MPS Logic:
2016-10-17-a

Contents

1 Ignored when A-Line B1/B2 Is Not On AND A-Line Kicker Is Not Enabled, A-Line SL10 Is Closed, TD11 Is In, YAG01 Is In, or YAG02 Is In **20**
1.1 Flowswitch: COLL BSYA 2060 (PC20) . . . 20
1.2 Flowswitch: COLL BSYA 2410 (COLL24H) . . . 20
1.3 Flowswitch: COLL BSYA 2410 (COLL24V) . . . 20
1.4 Flowswitch: COLL BSYA 2410 (PC24) . . . 21
1.5 Flowswitch: COLL BSYA 2600 (PC26) . . . 21
1.6 Flowswitch: COLL BSYA 2990 (PC29) . . . 21
1.7 Flowswitch: COLL BSYA 3710 (C37) . . . 21
1.8 Flowswitch: COLL BSYA 4120 (3C1A) . . . 22
1.9 PIC Raw Charge Thresholds: BSYA 2061 . . . 22
1.10 PIC Raw Charge Thresholds: BSYA 2120 . . . 22
1.11 PIC Raw Charge Thresholds: BSYA 2220 . . . 23
1.12 PIC Raw Charge Thresholds: BSYA 2321 . . . 23
1.13 PIC Raw Charge Thresholds: BSYA 2411 . . . 23
1.14 PIC Raw Charge Thresholds: BSYA 2472 . . . 24
1.15 PIC Raw Charge Thresholds: BSYA 2473 . . . 24
1.16 PIC Raw Charge Thresholds: BSYA 2474 . . . 24
1.17 PIC Raw Charge Thresholds: BSYA 2475 . . . 25
1.18 PIC Raw Charge Thresholds: BSYA 2520 . . . 25
1.19 PIC Raw Charge Thresholds: BSYA 2601 . . . 25
1.20 PIC Raw Charge Thresholds: BSYA 2861 . . . 26
1.21 PIC Raw Charge Thresholds: BSYA 2990 . . . 26
1.22 PIC Raw Charge Thresholds: BSYA 3320 . . . 26
1.23 PIC Raw Charge Thresholds: BSYA 3720 . . . 27
1.24 PIC Raw Charge Thresholds: BSYA 3721 . . . 27
1.25 PIC Raw Charge Thresholds: BSYA 3890 . . . 27
1.26 PIC Trigger Missed (LN42) . . . 28
1.27 Stopper BSYA 2275 (ST22) Position . . . 28
1.28 Stopper BSYA 2930 (ST29) Position . . . 28
1.29 Temperature RTD Summary: A-line Past SL10 . . . 28
1.30 Vac Valve BSYA 4005 (IV40) . . . 29
1.31 Vac Valve: VVFS BSYA 2855 (FV28) . . . 29
1.32 Vac Valve: VVPG BSYA 2635 (IV26) . . . 29
1.33 Vac Valve: VVPG ESA0 4195 POSITION (IV41) . . . 29

2 Ignored when A-Line B1/B2 Is Not On AND A-Line Kicker Is Not Enabled, TD11 Is In, YAG01 Is In, or YAG02 Is In **31**
2.1 A-Line SL10 Position . . . 31
2.2 Flowswitch: BPM BSYA 1020 (BPM10) . . . 31

2.3 Flowswitch: BPM BSYA 1240 (BPM12) . . . 32
2.4 Flowswitch: COLL BSYA 1015 (PC10) . . . 32
2.5 Flowswitch: COLL BSYA 1230 (PC12) . . . 32
2.6 Flowswitch: COLL BSYA 1490 (PC14) . . . 32
2.7 Flowswitch: COLL BSYA 1700 (PC17) . . . 33
2.8 PIC Raw Charge Thresholds: BSYA 1016 . . . 33
2.9 PIC Raw Charge Thresholds: BSYA 1021 . . . 33
2.10 PIC Raw Charge Thresholds: BSYA 1120 . . . 34
2.11 PIC Raw Charge Thresholds: BSYA 1320 . . . 34
2.12 PIC Raw Charge Thresholds: BSYA 1520 . . . 34
2.13 PIC Raw Charge Thresholds: BSYA 1701A . . . 35
2.14 PIC Raw Charge Thresholds: BSYA 1701B . . . 35
2.15 PIC Raw Charge Thresholds: BSYA 1980 . . . 35
2.16 Temperature RTD Summary: A-Line Before SL10 . . . 36
2.17 Vac Valve: VVFS BSYA 1030 (FV10) . . . 36
2.18 Vac Valve: VVPG BSYA 1018 (IV10) . . . 36

3 Ignored when BX01/BX02 Is Off, YAG01 Is In, or YAG02 Is In 37
3.1 Toroid Comparator IM02/IM03 . . . 37

4 Ignored when BX01/BX02 Is On, YAG01 Is In, or YAG02 Is In 38
4.1 BXS Status . . . 38
4.2 Toroid Comparator IM02/IMS1 . . . 38

5 Ignored when BXG Is Off or YAG01 Is In 39
5.1 Wakefield Shield Gun Spectrometer . . . 39

6 Ignored when BXG Is On or YAG01 Is In 40
6.1 Wakefield Shield Straight Ahead . . . 40

7 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, Diag Stopper XCS SB1 Is In, Spoiler SP0 Is In, ST1/ST2 Are In, Stopper SH1 Is In, Stopper SH2 Is In, Stopper XRT S5 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, XCS Is Not In Main Line, YAG01 Is In, or YAG02 Is In 41
7.1 XCS SB1 VGC 02 Gate Valve Position . . . 41
7.2 XCS SB2 VGC 01 Gate Valve Position . . . 41

8 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, Spoiler SP0 Is In, ST1/ST2 Are In, Stopper S5B Is In, Stopper SH1 Is In, Stopper SH2 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 42
8.1 CXI Configuration 1 Summary . . . 42
8.2 CXI Configuration 2 Summary . . . 43
8.3 CXI Configuration 3 Summary . . . 44
8.4 CXI Configuration 4 Summary . . . 46
8.5 CXI Configuration 5 Summary . . . 47

8.6 CXI Configuration 6 Summary . . . 48
8.7 CXI Configuration 7 Summary . . . 49
8.8 CXI KB2 VGC 02 Gate Valve Position . . . 50
8.9 CXI MPS PLC Readiness Status . . . 50
8.10 CXI User Patch Panel 1 Ready . . . 51
8.11 CXI User Patch Panel 2 Ready . . . 51
8.12 CXI:DG1:VGC:01 Gate Valve Open Position . . . 51
8.13 CXI:DG1:VGC:02 Gate Valve Open Position . . . 51
8.14 CXI:DG2:VGC:01 Gate Valve Position . . . 52
8.15 CXI:DG2:VGC:02 Gate Valve Position . . . 52
8.16 CXI:DG4:VGC:01 Gate Valve Position . . . 52
8.17 CXI:DSC:VGC:01 Gate Valve Position . . . 53
8.18 CXI:KB1:VGC:01 Gate Valve Open Position . . . 53
8.19 CXI:KB1:VGC:02 Gate Valve Open Position . . . 53
8.20 CXI:KB2:VGC:01 Gate Valve Open Position . . . 53
8.21 CXI:SC1:VGC:01 Gate Valve Position . . . 54
8.22 CXI:SC3:VGC:01 Be Gate Valve Position - Status from PLC . . . 54
8.23 HF4 LAM VGC 01 Gate Valve Position . . . 54

9 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, Spoiler SP0 Is In, ST1/ST2 Are In, Stopper SH1 Is In, Stopper SH2 Is In, Stopper XRT S5 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, XCS Is Not In Main Line, YAG01 Is In, or YAG02 Is In 55
9.1 XCS SB1 Diagnostic Stopper Position . . . 55
9.2 XCS SB1 VGC 01 Gate Valve Position . . . 55

10 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, Spoiler SP0 Is In, ST1/ST2 Are In, Stopper SH1 Is In, Stopper SH2 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 56
10.1 CXI XRT Laser Reference Mirror Position . . . 56
10.2 HFA:SND:VGC:01 Gate Valve Open Position . . . 56
10.3 HFX:DIA:VGC:02 Gate Valve Open Position . . . 56
10.4 PPS Stopper S5B Position . . . 57
10.5 XRT HXRAY DIA Isolation Valve HXX-DIA-VGC-01 . . . 57

11 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, Spoiler SP0 Is In, ST1/ST2 Are In, Stopper SH1 Is In, Stopper SH2 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 58
11.1 HFX:DG2:VGC:01 Gate Valve Position . . . 58
11.2 HFX:MON:VGC:01 Gate Valve Position . . . 58
11.3 HFX:MON:VGC:02 Gate Valve Position . . . 58
11.4 Stopper XRT S5 Position . . . 59

12 Ignored when Diag Stopper HFX UM6 Is In, Spoiler SP0 Is In, ST1/ST2 Are In, Stopper MFX S4.5 Is In, Stopper SH1 Is In, Stopper SH2 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In **60**
12.1 MFX Beam Focusing Interlock (Beryllium Lens) . . . 60
12.2 MFX MPS Summary - Downstream of S4.5 . . . 60

13 Ignored when Diag Stopper HFX UM6 Is In, Spoiler SP0 Is In, ST1/ST2 Are In, Stopper SH1 Is In, Stopper SH2 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 **61**
13.1 MEC DV4 VCG 01 Gate Valve Position . . . 61
13.2 MEC DV5 VGC 01 Gate Valve Position . . . 61
13.3 MEC HXM VGC 01 Gate Valve Position . . . 61
13.4 MEC XT1 Reference Laser Position . . . 62
13.5 MEC XT1 VGC 01 Gate Valve Position . . . 62
13.6 MEC XT2 VGC 02 Gate Valve Position . . . 62
13.7 MEC XT2 VGC 03 Gate Valve Position . . . 62
13.8 MEC XT2 VGC 04 Gate Valve Position . . . 63
13.9 MEC XT2 VGC 05 Gate Valve Position . . . 63
13.10 MEC XT2 VGC 06 Gate Valve Position . . . 63

14 Ignored when Diag Stopper HFX UM6 Is In, Spoiler SP0 Is In, ST1/ST2 Are In, Stopper SH1 Is In, Stopper SH2 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In **64**
14.1 DG2 Diagnostic Stopper Position . . . 64
14.2 MEC BXL VGC 01 Gate Valve Position . . . 64
14.3 MEC M3H Mirror and DG2 STP Fault . . . 64
14.4 MEC M3H Mirror Unknown Position Fault . . . 65
14.5 MEC XRT Attenuator Inspection Mirror Position . . . 65
14.6 MFX Gate Valve Summary - Upstream of Stopper 4.5 . . . 65
14.7 MFX Gate Valves Not All Open - PLC Summary Status . . . 66
14.8 Stopper MFX S4.5 Position . . . 66
14.9 Stopper XRT S6 Position . . . 66
14.10 XRT HXRAY LOM Isolation Valve HXX-LOM-VGC-01 . . . 67
14.11 XRT HXRAY MXT Gate Valve HXX:MXT:VGC:01 . . . 67
14.12 XRT HXRAY MXT Gate Valve HXX:MXT:VGC:02 . . . 67
14.13 XRT HXRAY MXT Gate Valve HXX:MXT:VGC:03 . . . 68
14.14 XRT HXRAY MXT Gate Valve HXX:MXT:VGC:05 . . . 68

15 Ignored when Laser Heater Attenuator Is In **69**
15.1 Laser Heater Photodiode Shutter Position . . . 69
15.2 OTRH1 Position When LH Atten Not In . . . 69
15.3 OTRH2 Position When LH Atten Not In . . . 69

16 Ignored when Spoiler SP0 Is In, ST1/ST2 Are In, Stopper S1 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In **70**

16.1 NEH AMO Laser Reference Mirror Position 70
16.2 NEH AMO Valves Ok for Beam - Summary From PLC 70
16.3 NEH1 Camera 1124 Position 70
16.4 NEH1 XTOD S1 Isolation Valve Summary 71

17 Ignored when Spoiler SP0 Is In, ST1/ST2 Are In, Stopper S2 Is In, Stopper S2B Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 72
17.1 NEH SXR Differential Pump Isolation Valve SXR-DFP-VGC-01 72
17.2 NEH SXR End Station Ready SXR-EXP-MPS-01 72
17.3 NEH SXR Intensity Monitor Isolation Valve SXR-FLX-VGC-01 73
17.4 NEH SXR KB Optics Isolation Valve SXR-KBO-VGC-01 73
17.5 NEH SXR Laser In-coupling Mirror Isolation Valve SXR-LIN-VGC-01 73

18 Ignored when Spoiler SP0 Is In, ST1/ST2 Are In, Stopper S2 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 74
18.1 NEH Camera 2124 Position 74
18.2 NEH SXR Collimator 3 Isolation Valve SXR-COL-VGC-01 74
18.3 NEH SXR Exit Slits Isolation Valve SXR-EXS-VGC-01 75
18.4 NEH SXR GMD VGC 01 Protection 75
18.5 NEH SXR Monochromator Tank Isolation Valve SXR-MON-VGC-01 75
18.6 NEH SXR Photon Stoppers Isolation Valve SXR-PST-VGC-01 76
18.7 NEH SXR Transmission Sample System Isolation Valve SXR-TSS-VGC-01 76
18.8 NEH SXR Zero Order Interlock SXR-MON-MMS-06, SXR-EXS-MMS-01 76
18.9 NEH1 XTOD S2 Isolation Valve Summary 77

19 Ignored when Spoiler SP0 Is In, ST1/ST2 Are In, Stopper SH1 Is In, Stopper SH2 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 78
19.1 UM6 Diagnostic Stopper Position 78
19.2 XRT HXRAY UM6 Isolation Valve HXX-UM6-VGC-01 78
19.3 XRT UM6 Camera Position HXX-UM6-CVP-01 79

20 Ignored when Spoiler SP0 Is In, ST1/ST2 Are In, Stopper SH1 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 80
20.1 NEH3 HXRAY DVD Isolation Valve HX3-DVD-VGC-01 80

21 Ignored when Spoiler SP0 Is In, ST1/ST2 Are In, Stopper SH1 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 81
21.1 XPP SB2 VGC 01 Gate Valve Position 81
21.2 XPP SB2 VGC 02 Gate Valve Position 81
21.3 XPP SB2 VGC 03 Gate Valve Position 81

22 Ignored when Spoiler SP0 Is In, ST1/ST2 Are In, Stopper SH1 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 82
22.1 HX2 UVD VGC 01 Gate Valve Position 82

22.2 HX3 MON VGC 01 Gate Valve Position . . . 82
22.3 NEH1 Camera 124 Position . . . 82
22.4 NEH1 Camera 195 Position . . . 83
22.5 NEH1 XTOD H Isolation Valve Summary . . . 83
22.6 NEH2 HXRAY DVD Isolation Valve HX2-DVD-VGC-01 . . . 83
22.7 NEH3 HXRAY UVD Isolation Valve HX3-UVD-VGC-01 . . . 84

23 Ignored when Spoiler SP0 Is In, ST1/ST2 Are In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 85
23.1 FEE Camera 1561 Position . . . 85
23.2 FEE Camera 1692 Position . . . 85
23.3 FEE Camera 1953 Position . . . 85
23.4 FEE Camera 2953 Position . . . 86
23.5 FEE Camera 852 Position . . . 86
23.6 FEE Camera 913 Position . . . 86
23.7 FEE Fast Shutter Valve and System Summary . . . 87
23.8 FEE Gas Flow Aperture Summary . . . 87
23.9 FEE Gas Flow Vacuum Isolation Valve Summary . . . 87
23.10 FEE Instrument Vacuum Isolation Valve Summary . . . 87
23.11 FEE Solid Attenuators - Gas Pressure Interlock . . . 88
23.12 FEE Spectrometer Crystal - Beam Energy Too Low When Crystal Not Out . . . 89
23.13 FEE Spectrometer Crystal - Pulse Energy Too High When Crystal Not Out . . . 89
23.14 FEE XTOD H Isolation Valve Summary . . . 89
23.15 FEE XTOD S1 Isolation Valve Summary . . . 90
23.16 FEE XTOD S2 Isolation Valve Summary . . . 90
23.17 FEE1 M1S Mirror Beam Energy Upper Limit . . . 90
23.18 FEE1 M1S Mirror State . . . 91
23.19 Gas Detector Problem When FEE Spectrometer Crystal Not Out . . . 91
23.20 HXR - Beam Energy Too Low With M1S Out . . . 91

24 Ignored when Stopper: BSY D2 Summary Is In 92
24.1 Stopper: ST1/ST2 Position . . . 92

25 Ignored when Stopper: BSY D2 Summary Is In or TDUND Is In 93
25.1 HXRSS Beamline Position . . . 93
25.2 HXRSS Chicane Bend Magnet Power Supply . . . 93
25.3 HXRSS Crystal Position . . . 93
25.4 HXRSS Crystal Valid Position . . . 94
25.5 HXRSS Mode State . . . 94
25.6 SXRSS Grating/M1 GRAT UND1 934 Position . . . 96
25.7 SXRSS M2 MIRR UND1 964 Position . . . 96
25.8 SXRSS M3 MIRR UND1 966 Position . . . 97
25.9 SXRSS Mode State . . . 97
25.10 SXRSS SLIT UND1 962 Position . . . 100
25.11 SXRSS Watchdog . . . 100

26 Ignored when Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In **101**
26.1 BCS LION LTU1 404 Threshold . . . 101
26.2 BCS LION LTU1 405 Threshold . . . 101
26.3 BCS LION LTU1 504 Threshold . . . 101
26.4 BCS LION LTU1 505 Threshold . . . 101
26.5 BCS LION LTU1 584 Threshold . . . 102
26.6 BCS LION LTU1 585 Threshold . . . 102
26.7 BCS LION LTU1 716 Threshold . . . 102
26.8 BCS LION LTU1 717 Threshold . . . 102
26.9 BCS LION LTU1 732 Threshold . . . 103
26.10 BCS LION LTU1 733 Threshold . . . 103
26.11 BCS LION LTU1 752 Threshold . . . 103
26.12 BCS LION LTU1 753 Threshold . . . 103
26.13 BCS LION LTU1 765 Threshold . . . 104
26.14 BCS LION LTU1 766 Threshold . . . 104
26.15 BOD UND1 1005 . . . 104
26.16 BOD UND1 1305 . . . 104
26.17 BYD Watchdog . . . 105
26.18 Magnet In Tolerance: QE31 . . . 105
26.19 Magnet In Tolerance: QUM1 . . . 105
26.20 Magnet In Tolerance: QUM2 . . . 105
26.21 Magnet In Tolerance: QUM3 . . . 106
26.22 Magnet In Tolerance: QUM4 . . . 106
26.23 Magnet Power: QE31 . . . 106
26.24 Magnet Power: QUM1 . . . 106
26.25 Magnet Power: QUM2 . . . 107
26.26 Magnet Power: QUM3 . . . 107
26.27 Magnet Power: QUM4 . . . 107
26.28 OTR30 LTU1 449 Position When TDUND Not In . . . 107
26.29 OTR33 Position When TDUND Not In . . . 108
26.30 PIC Raw Charge Thresholds: DMP1 698 . . . 108
26.31 PIC Raw Charge Thresholds: DMP1 699 . . . 108
26.32 Profile Monitor BSY0 45 Position When D2 or TDUND Not In . . . 109
26.33 Spoiler SP0 DMP1 765 Position . . . 109
26.34 VVFS DMP1 107 Position . . . 109
26.35 VVMG DMP1 743 Position . . . 109
26.36 VVMG UND1 1645 Position . . . 110
26.37 VVMG UND1 1655 Position . . . 110
26.38 VVPG DMP1 355 Position . . . 110
26.39 YAG LTU1 743 Position When TDUND Not In (PSI Prof Mon) . . . 111

27 Ignored when Stopper: BSY D2 Summary Is In, TD11 Is In, YAG01 Is In, or YAG02 Is In **112**
27.1 BCS PIC RAW Charge Threshold DMP 997 . . . 112
27.2 BCS PIC RAW Charge Threshold DMP 998 . . . 112

27.3 BLM Heartbeat: Dechirper LTU1 BLF545 . . . 112
27.4 BLM Pedestal Thresholds: Dechirper LTU1 BLF545 . . . 113
27.5 BLM Raw Charge Thresholds: Dechirper LTU1 BLF545 . . . 113
27.6 BYKIK 120 Hz Abort Trigger . . . 113
27.7 BYKIK 120 Hz Standby Trigger . . . 114
27.8 BYKIK 30 Hz Abort Trigger . . . 114
27.9 BYKIK 30 Hz Standby Trigger . . . 114
27.10 BYKIK Readback Signal . . . 114
27.11 LTU Dechirper - Horizontal Gap Too Small . . . 115
27.12 LTU Dechirper - Vertical Gap Too Small . . . 115
27.13 Magnet In Tolerance: BYD1 . . . 115
27.14 Magnet Power: BYD1 . . . 116
27.15 OTR30 LTU1 449 Position . . . 116
27.16 OTR33 Position . . . 116
27.17 TDUND Flow Switch Fault With TDUND Not Out . . . 117
27.18 TDUND Position . . . 117
27.19 Temperature RTD Summary: BSY Common Line Past D2 . . . 117
27.20 THZ-2 Position . . . 118
27.21 Undulator Beam Energy Lower Limit . . . 118
27.22 VVFS LTU1 102 Position . . . 118
27.23 VVMG LTU1 174 Position . . . 118
27.24 VVMG LTU1 355 Position . . . 119
27.25 VVMG LTU1 670 Position . . . 119
27.26 VVMG LTU1 742 Position . . . 119
27.27 VVMG LTU1 774 Position . . . 119
27.28 VVMG UND1 932 Position . . . 120
27.29 VVMG UND1 968 Position . . . 120
27.30 VVPG DMP1 103 Position . . . 120
27.31 VVPG DMP1 395 Position . . . 120
27.32 VVPG DMP1 700 Position . . . 121
27.33 VVPG LTU1 100 Position . . . 121
27.34 VVPG LTU1 265 Position . . . 121
27.35 VVPG LTU1 435 Position . . . 121
27.36 VVPG LTU1 580 Position . . . 122
27.37 VVPG LTU1 725 Position . . . 122
27.38 VVPG LTU1 757 Position . . . 122
27.39 VVPG LTU1 999 Position . . . 122
27.40 VVPG UND1 1000 Position . . . 123
27.41 VVPG UND1 2500 Position . . . 123
27.42 YAG LTU1 743 Position (PSI Prof Mon) . . . 123

28 Ignored when TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In 124
28.1 BFW 1010 Position . . . 124
28.2 BFW 110 Position . . . 124
28.3 BFW 1110 Position . . . 124

28.4 BFW 1210 Position . . . 125
28.5 BFW 1310 Position . . . 125
28.6 BFW 1410 Position . . . 125
28.7 BFW 1510 Position . . . 126
28.8 BFW 1610 Position . . . 126
28.9 BFW 1710 Position . . . 126
28.10 BFW 1810 Position . . . 127
28.11 BFW 1910 Position . . . 127
28.12 BFW 2010 Position . . . 127
28.13 BFW 210 Position . . . 128
28.14 BFW 2110 Position . . . 128
28.15 BFW 2210 Position . . . 128
28.16 BFW 2310 Position . . . 129
28.17 BFW 2410 Position . . . 129
28.18 BFW 2510 Position . . . 129
28.19 BFW 2610 Position . . . 130
28.20 BFW 2710 Position . . . 130
28.21 BFW 2810 Position . . . 130
28.22 BFW 2910 Position . . . 131
28.23 BFW 3010 Position . . . 131
28.24 BFW 310 Position . . . 131
28.25 BFW 3110 Position . . . 132
28.26 BFW 3210 Position . . . 132
28.27 BFW 3310 Position . . . 132
28.28 BFW 410 Position . . . 133
28.29 BFW 510 Position . . . 133
28.30 BFW 610 Position . . . 133
28.31 BFW 710 Position . . . 134
28.32 BFW 810 Position . . . 134
28.33 BFW 910 Position . . . 134
28.34 BFW Inserted Count . . . 134
28.35 BLM Argonne Heartbeat (LN32) . . . 136
28.36 BLM Argonne Heartbeat (LN33) . . . 136
28.37 BLM Argonne Heartbeat (LN35) . . . 136
28.38 BLM Argonne Heartbeat (LN36) . . . 137
28.39 BLM Argonne Heartbeat (LN37) . . . 137
28.40 BLM HVPS LTU1 762 . . . 137
28.41 BLM HVPS UND1 120 . . . 138
28.42 BLM HVPS UND1 1720 . . . 138
28.43 BLM HVPS UND1 2221 . . . 138
28.44 BLM HVPS UND1 2520 . . . 139
28.45 BLM HVPS UND1 3320 . . . 139
28.46 BLM HVPS UND1 920 . . . 139
28.47 BLM Pedestal Threshold: LTU1 722 . . . 140
28.48 BLM Pedestal Threshold: LTU1 732 . . . 140

