



# **3M™ Dynatel™ 1420X-iD Locators**

# **3M™ Dynatel™ 7420X-iD Locators**

Operator Manual



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## Introduction

|                                    |                                     |
|------------------------------------|-------------------------------------|
| 3M™ Dynatel™ Locators 1420X Series | 3M™ Dynatel™ Locators 1420XE Series |
| 3M™ Dynatel™ Locators 7420X Series | 3M™ Dynatel™ Locators 7420XE Series |

The 3M Dynatel Locator 1420X and 1420XE series and 3M Dynatel Locator 7420X and 7420XE series locators equip a locate professional with the following technologies for underground locating and mapping:

- Receiver with Bluetooth® wireless technology
- Integrated USB port is compatible with USB Type-C® Connector
- Internal GPS that can be saved internally or directly to a memory stick that is compatible with USB Type-C connector
- RFID Marker write/read/locate capabilities
- EMS Path Marking Antennas (3M Dynatel Locator 7420X and 7420XE)
- Multiple EMS antennas for maximum locate capabilities (3M Dynatel Locator 7420X and 7420XE)
- Large LCD display with image driven graphical interface

Visit our website at [www.3m.com/dynatel](http://www.3m.com/dynatel) for product information.

## Regulatory Link

Visit [www.3m.com/dynatel-regulatory](http://www.3m.com/dynatel-regulatory) for regulatory information.

## Wireless Technology

The 3M Dynatel Locator 1420X and 1420XE series and 3M Dynatel Locator 7420X and 7420XE series feature Bluetooth 5.0 wireless module at 2.4 GHz.

## Compliance

|                                                        |                                                                    |
|--------------------------------------------------------|--------------------------------------------------------------------|
| <b>1420X &amp; 7420X FCC Compliance</b>                | <b>1420XE &amp; 7420XE EU Compliance</b>                           |
| This equipment complies with Part 15 of the FCC Rules. | This product complies with EU Directives: RED Directive 2014/53/EU |

## Regulatory Information for X Model Locators

Supplier's Declaration of Conformity for the following 3M Company manufactured product(s):

Trade Name: 3M™ Dynatel™

Model(s): 1420X, 7420X

This device complies with Part 15 of the FCC Rules and Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Cet appareil est conforme à la partie 15 des règles de la FCC et aux RSS exempts de licence d'Innovation, Sciences et Développement économique Canada. Son fonctionnement est soumis aux deux conditions suivantes:

1. Cet appareil ne doit pas provoquer d'interférences nuisibles, et
2. Cet appareil doit accepter toute interférence reçue, y compris les interférences pouvant entraîner un fonctionnement indésirable.

#### Responsible Party – US Contact information:

3M Company

3M Business Center - Austin, 13011 McCallen Pass Bldg. C

Austin, TX 78753

Phone: 800-200-0265

[www.3m.com/dynatel](http://www.3m.com/dynatel)

Contains FCC ID: XF6-M7DB6 and IC: 8407A-M7DB6

Innovation, Science and Economic Development Canada ICES-003 Compliance information :

CAN ICES-3 (A)/NMB-3(A)

Canada 310

#### RF Exposure statement

This equipment complies with RED, FCC and ISED radiation exposure limits set forth for an uncontrolled environment. To reduce exposure to RF energy this equipment should be operated with minimum distance of at least 20 cm between the antenna used for this transmitter and your body during normal operation.

Equipment is for use by trained operators only and not for general household use. Usage duration shall be as short as possible to prevent possible radio interference to authorized services, especially the 100 kHz eLoran frequency.

#### Déclaration d'exposition RF

Cet équipement est conforme aux limites d'exposition aux rayonnements RED, FCC et ISED établies pour un environnement non contrôlé. Pour réduire l'exposition à l'énergie RF, cet équipement doit fonctionner avec une distance minimale d'au moins 20 cm entre l'antenne utilisée pour cet émetteur et votre corps pendant le fonctionnement normal.

L'équipement est destiné uniquement à des opérateurs formés et non à un usage domestique général. La durée d'utilisation doit être aussi courte que possible afin d'éviter d'éventuelles interférences radio avec les services autorisés, en particulier la fréquence eLoran de 100 kHz.

## Support and Service

Both the Receiver and the Transmitter are calibrated in the manufacturing process.

This equipment does not require annual calibration or maintenance.

