



RP 802F

TMC/ATA VEHICLE MAINTENANCE REPORTING STANDARDS

PREFACE

The following Recommended Practice is subject to the Disclaimer at the front of TMC's *Recommended Engineering Practices Manual*. Users are urged to read the Disclaimer before considering adoption of any portion of this Recommended Practice.

PURPOSE

The purpose of this Recommended Practice (RP) is to offer a general overview of the TMC/ATA VMRS standard, its advantages to equipment users, manufacturers and suppliers, and guidance on the basic requirements for implementing VMRS. The objective of VMRS is to provide the vital communication link between maintenance personnel, computers, and management. It establishes a "universal" language for fleets, OEMs, industry suppliers, computers, and those people whose responsibility it is to specify, purchase, operate, and maintain equipment.

BACKGROUND

Since 1970, the purpose of VMRS has been to provide a vital communication link between maintenance personnel, computers, and management. It establishes a "universal" language for fleets, original equipment manufacturers' (OEMs), industry suppli-

ers, computers, and those people whose responsibility it is to specify, purchase, operate, and maintain equipment.

Developed by and for equipment users under the auspices of the American Trucking Associations, VMRS provides the discipline necessary for different industry segments to communicate with each other. VMRS is the shorthand of maintenance reporting, eliminating the need for extensive written communications with all the inherent problems of miscommunication normally associated with the written word.

To meet the ever-changing needs of the equipment industry, the Technology & Maintenance Council (TMC) of American Trucking Associations serves as the official custodian of VMRS. TMC provides OEMs, manufacturers, part suppliers, and equipment users with updated codes on an "as needed" basis reflective of current equipment design and the informational needs of the VMRS user. In 1998, TMC rebranded VMRS™ to VMRS 2000™. The VMRS 2000™ designation began being phased out in 2016 and is returning to simply VMRS™.

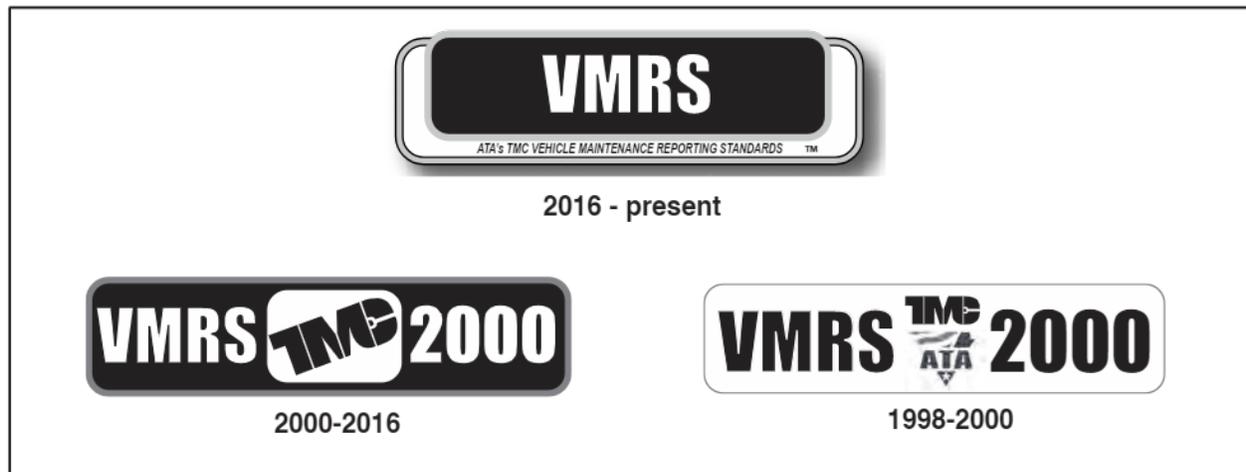


Figure 1: Examples of Authorized VMRS Logos (1998 - present)

WHAT IS VMRS?

The latest version of the VMRS coding convention represents a significant step forward in the evolution of VMRS. Based on user requests, TMC has:

- Increased the capacity of Code Key 33 to track vehicle systems by adding a ninth digit to the basic eight-digit code. VMRS can now accommodate growth for up to 1000 distinct vehicle systems, a 900 percent increase from the original 100.
- Reviewed Code Key 33 for inconsistencies in coding, language, descriptions, etc., to ensure consistent use of the coding convention industry-wide.
- Expanded Code Keys 1, 2, 10 and 48, which describe equipment categories, activities, and types. These codes now accommodate many industries beyond trucking, such as transit, off-highway and construction industries.
- Added Position Codes to VMRS. Code Key 79 allows VMRS users to identify position based on industry-accepted conventions.
- Improved the *VMRS Implementation Handbook*, by upgrading text and graphics, and making available a wholly electronic version of VMRS, for easy implementation into existing computer systems.