28.49 BLM Pedestal Threshold: LTU1 762 . . . 140
28.50 BLM Pedestal Threshold: LTU1 772 . . . 141
28.51 BLM Pedestal Thresholds: LTU1 980 . . . 141
28.52 BLM Pedestal Thresholds: UND 1021 . . . 141
28.53 BLM Pedestal Thresholds: UND 1121 . . . 142
28.54 BLM Pedestal Thresholds: UND 120 . . . 142
28.55 BLM Pedestal Thresholds: UND 121 . . . 142
28.56 BLM Pedestal Thresholds: UND 1221 . . . 143
28.57 BLM Pedestal Thresholds: UND 1321 . . . 143
28.58 BLM Pedestal Thresholds: UND 1421 . . . 143
28.59 BLM Pedestal Thresholds: UND 1521 . . . 144
28.60 BLM Pedestal Thresholds: UND 1621 . . . 144
28.61 BLM Pedestal Thresholds: UND 1720 . . . 144
28.62 BLM Pedestal Thresholds: UND 1721 . . . 145
28.63 BLM Pedestal Thresholds: UND 1821 . . . 145
28.64 BLM Pedestal Thresholds: UND 1921 . . . 145
28.65 BLM Pedestal Thresholds: UND 2021 . . . 146
28.66 BLM Pedestal Thresholds: UND 2121 . . . 146
28.67 BLM Pedestal Thresholds: UND 221 . . . 146
28.68 BLM Pedestal Thresholds: UND 2221 . . . 147
28.69 BLM Pedestal Thresholds: UND 2321 . . . 147
28.70 BLM Pedestal Thresholds: UND 2421 . . . 147
28.71 BLM Pedestal Thresholds: UND 2520 . . . 148
28.72 BLM Pedestal Thresholds: UND 2521 . . . 148
28.73 BLM Pedestal Thresholds: UND 2621 . . . 148
28.74 BLM Pedestal Thresholds: UND 2721 . . . 149
28.75 BLM Pedestal Thresholds: UND 2821 . . . 149
28.76 BLM Pedestal Thresholds: UND 2921 . . . 149
28.77 BLM Pedestal Thresholds: UND 3021 . . . 150
28.78 BLM Pedestal Thresholds: UND 3121 . . . 150
28.79 BLM Pedestal Thresholds: UND 321 . . . 150
28.80 BLM Pedestal Thresholds: UND 3221 . . . 151
28.81 BLM Pedestal Thresholds: UND 3320 . . . 151
28.82 BLM Pedestal Thresholds: UND 3321 . . . 151
28.83 BLM Pedestal Thresholds: UND 421 . . . 152
28.84 BLM Pedestal Thresholds: UND 521 . . . 152
28.85 BLM Pedestal Thresholds: UND 621 . . . 152
28.86 BLM Pedestal Thresholds: UND 721 . . . 153
28.87 BLM Pedestal Thresholds: UND 821 . . . 153
28.88 BLM Pedestal Thresholds: UND 920 . . . 153
28.89 BLM Pedestal Thresholds: UND 921 . . . 154
28.90 BLM Pedestal Thresholds: UND BLF1 . . . 154
28.91 BLM Pedestal Thresholds: UND BLF17 . . . 154
28.92 BLM PEP Timing Check (LN30) . . . 155
28.93 BLM PEP Timing Check (LN32) . . . 155

28.94 BLM PEP Timing Check (LN33) . . . 155
28.95 BLM PEP Timing Check (LN35) . . . 156
28.96 BLM PEP Timing Check (LN36) . . . 156
28.97 BLM PEP Timing Check (LN37) . . . 156
28.98 BLM Raw Charge Thresholds: LTU1 722 . . . 157
28.99 BLM Raw Charge Thresholds: LTU1 732 . . . 157
28.100 BLM Raw Charge Thresholds: LTU1 762 . . . 157
28.101 BLM Raw Charge Thresholds: LTU1 772 . . . 158
28.102 BLM Raw Charge Thresholds: LTU1 980 . . . 158
28.103 BLM Raw Charge Thresholds: UND 1021 . . . 158
28.104 BLM Raw Charge Thresholds: UND 1121 . . . 159
28.105 BLM Raw Charge Thresholds: UND 120 . . . 159
28.106 BLM Raw Charge Thresholds: UND 121 . . . 159
28.107 BLM Raw Charge Thresholds: UND 1221 . . . 160
28.108 BLM Raw Charge Thresholds: UND 1321 . . . 160
28.109 BLM Raw Charge Thresholds: UND 1421 . . . 160
28.110 BLM Raw Charge Thresholds: UND 1521 . . . 161
28.111 BLM Raw Charge Thresholds: UND 1621 . . . 161
28.112 BLM Raw Charge Thresholds: UND 1720 . . . 161
28.113 BLM Raw Charge Thresholds: UND 1721 . . . 162
28.114 BLM Raw Charge Thresholds: UND 1821 . . . 162
28.115 BLM Raw Charge Thresholds: UND 1921 . . . 162
28.116 BLM Raw Charge Thresholds: UND 2021 . . . 163
28.117 BLM Raw Charge Thresholds: UND 2121 . . . 163
28.118 BLM Raw Charge Thresholds: UND 221 . . . 163
28.119 BLM Raw Charge Thresholds: UND 2221 . . . 164
28.120 BLM Raw Charge Thresholds: UND 2321 . . . 164
28.121 BLM Raw Charge Thresholds: UND 2421 . . . 164
28.122 BLM Raw Charge Thresholds: UND 2520 . . . 165
28.123 BLM Raw Charge Thresholds: UND 2521 . . . 165
28.124 BLM Raw Charge Thresholds: UND 2621 . . . 165
28.125 BLM Raw Charge Thresholds: UND 2721 . . . 166
28.126 BLM Raw Charge Thresholds: UND 2821 . . . 166
28.127 BLM Raw Charge Thresholds: UND 2921 . . . 166
28.128 BLM Raw Charge Thresholds: UND 3021 . . . 167
28.129 BLM Raw Charge Thresholds: UND 3121 . . . 167
28.130 BLM Raw Charge Thresholds: UND 321 . . . 167
28.131 BLM Raw Charge Thresholds: UND 3221 . . . 168
28.132 BLM Raw Charge Thresholds: UND 3320 . . . 168
28.133 BLM Raw Charge Thresholds: UND 3321 . . . 168
28.134 BLM Raw Charge Thresholds: UND 421 . . . 169
28.135 BLM Raw Charge Thresholds: UND 521 . . . 169
28.136 BLM Raw Charge Thresholds: UND 621 . . . 169
28.137 BLM Raw Charge Thresholds: UND 721 . . . 170
28.138 BLM Raw Charge Thresholds: UND 821 . . . 170

28.139 BLM Raw Charge Thresholds: UND 920 . . . 170
28.140 BLM Raw Charge Thresholds: UND 921 . . . 171
28.141 BLM Raw Charge Thresholds: UND BLF1 . . . 171
28.142 BLM Raw Charge Thresholds: UND BLF17 . . . 171
28.143 BLM Timing Check (BLM:UND1:4) . . . 172
28.144 BLM Timing Check (LN30) . . . 172
28.145 BLM Trigger Missed (LN30) . . . 172
28.146 BLM Trigger Missed (LN32) . . . 172
28.147 BLM Trigger Missed (LN33) . . . 173
28.148 BLM Trigger Missed (LN35) . . . 173
28.149 BLM Trigger Missed (LN36) . . . 173
28.150 BLM Trigger Missed (LN37) . . . 173
28.151 BLM/PIC Watchdog: Downstream of TDUND . . . 174
28.152 BPM Summary (1-9) . . . 174
28.153 BPM Summary (10-18) . . . 174
28.154 BPM Summary (19-27) . . . 174
28.155 BPM Summary (28-36) . . . 175
28.156 OTR01 IN20 541 Position and TDUND Not In . . . 175
28.157 OTR02 IN20 571 Position and TDUND Not In . . . 175
28.158 OTR03 IN20 621 Position and TDUND Not In . . . 176
28.159 OTR04 IN20 711 Position and TDUND Not In . . . 176
28.160 OTR11 LI21 237 Position and TDUND Not In . . . 176
28.161 OTR12 LI21 291 Position and TDUND Not In . . . 177
28.162 OTR21 Position When TDUND Not In . . . 177
28.163 OTR22 Position When TDUND Not In . . . 177
28.164 OTRH1 Position When TDUND Not In . . . 178
28.165 OTRH2 Position When TDUND Not In . . . 178
28.166 PIC HVPS B921 - Location B921-2235 . . . 178
28.167 PIC Trigger Missed (LN34) . . . 178
28.168 THz Radiator Beryllium Foil . . . 179
28.169 Toroid Comparator (IMUNDI vs IMUNDO) . . . 179
28.170 Toroid Comparator (IMUNDO vs IMDUMP) . . . 179
28.171 Toroid Comparator Power Status (B921) . . . 180

29 Ignored when TD11 Is In, YAG01 Is In, or YAG02 Is In 181
29.1 BLM/PIC Watchdog BSY0/BSYA . . . 181
29.2 BLM/PIC Watchdog LI24 . . . 181
29.3 BLM/PIC Watchdog LI30 . . . 181
29.4 BSY GLAST Target Flow Switch . . . 182
29.5 BSY GLAST Target Klixon . . . 182
29.6 BSY GLAST Target Position . . . 182
29.7 Bunch Length Monitor BL21 Position . . . 183
29.8 Flowswitch: BSY PC320 . . . 183
29.9 Flowswitch: BSY PC90 . . . 183
29.10 Flowswitch: BSY RAD LCW Slit 10/30 . . . 183

29.11 Flowswitch: CE21 . . . 184
29.12 Flowswitch: COLL BSY0 16 (50PC20) . . . 184
29.13 Flowswitch: COLL BSY0 33 (50PC30) . . . 184
29.14 Flowswitch: COLL BSY0 45 (50PC-45) . . . 184
29.15 Flowswitch: COLL BSY0 59 (PC0119) . . . 185
29.16 Flowswitch: COLL BSY0 65 (PC0145) . . . 185
29.17 Flowswitch: COLL BSY0 67 (PC0155) . . . 185
29.18 Flowswitch: COLL BSY0 69 (PC0165) . . . 185
29.19 Flowswitch: COLL BSY0 71 (PC0175) . . . 186
29.20 Flowswitch: COLL BSY0 73 (PC0185) . . . 186
29.21 Flowswitch: COLL BSY0 75 (PC0195) . . . 186
29.22 Hydrogen Recombiner For BSY 1 Collimator . . . 186
29.23 Hydrogen Recombiner For BSY 2 Slit 10/30 . . . 187
29.24 Ion Chamber Gas Flowswitch BSY A . . . 187
29.25 Ion Chamber Gas Flowswitch BSY B . . . 187
29.26 Ion Chamber Gas Flowswitch BSY C . . . 187
29.27 KICK BSY0 66 PM1 State (A-Line Kicker) . . . 188
29.28 KICK BSY0 66 PM1 Trigger State (A-Line Kicker) . . . 188
29.29 KICK BSY0 66 PM2 State (A-Line Kicker) . . . 188
29.30 KICK BSY0 66 PM2 Trigger State (A-Line Kicker) . . . 189
29.31 OTR21 Position . . . 189
29.32 OTR22 Position . . . 189
29.33 PIC Gas Pressure LI24 . . . 190
29.34 PIC HVPS B911 - Location B911-2135 . . . 190
29.35 PIC HVPS B912 - Location B912-2135 . . . 190
29.36 PIC HVPS B913 - Location B913-2135 . . . 190
29.37 PIC HVPS BSY 1 - Location B005-3921 . . . 191
29.38 PIC HVPS BSY 2 - Location B005-3921 . . . 191
29.39 PIC HVPS BSY 3 - Location B005-3921 . . . 191
29.40 PIC HVPS BSY 4 - Location B005-3918 . . . 191
29.41 PIC HVPS BSY 5 - Location B005-3918 . . . 192
29.42 PIC HVPS BSY 6 - Location B005-3918 . . . 192
29.43 PIC HVPS LI24 - Location LKF24-0235 . . . 192
29.44 PIC Raw Charge Thresholds: LTU1 220 . . . 192
29.45 PIC Raw Charge Thresholds: LTU1 252 . . . 193
29.46 PIC Raw Charge Thresholds: LTU1 280 . . . 193
29.47 PIC Raw Charge Thresholds: LTU1 420 . . . 193
29.48 PIC Raw Charge Thresholds: LTU1 450 . . . 194
29.49 PIC Raw Charge Thresholds: LTU1 480 . . . 194
29.50 PIC Raw Charge Thresholds: LTU1 722 . . . 194
29.51 PIC Raw Charge Thresholds: LTU1 732 . . . 195
29.52 PIC Raw Charge Thresholds: LTU1 762 . . . 195
29.53 PIC Raw Charge Thresholds: LTU1 772 . . . 195
29.54 PIC Trigger Missed (LN28) . . . 196
29.55 PIC Trigger Missed (LN29) . . . 196

29.56 PIC Trigger Missed (LN31) . . . 196
29.57 Profile Monitor BSY0 45 Position . . . 196
29.58 Stopper: BSY D2, 60, 61 DM60 Summary . . . 197
29.59 Temperature RTD Summary: BSY Common Line Before D2 . . . 199
29.60 Toroid Chassis IMBC2 . . . 199
29.61 Toroid Comparator IMBC2IN/IMBC2OUT . . . 200
29.62 VVPG BSY0 IV2 Position . . . 200
29.63 VVPG BSY0 IV3 Position . . . 200
29.64 VVPG BSY0 IV4 Position . . . 201

30 Ignored when YAG01 Is In 202
30.1 BXG Status . . . 202
30.2 Toroid Peak Current Monitor IM01 . . . 202
30.3 YAG02 IN20 241 Position . . . 202

31 Ignored when YAG01 Is In or YAG02 Is In 203
31.1 BLM/PIC Watchdog: Upstream of TDUND . . . 203
31.2 BX01/BX02 Status . . . 203
31.3 Dump LI28 5879 Flowswitch . . . 203
31.4 Dump LI28 5879 Klixon . . . 203
31.5 Fast Shutter FV2 LI30 Position . . . 204
31.6 Fast Shutter FV2A LI30 Position . . . 204
31.7 Flowswitch: CE11 . . . 204
31.8 Flowswitch: COLL LI28-9 . . . 204
31.9 Flowswitch: COLL LI29-1 . . . 205
31.10 Flowswitch: COLL LI29-4 . . . 205
31.11 Flowswitch: COLL LI29-5 . . . 205
31.12 Flowswitch: COLL LI29-9 . . . 205
31.13 Flowswitch: COLL LI30-1 . . . 206
31.14 Flowswitch: COLL LI30-4 . . . 206
31.15 Flowswitch: COLL LI30-5 . . . 206
31.16 Flowswitch: TD11 . . . 206
31.17 Main Manifold Gauge: LI21 Station 5 . . . 207
31.18 Main Manifold Gauge: LI22 Station 5 . . . 207
31.19 Main Manifold Gauge: LI23 Station 5 . . . 207
31.20 Main Manifold Gauge: LI24 Station 5 . . . 207
31.21 Main Manifold Gauge: LI25 Station 5 . . . 208
31.22 Main Manifold Gauge: LI26 Station 5 . . . 208
31.23 Main Manifold Gauge: LI27 Station 5 . . . 208
31.24 Main Manifold Gauge: LI28 Station 5 . . . 208
31.25 Main Manifold Gauge: LI29 Station 5 . . . 209
31.26 Main Manifold Gauge: LI30 Station 5 . . . 209
31.27 Main Manifold Gauge: LI30 Station 9 . . . 209
31.28 Mirror BL11 Position . . . 209
31.29 OTR LI25 920 Position . . . 210

31.30 OTR01 IN20 541 Position . . . 210
31.31 OTR02 IN20 571 Position . . . 210
31.32 OTR03 IN20 621 Position . . . 211
31.33 OTR04 IN20 711 Position . . . 211
31.34 OTR11 LI21 237 Position . . . 211
31.35 OTR12 LI21 291 Position . . . 212
31.36 OTRH1 Position . . . 212
31.37 OTRH2 Position . . . 212
31.38 PIC HVPS LI30 - KG30-C1322 . . . 213
31.39 PIC Raw Charge Thresholds: LI24 791 . . . 213
31.40 PIC Raw Charge Thresholds: LI24 811 . . . 213
31.41 PIC Trigger Missed (LN16) . . . 213
31.42 Scraper Water LI21-9 (Station 22-1) . . . 214
31.43 Scraper Water LI22-9 (Station 23-1) . . . 214
31.44 Scraper Water LI23-9 (Station 24-1) . . . 214
31.45 Scraper Water LI24-9 (Station 25-1) . . . 214
31.46 Scraper Water LI25-9 (Station 26-1) . . . 215
31.47 Scraper Water LI26-9 (Station 27-1) . . . 215
31.48 Scraper Water LI27-9 (Station 28-1) . . . 215
31.49 Scraper Water LI28-9 (Station 29-1) . . . 215
31.50 Scraper Water LI29-9 (Station 30-1) . . . 216
31.51 Stopper LI28 950 and 960 Position . . . 216
31.52 Sub-booster Ready: LI21 . . . 216
31.53 Sub-booster Ready: LI22 . . . 216
31.54 Sub-booster Ready: LI25 . . . 217
31.55 Sub-booster Ready: LI26 . . . 217
31.56 Sub-booster Ready: LI27 . . . 217
31.57 Sub-booster Ready: LI28 . . . 217
31.58 Sub-booster Ready: LI29 . . . 218
31.59 Sub-booster Ready: LI30 . . . 218
31.60 TD11 Position . . . 218
31.61 Toroid Chassis IM11 . . . 218
31.62 Toroid Chassis IM12 . . . 219
31.63 Toroid Comparator IMBC1IN/IMBC1OUT . . . 219
31.64 VVFS LI21-9 Position (Station 22-1) . . . 219
31.65 VVFS LI22-9 Position (Station 23-1) . . . 219
31.66 VVFS LI23-9 Position (Station 24-1) . . . 220
31.67 VVFS LI24-9 Position (Station 25-1) . . . 220
31.68 VVFS LI25-9 Position (Station 26-1) . . . 220
31.69 VVFS LI26-9 Position (Station 27-1) . . . 220
31.70 VVFS LI27-9 Position (Station 28-1) . . . 221
31.71 VVFS LI28-9 Position (Station 29-1) . . . 221
31.72 VVFS LI29-9 Position (Station 30-1) . . . 221
31.73 VVFV IN20 785 Position . . . 221
31.74 VVMG LI21 195 Position . . . 222

31.75 VVMG LTU1 505 Position . . . 222
31.76 VVPG IN20 435 Position . . . 222
31.77 VVPG IN20 545 Position . . . 222
31.78 VVPG IN20 635 Position . . . 223
31.79 VVPG IN20 915 Position . . . 223
31.80 VVPG LI21-9 Position (Station 22-1) . . . 223
31.81 VVPG LI22-9 Position (Station 23-1) . . . 223
31.82 VVPG LI23-9 Position (Station 24-1) . . . 224
31.83 VVPG LI24 710 Position . . . 224
31.84 VVPG LI24 896 Position . . . 224
31.85 VVPG LI25-9 Position (Station 26-1) . . . 224
31.86 VVPG LI26-9 Position (Station 27-1) . . . 225
31.87 VVPG LI27-9 Position (Station 28-1) . . . 225
31.88 VVPG LI28-9 Position (Station 29-1) . . . 225
31.89 VVPG LI29-9 Position (Station 30-1) . . . 225
31.90 VVPG LI30-9 Position (Station 30-9) . . . 226
31.91 VVS Circuit Breaker: LI22 . . . 226
31.92 VVS Circuit Breaker: LI24 . . . 226
31.93 VVS Circuit Breaker: LI26 . . . 226
31.94 VVS Circuit Breaker: LI28 . . . 227
31.95 VVS Circuit Breaker: LI30 . . . 227
31.96 YAG03 IN20 351 Position . . . 227
31.97 YAGS1 IN20 921 Position . . . 227
31.98 YAGS2 LI21 995 Position . . . 228

32 Always Evaluated **229**
32.1 Backward Beam Stopper (RST1) . . . 229
32.2 BLM/PIC Watchdog: IN20 . . . 229
32.3 Bypass Recover . . . 229
32.4 DPS Temperature LI30 . . . 229
32.5 Gun RF Peak Power 20-6 . . . 230
32.6 Gun Waveguide Vacuum Summary . . . 230
32.7 IOC-IN20-MP01 MPS Support IOC Heartbeat . . . 230
32.8 Laser Heater Attenuator Position . . . 230
32.9 MCC Emergency Radiation Stopper . . . 231
32.10 Mechanical Shutter Position . . . 231
32.11 Mirror AM01 Position . . . 231
32.12 MPS Beam Permit: BYKIK . . . 231
32.13 MPS Beam Permit: Gun RF . . . 232
32.14 MPS Beam Permit: Heater Shutter . . . 232
32.15 MPS Beam Permit: Mechanical Shutter . . . 232
32.16 MPS Mechanical Shutter Position . . . 232
32.17 PIC HVPS LI20 - Location LKG-1535 . . . 233
32.18 PIC Raw Charge Thresholds: BSY0 16 . . . 233
32.19 PIC Raw Charge Thresholds: BSY0 33 . . . 233

32.20 PIC Raw Charge Thresholds: BSY0 45 . . . 234
32.21 PIC Raw Charge Thresholds: BSY0 59 . . . 234
32.22 PIC Raw Charge Thresholds: BSY0 78A . . . 234
32.23 PIC Raw Charge Thresholds: BSY0 78B . . . 235
32.24 PIC Raw Charge Thresholds: IN20 185 . . . 235
32.25 PIC Raw Charge Thresholds: IN20 232 . . . 235
32.26 PIC Raw Charge Thresholds: IN20 245 . . . 236
32.27 PIC Raw Charge Thresholds: IN20 665 . . . 236
32.28 PIC Raw Charge Thresholds: IN20 775 . . . 236
32.29 PIC Raw Charge Thresholds: IN20 933 . . . 237
32.30 PIC Raw Charge Thresholds: LI28 916 . . . 237
32.31 PIC Raw Charge Thresholds: LI29 146 . . . 237
32.32 PIC Raw Charge Thresholds: LI29 446 . . . 238
32.33 PIC Raw Charge Thresholds: LI29 546 . . . 238
32.34 PIC Raw Charge Thresholds: LI29 801 . . . 238
32.35 PIC Raw Charge Thresholds: LI29 956 . . . 239
32.36 PIC Raw Charge Thresholds: LI30 146 . . . 239
32.37 PIC Raw Charge Thresholds: LI30 446 . . . 239
32.38 PIC Raw Charge Thresholds: LI30 546 . . . 240
32.39 PIC Raw Charge Thresholds: LI30 801 . . . 240
32.40 PIC Trigger Missed (LN11) . . . 240
32.41 PIC Trigger Missed (LN22) . . . 240
32.42 PIC Trigger Missed (LN25) . . . 241
32.43 Pockels Cell AND Gate 100 . . . 241
32.44 Pockels Cell AND Gate 200 . . . 241
32.45 Rate Request: BYKIK 1 Hz . . . 241
32.46 Rate Request: BYKIK 10 Hz . . . 242
32.47 Rate Request: BYKIK 30 Hz . . . 242
32.48 Rate Request: BYKIK 60 Hz . . . 242
32.49 Rate Request: BYKIK Burst . . . 242
32.50 Rate Request: BYKIK Single Shot . . . 243
32.51 Rate Request: Pockels Cell 1 Hz . . . 243
32.52 Rate Request: Pockels Cell 10 Hz . . . 243
32.53 Rate Request: Pockels Cell 30 Hz . . . 243
32.54 Rate Request: Pockels Cell 60 Hz . . . 244
32.55 Rate Request: Pockels Cell Burst . . . 244
32.56 Rate Request: Pockels Cell Single Shot . . . 244
32.57 VVMG IN20 175 Position . . . 244
32.58 VVPG IN20 155 Position . . . 245
32.59 VVS Circuit Breaker: LI20 . . . 245
32.60 YAG01 IN20 211 Position . . . 245
32.61 YAGG1 IN20 841 Position . . . 245

