MPS Logic:
2025-04-01-a

Contents

1 Ignored when A-Line Kicker Is Not Enabled, A-Line SL10 Is Closed, TD11 Is In, YAG01 Is In, or YAG02 Is In **24**
1.1 Flowswitch: COLL BSYA 2060 (PC20) . . . 24
1.2 Flowswitch: COLL BSYA 2410 (COLL24H) . . . 24
1.3 Flowswitch: COLL BSYA 2410 (COLL24V) . . . 24
1.4 Flowswitch: COLL BSYA 2410 (PC24) . . . 24
1.5 Flowswitch: COLL BSYA 2600 (PC26) . . . 25
1.6 Flowswitch: COLL BSYA 2990 (PC29) . . . 25
1.7 Flowswitch: COLL BSYA 3710 (C37) . . . 25
1.8 Flowswitch: COLL BSYA 4120 (3C1A) . . . 25
1.9 PIC Raw Charge Thresholds: BSYA 2061 . . . 26
1.10 PIC Raw Charge Thresholds: BSYA 2120 . . . 26
1.11 PIC Raw Charge Thresholds: BSYA 2220 . . . 26
1.12 PIC Raw Charge Thresholds: BSYA 2321 . . . 27
1.13 PIC Raw Charge Thresholds: BSYA 2411 . . . 27
1.14 PIC Raw Charge Thresholds: BSYA 2472 . . . 27
1.15 PIC Raw Charge Thresholds: BSYA 2473 . . . 28
1.16 PIC Raw Charge Thresholds: BSYA 2474 . . . 28
1.17 PIC Raw Charge Thresholds: BSYA 2475 . . . 28
1.18 PIC Raw Charge Thresholds: BSYA 2520 . . . 29
1.19 PIC Raw Charge Thresholds: BSYA 2601 . . . 29
1.20 PIC Raw Charge Thresholds: BSYA 2861 . . . 29
1.21 PIC Raw Charge Thresholds: BSYA 2990 . . . 30
1.22 PIC Raw Charge Thresholds: BSYA 3320 . . . 30
1.23 PIC Raw Charge Thresholds: BSYA 3720 . . . 30
1.24 PIC Raw Charge Thresholds: BSYA 3721 . . . 31
1.25 PIC Raw Charge Thresholds: BSYA 3890 . . . 31
1.26 PIC Trigger Missed (LN42) . . . 31
1.27 Stopper BSYA 2275 (ST22) Position . . . 32
1.28 Stopper BSYA 2930 (ST29) Position . . . 32
1.29 Temperature RTD Summary: A-line Past SL10 . . . 32
1.30 Vac Valve BSYA 4005 (IV40) . . . 32
1.31 Vac Valve: VVFS BSYA 2855 (FV28) . . . 33
1.32 Vac Valve: VVPG BSYA 2635 (IV26) . . . 33
1.33 Vac Valve: VVPG ESA0 4195 POSITION (IV41) . . . 33

2 Ignored when A-Line Kicker Is Not Enabled, TD11 Is In, YAG01 Is In, or YAG02 Is In **34**
2.1 A-Line SL10 Position . . . 34
2.2 Flowswitch: BPM BSYA 1020 (BPM10) . . . 34
2.3 Flowswitch: BPM BSYA 1240 (BPM12) . . . 35

2.4 Flowswitch: COLL BSYA 1015 (PC10) . . . 35
2.5 Flowswitch: COLL BSYA 1230 (PC12) . . . 35
2.6 Flowswitch: COLL BSYA 1490 (PC14) . . . 35
2.7 Flowswitch: COLL BSYA 1700 (PC17) . . . 36
2.8 PIC Raw Charge Thresholds: BSYA 1016 . . . 36
2.9 PIC Raw Charge Thresholds: BSYA 1021 . . . 36
2.10 PIC Raw Charge Thresholds: BSYA 1120 . . . 37
2.11 PIC Raw Charge Thresholds: BSYA 1320 . . . 37
2.12 PIC Raw Charge Thresholds: BSYA 1520 . . . 37
2.13 PIC Raw Charge Thresholds: BSYA 1701A . . . 38
2.14 PIC Raw Charge Thresholds: BSYA 1701B . . . 38
2.15 PIC Raw Charge Thresholds: BSYA 1980 . . . 38
2.16 Temperature RTD Summary: A-Line Before SL10 . . . 39
2.17 Vac Valve: VVFS BSYA 1030 (FV10) . . . 39
2.18 Vac Valve: VVPG BSYA 1018 (IV10) . . . 39
2.19 VVPG BSYA 340 Position . . . 39

3 Ignored when BKRCUS Is On, STCLTS Is In, TD11 Is In, YAG01 Is In, or YAG02 Is In 40
3.1 BRCUS1 and BRCUSDC Consistent . . . 40

4 Ignored when BKRCUS Is On, SXR Beamline is in SC Mode, TD11 Is In, YAG01 Is In, or YAG02 Is In 41
4.1 BRCUSDC Current . . . 41

5 Ignored when BRCUSDC Is On, STCLTS Is In, TD11 Is In, YAG01 Is In, or YAG02 Is In 42
5.1 BRCUS1 and BKRCUS Consistent . . . 42

6 Ignored when BRCUSDC Is On, SXR Beamline is in SC Mode, TD11 Is In, YAG01 Is In, or YAG02 Is In 43
6.1 BKRCUS Current . . . 43

7 Ignored when BX01/BX02 Is Off, YAG01 Is In, or YAG02 Is In 44
7.1 Toroid Comparator Dogleg 1 (IM02 vs IM03) . . . 44

8 Ignored when BX01/BX02 Is On, YAG01 Is In, or YAG02 Is In 45
8.1 BXS Status . . . 45
8.2 Toroid Comparator Inj Spectrometer (IM02 vs IMS1) . . . 45

9 Ignored when BXG Is Off or YAG01 Is In 46
9.1 Wakefield Shield Gun Spectrometer . . . 46

10 Ignored when BXG Is On or YAG01 Is In 47
10.1 Wakefield Shield Straight Ahead . . . 47

11 Ignored when CBXFEL Cell 13 Beamline Deflection Is Not Ok, HXR Beamline is in SC Mode, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In **48**
11.1 CBXFEL: Station F Position (Chicane On) 48

12 Ignored when CBXFEL Cell 13 Beamline Deflection Is Ok, HXR Beamline is in SC Mode, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In **49**
12.1 CBXFEL: Station F Position (Chicane Off) 49

13 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, Diag Stopper XCS SB1 Is In, HXR Beamline is in SC Mode, Stopper SH2 Is In, Stopper ST1L0 Is In, Stopper XRT S5 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In **50**
13.1 XCS SB1 VGC 02 Gate Valve Position 50
13.2 XCS SB2 VGC 01 Gate Valve Position 50

14 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, HXR Beamline is in SC Mode, Stopper S5B Is In, Stopper SH2 Is In, Stopper ST1L0 Is In, Stopper XRT S5 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In **51**
14.1 CXI Configuration 1 Summary 51
14.2 CXI Configuration 2 Summary 52
14.3 CXI Configuration 3 Summary 53
14.4 CXI Configuration 4 Summary 55
14.5 CXI Configuration 5 Summary 56
14.6 CXI Configuration 6 Summary 57
14.7 CXI Configuration 7 Summary 58
14.8 CXI KB2 VGC 02 Gate Valve Position 59
14.9 CXI MPS PLC Readiness Status 59
14.10 CXI User Patch Panel 1 Ready 60
14.11 CXI User Patch Panel 2 Ready 60
14.12 CXI:DG1:VGC:01 Gate Valve Open Position 60
14.13 CXI:DG1:VGC:02 Gate Valve Open Position 60
14.14 CXI:DG2:VGC:01 Gate Valve Position 61
14.15 CXI:DG2:VGC:02 Gate Valve Position 61
14.16 CXI:DSC:VGC:01 Gate Valve Position 61
14.17 CXI:KB1:VGC:01 Gate Valve Open Position 62
14.18 CXI:KB1:VGC:02 Gate Valve Open Position 62
14.19 CXI:KB2:VGC:01 Gate Valve Open Position 62
14.20 CXI:SC1:VGC:01 Gate Valve Position 62
14.21 CXI:SC3:VGC:01 Be Gate Valve Position - Status from PLC 63
14.22 HF4 LAM VGC 01 Gate Valve Position 63

15 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, HXR Beamline is in SC Mode, Stopper SH2 Is In, Stopper ST1L0 Is In, Stopper XRT S5 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 64
15.1 CXI XRT Laser Reference Mirror Position . . . 64
15.2 HFA:SND:VGC:01 Gate Valve Open Position . . . 64
15.3 HFX:DIA:VGC:02 Gate Valve Open Position . . . 64
15.4 PPS Stopper S5B Position . . . 65
15.5 XCS SB1 Diagnostic Stopper Position . . . 65
15.6 XCS SB1 VGC 01 Gate Valve Position . . . 65
15.7 XRT HXRAY DIA Isolation Valve HXX-DIA-VGC-01 . . . 66

16 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, HXR Beamline is in SC Mode, Stopper SH2 Is In, Stopper ST1L0 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 67
16.1 HFX:DG2:VGC:01 Gate Valve Position . . . 67
16.2 HFX:MON:VGC:01 Gate Valve Position . . . 67
16.3 HFX:MON:VGC:02 Gate Valve Position . . . 67
16.4 Stopper XRT S5 Position . . . 68

17 Ignored when Diag Stopper HFX UM6 Is In, HXR Beamline is in SC Mode, Stopper MFX S4.5 Is In, Stopper SH2 Is In, Stopper ST1L0 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 69
17.1 MFX MPS Summary - Downstream of Stopper 4.5 . . . 69

18 Ignored when Diag Stopper HFX UM6 Is In, HXR Beamline is in SC Mode, Stopper SH2 Is In, Stopper ST1L0 Is In, Stopper XRT S6 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 70
18.1 MEC DV4 VCG 01 Gate Valve Position . . . 70
18.2 MEC DV5 VGC 01 Gate Valve Position . . . 70
18.3 MEC HXM VGC 01 Gate Valve Position . . . 70
18.4 MEC XT1 Reference Laser Position . . . 71
18.5 MEC XT1 VGC 01 Gate Valve Position . . . 71
18.6 MEC XT2 VGC 02 Gate Valve Position . . . 71
18.7 MEC XT2 VGC 03 Gate Valve Position . . . 71
18.8 MEC XT2 VGC 04 Gate Valve Position . . . 72
18.9 MEC XT2 VGC 05 Gate Valve Position . . . 72

19 Ignored when Diag Stopper HFX UM6 Is In, HXR Beamline is in SC Mode, Stopper SH2 Is In, Stopper ST1L0 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 73
19.1 DG2 Diagnostic Stopper Position . . . 73
19.2 MEC BXL VGC 01 Gate Valve Position . . . 73
19.3 MEC XRT Attenuator Inspection Mirror Position . . . 73
19.4 MFX Gate Valve Summary - Upstream of Stopper 4.5 . . . 74
19.5 Stopper MFX S4.5 Position . . . 74

19.6 Stopper XRT S6 Position . . . 74
19.7 XRT HXRAY LOM Isolation Valve HXX-LOM-VGC-01 . . . 75
19.8 XRT HXRAY MXT Gate Valve HXX:MXT:VGC:01 . . . 75
19.9 XRT HXRAY MXT Gate Valve HXX:MXT:VGC:02 . . . 75
19.10 XRT HXRAY MXT Gate Valve HXX:MXT:VGC:03 . . . 76
19.11 XRT HXRAY MXT Gate Valve HXX:MXT:VGC:05 . . . 76
19.12 XRT-M2 Mirror and DG2 STP Fault . . . 76

20 Ignored when HXR Beamline is in SC Mode, Stopper SH2 Is In, Stopper ST1L0 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 77
20.1 UM6 Diagnostic Stopper Position . . . 77
20.2 XRT HXRAY UM6 Isolation Valve HXX-UM6-VGC-01 . . . 77
20.3 XRT UM6 Camera Position HXX-UM6-CVP-01 . . . 78

21 Ignored when HXR Beamline is in SC Mode, Stopper SH2 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 79
21.1 XRT HOMS Fast Fault 1 . . . 79

22 Ignored when HXR Beamline is in SC Mode, Stopper ST1L0 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 80
22.1 SH2 PPS Stopper Position . . . 80

23 Ignored when HXR Beamline is in SC Mode, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 81
23.1 BLMH13 Threshold 500 ms Fault . . . 81
23.2 BLMH13 Threshold Single Shot Fault . . . 81
23.3 BLMH14 Threshold 500 ms Fault . . . 81
23.4 BLMH14 Threshold Single Shot Fault . . . 81
23.5 BLMH15 Threshold 500 ms Fault . . . 82
23.6 BLMH15 Threshold Single Shot Fault . . . 82
23.7 BLMH16 Threshold 500 ms Fault . . . 82
23.8 BLMH16 Threshold Single Shot Fault . . . 82
23.9 BLMH17 Threshold 500 ms Fault . . . 83
23.10 BLMH17 Threshold Single Shot Fault . . . 83
23.11 BLMH18 Threshold 500 ms Fault . . . 83
23.12 BLMH18 Threshold Single Shot Fault . . . 83
23.13 BLMH19 Threshold 500 ms Fault . . . 84
23.14 BLMH19 Threshold Single Shot Fault . . . 84
23.15 BLMH20 Threshold 500 ms Fault . . . 84
23.16 BLMH20 Threshold Single Shot Fault . . . 84
23.17 BLMH21 Threshold 500 ms Fault . . . 85
23.18 BLMH21 Threshold Single Shot Fault . . . 85
23.19 BLMH22 Threshold 500 ms Fault . . . 85
23.20 BLMH22 Threshold Single Shot Fault . . . 85
23.21 BLMH23 Threshold 500 ms Fault . . . 86

23.22 BLMH23 Threshold Single Shot Fault 86
23.23 BLMH24 Threshold 500 ms Fault 86
23.24 BLMH24 Threshold Single Shot Fault 86
23.25 BLMH25 Threshold 500 ms Fault 87
23.26 BLMH25 Threshold Single Shot Fault 87
23.27 BLMH26 Threshold 500 ms Fault 87
23.28 BLMH26 Threshold Single Shot Fault 87
23.29 BLMH27 Threshold 500 ms Fault 88
23.30 BLMH27 Threshold Single Shot Fault 88
23.31 BLMH28 Threshold 500 ms Fault 88
23.32 BLMH28 Threshold Single Shot Fault 88
23.33 BLMH29 Threshold 500 ms Fault 89
23.34 BLMH29 Threshold Single Shot Fault 89
23.35 BLMH30 Threshold 500 ms Fault 89
23.36 BLMH30 Threshold Single Shot Fault 89
23.37 BLMH31 Threshold 500 ms Fault 90
23.38 BLMH31 Threshold Single Shot Fault 90
23.39 BLMH32 Threshold 500 ms Fault 90
23.40 BLMH32 Threshold Single Shot Fault 90
23.41 BLMH33 Threshold 500 ms Fault 91
23.42 BLMH33 Threshold Single Shot Fault 91
23.43 BLMH34 Threshold 500 ms Fault 91
23.44 BLMH34 Threshold Single Shot Fault 91
23.45 BLMH35 Threshold 500 ms Fault 92
23.46 BLMH35 Threshold Single Shot Fault 92
23.47 BLMH36 Threshold 500 ms Fault 92
23.48 BLMH36 Threshold Single Shot Fault 92
23.49 BLMH37 Threshold 500 ms Fault 93
23.50 BLMH37 Threshold Single Shot Fault 93
23.51 BLMH38 Threshold 500 ms Fault 93
23.52 BLMH38 Threshold Single Shot Fault 93
23.53 BLMH39 Threshold 500 ms Fault 94
23.54 BLMH39 Threshold Single Shot Fault 94
23.55 BLMH40 Threshold 500 ms Fault 94
23.56 BLMH40 Threshold Single Shot Fault 94
23.57 BLMH41 Threshold 500 ms Fault 95
23.58 BLMH41 Threshold Single Shot Fault 95
23.59 BLMH42 Threshold 500 ms Fault 95
23.60 BLMH42 Threshold Single Shot Fault 95
23.61 BLMH43 Threshold 500 ms Fault 96
23.62 BLMH43 Threshold Single Shot Fault 96
23.63 BLMH44 Threshold 500 ms Fault 96
23.64 BLMH44 Threshold Single Shot Fault 96
23.65 BLMH45 Threshold 500 ms Fault 97
23.66 BLMH45 Threshold Single Shot Fault 97

23.67 BLMH46 Threshold 500 ms Fault . . . 97
23.68 BLMH46 Threshold Single Shot Fault . . . 97
23.69 BLMH47 Threshold 500 ms Fault . . . 98
23.70 BLMH47 Threshold Single Shot Fault . . . 98
23.71 BYDSH Current . . . 98
23.72 BYDSH Magnet Power Status . . . 98
23.73 FEE Summary Fault - HXR Fast Fault 1 . . . 99
23.74 FEE Summary Fault - HXR Fast Fault 2 . . . 99
23.75 FEE Summary Fault - HXR Gas System Fast Fault 1 . . . 99
23.76 FEE Summary Fault - HXR Gas System Fast Fault 2 . . . 99
23.77 FEE Summary Fault - HXR Motion Fast Fault 1 . . . 100
23.78 FEE Summary Fault - HXR Motion Fast Fault 2 . . . 100
23.79 FEE Summary Fault - HXR Optics Fast Fault 1 . . . 100
23.80 FEE Summary Fault - HXR Optics Fast Fault 2 . . . 100
23.81 FEE Summary Fault - HXR Vacuum Fast Fault 1 . . . 101
23.82 FEE Summary Fault - HXR Vacuum Fast Fault 2 . . . 101
23.83 FEE Vacuum - LFE Fast Shutter Fault . . . 101
23.84 HXR CBLM Alive and Updating . . . 101
23.85 HXR CBLM PMT High Voltage . . . 102
23.86 HXRSS Chicane Bend Power Supply . . . 102
23.87 HXRSS Crystal Position . . . 102
23.88 HXRSS Crystal Valid Position . . . 103
23.89 HXRSS Mode . . . 103
23.90 Magnet In Tolerance: QE31 . . . 104
23.91 Magnet In Tolerance: QUM1 . . . 104
23.92 Magnet In Tolerance: QUM2 . . . 105
23.93 Magnet In Tolerance: QUM3 . . . 105
23.94 Magnet In Tolerance: QUM4 . . . 105
23.95 Magnet Power: QE31 . . . 105
23.96 Magnet Power: QUM1 . . . 106
23.97 Magnet Power: QUM2 . . . 106
23.98 Magnet Power: QUM3 . . . 106
23.99 Magnet Power: QUM4 . . . 106
23.100 OTR01 IN20 541 Position and TDUND Not In . . . 107
23.101 OTR02 IN20 571 Position and TDUND Not In . . . 107
23.102 OTR03 IN20 621 Position and TDUND Not In . . . 107
23.103 OTR04 IN20 711 Position and TDUND Not In . . . 108
23.104 OTR11 LI21 237 Position and TDUND Not In . . . 108
23.105 OTR12 LI21 291 Position and TDUND Not In . . . 108
23.106 OTR21 Position When TDUND Not In . . . 109
23.107 OTR33 Position and TDUND Not In . . . 109
23.108 OTRH1 Position When TDUND Not In . . . 109
23.109 OTRH2 Position When TDUND Not In . . . 110
23.110 PMPS HXR Rate Limit . . . 110
23.111 RFBHX12 Orbit Fault . . . 110

23.112 RFBHX13 Orbit Fault . . . 111
23.113 RFBHX14 Orbit Fault . . . 111
23.114 RFBHX15 Orbit Fault . . . 111
23.115 RFBHX16 Orbit Fault . . . 112
23.116 RFBHX17 Orbit Fault . . . 112
23.117 RFBHX18 Orbit Fault . . . 112
23.118 RFBHX19 Orbit Fault . . . 113
23.119 RFBHX20 Orbit Fault . . . 113
23.120 RFBHX21 Orbit Fault . . . 113
23.121 RFBHX22 Orbit Fault . . . 114
23.122 RFBHX23 Orbit Fault . . . 114
23.123 RFBHX24 Orbit Fault . . . 114
23.124 RFBHX25 Orbit Fault . . . 115
23.125 RFBHX26 Orbit Fault . . . 115
23.126 RFBHX27 Orbit Fault . . . 115
23.127 RFBHX28 Orbit Fault . . . 116
23.128 RFBHX29 Orbit Fault . . . 116
23.129 RFBHX30 Orbit Fault . . . 116
23.130 RFBHX31 Orbit Fault . . . 117
23.131 RFBHX32 Orbit Fault . . . 117
23.132 RFBHX33 Orbit Fault . . . 117
23.133 RFBHX34 Orbit Fault . . . 118
23.134 RFBHX35 Orbit Fault . . . 118
23.135 RFBHX36 Orbit Fault . . . 118
23.136 RFBHX37 Orbit Fault . . . 119
23.137 RFBHX38 Orbit Fault . . . 119
23.138 RFBHX39 Orbit Fault . . . 119
23.139 RFBHX40 Orbit Fault . . . 120
23.140 RFBHX41 Orbit Fault . . . 120
23.141 RFBHX42 Orbit Fault . . . 120
23.142 RFBHX43 Orbit Fault . . . 121
23.143 RFBHX44 Orbit Fault . . . 121
23.144 RFBHX45 Orbit Fault . . . 121
23.145 RFBHX46 Orbit Fault . . . 122
23.146 RFBHX47 Orbit Fault . . . 122
23.147 SIOC UNDH MP04 HEARTBEAT . . . 122
23.148 SIOC UNDH MP05 HEARTBEAT . . . 122
23.149 SIOC UNDH MP06 HEARTBEAT . . . 123
23.150 SIOC UNDH MP07 HEARTBEAT . . . 123
23.151 SIOC UNDH MP08 HEARTBEAT . . . 123
23.152 SIOC UNDH MP09 HEARTBEAT . . . 123
23.153 SIOC UNDH MP11 HEARTBEAT . . . 124
23.154 ST1L0 PPS Stopper Position . . . 124
23.155 VVFS DMPH 157 POSITION . . . 124
23.156 VVMG DMPH 643 POSITION . . . 124

23.157 VVMG DMPH 681 POSITION . . . 125
23.158 VVMG UNDH 1338 POSITION . . . 125
23.159 VVMG UNDH 1343 POSITION . . . 125
23.160 VVMG UNDH 1498 POSITION . . . 125
23.161 VVMG UNDH 1798 POSITION . . . 126
23.162 VVMG UNDH 2138 POSITION . . . 126
23.163 VVMG UNDH 2143 POSITION . . . 126
23.164 VVMG UNDH 2498 POSITION . . . 126
23.165 VVMG UNDH 2838 POSITION . . . 127
23.166 VVMG UNDH 2844 POSITION . . . 127
23.167 VVMG UNDH 3298 POSITION . . . 127
23.168 VVMG UNDH 3598 POSITION . . . 127
23.169 VVMG UNDH 4098 POSITION . . . 128
23.170 VVMG UNDH 4398 POSITION . . . 128
23.171 VVPG DMPH 355 POSITION . . . 128
23.172 VVPG DMPH 396 POSITION . . . 128
23.173 VVPG UNDH 1288 POSITION . . . 129
23.174 VVPG UNDH 2098 POSITION . . . 129
23.175 VVPG UNDH 2298 POSITION . . . 129
23.176 VVPG UNDH 2798 POSITION . . . 129
23.177 VVPG UNDH 2998 POSITION . . . 130
23.178 VVPG UNDH 3798 POSITION . . . 130
23.179 VVPG UNDH 4598 POSITION . . . 130
23.180 VVPG UNDH 5196 POSITION . . . 130

24 Ignored when HXR Beamline is in SC Mode, Stopper: BSY D2 Summary Is In, TD11 Is In, YAG01 Is In, or YAG02 Is In 131
24.1 BCS LION LTU1 404 Threshold . . . 131
24.2 BCS LION LTU1 405 Threshold . . . 131
24.3 BCS LION LTU1 504 Threshold . . . 131
24.4 BCS LION LTU1 505 Threshold . . . 131
24.5 BCS LION LTU1 584 Threshold . . . 132
24.6 BCS LION LTU1 585 Threshold . . . 132
24.7 BCS LION LTU1 716 Threshold . . . 132
24.8 BCS LION LTU1 717 Threshold . . . 132
24.9 BCS LION LTU1 732 Threshold . . . 133
24.10 BCS LION LTU1 733 Threshold . . . 133
24.11 BCS LION LTU1 752 Threshold . . . 133
24.12 BCS LION LTU1 753 Threshold . . . 133
24.13 BCS LION LTU1 765 Threshold . . . 134
24.14 BCS LION LTU1 766 Threshold . . . 134
24.15 BLM Heartbeat: Dechirper LTUH BLF545 . . . 134
24.16 BLM Pedestal Thresholds: Dechirper LTUH BLF545 . . . 134
24.17 BLM Raw Charge Thresholds: Dechirper LTUH BLF545 . . . 135
24.18 BYD Current . . . 135

24.19 BYD Magnet Power Status . . . 135
24.20 BYD Watchdog . . . 136
24.21 BYKIK Current . . . 136
24.22 BYKIK Magnet Power Status . . . 136
24.23 BYKIK Timing Delay Fault . . . 136
24.24 BYKIK Timing Reference Fault . . . 137
24.25 CEDL1 Temperature . . . 137
24.26 CEDL3 Temperature . . . 137
24.27 CXQ6 Temperature . . . 137
24.28 CXQT22 Temperature . . . 138
24.29 CYBX32 Temperature . . . 138
24.30 CYBX36 Temperature . . . 138
24.31 Dechirper Mirror Position . . . 138
24.32 LTU Dechirper - Horizontal Gap Too Small . . . 139
24.33 LTU Dechirper - Vertical Gap Too Small . . . 139
24.34 OTR33 Position . . . 139
24.35 PIC HVPS B911 - Location B911-2135 . . . 140
24.36 PIC HVPS B912 - Location B912-2135 . . . 140
24.37 PIC Raw Charge Thresholds: LTUH 220 . . . 140
24.38 PIC Raw Charge Thresholds: LTUH 253 . . . 140
24.39 PIC Raw Charge Thresholds: LTUH 280 . . . 141
24.40 PIC Raw Charge Thresholds: LTUH 420 . . . 141
24.41 PIC Raw Charge Thresholds: LTUH 452 . . . 141
24.42 PIC Raw Charge Thresholds: LTUH 480 . . . 142
24.43 PIC Raw Charge Thresholds: LTUH 722 . . . 142
24.44 PIC Trigger Missed (LN28) . . . 142
24.45 PIC Trigger Missed (LN29) . . . 142
24.46 SIOC LTUH MP03 HEARTBEAT . . . 143
24.47 SIOC LTUH MP05 HEARTBEAT . . . 143
24.48 SIOC LTUH MP06 HEARTBEAT . . . 143
24.49 SIOC UNDH MP02 HEARTBEAT . . . 143
24.50 SIOC UNDH MP03 HEARTBEAT . . . 144
24.51 TDUND Flow Switch Fault with TDUND Not Out . . . 144
24.52 TDUND Position . . . 144
24.53 Undulator Beam Energy Lower Limit . . . 144
24.54 VVFS LTUH 102 POSITION . . . 145
24.55 VVMG LTUH 174 POSITION . . . 145
24.56 VVMG LTUH 355 POSITION . . . 145
24.57 VVMG LTUH 505 POSITION . . . 145
24.58 VVMG LTUH 670 POSITION . . . 146
24.59 VVMG LTUH 742 POSITION . . . 146
24.60 VVMG LTUH 774 POSITION . . . 146
24.61 VVPG LTUH 100 POSITION . . . 146
24.62 VVPG LTUH 265 POSITION . . . 147
24.63 VVPG LTUH 435 POSITION . . . 147

24.64 VVPG LTUH 580 POSITION . . . 147
24.65 VVPG LTUH 725 POSITION . . . 147
24.66 VVPG LTUH 757 POSITION . . . 148
24.67 YAGPSI (YAGS:LTUH:743) Position . . . 148

25 Ignored when HXR Beamline is in SC Mode, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 149
25.1 Magnet In Tolerance: BYD1 . . . 149
25.2 Magnet Power: BYD1 . . . 149

