


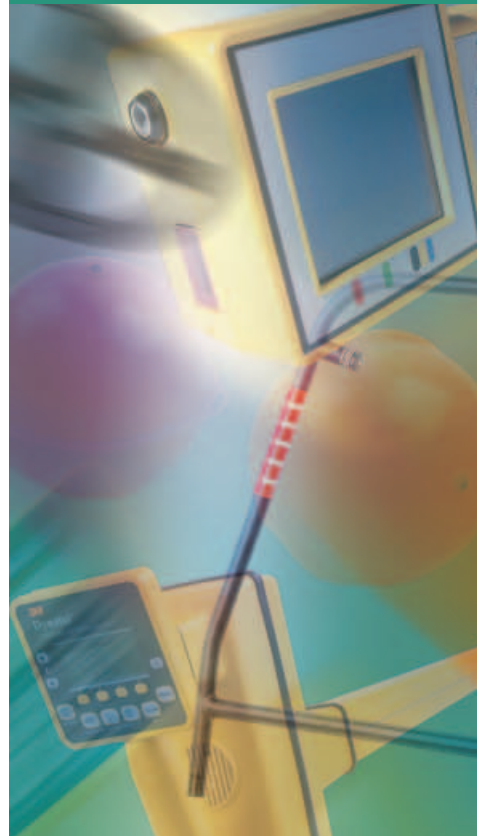


# FTTx – Marking & Locating

In outside plant it is critical to know the exact location of all underground (subterranean) networks. This is especially true for fibre optic networks where there is no metallic element in the cable. Marking the network will save time and effort and costly mistakes on maintenance, re-entry and new installations.

3M Telecommunications offers an advanced technology product portfolio for electronically marking the underground network. With 3M EMS and Locators it is possible to map the FTTX network and trace it precisely.

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## 9.1 Marking and Locating Products

# 3M™ Dynatel™ Cable and Fault Locators

### Description

#### 2210 Cable/Pipe Locators

Dynatel 2210 Cable/Pipe Locators are used to find the path and estimated depth of telephone, CATV, power and pipes with tracer wire. The 2210 Locators have two operator selectable frequencies as well as visual cable locates.





## Technical characteristics

### Features for Dynatel Cable and Fault Locators (international versions)



Features	2210E Cable Locator
<b>Transmitter</b>	
Two operator-selectable frequencies	•
Four operator-selectable frequencies	
Built-in ohmmetre	
Indicates presence of foreign and hazardous voltage	
Built-in continuity test	•
Three tone application methods (direct connect, coupler, inductive)	•
Auto load matching	•
High and normal output level	•
Sheath fault-finding capability	
Fault-locate and cable-locate tones applied simultaneously	
<b>Receiver</b>	
Peak mode	•
Null mode	
Differential mode	
Push button digital depth readout	•
Cable/pair identification	•
Measures signal current in cable	•
Direct readout of active duct probe depth	•
Visual and audible cable locates	•
Wet section testing	•
Digital fault strength indicator	
Graphic display	•
Ground level antenna	•
Expander amplifier	•
50/60 Hz power cable locate mode	•
<b>Kit Contents</b>	
Cable locator	•
Direct connect transmitter cable	•
8006 ground rod	•
3014 earth contact frame	
9026 earth contact frame cable	
Instruction manual	•
Video	

# 9.1 Marking and Locating Products

## 3M™ Dynatel™ Cable and Fault Locators

### Technical characteristics

#### Specifications for Dynatel Cable and Fault Locators (international versions)

Ordering Information	2210E Cable Locator
Net weight kg (lbs.)	4,1 (9.1)
Shipping weight kg (lbs.)	7,1 (15.7)
Operating temperature	-20° to 50°C (-4° to 122°F)
Storage temperature	-40° to 70°C (-40° to 158°F)

#### Transmitter

Output frequencies	One of two user-selectable frequencies
Trace mode	
Sheath fault mode (2273E only)	
Tone mode	
Induction mode	
Output voltage (maximum)	15 Vrms max.
Sheath fault (2273E only)	
Trace	
Tone	
Output power	
Normal setting	100 milliwatts
High setting	3 W
Power	Six LR14 cell alkaline batteries
Battery life	50 hrs. typical (normal mode)
	10 hrs. typical (boost mode)
Size H x W x D cm (in.)	17,2 x 28,6 x 19,7 (6.75 x 11.25 x 7.75)
Weight kg (lbs.)	2,4 (5.2)

#### Receiver

Frequencies	
Trace and tone modes	577 Hz, 33 kHz 50/60 Hz, User-selectable; 22 kHz
Depth	
Range	0 to 4,5 m (0 to 15 ft.)
Power	Six LR6 cell alkaline batteries
Battery life	60 hrs. typical
Size H x W x D cm (in.)	64,8 x 9,5 x 27,3 (25.5 x 3.75 x 10.75)
Weight kg (lbs.)	1,8 (3.9)

