

3M™ Dynatel™ Cable/Pipe/Marker Locator 2250M-iD Contract Locator Series

Operator's Manual

May 2019
78-9237-1692-8



Contents

Statement of Conformity	3
FCC Information to the User	3
Safety Information	4
Intended Use	4
About This Manual	5
Quick Start	7
Transmitter Battery Installation	7
Installing Alkaline Batteries in the Receiver	7
Installing Rechargeable Lithium Ion Battery in the Receiver.....	8
Power Up Battery Test.....	8
Receiver and Transmitter Outer Plastic Cleaning	8
3M™ Dynatel™ Transmitter 2250 Keypad and Connector Definitions.	9
Direct Connect Method	10
Frequencies for Pipes	11
M Dyna-Coupler	11
Locating Cables/Pipes (Receiver)	12
EMS-iD Locating (Receiver).....	12
Service and Accessories.....	13
Optional 3M Accessories.....	13
Receiver Specifications	14
Transmitter Specifications	15
Environmental and Regulatory Specifications.....	15
Important Notice	17
Limited Product Warranty.....	17

Congratulations! You have just purchased one of the finest, most advanced locating devices available today!

The 3M™ Dynatel™ Cable/Pipe/Marker 2250M-iD Contract Locators are designed to locate cables, pipes and EMS markers. Information such as a pre-programmed identification number, facility data, application type, placement date and other details can all be read, stored and downloaded to your PC for enhanced resource management.

3M is dedicated to bringing you premium equipment with outstanding reliability, backed by one of the best warranties in the business and outstanding service.

Visit our website at www.3M.com/dynatel for more product information.

Statement of Conformity

FCC Information to the User:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



Modifications to this device shall not be made without the written consent of 3M Company. Unauthorized modifications may void the authority granted under Federal Communication Rules permitting the operation of this device.



Safety Information

Please read, understand and follow all safety information contained in these instructions prior to the use of the 3M™ Dynatel™ Cable/Pipe/Marker M-Series Locator. Retain these instructions for future reference.

Intended Use

The 3M Dynatel Cable/Pipe/Fault Advanced M-Series Locator is used to identify the placement of underground utility lines. The system must be installed as specified in the 3M Dynatel Cable/Pipe/Marker Locator 2250M-iD Series Operator Manual. It has not been evaluated for other uses or locations. 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	
 WARNING:	Indicates hazardous situation which if not avoided, could result in death or serious injury.
 CAUTION:	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury and/or property damage.
NOTICE	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 WARNING applies to the following 3M Dyna-Couplers;

- 3" (75 mm) - Part number 3001
- 4.5" (114 mm) - Part number 4001
- 6" (150 mm) - Part number 1196
- All accessory kits containing any of the listed Dyna-Couplers - Part numbers 3019, 4519, 1196/C

A potential for electrical shock exists when using the Dyna-Coupler on cables energized with electrical power. Use appropriate safety procedures.

DO NOT USE ON CABLES CARRYING IN EXCESS OF 600 VOLTS RMS.

⚠ WARNING

This WARNING applies to the use of the Direct Connect Cables and the Transmitter.

To avoid potential shock, or electrically damaging the Transmitter, when setting up the Transmitter to locate using the Direct Connect method, follow these basic steps;

- ALWAYS plug the Direct Connect Cable into the Transmitter Output Jack [T-6] BEFORE connecting the leads to the cable/pipe to be located and the ground rod.
 - Connect the red lead to the cable/pipe.
 - Connect the black lead to ground rod.

A POTENTIAL FOR ELECTRICAL SHOCK, AND/OR TRANSMITTER ELECTRICAL DAMAGE, EXISTS WHEN USING THE DIRECT CONNECT CABLE ON CABLES ENERGIZED WITH ELECTRICAL POWER IF THE ABOVE INSTRUCTIONS ARE NOT FOLLOWED.