3M Repair and Service

1-800-200-0265 Opt. 1

Product Application Support

1-800-245-3573 Opt. 3

Customer Service

1-800-200-0265 Opt. 2

Canadian Repair and Service

1-800-268-6235

[caservice@mmm.com](mailto:caservice@mmm.com)

#### EMEA Locating & Marking Application Support

Frank van Meijl | Specialist Application Engineer

Electrical Markets Division

3M D-A-CH Region

3M Deutschland GmbH | Carl-Schurz-Str. 1 | 41453 Neuss | Germany

Office: +49 2131 14 5897 | Mobile: +49 160 9062 9295

[fvanmeijl@mmm.com](mailto:fvanmeijl@mmm.com)

## Cleaning Receiver and Transmitter Units

To clean the receiver and transmitter units, wipe with a damp cloth.

## Safety

Please read, understand and follow all safety information contained in these instructions prior to the use of the 3M™ Dynatel™ 1420X-iD Locators and 3M™ Dynatel™ 7420X-iD Locators. Retain these instructions for future reference.

## Intended Use

The 3M Dynatel 1420X-iD Locators are designed and tested for use in locating:

- 3M™ EMS Markers
- 3M™ EMS-iD Markers

The 3M Dynatel 7420X-iD Locators are designed and tested for use in locating:

- 3M™ EMS Path Marking Marking Solutions
- 3M EMS Markers
- 3M EMS-iD Markers. 3M caution tape and markers are used to identify buried utilities and structures.

If this equipment is used in a manner not specified by 3M, the protections provided by the equipment may be impaired.

| Explanation of Signal Word Consequences                                                           |                                                                                                                         |
|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
|  <b>WARNING:</b> | Indicates a hazardous situation which, if not avoided, could result in serious injury or death                          |
|  <b>CAUTION:</b> | Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury and/or property damage. |
| <b>NOTICE:</b>                                                                                    | Indicates a situation which, if not avoided, could result in property damage.                                           |

| Explanation of Product Safety Label Symbols                                         |                                                                                                                                        |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
|  | Do not throw away in normal trash                                                                                                      |
|  | Do not apply around or remove from UNINSULATED HAZARDOUS LIVE conductors, which may render electric shock, electric burn, or arc flash |

**⚠ WARNING** - This equipment is compliant with Class A. Operation of this equipment in a residential environment could cause radio interference.

|                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>⚠ WARNING</b>                                                                                                                                                             |
| To reduce the risks associated with hazardous voltage and fire:<br>-Do not operate the device if it has a damaged cable or other component or if it is not working properly. |

## **⚠ WARNING**

To reduce the risks associated with fire and explosion:

- Ensure batteries are installed with the correct polarity.
- Do not allow batteries to get wet.
- Only use the supplied charger or purchase a new charger from 3M.
- Only charge batteries in an indoor environment, with a temperature range of 0° C to 45° C (32° F to 113° F).
- Do not charge Alkaline batteries.
- If using Alkaline batteries, use only Alkaline AA (LR 6) with the included holder and adapter.

To reduce the risks associated with fire and explosion when using Lithium Ion batteries:

- Do not operate device outside of -20° C to 50° C (-4° F to 122° F).
- DO NOT DOUSE A BURNING BATTERY! USE A STANDARD A/B/C DRY CHEMICAL FIRE EXTINGUISHER!

To reduce the risks associated with hazardous voltage:

- Do not attempt to modify, disassemble, or service the device.
- Only use a USB cable rated at 3 Amps or higher or supplied or recommended by 3M.

To reduce the risks associated with exposure to chemicals and fire and environmental contamination:

- Do not open, modify, disassemble, pierce, crack, crush, incinerate, or expose to heat batteries above 55° C/130° F.
- The device batteries are not serviceable.

## **⚠ CAUTION**

1. **To reduce the risks associated with environmental contamination:**

- Always remove batteries when storing the device for long period of time.
- Dispose of batteries and electronic components in accordance with all regulations.

## **NOTICE**

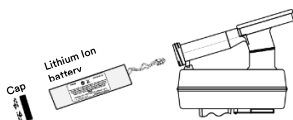
**To reduce the risks of damage to the device:**

- Replace the battery if the acid solution leaks.
- Only use accessories supplied or recommended by 3M.

