UENR7000
August 2015

Systems Operation Testing and Adjusting

Machine Security System (MSS3i) Integrated

PROOF

Important Safety Information

Most accidents that involve product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards, including human factors that can affect safety. This person should also have the necessary training, skills and tools to perform these functions properly.

Improper operation, lubrication, maintenance or repair of this product can be dangerous and could result in injury or death.

Do not operate or perform any lubrication, maintenance or repair on this product, until you verify that you are authorized to perform this work, and have read and understood the operation, lubrication, maintenance and repair information.

Safety precautions and warnings are provided in this manual and on the product. If these hazard warnings are not heeded, bodily injury or death could occur to you or to other persons.

The hazards are identified by the “Safety Alert Symbol” and followed by a “Signal Word” such as “DANGER”, “WARNING” or “CAUTION”. The Safety Alert “WARNING” label is shown below.

⚠ WARNING

The meaning of this safety alert symbol is as follows:

Attention! Become Alert! Your Safety is Involved.

The message that appears under the warning explains the hazard and can be either written or pictorially presented.

A non-exhaustive list of operations that may cause product damage are identified by “NOTICE” labels on the product and in this publication.

Caterpillar cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are, therefore, not all inclusive. You must not use this product in any manner different from that considered by this manual without first satisfying yourself that you have considered all safety rules and precautions applicable to the operation of the product in the location of use, including site-specific rules and precautions applicable to the worksite. If a tool, procedure, work method or operating technique that is not specifically recommended by Caterpillar is used, you must satisfy yourself that it is safe for you and for others. You should also ensure that you are authorized to perform this work, and that the product will not be damaged or become unsafe by the operation, lubrication, maintenance or repair procedures that you intend to use.

The information, specifications, and illustrations in this publication are on the basis of information that was available at the time that the publication was written. The specifications, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service that is given to the product. Obtain the complete and most current information before you start any job. Cat dealers have the most current information available.

⚠ WARNING

When replacement parts are required for this product Caterpillar recommends using Cat replacement parts.

Failure to follow this warning may lead to premature failures, product damage, personal injury or death.

In the United States, the maintenance, replacement, or repair of the emission control devices and systems may be performed by any repair establishment or individual of the owner's choosing.

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Testing and Adjusting

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Systems Operation Section

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General Information

SMCS Code: 7631

The Caterpillar ® Machine Security System (MSS) discourages unwanted operation of a machine. The MSS uses the Caterpillar ® Electronic Key or a pass code entered via a keypad or the machines display. The keypad or machine display pass code feature is only available on limited machines. Check the machines Operation and Maintenance Manual to verify that this feature is available. The Caterpillar Electronic Key contains an electronic chip. The electronic chip has a unique identification number (ID). An exciter coil is mounted around the key start switch. The exciter coil reads the ID of the key.

The Electronic Control Module (ECM) of the Machine Security System is set up with the ID of the keys of the intended users. When the MSS is armed, the ECM validates the ID of the key in the key start switch. If the key ID is in the list of authorized keys in the ECM and the key is valid, the machine will operate normally. If the key ID is not in the list of authorized keys or is not valid in the ECM, the MSS will keep the critical machine functions disabled.

Components

The Machine Security System consists of the following components:

- Electronic Control Module (ECM)
- Caterpillar Electronic Key
- Caterpillar Optional key pad entry
- Exciter Coil
- Key Reader Module (MSS3i)
- Status Indicator

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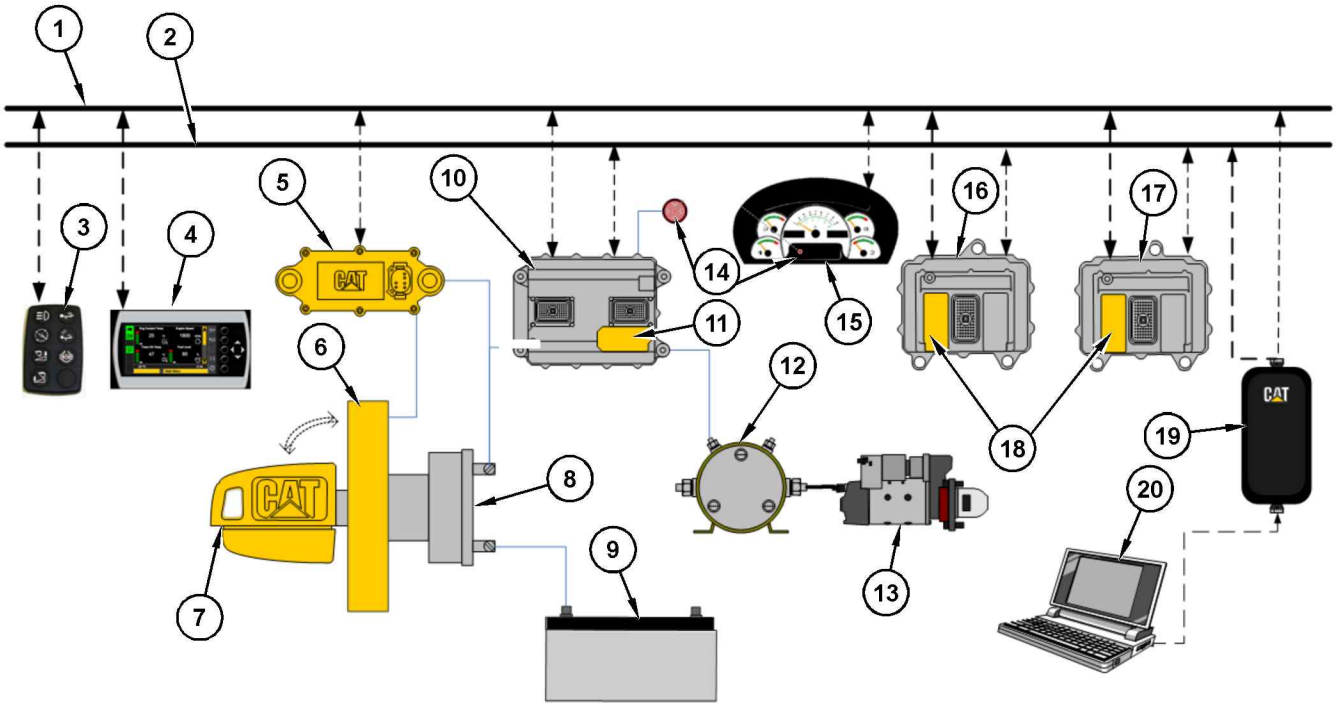

Illustration 1 g03864508

MSS3i Connections

(1) SAE J1939
(2) CAT Data Link
(3) External Keypad (Required for Passcode Entry)
(4) Integrated Keypad (Required for Passcode Entry)
(5) “Bouncer” (MSS3i) Electronic Key Reader
(6) Exciter Coil
(7) Electronic Key
(8) Key Switch
(9) Battery 12V or 24V
(10) Critical System (Transmission ECM)
(11) MSS3i (Main) Software
(12) Relay
(13) Starter
(14) MSS LED
(15) Integrated Cluster
(16) Critical System (Engine ECM)
(17) Critical System (Hydraulic ECM)
(18) Immobilizer (Support) Software
(19) Communications Adapter
(20) PC Caterpillar Service Tool Electronic Technician

The integrated Machine Security System (MSS) incorporates the MSS software into an ECM. That ECM controls other machine functions and uses an electronic key reader (MSS3i) to read the key.

The Electronic Key for the MSS contains an electronic chip that is embedded in the head of the key. Each key contains a unique identification number. The Electronic Key uses the same key cut as the standard Caterpillar key. The electronic key can be used to operate any machine that uses the current Caterpillar key start switch. The Electronic Key comes in a gray color or a yellow color. The electronic keys are not configurable.

The exciter coil of the MSS is a ring shaped device. The exciter coil is mounted around the existing Caterpillar key start switch. The exciter coil is used to read the ID that is contained in the Caterpillar electronic key.

Note: Ensure that you have only one electronic key near the exciter coil when the MSS reads the key. If there is more than one key, the ECM will not be able to read the key and the machine will not start.

The status indicator for the MSS is mounted in the dash of the machine near the key switch or the gauge cluster. The status indicator will give basic information about the MSS to the operator of the machine. The status indicator has two colors: red and green.

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System Overview

SMCS Code: 7631

The machine security system (MSS) is designed to restrict operation of a machine. A list of the authorized electronic keys for a machine is contained in the ECM for the MSS. Only a Caterpillar ® Electronic Key that is authorized can disarm the MSS. This disarming is accomplished by assigning the ID of an electronic key to the ECM for the MSS. The Caterpillar ® Electronic Technician (Cat ® ET) must be used to program the ECM with the authorized keys.

When the electronic key is placed in the key switch and turned to the ON position, the key reader reads the unique ID. This ID is stored in the key. The ECM will then compare this ID to the list of authorized keys.

The status indicator turns a green color when the MSS has read an authorized key.

If the ID of the key matches an authorized key, the status indicator will turn a green color and the MSS will disarm. This disarming will allow the machine to operate.

If the ID of the key that is read does not match the list in the ECM, the status indicator will become a red color. The MSS remains in the "armed" state and the machine will remain disabled.

Note: Ensure that you have only one electronic key near the exciter coil when the MSS reads the key. If there is more than one key, the ECM will not be able to read the key and the machine will not start.

The Machine Security System can be configured to work in a combination of ways depending on the electronic architecture of the machine.

1. Electronic Control

The MSS may disable the machine by controlling the electronic devices that are used to power critical machine systems.

2. Immobilizer

The MSS disables the machine by communicating with other electronic control modules across the Cat Data Link (CDL) and disabling critical machine functions.

In order to change the list of authorized keys or change the configuration parameters of the Machine Security System, the user must:

- Have the Caterpillar Electronic Technician (Cat ET)

and one of the following items:

- A key with Master Access Level for that specific Machine Security System
- A Factory Password

When a key with the master access level is not available, a Factory Password is required to change certain parameters in the configuration.

Refer to Testing and Adjusting, "Factory Password - Obtain" for additional information on Factory Passwords.

The Electronic Technician screen for the Factory Level Security Password will display the following parameters:

- ECM serial number
- "Product ID" (Serial Number of the machine)
- Serial Number of the Service Tool
- Reason Code
- Total Tattletale number

In order to obtain the proper passwords, the information must be given to an authorized Caterpillar dealer.

If a Master Access Level key for a machine being serviced is not available, a factory password must be entered before changes can be made. The following information is needed before you call for a factory password:

Table 1

Information That is Needed for the Factory Password	
Product Identification	
Serial Number for the ECM	
Serial Number from ET	
Tattletale	
Reason Code	

Note: The password may only be used for one programming session. A different password will be required after you exit the Electronic Service Tool Screen.

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Normal Operation

SMCS Code: 7631

Reading the ID of a Key

Before you can operate the machine, the machine security system MSS must identify a valid electronic key ID.

When the key is turned to the ON position, the MSS enters the read mode. The MSS then checks for a valid electronic key ID. If the electronic key ID matches an electronic key ID that is stored in the ECM, then the critical ECM functions are enabled. An "enable" message is also sent via the CAT data link to the other electronic control modules that are on the machine. The machine will operate normally.

Note: Ensure that you have only one electronic key near the exciter coil when the MSS reads the key. If there is more than one key, the ECM will not be able to read the key and the machine will not start.

Note: If the ECM has failed or has been removed, the other critical machine operations controlled by the other electronic control modules will not operate.

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Armed

When the MSS is armed, critical machine functions are disabled. The MSS disables the power that is supplied to each component that is powered by the output drivers. The machine will not be able to operate normally.

There are two states of operation within the "armed" mode.

1. **"Key Position OFF"**

   When no power is applied to the MSS, the MSS will default to "armed" state. When power is applied to the MSS and the Grace Period has expired, the MSS will return to the "MSS Armed" .

2. **"Key Position ON"**

   When the key switch is first moved to the ON position, the MSS tries to read the electronic key ID. The ECM will continue reading attempts until an ID is read or the read time-out expires. If the key is not read after several attempts, the MSS turns on the red LED of the status indicator and the MSS remains armed.

Note: Ensure that you have only one electronic key near the exciter coil when the MSS reads the key. If there is more than one key, the ECM will not be able to read the key and the machine will not start.

Disarmed

When the MSS is disarmed, the machine can be operated. The MSS has enabled the starter and main circuits on the machine. A message is sent to the other machine ECMs over the Cat data link. The machine will be able to start. The green LED of the status indicator will illuminate.

There are two ways to disarm the machine:

- Use a valid electronic key for this machine.
- Use ET to configure the MSS bypass schedule to allow machine operations during scheduled periods of time during the week.

Electronic Key

After a machine has been started successfully, the operator will have 30 seconds after the machine is turned off before the MSS is automatically armed. The operator is not required to arm the system manually.

During the 30 second grace period any key (electronic and non-electronic) will start the machine without key identification validation. When the 30 second grace period expires, the MSS will automatically rearm.

If the MSS is unable to read an electronic key ID, the system will remain armed.

When the MSS identifies a key with an invalid electronic key ID, the system will remain armed.

External Authentication Device (EAD) and Pass Codes

When the machine security system is configured to utilize External Authentication Device (EAD) and pass codes, the system will use the default setting. This setting is an extended 90 second grace period in addition to the normal grace period of 30 seconds. The application that configures the library can be set for a longer or shorter grace period.

Refer to the machines Operation and Maintenance Manual to confirm use of EAD or pass codes for the machine.

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Operation of Status Indicator

SMCS Code: 7631

The Machine Security System (MSS) uses a status indicator that is mounted in the cab near the key start switch or in the dash cluster. The status indicator provides a visible alert of the presence of the security system. When the key start switch is first turned to the ON or START positions, and MSS is armed, a red light status indicator momentarily displays. This light provides a warning that the machine is armed with a security system.

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Status Indicator

Illustration 2 g01014891

Typical installation of the Status Indicator

(1) Status Indicator

The status of the MSS is displayed by the status indicator in accordance with Table 2 . The operator can use the status indicator to determine the status of the system or for troubleshooting.

Table 2

Status Indicators[1]	Description
Red	The MSS is armed.[2]
Green	The MSS is disarmed. The green LED will remain ON 30 seconds after power down (Grace Period). After the 30 seconds have passed, the MSS automatically returns to the “armed” mode.

(1) The LED's are illuminated during initial power-up in order to test the LED's.
(2) The red LED will remain ON while the key is in the ON position or until a valid key is read.

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Key Information

SMCS Code: 7631

You may configure the “Machine Security System ” (MSS) to recognize up to 255 authorized keys. This list contains those keys that will disarm the Machine Security System. The user adds keys to this list.

Note: The system will be limited to 50 keys on older machines. This limitation is due to software limitations on the Machine ECM that utilizes a version of software that does not support the larger key storage.

