MPS Logic:
2022-06-24-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 **23**
1.1 Flowswitch: COLL BSYA 2060 (PC20) . . . 23
1.2 Flowswitch: COLL BSYA 2410 (COLL24H) . . . 23
1.3 Flowswitch: COLL BSYA 2410 (COLL24V) . . . 23
1.4 Flowswitch: COLL BSYA 2410 (PC24) . . . 23
1.5 Flowswitch: COLL BSYA 2600 (PC26) . . . 24
1.6 Flowswitch: COLL BSYA 2990 (PC29) . . . 24
1.7 Flowswitch: COLL BSYA 3710 (C37) . . . 24
1.8 Flowswitch: COLL BSYA 4120 (3C1A) . . . 24
1.9 PIC Raw Charge Thresholds: BSYA 2061 . . . 25
1.10 PIC Raw Charge Thresholds: BSYA 2120 . . . 25
1.11 PIC Raw Charge Thresholds: BSYA 2220 . . . 25
1.12 PIC Raw Charge Thresholds: BSYA 2321 . . . 26
1.13 PIC Raw Charge Thresholds: BSYA 2411 . . . 26
1.14 PIC Raw Charge Thresholds: BSYA 2472 . . . 26
1.15 PIC Raw Charge Thresholds: BSYA 2473 . . . 27
1.16 PIC Raw Charge Thresholds: BSYA 2474 . . . 27
1.17 PIC Raw Charge Thresholds: BSYA 2475 . . . 27
1.18 PIC Raw Charge Thresholds: BSYA 2520 . . . 28
1.19 PIC Raw Charge Thresholds: BSYA 2601 . . . 28
1.20 PIC Raw Charge Thresholds: BSYA 2861 . . . 28
1.21 PIC Raw Charge Thresholds: BSYA 2990 . . . 29
1.22 PIC Raw Charge Thresholds: BSYA 3320 . . . 29
1.23 PIC Raw Charge Thresholds: BSYA 3720 . . . 29
1.24 PIC Raw Charge Thresholds: BSYA 3721 . . . 30
1.25 PIC Raw Charge Thresholds: BSYA 3890 . . . 30
1.26 PIC Trigger Missed (LN42) . . . 30
1.27 Stopper BSYA 2275 (ST22) Position . . . 31
1.28 Stopper BSYA 2930 (ST29) Position . . . 31
1.29 Temperature RTD Summary: A-line Past SL10 . . . 31
1.30 Vac Valve BSYA 4005 (IV40) . . . 31
1.31 Vac Valve: VVFS BSYA 2855 (FV28) . . . 32
1.32 Vac Valve: VVPG BSYA 2635 (IV26) . . . 32
1.33 Vac Valve: VVPG ESA0 4195 POSITION (IV41) . . . 32

2 Ignored when A-Line Kicker Is Not Enabled, TD11 Is In, YAG01 Is In, or YAG02 Is In **33**
2.1 A-Line SL10 Position . . . 33
2.2 Flowswitch: BPM BSYA 1020 (BPM10) . . . 33
2.3 Flowswitch: BPM BSYA 1240 (BPM12) . . . 34

2.4 Flowswitch: COLL BSYA 1015 (PC10) . . . 34
2.5 Flowswitch: COLL BSYA 1230 (PC12) . . . 34
2.6 Flowswitch: COLL BSYA 1490 (PC14) . . . 34
2.7 Flowswitch: COLL BSYA 1700 (PC17) . . . 35
2.8 PIC Raw Charge Thresholds: BSYA 1016 . . . 35
2.9 PIC Raw Charge Thresholds: BSYA 1021 . . . 35
2.10 PIC Raw Charge Thresholds: BSYA 1120 . . . 36
2.11 PIC Raw Charge Thresholds: BSYA 1320 . . . 36
2.12 PIC Raw Charge Thresholds: BSYA 1520 . . . 36
2.13 PIC Raw Charge Thresholds: BSYA 1701A . . . 37
2.14 PIC Raw Charge Thresholds: BSYA 1701B . . . 37
2.15 PIC Raw Charge Thresholds: BSYA 1980 . . . 37
2.16 Temperature RTD Summary: A-Line Before SL10 . . . 38
2.17 Vac Valve: VVFS BSYA 1030 (FV10) . . . 38
2.18 Vac Valve: VVPG BSYA 1018 (IV10) . . . 38
2.19 VVPG BSYA 340 Position . . . 38

3 Ignored when BKRCUS Is On, STCLTS Is In, TD11 Is In, YAG01 Is In, or YAG02 Is In 39
3.1 BRCUS1 and BRCUSDC Consistent . . . 39

4 Ignored when BKRCUS Is On, TD11 Is In, YAG01 Is In, or YAG02 Is In 40
4.1 BRCUSDC Current . . . 40

5 Ignored when BRCUSDC Is On, STCLTS Is In, TD11 Is In, YAG01 Is In, or YAG02 Is In 41
5.1 BRCUS1 and BKRCUS Consistent . . . 41

6 Ignored when BRCUSDC Is On, TD11 Is In, YAG01 Is In, or YAG02 Is In 42
6.1 BKRCUS Current . . . 42

7 Ignored when BX01/BX02 Is Off, YAG01 Is In, or YAG02 Is In 43
7.1 Toroid Comparator Dogleg 1 (IM02 vs IM03) . . . 43

8 Ignored when BX01/BX02 Is On, YAG01 Is In, or YAG02 Is In 44
8.1 BXS Status . . . 44
8.2 Toroid Comparator Inj Spectrometer (IM02 vs IMS1) . . . 44

9 Ignored when BXG Is Off or YAG01 Is In 45
9.1 Wakefield Shield Gun Spectrometer . . . 45

10 Ignored when BXG Is On or YAG01 Is In 46
10.1 Wakefield Shield Straight Ahead . . . 46

11 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, Diag Stopper XCS SB1 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 47
11.1 XCS SB1 VGC 02 Gate Valve Position . . . 47

11.2 XCS SB2 VGC 01 Gate Valve Position 47

12 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, 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 48
12.1 CXI Configuration 1 Summary 48
12.2 CXI Configuration 2 Summary 49
12.3 CXI Configuration 3 Summary 50
12.4 CXI Configuration 4 Summary 52
12.5 CXI Configuration 5 Summary 53
12.6 CXI Configuration 6 Summary 54
12.7 CXI Configuration 7 Summary 55
12.8 CXI KB2 VGC 02 Gate Valve Position 56
12.9 CXI MPS PLC Readiness Status 56
12.10 CXI User Patch Panel 1 Ready 57
12.11 CXI User Patch Panel 2 Ready 57
12.12 CXI:DG1:VGC:01 Gate Valve Open Position 57
12.13 CXI:DG1:VGC:02 Gate Valve Open Position 57
12.14 CXI:DG2:VGC:01 Gate Valve Position 58
12.15 CXI:DG2:VGC:02 Gate Valve Position 58
12.16 CXI:DSC:VGC:01 Gate Valve Position 58
12.17 CXI:KB1:VGC:01 Gate Valve Open Position 59
12.18 CXI:KB1:VGC:02 Gate Valve Open Position 59
12.19 CXI:KB2:VGC:01 Gate Valve Open Position 59
12.20 CXI:SC1:VGC:01 Gate Valve Position 59
12.21 CXI:SC3:VGC:01 Be Gate Valve Position - Status from PLC 60
12.22 HF4 LAM VGC 01 Gate Valve Position 60

13 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 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 61
13.1 CXI XRT Laser Reference Mirror Position 61
13.2 HFA:SND:VGC:01 Gate Valve Open Position 61
13.3 HFX:DIA:VGC:02 Gate Valve Open Position 61
13.4 PPS Stopper S5B Position 62
13.5 XCS SB1 Diagnostic Stopper Position 62
13.6 XCS SB1 VGC 01 Gate Valve Position 62
13.7 XRT HXRAY DIA Isolation Valve HXX-DIA-VGC-01 63

14 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 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 64
14.1 HFX:DG2:VGC:01 Gate Valve Position 64
14.2 HFX:MON:VGC:01 Gate Valve Position 64
14.3 HFX:MON:VGC:02 Gate Valve Position 64

14.4 Stopper XRT S5 Position 65

15 Ignored when Diag Stopper HFX UM6 Is In, 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 66
15.1 MFX MPS Summary - Downstream of Stopper 4.5 66

16 Ignored when Diag Stopper HFX UM6 Is In, 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 67
16.1 MEC DV4 VCG 01 Gate Valve Position 67
16.2 MEC DV5 VGC 01 Gate Valve Position 67
16.3 MEC HXM VGC 01 Gate Valve Position 67
16.4 MEC XT1 Reference Laser Position 68
16.5 MEC XT1 VGC 01 Gate Valve Position 68
16.6 MEC XT2 VGC 02 Gate Valve Position 68
16.7 MEC XT2 VGC 03 Gate Valve Position 68
16.8 MEC XT2 VGC 04 Gate Valve Position 69
16.9 MEC XT2 VGC 05 Gate Valve Position 69
16.10 MEC XT2 VGC 06 Gate Valve Position 69

17 Ignored when Diag Stopper HFX UM6 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 70
17.1 DG2 Diagnostic Stopper Position 70
17.2 MEC BXL VGC 01 Gate Valve Position 70
17.3 MEC XRT Attenuator Inspection Mirror Position 70
17.4 MFX Gate Valve Summary - Upstream of Stopper 4.5 71
17.5 Stopper MFX S4.5 Position 71
17.6 Stopper XRT S6 Position 71
17.7 XRT HXRAY LOM Isolation Valve HXX-LOM-VGC-01 72
17.8 XRT HXRAY MXT Gate Valve HXX:MXT:VGC:01 72
17.9 XRT HXRAY MXT Gate Valve HXX:MXT:VGC:02 72
17.10 XRT HXRAY MXT Gate Valve HXX:MXT:VGC:03 73
17.11 XRT HXRAY MXT Gate Valve HXX:MXT:VGC:05 73
17.12 XRT-M2 Mirror and DG2 STP Fault 73