## Quick Start

### Lithium-Ion Battery in the Receiver

- Remove the receiver cap.
- Remove Alkaline adapter if connected, then connect the Lithium-Ion battery to the connector in the receiver handle.
- Slide the battery into the handle with text facing left or right of the receiver handle. Replace the cap.



## Installing Alkaline Batteries in the Receiver

- Remove cap from receiver handle.
- Remove Lithium-Ion battery if connected.
- Install eight 'AA' size alkaline cell batteries (LR6) into the battery holder as indicated by the polarity symbols (+ and -).
- Attach battery holder to the Alkaline adapter cable and then to the connector in the receiver handle.
- Slide holder into the handle. Replace the cap.

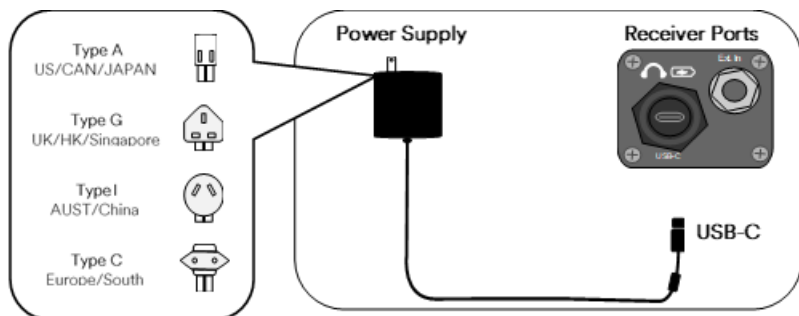


When using Alkaline Batteries, it is necessary to use an adapter that has a protective diode installed in the circuit. If this wire is damaged, then call 3M to get a new adapter. Do not modify this adapter.

## Charging the Receiver

Add the necessary plug type to the power supply.

Pull back the rubber cover and plug the AC charger into the USB port that is compatible with USB Type-C™ Connector.



## Upgrading the Receiver

Please visit [www.3m.com/dynatel](http://www.3m.com/dynatel) for the latest software to update the receiver.

## Receiver Connector Panel

- The USB port is compatible with USB Type-C® Connector serves as a multi-function port, which can be used for charging, communication to PC, communication to other external devices and headphones.
- External connector is used for probes, A-Frame, etc...

# Receiver Overview

[R-1] On/Off (Power).

[R-2] **Frequency:** Cycles through frequency selections and acts as a [Back] button in some screens.

[R-3] **GAIN/Volume:**

- Quick presses adjust the gain sensitivity of the receiver either up (+) or down (-) to maintain a satisfactory signal level.
- Long presses adjust the volume of the receiver either up (+) or down (-). Acts as up/down arrow keys in selection screens.

[R-4] **DEPTH:** Measure's depth of target and maps locate survey data using internal or external GPS.

[R-5] **Menu:** Cycles through the menu screens.

[R-6] **Softkey's:** There are two soft keys whose function is displayed on screen above each key. The act as left and right arrow keys during menu navigation.

[R-7] **Fault Finding Direction Indicators:** Used with 7573X Models.

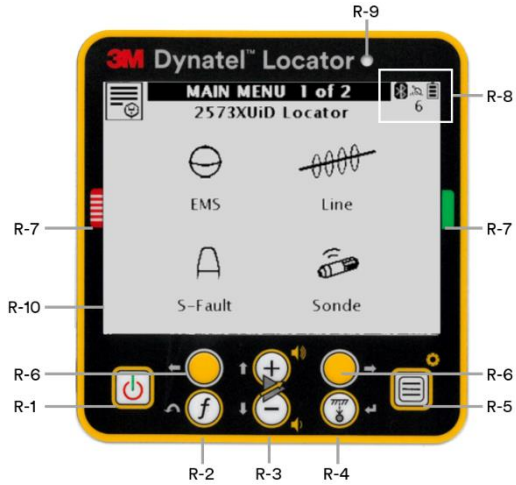
[R-8] **Indicator Tray:** Displays the battery level, number of satellites acquired by the internal GPS, Bluetooth® technology, Memory Stick Status and charging status.

[R-9] **Backlight Sensor**

[R-10] **LCD with built-in Backlight**

[R-11] **Charging Port and Audio Adapter Port is compatible with USB Type-C™ Connector**

[R-12] **External Input:** Port to connect cables from external devices such as the earth contact frame (A-Frame), a second Dyna-Coupler or a toning coil.