Ordering Information	2210E Cable Locator
Packaging	1/cs.
Minimum order	1 each
<b>3W Telco, International</b>	<b>051138-34607</b>
<b>3W Telco, International w/3" Coupler</b>	<b>051138-34608</b>
<b>3019 Coupler Accessory Kit</b>	<b>051138-91427</b>
<b>Carrying Bag</b>	<b>051138-57443</b>

#### Optional Accessories

<b>3019 Coupler Accessory Kit</b> (3" Dyna-Coupler, Coupler extension cable and pouch)	<b>051138-57443</b>
<b>2200 Series Carrying Bag</b>	<b>054007-57443</b>
<b>1196 6" Dyna-Coupler with pouch</b>	<b>054007-19042</b>
<b>9011 coupler extension cable</b>	<b>054007-31274</b>
<b>9043 ground extension cable</b>	<b>054007-34026</b>

# 9.1 Marking and Locating Products

## 3M™ Dynatel™ Cable and Fault Locators



### Description



#### New technology for the location of underground utilities.

The Dynatel 2273 M/ME-iD Cable/Pipe and Fault Locators and the Dynatel 2250 M/ME-iD Cable/Pipe Locators are microprocessor-based systems that incorporate advanced digital signal processing techniques to quickly trace the path of underground cables and pipes, both copper and fibre optic (with metallic tracer wire). The Dynatel 2273 M/ME-iD Cable/Pipe and Fault Locators can also quickly and efficiently locate conductor or sheath (earth return) faults. Both locators provide accurate cable or Sonde depth measurements, giving a digital readout in inches, feet and inches, or centimetres (user-defined). Lightweight, compact and well balanced, these locators allow you to accurately and easily:

- Locate cable and pipe path
- Measure cable or Sonde depth with the push of a button
- Measure signal current in the cable
- Pin-point conductor or sheath (earth return) faults and cable breaks (2273 M/ME-iD only)
- Discriminate between light and heavy faults (2273 M/ME-iD only)
- Identify cable and cable pairs
- Tone shorts and grounds in aerial cable
- Identify cable pairs through wet sections
- Locate energised power cable

#### Advanced features detect more information about underground utilities.

A new feature exclusive to the Dynatel 2273 ME-iD and 2250 ME-iD Locators is the ability to write, read and lock programmed information into the new 3M 1400 Series EMS iD Ball Markers. Information such as a pre-programmed unique identification number, facility data, owner information, application type, placement date and other details from up to 100 ID markers can all be read, stored with date/time stamp and transmitted back to your PC through a standard RS232 serial port for enhanced resource management.

Designed to be more accurate, faster and more integrated than any other locator on the market, the 3M Dynatel 2273 ME-iD and 2250 ME-iD Locators can perform these additional functions:

- Pin-point the location and estimate the depth of all existing models of properly installed underground passive EMS markers
- Direct depth reading of ID markers
- Locate two different marker frequencies simultaneously
- Trace a cable path while simultaneously finding buried markers along the way



#### Several unique modes of operation for accurate locates in every situation.

For cable path locating, the Dynatel Locators have a highly accurate multi-antenna design for various user-selected locating modes – Directional Peak, Multi-Directional Null, plus an ultra-sensitive Special Peak mode for extreme depths.

The receiver includes a unique "expander" function that makes peaks and nulls more pronounced. The expander feature enhances the response for fast tracking and pin-pointing of position. The unique Directional Peak mode combines the response from four peak antennas to indicate left/centre/right direction to the cable/pipe while the bar graph and numeric display indicate the sharp and accurate dual-peak response. Automatic gain set with manual override provides maximum flexibility and control. The multi-directional null mode shows null signal response with automatic gain and utilises the multiple antenna design to show cable/pipe location and direction on a unique "compass" like graphic user interface on the high-resolution display.



# 9.1 Marking and Locating Products

## 3M™ Dynatel™ Cable and Fault Locators

### Description

#### Precise location of sheath (earth return) faults.

The Dynatel 2273 M/ME-iD Cable/Pipe and Fault Locators can precisely locate conductor or sheath (earth return) faults on both short and long cable sections faster than ever before. The transmitter unit sends a trace signal simultaneously with a fault-locate signal, allowing the operator to use the cable-locate function when locating faults in long cable sections. Fault strength is indicated on the receiver liquid crystal display (LCD) screen, allowing minor faults to be ignored, if desired. Up to three fault readings may be stored for quick reference.

