Instruction manual
MTL fieldbus networks

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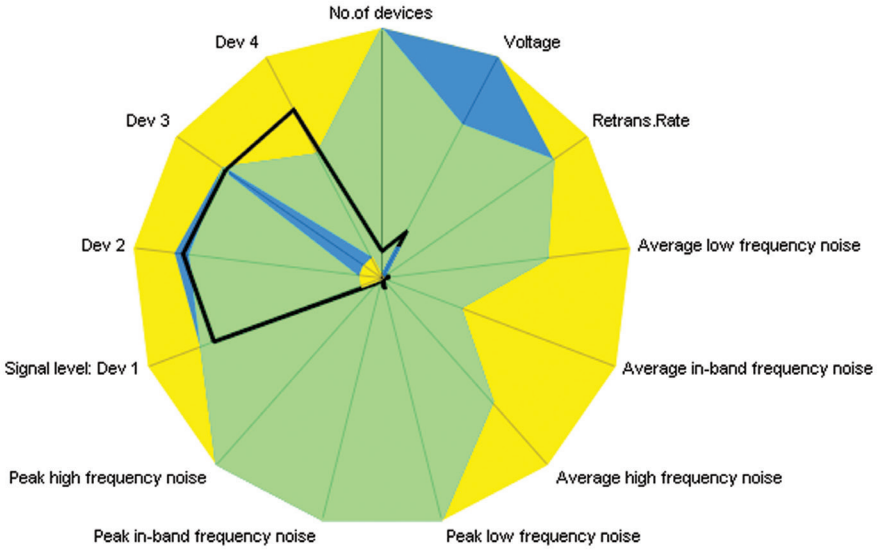
INM F809F-Plus (DTM) Rev 1.6

CROUSE-HINDS SERIES

MTL F809F-Plus

Device type manager (DTM)



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CONTENTS

MTL F809F-Plus (DTM)
Device type manager

1 OVERVIEW

This manual applies to the Device Type Manager (DTM) for Eaton's MTL F809F and MTL F809F-Plus diagnostic module. The DTM provides three key functions plus standard supporting facilities, such as printing of relevant information. The main functions of the F809F DTM and F809F-Plus DTM are Diagnosis, Compare, and Export.

The structure of this document follows the user workflow, from starting the DTM via accessing the diagnostic data to configuring the segments.

Individual help on a particular screen can also be found within the DTM help file.

2 INSTALLATION

Locate and download the DTM setup program from our website:

http://www.mtl-inst.com/product/f809f_fieldbus_diagnostics_module/

The DTM runs under Windows. Linux or Mac OS X are not supported.

Extract the .zip file and run the contained *setup.exe file.

The DTM will be installed. Note that there will not be any shortcut to the DTM in the start menu. The only accessible option in the start menu is to uninstall the DTM.

DTMs are run from within the Field Device Tool (FDT). If the newly installed DTM does not automatically appear in your device catalogue of your FDT tool, your FDT device catalogue may require to be refreshed. Check with your FDT vendor on how to refresh the device catalogue.

3 RUNNING THE DTM

3.1 Initiating the DTM on a DCS or in a FDT frame application

The DTM can be run from within a distributed control system (DCS), or from a stand-alone Field Device Tool (FDT) frame application. Such tools may be named 'Field Device Manager', 'FDT frame', 'Asset Management System' or similar. Consult your DCS vendor on how to employ the FDT frame application and consequently run the DTM, respectively how to execute DTMs from within the DCS engineering station.

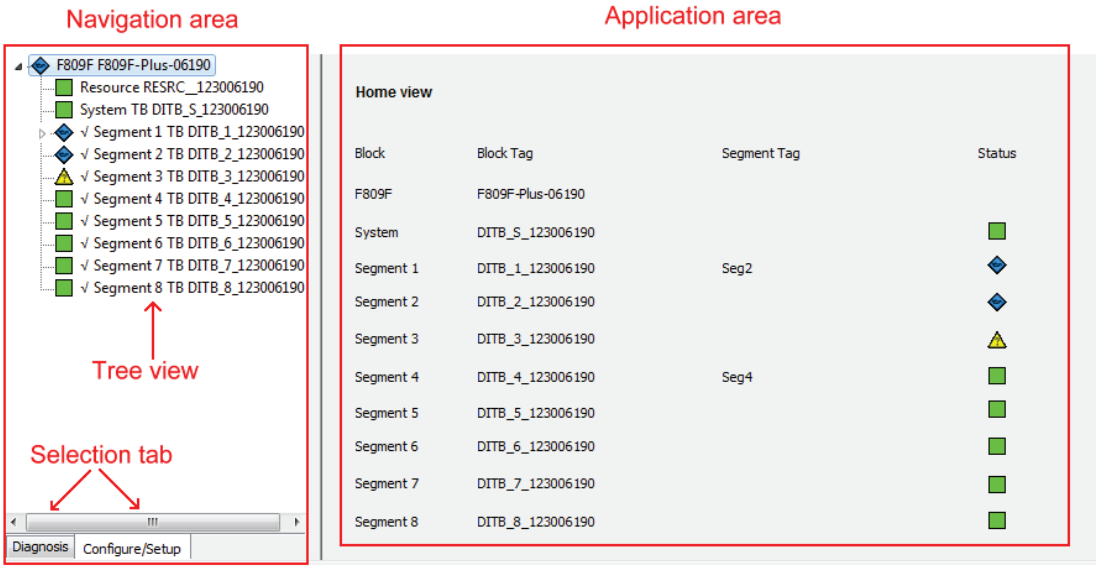
3.2 Automatic uploading

When the DTM is brought from offline to online, it performs an automatic upload. This is different from manual uploading, because it updates the device data set (i.e. the parameter values in the diagnostic module) and instance data set with the diagnostic module's data, but keep unchanged the working data set (the parameter values that the user is currently working with).

Note: Manual uploading will synchronize both the instance data set and the working data set from the F809F device data set. If a "downloading" job is in progress then both manual and automatic uploading commands will be ignored.

3.3 Navigating the F809F diagnostic module

The Navigation Area consists of two tabbed pages called "Diagnosis" and "Configure/Setup", each with a tree view and an application area.



Tree view and the application area will display information appropriate to the tab chosen.

The tree view allows navigating through the individual blocks of the respective 'root node' F809F module.

You may find the following blocks under the root node:

- Resource block (only accessible in the Configure/Setup tab)
  This block allows access to the F809F device block mode (Auto/OOS), as well as product-specific information (e.g. F809F device revision identifiers).

- System Transducer Block (System TB)
  This block provides access to:
  - the redundant power feed;
  - which segments are monitored;
  - whether alarms are latched and need acknowledgement;
  - several 'wizards' (see section 5.4.3).

- Segment transducer blocks for segments 1...8
  This block contains segment-related data such as segment voltage and noise levels.

- Devices on the respective segment
  The individual devices will show signal amplitude and retransmissions.

Click on the respective item in the tree view to access data in the application area relevant to the selected item.

4 MAIN FUNCTIONS OF DTM

4.1 Diagnosis

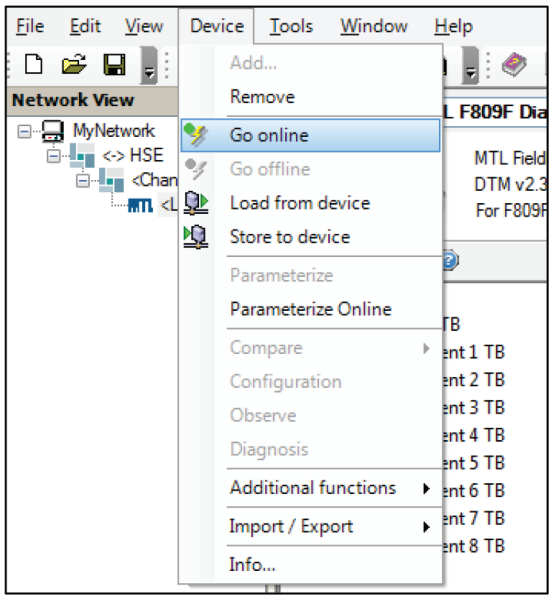
4.1.1 Introduction

This is the main option for viewing both segment and device characteristics collected by the Eaton's MTL F809F diagnostic module. Choose the data you want displayed by clicking on a specific node in the Navigation Area on the left of the screen.

4.1.2 Online / offline view

View data in Online or Offline mode. In online mode, it will repeatedly refresh the parameters displayed on the current page to present current values, the status of any alerts and limitations. In offline mode, it just shows the parameter values, alert status and limits last stored in DTM locally.

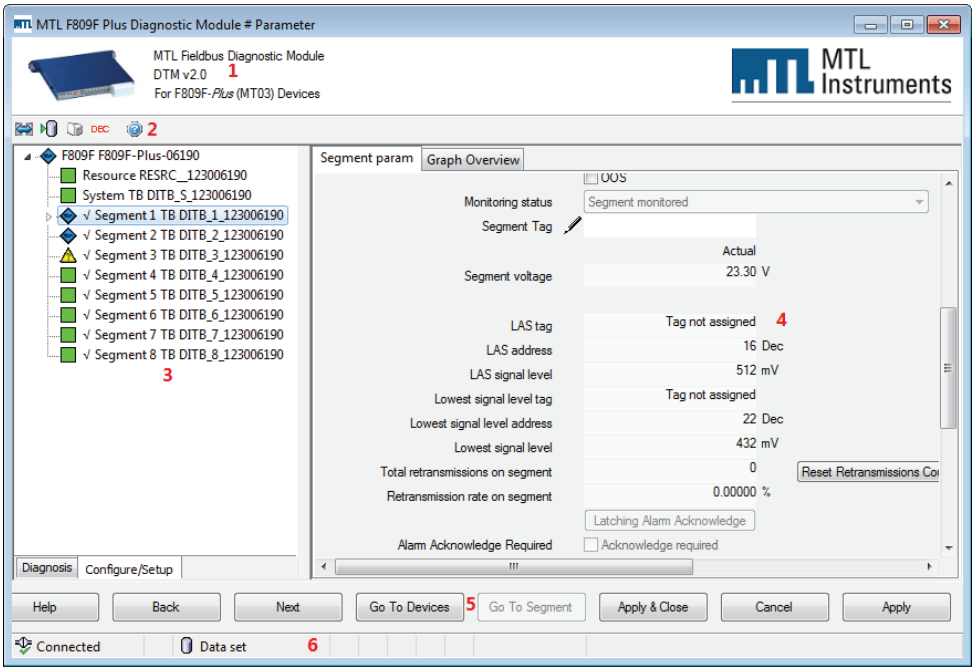
You may select online and offline mode from the DTM menu.



The refresh rate for the online mode can be configured in an XML file stored on the system. It can be found inside the installed application folder at the following location "..\XML\DtmSettings.xml";. Search within this file for the "TimeInterval" parameter:
<addkey="CyclicParameterReading" TimeInterval="10000" />
The "TimeInterval" parameter value here is in milliseconds. A value of 10000 for example means 10,000 milliseconds, which is 10 seconds.

4.1.3 Screen areas

The key areas of the Diagnosis screen are identified by numbers here.



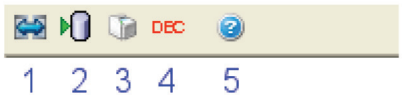
(1) Identification Area

Shows details about the F809F module.

(2) Toolbar Area

The Toolbar has five buttons with the following functions:

1. Compare: Compare the F809F device values with the values exported earlier. See section 4.3.



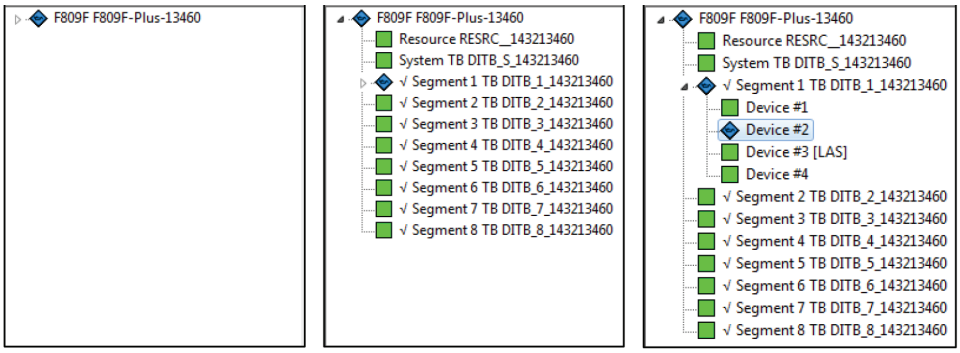
2. Export : Export the F809F device values to an XML file. See section 4.4.
3. Print: Print all parameters as HTML format according to FDT standard. See section 8.
4. Hex/Dec: Click to toggle the displayed address values between hexadecimal (HEX) or decimal (DEC) format.
5. Help: Online help.

(3) Navigation area

Navigate through the various blocks of your F809F diagnostic modules. Choose the data you want displayed by clicking on a specific node. Navigate through the hierarchy by clicking onto the small white arrow (▷) to expand or the small black arrow (◢) to collapse the hierarchy.

The Navigation Area shows an overview about the current status of the segments. The Navigation Area propagates faults from lower layers up, meaning that a device fault will propagate to a segment fault, and a segment fault to a F809F module fault. A fault in a lower layer can consequently always be identified, even if lower layers are currently collapsed. In such case, click onto the small white arrow (▷) to expand the hierarchy until you can identify the root cause item.

