

EDDYFI ECTANE2

A Proven Success. Made Better.

MFE INSPECTION
SOLUTIONS



General Precautions

- ♦ Before turning on the instrument, carefully read the instructions contained in this manual.
- ♦ Keep this manual in a safe place for future reference.
- ♦ Carefully follow the installation and operation procedures.
- ♦ Respect safety warnings on the instrument and in this manual.
- ♦ The Ectane[®] 2 should only be used by qualified personnel.
- ♦ When carrying the Ectane 2, it is the user's responsibility to make sure that the safety precautions used are in accordance with the local department of transportation's (or equivalent governing body) rules and regulations.
- ♦ The electrical plug shall only be inserted in a power outlet providing a protective earth contact. You must not negate the protective action by using an extension cord (power cable) without a protective conductor (grounding). Grounding one conductor of a two-conductor outlet is not sufficient protection.
- ♦ The instrument must only be connected to a power source corresponding to the type indicated on the rating plate.
- ♦ If the equipment is used in a manner not specified by Eddyfi NDT, Inc., the protection provided on the equipment may be rendered ineffective.
- ♦ Do not install substitute parts or perform any unauthorized modification to the instrument.
- ♦ Service instructions, when applicable, are for trained service personnel only. To avoid dangerous electric shock, do not perform any service unless qualified to do so. For any problem or question regarding this instrument, contact Eddyfi NDT, Inc., or an authorized Eddyfi NDT, Inc. representative.

Battery Charger Precautions

Note The battery charger is optional.

- ♦ Do not expose the battery charger or its power supply to water or liquids. The charger case is not sealed.
- ♦ Do not open the battery charger or power supply case. They contain no user-serviceable parts.
- ♦ Do not cover the fan exhaust or obstruct airflow; this would cause overheating.
- ♦ Use only the included power supply and observe terminal polarity.
- ♦ Place the charger away from external heat sources.

Marking and Symbols

The following symbols can appear on the instrument, and pertain to safety regulations that should be followed carefully.



The exclamation mark label is used as a general warning sign. It indicates that you should refer to this user manual to obtain the information necessary to ensure the proper protection of the instrument and its users.



The lightning flash with arrowhead label is used as a high voltage sign. It indicates the presence of hazardous voltages (within the product enclosure or accessible externally) that can be of sufficient magnitude to constitute a risk of electric shock to persons. Always refer to the user manual to ensure proper protection and safe practices.



The RoHS Compliant symbol signifies that this product complies with RoHS directive 2002/95/EC. This directive prohibits the use of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyl (PBB), or polybrominated diphenyl ether (PBDE) in certain classes of electrical and electronic units as of July 1, 2006.



The “Crossed-Out Wheeled Bin” label is a reminder to dispose of this product in accordance with local WEEE regulations. This electronic instrument was manufactured according to high quality standards to ensure safe and reliable operation when used as stated in this manual. Due to its nature, this instrument may contain small quantities of substances known to be hazardous to the environment or to human health if released in the environment. For this reason, Waste Electrical and Electronic Equipment (commonly known as WEEE) should never be disposed of in the public waste stream.

EMC Directive Compliance

FCC Compliance (USA)

This equipment was tested and found to comply with the limits for a Class A digital device, pursuant 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 user's guide, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case you will be required to correct the interference at your own expense.

ICES Compliance (Canada)

This ISM device complies with Canadian ICES-001.

Cet appareil ISM est conforme à la norme NMB-001 du Canada.

AS/NZS Compliance (Australia/New Zealand)

This device complies with Australia and New Zealand AS/NZS 4252.2 (IEC 61000-6-4) and AS/NZS 61000-6-2 (IEC 61000-6-2).

Calibration and Warranty Seals

Calibration and warranty seals are hidden under the Ectane 2's front-left bumper to prevent accidental damages.

Important Broken seals void the calibration certification and product warranty.

Safety Indications

The purpose of the various safety indications in this manual are meant to ensure operator safety and instrument integrity.

WARNING!



The Warning sign indicates a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, can result in personal injury.

Do not proceed beyond a Warning sign until the indicated conditions are fully understood and met.

CAUTION



The Caution sign indicates a hazard. It calls attention to a procedure, practice, or the like that, if not correctly performed or applied, can result in material damage or loss of data.

Do not proceed beyond a Caution sign until the indicated conditions are fully understood and met.

Important The Important indication calls attention to important information or information essential to completing a task.

Note *The Note calls attention to an operating procedure, practice, or the like that requires special attention. A Note also indicates related, parenthetical information that is useful, but not essential.*

Typographical Conventions

The various typographical conventions used in this document are explained below and were designed to standardize and simplify the look and feel of this document.

Italic

An italic typeface is used to indicate emphasis on a specific word or phrase (i.e., This options should *never* be selected.)

Bold

A bold typeface is used to indicate the name of a menu item or a named user-interface element (i.e., the **File** menu, the **Options** button, etc.) Generally, items in bold typeface are capitalized to reflect the capitalization used on screen.

SMALL CAPITALS

Small capitals are generally used when reference is made to inscriptions found “as is” on an instrument (buttons, connectors, indicator lights, etc.)

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Chapter 1

Introducing
the Ectane 2

Presentation

Eddyfi's innovative Ectane[®] 2 unleashes the full potential of electromagnetic testing (ET) technologies for surface and tube inspection. This high-performance ET data acquisition system offers the following top-of-the line key features:

- ◆ Light, rugged, portable, and sealed
- ◆ SmartMUX[™]: integrated, universal, and programmable array multiplexer for up to 256 elements
- ◆ Multitechnology for tube inspections: ECT, RFT, NFT, MFL, ECA, and IRIS¹ ultrasound technology
- ◆ Battery power and backup for flexibility and 100 % uptime
- ◆ Plug-and-play connectivity—no more BootP
- ◆ Standard connectors

The Ectane 2 is controlled by a computer running Microsoft Windows[®] XP or Windows[®] 7 and Eddyfi's Magnifi[®] software. This computer is referred to as the *workstation* in this document. For details about Magnifi, refer to its user's guide.

What is in the Box

All Ectane 2s come with the following standard accessories:

- ◆ Two, high-capacity batteries
- ◆ One power adapter (100 V–240 V)
- ◆ Power cords (one for North America, one for Europe)
- ◆ Ballistic nylon shoulder strap
- ◆ High-quality shielded Ethernet cable
- ◆ DVD containing the user's guide
- ◆ Transport case

¹. Patent pending

Instrument Description

At this time, the Ectane 2 is available in 11 different configurations. Numbers after the model's name indicate the maximum number of available channels with this instrument. The RNM option indicates RFT, NFT, and MFL capabilities. The I option indicates IRIS capabilities.

Available configurations are:

- ◆ Ectane 2 E
- ◆ Ectane 2 E64
- ◆ Ectane 2 E128
- ◆ Ectane 2 E256
- ◆ Ectane 2 I
- ◆ Ectane 2 ERNM
- ◆ Ectane 2 ERNMI
- ◆ Ectane 2 E64RNM
- ◆ Ectane 2 E64RNMI
- ◆ Ectane 2 E128RNM
- ◆ Ectane 2 E128RNMI

Front Plate Descriptions

The Ectane 2 comes with one of eight different front plates:

- ◆ Ectane 2 E (without SmartMUX)
- ◆ Ectane 2 E64 and E128
- ◆ Ectane 2 E256
- ◆ Ectane 2 I
- ◆ Ectane 2 ERNM (without SmartMUX)
- ◆ Ectane 2 ERNMI (without SmartMUX)
- ◆ Ectane 2 E64RNM and E128RNM
- ◆ Ectane 2 E64RNMI and E128RNMI

