



Vehicle Telematics

Training Manual

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Section 1. Overview



Note: The Telematics module requires integration with an additional program that will collect the fault code data. Please contact your Project Manager or M5 Customer Support for more information.

Modern Vehicles are controlled by computers that use sensors located throughout the engine, transmission and other major assemblies to constantly monitor the component. A vehicle's Electronic Control Unit (ECU) is the main computer on the vehicle and stores operating data and faults generated by the many sensors it connects to. The operating parameter data, diagnostic trouble codes (DTC), GPS location information and other electronic vehicle data is collectively referred to as telemetry or telematics.

Several different tools and communication methods are available that allow vehicle operators to access the data being stored in the ECU and use that information to monitor vehicle performance and manage its maintenance. Among the many ways that ECU data can be accessed are GPS-based vehicle locating systems that transmit ECU data along with the location of the vehicle, engine diagnostic tools that connect directly to the ECU and download data and in-cab solutions that alert drivers to vehicle parameters and trouble codes.

Depending on the age of your fleet vehicles you may have a variety of ECU types with different standards. The M5 Vehicle Telemetry Module is intended to provide a single method for capturing ECU parameter values and DTCs, processing this information into intelligent Work Requests and viewing historical telematics data for individual vehicles or groups of vehicles.

Each different vendor application uses a UIA adapter to load the ECU information into M5. Regardless of the application and adapter used the M5 Telemetry Module can process and store the information. This allows Fleet Managers to consolidate the collection of their telematics data and allows AssetWorks to support only a single module and the individual adapters.

Section 2. Technical Support

AssetWorks provides several ways to connect with the Customer Care team. Be prepared to provide detailed information to the representative. If you are reporting an issue by email, include screen images of the problem. This information provides the Customer Care representative with the necessary information to quickly and effectively respond to you.

Customer Care is available 7AM – 7PM EST Monday through Friday.

Telephone: 800.900.8152

Email: M5Support@AssetWorks.com

Website: Community.AssetWorks.com

You can use this website to open issues, review the status of past submitted issues, review and download documentation, review additional training materials, and access the latest AssetWorks news. For secure access to the website, contact Customer Care by calling the listed telephone number.

Section 3. FleetFocus M5 Functionality

FleetFocus M5 employs a service that captures general telematics data. The Service can be a web service or make use of standard queuing software to accept the data.

As part of this functionality, M5 captures and stores parameter data, readings and fault codes from the ECM into system tables. The data is stored in the TM_MESSAGES table. It can then be evaluated and used with custom reports and dashboards. The readings are stored in the TM_READINGS table. The fault codes are stored in the TM_ALERTS table.

Despite the variety of tools and methods available to read the ECU, the industry has developed standards for communicating with the ECU and standard structures for reporting the parameters and diagnostic trouble codes. The Society of Automotive Engineers has published standards that vehicle manufacturers were to adopt in programming their ECU's. Depending on the type of engine and the age of the vehicle, most vehicles built in the last 20 years use:

- J1708 - An early SAE serial communication protocol found in older truck and buses.
- J1939 - A newer SAE controller area network (CAN) protocol widely adopted by many diesel engine manufacturers.
- J1979 (OBD-II) - The protocol used by light-duty gasoline-powered vehicles.

Telematic Fault Preferred Job

SAVE
UNDO
REFRESH
DELETE
FIND

Telematic Fault Preferred Job

Selection Criteria

Protocol: Element Type:

Subsystem:

Element:

Sort by:

Unit Fault Job List (Loaded 0 records)

| Sub System | Element | Description | Prefered Job | No Action | No Fault | <input type="checkbox"/> |
|-------------|---------|-------------|--------------|-----------|----------|--------------------------|
| (0 records) | | | | | | |

The Telematic Fault Preferred Job frame displays a list of the unit fault codes for a particular protocol. It allows a user to enter a preferred job for a particular fault code or a default job. The default job reason can be set for all fault codes by setting the following system flags:

- System Flag 5206 - Default job code for inspecting ECM faults.
- System Flag 5207- Default job reason for inspecting ECM faults.