## Indicator Tray

The Indicator Tray will display status of the following technologies:

| Menu Item                                                                         | Description                                                                      |                                                                                                |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
|  | Bluetooth® technology                                                            | Indicates Bluetooth technology status “Always on.”                                             |
|  | GPS Satellites                                                                   | Displays number of satellites connected to receiver.                                           |
|  | Memory Stick                                                                     | Memory Stick is connected                                                                      |
|  | Charging                                                                         | The text “Charger” will initially display when plugged in and revert to the Charge image.      |
|  | 3 Bars = 100%                                                                    |  2 Bars = 60% |
|  | 1 Bar = 40%                                                                      |  0 Bars = 15% |
|  | Low battery Warning. Flashing = below 15% followed by warning and shutdown at 8% |                                                                                                |

## Menu

1. Press  Menu key to cycle through the menu screens
2. Use the  or  or  or  arrow keys to navigate through the menu items on each screen
3. Press the  key to select highlighted menu item

## Main Menu

The following menu items are available:

| Menu Item                                                                           |              | 7550X | 7573X | Description                                    |
|-------------------------------------------------------------------------------------|--------------|-------|-------|------------------------------------------------|
|  | EMS*         | X     | X     | Locate EMS and EMS-iD Markers                  |
|  | Path         | X     | X     | Locate Path Markers (7420X)                    |
|  | RFID*        | X     | X     | Edit templates and write data to EMS-iD makers |
|  | Data History | X     | X     | Review collected data                          |

\*Receivers need to include optional EMS Marker antenna for EMS and RFiD functions.

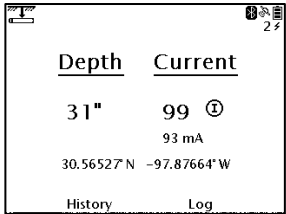
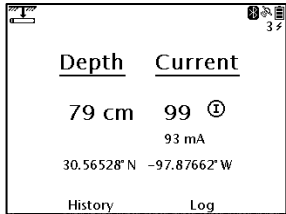
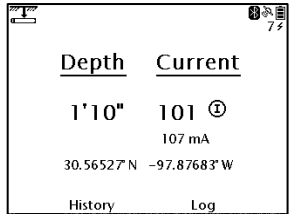
# Setup Menu

The receiver settings can be accessed on the last menu screen titled Setup Menu. Use the navigation  or  or  or  keys to select menu item and press the  key to select a menu. Each Setup screen uses the navigation keys based on the selections. Make any changes and press the  Menu key when done.

| Menu Item                                                                        |                | 2550X | 2573X | Description                                                                  |
|----------------------------------------------------------------------------------|----------------|-------|-------|------------------------------------------------------------------------------|
|  | Language Units | X     | X     | Provides language options and unit choices (Inches, cm...)                   |
|  | Date & Time    | X     | X     | Edit year, month, day and time.                                              |
|  | Frequency      |       | X     | Enable or disable frequencies for Cable/Pipe, Sonde, Tone or EMS Markers.    |
|  | Locate         | X     | X     | Change the display and audio settings for cable/pipe locates.                |
|  | Battery        | X     | X     | Update battery info to reflect Li-Ion or Alkaline.                           |
|  | Info           | X     | X     | Displays serial number, model number, software version and hardware version. |

# Depth Measurements and GPS Mapping

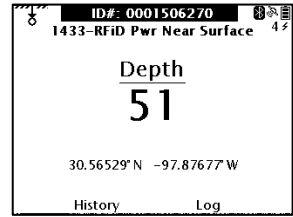
Depth estimations done when Line locating will provide the depth, relative current, a current in mA and the GPS data. The depth reading can be presenting in Inches, centimeters or feet/inches.

|                                                                                   |                                                                                    |                                                                                    |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|  |  |  |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|

The relative current can be used to compare with the transmitters displayed reading that alternately flashes when a single frequency is transmitted during a direct connect locate.  
The mA reading can be used on locates that do not include the transmitter.

The 3M™ Dynatel™ Locator 7420X and 7420XE Series performs single button depth measurements of 3M™ EMS-iD, non-iD and 3M™ Path Marking solutions.