26 Ignored when HXR Beamline is in SC Mode, TD11 Is In, YAG01 Is In, or YAG02 Is In 150
26.1 BCS PIC RAW Charge Threshold DMP 997 . . . 150
26.2 BCS PIC RAW Charge Threshold DMP 998 . . . 150
26.3 D2 Summary Position . . . 150
26.4 PIC Raw Charge Thresholds: BSYH 762 (PC90) . . . 151
26.5 PIC Raw Charge Thresholds: BSYH 836 (PC119) . . . 151
26.6 SIOC BSYH MP01 HEARTBEAT . . . 151
26.7 SIOC BSYH MP02 HEARTBEAT . . . 152
26.8 SIOC BSYH MP03 HEARTBEAT . . . 152
26.9 VVPG BSYH 470 POSITION . . . 152
26.10 VVPG BSYH 541 POSITION . . . 152
26.11 VVPG BSYH 837 POSITION . . . 153

27 Ignored when Laser Heater Attenuator Is In 154
27.1 Laser Heater Photodiode Shutter Position . . . 154
27.2 OTRH1 Position When LH Atten Not In . . . 154
27.3 OTRH2 Position When LH Atten Not In . . . 154

28 Ignored when MR1K1 Is In, ST3K4 Is In, STCLTS Is In, TD11 Is In, TDUNDB Is In, YAG01 Is In, or YAG02 Is In 155
28.1 FEE Summary Fault - TMO Fast Shutter Fault 2 . . . 155
28.2 FEE Summary Fault - TMO Motion Control Fast Fault 1 . . . 155
28.3 FEE Summary Fault - TMO Motion Control Fast Fault 2 . . . 155
28.4 FEE Summary Fault - TMO Vacuum Fast Fault 2 . . . 156

29 Ignored when MR1K1 Is In, STCLTS Is In, TD11 Is In, TDUNDB Is In, YAG01 Is In, or YAG02 Is In 157
29.1 FEE Summary Fault - TMO Fast Shutter Fault 1 . . . 157
29.2 FEE Summary Fault - TMO Vacuum Fast Fault 1 . . . 157
29.3 SXR TMO Optics Fast Fault 1 . . . 157

30 Ignored when MR1K1 Is Out, STCLTS Is In, TD11 Is In, TDUNDB Is In, YAG01 Is In, or YAG02 Is In 158
30.1 SXR RIX Motion Fast Fault 1 . . . 158
30.2 SXR RIX Vacuum Fast Fault 1 . . . 158

31 Ignored when STCLTS Is In, SXR Beamline is in SC Mode, TD11 Is In, YAG01 Is In, or YAG02 Is In **159**
31.1 SIOC BSYS MP01 HEARTBEAT . . . 159
31.2 SIOC BSYS MP02 HEARTBEAT . . . 159
31.3 SIOC BSYS MP03 HEARTBEAT . . . 159
31.4 SIOC BSYS MP04 HEARTBEAT . . . 159

32 Ignored when STCLTS Is In, SXRSS M1/Grating Is Out, TD11 Is In, TDUNDB Is In, YAG01 Is In, or YAG02 Is In **161**
32.1 SXRSS Guardian OK . . . 161
32.2 SXRSS Guardian ON . . . 161

33 Ignored when STCLTS Is In, TD11 Is In, TDUNDB Is In, YAG01 Is In, or YAG02 Is In **162**
33.1 BLMS16 Threshold 500 ms Fault . . . 162
33.2 BLMS16 Threshold Single Shot Fault . . . 162
33.3 BLMS17 Threshold 500 ms Fault . . . 162
33.4 BLMS17 Threshold Single Shot Fault . . . 162
33.5 BLMS18 Threshold 500 ms Fault . . . 163
33.6 BLMS18 Threshold Single Shot Fault . . . 163
33.7 BLMS19 Threshold 500 ms Fault . . . 163
33.8 BLMS19 Threshold Single Shot Fault . . . 163
33.9 BLMS20 Threshold 500 ms Fault . . . 164
33.10 BLMS20 Threshold Single Shot Fault . . . 164
33.11 BLMS21 Threshold 500 ms Fault . . . 164
33.12 BLMS21 Threshold Single Shot Fault . . . 164
33.13 BLMS22 Threshold 500 ms Fault . . . 165
33.14 BLMS22 Threshold Single Shot Fault . . . 165
33.15 BLMS23 Threshold 500 ms Fault . . . 165
33.16 BLMS23 Threshold Single Shot Fault . . . 165
33.17 BLMS24 Threshold 500 ms Fault . . . 166
33.18 BLMS24 Threshold Single Shot Fault . . . 166
33.19 BLMS25 Threshold 500 ms Fault . . . 166
33.20 BLMS25 Threshold Single Shot Fault . . . 166
33.21 BLMS26 Threshold 500 ms Fault . . . 167
33.22 BLMS26 Threshold Single Shot Fault . . . 167
33.23 BLMS27 Threshold 500 ms Fault . . . 167
33.24 BLMS27 Threshold Single Shot Fault . . . 167
33.25 BLMS28 Threshold 500 ms Fault . . . 168
33.26 BLMS28 Threshold Single Shot Fault . . . 168
33.27 BLMS29 Threshold 500 ms Fault . . . 168
33.28 BLMS29 Threshold Single Shot Fault . . . 168
33.29 BLMS30 Threshold 500 ms Fault . . . 169
33.30 BLMS30 Threshold Single Shot Fault . . . 169
33.31 BLMS31 Threshold 500 ms Fault . . . 169
33.32 BLMS31 Threshold Single Shot Fault . . . 169

33.33 BLMS32 Threshold 500 ms Fault . . . 170
33.34 BLMS32 Threshold Single Shot Fault . . . 170
33.35 BLMS33 Threshold 500 ms Fault . . . 170
33.36 BLMS33 Threshold Single Shot Fault . . . 170
33.37 BLMS34 Threshold 500 ms Fault . . . 171
33.38 BLMS34 Threshold Single Shot Fault . . . 171
33.39 BLMS35 Threshold 500 ms Fault . . . 171
33.40 BLMS35 Threshold Single Shot Fault . . . 171
33.41 BLMS36 Threshold 500 ms Fault . . . 172
33.42 BLMS36 Threshold Single Shot Fault . . . 172
33.43 BLMS37 Threshold 500 ms Fault . . . 172
33.44 BLMS37 Threshold Single Shot Fault . . . 172
33.45 BLMS38 Threshold 500 ms Fault . . . 173
33.46 BLMS38 Threshold Single Shot Fault . . . 173
33.47 BLMS39 Threshold 500 ms Fault . . . 173
33.48 BLMS39 Threshold Single Shot Fault . . . 173
33.49 BLMS40 Threshold 500 ms Fault . . . 174
33.50 BLMS40 Threshold Single Shot Fault . . . 174
33.51 BLMS41 Threshold 500 ms Fault . . . 174
33.52 BLMS41 Threshold Single Shot Fault . . . 174
33.53 BLMS42 Threshold 500 ms Fault . . . 175
33.54 BLMS42 Threshold Single Shot Fault . . . 175
33.55 BLMS43 Threshold 500 ms Fault . . . 175
33.56 BLMS43 Threshold Single Shot Fault . . . 175
33.57 BLMS44 Threshold 500 ms Fault . . . 176
33.58 BLMS44 Threshold Single Shot Fault . . . 176
33.59 BLMS45 Threshold 500 ms Fault . . . 176
33.60 BLMS45 Threshold Single Shot Fault . . . 176
33.61 BLMS46 Threshold 500 ms Fault . . . 177
33.62 BLMS46 Threshold Single Shot Fault . . . 177
33.63 BLMS47 Threshold 500 ms Fault . . . 177
33.64 BLMS47 Threshold Single Shot Fault . . . 177
33.65 BLMS48 Threshold 500 ms Fault . . . 178
33.66 BLMS48 Threshold Single Shot Fault . . . 178
33.67 BYDSS Magnet Power Status . . . 178
33.68 FEE Summary Fault - SXR Fast Fault 1 . . . 178
33.69 FEE Summary Fault - SXR Fast Fault 2 . . . 179
33.70 FEE Summary Fault - SXR Gas Attenuator Fast Fault . . . 179
33.71 FEE Summary Fault - SXR Motion Fast Fault 1 . . . 179
33.72 FEE Summary Fault - SXR Motion Fast Fault 2 . . . 179
33.73 FEE Summary Fault - SXR Vacuum Fast Fault 1 . . . 180
33.74 FEE Summary Fault - SXR Vacuum Fast Fault 2 . . . 180
33.75 PEPPEX Zone Plate Position . . . 180
33.76 PMPS SXR Rate Limit . . . 181
33.77 RFBSX16 Orbit Fault . . . 181

33.78 RFBSX17 Orbit Fault . . . 181
33.79 RFBSX18 Orbit Fault . . . 182
33.80 RFBSX19 Orbit Fault . . . 182
33.81 RFBSX20 Orbit Fault . . . 182
33.82 RFBSX21 Orbit Fault . . . 183
33.83 RFBSX22 Orbit Fault . . . 183
33.84 RFBSX23 Orbit Fault . . . 183
33.85 RFBSX24 Orbit Fault . . . 184
33.86 RFBSX25 Orbit Fault . . . 184
33.87 RFBSX26 Orbit Fault . . . 184
33.88 RFBSX27 Orbit Fault . . . 185
33.89 RFBSX28 Orbit Fault . . . 185
33.90 RFBSX29 Orbit Fault . . . 185
33.91 RFBSX30 Orbit Fault . . . 186
33.92 RFBSX31 Orbit Fault . . . 186
33.93 RFBSX32 Orbit Fault . . . 186
33.94 RFBSX33 Orbit Fault . . . 187
33.95 RFBSX34 Orbit Fault . . . 187
33.96 RFBSX35 Orbit Fault . . . 187
33.97 RFBSX36 Orbit Fault . . . 188
33.98 RFBSX37 Orbit Fault . . . 188
33.99 RFBSX38 Orbit Fault . . . 188
33.100 RFBSX39 Orbit Fault . . . 189
33.101 RFBSX40 Orbit Fault . . . 189
33.102 RFBSX41 Orbit Fault . . . 189
33.103 RFBSX42 Orbit Fault . . . 190
33.104 RFBSX43 Orbit Fault . . . 190
33.105 RFBSX44 Orbit Fault . . . 190
33.106 RFBSX45 Orbit Fault . . . 191
33.107 RFBSX46 Orbit Fault . . . 191
33.108 RFBSX47 Orbit Fault . . . 191
33.109 SIOC UNDS MP01 HEARTBEAT . . . 192
33.110 SIOC UNDS MP02 HEARTBEAT . . . 192
33.111 SIOC UNDS MP03 HEARTBEAT . . . 192
33.112 SIOC UNDS MP04 HEARTBEAT . . . 192
33.113 SIOC UNDS MP05 HEARTBEAT . . . 193
33.114 SIOC UNDS MP06 HEARTBEAT . . . 193
33.115 SIOC UNDS MP07 HEARTBEAT . . . 193
33.116 SXR CBLM Alive and Updating . . . 193
33.117 SXR CBLM PMT High Voltage . . . 194
33.118 SXR CRIX Motion Fast Fault 1 . . . 194
33.119 SXR CRIX Vacuum Fast Fault 1 . . . 194
33.120 SXR RIX Optics Fast Fault 1 . . . 194
33.121 SXRSS BOD10 Position (YAGS:UNDS:3575) . . . 195
33.122 SXRSS BOD12 Position(YAGS:UNDS:3795) . . . 195

33.123 SXRSS Mode . . . 195
33.124 SXRSS MSXS1 Position (MIRR:UNDS:3520) . . . 198
33.125 SXRSS MSXS2 Position (MIRR:UNDS:3560) . . . 199
33.126 SXRSS MSXS3 Position (MIRR:UNDS:3565) . . . 199
33.127 SXRSS SLSXS1 Position (SLIT:UNDS:3555) . . . 199
33.128 SXRSS Watchdog . . . 200
33.129 VVFS DMPS 157 POSITION . . . 200
33.130 VVMG DMPS 643 POSITION . . . 200
33.131 VVMG DMPS 681 POSITION . . . 200
33.132 VVMG UNDS 3511 POSITION . . . 201
33.133 VVMG UNDS 3568 POSITION . . . 201
33.134 VVMG UNDS 4998 Position . . . 201
33.135 VVPG DMPS 355 POSITION . . . 201
33.136 VVPG DMPS 396 POSITION . . . 202
33.137 VVPG UNDS 1651 POSITION . . . 202
33.138 VVPG UNDS 2177 POSITION . . . 202
33.139 VVPG UNDS 2877 POSITION . . . 202
33.140 VVPG UNDS 3477 POSITION . . . 203
33.141 VVPG UNDS 3577 POSITION . . . 203
33.142 VVPG UNDS 3877 POSITION . . . 203
33.143 VVPG UNDS 4477 POSITION . . . 203
33.144 VVPG UNDS 5198 POSITION . . . 204

34 Ignored when STCLTS Is In, TD11 Is In, YAG01 Is In, or YAG02 Is In 205
34.1 BRCUS1 Current . . . 205
34.2 BY1B Current . . . 205
34.3 BY1B Magnet Power Status . . . 205
34.4 BYDB Current . . . 206
34.5 BYDB Magnet Power Status . . . 206
34.6 BYKIKS Current . . . 206
34.7 BYKIKS Magnet Power Status . . . 206
34.8 BYKIKS Timing Delay Fault . . . 207
34.9 BYKIKS Timing Reference Fault . . . 207
34.10 CEDL13 Temperature . . . 207
34.11 CEDL17 Temperature . . . 207
34.12 CXBP34 Temperature . . . 208
34.13 CYBDL Temperature . . . 208
34.14 CYDL16 Temperature . . . 208
34.15 Merge Magnet Ok . . . 208
34.16 OTRDL18 (OTRS:LTUS:417) Position . . . 209
34.17 SIOC LTUS MP01 HEARTBEAT . . . 209
34.18 SIOC LTUS MP02 HEARTBEAT . . . 209
34.19 SIOC LTUS MP03 HEARTBEAT . . . 210
34.20 SIOC LTUS MP04 HEARTBEAT . . . 210
34.21 SIOC LTUS MP05 HEARTBEAT . . . 210

34.22 SIOC LTUS MP06 HEARTBEAT . . . 210
34.23 ST34AB Position . . . 211
34.24 SXR Facility Mode . . . 211
34.25 TDUNDB Position (10 Hz) . . . 211
34.26 TDUNDB Power when TDUNDB Is IN . . . 212
34.27 VVFS LTUS 109 POSITION . . . 212
34.28 VVMG LTUS 185 POSITION . . . 212
34.29 VVMG LTUS 348 POSITION . . . 212
34.30 VVMG LTUS 451 POSITION . . . 213
34.31 VVMG LTUS 505 POSITION . . . 213
34.32 VVMG LTUS 552 POSITION . . . 213
34.33 VVMG LTUS 656 POSITION . . . 213
34.34 VVMG LTUS 744 POSITION . . . 214
34.35 VVMG LTUS 802 POSITION . . . 214
34.36 VVMG LTUS 827 POSITION . . . 214
34.37 VVPG BSYS 904 POSITION . . . 214
34.38 VVPG CLTS 685 POSITION . . . 215
34.39 VVPG LTUS 108 POSITION . . . 215
34.40 VVPG LTUS 272 POSITION . . . 215
34.41 VVPG LTUS 442 POSITION . . . 215
34.42 VVPG LTUS 586 POSITION . . . 216
34.43 VVPG LTUS 726 POSITION . . . 216
34.44 VVPG LTUS 757 POSITION . . . 216
34.45 XLEAP: UMXL1H Downstream Position . . . 216
34.46 XLEAP: UMXL1H Upstream Position . . . 217
34.47 XLEAP: UMXL3H Downstream Position . . . 217
34.48 XLEAP: UMXL3H Upstream Position . . . 217
34.49 XLEAP: UMXL4H Downstream Position . . . 218
34.50 XLEAP: UMXL4H Upstream Position . . . 218

35 Ignored when TD11 Is In, YAG01 Is In, or YAG02 Is In 219
35.1 Attempt to deliver Beam Code 1 when SXR DC extraction magnet is ON . . . 219
35.2 BKRCUS Timing Delay Fault . . . 219
35.3 BKRCUS Timing Reference Fault . . . 219
35.4 BLM/PIC Watchdog BSY0/BSYA . . . 219
35.5 BLM/PIC Watchdog LI24 . . . 220
35.6 BLM/PIC Watchdog LI30 . . . 220
35.7 BLRCUS Current . . . 220
35.8 BRCUSDC on and HXR Mode . . . 220
35.9 Bunch Length Monitor BL21 Position . . . 221
35.10 Dump LI28 5879 Flowswitch . . . 221
35.11 Dump LI28 5879 Klixon . . . 221
35.12 Flowswitch: CE21 . . . 222
35.13 Flowswitch: COLL LI28-9 . . . 222
35.14 Flowswitch: COLL LI29-1 . . . 222

35.15 Flowswitch: COLL LI29-4 . . . 222
35.16 Flowswitch: COLL LI29-5 . . . 223
35.17 Flowswitch: COLL LI29-9 . . . 223
35.18 Flowswitch: COLL LI30-1 . . . 223
35.19 Flowswitch: COLL LI30-4 . . . 223
35.20 Flowswitch: COLL LI30-5 . . . 224
35.21 HXR Facility Mode . . . 224
35.22 HXR Magnet Mode . . . 224
35.23 Inconsistent Magnet Mode . . . 224
35.24 Main Manifold Gauge: LI22 Station 5 . . . 225
35.25 Main Manifold Gauge: LI23 Station 5 . . . 225
35.26 Main Manifold Gauge: LI24 Station 5 . . . 225
35.27 Main Manifold Gauge: LI25 Station 5 . . . 225
35.28 Main Manifold Gauge: LI26 Station 5 . . . 226
35.29 Main Manifold Gauge: LI27 Station 5 . . . 226
35.30 Main Manifold Gauge: LI28 Station 5 . . . 226
35.31 Main Manifold Gauge: LI29 Station 5 . . . 226
35.32 Main Manifold Gauge: LI30 Station 5 . . . 227
35.33 OTR LI25 920 Position . . . 227
35.34 OTR21 Position . . . 227
35.35 PIC Gas Pressure LI24 . . . 227
35.36 PIC HVPS BSY 1 - Location B005-3921 . . . 228
35.37 PIC HVPS BSY 2 - Location B005-3921 . . . 228
35.38 PIC HVPS BSY 3 - Location B005-3921 . . . 228
35.39 PIC HVPS BSY 4 - Location B005-3918 . . . 228
35.40 PIC HVPS BSY 5 - Location B005-3918 . . . 229
35.41 PIC HVPS BSY 6 - Location B005-3918 . . . 229
35.42 PIC HVPS LI24 - Location LKF24-0235 . . . 229
35.43 PIC HVPS LI30 - KG30-C1322 . . . 229
35.44 PIC Raw Charge Thresholds: CLTS 280 (BLRCUS) . . . 230
35.45 PIC Raw Charge Thresholds: LI24 791 . . . 230
35.46 PIC Raw Charge Thresholds: LI24 811 . . . 230
35.47 PIC Raw Charge Thresholds: LI28 916 . . . 231
35.48 PIC Raw Charge Thresholds: LI29 146 . . . 231
35.49 PIC Raw Charge Thresholds: LI29 446 . . . 231
35.50 PIC Raw Charge Thresholds: LI29 546 . . . 232
35.51 PIC Raw Charge Thresholds: LI29 801 . . . 232
35.52 PIC Raw Charge Thresholds: LI29 956 . . . 232
35.53 PIC Raw Charge Thresholds: LI30 146 . . . 233
35.54 PIC Raw Charge Thresholds: LI30 446 . . . 233
35.55 PIC Raw Charge Thresholds: LI30 546 . . . 233
35.56 PIC Raw Charge Thresholds: LI30 801 . . . 234
35.57 PIC Trigger Missed (LN16) . . . 234
35.58 PIC Trigger Missed (LN22) . . . 234
35.59 PIC Trigger Missed (LN25) . . . 234

35.60 Pulsed Magnet Mode Ok . . . 235
35.61 Scraper Water LI21-9 (Station 22-1) . . . 235
35.62 Scraper Water LI22-9 (Station 23-1) . . . 235
35.63 Scraper Water LI23-9 (Station 24-1) . . . 235
35.64 Scraper Water LI24-9 (Station 25-1) . . . 236
35.65 Scraper Water LI25-9 (Station 26-1) . . . 236
35.66 Scraper Water LI26-9 (Station 27-1) . . . 236
35.67 Scraper Water LI27-9 (Station 28-1) . . . 236
35.68 Scraper Water LI28-9 (Station 29-1) . . . 237
35.69 Scraper Water LI29-9 (Station 30-1) . . . 237
35.70 SIOC CLTS MP01 HEARTBEAT . . . 237
35.71 STCLTS Position . . . 237
35.72 Stopper LI28 950 and 960 Position . . . 238
35.73 Sub-booster Ready: LI22 . . . 238
35.74 Sub-booster Ready: LI25 . . . 238
35.75 Sub-booster Ready: LI26 . . . 238
35.76 Sub-booster Ready: LI27 . . . 239
35.77 Sub-booster Ready: LI28 . . . 239
35.78 Sub-booster Ready: LI29 . . . 239
35.79 Sub-booster Ready: LI30 . . . 239
35.80 SXR Magnet Mode Ok . . . 240
35.81 Temperature RTD Summary: BSY Common Line . . . 240
35.82 Timing / MPS Destination Mismatch . . . 240
35.83 Toroid Chassis LI24 IMBC2 . . . 240
35.84 Toroid Comparator BC2 (IMBC2IN vs IMBC2OUT) . . . 241
35.85 VVFS CLTH 101 Position . . . 241
35.86 VVFS LI21-9 Position (Station 22-1) . . . 241
35.87 VVFS LI22-9 Position (Station 23-1) . . . 242
35.88 VVFS LI23-9 Position (Station 24-1) . . . 242
35.89 VVFS LI24-9 Position (Station 25-1) . . . 242
35.90 VVFS LI25-9 Position (Station 26-1) . . . 242
35.91 VVFS LI26-9 Position (Station 27-1) . . . 243
35.92 VVFS LI27-9 Position (Station 28-1) . . . 243
35.93 VVFS LI28-9 Position (Station 29-1) . . . 243
35.94 VVFS LI29-9 Position (Station 30-1) . . . 243
35.95 VVPG CLTH 178 Position . . . 244
35.96 VVPG CLTH 375 Position . . . 244
35.97 VVPG CLTS 372 POSITION . . . 244
35.98 VVPG LI21-9 Position (Station 22-1) . . . 244
35.99 VVPG LI22-9 Position (Station 23-1) . . . 245
35.100 VVPG LI23-9 Position (Station 24-1) . . . 245
35.101 VVPG LI24 710 Position . . . 245
35.102 VVPG LI24 896 Position . . . 245
35.103 VVPG LI25-9 Position (Station 26-1) . . . 246
35.104 VVPG LI26-9 Position (Station 27-1) . . . 246

35.105 VVPG LI27-9 Position (Station 28-1) . . . 246
35.106 VVPG LI28-9 Position (Station 29-1) . . . 246
35.107 VVPG LI29-9 Position (Station 30-1) . . . 247
35.108 VVPG LI30-9 Position (Station 30-9) . . . 247

36 Ignored when YAG01 Is In 248
36.1 BXG Status . . . 248
36.2 Toroid Peak Current Monitor IM01 . . . 248
36.3 YAG02 IN20 241 Position . . . 248

37 Ignored when YAG01 Is In or YAG02 Is In 249
37.1 BLM/PIC Watchdog Upstream of TDUND . . . 249
37.2 BX01/BX02 Status . . . 249
37.3 Flowswitch: CE11 . . . 249
37.4 Flowswitch: TD11 . . . 249
37.5 Main Manifold Gauge: LI21 Station 5 . . . 250
37.6 Mirror BL11 Position . . . 250
37.7 OTR01 IN20 541 Position . . . 250
37.8 OTR02 IN20 571 Position . . . 251
37.9 OTR03 IN20 621 Position . . . 251
37.10 OTR04 IN20 711 Position . . . 251
37.11 OTR11 LI21 237 Position . . . 252
37.12 OTR12 LI21 291 Position . . . 252
37.13 OTRH1 Position . . . 252
37.14 OTRH2 Position . . . 253
37.15 Sub-booster Ready: LI21 . . . 253
37.16 TD11 Position . . . 253
37.17 Toroid Chassis IN20 IM11 . . . 253
37.18 Toroid Chassis IN20 IM12 . . . 254
37.19 Toroid Comparator BC1 (IMBC1IN vs IMBC1OUT) . . . 254
37.20 VVFV IN20 785 Position . . . 254
37.21 VVPG IN20 155 Position . . . 255
37.22 VVPG IN20 435 Position . . . 255
37.23 VVPG IN20 545 Position . . . 255
37.24 VVPG IN20 635 Position . . . 255
37.25 VVPG IN20 915 Position . . . 256
37.26 VVS Circuit Breaker: LI22 . . . 256
37.27 VVS Circuit Breaker: LI24 . . . 256
37.28 VVS Circuit Breaker: LI26 . . . 256
37.29 VVS Circuit Breaker: LI28 . . . 257
37.30 VVS Circuit Breaker: LI30 . . . 257
37.31 YAG03 IN20 351 Position . . . 257
37.32 YAGS1 IN20 921 Position . . . 257
37.33 YAGS2 IN20 995 Position . . . 258

38 Always Evaluated **259**
38.1 Backward Beam Stopper (RST1) . . . 259
38.2 Beam Destination: HXR . . . 259
38.3 Beam Destination: SXR . . . 259
38.4 BLM/PIC Watchdog IN20 . . . 259
38.5 Bypass Recover . . . 260
38.6 Gun RF Peak Power 20-6 . . . 260
38.7 Gun Waveguide Vacuum Summary . . . 260
38.8 HX2: 8 Hour Watchdog Timer . . . 260
38.9 HX2: Recombiner 50% LEL Threshold . . . 261
38.10 HX2: Room 50% LEL Threshold . . . 261
38.11 IOC-IN20-MP01 MPS Support IOC Heartbeat . . . 261
38.12 Laser Heater Attenuator Position . . . 261
38.13 MCC Emergency Radiation Stopper . . . 262
38.14 Mechanical Shutter Position . . . 262
38.15 Mirror AM01 Position . . . 262
38.16 MPS Beam Permit: BYKIK . . . 262
38.17 MPS Beam Permit: BYKIKS . . . 263
38.18 MPS Beam Permit: Gun RF . . . 263
38.19 MPS Beam Permit: Gun RF HXR . . . 263
38.20 MPS Beam Permit: Gun RF SXR . . . 263
38.21 MPS Beam Permit: Heater Shutter . . . 264
38.22 MPS Beam Permit: Mechanical Shutter . . . 264
38.23 MPS Mechanical Shutter Position . . . 264
38.24 PIC HVPS LI20 - Location LKG-1535 . . . 264
38.25 PIC Raw Charge Thresholds: IN20 185 . . . 265
38.26 PIC Raw Charge Thresholds: IN20 232 . . . 265
38.27 PIC Raw Charge Thresholds: IN20 245 . . . 265
38.28 PIC Raw Charge Thresholds: IN20 665 . . . 266
38.29 PIC Raw Charge Thresholds: IN20 775 . . . 266
38.30 PIC Raw Charge Thresholds: IN20 933 . . . 266
38.31 PIC Trigger Missed (LN11) . . . 267
38.32 Pockels Cell AND Gate 100 . . . 267
38.33 Pockels Cell AND Gate 200 . . . 267
38.34 Rate Request: BYKIK 1 Hz . . . 267
38.35 Rate Request: BYKIK 10 Hz . . . 268
38.36 Rate Request: BYKIK 30 Hz . . . 268
38.37 Rate Request: BYKIK 60 Hz . . . 268
38.38 Rate Request: BYKIK Burst . . . 268
38.39 Rate Request: BYKIK Single Shot . . . 269
38.40 Rate Request: BYKIKS 1 Hz . . . 269
38.41 Rate Request: BYKIKS 10 Hz . . . 269
38.42 Rate Request: BYKIKS 30 Hz . . . 269
38.43 Rate Request: BYKIKS 60 Hz . . . 270
38.44 Rate Request: BYKIKS Burst . . . 270

