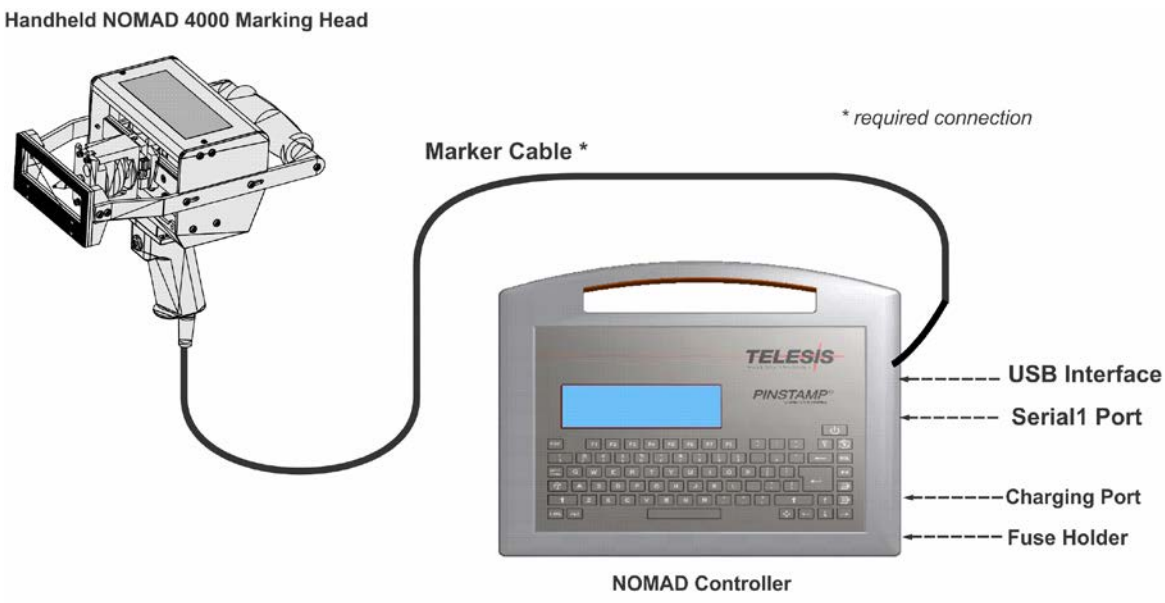

NOMAD 4000 Marking System – General Arrangement

SYSTEM OVERVIEW

The Telesis® NOMAD 4000 marking system permanently prints messages into materials such as steel, aluminum, and plastic. A hardened pin is accelerated to indent dot matrix characters into the item being marked at depths up to .30 mm (.012 inch) in mild steel. Character shape, size, density, and location are determined by the user through the marking system software.

Marking Head. The marking head is an electromechanical marker. A metal-formed cover houses the internal, mechanical components that position the pin cartridge. An electric solenoid fires the marking pin and an internal spring returns the pin to its idle position within the cartridge. The marking head moves the pin cartridge through X- and Y-axis rectilinear motions to reach the correct position for each dot of the characters to be marked. The system software controls pin extension to mark the message.

The marker uses two stepper-motor drives to rapidly and accurately position the pin at coordinate-defined locations in the marking window within .006 mm (.00024 inch). The marker accommodates the rigorous dynamics of impacting, rebounding, and rapid positioning of the marking pin through a linear rail/ball bearing saddle assembly, ceramic-coated guide shaft/linear bushing assemblies, and drive motors with rack and pinion gearing.

The lightweight and portable NOMAD 4000 is battery operated and designed for remote operation. The handheld marker incorporates a pistol grip handle with a Start Print push-button switch. A rear-mounted handle provides additional stability during marking. It can be used in virtually any orientation.

The integral standoff with its padded front surface is held against the marking surface while marking. The standoff can be adjusted forward and aft to change the pin stroke.