A Structured Coding System

VMRS is a structured coding system, providing the discipline necessary to operate in today's computer-based information age or — where desired — as a completely manual system. Simple in concept, VMRS can be used at any level, from total operating systems down to the individual part level. The level of coding used is entirely up to the user. One can modify the coding level at any time without the need to redesign the coding structure or implement costly new programs. No matter which level the user selects, the data collected can be compared directly to data collected by others at the same or higher VMRS coding level.

The coding structure encompasses most equipment found within today's transportation activities including trucks, tractors, trailers, forklifts, shop equipment, off-road vehicles, utility vehicles, etc.

Recognized Internationally

Today, equipment users worldwide use VMRS to capture and report their vehicle maintenance activities. Equipment manufacturers and maintenance software suppliers use VMRS coding for parts, thus

providing additional impetus for fleets to adopt this universal coding scheme.

A complete service industry has grown up around VMRS, with a number of firms offering VMRS computerized reporting systems and/or services to fleets. If your software provider doesn't use VMRS coding, this manual will help you help them implement it for your mutual benefit.

Update Advantages #10

15 Distinct Advantages to VMRS

There are 15 distinct advantages to using VMRS:

1. VMRS is Easy to Use—VMRS was designed for use at the shop level. Accurate and easily understood reporting by the mechanic is essential if any information system is to succeed. At the higher level, management must understand what the mechanic has accomplished. VMRS meets both criteria.
2. VMRS is Cost Effective—TMC has undertaken the initial cost normally associated with developing such a system. The practicality of the system has been proven, in that VMRS has been in continuous use since 1970. TMC keeps the system dynamic, thus eliminating the need for individual users to continually research and update their system.
3. Follows Accepted Accounting Practices—The structured VMRS code allows the user to comply with the needs of most recognized accounting disciplines. VMRS allows accounting personnel the flexibility to massage the data to meet both their immediate and long-term needs.
4. VMRS Enables Sound Budgeting—VMRS provides a sound basis for budget preparation and forecasting based on fleet mix, projected utilization, and historic performance. Requests for additional mechanics, increased parts inventory, special equipment, or expanded facilities can readily be supported by data captured using VMRS. VMRS is invaluable in determining how many vehicles are required to support a given workload. The same data can be used to determine the mechanic/parts mix required to support various equipment mixes and utilization criteria.
5. VMRS Helps Control Costs—VMRS provides detailed records of the maintenance activity comprising both vehicles and facilities. It identifies where monies were spent, at which point in a vehicle's life repairs were performed, and details the expenses incurred in the sup-

porting activity. Distribution between parts and labor is an inherent part of the VMRS reporting structure, thus allowing analysis of what occurred and when. This is important in determining the cause-and-effect relationship of maintenance.

6. VMRS Improves Facility Management — VMRS provides the ideal basis for establishing a facility management program. The coding structure provides the basis for complete labor and material distribution, direct and indirect, thus allowing management the opportunity to analyze in detail each cost segment. With this information, management can take whatever action is deemed appropriate to correct those situations which appear out of line. This information provides the necessary input for most purchasing decisions.
7. VMRS Tracks Labor Distribution—VMRS provides complete labor distribution covering both direct and indirect labor.
8. VMRS Helps Control Parts Inventory — VMRS was developed, and is used within the industry, as the basis of many successful parts inventory control systems. Some fleets have developed their own systems using VMRS, while others utilize off-the-shelf programs designed and built around the VMRS coding structure. VMRS provides complete details as to parts use, thus identifying which part should be inventoried and which should be procured on an “as required” basis. For those states having an Inventory Tax, VMRS provides documented back-up.
9. VMRS Supports Warranty Claims—The VMRS coding structure incorporates the capability to record and isolate those costs normally associated with warranty. Being a universal language, accepted and endorsed by vehicle manufacturers and industry suppliers, VMRS provides the ideal audit trail for instituting and supporting warranty claims. New Code Keys have been developed exclusively for warranty, too.



VMRS Improves Preventive Maintenance Programs—VMRS provides the ideal basis for determining the effectiveness of the PM program. Are PMs being performed too often or not often enough? Should PM intervals or their scopes be modified based on specific failures reported through maintenance reporting? What staffing is required to perform PMs? VMRS provides the answers.