38.45 Rate Request: BYKIKS Single Shot . . . 270
38.46 Rate Request: Gun RF HXR 1 Hz . . . 270
38.47 Rate Request: Gun RF HXR 10 Hz . . . 271
38.48 Rate Request: Gun RF HXR 30 Hz . . . 271
38.49 Rate Request: Gun RF HXR 60 Hz . . . 271
38.50 Rate Request: Gun RF HXR Burst . . . 271
38.51 Rate Request: Gun RF HXR Single Shot . . . 272
38.52 Rate Request: Gun RF SXR 1 Hz . . . 272
38.53 Rate Request: Gun RF SXR 10 Hz . . . 272
38.54 Rate Request: Gun RF SXR 30 Hz . . . 272
38.55 Rate Request: Gun RF SXR 60 Hz . . . 273
38.56 Rate Request: Gun RF SXR Burst . . . 273
38.57 Rate Request: Gun RF SXR Single Shot . . . 273
38.58 Rate Request: Pockels Cell 1 Hz . . . 273
38.59 Rate Request: Pockels Cell 10 Hz . . . 274
38.60 Rate Request: Pockels Cell 30 Hz . . . 274
38.61 Rate Request: Pockels Cell 60 Hz . . . 274
38.62 Rate Request: Pockels Cell Burst . . . 274
38.63 Rate Request: Pockels Cell Single Shot . . . 275
38.64 VVMG IN20 175 Position . . . 275
38.65 VVMG LI21 195 Position . . . 275
38.66 VVS Circuit Breaker: LI20 . . . 275
38.67 YAG01 IN20 211 Position . . . 276
38.68 YAGG1 IN20 841 Position . . . 276

39 Ignore Logic **277**
39.1 A-Line Kicker Is Not Enabled . . . 277
39.2 A-Line SL10 Is Closed . . . 277
39.3 BKRCUS Is On . . . 277
39.4 BRCUSDC Is Off . . . 277
39.5 BRCUSDC Is On . . . 278
39.6 BX01/BX02 Is Off . . . 278
39.7 BX01/BX02 Is On . . . 278
39.8 BXG Is Off . . . 278
39.9 BXG Is On . . . 279
39.10 CBXFEL Cell 13 Beamline Deflection Is Not Ok . . . 279
39.11 CBXFEL Cell 13 Beamline Deflection Is Ok . . . 279
39.12 Destination HXR . . . 279
39.13 Destination SXR . . . 280
39.14 Diag Stopper HFX DG2 Is In . . . 280
39.15 Diag Stopper HFX UM6 Is In . . . 280
39.16 Diag Stopper XCS SB1 Is In . . . 280
39.17 HXR Beamline is in SC Mode . . . 280
39.18 Laser Heater Attenuator Is In . . . 281
39.19 LTU Dechirper Is Out . . . 281

39.20 MR1K1 Is In . . . 281
39.21 MR1K1 Is Out . . . 281
39.22 ST1K2 Is In . . . 282
39.23 ST3K4 Is In . . . 282
39.24 STCLTS Is In . . . 282
39.25 Stopper MFX S4.5 Is In . . . 282
39.26 Stopper S5B Is In . . . 282
39.27 Stopper SH2 Is In . . . 283
39.28 Stopper ST1L0 Is In . . . 283
39.29 Stopper XRT S5 Is In . . . 283
39.30 Stopper XRT S6 Is In . . . 283
39.31 Stopper: BSY D2 Summary Is In . . . 284
39.32 SXR Beamline is in SC Mode . . . 284
39.33 SXR Wire Scanner Mode Disabled . . . 284
39.34 SXR Wire Scanner Mode Enabled . . . 284
39.35 SXRSS M1/Grating Is Out . . . 284
39.36 TD11 Is In . . . 285
39.37 TDUND Is In . . . 285
39.38 TDUNDB Is In . . . 285
39.39 XRT-M2 Mirror Is Out of Beam . . . 285
39.40 YAG01 Is In . . . 286
39.41 YAG02 Is In . . . 286

1 Ignored when A-Line Kicker Is Not Enabled, A-Line SL10 Is Closed, TD11 Is In, YAG01 Is In, or YAG02 Is In

1.1 Flowswitch: COLL BSYA 2060 (PC20)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `COLL_BSYA_2060_FLOW_SW_STATE`

1.2 Flowswitch: COLL BSYA 2410 (COLL24H)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `COLL_BSYA_2470_H_FLOW_SW_STATE`

1.3 Flowswitch: COLL BSYA 2410 (COLL24V)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `COLL_BSYA_2470_V_FLOW_SW_STATE`

1.4 Flowswitch: COLL BSYA 2410 (PC24)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = COLL_BSYA_2410_FLOW_SW_STATE

1.5 Flowswitch: COLL BSYA 2600 (PC26)

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = COLL_BSYA_2600_FLOW_SW_STATE

1.6 Flowswitch: COLL BSYA 2990 (PC29)

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = COLL_BSYA_2990_FLOW_SW_STATE

1.7 Flowswitch: COLL BSYA 3710 (C37)

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = COLL_BSYA_3710_FLOW_SW_STATE

1.8 Flowswitch: COLL BSYA 4120 (3C1A)

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = COLL_ESA0_4120_FLOW_SW_STATE

1.9 PIC Raw Charge Thresholds: BSYA 2061

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_BSYA_2061_LOSSL_THRESHOLD`,
B = `PICM_BSYA_2061_LOSSH_THRESHOLD`

1.10 PIC Raw Charge Thresholds: BSYA 2120

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_BSYA_2120_LOSSL_THRESHOLD`,
B = `PICM_BSYA_2120_LOSSH_THRESHOLD`

1.11 PIC Raw Charge Thresholds: BSYA 2220

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_BSYA_2220_LOSSL_THRESHOLD`,
B = `PICM_BSYA_2220_LOSSH_THRESHOLD`

1.12 PIC Raw Charge Thresholds: BSYA 2321

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_BSYA_2321_LOSSL_THRESHOLD`,
B = `PICM_BSYA_2321_LOSSH_THRESHOLD`

1.13 PIC Raw Charge Thresholds: BSYA 2411

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_BSYA_2411_LOSSL_THRESHOLD`,
B = `PICM_BSYA_2411_LOSSH_THRESHOLD`

1.14 PIC Raw Charge Thresholds: BSYA 2472

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_BSYA_2472_LOSSL_THRESHOLD`,
B = `PICM_BSYA_2472_LOSSH_THRESHOLD`

1.15 PIC Raw Charge Thresholds: BSYA 2473

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_BSYA_2473_LOSSL_THRESHOLD`,
B = `PICM_BSYA_2473_LOSSH_THRESHOLD`

1.16 PIC Raw Charge Thresholds: BSYA 2474

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_BSYA_2474_LOSSL_THRESHOLD`,
B = `PICM_BSYA_2474_LOSSH_THRESHOLD`

1.17 PIC Raw Charge Thresholds: BSYA 2475

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_BSYA_2475_LOSSL_THRESHOLD`,
B = `PICM_BSYA_2475_LOSSH_THRESHOLD`

1.18 PIC Raw Charge Thresholds: BSYA 2520

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_BSYA_2520_LOSSL_THRESHOLD`,
B = `PICM_BSYA_2520_LOSSH_THRESHOLD`

1.19 PIC Raw Charge Thresholds: BSYA 2601

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_BSYA_2601_LOSSL_THRESHOLD`,
B = `PICM_BSYA_2601_LOSSH_THRESHOLD`

1.20 PIC Raw Charge Thresholds: BSYA 2861

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_BSYA_2861_LOSSL_THRESHOLD`,
B = `PICM_BSYA_2861_LOSSH_THRESHOLD`

1.21 PIC Raw Charge Thresholds: BSYA 2990

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_BSYA_2990_LOSSL_THRESHOLD`,
B = `PICM_BSYA_2990_LOSSH_THRESHOLD`

1.22 PIC Raw Charge Thresholds: BSYA 3320

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_BSYA_3320_LOSSL_THRESHOLD`,
B = `PICM_BSYA_3320_LOSSH_THRESHOLD`

1.23 PIC Raw Charge Thresholds: BSYA 3720

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_BSYA_3720_LOSSL_THRESHOLD`,
B = `PICM_BSYA_3720_LOSSH_THRESHOLD`

1.24 PIC Raw Charge Thresholds: BSYA 3721

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_BSYA_3721_LOSSL_THRESHOLD`,
B = `PICM_BSYA_3721_LOSSH_THRESHOLD`

1.25 PIC Raw Charge Thresholds: BSYA 3890

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_BSYA_3890_LOSSL_THRESHOLD`,
B = `PICM_BSYA_3890_LOSSH_THRESHOLD`

1.26 PIC Trigger Missed (LN42)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Missed	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_BSYA_2061_NO_TRIG_MISSED`

1.27 Stopper BSYA 2275 (ST22) Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
MOVING	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OUT	F	T	120 Hz	120 Hz	120 Hz	–	–	–	–
IN	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
BROKEN	T	T	0 Hz	0 Hz	0 Hz	–	–	–	–

Where
A = `STPR_BSYA_2275_ST22_OUT_LIM_STATE`,
B = `STPR_BSYA_2275_ST22_IN_LIM_STATE`

1.28 Stopper BSYA 2930 (ST29) Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
MOVING	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OUT	F	T	120 Hz	120 Hz	120 Hz	–	–	–	–
IN	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	–

Where
A = `STPR_BSYA_2930_ST29_OUT_LIM_STATE`,
B = `STPR_BSYA_2930_ST29_IN_LIM_STATE`

1.29 Temperature RTD Summary: A-line Past SL10

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `RTD_BSYA_2060_PASTSL10SUM_STATUS`

1.30 Vac Valve BSYA 4005 (IV40)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = VVPG_BSYA_4005_POSITION_STATE

1.31 Vac Valve: VVFS BSYA 2855 (FV28)

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OPEN	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = VVFS_BSYA_2855_POSITION_STATE

1.32 Vac Valve: VVPG BSYA 2635 (IV26)

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OPEN	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = VVPG_BSYA_2635_POSITION_STATE

1.33 Vac Valve: VVPG ESA0 4195 POSITION (IV41)

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = VVPG_ESA0_4195_POSITION_STATE

2 Ignored when A-Line Kicker Is Not Enabled, TD11 Is In, YAG01 Is In, or YAG02 Is In

2.1 A-Line SL10 Position

The following code assigns the truth table's state number to the `unsigned int` variable `state`.

```
state = (unsigned int) -1;

if ( SLIT_BSYA_2010_SL10_FB_IN_STATE &&
        SLIT_BSYA_2010_SL10_FT_IN_STATE &&
        SLIT_BSYA_2010_SL10_RB_IN_STATE &&
        SLIT_BSYA_2010_SL10_RT_IN_STATE )
{
    state = 0; /* SL10 is Closed */
}

else
{
    state = 1; /* SL10 is Not Closed */
}
```

Name	State	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Closed	0	120 Hz	120 Hz	120 Hz	–	–	–	–
Not_Closed	1	120 Hz	120 Hz	120 Hz	–	–	–	–

2.2 Flowswitch: BPM BSYA 1020 (BPM10)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
IS_NOT_OK	F	0 Hz	0 Hz	–	–	–	–	–
OK	T	120 Hz	120 Hz	–	–	–	–	–

Where
A = `BPM_BSYA_1020_FLOW_SW_STATE`

2.3 Flowswitch: BPM BSYA 1240 (BPM12)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
IS_NOT_OK	F	0 Hz	0 Hz	–	–	–	–	–
OK	T	120 Hz	120 Hz	–	–	–	–	–

Where
A = `BPM_BSYA_1240_FLOW_SW_STATE`

2.4 Flowswitch: COLL BSYA 1015 (PC10)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
IS_NOT_OK	F	0 Hz	0 Hz	–	–	–	–	–
OK	T	120 Hz	120 Hz	–	–	–	–	–

Where
A = `COLL_BSYA_1015_FLOW_SW_STATE`

2.5 Flowswitch: COLL BSYA 1230 (PC12)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
IS_NOT_OK	F	0 Hz	0 Hz	–	–	–	–	–
OK	T	120 Hz	120 Hz	–	–	–	–	–

Where
A = `COLL_BSYA_1230_FLOW_SW_STATE`

2.6 Flowswitch: COLL BSYA 1490 (PC14)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `COLL_BSYA_1490_FLOW_SW_STATE`

2.7 Flowswitch: COLL BSYA 1700 (PC17)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `COLL_BSYA_1700_FLOW_SW_STATE`

2.8 PIC Raw Charge Thresholds: BSYA 1016

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	–	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	–	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	–	–	–	–	–
OK	T	T	120 Hz	120 Hz	–	–	–	–	–

Where
A = `PICM_BSYA_1016_LOSSL_THRESHOLD`,
B = `PICM_BSYA_1016_LOSSH_THRESHOLD`

2.9 PIC Raw Charge Thresholds: BSYA 1021

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	–	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	–	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	–	–	–	–	–
OK	T	T	120 Hz	120 Hz	–	–	–	–	–

Where
A = `PICM_BSYA_1021_LOSSL_THRESHOLD`,
B = `PICM_BSYA_1021_LOSSH_THRESHOLD`

2.10 PIC Raw Charge Thresholds: BSYA 1120

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	–	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	–	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	–	–	–	–	–
OK	T	T	120 Hz	120 Hz	–	–	–	–	–

Where
A = `PICM_BSYA_1120_LOSSL_THRESHOLD`,
B = `PICM_BSYA_1120_LOSSH_THRESHOLD`

2.11 PIC Raw Charge Thresholds: BSYA 1320

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	–	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	–	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	–	–	–	–	–
OK	T	T	120 Hz	120 Hz	–	–	–	–	–

Where
A = `PICM_BSYA_1320_LOSSL_THRESHOLD`,
B = `PICM_BSYA_1320_LOSSH_THRESHOLD`

2.12 PIC Raw Charge Thresholds: BSYA 1520

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	–	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	–	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	–	–	–	–	–
OK	T	T	120 Hz	120 Hz	–	–	–	–	–

Where
A = `PICM_BSYA_1520_LOSSL_THRESHOLD`,
B = `PICM_BSYA_1520_LOSSH_THRESHOLD`

2.13 PIC Raw Charge Thresholds: BSYA 1701A

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	–	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	–	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	–	–	–	–	–
OK	T	T	120 Hz	120 Hz	–	–	–	–	–

Where
A = `PICM_BSYA_1701A_LOSSL_THRESHOLD`,
B = `PICM_BSYA_1701A_LOSSH_THRESHOLD`

2.14 PIC Raw Charge Thresholds: BSYA 1701B

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	–	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	–	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	–	–	–	–	–
OK	T	T	120 Hz	120 Hz	–	–	–	–	–

Where
A = `PICM_BSYA_1701B_LOSSL_THRESHOLD`,
B = `PICM_BSYA_1701B_LOSSH_THRESHOLD`

2.15 PIC Raw Charge Thresholds: BSYA 1980

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	–	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	–	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	–	–	–	–	–
OK	T	T	120 Hz	120 Hz	–	–	–	–	–

Where
A = `PICM_BSYA_1980_LOSSL_THRESHOLD`,
B = `PICM_BSYA_1980_LOSSH_THRESHOLD`

2.16 Temperature RTD Summary: A-Line Before SL10

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Faulted	F	0 Hz	0 Hz	–	–	–	–	–
OK	T	120 Hz	120 Hz	–	–	–	–	–

Where
A = `RTD_BSYA_1015_PRESL10SUM_STATUS`

2.17 Vac Valve: VVFS BSYA 1030 (FV10)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	0 Hz	0 Hz	–	–	–	–	–
OPEN	T	120 Hz	120 Hz	–	–	–	–	–

Where
A = `VVFS_BSYA_1030_POSITION_STATE`

2.18 Vac Valve: VVPG BSYA 1018 (IV10)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	0 Hz	0 Hz	–	–	–	–	–
OPEN	T	120 Hz	120 Hz	–	–	–	–	–

Where
A = `VVPG_BSYA_1018_POSITION_STATE`

2.19 VVPG BSYA 340 Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Open	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `VVPG_BSYA_340_OPEN_LIMSW_POSITION`

3 Ignored when BKRCUS Is On, STCLTS Is In, TD11 Is In, YAG01 Is In, or YAG02 Is In

3.1 BRCUS1 and BRCUSDC Consistent

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Faulted	F	F	–	–	–	–	–	–	–
BRCUS1 Not On BRCUSDC On	F	T	0 Hz	0 Hz	0 Hz	–	0 Hz	0 Hz	0 Hz
BRCUS1 On BRCUSDC Not On	T	F	0 Hz	0 Hz	0 Hz	–	0 Hz	0 Hz	0 Hz
BRCUS1 and BRCUSDC On	T	T	–	–	–	–	–	–	–

Where
A = `BEND_CLTS_180_ON_STATE`,
B = `BEND_CLTS_765_ON_STATE`

4 Ignored when BKRCUS Is On, SXR Beamline is in SC Mode, TD11 Is In, YAG01 Is In, or YAG02 Is In

4.1 BRCUSDC Current

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `BEND_CLTS_180_CURRENT_THRESHOLD`

5 Ignored when BRCUSDC Is On, STCLTS Is In, TD11 Is In, YAG01 Is In, or YAG02 Is In

5.1 BRCUS1 and BKRCUS Consistent

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Faulted	F	F	–	–	–	–	–	–	–
BRCUS1 Not On BKRCUS On	F	T	0 Hz	0 Hz	0 Hz	–	0 Hz	0 Hz	0 Hz
BRCUS1 On BKRCUS Not On	T	F	0 Hz	0 Hz	0 Hz	–	0 Hz	0 Hz	0 Hz
BRCUS1 and BKRCUS On	T	T	–	–	–	–	–	–	–

Where
A = `KICK_CLTS_185_ON_STATE`,
B = `BEND_CLTS_765_ON_STATE`

6 Ignored when BRCUSDC Is On, SXR Beamline is in SC Mode, TD11 Is In, YAG01 Is In, or YAG02 Is In

6.1 BKRCUS Current

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `KICK_CLTS_185_CURRENT_THRESHOLD`

7 Ignored when BX01/BX02 Is Off, YAG01 Is In, or YAG02 Is In

7.1 Toroid Comparator Dogleg 1 (IM02 vs IM03)

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Downstream > Upstream	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Upstream > Downstream	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `TC203L1_STATE`,
B = `TC203L2_STATE`

8 Ignored when BX01/BX02 Is On, YAG01 Is In, or YAG02 Is In

8.1 BXS Status

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `BEND_IN20_931_OK_STATE`

8.2 Toroid Comparator Inj Spectrometer (IM02 vs IMS1)

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Downstream > Upstream	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Upstream > Downstream	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `TC2S1L1_STATE`,
B = `TC2S1L2_STATE`

9 Ignored when BXG Is Off or YAG01 Is In

9.1 Wakefield Shield Gun Spectrometer

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `WL_BL231_IN_STATE`

10 Ignored when BXG Is On or YAG01 Is In

10.1 Wakefield Shield Straight Ahead

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `WL_BL231_OUT_STATE`

11 Ignored when CBXFEL Cell 13 Beamline Deflection Is Not Ok, HXR Beamline is in SC Mode, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

11.1 CBXFEL: Station F Position (Chicane On)

Name	*D*	*C*	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Motion 5V Broken	F	F	F	F	–	–	0 Hz	–	–	–	–
Motion Out / MPS Moving	F	F	F	T	–	–	0 Hz	–	–	–	–
Motion 5V Broken	F	F	T	F	–	–	0 Hz	–	–	–	–
Motion Out / MPS In	F	F	T	T	–	–	0 Hz	–	–	–	–
Motion In / MPS Moving	F	T	F	F	–	–	0 Hz	–	–	–	–
Moving	F	T	F	T	–	–	120 Hz	–	–	–	–
Motion In / MPS In	F	T	T	F	–	–	120 Hz	–	–	–	–
Motion Moving / MPS In	F	T	T	T	–	–	0 Hz	–	–	–	–
Motion 5V Broken	T	F	F	F	–	–	0 Hz	–	–	–	–
Motion Out / MPS Out	T	F	F	T	–	–	120 Hz	–	–	–	–
Motion 5V Broken	T	F	T	F	–	–	0 Hz	–	–	–	–
Motion Out / MPS Broken	T	F	T	T	–	–	0 Hz	–	–	–	–
Motion Out / MPS In	T	T	F	F	–	–	0 Hz	–	–	–	–
Motion Moving / MPS Out	T	T	F	T	–	–	0 Hz	–	–	–	–
Motion In / MPS Broken	T	T	T	F	–	–	0 Hz	–	–	–	–
Motion Moving / MPS Broken	T	T	T	T	–	–	0 Hz	–	–	–	–

Where
A = `BOD_UNDH_1369_Y_POSITIVELIMIT_STATE`,
B = `BOD_UNDH_1369_Y_IN_LMTSW_STATE`,
C = `BOD_UNDH_1369_Y_NEGATIVELIMIT_STATE`,
D = `BOD_UNDH_1369_Y_OUT_LMTSW_STATE`

12 Ignored when CBXFEL Cell 13 Beamline Deflection Is Ok, HXR Beamline is in SC Mode, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

12.1 CBXFEL: Station F Position (Chicane Off)

Name	*D*	*C*	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Motion 5V Broken	F	F	F	F	–	–	0 Hz	–	–	–	–
Motion Out / MPS Moving	F	F	F	T	–	–	0 Hz	–	–	–	–
Motion 5V Broken	F	F	T	F	–	–	0 Hz	–	–	–	–
Motion Out / MPS In	F	F	T	T	–	–	0 Hz	–	–	–	–
Motion In / MPS Moving	F	T	F	F	–	–	0 Hz	–	–	–	–
Moving	F	T	F	T	–	–	0 Hz	–	–	–	–
Motion In / MPS In	F	T	T	F	–	–	120 Hz	–	–	–	–
Motion Moving / MPS In	F	T	T	T	–	–	0 Hz	–	–	–	–
Motion 5V Broken	T	F	F	F	–	–	0 Hz	–	–	–	–
Motion Out / MPS Out	T	F	F	T	–	–	120 Hz	–	–	–	–
Motion 5V Broken	T	F	T	F	–	–	0 Hz	–	–	–	–
Motion Out / MPS Broken	T	F	T	T	–	–	0 Hz	–	–	–	–
Motion Out / MPS In	T	T	F	F	–	–	0 Hz	–	–	–	–
Motion Moving / MPS Out	T	T	F	T	–	–	0 Hz	–	–	–	–
Motion In / MPS Broken	T	T	T	F	–	–	0 Hz	–	–	–	–
Motion Moving / MPS Broken	T	T	T	T	–	–	0 Hz	–	–	–	–

Where
A = `BOD_UNDH_1369_Y_POSITIVELIMIT_STATE`,
B = `BOD_UNDH_1369_Y_IN_LMTSW_STATE`,
C = `BOD_UNDH_1369_Y_NEGATIVELIMIT_STATE`,
D = `BOD_UNDH_1369_Y_OUT_LMTSW_STATE`

13 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, Diag Stopper XCS SB1 Is In, HXR Beamline is in SC Mode, Stopper SH2 Is In, Stopper ST1L0 Is In, Stopper XRT S5 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

13.1 XCS SB1 VGC 02 Gate Valve Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Open	F	T	–	–	120 Hz	–	–	–	–
Closed	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `XCS_SB1_VGC_02_OPN_DI_POSITION`,
B = `XCS_SB1_VGC_02_CLS_DI_POSITION`

13.2 XCS SB2 VGC 01 Gate Valve Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Open	F	T	–	–	120 Hz	–	–	–	–
Closed	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `XCS_SB2_VGC_01_OPN_DI_POSITION`,
B = `XCS_SB2_VGC_01_CLS_DI_POSITION`

14 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, HXR Beamline is in SC Mode, Stopper S5B Is In, Stopper SH2 Is In, Stopper ST1L0 Is In, Stopper XRT S5 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

14.1 CXI Configuration 1 Summary

The following code assigns the truth table's state number to the `unsigned int` variable `state`.

```
/*
state = 0 beam dump
state = 1 beam allowed
state = 2 other, beam allowed
*/

/* Initialize to a guard value */
state = (unsigned int) -1;
{
int evalCXIConfigOne = -1;
{
        if ( CXI_MPS_CFG_1_CONFID ) /* EPS PLC asserts we are in config
            1 */
        {
                /* Evaluate inputs to identify if we're in beam dump
                   state for Cfg 1 */
                if ((! CXI_DG1_MMS_03_A_POSITION) ||
                (! CXI_DG2_MMS_06_B_POSITION) ||
                (! CXI_SC1_VGC_02_OPN_DI_POSITION) )
                {
                        evalCXIConfigOne = 0;
                }
                else
                {
                        evalCXIConfigOne = 1;
                }
        }
}
```

```
switch( evalCXIConfigOne )
{
        case 0: state = 0; break;
        case 1: state = 1; break;
        default: state = 2; break;
}
}
```

Name	State	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Config 1 Fault	0	–	–	0 Hz	–	–	–	–
Config 1 Ok	1	–	–	120 Hz	–	–	–	–
Not In Config 1	2	–	–	120 Hz	–	–	–	–

14.2 CXI Configuration 2 Summary

The following code assigns the truth table's state number to the `unsigned int` variable `state`.

```
/*
state = 0 beam dump
state = 1 beam allowed
state = 2 other, beam allowed
*/

/* Initialize to a guard value */
state = (unsigned int) -1;
{
int evalCXIConfigTwo = -1;
{
        if ( CXI_MPS_CFG_2_CONFID ) /* EPS PLC asserts we are in config
            2 */
        {
                /* Evaluate inputs to identify if we're in beam dump
                    state for Cfg 2 */
                if (    (! CXI_DG1_MMS_03_A_POSITION) ||
                        (! CXI_SC1_VGC_02_OPN_DI_POSITION) || /* If the
                            valve is not open, trip */
                        (       (! CXI_DIA_ATTEN_OK_POSITION) && /* DIA
                            attenuation */
                                (! (    CXI_DG1_MMS_08_B_POSITION &&
                                                CXI_DG1_MMS_08_B_POSITION
                                                    &&
```

```
                                                        CXI_DG2_MMS_08_B_POSITION
                                                            &&
                                                        CXI_DG2_MMS_09_B_POSITION
                                                            &&
                                                        CXI_DG2_MMS_10_B_POSITION
                                                            &&
                                                        CXI_DG4_MMS_05_B_POSITION
                                                            &&
                                                        CXI_DG4_MMS_03_B_POSITION

                                                    )
                                                )
                                            )
                                            )
                        {
                                evalCXIConfigTwo = 0;
                        }
                        else
                        {
                                evalCXIConfigTwo = 1;
                        }
        }
}

switch( evalCXIConfigTwo )
{
        case 0: state = 0; break;
        case 1: state = 1; break;
        default: state = 2; break;
}
}
```

Name	State	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Faulted	0	–	–	0 Hz	–	–	–	–
Ok	1	–	–	120 Hz	–	–	–	–
Not In Config 2	2	–	–	120 Hz	–	–	–	–

14.3 CXI Configuration 3 Summary

The following code assigns the truth table's state number to the `unsigned int` variable `state`.

```
/*
```

```
state = 0 beam dump
state = 1 beam allowed
state = 2 other, beam allowed
*/

/* Initialize to a guard value */
state = (unsigned int) -1;
{
int evalCXIConfigThree = -1;
{
        if ( CXI_MPS_CFG_3_CONFID ) /* EPS PLC asserts we are in config
            3 */
        {
                /* Evaluate inputs to identify if we're in beam dump
                   state for Cfg 3 */
                if ((! CXI_DG1_MMS_03_A_POSITION) ||
                (! CXI_SC1_VGC_02_OPN_DI_POSITION) )
                {
                        evalCXIConfigThree = 0;
                }
                else
                {
                        evalCXIConfigThree = 1;
                }
        }
}

switch( evalCXIConfigThree )
{
        case 0: state = 0; break;
        case 1: state = 1; break;
        default: state = 2; break;
}
}
```

Name	State	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Faulted	0	–	–	0 Hz	–	–	–	–
Ok	1	–	–	120 Hz	–	–	–	–
Not in Config 3	2	–	–	120 Hz	–	–	–	–

