



HETRONIC

**Installation and User's Manual for Radio Remote
Controls used in hazardous environments**



CONGRATULATIONS on purchasing this high quality safety radio remote control system from HETRONIC. You have selected a quality product from one of the leading manufacturers of safety radio remote control systems and therefore can be fully confident that it reflects state-of-the-art technology.

Disclaimer of Liability

Using the Radio Control is forbidden for anybody who has not read and fully understood this manual. Special attention should be given to the safety instructions within this manual.

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The technical features of the Radio Control as described in this manual may be subsequently modified without notice with the sole purpose of improving the equipment to better satisfy the user.

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1. Safety

1.1. Safety of this radio remote control

This radio remote control system is equipped with both electronic and mechanical protection devices. Radios are equipped with unique identification code that prohibits control commands from other radio remote controls.

Important advice

Safe operation of the radio remote control system is only valid:

- If the product is used under the conditions described in the installation and operation instructions, and the intended application as per the rating plate. In case of unauthorized modifications carried out by the user Hetronic cannot be held responsible for any damage caused.
- When the specifications and markings on the rating plate are adhered to.
- When the performance limits given in the datasheets and manuals are obeyed.
- Monitoring and safety devices are correctly installed.
- Services and repairs are to be carried out by Hetronic service centres.
- Only original spare parts are used.
- EU directives and regulations for installation of electrical equipment in hazardous areas are respected.

In the event of incorrect operation or misuse, there is a risk of harm to

- the health of the operator or other persons, and
- the machine and other property.

All persons working with this radio remote control system

- must be both suitably qualified and have been instructed as required by regulations.
- must strictly comply with the contents of these operating instructions.

1.2. Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a stop alert symbol, notices referring only to property damage have an alert symbol. Notices shown below are graded according to the degree of danger.



This symbol is used to warn you of the risk of fatal accidents or serious injuries. Such risks can arise whenever operating or working instructions are not strictly followed.



This symbol is used to warn you of the risk of damage to the machine or to another property if the operating or working instructions are either not followed or not followed properly. Disregarding these warnings may void your warranty.



This symbol is used for important notes relevant for the explosion protection of this radio remote control.

1.3. Sources of risk

The system is designed for wireless remote control of equipment. Since control can go beyond your range of vision and behind obstacles in the vicinity, you should always:

- Put the transmitter down only in a safe and dry location, switch the transmitter off and pull the key from the key switch (or if your transmitter does not have a key switch, remove the rechargeable battery from the battery compartment).
- Disconnect the power supply before you start any installation, maintenance or repair work.
- Avoid removing or modifying any safety devices!



When taking the spare battery into the hazardous area, it is absolutely necessary for the operator to keep it with him.

The antenna of the Ex-Transmitter can ONLY BE REMOVED/ CHANGED OUTSIDE the hazardous area.

The battery pack shall only be charged in NON-HAZARDOUS AREA and ONLY using Hetronic battery charger that carries entity parameters $U_m \leq 6V$, $I_m \leq 385mA$. The battery shall not be charged to a voltage greater than 4.8V.

The USB, JTAG, UART and ISP connections available on electronic modules inside the transmitter units equipped with it are NOT meant for end-user use or application.

1.4. Qualified Operators

(Refer to the operating instructions for the machine you intend to operate with remote control).

The operator is responsible for ensuring that when the transmitter is put aside, it cannot be used by unauthorized persons. This can be done either by pulling the key from the key switch, by removing the rechargeable battery or by storing the transmitter in a locked location.

The owner of the controlled equipment must:

- Provide the operator with these operating instructions
- Ensure that the operator has read and understood them.

The operator of the system is committed to:



Keep radio in a good and safe working condition.

Operate the systems properly.

Regularly check the radio remote control unit to ensure that the explosion protection is still guaranteed.

1.5. Safety Measures to be taken within the working area

The user should ensure that the working area in which the radio control will be used is free from any risks for the movement or other potential hazards that could jeopardize the safe operation of the controller equipment. Before every use of the radio remote control unit, the user must check that nobody is within the working area of remote controlled equipment. If a carrying aid is prescribed for your transmitter, this must be worn during use.



Either turn the key switch to the off position and pull the key, or remove the rechargeable battery or the battery compartment from the receptacle when putting the transmitter down. This will prevent undesired use or misuse of the transmitter by third parties.

1.6. Protection devices

All of Hetronic's industrial radio remote controls are fitted with a STOP button on the transmitting unit. Some other protection devices exist in the Radio Control system which automatically intervene whenever:

- The transmission range is exceeded. Under this circumstance, the radio control immediately activates the STOP circuit and interrupts any outgoing signal of the receiving unit whilst maintaining continuous and constant radio contact between the transmitter and receiver.
- There is radio interference in the working area that affects the frequency range of the Hetronic Industrial Radio Control.
- The rechargeable battery is removed.
- The rechargeable battery or non-rechargeable batteries is/are run down.

These protection devices are included for the safety of both persons and property, and **MUST NOT** be modified, removed or bypassed under any circumstances or in any way whatsoever.

Additional protection devices (depending on transmitter version)

- Guard rim, guard clip or recessed function buttons. These safety devices protect against undesired actuation of the control elements, which in turn prevents unintentional control commands from being transmitted.
- Both transmitter and batteries are intrinsically safe (protection type "i"). The transmitter has got an antistatic surface (surface resistance between $10^1 \Omega$ and $10^9 \Omega$). The non-antistatic projected surface of the batteries is $< 20 \text{ cm}^2$. The contacts of the Zone 1 and 2 EX-batteries are interchanged to those of the standard batteries, in order to avoid use of the wrong batteries.

1.7. How to react in case of Emergency



In an emergency, immediately press the red EMERGENCY STOP button on the machine or the STOP button on the transmitter. Proceed as instructed in the operating instructions for your machine.

2. Operation

It is extremely important to read the information regarding the safety features and safe operation of the radio remote control in section 1 before moving on to the operating instructions in this section. The remote control cannot be used until you have done so.