18 Ignored when Laser Heater Attenuator Is In 74
18.1 Laser Heater Photodiode Shutter Position 74
18.2 OTRH1 Position When LH Atten Not In 74
18.3 OTRH2 Position When LH Atten Not In 74

19 Ignored when MR1K1 Is In, ST3K4 Is In, STCLTS Is In, TD11 Is In, TDUNDB Is In, YAG01 Is In, or YAG02 Is In 75
19.1 FEE Summary Fault - TMO Fast Shutter Fault 2 75
19.2 FEE Summary Fault - TMO Motion Control Fast Fault 1 75

19.3 FEE Summary Fault - TMO Motion Control Fast Fault 2 . . . 75
19.4 FEE Summary Fault - TMO Vacuum Fast Fault 2 . . . 76

20 Ignored when MR1K1 Is In, STCLTS Is In, TD11 Is In, TDUNDB Is In, YAG01 Is In, or YAG02 Is In 77
20.1 FEE Summary Fault - TMO Fast Shutter Fault 1 . . . 77
20.2 FEE Summary Fault - TMO Vacuum Fast Fault 1 . . . 77
20.3 SXR TMO Optics Fast Fault 1 . . . 77

21 Ignored when MR1K1 Is Out, STCLTS Is In, TD11 Is In, TDUNDB Is In, YAG01 Is In, or YAG02 Is In 78
21.1 SXR RIX Motion Fast Fault 1 . . . 78
21.2 SXR RIX Vacuum Fast Fault 1 . . . 78

22 Ignored when STCLTS Is In, SXRSS M1/Grating Is Out, TD11 Is In, TDUNDB Is In, YAG01 Is In, or YAG02 Is In 79
22.1 SXRSS Guardian OK . . . 79
22.2 SXRSS Guardian ON . . . 79

23 Ignored when STCLTS Is In, TD11 Is In, TDUNDB Is In, YAG01 Is In, or YAG02 Is In 80
23.1 BLMS26 Threshold 500 ms Fault . . . 80
23.2 BLMS26 Threshold Single Shot Fault . . . 80
23.3 BLMS27 Threshold 500 ms Fault . . . 80
23.4 BLMS27 Threshold Single Shot Fault . . . 80
23.5 BLMS28 Threshold 500 ms Fault . . . 81
23.6 BLMS28 Threshold Single Shot Fault . . . 81
23.7 BLMS29 Threshold 500 ms Fault . . . 81
23.8 BLMS29 Threshold Single Shot Fault . . . 81
23.9 BLMS30 Threshold 500 ms Fault . . . 82
23.10 BLMS30 Threshold Single Shot Fault . . . 82
23.11 BLMS31 Threshold 500 ms Fault . . . 82
23.12 BLMS31 Threshold Single Shot Fault . . . 82
23.13 BLMS32 Threshold 500 ms Fault . . . 83
23.14 BLMS32 Threshold Single Shot Fault . . . 83
23.15 BLMS33 Threshold 500 ms Fault . . . 83
23.16 BLMS33 Threshold Single Shot Fault . . . 83
23.17 BLMS34 Threshold 500 ms Fault . . . 84
23.18 BLMS34 Threshold Single Shot Fault . . . 84
23.19 BLMS35 Threshold 500 ms Fault . . . 84
23.20 BLMS35 Threshold Single Shot Fault . . . 84
23.21 BLMS36 Threshold 500 ms Fault . . . 85
23.22 BLMS36 Threshold Single Shot Fault . . . 85
23.23 BLMS37 Threshold 500 ms Fault . . . 85
23.24 BLMS37 Threshold Single Shot Fault . . . 85
23.25 BLMS38 Threshold 500 ms Fault . . . 86

23.26 BLMS38 Threshold Single Shot Fault . . . 86
23.27 BLMS39 Threshold 500 ms Fault . . . 86
23.28 BLMS39 Threshold Single Shot Fault . . . 86
23.29 BLMS40 Threshold 500 ms Fault . . . 87
23.30 BLMS40 Threshold Single Shot Fault . . . 87
23.31 BLMS41 Threshold 500 ms Fault . . . 87
23.32 BLMS41 Threshold Single Shot Fault . . . 87
23.33 BLMS42 Threshold 500 ms Fault . . . 88
23.34 BLMS42 Threshold Single Shot Fault . . . 88
23.35 BLMS43 Threshold 500 ms Fault . . . 88
23.36 BLMS43 Threshold Single Shot Fault . . . 88
23.37 BLMS44 Threshold 500 ms Fault . . . 89
23.38 BLMS44 Threshold Single Shot Fault . . . 89
23.39 BLMS45 Threshold 500 ms Fault . . . 89
23.40 BLMS45 Threshold Single Shot Fault . . . 89
23.41 BLMS46 Threshold 500 ms Fault . . . 90
23.42 BLMS46 Threshold Single Shot Fault . . . 90
23.43 BLMS47 Threshold 500 ms Fault . . . 90
23.44 BLMS47 Threshold Single Shot Fault . . . 90
23.45 BLMS48 Threshold 500 ms Fault . . . 91
23.46 BLMS48 Threshold Single Shot Fault . . . 91
23.47 BYDSS Magnet Power Status . . . 91
23.48 FEE Summary Fault - SXR Fast Fault 1 . . . 91
23.49 FEE Summary Fault - SXR Fast Fault 2 . . . 92
23.50 FEE Summary Fault - SXR Gas Attenuator Fast Fault . . . 92
23.51 FEE Summary Fault - SXR Motion Fast Fault 1 . . . 92
23.52 FEE Summary Fault - SXR Motion Fast Fault 2 . . . 92
23.53 FEE Summary Fault - SXR Vacuum Fast Fault 1 . . . 93
23.54 FEE Summary Fault - SXR Vacuum Fast Fault 2 . . . 93
23.55 PEPPEX Zone Plate Position . . . 93
23.56 PMPS SXR Rate Limit . . . 94
23.57 RFBSX16 Orbit Fault . . . 94
23.58 RFBSX19 Orbit Fault . . . 94
23.59 RFBSX21 Orbit Fault . . . 95
23.60 RFBSX24 Orbit Fault . . . 95
23.61 RFBSX25 Orbit Fault . . . 95
23.62 RFBSX26 Orbit Fault . . . 96
23.63 RFBSX27 Orbit Fault . . . 96
23.64 RFBSX28 Orbit Fault . . . 96
23.65 RFBSX29 Orbit Fault . . . 97
23.66 RFBSX30 Orbit Fault . . . 97
23.67 RFBSX31 Orbit Fault . . . 97
23.68 RFBSX32 Orbit Fault . . . 98
23.69 RFBSX33 Orbit Fault . . . 98
23.70 RFBSX34 Orbit Fault . . . 98

23.71 RFBSX35 Orbit Fault . . . 99
23.72 RFBSX36 Orbit Fault . . . 99
23.73 RFBSX37 Orbit Fault . . . 99
23.74 RFBSX38 Orbit Fault . . . 100
23.75 RFBSX39 Orbit Fault . . . 100
23.76 RFBSX40 Orbit Fault . . . 100
23.77 RFBSX41 Orbit Fault . . . 101
23.78 RFBSX42 Orbit Fault . . . 101
23.79 RFBSX43 Orbit Fault . . . 101
23.80 RFBSX44 Orbit Fault . . . 102
23.81 RFBSX45 Orbit Fault . . . 102
23.82 RFBSX46 Orbit Fault . . . 102
23.83 RFBSX47 Orbit Fault . . . 103
23.84 SIOC UNDS MP01 HEARTBEAT . . . 103
23.85 SIOC UNDS MP02 HEARTBEAT . . . 103
23.86 SIOC UNDS MP03 HEARTBEAT . . . 103
23.87 SIOC UNDS MP04 HEARTBEAT . . . 104
23.88 SIOC UNDS MP05 HEARTBEAT . . . 104
23.89 SIOC UNDS MP06 HEARTBEAT . . . 104
23.90 SIOC UNDS MP07 HEARTBEAT . . . 104
23.91 SXR CBLM Alive and Updating . . . 105
23.92 SXR CBLM PMT High Voltage . . . 105
23.93 SXR CRIX Motion Fast Fault 1 . . . 105
23.94 SXR CRIX Vacuum Fast Fault 1 . . . 105
23.95 SXR RIX Optics Fast Fault 1 . . . 106
23.96 SXRSS BOD10 Position (YAGS:UNDS:3575) . . . 106
23.97 SXRSS BOD12 Position(YAGS:UNDS:3795) . . . 106
23.98 SXRSS Mode . . . 106
23.99 SXRSS MSXS1 Position (MIRR:UNDS:3520) . . . 109
23.100 SXRSS MSXS2 Position (MIRR:UNDS:3560) . . . 110
23.101 SXRSS MSXS3 Position (MIRR:UNDS:3565) . . . 110
23.102 SXRSS SLSXS1 Position (SLIT:UNDS:3555) . . . 110
23.103 SXRSS Watchdog . . . 111
23.104 VVFS DMPS 157 POSITION . . . 111
23.105 VVMG DMPS 643 POSITION . . . 111
23.106 VVMG DMPS 681 POSITION . . . 111
23.107 VVMG UNDS 3511 POSITION . . . 112
23.108 VVMG UNDS 3568 POSITION . . . 112
23.109 VVMG UNDS 4998 Position . . . 112
23.110 VVPG DMPS 355 POSITION . . . 112
23.111 VVPG DMPS 396 POSITION . . . 113
23.112 VVPG UNDS 1651 POSITION . . . 113
23.113 VVPG UNDS 2177 POSITION . . . 113
23.114 VVPG UNDS 2877 POSITION . . . 113
23.115 VVPG UNDS 3477 POSITION . . . 114

