


3M™ Dynatel™
Locating and Marking System



Quickly and Accurately Identify Underground Assets



**A complete system
for damage prevention,
locating, marking
and mapping vital
underground assets.**

The full line of 3M locators and markers helps you quickly and accurately identify underground assets. From finding the exact path and estimated depth of underground utilities, to locating buried passive markers, to reading and writing information directly to the new markers, 3M offers the precision tools needed to manage your assets. And now, certain 3M™ Dynatel™ Locators interface with select GPS/GIS field mapping instruments. Together, these tools provide a complete locating and marking solution with the performance and reliability you trust from 3M.



A REPUTATION OF EXCELLENCE.

When you choose a quality 3M Dynatel locator, you get outstanding performance and reliability, along with a 24/7 support and service center dedicated to excellence.

Our service center provides calibration, repair, upgrades and modifications for safety, performance and reliability.

EASY TO USE.

These Dynatel locators require little training and are simple to use. Digital LCD readouts and push-button operation make the units easy to interpret for precise locates. A bar graph on the receiver indicates received signal and proximity to the cable, and a “memory” feature stores operator setup from previous use. Dynatel locators consist of two basic components:

- **TRANSMITTER** – transmits tracing and fault finding signals, measures the presence of foreign voltage, and tests the continuity of the circuit. Includes a built-in ohmmeter.
- **RECEIVER** – a rugged, one-piece, hand-held device with large, high-resolution LCD display. Bar graph signal strength and direction indicates received signal and proximity to the cable or pipe.

3M™ Dynatel™ Locators

GPS SYSTEM ENHANCES FIELD EFFICIENCY.

3M breaks new ground with GPS/GIS technology. The M-iD series and 1420-iD locators now interface with select GPS/GIS field mapping instruments for real-time mapping of marker placement. This integrated solution simplifies the mapping process so that a single button on the locator interface remotely transfers data to GPS/GIS devices to map electronic markers as they are located. The electronic upload of this information in industry-standard GIS formats provides a paperless system for facility records updating.

SOFTWARE INTERFACE FROM RECEIVER TO PC.

The 3M™ Dynatel™ PC Locator Tools Software (included with each of the M series and M-iD series locators) provides a user-friendly interface between the receiver and a PC.

This software utility allows customization of the receiver for specific applications as well as software update/revision. The marker utility can be used to create templates for programming 3M™ Electronic Marker System iD Ball Markers. It also downloads marker data that has been programmed and/or read by the receiver into the PC for documentation databases.



PRECISELY LOCATES FAULTS.

We earned our reputation for fault locating, and we continue to advance this technology today. 3M™ Dynatel™ Fault Locators identify and measure points of cable damage where there is metallic contact to earth via a conductor or cable shield. They utilize our proven fault detection method with enhanced speed, sensitivity and noise rejection. Our multi-antenna design provides high accuracy and performance.

	Cable/ Pipe	Cable/ Pipe/Fault	Marker Locator
M Series Advanced locator	Model 2250M	Model 2273M	N/A
M-iD Series Advanced locator reads/writes to active EMS markers GPS compatible	Model 2250M-iD	Model 2273M-iD	Model 2250M-iD Model 2273M-iD
2200 Series Basic locator	Model 2250 Model 2210	Model 2273	Model 2205 Model 2206
1420-iD Reads/writes to active EMS markers GPS compatible	N/A	N/A	Model 1420-iD

3M™ DYNATEL™ LOCATORS M SERIES

CABLE/PIPE LOCATOR 2250M

CABLE/PIPE/FAULT LOCATOR 2273M

For cable/pipe locating, the Dynatel M series has 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. They come equipped with several built-in features that allow accurate cable and pipe locating:

- Locate cable and pipe path
- Measure cable/pipe or Sonde depth
- Measure signal current in the cable or pipe
- Identify cable and cable pairs
- Tone shorts and grounds in aerial cable
- Locate energized power cable



3M™ Dynatel™ Cable/Pipe
and Fault Locator 2273M



3M™ Dynatel™ Cable/Pipe
Locator 2250M

The receiver includes a unique “expander” function that makes peaks and nulls more pronounced for fast tracking and pinpointing of position.

