Eddyfi Technologies

Beyond current

Getting Started with CYPHER

Copyright

This document was prepared with particular attention to usage to ensure the accuracy of the information it contains. It corresponds to the version of the product manufactured prior to the date appearing on the back cover. There may, however, be some differences between this document and the product, if the product was modified after publication.

The information contained in this document is subject to change without notice.

Manual version: A

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Chapter 1

Important Information, Safety Precautions, and Conventions

1 Important Information – Please Read Before Use

Intended Use

The Cypher® is designed to perform non-destructive inspections using ultrasound (UT) technologies for inspection.

WARNING!

Do not use the Cypher for any purpose other than its intended use.

User Manual

This user manual contains essential information on how to use the instrument safely and effectively. Before using the Cypher, please review this user manual. Use the instrument as intended. Keep this manual in a safe place for future reference.

Instrument Compatibility

Use only approved ancillary equipment provided by Eddyfi with this instrument.

CAUTION

Always use equipment and accessories that meet Eddyfi specifications. Using incompatible equipment could cause an instrument malfunction and/or damage, or human injury.

Repair and Modifications

This instrument does not contain any user-serviceable parts. Opening the device might void the warranty.

CAUTION

To prevent human injury and/or instrument damage, do not dissemble, modify, or repair the instrument.

Equipment Disposal

Before disposing of the Cypher, check your local laws, rules, and regulations, and follow them accordingly.

2 Microsoft software license terms - Windows 11 IOT LTSC

IF YOU LIVE IN (OR IF YOUR PRINCIPAL PLACE OF BUSINESS IS IN) THE UNITED STATES, PLEASE READ THE BINDING ARBITRATION CLAUSE AND CLASS ACTION WAIVER IN SECTION 8. IT AFFECTS HOW DISPUTES ARE RESOLVED.
Thank you for choosing Microsoft!

Depending on how you obtained the Windows software, this is a license agreement between (i) you and the device manufacturer or software installer that distributes the software with your device; or (ii) you and Microsoft Corporation (or, based on where you live or, if a business, where your principal place of business is located, one of its affiliates) if you acquired the software from a retailer. Microsoft is the device manufacturer for devices produced by Microsoft or one of its affiliates, and Microsoft is the retailer if you acquired the software directly from Microsoft. If you are a volume license customer, use of this software is subject to your volume license agreement rather than this agreement.

This agreement describes your rights, obligations, and the conditions upon which you may use the Windows software. You should review the entire agreement, including any supplemental license terms that accompany the software and any linked terms, because all of the terms are important and together create this agreement that applies to you. You can review linked terms by pasting the (aka.ms/) link into a browser window.

By accepting this agreement or using the software, you agree to all of these terms, and consent to the transmission of certain information during activation and during your use of the software as per the privacy statement described in Section 3. If you do not accept and comply with these terms, you may not use the software or its features. You may contact the device manufacturer or installer, or your retailer if you purchased the software directly, to determine its return policy and return the software or device for a refund or credit under that policy. You must comply with that policy, which might require you to return the software with the entire device on which the software is installed for a refund or credit, if any.

1. **Overview**
   a. **Applicability**. This agreement applies to the Windows software that is preinstalled on your device, or acquired from a retailer and installed by you, the media on which you received the software (if any), any fonts, icons, images or sound files included with the software, and also any Microsoft updates, upgrades, supplements or services for the software, unless other terms come with them. It also applies to Windows apps developed by Microsoft that provide functionality such as mail, calendar, contacts, music and news that are included with Windows, unless other terms apply. If this agreement contains terms regarding a feature or service not available on your device, those terms do not apply.
   b. **Additional terms**. Additional Microsoft and third-party terms may apply to your use of certain features, services and apps, depending on your device's capabilities, how it is configured, and how you use it. Please read them.
      (i) Some Windows apps provide an access point to, or rely on, online services, and the use of those services is sometimes governed by separate terms and privacy policies, such as the Microsoft Services Agreement at https://aka.ms/msa. You can view these terms and policies by looking at the service terms of use or the app's settings, as applicable; please read them. The services may not be available in all regions.
      (ii) Microsoft, or the device manufacturer or installer may include additional apps, which will be subject to separate license terms and privacy policies.
      (iii) The software may include third-party programs that are licensed to you under this agreement, or under their own terms. License terms, notices and acknowledgements, if any, for the third-party programs can be viewed at C:\Windows\Help\en-US\credits.rtf.

2. **Installation and Use Rights.**
   a. **License.** The software is licensed, not sold. The software license is permanently assigned to the device with which you acquired the software. Under this agreement, we grant you the right to install and run one instance of the software on your device (the licensed device), so long as you comply with the terms and restrictions contained in this agreement. Updating or upgrading from non-genuine software with software from Microsoft b. or authorized sources does not make your original version or the updated/upgraded version genuine, and in that situation, you do not have a license to use the software.
   b. **Device**. In this agreement, "device" means a physical hardware system with an internal storage device capable of running the software, or a virtual machine. A hardware partition or blade is considered to be a device.
   c. **Restrictions**. The device manufacturer or installer and Microsoft reserve all rights (such as rights under intellectual property laws) not expressly granted in this agreement, and no other rights are licensed to you. For the avoidance of doubt, this license does not give you any right to, and you may not (and you may not permit any other person or entity to):
      (i) use or virtualize features of the software separately.
      (ii) publish, copy (other than the permitted backup copy), rent, lease, or lend the software.
      (iii) transfer the software (except as permitted by this agreement);
      (iv) work around any technical restrictions or limitations in the software.
      (v) use the software as server software or to operate the device as a server, except as permitted under Section 2(d)(iii) below; use the software to offer commercial hosting services; make the software available for simultaneous use by more than one user over a network, except as permitted under Section 2(d)(vi) below; install the software on a server for remote access or use over a network; or install the software on a device for use only by remote users; a single device may be locally and simultaneously interacted with by up-to two end user operators;

(vi) reverse engineer, decompile, or disassemble the software, or attempt to do so, except and only to the extent that the foregoing restriction is (a) permitted by applicable law; (b) permitted by licensing terms governing the use of open-source components that may be included with the software; or (c) required to debug changes to any libraries licensed under the GNU Lesser General Public License that are included with and linked to by the software; and

(vii) when using Internet-based features you may not use those features in any way that could interfere with anyone else's use of them, or to try to gain access to or use any service, data, account, or network, in an unauthorized manner.

d. **Multi-Use scenarios.**

(i) Multiple versions. If when acquiring the software, you were provided with multiple versions (such as 32-bit and 64-bit versions), you may install and activate only one of those versions at a time.

(ii) Multiple or pooled connections. Hardware or software you use to multiplex or pool connections, or reduce the number of devices or users that access or use the software, does not reduce the number of licenses you need. You may only use such hardware or software if you have a license for each instance of the software you are using.

(iii) Device connections. You may allow up to 20 other devices to access the software installed on the licensed device solely to use the following software features for personal or internal purposes: file services, print services, Internet information services, and Internet connection sharing and telephony services on the licensed device. The 20 connection limit applies to devices that access the software indirectly through "multiplexing" or other software or hardware that pools connections. You may allow any number of devices to access the software on the licensed device to synchronize data between devices. This subsection does not mean, however, that you have the right to install the software, or use the primary function of the software (other than the features listed in this subsection), on any of these other devices.

(iv) Remote access. Users may access the licensed device from another device using remote access technologies, but only on devices separately licensed to run the same or higher edition of this software.

(v) Remote assistance. You may use remote assistance technologies to share an active session without obtaining any additional licenses for the software. Remote assistance allows one user to connect directly to another user's computer, usually to correct problems.

(vi) POS application. If the software is installed on a retail point of service device, you may use the software with a point of service application ("POS Application"). A POS Application is a software application which provides only the following functions: (i) process sales and service transactions, scan and track inventory, record and/or transmit customer information, and perform related management functions, and/or (ii) provide information directly and indirectly to customers about available products and services. You may use other programs with the software as long as the other programs: (i) directly support the manufacturer's specific use for the device, or (ii) provide system utilities, resource (vii) management, or anti-virus or similar protection. For clarification purposes, an automated teller machine ("ATM") is not a retail point of service device.

(vii) Cloud Computing Devices. If your device uses Internet browsing functionality to connect to and access cloud hosted applications: (i) no desktop functions may run locally on the device, and (ii) any files that result from the use of the desktop functions may not be permanently stored on the system. “Desktop functions,” as used in this agreement, means a consumer or business task or process performed by a computer or computing device. This includes but is not limited to email, word processing, spreadsheets, database, scheduling, network or internet browsing and personal finance.

(viii) Desktop Functions. If your system performs desktop functions, then you must ensure that they: (i) are only used to support the application, and (ii) operate only when used with the application.

d. **Specific Use.** The manufacturer designed the licensed device for a specific use. You may only use the software for that use.

e. **High Risk Use.**

(i) WARNING: THE SOFTWARE IS NOT DESIGNED OR INTENDED FOR USE WHERE FAILURE OR FAULT OF ANY KIND OF THE SOFTWARE COULD RESULT IN DEATH OR SERIOUS BODILY INJURY, OR IN PHYSICAL OR ENVIRONMENTAL DAMAGE (collectively “High Risk Use”). Accordingly, You must design and implement Your hardware and software such that, in the event of any interruption, defect, error, or other failure of the software, the safety of people, property, and the environment are not reduced below a level that is reasonable, appropriate, and legal, whether in general or for a specific industry. Your High Risk Use of the software is at Your own risk.

(ii) Indemnification. You agree to indemnify, defend and hold harmless Microsoft from any claims, including claims arising from any High Risk Uses, and inclusive of attorneys’ fees, related to the distribution or use of Your devices, except to the extent that any intellectual property claim is based solely on the unmodified software.

3. **Privacy; Consent to Use of Data**. Your privacy is important to us. Some of the software features send or receive information when using those features. Many of these features can be switched off in the user interface, or you can choose not to use them. By accepting this agreement and using the software you agree that Microsoft may collect, use, and disclose the information as described in the Microsoft Privacy Statement available at https://aka.ms/privacy, and as may be described in the user interface associated with the software features.

4. **Authorized Software and Activation.** You are authorized to use this software only if you are properly licensed and the software has been properly activated with a genuine product key or by other authorized method. When you connect to the Internet while using the software, the software will automatically contact Microsoft or its affiliate to confirm the software is genuine and the license is associated with the licensed device. You can also activate the software manually by Internet or telephone. In either case, transmission of certain information will occur, and Internet, telephone and SMS service charges may apply. During activation (or reactivation that may be triggered by changes to your device's components), the software may determine that the installed instance of the software is counterfeit, improperly licensed or includes unauthorized changes. If activation fails the software will attempt to repair itself by replacing any tampered Microsoft software with genuine Microsoft software. You may also receive reminders to obtain a proper license for the software. Successful activation does not confirm that the software is genuine or properly licensed. You may not bypass or circumvent activation. To help determine if your software is genuine and whether you are properly licensed, see https://aka.ms/genuine. Certain updates, support, and other services might be offered only to users of genuine Microsoft software.

5. **Updates.** The software periodically checks for system and app updates, and may download and install them for you. You may obtain updates only from Microsoft or authorized sources, and Microsoft may need to update your system to provide you with those updates. To the extent automatic updates are enabled on your device, by accepting this agreement, or using the software, you agree to receive these types of automatic updates without any additional notice.

6. **Geographic and Export Restrictions.** If your software is restricted for use in a particular geographic region, then you may activate the software only in that region. You must also comply with all domestic and international export laws and regulations that apply to the software, which include restrictions on destinations, end users, and end use. For further information on geographic and export restrictions, visit **https://aka.ms/exporting**.

7. **Device Manufacturer and Installer Support and Refund Procedures.** For the software generally, contact the device manufacturer or installer for support options. Refer to the support number provided with the software. For updates and supplements obtained directly from Microsoft, Microsoft may provide limited support services for properly licensed software as described at https://aka.ms/mssupport. If you are seeking a refund, contact the device manufacturer or installer to determine its refund policies. You must comply with those policies, which might require you to return the software with the entire device on which the software is installed for a refund.

8. **Binding Arbitration and Class Action Waiver** if You Live in (or, if a Business, Your Principal Place of Business is in) the United States.

   We hope we never have a dispute, but if we do, you and we agree to try for 60 days, upon receipt of a Notice of Dispute, to resolve it informally. If we can't, you and we agree to binding individual arbitration before the American Arbitration Association ("AAA") under the Federal Arbitration Act ("FAA"), and not to sue in court in front of a judge or jury. Instead, a neutral arbitrator will decide and the arbitrator's decision will be final except for a limited right of appeal under the FAA. Class action lawsuits, class-wide arbitrations, private attorney general actions, request for public injunctions, and any other proceeding or request for relief where someone acts in a representative capacity aren't allowed. Nor is combining individual proceedings without the consent of all parties. "We," "our," and "us" includes Microsoft, the device manufacturer, software installer, and our affiliates.

   a. Disputes covered—everything except IP. The term "dispute" is as broad as it can be. It includes any claim or controversy between you and the device manufacturer or installer, or you and Microsoft, concerning the software (or software to which this agreement applies including other Windows apps), its price, marketing, communications, your purchase transaction, billing, or this agreement, under any legal theory including contract, warranty, tort, statute, or regulation, except disputes relating to the enforcement or validity of your, your licensors', our, or our licensors' intellectual property rights.

   b. Send a Notice of Dispute before arbitration. If you have a dispute that our customer service representatives can't resolve and you wish to pursue arbitration, you must first send an individualized Notice of Dispute by U.S. Mail to the device manufacturer or installer, ATTN: LEGAL DEPARTMENT. If your dispute is with Microsoft, you must first mail it to Microsoft Corporation, ATTN: CELA ARBITRATION, One Microsoft Way, Redmond, WA 98052-6399, or submit the form electronically. The Notice of Dispute form is available at https://go.microsoft.com/fwlink/?LinkId=245499. Complete that form in full, with all the information it requires. We'll do the same if we have a dispute with you. Any applicable statute of limitations will be tolled from the date of a properly submitted individualized Notice of Dispute through the first date on which an arbitration may properly be filed under this Section 8.

   c. Small claims court option. Instead of sending a Notice of Dispute, either you or we may sue the other party in small claims court seeking only individualized relief, so long as the action meets the small claims court's requirements and remains an individual action seeking individualized relief. The small claims court must be in your county of residence (or, if a business, your principal place of business).

   d. Arbitration procedure. The AAA will conduct any arbitration under its Commercial Arbitration Rules (or if you are an individual and use the software for personal or household use, or if the value of the dispute is less than $75,000 USD whether or not you are an individual or how you use the software, its Consumer Arbitration Rules). For more information, see https://aka.ms/adr. This agreement governs to the extent it conflicts with any applicable AAA rules. To initiate an arbitration, submit the Demand for Arbitration form available at https://go.microsoft.com/fwlink/?LinkId=245497 to the AAA and mail a copy to the device manufacturer or installer (or to Microsoft if your dispute is with Microsoft). The form must contain information that is specific to you and your claim. In a dispute involving $25,000 USD or less, any hearing will be telephonic or by videoconference unless the arbitrator finds good cause to hold an in-person hearing instead. Any in-person hearing will take place in your county of residence (or, if a business, your principal place of business). The arbitrator may award the same damages to you individually as a court could. The arbitrator may award declaratory or injunctive relief only to you individually to satisfy your individual claim, but not relief that would affect non-parties.