33 Ignore Logic **247**
33.1 A-Line B1/B2 Is Not On AND A-Line Kicker Is Not Enabled . . . 247

33.2 A-Line SL10 Is Closed . . . 247
33.3 BX01/BX02 Is Off . . . 247
33.4 BX01/BX02 Is On . . . 248
33.5 BXG Is Off . . . 248
33.6 BXG Is On . . . 248
33.7 Diag Stopper HFX DG2 Is In . . . 248
33.8 Diag Stopper HFX UM6 Is In . . . 249
33.9 Diag Stopper XCS SB1 Is In . . . 249
33.10 Laser Heater Attenuator Is In . . . 249
33.11 LTU Dechirper Is Out . . . 249
33.12 M3H Mirror Is In Beam . . . 250
33.13 M3H Mirror Is Out of Beam . . . 250
33.14 Spoiler SP0 Is In . . . 250
33.15 ST1/ST2 Are In . . . 250
33.16 Stopper MFX S4.5 Is In . . . 250
33.17 Stopper S1 Is In . . . 251
33.18 Stopper S2 Is In . . . 251
33.19 Stopper S2B Is In . . . 251
33.20 Stopper S5B Is In . . . 251
33.21 Stopper SH1 Is In . . . 252
33.22 Stopper SH2 Is In . . . 252
33.23 Stopper XRT S5 Is In . . . 252
33.24 Stopper XRT S6 Is In . . . 252
33.25 Stopper: BSY D2 Summary Is In . . . 252
33.26 TD11 Is In . . . 253
33.27 TDUND Is In . . . 253
33.28 XCS Is Not In Main Line . . . 253
33.29 XPP-NH3-POS-00 Beamline Is In . . . 253
33.30 XPP-NH3-POS-00 Beamline Is Not In . . . 254
33.31 YAG01 Is In . . . 254
33.32 YAG02 Is In . . . 254

1 Ignored when A-Line B1/B2 Is Not On AND 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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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	PC	MS	BYKIK	LHS
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	PC	MS	BYKIK	LHS
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	PC	MS	BYKIK	LHS
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	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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	PC	MS	BYKIK	LHS
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	PC	MS	BYKIK	LHS
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	PC	MS	BYKIK	LHS
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	PC	MS	BYKIK	LHS
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 B1/B2 Is Not On AND 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	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
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*	PC	MS	BYKIK	LHS
NOT_OPEN	F	0 Hz	0 Hz	–	–
OPEN	T	120 Hz	120 Hz	–	–

Where
A = `VVPG_BSYA_1018_POSITION_STATE`

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

3.1 Toroid Comparator IM02/IM03

Name	*B*	*A*	PC	MS	BYKIK	LHS
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

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

4.1 BXS Status

Name	*A*	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `BEND_IN20_931_OK_STATE`

4.2 Toroid Comparator IM02/IMS1

Name	*B*	*A*	PC	MS	BYKIK	LHS
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`

5 Ignored when BXG Is Off or YAG01 Is In

5.1 Wakefield Shield Gun Spectrometer

Name	*A*	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
OK	T	10 Hz	10 Hz	10 Hz	–

Where
A = `WL_BL231_IN_STATE`

6 Ignored when BXG Is On or YAG01 Is In

6.1 Wakefield Shield Straight Ahead

Name	A	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `WL_BL231_OUT_STATE`

7 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, Diag Stopper XCS SB1 Is In, Spoiler SP0 Is In, ST1/ST2 Are In, Stopper SH1 Is In, Stopper SH2 Is In, Stopper XRT S5 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, XCS Is Not In Main Line, YAG01 Is In, or YAG02 Is In

7.1 XCS SB1 VGC 02 Gate Valve Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Open	F	T	120 Hz	120 Hz	120 Hz	–
Closed	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

7.2 XCS SB2 VGC 01 Gate Valve Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Open	F	T	120 Hz	120 Hz	120 Hz	–
Closed	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

8 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, Spoiler SP0 Is In, ST1/ST2 Are In, Stopper S5B Is In, Stopper SH1 Is In, Stopper SH2 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

8.1 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	PC	MS	BYKIK	LHS
Config 1 Fault	0	0 Hz	0 Hz	0 Hz	–
Config 1 Ok	1	120 Hz	120 Hz	120 Hz	–
Not In Config 1	2	120 Hz	120 Hz	120 Hz	–

8.2 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	PC	MS	BYKIK	LHS
Faulted	0	0 Hz	0 Hz	0 Hz	–
Ok	1	120 Hz	120 Hz	120 Hz	–
Not In Config 2	2	120 Hz	120 Hz	120 Hz	–

8.3 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	PC	MS	BYKIK	LHS
Faulted	0	0 Hz	0 Hz	0 Hz	–
Ok	1	120 Hz	120 Hz	120 Hz	–
Not in Config 3	2	120 Hz	120 Hz	120 Hz	–

8.4 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	PC	MS	BYKIK	LHS
Faulted	0	0 Hz	0 Hz	0 Hz	–
Ok	1	120 Hz	120 Hz	120 Hz	–
Not In Config 4	2	120 Hz	120 Hz	120 Hz	–

8.5 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	PC	MS	BYKIK	LHS
Faulted	0	0 Hz	0 Hz	0 Hz	–
Ok	1	120 Hz	120 Hz	120 Hz	–
Not In Config 5	2	120 Hz	120 Hz	120 Hz	–

8.6 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	PC	MS	BYKIK	LHS
Faulted	0	0 Hz	0 Hz	0 Hz	–
Ok	1	120 Hz	120 Hz	120 Hz	–
Not In Config 6	2	120 Hz	120 Hz	120 Hz	–

8.7 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	PC	MS	BYKIK	LHS
Faulted	0	0 Hz	0 Hz	0 Hz	–
Ok	1	120 Hz	120 Hz	120 Hz	–
Not In Config 7	2	120 Hz	120 Hz	120 Hz	–

8.8 CXI KB2 VGC 02 Gate Valve Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Open	F	T	120 Hz	120 Hz	120 Hz	–
Closed	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

8.9 CXI MPS PLC Readiness Status

Name	*A*	PC	MS	BYKIK	LHS
PLC Not OK	F	0 Hz	0 Hz	0 Hz	–
PLC OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `CXI_MPS_PLC_01_OK_STATUS`

8.10 CXI User Patch Panel 1 Ready

Name	*A*	PC	MS	BYKIK	LHS
Not Ready	F	0 Hz	0 Hz	0 Hz	–
Ready	T	120 Hz	120 Hz	120 Hz	–

Where
A = `CXI_USR_01_MPSFAULT_STATUS`

8.11 CXI User Patch Panel 2 Ready

Name	*A*	PC	MS	BYKIK	LHS
Not Ready	F	0 Hz	0 Hz	0 Hz	–
Ready	T	120 Hz	120 Hz	120 Hz	–

Where
A = `CXI_USR_02_MPSFAULT_STATUS`

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

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `CXI_DG1_VGC_01_OPN_DI_POSITION`

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

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `CXI_DG1_VGC_02_OPN_DI_POSITION`

8.14 CXI:DG2:VGC:01 Gate Valve Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Open	F	T	120 Hz	120 Hz	120 Hz	–
Closed	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

8.15 CXI:DG2:VGC:02 Gate Valve Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Open	F	T	120 Hz	120 Hz	120 Hz	–
Closed	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

8.16 CXI:DG4:VGC:01 Gate Valve Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Open	F	T	120 Hz	120 Hz	120 Hz	–
Closed	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `CXI_DG4_VGC_01_OPN_DI_POSITION`,
B = `CXI_DG4_VGC_01_CLS_DI_POSITION`

8.17 CXI:DSC:VGC:01 Gate Valve Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Open	F	T	120 Hz	120 Hz	120 Hz	–
Closed	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

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

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `CXI_KB1_VGC_01_OPN_DI_POSITION`

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

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `CXI_KB1_VGC_02_OPN_DI_POSITION`

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

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = CXI_KB2_VGC_01_OPN_DI_POSITION

8.21 CXI:SC1:VGC:01 Gate Valve Position

Name	B	A	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Open	F	T	120 Hz	120 Hz	120 Hz	–
Closed	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = CXI_SC1_VGC_01_OPN_DI_POSITION,
B = CXI_SC1_VGC_01_CLS_DI_POSITION

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

Name	A	PC	MS	BYKIK	LHS
Moving or Broken	F	0 Hz	0 Hz	0 Hz	–
Open or Closed	T	120 Hz	120 Hz	120 Hz	–

Where
A = CXI_SC3_VGC_01_OPN_DI_POSITION

8.23 HF4 LAM VGC 01 Gate Valve Position

Name	A	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = HF4_LAM_VGC_01_OPN_DI_POSITION

9 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, Spoiler SP0 Is In, ST1/ST2 Are In, Stopper SH1 Is In, Stopper SH2 Is In, Stopper XRT S5 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, XCS Is Not In Main Line, YAG01 Is In, or YAG02 Is In

9.1 XCS SB1 Diagnostic Stopper Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

9.2 XCS SB1 VGC 01 Gate Valve Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Open	F	T	120 Hz	120 Hz	120 Hz	–
Closed	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

10 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, Spoiler SP0 Is In, ST1/ST2 Are In, Stopper SH1 Is In, Stopper SH2 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

10.1 CXI XRT Laser Reference Mirror Position

Name	*A*	PC	MS	BYKIK	LHS
Mirror In Beam	F	0 Hz	0 Hz	0 Hz	–
Mirror Out of Beam	T	120 Hz	120 Hz	120 Hz	–

Where
A = `XRT_DIA_MMS_01_B_POSITION`

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

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `HFA_SND_VGC_01_OPN_DI_POSITION`

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

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `HFX_DIA_VGC_02_OPN_DI_POSITION`

10.4 PPS Stopper S5B Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
In	F	T	–	–	–	–
Out	T	F	–	–	–	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

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

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Closed	F	T	0 Hz	0 Hz	0 Hz	–
Open	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

11 Ignored when Diag Stopper HFX DG2 Is In, Diag Stopper HFX UM6 Is In, Spoiler SP0 Is In, ST1/ST2 Are In, Stopper SH1 Is In, Stopper SH2 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

11.1 HFX:DG2:VGC:01 Gate Valve Position

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `HFX_DG2_VGC_01_OPN_DI_POSITION`

11.2 HFX:MON:VGC:01 Gate Valve Position

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `HFX_MON_VGC_01_OPN_DI_POSITION`

11.3 HFX:MON:VGC:02 Gate Valve Position

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `HFX_MON_VGC_02_OPN_DI_POSITION`

11.4 Stopper XRT S5 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `STPR_XRT1_1_S5OUT_POSITION`,
B = `STPR_XRT1_1_S5IN_POSITION`

12 Ignored when Diag Stopper HFX UM6 Is In, Spoiler SP0 Is In, ST1/ST2 Are In, Stopper MFX S4.5 Is In, Stopper SH1 Is In, Stopper SH2 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

12.1 MFX Beam Focusing Interlock (Beryllium Lens)

Name	*A*	PC	MS	BYKIK	LHS
Not Safe	F	0 Hz	0 Hz	0 Hz	–
Safe	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MFX_LENS_1_SAFE_STATE`

12.2 MFX MPS Summary - Downstream of S4.5

Name	*A*	PC	MS	BYKIK	LHS
Not Ok	F	0 Hz	0 Hz	0 Hz	–
Ok	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MFX_MPS_1_SUM_STATE`

13 Ignored when Diag Stopper HFX UM6 Is In, Spoiler SP0 Is In, ST1/ST2 Are In, Stopper SH1 Is In, Stopper SH2 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

13.1 MEC DV4 VCG 01 Gate Valve Position

Name	*A*	PC	MS	BYKIK	LHS
Not open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MEC_DV4_VGC_01_OPN_DI_POSITION`

13.2 MEC DV5 VGC 01 Gate Valve Position

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MEC_DV5_VGC_01_OPN_DI_POSITION`

13.3 MEC HXM VGC 01 Gate Valve Position

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MEC_HXM_VGC_01_OPN_DI_POSITION`

13.4 MEC XT1 Reference Laser Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MEC_XT1_MMS_01_B_POSITION`

13.5 MEC XT1 VGC 01 Gate Valve Position

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MEC_XT1_VGC_01_OPN_DI_POSITION`

13.6 MEC XT2 VGC 02 Gate Valve Position

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MEC_XT2_VGC_02_OPN_DI_POSITION`

13.7 MEC XT2 VGC 03 Gate Valve Position

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MEC_XT2_VGC_03_OPN_DI_POSITION`

13.8 MEC XT2 VGC 04 Gate Valve Position

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MEC_XT2_VGC_04_OPN_DI_POSITION`

13.9 MEC XT2 VGC 05 Gate Valve Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Open	F	T	120 Hz	120 Hz	120 Hz	–
Closed	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

13.10 MEC XT2 VGC 06 Gate Valve Position

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MEC_XT2_VGC_06_OPN_DI_POSITION`

14 Ignored when Diag Stopper HFX UM6 Is In, Spoiler SP0 Is In, ST1/ST2 Are In, Stopper SH1 Is In, Stopper SH2 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

14.1 DG2 Diagnostic Stopper Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
In	F	T	–	–	–	–
Out	T	F	–	–	–	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

14.2 MEC BXL VGC 01 Gate Valve Position

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MEC_BXL_VGC_01_OPN_DI_POSITION`

14.3 MEC M3H Mirror and DG2 STP Fault

Name	*B*	*A*	PC	MS	BYKIK	LHS
In Transit: DG2 STP Not In Beam, M3H Mirror Not Out	F	F	0 Hz	0 Hz	0 Hz	–
In Transit: DG2 STP Not In Beam, M3H Mirror Out	F	T	120 Hz	120 Hz	120 Hz	–
Safe: DG2 STP In Beam, M3H Mirror Not Out	T	F	120 Hz	120 Hz	120 Hz	–
Safe: DG2 STP In Beam, M3H Mirror Out	T	T	120 Hz	120 Hz	120 Hz	–

Where
A = HXX_HXM_MMS_01_B_POSITION,
B = HFX_DG2_STP_01_IN_DI_POSITION

14.4 MEC M3H Mirror Unknown Position Fault

Name	*B*	*A*	PC	MS	BYKIK	LHS
In Transit: M3H Mirror Neither In Nor Out	F	F	120 Hz	120 Hz	120 Hz	–
Out: M3H Mirror Out of Beam	F	T	120 Hz	120 Hz	120 Hz	–
In: M3H Mirror In Beam	T	F	120 Hz	120 Hz	120 Hz	–
Broken: M3H Mirror Both In And Out	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = HXX_HXM_MMS_01_B_POSITION,
B = HXX_HXM_MMS_01_INBEAM_POSITION

14.5 MEC XRT Attenuator Inspection Mirror Position

Name	*A*	PC	MS	BYKIK	LHS
Mirror Not Out	F	0 Hz	0 Hz	0 Hz	–
Mirror Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = MEC_HXM_MMS_04_B_POSITION

14.6 MFX Gate Valve Summary - Upstream of Stopper 4.5

Name	*A*	PC	MS	BYKIK	LHS
Not All Out	F	0 Hz	0 Hz	0 Hz	–
All Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = MFX_XRT_VGC_OUT_SUM_STATE

14.7 MFX Gate Valves Not All Open - PLC Summary Status

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MFX_MPS_PLC_VAC_OK_STATUS`

14.8 Stopper MFX S4.5 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

14.9 Stopper XRT S6 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
In	F	T	120 Hz	120 Hz	120 Hz	–
Out	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

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

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Closed	F	T	0 Hz	0 Hz	0 Hz	–
Open	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

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

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `HXX_MXT_VGC_01_OPN_DI_POSITION`

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

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `HXX_MXT_VGC_02_OPN_DI_POSITION`

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

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Closed	F	T	0 Hz	0 Hz	0 Hz	–
Open	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

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

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `HXX_MXT_VGC_05_OPN_DI_POSITION`

15 Ignored when Laser Heater Attenuator Is In

15.1 Laser Heater Photodiode Shutter Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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`

15.2 OTRH1 Position When LH Atten Not In

Name	*B*	*A*	PC	MS	BYKIK	LHS
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`

15.3 OTRH2 Position When LH Atten Not In

Name	*B*	*A*	PC	MS	BYKIK	LHS
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`

16 Ignored when Spoiler SP0 Is In, ST1/ST2 Are In, Stopper S1 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

16.1 NEH AMO Laser Reference Mirror Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = SAS_MMM_01_B_POSITION

16.2 NEH AMO Valves Ok for Beam - Summary From PLC

Name	*A*	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
Ok	T	120 Hz	120 Hz	120 Hz	–

Where
A = AMO_MPS_VAC_OK_SUM_STATE

16.3 NEH1 Camera 1124 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = CAMR_NEH1_1124_OUT_STATE,
B = CAMR_NEH1_1124_IN_STATE

16.4 NEH1 XTOD S1 Isolation Valve Summary

Name	*A*	PC	MS	BYKIK	LHS
Faulted	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VMPS_NEH_703_ISOL_S1_STATE`

17 Ignored when Spoiler SP0 Is In, ST1/ST2 Are In, Stopper S2 Is In, Stopper S2B Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

17.1 NEH SXR Differential Pump Isolation Valve SXR-DFP-VGC-01

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Closed	F	T	0 Hz	0 Hz	0 Hz	–
Open	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = SXR_DFP_VGC_01_CLS_DI_STATE,
B = SXR_DFP_VGC_01_OPN_DI_STATE

17.2 NEH SXR End Station Ready SXR-EXP-MPS-01

Name	*A*	PC	MS	BYKIK	LHS
Not Ready	F	0 Hz	0 Hz	0 Hz	–
Ready	T	120 Hz	120 Hz	120 Hz	–

Where
A = SXR_EXP_MPS_01_STATE

17.3 NEH SXR Intensity Monitor Isolation Valve SXR-FLX-VGC-01

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Closed	F	T	0 Hz	0 Hz	0 Hz	–
Open	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = SXR_FLX_VGC_01_CLS_DI_STATE,
B = SXR_FLX_VGC_01_OPN_DI_STATE

17.4 NEH SXR KB Optics Isolation Valve SXR-KBO-VGC-01

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Closed	F	T	0 Hz	0 Hz	0 Hz	–
Open	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = SXR_KBO_VGC_01_CLS_DI_STATE,
B = SXR_KBO_VGC_01_OPN_DI_STATE

17.5 NEH SXR Laser In-coupling Mirror Isolation Valve SXR-LIN-VGC-01

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Closed	F	T	0 Hz	0 Hz	0 Hz	–
Open	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = SXR_LIN_VGC_01_CLS_DI_STATE,
B = SXR_LIN_VGC_01_OPN_DI_STATE

18 Ignored when Spoiler SP0 Is In, ST1/ST2 Are In, Stopper S2 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

18.1 NEH Camera 2124 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `CAMR_NEH1_2124_OUT_STATE`,
B = `CAMR_NEH1_2124_IN_STATE`

18.2 NEH SXR Collimator 3 Isolation Valve SXR-COL-VGC-01

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Closed	F	T	0 Hz	0 Hz	0 Hz	–
Open	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `SXR_COL_VGC_01_CLS_DI_STATE`,
B = `SXR_COL_VGC_01_OPN_DI_STATE`

18.3 NEH SXR Exit Slits Isolation Valve SXR-EXS-VGC-01

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Closed	F	T	0 Hz	0 Hz	0 Hz	–
Open	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = SXR_EXS_VGC_01_CLS_DI_STATE,
B = SXR_EXS_VGC_01_OPN_DI_STATE

18.4 NEH SXR GMD VGC 01 Protection

Name	*B*	*A*	PC	MS	BYKIK	LHS
In Transit: SXR GMD VGC 01 In Motion	F	F	0 Hz	0 Hz	0 Hz	–
Safe: SXR GMD VGC 01 Open	F	T	120 Hz	120 Hz	120 Hz	–
Closed: SXR GMD VGC 01 Closed	T	F	0 Hz	0 Hz	0 Hz	–
Error: SXR GMD VGC 01 Open and Closed	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = SXR_GMD_VGC_01_OPN_DI_POSITION,
B = SXR_GMD_VGC_01_CLS_DI_POSITION

18.5 NEH SXR Monochromator Tank Isolation Valve SXR-MON-VGC-01

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Closed	F	T	0 Hz	0 Hz	0 Hz	–
Open	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = SXR_MON_VGC_01_CLS_DI_STATE,
B = SXR_MON_VGC_01_OPN_DI_STATE

18.6 NEH SXR Photon Stoppers Isolation Valve SXR-PST-VGC-01

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Closed	F	T	0 Hz	0 Hz	0 Hz	–
Open	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = SXR_PST_VGC_01_CLS_DI_STATE,
B = SXR_PST_VGC_01_OPN_DI_STATE

18.7 NEH SXR Transmission Sample System Isolation Valve SXR-TSS-VGC-01

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Closed	F	T	0 Hz	0 Hz	0 Hz	–
Open	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = SXR_TSS_VGC_01_CLS_DI_STATE,
B = SXR_TSS_VGC_01_OPN_DI_STATE

18.8 NEH SXR Zero Order Interlock SXR-MON-MMS-06, SXR-EXS-MMS-01

Name	*B*	*A*	PC	MS	BYKIK	LHS
Slits Not Open, No Zero Order	F	F	120 Hz	120 Hz	120 Hz	–
Slits Not Open, Zero Order Fault	F	T	0 Hz	0 Hz	0 Hz	–
Slits Open, No Zero Order	T	F	120 Hz	120 Hz	120 Hz	–
Slits Open, Zero Order	T	T	120 Hz	120 Hz	120 Hz	–

Where
A = SXR_MON_MMS_06_B_STATE,
B = SXR_EXS_MMS_01_B_STATE

18.9 NEH1 XTOD S2 Isolation Valve Summary

Name	*A*	PC	MS	BYKIK	LHS
Faulted	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VMPS_NEH_703_ISOL_S2_STATE`

19 Ignored when Spoiler SP0 Is In, ST1/ST2 Are In, Stopper SH1 Is In, Stopper SH2 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

19.1 UM6 Diagnostic Stopper Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
In	F	T	–	–	–	–
Out	T	F	–	–	–	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `HFX_UM6_STP_01_IN_DI_POSITION`,
B = `HFX_UM6_STP_01_OUT_DI_POSITION`

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

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Closed	F	T	0 Hz	0 Hz	0 Hz	–
Open	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `HXX_UM6_VGC_01_CLS_DI_STATE`,
B = `HXX_UM6_VGC_01_OPN_DI_STATE`

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

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

20 Ignored when Spoiler SP0 Is In, ST1/ST2 Are In, Stopper SH1 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

20.1 NEH3 HXRAY DVD Isolation Valve HX3-DVD-VGC-01

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Closed	F	T	0 Hz	0 Hz	0 Hz	–
Open	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = HX3_DVD_VGC_01_CLS_DI_STATE,
B = HX3_DVD_VGC_01_OPN_DI_STATE

21 Ignored when Spoiler SP0 Is In, ST1/ST2 Are In, Stopper SH1 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

21.1 XPP SB2 VGC 01 Gate Valve Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Open	F	T	120 Hz	120 Hz	120 Hz	–
Closed	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `XPP_SB2_VGC_01_OPN_DI_POSITION`,
B = `XPP_SB2_VGC_01_CLS_DI_POSITION`

21.2 XPP SB2 VGC 02 Gate Valve Position

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `XPP_SB2_VGC_02_OPN_DI_POSITION`

21.3 XPP SB2 VGC 03 Gate Valve Position

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `XPP_SB2_VGC_03_OPN_DI_POSITION`

22 Ignored when Spoiler SP0 Is In, ST1/ST2 Are In, Stopper SH1 Is In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

22.1 HX2 UVD VGC 01 Gate Valve Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Open	F	T	120 Hz	120 Hz	120 Hz	–
Closed	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `HX2_SB1_VGC_01_OPN_DI_STATE`,
B = `HX2_SB1_VGC_01_CLS_DI_STATE`

22.2 HX3 MON VGC 01 Gate Valve Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Open	F	T	120 Hz	120 Hz	120 Hz	–
Closed	T	F	0 Hz	0 Hz	0 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `HX3_MON_VGC_01_OPN_DI_POSITION`,
B = `HX3_MON_VGC_01_CLS_DI_POSITION`