The ECM can store five configuration parameters that identify each electronic key. These parameters are listed below:

- “Security Type”
- “Description”
- “Access Level”
- “Expiration Date”
- “Security ID”

The parameters are not stored in the electronic key. A complete list of the configuration parameters that are available in the Caterpillar Electronic Technician (ET) are listed below:

1. Add an electronic key.

2. Change the information that is related to the electronic key.

a. Access level

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b. Expiration date

c. Description

3. Delete an electronic key.

4. “Security Bypass Times”

5. Set the internal clock.

6. “Fleet Configuration”

Note: Refer to the Testing and Adjusting, “Key - Program” section for additional information on items 2.a., 2.b., 2.c., 3, 5, and 6. Refer to the Testing and Adjusting, “Scheduled Access - Program” section addition information on item 4.

Note: A single electronic key can be used on as many machines with an MSS as desired. The following parameters can be different on each machine: Description, Access Level and Expiration Date. The ID will be the same on all the machines

Note: The features of the MSS are supported in version 2015A or later of the Caterpillar Electronic Technician (ET).

Table 3

Security Type	Description	Access Level	Expiration	Security ID
Key	Operator 1	Master	“- - - - -”	0:183243096
Key	Operator 2	Standard	“- - - - -”	0:110105956
Passcode	Operator 3	Standard	“10/24/2016”	245865321

Security ID

The ID that is stored in the electronic key is a 16-digit number that is displayed as two 8-digit numbers in the Caterpillar® Electronic Technician (ET). This field is known as “Security ID” . When the numbers are combined, the complete ID number is formed. The ECM uses this ID to associate a key to the set of parameters in the list of keys. Entries in the list may have the same information for the following items: Description, Access Level and Expiration Date. You may choose a description of 11 characters or less for each key in the list of keys. There can be multiple entries in the list with the same description. Create a description so that the key describes either the owner of the key or the function of the user.

Passcodes are utilized on some machine in place of electronic keys. This passcode will be a number assigned to an operator to allow authorized operation of the machine. Refer to the machine Operation and Maintenance Manual for additional information.

Note: Duplicate descriptions for the electronic keys are not advisable.

Access Level

You may assign one of two access levels to a key in the list of keys. The levels are either “Standard” or “Master” . Both access levels allow the key to disarm the system for operation. The master access level also gives the user the ability to modify the settings of the Machine Security System with the Caterpillar Electronic Technician (ET).

The standard access level is for normal operation of the machine. The master access level should be restricted to those persons that need to modify the settings of the Machine Security System.

Security Type

The security type identifies the type of security access that is being utilized. There are currently two types of security identification.

- Key
- Passcode

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Expiration Date

An expiration date may be assigned to any key in the list of keys. This expiration date is defined in 6 hour intervals on a given date. The third entry in Table 3 contains an expiration date. For all of the other keys in Table 3 , the column with the expiration date is filled with "Dash lines" . "Dash lines" indicates that those entries do not have an expiration date. The Machine Security System has an internal clock. Once the internal clock has passed the expiration date for a key, that key will no longer disarm the system. However, the entry will not be deleted from the list of keys. A new expiration date can be set, or the feature can be disabled. A possible use for the expiration date is used with a rental contract.

Note: If the machine is running when the expiration date and time are reached, the machine will continue to run. When the machine is shut down and the 30 second grace period has timed out, the machine will not be allowed to restart.

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Scheduled Access ("Security System Bypass Times")

SMCS Code: 7631

The Machine Security System can be programmed to disarm for a time period. The MSS can be set to disarm for different time periods on each day. Within these periods of time, any Caterpillar ® key (a standard key or an electronic key) will operate the machine.

Note: It is not possible to configure the "bypass times" for an individual electronic key. The "bypass times" are not associated to an individual electronic key.

"Security System Bypass Times" are time periods that can be set to disarm the Machine Security System automatically. An electronic key is not required during these periods. This feature can be used for the normal work shift of the machine. Outside the normal work shift, the Machine Security System would be armed. When the MSS is armed, an electronic key is required to start the machine. This feature would minimize the number of electronic keys that are needed.

Table 4

"Sunday Security System Bypass Start Time"	00:00
"Sunday Security System Bypass Stop Time"	00:00
"Monday Security System Bypass Start Time"	6:00
"Monday Security System Bypass Stop Time"	18:00
"Tuesday Security System Bypass Start Time"	6:00

(continued)

(Table 4, contd)

"Tuesday Security System Bypass Stop Time"	18:00
"Wednesday Security System Bypass Start Time"	6:00
"Wednesday Security System Bypass Stop Time"	18:00
"Thursday Security System Bypass Start Time"	6:00
"Thursday Security System Bypass Stop Time"	18:00
"Friday Security System Bypass Start Time"	6:00
"Friday Security System Bypass Stop Time"	12:00
"Saturday Security System Bypass Start Time"	12:00
"Saturday Security System Bypass Stop Time"	12:00

Table 4 shows an example of "Security System Bypass" . The "Start Time" is the time when the Machine Security System will disarm. The Machine Security System will return to the "armed" state at the "Stop Time" . Between these two periods of time, any Caterpillar ® key will operate the machine. Thus, the MSS is disarmed during this time period.

All times are based on a 24 hour clock. For example, 6:00 am is 06:00 and 3:00 pm is 15:00. The Machine Security System will be disarmed during the times that are listed below: Monday through Thursday from 06:00 to 18:00

On Friday, the MSS is disarmed for only half of the workday. After 12:00 on Friday, the Machine Security System will be armed automatically. Operation will be restricted to operators with electronic keys that are authorized in the ECM on that machine. Refer to Table 4 .

The Machine Security System is "armed" on the weekend. Because the "Start Time" and the "Stop Time" are set for the same time, the Machine Security System will be armed throughout the day.

See Testing and Adjusting, "Scheduled Access - Program" in order to program the security system bypass times.

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Diagnostic Operation

SMCS Code: 7631

A diagnostic code indicates that the ECM has detected one or more of the following conditions:

- an invalid signal from an input
- an improper feedback from an output
- an internal error

One method of displaying diagnostic information is provided:

- Diagnostic codes with descriptive text can be viewed with the Caterpillar Electronic Technician (ET).

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Display the diagnostic code with the Caterpillar Electronic Technician.

This method of displaying the diagnostic codes uses the service tool to display the codes. The Component Identifier (CID) identifies the specific component for a specific diagnostic. The Failure Mode Identifier (FMI) identifies the type of diagnostic that was detected. The diagnostic codes allow consistent identification of the problem. The service tool is used to display the CID-FMI with descriptive text for each combination. The descriptive text will help to avoid mistakes in interpreting the codes.

Active Diagnostics

Active diagnostics indicate the presence of active diagnostic codes for the MSS. A diagnostic code informs the operator that a problem exists with the MSS.

If the Cat service tool is available, the service tool can be used to display all active diagnostic codes. The service tool will also display codes that have been logged.

Logged Diagnostics

A logged diagnostic will record problems that are intermittent for the Machine Security System. Logged diagnostics eliminate the need to duplicate problems that are intermittent. Logged diagnostics will increase the accuracy of diagnosis. The time that is required to troubleshoot a problem is reduced with the use of Diagnostics. Logged diagnostics eliminate the need for trip recorders that are used to capture intermittent diagnostic information.

The control module memory is used to store diagnostic information. When a diagnostic is detected, the following information is logged:

- The CID will identify the component that has failed.
- The FMI will describe the problem.
- Number of occurrences of the diagnostic code
- The time of the first occurrence that the diagnostic was detected.
- Last occurrence time, when the diagnostic was last detected (stored with both machine hours and RTC stamp)

The problems which can be logged are listed in Troubleshooting, “Diagnostic Code List”. Refer to the Troubleshooting manual for your machine

The ECM logs the number of times that the machine is started with the methods that are listed below:

- Starting using an unauthorized method

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Protected Functions

SMCS Code: 7631

There are two levels of protection for the machine security system (MSS) :

- An electronic key with standard access level and a non-electronic key
- An electronic key with master access level (factory password)

The requirements for each level are explained below:

An Electronic Key with Standard Access Level and a Non-electronic Key

- The table of the MSS keys can be viewed but the table cannot be modified.
- The configuration settings of the MSS can be viewed but the settings cannot be modified.

Electronic Key with Master Access Level

A factory password or a master access level is needed to modify any MSS settings through the service tool.

- The settings for the MSS can be modified.
- The list of valid key IDs can be modified.

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Service Operation Using Service Tool

SMCS Code: 0785-UE; 7631

The service tool is used to communicate with the ECM for the following information:

- display and control of code
- programming
- management
- diagnostics

To protect the machine properly, the service tool requires a factory password or master access level key, before modifications can be made to the MSS.

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Electronic Control Module (ECM)

SMCS Code: 7610-MCH

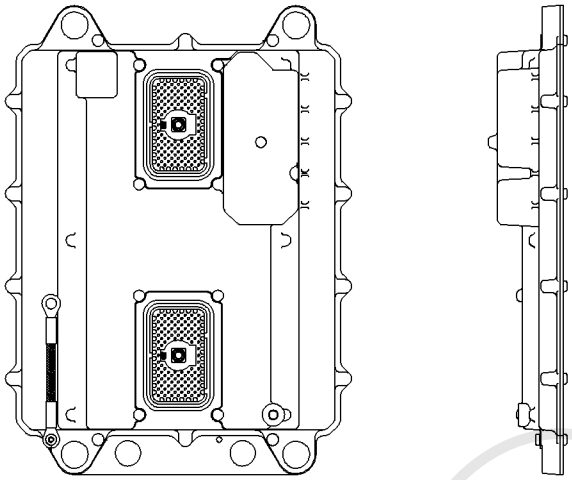

Illustration 3 g00785019

Electronic Control Module (ECM)

The Machine Security System (MSS) is an integrated feature for the machine ECM. The MSS software and components are integrated into an ECM that controls other machine functions. The system may utilize up to 255 electronic keys.

Note: The system will be limited to 50 keys on older machines. This limitation is due to software limitations on the Machine ECM that utilizes a version of software that does not support the larger key storage.

ECM Inputs

Keyswitch

The key start switch is also used as an input signal to the MSS. The input from the key switch is used to determine when the machine is on. Battery voltage is connected to this input through the ON and START positions of the keyswitch. See Table 5 for input voltages.

Table 5

Input Voltage	12V System	24V System
Machine is operating and the alternator is charging.	14.1 - 15.1V	27.6 - 29.6V
Machine is not running.	12V	24V

ECM Outputs

Status Indicator

The status indicator displays status of the system. The status indicator has three connections. One of the three connections is for a ground. Another connection is for the red LED. The third connection is for the green LED.

Output Drivers

Output drivers are available to control critical machine functions. Unless a valid "key ID" has been identified by the system, the drivers will remain without power.

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System Components

SMCS Code: 7631

Caterpillar ® Electronic Key

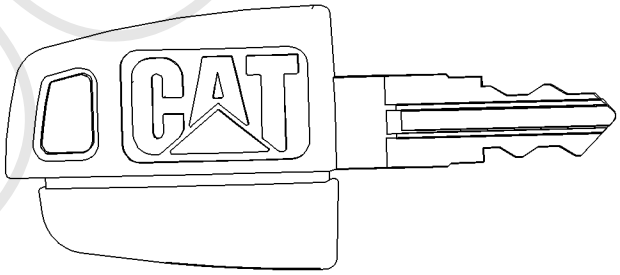

Illustration 4 g00793955

The Caterpillar Electronic Key

The electronic key has the same key cut as the universal Caterpillar ® key. The electronic key has an electronic chip that is embedded inside the head of the key. The electronic keys are gray or yellow.

Exciter Coil

The exciter coil provides communication between the electronic key and the key reader module.

The exciter coil is mounted around the keyswitch. This position allows the exciter coil to communicate with the electronic key. Any ferrous metal between the coil and the electronic key will interfere with the communications. Mounting the coil in the same plane as the top of the key start switch will minimize the interference.

Note: Ensure that you have only one electronic key near the exciter coil when the MSS reads the key. If there is more than one key, the ECM will not be able to read the key and the machine will not start.

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The exciter coil is connected to the harness via a 2-pin connector and a length of wire.

Antitheft Keypad

The antitheft keypad, (if equipped), immobilizes the engine, transmission, and hydraulic systems until a valid passcode is entered.

Refer to the Machine Operation and Maintenance Manual for details on the Anti Theft Keypad operation.

Electronic Key Reader (MSS3i)

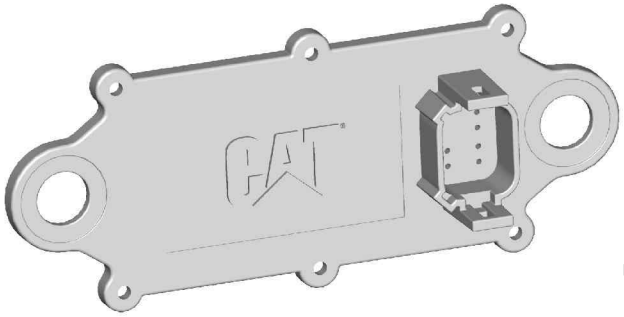

Illustration 5 g01007352

When the key start switch is placed in the ON position, the ECM will send a signal over the CAN data link. That signal will command the key reader to excite the coil. The key ID from an electronic key is sent back to the requesting ECM over the CAN data link.

Note: The key reader is NOT designed to communicate with the Caterpillar ® Electronic Technician (Cat ® ET). However the key reader control can be flashed via Cat ® ET. Refer to Test and adjust section, “ECM Flash” section of this manual.

Status Indicator

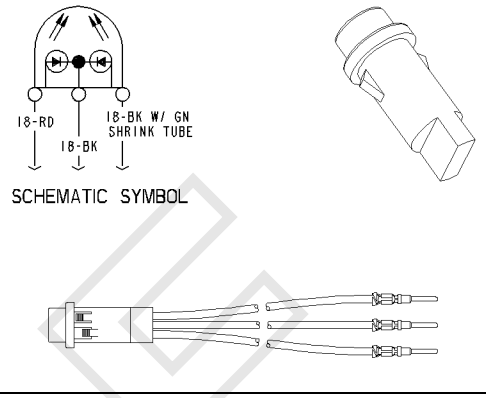

Illustration 6 g00862013

The state of the MSS is displayed by the status indicator. The green LED of the status indicator turns ON when the system is disarmed. The machine should start. The red LED of the status indicator turns ON when the system is armed and an invalid electronic key has been read by the MSS. The machine should not start. The green LED and the red LED will remain OFF when the machine security system is not installed.

Note: The Status indicator may be located in the dash cluster on some machine. Refer to the System Operation Manual for more information on the dash cluster.