Figure 1 Ectane 2 E

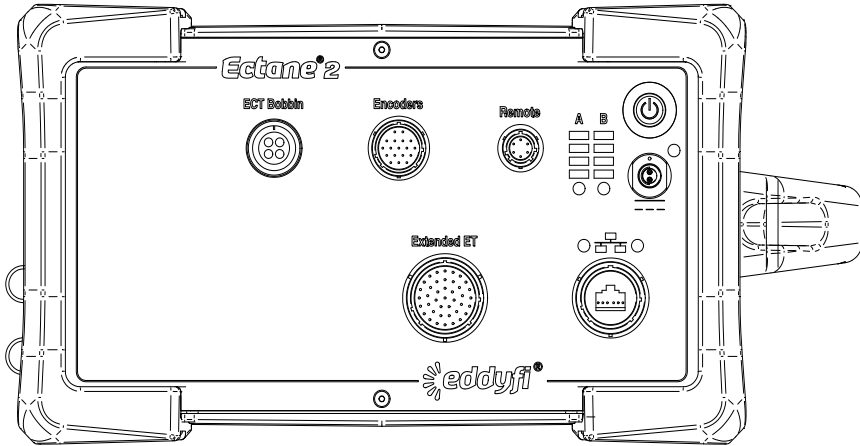


Figure 2 Ectane 2 E64 and E128

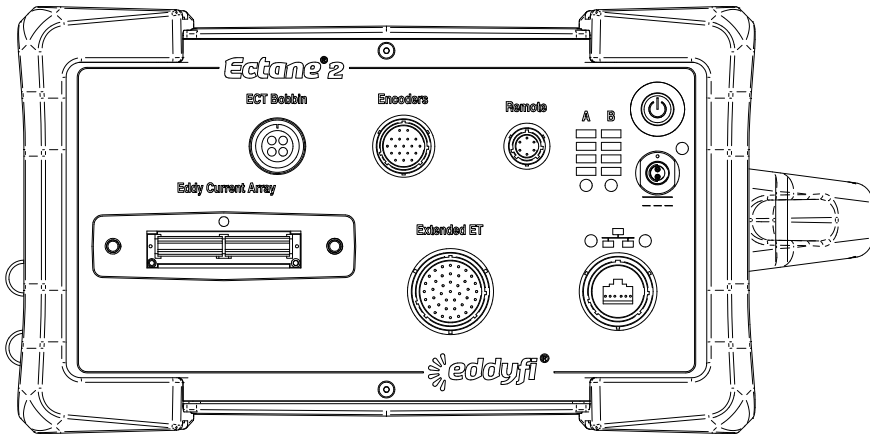


Figure 3 Ectane 2 E256

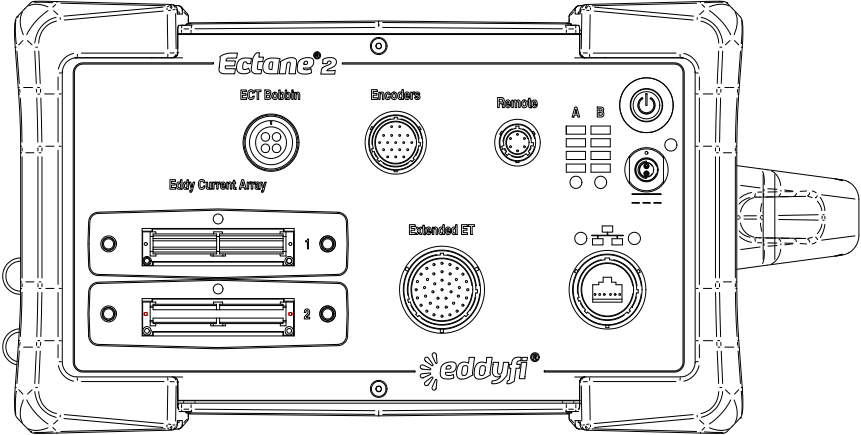


Figure 4 Ectane 2 I

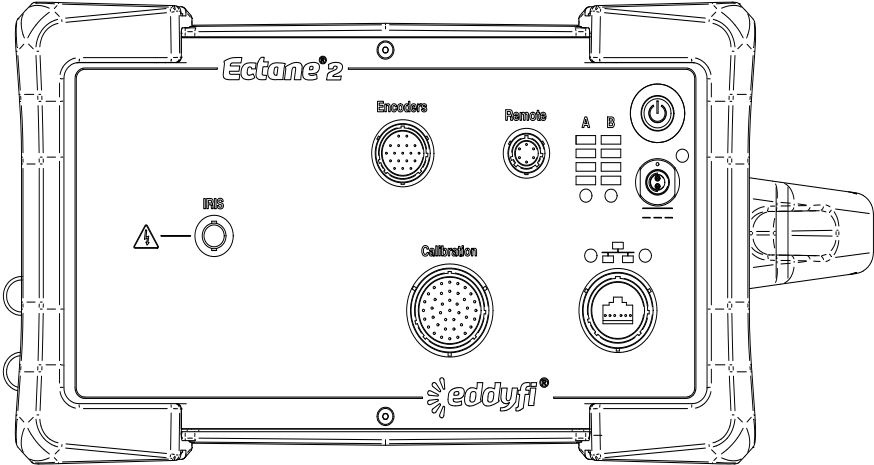


Figure 5 Ectane 2 ERNM

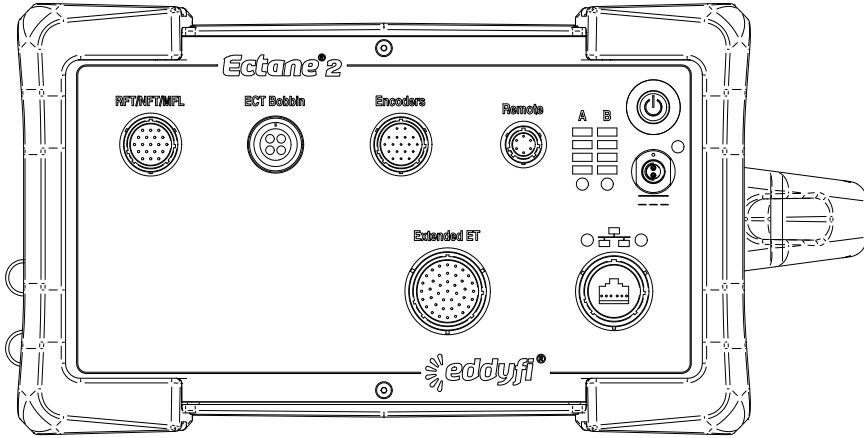


Figure 6 Ectane 2 ERNMI

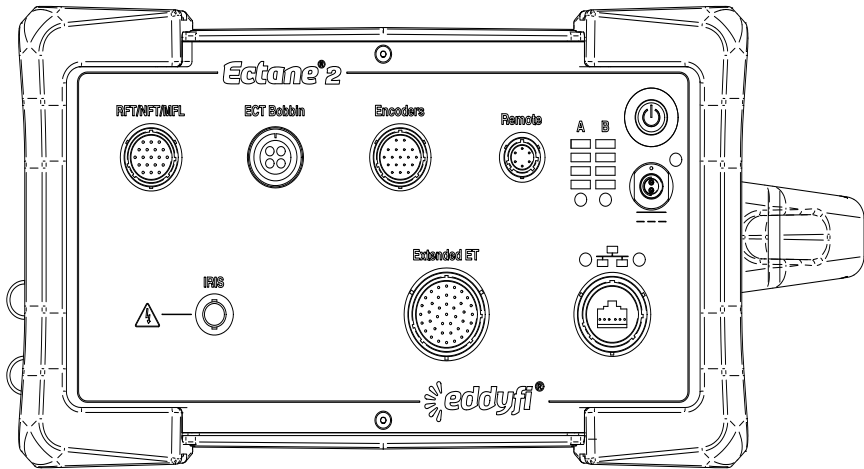


Figure 7 Ectane 2 E64RNM and E128RNM

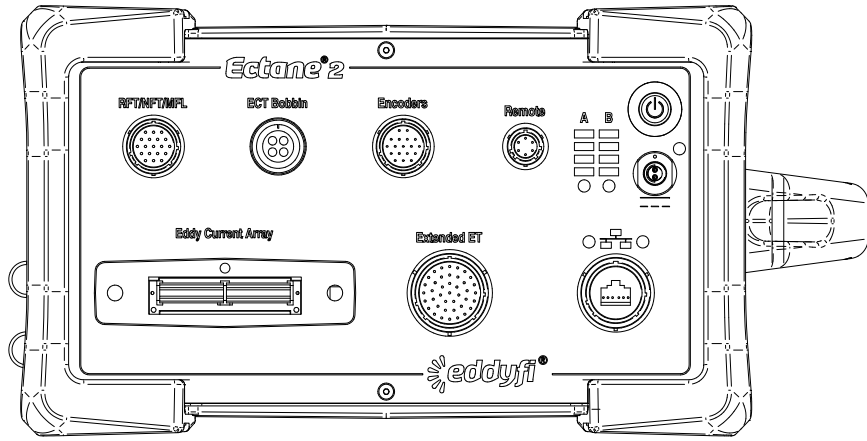
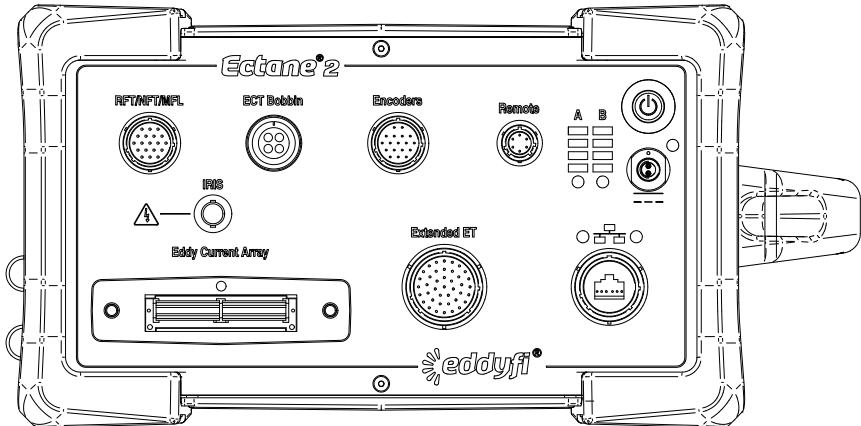


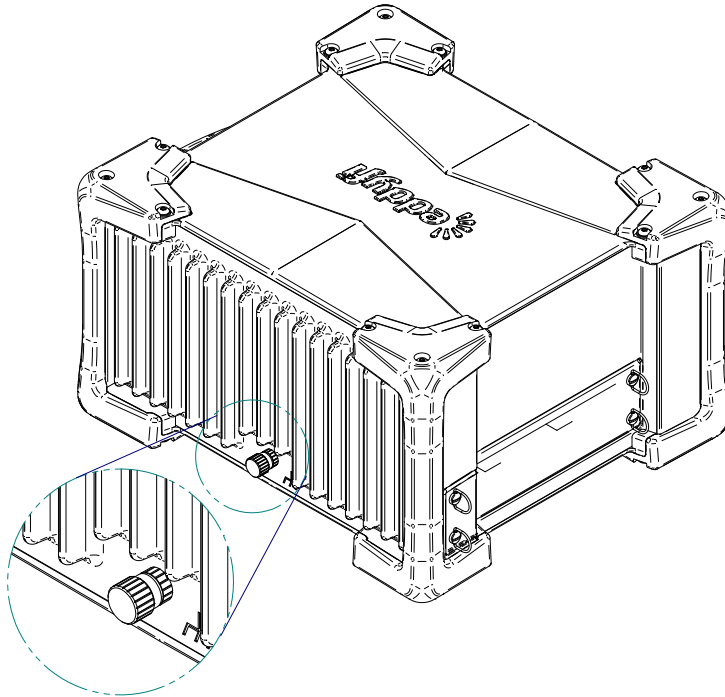
Figure 8 Ectane 2 E64RNMi and E128RNMi



Chassis Ground Connector

Behind the instrument, you will find the chassis' ground connector, which is used to ground the Ectane 2 when the situation requires it.

Figure 9 Chassis ground connector

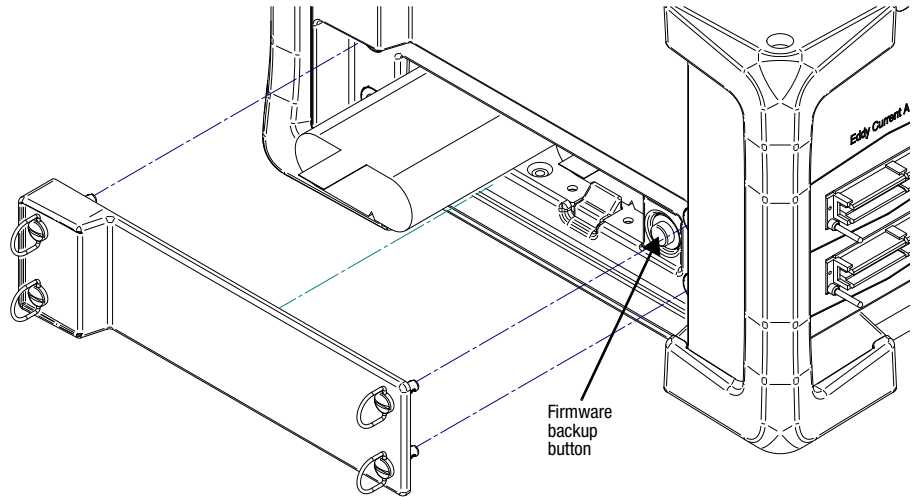


The chassis' ground connector is a simple screw that you remove to insert the ground wire, putting the screw back in to secure the connection.

Battery Compartment

The Ectane 2 can be powered by an external AC/DC supply or by two, high-power batteries. The batteries are accessible from a side access panel, as shown below.

Figure 10 Battery compartment



Important The firmware backup button is used in cases where the Ectane 2's original firmware becomes corrupted. The troubleshooting procedure in case of firmware corruption appears in the Magnifi documentation.

Chapter 2

Preparing the Instrument

Setting Up the Instrument

To properly set up the Ectane[®] 2:

1. Remove the instrument from its transportation case.
2. Position the instrument on a level and stable surface.
You can position it horizontally or vertically.

WARNING!



Never use the instrument when it is upside down (batteries on top). This position prevents the batteries from properly dissipating heat and can lead the Ectane 2 to enter its power safe mode. For details about the power safe mode, see “Environmental Conditions” on page 41.

Important Regardless of how you position the instrument, you must *always have a minimum clearance of 10 cm (4 in.)* on all sides of the instrument. Always position the instrument away from heat sources. This ensures proper heat dissipation while the instrument is in use.

CAUTION



When in use, and depending on the loaded setup, the instrument can generate a non-negligible amount of heat. It should not cause any kind of harm, but can prove uncomfortable to the touch. Therefore, when moving the instrument, use the carrying handle.

Connection Configurations

The Ectane 2 allows various test configurations. The following figures illustrate some of these configurations.