2.1. Battery Use

HETRONIC radio remote control systems are delivered with an HETRONIC EX-battery charger 10-30VDC or 90-270VAC and two rechargeable EX HETRONIC batteries. The operating time depends on the transmitter configuration as well as the handling and care of the battery during its lifetime. It is recommended to charge the batteries every 3 to 4 months when not in use to avoid permanent damage to the cells and consequently shortening the battery lifetime.

2.1.1. Replacing rechargeable batteries

Ensure that there is no dirt or grime in the rechargeable battery compartment, as this can lead to intermittent contact. The working voltage of the transmitter is constantly monitored by its electronics. Should it fall below a certain value, an intermittent buzzer will be heard for about 30 seconds before the system automatically shuts down. Low battery status is also indicated on the flashing red LED battery indicator for transmitters equipped with it. Should the battery run down, apply the following procedure:

- Bring the machine to a safe state as soon as possible.
- Switch off the transmitter by turning the key switch to “0” position.

HETRONIC rechargeable EX-batteries

- Move outside the hazardous zone.
- Place the transmitter on a clean and dry surface.
- Remove the run down rechargeable battery by pressing the edge lip or battery cover forward, then pull up and out.
- Take a charged Hetronic EX-battery and insert it in the designated pockets of the transmitter battery compartment with both contact points forward both guide rails down.
- Then press the rechargeable battery in the direction of the battery receptacle until the battery fully locks into place.



Only original Hetronic battery type BATT-EX-HET-2300 or EX-BATT2-HET must be used on explosion-proof devices within the hazardous area. Pay attention that the battery locks fully and correctly into place and fits firmly.



Use Hetronic original spare parts only! If not, there is danger of an explosion. Chemical substances that leak or parts that detach themselves can cause irreparable damage.



It is recommended to charge the batteries every 3 to 4 months when not in use to avoid permanent damage to the cells and consequently shortening the battery lifetime.

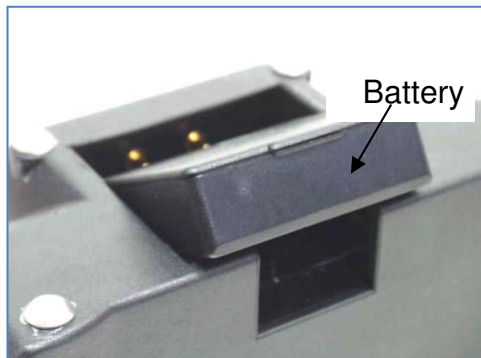
2.1.2 Charging the Hetronic EX-battery using Charger MINI UCH-2-AC-EX or MINI UCH-2-DC-EX



Make sure that the EX battery charger is meant for charging explosion proof batteries and that you are outside the hazardous area or in a room which is specially shielded and marked for charging.

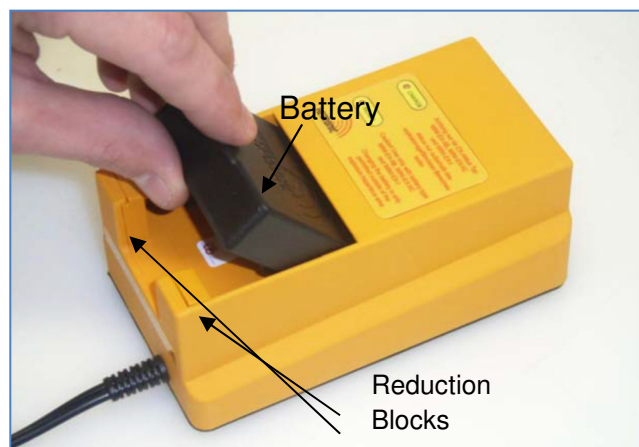
- The battery charger must have two reduction blocks as otherwise charging the batteries is not mechanically possible.
- Insert the battery in the designated pockets of the charger's battery compartment with both contact pins forward and both guide rails down. Now press the edge lip until the battery fully locks into place.
- If no LED turns ON after inserting battery on power at charger or the yellow LED is flashing continuously, the battery is bad and should be disposed safely.
- The yellow LED on the battery charger is ON as long as the battery is charging.
- The green LED turns ON when charging is finished.

It is recommended to always leave the battery in the transmitter and have the second battery on charge to have a charged battery available all the time.



Transmitter

(Fig. 2)



Battery charger

(Fig. 3)

The battery charger includes a charging processor which controls and regulates the whole charging process. The battery charger recognizes automatically when the battery is fully charged and switches to trickle charge. The battery charger delivers only as much current as is necessary to avoid a self-discharge of the battery.



The polarity of the battery charger is interchanged to be able to charge batteries type BATT-EX-HET-2300 or EX-BATT2-HET. Never try to charge batteries of any other type, as both battery charger and battery will be destroyed.



To achieve a long durability of your batteries they should only be charged when the low-battery indication of the corresponding transmitter emits either an acoustical or an optical signal, depending on transmitter type.

The battery charger MINI UCH-2-AC-EX or MINI UCH-2-DC-EX must only be operated outside hazardous areas.

2.1.3 Battery BATT-EX-HET-2300 or EX-BATT2-HET

The explosion-proof battery type **BATT-EX-HET-2300 or EX-BATT2-HET** is destined for the supply of portable, intrinsically safe devices (e.g. radio transmitters) in hazardous areas. It restricts current to < 1,1A (BATT-EX-HET-2300) or 1,6A (EX-BATT2-HET) in case of a short-circuit of the feeder clamp.

For the discharging process the battery is inserted in a corresponding battery compartment of the operating device to be supplied. The battery should never be charged within the hazardous area.

The spare battery can be taken into a hazardous area, but the operator has to keep it safe at all times.

The battery must only be charged in HETRONIC battery chargers specially marked with EX, type MINI UCH-2-AC-EX or MINI UCH-2-DC-EX and ONLY outside hazardous areas.

The battery housing consists of a black polymer based moulding material. The non-antistatic projected surface of the batteries is < 20 cm². The polarity of the EX-batteries are interchanged to those of the standard batteries, in order to avoid operation of the intrinsically safe device with wrong battery types.



Rechargeable battery packs are hazardous waste! Use a specialist disposal company for recycling or disposal! Defective battery packs can also be disposed of directly through HETRONIC!