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Data Link

SMCS Code: 7631

CAT Data Link

The Cat Data Link can connect the ECM for the following items:

- Service tools
- Onboard controls
- Monitoring systems

The service tool can send information to the ECM through the Cat Data Link. The ECM can provide information over the Cat Data Link to the following items: other electronic controls and service tool. The information can be for diagnostics, or the information can be used to control other systems on the machine.

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CAN Data Link

The CAN Data Link is an input and an output of the machine ECM. The CAN Data Link is designed to communicate with other electronic control modules through the machine harness. The CAN Data Link consists of internal ECM circuits and a twisted pair of wires within the wire harness. The CAN Data Link is bidirectional. The CAN Data Link allows the ECM to receive and transmit information and the CAN Data Link allows the ECM to send and receive information. The CAN Data Link communicates at a faster rate than the CAT Data Link.

The Electronic Key Reader (MSS3i) utilizes CAN data link for flashing.

PROOF

Testing And Adjusting Section

Testing and Adjusting

i06195575

General Information

SMCS Code: 7631

Caterpillar Electronic Key

The machine security system (MSS) uses a Caterpillar Electronic key. The key contains an electronic chip that is embedded in the head of the key. This chip contains a unique identification number. No two keys have the same ID. The Electronic Key uses the same key cut as the standard Caterpillar key. The electronic key can be used to operate machines that are not equipped with the MSS. The head of the electronic key is gray or yellow in color.

A System Disarm Feature will allow a machine to operate with any key. Refer to the Testing and Adjusting, “Scheduled Access - Program” for additional information.

Security Management

The Machine Security System uses the Caterpillar Electronic Technician (ET), version 2015A or later, to manage the settings of the system. There are restrictions on accessing the settings. The “Security Management” feature for the MSS controls the access to the settings.

i06195578

Troubleshooting

SMCS Code: 7569

Refer to the Troubleshooting manual for your machine in order to troubleshoot system failures.

i06195584

Key - Program

SMCS Code: 7631-591

The machine security system (MSS) may be programmed to accommodate up to a maximum of 255 keys. A new key is programmed into the machine ECM with the service tool.

Programming with a Service Tool

The “Security Management” function of the Caterpillar ET allows you to view information on the key currently in the key switch. You may also view a list of authorized keys. The authorized keys are the keys that have been programmed into the MSS.

PROOF

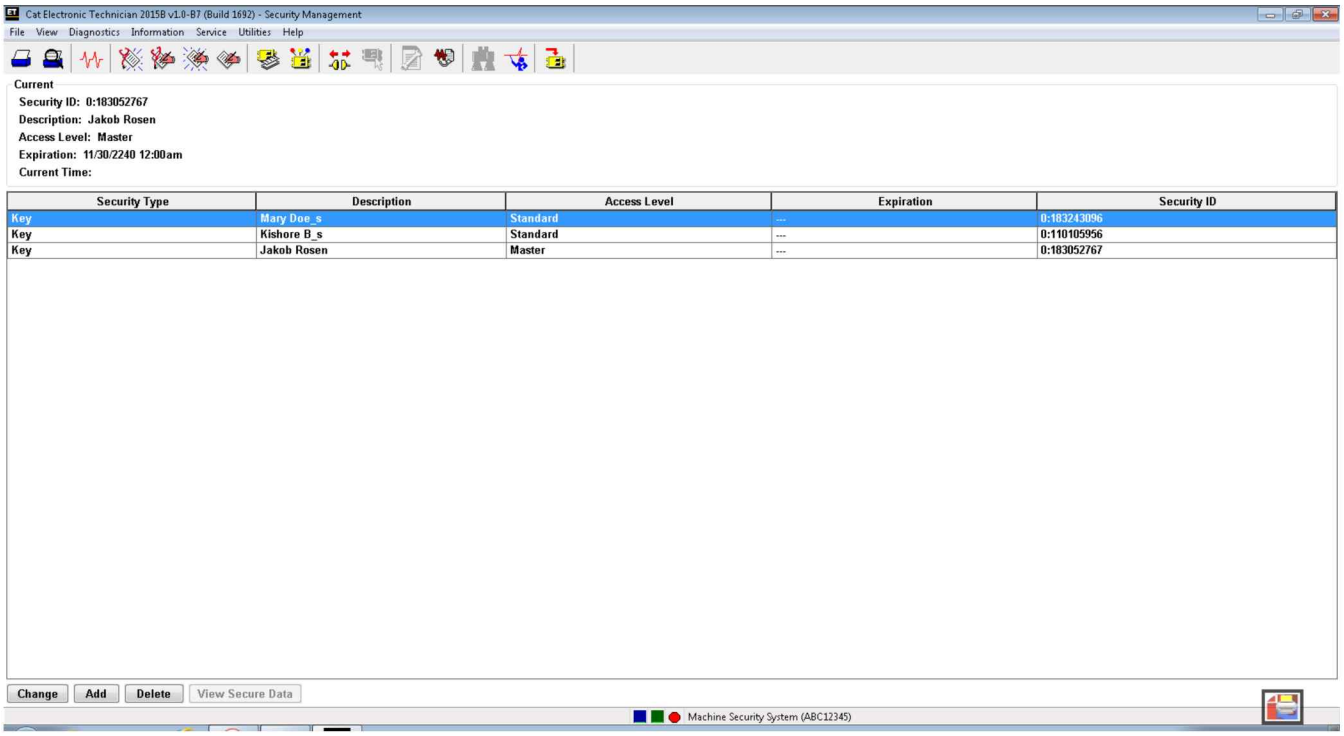

Illustration 7 g03858873

Security Management

Connect a laptop computer with the Caterpillar ET to the machine that will be programmed. After the laptop computer is connected to the machine, start the ET. Select the machine that has the MSS installed. Select the "Security Management" option from "Service" menu. The "Security Management" screen will be displayed. Refer to Illustration 7 .

Layout of the Screen

The "Security Management" screen has the following areas:

"Current Key Information" – The "Current Key Information" area displays information of the key currently in the keyswitch. If the "Description" , "Access Level" and "Expiration" information was not entered for the current key, these areas will be blank.

"Display Area" – The "Security Management" display area has five columns: "Security Type" , "Description" , "Access Level" , "Expiration" and "Security ID" . The information can be sorted by a column. Click on the heading of the column, in order to sort by the information in that column. The "Description" column is the name for the key. The "Access Level" column displays the access level for the key. There are two access levels: Master and Standard. The Master Access Level gives the user the capability to add or change information without a factory password. Standard Access Level requires factory passwords to add information on keys. The "Expiration" column gives the date and the time that a key will expire. Keys expire in 6 hour increments. "Security ID" is the unique identification numbers for the key.

Push Buttons – The following push buttons are available in the "Security Management" screen: "Change" , "Add" and "Delete" .

Adding Key Information

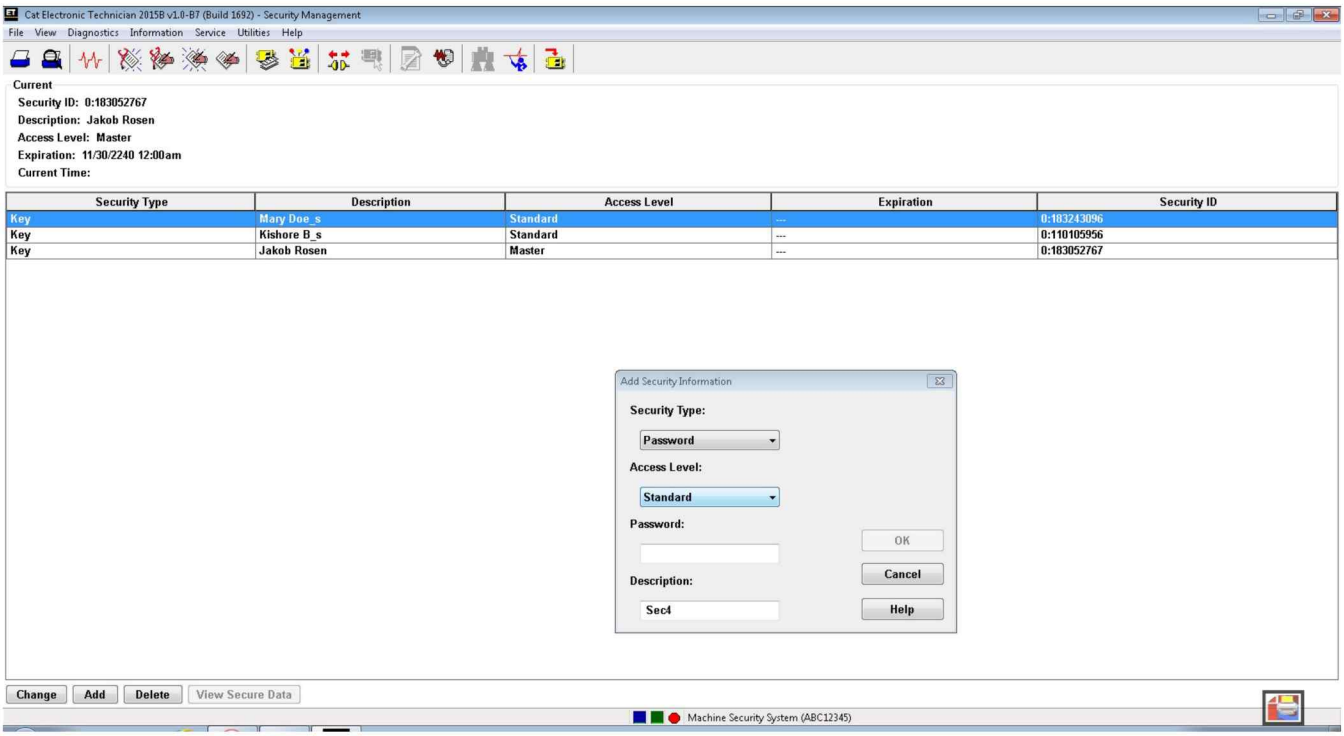

Illustration 8 g03859338

Add key information

The "Add" push button allows you to add a key to the list of Authorized Keys.

Note: When a function requires a factory password, the "Enter Factory Passwords" box is displayed.

To add a key, perform the following steps:

Note: Adding Keys requires a key with the master access level or a factory password.

1. Insert a master key for that machine in the key start switch. Turn the key to the ON position. If a master key is not used, then a factory password is required.

Note: The MSS indicator should be green.

2. Turn the key to the OFF position.

Note: The MSS indicator should remain green.

3. Insert the new key into the key start switch. This insertion must be done within 30 seconds of step 2. Turn the key to the ON position before the MSS indicator turns off.

4. Connect a laptop computer with the Caterpillar Electronic Technician to the ECM on the machine. Select the " Add Security Information" from the menu in the ET.

5. Select the "Security Management Option" under the Service Menu in the ET.

6. Press the "Add" push button. The "Add Key Information" dialog box is displayed.

7. Press the "Read" push button. ID1 and ID2 will be filled with the information for the key that is in the ignition.

Note: The "ID1" field may contain a "0" .

8. Enter the name for the key in the "Description" box, if desired. The description may have up to 11 characters. If no description is entered, the description will default to "Sec#" . The # sign indicates a number. For example, "Sec1" , "Sec2" , "Sec..." .

Note: Duplicate names for the keys in the list of keys is not advisable.

9. Select the access level of the key from the "Access Level" menu.

10. Select an “Expiration” button: “Disable” or “Enable”

“Disable” does not have an “Expiration Date” . If “Enable” is selected, enter the “Expiration Date” and “Expiration Time” for that key.

Note: Setting a Key with “Master Level Access” to the “Enable” status with an expiration date will cause the Key with “Master Level Access” to expire. If the “Master Level Access” Key expires, you will no longer be able to use the key as a Master Level Access Key.

11. Press the “OK” button in order to add the information for the key. The “Are you sure?” box is displayed. Press “OK” in order to add the key. Press “Cancel” in order to exit the “Add Key Information” dialog box without adding the information. Press “Help” to open on-line help for assistance.

PROOF

Changing the Key Information

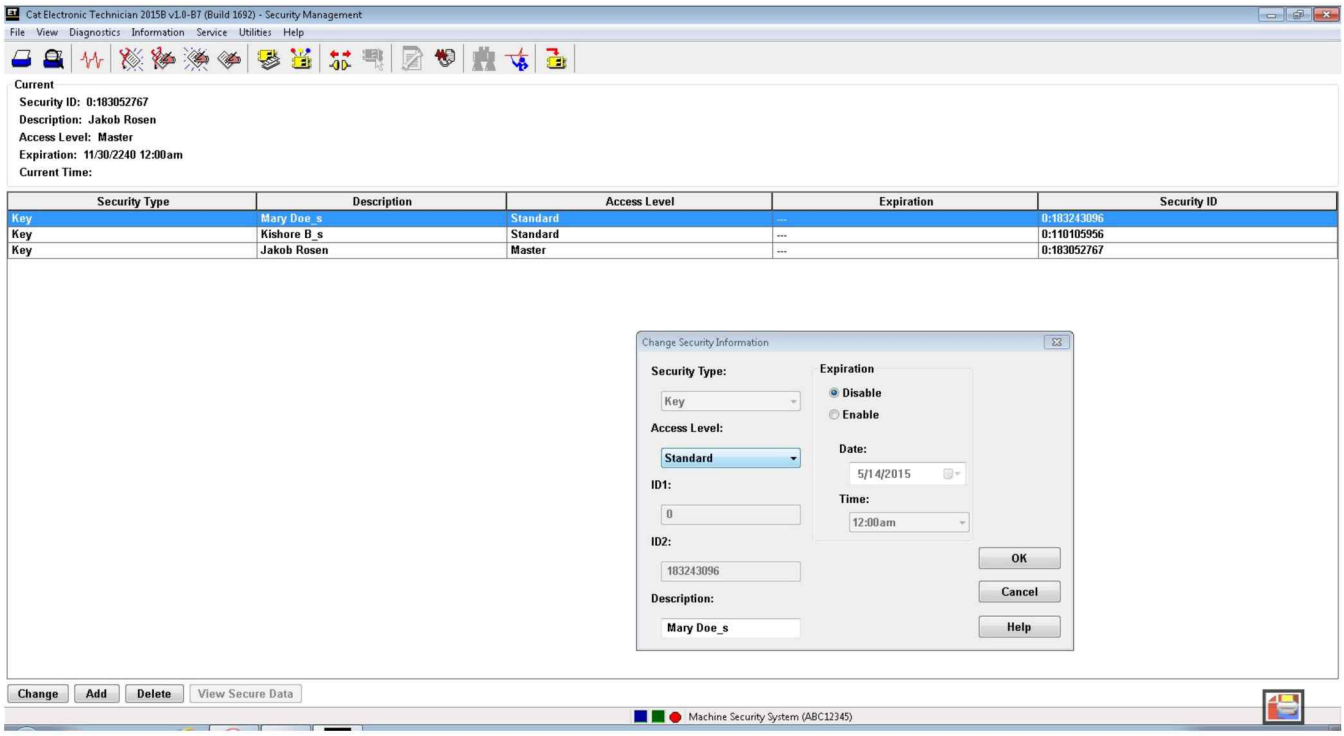

Illustration 9 g03859364

Change key information

The "Change" push button allows you to change the "Description", "Access Level" or "Expiration" of a key. ID1 and ID2 cannot be changed.