Figure 1 Typical configuration 1: Ectane 2 with SmartMUX™

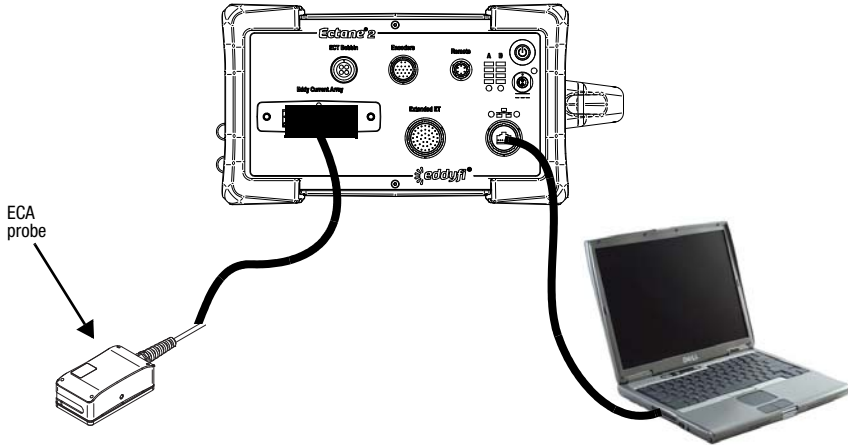


Figure 2 Typical configuration 2: Ectane 2 with SmartMUX, scanner, and probe

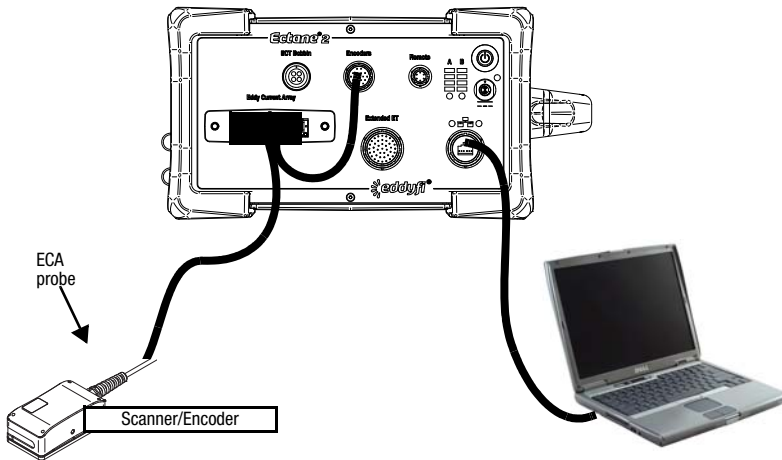
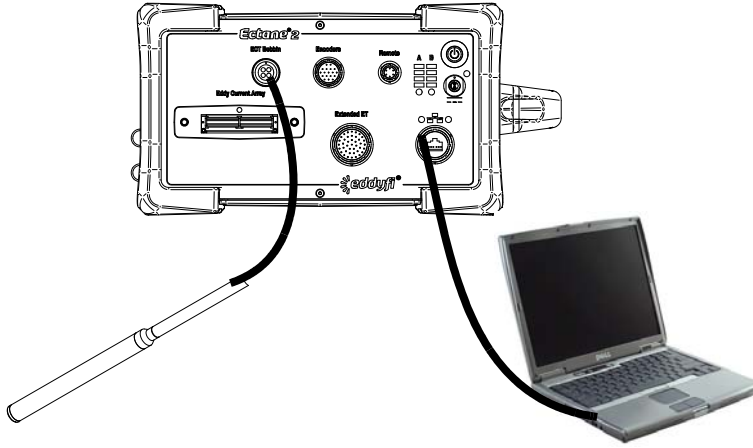


Figure 3 Typical configuration 3: Ectane 2 with bobbin probe



Starting the Instrument

Once you have properly connected all the components of your inspection setup, you can start the Ectane 2.

1. Connect the power adapter to the power cord.
2. Connect the power adapter to the power socket on the front of the Ectane 2.
3. Connect the power cord to the power outlet.
4. Press the power button until it clicks.

The power button lights up orange and all the indicators on the front panel of the instrument light up.

Note *If you want to use the batteries, simply press the power button.*

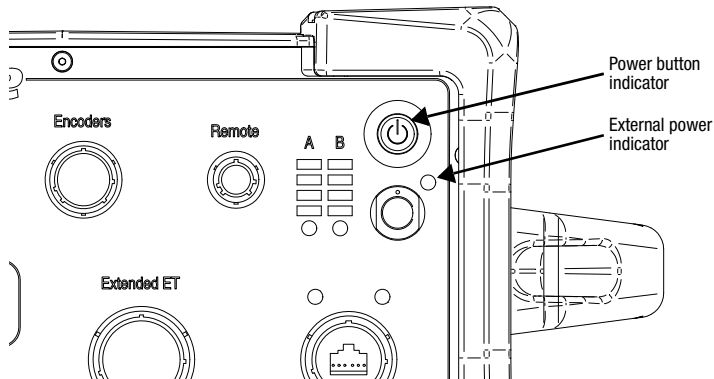
Understanding Indicators

There are various indicators on the front panel of the Ectane 2. The following pages explain the various behaviors of these indicators.

Power Indicators

Two indicators are assigned to the instrument's power status:

- ♦ Power button indicator
LED integrated in the power button. Lights orange when the Ectane 2 is on.
- ♦ External power indicator
Lights green when the external AC adapter is connected and powered.

Figure 4 Power indicators

Battery Indicators

Each battery has its own charge level indicator and charging status indicator.

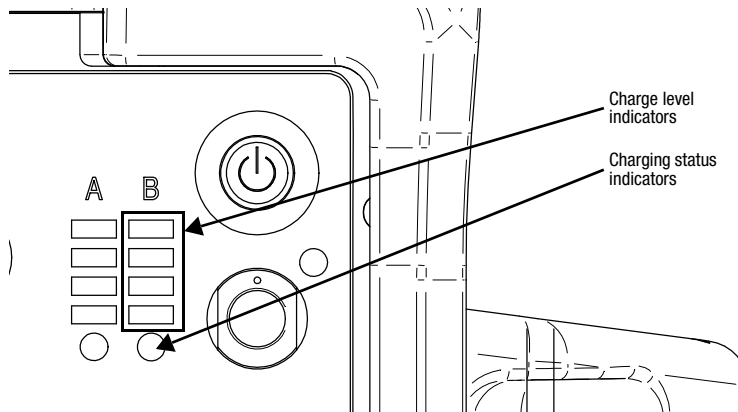
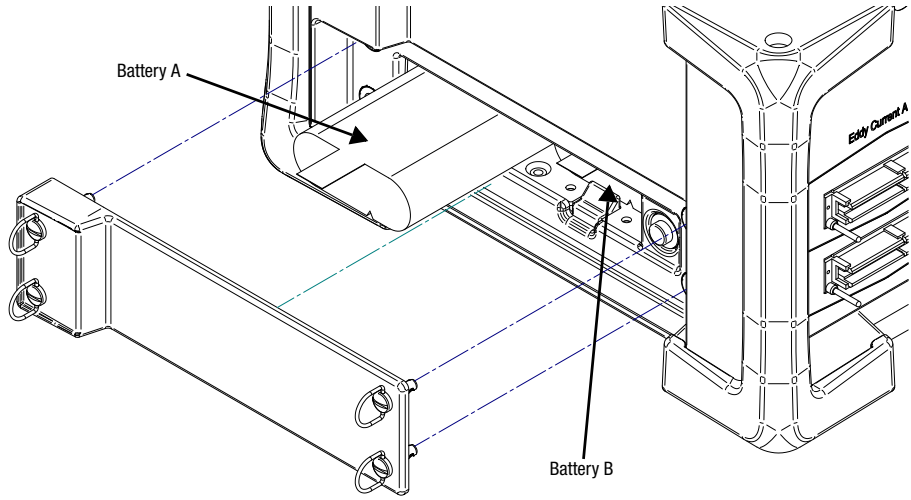
Figure 5 Battery B indicators

Figure 6 Battery corresponding to battery indicators



Charge level indicators light and blink depending on each battery's charge level, as explained below:

LED 1 (from bottom) is blinking	Charge is less than 10%
LED 1 is solid	Charge is over 10%
LED 2 is solid	Charge is over 25%
LED 3 is solid	Charge is over 50%
LED 4 is solid	Charge is over 75%

Charging status indicators can have one of five states:

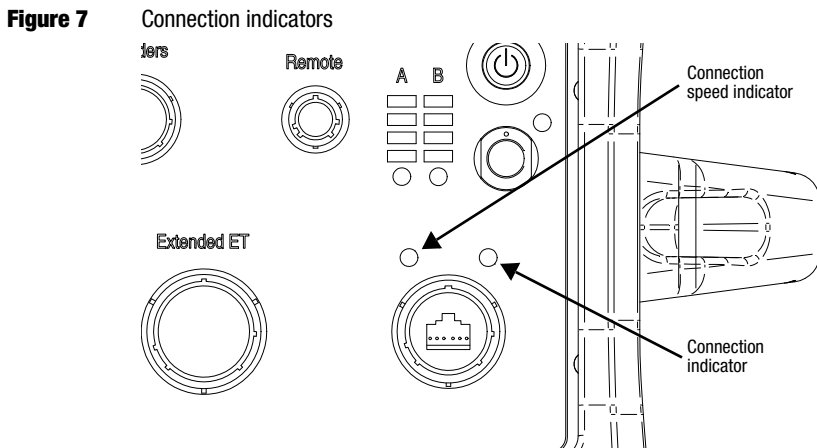
Off	When the following two conditions are present: <ul style="list-style-type: none">◆ no external power◆ instrument is off
Green is solid	Battery is fully charged
Orange is solid	Battery charging
Orange is blinking	Instrument shutdown due to low battery power
Orange-green blinking	Instrument shutdown due to overheating

Note *Indicators are set off for up to 1 minute when the instrument is turned on.*

Note *In the event that the Ectane 2 shuts down because of low battery power or overheating, the instrument automatically starts again once the shutdown condition clears.*

Connection Indicators

Just above the Ethernet port, two indicators provide the state of the communications between the Ectane 2 and your workstation.



The connection speed indicator can be in one of three states:

Orange is solid	Gigabit Ethernet communication is established
Green is solid	100 Mbps Ethernet communication is established
Off	10 Mbps Ethernet communication is established

The connection indicator can be in one of three states:

Green is blinking	Communication activity between the Ectane 2 and the workstation
Green is solid	Communication is established between the Ectane 2 and the workstation
Off	No link between the Ectane 2 and the workstation

Chapter 3

Managing Batteries

General

The Ectane[®] 2 uses Li204SX-7800 lithium-ion rechargeable batteries from Emerging Power. This type of battery does not suffer from the memory effect affecting previous generations of batteries.

WARNING! Whenever carrying the Ectane 2 in its transport case, *remove the batteries from the instrument* and make sure that they cannot come in contact during transport, as this poses a significant fire and explosion hazard.



When carrying the Ectane 2, it is the user's responsibility to make sure that the safety precautions used are in accordance with the local department of transportation's (or equivalent governing body) rules and regulations.

The transport case of the Ectane 2 comes with two slots, fitted to receive batteries when they are removed from the instrument.

Note *Make sure that you do not replace the batteries by batteries other than Li204X-7800 lithium-ion rechargeable batteries from Emerging Power.*

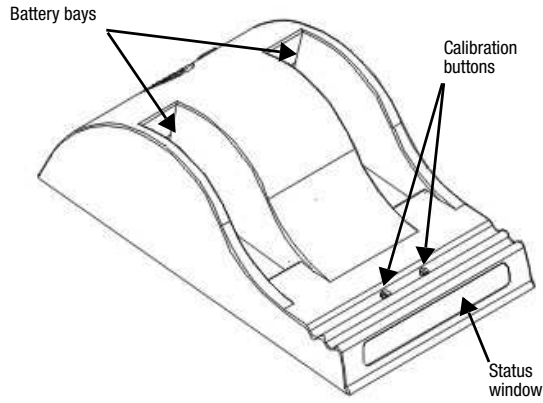
Charging the Batteries

Normally, the Ectane 2's batteries recharge automatically when they are in the instrument, that it is connected to a power outlet, and that it is on.

Note *Batteries do not recharge when their internal temperature exceeds 45°C (113°F). Batteries also do not power the Ectane if the instrument's internal temperature exceeds 55°C (131°F).*

An optional, external charger is available from Eddyfi. It also conditions and calibrates your batteries, which is important to maximize their useful life and to ensure accurate readings for the battery charger indicator in Magnifi[®].

Eddyfi recommends calibrating batteries at least every six months (for more information about calibrating your batteries, see "Calibrating Batteries" on page 49).

Figure 1 Battery charger

To charge the batteries with the optional, external charger:

1. Place the charger on a flat and level surface, *away from heat and moisture sources.*
2. Insert the power supply's DC connector into the back of the external charger.
3. Connect the power supply to an AC supply using the supplied cable.
All the LEDs flash momentarily to let you know that power is present.
4. Place the batteries into either battery bay, making sure that their 5-way connectors are fully seated.

The LEDs in the status window display status information and the charger automatically begins charging the batteries.

Battery Charger LED Status Indicator

When batteries are in the charger, status LEDs in the status window display various information:

Green (blinking)	Battery is charging
Green (solid)	Battery is fully charged
Blue (blinking)	Battery calibrating
Blue (solid)	Battery fuel gauge calibrated
Red (blinking)	Battery gauge in need of calibration
Red (solid)	Error

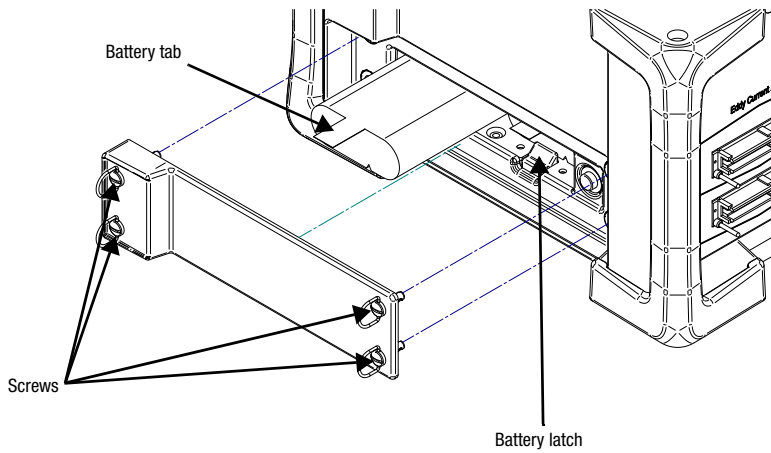
Removing the Batteries

Normally, you can leave the batteries in the Ectane 2 as long as you want. However, there are times when you must remove them from Ectane 2 (e.g., for calibration purposes or before placing the instrument on a plane).

To do so:

1. Turn each screw of the battery compartment door counterclockwise a quarter of a turn.
The battery compartment door pops out.

Figure 2 Opening the battery compartment door



Note *The screws are designed to stay with the compartment door.*

2. Press down the latch holding the battery in place.
3. Pull the battery tab.
The battery slides out.

Note *The battery compartment is designed to hold the batteries firmly. You may need to use a certain amount of force to pull the batteries out.*

Hot-Swapping Batteries

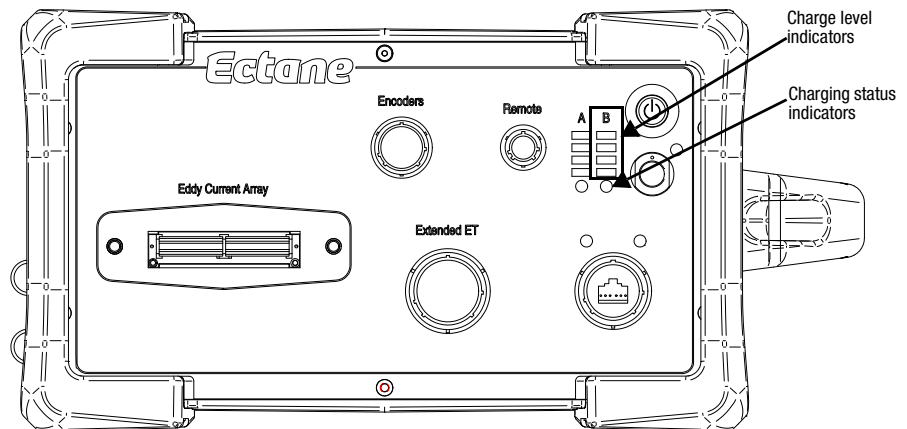
You can remove the batteries in the Ectane 2 one at a time, when the instrument is turned on. Normally, the Ectane 2 can run on only one battery.