Pin Cartridge. The pin cartridge is machined from engineered plastic materials and offers long life with little maintenance. Screws attach the pin cartridge to the marking head for easy removal, cleaning, and pin replacement. The cartridge/solenoid assembly can be configured for Long Throw or Short Throw operation. Long Throw configuration allows for deeper marks; Short Throw configuration allows for faster marking.

Marking Pins. The marking pins are made of carbide and are available in 30° and 45° cone angles.

Marker Cable. The marker cable permanently connects the marker to the controller. The cable is 2 m (6.5 feet) long and is prewired to the marking head.

NOMAD Controller. The NOMAD controller provides the electrical interface and software control of the NOMAD 4000 marking head. Refer to *NOMAD Controller Specifications* for details.

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SYSTEM OPTIONS

- Backup Utility Software
- Barcode Scanner
- Barcode Wand
- Logo/Font Generator Software
- Upgrade Utility Software

SYSTEM SETUP

The marking head is designed to be used as a handheld marker.

The following procedures provide a **general overview of the operation process**. For initial startup procedures, see the *NOMAD 4000 Getting Started Supplement.* For complete installation instructions, refer to the *NOMAD 4000 Installation & Maintenance Manual* and the *NOMAD 4000 Operation Manual*.

CAUTION

The NOMAD 4000 is not a sealed unit. See *Environmental Considerations*.

1. Place the controller on a flat, level, and stable surface as close as practical to the marking head. Standard marker cable length is 2 m (6.5 feet).
2. Press the controller power button on the front panel to **ON** to start the marking system software.
3. Load the needed pattern.
4. Adjust the pin stroke for impact depth as necessary.
5. Place the marking head on the correct location, and print the pattern.

NOMAD 4000 MARKING HEAD

Specifications

The NOMAD 4000 marking head specifications are subject to change without notice.

Dimensions	see *NOMAD 4000 Handheld Marking Head Dimensions*
Rating	NEMA 1 (I.P. 10)
Weight	3.00 kg (6.6 lb), marker only
Noise	81.4 dB (maximum) 73.1 dB (LEQ) See *Marking Noise* for details
Vibration	Does not exceed 2.5 m/s^2 See *Vibration Data* for details
Marking Area (W x H)	100 x 25 mm (4.0 x 1.0 inches)
Number of Impact Pins	1
Pin Types	30° or 45° cone angle
Pin Type	Carbide with 30° or 45° cone angle
Pin Stroke (maximum)	8.26 mm (.325 inch), Long Throw 4.45 mm (.175 inch), Short Throw
Operating Temperature	0° to 50°C (32° to 122° F), non-condensing
Humidity	10% to 80%

Marking Characteristics

The NOMAD 4000 can produce character sizes from 1.5 to 25 mm (.060 to 1.0 in.) increments. Characters can be rotated 359° in 1° increments with a printing resolution range from 4 dots/cm (10 dots/inch) to 31 dots/cm (80 dots/inch) for an engraved look. The depth of mark can be adjusted by adjusting the pin stroke or adjusting the Depth parameter in the marking system software.

Marking Speeds

The system can mark 3.175 mm (.125 inch-) high characters in the 5 x 7 font at a rate of 2 characters per second at a depth of .30 mm (.012 inch) in mild steel. Speeds vary widely depending on the selected character size, style, and dot density. Specific times can be verified by a Telesis representative.

Marking Noise

Sound pressure level tests were conducted on the NOMAD 4000 marking system using a Larson-Davis Model 710 sound pressure meter while dry firing the marker at a 50% duty cycle. The maximum sound pressure level during the test cycle was measured at 81.4 dB. The time-weighted average (LEQ) using the 3 db rule without threshold was 73.1 dB. Typical applications average a 20% to 30% duty cycle where the time-weighted average would not exceed 69.1 dB(A).

The sound pressure level tests were conducted under controlled conditions imitating predicted normal operation. However, noise level is heavily dependent on the part being impacted. Conditions such as the material being marked, the rigidity of the work piece, machine settings, and ambient noise can all vary when in operational use. Such variables will alter the actual noise level.