The 3M™ Dynatel™ Locator 1420X and 1420XE Series performs single button depth measurements of 3M EMS-iD and provides instruction on the screen to take two measurements and calculate the depth for non-iD markers.



## EMS Markers

Receivers that have ‘-iD’ in the product name will have the ability to locate 3M™ EMS and EMS-iD markers. Additionally, these units can write data to and read data from the EMS-iD markers.

## Configuration for CE Locators

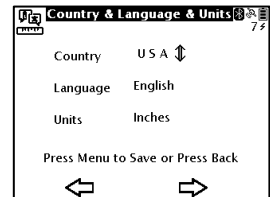
*Note: Models that are not designated with “E” ship with all marker types enabled and can skip to Marker Frequency Setup.*

### ATTENTION

It is unlawful to operate this unit in any country with a configuration setting that is not specific to that country. In order to prevent the user from operating this unit with a configuration setting that is not specific to the country where it is operated, this unit is equipped with configuration software for installing country specific configurations.

All 3M™ Dynatel™ Locators 1420XE-iD and 7420XE-iD (CE Models) include the frequencies based on the country of choice. The correct frequencies and filtering can be selected by navigating to the Lang. Units Settings found in the Settings Menu.

1. Navigate to the Setup Menu. 
2. Select Lang. Units. 
3. Choose the country to set the appropriate marker frequencies and output.



### Enable/Disable Marker Types

Marker frequencies can be enabled and disabled in the Setup Menu  .

1. Use the arrow  or  or  or  keys to navigate to the Frequency  setup.

2. Press the Enter  key to view frequency settings.
3. Use the Up/Down arrow  or  keys to navigate to EMS Marker Freq .
4. Press the Select  or Enter  key to view EMS frequency settings.
5. Use the Up/Down arrow  or  keys to highlight a frequency.
6. Press the Enter  key to enable or disable the frequency. Enabled frequencies will have a check mark and disabled frequencies will have no check mark.

## EMS Marker Locate

Use the EMS function from the Main Menu to select a marker to locate.

1. Select  EMS locates to locate buried EMS and EMS-iD Markers.
2. Press the  [Frequency] button to cycle through the frequency to be located.
3. When a signal is found, sweep left to right and then forward to back and search for the peak of the signal. *The peak signal of the locate will be directly over the top-center of a properly installed marker.*

| Utility         | Utility Icon                                                                        | Frequency (kHz) | Marker Color |
|-----------------|-------------------------------------------------------------------------------------|-----------------|--------------|
| Telephone       |    | 101.4           | Orange       |
| Power*          |    | 169.8           | Red          |
| Gas             |    | 83              | Yellow       |
| Water           |    | 145.7           | Blue         |
| Waste Water     |    | 121.6           | Green        |
| CATV            |    | 77              | Orange-Black |
| Reclaimed Water |   | 66.35           | Purple       |
| CE Power        |  | 134             | Red          |

\*Not available for E-Models

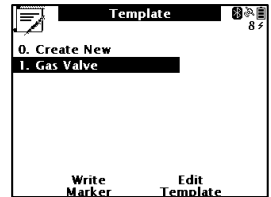
4. With the receiver directly over the peak, the depth  can be calculated or an 3M™ EMS-iD marker can be read .

*Note: If multiple 3M EMS-iD markers with the same frequency are read then the receiver will display [Read Next] above the second Soft Key . All markers read will be stored in the Data History.*

# Programming 3M™ EMS-iD Markers

Use the RFID function from the Main Menu to write data to an 3M EMS-iD Marker.

1. Select  RFID from the Menu and press  [Enter] to write data to 3M EMS-iD markers or edit templates.
2. Use the arrow  or  keys to select a template and select [Write Marker] or [Edit Template] to continue.

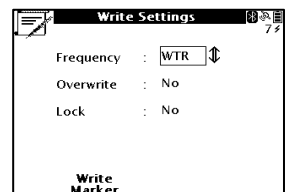


Both [Write Marker] and [Edit Template] options offer a path to write the data to an 3M EMS-iD Marker. The Write Marker limits editing to the Description fields on the right side of the screen and the Edit Template allows full editing as well as a [Save] option.

3. The Editing function includes characters as well as glossary terms and recently used terms:
4. Use the arrow  or  or  or  keys to navigate to a selection and press the  [Enter] key to select. The Back space is found next to 1 and  can be used to delete characters. The [Back]  key to return to previous screen without saving changes.



