# PURPOSE

This document defines National Transportation Communications for ITS Protocol (NTCIP) requirements for variable speed limit signs (VSLS). Please note that if the group is mandatory, then all objects within that group listed as mandatory shall be supported. If the VSLS does not support the functionality associated with a specific object or group of objects, yet still meets Florida Department of Transportation (FDOT) specifications, then the device must respond with a noSuchName error response when requests are made for those objects.

# NTCIP REQUIREMENTS

Ensure that the device complies with NTCIP 1102v01.15, 2101v01.19, 2103v02.07, 2201v01.15, 2202v01.05, and 2301v02.19, and section 3 of NTCIP 1103v02.17.

**Table 1: Abbreviations used in this document**

|  |  |
| --- | --- |
| **Abbreviation** | **Description** |
| M | *Mandatory* |
| O | *Optional* |
| D | *Deprecated* |

**Table 2: Supplemental VSLS NTCIP Requirements Table**

| **Conformance Group /**  **Object Name** | **Reference** | **FDOT**  **Requirement** | **Additional Notes and Requirements** |
| --- | --- | --- | --- |
| **dmsSignCfg** | **NTCIP 1203v02.39**  **5.2** | **M** |  |
| dmsSignAccess | 5.2.1 | M |  |
| dmsSignType | 5.2.2 | M |  |
| dmsSignHeight | 5.2.3 | M |  |
| dmsSignWidth | 5.2.4 | M |  |
| dmsHorizontalBorder | 5.2.5 | M |  |
| dmsVerticalBorder | 5.2.6 | M |  |
| dmsLegend | 5.2.7 | M |  |
| dmsBeaconType | 5.2.8 | M |  |
| dmsSignTechnology | 5.2.9 | M |  |
| **vmsCfg** | **5.3** | **M** |  |
| vmsCharacterHeightPixels | 5.3.1 | M |  |
| vmsCharacterWidthPixels | 5.3.2 | M |  |
| vmsSignHeightPixels | 5.3.3 | M |  |
| vmsSignWidthPixels | 5.3.4 | M |  |
| vmsHorizontalPitch | 5.3.5 | M |  |
| vmsVerticalPitch | 5.3.6 | M |  |
| monochromeColor | 5.3.7 | M |  |
| **fontDefinition** | **5.4** | **M** |  |
| numFonts | 5.4.1 | M | The device must support a minimum of 4 fonts. |
| fontTable | 5.4.2 | M |  |
| fontIndex | 5.4.2.1 | M |  |
| fontNumber | 5.4.2.2 | M |  |
| fontName | 5.4.2.3 | M |  |
| fontHeight | 5.4.2.4 | M |  |
| fontCharSpacing | 5.4.2.5 | M |  |
| fontLineSpacing | 5.4.2.6 | M |  |
| fontVersionID | 5.4.2.7 | M |  |
| fontStatus | 5.4.2.8 | M |  |
| maxFontCharacters | 5.4.3 | M | The device must support a minimum of 255 font characters. |
| characterTable | 5.4.4 | M |  |
| characterNumber | 5.4.4.1 | M |  |
| characterWidth | 5.4.4.2 | M |  |
| characterBitmap | 5.4.4.3 | M |  |
| fontMaxCharacterSize | 5.4.5 | M |  |
| **multiCfg** | **5.5** | **M** |  |
| defaultBackgroundColor | 5.5.1 | M |  |
| defaultForegroundColor | 5.5.2 | M |  |
| defaultFlashOn | 5.5.3 | M |  |
| defaultFlashOnActivate | 5.5.4 | M |  |
| defaultFlashOff | 5.5.5 | M |  |
| defaultFlashOffActivate | 5.5.6 | M |  |
| defaultFont | 5.5.7 | M |  |
| defaultFontActivate | 5.5.8 | M |  |
| defaultJustificationLine | 5.5.9 | M |  |
| defaultJustificationLineActivate | 5.5.10 | M |  |
| defaultJustificationPage | 5.5.11 | M |  |