The arbitrator rules on all issues except that a court has exclusive authority: (i) to decide arbitrability, as well as formation, existence, scope, validity, and enforceability of this arbitration agreement; (ii) to decide whether the parties have complied with the pre-arbitration requirements (including the individualized Notice of Dispute and Demand for Arbitration forms); (iii) to enforce the prohibition on class, representative, private attorney general, or combined actions or proceedings, or public injunctive relief; and (iv) to enjoin an arbitration from proceeding if it does not comply with this agreement.
If your Notice of Dispute involves claims similar to those of at least 24 other customers, and if you and those other customers are represented by the same lawyers, or by lawyers who are coordinating with each other, you and we agree that these claims will be "Related Cases." Related Cases may only be filed in batches of up to 50 individual arbitrations at a time, and those individual arbitrations will be resolved in the following manner: (i) for the first batch, each side may select up to 25 of these Related Cases to be filed and resolved in individual arbitrations under this Section 8; (ii) none of the other Related Cases may be filed or prosecuted in arbitration until the first batch of up to 50 individual arbitrations is resolved; and (iii) if, after that first batch, the parties are unable to informally resolve the remaining Related Cases, a second batch of Related Cases may be filed, where each side may select up to 25 of the Related Cases to be resolved in individual arbitrations under this Section 8. This process of batched individual arbitrations will continue until the parties resolve all Related Cases informally or through individual arbitrations. A court has exclusive authority to enforce this paragraph, including whether it applies to a given set of claims, and to enjoin the filing or prosecution of arbitrations that do not comply with this paragraph.

e. Arbitration fee and payments.

(i) Disputes involving less than $75,000 USD. The device manufacturer or installer (or Microsoft if your dispute is with Microsoft) will promptly reimburse your filing fees and pay the AAA's and arbitrator's fees and expenses. If (i) the dispute involves less than $75,000 USD; and before initiating arbitration (ii) you complied with all pre-arbitration requirements in this Section 8, including, if applicable, the Related Cases paragraph. Otherwise, the AAA rules will govern payment of filing fees and the AAA's and arbitrator's fees and expenses. If, at the conclusion of the arbitration, the arbitrator awards you more than our last written offer made before the arbitrator was appointed, the device manufacturer or installer (or Microsoft if your dispute is with Microsoft) will pay you: (i) the amount of the award or $1,000 USD (whichever is more); (ii) any reasonable attorney's fees you incurred; and (iii) any reasonable expenses (including expert witness fees and costs) that your attorney accrued in connection with your individual arbitration.

(ii) Disputes involving $75,000 USD or more. The AAA rules will govern payment of filing fees and the AAA's and arbitrator's fees and expenses.

f. **Severability.** If, after exhaustion of all appeals, a court finds any part of this Section 8 unenforceable as to any claim or request for a remedy, then the parties agree to arbitrate all claims and remedies subject to arbitration before litigating in court any remaining claims or remedies (such as a request for a public injunction remedy, in which case the arbitrator issues an award on liability and individual relief before a court considers that request). Otherwise, if any other part of Section 8 is found to be unenforceable, the remainder will remain in effect (with an arbitration award issued before any court proceeding begins).

g. **Microsoft as party or third-party beneficiary**. If Microsoft is the device manufacturer or if you acquired the software from a retailer, Microsoft is a party to this agreement. Otherwise, Microsoft is not a party but is a third-party beneficiary of your agreement with the device manufacturer or installer to resolve disputes through informal negotiation and arbitration.

9. **Governing Law.** The laws of the state or country where you live (or, if a business, where your principal place of business is located) govern all claims and disputes concerning the software, its price, or this agreement, including breach of contract claims and claims under state consumer protection laws, unfair competition laws, implied warranty laws, for unjust enrichment, and in tort, regardless of conflict of law principles. In the United States, the FAA governs all provisions relating to arbitration.
10. **Consumer Rights, Regional Variations.** This agreement describes certain legal rights. You may have other rights, including consumer rights, under the laws of your state or country. You may also have rights with respect to the party from which you acquired the software. This agreement does not change those other rights if the laws of your state or country do not permit it to do so. For example, if you acquired the software in one of the below regions, or mandatory country law applies, then the following provisions apply to you:
    a. **Australia.** References to "Limited Warranty" are references to the express warranty provided by Microsoft or the device manufacturer or installer. This warranty is given in addition to other rights and remedies you may have under law, including your rights and remedies under the Australian Consumer Law consumer guarantees. Nothing in this agreement limits or changes those rights and remedies. In particular:
        (i) support and refund policies referred to in Section 7 are subject to the Australian Consumer Law;
        (ii) the Australian Consumer Law consumer guarantees apply to the evaluation software described in (iii) Section 11(d)(i); and
        (iii) our goods come with guarantees that cannot be excluded under the Australian Consumer Law. In this subsection, "goods" refers to the software for which Microsoft, or the device manufacturer or installer provides the express warranty. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure. To learn more about your rights under the Australian Consumer Law, please review the information at **https://aka.ms/acl**.
    b. **Canada**. You may stop receiving updates on your device by turning off Internet access. If and when you reconnect to the Internet, the software will resume checking for and installing updates.
    c. **Germany and Austria.**
        (i) **Warranty**. The properly licensed software will perform substantially as described in any Microsoft materials that accompany the software. However, the device manufacturer or installer, and Microsoft, give no contractual guarantee in relation to the licensed software.
        (ii) **Limitation of Liability.** In case of intentional conduct, gross negligence, claims based on the Product Liability Act, as well as, in case of death or personal or physical injury, the device manufacturer or installer, or Microsoft is liable according to the statutory law. Subject to the preceding sentence, the device manufacturer or installer, or Microsoft will only be liable for slight negligence if the device manufacturer or installer or Microsoft is in breach of such material contractual obligations, the fulfillment of which facilitate the due performance of this agreement, the breach of which would endanger the purpose of this agreement and the compliance with which a party may constantly trust in (so-called "cardinal obligations"). In other cases of slight negligence, the device manufacturer or installer or Microsoft will not be liable for slight negligence.
    d. **Other regions.** See https://go.microsoft.com/fwlink/?LinkId=534978 for a current list of regional variations

11. **Additional Notices.**
    a. **Networks, data and Internet usage.** Some features of the software and services accessed through the software may require your device to access the Internet. Your access and usage (including charges) may be subject to the terms of your cellular or internet provider agreement. Certain features of the software may help you access the Internet more efficiently, but the software's usage calculations may be different from your service provider's measurements. You are always responsible for (i) understanding and complying with the terms of your own plans and agreements, and (ii) any issues arising from using or accessing networks, including public/open networks. You may use the software to connect to networks, and to share access information about those networks, only if you have permission to do so.
    b. **Codec Notices:**
        i. H.264/AVC Video Standard. This product includes AVC coding technology. MPEG LA LLC requires this notice:

            This product is licensed under the AVC patent portfolio license for the personal and noncommercial use of a consumer to (i) encode video in compliance with the AVC standard ("AVC VIDEO") and/or (ii) decode AVC video that was encoded by a consumer engaged in a personal and non-commercial activity and/or was obtained from a video provider licensed to provide AVC video. No license is granted or shall be implied for any other use. Additional information may be obtained from MPEG LA LLC. See **http://www.MPEGLA.COM**.

            For clarification purposes, this notice does not limit or inhibit the use of the product for normal business uses that are personal to that business which do not include (i) redistribution of the product to third parties, or (ii) creation of content with AVC Standard compliant technologies for distribution to third parties.
        ii. **VC-1 Video Standard.** This product includes VC-1 coding technology. MPEG LA LLC requires this notice:

            This product is licensed under the VC-1 Patent Portfolio license for the personal and noncommercial use of a consumer to (i) encode video in compliance with the VC-1 standard ("VC-1 Video") and/or (ii) decode vc-1 video that was encoded by a consumer engaged in a personal and non-commercial activity and/or was obtained from a video provider licensed to provide VC-1 video. No license is granted or shall be implied for any other use. Additional information may be obtained from MPEG LA LLC. See **http://www.MPEGLA.COM**.

            For clarification purposes, this notice does not limit or inhibit the use of the product for normal business uses that are personal to that business which do not include (i) redistribution of the product to third parties, or (ii) creation of content with VC-1 Standard compliant technologies for distribution to third parties.
    c. **Malware protection.** Microsoft cares about protecting your device from malware. The software will turn on malware protection if other protection is not installed or has expired. To do so, other antimalware software will be disabled or may have to be removed.
    d. **Limited rights versions**. If the software version you acquired is marked or otherwise intended for a specific or limited use, then you may only use it as specified. You may not use such versions of the software for commercial, non-profit, or revenue-generating activities.
        (i) Evaluation. For evaluation (or test or demonstration) use, you may not sell the software, use it in a live operating environment, or use it after the evaluation period. Notwithstanding anything to the contrary in this Agreement, evaluation software is provided "AS IS" and no warranty, implied or express (including the Limited Warranty), applies to these versions.

12. **Entire Agreement.** This agreement (together with the printed paper license terms or other terms accompanying any software supplements, updates, and services that are provided by the device manufacturer or installer, or Microsoft, and that you use), and the terms contained in web links listed in this agreement, are the entire agreement for the software and any such supplements, updates, and services (unless the device manufacturer or installer, or Microsoft, provides other terms with such supplements, updates, or services). You can review this agreement after your software is running by going to https://aka.ms/useterms or going to Settings - System - About within the software. You can also review the terms at any of the links in this agreement by typing the URLs into a browser address bar, and you agree to do so. You agree that you will read the terms before using the software or services, including any linked terms. You understand that by using the software and services, you ratify this agreement and the linked terms. There are also informational links in this agreement. The links containing notices and binding terms are:

    Windows Privacy Statement **https://aka.ms/privacy**
    Microsoft Services Agreement https://aka.ms/msa

3 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 people. Always refer to the user manual to ensure proper protection and safe practices.

The “Crossed-Out Wheeled Bin” marking acts as a reminder that the product should not be discarded as unsorted waste but must be sent to separate collection facilities for recovery and recycling in accordance with the local regulations applicable to Waste Electrical and Electronic Equipment (WEEE).

4 General Precautions – Please Read Before Use

- Before turning on the instrument, carefully read the instructions contained in this manual.
- Keep this user 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 Cypher® should only be used by qualified personnel.
- When carrying the Cypher®, 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 on the AC/DC adapter shall only be inserted in a power outlet providing 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 AC/DC adapter 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 Technologies, the protection provided on the equipment may be rendered ineffective.
- Do not install substitute parts or perform any unauthorized modifications to the instrument.
- Only use cables and accessories approved by Eddyfi Technologies for this instrument. Otherwise, the operation of surrounding sensitive equipment may be impaired, and data corrupted.
- 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.
- When using a Cypher® with some highly sensitive probes, it is possible that some high intensity electromagnetic phenomena (e.g., voltage arcs from welding machines, electrical transients created by commuting high power inductive loads, and so on) create visible disturbances observable in the acquired data. Since probes are electromagnetic-sensitive devices and are intended to receive and amplify low intensity ultrasounds, it is normally expected that high intensity external electromagnetic disturbances would be observable on the screen.
- The instrument may be operated in the rain. When operating the instrument in wet location, ensure that the battery compartment and HMI connector doors are closed, and that caps are plugged on the other unused connectors.
- For any problems or questions regarding this instrument, contact Eddyfi Technologies, or an authorized Eddyfi Technologies representative.

5 Battery Precautions

The Cypher® instrument can be operated in wet location only when running from batteries. Do not open the battery door compartment in a wet location as this will expose the instrument internal circuits.

6 Battery Charger Precautions

CAUTION

Before disposing of a battery, check local laws, rules and regulations and follow them accordingly.

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.

7 Ultrasound Probe Precaution

CAUTION

The Cypher® is designed to drive high frequency ultrasonic transducers in the form of high voltage pulses; the instrument does not contain any ultrasound device that generates hazardous ultrasonic pressure. A transducer requires a coupling medium to efficiently transmit its energy to the material to be inspected. Air does not allow high frequency ultrasounds to propagate in an aerial way; therefore, it cannot cause any hazardous pressure to personnel.

8 Regulatory Compliance

FCC Compliance (USA)

This equipment was tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when

the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the 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.

Canada – Industry Canada (IC)

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following conditions:

- This device my not cause interference.
- This device must accept any interference, including interference that my cause undesired operation of the device.

CE marking (EU)

Eddyfi declares that Cypher® equipment complies to the essential requirements of Electromagnetic Compatibility (EMC, 2014/30/EU), Low Voltage (LVD, 2014/35/EU) and Restriction of Hazardous Substances (RoHS, 2011/65/EU, 2015/863/EU and 2017/2102) directives. Please find the full EU Declaration of Conformity on the Eddyfi website: https://eddyfi.com/declaration-c-eu.

UKCA marking (UK)

Hereby, Eddyfi declares that Cypher® equipment complies with the essential requirements of Electromagnetic Compatibility (EMC, S.I. 2016 No. 1091), Electrical Equipment Safety (S.I. 2016 No. 1101) and Restriction of Hazardous Substances (RoHS, S.I. 2012 No. 3032, and S.I. 2021 No. 422) Statutory Instruments. Please find the full UKCA Declaration of Conformity on the Eddyfi website: https://eddyfi.com/declaration-c-uk.

JIS (Japan)

Eddyfi declares that Cypher® equipment complies to the essential requirements of Electrical Equipment Safety (JIS C 1010-1:2019*)*, Electromagnetic Compatibility (JIS C 61326-1:2022) and Japan RoHS (J-MOSS). Contact Eddyfi Technologies for the full GB GGBT/T Declaration of Conformity.

KSA (South Korea)

Eddyfi declares that Cypher® equipment complies to the essential requirements of Electrical Equipment Safety (similar to EN-61010-1 with deviations*)*, Electromagnetic Compatibility (similar to EN- 61326-1 with deviations) and Korea RoHS (similar to China). Contact Eddyfi Technologies for the full KSA Declaration of Conformity.

A급 기기 (업무용 방송통신기자재)
이 기기는 업무용(A급)으로 전자파적합기기로서
판매자 또는 사용자는 이 점을 주의하시기 바라며,
가정 외의 지역에서 사용하는 것을 목적으로 합니다.

Translation: Class A (Broadcasting and Communication equipment for Business)

Sellers and users should note that this equipment is an electromagnetic device for business (class A), and is intended for use outside the home.

The MSIT registration number for the Cypher 64/128-TFM is R-R-EdyT-Cypher

ICES Compliance (Canada)

This ISM device complies with Canadian ICES-001(A).

AS/NZS Compliance (Australia/New Zealand)

This device complies to the applicable regulations and standards for Australia (and New Zealand) as defined by the Australian Communications and Media Authority (ACMA). Eddyfi declares that Cypher® equipment complies to the essential requirements of Electrical Equipment Safety (AS/NZS-61010-1:2016) and Electromagnetic Compatibility (similar to EN- 61326-1 with deviations:2020. Contact Eddyfi Technologies for the full AS/NZS Declaration of Conformity.

SAR/RF Exposure notice

This equipment complies with FCC/IC radiation exposure limits set forth an uncontrolled environment and meets the FCC radio frequency Exposure Guidelines in Supplement C to OET-65 and RSS-102 of the IC (industry Canada) radio frequency RF exposure rules.