2.2. Cable Control Function

Hetronic Radio Remote Controls can optionally be equipped with cable control interface (CC-interface) for bi-directional operation of the machine. At the same time the transmitter will be supplied by intrinsically safe power supply over the CC-Interface. This enables the use of the system in areas where strong high-frequency interferences are occurring as well as at times or locations at which the use of radio equipment is prohibited.



The transmitter unit is equipped with a CC-interface to use it along with the control cable. Only Hetronic control cables “TRX” may be attached to the connector.

The CC-interface closes and opens only intrinsically safe circuits.

2.2.1. Approved Control Cables

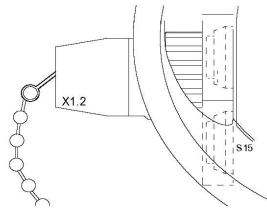
The use of the transmitter unit is only allowed with an approved control cable. The connector of control cable “TRX” must be labelled with "belongs to transmitter xxx yyy" as follows:

x x x	y y y
NOVA L (JS)	TRAC14ATEX0035X
NOVA L(PAD)	IECEXTRC14.0014X
NOVA XL	
GL	
GR	

Transmitters include CC-interface may only be used with a control cable “TRX” which length of max. 200m.

2.2.2. Wireless operation

For wireless operation connect the blind cap X1.2 to the CC-interface X1.1.



2.2.3. Plugging the Control Cable

Take hold of the control cable and identify the end connector with female contacts corresponding to the receiver. Connect this plug to the corresponding connector at the receiver unit.

Switch off the transmitter by rotating the key switch to the “0” position and unscrew the blind cap X1.2 of the connector at the transmitter.

Take the other end of the control cable with female pin contacts X1.3 and insert this into the CC-interface X1.1 at the transmitter unit and lock it in place.

You can now switch ON the transmitter unit again. The control of the machine is now done by control cable “TRX”.

Note: The transmitter automatically switches OFF the radio transmission when control cable is detected.

2.3. Control elements

Please refer to the transmitter and receiver diagram included with these operating instructions for the control element arrangement of your radio remote control system. The diagram forms an integral part of these operating instructions.

The following is a description of those control elements that are standard on HETRONIC radio remote control systems.

2.4. Operation



Before you use the system, you must carry out the safety checks described in sections 2.4.1. and 2.4.2. below. These safety checks must be carried out at least once each day before you start using the system or before each change of shift.

A diagram of your transmitter version is included with these operating instructions. The diagram forms part of the operating instructions. The arrangement of the control elements and the transmitter labelling will vary subject to customer requirements, but generally will be the same as the labelling of the previous controls. The only essential difference, in fact, is that you will now be able to exert control without the need for cable connections.

Refer also to the manufacturer's operating instructions for your machine and the diagram of your transmitter version to familiarize yourself with the arrangement of the control elements and their functions!

The section below deals with the radio remote control system's control elements and special features.



Risk to life and property!

Check the EMERGENCY STOP function each time before use as described in the manufacturer's manual.

2.4.1. Visual checks

ALWAYS check the transmitter for damage each time before use!

Are all protection devices present and intact?

Are there any broken parts?

Are all the rubber sleeves, pushbutton caps and potentiometer knobs present and damage free?

Are there any damaged or peeled labels?



Never work with a transmitter that is not complaint in any of these ways!

Ensure that transmitter unit is repaired immediately by a competent service person!

The explosion protection of this control is fully guaranteed only when the housing and all mounted control elements show no mechanical defect. At least protection class IP 54 has to be guaranteed for intrinsically safe transmitters. Hetronic Ex transmitters have a minimum ingress protection rating of IP65.

2.4.2. Safety checks and starting the radio remote control

Check the charge state of your transmitter's rechargeable battery

In the event that your transmitter is equipped with a **STOP** button, ensure that it is not activated. If the button is activated, unlock it.

Start the machine to be controlled remotely.

If your transmitter has a green START button, press it or start the transmitter by turning the key switch. The radio signal and the STOP relay remain active until the transmitter is switched off.

Press one of the function buttons of the transmitter and keep it depressed.

Check the **EMERGENCY STOP function** as described in the manufacturer's manual, however, instead of pressing the **EMERGENCY STOP button** on the machine, press the **STOP button** on the control panel of the transmitter.

Press the STOP button on the transmitter. Once you have pressed the stop button on the transmitter, it should no longer be possible to exercise control over any of the machine's functions!

Have you completed the checks and does the **STOP system** function properly?

Next release the function button and unlock the **STOP button** on the transmitter again.

After the **STOP button** has been unlocked and the transmitter restarted, the system is ready for operation again.



Push-Pull STOP button
(Fig. 4)



Push-Turn STOP button
(Fig. 5)

2.5. Fault troubleshooting

Your radio remote control system has been designed and manufactured using state-of-the art technology. Every individual device is subjected to a stringent quality control process at the manufacturer's factory before being released for delivery to the customer. Check the following points in the event of a fault.

Trouble symptom	Possible causes	Remedies
On/Off function cannot be actuated or controlled.	Self-test routine	The transmitter is ready for operation after a 3 second self-test routine.
	Rechargeable battery/non rechargeable run down	Insert charged rechargeable battery or check non-rechargeable batteries. Switch on the master switch of the machine.
No reaction to keying the transmitter.	Interruption to receiver power supply.	Check connectors. Measure the power supply of the receiver.
	Rechargeable battery or battery compartment is defective (contact corrosion). Batteries are run down.	Check to see if the same effect occurs with the second rechargeable battery or with new batteries. Check the battery compartment and rechargeable battery compartment and clean if required. Please contact your dealer.
	A non-compatible transmitter and receiver combination is being used. Addresses of transmitter and receiver do not correspond with each other.	Check the device number on the stickers of the transmitter and receiver to see if you are using two compatible devices. The device numbers correspond to the system address and therefore must be identical.
Operating time is too short.	Incorrect or run down rechargeable batteries/non-rechargeable batteries were inserted.	Check if the power supply for the charger was switched off, or if the connection is faulty or loose. Only use rechargeable batteries approved by HETRONIC.
There is interference with the transmission of the control commands to the machine.	No radio link.	Check that a yellow and red LED flash on the receiver. If not, please contact your dealer. (Within the hazardous area this is only possible after ascertaining that where is no atmosphere able to explode)
	Check to see if there is a large metal surface located between the transmitter and receiver.	A projecting aerial must be installed outside the steel cabinet, vehicle or the machine to be controlled. Try an alternative frequency setting for the transmitter and receiver. (EX-transmitters or EX-receivers must only be opened by specially authorised personnel.) Please contact your dealer.
	The range has been exceeded. Please contact your dealer.	
	The receiver is located in a steel cabinet or a vehicle, or is installed inside the machine to be controlled. The antenna is inadequate.	