The user can choose to select **No Action** when a fault code is recorded or to record as No Fault. The **No Fault** setting is common for fault codes that are informational only where no action is required. M5 uses the following sequence to search for the preferred job to apply to the fault:

- Tech Spec Main
- Category Main
- Fault Preferred Job Frame
- System Flags

Telematic Fault Query

The screenshot shows the 'Telematic Fault Query' interface. At the top, there are buttons for 'SAVE', 'UNDO', 'REFRESH', 'DELETE', and 'FIND'. Below these are 'Selection Criteria' fields for Unit, Protocol, Subsystem, Element, and Fault Status (set to 'Active'). There are also 'Fault Read Status' checkboxes for Read, Unread, Cleared, UnCleared, All Actionable, and No Action. 'Fault Dates' are specified with 'From Date' and 'To Date' fields. A 'Work Order/Work Request' section includes 'Work Order' and 'Work Request' fields with 'Clear' and 'Retrieve' buttons.

Below the form is a table titled 'Unit Fault List (Loaded 2 records)'. The table has the following columns: Unit No, Protocol, Initial Fault Date, Fault Date, Sub System, Element Link, Read Status, FMI, Description, Fault Status, Insight ID, Insight Priority, Occurrence Order, Job Code, Work Request, Meter Readings, and Detail.

| Unit No | Protocol | Initial Fault Date | Fault Date | Sub System | Element Link | Read Status | FMI | Description | Fault Status | Insight ID | Insight Priority | Occurrence Order | Job Code | Work Request | Meter Readings | Detail |
|---------|----------|----------------------|----------------------|------------|--------------|-------------|-----|-----------------------------|--------------|------------|------------------|------------------|-----------|--------------|----------------|--------|
| 45195 | J1939 | 16-Feb-2023 15:00:48 | 16-Feb-2023 15:00:48 | 6988 | 6218 | R | 6 | Tire Pressure (Extended Ran | Active | | | | 01-01-001 | 15866520 | 2 3787 | Detail |
| 45195 | J1939 | 16-Feb-2023 15:00:48 | 16-Feb-2023 15:00:48 | 6918 | 6218 | R | 7 | SCR System Cleaning Inhibit | Active | | | | 01-01-001 | 15866520 | 2 3787 | Detail |

The Telematic Fault Query frame allows a user to query the fault codes for a unit or protocol in a variety of methods such as *Fault Read Status* codes, *Fault Dates* range, or by a *Work Order* or **Work Request**. The **Retrieve** button displays the records that meet the selection criteria in the *Unit Fault List* i-frame. To create a new query, select the **Clear** button.

Unit Fault List i-frame

The *Unit Fault List* i-frame displays the records that meet your selection criteria.

The *Fault Date* column displays the Alert Date.

The *Insight ID* link opens the Insight Notes window that displays Insight Cause and Insight Complaint fields. The Note Text and Change Information also displays.



Note: No Cause Notes Provided or No Complaint Notes Provided display when the Insight does not have Cause or Complaint notes.

The Insight Priority field indicates the Insight Priority:

- Critical – Red
- Major - Orange
- Minor – Yellow

If the **Detail** button is selected, the most current fault Latitude, Longitude, Last Date, Last Meter, and Source displays. The fault may be reported more than once. A record is not created for each fault, the Initial Fault Date is displayed, and the fault information is updated in the Detail Column.

| Unit No | Protocol | Initial Fault Date | Fault Date | Sub System | Element Link | Read Status | FMI | Description | Fault Status | Insight ID | Insight Priority | Occurrence Order | Work Job Code | Work Request | Meter Readings | Detail |
|---------|----------|----------------------|----------------------|------------|--------------|-------------|-----|------------------------------------|--------------|------------|------------------|------------------|---------------|--------------|----------------|---|
| 45195 | J1939 | 16-Feb-2023 15:00:48 | 16-Feb-2023 15:00:48 | 6588 | 6028 | R | 6 | Tire Pressure (Extended Ran Active | | | | | 61-01-001 | 15866220 | 1 | Latitude: Longitude: Last Date: Last Meter: Last Meter2: Source: SI Close |

Workflow Processing

After Fault code data is captured the record can be used to initiate Work Flow Processing by creating Work Requests and completing them on Work Orders.