Note: The "Change" push button is disabled until a key is selected from the authorized list.

Note: When a function requires a factory level security password, the "Enter Factory Passwords" dialog box is displayed.

Note: Changing Keys requires a key with the master access level or a factory password.

Perform these steps in order to change the key information:

1. Highlight the key that you want to change. Press the "Change" push button. The "Change Key Information" dialog box is displayed.

OR

Double click the key you want to change. The "Change Key Information" dialog box is displayed.

2. Enter the changes you want to make. See "Adding Key Information" for more detail.

Deleting Key Information

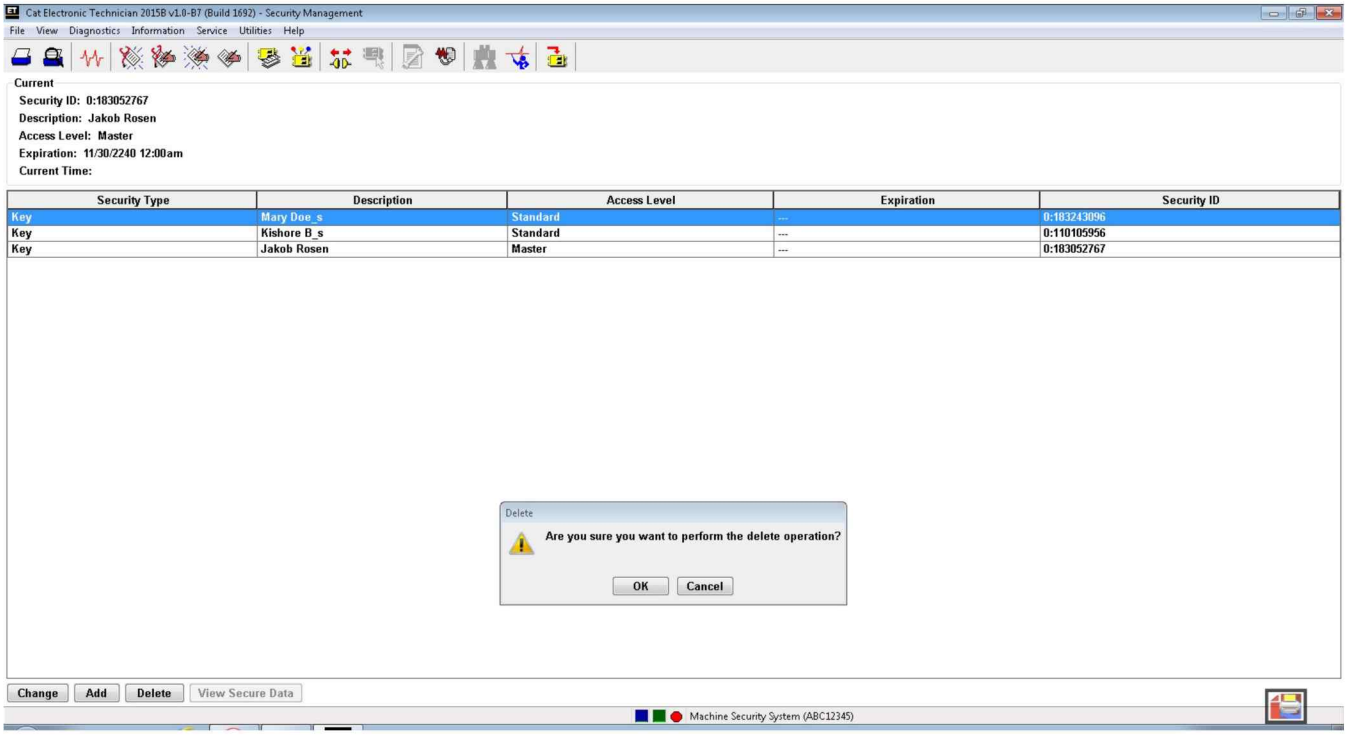

Illustration 10 g03859371
Delete Key

Note: You cannot delete the last Master key. An error message will display if you attempt to delete the last master access level key.

Note: Deleting Keys requires a key with master access level or a factory password.

To delete a key:

1. Highlight the key you want to delete. Press the “Delete” push button. The “Are you sure?” box is displayed.

2. Press “OK” if you want to delete the key. Press “Cancel” if you do not want to delete the key. You automatically return to the “Security Management” screen.

Adding A Password

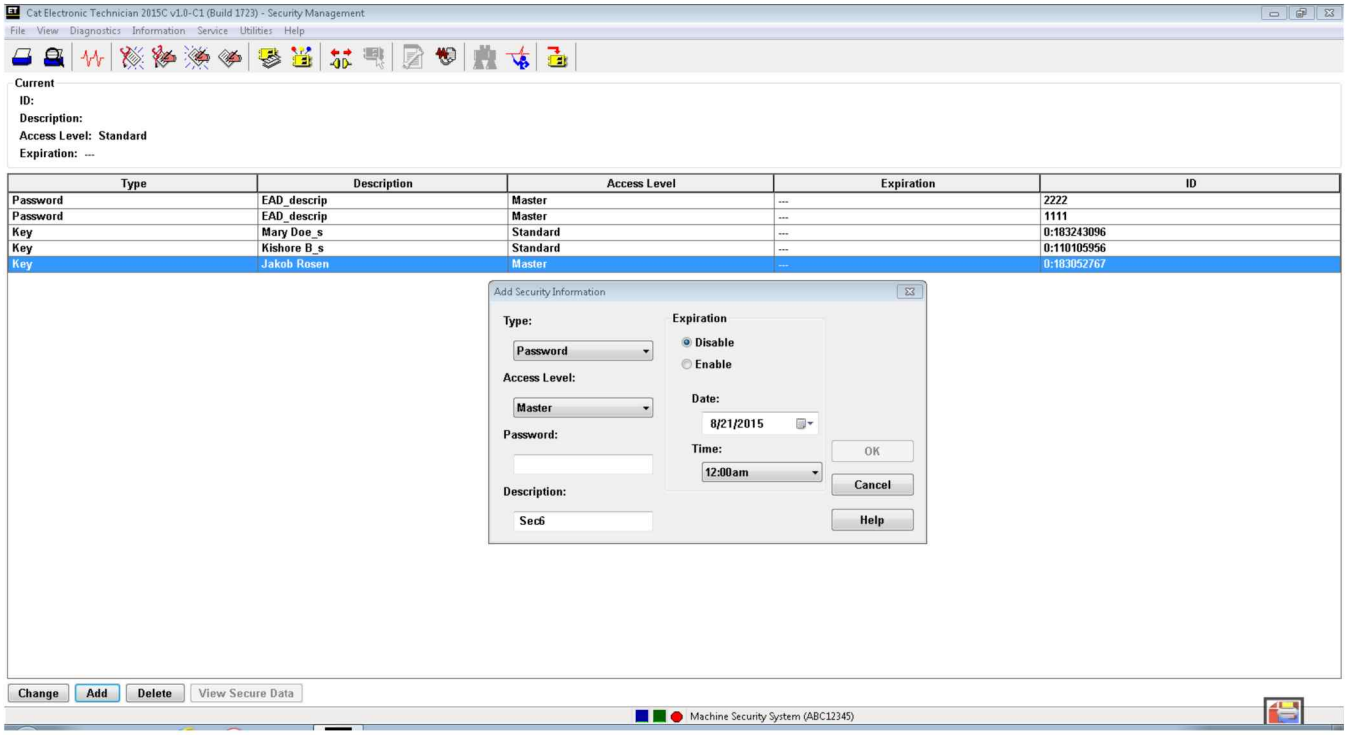

Illustration 11 g03882788

Note: Adding Passwords requires a key or password with the master access level or a factory password.

1. Insert a master key for that machine in the key start switch. Turn the key to the ON position. If a master key is not used, then a factory password is required. Alternatively a password entered through the on-screen keypad with master access can be used, if this feature is available on the machine.

2. Connect a laptop computer with the Caterpillar ® Electronic Technician to the ECM on the machine. Select the "Machine Security System" from the menu in the Cat ® ET.

3. Select the "Security Management Option" under the "Service Menu" in the ET.

4. Press the "Add" push button. The "Add Security Information" dialog box is displayed.

5. Enter the desired password into the "Password" box. Consult your User Manual for your machine for password limitations.

Note: The "ID1" field may contain a "0" .

6. Enter the name for the password in the "Description" box, if desired. The description may have up to 11 characters. If no description is entered, the description will default to "Sec#" . The # sign indicates a number. For example, "Sec1" , "Sec2" , "Sec..." .

Note: Duplicate names for the passwords in the list of "Security IDs" is not advisable.

7. Select the access level of the password from the "Access Level" menu.

8. Select an " "Expiration" button: "Disable" or "Enable" . "Disable" does not have an "Expiration Date" . If "Enable" is selected, enter the "Expiration Date" and "Expiration Time" for that password.

Note: Setting a password with "Master Level Access" to the "Enable" status with an expiration date will cause the password with "Master Level Access" to expire. If the "Master Level Access" password expires, you will no longer be able to use the password as a Master Level Access password.

9. Press the “OK” button in order to add the information for the password. The “Are you sure?” box is displayed. Press “OK” in order to add the password. Press “Cancel” in order to exit the “Add Security Information” dialog box without adding the information. Press “Help” to open on-line help for assistance.

PROOF

Changing A Password

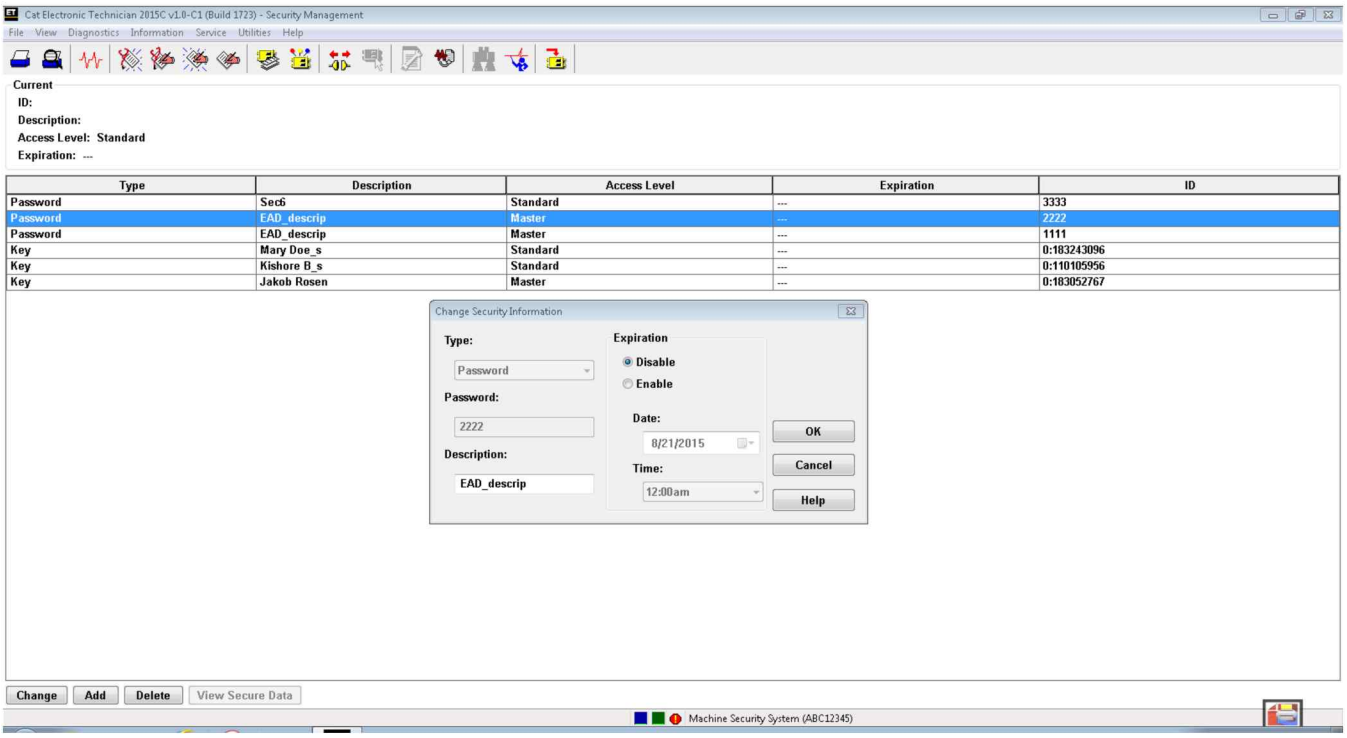

Illustration 12 g03882805

Changing a Password

Note: Changing Passwords requires a key or password with the master access level or a factory password.

1. Insert a master key for that machine in the key start switch. Turn the key to the ON position. If a master key is not used, then a factory password is required. Alternatively a password entered through the on-screen keypad with master access can be used, if this feature is available on the machine.

2. Connect a laptop computer with the Caterpillar ® Electronic Technician to the ECM on the machine. Select the "Machine Security System" from the menu in the Cat ® ET.

3. Select the "Security Management Option" under the "Service Menu" in the ET.

4. Press the "Change" push button. The "Change Security Information" dialog box is displayed.

5. Enter the desired password into the "Password" box. Consult your User Manual for your machine for password limitations.

Note: The "ID1" field may contain a "0".

6. Enter the name for the password in the "Description" box, if desired. The description may have up to 11 characters. If no description is entered, the description will default to "Sec#". The # sign indicates a number. For example, "Sec1", "Sec2", "Sec...".

Note: Duplicate names for the passwords in the list of "Security IDs" is not advisable.

7. Select the access level of the password from the "Access Level" menu.

8. Select an " "Expiration" button: "Disable" or "Enable". "Disable" does not have an "Expiration Date". If "Enable" is selected, enter the "Expiration Date" and "Expiration Time" for that password.

Note: Setting a password with "Master Level Access" to the "Enable" status with an expiration date will cause the password with "Master Level Access" to expire. If the "Master Level Access" password expires, you will no longer be able to use the password as a Master Level Access password.

9. Press the "OK" button in order to add the information for the password. The "Are you sure?" box is displayed. Press "OK" in order to add the password. Press "Cancel" in order to exit the "Add Security Information" dialog box without adding the information. Press "Help" to open on-line help for assistance.