14.4 CXI Configuration 4 Summary

The following code assigns the truth table's state number to the `unsigned int` variable `state`.

```
/*
state = 0 beam dump
state = 1 beam allowed
state = 2 other, beam allowed
*/

/* Initialize to a guard value */
state = (unsigned int) -1;
{
int evalCXIConfigFour = -1;
{
        if ( CXI_MPS_CFG_4_CONFID ) /* EPS PLC asserts we are in config
            4 */
        {
                /* Evaluate inputs to identify if we're in beam dump
                   state for Cfg 4 */
                if ((! CXI_DG1_MMS_03_A_POSITION) ||
                (! CXI_SC1_VGC_02_OPN_DI_POSITION) )
                {
                        evalCXIConfigFour = 0;
                }
                else
                {
                        evalCXIConfigFour = 1;
                }
        }
}

switch( evalCXIConfigFour )
{
        case 0: state = 0; break;
        case 1: state = 1; break;
        default: state = 2; break;
}
}
```

Name	State	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Faulted	0	–	–	0 Hz	–	–	–	–
Ok	1	–	–	120 Hz	–	–	–	–
Not In Config 4	2	–	–	120 Hz	–	–	–	–

14.5 CXI Configuration 5 Summary

The following code assigns the truth table's state number to the `unsigned int` variable `state`.

```
/*
state = 0 beam dump
state = 1 beam allowed
state = 2 other, beam allowed
*/

/* Initialize to a guard value */
state = (unsigned int) -1;
{
int evalCXIConfigFive = -1;
{
        if ( CXI_MPS_CFG_5_CONFID ) /* EPS PLC asserts we are in config
            5 */
        {
                /* Evaluate inputs to identify if we're in beam dump
                   state for Cfg 5 */
                if ((! CXI_DG1_MMS_03_A_POSITION) ||
                (! CXI_SC1_VGC_02_OPN_DI_POSITION) )
                {
                        evalCXIConfigFive = 0;
                }
                else
                {
                        evalCXIConfigFive = 1;
                }
        }
}

switch( evalCXIConfigFive )
{
        case 0: state = 0; break;
        case 1: state = 1; break;
        default: state = 2; break;
```

```
}
}
```

Name	State	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Faulted	0	–	–	0 Hz	–	–	–	–
Ok	1	–	–	120 Hz	–	–	–	–
Not In Config 5	2	–	–	120 Hz	–	–	–	–

14.6 CXI Configuration 6 Summary

The following code assigns the truth table's state number to the `unsigned int` variable `state`.

```
/*
state = 0 beam dump
state = 1 beam allowed
state = 2 other, beam allowed
*/

/* Initialize to a guard value */
state = (unsigned int) -1;
{
int evalCXIConfigSix = -1;
{
        if ( CXI_MPS_CFG_6_CONFID ) /* EPS PLC asserts we are in config
            6 */
        {
                /* Evaluate inputs to identify if we're in beam dump
                    state for Cfg 6 */
                if ((! CXI_DG1_MMS_03_A_POSITION) ||
                        (! CXI_DG2_MMS_06_B_POSITION) ||
                (! CXI_SC2_VGC_02_OPN_DI_POSITION) )
                {
                        evalCXIConfigSix = 0;
                }
                else
                {
                        evalCXIConfigSix = 1;
                }
        }
}

switch( evalCXIConfigSix )
```

```
{
        case 0: state = 0; break;
        case 1: state = 1; break;
        default: state = 2; break;
}
}
```

Name	State	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Faulted	0	–	–	0 Hz	–	–	–	–
Ok	1	–	–	120 Hz	–	–	–	–
Not In Config 6	2	–	–	120 Hz	–	–	–	–

14.7 CXI Configuration 7 Summary

The following code assigns the truth table's state number to the `unsigned int` variable `state`.

```
/*
state = 0 beam dump
state = 1 beam allowed
state = 2 other, beam allowed
*/

/* Initialize to a guard value */
state = (unsigned int) -1;
{
int evalCXIConfigSeven = -1;
{
        if ( CXI_MPS_CFG_7_CONFID ) /* EPS PLC asserts we are in config
            7 */
        {
                /* Evaluate inputs to identify if we're in beam dump
                   state for Cfg 7 */
                if ((! CXI_DG1_MMS_03_A_POSITION)        ||
                        (! CXI_SC1_VGC_02_OPN_DI_POSITION) ||
                (! CXI_SC2_VGC_02_OPN_DI_POSITION) )
                {
                        evalCXIConfigSeven = 0;
                }
                else
                {
                        evalCXIConfigSeven = 1;
                }
```

```
        }
}

switch( evalCXIConfigSeven )
{
        case 0: state = 0; break;
        case 1: state = 1; break;
        default: state = 2; break;
}
}
```

Name	State	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Faulted	0	–	–	0 Hz	–	–	–	–
Ok	1	–	–	120 Hz	–	–	–	–
Not In Config 7	2	–	–	120 Hz	–	–	–	–

14.8 CXI KB2 VGC 02 Gate Valve Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Open	F	T	–	–	120 Hz	–	–	–	–
Closed	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `CXI_KB2_VGC_02_OPN_DI_POSITION`,
B = `CXI_KB2_VGC_02_CLS_DI_POSITION`

14.9 CXI MPS PLC Readiness Status

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
PLC Not OK	F	–	–	0 Hz	–	–	–	–
PLC OK	T	–	–	120 Hz	–	–	–	–

Where
A = `CXI_MPS_PLC_01_OK_STATUS`

14.10 CXI User Patch Panel 1 Ready

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Ready	F	–	–	0 Hz	–	–	–	–
Ready	T	–	–	120 Hz	–	–	–	–

Where
A = `CXI_USR_01_MPSFAULT_STATUS`

14.11 CXI User Patch Panel 2 Ready

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Ready	F	–	–	0 Hz	–	–	–	–
Ready	T	–	–	120 Hz	–	–	–	–

Where
A = `CXI_USR_02_MPSFAULT_STATUS`

14.12 CXI:DG1:VGC:01 Gate Valve Open Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `CXI_DG1_VGC_01_OPN_DI_POSITION`

14.13 CXI:DG1:VGC:02 Gate Valve Open Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `CXI_DG1_VGC_02_OPN_DI_POSITION`

14.14 CXI:DG2:VGC:01 Gate Valve Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Open	F	T	–	–	120 Hz	–	–	–	–
Closed	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `CXI_DG2_VGC_01_OPN_DI_POSITION`,
B = `CXI_DG2_VGC_01_CLS_DI_POSITION`

14.15 CXI:DG2:VGC:02 Gate Valve Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Open	F	T	–	–	120 Hz	–	–	–	–
Closed	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `CXI_DG2_VGC_02_OPN_DI_POSITION`,
B = `CXI_DG2_VCG_02_CLS_DI_POSITION`

14.16 CXI:DSC:VGC:01 Gate Valve Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Open	F	T	–	–	120 Hz	–	–	–	–
Closed	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `CXI_DSC_VGC_01_OPN_DI_POSITION`,
B = `CXI_DSC_VGC_01_CLS_DI_POSITION`

14.17 CXI:KB1:VGC:01 Gate Valve Open Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `CXI_KB1_VGC_01_OPN_DI_POSITION`

14.18 CXI:KB1:VGC:02 Gate Valve Open Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `CXI_KB1_VGC_02_OPN_DI_POSITION`

14.19 CXI:KB2:VGC:01 Gate Valve Open Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `CXI_KB2_VGC_01_OPN_DI_POSITION`

14.20 CXI:SC1:VGC:01 Gate Valve Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Open	F	T	–	–	120 Hz	–	–	–	–
Closed	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = CXI_SC1_VGC_01_OPN_DI_POSITION,
B = CXI_SC1_VGC_01_CLS_DI_POSITION

14.21 CXI:SC3:VGC:01 Be Gate Valve Position - Status from PLC

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving or Broken	F	–	–	0 Hz	–	–	–	–
Open or Closed	T	–	–	120 Hz	–	–	–	–

Where
A = CXI_SC3_VGC_01_OPN_DI_POSITION

14.22 HF4 LAM VGC 01 Gate Valve Position

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = HF4_LAM_VGC_01_OPN_DI_POSITION

15 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, HXR Beamline is in SC Mode, Stopper SH2 Is In, Stopper ST1L0 Is In, Stopper XRT S5 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

15.1 CXI XRT Laser Reference Mirror Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Mirror In Beam	F	–	–	0 Hz	–	–	–	–
Mirror Out of Beam	T	–	–	120 Hz	–	–	–	–

Where
A = `XRT_DIA_MMS_01_B_POSITION`

15.2 HFA:SND:VGC:01 Gate Valve Open Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `HFA_SND_VGC_01_OPN_DI_POSITION`

15.3 HFX:DIA:VGC:02 Gate Valve Open Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `HFX_DIA_VGC_02_OPN_DI_POSITION`

15.4 PPS Stopper S5B Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
In	F	T	–	–	–	–	–	–	–
Out	T	F	–	–	–	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `STPR_FEH1_5_S5BIN_POSITION`,
B = `STPR_FEH1_5_S5BOUT_POSITION`

15.5 XCS SB1 Diagnostic Stopper Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Out	F	T	–	–	120 Hz	–	–	–	–
In	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `XCS_SB1_STP_01_OPN_DI_POSITION`,
B = `XCS_SB1_STP_01_CLS_DI_POSITION`

15.6 XCS SB1 VGC 01 Gate Valve Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Open	F	T	–	–	120 Hz	–	–	–	–
Closed	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `XCS_SB1_VGC_01_OPN_DI_POSITION`,
B = `XCS_SB1_VGC_01_CLS_DI_POSITION`

15.7 XRT HXRAY DIA Isolation Valve HXX-DIA-VGC-01

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Closed	F	T	–	–	0 Hz	–	–	–	–
Open	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `HXX_DIA_VGC_01_CLS_DI_STATE`,
B = `HXX_DIA_VGC_01_OPN_DI_STATE`

16 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, HXR Beamline is in SC Mode, Stopper SH2 Is In, Stopper ST1L0 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

16.1 HFX:DG2:VGC:01 Gate Valve Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `HFX_DG2_VGC_01_OPN_DI_POSITION`

16.2 HFX:MON:VGC:01 Gate Valve Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `HFX_MON_VGC_01_OPN_DI_POSITION`

16.3 HFX:MON:VGC:02 Gate Valve Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `HFX_MON_VGC_02_OPN_DI_POSITION`

16.4 Stopper XRT S5 Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Out	F	T	–	–	–	–	–	–	–
In	T	F	–	–	–	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `STPR_XRT1_1_S5OUT_POSITION`,
B = `STPR_XRT1_1_S5IN_POSITION`

17 Ignored when Diag Stopper HFX UM6 Is In, HXR Beamline is in SC Mode, Stopper MFX S4.5 Is In, Stopper SH2 Is In, Stopper ST1L0 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

17.1 MFX MPS Summary - Downstream of Stopper 4.5

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Ok	F	–	–	0 Hz	–	–	–	–
Ok	T	–	–	120 Hz	–	–	–	–

Where
A = `MFX_MPS_1_SUM_STATE`

18 Ignored when Diag Stopper HFX UM6 Is In, HXR Beamline is in SC Mode, Stopper SH2 Is In, Stopper ST1L0 Is In, Stopper XRT S6 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

18.1 MEC DV4 VCG 01 Gate Valve Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `MEC_DV4_VGC_01_OPN_DI_POSITION`

18.2 MEC DV5 VGC 01 Gate Valve Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `MEC_DV5_VGC_01_OPN_DI_POSITION`

18.3 MEC HXM VGC 01 Gate Valve Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `MEC_HXM_VGC_01_OPN_DI_POSITION`

18.4 MEC XT1 Reference Laser Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Out	F	–	–	0 Hz	–	–	–	–
Out	T	–	–	120 Hz	–	–	–	–

Where
A = `MEC_XT1_MMS_01_B_POSITION`

18.5 MEC XT1 VGC 01 Gate Valve Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `MEC_XT1_VGC_01_OPN_DI_POSITION`

18.6 MEC XT2 VGC 02 Gate Valve Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `MEC_XT2_VGC_02_OPN_DI_POSITION`

18.7 MEC XT2 VGC 03 Gate Valve Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `MEC_XT2_VGC_03_OPN_DI_POSITION`

18.8 MEC XT2 VGC 04 Gate Valve Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `MEC_XT2_VGC_04_OPN_DI_POSITION`

18.9 MEC XT2 VGC 05 Gate Valve Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Open	F	T	–	–	120 Hz	–	–	–	–
Closed	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `MEC_XT2_VGC_05_OPN_DI_POSITION`,
B = `MEC_XT2_VGC_05_CLS_DI_POSITION`

19 Ignored when Diag Stopper HFX UM6 Is In, HXR Beamline is in SC Mode, Stopper SH2 Is In, Stopper ST1L0 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

19.1 DG2 Diagnostic Stopper Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
In	F	T	–	–	–	–	–	–	–
Out	T	F	–	–	–	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `HFX_DG2_STP_01_IN_DI_POSITION`,
B = `HFX_DG2_STP_01_OUT_DI_POSITION`

19.2 MEC BXL VGC 01 Gate Valve Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `MEC_BXL_VGC_01_OPN_DI_POSITION`

19.3 MEC XRT Attenuator Inspection Mirror Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Mirror Not Out	F	–	–	0 Hz	–	–	–	–
Mirror Out	T	–	–	120 Hz	–	–	–	–

Where
A = `MEC_HXM_MMS_04_B_POSITION`

19.4 MFX Gate Valve Summary - Upstream of Stopper 4.5

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not All Out	F	–	–	0 Hz	–	–	–	–
All Out	T	–	–	120 Hz	–	–	–	–

Where
A = `MFX_XRT_VGC_OUT_SUM_STATE`

19.5 Stopper MFX S4.5 Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Out	F	T	–	–	120 Hz	–	–	–	–
In	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `STPR_XRT_1_S45OUT_STATE`,
B = `STPR_XRT_1_S45IN_STATE`

19.6 Stopper XRT S6 Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
In	F	T	–	–	120 Hz	–	–	–	–
Out	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `STPR_XRT1_1_S6IN_POSITION`,
B = `STPR_XRT1_1_S6OUT_POSITION`

19.7 XRT HXRAY LOM Isolation Valve HXX-LOM-VGC-01

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Closed	F	T	–	–	0 Hz	–	–	–	–
Open	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `HXX_LOM_VGC_01_CLS_DI_STATE`,
B = `HXX_LOM_VGC_01_OPN_DI_STATE`

19.8 XRT HXRAY MXT Gate Valve HXX:MXT:VGC:01

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `HXX_MXT_VGC_01_OPN_DI_POSITION`

19.9 XRT HXRAY MXT Gate Valve HXX:MXT:VGC:02

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `HXX_MXT_VGC_02_OPN_DI_POSITION`

19.10 XRT HXRAY MXT Gate Valve HXX:MXT:VGC:03

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Closed	F	T	–	–	0 Hz	–	–	–	–
Open	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `HXX_MXT_VGC_03_CLS_DI_POSITION`,
B = `HXX_MXT_VGC_03_OPN_DI_POSITION`

19.11 XRT HXRAY MXT Gate Valve HXX:MXT:VGC:05

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Open	F	–	–	0 Hz	–	–	–	–
Open	T	–	–	120 Hz	–	–	–	–

Where
A = `HXX_MXT_VGC_05_OPN_DI_POSITION`

19.12 XRT-M2 Mirror and DG2 STP Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS
In Transit: DG2 STP Not In Beam, XRT-M2 Mirror Not Out	F	F	–	–	0 Hz	–	–	–
In Transit: DG2 STP Not In Beam, XRT-M2 Mirror Out	F	T	–	–	120 Hz	–	–	–
Safe: DG2 STP In Beam, XRT-M2 Mirror Not Out	T	F	–	–	120 Hz	–	–	–
Safe: DG2 STP In Beam, XRT-M2 Mirror Out	T	T	–	–	120 Hz	–	–	–

Where
A = `HXX_HXM_MMS_01_B_POSITION`,
B = `HFX_DG2_STP_01_IN_DI_POSITION`

20 Ignored when HXR Beamline is in SC Mode, Stopper SH2 Is In, Stopper ST1L0 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

20.1 UM6 Diagnostic Stopper Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
In	F	T	–	–	–	–	–	–	–
Out	T	F	–	–	–	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = HFX_UM6_STP_01_IN_DI_POSITION,
B = HFX_UM6_STP_01_OUT_DI_POSITION

20.2 XRT HXRAY UM6 Isolation Valve HXX-UM6-VGC-01

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Closed	F	T	–	–	0 Hz	–	–	–	–
Open	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = HXX_UM6_VGC_01_CLS_DI_STATE,
B = HXX_UM6_VGC_01_OPN_DI_STATE

20.3 XRT UM6 Camera Position HXX-UM6-CVP-01

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Out	F	T	–	–	120 Hz	–	–	–	–
In	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `HXX_UM6_CVP_01_B_STATE`,
B = `HXX_UM6_CVP_01_A_STATE`

21 Ignored when HXR Beamline is in SC Mode, Stopper SH2 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

21.1 XRT HOMS Fast Fault 1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	0 Hz	–	–	–	–
Ok	T	–	–	120 Hz	–	–	–	–

Where
A = `MPLN_FEEH_1_XRTHOMSFSTFLT_STATE`

22 Ignored when HXR Beamline is in SC Mode, Stopper ST1L0 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

22.1 SH2 PPS Stopper Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Out	F	T	–	–	120 Hz	–	–	–	–
In	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `STPR_XRT1_1_SH2OUT_STATE`,
B = `STPR_XRT1_1_SH2IN_STATE`

23 Ignored when HXR Beamline is in SC Mode, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

23.1 BLMH13 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = `CBLM_UNDH_1375_I1_THRESHOLD`

23.2 BLMH13 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = `CBLM_UNDH_1375_I0_THRESHOLD`

23.3 BLMH14 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = `CBLM_UNDH_1475_I1_THRESHOLD`

23.4 BLMH14 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_1475_I0_THRESHOLD

23.5 BLMH15 Threshold 500 ms Fault

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_1575_I1_THRESHOLD

23.6 BLMH15 Threshold Single Shot Fault

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_1575_I0_THRESHOLD

23.7 BLMH16 Threshold 500 ms Fault

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_1675_I1_THRESHOLD

23.8 BLMH16 Threshold Single Shot Fault

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_1675_I0_THRESHOLD

23.9 BLMH17 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_1775_I1_THRESHOLD

23.10 BLMH17 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_1775_I0_THRESHOLD

23.11 BLMH18 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_1875_I1_THRESHOLD

23.12 BLMH18 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_1875_I0_THRESHOLD

23.13 BLMH19 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_1975_I1_THRESHOLD

23.14 BLMH19 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_1975_I0_THRESHOLD

23.15 BLMH20 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_2075_I1_THRESHOLD

23.16 BLMH20 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_2075_I0_THRESHOLD

23.17 BLMH21 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_2175_I1_THRESHOLD

23.18 BLMH21 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_2175_I0_THRESHOLD

23.19 BLMH22 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_2275_I1_THRESHOLD

23.20 BLMH22 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_2275_I0_THRESHOLD

23.21 BLMH23 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_2375_I1_THRESHOLD

23.22 BLMH23 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_2375_I0_THRESHOLD

23.23 BLMH24 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_2475_I1_THRESHOLD

23.24 BLMH24 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_2475_I0_THRESHOLD

23.25 BLMH25 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_2575_I1_THRESHOLD

23.26 BLMH25 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_2575_I0_THRESHOLD

23.27 BLMH26 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_2675_I1_THRESHOLD

23.28 BLMH26 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_2675_I0_THRESHOLD

23.29 BLMH27 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_2775_I1_THRESHOLD

23.30 BLMH27 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_2775_I0_THRESHOLD

23.31 BLMH28 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_2875_I1_THRESHOLD

23.32 BLMH28 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_2875_I0_THRESHOLD

23.33 BLMH29 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_2975_I1_THRESHOLD

23.34 BLMH29 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_2975_I0_THRESHOLD

23.35 BLMH30 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_3075_I1_THRESHOLD

23.36 BLMH30 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_3075_I0_THRESHOLD

23.37 BLMH31 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_3175_I1_THRESHOLD

23.38 BLMH31 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_3175_I0_THRESHOLD

23.39 BLMH32 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_3275_I1_THRESHOLD

23.40 BLMH32 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_3275_I0_THRESHOLD

23.41 BLMH33 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_3375_I1_THRESHOLD

23.42 BLMH33 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_3375_I0_THRESHOLD

23.43 BLMH34 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_3475_I1_THRESHOLD

23.44 BLMH34 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_3475_I0_THRESHOLD

23.45 BLMH35 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_3575_I1_THRESHOLD

23.46 BLMH35 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_3575_I0_THRESHOLD

23.47 BLMH36 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_3675_I1_THRESHOLD

23.48 BLMH36 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_3675_I0_THRESHOLD

23.49 BLMH37 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_3775_I1_THRESHOLD

23.50 BLMH37 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_3775_I0_THRESHOLD

23.51 BLMH38 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_3875_I1_THRESHOLD

23.52 BLMH38 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_3875_I0_THRESHOLD

23.53 BLMH39 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_3975_I1_THRESHOLD

23.54 BLMH39 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_3975_I0_THRESHOLD

23.55 BLMH40 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_4075_I1_THRESHOLD

23.56 BLMH40 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_4075_I0_THRESHOLD

23.57 BLMH41 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_4175_I1_THRESHOLD

23.58 BLMH41 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_4175_I0_THRESHOLD

23.59 BLMH42 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_4275_I1_THRESHOLD

23.60 BLMH42 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_4275_I0_THRESHOLD

23.61 BLMH43 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_4375_I1_THRESHOLD

23.62 BLMH43 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_4375_I0_THRESHOLD

23.63 BLMH44 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_4475_I1_THRESHOLD

23.64 BLMH44 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_4475_I0_THRESHOLD

23.65 BLMH45 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_4575_I1_THRESHOLD

23.66 BLMH45 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_4575_I0_THRESHOLD

23.67 BLMH46 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_4675_I1_THRESHOLD

23.68 BLMH46 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = CBLM_UNDH_4675_I0_THRESHOLD

23.69 BLMH47 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `CBLM_UNDH_4775_I1_THRESHOLD`

23.70 BLMH47 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `CBLM_UNDH_4775_I0_THRESHOLD`

23.71 BYDSH Current

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = `BEND_DMPH_395_CURRENT_THRESHOLD`

23.72 BYDSH Magnet Power Status

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Inconsistent	F	F	–	–	0 Hz	–	–	–	–
On	F	T	–	–	120 Hz	–	–	–	–
Off	T	F	–	–	0 Hz	–	–	–	–
Inconsistent	T	T	–	–	0 Hz	–	–	–	–

Where
A = `BEND_DMPH_395_ON_STATE`,
B = `BEND_DMPH_395_OFF_STATE`

23.73 FEE Summary Fault - HXR Fast Fault 1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = `MPLN_FEEH_1_FASTFLT_STATE`

23.74 FEE Summary Fault - HXR Fast Fault 2

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = `MPLN_FEEH_2_FASTFLT_STATE`

23.75 FEE Summary Fault - HXR Gas System Fast Fault 1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = `MPLN_FEEH_1_GASFASTFLT_STATE`

23.76 FEE Summary Fault - HXR Gas System Fast Fault 2

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = `MPLN_FEEH_2_GASFASTFLT_STATE`

23.77 FEE Summary Fault - HXR Motion Fast Fault 1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = `MPLN_FEEH_1_MCFASTFLT_STATE`

23.78 FEE Summary Fault - HXR Motion Fast Fault 2

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = `MPLN_FEEH_2_MCFASTFLT_STATE`

23.79 FEE Summary Fault - HXR Optics Fast Fault 1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = `MPLN_FEEH_1_OPTFASTFLT_STATE`

23.80 FEE Summary Fault - HXR Optics Fast Fault 2

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = MPLN_FEEH_2_OPTFASTFLT_STATE

23.81 FEE Summary Fault - HXR Vacuum Fast Fault 1

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = MPLN_FEEH_1_VACFASTFLT_STATE

23.82 FEE Summary Fault - HXR Vacuum Fast Fault 2

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = MPLN_FEEH_2_VACFASTFLT_STATE

23.83 FEE Vacuum - LFE Fast Shutter Fault

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVFS_FEEH_1_POSITION_STATE

23.84 HXR CBLM Alive and Updating

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = MPS_UNDH_1_CBLM_WDOG_STATE_STATE

23.85 HXR CBLM PMT High Voltage

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	120 Hz

Where
A = MPS_UNDH_1_CBLM_RMON_STATE_STATE

23.86 HXRSS Chicane Bend Power Supply

Name	B	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	–	–	0 Hz	–	–	–	–
ON	F	T	–	–	120 Hz	–	–	–	–
OFF	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = BEND_UNDH_2810_ON_STATE,
B = BEND_UNDH_2810_OFF_STATE

23.87 HXRSS Crystal Position

Name	B	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Out	F	T	–	–	120 Hz	–	–	–	–
In	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = XTAL_UNDH_2850_X_OUTPOSITION_STATE,
B = XTAL_UNDH_2850_IN_ENCDR_STATE

23.88 HXRSS Crystal Valid Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Valid	F	–	–	0 Hz	–	–	–	–
Valid	T	–	–	120 Hz	–	–	–	–

Where
A = `XTAL_UNDH_2850_POSITIONSTAT_STATE`

23.89 HXRSS Mode

The following code assigns the truth table's state number to the `unsigned int` variable `state`.

```
/* state = 0 : full rate (120 Hz) beam allowed, HXRSS Seeded Mode
 * state = 1 : fulle rate (120 Hz) beam allowed, HXRSS Phase Shifter /
    Sase Mode
 * state = 2 : no beam allowed, HXRSS undefined state
 */

state = (unsigned int) -1;

/*
 * Allow beam if HXRSS is on in SEEDED Mode:
 *   Magnet is on
 *     BEND_UNDH_2810_ON_STATE
 *   Magnet is in tolerance
 *     BEND_UNDH_2810_INTOL_BMIN_STATE
 *   Photon energy is OK (10 < E < 17 GeV)
 *     BEND_DMPH_400_INTOL_BRANGE_STATE
 *   Crystal is IN
 *     XTAL_UNDH_2850_IN_ENCDR_STATE
 * Allow beam if HXRSS is in Phase Shifter / Sase Mode:
 *   Magnet in ANY state
 *   Crystal is OUT
 *     XTAL_UNDH_2850_X_OUTPOSITION_STATE
 * Otherwise no beam allowed
 */

if ( BEND_UNDH_2810_INTOL_BMIN_STATE &&
     BEND_UNDH_2810_ON_STATE &&
     BEND_UNDH_2810_INTOL_BMIN_STATE &&
     XTAL_UNDH_2850_IN_ENCDR_STATE )
{
```

```
  state = 0;
}
else if ( XTAL_UNDH_2850_X_OUTPOSITION_STATE )
{
  state = 1;
}
else
{
  state = 2;
}
```

Name	State	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
HXRSS Seeded Mode	0	–	–	120 Hz	–	–	–	–
HXRSS Sase / Phase Shifter Mode	1	–	–	120 Hz	–	–	–	–
HXRSS Undefined Mode	2	–	–	0 Hz	–	–	–	–

23.90 Magnet In Tolerance: QE31

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = `QUAD_LTUH_720_INTOL_STATUS`

23.91 Magnet In Tolerance: QUM1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = `QUAD_LTUH_820_INTOL_STATUS`

23.92 Magnet In Tolerance: QUM2

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = QUAD_LTUH_840_INTOL_STATUS

23.93 Magnet In Tolerance: QUM3

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = QUAD_LTUH_860_INTOL_STATUS

23.94 Magnet In Tolerance: QUM4

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = QUAD_LTUH_860_INTOL_STATUS

23.95 Magnet Power: QE31

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_ON	F	–	–	0 Hz	–	–	–	–
ON	T	–	–	120 Hz	–	–	–	–

Where
A = QUAD_LTUH_720_STATE_STATUS

23.96 Magnet Power: QUM1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_ON	F	–	–	0 Hz	–	–	–	–
ON	T	–	–	120 Hz	–	–	–	–

Where
A = `QUAD_LTUH_820_STATE_STATUS`

23.97 Magnet Power: QUM2

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_ON	F	–	–	0 Hz	–	–	–	–
ON	T	–	–	120 Hz	–	–	–	–

Where
A = `QUAD_LTUH_840_STATE_STATUS`

23.98 Magnet Power: QUM3

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_ON	F	–	–	0 Hz	–	–	–	–
ON	T	–	–	120 Hz	–	–	–	–