Work Requests

From the Telematics Fault Query frame, the user can use the Link WR button to link an existing work request to a fault code or create a new work request for the fault code. After the link is made, the Status is now R - Read.

To create a new work request for the fault, complete the steps.

1. Select the **New Ticket** button. Enter the **Job Code**, **Job Reason**, and **Employee/Group** (optional).
2. Select the x on the right corner of the frame to return to the Telematics Fault Query.

SAVE UNDO REFRESH DELETE FIND

Link Work Request To A Fault

Work Request

Unit No:
DHRM162

Work Request:
New Ticket

Occurrence:
1

Job Code:
01-02-001 REPAIR RADIATOR GRILLE

Job Reason:
G EXT DATA JOB REASON

Employee/Group:

Apply to All:

SAVE UNDO REFRESH DELETE FIND

Active ▾

Fault Read Status :

Read
 Unread
 Cleared
 UnCleared
 All Actionable
 No Action

Fault Dates

From Date: 03/21/2019 00:00:00 To Date: 02/18/2021 00:00:00

Work Order/Work Request

Work Order: Work Request: Clear Retrieve

| Unit Fault List (Loaded 6 records) | | | | | | | | | | | |
|------------------------------------|----------|---------------------|------------|--------------|-------------|-----|-----------------------------|--------------|------------------|-----------|----------------------|
| Unit No | Protocol | Initial Fault Date | Sub System | Element Link | Read Status | FMI | Description | Fault Status | Occurrence Order | Job Code | Work Request |
| DH1103 | OBdII | 10/17/2019 19:53:29 | 1 | P0884 | C | | TCM Power Input Signal Inte | Active | | | Link WR |
| DHRM161 | OBdII | 12/17/2019 05:56:47 | | P04DB-00 | | | | Active | | | Link WR |
| DHRM161 | OBdII | 12/17/2019 05:56:47 | | P20BA-00 | R | | | Active | 533118445 | 05-04-002 | <input type="text"/> |
| DHRM162 | OBdII | 12/16/2019 14:56:59 | | P04DB-00 | R | | | Active | | 01-02-001 | Link WR |

3. Select the **SAVE** button to see the work request number created.

SAVE UNDO REFRESH DELETE FIND

Active ▾

Fault Read Status :

Read
 Unread
 Cleared
 UnCleared
 All Actionable
 No Action

Fault Dates

From Date: 03/21/2019 00:00:00 To Date: 02/18/2021 00:00:00

Work Order/Work Request

Work Order: Work Request: Clear Retrieve

| Unit Fault List (Loaded 6 records) | | | | | | | | | | | | |
|------------------------------------|----------|---------------------|------------|--------------|-------------|-----|-----------------------------|--------------|------------------|-----------|----------------------|-------------------|
| Unit No | Protocol | Initial Fault Date | Sub System | Element Link | Read Status | FMI | Description | Fault Status | Occurrence Order | Job Code | Work Request | Meter Readings |
| DH1103 | OBdII | 10/17/2019 19:53:29 | 1 | P0884 | C | | TCM Power Input Signal Inte | Active | | | Link WR | 1 101 2 |
| DHRM161 | OBdII | 12/17/2019 05:56:47 | | P04DB-00 | | | | Active | | | Link WR | 1 96523 2 5401 |
| DHRM161 | OBdII | 12/17/2019 05:56:47 | | P20BA-00 | R | | | Active | 533118445 | 05-04-002 | <input type="text"/> | 1 96523 2 5401 |
| DHRM162 | OBdII | 12/16/2019 14:56:59 | | P04DB-00 | R | | | Active | | 01-02-001 | 8522166 | 1 36451 2 2649 |

To link the fault to an existing work request, complete the steps.

