



iTrixx WFMN Hour Meter User Manual

www.linortek.com



For iTrixx WFMN-DI and iTrixx WFMN-ADI

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Thank you for purchasing the iTrixx Hour Meter. The iTrixx Hour Meter is a powerful equipment monitoring device in a compact unit. iTrixx Hour Meter is configured via WiFi using a Telnet client and communicates its data via UDP and can also communicate via TCP. The Linortek iTrixx WFMN-DI has two digital inputs, and two 5V signal relay outputs. The iTrixx WFMN-ADI has 2 analog inputs in addition to the digital inputs and relay outputs. Any of these inputs or outputs can be used to trigger the hour meters using the onboard software. The iTrixx Hour Meter has two separate hour counters.

PRODUCT CHECKLIST – Each product kit box contains the following:

____ One iTrixx WFMN SERVER

____ One 12VDC Power Supply

____ 2 Wago Connectors

____ iTrixx WFMN User Manual

For instructional videos, FAQ's and contact information for our technical support team, please visit: <https://www.linortek.com/technical-support>

For full instructions on the Web Interface please see the Fargo G2 and Koda Manual available at: <https://www.linortek.com/downloads/documentations/>

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LINORTEK ONE-YEAR LIMITED WARRANTY

Consumer law: For consumers who are covered by consumer protection laws or regulations in their country of residence ("Consumer Law"), the benefits provided in this Linortek One-Year Limited Warranty ("Linortek Limited Warranty") are in addition to and not instead of the rights provided by Consumer Law and it does not exclude, limit or suspend your rights arising from Consumer Law. You should consult the proper authorities in your country of residence for further information about these rights

Linortek's warranty obligations for this hardware product ("Product") are limited to the terms set forth below:

Linor Technology, Inc. ("Linortek") warrants this product against defects in materials and workmanship for a period of **ONE (1) YEAR** from the date of retail purchase by the original end-user purchaser ("Warranty Period") when used in accordance with the operating instructions. A copy of a retail receipt is required as proof of purchase. If a hardware defect arises and a valid claim is received within the Warranty Period, at its option and to the extent permitted by law, Linortek will either (1) repair the hardware defect at no charge, using new or refurbished replacement parts, (2) exchange the product with a product that is new or which has been manufactured from new or serviceable used parts and is at least functionally equivalent to the original product, or (3) refund the purchase price of the product. When a refund is given, the product for which the refund is provided must be returned to Linortek and becomes Linortek's property.

The foregoing warranty is subject to Buyer's (i) prompt written claim and (ii) timely provision to Linortek of an opportunity to inspect and test the Product claimed to be defective. Such inspection may be on Buyer's premises and/or Linortek may request the return of the Product at Buyer's expense. However, Linortek shall not be responsible for packing, inspection, or labor costs in connection with the return of Product. No Product shall be accepted for warranty service that is not accompanied by a Return Merchandise Authorization number (RMA#) issued by Linortek.

EXCLUSIONS AND LIMITATIONS

This Limited Warranty excludes damage resulting from abuse, misuse, neglect, fire or other external causes, accident, modifications, repairs or other causes that are not defects in materials and workmanship. Software distributed by Linortek with or without the Linortek brand name including, but not limited to system software ("Software") is not covered under this Limited Warranty. Your use and rights associated with the Software are governed by the Linortek End User License Agreement which you can find here: <https://www.linortek.com/end-user-license-agreement/>. Linortek is not responsible for damage arising from failure to follow instructions relating to the product's use. To assure conformance with operating limitations, Buyer should refer to the instruction manual [provided with the product]. Batteries are not included in the Warranty.

TO THE MAXIMUM EXTENT PERMITTED, THIS LIMITED WARRANTY AND THE REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, REMEDIES, AND CONDITIONS, AND LINORTEK SPECIFICALLY DISCLAIMS ALL STATUTORY OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT. IN SO FAR AS SUCH WARRANTIES CANNOT BE DISCLAIMED, ALL SUCH WARRANTIES SHALL, TO THE EXTENT PERMITTED BY LAW, BE LIMITED IN DURATION TO THE DURATION OF THE LINORTEK LIMITED WARRANTY AND THE REMEDY SHALL BE LIMITED TO REPAIR, REPLACEMENT OR REFUND AS DETERMINED BY LINORTEK IN ITS SOLE DISCRETION. SOME STATES (COUNTRIES AND PROVINCES) DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY OR CONDITION MAY LAST, SO THE LIMITATIONS DESCRIBED ABOVE MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS THAT VARY FROM STATE TO STATE (OR BY COUNTRY OR PROVINCE). THIS LIMITED WARRANTY IS GOVERNED BY AND CONSTRUED UNDER THE LAWS OF THE UNITED STATES.

Disclaimers

1. Read Instructions – Read all the safety and operating instructions before operating the product.
2. Retain Instructions – Retain the safety and operating instructions for future reference.
3. Heed Warnings – Adhere to all warnings on the product and in the operating instructions.
4. Follow Instructions – Follow all operating and use instructions.
5. Cleaning – Unplug the product from power before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning the enclosure only.
6. Attachments – Do not use attachments unless they are specifically recommended by Linortek. Using incompatible or otherwise unsuitable attachments can be hazardous.
7. Accessories – Do not place this product on an unstable stand, tripod, bracket, or mount. The product may fall, causing serious injury to a person and serious damage to the product. Use only with a stand, tripod, bracket, or mount recommended by the manufacturer, or sold with the product. Follow the manufacturer's instructions when mounting the product, and only use mounting accessories recommended by the manufacturer. Be cautious when using an appliance and cart combination. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.
8. Ventilation – Openings in the enclosure, if any, are provided for ventilation and to ensure reliable operation of the product and to protect it from overheating. Do not block or cover these openings. Do not place this product in a built-in installation unless proper ventilation is provided or the Linortek's instructions have been adhered to.

9. Power Sources – Operate this product only from the power source type indicated in the instruction manual or on the product label. If you are not sure of the type of power supply you plan to use, consult your appliance dealer or local power company – provided that use of any power source type other than indicated in the instruction manual or marking label will void any warranty. For products intended to operate from battery power, or other sources, refer to the operating instructions [included with the product].
10. Grounding or Polarization – This product may be equipped with a polarized alternating-current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug still fails to fit it is because your outlet is incompatible with the plug. Contact your electrician to replace your outlet with one that is compatible. Do not force the plug to fit into an incompatible outlet or otherwise try to defeat the safety purpose of the plug. Alternately, this product may be equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. Do not force the plug to fit into an incompatible outlet or otherwise try to defeat the safety purpose of the plug. If your outlet is incompatible with the plug, contact your electrician to replace your outlet with one that is compatible.
11. Power-Cord Protection – Route power supply cords so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords and plugs, convenience receptacles, and the point where the cords exit from the appliance.
12. Power Lines – Do not place an outdoor system anywhere in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing an outdoor system, use extreme care to keep from touching such power lines or circuits as contact with them might be fatal.
13. Overloading – Do not overload outlets and extension cords as this can cause fire or electric shock.
14. Object and Liquid Entry – Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts which can cause fire or electric shock. Never spill liquid of any kind on the product.
15. Servicing – Do not attempt to service to this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing of the product to Linortek.
16. Damage Requiring Service – Unplug the product from the outlet and refer servicing to Linortek Customer Support under the following conditions:
 - a. When the power-supply cord or plug is damaged.
 - b. If liquid has been spilled, or objects have fallen onto the product.
 - c. If the product has been exposed to rain or water.
 - d. If the product does not operate normally by following the operating instructions [included with the product]. Adjust only those controls that are covered by the operating instructions, as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.
 - e. If the product has been dropped or the cabinet has been damaged.
 - f. If the product exhibits a distinct change in performance.
17. Replacement Parts – If replacement parts are necessary, have a Low-Voltage Electrician replace them using only part specified by the manufacturer. Unauthorized substitutions may result in fire, electric shock or other hazards. Replacement parts can be found at <https://www.linortek.com/store/>
18. Safety Check – Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.
19. Coax Grounding – If an outside cable system is connected to the product, be sure the cable system is grounded. U.S.A. models only– Section 810 of the National Electrical Code, ANSI/NFPA No.70-1981, provides information with respect to proper grounding of the mount and supporting structure, grounding of the coax to a discharge product, size of grounding conductors, location of discharge product, connection to grounding electrodes, and requirements for the grounding electrode.
20. Lightning – For added protection of this product during a lightning storm, or before leaving it unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the cable system. This will prevent damage to the product due to lightning and power-line surges.
21. Outdoor Use – This product is not waterproof and should not be allowed to get wet. Do not expose to rain or other types of liquid. Do not leave out-of-doors overnight as condensation may occur.
22. While changing batteries, fuses or handling a board level product be careful of electrostatic discharge which can damage electronic devices. It is best to use a grounded electronics service bench. If this is not available you can discharge yourself by touching a metal appliance or pipe. While changing the batteries or fuses do not touch i) any wires other than the battery wires and ii) the printed circuit board.