22.3 NEH1 Camera 124 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = CAMR_NEH1_124_OUT_STATE,
B = CAMR_NEH1_124_IN_STATE

22.4 NEH1 Camera 195 Position

Name	B	A	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = CAMR_NEH1_195_OUT_STATE,
B = CAMR_NEH1_195_IN_STATE

22.5 NEH1 XTOD H Isolation Valve Summary

Name	A	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = VMPS_NEH_703_ISOL_H_STATE

22.6 NEH2 HXRAY DVD Isolation Valve HX2-DVD-VGC-01

Name	B	A	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Closed	F	T	0 Hz	0 Hz	0 Hz	–
Open	T	F	120 Hz	120 Hz	120 Hz	–
Fault	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = HX2_DVD_VGC_01_CLS_DI_STATE,
B = HX2_DVD_VGC_01_OPN_DI_STATE

22.7 NEH3 HXRAY UVD Isolation Valve HX3-UVD-VGC-01

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Closed	F	T	0 Hz	0 Hz	0 Hz	–
Open	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `HX3_UVD_VGC_01_CLS_DI_STATE`,
B = `HX3_UVD_VGC_01_OPN_DI_STATE`

23 Ignored when Spoiler SP0 Is In, ST1/ST2 Are In, Stopper: BSY D2 Summary Is In, TD11 Is In, TDUND Is In, YAG01 Is In, or YAG02 Is In

23.1 FEE Camera 1561 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `CAMR_FEE1_1561_OUT_STATE`,
B = `CAMR_FEE1_1561_IN_STATE`

23.2 FEE Camera 1692 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `CAMR_FEE1_1692_OUT_STATE`,
B = `CAMR_FEE1_1692_IN_STATE`

23.3 FEE Camera 1953 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = CAMR_FEE1_1953_OUT_STATE,
B = CAMR_FEE1_1953_IN_STATE

23.4 FEE Camera 2953 Position

Name	B	A	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = CAMR_FEE1_2953_OUT_STATE,
B = CAMR_FEE1_2953_IN_STATE

23.5 FEE Camera 852 Position

Name	B	A	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = CAMR_FEE1_852_OUT_STATE,
B = CAMR_FEE1_852_IN_STATE

23.6 FEE Camera 913 Position

Name	B	A	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = CAMR_FEE1_913_OUT_STATE,
B = CAMR_FEE1_913_IN_STATE

23.7 FEE Fast Shutter Valve and System Summary

Name	*A*	PC	MS	BYKIK	LHS
Not All Out And Ready	F	0 Hz	0 Hz	0 Hz	–
All Out And Ready	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VMPS_FEE1_E101_FSHR_FAULT`

23.8 FEE Gas Flow Aperture Summary

Name	*A*	PC	MS	BYKIK	LHS
Not All Out Or In	F	0 Hz	0 Hz	0 Hz	–
All Out Or In	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VMPS_FEE1_E202_APRT_FAULT`

23.9 FEE Gas Flow Vacuum Isolation Valve Summary

Name	*A*	PC	MS	BYKIK	LHS
Not All Out	F	0 Hz	0 Hz	0 Hz	–
All Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VMPS_FEE1_E202_ISOV_FAULT`

23.10 FEE Instrument Vacuum Isolation Valve Summary

Name	*A*	PC	MS	BYKIK	LHS
Not All Out	F	0 Hz	0 Hz	0 Hz	–
All Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VMPS_FEE1_E101_ISOL_FAULT`

23.11 FEE Solid Attenuators - Gas Pressure Interlock

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

```
/* Prevent beam if gas attenuator
* pressure is above a specified threshold,
* the gas valve is NOT CLOSED,
* AND interlocked solid attenuators are NOT OUT.
* Note that solid attenuators 3 and 4 are allowed to be in;
* they are not part of this logic.
*
* Gas pressure and valve status summary OK/Fault input comes from FEE
    PLC
* Dehong Zhang and Alex Wallace are contacts for this input
*/

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

if (VMPS_FEE1_E202_NOGAS_THRESHOLD)
{
     state = 0; /* Gas attenuator interlock is OK (pressure is low
        enough and valve is closed), okay to run beam */
}

else if (SATT_FEE1_329_OUT_POSITION && SATT_FEE1_328_OUT_POSITION
        && SATT_FEE1_327_OUT_POSITION && SATT_FEE1_326_OUT_POSITION
        && SATT_FEE1_325_OUT_POSITION && SATT_FEE1_322_OUT_POSITION
        && SATT_FEE1_321_OUT_POSITION)
{
     state = 1; /* Interlocked solid attenuators are OUT, okay to run
        beam */
}

else
{
     state = 2; /* Interlocked solid attenuators are NOT ALL OUT, NOT
        okay to run beam */
}
```

Name	State	PC	MS	BYKIK	LHS
Gas Pressure Ok	0	120 Hz	120 Hz	120 Hz	–
Solid Att Out	1	120 Hz	120 Hz	120 Hz	–
Solid Att Not Out While Gas Pressure High	2	0 Hz	0 Hz	0 Hz	–

23.12 FEE Spectrometer Crystal - Beam Energy Too Low When Crystal Not Out

Name	*B*	*A*	PC	MS	BYKIK	LHS
Fault	F	F	0 Hz	0 Hz	0 Hz	–
Energy Ok	F	T	120 Hz	120 Hz	120 Hz	–
Crystal Out	T	F	120 Hz	120 Hz	120 Hz	–
Crystal Out and Energy Ok	T	T	120 Hz	120 Hz	120 Hz	–

Where
A = `XTAL_FEE1_441_ENERGY_STATE`,
B = `XTAL_FEE1_441_OUT_LIMSW_POSITION`

23.13 FEE Spectrometer Crystal - Pulse Energy Too High When Crystal Not Out

Name	*B*	*A*	PC	MS	BYKIK	LHS
Fault	F	F	0 Hz	0 Hz	0 Hz	–
Pulse Energy Ok	F	T	120 Hz	120 Hz	120 Hz	–
Crystal Out	T	F	120 Hz	120 Hz	120 Hz	–
Crystal Out and Pulse Energy Ok	T	T	120 Hz	120 Hz	120 Hz	–

Where
A = `XTAL_FEE1_441_PULSEENERGY_THRESHOLD`,
B = `XTAL_FEE1_441_OUT_LIMSW_POSITION`

23.14 FEE XTOD H Isolation Valve Summary

Name	*A*	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = VMPS_FEE1_703_ISOL_H_FAULT

23.15 FEE XTOD S1 Isolation Valve Summary

Name	A	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = VMPS_FEE1_703_ISOL_S1_FAULT

23.16 FEE XTOD S2 Isolation Valve Summary

Name	A	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = VMPS_FEE1_703_ISOL_S2_FAULT

23.17 FEE1 M1S Mirror Beam Energy Upper Limit

Name	B	A	PC	MS	BYKIK	LHS
Fault	F	F	0 Hz	0 Hz	0 Hz	–
OK	F	T	120 Hz	120 Hz	120 Hz	–
OK	T	F	120 Hz	120 Hz	120 Hz	–
OK	T	T	120 Hz	120 Hz	120 Hz	–

Where
A = MIRR_FEE1_1560_OUT_LIMIT1_POSITION,
B = MIRR_FEE1_1560_ENERGY_STATE

23.18 FEE1 M1S Mirror State

Name	*B*	*A*	PC	MS	BYKIK	LHS
Not Out	F	F	120 Hz	120 Hz	120 Hz	–
Inconsistent	F	T	0 Hz	0 Hz	0 Hz	–
Inconsistent	T	F	0 Hz	0 Hz	0 Hz	–
Out	T	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MIRR_FEE1_1560_OUT_LIMIT1_POSITION`,
B = `MIRR_FEE1_1560_OUT_LIMIT2_POSITION`

23.19 Gas Detector Problem When FEE Spectrometer Crystal Not Out

Name	*B*	*A*	PC	MS	BYKIK	LHS
Fault	F	F	0 Hz	0 Hz	0 Hz	–
Gas Detector Ok	F	T	120 Hz	120 Hz	120 Hz	–
Crystal Out	T	F	120 Hz	120 Hz	120 Hz	–
Crystal Out and Gas Detector Ok	T	T	120 Hz	120 Hz	120 Hz	–

Where
A = `GDET_FEE1_1_CAL_OK_STATE`,
B = `XTAL_FEE1_441_OUT_LIMSW_POSITION`

23.20 HXR - Beam Energy Too Low With M1S Out

Name	*B*	*A*	PC	MS	BYKIK	LHS
Ok	F	F	120 Hz	120 Hz	120 Hz	–
Ok	F	T	120 Hz	120 Hz	120 Hz	–
Ok	T	F	120 Hz	120 Hz	120 Hz	–
Fault	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `MIRR_FEE1_1560_ENERGY_STATE`,
B = `MIRR_FEE1_1560_OUT_LIMIT1_POSITION`

24 Ignored when Stopper: BSY D2 Summary Is In

24.1 Stopper: ST1/ST2 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_FEE1_1_ST1ST2OUT_POSITION`,
B = `STPR_FEE1_1_ST1ST2IN_POSITION`

25 Ignored when Stopper: BSY D2 Summary Is In or TDUND Is In

25.1 HXRSS Beamline Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `BMLN_UND1_1650_OUT_LMTSW_STATE`,
B = `BMLN_UND1_1650_IN_LMTSW_STATE`

25.2 HXRSS Chicane Bend Magnet Power Supply

Name	*B*	*A*	PC	MS	BYKIK	LHS
Broken	F	F	0 Hz	0 Hz	0 Hz	–
ON	F	T	120 Hz	120 Hz	120 Hz	–
OFF	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `BEND_UND1_1640_ON_STATE`,
B = `BEND_UND1_1640_OFF_STATE`

25.3 HXRSS Crystal Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = XTAL_UND1_1650_OUT_LMTSW_STATE,
B = XTAL_UND1_1650_IN_ENCDR_STATE

25.4 HXRSS Crystal Valid Position

Name	A	PC	MS	BYKIK	LHS
Not Valid	F	0 Hz	0 Hz	0 Hz	–
Valid	T	120 Hz	120 Hz	120 Hz	–

Where
A = XTAL_UND1_1650_POSITIONSTAT_STATE

25.5 HXRSS Mode State

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 : full rate (120 Hz) beam allowed, HXRSS SASE Mode
 * state = 2 : full rate (120 Hz) beam allowed, HXRSS Phase Shifter
    Mode
 * state = 3 : no beam allowed, HXRSS undefined state
*/

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

/*
 * Allow beam if HXRSS is ON, Seeded Mode: the raft is in;
 *                            the magnet is on in and tolerance;
 *                            the photon energy is OK;
 *                            the crystal is IN
 * Allow beam if HXRSS is OFF, SASE Mode: the raft is out;
 *                             the magnet is off;
 *                             the crystal is out
 * Allow beam if HXRSS is in Phase Shifter Mode: the raft is in;
 *                             the magnet is in ANY state;
 *                             the crystal is out
 * Otherwise, do not allow beam.
```

```
 */


/* Input Descriptions
*
* BEND_DMP1_400_INTOL_BRANGE_STATE= HXRSS Beam Energy OK when 10 GeV <
    E < 15 GeV
* XTAL_UND1_1650_OUT_LMTSW_STATE    = Crystal OUT Limit Switch
* XTAL_UND1_1650_IN_ENCDR_STATE      = Crystal IN Limit Switch, from
    encoder
* BMLN_UND1_1650_IN_LMTSW_STATE      = HXRSS Raft IN Limit Switch
* BMLN_UND1_1650_OUT_LMTSW_STATE    = HXRSS Raft OUT Limit Switch
* BEND_UND1_1640_INTOL_BMIN_STATE    = HXRSS Chicane Bend INTOL, greater
    than +0.6 kG-m
* BEND_UND1_1640_OFF_STATE                = HXRSS Chicane Bend String is
    OFF
* BEND_UND1_1640_ON_STATE                 = HXRSS Chicane Bend String is
    ON
*
*/

if ( BMLN_UND1_1650_IN_LMTSW_STATE &&
            BEND_UND1_1640_INTOL_BMIN_STATE &&
            BEND_UND1_1640_ON_STATE &&
            BEND_DMP1_400_INTOL_BRANGE_STATE &&
            ( XTAL_UND1_1650_IN_ENCDR_STATE   ) )
{
    state = 0; /* HXRSS ON, HXRSS Seeded Mode, okay to run beam */
}

else if ( BMLN_UND1_1650_OUT_LMTSW_STATE &&
            BEND_UND1_1640_OFF_STATE &&
            XTAL_UND1_1650_OUT_LMTSW_STATE )
{
    state = 1; /* HXRSS OFF,SASE Mode, okay to run beam */
}

else if ( BMLN_UND1_1650_IN_LMTSW_STATE &&
            XTAL_UND1_1650_OUT_LMTSW_STATE )
{
    state = 2; /* HXRSS in Phase Shifter Mode, okay to run beam */
}

else
{
```

```
    state = 3; /* HXRSS Undefined State, no beam allowed */
}
```

Name	State	PC	MS	BYKIK	LHS
HXRSS Seeded Mode	0	120 Hz	120 Hz	120 Hz	–
HXRSS SASE Mode	1	120 Hz	120 Hz	120 Hz	–
HXRSS Phase Shifter Mode	2	120 Hz	120 Hz	120 Hz	–
HXRSS Undefined State	3	0 Hz	0 Hz	0 Hz	–

25.6 SXRSS Grating/M1 GRAT UND1 934 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `GRAT_UND1_934_OUT_LIMIT_POSITION`,
B = `GRAT_UND1_934_IN_LIMIT_POSITION`

25.7 SXRSS M2 MIRR UND1 964 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `MIRR_UND1_964_OUT_LIMIT_POSITION`,
B = `MIRR_UND1_964_IN_LIMIT_POSITION`

25.8 SXRSS M3 MIRR UND1 966 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `MIRR_UND1_966_OUT_LIMIT_POSITION`,
B = `MIRR_UND1_966_IN_LIMIT_POSITION`

25.9 SXRSS Mode State

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 SASE Mode
 * state = 2 : full rate (120 Hz) beam allowed, Harmonic 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
    }
 *                             OR
 *                             { slit is IN and grating/M1/M2/M3 are
    OUT }
 *                             chicane is ON;
 *                             e- beam position OK [mm]
 *                             e- beam energy   OK [GeV]
 *                             upstream undulators IN OK
 * 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]
 * Allow beam if SXRSS is in Harmonic Mode:
 *                              grating/M1 is OUT;
 *                              slit is NOT_IN and NOT_OUT;
 *                             M2 is OUT;
```

```
*                                M3 is OUT;
*                                chicane is ON;
*                                e- beam position  OK  [mm]
*                                e- beam energy     OK       [GeV]
* Otherwise, do not allow beam.
*
* Input Descriptions
*
*  Link Node MPS PV Name                  Link Node MPS Fault Name
                Desciption
* ------------------------------
   --------------------------------
   ------------------------------------------------
*  BEND:UND1:940:ON_MPS                =  BEND_UND1_940_ON_STATE
              =  Chicane power supply on
*  GRAT:UND1:934:IN_LIMIT_MPS          =  GRAT_UND1_934_IN_LIMIT_POSITION
      =  Grating/M1 IN limit switch
*  GRAT:UND1:934:OUT_LIMIT_MPS         =
   GRAT_UND1_934_OUT_LIMIT_POSITION    =  Grating/M1 OUT limit switch
*  SLIT:UND1:962:IN_LIMIT_MPS          =  SLIT_UND1_962_IN_LIMIT_POSITION
      =  Slit IN limit switch
*  SLIT:UND1:962:OUT_LIMIT_MPS         =
   SLIT_UND1_962_OUT_LIMIT_POSITION    =  Slit OUT limit switch
*  MIRR:UND1:964:IN_LIMIT_MPS          =  MIRR_UND1_964_IN_LIMIT_POSITION
      =  M2 IN limit switch
*  MIRR:UND1:964:OUT_LIMIT_MPS         =
   MIRR_UND1_964_OUT_LIMIT_POSITION    =  M2 OUT limit switch
*  MIRR:UND1:966:IN_LIMIT_MPS          =  MIRR_UND1_966_IN_LIMIT_POSITION
      =  M3 IN limit switch
*  MIRR:UND1:966:OUT_LIMIT_MPS         =
   MIRR_UND1_966_OUT_LIMIT_POSITION    =  M3 OUT limit switch
*  MPS:UND1:950:SX_HRMNC_ENERGY_MPS =
   MPS_UND1_950_SX_HRMNC_ENERGY_STATE =  e- beam energy safe for
   Harmonic mode
*  MPS:UND1:950:SX_HRMNC_X_MPS         =  MPS_UND1_950_SX_HRMNC_X_STATE
       =  e- beam position safe for Harmonic mode
*  MPS:UND1:950:SX_SASE_X_MPS          =  MPS_UND1_950_SX_SASE_X_STATE
        =  e- beam position safe for SASE mode
*  MPS:UND1:950:SX_SS_ENERGY_MPS       =  MPS_UND1_950_SX_SS_ENERGY_STATE
      =  e- beam energy safe for Seeded mode
*  MPS:UND1:950:SX_SS_UND_MPS          =  MPS_UND1_950_SX_SS_UND_STATE
        =  Inserted upstream undulators safe for Seeded mode
*  MPS:UND1:950:SX_SS_X_MPS            =  MPS_UND1_950_SX_SS_X_STATE
          =  e- beam position safe for Seeded mode
*/
```

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

if (     ((GRAT_UND1_934_IN_LIMIT_POSITION &&
         (MIRR_UND1_966_IN_LIMIT_POSITION ||
             MIRR_UND1_966_OUT_LIMIT_POSITION)) ||
          (SLIT_UND1_962_IN_LIMIT_POSITION  &&
              GRAT_UND1_934_OUT_LIMIT_POSITION &&
            MIRR_UND1_964_OUT_LIMIT_POSITION &&
                MIRR_UND1_966_OUT_LIMIT_POSITION)) &&
         BEND_UND1_940_ON_STATE &&
         MPS_UND1_950_SX_SS_X_STATE &&
         MPS_UND1_950_SX_SS_ENERGY_STATE &&
         MPS_UND1_950_SX_SS_UND_STATE )
{
    state = 0; /* SXRSS Seeded Mode, okay to run beam */
}

else if ( GRAT_UND1_934_OUT_LIMIT_POSITION &&
         SLIT_UND1_962_OUT_LIMIT_POSITION &&
         MIRR_UND1_964_OUT_LIMIT_POSITION &&
         MIRR_UND1_966_OUT_LIMIT_POSITION &&
         MPS_UND1_950_SX_SASE_X_STATE )
{
    state = 1; /* SXRSS SASE Mode, okay to run beam */
}

else if ( GRAT_UND1_934_OUT_LIMIT_POSITION &&
         !SLIT_UND1_962_IN_LIMIT_POSITION && !
             SLIT_UND1_962_OUT_LIMIT_POSITION &&
         MIRR_UND1_964_OUT_LIMIT_POSITION &&
         MIRR_UND1_966_OUT_LIMIT_POSITION &&
         BEND_UND1_940_ON_STATE &&
         MPS_UND1_950_SX_HRMNC_X_STATE &&
         MPS_UND1_950_SX_HRMNC_ENERGY_STATE )
{
    state = 2; /* SXRSS Harmonic Mode, okay to run beam */
}

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

Name	State	PC	MS	BYKIK	LHS
SXRSS Seeded Mode	0	120 Hz	120 Hz	120 Hz	–
SXRSS SASE Mode	1	120 Hz	120 Hz	120 Hz	–
SXRSS Harmonic Mode	2	120 Hz	120 Hz	120 Hz	–
SXRSS Undefined State	3	0 Hz	0 Hz	0 Hz	–

25.10 SXRSS SLIT UND1 962 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	120 Hz	120 Hz	120 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `SLIT_UND1_962_OUT_LIMIT_POSITION`,
B = `SLIT_UND1_962_IN_LIMIT_POSITION`

25.11 SXRSS Watchdog

Name	*A*	PC	MS	BYKIK	LHS
NOT_OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MPS_UND1_950_SXRSS_WDOG_STATE`

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

26.1 BCS LION LTU1 404 Threshold

Name	A	PC	MS	BYKIK	LHS
Exceeded	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `LION404_STATE`

26.2 BCS LION LTU1 405 Threshold

Name	A	PC	MS	BYKIK	LHS
Exceeded	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `LION405_STATE`

26.3 BCS LION LTU1 504 Threshold

Name	A	PC	MS	BYKIK	LHS
Exceeded	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `LION504_STATE`

26.4 BCS LION LTU1 505 Threshold

Name	A	PC	MS	BYKIK	LHS
Exceeded	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = LION505_STATE

26.5 BCS LION LTU1 584 Threshold

Name	A	PC	MS	BYKIK	LHS
Exceeded	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = LION584_STATE

26.6 BCS LION LTU1 585 Threshold

Name	A	PC	MS	BYKIK	LHS
Exceeded	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = LION585_STATE

26.7 BCS LION LTU1 716 Threshold

Name	A	PC	MS	BYKIK	LHS
Exceeded	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = LION716_STATE

26.8 BCS LION LTU1 717 Threshold

Name	A	PC	MS	BYKIK	LHS
Exceeded	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = LION717_STATE

26.9 BCS LION LTU1 732 Threshold

Name	A	PC	MS	BYKIK	LHS
Exceeded	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `LION732_STATE`

26.10 BCS LION LTU1 733 Threshold

Name	A	PC	MS	BYKIK	LHS
Exceeded	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `LION733_STATE`

26.11 BCS LION LTU1 752 Threshold

Name	A	PC	MS	BYKIK	LHS
Exceeded	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `LION752_STATE`

26.12 BCS LION LTU1 753 Threshold

Name	A	PC	MS	BYKIK	LHS
Exceeded	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `LION753_STATE`

26.13 BCS LION LTU1 765 Threshold

Name	*A*	PC	MS	BYKIK	LHS
Exceeded	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `LION765_STATE`

26.14 BCS LION LTU1 766 Threshold

Name	*A*	PC	MS	BYKIK	LHS
Exceeded	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `LION766_STATE`

26.15 BOD UND1 1005

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `BOD_UND1_1005_OUT_LIMIT_POSITION`,
B = `BOD_UND1_1005_IN_LIMIT_POSITION`

26.16 BOD UND1 1305

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = BOD_UND1_1305_OUT_LIMIT_POSITION,
B = BOD_UND1_1305_IN_LIMIT_POSITION

26.17 BYD Watchdog

Name	A	PC	MS	BYKIK	LHS
NOT_OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = BEND_DMP1_400_BACT_WDOG_STATE

26.18 Magnet In Tolerance: QE31

Name	A	PC	MS	BYKIK	LHS
No	F	0 Hz	0 Hz	0 Hz	–
Yes	T	120 Hz	120 Hz	120 Hz	–

Where
A = QUAD_LTU1_720_INTOL_STATUS

26.19 Magnet In Tolerance: QUM1

Name	A	PC	MS	BYKIK	LHS
No	F	0 Hz	0 Hz	0 Hz	–
Yes	T	120 Hz	120 Hz	120 Hz	–

Where
A = QUAD_LTU1_820_INTOL_STATUS

26.20 Magnet In Tolerance: QUM2

Name	A	PC	MS	BYKIK	LHS
No	F	0 Hz	0 Hz	0 Hz	–
Yes	T	120 Hz	120 Hz	120 Hz	–

Where
A = QUAD_LTU1_840_INTOL_STATUS

26.21 Magnet In Tolerance: QUM3

Name	A	PC	MS	BYKIK	LHS
No	F	0 Hz	0 Hz	0 Hz	–
Yes	T	120 Hz	120 Hz	120 Hz	–

Where
A = QUAD_LTU1_860_INTOL_STATUS

26.22 Magnet In Tolerance: QUM4

Name	A	PC	MS	BYKIK	LHS
No	F	0 Hz	0 Hz	0 Hz	–
Yes	T	120 Hz	120 Hz	120 Hz	–

Where
A = QUAD_LTU1_880_INTOL_STATUS

26.23 Magnet Power: QE31

Name	A	PC	MS	BYKIK	LHS
Off	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = QUAD_LTU1_720_STATE_STATUS

26.24 Magnet Power: QUM1

Name	A	PC	MS	BYKIK	LHS
Off	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = QUAD_LTU1_820_STATE_STATUS