The unique Directional Peak mode combines the response from four peak antennas to indicate left/center/right direction to the cable/pipe while the bar graph and numeric display indicate the sharp and accurate dual-peak response.

Semi-automatic gain set with manual fine tuning provides maximum flexibility and control.

The multi-directional null mode shows null signal response with automatic gain and utilizes the multiple antenna design to show cable/pipe location and direction on a unique compass-like graphic user interface on the high-resolution display.

For fault locating, the Dynatel locator 2273M performs all the functions of the 2250M plus the ability to find underground faults.



3M™ Dynatel™ Cable/Pipe
Locator 2250M

3M™ DYNATEL™ LOCATORS M-iD SERIES

CABLE/PIPE/MARKER LOCATOR 2250M-iD

CABLE/PIPE, FAULT/MARKER LOCATOR 2273M-iD

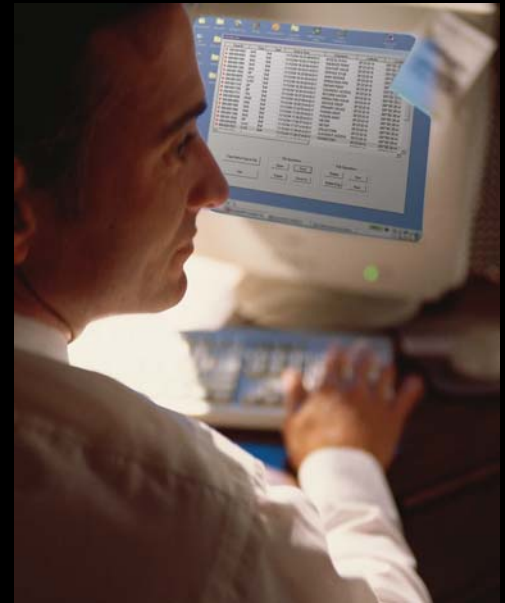
Our most advanced locator series, M-iD locators are engineered with the same cable/pipe locating platform as the M series but with the added ability to locate active and passive electronic markers. Even in the heaviest of traffic, these locators indicate whether a properly installed marker is for power, gas, water, wastewater, CATV or telephone utilities.

In addition, the M-iD series features the ability to write, read and lock programmed information into the 3M™ Electronic Marker System iD Ball Markers 1400 Series, an exclusive feature. Information such as a pre-programmed unique identification number, facility data, application type, placement date and other details from up to 100 iD markers can be stored with a date/time stamp. It can then be transmitted to a PC through a standard RS232 port.

In addition, the M-iD series provides reliable tools for many essential functions:

- Pinpoint the location of all existing models of properly installed underground passive and active EMS markers
- Estimate the depth of passive EMS markers
- Direct depth reading of iD markers
- Locate two marker frequencies simultaneously
- Trace cable or pipe path while finding buried markers along the way simultaneously
- Read/write capability to store and retrieve user facility data into iD ballmarkers
- Real-time mapping of marker placement when used in conjunction with selected GPS mapping instruments, Please go to www.3M.com/dynatel for more details.

For fault locating, the Dynatel locator 2273M-iD performs all the functions of the 2250M-iD plus the ability to find underground faults.