11. VMRS Helps Benchmark Equipment and Labor Productivity—The standards provide data necessary for measuring labor productivity. The relationship between direct and indirect labor can be evaluated and changes implemented as needed. Parts/labor ratios can be established that provide the lowest overall maintenance costs. VMRS provides the basis for establishing the economic breakpoint between parts replacement and parts repair. Vehicle utilization, an important ingredient in transportation, is impacted by maintenance. VMRS provides the means for recording downtime and identifying the specific reason for excessive delays.
12. VMRS Helps Benchmark Component Performance—VMRS provides the data for measuring performance and reliability of specific components and/or parts. A determination can be made of first failure (normally attributed to the equipment manufacturer) and subsequent failure (normally attributed to maintenance).
13. VMRS Assists in Equipment Replacement Decisions—VMRS can substantiate requests for new or replacement equipment based on current rather than historic information. Maintenance support requirements can be determined for each class of vehicle operated. This allows management to quickly determine whether it is more economical to replace or repair and what support is required in the way of labor and material for any combination of new and/or used equipment.
14. VMRS Satisfies Reporting Requirements—VMRS allows fleets to fulfill the ever-changing reporting requirements dictated by government agencies.
15. VMRS-Compatible Software is Widely Available—Many software suppliers currently offer complete turnkey VMRS-based maintenance programs. Many of these can provide custom-made reports to suit the specific needs of the user. Software is also available from a number of sources allowing in-house processing of VMRS.

What Are the Basic Requirements for Implementing VMRS?

All external reporting and data interchange must adhere to VMRS coding conventions as defined herein or further described in the *VMRS Implementation Handbook*.

Internal reporting may use other techniques; however, all external interchange of information must be converted to VMRS using direct correlations. No assumptions, prorations, or averages can be used in any conversions.

Basic implementation of VMRS requires use of nine key VMRS components. Unless each of nine items listed below can be checked “yes,” the user is not implementing VMRS correctly and will be unable to obtain credible or meaningful direct comparisons from any VMRS data base or other VMRS participant.

YES Does the System...?

- Use the VMRS Vehicle Master Record.
- Identify Specific Equipment Activity —Code Key 1.
- Segregate costs by Reason for Repair—Code Key 14
- Identify work accomplished using VMRS Coding—Code Key 15
- Identify systems via the three-digit VMRS System Code—Code Key 31
- Identify assemblies via the three-digit VMRS Assembly Code—Code Key 32
- Identify individual parts via the three-digit VMRS Component Code—Code Key 33.
- Identify Part Manufacturer or Suppliers universally using Code Key 34.
- Have the capability to record VMRS Part Failure Codes—Code Key 18

Let’s look at each of these nine VMRS components briefly to build an understanding of how VMRS works.

The Vehicle Master Record

What is a Vehicle? A vehicle is not just a year, make, and model of equipment, but rather a unique series of components assembled to perform a specific task. Under VMRS, each of these components can be followed and monitored on an independent basis or as a total vehicle. The sum of the costs of maintaining the components represents total vehicle maintenance cost.

VMRS uses a Vehicle Master Record (similar to a birth certificate) to record many of the items that appear on the manufacturer’s bill of materials. The Vehicle Master Record Form helps consolidate data from all manufacturers into a uniform format.

Equipment Activity Codes: Code Key 1

Each vehicle must be clearly identified as being assigned to a specific mission, identifiable within the VMRS coding system. To this end, VMRS employs the coding structure originally developed by the Interstate Commerce Commission (ICC) for use in its Uniform System of Accounts. However, TMC has expanded these codes to meet additional equipment user needs. Using Code Key 1, for example, allows linehaul costs to be identified and separated from pickup and delivery and/or other vehicle assignments.

Code Key 1 identifies the primary activity to which the unit has been assigned or “what the vehicle does.” The first digit of the code corresponds to the activities defined under the Interstate Commerce Commission’s Uniform System of Accounts. The second digit of the code provides a further subdivision to permit a more definitive identification of the activity to which the unit has been assigned. Additional codes are available through TMC for those equipment operations that do not fall into the following categories.

Code	Equipment Activity
10	Linehaul (non-refrigerated)
11	Combination Service (predominately linehaul, non-refrigerated)
12	Linehaul (refrigerated)
13	Combination Service (predominately linehaul, refrigerated)
20	Pickup and Delivery (non-refrigerated)
21	Combination Service (predominately pickup and delivery, non-refrigerated)
22	Pickup and Delivery (refrigerated)
23	Combination Service (predominately pickup and delivery, refrigerated)
30	Billing and Collecting
40	Platform
50	Terminal/Warehouse/Plant
60	Maintenance
70	Traffic and Sales
80	Insurance and Safety
90	General and Administration
A1	Airport / Airport Support /Ground Support Vehicles
B1	Construction
C1	Farm / Agriculture
D1	Fire Service
E1	Heavy Haul
F1	Logging
G1	Mining

Insert New Code Key Paragraph based on Key Number Assigned Below



H1	Oil Field
K1	Recreation
L1	Refuse / Recycle Vehicle
M1	Rescue / Crash Vehicle
N1	Utility
P1	Wrecker / Recovery Vehicle
Q1	Military Vehicle
S1	Earth Moving/Land Clearing
T1	Demolition

05	Routine Inspection
06	Lubrication
07	Pre-Delivery
08	PM
09	Rework
10	Road Call
11	Routine

Using Code Keys 2, 10 and 48 further identify a vehicle. Code Key 2, “Equipment Category” identifies what category of equipment a unit is. Code Keys 10 and 48 identify special body types for trailers, containers, and straight trucks. Used together as a composite code, these Code Keys generate a single code that describes what a vehicle is and what it does. For example: “1-10-185” identifies a truck (Code Key 2), used in pickup and delivery service (Code Key 1), with a special walk-in refrigerated van type body (Code Key 48).

