Mnemonic Limit Definitions

This page defines the format of the limit definitions used by the Data Viewer application.

A Limit Definition is a JSON object that describes limit thresholds for a single mnemonic telemetry value. The operator/user will be notified when a limit is triggered.

The JSON object is provided in the `LIMITS` column of the mnemonic definition text file (e.g. `DRAMS_TM_Database.txt`).

The top level object supports the following fields:

Field	Required	Value Format	Meaning
`limits`	Yes	JSON Array	Array of 1 or more limit objects. Each object defines a set of limit thresholds. If a Limit Definition does not define a context mnemonic, the array should contain a single object.
`cm`	No	String or integer	Context Mnemonic. The optional mnemonic that is used to determine if a limit should be checked. For example, you may want to only check a current monitor mnemonic's limit when a temperature is between 25 and 30 celsius. In that case, the temperature mnemonic would be the context mnemonic. Can be provided as the mnemonic name or numeric ID e.g. `MMC.HK:WRP_CURRENT` or `5204`.

Each limit object supports the following fields:

Field	Required	Value Format	Meaning
`cr`	No	Single number or range syntax	Context range. Only used if `cm` is provided at the top level. If the context mnemonic equals this value or falls within this range, the limit will be checked. If `cm` is provided but `cr` is not, the limit object will be used as the "default" limit. Single number example: `1.5` the limit will be used when the context mnemonic's value equals `1.5.`. Range example: `"5.2..10.3"` the limit will be used when the context mnemonic's value falls between 5.2 and 10.3, inclusive.

Field	Required	Value Format	Meaning
`ec`	No	Integer	Excursion count. Number of consecutive telemetry values that must exceed a threshold before the limit is triggered. Defaults to 2 if not provided.
`yh`	No	Number	Yellow high threshold. Triggers a yellow high alarm when the telemetry value is greater than or equal to this value for the required excursion count.
`yl`	No	Number	Yellow low threshold. Triggers a yellow low alarm when the telemetry value is less than or equal to this value for the required excursion count.
`rh`	No	Number	Red high threshold. Triggers a red high alarm when the telemetry value is greater than or equal to this value for the required excursion count.
`rl`	No	Number	Red low threshold. Triggers a red low alarm when the telemetry value is less than or equal to this value for the required excursion count.

Notes:

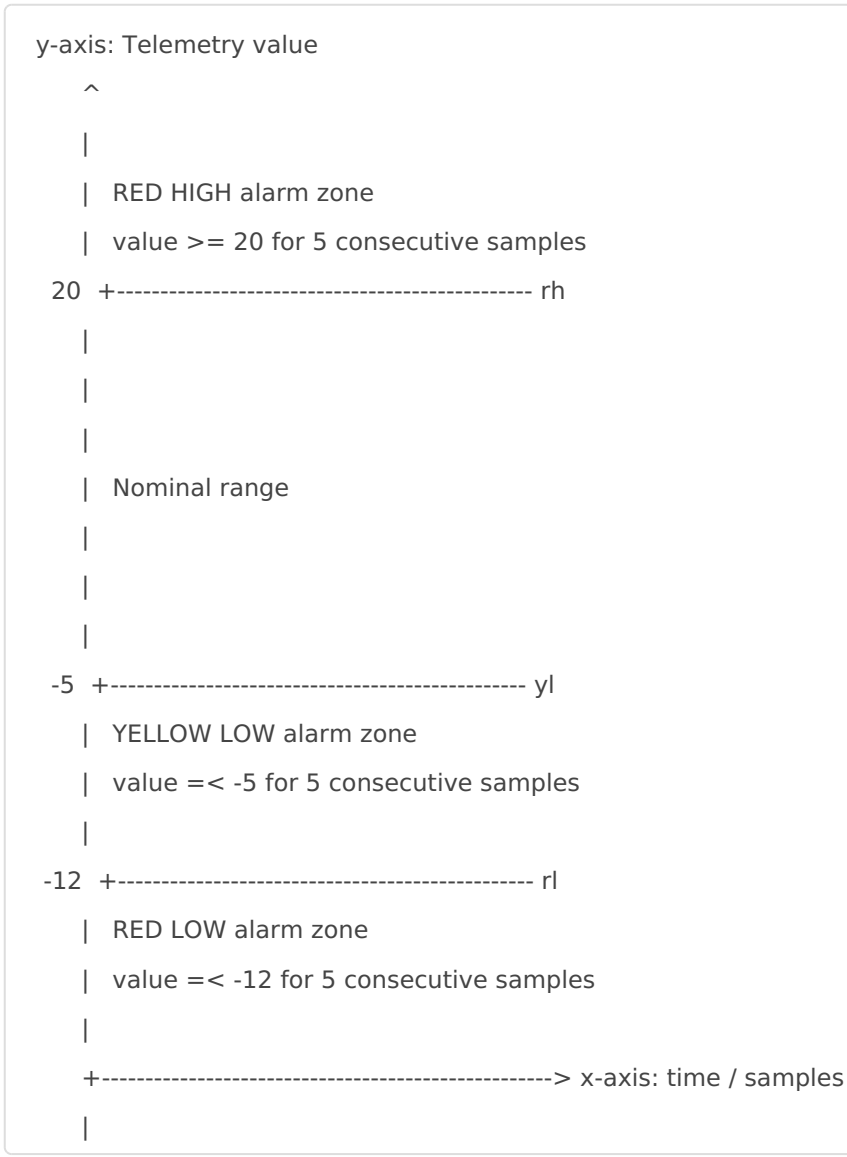
- At least 1 of the threshold values must be defined
- Threshold will be compared against the telemetry value's converted/science value

Example A:

- Limit definition for a `BOARD_TEMP` mnemonic
- Single limit with no context mnemonic
- Yellow high undefined
- Excursion count of 5 means the value must exceed the threshold for 5 consecutive values

```
{
  "limits": [
    {
      "ec": 5,
      "rh": 20,
      "yl": -5,
      "rl": -12
    }
  ]
}
```

The below visualizes how the limit thresholds are evaluated:



Example B:

- Limit definition for a `CURRENT_MONITOR` mnemonic
- `BOARD_TEMP` context mnemonic is used to determine which limit should be checked
- Defines a "default" limit that is used when none of the context ranges are satisfied
- Defines a limit with a context range using the range syntax. If the `BOARD_TEMP` is [0, 25], then this limit will be used.

```
{
 "cm": "BOARD_TEMP",
 "limits": [
  {
   "rh": 2.5,
   "yh": 2.0
  },
  {
   "cr": "0..25",
   "ec": 3,
```

```
    "rh": 2.3,
    "yh": 1.8
   }
  ]
}
```

Example C:

- Limit definition for a `VOLTAGE_MONITOR` mnemonic
- `MODE` context mnemonic is used to determine which limit should be checked
- If `MODE`'s value does not match any of the configured limits' context ranges, no limit will be checked. Note how the context range value is provided as a number.

```
{
 "cm": "MODE",
 "limits": [
  {
   "cr": 0,
   "rh": 1.5,
   "yh": 1.0
  },
  {
   "cr": 1,
   "ec": 2,
   "rh": 5.0,
   "yh": 4.5
  },
  {
   "cr": 2,
   "ec": 4,
   "rh": 10.0,
   "yh": 9.5
  }
 ]
}
```

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