Where
A = `QUAD_LTUH_860_INTOL_STATUS`

23.99 Magnet Power: QUM4

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_ON	F	–	–	0 Hz	–	–	–	–
ON	T	–	–	120 Hz	–	–	–	–

Where
A = `QUAD_LTUH_880_STATE_STATUS`

23.100 OTR01 IN20 541 Position and TDUND Not In

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `OTRS_IN20_541_OUT_LMTSW_STATE`,
B = `OTRS_IN20_541_IN_LMTSW_STATE`

23.101 OTR02 IN20 571 Position and TDUND Not In

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `OTRS_IN20_571_OUT_LMTSW_STATE`,
B = `OTRS_IN20_571_IN_LMTSW_STATE`

23.102 OTR03 IN20 621 Position and TDUND Not In

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `OTRS_IN20_621_OUT_LMTSW_STATE`,
B = `OTRS_IN20_621_IN_LMTSW_STATE`

23.103 OTR04 IN20 711 Position and TDUND Not In

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `OTRS_IN20_711_OUT_LMTSW_STATE`,
B = `OTRS_IN20_711_IN_LMTSW_STATE`

23.104 OTR11 LI21 237 Position and TDUND Not In

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `OTRS_LI21_237_OUT_LMTSW_STATE`,
B = `OTRS_LI21_237_IN_LMTSW_STATE`

23.105 OTR12 LI21 291 Position and TDUND Not In

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `OTRS_LI21_291_OUT_LMTSW_STATE`,
B = `OTRS_LI21_291_IN_LMTSW_STATE`

23.106 OTR21 Position When TDUND Not In

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `OTRS_LI24_807_OUT_LMTSW_STATE`,
B = `OTRS_LI24_807_IN_LMTSW_STATE`

23.107 OTR33 Position and TDUND Not In

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Out	F	T	–	–	120 Hz	–	–	–	–
In	T	F	–	–	0 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `OTRS_LTUH_745_OUT_LIMIT_POSITION`,
B = `OTRS_LTUH_745_IN_LIMIT_POSITION`

23.108 OTRH1 Position When TDUND Not In

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `OTRH1_OUT_LIMIT_STATE`,
B = `OTRH1_IN_LIMIT_STATE`

23.109 OTRH2 Position When TDUND Not In

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `OTRH2_OUT_LIMIT_STATE`,
B = `OTRH2_IN_LIMIT_STATE`

23.110 PMPS HXR Rate Limit

Name	*C*	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
PMPS HXR Rate Limit: 0Hz	F	F	F	–	–	0 Hz	–	–	–	–
PMPS HXR Rate Limit: 1Hz	F	F	T	–	–	1 Hz	–	–	–	–
PMPS HXR Fault: Arbiter Inconsistent	F	T	F	–	–	0 Hz	–	–	–	–
PMPS HXR Rate Limit: 10Hz	F	T	T	–	–	10 Hz	–	–	–	–
PMPS HXR Fault: Arbiter Inconsistent	T	F	F	–	–	0 Hz	–	–	–	–
PMPS HXR Fault: Arbiter Inconsistent	T	F	T	–	–	0 Hz	–	–	–	–
PMPS HXR Fault: Arbiter Inconsistent	T	T	F	–	–	0 Hz	–	–	–	–
PMPS HXR Rate: Full Rate	T	T	T	–	–	120 Hz	–	–	–	–

Where
A = `MPLN_FEEH_1_RATEREQ_STATE`,
B = `MPLN_FEEH_10_RATEREQ_STATE`,
C = `MPLN_FEEH_120_RATEREQ_STATE`

23.111 RFBHX12 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = `BPMS_UNDH_1305_XCUHBR_ORBIT`,
B = `BPMS_UNDH_1305_YCUHBR_ORBIT`

23.112 RFBHX13 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_1390_XCUHBR_ORBIT,
B = BPMS_UNDH_1390_YCUHBR_ORBIT

23.113 RFBHX14 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_1490_XCUHBR_ORBIT,
B = BPMS_UNDH_1490_YCUHBR_ORBIT

23.114 RFBHX15 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_1590_XCUHBR_ORBIT,
B = BPMS_UNDH_1590_YCUHBR_ORBIT

23.115 RFBHX16 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_1690_XCUHBR_ORBIT,
B = BPMS_UNDH_1690_YCUHBR_ORBIT

23.116 RFBHX17 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_1790_XCUHBR_ORBIT,
B = BPMS_UNDH_1790_YCUHBR_ORBIT

23.117 RFBHX18 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_1890_XCUHBR_ORBIT,
B = BPMS_UNDH_1890_YCUHBR_ORBIT

23.118 RFBHX19 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_1990_XCUHBR_ORBIT,
B = BPMS_UNDH_1990_YCUHBR_ORBIT

23.119 RFBHX20 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_2090_XCUHBR_ORBIT,
B = BPMS_UNDH_2090_YCUHBR_ORBIT

23.120 RFBHX21 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_2190_XCUHBR_ORBIT,
B = BPMS_UNDH_2190_YCUHBR_ORBIT

23.121 RFBHX22 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_2290_XCUHBR_ORBIT,
B = BPMS_UNDH_2290_YCUHBR_ORBIT

23.122 RFBHX23 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_2390_XCUHBR_ORBIT,
B = BPMS_UNDH_2390_YCUHBR_ORBIT

23.123 RFBHX24 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_2490_XCUHBR_ORBIT,
B = BPMS_UNDH_2490_YCUHBR_ORBIT

23.124 RFBHX25 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_2590_XCUHBR_ORBIT,
B = BPMS_UNDH_2590_YCUHBR_ORBIT

23.125 RFBHX26 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_2690_XCUHBR_ORBIT,
B = BPMS_UNDH_2690_YCUHBR_ORBIT

23.126 RFBHX27 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_2790_XCUHBR_ORBIT,
B = BPMS_UNDH_2790_YCUHBR_ORBIT

23.127 RFBHX28 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_2890_XCUHBR_ORBIT,
B = BPMS_UNDH_2890_YCUHBR_ORBIT

23.128 RFBHX29 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_2990_XCUHBR_ORBIT,
B = BPMS_UNDH_2990_YCUHBR_ORBIT

23.129 RFBHX30 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_3090_XCUHBR_ORBIT,
B = BPMS_UNDH_3090_YCUHBR_ORBIT

23.130 RFBHX31 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_3190_XCUHBR_ORBIT,
B = BPMS_UNDH_3190_YCUHBR_ORBIT

23.131 RFBHX32 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_3290_XCUHBR_ORBIT,
B = BPMS_UNDH_3290_YCUHBR_ORBIT

23.132 RFBHX33 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_3390_XCUHBR_ORBIT,
B = BPMS_UNDH_3390_YCUHBR_ORBIT

23.133 RFBHX34 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_3490_XCUHBR_ORBIT,
B = BPMS_UNDH_3490_YCUHBR_ORBIT

23.134 RFBHX35 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_3590_XCUHBR_ORBIT,
B = BPMS_UNDH_3590_YCUHBR_ORBIT

23.135 RFBHX36 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_3690_XCUHBR_ORBIT,
B = BPMS_UNDH_3690_YCUHBR_ORBIT

23.136 RFBHX37 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_3790_XCUHBR_ORBIT,
B = BPMS_UNDH_3790_YCUHBR_ORBIT

23.137 RFBHX38 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_3890_XCUHBR_ORBIT,
B = BPMS_UNDH_3890_YCUHBR_ORBIT

23.138 RFBHX39 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_3990_XCUHBR_ORBIT,
B = BPMS_UNDH_3990_YCUHBR_ORBIT

23.139 RFBHX40 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_4090_XCUHBR_ORBIT,
B = BPMS_UNDH_4090_YCUHBR_ORBIT

23.140 RFBHX41 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_4190_XCUHBR_ORBIT,
B = BPMS_UNDH_4190_YCUHBR_ORBIT

23.141 RFBHX42 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_4290_XCUHBR_ORBIT,
B = BPMS_UNDH_4290_YCUHBR_ORBIT

23.142 RFBHX43 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_4390_XCUHBR_ORBIT,
B = BPMS_UNDH_4390_YCUHBR_ORBIT

23.143 RFBHX44 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_4490_XCUHBR_ORBIT,
B = BPMS_UNDH_4490_YCUHBR_ORBIT

23.144 RFBHX45 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BPMS_UNDH_4590_XCUHBR_ORBIT,
B = BPMS_UNDH_4590_YCUHBR_ORBIT

23.145 RFBHX46 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = `BPMS_UNDH_4690_XCUHBR_ORBIT`,
B = `BPMS_UNDH_4690_YCUHBR_ORBIT`

23.146 RFBHX47 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	0 Hz	–	–	–	–
Y Faulted	F	T	–	–	0 Hz	–	–	–	–
X Faulted	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = `BPMS_UNDH_4790_XCUHBR_ORBIT`,
B = `BPMS_UNDH_4790_YCUHBR_ORBIT`

23.147 SIOC UNDH MP04 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = `SIOC_UNDH_MP04_HEARTBEAT_STATE`

23.148 SIOC UNDH MP05 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = SIOC_UNDH_MP05_HEARTBEAT_STATE

23.149 SIOC UNDH MP06 HEARTBEAT

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = SIOC_UNDH_MP06_HEARTBEAT_STATE

23.150 SIOC UNDH MP07 HEARTBEAT

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = SIOC_UNDH_MP07_HEARTBEAT_STATE

23.151 SIOC UNDH MP08 HEARTBEAT

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = SIOC_UNDH_MP08_HEARTBEAT_STATE

23.152 SIOC UNDH MP09 HEARTBEAT

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = SIOC_UNDH_MP09_HEARTBEAT_STATE

23.153 SIOC UNDH MP11 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `SIOC_UNDH_MP11_HEARTBEAT_STATE`

23.154 ST1L0 PPS Stopper Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Out	F	T	–	–	120 Hz	–	–	–	–
In	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `STPR_FEE1_ST1_OUT_POSITION`,
B = `STPR_FEE1_ST1_IN_POSITION`

23.155 VVFS DMPH 157 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = `VVFS_DMPH_157_POSITION_STATE`

23.156 VVMG DMPH 643 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = `VVMG_DMPH_643_POSITION_STATE`

23.157 VVMG DMPH 681 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVMG_DMPH_681_POSITION_STATE

23.158 VVMG UNDH 1338 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVMG_UNDH_1338_POSITION_STATE

23.159 VVMG UNDH 1343 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVMG_UNDH_1343_POSITION_STATE

23.160 VVMG UNDH 1498 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVMG_UNDH_1498_POSITION_STATE

23.161 VVMG UNDH 1798 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVMG_UNDH_1798_POSITION_STATE

23.162 VVMG UNDH 2138 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVMG_UNDH_2138_POSITION_STATE

23.163 VVMG UNDH 2143 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVMG_UNDH_2143_POSITION_STATE

23.164 VVMG UNDH 2498 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVMG_UNDH_2498_POSITION_STATE

23.165 VVMG UNDH 2838 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVMG_UNDH_2838_POSITION_STATE

23.166 VVMG UNDH 2844 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVMG_UNDH_2844_POSITION_STATE

23.167 VVMG UNDH 3298 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVMG_UNDH_3298_POSITION_STATE

23.168 VVMG UNDH 3598 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVMG_UNDH_3598_POSITION_STATE

23.169 VVMG UNDH 4098 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = `VVMG_UNDH_4098_POSITION_STATE`

23.170 VVMG UNDH 4398 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = `VVMG_UNDH_4398_POSITION_STATE`

23.171 VVPG DMPH 355 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = `VVPG_DMPH_355_POSITION_STATE`

23.172 VVPG DMPH 396 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = `VVPG_DMPH_396_POSITION_STATE`

23.173 VVPG UNDH 1288 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVPG_UNDH_1288_POSITION_STATE

23.174 VVPG UNDH 2098 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	0 Hz	–	–
OPEN	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = VVPG_UNDH_2098_POSITION_STATE

23.175 VVPG UNDH 2298 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVPG_UNDH_2298_POSITION_STATE

23.176 VVPG UNDH 2798 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVPG_UNDH_2798_POSITION_STATE

23.177 VVPG UNDH 2998 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVPG_UNDH_2998_POSITION_STATE

23.178 VVPG UNDH 3798 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVPG_UNDH_3798_POSITION_STATE

23.179 VVPG UNDH 4598 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVPG_UNDH_4598_POSITION_STATE

23.180 VVPG UNDH 5196 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVPG_UNDH_5196_POSITION_STATE

24 Ignored when HXR Beamline is in SC Mode, Stopper: BSY D2 Summary Is In, TD11 Is In, YAG01 Is In, or YAG02 Is In

24.1 BCS LION LTU1 404 Threshold

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `LION404_STATE`

24.2 BCS LION LTU1 405 Threshold

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `LION405_STATE`

24.3 BCS LION LTU1 504 Threshold

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `LION504_STATE`

24.4 BCS LION LTU1 505 Threshold

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = LION505_STATE

24.5 BCS LION LTU1 584 Threshold

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = LION584_STATE

24.6 BCS LION LTU1 585 Threshold

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = LION585_STATE

24.7 BCS LION LTU1 716 Threshold

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = LION716_STATE

24.8 BCS LION LTU1 717 Threshold

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = LION717_STATE

24.9 BCS LION LTU1 732 Threshold

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `LION732_STATE`

24.10 BCS LION LTU1 733 Threshold

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `LION733_STATE`

24.11 BCS LION LTU1 752 Threshold

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `LION752_STATE`

24.12 BCS LION LTU1 753 Threshold

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `LION753_STATE`

24.13 BCS LION LTU1 765 Threshold

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `LION765_STATE`

24.14 BCS LION LTU1 766 Threshold

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `LION766_STATE`

24.15 BLM Heartbeat: Dechirper LTUH BLF545

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	–	–	0 Hz	–	–	–	–
Over High Threshold	F	T	–	–	0 Hz	–	–	–	–
Under Low Threshold	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = `BLM_LTUH_BLF545_TEST_L_THRESHOLD`,
B = `BLM_LTUH_BLF545_TEST_H_THRESHOLD`

24.16 BLM Pedestal Thresholds: Dechirper LTUH BLF545

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	–	–	0 Hz	–	–	–	–
Over High Threshold	F	T	–	–	0 Hz	–	–	–	–
Under Low Threshold	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BLM_LTUH_BLF545_PED_L_THRESHOLD,
B = BLM_LTUH_BLF545_PED_H_THRESHOLD

24.17 BLM Raw Charge Thresholds: Dechirper LTUH BLF545

Name	B	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	–	–	0 Hz	–	–	–	–
Over High Threshold	F	T	–	–	0 Hz	–	–	–	–
Under Low Threshold	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = BLM_LTUH_BLF545_LOSS_L_THRESHOLD,
B = BLM_LTUH_BLF545_LOSS_H_THRESHOLD

24.18 BYD Current

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = BEND_DMPH_400_CURRENT_THRESHOLD

24.19 BYD Magnet Power Status

Name	B	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Inconsistent	F	F	–	–	0 Hz	–	–	–	–
On	F	T	–	–	120 Hz	–	–	–	–
Off	T	F	–	–	0 Hz	–	–	–	–
Inconsistent	T	T	–	–	0 Hz	–	–	–	–

Where
A = BEND_DMPH_400_ON_STATE,
B = BEND_DMPH_400_OFF_STATE

24.20 BYD Watchdog

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `BEND_DMP1_400_BACT_WDOG_STATE`

24.21 BYKIK Current

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `KICK_LTUH_320_CURRENT_THRESHOLD`

24.22 BYKIK Magnet Power Status

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Inconsistent	F	F	–	–	0 Hz	–	0 Hz	–	–
On	F	T	–	–	120 Hz	–	120 Hz	–	–
Off	T	F	–	–	0 Hz	–	0 Hz	–	–
Inconsistent	T	T	–	–	0 Hz	–	0 Hz	–	–

Where
A = `KICK_LTUH_320_ON_STATE`,
B = `KICK_LTUH_320_OFF_STATE`

24.23 BYKIK Timing Delay Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
TDES OOT	F	–	–	–	–	0 Hz	–	–
TDES OK	T	–	–	–	–	120 Hz	–	–

Where
A = `KICK_LTUH_320_TDES_TIMING`

24.24 BYKIK Timing Reference Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
TREF OOT	F	–	–	–	–	0 Hz	–	–
TREF OK	T	–	–	–	–	120 Hz	–	–

Where
A = KICK_LTUH_320_TREF_TIMING

24.25 CEDL1 Temperature

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = COLL_LTUH_253_TEMP_STATE

24.26 CEDL3 Temperature

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = COLL_LTUH_452_TEMP_STATE

24.27 CXQ6 Temperature

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = COLL_BSYH_892_TEMP_STATE

24.28 CXQT22 Temperature

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `COLL_LTUH_393_TEMP_STATE`

24.29 CYBX32 Temperature

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `COLL_LTUH_276_TEMP_STATE`

24.30 CYBX36 Temperature

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `COLL_LTUH_475_TEMP_STATE`

24.31 Dechirper Mirror Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Out	F	T	–	–	120 Hz	–	–	–	–
In	T	F	–	–	120 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `MIRR_LTUH_548_OUT_LIMIT_POSITION`,
B = `MIRR_LTUH_548_IN_LIMIT_POSITION`

24.32 LTU Dechirper - Horizontal Gap Too Small

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Both ends gap too small	F	F	–	–	0 Hz	–	–	–	–
Downstream end gap too small	F	T	–	–	0 Hz	–	–	–	–
Upstream end gap too small	T	F	–	–	0 Hz	–	–	–	–
Gap OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = `DCHP_LTUH_555_GAP_LIMSW_NEGZ_POSITION`,
B = `DCHP_LTUH_555_GAP_LIMSW_POSZ_POSITION`

24.33 LTU Dechirper - Vertical Gap Too Small

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Both ends gap too small	F	F	–	–	0 Hz	–	–	–	–
Downstream end gap too small	F	T	–	–	0 Hz	–	–	–	–
Upstream end gap too small	T	F	–	–	0 Hz	–	–	–	–
Gap OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = `DCHP_LTUH_545_GAP_LIMSW_NEGZ_POSITION`,
B = `DCHP_LTUH_545_GAP_LIMSW_POSZ_POSITION`

24.34 OTR33 Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Out	F	T	–	–	120 Hz	–	–	–	–
In	T	F	–	–	10 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = `OTRS_LTUH_745_OUT_LIMIT_POSITION`,
B = `OTRS_LTUH_745_IN_LIMIT_POSITION`

24.35 PIC HVPS B911 - Location B911-2135

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `PICM_LTUH_B911_HV_PWR_STATE`

24.36 PIC HVPS B912 - Location B912-2135

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `PICM_LTUH_B912_HV_PWR_STATE`

24.37 PIC Raw Charge Thresholds: LTUH 220

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	–	–	0 Hz	–	0 Hz	–	–
Over High Threshold	F	T	–	–	0 Hz	–	0 Hz	–	–
Under Low Threshold	T	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `PICM_LTUH_220_LOSSL_THRESHOLD`,
B = `PICM_LTUH_220_LOSSH_THRESHOLD`

24.38 PIC Raw Charge Thresholds: LTUH 253

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	–	–	0 Hz	–	0 Hz	–	–
Over High Threshold	F	T	–	–	0 Hz	–	0 Hz	–	–
Under Low Threshold	T	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = PICM_LTUH_253_LOSSL_THRESHOLD,
B = PICM_LTUH_253_LOSSH_THRESHOLD

24.39 PIC Raw Charge Thresholds: LTUH 280

Name	B	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	–	–	0 Hz	–	0 Hz	–	–
Over High Threshold	F	T	–	–	0 Hz	–	0 Hz	–	–
Under Low Threshold	T	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = PICM_LTUH_280_LOSSL_THRESHOLD,
B = PICM_LTUH_280_LOSSH_THRESHOLD

24.40 PIC Raw Charge Thresholds: LTUH 420

Name	B	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	–	–	0 Hz	–	–	–	–
Over High Threshold	F	T	–	–	0 Hz	–	–	–	–
Under Low Threshold	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = PICM_LTUH_420_LOSSL_THRESHOLD,
B = PICM_LTUH_420_LOSSH_THRESHOLD

24.41 PIC Raw Charge Thresholds: LTUH 452

Name	B	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	–	–	0 Hz	–	–	–	–
Over High Threshold	F	T	–	–	0 Hz	–	–	–	–
Under Low Threshold	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = PICM_LTUH_452_LOSSL_THRESHOLD,
B = PICM_LTUH_452_LOSSH_THRESHOLD

24.42 PIC Raw Charge Thresholds: LTUH 480

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	–	–	0 Hz	–	–	–	–
Over High Threshold	F	T	–	–	0 Hz	–	–	–	–
Under Low Threshold	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = `PICM_LTUH_480_LOSSL_THRESHOLD`,
B = `PICM_LTUH_480_LOSSH_THRESHOLD`

24.43 PIC Raw Charge Thresholds: LTUH 722

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	–	–	0 Hz	–	–	–	–
Over High Threshold	F	T	–	–	0 Hz	–	–	–	–
Under Low Threshold	T	F	–	–	0 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = `PICM_LTUH_722_LOSSL_THRESHOLD`,
B = `PICM_LTUH_722_LOSSH_THRESHOLD`

24.44 PIC Trigger Missed (LN28)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Missed	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_LTUH_220_NO_TRIG_MISSED`

24.45 PIC Trigger Missed (LN29)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = PICM_LTUH_480_NO_TRIG_MISSED

24.46 SIOC LTUH MP03 HEARTBEAT

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = SIOC_LTUH_MP03_HEARTBEAT_STATE

24.47 SIOC LTUH MP05 HEARTBEAT

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = SIOC_LTUH_MP05_HEARTBEAT_STATE

24.48 SIOC LTUH MP06 HEARTBEAT

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = SIOC_LTUH_MP06_HEARTBEAT_STATE

24.49 SIOC UNDH MP02 HEARTBEAT

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = SIOC_UNDH_MP02_HEARTBEAT_STATE

24.50 SIOC UNDH MP03 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	0 Hz	–	–	–	–
OK	T	–	–	120 Hz	–	–	–	–

Where
A = SIOC_UNDH_MP03_HEARTBEAT_STATE

24.51 TDUND Flow Switch Fault with TDUND Not Out

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	F	–	–	0 Hz	–	–	–	–
OK	F	T	–	–	120 Hz	–	–	–	–
OK, TDUND Out	T	F	–	–	120 Hz	–	–	–	–
OK	T	T	–	–	120 Hz	–	–	–	–

Where
A = DUMP_LTUH_970_FLOW_SW_STATE,
B = DUMP_LTUH_970_OUT_LIMIT_POSITION

24.52 TDUND Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	–	–	–
Out	F	T	–	–	120 Hz	–	–	–	–
In	T	F	–	–	30 Hz	–	–	–	–
Broken	T	T	–	–	0 Hz	–	–	–	–

Where
A = DUMP_LTUH_970_OUT_LIMIT_POSITION,
B = DUMP_LTUH_970_IN_LIMIT_POSITION

24.53 Undulator Beam Energy Lower Limit

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = BEND_DMPH_400_INTOL_BMIN_STATE

24.54 VVFS LTUH 102 POSITION

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	0 Hz	–	–
OPEN	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = VVFS_LTUH_102_POSITION_STATE

24.55 VVMG LTUH 174 POSITION

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	0 Hz	–	–
OPEN	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = VVMG_LTUH_174_POSITION_STATE

24.56 VVMG LTUH 355 POSITION

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	0 Hz	–	–
OPEN	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = VVMG_LTUH_355_POSITION_STATE

24.57 VVMG LTUH 505 POSITION

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVMG_LTUH_505_POSITION_STATE

24.58 VVMG LTUH 670 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVMG_LTUH_670_POSITION_STATE

24.59 VVMG LTUH 742 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVMG_LTUH_742_POSITION_STATE

24.60 VVMG LTUH 774 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = VVMG_LTUH_774_POSITION_STATE

24.61 VVPG LTUH 100 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	0 Hz	–	–
OPEN	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = VVPG_LTUH_102_POSITION_STATE

24.62 VVPG LTUH 265 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	0 Hz	–	–
OPEN	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `VVPG_LTUH_265_POSITION_STATE`

24.63 VVPG LTUH 435 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = `VVPG_LTUH_435_POSITION_STATE`

24.64 VVPG LTUH 580 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = `VVPG_LTUH_580_POSITION_STATE`

24.65 VVPG LTUH 725 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = `VVPG_LTUH_725_POSITION_STATE`

24.66 VVPG LTUH 757 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	–	–	–
OPEN	T	–	–	120 Hz	–	–	–	–

Where
A = `VVPG_LTUH_757_POSITION_STATE`

24.67 YAGPSI (YAGS:LTUH:743) Position

Name	*C*	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	F	–	–	0 Hz	–	–	–	–
Out	F	F	T	–	–	120 Hz	–	–	–	–
P1 (YAG)	F	T	F	–	–	10 Hz	–	–	–	–
Broken	F	T	T	–	–	0 Hz	–	–	–	–
P2 (OTR)	T	F	F	–	–	10 Hz	–	–	–	–
Broken	T	F	T	–	–	0 Hz	–	–	–	–
Broken	T	T	F	–	–	0 Hz	–	–	–	–
Broken	T	T	T	–	–	0 Hz	–	–	–	–

Where
A = `YAGS_LTUH_743_OUT_LMTSW_POSITION`,
B = `YAGS_LTUH_743_P1_LMTSW_POSITION`,
C = `YAGS_LTUH_743_P2_LMTSW_POSITION`

25 Ignored when HXR Beamline is in SC Mode, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

25.1 Magnet In Tolerance: BYD1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `BEND_DMPH_400_INTOL_STATUS`

25.2 Magnet Power: BYD1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_ON	F	–	–	0 Hz	–	0 Hz	–	–
ON	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `BEND_DMPH_400_STATE_STATUS`

26 Ignored when HXR Beamline is in SC Mode, TD11 Is In, YAG01 Is In, or YAG02 Is In

26.1 BCS PIC RAW Charge Threshold DMP 997

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	0 Hz	0 Hz	0 Hz	–	0 Hz	0 Hz	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	120 Hz	120 Hz	120 Hz

Where
A = `PIC997_STATE`

26.2 BCS PIC RAW Charge Threshold DMP 998

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	0 Hz	0 Hz	0 Hz	–	0 Hz	0 Hz	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	120 Hz	120 Hz	120 Hz

Where
A = `PIC998_STATE`

26.3 D2 Summary Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	0 Hz	–	0 Hz	–	–
Out	F	T	–	–	120 Hz	–	120 Hz	–	–
In	T	F	–	–	0 Hz	–	120 Hz	–	–
Broken	T	T	–	–	0 Hz	–	0 Hz	–	–

Where
A = `STPR_BSYH_847_OUT_LIMIT_POSITION`,
B = `STPR_BSYH_847_IN_LIMIT_POSITION`

26.4 PIC Raw Charge Thresholds: BSYH 762 (PC90)

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_BSYH_762_LOSSL_THRESHOLD`,
B = `PICM_BSYH_762_LOSSH_THRESHOLD`

26.5 PIC Raw Charge Thresholds: BSYH 836 (PC119)

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `PICM_BSYH_836_LOSSL_THRESHOLD`,
B = `PICM_BSYH_836_LOSSH_THRESHOLD`

26.6 SIOC BSYH MP01 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `SIOC_BSYH_MP01_HEARTBEAT_STATE`

26.7 SIOC BSYH MP02 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `SIOC_BSYH_MP02_HEARTBEAT_STATE`

26.8 SIOC BSYH MP03 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `SIOC_BSYH_MP03_HEARTBEAT_STATE`

26.9 VVPG BSYH 470 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	0 Hz	–	–
OPEN	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `VVPG_BSYH_470_POSITION_STATE`

26.10 VVPG BSYH 541 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	0 Hz	–	–
OPEN	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `VVPG_BSYH_541_POSITION_STATE`

26.11 VVPG BSYH 837 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	0 Hz	–	0 Hz	–	–
OPEN	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `VVPG_BSYH_837_POSITION_STATE`

27 Ignored when Laser Heater Attenuator Is In

27.1 Laser Heater Photodiode Shutter Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	–	0 Hz	–	–	–
Out	F	T	–	–	–	0 Hz	–	–	–
In	T	F	–	–	–	120 Hz	–	–	–
Broken	T	T	–	–	–	0 Hz	–	–	–