LIMITATION OF LIABILITY

IN NO EVENT WILL LINOR TECHNOLOGY BE LIABLE, WHETHER IN CONTRACT, TORT, OR OTHERWISE, FOR ANY INCIDENTAL, SPECIAL, INDIRECT, CONSEQUENTIAL OR PUNITIVE DAMAGES, INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR ANY LOSS OF USE, LOSS OF TIME, INCONVENIENCE, COMMERCIAL LOSS, OR LOST PROFITS, SAVINGS, OR REVENUES TO THE FULL EXTENT SUCH MAY BE DISCLAIMED BY LAW.

DISCLAIMER FOR CRITICAL APPLICATIONS

This product is not intended or authorized for life support product or for other uses for which a failure could cause personal injury or death. If you or your customers use or permit the use of this product for such unintended or unauthorized uses, you agree to fully indemnify Linor Technology and its affiliates, and the officers, employees and distributors of each, from all liability related to such use, including attorneys' fees and costs.

FURTHER NOTICE FOR LIMITATION OF USE

Unless specifically stated, our Products are NOT designed to switch line voltage (110V and above) devices. To control device that operate at line voltages a qualified electrician MUST install an intermediary device such as a relay. When choosing devices to control, it is best to select low voltage controls such as a 24VAC solenoid to water flow control. Only qualified electricians may wire a line voltage device. Additionally, local codes must be followed including but not limited to wire gauge size and suitable housing. Linortek assumes no responsibility for harm to the user or third parties for improperly using our Products. This liability remains with the user. Linortek assumes no responsibility for damage to the device due to improperly using our Products.

RELAY VOLTAGE SPECIFICATIONS

Please use caution when connecting devices to electrical circuits or other equipment. This web controller is NOT designed to connect to any voltage greater than 48V. If you want the product to control Line Voltage products and devices, refer to Diagram 1 below. Utilizing this arrangement, should allow you to virtually control anything. It is important that you use licensed electricians and comply with electrical codes that are applicable to your location. These codes exist for your safety, as well as the safety of others. Linortek assumes no responsibility for any harm or damage resulting from a failure adhere to local laws, ordinances or regulations or failure to follow specified instructions for installation and product usage.

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This End-User License Agreement ("EULA") is a legal agreement between YOU (an individual or single entity) and Linor Technology, Inc. ("Linortek" or "we" or "us") that governs your use of the software and documentation ("Software") embedded in or associated with the Fargo, Koda, Netbell, IoTMeter, and iTrixx series of products ("Linortek Products").

This EULA does not govern your use of the Linortek website or the Linortek Products (excluding the Software). Your use of the Linortek website is governed by the Linortek website terms of service and the Linortek privacy policy which can be found at: <http://www.linortek.com/terms-and-conditions> [Your purchase of Linortek Products (excluding the Software) is governed by the Linortek limited warranty, which can be found at <https://www.linortek.com/linortek-one-year-limited-warranty/>]

This EULA governs your access and use of the Software. This EULA gives you specific legal rights, and you may also have other legal rights in addition, which vary from jurisdiction to jurisdiction. The disclaimers, exclusions, and limitations of liability under this EULA will not apply to the extent prohibited or limited by applicable law. Some jurisdictions do not allow the exclusion of implied warranties or the exclusion or limitation of incidental or consequential damages or other rights, so those provisions of this EULA may not apply to you.

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- (b) license, assign, distribute, transmit, sell, rent, host, outsource, disclose or otherwise use the Software for any commercial purpose or make Software available to any third party;
- (c) allow any third party to use the Software on behalf of or for the benefit of any third party;

- (d) use any portion of the Software on any device or computer other than the Linortek Product that you own or control;
- (e) use the Software in any way that breaches any applicable local, national or international law; or
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7. Limitation of Liability.

Nothing in this EULA and in particular within this “Limitation of Liability” clause shall attempt to exclude liability that cannot be excluded under applicable law.

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, IN ADDITION TO THE ABOVE WARRANTY DISCLAIMERS, IN NO EVENT WILL (A) LINORTEK BE LIABLE FOR ANY CONSEQUENTIAL, EXEMPLARY, SPECIAL, OR INCIDENTAL DAMAGES, INCLUDING ANY DAMAGES FOR LOST DATA OR LOST PROFITS, ARISING FROM OR RELATING TO THE PRODUCTS OR SOFTWARE, EVEN IF LINORTEK KNEW OR SHOULD HAVE KNOWN OF THE POSSIBILITY OF SUCH DAMAGES, AND (B) LINORTEK’S TOTAL CUMULATIVE LIABILITY ARISING FROM OR RELATED TO THE PRODUCTS AND SOFTWARE, WHETHER IN CONTRACT OR TORT OR OTHERWISE, SHALL BE LIMITED TO AN AMOUNT NEVER TO EXCEED THE AMOUNT ACTUALLY PAID BY YOU TO LINORTEK AND LINORTEK’S AUTHORISED DISTRIBUTOR OR SALES REPRESENTATIVE FOR THE PRODUCTS OR SERVICES AT ISSUE IN THE PRIOR 6 MONTHS (IF ANY). THIS LIMITATION IS CUMULATIVE AND WILL NOT BE INCREASED BY THE EXISTENCE OF MORE THAN ONE INCIDENT OR CLAIM. LINORTEK DISCLAIMS ALL LIABILITY OF ANY KIND OF LINORTEK’S LICENSORS AND SUPPLIERS.

8. Compliance with Export Laws.

You acknowledge that the Software and related technology are subject to U.S. export control laws U.S. export jurisdiction and may be subject to export or import regulations in other countries. You agree to strictly comply with all applicable international and national laws and regulations that apply to the Software, including the U.S. Export Administration Regulations as well as end-user, end-use, and destination restrictions issued by U.S. and other governments. You acknowledge that you have the responsibility to obtain authorization to export, re-export, or import the Software and related technology, as may be required. You will indemnify and hold Linortek harmless from any and all claims, losses, liabilities, damages, fines, penalties, costs and expenses (including attorney’s fees) arising from or relating to any breach by you of your obligations under this section.

9. Assignment.

You may not assign any of your rights or obligations under this EULA, and any attempt to assign will be void and without effect.

10. Notices.

Linortek may provide any notice to you related to this EULA using the email and address that you provided when you registered with Linortek.

11. Waiver

To be effective, any and all waivers by Linortek hereunder must be in writing and signed by an authorized Linortek representative. Any other failure of Linortek to enforce any term hereunder will not be deemed a waiver.

12. Severability.

Any provision of this EULA that is found to be unenforceable will be edited and interpreted to accomplish the objectives of that provision to the greatest extent possible under applicable law and all remaining provisions will remain in full force and effect.

13. Governing Law; Venue.

You agree that this EULA, and any claim, dispute, action, cause of action, issue, or request for relief arising out of or relating to this EULA, will be governed by the laws of the state of North Carolina, U.S.A., without regard to conflicts of laws principles, provided that if you reside in a country that will not apply U.S. law to disputes related to these terms, then the laws of your country will apply. You also agree that the United Nations Convention on Contracts for the International Sale of Goods shall not apply. You agree that regardless of any statute or law to the contrary, any cause of action against us arising out of or related to the Linortek website, the Software or the Linortek Products must commence within one (1) year after the cause of action accrues or such cause of action shall be permanently barred. Any action or proceeding relating to this EULA must be brought in a federal or state court located in Raleigh, North Carolina and each party irrevocably submits to the jurisdiction and venue of any such court in any such claim or dispute, except that Linortek may seek injunctive relief in any court having jurisdiction to protect its intellectual property.

Precautions and Disclaimers

SAFETY PRECAUTIONS

	CAUTION RISK OF ELECTRICAL SHOCK, DO NOT OPEN	
CAUTION: TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT OPEN COVERS. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.		