5. When the templates are complete then position the iD capable locator within the specified distance of the 3M EMS-iD Marker to be written to. Select the Write Marker Option from the Write/Template Edit screen.
6. Three Write Mode options will be displayed before writing the 3M EMS-iD Marker:
  - a. Frequency: Select the 3M EMS-iD Marker to be written to.
  - b. Overwrite: Yes, writes over any existing data on an unlocked marker.
  - c. Lock: Yes, will permanently lock a marker and prevent any future editing.
  - d.
7. Press [Write Marker]  to start writing the data to the marker.



## Path Marker Locate

Use the 3M™ Dynatel™ Locator 7420X/7420XE Series EMS function from the Main Menu to select a marker to locate.

1. Select  EMS locates to locate buried Path Markers.
2. Press the  [Frequency] button to cycle through the frequency to be located.
3. When a signal is found, sweep left to right and then forward to back and search for the peak of the signal.

| Utility         | Utility Glyph                                                                     | Frequency (kHz) | Marker Color |
|-----------------|-----------------------------------------------------------------------------------|-----------------|--------------|
| Telephone       |  | 48.8            | Orange       |
| Power           |  | 34.9            | Red          |
| Gas             |  | 53.9            | Yellow       |
| Water           |  | 73.5            | Blue         |
| Waste Water     |  | 41.4            | Green        |
| Reclaimed Water |  | 44.9            | Purple       |

4. With the receiver directly over the peak, a depth  can be calculated or the next marker can be located.

## Data History

1. Select  Data History and press  [Enter] to view any stored data.
2. Use the arrow  or  keys to a stored data folder and press the  [Export] or  [Select] key to view.

[Export] – Requires a Flash Drive inserted into the USB port to allow data to be downloaded.

[Select] – Opens the selected history folder to view stored results.

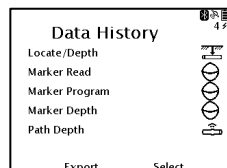
3. A selected data folder will display any saved results to be viewed by selecting the entry and pressing  Enter.

Locate/Depth displays Trace and Sonde results.

Marker Read display any data from markers read.

Marker Program displays data from programmed markers.

Marker Depth displays any marker depth data.



| Label                | Icon      |
|----------------------|-----------|
| Frequency            | $f_{Hz}$  |
| Signal Level         | <b>dB</b> |
| Depth                | $T_{cm}$  |
| Relative Current     | $I$       |
| Locate Type          | $\sim$    |
| Number of Satellites | $Sat$     |

| Locate/Depth                   |          |    |           |     |        |       |
|--------------------------------|----------|----|-----------|-----|--------|-------|
| 01.03.2000 04:57 hrs # 9 (9) 0 |          |    |           |     |        |       |
| mm/dd                          | $f_{Hz}$ | dB | $T_{cm}$  | $I$ | $\sim$ | $Sat$ |
| 01/03                          | 577      | 86 | 71        | 50  | SND    | 8     |
| 01/03                          | 577      | 95 | 124       | 7   | SND    | 9     |
| 01/03                          | 33K      | 64 | 1067      | 16  | TR     | 9     |
| 01/03                          | 33K      | 58 | 23        | 1   | TR     | 9     |
| 01/03                          | 33K      | 58 | 25        | 2   | TR     | 8     |
| 01/03                          | 33K      | 58 | 25        | 1   | TR     | 0     |
| 01/03                          | 33K      | 70 | 20        | 18  | TR     | 6     |
| Prev Page                      |          |    | Next Page |     |        |       |

#### Data Storage:

Read records\* 512

Program records\* 128

Cable depth records\* 512

Locate records\* 512

Number of RFID templates: 80

A USB flash drive compatible with USB Type-C® Connector can be connected and data will automatically write to the flash drive. There is no limit with external flash drive for number of records (only limited by flash drive size).

**Product Selection and Use:** Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. As a result, customer is solely responsible for evaluating the product and determining whether it is appropriate and suitable for customer's application, including conducting a workplace hazard assessment and reviewing all applicable regulations and standards (e.g., OSHA, ANSI, etc.). Failure to properly evaluate, select, and use a 3M product in accordance with all applicable instructions and with appropriate safety equipment, or to meet all applicable safety regulations, may result in injury, sickness, death, and/or harm to property.

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