If this device is to be operated in the 5.15-5.25 GHz frequency range, it is restricted to indoor environments only.

This instrument contains WiFi/Bluethooth module, which has the following approvals:

- Brazil- Anatel: 14242-20-04423
- Canada- IC: 1000M-AX210NG
- China- CMIIT: 2020AJ11402(M)
- India- ETA-SD20201006833
- Indonesia- 71459/SDPPI/2020 7965
- Japan- RF: 003-220254; TEL: D220163003
- Pakistan- 9.1000/2020
- South Korea- R-C-AX210NGW
- Taiwan- CCAH20LP8460T3
- USA- FCC ID: PD9AX210NG

Radio Frequency Regulatory Compliance

The following table shows the regulatory compliance declarations for radio frequency information for every country and region. For Wireless specifications, see Table 3 on page 65 For instructions on how to access the regulatory e-labels on your Cypher64/128-TFM, refer to “Accessing the Regulatory e-labels” on page xx.

Table 1- Radio Frequency Regulatory Compliance

Country/Region	Mark	Declaration
USA	See e-label for FCC ID FCC ID: PD9AX210NG	This device contains transmitters and has been designed, manufactures and tested to meet the Federal Communication Commission (FCC) guidelines for RF exposure and Specific Absorption Rate. The FCC ID marking indicates compliance and certification with the above FCC guidelines.
Canada	See e-label for IC number 1000M-AX210NG	This device contains transmitters and has been designed, manufactures and tested to meet the Innovation. Science and Economic Development (ISED) Canada Guidelines for RF exposure and Specific Absorption Rate. The ID number marking indicates compliance and certification with the above ISED guidelines.
UK	UKCA	This device complies with the requirements of the Electromagnetic Compatibility Regulations 2016, the Electrical Equipment (Safety) Regulations 2016, the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012, and the Radio Equipment Regulations 2017. The UKCA marking indicated compliance with the above regulations.
EU	CE	This device complies with the requirements of directive 2014/30/EU concerning electromagnetic compatibility, directive 2014/35/EU concerning low voltage, directive 2015/863 which amends 2011/65/EU concerning restriction of hazardous substances (RoHS), and directive 2014/53/EU concerning radio equipment (RED). The CE marking indicates compliance with the above directives.
Argentina	R! RAMATEL C-25568	This device contains transmitters and has been designed, manufactures and tested to meet the "Registro" de Actividades y Materiales" for RF exposure and Specific Absorption Rate. The ID number marking indicates compliance and certification with the guidelines.
Australia and New Zealand		The regulatory compliance mark (RCM) label indicates that the product complies with all applicable standards, and has been registered with the Australian Communications and Media Authority (ACMA) and the New Zealand Radio Spectrum Management (RSM) for placement on the Australian and New Zealand markets. In

Country/Region	Mark	Declaration
		addition, this device complies with the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) radiofrequency electromagnetic energy (RF EME) human exposure limits.
Brazil	ANATEL 14242-20-04423	A marcação ANATEL indica este dispositivo e a tecnologia sem fio contida neste dispositivo está em conformidade com os regulamentos de telecomunicações da Agência Nacional de Telecomunicações (ANATEL). Este equipamento não tem direito a proteção contra interferência prejudicial e não pode causar interferência a sistemas devidamente autorizados. Para mais informações, consulte o site da ANATEL. https://www.gov.br/anatel/pt-br
China	See e-label CMITT ID 2020AJ11402(M)	This device contains a radio transmitter and has been designed, manufactured and tested to meet the requirements of the State Radio Regulations of China (SRRC). The Chinese Ministry of Industry and Information Technology (CMIIT) ID number indicates compliance with the above requirements. Demander à ChatGPT
Hong Kong	N/A	This device contains radio transmitters and has been designed, manufactured and tested to meet the US Federal Communications Commission (FCC) and European Union (EU) guidelines for RF exposure and Specific Absorption Rate.
India	ETA-SD-20201006833	This device contains radio transmitters and has been designed, manufactured and tested to meet the US Federal Communications Commission (FCC) and European Union (EU) guidelines for RF exposure and Specific Absorption Rate. Thus, this device has received an Equipment Type Approval (ETA) certificate from the Wireless Planning & Coordination (WPC) Wing department.
Indonesia	71459/SDPPI/2020 7965 71459/SDPPI/2020 7965	This device contains radio transmitters and has been designed, manufactured and tested to meet the requirements of the Direktorat Jenderal Sumber Daya Dan Perangkat Pos Dan Informatika (SDPPI). The QR code, Certificate numbers, Certificate Holder's Registration number, and

Country/Region	Mark	Declaration
		warning sign indicates compliance with the SDPPI.
Japan	 RF: 003-220254 TEL: D220163003	This device contains radio transmitters and has been designed, manufactured and tested to meet Radio Act requirements for RF exposure and Specific Absorption Rate. The GITECKI (Technical Conformity Mark) indicates compliance and certification with the above Radio Act requirements.
South Korea	 R-C-INT-AX210NGW	This device complies with the electromagnetic compatability (EMC) and Radiofrequency (RF) requirements of Korea.
Malaysia		This device contains radio transmitters and has been designed, manufactured and tested to meet the requirements of the Malaysian Communications And Multimedia Commission (MCMC).
Mexico	See e-label for IFETEL/IFT number	This device contains radio transmitters and has been designed, manufactured and tested to meet the requirements of the Instituto Federal de Telecomunicaciones (IFETEL) and the The Normas Oficiales Mexicanas (NOM) The IFETEL/IFT number shows compliance with Mexico requirements.
Pakistan	 9.1000/2020	This device contains radio transmitters and has been designed, manufactured and tested to meet the requirements of the Pakistan Telecommunication Authority (PTA). The PTA marking indicates compliance with the above requirements.
Singapore	Complies with IMDA Standards	This device contains radio transmitters and has been designed, manufactured and tested to meet the requirements of the Infocomm Media Development Authority (IMDA). The IMDA marking indicates compliance with the above requirements.
South Africa		This device contains radio transmitters and has been designed, manufactured and tested to meet the requirements of the Independent Communications Authority of South Africa (ICASA). The ICASA marking indicates compliance with the above requirements.
Taiwan		This device contains radio transmitters and has been designed, manufactured and tested to meet the requirements of the National

Country/Region	Mark	Declaration
	CCAH20LP8460T3	Communications Commission (NCC). The NCC certification indicates compliance with the above requirements.
Thailand		This device contains radio transmitters and has been designed, manufactured and tested to meet the requirements of the National Broadcasting and Telecommunications Commission (NBTC). The NBTC marking indicates compliance with the above requirements. Demander à ChatGPT
United Arab Emirates	TRA – United Arab Emirates Dealer ID: 0018841/09 TA RTTE: ER91285/20 Model: AX210NGW Type: WLAN	This device contains radio transmitters and has been designed, manufactured and tested to meet the requirements of the Telecommunications and Digital Government Regulatory Authority (TDRA).
Vietnam	ICT	This device contains radio transmitters and has been designed, manufactured and tested to meet the requirements of the Vietnam Telecommunications Authority (VNTA).
For additional countries/regions see Intel: AW210- regulatory web flyer (https://cdrdv2-public.intel.com/841573/ax210-regulatory-webflyer-ccg.pdf)		

China RoHS compliance

China RoHS (Restriction of Hazardous Substances) is a regulation implemented by the Ministry of Information Industry (MII) in the People's Republic of China to address the environmental impact of electronic and electrical products. Modeled after the European Union's RoHS Directive, China RoHS aims to restrict the use of certain hazardous substances in electronic and electrical equipment, thereby reducing the potential harm these substances can cause to human health and the environment.

China RoHS reflects the growing global awareness of the need to minimize the environmental impact of electronics, promote responsible manufacturing practices, and ensure the safe handling of electronic waste.

	The China RoHS mark plays a pivotal role in signaling a product's commitment to environmentally conscious practices. However, it's crucial to underline that this mark doesn't directly correlate with the product's Environment-Friendly Use Period (EFUP). The EFUP, represented by the acronym, signifies a specific duration during which designated controlled substances, as outlined by the China RoHS regulation, are intentionally safeguarded against leakage or chemical deterioration within the confines of the product. This distinct timeframe, meticulously evaluated and affirmed, spans an impressive 15 years for the Cypher instrument. Within this stipulated period, the integrity of the controlled substances integrated into the Cypher is vigilantly maintained, preventing any degradation or escape into the surrounding environment.

	Note: The EFUP encapsulates the meticulous engineering that strives to align with sustainability principles, preserving the substances and mitigating their environmental impact. However, it's paramount to clarify that the EFUP is distinct from the product's functional and performance-related lifespan. While the EFUP focuses solely on substance preservation, the product's overall functionality and operational effectiveness may span beyond this designated timeframe. This differentiation underscores the multifaceted nature of assessing products, encompassing ecological considerations as one facet among several that both consumers and manufacturers must take into account.

Table 2 Table listing restricted substances for China RoHS 3

部件名称 Part name	有害物质 - **Hazardous substances**									
	(Pb) 铅	(Hg) 汞	(Cd) 镉	(Cr(VI) 六价铬	(PBB) 多溴联苯	(PBDE) 多溴二苯醚	(BBP) 邻苯二甲酸苄丁酯	(DBP) 邻苯二甲酸二丁酯	(DEHP) 邻苯二甲酸二乙基己酯	(DIBP) 邻苯二甲酸二异丁酯
电缆和连接器组件 Cables and Connector assemblies	X	O	O	O	O	O	O	O	O	O
电气和电子零件 Electrical & Electronics parts	X	O	O	O	O	O	O	O	O	O
金属部件 Metal parts	X	O	O	O	O	O	O	O	O	O
塑料件 Plastic parts	O	O	O	O	O	O	O	O	O	O
橡胶件 Rubber parts	O	O	O	O	O	O	O	O	O	O

印制电路板及配件 Printed circuit board and accessories	O	O	O	O	O	O	O	O	O	O
电池及配件 Battery and accessories	O	O	O	O	O	O	O	O	O	O
粘合剂、密封剂和标签 Adhesives, Sealants and Labels	O	O	O	O	O	O	O	O	O	O

(本表格依据SJ/T11364的规定编制) This table is compiled according to SJ/T 11364 standard.

O: (表示该有害物质在该部件所有均质材料中的含量均在GB/T26572规定的限量要求以下.)

Indicates that the concentration of the hazardous substance in all homogeneous materials for the part is below the relevant threshold of the GB/T 26572 standard.

X: (表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T26572规定的限量要.)

Indicates that the concentration of the hazardous substance in at least one homogenous material of the part is above the relevant threshold of the GB/T 26572 standard.

9 Calibration and Warranty Seals

Calibration and warranty seals are hidden under the front-left bumper of the Cypher® to prevent accidental damage.

IMPORTANT: Broken seals void the calibration certification and product warranty.

10 Safety Indications

The purpose of the various safety indications in this manual is 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.

High voltage

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.

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.*

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11 Typographical Conventions

The various typographical conventions used in this document to describe the operations of the instrument 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 option 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.)

12 Technical Support

Eddyfi is firmly committed to providing the highest level of customer service and product support. If you experience difficulties when using our instrument, or if it fails to operate as described, first consult this user manual, and then, if are still in need of assistance, please contact Eddyfi at support@eddyfi.com.

Chapter 2

Introducing Cypher

1 Introducing the Cypher®

Cypher is a state-of-the-art Phased Array Ultrasonic Testing (PAUT) instrument, designed to deliver uncompromising performance and usability across critical inspection environments. Born from the combined legacy of M2M and Zetec technologies, Cypher represents a unified evolution in ultrasonic inspection—merging high-end capabilities with intuitive operation. Whether you are inspecting welds in pipelines, evaluating aerospace components, or ensuring structural integrity in power generation, Cypher offers advanced Total Focusing Method (TFM) and Phased Array tools in a lightweight, rugged package built for the field. From its intelligent software platform to its seamless integration with Eddyfi accessories, every aspect of Cypher is engineered to simplify complex inspections, reduce operational downtime, and empower users at all levels of expertise. This high-performance ultrasonic testing (UT) data acquisition system is engineered for demanding field applications and offers the following key features:

- Lightweight, rugged, and fully portable design for easy transport and reliable field use
- IP65-rated enclosure for superior resistance to dust, water, and harsh environments
- Flexible channel configuration: Up to 64:128 with dual PAUT IPEX connectors for advanced inspection setups
- Four dedicated conventional UT pulsers, enabling both pulse-echo and pitch-and-catch/TOFD applications
- Extended field operation: Up to 4 hours of battery life with hot-swap capability for uninterrupted inspections
- Redundant power architecture providing both main battery and backup supply to ensure continuous 100% uptime
- High-voltage excitation for PAUT channels: Bipolar pulses up to 120 Vpp (into 50Ω load)
- Powerful excitation for UT channels: Negative pulses down to 200 V (into 50Ω load)
- Seamless plug-and-play connectivity for simplified setup and device integration
- Encoder and scanner support: Compatible with up to 3 quadrature-type encoders for precision positioning and automation

The Cypher® is controlled by a computer running Microsoft Windows® 11 IOT LTSC 24H2 and Eddyfi's Cypher OS® 1.0 or newer running on a 64bits operating system.

This user manual is your guide to unlocking Cypher's full potential—safely, efficiently, and with confidence.

2 Overview of Instrument

The Cypher® is available in available in the 64/128 configuration only. The following sections show the instrument under all view with indications to the main controls and features.

2.1 Descriptions of the front panel

Here is a quick view of the Cypher® front panel.

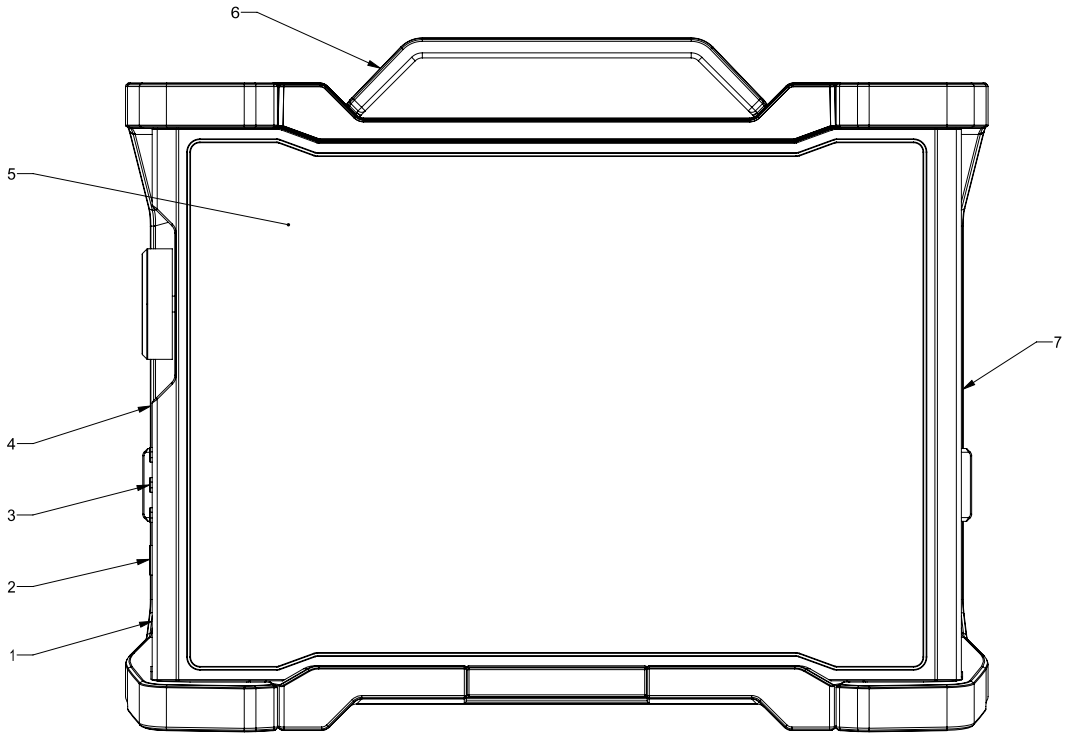


Figure 1 – Front panel view

1. DC input connector (see left-side panel).
2. On/off power button and power status indicator (see left-side panel).
3. Soft keys (see left-side panel).
4. HMI interface connectors (see left-side panel).
5. Multi-touch display.
6. Handle to lift and carry the instrument.
7. Battery compartment (see right-side panel).