#### A simple, easy-to-use system.

Lightweight and easy to operate, the Dynatel Locators are rugged, ergonomic and require very little operator training. A large backlit digital LCD screen and soft-key operation make them easy to understand for more precise locates. A "memory" feature remembers operator set-up from previous use. A standard RS232 communications port allows interfacing to an external computer for uploading/downloading of data, unit configuration and remote software upgrades. The system can run over 30 hours on eight AA alkaline batteries.

The system consists of three basic components:

- Transmitter with built-in ohmmetre, which also senses and measures the presence of foreign voltage and tests the continuity of the circuit
- Rugged, one-piece hand-held receiver with bar graph signal strength and direction, that indicates received signal and proximity to the cable; ID versions locate all 3M EMS Markers and read/write to all 3M EMS-iD Markers
- Lightweight earth contact frame that is colour-coded to correspond with indications from the receiver directing the operator toward the fault (2273 M/ME-iD only)

The Dynatel Locators use four active trace frequencies - 577Hz, 8kHz, 33kHz and 133kHz - which can be used individually or simultaneously to compensate for varying field conditions. The receiver incorporates passive power, VLF and auxiliary frequencies that do not require the use of the transmitter. The receiver also has the unique capability to accommodate four user-definable auxiliary frequencies and allows the user to perform a self-calibration operation at any frequency at any time. In total, the receiver accommodates 24 frequencies. With the easy-to-use configuration tool, users can enable or disable any frequency to select only the frequencies that they need to use.

The 1420E, 2250ME-ID and 2273ME-ID locators are now compatible with select GPS/GIS field mapping instruments for real-time mapping of marker placement. The customized Dynatel interface commands the GPS/GIS device in a mode transparent to the user allowing even a generalist field technician to preform real-time mapping. It's a simple system for mapping marker placement and saving information directly into CAD and GIS systems. The electronic upload of this information in GIS format creates an automated paperless system for records updating, making positive locates in the field easier than ever.



Both the receiver and the transmitter feature a self-test routine that is executed each time the unit is turned on. A power-up battery test indicates the battery level. Both components are constructed of heavy-duty materials designed to withstand typical field use.

#### Standard Dynatel accessories:

- 8006 Ground Rod; stainless steel
- 3019 Dyna-Coupler Kit; consists of 3 in. Dyna-Coupler, Coupler Cable and Pouch
- 2876 Direct-Connect Transmitter Cable; 10 ft. (3 m) in length; for Utility (U) models
- 9012 Direct-Connect Transmitter Cable; 5 ft. (1.5 m) in length; for Communications (C) models
- 3014 Earth Contact Frame (2273 M/ME-iD only)
- 9026 Earth Contact Frame Cable; 4 ft. (1.2 m) in length (2273 M/ME-iD only)

#### Optional Dynatel accessories:

- 2892 Small Clip Direct-Connect Transmitter Cable; 10 ft. (3 m) in length
- 9043 Ground Extension Cable
- 3001 3 in. Dyna-Coupler; for use on cables up to 3 in. (7.6 cm) in diameter
- 1196 6 in. Dyna-Coupler; for use on cables up to 6.9 in. (17.5 cm) in diameter; with pouch
- 9011 12 ft. Coupler Cable
- 3011 3/8 in. Inductive Probe; for pair identification
- 3013 Direct Probe
- 9023 Probe Cable
- 2200M Carrying Case/Bag



## Description

## Features of Dynatel 2200 M/ME-iD Series Locators

Receiver	2250ME	2250ME-iD	2273ME	2273ME-iD
Directional peak, directional null, single peak locate modes	x	x	x	x
Large backlit, high resolution graphic display	x	x	x	x
Push button cable/pipe depth readout with continuous depth measurement mode	x	x	x	x
Active duct probe (Sonde) depth measurement	x	x	x	x
Signal current measurement	x	x	x	x
Toning amplifier function	x	x	x	x
Cable/pair identification	x	x	x	x
Marker alert mode while path tracing		x		x
Wet section tagging	x	x	x	x
Digital fault strength indicator			x	x
Expander amplifier	x	x	x	x
Pre-set auxiliary frequencies for power, CATV, radio and long haul fibre applications	x	x	x	x
Four user-definable auxiliary frequencies	x	x	x	x
Self-calibration mode, on demand	x	x	x	x
PC interface via standard RS232 serial port	x	x	x	x
User-configurable features and interface	x	x	x	x
Detects all seven EMS marker frequencies		x		x
Marker-Link and Locator PC tools software		x		x
ID marker read/write capability		x		x
Dual marker frequency search-simultaneous		x		x
Marker depth estimation		x		x
Conductor or sheath (earth return) fault locating			x	x