23.116 VVPG UNDS 3577 POSITION . . . 114
23.117 VVPG UNDS 3877 POSITION . . . 114
23.118 VVPG UNDS 4477 POSITION . . . 114
23.119 VVPG UNDS 5198 POSITION . . . 115

24 Ignored when STCLTS Is In, TD11 Is In, YAG01 Is In, or YAG02 Is In 116
24.1 BRCUS1 Current . . . 116
24.2 BY1B Current . . . 116
24.3 BY1B Magnet Power Status . . . 116
24.4 BYDB Current . . . 117
24.5 BYDB Magnet Power Status . . . 117
24.6 BYKIKS Current . . . 117
24.7 BYKIKS Magnet Power Status . . . 117
24.8 BYKIKS Timing Delay Fault . . . 118
24.9 BYKIKS Timing Reference Fault . . . 118
24.10 CEDL13 Temperature . . . 118
24.11 CEDL17 Temperature . . . 118
24.12 CXBP34 Temperature . . . 119
24.13 CYBDL Temperature . . . 119
24.14 CYDL16 Temperature . . . 119
24.15 Merge Magnet Ok . . . 119
24.16 SIOC LTUS MP01 HEARTBEAT . . . 120
24.17 SIOC LTUS MP02 HEARTBEAT . . . 120
24.18 SIOC LTUS MP03 HEARTBEAT . . . 120
24.19 SIOC LTUS MP04 HEARTBEAT . . . 120
24.20 SIOC LTUS MP05 HEARTBEAT . . . 121
24.21 SIOC LTUS MP06 HEARTBEAT . . . 121
24.22 ST34AB Position . . . 121
24.23 TDUNDB Position (10 Hz) . . . 122
24.24 TDUNDB Power when TDUNDB Is IN . . . 122
24.25 VVFS LTUS 109 POSITION . . . 122
24.26 VVMG LTUS 185 POSITION . . . 122
24.27 VVMG LTUS 348 POSITION . . . 123
24.28 VVMG LTUS 451 POSITION . . . 123
24.29 VVMG LTUS 505 POSITION . . . 123
24.30 VVMG LTUS 552 POSITION . . . 123
24.31 VVMG LTUS 656 POSITION . . . 124
24.32 VVMG LTUS 744 POSITION . . . 124
24.33 VVMG LTUS 802 POSITION . . . 124
24.34 VVMG LTUS 827 POSITION . . . 124
24.35 VVPG BSYS 904 POSITION . . . 125
24.36 VVPG CLTS 685 POSITION . . . 125
24.37 VVPG LTUS 108 POSITION . . . 125
24.38 VVPG LTUS 272 POSITION . . . 125
24.39 VVPG LTUS 442 POSITION . . . 126

24.40 VVPG LTUS 586 POSITION . . . 126
24.41 VVPG LTUS 726 POSITION . . . 126
24.42 VVPG LTUS 757 POSITION . . . 126
24.43 XLEAP: UMXL1H Downstream Position . . . 127
24.44 XLEAP: UMXL1H Upstream Position . . . 127
24.45 XLEAP: UMXL2H Downstream Position . . . 127
24.46 XLEAP: UMXL2H Upstream Position . . . 128
24.47 XLEAP: UMXL3H Downstream Position . . . 128
24.48 XLEAP: UMXL3H Upstream Position . . . 128
24.49 XLEAP: UMXL4H Downstream Position . . . 129
24.50 XLEAP: UMXL4H Upstream Position . . . 129

25 Ignored when 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 130
25.1 UM6 Diagnostic Stopper Position . . . 130
25.2 XRT HXRAY UM6 Isolation Valve HXX-UM6-VGC-01 . . . 130
25.3 XRT UM6 Camera Position HXX-UM6-CVP-01 . . . 131

26 Ignored when Stopper SH2 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 132
26.1 XRT HOMS Fast Fault 1 . . . 132

27 Ignored when Stopper ST1L0 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, XPP-NH3-POS-00 Beamline Is In, YAG01 Is In, or YAG02 Is In 133
27.1 NEH3 HXRAY DVD Isolation Valve HX3-DVD-VGC-01 . . . 133

28 Ignored when Stopper ST1L0 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, XPP-NH3-POS-00 Beamline Is Not In, YAG01 Is In, or YAG02 Is In 134
28.1 XPP SB2 VGC 02 Gate Valve Position . . . 134
28.2 XPP SB2 VGC 03 Gate Valve Position . . . 134
28.3 XPP SB2 VGC 04 Gate Valve Position . . . 134

29 Ignored when Stopper ST1L0 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 135
29.1 NEH3 HXRAY UVD Isolation Valve HX3-UVD-VGC-01 . . . 135
29.2 SH2 PPS Stopper Position . . . 135

30 Ignored when Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 136
30.1 BLMH13 Threshold 500 ms Fault . . . 136
30.2 BLMH13 Threshold Single Shot Fault . . . 136
30.3 BLMH14 Threshold 500 ms Fault . . . 136
30.4 BLMH14 Threshold Single Shot Fault . . . 136
30.5 BLMH15 Threshold 500 ms Fault . . . 137
30.6 BLMH15 Threshold Single Shot Fault . . . 137
30.7 BLMH16 Threshold 500 ms Fault . . . 137

30.8 BLMH16 Threshold Single Shot Fault . . . 137
30.9 BLMH17 Threshold 500 ms Fault . . . 138
30.10 BLMH17 Threshold Single Shot Fault . . . 138
30.11 BLMH18 Threshold 500 ms Fault . . . 138
30.12 BLMH18 Threshold Single Shot Fault . . . 138
30.13 BLMH19 Threshold 500 ms Fault . . . 139
30.14 BLMH19 Threshold Single Shot Fault . . . 139
30.15 BLMH20 Threshold 500 ms Fault . . . 139
30.16 BLMH20 Threshold Single Shot Fault . . . 139
30.17 BLMH21 Threshold 500 ms Fault . . . 140
30.18 BLMH21 Threshold Single Shot Fault . . . 140
30.19 BLMH22 Threshold 500 ms Fault . . . 140
30.20 BLMH22 Threshold Single Shot Fault . . . 140
30.21 BLMH23 Threshold 500 ms Fault . . . 141
30.22 BLMH23 Threshold Single Shot Fault . . . 141
30.23 BLMH24 Threshold 500 ms Fault . . . 141
30.24 BLMH24 Threshold Single Shot Fault . . . 141
30.25 BLMH25 Threshold 500 ms Fault . . . 142
30.26 BLMH25 Threshold Single Shot Fault . . . 142
30.27 BLMH26 Threshold 500 ms Fault . . . 142
30.28 BLMH26 Threshold Single Shot Fault . . . 142
30.29 BLMH27 Threshold 500 ms Fault . . . 143
30.30 BLMH27 Threshold Single Shot Fault . . . 143
30.31 BLMH28 Threshold 500 ms Fault . . . 143
30.32 BLMH28 Threshold Single Shot Fault . . . 143
30.33 BLMH29 Threshold 500 ms Fault . . . 144
30.34 BLMH29 Threshold Single Shot Fault . . . 144
30.35 BLMH30 Threshold 500 ms Fault . . . 144
30.36 BLMH30 Threshold Single Shot Fault . . . 144
30.37 BLMH31 Threshold 500 ms Fault . . . 145
30.38 BLMH31 Threshold Single Shot Fault . . . 145
30.39 BLMH32 Threshold 500 ms Fault . . . 145
30.40 BLMH32 Threshold Single Shot Fault . . . 145
30.41 BLMH33 Threshold 500 ms Fault . . . 146
30.42 BLMH33 Threshold Single Shot Fault . . . 146
30.43 BLMH34 Threshold 500 ms Fault . . . 146
30.44 BLMH34 Threshold Single Shot Fault . . . 146
30.45 BLMH35 Threshold 500 ms Fault . . . 147
30.46 BLMH35 Threshold Single Shot Fault . . . 147
30.47 BLMH36 Threshold 500 ms Fault . . . 147
30.48 BLMH36 Threshold Single Shot Fault . . . 147
30.49 BLMH37 Threshold 500 ms Fault . . . 148
30.50 BLMH37 Threshold Single Shot Fault . . . 148
30.51 BLMH38 Threshold 500 ms Fault . . . 148
30.52 BLMH38 Threshold Single Shot Fault . . . 148