Where
A = `LHPHD_OUT_LIMIT_STATE`,
B = `LHPHD_IN_LIMIT_STATE`

27.2 OTRH1 Position When LH Atten Not In

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	–	0 Hz	–	–	–
Out	F	T	–	–	–	120 Hz	–	–	–
In	T	F	–	–	–	0 Hz	–	–	–
Broken	T	T	–	–	–	0 Hz	–	–	–

Where
A = `OTRH1_OUT_LIMIT_STATE`,
B = `OTRH1_IN_LIMIT_STATE`

27.3 OTRH2 Position When LH Atten Not In

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	–	0 Hz	–	–	–
Out	F	T	–	–	–	120 Hz	–	–	–
In	T	F	–	–	–	0 Hz	–	–	–
Broken	T	T	–	–	–	0 Hz	–	–	–

Where
A = `OTRH2_OUT_LIMIT_STATE`,
B = `OTRH2_IN_LIMIT_STATE`

28 Ignored when MR1K1 Is In, ST3K4 Is In, STCLTS Is In, TD11 Is In, TDUNDB Is In, YAG01 Is In, or YAG02 Is In

28.1 FEE Summary Fault - TMO Fast Shutter Fault 2

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPLN_FEES_1_XGMDFSTFLT_STATE`

28.2 FEE Summary Fault - TMO Motion Control Fast Fault 1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPLN_FEES_1_TMOMCFASTFLT_STATE`

28.3 FEE Summary Fault - TMO Motion Control Fast Fault 2

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPLN_FEES_2_TMOMCFASTFLT_STATE`

28.4 FEE Summary Fault - TMO Vacuum Fast Fault 2

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPLN_FEES_2_TMOVACFASTFLT_STATE`

29 Ignored when MR1K1 Is In, STCLTS Is In, TD11 Is In, TDUNDB Is In, YAG01 Is In, or YAG02 Is In

29.1 FEE Summary Fault - TMO Fast Shutter Fault 1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPLN_FEES_1_GMDFSTFLT_STATE`

29.2 FEE Summary Fault - TMO Vacuum Fast Fault 1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPLN_FEES_1_TMOVACFASTFLT_STATE`

29.3 SXR TMO Optics Fast Fault 1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPLN_FEES_1_TMOOPTFASTFLT_STATE`

30 Ignored when MR1K1 Is Out, STCLTS Is In, TD11 Is In, TDUNDB Is In, YAG01 Is In, or YAG02 Is In

30.1 SXR RIX Motion Fast Fault 1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPLN_FEES_1_RIXMCFASTFLT_STATE`

30.2 SXR RIX Vacuum Fast Fault 1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPLN_FEES_1_RIXVACFASTFLT_STATE`

31 Ignored when STCLTS Is In, SXR Beamline is in SC Mode, TD11 Is In, YAG01 Is In, or YAG02 Is In

31.1 SIOC BSYS MP01 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Faulted	F	–	–	–	–	–	0 Hz	0 Hz
OK	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = `SIOC_BSYS_MP01_HEARTBEAT_STATE`

31.2 SIOC BSYS MP02 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Faulted	F	–	–	–	–	–	0 Hz	0 Hz
OK	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = `SIOC_BSYS_MP02_HEARTBEAT_STATE`

31.3 SIOC BSYS MP03 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Faulted	F	–	–	–	–	–	0 Hz	0 Hz
OK	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = `SIOC_BSYS_MP03_HEARTBEAT_STATE`

31.4 SIOC BSYS MP04 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Faulted	F	–	–	–	–	–	0 Hz	0 Hz
OK	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = SIOC_BSYS_MP04_HEARTBEAT_STATE

32 Ignored when STCLTS Is In, SXRSS M1/Grating Is Out, TD11 Is In, TDUNDB Is In, YAG01 Is In, or YAG02 Is In

32.1 SXRSS Guardian OK

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPS_UNDS_1_SXRSS_GUARDIAN_OK_STATE`

32.2 SXRSS Guardian ON

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPS_UNDS_1_SXRSS_GUARDIAN_ON_STATE`

33 Ignored when STCLTS Is In, TD11 Is In, TDUNDB Is In, YAG01 Is In, or YAG02 Is In

33.1 BLMS16 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_1610_I1_THRESHOLD

33.2 BLMS16 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_1610_I0_THRESHOLD

33.3 BLMS17 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_1710_I1_THRESHOLD

33.4 BLMS17 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_1710_I0_THRESHOLD

33.5 BLMS18 Threshold 500 ms Fault

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_1810_I1_THRESHOLD

33.6 BLMS18 Threshold Single Shot Fault

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_1810_I0_THRESHOLD

33.7 BLMS19 Threshold 500 ms Fault

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_1910_I1_THRESHOLD

33.8 BLMS19 Threshold Single Shot Fault

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_1910_I0_THRESHOLD

33.9 BLMS20 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_2010_I1_THRESHOLD

33.10 BLMS20 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_2010_I0_THRESHOLD

33.11 BLMS21 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_2110_I1_THRESHOLD

33.12 BLMS21 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_2110_I0_THRESHOLD

33.13 BLMS22 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_2210_I1_THRESHOLD

33.14 BLMS22 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_2210_I0_THRESHOLD

33.15 BLMS23 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_2310_I1_THRESHOLD

33.16 BLMS23 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_2310_I0_THRESHOLD

33.17 BLMS24 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_2410_I1_THRESHOLD

33.18 BLMS24 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_2410_I0_THRESHOLD

33.19 BLMS25 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_2510_I1_THRESHOLD

33.20 BLMS25 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_2510_I0_THRESHOLD

33.21 BLMS26 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_2610_I1_THRESHOLD

33.22 BLMS26 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_2610_I0_THRESHOLD

33.23 BLMS27 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_2710_I1_THRESHOLD

33.24 BLMS27 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_2710_I0_THRESHOLD

33.25 BLMS28 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_2810_I1_THRESHOLD

33.26 BLMS28 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_2810_I0_THRESHOLD

33.27 BLMS29 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_2910_I1_THRESHOLD

33.28 BLMS29 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_2910_I0_THRESHOLD

33.29 BLMS30 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_3010_I1_THRESHOLD

33.30 BLMS30 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_3010_I0_THRESHOLD

33.31 BLMS31 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_3110_I1_THRESHOLD

33.32 BLMS31 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_3110_I0_THRESHOLD

33.33 BLMS32 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_3210_I1_THRESHOLD

33.34 BLMS32 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_3210_I0_THRESHOLD

33.35 BLMS33 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_3310_I1_THRESHOLD

33.36 BLMS33 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_3310_I0_THRESHOLD

33.37 BLMS34 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_3410_I1_THRESHOLD

33.38 BLMS34 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_3410_I0_THRESHOLD

33.39 BLMS35 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_3510_I1_THRESHOLD

33.40 BLMS35 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_3510_I0_THRESHOLD

33.41 BLMS36 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_3610_I1_THRESHOLD

33.42 BLMS36 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_3610_I0_THRESHOLD

33.43 BLMS37 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_3710_I1_THRESHOLD

33.44 BLMS37 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_3710_I0_THRESHOLD

33.45 BLMS38 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_3810_I1_THRESHOLD

33.46 BLMS38 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_3810_I0_THRESHOLD

33.47 BLMS39 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_3910_I1_THRESHOLD

33.48 BLMS39 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_3910_I0_THRESHOLD

33.49 BLMS40 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_4010_I1_THRESHOLD

33.50 BLMS40 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_4010_I0_THRESHOLD

33.51 BLMS41 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_4110_I1_THRESHOLD

33.52 BLMS41 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_4110_I0_THRESHOLD

33.53 BLMS42 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_4210_I1_THRESHOLD

33.54 BLMS42 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_4210_I0_THRESHOLD

33.55 BLMS43 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_4310_I1_THRESHOLD

33.56 BLMS43 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_4310_I0_THRESHOLD

33.57 BLMS44 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_4410_I1_THRESHOLD

33.58 BLMS44 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_4410_I0_THRESHOLD

33.59 BLMS45 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_4510_I1_THRESHOLD

33.60 BLMS45 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_4510_I0_THRESHOLD

33.61 BLMS46 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_4610_I1_THRESHOLD

33.62 BLMS46 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_4610_I0_THRESHOLD

33.63 BLMS47 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_4710_I1_THRESHOLD

33.64 BLMS47 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = CBLM_UNDS_4710_I0_THRESHOLD

33.65 BLMS48 Threshold 500 ms Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `CBLM_UNDS_4810_I1_THRESHOLD`

33.66 BLMS48 Threshold Single Shot Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `CBLM_UNDS_4810_I0_THRESHOLD`

33.67 BYDSS Magnet Power Status

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Inconsistent	F	F	–	–	–	–	–	–	0 Hz
On	F	T	–	–	–	–	–	–	120 Hz
Off	T	F	–	–	–	–	–	–	0 Hz
Inconsistent	T	T	–	–	–	–	–	–	0 Hz

Where
A = `BEND_DMPS_395_ON_STATE`,
B = `BEND_DMPS_395_OFF_STATE`

33.68 FEE Summary Fault - SXR Fast Fault 1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPLN_FEES_1_FASTFLT_STATE`

33.69 FEE Summary Fault - SXR Fast Fault 2

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPLN_FEES_2_FASTFLT_STATE`

33.70 FEE Summary Fault - SXR Gas Attenuator Fast Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPLN_FEES_1_GASATTNFSTFLT_STATE`

33.71 FEE Summary Fault - SXR Motion Fast Fault 1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPLN_FEES_1_MCFASTFLT_STATE`

33.72 FEE Summary Fault - SXR Motion Fast Fault 2

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPLN_FEES_2_MCFASTFLT_STATE`

33.73 FEE Summary Fault - SXR Vacuum Fast Fault 1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPLN_FEES_1_VACFASTFLT_STATE`

33.74 FEE Summary Fault - SXR Vacuum Fast Fault 2

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPLN_FEES_2_VACFASTFLT_STATE`

33.75 PEPPEX Zone Plate Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	–	–	–	–	0 Hz
Out	F	T	–	–	–	–	–	–	120 Hz
In	T	F	–	–	–	–	–	–	120 Hz
Broken	T	T	–	–	–	–	–	–	0 Hz

Where
A = `MOVR_UNDS_5013_OUT_LMTSW_POSITION`,
B = `MOVR_UNDS_5013_IN_LMTSW_POSITION`

33.76 PMPS SXR Rate Limit

Name	*C*	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
PMPS SXR Rate Limit: 0Hz	F	F	F	–	–	–	–	–	–	0 Hz
PMPS SXR Rate Limit: 1Hz	F	F	T	–	–	–	–	–	–	1 Hz
PMPS SXR Fault: Arbiter Inconsistent	F	T	F	–	–	–	–	–	–	0 Hz
PMPS SXR Rate Limit: 10Hz	F	T	T	–	–	–	–	–	–	10 Hz
PMPS SXR Fault: Arbiter Inconsistent	T	F	F	–	–	–	–	–	–	0 Hz
PMPS SXR Fault: Arbiter Inconsistent	T	F	T	–	–	–	–	–	–	0 Hz
PMPS SXR Fault: Arbiter Inconsistent	T	T	F	–	–	–	–	–	–	0 Hz
PMPS SXR Rate: Full Rate	T	T	T	–	–	–	–	–	–	120 Hz

Where
A = `MPLN_FEES_1_RATEREQ_STATE`,
B = `MPLN_FEES_10_RATEREQ_STATE`,
C = `MPLN_FEES_120_RATEREQ_STATE`

33.77 RFBSX16 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_1690_XCUSBR_ORBIT`,
B = `BPMS_UNDS_1690_YCUSBR_ORBIT`

33.78 RFBSX17 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_1790_XCUSBR_ORBIT`,
B = `BPMS_UNDS_1790_YCUSBR_ORBIT`

33.79 RFBSX18 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = BPMS_UNDS_1890_XCUSBR_ORBIT,
B = BPMS_UNDS_1890_YCUSBR_ORBIT

33.80 RFBSX19 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = BPMS_UNDS_1990_XCUSBR_ORBIT,
B = BPMS_UNDS_1990_YCUSBR_ORBIT

33.81 RFBSX20 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = BPMS_UNDS_2090_XCUSBR_ORBIT,
B = BPMS_UNDS_2090_YCUSBR_ORBIT

33.82 RFBSX21 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_2190_XCUSBR_ORBIT`,
B = `BPMS_UNDS_2190_YCUSBR_ORBIT`

33.83 RFBSX22 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_2290_XCUSBR_ORBIT`,
B = `BPMS_UNDS_2290_XCUSBR_ORBIT`

33.84 RFBSX23 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_2390_XCUSBR_ORBIT`,
B = `BPMS_UNDS_2390_XCUSBR_ORBIT`

33.85 RFBSX24 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_2490_XCUSBR_ORBIT`,
B = `BPMS_UNDS_2490_YCUSBR_ORBIT`

33.86 RFBSX25 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_2590_XCUSBR_ORBIT`,
B = `BPMS_UNDS_2590_YCUSBR_ORBIT`

33.87 RFBSX26 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_2690_XCUSBR_ORBIT`,
B = `BPMS_UNDS_2690_YCUSBR_ORBIT`

33.88 RFBSX27 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_2790_XCUSBR_ORBIT`,
B = `BPMS_UNDS_2790_YCUSBR_ORBIT`

33.89 RFBSX28 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_2890_XCUSBR_ORBIT`,
B = `BPMS_UNDS_2890_YCUSBR_ORBIT`

33.90 RFBSX29 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_2990_XCUSBR_ORBIT`,
B = `BPMS_UNDS_2990_YCUSBR_ORBIT`

33.91 RFBSX30 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = BPMS_UNDS_3090_XCUSBR_ORBIT,
B = BPMS_UNDS_3090_YCUSBR_ORBIT

33.92 RFBSX31 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = BPMS_UNDS_3190_XCUSBR_ORBIT,
B = BPMS_UNDS_3190_YCUSBR_ORBIT

33.93 RFBSX32 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = BPMS_UNDS_3290_XCUSBR_ORBIT,
B = BPMS_UNDS_3290_YCUSBR_ORBIT

33.94 RFBSX33 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_3390_XCUSBR_ORBIT`,
B = `BPMS_UNDS_3390_YCUSBR_ORBIT`

33.95 RFBSX34 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_3490_XCUSBR_ORBIT`,
B = `BPMS_UNDS_3490_YCUSBR_ORBIT`

33.96 RFBSX35 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_3590_XCUSBR_ORBIT`,
B = `BPMS_UNDS_3590_YCUSBR_ORBIT`

33.97 RFBSX36 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_3690_XCUSBR_ORBIT`,
B = `BPMS_UNDS_3690_YCUSBR_ORBIT`

33.98 RFBSX37 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_3790_XCUSBR_ORBIT`,
B = `BPMS_UNDS_3790_YCUSBR_ORBIT`

33.99 RFBSX38 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_3890_XCUSBR_ORBIT`,
B = `BPMS_UNDS_3890_YCUSBR_ORBIT`

33.100 RFBSX39 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_3990_XCUSBR_ORBIT`,
B = `BPMS_UNDS_3990_YCUSBR_ORBIT`

33.101 RFBSX40 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_4090_XCUSBR_ORBIT`,
B = `BPMS_UNDS_4090_YCUSBR_ORBIT`

33.102 RFBSX41 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_4190_XCUSBR_ORBIT`,
B = `BPMS_UNDS_4190_YCUSBR_ORBIT`

33.103 RFBSX42 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_4290_XCUSBR_ORBIT`,
B = `BPMS_UNDS_4290_YCUSBR_ORBIT`

33.104 RFBSX43 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_4390_XCUSBR_ORBIT`,
B = `BPMS_UNDS_4390_YCUSBR_ORBIT`

33.105 RFBSX44 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_4490_XCUSBR_ORBIT`,
B = `BPMS_UNDS_4490_YCUSBR_ORBIT`

33.106 RFBSX45 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_4590_XCUSBR_ORBIT`,
B = `BPMS_UNDS_4590_YCUSBR_ORBIT`

33.107 RFBSX46 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_4690_XCUSBR_ORBIT`,
B = `BPMS_UNDS_4690_YCUSBR_ORBIT`

33.108 RFBSX47 Orbit Fault

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
X and Y Faulted	F	F	–	–	–	–	–	–	0 Hz
Y Faulted	F	T	–	–	–	–	–	–	0 Hz
X Faulted	T	F	–	–	–	–	–	–	0 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `BPMS_UNDS_4790_XCUSBR_ORBIT`,
B = `BPMS_UNDS_4790_YCUSBR_ORBIT`

33.109 SIOC UNDS MP01 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = SIOC_UNDS_MP01_HEARTBEAT_STATE

33.110 SIOC UNDS MP02 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = SIOC_UNDS_MP02_HEARTBEAT_STATE

33.111 SIOC UNDS MP03 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = SIOC_UNDS_MP03_HEARTBEAT_STATE

33.112 SIOC UNDS MP04 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = SIOC_UNDS_MP04_HEARTBEAT_STATE

33.113 SIOC UNDS MP05 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = SIOC_UNDS_MP05_HEARTBEAT_STATE

33.114 SIOC UNDS MP06 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = SIOC_UNDS_MP06_HEARTBEAT_STATE

33.115 SIOC UNDS MP07 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = SIOC_UNDS_MP07_HEARTBEAT_STATE

33.116 SXR CBLM Alive and Updating

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = MPS_UNDS_1_CBLM_WDOG_STATE_STATE

33.117 SXR CBLM PMT High Voltage

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPS_UNDS_1_CBLM_RMON_STATE_STATE`

33.118 SXR CRIX Motion Fast Fault 1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPLN_FEES_1_CRIXMCFASTFLT_STATE`

33.119 SXR CRIX Vacuum Fast Fault 1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPLN_FEES_1_CRIXVACFASTFLT_STATE`

33.120 SXR RIX Optics Fast Fault 1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Fault	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPLN_FEES_1_RIXOPTFASTFLT_STATE`

33.121 SXRSS BOD10 Position (YAGS:UNDS:3575)

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	–	–	–	–	0 Hz
Out	F	T	–	–	–	–	–	–	120 Hz
In	T	F	–	–	–	–	–	–	10 Hz
Broken	T	T	–	–	–	–	–	–	0 Hz

Where
A = `YAGS_UNDS_3575_OUT_LIMIT_POSITION`,
B = `YAGS_UNDS_3575_IN_LIMIT_POSITION`

33.122 SXRSS BOD12 Position(YAGS:UNDS:3795)

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	–	–	–	–	0 Hz
Out	F	T	–	–	–	–	–	–	120 Hz
In	T	F	–	–	–	–	–	–	10 Hz
Broken	T	T	–	–	–	–	–	–	0 Hz

Where
A = `YAGS_UNDS_3795_OUT_LIMIT_POSITION`,
B = `YAGS_UNDS_3795_IN_LIMIT_POSITION`

33.123 SXRSS Mode

The following code assigns the truth table's state number to the `unsigned int` variable `state`.

```
/* Production MPS SXRSS Modes
 *
 * state = 0 : full rate (120 Hz) beam allowed, SXRSS Seeded Mode
 * state = 1 : full rate (120 Hz) beam allowed, SXRSS SLIT Mode
 * state = 2 : full rate (120 Hz) beam allowed, SXRSS SASE Mode
 * state = 3 : no beam allowed, SXRSS undefined state
 *
 * Allow beam if SXRSS is ON, Seeded Mode:
 *                              { grating/M1 is IN and M3 is IN or OUT
   }
```

```
*                                chicane is ON;
*                                e- beam position OK  [mm]
*                                e- beam energy   OK [GeV]
*                                SXRSS Guardian ON
*                                SXRSS Guardian OK
* Allow beam if SXRSS is ON, SLIT Mode:
*                                { slit is IN and grating/M1/M2/M3 are
   OUT }
*                                chicane is ON;
*                                e- beam position OK  [mm]
*                                e- beam energy   OK [GeV]
* Allow beam if SXRSS is OFF, SASE Mode:
*                                grating/M1 is OUT;
*                                slit is OUT;
*                                M2 is OUT;
*                                M3 is OUT;
*                                e- beam position    OK  [mm]
* Otherwise, do not allow beam.
*
* Input Descriptions
*
*  Link Node MPS PV Name                Link Node MPS Fault Name
                Desciption
* ------------------------------
   ---------------------------------
   ------------------------------------------------
*  BEND:UNDS:3510:ON_MPS                =  BEND_UNDS_3510_ON_STATE
             =  Chicane power supply on
*  MIRR:UNDS:3520:IN_LIMIT_MPS          =
   MIRR_UNDS_3520_IN_LIMIT_POSITION     =  Grating/M1 IN limit switch
*  MIRR:UNDS:3520:OUT_LIMIT_MPS         =
   MIRR_UNDS_3520_OUT_LIMIT_POSITION    =  Grating/M1 OUT limit switch
*  SLIT:UNDS:3555:IN_LIMIT_MPS          =
   SLIT_UNDS_3555_IN_LIMIT_POSITION     =  Slit IN limit switch
*  SLIT:UNDS:3555:OUT_LIMIT_MPS         =
   SLIT_UNDS_3555_OUT_LIMIT_POSITION    =  Slit OUT limit switch
*  MIRR:UNDS:3560:IN_LIMIT_MPS          =
   MIRR_UNDS_3560_IN_LIMIT_POSITION     =  M2 IN limit switch
*  MIRR:UNDS:3560:OUT_LIMIT_MPS         =
   MIRR_UNDS_3560_OUT_LIMIT_POSITION    =  M2 OUT limit switch
*  MIRR:UNDS:3565:IN_LIMIT_MPS          =
   MIRR_UNDS_3565_IN_LIMIT_POSITION     =  M3 IN limit switch
*  MIRR:UNDS:3565:OUT_LIMIT_MPS         =
   MIRR_UNDS_3565_OUT_LIMIT_POSITION    =  M3 OUT limit switch
*  MPS:UNDS:3500:SX_HRMNC_ENERGY_MPS =
```

```
    MPS_UNDS_3500_SX_HRMNC_ENERGY_STATE =  e- beam energy safe for
    Harmonic mode
 *  MPS:UNDS:3500:SX_HRMNC_X_MPS       =  MPS_UNDS_3500_SX_HRMNC_X_STATE
        =  e- beam position safe for Harmonic mode
 *  MPS:UNDS:3500:SX_SASE_X_MPS        =  MPS_UNDS_3500_SX_SASE_X_STATE
        =  e- beam position safe for SASE mode
 *  MPS:UNDS:3500:SX_SS_ENERGY_MPS     =
    MPS_UNDS_3500_SX_SS_ENERGY_STATE    =  e- beam energy safe for
    Seeded mode
 *  MPS:UNDS:3500:SX_SS_X_MPS          =  MPS_UNDS_3500_SX_SS_X_STATE
          =  e- beam position safe for Seeded mode
 *  MPS:UNDS:1:SXRSS:GUARDIAN_ON_STATE=
    MPS_UNDS_1_SXRSS_GUARDIAN_ON_STATE  =  SXRSS Guardian Process is ON
 *  MPS:UNDS:1:SXRSS:GUARDIAN_OK_STATE=
    MPS_UNDS_1_SXRSS_GUARDIAN_OK_STATE  =  SXRSS Guardian Process is
    reporting OK
 */

/* Initialize to a guard value */
state = (unsigned int) -1;

if (    (MIRR_UNDS_3520_IN_LIMIT_POSITION &&
        (MIRR_UNDS_3565_IN_LIMIT_POSITION ||
            MIRR_UNDS_3565_OUT_LIMIT_POSITION)) &&
        BEND_UNDS_3510_ON_STATE &&
        MPS_UNDS_3500_SX_SS_X_STATE &&
        MPS_UNDS_3500_SX_SS_ENERGY_STATE &&
        MPS_UNDS_1_SXRSS_GUARDIAN_ON_STATE &&
        MPS_UNDS_1_SXRSS_GUARDIAN_OK_STATE )
{
    state = 0; /* SXRSS Seeded Mode, okay to run beam */
}

else if (   (SLIT_UNDS_3555_IN_LIMIT_POSITION  &&
   MIRR_UNDS_3520_OUT_LIMIT_POSITION &&
        MIRR_UNDS_3560_OUT_LIMIT_POSITION &&
            MIRR_UNDS_3565_OUT_LIMIT_POSITION) &&
        BEND_UNDS_3510_ON_STATE &&
        MPS_UNDS_3500_SX_SS_X_STATE &&
        MPS_UNDS_3500_SX_SS_ENERGY_STATE &&
        MPS_UNDS_1_SXRSS_GUARDIAN_ON_STATE &&
        MPS_UNDS_1_SXRSS_GUARDIAN_OK_STATE )
{
    state = 1; /* SXRSS SLIT Mode, okay to run beam */
}
```

```
else if ( MIRR_UNDS_3520_OUT_LIMIT_POSITION &&
          SLIT_UNDS_3555_OUT_LIMIT_POSITION &&
          MIRR_UNDS_3560_OUT_LIMIT_POSITION &&
          MIRR_UNDS_3565_OUT_LIMIT_POSITION &&
          MPS_UNDS_3500_SX_SASE_X_STATE )
{
    state = 2; /* SXRSS SASE Mode, okay to run beam */
}

else
{
    state = 3; /* SXRSS Undefined State, no beam allowed */
}
```

Name	State	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
SXRSS Seeded Mode	0	–	–	–	–	–	–	120 Hz
SXRSS SLIT Mode	1	–	–	–	–	–	–	120 Hz
SXRSS SASE Mode	2	–	–	–	–	–	–	120 Hz
SXRSS Undefined Mode	3	–	–	–	–	–	–	0 Hz

33.124 SXRSS MSXS1 Position (MIRR:UNDS:3520)

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	–	–	–	–	0 Hz
Out	F	T	–	–	–	–	–	–	120 Hz
In	T	F	–	–	–	–	–	–	120 Hz
Broken	T	T	–	–	–	–	–	–	0 Hz

Where
A = `MIRR_UNDS_3520_OUT_LIMIT_POSITION`,
B = `MIRR_UNDS_3520_IN_LIMIT_POSITION`

33.125 SXRSS MSXS2 Position (MIRR:UNDS:3560)

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	–	–	–	–	0 Hz
Out	F	T	–	–	–	–	–	–	120 Hz
In	T	F	–	–	–	–	–	–	120 Hz
Broken	T	T	–	–	–	–	–	–	0 Hz

Where
A = `MIRR_UNDS_3560_OUT_LIMIT_POSITION`,
B = `MIRR_UNDS_3560_IN_LIMIT_POSITION`

33.126 SXRSS MSXS3 Position (MIRR:UNDS:3565)

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	–	–	–	–	0 Hz
Out	F	T	–	–	–	–	–	–	120 Hz
In	T	F	–	–	–	–	–	–	120 Hz
Broken	T	T	–	–	–	–	–	–	0 Hz

Where
A = `MIRR_UNDS_3565_OUT_LIMIT_POSITION`,
B = `MIRR_UNDS_3565_IN_LIMIT_POSITION`

33.127 SXRSS SLSXS1 Position (SLIT:UNDS:3555)

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	–	–	–	–	–	–	0 Hz
Out	F	T	–	–	–	–	–	–	120 Hz
In	T	F	–	–	–	–	–	–	120 Hz
Moving	T	T	–	–	–	–	–	–	0 Hz

Where
A = `SLIT_UNDS_3555_OUT_LIMIT_POSITION`,
B = `SLIT_UNDS_3555_IN_LIMIT_POSITION`

33.128 SXRSS Watchdog

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = `MPS_UNDS_3500_SXRSS_WDOG_STATE`