Management Decision

Code	Item
21	Capital Improvement
22	Conversion
23	Modification
24	Special Study

Reason for Repair Codes: Code Key 14

Identifying what caused a vehicle to come in for repair is a fundamental prerequisite of VMRS. VMRS requires separation of monies spent in each of the three following categories:

Outside Influence

Code	Item
31	Accident, Non-Reported
32	Accident, Reported
33	Manufacturer’s Recall
34	Statutory Inspection
35	Statutory Modification
36	Theft
37	Vandalism
38	Warranty
39	Act of God

1. Maintenance—This represents all monies spent on a vehicle to keep it operational, and which would affect management’s decision—would they buy that vehicle or select that specific component again? Monies spent in this category directly influence the replacement decision.
2. Management Decision—This category identifies and isolates all monies spent which are neither the vehicle’s nor manufacturer’s fault and over which management has direct control. An example would be incorporating new logos into the decor of the vehicle.
3. Outside Influence—Those items, over which neither the manufacturer nor the user have direct control, are classified in this category.

Work Accomplished Codes: Code Key 15

Classifying the work performed by the mechanic is important. For example, there is considerable difference between inspecting, adjusting, or repairing brakes. The original VMRS Codes Committee determined, and rightfully so, that use of such terms as major and minor would not suffice, as these terms left too much interpretation to the user. As a result, a series of two-digit work accomplished codes were developed. Each code specifically identifies what work was accomplished by the mechanic at the time the work was performed. The codes are briefly summarized below:

Under VMRS, each of the major groupings listed previously is further subdivided into a series of specific “Reason for Repair” codes.

Maintenance

Code	Item
01	Breakdown
02	Consumption, Fuel
03	Consumption, Oil
04	Driver’s Report

Code Work Accomplished

01	Adjust
02	Clean
03	Exchange, New
04	Exchange, Rebuilt
05	Exchange, Used
06	Inspect
07	Lubricate
08	Overhaul
09	PM “A”
10	PM “B”
11	PM “C”
12	PM “D”

- 13 Other Maintenance or Repair
- 20 Towing
- 30 Work Incomplete
- 98 In-frame Overhaul (powerplant only)
- 99 Out-of-chassis Overhaul(powerplant only)

VMRS System Level Codes: Code Key 31

VMRS uses a series of three-digit descriptor codes that readily and consistently identify the specific systems involved. While these codes are the heart of the “common language” of VMRS and are a vital part of the VMRS concept, they are by themselves nothing more than coding conventions designed for use at all levels within the industry, from fleets to mechanics to manufacturers to suppliers of parts. For example, brakes are identified as a system by system code 013.

In order to take advantage of the 3rd digit of the SYSTEM level Code (Code Key 31), TMC defines the VMRS GROUP portion of the SYSTEM CODE as follows:

There are 10 groups within VMRS Code Key 31 (and CK 32, and CK 33 as well):

- X1X Under the new structure, the 2nd digit of the SYSTEM CODE, identifies the GROUP CODE. The 1st and 3rd digits vary to permit additional systems within a GROUP.
- 010 Under the old VERS 2000 structure, the 1st 2 digits identified the GROUP CODE.
- 10 Under the original VMRS structure, the first digit of the 2-digit SYSTEM CODE identified the GROUP CODE.

This change in convention preserves the traditional definition of GROUPS within systems and is consistently backward compatible with all previous versions of VMRS and VMRS 2000.

The codes in Code Key 31 are listed briefly as follows (Note: All descriptions refer to systems, although in some cases one could incorrectly interpret the description as a piece of equipment itself):

Code System

X0X Cab, Climate Control, Instrumentation, & Aerodynamic Devices Group

- 001 Air Conditioning, Heating & Ventilating System
- 002 Cab & Sheet Metal
- 003 Instruments, Gauges, Warning & Shut-down Devices, & Meters
- 004 Aerodynamic Devices

X1X Chassis Group

- 011 Axles - Non-Driven, Front
- 012 Axles - Non-Driven, Rear
- 013 Brakes
- 014 Frame
- 015 Steering
- 016 Suspension
- 017 Tires, Tubes, Liners & Valves
- 018 Wheels, Rims, Hubs & Bearings
- 019 Automatic/Manual Chassis Lubricator
- 111 Undercarriage
- 112 Stabilization