26.25 Magnet Power: QUM2

Name	*A*	PC	MS	BYKIK	LHS
Off	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = QUAD_LTU1_840_STATE_STATUS

26.26 Magnet Power: QUM3

Name	*A*	PC	MS	BYKIK	LHS
Off	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = QUAD_LTU1_860_STATE_STATUS

26.27 Magnet Power: QUM4

Name	*A*	PC	MS	BYKIK	LHS
Off	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = QUAD_LTU1_880_STATE_STATUS

26.28 OTR30 LTU1 449 Position When TDUND Not In

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = OTRS_LTU1_449_OUT_LMTSW_STATE,
B = OTRS_LTU1_449_IN_LMTSW_STATE

26.29 OTR33 Position When TDUND Not In

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `OTR33_0745_OUT_STATE`,
B = `OTR33_0745_IN_STATE`

26.30 PIC Raw Charge Thresholds: DMP1 698

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `PICS_DMP1_100_LOSSL_THRESHOLD`,
B = `PICS_DMP1_100_LOSSH_THRESHOLD`

26.31 PIC Raw Charge Thresholds: DMP1 699

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `PICS_DMP2_200_LOSSL_THRESHOLD`,
B = `PICS_DMP2_200_LOSSH_THRESHOLD`

26.32 Profile Monitor BSY0 45 Position When D2 or TDUND Not In

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = PROF_BSY0_45_OUT_LIMIT_POSITION,
B = PROF_BSY0_45_IN_LIMIT_POSITION

26.33 Spoiler SP0 DMP1 765 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
In	F	T	120 Hz	120 Hz	120 Hz	–
Out	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = SPLR_DMP1_765_IN_LIMSW_POSITION,
B = SPLR_DMP1_765_OUT_LIMSW_POSITION

26.34 VVFS DMP1 107 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = VVFS_DMP1_107_OPEN_LMTSW_STATE

26.35 VVMG DMP1 743 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = VVMG_DMP1_743_POSITION_STATE

26.36 VVMG UND1 1645 Position

Name	A	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = VVMG_UND1_1645_OPEN_LMTSW_STATE

26.37 VVMG UND1 1655 Position

Name	A	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = VVMG_UND1_1655_OPEN_LMTSW_STATE

26.38 VVPG DMP1 355 Position

Name	B	A	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Open	F	T	120 Hz	120 Hz	120 Hz	–
Closed	T	F	0 Hz	0 Hz	0 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = VVPG_DMP1_355_OPENSTATUS_STATE,
B = VVPG_DMP1_355_CLOSEDSTATUS_STATE

26.39 YAG LTU1 743 Position When TDUND Not In (PSI Prof Mon)

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `YAGS_LTU1_743_OUT_LIMIT_POSITION`,
B = `YAGS_LTU1_743_IN_LIMIT_POSITION`

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

27.1 BCS PIC RAW Charge Threshold DMP 997

Name	*A*	PC	MS	BYKIK	LHS
Exceeded	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `PIC997_STATE`

27.2 BCS PIC RAW Charge Threshold DMP 998

Name	*A*	PC	MS	BYKIK	LHS
Exceeded	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `PIC998_STATE`

27.3 BLM Heartbeat: Dechirper LTU1 BLF545

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_LTU1_BLF545_TEST_L_THRESHOLD`,
B = `BLM_LTU1_BLF545_TEST_H_THRESHOLD`

27.4 BLM Pedestal Thresholds: Dechirper LTU1 BLF545

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_LTU1_BLF545_PED_L_THRESHOLD`,
B = `BLM_LTU1_BLF545_PED_H_THRESHOLD`

27.5 BLM Raw Charge Thresholds: Dechirper LTU1 BLF545

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_LTU1_BLF545_LOSS_L_THRESHOLD`,
B = `BLM_LTU1_BLF545_LOSS_H_THRESHOLD`

27.6 BYKIK 120 Hz Abort Trigger

Name	*A*	PC	MS	BYKIK	LHS
Missed Trigger	F	0 Hz	0 Hz	0 Hz	–
Stable	T	120 Hz	120 Hz	120 Hz	–

Where
A = `BYKIK_120HZ_ABRT_TRIG_MISSED`

27.7 BYKIK 120 Hz Standby Trigger

Name	*A*	PC	MS	BYKIK	LHS
Missed Trigger	F	0 Hz	0 Hz	0 Hz	–
Stable	T	120 Hz	120 Hz	120 Hz	–

Where
A = BYKIK_120HZ_STBY_TRIG_MISSED

27.8 BYKIK 30 Hz Abort Trigger

Name	*A*	PC	MS	BYKIK	LHS
Missed Trigger	F	0 Hz	0 Hz	0 Hz	–
Stable	T	120 Hz	120 Hz	120 Hz	–

Where
A = BYKIK_30HZ_ABRT_TRIG_MISSED

27.9 BYKIK 30 Hz Standby Trigger

Name	*A*	PC	MS	BYKIK	LHS
Missed Trigger	F	0 Hz	0 Hz	0 Hz	–
Stable	T	120 Hz	120 Hz	120 Hz	–

Where
A = BYKIK_30HZ_STBY_TRIG_MISSED

27.10 BYKIK Readback Signal

Name	*B*	*A*	PC	MS	BYKIK	LHS
Broken	F	F	0 Hz	0 Hz	0 Hz	–
Over Threshold	F	T	0 Hz	0 Hz	0 Hz	–
Under Threshold	T	F	0 Hz	0 Hz	0 Hz	–
OK	T	T	120 Hz	120 Hz	120 Hz	–

Where
A = BYKIK_THRESHOLD_UNDER_FAULT,
B = BYKIK_THRESHOLD_OVER_FAULT

27.11 LTU Dechirper - Horizontal Gap Too Small

Name	*B*	*A*	PC	MS	BYKIK	LHS
Both ends gap too small	F	F	0 Hz	0 Hz	0 Hz	–
Downstream end gap too small	F	T	0 Hz	0 Hz	0 Hz	–
Upstream end gap too small	T	F	0 Hz	0 Hz	0 Hz	–
Gap ok	T	T	120 Hz	120 Hz	120 Hz	–

Where
A = `DCHP_LTU1_555_GAP_LIMSW_NEGZ_POSITION`,
B = `DCHP_LTU1_555_GAP_LIMSW_POSZ_POSITION`

27.12 LTU Dechirper - Vertical Gap Too Small

Name	*B*	*A*	PC	MS	BYKIK	LHS
Both ends gap too small	F	F	0 Hz	0 Hz	0 Hz	–
Downstream end gap too small	F	T	0 Hz	0 Hz	0 Hz	–
Upstream end gap too small	T	F	0 Hz	0 Hz	0 Hz	–
Gap ok	T	T	120 Hz	120 Hz	120 Hz	–

Where
A = `DCHP_LTU1_545_GAP_LIMSW_NEGZ_POSITION`,
B = `DCHP_LTU1_545_GAP_LIMSW_POSZ_POSITION`

27.13 Magnet In Tolerance: BYD1

Name	*A*	PC	MS	BYKIK	LHS
No	F	0 Hz	0 Hz	0 Hz	–
Yes	T	120 Hz	120 Hz	120 Hz	–

Where
A = `BEND_DMP1_400_INTOL_STATUS`

27.14 Magnet Power: BYD1

Name	*A*	PC	MS	BYKIK	LHS
Off	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = BEND_DMP1_400_STATE_STATUS

27.15 OTR30 LTU1 449 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = OTRS_LTU1_449_OUT_LMTSW_STATE,
B = OTRS_LTU1_449_IN_LMTSW_STATE

27.16 OTR33 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = OTR33_0745_OUT_STATE,
B = OTR33_0745_IN_STATE

27.17 TDUND Flow Switch Fault With TDUND Not Out

Name	*B*	*A*	PC	MS	BYKIK	LHS
Fault	F	F	0 Hz	0 Hz	0 Hz	–
Ok	F	T	120 Hz	120 Hz	120 Hz	–
Ok, TDUND Out	T	F	120 Hz	120 Hz	120 Hz	–
Ok	T	T	120 Hz	120 Hz	120 Hz	–

Where
A = `TDUND_FS_STATE`,
B = `DUMP_LTU1_970_TDUND_OUT_POSITION`

27.18 TDUND Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	–	–	–	–
In	T	F	–	–	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `DUMP_LTU1_970_TDUND_OUT_POSITION`,
B = `DUMP_LTU1_970_TDUND_IN_POSITION`

27.19 Temperature RTD Summary: BSY Common Line Past D2

Name	*A*	PC	MS	BYKIK	LHS
Faulted	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `RTD_BSY0_89_PASTD2SUM_STATUS`

27.20 THZ-2 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `THZR_LTU1_741_OUT_LIMSW_POSITION`,
B = `THZR_LTU1_741_IN_LIMSW_POSITION`

27.21 Undulator Beam Energy Lower Limit

Name	*A*	PC	MS	BYKIK	LHS
FAULT	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `BEND_DMP1_400_INTOL_BMIN_STATE`

27.22 VVFS LTU1 102 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VACFS_LTU1_102_STATE`

27.23 VVMG LTU1 174 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VACV_LTU1_174_STATE`

27.24 VVMG LTU1 355 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = VACV_LTU1_355_STATE

27.25 VVMG LTU1 670 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = VVPG_0670_STATE

27.26 VVMG LTU1 742 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = VVPG_0742_STATE

27.27 VVMG LTU1 774 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = VVPG_0774_STATE

27.28 VVMG UND1 932 Position

Name	*A*	PC	MS	BYKIK	LHS
NOT_OUT	F	0 Hz	0 Hz	0 Hz	–
OUT	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VVMG_UND1_932_OUT_LIMIT_POSITION`

27.29 VVMG UND1 968 Position

Name	*A*	PC	MS	BYKIK	LHS
NOT_OUT	F	0 Hz	0 Hz	0 Hz	–
OUT	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VVMG_UND1_968_OUT_LIMIT_POSITION`

27.30 VVPG DMP1 103 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VACV_DMP_100_STATE`

27.31 VVPG DMP1 395 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VACV_DMP_395_STATE`

27.32 VVPG DMP1 700 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VACV_DMP_700_STATE`

27.33 VVPG LTU1 100 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VACV_LTU1_100_STATE`

27.34 VVPG LTU1 265 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VACV_LTU1_265_STATE`

27.35 VVPG LTU1 435 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VVPG_0435_STATE`

27.36 VVPG LTU1 580 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VVPG_0580_STATE`

27.37 VVPG LTU1 725 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VVPG_0725_STATE`

27.38 VVPG LTU1 757 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VVPG_0757_STATE`

27.39 VVPG LTU1 999 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VVPG_0999_STATE`

27.40 VVPG UND1 1000 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VACV_LTU0_1000_OPEN_STATE`

27.41 VVPG UND1 2500 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VACV_UND_2500_STATE`

27.42 YAG LTU1 743 Position (PSI Prof Mon)

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `YAGS_LTU1_743_OUT_LIMIT_POSITION`,
B = `YAGS_LTU1_743_IN_LIMIT_POSITION`

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

28.1 BFW 1010 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_1010_OUT_STATE,
B = BFW_UND1_1010_IN_STATE

28.2 BFW 110 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_110_OUT_STATE,
B = BFW_UND1_110_IN_STATE

28.3 BFW 1110 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_1110_OUT_STATE,
B = BFW_UND1_1110_IN_STATE

28.4 BFW 1210 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BFW_UND1_1210_OUT_STATE`,
B = `BFW_UND1_1210_IN_STATE`

28.5 BFW 1310 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BFW_UND1_1310_OUT_STATE`,
B = `BFW_UND1_1310_IN_STATE`

28.6 BFW 1410 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BFW_UND1_1410_OUT_STATE`,
B = `BFW_UND1_1410_IN_STATE`

28.7 BFW 1510 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BFW_UND1_1510_OUT_STATE`,
B = `BFW_UND1_1510_IN_STATE`

28.8 BFW 1610 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BFW_UND1_1610_OUT_STATE`,
B = `BFW_UND1_1610_IN_STATE`

28.9 BFW 1710 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BFW_UND1_1710_OUT_STATE`,
B = `BFW_UND1_1710_IN_STATE`

28.10 BFW 1810 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_1810_OUT_STATE,
B = BFW_UND1_1810_IN_STATE

28.11 BFW 1910 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_1910_OUT_STATE,
B = BFW_UND1_1910_IN_STATE

28.12 BFW 2010 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_2010_OUT_STATE,
B = BFW_UND1_2010_IN_STATE

28.13 BFW 210 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_210_OUT_STATE,
B = BFW_UND1_210_IN_STATE

28.14 BFW 2110 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_2110_OUT_STATE,
B = BFW_UND1_2110_IN_STATE

28.15 BFW 2210 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_2210_OUT_STATE,
B = BFW_UND1_2210_IN_STATE

28.16 BFW 2310 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_2310_OUT_STATE,
B = BFW_UND1_2310_IN_STATE

28.17 BFW 2410 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_2410_OUT_STATE,
B = BFW_UND1_2410_IN_STATE

28.18 BFW 2510 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_2510_OUT_STATE,
B = BFW_UND1_2510_IN_STATE

28.19 BFW 2610 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_2610_OUT_STATE,
B = BFW_UND1_2610_IN_STATE

28.20 BFW 2710 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_2710_OUT_STATE,
B = BFW_UND1_2710_IN_STATE

28.21 BFW 2810 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_2810_OUT_STATE,
B = BFW_UND1_2810_IN_STATE

28.22 BFW 2910 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_2910_OUT_STATE,
B = BFW_UND1_2910_IN_STATE

28.23 BFW 3010 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_3010_OUT_STATE,
B = BFW_UND1_3010_IN_STATE

28.24 BFW 310 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_310_OUT_STATE,
B = BFW_UND1_310_IN_STATE

28.25 BFW 3110 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_3110_OUT_STATE,
B = BFW_UND1_3110_IN_STATE

28.26 BFW 3210 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_3210_OUT_STATE,
B = BFW_UND1_3210_IN_STATE

28.27 BFW 3310 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_3310_OUT_STATE,
B = BFW_UND1_3310_IN_STATE

28.28 BFW 410 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_410_OUT_STATE,
B = BFW_UND1_410_IN_STATE

28.29 BFW 510 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_510_OUT_STATE,
B = BFW_UND1_510_IN_STATE

28.30 BFW 610 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BFW_UND1_610_OUT_STATE,
B = BFW_UND1_610_IN_STATE

28.31 BFW 710 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BFW_UND1_710_OUT_STATE`,
B = `BFW_UND1_710_IN_STATE`

28.32 BFW 810 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BFW_UND1_810_OUT_STATE`,
B = `BFW_UND1_810_IN_STATE`

28.33 BFW 910 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BFW_UND1_910_OUT_STATE`,
B = `BFW_UND1_910_IN_STATE`

28.34 BFW Inserted Count

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

```
unsigned int beamFinderWireInCount = 0;

/* "BFW UND1 XXX" is IN when BFW_UND1_XXX_OUT_STATE == 0 */
if (!( BFW_UND1_110_OUT_STATE)) { beamFinderWireInCount++; }
if (!( BFW_UND1_210_OUT_STATE)) { beamFinderWireInCount++; }
if (!( BFW_UND1_310_OUT_STATE)) { beamFinderWireInCount++; }
if (!( BFW_UND1_410_OUT_STATE)) { beamFinderWireInCount++; }
if (!( BFW_UND1_510_OUT_STATE)) { beamFinderWireInCount++; }
if (!( BFW_UND1_610_OUT_STATE)) { beamFinderWireInCount++; }
if (!( BFW_UND1_710_OUT_STATE)) { beamFinderWireInCount++; }
if (!( BFW_UND1_810_OUT_STATE)) { beamFinderWireInCount++; }
if (!( BFW_UND1_910_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_1010_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_1110_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_1210_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_1310_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_1410_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_1510_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_1610_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_1710_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_1810_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_1910_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_2010_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_2110_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_2210_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_2310_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_2410_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_2510_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_2610_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_2710_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_2810_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_2910_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_3010_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_3110_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_3210_OUT_STATE)) { beamFinderWireInCount++; }
if (!(BFW_UND1_3310_OUT_STATE)) { beamFinderWireInCount++; }

switch(beamFinderWireInCount)
{
    case 0:  state = 0; break; /* No BFWs in */
    case 1:  state = 1; break; /* One BFW in */
    default: state = 2; break; /* More than one BFW in */
}
```

Name	State	PC	MS	BYKIK	LHS
No BFWs In	0	120 Hz	120 Hz	120 Hz	–
One BFW In	1	10 Hz	10 Hz	10 Hz	–
More Than One BFW In	2	0 Hz	0 Hz	0 Hz	–

28.35 BLM Argonne Heartbeat (LN32)

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_120_TEST_L_THRESHOLD`,
B = `BLM_UND1_120_TEST_H_THRESHOLD`

28.36 BLM Argonne Heartbeat (LN33)

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_920_TEST_L_THRESHOLD`,
B = `BLM_UND1_920_TEST_H_THRESHOLD`

28.37 BLM Argonne Heartbeat (LN35)

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_1720_TEST_L_THRESHOLD,
B = BLM_UND1_1720_TEST_H_THRESHOLD

28.38 BLM Argonne Heartbeat (LN36)

Name	B	A	PC	MS	BYKIK	LHS
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 = BLM_2520_QTL_THRESHOLD,
B = BLM_2520_QTH_THRESHOLD

28.39 BLM Argonne Heartbeat (LN37)

Name	B	A	PC	MS	BYKIK	LHS
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 = BLM_UND1_3320_TEST_L_THRESHOLD,
B = BLM_UND1_3320_TEST_H_THRESHOLD

28.40 BLM HVPS LTU1 762

Name	B	A	PC	MS	BYKIK	LHS
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 = HVPS_LTU1_762_LOW_FAULT,
B = HVPS_LTU1_762_HIGH_FAULT

28.41 BLM HVPS UND1 120

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = HVPS_UND1_120_LOW_FAULT,
B = HVPS_UND1_120_HIGH_FAULT

28.42 BLM HVPS UND1 1720

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = HVPS_UND1_1720_LOW_FAULT,
B = HVPS_UND1_1720_HIGH_FAULT

28.43 BLM HVPS UND1 2221

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = HVPS_UND1_2221_LOW_FAULT,
B = HVPS_UND1_2221_HIGH_FAULT

28.44 BLM HVPS UND1 2520

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = HVPS_UND1_2520_LOW_FAULT,
B = HVPS_UND1_2520_HIGH_FAULT

28.45 BLM HVPS UND1 3320

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = HVPS_UND1_3320_LOW_FAULT,
B = HVPS_UND1_3320_HIGH_FAULT

28.46 BLM HVPS UND1 920

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = HVPS_UND1_920_LOW_FAULT,
B = HVPS_UND1_920_HIGH_FAULT

28.47 BLM Pedestal Threshold: LTU1 722

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_LTU1_722_PED_L_THRESHOLD`,
B = `BLM_LTU1_722_PED_H_THRESHOLD`

28.48 BLM Pedestal Threshold: LTU1 732

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_LTU1_732_PED_L_THRESHOLD`,
B = `BLM_LTU1_732_PED_H_THRESHOLD`

28.49 BLM Pedestal Threshold: LTU1 762

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_LTU1_762_PED_L_THRESHOLD`,
B = `BLM_LTU1_762_PED_H_THRESHOLD`

28.50 BLM Pedestal Threshold: LTU1 772

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_LTU1_772_PED_L_THRESHOLD`,
B = `BLM_LTU1_772_PED_H_THRESHOLD`

28.51 BLM Pedestal Thresholds: LTU1 980

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_LTU1_980_PED_L_THRESHOLD`,
B = `BLM_LTU1_980_PED_H_THRESHOLD`

28.52 BLM Pedestal Thresholds: UND 1021

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_1021_PED_L_THRESHOLD`,
B = `BLM_UND1_1021_PED_H_THRESHOLD`

28.53 BLM Pedestal Thresholds: UND 1121

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_1121_PED_L_THRESHOLD,
B = BLM_UND1_1121_PED_H_THRESHOLD

28.54 BLM Pedestal Thresholds: UND 120

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_120_PED_L_THRESHOLD,
B = BLM_UND1_120_PED_H_THRESHOLD

28.55 BLM Pedestal Thresholds: UND 121

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_121_PED_L_THRESHOLD,
B = BLM_UND1_121_PED_H_THRESHOLD

28.56 BLM Pedestal Thresholds: UND 1221

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_1221_PED_L_THRESHOLD`,
B = `BLM_UND1_1221_PED_H_THRESHOLD`

28.57 BLM Pedestal Thresholds: UND 1321

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_1321_PED_L_THRESHOLD`,
B = `BLM_UND1_1321_PED_H_THRESHOLD`

28.58 BLM Pedestal Thresholds: UND 1421

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_1421_PED_L_THRESHOLD`,
B = `BLM_UND1_1421_PED_H_THRESHOLD`

28.59 BLM Pedestal Thresholds: UND 1521

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_1521_PED_L_THRESHOLD`,
B = `BLM_UND1_1521_PED_H_THRESHOLD`

28.60 BLM Pedestal Thresholds: UND 1621

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_1621_PED_L_THRESHOLD`,
B = `BLM_UND1_1621_PED_H_THRESHOLD`

28.61 BLM Pedestal Thresholds: UND 1720

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_1720_PED_L_THRESHOLD`,
B = `BLM_UND1_1720_PED_H_THRESHOLD`

28.62 BLM Pedestal Thresholds: UND 1721

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_1721_PED_L_THRESHOLD`,
B = `BLM_UND1_1721_PED_H_THRESHOLD`

28.63 BLM Pedestal Thresholds: UND 1821

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_1821_PED_L_THRESHOLD`,
B = `BLM_UND1_1821_PED_H_THRESHOLD`

28.64 BLM Pedestal Thresholds: UND 1921

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_1921_PED_L_THRESHOLD`,
B = `BLM_UND1_1921_PED_H_THRESHOLD`

28.65 BLM Pedestal Thresholds: UND 2021

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_2021_PED_L_THRESHOLD,
B = BLM_UND1_2021_PED_H_THRESHOLD

28.66 BLM Pedestal Thresholds: UND 2121

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_2121_PED_L_THRESHOLD,
B = BLM_UND1_2121_PED_H_THRESHOLD

28.67 BLM Pedestal Thresholds: UND 221

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_221_PED_L_THRESHOLD,
B = BLM_UND1_221_PED_H_THRESHOLD

28.68 BLM Pedestal Thresholds: UND 2221

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_2220_QBLL_THRESHOLD`,
B = `BLM_2220_QBLH_THRESHOLD`

28.69 BLM Pedestal Thresholds: UND 2321

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_2320_QBLL_THRESHOLD`,
B = `BLM_2320_QBLH_THRESHOLD`

28.70 BLM Pedestal Thresholds: UND 2421

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_2420_QBLL_THRESHOLD`,
B = `BLM_2420_QBLH_THRESHOLD`

28.71 BLM Pedestal Thresholds: UND 2520

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_2520_QBLL_THRESHOLD`,
B = `BLM_2520_QBLH_THRESHOLD`

28.72 BLM Pedestal Thresholds: UND 2521

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_2521_PED_L_THRESHOLD`,
B = `BLM_UND1_2521_PED_H_THRESHOLD`

28.73 BLM Pedestal Thresholds: UND 2621

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_2620_QBLL_THRESHOLD`,
B = `BLM_2620_QBLH_THRESHOLD`

28.74 BLM Pedestal Thresholds: UND 2721

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_2720_QBLL_THRESHOLD,
B = BLM_2720_QBLH_THRESHOLD

28.75 BLM Pedestal Thresholds: UND 2821

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_2820_QBLL_THRESHOLD,
B = BLM_2820_QBLH_THRESHOLD

28.76 BLM Pedestal Thresholds: UND 2921

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_2920_QBLL_THRESHOLD,
B = BLM_2920_QBLH_THRESHOLD

28.77 BLM Pedestal Thresholds: UND 3021

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_3021_PED_L_THRESHOLD`,
B = `BLM_UND1_3021_PED_H_THRESHOLD`

28.78 BLM Pedestal Thresholds: UND 3121

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_3121_PED_L_THRESHOLD`,
B = `BLM_UND1_3121_PED_H_THRESHOLD`

28.79 BLM Pedestal Thresholds: UND 321

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_321_PED_L_THRESHOLD`,
B = `BLM_UND1_321_PED_H_THRESHOLD`