This label may appear on the bottom of the unit due to space limitations.



The lightning flash with an arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of un-insulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING
TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE UNITS NOT SPECIFICALLY DESIGNED FOR OUTDOOR USE TO RAIN OR MOISTURE.

SICHERHEITSVORKEHRUNGEN

	VORSICHT STROMSCHLAGGEFÄHR NIEHT NICHT ÖFFNEN!	
VORSICHT: UM EINEN ELEKTRISCHEN SCHLAG ZU VERMEIDEN, ABDECKUNG NICHT ENTFERNEN. WARTUNGEN ALLER ART QUALIFIZIERTEM PERSONAL ÜBERLASSEN.		

Aus Platzgründen kann diese Warnung auf der Unterseite des Gerätes angebracht sein.



Das Blitzsymbol im gleichseitigen Dreieck soll den Benutzer auf nicht isolierte "Hochspannung" im Gehäuse aufmerksam machen, die eventuell stark genug ist, um einen elektrischen Schlag zu verursachen.



Das Ausrufezeichen im gleichseitigen Dreieck soll den Benutzer auf wichtige Bedienungs- und Wartungsanleitungen in der dem Gerät beigelegten Literatur aufmerksam machen.

WARNUNG
UM FEUER ODER ELEKTRISCHE SCHLÄGE ZU VERMEIDEN, SETZEN SIE DAS GERÄT NIEMALS REGEN ODER FEUCHTIGKEIT AUS.

SECURITE

	ATTENTION RISQUE D'ÉLECTROCUTION, NE PAS OUVRIR	
DANGER: POUR ÉVITER TOUT RISQUE D'ÉLECTROCUTION, NE PAS OUVRIR LE BOÎTIER. IL N'Y A PAS DE PIÈCES REMPLAÇABLES À L'INTÉRIEUR. POUR TOUT RÉVISION, S'ADRESSER À UN TECHNICIEN SPÉCIALISÉ.		

En raison de limitation de place, cette étiquette peut être placée sur le dessous de l'appareil.



L'éclair fêché dans un triangle équilatéral, avertit l'utilisateur de la présence d'une "tension dangereuse" non isolée à l'intérieur de l'appareil et d'une valeur suffisante pour constituer un risque d'électrocution.



Le point d'exclamation contenu dans un triangle équilatéral, avertit l'utilisateur de la présence, dans la documentation qui accompagne l'appareil, de consignes d'utilisation et de maintenance importantes.

ATTENTION
POUR ÉVITER LE RISQUE D'ÉLECTROCUTION OU D'INCENDIE, NE PAS EXPOSER À LA PLUIE OU À L'HUMIDITÉ UN APPAREIL NON CONÇU POUR UNE UTILISATION EXTÉRIEURE.

PRECAUCIONES DE SEGURIDAD

	PRECAUCION PELIGRO DE DESCARGAS ELÉCTRICAS, NO ABRIR	
PRECAUCION: PARA REDUCIR EL RIESGO DE CHOQUE ELÉCTRICO, FAVOR NO ABRIR LA CUBIERTA. ESTE EQUIPO NO CONSTA DE PIEZAS O PARTES QUE REQUIEREN SERVICIO O MANTENIMIENTO. PARA REPARACIONES FAVOR REFERIRSE A UN TÉCNICO CALIFICADO.		

Debido a limitaciones de espacio, esta etiqueta puede aparecer en la parte inferior de la unidad.



El símbolo representado por un relámpago con punta de flecha dentro de un triángulo equilátero, se muestra con el objetivo de alertar al usuario que existen "voltajes peligrosos" sin aislamiento, dentro de la cubierta de la unidad. Dichos voltajes pueden ser de tal magnitud que constituyan un riesgo de choque eléctrico a personas.



El símbolo de exclamación dentro de un triángulo equilátero, se muestra con el objetivo de alertar al usuario de que instrucciones de operación y mantenimiento importantes acompañan al equipo.

PELIGRO
PARA EVITAR EL PELIGRO DE INCENDIO Ó CHOQUE ELÉCTRICO, NO EXPONGA A LA LLUVIA Ó HUMEDAD, EQUIPOS QUE NO HAN SIDO DISEÑADOS PARA USO EXTERIOR.

DISCLAIMER FOR CRITICAL APPLICATIONS

This product is not intended or authorized for life support product or for other uses for which a failure could cause personal injury or death. If you or your customers use or permit the use of this product for such unintended or unauthorized uses, you agree to fully indemnify Linor Technology and its affiliates, and the officers, employees and distributors of each, from all liability related to such use, including attorneys' fees and costs.

This product contains SOFTWARE and is provided by THE PROVIDER "as is" and "with all faults." THE PROVIDER makes no representations or warranties of any kind concerning the safety, suitability, lack of viruses, inaccuracies, typographical errors, or other harmful components of this SOFTWARE PRODUCT. There are inherent dangers in the use of any software and THE PROVIDER will not be liable for any damages you may suffer in connection with using, this SOFTWARE PRODUCT.



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IN NO EVENT WILL LINOR TECHNOLOGY BE LIABLE, WHETHER IN CONTRACT, TORT, OR OTHERWISE, FOR ANY INCIDENTAL, SPECIAL, INDIRECT, CONSEQUENTIAL OR PUNITIVE DAMAGES, INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR ANY LOSS OF USE, LOSS OF TIME, INCONVENIENCE, COMMERCIAL LOSS, OR LOST PROFITS, SAVINGS, OR REVENUES TO THE FULL EXTENT SUCH MAY BE DISCLAIMED BY LAW.

FURTHER NOTICE FOR LIMITATION OF USE

Unless specifically stated, this product is **NOT** designed to switch line voltage devices. This limitation includes all of Linortek products. To control device that operate at line voltages the user **MUST** install and intermediary device such as a relay. When choosing devices to control, it is best to select low voltage devices. When wiring a line voltage device, you **MUST** either be a qualified electrician or use the services of a qualified electrician. Additionally, local codes must be followed including but not limited to wire gauge size and suitable housing. Linortek cannot assume any responsibility for harm to the user or third parties for improperly using our Fargo product. This liability remains with the user. Linortek cannot assume any responsibility for damage to the device for improperly using our SERVER product. To prevent risk of electric shock causing injury, death, or damage to equipment; ensure power to equipment is shut off at the CIRCUIT BREAKER. If installing on a vehicle, ensure the vehicle's battery is disconnected. Installation should be performed by a qualified technician or electrician.

RELAY VOLTAGE SPECIFICATIONS

Please use caution when connecting devices. This web controller is **NOT** designed to connect to any voltage greater than 48V. If you want the unit to control Line Voltage products and devices, refer to Diagram 1 below. Utilizing this arrangement, should allow you to virtually control anything. It is important that you use licensed electricians and comply with electrical codes that are applicable to your location. These codes exist for your safety, as well as the safety of others. Linortek cannot assume any responsibility for any harm or damage caused by not following specified instructions for installation and product usage.



Proposition 65 Warning

This Product may expose you to traces of chemicals including lead which is known to the state of California to cause cancer or birth defects or other reproductive harm. For more information, visit www.p65warnings.ca.gov

Connecting iTrixx to WiFi Network

After powering on the iTrixx server, you then need to connect it to your network. To connect your server to your network, follow the steps below:

1. Push and hold the **DFLT** button until the blue LED starts flashing. Your device is now in **Provisioning Mode**. You now have 2 minutes to configure connect to your network before this mode times out.
2. Use a WiFi enabled PC or a mobile device to connect to your server's AP. This will be displayed as a WiFi network named **WiFiHM_xx:xx:xx** (The x's make up the last 6 characters of your device's MAC address. Write this down you will need it later).
3. When prompted enter the password: **wifiimpsk**
4. Once connected you may receive a message stating there is no internet connection. Disregard this message.
5. Using your web browser, navigate to <http://wifihm-config.com>
6. Enter the name of your WiFi network under **Network Name** and your WiFi password under **Pass phrase**
7. Click **Connect**. The Blue LED on your device will stop blinking and stay on. Your iTrixx server is now connected to your network.



Wiring your iTrixx Server

Before powering on your iTrixx server, you must first integrate it in to your equipment. Installing your iTrixx will involve tapping circuits on the equipment you intend to monitor.

WARNING: To prevent risk of electric shock causing injury, death, or damage to equipment; ensure power to equipment is shut off at the CIRCUIT BREAKER. If installing on a vehicle, ensure the vehicle's battery is disconnected. Installation should be performed by a qualified technician or electrician.