Printing Key Information

Illustration 13 g03859373
Print Dialog Box

The "Print Document" dialog box allows you to send a report to a file, to a printer, or to the screen. The report includes the following information:

- Source of data
- Time
- Date of report generation
- ECM connection
- List of parameter values
- Information that is unique to the function that you are printing

To print a report to a file:

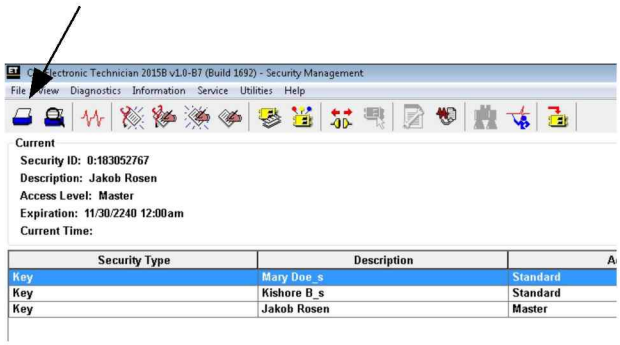

Illustration 14 g03878065
Print Icon On Tool Bar

1. Press the "Print Icon" in the upper left corner of the tool bar. See Illustration 14 . The "Print Document" box is displayed.

2. Press the "Print to File" button. Press "OK" in order to print the report. Press "Cancel" in order to exit the "Print Document" box without saving the file.

Note: The "Printing" box asks you to open a file, create a new file, or cancel, if you do not have a file open. Choose the appropriate button in order to continue.

Open: Press the "Open?" push button. The "Open File Dialog" box is displayed. Highlight a file and press the "Open" push button. The "Print New Document To File" box is displayed.

New: Press the "New?" push button. Enter a new file name into the "new file name" box. Press "OK" . The "Print New Document To File" dialog box is displayed.

Cancel: Press "Cancel" in order to exit the box. You return to the "Print Document" box.

3. In the "Print New Document To File" , enter a name for the document. Press "OK" . The "Print to File is complete" box is displayed. Press "OK" in order to return to the last active screen. Press "Cancel" in order to exit the "Print New Document To File" box.

To print a report to the printer:

1. Press the "Print Icon" in the upper left corner of the tool bar. See Illustration 14 . The "Print Document" dialog box is displayed.

2. Press the "Print to Printer" button and then press "OK" . The "Print to Printer is Complete" box is displayed. Press "OK" in order to return to the last active screen. Press "Cancel" in order to exit the "Print Document" box.

To print a report to the screen:

1. Press the "Print Icon" in the upper left corner of the tool bar. See Illustration 14 . The "Print Document" box is displayed.

PROOF

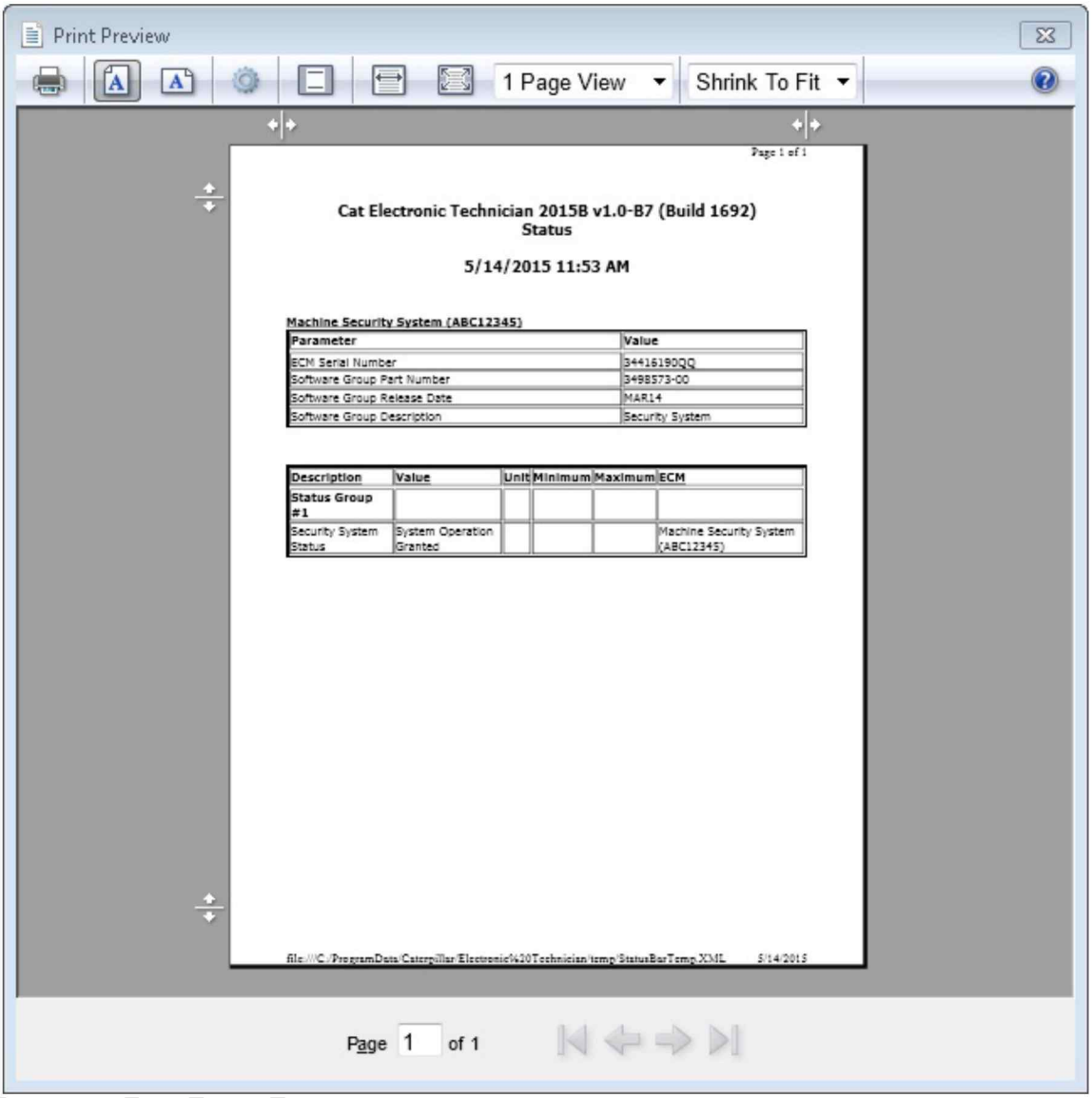

Illustration 15 g03859378
Typical ET screen for Security Management

2. Press the "Print Preview" button and then press "OK". The "Print Preview Screen" is displayed. Choose the appropriate push button to aid in viewing the document. "Print" prints the report to the printer. "Next Page" views the next page of the report. "Next Page" is disabled if you are on the last page of the report. "Prev Page" views the previous page of the report. "Prev Page" is disabled if you are on the first page of the report. "Two Page" displays two pages of the report. "Zoom In" magnifies the text. "Zoom In" is disabled when the text is fully magnified. "Zoom Out" decreases the size of the text. "Zoom Out" is disabled when the text is at normal size. "Close" will exit the preview.

See Testing and Adjusting, "Configuration" in order to copy and save key information to a file

i06195587

Scheduled Access - Program (Security System Bypass)

SMCS Code: 7631-591

Use the following procedure to change the Activation Periods of the Security System Bypass:

Note: Changing the MSS Bypass times requires you to use a key with master access level or a factory password.

1. Insert a key with Master Access Level in the key start switch and turn to the ON position.

2. Select "Service/Configuration" from the tool bar of the Cat ® ET. This selection will bring up the Configuration screen.

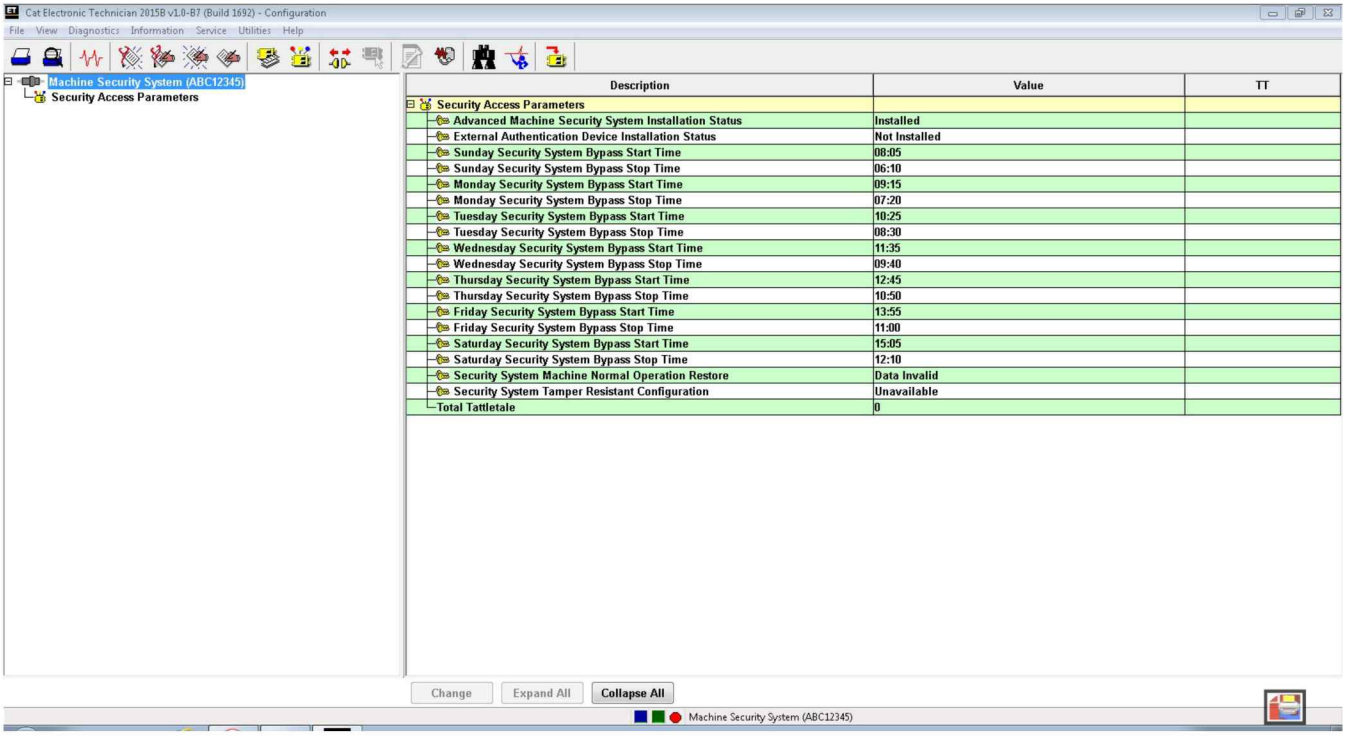

Illustration 16 g03859405
Typical ET screen

3. Highlight the "Security System Bypass Start Time" for the day that you want to set up. Press the "Change" push button at the bottom of the page. This push button will bring up the "Change Parameter Value" screen.

4. Enter the desired "start time" in the space that is provided. Then click the "OK" button.

   All times are based on a 24 hour clock. If you want the desired start time to be 6:00 am, then enter 06:00. If you want the desired start time to be 6:00 pm, then enter 18:00. Include the colon in the time setting or the MSS will not accept your entry.

5. Highlight the "Security System Bypass Stop Time" for the same day. Press the "Change" push button at the bottom of the page. This push button will bring up the "Change Parameter Value" screen. Enter the desired "stop time" in the space that is provided and click the "OK" button.

6. Repeat Steps 3 and 5 for all days which should have Bypass Activation Times.

7. To have the MSS armed 24 hours a day, repeat Steps 3 and 5 entering 00:00 as the "Start time" and 00:00 as the "Stop time".

Note: All times are based on a 24 hour clock. Refer to Testing and Adjusting, "Time - Set" for instructions on setting the date and the time of the MSS.

i06195588

Time - Set

SMCS Code: 7631-529

Set the correct date and time for the Machine Security System. Use the following procedure to set the date and time.

Note: Changing the MSS clock time requires a key with the master access level or a factory password. When the 30 second grace period is active, the MSS Status LED will be illuminated GREEN with the keyswitch in the OFF position.

1. Connect the Cat ® ET to the service connector via the communication adapter.
2. Place the Master Access Level Key into the key start switch and turn the key to the ON position.
3. Start the Cat ® ET.
4. Click on the "Connect" icon in the menu bar of the Cat ® ET.
5. Once the Cat ® ET has established communications with the MSS ECM, select the "ECM date/time" option from the "Service" menu. This selection will cause the Cat ® ET to display the following screen.

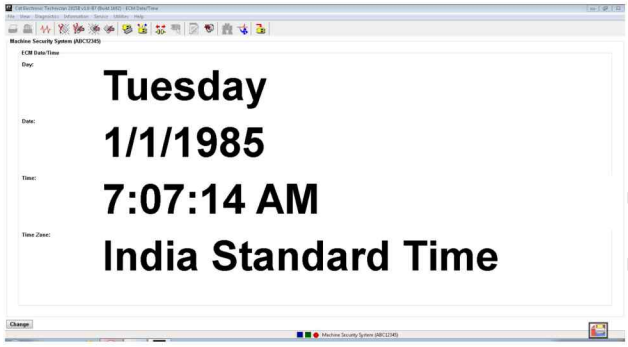

Illustration 17 g03859788
Date and Time

6. Press the "Change" button. This button will cause the "Date and Time" dialog box.

Illustration 18 g03859826
Time Zone

7. Select the local time zone from the drop-down list.

Illustration 19 g03859831
Local Date and Time

8. Enter the local date and time. Use an accurate time source.

Note: Laptop clocks are not accurate and may have a different time than the local time.

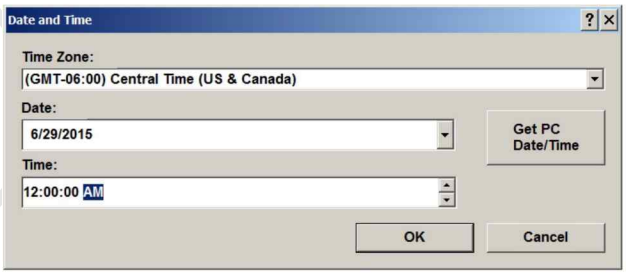

Illustration 20 g03859850
ET Display

9. Then press the "OK" button. The Cat ® ET will display the following message.

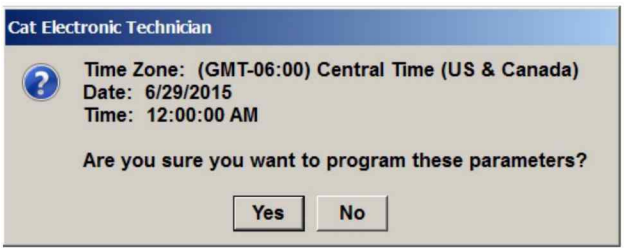

Illustration 21 g03859865
Cat ET Time Confirmation

10. Click on the "Yes" button in order to change the date and time or click on the "No" button in order to cancel the change. The Cat ® ET will display the new time on a 24-hour clock.