| defaultJustificationPageActivate | 5.5.12 | M |  |
| defaultPageOnTime | 5.5.13 | M |  |
| defaultPageOnTimeActivate | 5.5.14 | M |  |
| defaultPageOffTime | 5.5.15 | M |  |
| defaultPageOffTimeActivate | 5.5.16 | M |  |
| defaultBackgroundRGB | 5.5.17 | M |  |
| defaultBackgroundRGBActivate | 5.5.18 | M |  |
| defaultForegroundRGB | 5.5.19 | M |  |
| defaultForegroundRGBActivate | 5.5.20 | M |  |
| defaultCharacterSet | 5.5.21 | M |  |
| dmsColorScheme | 5.5.22 | M |  |
| dmsSupportedMultiTags | 5.5.23 | M |  |
| dmsMaxNumberPages | 5.5.24 | M |  |
| dmsMaxMultiStringLength | 5.5.25 | M |  |
| **dmsMessage** | **5.6** | **M** |  |
| dmsNumPermanentMsg | 5.6.1 | M |  |
| dmsNumChangeableMsg | 5.6.2 | M |  |
| dmsMaxChangeableMsg | 5.6.3 | M | The device must support a minimum of 50 changeable messages. |
| dmsFreeChangeableMemory | 5.6.4 | M |  |
| dmsNumVolatileMsg | 5.6.5 | M |  |
| dmsMaxVolatileMsg | 5.6.6 | M |  |
| dmsFreeVolatileMemory | 5.6.7 | M |  |
| dmsMessageTable | 5.6.8 | M |  |
| dmsMessageMemoryType | 5.6.8.1 | M |  |
| dmsMessageNumber | 5.6.8.2 | M |  |
| dmsMessageMultiString | 5.6.8.3 | M |  |
| dmsMessageOwner | 5.6.8.4 | M |  |
| dmsMessageCRC | 5.6.8.5 | M |  |
| dmsMessageBeacon | 5.6.8.6 | M |  |
| dmsMessagePixelService | 5.6.8.7 | O |  |
| dmsMessageRunTimePriority | 5.6.8.8 | M |  |
| dmsMessageStatus | 5.6.8.9 | M |  |
| dmsValidateMessageError | 5.6.9 | M |  |
| **signControl** | **5.7** | **M** |  |
| dmsControlMode | 5.7.1 | M |  |
| dmsSWReset | 5.7.2 | M |  |
| dmsActivateMessage | 5.7.3 | M |  |
| dmsMessageTimeRemaining | 5.7.4 | M |  |
| dmsMsgTableSource | 5.7.5 | M |  |
| dmsMsgRequesterID | 5.7.6 | M |  |
| dmsMsgSourceMode | 5.7.7 | M |  |
| dmsShortPowerRecoveryMessage | 5.7.8 | M |  |
| dmsLongPowerRecoveryMessage | 5.7.9 | M |  |
| dmsShortPowerLossTime | 5.7.10 | M |  |
| dmsResetMessage | 5.7.11 | M |  |
| dmsCommunicationsLossMessage | 5.7.12 | M |  |
| dmsTimeCommLoss | 5.7.13 | M |  |
| dmsPowerLossMessage | 5.7.14 | M |  |
| dmsEndDurationMessage | 5.7.15 | M |  |
| dmsMemoryMgmt | 5.7.16 | M |  |
| dmsActivateMsgError | 5.7.17 | M |  |
| dmsMultiSyntaxError | 5.7.18 | M |  |
| dmsMultiSyntaxErrorPosition | 5.7.19 | M |  |
| dmsMultiOtherErrorDescription | 5.7.20 | M |  |
| vmsPixelServiceDuration | 5.7.21 | O |  |
| vmsPixelServiceFrequency | 5.7.22 | O |  |
| vmsPixelServiceTime | 5.7.23 | O |  |
| dmsActivateErrorMsgCode | 5.7.24 | M |  |
| dmsActivateMessageState | 5.7.25 | M |  |
| **illum** | **5.8** | **M** |  |
| dmsIllumControl | 5.8.1 | M |  |
| dmsIllumMaxPhotocellLevel | 5.8.2 | M |  |
| dmsIllumPhotocellLevelStatus | 5.8.3 | M |  |
| dmsIllumNumBrightLevels | 5.8.4 | M | The device must support a minimum of 16 brightness levels. |
| dmsIllumBrightLevelStatus | 5.8.5 | M |  |
| dmsIllumManLevel | 5.8.6 | M |  |
| dmsIllumBrightnessValues | 5.8.7 | M |  |
| dmsIllumBrightnessValuesError | 5.8.8 | M |  |
| dmsIllumLightOutputStatus | 5.8.9 | M |  |