3M™ Dynatel™ PC Locator Tools



3M™ Dynatel™ Cable/Pipe, Fault and Marker Locator 2273M-iD

3M™ DYNATEL™ LOCATING AND MARKING SYSTEMS

FEATURES

RECEIVER	2250M 2250ME	2250M-iD 2250ME-iD	2273M 2273ME	2273M-iD 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
Digital fault strength indicator			X	X
Expander amplifier	X	X	X	X
Pre-set auxiliary frequencies for power, CATV, radio and long haul fiber applications	X	X	X	X
Four user-definable auxiliary frequencies	X	X	X	X
PC interface via standard RS232 serial port	X	X	X	X
User-configurable frequencies	X	X	X	X
Detects all seven EMS marker frequencies		X		X
Locator PC tools software	X	X	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
GPS communications capability with select GPS receivers		X		X
TRANSMITTER	2250M-iD 2250ME-iD	2273M-iD 2273ME-iD	2273M 2273ME	2273M-iD 2273ME-iD
Simultaneous signals	X	X	X	X
Built-in ohmmeter and continuity tester and Voltmeter	X	X	X	X
Three tone application methods (direct connect, coupler, inductive)	X	X	X	X
Auto load impedance 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

ACCESSORIES

PRODUCT NUMBER	DESCRIPTION
1196	6" Dyna-Coupler 1196 w/Pouch
2200M	Soft Carrying Bag 2200 for 2200M Series
2200RB	Rechargeable Battery 2200RB Series for 5 watt transmitters
2876	Large Clip Direct-Connect Transmitter Cable 2876, 10'
2892	Small Clip Direct-Connect Transmitter Cable 2892, 10'
3001	Dyna-Coupler 3001, 3"
3014	Earth Contact Frame 3014
3019	Cable Locator Coupler Accessory Kit 3019
3229	ADP 33KHZ Sonde 3229
3235	ADP Power Sonde 3235 for use w/Power EMS II
9011	Coupler Cable 9011
9012	Direct Connect 9012, 5' Transmitter Cable, Telephone
9026	Earth Contact Frame Cable 9026
9043	Ground Extension Cable 9043

3M™ DYNATEL™ LOCATING AND MARKING SYSTEMS

ORDERING INFORMATION MODEL 2250M/2273M

PRODUCT NUMBER	DESCRIPTION
2250M-UR	Cable/pipe locator US Receiver only
2250M-UC5W/RT	Cable/pipe locator US Communications 5 watt
2250M-UU5W/RT	Cable/pipe locator US Utility 5 watt
2250M-UC3W/RT	Cable/pipe locator US Communications 3 watt
2250M-UU3W/RT	Cable/pipe locator US Utility 3 watt
2273M-UR	Cable/pipe and fault locator US Receiver only
2273M-UC5W/RT	Cable/pipe and fault locator US Communications 5 watt
2273M-UU5W/RT	Cable/pipe and fault locator US Utility 5 watt
2273M-UC3W/RT	Cable/pipe and fault locator US Communications 3 watt
2273M-UU3W/RT	Cable/pipe and fault locator US Utility 3 watt

ORDERING INFORMATION MODEL 2250M-ID/2273M-ID

PRODUCT NUMBER	DESCRIPTION
2250M-ID/UR	Cable/pipe locator US Receiver only, w/EMS-ID capability
2250M-ID/UC5W-RT	Cable/pipe locator US Communications 5 watt w/EMS-ID capability
2250M-ID/UU5W-RT	Cable/pipe locator US Utility 5 watt w/EMS-ID capability
2250M-ID/UC3W-RT	Cable/pipe locator US Communications 3 watt w/EMS-ID capability
2250M-ID/UU3W-RT	Cable/pipe locator US Utility 3 watt w/EMS-ID capability
2273M-ID/UC5W-RT	Cable/pipe and fault locator US Communications 5 watt w/EMS-ID capability
2273M-ID/UU5W-RT	Cable/pipe and fault locator US Utility 5 watt w/EMS-ID capability
2273M-ID/UC3W-RT	Cable/pipe and fault locator US Communications 3 watt w/EMS-ID capability
2273M-ID/UU3W-RT	Cable/pipe and fault locator US Utility 3 watt w/EMS-ID capability