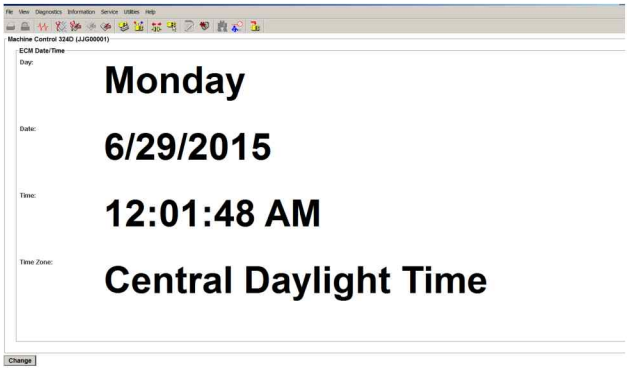

Illustration 22 g03859883
Cat ET Display 24 Hour Clock

i06195590

Factory Password - Obtain

SMCS Code: 7631-554-XW

You may use the following methods to obtain a factory password. The first method is via the Feature Protection System (FPS) via the Internet. The second method is via the telephone help line. The procedures for both methods are listed in the following sections.

Internet

1. The Feature Protection System (FPS) is a secure web site and a password is required. Proceed to step 1.a. if you do not have a "Login ID" and a "Password" . Proceed to step 2 if you already have a "Login ID" and a "Password" .

a. Refer to the "Telephone Help Line" section or see your Caterpillar dealer in order to obtain the factory password.

2. Open your web browser. Enter the address for the Factory Password System (FPS) ("http://fps.cat.com") in the address bar of the web browser.

Upon accessing FPS, the "Corporate Web Security" web site will appear.

PROOF

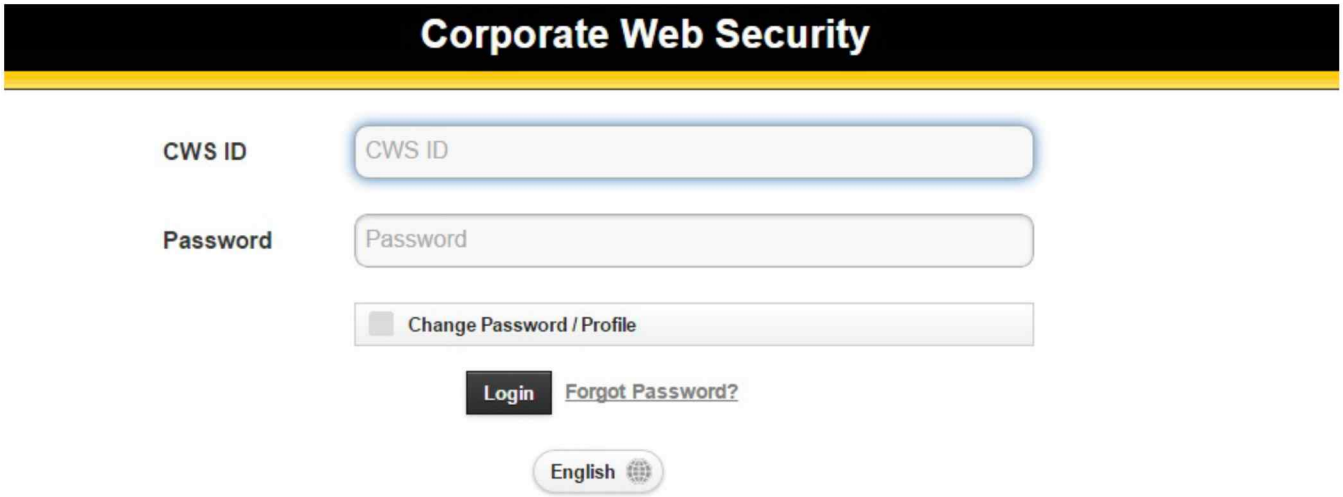

Illustration 23 g03859949

Login ID

3. Enter your “Login ID” and “Password” into the “Corporate Web Security” site. Refer to Illustration 23 .

PROOF

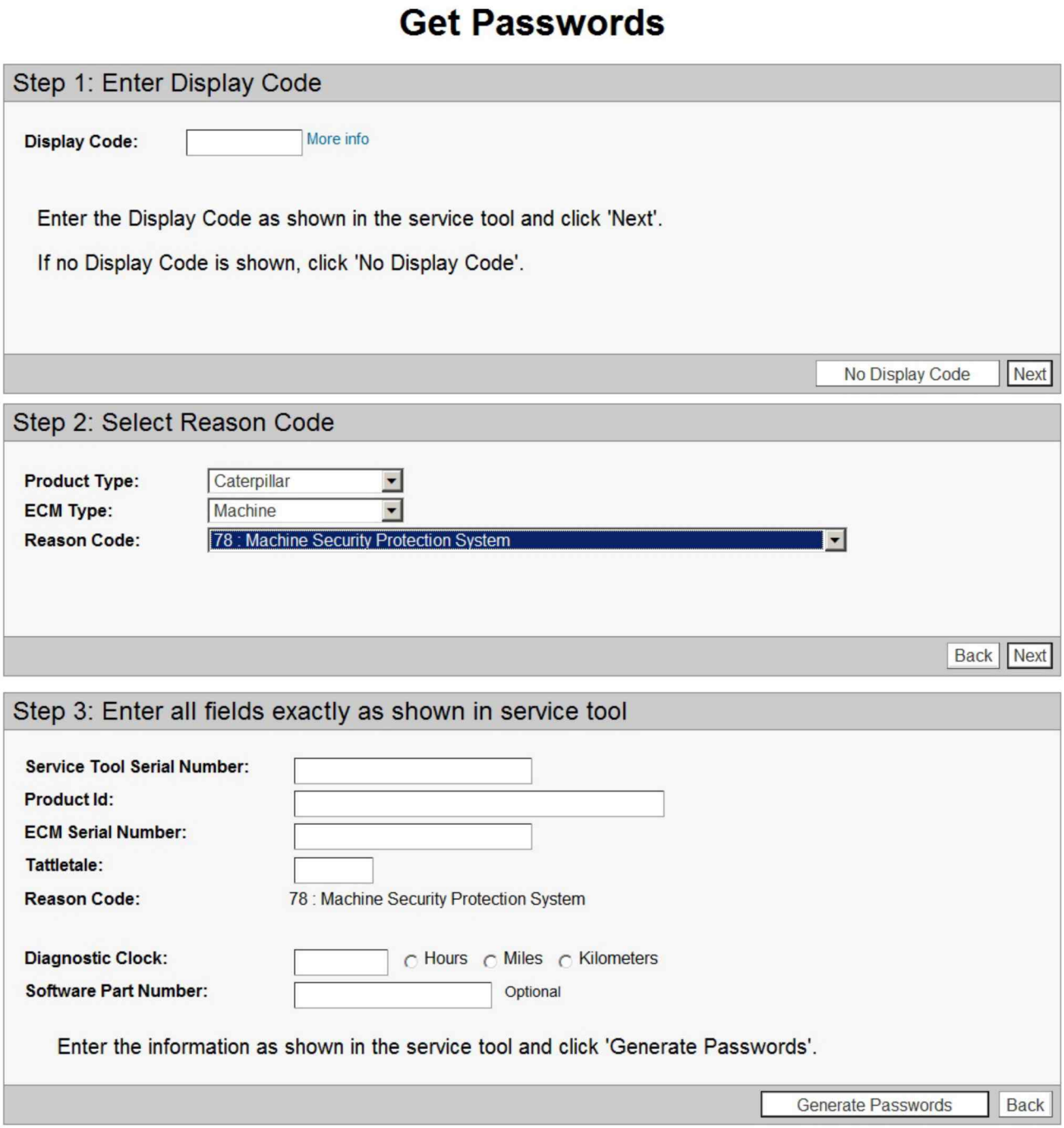

Illustration 24 g03859954
Product Serial Number

4. Enter the following information:

- “Product Serial Number”
- “Engine Units”

Note: Enter the hours that are displayed on the service hour meter in the “Engine Units” block. Select “Hours” as the unit.

- “Service Tool Serial Number”

- “ECM Serial Number”
- “Total Tattletale Value”
- “Reason Code”

Note: The “Rerate” section is not used with the Machine Security System. Do NOT enter information in this section.

Note: The information that is listed above may be obtained from the “Enter Factory Passwords” screen in the Caterpillar Electronic Technician (ET). Refer to Illustration 25 .

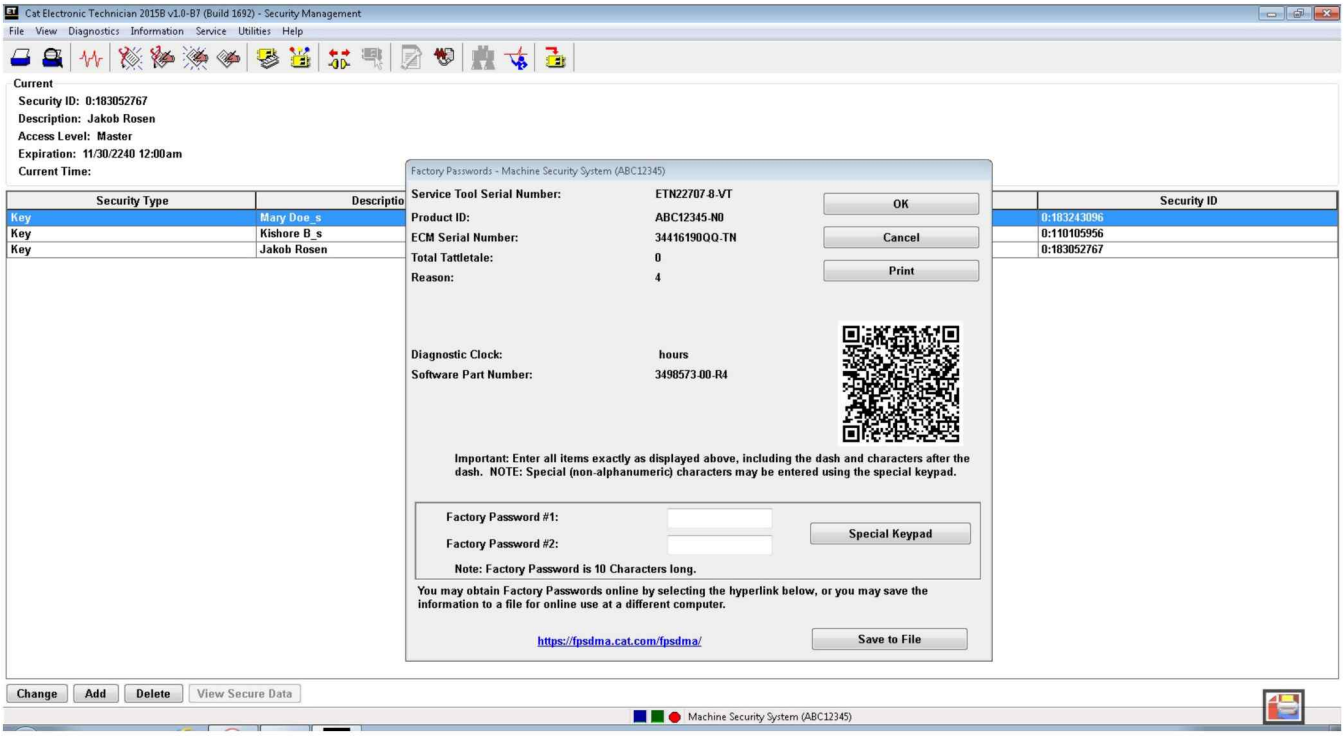

Illustration 25 g03859962
Factory Password

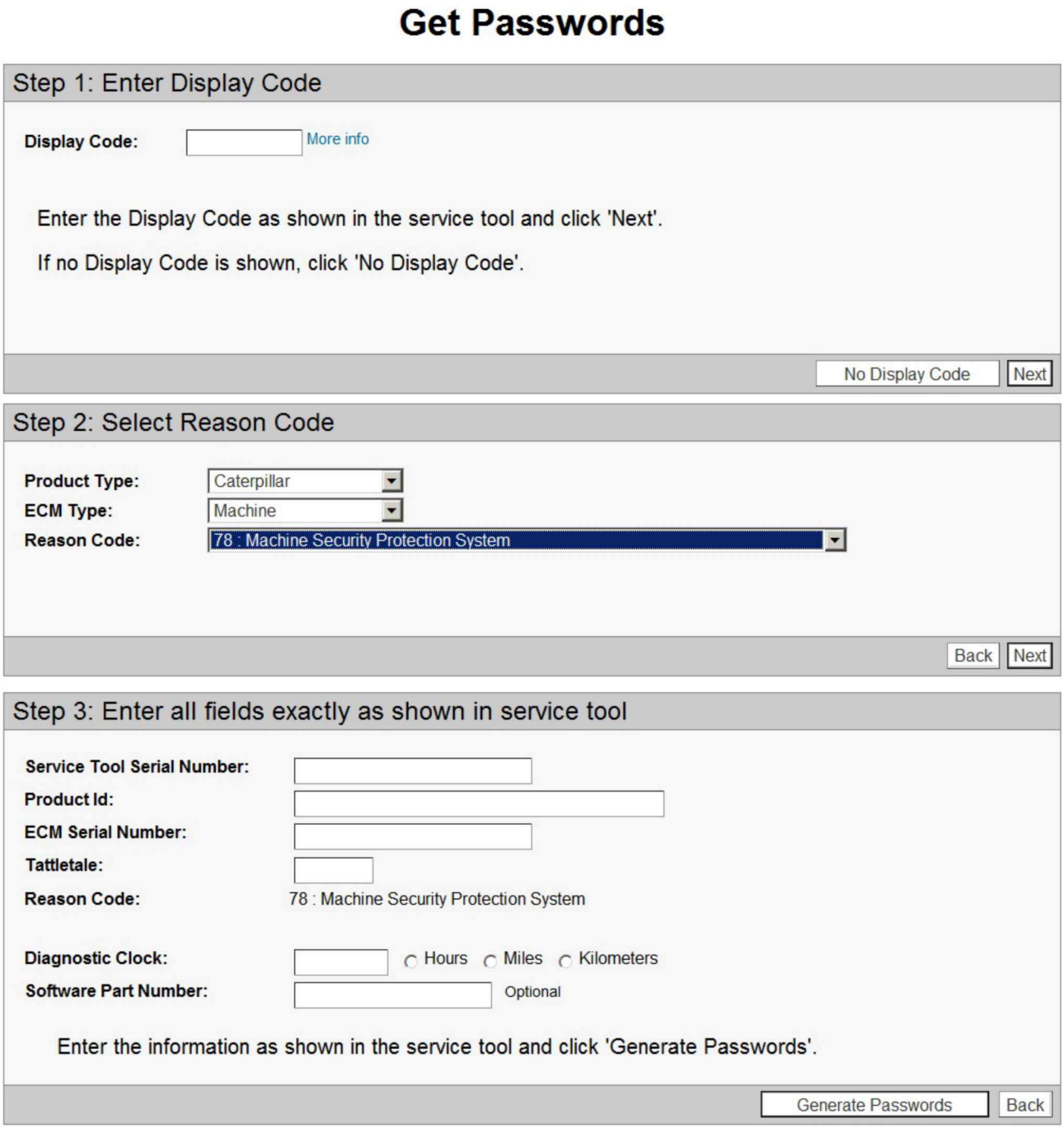

Illustration 26 g03859985

Generated Password

5. Enter all the required information. Then click the “Generate Password” button. The passwords will then be generated.

Illustration 27 g03879847
Factory Password Screen

6. Record both of the factory passwords.

Note: Both passwords are required, in order to change any parameters of the Machine Security System.