Despite detailed guidance provided with each machine, variable operating conditions are beyond the control of Telesis. The responsibility of establishing safe working levels of use remains with the end user. Accordingly, end users should conduct their own sound pressure level tests while marking actual work pieces.

Pin Life

Pin life depends on the type of material being marked, how hard or abrasive it is, and the required marking depth.

Vibration Data

Total hand-arm vibration does not exceed 2.5 m/s^2.

Vibration tests were performed under controlled conditions imitating typical normal operation.

Conditions such as rigidity of the work piece, material, and setting of the machine may vary in actual operational use and would alter the actual vibration level. Despite detailed guidance instructions provided with each machine, such conditions are beyond the control of Telesis and must remain the responsibility of the end user. End users should conduct their own tests to establish safe working levels of use.

The vibration tests were conducted using the following parameters:

Pin Stroke.....	8 mm (.31 inch) set for Long Throw
Marking Base	20 mm (.79 inch) thick steel
Marking Surfaces.....	3 mm (.125 inch) thick steel plate
Marking Mode.....	Dot
Text Marked.....	QWERTYUI12345678 5 x 7 font 3 mm (.12-inch) characters

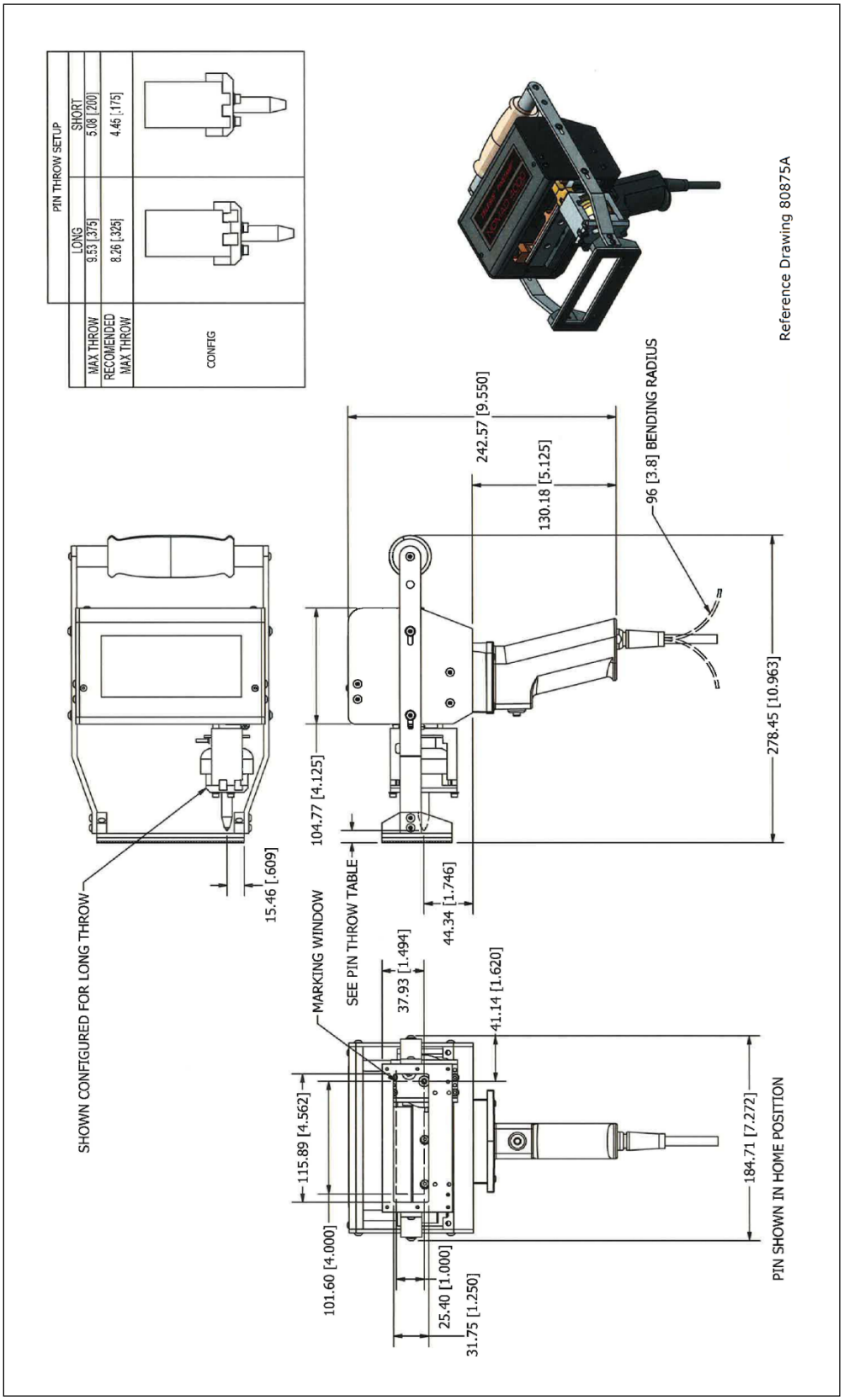
The worst-case scenarios under the given test conditions are listed in the following tables.