1. Select the **Link WR** button.
2. Use Work Request LOV to select an existing, available work request.
3. Select the x on the right corner of the frame to return to the Telematics Fault Query.

You can navigate to Work Request Main by double-clicking the work request number.

Work Request Main

SAVE UNDO REFRESH DELETE FIND ATTACH RELATED

Work Request

Vehicle: DHRM162 2016 CIVIC EX Max WG: 0

Serial#/VIN: 1FT1X3K14EEB02283

Number: 8522166 Occurrence: 1 Create Date: 12/15/2021

Job Code: 9142-001 REPAIR RADIATOR GRILLE Campaign No:

Job Reason: EXT DATA JOB REASON Tester:

Schedule Shift: Work Order:

General Summary Parts Incidents Estimates

Contact and Reference Information

Reported By: Requisition/Reference:

Phone: Maintenance Location: DH2 Doug 2

WR Source: Manual Employee/Group:

Incident: Alternate Unit No:

Accident No: Quote No:

Dates

Earliest: Due: Latest:

Notification

Date:

View Fault Codes

The **View Fault Codes** hyperlink displays as red and the fault codes are described in the note area.

General Summary Parts Incidents Estimates

Contact and Reference Information

Reported By: Requisition/Reference:

Phone: Maintenance Location: DH2 Doug 2

WR Source: Manual Employee/Group:

Incident: Alternate Unit No:

Accident No: Quote No:

Send to Vendor: No Vendor No:

Preserve estimates?: No Status: Locked

Direct Acct No:

Close-Out:

View Fault Codes

Dates

Earliest: Due: Latest:

Notification

Date:

Additional Information

Source: Symptom:

Notes

Fault codes: P04DB-00 -

Work Order Processing

When the work order is opened, if there is a work request for the fault job it can be selected. If the user hovers over the work request, a note will appear describing the fault. If the unit has a fault, the **Clear Fault Codes** hyperlink appears on the work order when it is opened.

Link/Clear Telematic Fault Codes

If the **Clear Fault Codes** hyperlink is selected, the Link/Clear Telematic Fault Codes frame opens.

The *Insight ID* link opens the *Insight Notes* window that displays **Insight Cause and Insight Complaint** fields. The Note Text and Change Information also displays.



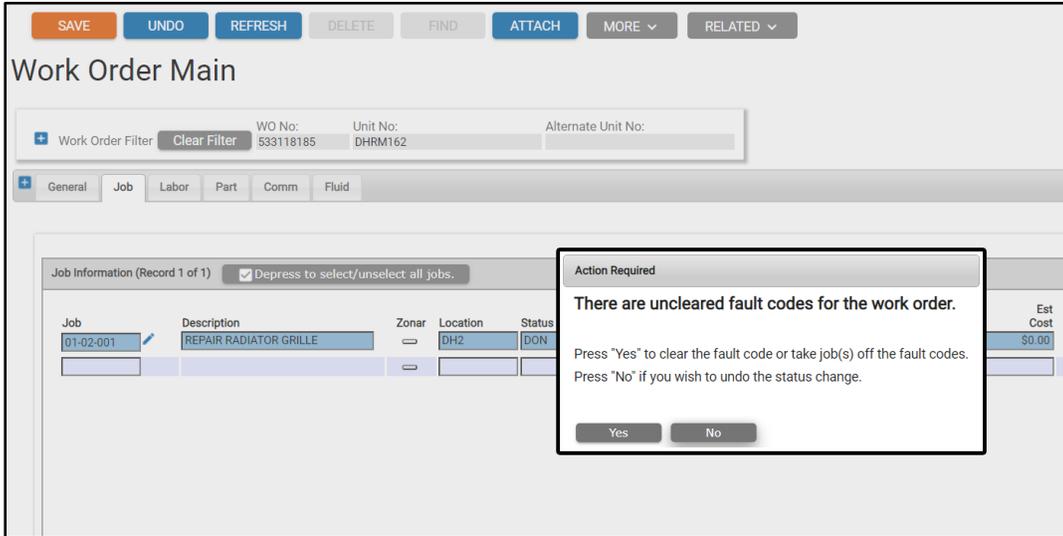
Note: No Cause Notes Provided or No Complaint Notes Provided display when the Insight does not have Cause or Complaint notes.