Transmitter	2250ME	2250ME-iD	2273ME	2273ME-iD
Simultaneous signals	x	x	x	x
Built-in ohmmetre and continuity tester	x	x	x	x
Indicates presence of crossed or hazardous voltage	x	x	x	x
Three tone application methods (direct connect, coupler, inductive)	x	x	x	x
Auto load matching	x	x	x	x
High and normal output level	x	x	x	x
3 watt and 5 watt models available	x	x	x	x
Conductor or sheath (earth return) fault signal			x	x
Fault and cable locate tones applied simultaneously			x	x



# 9.1 Marking and Locating Products

## 3M™ Dynatel™ Cable and Fault Locators

### Technical characteristics

#### Dynatel 2200 M/ME-iD Series Locators

Physical Specifications	Size (H x W x D) in. (cm)	Weight (including batteries)
Transmitter	6.75 x 11.25 x 7.75 (17,2 x 28,6 x 19,7)	5.2 lb. (2,4 kg)
Receiver	10.25 x 10.5 x 30 (26,7 x 26,1 x 76,2)	2250ME/2273ME – 4.05 lb. (1,9 kg), 2250ME-iD/2273ME-iD – 4.85 lb. (2,3 kg)
Shipping	N/A	2250ME/2273ME – 27 lb. (12,5 kg), 2250ME-iD/2273ME-iD – 28 lb. (12,9 kg)

#### Environmental Specifications

Operating Temperature	-4° F to 122° F (-20° C to 50° C)
Storage temperature	-4° F to 158° F (-20° C to 70° C)
Standard	IP54
Regulatory	CE

#### Electrical Specifications

##### Receiver

Frequencies	Active: 577Hz, 8kHz, 33kHz, and 133kHz Passive power: 50L, 50H, 100, 60L, 60H, 120 Passive (other): LF 15kHz~30kHz Auxiliary: 560, 512, 460, 400, 393, 340, 333, 273Hz User defined: up to four frequencies (50~999Hz)	
Trace and tone modes		
Performance	Sensitivity @ 1 m/3.3 ft. from cable, Single Peak mode under low noise conditions	
Depth		
Display resolution	0,1 dB	
Depth display range	0 to 30 ft. (9 m)	
Depth units	cm, inch, ft.-in.	
Depth accuracy*	+/- 2% +/- 2 in. (5 cm) +/- 6% +/- 2 in. (5 cm) +/- 10% +/- 2 in. (5 cm)	0 to 60 in. (1,5 m) 60 to 120 in. (1,5 to 3 m) 120 to 180 in. (3 to 4,5 m)
Cable current display	0.1 dB resolution or 0.01 mA resolution Units: dB or mA	
Power	Battery type: Eight AA size, alkaline	
Typical battery life	30 hours	

##### Transmitter

Output frequencies	577Hz, 8kHz, 33kHz, 133kHz	
Trace mode	577Hz, 8kHz, 33kHz, 133kHz	
Sheath (earth return) fault mode (2273M/ME-iD only)	10/20 Hz for sheath (earth return) fault; 577Hz and 33kHz for tracing	
Tone mode	577Hz and 200kHz pulsed at 8Hz	
Induction mode	33kHz, 133kHz	
Output Voltage (maximum)		
Sheath (earth return) fault (2273M/ME-iD only)	70 Vrms	
Trace	70 Vrms	
Tone	Normal setting: 10 Vrms, High setting: 60 Vrms	
Output Power	Normal setting: Limited to 0,5W High setting: Limited to 3W, or 5W with External DC power (option 'A' only)	
Output protection	240 Vrms	
Power	Battery type: Six C size, alkaline (LR14) cells; External DC: 9-18V DC (1A) (option 'A' only)	
Typical battery life	Normal output level: 50 hours High output level: 10 hours	

\*Note: Locators are tested in model field conditions with no adjacent signals. Actual operating conditions may result in decreased depth accuracy due to outside signal disruptions.



### Description

#### Passive Markers

The main element of the 3M Electronic Marker System (EMS) is a durable, passive marker that can be buried over key facilities during construction or used to mark existing facilities during maintenance. After installation, EMS saves both time and money by eliminating the need to search for “lost” facilities.

With EMS, you can find power, gas, water, wastewater, CATV and telephone utilities in the heaviest of traffic. With our Full-Range, Mini, Ball and Near-Surface Markers, there is a marker to meet every need.

#### Full Range Marker

The full-range marker is suited for deep applications up to 8'. Its 15" diameter makes it ideal for use as a digging shield over sensitive underground facilities.



#### Ball Marker

Engineered for narrow trench applications up to 5' in depth, the 4"-diameter ball marker has a unique, patented self-leveling feature that ensures an accurate, horizontal position regardless of how it is placed in the ground.\*



#### Mini-Marker

Designed for marking applications up to 6' in depth, marker spokes in the 8.5"-diameter mini-marker help stabilize it in the correct position after placement.