USE APPROPRIATE SAFETY PROCEDURES.

CHECK VOLTAGE BEFORE CONNECTING TRANSMITTER. VOLTAGE HIGHER THAN 240 VOLTS WILL DAMAGE EQUIPMENT. FOLLOW STANDARD PROCEDURES FOR REDUCING THE VOLTAGE.

About This Manual

The 2250M-iD Contract locator is designed to provide contract locators a tool to locate cables, pipes and EMS markers. The iD option provides locating and read capability to 3M™ iD Markers.

In order to demonstrate all available functions, the illustrations depict the 2250M-iD Contract Locator receiver unit and the 2250 3-watt transmitter.

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 0o C to 45o C (32° F to 113° F).
- Do not charge Alkaline batteries.
- Use only Alkaline AA (LR 6) with the included holder and adapter.
- Use only Alkaline C (LR 14) sized batteries in the device transmitter.

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 FIRE EXTINGUISHER!**

To reduce the risk associated with hazardous voltage:

- Do not attempt to modify, disassemble, or service the device.
- Voltage greater than 240 volts will damage equipment and could cause personal injury or death. Make all connections before turning on the transmitter. Follow standard procedures for reducing the voltage.
- Potential for electric shock exists when handling connection cables while the transmitter is ON. Make all connections prior to powering on the unit. Turn transmitter OFF before handling connection cables.

To reduce the risk associated with exposure to chemicals and fire:

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

CAUTION

To reduce the risks associated with environmental contamination:

- Always remove batteries when storing the device for long periods of time.
- Device batteries are not serviceable.
- Dispose of batteries and electronic components in accordance with all regulations..

NOTICE

To reduce the risk of damage to the device:

- Replace the battery if the acid solution leaks.

NOTICE

Shipping issues regarding batteries:

In many cases the outside of the packaging must have an appropriate warning label and the package may have weight restrictions;

Transportation regulations continuously change so please seek the advice of shipping agencies.

Quick Start

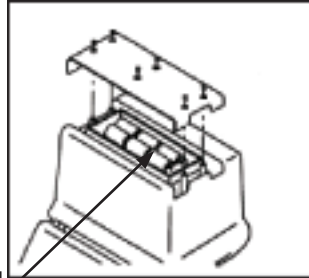
Transmitter Battery Installation

Loosen the six screws on the battery compartment cover on the bottom of the transmitter. Remove the cover.

Install six 'C' size alkaline cell batteries (LR14) into the compartment as indicated by the polarity symbols (+ and -).

Replace the cover and tighten the screws.

Press and hold OFF [T-1] to manually test the batteries. The display and audio will indicate one of the following levels: (OK w/solid tone = good; LO w/beeping tone = low; "--" w/no tone = replace)



6 'C' (LR14) size Alkaline batteries

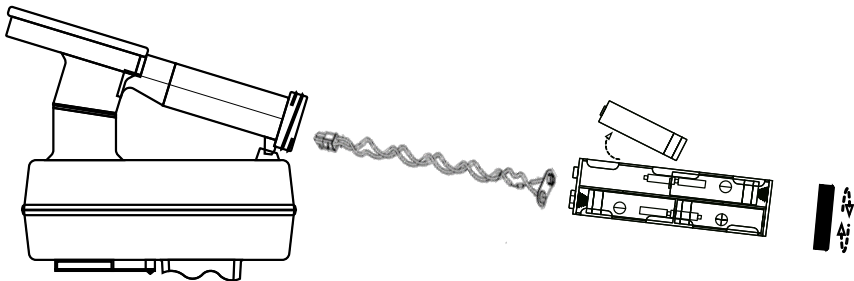
Installing Alkaline Batteries in the Receiver

Remove cap from receiver handle.

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.