The **Insight Priority** field indicates the Insight Priority:

- Critical – Red
- Major – Orange
- Minor – Yellow

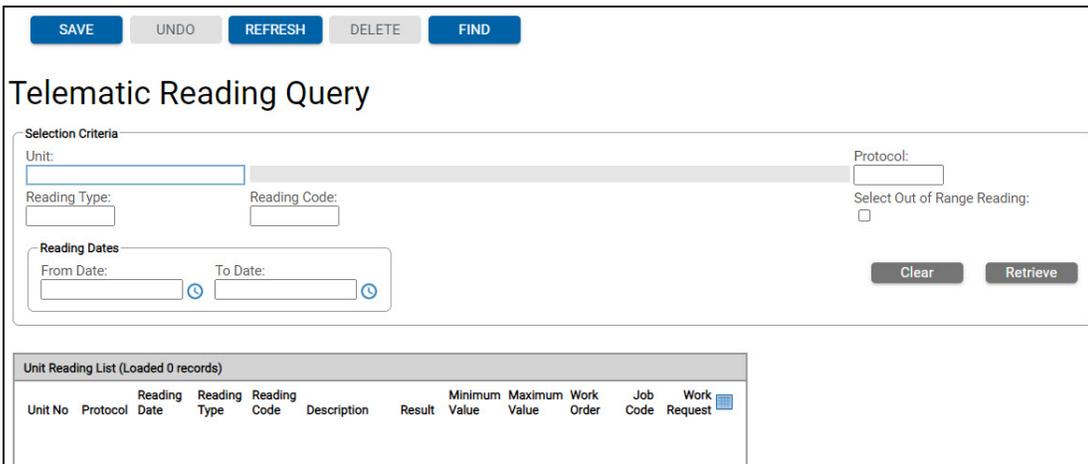
The job code is entered for the fault that was cleared and the **Read Status** is updated to **Cleared**.

If the faults are not cleared, when the job status is changed to DON, the following message displays.



Telematic Reading Query

The Telematic Reading Query frame allows a user to query reading codes for a unit or protocol.



This frame can display any readings that are outside the expected range. In order to validate the results of the ECU parameters, the Test Suites functionality is used to establish the parameter codes and its minimum and maximum values if required.



Note: There will be no actual Test Suite result created.

Test Suite Maintenance

A Test Suite is created for the type of vehicle parameter data to be tracked. Entries are made on the Test Suite to represent the parameter codes that will be sent to M5 from the telematics service provider. On the Test Suites these are referred to as labels. Based on the user's requirements, each label (parameter) will be defined with minimum and maximum values and any corrective jobs if required.

See the *Test Suites Quick Reference Guide* for details on configuring this frame.

SAVE
UNDO
REFRESH
DELETE
FIND
RELATED ▾

Test Suite Maintenance

Test Suite Information

Test Suite Name: Enabled: Yes ▾

Next to Perform:

Linked Test Suite ID:

If any test item fails, Corrective Job data is as follows, unless overridden.