#### Near-Surface Marker

The near-surface marker is ideal for marking underground and street-access facilities up to 2' in depth. Its 3.5" length, cylindrical size and shape allows for easy installation in asphalt, concrete or rock without extensive digging or drilling.



\*Contains a mixture of propylene glycol and water, which is approved for use in pharmaceuticals, cosmetics and as a food additive. The mixture is readily biodegradable and will not harm humans, wildlife or the environment.

# 9.1 Marking and Locating Products

## 3M™ Electronic Marking System

### Technical characteristics

#### Specifications for 3M Electronic Marking System

	Range	Telephone	Catv	Power	Water	Waste-Water	Gas	General Purpose
Near-surface marker	2 ft.							
Product number		1432	N/A	1433	1434	1435	1436	N/A
Color		Orange		Red	Blue	Green	Yellow	
Ball marker	5 ft.							
Product number		1401-XR	1407-XR	1402-XR	1403-XR	1404-XR	1405-XR	1408
Color		Orange	Black/Orange	Red	Blue	Green	Yellow	Purple
Disk marker	5 ft.							
Product number		1411-XR	N/A	1412-XR	1413-XR	1414-XR	1415-XR	N/A
Color		Orange		Red	Blue	Green	Yellow	
Mini-marker	6 ft.							
Product number		1255	N/A	1256	1257	1258	1259	N/A
Color		Orange		Red	Blue	Green	Yellow	
Full-range marker	8 ft.							
Product number		1250	N/A	1251	1252	1253	1254	N/A
Color		Orange		Red	Blue	Green	Yellow	
Marker locator	—							
Product number		1420/1420E	1420/1420E	1420/1420E	1420/1420E	1420/1420E	1420/1420E	1420/1420E

#### Physical Specifications

	Net Weight	Shipping Weight	Range (Dependant on Marker Type)	Standard Packaging
Near-surface marker	0.055 lbs. (0,025 kg)	3.75 lbs. (1,71 kg)	2 ft. (0,6 m) from locator probe	50/cs.
Ball marker	0.76 lbs. (0,35 kg)	25.00 lbs (11,40 kg)	5 ft. (1,5 m) from locator probe	30/cs.
Disk marker	1.40 oz. (39,70 g)	5.00 lbs. (2,30 kg)	5 ft. (1,5 m) from locator probe	50/cs.
Mini-marker	0.31 lbs. (0,14 kg)	17.00 lbs. (7,70 kg)	6 ft. (1,8 m) from locator probe	50/cs.
Full-range marker	1.75 lbs. (0,80 kg)	30.90 lbs. (14,00 kg)	8 ft. (2,4 m) from locator probe	25/cs.

#### Applications

Telephone	Catv	Power	Water	Wastewater	Gas
• Cable paths	• Cable paths	• Cable paths	• Pipeline paths	• Pipeline paths	• Pipeline buried
• Splices	• Fiber optic facilities	• Service drops	• Service stubs	• Service stubs	• Main stubs
• Buried service drops	• Buried service drops	• Conduit stubs	• Clean-outs	• PVC pipeline	• Service stubs
• Load coils	• Road crossings	• Buried splices	• Road crossings	• Buried valves	• Tees
• Conduit stubs	• Buried splices	• Road crossings		• Road crossings	• Road crossings
• Fiber optic facilities		• Branch splices		• Tees	• Valve boxes
• Branch splices		• Buried transformers			• Meter boxes

# 9.1 Marking and Locating Products

## 3M™ Dynatel™ 1420E-iD EMS Marker Locators

### Description

**New-to-the-world technology for locating underground utilities without any doubt.**

3M™ Dynatel™ 1420/1420E-iD Electronic Marker System (EMS) Marker Locators are microprocessor-based systems that incorporate advanced digital signal processing techniques to quickly and efficiently locate underground facilities – even years after construction or maintenance.

Designed to be more accurate, faster and more integrated than ever before, the 3M Dynatel EMS iD Marker Locators allow you to accurately and easily:

- Locate, read and write to ID markers
- Pin-point the exact depth and location of all existing models of properly installed underground passive EMS markers
- Direct depth reading of ID markers
- Locate two different marker frequencies simultaneously

**Advanced features detect more information about underground utilities.**

A new feature exclusive to the 3M Dynatel EMS iD Marker Locators is the ability to read, write and lock programmed information into the new 3M 1400 Series EMS iD Ball Markers. Information such as a pre-programmed unique identification number, facility data, owner information, application type, placement date and other details from up to 100 ID markers can all be read, stored with date/time stamp and transmitted back to your PC through a standard RS232 serial port for enhanced resource mana

**Accurate even in congested areas.**

3M Dynatel EMS iD Marker Locators are unaffected by metal conduit or pipe, metallic conductors, fences, AC power or electronic markers for other utilities. Multiple ID markers located at close proximity can be read individually using the new system.