28.80 BLM Pedestal Thresholds: UND 3221

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_3221_PED_L_THRESHOLD,
B = BLM_UND1_3221_PED_H_THRESHOLD

28.81 BLM Pedestal Thresholds: UND 3320

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_3320_PED_L_THRESHOLD,
B = BLM_UND1_3320_PED_H_THRESHOLD

28.82 BLM Pedestal Thresholds: UND 3321

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_3321_PED_L_THRESHOLD,
B = BLM_UND1_3321_PED_H_THRESHOLD

28.83 BLM Pedestal Thresholds: UND 421

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_421_PED_L_THRESHOLD`,
B = `BLM_UND1_421_PED_H_THRESHOLD`

28.84 BLM Pedestal Thresholds: UND 521

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_521_PED_L_THRESHOLD`,
B = `BLM_UND1_521_PED_H_THRESHOLD`

28.85 BLM Pedestal Thresholds: UND 621

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_621_PED_L_THRESHOLD`,
B = `BLM_UND1_621_PED_H_THRESHOLD`

28.86 BLM Pedestal Thresholds: UND 721

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_721_PED_L_THRESHOLD,
B = BLM_UND1_721_PED_H_THRESHOLD

28.87 BLM Pedestal Thresholds: UND 821

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_821_PED_L_THRESHOLD,
B = BLM_UND1_821_PED_H_THRESHOLD

28.88 BLM Pedestal Thresholds: UND 920

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_920_PED_L_THRESHOLD,
B = BLM_UND1_920_PED_H_THRESHOLD

28.89 BLM Pedestal Thresholds: UND 921

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_921_PED_L_THRESHOLD`,
B = `BLM_UND1_921_PED_H_THRESHOLD`

28.90 BLM Pedestal Thresholds: UND BLF1

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_BLF1_PED_L_THRESHOLD`,
B = `BLM_UND1_BLF1_PED_H_THRESHOLD`

28.91 BLM Pedestal Thresholds: UND BLF17

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_BLF17_PED_L_THRESHOLD`,
B = `BLM_UND1_BLF17_PED_H_THRESHOLD`

28.92 BLM PEP Timing Check (LN30)

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_LTU1_722_TEST_L_THRESHOLD`,
B = `BLM_LTU1_722_TEST_H_THRESHOLD`

28.93 BLM PEP Timing Check (LN32)

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_LTU1_762_TEST_L_THRESHOLD`,
B = `BLM_LTU1_762_TEST_H_THRESHOLD`

28.94 BLM PEP Timing Check (LN33)

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_621_TEST_L_THRESHOLD`,
B = `BLM_UND1_621_TEST_H_THRESHOLD`

28.95 BLM PEP Timing Check (LN35)

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_1421_TEST_L_THRESHOLD,
B = BLM_UND1_1421_TEST_H_THRESHOLD

28.96 BLM PEP Timing Check (LN36)

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_2220_QTL_THRESHOLD,
B = BLM_2220_QTH_THRESHOLD

28.97 BLM PEP Timing Check (LN37)

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_3021_TEST_L_THRESHOLD,
B = BLM_UND1_3021_TEST_H_THRESHOLD

28.98 BLM Raw Charge Thresholds: LTU1 722

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_LTU1_722_LOSS_L_THRESHOLD`,
B = `BLM_LTU1_722_LOSS_H_THRESHOLD`

28.99 BLM Raw Charge Thresholds: LTU1 732

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_LTU1_732_LOSS_L_THRESHOLD`,
B = `BLM_LTU1_732_LOSS_H_THRESHOLD`

28.100 BLM Raw Charge Thresholds: LTU1 762

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_LTU1_762_LOSS_L_THRESHOLD`,
B = `BLM_LTU1_762_LOSS_H_THRESHOLD`

28.101 BLM Raw Charge Thresholds: LTU1 772

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_LTU1_772_LOSS_L_THRESHOLD`,
B = `BLM_LTU1_772_LOSS_H_THRESHOLD`

28.102 BLM Raw Charge Thresholds: LTU1 980

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_LTU1_980_LOSS_L_THRESHOLD`,
B = `BLM_LTU1_980_LOSS_H_THRESHOLD`

28.103 BLM Raw Charge Thresholds: UND 1021

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_1021_LOSS_L_THRESHOLD`,
B = `BLM_UND1_1021_LOSS_H_THRESHOLD`

28.104 BLM Raw Charge Thresholds: UND 1121

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_1121_LOSS_L_THRESHOLD,
B = BLM_UND1_1121_LOSS_H_THRESHOLD

28.105 BLM Raw Charge Thresholds: UND 120

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_120_LOSS_L_THRESHOLD,
B = BLM_UND1_120_LOSS_H_THRESHOLD

28.106 BLM Raw Charge Thresholds: UND 121

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_121_LOSS_L_THRESHOLD,
B = BLM_UND1_121_LOSS_H_THRESHOLD

28.107 BLM Raw Charge Thresholds: UND 1221

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_1221_LOSS_L_THRESHOLD,
B = BLM_UND1_1221_LOSS_H_THRESHOLD

28.108 BLM Raw Charge Thresholds: UND 1321

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_1321_LOSS_L_THRESHOLD,
B = BLM_UND1_1321_LOSS_H_THRESHOLD

28.109 BLM Raw Charge Thresholds: UND 1421

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_1421_LOSS_L_THRESHOLD,
B = BLM_UND1_1421_LOSS_H_THRESHOLD

28.110 BLM Raw Charge Thresholds: UND 1521

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_1521_LOSS_L_THRESHOLD,
B = BLM_UND1_1521_LOSS_H_THRESHOLD

28.111 BLM Raw Charge Thresholds: UND 1621

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_1621_LOSS_L_THRESHOLD,
B = BLM_UND1_1621_LOSS_H_THRESHOLD

28.112 BLM Raw Charge Thresholds: UND 1720

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_1720_LOSS_L_THRESHOLD,
B = BLM_UND1_1720_LOSS_H_THRESHOLD

28.113 BLM Raw Charge Thresholds: UND 1721

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_1721_LOSS_L_THRESHOLD,
B = BLM_UND1_1721_LOSS_H_THRESHOLD

28.114 BLM Raw Charge Thresholds: UND 1821

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_1821_LOSS_L_THRESHOLD,
B = BLM_UND1_1821_LOSS_H_THRESHOLD

28.115 BLM Raw Charge Thresholds: UND 1921

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_1921_LOSS_L_THRESHOLD,
B = BLM_UND1_1921_LOSS_H_THRESHOLD

28.116 BLM Raw Charge Thresholds: UND 2021

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_2021_LOSS_L_THRESHOLD,
B = BLM_UND1_2021_LOSS_H_THRESHOLD

28.117 BLM Raw Charge Thresholds: UND 2121

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_2121_LOSS_L_THRESHOLD,
B = BLM_UND1_2121_LOSS_H_THRESHOLD

28.118 BLM Raw Charge Thresholds: UND 221

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_221_LOSS_L_THRESHOLD,
B = BLM_UND1_221_LOSS_H_THRESHOLD

28.119 BLM Raw Charge Thresholds: UND 2221

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_2220_QBL_THRESHOLD`,
B = `BLM_2220_QBH_THRESHOLD`

28.120 BLM Raw Charge Thresholds: UND 2321

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_2320_QBL_THRESHOLD`,
B = `BLM_2320_QBH_THRESHOLD`

28.121 BLM Raw Charge Thresholds: UND 2421

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_2420_QBL_THRESHOLD`,
B = `BLM_2420_QBH_THRESHOLD`

28.122 BLM Raw Charge Thresholds: UND 2520

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_2520_QBL_THRESHOLD,
B = BLM_2520_QBH_THRESHOLD

28.123 BLM Raw Charge Thresholds: UND 2521

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_2521_LOSS_L_THRESHOLD,
B = BLM_UND1_2521_LOSS_H_THRESHOLD

28.124 BLM Raw Charge Thresholds: UND 2621

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_2620_QBL_THRESHOLD,
B = BLM_2620_QBH_THRESHOLD

28.125 BLM Raw Charge Thresholds: UND 2721

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_2720_QBL_THRESHOLD,
B = BLM_2720_QBH_THRESHOLD

28.126 BLM Raw Charge Thresholds: UND 2821

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_2820_QBL_THRESHOLD,
B = BLM_2820_QBH_THRESHOLD

28.127 BLM Raw Charge Thresholds: UND 2921

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_2920_QBL_THRESHOLD,
B = BLM_2920_QBH_THRESHOLD

28.128 BLM Raw Charge Thresholds: UND 3021

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_3021_LOSS_L_THRESHOLD,
B = BLM_UND1_3021_LOSS_H_THRESHOLD

28.129 BLM Raw Charge Thresholds: UND 3121

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_3121_LOSS_L_THRESHOLD,
B = BLM_UND1_3121_LOSS_H_THRESHOLD

28.130 BLM Raw Charge Thresholds: UND 321

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_321_LOSS_L_THRESHOLD,
B = BLM_UND1_321_LOSS_H_THRESHOLD

28.131 BLM Raw Charge Thresholds: UND 3221

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_3221_LOSS_L_THRESHOLD,
B = BLM_UND1_3221_LOSS_H_THRESHOLD

28.132 BLM Raw Charge Thresholds: UND 3320

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_3320_LOSS_L_THRESHOLD,
B = BLM_UND1_3320_LOSS_H_THRESHOLD

28.133 BLM Raw Charge Thresholds: UND 3321

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_3321_LOSS_L_THRESHOLD,
B = BLM_UND1_3321_LOSS_H_THRESHOLD

28.134 BLM Raw Charge Thresholds: UND 421

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_421_LOSS_L_THRESHOLD`,
B = `BLM_UND1_421_LOSS_H_THRESHOLD`

28.135 BLM Raw Charge Thresholds: UND 521

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_521_LOSS_L_THRESHOLD`,
B = `BLM_UND1_521_LOSS_H_THRESHOLD`

28.136 BLM Raw Charge Thresholds: UND 621

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `BLM_UND1_621_LOSS_L_THRESHOLD`,
B = `BLM_UND1_621_LOSS_H_THRESHOLD`

28.137 BLM Raw Charge Thresholds: UND 721

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_721_LOSS_L_THRESHOLD,
B = BLM_UND1_721_LOSS_H_THRESHOLD

28.138 BLM Raw Charge Thresholds: UND 821

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_821_LOSS_L_THRESHOLD,
B = BLM_UND1_821_LOSS_H_THRESHOLD

28.139 BLM Raw Charge Thresholds: UND 920

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_920_LOSS_L_THRESHOLD,
B = BLM_UND1_920_LOSS_H_THRESHOLD

28.140 BLM Raw Charge Thresholds: UND 921

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_921_LOSS_L_THRESHOLD,
B = BLM_UND1_921_LOSS_H_THRESHOLD

28.141 BLM Raw Charge Thresholds: UND BLF1

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_BLF1_LOSS_L_THRESHOLD,
B = BLM_UND1_BLF1_LOSS_H_THRESHOLD

28.142 BLM Raw Charge Thresholds: UND BLF17

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = BLM_UND1_BLF17_LOSS_L_THRESHOLD,
B = BLM_UND1_BLF17_LOSS_H_THRESHOLD

28.143 BLM Timing Check (BLM:UND1:4)

Name	*B*	*A*	PC	MS	BYKIK	LHS
Bad Timing	F	F	0 Hz	0 Hz	0 Hz	–
Bad Timing High	F	T	0 Hz	0 Hz	0 Hz	–
Bad Timing Low	T	F	0 Hz	0 Hz	0 Hz	–
OK	T	T	120 Hz	120 Hz	120 Hz	–

Where
A = `BLM_UND1_4_TIMING_L_THRESHOLD`,
B = `BLM_UND1_4_TIMING_H_THRESHOLD`

28.144 BLM Timing Check (LN30)

Name	*B*	*A*	PC	MS	BYKIK	LHS
Bad Timing	F	F	0 Hz	0 Hz	0 Hz	–
Bad Timing High	F	T	0 Hz	0 Hz	0 Hz	–
Bad Timing Low	T	F	0 Hz	0 Hz	0 Hz	–
All OK	T	T	120 Hz	120 Hz	120 Hz	–

Where
A = `BLM_UND1_4_TIMING_L_THRESHOLD`,
B = `BLM_UND1_4_TIMING_H_THRESHOLD`

28.145 BLM Trigger Missed (LN30)

Name	*A*	PC	MS	BYKIK	LHS
Missed	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `BLM_LTU1_722_NO_TRIG_MISSED`

28.146 BLM Trigger Missed (LN32)

Name	*A*	PC	MS	BYKIK	LHS
Missed	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = BLM_LTU1_762_NO_TRIG_MISSED

28.147 BLM Trigger Missed (LN33)

Name	A	PC	MS	BYKIK	LHS
Missed	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = BLM_UND1_6_NO_TRIG_MISSED

28.148 BLM Trigger Missed (LN35)

Name	A	PC	MS	BYKIK	LHS
Missed	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = BLM_UND1_14_NO_TRIG_MISSED

28.149 BLM Trigger Missed (LN36)

Name	A	PC	MS	BYKIK	LHS
Missed	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = BLM_TRIG_MISSED

28.150 BLM Trigger Missed (LN37)

Name	A	PC	MS	BYKIK	LHS
Missed	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = BLM_UND1_30_NO_TRIG_MISSED

28.151 BLM/PIC Watchdog: Downstream of TDUND

Name	*A*	PC	MS	BYKIK	LHS
Faulted	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MPS_MCC0_2_PICBLM_WD_STATUS`

28.152 BPM Summary (1-9)

Name	*A*	PC	MS	BYKIK	LHS
Faulted	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `IOC_UND1_BP01_MPSSTAT_STATE`

28.153 BPM Summary (10-18)

Name	*A*	PC	MS	BYKIK	LHS
Faulted	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `IOC_UND1_BP02_MPSSTAT_STATE`

28.154 BPM Summary (19-27)

Name	*A*	PC	MS	BYKIK	LHS
Faulted	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `IOC_UND1_BP03_MPSSTAT_STATE`

28.155 BPM Summary (28-36)

Name	*A*	PC	MS	BYKIK	LHS
Faulted	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = IOC_UND1_BP04_MPSSTAT_STATE

28.156 OTR01 IN20 541 Position and TDUND Not In

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = OTRS_IN20_541_OUT_LMTSW_STATE,
B = OTRS_IN20_541_IN_LMTSW_STATE

28.157 OTR02 IN20 571 Position and TDUND Not In

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = OTRS_IN20_571_OUT_LMTSW_STATE,
B = OTRS_IN20_571_IN_LMTSW_STATE

28.158 OTR03 IN20 621 Position and TDUND Not In

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = OTRS_IN20_621_OUT_LMTSW_STATE,
B = OTRS_IN20_621_IN_LMTSW_STATE

28.159 OTR04 IN20 711 Position and TDUND Not In

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = OTRS_IN20_711_OUT_LMTSW_STATE,
B = OTRS_IN20_711_IN_LMTSW_STATE

28.160 OTR11 LI21 237 Position and TDUND Not In

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = OTRS_LI21_237_OUT_LMTSW_STATE,
B = OTRS_LI21_237_IN_LMTSW_STATE

28.161 OTR12 LI21 291 Position and TDUND Not In

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = OTRS_LI21_291_OUT_LMTSW_STATE,
B = OTRS_LI21_291_IN_LMTSW_STATE

28.162 OTR21 Position When TDUND Not In

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = OTRS_LI24_807_OUT_LMTSW_STATE,
B = OTRS_LI24_807_IN_LMTSW_STATE

28.163 OTR22 Position When TDUND Not In

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = OTRS_LI25_342_OUT_LMTSW_STATE,
B = OTRS_LI25_342_IN_LMTSW_STATE

28.164 OTRH1 Position When TDUND Not In

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `OTRH1_OUT_LIMIT_STATE`,
B = `OTRH1_IN_LIMIT_STATE`

28.165 OTRH2 Position When TDUND Not In

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = `OTRH2_OUT_LIMIT_STATE`,
B = `OTRH2_IN_LIMIT_STATE`

28.166 PIC HVPS B921 - Location B921-2235

Name	*A*	PC	MS	BYKIK	LHS
Not On	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = `PICM_DMP1_B921_HV_PWR_STATE`

28.167 PIC Trigger Missed (LN34)

Name	*A*	PC	MS	BYKIK	LHS
Missed	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = PICS_DMP1_100_NO_TRIG_MISSED

28.168 THz Radiator Beryllium Foil

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = THZR_DMP1_350_OUT_LIMIT_POSITION,
B = THZR_DMP1_350_IN_LIMIT_POSITION

28.169 Toroid Comparator (IMUNDI vs IMUNDO)

Name	*B*	*A*	PC	MS	BYKIK	LHS
Broken	F	F	0 Hz	0 Hz	0 Hz	–
3E8 ppb Gain	F	T	0 Hz	0 Hz	0 Hz	–
3E8 ppb Loss	T	F	0 Hz	0 Hz	0 Hz	–
Under 3E8 ppb Loss	T	T	120 Hz	120 Hz	120 Hz	–

Where
A = IMUNDI_COMP_L1_STATE,
B = IMUNDI_COMP_L2_STATE

28.170 Toroid Comparator (IMUNDO vs IMDUMP)

Name	*B*	*A*	PC	MS	BYKIK	LHS
Broken	F	F	0 Hz	0 Hz	0 Hz	–
3E8 ppb Gain	F	T	0 Hz	0 Hz	0 Hz	–
3E8 ppb Loss	T	F	0 Hz	0 Hz	0 Hz	–
Under 3E8 ppb Loss	T	T	120 Hz	120 Hz	120 Hz	–

Where
A = IMUNDO_COMP_L1_STATE,
B = IMUNDO_COMP_L2_STATE

28.171 Toroid Comparator Power Status (B921)

Name	A	PC	MS	BYKIK	LHS
Powered Off	F	0 Hz	0 Hz	0 Hz	–
Powered On	T	120 Hz	120 Hz	120 Hz	–

Where
A = COMP_STAT_ON_STATE

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

29.1 BLM/PIC Watchdog BSY0/BSYA

Name	*A*	PC	MS	BYKIK	LHS
Faulted	F	0 Hz	0 Hz	0 Hz	–
Ok	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MPS_BSY0_1_PICBLM_WD_STATUS`

29.2 BLM/PIC Watchdog LI24

Name	*A*	PC	MS	BYKIK	LHS
Faulted	F	0 Hz	0 Hz	0 Hz	–
Ok	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MPS_LI24_1_PICBLM_WD_STATUS`

29.3 BLM/PIC Watchdog LI30

Name	*A*	PC	MS	BYKIK	LHS
Faulted	F	0 Hz	0 Hz	0 Hz	–
Ok	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MPS_LI30_1_PICBLM_WD_STATUS`

29.4 BSY GLAST Target Flow Switch

Name	*B*	*A*	PC	MS	BYKIK	LHS
Faulted	F	F	0 Hz	0 Hz	0 Hz	–
Ok	F	T	120 Hz	120 Hz	120 Hz	–
Faulted but Target Out	T	F	120 Hz	120 Hz	120 Hz	–
Ok	T	T	120 Hz	120 Hz	120 Hz	–

Where
A = `TRGT_BSY0_70_FLOW_SW_STATE`,
B = `TRGT_BSY0_70_OUT_LIMSW_POSITION`

29.5 BSY GLAST Target Klixon

Name	*B*	*A*	PC	MS	BYKIK	LHS
Faulted	F	F	0 Hz	0 Hz	0 Hz	–
Ok	F	T	120 Hz	120 Hz	120 Hz	–
Faulted but Target Out	T	F	120 Hz	120 Hz	120 Hz	–
Ok	T	T	120 Hz	120 Hz	120 Hz	–

Where
A = `GL_KLIXON_STATE`,
B = `TRGT_BSY0_70_OUT_LIMSW_POSITION`

29.6 BSY GLAST Target Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
In	F	T	120 Hz	120 Hz	120 Hz	–
Out	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `TRGT_BSY0_70_IN_LIMSW_POSITION`,
B = `TRGT_BSY0_70_OUT_LIMSW_POSITION`

29.7 Bunch Length Monitor BL21 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `BL22_OUT_STATE`,
B = `BL22_IN_STATE`

29.8 Flowswitch: BSY PC320

Name	*A*	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
Ok	T	120 Hz	120 Hz	120 Hz	–

Where
A = `PC320_FS_STATE`

29.9 Flowswitch: BSY PC90

Name	*A*	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
Ok	T	120 Hz	120 Hz	120 Hz	–

Where
A = `PC90_FS_STATE`

29.10 Flowswitch: BSY RAD LCW Slit 10/30

Name	*A*	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
Ok	T	120 Hz	120 Hz	120 Hz	–

Where
A = `HTEXCH2_STATE`

29.11 Flowswitch: CE21

Name	*A*	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `COL_805_FLOSW_STATE`

29.12 Flowswitch: COLL BSY0 16 (50PC20)

Name	*A*	PC	MS	BYKIK	LHS
FAULT	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `COLL_BSY0_16_FLOW_SW_STATE`

29.13 Flowswitch: COLL BSY0 33 (50PC30)

Name	*A*	PC	MS	BYKIK	LHS
FAULT	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `COLL_BSY0_33_FLOW_SW_STATE`

29.14 Flowswitch: COLL BSY0 45 (50PC-45)

Name	*A*	PC	MS	BYKIK	LHS
FAULT	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `COLL_BSY0_45_FLOW_SW_STATE`

29.15 Flowswitch: COLL BSY0 59 (PC0119)

Name	*A*	PC	MS	BYKIK	LHS
FAULT	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `COLL_BSY0_59_FLOW_SW_STATE`

29.16 Flowswitch: COLL BSY0 65 (PC0145)

Name	*A*	PC	MS	BYKIK	LHS
FAULT	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `COLL_BSY0_65_FLOW_SW_STATE`

29.17 Flowswitch: COLL BSY0 67 (PC0155)

Name	*A*	PC	MS	BYKIK	LHS
FAULT	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `COLL_BSY0_67_FLOW_SW_STATE`

29.18 Flowswitch: COLL BSY0 69 (PC0165)

Name	*A*	PC	MS	BYKIK	LHS
FAULT	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `COLL_BSY0_69_FLOW_SW_STATE`

29.19 Flowswitch: COLL BSY0 71 (PC0175)

Name	*A*	PC	MS	BYKIK	LHS
FAULT	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `COLL_BSY0_71_FLOW_SW_STATE`

29.20 Flowswitch: COLL BSY0 73 (PC0185)

Name	*A*	PC	MS	BYKIK	LHS
FAULT	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `COLL_BSY0_73_FLOW_SW_STATE`

29.21 Flowswitch: COLL BSY0 75 (PC0195)

Name	*A*	PC	MS	BYKIK	LHS
FAULT	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `COLL_BSY0_75_FLOW_SW_STATE`

29.22 Hydrogen Recombiner For BSY 1 Collimator

Name	*A*	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
Ok	T	120 Hz	120 Hz	120 Hz	–

Where
A = `HYDRECM1_STATE`

29.23 Hydrogen Recombiner For BSY 2 Slit 10/30

Name	*A*	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
Ok	T	120 Hz	120 Hz	120 Hz	–

Where
A = HYDRECM2_STATE

29.24 Ion Chamber Gas Flowswitch BSY A

Name	*A*	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
Ok	T	120 Hz	120 Hz	120 Hz	–

Where
A = A_IC_GAS_STATE

29.25 Ion Chamber Gas Flowswitch BSY B

Name	*A*	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
Ok	T	120 Hz	120 Hz	120 Hz	–

Where
A = B_IC_GAS_STATE

29.26 Ion Chamber Gas Flowswitch BSY C

Name	*A*	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
Ok	T	120 Hz	120 Hz	120 Hz	–

Where
A = C_IC_GAS_STATE

29.27 KICK BSY0 66 PM1 State (A-Line Kicker)

Name	*B*	*A*	PC	MS	BYKIK	LHS
Inconsistent	F	F	0 Hz	0 Hz	0 Hz	–
Is_OFF	F	T	120 Hz	120 Hz	120 Hz	–
Is_ON	T	F	120 Hz	120 Hz	120 Hz	–
Inconsistent	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = KICK_BSY0_66_PM1_OFF_STATUS,
B = KICK_BSY0_66_PM1_ON_STATUS