Digital Inputs

iTrixx servers have 2 digital inputs (5-24VDC) built in to the board for triggering notifications, emergency alerts, and for monitoring runtime. See **Board Reference Layout** page 17. A circuit that switches on and off with your equipment can be wired to this digital input to detect whether or not your machine is running. Please note, when connecting a 12VDC-24VDC circuit to the input, an external resistor (provided upon request, 2.2k ohm 0.5watt) must be used.

There are two modes of operation for the digital inputs: **ISOLATED** and **PULL UP**.

- a) **ISOLATED** mode allows you to directly drive the iTrixx's opto-isolator with an external voltage through an internal 1K resistor. This voltage may be in the range of 5VDC to 24VDC supplying a minimum of 2mA or a maximum of 30mA to the opto-isolator diode. There is no other internal connection to this voltage so it is an isolated input. The DIN in this mode will default to an **OFF** state. To set this mode, move the DIN switch to the right (Towards center of board).
- b) **PULL-UP** mode connects a 1K resistor to an internal voltage allowing you to use a simple switch (such as a magnetic door switch) across terminals 1 and 2. When the switch is activated a signal is sent to the input. These modes are selected by the switch on the server (see the board layout for reference). The DIN in this mode will default to an **ON** state. To set this mode, move the DIN switch to the Left (Towards edge of board).

To wire your equipment to the iTrixx's digital input, identify a circuit of 5 – 24VDC that switches on and off with your equipment. Wire this to DIN 1 or DIN 2 on your iTrixx. **Note:** If using a circuit above 12VDC you must include a 2.2k ohm resistor between the tapped circuit and the iTrixx. The iTrixx will only detect a voltage on this circuit and will not draw any power or interfere with this circuit. **Do not exceed 24VDC on your digital input.** Once wired, see the section **Setting Triggers** on page 12 to trigger the hour counter or set up notifications.

Once you are finished wiring the IoTmeter to your equipment, you may then power on your equipment or reconnect the vehicle's battery and configure your device.

Analog Inputs

iTrixx servers have 2 analog inputs (5v 4-20mA) built in to the board to monitor sensors such as a tank level sensor or pressure sensor. This information can be set to trigger a notification. There are 3 wires for each analog input, see **Board Reference Layout** page 17.

Relay Outputs

Your iTrixx server has two 5VDC relay outputs. These relays are limited to a 5V signal and are not prewired to the outside of the enclosure. There are 3 positions on the terminal - NO (Normally Open), C (Common), and NC (Normally Closed). Additionally, there is a switch for each relay on the board. For a dry contact relay, push the switch to the right, to drive a 5VDC signal, push the switch to the left. (See **Board Layout Reference** page 17)

Powering iTrixx

Your iTrixx server is supplied with a 12VDC power supply. You may power your iTrixx server using this power supply or by tapping a 12 – 48 VDC circuit on your equipment. Once powered, your iTrixx server is ready to be connected to your network.

Connecting to your iTrixx Server

Before you can connect to your server you will need to find its IP address and you will also need a Telnet client on the device you are using to configure your iTrixx server.

Finding the IP address

The easiest way to find your server's IP address is by using the Linortek Hour Collector app. It will automatically display upon connecting to your network, or if already connected, press the **RESET** button and it will identify upon reboot. You may also find your device's IP address by signing on to your router and searching the list of connected devices. Your iTrixx hour meter will be identified on your router as **WiFiHM_XXXXXX** where the x's are the last 6 characters of the device's MAC address.

Hour Collector App

The Hour Collector app was developed for use with the Linortek IoTmeter. This is free to download at:

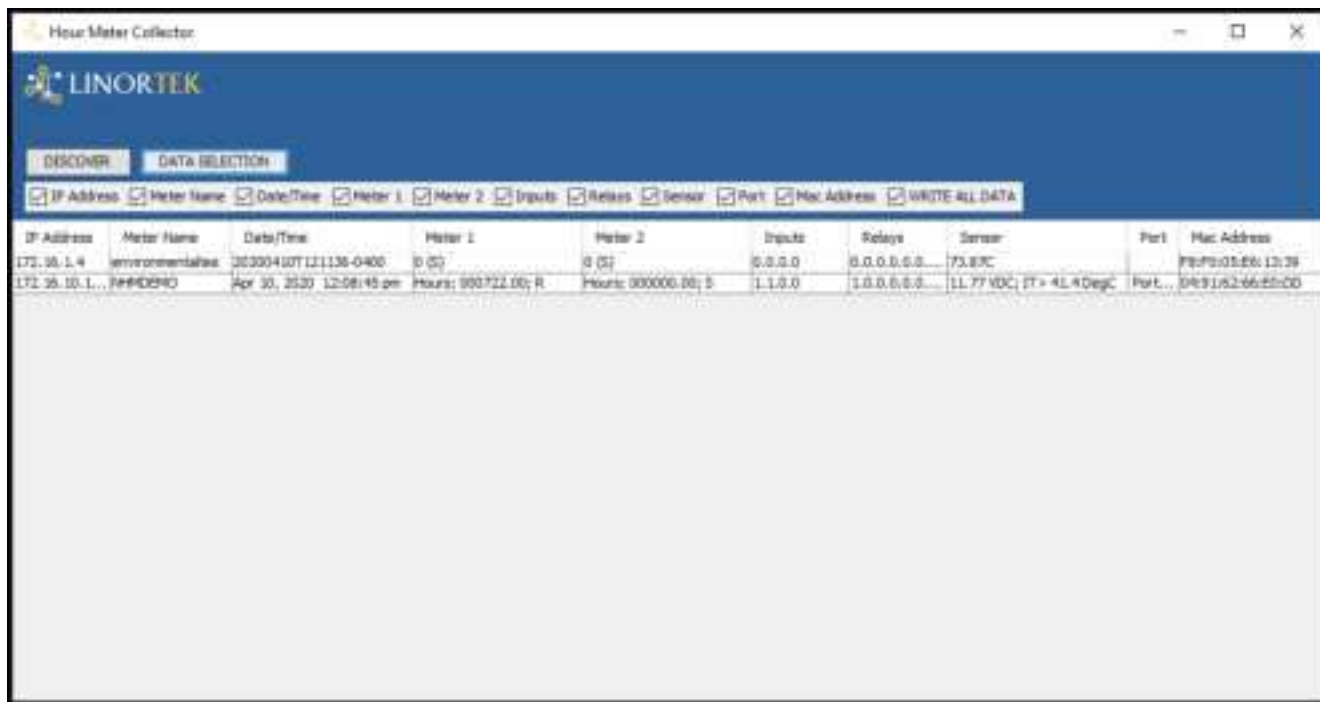
<https://www.linortek.com/downloads/support-programming/>

Before downloading, ensure your computer has Java installed. Java is available for download here: <https://www.java.com/en/>.

The Hour Collector app will automatically locate your IoTmeter and allows for quick access similar to the Discoverer app. The Hour Collector app will not immediately locate the WiFi IoTmeter if not connected via Ethernet. The WiFi IoTmeter will appear once the Hour Collector updates after receiving data from the WiFi IoTmeter. The Hour Collector app updates every two minutes.

When first opening the Hour Collector app, it will create a folder on your desktop named **CSV_FILE**. Inside is a .csv file containing a log the data collected by the hour collector app. This file can be viewed using MS Excel. In order for this log to update, the Hour Collector app must be running and the .csv file must not be open otherwise the Hour Collector cannot automatically edit the file. The Hour Collector app will display the following information:

1. IP Address
3. Meter Name
5. Date/Time
7. Meter 1 Information
9. Meter 2 Information
2. Input Information
4. Relay Information
6. Sensor Information
8. Port Number (if ported)
10. MAC Address



Clicking the DATA SELECTION button, you can check or uncheck which information you want to display on the Collector window. The "Write All Data" checkbox means it will write all the data to the .csv file, whether it is displayed or not displayed, unchecking this and then checking other data boxes will only write the selected data to the .csv file.