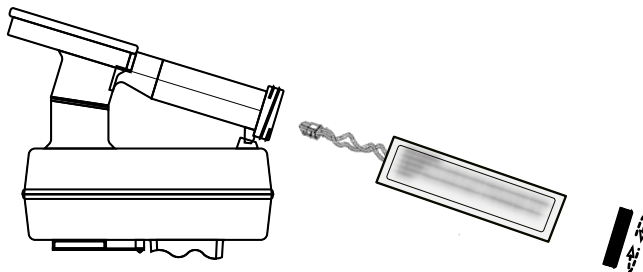


Installing Rechargeable Lithium Ion Battery in the Receiver

Remove the receiver cap.

If the Alkaline adapter is connected then remove and connect the Lithium Ion battery directly 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.



Receiver Power Up Battery Test

The receiver batteries are tested for two seconds every time the unit is turned on.



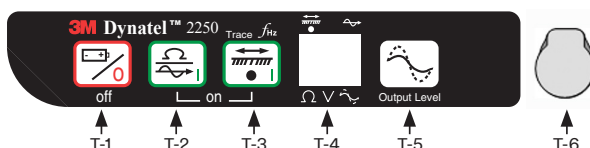
The bar graph on the display will fill to the relative battery level.

The Battery Icon [8] on the Locating Displays will continuously indicate the battery level.

Receiver and Transmitter Outer Plastic Cleaning

Use a soft damp cloth to clean the product and test leads if necessary.

3M™ Dynatel™ Transmitter 2250 Keypad and Connector Definitions



[T-1] off: Turns unit off and performs battery test.

[T-2] on: Ohm-meter / Tone: Turns the unit on and cycles through the following commands when pressed repeatedly.

Ohm-meter: Measures the continuity of the trace conductor/pipe and its far-end ground. It is also used to measure the fault resistance to earth.

[T-3] on: Trace (frequency): Turns the unit on and places the unit in Trace mode.

Select Frequency: Press Trace [T-3] repeatedly to cycle through the transmitter's active frequencies (577 Hz, 8 kHz, 33 kHz, and 200 kHz). The selected frequency will be displayed [T-4]. 'ALL' indicates that the following active frequencies are transmitting simultaneously: 577 Hz, 8 kHz, 33 kHz, and 200 kHz.

[T-4] Digital Display:

Indicator Flags: These flags coincide with the operational mode of the transmitter. (From top left to bottom right) Trace mode [T-3], Tone mode [T-2], Ohm-meter [T-2], Voltage (at start up the transmitter checks for foreign voltage), and the Output Level Flag (no flag = normal output; flag = high output).

Digital Display: Indicates frequency, relative current, resistance, battery level and voltage (if present on target).

[T-5] Output Level: Cycles output level; normal, high and maximum.

Normal=No Flag; High=Flag (indicated in *Digital Display* [T-4])

NOTE: Output is limited to 3 watts at 577 Hz, 8 kHz, 33 kHz and 1 watt at 200 kHz using the direct connection method.

[T-6] Output Jack: Port for direct connect cables or Dyna-coupler.

Direct Connect Method

⚠ WARNING

This **WARNING** applies to the use of the **Direct Connect Cables and the Transmitter**.

To avoid potential shock, or electrically damaging the Transmitter, when setting up the Transmitter to locate using the Direct Connect method, follow these basic steps;

- ALWAYS plug the Direct Connect Cable into the Transmitter Output Jack [T-6] BEFORE connecting the leads to the cable/pipe to be located and the ground rod.
 - Connect the red lead to the cable/pipe.
 - Connect the black lead to ground rod.

A POTENTIAL FOR ELECTRICAL SHOCK, AND/OR TRANSMITTER ELECTRICAL DAMAGE, EXISTS WHEN USING THE DIRECT CONNECT CABLE ON CABLES ENERGIZED WITH ELECTRICAL POWER IF THE ABOVE INSTRUCTIONS ARE NOT FOLLOWED.

USE APPROPRIATE SAFETY PROCEDURES.