X2X Drivetrain Group

- 021 Axles - Driven, Front Steering
- 022 Axles - Driven, Rear
- 023 Clutch
- 024 Driveshafts
- 025 Transfer Case
- 026 Transmission - Main, Manual
- 027 Transmission - Main, Automatic
- 028 Auxiliary Transmission
- 029 Auxiliary Section - Main Transmission, Manual

X3X Electrical Group

- 031 Charging System
- 032 Cranking System
- 033 Ignition System
- 034 Lighting System

X4X Engine / Motor Systems Group

- 041 Air Intake System
- 042 Cooling System
- 043 Exhaust System
- 044 Fuel System
- 045 Power Plant
- 046 Electric Propulsion System
- 047 Filter Kits - Multi System (040 - 046)

X5X Accessories Group

- 051 General Accessories
- 052 Electrical Accessories
- 053 Expendable Items
- 054 Horns & Mountings & Reverse Signal Alarms
- 055 Cargo Handling, Restraints, & Lift Systems
- 056 Power Take Off
- 057 Spare Wheel Mounting
- 058 Winch
- 059 Vehicle Coupling System

X6X Special Applications Group

- 061 Terminal Equipment - Multi Applications

- 063 Satellite Communications System
- 065 Hydraulic Systems - Multifunction
- 066 Blades
- 067 Buckets
- 068 Booms
- 069 Rollers
- 161 Brooms
- 162 Spreaders
- 163 Chippers
- 164 Blowers
- 165 Vacuums
- 166 Trenchers
- 167 Tillers
- 168 Mowers
- 169 Rippers
- 261 Rakes
- 262 Breakers
- 263 Hammers
- 264 Grapples
- 265 Magnets
- 266 Forks
- 267 Drilling and Boring
- 268 Lifting and Pulling
- 361 Air Compressors

X7X Bodies & Vessels Group

- 071 Body
- 072 Rear Wall & Door

- 073 Shell - Tank Vessel, Inner
- 074 Jacket - Tank Vessel, Outer
- 075 Manholes
- 076 Rings & Bolsters
- 077 Trailer Frame & Support
- 078 Trim & Miscellaneous Hardware
- 079 Safety Devices
- 171 Mixers
- 172 Compaction Bodies
- 173 Tilt Bodies

X8X Heating & Refrigeration Group

- 081 Heating Unit
- 082 Mechanical Refrigeration Unit
- 083 Nitrogen Refrigeration Unit
- 084 Hold Over Plate Refrigeration

X9X Bulk Product Transfer Systems Group

- 091 Blowers, Conveyors & Vibrators
- 092 Compressor - Bulk Product Systems
- 093 Bulk Storage System
- 094 Lines, Tubes, Hoses & Fittings - Bulk Product Transfer Systems
- 095 Manifold
- 096 Power Shaft - Power Take-Off
- 097 Pump - Product Transfer
- 098 Valves & Controls - Bulk Product Transfer Systems

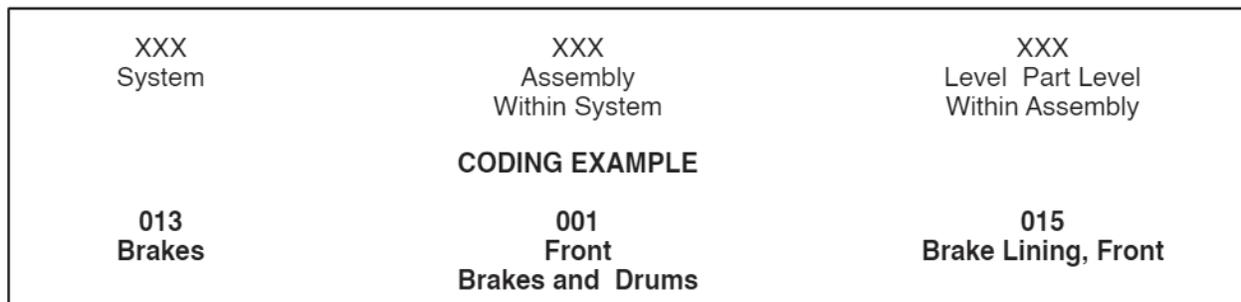


Fig. 2: Vehicle Maintenance Reporting Standards System/Assembly/Part Coding Structure

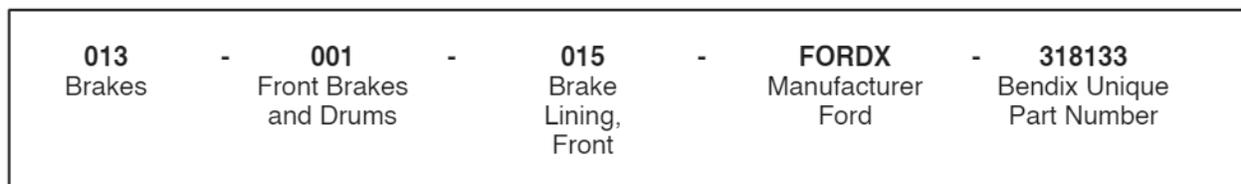


Fig. 3: Coding Example Showing VMRS System/Assembly/Part Code Used in Conjunction with Manufacturer's Code (Code Key 34) and Manufacturer's Unique Part Number.

