavity 6 and the gradient at which measurement was made (in MV/m). | [[Cav6QextOperator]] <<SRF>>  [[Cav6QextMeasTime]] <<TIMESTAMP>>  [[Cav6QextFPC]] <<SCINOT>>  [[Cav6QextFP]] <<SCINOT>>  [[Cav6QextMeasGradient]] <<FLOAT>> |
| 71 | Record the value displayed by the RxyzGMES field.that corresponds to the Gradient recorded in Step x.  Record the value of RxyzGGPRB if this value was modified. | [[Cav6GMES]] <<FLOAT>>  [[Cav6GGPRB]] <<SCINOT>> |
| 72 | Record the Maximum gradient (Emax) for Cavity 6 and the gradient limiting condition. | [[Cav6EmaxOperator]] <<SRF>>  [[Cav6EmaxMeasTime]] <<TIMESTAMP>>  [[Cav6Emax]] <<FLOAT>> (MV/m)  [[Cav6EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault, BL Vacuum Fault, WG Vacuum Fault,RF Power, Heat Load,End Group Quench}} <<SELECT>> |
| 73 | Record the gradient at which a successful One Hour Run was completed for Cavity 6. Upload spreadsheet containing data on the One Hour run. | [[Cav6OneHourRunOperator]] <<SRF>>  [[Cav6OneHourRunTime]] <<TIMESTAMP>>  [[Cav6Emaxop]] <<FLOAT>>  [[Cav6OneHourRunFile]] <<FILEUPLOAD>> |
| 74 | Record the Field Emission Onset gradient for Cavity 6. Upload the file containing Field emission data. | [[Cav6FEOperator]] <<SRF>>  [[Cav6FEMeasTime]] <<TIMESTAMP>>  [[Cav6FEOnset]] <<FLOAT>> (MV/m)  [[Cav6FEMaxDoseRate]] <<FLOAT>> (R/hr)  [[Cav6FEFile]] <<FILEUPLOAD>> |
| 75 | After completing the Q0 measurement sequence for Cavity 6, record the values of Q0 at 19 MV/m and / or Emaxop. Upload the Q0 measurement file. | [[Cav6QoOperator]] <<SRF>>  [[Cav6QoMeasTime]] <<TIMESTAMP>>  [[Cav6QoNineteen]] <<SCINOT>>  [[Cav6QoEmaxop]] <<SCINOT>>  [[Cav6QoFile]] <<FILEUPLOAD>> |
| 76 | Record the Pressure Sensitivity data collected during the Q0 measurement sequence | [[Cav6PressureSensOperator]] <<SRF>>  [[Cav6PressureSensTime]] <<TIMESTAMP>>  [[Cav6PressureSensitivity]] <<FLOAT>>  [[Cav6PressureSensFile]] <<FILEUPLOAD>> |
| 77 | Record the Static Lorentz coefficient calculated from data gathered during field emission measurements. | [[Cav6StaticLorentzOperator]] <<SRF>>  [[Cav6StaticLorentzTime]] <<TIMESTAMP>>  [[Cav6StaticLorentzCoeff]] <<FLOAT>>  [[Cav6StaticLorentzFile]] <<FILEUPLOAD>> |
| 78 | Upload files containing microphonics calculations for this Cavity 6. | [[Cav6MicrophonicsOperator]] <<SRF>>  [[Cav6MicrophonicsTime]] <<TIMESTAMP>>  [[Cav6MicrophonicsFile]] <<FILEUPLOAD>> |
| 79 | Use the comment box to list any problems or anything unusual about the performance of Cavity 6. | [[Cav6HPRFComments]] <<COMMENT>> |

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| **Cavity 7** | | |
| **Step No** | **Instructions** | **Data Inputs** |
| 80 | Record QextFPC and QextFP for Cavity 7 and the gradient at which measurement was made (in MV/m). | [[Cav7QextOperator]] <<SRF>>  [[Cav7QextMeasTime]] <<TIMESTAMP>>  [[Cav7QextFPC]] <<SCINOT>>  [[Cav7QextFP]] <<SCINOT>>  [[Cav7QextMeasGradient]] <<FLOAT>> |
| 81 | Record the value displayed by the RxyzGMES field.that corresponds to the Gradient recorded in Step x.  Record the value of RxyzGGPRB if this value was modified. | [[Cav7GMES]] <<FLOAT>>  [[Cav7GGPRB]] <<SCINOT>> |