Pistol Grip Handle		
VM	**$T_{(EAV)}$**	**$T_{(ELV)}$**
0.933 m/s^2	more than 24 hr	more than 24 hr

Padded (rear-mounted) Handle		
VM	**$T_{(EAV)}$**	**$T_{(ELV)}$**
0.87 m/s^2	more than 24 hr	more than 24 hr

where:

- **VM** = hand/arm Vibration Magnitude.
- **$T_{(EAV)}$** = time to reach the Exposure Action Value based on continuous marking.
- **$T_{(ELV)}$** = time to reach the Exposure Limit Value based on continuous marking.



NOMAD 4000 Handheld Marking Head Dimensions

NOMAD CONTROLLER

The NOMAD controller is a portable unit powered by a rechargeable factory installed lithium battery. The controller is permanently attached to the marker head via the marker cable.

*** This Product is powered by a Lithium Polymer/Li-ion Battery. Failure to follow Safety Instructions and Warnings or other misuse could result in risk of fire, explosion, or other safety hazards.**

***See your NOMAD system manuals for all Safety and Operation Instructions and Information.**

***Never charge the NOMAD controller unattended.**

***Always have a fire extinguisher for emergency use.**

***Never charge the NOMAD controller if the NOMAD controller's case is physically damaged or deformed**

***Charge the NOMAD controller in an isolated area, away from flammable materials or liquids.**

*** Lithium batteries have a life cycle. Replace the battery when it reaches its service life or when it is two years old, whichever comes first. Batteries should only be replaced by Telesis Technicians.**

*** Make sure the NOMAD controller is cooled to ambient temperature before charging.**

***Use only Telesis Lithium Polymer/Li-ion chargers provided to you by Telesis. Do not use NiMH or NiCd chargers.**

***Never store or charge the NOMAD controller in extreme temperatures.**

***Never charge the NOMAD controller while marking at the same time.**

***During discharge and handling of the NOMAD controller, do not exceed 0° to 50 °C (32° to 122 °F)**

***Store the NOMAD controller at room temperature between 5 and 27 °C (40 and 80 °F) for best results.**

*** Never leave the charger plugged into the NOMAD controller after it is fully charged. The charger will illuminate green when charge is complete.**

***When transporting or temporarily storing the Nomad controller in a vehicle, temperature range should be greater than -6°C (20 °F) but no more than 65°C (150°F).**

*** When not in use, the battery must be fully charged once a month to maintain the battery.**

*** If you observe a noticeable decrease in product run time or increase in required charge time, the battery must be replaced. Batteries should only be replaced by Telesis Technicians. Please contact your Telesis representative to schedule service**

*** If you observe smoke, disfiguration of the device or battery, swelling of the device or battery, or unusual heat while operating or during charging, discontinue use or charging, respectively, and report to a Telesis Representative.**

*** Storing the NOMAD controller at temperatures greater than 76˚ C (170˚ F) for extended periods of time (more than 2 hours) may cause damage to battery and possible fire.**

*** Wire lead shorts can cause fire.**

***Operating Temperature**

Charging: 0° to 45˚ C (32° to 113˚ F)

Discharge: 0° to 50˚ C (32° to 122˚ F)

NOMAD Controller Specifications

NOMAD controller specifications are subject to change without notice.