Should the power left in the remaining battery be insufficient to keep the Ectane 2 running, the instrument will shut down without damaging electronic components. However, all the work in progress in Magnifi (acquisition, etc.) is lost.

Battery Indicators

Each battery has its own charge level indicator, and charging status indicator. For details about which charge level indicator relates to what battery, see “Battery Indicators” on page 16.

Figure 3 Battery B indicators



Charge level indicators light or blink depending on each battery's charge level, as explained below:

LED 1 (from bottom) is blinking	Charge is less than 10%
LED 1 is solid	Charge is over 10%
LED 2 is solid	Charge is over 25%
LED 3 is solid	Charge is over 50%
LED 4 is solid	Charge is over 75%

Charging status indicators can have one of five states:

Off	When the following two conditions are met: <ul style="list-style-type: none"> ◆ No external power is present ◆ Instrument is off
Green is solid	Battery is fully charged
Orange is solid	Battery charging
Orange is blinking	Instrument shutdown due to low battery power
Orange-green blinking	Instrument shutdown due to overheating

Note *Indicators are set off for up to 1 minute when the instrument is turned on.*

Note *In the event that the Ectane 2 shuts down because of low battery power or overheating, the instrument automatically starts again once the shutdown condition clears.*

Chapter 4

Connector References

EXTENDED ET Connector (41 pins)

The EXTENDED ET connector is used to connect eddy current probes. The signals of the EXTENDED ET connector are the eddy current generator outputs, the eddy current channel amplifier inputs, the multiplexing outputs, and a DC power supply.

Description	41-pin, female, shell 20 connector
Manufacturer, number	Amphenol 58-570127-41S Eddyfi NDT, Inc., MACN4012
Suggested cable connector	ITT Cannon, KPT06B20-41P <i>or</i> Amphenol PT06J-20-41P Eddyfi NDT, Inc., MACN0005

Figure 1 EXTENDED ET connector

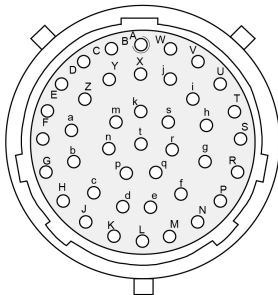


Table 1 EXTENDED ET connector pinout

Pin	I/O	Signal	Description
A	Output	ECT1 generator	ECT1 eddy current generator output
B, C, D, E, F, G, H	Outputs	ECT1 Generator / 100 Ω	ECT1 eddy current generator outputs through 100 Ω
J	–		Multiplexer mode selection
K	Input	Identification	Probe identification
L	–	GND	Power supply ground to the instrument and casing
M	Output	ECT2 generator	ECT2 eddy current generator output

Table 1 EXTENDED ET connector pinout (*continued*)

Pin	I/O	Signal	Description
N, P	Outputs	ECT2 Generator / 100 Ω	ECT2 eddy current generator outputs through 100 Ω
R	Output	ECT2 Generator / 100 Ω	ECT2 eddy current generator outputs through 100 Ω (if external MUX and motor encoder are not connected)
	Input	Motor Rotation +	Motor rotation feedback (if motor feedback is connected)
S	Output	ECT2 Generator / 100 Ω	ECT2 eddy current generator outputs through 100 Ω (if external MUX and motor encoder are not connected)
	Input	Motor Rotation –	Motor rotation feedback (if motor feedback is connected)
T	Output	MUX 0	Multiplexing signal output (bit 0) (if pin J is not grounded)
		CLK –	Clock – signal (if pin J is grounded)
U	Output	MUX 1	Multiplexing signal output (bit 1) (if pin J is not grounded)
		CLK +	Clock + signal (if pin J is grounded)
V	Output	MUX 2	Multiplexing signal output (bit 2) (if pin J is not grounded)
		+12.5 V supply	+12.5 V supply voltage (if pin J is grounded)
W	Output	MUX 3	Multiplexing signal output (bit 3) (if pin J is not grounded)
		–12.5 V supply	–12.5 V supply voltage (if pin J is grounded)
X	–	GND	Power supply ground to the instrument and casing
Y	Output	–15 V supply	–15 V supply voltage (600 mA max.)
		Motor –	Probe motor drive (0–24 V, 2.0 A max., 10 W max.)
		SC –	Current source (1 A max., 10 W max.)
Z	Input	In1 + input	Positive input of input amplifier 1
a	Input	In1 – input	Negative input of input amplifier 1

Table 1 EXTENDED ET connector pinout (*continued*)

Pin	I/O	Signal	Description
b	Input	In2 + input	Positive input of input amplifier 2
c	Input	In2 – input	Negative input of input amplifier 2
d	Input	In3 + input	Positive input of input amplifier 3
e	Input	In3 – input	Negative input of input amplifier 3
f	Input	In4 + input	Positive input of input amplifier 4
g	Input	In4 – input	Negative input of input amplifier 4
h	–	GND	Power supply ground to the instrument and casing
i	Input	In5 + input	Positive input of input amplifier 5
j	Input	In5 – input	Negative input of input amplifier 5
k	Input	In6 + input	Positive input of input amplifier 6
m	Input	In6 – input	Negative input of input amplifier 6
n	Input	In7 + input	Positive input of input amplifier 7
p	Input	In7 – input	Negative input of input amplifier 7
q	Input	In8 + input	Positive input of input amplifier 8
r	Input	In8 – input	Negative input of input amplifier 8
s	–	GND	Power supply ground to the instrument and casing
t	Output	+15 V supply	+15 V supply voltage (600 mA max.)
		Motor +	Probe motor drive (0–24 V, 2.0 A max., 10 W max.)
		SC +	Current source (1 A max., 10 W max.)

RFT/NFT/MFL Connector (19 pins)

The RFT/NFT/MFL connector is used to connect the remote field (RFT) and magnetic flux leakage probes. The signals contained in the RFT/NFT/MFL connector are the RFT generator outputs, the RFT channel amplifier inputs, and a DC power supply.

Description	19-pin, female, shell 14 connector
Manufacturer, number	Amphenol, 58-570124-19S <i>or</i> Souriau 851-02E1419S50A7 Eddyfi NDT, Inc., MACN4015
Suggested cable connector	ITT Cannon, KPT06A14-19P027 <i>or</i> Amphenol PT06J-14-19P Eddyfi NDT, Inc., MACN4021

Figure 2 RFT/NFT/MFL connector

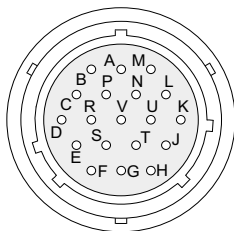


Table 2 RFT/NFT/MFL connector pinout

Pin	I/O	Signal	Description
A	–	GND	Ground
B	Input	RFT_IN 4- MFL4_IN 4-	Negative RFT input #4 Negative MFL input #4
C	Input	RFT_IN 3+ MFL_IN 3+	Positive RFT input #3 Positive MFL input #3
D	Input	RFT_IN 3- MFL3_IN 3-	Negative RFT input #3 Negative MFL input #3

Table 2 RFT/NFT/MFL connector pinout (*continued*)

Pin	I/O	Signal	Description
E		+15 V supply	+15 V supply voltage, 600 mA max.
F	Output	Drive2_OUT	Coil driver #2 output
G	–	GND	Ground
H	Output	Drive1_OUT	Coil driver #1 output
J		–15 V supply	–15 V supply voltage, 600 mA max.
K	Input	RFT_IN 2+	Positive RFT input #2
		MFL_IN 2+	Positive MFL input #2
L	Input	RFT_IN 2-	Negative RFT input #2
		MFL_IN 2-	Negative MFL input #2
M	Input	RFT_IN 1+	Positive RFT input #1
		MFL_IN 1+	Positive MFL input #1
N	Input	RFT_IN 1-	Negative RFT input #1
		MFL_IN 1-	Negative MFL input #1
P	Input	RFT_IN 4+	Positive RFT input #4
		MFL_IN 4+	Positive MFL input #4
R	–	GND	Ground
S	Input	Identification	Probe identification
T	–	NC	No connection
U	–	GND	Ground
V	–	GND	Ground

ECT BOBBIN Connector (4 pins)

The ECT BOBBIN connector allows you to connect standard 4-pin inspection probes.