| 82 | Record the Maximum gradient (Emax) for Cavity 7 and the gradient limiting condition. | [[Cav7EmaxOperator]] <<SRF>>  [[Cav7EmaxMeasTime]] <<TIMESTAMP>>  [[Cav7Emax]] <<FLOAT>> (MV/m)  [[Cav7EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault, BL Vacuum Fault, WG Vacuum Fault,RF Power, Heat Load,End Group Quench}} <<SELECT>> |
| 83 | Record the gradient at which a successful One Hour Run was completed for Cavity 7. Upload spreadsheet containing data on the One Hour run. | [[Cav7OneHourRunOperator]] <<SRF>>  [[Cav7OneHourRunTime]] <<TIMESTAMP>>  [[Cav7Emaxop]] <<FLOAT>>  [[Cav7OneHourRunFile]] <<FILEUPLOAD>> |
| 84 | Record the Field Emission Onset gradient for Cavity 7. Upload the file containing Field emission data. | [[Cav7FEOperator]] <<SRF>>  [[Cav7FEMeasTime]] <<TIMESTAMP>>  [[Cav7FEOnset]] <<FLOAT>> (MV/m)  [[Cav7FEMaxDoseRate]] <<FLOAT>> (R/hr)  [[Cav7FEFile]] <<FILEUPLOAD>> |
| 85 | After completing the Q0 measurement sequence for Cavity 7, record the values of Q0 at 19 MV/m and / or Emaxop. Upload the Q0 measurement file. | [[Cav7QoOperator]] <<SRF>>  [[Cav7QoMeasTime]] <<TIMESTAMP>>  [[Cav7QoNineteen]] <<SCINOT>>  [[Cav7QoEmaxop]] <<SCINOT>>  [[Cav7QoFile]] <<FILEUPLOAD>> |
| 86 | Record the Pressure Sensitivity data collected during the Q0 measurement sequence | [[Cav7PressureSensOperator]] <<SRF>>  [[Cav7PressureSensTime]] <<TIMESTAMP>>  [[Cav7PressureSensitivity]] <<FLOAT>>  [[Cav7PressureSensFile]] <<FILEUPLOAD>> |
| 87 | Record the Static Lorentz coefficient calculated from data gathered during field emission measurements. | [[Cav7StaticLorentzOperator]] <<SRF>>  [[Cav7StaticLorentzTime]] <<TIMESTAMP>>  [[Cav7StaticLorentzCoeff]] <<FLOAT>>  [[Cav7StaticLorentzFile]] <<FILEUPLOAD>> |
| 88 | Upload files containing microphonics calculations for this Cavity 7. | [[Cav7MicrophonicsOperator]] <<SRF>>  [[Cav7MicrophonicsTime]] <<TIMESTAMP>>  [[Cav7MicrophonicsFile]] <<FILEUPLOAD>> |
| 89 | Use the comment box to list any problems or anything unusual about the performance of Cavity 7. | [[Cav7HPRFComments]] <<COMMENT>> |

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| **Cavity 8** | | |
| **Step No** | **Instructions** | **Data Inputs** |
| 90 | Record QextFPC and QextFP for Cavity 8 and the gradient at which measurement was made (in MV/m). | [[Cav8QextOperator]] <<SRF>>  [[Cav8QextMeasTime]] <<TIMESTAMP>>  [[Cav8QextFPC]] <<SCINOT>>  [[Cav8QextFP]] <<SCINOT>>  [[Cav8QextMeasGradient]] <<FLOAT>> |
| 91 | Record the value displayed by the RxyzGMES field.that corresponds to the Gradient recorded in Step x.  Record the value of RxyzGGPRB if this value was modified. | [[Cav8GMES]] <<FLOAT>>  [[Cav8GGPRB]] <<SCINOT>> |
| 92 | Record the Maximum gradient (Emax) for Cavity 8 and the gradient limiting condition. | [[Cav8EmaxOperator]] <<SRF>>  [[Cav8EmaxMeasTime]] <<TIMESTAMP>>  [[Cav8Emax]] <<FLOAT>> (MV/m)  [[Cav8EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault, BL Vacuum Fault, WG Vacuum Fault,RF Power, Heat Load,End Group Quench}} <<SELECT>> |