Compliance	CE, RoHS
Configurations	Portable battery operated
Rating	(I.P. 50) for general use
Dimensions	refer to the *NOMAD Controller Dimensions drawing*
Weight	8 lb (3.63 kg) controller only
Operating Temperature	32° to 122° F (0° to 50°C)
Operating Humidity	10% to 80% non-condensing
Cooling	Internal, thermostat-controlled fan
Communications	RS232 Serial Comm Port USB (data backup and transfer)

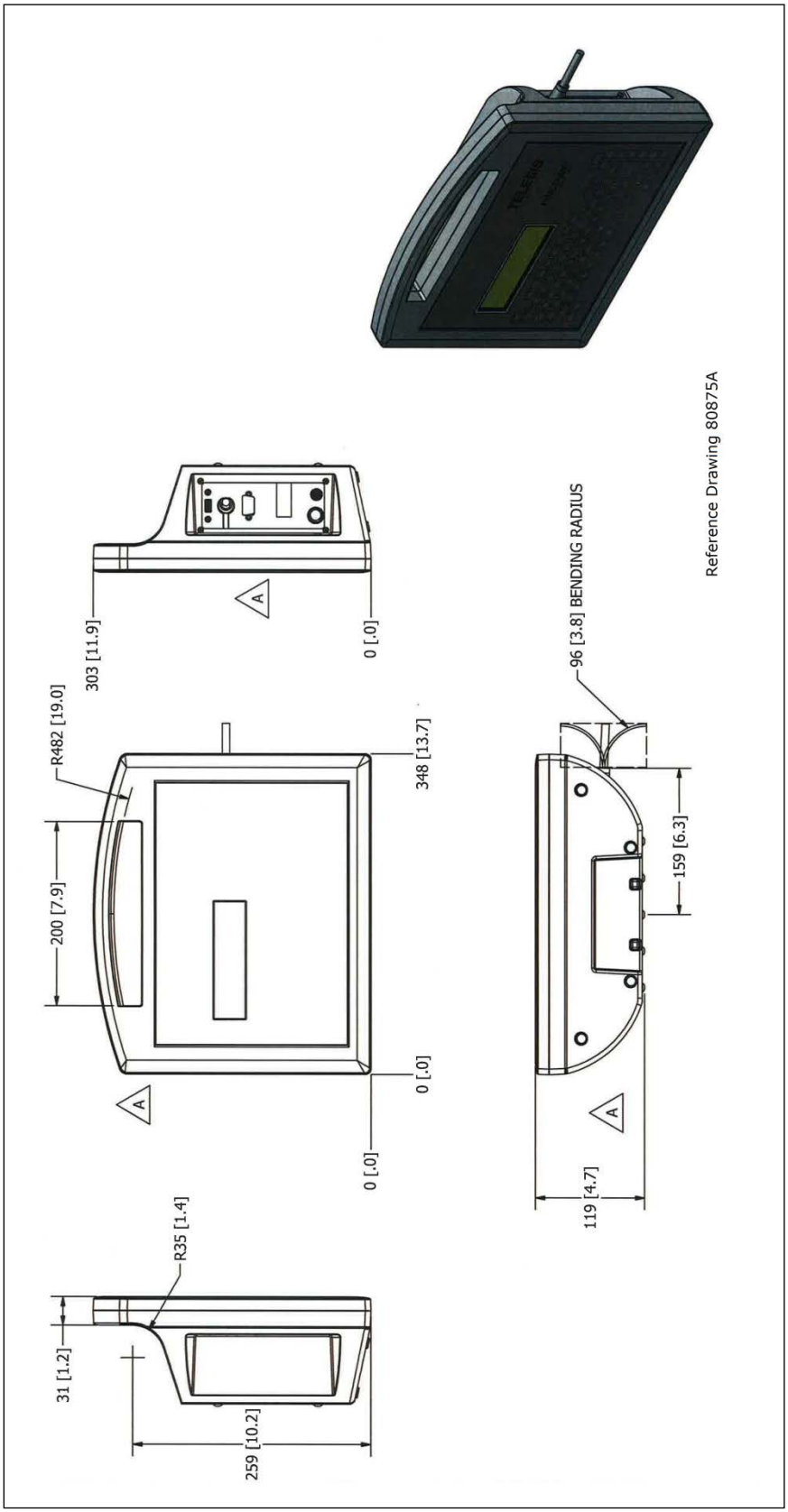
Battery Charger Specifications

Power Requirements	37-volt Lithium Battery with AC charging adapter
Input	100~240 volts
Output	42 volt ± 0.2 volts
Charging current	2 amp ± 0.1 amp
Operation Temp	-0ºC~40ºC (32ºF~104ºF)
Rating	NEMA® 1 (I.P. 50)