33.129 VVFS DMPS 157 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = `VVFS_DMPS_157_POSITION_STATE`

33.130 VVMG DMPS 643 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = `VVMG_DMPS_643_POSITION_STATE`

33.131 VVMG DMPS 681 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = `VVMG_DMPS_681_POSITION_STATE`

33.132 VVMG UNDS 3511 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = `VVMG_UNDS_3511_POSITION_STATE`

33.133 VVMG UNDS 3568 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = `VVMG_UNDS_3568_POSITION_STATE`

33.134 VVMG UNDS 4998 Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = `VVMG_UNDS_4998_POSITION_STATE`

33.135 VVPG DMPS 355 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = `VVPG_DMPS_355_POSITION_STATE`

33.136 VVPG DMPS 396 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = VVPG_DMPS_396_POSITION_STATE

33.137 VVPG UNDS 1651 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = VVPG_UNDS_1651_POSITION_STATE

33.138 VVPG UNDS 2177 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = VVPG_UNDS_2177_POSITION_STATE

33.139 VVPG UNDS 2877 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = VVPG_UNDS_2877_POSITION_STATE

33.140 VVPG UNDS 3477 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = VVPG_UNDS_3477_POSITION_STATE

33.141 VVPG UNDS 3577 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = VVPG_UNDS_3577_POSITION_STATE

33.142 VVPG UNDS 3877 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = VVPG_UNDS_3877_POSITION_STATE

33.143 VVPG UNDS 4477 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = VVPG_UNDS_4477_POSITION_STATE

33.144 VVPG UNDS 5198 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = `VVPG_UNDS_5198_POSITION_STATE`

34 Ignored when STCLTS Is In, TD11 Is In, YAG01 Is In, or YAG02 Is In

34.1 BRCUS1 Current

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	–	–	–	0 Hz	0 Hz
OK	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = BEND_CLTS_765_CURRENT_THRESHOLD

34.2 BY1B Current

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	0 Hz	0 Hz
OK	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = BEND_LTUS_525_CURRENT_THRESHOLD

34.3 BY1B Magnet Power Status

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Inconsistent	F	F	–	–	–	–	–	0 Hz	0 Hz
On	F	T	–	–	–	–	–	120 Hz	120 Hz
Off	T	F	–	–	–	–	–	0 Hz	0 Hz
Inconsistent	T	T	–	–	–	–	–	0 Hz	0 Hz

Where
A = BEND_LTUS_525_ON_STATE,
B = BEND_LTUS_525_OFF_STATE

34.4 BYDB Current

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = BEND_DMPS_400_CURRENT_THRESHOLD

34.5 BYDB Magnet Power Status

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Inconsistent	F	F	–	–	–	–	–	–	0 Hz
On	F	T	–	–	–	–	–	–	120 Hz
Off	T	F	–	–	–	–	–	–	0 Hz
Inconsistent	T	T	–	–	–	–	–	–	0 Hz

Where
A = BEND_DMPS_400_ON_STATE,
B = BEND_DMPS_400_OFF_STATE

34.6 BYKIKS Current

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	–	–	–	–	–	0 Hz	0 Hz
OK	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = KICK_LTUS_350_CURRENT_THRESHOLD

34.7 BYKIKS Magnet Power Status

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Inconsistent	F	F	–	–	–	–	–	0 Hz	0 Hz
On	F	T	–	–	–	–	–	120 Hz	120 Hz
Off	T	F	–	–	–	–	–	0 Hz	0 Hz
Inconsistent	T	T	–	–	–	–	–	0 Hz	0 Hz

Where
A = KICK_LTUS_350_ON_STATE,
B = KICK_LTUS_350_OFF_STATE

34.8 BYKIKS Timing Delay Fault

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
TDES OOT	F	–	–	–	–	–	0 Hz	–
TDES OK	T	–	–	–	–	–	120 Hz	–

Where
A = KICK_LTUS_350_TDES_TIMING

34.9 BYKIKS Timing Reference Fault

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
TREF OOT	F	–	–	–	–	–	0 Hz	–
TREF OK	T	–	–	–	–	–	120 Hz	–

Where
A = KICK_LTUS_350_TREF_TIMING

34.10 CEDL13 Temperature

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	–	–	–	0 Hz	0 Hz
OK	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = COLL_LTUS_235_TEMP_STATE

34.11 CEDL17 Temperature

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	–	–	–	0 Hz	0 Hz
OK	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = COLL_LTUS_372_TEMP_STATE

34.12 CXBP34 Temperature

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	–	–	–	0 Hz	0 Hz
OK	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = COLL_BSYS_859_TEMP_STATE

34.13 CYBDL Temperature

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	–	–	–	0 Hz	0 Hz
OK	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = COLL_LTUS_116_TEMP_STATE

34.14 CYDL16 Temperature

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	–	–	–	0 Hz	0 Hz
OK	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = COLL_LTUS_345_TEMP_STATE

34.15 Merge Magnet Ok

Name	B	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Faulted	F	F	–	–	–	–	–	–	–
BRCUS1 Current Wrong	F	T	0 Hz	0 Hz	0 Hz	–	0 Hz	0 Hz	0 Hz
Not Faulted	T	F	–	–	–	–	–	–	–
Pulsed Mode Ok	T	T	–	–	–	–	–	–	–

Where
A = BEND_CLTS_765_ON_STATE,
B = BEND_CLTS_765_CURRENT_THRESHOLD

34.16 OTRDL18 (OTRS:LTUS:417) Position

Name	C	B	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	F	–	–	–	–	–	–	0 Hz
Out	F	F	T	–	–	–	–	–	–	120 Hz
P1 (YAG)	F	T	F	–	–	–	–	–	–	10 Hz
Broken	F	T	T	–	–	–	–	–	–	0 Hz
P2 (OTR)	T	F	F	–	–	–	–	–	–	10 Hz
Broken	T	F	T	–	–	–	–	–	–	0 Hz
Broken	T	T	F	–	–	–	–	–	–	0 Hz
Broken	T	T	T	–	–	–	–	–	–	0 Hz

Where
A = OTRS_LTUS_417_OUT_LMTSW_POSITION,
B = OTRS_LTUS_417_P1_LMTSW_POSITION,
C = OTRS_LTUS_417_P2_LMTSW_POSITION

34.17 SIOC LTUS MP01 HEARTBEAT

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = SIOC_LTUS_MP01_HEARTBEAT_STATE

34.18 SIOC LTUS MP02 HEARTBEAT

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = SIOC_LTUS_MP02_HEARTBEAT_STATE

34.19 SIOC LTUS MP03 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = SIOC_LTUS_MP03_HEARTBEAT_STATE

34.20 SIOC LTUS MP04 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	–	–	–	0 Hz	0 Hz
OK	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = SIOC_LTUS_MP04_HEARTBEAT_STATE

34.21 SIOC LTUS MP05 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	–	–	–	0 Hz	0 Hz
OK	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = SIOC_LTUS_MP05_HEARTBEAT_STATE

34.22 SIOC LTUS MP06 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	–	–	–	–	0 Hz
OK	T	–	–	–	–	–	–	120 Hz

Where
A = SIOC_LTUS_MP06_HEARTBEAT_STATE

34.23 ST34AB Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	–	–	–	0 Hz	0 Hz
Out	F	T	–	–	–	–	–	120 Hz	120 Hz
In	T	F	–	–	–	–	–	0 Hz	0 Hz
Broken	T	T	–	–	–	–	–	0 Hz	0 Hz

Where
A = `STPR_BSYS_891_OUT_LIMIT_POSITION`,
B = `STPR_BSYS_891_IN_LIMIT_POSITION`

34.24 SXR Facility Mode

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NC Mode	F	–	–	–	–	–	–	–
SC Mode	T	–	–	–	–	–	0 Hz	–

Where
A = `MPS_UNDS_1_FACMODE_STATE`

34.25 TDUNDB Position (10 Hz)

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	–	–	–	–	0 Hz
Out	F	T	–	–	–	–	–	–	120 Hz
In	T	F	–	–	–	–	–	–	10 Hz
Broken	T	T	–	–	–	–	–	–	0 Hz

Where
A = `DUMP_LTUS_972_OUT_LIMIT_POSITION`,
B = `DUMP_LTUS_972_IN_LIMIT_POSITION`

34.26 TDUNDB Power when TDUNDB Is IN

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
OK (TDUNDB Not In)	F	F	–	–	–	–	–	–	120 Hz
Fault	F	T	–	–	–	–	–	–	0 Hz
OK (TDUNDB Not In)	T	F	–	–	–	–	–	–	120 Hz
OK	T	T	–	–	–	–	–	–	120 Hz

Where
A = `DUMP_LTUS_972_IN_LIMIT_POSITION`,
B = `DUMP_LTUS_972_MPSPOWER_THRESHOLD`

34.27 VVFS LTUS 109 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	0 Hz	0 Hz
OPEN	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = `VVFS_LTUS_109_POSITION_STATE`

34.28 VVMG LTUS 185 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	0 Hz	0 Hz
OPEN	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = `VVMG_LTUS_185_POSITION_STATE`

34.29 VVMG LTUS 348 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	0 Hz	0 Hz
OPEN	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = `VVMG_LTUS_348_POSITION_STATE`

34.30 VVMG LTUS 451 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = `VVMG_LTUS_451_POSITION_STATE`

34.31 VVMG LTUS 505 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Is Not Open	F	–	–	–	–	–	–	0 Hz
Is Open	T	–	–	–	–	–	–	120 Hz

Where
A = `VVMG_LTUS_505_POSITION_STATE`

34.32 VVMG LTUS 552 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = `VVMG_LTUS_552_POSITION_STATE`

34.33 VVMG LTUS 656 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Is Not Open	F	–	–	–	–	–	–	0 Hz
Is Open	T	–	–	–	–	–	–	120 Hz

Where
A = `VVMG_LTUS_656_POSITION_STATE`

34.34 VVMG LTUS 744 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = `VVMG_LTUS_744_POSITION_STATE`

34.35 VVMG LTUS 802 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = `VVMG_LTUS_802_POSITION_STATE`

34.36 VVMG LTUS 827 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = `VVMG_LTUS_827_POSITION_STATE`

34.37 VVPG BSYS 904 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	0 Hz	0 Hz
OPEN	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = `VVPG_BSYS_904_POSITION_STATE`

34.38 VVPG CLTS 685 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT OPEN	F	–	–	–	–	–	0 Hz	0 Hz
OPEN	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = VVPG_CLTS_685_POSITION_STATE

34.39 VVPG LTUS 108 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	0 Hz	0 Hz
OPEN	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = VVPG_LTUS_108_POSITION_STATE

34.40 VVPG LTUS 272 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	0 Hz	0 Hz
OPEN	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = VVPG_LTUS_272_POSITION_STATE

34.41 VVPG LTUS 442 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = VVPG_LTUS_442_POSITION_STATE

34.42 VVPG LTUS 586 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = `VVPG_LTUS_586_POSITION_STATE`

34.43 VVPG LTUS 726 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = `VVPG_LTUS_726_POSITION_STATE`

34.44 VVPG LTUS 757 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	–	0 Hz
OPEN	T	–	–	–	–	–	–	120 Hz

Where
A = `VVPG_LTUS_757_POSITION_STATE`

34.45 XLEAP: UMXL1H Downstream Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	–	–	–	–	0 Hz
Out	F	T	–	–	–	–	–	–	120 Hz
In	T	F	–	–	–	–	–	–	120 Hz
Broken	T	T	–	–	–	–	–	–	0 Hz

Where
A = `WIGG_LTUS_724_DS_OUT_STATE`,
B = `WIGG_LTUS_724_DS_IN_STATE`

34.46 XLEAP: UMXL1H Upstream Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	–	–	–	–	0 Hz
Out	F	T	–	–	–	–	–	–	120 Hz
In	T	F	–	–	–	–	–	–	120 Hz
Broken	T	T	–	–	–	–	–	–	0 Hz

Where
A = `WIGG_LTUS_724_US_OUT_STATE`,
B = `WIGG_LTUS_724_US_IN_STATE`

34.47 XLEAP: UMXL3H Downstream Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	–	–	–	–	0 Hz
Out	F	T	–	–	–	–	–	–	120 Hz
In	T	F	–	–	–	–	–	–	120 Hz
Broken	T	T	–	–	–	–	–	–	0 Hz

Where
A = `WIGG_LTUS_770_DS_OUT_STATE`,
B = `WIGG_LTUS_770_DS_IN_STATE`

34.48 XLEAP: UMXL3H Upstream Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	–	–	–	–	0 Hz
Out	F	T	–	–	–	–	–	–	120 Hz
In	T	F	–	–	–	–	–	–	120 Hz
Broken	T	T	–	–	–	–	–	–	0 Hz

Where
A = `WIGG_LTUS_770_US_OUT_STATE`,
B = `WIGG_LTUS_770_US_IN_STATE`

34.49 XLEAP: UMXL4H Downstream Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	–	–	–	–	0 Hz
Out	F	T	–	–	–	–	–	–	120 Hz
In	T	F	–	–	–	–	–	–	120 Hz
Broken	T	T	–	–	–	–	–	–	0 Hz

Where
A = `WIGG_LTUS_774_DS_OUT_STATE`,
B = `WIGG_LTUS_774_DS_IN_STATE`

34.50 XLEAP: UMXL4H Upstream Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	–	–	–	–	0 Hz
Out	F	T	–	–	–	–	–	–	120 Hz
In	T	F	–	–	–	–	–	–	120 Hz
Broken	T	T	–	–	–	–	–	–	0 Hz

Where
A = `WIGG_LTUS_774_US_OUT_STATE`,
B = `WIGG_LTUS_774_US_IN_STATE`

35 Ignored when TD11 Is In, YAG01 Is In, or YAG02 Is In

35.1 Attempt to deliver Beam Code 1 when SXR DC extraction magnet is ON

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OK	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `LP_DC_MODE_BC1`

35.2 BKRCUS Timing Delay Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
TDES OOT	F	–	–	–	–	–	0 Hz	–
TDES OK	T	–	–	–	–	–	120 Hz	–

Where
A = `KICK_CLTS_185_TDES_TIMING`

35.3 BKRCUS Timing Reference Fault

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
TREF OOT	F	–	–	–	–	–	0 Hz	–
TREF OK	T	–	–	–	–	–	120 Hz	–

Where
A = `KICK_CLTS_185_TREF_TIMING`

35.4 BLM/PIC Watchdog BSY0/BSYA

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = MPS_BSY0_1_PICBLM_WD_STATUS

35.5 BLM/PIC Watchdog LI24

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = MPS_LI24_1_PICBLM_WD_STATUS

35.6 BLM/PIC Watchdog LI30

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = MPS_LI30_1_PICBLM_WD_STATUS

35.7 BLRCUS Current

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = BEND_CLTS_280_CURRENT_THRESHOLD

35.8 BRCUSDC on and HXR Mode

Name	B	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Normal NC Operation	F	F	–	–	–	–	–	–	–
HXR in SC mode and DC magnet not on	F	T	–	–	–	–	0 Hz	–	–
Normal NC Operation	T	F	–	–	–	–	–	–	–
Normal SC operation	T	T	–	–	–	–	–	–	–

Where
A = MPS_UNDH_1_FACMODE_STATE,
B = BEND_CLTS_765_ON_STATE

35.9 Bunch Length Monitor BL21 Position

Name	B	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = BL22_OUT_STATE,
B = BL22_IN_STATE

35.10 Dump LI28 5879 Flowswitch

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = DUMP_5879_FLOW_SW_STATE

35.11 Dump LI28 5879 Klixon

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not OK	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = DUMP_5879_KLIXON_OK_STATE

35.12 Flowswitch: CE21

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `COL_805_FLOSW_STATE`

35.13 Flowswitch: COLL LI28-9

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `FLOW_SW_28_9_STATE`

35.14 Flowswitch: COLL LI29-1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `FLOW_SW_29_1_STATE`

35.15 Flowswitch: COLL LI29-4

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `FLOW_SW_29_4_STATE`

35.16 Flowswitch: COLL LI29-5

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `FLOW_SW_29_5_STATE`

35.17 Flowswitch: COLL LI29-9

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `FLOW_SW_29_9_STATE`

35.18 Flowswitch: COLL LI30-1

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `FLOW_SW_30_1_STATE`

35.19 Flowswitch: COLL LI30-4

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `FLOW_SW_30_4_STATE`

35.20 Flowswitch: COLL LI30-5

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `FLOW_SW_30_5_STATE`

35.21 HXR Facility Mode

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NC Mode	F	–	–	–	–	–	–	–
SC Mode	T	–	–	–	–	0 Hz	–	–

Where
A = `MPS_UNDH_1_FACMODE_STATE`

35.22 HXR Magnet Mode

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Faulted	F	F	–	–	–	–	–	–	–
Not Faulted	F	T	–	–	–	–	–	–	–
Not Faulted	T	F	–	–	–	–	–	–	–
HXR Mode	T	T	–	–	–	–	–	–	–

Where
A = `BEND_CLTS_180_OFF_STATE`,
B = `KICK_CLTS_185_OFF_STATE`

35.23 Inconsistent Magnet Mode

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Faulted	F	F	–	–	–	–	–	–	–
Not Faulted	F	T	–	–	–	–	–	–	–
Not Faulted	T	F	–	–	–	–	–	–	–
Both On	T	T	0 Hz	0 Hz	0 Hz	–	0 Hz	0 Hz	0 Hz

Where
A = BEND_CLTS_180_ON_STATE,
B = KICK_CLTS_185_ON_STATE

35.24 Main Manifold Gauge: LI22 Station 5

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = MPS_MM_GAUGE_OK_LI22_STATE

35.25 Main Manifold Gauge: LI23 Station 5

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = MPS_MM_GAUGE_OK_LI23_STATE

35.26 Main Manifold Gauge: LI24 Station 5

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = MPS_MM_GAUGE_OK_LI24_STATE

35.27 Main Manifold Gauge: LI25 Station 5

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = MPS_MM_GAUGE_OK_LI25_STATE

35.28 Main Manifold Gauge: LI26 Station 5

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = MPS_MM_GAUGE_OK_LI26_STATE

35.29 Main Manifold Gauge: LI27 Station 5

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = MPS_MM_GAUGE_OK_LI27_STATE

35.30 Main Manifold Gauge: LI28 Station 5

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = MPS_MM_GAUGE_OK_LI28_STATE

35.31 Main Manifold Gauge: LI29 Station 5

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = MPS_MM_GAUGE_OK_STATE

35.32 Main Manifold Gauge: LI30 Station 5

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `MPS_MM_GAUGE_30_5_OK_STATE`

35.33 OTR LI25 920 Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	10 Hz	10 Hz	10 Hz	–	–	–	10 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `OTR_TCAV_OUT_STATE`,
B = `OTR_TCAV_IN_STATE`

35.34 OTR21 Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	10 Hz	10 Hz	10 Hz	–	–	–	10 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `OTRS_LI24_807_OUT_LMTSW_STATE`,
B = `OTRS_LI24_807_IN_LMTSW_STATE`

35.35 PIC Gas Pressure LI24

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = PIC_GAS_PRESS_STATE

35.36 PIC HVPS BSY 1 - Location B005-3921

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_ON	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
ON	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = PICM_BSY0_1_HV_PWR_STATE

35.37 PIC HVPS BSY 2 - Location B005-3921

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_ON	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
ON	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = PICM_BSY0_2_HV_PWR_STATE

35.38 PIC HVPS BSY 3 - Location B005-3921

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_ON	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
ON	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = PICM_BSY0_3_HV_PWR_STATE

35.39 PIC HVPS BSY 4 - Location B005-3918

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_ON	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
ON	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = PICM_BSY0_4_HV_PWR_STATE

35.40 PIC HVPS BSY 5 - Location B005-3918

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_ON	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
ON	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `PICM_BSY0_5_HV_PWR_STATE`

35.41 PIC HVPS BSY 6 - Location B005-3918

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_ON	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
ON	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `PICM_BSY0_6_HV_PWR_STATE`

35.42 PIC HVPS LI24 - Location LKF24-0235

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_ON	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
ON	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `PICM_LI24_1_HV_PWR_STATE`

35.43 PIC HVPS LI30 - KG30-C1322

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_ON	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
ON	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `PICM_LI30_1_HV_PWR_STATE`

35.44 PIC Raw Charge Thresholds: CLTS 280 (BLRCUS)

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = PICM_CLTS_280_LOSSL_THRESHOLD,
B = PICM_CLTS_280_LOSSH_THRESHOLD

35.45 PIC Raw Charge Thresholds: LI24 791

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = PICM_LI24_791_LOSSL_THRESHOLD,
B = PICM_LI24_791_LOSSH_THRESHOLD

35.46 PIC Raw Charge Thresholds: LI24 811

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = PICM_LI24_811_LOSSL_THRESHOLD,
B = PICM_LI24_811_LOSSH_THRESHOLD

35.47 PIC Raw Charge Thresholds: LI28 916

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `PICM_LI28_916_LOSSL_THRESHOLD`,
B = `PICM_LI28_916_LOSSH_THRESHOLD`

35.48 PIC Raw Charge Thresholds: LI29 146

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `PICM_LI29_146_LOSSL_THRESHOLD`,
B = `PICM_LI29_146_LOSSH_THRESHOLD`

35.49 PIC Raw Charge Thresholds: LI29 446

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `PICM_LI29_446_LOSSL_THRESHOLD`,
B = `PICM_LI29_446_LOSSH_THRESHOLD`

35.50 PIC Raw Charge Thresholds: LI29 546

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `PICM_LI29_546_LOSSL_THRESHOLD`,
B = `PICM_LI29_546_LOSSH_THRESHOLD`

35.51 PIC Raw Charge Thresholds: LI29 801

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `PICM_LI29_801_LOSSL_THRESHOLD`,
B = `PICM_LI29_801_LOSSH_THRESHOLD`

35.52 PIC Raw Charge Thresholds: LI29 956

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `PICM_LI29_956_LOSSL_THRESHOLD`,
B = `PICM_LI29_956_LOSSH_THRESHOLD`

35.53 PIC Raw Charge Thresholds: LI30 146

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = PICM_LI30_146_LOSSL_THRESHOLD,
B = PICM_LI30_146_LOSSH_THRESHOLD

35.54 PIC Raw Charge Thresholds: LI30 446

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = PICM_LI30_446_LOSSL_THRESHOLD,
B = PICM_LI30_446_LOSSH_THRESHOLD

35.55 PIC Raw Charge Thresholds: LI30 546

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = PICM_LI30_546_LOSSL_THRESHOLD,
B = PICM_LI30_546_LOSSH_THRESHOLD

35.56 PIC Raw Charge Thresholds: LI30 801

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = PICM_LI30_801_LOSSL_THRESHOLD,
B = PICM_LI30_801_LOSSH_THRESHOLD

35.57 PIC Trigger Missed (LN16)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = PICM_LI24_791_NO_TRIG_MISSED

35.58 PIC Trigger Missed (LN22)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = PICM_LI28_916_NO_TRIG_MISSED

35.59 PIC Trigger Missed (LN25)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = PICM_BSY0_16_NO_TRIG_MISSED

35.60 Pulsed Magnet Mode Ok

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Faulted	F	F	–	–	–	–	–	–	–
BKRCUS Current Wrong	F	T	0 Hz	0 Hz	0 Hz	–	0 Hz	0 Hz	0 Hz
Not Faulted	T	F	–	–	–	–	–	–	–
Pulsed Mode Ok	T	T	–	–	–	–	–	–	–

Where
A = KICK_CLTS_185_ON_STATE,
B = KICK_CLTS_185_CURRENT_THRESHOLD

35.61 Scraper Water LI21-9 (Station 22-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = MPS_SCRAPPER_FLOW_OK_LI22_STATE

35.62 Scraper Water LI22-9 (Station 23-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = MPS_SCRAPPER_FLOW_OK_LI23_STATE

35.63 Scraper Water LI23-9 (Station 24-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = MPS_SCRAPPER_FLOW_OK_LI24_STATE

35.64 Scraper Water LI24-9 (Station 25-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `MPS_SCRAPPER_FLOW_OK_LI25_STATE`

35.65 Scraper Water LI25-9 (Station 26-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `MPS_SCRAPPER_FLOW_OK_LI26_STATE`

35.66 Scraper Water LI26-9 (Station 27-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `MPS_SCRAPPER_FLOW_OK_LI27_STATE`

35.67 Scraper Water LI27-9 (Station 28-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `MPS_SCRAPPER_FLOW_OK_LI28_STATE`

35.68 Scraper Water LI28-9 (Station 29-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = MPS_SCRAPPER_FLOW_OK_LI29_STATE

35.69 Scraper Water LI29-9 (Station 30-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = MPS_SCRAPPER_FLOW_OK_LI30_STATE

35.70 SIOC CLTS MP01 HEARTBEAT

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULTED	F	–	–	–	–	–	0 Hz	0 Hz
OK	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = SIOC_CLTS_MP01_HEARTBEAT_STATE

35.71 STCLTS Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	–	–	–	0 Hz	0 Hz
Out	F	T	–	–	–	–	–	120 Hz	120 Hz
In	T	F	–	–	–	–	–	120 Hz	120 Hz
Broken	T	T	–	–	–	–	–	0 Hz	0 Hz

Where
A = STPP_CLTS_585_OUT_LIMIT_POSITION,
B = STPR_CLTS_585_IN_LIMIT_POSITION

35.72 Stopper LI28 950 and 960 Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OUT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OUT	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `BASII_STOPPER_OUT_STATE`

35.73 Sub-booster Ready: LI22

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `MPS_SBST_OK_READY_LI22_STATE`

35.74 Sub-booster Ready: LI25

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `MPS_SBST_OK_READY_LI25_STATE`

35.75 Sub-booster Ready: LI26

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `MPS_SBST_OK_READY_LI26_STATE`

35.76 Sub-booster Ready: LI27

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `MPS_SBST_OK_READY_LI27_STATE`

35.77 Sub-booster Ready: LI28

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `MPS_SBST_OK_READY_LI28_STATE`

35.78 Sub-booster Ready: LI29

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `MPS_SBST_OK_READY_LI29_STATE`

35.79 Sub-booster Ready: LI30

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `MPS_SBST_OK_READY_LI30_STATE`

35.80 SXR Magnet Mode Ok

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Faulted	F	F	–	–	–	–	–	–	–
BRCUSDC Current Wrong	F	T	0 Hz	0 Hz	0 Hz	–	0 Hz	0 Hz	0 Hz
Not Faulted	T	F	–	–	–	–	–	–	–
SXR Mode Ok	T	T	–	–	–	–	–	–	–

Where
A = `BEND_CLTS_180_ON_STATE`,
B = `BEND_CLTS_180_CURRENT_THRESHOLD`

35.81 Temperature RTD Summary: BSY Common Line

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `RTD_BSY0_16_CLINESUM_STATUS`

35.82 Timing / MPS Destination Mismatch

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
MISMATCH	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `LP_DESTINATION_MATCH`

35.83 Toroid Chassis LI24 IMBC2

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = CHASIMB2_STATE

35.84 Toroid Comparator BC2 (IMBC2IN vs IMBC2OUT)

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Downstream > Upstream	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Upstream > Downstream	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = TCBC2L1_STATE,
B = TCBC2L2_STATE

35.85 VVFS CLTH 101 Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = VVFS_CLTH_101_OPEN_LIMSW_POSITION

35.86 VVFS LI21-9 Position (Station 22-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = FAST_VLV_OPEN_LI22_STATE

35.87 VVFS LI22-9 Position (Station 23-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `FAST_VLV_OPEN_LI23_STATE`

35.88 VVFS LI23-9 Position (Station 24-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `FAST_VLV_OPEN_LI24_STATE`

35.89 VVFS LI24-9 Position (Station 25-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `FAST_VLV_OPEN_LI25_STATE`

35.90 VVFS LI25-9 Position (Station 26-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `FAST_VLV_OPEN_LI26_STATE`

35.91 VVFS LI26-9 Position (Station 27-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `FAST_VLV_OPEN_LI27_STATE`

35.92 VVFS LI27-9 Position (Station 28-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `FAST_VLV_OPEN_LI28_STATE`

35.93 VVFS LI28-9 Position (Station 29-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `FAST_VLV_OPEN_LI29_STATE`

35.94 VVFS LI29-9 Position (Station 30-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `FAST_VLV_OPEN_LI30_STATE`

35.95 VVPG CLTH 178 Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `VVPG_CLTH_178_OPEN_LIMSW_POSITION`

35.96 VVPG CLTH 375 Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	–	–	0 Hz	–	0 Hz	–	–
OK	T	–	–	120 Hz	–	120 Hz	–	–

Where
A = `VVPG_CLTH_375_OPEN_LIMSW_POSITION`

35.97 VVPG CLTS 372 POSITION

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_OPEN	F	–	–	–	–	–	0 Hz	0 Hz
OPEN	T	–	–	–	–	–	120 Hz	120 Hz