	A radio remote control system with the same frequency is being used within the vicinity.	
Individual functions cannot be actuated or controlled.	Break in the control lead between the machine and the receiver.	Check that the connector plug is properly seated. Check the connecting cable to the machine. Check the wiring and carry out cable-based control checks of the individual functions if necessary.
	Output module in receiver is defective.	Check that a LED illuminates on the output modules in the receiver in response to actuating the corresponding function. (EX-receivers must only be opened by authorised and trained personnel.) Contact your dealer for details.

2.6. Frequencies and addressing

Radio remote control systems from HETRONIC include a CS419, CS429, CS434, CS447, CS458, CS480, CS869 or CS2400 RF module synthesizer.



The transmitter must never be used without an antenna, as this can destroy the RF module.

The address is preset by HETRONIC. If you should experience difficulties with the radio link in your system, please contact your dealer or closest HETRONIC's Service Centre.

3. Installation instructions

3.1. Connection information and start-up

The Hetronic radio remote control may only be connected by a qualified expert familiar with the machine to be operated (see section 4., "Maintenance").



Before starting any work switch on the cabinet or the receiver, switch off the power supply to the machine to be controlled.



HETRONIC will not accept liability or provide a guarantee in the event of personal injury, damage to property and consequential damage resulting from improper or negligent handling of this product or from handling that does not comply with the regulations and standards on which these operating instructions are based.

Identify an easily accessible place for the installation of the receiver outside the vehicle, the machine to be controlled such as a switch cabinet or any other similar equipment. A projecting antenna must be installed if the receiver is mounted inside a switch cabinet. Suitable antennas can be purchased from your closest Hetronic dealer.



If this control is equipped with a receiver for the hazardous area, also the operating manual and instructions attached to this receiver have to be considered for connection and startup.

3.2. Mounting the receiver

The receiver should be mounted on the vehicle or controlled equipment with the screwed glands or connections underneath. If your receiver is to be installed on a vehicle or on a mobile machine, four rubber dampers should be used to minimise machine vibrations from damaging the receiver electronics. Suitable dampers to match your receiver housing can be purchased from your closest Hetronic dealer. Drawings of your transmitter and receiver version are included with this manual.

3.3 Antenna location

When mounting the receiver, ensure that the antenna is positioned in such a way that it is minimally shielded by large metallic surfaces which will degrade the transmission range of the radio remote control. Antenna extension cables can be used to shift the antenna location away from the receiver. These are available at your closest Hetronic dealer. Projecting aerials can be ordered with 1.5, 3.0 and 5.0 meter extension lines.

4. Receiver constructions

4.1 Standard receiver mounted in safe area

Receiver consists of standard components without any EX-approved parts. The receiver can be only mounted in safe area. The outputs like antenna with antenna extension can only be used in safe area.

4.2 Standard receiver including EX-i antenna output

Receiver consists of standard components with EX-i circuits. The EX-i modules are installed according IEC60079-0,-11,-14. The receiver can only be mounted in safe area. The EX-i outputs like antenna with antenna extension can be used from safe area and be extended to hazardous area. For more information on the EX-zone in which receiver unit can be installed or EX-i circuits can be used refer to on EX-marking label on the receiver.

4.3 Receiver mounted in EX-d housing

Receiver consists of standard components including EX-i (intrinsically safe) parts. The receiver is protected by additional type of protection in this case “EX-d” (flameproof enclosure). The EX-i outputs like antenna with antenna extension or EX-cable control outputs of the CC-TRX module can be used in safe and hazardous area. The EX-i modules including housing are mounted in hazardous area according to IEC60079-0,-1,-7,-11,-14.

5. Maintenance

The employer is responsible for ensuring that devices for the wireless transmission of control commands are inspected by a qualified expert on a regular basis, and at the latest once annually.



A qualified expert is someone who has adequate skills and knowledge in the field of wireless radio controls based on relevant technical training or experience, and is familiar with

applicable national industrial safety regulations, safety standards, guidelines and generally approved technical practice (including EN, DIN standards, VDE standards and technical standards of other member states of the European Union or other states party to the convention on the European Economic Area), to the extent that they can assess the operating safety of the equipment.



After the initial installation, explosion-proof electrical devices have to be checked for their proper condition and on demand, but at least every 3 years, be tested by an official or officially acknowledged expert unless they are not regularly checked by a responsible engineer.



The testing statement and/or the results of the permanent survey have to be filed in written form and to be kept for at least 3 years. The notes have to be shown to the executives of the authorising agency or the controlling institution any time on request.

6. Disposal



Do not pollute the environment!

Electronic devices and their components are hazardous waste!

Rechargeable battery packs should be disposed in accordance to national recycling and waste regulations!