| 93 | Record the gradient at which a successful One Hour Run was completed for Cavity 8. Upload spreadsheet containing data on the One Hour run. | [[Cav8OneHourRunOperator]] <<SRF>>  [[Cav8OneHourRunTime]] <<TIMESTAMP>>  [[Cav8Emaxop]] <<FLOAT>>  [[Cav8OneHourRunFile]] <<FILEUPLOAD>> |
| 94 | Record the Field Emission Onset gradient for Cavity 8. Upload the file containing Field emission data. | [[Cav8FEOperator]] <<SRF>>  [[Cav8FEMeasTime]] <<TIMESTAMP>>  [[Cav8FEOnset]] <<FLOAT>> (MV/m)  [[Cav8FEMaxDoseRate]] <<FLOAT>> (R/hr)  [[Cav8FEFile]] <<FILEUPLOAD>> |
| 95 | After completing the Q0 measurement sequence for Cavity 8, record the values of Q0 at 19 MV/m and / or Emaxop. Upload the Q0 measurement file. | [[Cav8QoOperator]] <<SRF>>  [[Cav8QoMeasTime]] <<TIMESTAMP>>  [[Cav8QoNineteen]] <<SCINOT>>  [[Cav8QoEmaxop]] <<SCINOT>>  [[Cav8QoFile]] <<FILEUPLOAD>> |
| 96 | Record the Pressure Sensitivity data collected during the Q0 measurement sequence | [[Cav8PressureSensOperator]] <<SRF>>  [[Cav8PressureSensTime]] <<TIMESTAMP>>  [[Cav8PressureSensitivity]] <<FLOAT>>  [[Cav8PressureSensFile]] <<FILEUPLOAD>> |
| 97 | Record the Static Lorentz coefficient calculated from data gathered during field emission measurements. | [[Cav8StaticLorentzOperator]] <<SRF>>  [[Cav8StaticLorentzTime]] <<TIMESTAMP>>  [[Cav8StaticLorentzCoeff]] <<FLOAT>>  [[Cav8StaticLorentzFile]] <<FILEUPLOAD>> |
| 98 | Upload files containing microphonics calculations for this Cavity 8. | [[Cav8MicrophonicsOperator]] <<SRF>>  [[Cav8MicrophonicsTime]] <<TIMESTAMP>>  [[Cav8MicrophonicsFile]] <<FILEUPLOAD>> |
| 99 | Use the comment box to list any problems or anything unusual about the performance of Cavity 8. | [[Cav8HPRFComments]] <<COMMENT>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 100 | Record the **Average Static Heat Load** (in Watts) to the primary (2K) helium circuit. Upload the processed spreadsheet. Enter any requested information to the right. | [[InstStaticHeatLoadOperator]] <<SRF>>  [[InstStaticHeatLoadCalcComplete]] <<TIMESTAMP>>  [[InstStaticHeatLoadComments]] <<COMMENT>>  [[InstStaticHeatLoad]] <<FLOAT>> (W)  [[InstStaticHeatLoadFile]] <<FILEUPLOAD>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 101 | **Eight Cavity Run:** Complete an **Eight Cavity Run**.Use the one hour run gradients as targets. Cavities should be operated in GDR mode. Record the actual set of gradients used to complete a successful run below. Process any logfile data and upload the completed files below. | [[EightCavMaxGradientTech]] <<USERNAME>>  [[EightCavMaxGradientComplete]] <<TIMESTAMP>>  [[EightCavMaxGradientFiles]] <<FILEUPLOAD>>  [[EightCavMaxGradientComments]] <<COMMENT>>  [[Cav1EightCavMaxGradient]] <<FLOAT>> (MV/m)  [[Cav2EightCavMaxGradient]] <<FLOAT>> (MV/m)  [[Cav3EightCavMaxGradient]] <<FLOAT>> (MV/m)  [[Cav4EightCavMaxGradient]] <<FLOAT>> (MV/m)  [[Cav5EightCavMaxGradient]] <<FLOAT>> (MV/m)  [[Cav6EightCavMaxGradient]] <<FLOAT>> (MV/m)  [[Cav7EightCavMaxGradient]] <<FLOAT>> (MV/m)  [[Cav8EightCavMaxGradient]] <<FLOAT>> (MV/m)  [[CMEightCavTotalEnergy]] <<FLOAT>> (MV) |