- 099 Safety Devices, Instruments & Gauges
- 191 Batch Mobile Processing Plant
- 192 Conveying Systems

Assembly Level Codes: Code Key 32

Through the use of assembly level codes, VMRS provides additional capability to further define Code Key 31's System Codes. The first classification below the system level is referred to as the assembly. At this level, all major groupings within each system are broken out and reported through the use of a three digit code. These, when used with their system prefix, identify the specific assembly within a vehicle. For example, front brakes and drums can be identified by a combination of the System and Assembly Code 013-001.

A complete listing of Code Key 32 appears elsewhere in the *VMRS Implementation Handbook*.

Component Level Codes: Code Key 33

In order to provide a common generic term for each part within a vehicle, the system and assembly codes are further subdivided to the component level. This is accomplished through the use of an additional three digit part identifier code. These codes should not be confused with the manufacturers' or suppliers' unique identification (part) numbers, but rather should be considered universal identifiers or generic terms for the part. For example, a front brake lining can be identified by the following combination of System/Assembly/Component codes—013-001-015.

A complete listing of Code Key 33 appears elsewhere in the *VMRS Implementation Handbook*.

Manufacturer Identification: Code Key 34

In order not to disturb either the manufacturers' or suppliers' unique numbering system, VMRS uses its own generic means of identifying manufacturers and/or suppliers. Two identifiers are offered: a nine-digit numeric code based on the Dun and Bradstreet "DUNS Number," and a five-character alpha code, assigned by TMC.

Both are used as a prefix to the manufacturers' and/or suppliers' unique number. It is not the intent of VMRS to supplant the manufacturers'/suppliers' unique part numbering systems, but rather to supplement them.

When a Code Key 34 manufacturer's code and part number are used in conjunction with the VMRS System/Assembly/Component level codes (Code

Key 33), precise identification of a specific part is possible on a universal basis. This commonality of identification on a consistent basis is a prerequisite to developing an industry data base for analysis of maintenance information or for mutually exchanging information on a meaningful basis. A complete listing of Code Key 34 appears elsewhere in the *VMRS Implementation Handbook*.

Part Condition Codes: Code Key 18

VMRS has the additional capability of identifying why a mechanic or supervisor thinks a part failed and why.

An example of a part condition code is:

22 = Part Misaligned.

Code Key 18 is listed briefly below:

Code	Description
10	Bent
11	Binds, Sticks
12	Broken
13	Chipped
14	Cracked
15	Foreign Material Present
16	Glazed
47	High Pressure
17	Insufficient Lubrication
18	Leaking
19	Loose
46	Lost or Missing
48	Low Pressure
20	Lubrication or Oil Soaked
21	Misadjusted
22	Misaligned
23	Not Connected
24	Not Drilled
25	Out of Balance
26	Out of Round
27	Overheated
28	Part Improperly Installed
29	Part Omitted
30	Poor Fit
31	Poor Metal Finish
32	Porosity
33	Registers Incorrectly
34	Rough
35	Rusted or Corroded
36	Scored or Scratched
37	Seized
38	Shorted
39	Soiled or Stained
40	Stripped

- 41 Torn or Punctured
- 42 Warped
- 43 Weak
- 44 Worn
- 45 Wrong Part
- 49 Cut or Rubbed
- 50 Hard or Brittle

OTHER CODE KEYS

Vehicle Status Code: Code Key 20

In 2003, TMC adopted a new three-digit numeric Code Key within VMRS pertaining to vehicle availability status. The Code Key describes various status of vehicle readiness and availability for service.

* **NOTE:** Original Code Key 20, Vehicle Component Groups, was made obsolete in 1997 with development of VMRS 2000. It was incorporated into Code Key 31, Vehicle System Codes, and VMRS component groups are now designated by the first two digits of each system code within Code Key 31.