7. Technical data

7.1. General Information

Frequency range:	410-480MHz, 863-869.3MHz, 902-927MHz, 2,4GHz
RF synthesizer:	Microprocessor-controlled PLL synthesizer with over 32 selectable frequencies
RF output:	10 mW ERP
RF certifications:	Certified for frequency ranges subject to approval and freely assignable frequency ranges
Modulation:	FM - narrow bandwidth
Bandwidth:	12.5 kHz/25 kHz
Range:	Approx. 100 meters with Miniflex antenna Approx. 200 meters with directional antenna
Security:	20-bit (over 999,999 individual options)
Temperature range:	GL, ERGO-F: -20°C -> +60°C (-4°F -> +140°F) NOVA, GR: -20°C -> +60°C (-4°F -> +140°F) <i>(with no foot rack included)</i> NOVA, GR: -30°C -> +60°C (-22°F -> +140°F) <i>(must have foot rack included)</i>
Resistance to moisture:	0 - 97 % max. (applies only for condensation)
Response time:	Approx. 55 ms
Baud rate:	2400/4800/115200bps
Main components:	Surface mounting, modular construction
Diagnosis:	Status displays for RF communication; operating voltage displays for transmitter and receiver; under-voltage display



Note: The USB, JTAG, UART and ISP connections available on electronic modules inside the transmitter units equipped with it are not meant for end-user use or application.

7.2. Rechargeable batteries and battery charger

Type: BATT-EX-HET-2300 /EX-BATT2-HET

Type of Protection: Ex ia I Ma, Ex ia IIC T4 Gb, Ex ia IIIC 130°C Db.

Battery charger type MINI UCH-2AC-EX / MINI UCH-2DC-EX

ATEX EU Type-examination certificate according to Appendix VI of EU – guideline 2014/34/EU

NOTE: Only EX-BATT2-HET is considered under ANZEx certificate.

7.2.1. Battery

	BATT-EX-HET-2300	EX-BATT2-HET
Marking:	Ex ia I Ma Ex ia IIC T4 Gb Ex ia IIIC T130°C Db	Ex ia I Ma Ex ia IIC T4 Gb Ex ia IIIC T130°C Db
Certificates:	IECEX EPS 12.0020X EPS 12 ATEX 1450 X ANZEx 21.4175X (Only on EX-BATT2-HET)	
Nominal capacity:	2300mAh	
Output Characteristics:	$U_0 \leq 4,8V$ $I_0 \leq 1,06A$ $P_0 \leq 0,84W$	$U_0 \leq 4,8V$ $I_0 \leq 1,65A$ $P_0 \leq 1,30W$
Max inductance at terminals:	$L_0 \leq 31,6\mu H$	$L_0 \leq 13,1\mu H$
Max output capacitance:	$C_0 \leq 100\mu F$	$C_0 \leq 100\mu F$
Ambient temperature:	$T_0 = -30^{\circ}C$ to $+60^{\circ}C$ ($-22^{\circ}F \rightarrow +140^{\circ}F$)	
Housing:	Black PC/ABS	
Dimensions:	Approx. (60 x 53 x 22)mm	
Weight:	Approx. 105 g	

7.2.2. Battery charger:

Operating voltage	90-270Vac
MINI UCH-2-AC-EX:	10-30 Vdc
MINI UCH-2-DC-EX:	300mA
Charging current:	Approx. 19 Vdc
Open circuit voltage:	

7.2.3. CC-TRX module (mounted in receiver)

Table of entity parameters			
Parameter	Inputs (non I.S.): X1.3, X1.1, X2.3, X2.1, X3.3, X3.2, X4.3, X4.2, X5	Inputs (I.S.): X6.1, X6.2, X7.3, X7.4	Outputs (I.S.): X7.1, X6.4
Um	240Va.c.	-	-
Ui	-	5V	-
Ii	-	1.06A	-
Pi	-	1.3W	-
Uo	-	-	5V
Io	-	-	1.06A
Po	-	-	1.3W
Lo	-	-	31.6μH
Co	-	-	100μF

1. The Ex component (CC-TRX) shall be operated in an ambient temperature of -30°C to +60°C only.
2. The Ex component (CC-TRX) shall only be used in a non-hazardous/safe area or protected by another protection concept, e.g. Ex 'd'.
3. The Ex component (CC-TRX) shall only be powered through an IECEx approved Ex "i" intrinsically safe power source.
4. The defined electrical parameters Ui, Ii, Pi shall not be exceeded.
5. The Ex component (CC-TRX) must be assessed together as part of the overall system in which it is installed.
6. The Ex component (CC-TRX) shall only be installed in Hetronic radio remote control receivers.
7. The Ex component (CC-TRX) shall be protected by an IECEx approved enclosure with a minimum IP54 rating.
8. All marked critical components on this Ex component shall not be removed or replaced other than by manufacturer designated authorized personnel.

7.3.1 Transmitter Zone 1, Zone 21, Mining

Type:	Ergonomically-shaped housing
Housing material:	The transmitter is of plastic and has an antistatic or conductive surface (surface resistance between $10^1\Omega$ and $10^9\Omega$). The housing material depends on the used transmitter type.
Protection class:	Min. IP 65
Weight:	Between 2 and 3kg incl. Battery depending on the transmitter type.
Antenna:	External
Battery housing:	Electrically separated with gold-plated, self-cleaning contacts
Operating time:	Approx. 8 hours permanent operation depending on transmitter complexity.
Push-buttons or selector switches:	One or two-stage
Master switch/joystick:	All master switches have an automatic reset function, are moisture resistant and ergonomically designed
EX-protection:	Type of protection - intrinsically safe "i"  I M1 Ex ia I Ma  II 2GD Ex ia IIC T4 Gb Ex ia IIIC T130°C Db
Ambient Temperature:	(GL, ERGO-F): T = -20°C to +60°C (NOVA, GR): T = -20°C -> +60°C (with no foot rack included) (NOVA, GR): T = -30°C -> +60°C (must have foot rack included)

7.3.2 Transmitter NEC, CSA

Type:	Ergonomically-shaped housing The transmitter is of plastic and has an antistatic or conductive surface (surface resistance between $10^1\Omega$ and $10^9\Omega$). The housing material depends on the used transmitter type.
Protection class:	Min. IP 65
Weight:	Between 2 and 3kg incl. Battery depending on the transmitter type.
Antenna:	External
Battery housing:	Electrically separated with gold-plated, self-cleaning contacts
Operating time:	Approx. 8 Hours permanent operation depending on transmitter complexity.
Push-buttons or selector switches:	One or two-stage
Master switch/joystick:	All master switches have an automatic reset function, are moisture resistant and ergonomically designed
EX-protection:	Type of protection - intrinsically safe "i" Class I, II and III Division I & 2 Groups A-G CSA C22.2 No. 157 (Reaffirmed 2006) for Class I, II and III Division I & 2 Groups A-G
Ambient temperature:	NOVA, GL, ERGO-F): T = -20°C to + 60°C