Telnet

You will need to use a Telnet client to configure your iTrixx server. To configure Telnet on Windows 8.1 or Windows 10, follow the steps below:

1. Open **Control Panel**
2. Select **Programs**
3. Under **Programs and Features** select **Turn Windows features on or off**
4. Scroll down and select the checkbox for **Telnet Client** and click **OK**

To connect to the iTrixx server using your PC, follow these steps:

1. Open **Command Prompt**
2. Enter **telnet nnn.nnn.nnn.nnn 30316** where **n** is your device's IP address
3. Once connected, it will prompt you for a password. By default, this password is the last 6 characters of its MAC address – without colons – which can be found printed on the enclosure. (ex: cd56ef)
4. After entering your password, all available commands will be listed in the command prompt window.

```
Command Prompt
Microsoft Windows [Version 10.0.18363.778]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\henry>telnet 192.168.1.234 30316
```

You can also download a TCP Telnet app for a mobile device to be able to send Telnet commands to the WFMN provided the mobile device is also connected to the same WiFi network (does not work on cellular network).

Configuring your iTrixx Server

To configure your server, you will need to issue commands via the Telnet terminal. This section will cover the basic configuration of your device. For a full list of commands and syntax, see the following pages.

Note: Make certain to use the **save** command after making changes otherwise your changes will be lost when your server reboots.

Naming your server

To make your iTrixx server more identifiable on your network, enter **server=<name>** replacing <name> with your desired server name.

Setting Time and Date

By default, your server is configured for GMT. To adjust the time zone, enter **timezone=x** where **x** is your time zone offset. For example: **timezone=-5** for EST. To check your server's time, you may enter the command: **time**. This will display the current time and date formatted as: `yyyymmddThhmmss` followed by the time zone offset (ISO 8601). For example: `20200422T133000-0400` for 4/22/2020 1:30pm GMT-4.

You may also set your preferred NTP server and update interval. By default, your server uses the NTP server: `time.nist.gov` and updates the time every 11 minutes. To change the NTP server, enter **ntp host=<NTP host name>** (ex: `ntp host=time.nist.gov`). To change the update frequency, use the command **ntp period=x** where **x** is the update frequency in minutes (ex: `ntp period=11`)

Enabling Email Notifications

The iTrixx server supports SSL. To enable email notifications, you will need your email provider's SMTP server name, an email address to send **from**, the password for the account to send from, and an email address to send **to**. Use the following commands to configure your email:

- **email smtp host=<SMTP server>**
 - This command will set the SMTP server for the 'send **from**' email account
 - Ex: **email smtp host=smtp.gmail.com**
 - SMTP servers include (but not limited to):
 - `smtp.gmail.com` (Gmail)
 - `smtp.mail.yahoo.com` (Yahoo Mail)
 - `smtp.mail.me.com` (iCloud)
- **email login=<email from>**
 - This command sets the username for the 'send **from**' email account
 - Ex: **email login=myemail@gmail.com**
- **email password=<password>**
 - This command sets the password to the 'send **from**' email account
 - Ex: **email password=mypassword**
- **email to=<destination address>**
 - This command sets the 'send **to**' email account
 - Ex: **email to=destination@yahoo.com**

You may set a periodic email report using the command: **email period=x** where **x** is the interval in minutes to send an email report (ex: **email period=30** for a report every 30 minutes)

Setting Triggers

After configuring your iTrixx server, you can configure triggers to activate the different features of your device. Trigger syntax consists of 3 variables: a **source** (what activates the trigger), a **value** (the required condition of the source), and the **target** (what to do). Continue reading for a description of each variable. Each variable is separated by a comma. Sources are what activates the trigger.

Sources

Relays	Digital Inputs	Analog Inputs	Hour Meter	Temperature	Time	Duration	Accelerometer
relay.1	din.1	ain.1	hm.1	tsensor	time	duration.1	shock
relay.2	din.2	ain.2	hm.2			duration.2	
	dinfreq.1					duration.3	
	dinfreq.2					duration.4	
						duration.5	
						duration.6	

Notes on sources:

- The **tsensor** source uses the thermistor on the server's circuit board. This temperature will be higher than ambient temperature. Temperature is in Celsius.
- If using the **time** source to turn on a relay, the relay must have a duration configured (see '**relays**' page 14)
- The **shock** source uses a value of 0.000 – 8.000. A value of 1 represents no movement. Higher values require increasing amounts of vibration or impact to activate the trigger.

Values

The values you may use depends on which source you are using. **Relays** and **digital inputs** may use a value of **high** (on) or **low** (off). For values for the **analog inputs**, **hour meters**, **temperature**, and **accelerometer** sources, see the table below. Analog inputs, digital frequency, temperature, and accelerometer values require 2 numbers separated with a colon. The first number is what is used to activate the trigger and the second number resets the trigger so it may activate again.

Command	Description	Examples
gt	Greater than	hm.2,gt.5 ain.1,gt.5.5:3.2
ge	Greater than or equal to	hm.1,ge.3 shock,ge.4.1:2.5
lt	Less than	hm.2,lt.4 tsensor,lt.34:40
le	Less than or equal to	hm.1,le.10 ain.2,le.4.3:5.8
in	In the range of	hm.2,in.5:10 tsensor,in.35:40
out	Out of the range of	hm.1,out.10:20 ain.1,out.1:1.3
eq*	Equal to	hm.2,eq.20
neq*	Not equal to	hm.1,neq.35
every*	Every x, where x is the desired interval	hm.2,every.50

* Can only be used for hour meter triggers

The **time** source can be set activate at a specified interval, or to activate on a specific time and date. The **time** value consists of 2 parts – a ‘repeat period’ and a ‘start date/time’. You do not need to use both parts. The ‘start date/time’ must be preceded by a colon, whether or not there is a ‘repeat period’ before it. See the following examples below.

- To activate relay 1 every 30 minutes, use the command **trigger=time,00.30,relay.1**
- To activate relay 2 every hour, use the command **trigger=time,01.00,relay.2**
- To send a report every 1.5 hours starting from 8th Apr 2020, 6:00pm, use the command **trigger=time,01.30:20200408T1800,report**
- To activate relay.1 at 4th July 2020, 12am, use the command **trigger=time,:20200704T0000,relay.1**

Targets

The target is what is activated by the trigger. The Target may be **relay.1**, **relay.2**, **hm.1**, **hm.2**, **duration.1**, **duration.2**, **duration.3**, **duration.4**, **duration.5**, **duration.6**, **resethours.1**, **resethours.2** or **report**. The **report** target force updates the Hour Collector app and sends an email notification if configured.

See below for example triggers.

- | | |
|---|--|
| • trigger=relay.2,high,hm.2 | when relay 2 state:1, start hour meter 2 |
| • trigger=din.1,high,hm.1 | when digital input 1 state:1, start hour meter 1 |
| • trigger=ain.2,lt.3.5:4.1,relay.2 | when analog input 1 less than 3.5 (resets at 4.1), turn on relay 2 |
| • trigger=hm.1,eq.100,report | when hour meter 1 reaches 100 hours, send report |
| • trigger=tsensor,ge.40:35,relay.1 | when temperature sensor is greater or equal 40C (resets at 35C), turn on relay 1 |
| • trigger=shock,gt.5:1,report | when accelerometer sensor shows 5 (resets at 1), send report |
| • trigger=din.2,high,duration.1 | when digital input 2 state: 1, turn on duration 1 |
| • trigger=duration.1,ge.60,report | when duration 1 is greater or equal 60 sec, send report |
| • trigger=duration.1,ge.120,resethours.1 | when duration 1 is greater or equal 2 minutes, reset hour meter 1 data to zero |

duration measures time from the point when source becomes active. It resets to zero when source becomes inactive.

To view existing triggers, use the command **triggersdump**. This command will list all configured triggers in a numbered list. To delete a trigger, use the command **triggerdelete=x** where **x** corresponds to the number listed from the **triggersdump** command.

MQTT Configuration

The iTrixx server can report its JSON payload with a broker via MQTT. It will publish its payload under the topic **lt1000/MACADDRESS/tele** (Ex: lt1000/AB:CD:EF:12:34:56/tele). Use the following commands to enable this function and publish to a broker:

- | | |
|---|--|
| • mqttthost=<broker address>
○ Ex: mqttthost=172.16.1.41 | • mqttpassword=<broker password>
○ Ex: mqttpassword=brokerpw |
| • mqttport=<broker port number>
○ Ex: mqttport=1883 | • mqttssl=<use/disable ssl (0 or 1)>
○ Ex: mqttssl=1 |
| • mqttuser=<client ID>
○ Ex: mqttuser=clientname | • mqttperiod=<report frequency (seconds)>
○ Ex: mqttperiod=60 |

For more information about setting up an MQTT broker, please refer to the iTrixx MQTT documentation at:
<https://www.linortek.com/downloads/documentations/>.