30.53 BLMH39 Threshold 500 ms Fault . . . 149
30.54 BLMH39 Threshold Single Shot Fault . . . 149
30.55 BLMH40 Threshold 500 ms Fault . . . 149
30.56 BLMH40 Threshold Single Shot Fault . . . 149
30.57 BLMH41 Threshold 500 ms Fault . . . 150
30.58 BLMH41 Threshold Single Shot Fault . . . 150
30.59 BLMH42 Threshold 500 ms Fault . . . 150
30.60 BLMH42 Threshold Single Shot Fault . . . 150
30.61 BLMH43 Threshold 500 ms Fault . . . 151
30.62 BLMH43 Threshold Single Shot Fault . . . 151
30.63 BLMH44 Threshold 500 ms Fault . . . 151
30.64 BLMH44 Threshold Single Shot Fault . . . 151
30.65 BLMH45 Threshold 500 ms Fault . . . 152
30.66 BLMH45 Threshold Single Shot Fault . . . 152
30.67 BLMH46 Threshold 500 ms Fault . . . 152
30.68 BLMH46 Threshold Single Shot Fault . . . 152
30.69 BLMH47 Threshold 500 ms Fault . . . 153
30.70 BLMH47 Threshold Single Shot Fault . . . 153
30.71 BYDSH Current . . . 153
30.72 BYDSH Magnet Power Status . . . 153
30.73 FEE Summary Fault - HXR Fast Fault 1 . . . 154
30.74 FEE Summary Fault - HXR Fast Fault 2 . . . 154
30.75 FEE Summary Fault - HXR Gas System Fast Fault 1 . . . 154
30.76 FEE Summary Fault - HXR Gas System Fast Fault 2 . . . 154
30.77 FEE Summary Fault - HXR Motion Fast Fault 1 . . . 155
30.78 FEE Summary Fault - HXR Motion Fast Fault 2 . . . 155
30.79 FEE Summary Fault - HXR Optics Fast Fault 1 . . . 155
30.80 FEE Summary Fault - HXR Optics Fast Fault 2 . . . 155
30.81 FEE Summary Fault - HXR Vacuum Fast Fault 1 . . . 156
30.82 FEE Summary Fault - HXR Vacuum Fast Fault 2 . . . 156
30.83 FEE Vacuum - LFE Fast Shutter Fault . . . 156
30.84 HXR CBLM Alive and Updating . . . 156
30.85 HXR CBLM PMT High Voltage . . . 157
30.86 HXRSS Chicane Bend Power Supply . . . 157
30.87 HXRSS Crystal Position . . . 157
30.88 HXRSS Crystal Valid Position . . . 158
30.89 HXRSS Mode . . . 158
30.90 Magnet In Tolerance: QE31 . . . 159
30.91 Magnet In Tolerance: QUM1 . . . 159
30.92 Magnet In Tolerance: QUM2 . . . 160
30.93 Magnet In Tolerance: QUM3 . . . 160
30.94 Magnet In Tolerance: QUM4 . . . 160
30.95 Magnet Power: QE31 . . . 160
30.96 Magnet Power: QUM1 . . . 161
30.97 Magnet Power: QUM2 . . . 161

30.98 Magnet Power: QUM3 . . . 161
30.99 Magnet Power: QUM4 . . . 161
30.100 OTR01 IN20 541 Position and TDUND Not In . . . 162
30.101 OTR02 IN20 571 Position and TDUND Not In . . . 162
30.102 OTR03 IN20 621 Position and TDUND Not In . . . 162
30.103 OTR04 IN20 711 Position and TDUND Not In . . . 163
30.104 OTR11 LI21 237 Position and TDUND Not In . . . 163
30.105 OTR12 LI21 291 Position and TDUND Not In . . . 163
30.106 OTR21 Position When TDUND Not In . . . 164
30.107 OTR33 Position and TDUND Not In . . . 164
30.108 OTRH1 Position When TDUND Not In . . . 164
30.109 OTRH2 Position When TDUND Not In . . . 165
30.110 PMPS HXR Rate Limit . . . 165
30.111 RFBHX12 Orbit Fault . . . 165
30.112 RFBHX13 Orbit Fault . . . 166
30.113 RFBHX14 Orbit Fault . . . 166
30.114 RFBHX15 Orbit Fault . . . 166
30.115 RFBHX16 Orbit Fault . . . 167
30.116 RFBHX17 Orbit Fault . . . 167
30.117 RFBHX18 Orbit Fault . . . 167
30.118 RFBHX19 Orbit Fault . . . 168
30.119 RFBHX20 Orbit Fault . . . 168
30.120 RFBHX21 Orbit Fault . . . 168
30.121 RFBHX22 Orbit Fault . . . 169
30.122 RFBHX23 Orbit Fault . . . 169
30.123 RFBHX24 Orbit Fault . . . 169
30.124 RFBHX25 Orbit Fault . . . 170
30.125 RFBHX26 Orbit Fault . . . 170
30.126 RFBHX27 Orbit Fault . . . 170
30.127 RFBHX28 Orbit Fault . . . 171
30.128 RFBHX29 Orbit Fault . . . 171
30.129 RFBHX30 Orbit Fault . . . 171
30.130 RFBHX31 Orbit Fault . . . 172
30.131 RFBHX32 Orbit Fault . . . 172
30.132 RFBHX33 Orbit Fault . . . 172
30.133 RFBHX34 Orbit Fault . . . 173
30.134 RFBHX35 Orbit Fault . . . 173
30.135 RFBHX36 Orbit Fault . . . 173
30.136 RFBHX37 Orbit Fault . . . 174
30.137 RFBHX38 Orbit Fault . . . 174
30.138 RFBHX39 Orbit Fault . . . 174
30.139 RFBHX40 Orbit Fault . . . 175
30.140 RFBHX41 Orbit Fault . . . 175
30.141 RFBHX42 Orbit Fault . . . 175
30.142 RFBHX43 Orbit Fault . . . 176

30.143 RFBHX44 Orbit Fault . . . 176
30.144 RFBHX45 Orbit Fault . . . 176
30.145 RFBHX46 Orbit Fault . . . 177
30.146 RFBHX47 Orbit Fault . . . 177
30.147 SIOC UNDH MP04 HEARTBEAT . . . 177
30.148 SIOC UNDH MP05 HEARTBEAT . . . 177
30.149 SIOC UNDH MP06 HEARTBEAT . . . 178
30.150 SIOC UNDH MP07 HEARTBEAT . . . 178
30.151 SIOC UNDH MP08 HEARTBEAT . . . 178
30.152 SIOC UNDH MP09 HEARTBEAT . . . 178
30.153 SIOC UNDH MP11 HEARTBEAT . . . 179
30.154 ST1L0 PPS Stopper Position . . . 179
30.155 VVFS DMPH 157 POSITION . . . 179
30.156 VVMG DMPH 643 POSITION . . . 179
30.157 VVMG DMPH 681 POSITION . . . 180
30.158 VVMG UNDH 1498 POSITION . . . 180
30.159 VVMG UNDH 1798 POSITION . . . 180
30.160 VVMG UNDH 2498 POSITION . . . 180
30.161 VVMG UNDH 2838 POSITION . . . 181
30.162 VVMG UNDH 2844 POSITION . . . 181
30.163 VVMG UNDH 3298 POSITION . . . 181
30.164 VVMG UNDH 3598 POSITION . . . 181
30.165 VVMG UNDH 4098 POSITION . . . 182
30.166 VVMG UNDH 4398 POSITION . . . 182
30.167 VVPG DMPH 355 POSITION . . . 182
30.168 VVPG DMPH 396 POSITION . . . 182
30.169 VVPG UNDH 1288 POSITION . . . 183
30.170 VVPG UNDH 2098 POSITION . . . 183
30.171 VVPG UNDH 2298 POSITION . . . 183
30.172 VVPG UNDH 2798 POSITION . . . 183
30.173 VVPG UNDH 2998 POSITION . . . 184
30.174 VVPG UNDH 3798 POSITION . . . 184
30.175 VVPG UNDH 4598 POSITION . . . 184
30.176 VVPG UNDH 5196 POSITION . . . 184
30.177 YAGPSI Position and TDUND Not In . . . 185

31 Ignored when Stopper: BSY D2 Summary Is In, TD11 Is In, YAG01 Is In, or YAG02 Is In 186
31.1 BCS LION LTU1 404 Threshold . . . 186
31.2 BCS LION LTU1 405 Threshold . . . 186
31.3 BCS LION LTU1 504 Threshold . . . 186
31.4 BCS LION LTU1 505 Threshold . . . 186
31.5 BCS LION LTU1 584 Threshold . . . 187
31.6 BCS LION LTU1 585 Threshold . . . 187
31.7 BCS LION LTU1 716 Threshold . . . 187
31.8 BCS LION LTU1 717 Threshold . . . 187

31.9 BCS LION LTU1 732 Threshold . . . 188
31.10 BCS LION LTU1 733 Threshold . . . 188
31.11 BCS LION LTU1 752 Threshold . . . 188
31.12 BCS LION LTU1 753 Threshold . . . 188
31.13 BCS LION LTU1 765 Threshold . . . 189
31.14 BCS LION LTU1 766 Threshold . . . 189
31.15 BLM Heartbeat: Dechirper LTUH BLF545 . . . 189
31.16 BLM Pedestal Thresholds: Dechirper LTUH BLF545 . . . 189
31.17 BLM Raw Charge Thresholds: Dechirper LTUH BLF545 . . . 190
31.18 BYD Current . . . 190
31.19 BYD Magnet Power Status . . . 190
31.20 BYD Watchdog . . . 191
31.21 BYKIK Current . . . 191
31.22 BYKIK Magnet Power Status . . . 191
31.23 BYKIK Timing Delay Fault . . . 191
31.24 BYKIK Timing Reference Fault . . . 192
31.25 CEDL1 Temperature . . . 192
31.26 CEDL3 Temperature . . . 192
31.27 CXQ6 Temperature . . . 192
31.28 CXQT22 Temperature . . . 193
31.29 CYBX32 Temperature . . . 193
31.30 CYBX36 Temperature . . . 193
31.31 Dechirper Mirror Position . . . 193
31.32 LTU Dechirper - Horizontal Gap Too Small . . . 194
31.33 LTU Dechirper - Vertical Gap Too Small . . . 194
31.34 OTR33 Position . . . 194
31.35 PIC HVPS B911 - Location B911-2135 . . . 195
31.36 PIC HVPS B912 - Location B912-2135 . . . 195
31.37 PIC Raw Charge Thresholds: LTUH 220 . . . 195
31.38 PIC Raw Charge Thresholds: LTUH 253 . . . 195
31.39 PIC Raw Charge Thresholds: LTUH 280 . . . 196
31.40 PIC Raw Charge Thresholds: LTUH 420 . . . 196
31.41 PIC Raw Charge Thresholds: LTUH 452 . . . 196
31.42 PIC Raw Charge Thresholds: LTUH 480 . . . 197
31.43 PIC Raw Charge Thresholds: LTUH 722 . . . 197
31.44 PIC Trigger Missed (LN28) . . . 197
31.45 PIC Trigger Missed (LN29) . . . 197
31.46 SIOC LTUH MP03 HEARTBEAT . . . 198
31.47 SIOC LTUH MP05 HEARTBEAT . . . 198
31.48 SIOC LTUH MP06 HEARTBEAT . . . 198
31.49 SIOC UNDH MP02 HEARTBEAT . . . 198
31.50 SIOC UNDH MP03 HEARTBEAT . . . 199
31.51 TDUND Flow Switch Fault with TDUND Not Out . . . 199
31.52 TDUND Position . . . 199
31.53 Undulator Beam Energy Lower Limit . . . 199