2.2 Descriptions of the top

The Cypher® comes with a standard top plate as shown on the next figures:

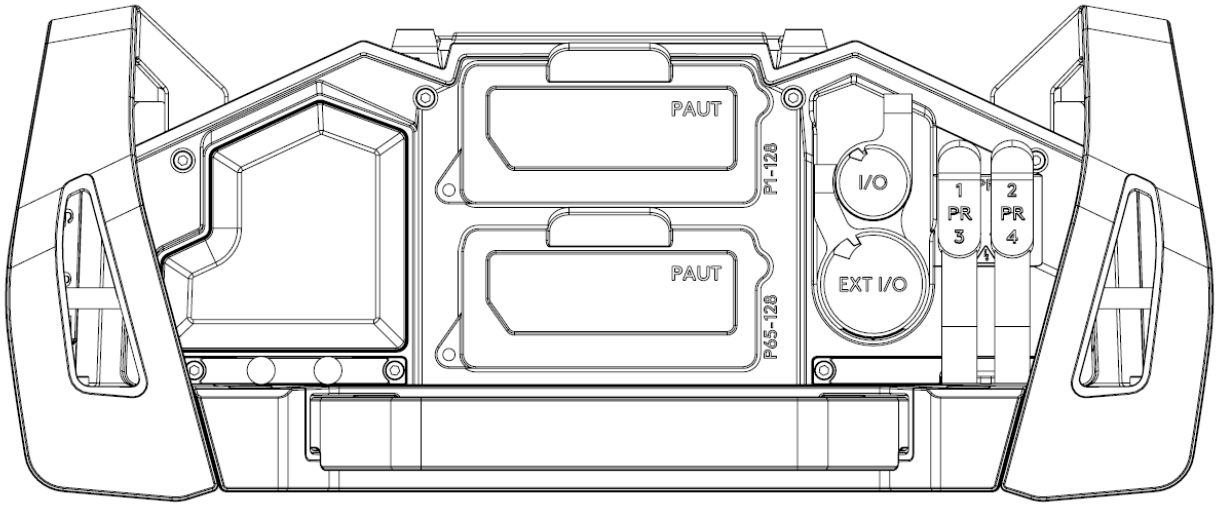


Figure 2 –Cypher top plate with connector covers

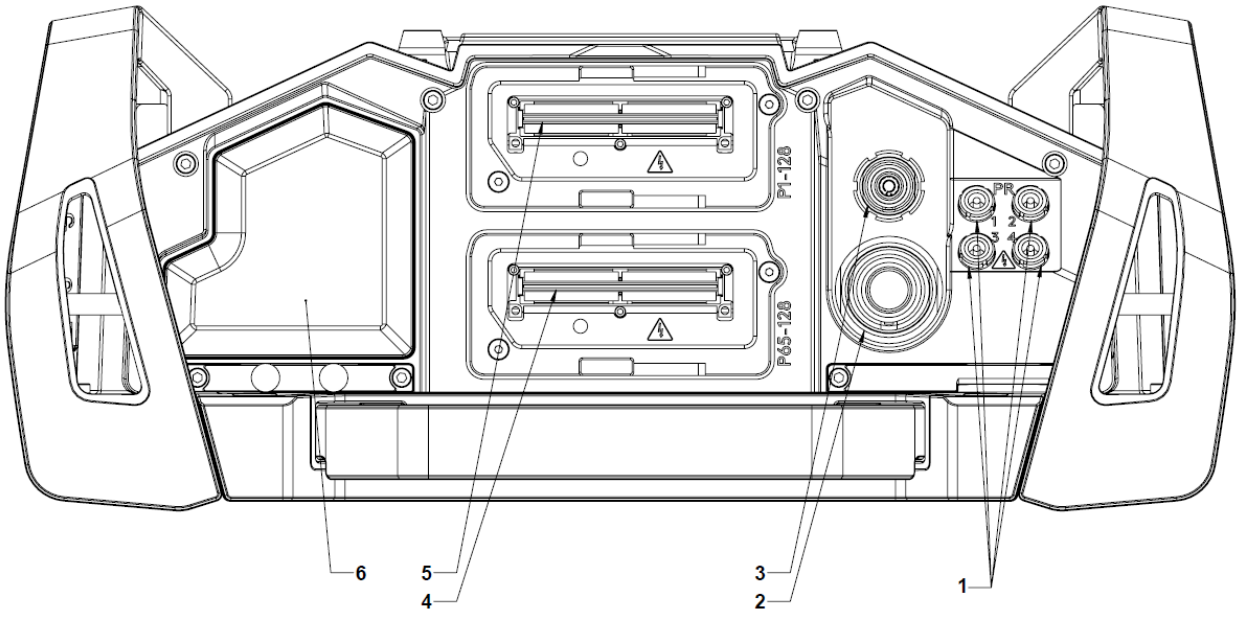


Figure 3 – Cypher top plate without connector cover

IMPORTANT: The top is not sealed unless connectors are plugged, or caps are in place.

1. 1 Pulser/receiver connector (PR1, PR2, PR3 and PR4) for conventional UT probes
2. Robotic connector (For further details, see section 5.5)
3. Encoder connector (For further details, see section 5.4)
4. Pulser/receiver connector for phased array probes (channels 65-128)
5. Pulser/receiver connector for phased array probes (channels 1-128)
6. GPS antenna. Make sure this area is not masked by metallic objects interfering with the function.

2.3 Description of the right-side panel

The Cypher® can be powered by an external AC/DC supply or by two high-power batteries. The batteries are accessible from a right-side panel, as shown on the next figure. See section 5, for information about battery precautions.

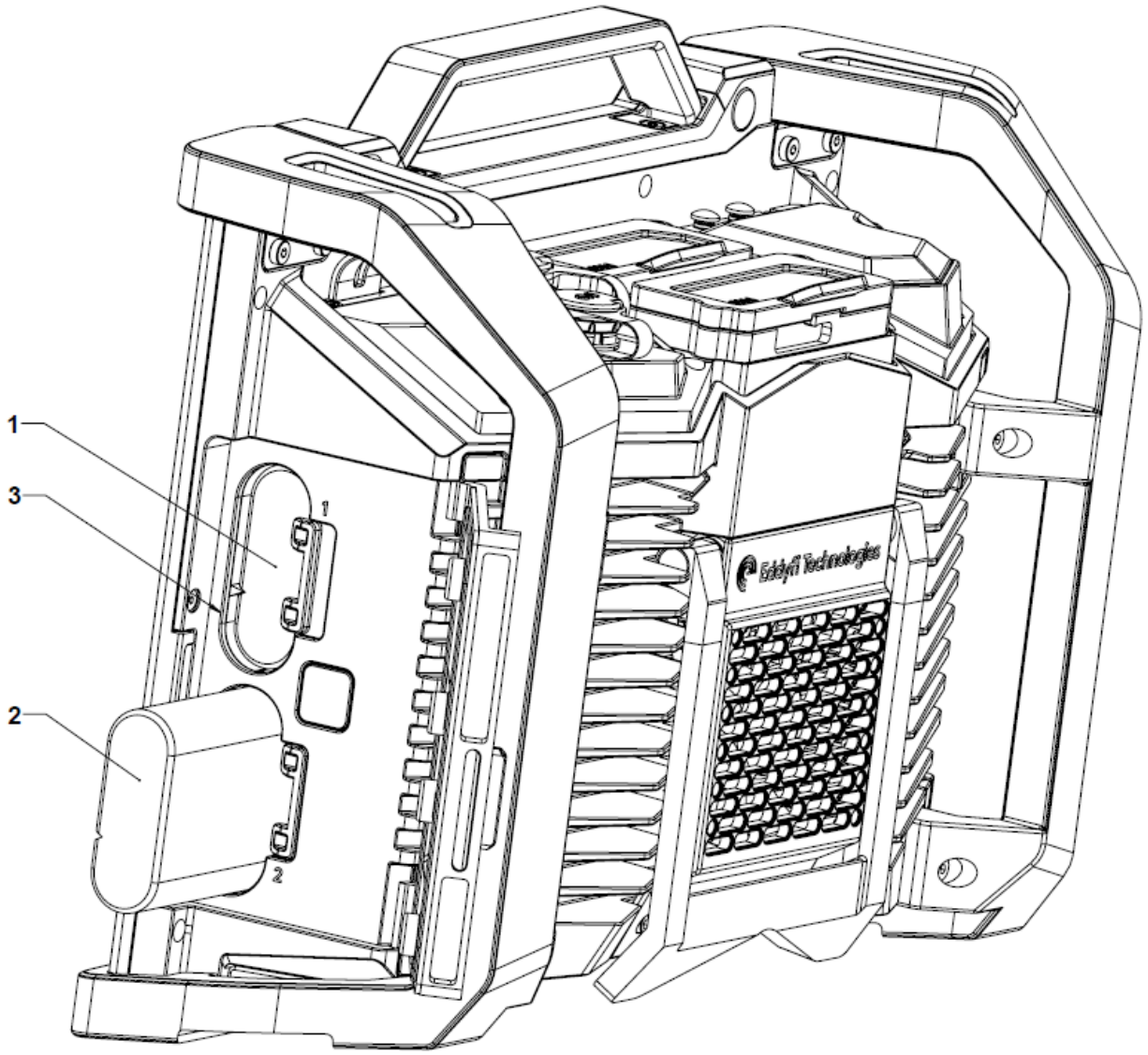


Figure 4 **– Right-side panel**

IMPORTANT: The right-side panel is not sealed unless the battery door is closed and properly latched.

1. Battery #1
2. Battery #2
3. Windows license sticker posted inside of battery compartment #1.

IMPORTANT: Certain events such as booting while the batteries are too depleted or when changing them can lock up the application software. This condition can be resolved by pressing the on/off button for 5 seconds to turn off the instrument and rebooting it with charged batteries. For further information about battery charge level, see section 5.

2.4 Description of the left-side Panel

The HMI connectors, soft keys, DC input power connector and power on/off button are located on the instrument's left-side panel.

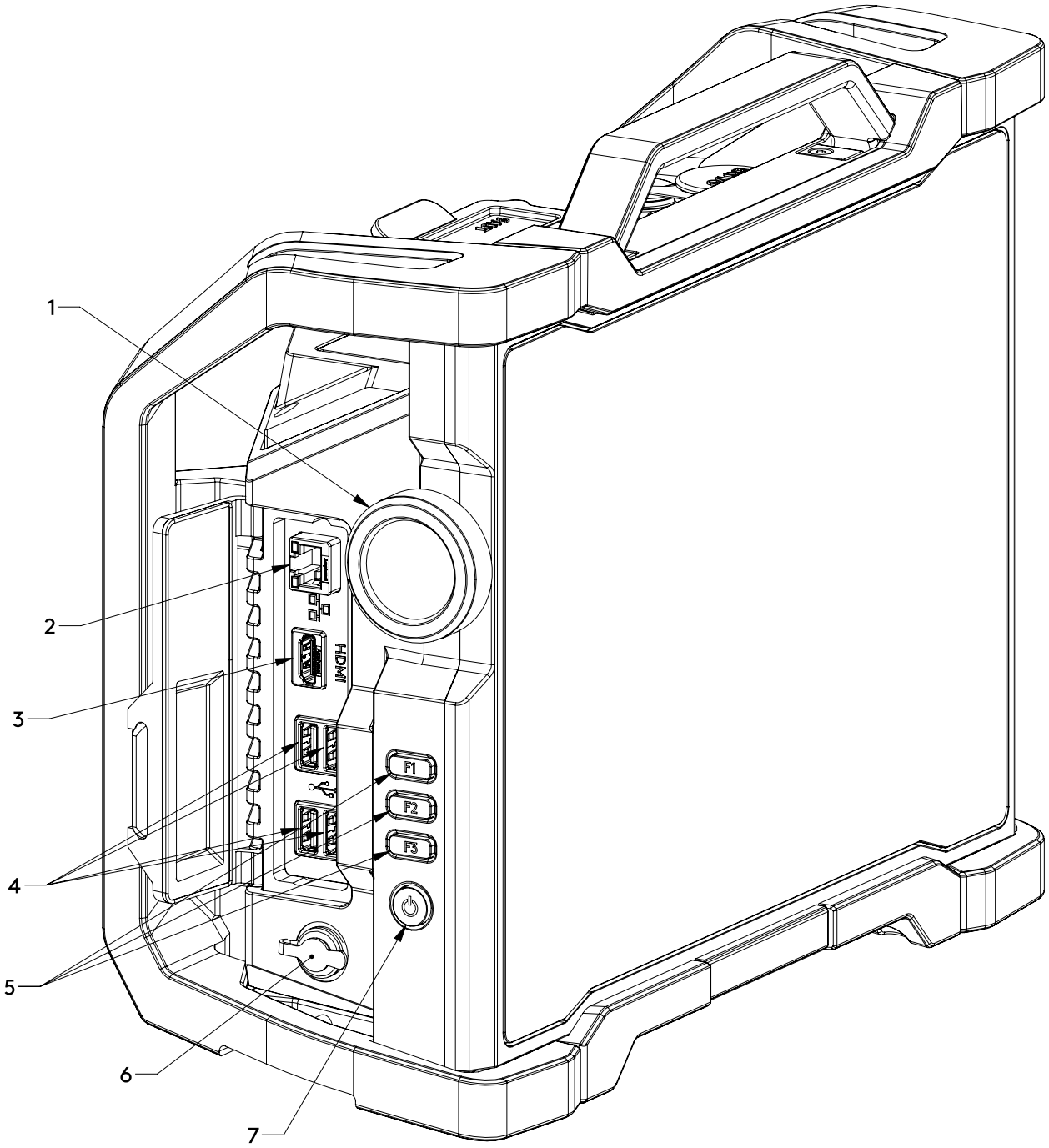


Figure 5 **– Left-side panel**

IMPORTANT: The left-side panel is not sealed unless the connector door is closed and properly latched.

1. Scroll wheel.
2. Ethernet connector with status LEDs (For further details, see section 5.3).
3. High-Definition Media Interface (For further details, see section 5.6).
4. USB3 ports connectors (For further details, see section 5.7).
5. Soft keys. Those keys are defined by Cypher OS® and depend on the application running.
6. DC input power (For further details, see section 5.3).
7. On/off button with status (For further details, see section 4).

2.5 Description of the back panel

Here is a quick view of the Cypher® black panel.