Where
A = `VVPG_CLTS_372_POSITION_STATE`

35.98 VVPG LI21-9 Position (Station 22-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `SLOW_VLV_OPEN_LI22_STATE`

35.99 VVPG LI22-9 Position (Station 23-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `SLOW_VLV_OPEN_LI23_STATE`

35.100 VVPG LI23-9 Position (Station 24-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `SLOW_VLV_OPEN_LI24_STATE`

35.101 VVPG LI24 710 Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `VV21_STATE`

35.102 VVPG LI24 896 Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `VV22_STATE`

35.103 VVPG LI25-9 Position (Station 26-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = SLOW_VLV_OPEN_LI26_STATE

35.104 VVPG LI26-9 Position (Station 27-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = SLOW_VLV_OPEN_LI27_STATE

35.105 VVPG LI27-9 Position (Station 28-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = SLOW_VLV_OPEN_LI28_STATE

35.106 VVPG LI28-9 Position (Station 29-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = SLOW_VLV_OPEN_LI29_STATE

35.107 VVPG LI29-9 Position (Station 30-1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `SLOW_VLV_OPEN_LI30_STATE`

35.108 VVPG LI30-9 Position (Station 30-9)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `SLOW_VLV_30_9_OK_OPEN_STATE`

36 Ignored when YAG01 Is In

36.1 BXG Status

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Off	F	T	120 Hz	120 Hz	120 Hz	–	–	–	–
On	T	F	10 Hz	10 Hz	10 Hz	–	–	–	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	–

Where
A = `BEND_IN20_231_OFF_STATE`,
B = `BEND_IN20_231_OK_STATE`

36.2 Toroid Peak Current Monitor IM01

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `TR_BL215_STATE`

36.3 YAG02 IN20 241 Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	10 Hz	10 Hz	10 Hz	–	–	–	10 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `YAGS_IN20_241_OUT_LMTSW_STATE`,
B = `YAGS_IN20_241_IN_LMTSW_STATE`

37 Ignored when YAG01 Is In or YAG02 Is In

37.1 BLM/PIC Watchdog Upstream of TDUND

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `MPS_MCC0_1_PICBLM_WD_STATUS`

37.2 BX01/BX02 Status

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Off	F	T	120 Hz	120 Hz	120 Hz	–	–	–	–
On	T	F	120 Hz	120 Hz	120 Hz	–	–	–	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	–

Where
A = `BEND_IN20_751_OFF_STATE`,
B = `BEND_IN20_751_OK_STATE`

37.3 Flowswitch: CE11

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `COLL_LI21_235_OPEN_STATE`

37.4 Flowswitch: TD11

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = FS_BL305_STATE

37.5 Main Manifold Gauge: LI21 Station 5

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = MPS_MM_GAUGE_OK_LI21_STATE

37.6 Mirror BL11 Position

Name	B	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = MIR_BL11_OUT_STATE,
B = MIR_BL11_IN_STATE

37.7 OTR01 IN20 541 Position

Name	B	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	10 Hz	10 Hz	10 Hz	–	–	–	10 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = OTRS_IN20_541_OUT_LMTSW_STATE,
B = OTRS_IN20_541_IN_LMTSW_STATE

37.8 OTR02 IN20 571 Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	10 Hz	10 Hz	10 Hz	–	–	–	10 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `OTRS_IN20_571_OUT_LMTSW_STATE`,
B = `OTRS_IN20_571_IN_LMTSW_STATE`

37.9 OTR03 IN20 621 Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	10 Hz	10 Hz	10 Hz	–	–	–	10 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `OTRS_IN20_621_OUT_LMTSW_STATE`,
B = `OTRS_IN20_621_IN_LMTSW_STATE`

37.10 OTR04 IN20 711 Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	10 Hz	10 Hz	10 Hz	–	–	–	10 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `OTRS_IN20_711_OUT_LMTSW_STATE`,
B = `OTRS_IN20_711_IN_LMTSW_STATE`

37.11 OTR11 LI21 237 Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	10 Hz	10 Hz	10 Hz	–	–	–	10 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `OTRS_LI21_237_OUT_LMTSW_STATE`,
B = `OTRS_LI21_237_IN_LMTSW_STATE`

37.12 OTR12 LI21 291 Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	10 Hz	10 Hz	10 Hz	–	–	–	10 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `OTRS_LI21_291_OUT_LMTSW_STATE`,
B = `OTRS_LI21_291_IN_LMTSW_STATE`

37.13 OTRH1 Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	10 Hz	10 Hz	10 Hz	–	–	–	10 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `OTRH1_OUT_LIMIT_STATE`,
B = `OTRH1_IN_LIMIT_STATE`

37.14 OTRH2 Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	10 Hz	10 Hz	10 Hz	–	–	–	10 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `OTRH2_OUT_LIMIT_STATE`,
B = `OTRH2_IN_LIMIT_STATE`

37.15 Sub-booster Ready: LI21

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `MPS_SBST_OK_READY_LI21_STATE`

37.16 TD11 Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	–	–	–	–	–
Out	F	T	120 Hz	120 Hz	–	–	–	–	–
In	T	F	120 Hz	120 Hz	–	–	–	–	–
Broken	T	T	0 Hz	0 Hz	–	–	–	–	–

Where
A = `TD11_OUT_LIMIT_STATE`,
B = `TD11_IN_LIMIT_STATE`

37.17 Toroid Chassis IN20 IM11

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = CHASIM11_STATE

37.18 Toroid Chassis IN20 IM12

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = CHASIM12_STATE

37.19 Toroid Comparator BC1 (IMBC1IN vs IMBC1OUT)

Name	B	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Downstream - Upstream > 50 pC	F	T	0 Hz	0 Hz	0 Hz	–	–	–	–
Upstream - Downstream > 200 pC	T	F	0 Hz	0 Hz	0 Hz	–	–	–	–
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = TCBC1L1_STATE,
B = TCBC1L2_STATE

37.20 VVFV IN20 785 Position

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = VVFV_IN20_785_OPEN_LMTSW_POSITION

37.21 VVPG IN20 155 Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `VV_BL155_STATE`

37.22 VVPG IN20 435 Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `VV_BL435_STATE`

37.23 VVPG IN20 545 Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `VV_BL545_STATE`

37.24 VVPG IN20 635 Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `VV_BL635_STATE`

37.25 VVPG IN20 915 Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = VV_IS915_STATE

37.26 VVS Circuit Breaker: LI22

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = VVS_BRKR_OK_READY_LI22_STATE

37.27 VVS Circuit Breaker: LI24

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = VVS_BRKR_OK_READY_LI24_STATE

37.28 VVS Circuit Breaker: LI26

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = VVS_BRKR_OK_READY_LI26_STATE

37.29 VVS Circuit Breaker: LI28

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `VVS_BRKR_OK_READY_LI28_STATE`

37.30 VVS Circuit Breaker: LI30

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `VVS_BRKR_OK_READY_LI30_STATE`

37.31 YAG03 IN20 351 Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	10 Hz	10 Hz	10 Hz	–	–	–	10 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `YAGS_IN20_351_OUT_LMTSW_STATE`,
B = `YAGS_IN20_351_IN_LMTSW_STATE`

37.32 YAGS1 IN20 921 Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	10 Hz	10 Hz	10 Hz	–	–	–	10 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = YAGS_IN20_921_OUT_LMTSW_STATE,
B = YAGS_IN20_921_IN_LMTSW_STATE

37.33 YAGS2 IN20 995 Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	10 Hz	10 Hz	10 Hz	–	–	–	10 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = YAGS_LI21_995_OUT_LMTSW_STATE,
B = YAGS_LI21_995_IN_LMTSW_STATE

38 Always Evaluated

38.1 Backward Beam Stopper (RST1)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Out	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Out	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `ST_BL551_STATE`

38.2 Beam Destination: HXR

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not True	F	–	–	–	–	–	–	–
True	T	–	–	–	–	–	–	–

Where
A = `LP_DESTINATION_HXR`

38.3 Beam Destination: SXR

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not True	F	–	–	–	–	–	–	–
True	T	–	–	–	–	–	–	–

Where
A = `LP_DESTINATION_SXR`

38.4 BLM/PIC Watchdog IN20

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `MPS_IN20_1_PICBLM_WD_STATUS`

38.5 Bypass Recover

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Recovering	F	0 Hz	0 Hz	0 Hz	0 Hz	–	–	–
OK	T	120 Hz	120 Hz	120 Hz	120 Hz	–	–	–

Where
A = `LP_BYPASS_RECOVER`

38.6 Gun RF Peak Power 20-6

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
OK	F	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
Fault	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `FLT_20_6_TRP_STATE`

38.7 Gun Waveguide Vacuum Summary

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `WGVACGUN_STATE`

38.8 HX2: 8 Hour Watchdog Timer

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Faulted	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Ok	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `HXRC_B969_1_TIMER_STATE`

38.9 HX2: Recombiner 50% LEL Threshold

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Faulted	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Ok	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = HXRC_B969_1_RCBR_LEL_THRESHOLD

38.10 HX2: Room 50% LEL Threshold

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Faulted	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Ok	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = HXRC_B969_1_ROOM_LEL_THRESHOLD

38.11 IOC-IN20-MP01 MPS Support IOC Heartbeat

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = MN_HEART_STATE

38.12 Laser Heater Attenuator Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	–	–	–	0 Hz	–	–	–
Out	F	T	–	–	–	–	–	–	–
In	T	F	–	–	–	–	–	–	–
Broken	T	T	–	–	–	0 Hz	–	–	–

Where
A = LHATTEN_OUT_LIMIT_STATE,
B = LHATTEN_IN_LIMIT_STATE

38.13 MCC Emergency Radiation Stopper

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not OK	F	0 Hz	0 Hz	0 Hz	0 Hz	0 Hz	0 Hz	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	120 Hz	120 Hz	120 Hz	120 Hz

Where
A = `EMG_RAD_STOP_STATE`

38.14 Mechanical Shutter Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	–	0 Hz	–	–	–	0 Hz
Out	F	T	–	–	–	–	–	–	–
In	T	F	–	–	–	–	–	–	–
Broken	T	T	0 Hz	–	0 Hz	–	–	–	0 Hz

Where
A = `MPS_IN20_200_MSHT1_OUT_FAULT`,
B = `MPS_IN20_200_MSHT1_IN_FAULT`

38.15 Mirror AM01 Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Out	F	0 Hz	0 Hz	0 Hz	–	–	–	–
Out	T	120 Hz	120 Hz	120 Hz	–	–	–	–

Where
A = `MR_BL191_STATE`

38.16 MPS Beam Permit: BYKIK

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Permitted	F	–	–	0 Hz	–	–	–	–
Permitted	T	–	–	120 Hz	–	–	–	–

Where
A = `LP_ALLOWS_BEAM_BYKIK`

38.17 MPS Beam Permit: BYKIKS

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Permitted	F	–	–	–	–	–	–	0 Hz
Permitted	T	–	–	–	–	–	–	120 Hz

Where
A = LP_ALLOWS_BEAM_BYKIKS

38.18 MPS Beam Permit: Gun RF

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Permitted	F	0 Hz	–	–	–	–	–	–
Permitted	T	120 Hz	–	–	–	–	–	–

Where
A = LP_ALLOWS_BEAM_POCKELS_CELL

38.19 MPS Beam Permit: Gun RF HXR

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Permitted	F	–	–	–	–	0 Hz	–	–
Permitted	T	–	–	–	–	120 Hz	–	–

Where
A = LP_ALLOWS_BEAM_GUN_HXR

38.20 MPS Beam Permit: Gun RF SXR

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Permitted	F	–	–	–	–	–	0 Hz	–
Permitted	T	–	–	–	–	–	120 Hz	–

Where
A = LP_ALLOWS_BEAM_GUN_SXR

38.21 MPS Beam Permit: Heater Shutter

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Permitted	F	–	–	–	0 Hz	–	–	–
Permitted	T	–	–	–	120 Hz	–	–	–

Where
A = LP_ALLOWS_BEAM_LH_SHUT

38.22 MPS Beam Permit: Mechanical Shutter

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Permitted	F	–	0 Hz	–	–	–	–	–
Permitted	T	–	120 Hz	–	–	–	–	–

Where
A = LP_ALLOWS_BEAM_MECH_SHUT

38.23 MPS Mechanical Shutter Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
OK	F	120 Hz	120 Hz	120 Hz	–	–	–	–
Readback Does Not Match	T	0 Hz	0 Hz	0 Hz	–	–	–	–

Where
A = SHFLT_STATE

38.24 PIC HVPS LI20 - Location LKG-1535

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
NOT_ON	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
ON	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = PICM_LI20_1_HV_PWR_STATE

38.25 PIC Raw Charge Thresholds: IN20 185

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = PICM_IN20_185_LOSSL_THRESHOLD,
B = PICM_IN20_185_LOSSH_THRESHOLD

38.26 PIC Raw Charge Thresholds: IN20 232

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = PICM_IN20_232_LOSSL_THRESHOLD,
B = PICM_IN20_232_LOSSH_THRESHOLD

38.27 PIC Raw Charge Thresholds: IN20 245

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = PICM_IN20_245_LOSSL_THRESHOLD,
B = PICM_IN20_245_LOSSH_THRESHOLD

38.28 PIC Raw Charge Thresholds: IN20 665

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `PICM_IN20_665_LOSSL_THRESHOLD`,
B = `PICM_IN20_665_LOSSH_THRESHOLD`

38.29 PIC Raw Charge Thresholds: IN20 775

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `PICM_IN20_775_LOSSL_THRESHOLD`,
B = `PICM_IN20_775_LOSSH_THRESHOLD`

38.30 PIC Raw Charge Thresholds: IN20 933

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Broken	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Over High Threshold	F	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Under Low Threshold	T	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `PICM_IN20_933_LOSSL_THRESHOLD`,
B = `PICM_IN20_933_LOSSH_THRESHOLD`

38.31 PIC Trigger Missed (LN11)

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `PICM_IN20_665_NO_TRIG_MISSED`

38.32 Pockels Cell AND Gate 100

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `MPS_IN20_100_ANDALLACTV_STATE`

38.33 Pockels Cell AND Gate 200

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `MPS_IN20_200_ANDALLACTV_STATE`

38.34 Rate Request: BYKIK 1 Hz

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	120 Hz	–	–	–	–
Requested	T	–	–	1 Hz	–	–	–	–

Where
A = `LP_MAX_RATE_BYKIK_1_HZ`

38.35 Rate Request: BYKIK 10 Hz

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	120 Hz	–	–	–	–
Requested	T	–	–	10 Hz	–	–	–	–

Where
A = `LP_MAX_RATE_BYKIK_10_HZ`

38.36 Rate Request: BYKIK 30 Hz

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	120 Hz	–	–	–	–
Requested	T	–	–	30 Hz	–	–	–	–

Where
A = `LP_MAX_RATE_BYKIK_30_HZ`

38.37 Rate Request: BYKIK 60 Hz

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	120 Hz	–	–	–	–
Requested	T	–	–	60 Hz	–	–	–	–

Where
A = `LP_MAX_RATE_BYKIK_60_HZ`

38.38 Rate Request: BYKIK Burst

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	120 Hz	–	–	–	–
Requested	T	–	–	Burst Mode	–	–	–	–

Where
A = `LP_MAX_RATE_BYKIK_BURST`

38.39 Rate Request: BYKIK Single Shot

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	120 Hz	–	–	–	–
Requested	T	–	–	Single Shot	–	–	–	–

Where
A = LP_MAX_RATE_BYKIK_SINGLE_SHOT

38.40 Rate Request: BYKIKS 1 Hz

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	–	–	–	–	120 Hz
Requested	T	–	–	–	–	–	–	1 Hz

Where
A = LP_MAX_RATE_BYKIKS_1_HZ

38.41 Rate Request: BYKIKS 10 Hz

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	–	–	–	–	120 Hz
Requested	T	–	–	–	–	–	–	10 Hz

Where
A = LP_MAX_RATE_BYKIKS_10_HZ

38.42 Rate Request: BYKIKS 30 Hz

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	–	–	–	–	120 Hz
Requested	T	–	–	–	–	–	–	30 Hz

Where
A = LP_MAX_RATE_BYKIKS_30_HZ

38.43 Rate Request: BYKIKS 60 Hz

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	–	–	–	–	120 Hz
Requested	T	–	–	–	–	–	–	60 Hz

Where
A = `LP_MAX_RATE_BYKIKS_60_HZ`

38.44 Rate Request: BYKIKS Burst

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	–	–	–	–	120 Hz
Requested	T	–	–	–	–	–	–	Burst Mode

Where
A = `LP_MAX_RATE_BYKIKS_BURST`

38.45 Rate Request: BYKIKS Single Shot

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	–	–	–	–	120 Hz
Requested	T	–	–	–	–	–	–	Single Shot

Where
A = `LP_MAX_RATE_BYKIKS_SINGLE_SHOT`

38.46 Rate Request: Gun RF HXR 1 Hz

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	–	–	120 Hz	–	–
Requested	T	–	–	–	–	1 Hz	–	–

Where
A = `LP_MAX_RATE_GUN_HXR_1_HZ`

38.47 Rate Request: Gun RF HXR 10 Hz

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	–	–	120 Hz	–	–
Requested	T	–	–	–	–	10 Hz	–	–

Where
A = `LP_MAX_RATE_GUN_HXR_10_HZ`

38.48 Rate Request: Gun RF HXR 30 Hz

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	–	–	120 Hz	–	–
Requested	T	–	–	–	–	30 Hz	–	–

Where
A = `LP_MAX_RATE_GUN_HXR_30_HZ`

38.49 Rate Request: Gun RF HXR 60 Hz

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	–	–	120 Hz	–	–
Requested	T	–	–	–	–	60 Hz	–	–

Where
A = `LP_MAX_RATE_GUN_HXR_60_HZ`

38.50 Rate Request: Gun RF HXR Burst

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	–	–	120 Hz	–	–
Requested	T	–	–	–	–	Burst Mode	–	–

Where
A = `LP_MAX_RATE_GUN_HXR_BURST`

38.51 Rate Request: Gun RF HXR Single Shot

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	–	–	120 Hz	–	–
Requested	T	–	–	–	–	Single Shot	–	–

Where
A = LP_MAX_RATE_GUN_HXR_SINGLE_SHOT

38.52 Rate Request: Gun RF SXR 1 Hz

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	–	–	–	120 Hz	–
Requested	T	–	–	–	–	–	1 Hz	–

Where
A = LP_MAX_RATE_GUN_SXR_1_HZ

38.53 Rate Request: Gun RF SXR 10 Hz

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	–	–	–	120 Hz	–
Requested	T	–	–	–	–	–	10 Hz	–

Where
A = LP_MAX_RATE_GUN_SXR_10_HZ

38.54 Rate Request: Gun RF SXR 30 Hz

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	–	–	–	120 Hz	–
Requested	T	–	–	–	–	–	30 Hz	–

Where
A = LP_MAX_RATE_GUN_SXR_30_HZ

38.55 Rate Request: Gun RF SXR 60 Hz

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	–	–	–	120 Hz	–
Requested	T	–	–	–	–	–	60 Hz	–

Where
A = LP_MAX_RATE_GUN_SXR_60_HZ

38.56 Rate Request: Gun RF SXR Burst

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	–	–	–	120 Hz	–
Requested	T	–	–	–	–	–	Burst Mode	–

Where
A = LP_MAX_RATE_GUN_SXR_BURST

38.57 Rate Request: Gun RF SXR Single Shot

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	–	–	–	–	–	120 Hz	–
Requested	T	–	–	–	–	–	Single Shot	–

Where
A = LP_MAX_RATE_GUN_SXR_SINGLE_SHOT

38.58 Rate Request: Pockels Cell 1 Hz

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	120 Hz	–	–	–	–	–	–
Requested	T	1 Hz	–	–	–	–	–	–

Where
A = LP_MAX_RATE_PC_1_HZ

38.59 Rate Request: Pockels Cell 10 Hz

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	120 Hz	–	–	–	–	–	–
Requested	T	10 Hz	–	–	–	–	–	–

Where
A = LP_MAX_RATE_PC_10_HZ

38.60 Rate Request: Pockels Cell 30 Hz

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	120 Hz	–	–	–	–	–	–
Requested	T	30 Hz	–	–	–	–	–	–

Where
A = LP_MAX_RATE_PC_30_HZ

38.61 Rate Request: Pockels Cell 60 Hz

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	120 Hz	–	–	–	–	–	–
Requested	T	60 Hz	–	–	–	–	–	–

Where
A = LP_MAX_RATE_PC_60_HZ

38.62 Rate Request: Pockels Cell Burst

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	120 Hz	–	–	–	–	–	–
Requested	T	Burst Mode	–	–	–	–	–	–

Where
A = LP_MAX_RATE_PC_BURST

38.63 Rate Request: Pockels Cell Single Shot

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Requested	F	120 Hz	–	–	–	–	–	–
Requested	T	Single Shot	–	–	–	–	–	–

Where
A = `LP_MAX_RATE_PC_SINGLE_SHOT`

38.64 VVMG IN20 175 Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `VV_BL175_STATE`

38.65 VVMG LI21 195 Position

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `VV_BL195_STATE`

38.66 VVS Circuit Breaker: LI20

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
FAULT	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
OK	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz

Where
A = `VVS_BRKR_OK_READY_LI20_STATE`

38.67 YAG01 IN20 211 Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	10 Hz	10 Hz	10 Hz	–	–	–	10 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `YAGS_IN20_211_OUT_LMTSW_STATE`,
B = `YAGS_IN20_211_IN_LMTSW_STATE`

38.68 YAGG1 IN20 841 Position

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Moving	F	F	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz
Out	F	T	120 Hz	120 Hz	120 Hz	–	–	–	120 Hz
In	T	F	10 Hz	10 Hz	10 Hz	–	–	–	10 Hz
Broken	T	T	0 Hz	0 Hz	0 Hz	–	–	–	0 Hz

Where
A = `YAGS_IN20_841_OUT_LMTSW_STATE`,
B = `YAGS_IN20_841_IN_LMTSW_STATE`

39 Ignore Logic

39.1 A-Line Kicker Is Not Enabled

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Is Not Enabled	F	F	–	–	–	–	–	–	–

Where
A = KICK_BSY0_66_PM1_TRIG_ENB_STATUS,
B = KICK_BSY0_66_PM2_TRIG_ENB_STATUS

39.2 A-Line SL10 Is Closed

Name	*D*	*C*	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Closed	T	T	T	T	–	–	–	–	–	–	–

Where
A = SLIT_BSYA_2010_SL10_FB_IN_STATE,
B = SLIT_BSYA_2010_SL10_FT_IN_STATE,
C = SLIT_BSYA_2010_SL10_RB_IN_STATE,
D = SLIT_BSYA_2010_SL10_RT_IN_STATE

39.3 BKRCUS Is On

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
On	T	–	–	–	–	–	–	–

Where
A = KICK_CLTS_185_ON_STATE

39.4 BRCUSDC Is Off

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Off	T	–	–	–	–	–	–	–

Where
A = BEND_CLTS_180_OFF_STATE

39.5 BRCUSDC Is On

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
On	T	–	–	–	–	–	–	–

Where
A = BEND_CLTS_180_ON_STATE

39.6 BX01/BX02 Is Off

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Off	F	T	–	–	–	–	–	–	–

Where
A = BEND_IN20_751_OFF_STATE,
B = BEND_IN20_751_OK_STATE

39.7 BX01/BX02 Is On

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
On	T	F	–	–	–	–	–	–	–

Where
A = BEND_IN20_751_OFF_STATE,
B = BEND_IN20_751_OK_STATE

39.8 BXG Is Off

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Off	F	T	–	–	–	–	–	–	–

Where
A = BEND_IN20_231_OFF_STATE,
B = BEND_IN20_231_OK_STATE

39.9 BXG Is On

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
On	T	F	–	–	–	–	–	–	–

Where
A = BEND_IN20_231_OFF_STATE,
B = BEND_IN20_231_OK_STATE

39.10 CBXFEL Cell 13 Beamline Deflection Is Not Ok

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not Ok	F	–	–	–	–	–	–	–

Where
A = PHYS_UNDH_1350_X_DISP_STATE

39.11 CBXFEL Cell 13 Beamline Deflection Is Ok

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
OK	T	–	–	–	–	–	–	–

Where
A = PHYS_UNDH_1350_X_DISP_STATE

39.12 Destination HXR

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
HXR	T	–	–	–	–	–	–	–

Where
A = LP_DESTINATION_HXR

39.13 Destination SXR

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
SXR	T	–	–	–	–	–	–	–

Where
A = `LP_DESTINATION_SXR`

39.14 Diag Stopper HFX DG2 Is In

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = `HFX_DG2_STP_01_IN_DI_POSITION`

39.15 Diag Stopper HFX UM6 Is In

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = `HFX_UM6_STP_01_IN_DI_POSITION`

39.16 Diag Stopper XCS SB1 Is In

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = `XCS_SB1_STP_01_CLS_DI_POSITION`

39.17 HXR Beamline is in SC Mode

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
SC Mode	T	–	–	–	–	–	–	–

Where
A = MPS_UNDH_1_FACMODE_STATE

39.18 Laser Heater Attenuator Is In

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = LHATTEN_IN_LIMIT_STATE

39.19 LTU Dechirper Is Out

Name	D	C	B	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Out	T	T	T	T	–	–	–	–	–	–	–

Where
A = DCHP_LTUH_545_OUT_LIMSW_NEGY_POSITION,
B = DCHP_LTUH_545_OUT_LIMSW_POSY_POSITION,
C = DCHP_LTUH_555_OUT_LIMSW_NEGX_POSITION,
D = DCHP_LTUH_555_OUT_LIMSW_POSX_POSITION

39.20 MR1K1 Is In

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Is In	T	–	–	–	–	–	–	–

Where
A = STPR_FEES_MR1K1_IN_STATE

39.21 MR1K1 Is Out

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Is Out	T	–	–	–	–	–	–	–

Where
A = MIRR_FEES_MR1K1_OUT_POSITION

39.22 ST1K2 Is In

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Is In	T	–	–	–	–	–	–	–

Where
A = STPR_FEES_ST1K2_IN_STATE

39.23 ST3K4 Is In

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Is In	T	–	–	–	–	–	–	–

Where
A = STPR_FEES_ST1K4_IN_STATE

39.24 STCLTS Is In

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = STPR_CLTS_585_IN_LIMIT_POSITION

39.25 Stopper MFX S4.5 Is In

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Is In	T	–	–	–	–	–	–	–

Where
A = STPR_XRT_1_S45IN_STATE

39.26 Stopper S5B Is In

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = STPR_FEH1_5_S5BIN_POSITION

39.27 Stopper SH2 Is In

Name	B	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	F	–	–	–	–	–	–	–

Where
A = STPR_XRT1_1_SH2OUT_STATE,
B = STPR_XRT1_1_SH2IN_STATE

39.28 Stopper ST1L0 Is In

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = STPR_FEE1_ST1_IN_POSITION

39.29 Stopper XRT S5 Is In

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = STPR_XRT1_1_S5IN_POSITION

39.30 Stopper XRT S6 Is In

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = STPR_XRT1_1_S6IN_POSITION

39.31 Stopper: BSY D2 Summary Is In

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = `STPR_BSYH_847_IN_LIMIT_POSITION`

39.32 SXR Beamline is in SC Mode

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
SC Mode	T	–	–	–	–	–	–	–

Where
A = `MPS_UNDS_1_FACMODE_STATE`

39.33 SXR Wire Scanner Mode Disabled

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Disabled	F	–	–	–	–	–	–	–

Where
A = `LP_SXR_WS_MODE`

39.34 SXR Wire Scanner Mode Enabled

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Enabled	T	–	–	–	–	–	–	–

Where
A = `LP_SXR_WS_MODE`

39.35 SXRSS M1/Grating Is Out

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
	T	–	–	–	–	–	–	–

Where
A = MIRR_UNDS_3520_OUT_LIMIT_POSITION

39.36 TD11 Is In

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = TD11_IN_LIMIT_STATE

39.37 TDUND Is In

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = DUMP_LTUH_970_IN_LIMIT_POSITION

39.38 TDUNDB Is In

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = DUMP_LTUS_972_IN_LIMIT_POSITION

39.39 XRT-M2 Mirror Is Out of Beam

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
IS_OUT	T	–	–	–	–	–	–	–

Where
A = HXX_HXM_MMS_01_B_POSITION

39.40 YAG01 Is In

Name	*B*	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	F	–	–	–	–	–	–	–

Where
A = YAGS_IN20_211_OUT_LMTSW_STATE,
B = YAGS_IN20_211_IN_LMTSW_STATE

39.41 YAG02 Is In

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = YAGS_IN20_241_IN_LMTSW_STATE