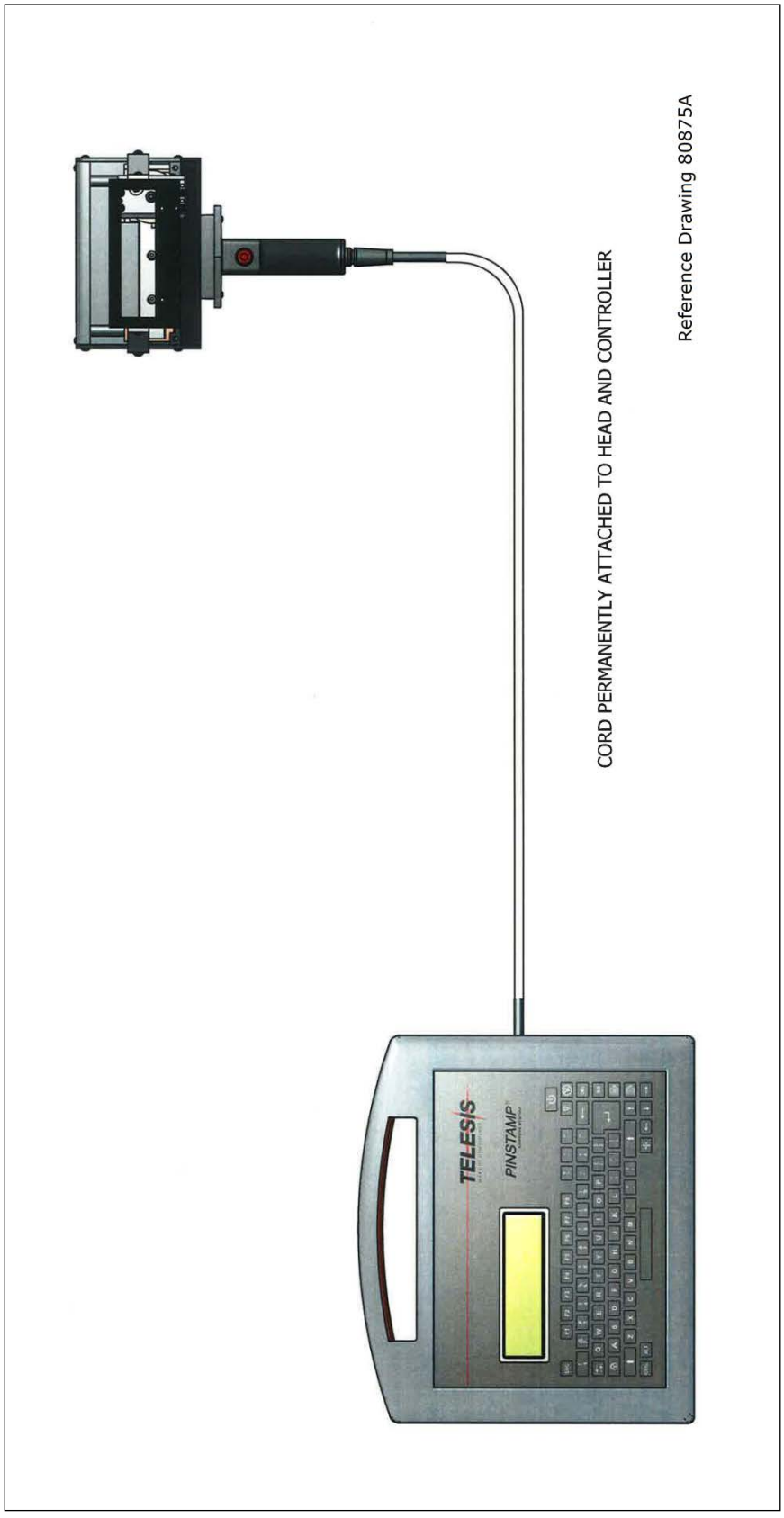
Environmental Considerations

The following environmental considerations must be taken into account when using the NOMAD controller.

Contaminants. The non-vented NOMAD is rated NEMA® 1 (IP50). Where liquid contaminants are present, the contaminants can be forced into the NOMAD controller and cause the controller to fail. For that reason, the controller should be protected in these types of environments. The unit should also be protected or not used in extreme heat or cold situations to ensure proper function.