CHECK VOLTAGE BEFORE CONNECTING TRANSMITTER. VOLTAGE HIGHER THAN 240 VOLTS WILL DAMAGE EQUIPMENT. FOLLOW STANDARD PROCEDURES FOR REDUCING THE VOLTAGE.

Equipment Used





3M™ Dynatel™ 3W US Transmitter, 2250M



3M™ Large Clip Direct-Connect Transmitter Cable 2876



3M™ Ground Rod 8006

1. Plug the Direct-Connect Cable into the transmitter.
2. Place the Ground Rod into the earth and connect the black test lead.
3. Connect the red test lead to the cable, wire or pipe to be located.
4.  Press the Ohms button to measure resistance.
5.  Select frequency based on utility or Ohm reading:

Ohms Measurement	Suggested Frequency
0 Ω - 2k Ω	577 Hz
2k Ω – 6k Ω	8 kHz
7k Ω or higher	33 kHz

Note: Higher frequency choices may provide a better locate depending on condition of utility.

Note: 200 kHz is included with the transmitter but is not available in the 2220X-iD receiver.

Frequencies for Pipes

Metal pipes (gas, water) with non-metallic joints will typically locate best with 8 kHz or higher. The lowest frequency may not travel past the first non-metallic joint.

In some cases where there are several non-metallic joints along the path, it is suggested that:

- High output is used.
- Special Peak is used when signal becomes weak.

Relative Current

When a single frequency is selected then you will also see the relative current toggle with the frequency. This number can be matched to the relative current estimated by the receiver during a depth reading and used to verify locate path.

”ALL” Frequencies

The transmitter can output 577 Hz, 8 kHz and 33 kHz at the same time by pressing the Trace Key until All is displayed.

3M™ Dyna-Coupler (Transmitter)

⚠ WARNING

This WARNING applies to the following 3M™ Dyna-Couplers:

- 3" (75 mm) - Part number 3001
- 4.5" (114 mm) - Part number 4001
- 6" (150 mm) - Part number 1196
- All accessory kits containing any of the listed 3M Dyna-Couplers - Part numbers 3019, 4519, 1196/C

A potential for electrical shock exists when using the 3M Dyna-Coupler on cables energized with electrical power. Use appropriate safety procedures.

DO NOT USE ON CABLES CARRYING IN EXCESS OF 600 VOLTS RMS.

Equipment Used





3M™ Dynatel™ 3W US Transmitter, 2250M



3M™ Coupler Cable 9011



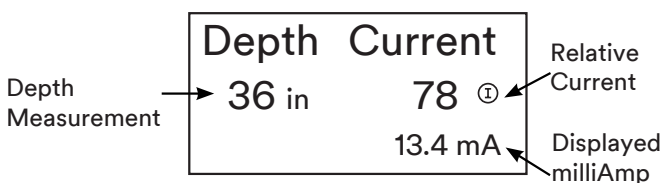
3M™ 3" Dyna-Coupler, 3001

1. Use the Coupler Cable to connect the transmitter to the Dyna-Coupler.
2.  Select 8 kHz or 33 kHz.
3.  Press High Output to transmit a 3 Watt signal.

Locating Cables/Pipes (Receiver)



1. Toggle Mode Key for locate antenna selection.
Directional Peak (recommended)
Directional Null
Special Peak
Special Peak + EMS/iD
2. Press SK to toggle through frequencies. (577 Hz, 8 kHz, 33 kHz and 60 Hz) *Select transmitter frequency or 60 Hz if doing passive Power.*
3. Sweep the receiver looking for signal using the Directional Peak Mode. Switch to Special Peak if signal is weak.
4. During the sweep, it is best to adjust the Gain so that the bars never fully close or fully open when over the signal path.
5. Depth and Current can be estimated by lowering the tip of the receiver to the ground over the located utility and pressing the Depth SK key.
6. The depth screen display the measured depth, relative current and a current in mA for 60 Hz locating.