**A simple, easy-to-use system.**

Lightweight and compact, the 3M Dynatel EMS iD Marker Locators are rugged, ergonomic and require very little operator training. A large backlit digital liquid crystal display (LCD) screen and soft-key operation make them easy to understand and use for more precise locates. A “memory” feature remembers operator set-up from previous use. A standard RS232 communications port allows interfacing to an external computer for uploading/downloading of data, unit configuration and remote software upgrades. The system can run over 25 hours on eight AA alkaline batteries.

The 1420E, 2250ME-ID and 2273ME-ID locators are now compatible with select GPS/GIS field mapping instruments for real-time mapping of marker placement. The customized Dynatel interface commands the GPS/GIS device in a mode transparent to the user allowing even a generalist field technician to preform real-time mapping. It’s a simple system for mapping marker placement and saving information directly into CAD and GIS systems. The electronic upload of this information in GIS format creates an automated paperless system for records updating, making positive locates in the field easier than ever.



TELEPHONE    GAS    CATV    POWER    WATER    WASTEWATER    GENERAL

**Highlights:**

- Large backlit, high resolution graphic display
- Marker-Link and Locator PC tools software
- PC interface via standard RS232 serial port
- ID marker read/write capability
- User-configurable features and interface
- Dual marker frequency search-simultaneous
- Detects all seven EMS marker frequencies
- Marker depth estimation

# 9.1 Marking and Locating Products

## 3M™ Dynatel™ 1420E-iD EMS Marker Locators

### Technical characteristics

Physical Specifications	Size (H x W x D in. (cm))	Weight (including Batteries)
Receiver	10.25 x 4.7 x 30 (26,7 x 11,8 x 76,2)	4 lb. (1,9 kg)
Shipping	N/A	11.5 lb. (5,3 kg)

Environmental Specifications	
Operating Temperature	-4° F to 122° F (-20° C to 50° C)
Storage temperature	-4° F to 158° F (-20° C to 70° C)
Regulatory	CE
Standard	IP54

Electrical Specifications	
Marker compatibility	All 3M markers (telephone, gas, CATV, power, water, wastewater and general purpose)
Dual marker mode	Any two marker frequencies simultaneously
Detection range	Exceeds maximum marker depth specifications
Marker read range	5 ft. (1,5 m) to all ID ball markers 4 ft. (1,2 m) to water and power markers on 1420E version only
Marker write range	1 ft. (30 cm)
Marker depth measurement accuracy	+/- 10% +/- 2 in. (5 cm) up to marker depth specifications
Display type	Backlit graphic liquid crystal display (LCD) screen
Memory storage with date/time stamp	Read marker records 100 Written marker records 100 User defined ID templates 32
Marker depth memory storage	Five with date/time stamp
Power	Battery type: eight AA size, alkaline Typical battery life: 25 hours
Display	Large graphic high-contrast LCD with backlight
Speaker	0,25 W
Headphone jack	Standard mini-jack
Serial port	Standard RS232 serial with DB9 connector

### Type/Order text

### Ref.-No.

For further information, contact your 3M sales representative.

**EMS-iD Marker Locator with iD Read/Write (OUS)**

**1420E**



## 9.1 Marking and Locating Products

# 3M™ Dynatel™ 1400 Series EMS iD Ball Markers

### Description



#### A Smarter Marking System.

Ball markers make the job of precisely locating underground facilities faster and easier. They have been considered the most reliable way to mark:

- Buried splices
- Buried service drops
- Conduit stubs
- Fibre optic facilities
- Cable paths
- Load coils
- Installations under pavement or snow

The 3M™ 1400 Series Electronic Marker System (EMS) iD Ball Markers provide more information than ever before. They are the first of a new series of markers that perfectly complement the existing line of EMS passive markers.

#### Positive Underground Identification.

For the first time, underground facilities can be positively identified with certainty even in difficult environments. 3M 1400 Series EMS iD Ball Markers do everything the existing line of EMS ball markers can do and more. These ID markers come pre-programmed with a unique identification number.

This pre-programmed number is also attached to the marker on a removable bar-coded tag, which can be peeled off before installation and attached to facility maps for future reference. When a 3M Dynatel™ 1420 or 2200M-iD Series Locator sends a “read” command signal, the ID markers will respond by sending back data previously stored in it. The ID markers can also be programmed and locked by the user via the 1420 and 2200M-iD Series Locators to include customer-specific information such as facility data, hazard levels, type of application, placement date and other important details. After the locator has read this data, it may be transferred to the user’s PC through a standard RS232 communications port.