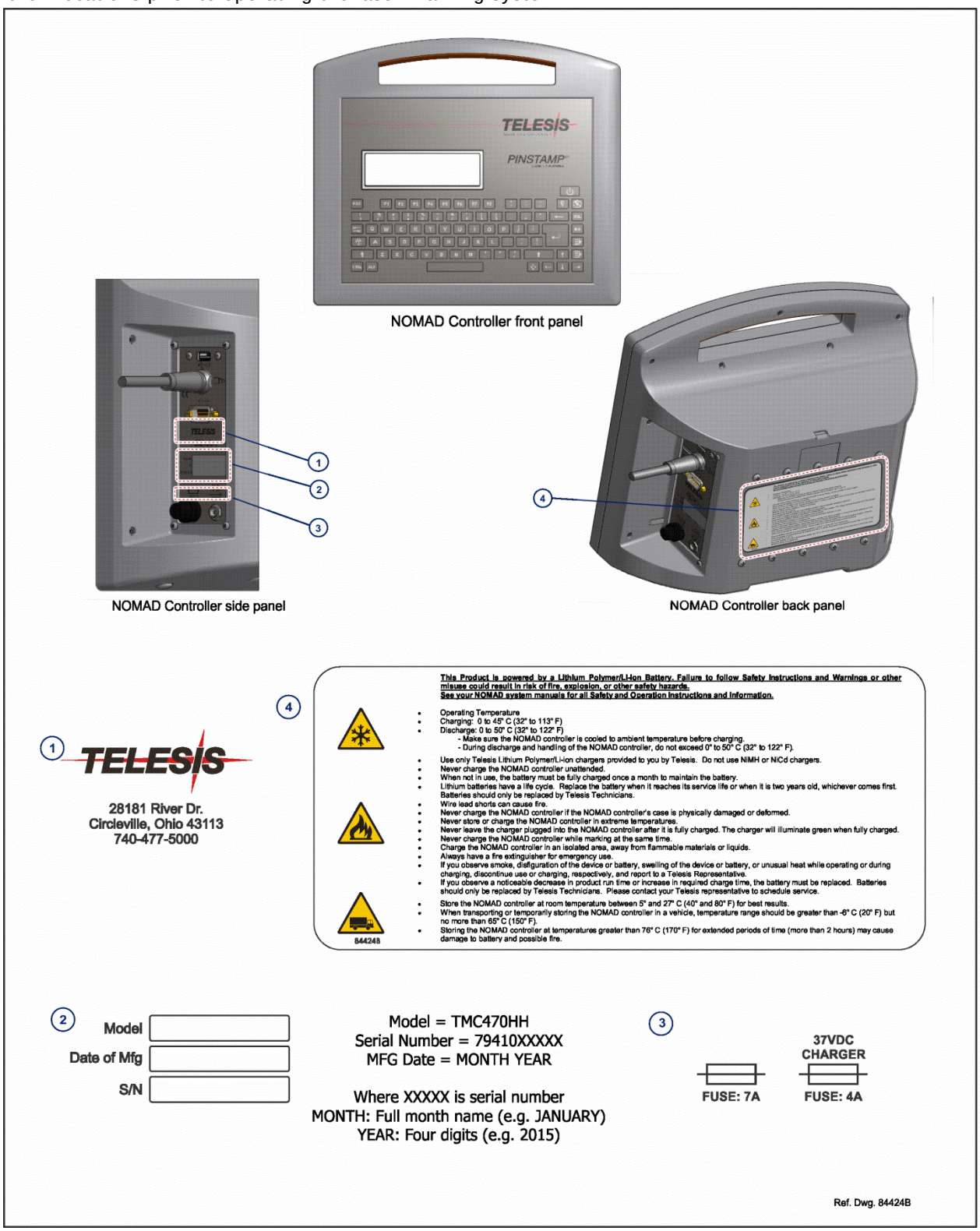
NOMAD Controller Dimensions



NOMAD Controller and Head

NOMAD Controller Safety Labels

Safety labels and their locations are shown in the following illustration. Familiarize yourself with the laser labels and their locations prior to operating the laser marking system.



NOMAD-Based System Software

The system software is installed in the controller and provides the user interface for the operator to control the marker. The software also provides a library for storing, loading, and editing user-defined patterns.

Patterns are files stored in the controller's memory. Depending on the size of the pattern files, the controller can store up to 200 patterns. Each pattern contains one or more fields; each field defines a single object.

Printable objects can be created to define text strings, arc-text strings, geometric shapes, graphics, and machine-readable data matrix symbols.

Printable text fields can include alphanumeric characters, symbols, and special message flags.

Message flags insert data, such as serial numbers, times, dates and user-defined codes, into the text string. Refer to the *NOMAD Operation Manual* for details.

Interface Panel

The side panel of the controller provides ports for the marker cable, USB, serial connection, and the charger cable.

Serial Interface. The Comm port allows you to connect to remote serial devices, such as a barcode scanner. See *Serial Communications* for details.

USB Interface. The USB port allows you to connect a memory stick or flash drive for pattern storage or retrieval and for software upgrades.

Charging Port. The charging port allows you to recharge the NOMAD battery pack. Check the battery monitor symbol on the top left of the main menu on the controller for the battery charge status. Keep the charger cable in an open area when charging to allow ventilation and prevent overheating. The red charging indicator on the charging cable turns green when the battery is fully charged. When the NOMAD is fully charged, unplug it from the charger.

- When the NOMAD is not used, the battery must be fully charged once a month to maintain the battery.
- Batteries that show a noticeable decrease in run time or increase in required charge time must be replaced. Contact your Telesis Technologies representative to schedule service.
- Lithium batteries have a life cycle, replace with the battery when it reaches its service life or when it is two years old, whichever comes first Technologies representative to schedule service.

Never use any charging cable other than the one provided by Telesis Technologies. The charger can generate heat and must be used in dry a ventilated area.

Never operate the NOMAD 4000 while it is charging.

RS232 Barcode Scanner

The marking system software allows you to configure communication parameters to transmit and receive data to and from the Comm1 port. This port is used with the optional barcode scanner.

Trademarks

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