The following screenshots shows an example of how a device fault is seen at different hierarchy layers:



(4) Application area

After selecting a certain tab / tree node combination in the Navigation area, the corresponding parameters will be displayed in the area to the right known as the Application Area.

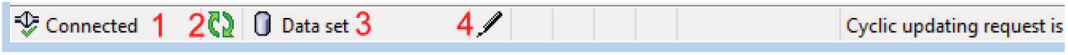
(5) Action area

Towards the bottom of the page is the Action Area, which has several buttons with the following functions:

- Apply- Apply the changes made by the user. In online mode, DTM will write any modified parameters into the F809F module. In offline mode, DTM will only cache the modified parameters.
- Apply & Close- Same as “Apply” button, then closes the user interface.
- Cancel- Discards any change made by the user and closes the user interface.
- Next- Selects the next node at the same level in the navigation tree.
- Back- Selects the previous node at the same level in the navigation tree.
- Go to Device- Selects the first device node under the current segment. This is applicable only when any segment node or device node is selected.
- Go to Segment- Selects the parent segment node of a device. This is applicable only when any segment node or device node is selected.
- Help- Opens online help file.

(6) Status area

At the bottom of the window is the Status Bar which displays various DTM system messages and icons.



1. Connected / Disconnected
   Indicates whether the connection to the F809F module is established ("Connected") or not ("Disconnected") .
2. Communication active
   The green circle indicates that communication between F809F module and DTM software is ongoing.
3. Data set / Device
   Indicates whether the screen shows offline data (Data set) or online data from the F809F module ("Device").
4. Pencil symbol (Data set is valid modified)

   A parameter value was modified, but is not downloaded into the F809F module, You may now download the parameter set to the F809F module, To download, click "Apply" or "Apply & Close". See also "(5) Action Area" above.

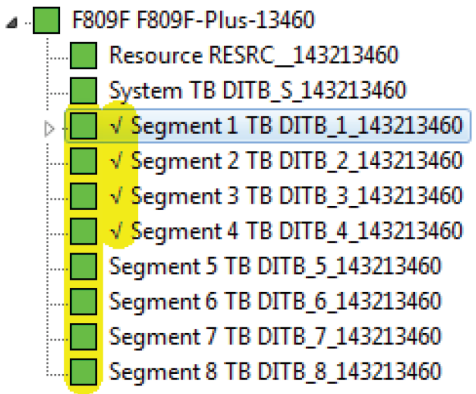
4.1.4 Icons

The icons displayed in the navigation tree area and/or the application area follow the NAMUR NE107 specification "Self-Monitoring and Diagnosis of Field Devices".

The following table shows the symbols as they are used in the F809F module.

Description in NE107	Symbol used in F809F	Status meaning in F809F
Maintenance required		PreAlert active (low alarm or high alarm)
Out of specification		Alert active (low-low alarm or high-high alarm)
Diagnosis active		Status ok (no alarms active)

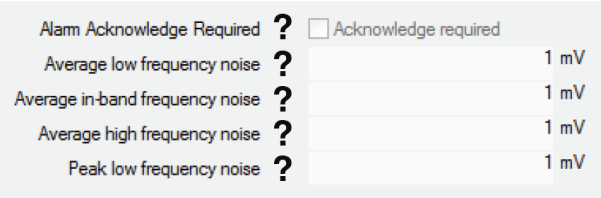
Monitored segments are indicated with a tick mark, non-monitored are without tick mark:



In this example, segments 5 to 8 are not monitored. The symbol of the non-monitored segments will show the last status, or will be reset to the green symbol "Status ok" if option "Set Non-scanning Segment Values Null" is ticked for the respective

4.1.5 Symbols used in the DTM

? A black question mark besides the parameter name indicates that the parameter value is out-of-date.



Out of date means that the value is not updated yet; simply wait until the question mark disappears which means that the value is updated.

The pencil symbol besides the parameter name indicates that the parameter value was modified, or that it is a value from the DTM data set stored on your hard disk which may be different from the values stored inside the F809F module.

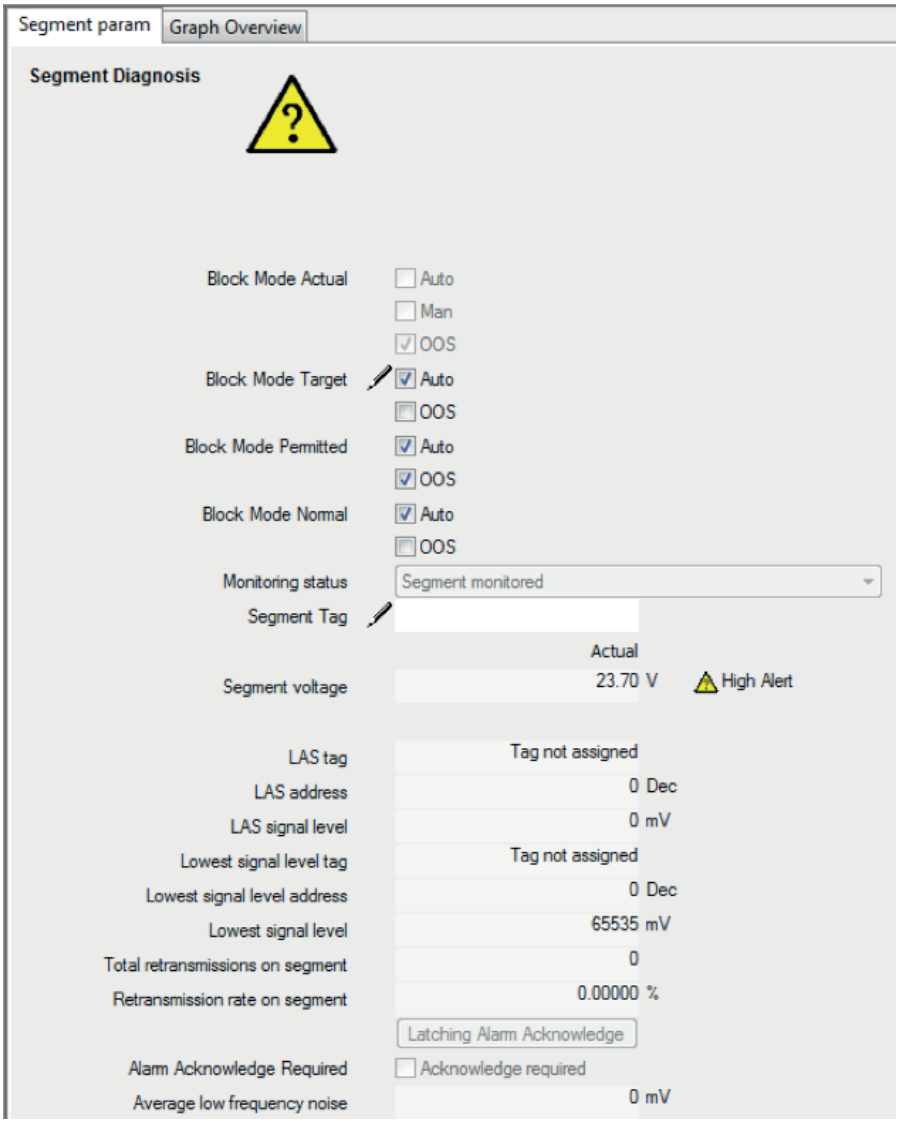
Please also refer to "(6) Status Area" in section 4.1.3.

4.1.6 The diagnosis tab

This is a general description of the diagnosis tab. For diagnostics of a specific node type, see sections 5 (system node), 6 (segment node) and 7 (device node).

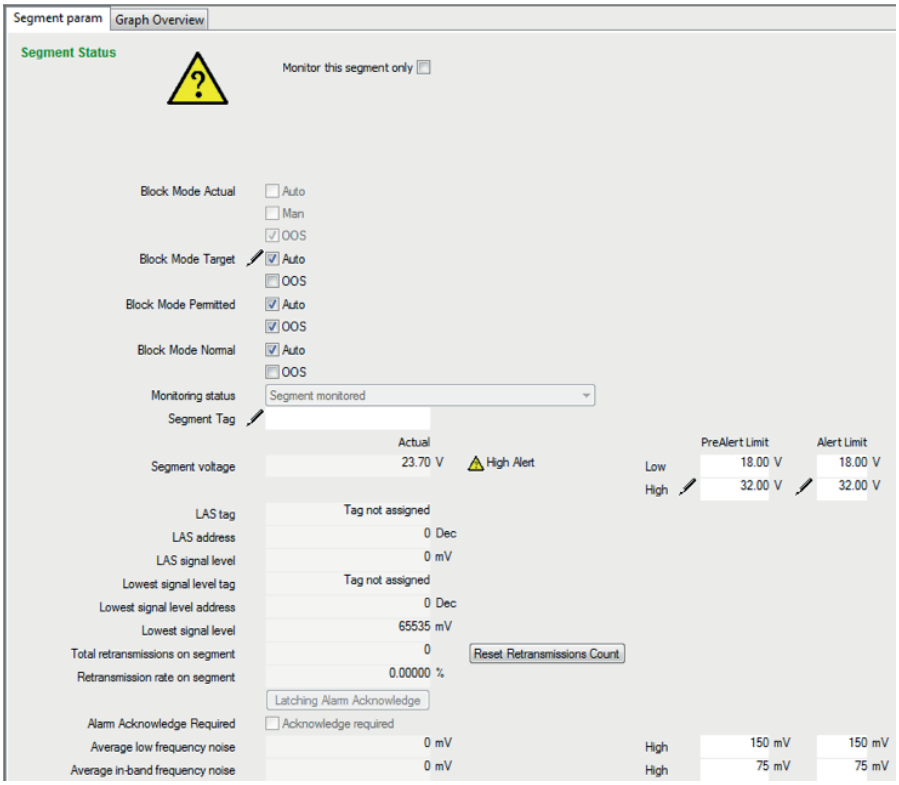
In the Navigation Area, select the 'diagnosis' tab to display diagnosis values together with a corresponding status icon.

This tab will not allow you to make any changes to the limit values. If you intend to make any changes to the limit values, select the 'Configure/Setup' tab instead.



4.1.7 The Configure/Setup tab

In the Navigation Area, select the 'Configure/Setup' tab to not only display diagnosis values, but also adds the capability to modify the corresponding limit values (low-low-alert, low-alert, high-alert and high-high-alert). Note that noise levels only have upper limits, as only high noise represents a problem. The lower the noise, the better.



This tab will also enable you to run 'wizards' (or 'DD methods').

If you do not intend to make any changes to the limit values or run any wizards, select the 'Diagnosis' tab instead.

For details on configuration of a specific node type, see sections 5 (system node), 6 (segment node) and 7 (device node).

You may configure segments and devices manually, via DCS templates, or by using wizards (also called methods).

- Manually

  A procedure where the user enters parameters by hand, individually for each segment and device.

Advantage:

The limit values can be set to best match the actual values of this particular segment and device. As segments all differ in length, number of devices, and environmental impact, a manual procedure will allow the user to set limits as close as possible to the actual values and make most use of predictive alarming.

Disadvantage:

The values in the device will differ from the values in the DCS engineering station, unless an upload from the device into the engineering station is performed. Otherwise, a later download from the engineering station would overwrite the values in the device.

- DCS template

  Instead of modifying values in the DTM, the user performs modifications only in the DCS engineering station (through the DD). This is the typically employed procedure.

Advantage:

A single database is maintained.

Disadvantage:

Even though segments are not alike, they will all have the same set of limits. Consequently, the limits will have to leave a larger margin compared to adjusting the limits for each segment individually.

- Using wizards/methods

  This is the most convenient way to configure limit values for each segment individually.
  An automated internal software procedure will run and adjust the limits to a user selectable percentage.

Advantage:

The limit values can be set to best match the actual values of this particular segment and device. As segments all differ in length, number of devices, and environmental impact, this procedure will allow the user to set limits as close as possible to the actual values and make most use of predictive alarming. Compared to the manual procedure, running wizards is more convenient and faster.

Disadvantage:

The values in the device will differ from the values in the DCS engineering station, unless an upload from the device into the engineering station is performed. Otherwise, a later download from the engineering station would overwrite the values in the device.
Also, the values may differ between one run and the next, as they depend on the status quo of the segment.

Note that for the alarm optimization wizards to complete successfully, the low-low-limits and high-high-limits should ideally be set to their defaults prior to running the wizard.

For details on configuration of a specific node type, see sections 5 (system node), 6 (segment node) and 7 (device node).

4.2 Upload/Download

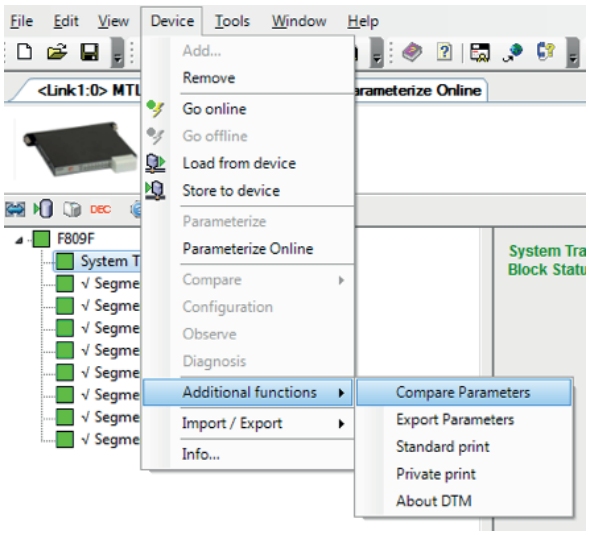
When the DTM is brought from offline to online, it performs an automatic upload. This is different from manual uploading, because it updates the device data set (i.e. the parameter values in the F809F module) and instance data set with the F809F module's data, but keeps unchanged the working data set (the parameter values that the user is currently working with).