31.54 VVFS LTUH 102 POSITION . . . 200
31.55 VVMG LTUH 174 POSITION . . . 200
31.56 VVMG LTUH 355 POSITION . . . 200
31.57 VVMG LTUH 505 POSITION . . . 200
31.58 VVMG LTUH 670 POSITION . . . 201
31.59 VVMG LTUH 742 POSITION . . . 201
31.60 VVMG LTUH 774 POSITION . . . 201
31.61 VVPG LTUH 100 POSITION . . . 201
31.62 VVPG LTUH 265 POSITION . . . 202
31.63 VVPG LTUH 435 POSITION . . . 202
31.64 VVPG LTUH 580 POSITION . . . 202
31.65 VVPG LTUH 725 POSITION . . . 202
31.66 VVPG LTUH 757 POSITION . . . 203
31.67 YAGPSI Position . . . 203

32 Ignored when TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 204
32.1 Magnet In Tolerance: BYD1 . . . 204
32.2 Magnet Power: BYD1 . . . 204

33 Ignored when TD11 Is In, YAG01 Is In, or YAG02 Is In 205
33.1 Attempt to deliver Beam Code 1 when SXR DC extraction magnet is ON . . . 205
33.2 BCS PIC RAW Charge Threshold DMP 997 . . . 205
33.3 BCS PIC RAW Charge Threshold DMP 998 . . . 205
33.4 BKRCUS Timing Delay Fault . . . 205
33.5 BKRCUS Timing Reference Fault . . . 206
33.6 BLM/PIC Watchdog BSY0/BSYA . . . 206
33.7 BLM/PIC Watchdog LI24 . . . 206
33.8 BLM/PIC Watchdog LI30 . . . 206
33.9 BLRCUS Current . . . 207
33.10 Bunch Length Monitor BL21 Position . . . 207
33.11 D2 Summary Position . . . 207
33.12 Dump LI28 5879 Flowswitch . . . 207
33.13 Dump LI28 5879 Klixon . . . 208
33.14 Flowswitch: CE21 . . . 208
33.15 Flowswitch: COLL LI28-9 . . . 208
33.16 Flowswitch: COLL LI29-1 . . . 208
33.17 Flowswitch: COLL LI29-4 . . . 209
33.18 Flowswitch: COLL LI29-5 . . . 209
33.19 Flowswitch: COLL LI29-9 . . . 209
33.20 Flowswitch: COLL LI30-1 . . . 209
33.21 Flowswitch: COLL LI30-4 . . . 210
33.22 Flowswitch: COLL LI30-5 . . . 210
33.23 HXR Magnet Mode . . . 210
33.24 Inconsistent Magnet Mode . . . 210
33.25 Main Manifold Gauge: LI22 Station 5 . . . 211

33.26 Main Manifold Gauge: LI23 Station 5 . . . 211
33.27 Main Manifold Gauge: LI24 Station 5 . . . 211
33.28 Main Manifold Gauge: LI25 Station 5 . . . 211
33.29 Main Manifold Gauge: LI26 Station 5 . . . 212
33.30 Main Manifold Gauge: LI27 Station 5 . . . 212
33.31 Main Manifold Gauge: LI28 Station 5 . . . 212
33.32 Main Manifold Gauge: LI29 Station 5 . . . 212
33.33 Main Manifold Gauge: LI30 Station 5 . . . 213
33.34 OTR LI25 920 Position . . . 213
33.35 OTR21 Position . . . 213
33.36 PIC Gas Pressure LI24 . . . 213
33.37 PIC HVPS BSY 1 - Location B005-3921 . . . 214
33.38 PIC HVPS BSY 2 - Location B005-3921 . . . 214
33.39 PIC HVPS BSY 3 - Location B005-3921 . . . 214
33.40 PIC HVPS BSY 4 - Location B005-3918 . . . 214
33.41 PIC HVPS BSY 5 - Location B005-3918 . . . 215
33.42 PIC HVPS BSY 6 - Location B005-3918 . . . 215
33.43 PIC HVPS LI24 - Location LKF24-0235 . . . 215
33.44 PIC HVPS LI30 - KG30-C1322 . . . 215
33.45 PIC Raw Charge Thresholds: BSYH 762 (PC90) . . . 216
33.46 PIC Raw Charge Thresholds: BSYH 836 (PC119) . . . 216
33.47 PIC Raw Charge Thresholds: CLTS 280 (BLRCUS) . . . 216
33.48 PIC Raw Charge Thresholds: LI24 791 . . . 217
33.49 PIC Raw Charge Thresholds: LI24 811 . . . 217
33.50 PIC Raw Charge Thresholds: LI28 916 . . . 217
33.51 PIC Raw Charge Thresholds: LI29 146 . . . 218
33.52 PIC Raw Charge Thresholds: LI29 446 . . . 218
33.53 PIC Raw Charge Thresholds: LI29 546 . . . 218
33.54 PIC Raw Charge Thresholds: LI29 801 . . . 219
33.55 PIC Raw Charge Thresholds: LI29 956 . . . 219
33.56 PIC Raw Charge Thresholds: LI30 146 . . . 219
33.57 PIC Raw Charge Thresholds: LI30 446 . . . 220
33.58 PIC Raw Charge Thresholds: LI30 546 . . . 220
33.59 PIC Raw Charge Thresholds: LI30 801 . . . 220
33.60 PIC Trigger Missed (LN16) . . . 221
33.61 PIC Trigger Missed (LN22) . . . 221
33.62 PIC Trigger Missed (LN25) . . . 221
33.63 Pulsed Magnet Mode Ok . . . 221
33.64 Scraper Water LI21-9 (Station 22-1) . . . 222
33.65 Scraper Water LI22-9 (Station 23-1) . . . 222
33.66 Scraper Water LI23-9 (Station 24-1) . . . 222
33.67 Scraper Water LI24-9 (Station 25-1) . . . 222
33.68 Scraper Water LI25-9 (Station 26-1) . . . 223
33.69 Scraper Water LI26-9 (Station 27-1) . . . 223
33.70 Scraper Water LI27-9 (Station 28-1) . . . 223

33.71 Scraper Water LI28-9 (Station 29-1) . . . 223
33.72 Scraper Water LI29-9 (Station 30-1) . . . 224
33.73 SIOC BSYH MP01 HEARTBEAT . . . 224
33.74 SIOC BSYH MP02 HEARTBEAT . . . 224
33.75 SIOC BSYH MP03 HEARTBEAT . . . 224
33.76 SIOC BSYS MP01 HEARTBEAT . . . 225
33.77 SIOC BSYS MP02 HEARTBEAT . . . 225
33.78 SIOC BSYS MP03 HEARTBEAT . . . 225
33.79 SIOC BSYS MP04 HEARTBEAT . . . 225
33.80 SIOC CLTS MP01 HEARTBEAT . . . 226
33.81 STCLTS Position . . . 226
33.82 STCLTS Temperature . . . 226
33.83 Stopper LI28 950 and 960 Position . . . 226
33.84 Sub-booster Ready: LI22 . . . 227
33.85 Sub-booster Ready: LI25 . . . 227
33.86 Sub-booster Ready: LI26 . . . 227
33.87 Sub-booster Ready: LI27 . . . 227
33.88 Sub-booster Ready: LI28 . . . 228
33.89 Sub-booster Ready: LI29 . . . 228
33.90 Sub-booster Ready: LI30 . . . 228
33.91 SXR Magnet Mode Ok . . . 228
33.92 Temperature RTD Summary: BSY Common Line . . . 229
33.93 Timing / MPS Destination Mismatch . . . 229
33.94 Toroid Chassis LI24 IMBC2 . . . 229
33.95 Toroid Comparator BC2 (IMBC2IN vs IMBC2OUT) . . . 229
33.96 VVFS CLTH 101 Position . . . 230
33.97 VVFS LI21-9 Position (Station 22-1) . . . 230
33.98 VVFS LI22-9 Position (Station 23-1) . . . 230
33.99 VVFS LI23-9 Position (Station 24-1) . . . 230
33.100 VVFS LI24-9 Position (Station 25-1) . . . 231
33.101 VVFS LI25-9 Position (Station 26-1) . . . 231
33.102 VVFS LI26-9 Position (Station 27-1) . . . 231
33.103 VVFS LI27-9 Position (Station 28-1) . . . 231
33.104 VVFS LI28-9 Position (Station 29-1) . . . 232
33.105 VVFS LI29-9 Position (Station 30-1) . . . 232
33.106 VVPG BSYH 470 POSITION . . . 232
33.107 VVPG BSYH 541 POSITION . . . 232
33.108 VVPG BSYH 837 POSITION . . . 233
33.109 VVPG CLTH 178 Position . . . 233
33.110 VVPG CLTH 375 Position . . . 233
33.111 VVPG CLTS 372 POSITION . . . 233
33.112 VVPG LI21-9 Position (Station 22-1) . . . 234
33.113 VVPG LI22-9 Position (Station 23-1) . . . 234
33.114 VVPG LI23-9 Position (Station 24-1) . . . 234
33.115 VVPG LI24 710 Position . . . 234