ORDERING INFORMATION CUSTOM KIT

PRODUCT NUMBER	DESCRIPTION
2250M-CNTR/5W	Cable/pipe locator 6" Coupler w/bag, 2-year warranty
2250M-ID-CNTR/5W	Cable/pipe locator w/iD 6" Coupler w/bag, 2-year warranty
2250M-ID-UU5W-6IN	Cable/pipe locator US Utility 5 watt w/iD, 6" Coupler
2273M-ID/UC3W-w/Case	Cable/pipe and fault locator US Communications 3 watt w/EMS-ID capability w/case
2273M-UC3W-w/Case	Cable/pipe and fault locator US Communications 3 watt w/case

ORDERING INFORMATION EXPORT KITS - CE COMPLIANT

PRODUCT NUMBER	DESCRIPTION
2250M-EC5W/RT	Cable/pipe locator OUS Communications 5 watt
2250M-EU5W/RT	Cable/pipe locator OUS Utility 5 watt
2250M-ID/EC5W-RT	Cable/pipe locator OUS Communications 5 watt w/EMS-ID capability
2250M-ID/EU5W-RT	Cable/pipe locator OUS Utility 5 watt w/EMS-ID capability
2273M-EC5W/RT	Cable/pipe and fault locator OUS Communications 5 watt
2273M-EU5W/RT	Cable/pipe and fault locator OUS Utility 5 watt
2273M-ID/EC5W-RT	Cable/pipe and fault locator OUS Communications 5 watt w/EMS-ID capability
2273M-ID/EU5W-RT	Cable/pipe and fault locator OUS Utility 5 watt w/EMS-ID capability

3M™ DYNATEL™ LOCATORS 2200 SERIES

CABLE/PIPE LOCATOR 2250

CABLE/PIPE/FAULT LOCATOR 2273



3M™ Dynatel™ Cable/Pipe
and Fault Locator 2273

The 2200 series locator is built specifically to find the path and estimated depth of buried cables and pipes. 2200 series locators have four active frequencies, passive frequencies for power, cathodic protection, CATV and auxiliary frequencies for long distance locating from remote transmitters. They also offer toning of aerial cable, direct readout of active duct probe, and cable/pair identification.

Receivers incorporate an “expander” function to make peaks and nulls more pronounced by enhancing the amplitude difference between two conductors carrying the same tone. Both the receiver and the transmitter feature a self-test routine that is executed each time the unit is turned on.

As with other locator models, the Dynatel locator 2273 performs all the functions of the 2250 locator plus the ability to find underground faults.

3M™ DYNATEL™ LOCATORS 2210 SERIES

CABLE/PIPE LOCATOR 2210



3M™ Dynatel™ Cable/Pipe
Locator 2210

The 2210 locator was developed specifically to pinpoint the path of underground cables and conductors. With the push of a button, the 2210 locator quickly and accurately measures relative signal current in the target cable with a direct readout of cable depth. The 2210 locator operates using two different active frequencies and incorporates an improved peak-locating mode which provides a sharp peak response, allowing easy discrimination between adjacent cables. All components are constructed of tough and rugged materials designed to withstand typical field use.

ORDERING INFORMATION EXPORT KITS

PRODUCT NUMBER	DESCRIPTION
2210-E3T3	Cable/pipe locator, OUS Telco 3 watt
2250-E5T3	Cable/pipe locator, OUS Telco 5 watt
2273-E5T3	Cable/pipe and fault locator, OUS Telco 5 watt

3M™ DYNATEL™ LOCATING AND MARKING SYSTEMS

FEATURES

RECEIVER	2250 2250E	2250- CNTR	2273 2273E	2210 2210E
Peak mode	x	x	x	x
Null mode	x	x	x	
Differential mode	x	x	x	
Push button digital depth readout	x	x	x	x
Cable identification	x	x	x	(2210E)
Measures signal current in cable	x	x	x	x
Direct readout of active duct probe depth	x	x	x	(2210E)
Visual and audible cable locates	x	x	x	x
Digital fault strength indicator			x	
Graphic display	x	x	x	x
Ground level antenna	x	x	x	x
Expander amplifier	x	x	x	
50/60 Hz power cable locate mode	x	x	x	x
Compatible with 2205/2206 marker locating accessory	x	x	x	x
TRANSMITTER	2250 2250E	2250- CNTR	2273 2273E	2210 2210E
Two operator-selectable frequencies				x
Four operator-selectable frequencies	x	x	x	
Simultaneous signals	x	x	x	
Built-in ohmmeter	x	x	x	
Indicates presence of foreign and hazardous voltage	x	x	x	
Built-in continuity test	x	x	x	x
Three tone application methods (direct connect, coupler, inductive)	x	x	x	x
Auto load impedance matching	x	x	x	x
High and normal output level	x	x	x	x
Sheath (earth return) fault-finding capability			x	
Fault-locate and cable-locate tones applied simultaneously			x	