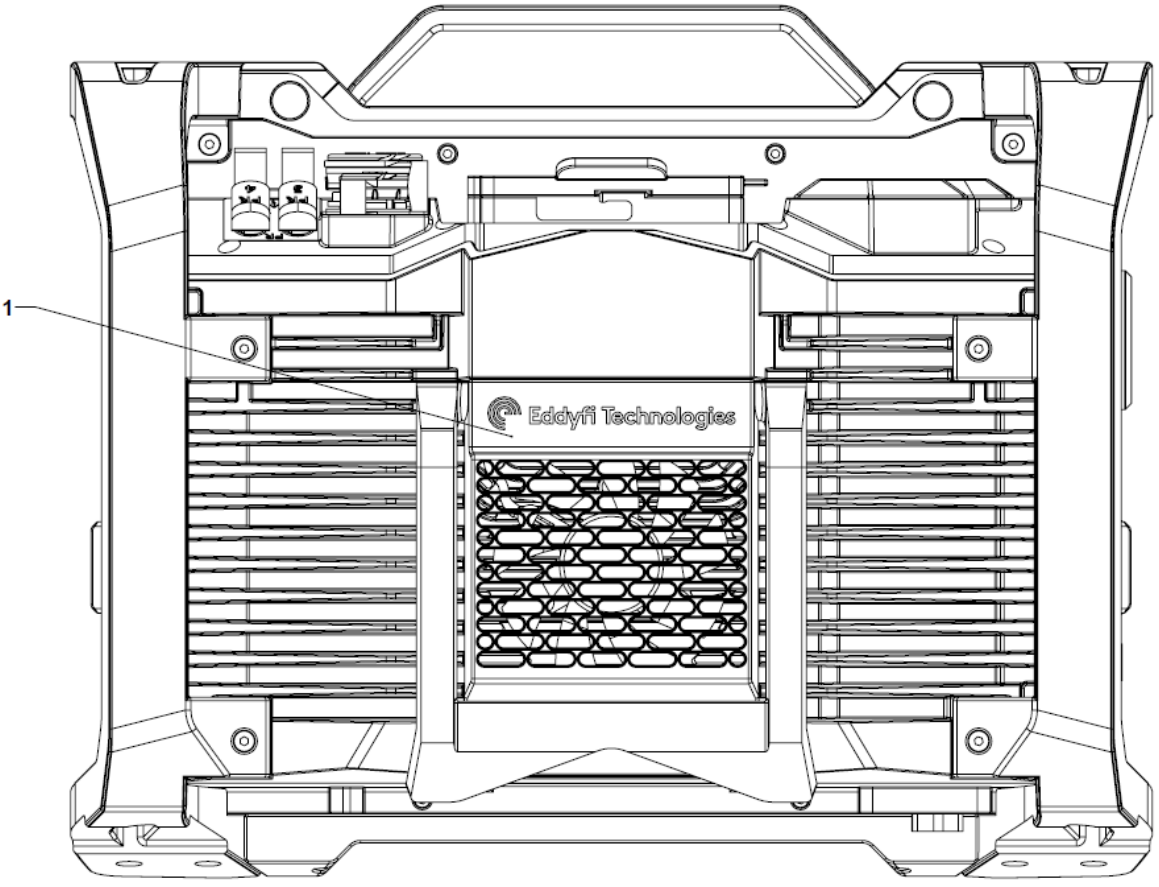


Figure 6 **– Rear view**

1. External cooling fan with protective grid

2.6 Description of the bottom

Here is a quick view of the Cypher® bottom panel.

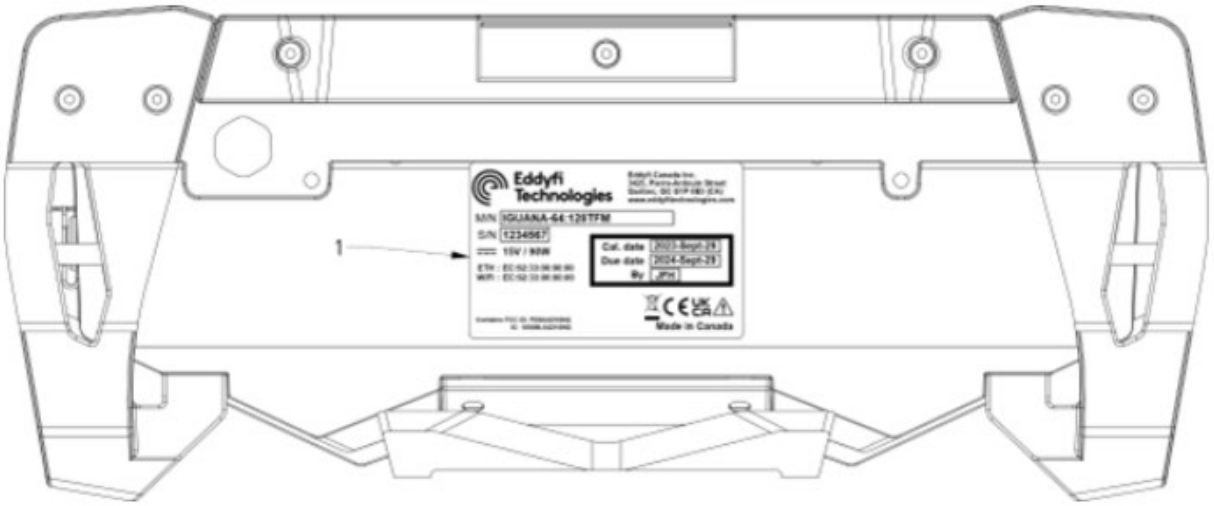


Figure 7 **– Bottom view with naming plate**

1. Naming plate with mandatory information for the instrument.

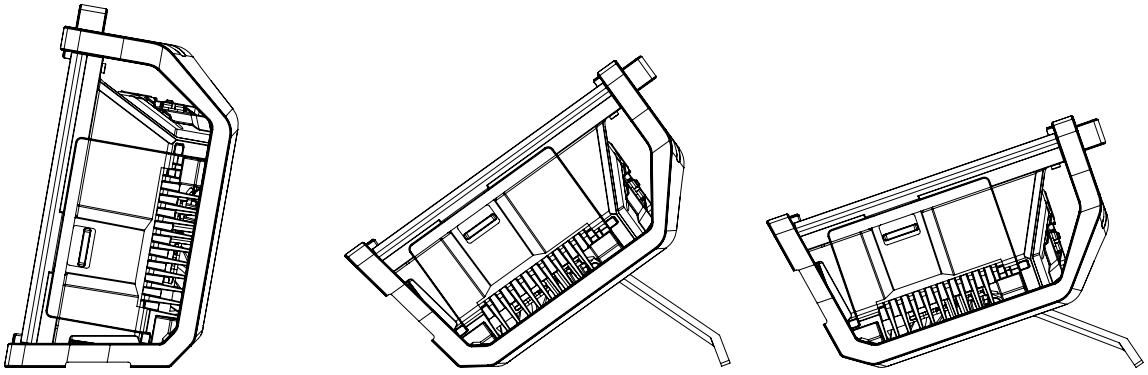
Chapter 3

Preparing the Instrument

1 Setting up the instrument

To properly set up the Cypher®:

1. Remove the instrument from its transportation case.
2. Position the instrument on a level and stable surface.
3. Use the instrument in one of its stable positions: Leaning on its bottom face or leaning on its stand bracket at one of the permitted angles.



Standing on bottom face | ***Leaning on rear bracket at the upper most position*** | ***Leaning on rear bracket at the lowest position***

Figure 8- Cypher® stable positions

IMPORTANT Eddyfi does not approve of any other position. If you need to use the instrument in any other position, you must make sure that the instrument is mechanically secure to ensure personnel safety. Eddyfi will not be responsible for any danger or accident which may result.

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, always use the carrying handle.

2 Connection Configurations

The Cypher® allows various test configurations; the following pictures show a few of those configurations.

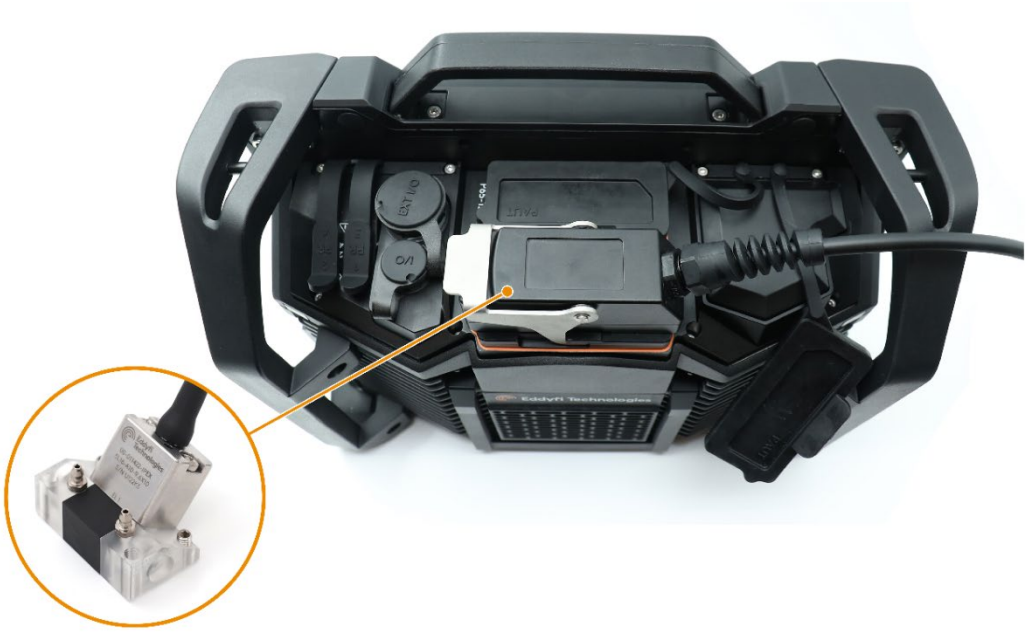


Figure 9 - Typical configuration 1: Standalone instrument with single PA probe

Figure 10 - Typical configuration 1: Standalone instrument with single UT channel

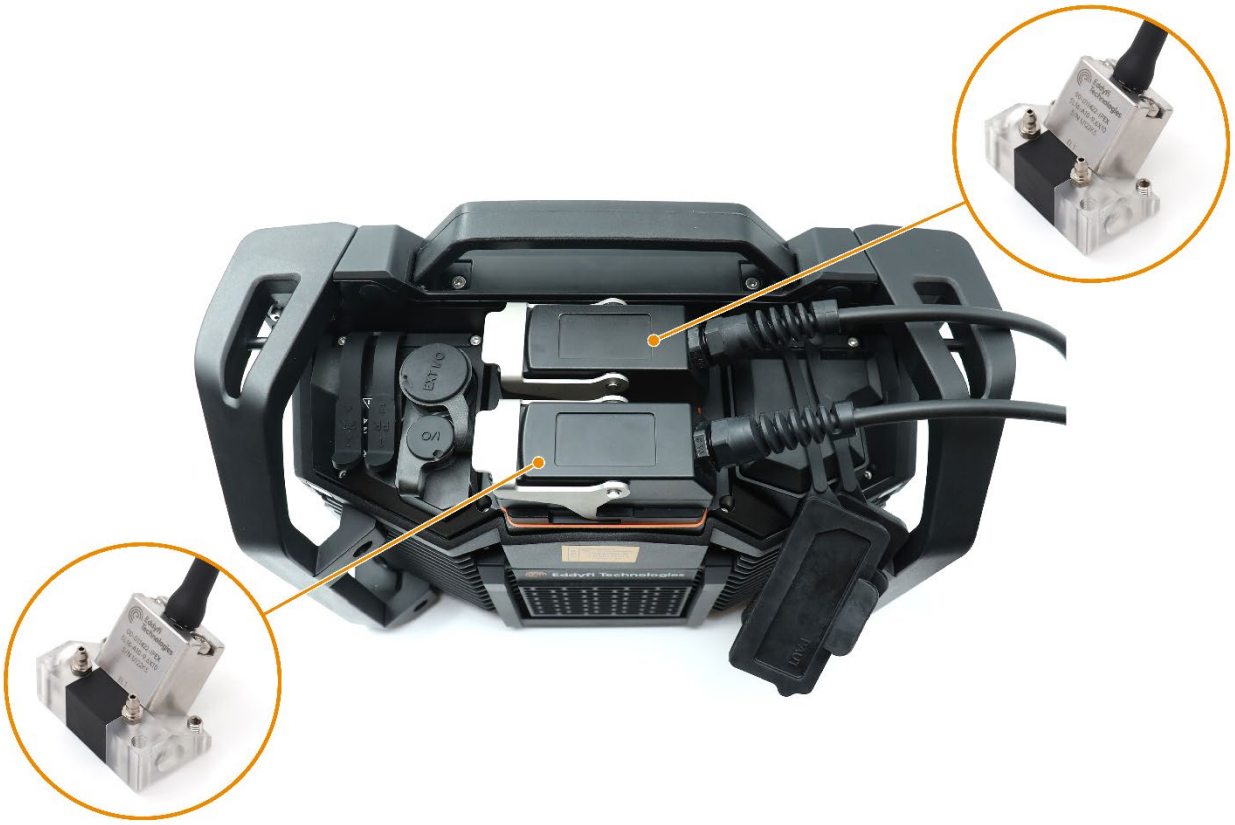


Figure 11 - Typical configuration 2: Standalone instrument with dual PA probe

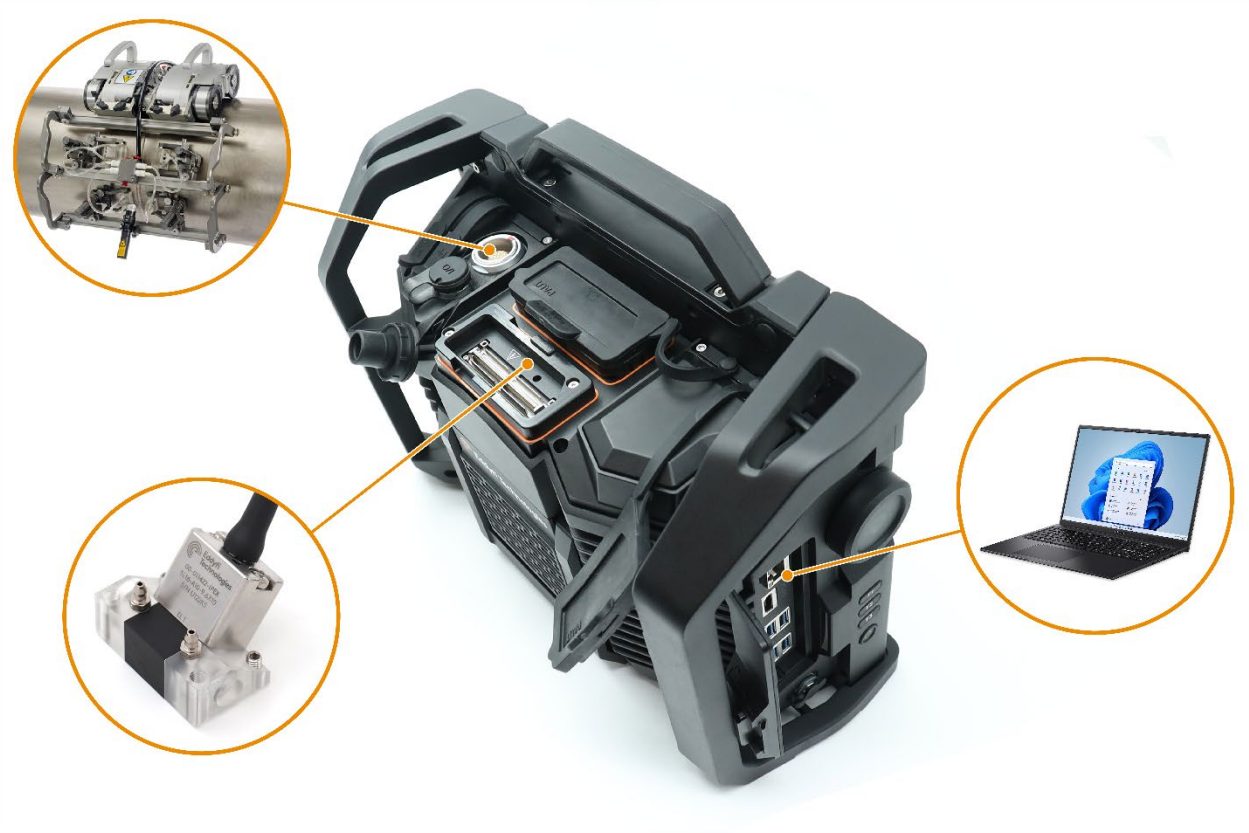


Figure 12 - Typical configuration 2: Remote mode with single PA probe and scanner

3 Starting the Instrument

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

4 Understanding Indicators

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

Indicator on the power button

The power on/off button indicator can have one of seven states:

Off	When the following two conditions are present: • No external power • Instrument is turned off
Green steady	Instrument is powering on

Flashing green at 0.5Hz	Instrument is in standby mode
Orange steady	Instrument is turned off with external power and batteries are fully charged
Flashing orange at 0.5Hz	Instrument is turned off with external power and batteries do not report charge status
Flashing orange at 2Hz	When battery level is less than 5%
Flashing red at 2Hz	After power button is activated when instrument cannot be turned on. The indicator turns off after 5s when this condition occurs. The most likely cause is because the internal temperature is too hot.