Telephone Help Line

The telephone help line for factory passwords is available at the telephone number that is listed below:

(309) 636-8500

Note: (309) 636-8500 is also the telephone number for the Dealer Solutions Network (DSN).

The telephone help line will need the information that is listed in order to obtain the password:

- “Product Serial Number”
- Service Meter Hours (“Engine Unit Block”)
- Serial number of the Service Tool (Electronic Technician)
- Serial Number of the Machine ECM
- Total Tattletale Value
- Reason Code

Note: The information that is listed “Telephone Help Line” may be obtained from the “Enter Factory Passwords” screen in the Caterpillar ® Electronic Technician (ET). Refer to Illustration 27 .

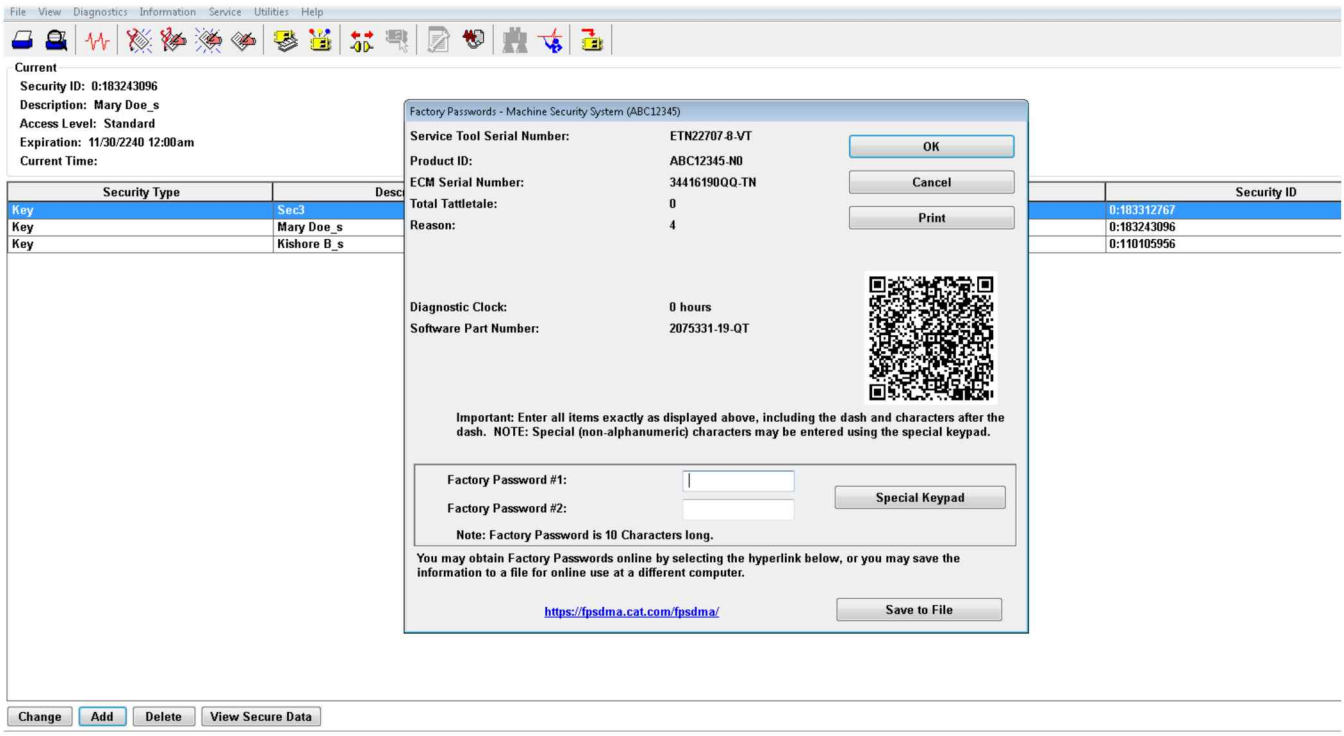

Illustration 28 g03864337

i06195595

Configuration

SMCS Code: 7631-025

“Fleet/Key Configuration”

The “Fleet/Key Configuration” function allows you to configure and manage a Machine Security System (MSS) enabled machine or a set of machines. The function allows you to program, load, and save a set of configuration parameters and key information. The information can be loaded from or programmed to the MSS. This information can also be saved to or loaded from a file.

Once a file is saved in “Fleet/Key Configuration” , File Management can be used to export the file as a *. MSS file. The exported *.MSS file can then be imported into the MSS Key Management Software program, for management of the “Fleet/Key” information.

Loading Data from the ECM

1. Connect the service tool to the Machine Security System ECM that you want to copy.
2. Select “Copy Configuration” from the “Service” menu, and then select “Fleet/Key Configuration” from the submenu.

Note: Changing the "Fleet/Key Configuration" requires a key with master access level or a factory password.

3. If there is no recently loaded data available, the "No data is available..." message box will display.

4. Press "Yes" to load data from the ECM. The "ECM Selector" dialog box displays.

Press "No" if you do not want to load data. The "Fleet/Key Configuration blank screen" displays.

Note: Pressing the "Load from ECM" push button from the "Fleet/Key Configuration" screen also displays the "ECM Selector" dialog box.

5. Highlight the Machine Security System ECM you wish to copy from and then press "OK" . As the data is loading from the ECM, the "Please wait" message displays. Then, the "Loading data from ECM" progress bar displays.

6. Press "Cancel" to exit the "ECM Selector" dialog box. Press "Help" to open online help for assistance.

You can cancel the loading process at any time, by pressing the "Cancel" push button. The "Are you sure..." message box displays. Press "Yes" to cancel loading the data or press "No" not to cancel loading the data.

7. When the data has been successfully loaded, "The data has been successfully loaded" message box displays.

8. Press "OK" . The "Fleet/Key Configuration" screen displays with the "Program ECM" and the "Save to File" push buttons are enabled.

Note: The data must be saved to a file before you disconnect from the service tool or the data is lost.

Saving the Configuration to a File

1. Press the "Save to File" push button. The "Print New Document to File" dialog box displays.

Note: If you do not have a file open, the "Printing" dialog box asks you to open a file, create a new file, or cancel. Choose the appropriate button to continue.

PROOF

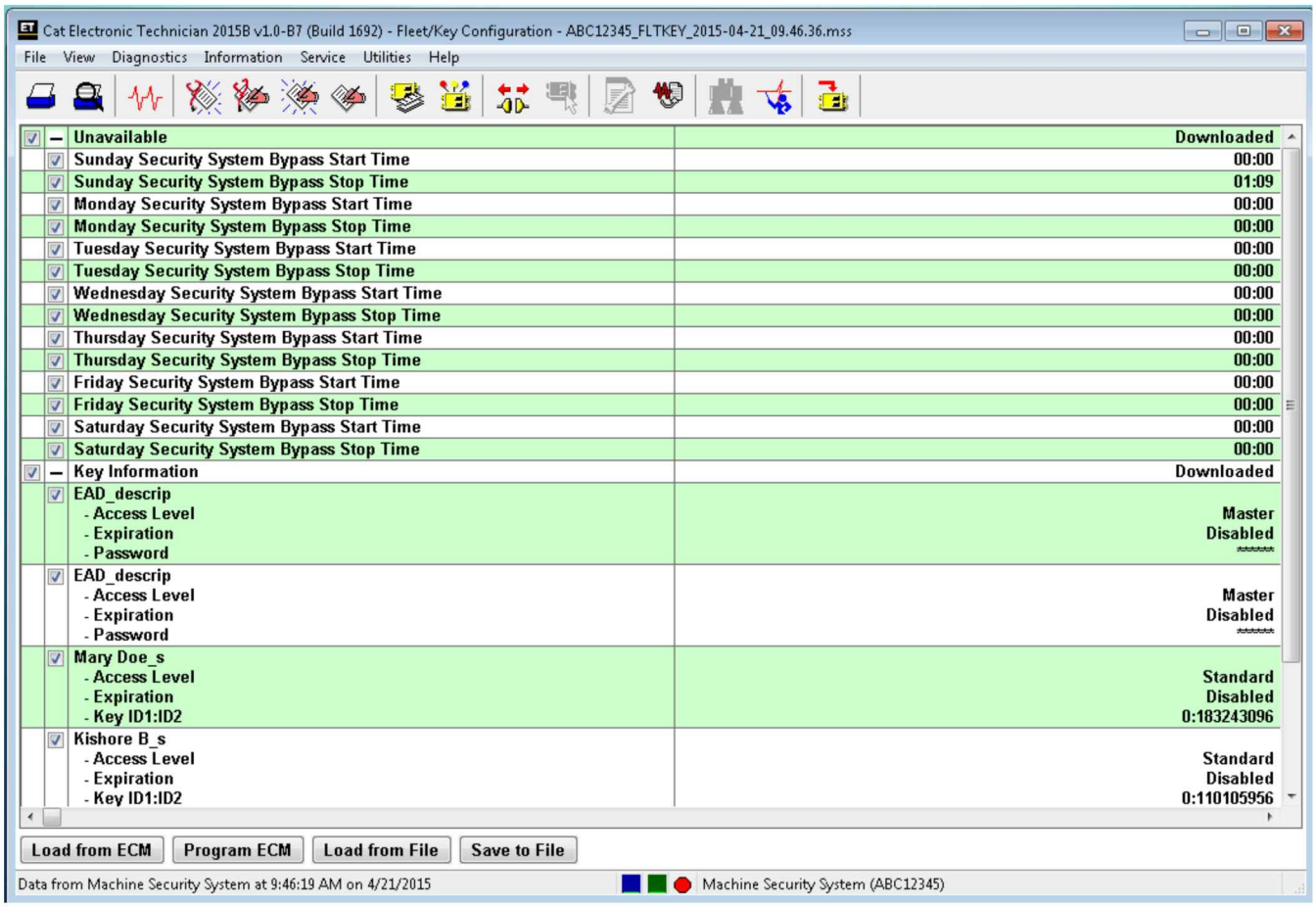

Illustration 29 g03864372
Saving Configuration to a File

2. Enter a document name and description in the appropriate text boxes. Press the "OK" button. The "Fleet/Key Configuration saved successfully" message box displays. Press the "Cancel" push button to exit the "Print New Document To File" dialog box without saving the file. You will return to the "Fleet Configuration" dialog box.

3. Press "OK" to return to the "Fleet/Key Configuration" screen.

Loading Data from a File

1. Connect the service tool to the ECM to be programmed.

2. Select "Copy Configuration" from the "Service" menu, and then select "Fleet/Key Configuration" from the submenu.

If there is no recently loaded data available, the "No data is available..." message box displays.

3. Press "No" that you do not want to load data from the ECM. The "Fleet/Key Configuration screen" displays.

4. Press the "Load from File" push button. The "File Management" dialog box displays.

5. If the "Load from File" push button is pressed with unsaved data on the "Fleet/Key Configuration" screen, a message box displays asking if you want to save changes.

6. From the " File Management" dialog box, highlight the file from the "Files" list box. Next highlight the "Fleet/Key Configuration document" that you want to load from the "Documents" list box.

7. Open the document. As the data loads, a progress bar displays. Then, the "Fleet Configuration" message box displays.

8. Press "OK" . The "Fleet/Key Configuration" screen displays with the file data.

Programming the ECM

Note: The data must be loaded from a file before you can program an ECM.

Note: Keys that are already programmed into the ECM can be unchecked from the "Fleet/Key Configuration" screen. This unchecking method is only a time saving measure. If you do not uncheck the keys, the "Program ECM" message box displays. This message box lists all keys that were not programmed because the keys were already stored.

Press the "Program ECM" push button. The "ECM Selector" dialog box displays.

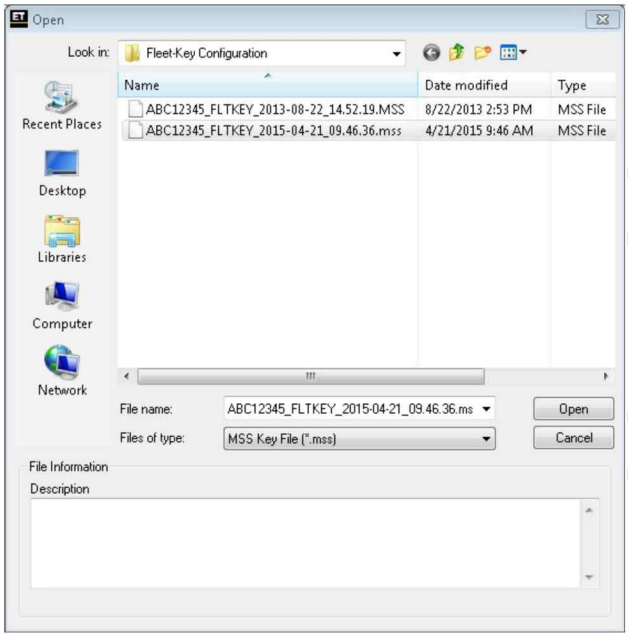

Illustration 30 g03860018
ECM Selector dialog box

Highlight an ECM and press "OK" The "Please wait" message box displays. Then the "Testing ECM" progress bar displays.

You can cancel the uploading process at any time, by pressing the "Cancel" push button. The "Are you sure..." message box displays. Press "Yes" to cancel uploading the data or "No" not to cancel.