Code:

Reason:

Priority:

Allow user to override JobCode: SmartApps Checklist: Enforce Signature: Available on Direct Test Suite Entry: Show on Vehicle Safety Query: Add WR To Current Work Order:

Test
Subsections
User Instructions

Tests (Loaded 0 records)

| Entry Change | Seq | Order | Entry Label | ID Number | Entry Description | Group Header | Subsection | Entry Datatype | Table | Column | Minimum Value | Maximum Value | In-Range | Allow Value | Override | Corrective Job | Corrective Job Code | Corrective Job Reason | Corrective Job Priority | Info Only | Spawn Job | Fault Code | Def Fault Code | Cannot Be Driven | Attach Req | Disable | |
|--------------------|-----|-------|-------------|-----------|-------------------|--------------|------------|----------------|-------|--------|---------------|---------------|----------|-------------|----------|----------------|---------------------|-----------------------|-------------------------|-----------|-----------|------------|----------------|------------------|------------|---------|--|
| (Empty table body) | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Tech Spec Main

The Test Suite is associated with the technical specification by entering the *Test Suite* name in the **Default Test Suite** field.

The screenshot shows the 'Tech Spec Main' form with the following sections and fields:

- Technical Specification:** Number, Description, Disabled (No)
- Navigation:** Detail, Products, Exceptions, Unit/Comp, Assoc Tech Spec, Telematic Elements, Document Types, Zones2
- Year / Manufacturer / Make / Model:** Input fields and a 'Choose File' button.
- Trim & Reference:** Trim, Reference
- License Class Code:** License Class Code, License Class Code Description
- Category:** Category Number, Expected Life (Year(s)), Salvage %, Expected Usage, Replacement %, Gross Vehicle Weight, Off-Road Use%
- Test Suite Information:** Default Test Suite (highlighted in red)

Workflow Processing

When parameter data is sent, M5 will compare the parameter result data sent to the unit's tech spec Default Test Suite. Based on the configuration of the Test Suite, M5 will take the action required such as create a work request.

Work Request

When the work request is generated, the reading code is written to the note area.

Work Order Processing

When the work order is opened, if there is a work request for the out-of-range reading job it can be selected. If the user hovers over the work request, the note will appear describing the reading message.

| Work Request List (Loaded 61 Records) | | | | | | | | | | | |
|---------------------------------------|-----------|-------------------------------------|---------|---|--|------------|-------|---|---|---------|----------|
| <input type="checkbox"/> | 01-15-007 | REPAIR CONTROL VALVE - TIE ROD TYPE | | 1 | | 07/30/2019 | FM | 9 | 0 | \$0.00 | Locked |
| <input type="checkbox"/> | 01-15-011 | REPAIR PITMAN ARM | | | | 06/11/2019 | NORMM | 9 | 0 | \$0.00 | Unlocked |
| <input type="checkbox"/> | 01-17-004 | REPAIR TUBE - INT | 1:07 PM | | | 08/03/2019 | NORMM | 5 | 0 | \$0.00 | Unlocked |
| <input checked="" type="checkbox"/> | 01-77-002 | REPAIR VERTICAL HOLES | | P | | 10/06/2020 | FM | 9 | 1 | \$10.00 | Unlocked |

Out of Range Condition

To select the results for an out of range condition, use the Telematic Reading Query frame. Select **Out of Range Reading** checkbox and then select **Retrieve**.

Notification Processing

In addition, the READING OUT OF RANGE notification event can be enabled. This sends an email notification to email address on the location main record for the maintenance location of the unit.

Reporting Fault Data

While there are no Standard Reports available for telematics data analysis, custom reports can be produced using Ad-hoc Reporting and Crystal Reports. Custom Dashboards can also be developed to support business requirements.

Section 4. Updates

The following updates apply to the *Vehicle Telematics Training Manual*.

| Release | Section | Description |
|---------|--|--|
| 25.0 | All sections | Applied miscellaneous writing style updates throughout the document. |
| 24.0 | Test Suite Maintenance | Updated the reference file title name. |
| 24.0 | Telematic Fault Query | Added Fault Date column. |
| 23.2 | Telematic Fault Query | Added Insight ID and Insight Priority fields. |
| 23.2 | Link/Clear Telematic Fault Codes | Added Insight ID and Insight Priority fields. |