○

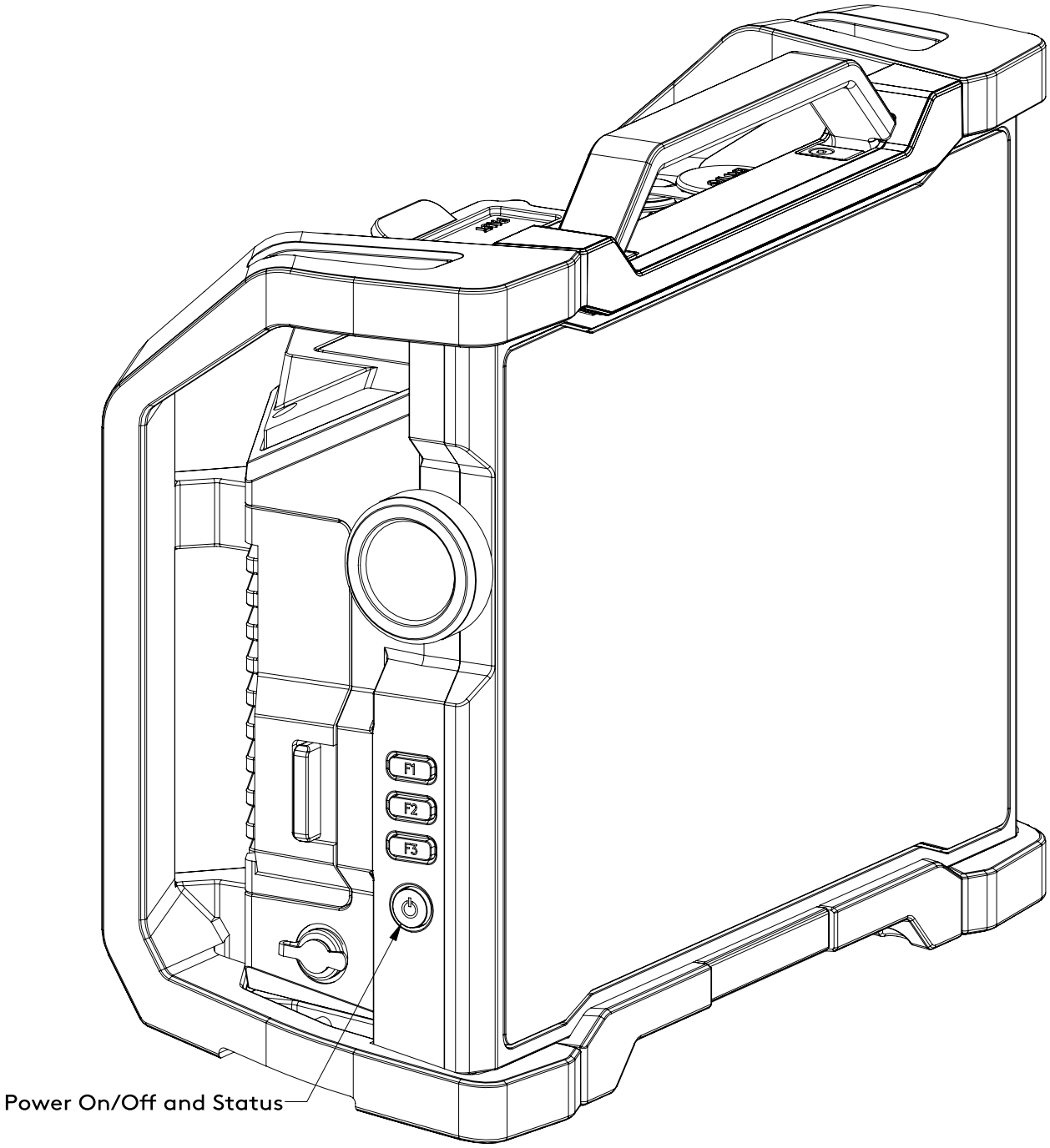


Figure 13 - Power indicators

5 Battery Indicators

Each battery has its own charge level indicator and charging status indicator. The application software reports the charge levels in the user's views.

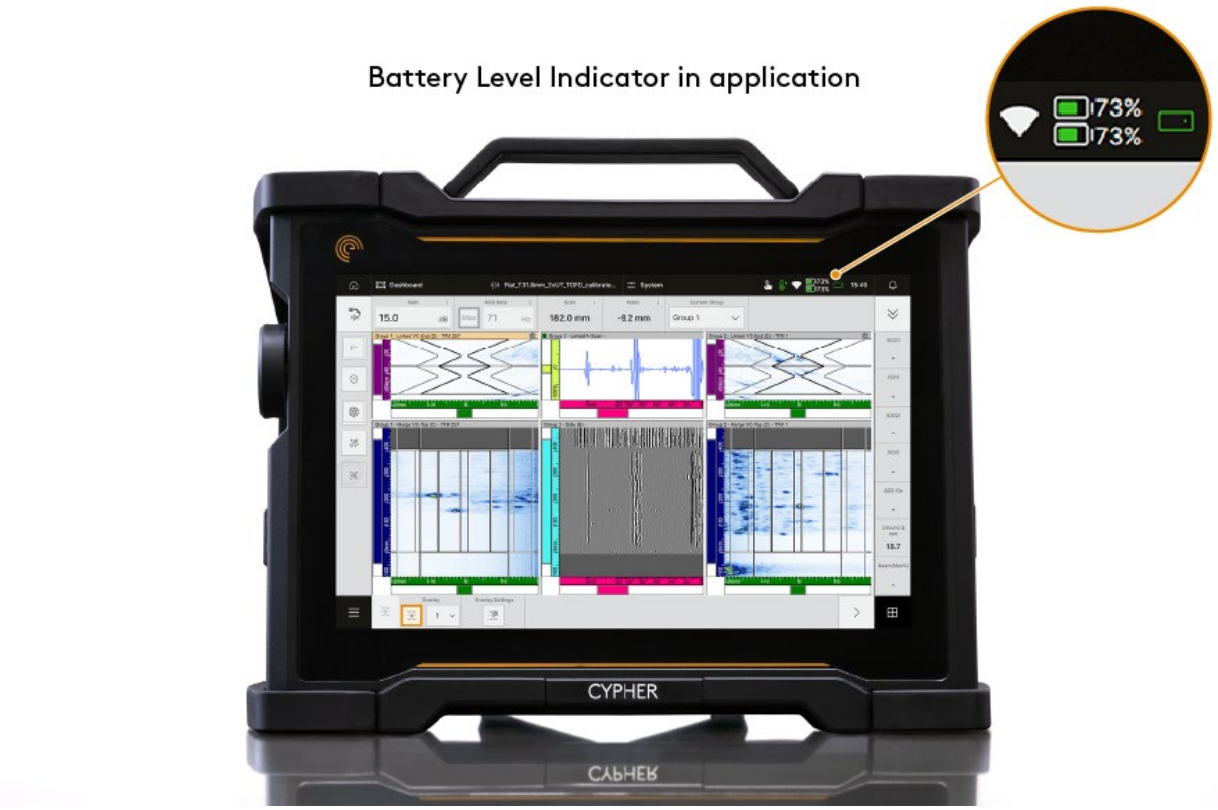


Figure 14 - Battery level indicators in application software

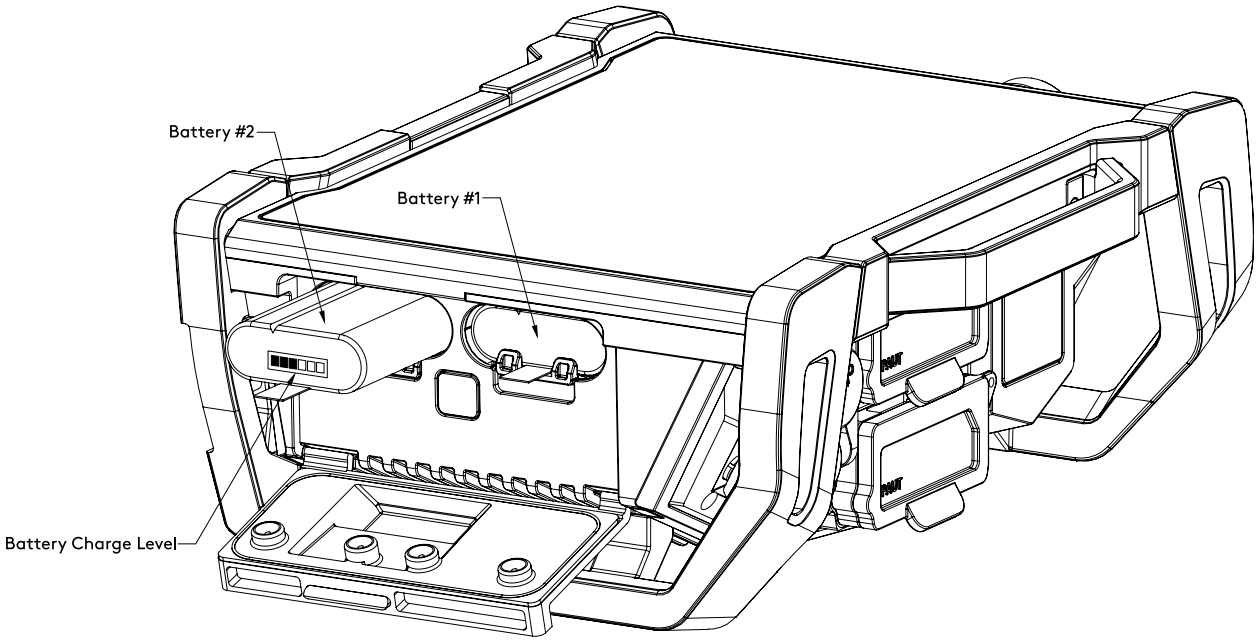


Figure 15 - Battery position with charge indicator

Charge level indicators light up 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%

Note *In the event that the Cypher® shuts down because of low battery power or overheating, the instrument automatically restarts once the shutdown condition clears if programmed to do so. The Cypher® instrument cannot be turned on if its internal temperature sensor reaches a temperature greater than 75°C.*

6 Connection Indicators

There are two LEDs beside the Ethernet connector on the Cypher® instrument. Those LEDs indicate the communication state when the instrument is connected to a workstation.

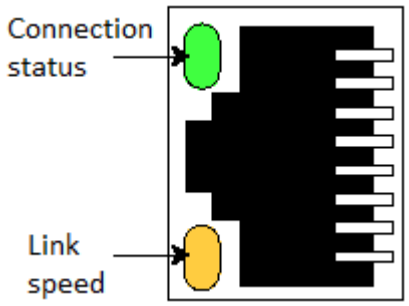


Figure 16 - Connection indicators

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 activity indicator can be in one of three states:

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

Chapter 4

Managing Batteries

1 General

The Cypher® uses lithium-ion rechargeable batteries. This type of battery does not suffer from the memory effect affecting previous generations of batteries.

WARNING!

Whenever transporting the Cypher® 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 transporting the Cypher, 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 Cypher 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 with batteries other than the original lithium-ion rechargeable batteries from Inspired Power.*

---

2 Charging the Batteries

The Cypher® batteries recharge automatically when they are in the instrument connected to an external power source.

Note *Batteries do not recharge when their internal temperature exceeds 45°C (113°F). Batteries also do not power the Cypher if the instrument's internal temperature exceeds 75°C (167 °F). If the previous limit is reached, the batteries do not resume power until their temperature drops to 65°C (149°F).*

An optional external charger is available from Eddyfi. It conditions and calibrates the batteries. This is important to maximize their useful life and to ensure accurate readings for the battery charger indicator in Cypher OS®. Eddyfi recommends calibrating batteries at least every six months (for more information about calibrating your batteries, see Calibrating Batteries on page 78).

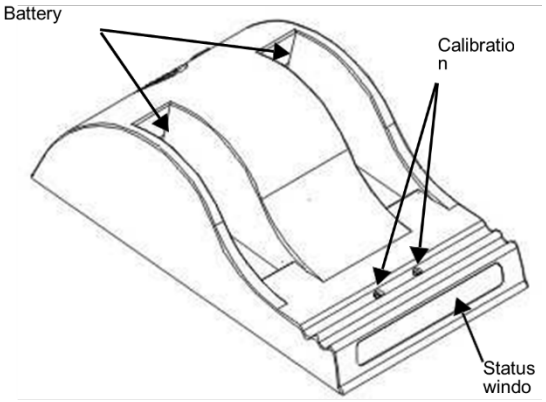


Figure 17- Battery charger

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 the 5-way connectors are fully seated. The LEDs in the status window display status information and the charger automatically begins charging the batteries.

3 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

4 Removing the Batteries

The batteries can remain in the Cypher ®if so desired. However, there are times when you must remove them from Cypher® (e.g., for calibration purposes or before placing the instrument on an airplane).