Refer to the following procedures when you "Append" or "Replace" the key list. Refer to the "Append" section to append the list. Refer to the "Replace" section to replace the list.

Append

1. Connect the service tool to the ECM to be programmed.
2. Start the Caterpillar Electronic Technician (ET)

Note: This procedure requires Caterpillar Electronic Technician (ET) version 2002A or later.

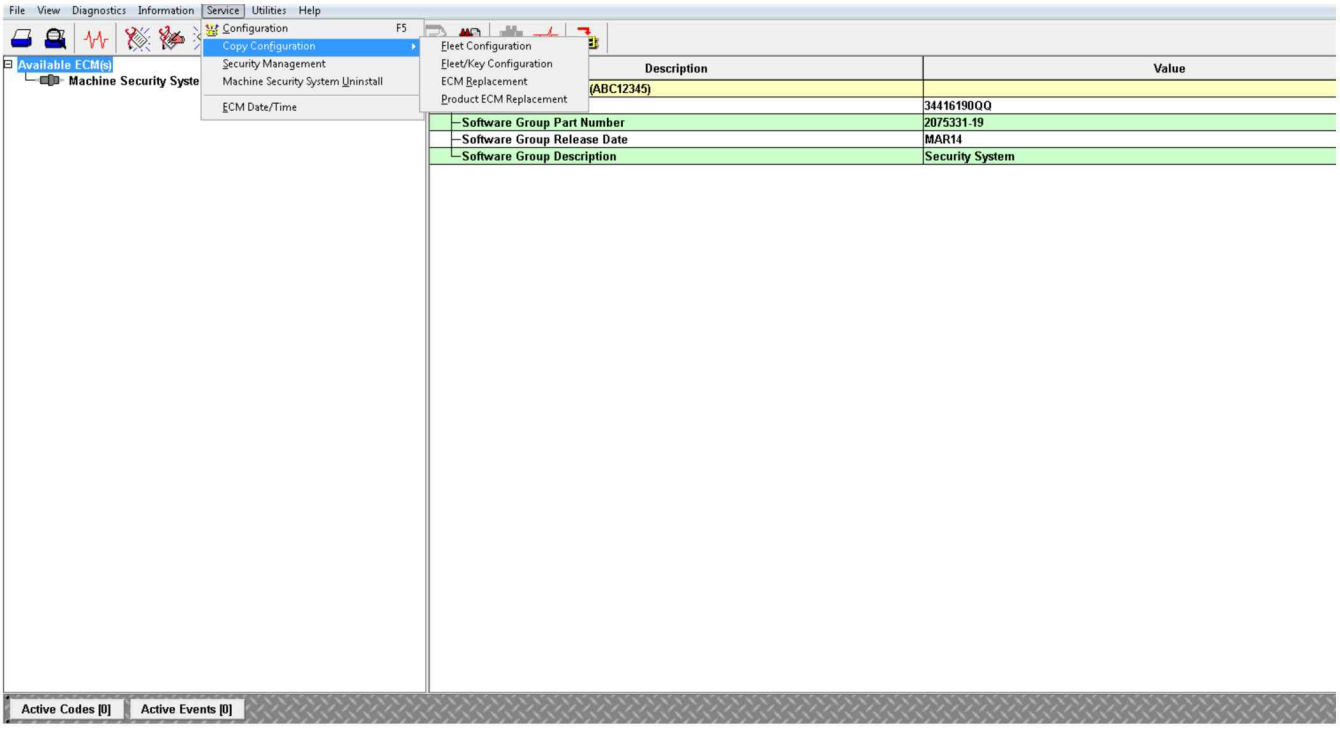

Illustration 31 g03864388

Copy Configuration, Service Menu, Fleet/Key Configuration

3. Select "Copy Configuration" from the "Service" menu, and then select "Fleet/Key Configuration" from the submenu.

4. Open the document. As the data loads, a progress bar displays. Then, the "Fleet Configuration" message box displays.

5. Press "OK" . The "Fleet/Key Configuration" screen displays with the file data.

6. Click on the "Program ECM" button. This button displays the Fleet key information box.

Illustration 32 g03864392

Append

7. Click on the “Append” button.

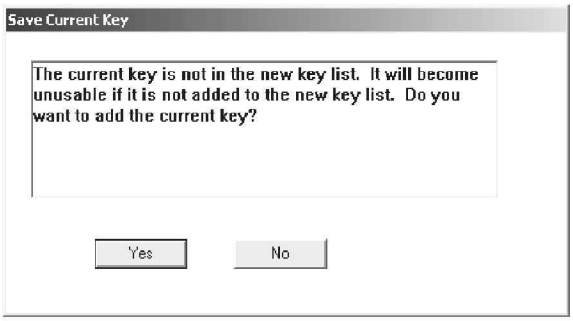

Illustration 33 g00900409

8. Click on the “Yes” button if you are prompted.

When the data has been successfully uploaded, the “Programming complete.” message box displays. Press “OK”

Note: MSS can store a maximum number of 50 keys at one time. “Fleet/Key Configuration” determines the number of keys slots not programmed on the MSS. You cannot program more keys than the maximum number allowed. A message box displays informing you of the number of key slots available or that there are no more key slots are available. Remove enough keys in order to add new key information.

STOP.

Replace

1. Connect the service tool to the ECM to be programmed.

Note: This procedure requires Caterpillar Electronic Technician (ET) version 2015A or later.

2. Start the Caterpillar Electronic Technician (ET)

PROOF

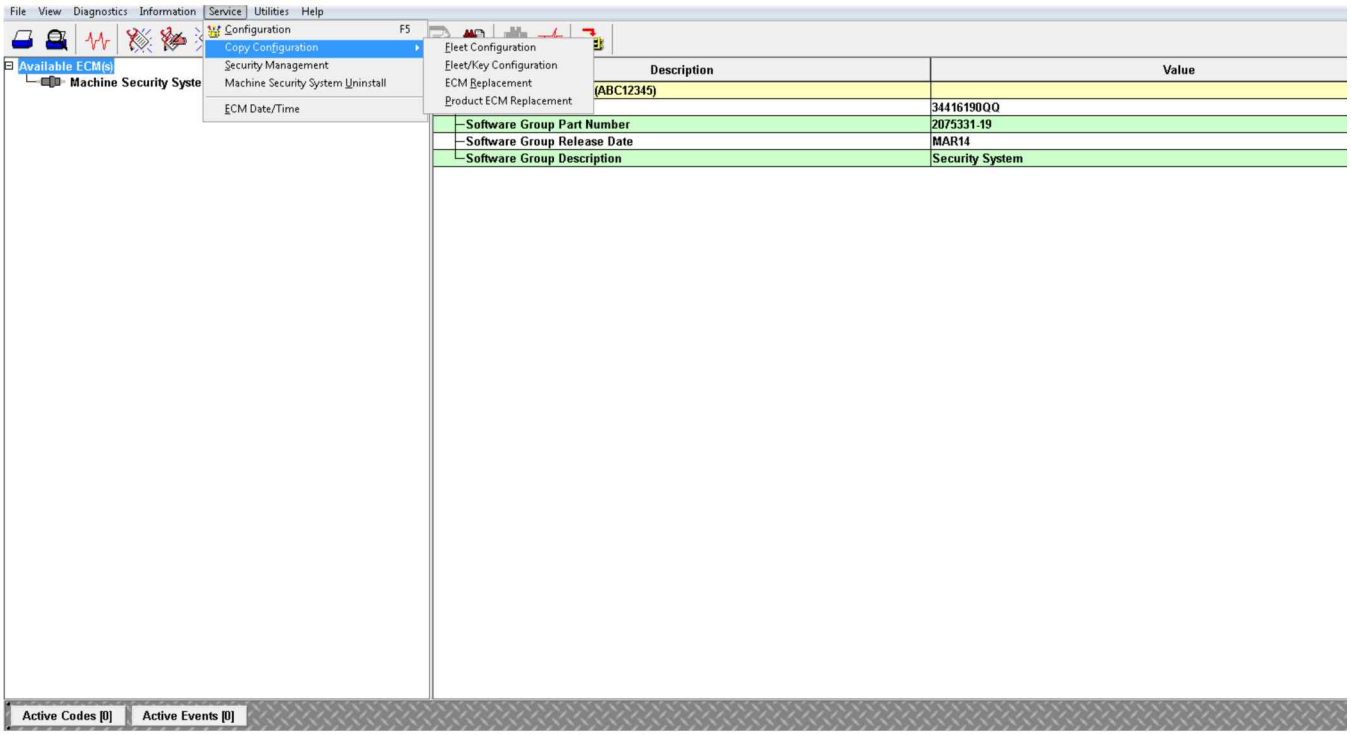

Illustration 34 g03864422

Copy Configuration, Service Menu

3. Select "Copy Configuration" from the "Service" menu, and then select "Fleet/Key Configuration" from the submenu.

4. From the " File Management" dialog box, highlight the file from the "Files" list box. Next highlight the "Fleet/Key Configuration document" that you want to load from the "Documents" list box.

5. Open the document. As the data loads, a progress bar displays. Then, the "Fleet Configuration" message box displays.

6. Press "OK" . The "Fleet/Key Configuration" screen displays with the file data.

7. Click on the "Program ECM" button. The Fleet

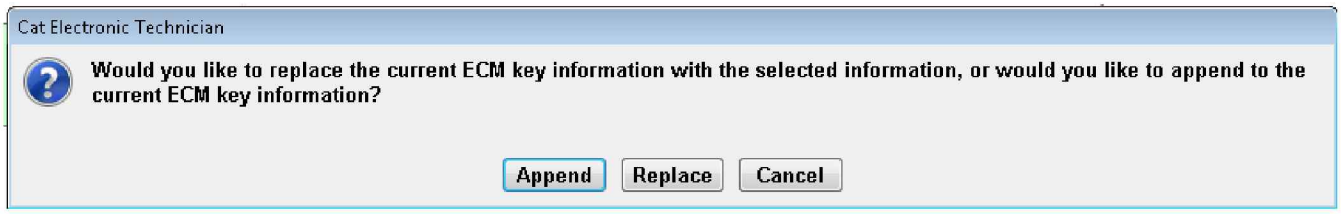

Illustration 35 g03864431

Replace

8. Click on the "Replace" button.

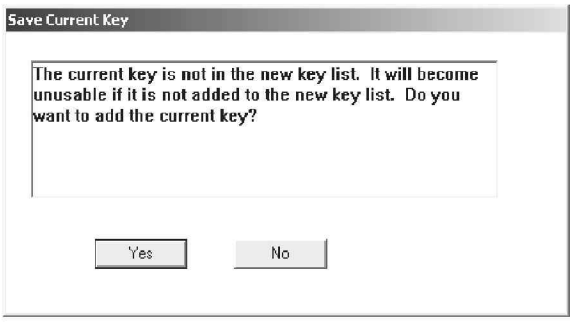

Illustration 36 g00900409

9. Click on the "No" button if you are prompted.

When the data has been successfully uploaded, the "Programming complete." message box displays. Press "OK"

Note: MSS can store a maximum number of 50 keys at one time. "Fleet/Key Configuration" determines the number of keys slots not programmed on the MSS. You cannot program more keys than the maximum number allowed. A message box displays informing you of the number of key slots available or that there are no more key slots are available. Remove enough keys in order to add new key information.

STOP.

i06195599

Machine Security System - Uninstall

SMCS Code: 7631-011

Use the following procedure in order to uninstall the Machine Security System (MSS) permanently.

Note: You will need to obtain a factory password in order to perform this procedure. A master electronic key will not allow the user to uninstall the Machine Security System. Refer to the Testing and Adjusting, "Factory Password - Obtain" section of this manual for information on obtaining a factory password.

Note: One factory password is required in order to uninstall MSS premium software from the ECM that the software is integrated with.

Note: An alternative to uninstalling the MSS software is to use a master key in order to bypass the security system. Refer to the Testing and Adjusting, "Scheduled Access - Program".

1. Connect a laptop Computer with the Caterpillar ® ET to the machine via the communication adapter.

2. Place a key in the key start switch.

3. Turn the key to the "ON" position.

4. Start the Electronic Technician and establish communications with the machine MSS3i ECM.

5. Select "Service/Configuration" from the toolbar on the Cat ® ET. This selection will bring up the configuration screen.

6. Highlight the "Machine Security System Installation Status" and select the "Change" button at the bottom of the page. This button will bring up the "Enter Factory Password Screen" .

7. Obtain a factory password. Refer to the Testing and Adjusting, “Factory Password - Obtain” section of this manual for information on obtaining a factory password.

8. Change the value to “Not Installed” .

9. Remove the electronic key reader hardware and plug the connector.

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Glossary of Terms

SMCS Code: 7631

Armed – The state of the security system when the machine is disabled.

CAN Data Link (CAN) – The CAN data link is an electrical connection for communication with onboard devices.

Disarmed – The state of the security system when the machine is able to operate normally.

Electronic Control Module – The portion of the MSS that contains the microprocessor and memory

Electronic Key Reader – The electronic key reader module sends key information to the ECM. The information is transmitted from the exciter coil to the key reader module.

EID – Event Identifier

Exciter Coil – The exciter coil is a small coil of fine wire. The wire is molded into the bezel of a keyswitch with harness wiring. The exciter coil provides a path of communication. The electronic key and the electronic control module communicate via radio frequency.

Factory Password – Protects the machine when using the service tool. The password must be used when any modifications are done to the MSS.

Immobilizer – The Machine Security System Immobilizer is a feature within another ECM (Engine and/or Transmission). This feature restricts the operation of the machine until the Machine Security System disarms.

Master Access Level – A level of access to permit the operation of the machine. In addition, the key allows the user to add new keys into the ECM and allows MSS settings to be modified without a factory password. Also, keys that are already programmed can be modified.

MSS – Machine Security System

PID – A parameter identifier is used to identify specific parameters that are used by the MSS.

Product ID – The Product ID is an 8 digit alphanumeric number that identifies the machine.

Programming – Programming refers to the process of storing information in the memory of the control module.

Software Enable Attachment – A feature or function on a machine that uses software in order to enable the functionality. The actual software used to accomplish the function is embedded in the standard machine software (flash file). The feature requires a factory level password in order to activate.

Standard Access Level – Keys that are programmed for this level of access permit the operation of the machine.

Tattletale – The tattletale is a counter in the ECM that is used as part of the calculation for the factory password. The tattletale is incremented after a factory password is used. The affected parameter will have an increase in the specific parameter of the tattletale and the total tattletale will reflect the increase as well. Once you use the factory password, the factory password will no longer be valid. To make a change on the same ECM at a later date, another password will be required.

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System Schematic

SMCS Code: 7566

Refer to the corresponding schematic of the machine or Special Instruction.

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