| **dmsSchedule** | **5.9** | **O** |  |
| numActionTableEntries | 5.9.1 | M |  |
| dmsActionTable | 5.9.2 | M |  |
| dmsActionIndex | 5.9.2.1 | M |  |
| dmsActionMsgCode | 5.9.2.2 | M |  |
| **dmsStatus** | **5.11** | **M** |  |
| **statError** | **5.11.2** | **M** |  |
| ***Controller Errors*** | ***5.11.2.1*** | ***M*** |  |
| shortErrorStatus | 5.11.2.1.1 | M |  |
| controllerErrorStatus | 5.11.2.1.2 | M |  |
| ***Power Status Data*** | ***5.11.2.2*** | ***M*** |  |
| dmsPowerFailureStatusMap | 5.11.2.2.1 | M |  |
| dmsPowerNumRows | 5.11.2.2.2 | M |  |
| dmsPowerStatusTable | 5.11.2.2.3 | M |  |
| dmsPowerIndex | 5.11.2.2.3.1 | M |  |
| dmsPowerDescription | 5.11.2.2.3.2 | M |  |
| dmsPowerMfrStatus | 5.11.2.2.3.3 | M |  |
| dmsPowerStatus | 5.11.2.2.3.4 | M |  |
| dmsPowerVoltage | 5.11.2.2.3.5 | M |  |
| dmsPowerType | 5.11.2.2.3.6 | M |  |
| ***Pixel Failure Data*** | ***5.11.2.4*** | ***M*** |  |
| pixelFailureTableNumRows | 5.11.2.4.1 | M |  |
| pixelFailureTable | 5.11.2.4.2 | M |  |
| pixelFailureDetectionType | 5.11.2.4.2.1 | M |  |
| pixelFailureIndex | 5.11.2.4.2.2 | M |  |
| pixelFailureXLocation | 5.11.2.4.2.3 | M |  |
| pixelFailureYLocation | 5.11.2.4.2.4 | M |  |
| pixelFailureStatus | 5.11.2.4.2.5 | M |  |
| pixelTestActivation | 5.11.2.4.3 | M |  |
| pixelStatusTable | 5.11.2.4.4 | M |  |
| dmsPixelStatusIndex | 5.11.2.4.4.1 | M |  |
| dmsPixelStatus | 5.11.2.4.4.2 | M |  |
| dmsPixelFailureTestRows | 5.11.2.4.5 | M |  |
| dmsPixelFailureMessageRows | 5.11.2.4.6 | M |  |
| ***statPower*** | ***5.11.3*** | ***M*** |  |
| signVolts | 5.11.3.1 | M |  |
| lowFuelThreshold | 5.11.3.2 | O |  |
| fuelLevel | 5.11.3.3 | O |  |
| engineRPM | 5.11.3.4 | O |  |
| lineVolts | 5.11.3.5 | M |  |
| powerSource | 5.11.3.6 | M |  |
| **globalConfiguration** | **NTCIP 1201v0315r**  **2.2** | **M** |  |
| globalSetIDParameter | 2.2.1 | M |  |
| globalMaxModules | 2.2.2 | M | The device must support at least two modules. At least one must be software version information. At least one must be hardware version information. |
| globalModuleTable | 2.2.3 | M |  |
| moduleNumber | 2.2.3.1 | M |  |
| moduleDeviceNode | 2.2.3.2 | M |  |
| moduleMake | 2.2.3.3 | M |  |
| moduleModel | 2.2.3.4 | M |  |
| moduleVersion | 2.2.3.5 | M |  |
| moduleType | 2.2.3.6 | M |  |
| controllerBaseStandards | 2.2.4 | M |  |

**Table 3: Required MULTI Tags**

|  |  |
| --- | --- |
| **NTCIP 1203v02.39 Required MULTI Tag** | **Required Values** |
| [jpx] | 2, 3, 4 |
| [jlx] | 2, 3, 4, 5 |
| [cfx] or [cfr,g,b] |  |
| [pbz] or [pbr,g,b] |  |
| [crx,y,w,h,r,g,b] or [crx,y,w,h,z] |  |
| [fox] |  |
| [scx] |  |

**Document History**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Rev** | **Description** | **Authored and Checked** | **Reviewed** | **Approved** | **Approval Date** | **Rev More Stringent?** |
| 1.0 | Supplemental Requirements for Variable Speed Limit Signs | A. Cramer | D. Vollmer | D. Vollmer | 09/29/2025 | N/A |
|  |  |  |  |  |  |  |