Note: Manual uploading will synchronize both the instance data set and the working data set from the F809F device data set. If a "downloading" job is in progress then both manual and automatic uploading commands will be ignored.

A download will download the working data set into the F809F module.

4.3 Compare

This allows the user to compare the current commissioned values with earlier stored data, for example, from an Export command (see below). This user interface can be opened either by the DTM function "Compare Parameters" from DTM's menu, or by clicking on the "Compare" button in the Diagnosis screen.



Tip: Perform a manual upload before comparing to ensure you have the latest values from the F809F module.

Note that different FDT frames and DCS field device tools may somewhat vary in their implementation of this function. Consult the manual of the FDT frame or DCS field device tool if your system deviates from above description.

4.4 Export

The DTM allows a user to export actual and alert limit values. This user interface can be opened either by the DTM function "Export Parameters" from DTM's context menu, or by clicking the "Export" toolbar button on the online Diagnosis view.

Tip: Perform a manual upload before comparing to ensure you have the latest values from the F809F module.

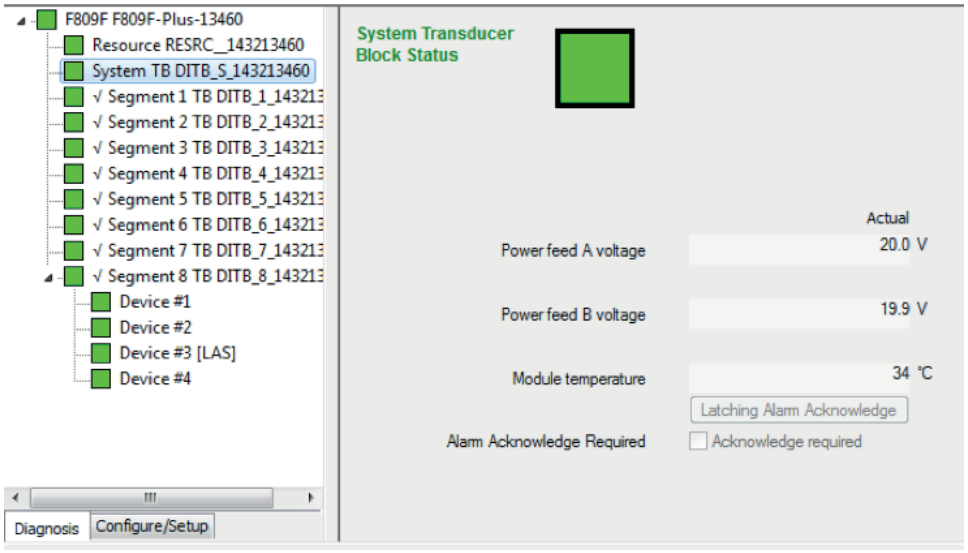
5 'SYSTEM' DIAGNOSTICS AND CONFIGURATION

5.1 Introduction

'System' refers to the Fieldbus power supply carrier and the associated F809F-Plus module. Configuration of segments and field devices is described in sections 6 and 7 of this manual. Screen layout and general information on diagnostics and configuration are described in section 4.1. This section will describe the specific parameters of the system transducer block and its configuration.

5.2 Diagnostics for the system transducer block node

Select the system transducer block node in the navigation area, and click on the 'diagnosis' tab.

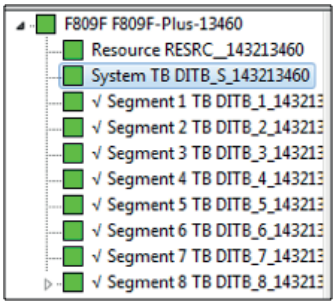


Diagnosed parameters associated to the system:

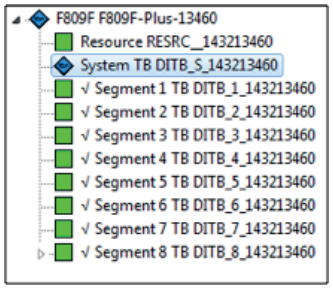
- Power feed A voltage and power feed B voltage refer to the bulk power supplies connected to the fieldbus power supply carrier.
- The 'Module Temperature' is measured inside the F809F-Plus module. Due to the physical proximity to the fieldbus power supply modules, it can be assumed that the F809F-Plus module measures the approximate temperature of the fieldbus power supply modules.
- Latching Alarm Acknowledge / Alarm Acknowledge required
  Setting alarms to latch (see 'Set Alarms to Latch' below) means that if an alarm occurs, the alarm message will persist until 'Latching Alarm Acknowledge' button is clicked, even if the actual problem(s) disappeared. Multiple alarm may occur, which then all will persist simultaneously. This way, intermittent alarms will not be missed. Once an alarm occurred, 'Alarm Acknowledge' will be ticked to indicate that acknowledgement is required. If the actual problem(s) disappeared, the alarm will only be cleared after 'Latching Alarm Acknowledge' is clicked.

5.3 Appearance of alarms and remedy

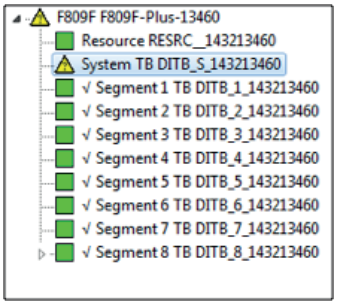
The Navigation area will indicate the status condition with the NAMUR symbols explained in section 4.1.4.



No Pre-alert or alert

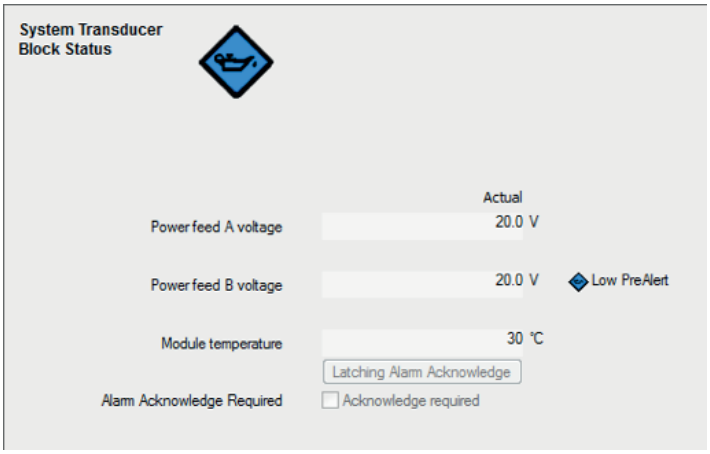


Pre-alert condition:



Alert condition

Example of a Pre-alert condition:



The following conditions can occur on the system block node:

Parameter	Symbol / Alert	Remedy
Power Feed A/B Voltage	Low Alert Low PreAlert High PreAlert High Alert	Check bulk power supply operation and wiring to carrier
Module Temperature	High PreAlert High Alert	Check cooling in power supply cabinet

5.4 Configurartion/Setup of the system transducer block node

5.4.1 Introduction

As described in section 4.1.7, you can use three methods for configuration:

- Manual
- Via DCS template
- Using Wizards/Methods

Note that not all parameters can be configured through wizards/methods. Setting the monitored segments, non-scanning segment values to null, and alarms to latch require manual configuration.

5.4.2 Manual or via DCS template

- The 'Block modes' are standard FF parameters and control the operation of the F809F module. Note that these parameters are normally set by the DCS system. Do not change any setting unless you are familiar with their meaning. For more information on these parameters, consult your system vendor or the fieldbus specification.

- Power Feed A/B voltage

  Adjust the limits so that they correspond to the minimum and maximum output voltage according to the datasheet of your bulk power supplies. Default operating range is 19.2 V to 30 V.

Default	Low-low limit: 19.2 V
	Low limit: 19.2 V
	High limit: 30 V
	High-high limit: 30 V
Minimum value	0V
Maximum value	40V
Alarm hysteresis (no alarm → alarm → no alarm)	0.5V
Condition: high limit > low limit by ...	1V

Note that the limit values have to be in rising sequence at all times:
Low-low-limit ≤ low-limit < high-limit ≤ high-high-limit
and high limit must be at least 1 V higher than low limit.

Note that the F809F device will round the entered values to a single digit decimal (example:
23.34V will be rounded to 23.3V, and 23.35V will be rounded to 23.4V).
The DTM does not perform the rounding, so that the entered value (e.g. 23.34V) will persistently be indicated with the pencil symbol , as the DTM value differs from the value in the F809F device.

Best is to enter values with a single digit decimal only (e.g. 23.4V).

- Module temperature

  The default values are limits for the F801 fieldbus power supply maximum operating temperature of 65 °C. The user may reset this to the maximum operating temperature of the power supply used or select a lower limit based on normal operating temperature of the cabinet. Setting the limit at the lower of the maximum operating temperature of the power supply or 10 °C above the normal operating temperature is recommended.

Default	High limit: 65 °C
	High-high limit: 65 °C
Minimum value	0°C
Maximum value	32767°C (Note: module operates up to 70 °C)
Alarm hysteresis (no alarm → alarm → no alarm)	1°C

- Latching Alarm Acknowledge / Alarm Acknowledge required

  Setting alarms to latch (see 'Set Alarms to Latch' below) means that if an alarm occurs, the alarm message will persist until 'Latching Alarm Acknowledge' button is clicked, even if the actual problem(s) disappeared. Multiple alarm may occur, which then all will persist simultaneously. This way, intermittent alarms will not be missed. Once an alarm occurred, 'Alarm Acknowledge' will be ticked to indicate that acknowledgement is required. If the actual problem(s) disappeared, the alarm will only be cleared after 'Latching Alarm Acknowledge' is clicked.

- Reset Measurement Processor

  Reset measurement processor to recover from fault state. Warning! Resetting measurement processor will delete device and segment tag data. Ensure this is backed up and download these parameters after reset.

- Set Monitored Segments

  The default value is to monitor all 8 segments. If any segments are not in use these may be omitted from the scan. It is recommended to set non-scanning segments to display null values. Whilst investigating an issue on a segment, select only that segment number to scan only that segment. After resolving the issue scanning should be reset to all active segments.

- Set Non-scanning Segment Values to Null

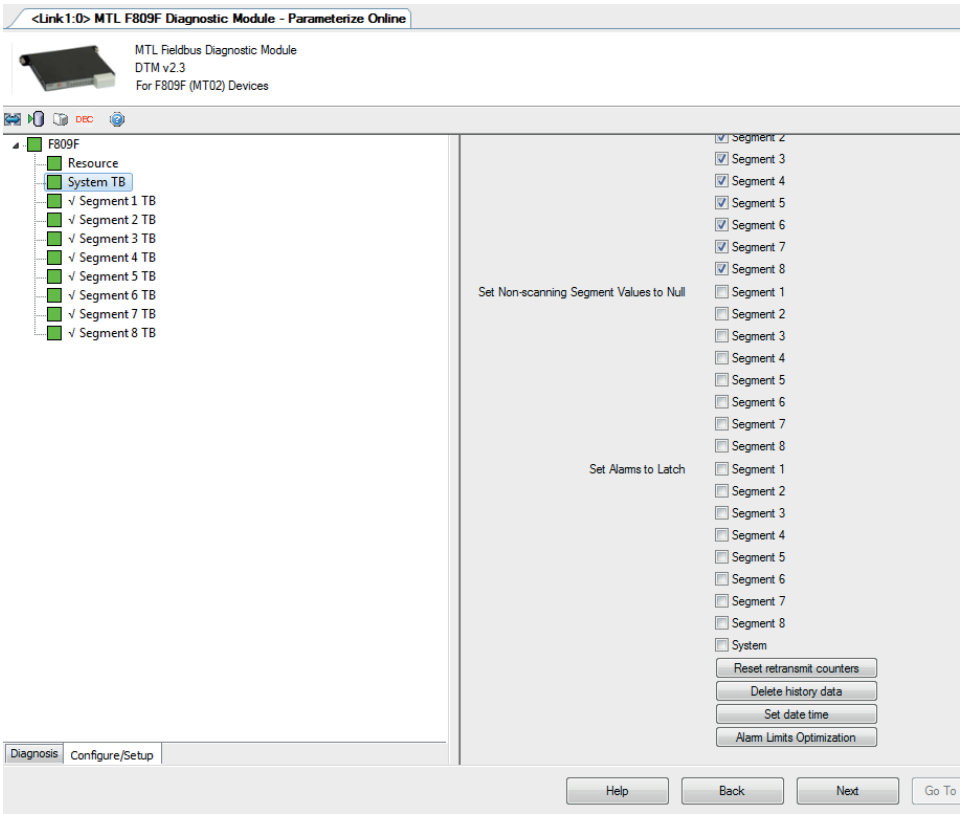
  The default is to display the last measured values for the segment. If any segments are not in use it is recommended to set to display null values and disable scanning on these segments.

- Set Alarms to Latch

  Set if alarm acknowledgement is required. Default is alarms do not require acknowledgement.