33.116 VVPG LI24 896 Position . . . 235
33.117 VVPG LI25-9 Position (Station 26-1) . . . 235
33.118 VVPG LI26-9 Position (Station 27-1) . . . 235
33.119 VVPG LI27-9 Position (Station 28-1) . . . 235
33.120 VVPG LI28-9 Position (Station 29-1) . . . 236
33.121 VVPG LI29-9 Position (Station 30-1) . . . 236
33.122 VVPG LI30-9 Position (Station 30-9) . . . 236

34 Ignored when YAG01 Is In 237
34.1 BXG Status . . . 237
34.2 Toroid Peak Current Monitor IM01 . . . 237
34.3 YAG02 IN20 241 Position . . . 237

35 Ignored when YAG01 Is In or YAG02 Is In 238
35.1 BLM/PIC Watchdog Upstream of TDUND . . . 238
35.2 BX01/BX02 Status . . . 238
35.3 Flowswitch: CE11 . . . 238
35.4 Flowswitch: TD11 . . . 238
35.5 Main Manifold Gauge: LI21 Station 5 . . . 239
35.6 Mirror BL11 Position . . . 239
35.7 OTR01 IN20 541 Position . . . 239
35.8 OTR02 IN20 571 Position . . . 240
35.9 OTR03 IN20 621 Position . . . 240
35.10 OTR04 IN20 711 Position . . . 240
35.11 OTR11 LI21 237 Position . . . 241
35.12 OTR12 LI21 291 Position . . . 241
35.13 OTRH1 Position . . . 241
35.14 OTRH2 Position . . . 242
35.15 Sub-booster Ready: LI21 . . . 242
35.16 TD11 Position . . . 242
35.17 Toroid Chassis IN20 IM11 . . . 242
35.18 Toroid Chassis IN20 IM12 . . . 243
35.19 Toroid Comparator BC1 (IMBC1IN vs IMBC1OUT) . . . 243
35.20 VVFV IN20 785 Position . . . 243
35.21 VVPG IN20 155 Position . . . 244
35.22 VVPG IN20 435 Position . . . 244
35.23 VVPG IN20 545 Position . . . 244
35.24 VVPG IN20 635 Position . . . 244
35.25 VVPG IN20 915 Position . . . 245
35.26 VVS Circuit Breaker: LI22 . . . 245
35.27 VVS Circuit Breaker: LI24 . . . 245
35.28 VVS Circuit Breaker: LI26 . . . 245
35.29 VVS Circuit Breaker: LI28 . . . 246
35.30 VVS Circuit Breaker: LI30 . . . 246
35.31 YAG03 IN20 351 Position . . . 246

35.32 YAGS1 IN20 921 Position . . . 246
35.33 YAGS2 LI21 995 Position . . . 247

36 Always Evaluated **248**
36.1 Backward Beam Stopper (RST1) . . . 248
36.2 Beam Destination: HXR . . . 248
36.3 Beam Destination: SXR . . . 248
36.4 BLM/PIC Watchdog IN20 . . . 248
36.5 Bypass Recover . . . 249
36.6 Gun RF Peak Power 20-6 . . . 249
36.7 Gun Waveguide Vacuum Summary . . . 249
36.8 IOC-IN20-MP01 MPS Support IOC Heartbeat . . . 249
36.9 Laser Heater Attenuator Position . . . 250
36.10 MCC Emergency Radiation Stopper . . . 250
36.11 Mechanical Shutter Position . . . 250
36.12 Mirror AM01 Position . . . 250
36.13 MPS Beam Permit: BYKIK . . . 251
36.14 MPS Beam Permit: BYKIKS . . . 251
36.15 MPS Beam Permit: Gun RF . . . 251
36.16 MPS Beam Permit: Gun RF HXR . . . 251
36.17 MPS Beam Permit: Gun RF SXR . . . 252
36.18 MPS Beam Permit: Heater Shutter . . . 252
36.19 MPS Beam Permit: Mechanical Shutter . . . 252
36.20 MPS Mechanical Shutter Position . . . 252
36.21 PIC HVPS LI20 - Location LKG-1535 . . . 253
36.22 PIC Raw Charge Thresholds: IN20 185 . . . 253
36.23 PIC Raw Charge Thresholds: IN20 232 . . . 253
36.24 PIC Raw Charge Thresholds: IN20 245 . . . 254
36.25 PIC Raw Charge Thresholds: IN20 665 . . . 254
36.26 PIC Raw Charge Thresholds: IN20 775 . . . 254
36.27 PIC Raw Charge Thresholds: IN20 933 . . . 255
36.28 PIC Trigger Missed (LN11) . . . 255
36.29 Pockels Cell AND Gate 100 . . . 255
36.30 Pockels Cell AND Gate 200 . . . 255
36.31 Rate Request: BYKIK 1 Hz . . . 256
36.32 Rate Request: BYKIK 10 Hz . . . 256
36.33 Rate Request: BYKIK 30 Hz . . . 256
36.34 Rate Request: BYKIK 60 Hz . . . 256
36.35 Rate Request: BYKIK Burst . . . 257
36.36 Rate Request: BYKIK Single Shot . . . 257
36.37 Rate Request: BYKIKS 1 Hz . . . 257
36.38 Rate Request: BYKIKS 10 Hz . . . 257
36.39 Rate Request: BYKIKS 30 Hz . . . 258
36.40 Rate Request: BYKIKS 60 Hz . . . 258
36.41 Rate Request: BYKIKS Burst . . . 258

36.42 Rate Request: BYKIKS Single Shot . . . 258
36.43 Rate Request: Gun RF HXR 1 Hz . . . 259
36.44 Rate Request: Gun RF HXR 10 Hz . . . 259
36.45 Rate Request: Gun RF HXR 30 Hz . . . 259
36.46 Rate Request: Gun RF HXR 60 Hz . . . 259
36.47 Rate Request: Gun RF HXR Burst . . . 260
36.48 Rate Request: Gun RF HXR Single Shot . . . 260
36.49 Rate Request: Gun RF SXR 1 Hz . . . 260
36.50 Rate Request: Gun RF SXR 10 Hz . . . 260
36.51 Rate Request: Gun RF SXR 30 Hz . . . 261
36.52 Rate Request: Gun RF SXR 60 Hz . . . 261
36.53 Rate Request: Gun RF SXR Burst . . . 261
36.54 Rate Request: Gun RF SXR Single Shot . . . 261
36.55 Rate Request: Pockels Cell 1 Hz . . . 262
36.56 Rate Request: Pockels Cell 10 Hz . . . 262
36.57 Rate Request: Pockels Cell 30 Hz . . . 262
36.58 Rate Request: Pockels Cell 60 Hz . . . 262
36.59 Rate Request: Pockels Cell Burst . . . 263
36.60 Rate Request: Pockels Cell Single Shot . . . 263
36.61 VVMG IN20 175 Position . . . 263
36.62 VVMG LI21 195 Position . . . 263
36.63 VVS Circuit Breaker: LI20 . . . 264
36.64 YAG01 IN20 211 Position . . . 264
36.65 YAGG1 IN20 841 Position . . . 264

37 Ignore Logic **265**
37.1 A-Line Kicker Is Not Enabled . . . 265
37.2 A-Line SL10 Is Closed . . . 265
37.3 BKRCUS Is On . . . 265
37.4 BRCUSDC Is Off . . . 265
37.5 BRCUSDC Is On . . . 266
37.6 BX01/BX02 Is Off . . . 266
37.7 BX01/BX02 Is On . . . 266
37.8 BXG Is Off . . . 266
37.9 BXG Is On . . . 267
37.10 Destination HXR . . . 267
37.11 Destination SXR . . . 267
37.12 Diag Stopper HFX DG2 Is In . . . 267
37.13 Diag Stopper HFX UM6 Is In . . . 267
37.14 Diag Stopper XCS SB1 Is In . . . 268
37.15 Laser Heater Attenuator Is In . . . 268
37.16 LTU Dechirper Is Out . . . 268
37.17 MR1K1 Is In . . . 268
37.18 MR1K1 Is Out . . . 269
37.19 ST1K2 Is In . . . 269

37.20 ST3K4 Is In . . . 269
37.21 STCLTS Is In . . . 269
37.22 Stopper MFX S4.5 Is In . . . 269
37.23 Stopper S5B Is In . . . 270
37.24 Stopper SH2 Is In . . . 270
37.25 Stopper ST1L0 Is In . . . 270
37.26 Stopper XRT S5 Is In . . . 270
37.27 Stopper XRT S6 Is In . . . 271
37.28 Stopper: BSY D2 Summary Is In . . . 271
37.29 SXR Wire Scanner Mode Disabled . . . 271
37.30 SXR Wire Scanner Mode Enabled . . . 271
37.31 SXRSS M1/Grating Is Out . . . 271
37.32 TD11 Is In . . . 272
37.33 TDUND Is In . . . 272
37.34 TDUNDB Is In . . . 272
37.35 XPP-NH3-POS-00 Beamline Is In . . . 272
37.36 XPP-NH3-POS-00 Beamline Is Not In . . . 273
37.37 XRT-M2 Mirror Is Out of Beam . . . 273
37.38 YAG01 Is In . . . 273
37.39 YAG02 Is In . . . 273