7.3.3 Label

	Entity-Parameters of transmitter
for operation with battery	
$U_i=4,8V$ $I_i=1,64A$ $P_i=1,3W$	$C_i=57,36\mu F$ $L_i=2,601\mu H$
for operation over cable control	
$U_i=5V$ $I_i=0,2A$ $U_o=5V$ $I_o=0,2A$	$C_i=57,36\mu F$ $L_i=2,601\mu H$ $C_o=42,64\mu F$ $L_o=6,279\mu H$

Diagram of the transmitter module showing dimensions and parameters:

- Overall height: 42.0
- Overall width: 42.0
- Module title: Entity-Parameters of transmitter
- for operation with battery:
 - Ui=4,8V
 - Ci=57,36μF
 - Ii=1,64A
 - Li= 2,601μH
 - Pi=1,3W
- for operation over cable control:
 - Ui=5V
 - Ci=57,36μF
 - Pi=1W
 - Ii=0,2A
 - Li= 2,601μH
 - Uo=5V
 - Co=42,64μF
 - Po=1W
 - Io=0,2A
 - Lo=6,279μH

The diagram shows a battery label with the following sections and callouts:

- Top Section:**
 - Logo: **HETRONIC** (with a radio wave symbol)
 - Text: **Birkirkara, CBD 4070, Malta** and **www.hetronic.com**
- Identification Fields:**
 - Type:** [Redacted field]
 - 20_** [Redacted field]
 - Ser. No.:** [Redacted field]
- Ex Marking:**
 - Red **Ex** symbol in a hexagon.
 - Red **CE** mark followed by **2012**.
 - Text: **IECEX TRC 14.0014X** and **TRAC14ATEX0035X**
- Temperature:**
 - T_{amb}:** [Redacted field]
- Warning:**
 - Warning symbol (exclamation mark in a triangle).
 - Text: **Charge and load battery in non hazardous locations !**
- Bottom Section:**
 - Logo: **HETRONIC** (with a radio wave symbol)
 - Text: **Birkirkara, CBD 4070, Malta**

Callouts from the right side explain the information:

- Label manufacturer to print year:** Points to the '20_' field.
- Hetronic to print product type:** Points to the 'Type:' field.
- Hetronic to print serial number:** Points to the 'Ser. No.:' field.
- Hetronic to print Ex Marking:** Points to the 'Ex' symbol.
- Hetronic to print Ambient Temperature:** Points to the 'T_{amb}:' field.
- For extended negative temp, a note showing text (must have foot rank included) must be added:** Points to the bottom section.

7.3.3.1 Product Marking for ANZEx

Note: ANZEx certificate has only assessed equipment for Group I

	Entity-Parameters of transmitter
for operation with battery	
U _i =4,8V	C _i =60,3μF
I _i =1,65A	L _i =2,601μH
P _i =1,3W	
for operation over cable control	
U _i =5V	C _i =60,3μF P _i =1W
I _i =0,2A	L _i =Negligible
U _o =5V	C _o =42,64μF P _o =1W
I _o =0,2A	L _o =0,1mH

Entity-Parameters of transmitter	
for operation with battery	
$U_i=4,8V$	$C_i=60,3\mu F$
$I_i=1,65A$	$L_i=2,601\mu H$
$P_i=1,3W$	
for operation over cable control	
$U_i=5V$	$C_i=60,3\mu F$ $P_i=1W$
$I_i=0,2A$	$L_i=Negligible$
$U_o=5V$	$C_o=42,64\mu F$ $P_o=1W$
$I_o=0,2A$	$L_o=0,1mH$

The diagram shows a battery label with the following fields and instructions:

- Manufacturer:** Birkirkara, CBD 4070, Malta
www.hetronic.com
- Typ.:** [Blank field]
- 20** (Fixed text)
- Ser. No.:** [Blank field]
- ANZEx 21.4175X** (Fixed text)
- T amb.:** [Blank field]
- Charge and load battery in non hazardous locations !** (Fixed text with a warning icon)

Instructions for printing:

- Hetronic to print product type
- Hetronic to print serial number
- Hetronic to print Ex Marking
- Hetronic to print Ambient Temperature
- For extended negative temp., a note showing text (must have foot rack included) must be added

Front view of the ANZEx 21.4175X battery unit. The unit is a rectangular metal enclosure with a hinged door. The door features a warning symbol (exclamation mark inside a triangle) and the text "Charge and load battery in non hazardous locations !". The top of the door has a label with the model number "ANZEx 21.4175X". The top of the unit has a label with the manufacturer's name "Birkirkara, CBD 4070, Malta" and website "www.hetronic.com". The unit is shown with dimensions: a height of 42.0 and a width of 42.0.

7.4. Antenna for transmitters

Type:	Miniflex TNC 440-470
Gainflex TNC 440-470	
Dual Band TNC 420-480, 850-950	
Marking:	Marking „440 – 470“
Length:	ca. 61mm
Weight:	ca. 22g
Plug :	TNC
Impedance:	50Ω
Material:	Plastic covered coil
Plug :	Brass black chromed
Mount:	Brass

7.5. Standard options

Proportional or digital feedback signals with or without LCD display, Push to operate master switch, interlocking of individual functions, push to operate joysticks, transmitter for multiple receivers, tandem operation, spare transmitter.