5.4.3 Wizards in the System Transducer block

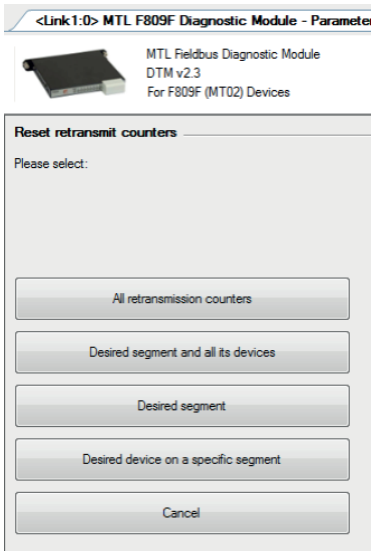
Wizards are software functions executed inside the F809F itself. They can be used to reset the measurements, set date and time, or optimize the alarm limits.



Select 'Configure/Setup' for the system transducer block node.

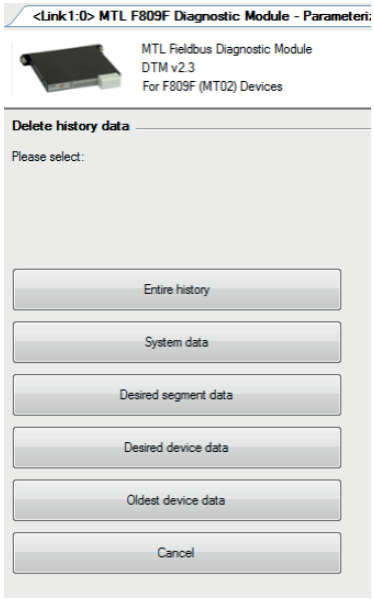
In the application area, scroll to the bottom to find four wizards executable via buttons.

- Wizard ‘Reset retransmit counters’



  - “All retransmission counters” will reset the retransmissions and retransmission rates of all segments and all devices
  - “Desired segment and all its devices” will reset the retransmissions and retransmission rates of a particular segment and all the connected devices
  - “Desired segment” will reset the retransmissions and retransmission rates of a particular segment, but not the devices on the segment
  - “Desired device on a specific segment” will reset the retransmissions and retransmission rates of a particular device on a particular segment

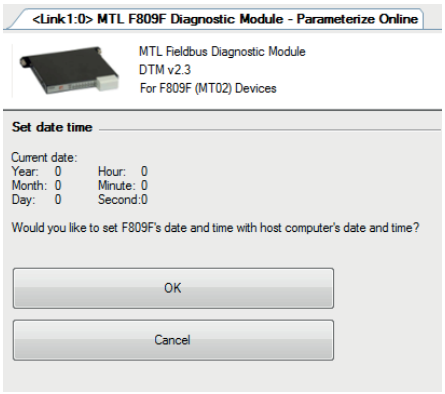
- Wizard ‘Delete history data’



  - “Entire history” will reset the measurement values of
    - the system transducer block (power feed voltage, temperature)
    - segments (noise, retransmissions, lowest signal amplitudes)
    - devices (tag, signal amplitudes, retransmissions)

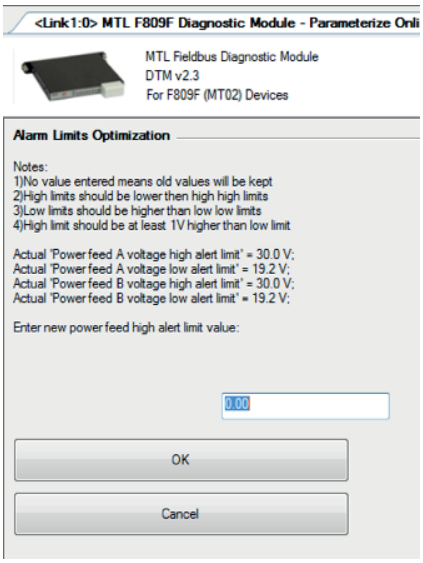
- "System data" will reset the measurement values of the system transducer block (power feed voltage, temperature)
- "Desired segment data" will reset the measurement values of a particular segment (noise, retransmissions, lowest signal amplitudes)
- "Desired device data" will reset the measurement values of a particular device (tag, signal amplitude, retransmissions)
- "Oldest device data" will reset the measurement values of the device (tag, signal amplitude, retransmissions) which was detected first (hence is the oldest device)

- Wizard 'Set date time'



The wizard will display the date and time currently stored inside the F809F, and gives you the option to change the date to the host computer's date and time, so that they are both in sync. Note that this function is implemented for future use, date and time are not used at time of writing this manual.

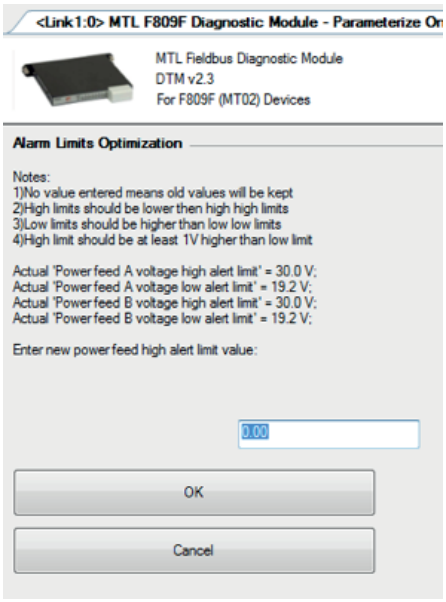
- Wizard 'Alarm Limit Optimization' (for Bulk Power Supply)



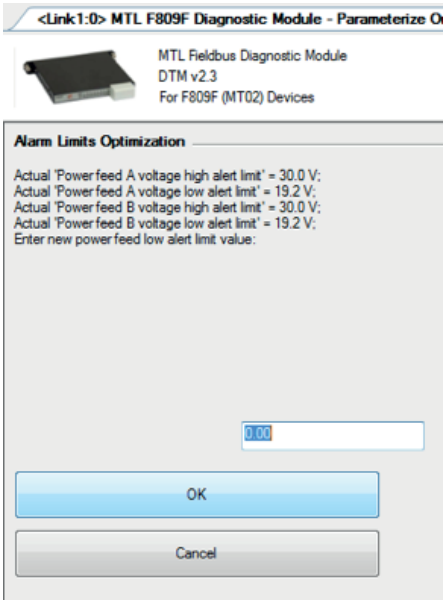
The wizard 'Alarm Limit Optimization' in the system transducer block will allow the user to adjust the low and high limit for the bulk power supply.

Low-low-limit and high-high-limit remain unchanged by the wizard. The default settings are 19.2 V and 30 V respectively. This is the nominal range of all MTL power supply carriers.

- Step 1: choose new high-limit:



- Step 2: choose new low-limit:



Note that the limit values have to be in rising sequence at all times:

Low-low-limit ≤ low-limit < high-limit ≤ high-high-limit

and high limit must be at least 1 V higher than low limit.

In case the user enters values that are not in sequence with the low-low-limit and high-high-limit stored in the F809F, the wizard will reject these values and provide the option to the user to enter different values (Step 3).

- Step 3: Enter different values if the new limits are not in sequence

You may choose to enter only a new high-limit value, low-limit value, or both values.

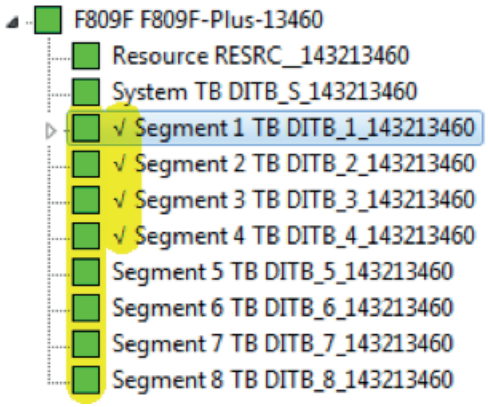
After the values are in sequence, the wizard will finish and store the values inside the F809F. In case you want to set the high limit higher than the current high-high limit, cancel the wizard and change high-high limit and high limit manually.

6 SEGMENT DIAGNOSTICS AND CONFIGURATION

6.1 Introduction

'Segment' refers to individual fieldbus segments and their connected fieldbus transmitters and devices. Configuration of power supply carrier-related parameters is described in section 5 of this manual. Configuration of field devices is described in section 7.

Monitored segments are indicated with a tick mark, non-monitored are without tick mark:

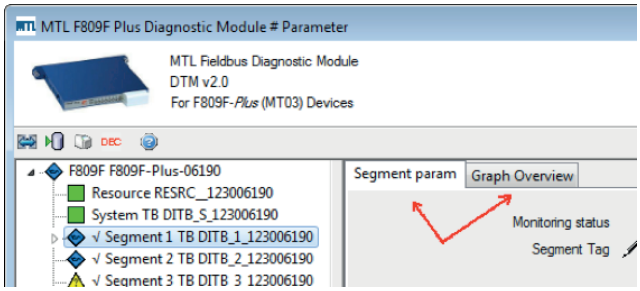


In this example, segments 5 to 8 are not monitored. The symbol of the non-monitored segments will show the last status, or will be reset to the green symbol "Status ok" if option "Set Non-scanning Segment Values to Null" is ticked for the respective segment. See section 5.4.2.

6.2 Diagnostics for the segment transducer block node

6.2.1 Selecting Segment Parameter or Graph Overview

When accessing any of the segment transducer blocks, you have the option of selecting 'Segment parameter' or a 'Graph overview'.

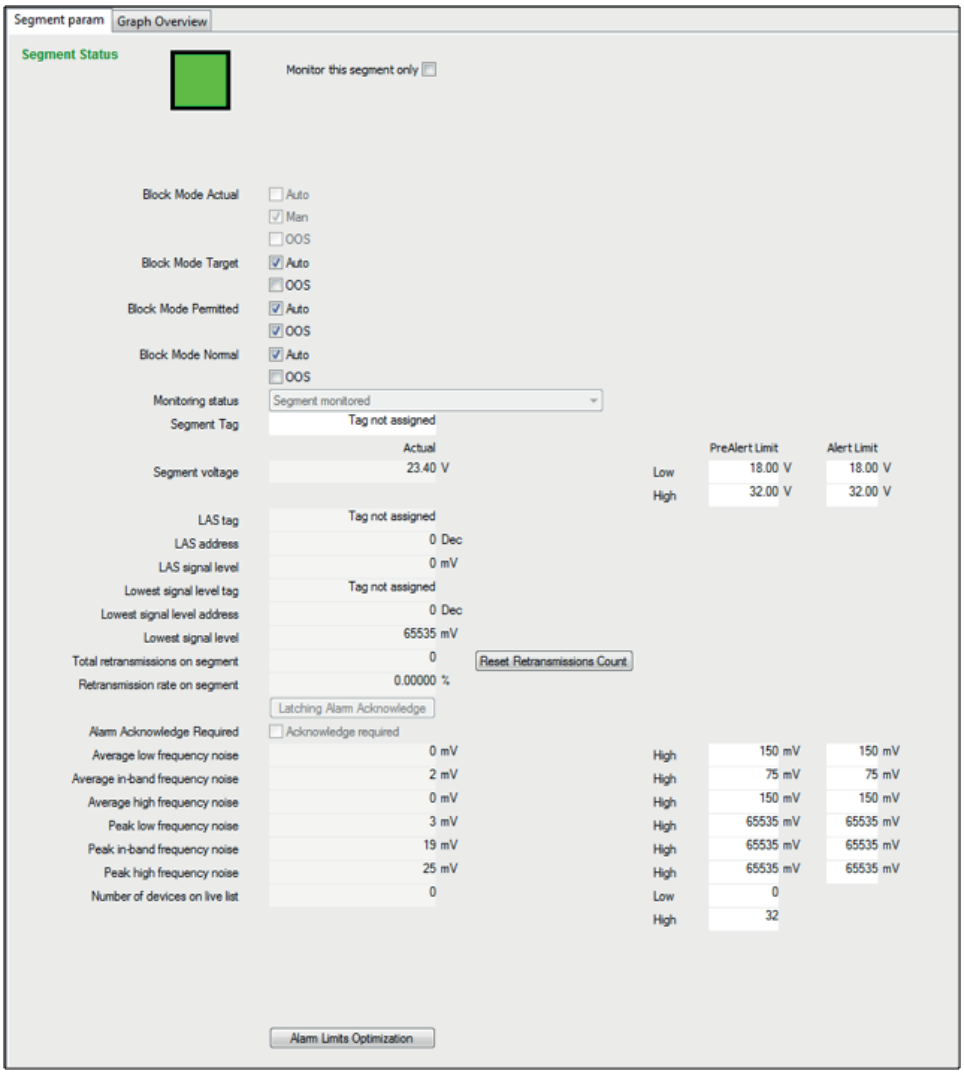


The 'Segment param' tab will provide you with access to the data values measured, together with the corresponding status icon (section 6.2.2). It also allows you to select the 'configure/Setup' tab and configure the limits.

The 'Graph Overview' will provide you with an All-in-one view (section 6.2.3).

6.2.2 Segment parameter

Whether you access the 'Segment param' tab inside the 'Diagnosis' or the 'Configure/ Setup' tab, you will always get to a screen showing the measured diagnostic values together with a status icon.