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, 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, 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 Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, Diag Stopper XCS SB1 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

11.1 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`

11.2 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`

12 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, 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

12.1 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	–	–	–	–

12.2 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	–	–	–	–

12.3 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	–	–	–	–

12.4 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	–	–	–	–

12.5 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	–	–	–	–

12.6 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	–	–	–	–

12.7 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	–	–	–	–

12.8 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`

12.9 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`

12.10 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`

12.11 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`

12.12 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`

12.13 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`

12.14 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`

12.15 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`

12.16 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`

12.17 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`

12.18 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`

12.19 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`

12.20 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

12.21 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

12.22 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

13 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 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

13.1 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`

13.2 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`

13.3 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`

13.4 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`

13.5 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`

13.6 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`

13.7 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`

14 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 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

14.1 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`

14.2 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`

14.3 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`

14.4 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`

15 Ignored when Diag Stopper HFX UM6 Is In, 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

15.1 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`

16 Ignored when Diag Stopper HFX UM6 Is In, 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

16.1 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`

16.2 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`

16.3 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`

16.4 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`

16.5 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`

16.6 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`

16.7 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`

16.8 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`

16.9 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`

16.10 MEC XT2 VGC 06 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_06_OPN_DI_POSITION`

17 Ignored when Diag Stopper HFX UM6 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 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`

17.2 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`

17.3 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`

17.4 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`

17.5 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`

17.6 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`

17.7 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`

17.8 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`

17.9 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`

17.10 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`

17.11 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`

17.12 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`

18 Ignored when Laser Heater Attenuator Is In

18.1 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`

18.2 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`

18.3 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`

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

19.1 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`

19.2 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`

19.3 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`

19.4 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`

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

20.1 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`

20.2 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`

20.3 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`

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

21.1 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`

21.2 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`

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

22.1 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`

22.2 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`

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

23.1 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

23.2 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

23.3 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

23.4 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

23.5 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

23.6 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

23.7 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

23.8 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

23.9 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

23.10 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

23.11 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

23.12 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

23.13 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

23.14 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

23.15 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

23.16 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

23.17 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

23.18 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

23.19 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

23.20 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

23.21 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

23.22 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

23.23 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

23.24 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

23.25 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

23.26 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

23.27 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

23.28 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

23.29 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

23.30 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

23.31 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

23.32 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

23.33 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

23.34 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

23.35 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

23.36 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

23.37 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

23.38 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

23.39 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

23.40 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

23.41 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

23.42 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

23.43 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

23.44 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

23.45 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`

23.46 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`

23.47 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`

23.48 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`

23.49 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`

23.50 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`

23.51 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`

23.52 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`

23.53 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`

23.54 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`

23.55 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`

23.56 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`

23.57 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`

23.58 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`

23.59 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`

23.60 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`

23.61 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`

23.62 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`

23.63 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`

23.64 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`

23.65 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

23.66 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

23.67 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

23.68 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`

23.69 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`

23.70 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`

23.71 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`

23.72 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`

23.73 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`

23.74 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

23.75 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

23.76 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

23.77 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`

23.78 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`

23.79 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`

23.80 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`

23.81 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`

23.82 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`

23.83 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

23.84 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

23.85 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

23.86 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

23.87 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

23.88 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

23.89 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

23.90 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

23.91 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`

23.92 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`

23.93 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`

23.94 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`

23.95 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`

23.96 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`

23.97 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`

23.98 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:UND3:3510:ON_MPS               =  BEND_UND3_3510_ON_STATE
               =  Chicane power supply on
 *  MIRR:UND3:3520:IN_LIMIT_MPS         =
    MIRR_UND3_3520_IN_LIMIT_POSITION     =  Grating/M1 IN limit switch
 *  MIRR:UND3:3520:OUT_LIMIT_MPS        =
    MIRR_UND3_3520_OUT_LIMIT_POSITION    =  Grating/M1 OUT limit switch
 *  SLIT:UND3:3555: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

23.99 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

23.100 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

23.101 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

23.102 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

23.103 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

23.104 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

23.105 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

23.106 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

23.107 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

23.108 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

23.109 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

23.110 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

23.111 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`

23.112 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`

23.113 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`

23.114 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`

23.115 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

23.116 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

23.117 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

23.118 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

23.119 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`

24 Ignored when STCLTS Is In, TD11 Is In, YAG01 Is In, or YAG02 Is In

24.1 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

24.2 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

24.3 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

24.4 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

24.5 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

24.6 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

24.7 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

24.8 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

24.9 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

24.10 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

24.11 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

24.12 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

24.13 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

24.14 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

24.15 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

24.16 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

24.17 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

24.18 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

24.19 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

24.20 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

24.21 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

24.22 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

24.23 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`

24.24 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`

24.25 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`

24.26 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

24.27 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

24.28 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

24.29 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

24.30 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

24.31 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`

24.32 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`

24.33 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`

24.34 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`

24.35 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`

24.36 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`

24.37 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`

24.38 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`

24.39 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`

24.40 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`

24.41 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`

24.42 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`

24.43 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`

24.44 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`

24.45 XLEAP: UMXL2H 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_726_DS_OUT_STATE`,
B = `WIGG_LTUS_726_DS_IN_STATE`

24.46 XLEAP: UMXL2H 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_726_US_OUT_STATE`,
B = `WIGG_LTUS_726_US_IN_STATE`

24.47 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`

24.48 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`

24.49 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`

24.50 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`

25 Ignored when 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

25.1 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

25.2 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

25.3 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`

26 Ignored when Stopper SH2 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

26.1 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`

27 Ignored when Stopper ST1L0 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, XPP-NH3-POS-00 Beamline Is In, YAG01 Is In, or YAG02 Is In

27.1 NEH3 HXRAY DVD Isolation Valve HX3-DVD-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 = `HX3_DVD_VGC_01_CLS_DI_STATE`,
B = `HX3_DVD_VGC_01_OPN_DI_STATE`

28 Ignored when Stopper ST1L0 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, XPP-NH3-POS-00 Beamline Is Not In, YAG01 Is In, or YAG02 Is In

28.1 XPP SB2 VGC 02 Gate Valve Position

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

Where
A = `XPP_SB2_VGC_02_OPN_DI_POSITION`

28.2 XPP SB2 VGC 03 Gate Valve Position

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

Where
A = `XPP_SB2_VGC_03_OPN_DI_POSITION`

28.3 XPP SB2 VGC 04 Gate Valve Position

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

Where
A = `XPP_SB2_VGC_04_OPN_DI_POSITION`

29 Ignored when Stopper ST1L0 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

29.1 NEH3 HXRAY UVD Isolation Valve HX3-UVD-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 = `HX3_UVD_VGC_01_CLS_DI_STATE`,
B = `HX3_UVD_VGC_01_OPN_DI_STATE`

29.2 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`

30 Ignored when Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

30.1 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`

30.2 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`

30.3 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`

30.4 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

30.5 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

30.6 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

30.7 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

30.8 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

30.9 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

30.10 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

30.11 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

30.12 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

30.13 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

30.14 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

30.15 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

30.16 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

30.17 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

30.18 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

30.19 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

30.20 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

30.21 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

30.22 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

30.23 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

30.24 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

30.25 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

30.26 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

30.27 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

30.28 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

30.29 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

30.30 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

30.31 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

30.32 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

30.33 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

30.34 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

30.35 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

30.36 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

30.37 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

30.38 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

30.39 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

30.40 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

30.41 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

30.42 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

30.43 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

30.44 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

30.45 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

30.46 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

30.47 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

30.48 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

30.49 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

30.50 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

30.51 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

30.52 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

30.53 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

30.54 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

30.55 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

30.56 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

30.57 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

30.58 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

30.59 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

30.60 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

30.61 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

30.62 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

30.63 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

30.64 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

30.65 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

30.66 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

30.67 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

30.68 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

30.69 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`

30.70 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`

30.71 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`

30.72 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`

30.73 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`

30.74 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`

30.75 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`

30.76 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`

30.77 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`

30.78 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`

30.79 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`

30.80 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

30.81 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

30.82 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

30.83 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

30.84 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

30.85 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

30.86 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

30.87 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_OUT_LMTSW_STATE,
B = XTAL_UNDH_2850_IN_ENCDR_STATE

30.88 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`

30.89 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_OUT_LMTSW_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_OUT_LMTSW_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	–	–	–	–

30.90 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`

30.91 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`

30.92 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

30.93 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

30.94 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

30.95 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

30.96 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`

30.97 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`

30.98 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`

30.99 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`

30.100 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`

30.101 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`

30.102 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`

30.103 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`

30.104 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`

30.105 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`

30.106 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`

30.107 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`

30.108 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`

30.109 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`

30.110 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`

30.111 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`

30.112 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

30.113 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

30.114 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

30.115 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

30.116 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

30.117 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

30.118 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

30.119 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

30.120 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

30.121 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

30.122 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

30.123 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

30.124 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

30.125 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

30.126 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

30.127 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

30.128 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

30.129 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

30.130 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

30.131 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

30.132 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

30.133 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

30.134 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

30.135 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

30.136 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

30.137 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

30.138 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

30.139 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

30.140 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

30.141 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

30.142 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

30.143 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

30.144 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

30.145 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`

30.146 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`

30.147 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`

30.148 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

30.149 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

30.150 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

30.151 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

30.152 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

30.153 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`

30.154 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`

30.155 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`

30.156 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`

30.157 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

30.158 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

30.159 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

30.160 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

30.161 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

30.162 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

30.163 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

30.164 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

30.165 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

30.166 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

30.167 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

30.168 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

30.169 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

30.170 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

30.171 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

30.172 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

30.173 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

30.174 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

30.175 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

30.176 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

30.177 YAGPSI 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 = `YAGS_LTUH_743_OUT_LIMIT_POSITION`,
B = `YAGS_LTUH_743_IN_LIMIT_POSITION`