7.6. Receiver in safe area with EX-antenna output

Housing material:	Fiberglass-based polycarbonate (PC)
Other materials available upon request	
Connection:	Via moisture resistant connecting plug
Protection class:	IP 65
Operating voltage:	9 - 30 VDC, 48/110/220 VAC
Weight:	< 7.2 kg
Power consumption:	< 35W own consumption
Antenna:	mostly external, with moisture resistant connection



EX-Marking:

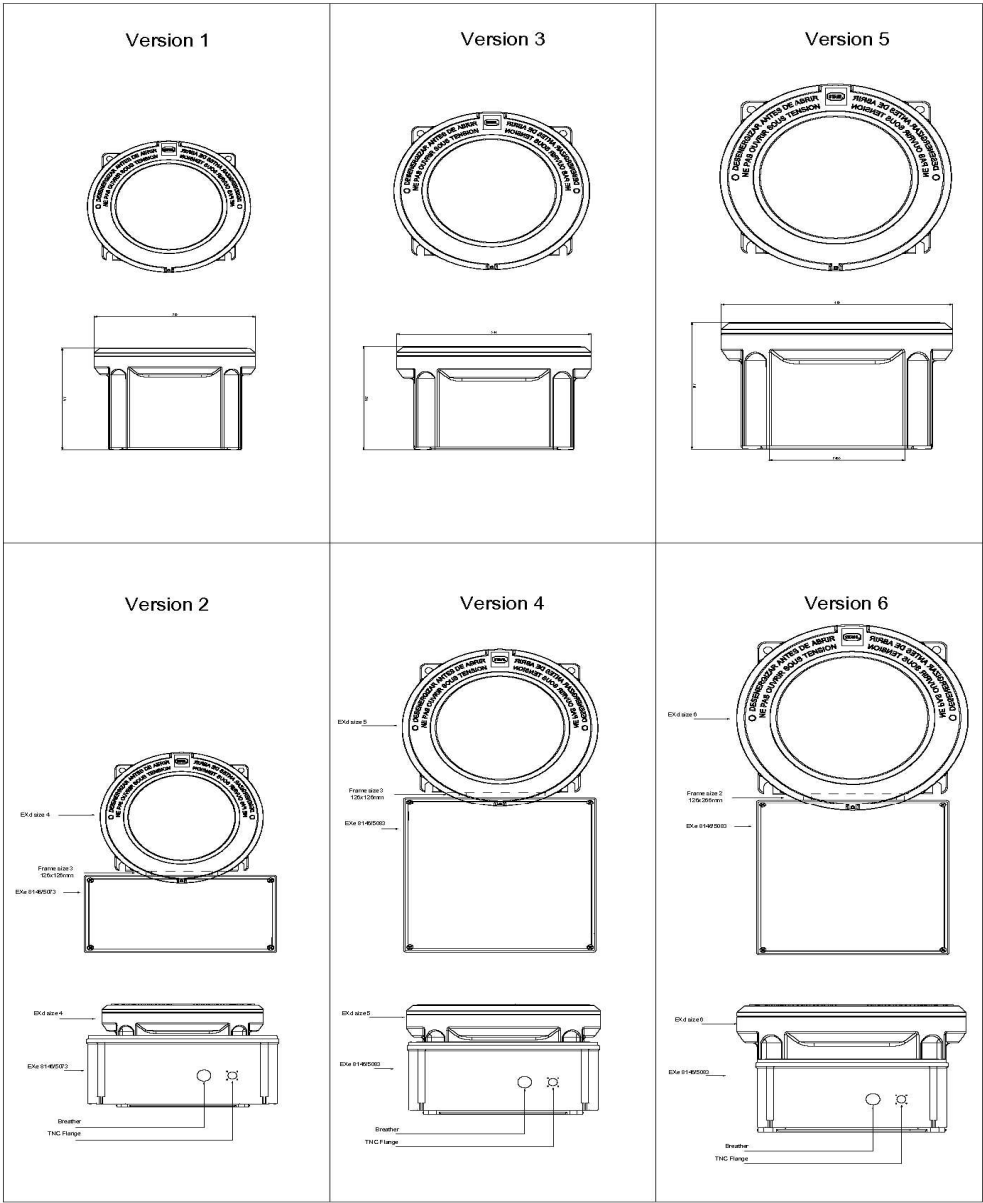
**I (M2) [Ex ia] I Mb
II (2)G [Ex ia] IIC Gb
II (2)D [Ex ia] IIC Db**

7.7. Receiver for Zone 1 and Zone 21

Receiver for EX-Zone 1 in different versions

Category:	II 2G Ex db [Ex ia Ga/ib Gb] IIC T6 Gb II 2G Ex db e [Ex ia Ga/ib Gb] IIC T6 Gb II 2D Ex tb [Ex ia Da/ib Db] IIC T125°C Db
Protection class:	IP 66
Housing material:	d-area: sheet steel or stainless steel (IIC) or light metal (IIB) e-area: Glass-fibre reinforced polyester resin
Antenna:	external with screw connection, type of protection intrinsically safe "i"
Connection:	via M-connection in e-area
Operating voltage:	9...30Vdc, 48/110/220Vac
Current consumption:	<0,8 A own consumption
Weight:	appr. 30kg depending on version
Digital outputs:	Fail-safe and self-monitoring STOP circuit. All relay outputs, 30 Vdc/8 A or 275 Vac/8 A
Proportional resolution:	8-bit (256 steps per function), built-in ramp function selectable
Proportional outputs:	PWM signal with selectable dither frequency and current range Linear output voltage Proportional functions set via transmitter with quickset properties or via potentiometer Multiple speed ranges selectable All proportional functions can be set with initial and final speeds
Serial interfaces:	RS232, RS458, CAN-bus, PROFI-bus, MOD-bus, PROFI-Net, EtherNet-IP

Overview of the Zone 1 and Zone 21 housings



7.8. Receiver for Zone 2 and Zone 22

Receiver for EX-Zone 2 in different versions

Category:

II 3(2)G Ex nR [ia IIC Gb] IIC T4 Gc

II 3(2)D Ex tc [ia IIIC Db] IIIC T125°C Dc

Protection class: IP 66

Housing material: Glass-fibre reinforced polyester

Antenna: external with screw connection, type of

Connection: protection intrinsically safe "i"
via M-connection

Operating voltage: 9...30Vdc, 48/110/220Vac

Current consumption: <0,8 A own consumption

Weight: appr. 10kg depending on version

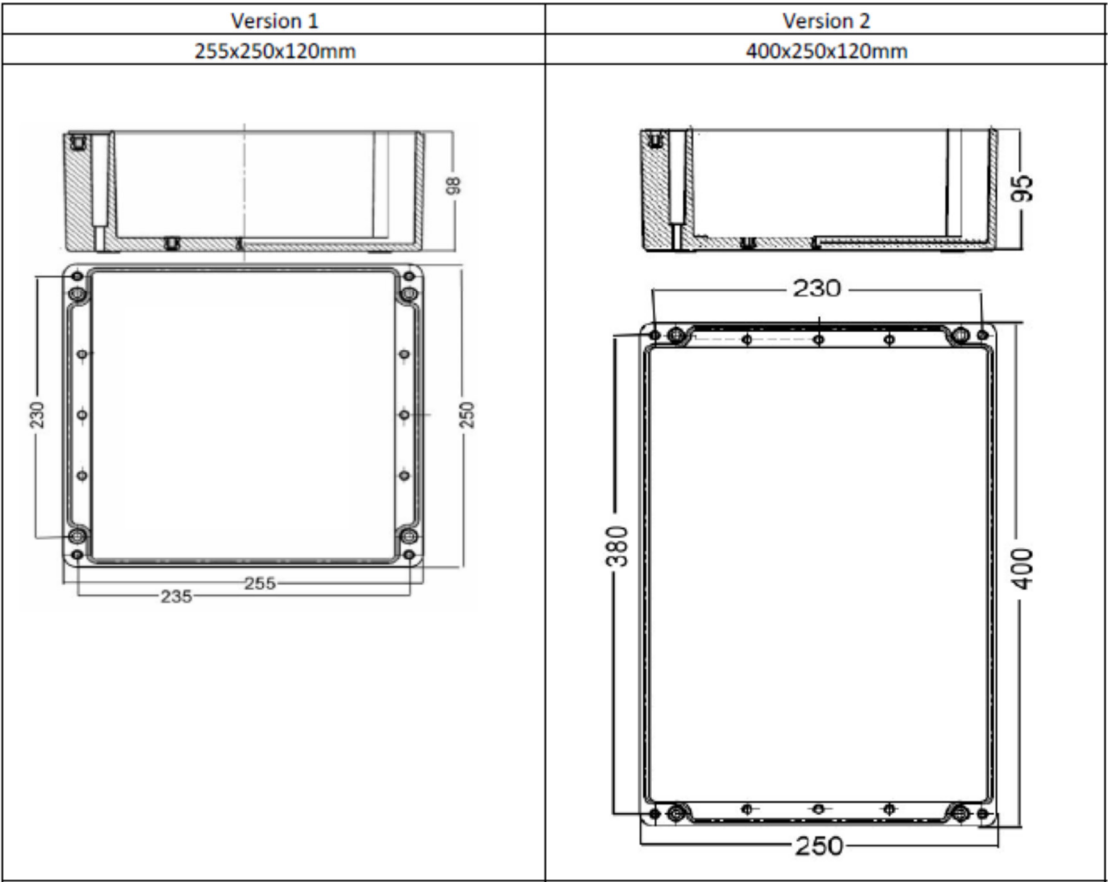
Digital outputs: Fail-safe and self-monitoring
STOP circuit. All relay outputs, 30
Vdc/8A or 275 Vac/8A

Proportional resolution: 8-bit (256 steps per function), built-in
ramp function selectable

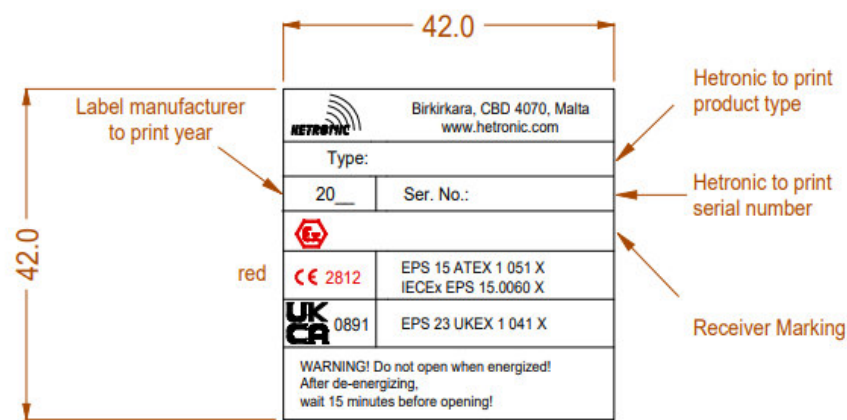
Proportional outputs: PWM signal with selectable dither
frequency and current range
Linear output voltage
Proportional functions set via transmitter
with quickset properties or via potentiometer
Multiple speed ranges selectable
All proportional functions can be set with
initial and final speeds

Serial interfaces: RS232, RS458, CAN-bus, PROFI-bus, MOD-
bus, PROFI-net

Overview of the Zone 2 and Zone 22 housings



7.9 Label



		Birkirkara, CBD 4070, Malta www.hetronic.com	
Type:			
20		Ser. No.:	
			
CE 2812		EPS 15 ATEX 1 051 X IECEX EPS 15.0060 X	
UKCA 0891		EPS 23 UKEX 1 041 X	
WARNING! Do not open when energized! After de-energizing, wait 15 minutes before opening!			

8. Appendix A

Installation and safety declaration



This form must be completed and signed by the person responsible for undertaking installation of the system.

HETRONIC will not accept liability for the correctness of the installation of the radio remote control system. As the operator, you have responsibility for ensuring that the radio remote control system and the machine have been properly commissioned with each other and tested, and that all relevant safety provisions are maintained.

Machine data

Manufacturer:
Type description:
Serial number:
Year of manufacture:

Radio remote control system

Manufacturer: HETRONIC
Type description:
System:
ID number:

I/We have carried out the installation, start-up and safety checks for the radio remote control system on the above-mentioned machine. In doing so and in this respect, the latest standards and regulations applicable to this type of machine have been maintained. All norms and regulations concerning the EX-protection have been fulfilled.

Name of the Commissioning EX-specialist:
Location/address:
Date:
Company:
Name of person responsible:

Signature:



<http://www.hetronic.com>
e-mail: info@hetronic.com