To remove the batteries:

1. Pull up the latch on the battery compartment door.
2. The battery compartment door pops out.

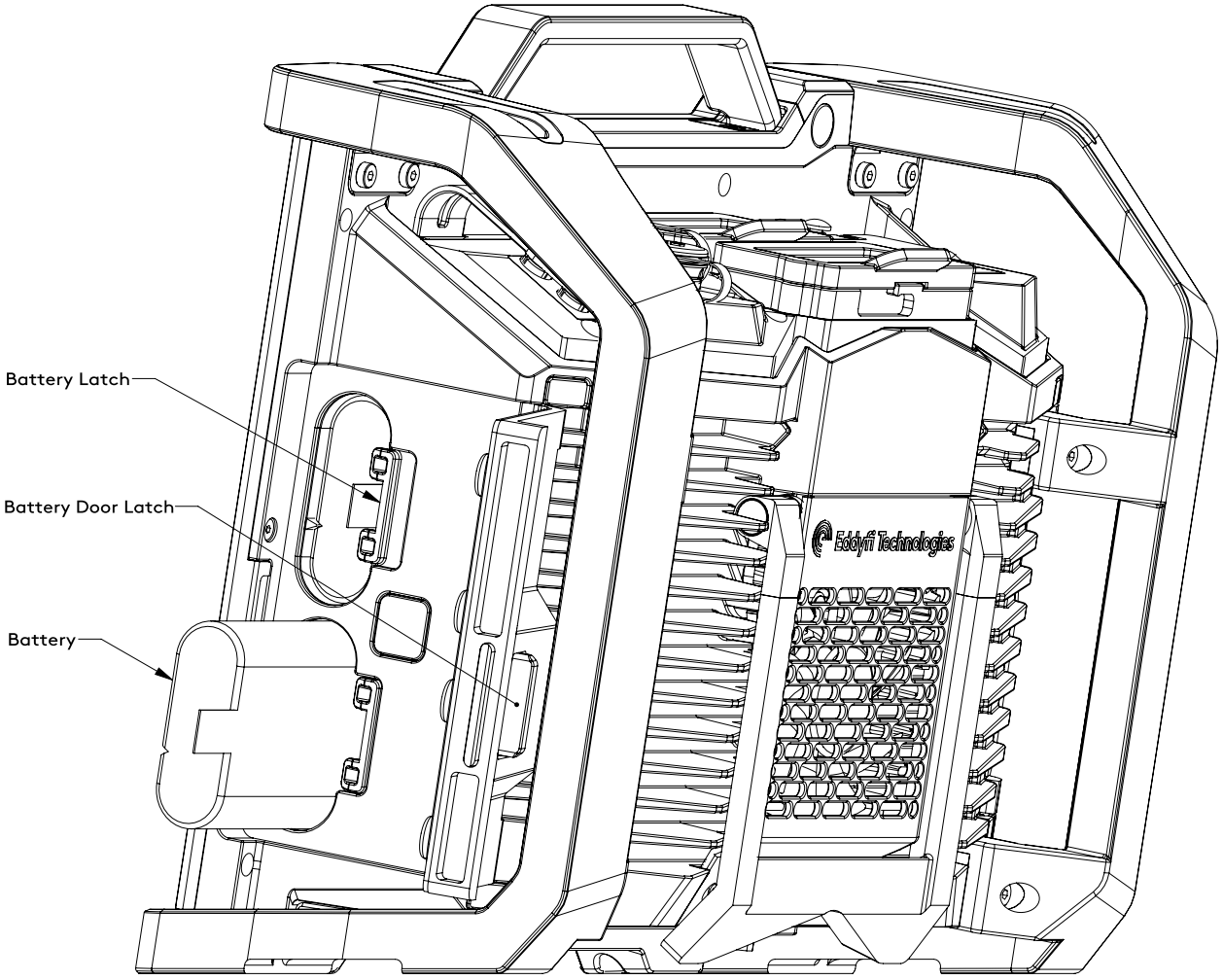


Figure 18 - Opening the battery compartment door

3. Press down the latch holding the battery in place.
4. 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.*

5 Hot-Swapping Batteries

You can remove the batteries in the Cypher® one at a time when the instrument is turned on. The Cypher® can run with only one battery. Should the power left in the remaining battery be insufficient to keep the Cypher® running, the instrument will shut down without damaging electronic components. However, all the work in progress in Cypher OS® (acquisition, etc.) will be lost.

Chapter 5

Specifications

1 General

This section presents the general specifications of the Cypher®.

Warm-up[a]	10 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.

Housing

Dimensions (W x H x D)	343 mm × 276 mm × 141 mm (13.50 in. × 10.87 in. × 5.55 in.)
Net weight[a]	7.1 kg (15.6 lb)[a] 6.1 kg (13.4 lb)[b]
Shock resistance	According to MIL-STD-810H

[a] Cypher 64/128 without batteries.

[b] Cypher 64/128 with two batteries.

Display

Display size	30.73 cm (12.1 in diagonal) with capacitive touch screen
Resolution	1200 x 800 pixels
Brightness	1000 cd/m^2
Number of colors	16M
Type	TFT LCD

Operating System

Operating system	Windows 11 IOT LTSC 24H2

Data Storage

Embedded hard drive	2 TB (Solid State Drive)
Maximum data file size	20GBytes

Environment

Environment	Indoor/Outdoor[a]

Operating temperature[b]	0°C to 45°C (32°F to 113°F) *The Cypher instrument can operate at lower/higher temperatures for intermittent operations; this condition should be avoided as much as possible because it will degrade performances might damage the instrument or cause hazards. Accuracy of the measurements is only guaranteed within the normal operating temperature range.
Storage temperature	–20°C to 60°C (–4°F to 140°F) with batteries
Relative humidity	Maximum 80% up to 31°C gradually decreasing to 50% at 40°C and 50% above, non-condensing
Altitude	2000 m maximum
Pollution degree rating	2 (when connected to the AC/DC adapter) 3 (when running on batteries with the connector door closed)
Protection	IP65[a]
Approvals	CE, UKCA, IEC 61010-1, IEC 61326-1, FCC15

[a]Outdoor use and IP65 rating for the instrument only with the battery and interface connectors door closed and **the** DC input power not used.

[b] The Cypher warns you through Cypher OS® when its internal operating temperature reaches 65°C (149°F) and then enters power safe mode to better protect itself when the operating temperature reaches 75°C (167°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.

Probe Connectors

Phased array connectors	IPEX with latch
UT channel connectors	4x LEMO for pulse-echo or pitch & catch

I/O Ports

USB ports	4x USB3 type A
Ethernet	1x Gigabit Ethernet (1000Base-T) Ethernet cable: at least Category 5a with shielded cable, length 100m (328ft) max
Video output	1x HDMI standard receptacle
Encoder	3x axis encoder lines 4x general input lines 3x general output lines +5V@0.25A
Robotics	1x USB2 port 1x 1GB Ethernet port 3x axis encoder lines 4x general input lines 3x general output lines +5V@0.25A +24V@0.42A
DC input	Barrel type

Power Supply

Power supply source	External power supply unit and/or (one or two) removable batteries
AC/DC adapter mains voltage	100-240VAC / 50-60 Hz
AC/DC adapter output	15Vdc, 90 W
AC/DC adapter maximum power	100VA

AC/DC adapter environment 	Pollution degree 2 **Caution:** Indoor use only in dry locations
AC/DC adapter derating	• 100% from 0°C to 40°C • Derating to 80% down to -20°C • Derating to 80% at 50°C then to 60% at 60°C
AC/DC adapter maximum ambient temperature for charging the batteries	• 40°C
Battery type	Li-Ion battery (rechargeable) Voltage 10.6V Capacity 8700mAh 300 charge/discharge cycles **Only approved battery must be used**
Number of batteries	Up to 2 (hot swappable)
Battery autonomy	Up to 5h autonomy with two batteries depending on power consumption

2 Inspection Techniques

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

Conventional UT

Conventional UT testing	Single beam
Applications	Thickness measurement Weld inspection Weld inspection Weld inspection
	Time of Flight Diffraction (TOFD)
Transmit/receive modes	Pulse-echo, pitch & catch

Phased array

Standard phased array	Focuses acoustic energy to inspect complex geometries and size defaults.
Total focusing method (TFM)	Acquires elementary A-Scans to reconstruct images at any point in a volume.
Transmit/receive modes	Pulse-echo, pitch & catch
Views	A-Scan. B-Scan, C-Scan, E-Scan, S-Scan
Multiple functions	Double bank, Multi group, Multi-mode, Plane Wave Imaging (PWI), etc
Applications	• Corrosion mapping • Detection of hydrogen-induced cracking (HIC), stress corrosion cracking (SCC), and stress-oriented hydrogen induced cracking (SOHIC) • Weld inspection of pressure vessels, piping, and tubing • Vessels and piping fabricated with composite materials • Accurate sizing data for fitness-for-service (FFS) calculations • Turbine blades and Christmas tree designs • Pressure vessel and piping welds • Erosion/corrosion mapping • Friction stir welds • Composite panels • Landing gear cylinders • Titanium billets, forgings and castings • Etc.

3 System

This section details the operating conditions of the Cypher.

Data acquisition

A-Scan length	Up to 65536 points
Synchronization	Free running, encoder position, external signal
Real time averaging	1, 2, 4, 8, 16 and 32
Compression	1, 2, 4, 8, 16 and 32
Data throughput	Up to 100 MB/s

Pulsers

Phased array	
Shape	Bipolar or negative square
Amplitude[1]	Phased array 20 to 120Vpp (1V step) in open circuit; 16 t0 100Vpp in 50Ω load
Width	30 ns to 1250 ns (2.5ns increments)
Maximum repetition frequency	Up to 40KHz
Output impedance	≤ 15Ω
Fall time	≤ 10 ns

Conventional UT	
Shape	Negative square
Amplitude[2]	Phased array 12 to 200V (1V step)
Width	30 n s to 1250 ns (2.5ns increments)
Maximum repetition frequency	Up to 40KHz

[1] As per EN ISO 18563-1 for phased array channels.

[2] As per EN ISO 22232-1 for conventional UT channels.

Output impedance	≤ 5Ω
Fall time	≤ 5 ns

Receiver – Conventional UT

Full-scale input voltage	3Vpp with attenuator 1.0Vpp without attenuator
Input impedance	50Ω ± 10%
Gain setting range	59dB analog, 120dB with digital gain (0.1dB step setting)
Overall bandwidth	0.25 to 22MHz
UT channel filtering	User adjustable
Filter	IIR, FIR
Referred input noise	≤ 20nV/Hz^{½}
Crosstalk between channels	≥ 100 dB at 5MHz
Rectification	Digital

Receiver – Phased array

Full-scale input voltage	2Vpp
Input impedance	50Ω ± 10% (≥50Ω for Chinese market)
Gain setting range	52dB analog, 120dB with digital gain (0.1dB step setting)
Overall bandwidth	0.4 to 20MHz
PA channel filtering	User adjustable
Filter	IIR, FIR
Referred input noise	≤ 20nV/Hz^{½}
Crosstalk between channels	≥ 50 dB at 5MHz
Rectification	Digital
Maximum number of active channels	Up to 64
Total number of channels	128

Transmit delay	0 to 16000 ns (2.5ns steps)
Receiver delay	0 to 16000 ns (2.5ns steps)
Dynamic range	≥ 70dB

TCG

Range	Analog 40dB[a] Digital 120dB
Speed	Analog up to 20 dB/µs[a] Digital up to 40dB/10ns
Resolution	0.1dB
Trigger	Pulser, echo
Number of points	32

[a] function not available.

Data type

A-Scan	RF, rectified
Gates	Number of gates per A-Scan processing: 5 • 1 Synchronization • 4 first echo, max echo, threshold crossing. • Measurements in Synchronisation gate the same than measurements in other 5 additional gates. • First gate can synchronize other gates. NB: Nth gate can synchronize Nth+1 gate. • Predictive Synchro capability. • Improved First Echo criterion capability. • NEW (SIR/BC) • Included: A-scan linearization (Front wall echo synchronization)
Encoder	3x 32-bit

	Maximum frequency: 3MHz
Display refresh rate	Up to 30Hz

TFM

TFM maximum aperture	1017 x 1017 points
Sound paths	Direct (L or S), indirect and converted modes
Maximum data transfer	Up to 100 MB/s (on Ethernet)

4 Network Standard and Specification

Table 3- Network Standard and Specification

Wireless Characteristics	Specification
Network standard	IEEE 802.11a, b, d, e, g, h, i, k, n, r, u, v, w, ac, ax; Fine Timing Measurement Based on 802.11-216, 802.11az HW readiness
Bluetooth	Bluetooth R5.3
Transmission frequency range	2.4 – 6.425 GHz
Frequency bands and maximum RF power	2.400 to 2.483GHz – 13.2 dBm (20.9 mW) EIRP for Bluetooth 2.400 to 2.483 GHz – 9.9 dBm (9.8 mW) EIRP for Bluetooth Low Energy 2.412 to 2.472 GHz – 20.0 dB, (100 mW) EIRP for WiFi 5.150 to 5.350 GHz – 22.9 dBm (195 mW) EIRP for WiFi 5.470 to 5.725 GHz – 22.9 dBm (195 mW) EIRP for WiFi 5.725 to 5.875 GHz – 13.95 dBm (24.8 mW) EIRP for WiFi 5.945 to 6.425 GHz – 22.8 dBm (190.5 mW) EIRP – LPI 5.945 to 6.425 GHz – 14.0 dBm (25.2 mW) EIRP - LVP
Typical maximum SAR	0.780 mW/kg at 0cm [(Limit-1.6W/kg (1g.)]
Modulation types	GFSK, π/4 DQPSK, 8DPSK, DSSS (DBPSK, DQPSK, CCK), OFDM/OFDMA (BPSK, QPSK, 16QAM, 256QAM, 1024QAM)

Chapter 6

Connector References

1 Connector References

You will find the relevant connector information in the following pages.

1.1 DUAL IPEX Connector

The Cypher instrument has two IPEX connectors for phased array probes. The first one provides access to the full 128 channels while the second allows access to the upper 64 channels. This second connector acts as an onboard splitter and allows a second probe to connect.