- The 'Block modes' are standard FF parameters and control the operation of the respective F809F transducer block. Note that these parameters are normally set by the DCS system. Do not change any setting unless you are familiar with their meaning. For more information on these parameters, consult your system vendor or the fieldbus specification.
- Monitoring status

  Tells you whether the segment is currently monitored or not. This setting is performed in the system transducer block, see "Set Monitored Segments" in section 5.4.2.
- Segment tag

  This is to enter the tag name of the segment. Default is blank.
- Segment voltage

  The output voltage of the fieldbus power supply to the segment.

- LAS tag

  This is to enter the tag of the Link Active Scheduler on the network segment. Default is blank.

- LAS address

  Address of the Link Active Scheduler on the network segment.

- LAS signal level

  Peak-to-peak signal level of the Link Active Scheduler transmissions on the network segment.

- Lowest signal level tag

  Tag of the device on the network segment with the lowest detected signal level (if set).

- Lowest signal level address

  Address of the device on the network segment with the lowest detected signal level.

- Lowest signal level

  The lowest detected signal level at which a device transmitted during the last hour.

- Total retransmissions on segment

  Total retransmissions monitored by diagnostic module of all devices on this segment since last reset. Resetting this value does not reset the retransmissions of the devices. A reset of both the segment retransmission counter as well as all device retransmissions can be performed through the wizard 'Reset retransmit counters' in the System Transducer Block (see section 5.4.3).

- Retransmission rate on segment

  Retransmission rate = Total Re-transmissions / Total pass token requests from LAS of all devices on this segment over the last calendar month. Note that the rate is always calculated based on the sum of retransmissions of the devices, and not on the figure indicated as 'total retransmissions on segment'. This is so that the segment retransmission counter can be reset any time without any impact on the actual retransmission rate, for example when observing the segment for newly appearing retransmissions.

- Latching Alarm Acknowledge / Alarm Acknowledge required

  Setting alarms to latch (see 'Set Alarms to Latch' below) means that if an alarm occurs, the alarm message will persist until 'Latching Alarm Acknowledge' button is clicked, even if the actual problem(s) disappeared. Multiple alarm may occur, which then all will persist simultaneously. This way, intermittent alarms will not be missed. Once an alarm occurred, 'Alarm Acknowledge' will be ticked to indicate that acknowledgement is required. If the actual problem(s) disappeared, the alarm will only be cleared after 'Latching Alarm Acknowledge' is clicked. If the alarm is due to excessive retransmissions and the button "Reset Retransmissions Count" is clicked (see section 6.4.3), the retransmissions will be cleared and the alarm is acknowledged and cleared as well.

- Average low/in-band/high frequency noise

  Average noise in the frequency band. Note that noise levels only have upper limits, as only high noise represents a problem. The lower the noise, the better. The average value is calculated based on the past 128 noise readings in the respective frequency band.

Frequency band and default limit values are:

Frequency band	Frequency	PreAlert limit (High limit)	Alert limit (High-high limit)
Low frequency	25 Hz - 3.8 kHz	150 mV	150 mV
In-band frequency (=fieldbus frequency)	5 kHz - 55 kHz	75 mV	75 mV
High frequency	90 kHz - 350 kHz	150 mV	150 mV

The difference between average and peak noise is described under Peak noise.

- Peak low/in-band/high frequency noise

  Peak noise in the respective frequency band detected by the diagnostic module over the last hour. The F809F continuously measures noise on the segment. Noise is measured during the time when no data transmission is taking place on the bus. Each measurement is kept for one hour. The highest measurement within this one-hour period is displayed as the peak value. Consequently, if the latest measurement is a new peak value and it exceeds the respective limit, the corresponding alarm will be displayed for one hour after the measurement. Note that noise levels only have upper limits, as only high noise represents a problem. The lower the noise, the better.

Frequency bands are identical to 'average' frequency bands. Default limit values are:

Frequency band	PreAlert limit (High limit)	Alert limit (High-high limit)
Low frequency	65535 mV	65535 mV
In-band frequency (=fieldbus frequency)	65535 mV	65535 mV
High frequency	65535 mV	65535 mV

What is the difference between peak noise and average noise?

A peak value can be understood as a spike. If only once in a while a spike occurs, you may have some high values for the peak noise level, but if at other times the noise is low, the average value would still remain low.

A peak noise value exceeding the fieldbus specification limits may be able to disturb the communication, but only for a short period of time. Examples of such peaks are a lightning strike, a machine switching on/off, or a maintenance person causing an accidental short circuit at a field device. As a result, a data transmission may be corrupted, but the fieldbus protocol is designed to tolerate such disturbances, so that the bus itself will continue to operate without any problem at all.

However, if the source of noise is of permanent nature, such as a VSD/VFD (variable speed/frequency drive), and for some reason such noise is able to impact on the fieldbus cable (e.g. if unshielded cable is used), the peaks will occur permanently, and as such the average value will be significantly increased. If this condition remains, fieldbus could be disturbed permanently.

As such, it should be understood that average noise levels are more critical, and hence average noise limits should be set lower than peak noise limits.

- Number of devices on live list

  Number of active fieldbus devices on the network segment.

  The live list is the list of all devices that are properly responding to the Pass Token (PT) message.

  New devices may be added to the fieldbus at any time. The LAS periodically sends Probe Node (PN) messages to the addresses not in the Live List. If a device is present at the address and receives the PN, it immediately returns a Probe Response (PR) message. If the device answers with a PR, the LAS adds the device to the Live List and confirms its addition by sending the device a Node Activation message.

A typical segment consists of:

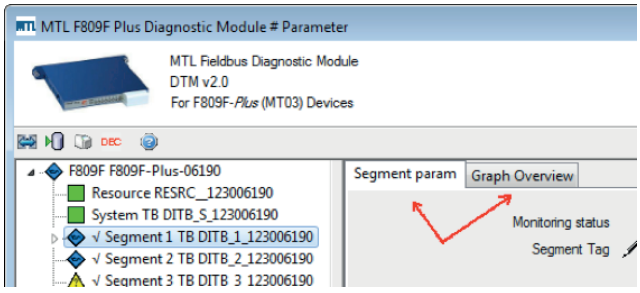
- Primary host card (LAS, Link Active Scheduler, active Link Master)
- Redundant host card (secondary Link Master)
- Field instruments, such as transmitters, valve positioners
- F809F diagnostic module, if configured to communicate on this segment (typically segment 8)
- Potentially a handheld communicator such as Emerson 475.
- Non-communicating fieldbus tester such as FBT-6 will not count/appear as a device.

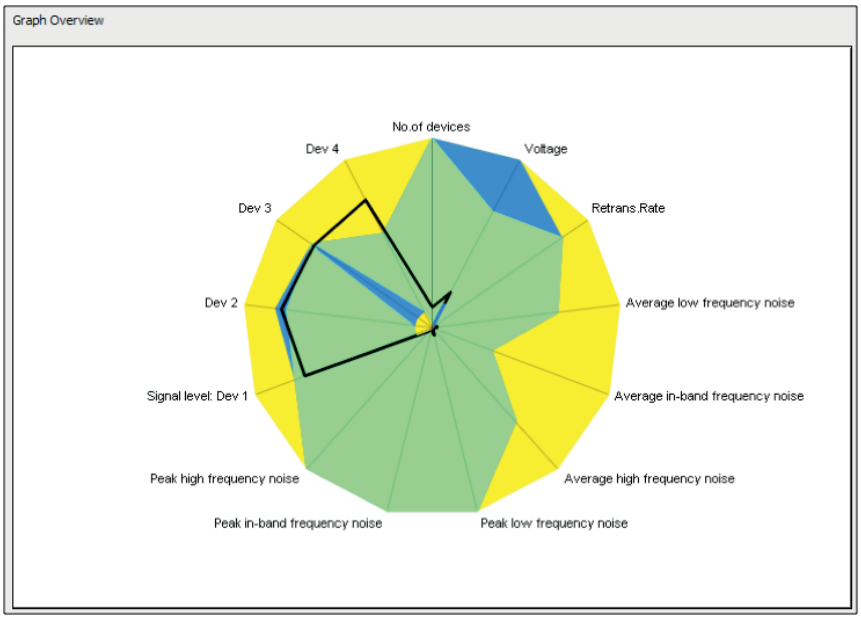
Default limit is 0..32 devices. Connecting an handheld fieldbus tester FBT-6 will not count as a device; however, a communicator such as Emerson 475 will. If connecting a communicator should not generate an alarm, the upper limit should be increased by 1.

Once the number of devices is confirmed, low limit can be set to the actual number of devices if the F809F should generate an alarm to the system, for example if a device is removed. As however DCS systems detect missing devices themselves, this alarm would be a duplication. In such case, set the limits to the default 0..32 devices to avoid an alarm by the F809F.

6.2.3 'Graph Overview' or 'All-in-one' view

Segment specific parameters can be visualized in a radar graph, known as an "All-In-One" graph. This graph is available only in the Diagnosis view. Select a segment node and the 'Diagnosis' tab in the Navigation Area, then click on the "Graph Overview" tab at the top left of the Application Area to display this view.





The All-In-One graph shows a number of segment/device parameters in one display.

Each radial line represents one parameter and the bold black line connecting points on these radial lines represents the measured values.

The middle green area is the "safe zone" between high and low limits. The bold black curve is created by connecting all the actual measured values for the parameters.

The colored areas follow the NAMUR NE107 color-coding (section 4.1.4). If the black line moves into other colored areas it has the following meaning:

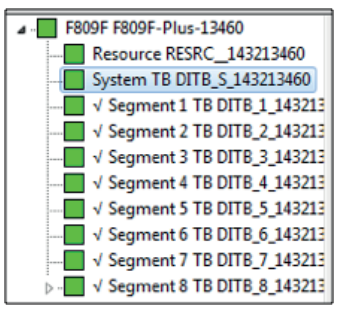
- Outer Yellow areas: Parameter has exceed high-high limit (out of specification)
- Outer Blue areas: Parameter has exceed high limit (maintenance required)
- Inner Blue areas: Parameter has fallen below low limit (maintenance required)
- Inner Yellow areas: Parameter has fallen below low-low limit (out of specification)

6.3 Appearance of alarms and remedy

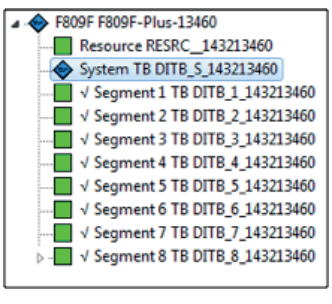
The Navigation area will indicate the status condition with the NAMUR symbols explained in section 4.1.4.

Monitored segments are indicated with a tick mark, non-monitored are without tick mark (see section 6.1).

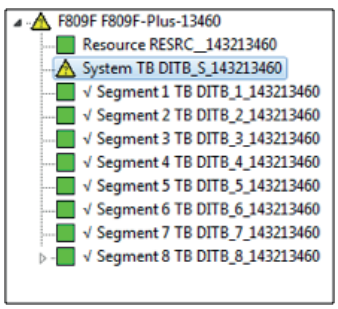
Example of a Pre-alert condition (+ short to shield):



No Pre-alert or alert



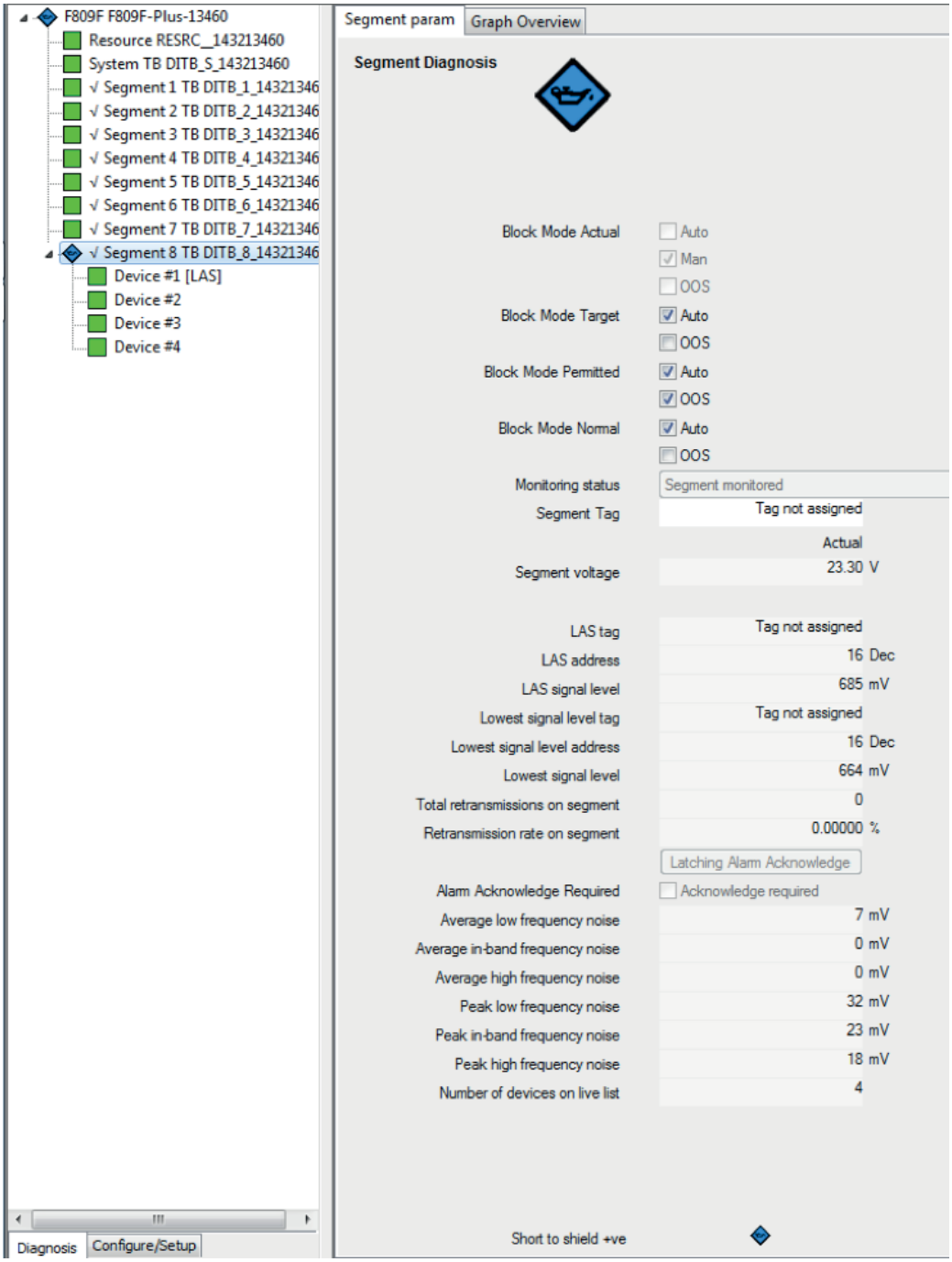
Pre-alert condition:



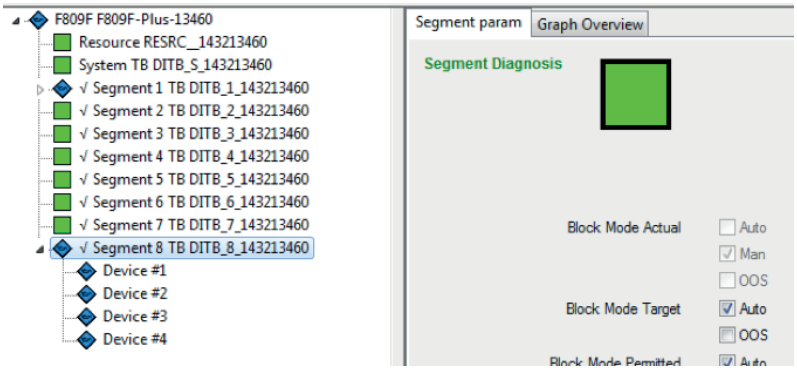
Alert condition

Note that in this example, the symbol in the application area (right) matches the symbol in the navigation area (left). This is the case for all faults occurring on the segment.

If the Segment diagnosis symbol in the application area does not correspond to the symbol in the Navigation area (see following screenshot), the navigation area shows a propagated symbol from a lower hierarchy layer. Click on the white arrow ( ) next to the respective segment in the Navigation area, so that the lower layer devices are shown.



The Navigation area shows the blue oil can for Segment 8, but the application area for the segment shows a green symbol for Segment Diagnosis. This means that the segment parameter are ok, and the problem occurs at a lower layer, which are the field instruments.



Check the Navigation area for field instrument that show an error, and investigate the respective field instrument(s).

The following conditions can occur on a segment block node:

Parameter	Symbol / Alert	Remedy
Segment Voltage	Low Alert Low PreAlert High PreAlert High Alert	Check bulk power supply operation and wiring to carrier
Average low frequency noise	High PreAlert High Alert	Check: 1. Fieldbus screen is correctly cut back and taped at each of the fieldbus devices; 2. Fieldbus screen connections are correctly made in fieldbus wiring block junction box, intermediate junction boxes, in marshalling cabinet and correctly connected to ground; 3. No AC cabling close to fieldbus cabling; 4. Wire terminations are properly secured.
Average in-band frequency noise (fieldbus frequency)	High PreAlert High Alert	Check: 1. Fieldbus screen is correctly cut back and taped at each of the fieldbus devices; 2. Fieldbus screen connections are correctly made in fieldbus wiring block junction box, intermediate junction boxes, in marshalling cabinet and correctly connected to ground; 3. No AC cabling close to fieldbus cabling; 4. Wire terminations are properly secured; 5. For welding in the plant; 6. Poor grounding of frequency controlled drives; 7. Use of high power radios close to fieldbus network.
Average high frequency noise	High PreAlert High Alert	Check: 1. For welding in the plant; 2. Poor grounding of frequency controlled drives.

continued on the next page

Parameter	Symbol / Alert	Remedy
Peak low frequency noise	High PreAlert High Alert	If frequent alarms, check: 1. Fieldbus screen is correctly cut back and taped at each of the fieldbus devices; 2. Fieldbus screen connections are correctly made in fieldbus wiring block junction box, intermediate junction boxes, in marshalling cabinet and correctly connected to ground; 3. No AC cabling close to fieldbus cabling; 4. Wire terminations are properly secured.
Peak in-band frequency noise (fieldbus frequency)	High PreAlert High Alert	If frequent alarms, check: 1. For operation of radios with Effective Radiated Power (ERP) up to 5W being used within 1.5m of fieldbus devices, junction box or cabling; 2. Fieldbus screen is correctly cut back and taped at each of the fieldbus devices; 3. Fieldbus screen connections are correctly made in fieldbus wiring block junction box, intermediate junction boxes, in marshalling cabinet and correctly connected to ground; 4. No AC cabling close to fieldbus cabling; 5. Wire terminations are properly secured; 6. For welding in the plant; 7. Poor grounding of frequency controlled drives.
Peak high frequency noise	High PreAlert High Alert	If frequent alarms, check: 1. For operation of radios with Effective Radiated Power (ERP) up to 5W being used within 1.5m of fieldbus devices, junction box or cabling; 2. For welding in the plant; 3. Poor grounding of frequency controlled drives.
Number of devices on live list	Low PreAlert	Check for device failed or removed for maintenance. If latching alarm acknowledge is configured and alert cleared on acknowledgement this is an indication of intermittent communication. Check: 1. Trunk cabling, host and trunk JB connections are tight; 2. For water in trunk or spur cable, junction boxes; 3. Host operation; 4. Spur cabling, spur andf device connections are tight; 5. For water in spur cable or device; 6. Device operation.
	High PreAlert	A device was additionally connected to the bus. This alert may appear for a handheld communicator (e.g. Emerson 475) if the limit was set to the actual number of devices. In that case, increase the limit by one to avoid this alert.
Short to shield +/-ve	(symbol only)	Check: 1. Fieldbus screening is correctly cut back and taped at each end of the fieldbus device; 2. Fieldbus screen connections are correctly made in Fieldbus Barrier Junction Box, intermediate junction boxes, in marshalling cabinet, surge protector and correctly connected to ground; 3. Disconnect portions of cable and check if the short goes away; 4. Verify the fieldbus power supply is isolated from ground; 5. Check for damaged or waterlogged cable, junction box or device.

6.4 Configuration/Setup of the segment transducer block node

6.4.1 Introduction

As described in section 4.1.7, you can use three methods for configuration:

- Manual
- Via DCS template
- Using Wizards/Methods

The segment transducer blocks allow all parameters to be configured through wizards/ methods. A manual configuration is possible but not necessary.

6.4.2 Manual or via DCS template

- Fieldbus Power Supply

  Limits for the fieldbus power supply should be according to minimum and maximum output voltage as listed in the datasheet of the respective FFPS. Default values and the input value range are as shown in the following table.

Default	Low-low limit, low limit: 18 V High limit, High-high limit: 32 V
Minimum value	0 V
Maximum value	40 V
Alarm hysteresis (no alarm → alarm → no alarm)	0.5 V
Condition: high limit > low limit by ...	1 V

Note that the limit values have to be in rising sequence at all times:
Low-low-limit ≤ low-limit < high-limit ≤ high-high-limit
and high limit must be at least 1 V higher than low limit.

Note that the F809F device will round the entered values to a single digit decimal (example:
23.34V will be rounded to 23.3V, and 23.35V will be rounded to 23.4V).
The DTM does not perform the rounding, so that the entered value (e.g. 23.34V) will persistently be indicated with the pencil symbol , as the DTM value differs from the value in the F809F device.

Best is to enter values with a single digit decimal only (e.g. 23.4V).

- Noise Limits

  'Noise' is an unwanted random addition to a signal. Sources of noise include electromagnetic interference from electric machines or circuits, electronic thermal noise due to the random movement of electrons conducting current, and even radiation from solar flare or from the cosmos.

  Unwanted noise may appear over specific frequencies, or across the maximum possible frequency bandwidth that the physical media supports.

  The level of noise depends on the quality and type of the cable used, the

  earthing/grounding concept and implementation, the environment, and many other factors. The F809F identifies low frequency noise, in-band frequency noise (i.e. noise in the frequency that Foundation Fieldbus uses), and high frequency noise.

  It differentiates between peak and average noise levels.

Note that noise levels only have upper limits, as only high noise represents a problem. The lower the noise, the better.

Average values are typically lower than 20 mV, and peak values are typically lower than 60 mV.

The Fieldbus physical layer specification IEC 61158-2 specifies maximum values for noise that a fieldbus device has to reject[1]. These maximum values are set as high-limit and high-high-limit (out of specification) in the F809F module.

		PreAlert Limit	Alert Limit
Average low frequency noise	High	150 mV	150 mV
Average in-band frequency noise	High	75 mV	75 mV
Average high frequency noise	High	150 mV	150 mV
Peak low frequency noise	High	65535 mV	65535 mV
Peak in-band frequency noise	High	65535 mV	65535 mV
Peak high frequency noise	High	65535 mV	65535 mV

[1] IEC61158-2:2004, section 12.5.1, specifies receiver noise rejection limit as 75 mV. This value was applied to in-band frequency noise. Section 12.7.3 allows significantly higher limits of up to 2000 mV for low frequency noise and 1600 mV for HF noise. These limits are however frequency-dependent. As F809F can only have one limit per LF and HF noise, MTL selected 150 mV as limits, which appear to be sufficient to avoid nuisance alarms.

Alarm hysteresis (no alarm >alarm > no alarm) is 3mV for low frequency and high frequency, and 2 mV for in-band frequency.

All peak noise limits are set to 65535 mV and hence disabled. This will ensure that users do not get nuisance alarms in a factory-default condition.

Note that once these maximum limits are exceeded, the segment is operating outside the specification, which means that proper operation is no longer guaranteed. We hence suggest to lower the values in order to get high-high alarm before the segment fails.

Typical plants will have values in the following magnitude:

- Average Noise levels: typically 20 mV or below
- Peak Noise levels: typically less than 50 mV, typically in the LF frequency range. In-band frequency and high frequency peak noise levels are typically in the magnitude of 30 mV to 40 mV.

We recommend to consider lowering the default limit values and bring them close to the actual values experienced.

- Device signal amplitude limits

  The physical layer standard IEC 61158-2 specifies transmit levels of 750 mV to 1000 mV under test conditions with two terminators. Under plant conditions, the actual values will differ from segment to segment, and under some circumstances even significantly.

  Values down to 550 mV and up to 1200 mV should however cover most applications.

  The default limits are set to the following:

		PreAlert Limit	Alert Limit
Signal level	Low	150 mV	150 mV
	High	1200 mV	1200 mV

Alarm hysteresis (no alarm > alarm > no alarm) is 10 mV. Note that the limit values have to be in rising sequence at all times:

Low-low-limit ≤ low-limit < high-limit ≤ high-high-limit

and high limit must be at least 20 mV higher than low limit.

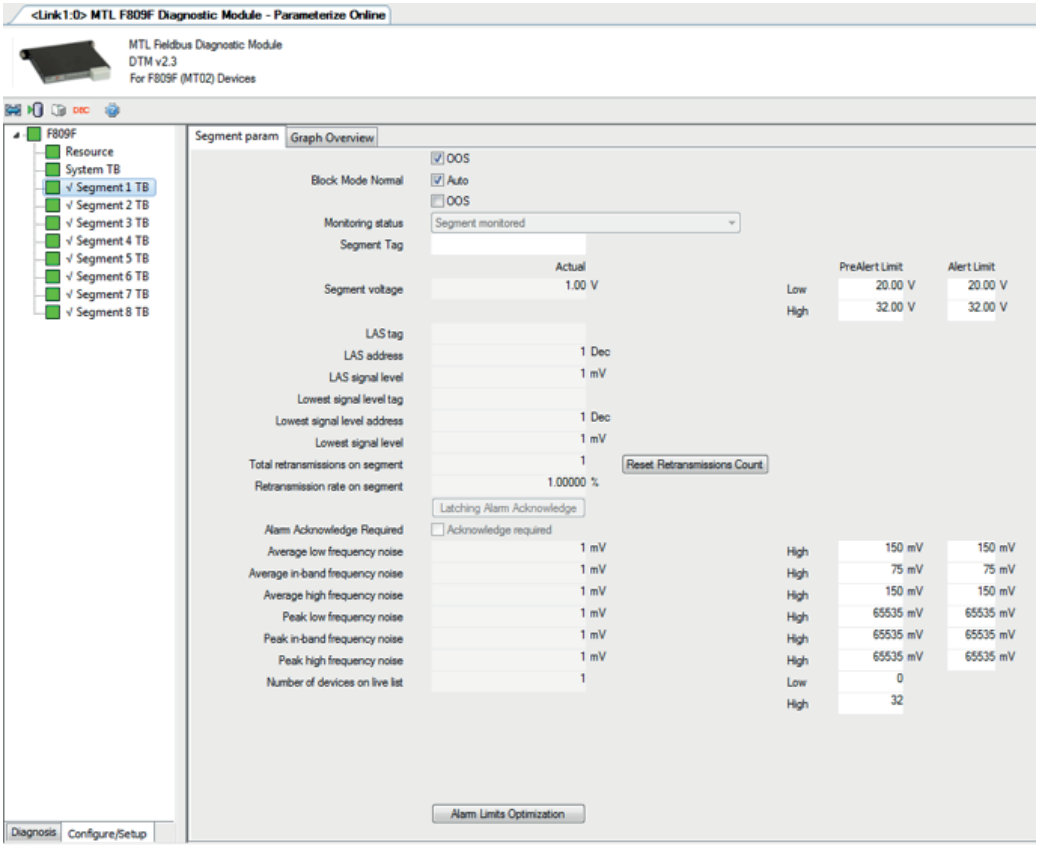
We recommend that after successful commissioning, the device low limit is set to 75 % of current value and device high limit to 125 % of current value.