Samples of this Code Key follow:

- 001 Owned Equipment
- 002 New Equipment Available For Assignment

- 012 Available For Assignment (Used, Awaiting Reassignment)
- 013 Decommission To Sell
- 015 Owned Equipment—Repairs Not To Exceed \$500.00 Without Approval
- 016 Owned Equipment—Repairs Not To Exceed \$1000.00 Without Approval
- 031 New Equipment Not In Service (On Order)
- 033 New Equipment Not In Service (Received, But Being Made Ready By Maintenance)
- 040 Leased Equipment—Repairs Not To Exceed \$50.00 Without Approval
- 041 Leased Equipment—Repairs Not To Exceed \$100.00 Without Approval
- 050 Demonstrator Equipment—Returned To Manufacturer
- 051 Equipment—For Sale
- 052 Equipment—Sold
- 053 Equipment—In Storage
- 054 Equipment—Lost
- 055 Equipment—Stolen
- 056 Equipment—Junked

Brake System Type Code: Code Key 40

In 2003, TMC expanded Code Key 40 which describes

XX	XX	XX	XX	XX
FOUNDATION	ACTUATION	ENERGY SOURCE	ABS/ECBS EQUIPPED	AUXILIARY BRAKING EQUIPPED
01 Disc—All Wheel	1A Piston			
02 Drum—All Wheel	1B Screw	01 Air	AX ABS only	Y YES
03 Disc Front, Drum Rear	1C Toggle (Lever Activated)	02 Hydraulic	AE ABS/ECBS	N NO
	1D Wedge	03 Air/Hydraulic	XX Not Applicable	
	1E Wedge (Dual Stage)	04 Mechanical		
	1F S-cam			

Sample Code: 021F01AXY Drum—All Wheel Tractor, with air S-cam actuated brake with antilock braking system (ABS) and engine brake.

Code	Brake System Type
1	Air, S-Cam
2	Air, Wedge
3	Vacuum
4	Vacuum, S-Cam
5	Air Over Hydraulic
6	Hydraulic
7	Disc, (any type)

Fig. 4: Revised Code Key 40: Brake System Type Code

brake system types. The revised Code Key more completely identifies variations in brake configuration.) Fig. 3 describes the code structure of revised Code Key 40.

Warranty Claim Codes: Code Keys 81, 83, 84

In 2001, TMC began introducing new Code Keys within VMRS pertaining to warranty processing. Code Key 81 describes Type of Claim; Code Key 83 describes Claim Response Reason Codes; Code Key 84 describes Claim Response Status Codes. A complete description of these two-digit numeric codes appears in the latest version of TMC’s VMRS standard.

Operator Vehicle Condition Report: Code Key 82

Code Key 82: Operator Vehicle Condition Report standardizes descriptions of conditions that drivers/operators may report to fleet management regarding vehicle status. A complete description of this three-digit numeric codes appears in the latest version of TMC’s VMRS standard.

Position Code: Code Key 79

In 2007, TMC expanded Code Key 79, which describes position codes that apply to multiples of an identical component performing the same function within a VMRS assembly that can be installed at various locations on the same vehicle/equipment. The updated Code Key 79 defines position through two data elements:

- Code Key 79a: Side and Orientation
- Code and Code Key 79b: Sequence Code.

Code Key 79a Side and Orientation Code is a two-digit alpha-numeric data element that defines the side and orientation, relative to driver position. (The code must be considered in conjunction with Code Key 33: Component Code.) Code Key 79b Sequence Code is a numeric, two-digit sequential data element. The sequence code is based on a count (front to rear, left to right, top to bottom). When a circular pattern is involved, the upper/front most occurrences are defined as the number one (1) position and the sequence is counted in a clockwise direction.

Taken together, Code Key 79a and 79b define position using a four-digit code:

Example: 02-01 where
02=Front Left
01=Position 1 or First

An alternate code schema is offered for Code Key 79a: Side and Orientation Code, consisting of four data elements, each of which is expressed as a alpha character. This schema is easier to remember and visually intuitive.

- Data Element 1 defines Front or Rear where: F=Front; R=Rear; X= not applicable.
- Data Element 2 defines Left or Right where: L=Left; R=Right; X= not applicable.
- Data Element 3 defines Top/Upper or Bottom/Lower where: T=Top/Upper; B=Bottom/Lower; X=not applicable.
- Data Element 4 defines Inner, Outer, Center, Inner and Outer and All where: I=Inner; O=Outer; C=Center; E=Inner and Outer; A=All; X=not applicable.

Example: F L X X-01 where
F L X X =Front Left
01=Position 1 or First

The sole exception to this schema is the definition of circular, which is expressed as “C C C C”.

The following is a representative list of codes from Code Key 79a:

A/N	Alpha	Description
01	F X X X	Front
02	F L X X	Front Left
03	F L B X	Front Left Bottom/Lower
04	F L B I	Front Left Bottom/Lower Inner
24	F R B O	Front Right Bottom/Lower Outer
46	F X T C	Front Top/Upper Center
50	F X X I	Front Inner
51	F X X C	Front Center
52	F X X O	Front Outer
53	F X X E	Front Inner and Outer
54	F X X A	Front All
55	R X X X	Rear
56	R L X X	Rear Left
93	R X B I	Rear Bottom/Lower Inner
A2	R X T O	Rear Top/Upper Outer
A3	R X T E	Rear Top/Upper Inner and Outer
A4	R X T A	Rear Top/Upper All
A5	R X X I	Rear Inner
A6	R X X C	Rear Center
A7	R X X O	Rear Outer
A8	R X X E	Rear Inner and Outer
A9	R X X A	Rear All
B1	X L X X	Left
B2	X L B X	Left Bottom/Lower
B7	X L B A	Left Bottom/Lower All