31 Ignored when Stopper: BSY D2 Summary Is In, TD11 Is In, YAG01 Is In, or YAG02 Is In

31.1 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`

31.2 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`

31.3 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`

31.4 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

31.5 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

31.6 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

31.7 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

31.8 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

31.9 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`

31.10 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`

31.11 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`

31.12 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`

31.13 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`

31.14 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`

31.15 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`

31.16 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

31.17 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

31.18 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

31.19 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

31.20 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

31.21 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

31.22 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

31.23 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

31.24 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

31.25 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

31.26 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

31.27 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

31.28 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`

31.29 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`

31.30 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`

31.31 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`

31.32 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`

31.33 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`

31.34 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`

31.35 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

31.36 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

31.37 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

31.38 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

31.39 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

31.40 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

31.41 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

31.42 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

31.43 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

31.44 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

31.45 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

31.46 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

31.47 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

31.48 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

31.49 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

31.50 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

31.51 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

31.52 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

31.53 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

31.54 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

31.55 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

31.56 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

31.57 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

31.58 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

31.59 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

31.60 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

31.61 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

31.62 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`

31.63 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`

31.64 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`

31.65 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`

31.66 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`

31.67 YAGPSI 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 = `YAGS_LTUH_743_OUT_LIMIT_POSITION`,
B = `YAGS_LTUH_743_IN_LIMIT_POSITION`

32 Ignored when TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

32.1 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`

32.2 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`

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

33.1 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`

33.2 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`

33.3 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`

33.4 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

33.5 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

33.6 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

33.7 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

33.8 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

33.9 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`

33.10 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`

33.11 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`

33.12 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

33.13 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

33.14 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

33.15 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

33.16 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

33.17 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`

33.18 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`

33.19 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`

33.20 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`

33.21 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`

33.22 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`

33.23 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`

33.24 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

33.25 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

33.26 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

33.27 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

33.28 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

33.29 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

33.30 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

33.31 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

33.32 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

33.33 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`

33.34 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`

33.35 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`

33.36 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

33.37 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

33.38 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

33.39 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

33.40 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

33.41 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`

33.42 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`

33.43 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`

33.44 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`

33.45 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`

33.46 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`

33.47 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`

33.48 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`

33.49 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`

33.50 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`

33.51 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

33.52 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

33.53 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

33.54 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`

33.55 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`

33.56 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`

33.57 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

33.58 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

33.59 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

33.60 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`

33.61 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`

33.62 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`

33.63 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`

33.64 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`

33.65 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`

33.66 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`

33.67 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`

33.68 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`

33.69 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`

33.70 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`

33.71 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`

33.72 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`

33.73 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`

33.74 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`

33.75 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`

33.76 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

33.77 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

33.78 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

33.79 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

33.80 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

33.81 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

33.82 STCLTS Temperature

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

Where
A = STPR_CLTS_585_TEMP_STATE

33.83 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

33.84 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`

33.85 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`

33.86 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`

33.87 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`

33.88 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`

33.89 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`

33.90 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`

33.91 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`

33.92 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`

33.93 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`

33.94 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`

33.95 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

33.96 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

33.97 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

33.98 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

33.99 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

33.100 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

33.101 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

33.102 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

33.103 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

33.104 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`

33.105 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`

33.106 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`

33.107 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`

33.108 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`

33.109 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`

33.110 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`

33.111 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`

33.112 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

33.113 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

33.114 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

33.115 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

33.116 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`

33.117 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`

33.118 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`

33.119 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`

33.120 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

33.121 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

33.122 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

34 Ignored when YAG01 Is In

34.1 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`

34.2 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`

34.3 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`

35 Ignored when YAG01 Is In or YAG02 Is In

35.1 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`

35.2 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`

35.3 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`

35.4 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`

35.5 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`

35.6 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`

35.7 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`

35.8 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`

35.9 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`

35.10 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`

35.11 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`

35.12 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`

35.13 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`

35.14 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`

35.15 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`

35.16 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`

35.17 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

35.18 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

35.19 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

35.20 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

35.21 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`

35.22 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`

35.23 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`

35.24 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`

35.25 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

35.26 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

35.27 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

35.28 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

35.29 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`

35.30 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`

35.31 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`

35.32 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

35.33 YAGS2 LI21 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

36 Always Evaluated

36.1 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`

36.2 Beam Destination: HXR

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not True	F	–	–	–	–	–	–	–
True	T	–	–	–	–	–	–	–

Where
A = `LP_DESTINATION_HXR`

36.3 Beam Destination: SXR

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not True	F	–	–	–	–	–	–	–
True	T	–	–	–	–	–	–	–

Where
A = `LP_DESTINATION_SXR`

36.4 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`

36.5 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`

36.6 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`

36.7 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`

36.8 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`

36.9 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`

36.10 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`

36.11 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`

36.12 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

36.13 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

36.14 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

36.15 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

36.16 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

36.17 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

36.18 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

36.19 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

36.20 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

36.21 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

36.22 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

36.23 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

36.24 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`

36.25 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`

36.26 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`

36.27 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`

36.28 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`

36.29 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`

36.30 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`

36.31 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`

36.32 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`

36.33 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`

36.34 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`

36.35 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

36.36 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

36.37 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

36.38 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

36.39 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`

36.40 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`

36.41 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`

36.42 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`

36.43 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

36.44 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

36.45 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

36.46 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

36.47 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

36.48 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

36.49 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

36.50 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

36.51 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

36.52 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

36.53 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

36.54 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

36.55 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

36.56 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

36.57 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

36.58 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

36.59 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`

36.60 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`

36.61 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`

36.62 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`

36.63 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`

36.64 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`

36.65 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`

37 Ignore Logic

37.1 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

37.2 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

37.3 BKRCUS Is On

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
On	T	–	–	–	–	–	–	–

Where
A = KICK_CLTS_185_ON_STATE

37.4 BRCUSDC Is Off

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Off	T	–	–	–	–	–	–	–

Where
A = BEND_CLTS_180_OFF_STATE

37.5 BRCUSDC Is On

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
On	T	–	–	–	–	–	–	–

Where
A = BEND_CLTS_180_ON_STATE

37.6 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

37.7 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

37.8 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

37.9 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

37.10 Destination HXR

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
HXR	T	–	–	–	–	–	–	–

Where
A = LP_DESTINATION_HXR

37.11 Destination SXR

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
SXR	T	–	–	–	–	–	–	–

Where
A = LP_DESTINATION_SXR

37.12 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

37.13 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

37.14 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

37.15 Laser Heater Attenuator Is In

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = LHATTEN_IN_LIMIT_STATE

37.16 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

37.17 MR1K1 Is In

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Is In	T	–	–	–	–	–	–	–

Where
A = STPR_FEES_MR1K1_IN_STATE

37.18 MR1K1 Is Out

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Is Out	T	–	–	–	–	–	–	–

Where
A = `MIRR_FEES_MR1K1_OUT_POSITION`

37.19 ST1K2 Is In

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Is In	T	–	–	–	–	–	–	–

Where
A = `STPR_FEES_ST1K2_IN_STATE`

37.20 ST3K4 Is In

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Is In	T	–	–	–	–	–	–	–

Where
A = `STPR_FEES_ST1K4_IN_STATE`

37.21 STCLTS Is In

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = `STPR_CLTS_585_IN_LIMIT_POSITION`

37.22 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

37.23 Stopper S5B Is In

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = STPR_FEH1_5_S5BIN_POSITION

37.24 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

37.25 Stopper ST1L0 Is In

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = STPR_FEE1_ST1_IN_POSITION

37.26 Stopper XRT S5 Is In

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = STPR_XRT1_1_S5IN_POSITION

37.27 Stopper XRT S6 Is In

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = STPR_XRT1_1_S6IN_POSITION

37.28 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

37.29 SXR Wire Scanner Mode Disabled

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Disabled	F	–	–	–	–	–	–	–

Where
A = LP_SXR_WS_MODE

37.30 SXR Wire Scanner Mode Enabled

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Enabled	T	–	–	–	–	–	–	–

Where
A = LP_SXR_WS_MODE

37.31 SXRSS M1/Grating Is Out

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
	T	–	–	–	–	–	–	–

Where
A = MIRR_UNDS_3520_OUT_LIMIT_POSITION

37.32 TD11 Is In

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = TD11_IN_LIMIT_STATE

37.33 TDUND Is In

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = DUMP_LTUH_970_IN_LIMIT_POSITION

37.34 TDUNDB Is In

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = DUMP_LTUS_972_IN_LIMIT_POSITION

37.35 XPP-NH3-POS-00 Beamline Is In

Name	A	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = XPP_NH3_POS_00_IN_STATE

37.36 XPP-NH3-POS-00 Beamline Is Not In

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
Not_IN	F	–	–	–	–	–	–	–

Where
A = XPP_NH3_POS_00_IN_STATE

37.37 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

37.38 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

37.39 YAG02 Is In

Name	*A*	GUNL	MS	BYKIK	LHS	GUNH	GUNS	BYKIKS
In	T	–	–	–	–	–	–	–

Where
A = YAGS_IN20_241_IN_LMTSW_STATE