6.4.3 Wizards / alarm limit optimization in the segment transducer block

Wizards are software functions executed inside the F809F itself.

The segment transducer block contains two methods:

- The Alarm Optimization Wizard optimizes the alarm limits.
- The "Reset Retransmissions Count" resets the "Total retransmissions on segment" parameter to Zero. Resetting this value does not reset the retransmissions of the devices. A reset of both the segment retransmission counter as well as all device retransmissions can be performed through the wizard 'Reset retransmit counters' in the System Transducer Block (see section 5.4.3).



Select 'Configure/Setup' for the segment 1..8 transducer block node.

In the application area, scroll to the bottom to find the 'Alarm Limits Optimization' wizard, and slightly above it the 'Reset Retransmissions Count' wizard executable via buttons.

- Wizard 'Alarm Limits Optimization' (for signal amplitude and noise)

  The wizard 'Alarm Limits Optimization' in the segment transducer block will adjust the following PreAlert limits (Alert limits are not modified by the wizard):

  - low- and high-limits of the fieldbus segment power supply
  - high limit for the noise levels (there is no low limit)
  - low- and high-limits for device signal amplitudes.

It also allows the user to select whether a removed or added device creates an alarm or not.

The wizard is executed in 3 steps:

- **Step 1:** select the fieldbus segment power supply

Select the model of fieldbus power supply in use. If you are using a model other than listed in the wizard, choose 'Custom limits configuration' and enter the limits according to the datasheet of the fieldbus power supply in use.

Default values are as shown in the following table:

		PreAlert Limit	Alert Limit
Segment voltage	Low	18.00 V	18.00 V
	High	32.00 V	32.00 V

The following limits will be set for the respective selected power supply:

Selected Fieldbus Power supply	Associated Low-limit	Associated High-limit
F101	21.3 V	24.2 V
F102	27.7 V	30.2 V
F6xx Series (FPS-IPM)	24.8 V	30.2 V
F801	21.3 V	24.2 V
F802	27.8 V	30.2 V
918 *.* 1	27.8 V	30.2 V
918 *.* 2	18.5 V	22.5 V

Note that the limit values have to be in rising sequence at all times:
Low-low-limit ≤ low-limit < high-limit ≤ high-high-limit
and high limit must be at least 1 V higher than low limit.

In case the calculated values are not in sequence with the low-low-limit and high-high-limit stored in the F809F, the wizard will reject the calculated values and keep the old values without notification to the user.

- **Step 2:** Select whether an added/removed device creates an alarm or not

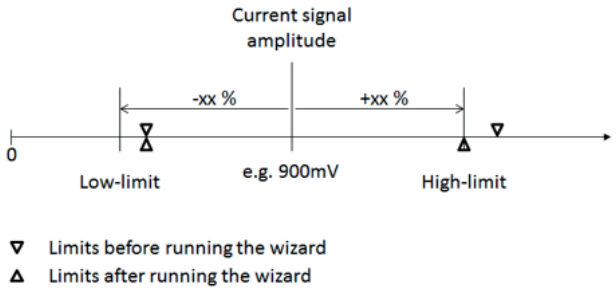
  - 'Yes but do not alarm when one device added to allow use of fieldbus communicator' will set low limit to actual device count, and high limit to actual device count + 1.
  - 'Yes' will set low limit and high limit to actual device count.
  - 'No, do not change live device count alarm limits' will leave the limits as they are. The defaults are:

		PreAlert Limit
Number of devices on live list	Low	0
	High	32

so that no alarm will be generated if the limits are not changed.

- **Step 3:** Select margins for signal amplitude

Note that the wizard will only adjust low-limit and high-limit if the calculated limits represent a tighter margin than the current limits. This means, the calculated low limit must be higher than the current low limit and the calculated high limit must be lower than the current high limit. If not, the wizard will reject the calculated value(s) and keep the old value(s) without notification to the user.



- 'Custom variation percentage' will set

  low-limit = signal amplitude current value – xx %,

  provided this limit would be higher than the current low-limit, and

  high-limit = signal amplitude current value + xx %,

  provided this limit would be lower than the current high-limit.

- 'Default variation percentage (40 percent)' will set

  low-limit = signal amplitude current value – 40 %,

  provided this limit would be higher than the current low-limit, and

  high-limit = signal amplitude current value + 40 %,

  provided this limit would be lower than the current high-limit.

Example:

Current signal amplitude is 900 mV, current low limit is 500 mV, current high limit is 1100 mV. When executing the wizard, the user selects 30 %.

Calculated new low limit: 900 mV – 30 % = 630 mV; as this is higher than the current low limit, it will be accepted as the new low limit.

Calculated new high limit: 900 mV + 30 % = 1170 mV; as this is not lower than the current high limit, it will not be accepted as the new high limit, and the high limit remains at 1100 mV.

The final limit setting for this example will be: low: 630 mV, high: 1100 mV.

- **Step 4:** Calculation of noise limits

The noise high-limits will be set according to the following table. The high-high-limits will remain unchanged.

	Alarm wizard criteria	High-limit (PreAlert)
Avg Low Frequency Noise (mV)	if actual <50	100
Avg in-band (Fieldbus) Frequency Noise (mV)	if actual <25	50
Avg High Frequency Noise (mV)	if actual <50	100
Peak Low Frequency Noise (mV)	if actual <300	600
Peak in-band (Fieldbus) Frequency Noise(mV)	if actual <150	300
Peak High Frequency Noise (mV)	if actual <300	600

If the actual values > respective limit listed in the table (e.g. actual Avg Fieldbus Frequency Noise > 25 mV), the high-limit (PreAlert) will remain unchanged.

Note that the limit values have to be in rising sequence at all times:

high-limit ≤ high-high-limit

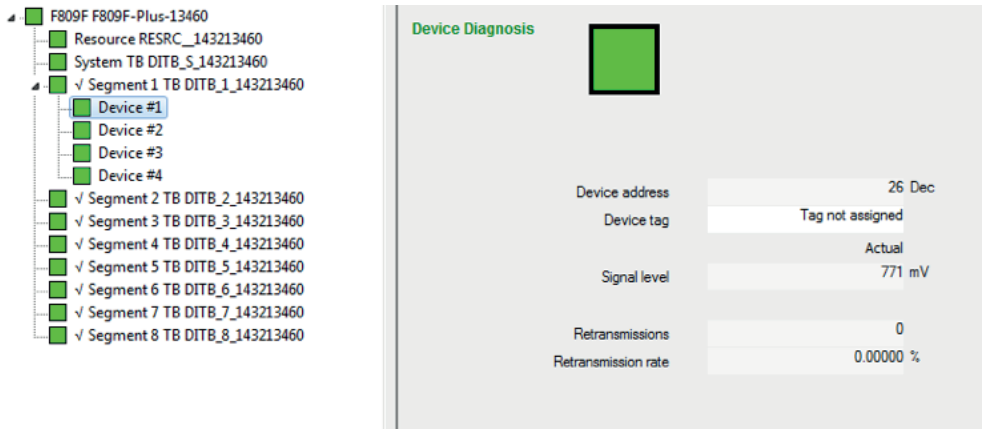
In case the calculated high limit is higher than the high-high-limit stored in the F809F, the wizard will reject the calculated value and keep the old high limit value without notification to the user.

7 DEVICE DIAGNOSTICS AND CONFIGURATION

7.1 Introduction

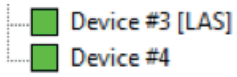
'Device' refers to individual fieldbus devices such as fieldbus transmitters and valve positioners.

7.2 Diagnostics for field device nodes



Select a device in the navigation area. If devices are not visible, search and click on the white arrow (▹) to open lower hierarchy layers. Field devices are in the lowest layer.

Device that is currently operating as Link Active Scheduler (LAS) is indicated as [LAS] behind



Note that (backup) Link Master (LM) devices (devices that can become LAS if the LAS fails) can't be identified through observation of the bus communication and hence don't carry any additional marking in the navigation area.

Parameters shown are:

- Device address

  Device address can be displayed as decimal value (indicated as Dec) or hexadecimal value (indicated as Hex). Default is a decimal display. To toggle displaying addresses decimal or hexadecimal, use the Hex/Dec toggle option in the toolbar area (see section 4.1.3). When comparing data to other screens in fieldbus control system check the address is displayed in the same format.

  Network node addresses 16-247 (decimal) are for permanently addressed field devices (includes host). The assignment of a permanent node address may refer to the placing of a device in an active mode, or a state in which the Foundation Fieldbus host application may collect additional field device information and/or field device parameters. The network node addresses 248 251 are temporary node addresses. The remaining node addresses 252-255 are for temporary devices (e.g., handheld devices).

- Device tag

  User assigned device tag, stored in volatile memory.

- Signal level

  This is the communication signal amplitude of this particular device. The physical layer standard IEC 61158-2 specifies transmit levels of 750 mV to 1000 mV under test conditions with two terminators. Under plant conditions, the actual values will differ from segment to segment and device to device, under some circumstances even significantly.

  Typical values are between 550 mV and 1200 mV.

- Retransmissions

  Retransmissions detected by diagnostic module for this device since last reset. A device will remain in the live list as long as it responds properly to the PTs sent from the LAS. The LAS will remove a device from the Live List if the device does neither use the token, nor immediately return it to the LAS after three2 successive tries. These re-tries of PT messages are called retransmissions.

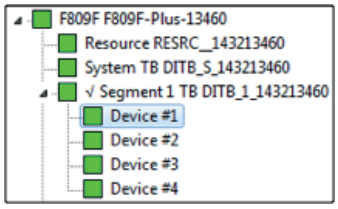
- Retransmission rate

  Retransmission rate = Re-transmissions/Total pass token requests from LAS over the last month.

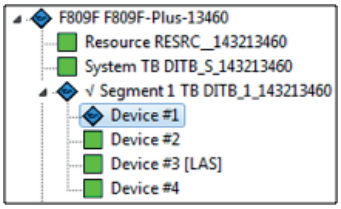
7.3 Appearance of alarms and remedy

The Navigation area will indicate the status condition with the NAMUR symbols explained in section 4.1.4.

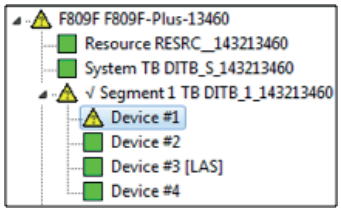
If devices are not visible, search and click on the white arrow (▹) to open lower hierarchy layers. Field devices are in the lowest layer.



No Pre-alert or alert

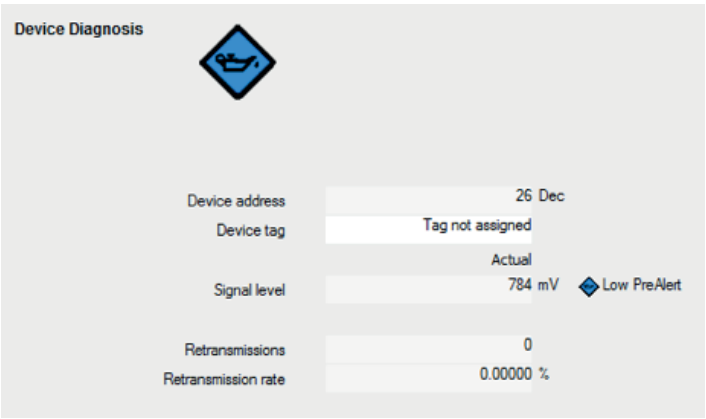


Pre-alert condition:



Alert condition

Example of a Pre-alert condition:



The following conditions can occur on a device node:

Parameter	Symbol / Alert	Remedy
Signal level	Low Alert Low PreAlert	If only one device low, check: • alarm limits have not been wrongly set; • spur cabling, spur and device connections are tight; • water in spur cable or device; • device operation. If several/all devices on segment low check: • for more than two terminators on segment; • water in devices, junction boxes and cabling.
	High PreAlert High Alert	If only one device high, check: • alarm limits have not been wrongly set • device operation If several/all devices on segment high, check: • for only one terminator on segment or failed terminator
Retransmissions	High PreAlert High Alert	• Check retransmission limit has not been wrongly set. • Check retransmission rate. • Check for changes in parameter levels compared to values at commissioning and with history. Investigate any significant changes.
Retransmissions rate	High PreAlert High Alert	This is an excellent key performance indicator of device communication health. • Check retransmission rate limit has not been wrongly set. • Check for changes in parameter levels compared to values at commissioning and with history. Investigate any significant changes. If only one device, check: • spur cabling, spur and device connections are tight; • for water in spur cable or device; • device operation. If all/several devices on segment, check: • trunk cabling host and trunk JB connections are tight; • for water in trunk or spur cable, junction boxes or all devices; • host operation.

continued

Parameter	Symbol / Alert	Remedy
Device removed	(symbol only)	When an established device is removed from a segment, this alert is displayed for one hour. It does not set the 'Device needs maintenance soon' bit.
New device	(symbol only)	When new device is added to segment, this alert is displayed for one hour. It does not set the 'Device needs maintenance soon' bit.
Device not live	(symbol only)	This device address was used by a device at some point in time, but is no longer in use. If 'device removed' is displayed, this device was removed within the past one hour.