B8	X L T X	Left Top/Upper
D1	X R X X	Right
D2	X R B X	Right Bottom/Lower
E7	X R X O	Right Outer
E8	X R X E	Right Inner and Outer
E9	X R X A	Right All
F1	X X B X	Bottom/Lower
F8	X X T I	Top/Upper Inner
G4	X X X I	Inner
G5	X X X C	Center
G6	X X X O	Outer
G7	X X X E	Inner and Outer
G8	X X X A	All
G9	C C C C	Circular

The following is a representative list of codes from Code Key 79b: Sequence Code.

Code	Sequence
00	Not Applicable
01	First
02	Second
03	Third
04	Fourth
05	Fifth
06	Sixth
07	Seventh
08	Eighth
09	Ninth
10	Tenth
11	Eleventh
Etc.	Etc.

Tire Position Code: Code Key 23

TMC's VMRS Codes Committee has determined that Code Key 79—as currently configured—is not ideally suited for denoting tire position. Therefore, TMC has created a separate Code Key for tire position entitled Code Key 23: Tire Position Codes.

Code Key 23 generally follows the coding schema of Code Key 79. However, it has been simplified to meet the needs of tire coding. Code Key 23 consists of four data elements:

- Data Element 1 defines axle type.
- Data Element 2 defines axle sequence.
- Data Element 3 defines left, right or center position relative to axle.
- Data Element 4 defines inner, outer or center position relative to axle.

Data Element 1—Axle Type

Code	Description
S	Steer
D	Drive
T	Trailer
C	Converter Dolly
L	Lift
G	Tag
P	Pusher
F	Other Free Rolling Axle
Z	Spare

Data Element 2—Axle Sequence

Axle sequence is defined in numerical ascending order, starting with first axle at the foremost position on the vehicle.

Code	Description
1	First
2	Second
3	Third
etc.	etc.

Data Element 3—Left/Right Position

Code	Description
L	Left
R	Right

Data Element 4—Inner/Outer/Center Orientation

Code	Description
I	Inner
R	Outer
C	Center

For all data elements, X is used for "not applicable."

Coding Example 1:

Identify of the inner dual tire located on the passenger side of rear-most tandem axle on a 6x4 tractor (six wheels; four driven). Code: D2RI

D = Drive R = Right
2 = Second I = Inner

Coding Example 2:

Identify the tire located on the driver's side of steer axle on a 6x4 tractor (six wheels; four driven). Code: S1LX

S = Steer L = Left
1 = First X = Not applicable

Code Key 24: Maintenance Status

TMC's VMRS Codes Committee has determined that VMRS needs greater flexibility to describe the maintenance status of a part, system, and/or complete vehicle — beyond the current capacity of existing VMRS Code Keys. Therefore, in 2016, the Committee proposed adoption of a separate Code Key for maintenance status entitled **Code Key 24: Maintenance Status**. It was balloted and approved in 2016 and officially adopted in 2017.

Code Key 24 employs a two-digit numeric code structure consisting of a single data element. There is no logic to the code structure, other than the codes are issued in sequential numeric order beginning with "01."

There are 11 codes at this time. These include:

01	Enroute
02	Arrived
03	Checked-In
04	Triage
05	Diagnostics in Progress
06	Estimating
07	Waiting for Authorization
08	Repair in Progress
09	Repair Complete
10	Ready for Delivery
11	Delivered

SUMMARY

In summary, there are nine basic, integral parts to VMRS™, each interrelated to the other. Independently they cannot be considered VMRS any more than a chassis by itself can be considered a truck.

VMRS, by its very concept, requires complete integration of all elements in the same manner that all parts of a vehicle must be considered when reviewing the entire vehicle. Basic VMRS elements are:

1. The VMRS Vehicle Master Record—a vehicle birth certificate.
2. Code Key 1: Equipment Activity Codes—used to identify the specific work assignment of the vehicle.
3. Code Key 14: Reason for Repair Codes—used for segregating repair expenditures.
4. Code Key 15: Work Accomplished Codes—used to denote what tasks were performed to the vehicle.
5. Code Key 31: System Level Coding—used to identify vehicle systems.
6. Code Key 32: Assembly Level Coding—used to identify vehicle subsystems.
7. Code Key 33: Component Level Coding—used to identify vehicle components.

***SPECIAL NOTE:** If coding to the assembly or part level is exercised, no substitution or deviation of coding structure is permitted.

8. Code Key 34: Manufacturer Code—used to identify the actual manufacturer/supplier of a given part.
9. Code Key 18: Part Condition Code—used to record the technician's/supervisor's best guess as to why a specific component failed.