ORDERING INFORMATION

PRODUCT NUMBER	DESCRIPTION
2250-U3P3	Cable/pipe locator US/Canada Power 3 watt
2250-U3T3	Cable/pipe locator US/Canada Telco 3 watt
2250-CNTR	Cable/pipe locator US/Canada Contractor 3 watt
2250-CNTR	Cable/pipe locator US/Canada Contractor 5 watt
2273-T3	Cable/pipe locator US/Canada 3 watt w/o fault accessories, w/3" coupler
2273-TN	Cable/pipe locator US/Canada 3 watt w/o fault accessories, w/o 3" coupler
2273-U3P3	Cable/pipe and fault locator US/Canada Power 3 watt
2273-U3R	Cable/pipe and fault locator US Receiver only
2273-U3T	Cable/pipe and fault locator US Transmitter only
2273-U3T3	Cable/pipe and fault locator US/Canada Telco 3 watt
2273-U5P3/A	Cable/pipe and fault locator US/Canada Power 5 watt w/external DC input
2273-U5T3/A	Cable/pipe and fault locator US/Canada Telco 5 watt w/external DC input
2210-U3P3	Cable/pipe locator US/Canada Power 3 watt
2210-U3T3	Cable/pipe locator US/Canada Telco 3 watt
2205-PWR	EMS Marker locating accessory—Power
2205-TEL	EMS Marker locating accessory—Telephone
2206-ALL	EMS Marker locating accessory—Multi-Markers

As communities grow, so do their underground assets. It becomes increasingly important to quickly and accurately identify exactly what is buried underground and where. The 3M Electronic Marker System (EMS) delivers more information to accelerate identification and help avoid costly mistakes.

POSITIVE IDENTIFICATION.

Unlike surface markers such as stakes, flags or paint, an EMS marker is not affected by overgrown vegetation or vandalism, and can't be worn away by weather. Markers are passive antennas with no internal power source to run down. Their high strength polyethylene shells are impervious to minerals, chemicals and the temperature extremes normally found underground. The 3M Electronic Marker System consists of durable, passive markers that can be buried over key facilities during construction or used to mark existing facilities during maintenance.

SIMPLE INSTALLATION.

It takes just minutes to learn to use the system, and finding buried markers is just as easy. The locator transmits an RF signal to the buried marker. The marker reflects the signal back to the locator, and the location is indicated with both a visual meter reading and an audible tone. With our full range of markers, 3M has exactly what you need.

3M™ Electronic Marker System

3M™ ELECTRONIC MARKER SYSTEM APPLICATIONS

	Cable paths, buried splices, buried service drops, load coils, conduit stubs, fiber optic facilities, all types of splices, bends, depth changes, manhole covers, road crossings
TELEPHONE	
	Cable paths, service drops, conduit stubs, road crossings, all types of splices, buried transformers, service loops, street lighting, bends, man hole covers, distribution loops
POWER	
	Cable paths, fiber optic facilities, buried service drops, road crossings, buried splices, bends
CATV	
	Reclaimed water, private campuses, valve boxes, road crossings, path marking, buried valves, tees, meter boxes, main stubs, service stubs
GENERAL PURPOSE	
	Pipeline paths, service stubs, PVC pipeline, all types of valves, road crossings, tees, clean-outs, casing ends
WATER	
	Valves, all types of fittings, clean outs, service stubs, laterals, pathmarking of non-metallic facility
WASTE WATER	
	Pipeline paths, main stubs, service stubs, tees, road crossings, all types of valves, meter boxes, stopping fittings, depth changes, transition fittings, squeeze points, pressure control fittings, electro fusion couplings, all types of fittings and joints
GAS	



3M™ ELECTRONIC MARKER SYSTEM iD BALL MARKERS 1400 SERIES.