Description	160-pin, Minidock connector
Manufacturer, number	IPEX 30046-160T-03F
Suggested cable connector	IPEX 30030, 30047 or 30056

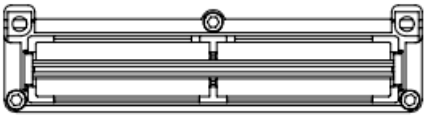


Figure 19 – IPEX connector

Table 4 – IPEX connector pinouts

Pin	PAUT 1-128 signal	PAUT 65-128 signal	Pin	PAUT 1-128 signal	PAUT 65-128 signal	Pin	PAUT 1-128 signal	PAUT 65-128 signal	Pin	PAUT 1-128 signal	PAUT 65-128 signal
1	NC	NC	41	GND	GND	81	GND	GND	121	ER116	ER116
2	NC	NC	42	GND	GND	82	GND	GND	122	ER100	ER100
3	ER128	ER128	43	ER124	Er124	83	ER120	ER120	123	ER84	ER84
4	ER112	ER112	44	ER108	ER108	84	ER104	ER104	124	ER68	ER68
5	ER96	ER96	45	ER92	ER92	85	ER88	ER88	125	ER52	NC
6	ER80	ER80	46	ER76	ER76	86	ER72	ER72	126	ER36	NC
7	ER64	NC	47	ER60	NC	87	ER56	NC	127	ER20	NC
8	ER48	NC	48	ER44	NC	88	ER40	NC	128	ER4	NC
9	ER32	NC	49	ER28	NC	89	ER24	NC	129	GND	GND
10	ER16	NC	50	ER12	NC	90	ER8	NC	130	GND	GND
11	1W-1	1W-2	51	GND	GND	91	ER119	ER119	131	ER115	ER115
12	GND	GND	52	GND	GND	92	ER103	ER103	132	ER99	ER99
13	ER127	Er127	53	ER123	ER123	93	ER87	ER87	133	ER83	E83
14	ER111	ER111	54	ER107	ER107	94	ER71	ER71	134	ER67	ER67
15	ER95	ER95	55	ER91	ER91	95	ER55	NC	135	ER51	NC
16	ER79	ER79	56	ER75	ER75	96	ER39	NC	136	ER35	NC
17	ER63	NC	57	ER59	NC	97	ER23	NC	137	ER19	NC
18	ER47	NC	58	ER43	NC	98	ER7	NC	138	ER3	NC
19	ER31	NC	59	ER27	NC	99	GND	GND	139	GND	GND
20	ER15	NC	60	ER11	NC	100	GND	GND	140	GND	GND

Pin	PAUT 1-128 signal	PAUT 65-128 signal	Pin	PAUT 1-128 signal	PAUT 65-128 signal	Pin	PAUT 1-128 signal	PAUT 65-128 signal	Pin	PAUT 1-128 signal	PAUT 65-128 signal
21	GND	GND	61	GND	GND	101	ER118	ER118	141	ER114	ER114
22	GND	GND	62	GND	GND	102	ER102	ER102	142	ER98	ER98
23	ER126	ER126	63	ER122	ER122	103	ER86	ER86	143	ER82	ER82
24	ER110	ER110	64	ER106	ER106	104	ER70	ER70	144	ER66	ER66
25	ER94	ER94	65	ER90	ER90	105	ER54	NC	145	ER50	NC
26	ER78	ER78	66	ER74	ER74	106	ER38	NC	146	ER34	NC
27	ER62	NC	67	ER58	NC	107	ER22	NC	147	ER18	NC
28	ER46	NC	68	ER42	NC	108	ER6	NC	148	ER2	NC
29	ER30	NC	69	ER26	NC	109	GND	GND	149	GND	GND
30	ER14	NC	70	ER10	NC	110	GND	GND	150	P_CON1	P_CON2
31	GND	GND	71	ER121	ER121	111	ER117	ER117	151	ER113	ER113
32	GND	GND	72	ER105	NC	112	ER101	ER101	152	ER97	ER97
33	ER125	ER125	73	ER89	ER89	113	ER85	ER85	153	ER81	ER81
34	ER109	ER109	74	ER73	ER73	114	ER69	ER69	154	ER65	ER65
35	ER93	ER93	75	ER57	NC	115	ER53	NC	155	ER49	NC
36	ER77	ER77	76	ER41	NC	116	ER37	NC	156	ER33	NC
37	ER61	NC	77	ER25	NC	117	ER21	NC	157	ER17	NC
38	ER45	NC	78	ER9	NC	118	ER5	NC	158	ER1	NC
39	ER29	NC	79	GND	GND	119	GND	GND	159	GND	GND
40	ER13	NC	80	GND	GND	120	GND	GND	160	GND	GND

1.2 UT Connector

The Cypher instrument is equipped with four Lemo connectors for conventional UT applications.

Description	Lemo 0019-pin, female, shell 14 connector
Manufacturer, number	Lemo VPS.00.250.CTLE31
Suggested cable connector	Lemo FFC.00.250.CTAC31 *or* Fisher S.101.A004/3.0 DG/SL/NB

Figure 20 – Lemo 00 connector

1.3 Ethernet Connector

The Ethernet connector is used to connect the Cypher to a workstation through an Ethernet link. Eddyfi supplies a high-quality Ethernet connector and cable. International Ethernet standards are used.

Description	RJ45, female connector
Manufacturer, number	Amphenol MRJ5384M1

Figure 21 – Ethernet connector

Table 5 – Ethernet connector pinouts

Pin	I/0	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 Ethernet cable must be at least category 5e shielded.

1.4 I/O Encoder Connector

The encoder connector allows the instrument to send and receive various signals such as the encoders, general inputs and general outputs.

Description	16-pin, push-pull receptable
Manufacturer, number	Lemo HMG.1K.316.CLNP
Suggested cable connector	FCG.1K.316.CLAC65Z *or* equivalent

Figure 22 – Encoders connector

Table 6 – Encoders connector pinouts

Pin	I/0	Signal	Description
1	TTL Input/output	1-Wire	1-Wire
2	Output	+5V	+5V supply at 300mA shared with robotic
3	Input	Input 1	General input 1
4	Input	Input 2	General input 2
5	Input	Input 3	General input 2
6	Input	Input 4	General input 2
7	Output	Output 1	General output 1
8	Output	Output 2	General output 2
9	Input	ENC1A	Encoder input 1A
10	Input	ENC1B	Encoder input 1B
11	Input	ENC2B	Encoder input 2B
12	Input	ENC2A	Encoder input 2A
13	Output	Output 3	General output 3
14	Input	ENC3A	Encoder input 3A
15	Input	ENC13B	Encoder input 3B
16	Output	GND	Ground (0V)

1.5 Robotic Connector

The robotic connector allows you to connect robotic inspection for automated or assisted inspection.

Description	30-pin, push-pull receptable
Manufacturer, number	Lemo HEG-3K.330.CLNP
Suggested cable connector	Lemo FGG.3K.330.CLAK12 or equivalent

Figure 23 – Robotic connector

Table 7 – Robotics connector pinouts

Pin	I/0	Signal	Description
1	Input/output	USB2_D+	USB2 line D+
2	Output	USB2_D-	USB2 line D-
3	Input	Rob_In 1	Robotic general input 1
4	Input	Rob_In 2	Robotic general input 2
5	Input	Rob_In 3	Robotic general input 3
6	Input	Rob_In 4	Robotic general input 4
7	Output	Rob_Out 1	Robotic general output 1
8	Output	Rob_Out 2	Robotic general output 3
9	Output	Rob_Out 3	Robotic general output 4
10	---	NC	No connect
11	Input	Rob_ENC3B	Robotic encoder input 3B
12	Input	Rob_ENC3A	Robotic encoder input 3A
13	Output	RoB_ENC2B	Robotic encoder input 2B
14	Input	Rob_ENC2A	Robotic encoder input 2A
15	Input	Rob_ENC1B	Robotic encoder input 1B
16	Output	ENC1A	Robotic encoder input 1A

Pin	I/0	Signal	Description
17	Ethernet	ETH_DD-	Ethernet DD-
18	Ethernet	ETH_DD+	Ethernet DD+
19	Ethernet	ETH_DC-	Ethernet DC-
20	Ethernet	ETH_DC+	Ethernet DC+
21	Ethernet	ETH_DB-	Ethernet DB-
22	Ethernet	ETH_DB1+	Ethernet DB+
23	Ethernet	ETH_DA-	Ethernet DA-
24	Ethernet	ETH_DA+	Ethernet DA+
25	Power	+5V	+5V supply at 300mA shared with encoders
26	Power	GND	Ground (0V)
27	Power	GND	Ground (0V)
28	Power	+24V	+24V at 520mA
29	Power	+24V	+24V at 520mA
30	Power	GND	Ground (0V)

1.6 HDMI Connector

The HDMI connector allows you to interface with an external video monitor.

Description	HDMI, standard receptacle
Manufacturer, number	Amphenol MHDRA111M1
Suggested cable connector	Standard HDMI cable

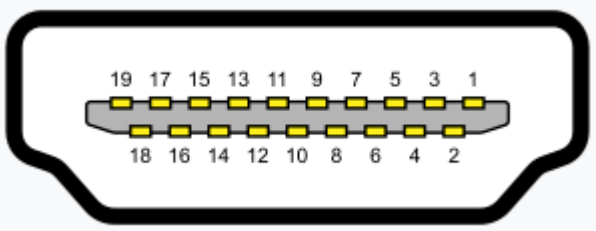


Figure 24 – HDMI connector

Table 8 – HDMI connector pinouts

Pin	I/0	Signal	Description
1	Output	TMDS2+	TMDS data 2+
2	Output	Shield	TMDS data 2 shield
3	Output	TMDS2-	TMDS data 2-
4	Output	TMDS1+	TMDS data 1+
5	Output	Shield	TMDS data 1 shield
6	Output	TMDS1-	TMDS data 1-
7	Output	TMDS0+	TMDS data 0+
8	Output	Shield	TMDS data 0 shield
9	Output	TMDS0-	TMDS data 0-
10	Output	CLK+	TMDS clock+
11	Input	Shield	TMDS clock shield
12	Input	TMDS2-	TMDS clock-
13	Input/output	CEC	Consumer electronic control
14	Input	RSV	Reserved
15	Output	SCL	Serial clock for display device
16	Input/output	SDA	Serial data for display device
17	Power	GND	Ground (0V)
18	Ethernet	ETH_DD+	Ethernet DD+
19	Ethernet	ETH_DC-	Ethernet DC-
20	Ethernet	ETH_DC+	Ethernet DC+
21	Ethernet	ETH_DB-	Ethernet DB-
22	Ethernet	ETH_DB1+	Ethernet DB+
23	Ethernet	ETH_DA-	Ethernet DA-

Pin	I/0	Signal	Description
24	Ethernet	ETH_DA+	Ethernet DA+
25	Power	+5V	+5V supply at 300mA shared with encoders
26	Power	GND	Ground (0V)
27	Power	GND	Ground (0V)
28	Power	+24V	+24V at 520mA
29	Power	+24V	+24V at 520mA
30	Power	GND	Ground (0V)

1.7 USB3 Connectors

The USB3 connectors allow you to interface with usual HMI devices such as mouse, keyboard, USB stick, etc.

Description	Dual USB3, standard receptacle
Manufacturer, number	Amphenol MUSBR-4193-M0
Suggested cable connector	Standard USB2/USB3 cables

Figure 25 – USB3 dual connector

Table 9 – USB3 connector pinouts

Pin	I/O	Signal	Description
1	Power	VBUS	+5V supply voltage at 0.9A for each dual connector
2	Input/output	USB2_D+	USB2 line D+
3	Input/output	USB2_D-	USB2 line D-
4	Power	GND	Power return (0V)
5	Output	SSTX-	Superspeed data transmit TX-
6	Output	SSTX+	Superspeed data transmit TX+
7	Power	GND	Signal return (0V)
8	Output	SSRX-	Superspeed data receive RX-
9	Output	SSRX+	Superspeed data receive RX+

1.8 DC Input Power Connector

The DC input power connector allows the Cypher instrument to power with an 15V external AC-DC adapter.

Make sure to use an approved adapter recommended for the Cypher instrument.

Description	Barrel connector 2M receptacle
Manufacturer, number	Tensility International 54-00308
Suggested AC-DC adapter (15V, 90W)	Globtek TR9CG6000LCPFER(R6B) Globtek TR9CG6000LCP-IM(R6B) Meanwell GST90A15-P1M Meanwell GSM90A15-P1M

Figure 26 – DC input connector

Table 10 – DC input connector pinouts

Pin	I/0	Signal	Description
1	Power	+15V	Inner pin (+15V)
2	Power	GND	Outer ring (0V)

Chapter 7

Maintenance and Troubleshooting

1 Preventive Maintenance

Due to its design, the Cypher only requires minimal maintenance. The instrument has no moving parts; therefore, it does not require any preventive maintenance by the user. Only a regular inspection of the instrument is recommended, to ensure that it is working properly. Eddyfi strongly recommends an annual calibration and factory-performed preventive maintenance by an officially qualified Eddyfi technician.

2 Cleaning the Instrument

The Cypher 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 turned off, that the power pack is disconnected and that the batteries are removed.
2. To bring the instrument back to its original finish, clean the casing and the front touchscreen 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.

3. To remove stubborn stains, use a cloth moistened with soft soapy solution. Do not use abrasive products or powerful solvents as they can damage the finish.
4. Wait until the instrument is completely dry before connecting the power cord and cables.

3 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 of a standard battery charge followed by a deep discharge, and a complete charge. This procedure usually takes between 10 and 13 hours, whereas the 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 Calibrating Batteries on page 78). Eddyfi recommends calibrating your batteries at least once every six months.

CAUTION

During calibration, the charger may become warm.

Chapter 8

Legal Notice

1 Limited Warranty

The limited warranty applicable to the product is contained in Eddyfi's applicable Sales & Rentals Terms and Conditions (https://www.eddyfi.com/en/salesterms) at the time of purchase (the "Ts&Cs").

For illustrative purposes only, and except as otherwise provided in the Ts&Cs at the time of publication, mechanical products, spare parts, probes, and cables are warrantied to the original customer only for use solely by customer or direct affiliate, against defects in material and workmanship for a period of 12 months from the date of delivery.

Additional coverage may be provided under any Hardware Maintenance Plan (HMP) purchased by the customer. Probes and cables are considered consumable and require periodic replacement due to wear. Eddyfi does not warrant the service life of probes, cables, and other consumables. Eddyfi does not warrant any products against damages or defects caused by wear and tear, negligence, misuse, abnormal operating conditions, alterations, or damage caused by events beyond the control of Eddyfi.

Eddyfi shall not be liable for product defects caused by or resulting from any inaccuracies in any drawing, description or specification supplied by the customer, as applicable.

Upon customer's written request during the warranty period, Eddyfi, at its discretion, will repair or replace defective products within a reasonable time. The original term of warranty applies, without extension, for repaired or replacement products. All defective products shall be sent to Eddyfi freight prepaid by customers in appropriate packaging to prevent damage in transit.

The Limited Product Warranty does not apply to periodic calibration or minor maintenance as described in this user guide or any other product manual or information.

All customer paid repairs performed by Eddyfi are warranted against defects in materials and workmanship for 90 days from the completion of repair.

Upon customer's written notice of defect within the 90day period, Eddyfi will replace the defective part(s) and/or re-perform the service. This warranty is limited to failures in areas directly related to the repair performed.

2 Disclaimer

The materials in this user guide are for informational purposes only. Eddyfi reserves the right to change, without notice, product offerings and specifications.

Except as expressly provided above, Eddyfi makes no representations or warranties with respect to this user guide or with respect to the products described herein.

Eddyfi shall not be liable for any damages, losses, costs, or expenses, direct, indirect or incidental, consequential or special, arising out of, or related to the use of this user guide or the products described herein.

3 Trademarks

Eddyfi, Cypher, Cypher OS, and their associated logos are trademarks of Eddyfi Canada, Inc. You must obtain written consent from Eddyfi before using any of these marks. Eddyfi reserves the right to change, without notice, product offerings and specifications.

Appendix A

Accessories

1 Standard Equipment and Accessories

All Cypher® instruments come with the following standard equipment and accessories:

- Two high-capacity batteries
- One power adapter (100 V– 240 V)
- One region-specific power cord
- One robust and waterproof transport case with wheels and retractable handle
- One Remote Performance Verification Plug

2 Protective Caps

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

3 Adapters and Connectors

The Cypher connectors were chosen to match the most common connectors in use today. However, you may have specific needs outside the connectors supplied with the Cypher. 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.

4 Battery Charger and Batteries

The Cypher comes with batteries but depending on your work environment and your workload, you may require additional batteries and the optional battery charger. Contact your Eddyfi representative for more information about pricing and availability.

5 Adapters

Eddyfi offers many adapter models to fit with probes having TC ZIF or Hypertronics connectors. Contact your Eddyfi representative for more information about pricing and availability.

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