

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division

Washington, D.C. 20594

December 13, 2021

Engine Data Monitor (EDM)

Specialist's Factual Report

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1. EVENT SUMMARY

Location: Galt, Missouri
Date: February 8, 2021
Aircraft: Cessna 177RG
Registration: N8080G
Operator: Private
NTSB Number: CEN21FA125

2. GROUP

A group was not convened.

3. DETAILS OF INVESTIGATION

On February 16, 2021, the National Transportation Safety Board (NTSB) Vehicle Recorder Division received the following engine data monitor device:

Device Manufacturer/Model: J.P. Instruments EDM-700
Serial Number: 17970

3.1. Device Description

The J. P. Instruments EDM-700 is a panel mounted gauge that monitors and records up to 24 parameters related to twin engine operations. Depending on the installation engine parameters monitored can include Exhaust Gas Temperature (EGT), Cylinder Head Temperature (CHT), Oil Pressure and Temperature, Manifold Pressure, Outside Air Temperature, Turbine Inlet Temperature, Engine Revolutions per Minute, Compressor Discharge Temperature, Fuel Flow, Carburetor Temperature, and Battery Voltage.

The unit can also calculate, in real-time, horsepower, fuel used, shock cooling rate, and EGT differentials between the highest and lowest cylinder temperatures. These calculations are also dependent upon the aircraft installation.

The unit contains non-volatile memory¹ for data storage of the recorded and calculated parameters. The rate at which the data is stored is selectable by the operator from 2 to 500 seconds per sample. The memory can store up to 20 hours of data at a 6 second-per-sample rate. The data can be downloaded using software from J.P. Instruments.

3.2. Data Recovery

Upon arrival at the Vehicle Recorder Division, an exterior examination revealed the unit had sustained severe impact damage, as shown in Figure 1. The non-volatile memory chips were removed, read out and converted into engineering units using laboratory tools.



3.3. Data Description

The data extracted included two flights recorded on February 8, 2021 (the accident date). The first flight was recorded from 17:18:02 to 18:50:20, and the second one was recorded from 20:45:50 on February 8 to 00:33:08 on February 9. The second flight was determined to be related to the event. The values of some of the parameters became abnormal beyond 21:22:44 for the accident flight recording, so only recording from 20:45:50 to 21:22:44 for the accident flight were considered valid. Both the validated portion of the

¹ Non-volatile memory (NVM) is semiconductor memory that does not require external power for data retention.

accident flight recording and the previous flight recording are included in this report. The data were recorded at a 6 second-per-sample rate.

3.4. Data Time Correlation

The device time is set and adjusted by the operator. Since the device could not power on, the time offset between the device time and local time could not be determined. Therefore, the timestamps were not converted to the local time and all times are expressed as device time.

3.5. Parameters Provided

Table 1: JPI EDM 700 Data Parameters.

Parameter Name	Parameter Description
Date	Date for recorded data point (MM/DD/YYYY)
Time	Device time for recorded data point (HH:MM:SS)
CHT 1-4 (degF)	Cylinder Head Temperature Cylinder # (degrees Fahrenheit)
EGT 1-4 (degF)	Exhaust Gas Temperature Cylinder # (degrees Fahrenheit)
CLD (degF/MIN)	Shock Cooling Rate (degrees Fahrenheit per minute)
OILT (degF)	Oil Temperature (degrees Fahrenheit)
OAT (degF)	Outside Air Temperature (degrees Fahrenheit)
FF (GPH)	Fuel Flow Rate (gallons per hour)
Fuel Used (gal)	Fuel Used (gallons)
BAT (V)	Bus Battery Voltage (voltage)

3.6. Overlay and Tabular Data

Figure 2 is a plot of parameters from the JPI device for the entire accident flight. The time interval displayed is 20:45:00 to 21:25:00 device time on February 8, 2021. The last validated point was recorded at 21:22:38.

Figure 3 is a plot of parameters from the JPI device for approximately the last five minutes of the accident flight. The time interval displayed is 21:18:00 to 21:23:00 device time on February 8, 2021.

Figure 4 is a plot of parameters from the JPI device for the flight prior to the accident flight. The time interval displayed is 17:15:00 to 18:55:00 device time on February 8, 2021.

The data recorded by the JPI EDM 700 device used to generate Figures 2 and 3 are included in tabular form as Attachment 1, and the recorded data used to generate Figure 4 are included as Attachment 2 to this report. These attachments are provided in electronic comma-delimited (.csv) format.

Location, Date: Galt, Missouri, 02/08/21

NTSB No. CEN21FA125