Available Commands

timezone

Set time-zone offset (supported values: -11 .. 11)

Example:

```
>timezone=-7
```

OK

setting time-zone offset: -7

relay

Set relays on / off.

NOTE: this command overrides relay state set by configured trigger

Syntax:

```
>relay=<relay_number>,<value>
```

- relay number - 1 or 2

- value - 0 - off, 1 - on

Example (1): turn relay1 ON

```
> relay=1,1
```

OK

relay: 1 (on: 1)

relayspulse

Configure or disable relay pulses.

Syntax:

```
>relayspulse=<relay_number>,<pulse_duration_sec>[,<off_duration_sec>,<number_of_pulses>]
```

- relay_number - 1 or 2

- pulse_duration - duration of pulse

- off_duration_sec - duration in OFF state before the next pulse

- number_of_pulses - number of pulses

Example (1): configure relay 1 for 3 pulses of 5 sec duration and 2 sec between pulses

```
> relayspulse=1,5,2,3
```

OK

```
>
```

Example (2): disable pulse mode for relay 1

```
> relayspulse=1,0
```

OK

```
>
```

status

Print system status information. See Appendix A for example

ntphost

Set NTP server host name

Example (1) (Set NTP host):

```
> ntphost=pool.ntp.org
```

OK

new NTP host set: 'pool.ntp.org'

```
>
```

Example (2) (Clear NTP host):

```
> ntphost=
```

OK

new NTP host set: ''

```
>
```

ntppperiod

Set NTP refresh period in minutes (must be 1 or more)

Example:

```
> ntppperiod=11
```

OK

```
>
```

reset_nvm_stats

Reset statistical data in EEPROM.

Example:

```
> reset_nvm_stats
```

OK

NVM stats reset

```
>
```

location

Sets device location (human readable).

Example:

```
> location=Room#1
```

OK

new location set: 'Room#1'

```
>
```

ifconfig

Sets board IP configuration.

Configuration allows to set static IP address or use DHCP client.

Current configuration is printed if entered without parameters.

Syntax:

1. Configure DHCP:

```
> ifconfig=dhcp
```

2. Configure static IP address:

```
> ifconfig=<IP
```

```
address>,<netmask>,<gateway
```

```
IP>,<DNS server IP>
```

NOTE: IP configuration is applied only after board restart ('reboot' command).

Example (1) (Static IP):

```
>ifconfig=192.168.0.202,255.255.255.0,192.168.0.1,8.8.8.8
```

OK

Static IP configuration:

IP: 192.168.0.202

netmask: 255.255.255.0

default gateway: 192.168.0.1

DNS server: 8.8.8.8

Example (2) (DHCP):

```
> ifconfig=dhcp
```

OK

```
>
```

dumpconfig

Dump current configuration in the format which is suitable for restoring configuration via TCP. See Appendix B for example

report

Prints and sends data report in JSON format. See Appendix C for example

reporthost

Sets destination host for TCP reports (runtime_config.h: tcp_server.host).

All new reports will be sent to this new host.

All reports from ongoing sending session will be sent to the old host.

This parameter is saved to NVM with 'save' command.

NOTE: both 'reporthost' and

'reportport' must be non-zero in order for reports to be sent

Example:

```
> reporthost=example.com
```

OK

```
>
```

reportport

Sets destination TCP port for reports (runtime_config.h: tcp_server.port).

All new reports will be sent to this new TCP port.

All messages from ongoing sending session will be sent to the old TCP port.

This parameter is saved to NVM with 'save' command.

NOTE: both 'reporthost' and

'reportport' must be non-zero in order for reports to be sent

Example:

```
> reportport=8456
```

OK

```
>
```

reportperiod

Sets period for TCP reports in minutes.

If set to 0 - periodic TCP reports will be disabled.

Example:

```
> reportperiod=10
```

OK
>

emailsmtphost
Sets host name of SMTP server
Example:
> emailsmtphost=example.com
OK
>

emaillogin
Sets e-mail address to send e-mails from.
This is also used as SMTP server login.
NOTE: setting empty value with 'emaillogin=' stops sending e-mail reports

Example:
>
emaillogin=myaccount@example.org
OK
>

emailpassword
Sets password which is used to authenticate on SMTP server.
NOTE: setting empty value with 'emailpassword=' stops sending e-mail reports
Example:
>
emailpassword=myaccountpassword
OK
>

emailto
Sets e-mail address to send e-mails to.
NOTE: setting empty value with 'emailto=' stops sending e-mail reports
Example:
> emailto=destination@example.org
OK
>

emailperiod
Sets period for e-mail reports in minutes.
If set to 0 - periodic e-mail reports will be disabled.
Example:
> emailperiod=10
OK
>

mqtthost
Sets MQTT broker host.
Example:

> mqtthost=mqtt.frankmueller.us
OK
new MQTT broker host set: 'mqtt.frankmueller.us'
>

mqttport
Sets MQTT broker port.
Example:
> mqtttport=7883
OK
new MQTT broker port: '7883' (0x1ecb)
>

mqttpperiod
Sets MQTT reports period in seconds.
Example:
> mqtttpperiod=60
OK
new MQTT report period: '60' (0x003c)
>

mqttssl
Enable / disable SSL for MQTT (1=enable, 0=disable).
Example:
> mqttssl=1
OK
new MQTT SSL: '1' (0x01)
>

mqttuser
Sets MQTT broker user.
Example:
> mqttuser=test
OK
new MQTT broker user name set: 'test'
>

mqttpassword
Sets MQTT broker password.
Example:
> mqttpassword=test
OK
new MQTT broker password set: 'test'
>

hourspreset
Presets hour metering data for provided channel.
Corresponding hour metering channel is reset to 0 if executed without second parameter.
Supported channels: 1, 2

Example:
> hourspreset=1,11:59:59
OK
presetting hour meter data on channel 1 to 11:59:59
> hourspreset=1
OK
presetting hour meter data on channel 1 to 0:00:00
> hourspreset=2
OK
presetting hour meter data on channel 2
>

trigger
This command configures different types of triggers and their actions. Please refer to 'trigger_configuration.txt' for detailed description.
This command also produces handy 'triggersdump' output after creating the new trigger.
You can use 'save' command to save configured trigger so it is available after reboot.
Example:
> trigger=din.1,low,relay.2
OK
set new trigger[7]: 'din.1,low,relay.2'
Triggers:
trigger[0]: din.1,high,relay.1
trigger[1]: din.2,high,report
trigger[2]: din.2,low,report
trigger[3]: din.1,high,report
trigger[4]: din.1,low,report
trigger[5]: din.1,high,hm.1
trigger[6]: din.2,low,hm.2
trigger[7]: din.1,low,relay.2
>

triggersdump
Print currently configured triggers. You can use this output to get triggers' indexes to be used in 'triggerdelete' command
INT: output of 'triggersdump' can be used in 'trigger' command to restore deleted trigger.
Example:
> triggersdump
OK
Triggers:
trigger[0]: din.1,high,relay.1
trigger[1]: din.2,high,report

```

trigger[2]: din.2,low,report
trigger[3]: din.1,high,report
trigger[4]: din.1,low,report
trigger[5]: din.1,high,hm.1
trigger[6]: din.2,low,hm.2
trigger[7]: din.1,low,relay.2
>

```

triggerdelete

Deletes previously configured trigger by index and deactivates trigger's target (see more in `trigger\_configuration.txt`). Use `triggersdump` command to list triggers and find index of trigger to delete. This command also produces handy `triggersdump` output after trigger deletion. You can use `save` command to save configuration with deleted trigger so it is not restored after reboot.

Example:

```

> triggerdelete=6
OK

```

Triggers:

```

trigger[0]: din.1,high,relay.1
trigger[1]: din.2,high,report
trigger[2]: din.2,low,report
trigger[3]: din.1,high,report
trigger[4]: din.1,low,report
trigger[5]: din.1,high,hm.1
trigger[7]: din.1,low,relay.2
>

```

aincorrect

Configure AIN corrector.

$V_{corr} = V * multiplier + offset$

If offset is not provided, it will be set to 0.00.

Syntax:

```

>
aincorrect=<channel>,<multiplier>[,<offset>]
- channel - 1 or 2

```

Example:

```

> aincorrect=1,1.05,2.00
OK
>

```

voltmoncorrect

Configure voltage monitor corrector.