#### Application-Specific Design.

Dynatel 1400 Series EMS iD Ball Markers are available in seven standard frequencies, colour coded to APWA standards to quickly signify the application: telephone, gas, CATV, power, water, wastewater and a new general-purpose application. These markers are readable to a maximum buried depth of five feet. The ID markers can be located by the previous generation of locators, but can only be read and written to using the new 3M Dynatel 1420 and 2200M-iD Series Locators.



TELEPHONE      GAS      CATV      POWER      WATER      WASTEWATER      GENERAL

#### Quality that Lasts.

3M 1400 Series EMS iD Ball Markers work in all soil conditions and in the presence of all types of congestion. Their four-inch diameter makes them easy to drop into a standard-sized trench. A free-floating, self-leveling design inside a watertight, polyethylene shell ensures that the marker is always in an accurate horizontal position, regardless of how it is placed in the ground. The markers contain a mixture of propylene glycol and water, which is approved for use in pharmaceuticals, cosmetics and as a food additive. The mixture is readily biodegradable and will not harm humans, wildlife or the environment. With over a quarter century of leadership in Electronic Marker Systems, 3M continues to set the standard for quality and innovation.



# 9.1 Marking and Locating Products

## 3M™ Dynatel™ 1400 Series EMS iD Ball Markers

### Description

#### Features of Dynatel<sup>†</sup> 1400 Series EMS iD Ball Markers

	TELEPHONE	POWER	CATV	GENERAL PURPOSE	WATER	WASTEWATER	GAS
<b>MODEL</b>	1421-XR/iD	1422-XR/iD	1427-XR/iD	1428-XR/iD	1423-XR/iD	1424-XR/iD	1425-XR/iD
<b>COLOUR</b>	orange	red	black/orange	purple	blue	green	yellow
<b>READ RANGE*</b>	5 ft. (1,5 m) from locator probe						
<b>UNIQUE ID NUMBER</b>	10 digits						
<b>MEMORY SIZE</b>	256 bits						
<b>TYPICAL COMPRESSED TEXT LENGTH**</b>	7 lines						
<b>MARKER WEIGHT</b>	0.77 lbs. (0,35 kg)						
<b>STANDARD PACKAGE</b>	30/cs.						
<b>SHIPPING WEIGHT</b>	25 lbs. (11,4 kg)						

\*Range specifies maximum distance when using 3M Dynatel™ 1420 Locator. Read range may vary on export models for water and power frequencies.

\*\*Typical compressed text is 6 lines. Each line holds an 8-character subject label and a 13-character description label.

#### Technical characteristics:

##### Physical Specifications

Size	4 in. (10,4 cm) diameter sphere
Marker weight	0.77 lb. (0,35 kg)
Shipping weight	25 lb. (11,4 kg)
Packaging	30 to a case
Frequencies/Models	Telephone, gas, CATV, power, water, wastewater, general-purpose
Range	
Search Mode	5 ft. maximum using any 3M Dynatel Locator for markers
Read Mode	5 ft. maximum using 3M Dynatel 1420 or 2200M-iD Series Locators
Write	1 ft. maximum using 3M Dynatel 1420 or 2200M-iD Series Locators
Shell	High-density, watertight polyethylene
Contents	Mixture of propylene glycol and water
ID number	Unique 10-digit number (xxx-xxx-xxxx)
Memory size	256 bits
Typical compressed text length	6 lines (each line holds an 8-character subject label and a 13-character description label)

##### Environmental Specifications

Operating temperature	-4° F to 122° F (-20° C to 50° C)
Storage temperature	-4° F to 158° F (-20° C to 70° C)

# Marking and Locating Products

## 3M™ Dynatel™ 1400 Series

### EMS iD Ball Markers



Type/Order text

#### Applications for Dynatel 1400 Series EMS iD Ball Markers

TELEPHONE	POWER	CATV	GENERAL PURPOSE	WATER	WASTEWATER	GAS
Cable paths	Cable paths	Cable paths	Reclaimed water	Pipeline paths	Pipeline paths	Pipeline paths
Buried splices	Service drops	Fibre optic facilities	Private campuses	Service stubs	Service stubs	Main stubs
Buried service drops	Conduit stubs	Buried service drops	Valve boxes	PVC pipeline	PVC pipeline	Service stubs
Load coils	Road crossings	Road crossings	Road crossings	All types of valves	Buried valves	Tees
Conduit stubs	All types of splices	Buried splices	Path marking	Road crossings	Road crossings	Road crossings
Fibre optic facilities	Buried transformers	Bends	Buried valves	Tees	Tees	All types of valves
All types of splices	Service loops		Tees	Clean-outs	Clean-outs	Metre boxes
Bends	Street lighting		Metre boxes			Stopping fittings
Depth changes	Bends		Main stubs			Depth changes
Man hole covers	Man hole covers		Service stubs			Transition fittings
Road crossings	Distribution loops					Squeeze points
						Pressure control fittings
						Electro fusion couplings

To order, select the ball marker model that matches your specific application. For further information, contact your 3M sales representative.