7.4 Configuration/Setup of a device node

7.4.1 Introduction

As described in section 4.1.7, you can use three methods for configuration:

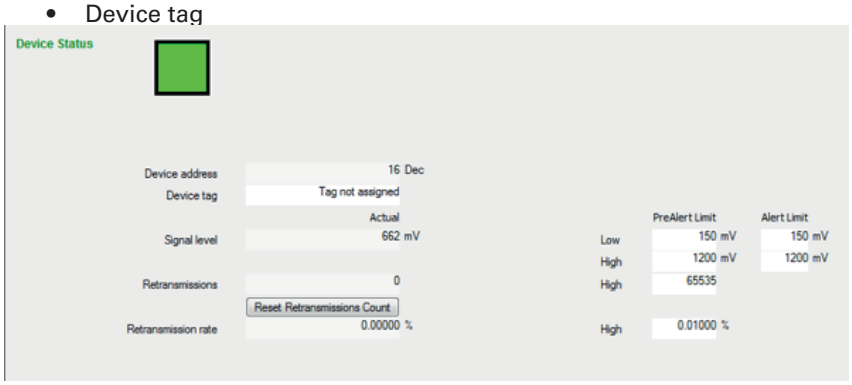
- Manual
- Via DCS template
- Using Wizards/Methods

Note that not all parameters can be configured through wizards/methods. Setting the monitored segments, non-scanning segment values to null, and alarms to latch require manual configuration.

7.4.2 Manual or via DCS template

Parameters that can be configured are:

- Device tag



  You may enter a tag for the device to support identification. As all bus communication is address-based, the device address is of highest importance.

- Device signal amplitude limits

  The physical layer standard IEC 61158-2 specifies transmit levels of 750 mV to 1000 mV under test conditions with two terminators. Under plant conditions, the actual values will differ from segment to segment, and under some circumstances even significantly.
  Values down to 550 mV and up to 1200 mV should however cover most applications.

The default limits are set to the following:

		PreAlert Limit	Alert Limit
Signal level	Low	150 mV	150 mV
	High	1200 mV	1200 mV

We recommend that after successful commissioning, the device low limit is set to 75 % of current value and device high limit to 125 % of current value.

- Retransmissions High PreAlert limit

  The absolute number of retransmissions at which an alarm will be generated. Default is 65535 which disables this alarm.

- Retransmission Rate High PreAlert limit

  Retransmission rate = Re-transmissions/Total pass token requests from LAS over the last month. Default is 0.1 % (approximately 1 retransmission per hour).
  The Retransmission Rate provides an excellent indicator for the quality of fieldbus segment communications. To provide an accurate Retransmission Rate, a large sample of Pass Token message replies needs to be monitored. To provide useful data at all times- even just after power is connected to the F809F-Plus, or after the retransmission counter is reset- the device calculates the retransmission rate in three phases.

a) To avoid the risk of nuisance alarms during the initial phase from 1 to 5,000 Pass Tokens (typically 6 hours when 8 segments are being monitored), the displayed value will approach the actual value from below.

b) During the averaging phase from 5,000 to 100,000 Pass Tokens (typically 6 days when 8 segments are being monitored) the accuracy of the displayed value increases.

c) In normal operation, with greater than 100,000 Pass Tokens monitored, the F809F-Plus displays a moving average retransmission rate that avoids nuisance alarms from typical events whilst providing good response to changes in fieldbus communications performance.

7.4.3 Wizard in the device node

Wizards are software functions executed inside the F809F itself. The device node contains one method "Reset Retransmissions Count", which resets the "Retransmissions" parameter of this device to Zero, and consequently the "Retransmission rate" as well.

If alarms are set to latch (see 'Set Alarms to Latch' in section 5.4.2), and the alarm is due to excessive retransmissions and the button "Reset Retransmissions Count" is clicked, the retransmissions will be cleared and the alarm is acknowledged as well. If no other alarm on the segment exists, the alarm will then be cleared.

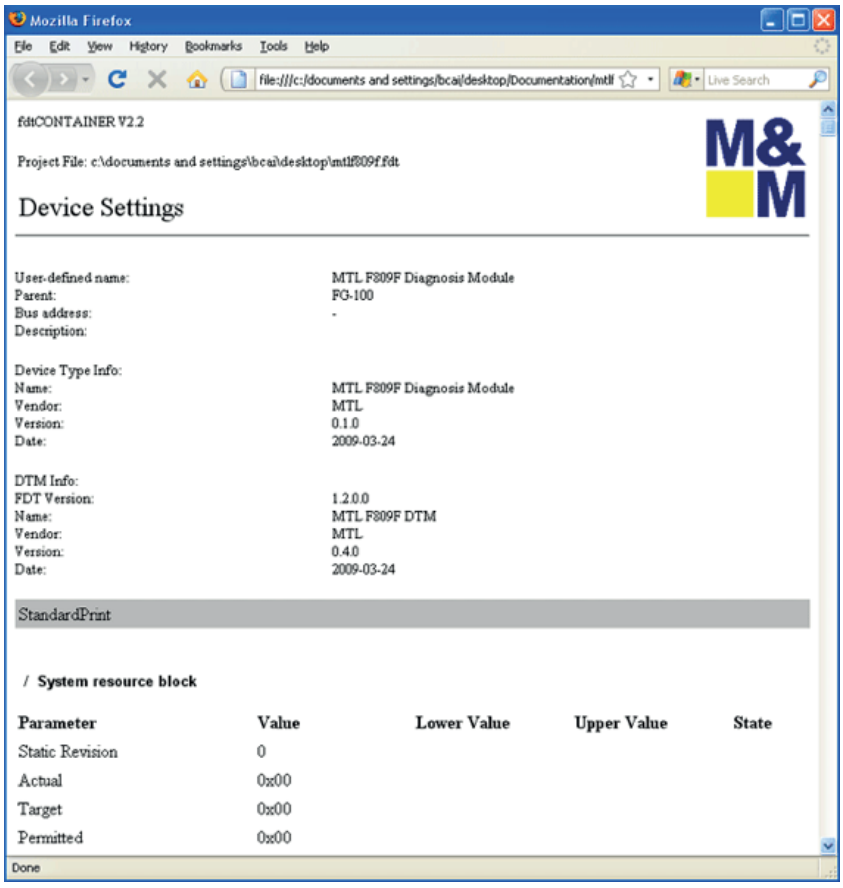
8 PRINT / REPORT GENERATION

The DTM provides other functions known as Standard print and Private print. These two functions can be opened by from the DTM's menu.

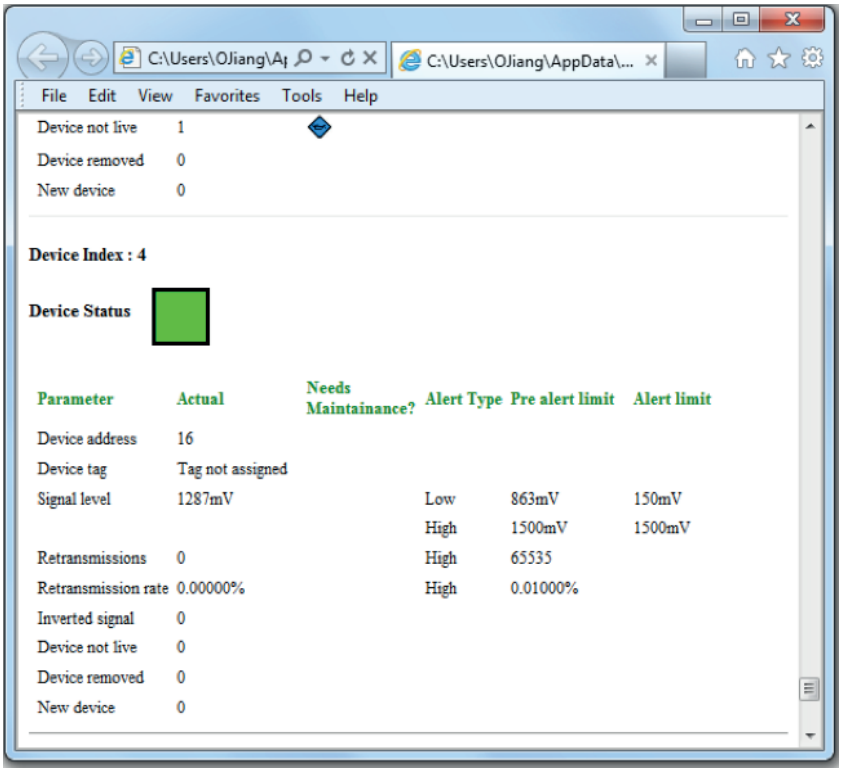
These functions can be used to generate a report in HTML format about all segments, so that they can be viewed with any browser, and then from there printed or exported into other formats.

The "Private Print' is best suited to serve as a commissioning report, since all values are grouped with their respective limits, as well the NE107 symbols.

The "Standard print" provides standard FDT printing. It prints all the parameters displayed in the Diagnosis view to the user's default web browser. A typical page using "Standard print" is shown below.



The "Private print" groups parameters that are related to each other, and prints them to the user's default web browser. For example, actual value is grouped with its alert limits. The screenshot of a "Private print" is shown opposite.



9 TRENDING OF DIAGNOSTIC PARAMETERS

Trending is part of the FDT tool respectively of the asset management software package (e.g. field device manager), and not of the device-specific DTM.

Typically, two methods are implemented by such tools:

- online trending, where a graph is displayed while the application is running
- trending via a data historian server; this may require additional software licenses and/or computers
- Consult the manual of the FDT tool and asset management software package on how to trend parameters.

10 CLOSING THE DTM

Closing the DTM may take some time. The DTM will close as soon as all pending communications between DTM and F809F module are completed.

11 PARAMETER REFERENCE IN ALPHABETICAL ORDER

Parameter	Node	See section(s) / Description
Alarm Acknowledge required	System, Segment	If indicated, new alarms require acknowledgement. See also: “Set Alarms to Latch” and “Latching Alarm Acknowledge”.
Alarm Limits Optimization	System, Segment	5.4.3, 6.4.3
Auto	System, Segment	Possible option for block mode: Automatic
Average high frequency noise	System, Segment	6.2.2, 6.3
Average in-band frequency noise	System, Segment	6.2.2, 6.3
Average low frequency noise	System, Segment	6.2.2, 6.3
Block Mode Actual	System, Segment	Mode the block is actually operating in
Block Mode Normal	System, Segment	Mode the block normally is supposed to operate in
Block Mode Permitted	System, Segment	Mode the block is permitted to operate in
Block Mode Target	System, Segment	Mode the block is requested to operate in
Delete history data	System	5.4.3
Device address	Device	7.2
Device not live	Device	7.3
Device removed	Device	7.3
Device tag	Device	7.2, 7.4.2
LAS address	Segment	6.2.2
LAS signal level	Segment	6.2.2
LAS tag	Segment	6.2.2
Latching Alarm Acknowledge	System, Segment	5.2, 5.4.2, 6.2.2
Lowest signal level	Segment	6.2.2
Lowest signal level address	Segment	6.2.2
Lowest signal level tag	Segment	6.2.2
Man	System, Segment	Possible option for block mode: Manual
Module Temperature	System	5.2
Monitoring status	Segment	6.2.2. See also “Set monitored segments”
New device	Device	7.3
Number of devices on live list	Segment	6.2.2, 6.3
OOS	System, Segment	Possible option for block mode: Out of service
Peak high frequency noise	Segment	6.2.2, 6.3
Peak in-band frequency noise	7.2.2	6.2.2
Peak low frequency noise	Segment	6.2.2, 6.3
Power feed A voltage	System	5.2, 5.4.2
Power feed B voltage	System	5.2, 5.4.2
Reset Measurement Processor	System	5.4.2
Reset retransmit counters	System	5.4.3
Reset Retransmissions Count	Segment, Device	6.4.3, 7.4.3
Retransmission rate	Device	7.2, 7.3
Retransmission rate on segment	Segment	6.2.2
Retransmissions	Device	7.2, 7.3
Segment Tag	Segment	6.2.2
Segment voltage	Segment	6.2.2
Set alarms to latch	System	5.2, 5.4.2. See also: “Latching Alarm Acknowledge”
Set date time	System	5.4.3
Set monitored segments	System	5.4.2
Set Non-scanning Segment Values to Null	System	5.4.2. See also: “Set monitored segments”
Signal level	Device	7.2, 7.3
Total retransmissions on segment	Segment	6.2.2

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