EMS-iD Locating (Receiver)

1. Press the EMS Key set the EMS/iD Mode.
2. or Select the frequency by pressing the EMS key or SK1 until desired frequency is displayed.
3. Sweep receiver along path searching for installed EMS and EMS-iD markers.

This 3M™ Dynatel™ Receiver Series 2220X-iD can also search for EMS markers while conducting a cable/pipe locate. The receiver can be set up:

1. Select EMS Marker frequency.
2. Select Special Peak + EMS/iD
3. Select locate frequency.
4. Gain function will affect the cable/pipe locate and the EMS Marker gain is automatically set in Special Peak + EMS/iD mode.
5. Pressing Depth with start the EMS-iD read function. If a passive marker is detected then instructions will display on screen to measure depth, otherwise the depth will be displayed and marker data is available through Read History in the Menu.

Service and Accessories

Information regarding service, accessories, or replacement parts can be obtained by contacting 3M at 1-800-426-8688.

This equipment does not require annual calibration or maintenance.

Optional 3M™ Accessories

Item	Part Number
Direct Connect Cables, Small Clip, 1/4" (6.4 mm), Communications version, 10' (3 m) cable length	2892
Direct Connect Cables, Large Clip, 5/8" (15.8 mm), Utility version, 10' (3 m) cable length	2876
Direct Connect Cables, Small Clip, 1/4" (6.4 mm), Communications version, 5' (1.5 m) cable length	9012
Ground Extension Cable	9043
Dyna-Coupler Clamp 3" (75 mm)	3001
Dyna-Coupler Clamp 4.5" (114 mm)	4001
Dyna-Coupler Clamp 6" (150 mm) w/ pouch	1196
Locator Coupler Accessory Kit, 3" (75 mm) (includes 3" (75 mm) Dyna-Coupler, Coupler Cable and Coupler Pouch)	3019
Locator Coupler Accessory Kit, 4.5" (114 mm) (includes 4.5" (114 mm) Dyna-Coupler, Coupler Cable and Coupler Pouch)	4519
Locator Coupler Accessory Kit, 6" (150 mm) (includes 6" (150 mm) Dyna-Coupler, Coupler Cable and Coupler Pouch)	1196/C
Coupler Cable 12' (3.6 m)	9011
Carrying Bag	2200M
33 kHz Sonde (ADP; Active Duct Probe)	3229
7000RB Rechargeable Battery Pack for Receiver	80-6300-0253-5
7000C AC Charger for 7000RB Receiver Batteries	80-6300-0352-5

Receiver Specifications

Item	Specification
Modes	Directional Peak Directional Null Special Peak Induction Peak Marker Alert
Frequency Response:	
Active	577 Hz 8 kHz 33 kHz
Passive	9 – 30 kHz (LF)
Power	60 Hz
Display	LCD
Gain Control	Manual and Automatic
Weight w/batteries	4–5 lbs. (1.8–2.3 kg) (model dependent)
Battery Qty. and size	8 AA (LR6)
Battery Life	30 hours average
Depth Accuracy	±2% ± 2 in. (5 cm) for 0–60 in. (0-1.5 m) ±6% ± 2 in. (5 cm) for 60–120 in. (1.5–3.0 m) ±10% ± 2 in. (5 cm) for 120–180 in. (3.0 m–4.5 m)
Depth Range	0–360 in. (0–914 cm)
Marker depth accuracy	± 15% ± 2 in. (5 cm)
Read Range 3M™ iD Markers*	
Near-Surface	3 ft (0.9 m)
Ball Marker	5 ft (1.5 m)
Full-Range	8 ft (2.4 m)
Detection Depth 3M Non-iD (Passive) Markers*	
Near Surface	2 ft (0.6 m)
Ball Marker	5 ft (1.5 m)
Mid-Range	6 ft (1.8 m)
Full-Range	8 ft (2.4 m)

* Marker frequencies include telephone, power, gas, water and GP.