$V_{corr} = V * multiplier + offset$

If offset is not provided, it will be set to 0.00.

Syntax:

```

>
voltmoncorrect=<multiplier>[,<offset>]
>
Example:
> voltmoncorrect=1.05,2.00
OK
>

```

esfid

Read SPI flash IDs

Syntax:

```

> esfid

```

Example:

```

> esfid
OK
SPI IDs:
Manufacturer ID ef
Device ID: 14
>

```

esferase

Erase SPI flash sector.

Syntax:

```

> esferase=<byte_address>

```

Example:

```

> esferase=0
OK
erased SPI @ 00000000, size: 4096
>

```

upgrade

Perform reboot if firmware image was downloaded to SPI flash and the version is greater the version of currently run one.

Example:

```

>upgrade
OK
Upgrade    available.    Rebooting..
>

```

force_upgrade

Force software upgrade to the same version or to an older one.

Example:

```

>force_upgrade
OK
Blocking    firmware    updates...
Corrupting   board      package...
OK
Upgrade     forced.     Rebooting...
>

```

dinfreqcorrect

Configure DIN frequency corrector.

$Corr = freq * multiplier + offset$.

Syntax:

```

dinfreqcorrect=<channel>,<multiplier>,<offset>. Offset by default is 0.

```

Example:

```

dinfreqcorrect=1,7.8,9.6
OK>

```

dinpulseset

Set DIN pulse counter.

Syntax:

```

dinpulseset=<channel>,<value> .

```

Value by default is 0.

Example:

```

dinpulseset=1,10
OK>
din channel: '1' (0x01)
counter: '10' (0x0000000a)
setting DIN pulse counter 1 to 10

```

dinpulsecorrect

Configure DIN pulse count corrector.

$corr = pulse_count * multiplier + offset$.

Syntax:

```

dinpulsecorrect=<channel>,<multiplier>,<offset>. Offset by default 0.

```

Example:

```

dinpulsecorrect=1,4.3,7.8
OK>
din channel: '1' (0x01)
correcting DIN 1 pulse counter:
multiplier 4.300, offset: 7.800

```

Board Reference Layout



1. Reset Button
2. DFLT Button
3. Terminal Connector
4. Terminal Connector



1. Digital Input Switches – Left for Pull-up, right for Isolated
2. Relay switches – Left +5VDC, right dry contact



1. Power LED
2. Wi-Fi connection status LED
3. Boot mode LED
4. Software running status LED

Above are bare board photos of your iTrixx Server. The terminal connectors come pre-wired for power, digital input, and analog input.

Below is the iTrixx as shipped. There are 3 cables, see below for explanation.



1. Analog Inputs
 - Green – Ain1
 - Brown – Return
 - Red – 5V
 - White – Ain2
 - Blue – Return
 - Black – 5V
2. Relay Outputs
 - Brown – Relay 1 NC
 - Green – Relay 1 C
 - Red – Relay 1 NO
 - Blue – Relay 2 NC
 - White – Relay 2 C
 - Black – Relay 2 NO
3. Digital Inputs and Power
 - Red – 12-48VDC
 - Black – Ground
 - Green – DIN 1 A
 - White – DIN 1 C
 - Brown – DIN 2 A
 - Blue – DIN 2 C

This document can be found at:

www.linortek.com/downloads/documentations/

If you need assistance with your device please visit www.linortek.com/technical-support

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Appendix A

`report`

Print report in json format

Report includes:

- board name (see `server`)
- destination IP address
- destination UDP port
- MAC address
- current time
- digital inputs status
- relays status
- analog sensors (voltage monitor, temperature sensor, AIN1, AIN2)
- detailed sensors report

Example on next page:

```

"device_id": "802d423485ab",
"device_name": "U300-HTTPS",
"mac_address": "80:2D:42:34:85:AB",
"local_time": "20230124T173835-0500",
"uptime": "45255",
"device_location": "unknown",
"g_max": "1.00G",
"g_xyz": "-0.1G,-0.2G,4.0G",
"status": {
  "ip": "172.16.10.110",
  "input_voltage": "3.12",
  "onboard_temp01": "27.54",
  "onboard_temp01_type": "c"
},
"din": [
  {
    "idx": "0",
    "value": "0",
    "freq": "0"
  },
  {
    "idx": "1",
    "value": "1",
    "freq": "0"
  }
],
"ain": [
  {
    "idx": "0",
    "value": "0.00"
  },
  {
    "idx": "1",
    "value": "0.00"
  }
],
"hour_meter": [
  {
    "idx": "0",
    "value": "4181.96",
    "status": "r"
  },
  {
    "idx": "1",
    "value": "0.00",
    "status": "s"
  }
],
"relay": [
  {
    "idx": "0",
    "state": "0",
    "mode": "normal"
  },
  {
    "idx": "1",
    "state": "0",
    "mode": "normal"
  }
]
}

```

Device ID (same as MAC address)
 Device name
 Device MAC address
 Time on device (GMT + timezone)
 System uptime
 Not used
 Accelerometer threshold
 Accelerometer value
 Device IP address
 Onboard detected voltage
 Board temperate (slightly above ambient)
 Unit of measurement (c or f)

Digital input 1
 Binary value
 Frequency (if configured)

Digital input 2

Analog input 1
 Analog value w/ corrector

Analog input 2

Hour Counter 1
 Hours + 1/100
 State (r - running, s - stopped)

Hour Counter 2

Relay 1
 State (binary value)
 Mode (normal = on/off, Pulse = timed)

Relay 2

Appendix B

Triggers configuration (v0.62.3)

This document describes how to configure triggers with ``trigger``, ``triggerclear`` and ``triggersdump`` commands.

Trigger is a configuration object which consists of `*source*`, `*condition*`, and `*target*`, where `*source*` is the source of event, `*condition*` is a condition against which `*source's*` input is tested, and `*target*` is an action which is taken when

`*condition*` becomes active (true).

For example, `*high*` signal level on a DIN `*source*` input can be configured to `*trigger*` relay state:

```
trigger=din.1,high,relay.1
```

``trigger`` command

This command allows to configure certain input events to trigger certain actions.

It accepts 3 parameters (descriptors) separated with comas:

```
trigger=<source>,<condition>,<target>
```

If command's parameter is correct, an unconfigured trigger is taken from the pool and configured appropriately.

There are 20 trigger descriptors available to be configured (buffer_sizes.h: TRIGGERS_NUMBER_MAX).

If all trigger descriptors are configured, the command will fail.

All configured triggers can be persistently saved with ``save`` command.

`*source*` descriptor

Source descriptor consists of source identifier and optional channel number which are separated with period.

Channel numbering starts from 1.

Every source can be assigned to a number of targets.

F.e. ``din.1`` can be configured to trigger relay action, hour-meter action, and report.

The following table describes `*source*` identifiers:

Identifier	Supported	Value type	Has channels	Description
<code>`din`</code>	yes	<code>*bool*</code>	yes	digital input
<code>`dinfreq`</code>	yes	<code>*float*</code>	yes	frequency on digital input
<code>`dinpulse`</code>	yes	<code>*float*</code>	yes	pulse counter on digital input
<code>`ain`</code>	yes	<code>*float*</code>	yes	analogue input
<code>`hm`</code>	yes	<code>*uint*</code>	yes	hour meter channel value in seconds
<code>`relay`</code>	yes	<code>*bool*</code>	yes	relay state
<code>`voltmon`</code>	yes	<code>*float*</code>	no	voltage monitor input
<code>`tsensor`</code>	yes	<code>*float*</code>	no	temperature sensor
<code>`time`</code>	yes	<code>*time*</code>	no	time
<code>`shock`</code>	yes	<code>*float*</code>	no	G-sensor (acceleration)
<code>`duration`</code>	yes	<code>*uint*</code>	yes	duration channel value in seconds
<code>`exthum`</code>	yes	<code>*float*</code>	no	external humidity (AS2382 sensor)
<code>`exttemp`</code>	yes	<code>*float*</code>	no	external temperature (AS2382 sensor)

Examples:

```
* `din.1`      - digital input, channel 1
* `ain.2`      - analogue input, channel 2
* `hm.1`       - hour meter, channel 1
* `tsensor`    - temperature sensor
* `shock`      - absolute acceleration in G (range 0..8 G)
* `duration.4` - duration, channel 4
```

****NOTE**:** source identifier influences value type for condition.

condition description

Conditions are tested against *source* input value and when it becomes true, *target* is activated.