29.28 KICK BSY0 66 PM1 Trigger State (A-Line Kicker)

Name	*B*	*A*	PC	MS	BYKIK	LHS
Inconsistent	F	F	0 Hz	0 Hz	0 Hz	–
Is_Triggered	F	T	120 Hz	120 Hz	120 Hz	–
Is_Trig_Disabled	T	F	120 Hz	120 Hz	120 Hz	–
Inconsistent	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = KICK_BSY0_66_PM1_TRIG_ENB_STATUS,
B = KICK_BSY0_66_PM1_TRIG_LOCK_STATUS

29.29 KICK BSY0 66 PM2 State (A-Line Kicker)

Name	*B*	*A*	PC	MS	BYKIK	LHS
Inconsistent	F	F	0 Hz	0 Hz	0 Hz	–
Is_OFF	F	T	120 Hz	120 Hz	120 Hz	–
Is_ON	T	F	120 Hz	120 Hz	120 Hz	–
Inconsistent	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = KICK_BSY0_66_PM2_OFF_STATUS,
B = KICK_BSY0_66_PM2_ON_STATUS

29.30 KICK BSY0 66 PM2 Trigger State (A-Line Kicker)

Name	*B*	*A*	PC	MS	BYKIK	LHS
Inconsistent	F	F	0 Hz	0 Hz	0 Hz	–
Is_Triggered	F	T	120 Hz	120 Hz	120 Hz	–
Is_Trig_Disabled	T	F	120 Hz	120 Hz	120 Hz	–
Inconsistent	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = KICK_BSY0_66_PM2_TRIG_ENB_STATUS,
B = KICK_BSY0_66_PM2_TRIG_LOCK_STATUS

29.31 OTR21 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = OTRS_LI24_807_OUT_LMTSW_STATE,
B = OTRS_LI24_807_IN_LMTSW_STATE

29.32 OTR22 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = OTRS_LI25_342_OUT_LMTSW_STATE,
B = OTRS_LI25_342_IN_LMTSW_STATE

29.33 PIC Gas Pressure LI24

Name	*A*	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = PIC_GAS_PRESS_STATE

29.34 PIC HVPS B911 - Location B911-2135

Name	*A*	PC	MS	BYKIK	LHS
Not On	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = PICM_LTU1_B911_HV_PWR_STATE

29.35 PIC HVPS B912 - Location B912-2135

Name	*A*	PC	MS	BYKIK	LHS
Not On	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = PICM_LTU1_B912_HV_PWR_STATE

29.36 PIC HVPS B913 - Location B913-2135

Name	*A*	PC	MS	BYKIK	LHS
Not On	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = PICM_LTU1_B913_HV_PWR_STATE

29.37 PIC HVPS BSY 1 - Location B005-3921

Name	*A*	PC	MS	BYKIK	LHS
Not On	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = `PICM_BSY0_1_HV_PWR_STATE`

29.38 PIC HVPS BSY 2 - Location B005-3921

Name	*A*	PC	MS	BYKIK	LHS
Not On	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = `PICM_BSY0_2_HV_PWR_STATE`

29.39 PIC HVPS BSY 3 - Location B005-3921

Name	*A*	PC	MS	BYKIK	LHS
Not On	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = `PICM_BSY0_3_HV_PWR_STATE`

29.40 PIC HVPS BSY 4 - Location B005-3918

Name	*A*	PC	MS	BYKIK	LHS
Not On	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = `PICM_BSY0_4_HV_PWR_STATE`

29.41 PIC HVPS BSY 5 - Location B005-3918

Name	*A*	PC	MS	BYKIK	LHS
Not On	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = PICM_BSY0_5_HV_PWR_STATE

29.42 PIC HVPS BSY 6 - Location B005-3918

Name	*A*	PC	MS	BYKIK	LHS
Not On	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = PICM_BSY0_6_HV_PWR_STATE

29.43 PIC HVPS LI24 - Location LKF24-0235

Name	*A*	PC	MS	BYKIK	LHS
Not On	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = PICM_LI24_1_HV_PWR_STATE

29.44 PIC Raw Charge Thresholds: LTU1 220

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = PICS_LTU1_220_LOSSL_THRESHOLD,
B = PICS_LTU1_220_LOSSH_THRESHOLD

29.45 PIC Raw Charge Thresholds: LTU1 252

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = PICS_LTU1_252_LOSSL_THRESHOLD,
B = PICS_LTU1_252_LOSSH_THRESHOLD

29.46 PIC Raw Charge Thresholds: LTU1 280

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = PICS_LTU1_280_LOSSL_THRESHOLD,
B = PICS_LTU1_280_LOSSH_THRESHOLD

29.47 PIC Raw Charge Thresholds: LTU1 420

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = PICS_LTU1_420_LOSSL_THRESHOLD,
B = PICS_LTU1_420_LOSSH_THRESHOLD

29.48 PIC Raw Charge Thresholds: LTU1 450

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = PICS_LTU1_450_LOSSL_THRESHOLD,
B = PICS_LTU1_450_LOSSH_THRESHOLD

29.49 PIC Raw Charge Thresholds: LTU1 480

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = PICS_LTU1_480_LOSSL_THRESHOLD,
B = PICS_LTU1_480_LOSSH_THRESHOLD

29.50 PIC Raw Charge Thresholds: LTU1 722

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = PICS_LTU1_722_LOSSL_THRESHOLD,
B = PICS_LTU1_722_LOSSH_THRESHOLD

29.51 PIC Raw Charge Thresholds: LTU1 732

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_LTU1_732_LOSSL_THRESHOLD,
B = PICM_LTU1_732_LOSSH_THRESHOLD

29.52 PIC Raw Charge Thresholds: LTU1 762

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = PICS_LTU1_762_LOSSL_THRESHOLD,
B = PICS_LTU1_762_LOSSH_THRESHOLD

29.53 PIC Raw Charge Thresholds: LTU1 772

Name	*B*	*A*	PC	MS	BYKIK	LHS
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 = PICS_LTU1_772_LOSSL_THRESHOLD,
B = PICS_LTU1_772_LOSSH_THRESHOLD

29.54 PIC Trigger Missed (LN28)

Name	*A*	PC	MS	BYKIK	LHS
Missed	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = PICS_LTU1_220_NO_TRIG_MISSED

29.55 PIC Trigger Missed (LN29)

Name	*A*	PC	MS	BYKIK	LHS
Missed	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = PICS_LTU1_480_NO_TRIG_MISSED

29.56 PIC Trigger Missed (LN31)

Name	*A*	PC	MS	BYKIK	LHS
Missed	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = PICS_LTU1_762_NO_TRIG_MISSED

29.57 Profile Monitor BSY0 45 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = PROF_BSY0_45_OUT_LIMIT_POSITION,
B = PROF_BSY0_45_IN_LIMIT_POSITION

29.58 Stopper: BSY D2, 60, 61 DM60 Summary

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

```
/*
 * state = 0 : full rate (120 Hz) beam allowed, ALL OUT
 * state = 1 : full rate (120 Hz) beam allowed, ALL IN
 * state = 2 : do not allow beam, Moving or Inconsistant
*/

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

/*
 * Stopper: BSY D2, 60, 61 DM60 Summary
 * Status given from PPS Stopper chassis very close to limit switches
    and CNTRL and passed to MPS via
 * opto's to insure fasts possible response. BTM60 has been documented
    to move at 200 msec from OUT to IN
 * Allow beam if ALL OUT
 * Allow beam if ALL IN
 * Otherwise, do not allow beam, Moving or Inconsistant
 */


/* Input Descriptions
*    INPUT_NAME                                                    ,
   FAULT_NAME (low)      , OK_NAME           , DESC
*       STPR_BSY0_89_IN_LIMSW_A_POSITION          , "IS_NOT_IN"
              , "IS_IN"      , "ST60 IN LIMSW CHAN A"
*       STPR_BSY0_89_IN_LIMSW_B_POSITION          , "IS_NOT_IN"
              , "IS_IN"      , "ST60 IN LIMSW CHAN B"
*       STPR_BSY0_89_OUT_LIMSW_A_POSITION         , "IS_NOT_OUT"
             , "IS_OUT"     , "ST60 OUT LIMSW CHAN A"
*       STPR_BSY0_89_OUT_LIMSW_B_POSITION         , "IS_NOT_OUT"
             , "IS_OUT"     , "ST60 OUT LIMSW CHAN B"
*       STPR_BSY0_90_IN_LIMSW_A_POSITION          , "IS_NOT_IN"
              , "IS_IN"      , "ST61 IN LIMSW CHAN A"
*       STPR_BSY0_90_IN_LIMSW_B_POSITION          , "IS_NOT_IN"
              , "IS_IN"      , "ST61 IN LIMSW CHAN B"
*       STPR_BSY0_90_OUT_LIMSW_A_POSITION         , "IS_NOT_OUT"
             , "IS_OUT"     , "ST61 OUT LIMSW CHAN A"
*       STPR_BSY0_90_OUT_LIMSW_B_POSITION         , "IS_NOT_OUT"
             , "IS_OUT"     , "ST61 OUT LIMSW CHAN B"
```

```
*        STPR_BSY0_88_IN_LIMSW_A_POSITION          , "IS_NOT_IN"
               , "IS_IN"       , "D2 IN LIMSW CHAN A"
*        STPR_BSY0_88_IN_LIMSW_B_POSITION          , "IS_NOT_IN"
               , "IS_IN"       , "D2 IN LIMSW CHAN B"
*        STPR_BSY0_88_OUT_LIMSW_A_POSITION         , "IS_NOT_OUT"
              , "IS_OUT"      , "D2 OUT LIMSW CHAN A"
*        BTM_BSY0_89_IN_LIMSW_A_POSITION           , "IS_NOT_IN"
               , "IS_IN"       , "BTM60 IN LIMSW CHAN A"
*        BTM_BSY0_89_IN_LIMSW_B_POSITION       , "IS_NOT_IN"          , "
    IS_IN"       , "BTM60 IN LIMSW CHAN B"
*        BTM_BSY0_89_OUT_LIMSW_A_POSITION          , "IS_NOT_OUT"
               , "IS_OUT"      , "BTM60 OUT LIMSW CHAN A"
*        BTM_BSY0_89_OUT_CNTRL_A_PPS_CNTRL         , "IS_NOT_OUT_RQ"
          , "IS_OUT_RQ" , "BTM60 OUT SOLN CNTRL CHAN A"
*        BTM_BSY0_89_OUT_CNTRL_B_PPS_CNTRL         , "IS_NOT_OUT_RQ"
          , "IS_OUT_RQ" , "BTM60 OUT SOLN CNTRL CHAN B2"
*
*/

if ( STPR_BSY0_89_OUT_LIMSW_A_POSITION &&
    STPR_BSY0_89_OUT_LIMSW_B_POSITION &&
            STPR_BSY0_90_OUT_LIMSW_A_POSITION &&
                STPR_BSY0_90_OUT_LIMSW_B_POSITION &&
            STPR_BSY0_88_OUT_LIMSW_A_POSITION &&
                BTM_BSY0_89_OUT_LIMSW_A_POSITION &&
            BTM_BSY0_89_OUT_CNTRL_A_PPS_CNTRL &&
                BTM_BSY0_89_OUT_CNTRL_B_PPS_CNTRL &&
            !( STPR_BSY0_89_IN_LIMSW_A_POSITION ||
                STPR_BSY0_89_IN_LIMSW_B_POSITION ||
                STPR_BSY0_90_IN_LIMSW_A_POSITION ||
                    STPR_BSY0_90_IN_LIMSW_B_POSITION ||
                STPR_BSY0_88_IN_LIMSW_A_POSITION ||
                    STPR_BSY0_88_IN_LIMSW_B_POSITION ||
                BTM_BSY0_89_IN_LIMSW_A_POSITION ||
                    BTM_BSY0_89_IN_LIMSW_B_POSITION ) )
{
     state = 0; /* ALL OUT, and NOT IN, okay to run beam */
}

else if ( STPR_BSY0_89_IN_LIMSW_A_POSITION  &&
    STPR_BSY0_89_IN_LIMSW_B_POSITION &&
              STPR_BSY0_90_IN_LIMSW_A_POSITION &&
                  STPR_BSY0_90_IN_LIMSW_B_POSITION &&
              STPR_BSY0_88_IN_LIMSW_A_POSITION &&
                  STPR_BSY0_88_IN_LIMSW_B_POSITION &&
```

```
                BTM_BSY0_89_IN_LIMSW_A_POSITION &&
                    BTM_BSY0_89_IN_LIMSW_B_POSITION   &&
                !(STPR_BSY0_89_OUT_LIMSW_A_POSITION  ||
                    STPR_BSY0_89_OUT_LIMSW_B_POSITION  ||
                  STPR_BSY0_90_OUT_LIMSW_A_POSITION  ||
                      STPR_BSY0_90_OUT_LIMSW_B_POSITION  ||
                  STPR_BSY0_88_OUT_LIMSW_A_POSITION  ||
                      BTM_BSY0_89_OUT_LIMSW_A_POSITION   ||
                  BTM_BSY0_89_OUT_CNTRL_A_PPS_CNTRL  ||
                      BTM_BSY0_89_OUT_CNTRL_B_PPS_CNTRL  ) )
{
    state = 1; /* ALL IN and NOT OUT okay to run beam */
}

else
{
    state = 2; /* do not allow beam, Moving or Inconsistent */
}
```

Name	State	PC	MS	BYKIK	LHS
IS_OUT	0	120 Hz	120 Hz	120 Hz	–
IS_IN	1	10 Hz	10 Hz	10 Hz	–
Moving or Inconsistent	2	0 Hz	0 Hz	0 Hz	–

29.59 Temperature RTD Summary: BSY Common Line Before D2

Name	*A*	PC	MS	BYKIK	LHS
Faulted	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `RTD_BSY0_16_CLINESUM_STATUS`

29.60 Toroid Chassis IMBC2

Name	*A*	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = CHASIMB2_STATE

29.61 Toroid Comparator IMBC2IN/IMBC2OUT

Name	B	A	PC	MS	BYKIK	LHS
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

29.62 VVPG BSY0 IV2 Position

Name	A	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = IV2_OPEN_STATE

29.63 VVPG BSY0 IV3 Position

Name	A	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = IV3_OPEN_STATE

29.64 VVPG BSY0 IV4 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `IV4_OPEN_STATE`

30 Ignored when YAG01 Is In

30.1 BXG Status

Name	*B*	*A*	PC	MS	BYKIK	LHS
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

30.2 Toroid Peak Current Monitor IM01

Name	*A*	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = TR_BL215_STATE

30.3 YAG02 IN20 241 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = YAGS_IN20_241_OUT_LMTSW_STATE,
B = YAGS_IN20_241_IN_LMTSW_STATE

31 Ignored when YAG01 Is In or YAG02 Is In

31.1 BLM/PIC Watchdog: Upstream of TDUND

Name	*A*	PC	MS	BYKIK	LHS
Faulted	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MPS_MCC0_1_PICBLM_WD_STATUS`

31.2 BX01/BX02 Status

Name	*B*	*A*	PC	MS	BYKIK	LHS
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`

31.3 Dump LI28 5879 Flowswitch

Name	*A*	PC	MS	BYKIK	LHS
No Flow	F	0 Hz	0 Hz	0 Hz	–
Flow OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `DUMP_5879_FLOW_SW_STATE`

31.4 Dump LI28 5879 Klixon

Name	*A*	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = DUMP_5879_KLIXON_OK_STATE

31.5 Fast Shutter FV2 LI30 Position

Name	A	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = FAST_SHUTTER_FV2_OK_OPEN_STATE

31.6 Fast Shutter FV2A LI30 Position

Name	A	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = FAST_SHUTTER_FV2A_OK_OPEN_STATE

31.7 Flowswitch: CE11

Name	A	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = COLL_LI21_235_OPEN_STATE

31.8 Flowswitch: COLL LI28-9

Name	A	PC	MS	BYKIK	LHS
No Flow	F	0 Hz	0 Hz	0 Hz	–
Flow OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = FLOW_SW_28_9_STATE

31.9 Flowswitch: COLL LI29-1

Name	*A*	PC	MS	BYKIK	LHS
No Flow	F	0 Hz	0 Hz	0 Hz	–
Flow OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = FLOW_SW_29_1_STATE

31.10 Flowswitch: COLL LI29-4

Name	*A*	PC	MS	BYKIK	LHS
No Flow	F	0 Hz	0 Hz	0 Hz	–
Flow OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = FLOW_SW_29_4_STATE

31.11 Flowswitch: COLL LI29-5

Name	*A*	PC	MS	BYKIK	LHS
No Flow	F	0 Hz	0 Hz	0 Hz	–
Flow OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = FLOW_SW_29_5_STATE

31.12 Flowswitch: COLL LI29-9

Name	*A*	PC	MS	BYKIK	LHS
No Flow	F	0 Hz	0 Hz	0 Hz	–
Flow OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = FLOW_SW_29_9_STATE

31.13 Flowswitch: COLL LI30-1

Name	*A*	PC	MS	BYKIK	LHS
No Flow	F	0 Hz	0 Hz	0 Hz	–
Flow OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = FLOW_SW_30_1_STATE

31.14 Flowswitch: COLL LI30-4

Name	*A*	PC	MS	BYKIK	LHS
No Flow	F	0 Hz	0 Hz	0 Hz	–
Flow OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = FLOW_SW_30_4_STATE

31.15 Flowswitch: COLL LI30-5

Name	*A*	PC	MS	BYKIK	LHS
No Flow	F	0 Hz	0 Hz	0 Hz	–
Flow OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = FLOW_SW_30_5_STATE

31.16 Flowswitch: TD11

Name	*A*	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = FS_BL305_STATE

31.17 Main Manifold Gauge: LI21 Station 5

Name	A	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = MPS_MM_GAUGE_OK_LI21_STATE

31.18 Main Manifold Gauge: LI22 Station 5

Name	A	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = MPS_MM_GAUGE_OK_LI22_STATE

31.19 Main Manifold Gauge: LI23 Station 5

Name	A	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = MPS_MM_GAUGE_OK_LI23_STATE

31.20 Main Manifold Gauge: LI24 Station 5

Name	A	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = MPS_MM_GAUGE_OK_LI24_STATE

31.21 Main Manifold Gauge: LI25 Station 5

Name	A	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MPS_MM_GAUGE_OK_LI25_STATE`

31.22 Main Manifold Gauge: LI26 Station 5

Name	A	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MPS_MM_GAUGE_OK_LI26_STATE`

31.23 Main Manifold Gauge: LI27 Station 5

Name	A	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MPS_MM_GAUGE_OK_LI27_STATE`

31.24 Main Manifold Gauge: LI28 Station 5

Name	A	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MPS_MM_GAUGE_OK_LI28_STATE`

31.25 Main Manifold Gauge: LI29 Station 5

Name	*A*	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MPS_MM_GAUGE_OK_STATE`

31.26 Main Manifold Gauge: LI30 Station 5

Name	*A*	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MPS_MM_GAUGE_30_5_OK_STATE`

31.27 Main Manifold Gauge: LI30 Station 9

Name	*A*	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MPS_MM_GAUGE_30_9_OK_STATE`

31.28 Mirror BL11 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	120 Hz	120 Hz	120 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `MIR_BL11_OUT_STATE`,
B = `MIR_BL11_IN_STATE`

31.29 OTR LI25 920 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `OTR_TCAV_OUT_STATE`,
B = `OTR_TCAV_IN_STATE`

31.30 OTR01 IN20 541 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

31.31 OTR02 IN20 571 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

31.32 OTR03 IN20 621 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

31.33 OTR04 IN20 711 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

31.34 OTR11 LI21 237 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

31.35 OTR12 LI21 291 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

31.36 OTRH1 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

31.37 OTRH2 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

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

31.38 PIC HVPS LI30 - KG30-C1322

Name	*A*	PC	MS	BYKIK	LHS
Not On	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = PICM_LI30_1_HV_PWR_STATE

31.39 PIC Raw Charge Thresholds: LI24 791

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_LI24_791_LOSSL_THRESHOLD,
B = PICM_LI24_791_LOSSH_THRESHOLD

31.40 PIC Raw Charge Thresholds: LI24 811

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_LI24_811_LOSSL_THRESHOLD,
B = PICM_LI24_811_LOSSH_THRESHOLD

31.41 PIC Trigger Missed (LN16)

Name	*A*	PC	MS	BYKIK	LHS
Missed	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = PICM_LI24_791_NO_TRIG_MISSED

31.42 Scraper Water LI21-9 (Station 22-1)

Name	A	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = MPS_SCRAPPER_FLOW_OK_LI22_STATE

31.43 Scraper Water LI22-9 (Station 23-1)

Name	A	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = MPS_SCRAPPER_FLOW_OK_LI23_STATE

31.44 Scraper Water LI23-9 (Station 24-1)

Name	A	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = MPS_SCRAPPER_FLOW_OK_LI24_STATE

31.45 Scraper Water LI24-9 (Station 25-1)

Name	A	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = MPS_SCRAPPER_FLOW_OK_LI25_STATE

31.46 Scraper Water LI25-9 (Station 26-1)

Name	*A*	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = MPS_SCRAPPER_FLOW_OK_LI26_STATE

31.47 Scraper Water LI26-9 (Station 27-1)

Name	*A*	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = MPS_SCRAPPER_FLOW_OK_LI27_STATE

31.48 Scraper Water LI27-9 (Station 28-1)

Name	*A*	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = MPS_SCRAPPER_FLOW_OK_LI28_STATE

31.49 Scraper Water LI28-9 (Station 29-1)

Name	*A*	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = MPS_SCRAPPER_FLOW_OK_LI29_STATE

31.50 Scraper Water LI29-9 (Station 30-1)

Name	*A*	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = MPS_SCRAPPER_FLOW_OK_LI30_STATE

31.51 Stopper LI28 950 and 960 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = BASII_STOPPER_OUT_STATE

31.52 Sub-booster Ready: LI21

Name	*A*	PC	MS	BYKIK	LHS
Not Ready	F	0 Hz	0 Hz	0 Hz	–
Ready	T	120 Hz	120 Hz	120 Hz	–

Where
A = MPS_SBST_OK_READY_LI21_STATE

31.53 Sub-booster Ready: LI22

Name	*A*	PC	MS	BYKIK	LHS
Not Ready	F	0 Hz	0 Hz	0 Hz	–
Ready	T	120 Hz	120 Hz	120 Hz	–

Where
A = MPS_SBST_OK_READY_LI22_STATE

31.54 Sub-booster Ready: LI25

Name	*A*	PC	MS	BYKIK	LHS
Not Ready	F	0 Hz	0 Hz	0 Hz	–
Ready	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MPS_SBST_OK_READY_LI25_STATE`

31.55 Sub-booster Ready: LI26

Name	*A*	PC	MS	BYKIK	LHS
Not Ready	F	0 Hz	0 Hz	0 Hz	–
Ready	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MPS_SBST_OK_READY_LI26_STATE`

31.56 Sub-booster Ready: LI27

Name	*A*	PC	MS	BYKIK	LHS
Not Ready	F	0 Hz	0 Hz	0 Hz	–
Ready	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MPS_SBST_OK_READY_LI27_STATE`

31.57 Sub-booster Ready: LI28

Name	*A*	PC	MS	BYKIK	LHS
Not Ready	F	0 Hz	0 Hz	0 Hz	–
Ready	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MPS_SBST_OK_READY_LI28_STATE`

31.58 Sub-booster Ready: LI29

Name	*A*	PC	MS	BYKIK	LHS
Not Ready	F	0 Hz	0 Hz	0 Hz	–
Ready	T	120 Hz	120 Hz	120 Hz	–

Where
A = MPS_SBST_OK_READY_LI29_STATE

31.59 Sub-booster Ready: LI30

Name	*A*	PC	MS	BYKIK	LHS
Not Ready	F	0 Hz	0 Hz	0 Hz	–
Ready	T	120 Hz	120 Hz	120 Hz	–

Where
A = MPS_SBST_OK_READY_LI30_STATE

31.60 TD11 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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

31.61 Toroid Chassis IM11

Name	*A*	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = CHASIM11_STATE

31.62 Toroid Chassis IM12

Name	*A*	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `CHASIM12_STATE`

31.63 Toroid Comparator IMBC1IN/IMBC1OUT

Name	*B*	*A*	PC	MS	BYKIK	LHS
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`

31.64 VVFS LI21-9 Position (Station 22-1)

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `FAST_VLV_OPEN_LI22_STATE`

31.65 VVFS LI22-9 Position (Station 23-1)

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = `FAST_VLV_OPEN_LI23_STATE`