Description	4-pin, female, shell 14 connector
Manufacturer, number	Amphenol ACS02A-14S-2S (472) Eddyfi NDT, Inc., MACN4020
Suggested cable connector	Amphenol 97-3106A-14S-2P Eddyfi NDT, Inc., MACN0059

Figure 3 ECT BOBBIN connector

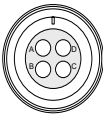


Table 3 ECT BOBBIN connector pinout

Pin	Signal
A	Bobbin Abs/Diff
B	Bobbin Diff
C	GND
D	GND

ENCODERS Connector (18 pins)

The ENCODERS connector allows the instrument to send and receive various signals such as the acquisition start and stop commands, the encoder and rotation synchronization signals, the relay outputs, etc.

Description	18-pin, female, shell 14 connector
Manufacturer, number	Amphenol 58-570124-18S Eddyfi NDT, Inc., MACN4014
Suggested cable connector	ITT Cannon, KPT06B14-18P <i>or</i> Amphenol PT06J-14-18P Eddyfi NDT, Inc., MACN0011

Figure 4 ENCODERS connector

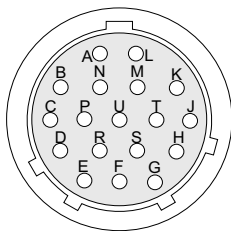


Table 4 ENCODERS connector pinout

Pin	I/O	Signal	Description
A	TTL Input	ϕ B1	Phase B axis 1
B	Output	CLK_ACQ_OUT	Acquisition clock output (open drain with 10 k Ω pull-up)
C	TTL Input	ϕ A2	Phase A axis 2
D	–	GND	Encoders ground
E	TTL Input	Input 1	User-defined input for software and hardware function activation.
F	TTL Input	Input 3	User-defined input for software and hardware function activation.
G	TTL Input	Input 2	User-defined input for software and hardware function activation.

Table 4 ENCODERS connector pinout (*continued*)

Pin	I/O	Signal	Description
H	Output	Alarm	Used to indicate that the probe is in the air (for tube inspections) (open drain with 10 k Ω pull-up).
J	Relay contact	Relay 2	Relay used for automatic acquisition sequence control
K	Relay contact	Relay 3	Relay used for automatic acquisition sequence control
L	Relay contact	Relay 1	Relay used for automatic acquisition sequence control
M	TTL Input	CLKACQ	Receives signal to trigger acquisition with probe position along the scanning axis.
N		NC	No connection—Reserved
P	TTL Input	ϕ B2	Phase B axis 2
R	TTL Input	ϕ A3	Phase A axis 3
		Input 5	User-defined input for automatic acquisition sequence.
S	Supply Output	+5 V	5 V supply output, 250 mA max.
T	TTL Input	ϕ B3	Phase B axis 3
		Input 4	User-defined input for automatic acquisition sequence.
U	TTL Input	ϕ A1	Phase A axis 1

IRIS Connector

The IRIS connector allows the instrument to control IRIS probes.

Description	BNC Adapter, bulkhead, 50 Ω
Manufacturer, number	Amphenol 31-220N-RFX Eddyfi NDT, Inc., MACN4022
Suggested cable connector	POMONA, 2249-C-120 Eddyfi NDT, Inc., MAME0021

Figure 5 IRIS connector

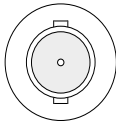


Table 5 IRIS connector pinout

Pin	Signal	Description
Center	Pulser output Receiver input	Ultrasound pulser outputs and ultrasound receiver input
Shell	Ground	Power supply common to instrument and casing

EDDY CURRENT ARRAY Connectors

On the Ectane[®] 2 instruments equipped with the SmartMUX[™] option, 160-pin connectors are available on the front of the instrument, under EDDY CURRENT ARRAY. These connectors are specific and designed by Eddyfi.

For details about the Eddyfi 160-pin connectors, contact Eddyfi directly at info@eddyfi.com.

Ethernet Connector

The Ethernet connector is used to connect the Ectane 2 to a workstation through an Ethernet link. Eddyfi supplies a high-quality, military-grade circular Ethernet connector and cable. International Ethernet standards are used.

Description	RJ45, female connector
Manufacturer, number	PEI Genesis, Amphenol RJF22B00SCC Eddyfi NDT, Inc., MACN4016

Figure 6 Ethernet connector

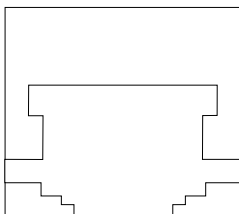


Table 6 Ethernet connector pinout

Pin	I/O	Signal	Description
1	Bidirectional	Bi_DA+	Bidirectional pair A+
2	Bidirectional	Bi_DA-	Bidirectional pair A-
3	Bidirectional	Bi_DB+	Bidirectional pair B+
4	Bidirectional	Bi_DC+	Bidirectional pair C+
5	Bidirectional	Bi_DC-	Bidirectional pair C-
6	Bidirectional	Bi_DB-	Bidirectional pair B-
7	Bidirectional	Bi_DD+	Bidirectional pair D+
8	Bidirectional	Bi_DD-	Bidirectional pair D-

Important The Ectane 2 must be linked to a workstation with at least a category 5e, shielded, Ethernet cable.

Chapter 5

Specifications

General

This section presents the general specifications of the Ectane[®] 2.

System

Warm-up ^a	15 minutes
Workstation link	Ethernet 1000BASE-T
Transfer rate on Ethernet cable	1 Gbps

- a. The warm-up time corresponds to the time required by the unit to reach its optimal accuracy after it is turned on. Eddyfi recommends waiting until the end of the warm-up period before balancing probes or performing acquisitions.

Power Requirements

Power configuration	100 W external AC/DC power supply of 15 VDC or battery (removable)
Voltage	100–240 VAC, ±10%
Frequency	50/60 Hz
Maximum input current	1.5 A
Battery type	Li204SX-7800 rechargeable Lithium-ion, DOT-compliant
Battery autonomy ^a	8 hours

- a. Typical (with two batteries in the instrument)

Environmental Conditions

Operating temperature ^a	0°C to 45°C (32°F to 113°F)
Storage temperature	-20°C to 60°C (-4°F to 140°F)
Relative humidity	95%, non-condensing
Pollution degree rating	2
Protection	Designed for IP64
Compliance	ASME, EN61010-1, EMC, CE, WEEE, RoHS

- a. The Ectane 2 warns you through Magnifi[®] when its operating temperature reaches 65°C (149°F), and then enters power safe mode to better protect itself when the operating temperature reaches 70°C (158°F). In power safe mode, some internal circuitry shuts down, acquisitions are stopped, and the instrument becomes inactive for work purposes until the condition that initiated the power safe mode is corrected.

Housing

Dimensions (W×H×D) ^a	279.6 mm × 254.0 mm × 158.8 mm (11.00 in. × 10.00 in. × 6.25 in.)
Net weight ^b	6.8 kg (15 lb)

- a. Outline dimensions include the handle.
b. Ectane 2 E64 or E128 with batteries.