**Technical characteristics:**

**Construction**

Shell

The high-density, watertight polyethylene shell is impervious to minerals, chemical and temperature extremes normally found in the underground environment.

Contents

The markers contain a mixture of propylene glycol and water, which is approved for use in pharmaceuticals, cosmetics and as a food additive. The mixture is readily biodegradable and will not harm humans, wildlife or the environment.







# 9.1 Marking and Locating Products

## Testing Products Accessories







### Type/Order text

### Ref.-No.

#### Subscriber Loop Tester/Analyser Accessories for 3M™ Dynatel™ 965DSP

	Pkg.	Min. Order	
			<b>Cigarette lighter adapter accessory</b> (not pictured) 1/cs. 1 each <b>051138-57744</b>
			<b>Alkaline battery holder</b> 1/cs. 1 each <b>051138-57685</b>
			<b>110/220 Vac adapter</b> 1/cs. 1 each <b>051138-57606</b>
			<b>Soft case</b> (not pictured) 1/cs. 1 each <b>051138-57605</b>
			<b>Nickel metal hydride battery pack</b> 1/cs. 1 each <b>051138-57686</b>
			<b>Black/red test lead, alligator, bed of nails</b> (not pictured) 1/cs. 1 each <b>051138-57648</b>
			<b>Black/red test lead, banana plugs</b> (not pictured) 1/cs. 1 each <b>051138-57608</b>
			<b>Blue/yellow test lead, alligator, bed of nails</b> (not pictured) 1/cs. 1 each <b>051138-57649</b>
			<b>Blue/yellow test lead, banana plugs</b> (not pictured) 1/cs. 1 each <b>051138-57610</b>
			<b>Ground Strap, alligator</b> 1/cs. 1 each <b>051138-58529</b>
			<b>Ground Strap, banana</b> (not pictured) 1/cs. 1 each <b>051138-58532</b>
			<b>Green test lead, alligator, bed-of-nails</b> 1/cs. 1 each <b>051138-57650</b>
			<b>Green test lead, banana plugs</b> (not pictured) 1/cs. 1 each <b>051138-57612</b>


**Type/Order text**
**Ref.-No.**
**Locator Accessories and Replacement Parts**

		Pkg.	Min. Order	
	<b>3001 Dyna-Coupler, 3-inch</b> Permits coupling of RF trace tone to cables with a maximum diameter of 3".	1/cs.	1 each	<b>3001</b>
	<b>1196 Dyna-Coupler, 6-inch with pouch</b> Permits coupling of RF trace tone to large diameter cables, bundle cables, and cables enclosed in accessible non-metallic ducts. For use on cables and conduits with a maximum diameter of 6.9".	1/cs.	1 each	<b>1196</b>
	<b>9011 Coupler Cable</b> For use with any Dynatel Transmitter, Receiver, or Coupler: 12' in length.	1/cs.	1 each	<b>9011</b>
	<b>9012 Direct Connect, 5-ft. Transmitter Cable</b> Two lead, 5' cable used for direct connection to cable and ground.	1/cs.	1 each	<b>9012</b>
	<b>2892 Direct Connect, 10-ft. Transmitter Cable</b> Two lead, 5' cable used for direct connection to cable and ground.	1/cs.	1 each	<b>2892</b>
	<b>9023 Probe Cable, 6-ft.</b> For use with most Dynatel Receivers to connect the 3011 Inductive Probe; 6' in length.	1/cs.	1 each	<b>9023</b>






# 9.1 Marking and Locating Products

## Testing Products Accessories

### Type/Order text

### Ref.-No.

#### Locator Accessories and Replacement Parts

		Pkg.	Min. Order	
	<p><b>9026 Earth Contact Frame Cable</b> For use with the 3014 Earth Contact Frame for sheath (earth return) fault location; 4' in length.</p>	1/cs.	1 each	<b>9026</b>
	<p><b>9043 Ground Extension Cable</b> Extends ground capability to 12'.</p>	1/cs	1 each	<b>9043</b>
	<p><b>3014 Earth Contact Frame</b> Used only when locating sheath (earth return) faults. It indicates direction to the fault and is colour coded to correspond with the Receiver's indicator.</p>	1/cs.	1 each	<b>3014</b>
	<p><b>8006 Ground Rod</b> For applying ground capability. Stainless steel.</p>	1/cs.	1 each	<b>8006</b>
	<p><b>2200 Series Locator Carrying Bag</b></p>	1/cs.	1 each	<b>2200</b>

# Notes



# Notes



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