31.66 VVFS LI23-9 Position (Station 24-1)

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = FAST_VLV_OPEN_LI24_STATE

31.67 VVFS LI24-9 Position (Station 25-1)

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = FAST_VLV_OPEN_LI25_STATE

31.68 VVFS LI25-9 Position (Station 26-1)

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = FAST_VLV_OPEN_LI26_STATE

31.69 VVFS LI26-9 Position (Station 27-1)

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = FAST_VLV_OPEN_LI27_STATE

31.70 VVFS LI27-9 Position (Station 28-1)

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = FAST_VLV_OPEN_LI28_STATE

31.71 VVFS LI28-9 Position (Station 29-1)

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = FAST_VLV_OPEN_LI29_STATE

31.72 VVFS LI29-9 Position (Station 30-1)

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = FAST_VLV_OPEN_LI30_STATE

31.73 VVFV IN20 785 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = VVFV_IN20_785_OPEN_LMTSW_POSITION

31.74 VVMG LI21 195 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = VV_BL195_STATE

31.75 VVMG LTU1 505 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = VVPG_0505_STATE

31.76 VVPG IN20 435 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = VV_BL435_STATE

31.77 VVPG IN20 545 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = VV_BL545_STATE

31.78 VVPG IN20 635 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = VV_BL635_STATE

31.79 VVPG IN20 915 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = VV_IS915_STATE

31.80 VVPG LI21-9 Position (Station 22-1)

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = SLOW_VLV_OPEN_LI22_STATE

31.81 VVPG LI22-9 Position (Station 23-1)

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = SLOW_VLV_OPEN_LI23_STATE

31.82 VVPG LI23-9 Position (Station 24-1)

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = SLOW_VLV_OPEN_LI24_STATE

31.83 VVPG LI24 710 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = VV21_STATE

31.84 VVPG LI24 896 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = VV22_STATE

31.85 VVPG LI25-9 Position (Station 26-1)

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = SLOW_VLV_OPEN_LI26_STATE

31.86 VVPG LI26-9 Position (Station 27-1)

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = SLOW_VLV_OPEN_LI27_STATE

31.87 VVPG LI27-9 Position (Station 28-1)

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = SLOW_VLV_OPEN_LI28_STATE

31.88 VVPG LI28-9 Position (Station 29-1)

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = SLOW_VLV_OPEN_LI29_STATE

31.89 VVPG LI29-9 Position (Station 30-1)

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = SLOW_VLV_OPEN_LI30_STATE

31.90 VVPG LI30-9 Position (Station 30-9)

Name	*A*	PC	MS	BYKIK	LHS
Not Open	F	0 Hz	0 Hz	0 Hz	–
Open	T	120 Hz	120 Hz	120 Hz	–

Where
A = SLOW_VLV_30_9_OK_OPEN_STATE

31.91 VVS Circuit Breaker: LI22

Name	*A*	PC	MS	BYKIK	LHS
Not On	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = VVS_BRKR_OK_READY_LI22_STATE

31.92 VVS Circuit Breaker: LI24

Name	*A*	PC	MS	BYKIK	LHS
Not On	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = VVS_BRKR_OK_READY_LI24_STATE

31.93 VVS Circuit Breaker: LI26

Name	*A*	PC	MS	BYKIK	LHS
Not On	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = VVS_BRKR_OK_READY_LI26_STATE

31.94 VVS Circuit Breaker: LI28

Name	*A*	PC	MS	BYKIK	LHS
Not On	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = VVS_BRKR_OK_READY_LI28_STATE

31.95 VVS Circuit Breaker: LI30

Name	*A*	PC	MS	BYKIK	LHS
Not On	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = VVS_BRKR_OK_READY_LI30_STATE

31.96 YAG03 IN20 351 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = YAGS_IN20_351_OUT_LMTSW_STATE,
B = YAGS_IN20_351_IN_LMTSW_STATE

31.97 YAGS1 IN20 921 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = YAGS_IN20_921_OUT_LMTSW_STATE,
B = YAGS_IN20_921_IN_LMTSW_STATE

31.98 YAGS2 LI21 995 Position

Name	B	A	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = YAGS_LI21_995_OUT_LMTSW_STATE,
B = YAGS_LI21_995_IN_LMTSW_STATE

32 Always Evaluated

32.1 Backward Beam Stopper (RST1)

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `ST_BL551_STATE`

32.2 BLM/PIC Watchdog: IN20

Name	*A*	PC	MS	BYKIK	LHS
Faulted	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MPS_IN20_1_PICBLM_WD_STATUS`

32.3 Bypass Recover

Name	*A*	PC	MS	BYKIK	LHS
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`

32.4 DPS Temperature LI30

Name	*A*	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `DPS_TEMP_STATE`

32.5 Gun RF Peak Power 20-6

Name	*A*	PC	MS	BYKIK	LHS
OK	F	120 Hz	120 Hz	120 Hz	–
Fault	T	0 Hz	0 Hz	0 Hz	–

Where
A = FLT_20_6_TRP_STATE

32.6 Gun Waveguide Vacuum Summary

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = WGVACGUN_STATE

32.7 IOC-IN20-MP01 MPS Support IOC Heartbeat

Name	*A*	PC	MS	BYKIK	LHS
Fault	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = MN_HEART_STATE

32.8 Laser Heater Attenuator Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
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

32.9 MCC Emergency Radiation Stopper

Name	*A*	PC	MS	BYKIK	LHS
Not OK	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = `EMG_RAD_STOP_STATE`

32.10 Mechanical Shutter Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	–	0 Hz	–
Out	F	T	–	–	–	–
In	T	F	–	–	–	–
Broken	T	T	0 Hz	–	0 Hz	–

Where
A = `MPS_IN20_200_MSHT1_OUT_FAULT`,
B = `MPS_IN20_200_MSHT1_IN_FAULT`

32.11 Mirror AM01 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `MR_BL191_STATE`

32.12 MPS Beam Permit: BYKIK

Name	*A*	PC	MS	BYKIK	LHS
Not Permitted	F	–	–	0 Hz	–
Permitted	T	–	–	120 Hz	–

Where
A = `LP_ALLOWS_BEAM_BYKIK`

32.13 MPS Beam Permit: Gun RF

Name	*A*	PC	MS	BYKIK	LHS
Not Permitted	F	0 Hz	–	–	–
Permitted	T	120 Hz	–	–	–

Where
A = LP_ALLOWS_BEAM_POCKELS_CELL

32.14 MPS Beam Permit: Heater Shutter

Name	*A*	PC	MS	BYKIK	LHS
Not Permitted	F	–	–	–	0 Hz
Permitted	T	–	–	–	120 Hz

Where
A = LP_ALLOWS_BEAM_LH_SHUT

32.15 MPS Beam Permit: Mechanical Shutter

Name	*A*	PC	MS	BYKIK	LHS
Not Permitted	F	–	0 Hz	–	–
Permitted	T	–	120 Hz	–	–

Where
A = LP_ALLOWS_BEAM_MECH_SHUT

32.16 MPS Mechanical Shutter Position

Name	*A*	PC	MS	BYKIK	LHS
OK	F	120 Hz	120 Hz	120 Hz	–
Readback Does Not Match	T	0 Hz	0 Hz	0 Hz	–

Where
A = SHFLT_STATE

32.17 PIC HVPS LI20 - Location LKG-1535

Name	*A*	PC	MS	BYKIK	LHS
Not On	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = PICM_LI20_1_HV_PWR_STATE

32.18 PIC Raw Charge Thresholds: BSY0 16

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_BSY0_16_LOSSL_THRESHOLD,
B = PICM_BSY0_16_LOSSH_THRESHOLD

32.19 PIC Raw Charge Thresholds: BSY0 33

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_BSY0_33_LOSSL_THRESHOLD,
B = PICM_BSY0_33_LOSSH_THRESHOLD

32.20 PIC Raw Charge Thresholds: BSY0 45

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_BSY0_45_LOSSL_THRESHOLD`,
B = `PICM_BSY0_45_LOSSH_THRESHOLD`

32.21 PIC Raw Charge Thresholds: BSY0 59

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_BSY0_59_LOSSL_THRESHOLD`,
B = `PICM_BSY0_59_LOSSH_THRESHOLD`

32.22 PIC Raw Charge Thresholds: BSY0 78A

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_BSY0_78A_LOSSL_THRESHOLD`,
B = `PICM_BSY0_78A_LOSSH_THRESHOLD`

32.23 PIC Raw Charge Thresholds: BSY0 78B

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_BSY0_78B_LOSSL_THRESHOLD,
B = PICM_BSY0_78B_LOSSH_THRESHOLD

32.24 PIC Raw Charge Thresholds: IN20 185

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_IN20_185_LOSSL_THRESHOLD,
B = PICM_IN20_185_LOSSH_THRESHOLD

32.25 PIC Raw Charge Thresholds: IN20 232

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_IN20_232_LOSSL_THRESHOLD,
B = PICM_IN20_232_LOSSH_THRESHOLD

32.26 PIC Raw Charge Thresholds: IN20 245

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_IN20_245_LOSSL_THRESHOLD,
B = PICM_IN20_245_LOSSH_THRESHOLD

32.27 PIC Raw Charge Thresholds: IN20 665

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_IN20_665_LOSSL_THRESHOLD,
B = PICM_IN20_665_LOSSH_THRESHOLD

32.28 PIC Raw Charge Thresholds: IN20 775

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_IN20_775_LOSSL_THRESHOLD,
B = PICM_IN20_775_LOSSH_THRESHOLD

32.29 PIC Raw Charge Thresholds: IN20 933

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_IN20_933_LOSSL_THRESHOLD`,
B = `PICM_IN20_933_LOSSH_THRESHOLD`

32.30 PIC Raw Charge Thresholds: LI28 916

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_LI28_916_LOSSL_THRESHOLD`,
B = `PICM_LI28_916_LOSSH_THRESHOLD`

32.31 PIC Raw Charge Thresholds: LI29 146

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_LI29_146_LOSSL_THRESHOLD`,
B = `PICM_LI29_146_LOSSH_THRESHOLD`

32.32 PIC Raw Charge Thresholds: LI29 446

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_LI29_446_LOSSL_THRESHOLD,
B = PICM_LI29_446_LOSSH_THRESHOLD

32.33 PIC Raw Charge Thresholds: LI29 546

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_LI29_546_LOSSL_THRESHOLD,
B = PICM_LI29_546_LOSSH_THRESHOLD

32.34 PIC Raw Charge Thresholds: LI29 801

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_LI29_801_LOSSL_THRESHOLD,
B = PICM_LI29_801_LOSSH_THRESHOLD

32.35 PIC Raw Charge Thresholds: LI29 956

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_LI29_956_LOSSL_THRESHOLD`,
B = `PICM_LI29_956_LOSSH_THRESHOLD`

32.36 PIC Raw Charge Thresholds: LI30 146

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_LI30_146_LOSSL_THRESHOLD`,
B = `PICM_LI30_146_LOSSH_THRESHOLD`

32.37 PIC Raw Charge Thresholds: LI30 446

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_LI30_446_LOSSL_THRESHOLD`,
B = `PICM_LI30_446_LOSSH_THRESHOLD`

32.38 PIC Raw Charge Thresholds: LI30 546

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_LI30_546_LOSSL_THRESHOLD,
B = PICM_LI30_546_LOSSH_THRESHOLD

32.39 PIC Raw Charge Thresholds: LI30 801

Name	*B*	*A*	PC	MS	BYKIK	LHS
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_LI30_801_LOSSL_THRESHOLD,
B = PICM_LI30_801_LOSSH_THRESHOLD

32.40 PIC Trigger Missed (LN11)

Name	*A*	PC	MS	BYKIK	LHS
Missed	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = PICM_IN20_665_NO_TRIG_MISSED

32.41 PIC Trigger Missed (LN22)

Name	*A*	PC	MS	BYKIK	LHS
Missed	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = PICM_LI28_916_NO_TRIG_MISSED

32.42 PIC Trigger Missed (LN25)

Name	A	PC	MS	BYKIK	LHS
Missed	F	0 Hz	0 Hz	0 Hz	–
OK	T	120 Hz	120 Hz	120 Hz	–

Where
A = PICM_BSY0_16_NO_TRIG_MISSED

32.43 Pockels Cell AND Gate 100

Name	A	PC	MS	BYKIK	LHS
Bypassed	F	0 Hz	0 Hz	0 Hz	–
Active	T	120 Hz	120 Hz	120 Hz	–

Where
A = MPS_IN20_100_ANDALLACTV_STATE

32.44 Pockels Cell AND Gate 200

Name	A	PC	MS	BYKIK	LHS
Bypassed	F	0 Hz	0 Hz	0 Hz	–
Active	T	120 Hz	120 Hz	120 Hz	–

Where
A = MPS_IN20_200_ANDALLACTV_STATE

32.45 Rate Request: BYKIK 1 Hz

Name	A	PC	MS	BYKIK	LHS
Not Requested	F	–	–	120 Hz	–
Requested	T	–	–	1 Hz	–

Where
A = LP_MAX_RATE_BYKIK_1_HZ

32.46 Rate Request: BYKIK 10 Hz

Name	*A*	PC	MS	BYKIK	LHS
Not Requested	F	–	–	120 Hz	–
Requested	T	–	–	10 Hz	–

Where
A = `LP_MAX_RATE_BYKIK_10_HZ`

32.47 Rate Request: BYKIK 30 Hz

Name	*A*	PC	MS	BYKIK	LHS
Not Requested	F	–	–	120 Hz	–
Requested	T	–	–	30 Hz	–

Where
A = `LP_MAX_RATE_BYKIK_30_HZ`

32.48 Rate Request: BYKIK 60 Hz

Name	*A*	PC	MS	BYKIK	LHS
Not Requested	F	–	–	120 Hz	–
Requested	T	–	–	60 Hz	–

Where
A = `LP_MAX_RATE_BYKIK_60_HZ`

32.49 Rate Request: BYKIK Burst

Name	*A*	PC	MS	BYKIK	LHS
Not Requested	F	–	–	120 Hz	–
Requested	T	–	–	Burst Mode	–

Where
A = `LP_MAX_RATE_BYKIK_BURST`

32.50 Rate Request: BYKIK Single Shot

Name	*A*	PC	MS	BYKIK	LHS
Not Requested	F	–	–	120 Hz	–
Requested	T	–	–	Single Shot	–

Where
A = LP_MAX_RATE_BYKIK_SINGLE_SHOT

32.51 Rate Request: Pockels Cell 1 Hz

Name	*A*	PC	MS	BYKIK	LHS
Not Requested	F	120 Hz	–	–	–
Requested	T	1 Hz	–	–	–

Where
A = LP_MAX_RATE_PC_1_HZ

32.52 Rate Request: Pockels Cell 10 Hz

Name	*A*	PC	MS	BYKIK	LHS
Not Requested	F	120 Hz	–	–	–
Requested	T	10 Hz	–	–	–

Where
A = LP_MAX_RATE_PC_10_HZ

32.53 Rate Request: Pockels Cell 30 Hz

Name	*A*	PC	MS	BYKIK	LHS
Not Requested	F	120 Hz	–	–	–
Requested	T	30 Hz	–	–	–

Where
A = LP_MAX_RATE_PC_30_HZ

32.54 Rate Request: Pockels Cell 60 Hz

Name	*A*	PC	MS	BYKIK	LHS
Not Requested	F	120 Hz	–	–	–
Requested	T	60 Hz	–	–	–

Where
A = LP_MAX_RATE_PC_60_HZ

32.55 Rate Request: Pockels Cell Burst

Name	*A*	PC	MS	BYKIK	LHS
Not Requested	F	120 Hz	–	–	–
Requested	T	Burst Mode	–	–	–

Where
A = LP_MAX_RATE_PC_BURST

32.56 Rate Request: Pockels Cell Single Shot

Name	*A*	PC	MS	BYKIK	LHS
Not Requested	F	120 Hz	–	–	–
Requested	T	Single Shot	–	–	–

Where
A = LP_MAX_RATE_PC_SINGLE_SHOT

32.57 VVMG IN20 175 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = VV_BL175_STATE

32.58 VVPG IN20 155 Position

Name	*A*	PC	MS	BYKIK	LHS
Not Out	F	0 Hz	0 Hz	0 Hz	–
Out	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VV_BL155_STATE`

32.59 VVS Circuit Breaker: LI20

Name	*A*	PC	MS	BYKIK	LHS
Not On	F	0 Hz	0 Hz	0 Hz	–
On	T	120 Hz	120 Hz	120 Hz	–

Where
A = `VVS_BRKR_OK_READY_LI20_STATE`

32.60 YAG01 IN20 211 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = `YAGS_IN20_211_OUT_LMTSW_STATE`,
B = `YAGS_IN20_211_IN_LMTSW_STATE`

32.61 YAGG1 IN20 841 Position

Name	*B*	*A*	PC	MS	BYKIK	LHS
Moving	F	F	0 Hz	0 Hz	0 Hz	–
Out	F	T	120 Hz	120 Hz	120 Hz	–
In	T	F	10 Hz	10 Hz	10 Hz	–
Broken	T	T	0 Hz	0 Hz	0 Hz	–

Where
A = YAGS_IN20_841_OUT_LMTSW_STATE,
B = YAGS_IN20_841_IN_LMTSW_STATE

33 Ignore Logic

33.1 A-Line B1/B2 Is Not On AND A-Line Kicker Is Not Enabled

Name	*D*	*C*	*B*	*A*	PC	MS	BYKIK	LHS
Is Not On	T	T	F	F	–	–	–	–

Where
A = KICK_BSY0_66_PM1_TRIG_ENB_STATUS,
B = KICK_BSY0_66_PM2_TRIG_ENB_STATUS,
C = BEND_BSYA_140_PS_OFF_A_STATE,
D = BEND_BSYA_140_PS_OFF_B_STATE

33.2 A-Line SL10 Is Closed

Name	*D*	*C*	*B*	*A*	PC	MS	BYKIK	LHS
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

33.3 BX01/BX02 Is Off

Name	*B*	*A*	PC	MS	BYKIK	LHS
Off	F	T	–	–	–	–

Where
A = BEND_IN20_751_OFF_STATE,
B = BEND_IN20_751_OK_STATE

33.4 BX01/BX02 Is On

Name	*B*	*A*	PC	MS	BYKIK	LHS
On	T	F	–	–	–	–

Where
A = BEND_IN20_751_OFF_STATE,
B = BEND_IN20_751_OK_STATE

33.5 BXG Is Off

Name	*B*	*A*	PC	MS	BYKIK	LHS
Off	F	T	–	–	–	–

Where
A = BEND_IN20_231_OFF_STATE,
B = BEND_IN20_231_OK_STATE

33.6 BXG Is On

Name	*B*	*A*	PC	MS	BYKIK	LHS
On	T	F	–	–	–	–

Where
A = BEND_IN20_231_OFF_STATE,
B = BEND_IN20_231_OK_STATE

33.7 Diag Stopper HFX DG2 Is In

Name	*A*	PC	MS	BYKIK	LHS
In	T	–	–	–	–

Where
A = HFX_DG2_STP_01_IN_DI_POSITION

33.8 Diag Stopper HFX UM6 Is In

Name	*A*	PC	MS	BYKIK	LHS
In	T	–	–	–	–

Where
A = HFX_UM6_STP_01_IN_DI_POSITION

33.9 Diag Stopper XCS SB1 Is In

Name	*A*	PC	MS	BYKIK	LHS
In	T	–	–	–	–

Where
A = XCS_SB1_STP_01_CLS_DI_POSITION

33.10 Laser Heater Attenuator Is In

Name	*A*	PC	MS	BYKIK	LHS
In	T	–	–	–	–

Where
A = LHATTEN_IN_LIMIT_STATE

33.11 LTU Dechirper Is Out

Name	*D*	*C*	*B*	*A*	PC	MS	BYKIK	LHS
Out	T	T	T	T	–	–	–	–

Where
A = DCHP_LTU1_545_OUT_LIMSW_NEGY_POSITION,
B = DCHP_LTU1_545_OUT_LIMSW_POSY_POSITION,
C = DCHP_LTU1_555_OUT_LIMSW_NEGX_POSITION,
D = DCHP_LTU1_555_OUT_LIMSW_POSX_POSITION

33.12 M3H Mirror Is In Beam

Name	*A*	PC	MS	BYKIK	LHS
Is_IN	T	–	–	–	–

Where
A = HXX_HXM_MMS_01_INBEAM_POSITION

33.13 M3H Mirror Is Out of Beam

Name	*A*	PC	MS	BYKIK	LHS
IS_OUT	T	–	–	–	–

Where
A = HXX_HXM_MMS_01_B_POSITION

33.14 Spoiler SP0 Is In

Name	*A*	PC	MS	BYKIK	LHS
Is In	T	–	–	–	–

Where
A = SPLR_DMP1_765_IN_LIMSW_POSITION

33.15 ST1/ST2 Are In

Name	*B*	*A*	PC	MS	BYKIK	LHS
In	T	F	–	–	–	–

Where
A = STPR_FEE1_1_ST1ST2OUT_POSITION,
B = STPR_FEE1_1_ST1ST2IN_POSITION

33.16 Stopper MFX S4.5 Is In

Name	*A*	PC	MS	BYKIK	LHS
Is In	T	–	–	–	–

Where
A = STPR_XRT_1_S45IN_STATE

33.17 Stopper S1 Is In

Name	A	PC	MS	BYKIK	LHS
Is In	T	–	–	–	–

Where
A = STPR_FEE1_1_S1IN_POSITION

33.18 Stopper S2 Is In

Name	A	PC	MS	BYKIK	LHS
In	T	–	–	–	–

Where
A = STPR_FEE1_1_S2IN_STATE

33.19 Stopper S2B Is In

Name	A	PC	MS	BYKIK	LHS
In	T	–	–	–	–

Where
A = STPR_FEE1_1_S2BIN_STATE

33.20 Stopper S5B Is In

Name	A	PC	MS	BYKIK	LHS
In	T	–	–	–	–

Where
A = STPR_FEH1_5_S5BIN_POSITION

33.21 Stopper SH1 Is In

Name	*A*	PC	MS	BYKIK	LHS
In	T	–	–	–	–

Where
A = STPR_FEE1_1_SH1IN_STATE

33.22 Stopper SH2 Is In

Name	*B*	*A*	PC	MS	BYKIK	LHS
In	T	F	–	–	–	–

Where
A = STPR_XRT1_1_SH2OUT_STATE,
B = STPR_XRT1_1_SH2IN_STATE

33.23 Stopper XRT S5 Is In

Name	*A*	PC	MS	BYKIK	LHS
In	T	–	–	–	–

Where
A = STPR_XRT1_1_S5IN_POSITION

33.24 Stopper XRT S6 Is In

Name	*A*	PC	MS	BYKIK	LHS
In	T	–	–	–	–

Where
A = STPR_XRT1_1_S6IN_POSITION

33.25 Stopper: BSY D2 Summary Is In

Name	*B*	*A*	PC	MS	BYKIK	LHS
In	T	T	–	–	–	–

Where
A = STPR_BSY0_88_IN_LIMSW_A_POSITION,
B = STPR_BSY0_88_IN_LIMSW_B_POSITION

33.26 TD11 Is In

Name	A	PC	MS	BYKIK	LHS
In	T	–	–	–	–

Where
A = TD11_IN_LIMIT_STATE

33.27 TDUND Is In

Name	A	PC	MS	BYKIK	LHS
In	T	–	–	–	–

Where
A = DUMP_LTU1_970_TDUND_IN_POSITION

33.28 XCS Is Not In Main Line

Name	A	PC	MS	BYKIK	LHS
Not in	F	–	–	–	–

Where
A = XCS_SB_POS_HARD_POSITION

33.29 XPP-NH3-POS-00 Beamline Is In

Name	A	PC	MS	BYKIK	LHS
In	T	–	–	–	–

Where
A = XPP_NH3_POS_00_IN_STATE

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

Name	*A*	PC	MS	BYKIK	LHS
Not_IN	F	–	–	–	–

Where
A = XPP_NH3_POS_00_IN_STATE

33.31 YAG01 Is In

Name	*B*	*A*	PC	MS	BYKIK	LHS
In	T	F	–	–	–	–

Where
A = YAGS_IN20_211_OUT_LMTSW_STATE,
B = YAGS_IN20_211_IN_LMTSW_STATE

33.32 YAG02 Is In

Name	*A*	PC	MS	BYKIK	LHS
In	T	–	–	–	–

Where
A = YAGS_IN20_241_IN_LMTSW_STATE