When condition becomes false, *target* is deactivated.

There are different *condition* descriptors for different *source* value types.

Source value type	Condition descriptor format	Supported	Examples
bool	`<bool_active_value>`	yes	`high`, `low`
uint	`<compare_operation>.<active_threshold>[:<inactive_threshold>]`	yes	`gt.2`, `lt.3`, `eq.5`, `gt.5:3`, `lt.4:8`
float	`<compare_operation>.<active_threshold>[:<inactive_threshold>]`	yes	`gt.2.0:1.5`, `lt.3.5:3.8`
time	`<repeat_period>[:start_date_time]`	yes	01.00, 00.30:20200408T1300, :20200704T0000

bool conditions

For *bool* type sources, bool condition format must be used.

`<bool\_active\_value>` (see table above) can take 2 values: `high`, or `low`.

Example: set up a trigger, which will activate `relay.1` when `din.1` becomes `high`:

```
trigger=din.1,high,relay.1
```

Example: set up a trigger, which will activate `relay.2` when `din.1` becomes `low`:

```
trigger=din.1,low,relay.2
```

uint and *float* conditions

For *uint* and *float* type sources the following condition format must be used:

```
<compare_operation>.<active_threshold>[:<inactive_threshold>]
```

Where *compare_operation* is the operation which will be performed on *source* value. It can be one of:

- `gt` - greater than
- `ge` - greater than or equal
- `lt` - less than
- `le` - less than of equal
- `eq` - equal
- `neq` - not equal
- `in` - in range
- `out` - out of range
- `every` - true when *source* value reaches (N x *active_threshold* where N is unsigned integer).

****NOTE**:** use of `eq` and `neq` for *float* types is not allowed due to *float* type inaccuracy.

****NOTE**:** `every` condition is active for a very short period of time which is enough to trigger report sending but is not enough for relay targets. If used with relay targets, relay pulse must be configured appropriately.

Once *compare_operation* on *source* reading and *active_threshold* becomes `true`, the *target* gets activated.

Deactivation rule is built implicitly by applying operation which is *the opposite* to the provided one. Refer to the table below to get a reference on opposite compare operations.

Once *opposite compare_operation* on *source* reading and *inactive_threshold* becomes `true`, the *target* gets deactivated.

inactive_threshold, if not provided explicitly, gets assigned to the *active_threshold* value.

Providing *inactive_threshold* explicitly allows to set up a hysteresis for *source* value readings.

****NOTE**:** `eq`, `neq` and `every` operation does not allow to provide `*inactive_threshold*` and it is always implicitly set to the same value as `*active_threshold*`.

Example: configure a trigger which sends `*report*` when `*hour meter 1*` reading becomes greater than `*3600*` seconds:

```
...
trigger=hm.1,gt.3600,report
...
```

Example: configure a trigger which activates `*relay 1*` when `*AIN 1*` reading becomes greater than `*2.2*` and deactivates it when `*AIN 1*` reading becomes less than or equal to `*1.5*`:

```
...
trigger=ain.1,gt.2.2:1.5,relay.1
...
```

Example: configure a trigger which activates `*relay 1*` every 3 hours (10800 seconds) measured by hour meter:

```
...
trigger=hm.1,every.10800,relay.1
...
```

Operation	Description	Supported types	Implicit opposite operation	<code>*inactive_threshold*</code> limitations
gt	"source" reading is "greater than" <code>*active_threshold*</code>	uint*, float*	le	must be less than or equal to <code>*active_threshold*</code>
ge	"source" reading is "greater than or equal to" <code>*active_threshold*</code>	uint*, float*	lt	must be less than or equal to <code>*active_threshold*</code>
lt	"source" reading is "less than" <code>*active_threshold*</code>	uint*, float*	ge	must be greater than or equal to <code>*active_threshold*</code>
le	"source" reading is "less than or equal to" <code>*active_threshold*</code>	uint*, float*	gt	must be greater than or equal to <code>*active_threshold*</code>
eq	"source" reading is "equal to" <code>*active_threshold*</code>	uint*	neq	must be the same as <code>*active_threshold*</code>
neq	"source" reading is "not equal to" <code>*active_threshold*</code>	uint*	eq	must be the same as <code>*active_threshold*</code>
in	"source" reading is "in" <code>*active_threshold*..*inactive_threshold*</code>	uint*, float*	out	must be greater than or equal to <code>*active_threshold*</code>
out	"source" reading is "out" <code>*active_threshold*..*inactive_threshold*</code>	uint*, float*	in	must be greater than or equal to <code>*active_threshold*</code>
every	"source" reading is (N x <code>*active_threshold*</code>)	uint*, float*	none	inapplicable

`*time*` conditions

`*time*` condition consists of optional `*repeat_period*` and optional `*start_date_time*`.

`*repeat_period*` specifies trigger activation period. This is an optional part and `*time*` trigger will fire just once if `*repeat_period*` is omitted.

`*repeat_period*` has 1 minute precision and must be in the following format:

```
...
<HH>.<MM>
...
```

Where `HH` stands for hours (00-23), `MM` - minutes (00-59).

`*start_date_time*` defines absolute time at which condition will start to be applied. This is an optional part and is set to current time if omitted.

`*start_date_time*` has 1 minute precision and is assumed to be in local time zone (GMT offset is taken into account). It must be in the following format:

```
...
<YYYYmmddTHHMM>
...
```

Where `YYYY` stands for year, `mm` - for month (01-12), `dd` - day of month (from 01 to 28, or 29, or 30, or 31), `HH` - hours (00-23), `MM` - minutes (00-59)

Timezone is optional and is set to the current timezone if omitted.

NOTE: `*start_date_time*` is specified in current local time while is saved in UTC time and will not be automatically modified if you change timezone with ``timezone`` command. I.e. if you had `timiezone` configured as `'-7'` (`timezone=-7`), then configured a time-trigger `'trigger=time,:20200601T1200,relay.1'` which is supposed to fire at 12:00 current local time (05:00 UTC), and then changed the timezone to `'-2'`, the trigger will still fire a 05:00 UTC which is 03:00 new local time.

Example: make ``report`` every hour starting from now:

```
...
trigger=time,01.00,report
...
```

...

Example: make `report` every 30 minutes starting from now:

...

```
trigger=time,00.30,report
```

...

Example: make `report` every 1.5 hours starting from 8th Apr 2020, 18:00 (local time):

...

```
time,01.30:20200408T1800,report
```

...

Example: activate `relay.1` at 4th July 2020, 00:00 local time:

...

```
time,:20200704T0000,relay.1
```

...

target descriptor

Target descriptor consists of target identifier and optional channel number which are separated with period.

Channel numbering starts from 1.

It has the same format as source descriptor and differ on by available identifiers.

****NOTE****: Most targets can have just *one* source, i.e. if a target is configured to act upon certain source input, attempt to include the same target into a different trigger will fail.

The following table describes *target* identifiers:

Identifier	Supported	Has channels	Multiple sources	Description
`relay`	yes	yes	no	relay channel
`hm`	yes	yes	no	hour meter channel
`report`	yes	no	yes	send reports
`duration`	yes	yes	no	duration channel
`resethours`	yes	yes	no	reset hours meter channel

Example: set up a trigger which will send reports when `din.1` becomes `high`

...

```
trigger=din.1,high,report
```

...

Example: set up another trigger which will send reports when `din.2` becomes `low`

...

```
trigger=din.2,low,report
```

...

****`hm`**** channels

****`hm`**** stands for hour meter.

Each `hm` channel represents an accumulative meter which measures *total time* of `source` being active with 1 second accuracy.

It is not reset when `source` becomes inactive and can only be reset by a special command.

`hm` value is saved to non-volatile memory across reboot or power down and is restored upon bootup.

There are 2 `hm` channels in the device which can act either as trigger's `target` or trigger's `source`.

****`duration`**** channels

****`duration`**** measures time from the point when `source` becomes active to the point when it gets inactive with 1 second accuracy.

It is reset to zero when `source` becomes inactive and is never saved to non-volatile memory thus it is *never* restored upon bootup.

There are 6 `duration` channels in the device which can act either as trigger's `target` or trigger's `source`.

****`resethours`**** channels

****`resethours`**** Resets hour metering data for provided channel. There are 2 `resethours` channels in the device which can act only as a triggers's `target`.