Ethernet Cable

Type	At least category 5e, shielded
Maximum length	100 m (328 ft)

Motor Drive for Rotating Probes

Voltage	0–24 V
Maximum peak output current	2 A
Maximum continuous output current	1 A
Maximum continuous power	10 W

Current Source for Saturation Probes

Range	0–1 A
Maximum output power	10 W
Maximum output voltage	15 V

Inspection Techniques

This section presents the Ectane 2's operating specifications by inspection technique.

Eddy Current Testing (ECT)

Probe inputs	8
Number of frequencies	8
Frequency range	5 Hz–10 MHz
Generators/Coil drivers	2
Generator output/Coil drive	Up to 20 V, peak-to-peak
Injection modes	Multiplexed, simultaneous, continuous
Receiver gain	41 dB range, 23–64 dB
Data resolution	16 bits
Acquisition/Sampling rate	Up to 50 000 per second
Compatible with external multiplexer	Through 41-pin EXTENDED ET connector
Number of channels (through external multiplexer)	Up to 64 per ECT frequency (max. 5 frequencies)

Eddy Current Array (ECA)

Number of channels	
Ectane 2 E64	Up to 64 channels for each ECT frequency (max. 5 frequencies)
Ectane 2 E128	Up to 128 channels for each ECT frequency (max. 5 frequencies)
Ectane 2 E256	Up to 256 channels for each ECT frequency (max. 2 frequencies) <i>or</i> Up to 128 channels for each ECT frequency (max. 5 frequencies)
Multiplexer	SmartMUX™: integrated, universal, and programmable
Connector type ^a	Single or double, 160-pin connector

- a. The Ectane 2 uses an ID device found in Eddyfi probes. This ID device contains information that helps set up acquisitions and confirm compatibility between setup and probe.

Remote/Near-Field Testing (RFT/NFT)

Probe inputs	4 on 19-pin RFT/NFT/MFL connector 8 on 41-pin EXTENDED ET connector
Number of frequencies	5
Frequency range	5 Hz–250 kHz
Generators/Coil drivers	2
Generator output/Coil drive	20V, peak-to-peak
Receiver gain	50 dB range, 36–86 dB
Acquisition/Sampling rate	Up to 20 000 per second
Connector type	19-pin RFT/NFT/MFL connector 41-pin EXTENDED ET connector

Magnetic Flux Leakage (MFL)

Probe inputs	4 on 19-pin RFT/NFT/MFL connector 8 on 41-pin EXTENDED ET connector
Receiver gain	41 dB range, 23–64 dB
Connector type	19-pin RFT/NFT/MFL connector 41-pin EXTENDED ET connector

Internal Rotary Inspection System (IRIS)

Number of UT channels	1, pulse-echo
Transducer frequency	5 MHz, 10 MHz, 15 MHz, or 20 MHz
Pulsing rate	Up to 30 kHz
Pulser voltage	75–200 V (25 V steps)
Pulse width	Automatically adjusted for transducer frequency
Receiver gain	8–72 dB (in 1 dB steps)
Receiver DAC	Up to 20 dB/ μ s
RF Filters	4 user-selectable filters for 5 MHz, 10 MHz, 15 MHz, and 20 MHz transducers
Digitizer	12 bits, 100 MHz
Gates	3; target pin, front wall, back wall

Chapter 6

Maintenance & Troubleshooting

Preventive Maintenance

Due to its design, the Ectane[®] 2 only requires minimal maintenance.

Because it has no moving parts, the Ectane 2 also does not require any preventive maintenance by the user. Only a regular inspection of the instrument is recommended, to ensure that it is properly grounded.

Also, Eddyfi strongly recommends an annual calibration and a factory-performed preventive maintenance by an officially qualified Eddyfi technician.

Cleaning the Instrument

The Ectane 2 external surfaces (i.e., casing and front panel), can be cleaned when necessary. This section explains the procedure to appropriately clean the instrument.

To clean the instrument:

1. Make sure that the instrument is off and that the power cord is disconnected.
2. To bring the instrument back to its original finish, clean the casing and the front panel with a soft cloth.

WARNING! Do not clean the instrument with a spray or water jet.



If you do, connector contacts can remain wet and produce short circuits when connected.

To removed stubborn stains, use a cloth moistened with soft soapy solution. Do not use abrasive products or powerful solvents as they can damage the finish.

Wait until the instrument is completely dry before connecting the power cord and cables.

Calibrating Batteries

To ensure that your batteries perform at their full capacity for the longest possible time, it is important to calibrate them on a regular basis.

Calibration consists in a standard battery charge followed by a deep discharge, and a complete charge. This procedure usually takes between 10 and 13 hours, whereas a standard charge only takes about 3.5 hours.

Calibrate batteries by placing them in the optional, external charger and then pressing the recalibrate button (See “Managing Batteries” on page 21.) Eddyfi recommends calibrating your batteries at least once every six months.

CAUTION During calibration, the charger may become warm.



Troubleshooting

To trouble shoot the Ectane 2, you must first connect it to a workstation running Magnifi[®]. Troubleshooting information is found in the Magnifi documentation.

Firmware Corruption

If the Ectane 2 firmware becomes corrupted, you must start the instrument from a backup firmware. This procedure is explained in the Magnifi documentation. To locate the backup firmware button, see “Battery Compartment” on page 9.

Appendix A

Accessories

Protective Caps

If you need to tackle challenging inspection environments where dust or nuclear contamination is present, you need protective caps to cover the Ectane[®] 2's connectors. All the connectors have specific protective caps. Contact your Eddyfi representative for more information about pricing and availability.

Adapters and Connectors

The Ectane 2 connectors were chosen to match the most common connectors in use today. You could, however, have specific needs outside the connectors supplied with the Ectane 2. Eddyfi offers a comprehensive array of adapters and specialty connectors to suit your needs. Contact your Eddyfi representative for more information about pricing and availability.

Battery Charger and Batteries

The Ectane 2 comes with batteries. Depending on your work environment and your workload, however, you could have a need for more and the optional battery charger. Contact your Eddyfi representative for more information about pricing and availability.

Remote Control

The Ectane 2 can be operated through an optional remote control. Contact your Eddyfi representative for more information about pricing and availability.

Appendix B

Warranty,
Trademarks,
Copyrights

Limited Warranty

Eddyfi NDT, Inc. warrants the hardware to be free of any defects in materials or workmanship for a period of twelve (12) months from the date of delivery, under normal use and service. These warranties are limited to the original purchase of the product and are not transferable.

Eddyfi NDT, Inc. will repair or replace any product component or documentation, at its option and at no additional charge, if found defective within the warranty period. The purchaser is responsible for returning the product to Eddyfi NDT, Inc.

Eddyfi NDT, Inc., will not be held responsible in any way whatsoever for damage resulting from improper installation, accident, misuse, or from service or modification of the product by anyone other than Eddyfi NDT, Inc., or an authorized Eddyfi NDT, Inc. service center.

Eddyfi NDT, Inc. will not be held responsible in any way whatsoever for direct, indirect, special, incidental, or consequential damages resulting from possession, use, improper installation, accident, service, modification, or malfunction of the product (including, without limitation, damages for loss of business profits, business interruption, loss of business information, or other pecuniary loss). Eddyfi's total shall in no event exceed the purchase price of the applicable item(s).

This warranty is in lieu of all other warranties, whether oral, written, expressed, or implied, including any warranty of merchantability or fitness for a particular purpose, and no other representation or claims of any nature shall be binding on or obligate Eddyfi NDT, Inc.

This agreement is governed by the laws of the province of Québec, Canada. Each of the parties hereto irrevocably attorns to the jurisdiction of the courts of the province of Québec and further agrees to commence any litigation which may arise hereunder in the courts located in the judicial district of Québec.

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Manual version A

Part number: SXSC2008A

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