Transmitter Specifications

Item	Specification
Trace Mode	577 Hz 8 kHz 33 kHz
Induction Mode	33 kHz
Output Power (in Direct Connect mode)	3 Watt Transmitter Model Normal setting: 0.5 W High setting: 3 W @ 577 Hz, 8 kHz, 33 kHz; 1 W @ 200 kHz
Output Voltage (Maximum)	70 Vrms
Output Protection	240 Vrms
Weight w/batteries	w/ alkaline batteries only: 5.2 lbs (2.4 kg))
Battery Qty. and size	For Normal and High Output Power: 6 "C" size, Alkaline (LR14)
Battery Life	Normal Output Power level: 40 Hours

Environmental and Regulatory Specifications

Item	Specification
Standard	IP54
Regulatory	FCC compliant, FCC Part 15
Operating Temperature	-4°F to 122°F (-20°C to 50°C)
Storage Temperature	-4°F to 158° F (-20°C to 70°C)

⚠ 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.
- Use only Alkaline AA (LR 6) with the included holder and adapter.
- Use only Alkaline C (LR 14) sized batteries in the device transmitter.

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 FIRE EXTINGUISHER!

To reduce the risk associated with hazardous voltage:

- Do not attempt to modify, disassemble, or service the device.
- Voltage greater than 240 volts will damage equipment and could cause personal injury or death. Make all connections before turning on the transmitter. Follow standard procedures for reducing the voltage.
- Potential for electric shock exists when handling connection cables while the transmitter is ON. Make all connections prior to powering on the unit. Turn transmitter OFF before handling connection cables.

To reduce the risk associated with exposure to chemicals and fire:

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



This is the EU symbol for equipment that is covered under the Waste from Electrical and Electronic Equipment (WEEE) directive per CENELEC Specification 5041. It indicates that certain products should not be discarded in the trash, but rather should be recycled. This applies to all electronic pluggable and battery powered products.

3M and Dynatel are trademarks of 3M Company.

Important Notice:

All statements, technical information, and recommendations related to 3M's products are based on information believed to be reliable, but the accuracy or completeness is not guaranteed. Before using this product, you must evaluate it and determine if it is suitable for your intended application. You assume all risks and liability associated with such use. Any statements related to the products which are not contained in 3M's current publications, or any contrary statements contained on your purchase order shall have no force or effect unless expressly agreed upon, in writing, by an authorized officer of 3M.

Limited Product Warranty:

All 3M products, locating instruments (except accessories), manufacture dated test leads, and rechargeable batteries will conform to 3M's published specifications and will be free from defects in material and manufacture for a period of twelve (12) months from the date of purchase. Dry cell batteries included in any of 3M's products are warranted only to the extent the battery manufacturer determines such batteries are covered by its warranty. Accessories for locating instruments are warranted for ninety (90) days after purchase. 3M's obligations and liability under this warranty are limited to repairing, replacing or refund of the purchase price, at 3M's option, any of 3M's products which, after normal and proper usage, are determined by 3M to be defective. This warranty does not extend to any of 3M's products which have been subjected to misuse, neglect, accident or improper applications, nor shall it extend to products which have been repaired or substantially altered outside 3M's manufacturing or repair facility, nor to any associated instruments, equipment or apparatus. Before utilizing any of 3M's products, BUYER should determine the suitability of the product for BUYER'S intended use. **3M MAKES NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** In no case shall 3M be liable for any direct, indirect, special, incidental, or consequential damages based upon breach of warranty, breach of contract, negligence, strict liability or any other legal theory. This limitation does not apply to claims for personal injury.

3M

Electrical Markets Division

Austin, TX
1-800-200-0265
FAX: 1-877-601-1305
www.3M.com/dynatel

Please Recycle. Printed in USA.
© 3M 2019. All Rights Reserved.
78-9237-1692-8