1400 series iD ball markers can be programmed to include customer-specific information such as facility data, type of application, material type and size, placement date and other important details. iD markers come programmed with a unique identification number, which is also attached to the marker on a removable bar-coded tag for future reference. Additional information can be programmed and locked by the user via the 1420-iD or M-iD series locators.

When sent a “read” command signal, the iD markers respond with the data previously stored. Read data may be easily transferred to the user’s PC for future reference or sent directly to select GPS/GIS mapping devices for real time mapping. iD markers’ four-inch diameter makes them easy to drop in a standard sized trench and can be located and read from a depth of five feet. A patented free-floating design in a rugged polyethylene shell ensures that the self-leveling marker is always in an accurate horizontal position, regardless of how it is placed in the ground.

3M™ 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. (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.)



3M™ NEAR-SURFACE MARKER.

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



3M™ MINI-MARKER.

Designed for marking applications at depths up to 6', marker spokes in the 8.25" diameter mini-marker help stabilize it in the correct position after placement.



3M™ 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.



3M™ DYNATEL™ ELECTRONIC MARKER SYSTEM

MARKER LOCATOR 1420-iD








A feature exclusive to the Dynatel EMS locator is the ability to read, write and lock programmed information into 3M™ Electronic Marker System iD Ball Markers 1400 Series. The 1420-iD series also pinpoints the exact depth and location of all existing models of properly installed underground passive EMS markers — easily differentiating between standard frequencies. As with the 2200M-iD locators, detailed information can be read, stored with date/time stamp and transmitted back to your PC for enhanced resource management through a standard RS232 serial port.



3M™ Dynatel™ Electronic Marker System Marker Locator 1420-iD

As referenced in a previous section, the 1420-iD series is now compatible with selected GPS/GIS instruments to greatly simplify the mapping process. Please go to www.3M.com/dynatel for more details.

SPECIFICATIONS - 3M™ ELECTRONIC MARKER SYSTEM

	Telephone	Power	CATV	General Purpose	Water	Wastewater	Gas	Read Range*
Color	 orange	 red	 black/orange	 purple	 blue	 green	 yellow	n/a
ACTIVE								
EMS iD Ball Marker								
Product Number	1421-XR/iD	1422-XR/iD	1427-XR/iD	1428-XR/iD	1423-XR/iD	1424-XR/iD	1425-XR/iD	5 ft. (1.5m)
PASSIVE								
Ball Marker Extended Range								
Product Number	1401-XR	1402-XR	1407-XR	1408	1403-XR	1404-XR	1405-XR	5 ft. (1.5m)
Near-Surface Marker								
Product Number	1432	1433	N/A	N/A	1434	1435	1436	2 ft. (0.6m)
Mini-Marker								
Product Number	1255	1256	N/A	N/A	1257	1258	1259	6 ft. (1.8m)
Full-Range								
Product Number	1250	1251	N/A	N/A	1252	1253	1254	8 ft. (2.4m)

*Read range specifies maximum distance from locator probe using 3M™ Dynatel™ Locator 1420. Read range may vary on export models for water and power frequencies—refer to product bulletins.

ORDERING INFORMATION

PRODUCT NUMBER	DESCRIPTION
1420-iD	EMS-iD marker locator w/iD read/write
1420E-iD	EMS-iD marker locator w/iD read/write (OUS)

Contact your local 3M representative for more information, or call the Global 3M Telecom
Access Division at: 800/426 8688.
www.3M.com/dynatel



Picture on page 1-2 courtesy of *The Planet Underground*.

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